Rotary Rake

Swadro TC 880

(from serial no.: 931 242)

Order no.: 150 000 296 03 us

19.11.2015
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To this Document

2.1 Validity
These operating instructions apply to rotary rakes of the series:
Swadro TC 880

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 “rotor rake” 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 **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="image" alt="1" /></td>
<td>Reference sign for part</td>
</tr>
<tr>
<td><img src="image" alt="I" /></td>
<td>Position of a part (e.g. move from pos. I to pos. II)</td>
</tr>
<tr>
<td><img src="image" alt="X" /></td>
<td>Dimensions (e.g. B = width, H = height, L = length)</td>
</tr>
<tr>
<td><img src="image" alt="XXX Nm" /></td>
<td>Action step: Tighten screws with torque key with specified tightening torque</td>
</tr>
<tr>
<td><img src="image" alt="→" /></td>
<td>Direction of motion</td>
</tr>
<tr>
<td><img src="image" alt="←" /></td>
<td>Direction of travel</td>
</tr>
<tr>
<td><img src="image" alt="open" /></td>
<td>opened</td>
</tr>
<tr>
<td><img src="image" alt="close" /></td>
<td>closed</td>
</tr>
<tr>
<td><img src="image" alt="enlargement" /></td>
<td>enlargement of display detail</td>
</tr>
<tr>
<td><img src="image" alt="framings" /></td>
<td>Framings, dimension line, dimension line limitation, reference line for visible parts or visible mounting material</td>
</tr>
<tr>
<td><img src="image" alt="framings covered" /></td>
<td>Framings, dimension line, dimension line limitation, reference line for covered parts or covered mounting material</td>
</tr>
<tr>
<td><img src="image" alt="laying routes" /></td>
<td>Laying routes</td>
</tr>
<tr>
<td><img src="image" alt="LH" /></td>
<td>Left-hand machine side</td>
</tr>
<tr>
<td><img src="image" 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.
### Conversion table

By means of the following table, metric units can be converted into US units.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SI Units (Metric)</th>
<th>Factor</th>
<th>Inch-Pound Units</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Name</td>
<td>Abbreviation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>hectare</td>
<td>ha</td>
<td>2.47105</td>
<td>acre</td>
</tr>
<tr>
<td></td>
<td>acre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow</td>
<td>liters per minute</td>
<td>L/min</td>
<td>0.2642</td>
<td>US gallon per minute</td>
</tr>
<tr>
<td></td>
<td>cubic meter per hour</td>
<td>m³/h</td>
<td>4.4029</td>
<td></td>
</tr>
<tr>
<td>Force</td>
<td>newton</td>
<td>N</td>
<td>0.2248</td>
<td>pound-force</td>
</tr>
<tr>
<td></td>
<td>pound-force</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>millimeter</td>
<td>mm</td>
<td>0.03937</td>
<td>inch</td>
</tr>
<tr>
<td></td>
<td>meter</td>
<td>m</td>
<td>3.2808</td>
<td>foot</td>
</tr>
<tr>
<td></td>
<td>foot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>kilowatt</td>
<td>kW</td>
<td>1.3410</td>
<td>horsepower</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascal</td>
<td>kPa</td>
<td>0.1450</td>
<td>pound per square inch</td>
</tr>
<tr>
<td></td>
<td>megapascal</td>
<td>MPa</td>
<td>145.0377</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bar (non-SI)</td>
<td>bar</td>
<td>14.5038</td>
<td></td>
</tr>
<tr>
<td>Torque</td>
<td>newton meter</td>
<td>Nm</td>
<td>0.7376</td>
<td>pound-foot or foot-pound</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8.8507</td>
<td>pound-inch or inch-pound</td>
</tr>
<tr>
<td>Temperature</td>
<td>degree Celsius</td>
<td>°C</td>
<td>°C × 1.8 + 32</td>
<td>degree Fahrenheit</td>
</tr>
<tr>
<td>Velocity</td>
<td>meter per minute</td>
<td>m/min</td>
<td>3.2808</td>
<td>foot per minute</td>
</tr>
<tr>
<td></td>
<td>meter per second</td>
<td>m/s</td>
<td>3.2808</td>
<td>foot per second</td>
</tr>
<tr>
<td></td>
<td>kilometer per hour</td>
<td>km/h</td>
<td>0.6215</td>
<td>miles per hour</td>
</tr>
<tr>
<td>Volume</td>
<td>liter</td>
<td>L</td>
<td>0.2642</td>
<td>US gallon</td>
</tr>
<tr>
<td></td>
<td>milliliter</td>
<td>ml</td>
<td>0.0338</td>
<td>US ounce</td>
</tr>
<tr>
<td></td>
<td>cubic centimeter</td>
<td>cm³</td>
<td>0.0610</td>
<td>cubic inch</td>
</tr>
<tr>
<td>Weight</td>
<td>kilogram</td>
<td>kg</td>
<td>2.2046</td>
<td>pound</td>
</tr>
</tbody>
</table>

---
3 Safety

3.1 Purpose of Use
The rotary rake is used for swathing of cut crops. It is attached on the rear in the three-point block KAT I and KAT II.

3.2 Intended use
The rotary rake is built exclusively for conventional 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.

3.3 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.

3.4 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.

3.4.1 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.
3.4.2 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.

3.4.3 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.

3.4.4 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.

3.4.5 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.
3.4.6 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.

3.4.7 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.

3.4.8 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".
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:
- 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.
• 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”.

3.4.9  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
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.
3.4.10 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.

3.4.11 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
- Close-fitting protective clothing
- Hearing protection
- Safety glasses
- 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.
3.4.12 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".

3.4.13 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.
3.4.14 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".

3.4.15 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.
3.4.16 **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.
3.4.17 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.
3.4.18 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".

3.4.19 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.
3.5 Safety routines

3.5.1 Stopping and securing the machine

**WARNING!**

*Risk of injury 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.
- Secure the tractor against rolling away.

3.5.2 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.
This page has been left blank deliberately!!
3.6  **Safety stickers on the machine**

3.6.1  **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 RH= Direction of travel right/ LH= Direction of travel left
1) Order No. 27 002 054 0 (1x)

**CAUTION**

To avoid serious injury or death.
- Read and understand operator’s manual before operating equipment.
- Lower implement, stop tractor engine and remove key before leaving operator’s platform.
- Keep all shields and guards in place.
- Keep hands, feet and clothing away from moving parts.
- Keep riders off the machine.
- Make certain everyone is clear of the machine before starting tractor engine and starting.
- Do not allow unqualified operator to run equipment.
- Do not operate equipment in transport position.
- Never lubricate, adjust, unclog or service the equipment with tractor engine is running.
- Wait for all movement to stop before opening shield or servicing machine.
- Never work underneath equipment without securely supporting.

2) Order No. 27 004 600 0 (1x)

**CAUTION**

Max. PTO speed 540 RPM.

3) Order No. 27 004 598 0 (1x)

**CAUTION**

The operating pressure of the hydraulic system must not exceed 200 bar.

4) Order No. 27 010 984 0 (2x)

**WARNING**

To avoid possible injury.
Before starting work, move the hoop guards to the protective position (fold down).

5) Order No. 27 009 598 0 (4x)

**WARNING**

Danger in the slewing range.
Keep distance while the machine is operating!
Fig. 2 RH= Direction of travel right/ LH= Direction of travel left

6) Order No. 27 003 029 0 (2x)

![Warning]

**WARNING**

To avoid possible injury.  
Do not stay in the swivel area of the outrigger arms!  
Keep your distance!

7) Order No. 27 002 057 0 (4x)

![Warning]

**WARNING**

To avoid personal injury.  
Never put your hand into the danger area as parts may be moving.

8) Order No. 27 009 069 0 (1x)

![DANGER]

**DANGER**

To avoid injury or death, do not contact electric lines.
9) Order No. 949 228 0 (3x)

**DANGER**

ROTATING DRIVELINE – CONTACT CAN CAUSE DEATH
KEEP AWAY!
DO NOT OPERATE WITHOUT-
- All driveline guards, tractor and equipment shields in place.
- Driveline securely attached at both ends.
- Driveline guards that turn freely on driveline.

10) Order No. 27 002 059 0 (1x)

**CAUTION**

- High pressure oil leaks can penetrate skin causing serious injury and gangrene. (See operators manual & consult a physician immediately).
- Do not use finger or skin to check leaks.
- Lower load, release pressure and be sure oil cool before loosening fitting.

11) Order No. 27 008 285 0 (2x)

**WARNING**

Thrown objects can cause possible injury.
Keep distance while the machine is operating!

12) Order No. 27 004 017 0 (1x)

*) for hydraulic single-rotor lifting mechanism only

**WARNING**

Hydraulic accumulators store energy.
To AVOID explosion, depressurize the system on the fluid side before repairing.
Failure to comply could result in death or serious injury.
3.6.2 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”).

3.6.3 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.

3.6.4 Contact for KRONE NORTHAMERICA

4985 Outland Center Drive 102
Phone: + (001) 901 842-6011
Fax: + (001) 901 842-6016
Internet: [www.krone-northamerica.com](http://www.krone-northamerica.com)
Email: lcourts@krone-na.com
4 Machine Description

4.1 Machine overview

Fig. 3

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hoop guard</td>
<td>2</td>
<td>Tine arm with tines</td>
</tr>
<tr>
<td>4</td>
<td>Warning panel</td>
<td>5</td>
<td>Chassis</td>
</tr>
<tr>
<td>7</td>
<td>Steering rod</td>
<td>8</td>
<td>Lighting</td>
</tr>
<tr>
<td>10</td>
<td>Rotor chassis</td>
<td>11</td>
<td>Rotor gearbox</td>
</tr>
<tr>
<td>13</td>
<td>Crank (for mechanically adjustable working height)</td>
<td>Electric motor (for electrically adjustable working height)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Indicator arrow (working width)</td>
<td>15</td>
<td>Support tine guards</td>
</tr>
<tr>
<td>17</td>
<td>Drive universal shaft</td>
<td>18</td>
<td>Parking support</td>
</tr>
<tr>
<td>20</td>
<td>Overload protection</td>
<td>21</td>
<td>Locking</td>
</tr>
</tbody>
</table>

1) Outrigger arm
2) Wheel chock
3) Rotary drive universal shaft
4) Rotor
4.2 Identification Plate

Fig. 4
The machine data can be found on type plate (1).

4.3 Information Required for Questions and Orders

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

4.3.1 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.ldm@krone.de
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!

![Overload protection](SW000018_1)

Fig. 5
1) Overload protection

The star ratchet couplings of the overload protection systems can also engage if the speed is low or when approaching the rotors. A vibrating noise results. The torque is then transferred by pulsation. The brief engaging of the star ratchet couplings does not affect the function of the machine. To prevent an early wear of the overload protection system, switch of the P.T.O. shaft if the vibrating noise can be heard for a longer duration.
5 Technical Data of the Machine

5.1 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.

Swadro TC 880

Road travel is only permitted with the swivelled outrigger arms in transport position. The maximum height of 4 m must not be exceeded.

Fig.6

<table>
<thead>
<tr>
<th>Dimensions in Transport Position</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>3975</td>
</tr>
<tr>
<td>Length</td>
<td>6330</td>
</tr>
<tr>
<td>Width (with 11.5/80-15.3 10 PR TL tyres)</td>
<td>2840</td>
</tr>
<tr>
<td>Width (with 15.0/55-17 10 PR TL tyres)</td>
<td>2990</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions in Working Position</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1600</td>
</tr>
<tr>
<td>Length</td>
<td>6330</td>
</tr>
<tr>
<td>Width</td>
<td>7600 - 8800</td>
</tr>
<tr>
<td>Acreage output</td>
<td>8 - 8.5 ha/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weights</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permitted gross weight</td>
<td>2500</td>
</tr>
<tr>
<td>Permissible axle load</td>
<td>1400</td>
</tr>
<tr>
<td>Permissible bearing load</td>
<td>1150</td>
</tr>
</tbody>
</table>
## Technical Data of the Machine

### Minimum Requirements for the Tractor

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power requirement</td>
<td>40/55 kW/HP</td>
</tr>
<tr>
<td>PTO speed</td>
<td>max. 540 rpm</td>
</tr>
<tr>
<td>Lighting voltage</td>
<td>12 volt – 7-pin plug</td>
</tr>
<tr>
<td>Max. operating pressure of hydraulic system</td>
<td>200 bar</td>
</tr>
<tr>
<td>Hydraulic connections</td>
<td>1x 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 definable and side definable</td>
</tr>
</tbody>
</table>

### Machine equipment (series)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understeering coupling</td>
<td>CAT II</td>
</tr>
<tr>
<td>Number of rotors</td>
<td>2</td>
</tr>
<tr>
<td>Number of arms per rotor</td>
<td>13</td>
</tr>
<tr>
<td>Number of double tines per arm</td>
<td>4</td>
</tr>
<tr>
<td>Rotor diameter</td>
<td>3,600 mm</td>
</tr>
<tr>
<td>PTO shaft</td>
<td>Wide angle</td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
</tr>
<tr>
<td>Warning panels</td>
<td></td>
</tr>
<tr>
<td>Hydraulic working width adjustment</td>
<td></td>
</tr>
<tr>
<td>Mechanical rotor height adjustment</td>
<td></td>
</tr>
</tbody>
</table>

### Equipment of the machine (variant)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tine arms rigid</td>
<td></td>
</tr>
<tr>
<td>Tine arms folding</td>
<td></td>
</tr>
<tr>
<td>Plus</td>
<td>Electro-hydraulic single-rotor lifting mechanism</td>
</tr>
<tr>
<td></td>
<td>Electrical rotor height adjustment</td>
</tr>
<tr>
<td></td>
<td>Larger rotor guide wheels</td>
</tr>
<tr>
<td></td>
<td>Spring relief</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>
5.2 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.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Filling quantity</th>
<th>Specification</th>
<th>Initial filling ex works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor gearbox</td>
<td>0.5 l</td>
<td>Fluid gear grease GFO 35</td>
<td>RENOLIT SO – GFO 35</td>
</tr>
<tr>
<td>Main gearbox</td>
<td>1.0 l</td>
<td>SAE 90</td>
<td>Violin ML 4 SAE 90</td>
</tr>
</tbody>
</table>

Biodegradable consumables on request.

5.3 Tyres

<table>
<thead>
<tr>
<th>Tyres</th>
<th>Tyre designation</th>
<th>Tyre pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main running gear</td>
<td>11.5/80-15.3 10 PR TL (standard)</td>
<td>1.3 bar</td>
</tr>
<tr>
<td></td>
<td>15.0/55-17 10 PR TL (optional)</td>
<td></td>
</tr>
<tr>
<td>Rotor running gear</td>
<td>16 x 6.50-8 10 PR (standard)</td>
<td>1.8 bar</td>
</tr>
<tr>
<td></td>
<td>18 x 8.5-8 6 PR (optional)</td>
<td></td>
</tr>
</tbody>
</table>

5.4 Airborne Sound Emission

**Airborne Sound Emission**

- Equivalent continuous pneumatic level recorder: less than 70 d B(A)

5.5 Ambient Temperature

**Ambient temperature**

- Temperature range for machine operation: -5 to +45°C
## Control and Display Elements

The following table shows the functions on the machine (depending on machine design):

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crank at left rotor</td>
<td>• Increase or reduce the rotor height of the left rotor.</td>
</tr>
<tr>
<td>Crank at right rotor</td>
<td>• Increase or reduce working height of right rotor.</td>
</tr>
</tbody>
</table>
| Single-action control unit (red 1+) | **From transport position to working position:**  
  • Pull the operating cable and keep it under tension.  
  • Float position (red 1+): Lowers the machine from transport position to working position.  
  **Headland position:**  
  • Pressure (red 1+): Raises the machine from working position to headland position.  
  • Float position (red 1-): Lowers the machine from headland position to working position.  
  **From working position to transport position:**  
  • Switch off PTO drive.  
  • Pull the operating cable and keep it under tension.  
  • Pressure (red 1+): Raises the machine from working position to transport position. |
| Double-action control unit (blue 2+/ blue 2-) | **Increasing the working width**  
  • Pressure (blue 2+): Increase the working width.  
  **Reducing the working width**  
  • Pressure (blue 2+): Reduce the working width. |
The position of the switching valve (1) determines the rotor to be raised or lowered. The actual movement is made via the single-action control unit.

<table>
<thead>
<tr>
<th>Position</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td><strong>Single-rotor lifting mechanism of left rotor:</strong></td>
</tr>
<tr>
<td></td>
<td>The right rotor remains in its position. The left rotor is raised or lowered.</td>
</tr>
<tr>
<td>II</td>
<td><strong>Twin-rotor lifting mechanism:</strong></td>
</tr>
<tr>
<td></td>
<td>Both rotors are raised or lowered.</td>
</tr>
<tr>
<td>III</td>
<td><strong>Single-rotor lifting mechanism of right rotor:</strong></td>
</tr>
<tr>
<td></td>
<td>The left rotor remains in its position. The right rotor is raised or lowered.</td>
</tr>
</tbody>
</table>
With electric single-rotor lifting mechanism design

The following table explains the function of the individual switches.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Main switch</td>
<td>Switch the operation device on (I) or off (II).</td>
</tr>
<tr>
<td>2) Warning light (red)</td>
<td>Lit when operation device is switched on.</td>
</tr>
<tr>
<td>3) Toggle switch (momentary-action)</td>
<td>Set the working height on left rotor.</td>
</tr>
<tr>
<td>4) Toggle switch (momentary-action)</td>
<td>Set the working height on right rotor.</td>
</tr>
<tr>
<td>5) Toggle switch</td>
<td>Selects the rotor that is to be raised or lowered. The actual movement is made via the single-action control unit.</td>
</tr>
<tr>
<td>Pos. I</td>
<td>Single-rotor lifting mechanism of left rotor: The right rotor remains in its position. The left rotor is raised or lowered.</td>
</tr>
<tr>
<td>Pos. II</td>
<td>Twin-rotor lifting mechanism: Both rotors are raised or lowered.</td>
</tr>
<tr>
<td>Pos. III</td>
<td>Single-rotor lifting mechanism of right rotor: The left rotor remains in its position. The right rotor is raised or lowered.</td>
</tr>
<tr>
<td>6) Toggle switch</td>
<td>Depending on toggle switch (5)</td>
</tr>
<tr>
<td>Pos. IV</td>
<td>Switching from headland position to working position and vice versa.</td>
</tr>
<tr>
<td>Pos. V</td>
<td>Switching from headland position to transport position and vice versa.</td>
</tr>
</tbody>
</table>
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".

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 General
Prior to attaching or detaching devices to or from the 3-point suspension, move the loading equipment to a position that excludes inadvertent lifting or lowering!
Use extreme caution when attaching or detaching implements onto or from the tractor!
In the vicinity of the 3-point linkage, there is risk of injury due to crushing and shearing points!

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

7.3.1 Adjusting the lower suspension arms

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.
7.4 Connecting the Lower Link

- Connect the machine according to the operating instructions of the tractor manufacturer to the lower links, raise it slightly and secure it.
- Place the machine onto the parking support.
- Turn off the tractor and secure it.

7.5 Height of tractor lower suspension arms

Perform default setting on level surface.

The height of the lower links of the tractor must be set so that the distance between height $H$ of lower link pinions and ground is *approx. 66 cm*. Fix the height of the lower links (refer to chapter Special Equipment “Chain for Depth Restriction of Lower Links”).
7.6 PTO shaft

7.6.1 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".

![Image of PTO shaft adjustment](SW9070052)

Fig. 12

The length of the universal shaft must be adjusted.
- Connect the machine to the tractor without universal shaft.
- Raise the lower links of the tractor.
- Drive three-point hitch in all the way.
- Position machine in the shortest universal shaft position setting.

The shortest position is reached if the PTO shaft end of the tractor is on the same height (horizontal) as the drive journal of the machine.
- Place the machine onto the parking support.
- Turn off the tractor, remove the ignition key and carry it with you. Secure the machine from rolling away.
- Disassemble the universal shaft.
- Attach universal shaft half with wide-angle coupling (1) on machine side.
- Attach the other universal shaft half (2) on tractor side.

Observe the marking on the universal shaft.
For further procedure, please refer to the operating instructions of the universal shaft manufacturer.

Note
Check the swivel range and clearance of the PTO shaft! Damage can be caused if the tractor or the machine touch the PTO shaft (e.g. hitching device, hitching frame, lower suspension arms).
7.7 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. 13
If the rotary rake is not running in the centre behind the tractor on a level street, this can be controlled by adjusting the steering linkage (1).
• Loosen counter nut (2).
• Adjusting the steering linkage:
  Steering rod shorter => directs machine further to the left
  Steering rod longer => directs machine further to the right
• Tighten counter nut (2).
7.8 Checking the Locking of the Transport Position

Fig. 14

- The machine is in transport position.
- The single-action control unit is pressurised.
- The tractor engine is switched off, the ignition key is removed and you carry it with you.
- Tractor and machine are secured against rolling away.

• Check dimension A; right and left sides of the machine

The dimension A between wedge (1) and locking (2) must be 2.5 to 3 mm.
Adjust the dimension A if it is not in the range between 2.5 to 3 mm.
To do this:
• Unscrew screws (3); move the wedge until the dimension is between 2.5 to 3 mm.
• Tighten screws (3).
7.9 Checking / Setting Distance Between Tine Arm and Outrigger Arm

**CAUTION!**
The machine may be damaged if the dimension X1 is not set.
- Check dimension X1 and set it, if necessary.

![Diagram showing the distance between tine arm and outrigger arm](TS620-003)

**Fig. 15**

Prerequisite:
- The machine is in headland position and the outrigger arms are completely retracted.

- In order to achieve the shortest possible distance between tine arm and lifting cylinder, press tine arm towards outrigger arm.
- Measure the distance X1 between tine arm (1) and outrigger arm (2).
  - If the dimension is X1 ≥ 100 mm, everything is OK.
  - If the dimension is not X1 ≥ 100 mm, the distance must be set via intermediate link.
- Dismount bolt (4).
- Loosen counter nut (5).
- Turn the intermediate link (3) until the dimension X1 ≥ 100 mm is set.
- Tighten counter nut (5).
- Mount bolt (4).
7.10 Basic Setting of Rotor Inclination

Fig. 17

- The rotor rake must be put down on level and firm ground.
- Move rotor rake into working position. In doing so, make sure that the running direction of the guide wheels shows in the direction of travel.
- If necessary, drive up until the running direction of the guide wheels shows in the direction of travel.

The rotor inclination is set via guide wheels on the chassis individually for each rotor. When performing basic setting of rotor inclination, the tines (2) must have a certain distance $X$ to the ground (1). The following distances must be met when performing basic setting of rotor inclination:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>15 mm</td>
</tr>
<tr>
<td>$X_2$</td>
<td>5 mm</td>
</tr>
<tr>
<td>$X_3$</td>
<td>0 mm</td>
</tr>
</tbody>
</table>
8 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. 19

- Connect the machine according to the operating instructions of the tractor manufacturer to the lower links, raise it slightly and secure it.
- Place the machine onto the parking support.
- Turn off the tractor and secure it.
8.3 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".

---

**Fig. 20**  
- Connect the hydraulic coupling (red 1+) of the machine to a single-action control unit of the tractor.  
- Connect the hydraulic couplings (blue 2+ / blue 2-) of the machine to a double-action control unit of the tractor.
8.4 Lighting connection

Fig. 21
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
Before inserting the plugs, make certain the plugs and sockets are clean and dry. Dirt and moisture may result in short circuits!
8.5 Connecting the Operation

In case of Plus version

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

Fig. 22
The connection for the electrical control is made via the power supply cable (1)

Note
If necessary, the continuous power socket and support for the control unit must be previously installed on the tractor.

To do this:
• Connect the power supply cable (1) with the continuous power socket (2) on the tractor and with the socket (3) on the machine.
• Insert the plug of the control unit into the appropriate socket (4) of the machine.
• Position the cables so that they will not come into contact with the wheels
8.6 Install the PTO shaft

**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".

---

**Fig. 23**

- Switch off the engine and remove the ignition key.
- **Install the PTO shaft (1) on the machine side (wide angle on machine side).**
- Swing the PTO shaft support (2) to the side.
- Then slide the universal shaft on the PTO shaft of the tractor. In doing this, ensure that the sliding pin is securely engaged.
- Secure PTO shaft guards with retaining chain (3) against turning.
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".

The safety chain is used as an additional safety precaution for trailed devices, should they become detached from the drawbar during transport. Attach the safety chain with the respective mounting parts to the hitching device on the tractor or to another specified connection point. The safety chain should have just enough play to be able to go around curves.

Fig. 24

- Install safety chain (1) on an eligible position (for example: a or b) on the tractor.
Fig. 25

• Install the safety chain (1) on the machine.
8.8 Swivelling parking support into transport position

Fig. 26

- Raise the machine until the parking support (1) can be swivelled to the rear.
- Turn off the tractor and secure it against the possibility of rolling back.
- Pull the tension bar (2), swivel the parking support (1) to the rear by 90° and fix it in place in this position by using the tension bar.
9 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.
- the PTO shaft is switched off and the rotors have come to a standstill.
- the rotors are locked (right-hand and left-hand side of the machine). To do this, see chapter Operation Device “Swivelling Tine Arms into Transport Position”.
- the machine is in the transport position.
- the outrigger arms are retracted until the stop is reached (the indicator arrow (1) is located just before the upper screw).
- the operation panel is switched off, for version with electrical single-rotor lifting mechanism.
- all hydraulic control units are in neutral position.
- the tines guards (2) are plugged onto the tines which are located in the transport position below 2 m (right-hand and left-hand sides of the machine).
- the lighting system works.
- the lower links are set to a height of 66 cm to the ground, in order to observe the transport height.
9.2 Driving on Slopes

**WARNING!**

Travelling on an incline

As long as the machine is used transverse to slope and the outrigger arms are folded in or folded down, the machine may tilt. Thus there is a risk of serious injuries or death.

- 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 across an incline.

For the version with trailing guide wheels

In order to prevent the machine from drifting off when driving on the slope, the trailing guide wheels must be fixed, refer to chapter Settings “Fixing the Trailing Guide Wheels”.

Fig. 28

KS102325
9.3 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.

Choose a level, dry and adequately stable surface.
• Set control unit(s) to float position.
• Switch off tractor and secure it against the possibility of rolling away.
• Secure the machine against the possibility of rolling away by means of wheel chocks (8).
• To swivel the parking support (1) downward, pull the bolt (2), swivel parking support downward until the bolt locks.
• Lower the lower links until the parking support is on the ground.
• Disconnect universal shaft (3) and lay it down on the support (4).
• Uncouple hydraulic hoses (5) and insert them into the supports.
• Loosen lighting cable (6) between tractor and machine and insert it into the supports intended for this purpose.
• Disconnect the power supply plug (7) (optional) between tractor and machine and place it in the supports.
• Put down the operating cable.
• Lower the lower link pinions of the tractor until the tractor can be driven away safely.

For design with control unit:
• Remove the control unit (9) from the tractor cabin and mount it on the machine.
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.

10.1 Removing the tine protections from the tine tips

![Diagram of the tine protections](image_url)

Fig. 30
- Turn off the tractor and secure it against the possibility of rolling back.
- Remove the tine guards (1) from the machine.
- Insert the tine guards into the support (2) and secure them with linch pins (3).
- Repeat this process for the other machine side.
10.2 Lowering Outrigger Arms into Working Position

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

10.2.1 For design without single-rotor lifting mechanism

Fig. 31

- Turn on the tractor.
- Actuate double-action control unit (2+) until the indicator arrow (4) is in the area of the icon ( ).
- Move single-action control unit (1+) to float position.

The rotors lower automatically until the wheels of the rotor chassis are on the ground.
10.2.2 For design with hydraulic single-rotor lifting mechanism

Fig. 32

• Turn on the tractor.
• Move switching valve (3) to central position (III).
• Raise the rotor arms using the double-action control unit (2+) until the indicator arrow is in the area of the icon ( ).
• Move single-action control unit (1+) to float position.

The rotors lower automatically until the wheels of the rotor chassis are on the ground.
10.2.3 In Case of Electro-Hydraulic Single-Rotor Lifting Mechanism Design

Fig. 33

- **Prerequisite:**
  - The rotors are in transport position.
  - The tractor is switched on.
  - The operation panel is switched on via switch (1) (0 > 1).
  - The switch (3) is in position II.
- Raise the rotor arms using the double-action control unit until the indicator arrow (4) is in the area of the icon ( ).
- Move switch (2) up into position V, keep it pressed and lower the rotors simultaneously to headland position using the single-action control unit (1+).

**The piston rod facing the machine side must be completely extended.**

- Release switch (2); it automatically jumps to position IV.
- Move single-action control unit (1+) to float position.
  
The rotors lower automatically until the wheels of the rotor chassis are on the ground.

**Note**

The changeover of the outrigger arms from the transport position into working position can also be performed without the operation panel being switched on. In this case, both outrigger arms are always activated at the same time.
10.3 Swivel tine arms to working position.

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

10.3.1 With rigid tine arms design

- Lower the rotor arms into working position.
- Turn off the tractor and secure it against the possibility of rolling back.
- To release the rotor locking, loosen the tension spring (1) out of the fastening clamp (2) of the tine.
- Hinge the tension spring in the fastening hole (3).
10.3.2 For design with collapsible tine arm

Fig. 35

NOTE! Swivel folding tine arms into working position in a certain order:

- In direction of travel right, swivel the folding tine arms into working position starting from the rear.
- In direction of travel left, swivel the folding tine arms into working position starting from the front.
  • Pull linch pin (1).
  • Pull out bolt (2).

CAUTION! When swivelling the tine arms into working position, turn the rotors so that the tine arms do not collide with the guard.
  • Swivel tine arm (3) into working position.

NOTE! The bolts may get lost when they are not inserted from above and secured.
  • Insert bolt (2) from above.
  • Secure bolt with linch pin (1).

Make sure that the linch pin (1) engages properly (the ring of the linch pin must be located in the groove of the shaft).
10.4 Move the hoop guards to the working position.

Warning - Crush hazard!
Effect: Injury to hands
Do not hold onto hoop guards to swivel within range of the rotating points.

Fig. 36

- Swivel the hoop guard (1) to the outside into working position and allow the locking (2) to lock in place.
10.5 Setting the Working Height

For mechanical version

Fig. 37

• Lower outrigger arms to working position.
• Raise the lower links until the lower link pinions are approx. 66 cm above the ground.
• Switch off tractor and secure it against the possibility of rolling away.
• To increase spacing of tines to the ground, turn the crank handle (1) in clockwise direction.
• To reduce spacing of tines to the ground, turn crank handle (1) anticlockwise.
For the electrical version

Swadro TC 880 Plus

Fig. 38

The working height can be adapted to crop and terrain while the machine is in operation or in headland position.

To do this:
• Raise the lower links until the lower link pinions are located approx. 660 mm above the ground.
• Move outrigger arms to headland position or working position.
  Move switch (1) to position 1.
  The operation panel is switched on.

Setting the working height on left rotor:
• To increase the working height of left rotor, press switch (3) up.
• To reduce the working height of left rotor, press switch (3) down.

Setting the working height on right rotor:
• To increase the working height of right rotor, press switch (4) up.
• To reduce the working height of right rotor, press switch (4) down.
10.6 Adjusting the Working Width

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

**Caution! - Adjusting the working width**

Effect: Damage to the machine
- Before extending the rotors, make certain there is no one in the danger zone of the rotors!
- Never try to adjust the working width if the tractor is switched off and the tines are in contact with the ground.
- Only set the working width of the rotor arms in headland position.

- In order to lift the rotors to the headland position, actuate the single-action control unit (red 1+).
- In order to increase the working width, actuate the double-action control unit (blue 2+).
- In order to reduce the working width, actuate the double-action control unit (blue 2-).

**CAUTION!** In order to meet the transport height, retract rotors completely.

The distance between the rotors and the swath former:
- high amount of forage = long distance
- small amount of forage = short distance
10.7 Move the hoop guards to transport position.

Warning - Crush hazard!

Effect: Injury to hands
Do not hold onto hoop guards to swivel within range of the rotating points.

- Lower rotor arms into working position.
- Turn off the tractor and secure it against the possibility of rolling back.
- Fold over the hoop guard (1) from working position to transport position.
10.8 Swivelling tine arms into transport position

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

10.8.1 With rigid tine arms design

- Lower outrigger arms into working position.
- Switch off tractor and secure it against rolling away.
- To prevent the rotors from turning, unhook the tension spring (4) from the fastening hole (5) and hook it on the tine (6) (rotor locking device, if necessary).

Fig. 40
10.8.2 For design with collapsible tine arm

Firstly:
• Turn the left rotor far enough so that the swivelling tine arms are extended outwardly.
• Pull out the linch pin (1).
• Remove the bolts (2).
• Swivel tine arms (3) to transport position; the rotor must be turned so that the tine arms do not collide with the protection when swivelling.
• Insert the bolts (2) and secure with the linch pin (1).
• Secure rotors so that they do not turn, unhook the tension spring (4) from the fastening hole (5) and hook into the fastening clamp (6).

Then:
• Turn the right rotor far enough so that the swivelling tine arms are extended outwardly.
• Pull out the linch pin (1).
• Remove the bolts (2).
• Swivel tine arms (3) to transport position; the rotor must be turned so that the tine arms do not collide with the protection when swivelling.
• Insert the bolts (2) and secure with the linch pin (1).
• Secure rotors so that they do not turn, unhook the tension spring (4) from the fastening hole (5) and hook into the fastening clamp (6).

Note
Check that the swivelling tine arms of both rotors are extended outwards. If necessary, move rotors to correct position.

Note
Swivel the right collapsible tine arm on the machine side in sequence from the front backwards and the left collapsible tine arm on the machine side in sequence from the back forwards to the transport position.
10.9 Raising Outrigger Arms into Transport Position

**CAUTION!**
Before swivelling into transport position, turn off the PTO shaft.
- Before lifting the rotors from the headland position, turn off PTO shaft and wait for rotors to come to a standstill.
- Ensure that nobody is in the swivel range of the rotors.
- Ensure that nobody is in the swivel range of the chassis.

**Note**
Before switching from the working to the transport position, make sure the width adjustment (working width) is fully retracted.
For design without single-rotor lifting mechanism

- Turn on the tractor.
- Actuate the single-action control unit (1+) until the rotors are raised to headland position.
- Actuate the double-action control unit (2+) or (2-) until the indicator arrow (4) is in the area of the icon ( ).
- To loosen the lockings (1), move single-action control unit (1+) to float position.
- To raise the lockings (1), pull the operating cable (2) and keep it tensioned.
- Actuate single-action control unit (1+) until the rotors are raised to transport position.
- Release the operating cable.

To ensure transport height of less than 4 m, retract the working width until the stop is reached using the double-action control unit (2-) (the indicator arrow (4) is located just before the upper screw).

Move all hydraulic control units to neutral position.

Note
Make certain the transport locks engage correctly and the actuating rope is not tight. Perform a visual inspection to ensure the locks (1) have engaged correctly.
10.9.2 For design with hydraulic single-rotor lifting mechanism

Fig. 44

- Prerequisite:
  - The machine is in the working position.
  - Turn on the tractor.
  - Move switching valve (3) to central position (II).
  - Actuate the single-action control unit (1+) until the rotors are raised to headland position.
  - Actuate the double-action control unit (2+) or (2-) until the indicator arrow (4) is in the area of the icon ( ).
- To loosen the lockings (1), move single-action control unit (1+) to float position.
- To raise the lockings (1), pull the operating cable (2) and keep it tensioned.
- Actuate the single-action control unit (1+) until the rotors are raised to transport position.
- Release the operating cable.

Fig. 45

- To ensure transport height of less than 4 m, retract the working width until the stop is reached using the double-action control unit (2-) (the indicator arrow (4) is located just before the upper screw).
- Move all hydraulic control units to neutral position.

Note

Make certain the transport locks engage correctly and the actuating rope is not tight. Perform a visual inspection to ensure the locks (1) have engaged correctly.
10.9.3 In Case of Electro-Hydraulic Single-Rotor Lifting Mechanism Design

Fig. 46

- **Prerequisite:**
  - The rotors are in working position.
  - The tractor is switched on.
  - The control unit is switched on via switch (1) (0 → 1).
  - The switch (3) is in position II.
- Actuate the single-action control unit (1+) until the rotors are raised to headland position.
- Actuate the double-action control unit (2+) or (2-) until the indicator arrow (4) is in the area of the icon ( ).
- Move switch (2) up to position V, keep it pressed and simultaneously actuate the single-action control unit (1+) until the rotors are raised to transport position.

The piston rod facing the machine side must be completely retracted.

Fig. 47

- Release switch (2); it moves automatically to position IV.
- To ensure transport height of less than 4 m, retract the working width until the stop is reached using the double-action control unit (2-) (the indicator arrow (4) is located just before the upper screw).
- Move all hydraulic control units to neutral position.
- Switch off operation panel.

**Note**

Make certain the transport locks engage correctly and the actuating rope is not tight. Perform a visual inspection to ensure the locks (1) have engaged correctly.
10.10 Protecting the tine tips (transport position and rotary rake switched off)

The tines must be fitted with guards which are positioned at less than 2 m in transport position or when the machine is switched off. The tine guards are located on the front supports (right and left side of the machine).

- Connect the tine guards (1) onto the tines.
10.11 Selecting Rotor Operation

Depending on how the machine is equipped, different rotor operations can be selected with the rotary rake.

Twin-rotor operation: Swath placement to the middle with right and left rotor
Single-rotor operation: Swath placement to the middle with left rotor
Single-rotor operation: Swath placement to the middle with the right rotor

**WARNING!**
Risk of injury due to the machine overturning!
If single-rotor operation is selected in transport position, personal injury or material damage may result.
- To avoid accidents, only select single-rotor operation if the rotors are in headland position or working position.

10.11.1 For design with hydraulic single-rotor lifting mechanism

From headland position to working position

Fig. 49
Prerequisite: The rotors are in headland position.

**Single-rotor operation with right rotor**
In order to use just the right rotor for swathing, proceed as follows:
- Move the switching valve (1) to position (III).
- Move single-action control unit to position (“Lower / float position”).

**Twin-rotor operation**
To swath with both rotors, proceed as follows:
- Move the switching valve (1) to position (II).
- Move single-action control unit to position (“Lower / float position”).

**Single-rotor operation with left rotor**
In order to use just the left rotor for swathing, proceed as follows:
- Move the switching valve (1) to position (I).
- Move single-action control unit to position (“Lower / float position”).
Fig. 50

Prerequisite: The rotors are in the working position.

**Single-rotor operation with right rotor**
In order to use just the right rotor for swathing, proceed as follows:
- Move the switching valve (1) to position (I).
- To raise the left rotor to headland position, actuate the single-action control unit (1+).
- Move control unit to neutral position.
- Move the switching valve (1) to position (III).
- Move single-action control unit to position (“Lower / float position”).

**Twin-rotor operation**
To swath with both rotors, proceed as follows:
- Move the switching valve (1) to position (II).
- Move single-action control unit to position (“Lower / float position”).

**Single-rotor operation with left rotor**
In order to use just the left rotor for swathing, proceed as follows:
- Move the switching valve (1) to position (III).
- To raise the right rotor to headland position, actuate the single-action control unit.
- Move control unit to neutral position.
- Move the switching valve (1) to position (I).
- Move single-action control unit to position (“Lower / float position”).
10.11.2 In Case of Electro-Hydraulic Single-Rotor Lifting Mechanism Design

From headland position to working position

Fig. 51
Prerequisite: The rotors are in headland position.

**Single-rotor operation with right rotor**

In order to use just the right rotor for swathing, proceed as follows:
- Move switch (5) to position (III).
- Move single-action control unit to position (“Lower / float position”).

**Twin-rotor operation**

In order to swath with both rotors, proceed as follows:
- Move switch (5) to position (II).
- Move single-action control unit to position (“Lower / float position”).

**Single-rotor operation with left rotor**

In order to use just the left rotor for swathing, proceed as follows:
- Move switch (5) to position (I).
- Move single-action control unit to position (“Lower / float position”).
From working position to headland position

Prerequisite: The rotors are in working position.

**Single-rotor operation with right rotor**
In order to use just the right rotor for swathing, proceed as follows:
- Move switch (5) to position (I).
- To raise the left rotor to headland position, actuate the single-action control unit (1+).
- Move control unit to neutral position.
- Move switch (5) to position (III).
- Move single-action control unit to position (“Lower / float position”).

**Twin-rotor operation**
In order to swath with both rotors, proceed as follows:
- Move switch (5) to position (II).
- Move single-action control unit to position (“Lower / float position”).

**Single-rotor operation with left rotor**
In order to use just the left rotor for swathing, proceed as follows:
- Move switch (5) to position (III).
- To raise the right rotor to headland position, actuate the single-action control unit.
- Move control unit to neutral position.
- Move switch (5) to position (I).
- Move single-action control unit to position (“Lower / float position”).
10.12 Travelling speed und drive speed

The travelling speed and drive speed while swathing depend on:
• forage quantity
• ground
• degree of dryness

Use these as rough guidelines:
• PTO speed approx. 450 rpm
• Travelling speed approx. 8 - 10 km/h

Drive speed and travel speed must be adapted to each individual operation.

Note
The travelling speed is based on the work image (orderly rake work with good formation of swaths).

10.13 Swathing

• Make certain there is no one in the working range of the machine.
• Make certain the height of the steerable pinions to the ground is approx. 660 mm.
• Lift rotor arms to headland position.
• Switch on the universal shaft with low engine speed.
• Slowly increase the speed to approx. 450 rpm.
• Lower the rotor arms to working position.
• To ensure the soil adaption of the chassis during use, move the single-action control unit to position (“Lowering / Float Position”).
• Select the travelling speed so that the crop is picked up cleanly and completely.
• Readjust the working depth, if necessary.
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 Setting the Rotor Inclination

The rotor pitch angle has been set at a transverse angle to the chassis in the factory. If the crops are not picked up properly, the working quality can be improved by adjusting the rotor pitch.

The rotor pitch angle is adjusted for each rotor via the guide wheels at the chassis. The best results are achieved if the rotor pitch adjustment ensures the tines are closer to the ground level when outputting the crops than at the start when picking up the crops.

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

11.1.1 Rotor chassis (serial)

Fig. 53

Setting the rotor inclination:
Pos. I = Reducing rotor inclination
Pos. II = Increasing rotor inclination

Do not step under the raised rotors.
- To do this, raise the outrigger arms until the changeover work can be performed.
- To set rotor inclination, dismount the rear guide wheels and move them in the hole pattern.

Vernier adjustment via eccentric cam (1):
- = Reducing rotor inclination
+ = Increasing rotor inclination

Do not step under the raised rotors.
- Raise the outrigger arms until the changeover work can be performed.
- Loosen the nut of the wheel bolt.
- Turn the eccentric (1) to set the rotor inclination.
- Tighten the nut of wheel bolt.

Note
If the forage is heavy, adjust the inner running gear as low as possible!
11.1.2 For the Version with Trailing Guide Wheels (optional)

Setting the rotor inclination:
Pos. I = Reducing rotor inclination
Pos. II = Increasing rotor inclination

Do not step under the raised rotors.
- To do this, raise the outrigger arms until the changeover work can be performed.
- To set rotor inclination, dismount the rear guide wheels and move them in the hole pattern.

Vernier adjustment by the screw on the oblong hole (3):
− = Reducing rotor inclination
+ = Increasing rotor inclination

Note
If the forage is heavy, adjust the inner running gear as low as possible!
11.1.3 With tandem chassis version (optional)

Fig. 55

Setting the rotor inclination:
Pos. I  = Reducing rotor inclination
Pos. II = Increasing rotor inclination

Do not step under the raised rotors.
• To do this, raise the outrigger arms until the changeover work can be performed.
• To set rotor inclination, dismount the rear guide wheels and move them in the hole pattern.

Vernier adjustment via plate (1):
− = Reducing rotor inclination
+ = Increasing rotor inclination

Note
When adjusting the rotor pitch, ensure the tandem axle (2) is horizontal.

Note
If the forage is heavy, adjust the inner running gear as low as possible!
11.2 Fixing the Trailing Guide Wheels

In order to prevent the machine from drifting off when driving on the slope, fix the trailing guide wheels.

To do this:
- Loosen counter nut (5).
- Press guide wheel to the outside until the stop is reached and hold it.
- Unscrew the screw (4) until it rests against the screw (3).
- Tighten counter nut (5).

Fig. 56
11.3 **Adjustable throttles**

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

**WARNING!**
When performing repair, maintenance or cleaning work on the machine, or in case of technical intervention, drive elements may start moving. Thus there is a risk of serious injuries or death.
- Switch off tractor engine, remove the ignition key and carry it with you.
- Secure the tractor against accidental start-up and against rolling.
- Wait until all machine parts have come to a complete stop and have been cooled down completely.

You can use the adjustable throttles to adjust the lowering speeds of the rotors on the machine. To allow for different types of tractors and oil pressures, the throttles may need to be readjusted.

**Note**
Adjustment on the throttles
Even the smallest adjustments to the stud bolts or throttle setting screws may significantly change the lifting and lowering speed.

**Note**
Adjustment on the throttles
After an adjustment has been made to the throttles, lock the hexagonal nuts and Allen head screw. Then test functionality.

**Throttle (1)**
Set the speed when extending for swath width adjustment (working width).
- Unscrew the hexagonal nut (a).
- Screw in or screw out the stud bolt (b) (screwing in reduces the flow of oil and thus slows down the speed when extending for swath width adjustment).

**Throttle (2)**
Set the lowering speed of both rotors.
- Loosen hexagonal socket head screw (c).
- Screw stud bolt (d) in or out (Unscrewing it increases the flow of oil and thus increases the speed at which the rear rotor is lowered.)
11.4 Calibrating the Sensor – with Electrical Rotor Height Adjustment Design

The calibration only works if sensor voltage is less than 1 V (bottom stop) or greater than 4 V (upper stop).

If this is not the case, consult KRONE specialist workshop so that the sensor can be readjusted mechanically until the voltage values are again in the permissible range.

- Park machine on level and firm ground so that both rotors are parallel to the ground.
- Set the rotors to the least working height. In doing so, make sure that both rotors have the same distance to the ground.

Due to allowed deviating tolerances of parts, the displays may contain different values before calibration is performed.

![Image of sensor calibration tool]

Fig. 58

Resetting the displays to zero
- Lay permanent magnet on the display.

Calibration was successful when the display flashes three times. If the display does not flash, perform calibration again.

Calibration process
- Move each of the both rotors down to the ground.
- Hold permanent magnet over the right display (1).

The right display flashes for approx. 5 seconds. After that measurement value 0 is saved as lower limit of measuring range.
- Remove magnet.
- Hold permanent magnet over the left display (2).

The left display flashes for approx. 5 seconds. After that measurement value 0 is saved as lower limit of measuring range.
- Remove magnet.
- Raise both rotors to headland position and raise rotor height adjustment until the stop is reached.
- Hold permanent magnet over the right display (1).

The right display flashes for approx. 5 seconds. After that measurement value 99 is saved as upper limit of measuring range.
- Remove magnet.
- Hold permanent magnet over the left display (2).

The left display flashes for approx. 5 seconds. After that measurement value 99 is saved as upper limit of measuring range.
- Remove magnet.
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.
12.2 Special Safety Instructions

**WARNING!** - When performing repair, maintenance or cleaning work on the machine, or in the case of technical intervention, drive elements may start moving.
Effect: Danger to life, injuries or damage to the machine.
- Switch off engine, remove the ignition key and carry it with you.
- Secure machine and tractor against rolling.
- Turn off PTO shaft.
- After the repair, maintenance, cleaning work or technical modifications are completed, mount all protective covers and safety devices properly again.
- Avoid skin contact with oils, greases, cleaning agents and solvents.
- In the event of injuries or burns due to oils, cleaning agents or solvents, contact a physician immediately.
- All other safety instructions must also be followed to avoid injuries and accidents.

12.3 Test run.

**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.
## 12.4 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><strong>Rotor gearbox</strong></td>
<td></td>
</tr>
<tr>
<td>Maintenance-free (permanently lubricated with grease)</td>
<td></td>
</tr>
<tr>
<td><strong>Main gearbox</strong></td>
<td></td>
</tr>
<tr>
<td>Oil level check</td>
<td></td>
</tr>
<tr>
<td>Oil change</td>
<td></td>
</tr>
<tr>
<td><strong>Tyres</strong></td>
<td></td>
</tr>
<tr>
<td>Check tyres for cuts and breaks visually</td>
<td></td>
</tr>
<tr>
<td>Check tyre pressure</td>
<td>X</td>
</tr>
<tr>
<td>Wheel nuts</td>
<td>X</td>
</tr>
<tr>
<td>Crown nut chassis</td>
<td>X</td>
</tr>
<tr>
<td><strong>Tighten screws / nuts</strong></td>
<td></td>
</tr>
<tr>
<td>All screws</td>
<td>X</td>
</tr>
<tr>
<td>Screws on the tines</td>
<td>X</td>
</tr>
<tr>
<td>Check the locking of the transport position</td>
<td></td>
</tr>
</tbody>
</table>
12.5  
Tightening torques

12.5.1  
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>
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<tbody>
<tr>
<td></td>
<td>Tightening torque (Nm)</td>
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</tr>
<tr>
<td>M4</td>
<td></td>
<td>3.0</td>
<td>4.4</td>
<td>5.1</td>
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<td>M5</td>
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<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>
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<td>M8</td>
<td></td>
<td>25</td>
<td>36</td>
<td>43</td>
<td></td>
</tr>
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</tr>
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</table>

**A = thread size**

(stability class can be seen on screw head)

[Image of screw with hexagonal socket and countersink]
### 12.5.2 Metric Thread Screws with Fine Thread

**Tightening torque in Nm (unless otherwise stated)**

<table>
<thead>
<tr>
<th>A</th>
<th>Stability class</th>
<th>M12 x 1.5</th>
<th>M14 x 1.5</th>
<th>M16 x 1.5</th>
<th>M18 x 1.5</th>
<th>M20 x 1.5</th>
<th>M24 x 2</th>
<th>M27 x 2</th>
<th>M30 x 1.5</th>
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<td>800</td>
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<td>130</td>
<td>213</td>
<td>327</td>
<td>525</td>
<td>662</td>
<td>1121</td>
<td>1635</td>
<td>2100</td>
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<tr>
<td></td>
<td>10.9</td>
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<td>249</td>
<td>382</td>
<td>614</td>
<td>775</td>
<td>1312</td>
<td>1914</td>
<td>2650</td>
</tr>
</tbody>
</table>

**A = thread size**

(stability class can be seen on screw head)

### 12.5.3 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>
<th>M4</th>
<th>M5</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M14</th>
<th>M16</th>
<th>M20</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**A = thread size**

(stability class can be seen on screw head)
12.6 Deviating Tightening Torques \( M_a \) (Nm)

12.6.1 Testing the Screws on the Tines

Fig. 59
Testing the Screws on the Tines: According to the Maintenance Table
When having released the screws,
• remove the nut.
• apply adhesive (high-strength) on the threading overhang of the screw.
• lift the tines on the tine end and tighten the nut to the torque specified below.

12.6.2 Torque of Wheels on the Running Gear

Fig. 60
Check locknut: According to the maintenance table
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.

12.7.1 Checking and maintaining tyres

When loosening and tightening the wheel nuts, observe the order indicated in the illustration.
Check the wheel nuts: According to the maintenance table
Check the tyre air pressure: According to the maintenance table

<table>
<thead>
<tr>
<th>Threading</th>
<th>Key size in mm</th>
<th>Number of bolts per hub - pieces</th>
<th>Max. tightening torque</th>
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<tr>
<td>M12 x 1.5</td>
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<td>4/5</td>
<td>95 Nm</td>
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<td>8</td>
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<td>M22 x 1.5</td>
<td>32</td>
<td>8/10</td>
<td>510 Nm</td>
</tr>
<tr>
<td>M22 x 2</td>
<td>32</td>
<td>10</td>
<td>460 Nm</td>
</tr>
</tbody>
</table>

Fig. 61

KS-0-034
This page has been left blank deliberately!!
12.8 Replacing the tine arms (in case of repair)

Fig. 62
In case of repairs, the tine arms can be removed and replaced individually.

- Unscrew the screws (1) of the tine arm
- Loosen the bolts (2) on the nearby tine arms
- Remove the tine arm (3) and replace the faulty components

**Note**
The tine arms (3) are glued together with the control arm shafts (4). To be able to loosen the components from each other, the connecting point must be heated up (to about 300 degrees).

- When a new tine arm (3) /control arm shaft (4) is installed, these two parts must be glued to each other before installation with high-strength adhesive.
- Apply glue (high-strength) (Part No. 939 042 0) on the front of the control arm shaft (4).
- Mount the tine arm (3) and secure with clamping sleeves (5).
- While installing the tine arm, make certain that the cam follower roller is inserted into the running track of the cam track.

**Note**
The cam follower roller is securely inserted into the running track when barely any play can be observed in the motion of the tine arm.

- Tighten all bolts to the required torque (105 Nm).

**Caution!**
Turn the rotor once around 360 degrees manually. The rotor must move easily. If it does not, the tine arms are not installed correctly. The error must be eliminated so that the rotor can turn easily.
12.9 Replacing the tines (in case of repairs)

Fig. 63

1 Tines
2 Tine arm
3 Locknut M12
4 Base
5 Tine holder
6 Disc 13 x 35 x 5
7 Detent edged washer SKB 12
8 Hexagon head screw M12 x 85 10.9
9 Hexagon head screw M12 x 100
10 Deflection sheet

Adhesive (high-strength) (order no. 938 627 0)

• To remove the broken tine, remove all tines in front of the broken tine.
• Remove the broken tine.

Mounting new tine
• Insert tine holder into tine. In doing so, make sure that the tine holder is positioned according to the figure.
• Slide tine with tine holder on tine arm.
• Guide hexagon head screw with detent edged washer and disc from below through tine holder and tine arm.
• Apply adhesive (high-strength) on threading overhang of hexagon head screw.
• Mount support, locknut and deflection sheet, if necessary.
• Raise the tines at their end and tighten locknut with tightening torque = 95 Nm.
• Proceed with all tines as described above.
13 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:
- Outrigger arms are in working position, see chapter “Lowering Outrigger Arms into Working Position”.
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

13.1 Lubrication Points on the Universal Shafts

![Rotary drive PTO shafts and Drive PTO shaft diagram]

Fig. 64 Rotary drive PTO shafts Drive PTO shaft
Lubricate the PTO shafts at the intervals indicated in the figure with multi-purpose grease.
Follow the operating instructions of the PTO shaft manufacturer.
The lubrication point for lubricating the section tube at the rotor’s universal shafts is located under the bushing (1).

**Fig. 65**

- Turn on the tractor.
- Actuate the double-action control unit (2+) until the indicator arrow (3) is in the area of the icon ( ).
- Push sleeve (1) aside.
- If necessary, turn the rotor until the grease nipple (2) is visible.
- After lubrication, push sleeve again over the lubrication point.
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).
Lubricate the lubrication points every 20 operating hours.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image 1]</td>
<td>![Image 2]</td>
<td>![Image 3]</td>
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<td>![Image 7]</td>
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</tbody>
</table>

<table>
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<tr>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image 10]</td>
</tr>
</tbody>
</table>
14 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!
Fig. 68
**Legend:**

1) Width adjustment  
2) Double cylinder right  
3) Double cylinder left  
4) Hydraulic accumulator  
5) Direction of travel

<table>
<thead>
<tr>
<th>Function</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>Hydraulic control unit tractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>From transport position to headland position</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>+</td>
</tr>
<tr>
<td>From headland position to transport position</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>~</td>
</tr>
<tr>
<td>From headland position to working position</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>~</td>
</tr>
<tr>
<td>From working position to headland position</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>+</td>
</tr>
<tr>
<td>Single rotor operation right rotor</td>
<td>X</td>
<td>o</td>
<td>o</td>
<td>+/~</td>
</tr>
<tr>
<td>Single rotor operation left rotor</td>
<td>o</td>
<td>X</td>
<td>o</td>
<td>+/~</td>
</tr>
<tr>
<td>Rotor in transport position</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>N</td>
</tr>
<tr>
<td>Rotor in headland position</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>N</td>
</tr>
<tr>
<td>Rotor in working position</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>~</td>
</tr>
</tbody>
</table>

- K1 = Lock valve left rotor  
  - x = powered  
  - X = Neutral position  
- K2 = Lock valve right rotor  
  - o = powered  
  - + = Flow position  
- K3 = Transport position/ headland position  
  - ~ = Float position

Table 1
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".

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:**
- Outrigger arms are in working position, see chapter "Lowering Outrigger Arms into Working Position".
- 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".
15.1 Main gearbox

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

Oil quality/amount of oil: refer to chapter entitled Technical Data of Machine “Operating Materials”

**Oil level check:**
• Clean thoroughly around the oil dip stick.
• Unscrew the oil dip stick, wipe off oil residue.
• Screw in oil dip stick and unscrew again.
• Read off the oil level - the oil level must be between the max. and min. marks.
• Screw in oil dip stick again.

**Oil change:**
Collect escaping oil in a suitable container.
• Screw out the oil dip stick.
• Screw out oil drain plug and drain the oil.
• Screw in oil drain plug and tighten it securely.
• Top up new oil up to the middle of the markings on the oil dip stick.
• Screw in the oil dip stick.

**Note**
The used oil must be disposed of correctly
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 Tine loss safeguard

![Diagram of tine loss safeguard](image)

**Figure 70**
**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
16.2 Chain for height restriction of suspension arms

Figure 71
- Secure chains (1) with a spring-type slotted straight pin (3) and a washer (2) at the suspension arm seats.
- Attach chain hooks (4) to the tractor.
- Select chain length according to desired max. lowering level.

Note
Spare tine loss safeguards Order No.: 153 479 0
Chain for height restriction of suspension arms Order No.: 250 759 0
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 Special Safety Instructions

**WARNING! - When performing repair, maintenance or cleaning work on the machine, or in the case of technical intervention, drive elements may start moving.**
Effect: Danger to life, injuries or damage to the machine.
- Switch off engine, remove the ignition key and carry it with you.
- Secure machine and tractor against rolling.
- Turn off PTO shaft.
- After the repair, maintenance, cleaning work or technical modifications are completed, mount all protective covers and safety devices properly again.
- Avoid skin contact with oils, greases, cleaning agents and solvents.
- In the event of injuries or burns due to oils, cleaning agents or solvents, contact a physician immediately.
- All other safety instructions must also be followed to avoid injuries and accidents.
17.2 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.
17.3 Before the Start of the New Season

WARNING! - When performing repair, maintenance or cleaning work on the machine, or in the case of technical intervention, drive elements may start moving.

Effect: Danger to life, injuries or damage to the machine.

- Switch off engine, remove the ignition key and carry it with you.
- Secure machine and tractor against rolling.
- Turn off PTO shaft.
- After the repair, maintenance, cleaning work or technical modifications are completed, mount all protective covers and safety devices properly again.
- Avoid skin contact with oils, greases, cleaning agents and solvents.
- In the event of injuries or burns due to oils, cleaning agents or solvents, contact a physician immediately.
- All other safety instructions must also be followed to avoid injuries and accidents.

- 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.
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".
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<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Remedy</th>
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<tr>
<td>Rotor does not work smoothly</td>
<td>Raking height set too high</td>
<td>Set raking height lower</td>
</tr>
<tr>
<td></td>
<td>The working speed is too high.</td>
<td>Reduce the travelling speed. Guide value 8 - 10 km/h. For uneven terrain and/or higher amount of forage, it may be necessary to drive slower.</td>
</tr>
<tr>
<td></td>
<td>Speed is too low</td>
<td>Increase the speed. Rough value 450 rpm</td>
</tr>
<tr>
<td></td>
<td>Side rotor inclination adjusted incorrectly.</td>
<td>Change the side inclination (see chapter Operation “Setting Rotor Running Gear”).</td>
</tr>
<tr>
<td></td>
<td>Tine arm(s) crooked</td>
<td>Replace tine arm(s)</td>
</tr>
<tr>
<td>High forage contamination</td>
<td>Raking height set too low</td>
<td>Set raking height higher</td>
</tr>
<tr>
<td></td>
<td>Tine arm(s) bent</td>
<td>Replace tine arm(s)</td>
</tr>
<tr>
<td>Swath width too large</td>
<td>Working width too great</td>
<td>Change working width</td>
</tr>
<tr>
<td></td>
<td>Speed is too low</td>
<td>Increase speed</td>
</tr>
<tr>
<td>One rotor goes down in headland position, the other goes up.</td>
<td>Rotor not swivelled up into headland position</td>
<td>Activate hydraulics until the rotor arms are resting against the stops.</td>
</tr>
<tr>
<td>Not possible to adjust rotor to unevenness in the ground.</td>
<td>Tractor's lower suspension arm set too high or too low</td>
<td>Align frame horizontally (height of the steerable pinions approx. 66 cm)</td>
</tr>
<tr>
<td></td>
<td>Tractor hydraulics not in float position.</td>
<td>Set tractor hydraulics to float position.</td>
</tr>
<tr>
<td>Setting the raking height - electrical not working</td>
<td>Fuse defective</td>
<td>Replace the fuse in the switch box which is screwed onto the frame.</td>
</tr>
</tbody>
</table>
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.
The circuit diagram can be found in the Appendix.
twin rotor rake centre swathing
Swadro TC 880 Plus
<table>
<thead>
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<th>Sheet</th>
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<td>Layout plan</td>
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<td>/1.E5</td>
</tr>
<tr>
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</tr>
<tr>
<td>-K3</td>
<td>transport/land</td>
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<td>-M2</td>
<td>working height right</td>
<td>/1.E4</td>
</tr>
<tr>
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<td>control system ON</td>
<td>/1.A3</td>
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<td>-S1</td>
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<td>single-rotor lifting mechanism</td>
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