

ORIGINAL INSTRUCTIONS- according to Directive 2006/42/EC, Annex I 1.7.4.1

OPERATOR'S MANUAL

R+ 420

R+ 460

Rotary rake

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Every 40 hours

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1 - GENERAL INFORMATION

Note to the owner

This manual has been prepared to assist you in the correct procedure to run in, to drive, to operate, to adjust and to maintain your new implement.

This implement has been designed and built to give maximum performance, economy and ease of operation under a wide variety of conditions.

Prior to delivery, your implement was carefully inspected both at the factory and by your dealer to make sure that it reaches you in optimum condition. To maintain this condition and assure trouble-free operation it is important that routine services, as specified in this manual, are carried out at the recommended intervals.

Read this manual carefully (especially Chapter 2 that covers the safety information) and keep this manual in a convenient place for future reference. DO NOT operate or permit anyone to operate or service this implement until you and/or other persons have read this manual. Read the manual, it will save you time and hassle later. Lack of knowledge can lead to accidents. Employ only trained operators who have demonstrated the ability to operate and service this implement correctly and safely. Contact your dealer for assistance providing the required training to your operators. Contact your dealer to obtain additional manuals or alternate language versions.

If at any time you require advice that concerns your implement, do not hesitate to contact your authorized dealer. He has factory-trained personnel, genuine service parts and the necessary equipment to carry out your service requirements.

NOTICE: *This implement has been designed and built in line with the requirements put forward by the European Directives 2006/42/EC and 2014/30/EU.*

Always use genuine KONGSKILDE Service Parts or parts that match at least the same quality, reliability and functionality as the equivalent original Service Parts when you service and repair your implement and do not modify your implement without a written permission of the manufacturer. Failure to do so will void the responsibility of the manufacturer.

Check local road legislation before you drive the implement on public roads.

When you operate interchangeable implement, make sure that the implement is CE approved.

As this publication is distributed throughout our international network, the implement illustrated, either as standard or as an accessory, may vary according to the country in which the implement is to be used. Low specification configurations, as chosen by the customer, may deviate from the specifications given.

Several figures in this operator's manual show the safety guarding or the additional guards, legally required by certain countries, open or removed to better illustrate a particular feature or adjustment. The implement must not be used in this condition. For your own safety, make sure that all guards are closed or replaced before you operate the implement.

OWNER ASSISTANCE

We at KONGSKILDE and your KONGSKILDE dealer want you to be completely satisfied with your investment. Normally, your dealer's Service Department will handle any problems with your implement. Sometimes however, misunderstanding can occur. If your problem has not been handled to your satisfaction, we suggest you to contact the owner or General Manager of the dealership, explain the problem and request assistance. When additional assistance is needed, your dealer has direct access to our branch office.

COMPANY POLICY

Company policy, which is one of continuous improvement, reserves the right to make changes in design and specification at any time without notice and without obligation to modify units previously built.

All data given in this book is subject to production variations. The information in this publication is provided on the basis of information that was available at the time that the manual was written. Settings, procedures and other items can change. These changes can affect the service that is given to the implement. Dimensions and weights are approximate only and the illustrations do not necessarily show the implement in standard condition. For exact information about any particular implement please consult your dealer. Make sure that you have the most current and complete information from your dealer before you start any job.

ACCESSORIES AND OPTIONS

Your implement has been designed to operate in a wide variety of soils/crops and conditions. Nevertheless additional equipment may, in certain cases, be required to improve the implement performance. A list of this additional equipment is given in the "Accessories" chapter in this manual. Use only those accessories designed for your implement.

PARTS AND ACCESSORIES

Genuine KONGSKILDE parts and accessories have been specifically designed for KONGSKILDE implements.

We would like to point out that "non-genuine" parts and accessories have not been examined and released by KONGSKILDE. The installation and/or use of such products could have negative effects upon the design characteristics of your implement and thereby affect its safety. KONGSKILDE is not liable for any damage caused by the use of "non-genuine" parts and accessories.

Rely on your authorized dealer to supply you with genuine KONGSKILDE parts only. These parts are covered by our warranty and will give you the best performance.

See the parts catalog or browse the KONGSKILDE portal to find service parts for your implement.

When you order service parts, always quote the model and serial number printed on the Product Identification Number (PIN) plate.

LUBRICANTS

Your dealer sells a selection of specially formulated lubricants based on own engineering specifications.

Recommended lubricants for your implement are listed in the maintenance chapter.

WARRANTY

Your implement is warranted according to legal rights in your country and the contractual agreement with the selling dealer. No warranty shall, however, apply if the implement has not been used, adjusted and maintained according to the instructions given in this operator's manual.

It is prohibited to carry out any modifications to the implement unless specifically authorized, in writing, by a KONGSKILDE representative.

CLEANING YOUR IMPLEMENT

When you use a high pressure washer, do not stand too close to the implement and avoid directing the jet at electronic components, electrical connections, breathers, seals, filler caps, and so on.

Clean decals only with a soft cloth, water and a gentle detergent. DO NOT use solvent, gasoline or other harsh chemicals to clean decals. Decals could be removed or get damaged.

DISASSEMBLY OR SCRAPPING

When your implement is taken out of service because it is damaged beyond repair or has reached the end of its useful life, disassembly, scrapping and/or recycling of components must be performed only by a qualified technician with service instructions, and in compliance with local law and regulations.

Intended use

The KONGSKILDE rotary rake can only perform the usual work in agriculture. Only connect the rotary rake to a tractor which corresponds with the specifications of the implement and is legal to use. Only the Power Take- Off (PTO) shaft of the tractor can drive the attached rotary rake.

The rotary rake may only be used for rake grass hay and straw crops on the ground.

Consider any other use contrary to the intended use. The manufacturer is not responsible for any damage that re-

sults from the improper use of the implement. The user bears that risk.

Always observe the following safety instructions as well as the common rules concerning technical safety, working practices and road safety.

If you make changes to the implement and its construction without the permission from the manufacturer, the manufacturer does not accept any responsibility for damages that results from this.

Prohibited usage

Sweeping of for example farmyards with the tine arm assembly or brooms fastened to these is not allowed. There is a risk that for example stones are thrown out from the working area of the implement with danger of personal injury or damage to objects.

Any use beyond the intended use is regarded as foreseeable misuse.

Electro-Magnetic Compatibility (EMC)

This machine complies strictly with the European Regulations on electro-magnetic emissions. However, interference may arise as a result of add-on equipment which may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

- Ensure that each piece of non- KONGSKILDE equipment fitted to the machine bears the CE mark.
- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine.
- The electro-magnetic field generated by the add-on system should not exceed **24 V/m** at any time and at any location in the proximity of electronic components.

Failure to comply with these rules will render the KONGSKILDE warranty null and void.

Manual scope and required training level

Introduction to this manual

This manual gives information about the use of your KONGSKILDE machine as intended and under the conditions foreseen by KONGSKILDE during normal operation, routine service, and maintenance.

This manual does not contain all the information that relates to periodic service, conversions, and repairs that only trained service personnel can perform. Some of these activities may require appropriate facilities, technical skills, and/or tools that KONGSKILDE does not supply with the machine.

The manual contains the chapters as shown on the Contents pages. See the Index at the end of this manual to locate specific items about your KONGSKILDE machine.

Normal operation

Normal operation consists of the use of this machine for the purpose KONGSKILDE intends by an operator that:

- Is familiar with the machine and any mounted equipment or towed equipment
- Complies with the information on operation and safe practices as specified by KONGSKILDE in this manual and by the signs on the machine

Normal operation includes:

- Preparation and storage of the machine
- Addition and removal of ballast
- Connection and disconnection of mounted equipment and/or towed equipment
- Adjustment and configuration of the machine and equipment for the specific conditions of the job site, field, and/or crop
- Movement of components into and out of working positions

Routine service and maintenance

Routine service and maintenance consists of the daily activities necessary to maintain the proper machine function. The operator must:

- Be familiar with the machine characteristics
- Comply with the information on routine service and safe practices as specified by KONGSKILDE in this manual and by the signs on the machine

Routine service can include:

- Fueling
- Cleaning
- Washing
- Topping up fluid levels

- Greasing
- Replacing consumable items such as light bulbs

Periodic service, conversions, and repairs

Periodic service consists of activities that are necessary to maintain the expected life of the KONGSKILDE machine. These activities have defined intervals.

Trained service personnel familiar with the machine characteristics must perform these activities at the defined intervals. Trained service personnel must comply with the information on periodic service and safe practices as partly specified by KONGSKILDE in this manual and/or other company literature.

Periodic service includes:

- Oil change service for the engine, hydraulic circuits, or transmission
- Periodic exchange of other substances or components as required

Conversion activities rebuild the KONGSKILDE machine in a configuration that is appropriate for a specific job site, crop, and/or soil conditions (e.g., installation of dual wheels). Conversion activities must be done:

- By trained service personnel familiar with the machine characteristics
- By trained service personnel that comply with the information on conversion as partly specified by KONGSKILDE in this manual, assembly instructions, and/or other company literature

Repair activities restore proper function to a KONGSKILDE machine after a failure or degradation of performance. Dismantling activities occur during the scrapping and/or dismantling of the machine.

Trained service personnel familiar with the machine characteristics must perform these activities. Trained service personnel must comply with the information for repair as specified by KONGSKILDE in the service manual.

Before you operate

Read this manual before you start the engine or operate this KONGSKILDE machine. Contact your KONGSKILDE dealer if:

- You do not understand any information in this manual
- You need more information
- You need assistance

All persons training to operate, or who will operate this KONGSKILDE machine should be old enough to possess a valid local vehicle operating permit (or meet other applicable local age requirements). These persons

must demonstrate the ability to operate and service the KONGSKILDE machine in a correct and safe manner.

Product Identification Number (PIN)

The Product Identification Number (PIN) is a serial number that identifies the implement.

The serial number, model and other specifications are on the PIN plate.

Provide your KONGSKILDE dealer with the model and the PIN when you order parts.



ZEIL18HT00546EA 1

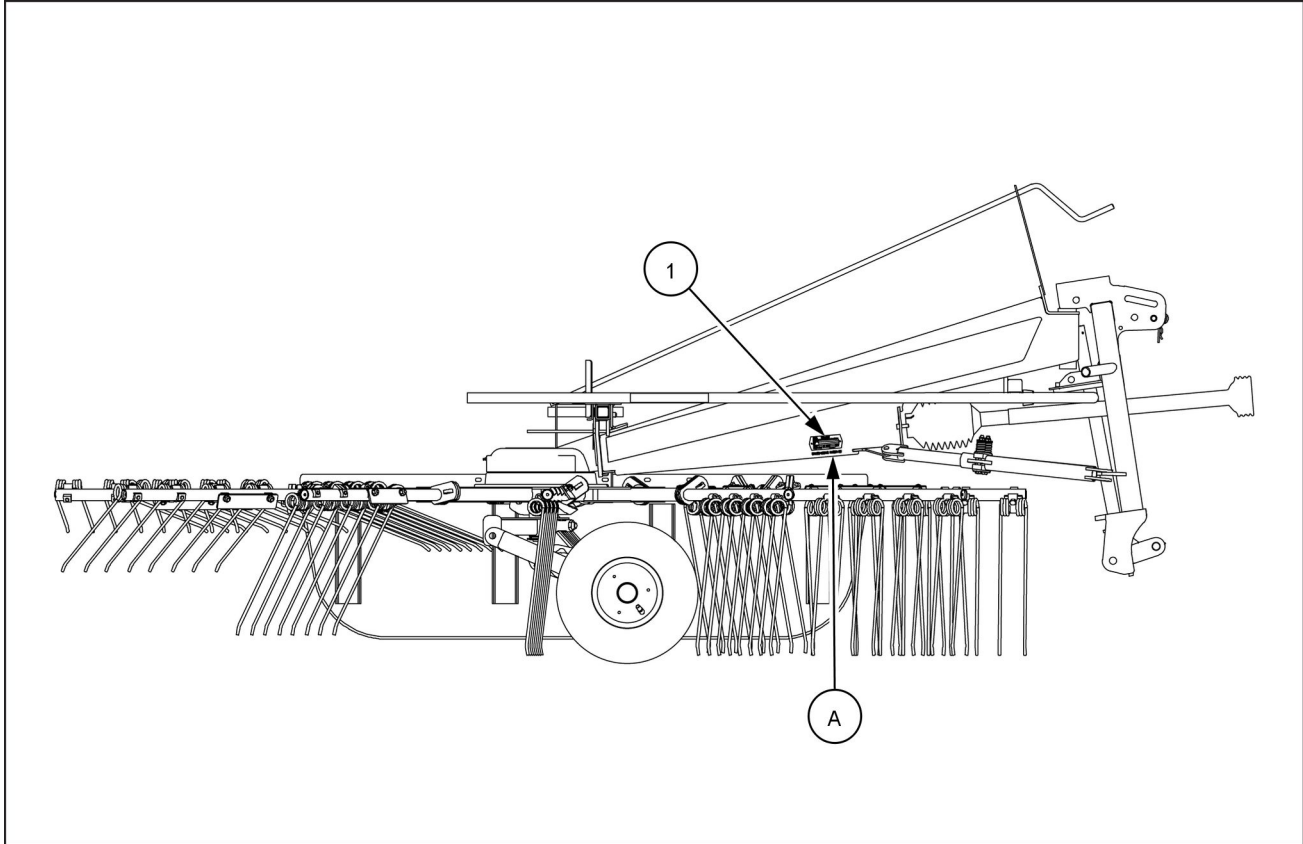
- | | | | |
|-----|---------------------------|------|-------------------------------------|
| (1) | Company name | (7) | Year of construction |
| (2) | Brand identification logo | (8) | Made in (country of origin) |
| (3) | Mail address | (9) | Maximum weight |
| (4) | Type / Variant / Version | (10) | Product Identification Number (PIN) |
| (5) | Model year | (11) | Model |
| (6) | Certification mark | (12) | Designation |

Product identification

NOTE: Do not remove or change the *Product Identification Number (PIN) plate (1)* on the implement.

The PIN plate **(1)** is placed on the right-hand side of the implement.

The PIN is also engraved on the chassis at **(A)** below the PIN plate **(1)**.



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For future reference, record your implement model and PIN in the spaces below.

Model

Product Identification Number (PIN)

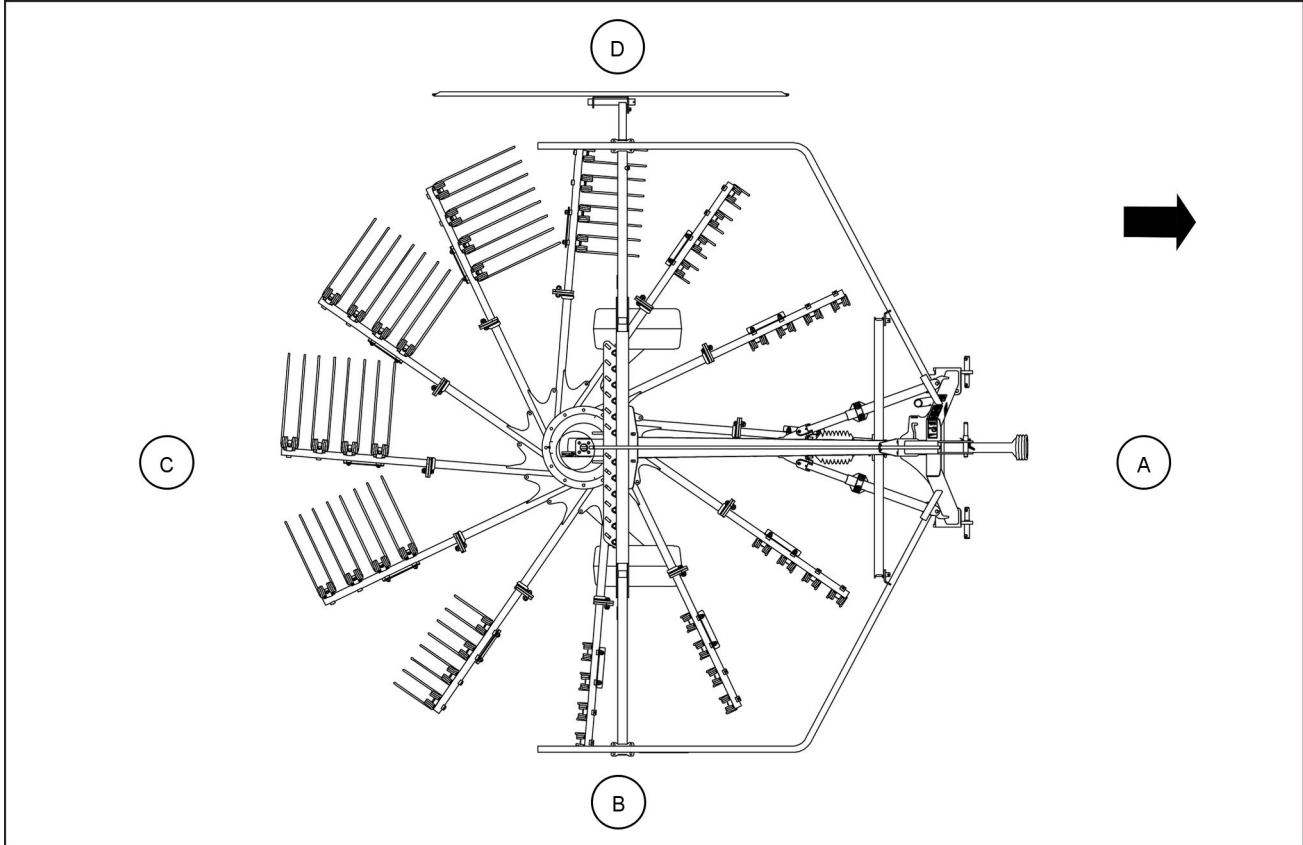
Operator's manual storage on the machine

Keep this operator's manual protected and accessible on the tractor whenever you transport or operate the implement.

Implement orientation

NOTE: To determine the left-hand side and the right-hand side of the implement, stand behind the implement and face the direction of travel during working operation.

The following overhead view illustration is a general representation of the implement. The illustration indicates the sides, front, and rear orientations of the implement as referred to throughout the operator's manual.



NOTE: The arrow indicates the direction of the implement during working operation.

- (A) Front of the implement
- (B) Right-hand side of the implement
- (C) Rear of the implement
- (D) Left-hand side of the implement

2 - SAFETY INFORMATION

Safety rules and signal word definitions


Personal safety





This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

 DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: Notice indicates a situation that, if not avoided, could result in machine or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: Note indicates additional information that clarifies steps, procedures, or other information in this manual.

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

General recommendations

Most farm machinery accidents can be avoided by the observance of a few simple safety precautions.

- This operator's manual contains important information concerning operation, maintenance and adjustment of the implement. Furthermore, this operator's manual mentions and emphasizes all the safety instructions.
- Read the operator's manual thoroughly before you start, operate, service, or carry out any other operation on the implement. Even though you have been driving a similar implement before, you must read the manual. This is a matter of your own and other people safety. A few minutes reading will save you time and hassle later. Lack of knowledge can lead to accidents.
- Your implement was designed with safety in mind. However, there is no real substitute for caution and attention when you need to prevent an accident. Once an accident has occurred, it is too late to think about what you should have done. This means that it is very important that you as user of the implement pay attention and use the implement correctly and thereby avoid exposing yourself and others to unnecessary danger.
- The implement must be operated only by responsible persons who have been adequately trained and authorized to use the implement. Never leave the implement to others before you have made sure that they have the necessary knowledge to operate the implement safely.
- Never let the implement run without supervision.
- Always keep a first aid kit handy.
- Take the necessary precautions (for example assistance) to always be aware of the possible presence of bystanders and pets.
- Keep children away from and off the implement at all times.
- Do not use this implement as a lift, ladder or platform to work at heights.
- Before you work on the implement, disengage all drives, stop the engine and remove the ignition key. Wait for the rotating parts to run down.
- Never work around the implement with loose clothing, jewelry, watches, long hair and other loose or hanging items can be pulled in by the moving parts of the implement.
- Keep hands away from moving parts of the implement.
- Never attempt to carry out any adjustments on the implement while the implement is in motion or while the Power Take-Off (PTO) shaft is engaged.
- PTO driven implement can cause death or serious injury. Before you work on or near the PTO shaft or service or clear the driven implement, disengage the PTO, stop the engine and remove the ignition key.

Illustrations

WARNING

Illustrations in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment.
Replace all shields before operating the machine.
Failure to comply could result in death or serious injury.

W0012A

NOTE: Some of the illustrations in this manual have been obtained by photographing prototypes. Standard production machines may differ in some details.

Legal obligations

Your machine may be equipped with special guarding or other devices in compliance with local legislation. Some of these require active action by the operator.

Therefore, check local legislation on the usage of this machine.

Fire or explosion prevention

1. Crop material, trash, debris, bird nests or flammable material can ignite on hot surfaces.
2. Inspect the electrical system for loose connections or frayed insulation. Repair or replace loose or damaged parts.
3. Do not store oily rags or other flammable material on the implement.
4. Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvent before you weld or cut with a flame.
5. Do not expose the implement to flames, burning brush or explosives.
6. Promptly investigate any unusual smells or odors that may occur during the operation of the implement.

Hazardous chemicals

1. If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etcetera. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.
2. Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures and procedures to be taken in the event of a spill or accidental release. MSDS are available from your dealer.
3. Before you service your machine check the MSDS for each lubricant, fluid, etcetera. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, on manufacturer containers, as well as the information in this manual when you service the machine.
4. Dispose of all fluids, filters and containers in an environmentally safe manner in accordance with local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.
5. Store fluids and filter in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.
6. Keep out of reach of children or other unauthorized persons.
7. Additional precautions are required for applied chemicals. Obtain complete information from the manufacturer or distributor of the chemicals before you use them.

Starting up the implement safely

Before you attach the implement to the tractor, ensure that the tractor is in good working order and that the brakes are efficient, particularly if you operate on hilly ground. Also, ensure that the hydraulic or pneumatic system is compatible with that of the implement.

When you attach the implement to the tractor:

- Never allow anyone to stand between the tractor and the implement. An unintentional manoeuvre with the tractor may cause serious injury.
- Never go under an unsupported implement.

Install all the guards correctly before you use the implement.

Replace worn and damaged canvases before you work with the implement.

Make sure that you are thoroughly familiar with the instruments and controls before you engage the Power Take-Off (PTO) drive for the first time.

The PTO shaft has its own instruction manual that the manufacturer supply with the implement. To ensure the correct use of the shaft, follow all the instructions of the manufacturer manual. Pay particularly close attention to the safety and maintenance instructions, in order to prevent unintentional injury and damage.

Do not use Power Take-Off (PTO) drive shafts with other specifications than the shaft which was supplied with the implement.

Before you install the PTO drive shaft, check that the Revolutions Per Minute (RPM) and direction of the PTO on the tractor match those of the PTO on the implement.

Repair immediately a damaged PTO shaft before you work with the implement.

Always stop the PTO and the tractor engine and remove the ignition key before you connect the PTO drive shafts.

After you attach the implement to the tractor, ensure that the Power Take-Off (PTO) lock pin is properly engaged in the tractor Power Take-Off shaft. An incorrectly locked PTO shaft could work loose and cause accidents or damage to the implement.

Make sure to install and secure the PTO drive shaft correctly. Check that the lock pin is in mesh. Fasten the support chain at both ends.

Always make sure that the guard tubes do not separate at the maximum working or transport length of the PTO drive shaft. Check also that the guard tubes do not jam at the minimum working or transport length of the PTO drive shaft.

Unless the protective guards, the PTO drive shaft may cause serious injury. Be careful not to damage the guards when you connect the PTO drive shaft to or from the tractor.

Fit correctly the guards on the PTO drive shaft. Secure the guard of the PTO shaft with the chain.

Before you start up the implement (for example the first time after a long standstill period), make sure that there are no detached loose parts on the drive line area and on the moving parts of the implement.

Traveling on public roads

Comply with the relevant traffic regulations

WARNING

Impact hazard!
Take care when making turns. The machine rear end swings out when changing direction. Failure to comply could result in death or serious injury.

W0089A

WARNING

Loss of control hazard!
Uneven brake force exists on left-hand and right-hand brakes. Always use brake pedal coupler when traveling on public roads to ensure brakes are actuated together. Failure to comply could result in death or serious injury.

W0081A

The implement is built according to the homologation requirements of your country. Do not modify the implement in a sense that would conflict with the national regulations.

If you wish to transport the implement on the public road, make sure that the combination tractor and implement observes the traffic rules in your country. This gives you and your surroundings the best possible safety.

The operators must observe relevant statutory or other national regulations that deal with road safety and labor safety issues.

Before you drive the implement on public roads:

- Check the allowable transport dimensions and weights.
- Install correctly the lighting and the warning panels.

Always observe the principles for permissible axle loads, the total unit mass and the transport gauge.

Observe the tractor manufacturer regulations and recommendations, specifically those relating to maximum transport loads and maximum speed.

Even in similar circumstances, the maximum allowed speed can vary depending on which country you travel in.

Always drive with the statutory lights and safety marking during transport on public road and at night.

Install all the required signs that indicate the vehicle width. Also install all the required lights that indicate the vehicle width during the nightly transport. If in doubt, contact your government department responsible for road transport.

Travel may be restricted to certain road types. Transport may be restricted to daytime or outside peak traffic hours. However plan your route to avoid heavy traffic and peak traffic hours.

Passengers

Do not allow passengers to ride in the tractor unless a specific seat is provided.

During transport, the transportation of people on the top of the implement is strictly forbidden.

Transport safety

Transport the implement only in transport position. Secure the implement for transport. Always activate the mechanical transport safety devices before transport.

Make sure to fit all the hitch pins with retaining pins correctly. Mechanically secure the hydraulic cylinders to prevent cylinders from creeping.

Drive safe

Do not drive under the influence of alcohol or drugs.

Never travel at speed in crowded areas.

When you maneuver the tractor with the implement, always be aware and conscious of its size.

The tractor driver must not leave the cabin during transport.

Always consider other road users.

Always adopt safe driving practices. Slow down and signal before turning. Give way to oncoming traffic in all situations, including narrow bridges, intersections etcetera. Pull over to allow faster traffic to pass.

If the implement is marked with a maximum speed limit, never exceed this maximum speed limit.

Always adjust the driving speed to the road and weather conditions. In case of bad road conditions and high driving speeds, big forces may occur and cause overload of tractor and implement.

Drive at a safe speed to ensure control and ability to stop in an emergency.

Lock the tractor brake pedals together. Never use independent breaking at transport speeds.

Mounted implements and ballast weights influence the driving, steering and braking capacity of the tractor. Make sure that the additional weight of the implement on the linkage does not compromise driving, steering and braking capacity of the tractor. Install front weights or repair the brakes if the tractor is not safe to drive.

Reduce speed during turns. Tractors have not been designed for fast turning. Avoid that the rear end of the implement hits an obstacle.

When you turn during transport pay attention to the overhang and/or oscillating weight of the implement.

Use engine braking when you drive down hills. Do not coast.

Watch for obstructions, particularly if over-width. Observe any load ratings applicable on bridges.

After you finish the transport, before you leave the tractor, always lower the implement to the ground in parking position, turn off the tractor engine, pull the parking brake, and remove the key from the ignition.

Operating the implement safely

⚠ WARNING

Hazard to bystanders!

Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.

Failure to comply could result in death or serious injury.

W0304A

⚠ WARNING

Rotating parts!

Keep clear of all drives and rotating components.

Failure to comply could result in death or serious injury.

W1101A

NOTE: Only put the implement into operation according to the instructions from the dealer.

Never operate the implement under the influence of alcohol, drugs, or while otherwise impaired.

Avoid using the implement in unsuitable field and weather conditions. It is better to stop work temporarily rather than to operate in such conditions.

Keep people away from the implement during operation. Ask bystanders to leave the field. There is the risk for bystanders to be overrun by the implement. Stop the implement immediately if someone approaches.

The tractor or its implement may strike or crush against a person or pet within the operator area of the tractor. DO NOT allow anyone to enter the work area. Make sure that the area is clear and operation is safe before you move the implement.

When you operate the implement, always remain seated in the tractor cab. Operate controls only when seated in the tractor seat, except for those controls expressly intended for use from other locations.

While in operation, the transportation of people on the top of the implement is strictly forbidden.

Never attempt to remove residues from the implement while the implement runs. Such an imprudence could cost life or limb. Always disengage the Power Take-Off (PTO) shaft mechanism, switch OFF the tractor engine and apply the parking brake before you remove residues.

During the daily work you must consider that loose stones and foreign matter on the ground might get in contact with the revolving parts and get thrown out again at a very high speed. Therefore, before you operate the implement make sure that all safety guards are intact, properly fitted and secured.

Before you raise or lower the implement with the link arms of the tractor, check that nobody is near the implement or touches the implement.

Always operate the implement at a safe speed in accordance with the ground conditions. On uneven ground, proceed with the utmost caution to ensure proper stability.

When you turn on hillsides always be careful when you lift the implement with the 3-point linkage because there is a risk of overturning. Adjust the speed to these conditions.

Drive in a low tractor gear if you work on hillsides.

When you drive up and down and across hillsides, avoid sharp turns.

When you turn during operation, pay attention to the overhang and/or oscillating weight of the implement.

Avoid changing direction abruptly, especially when you reverse, to avoid dangerous pitching of the implement.

When you work with the implement keep a safe distance from steep slopes and similar ground conditions, as the ground may be slippery and pull the implement and the tractor sideways. Also remember to adjust the speed for sharp turns when you drive on hillsides.

Pay the necessary attention while you operate next to public roads or footpaths.

Stopping the implement safely

WARNING

Moving parts!

Some components may continue to run after disengaging the drive systems. Make sure all drive systems are fully disengaged and all movement has stopped before servicing the machine.

Failure to comply could result in death or serious injury.

W0002A

Always interrupt the operation of the implement before you leave the tractor seat.

For safety's sake never leave the tractor cab without first to disengage the Power Take-Off (PTO) shaft mechanism and to stop the tractor engine. Furthermore, if you leave the tractor unattended, always remove the ignition key.

Stop the tractor engine and the PTO shaft and wait until the implement has completely stopped before you open any of the safety guards. There are rotating parts under the safety guards which may continue rotating after the implement has been stopped. Look and listen for evidence of rotating parts before you open any of the safety guards.

Make sure to secure the tractor by means of the hand brake and/or stop blocks if you need to stand between the tractor and the implement.

When, due to exceptional circumstances, you would decide to keep the tractor engine running after leaving

the tractor cab, then the following precautions must be followed:

- Bring the tractor engine to low idle speed.
- Disengage all drive systems.
- Shift the tractor transmission into neutral.
- Apply the parking brake.

When you park the implement there are some operational risks which may cause personal injury. Therefore, you must:

- Make sure that the ground is firm and even during parking.
- Make sure that tractor and implement cannot move.
- Always lower the implement to the ground.
- Stop the tractor engine and remove the ignition key.
- Use correct support or transport safety device when the implement is parked. Make sure that the parking stand is secured.

When you detach the implement from the tractor:

- Always detach the implement carefully and on a flat surface to prevent damage.
- Make sure that nobody stands in front of the implement.
- Never allow anyone to stand between the tractor and the implement.
- Never go under an unsupported implement.

Maintenance

WARNING

Maintenance hazard!

Before you start servicing the machine, attach a DO NOT OPERATE warning tag to the machine in a visible area.

Failure to comply could result in death or serious injury.

W0004A

- Follow the maintenance schedule with regard to the implement servicing intervals.
Remember that the implement requires attention from time to time. Also remember that the maintenance will greatly extend the life of the implement.
- Take the necessary precautions: not to spill any oil, fuel or grease.
To avoid oil and grease contact with your skin, wear protective gloves.
- Service the implement on a firm level surface.
- Do not attempt to remove material from any part of the implement, clean, lubricate or carry out any adjustments on the implement while it is in use.
- Keep hands, feet and/or garments away from parts which move. Check that all rotating parts have a suitable protective guard.
- Raised implement and/or loads can fall unexpectedly and crush persons underneath. Never enter or allow anyone to enter the area underneath raised implement during operation.
Unsupported hydraulic cylinders can lose pressure and drop the implement and cause a crushing hazard. Do not leave the implement in a raised position while parked or during service, unless securely blocked on wooden blocks.
- Never work under a raised implement unless a support chain or other mechanical securing device secure the link arms of the tractor so that the implement cannot move to a lower position unintentionally.
- Relieve the pressure, stop the engine and remove the ignition key, before you connect or disconnect fluid lines.
- Before you adjust, clean, lubricate or you carry out repairs on the implement, stop the engine and remove the ignition key.
- Never adjust the implement while the Power Take-Off (PTO) drive shaft is engaged. Do not to remove the guards until all revolving parts have stopped.
- Any leakage of hydraulic oil or fuel under pressure may cause severe harm, so always use a shielding, goggles and gloves when you trace oil or fuel leaks.
Do not use your hand to check for leaks. Use a piece of cardboard or paper.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.
- If hydraulic fluid or diesel penetrates the skin, seek medical care immediately.
- Observe all recommendations that are mentioned in this manual such as service intervals, torques, lubricants, etcetera.
- Always replace all parts that have damage or wear.
- Never build flexible hose assemblies from hoses that were previously part of a hose assembly.
- Never weld to the tubes.
- Always use gloves when you work with parts on the implement as the parts can have sharp edges.
- Transmission and hydraulic lines may become hot during operation. Be careful when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when required.

Personal Protective Equipment (PPE)

Wear Personal Protective Equipment (PPE) such as protective clothing, eye protection, hearing protection, dust mask, hard hat, heavy gloves, work boots, and/or any other PPE that provides for the safety and protection of the individual that operates this equipment.



NHIL13RB00001AA 1

Safety requirements for fluid power systems and components - hydraulic systems

Before you start the engine or pressurize the hydraulic system, install and tight correctly all the hydraulic couplings. Check that all hoses and fittings are not damaged. Replace immediately damaged components.

Only connect the hydraulic hoses to the tractor outlets if the tractor and the implement are pressure-free. If the hydraulics of the tractor is activated it may lead to uncontrolled movements which may cause damage.

Make sure that no persons are near the implement when you start the implement, as there might be air in the hydraulic system which might lead to sudden movements.

When the tractor engine has stopped, activate the tractor hydraulic spool valves to make sure that there is no pressure in the hydraulic hoses.

To expel all the air from the oil in the hydraulic cylinders, test all the functions after you connect the hydraulic connections to the tractor, especially before you enter or drive on the public roads.

Noise emission

The measuring and reporting of the noise level were carried out according to ISO 5131.

The noise level of **70 dB** was measured in the cabin of the tractor where the head of the operator is usually situated.

Use hearing protectors if the noise from the implement is annoying or if you work with the implement for a considerable period in a tractor cabin that has not a adequate soundproof cabin.

Vibration levels

Install all revolving parts correctly before you start the implement. An unbalance can create vibrations that damage the implement.

NOTE: *You must check that the all part are in the correct position before start the implement.*

NOTE: *If the vibrations or the noise of the implement increase considerably during the operation, stop the work immediately. Correct the fault before you continue the work.*

Implement stability

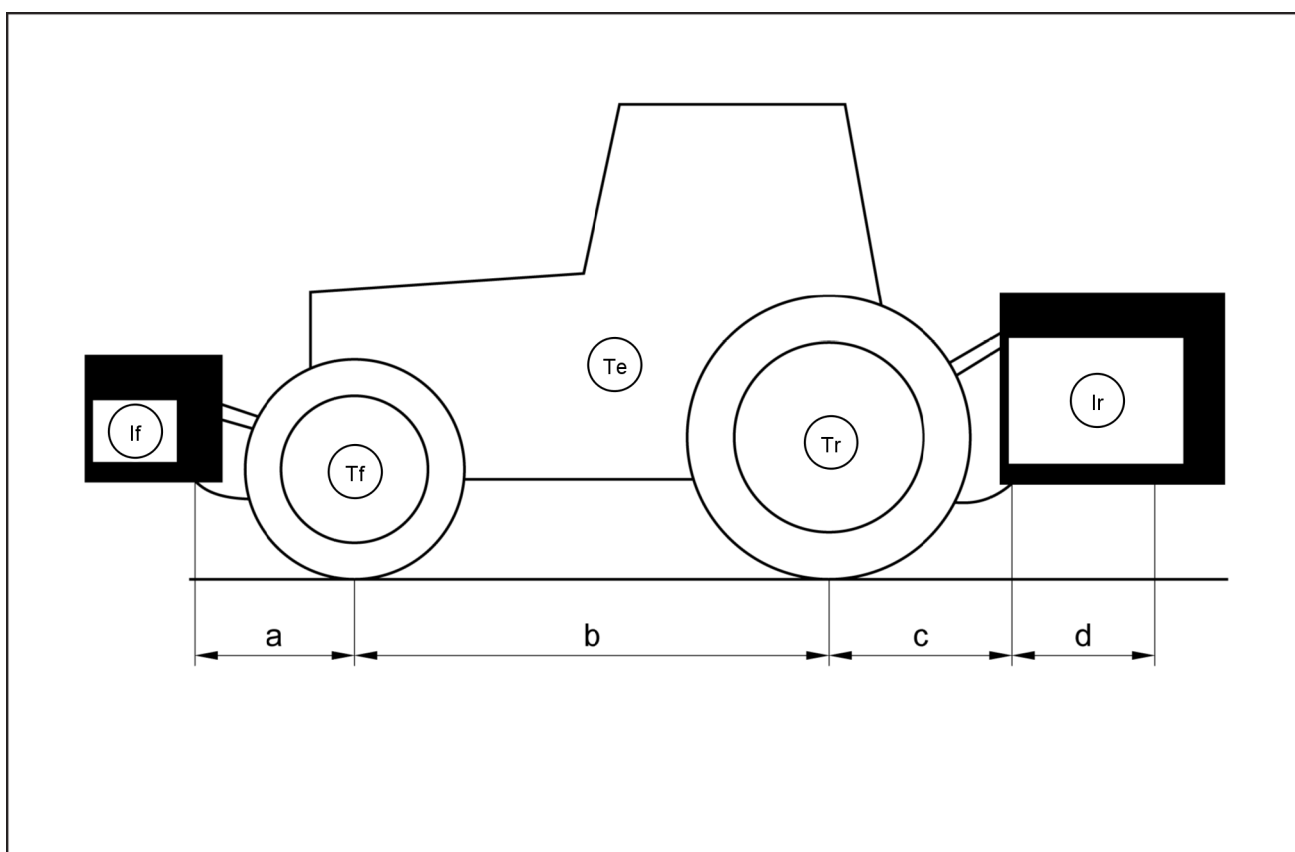
The combination of your tractor and implement can become unstable, due to the additional weight that the implement adds to the tractor.

In order to guarantee stable and safe transport, you must check if you need ballast weights for transport and field work.

You must also check and guarantee that you have at least **20%** from the tractor weight on the front axle.

For rear mounted implements and front-rear combinations, the formula is:

$$I_{f,min} = \frac{[I_r \times (c + d)] - (T_f \times b) + (0,2 \times T_e \times b)}{a + b}$$



ZEIL18HT00277FA 1

Example of references to stability of the combination tractor – implement

List of signs

T_e [kg]	The tractor own weight.
T_f [kg]	Front axle load with empty tractor.
T_r [kg]	Rear axle load with empty tractor.
I_r [kg]	Total weight of the rear-mounted implement/rear ballast.
I_f [kg]	Total weight of the front-mounted implement/front ballast.
a [m]	Distance between the center of gravity of the front-mounted implement/front ballast and the middle of the front axle.
b [m]	The tractor wheel distance.
c [m]	Distance between the middle of the rear axle and the middle of the link arm balls.
d [m]	Distance between the middle of the link arm balls and the center of gravity of the rear mounted implement/rear ballast.

Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances. Your KONGSKILDE dealer can also provide assistance.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your KONGSKILDE dealer or air-conditioning specialist has a special extractor for this purpose and can recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. KONGSKILDE strongly recommends that you return all used batteries to a KONGSKILDE dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



NHIL14GEN0038AA 1

Mandatory battery recycling

NOTE: The following requirements are mandatory in Brazil.

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

Safety signs

The following safety signs are on your implement as a guide for your safety and for the safety of those who work with you.

Walk around your implement and note the significance and location of all safety signs before you operate your implement. Read all the safety signs adhered to the implement and follow the instructions.

Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and a gentle detergent.

NOTICE: Do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove the safety signs.

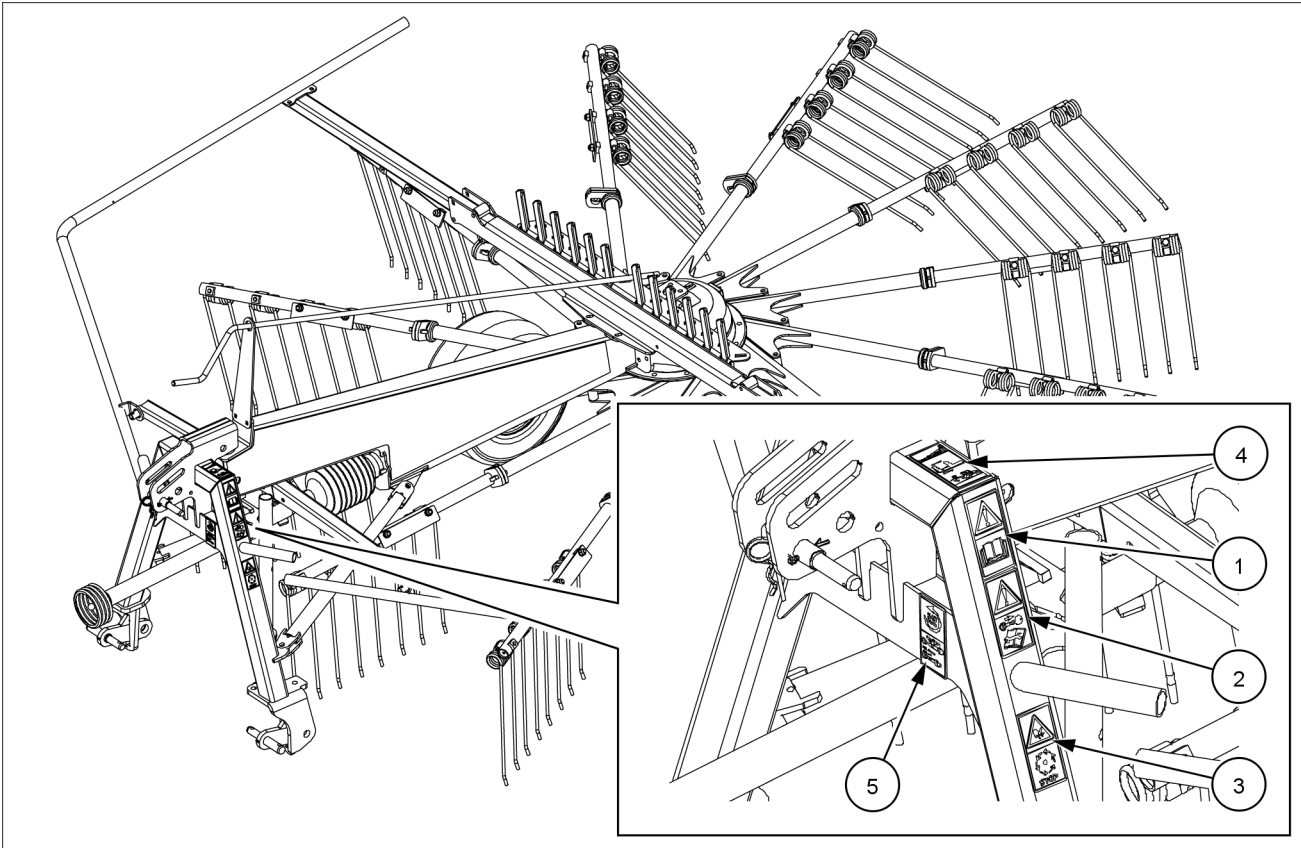
Replace all safety signs that are damaged, missing, painted over, or illegible. If a safety sign is on a part that you or your dealer replaces, make sure that you or your dealer install the safety sign on the new part. Contact your dealer for the replacement of the safety signs.

Safety signs that display the “Read operator’s manual” symbol direct you to the operator’s manual for further information regarding maintenance, adjustments, or procedures for particular areas of the implement. When a safety sign displays this symbol, consult the appropriate page of the operator’s manual.

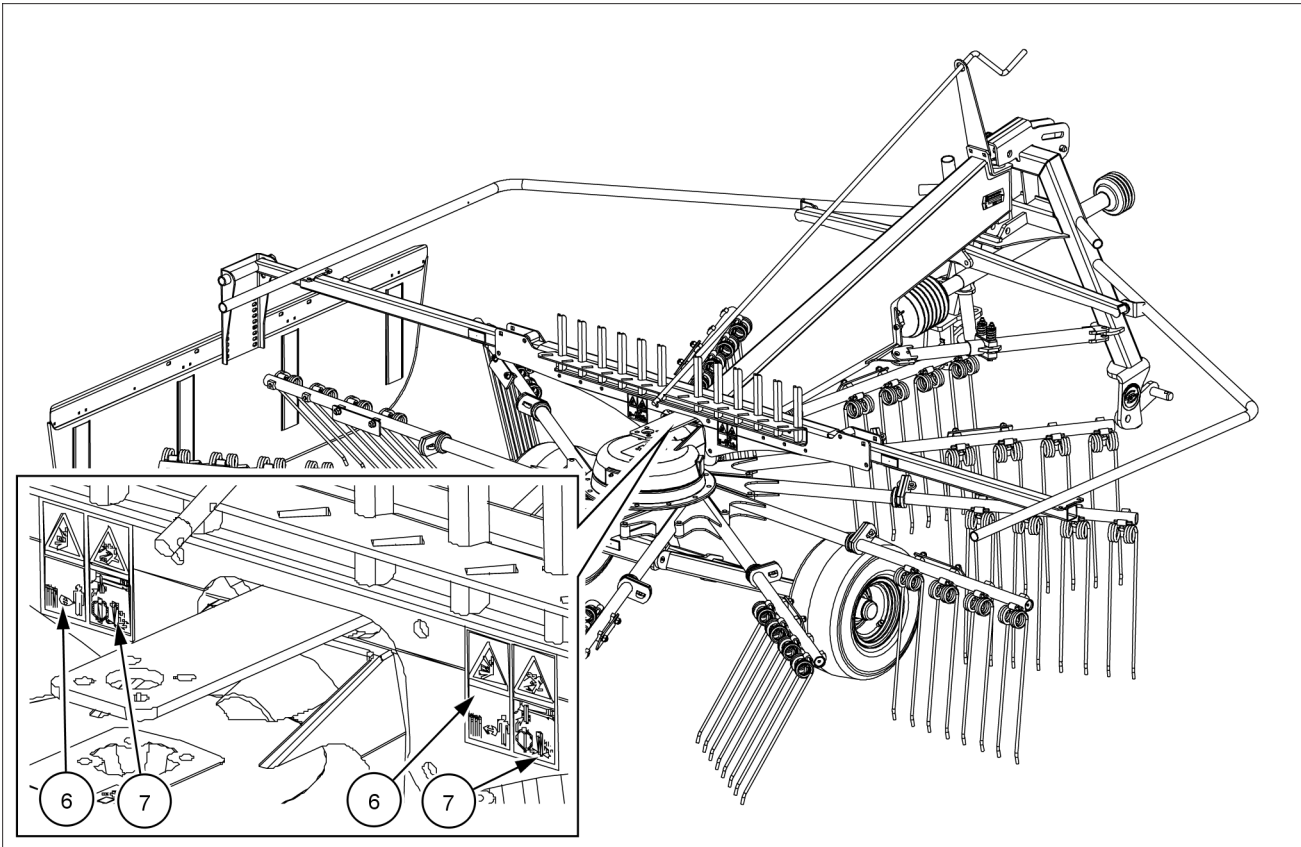


Safety signs that display the “Read service manual” symbol direct you to the service manual. If you doubt your ability to perform service operations, contact your dealer.



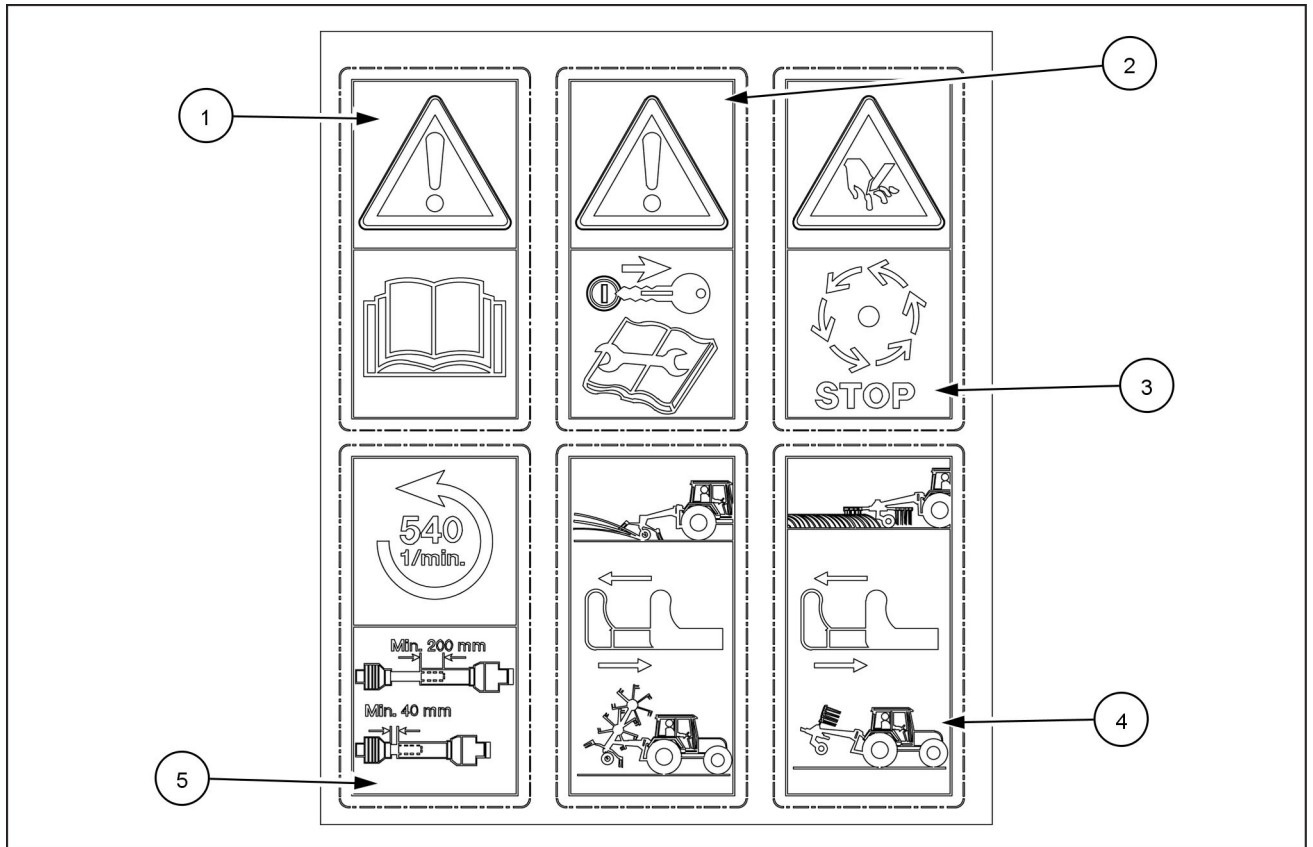


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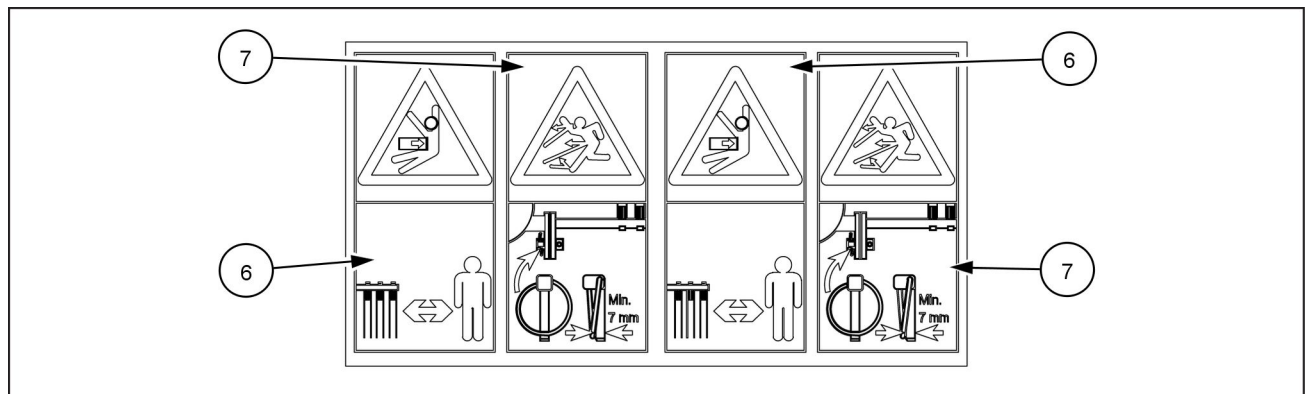
ZEIL18HT00273FA 2

2 - SAFETY INFORMATION



81PR80-0859 3

Part number: 81PR80-0859



810699920 4

Part number: 810699920

Safety sign (1)

Read the operator's manual and the safety instructions. Read the operator's manual to operate the implement and to avoid unnecessary accidents and damages to the implement.

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.

MAKE SURE THAT EVERY OPERATOR:

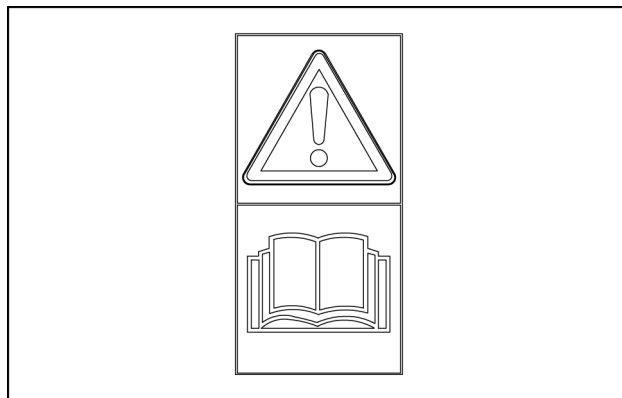
-is instructed in the safe and proper use of this machine.

-reads and understands the operator's manual for this machine.

-reads and understands ALL safety signs on the machine.

Failure to comply could result in death or serious injury.

W0188A



81PR80-0859_5 5

Part of part number: 81PR80-0859

Safety sign (2)

Always stop the tractor engine before you adjust, maintain, repair, or lubricate the implement. Also remember to remove the ignition key. Make sure that nobody starts the engine, until you have finished.

Part of part number: 81PR80-0859

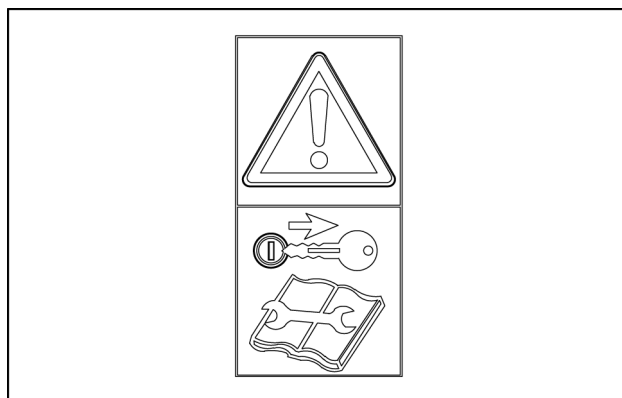
⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.

1. Disengage all drives.
2. Engage parking brake.
3. Lower all attachments to the ground, or raise and engage all safety locks.
4. Shut off engine.
5. Remove key from key switch.
6. Switch off battery key, if installed.
7. Wait for all machine movement to stop.

Failure to comply could result in death or serious injury.

W0047A



81PR80-0859_2 6

Safety sign (3)

Moving parts are dangerous and if the moving parts come in contact to your body the moving parts can pinch your body.

The hazard may cause severe injuries to the entire body, with possible lethal effect.

To avoid the hazards, wait until all moving elements have completely stopped before you touch the moving elements.

⚠ WARNING

Pinch hazard!

Wait for all movement to stop before you service or adjust the machine or equipment.

Failure to comply could result in death or serious injury.

W1420A

Part of part number: 81PR80-0859

Safety sign (4)

Pull out the safety bolt during operation in the field. Push in the safety bolt during the transport.

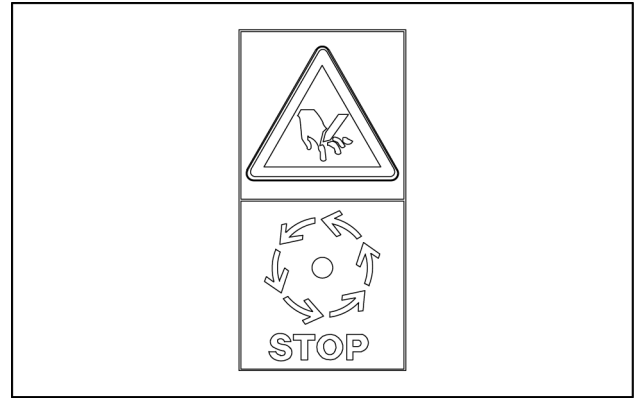
Part of part number: 81PR80-0859

Safety sign (5)

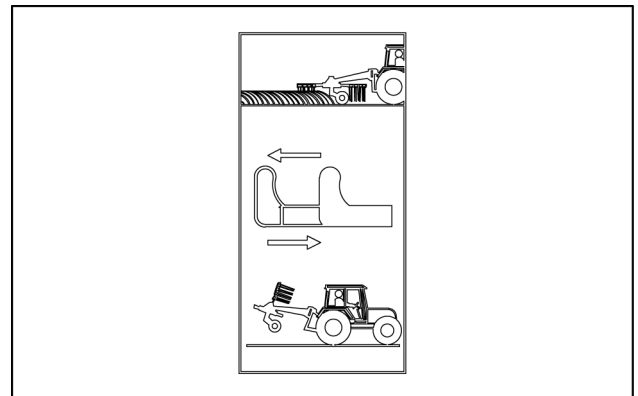
The sign indicates the maximum Revolutions Per Minute (RPM) (**540 RPM**) and the direction of rotation of the Power Take-Off (PTO) shaft.

Reference to the minimum overlapping on the profile tubes and the minimum distance required not to bottom the shaft.

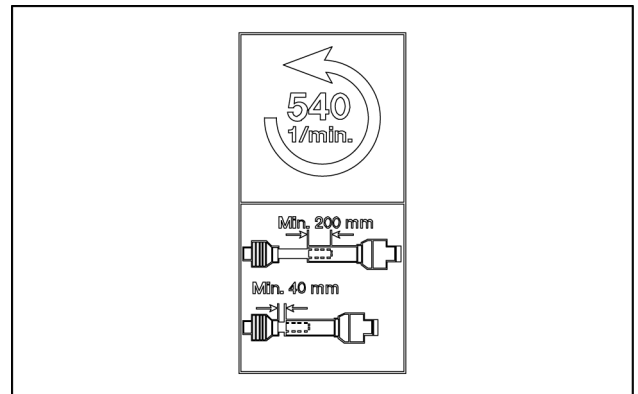
Part of part number: 81PR80-0859



81PR80-0859_1 7



81PR80-0859_3 8

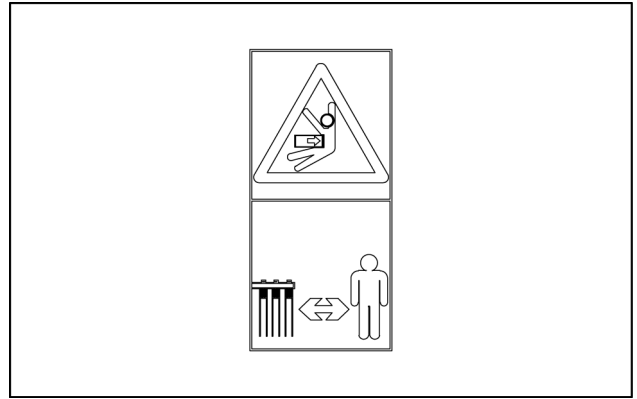


81PR80-0859_4 9

Safety sign (6)

Keep a safe distance from the rotating parts of the implement.

Part of part number: 810699920

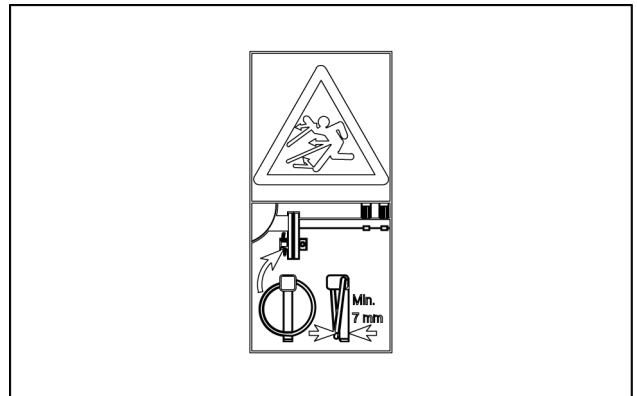


810699920_6 10

Safety sign (7)

Check the safety pins for wear. If the thickness is less than **7 mm (0.28 in)**, replace immediately the safety pins.

Part of part number: 810699920



810699920_7 11

3 - CONTROLS AND INSTRUMENTS

Information

Operating principles

For all information related to the description and the location of the controls to use your implement, see chapter “Controls and Instruments” in the operator’s manual of your vehicle.

4 - OPERATING INSTRUCTIONS

Commissioning the unit

Preparing for operation

NOTICE: Only authorized and informed personnel can mount the implement.

NOTICE: The necessary tools and adjustment tools must be available.

NOTICE: Incorrect assembly of the implement is highly dangerous. Before you perform the functional test, check the correct assembly of the implement.

NOTICE: Make sure that there are no tools in the area around the implement.

Make sure that there are no persons in the work zone.

NOTE: After the assembly of the implement, perform a complete functional test.

NOTE: Torque all screw joints every 5 h of operation.

The implement is disassembled into parts and delivered on a pallet. For shipment on a big pallet the wheel axle assembly and some arms are dismounted.

Loose parts such as a bag with small parts (screws) and the Power Take-Off (PTO) shaft have been tied to the pallet or the implement to save space.

Starting the unit

Connection to the tractor

WARNING

Crushing hazard!

Use care when you connect and disconnect the machines. Never stand between the tractor and the implement when you connect the link arms.

Failure to comply could result in death or serious injury.

W1545A

WARNING

Crushing hazard!

Do not stand or place any body part between the implement and a moving tractor. Stop the tractor engine and set the parking brake before you attach cables and hoses.

Failure to comply could result in death or serious injury.

W1544A

WARNING

Hitching hazard!

Always keep the area between the tractor and the implement clear of all persons while the tractor or three-point hitch is in motion. Lock the tractor transmission in Park and engage the parking brake(s) before you allow anyone to complete hitching or unhitching.

Failure to comply could result in death or serious injury.

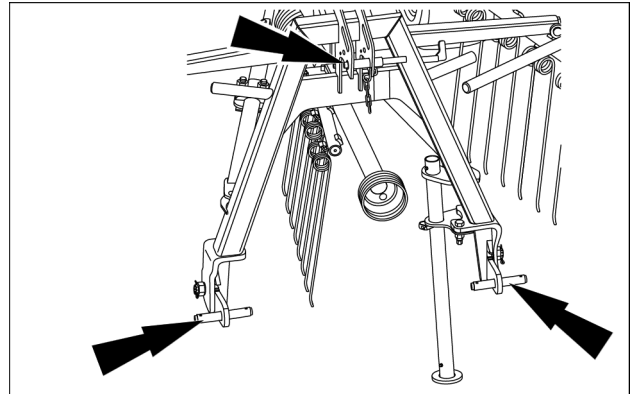
W1540A

Three point suspension on the tractor

Connect the rakes R+ 420 and the R+ 460 to the three point suspension of the tractor.

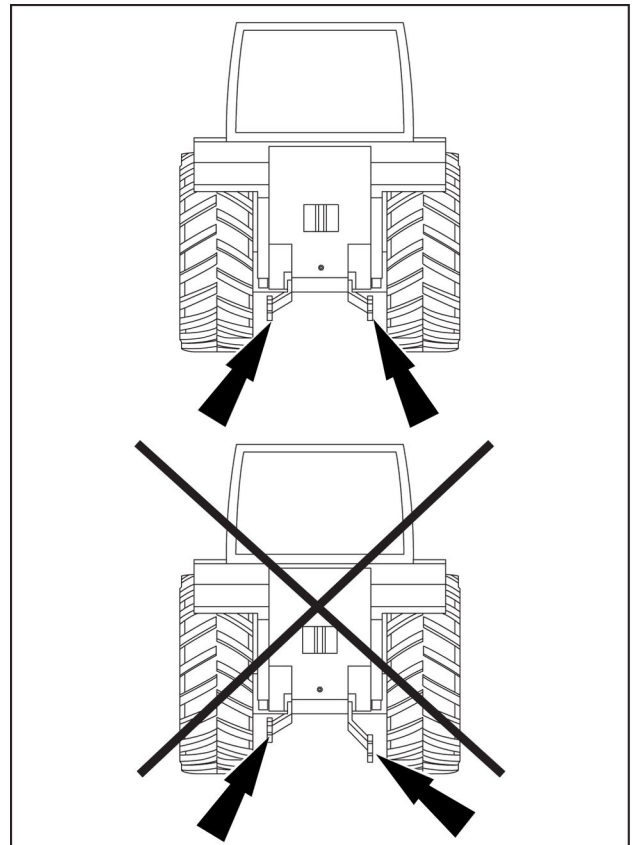
Hitch pins:

- Category I: inside
- Category II: outside



ZEIL17HT00206AA 1

Minimize the sideways movement of the bearing arm on the tractor to avoid oscillation of the implement during work and transport. You must secure the bearing arms with limiting chains or other locking device. Adjust the bearing arms of the tractor so that the bearing arms are at the same height above the ground at the two sides.



ZEIL18HT00270BA 2

Connection of the rotary rake to the tractor

NOTICE: Never stand between the tractor and the implement during connection to the tractor.

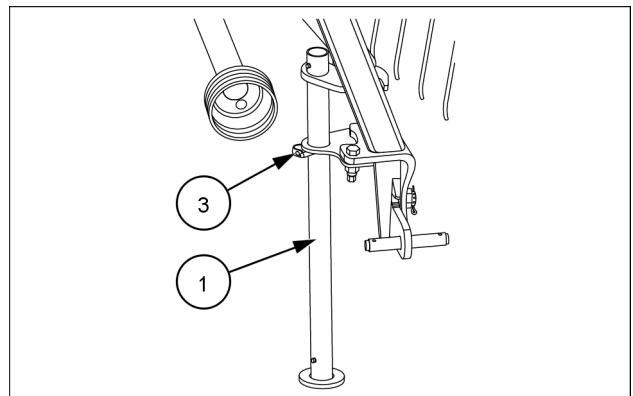
NOTE: The instructions are based on a fully mounted implement in locked transport position with the support folded down.

1. Reverse the tractor to the implement and connect the balls on the pins on the suspension of the implement to the bearing arms of the tractor and secure.
2. Fold down the top link on the tractor and connect it to the upper ball on the suspension of the tractor and secure.

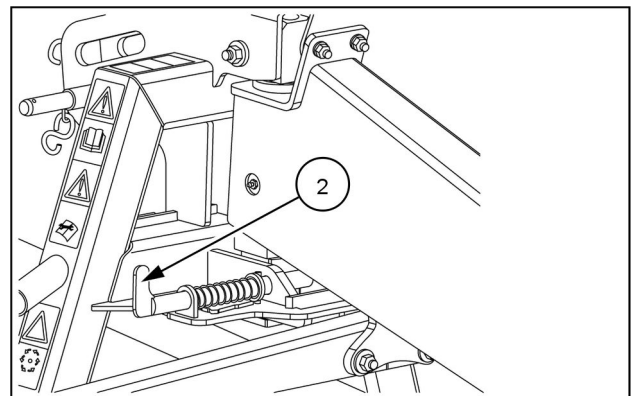
NOTICE: Secure the top link bolt with a hairpin cotter. The chain of the hair pin cotter must hang freely.

NOTICE: Secure the link arm balls with linchpin (12 mm (0.47 in)).

3. Raise the implement with the bearing arms until you raise the support (1) from the ground.
4. Remove the hair pin cotter (2) under the bottom steering plate of the support and push up the support (1).
5. Place the hair pin cotter (3) in the bottom hole of the support (1) above the bottom steering plate.
6. Pull and turn the transport safety bolt (2) to release the split pin. Push the transport safety bolt (2) until the end of the guide. The spring supports the procedure and prevents the transport safety bolt (2) from wandering back. Make sure that the transport safety bolt (2) is pushed in, in the correct position.



ZEIL17HT00207AA 3



ZEIL17HT00208AA 4

Power Take-Off (PTO) shaft connection

NOTICE: To install and remove the PTO shaft, stop the engine.

NOTICE: Only use the supplied PTO shaft or the PTO shaft that the manufacturer approve.

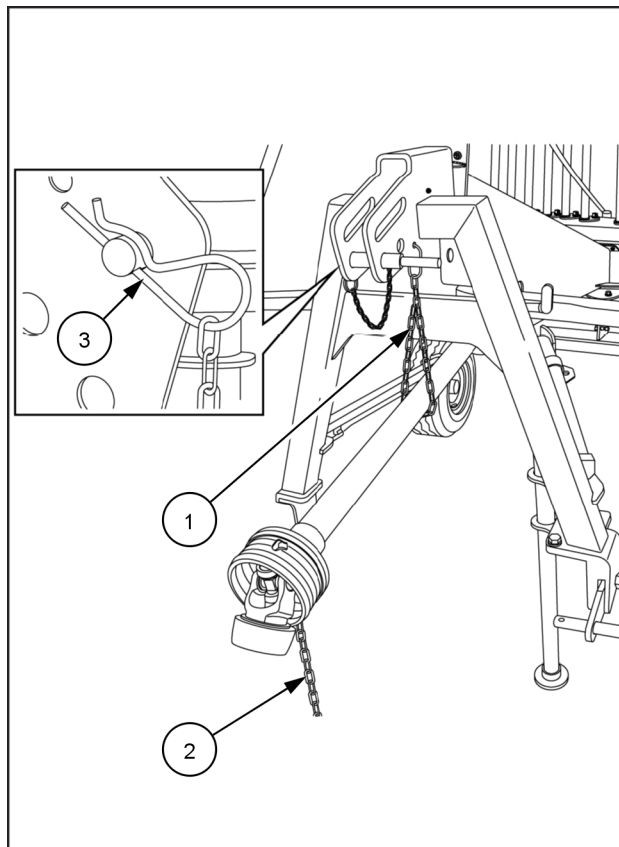
Adjust the length of the PTO shaft to the tractor before you perform the following steps. If you use the implement with different tractors, check that the PTO shaft has the correct length.

NOTICE: The safety guards on the tractor side and on the implement side there must be intact.

1. Release the PTO shaft from the support chain (1).
2. Push the PTO shaft onto the tractor PTO shaft until you engage the locking balls.
3. The safety chain (2) secure the safety guard of the PTO shafts on the tractor side. On the implement, side there is a full-covering protection. The clamp secure the full-covering protection.

Support chain (1) for PTO shaft, safety chain (2) on the tractor side, and hair pin cotter (3) for top link bolt.

NOTICE: The chain secure the safety guard of the PTO shaft.



ZEIL18HT00278BA 5

Functional test

After the preparation of the implement, perform a functional test.

1. Fold the implement in and out.
2. Check that the implement works correctly.
3. Torque again the screws after 5 h of operation.

Power Take-Off (PTO) shaft – Shorten

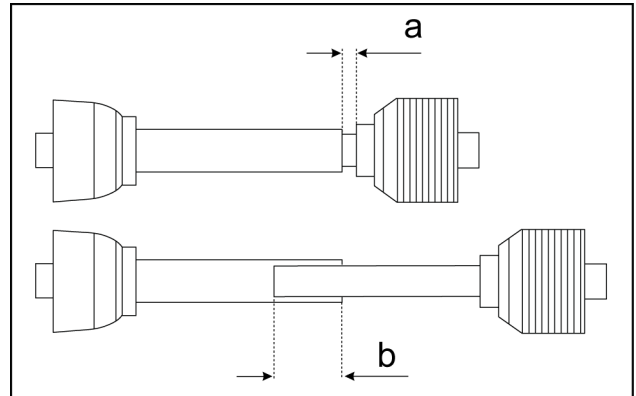
Power Take-Off (PTO) shaft length

NOTE: Do not shorten your new Power Take-Off (PTO) shaft until you are certain that it is necessary. From the factory the distance from PTO to Power Input Connection (PIC) is standard on most tractor brands.

Check the length of the PTO shaft for each tractor prior to first use.

If it is still necessary to shorten the PTO shaft, the profile tubes of the PTO shaft must fully comply with the following overlapping measures.

- The sliding tubes must have as much overlap as possible, with an acceptable minimum overlap (**b**) of **200 mm (7.87 in)** during normal operation (Top Safe extension links in the normal position).
- There must be a minimum of **40 mm (1.6 in)** of free PTO shaft length (**a**) to prevent the shaft from bottoming out.



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Determining the required shaft length

When you determine that you must shorten the PTO shaft, select the length so that the telescoping members never close completely or bottom out when in use. The PTO length must never be smaller than the minimum distance between the joints.

1. Attach the implement to the tractor without the PTO shaft.
2. Adjust the three-point hitch so that the PTO shaft is parallel with the ground.
3. Stop the tractor and engage the parking brake.
4. Determine if the PTO shaft bottoms out in this position. If the PTO shaft bottoms out in this position or if the free length is less than **40 mm (1.6 in)**, proceed with the procedure to shorten the PTO shaft.

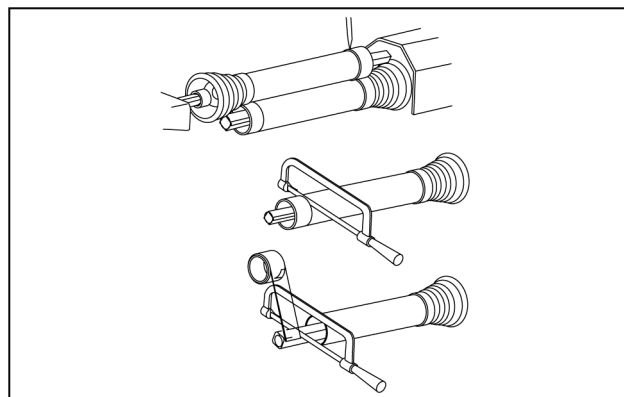
Shortening the PTO shaft

To shorten the PTO shaft proceed as follows.

1. Fasten the PTO shaft half parts to the PTO (on the tractor) and the PIC (on the implement). The PTO shaft half parts must be at the same horizontal level, opposite each other at the shortest distance from the tractor.
2. Make sure that a minimum overlap of **200 mm (7.87 in)** exists.
3. Check that the PTO shaft does not bottom out at one end. Keep the shaft ends parallel to each other and mark the minimum distance of **40 mm (1.6 in)**. Only cut enough PTO shaft off to achieve this minimum free shaft length. This will maintain the maximum amount of PTO shaft overlap.
4. Shorten all four tubes equally.
5. Round off the ends of the profile tubes and remove the burrs carefully.
6. Remove the metal shavings.

NOTICE: To avoid big friction forces, grease the tube carefully before you reassemble the tube. Use **NLGI 2**.

NOTE: If you shorten the PTO shaft, then you must check the minimum overlap and the minimum distance again if you operate the implement with a different tractor.



ZEIL18HT00013AA 2

5 - TRANSPORT OPERATIONS

Road transport

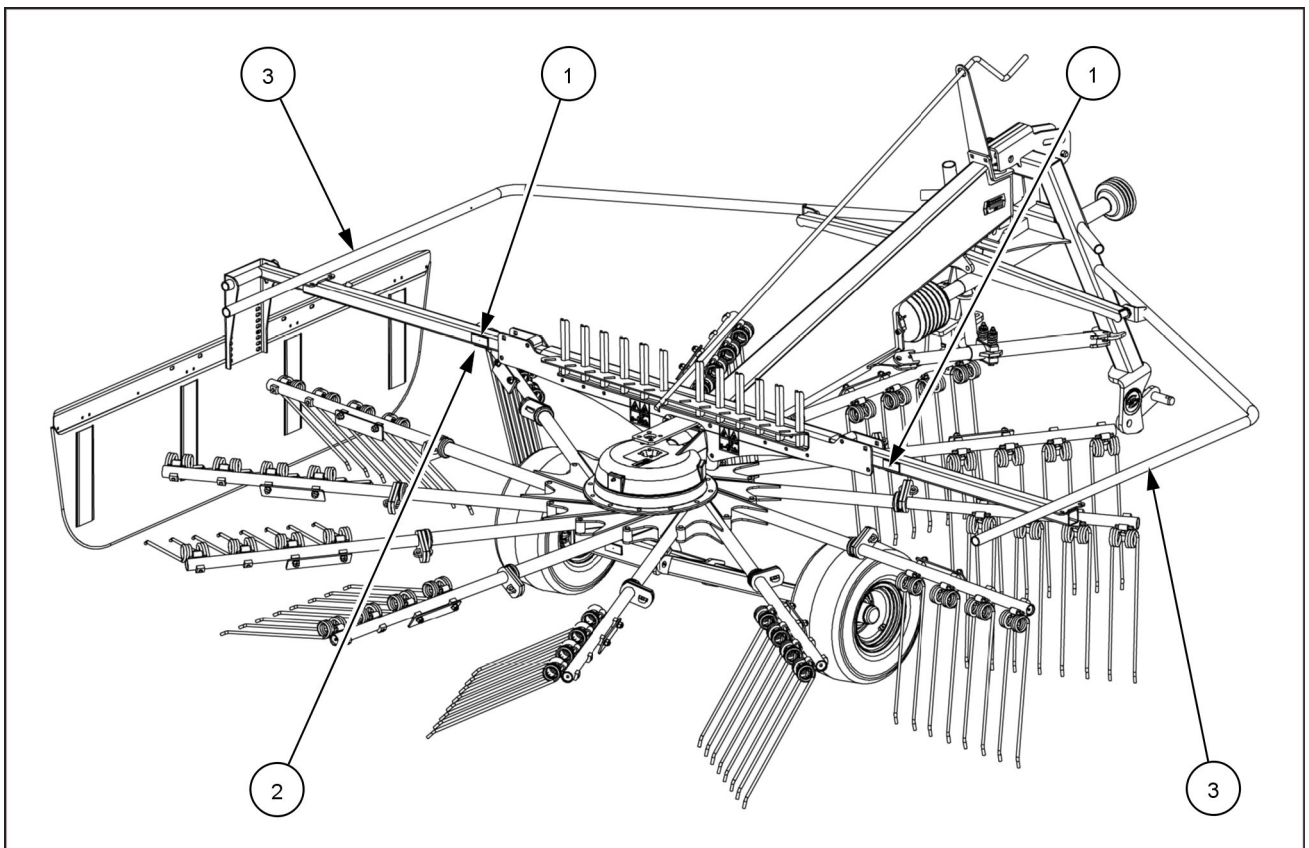
Transport on public roads

Connection of lighting equipment (optional)

The lighting system is equipped with a seven pole plug at the lighting cable. Connect this plug to the socket on the rear side of the tractor.

NOTICE: After the connection check the function of the lighting system. Dirt and moisture can cause contact problems or even short circuit. You must keep the plug connection clean and dry.

Installation of the warning panels



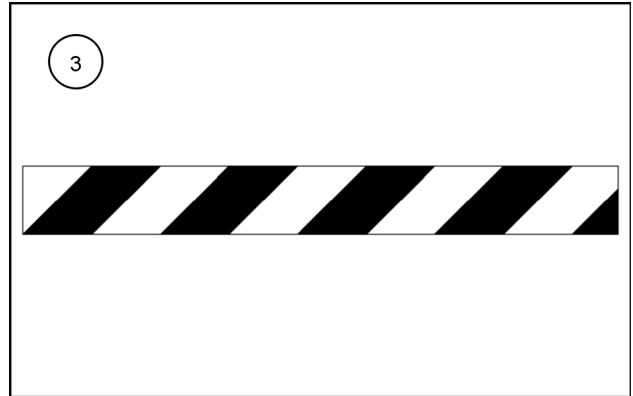
ZEIL18HT00282FA 1

The red reflector (1) is place at the rear side of the implement.

The yellow reflector (2) is place at the left-hand side of the implement when the safety guards are folded up.

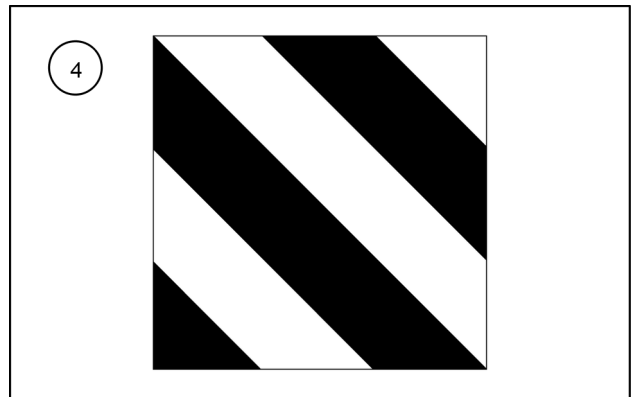
NOTICE: The warning panels are warning of dangers on the implement. You must always observe the safety references. Kept clean and in readable condition the warning panels. Order from your dealer the damaged or missing warning panels. Position the new warning panels on the correct position on the implement.

The red and white reflecting warning panels **(3)** are place on the right-hand side and on the left-hand side of the implement.



ZEIL18HT00281AA 2

Red and white reflecting warning panel **(4)** not included.



ZEIL18HT00279AA 3

Transport

NOTICE: *The tube overlap of the Power Take-Off (PTO) shaft must be in the correct position during transport and working operations.*

NOTICE: *Before you start the PTO shaft check that the number of RPM of the tractor PTO shaft matches the number of Revolutions Per Minute (RPM) of the implement.*

NOTICE: *When you use a travel speed controlled PTO shaft, be aware that the number of RPM depend on the travel speed and that the direction of rotation will change when you back.*

NOTICE: *Before you start the PTO shaft check that there are no persons in the danger zone of the implement.*

Follow your local traffic rules during the transport on public roads. Apply the lighting and warning panels.

Push in the correct position the transport safety bolt.

Fold up and secure in transport position the safety guards of the rotors.

Secure to fold down to vertical the swath canvas when you fold up the safety guard.

Always adjust the driving speed to the conditions of the road. Drive carefully on bad roads to ensure that the connection forces between the tractor and the implement do not cause damage.

Implements and ballast weights change the driving, steering and braking capacity of the tractor.

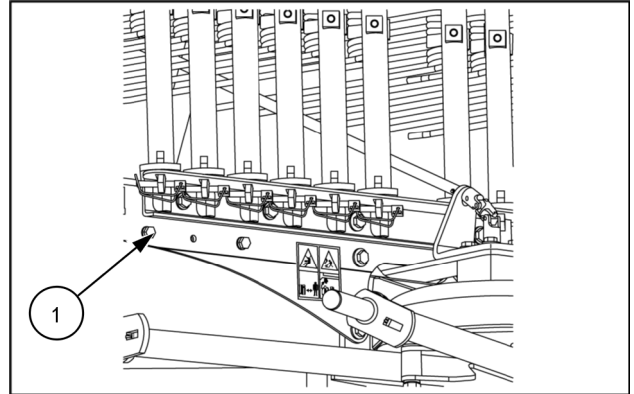
When perform round bends be careful for width of the tractor and the change of the center of gravity of the implement.

Preparing for road transport

Conversion of the rake from working to transport position

Disassemble of the tine arms assembly

1. Remove the linchpin on the bearing arm.
2. Remove the tine arm assembly from the bearing arm and place the tine arm assembly on the holder (1) above the rotor gear.
3. Secure the tine arm assembly with split pin so that the tine arm assembly cannot fall off.



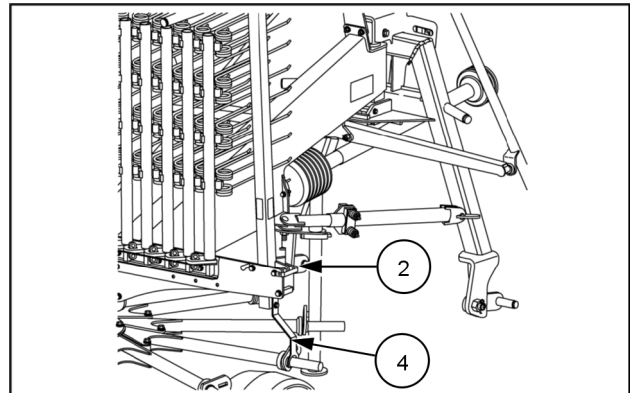
ZEIL17HT00217AA 1

Place the safety guard in transport position

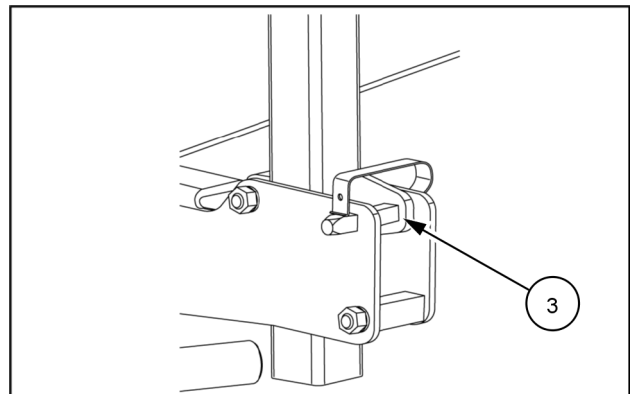
NOTICE: Make sure that no person is in the foldable area.

1. Remove the hair pin cotter (2).
2. Fold up the safety guard to vertical position.
3. Place the hair pin cotter (2) in the same hole.
4. Make sure that the hair pin cotter (2) also goes through the fish plate of the support tube (3) so that it secures the safety guard.
5. The R+ 420 and R+ 460 are equipped with a locking pawl (4) for rotor.

NOTICE: Fold up the safety guard holder, approximately. **100°**, and turn the rotor so that the end of the bearing arm fits into the locking pawl (4). Swivel back the safety guard so that the hair pin cotter (2) fits into the fish plate of the support tube (3).

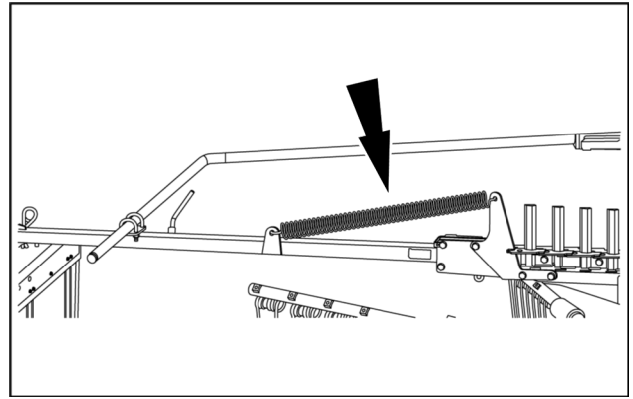


ZEIL17HT00218AA 2



ZEIL17HT00219AA 3

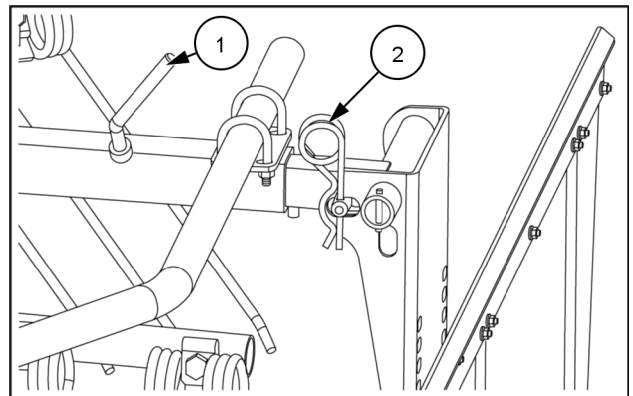
NOTE: The R+ 460 is equipped with a relief spring. The relief spring help to lift the safety guard and the swath canvas.



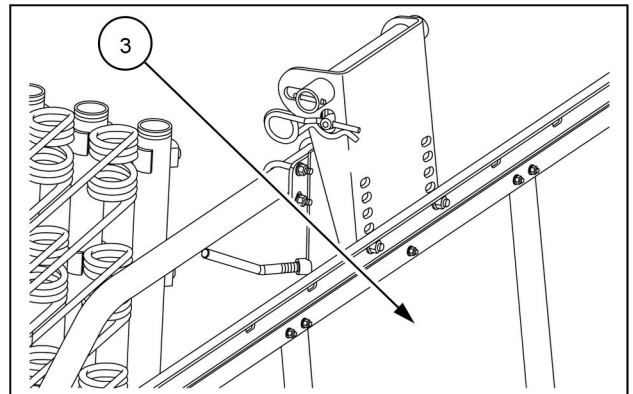
ZEIL17HT00220AA 4

Install the swath canvas in transport position

1. Loosen the screw (1).
2. Push the swath canvas (3) to the end of support tube of the safety guard.
3. Torque the crew (1).
4. Remove the hair pin cotter (2).
5. Push the swath canvas (3) forward and move swath canvas (3) down vertical.
6. Push the swath canvas (3) to the rear until the swath canvas (3) is fixed with the pin in the oblong hole.
7. Place the hair pin cotter (2).



ZEIL17HT00221AA 5



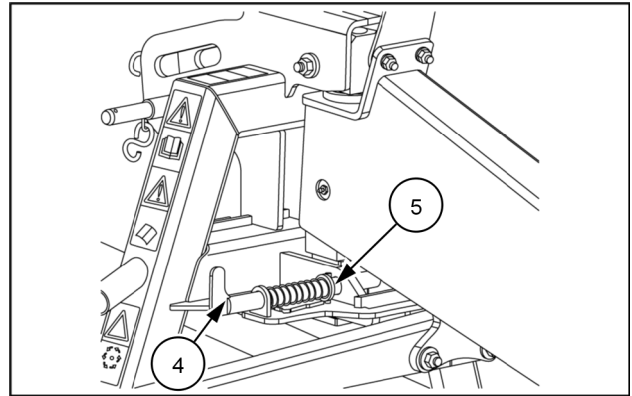
ZEIL17HT00222AA 6

Activating the transport safety bolt

1. Lift the implement with the bearing arms until the wheel axle assembly raise from the ground.
2. Briefly pull the transport safety bolt (4). Turn the transport safety bolt (4) to release the split pin (5).
3. Push the transport safety bolt (4) so far in that the split pin (5) reaches the end of the guide. The spring supports the procedure and prevents the transport safety bolt (4) from wandering back.
4. The implement is ready for transport.

NOTICE: With the implement mounted on the tractor you must have a safe transport, a good steering and a good braking capacity. Follow the instruction of the manufacturer of the tractor and of the implement.

NOTICE: Check if it is necessary to change the weight distribution to the front axle.



ZEIL17HT00223AA 7

6 - WORKING OPERATIONS

General information

Special instructions

WARNING

Pinch hazard!
Wait for all movement to stop before you service or adjust the machine or equipment.
Failure to comply could result in death or serious injury.

W1420A

WARNING

Electrocution hazard!
Contact with overhead power lines can cause severe electrical burns or death from electrocution. Make sure there is enough clearance between equipment and overhead power lines.
Failure to comply could result in death or serious injury.

W0040A

WARNING

Crushing hazard!
Use care when you connect and disconnect the machines. Never stand between the tractor and the implement when you connect the link arms.
Failure to comply could result in death or serious injury.

W1545A

WARNING

Crushing hazard!
Do not stand or place any body part between the implement and a moving tractor. Stop the tractor engine and set the parking brake before you attach cables and hoses.
Failure to comply could result in death or serious injury.

W1544A

WARNING

Hitching hazard!
Always keep the area between the tractor and the implement clear of all persons while the tractor or three-point hitch is in motion. Lock the tractor transmission in Park and engage the parking brake(s) before you allow anyone to complete hitching or unhitching.
Failure to comply could result in death or serious injury.

W1540A

NOTICE: Be particularly careful when you connect and disconnect the implement. Never stand between the tractor and the implement when you connect the bearing arms. Keep all the unauthorized persons away from the danger zone until you complete the connection of the electric cables, the hydraulic hoses and the PTO shaft. Be careful against wrong use the operating elements of the tractor before connect and disconnect of the PTO shaft.

NOTICE: Disengage the PTO shaft, stop the engine and remove the ignition key before maintaining, repairing and mounting the implement. Secure the tractor and the implement so that the tractor and the implement cannot move.

NOTICE: The maximum number of Revolutions Per Minute is **540 RPM**.

NOTICE: The cable for the lighting equipment is placed so that unintended contact with the tractor wheels is impossible. Check that the lighting equipment (optional) is working.

NOTICE: Do not stay between the tractor and the implement or under the lifted rotor arm during the lift and the lowering operations. Injury can occur.

NOTICE: Before you start the PTO shaft check that there are no persons in the danger zone of the implement.

NOTICE: Before work and transport on public road always make sure that all the safety guards are correctly installed.

NOTICE: The operator must never leave the tractor during the work. Make sure that there are no persons in the danger zone.

NOTICE: When you work with the PTO shaft make sure that no persons stand near the rotating PTO shaft.

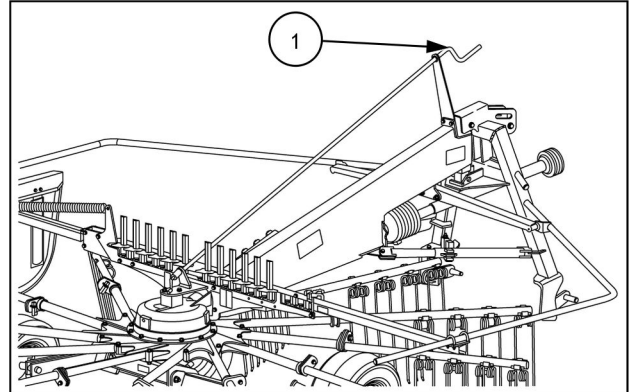
Basic adjustment

Adjustment of working depth

Turn the spindle (1) to adjust the working depth of the rake tines.

Turn clockwise the spindle (1) to decrease the distance between the rake tines and the ground. Turn counter-clockwise the spindle (1) to increase the distance between the rake tines and the ground.

NOTICE: Rake tines adjusted in too low position can cause contamination of the feed and damage to the grass roots. Rake tines adjusted in too high position cannot obtain a clean raking.

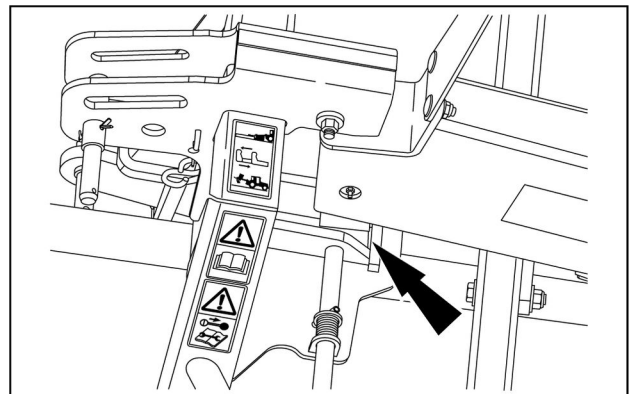


ZEIL17HT00224AA 1

Adjustment of the length of the top link

Adjust the length of the top link so that there is about **2 – 4 mm (0.08 – 0.16 in)** space to the slide block at the end of the guideway of the suspension.

NOTICE: The lever for adjustment of the link arms must be in neutral position, not in floating position.



ZEIL17HT00225AA 2

Adjustment of the rotor inclination in the direction of travel

The rotor must be horizontal seen from the lateral side. Adjust the height of the link arms to adjust the rotor inclination.

In case of large amounts of crop, it may be an advantage to give to the rotor a small inclination forward. Lower the link arms so much that the rake tines do not damage the grass roots.

After the adjustment of the link arms, check the adjustment of the top link as described in "Adjustment of the length of the top link".

Adjustment of the rotor inclination with extra support wheel (option)

If the rotary rake is equipped with a support wheel (option) at the suspension, means of this wheel adjust the rotor inclination.

The rotor must be horizontal seen from the lateral side. Adjust the height of the link arms to adjust the rotor inclination.

In case of large amounts of crop, it may be an advantage to give to the rotor a small inclination forward. Lower the link arms so much that the rake tines do not damage the grass roots.

After the adjustment of the link arms, check the adjustment of the top link as described in "Adjustment of the length of the top link".

The lever for adjustment of the link arms must be set in floating position. The support wheel maintains the raking height.

In mountainous areas it may be advantageous to use a chain top link.

NOTICE: During transport on public road the equip the implement with the normal inflexible top link. Not in the oblong hole.

Adjustment of the rotor inclination transverse to the direction of travel

The rotary rakes R+ 420 and R+ 460 are designed so that the rotor is horizontal transverse to the direction of travel. This give perfect raking and optimal swath shaping.

With a very large amounts of crop can be necessary increase the downwards inclination of the rotor in the swath safety guard side.

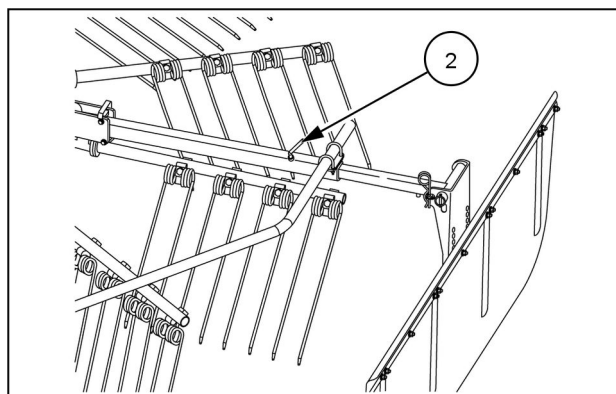
Reduce the tire pressure on the left-hand side tire to increase the downwards inclination of the rotor in the swath guard side. The tire pressure should not be lower than **1.2 bar (17.4 psi)**.

Adjustment of working width and swath width

Adjust the swath safety guard to adjust the working width and the swath width.

Loosen the screw (2) and push the swath guard to the wanted position. Torque the screw (2).

NOTE: The swath safety guard can also be adjusted in height.



ZEIL17HT00226AA 3

Adjustment of the cam track

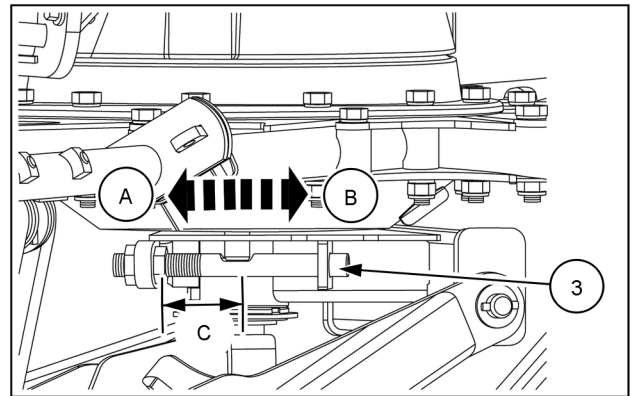
The adjustment of the cam track **(3)** change the delivery time of the crop and change the shape of the swath.

The length **(C)** from the factory is **70 mm (2.76 in)**. In most cases gives a very satisfactory results.

Depending on the crop it may be necessary to make an adjustment. Move the two nuts to the right-hand side or left-hand side to adjust the cam track **(3)**.

(A) Delivery time earlier

(B) Delivery time later



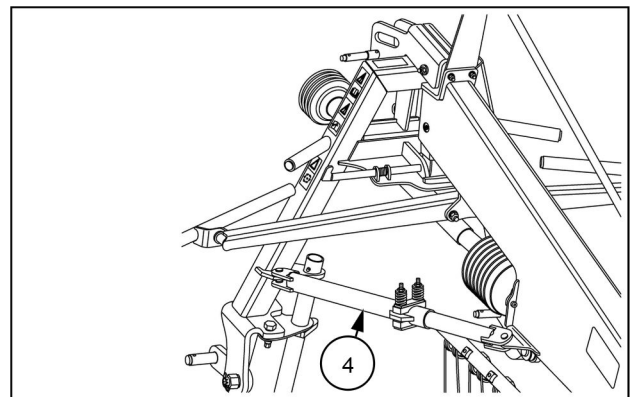
ZEIL17HT00227AA 4

Adjustment of shock absorber

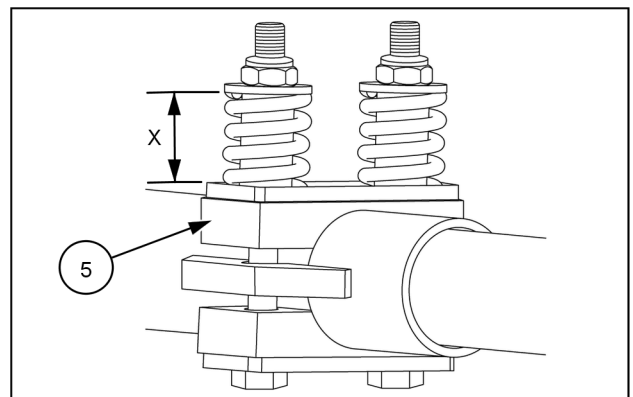
The shock absorber **(4)** gives a steady operation.

The factory setting of the springs of the shock absorber **(X)** is **37 mm (1.5 in)**. The adjustment is made with the friction dumper **(5)**.

NOTICE: When you drive on slopes under extreme conditions it may happen that the rake tines are lifted from the ground without raking the grass. In this case torque the springs to maximum value of **32.0 mm (1.3 in)**.



ZEIL17HT00228AA 5



ZEIL17HT00229AA 6

Working speed and number of revolutions

The working speed and the number of Revolutions Per Minute (RPM) during raking depend on the type and amount of crop, the dry matter content and the ground conditions.

Use the following informations as a guide.

- Power Take-Off (PTO) shaft number of revolutions, approximately **380 – 450 RPM**.
- Driving speed, approximately **8 – 15 km/h (5 – 9 mph)**.

Adjust the two values to the working conditions.

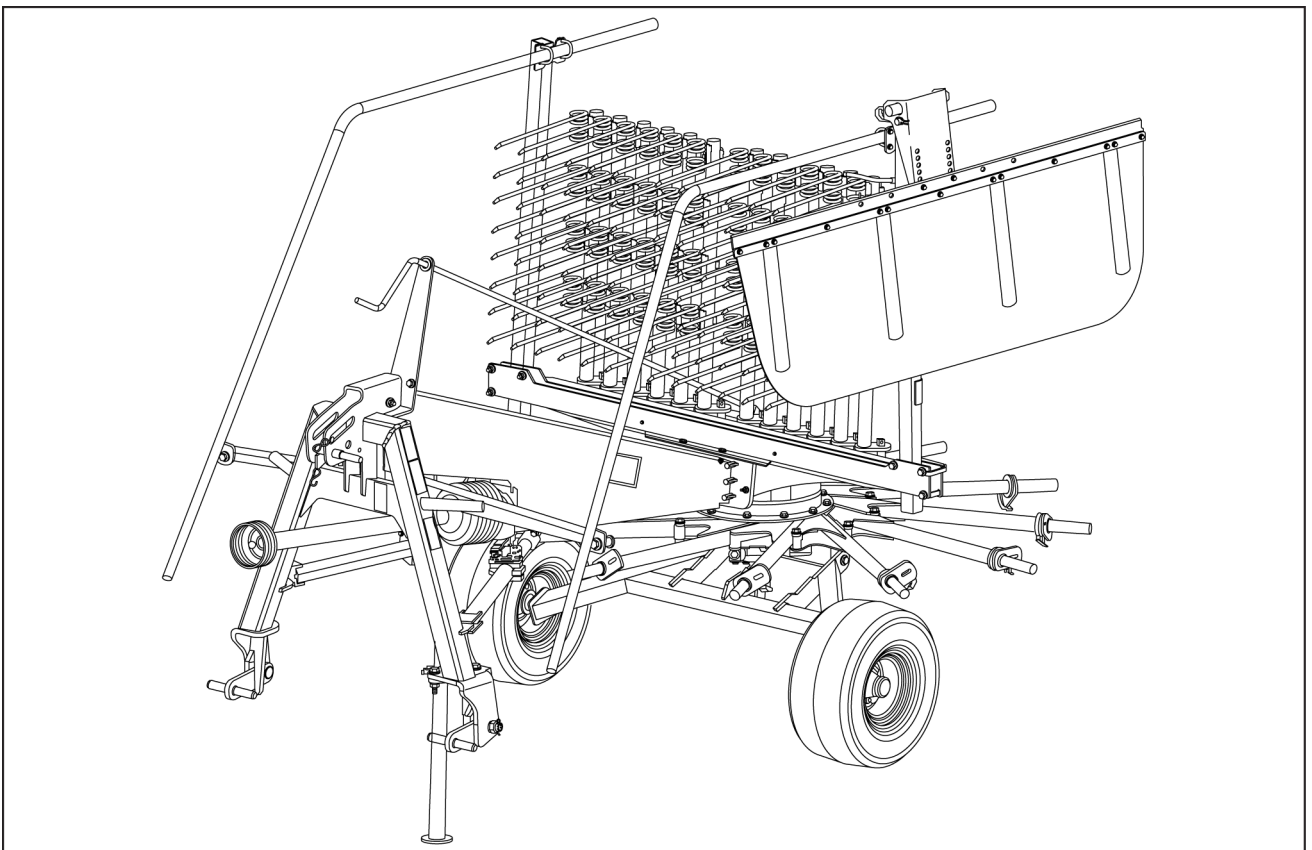
Disconnection and parking

1. Raise the implement with the bearing arms.
2. Lower the support and place the hair pin cotter under the bottom steering plate again.
3. Lower the implement with the bearing arms until it stands firmly with the wheel axle assembly and the support on the ground.
4. Disconnect the Power Take-Off (PTO) shaft from the tractor and place the PTO shaft in the support chain.
5. Disconnect the electric cable for the lighting equipment (option) from the tractor and place it on the implement.
6. Disconnect the top link and the bearing arms from the implement.
7. Fold up the top link and secure the top link on the tractor.
8. Lower the bearing arms further.
9. Drive the tractor forward, away from the implement.

NOTICE: Make sure to place the implement on firm and even ground so that the implement is not in danger of turning over.

NOTICE: Make sure that the transport safety bolt is still pushed in while the implement is parked.

NOTICE: Do not pull out the transport safety bolt when the implement is parked. Risk of personal injury. The shock absorber would press the suspension forward.



ZEIL17HT00210FA 1

Handling during working

NOTICE: *The following description implies that the implement is completely mounted and connected to the tractor.*

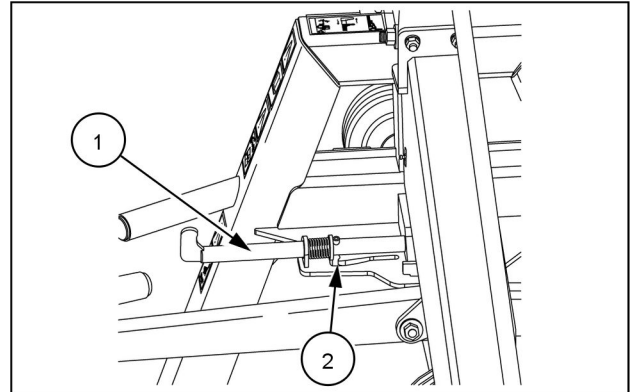
The implement is in transport position, for example:

- The safety guard is folded up.
- The swath canvas is folded in vertically.
- The support is placed in folded position.
- The tine arms assembly are placed on the holder and secured.
- The transport lock is engaged.

Conversion of the rake from transport to working position

Release of the transport safety bolt

1. When the implement is raised in transport position the transport safety bolt (1) must be pulled towards the left-hand to the end of the guide of the tightening pin (2).
2. Turn the transport safety bolt (1) to engage the tightening pin (2) in the guide.

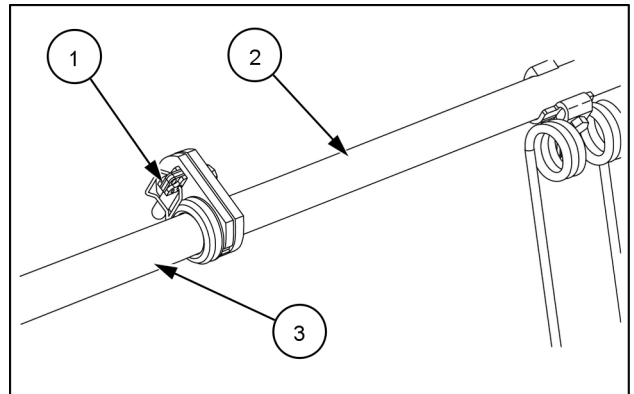


ZEIL17HT00211AA 1

Place and secure the tine arms on the bearing arms

NOTE: The tine arms (2), which are dismantled for transport, can be found at the back of the holder above the rotor gear.

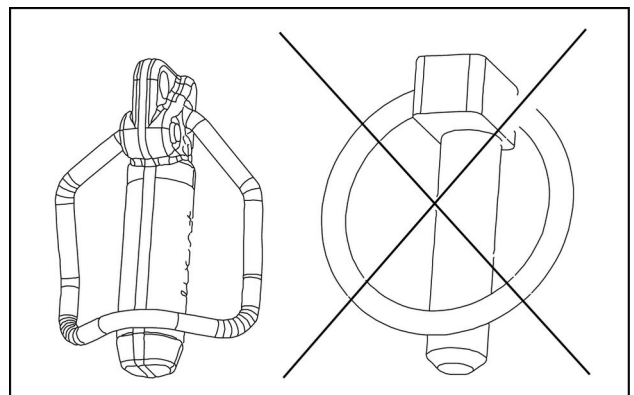
1. Remove the linchpin (1) on the tine arm assembly (2).
2. Lift the tine arm assembly (2) from the holder and push it onto the bearing arm (3) so that the fishplate on the tine arm assembly (2) is led through the slot in the bearing arm (3).
3. Place the linchpin (1) in the fishplate of the tine arm assembly (2) and fold linchpin (1) in to secure the tine arm assembly (2).
4. If the tine arm assembly (2) are not all installed when you start the implement, an unbalance can create damage to the implement.



ZEIL18HT00283AA 2

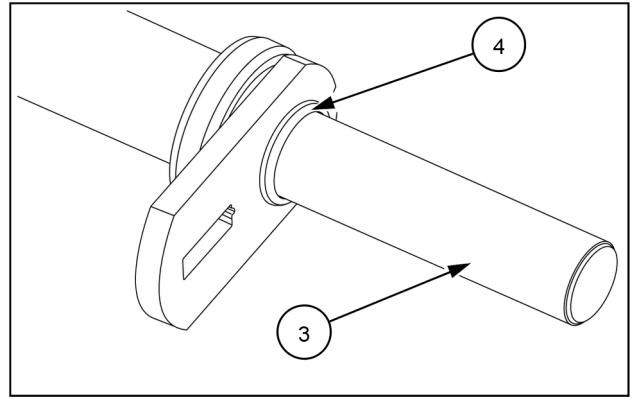
NOTE: Check that the all linchpins (1) are in the correct position before you start the implement.

NOTE: Only use original linchpins (1). Linchpins (1) with round ring do not have enough room and would be able to open.



ZEIL17HT00213AA 3

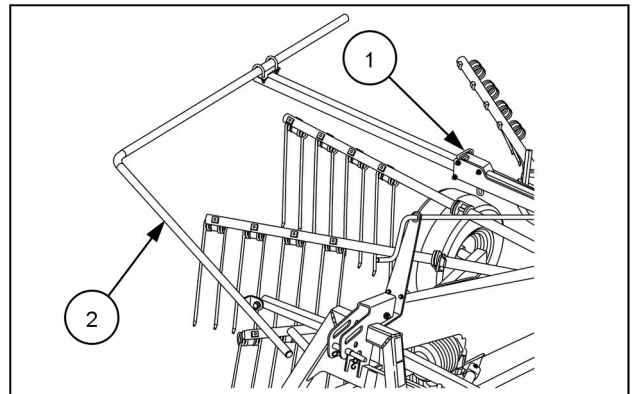
5. On each bearing arm (3) there is a seal ring (4) that prevents dust and dirt from getting between the bearing tube and the tine arm assembly (2).
6. The tine arm assembly (2) is always easy to disassemble.



ZEIL17HT00214AA 4

Place the safety guard in working position

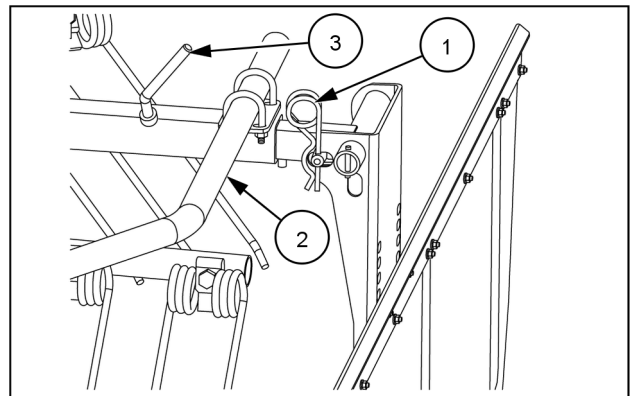
1. Remove the hair pin cotter (1).
2. Fold down the safety guard (2).
3. Place the hair pin cotter (1) above the support tube of the safety guard (2) in the same holes.
4. Fold down at both sides the safety guards (2).



ZEIL17HT00215AA 5

Place the swath canvas in working position

1. Loosen the screw (3).
2. Pull the complete swath canvas so far out of the support tube of the safety guard (2) that the swath canvas is not lying above the bearing arms anymore.
3. Torque the screw (3).
4. Remove the hair pin cotter (1).
5. Push the swath canvas forward until the oblong hole in the swath safety guard holder is free.
6. Move the swath canvas down to vertical position.
7. Push the swath canvas to the rear until the pin fixes the position.
8. Place the hair pin cotter (1).



ZEIL17HT00216AA 6

Starting the rotor

NOTE: Check that there are no persons near the implement before you start the rotor.

NOTE: Make sure that all bearing arms have been secured correctly with split pin.

NOTE: Always start the Power Take-Off (PTO) shaft of the tractor with the engine at idle speed.

7 - MAINTENANCE

General information

Maintenance

General information

WARNING

Avoid injury!
Follow ALL of the precautions listed below.
Failure to comply could result in death or serious injury.

W1091A

NOTICE: Do the maintenance, the service, the cleaning, and the repair with the Power Take-Off (PTO) shaft and the engine OFF. Remove the ignition key.

NOTICE: Take care that oil and grease do not get in contact with your skin.

NOTICE: You must always block the tractor wheels before you work on the implement.

NOTICE: After the first hours of operation you must torque again all the screws.

NOTICE: During greasing, the implement must be in working position and parked safely and firmly on the ground.

NOTICE: During maintenance on a lifted implement, you must always place suitable supports underneath.

Check the screws, the bolts, and the nuts after **50 h** of operations and torque again if necessary. See the torque table. It is particularly important to check the fixing bolts of the implement.

Only use original spare parts and equipment. There is no warranty on non-original components. The manufacturer is not responsible for any damage resulting from such use.

NOTICE: To replace any tools with cutting edges always use suitable tools and protective gloves.

NOTICE: Before working on the electric gear, disconnect the battery cables.

NOTICE: Always make sure that all the safety guards of the implement are in place and functional. Immediately replace the safety guards worn or damaged. Do not operate the implement until you replace all the worn or damaged safety guards.

After the first **10 h** of operations torque again all the hydraulic screw joints. Only use original spare parts and equipment.

Torque

Minimum hardware tightening torques (in N m or lb in /lb ft) for normal assembly applications unless otherwise stated

The minimum hardware tightening torque on drawings, in specifications, etcetera have priority.

In the following tables, torque specifications are shown following the standard **ENS7001**, applicable for material class 8.8 and material class 10.9.

Hex head bolts

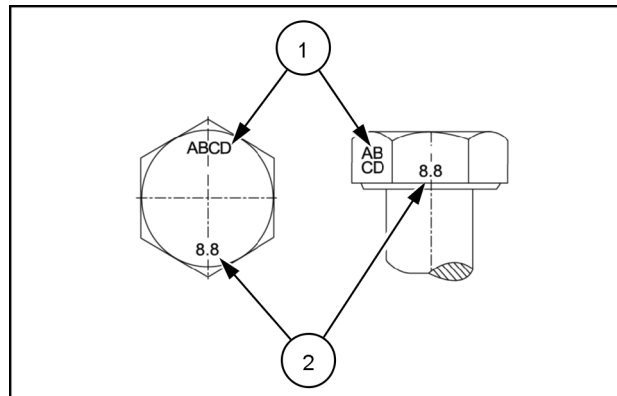
Nominal Size	Class 8.8 in N m (lb in or lb ft)			Class 10.9 in N m (lb in or lb ft)		
	Plated nut	Lock nut	Hardened nut/Oiled plated nut	Plated nut	Lock nut	Hardened nut/Oiled plated nut
M3	1.3 N·m (11.5 lb in)	0.7 N·m (6.2 lb in)	1.2 N·m (10.6 lb in)	1.8 N·m (15.9 lb in)	0.9 N·m (8.0 lb in)	1.6 N·m (14.2 lb in)
M4	2.9 N·m (25.7 lb in)	1.6 N·m (14.2 lb in)	2.6 N·m (23.0 lb in)	4.2 N·m (37.2 lb in)	2.3 N·m (20.4 lb in)	3.7 N·m (32.7 lb in)
M5	5.9 N·m (52.2 lb in)	3.2 N·m (28.3 lb in)	5.3 N·m (46.9 lb in)	8.5 N·m (75.2 lb in)	4.6 N·m (40.7 lb in)	7.6 N·m (67.3 lb in)
M6	10.1 N·m (89.4 lb in)	5.5 N·m (48.7 lb in)	9.1 N·m (80.5 lb in)	14.5 N·m (10.7 lb ft)	7.9 N·m (69.9 lb in)	13 N·m (9.6 lb ft)
M8	24.5 N·m (18.1 lb ft)	13.5 N·m (10.0 lb ft)	22 N·m (16.2 lb ft)	35.1 N·m (25.9 lb ft)	19.3 N·m (14.2 lb ft)	31.5 N·m (23.2 lb ft)
M10	48.7 N·m (35.9 lb ft)	26.8 N·m (19.8 lb ft)	43.8 N·m (32.3 lb ft)	69.5 N·m (51.3 lb ft)	38.2 N·m (28.2 lb ft)	62.5 N·m (46.1 lb ft)
M12	85 N·m (62.7 lb ft)	46.7 N·m (34.4 lb ft)	76.5 N·m (56.4 lb ft)	121 N·m (89.2 lb ft)	66.5 N·m (49.0 lb ft)	108.9 N·m (80.3 lb ft)
M14	135 N·m (99.6 lb ft)	74.2 N·m (54.7 lb ft)	121.5 N·m (89.6 lb ft)	193 N·m (142.3 lb ft)	106.1 N·m (78.3 lb ft)	173.7 N·m (128.1 lb ft)
M16	210 N·m (154.9 lb ft)	115.5 N·m (85.2 lb ft)	189 N·m (139.4 lb ft)	301 N·m (222 lb ft)	165.5 N·m (122.1 lb ft)	270.9 N·m (199.8 lb ft)
M18	299 N·m (220.5 lb ft)	164.4 N·m (121.3 lb ft)	269.1 N·m (198.5 lb ft)	414 N·m (305.4 lb ft)	227.7 N·m (167.9 lb ft)	372.6 N·m (274.8 lb ft)
M20	425 N·m (313.5 lb ft)	233.72 N·m (172.4 lb ft)	382.5 N·m (282.1 lb ft)	587 N·m (432.9 lb ft)	322.8 N·m (238.1 lb ft)	528.3 N·m (389.7 lb ft)
M22	579 N·m (427 lb ft)	318.4 N·m (234.8 lb ft)	521.1 N·m (384.3 lb ft)	801 N·m (590.8 lb ft)	440.5 N·m (324.9 lb ft)	720.9 N·m (531.7 lb ft)
M24	735 N·m (542.1 lb ft)	404.2 N·m (298.1 lb ft)	661.5 N·m (487.9 lb ft)	1016 N·m (749.4 lb ft)	558.8 N·m (412.1 lb ft)	914.4 N·m (674.4 lb ft)
M27	1073 N·m (791.4 lb ft)	590.1 N·m (435.2 lb ft)	967.5 N·m (713.6 lb ft)	1486 N·m (1096 lb ft)	817.3 N·m (602.8 lb ft)	1337 N·m (986.1 lb ft)
M30	1461 N·m (1077.6 lb ft)	803.5 N·m (592.6 lb ft)	1315 N·m (969.9 lb ft)	2020 N·m (1489.9 lb ft)	1111 N·m (819.4 lb ft)	1818 N·m (1340.9 lb ft)

Flange head bolt/Flange nut

Nominal Size	Class 10.9 in N·m (lb ft)
M3	2.0 N·m (1.5 lb ft)
M4	4.6 N·m (3.4 lb ft)
M5	9.4 N·m (6.9 lb ft)
M6	15.9 N·m (11.7 lb ft)
M8	38.7 N·m (28.5 lb ft)
M10	76.5 N·m (56.4 lb ft)
M12	134 N·m (98 lb ft)
M14	213 N·m (157 lb ft)
M16	331 N·m (244 lb ft)
M18	455 N·m (336 lb ft)
M20	645 N·m (476 lb ft)
M22	881 N·m (650 lb ft)
M24	1118 N·m (824 lb ft)
M27	1635 N·m (1206 lb ft)
M30	2222 N·m (1639 lb ft)
M36	3880 N·m (2862 lb ft)

Identification markings

Metric hex head, flange hex head and carriage bolts,
Classes (CL) 5.6 and upward

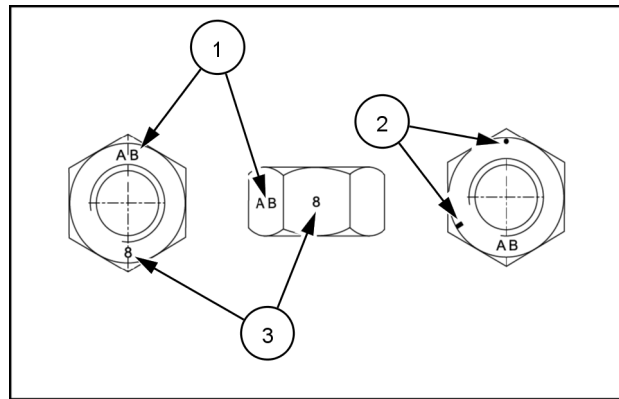


NHIL14RB00662AA 1

Metric bolt identification markings

1. Manufacturer's identification
2. Property class

Metric hex nuts and locknuts, Classes (CL) 05 and upward



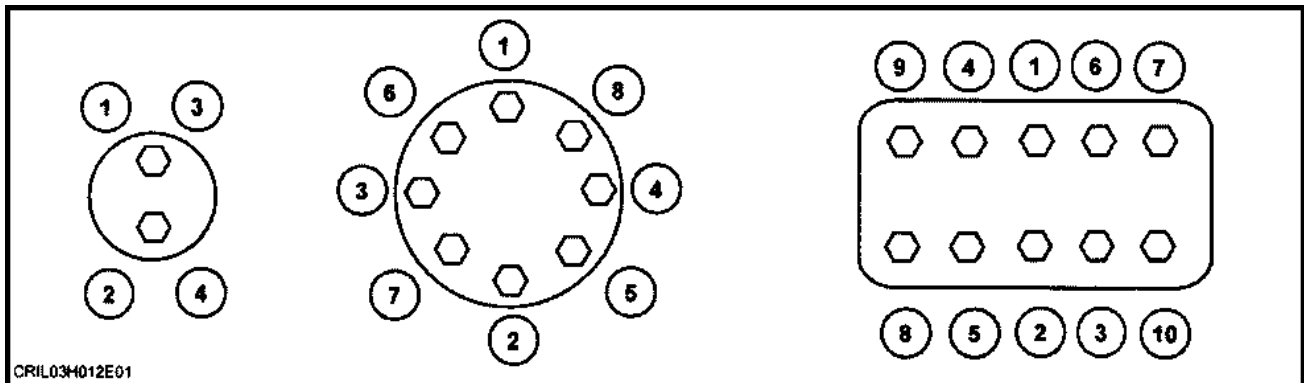
NHIL14RB00663AA 2

Metric hex nut identification markings

- (1) – Manufacturer's identification
- (3) – Property class
- (2) – Clockwise type markings indicate property class and may include manufacturer identification (if applied),
Example: property marks **240°** apart (shown) at the eight o'clock position indicate a Class 8 property, and marks **300°** apart at the ten o'clock position indicate a Class 10 property.

Torque tightening sequence

NOTICE: Shown below is the suggested initial torque tightening sequences for general applications, tighten in sequence from item 1 through to the last item of the hardware.



CRIL03H012E01

DF5019-1 3

Torque for class 12.9

Bolts of quality 12.9 are used on the implements. Make sure to use the same type of bolts and nuts to replace bolts and nuts of quality 12.9. It is easier to torque bolts and nuts to correct value of torque if you lubricate bolts and nuts with oil.

Quality	Size	Torque for dry bolts and nuts	Torque for bolts and nuts lubricated with oil
12.9	M8	40 N·m (29.50 lb ft)	—
12.9	M10	81 N·m (59.74 lb ft)	—
12.9	M12	135 N·m (99.57 lb ft)	—
12.9	M12 x 1.25	146 N·m (107.68 lb ft)	—
12.9	M14	215 N·m (158.58 lb ft)	—
12.9	M14 x 1.5	230 N·m (169.64 lb ft)	—
12.9	M16	333 N·m (245.61 lb ft)	286 N·m (210.94 lb ft)
12.9	M16 x 1.5	350 N·m (258.15 lb ft)	—
12.9	M18	440 N·m (324.53 lb ft)	—
12.9	M20	649 N·m (478.68 lb ft)	558 N·m (411.56 lb ft)
12.9	M20 x 1.5	720 N·m (531.04 lb ft)	—
12.9	M24	1120 N·m (826.07 lb ft)	963 N·m (710.27 lb ft)
12.9	M24 x 1.5	1175 N·m (8666.35 lb ft)	—
12.9	M30	2300 N·m (1696.39 lb ft)	—

Fluids and lubricants

Item	Capacity	KONGSKILDE brand name	KONGSKILDE specification	Lubricant grade	International specification
Grease fittings	-	-	-	NLGI 2	M1C 137-A or M1C 75-B
Universal joint	-	-	-	SAE 80W90	API GL-5 MIL-L-2105D
Safety bolt	-	-	-	SAE 80W90	API GL-5 MIL-L-2105D

Maintenance planning

Maintenance chart

Maintenance action	Check					Replace	
	Grease		Tighten			Lubricate	
						Page no.	
After the first 3 hours of operation							
Bolts and fittings	x					7-8	
Every 8 hours							
Power Take-Off (PTO) shaft		x				7-9	
Rotor gear		x				7-10	
Every 20 hours							
Power Take-Off (PTO) shaft		x				7-11	
Every 40 hours							
Power Take-Off (PTO) shaft		x				7-12	
Swivel pin		x				7-13	
Every 50 hours							
Tire pressure			x			7-14	
Every 6 years							
Hydraulic hoses				x		7-15	
As required							
Transport safety bolt					x	7-16	
Cam track		x				7-17	
Universal joint		x				7-18	
Bearing arms				x		7-19	

After the first 3 hours of operation

Bolts and fittings

Torque again all the bolts, the nuts and the fasteners after the first **3 h** of work.

Every 8 hours

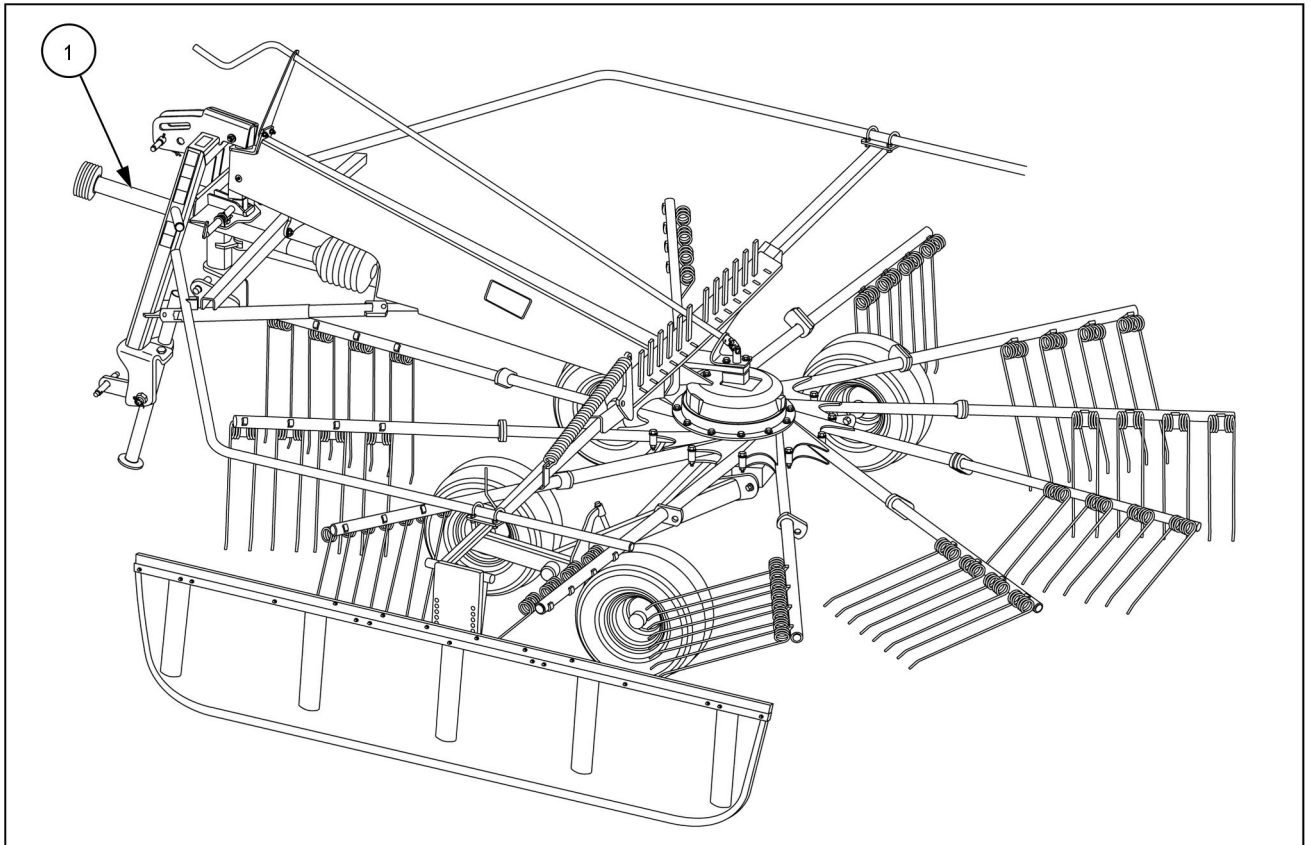
Power Take-Off (PTO) shaft

Perform the lubrication every 8 h.

Lubricant: **NLGI 2**

Prior operation:

Place the implement in safe conditions for maintenance.

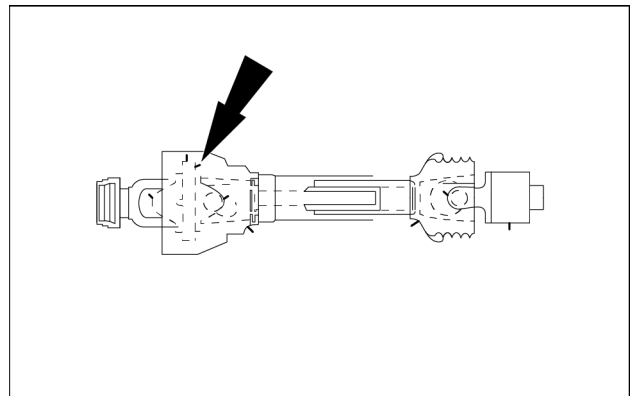


ZEIL17HT00235FA 1

Lubricate the PTO shaft (1) in the fitting indicated in the figure.

NOTICE: Clean, grease, and adjust the PTO shaft only when you stop the engine and remove ignition key.

NOTICE: When the PTO shaft has been stopped there will be a momentum. Do not get too close to the implement. Do not make any work on the implement until it has come to a complete stop.



ZEIL17HT00029AA 2

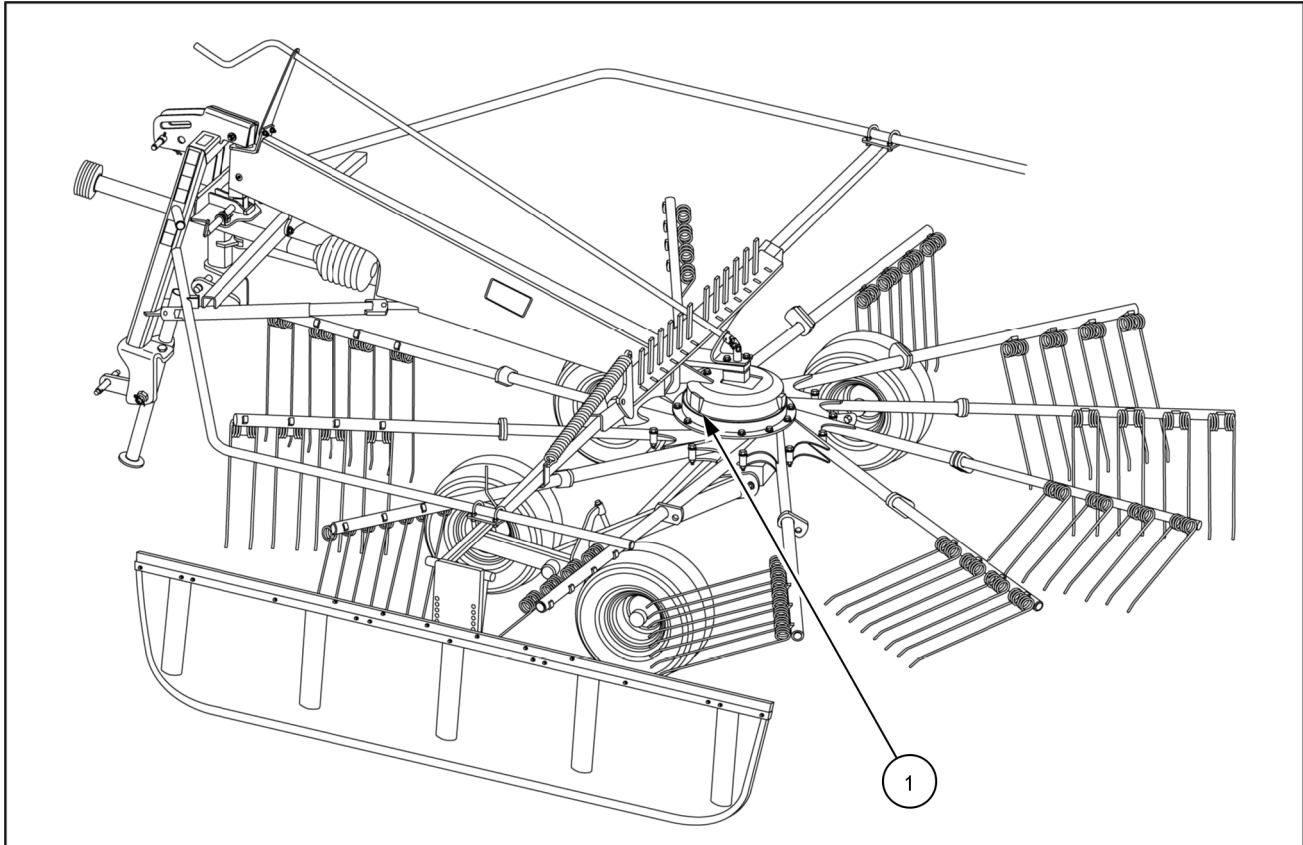
Rotor gear

Perform the lubrication every **8 h**.

Lubricant: **NLGI 2**

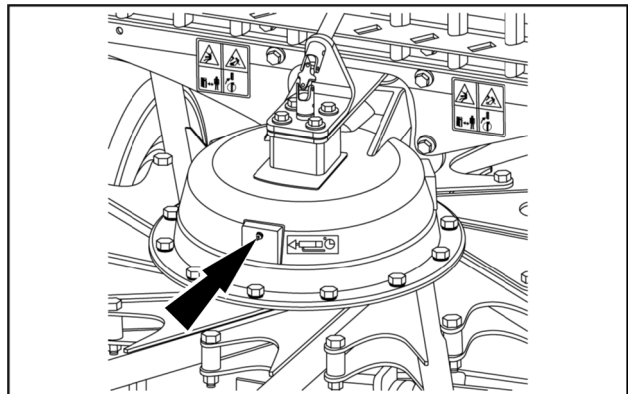
Prior operation:

Place the implement in safe conditions for maintenance.



ZEIL17HT00235FA 1

Lubricate the rotor gear **(1)** in the fitting indicated in the figure.



ZEIL17HT00236AA 2

Every 20 hours

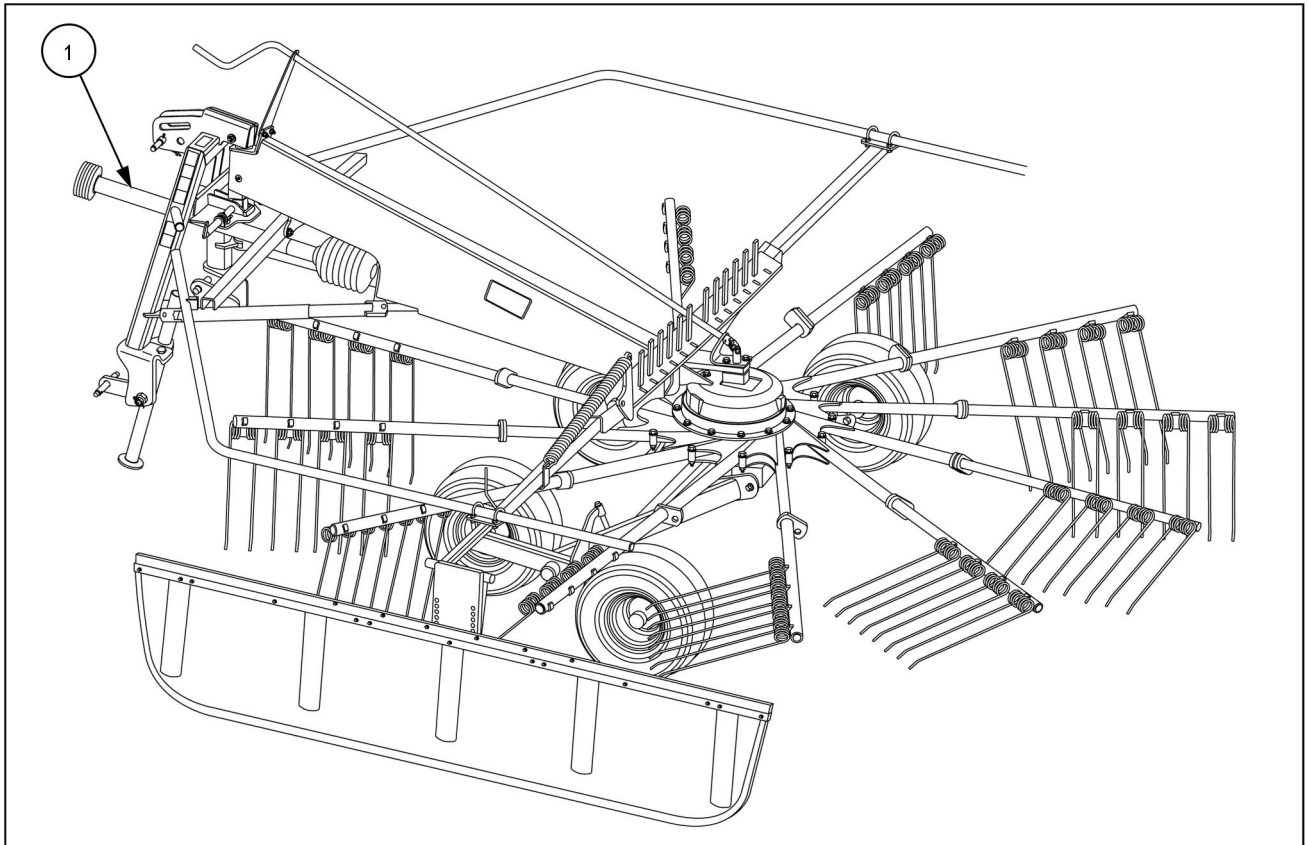
Power Take-Off (PTO) shaft

Perform the lubrication every 20 h.

Lubricant: **NLGI 2**

Prior operation:

Place the implement in safe conditions for maintenance.

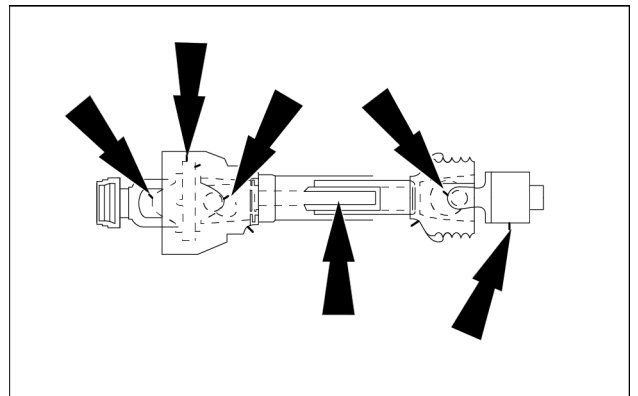


ZEIL17HT00235FA 1

Lubricate the PTO shaft **(1)** in the fittings indicated in the figure.

NOTICE: Clean, grease, and adjust the PTO shaft only when you stop the engine and remove ignition key.

NOTICE: When the PTO shaft has been stopped there will be a momentum. Do not get too close to the implement. Do not make any work on the implement until it has come to a complete stop.



ZEIL17HT00029AA 2

Every 40 hours

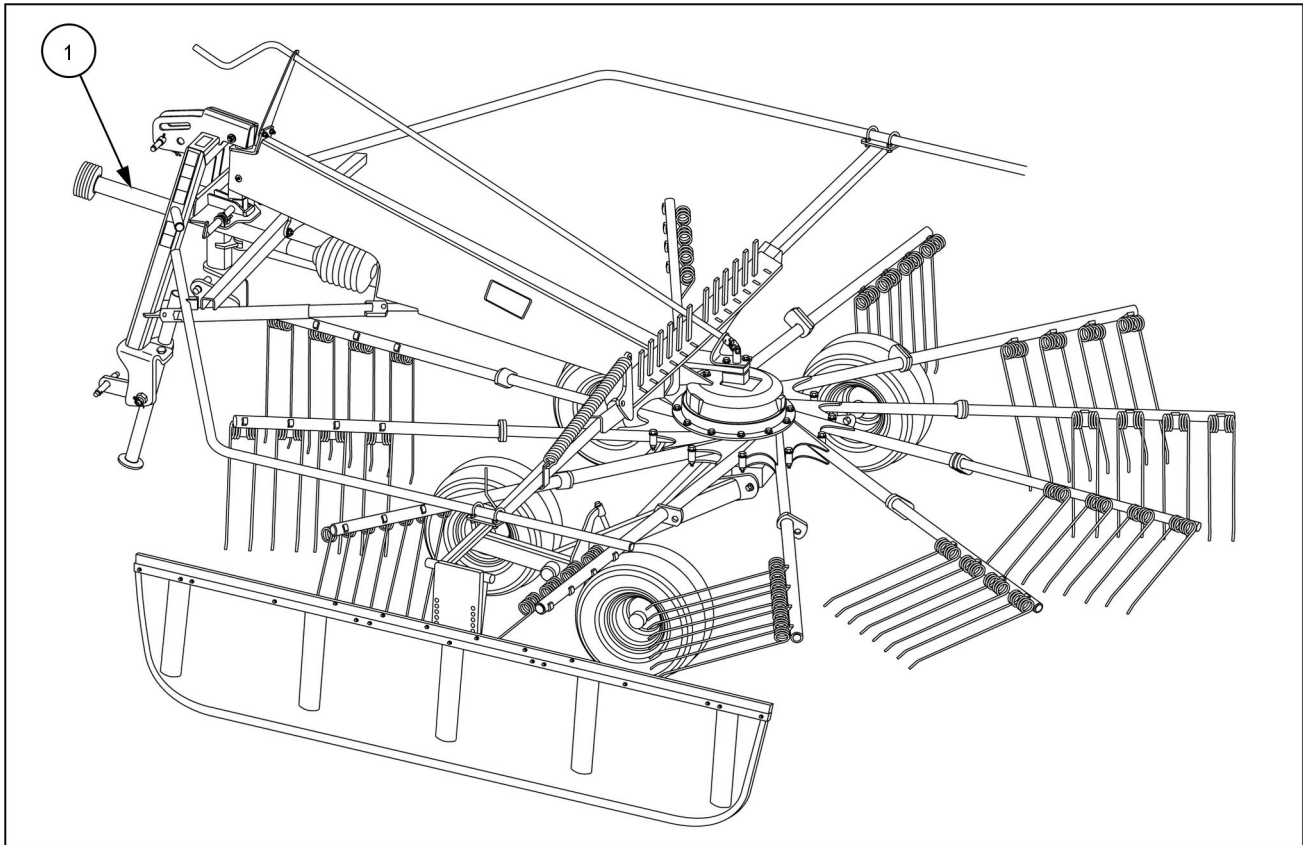
Power Take-Off (PTO) shaft

Perform the lubrication every 40 h.

Lubricant: **NLGI 2**

Prior operation:

Place the implement in safe conditions for maintenance.

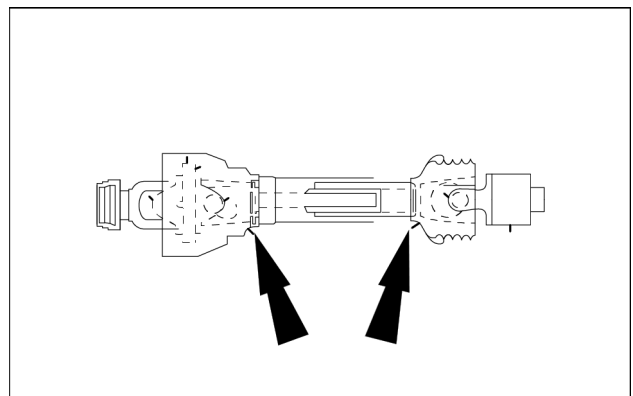


ZEIL17HT00235FA 1

Lubricate the PTO shaft **(1)** in the fittings indicated in the figure.

NOTICE: Clean, grease, and adjust the PTO shaft only when you stop the engine and remove ignition key.

NOTICE: When the PTO shaft has been stopped there will be a momentum. Do not get too close to the implement. Do not make any work on the implement until it has come to a complete stop.



ZEIL17HT00029AA 2

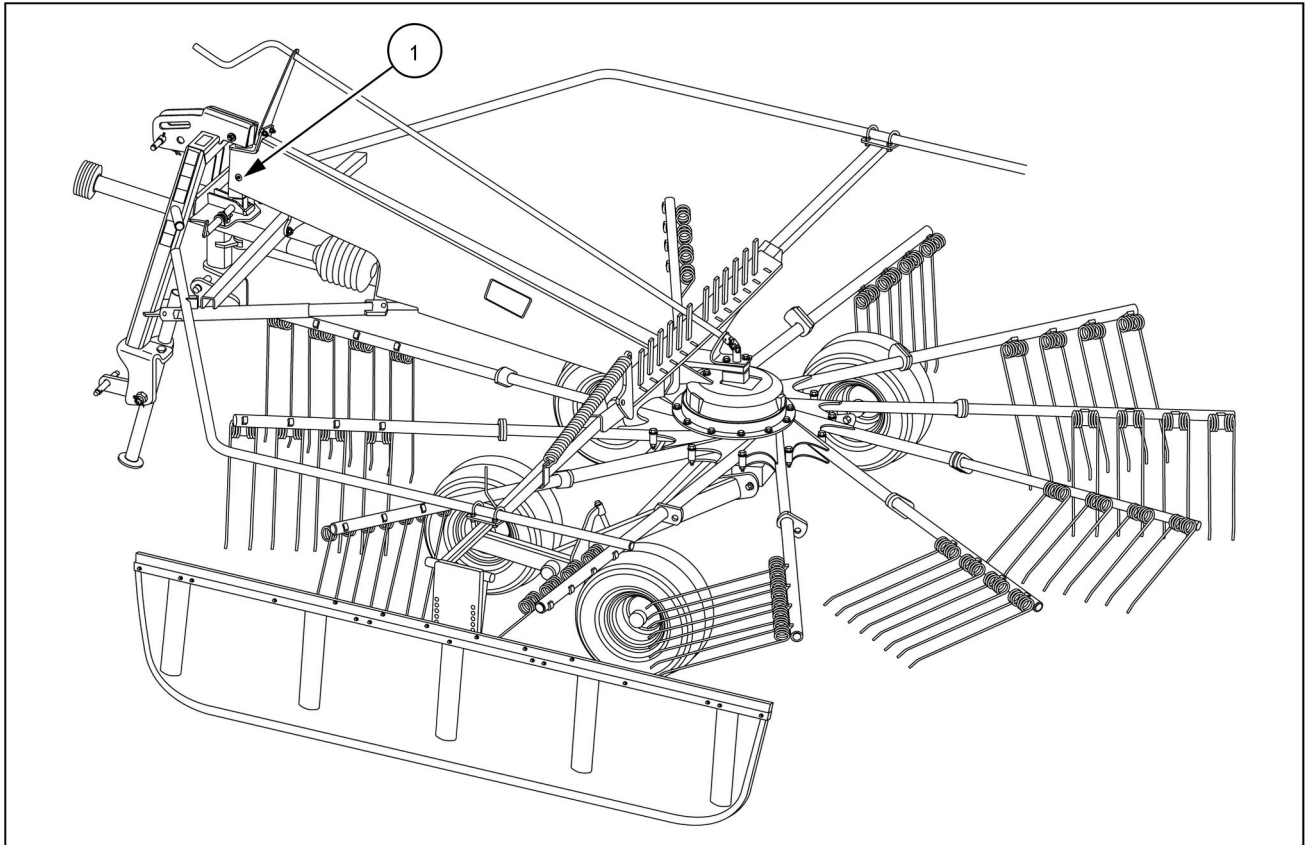
Swivel pin

Perform the lubrication every **40 h**.

Lubricant: **NLGI 2**

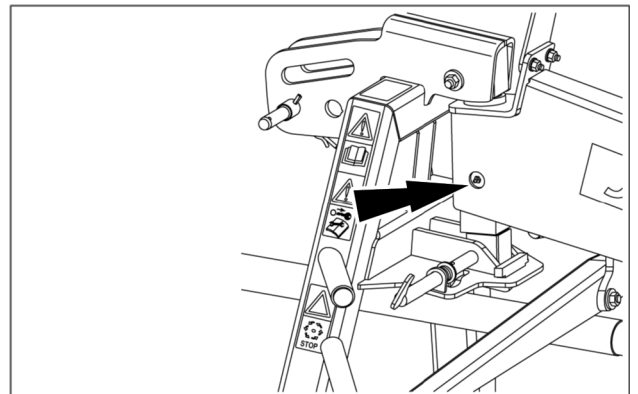
Prior operation:

Place the implement in safe conditions for maintenance.



ZEIL17HT00235FA 1

Lubricate the swivel pin **(1)** (located on the suspension) in the fitting indicated in the figure.



ZEIL17HT00232AA 2

Every 50 hours**Tire pressure**

NOTICE: Before do the maintenance on the tires you must stable the implement. Put a wood blocks on the tires to prevent movement of the implement.

NOTICE: Mounting of wheels requires sufficient knowledge and correct mounting tools.

NOTICE: Check regularly and adjust if necessary the tire pressure.

NOTICE: Check regularly and torque again if necessary

The required tire pressure is shown in the below table.

Place	Wheels	Tire pressure
Rotor chassis	18,5x8,50-8 (6PR)	2.2 bar (31.9 psi)
Extra support wheel (option)	16x6,50-8 (6PR)	2.2 bar (31.9 psi)
Bogie-axle (option)	18,5x8,50-8 (6PR)	2.2 bar (31.9 psi)

Check the tire pressure after the first **2 h** of operation.

NOTICE: If the pressure is too high the tire may crack. If the pressure is too low the tire may be damaged due to deformation of the tire wall.

Every 6 years

Hydraulic hoses

WARNING

Escaping fluid!

Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.

Failure to comply could result in death or serious injury.

W0178A

NOTICE: To avoid wrong hydraulic connection, mark sockets and plugs (for example color coded). This helps to prevent switched controls (lifting instead of lowering or vice versa).

NOTICE: Before you start the maintenance on the hydraulic system, actuate the control lever accordingly to relieve the pressure from the system, lower the implement to the ground and stop the tractor engine.

Before the first use of the implement and then at least once a year, an expert worker must check the hoses and replace the damaged hoses.

The lifetime of the hoses should not exceed six years including a maximum storage time of two years.

Replacement hydraulic hoses must correspond to the technical requirements of the implement. Contact your KONGSKILDE dealer if you need any spare parts.

As required

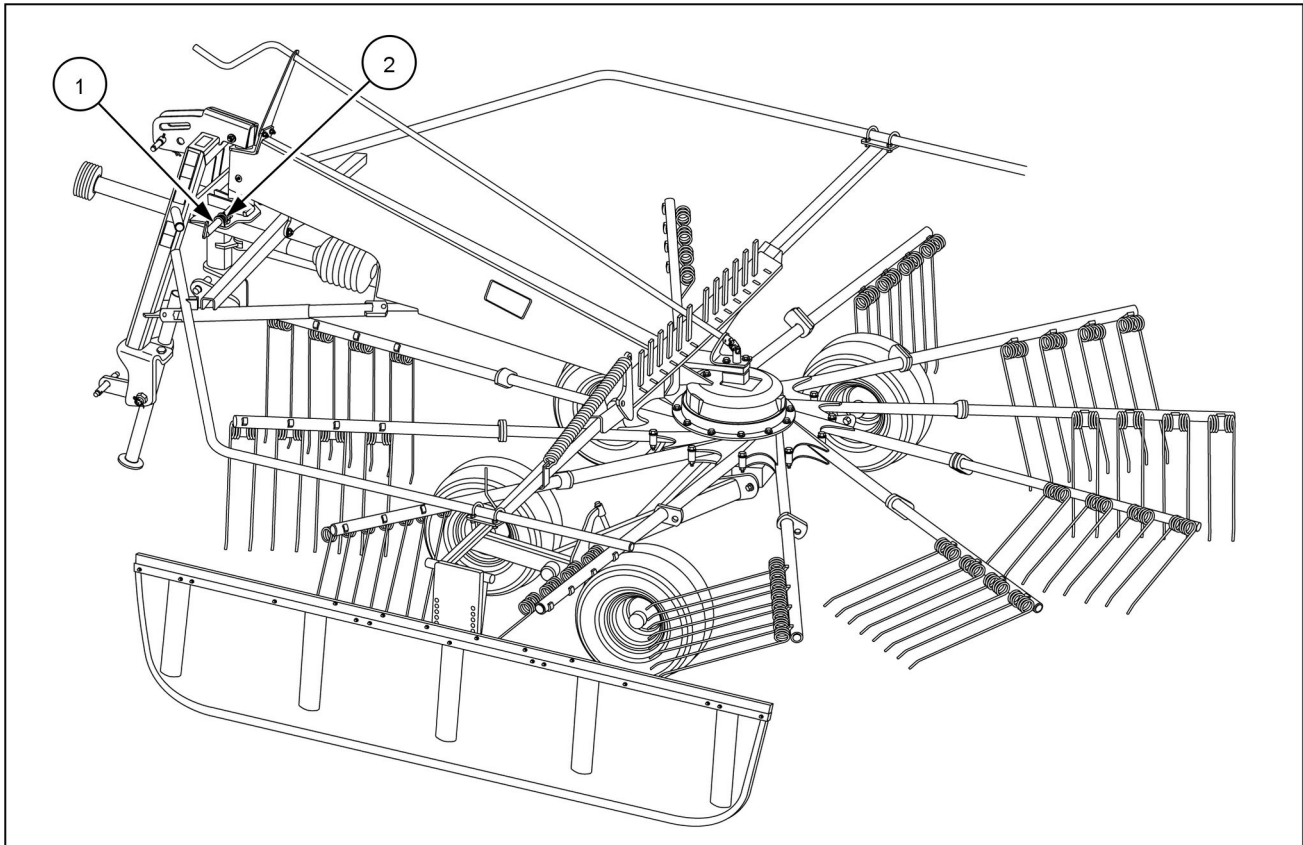
Transport safety bolt

Occasionally lubricate with oil the guides of the transport safety bolt (1) and the tightening pin (2).

Lubricant: **NLGI 2**

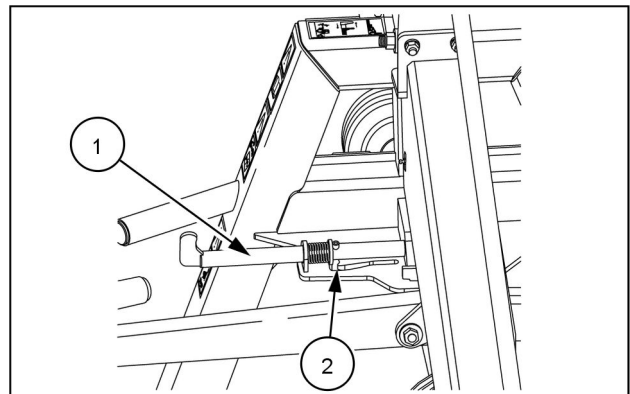
Prior operation:

Place the implement in safe conditions for maintenance.



ZEIL17HT00235FA 1

Lubricate the transport safety bolt (1) and the tightening pin (2).



ZEIL17HT00211AA 2

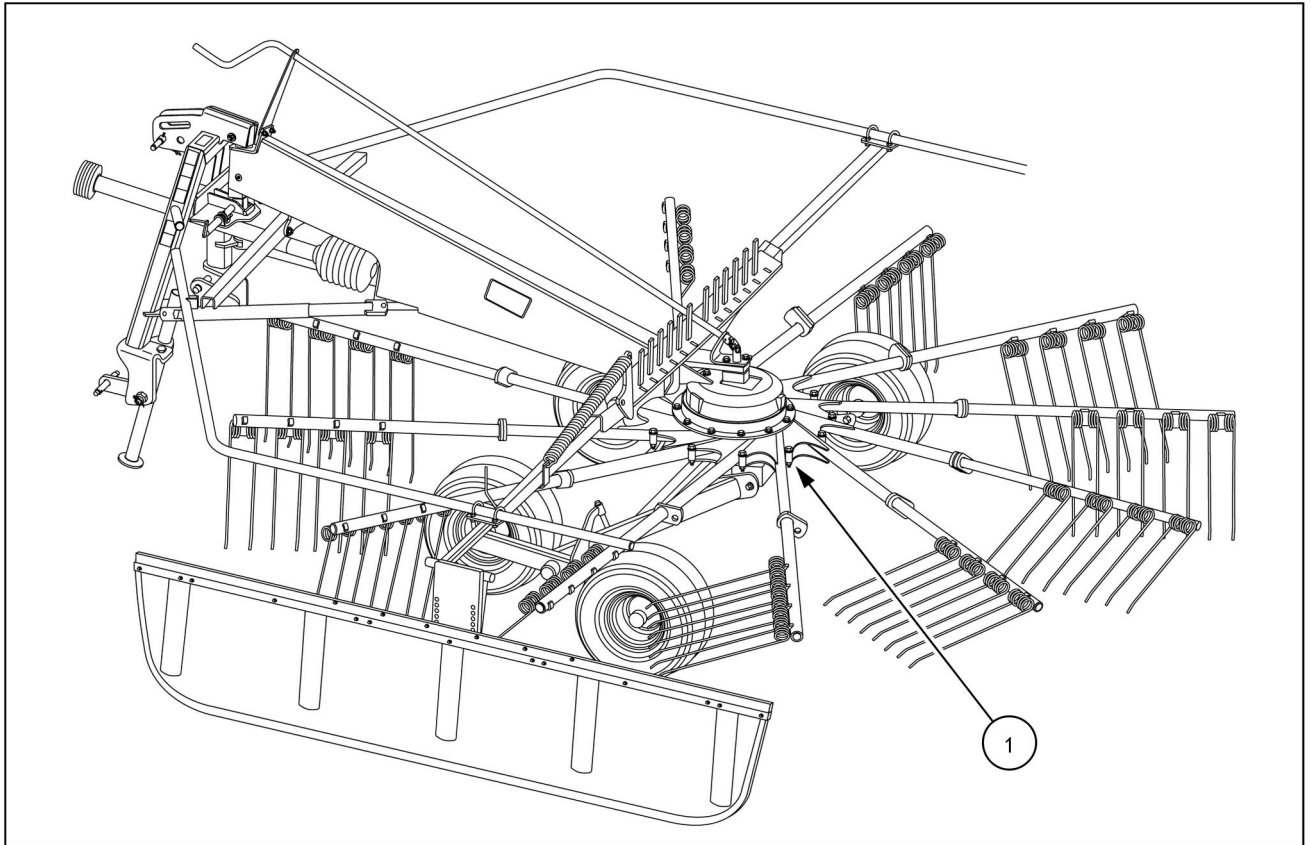
Cam track

To avoid squeaking noises, occasionally lubricate the cam track in the roller path.

Lubricant: **NLGI 2**

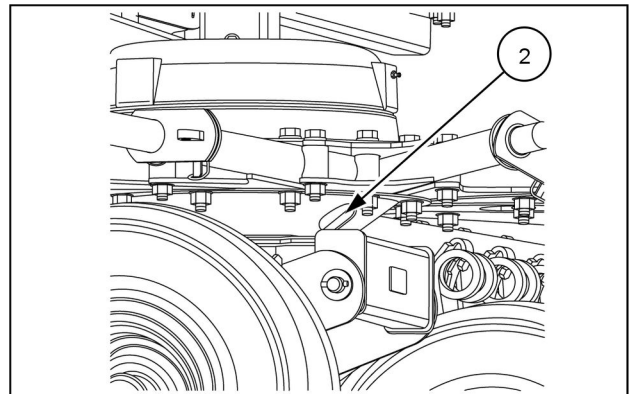
Prior operation:

Place the implement in safe conditions for maintenance.



ZEIL17HT00235FA 1

Remove the yellow drain plug (2) to reach the cam track (1).



ZEIL17HT00231AA 2

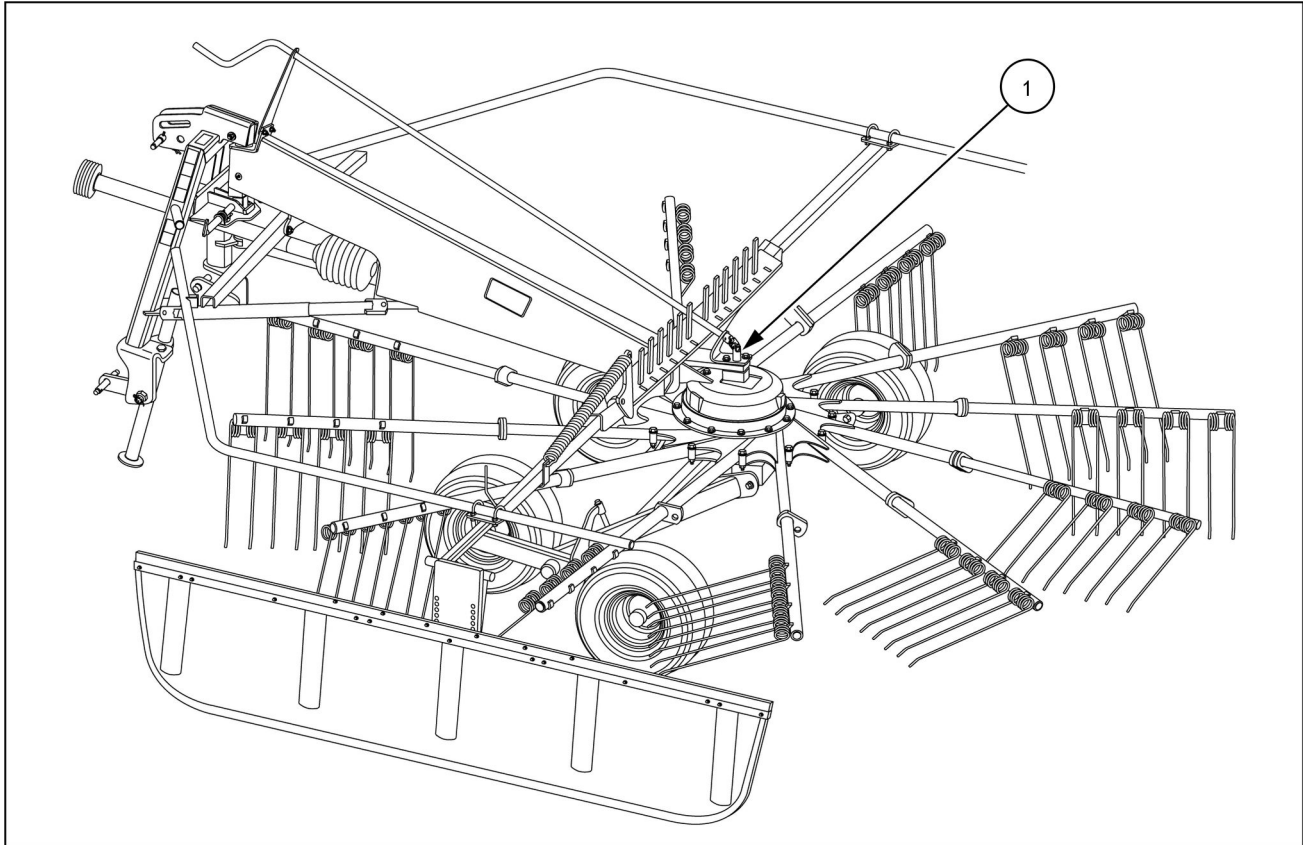
Universal joint

Occasionally perform the oiling of the connecting links of the universal joint.

Lubricant: **NLGI 2**

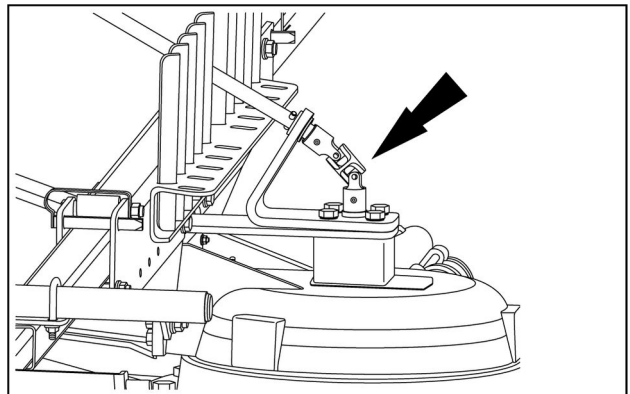
Prior operation:

Place the implement in safe conditions for maintenance.



ZEIL17HT00235FA 1

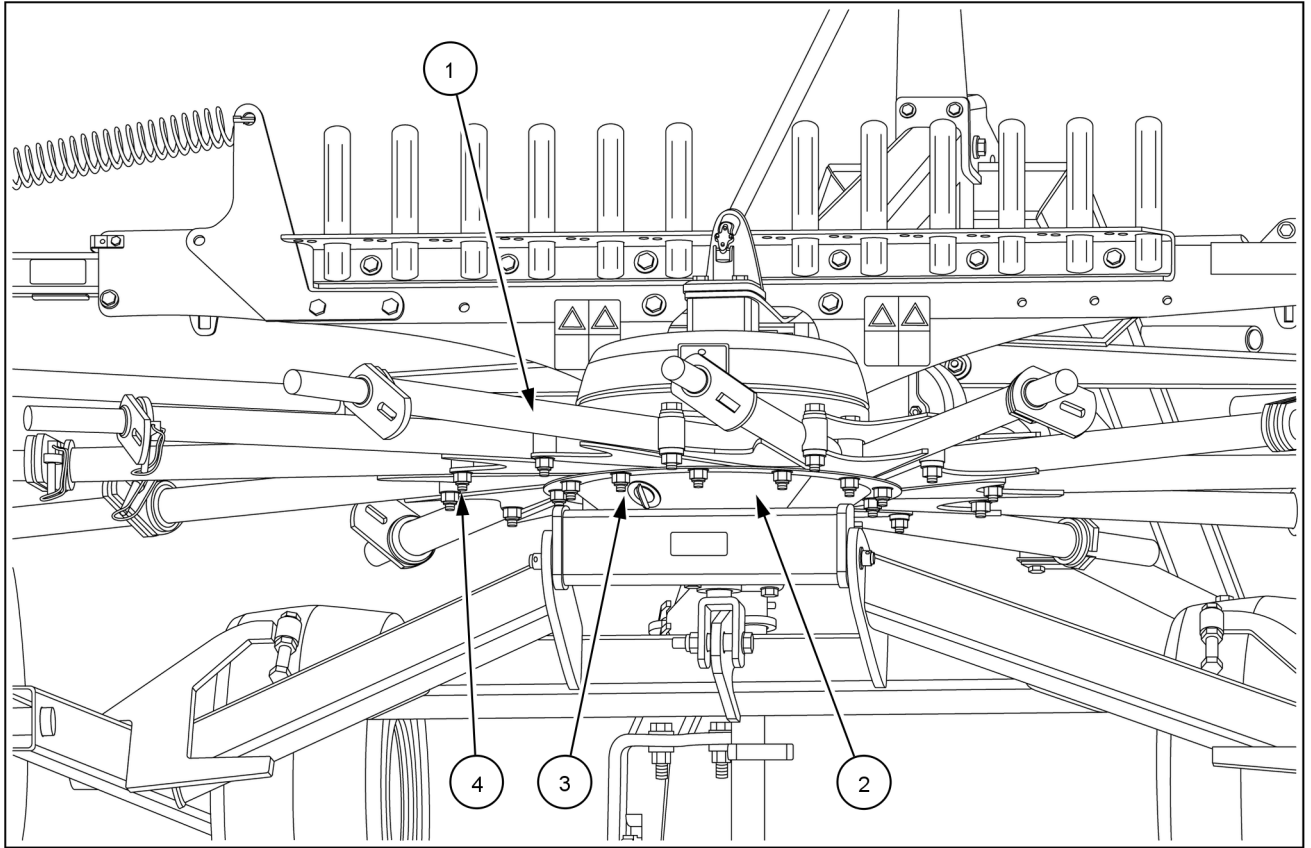
Lubricate the universal joint (1) as indicated in the figure.



ZEIL17HT00234AA 2

Bearing arms

NOTICE: If a bearing arm is damaged, is not necessary remove the whole rotor to replace the bearing arm.



ZEIL17HT00230FA 1

1. To replace a bearing arm **(1)** you must know to which cover plate **(2)** the bearing arm **(1)** is connect.
2. On the cover plate **(2)** remove the six screws on the innermost hole circle **(3)**.
3. Remove the cover plate **(2)**.
4. Remove the screws on the defective bearing arm **(1)** on the outmost hole circle **(4)**.
5. Loosen the screws near the bearing arms **(1)** and hold the bearing arms **(1)**.
6. Remove the defective bearing arm **(1)**.
7. Install the new bearing arm **(1)** in the correct position.
8. Make sure that the roller runs correctly in the roller path of the cam track.
9. Install the cover plate **(2)** on the correct position.
10. Finger-tight the screws.
11. Torque the screws.
 - Innermost hole circle: **160 N·m (118 lb ft)**
 - Outmost hole circle: **145 N·m (107 lb ft)**

Storage

Pressure washing

Before you use pressure washing, clean the implement with compressed air.

NOTE: *Legislation in certain countries and good practice requires special treatment of waste water through sedimentation and oil separation and controlled removal of residues.*

Avoid pressure washing at ambient temperatures below **10 °C (50 °F)** or when the implement is wet. Place the implement in a heated workshop or dry barn for at least **24 h**. Clean the implement only when fully dry.

NOTE: *Be careful when you clean the implement with a high pressure washing. Avoid to direct water jets on electric equipment, bearings, seals, gearboxes, etcetera.*

NOTE: *Grease all grease fittings carefully after you clean the implement to press possible water outside bearings.*

When you use a high pressure washer:

- Keep a minimum distance of **25 cm (9.8 in)** between the spray gun and the surface to be cleaned.
- Spray under an angle of minimum **25°** (do not spray straight at the implement).
- Maximum water temperature: **50 °C (122 °F)**.
- Maximum water pressure: **80 bar (1160 psi)**.
- Do not use chemicals.

NOTICE: *On the cylinders, do NOT direct the stream of a high pressure washer at the wiper seal. Water could come through the rod guide and create corrosion. This corrosion could generate pollution and seizing of the cylinder rod and the rod guide.*

End of season service

When the season is over, prepare the implement for the storage immediately.

To prepare the implement for winter storage:

1. Clean the implement thoroughly. Dust and dirt absorb moisture and moisture increases the formation of rust.
2. Store the implement in a dry place, protected against wind and weather in the best possible way.
3. Grease all grease fittings according to the "Maintenance chart".
4. Before you the implement, check carefully for damaged parts, loose screw-joints, leakage, wear and other defects. If there is any damage, it may be forgotten during the storage and result in problems the following season. Note down the necessary parts you will need before the next season and order the spare parts.
5. Dismount the Power Take-Off (PTO) shafts, lubricate the profile tubes and keep them in a dry place.
6. Spray the implement with a coat of rust-preventing oil.
7. Parts polished and the cylinder rods of the hydraulic cylinder may get rusty. Clean and brush with grease parts polished and the cylinder rods to protect against wind and weather.
8. Change the oil in the hydraulic system and the gear-boxes.
9. Support the implement to relieve the weight from the tires. Leave tires inflated. Tire and rubber components life will be extended if protected from sunlight during storage.

NOTE: *Periodic checks will help to keep your implement maintenance and repairs to a minimum and avoid costly breakdowns during the season. Therefore, it is good practice to have the implement inspected at the end of the season.*

Ordering parts and / or accessories

When you prepare the implement for storage, check thoroughly for any parts that may have become worn and need replacing.

Order and install the spare parts and/or accessories at once before the next season.

When you order spare parts, always make sure to give your KONGSKILDE dealer the model number and the Product Identification Number (PIN) of your implement. See "Product identification" in Chapter 1 of this operator's manual.

Insist on genuine KONGSKILDE "quality" spare parts as they will give the best performance and are covered by our warranty.

For best performance, have your implement serviced by an authorized KONGSKILDE dealer.

8 - TROUBLESHOOTING

Fault code resolution

Troubleshooting chart

This chapter is not available.

9 - SPECIFICATIONS

Technical data

Technical data	R+ 420	R+ 460
Rotor diameter	3.2 m (126 in)	3.5 m (137.8 in)
Tine arms assembly per rotor	12	
Double tines per tine arm assembly	4	
Working width, maximum	4.15 m (163.39 in)	4.45 m (175.2 in)
Minimum transport width	1.90 m (74.80 in)	2.18 m (85.83 in)
Length (with tine arms / without Power Take-Off (PTO) shaft)	3.7 m (145.67 in)	4 m (157.48 in)
Number of Revolutions Per Minute (RPM), PTO shaft	540 RPM	
Link arm category	I + II	
Suspension type	3-point	
Power requirement	from 30 kW (41 Hp)	from 33 kW (45 Hp)
Number of rotor wheels	2	4
Wheels, rotor	18.5x8.5-8 (6PR)	
Tire pressure	2.2 bar (31.9 psi)	
Electricity (for extra lighting kit)	12 V	
Equivalent sound pressure level	under 70 dB (A)	
Maximum total weight	645 kg (1422 lb)	695 kg (1532 lb)

Fluids and lubricants

Item	Capacity	KONGSKILDE brand name	KONGSKILDE specification	Lubricant grade	International specification
Grease fittings	-	-	-	NLGI 2	M1C 137-A or M1C 75-B
Universal joint	-	-	-	SAE 80W90	API GL-5 MIL-L-2105D
Safety bolt	-	-	-	SAE 80W90	API GL-5 MIL-L-2105D

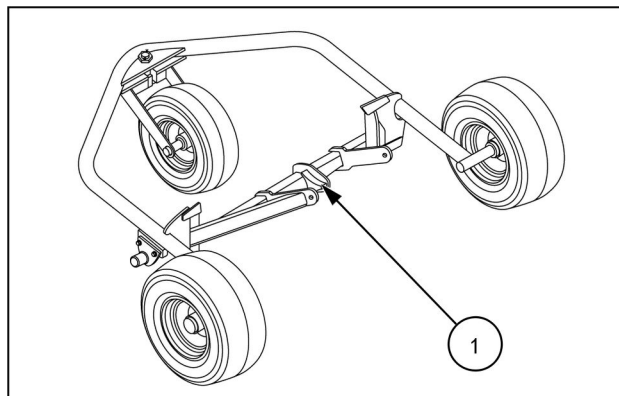
10 - ACCESSORIES

General information

Accessories or optional equipment listed hereafter may be part of the standard equipment for certain countries. Some of these accessories or options may not be available in certain markets.

3-wheel system

The 3-wheel system (1) is hinged as a boogie system. The hinge point is the standard wheel axle. The 3-wheel system (1) is recommended in uneven fields due to tracks from previous field operations. The front wheel is a caster wheel. The front wheel does not damage the grass cover during the turn.

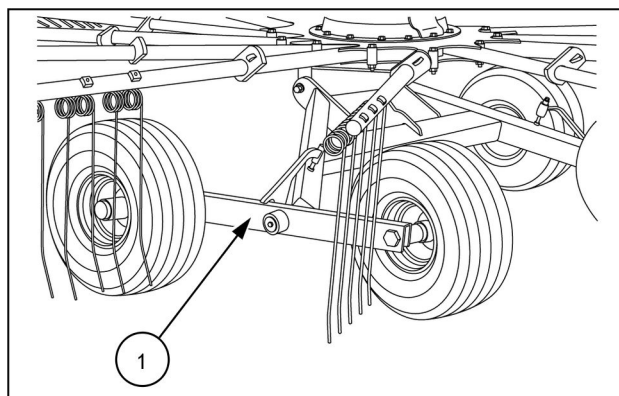


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4-wheel tandem boogie

The 4-wheel tandem boogie system (1) is recommended in uneven fields where there are tracks from previous field operations. The 4-wheel tandem boogie system (1) gives a more stable work height. The 4-wheel tandem boogie system (1) is also recommended when working in fields with soft ground because the 4-wheel tandem boogie system (1) is able to distribute the weight of the rake better.

NOTE: Standard on R+ 420.

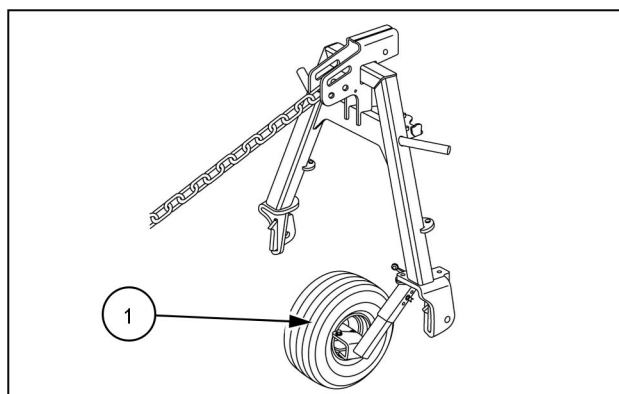


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Front gauge wheel

The front gauge wheel (1) mounted on the headstock increase the ground following of the implement and get an optimal work application. The front gauge wheel (1) reduce the risk of crop soil contamination because improves the condition of the ground following of the implement. The front gauge wheel (1) is specially recommended in rolling field conditions. Replace the top link with the chain includes on the kit to increase the movability.

NOTICE: Do not use the chain during the road transport.

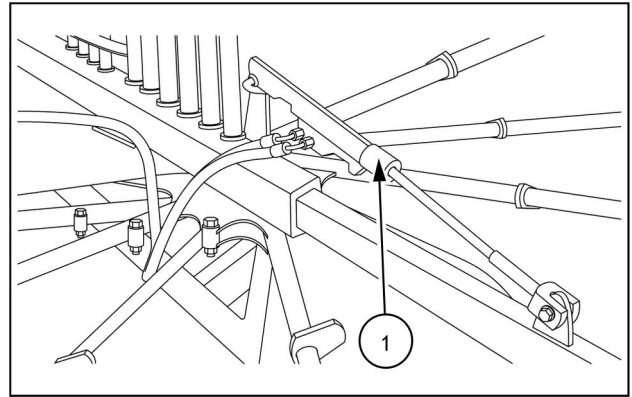


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Hydraulic lift of the swath canvas

The kit with the hydraulic cylinder (1) replace the swath canvas lift spring. The hydraulic cylinder (1) lifts the swath canvas arm from horizontal position to road transport position.

NOTE: You can install the lifting spring only on the R+460.

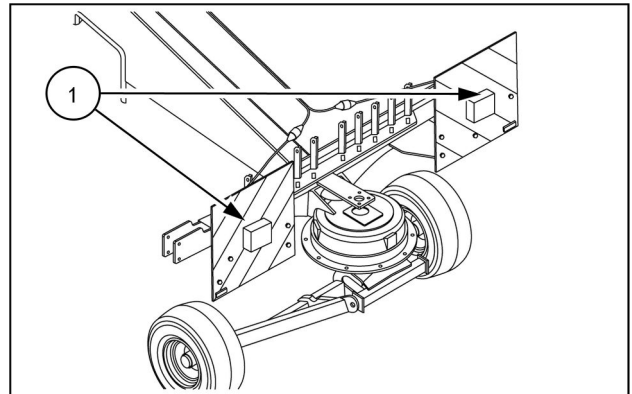


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Traffic light kit and side marking

Standard traffic light kit includes the warning plates (1). Side marking is separate kit.

Some countries may require this kit by law for the transport of the implement on public roads.



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11 - FORMS AND DECLARATIONS

EC Declaration of Conformity

EF-overensstemmelseserklæring/ EG-Konformitätserklärung/ EC Declaration of Conformity/ Déclaration CE de conformité/ Dichiarazione CE di conformità/ EG Verklaring van Overeenstemming/ EG-försäkran om överensstämmelse/ EY-vaatimustenmukaisuusvakuutus/ Declaración de conformidad CE/ Deklaracja Zgodności WE./ Декларация за съответствие ЕО/ EK Megfelelőségi Nyilatkozat /ES Prohlášení o shodě/ EB Atitikties deklaracija/ ES prehlásenie o zhode/ Declarația de conformitate CE/ Vastavuse Deklaratsioon EÜ /ES Izjava o skladnosti/ Δήλωση πιστότητας ΕΚ/ Declaração de fidelidade CE/ Dikjarazzjoni ta' Konformità tal-KE/ EK Atbilstības deklarācija/


F abrikant/ Hersteller/ Manufacturer/ Fabricant/ Produttore/ Fabrikant/ Fabrikant/ Valmistaja/ Fabricante/ Producent/ Производител/ Gyártó/ Výrobce/ Gamintojas/ Výrobca/ Producător/ Tootja/ Proizvajalec/ Κατασκευαστής/ Fabricante/ Fabbrikant/ Ražotājs

CNH INDUSTRIAL Belgium N.V.

B8210 Zedelgem, Belgium

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Maskine:	La máquina:	Masin:	 KONGSKILDE Model/Type: Designation: Rake TVV: Serial:
Maschine:	Maszyna:	Stroj:	
Machine:	Машината:	Η μηχανή:	
Machine:	Gép:	Máquina:	
La macchina:	Stroj:	Il-magna:	
Machine:	Mašina:	Mašina:	
Maskin:	Stroj:		
Laite:	Mašina:		

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- er i overensstemmelse med Maskindirektivets bestemmelser (Direktiv 2006/42/EF) og hvis relevant også bestemmelserne i EMC-direktivet 2014/30/EU

- In übereinstimmung mit den Bestimmungen der Maschinen-Richtlinie 2006/42/EG und wenn erforderlich auch mit der EMC-Richtlinie 2014/30/EU hergestellt wurde.

- is in conformity with the provisions of the Machinery Directive 2006/42/EC and if relevant also the provisions of the EMC Directive 2014/30/EU.

- est conforme aux dispositions de la Directive relatives aux machines 2006/42/CE et également aux dispositions de la Directive sur la Directive EMC 2014/30/UE

- é in conformita' con la Direttiva Macchine 2006/42/CE e, se pertinente, anche alla Direttiva alla Direttiva EMC 2014/30/UE.

- in overeenstemming is met de bepalingen van de Machine richtlijn 2006/42/EG en wanneer relevant ook met de bepalingen van de EMC richtlijn 2014/30/EU.

- är i överensstämmelse med Maskindirektivets bestämmelser (Direktiv 2006/42/EG) och om relevant också bestämmelserna i EMC-direktivet 2014/30/EU.

- täyttää Konedirektiivin (Direktiivi 2006/42/EY) määräykset ja oleellisilta osin myös EMC-direktiivin 2014/30/EU.

- es conforme a la Directiva de Maquinaria 2006/42/CE y, si aplica, es conforme también a la Directiva EMC 2014/30/EU.

- pozostaje w zgodzie z warunkami Dyrektywy Maszynowej 2006/42/WE i jeżeli ma to zastosowanie również z warunkami Dyrektywy dot. kompatybilności elektro magnetycznej EMC 2014/30/UE.

- отговаря на изискванията на Директивата за Машините 2006/42/ЕО и ако има приложение на изискванията на Директивата за електромагнитна съвместимост 2014/30/ЕС.

- Megfelel a 2006/42/EK Gépi Eszközökre vonatkozó előírásoknak és amennyiben felhasználásra kerül, a 2014/30/EU Elektromágneses kompatibilitás Irányelv feltételeinek.

- odpovídá základním požadavkům Strojní směrnice 2006/42/ES a jestliže to její uplatnění vyžaduje i s podmínkami Směrnice 2014/30/EU týkající se elektromagnetické compatibility.

- atitinka Mašinų direktyvos Nr. 2006/42/EB ir, jeigu taikoma, Elektromagnetinio suderinamumo direktyvos Nr. 2014/30/ES reikalavimus.

- je v súlade s podmienkami Smernice 2006/42/ES o strojných zariadeniach a pokiaľ si to jeho uplatnenie vyžaduje aj s podmienkami Smernice 2014/30/EÚ o elektromagnetickej kompatibilite.

- îndeplineşte prevederilor Directivei de Maşini 2006/42/CE şi dacă este utilizată de asemenea cu prevederile Directivei referitoare la compatibilitatea electro-magnetică EMC 2014/30/UE.

- on vastavuses Masinate Direktiivi tingimustega 2006/42/EÜ ning sammuti juhul, kui on tegemist sammuti on vastavuses Elektromagnetilise kokkusobivuse Direktiivitingimustega EMC 2014/30/EL.

- z določili Direktive o strojih 2006/42/ES ter, če je to relevantno, tudi z določili EMC Direktive 2014/30/EU.
- παραμένει σύμφωνη με τους όρους της Οδηγίας περί Μηχανών 2006/42/EK και σε περίπτωση που αυτό εφαρμόζεται και με τους όρους της Οδηγίας περί ηλεκτρομαγνητικής συμβατότητας (ΗΜΣ) 2014/30/ΕΕ.
- Está de acordo com exigências das Directivas das Maquinarias 2006/42/CE e no caso em que tiver igualmente aplicação com as exigências das Directivas referentes a compatibilidade electromagnética EMC 2014/30/UE.
- tikkonforma mad-dispożizzjonijiet tad-Direttiva dwar il-Makkinarju 2006/42/KE u jekk rilevanti wkoll mad-dispożizzjonijiet tad d-Direttiva EMC 2014/30/EU.
- atbilst mašīnu direktīvai 2006/42/EK, kā arī nepieciešamības gadījumā elektromagnētiskās saderības direktīvai EMC 2014/30/ES.

Zedelgem,

Antoon Vermeulen

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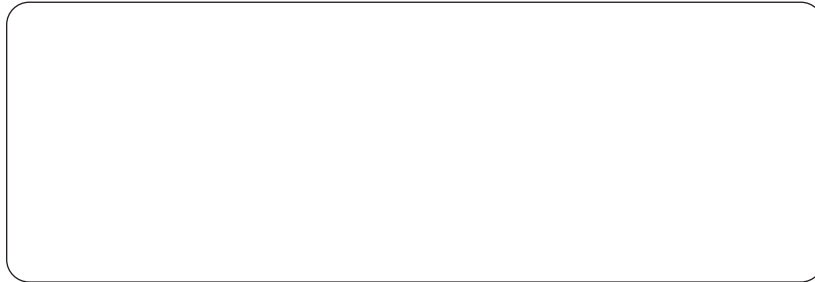
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Dealer's stamp



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