Operating Manual

AMAZONE

Soil tillage implements

Rotary cultivator
KG Special
KG Super

Rotary cultivator
KX

Rotary harrow
KE Special
KE Super

Please read this operating manual before commissioning. Keep it in a safe place for future use.

MG4321
BAH0063-5 11.14

en

Reading the instruction

manual and to adhere to it should not appear to be inconvenient and superfluous as it is not enough to hear from others and to realise that a machine is good, to buy it and to believe that now everything would work by itself. The person concerned would not only harm himself but also make the mistake of blaming the machine for the reason of a possible failure instead of himself. In order to ensure a good success one should go into the mind of a thing or make himself familiar with every part of the machine and to get acquainted with its handling. Only this way, you would be satisfied both with the machine as also with yourself. To achieve this is the purpose of this instruction manual.

Leipzig-Plagwitz 1872. Rud. Sark.

Identification data

Please insert the identification data of the implement. The identification data are arranged on the type plate.

Implement ID No.: (10-digit)	
Type:	KG / KX / KE
Permissible system pressure in bar:	Maximum 210 bar
Year of manufacture:	
Basic weight (kg):	
Permissible total weight (kg):	
Maximum load (kg):	

Manufacturer's address

AMAZONEN-WERKE
H. DREYER GmbH & Co. KG
Postfach 51
D-49202 Hasbergen, Germany
Tel.: + 49 (0) 5405 50 1-0
Fax: + 49 (0) 5405 501-234
E-mail: amazone@amazone.de

Spare part orders

Spare parts lists are freely accessible in the spare parts portal at www.amazone.de.

Please send orders to your AMAZONE dealer.

Formalities of the operating manual

Document number: MG4321
Compilation date: 11.14

Foreword

Dear Customer,

You have chosen one of the quality products from the wide product range of AMAZONEN-WERKE, H. DREYER GmbH & Co. KG. We thank you for your confidence in our products.

On receiving the implement, check to see if it has been damaged during transport or if parts are missing. Using the delivery note, check that the implement has been delivered in full, including any special equipment ordered. Damage can only be rectified if problems are signalled immediately.

Before commissioning, read and understand this operating manual, and particularly the safety information. Only after careful reading will you be able to benefit from the full scope of your newly purchased implement.

Please ensure that all the implement operators have read this operating manual before the implement is commissioned.

Should you have any questions or problems, please consult this operating manual or contact your local service partner.

Regular maintenance and timely replacement of worn or damaged parts increases the lifespan of your implement.

1 User Information

The User Information section provides information on use of the operating manual.

1.1 Purpose of the document

This operating manual

- describes the operation and maintenance of the implement.
- provides important information on safe and efficient handling of the implement.
- is a component part of the implement and should always be kept with the implement or the towing vehicle.
- Keep it in a safe place for future use.

1.2 Locations in the operating manual

All the directions specified in the operating manual are always seen in the direction of travel.

1.3 Diagrams

Instructions and responses

Activities to be carried out by the user are given as numbered instructions. Always keep to the order of the instructions. The reaction to the handling instructions is given by an arrow.

Example:

1. Instruction 1

→ Implement response to instruction 1

2. Instruction 2

Lists

Lists without an essential order are shown as a list with bullets.

Example:

- Point 1
- Point 2

Item numbers in diagrams

Numbers in round brackets refer to the item numbers in the diagrams. The first number refers to the diagram and the second number to the item.

Example: (Fig. 3/6)

- Figure 3
- Item 6

2 General Safety Instructions

This section contains important information on safe operation of the implement.

2.1 Obligations and liability

Comply with the instructions in the operating manual

Knowledge of the basic safety information and safety regulations is a basic requirement for safe handling and fault-free implement operation.

Obligations of the operator

The operator is obliged only to let those people work with/on the implement who

- are aware of the basic workplace safety information and accident prevention regulations.
- have been instructed in working with/on the implement.
- have read and understood this operating manual.

The operator is obliged

- to keep all the warning symbols on the implement in a legible state.
- to replace damaged warning symbols.

If you still have queries, please contact the manufacturer.

Obligations of the user

Before starting work, anyone charged with working with/on the implement is obliged

- to comply with the basic workplace safety instructions and accident prevention regulations.
- to read and follow the "General safety information" section of this operating manual.
- To read the section "Warning symbols and other labels on the implement" in this operating manual and to follow the safety instructions represented by the warning symbols when operating the implement.
- To get to know the implement.
- To read the sections of this operating manual, important for carrying out your work.

If the user discovers that a function is not working properly, then they must eliminate this fault immediately. If this is not the task of the user or if the user does not possess the appropriate technical knowledge, then they should report this fault to their superior (operator).

Risks in handling the implement

The implement has been constructed to the state-of-the art and the recognised rules of safety. However, operating the implement may cause risks and restrictions to

- the health and safety of the user or third parties,
- the implement,
- other property.

Only use the implement

- for the purpose for which it was intended,
- in a perfect state of repair.

Eliminate any faults immediately which could impair safety.

Guarantee and liability

Our "General conditions of sales and delivery" are always applicable. These shall be available to the operator, at the latest on conclusion of the contract. Guarantee and liability claims for damage to people or property will be excluded if they can be traced back to one or more of the following causes:

- Improper use of the implement.
- Improper installation, commissioning, operation and maintenance of the implement.
- Operation of the implement with defective safety equipment or improperly attached or non-functioning safety equipment.
- Non-compliance with the instructions in the operating manual regarding commissioning, operation and maintenance.
- Unauthorised design changes to the implement.
- Insufficient monitoring of implement parts which are subject to wear.
- Improperly executed repairs.
- Disasters due to the effects of foreign objects and force majeure.

2.2 Representation of safety symbols

Safety instructions are indicated by the triangular safety symbol and the highlighted signal word. The signal word (danger, warning, caution) describes the severity of the risk, and carries the following meaning:

DANGER

Indicates an immediate high risk which will result in death or serious physical injury (loss of body parts or long term damage) if not avoided.

If the instructions are not followed, then this will result in immediate death or serious physical injury.

WARNING

Indicates a medium risk, which could result in death or (serious) physical injury if not avoided.

If the instructions are not followed, then this may result in death or serious physical injury.

CAUTION

Indicates a low risk which could cause minor or medium level physical injury or damage to property if not avoided.

IMPORTANT

Indicates an obligation to special behaviour or an activity required for proper implement handling.

Non-compliance with these instructions can cause faults on the implement or disturbance to the environment.

NOTE

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your implement in the best way possible.

2.3 Organisational measures

The operator must provide the necessary personal protective equipment as per the information provided by the manufacturer of the crop protection agent to be used, such as:

- Safety glasses
- Protective shoes
- Chemical-resistant overalls
- Skin protection agents, etc.

The operating manual

- Must always be kept at the place at which the implement is operated.
- Must always be easily accessible for the user and maintenance personnel.

Check all the available safety equipment regularly.

2.4 Safety and protection equipment

Before starting up the implement each time, all the safety and protection equipment must be properly attached and fully functional. Check all safety and protection equipment regularly.

Faulty safety equipment

Faulty or disassembled safety and protection equipment can lead to dangerous situations.

2.5 Informal safety measures

As well as all the safety information in this operating manual, comply with the general, national regulations pertaining to accident prevention and environmental protection.

When driving on public roads and routes you should comply with the statutory road traffic regulations.

2.6 User training

Only those people who have been trained and instructed may work with/on the implement. The operator must clearly specify the responsibilities of the people charged with operation and maintenance work.

People being trained may only work with/on the implement under the supervision of an experienced person.

Person / Activity	Person specially trained for the activity [1]	Trained person [2]	Persons with specialist training (specialist workshop) [3]
Loading/Transport	X	X	X
Start-up	--	X	--
Set-up, tool installation	--	--	X
Operation	--	X	--
Maintenance	--	--	X
Troubleshooting and fault elimination	--	X	X
Disposal	X	--	--

Legend: X..permitted --..not permitted

1) A person who can assume a specific task and who can carry out this task for an appropriately qualified company.

2) Instructed persons are those who have been instructed in their assigned tasks and in the possible risks in the case of improper behaviour, have been trained if necessary, and have been informed about the necessary protective equipment and measures.

3) People with specialist technical training shall be considered as a specialist. Due to their specialist training and their knowledge of the appropriate regulations, they can evaluate the work with which they have been charged and detect possible dangers.

Comment:

A qualification equivalent to specialist training can be obtained from several years' experience in the relevant field.

If maintenance and repair work on the implement is additionally marked "Workshop work", only a specialist workshop may carry out such work. The personnel of a specialist workshop shall possess the appropriate knowledge and suitable aids (tools, lifting and support equipment) for carrying out the maintenance and repair work on the implement in a way which is both appropriate and safe.

2.7 Safety measures in normal operation

Only operate the implement if all the safety and protection equipment is fully functional.

Check the implement at least once a day for visible damage and check the function of the safety and protection equipment.

2.8 Danger from residual energy

Note that there may be residual mechanical, hydraulic, pneumatic and electrical/electronic energy on the implement.

Use appropriate measures to inform the operating personnel. You can find detailed information in the relevant sections of this operating manual.

2.9 Maintenance and repair work, fault elimination

Carry out prescribed setting, maintenance and inspection work in good time.

Secure all media such as compressed air and the hydraulic system against unintentional start-up.

Carefully fix and secure larger assemblies to lifting gear when carrying out replacement work.

Check all the screw connections for firm seating. On completion of the maintenance work, check the function of the safety devices.

2.10 Design changes

You may make no changes, expansions or modifications to the implement without the authorisation of AMAZONEN-WERKE. This also applies when welding support parts.

Any expansion or modification work shall require the written approval of AMAZONEN-WERKE. Only use modification and accessory parts approved by AMAZONEN-WERKE so that the type approval, for example, remains valid in accordance with national and international regulations.

Vehicles with an official type approval or with equipment connected to a vehicle with a valid type approval or approval for road transport according to the German road traffic regulations must be in the state specified by the approval.

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through the failure of support parts.

It is strictly forbidden to

- drill holes in the frame or on the running gear.
- increase the size of existing holes on the frame or the running gear.
- weld support parts.

2.10.1 Spare and wear parts and aids

Immediately replace any implement parts which are not in a perfect state.

Use only genuine AMAZONE spare and wear parts or the parts cleared by AMAZONEN-WERKE so that the operating permit retains its validity in accordance with national and international regulations. If you use wear and spare parts from third parties, there is no guarantee that they have been designed and manufactured in such a way as to meet the requirements placed on them.

AMAZONEN-WERKE shall accept no liability for damage caused by the use of non-approved spare and wear parts or aids.

2.11 Cleaning and disposal

Handle and dispose of any materials used carefully, in particular

- when carrying out work on lubrication systems and equipment and
- when cleaning using solvents.

2.12 User workstation

The implement must be operated by only one person from the driver's seat of the tractor.

2.13 Warning symbols and other labels on the implement

Always keep all the warning pictograms of the implement clean and in a legible state. Replace illegible warning pictograms. Order warning pictograms from the dealer using the relevant order number (e.g., MD 075).

Warning symbols - structure

Warning symbols indicate danger areas on the implement and warn against residual dangers. At these points, there are permanent or unexpected dangers.

A warning symbol consists of two fields:

Field 1

is a symbol describing the danger, surrounded by triangular safety symbol.

Field 2

is a symbol showing how to avoid the danger.

Warning symbols - explanation

The column **Order number and explanation** provides an explanation of the neighbouring warning symbol. The description of the warning symbols is always the same and specifies, in the following order:

1. A description of the danger.
   For example: risk of cutting
2. The consequence of non-compliance with the risk avoidance instructions.
   For example: causes serious injuries to fingers or hands.
3. Risk avoidance instructions.
   For example: only touch implement parts when they have come to a complete standstill.

Order number and explanation	Warning pictograms

MD 075

Risk of cutting or severing of fingers/hand through direct contact with moving parts involved in the working process!

This hazard can cause extremely serious injuries resulting in the loss of limbs.

- Never reach into the danger area when the tractor engine is running with the universal joint shaft or hydraulic/electrical system connected.
- Wait until all moving parts of the implement are at a standstill before reaching into the danger area.

MD 076

Risk of drawing-in/entrapment for hand or arm due to moving force-transmission parts!

This hazard can cause extremely serious injuries resulting in the loss of limbs.

Never open or remove protective equipment,

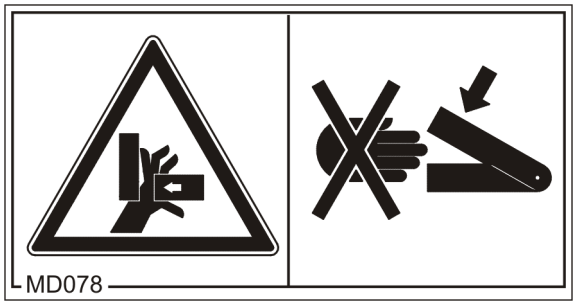
- while the tractor engine is running with the universal joint shaft or hydraulic/electronic system connected.
- if the ground wheel drive is moving.

MD 078

Risk of crushing of fingers/hand by accessible, moving parts of the implement!

This hazard can cause extremely serious injuries resulting in the loss of limbs.

Never reach into the danger area when the tractor engine is running with the universal joint shaft or hydraulic/electrical system connected.

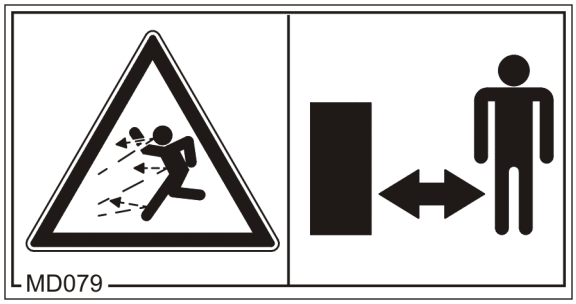


MD 079

Risk of materials or foreign objects being flung away from or out of the implement when entering or remaining in the danger area of the implement!

These dangers can inflict severe injuries on all parts of the body.

- Stay well clear of the danger area of the implement.
- Ensure that all persons maintain a sufficient safety distance from the danger area of the implement as long as the tractor engine is running.



MD 082

Risk of falling when riding the implement on treads or platforms!

Causes serious, potentially fatal injuries anywhere on the body.

It is forbidden to ride on the implement or climb the implement when it is running. This prohibition also applies to implements with step surfaces or platforms.

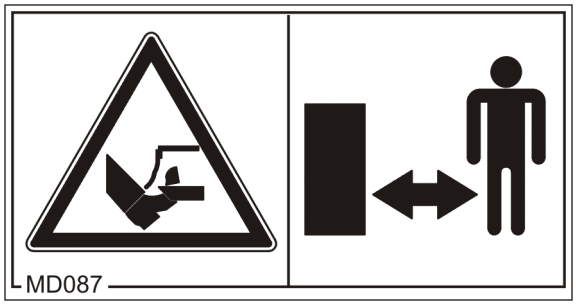
Make sure that nobody is riding on the implement.

MD 087

Risk of cutting or severing of toes or feet through direct contact with moving parts involved in the working process!

This hazard can cause extremely serious injuries resulting in the loss of limbs.

Stay well clear of the danger area when the tractor engine is running with the universal joint shaft or hydraulic/electrical system connected.

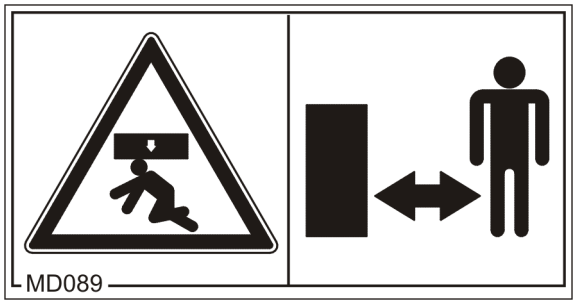


MD 089

Risk of crushing the entire body due to standing under suspended loads or raised implement parts.

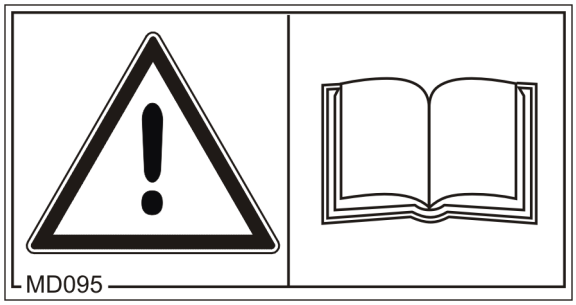
Causes serious, potentially fatal injuries anywhere on the body.

- It is forbidden to stand under suspended loads or raised implement parts.
- Maintain an adequate safety distance from any suspended loads or raised implement parts.
- Ensure that all personnel maintain an adequate safety distance from suspended loads or raised implement parts.



MD095

Read and follow the operating manual and safety information before starting up the implement!

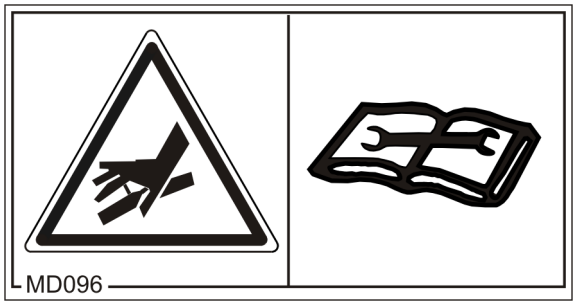


MD 096

Danger from escaping high-pressure hydraulic fluid due to leaking hydraulic hose lines.

This danger may cause serious injuries, perhaps even resulting in death, if escaping high-pressure hydraulic fluid passes through the skin and into the body.

- Never attempt to plug leaks in hydraulic hose lines with your hand or fingers.
- Read and observe the information in the operating manual before carrying out maintenance work on the hydraulic hose lines.
- If you are injured by hydraulic fluid, contact a doctor immediately.

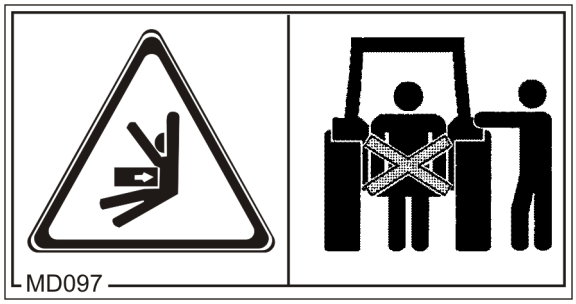


MD 097

Risk of crushing the entire body when standing in the lifting area of the three-point suspension when the three-point hydraulic system is operated!

Causes serious, potentially fatal injuries anywhere on the body.

- It is forbidden to stand in the lifting area of the three-point suspension when actuating the three-point hydraulic system.
- Actuate the operator controls for the tractor's three-point hydraulic system:
  - o from the intended workstation.
  - o under no circumstances if you are in the stroke area between the tractor and implement.

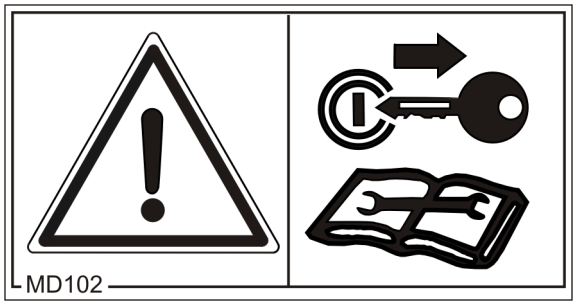


MD 102

Danger from intervention in the implement, e.g. installation, adjusting, troubleshooting, cleaning, maintaining and repairing, due to the tractor and the implement being started unintentionally and rolling.

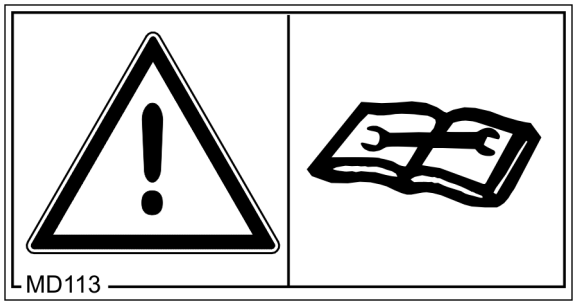
These dangers can cause extremely serious and potentially fatal injuries.

- Secure the tractor and the implement against unintentional start-up and rolling before any intervention in the implement.
- Depending on the type of intervention, read and understand the information in the relevant sections of the operating manual.



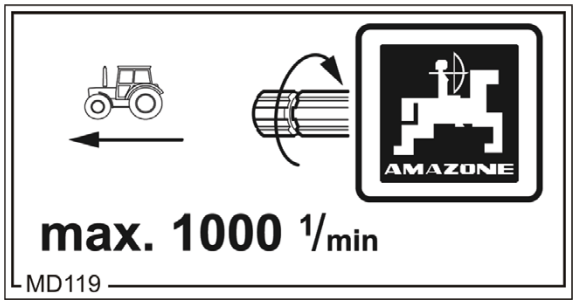
MD 113

Study and observe the instructions for cleaning, servicing and maintaining in the appropriate chapter of the operating manual.



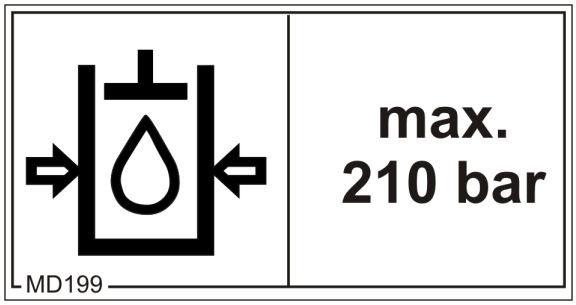
MD119

This symbol indicates the maximum drive speed (1000 rpm) and direction of rotation of the drive shaft on the implement side.



MD199

The maximum operating pressure of the hydraulic system is 210 bar.



2.13.1 Positions of warning symbols and other labels

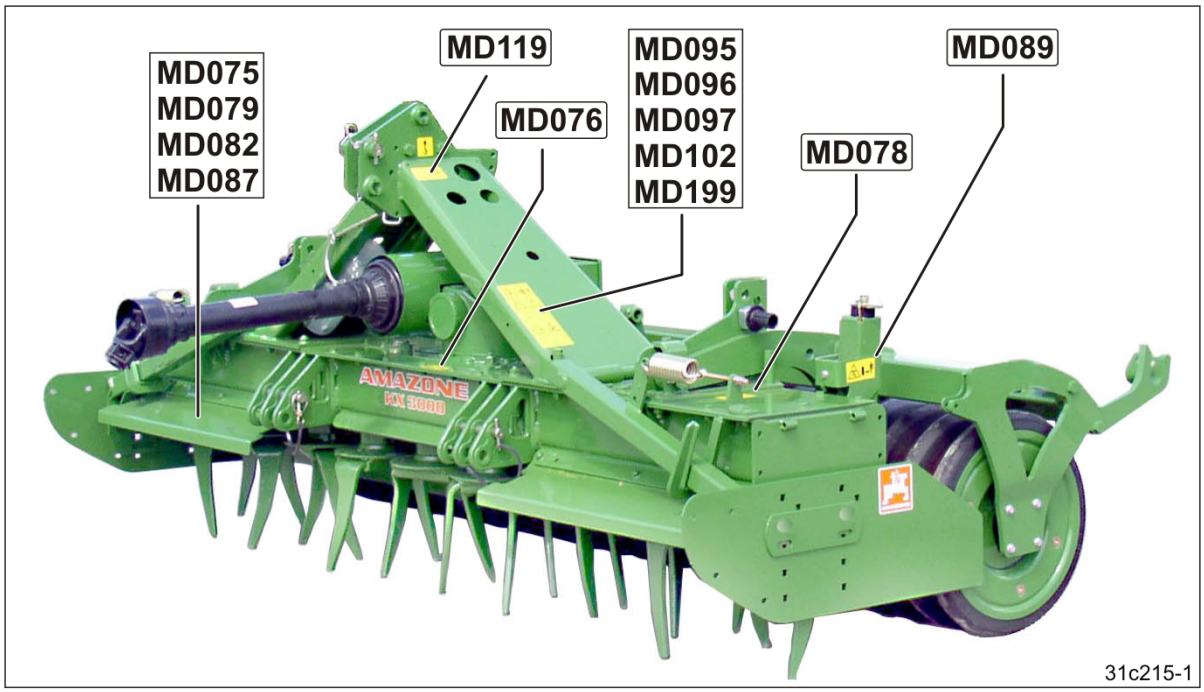


Fig. 1: KX 3000

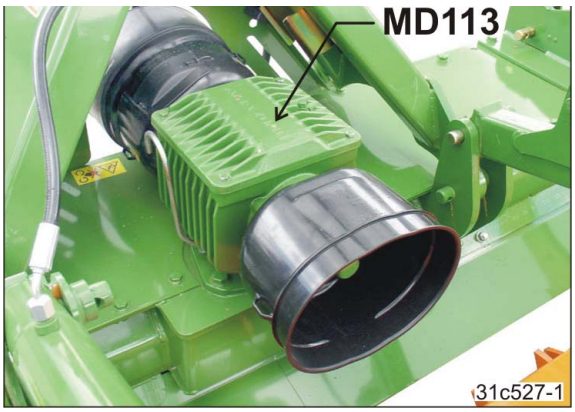


Fig. 2: WHG/KE-SPEC / WHG/KE-SUP

Fig. 3: WHG/KX

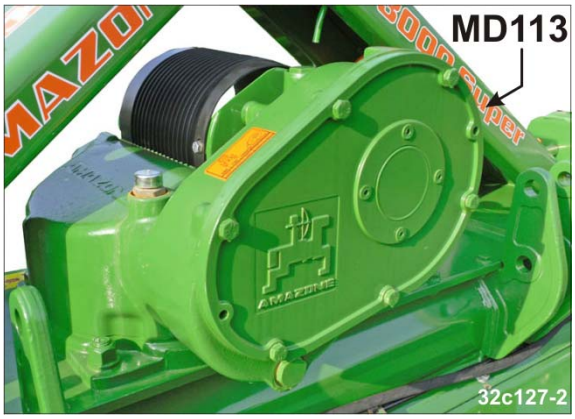


Fig. 4: WHG/KG-SPEC/WHG/KG-SUP

2.14 Potential risks from not observing the safety instructions

Non-compliance with the safety information

- can pose both a danger to people and also to the environment and implement.
- can lead to the loss of all warranty claims.

In particular, non-compliance with the safety information could pose the following risks:

- Danger to people through non-secured working areas.
- Failure of important implement functions.
- Failure of prescribed methods of maintenance and repair.
- Danger to people through mechanical and chemical impacts.
- Risk to the environment through leakage of hydraulic fluid.

2.15 Safety-conscious working

Besides the safety information in this operating manual, the generally applicable national workplace safety and accident prevention regulations are binding.

Comply with the accident prevention instructions on the warning symbols.

When driving on public roads and routes, comply with the appropriate statutory road traffic regulations.

2.16 Safety information for users

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through inadequate roadworthiness and operational safety.

Before starting up the implement and the tractor, always check their traffic and operational safety.

2.16.1 General safety instructions and accident prevention instructions

- In addition to these instructions, also comply with the generally valid national and safety and accident prevention regulations!
- The warning and information signs attached on the implement provide important instructions for safe operation of the implement. Compliance with these instructions is essential for your safety!
- Before moving off and starting up the implement, check the immediate area of the implement (children). Ensure that you can see clearly.
- It is forbidden to ride on the implement or use it as a means of transport!
- Drive in such a way that you always have full control over the tractor with the attached implement.

  In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected or coupled implement.

Coupling and uncoupling the implement

- Only connect and transport the implement with tractors suitable for the task.
- When connecting implements to the tractor's three-point hydraulic system, the attachment categories of the tractor and the implement must always be the same!
- Connect the implement to the prescribed equipment in accordance with the specifications.
- When coupling implements to the front or the rear of the tractor, the following may not be exceeded:
  - the approved total tractor weight
  - the approved tractor axle loads
  - the approved load capacities of the tractor tyres
- Secure the tractor and the implement against unintentional rolling before coupling or uncoupling the implement.
- It is forbidden for people to stand between the implement to be coupled and the tractor while the tractor is approaching the implement.

  Any helpers may only act as guides standing next to the vehicles, and may only move between the vehicles when both are at a standstill.

- Before the implement is connected to or disconnected from the tractor's three-point hydraulic system, secure the operating lever of the tractor hydraulic system such that unintentional raising or lowering is impossible.
- When coupling and uncoupling implements, move the support equipment (if available) to the appropriate position (stability).
- When actuating the support equipment, there is a danger of injury from contusion and cutting points!
- Be particularly careful when coupling the implement to the tractor or uncoupling it from the tractor! There are contusion and cutting points in the area of the coupling point between the tractor and the implement.
- It is forbidden to stand between the tractor and the implement when actuating the three-point hydraulic system!
- Coupled supply lines:
  - Must give without tension, bending or rubbing on all movements when travelling round corners.
  - Must not chafe against other parts.
- The release ropes for quick action couplings must hang loosely and may not release themselves when lowered.
- Also ensure that uncoupled implements are stable!

Use of the implement

- Before starting work, make sure that you understand all the equipment and control elements of the implement and their functions. There is no time for this when the implement is already in operation!
- Wear tight-fitting clothing! There is an increased risk of loose clothing getting caught or entangled on drive shafts!
- Only place the implement in service after all protective devices have been attached and are in protective position!
- Comply with the maximum load of the connected implement and the approved axle and support loads of the tractor. If necessary, drive only with a partially filled tank.
- It is forbidden to stand in the working area of the implement.
- It is forbidden to stand in the turning and swivel range of the implement.
- There are crushing and shearing hazards on implement parts actuated by external force (e.g. hydraulically)!
- Only actuate implement parts actuated by external force if personal are maintaining an adequate safety distance to the implement!
- Secure the tractor against unintentional start-up and rolling, before you leave the tractor.
  For this:
  - Lower the implement onto the ground.
  - Apply the parking brake.
  - Switch off the tractor engine.
  - Remove the ignition key.

Implement transportation

- When using public roads, national road traffic regulations must be observed.
- Before moving off, check:
  - the correct connection of the supply lines.
  - the lighting system for damage, function and cleanliness.
  - the brake and hydraulic system for visible damage.
  - that the parking brake is completely released.
  - the functioning of the brake system.
- Ensure that the tractor has sufficient steering and braking power. Any implements and front/rear weights connected to the tractor influence the driving behaviour and the steering and braking power of the tractor.
- If necessary, use front weights.
  The front tractor axle must always be loaded with at least 20 % of the empty tractor weight, in order to ensure sufficient steering power.
- Always fix the front or rear weights to the intended fixing points according to regulations.
- Comply with the maximum load of the connected implement and the approved axle and support loads of the tractor.
- The tractor must guarantee the prescribed brake delay for the

loaded vehicle combination (tractor plus connected implement).

- Check the brake power before moving off.
- When turning corners with the implement connected, take the broad load and balance weight of the implement into account.
- Before transport of the implement, ensure sufficient side locking of the tractor lower links if the implement is attached to the three-point hydraulic system or lower links of the tractor.
- Before moving off, move all the swivel implement parts to the transport position.
- Before moving off, secure all the swivel implement parts in the transport position against risky position changes. Use the transport locks intended for this.
- Before transporting, lock the operating lever of the tractor's three-point hydraulic system against the unintentional raising or lowering of the connected or hitched implement.
- Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the implement.
- Before transportation, carry out a visual check that the top and lower link bolts are firmly fixed with the lynch pin against unintentional release.
- Adjust your forward speed to the prevailing conditions.
- Before driving downhill, switch to a low gear.
- Before moving off, always switch off the independent wheel braking (lock the pedals).

2.16.2 Attached tools

- When attaching to the three-point linkage, the linkage categories on tractor and implement must be compatible or an adapter must be used!
- Take note of the manufacturer's instructions.
- Before attaching implements to or removing them from the three-point suspension, shift the operating equipment to a position in which unintended raising or lowering is impossible.
- There is a danger of crushing or shearing injury around the three-point linkage.
- The implement may be transported and towed only by the tractors intended for this purpose.
- There is a risk of injury when implements are coupled to and uncoupled from the tractor.
- Do not step between tractor and implement when operating the external control for the three-point attachment!
- There is a danger of crushing and shearing injury when operating the support devices.
- When mounting implements at the front or rear of a tractor, do not exceed
  - the approved total tractor weight.
  - the approved tractor axle loads.
  - the approved load capacities of the tractor tyres.
- Observe the max. working load of the mounted implement and the permissible axle loads of the tractor!
- Always ensure that the tractor lower links are adequately locked against sideways movement before transporting the implement.
- The operating lever for the tractor lower link must be locked against lowering when driving on roads.
- Shift all equipment into the transport position before travelling on the road.
- Any mounted implements and ballast weights affect the handling, steering and braking of the tractor!
- The front tractor axle must always be loaded with at least 20 % of the empty tractor weight, in order to ensure sufficient steering power. Apply front weights if necessary!
- Only ever carry out any servicing, maintenance or cleaning operations or remedy malfunctions with the ignition key removed.
- Leave safety devices attached and always position them in the protective position.

2.16.3 Hydraulic system

- The hydraulic system is under a high pressure.
- Ensure that the hydraulic hose lines are connected correctly!
- When connecting the hydraulic hose lines, ensure that the hydraulic system is depressurized on both the implement and tractor sides.
- It is forbidden to block the operator controls on the tractor which are used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements which:
  - are continuous or
  - are automatically locked or
  - require a float position or pressure position due to their function.
- Before working on the hydraulic system,
  - lower the implement.
  - depressurise the hydraulic system.
  - switch off the tractor engine.
  - apply the parking brake.
  - remove the ignition key.
- Have the hydraulic hose lines checked for proper functioning by a specialist at least once a year.
- Replace the hydraulic hose lines if they are damaged or worn. Use only genuine AMAZONE hydraulic hose lines!
- The hydraulic hose lines should not be used for longer than six years, including any storage time of maximum two years. Even with proper storage and approved use, hoses and hose connections are subject to natural aging, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose lines made of thermoplastics, other guide values may be decisive.
- Never attempt to plug leaks in hydraulic hose lines using your hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Risk of infection.
- When searching for leakage points, use suitable aids, to avoid the serious risk of infection.

2.16.4 Electrical system

- When working on the electrical system, always disconnect the battery (negative terminal).
- Only use the prescribed fuses. If fuses are used that are too highly rated, the electrical system will be destroyed – risk of fire
- Ensure that the battery is connected correctly – firstly connect the positive terminal and then connect the negative terminal. When disconnecting the battery, disconnect the negative terminal first, followed by the positive terminal.
- Always place the appropriate cover over the positive battery terminal. If there is accidental earth contact, there is a risk of explosion.
- Risk of explosion: avoid the production of sparks or the presence of naked flames in the vicinity of the battery.
- The implement may be equipped with electronic components whose function is influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed.
  - If retrofitting electrical units and/or components on the implement with a connection to the on-board power supply, the user is responsible for checking whether the installation might cause faults on the vehicle electronics or other components.
  - Ensure that the retrofitted electrical and electronic components comply with the EMC Directive in the appropriate version and carry the CE mark.

2.16.5 PTO shaft operation

- Use only the universal joint shafts prescribed by the AMAZONEN-WERKE factories, equipped with the proper safety devices.
- Also read and follow the operating manual from the universal joint shaft manufacturer.
- The protective tube and universal joint shaft guard must be undamaged, and the shield of the tractor and implement PTO shaft must be attached and be in proper working condition.
- Work is prohibited while the safety devices are damaged.
- You can attach and detach the universal joint shaft only with
  - switched off PTO shaft.
  - switched off tractor engine.
  - applied parking brake.
  - removed ignition key.
- Always ensure that the universal joint shaft is installed and secured correctly.
- Beim Einsatz von Weitwinkel-Gelenkwellen das Weitwinkelgelenk immer am Drehpunkt zwischen Traktor und Maschine anbringen!
- Secure the universal joint shaft guard by attaching the chain(s) to prevent movement.

- Observe the prescribed pipe overlaps for universal joint shafts in transport and working positions. (Read and follow the operating manual from the universal joint shaft manufacturer.)
- When turning corners, observe the permitted bending and displacement of the universal joint shaft.
- Before switching on the PTO shaft, check that the selected PTO shaft speed of the tractor matches the permitted drive speed of the implement.
- Instruct everyone to leave the danger area of the implement before switching on the PTO shaft.
- While work is being carried out with the PTO shaft, there must be no one in the area of the PTO or universal joint shaft while it is turning.
- Never switch on the PTO shaft while the tractor engine is turned off.
- Always switch off the PTO shaft whenever excessive bending occurs or it is not needed.
- WARNING! After the PTO shaft is switched off, there is a danger of injury from the continued rotation of freewheeling implement parts.

  Do not approach the implement too closely during this time. You must only start work on the implement once all implement parts are at a complete standstill!
- Secure the tractor and implement against unintentional starting and unintentional rolling away before you perform any cleaning, servicing or maintenance work on PTO shaft-driven implements or universal joint shafts.
- After uncoupling the universal joint shaft, place it on the holder provided.
- After removing the universal joint shaft, attach the protective sleeve to the PTO shaft stub.
- When using the travel-dependent PTO shaft, note that the PTO shaft speed depends on the drive speed, and that the direction of rotation reverses when you drive in reverse.

2.16.6 Cleaning, maintenance and repair

- Only carry out cleaning, maintenance and repair work on the implement when:
  - the drive is switched off.
  - the tractor engine is at a standstill.
  - the ignition key has been removed.
  - the implement plug has been disconnected from the on-board computer.
- Regularly check the nuts and bolts for a firm seat and retighten them as necessary.
- Secure the raised implement and/or raised implement parts against unintentional lowering before performing any cleaning, maintenance or repair work on the implement!
- When replacing work tools with blades, use suitable tools and gloves.
- Dispose of oils, greases and filters in the appropriate way.
- Disconnect the cable to the tractor generator and battery, before carrying out electrical welding work on the tractor and on attached implements.
- Spare parts must meet at least the specified technical requirements of AMAZONEN-WERKE! This is ensured through the use of original AMAZONE spare parts.

3 Loading and unloading

The pictogram marks the location at which the lifting gear is to be secured to the implement.

DANGER

Only attach the lifting gear at the marked location.

Do not stand under suspended loads.

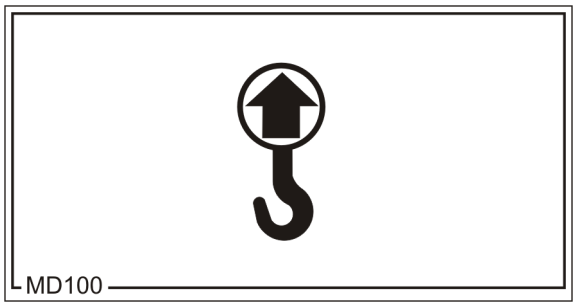


Fig. 5

Loading the implement on a transport vehicle

1. Uncouple the seed drill and deep loosener from the soil tillage implement.
2. Attach the lifting gear at the marked location.
3. Place the implement on the transport vehicle and lash it down as prescribed.

Fig. 6

4 Product description

This section:

- provides a comprehensive overview of the implement structure.
- provides the names of the individual modules and controls.

If possible, read this section when actually at the implement. This helps you to understand the implement better.

4.1 Main assemblies of the implement

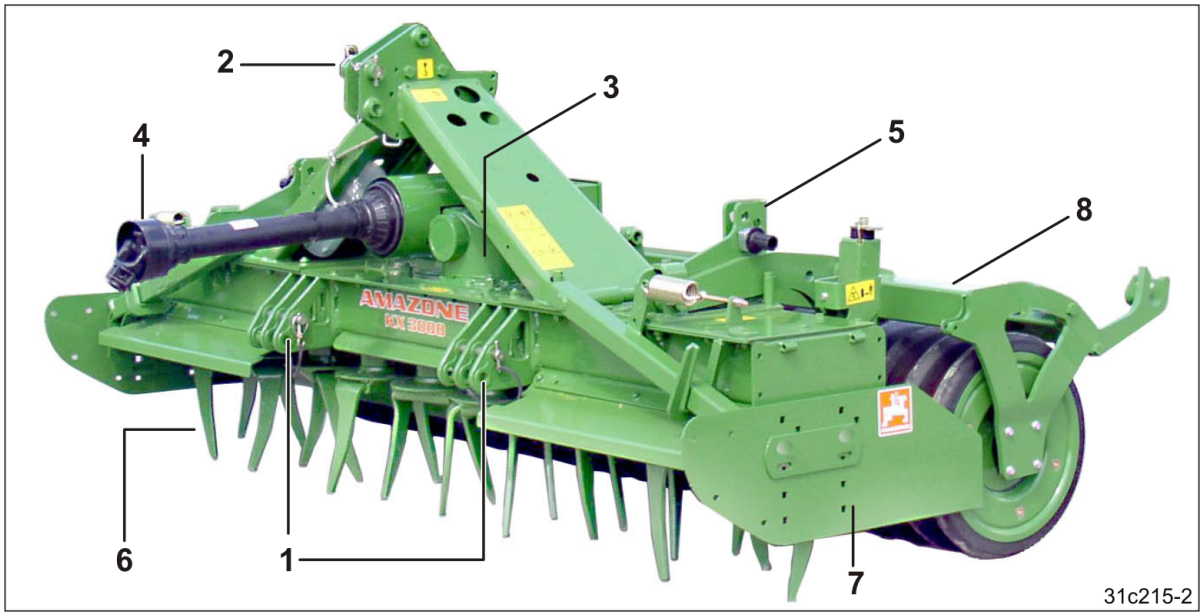


Fig. 7: KX 3000

(1) Lower link coupling points
(2) Top link coupling point
(3) Gearbox
(4) Universal joint shaft with overload clutch
(5) Segment for adjusting the working depth
(6) Tool tines
(7) Side panel
(8) Trailing roller

4.2 Safety and protection equipment

Fig. 8

Universal joint shaft guard

Fig. 8

Fig. 9/…

(1) Tool guard plate

(2) Levelling board

(3) Side panel

(4) Roller, trailing

The above-mentioned components serve as tool protection; use of the implement without these components is not permitted.

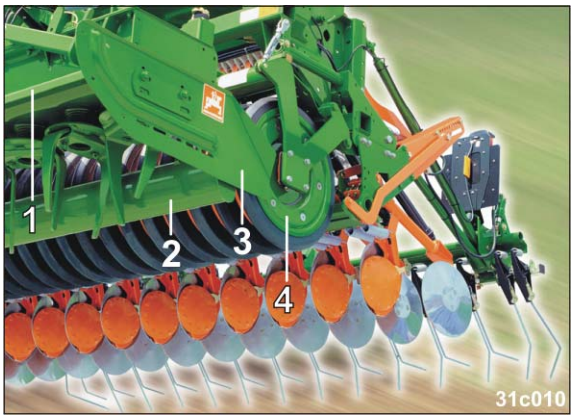


Fig. 9

4.3 Overview – supply lines between the tractor and the implement

Power supply cable

Designation	Function
Plug (7-pin)	Road traffic lighting system (optional)
Plug for tractor socket	Oil cooler fan (optional)

Hydraulic hose lines

All hydraulic hose lines have handles with coloured markings and a code number or code letter to assign the respective hydraulic function to the pressure line of a tractor control unit!

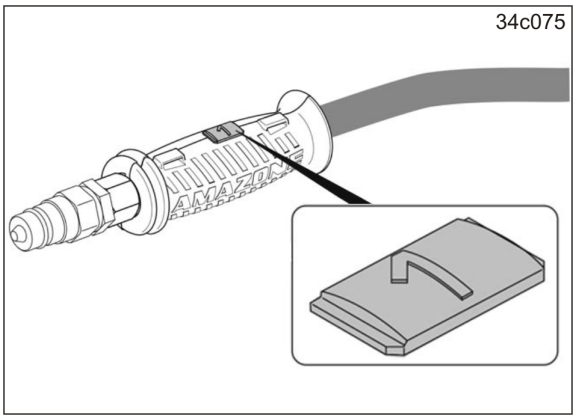


Fig. 10

The function of the tractor control unit is represented symbolically:

Latched, for a permanent oil circulation

When the button is pressed, as long as the function is active

Float position, free oil flow in the control unit

Hydraulic hose		Implement functions		Note	Tractor control unit		
Marking					Function / Designation		
Green	1	Lifting frame (optional)	Tilt		Single-acting		*Green*
Beige	1	Adjusting the working depth (optional)	Shallower		Double-acting		*Beige*
	2		Deeper				

4.4 Transportation equipment

Fig. 11/...

(1) 2 rear-facing warning signs

Fig. 11

Fig. 12/...

(1) 2 rear-facing turn signals

(2) 2 reflectors, yellow.

(3) 2 brake and rear lights

(4) 2 red reflectors

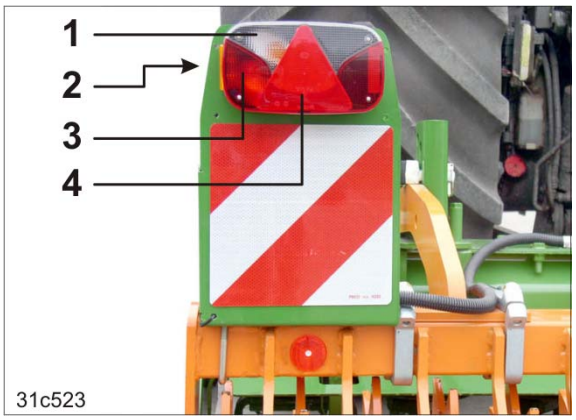


Fig. 12

Fig. 13/...

(1) 2 forwards-facing warning signs

(2) 2 forwards-facing side lights

(3) 2 forwards-facing turn signals

(4) 2 side-facing warning signs
(France kit; not permitted in Germany)

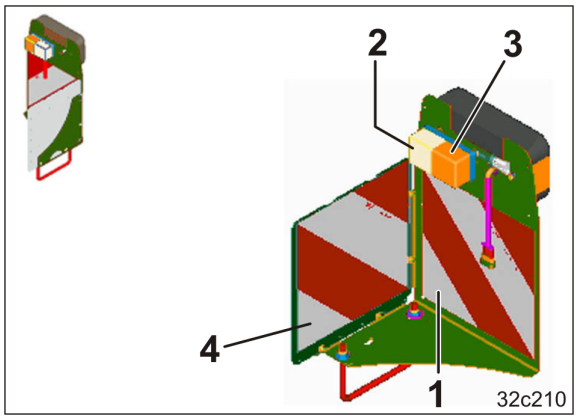


Fig. 13

4.5 Intended use

The soil tillage implement

- has been designed for conventional soil tillage on agricultural crop lands.
- is coupled to the tractor using the tractor three-point hitch attachment and is controlled by an operator.
- may be used only with the levelling board, side panels and trailing roller fitted.
  This also applies if the soil tillage implement is part of a sowing combination.

Slopes can be travelled

- along the contours.

  Direction of travel to the left 15 %

  Direction of travel to the right 15 %
- along the gradient.

  Up the slope 15 %

  Down the slope 15 %

"Intended use" also covers:

- Compliance with all the instructions in this operating manual.
- Adherence of inspection and maintenance work
- Exclusive use of original AMAZONE spare parts.

Other uses to those specified above are forbidden and shall be considered as improper.

For any damage resulting from improper use

- the operator bears the sole responsibility.
- AMAZONEN-WERKE accepts no liability.

4.6 Danger areas and danger points

The danger area is the area around the implement in which people can be caught:

- by work movements made by the implement and its tools.
- by materials or foreign bodies thrown out of the implement.
- by tools rising or falling unintentionally.
- by unintentional rolling of the tractor and the implement.

Within the implement danger area, there are danger points with permanent or unexpected risks. Warning pictograms indicate these danger points and warn against residual dangers, which cannot be eliminated for construction reasons. Here, the special safety regulations of the appropriate section shall be valid.

No-one may stand in the implement danger area:

- as long as the tractor engine is running with the universal joint shaft/hydraulic system connected.
- as long as the tractor and implement are not protected against unintentional start-up and running.

The operating person may only move the implement or switch or drive the tools from the transport position to the working position or vice-versa when there is no-one in the implement danger area.

Danger points exist:

- between the tractor and the implement, particularly during coupling and uncoupling operations.
- in the area of moving parts.
- by climbing onto the implement.
- underneath raised, unsecured implements or parts of implements.
- in the area of the swivelling track markers.

4.7 Rating plate and CE mark

The diagram shows the location of the rating plate and the CE mark. The CE mark on the implement indicates compliance with the stipulations of the valid EU directives.

The rating plate shows:

- Mach. ident. no.
- Type
- Model year
- Factory
- Basic weight kg

Fig. 14

4.8 Noise production data

The workplace-related emission value (acoustic pressure level) is 72 dB(A), measured in operating condition at the ear of the tractor driver with the cabin closed.

Measuring unit: OPTAC SLM 5.

The noise level is primarily dependent on the vehicle used.

4.9 Technical data

Rotary harrow KE 2500 Special		
Working width	[m]	2.50
Transport width	[m]	2.55
Tractor mount category		see below
Number of rotors		8
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KE 2500 Special		[kg]	795
Roller	SW 2500-420	[kg]	198
	PW 2500-420	[kg]	257
	PW 2500-500	[kg]	327
	KW 2500-520/125	[kg]	370
2 carrying arms for the roller		[kg]	68
Total weight G_H: KE 2500 Special + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.55

Rotary harrow KE 3000 Special		
Working width	[m]	3.0
Transport width	[m]	3.0
Tractor mount category		see below
Number of rotors		10
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KE 3000 Special		[kg]	850
Roller	SW 3000-420	[kg]	227
	SW 3000-520	[kg]	250
	PW 3000-420	[kg]	303
	PW 3000-500	[kg]	376
	PW 3000-600	[kg]	607
	KW 3000-520/125	[kg]	410
	KW 3000-580/125	[kg]	550
	KW 3000-580/166	[kg]	510
	CDW 3000-550/125	[kg]	688
2 carrying arms for the roller		[kg]	68
Total weight G_H: KE 3000 Special + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.55

Rotary harrow KE 3000 Super		
Working width	[m]	3.0
Transport width	[m]	3.0
Tractor mount category		see below
Number of rotors		10
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KE 3000 Super		[kg]	860
Roller	SW 3000-420	[kg]	227
	SW 3000-520	[kg]	250
	PW 3000-420	[kg]	303
	PW 3000-500	[kg]	376
	PW 3000-600	[kg]	607
	KW 3000-520/125	[kg]	410
	KW 3000-580/125	[kg]	550
	KW 3000-580/166	[kg]	510
	CDW 3000-550/125	[kg]	688
2 carrying arms for the roller		[kg]	68
Total weight G_H: KE 3000 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

Rotary cultivator KE 3500 Super		
Working width*)	[m]	3.43 or 3.50
Transport width*)	[m]	3.43 or 3.50
Tractor mount category		see below
Number of rotors		12
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KE 3500 Super		[kg]	1360
Roller	SW 3500-520	[kg]	290
	PW 3500-500	[kg]	435
	PW 3500-600	[kg]	706
	KW 3500-580/125	[kg]	660
	KW 3500-580/166	[kg]	610
	CDW 3500-550/125	[kg]	829
2 carrying arms for the roller		[kg]	68
Total weight G_H: KE 3500 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

*) The working and transport width of the KE 3500 rotary cultivator can be 3.43 m or 3.50 m. The side panel consoles are fitted accordingly upon delivery of the implement.

KE 4000 Super rotary harrow		
Working width	[m]	4.0
Transport width	[m]	4.03
Tractor mount category		see below
Number of rotors		14
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KE 4000 Super		[kg]	1180
Roller	SW 4000-520	[kg]	320
	PW 4000-500	[kg]	496
	PW 4000-600	[kg]	809
	KW 4000-580/125	[kg]	780
	KW 4000-580/166	[kg]	720
	CDW 4000-550/125	[kg]	931
2 carrying arms for the roller		[kg]	68
Total weight G_H: KE 4000 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

Rotary cultivator KX 3000		
Working width	[m]	3.0
Transport width	[m]	3.0
Tractor mount category		see below
Number of rotors		10
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KX 3000		[kg]	1175
Roller	SW 3000-520	[kg]	250
	PW 3000-500	[kg]	376
	PW 3000-600	[kg]	607
	KW 3000-520/125	[kg]	410
	KW 3000-580/125	[kg]	550
	KW 3000-580/166	[kg]	510
	CDW 3000-550/125	[kg]	688
2 carrying arms for the roller		[kg]	68
Total weight G_H: KX 3000 + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.55

Rotary cultivator KG 3000 Special		
Working width	[m]	3.0
Transport width	[m]	3.0
Tractor mount category		see below
Number of rotors		10
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 3000 Special		[kg]	1200
Roller	SW 3000-520	[kg]	250
	PW 3000-500	[kg]	376
	PW 3000-600	[kg]	607
	KW 3000-520/125	[kg]	410
	KW 3000-580/125	[kg]	550
	KW 3000-580/166	[kg]	510
	CDW 3000-550/125	[kg]	688
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 3000 Special + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

Rotary cultivator KG 3500 Special		
Working width*)	[m]	3.43 or 3.50
Transport width*)	[m]	3.43 or 3.50
Tractor mount category		see below
Number of rotors		12
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 3500 Special		[kg]	1330
Roller	SW 3500-520	[kg]	290
	PW 3500-500	[kg]	435
	PW 3500-600	[kg]	706
	KW 3500-580/125	[kg]	660
	KW 3500-580/166	[kg]	610
	CDW 3500-550/125	[kg]	829
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 3500 Special + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

*) The working and transport width of the KG 3500 rotary cultivator can be 3.43 m or 3.50 m. The side panel consoles are fitted accordingly on delivery of the implement.

Rotary cultivator KG 4000 Special		
Working width	[m]	4.00
Transport width	[m]	4.12
Tractor mount category		see below
Number of rotors		14
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 4000 Special		[kg]	1500
Roller	SW 4000-520	[kg]	320
	PW 4000-500	[kg]	496
	PW 4000-600	[kg]	809
	KW 4000-580/125	[kg]	780
	KW 4000-580/166	[kg]	720
	CDW 4000-550/125	[kg]	931
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 4000 Special + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.55

Rotary cultivator KG 3000 Super		
Working width	[m]	3.0
Transport width	[m]	3.0
Tractor mount category		see below
Number of rotors		10
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 3000 Super		[kg]	1250
Roller	SW 3000-520	[kg]	250
	PW 3000-500	[kg]	376
	PW 3000-600	[kg]	607
	KW 3000-520/125	[kg]	410
	KW 3000-580/125	[kg]	550
	KW 3000-580/166	[kg]	510
	CDW 3000-550/125	[kg]	688
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 3000 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

Rotary cultivator KG 3500 Super		
Working width*)	[m]	3.43 or 3.50
Transport width*)	[m]	3.43 or 3.50
Tractor mount category		see below
Number of rotors		12
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 3500 Super		[kg]	1360
Roller	SW 3500-520	[kg]	290
	PW 3500-500	[kg]	435
	PW 3500-600	[kg]	706
	KW 3500-580/125	[kg]	660
	KW 3500-580/166	[kg]	610
	CDW 3500-550/125	[kg]	829
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 3500 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.89

*) The working and transport width of the KG 3500 rotary cultivator can be 3.43 m or 3.50 m. The side panel consoles are fitted accordingly on delivery of the implement.

Rotary cultivator KG 4000 Super		
Working width	[m]	4.00
Transport width	[m]	4.12
Tractor mount category		see below
Number of rotors		14
Tool tines		see below
Working depth, max.	[cm]	20

Data for the calculation of tractor weights and tractor axle loads			
			Basic weight
KG 4000 Super		[kg]	1500
Roller	SW 4000-520	[kg]	320
	PW 4000-500	[kg]	496
	PW 4000-600	[kg]	809
	KW 4000-580/125	[kg]	780
	KW 4000-580/166	[kg]	720
	CDW 4000-550/125	[kg]	931
2 carrying arms for the roller		[kg]	68
Total weight G_H: KG 4000 Super + roller + 2 carrying arms		[kg]	
Distance d		[m]	0.55

4.10 Necessary tractor equipment

For operation of the implement in compliance with the intended use, the tractor must fulfil the following requirements.

Implement type	Tractor engine power	
	For solo operation with roller	Maximum permitted for operation with a seed drill
KE 2500 Special	from 40 kW/55 hp	to 103 kW/140 hp
KE 3000 Special	from 48 kW/65 hp	to 103 kW/140 hp
KE 3000 Super	from 59 kW/80 hp	to 132 kW/180 hp
KE 4000 Super	from 66 kW/90 hp	to 132 kW/180 hp
KX 3000	from 66 kW/90 hp	to 140 kW/190 hp
KG 3000 Special	from 66 kW/90 hp	to 162 kW/220 hp
KG 3500 Special	from 77 kW/105 hp	to 162 kW/220 hp
KG 4000 Special	from 88 kW/120 hp	to 162 kW/220 hp
KG 3000 Super	from 66 kW/90 hp	to 220 kW/300 hp
KG 3500 Super	from 77 kW/105 hp	to 220 kW/300 hp
KG 4000 Super	from 88 kW/120 hp	to 220 kW/300 hp

Electrical system	Battery voltage	12 V (volts)
	Lighting socket	7-pin (optional)
Hydraulics	Tractor control units	see section 4.3, Seite 38Seite 38
	Maximum approved operating pressure	210 bar
	Tractor pump power	At least 80 l/min at 150 bar
	Hydraulic oil for supplying the implement	see section 4.13, Seite 57Seite 57
Tractor PTO shaft connection	Speed (optionally)	1000 rpm, 750 rpm or 540 rpm
	Direction of rotation (as seen in the direction of travel)	Clockwise

4.11 Gearbox – oils and filling capacities

Gearbox	Fill quantity	Gear oil
WHG/KE-Spec	4.5 litres (without oil cooler)	SAE 90 EP GL4
WHG/KE-Sup	4.5 litres (without oil cooler)	SAE 90 EP GL4
WHG/KX	4.5 litres (without oil cooler)	SAE 90 EP GL4
WHG/KG-Spec	3.5 litres (without oil cooler)	SAE 90 EP GL4
	5.0 litres (with oil cooler)	SAE 90 EP GL4
WHG/KG-Sup	4.0 litres (without oil cooler)	SAE 90 EP GL4
	5.5 litres (with oil cooler)	SAE 90 EP GL4

4.12 Spur gear trough – oils and filling quantities

Spur gear trough gear oil

Spur gear trough gear oil:	**Gear oil CLP/CKC 460** **DIN 51517, Part 3 / ISO 12925**

Oils that comply with this standard can be topped up or used to replace the existing oil in the spur gear trough. Only fill with new and clean gear oil.

The following table lists several gear oil types that comply with the standard. The spur gear trough is filled with gear oil Wintershall ERSOLAN 460 in the factory.

Manufacturer	Designation
Wintershall	ERSOLAN 460
Agip	Blasia 460
ARAL	Degol BG 460
Autol	Precis GEP 460
Avia	Avilub RSX 460
BP	Energol GR-XP 460
Castrol	Alpha SP 460
DEA	Falcon CLP 460
ESSO	Spartan EP 460
FINA	Giran 460
Fuchs	Renep Compound 110
Mobil	Mobilgear 600 XP 460
Shell	Omala 460
OMV	OMV Gear HST 460

Spur gear trough filling quantities

Implement type	Spur gear trough filling quantities
KE 2500 Special	21 litres
KE 3000 Special	25 litres
KE 3000 Super	25 litres
KE 3500 Super	30 litres
KE 4000 Super	35 litres
KX 3000	25 litres
KG 3000 Special/Super	25 litres
KG 3500 Special/Super	30 litres
KG 4000 Special/Super	35 litres

4.13 Hydraulic oil for the implement supply

Hydraulic oil for the implement supply (connection to the tractor hydraulic system)	Hydraulic oil HLP68 din51524

5 Structure and function

The implement is used on agricultural land for tilling the soil

- As a stand-alone machine with trailing roller
- As part of a cultivation combination with trailing roller and
  - mounted seed drill.
  - pack-top seed drill.

Rotary harrows have dragging tool tines.

The rotary harrow is used for seed bed preparation on fields with little organic matter

- After the plough
- On light soils without pre-tilling.

KG rotary cultivators have tool tines in the forward position

- For seed bed preparation
  - Without pre-tilling (mulch sowing)
    Straw and other organic matter is mulched close to the surface.
  - After chisel cultivators or deep looseners
  - After the plough
- For stubble cultivation
- For ploughing up of grassland

KX rotary cultivators can be fitted with forward position tool tines or dragging tool tines, as required.

Tool tines in the forward position have a sifting effect:

- Coarse particles of soil are transported further than fine particles of soil
- The fine earth is concentrated in the lower area of the tilled zone; the large particles of soil remain at the surface and protect against capping.

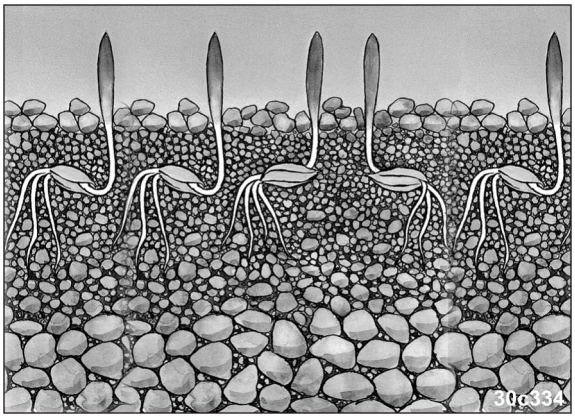


Fig. 15

5.1 KE rotary harrows

KE 3000 Special rotary harrow with lifting frame

Fig. 16

KE 3000 Super rotary harrow

Fig. 17

5.2 KX rotary cultivator/KG rotary cultivator

KX 3000 rotary cultivator

Fig. 18

KG 3000 Special rotary cultivator with lifting frame

Fig. 19

Fig. 20

5.3 Cartridge

The cartridge (**Fig.** 21/1) contains

- the operating manual.
- the ratchet
  to operate the levelling board.

Fig. 21

5.4 Tractor mount category

KE Special/KE Super rotary harrow			
Fig. 22/...	**Part name**	**Pin diameter [mm]**	**Tractor mount category**
1	Upper link pin	Ø 25	Cat. 2
2	Upper link pin	Ø 31.7	Cat. 3
3	Lower link pin	Ø 28	Cat. 2

The ball sleeves are tractor accessories

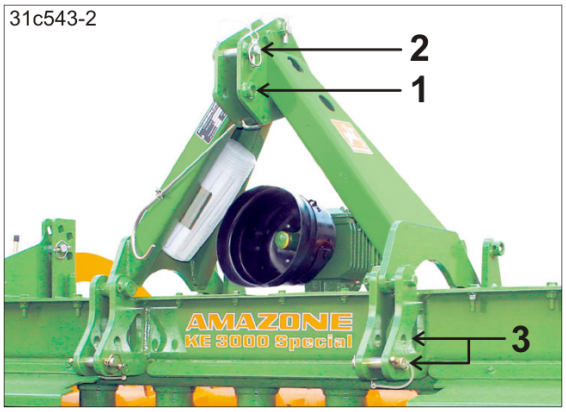


Fig. 22

The rotary harrow has two upper link pins (cat. 2 and cat. 3).

If a cat. 2 upper link is to be connected to the cat. 3 upper link pin (Fig. 22/2), the holes must be retrofitted in a specialist workshop with two elastic bushings (see online spare parts list).

With the elastic bushing, the upper link pin Ø 25.0 mm (Fig. 22/1) replaces the upper link pin Ø 31.7 mm (Fig. 22/2).

KG Special/KX/KG Super rotary cultivator			
Fig. 23/...	**Part name**	**Pin diameter [mm]**	**Tractor mount category**
1	Upper link pin	Ø 25	Cat. 2
2	Upper link pin	Ø 31.7	Cat. 3
3	Lower link pin	Ø 28	Cat. 2
4	Lower link pin	Ø 36.6	Cat. 3

The ball sleeves are tractor accessories

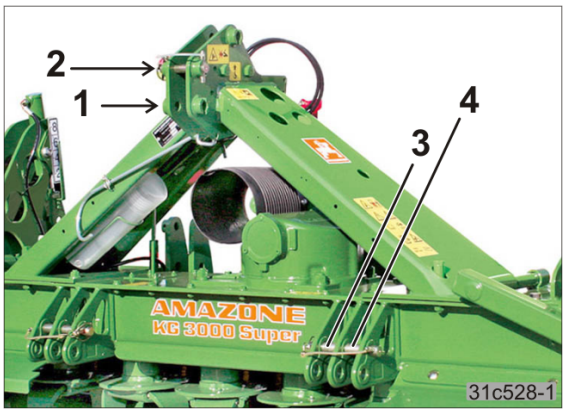


Fig. 23

5.5 Three-point hitch extension (option)

With wheel mark eradicators, the space between the tractor and the implement may be too small.

The three-point hitch extension serves to increase the distance between the tractor and implement.

The three-point extension consists of 3 spacers. Each spacer is pegged to the implement using 2 pins and secured using lynch pins.

5.5.1 Three-point hitch extension for KE rotary harrows

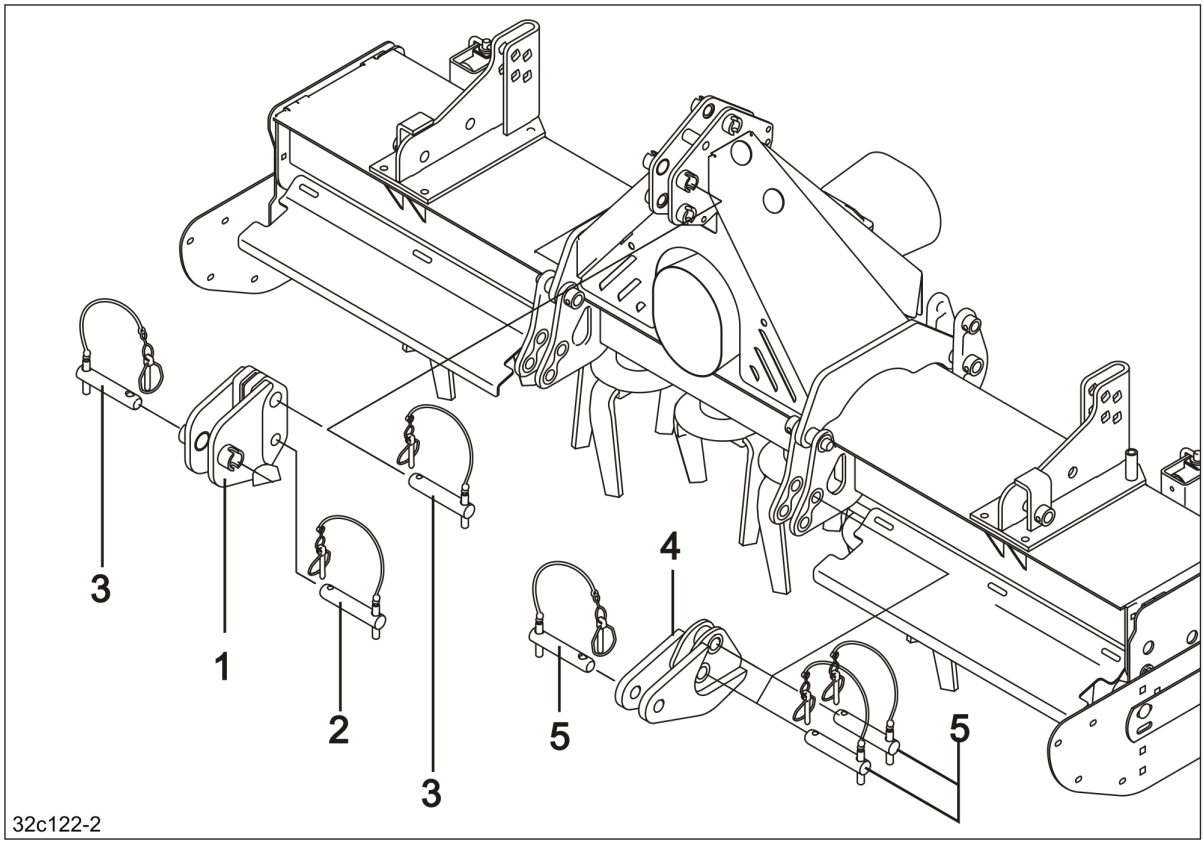


Fig. 24

Three-point hitch extension for KE rotary harrows				
Fig. 24/…	**Part name**	**Pin diameter (mm)**	**Tractor mount category**	**Quantity**
1	Upper link extension	–	–	1
2	Upper link pin	Ø 25	Cat. 2	1
3	Upper link pin	Ø 31.7	Cat. 3	2
4	Lower link extension	–	–	2
5	Lower link pin	Ø 28	Cat. 2	6

5.5.2 Three-point extension cat. 2 for KX/KG rotary cultivators

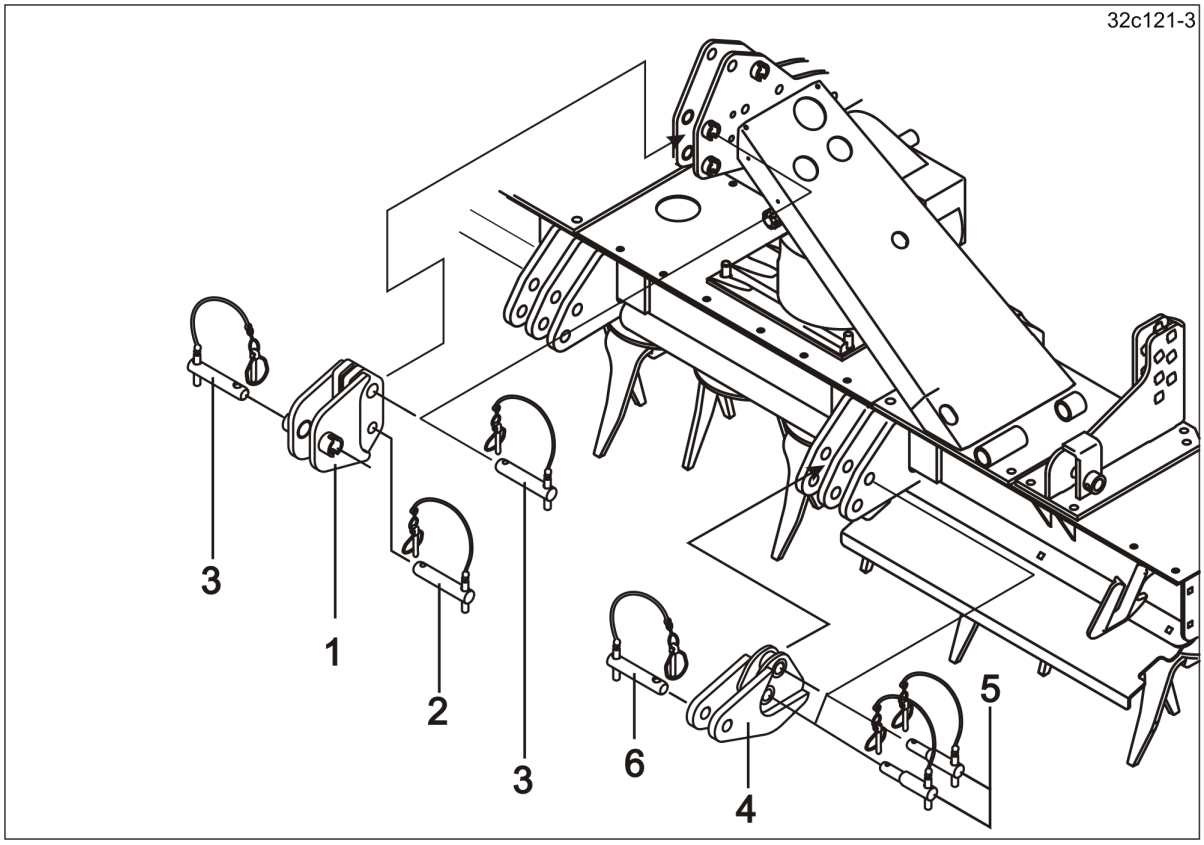


Fig. 25

Three-point extension for KX/KG rotary cultivators				
Fig. 25/…	**Part name**	**Pin diameter (mm)**	**Tractor mount category**	**Quantity**
1	Upper link extension	–	–	1
2	Upper link pin	Ø 25	Cat. 2	1
3	Upper link pin	Ø 31.7	Cat. 3	2
4	Lower link extension	–	–	2
5	Lower link pin	Ø 28/36.6	Cat. 2/3	4
6	Lower link pin	Ø 28	Cat. 2	2

5.5.3 Three-point extension cat. 3 for KX/KG rotary cultivators

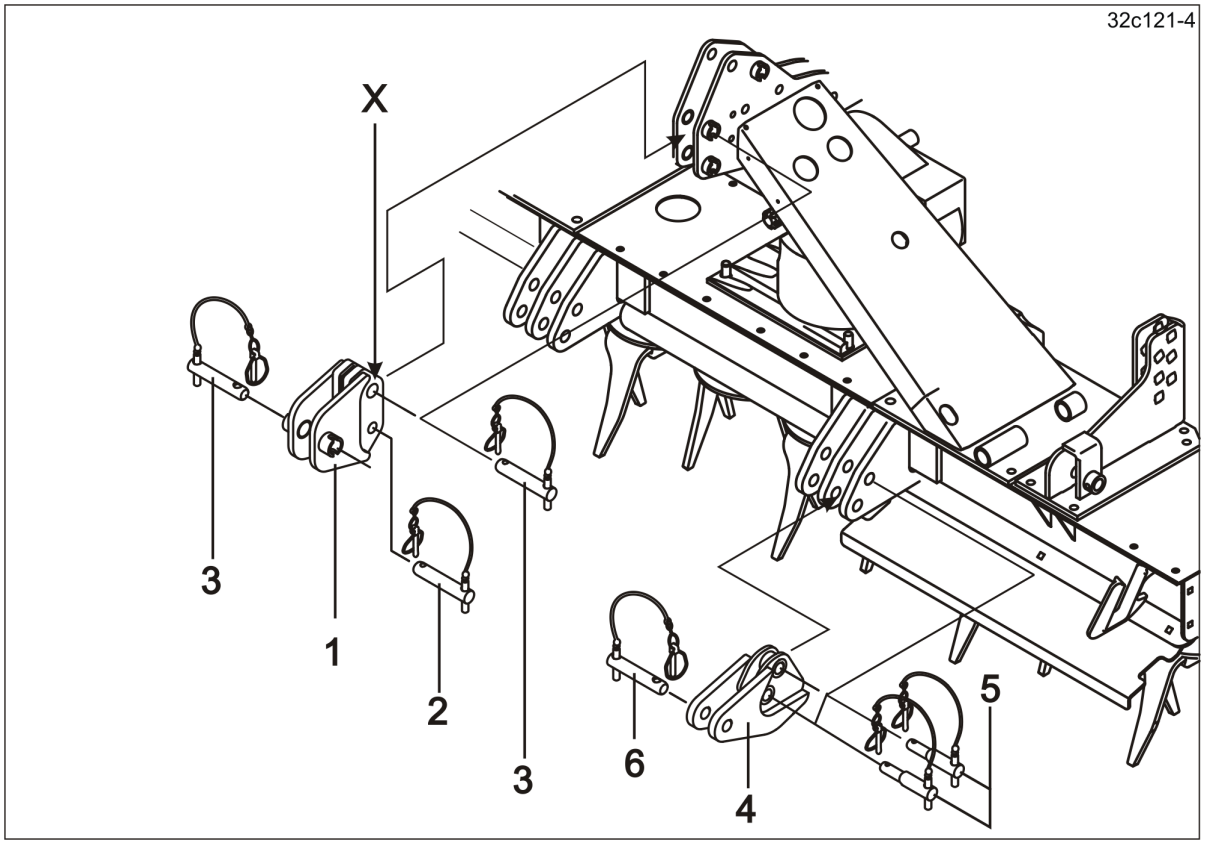


Fig. 26

Three-point extension for KX/KG rotary cultivators				
Fig. 26/…	**Part name**	**Pin diameter (mm)**	**Tractor mount category**	**Quantity**
1	Upper link extension	–	–	1
2	Upper link pin	Ø 25	Cat. 2	1
3	Upper link pin	Ø 31.7	Cat. 3	2
4	Lower link extension	–	–	2
5	Lower link pin	Ø 28/36.6	Cat. 2/3	4
6	Lower link pin	Ø 36.3	Cat. 3	2
X	Note: Remove elastic bushing			

5.6 Tractor wheel mark eradicator (optional)

The tractor wheels can leave deep tracks on the field.

The soil tillage implement can be used with a shallower working depth if the deep tracks are eliminated by the wheel mark eradicators.

The attachment frame (Fig. 27/1) serves to attach the horizontally and vertically adjustable tractor wheel mark eradicators.

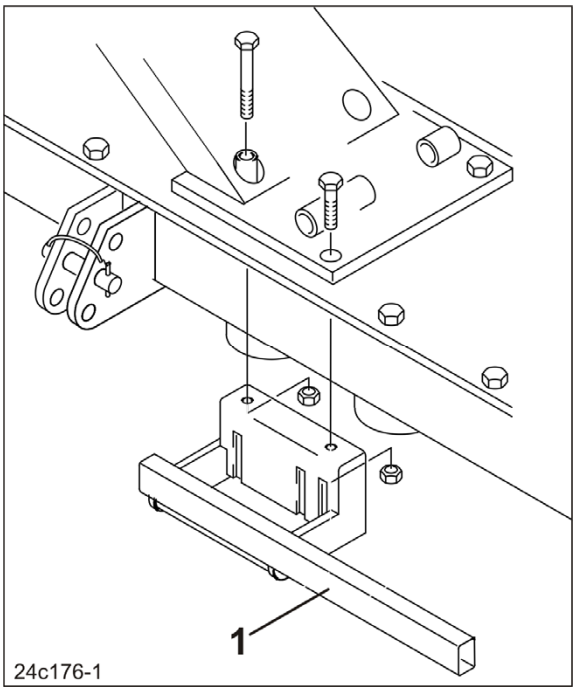


Fig. 27

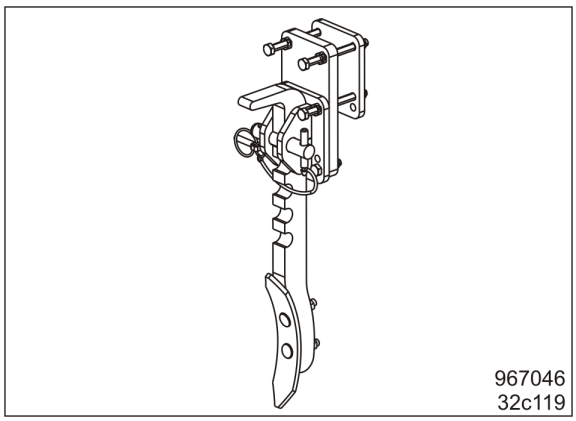


Fig. 28: Wheel mark eradicator, rigid

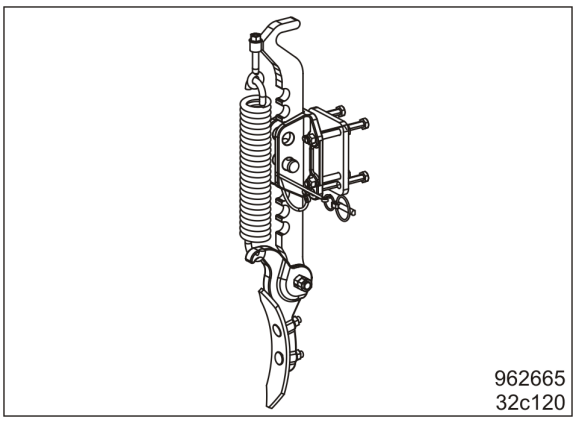


Fig. 29: Wheel mark eradicator, spring-suspended

With an attachment frame for wheel mark eradicators, the standard rotary cultivator lower link pins cannot be pegged in position.

Two special pins (Fig. 30/1) are required, which are pegged from the inside. The outer holes are fitted with reducing bushings (Fig. 30/2).

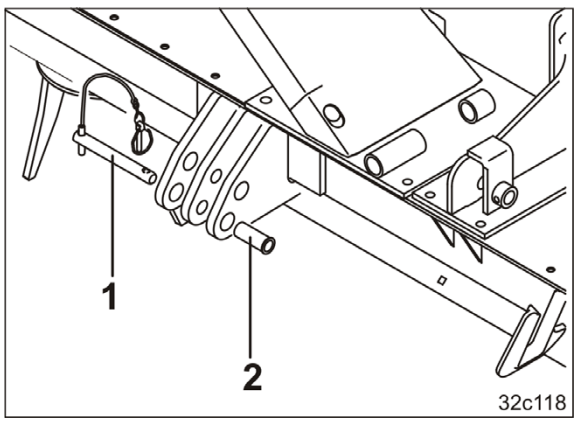


Fig. 30

5.7 Rollers

The rollers serve to

- support the soil tillage implement and maintain the working depth.
- protect against the rotating tools of the soil tillage implement.

Only use the soil tillage implement

- for solo operation with the rollers specified below.
- in combination with a seed drill with the rollers specified in the seed drill operating manual.

Soil tillage implement	**KE 2500 Special**	**KE 3000 Special** **KE 3000 Super**	**KX 3000** **KG 3000 Special** **KG 3000 Super**	**KG 3500 Special** **KG 3500 Super**	**KE 4000 Super** **KG 4000 Special** **KG 4000 Super**
Cage roller	SW 2500-420	SW 3000-420	–	–	–
	–	SW 3000-520	SW 3000-520	SW 3500-520	SW 4000-520
Tooth packer roller	PW 2500-420	PW 3000-420	–	–	–
	PW 2500-500	PW 3000-500	PW 3000-500	PW 3500-500	PW 4000-500
	–	PW 3000-600	PW 3000-600	PW 3500-600	PW 4000-600
Wedge ring roller for row spacing of 12.5 cm	KW 2500/520-125	KW 3000-520/125	KW 3000-520/125	–	–
	–	KW 3000-580/125	KW 3000-580/125	KW 3500-580/125[1)]	KW 4000-580/125
	–	KW 3000-580/166	KW 3000-580/166	KW 3500-580/166	KW 4000-580/166
Cracker Disc Roller for row spacing of 12.5 cm	–	CDW 3000-550/125	CDW 3000-550/125	CDW 3500-550/125	CDW 4000-550/125

1) The wedge ring roller KW 3500-580/125 has a wide outer ring for working widths of 3.43 m to 3.50 m.

5.7.1 Wedge ring roller KW

Field of application
Use the wedge ring roller KW on medium to heavy soils.

Work method
The wedge rings compact the soil in strips.

In combination with a seed drill, the seed is embedded in the compacted soil. Good soil coverage means that more humidity is available for germination.

The loose soil between the wedge rings is used to close the furrows.

Cleaning
Adjustable, carbide-coated scrapers clean the roller.

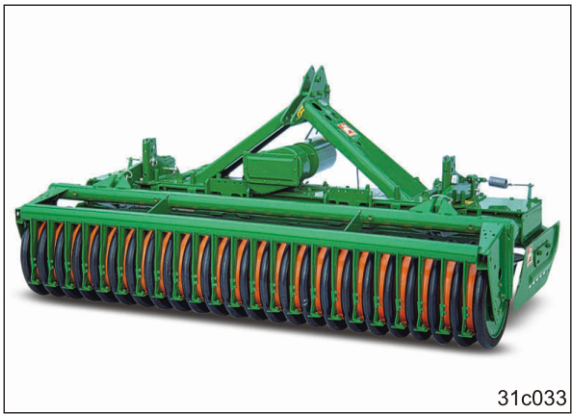


Fig. 31

5.7.2 Tooth packer roller PW

Field of application
Use the tooth packer roller PW on light to heavy soils.

Work method
The compacting of the soil by the tooth packer roller occurs uniformly over the entire working width.

Cleaning
Adjustable, carbide-coated scrapers clean the roller.

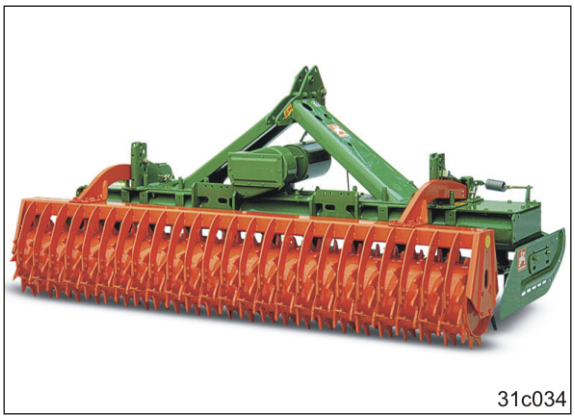


Fig. 32

5.7.3 Cage roller SW

Field of application
Using the SW cage roller on light soils.

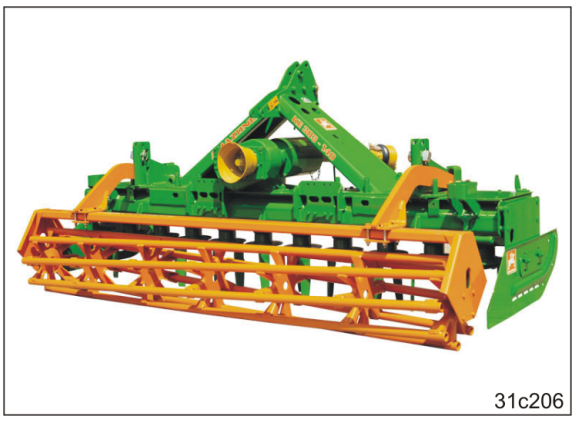


Fig. 33

5.7.4 Cracker Disk roller

The steel packer rings of the Cracker Disk roller (Fig. 34/1) have a diameter of 550 mm. They consolidate the soil in strips. In combination with a seed drill, the seed is embedded in the compacted soil. The integrated cross bars of the steel packer rings provide additional driving force.

The Cracker Disk roller has a spring suspended cutting rail (Fig. 34/2). Two adjustment segments (Fig. 34/3) with integrated springs (Fig. 34/4) are used to adjust the cutting rail. Always perform the same settings on both adjustment segments.

Upon delivery, the cutting rail is adjusted such that the ends of the blades (Fig. 34/5) are flush with the edges of the roller.

During work, the blades can avoid obstacles in the soil by deflecting upwards. The force with which the blades work the soil can be adjusted (Position A or B). The roller can also work without blades (Position C).

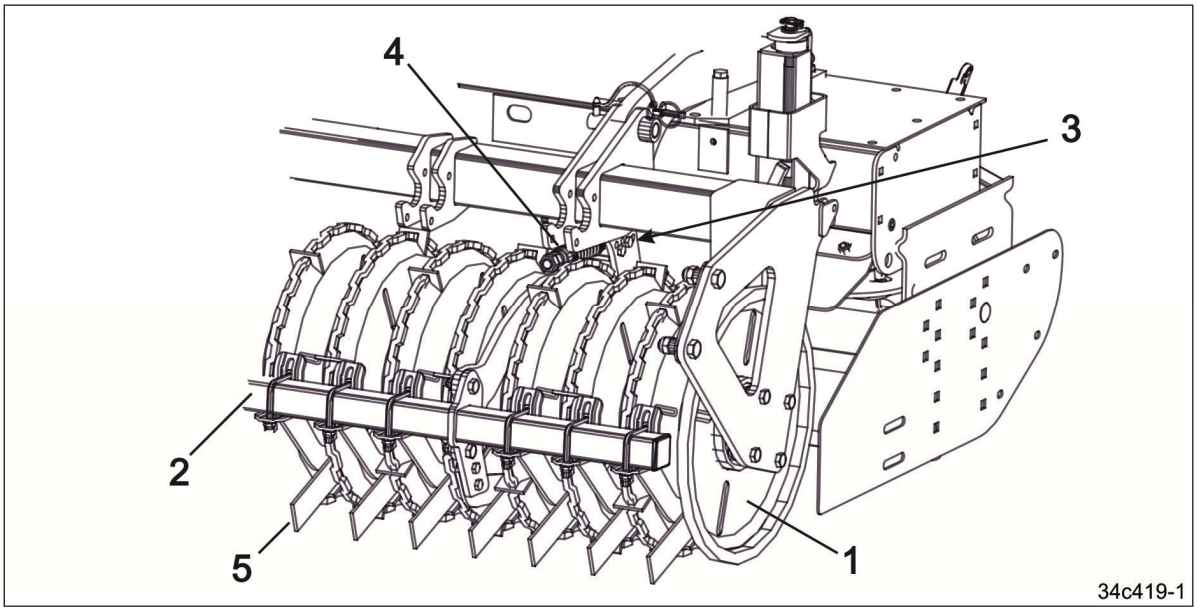


Fig. 34

Adjustment of the cutting rail

- **On soils with large clods**

  Position A: the spring force permanently acts on the cutting rail and the blades.

- **On soils with a high fine particle fraction that are susceptible to capping**

  Position B: only the net weight of the cutting rail acts on the blades.

  Position C: the roller works without blades.

5.8 Drive

The universal joint shaft (Fig. 35/1) transfers the drive force from the tractor PTO shaft to the tool carrier through the implement gearbox.

If the implement encounters a fixed obstacle, the tool carriers may come to a stop. To prevent damage to the gearbox, the implement is equipped with an overload clutch.

The overload clutch is located on the input shaft of the implement gearbox, under the all-round guard.

Fig. 35

5.8.1 Gearbox/Tractor PTO shaft speed/Tine speed

Different soils require that the tine speed be adjusted in order to attain the desired fine seed bed. The implement gearbox makes this adjustment possible.

Never select a higher tine speed than is absolutely necessary. If the tine speed is increased, the power requirement and tine wear increase disproportionately.

Selecting the right tine speed lowers wear costs and increases area efficiency.

Always set the tractor PTO shaft speed to 1000 rpm. Lower tractor PTO shaft speeds lead to higher torques at the universal joint shaft and can cause rapid wear of the overload clutch.

The gearbox type depends on the machine type and the permissible tractor engine power (see table). Do not couple the implement with tractors which exceed the permissible tractor engine power.

Implement			Gearbox	Maximum permissible tractor engine power	PTO shaft through drive
Rotary harrow	KE 2500	Special	WHG/KE-Spec	up to 103 kW (140 HP)	Standard
Rotary harrow	KE 3000	Special			
Rotary harrow	KE 3000	Super	WHG/KE-Sup	up to 129 kW (175 HP)	Standard
Rotary harrow	KE 3500	Super			
Rotary harrow	KE 4000	Super			
Rotary cultivator	KX 3000		WHG/KX	up to 140 kW (190 HP)	Option
Rotary cultivator	KG 3000	Special	WHG/KG-Spec	up to 161 kW (220 HP)	Option
Rotary cultivator	KG 3500	Special			
Rotary cultivator	KG 4000	Special			
Rotary cultivator	KG 3000	Super	WHG/KG-Sup	up to 220 kW (300 HP)	Option
Rotary cultivator	KG 3500	Super			
Rotary cultivator	KG 4000	Super			

5.8.2 WHG/KE-Spec gearbox and WHG/KE-Sup gearbox

The speed of the tines can be adjusted by repositioning the bevel wheels in the WHG/KE-Spec and WHG/KE-Sup gearboxes.

The table (below) shows

- the tractor PTO shaft speeds.
- the gear wheel pairings.
- the tine speeds.

Both gearboxes are fitted with a PTO shaft through drive. The speed at the PTO shaft through drive corresponds to the tractor's PTO shaft speed.

Fig. 36: WHG/KE-Sup

Speed table
WHG/KE-Spec and WHG/KE-Sup

1: Gear wheel pairing

The gearbox is fitted with the following as standard
Gear wheel I: .....20 teeth

Gear wheel II: .....23 teeth

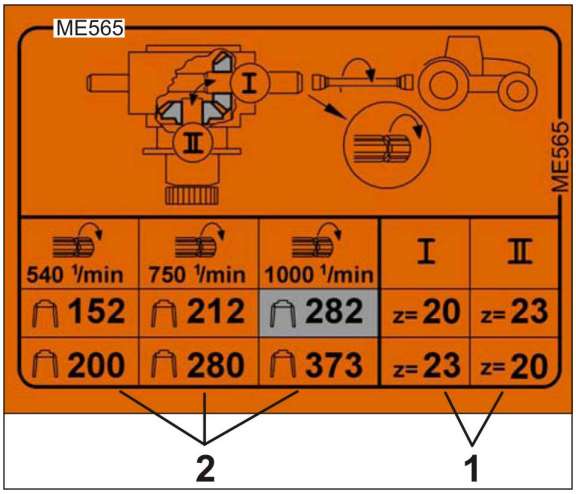
2: Tine speed [rpm] at
Tractor
PTO shaft speed ..... 1000 rpm
Tractor
PTO shaft speed ..... 750 rpm
Tractor
PTO shaft speed ..... 540 rpm

Example:

Gear wheel pairing I/II: 20/23

Tractor
PTO shaft speed: ..... 1000 rpm

Tine speed: ..... 282 rpm



5.8.3 Gearbox WHG/KX

The speed of the tines can be adjusted by repositioning or replacing the gear wheels in the WHG/KX gearbox. Only replace the gear wheels in pairs.

The table (below) shows

- the tractor PTO shaft speeds.
- the gear wheel pairings.
- the tine speeds.

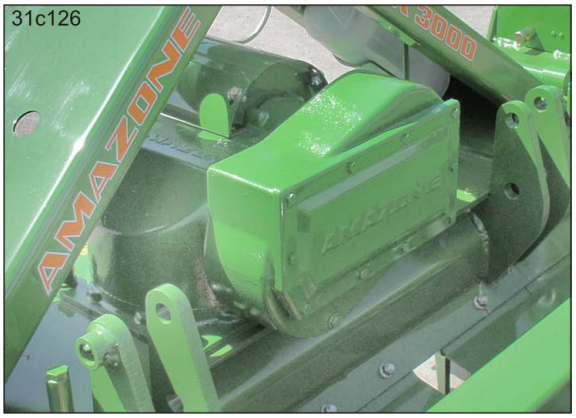


Fig. 37: WHG/KX

Speed table WHG/KX

1: Gear wheel pairing

The gearbox is fitted with the following as standard
Gear wheel I:..... 29 teeth

Gear wheel II:..... 36 teeth

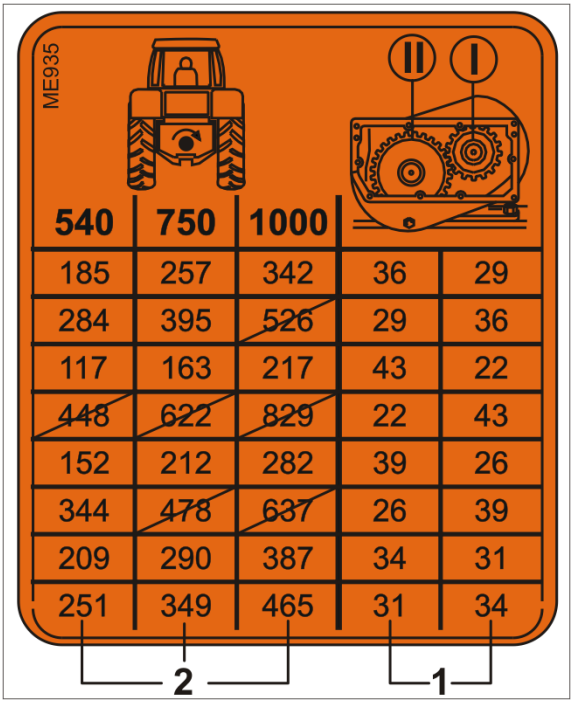
2: Tine speed [rpm] at
Tractor
PTO shaft speed .....1000 rpm
Tractor
PTO shaft speed .....750 rpm
Tractor
PTO shaft speed .....540 rpm

Example:

Gear wheel pairing I/II:.....29/36

Tractor
PTO shaft speed:.....1000 rpm

Tine speed: .....342 rpm



Never set the crossed out tine speeds. These high speeds are unsuitable for soil tillage and could cause the implement to be damaged.

The gearbox can be fitted with a PTO shaft through drive, as an option.

The speed corresponds to the tractor's PTO shaft speed.

5.8.4 WHG/KG-Spec gearbox and WHG/KG-Sup gearbox

The speed of the tines can be adjusted by repositioning or replacing the gear wheel pairings in the WHG/KG-Spec and WHG/KG-Sup gearboxes.

The table (below) shows

- the tractor PTO shaft speeds.
- the gear wheel pairings.
- the tine speeds.

Fig. 38: WHG/KG-Spec

Speed table
WHG/KG-Spec and WHG/KG-Sup

1: Gear wheel pairing

The gearbox is fitted with the following as standard
Gear wheel I: ..... 21 teeth

Gear wheel II: ..... 23 teeth

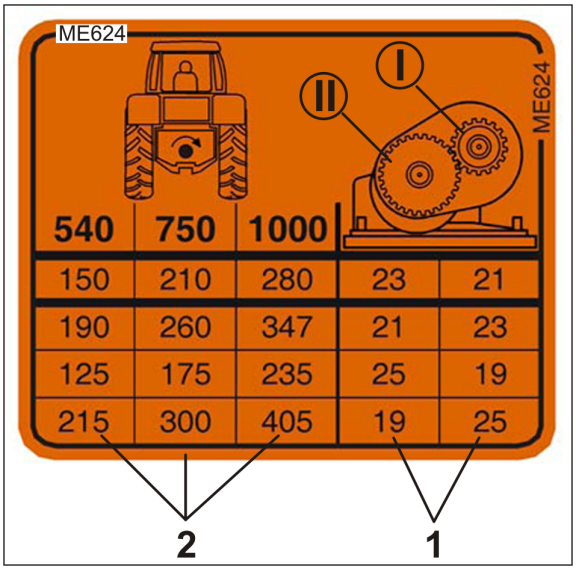
2: Tine speed [rpm] at
Tractor
PTO shaft speed ..... 1000 rpm
Tractor
PTO shaft speed ..... 750 rpm
Tractor
PTO shaft speed ..... 540 rpm

Example:

Gear wheel pairing I/II: 21/23

Tractor PTO shaft speed: ..... 1000 rpm

Tine speed: ..... 280 rpm



The gearbox can be fitted with a PTO shaft through drive, as an option.

The speed corresponds to the tractor's PTO shaft speed.

Fig. 39: WHG/KG-Sup PTO shaft through drive

5.8.5 Oil cooler (optional)

The oil cooler (Fig. 40/1) cools the transmission fluid.

The gear shaft drives the oil pump (Fig. 40/2). The oil flows through an oil filter (Fig. 40/3).

The fan in the oil cooler is connected to the tractor socket. Every 20 minutes, the fan changes its direction of rotation for approx. 40 seconds, in order to remove any impurities from the radiator fins.

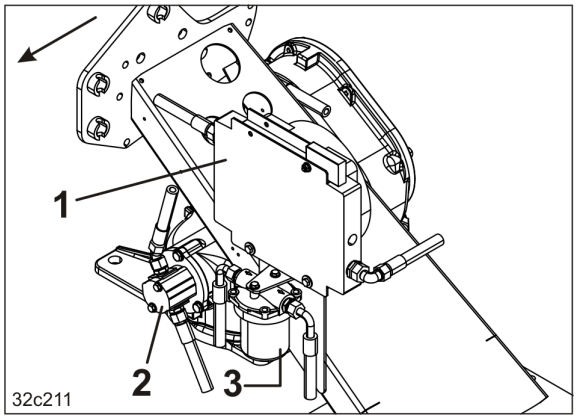


Fig. 40

5.9 Universal joint shafts

The universal joint shaft transfers the drive force of the tractor PTO shaft to the tool carrier through the implement gearbox.

The universal joint shaft type depends on the implement type and the tractor PTO shaft.

Soil tillage implement	Universal joint shaft	Order number
Rotary harrow KE 2500 Special KE 3000 Special	Bondioli & Pavesi LR23 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ486
	Bondioli & Pavesi LR23 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ487
	Walterscheid W2400 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ547

Soil tillage implement	Universal joint shaft	Order number
Rotary harrow KE 3000 Super KE 3500 Super KE 4000 Super	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ578
	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ579
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ558
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ559

Soil tillage implement	Universal joint shaft	Order number
Rotary cultivator KX 3000	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ578
	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ579
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ558
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ559

Soil tillage implement	Universal joint shaft	Order number
Rotary cultivator KG 3000 Special KG 3500 Special KG 4000 Special	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ582
	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ583
	Bondioli & Pavesi SFT-H7 Universal joint shaft with ratchet clutch 1 3/4 inch, 6 parts, 760 mm	EJ584
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ532
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ531
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/4 inch, 6 parts, 760 mm	EJ530

Soil tillage implement	Universal joint shaft	Order number
Rotary cultivator KG 3000 Super KG 3500 Super KG 4000 Super	Bondioli & Pavesi SFT-S8 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ592
	Bondioli & Pavesi SFT-S8 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ593
	Bondioli & Pavesi SFT-S8 Universal joint shaft with ratchet clutch 1 3/4 inch, 6 parts, 760 mm	EJ594
	Bondioli & Pavesi SFT-S8 Universal joint shaft with ratchet clutch 1 3/4 inch, 20 parts, 760 mm	EJ595
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 6 parts, 760 mm	EJ528
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/8 inch, 21 parts, 760 mm	EJ527
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/4 inch, 6 parts, 760 mm	EJ526
	Walterscheid P500 Universal joint shaft with ratchet clutch 1 3/4 inch, 20 parts, 760 mm	EJ525

5.10 Electronic drive monitoring (optional) on the KG Super

If the implement encounters a fixed obstacle, the tool carriers may come to a stop.

An overload clutch on the input shaft of the implement gearbox prevents the gearbox from being damaged.

The KG Super rotary cultivator can be equipped with the electronic drive monitor.

If the tool carriers come to a stop, the on-board computer issues an alarm via

- display on the control terminal.
- an acoustic signal.

The gearbox stop is detected by

- sensors (Fig. 41/1) installed on the gearbox, in combination with Walterscheid universal joint shafts.
- sensors (Fig. 42/1) installed on the gearbox, in combination with Bondioli & Pavesi universal joint shafts.

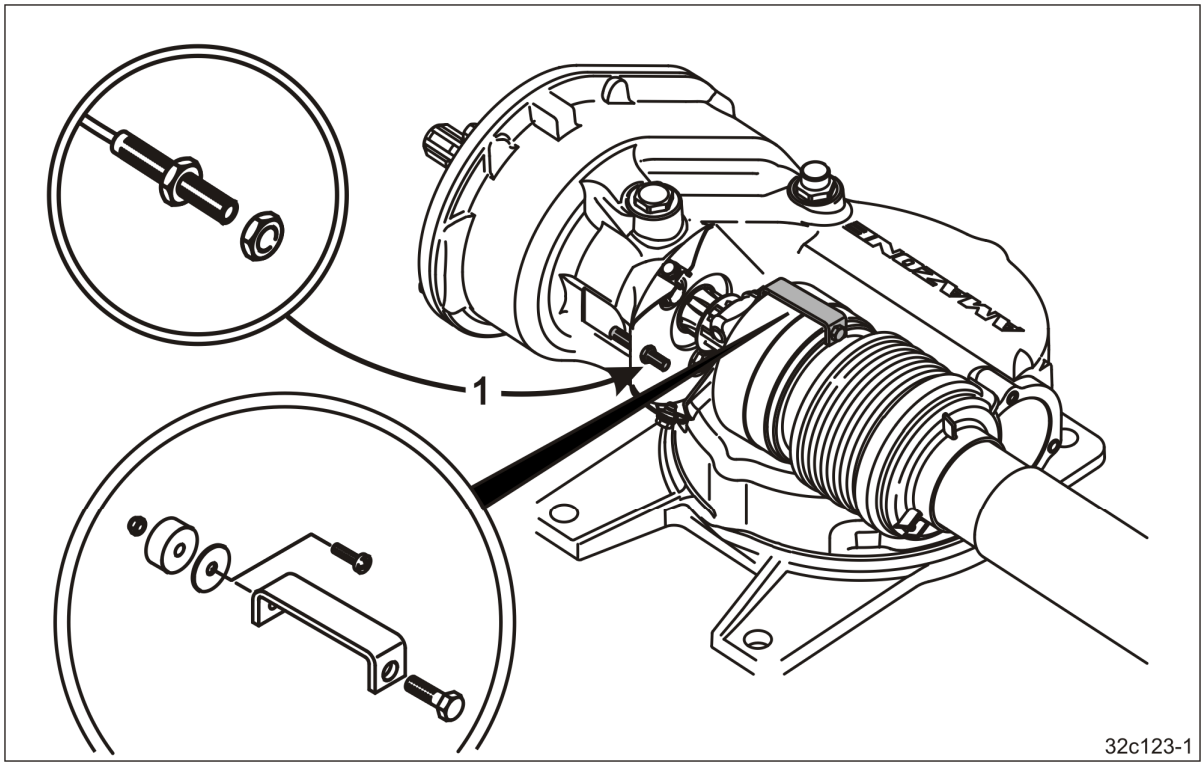


Fig. 41

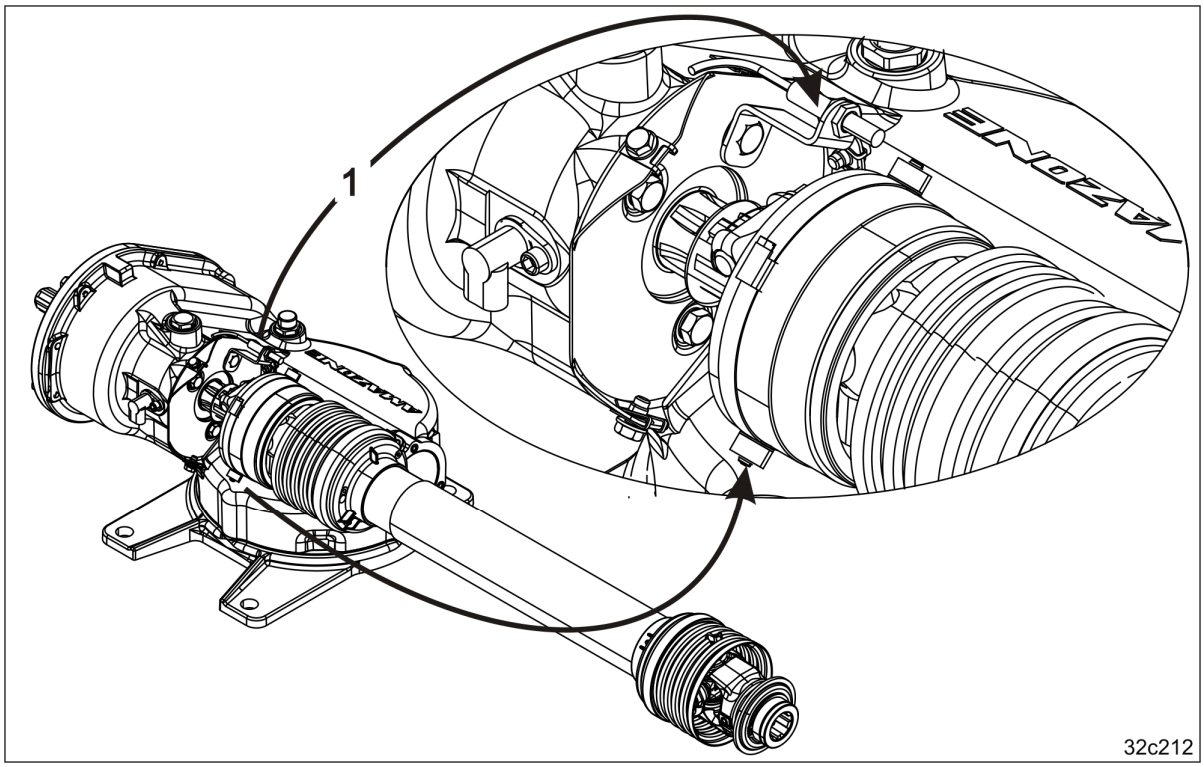
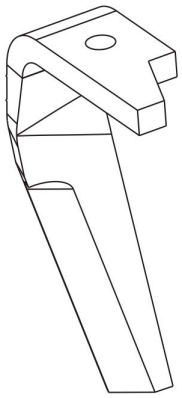


Fig. 42

5.11 Tool tines

Soil tillage implement		Tool tines	Length of the tool tines
Rotary harrow	KE 2500 Special KE 3000 Special	KE drag Special	26 cm
	KE 3000 Super KE 3500 Super KE 4000 Super		
Rotary cultivator	KX 3000	KG drag	33 cm
		KG grip Special	33 cm
Rotary cultivator	KG 3000 Special KG 3500 Special KG 4000 Special	KG drag	33 cm
		KG grip Special	33 cm
Rotary cultivator	KG 3000 Super KG 3500 Super KG 4000 Super	KG drag	33 cm
		KG Griff Super	33 cm

Tool tines
KE drag Special (anticlockwise)



965781
31c207-1

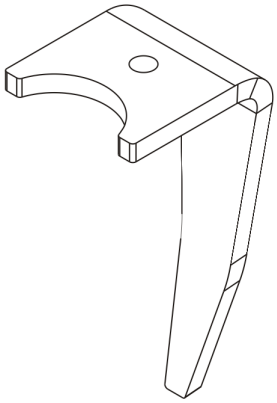
Fig. 43

Tool tines
KG drag (anticlockwise)

962338
31c208-1

Fig. 44

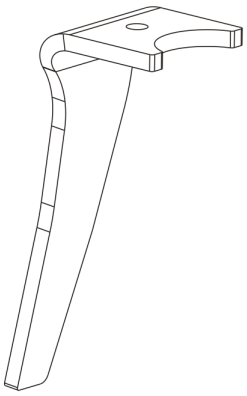
Tool tines
KG grip Special (anticlockwise)



967496
31c210-1

Fig. 45

Tool tines
KG grip Super (anticlockwise)



967496
31c209-1

Fig. 46

5.11.1 Tool tine minimum length

The tool tines are subject to wear. Replace the tines

- once they reach the minimum length of L = 150 mm.
- before they reach the minimum length when working at great working depths, in order to prevent damage/wear to the tool carriers.

If the tines fall below the minimum length prescribed by the manufacturer, claims due to rock damage shall not be accepted.

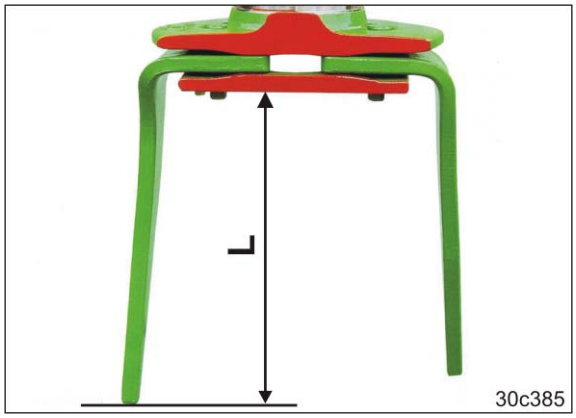


Fig. 47

5.11.2 Stone protection

The tool tines (Fig. 48/1) are fastened to the sockets (Fig. 48/2) of the tool carriers.

The sockets are shaped in such a way that the tines have a spring action and can avoid rocks and other obstacles.

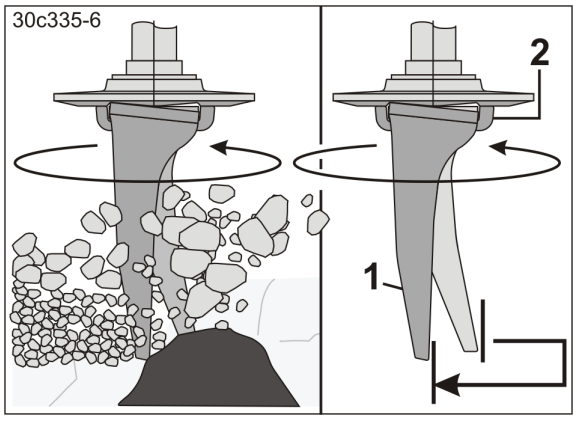


Fig. 48

5.12 Working depth of the soil tillage implement

The soil tillage implement is supported by the roller. This ensures that the working depth is precisely maintained.

5.12.1 Mechanical adjustment of the working depth

The adjuster segment (Fig. 49/1) is used to adjust the working depth.

The working depth is adjusted by relocating the depth setting pin (Fig. 49/2) in the adjuster segment.

The various settings have an effect on a roller carrying arm (Fig. 49/3) below the depth setting pin.

The soil tillage implement is fitted with 2 adjuster segments.

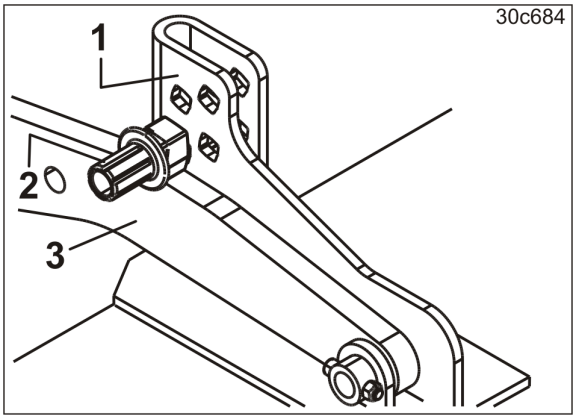


Fig. 49

A finer graduation of the working depth is attained by turning the depth setting pin in the same square hole.

The edges (Fig. 50/1) of the depth setting pins have different distances and are labelled with the numbers 1 to 4 (Fig. 50/2).

Always secure the depth setting pins using a lynch pin (Fig. 50/3).

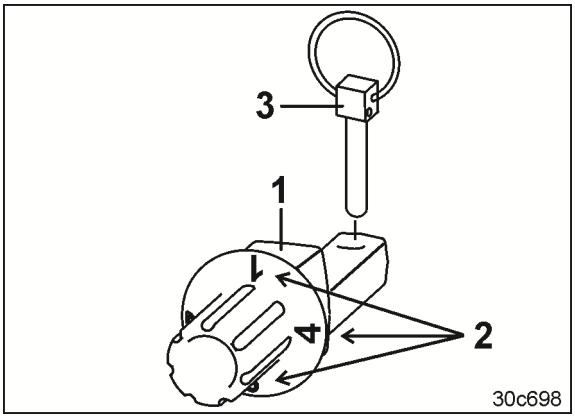


Fig. 50

The working depth increases:

- The higher the depth setting pin (Fig. 49/2) is located in the adjuster segment.
- The larger the number (Fig. 50/2) present at the carrying arm (Fig. 49/3).

5.12.2 Hydraulic adjustment of the working depth (optional)

The rotary cultivator is supported on the roller by the carrying arms and maintains a constant working depth. The working depth can be hydraulically adjusted during work.

Actuation of the control unit (*Beige*) adjusts the working depth of the rotary cultivator.

Lock the control unit (*Beige*) after each adjustment.

Two hydraulic cylinders (Fig. 51/1) are connected to the tractor control unit (*Beige*) for adjusting the working depth. The scale (Fig. 51/2) displays the set working width.

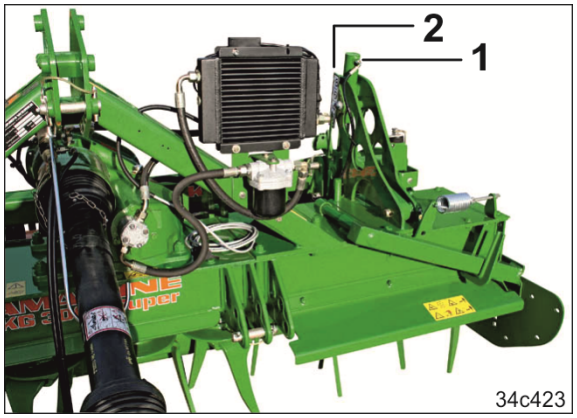


Fig. 51

5.13 Side panel

The side panel (Fig. 52/1) ensures that the tilled soil is guided in front of the roller and not thrown to the side.

The side panel can be spring-mounted or swivelling, depending on the machine type.

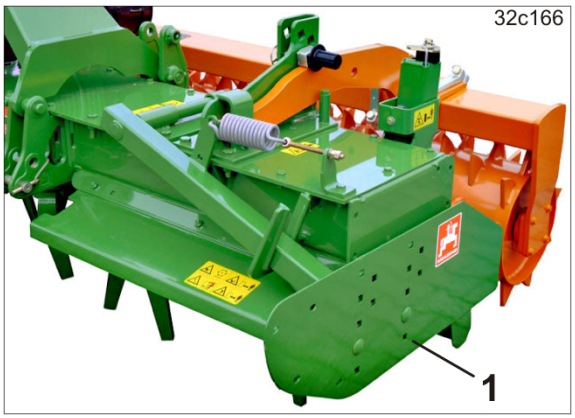


Fig. 52

Soil tillage implement		Side panel
Rotary harrow	KE 2500 Special KE 3000 Special	Side panel, spring-mounted
Rotary harrow	KE 3000 Super KE 3500 Super KE 4000 Super	Side panel, swivelling
Rotary cultivator	KX 3000	
Rotary cultivator	KG 3000 Special KG 3500 Special KG 4000 Special	
Rotary cultivator	KG 3000 Super KG 3500 Super KG 4000 Super	

In order to restrict the soil stream effectively, the working depth of the side panels, the working depth of the soil tillage implement, and the spring tension must be adjusted to the soil conditions.

- Screw on the side panels so that they slip through the soil at a maximum depth of 1 to 2 cm.
- If the field is covered with a lot of straw, fasten the side panels
  - higher at the front than at the rear.
  - or right at the top.

Free-flowing soil can escape between the side panel and the roller, even when adjusted correctly. The soil guiding angle bracket (optional, Fig. 53/1) prevents the soil from escaping.

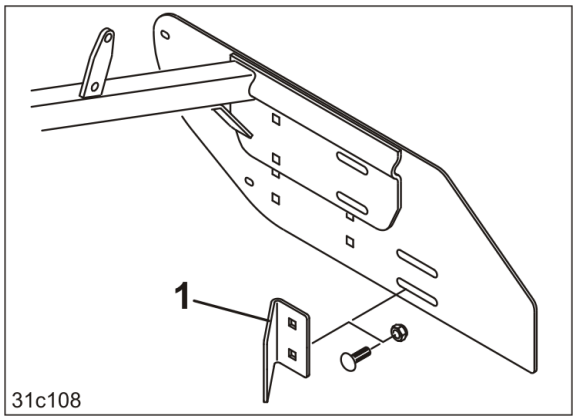


Fig. 53

5.13.1 Side panel, spring-mounted

The spring-mounted side panel (**Fig.** 54/1) moves around obstacles.

Two tension springs bring the side panel back to the working position.

Fig. 54

5.13.2 Side panel, swivelling

The swivelling side panel (Fig. 55/1) deflects upwards when hitting obstacles.

The dead weight of the side panel and a tension spring (Fig. 55/2) bring the side panel back to the working position.

The adjustable tension of the spring is adjusted at the factory for light and medium soils.

Adjust the spring tension as follows:

- Increase it on heavy soils.
- Decrease it when incorporating straw.

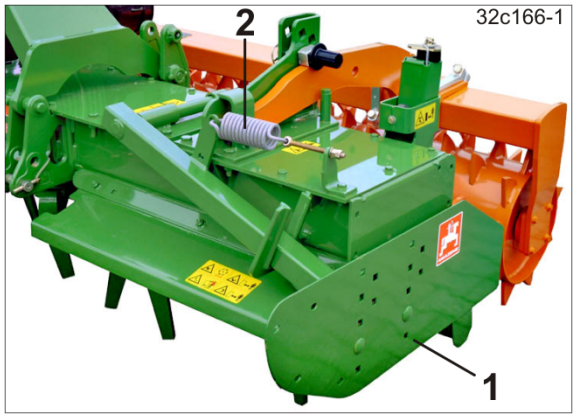


Fig. 55

5.14 Levelling board

The levelling board (Fig. 56/1)

- removes ground undulations behind the implement.
- pulverises remaining clods on heavy soil.
- compacts loose soil.

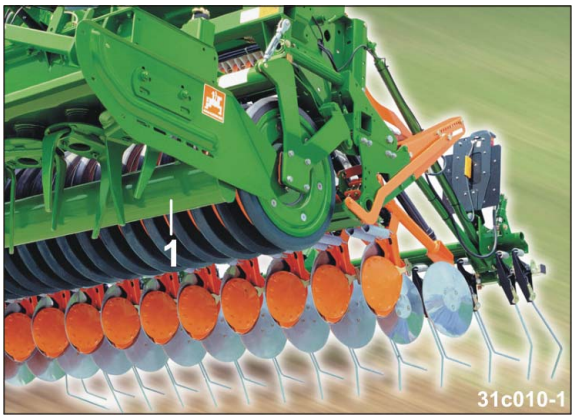


Fig. 56

The implement has two spindles (**Fig.** 57/1) to adjust the levelling boards.

Always adjust the levelling board evenly across the entire working width. Use the scale next to the spindle as a guide.

For plough seeding, adjust the levelling board such that a small ridge of soil is always pushed ahead of the bar to level any undulations.

For mulch seeding, adjust the levelling board high enough for crop residues to be able to pass underneath.

When fastened right at the top, the levelling board has no function.

Fig. 57

5.15 Front mounting frame

For intensive soil tillage, the KE Special and KE Super rotary harrows are used in combination with the front-mounted cage roller.

Fig. 58

5.16 Combination possibilities with other AMAZONE implements

The soil tillage implement can be combined with:

- mounted seed drill (Fig. 59)
- pack-top seed drill, mechanical (Fig. 60)
- pack-top seed drill, pneumatic (Fig. 61)
- deep loosener (Fig. 61)

This operating manual describes how to couple the mounted seed drill (Fig. 59).

Fig. 59

Fig. 60

Fig. 61

5.16.1 Working with an AMAZONE mounted seed drill

To couple the mounted seed drill, fit the soil tillage implement with the following, as required:

- Coupling parts.
- Lifting frame.

5.16.1.1 Coupling parts (optional)

The coupling parts are used to attach the mounted seed drill.

The coupling parts have Cat. II pivot points to attach mounted seed drills of the same category.

Fig. 62

5.16.1.2 Lifting frame (optional)

The lifting frame is used to attach the mounted seed drill and is available in two versions, depending on the total weight of the seed drill.

The lifting frames have Cat. II pivot points to attach mounted seed drills of the same category.

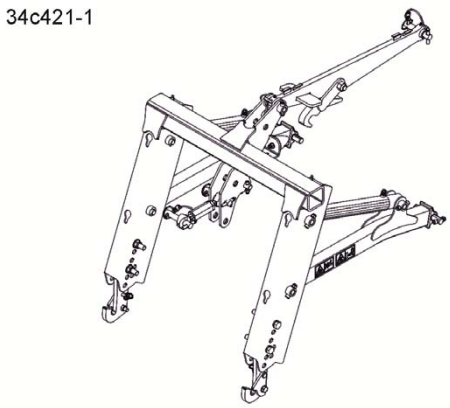


Fig. 63

Lifting frame 2.1 is approved for seed drills up to a total weight of 1600 kg.

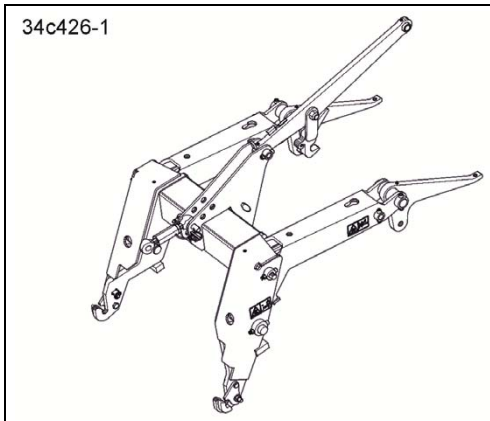


Fig. 64

Lifting frame 3.1 is approved for seed drills up to a total weight of 2500 kg.

The lifting frame is used

- to attach the mounted seed drill.
- to reduce the tractor lifting power.

A single-acting tractor control unit is required to actuate the lifting frame.

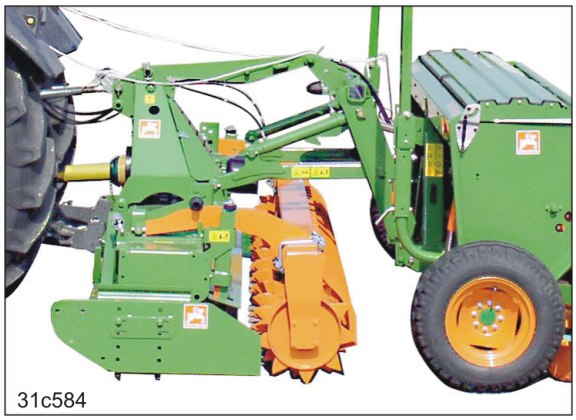


Fig. 65

If the lifting power of the tractor is not sufficient to raise the combination of soil tillage implement, roller and mounted seed drill with the coupling parts, the lifting power requirement can be reduced using the lifting frame.

The lifting frame first lifts the seed drill over the roller. This reduces the total lifting power requirement. With a reduced lifting power requirement, the tractor hydraulics raise the combination in order to turn at the end of a field or for transport.

During road transport, the raised lifting frame is locked.

Fig. 66

The lifting frame allows the tractor to turn at the end of the field while the universal joint shaft is running.
Once the seed drill has been raised, the tractor lower links should raise the implement combination only to the point where the tines of the soil tillage implement and the roller are just out of the soil.
In this position, the angling of the universal joint shaft in most tractors is only very slight which means it is possible to turn with the universal joint shaft running.

Once the turn is complete, the combination is then lowered and work with the soil tillage implement starts, and as the tractor moves off, the seed drill is applied roughly at the point where the soil tillage implement has started work. This makes working in narrower headlands possible.

5.16.1.3 Lift height limiter (optional)

If the soil tillage implement is combined with a PTO shaft driven seed drill, the lift height of the lifting frame can be limited in order that the PTO shaft can continue to run, even while turning.

A precision airplanter remains functional even during turning with the tractor's PTO shaft running. This eliminates the need to switch off the PTO shaft and the associated loss of pressure in the precision airplanter.

If the seed drill is raised by the lifting frame, the upper link (**Fig.** 67/1) pushes against the pin (**Fig.** 67/2) and closes the valve that regulates the flow of oil to the cylinders.

The lift height of the seed drill is adjustable.

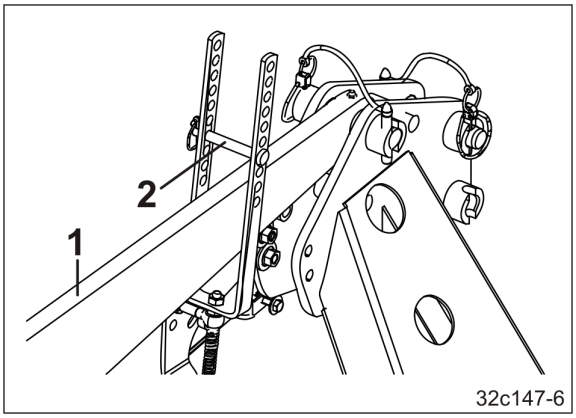


Fig. 67

5.16.1.4 Side stabiliser for lifting frame 2.1 (optional)

The side stabiliser (**Fig.** 68/1) improves the seed drill's tracking on sloping terrain and reduces the swaying of the raised seed drill during transport.

The side stabiliser connects the lower links of lifting frame 2.1 to each other.

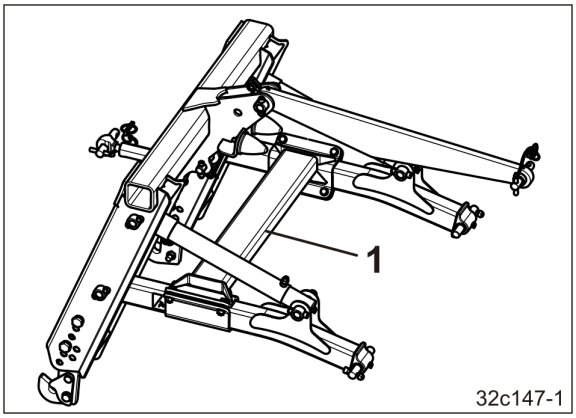


Fig. 68

5.17 Shaft-mounted gearbox

If a PTO shaft driven seed drill is to be connected to the PTO shaft through drive, the high roller frame can prevent the universal joint shaft from being mounted on the PTO shaft stub.

The PTO shaft is connected via the roller frame by means of a shaft-mounted gearbox.

There are two gearboxes available, each with a

- gear ratio 1:1
  e.g.. input speed: 1000 rpm
  output speed: 1000 rpm
- gear ratio 1:1.85
  e.g. input speed: 540 rpm
  output speed: 1000 rpm

The gearbox mounted on the PTO shaft is screwed to the implement gearbox.

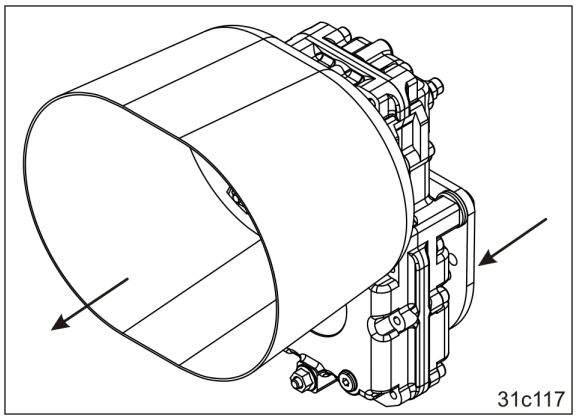


Fig. 69

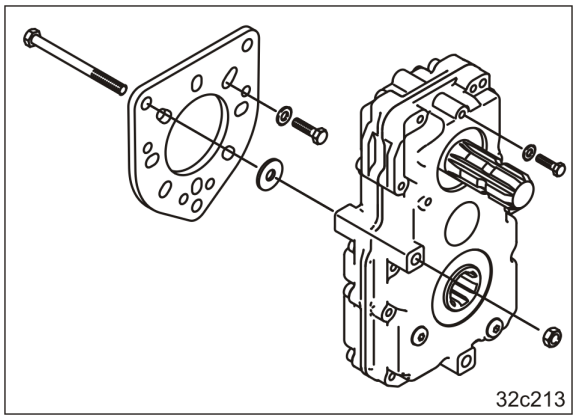


Fig. 70

6 Start-up

This section contains information

- on initial operation of your implement.
- on checking how you may couple the implement to your tractor.

DANGER

Risk of crushing, cutting, being caught or drawn in and knocks!

Before starting up the implement and tractor, always check their roadworthiness and operational safety.

- Before operating the implement for the first time the operator must have read and understood the operating manual.
- Follow the instructions given in the section "Safety information for the operator" when/during
  - coupling and uncoupling the implement.
  - implement transportation.
  - use of the implement.
- Only couple and transport the implement to/with a tractor which is suitable for the task.
- The tractor and implement must meet the national road traffic regulations.
- The operator and the user shall be responsible for compliance with the statutory road traffic regulations.

DANGER

Risk of crushing, shearing, cutting, or being caught and drawn in in the area of hydraulically or electrically actuated components.

Do not block the operator controls on the tractor which are used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when the appropriate control is released. This does not apply to equipment movements which:

- are continuous or
- are automatically locked or
- require a float position or pressure position due to their function.

6.1 Checking the suitability of the tractor

WARNING

Danger of breaking during operation, insufficient stability and insufficient tractor steering and braking power on improper use of the tractor!

- Check the suitability of your tractor before you attach or hitch the implement to the tractor.

  You may only connect the implement to tractors suitable for the purpose.

- Carry out a brake test to check whether the tractor achieves the required braking delay with the implement connected.

Requirements for the suitability of a tractor are, in particular:

- The approved total weight
- The approved axle loads
- The approved drawbar load at the tractor coupling point
- The load capacity of the installed tyres
- The approved trailer load must be sufficient

  You can find this data on the rating plate or in the vehicle documentation and in the tractor operating manual.

The front axle of the tractor must always be subjected to at least 20 % of the empty weight of the tractor.

The tractor must achieve the brake delay specified by the tractor manufacturer, even with the implement connected.

6.1.1 Calculating the actual values for the total tractor weight, tractor axle loads and load capacities, as well as the minimum ballast

The approved total tractor weight, specified in the vehicle documentation, must be greater than the sum of the

- tractor empty weight,
- ballast weight and
- total weight of the attached implement or drawbar load of the hitched implement.

This notice applies only to Germany:

If, having tried all possible alternatives, it is not possible to comply with the axle loads and/or the approved total weight, then a survey by an officially recognised motor traffic expert can, with the approval of the tractor manufacturer, be used as a basis for the responsible authority to issue an exceptional approval according to § 70 of the German Regulations Authorising the Use of Vehicles for Road Traffic and the required approval according to § 29, paragraph 3 of the German Road Traffic Regulations.

6.1.1.1 Data required for the calculation (attached implement)

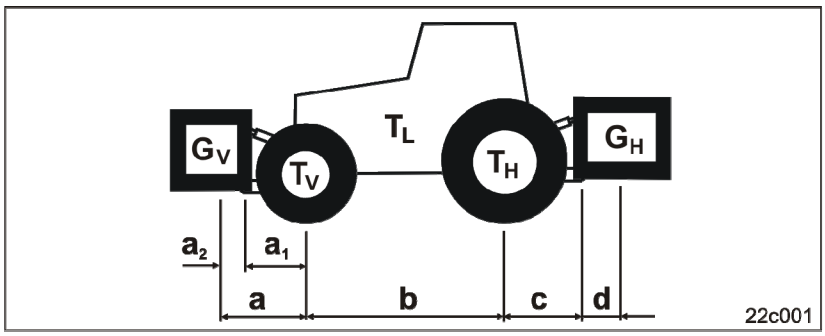


Fig. 71

T_L	[kg]	Tractor empty weight	See tractor operating manual or vehicle documentation
T_V	[kg]	Front axle load of the empty tractor	
T_H	[kg]	Rear axle load of the empty tractor	
G_H	[kg]	Total weight of rear-mounted implement or rear ballast	see the section "Technical Data" or rear ballast
G_V	[kg]	Total weight of front-mounted implement or front ballast	See technical data for front-mounted implement or front ballast
a	[m]	Distance between the centre of gravity of the front implement mounting or the front weight and the centre of the front axle (total $a_1 + a_2$)	See technical data of tractor and front implement mounting or front weight or measurement
a_1	[m]	Distance from the centre of the front axle to the centre of the lower link connection	See tractor operating manual or measurement
a_2	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the front-mounted implement or front ballast (centre of gravity distance)	See technical data of front implement mounting or front weight or measurement
b	[m]	Tractor wheel base	See tractor operating manual or vehicle documents or measurement
c	[m]	Distance between the centre of the rear axle and the centre of the lower link connection	See tractor operating manual or vehicle documents or measurement
d	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the rear-mounted implement or rear ballast (centre of gravity distance)	See section "Technical Data"

6.1.1.2 Calculation of the required minimum ballasting at the front $G_{V\ min}$ of the tractor to ensure steering capability

$$G_{V\ min} = \frac{G_H \bullet (c+d) - T_V \bullet b + 0{,}2 \bullet T_L \bullet b}{a+b}$$

Enter the numeric value for the calculated minimum ballast $G_{V\ min}$, required on the front side of the tractor, in the following table.

6.1.1.3 Calculation of the actual front axle load of the tractor $T_{V\ tat}$

$$T_{V\ tat} = \frac{G_V \bullet (a+b) + T_V \bullet b - G_H \bullet (c+d)}{b}$$

Enter the numeric value for the calculated actual front axle load and the approved tractor front axle load specified in the tractor operating manual in the following table.

6.1.1.4 Calculation of the actual total weight of the combined tractor and implement

$$G_{tat} = G_V + T_L + G_H$$

Enter the numeric value for the calculated actual total weight and the approved total tractor weight specified in the tractor operating manual in the following table.

6.1.1.5 Calculation of the actual rear axle load of the tractor $T_{H\ tat}$

$$T_{H\ tat} = G_{tat} - T_{V\ tat}$$

Enter the numeric value for the calculated actual rear axle load and the approved tractor rear axle load specified in the tractor operating manual in the following table.

6.1.1.6 Tractor tyre load-bearing capacity

Enter twice the value (two tyres) of the approved tyre load capacity (see tyre manufacturer's documentation, for example) in the following table.

6.1.1.7 Table

	Actual value according to calculation		Approved value according to tractor instruction manual		Double approved load capacity (two tyres)
Minimum ballast front/ rear	/ kg		--		--
Total weight	kg	≤	kg		--
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

- You can find the approved values for the total tractor weight, axle loads and load capacities in the tractor registration papers.
- The actual calculated values must be less than or equal to (≤) the permissible values!

WARNING

Risk of contusions, cutting, catching, drawing in and impact through insufficient stability and insufficient tractor steering and brake power.

It is forbidden to couple the implement to the tractor used as the basis for calculation, if

- One of the actual, calculated values is greater than the approved value.
- There is no front weight (if required) attached to the tractor for the minimum front ballast ($G_{V\,min}$).

- Ballast your tractor with weights at the front or rear if the tractor axle load is exceeded on only one axle.
- Special cases:
  - o If you do not achieve the minimum ballast at the front ($G_{V\,min}$) from the weight of the front-mounted implement (G_V), you must use ballast weights in addition to the front-mounted implement.
  - o If you do not achieve the minimum ballast at the rear ($G_{H\,min}$) from the weight of the rear-mounted implement (G_H), you must use ballast weights in addition to the rear-mounted implement.

6.2 Securing the tractor/implement against unintentional start-up and rolling

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact when making interventions in the implement, through

- Unintentional lowering of the unsecured implement raised using the tractor's 3-point hydraulic system.
- Unintentional lowering of raised, unsecured parts of the implement
- Unintentional start-up and rolling of the tractor-implement combination.

Secure the tractor and the implement against unintentional start-up and rolling before any intervention in the implement.

It is forbidden to make any intervention in the implement, such as installation, adjustment, troubleshooting, cleaning, maintenance and repairs

- while the implement is being driven.
- as long as the tractor engine is running with the PTO shaft/hydraulic system connected.
- o if the ignition key is inserted in the tractor and the tractor engine can be started unintentionally with the tractor PTO shaft/hydraulic system connected.
- if the tractor and implement have not each been prevented from unintentionally rolling away by applying their parking brakes and/or securing them with wheel chocks.
- if moving parts are not blocked against unintentional movement.
- when carrying out such work, in particular, there is a high risk of contact with unsecured components.

1. Always park the tractor and the implement on firm, flat ground.
2. Lower any raised, unsecured implement/raised, unsecured implement parts.

→ This is how to prevent unintentional falling:

3. Shut down the tractor engine.
4. Remove the ignition key.
5. Apply the tractor's parking brake.

6.3 Attaching the side panels

1. Undo the flat head screws (Fig. 72/1).
2. Turn the side panel by 90°.
3. Insert the flat head screws (Fig. 72/2) into the side panel from the outside and screw on the side panel.

   Do not use the (Fig. 72/3) washers.

Always insert the flat head screws into the side panel from the outside.

The reverse would cause the permissible transport width of 3.00 m to be exceeded.

This applies accordingly for 3.50 m and 4.00 m machines.

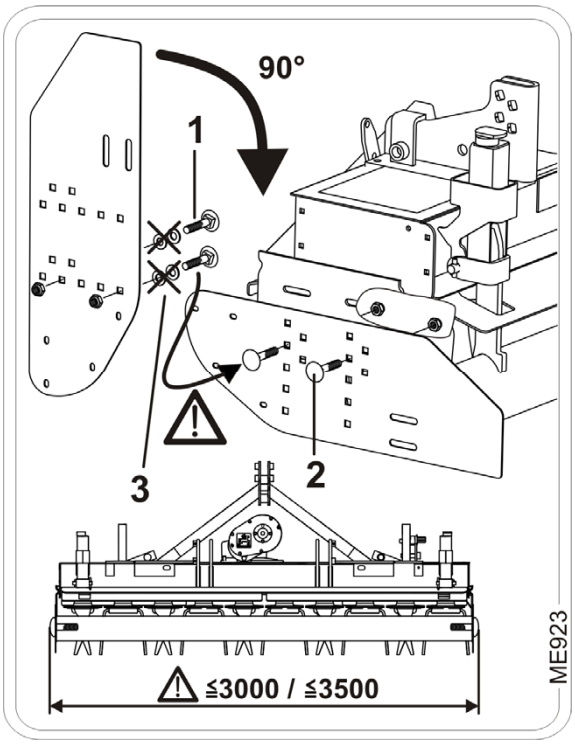


Fig. 72

6.4 Attaching the protective panels

The protective panels (Fig. 73/1) of the soil tillage implement are available in two versions.

The suitable protective panels for the roller must be attached to the soil tillage implement:

- Protective panel (Fig. 73/2)
  for all AMAZONE rollers,
  except Cracker Disk roller (CDW)
- Protective panel (Fig. 73/3)
  for Cracker Disk roller (CDW).

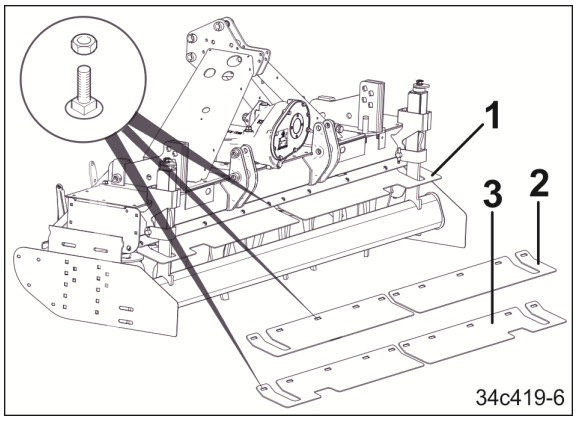


Fig. 73

6.5 Attaching the roller (specialist workshop)

WARNING

Secure the roller against rolling away.

The pictogram (Fig. 74, Fig. 75/1) shows the correct mounting of the clamps (Fig. 75/2).

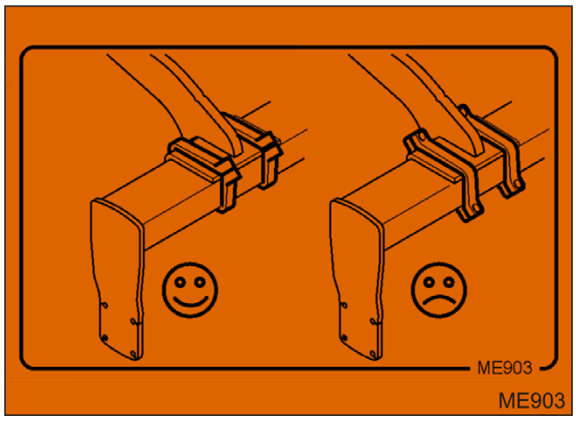


Fig. 74

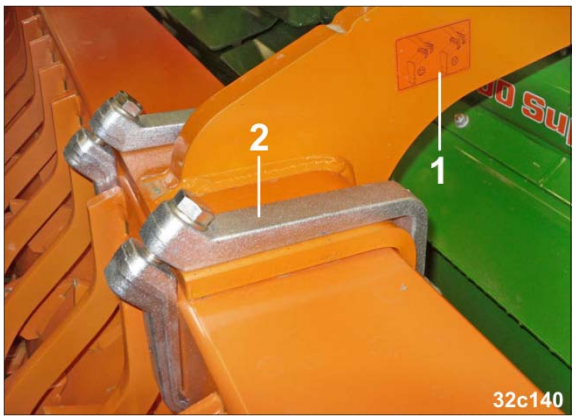


Fig. 75

1. Couple the implement to the tractor.
2. Raise the roller using a crane.
3. Reverse the soil tillage implement up to the roller.
4. Attach the roller carrying arm (Fig. 76/1) to the adjuster segment (Fig. 76/2) with a pin (Fig. 76/3). Secure the pin with a screw and nut (Fig. 76/4).
5. Plug the depth setting pin (Fig. 76/5) into the closest possible hole above the carrying arm and secure the depth setting pin using a lynch pin (Fig. 76/6).
6. Fasten the second carrying arm to the second adjuster segment as described above.

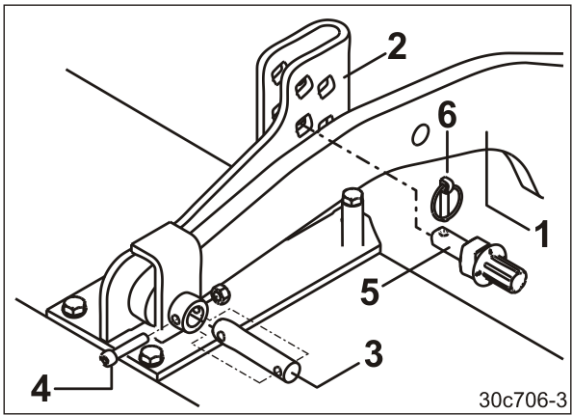


Fig. 76

Fixing the carrying arm as shown here is not permitted.

The holes (X) in the adjuster segment are used only to fix the roller for transport on a freight vehicle, when delivering the implement ex works.

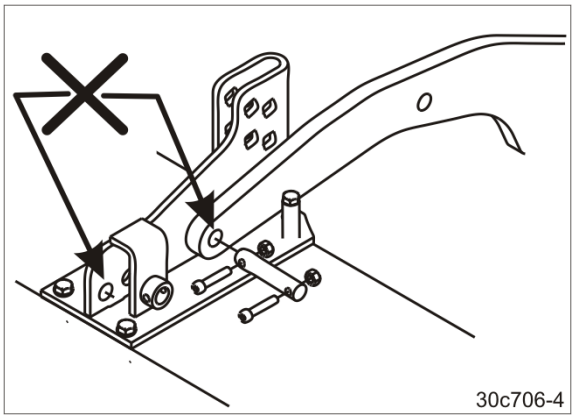


Fig. 77

Set the correct working depth of the tool tines on the field.

6.6 Adjusting the length of the universal joint shaft to the tractor (specialist workshop)

WARNING

Only a specialist workshop may make structural changes to the universal joint shaft.

WARNING

Danger of crushing from unintentional

- **Rolling of the tractor and the coupled implement!**
- **Lowering of the lifted implement!**

Secure the tractor and implement from unintentional starting and unintentional rolling and secure the implement from unintentional lowering before entering the danger zone between the tractor and lifted implement in order to adjust the universal joint shaft.

1. Couple the soil tillage implement to the tractor.
2. Secure the tractor and implement against unintentional start-up and rolling.
3. Clean and grease the tractor PTO shaft and the implement's gearbox input shaft.
4. Fix the two universal joint shaft halves to the tractor PTO shaft and the gearbox input shaft.
   - o Do not interconnect the universal joint shaft halves.
   - o Observe the operating manual from the universal joint shaft manufacturer.
5. Raise and lower the implement.
   To do so, actuate the control valves at the rear of the tractor.
6. Before entering the danger area between the tractor and implement, secure the raised implement against unintentional lowering, by supporting it or hooking it to a crane.
7. Determine the shortest and longest operating position for the universal joint shaft by holding the universal joint shaft halves next to each other.
8. If necessary, have the universal joint shaft shortened in a specialist workshop. Observe the operating manual from the universal joint shaft manufacturer.

The safety devices and guards of the extended universal joint shaft must overlap by at least 50 mm.

WARNING

Never actuate the operator controls for the tractor's three-point hydraulic system while you are in the danger area between the tractor and implement.

6.7 Fitting the coupling parts (specialist workshop)

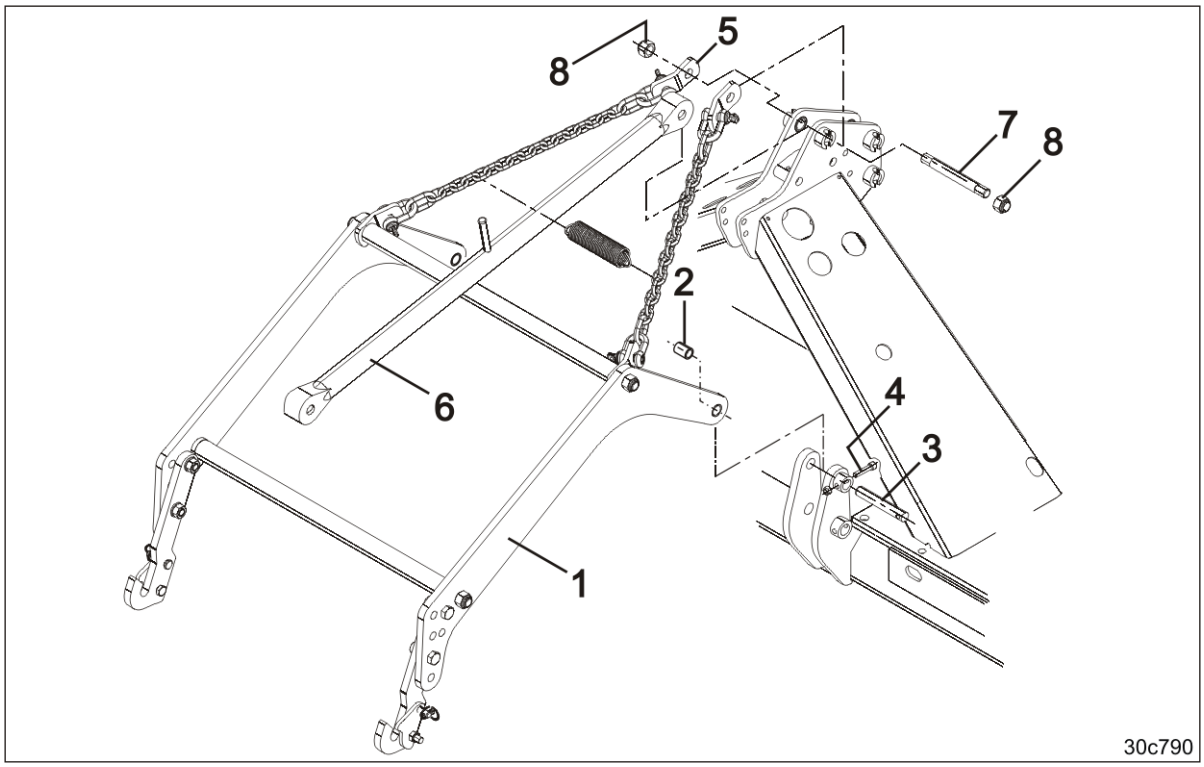


Fig. 78

1. Attach the coupling carrier arms (Fig. 78/1) to a crane.
2. Secure the coupling carrier arms with two spacer sleeves (Fig. 78/2) to the soil tillage implement with two pins (Fig. 78/3).
3. Secure the pins with screws (Fig. 78/4) and nuts.
4. Secure the chains (Fig. 78/5), together with the upper link (Fig. 78/6), to the soil tillage implement with a pin (Fig. 78/7).
5. Secure the pin with two securing nuts (Fig. 78/8).
6. Connect the chains using a tension spring (Fig. 79/1). When untensioned, the chains should not touch the tower of the soil tillage implement.

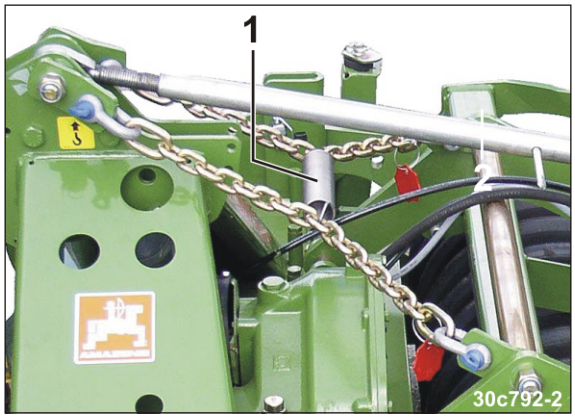


Fig. 79

6.8 Attaching the lifting frame

Before start-up, check with the tractor rear window open whether parts of the lifting frame collide with the rear window.

Connecting the hydraulic line of the lifting frame to the hydraulics for the tractor lower links brings advantages

When actuating the tractor lower link,

- first, the seed drill is raised over the roller. This reduces the required lifting power of the tractor lower links.
- the implement combination (with reduced lifting power requirement) is lifted by the tractor lower links.

To do this, it is necessary to install an additional hydraulic coupling in the tractor (specialist workshop).

6.9 Attaching lifting frame 2.1 (specialist workshop))

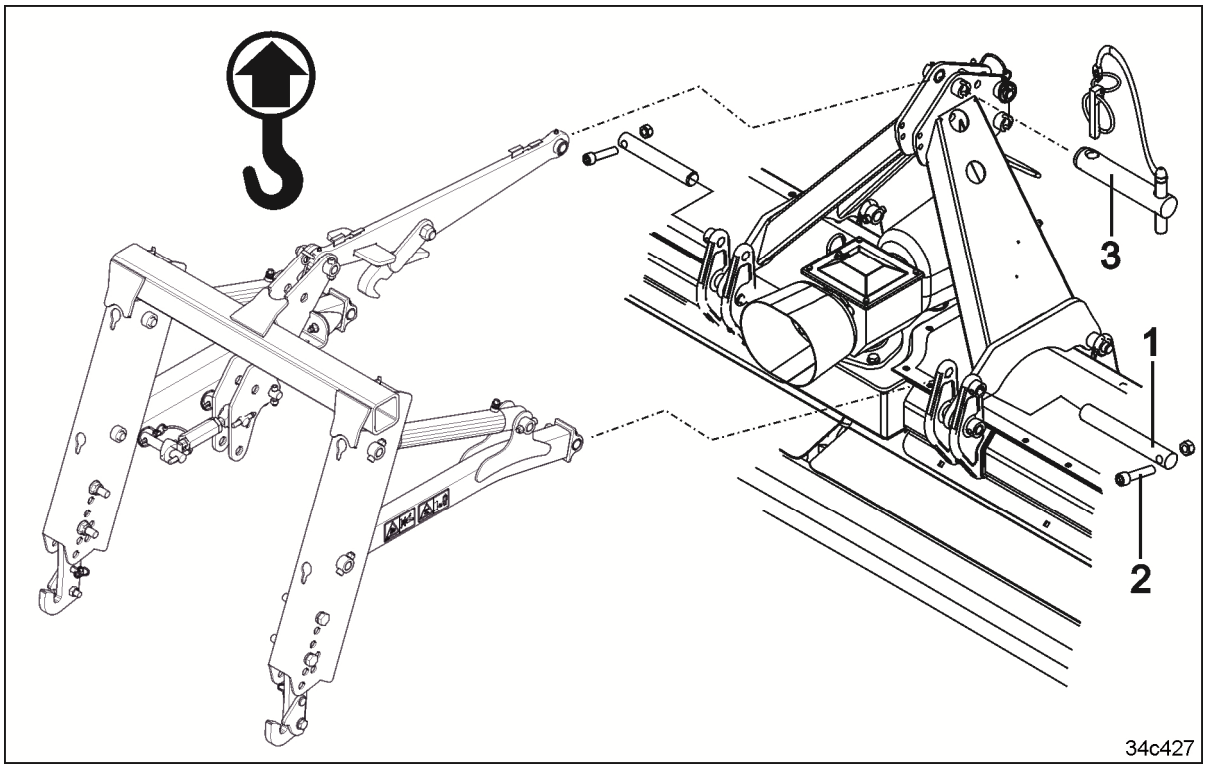


Fig. 80

1.Couple the tractor to the implement.

2. Park the implement on a firm surface.
3. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
4. Hook the lifting frame to a crane.
5. Position the lifting frame at the lower pivot points. Secure the pin (Fig. 80/1) with a screw (Fig. 80/2) and nut.
6. Position the upper link with a pin (Fig. 80/3) and secure with a lynch pin.
7. Connect the hydraulic lines to the hydraulic cylinder and secure with cable ties.
8. Connect the hydraulic plug to a single-acting control unit (*green*) on the tractor.
9. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
10. Actuate the tractor control unit (*green*) in the tractor cab.
11. Check the lifting frame for correct operation and inspect it for leaks.

6.10 Attaching lifting frame 3.1 (specialist workshop)

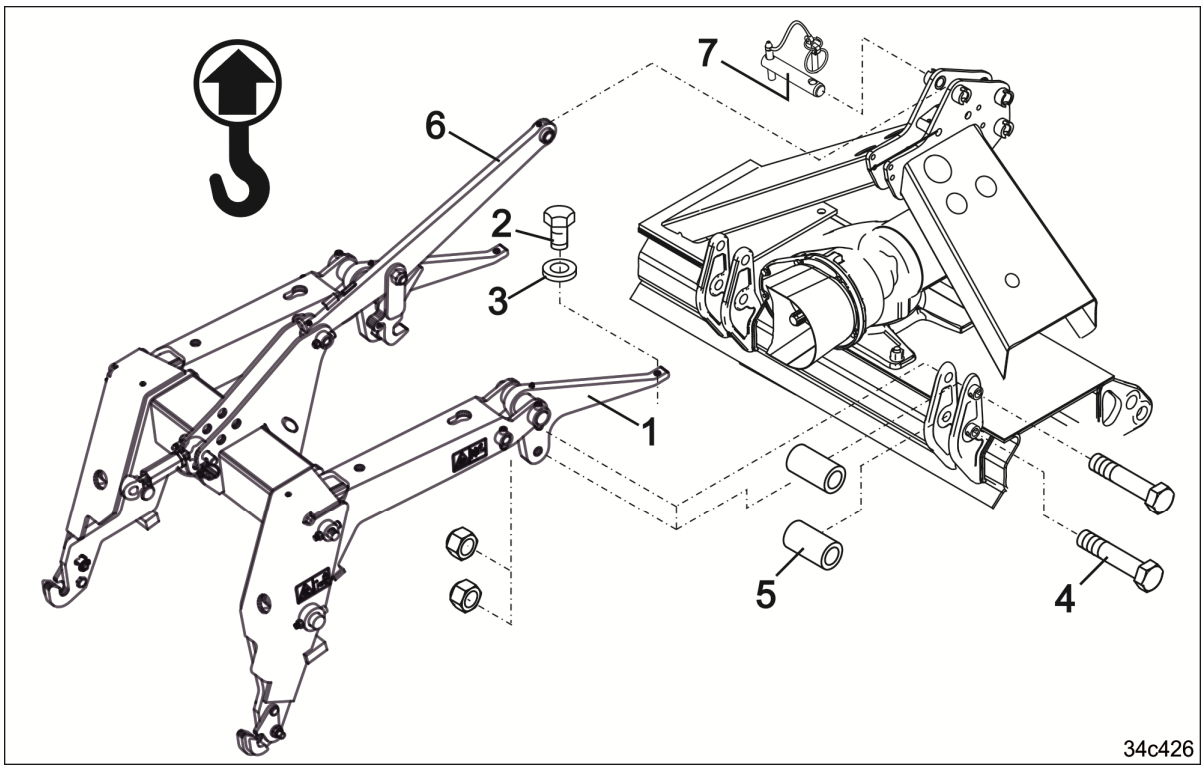


Fig. 81

1.Couple the tractor to the implement.

2. Park the implement on a firm surface.
3. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
4. Hook the lifting frame to a crane
5. Screw the bracket (Fig. 81/1) to the soil tillage implement using
   - o two implement bolts (Fig. 81/2)
     with washers (Fig. 81/3)
   - o 4 bolts (Fig. 81/4)
     with 4 spacer sleeves (Fig. 81/5).
6. Position the upper link (Fig. 81/6) with a pin (Fig. 81/7) and secure with a lynch pin.
7. Connect the hydraulic lines to the hydraulic cylinder and secure with cable ties.
8. Connect the hydraulic plug to a single-acting control unit (*green*) on the tractor.
9. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
10. Actuate the tractor control unit (*green*) in the tractor cab.
11. Check the lifting frame for correct operation and inspect it for leaks.

6.10.1 Fitting the lift height limiter (specialist workshop)

CAUTION

The hydraulic system is under high pressure.

Depressurise the hydraulic system before starting work on the lifting frame.

1.Couple the tractor to the implement.

2. Lower the lifting frame.
3. Secure the tractor and implement against unintentional starting and unintentional rolling. away.
4. Depressurise the hydraulic system.
5. Uncouple the lifting frame hydraulic hose line from the tractor.
6. Unscrew the hydraulic hose line from the T-connector (Fig. 82/1).
7. Screw on the valve holder (Fig. 82/2).
8. Connect the hydraulic hoses to the valve (Fig. 82/3).
9. Connect the hydraulic plug to a single-acting control unit (*green*) on the tractor.
10. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
11. Actuate the tractor control unit in the tractor cab.
12. Check the lifting frame for correct operation and inspect it for leaks.

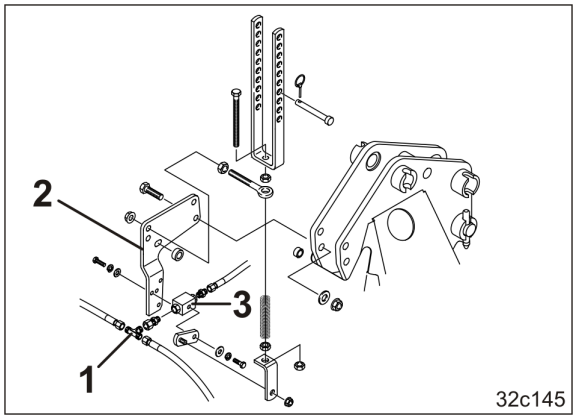


Fig. 82

6.11 Hydraulic hose lines

WARNING

Danger of infection from escaping hydraulic fluid at high pressure!

When coupling and uncoupling the hydraulic hose lines, ensure that the hydraulic system is depressurized on both the implement and tractor sides.

If you are injured by hydraulic fluid, contact a doctor immediately.

6.11.1 Coupling the hydraulic hose lines

Check the compatibility of the hydraulic fluids.

Do not mix any mineral oils with biological oils.

1. Clean the hydraulic connector and hydraulic socket of the tractor control valve.
2. Shift the tractor spool valve to the float position (neutral position).
3. Push the hydraulic connector into the hydraulic socket until the hydraulic connector perceivably locks.

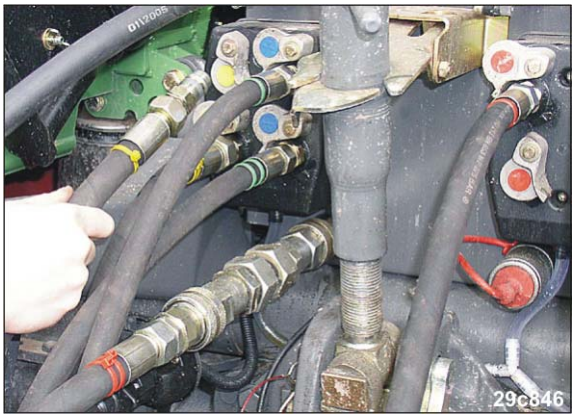


Fig. 83

WARNING

Risk of being crushed, cut, caught, drawn in or struck due to faulty hydraulic functions when the hydraulic hose lines are connected incorrectly!

When coupling the hydraulic hose lines, observe the coloured markings on the hydraulic plugs.

The maximum operating pressure of the hydraulic system is 210 bar.

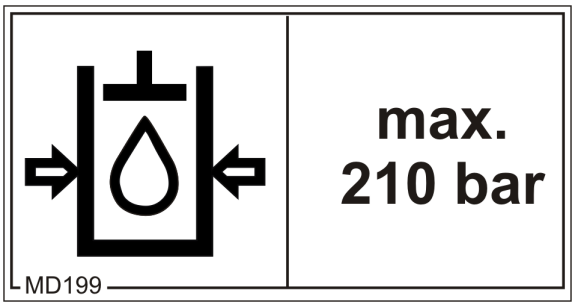


Fig. 84

6.12 Uncoupling the hydraulic hose lines

1. Shift the tractor spool valve to the float position (neutral position).
2. Unlock the hydraulic connector.
3. Push on the dust protection caps.

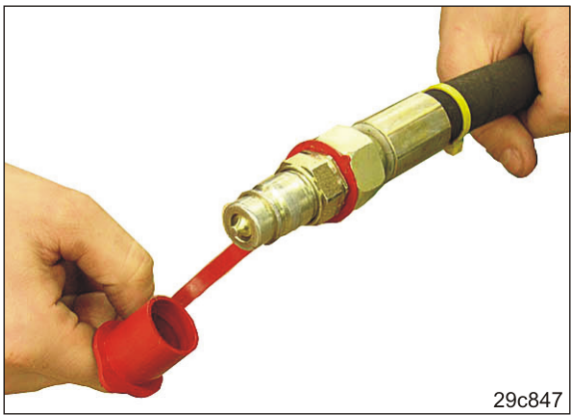


Fig. 85

7 Coupling and uncoupling the implement

When coupling and uncoupling the implement take heed of the section “Safety information for users”.

Danger

- **Secure the tractor and the implement against unintentional start-up and rolling before working on the implement.**
- **Direct people out of the danger area between the tractor and implement before you approach the implement with the tractor.**
- **Any helpers may only act as guides standing next to the tractor and the implement, and may only move between the vehicles when both are at a standstill.**
- **Never actuate the operating controls for the tractor's three-point hydraulic system while you are in the danger area between the tractor and implement.**

When handling the universal joint shaft, observe the following:

- Use only the provided universal joint shaft or one of the prescribed type.
- Read and follow the operating manual for the universal joint shaft supplied by the universal joint shaft manufacturer. Correct use and maintenance of the universal joint shaft prevents serious accidents.
- When coupling the universal joint shaft, observe the operating manual from the universal joint shaft manufacturer.
- The installation length of the universal joint shaft must be according to the specifications (see included operating manual from the universal joint shaft manufacturer). Have the universal joint shaft shortened by a specialist workshop if necessary.
- Ensure sufficient clearance in the swivelling area of the universal joint shaft. Insufficient clearance causes damage to the universal joint shaft.
- Observe the permitted drive rev. speed of the implement.
- Observe the correct installation position of the universal joint shaft. The tractor symbol on the protective tube of the universal joint shaft identifies the tractor-side connection of the universal joint shaft.

  Always mount the universal joint shaft overload clutch on the implement side.
- Before switching on the tractor PTO shaft, read and follow the safety precautions for PTO shaft operation (see section "Safety information for the operator").

WARNING

Risk of contusions, cutting, catching, drawing in and knocks when the implement unexpectedly releases from the tractor!

- Use the intended equipment to connect the tractor and the implement in the proper way.
- When coupling the implement to the tractor's three-point hydraulic system, ensure that the attachment categories of the tractor and the implement are the same.
- Only use the top and lower link pins provided for coupling the implement.
- Check the top and lower link pins for visible damage each time you couple the implement. Replace the top and lower link pins if there are clear signs of wear.
- Secure the upper link pin and the lower link pin against unintentional detachment using lynch pins.

WARNING

Risk of energy supply failure between the tractor and the implement through damaged power lines!

During coupling, check the course of the power lines. The supply lines:

- Must give slightly without tension, bending or rubbing on all movements of the connected implement.
- Must not chafe against other parts.

7.1 Coupling the implement to the tractor

1. Clean and grease the tractor PTO shaft and the implement's gearbox input shaft.
2. Limit the lateral play of the tractor lower link, to prevent the connected implement from oscillating.
3. Fasten the implement-side universal joint shaft half to the overload clutch on the gearbox input shaft and secure.

   Observe the operating manual from the universal joint shaft manufacturer.
4. Interconnect the two halves of the universal joint shaft.
5. Hook the universal joint shaft into the bracket (Fig. 86/1).

Fig. 86

Adjust the length of the universal joint shaft to the tractor (see section "Adjusting the universal joint shaft to the tractor")

- before initial use.
- after fitting/removing the three-point hitch extension.
- when using a different implement type.

DANGER

For your own safety, always observe the fundamental rules when handling universal joint shafts. If you identify any defects on a universal joint shaft, the universal joint shaft must not be used.

6. Instruct persons to get out of the danger area between the tractor and the implement.
7. Drive the tractor towards the implement, leaving a clearance of approx. 25 cm.
   The tractor lower links must be flush with the lower pivot points of the implement.
8. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
9. Fasten the universal joint shaft to the tractor PTO shaft and secure (see operating manual of the universal joint shaft manufacturer).
10. Couple the supply lines (see section "Overview – supply lines between the tractor and the implement", Seite 38) to the tractor.
11. Secure the universal joint shaft guard on the tractor and on the implement using supporting chains (Fig. 88/1) so that they do not rotate.

Fig. 87

Ensure that the universal joint shaft has a sufficient swivelling range in all operating conditions.
The supporting chains must not become caught on implement or tractor parts.

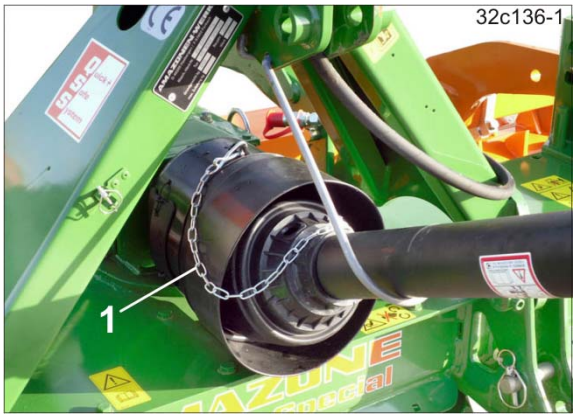


Fig. 88

12. Fasten the bracket to the transport bracket and secure it using a lynch pin (Fig. 89/1).

Fig. 89

13. Instruct persons to get out of the danger area between the tractor and the implement.

14. Engage the lower pivot points (Fig. 90/1) of the implement using the tractor lower links. The lower link hooks lock automatically.

15. Fasten the tractor upper link (Fig. 90/2) to the implement. The upper link hook locks automatically.

    The amount of lifting force required to lift the implement is at a minimum when the tractor upper link is horizontal.

Fig. 90

16. Bring the soil tillage implement into a straight position by adjusting the upper link.

17. Secure the upper link against twisting.

18. Check that the upper and lower link hooks are locked correctly.

19. Mount the wheel mark eradicators (optional).

    19.1 Screw the wheel maker eradicator holder (Fig. 91/1) to the three-point extension frame using the clamping plate (Fig. 91/2).

    19.2 Pin the wheel mark eradicator right at the top with the positioning bolt (Fig. 91/3) and secure with a lynch pin.

    The working depth is adjusted on the field.

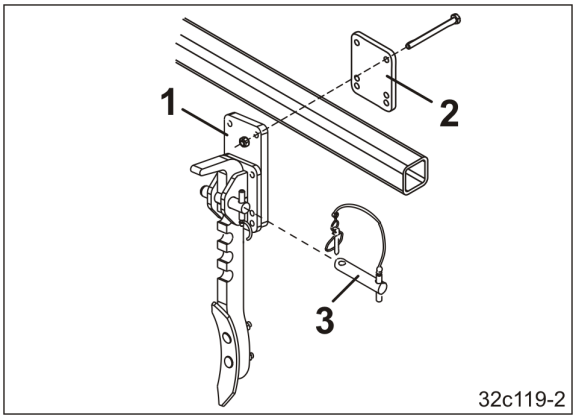


Fig. 91

7.2 Uncoupling the implement

WARNING

Risk of contusions, cutting, catching, drawing in and knocks through insufficient stability and possible tilting of the uncoupled implement!

Park the implement on a level surface on solid ground.

CAUTION

Avoid coming into contact with hot gearbox and universal joint shaft components.

Wear protective gloves.

1. Switch off the tractor PTO shaft.
   Wait until the tool tines have come to a complete stop.
2. Park the implement on a level surface on solid ground.

   Ensure that:

   - the tractor wheel mark eradicators (optional) can penetrate into loose soil. Or position the tractor wheel mark eradicators all the way at the top.
3. Apply the tractor parking brake, switch off the engine and remove the ignition key.
4. Release the upper link by adjusting the upper link length.
5. Decouple the upper link hook, working from the tractor cab.
6. Decouple the lower link hooks, working from the tractor cab.
7. Pull the tractor forward approx. 25 cm.
   The clearance between tractor and implement provides convenient access for uncoupling the universal joint shaft and supply lines.
8. Apply the tractor parking brake, switch off the engine and remove the ignition key.
9. Uncouple the hydraulic hose lines.
10. Fasten the supply lines to the hose cabinet.
11. Remove the universal joint shaft from the tractor PTO shaft (see operating manual from the universal joint shaft manufacturer).
12. Hook the universal joint shaft into the bracket (Fig. 92/1).

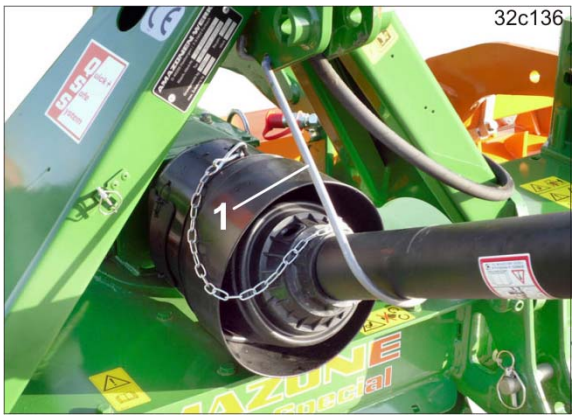


Fig. 92

7.3 Coupling the mounted seed drill

7.3.1 Attaching the seed drill with the coupling parts

1. Fasten the catch hooks (Fig. 93/1) to the lifting frame using two screws for each one (Fig. 93/2).

> Screw the catch hooks to the coupling parts so that the seed drill
>
> - can be connected without problem
> - runs closely behind the roller.
>
> The closer the seed drill is attached to the roller, the lower the lifting power required.

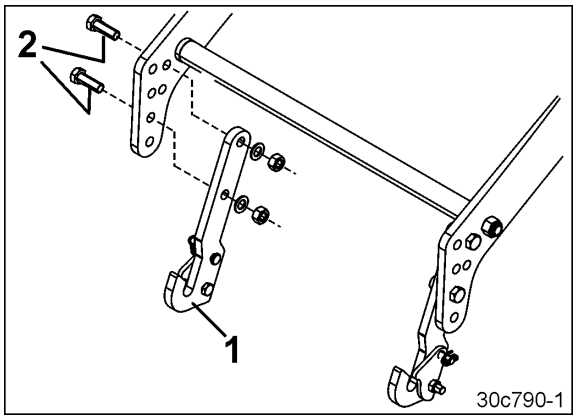


Fig. 93

2. Release the locking straps (Fig. 94/1).
   2.1 Remove the pins **(Fig. 94**/2).
3. Direct persons away from the danger area between the soil tillage implement and the seed drill.
4. Drive the soil tillage implement up to the seed drill.
5. Engage the lower pivot points (Fig. 94/3) of the seed drill using the catch hooks.
6. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
7. Swivel the locking straps (Fig. 94/1) and secure each with a pin (Fig. 94/2). Secure the pins with lynch pins.
8. Position the upper link (Fig. 95/1) to the upper hinging point (Cat. II) of the seed drill.
9. Secure the pin with a lynch pin.
10. Align the seed drill so that it is straight by lengthening or shortening the upper link. Secure the position of the upper link with the lock nut (Fig. 95/2).

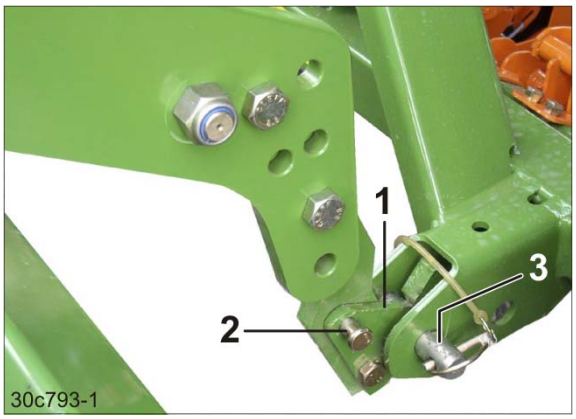


Fig. 94

Fig. 95

7.3.2 Attaching the seed drill to the lifting frame

Fig. 96

Lifting frame 2.1 only

1. Fasten the catch hooks (Fig. 97/1) to the lifting frame using two screws for each one (Fig. 97/2).

Lifting frame 2.1 has two groups of holes to which the catch hooks may be screwed.

The required group of holes depends on the roller diameter:

- Holes (Fig. 97/3)
  for small roller diameter
- Holes (Fig. 97/4)
  for large roller diameter.

The closer the seed drill is attached to the roller, the lower the lifting power required.

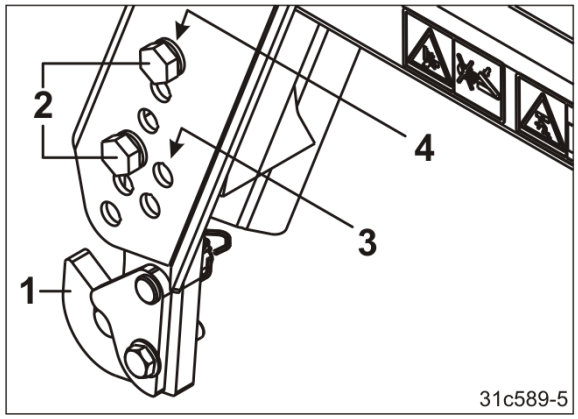


Fig. 97

All types:

2. Release the locking straps (Fig. 98/1).

   2.1 Remove the pins (Fig. 98/2).

3. Direct persons away from the danger area between the soil tillage implement and the seed drill.
4. Drive the soil tillage implement up to the seed drill.
5. Engage the lower pivot points (Fig. 98/3) of the seed drill using the catch hooks.
6. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
7. Swivel the locking straps (Fig. 98/1) and secure each with a pin (Fig. 98/2). Secure the pins with lynch pins.
8. Position the upper link (Fig. 99/1) to the upper hinging point (Cat. II) of the seed drill.
9. Secure the pin with a lynch pin.
10. Align the seed drill so that it is straight by lengthening or shortening the upper link. Secure the position of the upper link with the lock nut (Fig. 99/2).

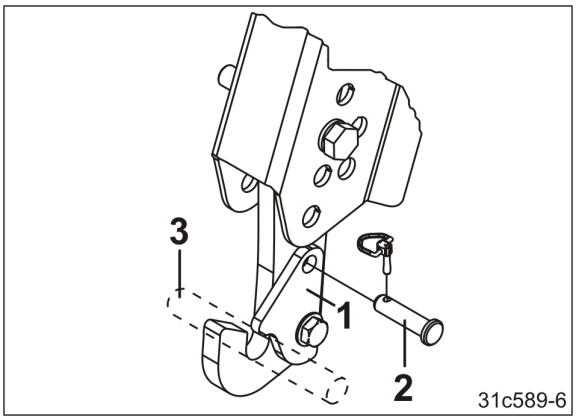


Fig. 98

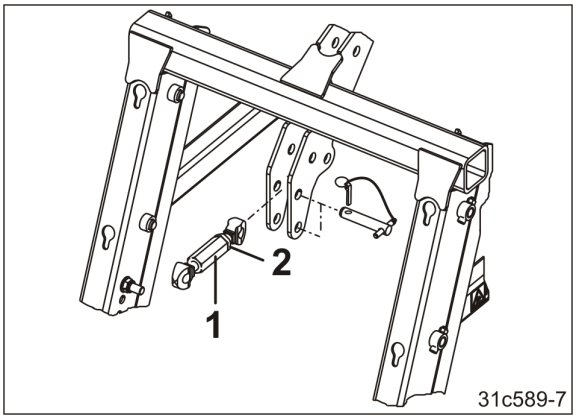


Fig. 99

11. Limit the lift height of the seed drill by inserting the pin (Fig. 100/1) in the required hole in the U-bracket.
12. Secure the pin with a lynch pin.

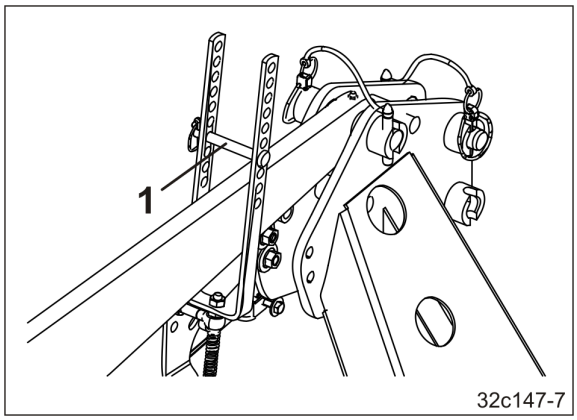


Fig. 100

DANGER

Risk of injury
from the movement of the lifting frame.

Maintain a minimum distance of 10.0 m from the implement combination.

When raising the seed drill, check whether parts of the lifting frame collide with the tractor rear window.

7.4 Attaching the front-mounted soil tillage implement

1. Couple the rotary harrow with the cage roller (see section "Start-up", Seite 92).
2. Fasten the front attachment frame (Fig. 101/1) to the
   - o KE 3000
     with the threaded pins (Fig. 101/2)
   - o KE 3500 and KE 4000
     with the Cat. II/III lower link pins (Fig. 101/3).

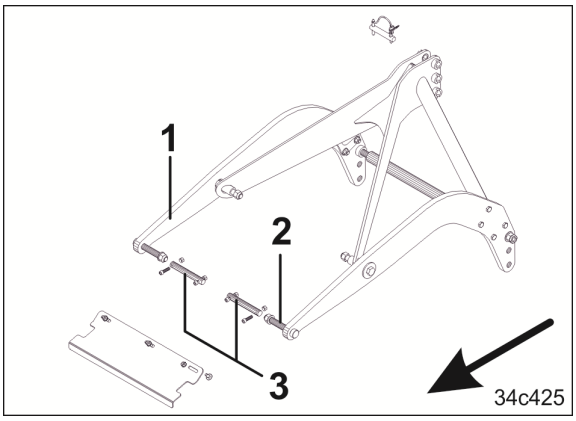


Fig. 101

3. Couple the tractor with the front attachment frame.
4. Screw the middle protective plate (Fig. 102/1) onto the rotary harrow.
5. Mount the universal joint shaft (see section "Coupling and uncoupling the implement", Seite 110).
6. Adjust the working depth of the rotary harrow (see section "Settings", Seite 121).

Fig. 102

8 Settings

DANGER

Carry out the adjustments only if the following apply:

- **The tractor PTO shaft is switched off.**
  (wait until the tool carriers have come to a complete stop).
- **The implement has been lowered.**
- **Applied the tractor parking brake.**
- **Shut off the tractor engine.**
- **Removed the ignition key.**

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional lowering of the implement raised using the tractor's 3-point hydraulic system.**
- **unintentional lowering of raised, unsecured implement parts.**
- **unintentional start-up and rolling of the tractor-implement combination.**

Secure the tractor and the implement against unintentional starting and rolling away before you make any adjustments to the implement.

8.1 Setting the working depth of the tool tines

1. Lift the implement just enough for the depth setting pins (Fig. 103/2) to clear the carrying arms (Fig. 103/1).
2. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.

   Wait until the tool carriers have come to a complete stop.

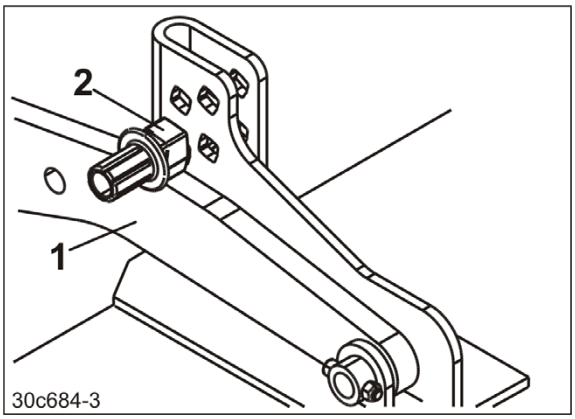


Fig. 103

3. Position the depth setting pin (Fig. 104/1).
   - o In both outer segments.
   - o In the same square hole.

DANGER

Touch the depth setting pin by the handle only.

Never reach between the carrying arm and the depth setting pins.

4. Secure the depth setting pins with lynch pins (Fig. 104/2).

Fig. 104

WARNING

Whenever you relocate the depth setting pin, secure it using a lynch pin (Fig. 104/2).

5. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
6. Lower the soil tillage implement.

→ The carrying arms (Fig. 105/1) are supported by the depth setting pins (Fig. 105/2).

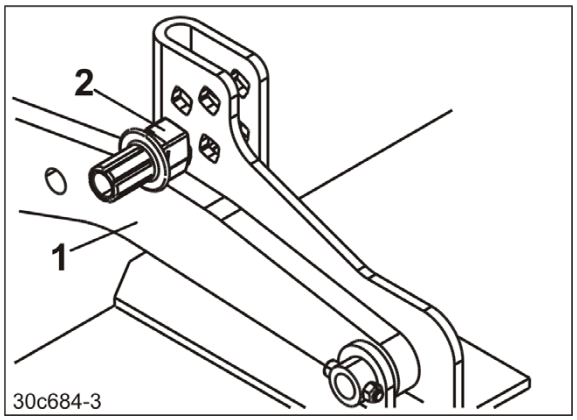


Fig. 105

Adjust the following to the new working depth:

- side panels
- levelling board.

8.2 Adjusting the side panel

Vertical adjustment

The side panel is fastened with two round-head screws (Fig. 106/1) and can be adjusted vertically.

Adjusting the spring tension

1. Release the lock nut.
2. Adjust the tension of the spring (Fig. 106/2) by turning the nut (Fig. 106/3).
3. Tighten the lock nut.

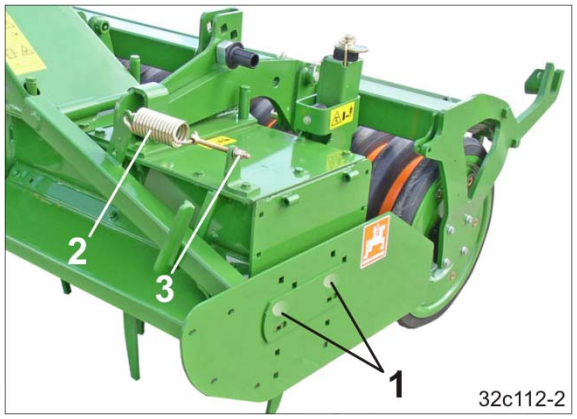


Fig. 106

8.3 Adjusting the tractor wheel mark eradicator

Vertical adjustment

Adjust the tractor wheel mark eradicator vertically, position it and secure the positioning bolt (Fig. 107/1) with a lynch pin.

Horizontal adjustment

Adjust the tractor wheel mark eradicator horizontally and secure it with the screws (Fig. 107/2).

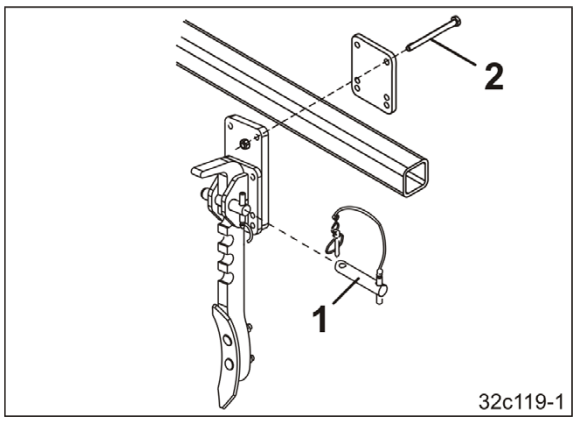


Fig. 107

8.4 Adjusting the cutting rail

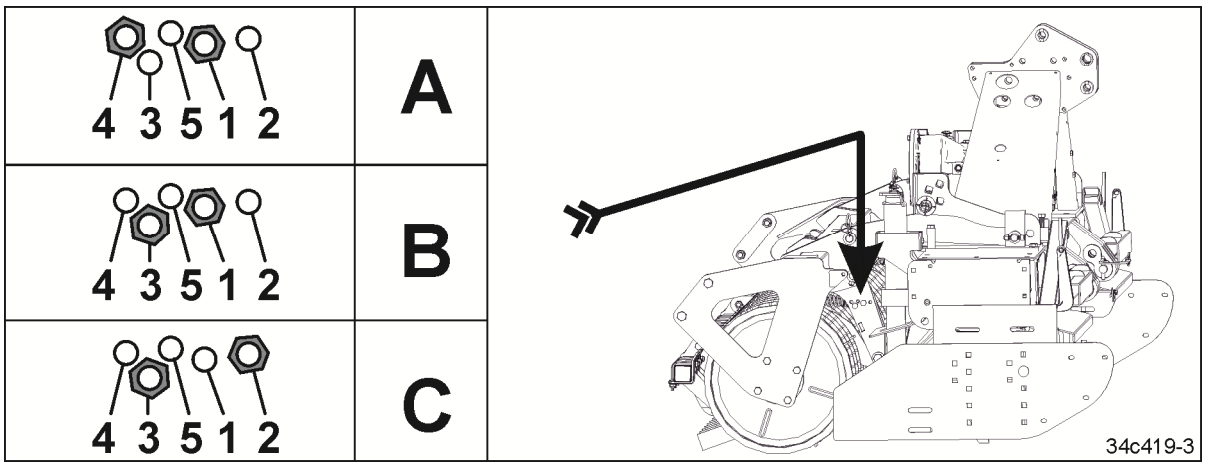


Fig. 108

Position A

One bolt is inserted in hole (Fig. 108/1), the second bolt is inserted in hole (Fig. 108/4).

The spring force is permanently acting on the cutting rail and the blades.

Position B

Repositioning of the bolt from hole (Fig. 108/4) to hole (Fig. 108/3) or (Fig. 108/5) causes only the net weight of the cutting rail is acting on the blades. The spring forces only comes into effect when the blades are raised and the bracket strikes against the bolt in hole (Fig. 108/3) or (Fig. 108/5).

The spring force comes into effect

- only after the bolt is inserted in hole (Fig. 108/3).
- later if the bolt is inserted in hole (Fig. 108/5).

Position C

Repositioning the bolt from hole (Fig. 108/1) to hole (Fig. 107/2) causes the roller to work without the blades. Raise the cutting rail to reposition the bolt.

8.5 Adjusting the levelling board

1. Adjust the spindle of the levelling board using the ratchet (Fig. 109/1).

   In the parking position, the ratchet is stowed in the cartridge.

Fig. 109

2. Position the spindle with a mandrel (Fig. 110/1).

Fig. 110

3. Secure the mandrel with a lynch pin (Fig. 111/1).

Fig. 111

8.6 Transport locking mechanism for lifting frame (all types)

Fig. 112

Locking the lifting frame

1. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
2. Pull on the cord (Fig. 112/1).
   → The locking hook (Fig. 112/2) opens.
3. Actuate the tractor control unit *(green)*.
   → The lifting frame is raised. Actuate tractor control unit *(green)* until the lifting frame is fully raised and locked.
4. Release the (Fig. 112/1) cord.
   → The locking hook (Fig. 112/3) forms the mechanical locking mechanism of the lifting frame.

Unlocking the lifting frame

1. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
2. Pull on the cord (Fig. 112/1).
   → The locking hook (Fig. 112/2) opens.
3. Actuate the tractor control unit *(green)*.
   → The lifting frame is lowered.

Actuate tractor control unit *(green)* until the lifting frame is fully lowered.

If the lifting frame fails to lock, e.g. when turning at the end of a field (see Fig. 113), do not pull the cord (Fig. 112/1).

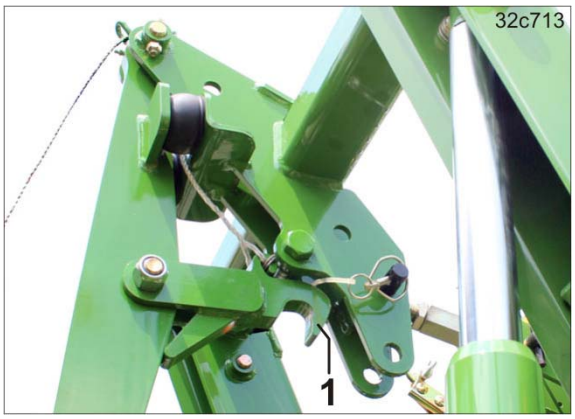


Fig. 113

9 Transportation

When driving on public roads and ways the tractor and implement must comply with the national road traffic regulations (in Germany the StVZO and the StVO) and the accident prevention regulations (in Germany those of the industrial injury mutual insurance organisation).

In Germany and in many other countries, the maximum transport width of the implement combination mounted on the tractor is 3.0 m.

Transport of a implement combination over 3.0 m wide is only permitted on a transport vehicle.

The vehicle keeper and driver are responsible for compliance with the statutory stipulations.

The maximum permitted speed[1)] is:

- 25 km/h for tractors with attached soil tillage implement, trailing roller and sowing rail with front tank
- 40 km/h for tractors with attached soil tillage implement, trailing roller with or without
  - o mounted seed drill.
  - o pack-top seed drill.

The implement must always be driven at much lower speeds than those specified when travelling on poor roads and unclassified roads in particular.

[1)] The maximum permitted speed for attached implements differs in the various countries according to national road traffic regulations. Ask your local importer/implement dealer about the maximum permitted speed for road travel.

1. Instruct any people in the area to stand at a minimum distance of 10.0 m from the implement.
2. Deactivate the lifting frame height limiter (optional).
   2.1 Remove the pin (Fig. 114/1).
3. Raise the lifting frame.
   3.1 Actuate tractor control unit *(green)* until the lifting frame is fully raised.
4. Check whether the lifting frame is locked (see section "Transport locking mechanism for lifting frame ", Seite 126).
5. Raise the soil tillage implement.
6. Lock the tractor control units.
7. Switch off the on board computer.

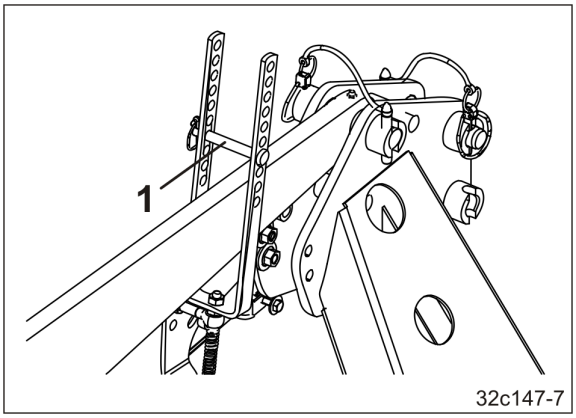


Fig. 114

8. Check the lighting system for operation.
9. Switch on the rotating beacon light (if present), which is subject to authorisation, and check for correct function.

Fig. 115

DANGER

- Before transportation, carry out a visual check that the upper and lower link pins are secured with the original lynch pins against unintentional release.
- Before transportation, fasten the side locking device of the tractor lower link so that the mounted or towed implement cannot swing back and forth.
- In bends take into consideration the wide sweep and the centrifugal mass of the implement.
- Drive in such a way that you always have full control over the tractor with the attached implement. In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected or coupled implement.
- It is forbidden to ride on the implement as a passenger and/or to climb onto implements while they are running.

- Before transport, follow the instructions given in the section "Safety information for the operator".
- Before moving off, check:
  - o that the permissible weight is not exceeded.
  - o that the supply lines are connected correctly.
  - o the lighting system for damage, function and cleanliness.
  - o the brake and hydraulic system for visible damage.
- That the tractor parking brake is released completely.
- The warning signs and yellow reflectors must be clean and undamaged.
- Switch on the rotating beacon light (if present), which is subject to authorisation, prior to starting a journey and check for operability.

10 Use of the implement

When using the implement, observe the information in the following sections:

- Warning symbols and other labels on the implement
- Safety information for the operator.

DANGER

Risk of crushing, being pulled in or caught during implement operation because of unprotected drive elements.

Only operate the implement if

- all safety equipment is fully mounted.
- the side panel is mounted.
- the roller is coupled up.

DANGER

Danger of being entangled and drawn in by an unguarded universal joint shaft or damaged safety devices!

Work only when the drive between the tractor and driven implement is fully guarded, i.e.:

The tractor must be equipped with a shield, and the implement must be equipped with the standard universal joint shaft guard.

Whenever the implement is used, first check to ensure that the safety devices and guards of the universal joint shaft are fully intact and functional.

Danger of being entangled and drawn in

- by unguarded parts of the universal joint shaft.
- by damaged safety devices.
- by an unsecured universal joint shaft (supporting chain).

Have damaged safety devices and guards of the universal joint shaft replaced immediately by a specialist workshop.

- Maintain a sufficient safety clearance between you and the driven universal joint shaft.
- Direct people out of the danger area of the driven universal joint shaft.
- Shut down the tractor engine immediately in case of danger.

WARNING

Risk of being crushed, caught or struck by objects ejected by the implement when it is driven!

Instruct people to leave the danger area of the implement before you switch on the PTO shaft.

DANGER

- Before transportation, carry out a visual check that the upper and lower link pins are secured with the original lynch pins against unintentional release.
- Before transportation, fasten the side locking device of the tractor lower link so that the mounted or towed implement cannot swing back and forth.
- When turning corners, take into consideration the wide sweep and the centrifugal mass of the implement.
- Drive in such a way that you always have full control over the tractor with the attached implement. In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the influence of the mounted or attached implement.
- It is forbidden to ride on the implement as a passenger and/or to climb onto implements while they are running.

WARNING

Risk of being crushed, caught or struck by damaged components or foreign objects ejected by the implement!

Observe the permissible implement drive speed before switching on the tractor PTO shaft.

CAUTION

Danger from failure of the universal joint shaft in case of excessive bending of the driven universal joint shaft!

Observe the permitted bending of the driven universal joint shaft when lifting the implement. Excessive bending of the driven universal joint shaft causes increased, premature wear to or immediate destruction of the universal joint shaft.

Switch off the PTO shaft of the tractor immediately if the lifted implement makes a lot of noise while running.

CAUTION

Danger from failure during operation when the overload clutch engages!

Switch off the PTO shaft of the tractor immediately if the overload clutch engages. This avoids damaging the overload clutch.

10.1 On the field

DANGER

Instruct any people in the area to stand at a minimum distance of 20.0 m from the implement.

Starting work

1. Lower the soil tillage implement until the tines are just above, but not yet touching, the soil.
2. Bring the tractor's PTO shaft up to the prescribed speed.
3. Start up the tractor and fully lower the soil tillage implement.

Fig. 116

A tractor PTO shaft speed of 1000 rpm is recommended.

Setting a lower PTO shaft speed leads to high torques at the universal joint shaft and can cause rapid wear of the overload clutch.

The working depth can be adjusted hydraulically during work.

Actuation of the control unit (*Beige*) adjusts the working depth of the rotary cultivator.

Lock the control unit (*Beige*) after each adjustment.

The scale (Fig. 51/2) shows the set working depth.

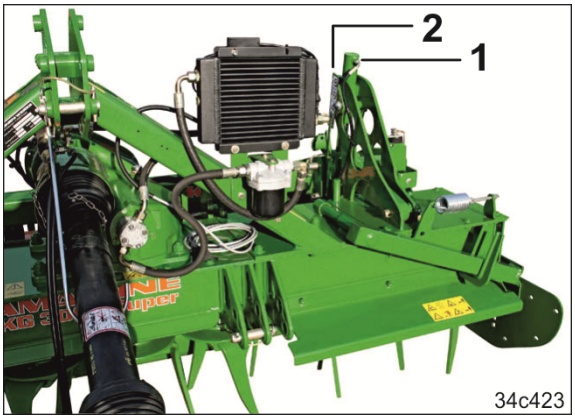


Fig. 117

During the work

In the event of tine wear, correct the following settings:

- the working depth of the soil tillage implement,
- the side panels,
- the levelling board,
- the tractor wheel mark eradicator.

When working at great working depths, it is necessary to replace the tool tines with new ones even before they reach the minimum length in order to prevent damage or wear to the tool carriers.

Turning at end of the field

Before turning at the end of the field

- raise the mounted seed drill over the packer roller using the lifting frame (optional).
- raise the combination with the tractor hydraulics until the combination has sufficient ground clearance.

Fig. 118

Switch off the tractor PTO shaft when turning if the angle of the universal joint shaft becomes too large or the implement does not run smoothly when raised.

After use

When switching off the implement, ensure that the soil tillage implement is parked on firm ground.

To prevent damage, the tines of the wheel mark eradicators should be able to sink into loose soil or be pinned right at the top.

11 Faults

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional lowering of the implement raised using the tractor's 3-point hydraulic system.**
- **unintentional lowering of raised, unsecured implement parts.**
- **unintentional start-up and rolling of the tractor-implement combination.**

Secure the tractor and the implement against unintentional start-up and rolling before eliminating faults on the implement.

Wait for the implement to stop before entering the danger area of the implement.

11.1 Initial use of the tooth packer roller

If the tooth packer roller rotates with difficulty when first used, e.g. because of areas glued by paint, do not adjust the scrapers of the tooth packer roller, but rather pull the roller over solid ground.

11.2 Tool tines stopping when work is in progress

If the implement encounters an obstacle, the tool carriers may come to a stop.

To prevent damage to the gearbox, the gearbox input shaft is fitted with an overload clutch.

If the tool carriers come to a stop, stop driving and reduce the tractor's PTO shaft speed (approx. 300 rpm) until you hear the ratchet clutch engage. Bring the PTO shaft back to its original speed and continue working.

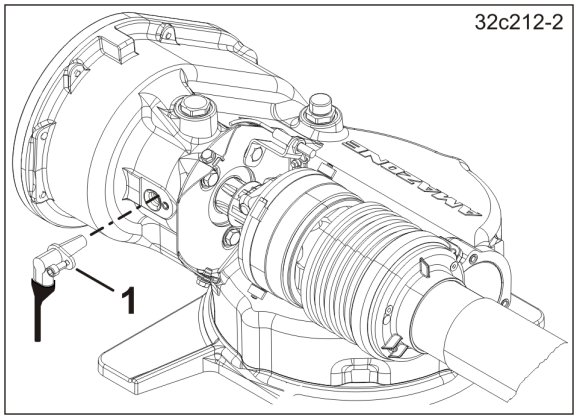
If the tool carriers do not turn, rectify the malfunction:

1. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
2. Wait until the tractor PTO shaft comes to a complete stop.
3. Remove the obstacle.
   The ratchet clutch is now ready to be used again.

11.3 Hall sensor on the gearbox

The Hall sensor is magnetic.

In event of faults, unscrew the Hall sensor, free the contact surface from chippings and clean it.



Hall sensor (1) on gearbox WHG/KG-SUP

Fig. 119

12 Cleaning, maintenance and repair

12.1 Safety first

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional lowering of the implement raised using the tractor's 3-point hydraulic system.**
- **unintentional lowering of raised, unsecured implement parts.**
- **unintentional start-up and rolling of the tractor-implement combination.**

Secure the tractor and the implement against unintentional start-up and rolling before working on the implement.

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through unprotected danger points.

- Mount protective equipment, which you removed when cleaning, maintaining and repairing the implement.
- Replace defective protective equipment with new equipment.

Danger

Carry out cleaning, maintenance or repair work (unless otherwise specified) only after you have done all of the following:

- Lowered the implement completely.
- Applied the tractor parking brake.
- Switched off the tractor PTO shaft.
- Shut off the tractor engine.
- Removed the ignition key.

CAUTION

Avoid coming into contact with hot components and transmission fluids.

Wear protective gloves.

12.2 Cleaning the implement

- Pay particular attention to the brake, air and hydraulic hose lines.
- Never treat brake, air and hydraulic hose lines with fuel, benzene, petroleum or mineral oils.
- After cleaning, grease the implement, in particular after cleaning with a high pressure cleaner/steam jet or liposoluble agents.
- Observe the statutory requirements for the handling and removal of cleaning agents.

Cleaning with a high-pressure cleaner/steam cleaner

Always observe the following points when using a high-pressure cleaner/steam cleaner:

- Do not clean any electrical components.
- Never aim the cleaning jet from the nozzle of the high pressure cleaner/steam jet directly on lubrication and bearing points.
- Always maintain a minimum jet distance of 300 mm between the high pressure cleaning or steam jet cleaning nozzle and the implement.
- Comply with safety regulations when working with high pressure cleaners.

12.3 Adjustment work

12.3.1 Repositioning the bevel wheels in the WHG/KG-Spec/WHG/KE-Sup (specialist workshop)

1. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
2. Remove the universal joint shafts with the universal joint shaft guard.
3. Thoroughly clean the gearbox cover and the drive shaft so that no dirt enters the gearbox housing.

Fig. 120

4. Open the gearbox cover (Fig. 121/1).

5.Pull off the axial retaining device (Fig. 121/2).

6. Pull the drive shaft (Fig. 121/3) out of the gearbox housing.

→ The bevel wheel (Fig. 121/4) comes away from the drive shaft.

The second bevel wheel (Fig. 121/5) sits on the output drive shaft. The bevel wheel is not secured axially.

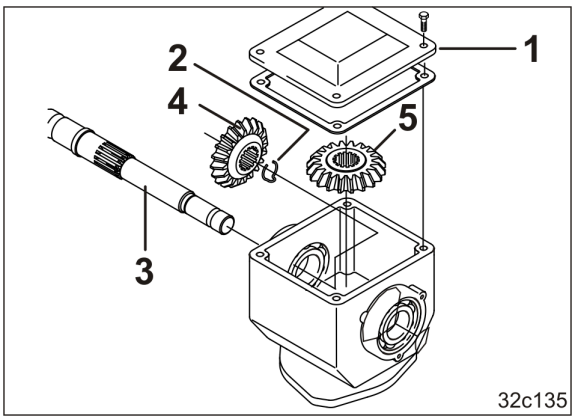


Fig. 121

7. Swap the bevel wheels over.
8. Fit the drive shaft together with the bevel wheel.
9. Secure the bevel wheel axially to the drive shaft.
10. Close the gearbox cover and cover gasket.
11. Check the gearbox for leak points.
12. Check the oil level.
13. Fit the universal joint shafts with the universal joint shaft guard.

12.3.2 Repositioning/replacing the gear wheels on the WHG/KX /WHG/KG-Spec and WHG/KG-Sup (specialist workshop)

When the gearbox cover is opened, transmission fluid runs out.

To prevent contamination from escaping fluid,

- raise the mounted implement using the tractor's three-point hydraulics until the implement is inclined about 30° forwards.
- park the implement on solid ground and reduce the oil level by draining off the transmission fluid.
  Only reuse the collected transmission fluid if it has not been contaminated by dirt particles.

DANGER

Secure the raised soil tillage implement which is attached to the tractor against unintentional lowering by using suitable support elements or a crane.

12.3.2.1 Repositioning/replacing the gear wheels on the WHG/KX

1. Couple the soil tillage implement to the tractor.
2. Uncouple the seed drill.
3. Tilt the implement about 30° forwards using the tractor's three-point hydraulic system.
4. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
5. Secure the raised implement using suitable support elements or a crane.
6. Open the gearbox cover.
7. Remove the retaining springs (Fig. 122/1).
8. Remove the gear wheels and, using the speed table,
   - o swap them around or
   - o replace with a different set of gear wheels.
9. Fit the retaining springs.
10. Close the gearbox cover and cover gasket.
11. Lower the implement.
12. Check the gearbox for leak points.
13. Check the oil level.

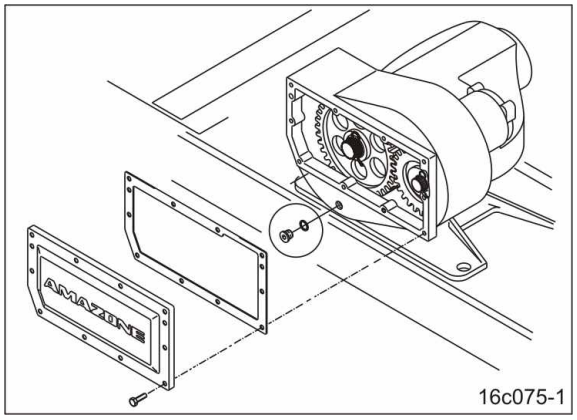


Fig. 122

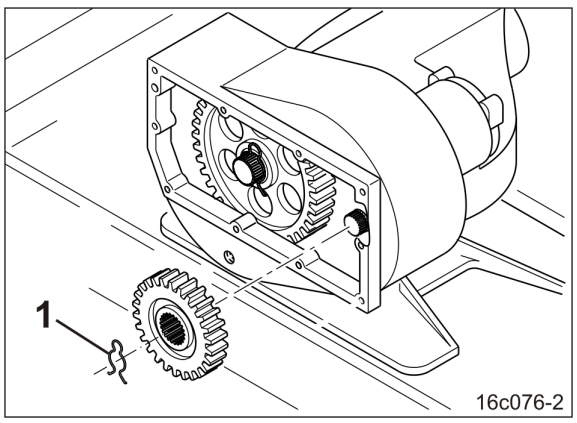


Fig. 123

12.3.2.2 Repositioning/replacing the gear wheels on the WHG/KG-Spec and WHG/KG-Sup (specialist workshop)

1. Couple the soil tillage implement to the tractor.
2. Uncouple the seed drill.
3. Tilt the implement about 30° forwards using the tractor's three-point hydraulic system.
4. Switch off the tractor PTO shaft, apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
5. Secure the raised implement using suitable support elements or a crane.
6. Open the gearbox cover.

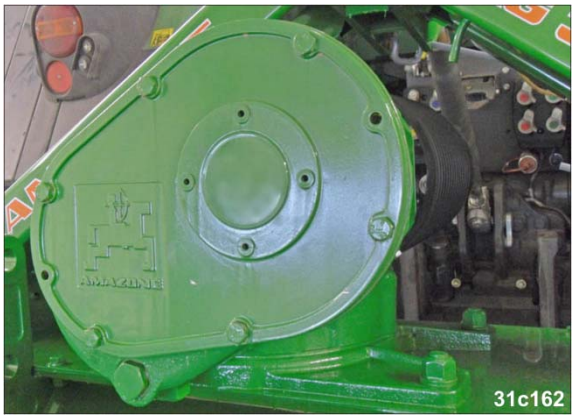


Fig. 124

7. Remove the retaining springs (Fig. 125/1).

Fig. 125

8. Remove the gear wheels and, using the speed table,
   - o swap them around or
   - o replace with a different set of gear wheels.
9. Fit the retaining springs.
10. Close the gearbox cover and cover gasket.
11. Lower the implement.
12. Check the gearbox for leak points.
13. Check the oil level.

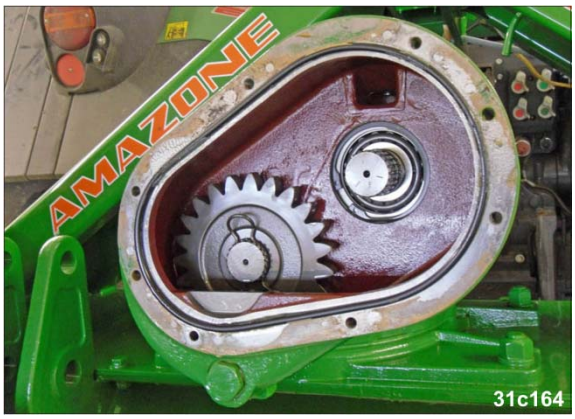


Fig. 126

12.3.3 Replacing the tool tines (specialist workshop)

DANGER

Raise the stand-alone machine using a crane and support it properly.

1. In a specialist workshop, raise the stand-alone machine with a crane and support it properly.
2. Remove the lynch pin (Fig. 127/1).
3. Remove the pin (Fig. 127/2) from the tool carrier by striking it in an upwards direction.
4. Replace the tool tines (Fig. 127/3).
5. Fasten the tool tines using the pin and secure it using the lynch pin.

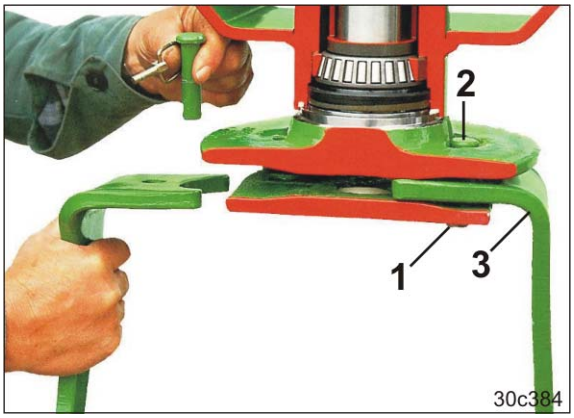


Fig. 127

Direction of rotation of the rotary harrow tines

The implement is equipped with two varieties of tool tines (clockwise/anticlockwise).

Tool tines (1),
anticlockwise (see direction of the arrow).

Tool tines (2),
clockwise (see direction of the arrow).

Note:

The leftmost tool carrier, viewed in the direction of travel, always rotates clockwise.

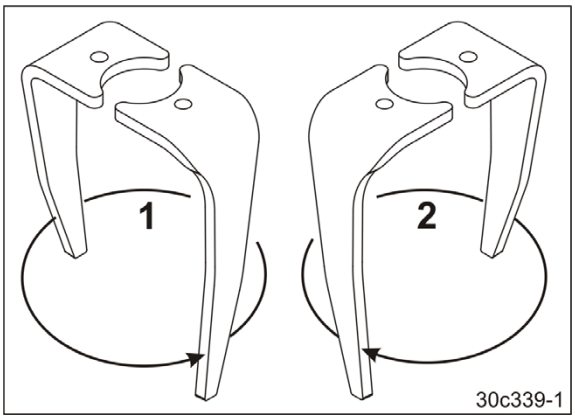


Fig. 128

Direction of rotation of the rotary cultivator tines

The implement is equipped with two varieties of tool tines (clockwise/anticlockwise).

Tool tines (1),
clockwise (see direction of the arrow).

Tool tines (2),
anticlockwise (see direction of the arrow).

Note:

The leftmost tool carrier, viewed in the direction of travel, always rotates clockwise.

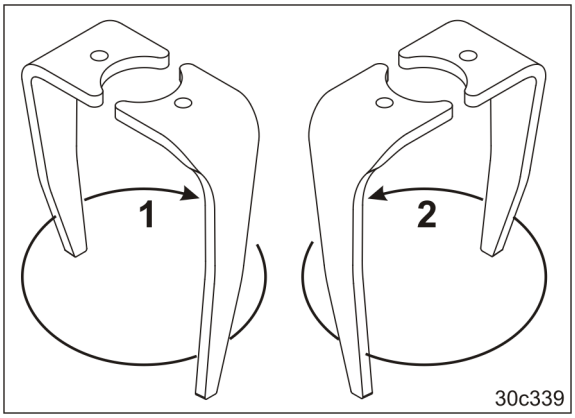


Fig. 129

12.3.4 Adjusting the cutting rail of the Cracker Disk roller (specialist workshop)

12.3.4.1 Increasing the spring force that is acting on the cutting rail

1. Put the cutting rail in position A (see section "Adjusting the cutting rail", Seite 124).
2. Insert 1 to 2 spacer discs (Fig. 130/1) between the socket (Fig. 130/2) and hexagon nut (Fig. 130/3).

If the spring force changes, the position of the blades also changes.

Readjust the blades (see section "Readjusting worn blades", unterhalb).

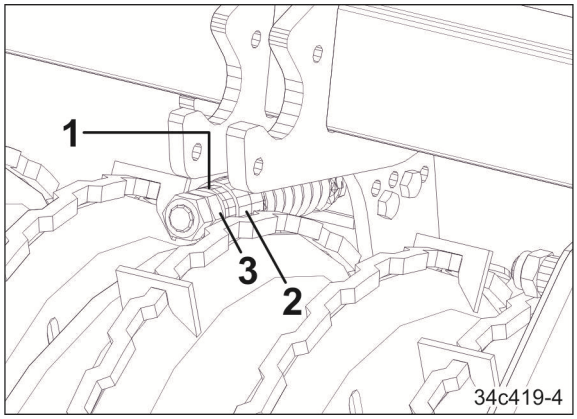


Fig. 130

12.3.4.2 Readjusting worn blades

1. Put the cutting rail in position A (see section "Adjusting the cutting rail", Seite 124).
2. Turn the hexagon nut (Fig. 131/1) on the spring package until the ends of the blades are flush again with the edges of the roller. Lock the hexagon nut.

Increase the spring force if the adjustment range is not sufficient.
(see section "Increasing the spring force that is acting on the cutting rail", oben).

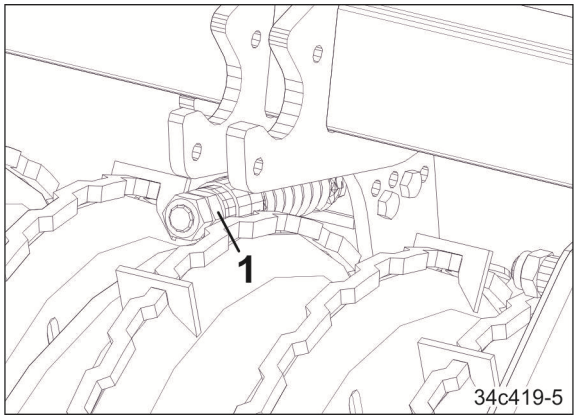


Fig. 131

12.4 Lubrication regulations

Carefully clean the lubrication nipple and grease gun before lubrication so that no dirt is pressed into the bearings. Press the dirty grease completely into the bearings and replace it with new grease.

The pictogram indicates a lubrication point.

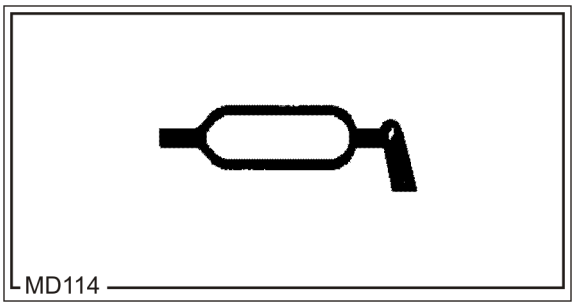


Fig. 132

12.4.1 Lubricants

Use only the lubricants specified in the table or another lithium-saponified multipurpose grease with EP additives.

Company	Lubricant designation
ARAL	Aralub HL2
FINA	Marson L2

Company	Lubricant designation
ESSO	Beacon 2
SHELL	Retinax A

12.4.2 Lubrication points – overview

Lubrication points (see Figure)	Number of lubrication nipples	Lubrication interval	Notes
Fig. 133/1	1	50 h	Lubricate the universal joint shaft, referring to the universal joint manufacturer's maintenance schedule. Grease the protective tubes and profile tubes. Greasing the protective tubes prevents them from freezing. Open the sliding profiles for lubrication.
Fig. 133/2	1	50 h	
Fig. 133/3	1	50 h	
Fig. 134/1	–	• every 500 operating hours • before an extended idle period	Clean and grease the spindle
Fig. 135/1 to 6	10	50 h	Lifting frame 2.1
Fig. 136/1 to 6	10	50 h	Lifting frame 3.1

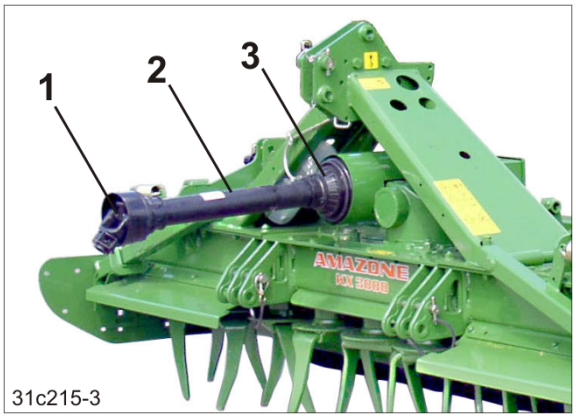


Fig. 133

Fig. 134

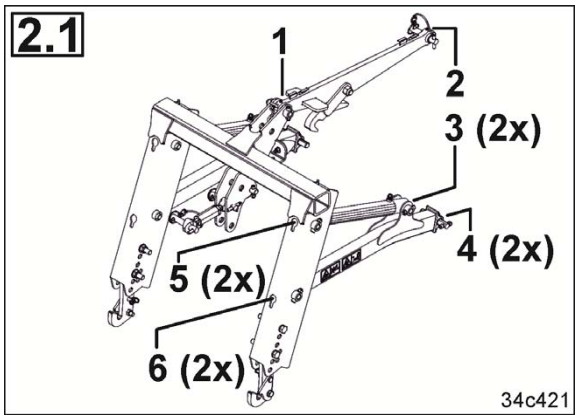


Fig. 135

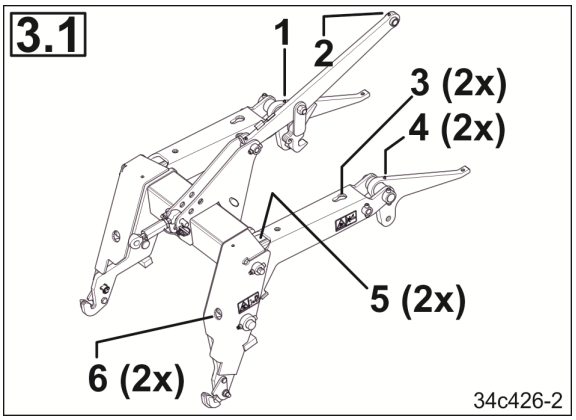


Fig. 136

12.5 Maintenance and care schedule – overview

Carry out maintenance work when the first interval is reached.

The time intervals, kilometre readings or maintenance intervals specified in any third party documentation supplied shall have priority over the maintenance schedule.

Initial operation	**Before initial commissioning**	Specialist workshop	Check the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.15
			Gearbox: Check the oil level and ventilation	Section 12.6 Section 12.7 Section 12.8
			Spur gear trough: Check the oil level and ventilation	Section 12.9
	After the first 10 operating hours	Specialist workshop	Check the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.15
		Specialist workshop	Check all screw connections for a secure fit.	Section 12.16
	After the first 50 operating hours	Specialist workshop	WHG/KE-Spec: Changing transmission fluid	Section 12.6
			WHG/KE-Sup gearbox: Changing transmission fluid	Section 12.6
			WHG/KX gearbox Changing transmission fluid	Section 12.7
			WHG/KG-Spec: Changing transmission fluid	Section 12.8
			WHG/KG-Sup gearbox: Changing transmission fluid	Section 12.8

before starting work		Checking the upper and lower link pins	Section 12.13
(daily)		Check: Length of the tool tines	
After completion of work		Cleaning the implement (as required)	Section 12.2
(daily)			
Each week	Specialist workshop	Check the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.15
(at least every 50 operating hours)		Gearbox: Checking the oil level	Section 12.7 Section 12.6 Section 12.8
		Spur gear trough: Check the oil level	Section 12.9
Every 6 months	Specialist workshop	Checking/cleaning/lubricating the ratchet clutch	Section 12.14
after the season			
Every 6 months	Specialist workshop	Check the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.15
before the season			

12.6 WHG/KE-Spec gearbox and WHG/KE-Sup gearbox

Ventilation

The gearbox is equipped with a vent pipe (Fig. 137/1).
Ventilation must be ensured to prevent the gearbox from developing leaks.

Check the oil level

1. Park the implement on a level surface.
2. Check the oil level with the dipstick.

At the correct fill level, the oil level reaches between the markings on the dipstick.

3. If necessary, top up the transmission fluid through the opening in the dipstick.

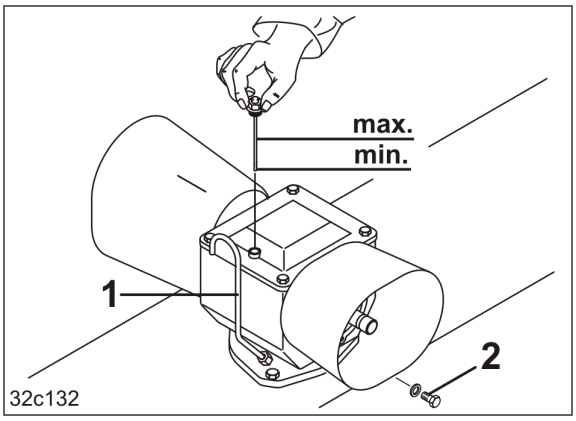


Fig. 137

Changing transmission fluid (specialist workshop)

1. Remove the universal joint shaft.
2. Place a suitable container below the oil drain opening.
3. Unscrew the oil drain screw (Fig. 137/2).
4. Collect the transmission fluid and dispose of it properly.
5. Screw in the oil drain screw.
6. Refill with new transmission fluid
   (for oil types and fill quantities, see section "Technical Data").
7. Screw in the dipstick.
8. Fit the universal joint shaft.

12.7 WHG/KX gearbox

Ventilation

The dipstick is equipped with a ventilation valve.
Ventilation must be ensured to prevent the gearbox from developing leaks.

Check the oil level

1. Park the implement on a level surface.
2. Check the oil level with the dipstick.

At the correct fill level, the oil level reaches between the markings on the dipstick.

3. If necessary, top up the transmission fluid through the opening in the dipstick.

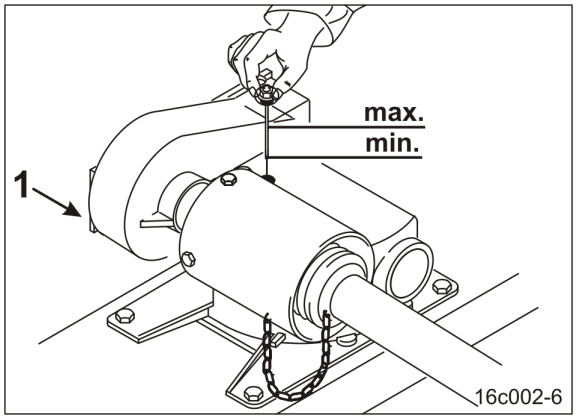


Fig. 138

Changing transmission fluid (specialist workshop)

1. Place a suitable container below the oil drain opening.
2. Unscrew the oil drain screw (Fig. 138/1).
3. Collect the transmission fluid and dispose of it properly.
4. Screw in the oil drain screw.
5. Refill with new transmission fluid
   (for oil types and fill quantities, see section "Technical Data").
6. Screw in the dipstick.

12.8 WHG/KG-Spec gearbox and WHG/KG-Sup gearbox

Ventilation

The dipstick is equipped with a ventilation valve.
Ventilation must be ensured to prevent the gearbox from developing leaks.

Check the oil level

1. Park the implement on a level surface.
2. Check the oil level with the dipstick.

At the correct fill level, the oil level reaches between the markings on the dipstick.

3. If necessary, top up the transmission fluid through the opening in the dipstick.

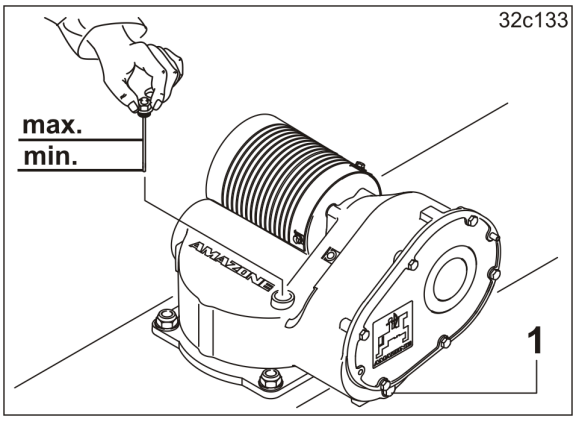


Fig. 139

Changing transmission fluid (specialist workshop)

1. Place a suitable container below the oil drain opening.
2. Unscrew the oil drain screw (Fig. 139/1).
3. Collect the transmission fluid and dispose of it properly.
4. Screw in the oil drain screw.
5. Refill with new transmission fluid
   (for oil types and fill quantities, see section "Technical Data").
6. Screw in the dipstick.

12.9 Spur gear trough

No dirt must enter the spur gear trough.

There is no need to change the oil.

Ventilation

The spur gear trough is equipped with a ventilation pipe (Fig. 140/1).
Ventilation must be ensured to prevent the spur gear trough from developing leaks.

Checking the oil level (only KG and KX rotary cultivatory)

1. Park the implement on a level surface.
2. Open the cover with the ventilation pipe (Fig. 140/1).

The spur gears in the spur gear trough must be halfway covered with transmission fluid.

3. If necessary, top up the transmission fluid.

   For oil type and fill quantity,
   see the section "Technical Data".

Fig. 140

Checking the oil level (only KE rotary harrow)

1. Park the implement on a level surface.
2. Screw off the protective cap (Fig. 141/1).
3. Open the plug seals (Fig. 141/2).

The spur gears in the spur gear trough must be halfway covered with transmission fluid.

4. If necessary, top up the transmission fluid.

   For oil type and fill quantity,
   see the section "Technical Data".

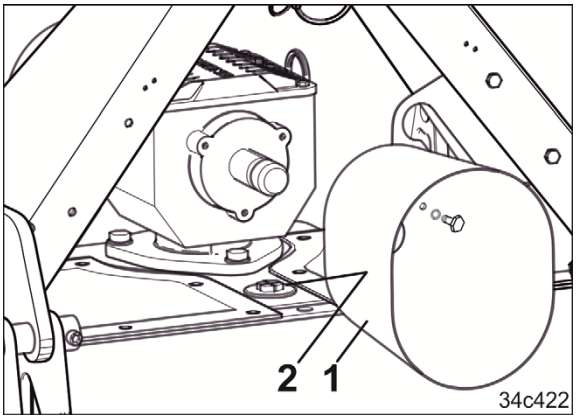


Fig. 141

12.10 Changing the oil filter in the cooling kit (specialist workshop)

1. Remove the oil filter cartridge (Fig. 142/1).
   1.1 Undo the screws (Fig. 142/2).
   1.2 Carefully remove the oil filter cartridge. Collect the escaping fluid.
2. Replace the oil filter in the oil filter cartridge.

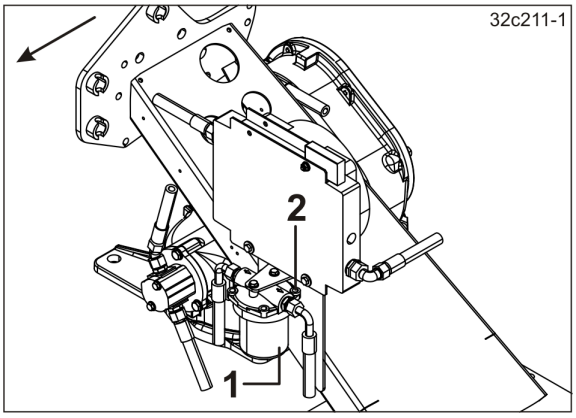


Fig. 142

12.11 Checking/adjusting the wedge ring roller scrapers

The distance between the scraper (Fig. 143/1) and the roller sleeve is 10 mm.
Adjust worn scrapers to the correct dimension or replace.

Fig. 143

12.12 Checking/adjusting the tooth packer roller scrapers

To prevent damage to the roller sleeve, the carbide-coated scrapers must not touch the roller sleeve.

1. Uncouple the seed drill.
2. Using the tractor hydraulics, lift the soil tillage implement just enough for the roller to clear the ground.
3. Support the soil tillage implement against unintentional lowering.
4. Unscrew the bolt (Fig. 144/2).
5. Screw on the scraper (Fig. 144/1) with a distance of 0.5 mm to the roller tube.
6. Rotate the roller to check whether the distance of 0.5 mm is maintained at all points. The carbide-coated scrapers must not touch the roller shell.

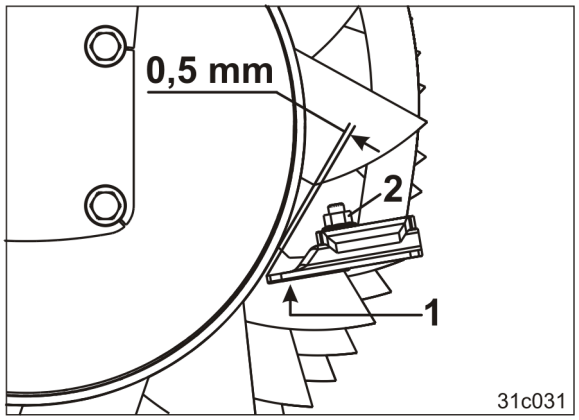


Fig. 144

12.13 Checking the upper and lower link pins

Check the upper and lower link pins for visible defects whenever the implement is coupled, and replace if worn.

12.14 Checking/cleaning/lubricating the ratchet clutch (specialist workshop)

When used under normal conditions, the ratchet clutch is maintenance-free.

If the clutch engages frequently, open the ratchet clutch, clean it and lubricate it with special grease (for more information, refer to the maintenance instructions of the universal joint shaft manufacturer).

Use special grease only:

- Agraset 116 or
- Agraset 117.

12.15 Hydraulic system

WARNING

Risk of infection through the high pressure hydraulic fluid of the hydraulic system entering the body.

- Only a specialist workshop may carry out work on the hydraulic system.
- Depressurise the hydraulic system before carrying out work on the hydraulic system.
- When searching for leak points, always use suitable aids.
- Never attempt to plug leaks in hydraulic hose lines using your hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Risk of infection

- When connecting the hydraulic hose lines to the hydraulic system of the tractor, ensure that the hydraulic system is depressurized on both the tractor side and the trailer.
- Ensure that the hydraulic hose lines are connected correctly.
- Regularly check all the hydraulic hose lines and couplings for damage and impurities.
- Have the hydraulic hose lines checked for proper functioning by a specialist at least once a year.
- Replace the hydraulic hose lines if they are damaged or worn. Use only genuine AMAZONE hydraulic hose lines!
- The hydraulic hose lines should not be used for longer than six years, including any storage time of maximum two years. Even with proper storage and approved use, hoses and hose connections are subject to natural aging, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose lines made of thermoplastics, other guide values may be decisive.
- Dispose of old oil in compliance with regulations. If you have problems with disposal, contact your oil supplier.
- Keep hydraulic fluid out of the reach of children!
- Ensure that no hydraulic fluid enters the soil or waterways.

12.15.1 Identification of hydraulic hose lines

Valve chest identification provides the following information:

Fig. 145/...

(1) Manufacturer's marking on the hydraulic hose line (A1HF)

(2) Date of manufacture of the hydraulic hose line
(15/02 = Year / Month = February 2015)

(3) Maximum permitted operating pressure (210 bar).

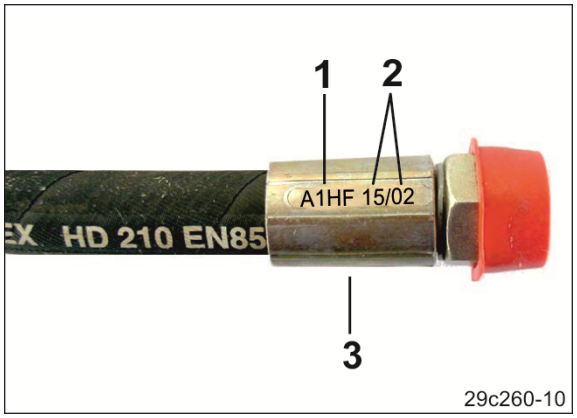


Fig. 145

12.15.2 Maintenance intervals

After the first 10 operating hours, and then every 50 operating hours

1. Check all the components of the hydraulic system for tightness.
2. If necessary, tighten screw unions.

Before each start-up:

1. Check the hydraulic hose lines for visible defects.
2. Repair any areas of chafing on the hydraulic hose lines and pipes.
3. Replace any worn or damaged hydraulic hose lines immediately.

12.15.3 Inspection criteria for hydraulic hose lines

For your own safety and in order to reduce pollution, ensure the following inspection criteria.

Replace hydraulic hose lines when finding any of the following inspection criteria during the inspection:

- Damage to the outer layer up to the ply (e.g. scouring points, cuts, cracks).
- Brittleness of the outer layer (crack formation of the hose material).
- Deformations which do not match the natural shape of the hose. Both in a depressurised and pressurised state or when bent (e.g. layer separation, bubble formation, pinching, bends).
- Leak points.
- Damage or deformation of the hose assembly (sealing function restricted); minor surface damage is not a reason for replacement.
- Movement of the hose out of the assembly.

- Corrosion of assembly, reducing the function and tightness.
- Installation requirements not complied with.
- Life span of 6 years has been exceeded.

  The date of manufacture of the hydraulic hose line on the assembly plus six years is decisive. If the date of manufacture on the assembly is "2015", then the hose should not be used after February 2021. For more information, see "Identification of hydraulic hose lines".

12.15.4 Installing and removing hydraulic hose lines

When installing or removing hydraulic hose lines, be sure to observe the following instructions:

- Use only genuine AMAZONE hydraulic hose lines!
- Ensure cleanliness.
- As a matter of principle, you must install the hydraulic hose lines such that, in all implement situations,
  - There is no tension, apart from the hose's own weight.
  - There is no possibility of compression for short lengths.
  - Outer mechanical influences on the hydraulic hose lines are avoided.

    Use appropriate arrangements and fixing to prevent any scouring of the hoses on components or on each other. If necessary, secure hydraulic hose lines using protective covers. Cover sharp-edged components.
  - The approved bending radii may not be exceeded.
- When connecting a hydraulic hose line to moving parts, the hose length must be appropriate so that the smallest approved bending radius is not undershot over the whole area of movement and/or the hydraulic hose line is not overtensioned.
- Attach the hydraulic hose lines onto the specified attachment points. There, avoid hose clips, which impair the natural movement and length changes of the hose.
- It is forbidden to paint hydraulic hose lines!

12.16 Bolt tightening torques

Thread	Width across flats [mm]	Tightening torques [Nm] as a function of the bolt/nut grade		
		8.8	10.9	12.9
M 8	13	25	35	41
M 8x1		27	38	41
M 10	16 (17)	49	69	83
M 10x1		52	73	88
M 12	18 (19)	86	120	145
M 12x1.5		90	125	150
M 14	22	135	190	230
M 14x1.5		150	210	250
M 16	24	210	300	355
M 16x1.5		225	315	380
M 18	27	290	405	485
M 18x1.5		325	460	550
M 20	30	410	580	690
M 20x1.5		460	640	770
M 22	32	550	780	930
M 22x1.5		610	860	1050
M 24	36	710	1000	1200
M 24x2		780	1100	1300
M 27	41	1050	1500	1800
M 27x2		1150	1600	1950
M 30	46	1450	2000	2400
M 30x2		1600	2250	2700

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