

# Operating Manual

## **AMAZONE**

Soil tillage implement

Rotary cultivator

**KG 4000-2**

**KG 5000-2**

**KG 6000-2**



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MG3296  
BAH0031-1 07.14



Please read and follow this operating manual before putting the machine into operation. Keep it in a safe place for future use.



# *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.*

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*Leipzig-Plagwitz 1872. Rud. Sack.*

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**Identification data**

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Enter the machine identification data here. You will find the identification data on the rating plate.

Machine identification number:  
(ten-digit)

Type:

KG

Permissible system pressure in  
bar:

Maximum 200 bar

Year of manufacture:

Basic weight (kg):

Permissible total weight (kg):

Maximum load (kg):

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**Manufacturer's address**

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AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

Postfach 51

D-49202 Hasbergen

Phone: + 49 5405 501-0

Fax: +49 5405 501-234

E-mail: amazone@amazone.de

---

**Spare part orders**

---

AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

Postfach 51

D-49202 Hasbergen

Phone: +49 5405 501-290

Fax: +49 5405 501-106

E-mail: et@amazone.de

Online spare parts catalogue: [www.amazone.de](http://www.amazone.de)

When ordering spare parts, always specify the (ten-digit) machine identification number.

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**Formalities of the operating manual**

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## Foreword

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## Foreword

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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 machine, check to see if it was damaged during transport or if parts are missing. Using the delivery note, check that the machine was delivered in full including the ordered special optional equipment. Replacement will be made only if a claim is filed immediately!

Please read and follow this operating manual—in particular, the safety instructions—before putting the machine into operation. Only after careful reading will you be able to benefit from the full scope of your newly purchased machine.

Please ensure that all the machine operators have read this operating manual before they put the machine into operation.

Should you have problems or queries, please consult this operating manual or give us a call.

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

## User evaluation

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Dear Reader

We update our operating manuals regularly. Your suggestions for improvement help us to create ever more user-friendly manuals. Send us your suggestions by fax.

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# **1 User information**

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The "User information" section supplies information on using the operating manual.

## **1.1 Purpose of the document**

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This operating manual

- Describes the operation and maintenance of the machine.
- Provides important information on safe and efficient handling of the machine.
- Is a component part of the machine and should always be kept with the machine or the traction vehicle.
- Keep it in a safe place for future use.

## **1.2 Locations in the operating manual**

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

## **1.3 Diagrams used**

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### **Instructions for action and reactions**

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Tasks to be carried out by the operator are presented as numbered instructions. Always keep to the order of the instructions. The reaction to instructions is given by an arrow.

Example:

1. Instruction for action 1
- Reaction of the machine to instruction for action 1
2. Instruction for action 2

### **Lists**

---

Lists without a mandatory sequence are presented as a list with bullet points.

Example:

- Point 1
- Point 2

### **Item numbers in diagrams**

---

Numbers in round brackets refer to the item numbers in the diagrams. The first digit refers to the diagram; the second digit, to the item number in the illustration.

Example (Fig. 3/6)

- Figure 3
- Item 6

## 2 General safety instructions

---

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

### 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 machine operation.

#### Obligations of the operator

---

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

- Are aware of the basic workplace safety information and accident prevention regulations.
- Have been trained in working with/on the machine.
- Have read and understood this operating manual.

The operator is obliged

- To keep all the warning pictograms on the machine in a legible state.
- To replace damaged warning pictograms.

If you still have queries, please contact the manufacturer.

#### Obligations of the operator

---

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

- To comply with the basic workplace safety instructions and accident prevention regulations.
- To read and understand the section "General safety information" of this operating manual.
- To read the section "Warning symbols and other labels on the machine", Seite 17 of this operating manual and to follow the safety instructions of the warning symbols when operating the machine.
- To get to know the machine.
- To read the sections of this operating manual, important for carrying out your work.

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

## General safety instructions

---

### Risks in handling the machine

---

The machine has been constructed to the state-of-the art and the recognised rules of safety. However, there may be risks and restrictions which occur when operating the machine

- For the health and safety of the operator or third persons,
- For the machine,
- For other goods.

Only use the machine

- For the purpose for which it was intended.
- In a perfect state of repair.

Eliminate any faults that could impair safety immediately.

### Guarantee and liability

---

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

- Improper use of the machine.
- Improper installation, commissioning, operation and maintenance of the machine.
- Operation of the machine 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.
- Independently-executed constructive changes to the machine.
- Insufficient monitoring of machine parts that are subject to wear.
- Improperly executed repairs.
- Catastrophic events as a result of the impact of foreign objects or 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 gravity of the risk and has the following significance:



### **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 incur 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 machine handling.

Non-compliance with these instructions can cause faults on the machine or in the environment.



### **NOTE**

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your machine to the optimum.

## 2.3 Organisational measures

---

The operator must provide the necessary personal protective equipment, such as:

- Safety glasses
- Protective shoes
- Protective suit
- Skin protection, etc.



The operating manual

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

Check all the available safety equipment regularly.

## 2.4 Safety and protection equipment

---

Before each commissioning of the machine, all the safety and protection equipment must be properly attached and fully functional. Check all the 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, then 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 machine. The operator must clearly specify the responsibilities of the people charged with operation, maintenance and repair work.

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

Activity \ People	Person specially trained for the activity <sup>1)</sup>	Trained person <sup>2)</sup>	Person with specialist training (specialist workshop) <sup>3)</sup>
Loading/Transport	X	X	X
Commissioning	—	X	—
Set-up, tool installation	—	—	X
Operation	—	X	—
Maintenance	—	—	X
Troubleshooting and fault elimination	—	X	X
Disposal	X	—	—

Legend: X..permitted —..not permitted

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

<sup>2)</sup> 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.

<sup>3)</sup> 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 through long term activity in the appropriate field of work.



Only a specialist workshop may carry out maintenance and repair work on the machine, if such work is specifically designated "Workshop 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 machine in a way which is both appropriate and safe.

## **2.7 Safety measures in normal operation**

---

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

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

## **2.8 Dangers from residual energy**

---

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

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 a timely manner.

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

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

Check all the screw connections for a firm seat. On completing maintenance work, check the function of safety and protection equipment.

## 2.10 Constructive changes

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

Any expansion or modification work shall require the written approval of **AMAZONEN-WERKE**. Only use the modification and accessory parts released by **AMAZONEN-WERKE** so that the operating permit, 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 being crushed, cut, caught, drawn in or struck if supporting parts break.**

It is forbidden to:

- Drill holes in the frame or on the chassis.
- Increasing the size of existing holes on the frame or the chassis.
- Welding support parts.



### 2.10.1 Spare and wear parts and aids

---

Immediately replace any machine 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 accepts no liability for damage arising from the use of unapproved spare parts, wear parts or auxiliary materials.

### 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 Operator workstation

---

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

## 2.13 Warning symbols and other labels on the machine



Always keep all the warning pictograms of the machine clean and in a legible state. Replace illegible warning pictograms. You can obtain the warning pictograms from your dealer using the order number (e.g. MD 075).

### Warning pictograms - structure

Warning pictograms indicate dangers on the machine and warn against residual dangers. At these points, there are permanent or unexpected dangers.

A warning pictogram consists of two fields:



#### Field 1

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

#### Field 2

is a pictogram showing how to avoid the danger.

### Warning pictograms - explanation

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

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

Order number and explanation

Warning pictograms

**MD075**

**Danger of cuts to or shearing off of fingers or hands by rotating machine parts!**

This danger causes extremely serious injuries with the loss of body parts such as fingers or hands.

Never reach into the danger area when the tractor engine is running with PTO shaft / hydraulic system connected.

Do not touch machine parts until they have come to a complete stop.



**MD076**

**Danger of your hand or arm being drawn in or caught by a power driven, unprotected chain or belt drive!**

This danger causes extremely serious injuries with the loss of parts of the hand or arm.

Never open or remove the guard devices on chains or belt drives if either of the following is true:

- The tractor engine is running with the PTO shaft connected / hydraulic drive engaged
- The ground wheel drive is moving

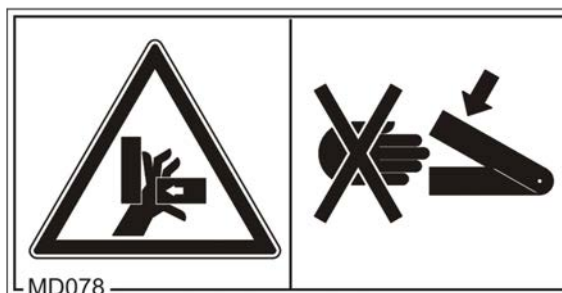


**MD078**

**Risk of contusions for fingers or hands through accessible moving machine parts!**

This danger causes extremely serious injuries with the loss of body parts such as fingers or hands.

Never reach into the danger area when the tractor engine is running with PTO shaft / hydraulic system connected.

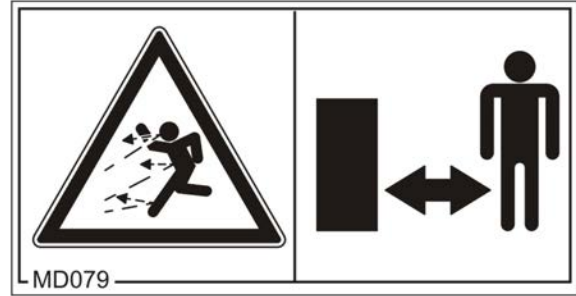


### MD079

**Danger from materials or foreign objects that fly off of the machine or are ejected by the machine at high speeds!**

This danger causes extremely serious injuries anywhere on the body.

Ensure that bystanders maintain a sufficient safety distance from the danger area of the machine as long as the tractor engine is running.



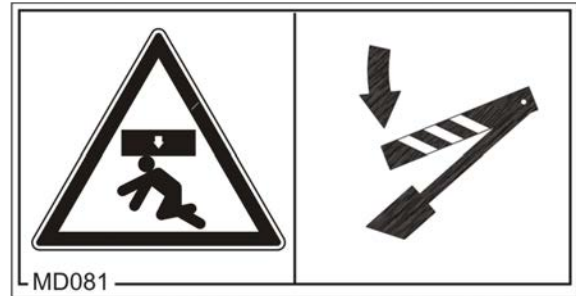
### MD 081

**Danger of crushing for the entire body by machine parts lifted via lifting cylinder and lowered accidentally!**

This danger causes serious injuries anywhere on the body or death.

Secure the lifting cylinder from unintentional lowering before entering the danger area below raised machine parts.

To do this, use the mechanical lifting cylinder support device or the hydraulic locking device.



### MD082

**Danger of falling from treads and platforms when riding on the machine!**

This danger causes serious injuries anywhere on the body or death.

It is forbidden to ride on the machine and/or climb the running machine. This ban also applies to machines with treads or platforms.

Ensure that no one rides with the machine.



## General safety instructions

### MD084

#### **Risk of contusions over the whole body from machine parts moving down from above!**

This danger causes serious injuries anywhere on the body or death.

It is forbidden to stand in the swivel area of moving machine parts.

Instruct people to leave the swivel area of moving machine parts before the machine parts move down.



### MD086

#### **Danger of crushing for the entire body under lifted machine parts that are lowered accidentally!**

This danger causes serious injuries anywhere on the body or death.

Before spending time in the danger area underneath raised machine parts, secure the raised parts to prevent them from being accidentally lowered.

To do this, use the mechanical support or the hydraulic locking device.

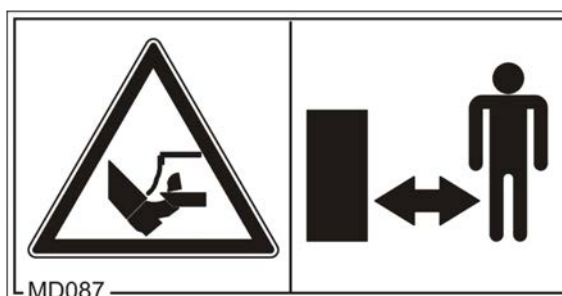


### MD087

#### **Danger of cuts to or shearing off of toes or feet by driven tools!**

This danger causes extremely serious injuries with the loss of body parts such as toes or feet.

Keep a sufficient safety distance from the danger point when the tractor engine is running with PTO shaft / hydraulic system connected.



### MD089

#### Danger!

**Danger of crushing for the entire body in the danger area of suspended loads/machine parts**

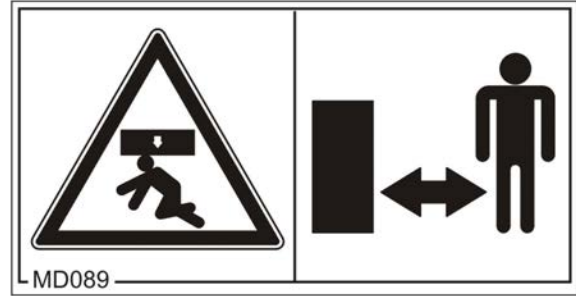
This danger causes serious injuries anywhere on the body or death.

The presence of persons under suspended loads/machine parts is prohibited.

Maintain a sufficient safety clearance between you and any suspended loads/machine parts.

Ensure that all personnel maintain a sufficient safety clearance from suspended loads/machine parts.

Direct persons out of the danger area of suspended loads/machine parts.



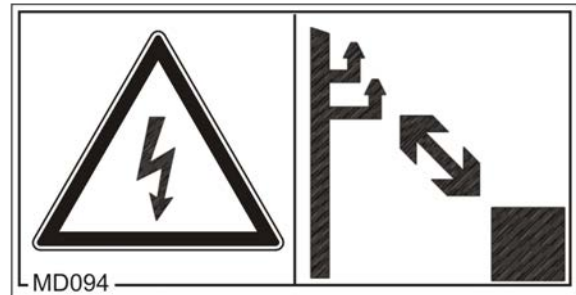
### MD094

#### Electrical hazard!

Causes serious injuries anywhere on the body or death.

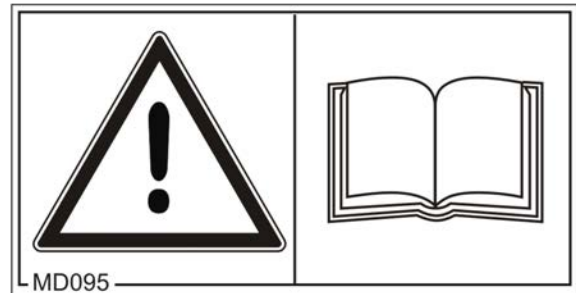
Maintain a sufficient distance from electrical overhead cables when swinging any parts of the machine in and out.

The safety distance from a 220 to 380 volt transmission line must not fall below 5.0 m.



### MD095

Read and understand the operating manual safety information before starting up the machine!



### MD096

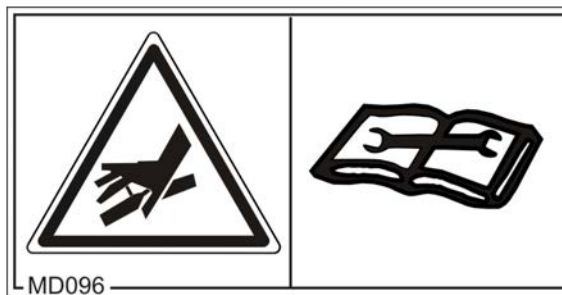
#### **Danger of infection to the whole body from liquids escaping at a high pressure (hydraulic fluid)!**

This danger will cause serious injuries over the whole body, if hydraulic fluid escaping at high pressure passes through the skin and into the body.

Never attempt to plug leaks in hydraulic hose lines using your hand or fingers.

Read and understand the information in the operating manual before carrying out maintenance and repair work.

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



### MD097

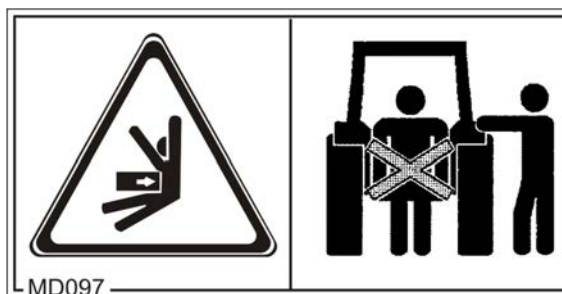
#### **Danger of crushing your torso in the stroke range of the three-point suspension due to the narrowing spaces when the three-point hydraulic system is actuated!**

This danger causes extremely serious injuries and even death.

Personnel are prohibited from entering the stroke area of the three-point suspension when the three-point hydraulic system is actuated.

Only actuate the operator controls for the tractor's three-point hydraulic system:

- From the workstation provided.
- If you are outside of the danger area between the tractor and the machine.



### MD102

#### **Danger from unintentional machine starting and rolling during intervention in the machine, e.g. installation, adjusting, troubleshooting, cleaning, maintaining and repairing.**

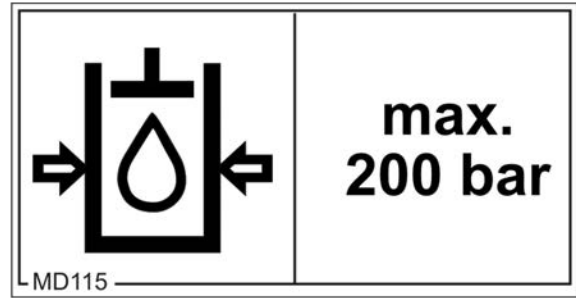
This danger causes serious injuries anywhere on the body or death.

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



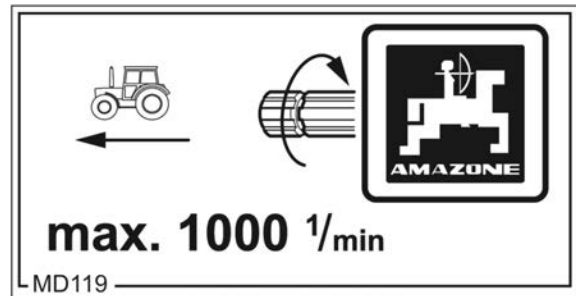
### MD115

The maximum operating pressure of the hydraulic system is 200 bar.



### MD119

Nominal speed (maximum 1000 rpm) and direction of rotation of the machine-side drive shaft.



### MD163

**Danger of persons falling from the wedge ring tyre roller if individual roller segments are inadvertently turned!**

This could result in serious injury to any part of the body.

Never stand or walk on the roller segments of the wedge ring tyre roller.



## 2.13.1 Positions of warning pictograms and other labels

### Warning pictograms

The following diagrams show the arrangement of the warning pictograms on the machine.

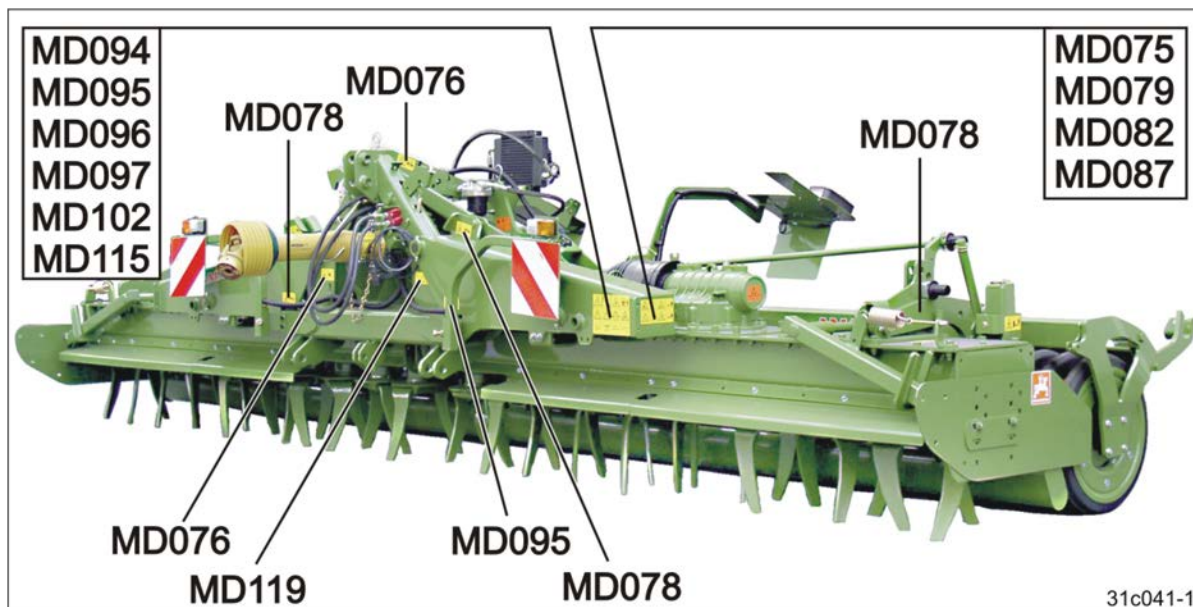


Fig. 1

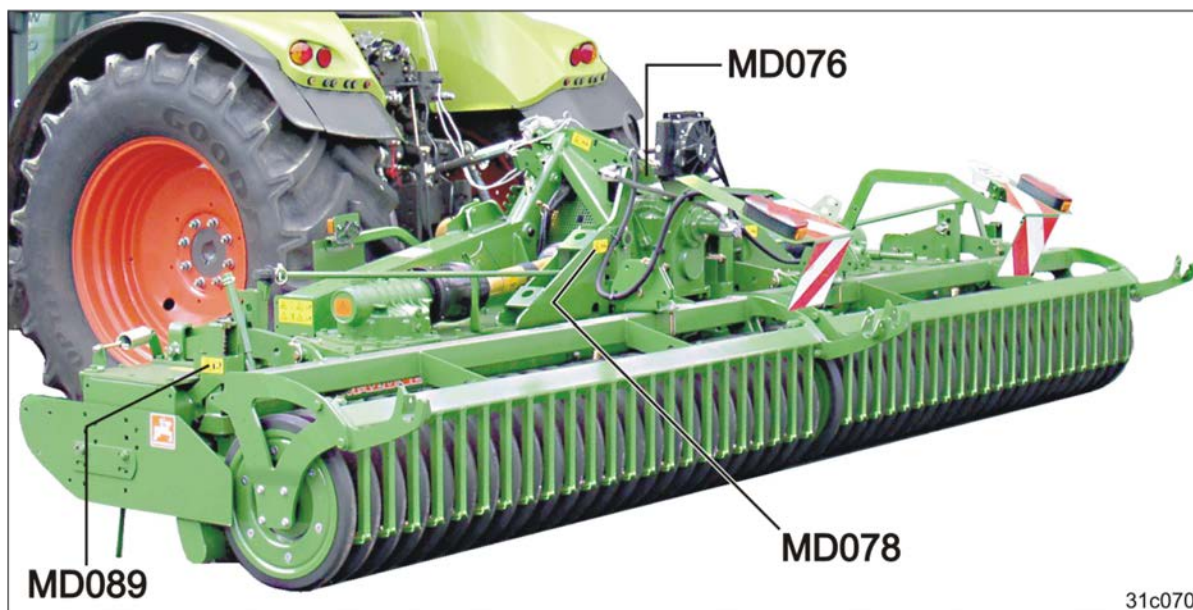


Fig. 2



Fig. 3

## 2.14 Dangers if the safety information is not observed

Nonobservance of the safety information

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

Seen individually, non-compliance with the safety information could pose the following risks:

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

## 2.15 Safety-conscious working

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

Comply with the accident prevention instructions on the warning pictograms.

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

## 2.16 Safety information for the operator



### WARNING

**Risk of being crushed, cut, caught, drawn in or struck due to insufficient roadworthiness and operational safety!**

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

### 2.16.1 General safety and accident prevention information

- Beside these instructions, comply with the general valid national safety and accident prevention regulations.
- The warning pictograms and labels attached to the machine provide important information on safe machine operation. Compliance with this information guarantees your safety!
- Before moving off and starting up the machine, check the immediate area of the machine (children)! Ensure that you can see clearly!
- It is forbidden to ride on the machine 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 machine.

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 machine.

### Coupling and uncoupling the machine

- Only connect and transport the machine with tractors suitable for the task.
- When coupling machines to the tractor's three-point hydraulic system, the attachment categories of the tractor and the machine must always be the same!
- Connect the machine to the prescribed equipment in accordance with the specifications.
- When coupling machines 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 machine against unintentional rolling, before coupling or uncoupling the machine.
- It is forbidden for people to stand between the machine to be coupled and the tractor, whilst the tractor is moving towards the machine!
 

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 connecting the machine to or disconnecting the machine from the tractor's three-point hydraulic system, secure the operating lever of the tractor hydraulic system so that unintentional raising or

lowering is prevented.

- When coupling and uncoupling machines, move the support equipment (if available) to the appropriate position (stability).
- When actuating the support equipment, there is a danger of injury from nip and shear points!
- Be particularly careful when coupling the machine to the tractor or uncoupling it from the tractor! There are nip and shear points in the area of the coupling point between the tractor and the machine.
- It is forbidden to stand between the tractor and the machine 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 machines are stable!



### Use of the machine

---

- Before starting work, ensure that you understand all the equipment and actuation elements of the machine and their function. There is no time for this when the machine is already in operation!
- Do not wear loose-fitting clothing! Loose clothing increases the risk of being caught by drive shafts!
- Only start-up the machine, when all the safety equipment has been attached and is in the safety position!
- Comply with the maximum load of the coupled machine and the approved axle and drawbar loads of the tractor. If necessary, drive only with a partially-filled hopper.
- It is forbidden to stand in the working area of the machine.
- It is forbidden to stand in the turning and swivel range of the machine.
- There are nip and shear points at externally actuated (e.g. hydraulic) machine points.
- Only actuate externally-actuated machine parts when you are sure that there is no-one within a sufficient distance from the machine!
- Secure the tractor against unintentional start-up and rolling before you leave the tractor.  
For this:
  - Lower the machine onto the ground
  - Apply the parking brake
  - Switch off the tractor engine
  - Remove the ignition key

### Machine transportation

---

- When using public highways, 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 released completely
  - the proper functioning of the braking system
- Ensure that the tractor has sufficient steering and braking power. Any machines and front/rear weights coupled 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 payload of the coupled machine and

the approved axle and drawbar loads of the tractor.

- The tractor must guarantee the prescribed brake delay for the loaded vehicle combination (tractor plus coupled machine).
- Check the brake power before moving off.
- When turning corners with the machine coupled, take the wide sweep and centrifugal mass of the machine into account.
- Before moving off, ensure sufficient side locking of the tractor lower links, when the machine is fixed to the three-point hydraulic system or lower links of the tractor.
- Before moving off, move all the swivel machine parts to the transport position.
- Before moving off, secure all the swivel machine parts in the transport position against risky position changes. Use the transport locks intended for this.
- Before transporting, secure the operating lever of the tractor's three-point hydraulic system against the unintentional raising or lowering of the connected/hitched machine.
- Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the machine.
- Before transportation, carry out a visual check that the upper and lower link pins 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 tools are attached, the attachment categories of the tractor and the machine must always coincide or be matched to one another.
- Take note of the manufacturer's instructions
- Before attaching machines 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 machine may be transported and towed only by the tractors intended for this purpose.
- There is a risk of injury when machines are coupled to and uncoupled from the tractor.
- Do not step between tractor and machine 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 devices are attached 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.
- Observe the maximum payload of the attached devices and the permissible axle loads of the tractor.
- Always ensure that the tractor lower links are adequately locked against sideways movement before transporting the machine.
- The operating lever for the tractor lower links must be secured against lowering when the machine is being towed on the road.
- Shift all equipment into the transport position before travelling on the road.
- Any devices and ballast weights attached to a tractor influence the driving behaviour and the steering and braking power of the tractor.
- The front tractor axle must always be loaded with at least 20% of the tractor's empty weight to ensure sufficient steering capability. If necessary, use front weights.
- 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 depressurised on both the machine 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 that:
  - are continuous or
  - are automatically locked or
  - necessarily require a float or pressure position to operate correctly
- Before working on the hydraulic system
  - Lower the machine
  - Depressurise the hydraulic system
  - Switch off the tractor engine
  - Apply the parking brake
  - Take out the ignition key
- Have the hydraulic hose lines checked at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose line if it is damaged or worn. Only use original **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 ageing, 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 from thermoplastics, other guide values may be authoritative.
- 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. Danger 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 with too high a rating, the electrical system will be destroyed – danger 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. Contact with earth may cause an explosion
- Risk of explosion: avoid the production of sparks or the presence of naked flames in the vicinity of the battery.
- The machine can be equipped with electronic components, the function of which may be influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed.
  - In the case of retrofitting electrical units and/or components on the machine, with a connection to the on-board power supply, the operator 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 89/336/EEC in the appropriate version and carry the CE mark.

#### 2.16.5 Universal joint shaft operation

---

- Use only the PTO shafts prescribed by the **AMAZONEN-WERKE** factories, equipped with the proper safety devices.
- Also read and follow the operating manual from the PTO shaft manufacturer.
- The protective tube and PTO shaft guard must be undamaged, and the shield of the tractor and machine universal joint shaft must be attached and be in proper working condition.
- Work is prohibited while the safety devices are damaged.
- You may install or remove the PTO shaft only after you have done all of the following:
  - Switched off the universal joint shaft
  - Switched off the tractor engine
  - Applied the parking brake
  - Removed the ignition key
- Always ensure that the PTO shaft is installed and secured correctly.
- When using wide-angle PTO shafts, always install the wide angle joint at the pivot point between the tractor and machine.
- Secure the PTO shaft guard by attaching the chain(s) to prevent movement.
- Observe the prescribed pipe overlaps in transport and working positions. (Read and follow the operating manual from the PTO

shaft manufacturer.)

- When turning corners, observe the permitted bending and displacement of the PTO shaft.
- Before switching on the universal joint shaft, check that the selected universal joint shaft speed of the tractor matches the permitted drive rev. speed of the machine.
- Instruct people to leave the danger area of the machine before you switch on the universal joint shaft.
- While work is being carried out with the universal joint shaft, there must be no one in the area of the universal drive or PTO shaft while it is turning.
- Never switch on the universal joint shaft while the tractor engine is shut off.
- Always switch off the universal joint shaft whenever excessive bending occurs or it is not needed.
- **WARNING!** After the universal joint shaft is switched off, there is a danger of injury from the continued rotation of freewheeling machine parts.  
Do not approach the machine too closely during this time. You may work on the machine only after all machine parts have come to a complete stop.
- Secure the tractor and machine against unintentional starting and unintentional rolling away before you perform any cleaning, servicing or maintenance work on universal joint shaft-driven machines or PTO shafts.
- After uncoupling the PTO shaft, place it on the holder provided.
- After removing the PTO shaft, attach the protective sleeve to the universal joint shaft stub.
- When using the travel-dependent universal joint shaft, note that the universal joint 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 repairs

---

- Only carry out cleaning, maintenance and repair work on the machine when:
  - The drive is switched off.
  - The tractor engine is at a standstill.
  - The ignition key has been removed.
  - The machine's connector has been disconnected from the on-board computer!
- Regularly check the nuts and bolts for a firm seat and retighten them as necessary.
- If the machine or parts of the machine are raised, secure them against unintentional lowering before carrying out cleaning, maintenance or repair work.
- 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 machines.
- 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

#### Crane loading

The pictogram (Fig. 4) marks the place at which the chain for lifting the machine is to be fastened.

**DANGER**

Fasten the chains for loading the machine with a crane at the designated places only.

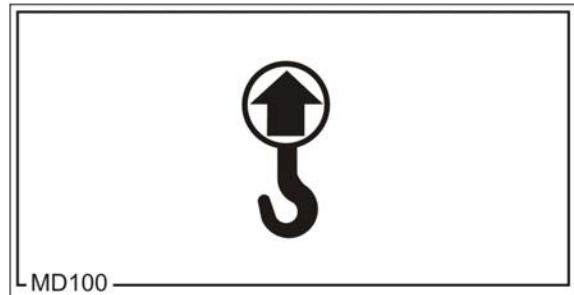


Fig. 4

**DANGER**

Ensure that the chain has the required tensile strength.  
Do not stand under suspended loads.

**CAUTION**

Always load the rotary cultivator with it in an extended position.  
Risk of accident from tilting due to the high centre of gravity.

#### Loading the combination rotary cultivator/roller:

1. Fold out the machine (see section "Folding the machine wings in / out", Seite 96).
2. For loading on a transport vehicle, hook the machine onto a crane at the designated location only (see Fig. 5).
3. Tie the machine down to the transport vehicle as prescribed.



Fig. 5

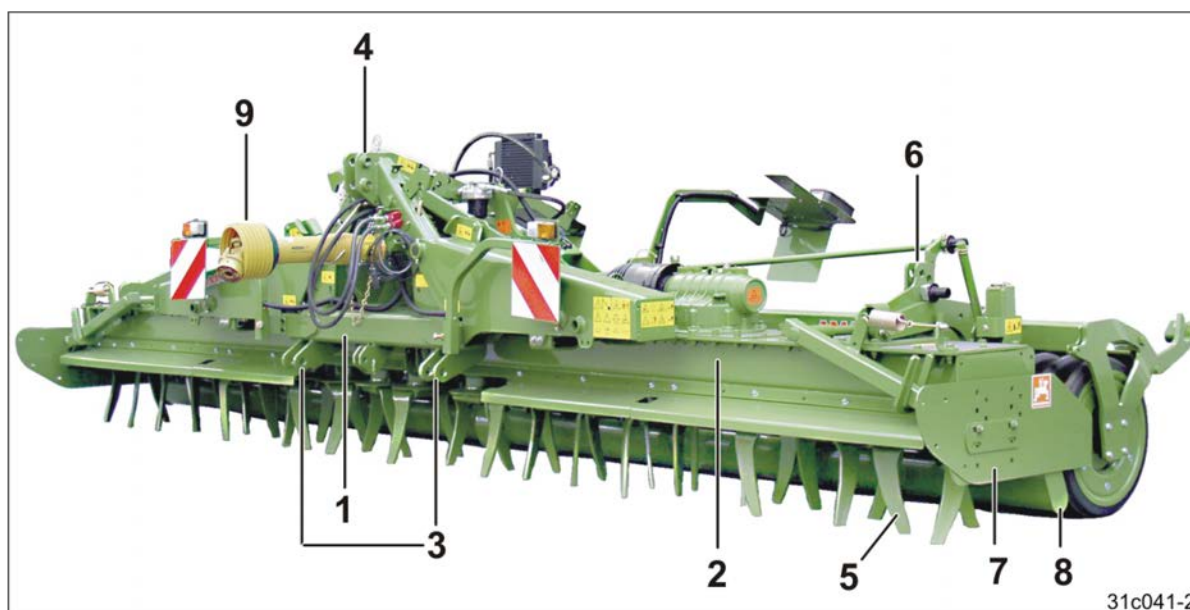
## 4 Product description

This section:

- Provides a comprehensive overview of the machine structure.
- Provides the names of the individual subassemblies and controls.

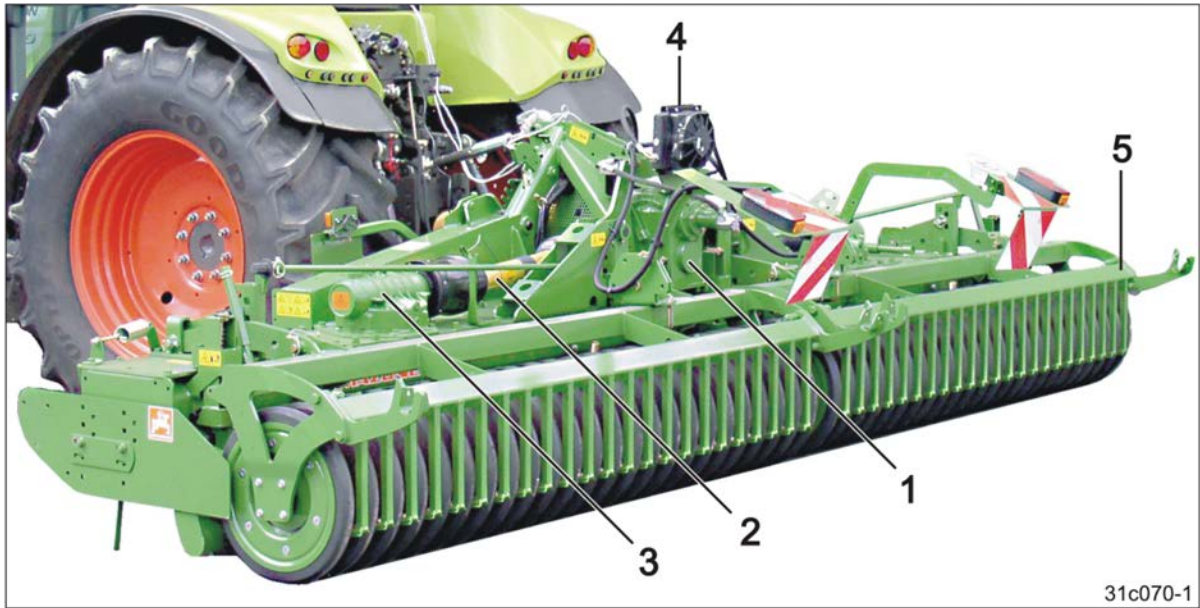
Read this section when actually at the machine. This helps you to understand the machine better.

### 4.1 Overview – subassemblies



**Fig. 6**

- |                                |   |
|--------------------------------|---|
| (1) Machine frame              | (6) Segment for adjusting the working depth |
| (2) Machine wing               | (7) Side panel                              |
| (3) Lower link coupling points | (8) Levelling bar                           |
| (4) Top link coupling point    | (9) PTO shaft                               |
| (5) Soil tillage tines         |   |



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- |                                    |   |
|------------------------------------|---|
| (1) Three-gear transmission        | (4) Cooling kit for transmission (optional) |
| (2) PTO shaft with overload clutch | (5) Wedge ring roller                       |
| (3) Angular gearbox                |   |

## 4.2 Safety and protection equipment

Fig. 7/...

- (1) Guard screen of PTO shaft connection
- (2) PTO shaft guard



Fig. 7

Fig. 8/...

- (1) Tool guard plate
- (2) Levelling bar
- (3) Side panels
- (4) Trailing roller

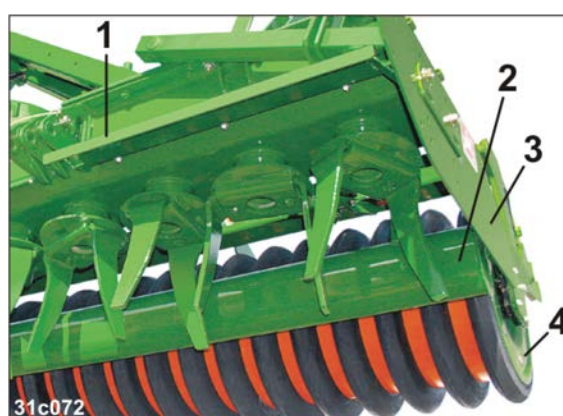


Fig. 8

Fig. 8/...

- (1) Mechanical transport lock



Fig. 9

### 4.3 Overview – supply lines between the tractor and the machine

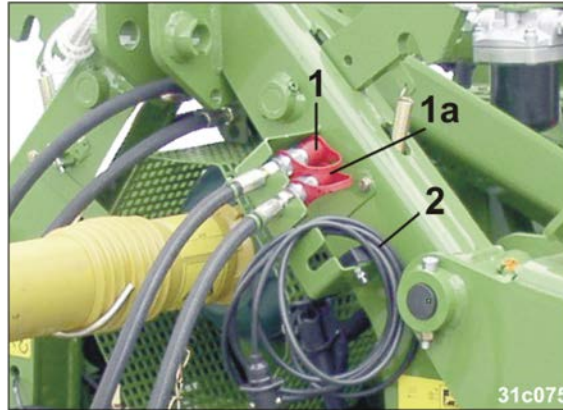


Fig. 10

Tractor-side		Machine-side (rotary cultivator)						
		Fig. 10/...	Running di- rection	Marking			Function	
Control unit	1	Hydraulic line	(1)	Flow	Cable tie	1	green	Folding the machine wing in / out
			(1a)	Return flow		2		
	2		not pic- tured	Flow		1	Yellow	Hydraulic adjustment of working depth (optional)
			not pic- tured	Return flow		2		

Fig. 10/...	Designation	Function
(2)	Plug (7-pin)	Road traffic lighting system
not pictured	Plug for tractor socket	Fan (cooling kit for transmission)

## 4.4 Transportation equipment

Fig. 11/...

- (1) 2 rear-facing turn signals
- (2) 2 reflectors, yellow
- (3) 2 brake and tail lamps
- (4) 2 red reflectors
- (5) 2 rear-facing warning boards, pointed towards the side

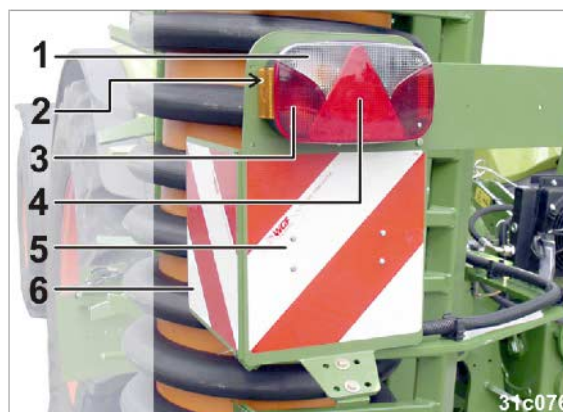


Fig. 11

Fig. 12/...

- (1) 2 forwards-facing warning boards
- (2) 2 forwards-facing limiting lights
- (3) 2 forwards-facing turn indicators



Fig. 12

## 4.5 Intended use

The rotary cultivator:

- 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 bar fitted and the trailing roller in place.  
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 left 10 %
  - Direction of travel to right 10 %
- Along the gradient
  - Up the slope 10 %
  - Down the slope 10 %

The intended use also includes:

- Compliance with all the instructions in this operating manual.
- Execution 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 owner/operator bears the sole responsibility
- **AMAZONEN-WERKE** assumes no liability whatsoever.

## 4.6 Danger area and danger points

---

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

- By work movements made by the machine and its tools
- By materials or foreign objects ejected by the machine
- By tools rising or falling unintentionally
- By unintentional rolling of the tractor and the machine

Within the machine 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 machine danger area:

- As long as the tractor engine is running with the PTO shaft / hydraulic system connected.
- as long as the tractor and machine are not protected against unintentional start-up and running.

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

Danger points exist:

- Between the tractor and the machine, particularly during coupling and uncoupling operations.
- In the area of moving parts:
- By climbing onto the machine.
- Underneath raised, unsecured machines or parts of machines.

## 4.7 Rating plate and CE marking

The following diagrams show the positions of the rating plate (Fig. 13/1) and the CE mark (Fig. 13/2).

The rating plate shows:

- Mach. ident. no.
- Type
- year of manufacture
- factory
- basic weight (kg)

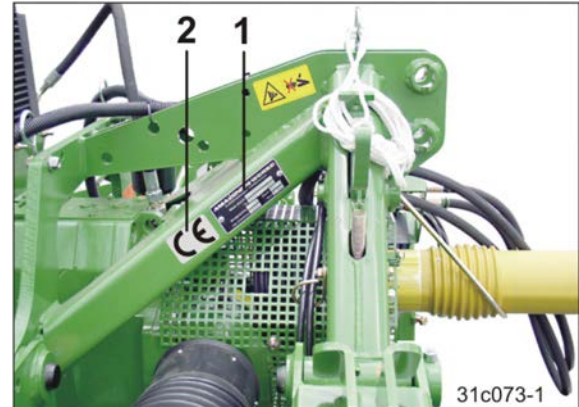


Fig. 13

The CE mark (Fig. 14) on the machine indicates compliance with the stipulations of the valid EU directives.



Fig. 14

## 4.8 Technical data

Rotary cultivator		KG 4000-2	KG 5000-2	KG 6000-2
Working width	[m]	4.00	5.00	6.00
Transport width	[m]	3.00	3.00	3.00
Linkages (as required)		Cat. 3 / Cat. 4	Cat. 3 / Cat. 4	Cat. 3 / Cat. 4
Number of rotors		14	16	20
Tines		Griff Super	Griff Super	Griff Super
Length of the tines	[cm]	30	30	30
Working depth, max.	[cm]	20	20	20

### Basic weights

Rotary cultivator KG		[kg]	2345	2620	2855
Roller	PW 500	[kg]	820	930	885
	PW 600	[kg]	—	—	1275
	KW 580	[kg]	—	1004	1228

Data for calculating the tractor weights and tractor axle loads (see Seite 67)

Total weight $G_H$ (= basic weights of KG + roller)	[kg]			
Distance d	[m]	0.89	0.89	0.89

---

## 4.9 Necessary tractor equipment

---

For the machine to be operated as intended, the tractor must fulfil the following requirements:

### Tractor engine power

---

<b>KG 4000-2:</b>	from 88 kW (120 bhp) upwards
<b>KG 5000-2:</b>	from 110 kW (150 bhp) upwards
<b>KG 6000-2:</b>	from 132 kW (180 bhp) upwards

### Electrical system

---

Battery voltage:	12 V (volts)
Lighting socket:	7-pin

### Hydraulic system

---

Maximum operating pressure:	200 bars
Tractor pump capacity:	At least 15 l/min at 150 bar
Machine hydraulic fluid:	Transmission/hydraulic fluid Otto SAE 80W API GL4 The machine hydraulic/transmission fluid is suitable for the combined hydraulic/transmission fluid circuits of all standard makes of tractor.
Control unit:	At least one double-acting control unit (in standard equipment)

---

## 4.10 Noise production data

---

The workplace-related emission value (acoustic pressure level) is 76 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.

## 5 Structure and function

The following section provides information on the machine structure and the functions of the individual components.



**Fig. 15**

The rotary cultivator (Fig. 15/1) is used for soil tillage in agricultural areas. The machine is used as a stand-alone machine with roller (Fig. 15/2) or as a cultivation combination with front tank (see separate operating manual).

The soil tillage tines (Fig. 15/3) of the rotary cultivator are "on grip".

Tines that are "on grip":

- Tear up the soil and crumble it.
- Pull the rotary cultivator into the soil.

Thus the rotary cultivator, supported on the roller, maintains a constant working depth.

The rotary cultivator can be used universally:

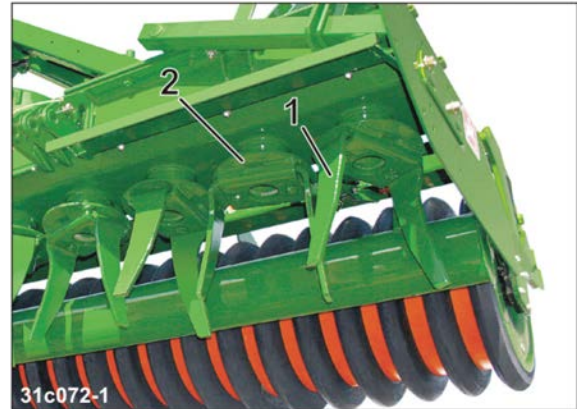
- For seed bed preparation
  - With pre-tilling (mulch sowing)
  - After chisel cultivators or deep rippers
  - After the plough
- For stubble cultivation
- For ploughing up of grassland

For road transport, the rotary cultivator is folded up to a transport width of 3.0 m.

The soil tillage implement runs especially quietly. The tracks of the soil tillage tines (Fig. 16/1) of two tool carriers arranged next to each other overlap in the soil.

When incorporating straw, the long soil tillage tines made of hardened boron steel allow a large passage clearance.

The round tool carriers (Fig. 16/2) and the smooth bottom of the trough prevent rocks from becoming jammed.



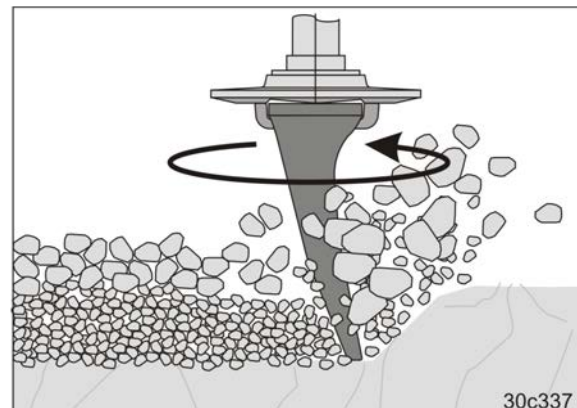
**Fig. 16**

The rotary cultivator is used:

- As a stand-alone machine with trailing roller
- As part of a cultivation combination
  - With trailing roller
  - And top-mounted sowing rail (PSKW or PSPW)
  - And front tank (FRS or FPS).

An earth wall is kicked up in front of the rotary cultivator (see Fig. 17) that fills in undulations.

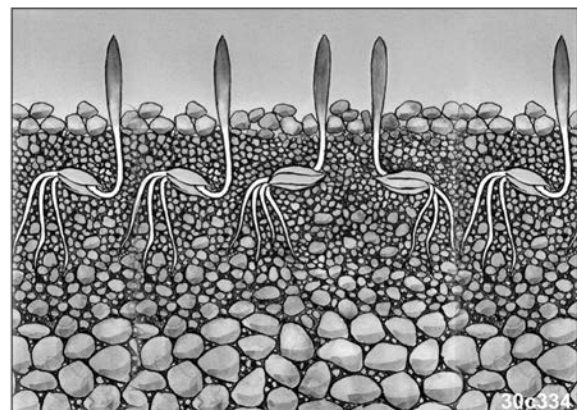
Straw and other organic matter is mulched close to the surface.



**Fig. 17**

When "on grip", the soil tillage tines of the rotary cultivator have a sifting effect:

- Coarse particles of soil are transported farther 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 (see Fig. 18).



**Fig. 18**

## Structure and function

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

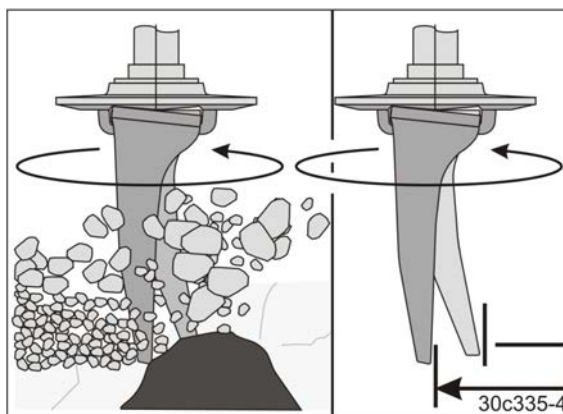


Fig. 19

## 5.1 Rollers

The rotary cultivator is supported on two rollers and thus maintains the exact working depth. Use the rotary cultivator with attached rollers only.

### Wedge ring roller KW

Use the wedge ring roller (Fig. 20/1) on medium to heavy soils. The wedge ring roller re-consolidates the soil in strips.

If the wedge ring roller is used as part of a sowing combination, the seed is embedded in the soil, which is consolidated by the wedge rings in strips. Better soil coverage means that more humidity is available for germination.

The loose soil next to the wedge rings is used to close the furrow through the exact harrow.

Adjustable, carbide-coated scrapers clean the roller.



Fig. 20

## Tooth packer roller PW

Use the tooth packer roller on light to heavy soils.

The re-consolidation by the tooth packer roller takes place uniformly over the entire working width.

Adjustable, carbide-coated scrapers clean the roller.



31c034

Fig. 21

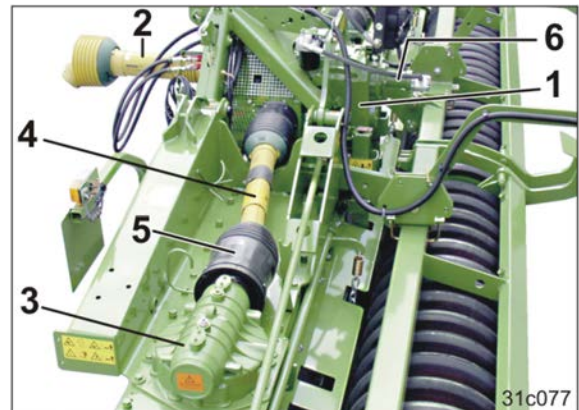
## 5.2 Drive

The rotary cultivator has a three-gear transmission (Fig. 22/1) that allows different tine speeds to be set with a constant tractor universal joint shaft speed.

The PTO shaft (Fig. 22/2) transmits the drive forces of the tractor universal joint shaft to the three-gear transmission.

The three-gear transmission transmits the drive forces to two angular gearboxes (Fig. 22/3) via PTO shafts (Fig. 22/4).

The tool carriers with the soil tillage tines and the angular gearboxes are connected to each other via gear wheels.



31c077

Fig. 22

Two ratchet clutches prevent damage to the gearbox that can occur in the event of a brief stop of the tool carriers, for example.

One ratchet clutch is present on each input shaft of the angular gearbox under the all-round guard (Fig. 22/5).

Do not switch the ratchet clutches during repair, as otherwise their function is no longer guaranteed (see section "Installation instructions for ratchet clutch", Seite 115).

The three-gear transmission has a universal joint shaft through drive (Fig. 22/6) which can be used, for example, to drive the hydraulic pump on the cooling kit for the transmission [see section "Transmission cooling kit (optional)", Seite 61].

## 5.2.1 Tractor universal joint shaft speed / tine speed

### Tractor universal joint shaft speed

Always set the tractor universal joint shaft speed to 1000 rpm.

Working with a tractor universal joint shaft speed of 540 rpm leads to very high torque at the PTO shaft and can cause rapid wear of the overload clutches.

### Tine speed

Different soils require that the tine speed be adjusted in order to attain the desired fine seed bed.

The tine speed is adjusted at the three-gear transmission.

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 [see Table (Fig. 23)] lowers wear costs and increases area efficiency.




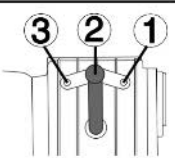
<p><b>A: Tine speeds [rpm]</b> (at tractor universal joint shaft speed of 1000 rpm)</p> <p><b>B: Gearbox shift positions</b></p> <p><b>Example:</b> Gearbox shift position: ..... 2 Tine speed:..... 296 rpm Tractor universal joint shaft speed: ..... 1000 rpm</p>	<p>1. </p> <p>2. </p> <p>955418</p>	 <b>1000</b>	 <b>3 2 1</b>

Fig. 23

### Shifting gears using the shift lever of the three-gear transmission

The gears of the three-gear transmission are engaged using the shift lever (Fig. 24).

The numbers (1 to 3) indicate the gear level position of the engaged gear.

The figure (Fig. 24) shows the three-gear transmission with second gear engaged.

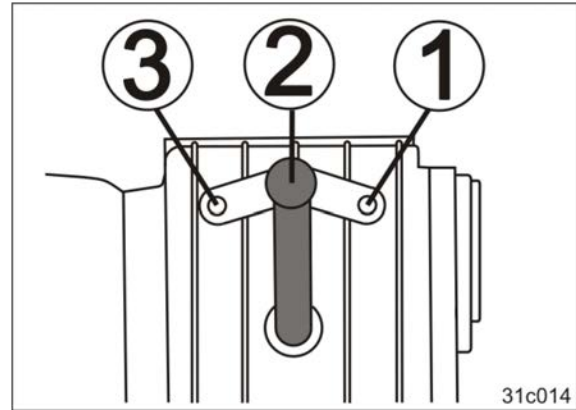


Fig. 24

### Shifting gears using the shift rod of the three-gear transmission

In combination with the hydraulic working depth adjustment (see section "5.3.1", Seite 58), the three-gear transmission is equipped with a shift rod (Fig. 25/A).

The gears of the three-gear transmission are engaged using the shift rod.

The numbers (1 to 3) indicate the shift rod position in the shifting gate (Fig. 25/B).

The figure (Fig. 25) shows the three-gear transmission with first gear engaged.

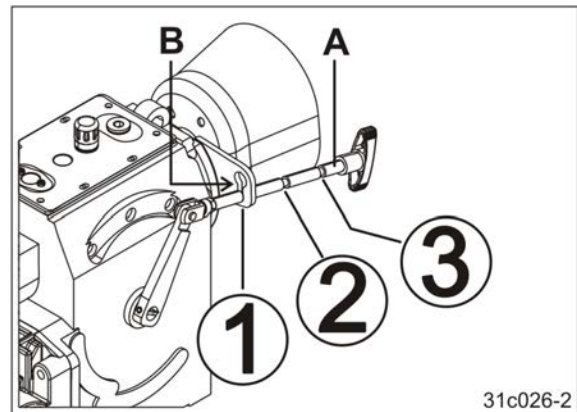


Fig. 25

## 5.2.2 PTO shafts

A PTO shaft (Fig. 26/1) transmits the drive force of the tractor universal joint shaft to the machine gearbox.

Two other PTO shafts (Fig. 26/2) are installed for power transmission.

Only high safety requirements allow safe PTO shaft operation.

For your own safety, observe the basic rules when handling the PTO shafts. If you identify defects on a PTO shaft, you must not use the PTO shaft.

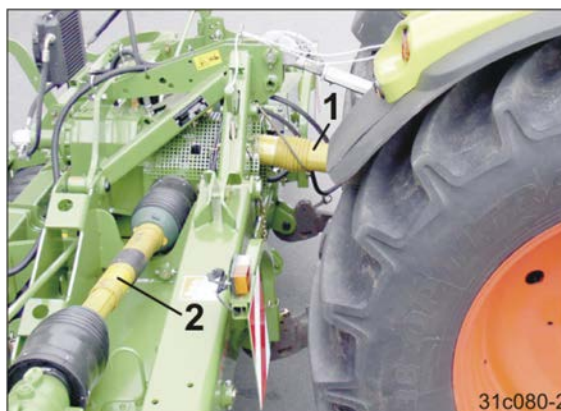


Fig. 26



### When handling the PTO shaft, observe the following:

- Use only the provided PTO shaft or one of the prescribed type.
- Read and follow the operating manual for the PTO shaft supplied by the PTO shaft manufacturer. Correct use and maintenance of the PTO shaft prevents serious accidents.
- When coupling the PTO shaft, observe the operating manual from the PTO shaft manufacturer.
- The installation length of the PTO shaft must be according to the specifications (see included operating manual from the PTO shaft manufacturer). Have the PTO shaft shortened by a specialised workshop if necessary.
- Ensure sufficient clearance in the swivelling area of the PTO shaft. Insufficient clearance causes damage to the PTO shaft.
- Observe the permitted drive rev. speed of the machine.
- Observe the correct installation position of the PTO shaft. The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.
- Before switching on the tractor universal joint shaft, read and follow the safety precautions for universal joint shaft operation (see section "Safety information for the operator", Seite 26).



### WARNING

#### **Danger of crushing from tractor and machine unintentionally starting up or rolling away!**

Couple or uncouple the PTO shaft and tractor only when tractor and machine have been secured against both unintentional starting and unintentional rolling away.



### WARNING

#### **Danger of being entangled and drawn in by unguarded PTO shaft or damaged safety devices!**

- Never use the PTO shaft if the safety device is missing or damaged, or without correctly using the supporting chain.

- Always check before using the machine
  - that all protective equipment for the PTO shaft is installed and in working order.
  - that the clearances around the PTO shaft are sufficient in all implement situations. Insufficient clearances will result in damage to the PTO shaft.
- Attach the supporting chains (does not apply to PTO shaft with full guard) in such a way as to ensure sufficient swivelling range in all operating positions. Supporting chains must not become caught on machine or tractor parts.
- Have any damaged or missing parts of the PTO shaft replaced immediately with OEM parts from the PTO shaft manufacturer. Note that only specialised workshops may repair PTO shafts.
- Place the PTO shaft in the holder provided when the machine is uncoupled. This protects the PTO shaft from damage and dirt.
  - Never use the supporting chain of the PTO shaft to hang up the uncoupled PTO shaft.

**WARNING****Danger of becoming entangled and drawn in by unguarded parts of the PTO shaft!**

These risks pose serious injuries or death.

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

- The tractor must be equipped with a shield, and the machine must be equipped with a PTO shaft guard.
- The safety devices and guards of the extended PTO shaft must overlap by at least 50 mm.

**Otherwise, do not use the PTO shaft.**

**DANGER****Danger of being entangled and drawn in**

- By unguarded parts of the PTO shaft
- By damaged safety devices
- By an unsecured PTO shaft (supporting chain)

These risks pose serious injuries or death.

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

- The tractor must be equipped with a shield, and the machine must be equipped with the standard PTO shaft guard.
- The safety devices and guards of the extended PTO shaft must overlap by at least 50 mm.
- Never use the PTO shaft without correctly using the supporting chain (does not apply for PTO shaft with full guard). Attach the supporting chains in a way that ensures a sufficient swivel range in all operating positions. Supporting chains must not become caught on machine or tractor parts.

**Work only with a completely guarded PTO shaft.**

- Never use the PTO shaft without a safety device or with a damaged safety device.
- Before each use, check that all safety devices of the PTO shaft are installed and fully functional.
- Have any damaged or missing parts of the PTO shaft replaced immediately with OEM parts from the PTO shaft manufacturer.

Note that only specialised workshops may adjust or repair PTO shafts.

### 5.2.3 Electronic drive monitor (optional)

Two ratchet clutches prevent damage to the gearbox that can occur in the event of a brief stop of the tool carriers, for example. One ratchet clutch is on each angular gearbox input shaft.

If the machine is equipped with the **AMATRON<sup>+</sup>** on-board computer or the **AMALOG<sup>+</sup>** on-board computer, the on-board computer sends an alarm if an angular gearbox comes to a complete stop (see operating manual for the on-board computer).

The alarm consists of:

- A visual alarm in the display of the on-board computer.
- An audible signal.

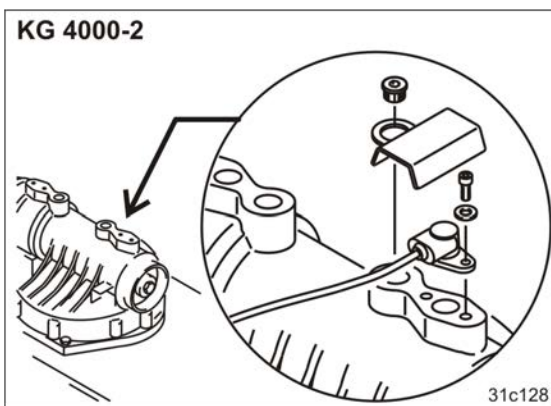


Fig. 27

The complete stop of the tool carriers is detected by sensors on the angular gearboxes and on the three-gear transmission (see Fig. 27 to Fig. 29).

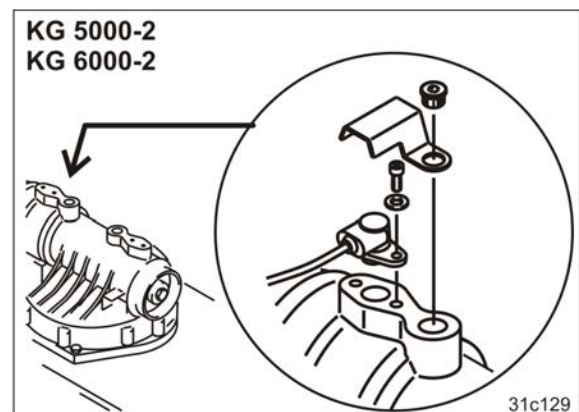


Fig. 28

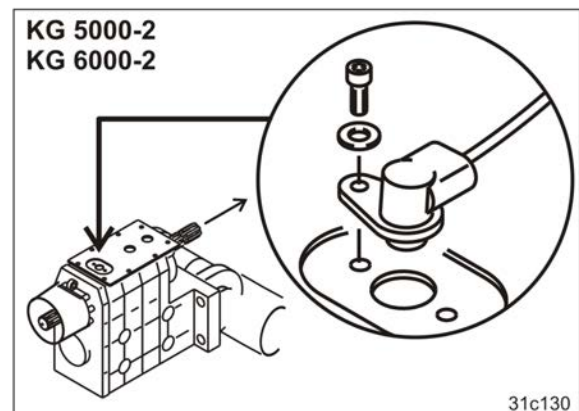


Fig. 29

### AMALOG<sup>+</sup> on-board computer

The **AMALOG<sup>+</sup>** consists of the control terminal (Fig. 30) and the basic equipment (cable and fastening materials).

Fasten the control terminal in the tractor cab according to the **AMALOG<sup>+</sup>** operating manual.

The machine-specific data are entered via the control terminal.



Fig. 30

### AMATRON<sup>+</sup> on-board computer

The **AMATRON<sup>+</sup>** on-board computer consists of the control terminal (Fig. 31), the basic equipment (cable and fastening materials) and the job computer on the machine.

Fasten the control terminal in the tractor cab according to the **AMATRON<sup>+</sup>** operating manual.

The machine-specific data are entered via the control terminal.



Fig. 31

### 5.3 Rotary cultivator working depth

The working depth of the rotary cultivator is adjusted using the corresponding support on the roller.

The rotary cultivator is equipped with 4 adjuster segments. There are two outer adjuster segments (Fig. 32/1) and two adjuster segments (Fig. 35) in the centre of the machine.

Always carry out the same settings in the two outer adjuster segments (Fig. 32) and in the two adjuster segments (Fig. 35) in the centre of the machine.

Carry out the settings on the outer and inner adjuster segments so that the rotary cultivator is aligned level to the field surface during work.

The adjuster segment (Fig. 32/1) is used to adjust the working depth.

The working depth is adjusted by relocating the depth setting pin (Fig. 32/2) in the adjuster segment.

The various settings have an effect on a roller carrying arm (Fig. 32/3) below the depth setting pin.



#### CAUTION

**Crushing hazard! Touch the depth setting pin by the handle (Fig. 32/2) only!**

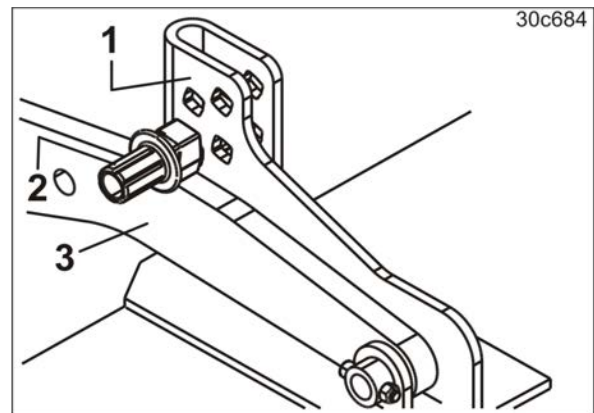


Fig. 32

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

For this purpose, the edges (Fig. 33/1) of the depth setting pin have different distances and are labelled with numbers 1 to 4.

Always secure the depth setting pin using a lynch pin (Fig. 33/3).

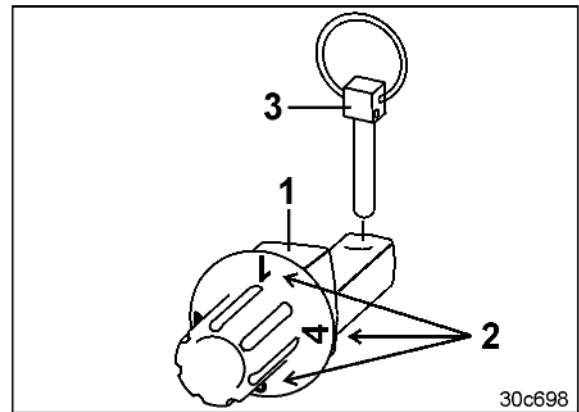


Fig. 33

The working depth increases:

- The higher the depth setting pin (Fig. 32/2) is located in the adjuster segment.
- The larger the number (Fig. 33/2) present at the carrying arm (Fig. 32/3).

Fig. 34

## Structure and function

In the centre of the machine, the eccentric pin (Fig. 35/1) is fastened to an operating rod.

During adjustment tasks in the centre of the machine, the operator stands next to the machine.

Always secure the operating rod using a lynch pin (Fig. 35/2).

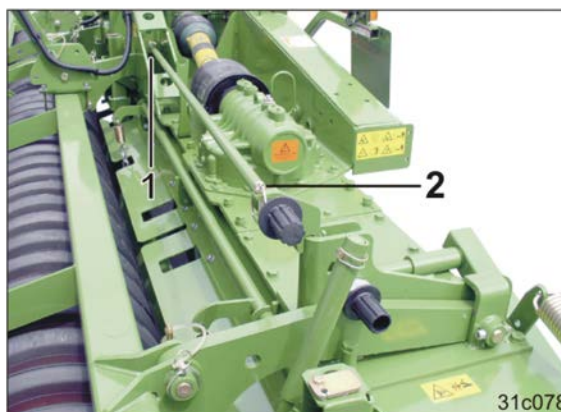


Fig. 35

### 5.3.1 Rotary cultivator working depth, hydraulic adjustment (optional)

You can adjust the working depth of the rotary cultivator hydraulically during work, e.g. when changing from light to heavy soil.

The corresponding working depth is shown by a needle (Fig. 36/1) on a scale (Fig. 36/2).

Needle indicator (Fig. 36/1):

Low scale value	→	Shallow working depth
High scale value	→	Great working depth

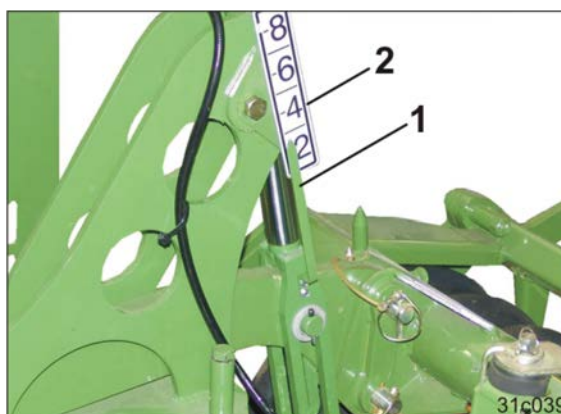


Fig. 36

### 5.3.2 Length of the soil tillage tines

The rotary cultivator is equipped with "Griff Super" soil tillage tines (Fig. 37/1).

The soil tillage tines are subject to wear. Replace the soil tillage tines when they reach the minimum length (see Table, Fig. 38).

For great working depths, it is necessary to replace the soil tillage tines even before they reach the minimum length in order to prevent damage or wear to the tool carriers.



Fig. 37

Always monitor the tine length.

**Replace the soil tillage tines no later than when they reach the minimum length  $L = 150$  mm.**

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

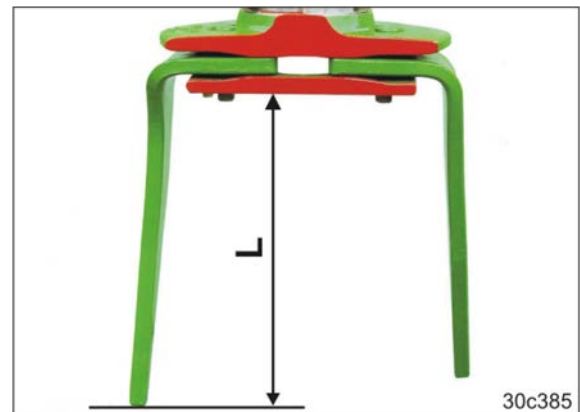


Fig. 38

## 5.4 Side panels

The side panels (Fig. 39/1) ensure that the tilled soil cannot escape to the side. The stream of soil is guided towards the rear so that it lands directly in front of the roller.



Fig. 39

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

Screw the side panels:

- So that they slip through the soil at a maximum depth of 1 to 2 cm.
- Higher in front than at the rear, if the field is heavily covered with straw.

The swivelling side guide panels can avoid obstacles by moving upwards.

The dead weight of the side plate, along with a strong tension spring (Fig. 40/1), bring the side plate back into working position.

The tension of the spring has been 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. 40

## 5.5 Levelling bar

Any ground undulations present behind the rotary cultivator are eliminated by the levelling bar (Fig. 41/1).

It crumbles the residual clods on heavy soils and loose soil is pre-consolidated by the levelling bar.

A hand lever (Fig. 41/2) is used to adjust the height of the levelling bar, which is then pinned and secured using bolts (Fig. 41/3) and safety splints.

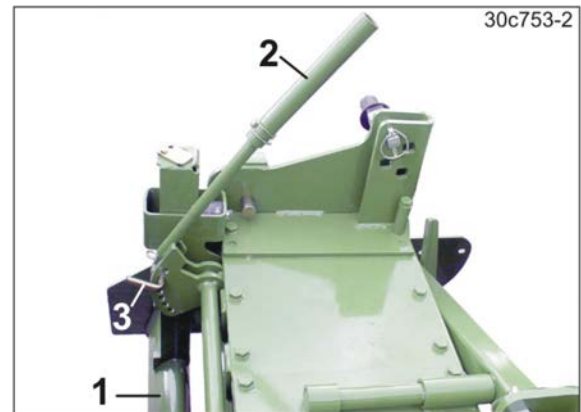


Fig. 41

### Setting for mulch sowing

For mulch sowing, place the levelling bar in one of the upper positions depending on the crop residues.

### Setting for conventional drilling

For conventional drilling, adjust the working height of the levelling bar so that an earth wall is always pushed in front to level existing undulations.

## 5.6 Transmission cooling kit (optional)

The oil cooler (Fig. 42/1) cools the transmission fluid in the three-gear transmission.

Every 20 minutes, the fan changes its direction of rotation for approx. 40 seconds. This eliminates any dirt from the radiator fins.

The oil pump (Fig. 42/2) is on the universal joint shaft through drive of the three-gear transmission.

The oil cooler is connected to the electrical system at the tractor socket.

The system has an oil filter (Fig. 42/3).

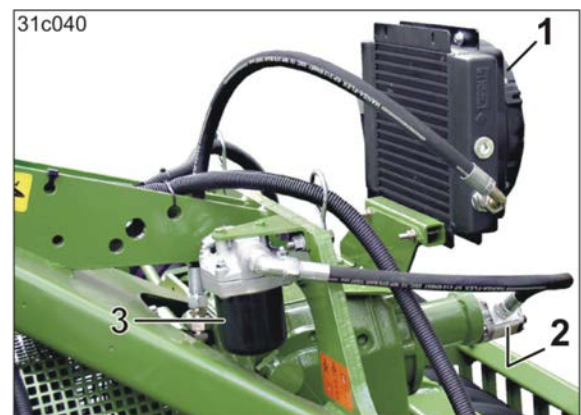


Fig. 42

## 5.7 Centre line eradicator (optional)

For design reasons, the tracks of the tines do not intersect in the centre of the machine. A raised centre line can remain there. This is remedied by the centre line eradicator (Fig. 43/1).



To prevent damage when parking, ensure that the centre line eradicator can sink into loose soil, but that the soil tillage implement is on a solid substrate.

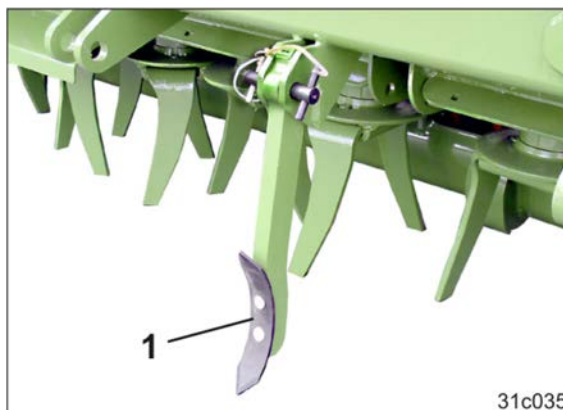


Fig. 43

If the centre line eradicator is not needed, disconnect the tractor and the soil tillage implement (see section "Uncoupling the machine from the tractor", Seite 82) and remove the centre line eradicator.

## 5.8 Three-point extension frame with or without tractor wheel mark eradicator (optional)

The three-point extension frame (Fig. 44/1) is used to:

- Increase the distance between the tractor and the machine.
- Fasten the wheel mark eradicators (Fig. 44/2).

The tractor wheels can leave deep marks on the field.

The soil tillage implement can be used with a shallower working depth if the deep tracks are eliminated by the tractor wheel mark eradicators (Fig. 44/2).

The tractor wheel mark eradicators are fastened to the three-point extension frame and can be adjusted both horizontally and vertically.

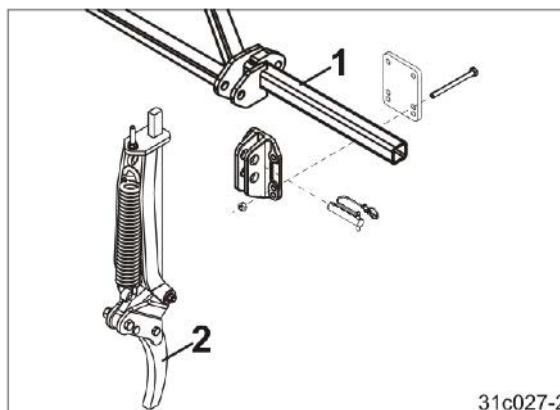


Fig. 44



To prevent damage when parking, ensure that the wheel mark eradicator tines can sink into loose soil, but that the soil tillage implement is on a solid substrate.

## 5.9 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 depressurised on both the machine and tractor sides.

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

### 5.9.1 Coupling the hydraulic hose lines



### 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 connectors.



- Check the compatibility of the hydraulic fluids before connecting the machine to the hydraulic system of the tractor.  
Do not mix any mineral oils with biological oils.
- Observe the maximum approved hydraulic fluid pressure of 200 bar.
- Only couple clean hydraulic connectors.
- Push the hydraulic push-fit connector(s) into the hydraulic sockets until you feel the hydraulic connector(s) lock.
- Check the coupling points of the hydraulic hose lines for a correct, tight seat.

1. Swivel the actuation lever on the spool valve on the tractor to float position (neutral position).
2. Clean the hydraulic connectors of the hydraulic hose lines before you couple the hydraulic hose lines to the tractor.
3. Connect the hydraulic hose line(s) to the tractor control unit(s).



Fig. 45

## 5.9.2 Uncoupling the hydraulic hose lines

1. Swivel the actuation lever on the control unit on the tractor to float position (neutral position).
2. Unlock the hydraulic connectors from the hydraulic sockets.
3. Safeguard the hydraulic connectors and hydraulic connector sockets against soiling with the dust protection caps.
4. Place the hydraulic hose lines in the hose cabinet.



**Fig. 46**

## 6 Commissioning

This section contains information

- On initial operation of your machine.
- On checking how you may couple the machine to your tractor.



- Before operating the machine for the first time the operator must have read and understood the operating manual.
- Observe the section "Safety information for the operator", on Seite 26 when:
  - Coupling and uncoupling the machine
  - Transporting the machine
  - Using the machine
- Only couple and transport the machine to/with a tractor which is suitable for the task.
- The tractor and machine must meet the national road traffic regulations.
- The owner/operator and the user shall be responsible for compliance with the statutory road traffic regulations.



### WARNING

**Danger 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 you release the appropriate control. This does not apply to equipment movements that:

- are continuous or
- are automatically locked or
- necessarily require a float or pressure position to operate correctly

## 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 hook up the machine.  
You may only attach or hook up the machine to tractors suitable for the purpose.
- Carry out a brake test to check whether the tractor achieves the required braking delay with the machine connected.

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

- The permissible 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 machine attached or hooked up.

### 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 permissible total tractor weight specified in the vehicle documentation must be greater than the sum of the

- empty tractor weight
- ballast weight and
- machine's total weight when attached or drawbar load when hitched.



#### **This note only applies to Germany:**

If, having tried all possible alternatives, it is not possible to comply with the axle loads and / or the permissible 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 machine)

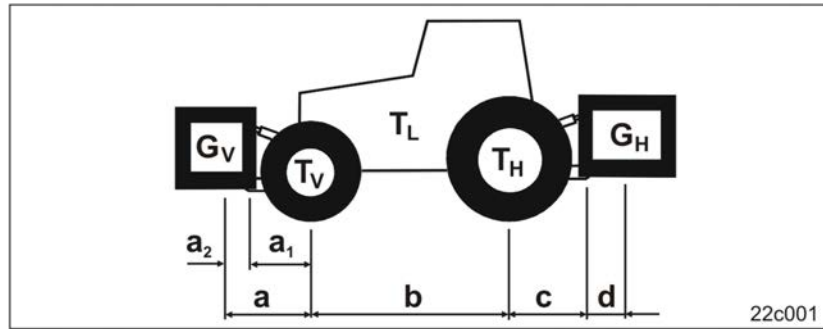


Fig. 47

$T_L$	[kg]	Empty tractor 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 machine or rear ballast	See section "Data for calculating the tractor weights and tractor axle loads", Seite 44, or rear ballast
$G_V$	[kg]	Total weight of front-mounted machine or front weight	See technical data for front-mounted machine or front weight
$a$	[m]	Distance between the centre of gravity of the front machine mounting or the front weight and the centre of the front axle (total $a_1 + a_2$ )	See technical data of tractor and front machine 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 machine mount or front weight (centre of gravity distance)	See technical data of front machine 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 machine or rear ballast (centre of gravity distance)	See section "Data for calculating the tractor weights and tractor axle loads", Seite 44

## Commissioning

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

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

Enter the numeric value for the calculated minimum ballast  $G_{V \min}$ , required on the front side of the tractor, in the table (Section 6.1.1.7).

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

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

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 table (Section 6.1.1.7).

### 6.1.1.4 Calculation of the actual total weight of the combined tractor and machine

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

Enter the numeric value for the calculated actual total weight and the approved total tractor weight specified in the tractor operating manual in the table (Section 6.1.1.7).

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

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

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 table (Section 6.1.1.7).

### 6.1.1.6 Tractor tyre load capacity

Enter the double value (two tyres) of the approved load capacity (see, for example, tyre manufacturer's documentation) in the table (Section 6.1.1.7).

**6.1.1.7 Table**

	Actual value according to calculation	Approved value according to tractor operating manual	Double approved load capacity (two tyres)
Minimum ballast front / rear	<div style="border: 1px solid black; padding: 5px; display: inline-block;">/ kg</div>	--	--
Total weight	<div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	≤ <div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	--
Front axle load	<div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	≤ <div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	≤ <div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>
Rear axle load	<div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	≤ <div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>	≤ <div style="border: 1px solid black; padding: 5px; display: inline-block;">kg</div>



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


**WARNING**

**Danger of crushing, cutting, entrapment, drawing in and impact through insufficient stability of the tractor and insufficient tractor steering capability and braking power.**

It is forbidden to couple the machine 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:
  - If you do not achieve the minimum ballast at the front ( $G_{V \min}$ ) from the weight of the front-mounted machine ( $G_V$ ), you must use ballast weights in addition to the front-mounted machine.
  - If you do not achieve the minimum ballast at the rear ( $G_{H \min}$ ) from the weight of the rear-mounted machine ( $G_H$ ), you must use ballast weights in addition to the rear-mounted machine.

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



### WARNING

**Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks when making interventions in the machine through**

- **unintentional lowering of the machine when it is raised with the tractor's three-point hydraulic system and unsecured.**
- **unintentional lowering of parts of the machine when in a raised position and unsecured.**
- **unintentional start-up and rolling of the tractor-machine combination.**
- Secure the tractor and the machine against unintentional start-up and rolling before any intervention in the machine.
- It is forbidden to make any intervention in the machine, such as installation, adjustment, troubleshooting, cleaning, maintenance and repairs
  - While the machine is being driven.
  - As long as the tractor engine is running with the PTO shaft / hydraulic system connected.
  - If the ignition key is in the tractor and the tractor engine can be started unintentionally with the PTO shaft / hydraulic system connected.
  - If the tractor and machine have not each been prevented from unintentionally rolling away by applying their parking brakes.
  - If moving parts are not blocked against unintentional movement.

When carrying out such work, there is a high risk of contact with unsecured components.

1. Park the tractor and the machine on solid, level ground only.
2. Lower the raised, unsecured machine / raised, unsecured parts of the machine.  
→ This is how to prevent unintentional falling:
3. Shut down the tractor engine.
4. Remove the ignition key.
5. Apply the tractor parking brake.

## 6.3 Before initial commissioning

When the machine is delivered, some components are provided loose and have to be installed or adapted to the tractor before putting it into operation.

### 6.3.1 Fastening the PTO shaft guard screen

Screw on the PTO shaft guard (Fig. 48/1) at the four mounting points (arrow).



Fig. 48

### 6.3.2 Fastening the rollers to the rotary cultivator (specialist workshop)

The rotary cultivator must be used with a wedge ring or tooth packer roller only (see section "Technical data", Seite 44).

Fasten two rollers of the same type to the rotary cultivator, one after the other.

1. Couple the rotary cultivator to the tractor (see section "Coupling the machine to the tractor with/without three-point extension frame", Seite 78).
2. Park the machine on a level substrate.
3. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.



#### **DANGER**

**Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.**

## Commissioning

4. Upright the roller using a crane (see Fig. 49).



### WARNING

Install the roller using a crane.



Fig. 49

5. Locate the roller carrying arm (Fig. 50/1) on the support (Fig. 50/2) using a pin (Fig. 50/3) and secure it using a screw and nut (Fig. 50/4).
6. Plug a depth setting pin (Fig. 50/5) into the closest possible hole above the carrying arm and secure the depth setting pin using a lynch pin (Fig. 50/6).

The roller has two roller carrying arms. Fasten the second carrying arm as described.

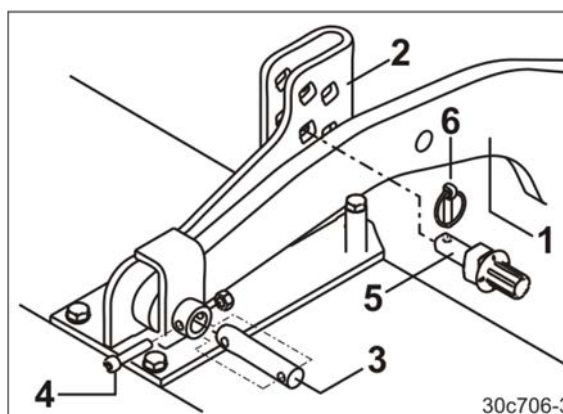


Fig. 50

7. Fasten the second roller to the soil tillage implement as described.

### 6.3.3 Adapting the PTO shaft to the tractor (specialist workshop)



#### WARNING

**Danger of crushing from unintentional:**

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

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



#### WARNING

**Danger of being crushed between the rear of the tractor and the machine when raising and lowering the machine to determine the shortest and longest operating position of the PTO shaft.**

Only actuate the operator controls for the tractor's three-point hydraulic system:

- From the workstation provided.
- If you are outside of the danger area between the tractor and the machine.



#### WARNING

**Danger of being caught and drawn in if the PTO shaft is installed incorrectly or if unauthorised design changes are made.**

Only a specialist workshop may make constructive changes to the PTO shaft. When doing so, read and follow the operating manual from the manufacturer.

Adjusting the length of the PTO shaft is permitted with consideration of the minimum profile overlap.

Constructive changes to the PTO shaft that are not described in the operating manual from the PTO shaft manufacturer are not permitted.



The PTO shaft is short in horizontal arrangement and long when the machine is lifted.

1. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
2. Clean and grease the following:
  - The tractor universal joint shaft.
  - The gearbox input shaft of the machine.
3. Couple the tractor to the machine (see section "Coupling the machine to the tractor with/without three-point extension frame", Seite 78).  
Do not connect the supply lines.
4. Fasten both PTO shaft halves to the tractor universal joint shaft and the gearbox input shaft according to the operating manual

from the PTO shaft manufacturer.  
Do not interconnect the PTO shaft halves.

5. Apply the tractor parking brake.
6. Raise and lower the machine.  
To do so, actuate the control valves at the workstation provided on the rear of the tractor.
7. Determine the shortest and longest operating position for the PTO shaft by holding the PTO shaft halves next to each other.
8. If necessary, shorten the PTO shaft according to the operating manual from the PTO shaft manufacturer.



### **DANGER**

**Before entering the danger area between the tractor and machine:**

- **Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.**
- **Secure the lifted machine from being lowered accidentally by propping it up or hooking it to a crane.**
- **Secure the tractor against unintentionally starting.**

## 7 Coupling and uncoupling the machine



When coupling and uncoupling the machine, observe the section on "Safety information for the operator", Seite 26.



### WARNING

**Danger of crushing from unintentional starting and rolling of the tractor and machine when coupling or uncoupling the machine!**

When coupling or uncoupling the machine, secure the tractor and machine against unintentional start-up and rolling before entering the danger area between the tractor and machine; refer to section 6.2, Seite 70.



### WARNING

**Danger of being crushed between the rear of the tractor and the machine when coupling and uncoupling the machine!**

Only actuate the operator controls for the tractor's three-point hydraulic system:

- From the workstation provided.
- If you are outside of the danger area between the tractor and the machine.

### 7.1 Coupling the machine to the tractor



### WARNING

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

You may only attach or hook up the machine to tractors suitable for the purpose. For additional information, refer to the section on "Checking the suitability of the tractor", Seite 66.



### WARNING

**Danger of crushing when coupling the machine and standing between the tractor and the machine!**

Instruct people to leave the danger area between the tractor and the machine before you approach the machine.

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



### WARNING

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

- Use the intended equipment to connect the tractor and the machine in the proper way.
- When coupling the machine to the tractor's three-point hydraulic system, ensure that the attachment categories of the tractor and the machine are the same.
- Only use the upper and lower link pins provided for coupling the machine.
- Check the upper and lower link pins for visible defects whenever the machine is coupled. Replace the upper 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 machine through damaged supply lines!**

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

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



The rotary cultivator or the three-point extension frame (optional) is prepared for coupling tractors with upper and lower link catch hooks, Cat. 3 and Cat. 4.

### 7.1.1 Fastening the centre line eradicator (optional)

Hold the centre line eradicator (Fig. 51/1) in place using a pin (Fig. 51/2) and secure it using a lynch pin.



First, fasten the centre line eradicator, then couple the machine to the tractor.

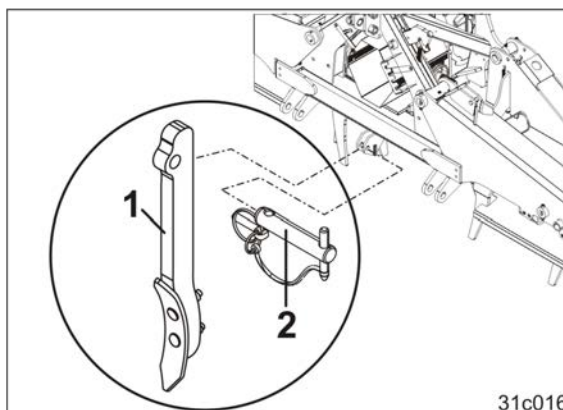
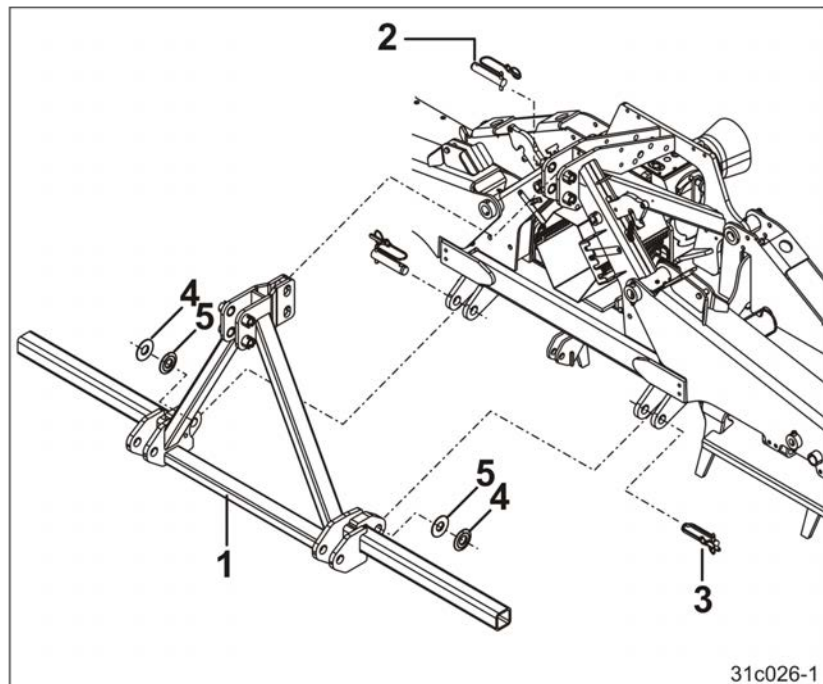


Fig. 51

31c016

### 7.1.2 Fastening the three-point extension frame (optional) (specialist workshop)



**Fig. 52**

1. Attach the three-point extension frame (Fig. 52/1) to a crane.
2. Pin the three-point extension frame to the rotary cultivator using:
  - o The upper link pin  $\varnothing$  31.7 mm (Fig. 52/2)
  - o Two lower link pins  $\varnothing$  36.6 mm (Fig. 52/3)
  - o 2 spacers  $\varnothing$  90 mm x 6.5 mm thick (Fig. 52/4)
  - o 2 spacers  $\varnothing$  100 mm x 13.5 mm thick (Fig. 52/5)
3. Secure the pins using lynch pins.

### 7.1.3 Coupling the machine to the tractor with/without three-point extension frame

The rotary cultivator may be attached to tractors with tractor mount category III or IV only.

You can couple the rotary cultivator to the tractor with or without the three-point extension frame.

The components with which you have to equip the upper and lower link hinging points of the rotary cultivator or the three-point extension frame are the same.

The ball sleeves are accessories of your tractor. The version of the ball sleeves required depends on the following:

- The tractor type.
- The tractor mount category of the tractor.

#### Tractor mount category III

- Using the upper link pin  $\varnothing$  31.7 mm, fasten (Fig. 53/1):
  - One upper link ball sleeve, Cat. III (Fig. 53/2).
  - Two spacers, Cat. III, 6.5 mm thick (Fig. 53/3).
- Using each lower link pin  $\varnothing$  36.6 mm, fasten (Fig. 53/4):
  - One lower link ball sleeve, Cat. III (Fig. 53/5).
  - 2 spacers, Cat. III, 13.5 mm thick (Fig. 53/6).

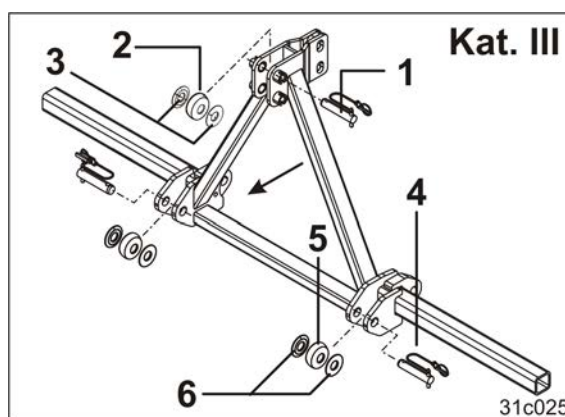


Fig. 53

Continue with point "3", Seite 79.

#### Tractor mount category IV

- Using the upper link pin  $\varnothing$  31.7 mm, fasten (Fig. 54/1):
  - One upper link ball sleeve, Cat. IV (Fig. 54/2).
- Using each lower link pin  $\varnothing$  36.6 mm, fasten (Fig. 54/3):
  - One lower link ball sleeve, Cat. IV (Fig. 54/4).
  - 2 spacers, Cat. IV, 6.5 mm thick (Fig. 54/5).

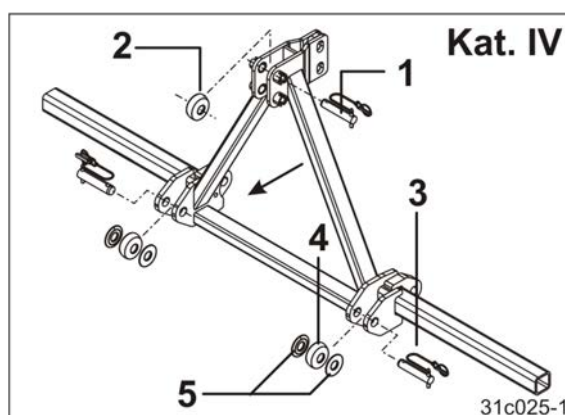


Fig. 54

## All types

3. Secure the upper and lower link pins using lynch pins.
4. Adapt the length of the PTO shaft to the tractor:
  - o Before initial use.
  - o Before installing/removing the three-point extension frame.
  - o Before using another tractor type.
 (See section "Adapting the PTO shaft to the tractor", Seite 73.)

5. Clean and grease the following:
  - o The tractor universal joint shaft.
  - o The gearbox input shaft.
6. Fasten the machine-side PTO shaft half to the gearbox input shaft  
Observe the operating manual of the PTO shaft manufacturer.
- 7 Do not interconnect both PTO shaft halves.
8. Hook the PTO shaft into the bracket (Fig. 55/1).

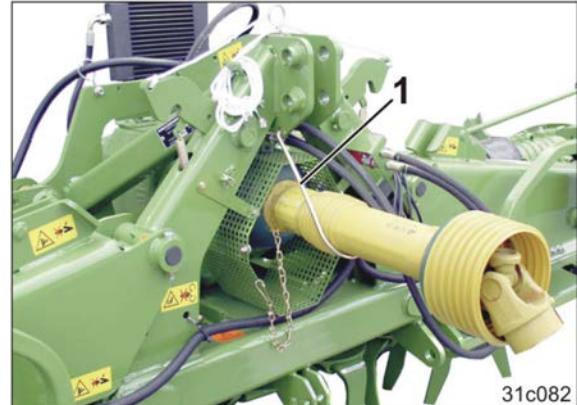


Fig. 55

- 9 Direct persons away from the danger area between the tractor and the machine.
10. Drive the tractor towards the machine, leaving a clearance of approx. 25 cm.  
The tractor lower links must be flush with the lower hinging points of the machine.
11. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
12. Fasten the PTO shaft (Fig. 56) to the tractor universal joint shaft.



Fig. 56

Observe the operating manual of the PTO shaft manufacturer.

13. Secure the PTO shaft guard on the tractor and the machine using supporting chains so that they do not rotate.



Fasten the supporting chain perpendicular to the PTO shaft.

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



Fig. 57

## Coupling and uncoupling the machine

14. Fasten the bracket to the transport bracket (Fig. 58/1) and secure it using a lynch pin.



**Fig. 58**

15. Couple the supply lines to the tractor (see section "Overview – supply lines between the tractor and the machine", Seite 39).

16. Direct persons away from the danger area between the tractor and the machine.
17. Engage the lower hinging points (Fig. 59/1) of the machine using the tractor lower links. The lower link hooks lock automatically.
18. Couple the tractor upper link (Fig. 59/2) to the upper hinging point of the machine. The upper link hook locks automatically.

Note:

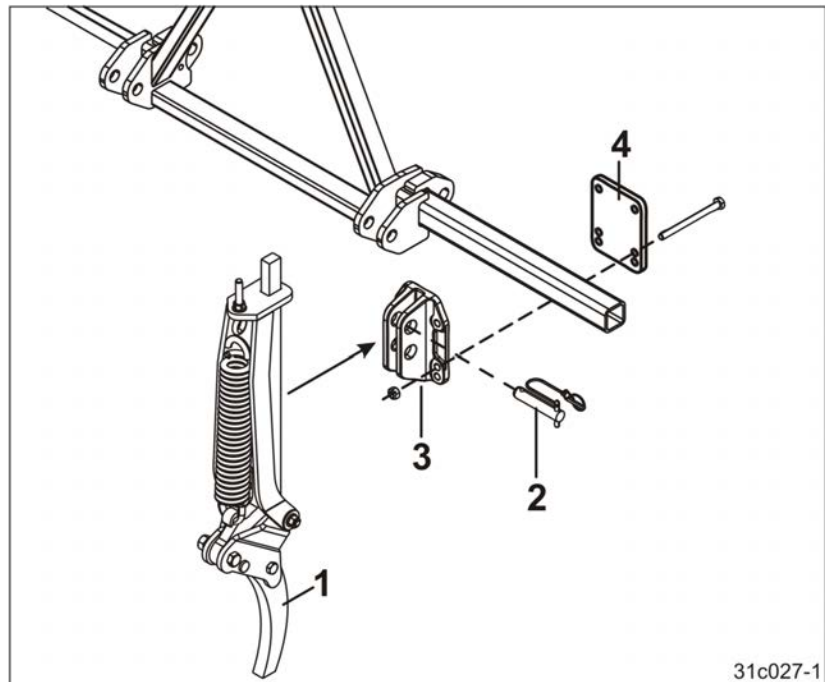
The least force is required for lifting the machine if the tractor upper link (Fig. 59/2) runs horizontally.

19. Bring the soil tillage implement into a straight position by adjusting the upper link.
20. Secure the upper link against twisting.
21. Check that the upper and lower link hooks are locked correctly.



**Fig. 59**

### Installing the wheel mark eradicator (optional)



**Fig. 60**

22. Screw the wheel mark eradicator holder (Fig. 60/3) to the three-point extension frame using the clamping plate (Fig. 60/4).
23. Secure the wheel mark eradicator (Fig. 60/1) at the very top position using the positioning bolt (Fig. 60/2).  
The working depth is adjusted on the field.
24. Secure the positioning bolt using a lynch pin.

The three-point extension frame can be equipped with four wheel mark eradicators.

## 7.2 Uncoupling the machine from the tractor



### WARNING

**Danger of being crushed, cut, caught, drawn in or struck through insufficient stability and possible tilting of the uncoupled machine!**

Park the machine in a level parking area on solid ground.

1. Disengage the tractor universal joint shaft.  
Wait until the soil tillage tines have come to a complete stop.
2. Park the machine in a level parking area on solid ground.  
Ensure the following:
  - o The centre line eradicator (optional) can sink into loose soil.
  - o The tractor wheel mark eradicators (optional) can sink into loose soil, or secure the tractor wheel mark eradicators at the very top position beforehand.
3. Apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
4. Release the upper link. Adjust the upper link length accordingly.
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 machine provides convenient access for uncoupling the PTO shaft and supply lines.

8. Apply the tractor parking brake, switch the tractor engine off and remove the ignition key.
9. Uncouple the hydraulic hose lines (see section "Uncoupling the hydraulic hose lines", Seite 64)
10. Fasten the supply lines to the hose cabinet (Fig. 61).

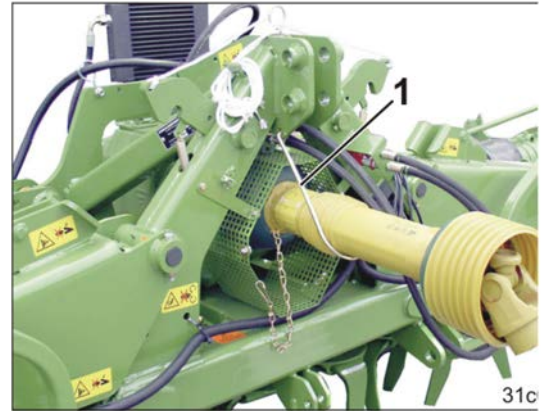


**Fig. 61**

**CAUTION**

Hot PTO shaft components can cause burns. Wear gloves.

11. Remove the PTO shaft from the tractor universal joint shaft (follow the instructions from the PTO shaft manufacturer).
12. Hook the PTO shaft into the bracket (Fig. 62/1).



**Fig. 62**

## 8 Adjustments



### DANGER

Carry out the adjustments only if the following apply:

- The tractor universal joint shaft is disengaged (wait until the tool carriers have come to a complete stop).
- The machine is extended and lowered.
- The tractor parking brake is applied.
- The tractor engine is shut off.
- The ignition key has been removed.



### WARNING

Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks through:

- unintentional falling of the machine raised using the tractor's three-point hydraulic system.
- unintentional falling of raised, unsecured machine parts.
- unintentional start-up and rolling of the tractor-machine combination.

Secure the tractor and the machine against unintentional start-up and rolling before making adjustments to the machine; for additional information, refer to section 6.2, Seite 70.

## 8.1 Adjusting the working depth of the rotary cultivator (on the field)

1. Fold out the machine wings on the field (see section "Folding the machine wings in / out", Seite 96).
2. Lift the machine just enough for the depth setting pins (Fig. 63/2) to clear the carrying arms (Fig. 63/1).
3. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.

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

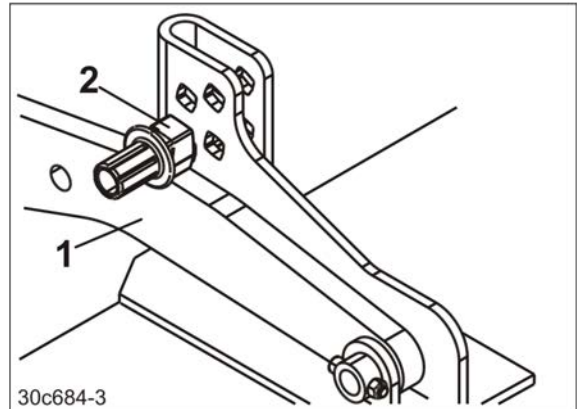


Fig. 63

4. Position the depth setting pins (Fig. 64/1):
  - o In both outer segments.
  - o In the same square hole.



### DANGER

**Touch the depth setting pins by the handle. Never put your hand between the carrying arm and the depth setting pins!**

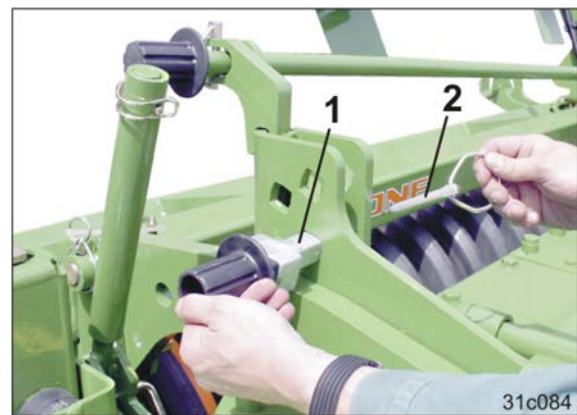


Fig. 64

5. Secure both depth setting pins using lynch pins (Fig. 64/2).
6. Position the depth setting pins (Fig. 65/1):
  - o In both centre segments.
  - o In the same square hole.
7. Secure both positioning rods using lynch pins (Fig. 65/2).

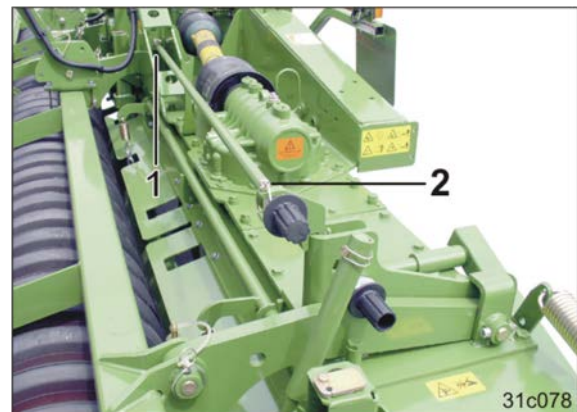


Fig. 65



You can position the depth setting pins in different holes in the centre and outer segments in order to attain optimum working results.



### WARNING

**Whenever you relocate the depth setting pin, secure it using a lynch pin (Fig. 33/3).**

## Adjustments



### WARNING

Direct people out of the danger area.

8. Lower the rotary cultivator.

→ The carrying arms (Fig. 66/1) are supported by the depth setting pins (Fig. 66/2).

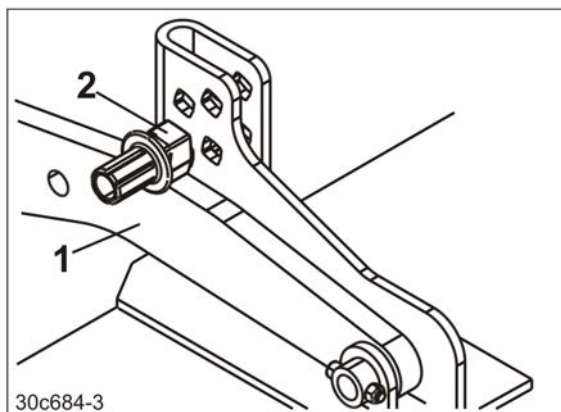


Fig. 66



Adjust the following to the new rotary cultivator working depth:

- The side panels  
(see section "Adjusting the side panels", Seite 87)
- The levelling bar  
(see section "Adjusting the levelling bar", Seite 88)

## 8.2 Adjusting the side panels

1. Fold out the machine wings on the field (see section "Folding the machine wings in / out", Seite 96).
2. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.

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

### Vertical adjustment

3. The side panel (Fig. 67/1) is screwed on using two nuts (Fig. 67/2) and can be adjusted in height.

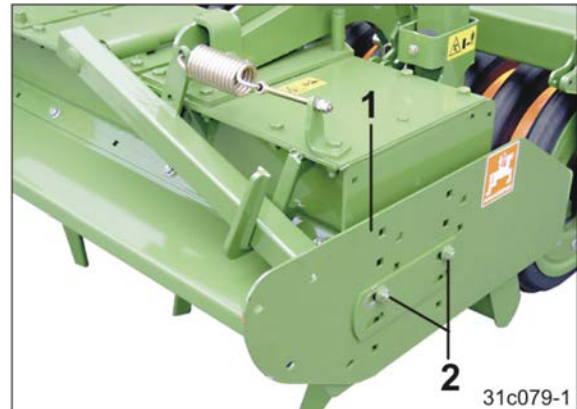


Fig. 67

### Adjusting the spring tension

4. Loosen the lock nut.
5. Adjust the tension of the spring (Fig. 68/1) by turning the nut (Fig. 68/2).
6. Tighten the lock nut securely.



Fig. 68

## 8.3 Adjusting the levelling bar

1. Fold out the machine wings on the field (see section "Folding the machine wings in / out", Seite 96).
2. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.

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

3. Attach the extension pipe (Fig. 69/1) to the lever (Fig. 69/2) in reversed position and secure it using the lynch pin (Fig. 69/3).
  4. Move the extended lever in the direction of the arrow.
- The levelling bar (Fig. 69/4) is raised.
5. Hold the levelling bar in place using the pin (Fig. 69/5) and secure the pin using the safety splint.
  6. Carry out the same settings on all adjuster segments.

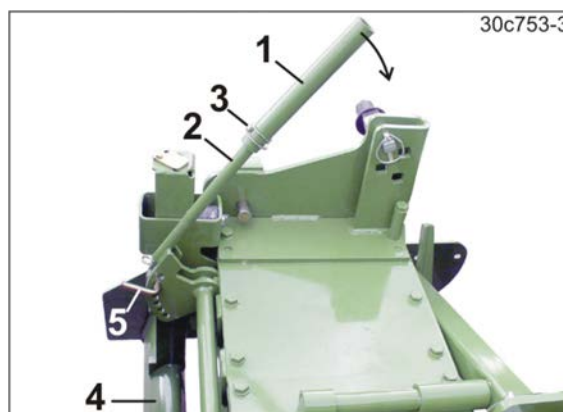


Fig. 69

## 8.4 Adjusting the tractor wheel mark eradicator (optional)

### Vertical adjustment

After the adjustment, position the tractor wheel mark eradicator (Fig. 70/1) using a pin and secure the positioning bolt (Fig. 70/2) using a lynch pin.

### Horizontal adjustment

After unscrewing the screws (Fig. 70/4), move the wheel mark eradicator holder (Fig. 70/3) horizontally.

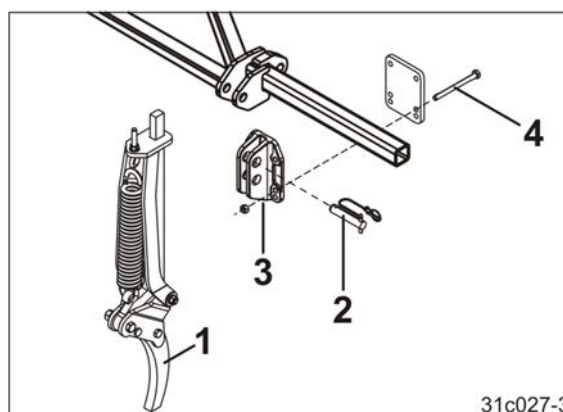


Fig. 70

## 8.5 Adjusting the speed of the soil tillage tines



### DANGER

- Carry out the adjustments only with the tractor universal joint shaft disengaged, the engine shut off, the tractor parking brake applied and the ignition key removed!
- Wait until the tool carriers have come to a complete stop.
- Do not touch hot gearbox parts; wear gloves.

### Shifting using the shift lever

1. Pull the shift lever (Fig. 71/1) out of the recess.
2. Move the shift lever into the required shift position [see Table (Fig. 23), Seite 50].
3. Engage the shift lever in the recess.

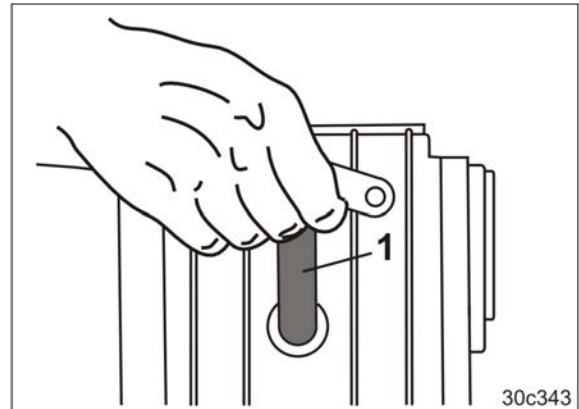


Fig. 71

### Shifting using the shift rod

1. Engage the desired gear [(see Figure (Fig. 25), Seite 51].
2. Latch the shift rod (Fig. 72/1) in the shifting gate (Fig. 72/2).

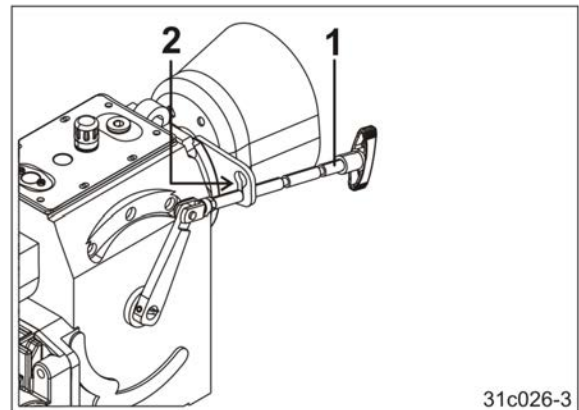


Fig. 72

## 9 Transportation

When driving on public streets or roads, the tractor and machine 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).

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

Furthermore, the instructions in this section have to be complied with prior to starting and during travel.

### The maximum permitted speed<sup>1)</sup> is:

- 25 km/h for tractors with attached rotary cultivator, trailing roller, sowing rail and front tank.
- 40 km/h for tractors with attached rotary cultivator and trailing roller.

Particularly on poorly maintained roads or paths, you must always drive at a substantially lower speed than that specified!

<sup>1)</sup>The maximum permitted speed for attached implements is regulated differently in the corresponding road traffic regulations of individual countries. Ask your local importer / machine dealer about the maximum permitted speed for road travel.



- For transport journeys, observe the section on "Safety information for the operator", Seite 26.
- Before transport, 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 tractor parking brake is released completely



### WARNING

**Danger of being crushed, cut, caught, drawn in or struck if the machine is unintentionally released from its attached or hitched position.**

Before transportation, carry out a visual check that the upper and lower link pins are secured with the original lynch pins against unintentional release.

**WARNING**

**Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks through unintentional machine movements.**

- On folding machines, check that the transport locks are locked correctly.
- Secure the machine against unintentional movements before starting transportation.

**WARNING**

**Danger of crushing, cuts, dragging, catching or knocks from tipping and insufficient stability.**

- Drive in such a way that you always have full control over the tractor with the attached machine.  
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 machine.
- Before transportation, fasten the side locking of the tractor lower link, so that the connected or coupled machine cannot swing back and forth.

**WARNING**

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

These risks pose serious injuries or death.

Comply with the maximum load of the connected machine and the approved axle and drawbar loads of the tractor.

**WARNING**

**Risk of falling from the machine if riding against regulations!**

It is forbidden to ride on the machine and/or climb the running machine.

## 9.1 Bringing the machine into road transport position after fieldwork

1. Fold in the machine wings (see section "Folding the machine wings in / out", Seite 96).



Fig. 73

2. Remove the pin, which is secured using a safety splint.



Fig. 74

3. Swivel both wings of the lighting system into road transport position.
4. Position the wings of the lighting system using pins and safety splints.



Fig. 75

5. Check the lighting system for proper function (see section "Transportation equipment", Seite 40).
6. Switch off the on-board-computer (optional).
7. Disable the tractor control units during transport.



Fig. 76

**DANGER**

- **Disable the tractor control units during transport.**
- **When turning corners, take into consideration the wide sweep and the centrifugal mass of the machine.**



- The warning signs and yellow reflectors must be clean and undamaged.
- Switch on the all round lighting (if present), which is subject to authorisation, prior to starting a journey and check for operability.

## 10 Use of the machine



When using the machine, observe the information in the sections

- "Warning symbols and other labels on the machine", as of Seite 17 and
- "Safety information for the operator", Seite 26.

Observing this information is important for your safety.



### **WARNING**

**Risk of contusions, cutting, catching, drawing in and knocks through insufficient stability and tipping of the tractor and/or the connected machine.**

Drive in such a way that you always have full control over the tractor with the attached machine.

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 machine.



### **WARNING**

**Risk of being crushed, cut, caught, drawn in or struck if the machine is unintentionally released from its attached or hitched position.**

Each time before the machine is used, carry out a visual check that the upper and lower link pins are secured with lynch pins against unintentional release.



### **WARNING**

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

Observe the permissible machine drive speed before switching on the tractor universal joint shaft.

**WARNING**

**Danger of being entangled and drawn in and danger from foreign objects being caught and thrown in the danger area of the driven PTO shaft!**

- Whenever the machine is used, first check to ensure that the safety devices and guards of the PTO shaft are fully intact and functional.  
Have damaged safety devices and guards of the PTO shaft replaced immediately by a specialist workshop.
- Check that the PTO shaft guard is secured against rotation by the supporting chain.
- Maintain a sufficient safety clearance between you and the driven PTO shaft.
- Direct people out of the danger area of the driven PTO shaft.
- Shut down the tractor engine immediately in case of danger.

**CAUTION**

**Danger from failure during operation when the overload clutch engages!**

Switch off the universal joint shaft of the tractor immediately if the overload clutch engages.

This avoids damaging the overload clutch.

**CAUTION**

**Danger from failure of the PTO shaft in case of excessive bending of the driven PTO shaft!**

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

Switch off the universal joint shaft of the tractor immediately if the lifted machine makes a lot of noise while running.

**WARNING**

**Risk of contusions, drawing in and catching during machine operation without the intended protective equipment!**

Only ever start up the machine when the protective equipment is fully installed.



### WARNING

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

Instruct people to leave the danger area of the machine before you switch on the universal joint shaft.

## 10.1 Folding the machine wings in / out



### DANGER

**Instruct people to leave the swivel area of machine's wing before you fold the machine's wing out or in.**



Align the tractor and machine straight on a flat surface before you fold the machine's wings out or in.

Lift the rotary cultivator enough so that the soil tillage tines and the roller have sufficient ground clearance and are not damaged.



Before folding it in, switch off the tractor universal joint shaft and do not switch it on again until the machine wings are extended completely.

The bars (Fig. 77/1) of the rotary cultivator form the mechanical transport lock. The cables (Fig. 77/2) are used to release the bars.

Operate the cables from the tractor cab only.

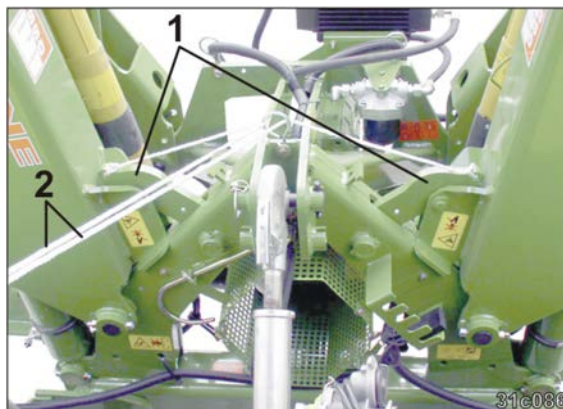


Fig. 77

### 10.1.1 Folding out the machine wing

1. Raise the tractor lower links.
  - 1.1 Raise the rotary cultivator until the soil tillage tines and the roller have enough ground clearance during the folding process.
2. Open the bar (Fig. 78/1) by actuating the two cables (Fig. 78/2) from the tractor seat.

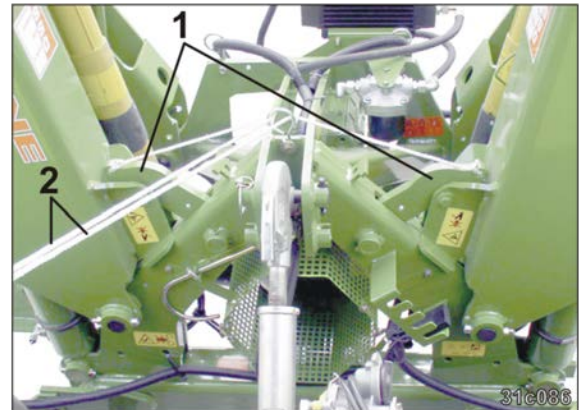


Fig. 78

3. Fold out the machine wings completely.
  - 3.1 Actuate control unit 1 (see section "Overview – supply lines between the tractor and the machine", Seite 39) until the machine wings are extended completely.

While working in the field, leave tractor control unit 1 in float position.



Fig. 79

### 10.1.2 Folding in the machine wings

1. Switch off the tractor universal joint shaft. Wait until the tool carriers have come to a complete stop.
2. Raise the tractor lower links.
  - 2.1 Raise the rotary cultivator until the soil tillage tines and the roller (see Fig. 80) have enough ground clearance during the folding process.
3. Fold in the machine wings completely.
  - 3.1 Actuate control unit 1 (see section "Overview – supply lines between the tractor and the machine", Seite 39) until the machine wings are folded in completely.



Fig. 80



#### **DANGER**

After the machine wings are folded out, check that both bars are engaged properly and the cords are relieved.

The bars (Fig. 81/1) form the mechanical transport lock.



Fig. 81

4. Lower the tractor lower links into a central position.



Ensure that the machine has sufficient ground clearance in all driving situations.



Fig. 82

## 10.2 Use

1. Swivel the machine wings of the traffic light kit from the road transport position into the machine working position (see Fig. 83).



**Fig. 83**

2. Position the wings of the lighting system using pins and safety splints.



**Fig. 84**

3. Fold out the machine wings on the field (see section "Folding the machine wings in / out", Seite 96).
4. Just before starting work in the field, lower the soil tillage implement using the tractor hydraulics until the soil tillage tines are slightly above, but not touching, the ground.
5. Bring the universal joint shaft of the tractor up to the prescribed speed (see section "Tractor universal joint shaft speed / tine speed", Seite 50).

To prevent damage to the PTO shaft, engage hydraulically or pneumatically shiftable universal joint shafts while idling only.

6. Approach the position with the tractor and lower the soil tillage implement completely.  
While working in the field, leave control unit 1 (see section "Overview – supply lines between the tractor and the machine", Seite 39) in float position.



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

- The working depth of the soil tillage implement
- The side panels
- The levelling bar
- The tractor wheel mark eradicator

For great working depths, it is necessary to replace the soil tillage 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

---

When turning at the end of the field, raise the soil tillage implement just enough to lift the soil tillage implement and roller slightly out of the ground.

As long as the PTO shaft is angled only slightly, the PTO shaft can continue to run.

If the machine makes noise while lifted, switch off the tractor universal joint shaft.

## 11 Faults



### WARNING

**Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks through:**

- **unintentional falling of the machine raised using the tractor's three-point hydraulic system.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and the machine against unintentional start-up and rolling away, before you eliminate any faults on the machine. For more information, refer to section 6.2 Seite 70

Wait for the machine to stop, before entering the machine danger area.

### 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 immediately adjust the scrapers, but simply pull the roller over solid (unploughed) ground until it rotates easily.

### No motion of soil tillage tines when work is in progress

If the machine encounters stony ground or a fixed obstacle, the tool carriers may come to a complete stop.

To prevent gearbox damage, a ratchet clutch is upstream of each angular gearbox.

If the tool carriers come to a complete stop because the ratchet clutch disengages, follow these steps:

- Stop.
- Lower the universal joint shaft speed of the tractor (approx. 300 rpm) until you hear the ratchet clutch engage.

If the tool carriers do not begin to rotate:

- Disengage the tractor universal joint shaft.
- Apply the tractor parking brake.
- Switch off the tractor engine.
- Take out the ignition key.
- Remove the obstacle.

After the obstacle is removed, the ratchet clutch is again ready to use.

## 12 Cleaning, maintenance and repairs



### WARNING

**Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks through:**

- **unintentional falling of the machine raised using the tractor's three-point hydraulic system.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and machine against unintentional starting and unintentional rolling away before you perform any cleaning, servicing or maintenance work on the machine. For more information, refer to Seite 70.



### WARNING

**Danger of crushing, shearing, cutting, being caught or drawn in, winding and knocks through unprotected danger points!**

- Mount protective equipment, which you removed when cleaning, maintaining and repairing the machine.
- 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:**

- Switched off the universal joint shaft.
- Folded out the machine extension arms (see section "Folding the machine wings in / out", Seite 96).
- Lowered the machine completely.
- Applied the tractor parking brake.
- Shut off the tractor engine.
- Removed the ignition key.

## 12.1 Cleaning the machine



- Inspect the hydraulic hose lines with particular care!
- Never treat the hydraulic hose lines with petrol, benzene, kerosene or mineral oils.
- After cleaning, grease the machine, in particular after cleaning with a high pressure cleaner / steam jet or liposoluble agents.
- Observe the statutory requirement for the handling and removal of cleaning agents.



### **Important instructions for cleaning with a high-pressure cleaner / steam jet:**

- Do not clean any electrical components.
- Do not clean any chromed 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 machine.
- Comply with safety regulations when working with high pressure cleaners.

## 12.2 Lubrication specifications



### DANGER

Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.



### DANGER

Fold out the machine for lubrication (see section "Folding the machine wings in / out", Seite 96) and lower it completely unless otherwise specified.



Lubricate the machine according to the manufacturer's instructions.

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

Lubrication points on the machine are indicated with the foil sticker (Fig. 85).

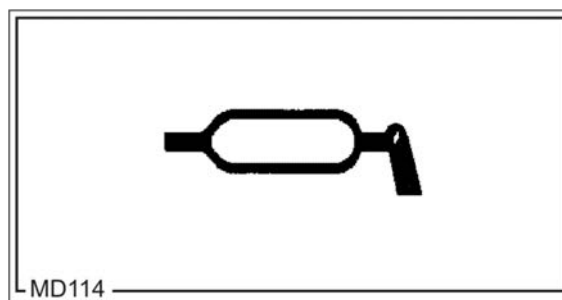


Fig. 85

### 12.2.1 Lubricants



For lubrication work, use a lithium saponified multipurpose grease with EP additives:

Company	Lubricant name
ARAL	Aralub HL2
FINA	Marson L2
ESSO	Beacon 2
SHELL	Ratinax A

## 12.2.2 Lubrication points – overview

Refer to the table (Fig. 86) for the lubrication points and lubrication intervals.

Lubrication points (see Figure)	Number of grease nipples	Lubrication interval	Note
Fig. 87/1	4	50 h	
Fig. 87/2	2	250 h <sup>2)</sup>	See section: Moving the protective cap of the PTO shaft on the PTO shaft, Seite 106.
Fig. 87/3	2	250 h <sup>2)</sup>	
Fig. 87/4	2	250 h <sup>2)</sup>	
Fig. 87/5	2	250 h <sup>2)</sup>	
Fig. 87/6	2	250 h <sup>2)</sup>	Opening the sliding profile for lubrication
Fig. 88/1	1	250 h <sup>2)</sup>	
Fig. 88/2	1	250 h <sup>2)</sup>	
Fig. 88/3	1	250 h <sup>2)</sup>	Use the installation hole in the guard screen for lubricating the machine-side PTO shaft half.
Fig. 88/4	1	250 h <sup>2)</sup>	Refer also to the section on: Moving the protective cap of the PTO shaft on the PTO shaft, Seite 106.
Fig. 88/5	1	250 h <sup>2)</sup>	Opening the sliding profile for lubrication
Fig. 89/1	2	50 h <sup>1)</sup>	
<sup>1)</sup> Always lubricate with the machine folded in and secured (see 10.1, Seite 96). <sup>2)</sup> Observe the service instructions of the PTO shaft manufacturer.			

Fig. 86

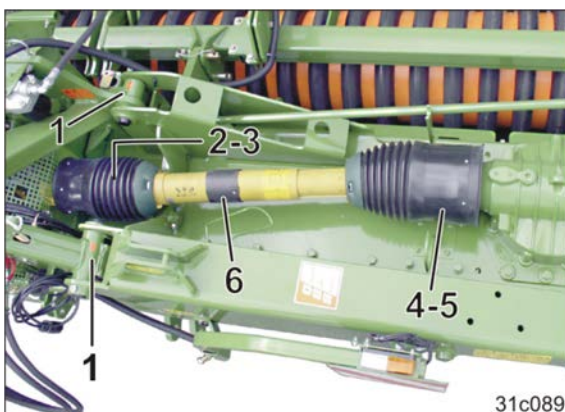


Fig. 87

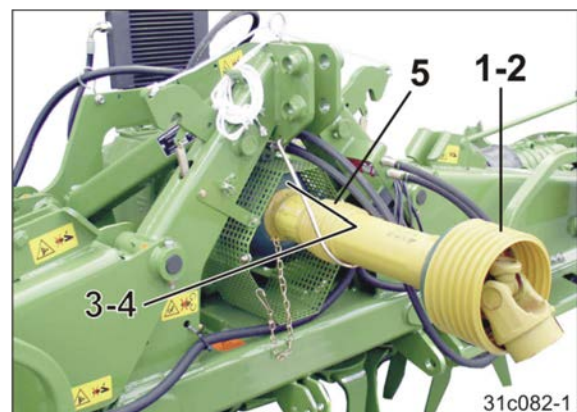


Fig. 88



Fig. 89

### 12.2.2.1 Moving the protective cap of the PTO shaft on the PTO shaft

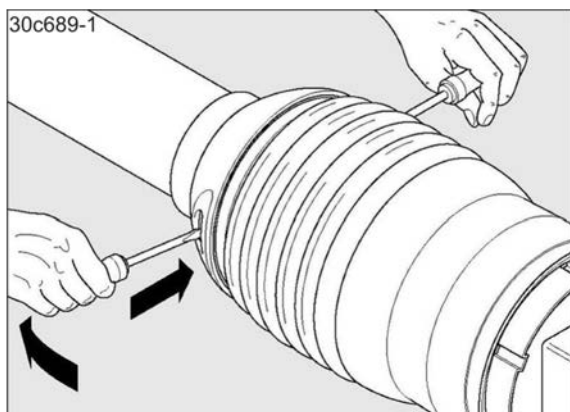


Fig. 90

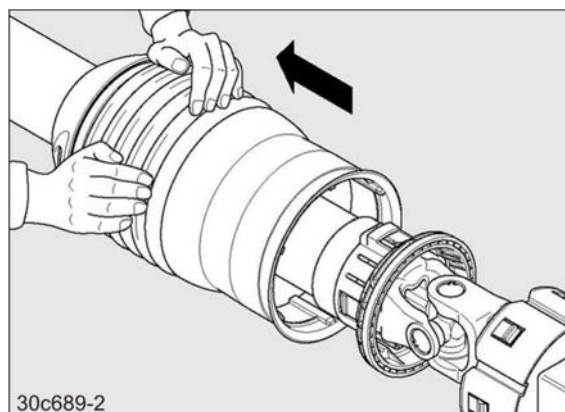


Fig. 91

1. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
2. Detach the PTO shaft protective cap.
  - 2.1 Actuate the snap fasteners using two wide screwdrivers (Fig. 90).
3. Move the protective cap on the PTO shaft (Fig. 91).
4. Lubricate the grease nipples (Fig. 92/1+2).

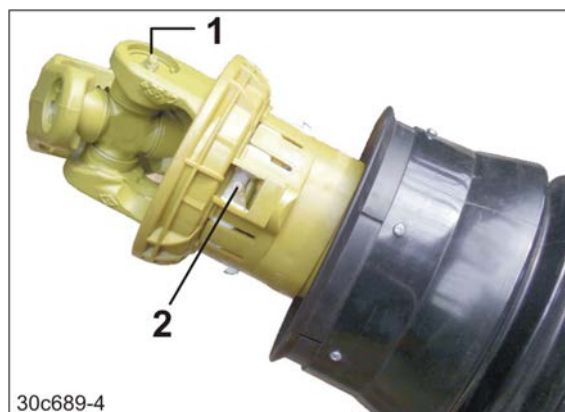


Fig. 92



#### **DANGER**

After you finish the maintenance work, push the PTO shaft protective cap back into place.

Ensure that the snap fasteners engage properly.

## 12.3 Service plan – overview



Carry out maintenance work when the first interval is reached.

The times, continuous services or maintenance intervals specified in any third party documentation shall have priority.

<b>Before initial operation</b>	Specialist workshop	Check and service the hydraulic hose lines. The inspection has to be recorded by the owner/operator.	Section 12.11
		Checking the oil level Three-gear transmission	Section 12.4
		Checking the oil level Angular gearbox	Section 12.5
		Checking the oil level Spur gear trough	Section 12.6
		Checking the vent pipes	Section 12.6.1
<b>After the first 10 operating hours</b>	Specialist workshop	Check and service the hydraulic hose lines. The inspection has to be recorded by the owner/operator.	Section 12.11
<b>After the first 50 operating hours</b>	Specialist workshop	Changing transmission fluid Three-gear transmission with Changing the oil filter of the cooling kit	Section 12.4 and Section 12.4.1
	Specialist workshop	Changing transmission fluid Angular gearbox	Section 12.5

## Cleaning, maintenance and repairs

<b>Every day before beginning work</b>		Check: Length of the soil tillage tines	Section 5.3.2
		Check: Checking/replacing the upper and lower link pins	Section 12.9
<b>Daily at the end of work</b>		Cleaning the machine (if necessary)	Section 12.1
<b>Every week, at the latest every 50 operating hours</b>	Specialist workshop	Check and service the hydraulic hose lines. The inspection has to be recorded by the operator.	Section 12.11
		Checking the oil level Three-gear transmission	Section 12.4
		Checking the oil level Angular gearbox	Section 12.5
		Checking the oil level Spur gear trough	Section 12.6
		Checking the vent pipes	Section 12.6.1
		Checking/adjusting the wedge ring roller scrapers	Section 12.7
		Checking/adjusting the tooth packer roller scrapers	Section 12.8
		Checking/replacing the upper and lower link pins	Section 12.9
<b>Every 6 months before the season</b>	Specialist workshop	Check and service the hydraulic hose lines. The inspection has to be recorded by the operator.	Section 12.11
	Specialist workshop	Checking/cleaning/lubricating the ratchet clutch	Section 12.10
<b>Every 6 months after the season</b>	Specialist workshop	Checking/cleaning/lubricating the ratchet clutch	Section 12.10

## 12.4 Three-gear transmission

### Checking the oil level

1. Park the machine on a level surface.
2. Unscrew the oil check screw (Fig. 93/1).

The oil level reaches the bottom edge of the inspection opening.

3. Replenish transmission fluid if necessary (see "Changing transmission fluid", unterhalb).
4. Screw in the oil check screw.

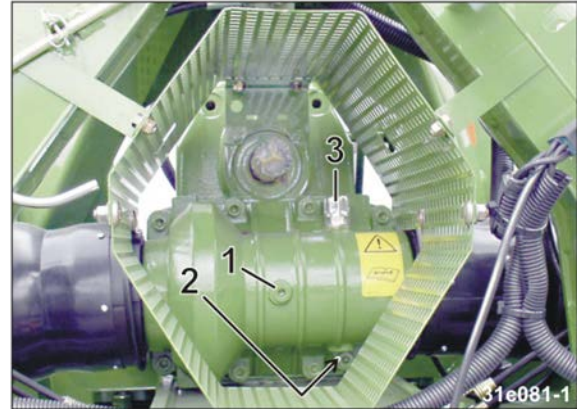


Fig. 93

### Changing transmission fluid (specialist workshop)

1. Remove the PTO shaft and guard screen.
2. Place a suitable container below the oil drain opening.
3. Unscrew the oil drain screw (Fig. 93/2).
4. Collect the transmission fluid and dispose of it properly.
5. Screw in the oil drain screw.
6. Unscrew the breather (Fig. 93/3).
7. Add new transmission fluid [see Table (Fig. 94)] through the ventilation opening.
8. Screw in the breather.
9. Install the guard screen and PTO shaft.

Fill quantity, machine without oil cooler	8.0 litres
Fill quantity, machine with oil cooler	9.5 litres
Transmission fluid	Mobil Glygoyle 30 SNR 130563 (synthetic oil)

Fig. 94



If proper ventilation is not provided, the gearbox can develop leaks.

- Use the original breather only.
- Check the breather (Fig. 93/3) for secure fit.

## 12.4.1 Changing the oil filter of the cooling kit (specialist workshop)

Transmission cooling kit (optional)

1. Remove the oil filter cartridge (Fig. 95/1).
  - 1.1 Unscrew the four screws (Fig. 95/2).
  - 1.2 Remove the oil filter cartridge carefully (oil can escape).
2. Replace the oil filter in the oil filter cartridge.



### CAUTION

**Danger of burns  
from hot transmission fluid!**

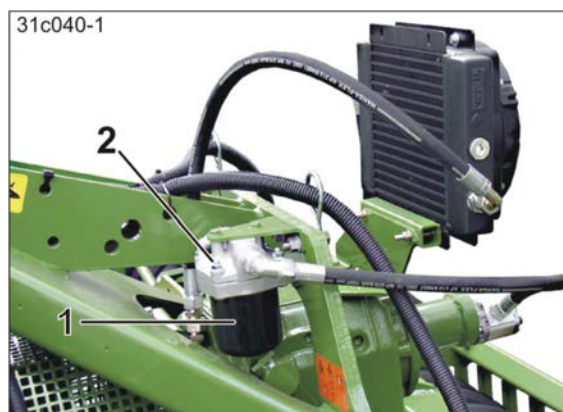


Fig. 95

## 12.5 Angular gearbox

### Checking the oil level

1. Park the machine on a level surface.
2. Unscrew the oil check screw (Fig. 96/1).

The oil level reaches the bottom edge of the inspection opening.

3. Replenish transmission fluid if necessary (see "Changing transmission fluid", unterhalb).
4. Screw in the oil check screw.

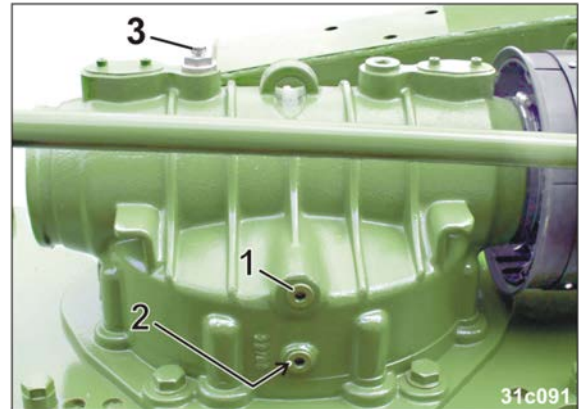


Fig. 96

### Changing transmission fluid

1. Place a suitable container below the oil drain opening.
2. Unscrew the oil drain screw (Fig. 96/2).
3. Collect the transmission fluid and dispose of it properly.
4. Screw in the oil drain screw.
5. Unscrew the breather (Fig. 96/3).
6. Add new transmission fluid [see Table (Fig. 97)] through the ventilation opening.
7. Screw in the breather.

Filling quantity	4.5 litres
Transmission fluid	Mobil Glygoyle 30 SNR 130563 (synthetic oil)

Fig. 97



If proper ventilation is not provided, the gearbox can develop leaks.

- Use the original breather only.
- Check the breather (Fig. 96/3) for secure fit.

## 12.6 Spur gear trough

### Checking the oil level

1. Park the machine on a level surface.
2. Open the lid (Fig. 98/1) of the vent pipe for checking and for filling the spur gear trough with transmission fluid [see Tables (Fig. 99 / Fig. 100)].

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

3. Check the second spur gear trough.



Fig. 98



Dirt must not get into the spur gear trough during filling.



There is no need to change the oil.

	Fill quantity per spur gear trough	Total filling level per machine (2 spur gear troughs)
<b>KG 4000-2</b>	18 litres	36 litres
<b>KG 5000-2</b>	21 litres	42 litres
<b>KG 6000-2</b>	25 litres	50 litres

Fig. 99

Manufacturer	Transmission fluid	Manufacturer	Transmission fluid
Wintershall	ERSOLAN 460	DEA	Falcon CLP 460
Agip	Blasia 460	ESSO	Spartan EP 460
ARAL	Degol BG 460	FINA	Giran 460
Autol	Precis GEP 460	Fuchs	Renep Compound 110
Avia	Avilub RSX 460	Mobil	Mobilgear 634
BP	Energol GR-XP 460	Shell	Omala 460
Castrol	Alpha SP 460	OMV	OMV Gear HST 460

Fig. 100



The spur gear trough is filled at the factory with ERSOLAN 460 transmission fluid.

- All gear oil varieties listed in the table (Fig. 100) can be used for replenishing or the transmission fluid ERSOLAN 460 can be replaced with any of the gear oil varieties listed.
- Add new, clean transmission fluid only.
- Do not use any other gear oil varieties than those listed in the table (Fig. 100).

### 12.6.1 Checking the vent pipes

1. Check the vent pipe (Fig. 101/1) of the spur gear trough for permeability.
2. Check the vent pipe of the second spur gear trough.



Fig. 101

## 12.7 Checking/adjusting the wedge ring roller scrapers

Screw on the scrapers (Fig. 102/1) with a distance of 10 mm to the roller sleeve.



Fig. 102

## 12.8 Checking/adjusting the tooth packer roller scrapers



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

1. Fold out the machine wings (see section "Folding the machine wings in / out", Seite 96).
2. Using the tractor hydraulics, lift the rotary cultivator just enough for the roller to clear the ground.
3. Prop up the rotary cultivator to prevent it from lowering accidentally.
4. Unscrew the screw (Fig. 103/2).
5. Screw on the scraper (Fig. 103/1) with a distance of 0.5 mm to the roller sleeve.
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.

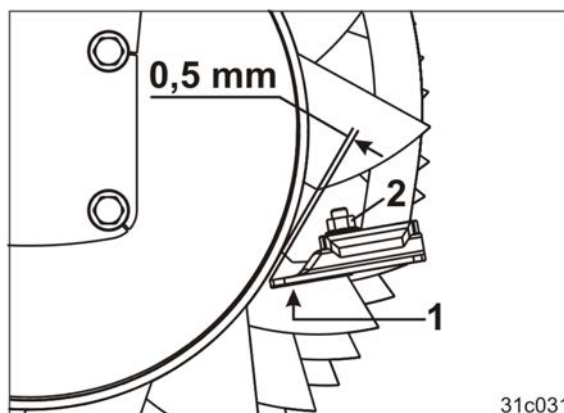


Fig. 103

## 12.9 Checking/replacing the upper and lower link pins



### WARNING

**Danger of crushing, catching, and knocks if the machine unexpectedly releases from the tractor!**

Check the upper and lower link pins for visible damage each time you couple the machine. Replace the upper and lower link pins in the event of wear.

## 12.10 Checking/cleaning/lubricating the ratchet clutch (specialist workshop)

When used under normal conditions, the ratchet clutch (Fig. 104/1) is maintenance-free. However, if the clutch engages frequently, check the ratchet clutch for dirt.

To do so, open the ratchet clutch, clean it, and lubricate it with special grease (for more information, refer to the service instructions of the PTO shaft manufacturer).

Use special grease only:

- Agraset 116 or
- Agraset 117.

During installation, observe the installation instructions (see section "12.10.1", unterhalb).

### 12.10.1 Installation instructions for ratchet clutch

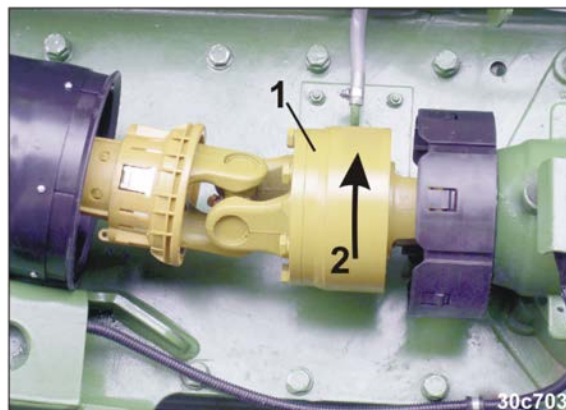
The ratchet clutches must not be mixed up during installation [see Table (Fig. 104)].

The ratchet clutches (1) rotate in the direction of the arrow (2).

The ratchet clutches (1) are installed correctly if, when seen from above, the arrows (2) on the ratchet clutches point in the direction of travel.

The illustration shows the Walterscheid ratchet clutch with the designation EK64/22R (clock-wise), on the right side of the machine viewed in direction of travel.

The Walterscheid ratchet clutch on the left side of the machine viewed in the direction of travel has the designation EK64/22L (anticlockwise).



**Fig. 104**

## 12.11 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 connected machines, ensure that the hydraulic system is depressurised on both the drawing vehicle 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 at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose line if it is damaged or worn. Only use original **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 ageing, 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 from thermoplastics, other guide values may be authoritative.
- Dispose of old oil in the correct way. 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.

### 12.11.1 Labelling hydraulic hose lines

The valve chest identification provides the following information:

Fig. 105/...

- (1) Manufacturer's marking on the hydraulic hose line (A1HF)
- (2) Date of manufacture of the hydraulic hose line (09/02 = Year / Month = February 2009)
- (3) Maximum approved operating pressure (210 BAR).

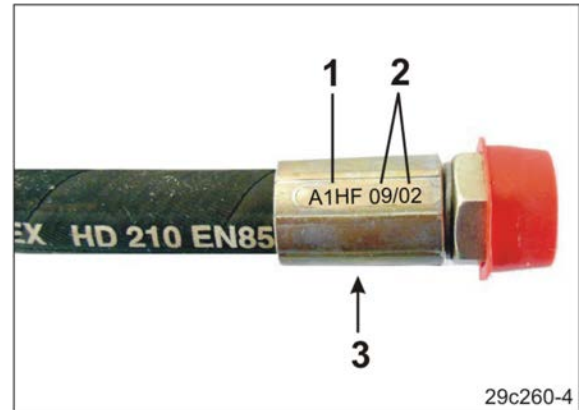


Fig. 105

### 12.11.2 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 hydraulic hose lines for visible damage.
2. Eliminate any scouring points on hydraulic hose lines and pipes.
3. Replace any worn or damaged hydraulic hose lines immediately.

### 12.11.3 Inspection criteria for hydraulic hose lines



For your own safety, comply with the following inspection criteria!

**Replace hydraulic hose lines, on determining any of the following 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 or the hose line. 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 is decisive for determining these six years. If the date of manufacture on the assembly is "2009", then the hose should not be used beyond February 2015. See also "Labelling of hydraulic hose lines".

#### 12.11.4 Installation and removal of hydraulic hose lines



When installing and removing hydraulic hose lines, always observe the following information:

- Only use original **AMAZONE** hydraulic hose lines.
- Ensure cleanliness.
- You must always install the hydraulic hose lines so that, in all states of operation:
  - 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 over-tensioned.
- Fix the hydraulic hose lines to the intended fixing points. There, avoid hose clips, which impair the natural movement and length changes of the hose.
- It is forbidden to paint over hydraulic hose lines!

## 12.12 Exchanging the soil tillage tines

1. Fold in the machine wings (see section "Folding the machine wings in / out", Seite 96).
2. Remove the lynch pin (Fig. 106/1).
3. Remove the pin (Fig. 106/2) from the tool carrier by striking it in an upwards direction.
4. Replace the soil tillage tines (Fig. 106/3) [see Table (Fig. 107)].
5. Fasten the soil tillage tines using the pin and secure it using the lynch pin.

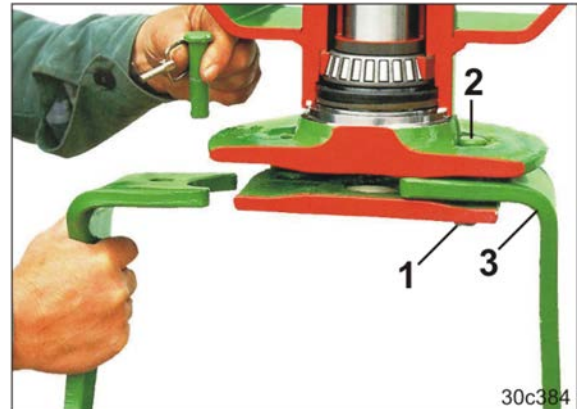


Fig. 106

### Direction of rotation of the soil tillage tines

The machine is equipped with two varieties of soil tillage tines (clockwise/anticlockwise).

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

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

Note:

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

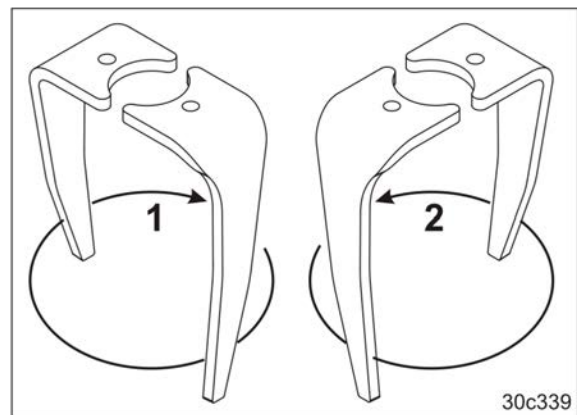


Fig. 107



The soil tillage tines of the rotary cultivator are "on grip" when they are fastened to the tool carriers as shown in the table (Fig. 107).

## 12.13 Adjusting the speed of the machine wings during folding (specialist workshop)

A higher unfolding speed of the rotary cultivator than that set at the factory can cause damage to the machine. Therefore, make a correction only in exceptional cases with sufficient reason.

Use a hexagon socket wrench (Fig. 108/1) to change the diameter of the opening of a throttle and thus the oil supply to the hydraulic cylinder. The machine has 4 throttles.

1. Loosen the lock nut.
2. Make the adjustment [see Table (Fig. 108)].

Note:

Make the same adjustment on all 4 throttles.

3. Tighten the lock nut.
4. Check the settings with particular caution.

- **To increase the folding speed:**  
Unscrew the hexagon socket head screw using a hexagon socket wrench (1) by a maximum of **one-quarter turn**.
- **To decrease the folding speed:**  
Screw in the hexagon socket head screw using a hexagon socket wrench (1), by a maximum of **one-quarter turn**.



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- Observe the maximum adjustment distances (**one-quarter turn**).
- Make the same adjustments on all four throttles.
- Check the settings immediately and correct if necessary.

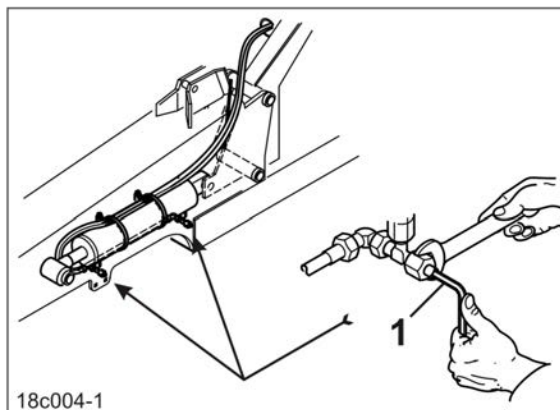


Fig. 108

## 12.14 Screw tightening torques

Thread	Width across flats [mm]	Tightening torques [Nm] depending on the quality of the nuts/bolts		
		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

## 13 Hydraulic diagrams

### 13.1 Hydraulic diagram – rotary cultivator

Rotary cultivator KG 4000-2, KG 5000-2, KG 6000-2

Fig. 109/...	Designation	Note
T01	Hydr. cyl., folding, frame, left	
T02	Hydr. cyl., folding, frame, right	
T03	Hydr. cyl., working depth, outer, left	
T04	Hydr. cyl., working depth, centre, left	
T05	Hydr. cyl., working depth, centre, right	
T06	Hydr. cyl., working depth, outer, right	
T07	Check valve (4 pcs.)	
T08	Control block, depth adjustment	
T09	1 cable tie, green	
T10	2 cable ties, green	
T11	1 cable tie, yellow	
T12	2 cable ties, yellow	
T13	Tractor	

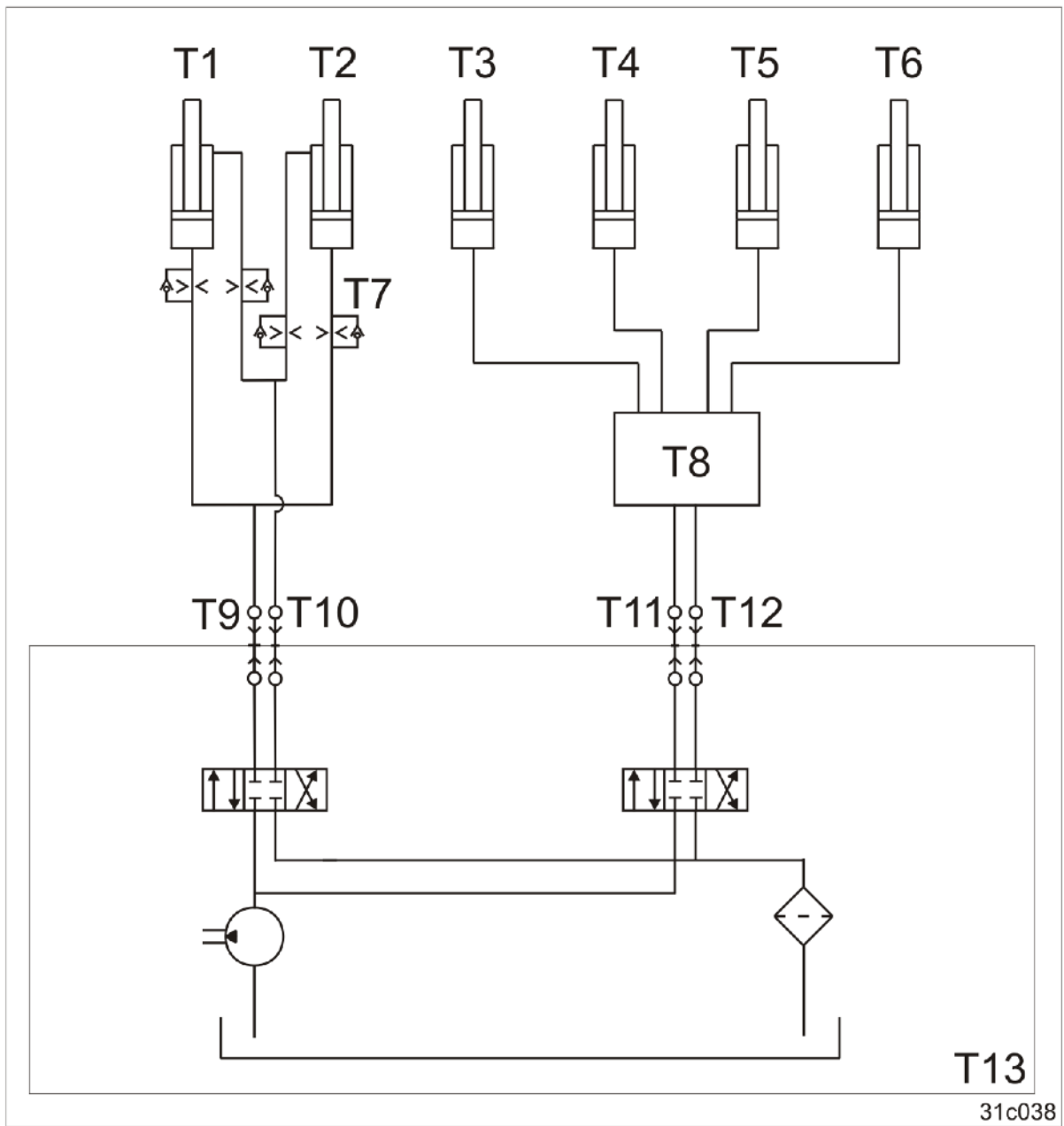


Fig. 109







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