

Instruction manual

AMAZONE

Deep Loosener

TL 3000



MG3500
BAH0035-0 10.09



Before starting operation,
please carefully read and
follow this instruction manual
and safety advice.
Retain for future reference.

en



Reading the instruction

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

Leipzig-Plagwitz 1872. Rud. Sark.



Identification data

Enter the implement identification data here. You will find the identification data on the data plate.

Machine-Ident-Nr.:
(ten figure number)

Type:

TL 3000

Year of construction:

Power kW:

Basic weight kg:

Allowable total weight kg:

Manufacturer's address

AMAZONEN-WERKE

H. DREYER GmbH & Co. KG

Postfach 51

D-49202 Hasbergen

Tel.: + 49 (0) 5405 50 1-0

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For spare parts orders

AMAZONEN-WERKE

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email: et@amazone.de

Online spare parts catalogue: www.amazone.de

When ordering spare parts always specify the machine ID no. (10 figures) of the machine.

Formal remarks to this instruction manual

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Dear Customer,

You decided to purchase one of our high quality machines from the comprehensive range of farm machinery produced by AMAZONEN-WERKE, H. DREYER GmbH & Co. KG.

When receiving the machine, please check immediately that no damage has been caused in transit and that all parts are present. Please check whether all parts mentioned in the delivery note including the ordered optional equipment are present. Only the immediate reportage of damage will be considered for compensation.

Before the first operation, please read and adhere to this instruction manual and the safety advice. After having thoroughly read the instruction manual you can make fullest use of the advantages of your recently purchased machine.

Please ensure that this instruction manual is made available to any operator before he or she starts to operate the machine.

In case of any questions or problems, please refer to this instruction manual or just call us.

Maintenance and in regular intervals and the exchange of worn or damaged parts in time increases the life expectancy of your machine.

User's review

Dear reader,

Our instruction manuals are regularly updated. With your suggestions for improvement you will help to create an always user friendly instruction manual. Please send your suggestions by fax.

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1 User instructions

The chapter "User advice" provides information for dealing with the instruction manual.

1.1 Purpose of the document

The present instruction manual

- describes the operation and maintenance of the implement.
- gives important advice for safe and efficient operation of the implement.
- is a component of the implement and should be retained so that it is always available on the implement or in the towing vehicle.
- must be retained for future reference.

1.2 Information about directions in this instruction manual

All information about direction in this instruction manual are to be understood in direction of travel.

1.3 Illustrations used

Action instructions and reactions

The steps of operation to be carried out by the operational staff are described in a numbered list. Follow the sequence of the specified action instructions. The reaction to the respective action instruction is marked by an arrow. Example:

1. Operational action step 1
→ Reaction of the implement on operational action step 1
2. Operational action step 2

Listings

Listings without a mandatory sequence are presented as a list with bullet points. Example:

- Point 1
- Point 2

Position numbers in illustrations

Numbers in parentheses refer to position numbers in illustrations. The first figure refers to the illustration, the second figure refers to the item number in the illustration.

Example (Fig. 3/6):

- Figure 3
- Item 6



2 General safety advice

This chapter contains important hints for the safety conscious operation of the machine.

2.1 Obligations and liability

Observe the advice given in this instruction manual

Knowledge of the basic safety instructions and safety guidelines is the basic prerequisite for safe handling and trouble-free machine operation.

Obligation of the user

The owner is obligated to only allow persons to work with/on the machine who

- are acquainted with the basic regulations regarding health and safety at work and accident prevention.
- have been instructed in the work performed with/on the implement
- have read and understood this instruction manual.

The owner is obligated to

- to keep all warning signs on the implement in readable condition.
- to replace damaged warning signs.

If there are questions please contact the manufacturer.

Obligation of the operator

Before commencing any operation all persons who are instructed to operate the machine commit themselves to

- to observe the basic regulations regarding health and safety at work and accident prevention
- to read and follow the chapter "Safety" in this manual
- to read the chapter "Safety symbols and other identifications on the machine", on page 16 in this manual and to comply with the safety instructions given by the warning signs when operating the implement
- to familiarize themselves with the implement
- to read the sections of this manual that are important for executing the tasks that have been assigned to them.

If the operator notices safety problems with any part of the implement, he or she must rectify the problem immediately. If this does not constitute part of the operator's job description or if he/she does not have the required technical skills, then he/she must report the problem to a superior (the owner).

Dangers associated with handling the machine

The machine has been manufactured according to the state of the art and the certified safety regulations. Nevertheless when using the machine dangers and impairments can occur

- for the health and life of the operator or third parties,
- for the implement itself,
- for other property.

Only use the machine

- for its intended purpose.
- in perfect, safe working order.

Immediately remedy all failures affecting the safety.

Guarantee and liability

As a matter of principle our "General terms of sale and delivery" prevail. These will be made available to the user on the date of conclusion of contract at the latest. Warranty and liability claims for injury to life or property are rejected when they have been put down to one or several of the following causes:

- improper use of the implement.
- improper assembly, start-up, operation and maintenance of the implement.
- operating the implement with defective safety features or incorrectly fitted or non-functioning safety and guard devices.
- non-compliance with the instruction manual regarding start-up, operation and maintenance,
- alterations to the structure of the implement undertaken without the manufacturer's approval.
- insufficient monitoring of machinery parts that are subject to wear.
- faulty repair work.
- disasters due to external influences and force majeure.

2.2 Illustration of safety advice

Safety instructions are indicated by the triangular safety symbol and the preceding heading. The signal word (DANGER, WARNING, CAUTION) describes the severity of the threatening hazard and has the following meaning:



DANGER

indicates an immediate hazard with high risk, resulting in death or serious personal injury (loss of body parts or long-term damage) if it is not avoided.

If these warnings are not heeded imminent fatal consequences or severe bodily injury is threatened.



WARNING

indicates a possible danger with moderate risk that can result in death or (severe) bodily injury if it is not avoided.

Failure to heed these warnings results in fatal consequences or severe injuries under certain circumstances.



CAUTION

indicates a danger with minor risk that could cause minor or moderate bodily injury or property damage if it is not avoided.



IMPORTANT

indicates an obligation for certain behaviour or a certain activity to properly handle the machine.

Failure to comply with these warnings can result in disturbances on the machine or in the vicinity of the machine.



NOTE

indicates tips for operation and particularly useful information.

These hints will help you to optimally make use of the function of the machine.

2.3 Organising measures

The operator must ensure the availability of the personal protective equipment, e.g.:

- safety goggles
- safety shoes
- protective clothing
- skin protection, etc.



The instruction manual

- must always be kept where the implement is operated.
- must always be easily accessible to the operator and maintenance personnel.

Regularly check all existing safety devices.

2.4 Safety devices and protective devices

Only operate the machine with all safety devices and guards fitted and properly functioning. Regularly check all safety devices and guards.

Defective safety devices

Defective or dismantled safety devices and protective devices can cause hazardous situations.

2.5 Informal safety measures

Besides the safety advice in this instruction manual observe and adhere to the national, local and generally valid advice for operational safety, accident prevention and environmental care.

Please particularly observe the accident prevention prescriptions of your national authorised trade association.

2.6 Training of the staff

Only trained and instructed personnel should work with/on the machine. The owner must clearly specify the responsibilities of personnel for operation, maintenance, and repair.

A trainee may only operate the machine under the supervision of a skilled person.

Personnel Activity	Person specially trained for the task ¹⁾	Instructed person ²⁾	Persons with specific professional training (specialist workshop) ³⁾
Loading/transport	X	X	X
Putting into operation	—	X	—
Installation, setting up	—	—	X
Operation	—	X	—
Maintenance	—	—	X
Troubleshooting and malfunction resolution	—	X	X
Disposal	X	—	—

Legend: X.. allowed —..not permitted

- ¹⁾ A person who is able to undertake a specific task and who is permitted to perform this task for an appropriately qualified company.
- ²⁾ An instructed person is a person who has been instructed and, if required, has had practical orientation for the assigned tasks and the potential hazards associated with improper behaviour, and has been educated concerning the necessary safety features and protective measures.
- ³⁾ Persons with specific professional training are considered to be specialists. Due to their professional training, and knowledge of the applicable regulations they can evaluate the tasks assigned to them and can recognize possible hazards.

Comment:

A qualification equivalent to professional education can also be acquired through multi-year activity in the applicable field.



Any servicing and maintenance task identified as a "Workshop Task" may only be carried out by a specialised workshop. Personnel employed by a specialized workshop have required knowledge as well as suitable equipment (tools, lifting, and support equipment) for proper and safe execution of tasks to service and maintain the machine.

2.7 Safety measures in normal operation

Only operate the machine if all safety devices and protective devices are completely functional.

Check the machine at least once a day for externally recognisable damage and for function of the safety devices and guards.

2.8 Dangers due to residual energy

Beware of residual mechanical, hydraulic, pneumatic, and electric/electronic power on the implement.

Undertake appropriate measures when instructing the operating staff. Detailed hints are again given in the relevant chapters of this instruction manual.

2.9 Service and maintenance, fault correction

Execute prescribed adjusting, service, and inspection tasks.

Safeguard all operating media such as compressed air and hydraulic fluid against unintentional start-up.

Carefully fasten and secure the larger components to lifting machines when replacing such components.

Check that loose threaded connections are firmly secured. Check the function of safety and protective devices after any maintenance work.

2.10 Structural changes

Do not make any changes, attach anything, or convert anything on the machine without permission from AMAZONEN-WERKE. This also applies for welding work on bearing parts.

All attachment or conversion measures require written permission from AMAZONEN-WERKE. Use only modification and accessory parts approved by AMAZONEN-WERKEN to ensure that the operating permit remains valid according to national and international regulations.

Vehicles with official operating licenses or devices and equipment connected to a vehicle with valid operating license or approval for road traffic as stipulated in traffic regulations must be in the status specified in the permission or license.



WARNING

Danger due to crushing, cutting, catching, pulling in and impact caused by the breaking of bearing parts.

The following is prohibited

- drilling on the frame or the chassis.
- boring out existing holes on the frame or the chassis.
- welding on load-bearing parts.

2.10.1 Spare parts and wearing parts as well as auxiliary material

Immediately exchange defective machine parts.

Use only original AMAZONE spare parts and parts subject to wear, or parts that have been approved by AMAZONEN-WERKEN to ensure that the operating permit remains valid according to national and international regulations. With use of spare parts and wearing parts from third-party manufacturers there is no guarantee that these parts have been designed and manufactured to meet the stress and safety requirements.

AMAZONEN-WERKE assumes no liability whatsoever for damage arising from the use of non-approved spare parts and wearing parts, or non-approved auxiliary materials.

2.11 Cleaning and disposal

Properly handle and dispose of used substances and materials, particularly

- when working with lubrication systems and devices and
- when cleaning with solvents.

2.12 Operator's workstation

The implement may only be operated by one single person from the driver's seat in the tractor.

2.13 Safety symbols and other identifications on the machine



Always keep all safety symbols on the machine clean and in well readable condition! Replace not readable safety symbols. Ask your dealer for warning signs stating the relevant order number (e.g. MD 075).

Warning signs - composition

Warning signs indicate hazard zones on the implement and warn of residual risks. These hazard zones include ongoing existing hazards and hazards that may arise without warning.

The warning sign consists of 2 fields:



Field 1

Gives a vivid description of the danger and is surrounded by a triangle safety symbol.

Field 2

Gives the vivid instruction to avoid these dangers.

Warning sign - Explanation

The column **Order Number and Explanation** gives a description of the adjacent warning sign. The description of the warning sign is always the same and states in the sequence indicated:

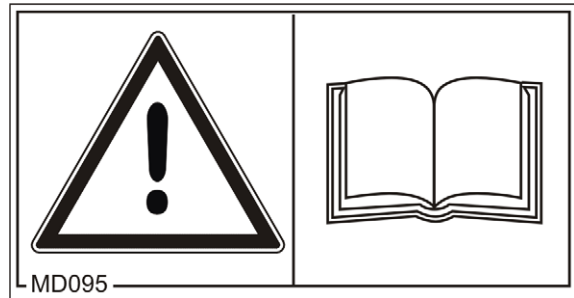
1. Description of danger.
Example: Laceration or amputation hazard.
2. Consequences when not adhering to the given advice how to avoid dangers.
Example: Will cause severe injury to finger or hand.
3. The advice to avoid danger.
Example: Touch machinery parts only when they have come to a complete stop.

Order No. and explanation

Warning decals

MD095

Before commencing operation read thoroughly operators manual and safety advice!

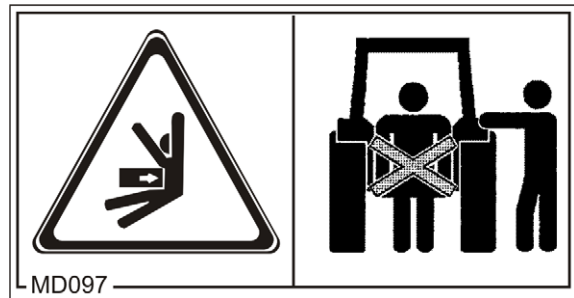


MD 097

Standing in the lifting zone of the three-point linkage when operating the three-point hydraulic system presents a crush hazard for the whole body.

This hazard may cause serious injury or even death.

- It is prohibited to stand within the lifting zone of the three-point linkage when operating the three-point hydraulic system.
- Operate the controls for the tractor's three-point hydraulic system
 - only from the proper work station.
 - never if you are in the lifting zone between the tractor and the implement.



2.13.1 Positioning of warning decals and other identifications

Warning decals

The following illustrations show the arrangement of the warning decals.



Fig. 1

2.14 Danger when not adhering to the safety advice

Failure to comply with safety instructions

- may present a hazard to persons, the environment and the implement.
- may render any damage claims null and void.

Specifically, failure to comply with the safety instructions may result in the following dangers:

- Hazard to persons due to unsecured operational areas.
- Failure of important implement functions.
- Failure of stipulated methods of repair and maintenance.
- Mechanical and chemical hazards to persons
- Environmental hazard due to leaking hydraulic fluid

2.15 Safety-conscious work

Besides the safety advice in this instruction manual additionally, the national, and generally valid operation safety and accident prevention advice of the authorised trade association are binding.

Adhere to the advice given on the warning signs to avoid danger.

Comply with the legal traffic regulations when driving on public roads.

2.16 Safety advice for the operator



WARNING

Crush, cut, catching, pulling in and impact hazards caused by poor driving and operating safety.

Always check traffic and operational safety before putting the machine to operation!

2.16.1 General safety and accident prevention advice

- You must comply with the advice in this instruction manual as well as the generally applicable health and safety regulations in your country.
- The warning and advisory decals placed on the implement give important information for its safe operation. Adhering to these hints serves your safety.
- Before starting up or operating the implement, be sure to check the surrounding area (children etc.). Ensure sufficient visibility!
- It is prohibited to ride on or transport any items on the implement.
- When driving, ensure that you are in complete control of the tractor and any machinery attached directly or as a trailer at all times.
In so doing, you must consider your personal capabilities, the road, traffic, visibility and weather conditions, the handling characteristics of the tractor and the effects of the mounted or towed implement.

Coupling and uncoupling the machine

- Use only suitable tractors for coupling and transporting the implement.
- The linkage categories of the tractor and the implement must be compatible when coupling implements to the tractor's three-point hydraulic system.
- Couple the implement to the specified devices according to the instructions.
- When mounting implements at the front and/or the rear of a tractor, do not exceed
 - the total permissible tractor weight
 - the permissible tractor axle loads
 - the permissible tyre load capacity of the tractor tyres
- Ensure that the tractor and the implement cannot accidentally roll away before coupling or uncoupling the implement.
- It is forbidden for people to stand between tractor and implement while the tractor is backing up to the implement for coupling.
 - Standing of persons between the machine to be coupled and the tractor is prohibited whilst the tractor is backing up.
- Before coupling and uncoupling the implement from the tractor's three-point hydraulic system, secure the control lever for the tractor hydraulics in such a position that accidental raising or lowering is impossible.
- When coupling or uncoupling any implement, set the stabilisers

to the correct position (stability).

- There is pinching and shearing hazard when raising or lowering the stabilisers.
- Special care should be taken when coupling or uncoupling implements to or from the tractor. There exist squeezing and shearing points at the coupling points between tractor and implement.
- It is forbidden for people to stand between tractor and implement when the three point hydraulic system is in operation.
- Coupled supply lines
 - must be able to move and bend freely without tension, kinking or rubbing when driving around bends.
 - must rub on any other parts.
- Release ropes for quick couplers must hang freely and, when in the bottom position, must not be able to release the quick coupling by themselves.
- Park uncoupled implements in a safe and stable position.

Operation

- Familiarise yourself with the machinery's equipment, controls and functions before beginning operation. Doing this during operation would be too late.
- Wear close-fitting, snag-free clothes. Wearing loose-fitting clothes would increase the danger of getting caught by the drive shafts.
- Only start the implement when all guards are installed and in the the correct position.
- Observe the maximum payload of the mounted / towed implement and the permissible axle and vertical loads of the tractor. If necessary travel with only partly filled hopper.
- It is forbidden for people to stand within the operational zone of the implement.
- It is forbidden for people to stand within the pivot and swivel zones of the implement.
- There are pinch and shear points on externally powered (e.g. hydraulic) parts.
- Externally powered machinery parts may only be actuated when persons are at a safe distance from the implement.
- Ensure that the tractor and the implement cannot accidentally start up or roll away before leaving the tractor.

To do this

 - lower the implement to the ground
 - engage the parking brake
 - switch off the tractor engine
 - remove the ignition key.

Transport of the machine

- When using public roads, be sure to observe the national road traffic regulations (Highway Code).
- Before transporting the implement, make sure you check
 - that the supply lines are properly connected
 - that the light board is undamaged, operating correctly and clean
 - that the brake and hydraulic equipment show no visible signs of defect
 - that the parking brake is completely disengaged
 - that the brakes are functioning correctly
- Always ensure that the tractor's steering and braking systems are operating correctly.
Steering and braking of the tractor are influenced by mounted or trailed machines and front or rear ballast weights.
- Apply front weights if necessary.
The tractor front axle load must be at least 20 % of the tractor's net weight in order to ensure a sufficient steering.
- Attach the front or rear ballast weights properly on the specified fixing points.
- Observe the maximum working load of the mounted / towed implement and the permissible axle and tow loads of the tractor.
- The tractor must provide the required brake lag for the loaded combination (tractor plus mounted / towed implement).
- Check the function of the brakes before driving on public roads.
- Take account of the width of the mounted or towed implement and the centrifugal mass of the implement when driving around curves.
- Before driving on public roads, ensure sufficient lateral locking of the tractor's lower lift arms when the implement is fixed to the three point hydraulic system or the lower lift arms of the tractor.
- Put all swivelling machinery parts in transport position before starting transportation.
- Before transportation, secure all swivelling machinery parts in transport position to prevent dangerous movement. For this use the intended transport securing devices.
- Before transportation, secure the lever of the three point hydraulic system against accidental raising or lowering of the mounted or towed implement.
- Before transportation, ensure that the required transport equipment is correctly mounted on the implement, e.g. vehicle lights, warning devices, guards.
- Before transportation, visually check that the top and

lower link pins are secured with the locking pin against accidental loosening.

- Adapt your travelling speed to the prevailing conditions.
- Shift to a lower gear when driving down hill.
- Always switch off the single wheel braking (lock the pedal) before starting transportation.

2.16.2 Mounted implements

- When fitting to the three-point linkage, the linkage categories on tractor and implement must be compatible or an adapter must be used.
- Observe the manufacturer's instructions.
- Before coupling and uncoupling the implement at the three-point linkage, secure the controls in such a position that accidental raising or lowering is impossible.
- Pinching or shearing hazard within the operating range of the three-point linkage.
- The implement should only be transported and driven with a suitable tractor.
- Risk of injury when coupling and decoupling implements to and from the tractor.
- It is forbidden for people to stand between tractor and implement when operating the external controls for the three-point linkage.
- There is risk of pinching and shearing when operating the stabilisers.
- When mounting implements at the front or rear of a tractor, do not exceed
 - the total permissible tractor weight
 - the permissible tractor axle loads
 - the permissible tyre load capacity of the tractor tyres.
- Observe the max. working load of the mounted implement and the permissible axle loads of the tractor.
- Before transportation on public roads, ensure sufficient lateral locking of the tractor lower lift arms.
- When driving on public roads, secure the lever of the tractor lower lift arms against accidental lowering.
- Before driving on public roads, ensure that all parts are in transport position.
- Any mounted implements and ballast weights affect the handling, steering and braking of the tractor.
- The tractor front axle load must be at least 20 % of the tractor's net weight in order to ensure a sufficient steering. If necessary apply front weights.
- Always remove the ignition key before fixing malfunctions or carrying out any repair, maintenance or cleaning work.
- Ensure that all guards are always installed and properly in place.

2.16.3 Cleaning, maintenance and repair

- Only perform cleaning, maintenance and repair work on the implement if the traction unit is switched off
 - the tractor engine has come to a stop
 - the tractor engine has come to a stop
 - the ignition key has been removed
 - the implement's on-board computer has been disconnected.
- Check nuts and bolts regularly for tightness and re-tighten if necessary.
- Before carrying out any maintenance, repair or cleaning work, secure the raised implement or raised implement parts against accidental lowering.
- Use appropriate tools and wear suitable gloves when replacing tools with cutting edges.
- Properly dispose of oil, grease and filters.
- Disconnect the cable from the generator and tractor battery before doing any electrical welding on the tractor or mounted implements.
- As a minimum standard, spare parts must satisfy the technical requirements specified by AMAZONEN-WERKE. Use original AMAZONE spare parts to be sure.

3 Loading

Crane loading

When lifting the implement by crane, the pictogram (Fig. 2) shows the point where the chain must be fixed.

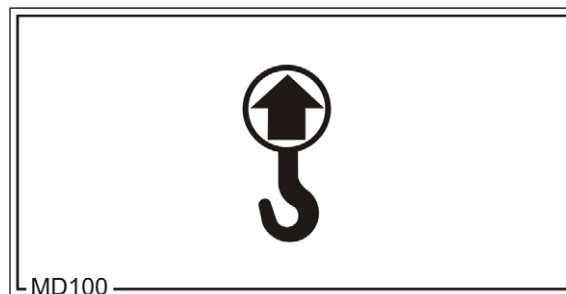
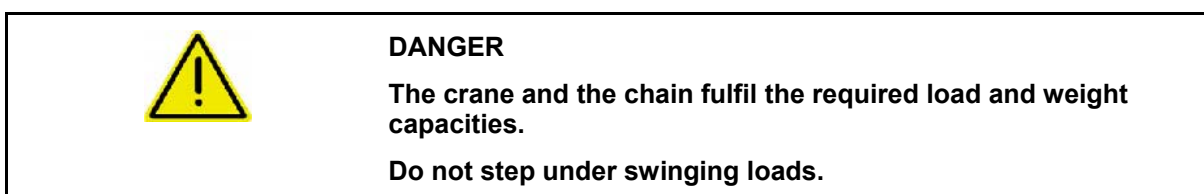


Fig. 2



1. Attach a chain at the specified points on the implement (see Fig. 3).
2. Lift the implement with a crane to load onto a transport vehicle.
3. Secure the implement properly on the transport vehicle.

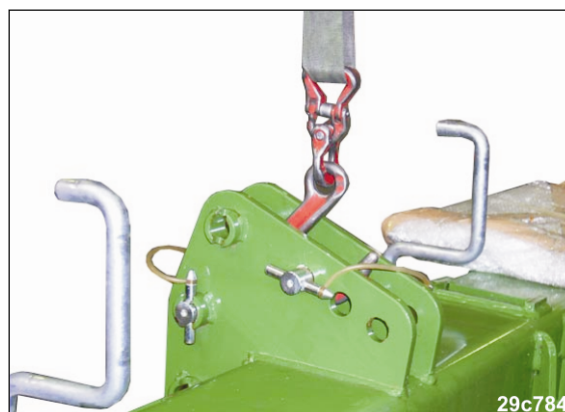


Fig. 3

4 Product description

This chapter

- provides a comprehensive overview of the implement's design.
- provides descriptions of the individual components and parts.

Read this chapter when standing at the machine. In this way you will get optimally acquainted to the machine.

4.1 Overview – Components



Fig. 4

Fig. 4/...

- | | |
|---|--------------------------------|
| (1) Main frame | (3) Soil guide share |
| (2) Crank for setting the working depth | (4) Wing shares |
| | (5) Side guide plate extension |

4.2 Road traffic safety equipment



Fig. 5



Fig. 6

The subsoiler may only be transported on public roads and tracks in combination with the rotary cultivator with rear roller, with or without mounted or pack-top seed drill attached.

The traffic safety equipment is attached to the mounted or pack top seed drill. For combinations without the seed drill, the traffic safety equipment is attached to the rotary cultivator.

You will find information on the traffic safety equipment in the instruction manual for your seed drill or rotary cultivator.

4.3 Designated use of the machine

The TL deep loosener

- is designed for soil tillage in combination with the AMAZONE rotary cultivator with roller and with or without mounted or pack top seed drill.
- is used for stubble and primary soil cultivation.
- is coupled to a tractor with the tractor three-point linkage and controlled by an operator.

You will find information on driving across or up and down slopes in the instruction manual for your seed drill or rotary cultivator.

The declined use also includes:

- observing all instructions in this instruction manual.
- carrying out all service and maintenance tasks.
- using only original AMAZONE spare parts.

Other use than that stipulated is prohibited and is no longer considered as designed use.

For damage resulting from not designed use

- the operator himself will carry the full responsibility
- AMAZONEN-WERKE accepts no liability.

4.4 Danger zone and hazard points

The danger zone is the area around the implement in which persons may come into contact

- with moving machinery parts and implements during operation
- with materials or foreign bodies ejected from the implement
- with accidentally raised or lowered implements
- with parts due to accidental rolling of the tractor and implement

Within the implement's danger zone, there are hazard points with hazards that are permanently present or may arise unexpectedly. Safety symbols identify these hazard points and warn of residual dangers which cannot be avoided through design and construction. The special safety instructions in the relevant chapters apply here.

Do not stand within the implement's hazard zone,

- whilst the tractor engine is running and the PTO shaft / hydraulic linkage is connected.
- whilst there is any risk that the tractor or implement might start up or roll accidentally.

The operator may only move or operate the implement, or switch implements from transport to work position or from work to transport position if nobody is standing within the implement's danger zone.

Hazard points exist:

- between tractor and implement, especially when coupling and uncoupling
- within the range of moving implement components
- when climbing onto the implement
- underneath lifted, unsecured implements and machinery parts

4.5 Type plate and CE declaration

The following illustrations show the arrangement of the type plate and the CE declaration.

The following details are stated on the type plate:

- Machinery ID No.
- Type
- Year of construction
- Factory
- Dry operating weight kg



Fig. 7

The CE-sign (Fig. 8) on the machine indicates the compliance with the valid EC guide lines!



Fig. 8

4.6 Conformity

The machine fulfils the:

Guide lines- / Standard terms

- Machinery directive 98/37/EC
- EMC directive 89/336/EEC.

4.7 Technical data

Technical data		TL 3000 deep loosener
Working width	[m]	3.0
Transport width	[m]	3.0
Number of wing shares		4
Width of wing shares	[mm]	300 or 600 (option)
Dry operating weight	KG	530
Tractor power requirement for combinations including pack-top seed drill		from 88 kW (120 HP)

Technical data for calculating the tractor weights and tractor axle loads (see on page 39).

3-m combination	Total weight G_H [kg]	Distance d [m]
<ul style="list-style-type: none"> TL 3000 deep loosener Rotary cultivator KG Wedge ring roller KW 	2185	1.05
<ul style="list-style-type: none"> TL 3000 deep loosener Rotary cultivator KG Wedge ring roller KW Top pack seed drill AD with RoTeC blades (full seed hopper) 	2970	1.33

5 Assembly and function

The following chapter informs you about the assembly of the machine and the functions of the individual components.



Fig. 9

The subsoiler is used in agricultural fields to cultivate the soil.

The subsoiler is used

- with rotary cultivator and rear roller
- as part of a cultivator combination
 - with rotary cultivator and rear roller and
 - mounted or pack-top seed drill.

The TL subsoiler allows for no-till cultivation methods even in heavy trash conditions.

The widely breaking up wing shares allow for large distances between the tools and result blockage free operation even where large amounts of straw prevail.

The compact, close-coupled design only slightly increases the required lifting power of the sowing combination.

Stubble working – deep loosening - sowing

For the initial stubble working pass deep loosener and rotary cultivator should operate only at a working depth of 6 to 8 cm.

In the following second pass deep loosening of 15 to 25 cm, deep straw mix and the removal of volunteer grain and weeds is then carried out.

For sowing a deep loosening is not required.

Incorporation of straw and sowing in one operational pass

Where short crop rotations do not allow for prior stubble cultivation, the subsoiler operates at a working depth of 15 to 25 cm in one pass in combination with the rotary cultivator, wedge ring roller and pack top seed drill with RoTeC blades.

5.1 Wing share

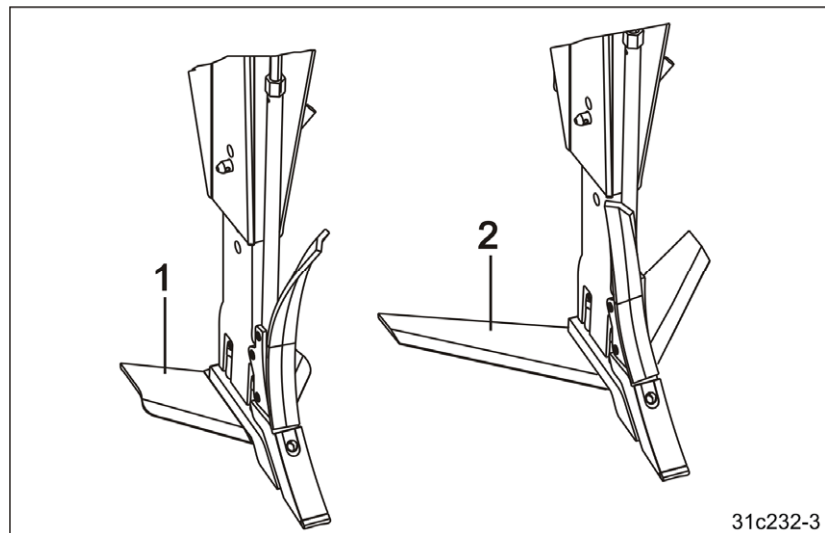


Fig. 10

Wing share (300 mm)

The subsoiler is equipped with 300 mm-wide wing shares (Fig. 10/1).

At large working depths of between 15 and 25 cm, the soil is loosened across the entire working width. The soil between the wing shares breaks open diagonally towards the surface and is also loosened.

Wing share (600 mm)

The 600 mm wide wing shares (Fig. 10/1, option) should only be used for a shallow working depth of between 5 and 10 cm.

With the use of the 600 mm wide wing shares for stubble working the roots are cut across the entire working width and the soil is broken up.



For mulch sowing winter wheat after late crop like sugar beet or maize, we recommend to operate the deep loosener with the 300 mm wide wing shares.

5.2 Soil guide share

The soil guide shares (Fig. 11/1) provide rising soil ridges and eject them diagonal to the front towards the machine centre. In this way the soil-straw mixture will not escape from the operational range of the combination.

Where straw prevails the soil guide shares improve the mixing effect in stubble working.

The arising soil ridges clean the shares from long straw and reduce danger of blocking.



Fig. 11

5.3 Side guide plate extension

The side guide plates of the rotary cultivator prevent the worked soil from escaping from the operational range of the rotary cultivator.

The side plate extensions (Fig. 12/1) hold back the worked soil within the subsoiler's working area.



Fig. 12

6 Putting into operation

In this chapter you will find information

- on using your implement for the first time
- on how you can check whether you are able to mount / tow the implement on your tractor.



- Before using the implement for the first time, ensure that the operator has read and understood the instruction manual.
- Take note of the chapter "Safety advice for the operator", from on page 20 when
 - Coupling and uncoupling the machine
 - Transport of the machine
 - Operation
- Only couple and transport the implement with a tractor that is suited to this purpose.
- Tractor and implement must comply with national road traffic regulations (Highway Code).
- Both the vehicle owner and the operator are responsible for complying with the national road traffic regulations.



WARNING

Crush, shear, cut, pulling-in and entanglement hazards around the hydraulically or electrically operated parts.

Do not block any controls on the tractor that serve to control the movement of any hydraulic or electric parts, e.g. folding, swivelling or sliding. The respective movement must stop automatically when you release the respective operating element. This does not apply for movements of devices that

- are continuous or
- are automatically controlled, or
- require a float position or pressure position due to their specific function.

6.1 Check that the tractor is suitable



WARNING

If the tractor is not used properly, this may lead to hazards due to breakage during operation as well as insufficient stability, steering and braking capacity of the tractor.

- Check that your tractor is suitable before mounting or towing the implement.
Use only suitable tractors for coupling and transporting the implement.
- Test the brakes to check that the tractor has the required brake lag even when the implement is mounted or is being towed.

Specific requirements for the tractor:

- the permissible total weight
- the permissible axle loads
- the permissible vertical load at the tractor's coupling point
- the permissible tyre load capacity of the mounted tyres
- the permissible trailer load must be sufficient

You will find this information on the data plate or in the vehicle registration document and instruction manual for the tractor.

At least 20 % of the unloaded weight of the tractor must always be carried on the tractor's front axle.

The tractor must provide the required brake lag as specified by the manufacturer even when the implement is mounted or on tow.

6.1.1 Calculation of the actual values for the tractor's total weight, tractor axle loads, tyre load capacity and the required minimum ballast weights



The permissible total weight of the tractor as specified in the vehicle registration document must be greater than the sum of

- the tractor net weight,
- ballast weight and
- total weight of the mounted implement or load of the implement on tow



This instruction applies to Germany only:

If, after exhausting all reasonable options, it is still not possible to comply with the axle load and/or permitted total weight limits, the authority responsible according to the state law may, based on an expert opinion from an officially recognized appraiser for road traffic and with the approval of the tractor manufacturer, issue an exemption certificate pursuant to § 70 of the StVZO (German Road Traffic Licensing Act) and the necessary permit pursuant to § 29 paragraph 3 of the StVO (German Road Traffic Act).

6.1.1.1 Data required for the calculation (mounted implements)

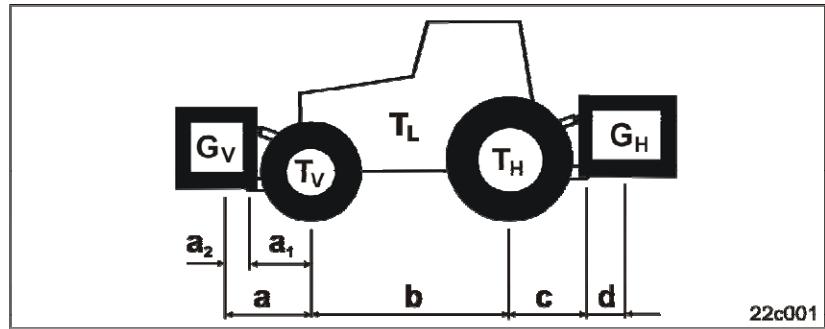


Fig. 13

T_L	KG	Tractor net weight	Please see tractor Instruction manual / registration papers
T_V	KG	Front axle load of the empty tractor	
T_H	KG	Rear axle load of empty tractor	
G_H	KG	Total weight rear mounted implement or rear weight	see chap. „Technical data“, on page 32, or tail weight
G_V	KG	Total weight of front mounted implement or front weight	Please see technical data front mounted implement or front weight
a	[m]	Distance between the centre of gravity of the front mounted machine or front weight and centre of the front axle (sum $a_1 + a_2$)	Please see technical data tractor and front mounted machine or front weight or measure
a_1	[m]	Distance between centre of the front axle and the lower link joint	Please see tractor Instruction manual or measure
a_2	[m]	Spacing between centre lower link ball and centre of gravity of the front mounted machine or front weight (point of gravity spacing)	Please see technical data front mounted machine or front weight or measure
b	[m]	Wheel base of tractor	Please see tractor Instruction manual, registration papers or measure
c	[m]	Spacing between centre rear axle and centre lower link ball	Please see tractor Instruction manual, registration papers or measure
d	[m]	Distance between centre lower link point and centre of gravity of rear mounted implement or rear weight (centre of gravity distance)	see chap. „Technical data“, 32

Putting into operation

6.1.1.2 Calculation of the required minimum front ballast $G_{V \min}$ of the tractor to ensure safe steering

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

Enter into the table the figure for the calculated minimum ballast weight $G_{V \min}$ required at the front of the tractor (chapter 6.1.1.7).

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

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

Enter into the table the numerical value for the calculated actual total front axle load and the permissible front axle load specified in the instruction manual for the tractor (chapter 6.1.1.7).

6.1.1.4 Calculation of the actual total weight of the tractor/ implement combination

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

Enter into the table the numerical value for the calculated actual total weight and the permissible tractor total weight as specified in the tractor instruction manual (chapter 6.1.1.7).

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

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

Enter into the table the numerical value for the calculated actual rear axle load and the permissible tractor rear axle load indicated in the tractor instruction manual (chapter 6.1.1.7).

6.1.1.6 Tyre carrying capacity

Enter into the table double the value (two tyres) of the permissible tyre load capacity (please refer e.g. to the documentation from the tyre manufacturer) (chapter 6.1.1.7).

6.1.1.7 Table

	Actual value according to the calculation	Permissible value according to the tractor-instruction manual	Double the permissible tyre carrying 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>



- Please take the permissible values for the tractor total weight, axle loads and tyre carrying capacity from the registration papers of your tractor.
- The actual calculated values must be less than or equal to (≤) the permissible values.


WARNING

Crush, cut, entanglement, pulling in and impact hazards caused by poor stability and insufficient steering and braking capacity of the tractor.

It is prohibited to couple the implement to the tractor on which the calculation is based if

- even just one of the actual calculated values is greater than the permissible value
- the tractor is not equipped with a front weight (where necessary) for the required minimum front ballast ($G_{V \min}$).



- Apply ballast to the tractor with the aid of a front or rear weight if the tractor axle load is exceeded on just one axle.
- Special cases:
 - If the weight of the front-mounted implement (G_V) does not provide the required minimum front ballast weight ($G_{V \min}$), extra weights must be used in addition to the front-mounted implement.
 - If the weight of the rear-mounted implement (G_H) does not provide the required minimum rear ballast weight ($G_{H \min}$), extra weights must be used in addition to the rear-mounted implement.

6.2 Ensure that the tractor and the implement cannot accidentally start up or roll away.



WARNING

Crush, shear, cut, amputation, grab, entanglement, pulling in, catching and impact hazards exist when working with the implement caused by

- **accidental lowering of the unsecured implement when raised on the tractor's three-point hydraulic system.**
- **accidental lowering of raised, unsecured machinery parts.**
- **accidental starting or rolling away of the tractor-implement combination.**
- Ensure that the tractor and the implement cannot accidentally start up or roll away before carrying out any work on the implement.
- All work on the implement, such as mounting, adjusting, fixing malfunctions, cleaning, maintenance and repairs, is prohibited
 - when the implement is running
 - whilst the tractor engine is running and the PTO shaft / hydraulic linkage is connected
 - whilst the ignition key is in the tractor ignition and the tractor engine may be accidentally switched on while the PTO shaft / hydraulic linkage is connected
 - if the tractor and implement are not each secured with their parking brakes against accidentally rolling away
 - if moving parts are not blocked to prevent accidental movement.

Coming in to contact with unsecured components poses a hazard during this kind of work in particular.

1. Only park the tractor with the implement on firm, level ground.
2. Lower the implement or machinery parts if raised and unsecured.
→ This will avoid accidental lowering.
3. Switch off the tractor engine.
4. Remove the tractor ignition key.
5. Engage the tractor's parking brake.

6.2.1 Adjust the length of the PTO shaft to the tractor (specialist workshop)

The PTO shaft transmits the tractor drive to the rotary cultivator.

Coupling and uncoupling the subsoiler changes the distance between the rotary cultivator and the tractor and requires that the PTO shaft length be readjusted.

You will find information in the operating manual for your rotary cultivator on how to adjust and handle the PTO shaft, and in particular safety information when dealing with the PTO shaft.

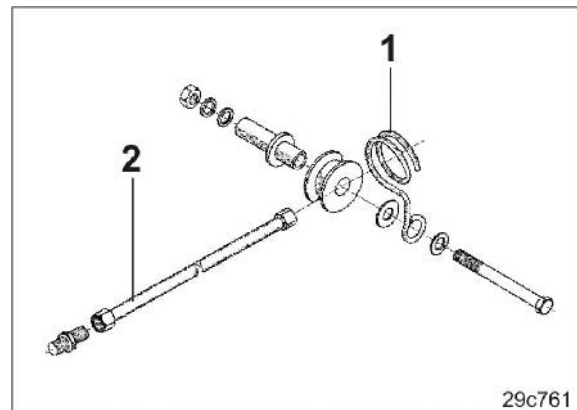
The highest level of safety precautions are required when working with the PTO shaft.

For your own safety, ensure compliance with the basic rules when working with the PTO shaft.

If any defects are noted on the PTO shaft, the PTO shaft must not be used.

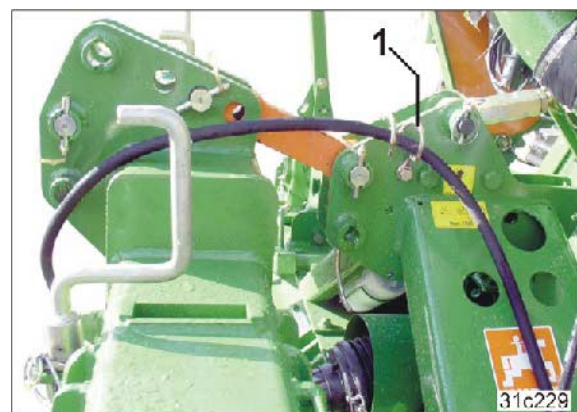
6.2.2 Fitting the hydraulic hose extension (option) and hose carrier (option)

1. Relief the hydraulic system of the seed drill from pressure (please see operator's manual for the seed drill).
2. Uncouple the rotary cultivator/seed drill-combination from the tractor (please see operator's manual for the rotary cultivator).
3. Attach the hose carrier (Fig. 14/1) to the tower of the rotary cultivator (see Fig. 15).
4. Fit hydraulic hose extensions (Fig. 14/2) to the hydraulic hoses of the seed drill that are connected with the tractor spool valves
5. Hook the hydraulic hoses and cables into the hose carrier (Fig. 15/1).



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Fig. 14



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Fig. 15

6.2.3 Fitting the side guide plate extensions

1. Bolt the side guide plate extensions (Fig. 16/1) on to the side guide plates (Fig. 16/2) of the rotary cultivator.

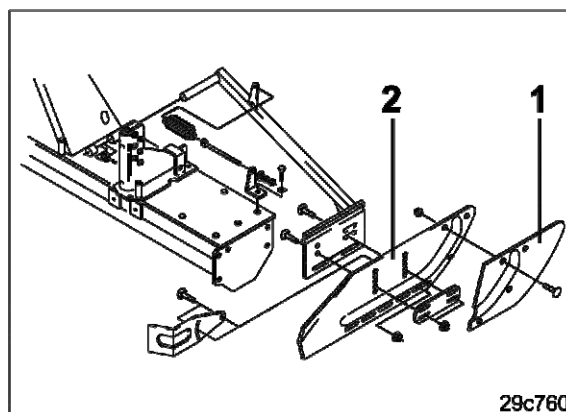


Fig. 16

7 Coupling and uncoupling the machine



Observe chapter "Safety advice for the operator", on page 20 when coupling and uncoupling implements.



WARNING

Crush hazard if the tractor or implement accidentally start up or roll away when coupling or uncoupling the implement.

Before entering the hazard zone between tractor and implement for coupling or uncoupling the implement, ensure that the tractor and the implement cannot accidentally start up or roll away, see chapter 6.2, on page 42.



WARNING

Crush hazard between the rear of the tractor and the implement when coupling or uncoupling the implement.

Operate the controls for the tractor's three-point hydraulic system

- only from the proper work station.
- never if you are in the hazard zone between the tractor and the implement.



WARNING

Crush hazard between tractor and implement when coupling the implement.

Instruct persons to vacate the implement's hazard zone before driving up to the implement.

Any persons present to assist must stand to the side of the tractor and implement when directing, and may only step between tractor and implement once these have come to a complete stop.

7.1 Coupling the deep loosener on to the tractor



WARNING

If the tractor is not used properly, this may lead to hazards due to breakage during operation as well as insufficient stability, steering and braking capacity of the tractor.

Use only suitable tractors for coupling and transporting the implement. Please refer to chapter "Check that the tractor is suitable", on page 38.



WARNING

Crush, cut, entanglement, pulling in and impact hazards to persons arise if the the implement accidentally comes loose from the tractor.

- Use only the designated equipment to properly couple tractor and implement.
- Make sure that the linkage categories on the tractor and the implement are matching when coupling the implement to the tractor's three-point linkage.
- Only use the upper and lower link pins supplied when coupling the implement.
- Check the upper and lower link pins for any visible defect at each coupling. Replace the upper and lower link pins when there are clear signs of wear.
- Use locking pins to secure the upper and lower link pins against accidentally loosening.



WARNING

Hazards due to loss of power supply between tractor and implement caused by damaged supply lines.

When coupling the supply lines, ensure that the lines have a clear run. The supply lines

- must be able to move and bend freely without tension, kinking or rubbing as the implement moves when mounted or on tow.
- must rub on any other parts.

1. Fit your lower and upper link pins with ball bushings.

The subsoiler is equipped with Cat III lower and top link pins for coupling with the tractor.

The ball bushings depend on the type of tractor (see tractor's operating manual).

2. Secure the lower and top link pins with locking pins.
3. Open the tractor lower link locking, that means, it should be ready for coupling.
4. Set the positions of the lower lift arm hitches so that they line up with the implement's articulation points.

5. Instruct persons to vacate the implement's hazard zone before driving up to the implement.
6. Drive the tractor backwards towards the implement so that the hitches on the tractor's lower lift arm automatically pick up the implement's ball bushings.
→ The lower lift arm hitches will lock automatically.
7. Check that the lock safety device on the tractor's lower lift arm is closed and secured (please see tractor's operating manual).
8. Connect the tractor's upper link arm (Fig. 18/1).
9. Set the upper link arm in such a way that the deep loosener is in about horizontal operational position.



Fig. 17



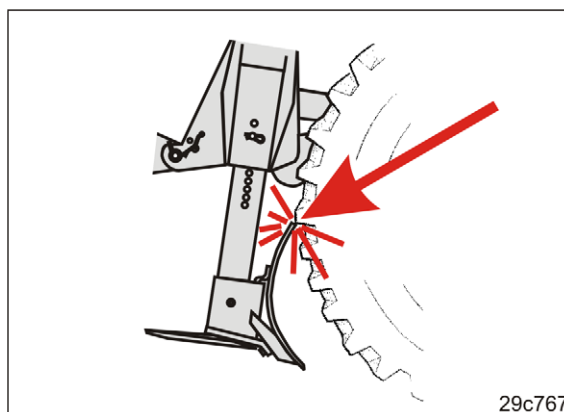
Fig. 18

Coupling and uncoupling the machine



Ensure that the soil guide shares do not touch the tractor tyres when the deep loosener is lifted.

The instructions (Fig. 19) posted on your subsoiler should remind you of this.



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Fig. 19

7.2 Coupling the rotary cultivator-combination on to the deep loosener

1. The tools of the subsoiler and the rotary cultivator generally operate at different depths in the soil. Before coupling the two implements, adjust the tools of the subsoiler to the level of the rotary cultivator (see chapter "Setting the working depth of the deep loosener", on page 51).
2. Slide the supplied ball bushings onto the rotary cultivator's Cat III lower link pins.
3. Use locking pins to secure the lower link pins.

The subsoiler is equipped with Cat III lower lift arm link hooks.

4. Open the safety catches on the subsoiler's link hooks.
 - 4.1 Pull the link hook's safety mechanism upwards until it clicks.

The subsoiler link hooks are now ready for coupling.

5. Instruct people to vacate the hazard zone between subsoiler and rotary cultivator.
 6. Drive the subsoiler backwards towards the rotary cultivator.
 7. Pick up the rotary cultivator's ball bushings with the subsoiler's hooks.
- The link hooks will lock automatically.
8. Check that the hook lock safety mechanism is closed.



Fig. 20

9. Switch off universal joint shaft, apply the parking brake, stop the engine and remove the ignition key.
10. Connect the connector piece (Fig. 21/1) to both implements.
11. Use locking pins to secure the pins.
12. Set the length of the tractor's top link (Fig. 21/2) such that the rotary cultivator is roughly horizontal when in working position.

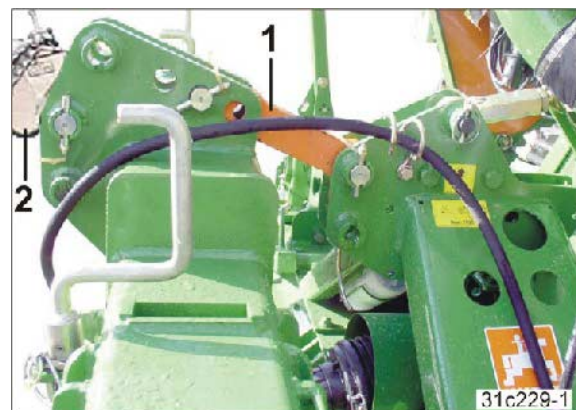


Fig. 21

Coupling and uncoupling the machine

13. Connect the PTO shaft of the rotary cultivator with the tractor universal joint shaft (please see operator's manual for the rotary cultivator).



Equip the rotary cultivator with a longer PTO shaft if the rotary cultivator was previously working directly behind the tractor.

Prior to the first coupling on to the tractor and when changing the tractor type, always match the PTO shaft length (see operator's manual for the rotary cultivator).



CAUTION

Before uncoupling the combination from the tractor, adjust the tools of the subsoiler to the level of the rotary cultivator (see chapter "Setting the working depth of the deep loosener", on page 51).

8 Settings

8.1 Setting the working depth of the deep loosener



CAUTION

Before adjusting the working depth couple the deep loosener on to the tractor.



DANGER

Switch off the tractor's universal joint shaft, engage the tractor's parking brake, switch off the tractor engine and remove the ignition key.

1. Raise the combination with the subsoiler.
2. Switch off the tractor's universal joint shaft, engage the tractor's parking brake, switch off the tractor engine and remove the ignition key.
3. Remove locking pin (Fig. 22/1).
4. Pull out the pin (Fig. 22/2). The pin is secured with the aid of a lynch pin.
5. Set the desired working depth of the share by turning the crank (Fig. 22/3).

Crank turn

Turn to the right:	Reduce working depth
Turn to the left:	Increase working depth

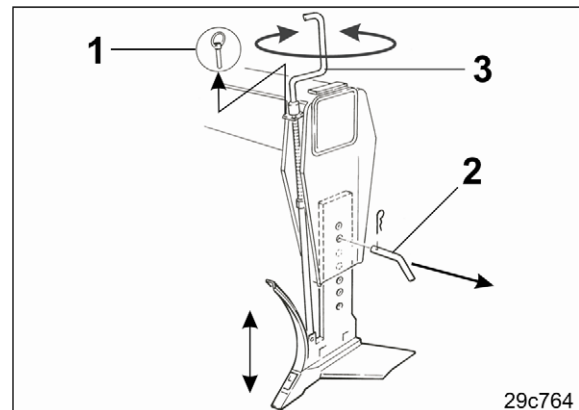


Fig. 22

6. Insert the pin (Fig. 23/1) and secure using a locking pin (Fig. 23/2). The pin mechanically secures the beam.

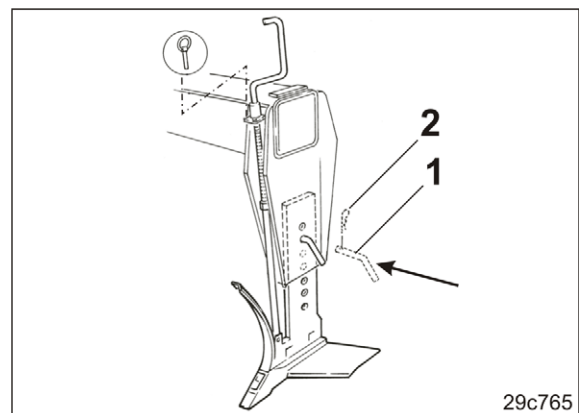


Fig. 23

Settings

7. Turn the crank (Fig. 24/1) counter-clockwise once.
The distance "A" between crank and bracket must be clearly visible. The crank must not rest on the bracket.
8. Secure the crank against turning by using a locking pin (Fig. 24/2).
9. Adjust all shares to the same working depth.

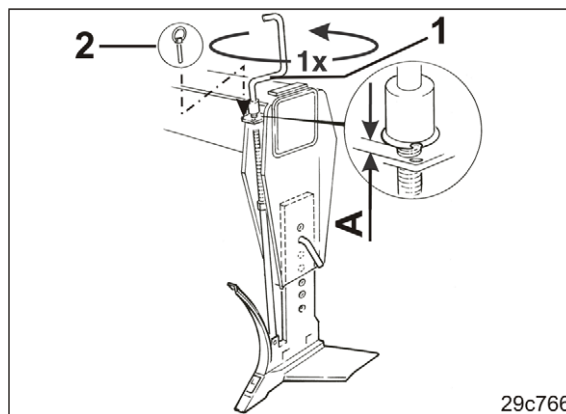


Fig. 24

9 Transport on public roads



Fig. 25



Fig. 26

The subsoiler may only be transported on public roads and tracks in combination with the rotary cultivator with rear roller, with or without mounted or pack-top seed drill attached.

The traffic safety equipment is attached to the mounted or pack top seed drill. For combinations without the seed drill, the traffic safety equipment is attached to the rotary cultivator.

You will find information on the traffic safety equipment in the instruction manual for your seed drill or rotary cultivator.

When travelling on public roads and tracks, ensure that tractor and implement correspond to the national road transport and traffic rules (in Germany STVZO and STVO) and to the accident prevention regulation (in Germany the trade association).

Both, the vehicle owner and the operator are responsible for adhering to the legal traffic rules.

In addition all advice given in this chapter should be adhered to before and during travelling.

The maximum permissible speed¹⁾ is

40 km/h for tractors with mounted tilling implements and trailing roller with or without mounted or pack top seed drill.

Drive at a much lower speed than specified when travelling on poor roads or tracks.

¹⁾ The maximum permissible speed for mounted working implements varies depending on the road traffic regulations in each individual country. Ask your importer / local machinery retailer about the maximum permissible speed for road transport.



- Prior any transport travel observe the chapter "Safety advice for the operator", on page 20.
- Before transporting the implement check
 - that the supply lines are properly connected
 - that the light board is undamaged, operating correctly and clean
 - that hydraulic equipment show no visible signs of defect
 - that the tractor's parking brake is completely disengaged.



WARNING

Crush, cut, grab, pulling in and impact hazards are caused by the implement accidentally coming loose when mounted or on tow.

Before road transportation, visually check that the top link and lower link pins are secured against accidentally coming loose with the locking pin.



WARNING

Crush, cut, entanglement, pulling in and impact hazards caused by poor stability and tipping.

- When driving, ensure that you are in complete control of the tractor and any machinery attached directly or as a trailer at all times.
In so doing, you must consider your personal capabilities, the road, traffic, visibility and weather conditions, the handling characteristics of the tractor and the effects of the mounted or towed implement.
- Before transportation, secure the tractor lower link lateral locking mechanism so that the implement cannot swing about while mounted or on tow.



WARNING

If the tractor is not used properly, this may lead to hazards due to breakage during operation as well as insufficient stability, steering and braking capacity of the tractor.

These hazards may cause serious injury or even death.

Observe the maximum payload of the mounted / towed implement as well as the permissible axle loads and supported loads of the tractor.



WARNING

Unauthorised persons travelling on the implement may fall off.

It is forbidden to travel on the implement and/or climb onto a implement while it is running.

**WARNING**

Secure the implement against any accidental movement before transportation.

9.1 Set the implement to road transport mode

**WARNING**

Crush, shear, cut, amputation, grab, entanglement, pulling in, catching and impact hazards exist from

- accidental lowering of the implement when raised via the tractor's three-point hydraulic system.
- accidental lowering of raised, unsecured machinery parts.
- accidental starting or rolling away of the tractor-implement combination.

Ensure that the tractor and the implement cannot accidentally start up or roll away (see chap. „6.2“, 42).

Set the combination mounted on the tractor to transport mode:

You will find information on this in the instruction manual for your seed drill or rotary cultivator.

**DANGER**

- Lock the tractor steering devices during travel.
- Take account of the width of the mounted or towed implement and the centrifugal mass of the implement when driving around curves.

10 Operation



When operating the implement observe the instructions in the chapter

- "Safety symbols and other identifications on the machine", from on page 16 and
- "Safety advice for the operator", on page 20.

Compliance with these instructions is for your own safety.



WARNING

Crush, cut, grab, pulling in and impact hazards are caused by the implement accidentally coming loose when mounted or on tow.

Before using the implement each time, visually check that the top link and lower link pins are secured with the locking pin against accidental loosening.



WARNING

Crush hazard exists between the bearing arms of the tillage implement and the support for the trailing roller as well as between the bearing arms and the depth setting pins when raising and lowering the implement.

These hazards may cause serious injury to fingers and hands.

Instruct persons to vacate the implement's hazard zone before raising or lowering the implement.



WARNING

Crush, cut, amputation, pulling in, trapping and impact hazards caused by poor stability and tipping of the tractor / implement on tow.

When driving, ensure that you are in complete control of the tractor and any machinery attached directly or as a trailer at all times.

In so doing, you must consider your personal capabilities, the road, traffic, visibility and weather conditions, the handling characteristics of the tractor and the effects of the mounted or towed implement.

10.1 Commencing work

1. Adjust the working depth of the subsoiler (see chapter "Setting the working depth of the deep loosener", on page 51)
2. Lower the combination until the shares of the deep loosener are just above the soil.
In this position, the angle of the rotary cultivator PTO shaft must be within the tolerance range.
3. Drive the tractor universal joint shaft speed with the prescribed rev. speed of the rotary cultivator.
4. Start driving and lower the combination.



- When the combination is lifted, the angle of the running PTO shaft must be within the tolerance range; if not, switch off the tractor's universal joint shaft.
- Switch off the tractor's universal joint shaft if the rotary cultivator runs unevenly when lifted.

10.2 Turning at the headlands

If it is intended that the PTO shaft of the rotary cultivator continues to run when turning or when the combination is lifted, ensure that the shares are lifted out of the soil and that the angling of the PTO shaft is within the range of tolerance.



Switch off the universal joint shaft before turning if

- the angle of the PTO shaft is outside of the tolerance range
- the rotary cultivator runs unevenly when lifted.

11 Faults



WARNING

Crush, shear, cut, amputation, grab, entanglement, pulling in, catching and impact hazards exist from

- accidental lowering of the implement when raised via the tractor's three-point hydraulic system.
- accidental lowering of raised, unsecured machinery parts.
- accidental starting or rolling away of the tractor-implement combination.

Ensure that the tractor and the implement cannot accidentally start up or roll away before fixing malfunctions on the implement, see chap. 6.2, 42.

11.1 Incorporation of large amounts of straw

With normal amounts of straw on the field surface and normal forward speed the straw/soil mix is lifted and inverted by the soil guide shares (Fig. 11/1) of the deep loosener. The rotary cultivator mulchs the straw at the surface.

Large amounts of straw, large working depth and high forward speeds may cause problems of blockage directly in front of the rotary cultivator. The soil/straw mix has not yet settled sufficiently and is bulldozed by the frame of the rotary cultivator.

This can be remedied by reducing the forward speed.

Lock the levelling bar of the rotary cultivator in the upper most position.

12 Cleaning, maintenance and repair



WARNING

Crush, shear, cut, amputation, grab, entanglement, pulling in, catching and impact hazards exist from

- accidental lowering of the implement when raised via the tractor's three-point hydraulic system.
- accidental lowering of raised, unsecured machinery parts.
- accidental starting or rolling away of the tractor-implement combination.

Ensure that the tractor and the implement cannot accidentally start up or roll away before undertaking cleaning, maintenance or repair work on the implement, see on page 42.



Danger

Cleaning, maintenance and repair work (unless otherwise specified) should only be undertaken when

- the universal joint shaft is turned off (wait until the tool carriers have come to a complete stop)
- implement is fully lowered
- tractor parking brake is engaged
- the tractor engine is switched off
- the ignition key is removed.

12.1 Cleaning the machine

Clean the machine with a jet of water, a high pressure cleaner or with the aid of compressed air.

ignition key has been removed. Check the shares and share tips after cleaning. Replace damaged shares.



Points to observe when cleaning with a pressure washer or steam cleaner

- Always keep a minimum distance of 300 mm between the cleaning nozzle of the pressure washer or steam cleaner and the implement.
- Observe the safety instructions for working with pressure washers.

12.1.1 Parking the deep loosener over a prolonged period

1. Thoroughly clean and dry the coulters.
2. Coat the shares (Fig. 27) with strippable paint to prevent the formation of rust.



Fig. 27

12.2 Bolt torques

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



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