

Operating Manual

a z

Precision airplanter

ED 302 ED 452

ED 452-K ED 602-K



MG 5104

BAH0023.0 03.14

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

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. Sack.

Identification data

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

Implement ID No.:
(10-digit)

Type:

ED 02

Permissible system pressure in
bar:

Maximum 210 bar

Year of manufacture:

Basic weight (kg):

Permissible total weight (kg):

Maximum load (kg):

Manufacturer's address

AMAZONEN-WERKE

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Spare part orders

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

Please send orders to your AMAZONE dealer.

Formalities of the operating manual

Document number: MG 5104

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Foreword

Foreword

Dear Customer,

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

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

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

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

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

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

User evaluation

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

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

1.1 Purpose of the document

This operating manual

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

1.2 Locations in the operating manual

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

1.3 Diagrams

Instructions and responses

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

Example:

1. Instruction 1
→ Reaction of the implement to handling instruction 1
2. Instruction 2

Lists

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

Example:

- Point 1
- Point 2

Item numbers in diagrams

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

Example: (Fig. 3/6):

- Figure 3
- Item 6

2 General Safety Instructions

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

2.1 Obligations and liability

Comply with the instructions in the operating manual

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

Obligations of the operator

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

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

The operator is obliged

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

If you still have queries, please contact the manufacturer.

Obligations of the user

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

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

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

Risks in handling the implement

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

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

Only use the implement

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

Eliminate any faults immediately which could impair safety.

Guarantee and liability

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

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

2.2 Representation of safety symbols

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



DANGER

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

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



WARNING

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

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



CAUTION

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



IMPORTANT

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

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



NOTE

Indicates handling tips and particularly useful information.

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

2.3 Organisational measures

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

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



The operation manual

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

Check all the available safety equipment regularly.

2.4 Safety and protection equipment

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

Faulty safety equipment

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

2.5 Informal safety measures

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

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

2.6 User training

Only trained and instructed persons should be allowed to work with/on the implement. The responsibilities of the operating and maintenance personnel must be clearly defined.

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

Person Activity	Person especially trained for the task	Instructed operator	Persons with specialist training (authorised workshop)
Loading/Transport	X	X	X
Start-up	—	X	—
Set-up, tool installation	—	—	X
Operation	—	X	—
Maintenance	—	—	X
Troubleshooting and fault elimination	—	X	X
Disposal	X	—	—

Legend: X..permitted —..not permitted

- 1) A person who can assume a specific task and who can carry out this task for an appropriately qualified company.
- 2) Instructed persons are those who have been instructed in their assigned tasks and in the possible risks in the case of improper behaviour, have been trained if necessary, and have been informed about the necessary protective equipment and measures.
- 3) People with specialist technical training shall be considered as a specialist. Due to their specialist training and their knowledge of the appropriate regulations, they can evaluate the work with which they have been charged and detect possible dangers.

Comment:

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



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

2.7 Safety measures in normal operation

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

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

2.8 Danger from residual energy

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

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

2.9 Maintenance and repair work, fault elimination

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

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

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

Check loosened threaded connections for tightness. When the maintenance work is completed, check the functioning of the safety devices.

2.10 Design changes

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

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

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



WARNING

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

It is strictly forbidden to

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

2.10.1 Spare and wear parts and aids

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

Only use genuine AMAZONE spare and wear parts, or those approved by AMAZONEN-WERKE, so that the type approval remains valid according to the national and international regulations. The use of spare and wear parts from third parties does not guarantee that they have been constructed such that they meet the requirements placed on them.

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

2.11 Cleaning and disposal

Handle and dispose of any materials used carefully, in particular

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

2.12 User workstation

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

2.13 Warning symbols and other signs on the implement



Always keep all the warning pictograms of the implement 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 symbols - structure

Warning pictograms indicate danger areas on the implement and warn of residual dangers. Permanent or unexpected dangers exist in these areas.

A warning symbol consists of two fields:



Field 1

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

Field 2

is a symbol showing how to avoid the danger.

Warning symbols - Explanation

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

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

Order No. and explanation

Warning symbols

MD 076

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

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

Never open or remove protective equipment

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



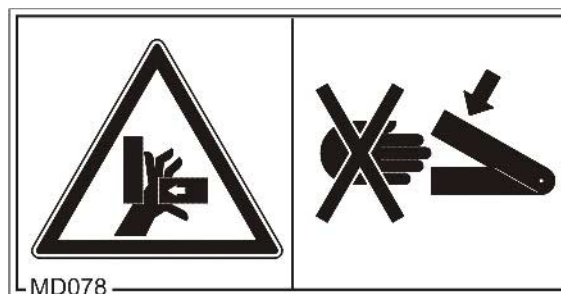
MD076

MD 078

Risk of crushing for fingers or hands, caused by accessible, moving parts of the implement!

This risk can cause the most serious injuries with the loss of body parts.

Never reach into the danger area while the tractor engine is running with the PTO shaft / hydraulics / electronic system connected.



MD078

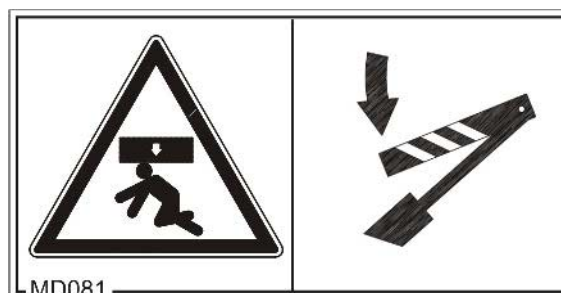
MD 081

Risk of crushing for the whole body from the implement parts lifted by the lifting cylinder unintentionally lowering!

This risk can cause the most serious injuries to the whole body, potentially even death.

Secure the lifting cylinder on raised implement parts against unintentional lowering before entering the danger area below raised implement parts.

Use the mechanical lifting cylinder support of the hydraulic locking mechanism.



MD081

MD 082

Risk of falling caused by riding on the step surfaces or platforms!

This risk can cause the most serious injuries with potentially fatal injuries.

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

Ensure that nobody is riding on the implement.



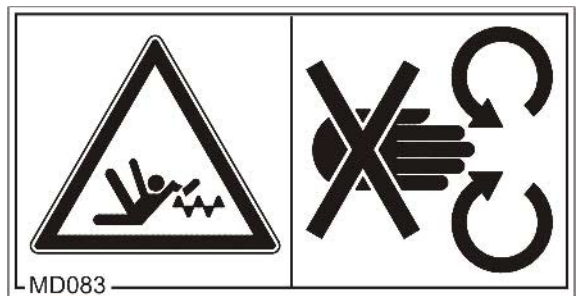
MD082

MD 083

Danger of arms being drawn in and/or caught by moving parts involved in the working process!

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

Never open or remove protective devices while the tractor engine is running with the PTO shaft / hydraulic or electronic systems connected.



MD083

MD 084

Risk of crushing the entire body due to standing in the swivel range when implement parts are being lowered.

Causes serious, potentially fatal injuries anywhere on the body.

- It is forbidden to stand in the swivel range of the implement when implement parts are being lowered.
- Instruct personnel to leave the swivel range of any implement parts which can be lowered before you lower the parts.



MD084

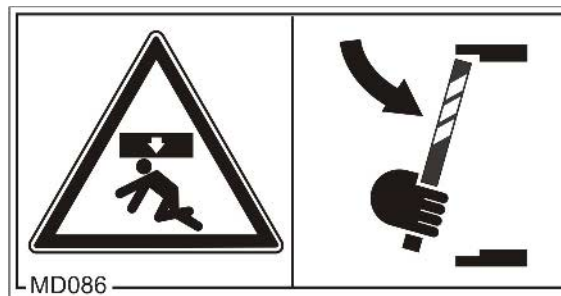
MD 086

Risk of crushing the entire body due to necessary periods spent under raised, unsecured implement parts.

Causes serious, potentially fatal injuries anywhere on the body.

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

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

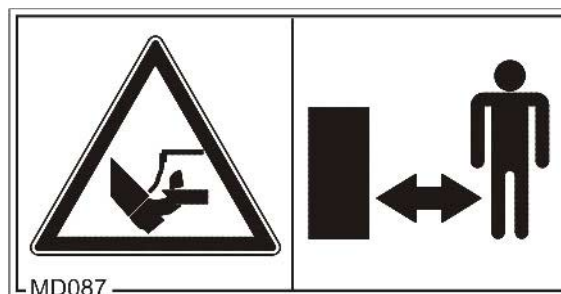


MD 087

Risk of cutting or cutting off of toes or feet by driven implements!

This risk can cause the most serious injuries with the loss of body parts to toes or feet.

Keep well clear of the danger area while the tractor engine is running with the PTO shaft or hydraulic/electrical system connected.

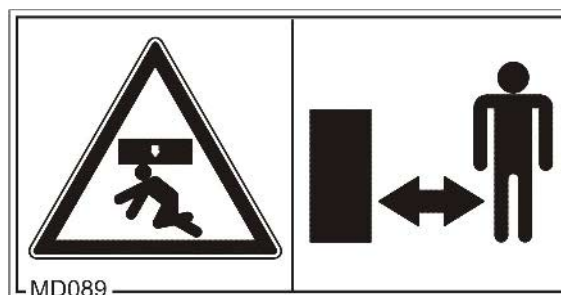


MD 089

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

Causes serious, potentially fatal injuries anywhere on the body.

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

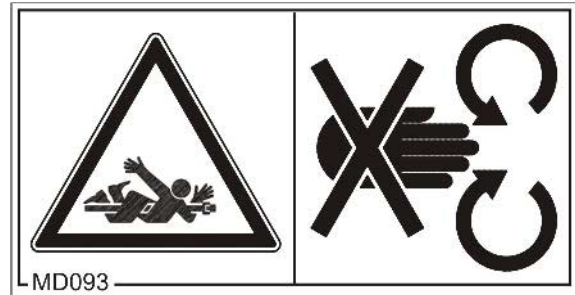


MD 093

Risk of entanglement or being dragged in for the whole body by unprotected, driven drive shafts!

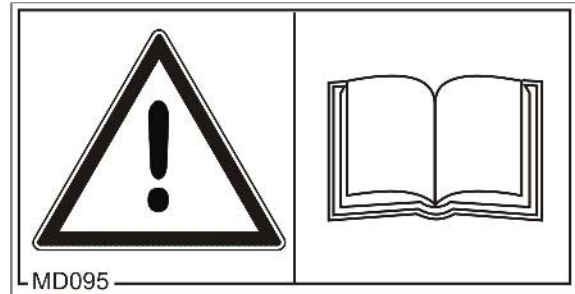
This risk can cause the most serious injuries to the whole body, potentially even death.

Never open protective devices on drive shafts while the tractor engine is running with the PTO shaft connected or the hydraulic drive connected.



MD 095

Read and follow the operating instructions and safety information before starting up the implement.

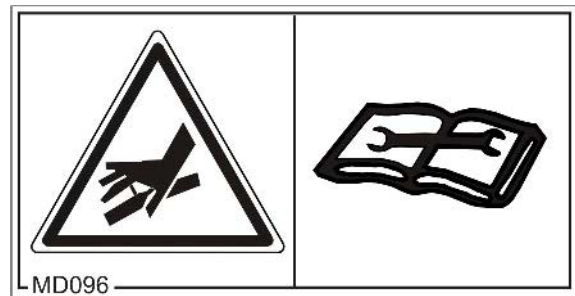


MD 096

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

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

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

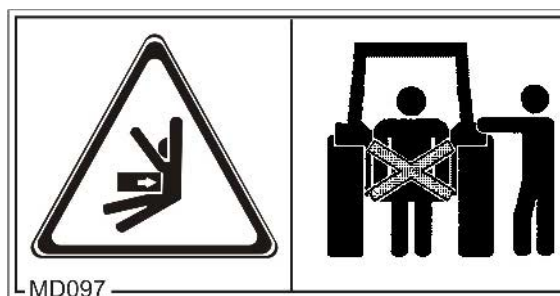


MD 097

Risk of crushing the entire body due to standing in the stroke area of the three-point suspension when the three-point hydraulic system is actuated.

Causes serious, potentially fatal injuries anywhere on the body.

- 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:
 - o only from the proper work station.
 - o Never when you are in the lifting area between the tractor and implement.



MD 102

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

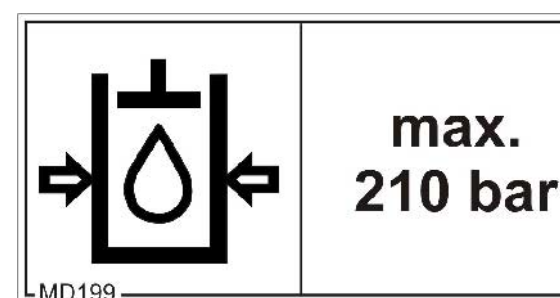
These dangers can cause extremely serious and potentially fatal injuries.

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



MD 199

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



2.13.1 Positions of warning symbols and other labels

Warning symbols

The following diagrams show the arrangement of the warning symbols on the implement.

Precision airplanter ED 302



Fig. 1



Fig. 2

Precision airplanters ED 452 [-K] and ED 602-K



Fig. 3



Fig. 4

2.14 Potential risks from not observing the safety instructions

Non-compliance with the safety information

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

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

- Risk to people from working in an unsafe working environment.
- Failure of important implement functions.
- Failure of prescribed methods of maintenance and repair.
- Risk to people through mechanical and chemical influences.
- Risk to the environment through leakage of hydraulic fluid.

2.15 Safety-conscious working

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

Comply with the accident prevention instructions on the warning pictograms.

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

2.16 Safety information for users



WARNING

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

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

2.16.1 General safety and accident prevention information

- Beside these instructions, comply with the generally applicable national safety and accident prevention regulations.
- The warning symbols and other labels attached to the implement provide important information on safe implement operation. Compliance with this information is in the interests of your safety.
- Before moving off and starting up the implement, check the immediate area of the implement (children). Ensure that you can see clearly.
- It is forbidden to ride on the implement or use it as a means of transport!
- Drive in such a way that you always have full control over the tractor with the attached implement.
In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected or coupled implement.

Coupling and uncoupling the implement

- Only connect and transport the implement with tractors suitable for the task.
- When connecting implements to the tractor's three-point hydraulic system, the attachment categories of the tractor and the implement must always be the same!
- Connect the implement to the prescribed equipment in accordance with the specifications.
- When coupling implements to the front or the rear of the tractor, the following may not be exceeded:
 - The approved total tractor weight
 - The approved tractor axle loads
 - The approved load capacities of the tractor tyres
- Secure the tractor and the implement against unintentional rolling, before coupling or uncoupling the implement.
- It is forbidden for people to stand between the implement to be coupled and the tractor, whilst the tractor is moving towards the implement!
Any helpers may only act as guides standing next to the vehicles, and may only move between the vehicles when both are at a standstill.
- Secure the operating lever of the tractor hydraulic system so that

unintentional raising or lowering is impossible, before connecting the implement to or disconnecting the implement from the tractor's three-point hydraulic system.

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



Use of the implement

- Before starting work, ensure that you understand all the equipment and actuation elements of the implement and their function. There is no time for this when the implement is already in operation.
- Do not wear loose-fitting clothing. Loose clothing increases the risk of being caught by the drive shaft.
- Only start-up the implement, when all the safety equipment has been attached and is in the safety position.
- Comply with the maximum load of the connected implement and the approved axle and support loads of the tractor. If necessary, drive only with a partially filled tank.
- It is forbidden to stand in the working area of the implement.
- It is forbidden to stand in the turning and swivel range of the implement.
- There are crushing and cutting points at externally-actuated (e.g. hydraulic) implement points.
- Only actuate externally-actuated implement parts when you are sure that no-one is standing within the prescribed safety distance.
- Secure the tractor against unintentional start-up and rolling, before you leave the tractor.

For this purpose:

- Lower the implement onto the ground
- Apply the tractor parking brake
- Switch off the tractor engine
- Remove the ignition key.

Implement transportation

- When using public roads, national road traffic regulations must be observed.
- Before moving off, check:
 - The correct connection of the supply lines
 - The lighting system for damage, function and cleanliness
 - The brake and hydraulic system for visible damage
 - That the tractor parking brake is released completely
 - the function of the brake system
- Ensure that the tractor has sufficient steering and braking power.

Any implements and front/rear weights connected to the tractor influence the driving behaviour and the steering and braking power of the tractor.
- If necessary, use front weights.

The front tractor axle must always be loaded with at least 20% of the empty tractor weight, in order to ensure sufficient steering power.
- Always fix the front or rear weights to the intended fixing points according to regulations.
- Comply with the maximum load of the connected implement and

the approved axle and support loads of the tractor.

- The tractor must guarantee the prescribed brake delay for the loaded vehicle combination (tractor plus connected implement).
- Check the brake power before moving off.
- When turning corners with the implement connected, take the broad load and balance weight of the implement into account.
- Before moving off, ensure sufficient side locking of the tractor lower links, when the implement is fixed to the three-point hydraulic system or lower links of the tractor.
- Before moving off, move all the swivel implement parts to the transport position.
- Before moving off, secure all the swivel implement parts in the transport position against risky position changes. Use the transport locks intended for this.
- Before transporting, secure the operating lever of the three-point hydraulic system against the unintentional raising or lowering of the connected/hitched implement.
- Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the implement.
- Before transportation, carry out a visual check that the top and lower link bolts are firmly fixed with the lynch pin against unintentional release.
- Adjust your driving 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 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 implement and tractor sides.
- It is forbidden to block the operator controls on the tractor which are used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements which:
 - o are continuous or
 - o are automatically locked or
 - o require a float position or pressure position due to their function.
- Before working on the hydraulic system,
 - o Lower the implement
 - o Depressurise the hydraulic system
 - o Switch off the tractor engine
 - o Apply the tractor parking brake
 - o 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 genuine AMAZONE hydraulic hose lines!
- The hydraulic hose lines should not be used for longer than six years. This period includes any storage time of a maximum of 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 connections made from thermoplastics, other guide values may be decisive.
- Never attempt to plug leaks in hydraulic hose lines with your hand or fingers.

Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.
If you are injured by hydraulic fluid, contact a doctor immediately.
Risk of infection.
- When searching for leakage points, use suitable aids, to avoid the serious risk of infection.

2.16.3 Electrical system

- When working on the electrical system, always disconnect the battery (negative terminal).
- Only use the prescribed fuses. If fuses are used that are too highly rated, the electrical system will be destroyed – risk of fire
- Ensure that the battery is connected correctly - firstly connect the positive terminal and then connect the negative terminal. When disconnecting the battery, disconnect the negative terminal first, followed by the positive terminal.
- Always place the appropriate cover over the positive battery terminal. If there is accidental earth contact, there is a risk of explosion
- Risk of explosion: avoid the production of sparks or the presence of naked flames in the vicinity of the battery.
- The implement may be equipped with electronic components whose function is influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed.
 - If retrofitting electrical units and/or components on the implement with a connection to the on-board power supply, the user is responsible for checking whether the installation might cause faults on the vehicle electronics or other components.
 - Ensure that the retrofitted electrical and electronic components comply with the EMC directive 2004/108/EEC in the appropriate version and carry the CE mark.

2.16.4 Attached tools

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

2.16.5 PTO 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 implement universal joint shaft must be attached and be in proper working condition.
- Work is prohibited while the safety devices are damaged.
- You can attach and detach the PTO shaft only with
 - o Switched off the universal joint shaft
 - o Switched off the tractor engine
 - o Applied the parking brake
 - o the ignition key has been removed
- Always ensure that the PTO shaft is installed and secured correctly.
- Beim Einsatz von Weitwinkel-Gelenkwellen das Weitwinkelgelenk immer am Drehpunkt zwischen Traktor und Maschine anbringen!
- Secure the PTO shaft guard by attaching the chain(s) to prevent movement.
- Observe the prescribed pipe overlaps for PTO shafts 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 speed of the implement.
- Instruct everyone to leave the danger area of the implement before switching 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 turned 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 implement parts.
Do not approach the implement too closely during this time. You must only start work on the implement once all implement parts are at a complete standstill!
- Secure the tractor and implement against unintentional starting and unintentional rolling away before you perform any cleaning, servicing or maintenance work on universal joint shaft-driven implements 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 Operation of the seed drill

- Comply with the permitted filling volumes of the seed hopper (seed hopper content).
- When filling the seed hopper, only use the ladder and the loading board.
It is forbidden to ride on the implement during operation!
- During the calibration test, note the danger points from rotating and oscillating implement parts.
- Before transportation, remove the thrust collars of the tramline marker.
- Do not place any parts in the seed hopper.
- Before transportation, lock the track marker (construction-dependent) in the transport position.

2.16.7 Cleaning, maintenance and repair

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

3 Loading and unloading



DANGER

Never stand underneath implements lifted by a crane.

3.1 Loading the precision airplanters ED 302 and ED 452

The precision airplanters ED 302 and ED 452 are loaded with a crane (Fig. 5).



Fig. 5

Fasten the transport straps (Fig. 6/1) to both sides on the holders of the track marker and the support feet.

Secure the implement in accordance with the regulations to the transport vehicle.



Fig. 6

3.2 Loading the precision airplanters ED 452-K and ED 602-K

Fold in the precision airplanters ED 452-K and ED 602-K and load as follows with a crane.

1. Fasten the transport straps (Fig. 7/1) to the eyelets on the implement



Fig. 7

2. The eyelets are marked with the label (Fig. 8).
3. Secure the implement in accordance with the regulations to the transport vehicle.

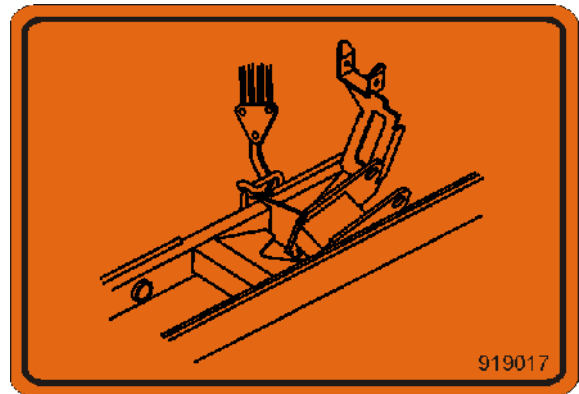


Fig. 8

4 Product description

This section:

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

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

4.1 Main assemblies of the implement

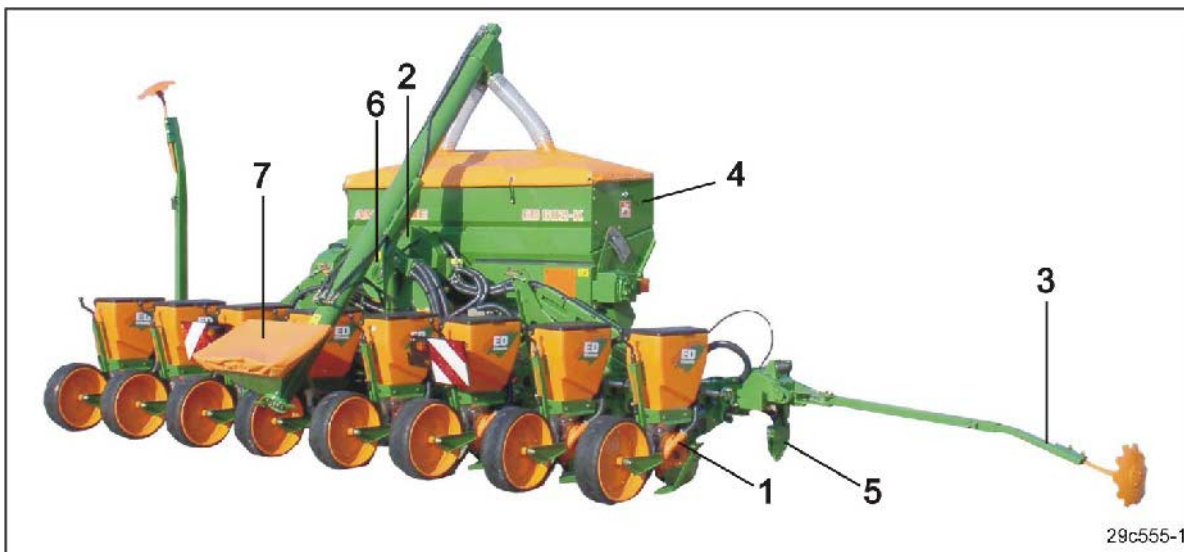


Fig. 9

Fig. 9/...

- (1) Sowing unit
- (2) Suction air fan
- (3) Track marker
- (4) 900/1100 litre fertiliser hopper (optional)
- (5) Fertiliser coulter (optional)
- (6) Compressed air fan (optional)
- (7) Fertiliser filling auger (optional)

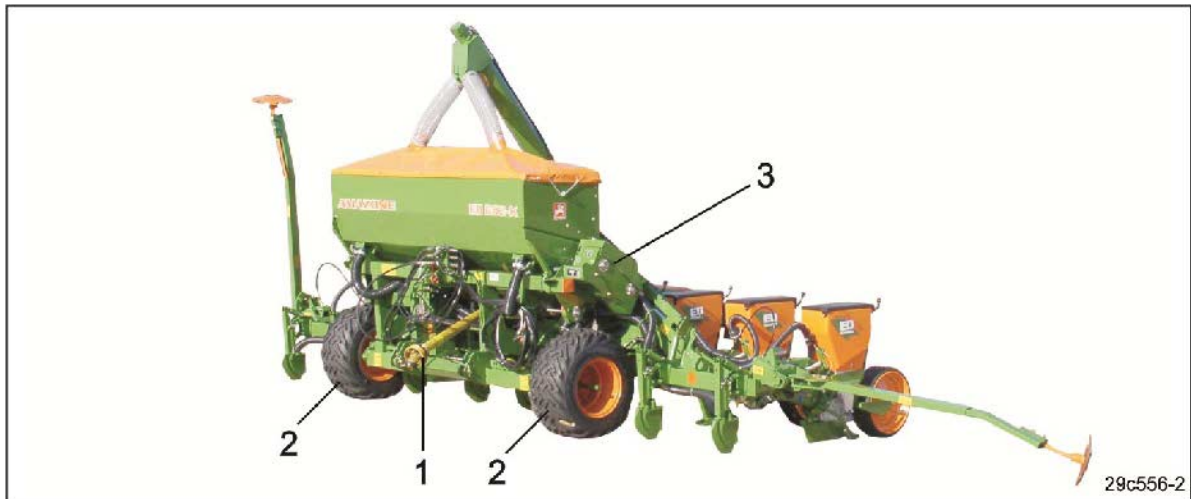
**Fig. 10**

Fig. 10/...

- (1) Universal joint shaft for the fan drive
- (2) Drive wheels
- (3) Setting gearbox

4.2 Overview of the assemblies

Fig. 11

AMASCAN⁺ control terminal
(optional)

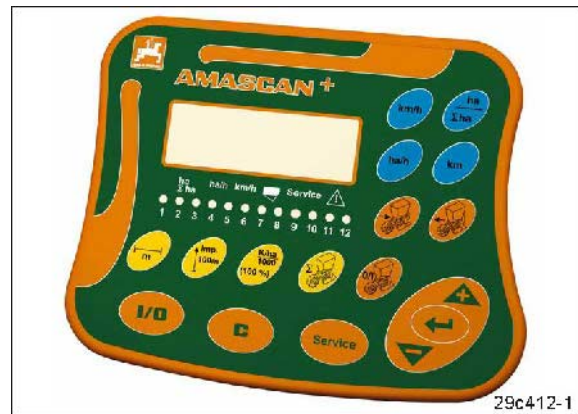


Fig. 11

Fig. 12

AMASCAN-PROFI control terminal
(optional)

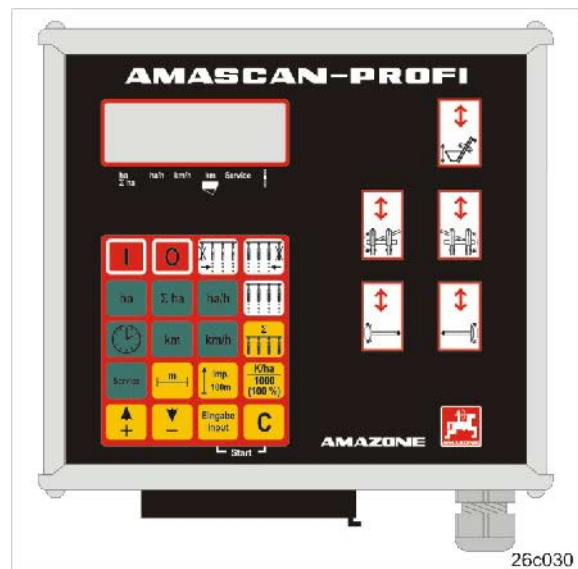


Fig. 12

Fig. 13

ED-CONTROL control terminal
(optional)

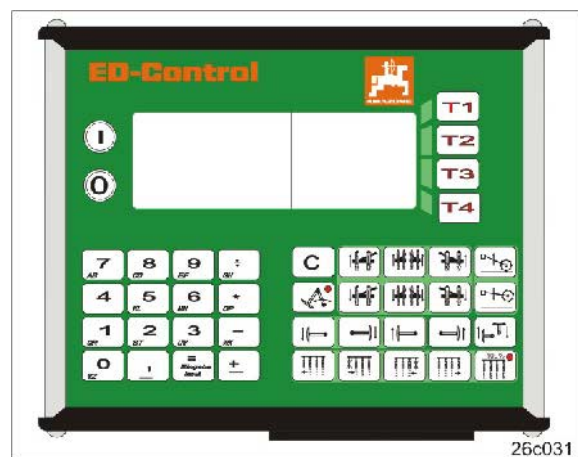


Fig. 13

Classic sowing unit

Fig. 14/...

- (1) Seed hopper
- (2) Adjusting the seed placement depth
- (3) Sowing housing
- (4) Seeding coulter
- (5) Farm flex tyre
- (6) Leading closer

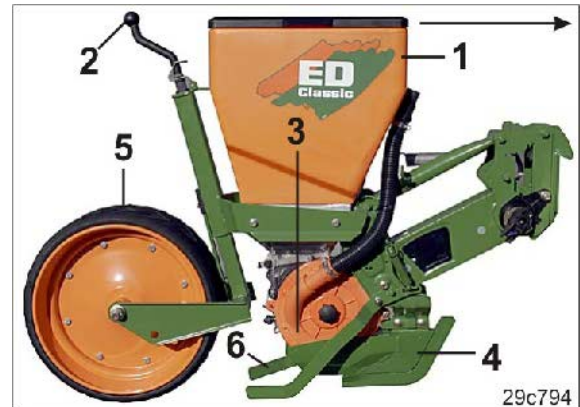


Fig. 14

Contour sowing unit

Fig. 15/...

- (1) Seed hopper
- (2) Adjusting the seed placement depth
- (3) Sowing housing
- (4) Seeding coulter
- (5) Leading press roller
- (6) V-press roller
- (7) Clod clearer (optional)

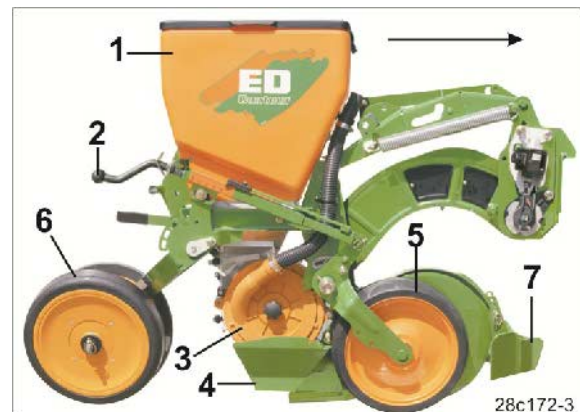


Fig. 15

Fertiliser system with hopper at the rear

Fig. 16/...

- (1) 650, 900 or 1100 litre fertiliser tank (optional)



Fig. 16

Fertiliser system with container at the front addition

Fig. 17/...

- (1) Front tank (fertiliser)
- (2) Star wheel
- (3) Dosing unit
- (4) Injector housing
- (5) Blower fan
- (6) Collection bucket holder for calibration test



Fig. 17

4.3 Safety and protection equipment

Fig. 18/...

- (1) PTO shaft guard



Fig. 18

Fig. 19/...

- (1) Fan guard



Fig. 19

Fig. 20/..

- (1) Exhaust air guide ENVIRO-Safe



Fig. 20

4.4 Transportation equipment (optional)

Fig. 21/...

- (1) 2 rear-facing turn signals
- (2) 1 light for 1 number plate holder (optional)
- (3) 2 red reflectors
- (4) 2 brake and tail lamps
- (5) 2 rear-facing warning signs
- (6) 2 reflectors, yellow.

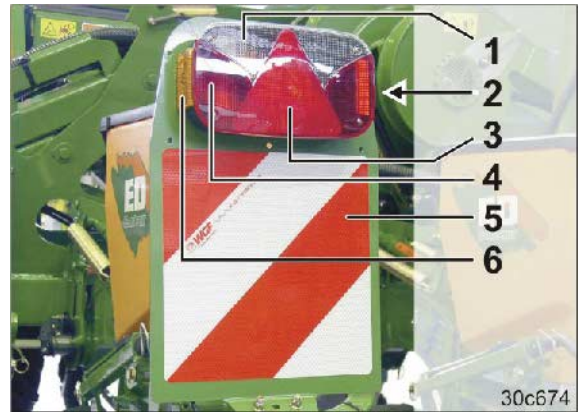


Fig. 21

Fig. 22/...

- (1) 2 forwards-facing side lights
- (2) 2 forwards-facing turn signals
- (3) 2 forwards-facing warning signs

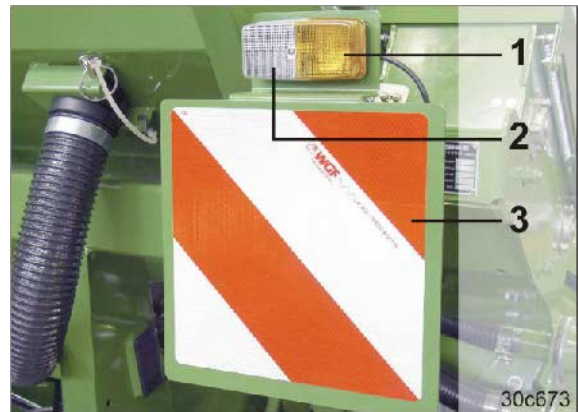


Fig. 22

4.5 Intended use

The implement

- is designed for metering and placing certain commercially-available types of seeds and fertilisers
- is coupled to the tractor via the three-point link and operated by one operator.

Sloping terrain can be traversed as follows:

- 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 %

"Intended use" also covers:

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

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

For any damage resulting from improper use

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

4.6 Danger areas and danger points

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

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

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

No-one may remain in the danger area of the implement while

- the tractor engine is running with a PTO shaft connected / hydraulic system connected.
- the tractor and implement are not protected against unintentional start-up and rolling.

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

Danger points exist:

- Between the tractor and the implement, particularly during coupling and uncoupling operations.
- Where there are moving components.
- In the area of the swivelling implement extension arms
- In the area of the swivelling track marker
- Underneath raised, unsecured implements or parts of implements
- When folding the implement extension arms in/out near overhead power lines
- By climbing onto the implement.

4.7 Rating plate and CE mark

The rating plate (Fig. 23/1) shows:

- Mach. ident. no.
- Type
- Permitted total weight [kg]
- Year of manufacture
- Basic weight [kg]
- Factory

The CE mark (Fig. 23/2) on the implement indicates compliance with the stipulations of the applicable EU directives.



Fig. 23

The following illustrations show the arrangement of the rating plate and the CE mark on the implements

- ED 302, ED 452 (-K) (see Fig. 24)
- ED 602-K (see Fig. 25).



Fig. 24



Fig. 25

4.8 Necessary tractor equipment

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

4.8.1 Tractor engine power

	without fertiliser hopper	with fertiliser hopper
ED 302	from 44 kW (60 HP)	from 55 kW (75 HP)
ED 452 / ED452-K	from 55 kW (75 HP)	from 66 kW (90 HP)
ED 602-K	from 66 kW (90 HP)	from 88 kW (120 HP)

4.8.2 Electrical connections

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

4.8.3 Hydraulic system

Maximum operating pressure: 200 bar

Tractor pump power:	• 20 l/min. at 150 bar	o without hydraulic blower fan drive
		o without filling auger
	• 45 l/min. at 150 bar	o with hydraulic blower fan drive
		o with filling augur.

Transmission/hydraulic fluid Utto SAE 80W API GL4

Implement hydraulic fluid: The implement hydraulic/transmission fluid is suitable for the combined hydraulic/transmission fluid circuits of all standard makes of tractor.

4.9 Overview - Supply lines between the tractor and the implement

4.9.1 Hydraulic standard circuit

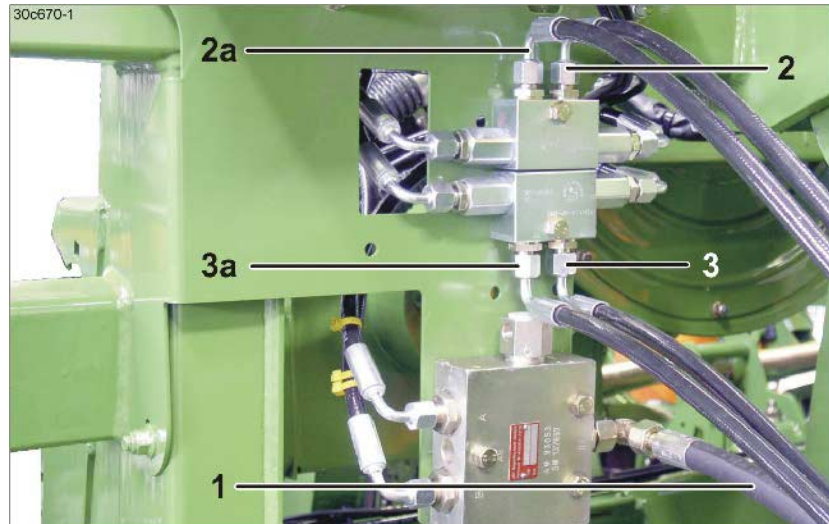


Fig. 26

Tractor side			Implement side						
				Run direction	Marking		Function		
Tractor control unit	1	single acting	Hydraulic line	(1)	Feed	Handle no.	1	Yellow	Track marker actuation (T/S)
	2	double acting		(2)	Feed line		1	Green	only ED02-K: Boom folding system, left side (T)
				(2a)	Return		2		
	3	double acting		(3)	Feed line		1	Blue	only ED02-K: Boom folding system, right side (T)
				(3a)	Return		2		
	4	single acting		(4)	Feed line		1	natural	Filling auger hydraulic motor (optional) (R)
				(4a)	Return		2		
	5	double acting		(5)	Feed line		1	natural	Star wheel lifting (front tank) (T)
				(5a)	Return		2		
	6	Single-acting or double-acting		(6)	Feed line ¹⁾		1	Red	Hydraulic motor blower fan (optional) (R)
unpressurised lines			(6a)	Return line ²⁾	2				

¹⁾ Pressure line with priority

²⁾ pressureless hose (see section "Installation regulations for the hydraulic blower fan drive connection (optional)", Seite 72).

4.9.2 Hydraulic Profi control (without load-sensing function)

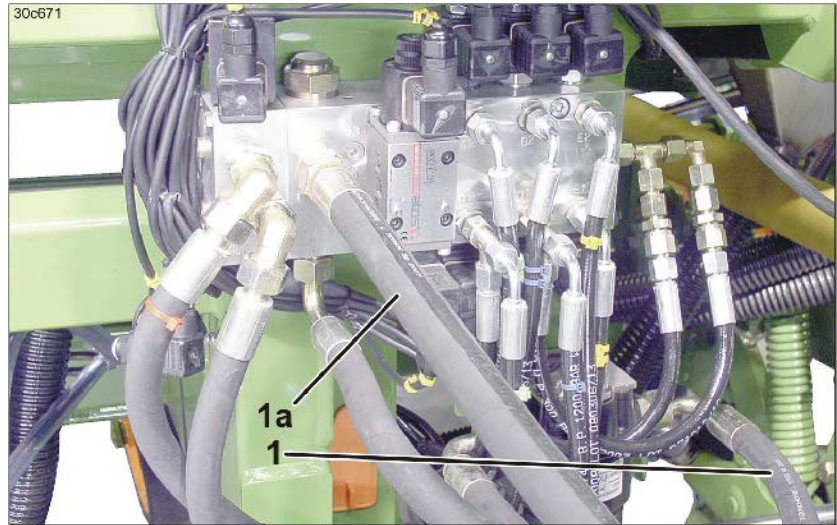


Fig. 27

Tractor side		Implement side					
			Run direction	Marking			Function
1	Tractor control unit double-action	Hydraulic line	(1)	Feed	1	Red	Profi control without load-sensing function
unpressurised lines			(1a)	Return line ²⁾			
2	Tractor control unit single or double-action		(2)	Feed line ¹⁾	1	Red	Hydraulic motor blower fan (optional) (R)
unpressurised lines			(2a)	Return line ²⁾			
3	Tractor control unit double-action		(3)	Feed line	1		Star wheel lifting (front tank) (T)
			(3a)	Return	2	natural	

¹⁾ Pressure line with priority

²⁾ pressureless hose (see section "Installation regulations for the hydraulic blower fan drive connection (optional)", Seite 72).

4.9.3 Hydraulic Profi control (with load-sensing function)

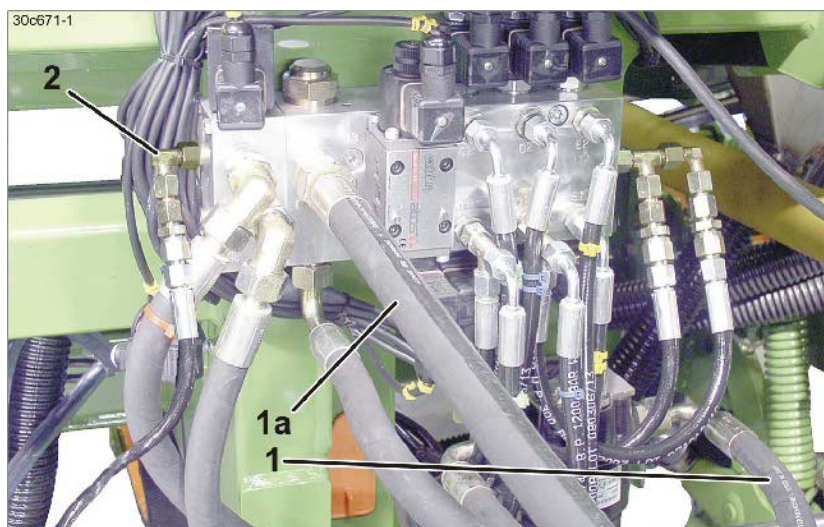


Fig. 28

Tractor side		Implement side						
			Run direction	Marking			Function	
1	Tractor control unit "LS"	Hydraulic line	(1)	Feed: LS pressure line	Handle no.	1	Red	Profi control with load-sensing function
			(1a)	Return flow: Pressure-free tank line		2		
			(2)	LS control line				

4.10 Noise production data

The workplace-related emission value (acoustic pressure level) is 74 dB(A), measured in operating condition at the ear of the tractor driver with the cabin closed.

Measuring unit: OPTAC SLM 5.

The noise level is primarily dependent on the vehicle used.

4.11 Technical specifications

Precision airplanter		ED 302		ED 452	
Sowing units		Classic	Contour	Classic	Contour
Possible tyres		10.0/75-15			
Transport width (also see table Seite 91)	[m]	3.00		4.00	
Transport length	[m]	2.40		2.40	
Number of sowing units in standard version (row spacing 75 cm)		4		6	
Max. number of sowing units with/without under root fertilising		10/6	6/6	12/6	9/6
Fertiliser hopper capacity	[l]	650 / 900		900	
Empty weight without row fertiliser applicator from	[kg]	662	798	824	1028
Empty weight with row fertiliser applicator from	[kg]	864	1036	1071	1275

Precision airplanter		ED 452-K		ED 602-K	
Sowing units		Classic	Contour	Classic	Contour
Possible tyres		10.0/75-15		31x15.5/15	
Transport width (also see table Seite 91)	[m]	3.00		3.05	
Transport length	[m]	2.80		2.90	
Number of sowing units in standard version (row spacing 75 cm)		6		8	
Max. number of sowing units with/without under root fertilising		7/6		12/8-12 ¹	
Fertiliser hopper capacity	[l]	900		1100	
Empty weight without row fertiliser applicator from	[kg]	903	1107	1337	1606
Empty weight with row fertiliser applicator from	[kg]	1150	1400	1697	2112
Front tank empty weight	[kg]	—		640	

¹ only in combination with front tank

Precision airplanter		• All types
Drive		• Sprocket gearing 54 steps
Grain spacing (also see table Seite 95)	[cm]	• 3.1 to 86.9 depending on the singling disc used
Blower fan drive		• PTO shaft with freewheel PTO shaft speed 540 rpm, 710 rpm or 1000 rpm optionally with hydraulic blower fan drive
Singling disc		• Plastic singling discs for maize, beans, peas, soya beans, sunflowers, etc.

4.11.1 Technical data for calculating the tractor weight and the tractor axle loads

(see Seite 67)		Total weight G_H	Distance d
ED 302 without fertiliser hopper	4-row classic	802 kg	885 mm
	4-row contour	942 kg	1076 mm
	10-row classic	1372 kg	1070 mm
	6-row contour	1202 kg	1180 mm
ED 302 with 650 litre fertiliser hopper	4-row classic	1472 kg	745 mm
	4-row contour	1652 kg	899 mm
	6-row classic	1692 kg	824 mm
	6-row contour	1962 kg	1006 mm
ED 302 with 900 litre fertiliser hopper	4-row classic	1508 kg	745 mm
	4-row contour	1688 kg	899 mm
	6-row classic	1728 kg	824 mm
	6-row contour	1998 kg	1006 mm
ED 452 without fertiliser hopper	6-row classic	1034 kg	950 mm
	6-row contour	1244 kg	1157 mm
	10-row classic	1414 kg	1052 mm
	9-row contour	1634 kg	1252 mm
ED 452 with 900 litre fertiliser hopper	6-row classic	2260 kg	731 mm
	6-row contour	2530 kg	878 mm
ED 452-K without fertiliser hopper	6-row classic	1113 kg	917 mm
	6-row contour	1323 kg	1117 mm
	7-row classic	1208 kg	950 mm
	7-row contour	1453 kg	1156 mm
ED 452-K with 900 litre fertiliser hopper	6-row classic	2339 kg	722 mm
	6-row contour	2609 kg	866 mm

(see Seite 67)		Total weight G_H	Distance d
ED 602-K without fertiliser hopper	8-row classic	1617 kg	881 mm
	8-row contour	1897 kg	1072 mm
	12-row classic	1997 kg	967 mm
	12-row contour	2417 kg	1177 mm
ED 602-K with 1100 litre fertiliser hopper	8-row classic	3127 kg	722 mm
	8-row contour	3487 kg	865 mm
ED 602-K with row fertiliser attachment kit for front tank	12-row classic	2422 kg	945 mm
	12-row contour	2962 kg	1158 mm

(see Seite 67)		Total weight G_V	Distance a_2
· Front tank FRS 103 (without extension) · Front tank FRS 203 (without extension)		2150 kg	0.9 m
· Front tank FPS 103 (without extension) · Front tank FPS 203 (without extension)		2675 kg	0.85 m

5 Layout and function

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

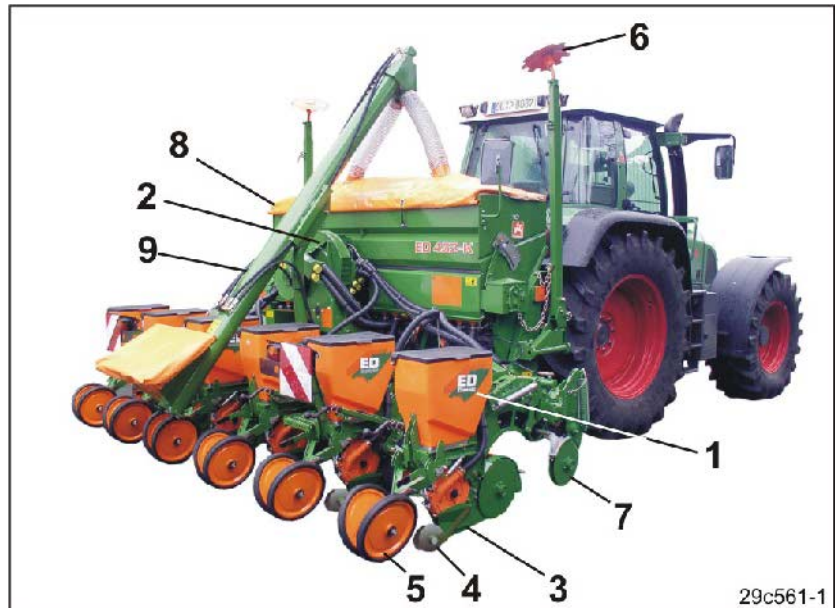


Fig. 29

Precision airplanters place the seed grains individually in equal, adjustable distances in the ground. In each row one sowing unit works with its own seed hopper (Fig. 29/1).

The seed is sucked into the holes in the rotating singling discs. One suction blower fan (Fig. 29/2) creates the required vacuum. At the lowest point of the singling disc, the vacuum is released and the seed grain falls into the seed trench created by the seeding coulter (Fig. 29/3).

After sowing, the seed is covered evenly and pressed in place by the closer (Fig. 29/4) and the press roller (Fig. 29/5).

The drive wheels of the precision airplanter drive the singling discs. The speed of the singling discs is set via the setting gearbox and the secondary gears. Gearbox speed changes alter the spacing of the grains in the ground. Individual sowing units can be electronically switched off, e.g. using the AMASCAN⁺ on-board computer (optional).

The suction air fan (Fig. 29/2) is driven by the tractor PTO shaft or by a hydraulic motor.

Track markers (Fig. 29/6) mark the field connection run either in the centre of the tractor in the tractor track (except ED 302).

For under root fertilising (optional), precision airplanters are fitted with fertiliser coulters (Fig. 29/7) which deposit the fertiliser normally at 6 cm distance (adjustable) next to the seeding coulters (Fig. 29/3) in the ground.

The fertiliser placement depth is adjustable. The fertiliser is stored in the hopper (Fig. 29/8) or in the front tank.

Using the filling auger (Fig. 29/9, option), the fertiliser hopper can be easily filled.

5.1 Classic sowing unit

The classic sowing unit is used for sowing in ploughed ground.

Seed which can be sown with the classic sowing unit:

- Maize
- Beans
- Sunflowers
- Peas
- Cotton
- Sorghum

The crank (Fig. 30/1) is used to adjust the seed placement depth.

The maximum seed placement depth is 10 cm.

The following farm flex tyres (Fig. 30/2)

- guide the sowing unit to the depth
- presses the seed furrow in.

If the desired placement depth is not reached, the sowing unit can be additionally loaded by being fitted with a lever (Fig. 30/3) which adjusts the spring pressure.



Fig. 30

The adjustable, fore-running closer (Fig. 31/1) closes the seed furrow.



Fig. 31

5.2 Contour sowing unit

Sowing process with the contour sowing unit:

- Conventional sowing
- Mulch sowing

Seed which can be sown with the contour sowing unit:

- | | |
|--------------|---------------|
| • Maize | • Sugar beet |
| • Beans | • Turnips |
| • Sunflowers | • Rapeseed |
| • Peas | • Water melon |
| • Cotton | |
| • Sorghum | |

The contour sowing unit is supported by the leading press roller (Fig. 32/1) located on one side (both sides as an optional) and the following V press roller (Fig. 32/2).

The press rollers are connected together via the depth adjustment spindle (Fig. 32/3) and form a longitudinal tandem.

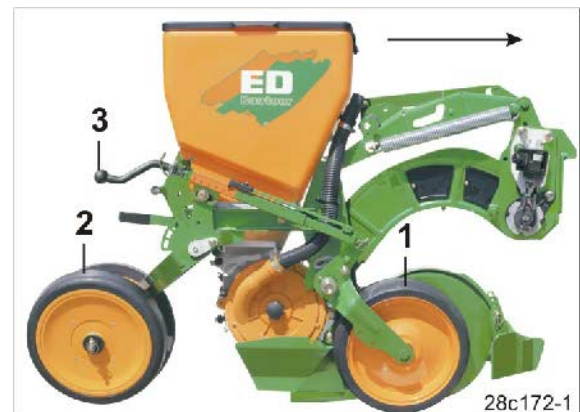


Fig. 32

The contour sowing unit can therefore adapt itself to the level of the surface (Fig. 33).

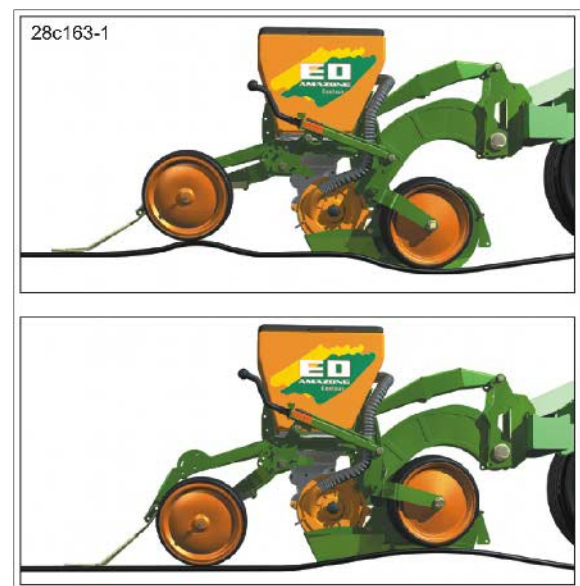


Fig. 33

Layout and function

The large double discs (Fig. 34/1) clear the organic remains of plants from fields in front of the seeding coulter (Fig. 34/2).

The rubber V-press roller (Fig. 34/3) and the super V-press roller are suitable for plowing and mulch sowing.

The rubber V-press roller

- keeps the seed placement depth constant in conjunction with the front press roller
- closes the seed furrow
- presses the seed furrow in.

The Super V press roller (optional)

- increases the ground pressure beside the seed furrow using a special rubber profile with an integrated wire rope.

The seed placement depth is set using a crank (Fig. 35/1) and displayed on a scale (Fig. 35/2). The scale value is a relative one which is used to simplify adjusting the other units.

The maximum seed placement depth is 12 cm.

The sowing units on an implement are matched to each other. The scale value (Fig. 35/2) displayed on one sowing unit can be transferred to all the other sowing units.

If the desired placement depth is not reached, the sowing unit can be additionally loaded by adjusting the spring (Fig. 36/1).

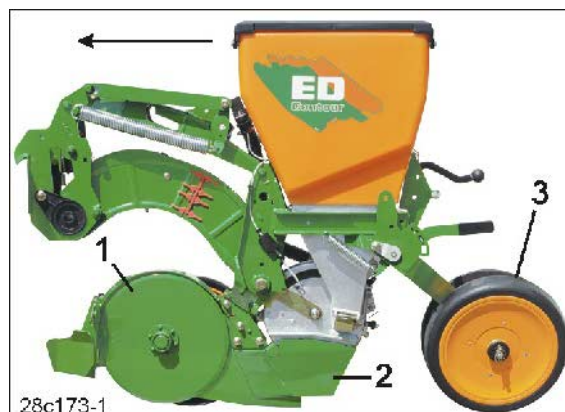


Fig. 34

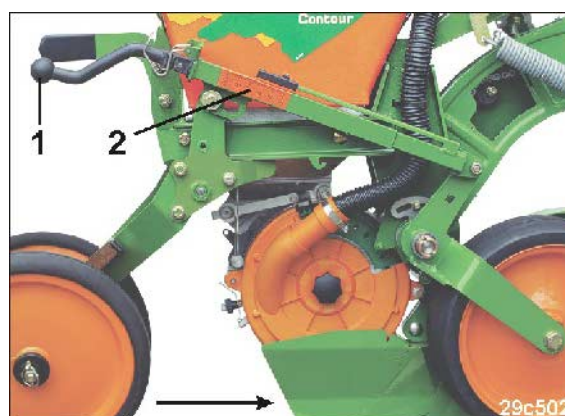


Fig. 35



Fig. 36

The clod clearer (Fig. 37/1) allows the sowing unit to run smoothly on ground with rough surface structures.

Do not insert the clod clearer too deeply. The clod clearer should only clear the large clods off to the side. If the clod clearer causes complete earth movement, this has a negative impact when closing the seed furrows.

If the placement depth is uneven, the clod clearer can be adjusted one hole deeper, and the placement depth checked again.

Attach the clod clearers right at the top if they are not needed.

The adjustable, fore-running closer (Fig. 37/2) closes the seed furrow. They are suited for sowing in plough furrows.

Disc furrow closers (optional, Fig. 38/1) close the seed furrow and are suitable for use behind a plough as well as for sowing in mulch.

The following rollers close the seed furrow and press the ground down.



Fig. 37

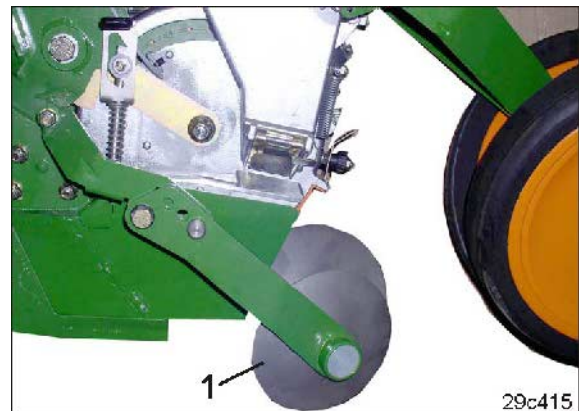


Fig. 38

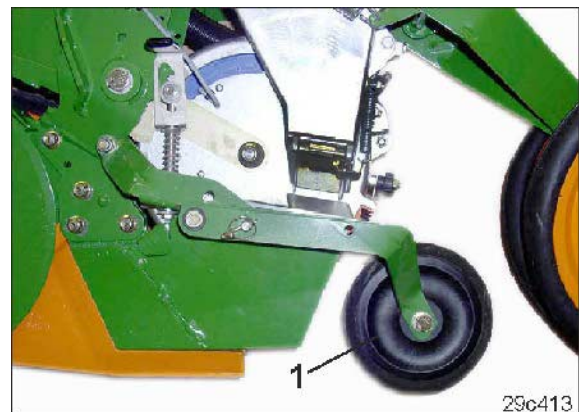


Fig. 39

The intermediate press roller (optional) is used for small seed.

The intermediate press roller (Fig. 39/1) presses the seed in. Improved soil coverage means that more moisture is available for germination.

5.3 Seed dosing

At a set row spacing, sowing is wanted at a certain number "grains per m²" or "grains per hectare".

The required grain spacing is calculated from this which is set by adjusting the speed of the singling discs.

- on the setting gearbox (Fig. 40/1) in 18 steps
- on the secondary gearbox (Fig. 40/2) in 3 steps.



Fig. 40

The seed flows from the seed hopper through the feed opening (Fig. 41/1) in the seed hopper area (Fig. 41/2) of the singling disc.

The seed hopper area must not overflow nor must it contain too little seed.

Using the reduction flap (Fig. 41/3), the correct opening size can be set.

A blower fan creates a vacuum behind the holes (Fig. 41/4) of the turning singling disc. The grains are then sucked out of the seed hopper area into the holes (Fig. 41/4).

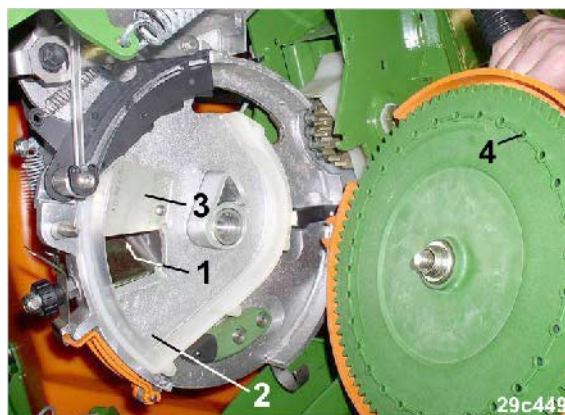


Fig. 41

Air leaves the sowing housing through the slits (Fig. 42/1) of the suction nodule.

At the lowest point of the singling disc (Fig. 42/2) the vacuum is released and the seed grain falls into the seed furrow created by the seeding coulter.



Fig. 42

An ejector (Fig. 43/1) releases any broken grains which could block up the holes of the singling disc.

If several seeds are sucked into a hole at the same time, an adjustable scraper (5 positions, Fig. 43/2) carefully wipes off the excess seed grains which then fall back into the seed hopper area (Fig. 43/3).



Fig. 43

The seed fan (Fig. 44/1) creates a vacuum which sucks the seed grains into the holes of the singling discs.

The seed fan is driven

- by the tractor PTO shaft, or
- by a hydraulic motor.



Fig. 44

The vacuum is shown on a pressure gauge (Fig. 45/1) in the tractor cabin.

Changing the speed of the suction air blower fan causes a change to the vacuum.

The required blower fan speed can be set using the pressure gauge.

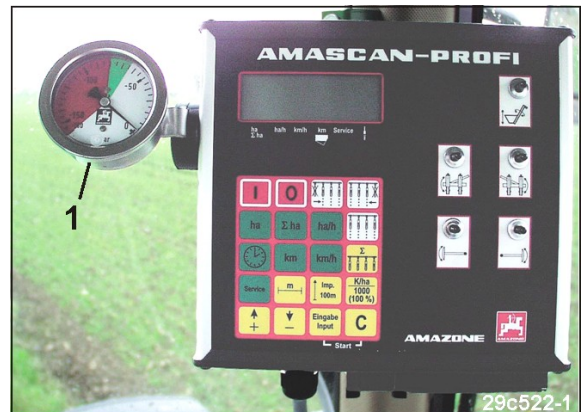


Fig. 45

The holes of the singling discs (Fig. 46) are designed to match the seed properties (size, shape and weight). The singling discs should therefore be changed as appropriate.

The marking on the singling discs shows the number of holes, the hole diameter, and the colour of the singling disc, e.g. 30/5.0 green: 30 holes / diameter 5.0 mm, colour green.



Fig. 46

5.4 Markers

The hydraulically-actuated track markers (Fig. 47/1) dig into the ground alternately on the left and the right of the implement.

In so doing, the active track marker creates a mark. This mark serves as an orientation aid for the next run after turning.

After turning, the tractor driver drives either with the mark in the centre, or with the front wheel on the marking.

The following are adjustable:

- the length of the track marker
- the working intensity of the track marker, depending on the type of soil.



Fig. 47

5.5 Wheel mark eradicator (optional)

The design of the wheel mark eradicator (optional) is dependent on the implement type and its place of use.

The wheel mark eradicators (Fig. 48) can be adjusted horizontally and vertically.



Fig. 48

5.6 Under root fertilising (optional)

5.6.1 Fertiliser coulters

The fertiliser placement depth and the distance between the fertiliser coulters to the seeding coulters is adjustable.

Obstacles are avoided by the fertiliser coulters.

The towed fertiliser coulters (Fig. 49) are used on

- ploughed ground.



Fig. 49

The single disc fertiliser coulters (Fig. 50) are used

- on ploughed ground
- when mulch sowing.



Fig. 50

5.7 Electronic monitoring and operation (optional)

The precision airplanters are electronically monitored and controlled via an on-board computer (optional). There are three on-board computers available for the different requirements:

- AMASCAN ⁺
- AMASCAN-PROFI
- ED-CONTROL.

The display and operation is done using the control terminal in the tractor cabin.

5.7.1 AMASCAN ⁺

The AMASCAN ⁺

- Monitors the singling.
Acoustic and optical fault reporting.
- Displays the "number of grains per hectare".
Acoustic and optical fault reporting if there is a deviation from the set value.
- Provides a service function to test the optical sensor function.
- Turns off the drive of individual sowing units (part width section control).
Required equipment: sowing units with electrical switching (optional).
- Sounds alarms (optional)
 - o When the minimum filling level is reached in 900 / 1100 litre fertiliser storage tanks and in the front tank.
 - o If the dosing wheels stop in the 900 /1100 litre fertiliser storage tanks and in the front tank.

Required equipment:

Container monitoring system (optional).

- Displays the working speed [km/h].

The AMASCAN ⁺ saves

- the worked area [ha]
- the distance covered [km]
- the area efficiency [ha/h]
- the total area worked [ha].



Fig. 51

5.7.2 AMASCAN-PROFI

The AMASCAN-PROFI has all the functions of the AMASCAN⁺ and also has the additional functions listed below:

- folds the sowing unit booms in and out separately
- folds the track markers in and out separately
- switches the filling auger on and off
- saves the working time [h].

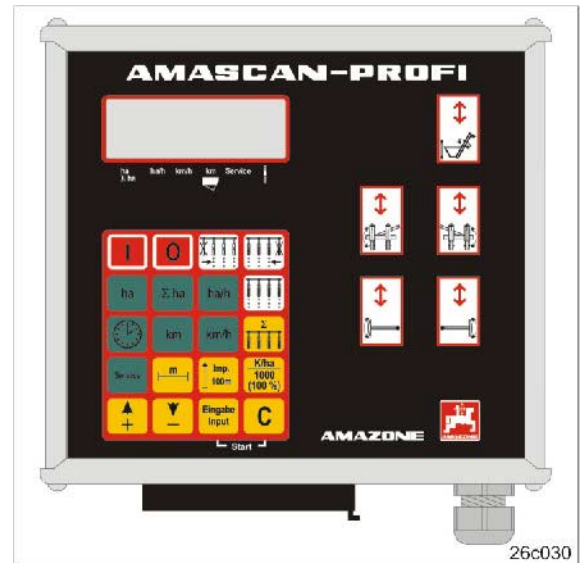


Fig. 52

5.7.3 ED-CONTROL

The ED-CONTROL has all the functions of the AMASCAN-PROFI and also has the additional functions listed below:

- saves 12 jobs
- automatically switches the drive of individual sowing units to create tramlines in certain rhythms.

Required equipment: sowing units with electrical switching (optional).

- contains the automatic changer for track markers in the headlands
- lowers / lifts the star wheel (front tank)

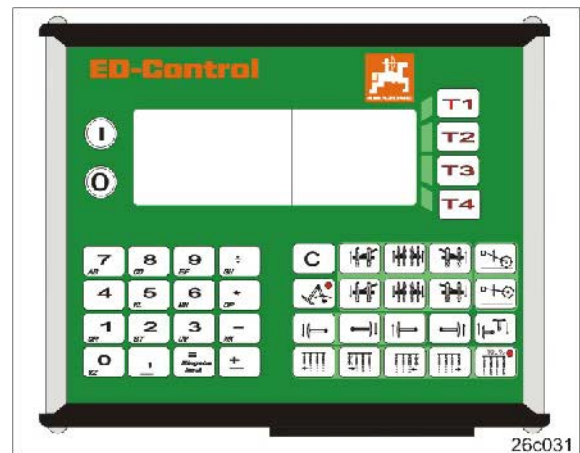


Fig. 53

6 Start-up

This section contains information

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



- Before operating the implement for the first time the operator must have read and understood the operating manual.
- Take heed of section "Safety information for users", from Seite 26 onwards on
 - Coupling and uncoupling the implement
 - Implement transportation
 - Use of the implement.
- Only couple and transport the implement to/with a tractor which is suitable for the task.
- The tractor and implement must meet the national road traffic regulations.
- The operator and the user shall be responsible for compliance with the statutory road traffic regulations.



WARNING

Risk of contusions, cutting, catching, drawing in and knocks 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 which:

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

6.1 Checking the suitability of the tractor



WARNING

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

- Check the suitability of your tractor before you attach or hitch the implement to the tractor.
You may only connect the implement to tractors suitable for the purpose.
- Carry out a brake test to check whether the tractor achieves the required braking deceleration also with the implement attached.

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

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

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

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

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

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



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

- Tractor empty weight
- ballast weight and
- total weight of the attached implement or noseweight of the hitched implement.



This notice applies only to Germany.

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

6.1.1.1 Data required for the calculation (attached implement)

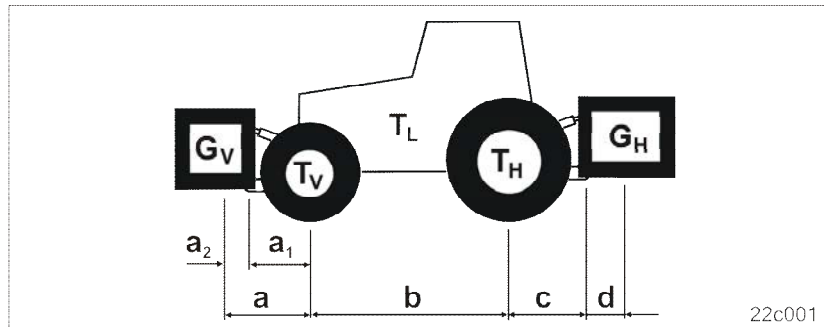


Fig. 54

T_L	[kg]	Tractor empty weight	See tractor operating manual or vehicle documentation
T_V	[kg]	Front axle load of the empty tractor	
T_H	[kg]	Rear axle load of the empty tractor	
G_H	[kg]	Total weight of rear-mounted implement or rear ballast	See section "Technical specifications" from Seite 51 or the rear balast
G_V	[kg]	Total weight of front-mounted implement or front ballast	See technical data for front-mounted implement or front ballast
a	[m]	Distance between the centre of gravity of the front implement mounting or the front weight and the centre of the front axle (total $a_1 + a_2$)	See technical data of tractor and front implement mounting or front weight or measurement
a_1	[m]	Distance from the centre of the front axle to the centre of the lower link connection	See tractor operating manual or measurement
a_2	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the front-mounted implement or front ballast (centre of gravity distance)	See technical data of front implement mounting or front weight or measurement
b	[m]	Tractor wheel base	See tractor operating manual or vehicle documents or measurement
c	[m]	Distance between the centre of the rear axle and the centre of the lower link connection	See tractor operating manual or vehicle documents or measurement
d	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the rear-mounted implement or rear ballast (centre of gravity distance)	See section "Technical specifications" from Seite 51 or the rear balast

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 implement

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

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 Tyre load capacity for the tractor tyres

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 instruction 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 actual calculated values must be less than or equal to (\leq) the permissible values!


WARNING

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

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

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



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

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



WARNING

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

- Unintentional lowering of the unsecured implement when it is raised via the three-point hydraulic system of the tractor
- Unintentional lowering of raised, unsecured parts of the implement
- Unintentional start-up and rolling of the tractor-implement combination.



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

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

- while the implement is being driven.
- when the tractor's engine is running and the tractor's universal joint shaft/hydraulic system is connected.
- if the ignition key is inserted in the tractor when the tractor's universal joint shaft/hydraulic system is connected and the tractor engine could be started unintentionally.
- if the tractor and implement have not each been prevented from unintentionally rolling away by applying their parking brakes and/or securing them with wheel chocks.
- if moving parts are not blocked against unintentional movement.

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

1. Park the tractor and the implement on solid, level ground only.
2. Lower any die angehobene, ungesicherte Maschine / raised, unsecured implement parts.

→ This is how to prevent unintentional falling.

3. Shut down the tractor engine.
4. Remove the ignition key.
5. Apply the tractor parking brake.
6. Secure the implement with wheel chocks against unintentionally rolling away.

6.2.1 Adjust the PTO shaft to the tractor



Prior to the first coupling to the tractor and when changing the tractor adjust the PTO shaft length. In this regard, observe the operating manual of the PTO shaft manufacturer.



DANGER

Only install / remove the PTO shaft with the drive shaft turned off, the hand brake applied, the engine switched off and the ignition key removed.

Attach the PTO shaft halves onto the shaft connections on the tractor and the implement in the prescribed direction of installation (see the symbol on the PTO shaft), do not connect the shaft pipes into each other.

Fig. 55/...

- (1) By holding both shaft pipes next to each other, check that they attach into each other in every position by at least $A = 185 \text{ mm}$.
- (2) When they are pushed together, the shaft pipes must not impact against the forks of the cross joint. A safety distance of at least 10 mm must be maintained.
- (3) To adjust the length, hold the PTO shaft halves next to each other at the shortest operating position and mark them.
- (4) Shorten the inner and outer protective pipes evenly.
- (5) Shorten the inner and outer profile tube by the same length as the protective pipe.
- (6) Round off the cut edges and carefully remove any swarf.
- (7) Grease the profile tubes and push into each other.
- (8) The protective pipes of the PTO shaft are fitted with retaining chains which should be fastened to the tractor and the implement. The safety chains prevent the protective pipe turning when the PTO shaft is running. Retaining chains should be hung in the holes provided, so that it is ensured that there is sufficient swing range of the PTO shaft and that the protective pipes do not turn during operation.

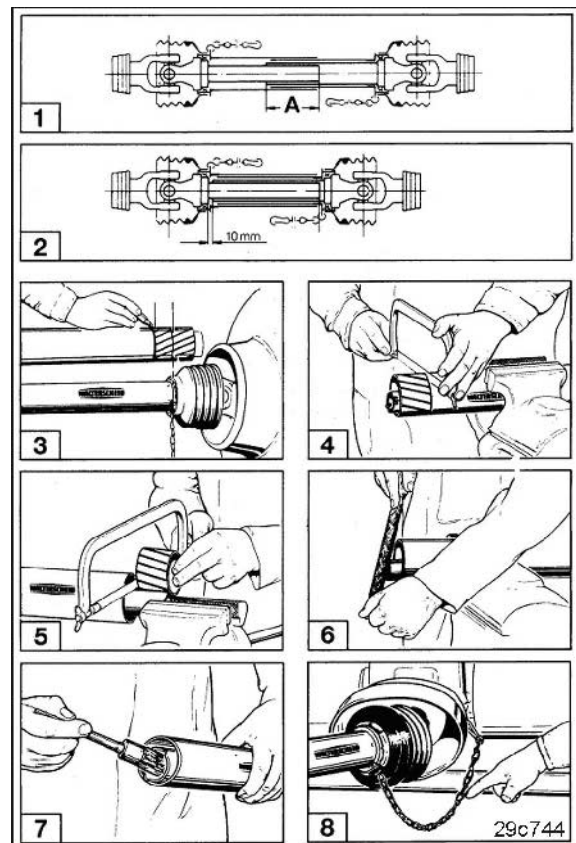


Fig. 55

6.2.2 Installation regulations for the hydraulic blower fan drive connection (optional)

The banking-up pressure of 10 bar must not be exceeded. The installation regulations therefore have to be complied with when connecting the hydraulic fan connection.

- Connect the hydraulic coupling of the pressure line (Fig. 56/5) to a single-acting or double-acting tractor control unit with priority.
- Connect the large hydraulic coupling of the return line (Fig. 56/6) only to an unpressurised tractor connection with direct access to the hydraulic fluid tank (Fig. 56/4).
In order that the banking-up pressure of 10 bar is not exceeded, do not connect the return line to a tractor control unit.
- For retro-installation of the tractor return line, use only piping with ND 16, e.g. 20 id. x 2.0 mm with a short return path to the hydraulic fluid tank.

Fig. 56/..

(A) Implement side

(B) Tractor side

- (1) Tractor control device with priority, single acting or double acting
- (2) Blower fan hydraulic motor
- (3) Flow control valve of the implement
- (4) Hydraulic pipe pressure line (marking: 1 cable tie, red)
- (5) Hydraulic pipe return flow line with large plug coupling (marking: 2 cable tie, red)
- (6) Tractor hydraulic pump
- (7) Oil filter on the tractor side
- (8) Tractor hydraulic oil tank

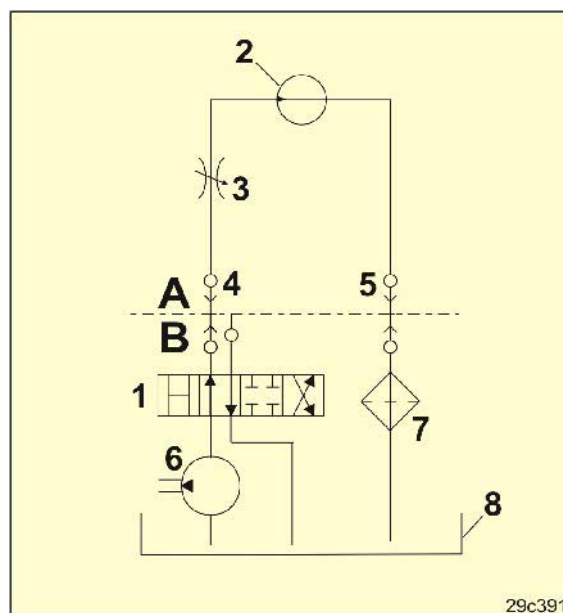


Fig. 56



The hydraulic fluid must not overheat.

High oil flow rates in conjunction with small oil tanks encourage rapid heating-up of the hydraulic fluid. The capacity of the tractor's oil tank (Fig. 56/8) should be at least twice the oil flow rate. If the hydraulic fluid heats up excessively, the installation of an oil cooler is required at a specialist workshop.

If a second hydraulic motor is driven besides the hydraulic fan motor, both motors have to be wired in parallel. If both motors are wired in series, the permissible oil pressure of 10 bar is always exceeded behind the first motor.

6.2.3 Installation regulations Profi control (optional)

Without "LS operation":

- Connect the pressure line (Fig. 57/2) to a single or double-acting tractor control unit with priority.

With "LS operation":

- LS pressure line connection
- LS control line connection.

With and without "LS operation":

- - Only connect the return line (Fig. 57/3) to an unpressurised tractor connection with direct access to the hydraulic oil tank. Do not connect the return line to a tractor control unit. Do not exceed a back pressure of 10 bar..

To install the tractor return line, use only DN 16 piping, e.g. Ø 20 x 2.0 mm with a short return path to the hydraulic oil tank.

Fig. 57/...

- (A) Implement side
(B) Tractor side

- (1) Tractor control device with priority, single acting or double acting
 - (2) Hydraulic pipe pressure line (marking: 1 cable tie, red)
 - (3) Hydraulic pipe return flow line with large plug coupling (marking: 2 cable tie, red)
 - (4) Oil filter on the implement side
 - (5) Tractor hydraulic pump
 - (6) Oil filter on the tractor side
 - (7) Tractor hydraulic oil tank
 - (8) Electrohydraulic control block (Profi control)
 - (9) Valve (fold boom left side)
 - (10) Valve (fold boom right side)
 - (11) Valve (actuate track marker)
 - (12) Valve (optional, switch the filling auger on / off)
 - (13) Valve (optional, actuate star wheel, only in conjunction with ED-CONTROL).
-
- (LS) Load Sensing control line connection (optional)

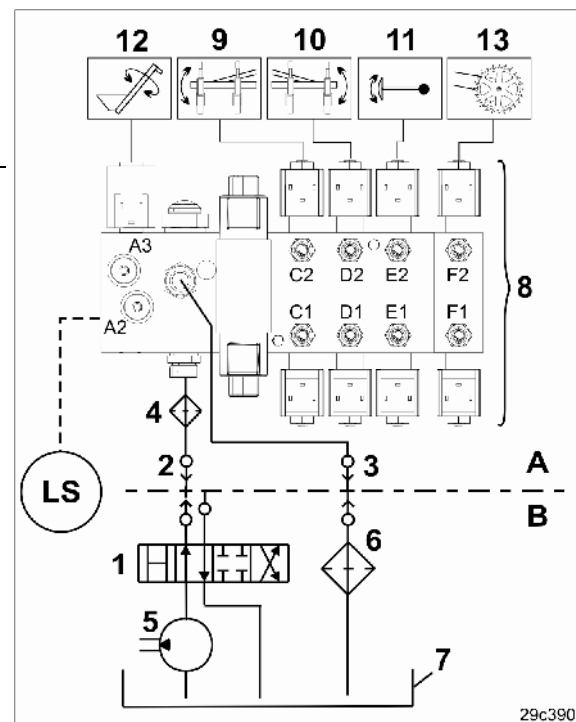


Fig. 57

Start-up

Profi controls with load sensing function are marked with a "LS" sticker (Fig. 58/1).



Fig. 58

6.2.4 Initial installation of the control terminal (optional)

The initial installation of the control terminal (Fig. 59) in the tractor cabin can be taken from the respective operating instructions.



Fig. 59

6.2.5 Initial installation of the clod clearer (optional, contour sowing unit)

1. Screw in the guide bolts (Fig. 60/1).



Fig. 60

2. Hang the clod clearer (Fig. 61/1) on the guide bolts (Fig. 60/1), secure with a pin (Fig. 61/2) and secure with a linch pin.

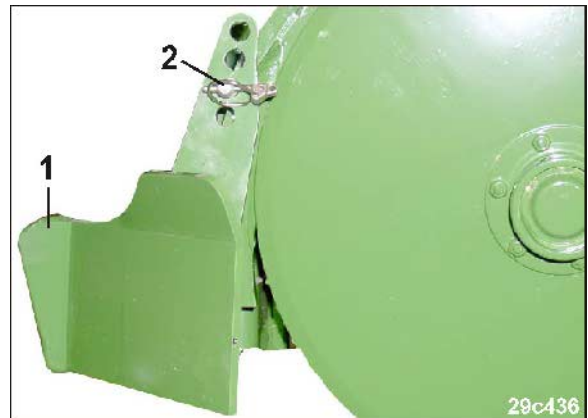


Fig. 61

7 Coupling and uncoupling the implement



When coupling and uncoupling the implement take heed of the section "Safety information for users", Seite 26.



WARNING

Risk of contusions from unintentional starting and rolling of the tractor and implement when coupling or uncoupling the implement!

Secure the tractor and implement to prevent unintentional starting and rolling before entering the danger area between the tractor and implement to couple or uncouple the implement. For more information, see section 6.2, Seite 70.



WARNING

Risk of contusions between the rear of the tractor and the implement when coupling and uncoupling the implement!

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

- From the workplace provided.
- If you are outside the danger area between the tractor and the implement.



WARNING

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

You may only connect the implement to tractors suitable for the purpose. On this subject see the section "Checking the suitability of the tractor", Seite 65.



WARNING

Risk of contusions when coupling the implement and standing between the tractor and the implement!

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

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

**WARNING**

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

- Use the intended equipment to connect the tractor and the implement in the proper way.
- When coupling the implement to the tractor's three-point hydraulic system, it is vital to ensure that the tractor mount categories of the tractor and the implement are the same.
Refit the cat. II top link and lower link pins of the implement to be cat. III using reducing sleeves if your tractor has a cat. III three-point hydraulic system.
- Only use the top and lower link pins provided for coupling the implement.
- Check the top and lower link pins for visible damage each time you couple the implement. Replace the top and lower link pins if there are clear signs of wear.
- Use a lynch pin on each of the top and lower link pins in the pivot points on the three-point frame attachment to secure them against unintentional release.

**WARNING**

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

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

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

Coupling the front tank

Couple and uncouple the front tank (Fig. 62) to the tractor based on the front tank's operating instructions.



Fig. 62



Create a conducting connection of the front tank's cable harness (implement plug) to the tractor ground (danger of static charging).

7.1 Coupling the implement

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 PTO shaft connections on the implement and tractor sides.
3. Insert the PTO shaft half with a freewheel (Fig. 63/1) in the PTO shaft connection of the implement and secure it in line with the instructions (see the PTO shaft manufacturer's operating instructions).



Fig. 63

Only use approved Walterscheid PTO shafts

- o W2200, 1210 mm 1 3/8, 6-part with freewheel (Fig. 63/1) or
- o W2200, 1610 mm 8x32x38 with freewheel (for tractors meeting the Russian design).

The freewheel permits the blower fan to run on when the PTO shaft is switched off.

In the direction of travel, the PTO shaft turns to the right (clockwise).

4. Support the PTO shaft on the PTO shaft support (Fig. 63/2)

5. The implement is fitted with category II lower and top link pins.
Fit the lower and top link pins with bearing sleeves (Fig. 64).
The bearing sleeves used depend on the type of the tractor (see the tractor's operating instructions).

It is imperative to adapt the category II top and lower pins of the implement using the reducing sleeves to category III if your tractor has a hydraulic three-point category III system.
6. Secure the top and lower link pins (linch pin securing pins).
7. Direct people out of the danger area between the tractor and implement before you approach the implement with the tractor.
8. First connect the supply lines (see section 7.2, Seite 82 and section 7.3, Seite 85) before coupling the implement to the tractor.
 - 8.1 Drive the tractor towards the implement leaving a gap (approx. 25 cm) between the tractor and the implement.
 - 8.2 Secure the tractor against unintentional starting and rolling away.
 - 8.3 Check that the tractor's PTO shaft is switched off.
 - 8.4 Connect the supply lines to the tractor.
 - o Make the hydraulic connections (see section 7.2, from Seite 82).
 - o Make the electrical connections (see section "Electrical connections", Seite 85)
 - 8.5 Position the lower link hooks so that they are aligned with the lower pivot points on the implement.



Fig. 64

Coupling and uncoupling the implement

9. Open the tractor lower link securing device, i.e. it must be ready for coupling.
 10. Drive the tractor further backwards towards the implement so that the lower link hooks of the tractor automatically take up the lower bearing sleeves of the lower pivot point of the implement.
- The lower link hooks lock automatically.

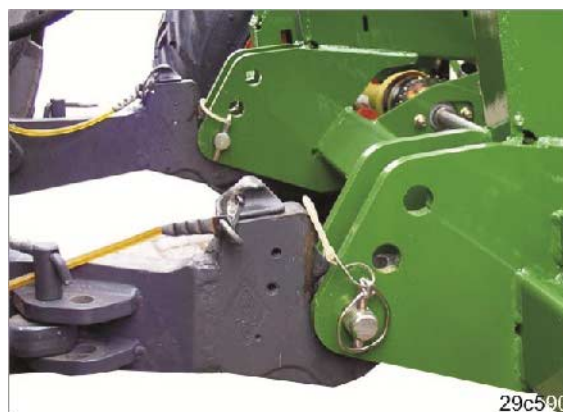


Fig. 65



The tractor lower links must be able to swing vertically during work.

11. Couple the top link (Fig. 66/1) from the tractor seat using the top link hooks with the top pivot point.
- The top link hook locks automatically.
12. Visually check that the top and lower link hooks are correctly locked.



Fig. 66



WARNING

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

Check the lower and top link pins for any obvious defects whenever the implement is coupled. Replace the pins if there are clear signs of wear.



DANGER

Only install / remove the PTO shaft with the drive shaft turned off, the hand brake applied, the engine switched off and the ignition key removed.

If you are caught up in a rotating shaft, it can cause serious injury or even death.

Always ensure that the PTO shaft is installed and secured correctly.

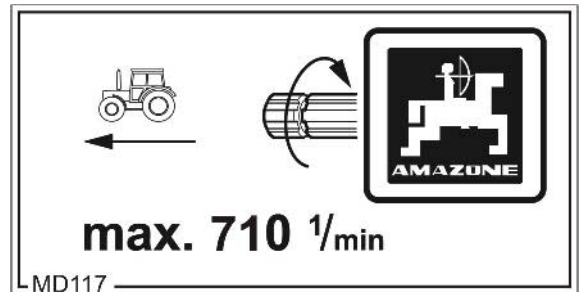
13. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
14. Attach and properly secure the PTO shaft halves into the PTO shaft connection of the tractor.
15. Fasten the safety chains (Fig. 67/1) of the PTO shaft protective pipes
 - o to the implement (see Fig. 67)
 - o to the tractor.
16. Follow the installation instructions of the PTO shaft manufacturer fastened to the PTO shaft.



Fig. 67

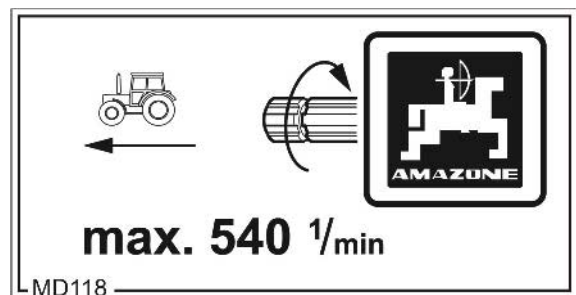
MD 117

Nominal speed (maximum 710 rpm) and direction of rotation of the drive shaft on the implement side.



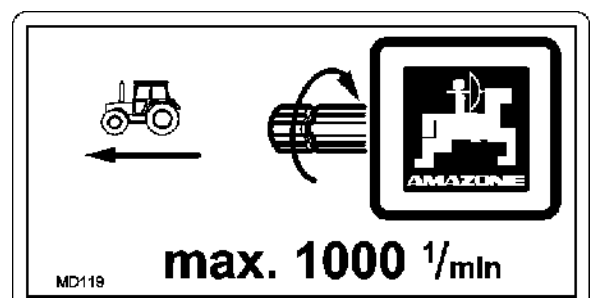
MD 118

Nominal speed (maximum 540 rpm) and direction of rotation of the drive shaft on the implement side.



MD 119

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





Check the route of the supply lines.

The supply lines:

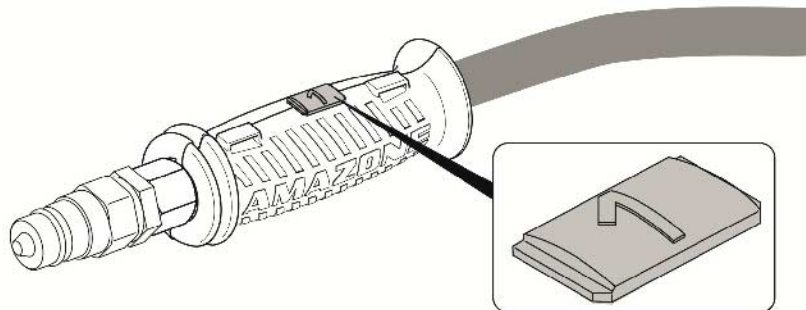
- Must easily give way to all movements in bends without tensioning, kinking or rubbing.
- Must not chafe against other parts.

7.2 Hydraulic connections



All of the hydraulic hose lines are equipped with grips.

Coloured markings with a code number or code letter have been applied to the gripping sections in order to assign the respective hydraulic function to the pressure line of a tractor controller!



Films are stuck on the implement for the markings that illustrate the respective hydraulic function.

Operating the respective valve for the various functions:

- **R** = engaging
- **T** = push action
- **S** = float position



- Clean the hydraulic couplings before connecting them to the tractor.
- Minor oil impurities from particles can cause a failure of the hydraulic system.
- Connect the front tank based on the front tank's operating instructions.

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Yellow	1	Feed	single-acting	No.1	Track marker actuation (T/S)

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Green	1	Feed	double acting	No. 2	Boom folding system, left side (T)
		2	return			
	Blue	1	Feed	double acting	No. 3*	Boom folding system, right side (T)
		2	return			
	Red	2	Return flow: pressureless line			Pressure relief of the Boom folding

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	natural	1	Feed	single acting	No. 4	Filling auger hydraulic motor (R)
		2	return			

Tractors with constant pressure hydraulic systems are only partially suited to operate hydraulic motors. Observe of the recommendations of the tractor manufacturer.

Interface	Implement side Identification of the hydraulic lines		Front tractor control unit			implement functions
Tractor	natural	1	Feed	double acting	No. 5	Star wheel lifting front tank (T)
		2	return			

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Red	1	Flow pipe: pressure line with priority	single acting	No. 6	Blower fan hydraulic motor (R)
		2	Return flow: pressureless line			

* Follow installation instructions

[see section "Installation regulations for the hydraulic blower fan drive connection (optional)", Seite 72].

7.2.1 One control unit for two implement functions (control unit, optional)

If there are fewer tractor control units available than are needed, two implement functions can be assigned to one tractor control unit.

Select one of the two functions desired using the lever (Fig. 68/A) and then confirm with the tractor control unit.

Check the function with lever setting "A" and "B" before bringing into use.

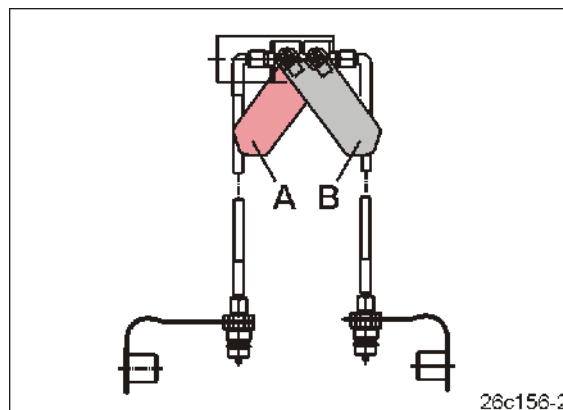


Fig. 68



DANGER

Risk of mixing up the functions! Before operating the tractor control unit, check the lever setting of the control unit (Fig. 68).

7.2.2 Hydraulic connection Profi control

Profi control without load-sensing function

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Red	1	Flow pipe: pressure line with priority*	single acting	No. 1	Profi control without load- sensing function
		2	Return flow pressure-free tank line*			

* Follow installation instructions [see section "Installation regulations Profi control", field].

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Red	1	Flow pipe: pressure line with priority*	single acting	No. 2	Blower fan hydraulic motor (R)
		2	Return flow pressure-free tank line*			

** Observe the installation instructions [see section "Installation regulations Profi control", Seite 73].

Interface	Implement side Identification of the hydraulic lines		Front tractor control unit			implement functions
Tractor	natural	1	Feed	double acting	No. 3	Star wheel lifting front tank (T)
		2	return			

*** not required when connected to ED-CONTROL

Profi control with load-sensing function

Interface	Implement side Identification of the hydraulic lines		Tractor control unit			implement functions
Tractor	Red	1	Flow pipe: LS pressure line	"LS"	No. 1	Profi control with load-sensing function
		2	Return flow pressure-free tank line			
	-		LS control line			

7.3 Electrical connections

Interface	Assembly:	Function	Notes
Tractor	Plug (7-pin)	Road traffic lighting system (optional)	
	Implement plug	Data cable on board computer AMASCAN ⁺ (optional)	
		Data cable on board computer AMASCAN-PROFI (optional)	
		Data cable on board computer ED-CONTROL (optional)	

7.4 Connect the pressure gauge

Connect the pressure gauge (Fig. 69/1) to the hose (Fig. 69/2).



Fig. 69

7.5 Supports



DANGER

The implement may only be set down on a level, firm surface.

Before pinning the support legs, apply the hand brake, switch off the tractor engine, and remove the ignition key.

When detached, the implement is supported on two support legs.

Support position:

Pin the support leg (Fig. 70/1) with a pin (Fig. 70/2) and secure with an R clip.

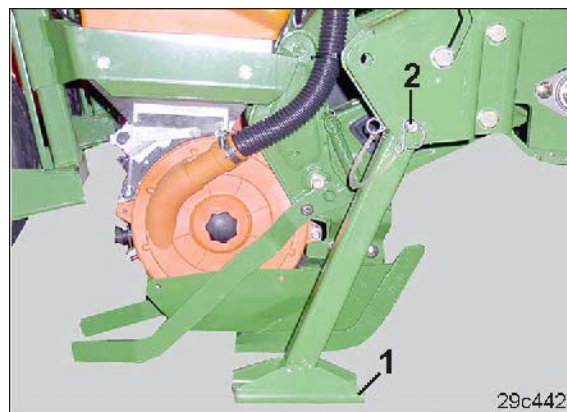


Fig. 70

Transport position:

Pin the support leg (Fig. 71/1) with a pin (Fig. 71/2) and secure with an R clip.



Fig. 71

7.6 Uncoupling the implement



WARNING

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

Set the empty implement down on a level parking area with a firm base.



When uncoupling the implement, there must always be enough free space in front of the implement that the tractor can be aligned with the implement again during recoupling.

1. Switch off the control terminal (if fitted).
2. Put the support legs into the support position [see section "Supports", Seite 86] and park the implement.
3. Turn off the PTO shaft, apply the hand brake, switch off the tractor engine, and remove the ignition key.
4. Uncouple the implement from the tractor.
 - 4.1 Relieve the top links.
 - 4.2 Unlock and uncouple the top link hooks from the tractor seat.
 - 4.3 Relieve the lower links.
 - 4.4 Unlock and uncouple the lower link hooks from the tractor seat.
 - 4.5 Drive the tractor approx. 25 cm forwards.
 - This will allow more clearance between tractor and implement and give better access for uncoupling the supply lines.
 - 4.6 Secure the tractor and implement against unintentional start-up and rolling.
 - 4.7 Depressurise the tractor's hydraulic system.
 - 4.9 Uncouple the supply lines.
 - 4.10 Close the hydraulic connectors with the protective caps.
 - 4.11 Fasten the supply lines in their respective parking sockets.
5. Uncouple the PTO shaft halves on the tractor side. Support the PTO shaft on the PTO shaft support (Fig. 63/2).



DANGER

While pulling the tractor forwards no personnel are allowed to be between the tractor and the implement!

Coupling and uncoupling the implement

6. Uncouple the top link from the tractor seat.
7. Uncouple the lower link from the tractor seat.
8. Pull the tractor forwards.



Fig. 72

8 Settings



WARNING

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

- Unintentional falling of the implement raised using the tractor's three-point hydraulic system.
- unintentional lowering of raised, unsecured implement parts.
- Unintentional starting and rolling of the tractor-implement combination.

Secure the tractor and the uncoupled implement against unintentional start-up and rolling before you make any adjustments to the implement, for this see section 6.2, Seite 70.



DANGER

Before adjustment tasks (unless otherwise specified):

- Fold out the implement extension arms
- Switch off the tractor's universal joint shaft
- Wait until the tractor's universal joint shaft stops moving
- Apply the tractor's parking brake
- Switch off the tractor's engine
- Remove the ignition key.

8.1 Adjust the row spacing

1. Undo the bolts (Fig. 73/1) and nuts (Fig. 73/2).
2. Lift up the implement and support with suitable supports.
3. The sowing unit can be adjusted to the desired row spacing by sliding the sowing unit on the clamping rail (Fig. 73/3).

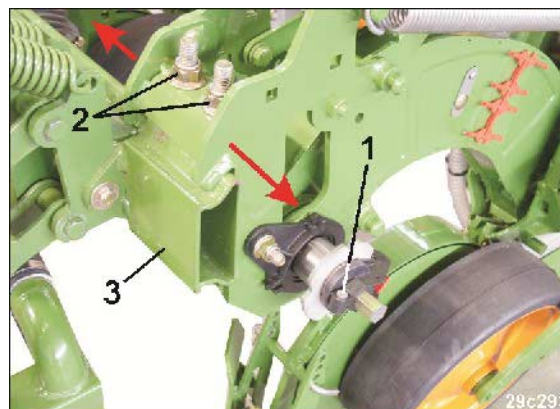


Fig. 73

ME 677

Check that the bolts/nuts are firmly seated after 10 operating hours (tightening torque 200 Nm).



Check that the nuts (Fig. 73/2) are firmly seated after 10 operating hours (tightening torque 200 Nm).

8.2 Adjustable row spacings

No. of rows	X	Row spacing	with classic sowing units				with contour sowing units			
			Number of sowing units	Row application of fertiliser possible	Working width (m)	Transport width (m)	Number of sowing units	Row application of fertiliser possible	Working width (m)	Transport width (m)
ED 302										
4	x	70	4	yes	2.80	3.00	2 right / 2 left	yes	2.80	3.00
4	x	75	4	yes	3.00	3.00	2 right / 2 left	yes	3.00	3.00
4	x	80	4	yes	3.20	3.00	2 right / 2 left	yes	3.20	3.00
5	x	60	5	yes	3.00	3.00	3 right / 2 left	yes	3.00	3.00
6	x	45	6	yes	2.70	3.00	3 right / 3 left	yes	2.70	3.00
6	x	50	6	yes	3.00	3.00	3 right / 3 left	yes	3.00	3.00
7	x	45	7	No	3.15	3.00	4 right / 3 left	No	3.15	3.00
8	x	40	8	No	3.20	3.00	4 right / 3 left	No	3.20	3.00
10	x	30	10	No	3.00	3.00				
ED 452										
6	x	70	6	Yes	4.20	4.00	3 right / 3 left	yes	4.20	4.00
6	x	75	6	Yes	4.50	4.00	3 right / 3 left	yes	4.50	4.00
6	x	80	6	Yes	4.80	4.25	3 right / 3 left	yes	4.80	4.25
7	x	60	7	No	4.20	4.00	4 right / 3 left	No	4.20	4.00
8	x	50	8	No	4.00	4.00	4 right / 4 left	No	4.00	4.00
9	x	45	9	No	4.05	4.00	5 right / 4 left	No	4.05	4.00
10	x	40	10	No	4.00	4.00	5 right / 5 left	No	4.05	4.00
ED 452-K										
6	x	70	6	Yes	4.20	3.00	3 right / 3 left	Yes	4.20	3.00
6	x	75	6	Yes	4.50	3.00	3 right / 3 left	Yes	4.50	3.00
6	x	80	6	Yes	4.80	3.00	3 right / 3 left	Yes	4.80	3.00
7	x	60	7	No	4.20	3.00	4 right / 3 left	No	4.20	3.00
ED 602-K										
8	x	70	8	with front tank	5.60	3.05	4 right / 4 left	with front tank	5.60	3.05
8	x	70	8	with rear tank see section 8.19.2 Page138	5.60	3.15	4 right / 4 left	with rear tank see section 8.19.2 Page138	5.60	3.15
8	x	75	8	Yes	6.00	3.05	4 right / 4 left	Yes	6.00	3.05
8	x	80	8	Yes	6.40	3.12	4 right / 4 left	Yes	6.40	3.12
9	x	60	9	No	5.40	3.05	5 right / 4 left	No	5.40	3.05
12	x	45	12	with front tank	5.40	3.15	6 right / 6 left	with front tank	5.40	3.15
12	x	45	12	No	5.40	3.05	6 right / 6 left	with front tank	5.40	3.05
12	x	50	12	with front tank	6.00	3.15	6 right / 6 left	No	6.00	3.15
12	x	50	12	No	6.00	3.05	6 right / 6 left	No	6.00	3.05

Fig. 74

8.3 Adjusting the track width

To avoid driving over the seed bed, the track width can be adjusted using the various attachment positions to the row width.

If the row width is 70, 75, or 80 cm, fit the wheel on the inside flange Fig. 75/1).

1. Loosen the wheel nuts,
2. Push the wheel onto the inside flange,
3. Insert the wheel bolts,
4. Only insert the bushings as shown between the rim and the wheel nut,
5. Tighten up the wheel nuts, observe the tightening torques (section 12.4).



Fig. 75

If the row width is 45 or 50 cm, fit the wheel on the outside flange Fig. 76/1).

1. Loosen the wheel nuts,
2. Push the wheel onto the outside flange,
3. Insert the wheel bolts,
4. Only insert the bushings as shown between the rim and the wheel nut,
5. Tighten up the wheel nuts, observe the tightening torques (section 12.4).



Fig. 76

8.4 Switching off the sowing units

When not being used, or for maintenance purposes, the sowing units can be switched off. This switching off is done mechanically, or electronically as an optional.



Interrupt the fertiliser feed (if present) to the associated fertiliser coulters.

8.4.1 Switching of the sowing units mechanically

1. Using pliers, pull out the shear pin (Fig. 77/1) from the coupling.
2. Insert the shear pin when it is not being used into the hole (Fig. 77/2) on the coupling flange.

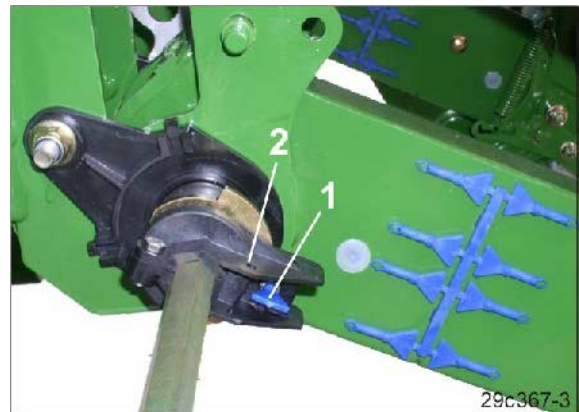


Fig. 77

8.4.2 Switching off the sowing units electronically (optional)

You can switch off the sowing units electronically on the control terminals from AMASCAN, AMASCAN-PROFI or ED-CONTROL. Refer to the respective operating instructions for a more detailed description.

8.5 Grain spacing

At a set row spacing and with the prescribed singling discs, sowing is wanted as a certain number of "grains per m²" or "grains per hectare".

8.5.1 Grain spacing (tabular)

Find the required grain spacing from the tables from Seite 95.

Example:	
Singling discs:	30 bore holes
Row spacing:	75 cm
Desired number of grains per hectare:	95000

Look for the example value (underlined in black) in the table (Fig. 78) and read off the grain spacing: 13.9 cm.



Singling discs with 30 boreholes										
	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	6.1	16.4	204918	218579	234204	273224	327869	364299	437158	546448
	6.6	15.2	189394	202020	216462	252525	303030	336700	404040	505051
	7.1	14.1	176056	187793	201218	234742	281690	312989	375586	469484
	7.5	13.3	166667	177778	190487	222222	266667	296296	355556	444444
	8.0	12.5	156250	166667	178581	208333	250000	277778	333334	416667
	8.5	11.8	147059	156863	168077	196078	235294	261438	313726	392157
	8.7	11.5	143678	153257	164213	191571	229885	255428	306514	383142
	9.3	10.8	134409	143369	153618	179211	215054	238949	286738	358423
	10.0	10.0	125000	133333	142864	166667	200000	222222	266666	333333
	10.7	9.3	116822	124611	133519	155763	186916	207684	249222	311526
	11.3	8.8	110619	117994	126429	147493	176991	196657	235988	294985
	12.0	8.3	104167	111111	119054	138889	166667	185185	222222	277778
	12.2	8.2	102459	109290	117103	136612	163934	182149	218580	273224
	13.1	7.6	95420	101781	109057	127226	152672	169635	203562	254453
	13.9	7.2	89928	95923	102780	119904	143885	159872	191846	239808
	14.8	6.8	84459	90090	96530	112613	135135	150150	180180	225225
	15.7	6.4	79618	84926	90997	106157	127389	141543	169852	212314

Fig. 78

Singling discs with 15 boreholes

	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	12.2	8.2	102459	109290	117103	136612	163934	182149	218580	273224
	13.2	7.6	94697	101010	108231	126263	151515	168350	202020	252525
	14.2	7.0	88028	93897	100609	117371	140845	156495	187794	234742
	15.0	6.7	83333	88889	95243	111111	133333	148148	177778	222222
	16.0	6.3	78125	83333	89290	104167	125000	138889	166666	208333
	17.0	5.9	73529	78431	84038	98039	117647	130719	156862	196078
	17.2	5.8	72674	77519	83061	96899	116279	129199	155038	193798
	18.6	5.4	67204	71685	76809	89606	107527	119474	143370	179211
	20.0	5.0	62500	66667	71433	83333	100000	111111	133334	166667
	21.4	4.7	58411	62305	66759	77882	93458	103842	124610	155763
	22.6	4.4	55310	58997	63214	73746	88496	98328	117994	147493
	24.0	4.2	52083	55556	59527	69444	83333	92593	111112	138889
	24.4	4.1	51230	54645	58551	68306	81967	91075	109290	136612
	26.2	3.8	47710	50891	54529	63613	76336	84818	101782	127226
	27.8	3.6	44964	47962	51391	59952	71942	79936	95924	119904
X	29.6	3.4	42230	45045	48265	56306	67568	75075	90090	112613
	31.4	3.2	39809	42463	45499	53079	63694	70771	84926	106157
	21.0	4.8	59524	63492	68031	79365	95238	105820	126984	158730
	22.6	4.4	55310	58997	63214	73746	88496	98328	117994	147493
	24.2	4.1	51653	55096	59035	68871	82645	91827	110192	137741
	25.8	3.9	48450	51680	55374	64599	77519	86133	103360	129199
	27.4	3.6	45620	48662	52141	60827	72993	81103	97324	121655
	29.0	3.4	43103	45977	49264	57471	68966	76628	91954	114943
	29.6	3.4	42230	45045	48265	56306	67568	75075	90090	112613
	32.0	3.1	39063	41667	44646	52083	62500	69444	83334	104167
	34.2	2.9	36550	38986	41773	48733	58480	64977	77972	97466
	36.6	2.7	34153	36430	39034	45537	54645	60716	72860	91075
	38.4	2.6	32552	34722	37204	43403	52083	57870	69444	86806
	41.0	2.4	30488	32520	34845	40650	48780	54201	65040	81301
	41.8	2.4	29904	31898	34178	39872	47847	53163	63796	79745
Z	44.8	2.2	27902	29762	31890	37202	44643	49603	59524	74405
	47.8	2.1	26151	27894	29888	34868	41841	46490	55788	69735
	50.8	2.0	24606	26247	28123	32808	39370	43745	52494	65617
	53.8	1.9	23234	24783	26555	30979	37175	41305	49566	61958
	33.9	3.0	36857	39315	42125	49143	58973	65524	78630	98287
	36.6	2.8	34197	36477	39085	45597	54716	60796	72954	91195
	39.0	2.5	32050	34187	36631	42734	51280	56978	68374	85467
	41.6	2.4	30020	32021	34310	40026	48032	53369	64042	80053
	44.3	2.2	28232	30114	32267	37642	45170	50189	60228	75284
	46.9	2.1	26644	28421	30453	35525	42631	47367	56842	71050
	47.9	2.1	26119	27861	29853	34826	41791	46435	55722	69652
	51.6	1.9	24213	25827	27673	32284	38741	43046	51654	64568
	55.2	1.8	22643	24152	25879	30190	36229	40254	48304	60381
	59.2	1.7	21128	22537	24148	28171	33806	37562	45074	56343
	62.7	1.6	19923	21251	22770	26564	31877	35419	42502	53128
66.1	1.5	18901	20161	21602	25202	30242	33603	40322	50403	
67.5	1.5	18532	19767	21180	24709	29651	32946	39534	49418	
72.4	1.4	17277	18429	19746	23036	27644	30715	36858	46072	
77.2	1.3	16182	17260	18494	21575	25890	28767	34520	43150	
82.0	1.2	15252	16269	17432	20335	24403	27114	32538	40670	
86.9	1.2	14391	15350	16447	19189	23026	25584	30700	38376	

Singling discs with 30 boreholes

	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	6.1	16.4	204918	218579	234204	273224	327869	364299	437158	546448
	6.6	15.2	189394	202020	216462	252525	303030	336700	404040	505051
	7.1	14.1	176056	187793	201218	234742	281690	312989	375586	469484
	7.5	13.3	166667	177778	190487	222222	266667	296296	355556	444444
	8.0	12.5	156250	166667	178581	208333	250000	277778	333334	416667
	8.5	11.8	147059	156863	168077	196078	235294	261438	313726	392157
	8.7	11.5	143678	153257	164213	191571	229885	255428	306514	383142
	9.3	10.8	134409	143369	153618	179211	215054	238949	286738	358423
	10.0	10.0	125000	133333	142864	166667	200000	222222	266666	333333
	10.7	9.3	116822	124611	133519	155763	186916	207684	249222	311526
	11.3	8.8	110619	117994	126429	147493	176991	196657	235988	294985
	12.0	8.3	104167	111111	119054	138889	166667	185185	222222	277778
	12.2	8.2	102459	109290	117103	136612	163934	182149	218580	273224
	13.1	7.6	95420	101781	109057	127226	152672	169635	203562	254453
	13.9	7.2	89928	95923	102780	119904	143885	159872	191846	239808
	14.8	6.8	84459	90090	96530	112613	135135	150150	180180	225225
X	15.7	6.4	79618	84926	90997	106157	127389	141543	169852	212314
	10.5	9.5	119048	126984	136062	158730	190476	211640	253968	317460
	11.3	8.8	110619	117994	126429	147493	176991	196657	235988	294985
	12.1	8.3	103306	110193	118070	137741	165289	183655	220386	275482
	12.9	7.8	96899	103359	110748	129199	155039	172265	206718	258398
	13.7	7.3	91241	97324	104281	121655	145985	162206	194648	243309
	14.5	6.9	86207	91954	98527	114943	137931	153257	183908	229885
	14.8	6.8	84459	90090	96530	112613	135135	150150	180180	225225
	16.0	6.3	78125	83333	89290	104167	125000	138889	166666	208333
	17.1	5.8	73099	77973	83547	97466	116959	129955	155946	194932
	18.3	5.5	68306	72860	78068	91075	109290	121433	145720	182149
	19.4	5.2	64433	68729	73642	85911	103093	114548	137458	171821
	20.5	4.9	60976	65041	69691	81301	97561	108401	130082	162602
	20.9	4.8	59809	63796	68357	79745	95694	106326	127592	159490
	22.4	4.5	55804	59524	63779	74405	89286	99206	119048	148810
	23.9	4.2	52301	55788	59776	69735	83682	92980	111576	139470
Z	25.4	3.9	49213	52493	56246	65617	78740	87489	104986	131234
	26.9	3.7	46468	49566	53109	61958	74349	82610	99132	123916
	17.0	5.9	73715	78630	84251	98287	117944	131050	157260	196574
	18.3	5.5	68396	72956	78171	91195	109433	121593	145912	182388
	19.5	5.1	64100	68373	73261	85467	102560	113956	136746	170934
	20.8	4.8	60040	64042	68620	80053	96064	106737	128084	160106
	22.1	4.6	56462	60227	64532	75284	90340	100379	120454	150567
	23.5	4.2	53288	56841	60904	71050	85261	94735	113682	142102
	23.9	4.1	52240	55721	59704	69652	83583	92870	111442	139305
	25.8	3.8	48426	51655	55348	64568	77482	86091	103310	129137
	27.6	3.6	45286	48305	51758	60381	72457	80508	96610	120763
	29.6	3.4	42257	45074	48296	56343	67611	75123	90148	112686
	31.4	3.2	39847	42502	45540	53128	63754	70837	85004	106256
	33.1	3.0	37803	40323	43206	50403	60484	67205	80646	100807
	33.7	3.0	37063	39535	42361	49418	59302	65890	79070	98836
	36.2	2.8	34554	36857	39492	46072	55286	61429	73714	92145
	38.6	2.5	32363	34520	36988	43150	51780	57534	69040	86301
	41.0	2.4	30503	32536	34862	40670	48805	54228	65072	81341
	43.4	2.3	28783	30702	32897	38376	46052	51169	61404	76754

Singling discs with 45 boreholes

	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	4.1	24.4	304878	325203	348450	406504	487805	542005	650406	813008
	4.4	22.7	284091	303030	324692	378788	454545	505051	606060	757576
	4.7	21.3	265957	283688	303968	354610	425532	472813	567376	709220
	5.0	20.0	250000	266667	285730	333333	400000	444444	533334	666667
	5.3	18.9	235849	251572	269556	314465	377358	419287	503144	628931
	5.6	17.9	223214	238095	255115	297619	357143	396825	476190	595238
	5.7	17.5	219298	233918	250640	292398	350877	389864	467836	584795
	6.2	16.1	201613	215054	230427	268817	322581	358423	430108	537634
	6.6	15.2	189394	202020	216462	252525	303030	336700	404040	505051
	7.1	14.1	176056	187793	201218	234742	281690	312989	375586	469484
	7.6	13.2	164474	175439	187980	219298	263158	292398	350878	438596
	8.0	12.5	156250	166667	178581	208333	250000	277778	333334	416667
	8.2	12.2	152439	162602	174226	203252	243902	271003	325204	406504
	8.7	11.5	143678	153257	164213	191571	229885	255428	306514	383142
	9.3	10.8	134409	143369	153618	179211	215054	238949	286738	358423
	9.9	10.1	126263	134680	144308	168350	202020	224467	269360	336700
	10.4	9.6	120192	128205	137370	160256	192308	213675	256410	320513
X	7.0	14.3	178571	190476	204092	238095	285714	317460	380952	476190
	7.5	13.3	166667	177778	190487	222222	266667	296296	355556	444444
	8.1	12.3	154321	164609	176376	205761	246914	274348	329218	411523
	8.6	11.6	145349	155039	166122	193798	232558	258398	310078	387597
	9.1	11.0	137363	146520	156994	183150	219780	244200	293040	366300
	9.7	10.3	128866	137457	147283	171821	206186	229095	274914	343643
	9.9	10.1	126263	134680	144308	168350	202020	224467	269360	336700
	10.7	9.3	116822	124611	133519	155763	186916	207684	249222	311526
	11.4	8.8	109649	116959	125320	146199	175439	194932	233918	292398
	12.2	8.2	102459	109290	117103	136612	163934	182149	218580	273224
	12.9	7.8	96899	103359	110748	129199	155039	172265	206718	258398
	13.7	7.3	91241	97324	104281	121655	145985	162206	194648	243309
	13.9	7.2	89928	95923	102780	119904	143885	159872	191846	239808
	14.9	6.7	83893	89485	95882	111857	134228	149142	178970	223714
	15.9	6.3	78616	83857	89852	104822	125786	139762	167714	209644
	16.9	5.9	73964	78895	84535	98619	118343	131492	157790	197239
	17.9	5.6	69832	74488	79813	93110	111732	124146	148976	186220
Z	11.3	8.8	110573	117944	126375	147431	176917	196574	235888	294861
	12.2	8.3	102858	109716	117559	137145	164574	182859	219432	274289
	13.1	7.6	95459	101822	109101	127278	152734	169704	203644	254556
	13.6	7.3	92145	98287	105313	122859	147431	163812	196574	245717
	14.7	6.8	85056	90726	97212	113409	136090	151211	181452	226816
	15.6	6.4	79932	85261	91356	106577	127892	142102	170522	213152
	16.0	6.3	78051	83255	89207	104068	124882	138758	166510	208137
	17.2	5.8	72507	77341	82870	96676	116011	128901	154682	193351
	18.4	5.4	68045	72581	77770	90726	108872	120969	145162	181453
	19.7	5.1	63487	67719	72560	84649	101579	112865	135438	169299
	20.8	4.8	60040	64042	68620	80053	96064	106737	128084	160106
	22.1	4.6	56462	60227	64532	75284	90340	100379	120454	150567
	22.4	4.5	55751	59467	63718	74335	89202	99113	118934	148669
	24.0	4.1	52035	55504	59472	69379	83255	92505	111008	138758
	25.7	3.9	48604	51844	55550	64805	77765	86406	103688	129609
	27.3	3.6	45754	48805	52294	61005	73207	81341	97610	122012
	28.9	3.5	43221	46102	49398	57628	69154	76837	92204	115256

Singling discs with 60 boreholes

	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	3.1	32.8	409836	437158	468409	546448	655738	728597	874316	1092896
	3.3	30.3	378788	404040	432923	505051	606061	673401	808080	1010101
	3.6	28.2	352113	375587	402436	469484	563380	625978	751174	938967
	3.8	26.7	333333	355556	380973	444444	533333	592593	711112	888889
	4.0	25.0	312500	333333	357162	416667	500000	555556	666666	833333
	4.3	23.5	294118	313725	336152	392157	470588	522876	627450	784314
	4.4	23.0	287356	306513	328424	383142	459770	510856	613026	766284
	4.7	21.5	268817	286738	307236	358423	430108	477897	573476	716846
	5.0	20.0	250000	266667	285730	333333	400000	444444	533334	666667
	5.4	18.7	233645	249221	267037	311526	373832	415369	498442	623053
	5.7	17.7	221239	235988	252858	294985	353982	393314	471976	589971
	6.0	16.7	208333	222222	238108	277778	333333	370370	444444	555556
	6.1	16.4	204918	218579	234204	273224	327869	364299	437158	546448
	6.6	15.3	190840	203562	218114	254453	305344	339271	407124	508906
	7.0	14.4	179856	191847	205561	239808	287770	319744	383694	479616
	7.4	13.5	168919	180180	193060	225225	270270	300300	360360	450450
X	7.9	12.7	159236	169851	181993	212314	254777	283086	339702	424628
	5.3	19.0	238095	253968	272123	317460	380952	423280	507936	634921
	5.7	17.7	221239	235988	252858	294985	353982	393314	471976	589971
	6.1	16.5	206612	220386	236141	275482	330579	367309	440772	550964
	6.5	15.5	193798	206718	221495	258398	310078	344531	413436	516796
	6.9	14.6	182482	194647	208562	243309	291971	324412	389294	486618
	7.3	13.8	172414	183908	197055	229885	275862	306513	367816	459770
	7.4	13.5	168919	180180	193060	225225	270270	300300	360360	450450
	8.0	12.5	156250	166667	178581	208333	250000	277778	333334	416667
	8.6	11.7	146199	155945	167093	194932	233918	259909	311890	389864
	9.2	10.9	136612	145719	156136	182149	218579	242866	291438	364299
	9.7	10.3	128866	137457	147283	171821	206186	229095	274914	343643
	10.3	9.8	121951	130081	139380	162602	195122	216802	260162	325203
	10.5	9.6	119617	127592	136713	159490	191388	212653	255184	318979
	11.2	8.9	111607	119048	127558	148810	178571	198413	238096	297619
	12.0	8.4	104603	111576	119552	139470	167364	185960	223152	278940
Z	12.7	7.9	98425	104987	112492	131234	157480	174978	209974	262467
	13.5	7.4	92937	99133	106220	123916	148699	165221	198266	247831
	8.5	11.8	147431	157259	168501	196574	235889	262099	314518	393148
	9.1	10.9	136791	145911	156342	182388	218866	243184	291822	364777
	9.8	10.2	127584	136090	145819	170112	204135	226816	272180	340225
	10.5	9.6	119539	127507	136622	159384	191261	212512	255014	318768
	11.1	9.0	112447	119943	128517	149929	179916	199906	239886	299859
	11.8	8.5	106150	113227	121321	141533	169840	188711	226454	283067
	12.0	8.4	104478	111444	119411	139305	167165	185739	222888	278609
	12.9	7.7	96852	103309	110694	129137	154963	172182	206618	258273
	13.8	7.2	90264	96281	103164	120352	144421	160469	192562	240703
	14.8	6.8	84515	90149	96593	112686	135223	150248	180298	225371
	15.7	6.4	79453	84750	90808	105938	127125	141251	169500	211876
	16.6	6.1	75391	80417	86166	100521	120625	134028	160834	201042
	16.9	5.9	74127	79069	84721	98836	118604	131781	158138	197673
	18.1	5.5	69108	73715	78985	92145	110573	122859	147430	184288
	19.3	5.2	64726	69041	73976	86301	103561	115068	138082	172602
	21.5	4.7	58197	62077	66515	77595	93114	103460	124154	155190
	21.9	4.6	57193	61005	65366	76257	91509	101676	122010	152514

Singling discs with 90 boreholes

	Grain distance a (cm)	Grain/m	Row spacing							
			80 cm	75 cm	70 cm	60 cm	50 cm	45 cm	37.5 cm	30 cm
			Number of grains per hectare							
Y	2.1	48.8	609756	650407	696902	813008	975610	1084011	1300814	1626016
	2.2	45.5	568182	606061	649386	757576	909091	1010101	1212122	1515152
	2.4	42.6	531915	567376	607935	709220	851064	945626	1134752	1418440
	2.5	40.0	500000	533333	571459	666667	800000	888889	1066666	1333333
	2.7	37.7	471698	503145	539113	628931	754717	838574	1006290	1257862
	2.8	35.7	446429	476190	510231	595238	714286	793651	952380	1190476
	2.9	35.1	438596	467836	501280	584795	701754	779727	935672	1169591
	3.1	32.3	403226	430108	460855	537634	645161	716846	860216	1075269
	3.3	30.3	378788	404040	432923	505051	606061	673401	808080	1010101
	3.6	28.2	352113	375587	402436	469484	563380	625978	751174	938967
	3.8	26.3	328947	350877	375960	438596	526316	584795	701754	877193
	4.0	25.0	312500	333333	357162	416667	500000	555556	666666	833333
	4.1	24.4	304878	325203	348450	406504	487805	542005	650406	813008
	4.4	23.0	287356	306513	328424	383142	459770	510856	613026	766284
	4.7	21.5	268817	286738	307236	358423	430108	477897	573476	716846
	5.0	20.2	252525	269360	288615	336700	404040	448934	538720	673401
	5.2	19.2	240385	256410	274740	320513	384615	427350	512820	641026
X	3.5	28.6	357143	380952	408185	476190	571429	634921	761904	952381
	3.8	26.7	333333	355556	380973	444444	533333	592593	711112	888889
	4.1	24.7	308642	329218	352752	411523	493827	548697	658436	823045
	4.3	23.3	290698	310078	332244	387597	465116	516796	620156	775194
	4.5	22.1	276243	294659	315723	368324	441989	491099	589318	736648
	4.9	20.6	257732	274914	294567	343643	412371	458190	549828	687285
	5.0	20.2	252525	269360	288615	336700	404040	448934	538720	673401
	5.4	18.7	233645	249221	267037	311526	373832	415369	498442	623053
	5.7	17.5	219298	233918	250640	292398	350877	389864	467836	584795
	6.1	16.4	204918	218579	234204	273224	327869	364299	437158	546448
	6.5	15.5	193798	206718	221495	258398	310078	344531	413436	516796
	6.9	14.6	182482	194647	208562	243309	291971	324412	389294	486618
	7.0	14.4	179856	191847	205561	239808	287770	319744	383694	479616
	7.5	13.4	167785	178971	191765	223714	268456	298285	357942	447427
	8.0	12.6	157233	167715	179704	209644	251572	279525	335430	419287
	8.5	11.8	147929	157791	169071	197239	236686	262985	315582	394477
	9.0	11.2	139665	148976	159626	186220	223464	248293	297952	372439
Z	5.7	17.7	221145	235889	252752	294861	353833	393148	471778	589723
	6.1	16.5	205717	219431	235117	274289	329148	365720	438862	548579
	6.6	15.3	190917	203646	218204	254556	305468	339408	407292	509112
	6.8	14.8	184288	196574	210626	245717	294861	327623	393148	491435
	7.3	13.6	170112	181453	194424	226816	272179	302421	362906	453632
	7.8	12.7	159864	170523	182713	213152	255783	284204	341046	426305
	8.0	12.5	156103	166510	178413	208137	249765	277516	333020	416275
	8.7	11.6	145014	154681	165739	193351	232022	257802	309362	386703
	9.2	10.9	136090	145162	155539	181453	217743	241937	290324	362906
	9.9	10.2	126973	135439	145121	169299	203158	225731	270878	338596
	10.5	9.6	120079	128085	137241	160106	192126	213474	256170	320211
	11.1	9.0	112926	120454	129065	150567	180681	200756	240908	301135
	11.2	8.9	111502	118936	127438	148669	178403	198226	237872	297339
	12.1	8.3	104068	111006	118941	138758	166510	185011	222012	277516
	12.9	7.7	97207	103687	111099	129609	155531	172812	207374	259218
	13.7	7.3	91509	97609	104587	122012	146414	162682	195218	244023
	14.5	6.9	86441	92204	98795	115256	138306	153673	184408	230510

8.5.2 Grain spacing (calculated)

$$\text{Grain distance } a \text{ [cm]} = \frac{100}{\text{Grains per m}^2 \times \text{row spacing [m]}}$$

Example:	
Number of boreholes of the singling disc:	30 bore holes
Desired "number of grains per hectare":	95000 grains/ha (= 9.5 grains per m ²)
Selected row spacing:	0.75m

$$\text{Grain distance } a \text{ [cm]} = \frac{100}{9.5 \times 0.75 \text{ [m]}} = 14.04 \text{ cm}$$

With the values (30 boreholes / 14.04 cm), go to the table (Figure Fig. 79) and read the nearest value:
Grain distance a = 13.9 cm.

8.5.3 Chain wheel pairs for the setting and secondary gearboxes

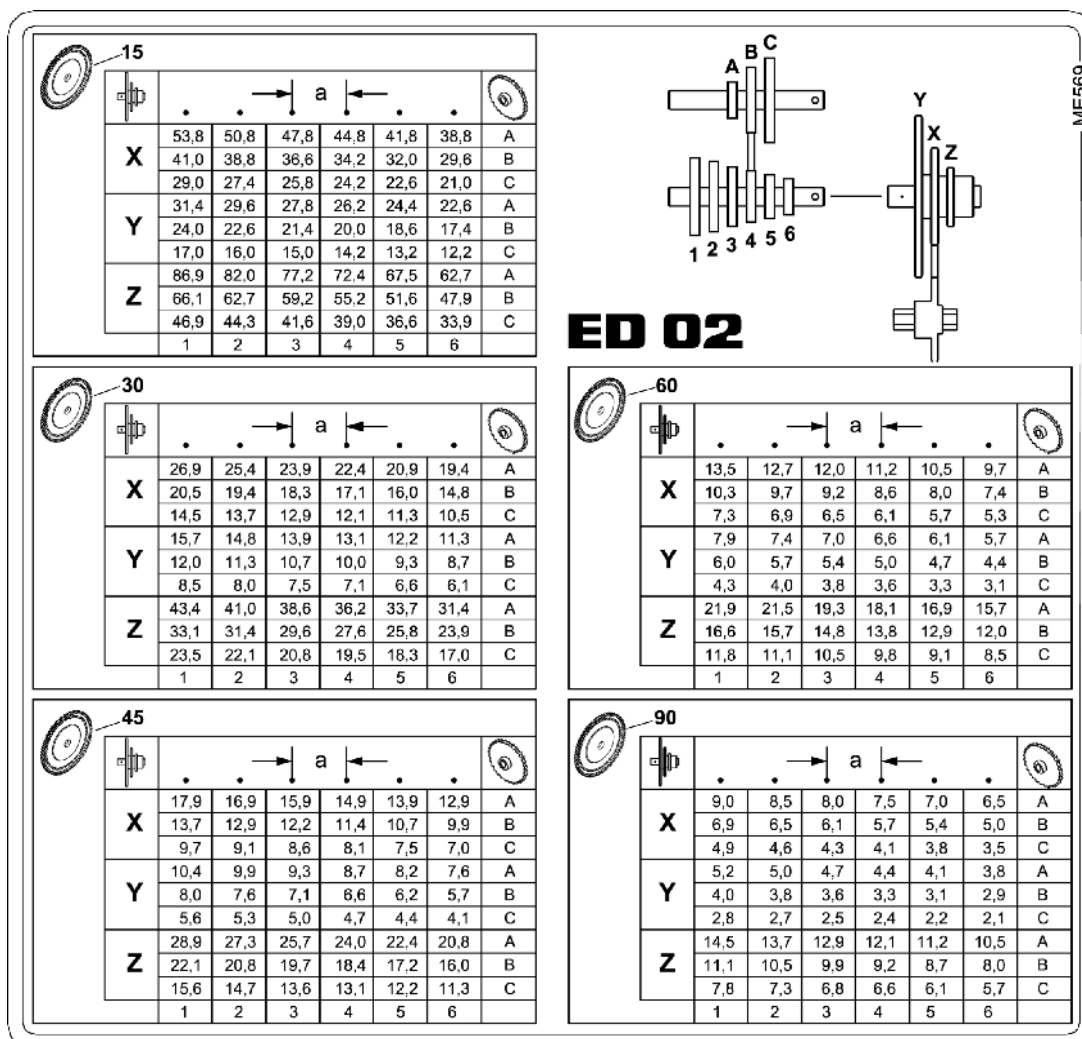


Fig. 79

Example:

Singling discs: 30 boreholes

Grain spacing a: 13.9 cm

The gear ratio can be taken from the table (as seen in Fig. 80):

Chain wheel pairing
in the setting gearbox: A – 3

Chain wheel pairing
in the secondary
gearbox: Y

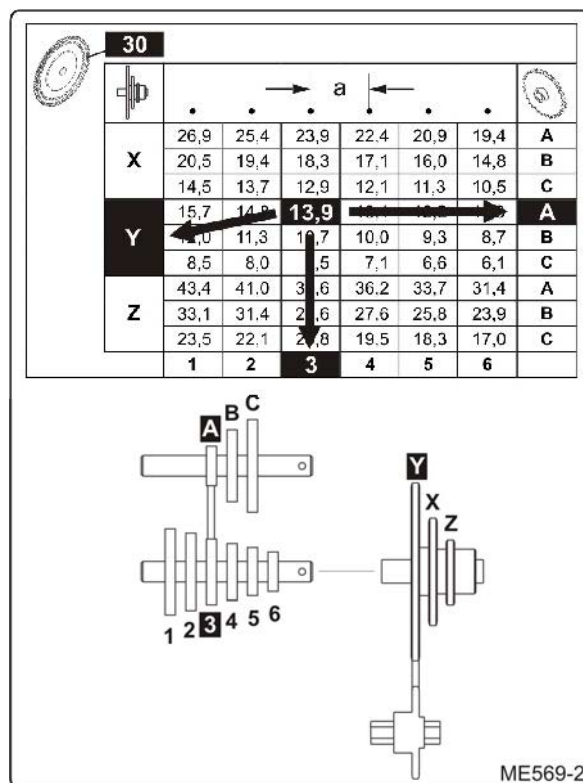


Fig. 80

8.6 Set the grain spacing in the setting gearbox

The following section describes how the gear ratio determined is set in the implement. The grain spacing is adjustable in the setting gearbox (Fig. 40/1).

1. Remove the hooks (Fig. 81/1) from the holder.



Fig. 81

2. Open the gearbox cover (Fig. 82)



Fig. 82

3. Insert the hand crank (Fig. 83/1) into the chain tensioner of the setting gearbox.



Fig. 83

**CAUTION**

The spring pressure which is applied to the hand crank is very large.

4. Release the tension of the chain tensioner using the hand crank (Fig. 84).
5. Press the hand crank (Fig. 83/1) so far that the pin (Fig. 85/1) engages into the recess (Fig. 85/2).

**Fig. 84**

6. If required, undo the linkage (Fig. 85/3) so that more chain length can be adjusted.

**Fig. 85**

Settings

7. Using the hook (Fig. 81/1), place the roller chain (Fig. 86/7) onto the correct chain cog.

→ Setting value, see section "Chain wheel pairs for the setting and secondary gearboxes", Seite 100.

Example:

Chain cog pairing A – 3.

The roller chain connects the chain cog (Fig. 86/A) and the chain cog (Fig. 86/3).

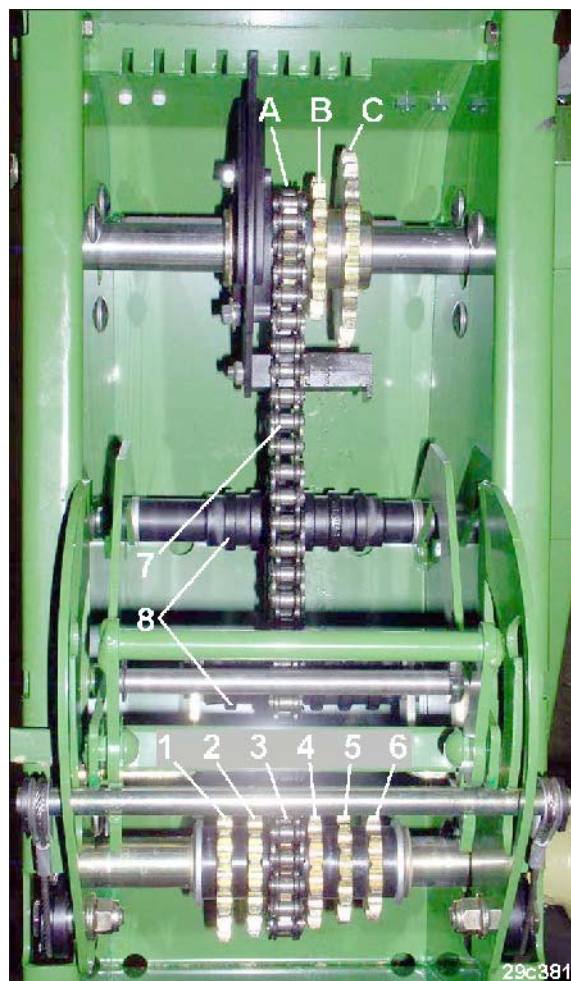


Fig. 86

8. Place the roller chain on one of the chain cogs "A", "B" or "C".
 - 8.1 Turn the securing disc (Fig. 87/1) against the direction of travel. The plastic block (Fig. 87/2) lifts the roller chain from the chain cog.
 - 8.2 Place the roller chain on the correct chain cog.
 - 8.3 Slide the securing disc (Fig. 87/1) so far that the roller chain is aligned and turn it back on the axial securing device.

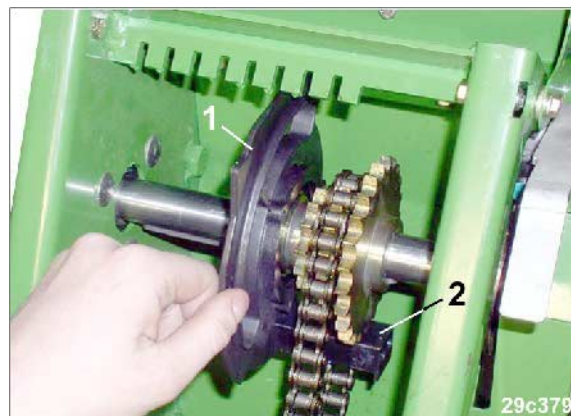


Fig. 87



The roller chain must be aligned and run on the guides of both rollers (Fig. 86/8).

If required, slide the chain cogs A to C as shown in figure (Fig. 87), on the shaft.

**CAUTION**

The large spring pressure acts immediately after loosening the bolts on the hand crank.

9. Press the hand crank and the links at the same time in the direction of the arrow (Fig. 88).

Lever out the link on the bolt out of the recess (Fig. 83/2) and release the spring pressure using the hand crank.

10. Place the hand crank in the transport bracket.
11. Close the gearbox cover (Fig. 82).
12. Fasten the hook-bolts (Fig. 81) on the gearbox cover.



Fig. 88



After tensioning, check the alignment of the roller chain!

8.7 Adjusting the grain spacing in the secondary gearbox

1. Unscrew the wing nut (Fig. 89/1).
2. Remove the gearbox cover (Fig. 89/2).



Fig. 89

3. Latch the lever (Fig. 90/1) in the groove (Fig. 90/2).
- The roller chain relaxes.

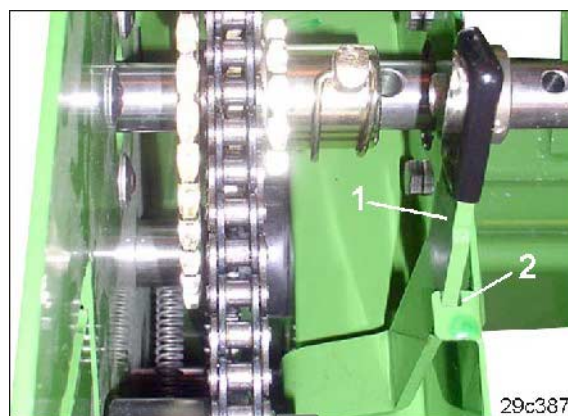


Fig. 90

4. Loosen the wing nut (Fig. 91/1) and slide the chain tensioner to the back.



Fig. 91

5. Using the hook (Fig. 81/1) lay the roller chain (Fig. 92) onto the correct chain cog (X, Y, or Z).
Setting value, see section "Chain wheel pairs for the setting and secondary gearboxes", Seite 100.
6. Slide the chain cog accordingly if the roller chain is not aligned.
After every adjustment of the chain cog, secure the cog with a linch pin (Fig. 92/1).

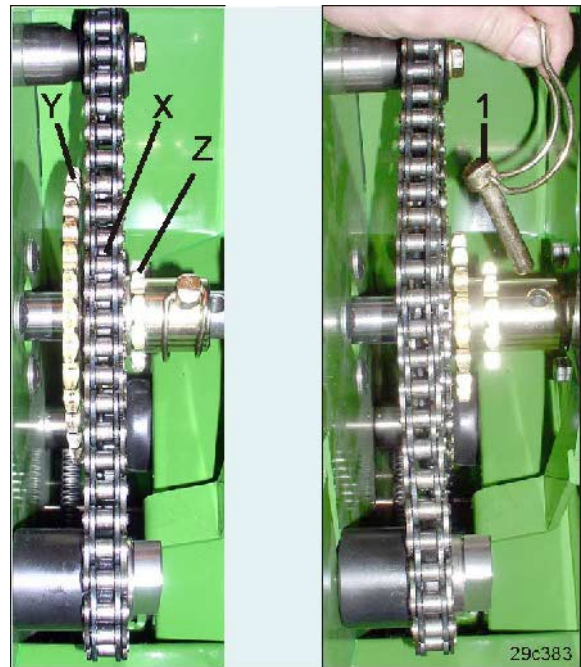


Fig. 92

7. Tension the roller chain.
For this, slide the wing nut to the stop in the direction of the arrow and finally back to the next recess (Fig. 93/1). Allow the chain tensioner to latch into the recess.
8. Tighten up the wing nut.
9. Release the lever (Fig. 90/1) out of the groove (Fig. 90/2).
10. Close the gearbox cover and fasten with the wing nut (Fig. 89/1).

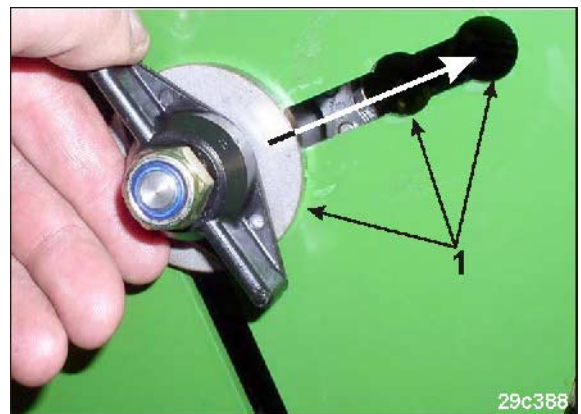


Fig. 93

8.8 Adapting the sowing unit to the seed

Sowing unit setting data

Seed	Thousand grain weight TGW	the singling disc			Ejector		Position		Sowing unit
		Description	Colour	Order no.	Colour	Order no.	scraper bar	Reducing flap	
Maize	< 220 g (11 kg / 50000 G)	30/5	Green	910777	black	926240	1/2	2	Classic and contour
	220 to 250 g (11 to 12.5 kg / 50000 G)	30/5	Green	910777	black	926240	2/3	2	
	250 to 280 g (12.5 to 14 kg / 50000 G)	30/5	Green	910777	black	926240	3	2	
	280 to 320 g (14 to 16.0 kg / 50000 G)	30/5	Green	910777	black	926240	4/5	1	
	> 320 g	30/5.8	natural	910790	black	926240	3/4	1	
Peas		60/5	Dark grey	924211	black	926240	3	2	
Beans	< 400 g						5	2	
Field (broad) beans		45/6	Red	910792	black	926240	5	1	
Small beans		60/2.5	black	924213	black	926240	2	1	
Sunflowers	< 70 g	30/2.2	Blue	918860	Yellow	926241	1	2	
	70 g to 95 g	30/2.5	brown	910794	black	926240	1	2	
	> 95 g	30/3	Pink	927123	black	926240	1	2	
Soya beans		60/4	Orange	924212	black	926240	3	2	
Cotton		60/3.2	Light green	915673	black	926240	3	2	
Sorghum		60/2.2	Bordeaux red	918477	Yellow	926241	1	2	
Sorghum for generating biogas		60/2.5	black	924213	Yellow	926241	1	2	
Sugar beet (pelleted)	< 70 g	30/2.2	Blue	918860	Yellow	926241	3	3	Contour
Sugar beet (pelleted)	> 70 g	15/2.2	Turquoise	920048	Yellow	926241	3	3	
Beet (plain seed)		30/1.8	Yellow	920049	Yellow	926241	1	2	
Water melons									
Beet (plain seed)		90/1.5	white	206551	Yellow	926241	1	2	
Rape		90/0.8	white	206552	Red	925912	3	3	
Rape		90/1.2	white	920051	Red	925912	3	3	



The table values () are guidance values which can change due to the shape and size of the grains.

8.8.1 Determining grain size

Using the multi-placement tester, the singling can be adapted to the seed.



Fig. 94

1. By placing the seed on the comparison holes (Fig. 95/1), the optimum hole diameter can be determined.



Fig. 95

8.8.2 Checking the placement depth and grain spacing

Different soils have an effect on the seed placement depth and the grain spacing. Therefore, regularly check:

- after each adjustment of the seed placement depth,
- when changing from a light to heavy soil, and vice-versa.

1. Sow approximately 30 m at working speed.
2. Expose the grains at several points with the multi-placement tester (optional). Use the read-off edge to remove the earth in layers.
3. Place the multi-placement tester (Fig. 96) horizontally on the ground
4. Place the pointer (Fig. 96/1) on the seed grain and read off the placement depth from the scale (Fig. 96/2).
5. Measure the grain spacing with the ruler.



Fig. 96

8.8.3 Adapting the sowing unit to the seed

The following section describes how the settings of the sowing unit are adapted to the seed.

8.8.3.1 Adjusting the scraper



Secure the implement with suitable supports to prevent unintentional sinking!

The scraper positions 1 to 5 can be seen on the adjusting lever (Fig. 97/A).

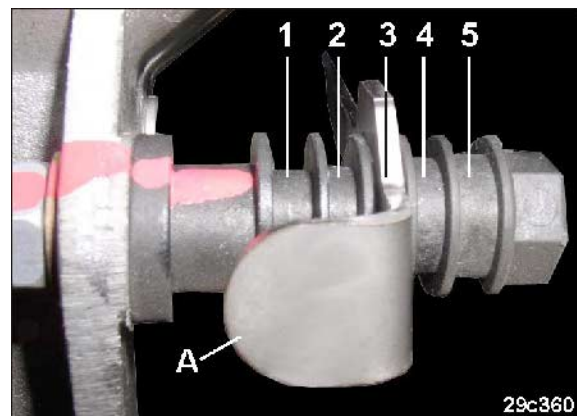


Fig. 97

8.8.3.2 Changing the singling disc and ejector

1. Lift up the implement and secure it using suitable supports.
2. Release the nut (Fig. 98/1).
3. Swivel the seeding coulter (Fig. 98/2) downwards.
4. Release the nut (Fig. 98/3).

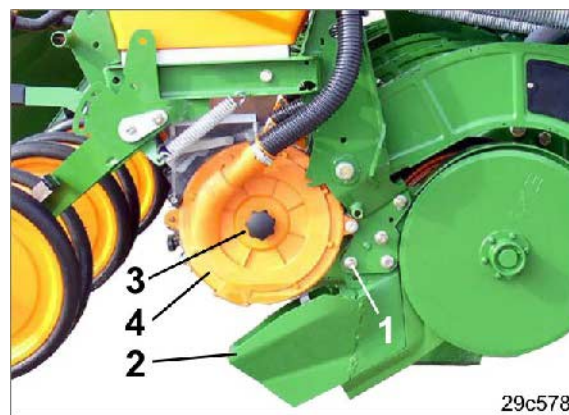


Fig. 98

5. Pull off the suction cover (Fig. 98/4) together with the singling disc (Fig. 99/1) from the sowing housing.
6. If required, change the singling disc.



Fig. 99



Important

The naps (Fig. 99/2) point towards the sowing housing, not the suction cover.

7. If required, change the ejector (Fig. 100/1).



Fig. 100

8.8.3.3 Set the reduction flap

To adjust the seed inflow, change the position of the reduction flap (Fig. 101/2):

1. Undo the fixing bolts (Fig. 101/1),
2. Slide the reduction flap (Fig. 101/2) to its new position (Fig. 101/3),
3. Tighten up the fixing bolts (Fig. 101/1).

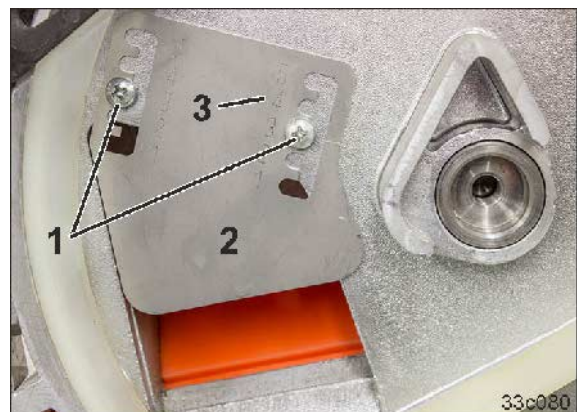


Fig. 101

Parking the reduction flap

To deactivate the reduction flap's function (Fig. 102/2), change the adjustment.

1. Undo and remove the fixing bolts (Fig. 102/1),
2. Turn the reduction flap (Fig. 102/2) upwards and set it in the upper position (Fig. 102/3),
3. Insert and tighten up the fixing bolts (Fig. 102/1).

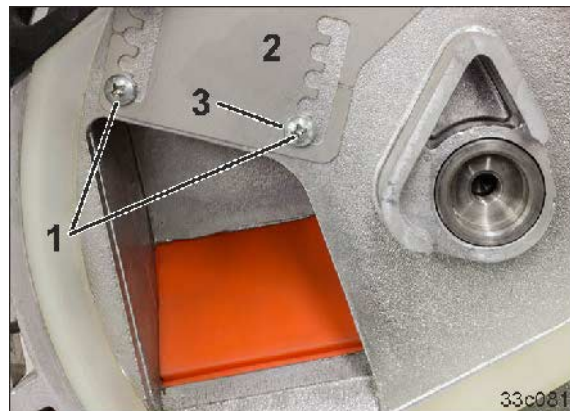


Fig. 102

8.8.3.4 Close the sowing housing

Close the suction cover (Fig. 103/1):

1. Hand tighten the nut (Fig. 103/2),
2. Swivel the coulter (Fig. 103/3) upwards,
3. Tighten up the nut (Fig. 103/4).

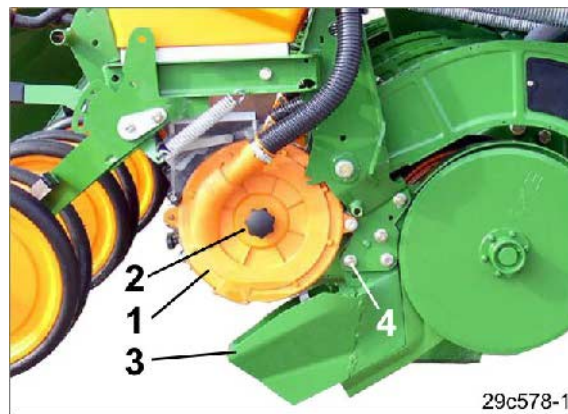


Fig. 103

4. Carefully pull on the lever (Fig. 104/1) and check to see if the lever returns to its starting position after it has been pulled out,
5. Check the setting of the first sowing unit (see section "Check the scraper position and the reduction flap position", Seite 113),
6. Set all sowing units to match the value of the first sowing unit.

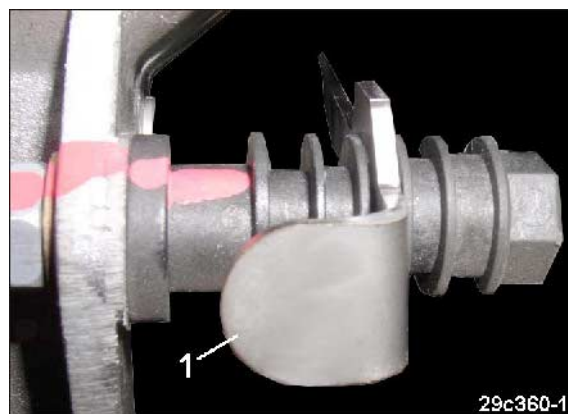


Fig. 104

8.8.4 Check the scraper position and the reduction flap position

1. Fill the seed hopper (see section "Filling and emptying the seed hopper", Seite 114).
2. Switch on the blower fan (see section "Blower fan speed", Seite 116).
3. Turn the drive wheel (Fig. 168) and thereby the singling discs with the hand crank.
4. A second person checks if every hole (Fig. 105/1) is filled with a grain.



Fig. 105

5. If there are gaps, set the lever (Fig. 106/A) of the scraper in a groove with a higher number. If double occupied, set the lever (Fig. 106/A) of the scraper in a groove with a lower number.

Gaps can also appear if the reducing flap (Fig. 107/2) is set incorrectly and too little seed is flowing through.

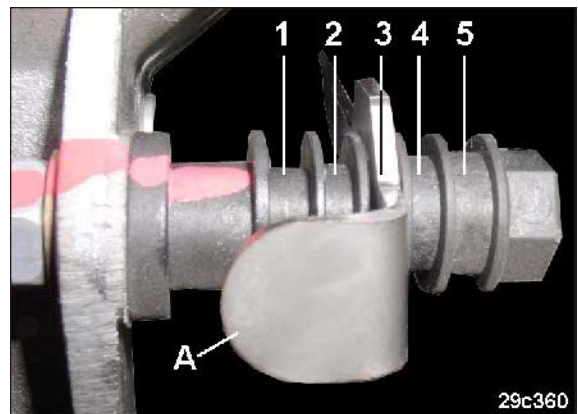


Fig. 106



The spring-loaded lever (Fig. 106/A) must move freely and, after it has been moved out, move back into its starting position.

Settings

6. If there are still grains missing with the scraper correctly set on the holes of the singling disc, increase the size of the opening by adjusting the reducing flap (Fig. 107/1) to the next lowest position number.

If seed appears out of the housing opening (Fig. 105), reduce the feed opening size by adjusting the reducing flap to the next highest position number.

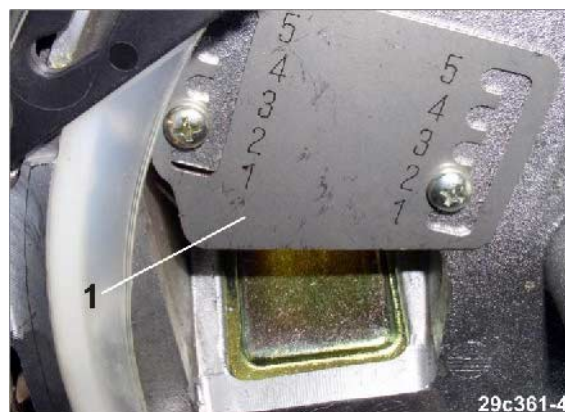


Fig. 107



Check the adjustments in the field after a short distance has been driven.

Determine any double filling or gaps by exposing the seed on the field.

Gaps will be displayed by AMASCAN⁺, AMASCAN-PROFI and ED-CONTROL.

8.9 Filling and emptying the seed hopper

Filling the seed hopper

- Remove foreign bodies from the seed.
- Remove foreign bodies from the seed hopper.
- Do not fill the seed hopper with any damp or sticky seed.



Fig. 108



If, due to grain shape and dressing, bridging occurs, the ability of the seed to slide can be improved by adding approximately 200 g of talcum powder to 100 kg of seed.

Emptying the seed hopper and sowing housing



WARNING

Only hold the spring-loaded flap (Fig. 110/2) on its handle (Fig. 110/3), otherwise there is a risk of injury if the flap snaps closed.

Never reach between the flap and the sowing housing with your hand.

1. Raise the implement to the point that the seeding coulters are clear of the ground.
2. Remove the linch pin and bolt (Fig. 109/1) and swing the intermediate press roller (optional) downwards.

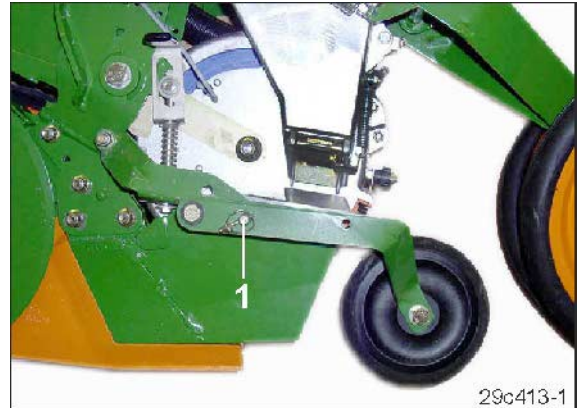


Fig. 109

3. Place a suitable collection container (Fig. 110/1) under the sowing unit.
4. Open the spring-loaded flap (Fig. 110/2) and empty the seed hopper.
5. Close the flap (Fig. 110/2).

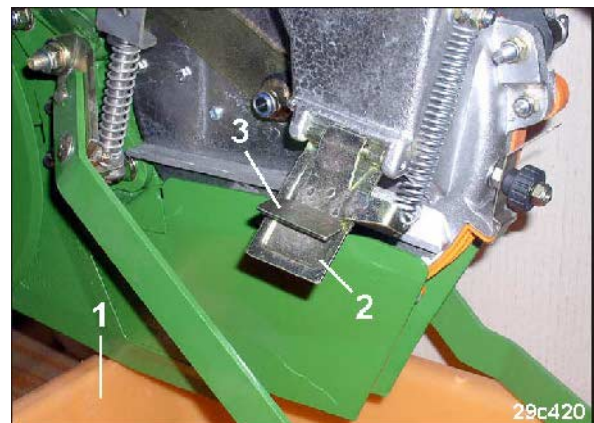


Fig. 110

To completely empty the sowing housing:

6. Release the nut (Fig. 111/1).
7. Swing the spring (Fig. 111/2) to the side.
8. Open the residue emptying flap (Fig. 111/3) and empty the sowing housing.
9. Close the residue emptying flap and lock with the spring.
10. Tighten up the nut.

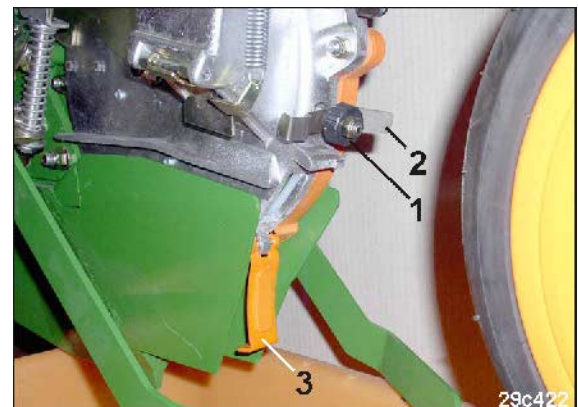


Fig. 111

8.10 Coulter tips

When changing from maize seed to beet/turnip seed, the coulter tips on the contour sowing unit should be exchanged (see section "Check / exchange the seeding coulter tips", Seite 189). The required coulter tips can be found in the table (Fig. 112).

Maize coulter tips (for classic and contour sowing unit)	Beet/turnip coulter tips (for contour sowing unit)
Maize	Sugar beet
Beans	Turnips
Sunflowers	Water melons
Peas	Rape
Cotton	
Sorghum	

Fig. 112

8.11 Blower fan speed

A pressure gauge (Fig. 113/1) in the tractor cabin shows the vacuum of the suction fan.

The fan speed of the suction fan is correctly set when the pointer of the pressure gauge is in the middle of the green scale area (Fig. 113/2), i.e. between 65 and 80 mbar.

The setting of the fan speed is done

- with the PTO shaft drive
(see section "PTO blower fan drive", Seite 117)
- with the hydraulic drive
(see section "Hydraulic blower fan drive", Seite 118).

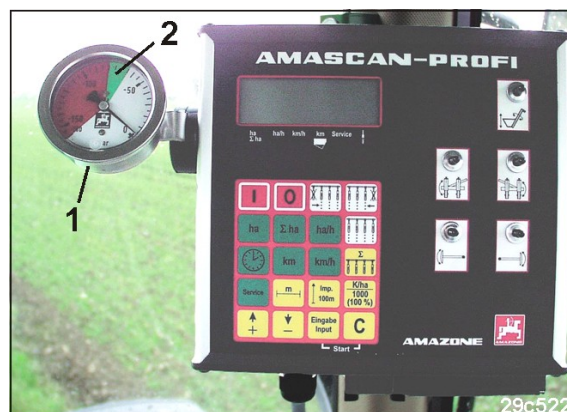


Fig. 113



Make sure that the fan speed remains in the specified green scale area

- to avoid double filling / gaps in the seed on the singling discs
- to avoid increased wear on the blower fan.

When using the red singling disc for field/broad beans (see table, Seite 108), increase the fan speed until the pointer of the pressure gauge (Fig. 113) is just before the red area.



Notes for setting the fan speed on the front tank (see section "Adjusting the fan speed on the front tank", Seite 120).

The compressed air fan and the suction fan have the same speed.

The pressure gauge (Fig. 113) shows the vacuum of the suction fan.

If the speed of the suction fan is set correctly, the air pressure of the compressed air fan can be too high. The fertiliser is then blown out of the fertiliser furrow.

Using the shutter (Fig. 114/1) on the compressed air fan, you can adjust the air inlet opening

- decrease its size to reduce the air pressure
- increase its size to increase the air pressure.



Fig. 114

8.11.1 PTO blower fan drive

The blower fan drive is set according to your requirements stated in the order, e.g. to 1000 rpm tractor PTO shaft speed. A sticker (Fig. 115) on the fan housing marks the permitted tractor PTO shaft speed.

If the permitted tractor PTO shaft speed is maintained, the pointer of the pressure gauge will be in the green scale area (Fig. 113/2) while working.

Small corrections can be made by making slight adjustments to the speed of the tractor's PTO shaft.




	540	rpm.
	710	rpm.
	1000	rpm.

Fig. 115

8.11.2 Hydraulic blower fan drive

The blower fan can be driven by a hydraulic motor (Fig. 116).

The fan speed can be set via the pressure gauge (Fig. 113), either:

- on the flow control valve of the tractor (if fitted) (see section "Adjusting the fan speed", Seite 119)
- on the flow control valve of the implement (see section "Adjusting the fan speed", Seite 119).



Fig. 116



Only tractors with a load sensing system or a separate oil circuit are suitable to drive the fan hydraulically. On other tractors, you must first turn off the fan before you can lift up the implement at the end of the field.



The fan speed alters until the hydraulic fluid has reached its working temperature.

On initial operation correct the fan speed up to attainment of the working temperature.

If the fan is put back into operation after a long stoppage period, the preset fan speed is not attained until the hydraulic fluid has heated up to working temperature.

8.11.2.1 Adjusting the fan speed via the flow control valve of the tractor

1. Fill all seed hoppers.
2. Unscrew the lock nut (Fig. 117/1).
3. Close the hand wheel (Fig. 117/2) (turn clockwise) and finally open it by 1/2 a turn so that the oil supply amount is as small as possible. Larger oil supply amounts, unless absolutely essential, should be avoided.
4. Secure the hand wheel with the lock nut (Fig. 117/1).
5. Start the tractor engine and run at high rpm.
6. Turn the drive wheel with the hand crank until all the holes of the singling discs are filled with seed grains (see section "Check the scraper position and the reduction flap position", Seite 113).
7. Adjust the fan speed using the pressure gauge (Fig. 113) on the flow control valve of the tractor.

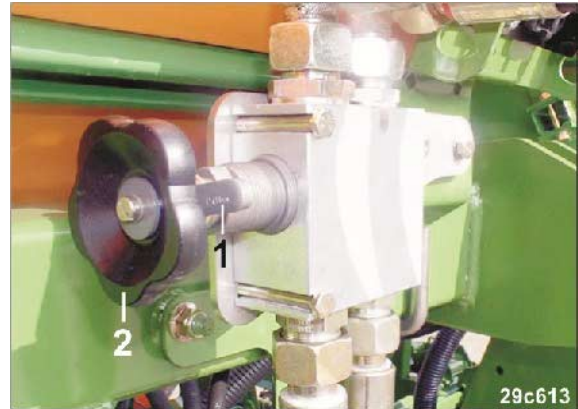


Fig. 117

8.11.2.2 Adjusting the fan speed via the flow control valve of the implement

The fan speed can only be adjusted on the flow control valve of the implement, when the tractor does not have a flow control valve.

Adjusting the fan speed on the flow control valve of the implement.

1. Fill all seed hoppers.
2. Start the tractor engine and run at high rpm.
3. Unscrew the lock nut (Fig. 118/1).
4. Turn the drive wheel with the hand crank until all the holes of the singling discs are filled with seed grains.
5. Turn the hand wheel (Fig. 118/2) until the pointer of the pressure gauge (Fig. 113) is in the green area.
6. Secure the hand wheel with the lock nut (Fig. 118/1).



Fig. 118

8.11.2.3 Adjusting the fan speed on the front tank

The combinations with front tanks have two fans

- the exhaust fan on the precision airplanter
- the compressed air fan on the front tank.

Adjust the fan speed of the exhaust fan (see section "Blower fan speed", Seite 116).

Adjust the fan speed of the compressed air fan following the front tank's operating manual.



28c176

Fig. 119



Important

Fan speeds of the compressed air fan on the front tank:

Minimum fan speed: 3500 rpm

Maximum fan speed: 4000 rpm

8.12 Adjusting the track marker



Danger

It is forbidden to stand in the swivelling area of the track marker!

Carry out the adjustments to the track marker only with the hand brake applied, the engine switched off and the ignition key removed.

8.12.1 Calculating the track marker length to mark a track in the centre of the tractor

Calculating the track marker width A (Fig. 120) measured from the centre of the implement to the contact surface of the track marker disc on the ground, this corresponds to the working width.

Track marker length A	=	Row spacing R [cm] x number of sowing units
-----------------------	---	---

Example:

Row spacing R: 45 cm

Number of sowing units: 7

Track marker length A 45 cm x 7

Track marker length A 315 cm

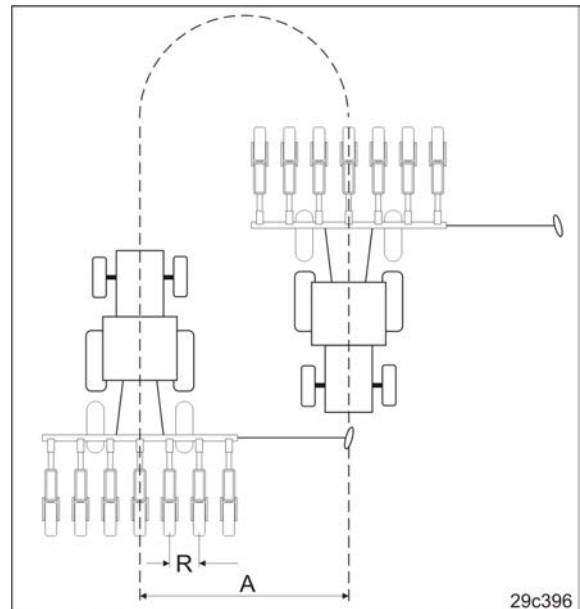


Fig. 120

8.12.2 Calculating the track marker length to mark a track in the tractor track

Calculating the working width A (Fig. 121) measured from the centre of the implement to the contact surface of the track marker disc on the ground with the coulters arranged symmetrically.

Track marker length A	=	Row spacing R [cm] x number of sowing units	$\frac{\text{Tractor track S [cm]}}{200}$
--------------------------	---	---	---

Example:

Row spacing R: 45 cm
 Number of sowing units: 7
 Tractor track width S: 150 cm

$$\begin{aligned} \text{Track marker length A} &= 45 \times 7 \times \frac{150}{200} \\ \text{Track marker length A} &= 236 \text{ cm} \end{aligned}$$

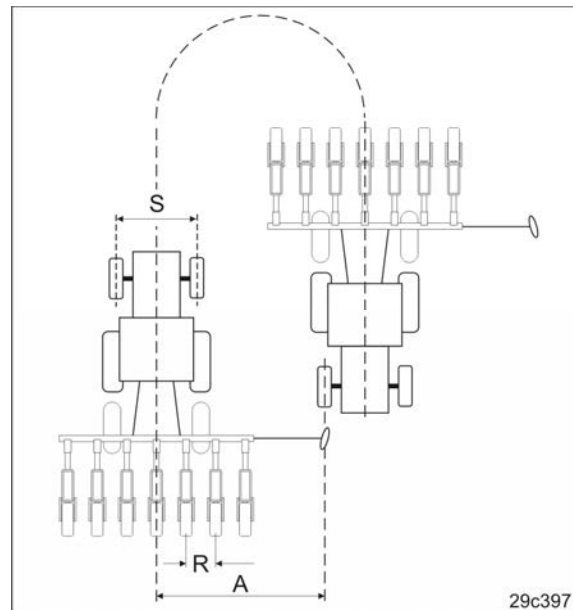


Fig. 121

8.12.3 Adjusting the working intensity of the track marker

1. Adjust the working intensity of the track marker by turning the track marker disc (Fig. 122/1).

The track marking disc runs roughly parallel with the direction of travel on light soils, and has more grip on heavy soils.

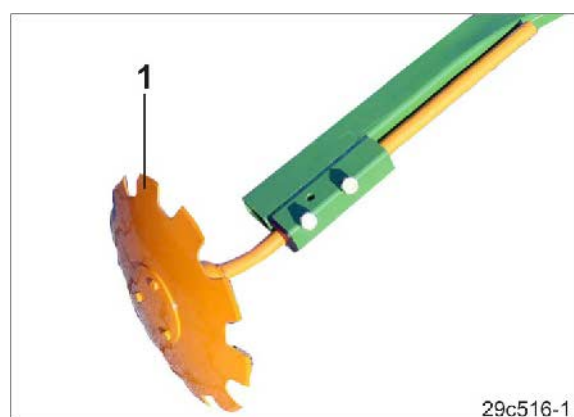


Fig. 122

8.12.4 Adjusting the track marker (ED 302)

The track markers of the ED 302 mark a track in the centre of the tractor.

Adjusting the track marker length:

1. Set the implement down on the field.
2. Release the track markers (see section "Track marker transport lock", Seite 165).
3. Fold out the track markers (see section "Track marker operation", Seite 167).
4. Apply the hand brake, switch off the tractor engine, and remove the ignition key.
5. Loosen both screws (Fig. 123/1).
6. Adjust the track marker length to length "A" (see section "Calculating the track marker length", Seite 121).
7. Tighten up the screws (Fig. 123/1).
8. Limit the working depth of the track marker discs to about 5 cm by repositioning the chain (Fig. 124/1)
9. Secure the chain with a linch pin (Fig. 124/2).



Fig. 123

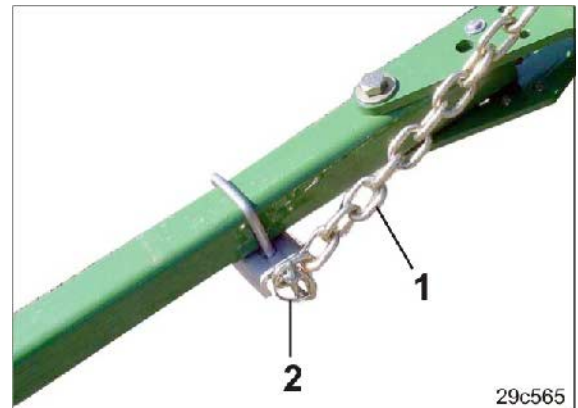


Fig. 124

8.12.5 Adjusting the track marker (ED 452 [-K])

The track markers of the ED 452 [-K] mark a track in the centre of the tractor or in the tractor track.

Adjusting the track marker length:

1. Set the implement down on the field.
2. Release the track markers (see section "Track marker transport lock", Seite 165).
3. Fold out the track markers (see section "Track marker operation", Seite 10).
4. Apply the hand brake, switch off the tractor engine, and remove the ignition key.
5. Pull out the spring-loaded pins (Fig. 126/1), swing them to the side and lock in place.
6. Pull out the boom tubing (Fig. 126/2) to the first or second hole.

Positioning the boom tubing (Fig. 126/2):

® **First hole: mark in the tractor track.**

® **Second hole: mark in the centre of the tractor**

7. Secure the boom tubing (Fig. 126/2) with the pin (Fig. 126/1).
8. Unscrew the screw (Fig. 126/3).
9. Adjust the track marker to length "A"
 - o see section "Calculating the track marker length", Seite 121
 - o see section "Calculating the track marker length", Seite 122.
10. Tighten up the bolt (Fig. 126/3).



Fig. 125

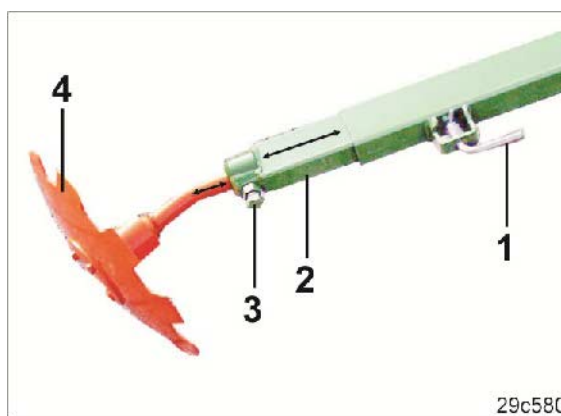


Fig. 126

8.12.6 Adjusting the track marker (ED 602-K)

The track markers of the ED 602-K mark a track in the centre of the tractor or in the tractor track.

Adjusting the track marker length:

1. Set the implement down on the field.
 2. Fold out the track markers (see section "Track marker operation", Seite 167).
 3. Apply the tractor parking brake, switch off the tractor engine and remove the ignition key.
 4. Pull out the spring-loaded pins (Fig. 128/1), swing them to the side and lock in place.
 5. Pull out the boom tubing (Fig. 128/2) to the first or second hole.
- Positioning the boom tubing (Fig. 128/2):**
- ® **First hole: mark in the tractor track.**
 - ® **Second hole: mark in the centre of the tractor**
6. Secure the boom tubing (Fig. 128/2) with the spring-loaded pin (Fig. 128/1).
 7. Undo the screws (Fig. 129/1).
 8. Adjust the track marker length to length "A"
 - o see section "Calculating the track marker length", Seite 121
 - o see section "Calculating the track marker length", Seite 122.
 9. Tighten up the screws (Fig. 129/1).

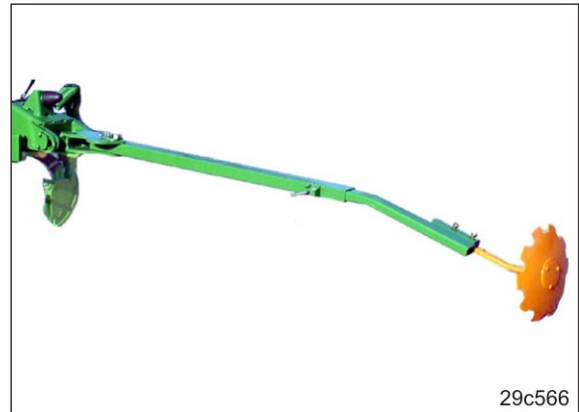


Fig. 127

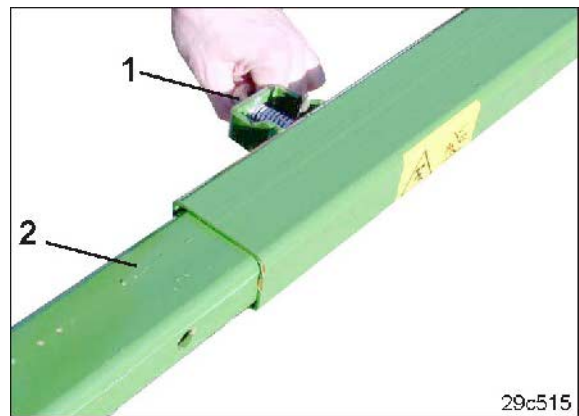


Fig. 128

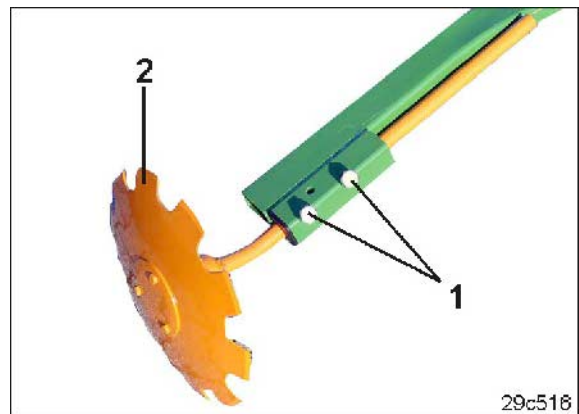


Fig. 129

Settings

10. Loosen the turnbuckle lock nut (Fig. 130/1).
11. Adjust the turnbuckle so that the track marker disc (Fig. 129/2) touches the ground.
12. Shorten the turnbuckle by one turn so that the working depth of the track marker disc is limited to approximately 5 cm.
13. Tighten up the turnbuckle lock nut (Fig. 130/1).

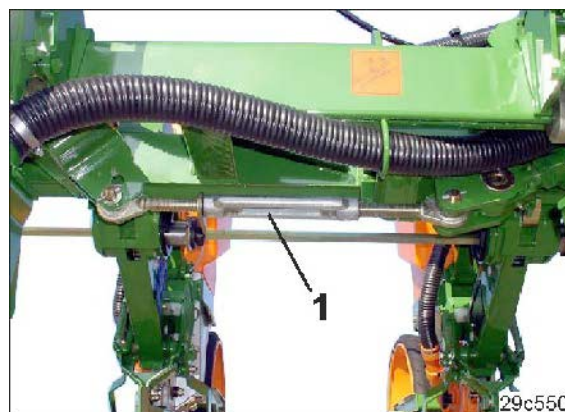


Fig. 130

8.13 Adjusting the wheel mark eradicator



First bring the wheel mark eradicator in the field to the working position and, after work has finished, fasten it right at the top to avoid damage when setting the implement down.



DANGER

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

Before moving the wheel mark eradicator

- Horizontally: loosen nut (Fig. 131/1)
- Vertically: loosen the bolt (Fig. 131/2).



Fig. 131

Before moving the wheel mark eradicator

- Horizontally: loosen nut (Fig. 132/1)
- Vertically: loosen the linch pin and bolt (Fig. 132/2).



Fig. 132

8.14 Adjusting the seed placement depth (classic sowing unit)



Set the seed hopper cover horizontally by lengthening or shortening the top link.

1. Bring the implement to the working position in the field (see section "Use of the implement", Seite 162).
2. Release the spring clip (Fig. 133/1). The spring clip secures the crank Fig. 133/2) from turning.
3. Using the crank (Fig. 133/2), adjust to the desired placement depth.

Turning the crank

® to the right (clockwise): reduce working depth

® to the left (anticlockwise): increase the working depth

4. Secure the crank (Fig. 133/2) with the clip (Fig. 133/1) to prevent it turning.
5. Check the placement depth of the first sowing unit (see section "Checking the placement depth and grain spacing", Seite 109) and correct if needed.

The maximum placement depth is 10 cm!

If the desired seed placement depth is not reached, adjust the weight of the sowing unit (load) on the sowing coulters [see section "Adjusting the loading level", Seite 129].

6. Adjust all the sowing units to the loading level and the crank setting of the first sowing unit. Read the crank setting from the scale (Fig. 133/3).
7. Finally, check the placement depth of all the sowing units (see section "Checking the placement depth and grain spacing", Seite 109).



Fig. 133

8.14.1 Adjusting the loading level (classic sowing unit)



Caution!

Risk of injury when releasing the spring-loaded lever (Fig. 134).

1. Lift up the implement on the tractor three-point hitch far enough so that the sowing units are clear of the ground.
2. Hold the lever (Fig. 134) firmly, and latch it into one of the 4 lever positions (loading levels).

Lever position (Fig. 134/...)

- (1) = Unloaded
- (2) = Neutral
- (3) = 50% loaded
- (4) = 100% loaded

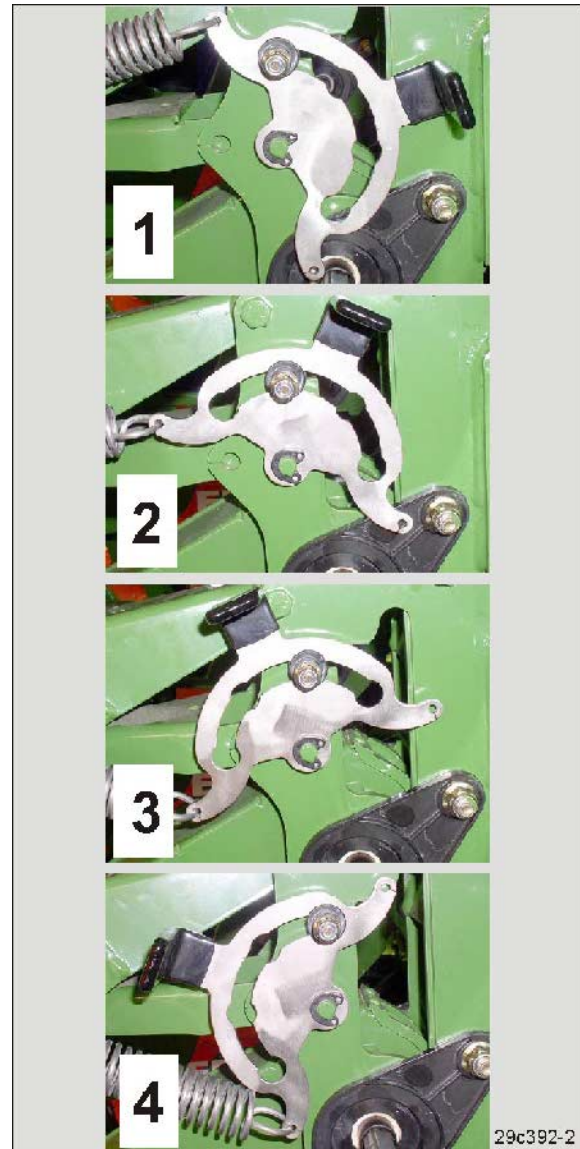


Fig. 134

8.15 Adjusting the seed placement depth (contour sowing unit)

1. Put the implement in the working position in the field (see Chapter "Use of the implement", Seite 162).
2. Release the spring clip (Fig. 135/1). The spring clip secures the crank (Fig. 135/2) from turning.
3. Using the crank (Fig. 135/2), adjust to the desired placement depth.

Turning the crank

® to the right (clockwise): reduce working depth

® to the left (anticlockwise): increase the working depth

4. Secure the crank (Fig. 135/2) with the clip (Fig. 135/1) to prevent it turning.
5. Check the placement depth of the first sowing unit (see section "Checking the placement depth and grain spacing", Seite 109) and correct if needed.

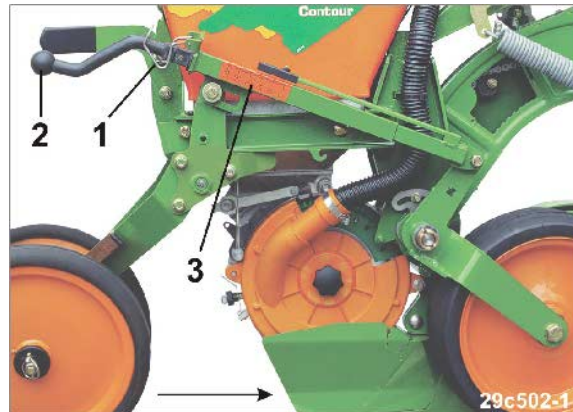


Fig. 135

The maximum placement depth is 12 cm!

6. If the desired seed placement depth cannot be reached, change the load on the seeding coulter [see section "Adjusting the loading level", unterhalb].
7. Adjust all the sowing units to the loading level and the crank setting of the first sowing unit. Read the crank setting from the scale (Fig. 135/3).
8. Finally, check the placement depth of all the sowing units (see section "Checking the placement depth and grain spacing", Seite 109).

8.15.1 Adjusting the loading level (contour sowing unit)

1. Lift up the implement on the tractor three-point hitch far enough so that the sowing units are clear of the ground.
2. Insert the hand crank (Fig. 136/1) into the square opening of the first sowing unit.
3. Turn the hand crank against the spring pressure and release the struts (Fig. 136/2) from the bolts (Fig. 136/3).
4. Relieve the strain on the draw springs (Fig. 136/4).



Fig. 136

5. Hang both draw springs (Fig. 136/4) as shown in figures (Fig. 137 to Fig. 139).
6. Using the hand crank, tension the springs and hang the struts (Fig. 136/2), as shown in figures (Fig. 137 to Fig. 139) on one bolt.
7. Perform the fine adjustment of the placement depth with the crank [see section "Adjusting the seed placement depth", Seite 130].

Loading level 1:

Fasten the spring (Fig. 137/1) and the strut (Fig. 137/2) as illustrated.

At loading level 1, the smallest possible weight acts against the seeding coulter, this increases in steps.

Loading level 2: (see Fig. 138)

Loading level 3: (see Fig. 139)



Fig. 137



Fig. 138



Fig. 139

The mounting diagrams of the three loading levels can be found on a sticker (Fig. 140) on the implement.

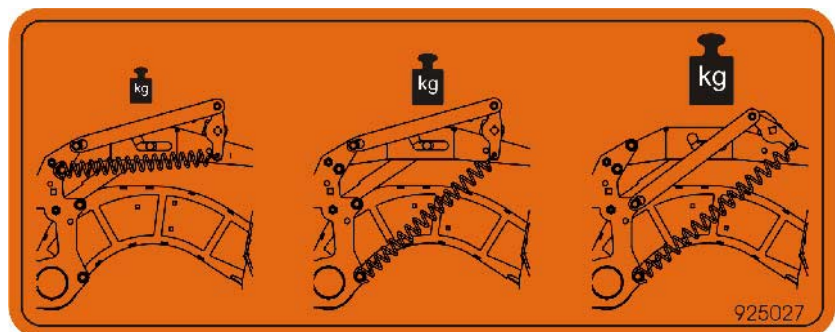


Fig. 140

8.15.2 Setting the load distribution of the press rollers (contour sowing unit)

To adapt to the various soil properties and conditions, the load distribution between the front-running (Fig. 141/1) and the rear-running press rollers (Fig. 141/2) is adjustable.

If the seed furrow cannot be closed due to the hardness of the soil, more load should be applied to the rear farm flex tyres to break the furrow edges and to close the seed furrow.

An even load distribution (50/50) is set at the factory between the press rollers.

The load distribution is varied by repositioning the crank (Fig. 141/3) in the receptacles a to d.

Position A:

Crank receptacle a and c (Fig. 141/A):

even weight distribution front and rear (factory setting).

Position B:

Crank receptacle a and c (Fig. 141/B):

weight distribution 30% front and 70% rear.

When working very heavy soils. The trailing V-press roller is loaded.

Position C:

Crank receptacle a and d (Fig. 141/C):

weight distribution 70% front, 30% rear.

To sow pressure-sensitive seed, e.g. turnips / beet. The trailing rubber V-press roller is loaded less strongly.

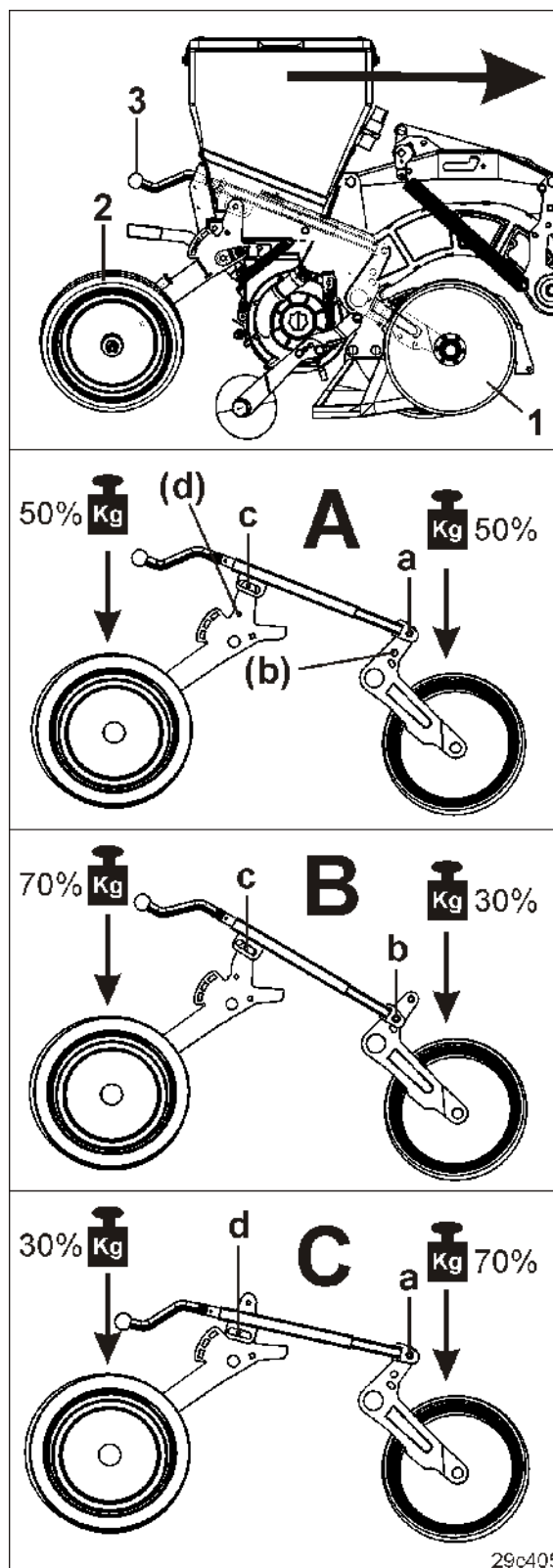


Fig. 141

In each of the positions "A" to "C", the weight which is applied to the rear V-press roller (Fig. 142/1) can be changed with the lever (Fig. 142/2).

Depending on how high the lever is inserted into the holder, the larger the force which acts upon the trailing press roller.

The lever locks into one of the three positions in the holder (Fig. 142/3).

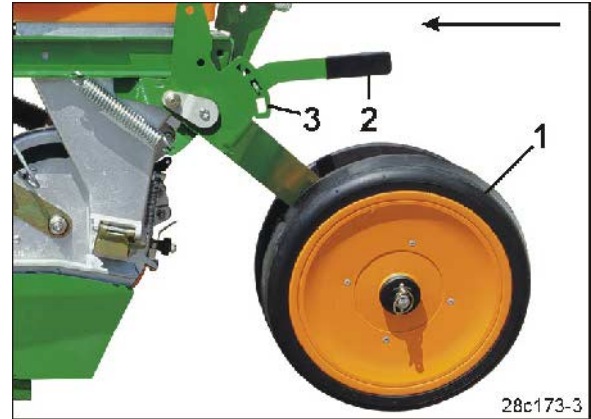


Fig. 142



On changing soils, the lever should always be fastened right at the top in the holder!

8.16 Adjusting the clod clearer (contour sowing unit)

Do not set the clod clearer (Fig. 143/1) in the setting segment with a pin (Fig. 143/2) too deeply and secure it with a linch pin.

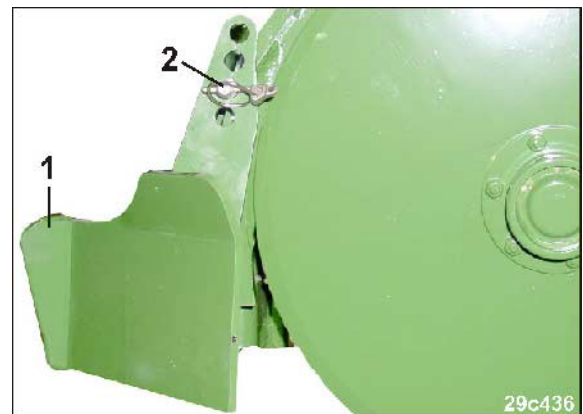


Fig. 143

8.17 Closing the seed furrow (classic sowing unit)

1. Follow the implement at the start of work on the field and check the seed coverage.
2. If the seed furrow is not closed, adjust the working intensity of the following closers (Fig. 144/1) by hanging the springs (Fig. 145/1) in the recesses A to C.

The largest working intensity is achieved by hanging the spring in the recess C.



Fig. 144



Fig. 145

8.18 Closing the seed furrow (contour sowing unit)

The working intensity of the closer (Fig. 147/1) or the disc closer (Fig. 148/1) increases the higher the lever (Fig. 146/1) is locked into place.

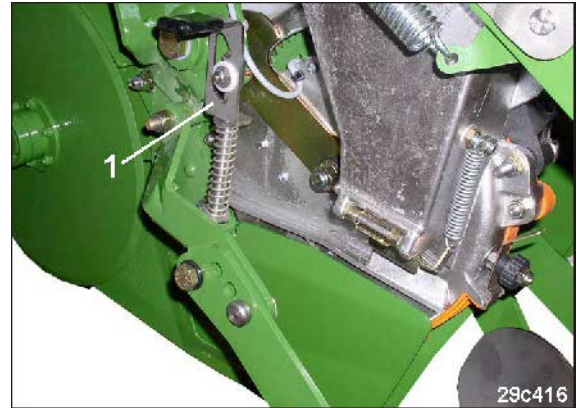


Fig. 146

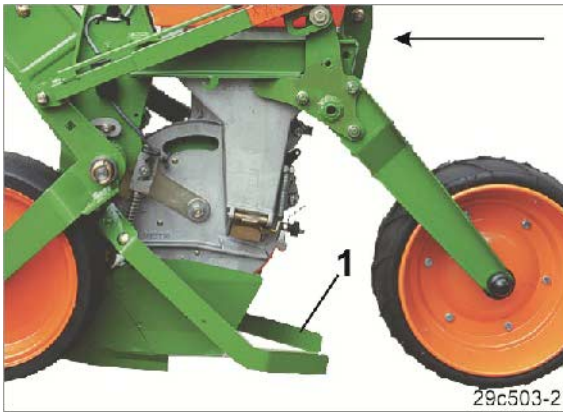


Fig. 147

The rubber V-press rollers keep the placement depth and closes the seed furrow.

Depending on the soil conditions, the distance between the rubber V-press rollers can be adjusted to each so that the rubber V-press rollers run tightly alongside the seed furrow cut edge, breaks this and closes the seed furrow.

Secure each adjustment by inserting a linch pin (Fig. 149/1).

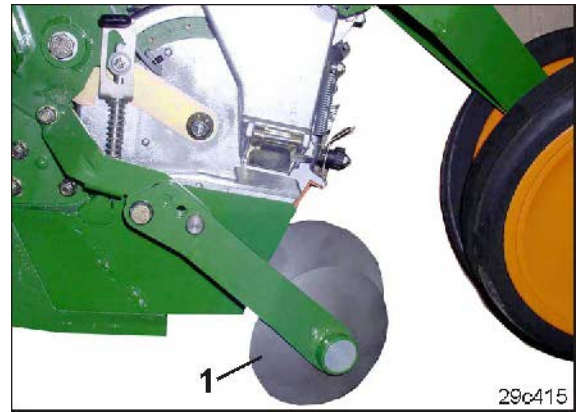


Fig. 148



Fig. 149



To prevent the linch pins being lost, ensure that the clip of the linch pin (Fig. 149/1) locks in place.

Settings

If the seed furrow is not closed with the correct setting of the axial distance, the means of working of both angled pressure rollers to each other can be infinitely adjusted using a lever (Fig. 150/2) after the bolted connection (Fig. 150/1) has been released. The shaped indicator element is used as a setting aid.

Lever adjustment:

- ® **Upwards:** increases the soil movement.
- ® **Downwards:** reduces the soil movement.



Fig. 150

If the possible settings of the rubber V-press rollers do not lead to the desired results, more load should be applied to the rubber V-press rollers [see section "Setting the load distribution of the press rollers", Seite 132].

Example:

If at the factory settings of position "A" and load level "3", the seed furrow is not closed, the press rollers should be loaded with 30% of the weight at the front and 70% at the rear. Move the crank to position "B", i.e. fasten in receptacles "b" and "c".

8.18.1 Adjusting the intermediate press roller (contour sowing unit)

The working intensity of the intermediate press roller (Fig. 151/1) increases the higher the lever (Fig. 152/1) is locked in.

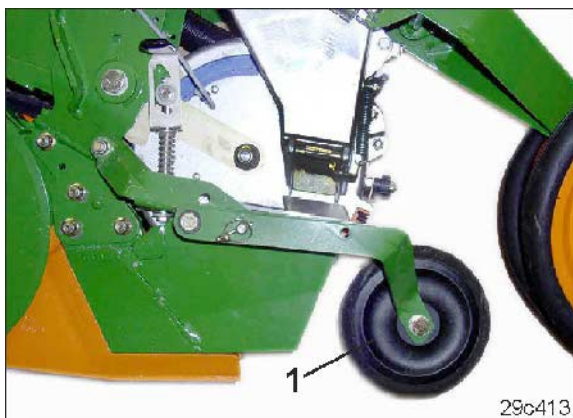


Fig. 151

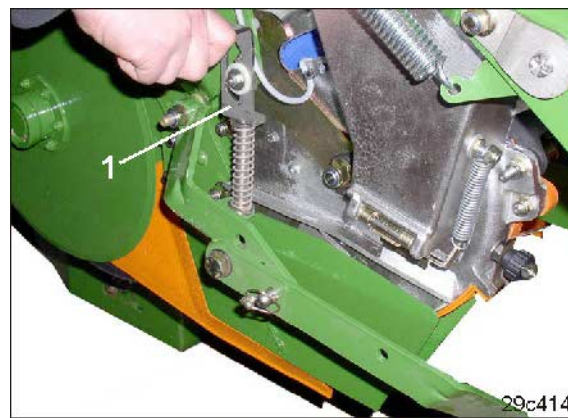


Fig. 152

8.19 Adjusting the fertiliser coulters

1. Loosen the nut (Fig. 153/1) to move the fertiliser coulter horizontally on the clamping rail. The distance to the seeding coulter is set at the factory to 6 cm.
2. Remove the R clip and the pin (Fig. 153/2) to adjust the placement depth of the fertiliser coulter.

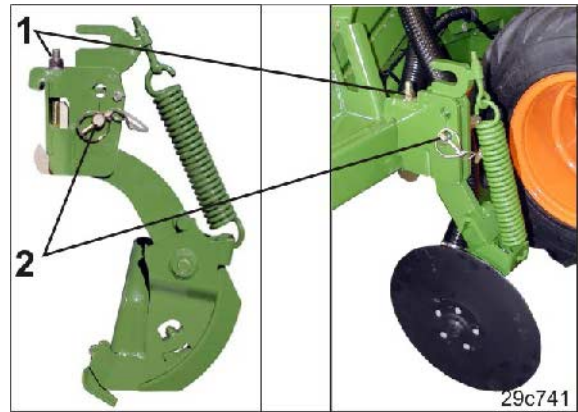


Fig. 153



The hoses to the fertiliser coulters must not hang down, so that no fertiliser can settle in the hose.

If required, shorten the fertiliser hoses!

Check that the nuts (Fig. 153/1) are firmly seated after 10 operating hours (tightening torque 200 Nm).

8.19.1 Adjusting the furrow former on the fertiliser coulter

Adjusting the distance from the furrow former to the cutting disc.

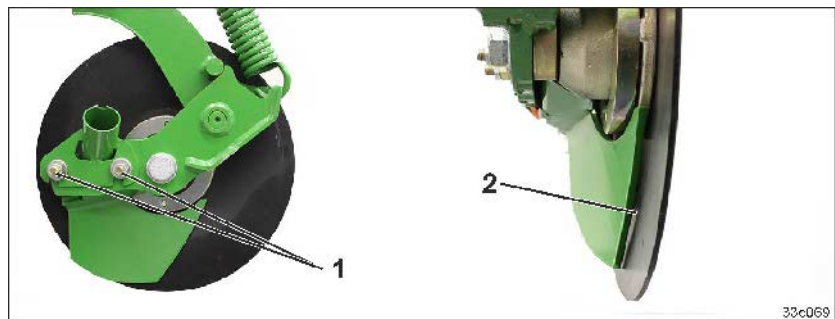


Fig. 154

1. Loosen the lock nut (Fig. 154/1),
2. Undo the fixing bolts (Fig. 154/1),
3. To adjust, screw in the fixing bolts (Fig. 154/1),
4. Adjust the distance from the furrow former to the cutter disc to 1 to 2 mm (Fig. 154/2),
5. Tighten up the lock nut.

8.19.2 Adjust the fertiliser coulters (ED 602K with 70 cm row spacing)



A deep depositing setting for the fertiliser coulters with the ED 602-K with 8 rows and 70 cm row spacing can result in a collision between the coulters disc and the setting gearbox during the folding procedure! (See Fig. 155/1).

Before folding in the fertiliser coulters, bring row 2 to the upper pin position.

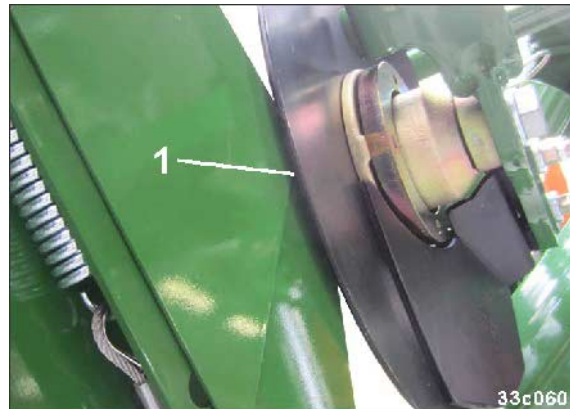


Fig. 155

1. Remove the linch pin from the positioning pin,
2. Hold the fertiliser coulters on the handle, (Fig. 156/1)
3. Pull out the positioning pin, (Fig. 156/2)
4. Move the fertiliser coulters to the upper position,
5. Insert the positioning pin and secure with the linch pin (Fig. 156/2).

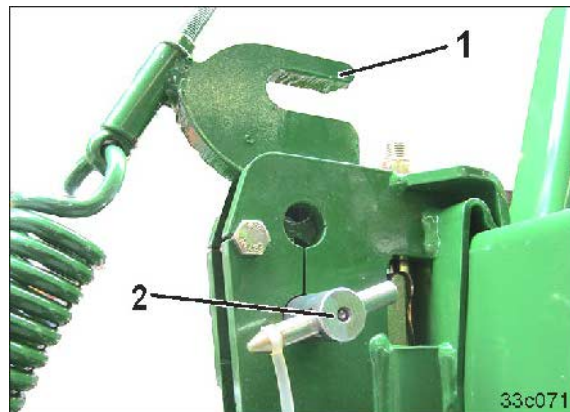


Fig. 156

8.20 Fertiliser hopper (650, 900 and 1100 l)



Couple the implement to the tractor before filling the fertiliser hopper.

Empty the fertiliser hopper before uncoupling the implement from the tractor.

8.20.1 Filling the fertiliser hopper (650, 900 and 1100 l)

1. Couple the precision airplanter to the tractor. Fold out the booms.
2. Set the implement down on a level surface.
3. Apply the tractor parking brake, switch off the tractor engine and remove the ignition key.
4. Open the fertiliser hopper tarpaulin (Fig. 157) which is secured with a rubber strap.



Fig. 157

5. To adjust the fill level sensor (optional), open the sieve grate (Fig. 158/1) in the fertiliser hopper.



Fig. 158

6. Adjust the fill level sensor (Fig. 159/1) in the fertiliser hopper.
The fill level sensor (optional) triggers and alarm as soon as the sensor is no longer submerged in the fertiliser.
7. Close the sieve grate (Fig. 158/1).
8. Fill the fertiliser hopper
 - o Manual access via the steps (Fig. 157/1)
 - o with the filling auger (see section "Fertiliser filling auger", Seite 157).
9. Close the fertiliser hopper tarpaulin.



Fig. 159

8.20.2 Adjusting the fertiliser quantity



The maximum application quantity is approx. 550 kg/ha at a working speed of 8 km/h!



Test each adjustment with a calibration test (see section "Calibration test", Seite 144).

1. Remove the spray protection (Fig. 160/1).
The spray protection is hung on two brackets (Fig. 160/2)



Fig. 160

2. Fix the bottom flap setting lever (Fig. 161/1) to the back (Fig. 161/2).



Fig. 161

3. Position the active shutter slides (Fig. 162) in position "B".
4. Position all other shutter slides in position "A". The fertiliser supply to the fertiliser coulters is interrupted.

Shutter slide positions (Fig. 162):

- A = closed
- B = 3/4 open
- C = open

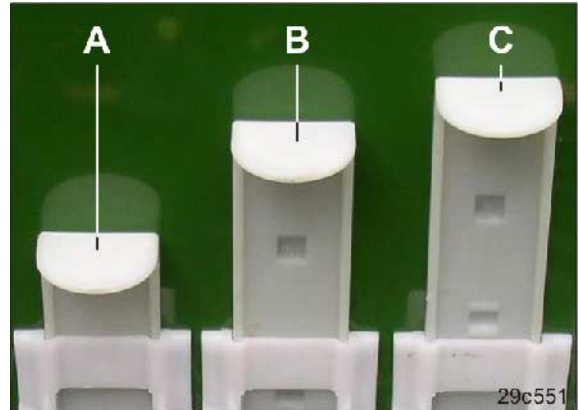


Fig. 162

5. Unscrew the wing nut (Fig. 163/1).
6. Take the gearbox setting number from the section "Determine the gearbox setting number" () and adjust the scale (Seite 142/2).
The gearbox lever (Fig. 163/3) must always be adjusted from underneath to the scale value.
7. Tighten up the wing nut (Fig. 163/1).
8. To bring the fertiliser spreader out of use, it is sufficient to move the adjustment lever to the 0 position.



Fig. 163

8.20.2.1 Determine the gearbox setting number





	[kg/l]	Diammonphosphat 18-46-0 0,94 kg/l			Kalkammonphosphat 27% N 1,02 kg/l			Harnstoff 46% N 0,76 kg/l		
	[cm]	70 cm	75 cm	80 cm	70 cm	75 cm	80 cm	70 cm	75 cm	80 cm
	5	29	27	25	30	28	26	25	23	22
	10	66	62	58	81	76	71	56	52	49
	15	100	93	87	118	110	103	84	78	73
	20	135	126	118	160	149	140	111	104	98
	25	174	162	152	196	183	172	140	131	123
	30	204	190	178	234	218	204	167	156	146
	35	236	220	206	270	252	236	195	182	171
	40	268	250	234	304	284	266	219	204	191
	45	297	277	260	340	317	297	244	228	214
	50	333	311	292	381	356	334	274	256	240
	55	363	339	318	409	382	358	299	279	262
	60	404	377	353	471	440	413	328	306	287
	65	429	400	375	490	457	428	358	334	313
	70	465	434	407	529	494	463	389	363	340
	75	497	464	435	586	547	513	401	374	351
	80	512	478	448	593	553	518	418	390	366
	[kg/l]	NPK 13+13+21 BASF 1,18 kg/l			Triple-Superphosphat 0,98 kg/l			MAP 12-52 1,02 kg/l		
	[cm]	70 cm	75 cm	80 cm	70 cm	75 cm	80 cm	70 cm	75 cm	80 cm
	5	42	39	37	26	24	23	14	13	12
	10	85	79	74	79	74	69	57	53	50
	15	120	112	105	120	112	105	94	88	83
	20	162	151	142	158	147	138	139	130	122
	25	198	185	173	197	184	173	178	166	156
	30	231	216	203	233	217	203	219	204	191
	35	271	253	237	267	249	233	246	230	216
	40	305	285	267	308	287	269	287	268	251
	45	346	323	303	345	322	302	328	306	287
	50	388	362	339	383	357	335	343	320	300
	55	422	394	369	418	390	366	374	349	327
	60	464	433	406	451	421	395	410	383	359
	65	507	473	443	493	460	431	447	417	391
	70	551	514	482	528	493	462	491	458	429
	75	591	552	518	573	535	502	511	477	447
	80	599	559	524	585	546	512	521	486	456

Fig. 164

Calculating the gearbox setting number for precision airplanters with other row spacings

$$\text{Conversion factor} = \frac{\text{Row spacing x application rate (table value)}}{\text{Row spacing x application rate}}$$

$$\text{Gearbox setting number} = \frac{\text{Gearbox setting number (table value)}}{\text{Conversion factor}}$$

Example:

Desired fertiliser type: di-ammonium phosphate

Desired application rate:	300 kg/ha
Row spacing:	60 cm
Gearbox setting number:	calculate

Table value (Fig. 164):	
Application rate:	333 kg/ha
Row spacing:	70 cm
Gearbox setting number:	50

$$\text{Conversion factor} = \frac{70 \text{ cm} \times 333 \text{ kg/ha}}{60 \text{ cm} \times 300 \text{ kg/ha}} = 1.295$$

$$\text{Gearbox setting number} = \frac{50}{1.295} = 38.5$$

To apply 300 kg/ha di-ammonium phosphate, set the gearbox lever (Fig. 163/3) to the scale value of 38.5.

8.20.3 Emptying the fertiliser hopper

To empty the fertiliser hopper, remove the hose (Fig. 165/2) from the bracket which is secured with a linch pin (Fig. 165/1).

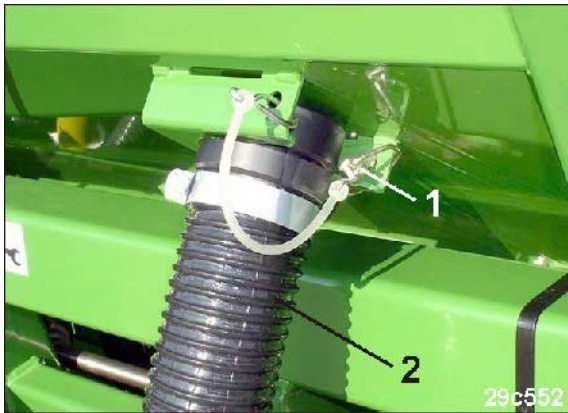


Fig. 165



Fig. 166

8.21 Calibration test (650, 900 and 1100 l hoppers)



You can check if the desired fertiliser quantity is being applied using the calibration test.

1. Fill the fertiliser hopper at least 1/4 full with fertiliser.
2. **650, 900, 1,100 litre hoppers:**
Place suitable collecting bucket(s) (Fig. 167/1) under a fertiliser coulters (Fig. 167/2), or optionally under all fertiliser coulters.
Close the shutter slides (Fig. 162) to all fertiliser coulters without collection buckets.



Fig. 167

3. Insert the hand crank (Fig. 168/1) into the recess on the right-hand wheel.
4. Once the collecting bucket (Fig. 167/1) has been positioned under the fertiliser coulters that must be supplied with compressed air, switch on the compressed air blower fan (see section "Blower fan speed", Seite 116).
5. Turn the wheel with the hand crank to the right (clockwise) until fertiliser falls into all the collecting buckets.



Fig. 168

6. Empty the collecting buckets (not into the fertiliser hopper with the blower fan running).
7. Put the collecting buckets back under the fertiliser coulters.
8. Read the number of crank turns from the table (Fig. 169).
The number of crank turns is determined by the working width and the tyres on the implement.

	ED302					ED452 [-K]			ED602-K	
Number of sowing units	6	5	4	4	4	6	6	6	8	8
Row spacing [cm]	50	60	70	75	80	70	75	80	—	—
Crank turns to 1/40 [ha] with tyres 10.0/75-15	36.8	36.8	39.4	36.8	34.5	26.3	24.5	23.0	—	—
Crank turns to 1/40 [ha] with tyres 31x15.50-15	—	—	—	—	—	—	—	—	16.1	15.1

Fig. 169

Calculating the number of crank turns for precision airplanters with other row spacings

Crank turns = $\frac{\text{Crank turns x number of sowing units x row spacing (table values)}}{\text{Number of sowing units x row spacing}}$

Fig. 170

Example:

Data to calculate the crank turns on the wheel	
Number of sowing units:	4
Row spacing	70 cm
Tyres:	10.0/75-15
Crank turns:	calculate

Data from the table (Fig. 169)	
Number of sowing units:	6
Row spacing	50 cm
Tyres:	10.0/75-15
Crank turns:	36.8

$$\text{Crank turns} = \frac{36.8 \times 6 \times 50 \text{ cm}}{4 \times 70 \text{ cm}} = 39.5$$

9. Turn the crank clockwise by the number of crank turns in the table (Fig. 169).
10. Weigh the amount of fertiliser collected taking the weight of the container into consideration (Fig. 171) and multiply by the factor "40".

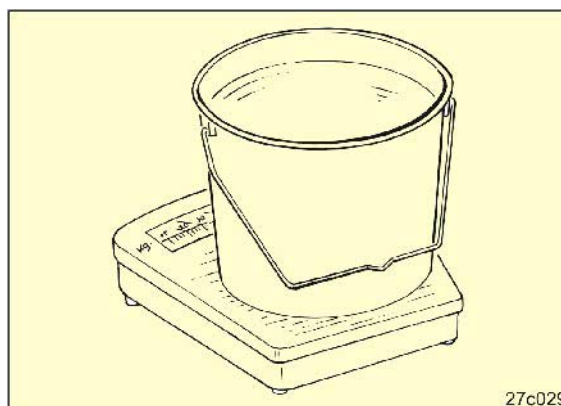


Fig. 171

11. After the calibration test:
 - Place the hand crank in the transport bracket,
 - Open the shutter slides which were shut for the calibration test.

Example:

collected amount of fertilizer; 5 kg (calibrated to 1/40 ha)

Fertiliser application rate = 5 x 40 = 200 [kg/ha]

650, 900 and 1,100 litre hoppers:

Calculation if the fertiliser quantity was just collected from one fertiliser coulter and where 6 fertiliser coulters are used for the future work:

Fertiliser application rate = 20 [kg/ha] x 6 = 120 [kg/ha]

650, 900 and 1,100 litre hoppers:

If the desired fertiliser application rate [kg/ha] has not been achieved during the calibration test, calculate the deviation (%) between the desired and the measured fertiliser quantities and adjust the gearbox by this percentage amount.

Repeat the calibration test until the desired fertiliser application rate is achieved.



Open the shutter slides which were shut for the calibration test.

8.22 Front tank



DANGER

Couple the front tank to the tractor before filling.

Empty the front tank before uncoupling from the tractor.



Before filling, check which metering roller is attached. If required, change the metering roller!

- Recommended: Polyurethane metering roller
- Fill the front tank in accordance with the front tank's operating manual.

8.22.1 Installing/removing the metering roller

1. Remove the linch pin (Fig. 172/2)
(Only required with filled hoppers to close the hopper with the shutter (Fig. 172/1).

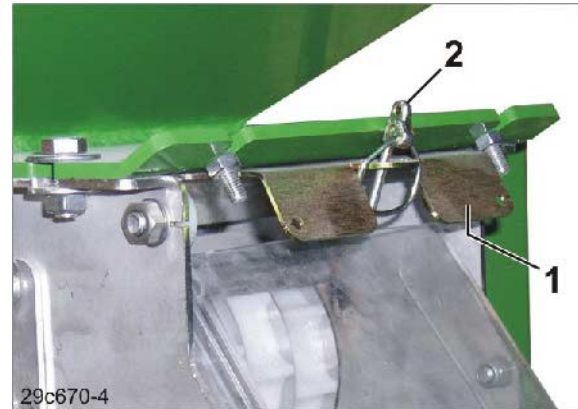


Fig. 172

2. Push the slider (Fig. 173/1) into the dosing unit up to the stop.
- The shutter seals the hopper. Fertiliser cannot pout out inadvertently when the dosing roller is being replaced.

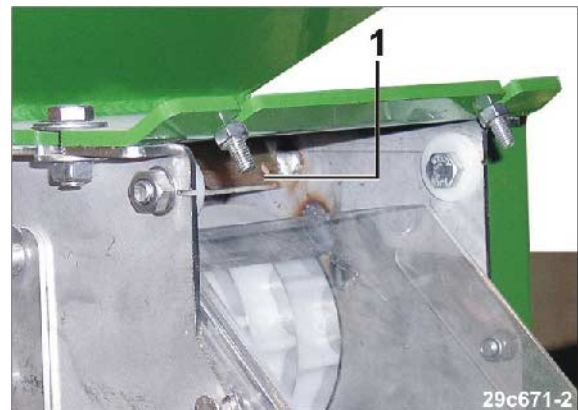


Fig. 173

Settings

3. Loosen, but do not unscrew the two wing nuts (Fig. 174/1)
4. Turn the bearing cover and pull it off.



Fig. 174

5. Pull the metering roller out of the dosing unit.
6. Fit the desired metering roller in the reverse sequence.



Fig. 175



Fit all the metering units on the implement with the same metering roller.

Open all shutters (Fig. 172/1) and secure [linch pin (Fig. 172/2)].

8.22.2 Adjusting the fertiliser quantity

To apply the desired fertiliser quantity, adjustments have to be made

- To the metering units
- To the vario gearbox.



Fig. 176



Test each adjustment with a calibration test (see section "Calibration test", Seite 154).




1. Take the gear setting number for the desired fertiliser application rate from the tables (Fig. 178 to Fig. 181).
2. Loosen the rotary knob (Fig. 177/1).
3. Take the gear setting number for the desired fertiliser application rate from the tables (Fig. 178 to Fig. 181).
4. Loosen the rotary knob (Fig. 177/1).
5. Set the pointer (Fig. 177/2) from below to the gearbox setting number from the scale (Fig. 177/3).
6. Tighten up the rotary knob.
7. Carry out the calibration test (see section "Calibration test", Seite 154).



Fig. 177




Type of fertilizer	Di-ammonium phosphate 18 – 46 – 0 0.97 kg/l					
Type	FS2		FS1			
Working width	• 6.0 m	• 5.4 m	• 6.0 m	• 5.4 m	• 4.5 m	• 3.0 m
• 5	4	4.44	2	2.22	2.67	4
• 10	30	33.3	15	16.7	20	30
• 15	58	64.4	29	32.2	38.7	58
• 20	80	88.9	40	44.4	53.3	80
• 25	112	124	56	62.2	74.7	112
• 30	138	153	69	76.7	92	138
• 35	166	184	83	92.2	111	166
• 40	194	216	97	108	129	194
• 45	222	247	111	123	148	222
• 50	250	278	125	139	167	250
• 55	278	309	139	154	185	278
• 60	308	342	154	171	205	308
• 65	340	378	170	189	227	340
• 70	368	409	184	204	245	368
• 75	400	444	200	222	267	400
• 80	432	480	216	240	288	432
• 85	466	518	233	259	311	466
• 90	484	538	242	269	323	484
• 95	526	584	263	292	351	526
• 100	558	620	279	310	372	558
Fertiliser application rate [kg/ha]						

Fig. 178

		Max. quantity at 10 km/h
		Max. quantity at 8 km/h

Type of fertilizer		Calcium ammonium nitrate 1.06 kg/l					
Type	FS2			FS1			
Working width	• 6.0 m	• 5.4 m	• 6.0 m	• 5.4 m	• 4.5 m	• 3.0m	
• Gearbox setting number	• 5	3	3.33	1.5	1.67	2	3
	• 10	24	26.7	12	13.3	16	24
	• 15	56	62.2	28	31.1	37.3	56
	• 20	84	93.3	42	46.7	56	84
	• 25	112	124	56	62.2	74.7	112
	• 30	144	160	72	80	96	144
	• 35	176	196	88	97.8	117	176
	• 40	204	227	102	113	136	204
	• 45	236	262	118	131	157	236
	• 50	268	298	134	149	179	268
	• 55	296	329	148	164	197	296
	• 60	324	360	162	180	216	324
	• 65	356	396	178	198	237	356
	• 70	384	427	192	213	256	384
	• 75	420	467	210	233	280	420
	• 80	452	502	226	251	301	452
	• 85	484	538	242	269	323	484
	• 90	512	569	256	284	341	512
	• 95	544	604	272	302	363	544
• 100	584	649	292	324	389	584	
Fertiliser application rate [kg/ha]							

Fig. 179

		Max. quantity at 10 km/h
		Max. quantity at 8 km/h

Settings

Type of fertilizer	NPK 1.15 kg/l					
Type	FS2		FS1			
Working width	• 6.0 m	• 5.4 m	• 6.0 m	• 5.4 m	• 4.5 m	• 3.0 m
• 5	5	5.56	2.5	2.78	3.33	5
• 10	36	40	18	20	24	36
• 15	68	75.6	34	37.8	45.3	68
• 20	108	120	54	60	72	108
• 25	132	147	66	73.3	88	132
• 30	164	182	82	91.1	109	164
• 35	196	218	98	109	131	196
• 40	228	253	114	127	152	228
• 45	256	284	128	142	171	256
• 50	288	320	144	160	192	288
• 55	320	356	160	178	213	320
• 60	352	391	176	196	235	352
• 65	388	431	194	216	259	388
• 70	420	467	210	233	280	420
• 75	456	507	228	253	304	456
• 80	492	547	246	273	328	492
• 85	524	582	262	291	349	524
• 90	552	613	276	307	368	552
• 95	588	653	294	327	392	588
• 100	624	693	312	347	416	624
•	• Fertiliser application rate [kg/ha]					

Fig. 180

Type of fertilizer	Urea 0.75 kg/l					
Type	FS2		FS1			
Working width	• 6.0 m	• 5.4 m	• 6.0 m	• 5.4 m	• 4.5 m	• 3.0 m
• 5	4	4.44	2	2.22	2.67	4
• 10	32	35.6	16	17.8	21.3	32
• 15	56	62.2	28	31.1	37.3	56
• 20	76	84.4	38	42.2	50.7	76
• 25	96	107	48	53.3	64	96
• 30	116	129	58	64.4	77.3	116
• 35	140	156	70	77.8	93.3	140
• 40	160	178	80	88.9	107	160
• 45	180	200	90	100	120	180
• 50	200	222	100	111	133	200
• 55	216	240	108	120	144	216
• 60	244	271	122	136	163	244
• 65	264	293	132	147	176	264
• 70	284	316	142	158	189	284
• 75	304	338	152	169	203	304
• 80	328	364	164	182	219	328
• 85	352	391	176	196	235	352
• 90	372	413	186	207	248	372
• 95	396	440	198	220	264	396
• 100	416	462	208	231	277	416
•	• Fertiliser application rate [kg/ha]					

Fig. 181

8.22.2.1 Calibration test



You can check if the desired fertiliser quantity is being applied using the calibration test.

1. Fill the fertiliser hopper at least 1/4 full with fertiliser..
2. Take the collection buckets from the transport bracket.

The collection buckets are stacked together for transport, and secured with a linch pin (Fig. 182/1).



Fig. 182

3. Place a collection bucket under each metering unit.
4. Open all injector sluice flaps (Fig. 183/1).



Fig. 183



WARNING

Risk of crushing when opening and closing the injector sluice flap (Fig. 183/1)!

Only hold the injector sluice flaps on the tab (Fig. 183/2), otherwise there is a risk of injury when the spring-loaded injector sluice flap closes.

Never put your hand between the injector sluice flap and the injector sluice!

5. Insert the hand crank into the square hole of the star wheel.
6. Turn the star wheel with the hand crank clockwise (Fig. 184) until all chambers of the metering wheels are filled with fertiliser and an even stream of fertiliser falls into the collection bucket(s).
7. Empty the collection bucket(s) into the front tank and place under the metering unit(s) again.



Fig. 184

The required number of crank turns is determined by:

- The working width (Fig. 185/1)
- The number of crank turns on the start wheel per 1/40 ha (Fig. 185/2).

Crank turns for working widths which are not listed, can be calculated as shown below.


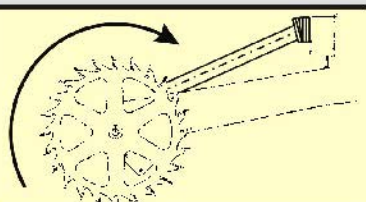
 29c350		
	1/40 ha	1/10 ha
3,0 m	38,5	154,0
4,5 m	26,0	104,0
5,4 m	17,5	70,0
6,0 m	19,5	78,0
8,1 m	14,5	58,0
9,0 m	13,0	52,0
1	2	

Fig. 185

Example:

Data to calculate the crank turns on the star wheel	
Working width:	8.40m
Calibration:	to 1/40 ha
Crank turns on the star wheel:	calculate

Data from the table (Fig. 185)	
Working width:	8.10m
Calibration:	to 1/40 ha
Crank turns on the star wheel:	14.5

$$\text{Crank turns} = 14.5 \times \frac{8.1 \text{ [m]}}{8.4 \text{ [m]}} = 14.0$$

8. Turn the crank clockwise for the number of crank turns listed in the table (Fig. 185).
9. Weigh the amount of fertiliser collected taking the weight of the container into consideration (Fig. 186) and multiply by the factor "40".

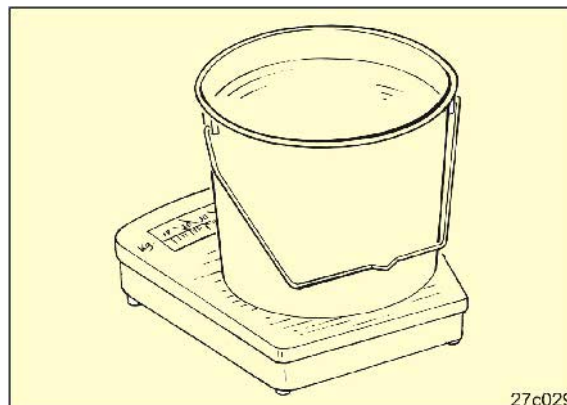


Fig. 186

Example:

collected amount of fertilizer;	3.2 kg (calibrated to 1/40 ha)
Fertiliser application rate	= 3.2 x 40 = 128 [kg/ha]

10. If the desired fertiliser application rate [kg/ha] is not achieved during the calibration test, calculate the deviation (%) between the desired and the determined amount of fertiliser and adjust the gearbox by this percentage.

Repeat the calibration test until the desired fertiliser application rate is achieved.

11. After the calibration test
 - Place the hand crank in the transport bracket,
 - Close the injector sluice flap with particular care (see hazard note [Fig. 183]).
 - Fasten the collection buckets (Fig. 182) into the transport bracket and secure with a linch pin.

8.23 Fertiliser filling auger (optional)

Fill the fertiliser hopper with the filling auger:

1. Set the implement on a level surface.
2. Apply the tractor parking brake, switch off the tractor engine and remove the ignition key.
3. Remove the cover tarpaulin (Fig. 187/1).



Fig. 187

4. Switch off the hydraulic drive of the filling auger.

Stop cock lever position A (Fig. 188)

® **Switch off the filling auger**

Stop cock lever position B (Fig. 188).

® **Switch on the filling auger**

5. Apply the tractor parking brake and start up the tractor's engine.
6. Switch on the tractor control unit 4 (see section "Hydraulic connections", Seite 82).
7. Switch on the filling auger's hydraulic drive on the stop cock (Fig. 189/1) slowly.
Control the feed speed with the stop cock.

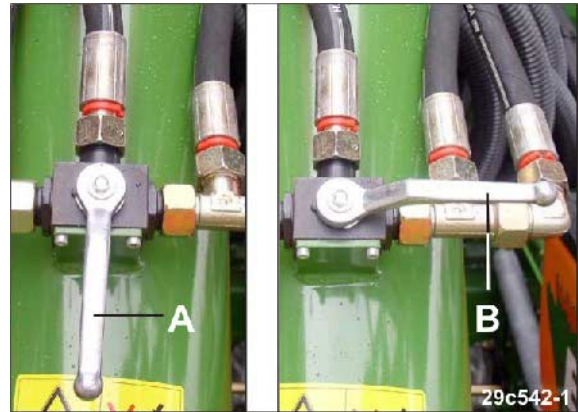


Fig. 188



Fig. 189

Settings

8. Fit the filling funnel of the filling auger, e.g. from a supply vehicle (Fig. 190).
9. Switch off the filling auger as soon as the fertiliser hopper is filled.
The fertiliser hopper with the tarpaulin closed is filled as soon as the filling auger blocks up.
10. Turn off tractor control unit 4.
11. Close the filling funnel with the cover tarpaulin (Fig. 187/1).



Fig. 190



DANGER

Make sure nobody is standing between the supply vehicle and filling funnel during manoeuvring.



The rear view mirror (optional, Fig. 190) makes manoeuvring easier with the precision airplanter.



Switch off the hydraulic valve of the filling auger and the tractor's control valve after use.

9 Transportation

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

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.



- For transport journey, observe of the section "Safety information for users", Seite 26.
- Before moving off, check:
 - The correct connection of the supply lines
 - The lighting system for damage, function and cleanliness



WARNING

Risk of contusions, cutting, catching, drawing in and knocks when making interventions in the implement through unintentional implement movements.

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



WARNING

Risk of crushing, cutting, being caught and/or drawn in, or impact from tipping and insufficient stability.

- Drive in such a way that you always have full control over the tractor with the attached implement.
In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected or coupled implement.
- Before transportation, fasten the side locking of the tractor lower link, so that the connected or coupled implement 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.

Observe the maximum load of the mounted / trailed implement and the permissible axle and draw bar loads of the tractor. If necessary, drive only with an empty hopper.

**WARNING**

Risk of falling when riding on the implement, contrary to instructions.

It is forbidden to ride on the implement and/or climb the implement while it is running.

Instruct people to leave the loading site before approaching the implement.

The precision airplanter should be moved to the transport position after work on the field.

**DANGER**

Switch off the tractor PTO shaft!



In certain arrangements, the transport width is larger than listed in table ().

Apply for a special permit from your local authorities to transport your implement on public roads when the transport width is more than 3.0 m.



The precision airplanters ED 452 can only be carried on a transport vehicle.

1. Determine the transport width of the implement. To do this, take the transport width of the implement from table (), or measure the implement directly.
2. Push in the track marker boom tubing of the ED 452, ED 452-K and ED 602-K and lock it (see section 8.12.5, Seite 124 and section 8.12.6, 125).
3. Position both track markers vertically (see section "Track marker operation", Seite 167).
4. Secure the track markers [see section "Track marker transport lock", Seite 165].
5. Fold in and secure the implement booms (see section "Fold the implement booms", Seite 165).
6. Turn off the computer on the control terminal.

The traffic safety equipment [see section "Transportation equipment", Seite 43] is prescribed by law.

7. Check that the lighting system works.
8. The warning signs must be clean and undamaged.
9. Lift the implement up for road transport. The following distances must be observed
 - o Top of rear lamps to the road surface, max. 1,550 mm
 - o Top of rear flood light to the road surface, max. 900 mm.
10. Disable the tractor control units.



Fig. 191



Fig. 192



If the precision airplanter is transported in combination with a front tank on the public roads, the front tank must also comply with the national road transport regulations (in Germany the StVZO and the StVO). Further information can be found in the front tank operating manual.

10 Use of the implement



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

- "Warning symbols and other signs on the implement", as of Seite 17 and
- "Safety information for users", Seite 26.

Observing this information is important for your safety.



WARNING

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

Observe the maximum load of the mounted / trailed implement and the permissible axle and draw bar loads of the tractor.



WARNING

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

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

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



WARNING

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

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

**WARNING**

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

Before turning on check to ensure that the tractor PTO shaft speed corresponds with the permitted drive speed of the implement.

**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 implement 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 when the overload clutch engages!

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

This avoids damaging the overload clutch.

**DANGER**

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

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

10.1 Starting work



DANGER

- Direct people out of the danger area of the implement, in particular from the swivel zone of the implement extension arms and the track markers.
- Actuate the tractor's control units only in the tractor cab.



Position the seed hopper cover (Fig. 193/1) horizontally by lengthening or shortening the top link (Fig. 193/2).

1. Fold out the implement booms (see section "Fold the implement booms", Seite 165).
2. Set the precision airplanter down at the start of the field.
3. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
4. Unlock the track markers (only ED 302 and ED 452 [-K]), [see section "Track marker transport lock", Seite 165].
5. Set the track markers in the working position (see section "Track marker operation", Seite 167).
6. Set the blower fan to the correct speed (see section "Blower fan speed", Seite 116).
7. Set the control unit for the tractor lower link to the float position and operate it during work in the float position.
8. Switch on the tractor PTO shaft.
To avoid damage, only engage the PTO shaft slowly in neutral or at low tractor engine speed.
9. Drive off with the tractor.



Fig. 193

Check after the first 30 m, correct if necessary

10. Seed placement depth and grain spacing (see section "Checking the placement depth and grain spacing", Seite 109).

10.2 Track marker transport lock (ED 302 and ED 452 [-K])



DANGER

Secure the track marker before leaving the field or when driving on roads and paths

Press the track markers against the bracket and secure with a linch pin (Fig. 194/1).

If not in use, put the linch pin in the hole (Fig. 194/2) (parking position).

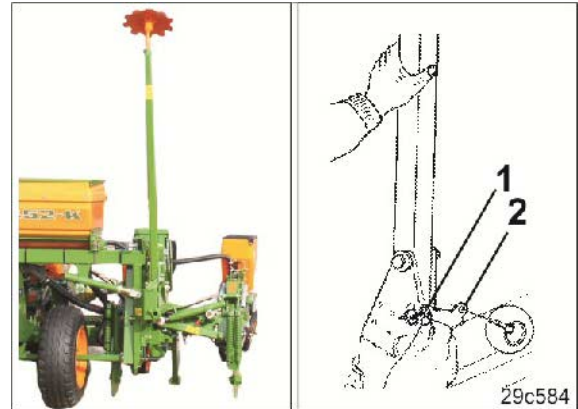


Fig. 194

10.3 Fold the implement booms



DANGER

- Secure the implement booms before leaving the field or when driving on roads and paths.
- It is forbidden to be within the swing range of the implement booms when the tractor control device is operated.
- There are crushing and shearing points between the implement booms and the implement. Never reach into the crush area.



- Park the tractor on a level surface and lift up the precision airplanter before folding the implement booms in and out.
- Operate the tractor control device without interruption until the implement booms are completely folded in or out.

10.3.1 Folding the implement booms and track markers (ED 452-K and ED 602-K)

Two safety clips (Fig. 195) are the mechanical lock for the folded in implement booms.

Implement booms

- Unlock before folding out (Fig. 195/B).
- Lock after folding in (Fig. 195/A).

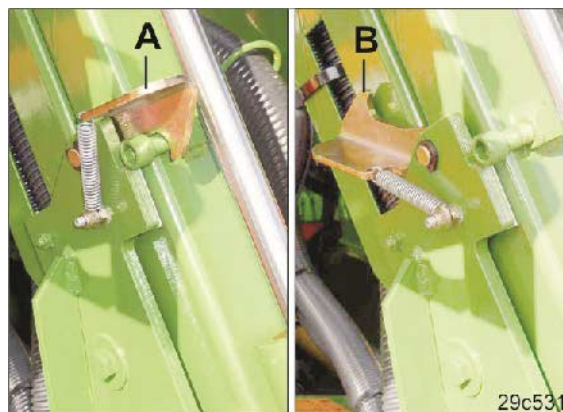


Fig. 195

Fold out the implement booms:

1. Unlock the implement booms.
2. Lift up the precision airplanter.
3. Operate the tractor control devices 2 and 3 (see section "Hydraulic connections", Seite 82) until the implement booms are folded out.
The traction of the sowing unit follows automatically.

The track markers of the ED 602-K fold out together with the implement booms.

4. Set the tractor control devices 2 and 3 to the "0" position.

Folding in the implement booms:

Only ED 452-K:

1. Secure both track markers (see section "Track marker transport lock", Seite 165).

Only ED 602-K:

1. Raise up both track markers (see section "Track marker operation", Seite 167).

All types:

2. Lift up the precision airplanter.
3. Operate the tractor control devices 2 and 3 until the implement booms are folded in.

The track markers of the ED 602-K fold in together with the implement booms.

4. Lock the folded in implement booms.

10.4 Track marker operation



DANGER

- It is forbidden to stand in the swivelling area of the track marker!
- When operating the tractor control unit, depending on the switch position, one of the track markers folds out.
- There are crushing and shearing points between the track markers and the implement. Never reach into the crush area while folding the track marker in and out.

Start of work or after turning at the end of the field:

Set the tractor control unit 1 to the float position

→ The track markers lower.

Before turning at the end of the field, or before an obstacle:

Pressurise the tractor control unit 1

→ Both track markers are lifted up.



If the wrong track marker lowers when the tractor control unit 1 is put in the float position, switch through the control unit multiple times.

The automatic changeover of implements with ED-CONTROL is only active when the implement has taken up speed in the working position.

10.5 Turning at end of the field

Before turning at the end of the field, lower the blower fan speed far enough that the pressure gauge (Fig. 196/1) shows a value between 35 and 40 mbar.

At this speed, the grains do not fall from the singling discs.



Fig. 196

11 Faults

WARNING



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

- Unintentional falling of the implement raised using the tractor's three-point hydraulic system.
- unintentional lowering of raised, unsecured implement parts.
- Unintentional starting and rolling of the tractor-implement combination.

Secure the tractor and the implement against unintentional start-up and rolling, before you eliminate any faults on the implement. On this subject see section 6.2, Seite 70.

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

11.1 One singling disc stops

Fault:

A shear pin (Fig. 197/1) is damaged. This means that a singling disc does not turn.

Display:

The control terminal (optional) displays the fault.

Fault elimination:

Determine and correct the cause of the fault.

Place a spare shear pin (Fig. 197/1) in the coupling.

Spare shear pins (Fig. 197/2) can be found on all sowing housings.

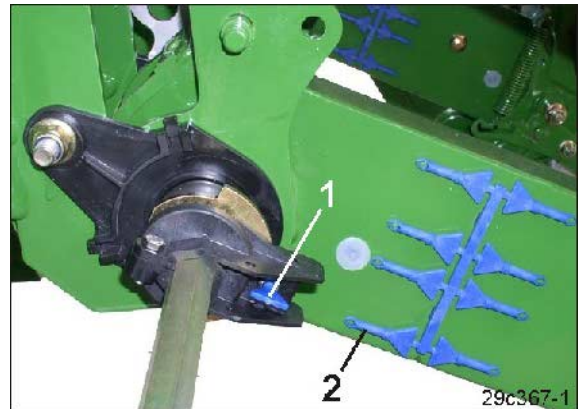


Fig. 197

11.2 Track marker boom shears off

If the track marker hits a solid obstacle, a bolt (Fig. 198/1) shears off and the track marker folds rearwards.

Only use bolts with a strength rating of 8.8 as a replacement (see the online spare parts list).

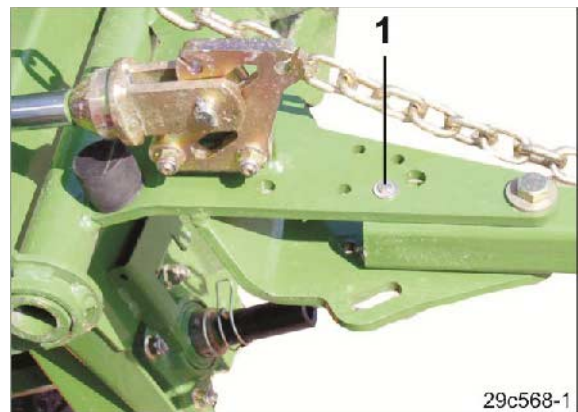


Fig. 198

11.3 Application / calibration fertiliser metering cannot be adjusted

If the fertiliser application amount is significantly less than the set amount, check the setting of the two-range gearbox (Fig. 199). The setting to crawl speed (Fig. 200) results in the speed of the metering units being incorrect.

Pay particular attention to the gearbox setting after an exchange or following maintenance!

- Positioning of the two-range gearbox in the implement.

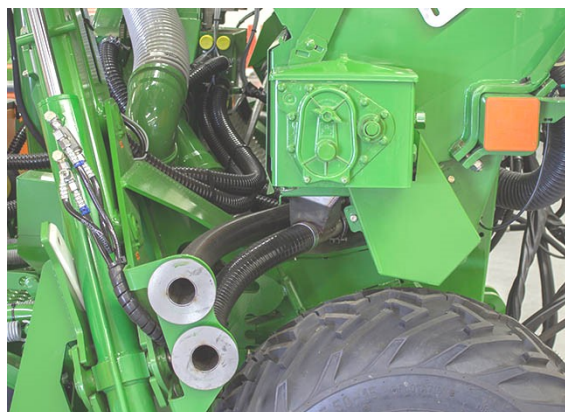


Fig. 199

- Setting in crawl speed (Fig. 200)

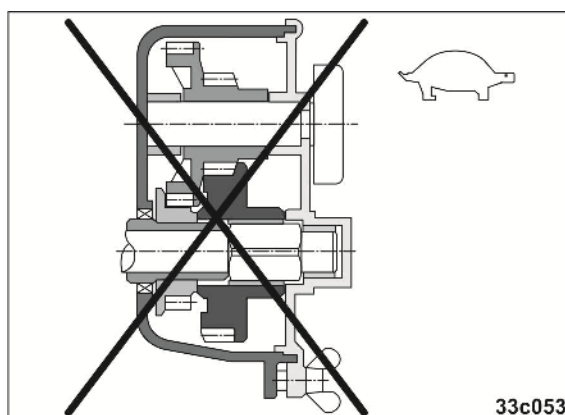


Fig. 200

- Setting in rapid speed (Fig. 201)

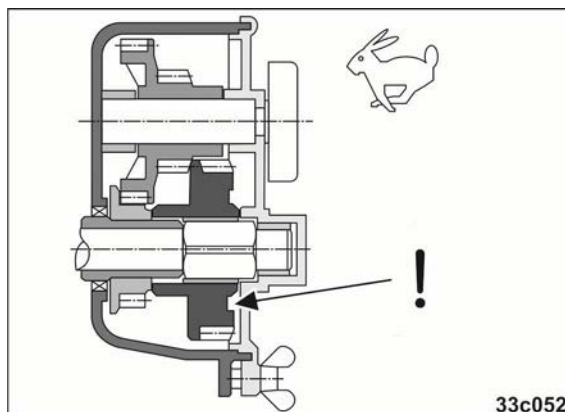


Fig. 201

1. Open the gearbox cover (Fig. 202/1)
(liquid grease lubrication)
2. Pull out the gearwheel on the hexagonal
(Fig. 202/2),
3. Turn the gearwheel around and reinsert it
(Fig. 202/3),
4. Push the gearwheel to the stop on the
shaft (Fig. 202/4),
5. Close the gearbox cover (Fig. 202/1).



Fig. 202

11.4 Seed application amount



The set values are only guide values as the friction of the drive wheels is influenced by the soil characteristics.

Check the tyre pressure before the planting season. Take the values from the table (Fig. 217, section 12.5)

Fault: Application amount larger than the set value.

Error: Friction of the drive wheels affected by the soil characteristics.

Correction: By changing the step of the gearbox it is possible to compensate for this by choosing a narrower transmission range.

11.5 Implement boom locks (ED 452-K)

The implement booms are locked in the working position.
(See Fig. 203/1)

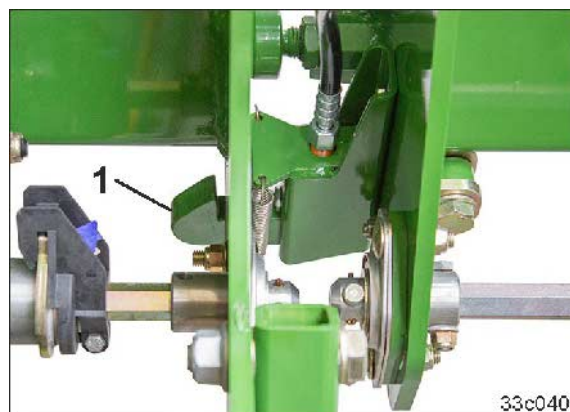


Fig. 203

If the booms do not fold in, check the locks (Fig. 204/1/2).

1. Connect the pressureless return flow,
2. Check the dynamic pressure (less than 10 bar),
3. Check that the lock operates smoothly (Fig. 204/1),
4. Check the oil supply (Fig. 204/2),
5. Check that the unlocking cylinder functions properly (Fig. 204/2).

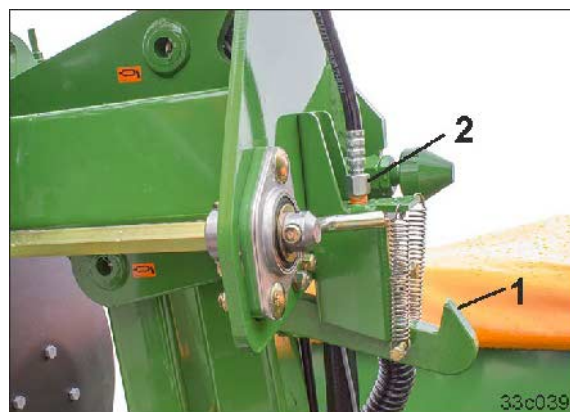


Fig. 204

12 Maintenance, repairs and servicing



WARNING

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

- **Unintentional falling of the implement raised using the tractor's three-point hydraulic system.**
- **unintentional lowering of raised, unsecured implement parts.**
- **Unintentional starting and rolling of the tractor-implement combination.**

Secure the tractor and implement against unintentional starting and unintentional rolling before you perform any cleaning, servicing or maintenance work on the implement, see Seite 70.

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



WARNING

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

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



Danger

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

- Folded out implement booms
- Lowered the implement completely.
- Tractor parking brake applied
- Shut off the tractor engine.
- Removed the ignition key.



When carrying out any maintenance, repair and care work, observe the chapter "Safety advice for the operator", Seite 35.

Thoroughly clean the implement prior to prolonged breaks of operation.



DANGER

All work identified by "authorised workshop" must only be carried out in an authorised workshop.

12.1 Cleaning the implement



DANGER

Dressing dust is toxic and must not be inhaled or come into contact with body parts.

When emptying the seed hopper and the singling device or when removing dressing dust, e.g. with compressed air, wear a protective suit, face mask, safety glasses and gloves.



DANGER

Fully extend or retract the implement before cleaning it.

Never clean the implement with incompletely folded implement booms.



- Monitor brake, air and hydraulic hose lines particularly carefully
- Never treat brake, air and hydraulic hoses with petrol, benzene, petroleum or mineral oils.
- After cleaning, grease the implement, in particular after cleaning with a high pressure cleaner/steam jet or liposoluble agents.
- Observe the legal regulations for handing and disposing of cleaning agents.



What should be observed when cleaning with a high-pressure cleaner / steam cleaner:

- 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 implement.
- Comply with safety regulations when working with high pressure cleaners.
- Completely dispose of fertiliser residue. Fertiliser residues harden up and can damage rotating components on the next use.

1. Empty the implement
 - Seed hopper and sowing housing
(see section "Emptying the seed hopper and sowing housing", Seite 115)
 - 650, 900 and 1100 litre fertiliser hoppers
(see section "Emptying the fertiliser hopper", Seite 144)
 - Front tank fertiliser hopper
(see front tank operating manual).
2. Clean the implement with a jet of water, a high-pressure cleaner or with compressed air.

12.1.1 Clean the suction air blower fan rotor

Dressing dust can be sucked in by the suction air blower, be deposited on the suction air blower fan rotor and cause the air blower to become unbalanced. This can cause the air blower to be destroyed. Clean the suction air blower fan rotor regularly.

Clean the suction air blower fan rotor:

1. Remove the cap of a free suction connection.
2. Apply the tractor parking brake.
3. Switch on the suction blower fan (see section "Blower fan speed", Seite 116).
4. Put on safety glasses.
5. Position a water jet into the free suction connection and remove the deposits with the fan blower running.

**DANGER**

Water will be ejected out of the fan exhaust during cleaning.

Wear safety glasses.

**DANGER**

Do not reach into the open suction connection.

Do not hold the lance of the high-pressure cleaner in the opening of the suction connection.

12.1.2 Cleaning the filling auger



DANGER

Cleaning and maintenance of the filling auger may only be done with the tractor engine switched off and the ignition key removed.

1. Unscrew the nuts (Fig. 205/1).
2. Place a suitable container under the supply tube.
3. Remove the cover (Fig. 205/2).

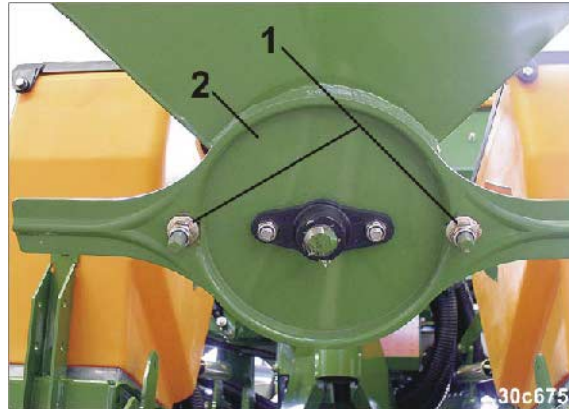


Fig. 205

4. Knock out the fertiliser residue from the supply tube.



Fig. 206

5. For intensive cleaning, unscrew the installation flap (Fig. 207/1).
6. Thoroughly clean the filling auger with a water jet.



Fig. 207

The strut (Fig. 208/1) is used to position the cover deviation tarpaulin of the fertiliser hopper.

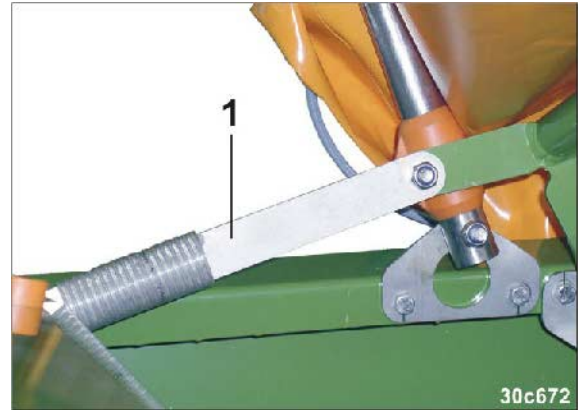


Fig. 208

12.2 Lubrication regulations



DANGER

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



Lubricate the implement in accordance with the specifications of the manufacturer.

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

The lubrication points on the implement are marked with a foil sticker (Fig. 209).

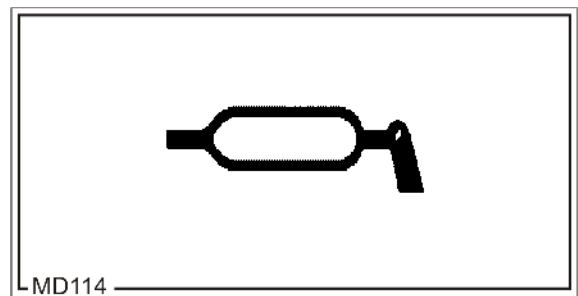


Fig. 209

12.2.1 Lubricants



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

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

12.2.2 Lubrication point overview

Figure	Type	Component	Number of lubrication nipples	Lubrication interval
Fig. 210/1	ED 302 ED 452 ED 452-K	Flange bearing	4	50 h
Fig. 211/1	ED 452-K	Boom	8	50 h
Fig. 212/1	ED 602-K	Boom	8	50 h
Fig. 213/1	ED 602-K	Hydraulic cylinders	2	50 h
Fig. 214/1	ED 602-K	Actuating scissors	1	50 h
Fig. 214/2	ED 602-K	Actuating scissors	1	50 h
Fig. 214/3	ED 602-K	Actuating scissors	1	50 h
Fig. 214/4	ED 602-K	Hydraulic cylinders	1	50 h
Fig. 214/5	ED 602-K	Hydraulic cylinders	1	50 h



Fig. 210



Fig. 211



Fig. 212



Fig. 213



Fig. 214

PTO shaft lubricating points:

Based on the maintenance plan (Fig. 215)

- Lubricate all PTO shafts
- Grease the protective tubes and profile tubes.

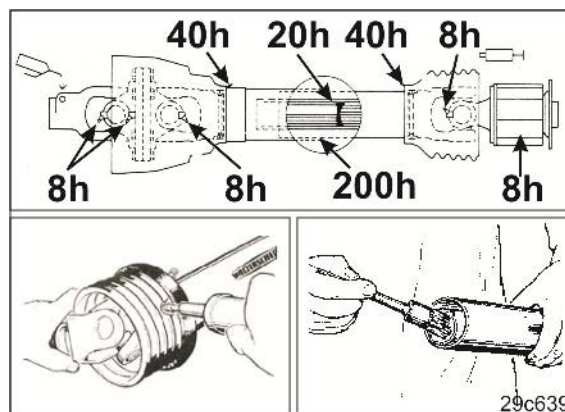


Fig. 215

12.3 Maintenance and care schedule – overview



- Carry out maintenance work when the first interval is reached.
- The times, continuous services or maintenance intervals of any third party documentation shall have priority.
- Front tank maintenance intervals, see front tank operating manual.

Before commissioning	Specialist workshop	Check and service the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.6.1
		Check tyre inflation pressure.	Section 12.5
		Check the oil level in the setting gearbox (650, 900 & 1100 l fertiliser hoppers).	Section 12.6
After the first 10 operating hours	Specialist workshop	Check the wheel bolt tightening torques	Section 12.4
	Specialist workshop	Check and service the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.6.1
	Specialist workshop	Check the v-belt in the fan blower belt drive	Section 12.7
	Specialist workshop	Roller chain maintenance	Section 12.8
		Check that the fastening nuts on the seed unit are tight	Section 8.1
		Check that the fastening nuts on the fertiliser coulters are tight	Section 8.19
10 operating hours after a wheel change	Specialist workshop	Check the wheel bolt tightening torques	Section 12.4
Daily at the end of work		Cleaning	Section 12.1

Every week, at least every 50 operating hours	Specialist workshop	Check and service the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.6.1
		Roller chain maintenance	Section 12.8
Every 2 weeks, at least every 100 operating hours		Check tyre inflation pressure.	Section 12.5
		Check the oil level in the setting gearbox (650, 900 & 1100 l fertiliser hoppers).	Section 12.6
		Check / exchange the seeding coulter tips	Section 12.10
		Check / replace towed fertiliser coulter tips	Section 12.11
Every 6 months before the planting season	Specialist workshop	Check and service the hydraulic hose lines. The inspection is to be recorded by the operator.	Section 12.6.1
Every 6 months after the planting season	Specialist workshop	Check the v-belt in the fan blower belt drive	Section 12.7
		Check the sowing units	Section 12.9

12.4 Wheel bolt tightening torques

Tyres	Wheel bolt tightening torques
Tyres 10.0/75-15	350 Nm
Tyres 31 x 15.5/15 (Terra)	350 Nm

Fig. 216

12.5 Tyre inflation pressure

Tyres	Tyre inflation pressure
Tyres 10.0/75-15	2.5 bar
Tyres 31 x 15.5/15 (Terra)	2.5 bar

Fig. 217

12.6 Check the oil level in the setting gearbox (650, 900 and 1100 l fertiliser hoppers)

There is no need to change the oil.

Check the oil level in the setting gearbox:

1. Position the implement on a horizontal surface.
- The oil level should be visible in the oil sight glass (Fig. 218/1).
2. To fill up the gearbox oil (see table: Fig. 219), loosen bolt (Fig. 218/2) and remove the gearbox cover (Fig. 218/3).

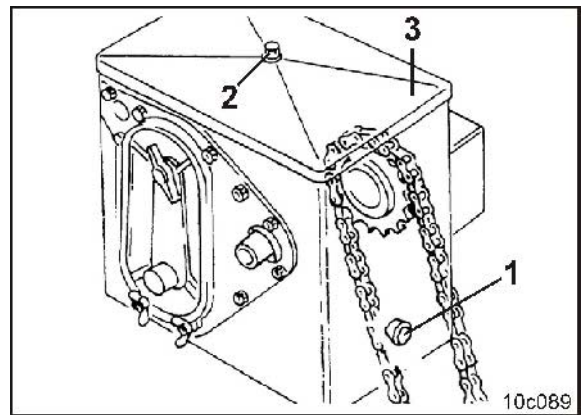


Fig. 218

Total filling quantity:	1.8 litres
Gear oil (selectable):	Wintershall Wintal UG22 WTL-HM (from factory)
	Fuchs Renolin MR5 VG22

Fig. 219

12.6.1 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!
- Depressurize 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 implements, 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. This period includes any storage time of a maximum of 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 connections made from thermoplastics, other guide values may be decisive.
- 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.

12.6.1.1 Labelling hydraulic hose lines

Valve chest identification provides the following information:

Fig. 220/...

- (1) Manufacturer's marking on the hydraulic hose line (A1HF)
- (2) Date of manufacture of the hydraulic hose line (08/02 = Year / Month = February 2008)
- (3) Maximum approved operating pressure (210 BAR).

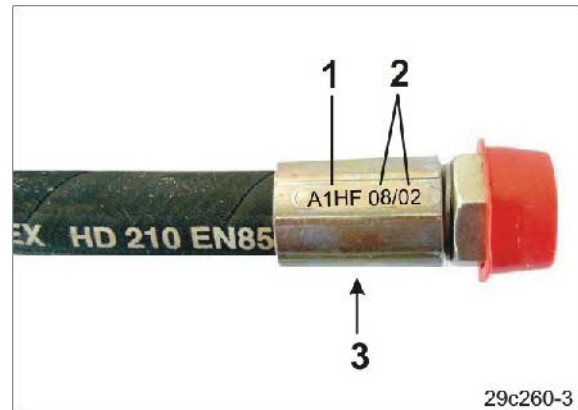


Fig. 220

12.6.1.2 Maintenance intervals

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

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

Before each start-up:

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

12.6.1.3 Inspection criteria for hydraulic hose lines



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

Replace hoses if the respective hose fulfils at least one of the following criteria:

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

- Installation requirements not complied with.
- Life span of 6 years has been exceeded.

The date of manufacture of the hydraulic hose line on the assembly is decisive for determining these six years. If the date of manufacture on the assembly is "2008", then the hose should not be used beyond February 2014. See also "Labelling of hydraulic hose lines".

12.6.1.4 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 lines so that, in all states of operation:
 - There is no tension, apart from the hose's own weight.
 - There is no possibility of jolting on 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!

12.7 Check the V-belt in the fan blower belt drive (specialist workshop)

Check the V-belt in the fan blower belt drive (specialist workshop):

1. Change the V-belt (Fig. 221/1) if
 - o Damaged
 - o Fraying
 - o Laterally cracked
 - o Rib break.

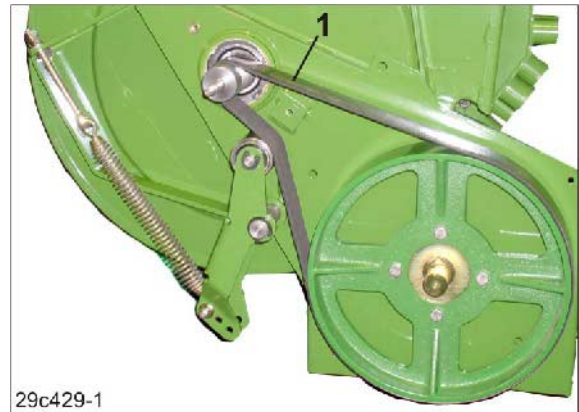


Fig. 221

12.8 Roller chains and chain cogs

On all roller chains, at the end of the planting season

1. Cleaning (including the chain cogs and the chain tensioner).
2. Condition checked.

Please observe the following points when lubricating the chains:

- Lubricate the chain links, especially in the area of deflection.
- Do not apply extra "top-up" lubrication to the chain with tough lubricants since the joints are "sealed" against re-lubrication and dirt particles increasingly accumulate on the chain.
- If possible, release the tension on the chain during the lubrication and move it in the links.
- Lubricate in doses, do not allow large quantities of the lubricant to drop from the chain.
- Clean the soiled chain with diesel, petrol or cleaning spirit using a brush.
- Use low-viscosity oils for the relubrication (SAE10 or SAE15).
- Do not use high-pressure cleaners.



12.9 Check the sowing units

Check the following functional parts and replace if needed:

1. Singling disc (Fig. 222/1).
2. PE foam profile sealing (Fig. 222/2).
3. Suction cover and suction system interior (Fig. 222/3).

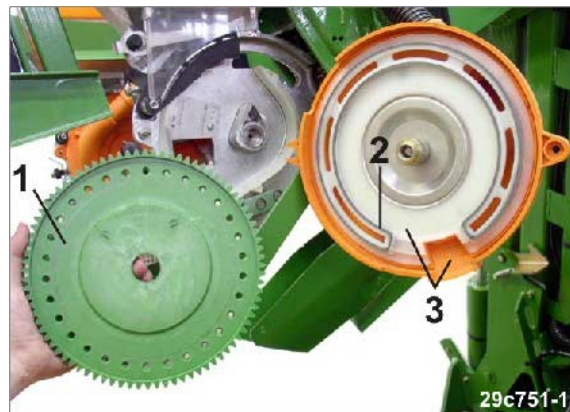


Fig. 222

4. Sowing housing seal (Fig. 223/1).
5. Ejector tip (Fig. 223/2).



Fig. 223

12.10 Check / exchange the seeding coulters tips

The seeding coulters tips form the furrow and are subject to natural wear.

Exchange the seeding coulters tips:

1. Lift up the implement and support with suitable supports.
2. Disengage the tractor universal joint shaft, engage the tractor parking brake, shut off the tractor engine and remove the ignition key.
3. Loosen the nuts (Fig. 224/2) and swivel the seeding coulters (Fig. 224/1) downwards.

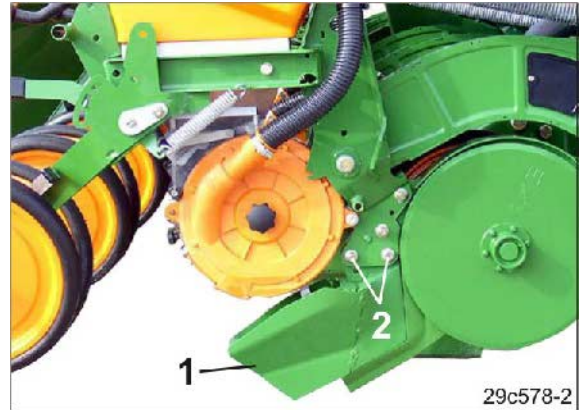


Fig. 224

Classic seeding coulters tip:

4. Loosen the nuts (Fig. 225/2) and exchange the seeding coulters tip (Fig. 225/1).

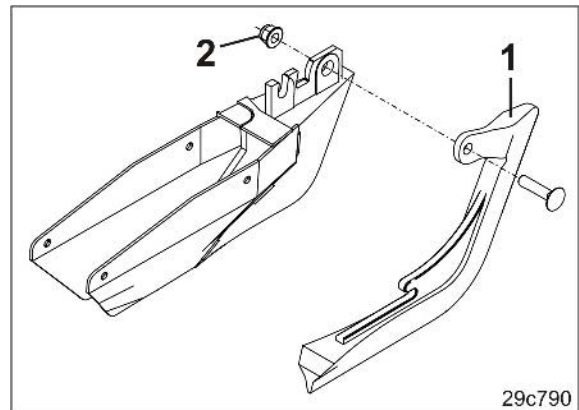


Fig. 225

Contour seeding coulters tip (maize or beet/turnips):

4. Loosen the nuts (Fig. 226/2) and exchange the contour seeding coulters tip (Fig. 226/1).

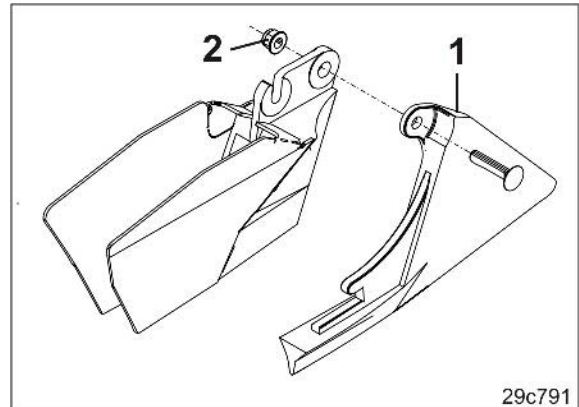


Fig. 226

12.11 Check / exchange the towed fertiliser coulters tips

The towed fertiliser coulters tips form the furrow and are subject to natural wear.

Exchanging the towed fertiliser coulters tips:

1. Lift up the implement and support with suitable supports.
2. Apply the hand brake, switch off the tractor engine, and remove the ignition key.
3. Loosen the nut (Fig. 227/2) and exchange the towed fertiliser coulters tip (Fig. 227/1).

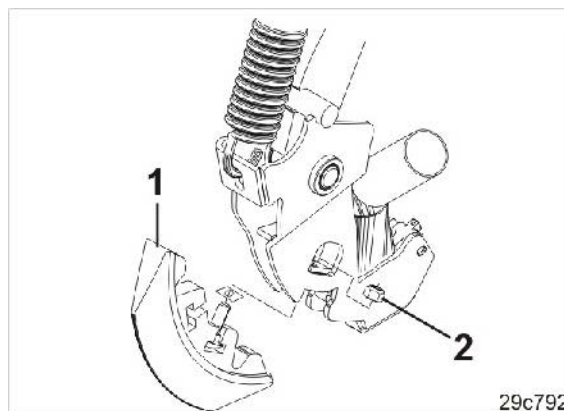
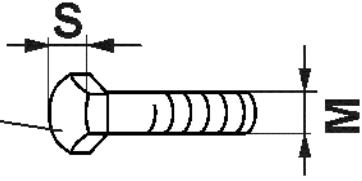
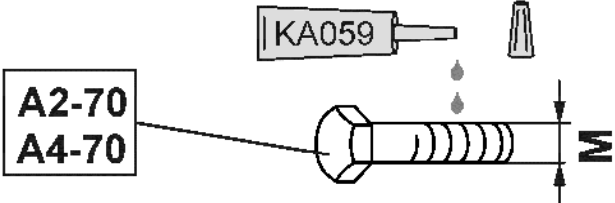



Fig. 227

12.12 Screw tightening torques

<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> 8.8 10.9 12.9 </div>  </div>				
M	S	Nm		
		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

												
M	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
 Nm	2.3	4.6	7.9	19.3	39	66	106	162	232	326	247	314



tightening torques for the wheel bolts (see section "Wheel bolt tightening torques", Seite 182).

13 Hydraulic diagram

13.1 Profi control ED

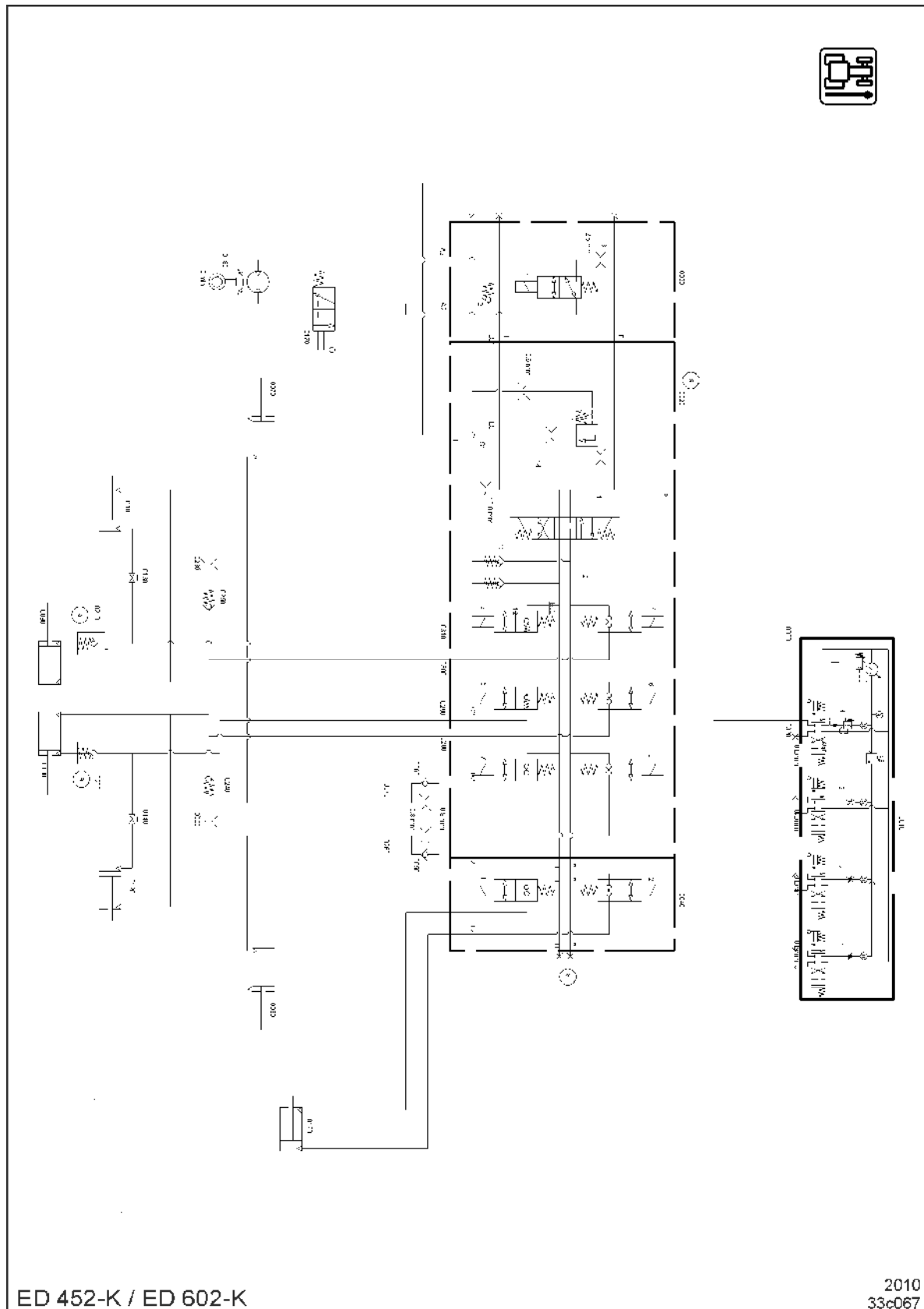


Fig. 228

13.2 Hydraulic diagram - legend

Fig. 228/...	Designation	Note
0010	Tractor hydraulics	
0020	Control block ED	
0030	Control block auger	
0040	Control block supplemental function	
0050	Throttle check valve, left track marker	
0060	Throttle check valve, right track marker	
0070	Left track marker	
0080	Right track marker	
0090	Left boom	
0100	Right boom	
0110	Left track width	
0120	Right track width	
0130	Left track width lock	
0140	Right track width lock	
0170	Ball valve, augur control	
0180	Augur motor	
0190	Star wheel excavation	
0200	Right holding valve	
0210	Left holding valve	
0220	Flap throttle, right track marker	
0230	Flap throttle, left track marker	
0240	Folding, right track marker	
0250	Folding left track marker	
0260	1 cable ties, yellow	
0270	2 cable ties, yellow	
0280	1 cable ties, blue	
0290	1 cable ties, blue	
0300	2 cable tie, green	
0310	1 cable tie, green	
0320	1 cable tie, red	
0330	2 cable tie, red	

All position specifications in direction of travel



Space for your notes:

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