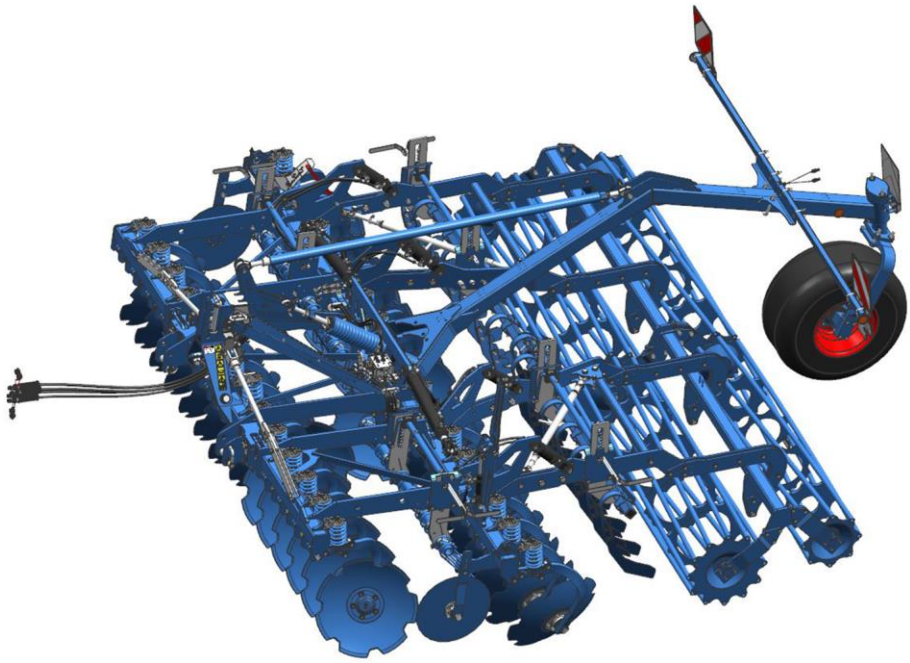
Operating Instructions

Compact Disc Harrow

Rubin 10 U



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Item no. 17512391
01/09.21

LEMKEN GmbH & Co. KG

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Dear customer,

Thank you for the trust you have placed in us by purchasing this device. The device can only be used to its full advantage when operated and used properly. When the device was delivered, you will already have been instructed in operation, adjustment and maintenance by your dealer. However, this brief instruction is not a substitute for thorough study of the operating instructions.

These operating instructions will help to familiarise you with the LEMKEN GmbH & Co. KG device and the options available for using it.

The operating instructions contain important information about how to operate the device safely, properly and efficiently. Following the instructions will help to prevent hazards, faults and down times and will increase reliability and service life. Read the operating instructions carefully and attentively before commissioning.

Make sure that the operating instructions are always available at the location where the device is used.

The operating instructions must be read and followed by anyone who is involved in carrying out the following work:

- Coupling and uncoupling
- Adjustments
- Operation
- Maintenance and repairs
- Troubleshooting, and
- Final shutdown and disposal.

Spare parts ordering

This device is supplied with a specification listing all assemblies that are relevant for the product. The spare parts list valid for your device includes both those assemblies relevant to you and those that are not intended for your device. Make sure that you only order spare parts that belong to the assemblies that can be found on your specification or the enclosed print out. When ordering spare parts, state the type designation and serial number of the device. This information can be found on the type plate. Enter this data in the fields below so that it is always to hand.

Type designation:	
Serial number:	

Remember that you should only use genuine LEMKEN spare parts. Reproduction parts have a negative influence on the function of the device, have a shorter service life and present risks and hazards that cannot be estimated by LEMKEN GmbH & Co. KG. They also increase the maintenance costs.

Service and spare parts

Information on service and spare parts is available from your local dealer or our website at www.lemken.com.

CONTENTS

1 GENERAL INFORMATION

1.1 Liability

The "Standard Terms and Conditions of Sales and Delivery" of LEMKEN GmbH & Co. KG, in particular Section IX, shall apply. Liability. In line with the dimensions cited in these conditions the LEMKEN GmbH & Co. KG shall not be held liable for any personal or material damage, when such damage is caused by one or more of the following reasons:

- improper use of the device, see also section entitled "Intended use",
- non-compliance with the operating instructions and the enclosed safety instructions,
- unauthorised changes to the device,
- inadequate monitoring of parts which are subject to wear,
- maintenance work that has not been conducted properly or in good time,
- the use of spare parts that are not original LEMKEN GmbH & Co. KG spare parts,
- accidents or damage through outside influences or force majeure

1.2 Guarantee

The "Standard Terms and Conditions of Sales and Delivery" of LEMKEN GmbH & Co. KG shall apply at all times.

The guarantee period shall be one year from the date of receipt of the implement. We shall rectify any implement faults in accordance with the LEMKEN guarantee guidelines.

1.3 Copyright

These operating instructions represent a document in terms of the law on unfair competition.

Copyright is retained by

LEMKEN GmbH & Co. KG

Weseler Strasse 5

D-46519 Alpen, Germany

These operating instructions are intended to be used by the user of the implement. They contain texts and drawings which must not be

- reproduced,
- divulged or
- communicated in any other way in whole or in part without the express permission of the manufacturer.

Infringements will result in a claim for damages.

1.4 Optional accessories

LEMKEN implements may be equipped with various accessories. The operating instructions below describe both series components and optional accessories.

Please note: These accessories will vary depending on the type of equipment.

1.5 Type plate

The implement is marked with a type plate.

The type plate is located at the front right of the implement.

The operating instructions can apply to various implement types or implement equipment.

In the operating instructions, contents are marked that are only valid for a certain implement type or certain implement equipment.

Use the type plate to determine the implement type and the implement equipment.

Design of the type plate

Figure: Sample of a type plate (standard)

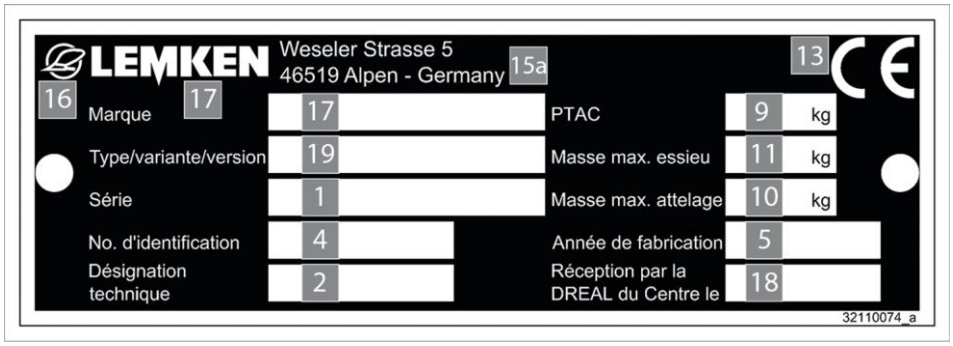


Figure: Sample of a type plate, only France

1 Series

2 Type designation

3 Model year

4 Serial number

5 Year of manufacture

6 Vehicle class, subclass, speed index

7 EU type approval number

8 Vehicle identification number. The vehicle identification number is also engraved in the frame near the type plate.

9 Permitted gross weight [kg]*

10 Permissible drawbar load [kg] (axle 0)

11 Permissible axle load [kg] (axle 1)

12 Permissible axle load [kg] (axle 2)

13 CE label

14 EAC label

15 Company name and address of the manufacturer

15a Address of the manufacturer

16 Company logo

17 Manufacturer

18 Date of homologation

19 Type / Equipment / Version

*For implements with an EU type-approval number, the permissible gross weight is equal to the sum of the permissible axle loads.

2 SYMBOLS USED IN THE OPERATING INSTRUCTIONS

2.1 Hazard classes

The following symbols are used in the Operating Instructions for particularly important information:

DANGER

Denotes an imminent hazard with high risk, which will result in death or severe physical injury, if not avoided.

WARNING

Denotes a possible hazard with medium risk, which could result in death or severe physical injury, if not avoided.

CAUTION

Denotes a low-risk hazard, which could cause light or medium physical injury or property damage, if not avoided.

2.2 Information

Denotes special user tips and other particularly useful or important information for operation and efficient utilisation.

2.3 Environmental protection

Indication of special recycling and environmental protection measures.

2.4 Indication of passages

The following symbols are used for particular passages in the operating instructions:

– Indicates work steps

- Indicates enumerations

3 SAFETY MEASURES AND PRECAUTIONS

General safety instructions for the operator are specified in the chapter entitled «Safety measures and precautions». At the start of some main chapters the safety instructions, which refer to all work to be carried out in this chapter, are listed together. Each safety-relevant work step includes other safety instructions specific to the work step.

3.1 Target group

These operating instructions are restricted exclusively to the use of the device by trained technicians and instructed persons.

3.2 Intended use

The implement is manufactured in accordance with state-of-the-art standards and the recognised safety-related rules. However, the use of the implement may result in a risk to life and limb of the user or third parties, or cause damage to the implement and other material property. The implement may be operated in a technically perfect condition only, in accordance with its designated use and by safety-conscious persons in compliance with the operating instructions.

Intended use also includes:

- compliance with the operating instructions and implementation of the work steps indicated in the operating instructions,
- compliance with the safety and warning signs on the implement,
- observance of the power limits of the tractor and implement,
- observance of all maintenance specifications and additional checks,
- the use of original spare parts,
- the use of the listed auxiliary and operating materials as well as their environmentally friendly disposal.

Safe operation is not guaranteed unless all instructions, settings and power limits applicable to the implement are observed.

The implement has been designed solely for conventional agricultural usage.

The implement must not be used immediately after self-propelled vehicle for slurry spreading, which exceeds the LEMKEN-specified output limits for tractors (cf. LEMKEN price list) and which are equipped with a three-point linkage, which

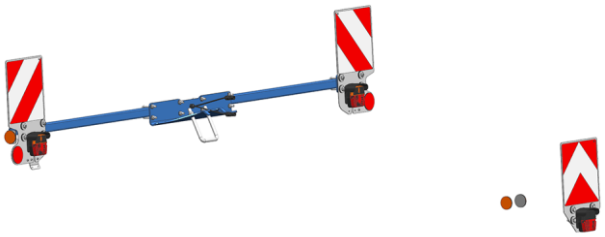
- is double-acting,
- does not exhibit any float position and
- is insufficiently mobile at the side.

See also Chapter 1 "General Information", Section 1.1 "Liability".

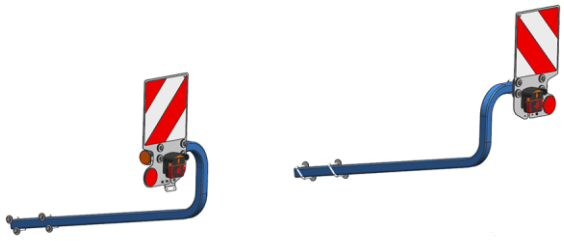
3.3 Safety features of the device

To protect the operator and the device, the device is equipped with special safety features in accordance with country specific requirements.

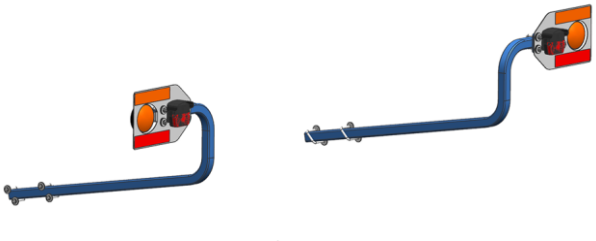
– Always keep all safety devices in working order.



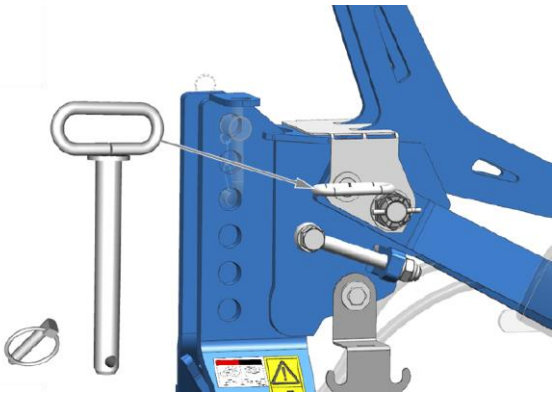
Lighting and warning boards Europe – implements with depth and transport wheel



Lighting and warning boards EU – implements without depth and transport wheel



Lighting and warning boards outside Europe



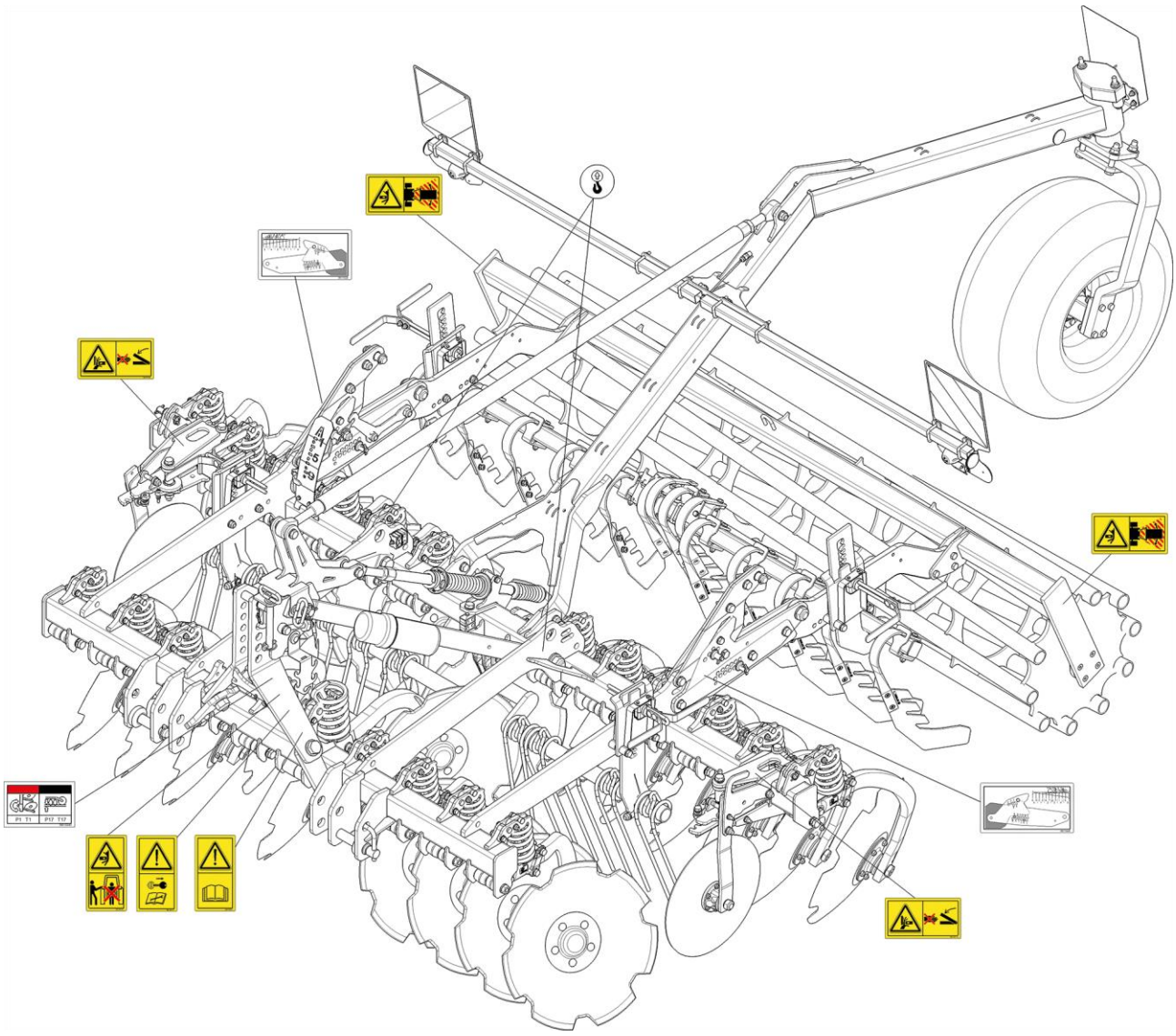
Pins for securing the depth and transport wheel

3.4 Safety and warning signs

3.4.1 General information

The implement features all equipment which ensures safe operation. If hazardous areas could not be completely secured with respect to operational safety, warning signs are affixed which indicate these residual risks. Damaged, lost or illegible warning signs must be replaced immediately.

3.4.2 Position of safety and warning stickers



3.4.3 Meaning of warning signs

– Please familiarise yourself with the meaning of the warning signs.

The following explanations provide detailed information.

Please read and observe the operating instructions and safety instructions before starting up the implement for the first time.

Art. 39010147

Before carrying out maintenance or repair work, switch off the engine and remove key.

Art. 39010146

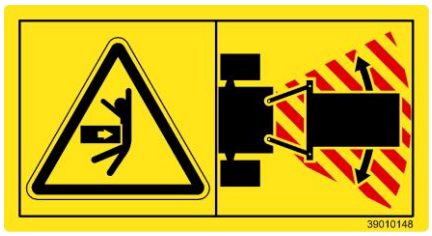
Area between tractor and implement

A running tractor may cause or initiate unintentional movements. This will result in death or serious injuries.

When the tractor is running:

– Do not remain in the area between the tractor and implement.

Article no. 39010145



Do not remain in the operating and swivel area of the implement.

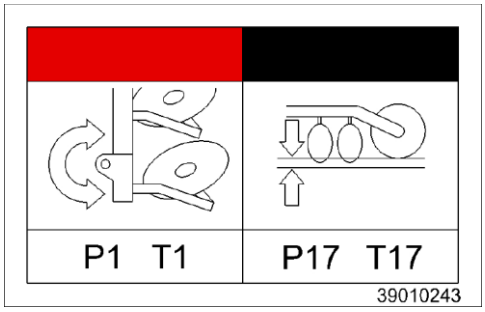
Art. 39010148

Crushing hazard

3.4.4 Meaning of other symbols.

Sling points

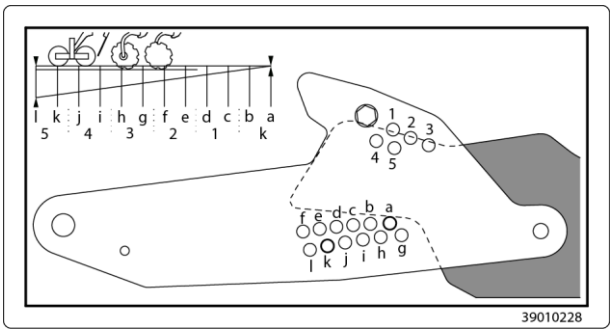
Connection overview of hydraulic hoses



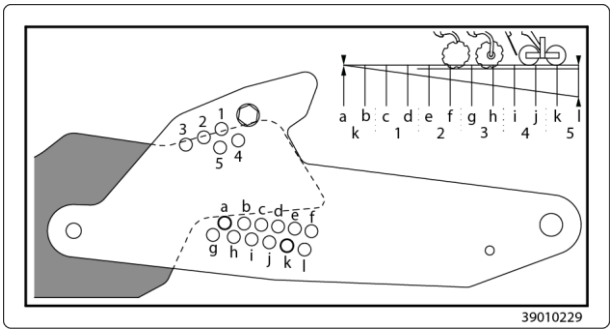
P1 / T1 Hydraulic folding of the outer concave discs

P17 / T17 Hydraulic working depth adjustment

Item no. 39010243



Mechanical depth adjustment, right



Mechanical depth adjustment, left

3.5 Special safety instructions

Risk of injury due to non-observance of the currently valid occupational safety guidelines

WARNING

If the currently valid occupational safety guidelines are bypassed or safety equipment is rendered unusable when handling the device, there is a risk of injury.

- The operator must personally monitor all work on and with the device.
- The operator instructs his personnel in occupational safety according to the currently valid occupational safety guidelines.

Risk of injury due to foreign objects ejected at high speed

WARNING

During work there is a risk of injury to the face and body by lumps of earth, soil constituents or stones ejected at high speed.

- During work there must be nobody directly in front of, behind or next to the device.
- During work nobody must accompany the device.

Risk of injury when freeing casualties

WARNING

When rescuing people trapped or injured by the device, there is a risk of additional serious injury to the casualty if the hydraulic connections were not connected according to their colour coding as described in the section entitled "Required hydraulic equipment". As a result, functions may run in the opposite direction or may be inverted.

– Before actuating the hydraulics, check that the hydraulic connections of the device are connected to the tractor according to the colour coding.

If there is no identification on the tractor and on the device or if the connections are not connected to the tractor according to their identification, it may not be possible to free the person safely.

If in doubt, leave casualties to be freed by specially trained rescue personnel.

3.6 Danger areas

3.6.1 Danger areas during implement operation

Moving danger area

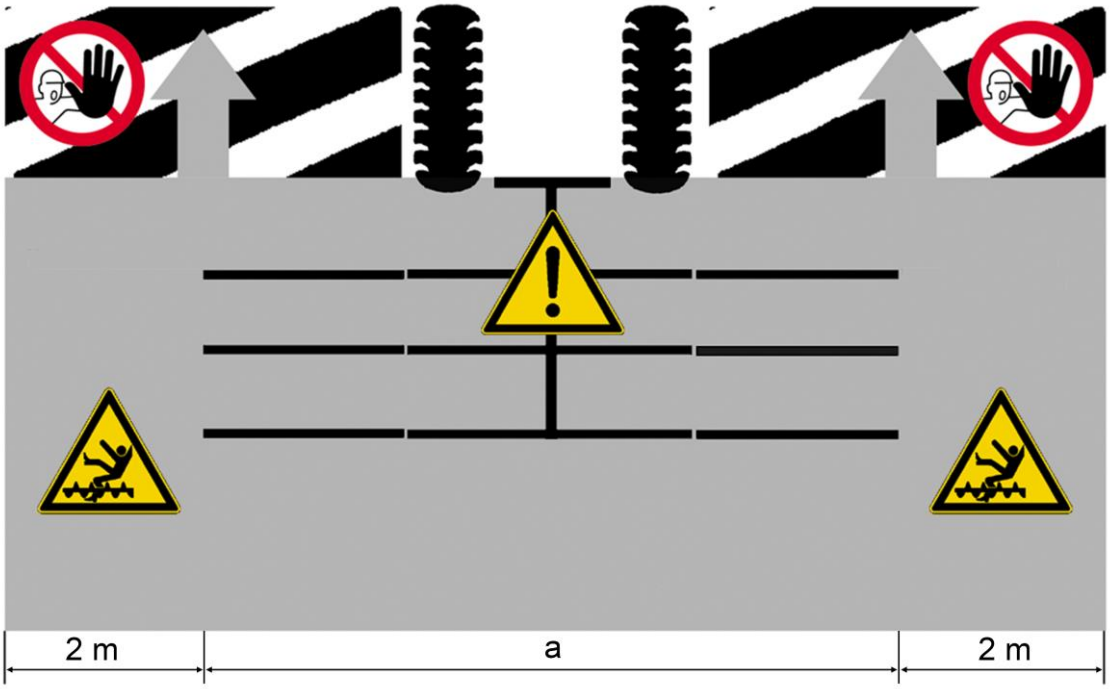
WARNING

The danger area around the implement moves with the implement during operation. The danger area includes the area extending across the entire width (a) of the implement in the direction of travel. Allow an additional 2 m safety distance from the implement on each side.

– Pay attention to the entire danger area while the implement is moving in the field. Stop if necessary.

– Never get off the tractor while it is moving.

– Never allow anyone else to get on or off the tractor while it is moving.



3.7 Residual risks

Residual risks are particular hazards which occur when handling the device and which cannot be eliminated despite a design in accordance with safety requirements.

Residual risks are not usually obvious and may be the source of a potential injury or health hazard.

3.7.1 Hazard caused by mechanical systems

There is a risk of accidents due to crushing, cutting and striking body parts

- on abruptly moving machine parts,
- on moving machine parts caused by stored mechanical energy in elastic parts, such as springs,
- on an inadequately stable device,
- on the general shape or mounting location of components.

WARNING

Risk of accidents due to freely rotating rollers

If you climb onto freely rotating rollers, there is a risk of crushing or trapping the feet and legs between freely rotating rollers and fixed parts of the implement.

– Never climb onto freely rotating rollers.

WARNING

Risk of accidents due to energy stored in the spring elements

The spring elements are under high pressure. Inappropriate assembly or disassembly can result in the sudden release of stored mechanical energy. This can cause severe injury or even death.

– Do not assemble or disassemble the spring elements. The spring elements are maintenance-free.

– All works on the spring elements require special tools.

– Disassembly and disposal must be carried out by a specialist workshop.

3.7.2 Hazards of hydraulic systems

There is a risk of burn injuries and contamination with hydraulic oil, particularly of the face, eyes and unprotected skin:

- when hot/pressurised hydraulic oil escapes from leaking connections or hoses
- when pressurised hoses or components burst
- due to skin contact

Wear personal protective equipment!

3.7.3 Hazard during operation

During operation there is a risk of injury, particularly to the face, from ejected stones and lumps of earth.

3.8 Applicable rules and regulations

The applicable rules which must be observed during operation of the device are listed below:

- Observe the currently valid national highway code!
- Observe the currently valid national laws and regulations for occupational safety.
- Observe the currently valid national laws and regulations for operational safety.

3.9 Operation on public highways

3.9.1 Lighting system and identification

A proper lighting system, identification and equipment must be on the device if it is to be transported on public roads. Further information can be requested from the appropriate authorities.

3.9.2 Requirements of the tractor

– Ensure that the tractor with mounted device always reaches the stipulated braking deceleration.

Observe the permitted axle loads, gross weights and transportation dimensions, see also section entitled "Axle loads"!

Observe the permitted power limit of the tractor!

WARNING

Risk of accidents due to inadequate steerability

A tractor which is too small or which has inadequate front ballast cannot be manoeuvred safely or steered with adequate tracking stability. As a result, the driver or other road users may be injured or killed.

– Only use a tractor which can be adequately ballasted and safely manoeuvred.

– Ensure that the front axle of the tractor is always loaded with at least 20% of the net weight of the tractor. See section on "Axle loads".

3.9.3 Axle loads

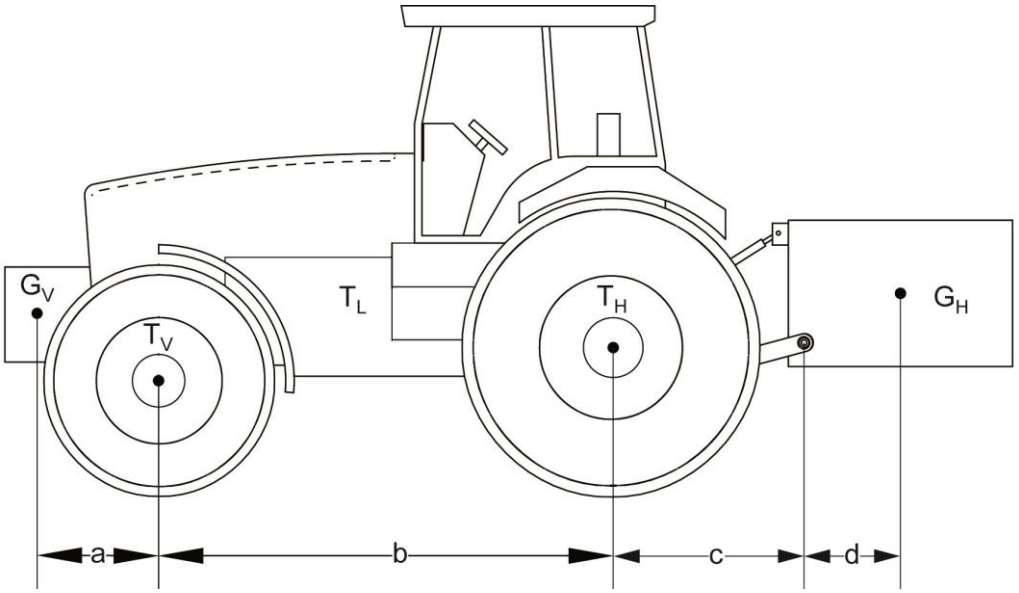
Implements mounted to the front and rear three-point linkage must not result in the following being exceeded:

- permissible gross weight of tractor,
- permissible axle loads of tractor,
- the tractor's tyre load-carrying capacities.

The tractor's front axle must always be loaded with at least 20 % of the tractor's curb weight.

The following data are required for the calculation:

- from the tractor operating instructions,
- from the implement operating instructions,
- which are to be documented through remeasuring.



Data from tractor operating instructions

– Take the following data from your tractor's operating instructions:

Abbreviation		Data
T_L	Tractor kerb weight (kg)	_____ kg
T_V	Front axle load (kg) of empty tractor	_____ kg
T_H	Rear axle load (kg) of empty tractor	_____ kg

Data from implement operating instructions

– Take the following data from these operating instructions or from the documents for the front weight or rear weight:

Abbreviation		Data
G_H	Gross weight (kg) for rear mounting implement or rear weight	_____ kg
G_V	Gross weight (kg) for front mounting implement or front weight	_____ kg
d	Distance (m) between centre of lower control link ball and centre of gravity for rear mounting implement or rear weight	_____ m

Data to be determined through remeasuring are

– Determine the following data through remeasuring:

Abbreviation		Data
a	Distance (m) between centre of gravity for front mounting implement or front weight and centre of front axle	_____ m
b	Tractor wheelbase (m)	_____ m
c	Distance (m) between centre of rear axle and centre of lower control link	_____ m

Calculation of minimum ballasting value at front $G_{V\ min}$ for rear mounting implement

$$G_{V\ min} = \frac{G_H \times (c + d) - T_V \times b + (0.2 \times T_L \times b)}{a + b}$$

– Enter the calculated minimum ballasting value, as required at the front of the tractor, into the table.

Calculation of minimum ballasting value at rear $G_{H\ min}$ for front mounting implement

$$G_{H\ min} = \frac{G_V \times a - T_H \times b + (0.45 \times T_L \times b)}{b + c + d}$$

– Enter the calculated minimum ballasting value, as required at the rear of the tractor, into the table.

Calculation of actual gross weight G_{tat}

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

– Enter the value for the calculated actual gross weight and the permissible gross weight as given in the tractor's operating instructions into the table.

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

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

– Enter the value for the calculated actual front axle load and the permissible front axle load as given in the tractor's operating instructions into the table.

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

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

– Enter the value for the calculated actual rear axle load and the permissible rear axle load as given in the tractor's operating instructions into the table.

Tyre load-carrying capacity

– Enter double the value (for two tyres) for the permissible tyre load-carrying capacity (see, e.g. tyre manufacturer's documentation) into the table.

Table	Actual value according to calculation			Permissible value according to tractor operating instructions			Double permissible tyre load-carrying capacity [two tyres]	
Minimum ballasting, front	$\mathbf{G_{V\ min}}$	kg		-			-	
Minimum ballasting, rear	$\mathbf{G_{H\ min}}$	kg		-			-	
Gross weight	$\mathbf{G_{tat}}$	kg	≤	$\mathbf{T_L}$	kg		-	
Front axle load	$\mathbf{T_{V\ tat}}$	kg	≤	$\mathbf{T_V}$	kg	≤		kg
Rear axle load	$\mathbf{T_{H\ tat}}$	kg	≤	$\mathbf{T_H}$	kg	≤		kg

Supplement for implements with depth and transport wheel:

When the depth and transport wheel is lowered, the front axle of the tractor must always be loaded with at least **25%** of the tare weight of the tractor. This safety margin ensures sufficient front axle load and steerability when the depth and transport wheel briefly looses contact with the road.

3.9.4 Check before departure

– Before driving with the implement raised, lock the control lever of the control unit; otherwise it may drop and the implement may be unintentionally lowered.

– Mount and check the transport equipment such as the lighting system, warning signs and protective devices.

The actuating cables for the quick-release couplings of the tractor must hang loose and must not actuate themselves in any position.

– Before starting up and operating the implement, check the immediate vicinity around it. No-one must be standing in this area!

– Ensure that visibility is adequate.

Observe permitted axle loads, total weights and transportation dimensions.

3.9.5 Correct behaviour in road traffic

– When driving on public highways, observe the relevant statutory national regulations.

Driving behaviour, steering and braking performance are influenced by ballast weights.

– Ensure that the tractor has adequate steering and braking performance.

– When driving around corners, take into account the wide radius and the inertia of the device.

It is prohibited to transport people on the device.

3.10 Obligation of the operator

– Before switching on the device, read the operating instructions.

– Follow the safety instructions!

– Wear appropriate protective clothing when carrying out any work on the device. Protective clothing must be tight-fitting!

– Observe generally accepted and other obligatory regulations for the prevention of accidents and protection of the environment and add them to the operating instructions!

The operating instructions are an important component of the device.

- Ensure that the operating instructions are always ready available at the installation location of the device and are kept for the entire service life of the device.
- If the device is sold or the operating company changes, pass on the operating instructions with the device!
- Keep all safety instructions and danger warnings on the device in a completely legible state. The affixed safety and warning signs provide important information on safe operation. Comply with them to ensure your safety!
- Do not alter, retrofit or modify the device, potentially impairing safety, without the approval of the manufacturer. The manufacturer is not liable for any damage resulting from arbitrary modifications to the device!
- Operate the device only in compliance with all connection and default values provided by the manufacturer!
- Use original spare parts only!

3.11 Safe use of the implement

3.11.1 General

- Before starting work, familiarise yourself with all the equipment and controls and how they work.
- Do not operate the implement unless all the safety guards are in place and correctly positioned. For field work: remove safety guards that are designed for transport only.
- Always attach the implement correctly and only attach it to the equipment provided for that purpose.
- Always take great care when attaching the implement to and detaching it from the tractor.

There is a risk of injury due to crush and shear points in the area around the three-point linkage.

- Before attaching or detaching the implement to/from the three-point linkage, move the control device to the position where the implement cannot be raised or lowered accidentally.

– Do not stand between the tractor and implement when operating the external controls for the three-point linkage.

Do not stand in the danger area around the implement or climb onto the implement during operation.

There is a risk of injury in the wider operating area around the implement, e.g. from flying stones.

– Before operating the hydraulic equipment, ensure that nobody is standing in the danger area. There is a risk of crushing and shearing from power-operated components.

– Do not stand between the tractor and the implement. This is only permitted when the tractor is secured by the parking brake and wheel chocks to prevent it from rolling away.

– Always keep the implement clean to avoid the risk of fire.

– Lower the implement onto the ground before leaving the tractor.

– Switch off the engine.

– Remove the ignition key.

3.11.2 Personnel selection and qualifications

- The tractor driver must have the appropriate driving licence.
- All work on the implement must be carried out by properly trained and instructed personnel. The personnel must not be under the influence of drugs, alcohol or medication.
- All maintenance and servicing work must be carried out by trained technicians or persons who have received appropriate instruction.
- All work on electrical components must be carried out by an electrician in accordance with the electrical safety regulations.

4 HANDING OVER THE IMPLEMENT

– As soon as the implement is delivered, ensure that it corresponds with the order package.

– Also check the type and completeness of any supplied accessories.

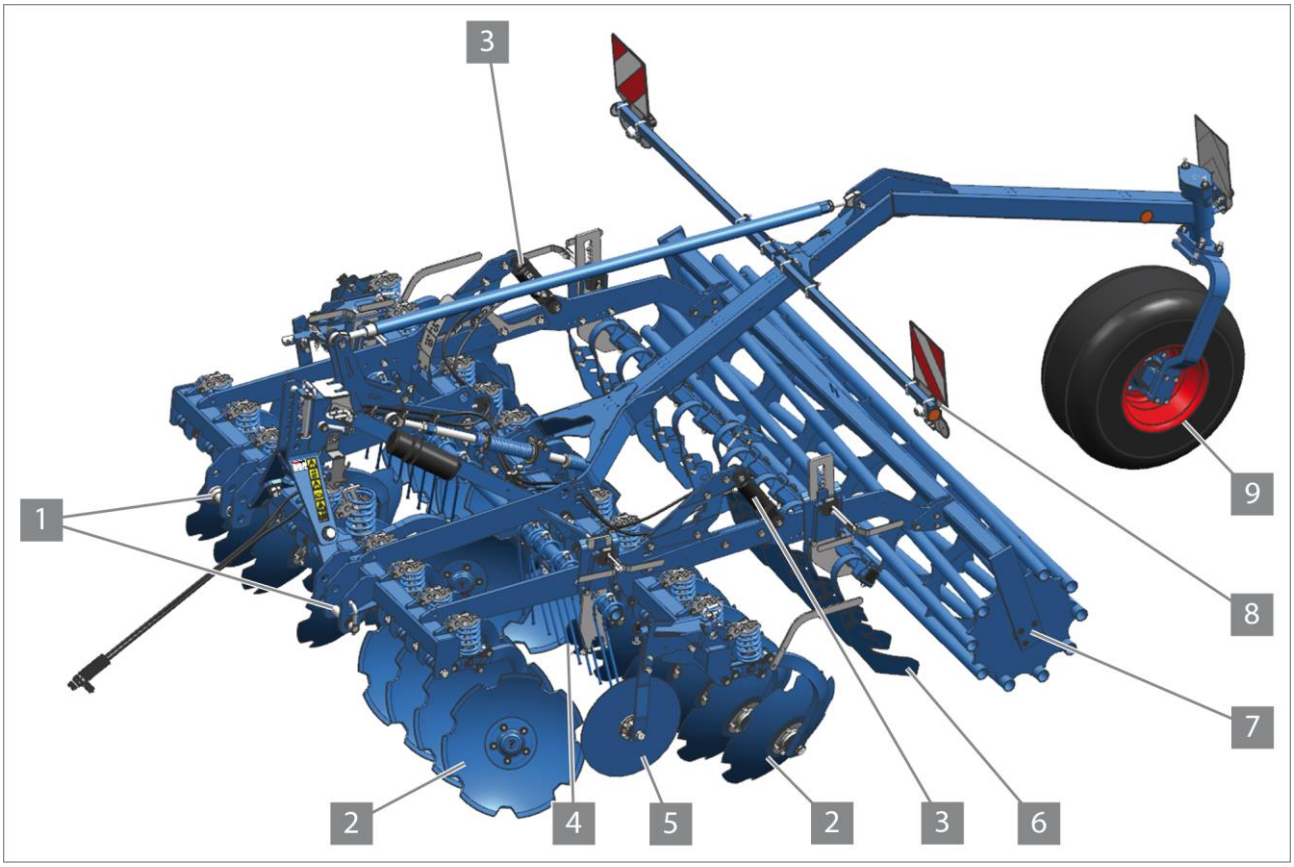
When the device is handed over, your dealer will explain how it works.

– As soon as the implement is handed over, familiarise yourself with the implement and its functions.

5 LAYOUT AND DESCRIPTION

The following assembly groups may be installed on the implement, depending on implement model and national requirements.

5.1 Overview



1 Lower link connection
2 Concave discs
3 Working depth adjustment for concave discs
4 Rebound harrow
5 Limiting disc
6 Levelling harrow
7 Roller
8 Lighting equipment
9 Depth and transport wheel

5.2 Function

5.2.1 Lower link connection

The lower link connection with its pins and the top link pin are based on standard ISO 730. The lower link connection and the top link pin are used to connect the implement to the three-point linkage of the tractor.

The lower link connection can be set up for the categories 2 (only implements with a working width of 2.5 m), 3N, 3 or 4N.

The implement is optionally supplied with a top link pin of category 2 (only with a working width of 2.5 m) or category 3.

The implement can also be set up for the attachment to quick-hitch couplings of categories 3 and 4N.

To set up the categories, the spacer rings and pins are inserted differently.

The implement features two positions for mounting the three-point linkage. Soil penetration and lift height of the implement are changed by selecting the respective position.

5.2.2 Hollow discs

The implement consists of two rows of curved and notched hollow discs that are arranged separately on the frame. The hollow discs are protected against overloading by pre-tensioned spring elements. The hollow discs loosen and mix the soil. The hollow discs loosen and mix the soil.

5.2.3 Working depth adjustment for the hollow discs

The working depth can be adjusted mechanically or hydraulically.

Mechanical depth adjustment is carried out separately for the left and right sides of the implement and both sides must be the same height. An adjusting device using pins is used.

Hydraulic depth adjustment for both sides of the implement is carried out from the tractor cab via a spool valve.

5.2.4 Limiting discs

The limiting discs prevent the outer front concave discs leaving grooves or creating ridges. The limiting discs limit the flow of soil to the working width of the implement.

5.2.5 Rebound harrows

The rebound harrows control placement of thrown-up soil and ensure that the following implements are not impeded by accumulations of soil.

5.2.6 Levelling harrow

The levelling harrow levels the soil that has been lifted.

5.2.7 Rollers

The rollers ensure reconsolidation and additional crumbling of the soil. During operation on the field they bear the weight of the implement if the implement has been lowered for work and they ensure exact depth guiding. The weight of the rollers can also support the feed behaviour of the implement. The implement can be fitted with different roller types.

5.2.8 Depth and transport wheel

The depth and transport wheel is used as the transport wheel and influences the axle loads of the tractor. The rear axle load is reduced by the depth and transport wheel and the front axle load increased.

6 PREPARATIONS ON TRACTOR

6.1 Tyres

The air pressure must be identical, particularly on the rear tractor tyres. Under difficult conditions, additional wheel weights should be used or the tyres topped up evenly with water. Refer to the operating instructions from the tractor manufacturer.

6.2 Lifting struts

Adjust the lifting struts of the tractor on both sides to the same length, ideally short. See the operating instructions of the tractor manufacturer.

6.3 Check chains/stabilisers on the three-point linkage

The check chains or stabilisers must be set so that

- they provide sufficient lateral movement of the tractor's lower links during operation
- the implement runs centrally behind the tractor

6.4 Power sources required

CAUTION

Damage to electrical components

The tolerance range for the power supply is between 10 V and 15 V. Overvoltages and undervoltages cause malfunctions and may destroy electrical and electronic components.

– Ensure that the power supply to the implement is always within the specified tolerance range.

The tractor must have the power sources listed below to supply the electrical loads on the implement:

Load	Volt	Direct connection to the tractor battery	Power socket
Lighting equipment	12	-	acc. to DIN ISO 1724
Lighting equipment (Canada, USA)	12	-	acc. to ISO 1185

6.5 Required hydraulic equipment

The implement is supplied as standard with separate hydraulic connections for each consumer. The protecting caps for the hydraulic connections are colour-coded and the hydraulic connections themselves are alphanumerically coded.

For operation of the specific hydraulic equipment listed below, the tractor must be equipped with the following control units:

Consumer	**Single acting spool valve**	**Double acting spool valve**	**Tractor/implement**	
			Colour	Code
Folding – outer concave discs	-	x	Red	P1 T1
Working depth adjustment	-	x	Black	P17 T17

6.6 Three-point linkage

DANGER

Danger to life if three-point linkage category is too small

If a lower link connection or a top link pin is used with a category which is too small, these components may be overloaded and break. As a result, the implement may fall down and injure or kill people in the immediate vicinity.

As a result, the implement may be damaged.

As a result, other road users may be injured or killed while the implement is being transported.

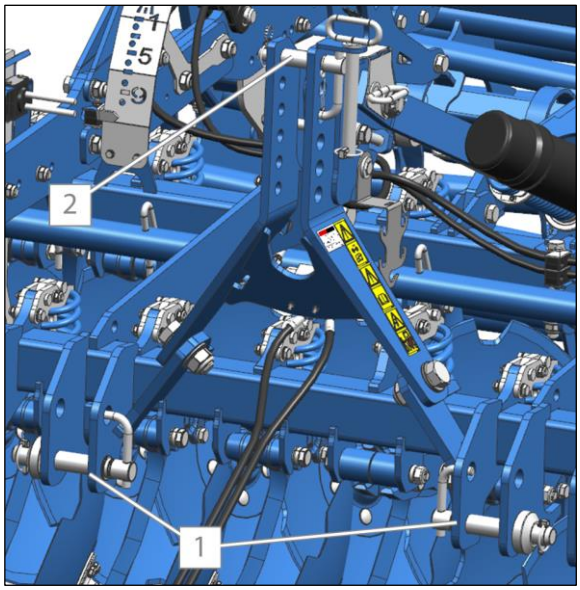
– Only use lower link connections and top link pins which comply with a category corresponding to the power of the tractor in accordance with ISO 730-1.

WARNING

Loss of the implement

The tractor's three-point linkage category and the categories of the lower link connection and top link pins must match. Otherwise, the lower link connections and the top link pins may slip out of the linkage when driving over uneven ground or due to vibrations.

– Always ensure that the three-point linkage categories exactly match the diameter of the lower link connections and the top link pins.



Only lower link connections (1) and top link pins (2) listed in the following table are permitted for the implement. The lower link connections and top link pins must match the category of the tractor's three-point linkage.

If they do not match, then either the tractor's three-point linkage or the implement's lower link connections (1) and the top link pin (2) must be set up accordingly.

More information is available in the following table.

	Rubin 10
Lower link connections	Category 2*
Lower link connections	Category 3N
Lower link connections	Category 3
Lower link connections	Category 4N
Lower link connections (quick-hitch)	Category 3
Lower link connections (quick-hitch)	Category 4N
Top link pin	Category 2* (approx. Ø 26 mm)
Top link pin	Category 3* (approx. Ø 32 mm)

* Only for implements with 2.5 m working width

The table below shows the permitted maximum tractor power and dimensions for each category as per ISO 730-1.

Tractor power*		Cat.	Pintle diameter of cross shaft (mm)	Length of cross shaft (shoulder distance) (mm)
kW	HP			
92	125	2	28	825
185	251	3N	36.6	825
185	251	3	36.6	965
350	476	4N	50.8	965

* The indicated values refer to the design of the lower link connections. The maximum device-specific tractor powers will differ from these values. See Technical data.

6.7 Hydraulic system

6.7.1 Transport

CAUTION

Lowering the three-point linkage

The device may be damaged if the three-point linkage of the tractor is lowered due to an incorrect setting or operation.

– For transport always switch the hydraulic system of the tractor to "position control".

See operating instructions of the tractor manufacturer.

6.7.2 Work assignment

– For use on the land switch the hydraulic system of the tractor to float position or mixed control.

See operating instructions of the tractor manufacturer.

6.7.3 Coupling and uncoupling

CAUTION

Lowering or raising the three-point linkage

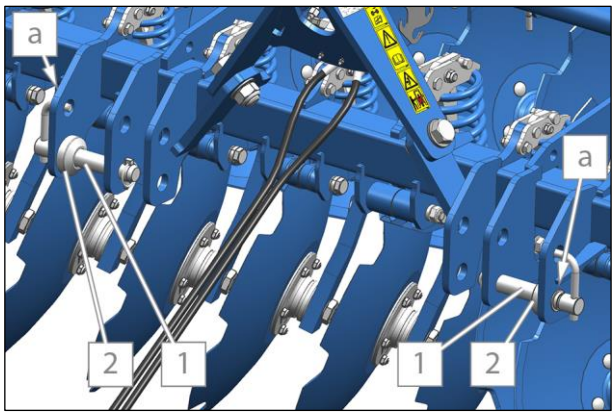
If the three-point linkage moves uncontrollably due to an incorrect setting or operation, the operator may be injured.

– To couple or uncouple the device, always switch the tractor hydraulics to position control.

7 PREPARING THE IMPLEMENT

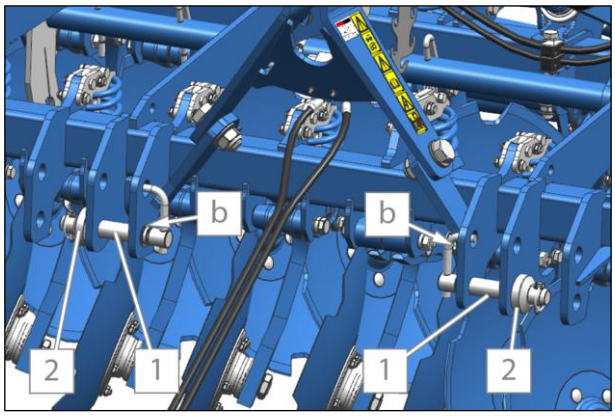
7.1 Setting up the category of the lower link connections

The category of the lower link connections is set up through the insertion position of the pins (1) and spacer rings (2). The implement can be adapted to three-point linkages or quick-hitch couplings of various tractors.



Category 3 / 4N

- Insert the pins (1) from the outside (a).
- Slide spacer rings (2) between the two outer plates onto pins.
- Secure the pins with linch pins.



Category 3N

- Insert the pins (1) from the inside (b).
- Slide distance rings (2) onto pins from the outside.
- Secure the pins with linch pins.

8 ATTACHING THE IMPLEMENT

WARNING

Risk of injury when coupling the device

There is a risk of body parts being crushed between the tractor and device

The tractor must be secured against unintentionally rolling away.

– Never actuate the hydraulic system of the tractor if there are people between the tractor and device.

WARNING

Risk of accident from spurting hydraulic fluid

Hydraulic fluid which escapes under high pressure may penetrate your skin and cause severe injuries. If injuries occur, call a doctor immediately

– Before connecting the hydraulic hoses to the tractor hydraulics, check that the hydraulics are depressurised on the tractor and device.

– Always ensure that the hydraulic hoses are connected as stipulated.

To prevent operating errors, coupling sleeves and plugs must be identified for hydraulic function connections between tractor and device. If the connections are interchanged, functions will be reversed (e.g. raise/lower or fold in/fold out).

CAUTION

Risk of injury from unsecured top link pin

If the top link pin is not secured, it may slip out or get lost.

- As a result, the device may fall down or be damaged.
- As a result, people in the immediate vicinity may be injured.
- The top link pin must always be secured.
- When the device is lifted out, there must be nobody in the immediate vicinity of the device.

DANGER

Danger to life due to unsecured connection between lower link and lower link connection

If the connection between the lower link and the lower link connection is not secured, the pin of the lower link connection may slip out.

The implement may fall down laterally and injure or kill people in the immediate vicinity.

As a result, other road users may be injured or killed while the implement is being transported.

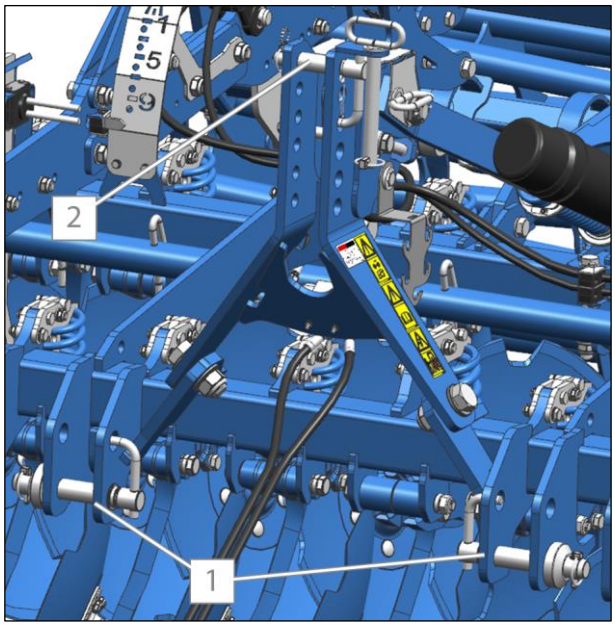
The connection between the lower link and the lower link connection must always be secured.

Nobody must be in the immediate vicinity of the implement when it is lifted out.

8.1 Attachment

- Switch the tractor's hydraulic system to position control mode.
- Move the tractor straight back in front of the implement.
    - Stop at a distance of about 40 cm.
    - The lower links are positioned in front of the lower link connections.
- Secure the tractor to prevent it from rolling away.
- Depressurise the auxiliary spool valves of the hydraulic system.

- Connect the hydraulic hoses to the tractor.
    - Make certain they are assigned correctly.
    - Note the hydraulic system labels.
- Connect the electrical lines to the tractor.
- Back the tractor up to the implement.

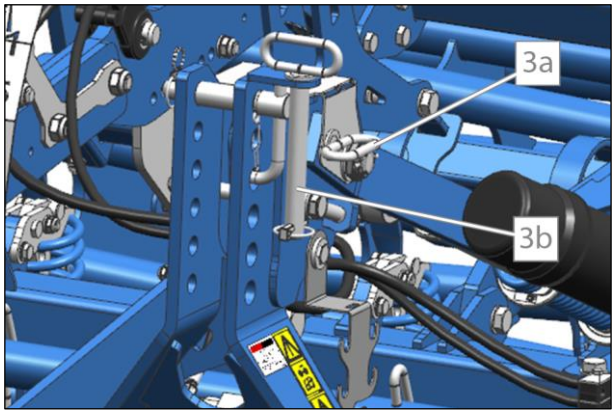


- Connect the lower link of the tractor to the implement's lower link connections (1).
- Secure the connection. Also see the operating instructions of the tractor manufacturer or the operating instructions of the quick-hitch coupling.
- Select the mounting position for the top link.
- Adjust top link to correct length.
- Connect the implement and top link with the top link pin (2).
- Secure the top link pin with a linch pin.

The position of the top link also presets the pressure on the rollers and therefore the degree of tilling and reconsolidation of the soil. See "Pressure load of the rollers, page 67".

If the route to the field is via public highways, there must be a lighting equipment on the implement.

- Test the lighting equipment.



Activate the function of the depth and transport wheel

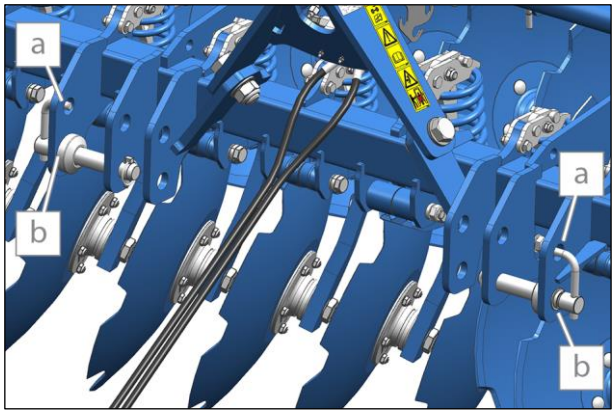
When detached, secure the depth and transport wheel in lifted out position with a pin (3a).

To activate the depth and transport wheel:

- Remove the linch pin of the pin.
- Pull out the pin.
- Insert the pin into the holder for storage. (3b)
- Secure the pin in the holder with linch pin.

The depth and transport wheel is now operational.

8.2 Mounting positions



The implement can be mounted at the tractor's three-point linkage in two positions (heights).

a – top

b – bottom

Mounting position	Draw point	Function
top	low	• Improve penetration of the implement • Increase roller pressure • Reduce the lifting force requirement
bottom	high	• Increase the lifting height • Reduce slippage • Reduce roller pressure

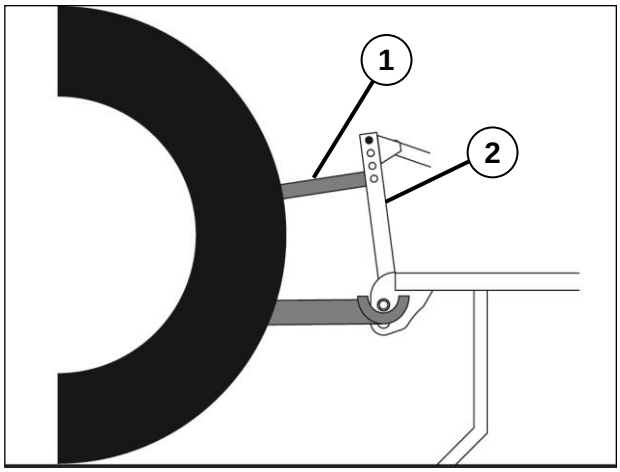
8.3 Upper control link

CAUTION

Risk of injury from unsecured upper control link pin

If the upper control link pin is not secured, it may slip out or get lost.

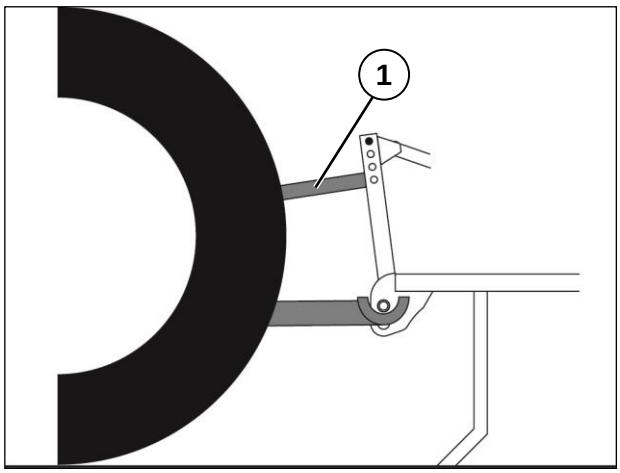
- As a result, the implement may fall down or be damaged.
- As a result, people in the immediate vicinity may be injured.
- The upper control link pin must always be secured.
- Nobody may be in the immediate vicinity of the implement when it is lifted out.



The top link (1) can be mounted in several positions on the three-point tower (2).

A total of four mounting positions are provided.

Upper control link mounting position	Function
Lower	• Improve infeed of the implement • Relieve less load on the front axle of the tractor • Increase roller pressure • Reduce the lifting force requirement
Higher	• Increase the lifting height • Reduce slippage • Reduce roller pressure



The position of the top link (1) can be adjusted as follows:

- Lower the implement completely.
- Switch the tractor's three-point linkage to position control.
- Activate the tractor's three-point linkage until there is no load on the top link pin.
- Release the top link pin and pull it out.
- Adjust the length of the top link so that the top link pin can be fitted in the position required.
- Insert the top link pin.
- Secure the top link pin using a linch pin.

9 DRIVING ON PUBLIC HIGHWAYS

9.1 General information

A proper lighting system, identification and equipment must be on the implement, if it is to be transported on public roads. The country-specific valid laws and regulations pertaining to driving on public roads must be observed.

9.2 Preparation for driving on public roads

Before commencing a journey on public roads, the following components and safety equipment must be checked to ensure they are working properly and can be used and applied in accordance with these operating instructions:

Lighting equipment

- Ensure power supply.
- Check proper functioning.

Outer concave discs

DANGER

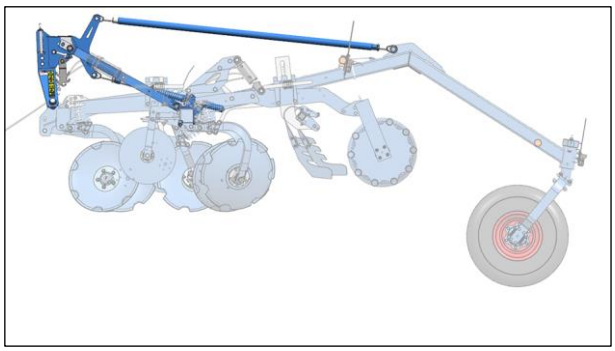
Risk of accident due to outer concave discs that are not retracted

When the outer concave discs of the implement are not retracted, the implement is wider than 3 m.

This can result in accidents when driving on public highways, which in turn could cause persons to be injured or killed.

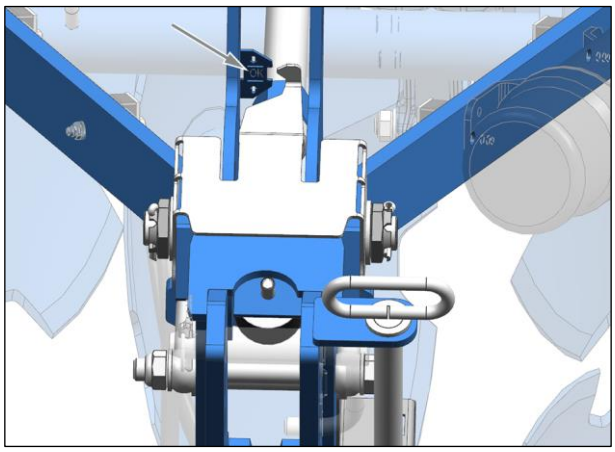
- Retract the outer concave discs every time before driving on public highways.

- Retracting, see "Retracting the outer concave discs, page 53".



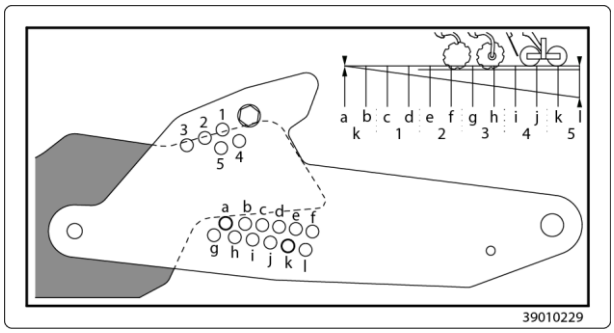
Depth and transport wheel

When lifting out the implement, the weight of the depth and transport wheel is transferred without the need of an auxiliary spool valve.



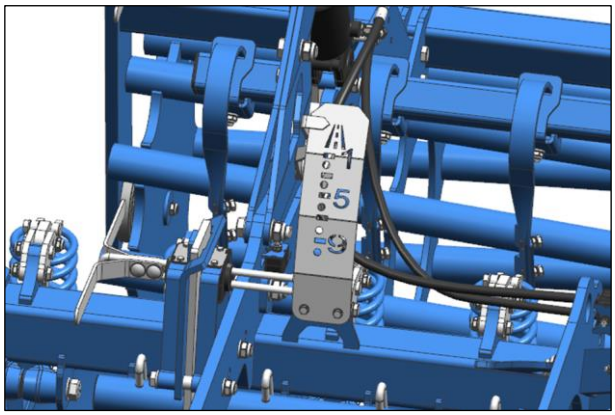
On even ground:

– Lift out the implement until the indicator of the depth and transport wheel's depth display is within the "OK" range.



Working depth adjustment

– Adjust to a low working depth
  - mechanical: k, 1, 2 or 3
  - hydraulic: "Road travel" position



Axle load ballasting

– Ensure sufficient front axle load of the tractor (see "**Axle loads**, page 24")

Road travel after application in the field:

– Clean the implement roughly and remove sticking soil.

9.3 Permitted transport speed

The following table shows the permitted maximum transport speeds depending on the tyres and the equipment of the implement. Also comply with respective applicable country-specific Road Traffic Act.

Equipment	permitted maximum transport speed [km/h]
Without depth and transport wheel	permitted maximum speed of the tractor
With depth and transport wheel	40

10 OPERATION

CAUTION 	– Read and follow the information in the section entitled "Safety and protection measures". • The implement may only be used, maintained and repaired by people who are familiar with it and who are aware of the hazards involved. • All adjustments and repair work, as well as the rectification of any malfunctions, is to be conducted when the drive has been switched off and the engine is at a standstill only. Remove the ignition key.

DANGER 	**Risk of accident when making adjustments** When making any adjustments to the device, there are risks of crushing, cutting, clamping and striking your hands, feet and body on heavy and occasionally compressed and/or sharp-edged parts. • Always park implement on the ground. • Adjustment work may be carried out by appropriately instructed personnel only. • Always wear appropriate protective clothing. • Always observe the currently valid operational safety and accident prevention regulations. • Switch off tractor engine. • Pull on handbrake.

10.1 Working depth

The working width adjustment takes place, depending on the implement equipment, mechanically using pins or hydraulically.

WARNING

Risk of accident due to freely rotating rollers

When climbing onto freely rotating rollers, there is a risk of body parts being crushed and trapped.

Adjusting work may only be performed by instructed personnel.

– Never climb onto freely rotating rollers.

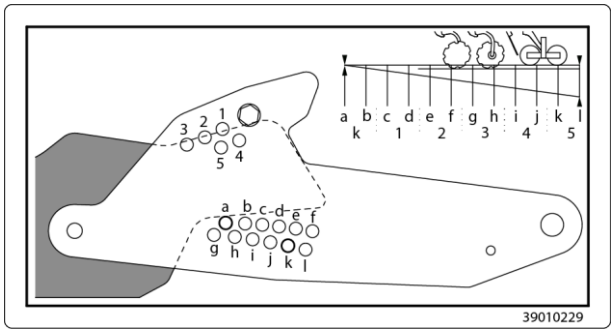
WARNING

Loss of components

Unsecured pins may fall out during operation due to vibration. This may result in components being lost during operation and transportation, and it can cause accidents or damage to the implement and the tractor.

– Secure pins with linch pins.

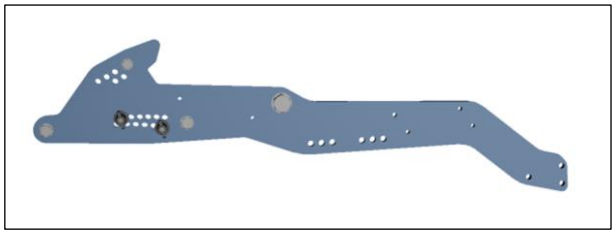
10.1.1 Mechanical working depth adjustment



The working depth adjustment takes place using in the connector pins in the adjusting plates.

- a => minimum working depth
- l => maximum working depth

The depth change between two neighbouring adjustments is approx. 2 cm.



– Lift out the implement until the pins have been relieved on both sides of the implement.

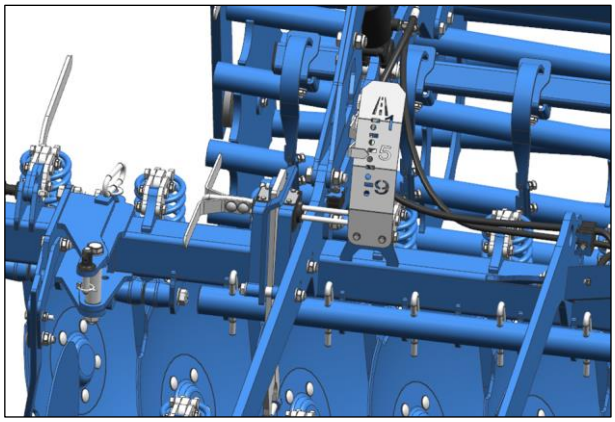
– Release the bottom pins.
    - Remove the linch pins.
– Select a hole for the desired working depth.
– Insert the bottom pins into the desired holes in the adjusting plates.
– Secure pins with linch pins.

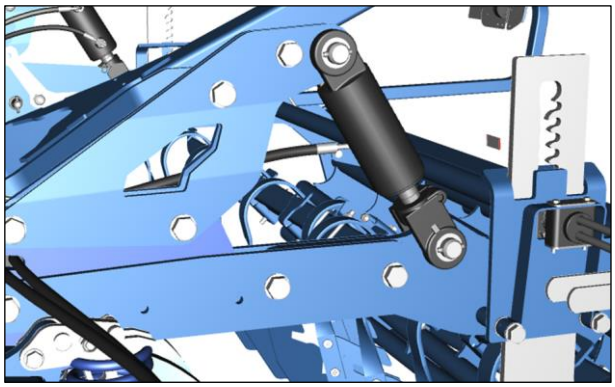
The pins in holes 1 to 5 determine the lowering depth of the rollers when the implement is lifted out. The less the lowering depth, the more the weight of the rollers supports the soil penetration of the implement when being inserted.

To keep the lowering depth as low as possible:

– Lower the implement.
– Insert the top pins into holes 1 to 5 of the working depth, directly above the carrier.
– Secure pins with linch pins.

10.1.2 Hydraulic working depth adjustment





The working depth is adjusted with a spool valve of the tractor through the hydraulic rams.

The set working depth can be read off on the scale. A graduation mark on the scale corresponds to an approx. 2 cm change in working depth.

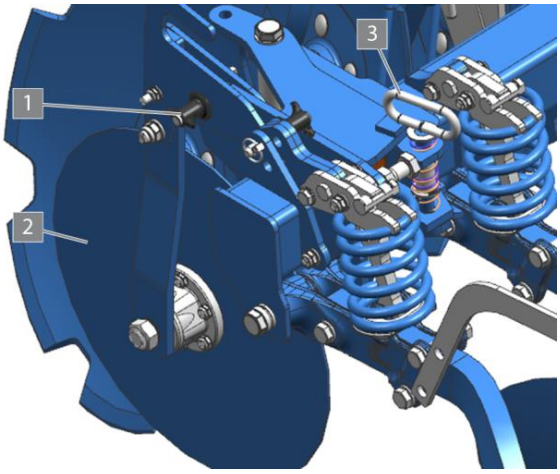
- 0 => minimum working depth
- 10 => maximum working depth

The adjustment "0" is marked with a symbol for road travel.

– Extend the hydraulic rams with the spool valve:
  - smaller working depth
– Retract the hydraulic rams with the spool valve:
  - greater working depth

10.2 Outer concave discs

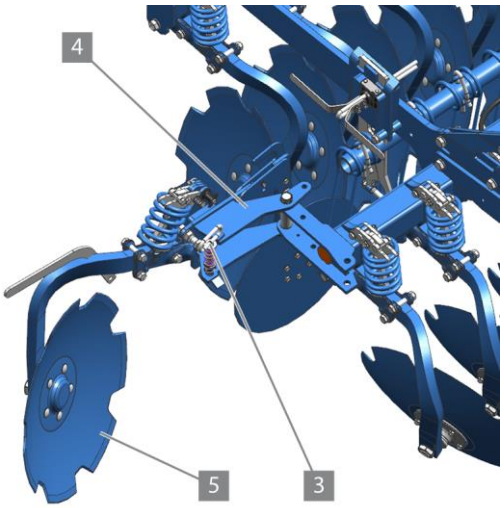
10.2.1 Retracting the outer concave discs



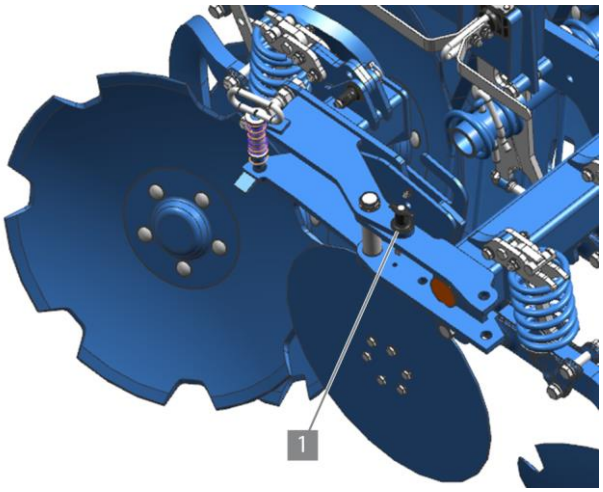
Retract the outer concave discs for transportation:

Retract mechanically

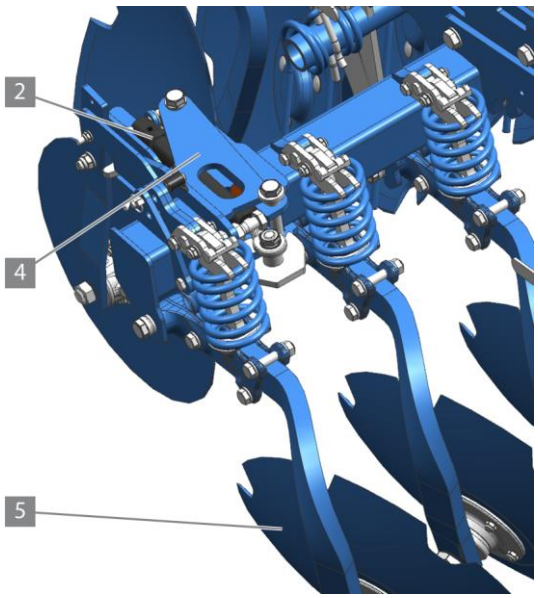
– Lift out the implement.
– Release the pin (1) of the limiting discs (2).
– Remove pin.
– Lower the limiting disc.



- Pull the pin (3) of the wheel bracket upwards against the spring pressure.
- Swivel the wheel bracket (4) with the outer concave disc (5) forwards.

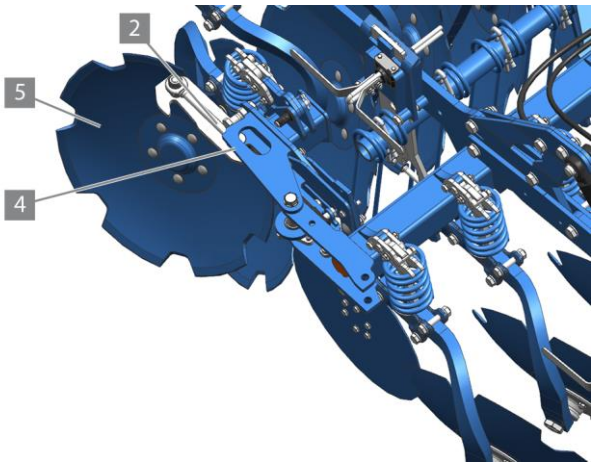


- Secure the wheel bracket with the pin (1) of the limiting disc in retracted position.
- Secure the pin with linch pin.



Retract hydraulically

- Lift out the implement.
- Retract the outer concave discs (5) using the spool valve of the tractor.
    - The hydraulic ram (2) swivels the wheel brackets (4) with the outer concave discs (5) forwards.

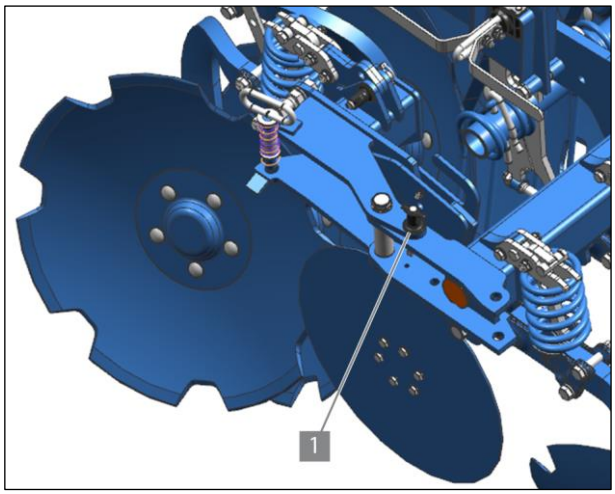


– Ensure that the outer concave discs are retracted fully.

– Lock the spool valve of the tractor.

10.2.2 Extending the outer concave discs

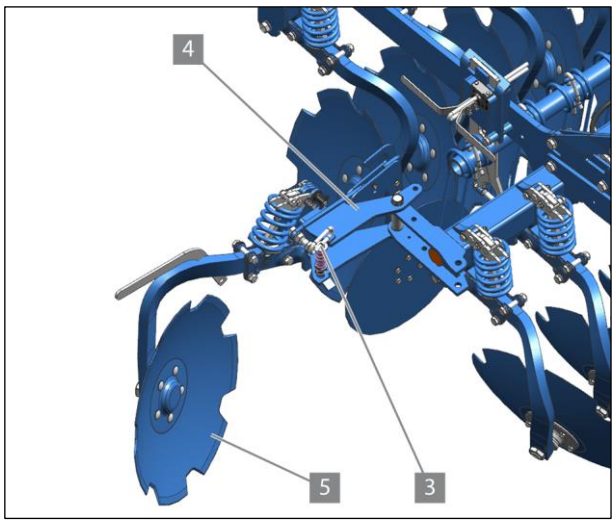
Extend the outer concave discs for working in the field:



Extend mechanically

– Lift out the implement.

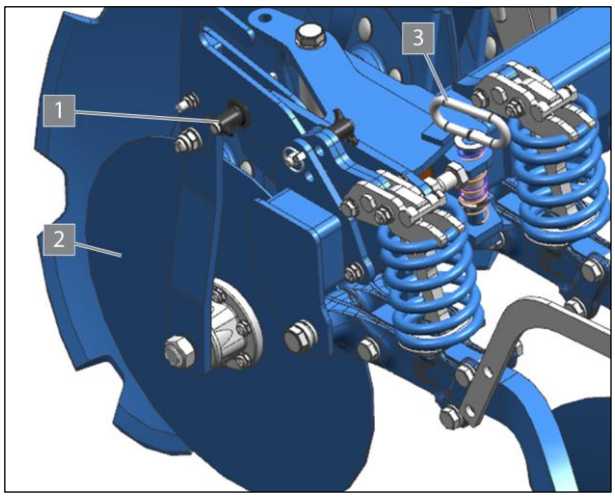
– Dismantle the pin (1) of the limiting disc.



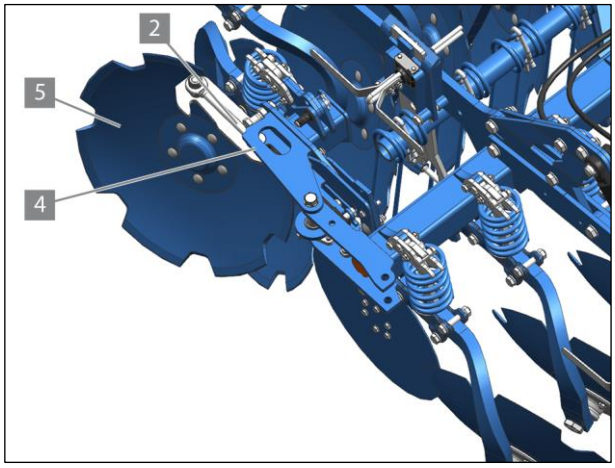
– Swivel the wheel bracket (4) with the outer concave disc (5) to the rear.

– Pull the pin (3) of the wheel bracket upwards against the spring pressure.

– Secure the wheel bracket (4) in extended position with the pin (3) of the wheel bracket.

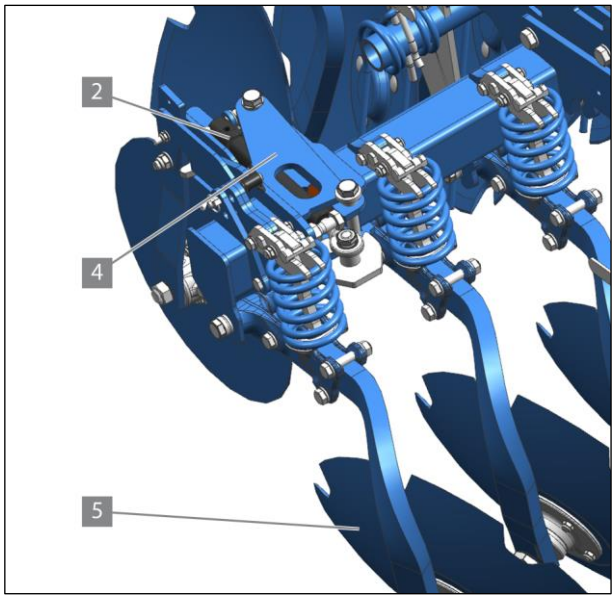


- Raise the limiting disc (2).
- Secure the limiting disc with the pin (1).
- Secure the pin with linch pin.



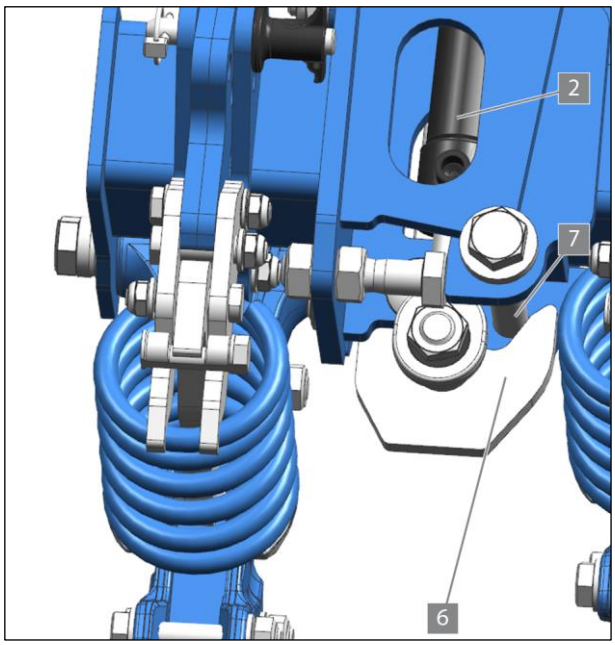
Extend hydraulically

- Lift out the implement.
- Extend the wheel brackets (4) with the outer concave discs (5) using the spool valve of the tractor.



After reaching the end position:

- Hold the lever of the spool valve in extended position for roughly 5 seconds.
    - This ensures locking of the outer concave discs.

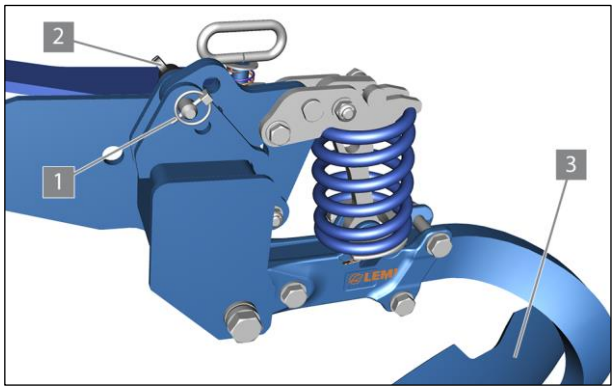


- The hook (6) of the hydraulic ram (2) always hooks in behind the hexagon bolt (7).

10.2.3 Adjusting the outer concave discs

The outer concave discs are used to optimise edge levelling.

The outer concave discs feature a three-stage height adjustment. The adjustment takes place without tools.



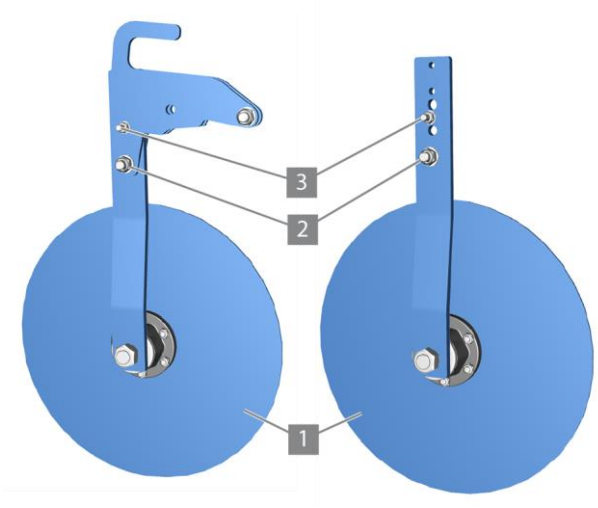
- Remove the linch pin (1) from the pin.
- Pull out pin (2).
- Swivel the outer concave disc (3) to the desired position.
- Lock the outer concave disc with pin at the desired position.
- Secure the pin with linch pin.

10.2.4 Adjusting the limiting discs

The limiting discs feature a three-stage height adjustment.

With increasing wear:

Set the limiting discs lower.



– Loosen the nuts of the bolted connections (2, 3).
– Move the limiting disc (1) to the desired position.
    - **ATTENTION:** If the bolted connections are removed, hold on tight to the limiting disc.
– Screw on new self-locking nuts and tighten.

Replace defective shear bolts (3) immediately.

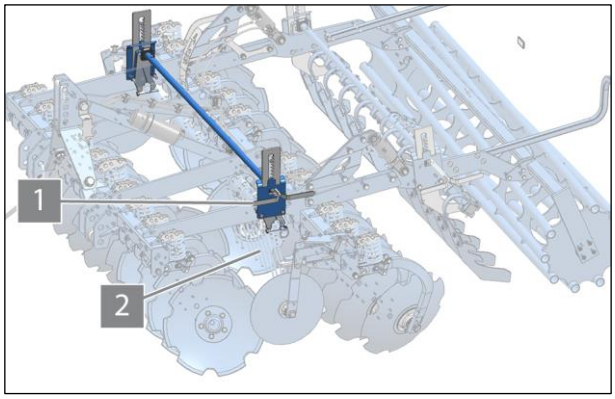
10.3 Rebound harrow

The height of the rebound harrow can be adjusted.

The lower the rebound harrows are, the more precisely they can collect and set down the soil that is raised by the concave discs.

An excessively deep adjustment of the rebound harrows may lead to blockages.

Height adjustment

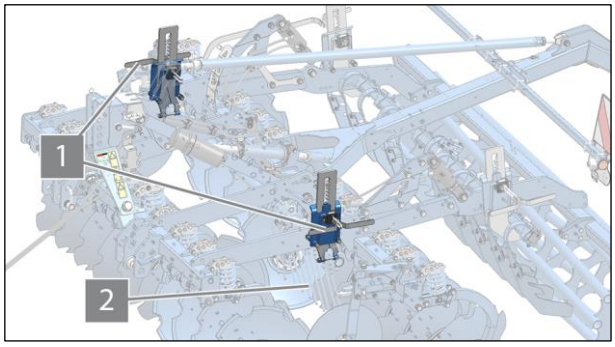


Implements without depth and transport wheel:

The height adjustment takes place via the lever (1) of the harrow adjustment, on the left-hand side of the implement.

To change the height of the rebound harrow (2):

– Turn the lever to the desired direction.



Implements with depth and transport wheel:

The height adjustment takes place via the levers (1) of the harrow adjustment, on the left and right-hand side of the implement.

To change the height of the rebound harrow (2):

– Turn the levers on the left and right-hand side of the implement alternately to the desired direction.
    - The height difference between both sides must be max. 3 teeth.

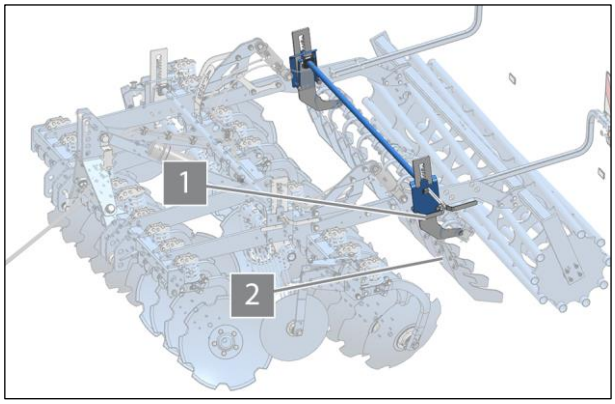
Adjust both sides to the same height to achieve an optimum work result.

10.4 Levelling harrow

The levelling harrow refills the grooves left by the rear concave discs with soil.

The height of the levelling harrow can be adjusted.

Height adjustment

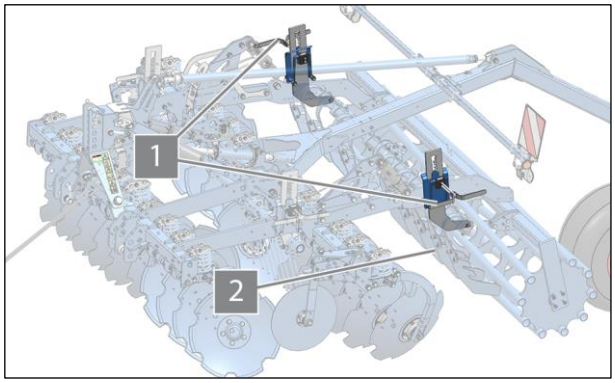


Implements without depth and transport wheel:

The height adjustment takes place via the lever (1) of the harrow adjustment, on the left-hand side of the implement.

To change the height of the harrow (2):

– Turn the lever to the desired direction.



Implements with depth and transport wheel:

The height adjustment takes place via the levers (1) of the harrow adjustment, on the left and right-hand side of the implement.

To change the height of the harrow (2):

– Turn the levers on the left and right-hand side of the implement alternately to the desired direction.

  - The height difference between both sides must be max. 3 teeth.

Adjust both sides to the same height to achieve an optimum work result.

10.5 Mounting and dismantling the weed harrow

Preconditions

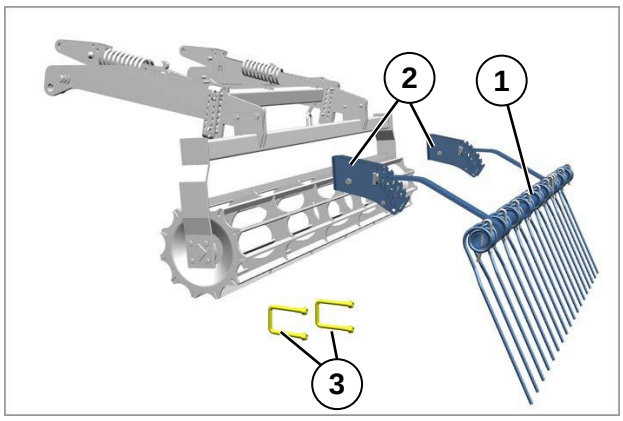
- The machine has been lowered fully.
- The tractor engine has been switched off.
- The tractor-machine combination has been secured against rolling away.

The following description shows an example of the mounting and dismantling procedure for a weed harrow with horizontally aligned U-bolts.

Depending on the equipment of the machine, a different mounting and dismantling procedure may be necessary for the weed harrow.

– Observe the mounting instructions of the weed harrow.

Mounting the weed harrow

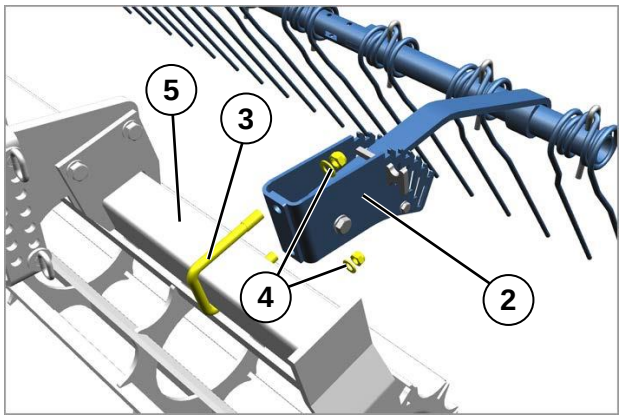


Example image

The weed harrow (1) must always be mounted on a trailing roller.

Brackets (2) and U-bolts (3) are available for mounting.

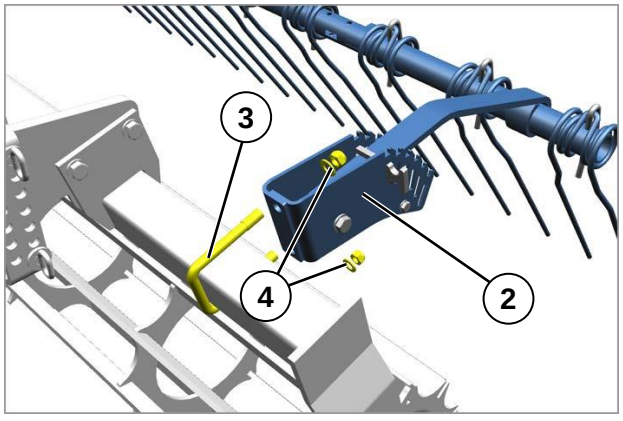
There is one harrow segment for each trailing roller segment.



Example image

- Position both U-bolts (3) on the supporting frame (5) of the roller.
- Mount the brackets (2) of the harrow segment.
- Install and tighten the washers and nuts (4).
- Adjust the weed harrow, if required.

Dismantling the weed harrow

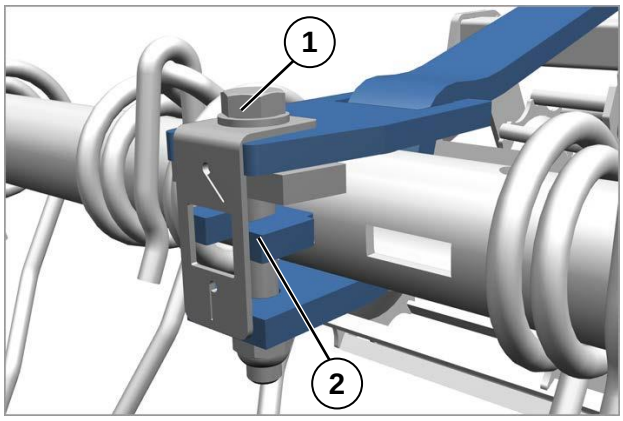


Example image

- Dismantle the washers and nuts (4).
- Dismantle the brackets (2) of the harrow segment.
- Dismantle both U-bolts (3).

10.6 Adjusting the weed harrow

Adjusting the angle



Example image

– Turn the screw (1) with the spanner

Clockwise = flat angle

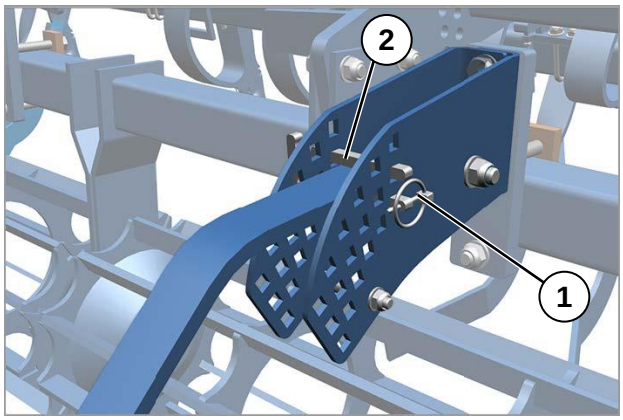
Anticlockwise = steep angle

➔ The yoke (2) moves up or down with the harrow tube. The angle of the harrow changes.

Adjusting the height

Preconditions:

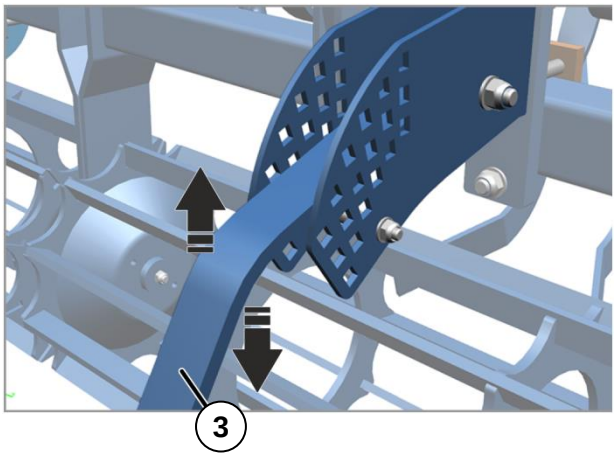
- The machine has been lowered fully.
- The tractor engine has been switched off.
- The tractor-machine combination has been secured against rolling away.
- The working depth has been adjusted via the depth guiding wheels.



Example image

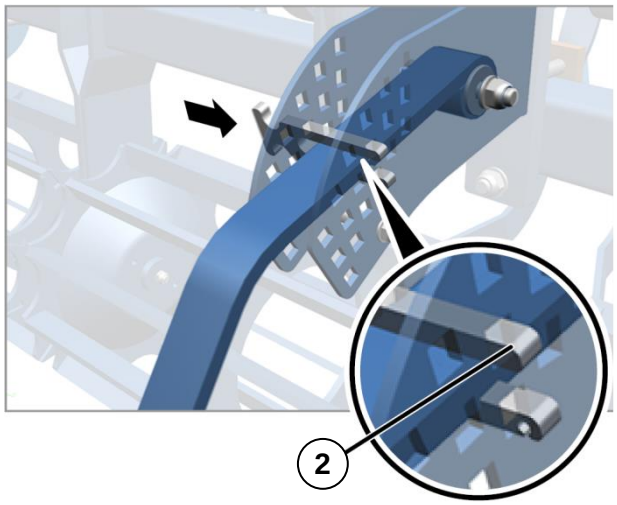
– Remove the linch pin (1).

– Remove the pin (2).



Example image

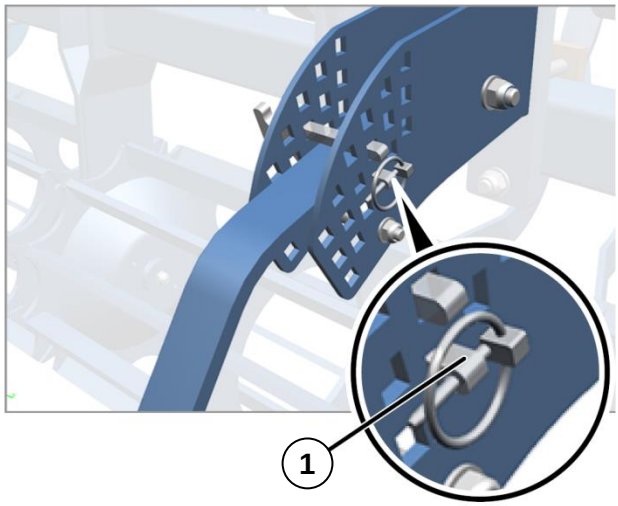
– Swivel the holder (3) to the required height.



Example image

To fix the holder in the swivelled in position:

– Insert the pin (2) into the matching notches above and below the holder.



Example image

– Secure the pin with a linch pin (1).

➔ The height of the weed harrow has been adjusted.

10.7 Rollers

10.7.1 General information

The implement can be fitted with different roller types, see the following table. The rollers control the implement at the working depth. Irrespective of the roller type used, the soil is more or less recompacted or more or less crumbled.

Roller type		**Rubin 10**			
		250 U	**300 U**	**350 U**	**400 U**
Tube bar roller	RSW 540	x	x	x	x
	RSW 600	x	x		x
Double roller	DRF 400/400	x	x	x	x
	DRF 540/400	x	x	x	x
	DRR 400/400	x	x	x	x
	DRR 540/400	x	x	x	x
Flexring roller	FRW 540	x	x	x	x
Rubber ring roller	GRW 590	x	x		x
Knife roller	MSW 600	x	x	x	x
Double profile ring roller	DPW 540/540	x	x	x	x

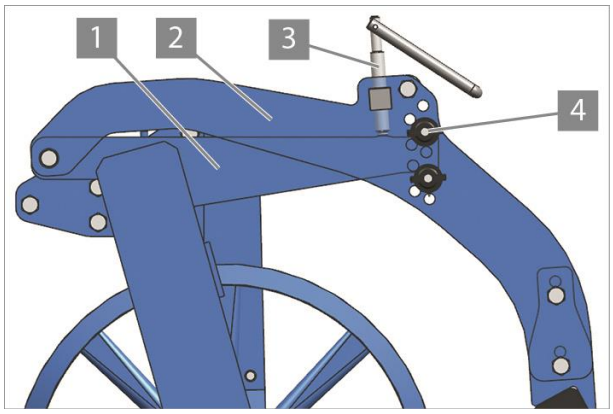
The tube bar rollers, double rollers, double profile roller and the flexring roller do not require any special adjustment measures. However, the scrapers of the flexring roller can be replaced after being worn down, see "**Flex ring roller scrapers**, page 92".

The rubber ring roller is fitted with adjustable scrapers, see "**Scrapers**, page 92".

The knife roller has a knife bar with blades used as scrapers. This knife bar can be adjusted in various ways. For more information, see "**Knife rollers**, page 65".

10.7.2 Knife rollers

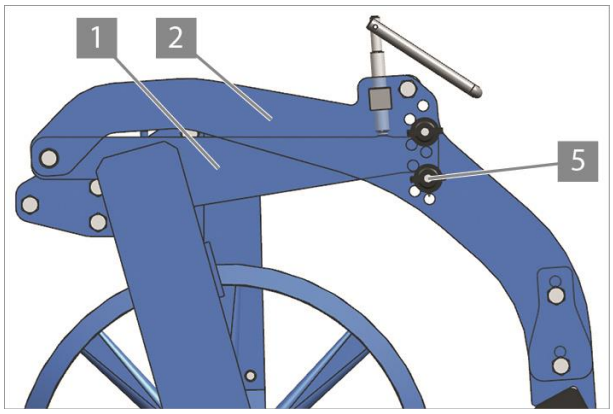
Adjusting the knife roller



Blade working depth

On both sides of the roller:

- Take any loads off the upper bolt (4).
    - Turn the screw (3) clockwise to do so.
- Release the upper bolt (4).
- Remove the upper bolt (4).
- Set the desired working depth using the screw (3).
- Insert the upper bolt (4) into the hole in the adjustment plate (2).
    - Choose the hole directly above the support plate (1).
- Secure the upper bolt (4) using a linch pin or circlip.
- Take any loads off the screw (3).
    - Turn the screw anti-clockwise to do so.



Knife bar deflection travel

On both sides of the roller:

The lower bolts (5) limit the height of the knife bar deflection travel.

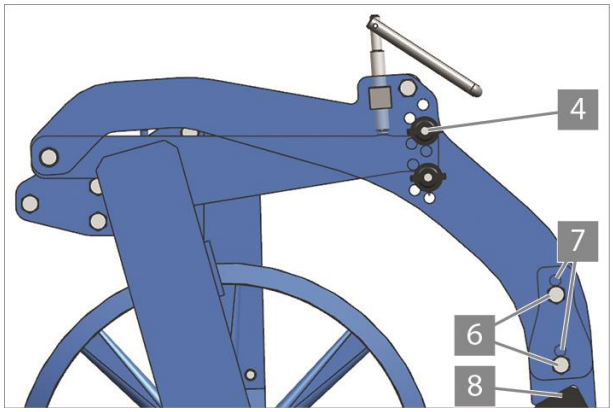
Short deflection travel (standard):

– Insert the lower bolt (5) into the hole in the adjustment plate (2).
    - Choose the hole directly below the support plate (1).
    - The knives operate more aggressively if the deflection travel is short.

Large deflection travel (for very light or rocky soils):

– Insert the lower bolt (5) into the lower holes in the adjustment plate (2).

– Secure the lower bolt (5) using a linch pin or circlip.



Knife bar position

The knife bar (8) can be mounted in two positions.

Upper mounting position (6)
(lower hole):

- Standard setting
- Setting for extremely sticky soils
- Setting for light soils

Lower mounting position (7)
(upper hole):

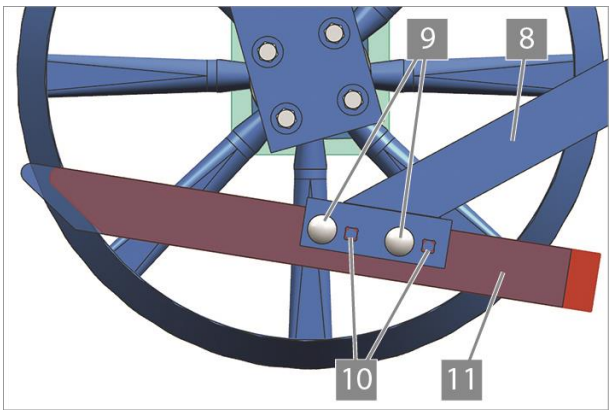
- Greater work intensity, but increased risk of clogging
- If the adjustment options provided by the bolts (4) are not sufficient in the upper mounting position (6):

Set the knife bar to a lower position

On both sides of the roller:

– Remove the screws from the holes (6).

– Reposition the knife bar (8) in the lower mounting position (7).



Blade position

There are two mounting positions for the blades (11) on the knife bar (8):

- Front position (9) (standard)
- Rear position (10) (after wear)

After wear:

– Reposition the blades (11) towards the rear (10).

10.7.3 Pressure load on rollers - soil penetration

The pressure load on the rollers is determined by the position of the top link and the mounting position of the cross shaft.

The hydraulic system of the three-point linkage on the tractor must be switched to the float position.

Lower link

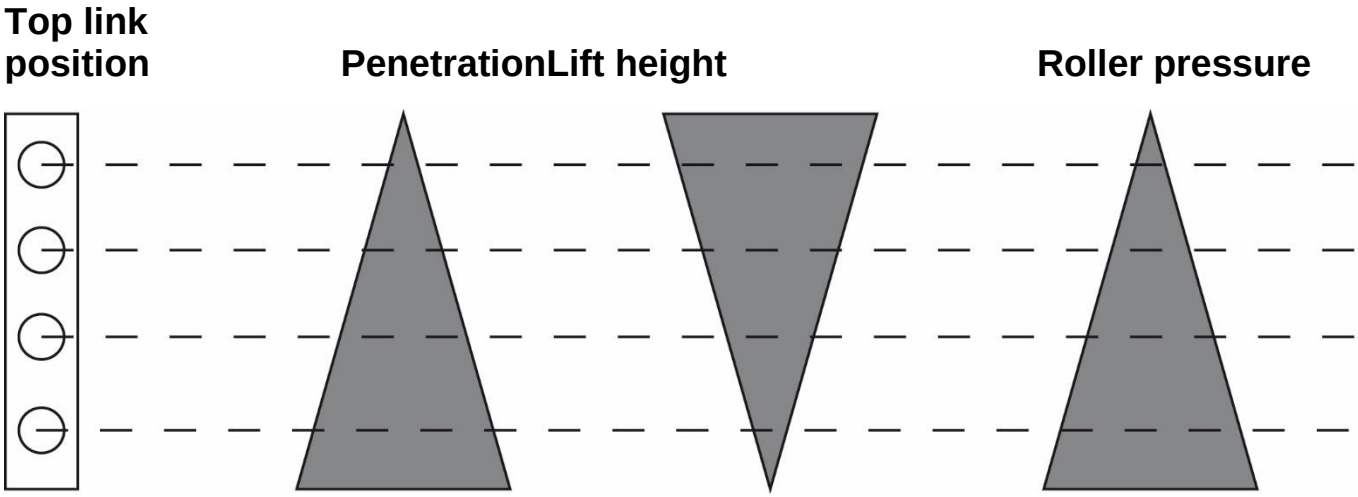
The lower links should always be mounted in the upper mounting position.

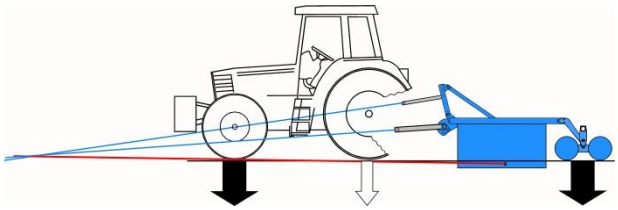
The lower links should only be mounted at the implement in the lower mounting position when the implement is unable to be raised far enough or when the pressure load on the rollers is too high even when the top link is in an optimum position.

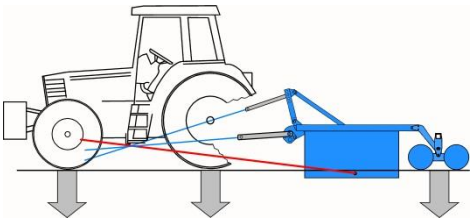
The hydraulic system of the three-point linkage on the tractor must be switched to the float position.

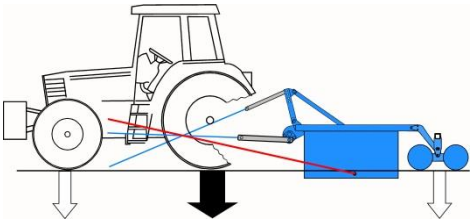
Top link

The mounting position of the top link exerts an influence on the lift height, the soil penetration and the roller pressure. The hydraulic system of the three-point linkage on the tractor must be switched to the float position.









- The lower the top link is mounted on the implement's headstock, the greater the pressure load on the rollers – resulting in better soil penetration.
- The higher the top link is mounted on the implement's headstock, the lower the pressure load on the rollers – resulting in poorer soil penetration.
- If the pressure load is too low and the reconsolidation or crumbling effect of the rollers is insufficient, the top link has to be mounted lower on the headstock – resulting in better soil penetration.
- If the pressure load is too high and the rollers clogged as a result or if they plunge too far into the soil, the top link must be mounted higher up on the headstock – resulting in poorer soil penetration.

10.8 Turning at the headland

DANGER

Risk of damage to components

If the implement is not fully raised, there is a danger that components may be damaged during an improper turn at the headland.

Before turning at the headland the implement must be completely raised before turning-in to avoid any damage to the implement.

Turning at the headland may only be conducted at a speed suitable for the off-road and ground conditions.

Before turning at the headland

– Raise the implement all the way.

After turning at the headland

– Lower the implement when driving straight ahead, at a suitable speed, to the preset working depth.

10.9 Working speed

A sufficiently high working speed is required to achieve good work results.

– Drive at a working speed of at least 10 km/h so that the soil will be well crumbled and mixed and can be levelled.

11 CLEANING AND CARE

11.1 Cleaning with a high-pressure cleaner

When cleaning with a high-pressure cleaner, ensure that water does not get into the electrical and electronic components. Do not point the jet of the high-pressure cleaner directly at the bearings.

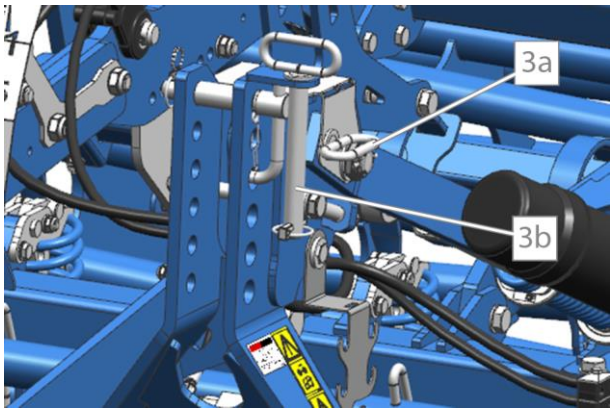
12 DETACHING THE IMPLEMENT

– Select an even, solid surface for detachment.

– Switch the tractor's hydraulic system to position control mode.

– Lower the implement.

  - Both concave disc rows and the roller must be on the ground.



Secure the depth and transport wheel

Before detaching, secure the depth and transport wheel in lifted out position with a pin:

– Remove the linch pin of the pin in the parking position (3b).

– Remove the pin from the parking position.

– Remove the linch pin of the pin.

– Insert the pin into the hole for securing the depth and transport wheel (3a).

– Secure the pin with linch pin.

The depth and transport wheel is now deactivated and secured.

– Relieve the top link pin via the three-point power lift of the tractor.

– Unlock and disassemble the top link pin.

– Remove the top link from the implement and fix it using the tractor-sided holder.

– Secure the device against rolling over.

- Disconnect the lower link from the lower link connections.
- Drive the tractor about 40 cm away from the implement.
- Secure the tractor to prevent it from rolling away.
- Depressurise the auxiliary spool valves of the hydraulic system.
- Disconnect the hydraulic hoses from the tractor.
- Slide protecting caps onto the hydraulic connections.
- Hook the hydraulic hoses into the hose cabinet.
- Disconnect the electrical lines from the tractor.
- Drive the tractor away from the implement.

13 PUT THE IMPLEMENT OUT OF OPERATION

13.1 Shutting down the implement in an emergency

– In an emergency shut down the implement via the tractor.

– Switch the tractor engine off.

– Remove the ignition key.

CAUTION

Damage caused by improper storage of the implement

If incorrectly or improperly stored, the implement may be damaged, e.g. by humidity and dirt.

The implement should be deposited on a flat and adequately stable base only.

– Clean the implement prior to storage.

– Lubricate the implement according to "Lubrication diagram".

13.2 Disposal

Metal and plastic components must be recycled.

– When disposing of the implement, ensure that the individual components as well as the auxiliary and operating materials are disposed of in an environmentally friendly manner.

DANGER

The spring assemblies on the hollow discs are highly pre-tensioned.

Incorrect removal can result in severe or fatal injury.

14 MAINTENANCE AND REPAIRS

14.1 Special safety instructions

14.1.1 General

WARNING

Risk of injury when carrying out maintenance and repair work

There is always the risk of injury when carrying out maintenance and repair work.

- Use suitable tools, suitable climbing aids, platforms and support elements.
- Always wear protective clothing.
- Carry out maintenance and repair work only on an extended and deposited device or on a device secured by suitable support elements to prevent it from extending or dropping.

14.1.2 Personnel qualifications

CAUTION

Risk of accident due to inadequate qualifications of the maintenance and repair personnel

Maintenance and repair work require appropriate training.

All maintenance and repair work may only be carried out by trained and instructed personnel.

14.1.3 Protective equipment

CAUTION

Risk of accident due to working without protective equipment

There is always an increased risk of accidents when carrying out maintenance work and repairs.

- Always wear appropriate protective equipment.

14.1.4 Immobilise the implement for maintenance and repairs

Risk of accidents when tractor starts up

Injuries may occur if the tractor starts moving during maintenance and repair work.

WARNING

- Switch off the tractor engine before carrying out any work on the implement.
- Secure the tractor against unintentional starting.
- Remove the ignition key.
- Affix a warning sign in front of the implement and in front of the tractor to advise outsiders of maintenance work.
- Secure the tractor against rolling away using wheel chocks.

14.1.5 Working on the hydraulics

Risk of accident from spurting hydraulic fluid

WARNING

Fluid (hydraulic fluid) which escapes under high pressure may penetrate your skin and cause severe injuries. If injuries occur, call a doctor immediately.
Always depressurise the hydraulic system before working on it.

- Always wear appropriate protective clothing before working on the hydraulic system.

14.1.6 Working on the electrics

CAUTION

The device will be damaged if it is connected to the power supply while work is being carried out on it

If the device is still connected to the power supply of the tractor, the device will be damaged if work is carried out on the electrics.

- Before carrying out any work on the electrics of the device, always disconnect the power supply from the tractor.

14.1.7 Working under the raised device

WARNING

Risk of accident due to lowering and extending of components and devices

It is extremely dangerous to work under raised or next to retracted components and devices.

- Always secure the tractor to prevent it from rolling away.
- Remove the ignition key.
- Secure the tractor to prevent it from being started up by unauthorised persons.
- Support and secure raised or retracted components and devices with suitable support elements.

Working underneath the raised depth and transport wheel is dangerous.

- Secure the depth and transport wheel in lifted out position with a pin.

14.1.8 Utilised tool

WARNING

Risk of accident due to use of unsuitable tool

If working with an unsuitable or defective tool, there is a risk of accidents and injuries.

- Perform all work on the device with a suitable and functional tool only. This applies in particular to the use of lifting gear.

WARNING

Risk of back injuries

If your posture is not correct when installing or fixing heavy or cumbersome components, you may suffer back injuries which require long convalescence.

Installation and maintenance work may be carried out by trained and instructed personnel only.

– Perform all work on the device with a suitable and functional tool only. This applies in particular to the use of lifting gear.

WARNING

Risk of accident due to tool slipping off

If applying a large force, e.g. when loosening bolts, the tool may slip off. This may result in hand injuries on sharp-edged parts.

– Avoid applying a large force by using suitable auxiliary equipment (e.g. extensions).

Check nuts and bolt heads, etc. for wear and, if required, consult an expert.

14.2 Environmental protection

– Ensure that all materials and operating supplies used to maintain and care for the device are disposed of in line with environmental regulations.

– All recyclable components should be recycled.

– Observe the national regulations applicable in your country.

14.3 Lubrication

WARNING

Eye injuries due to grease

When lubricating the lubrication points, grease can escape between components at high pressure and cause injury to the eyes. In case of injury, seek medical attention immediately.

– Wear protective clothing during lubrication, particularly goggles.

- For all lubrication work, use the listed environmentally-compatible lubricants only.
- Ensure that all chain links, pins, guides, etc. can move freely.
- Lubricate all moving parts using high-grade multipurpose grease or multipurpose oil.

- Service the implement in line with the "Maintenance intervals" section.

Additionally after the season is over

- Grease all guide pins.
- Grease all piston rods on the hydraulic cylinder using an acid-free grease as per DIN 51 502.
- Grease all surfaces that could suffer from corrosion.
- Push the protective caps onto the connection couplings of the hydraulic lines.
- Push the protective caps onto the connection couplings for the electronic connections.

14.4 Maintenance intervals

14.4.1 After commissioning (within 2 hours)

Check	**What to do?**
Screw connections	– Retighten all bolts and nuts on the device to the appropriate torque. See section entitled “Tightening torques”.

14.4.2 Daily check

Check	What to do?
Hydraulic hoses	– Check hydraulic hoses for damage and leaks. – Replace damaged or defective hydraulic hoses immediately. The hydraulic hoses must be replaced 6 years after the date of manufacture at the latest. Only used hydraulic hoses approved by Lemken.
Safety equipment	– Check that all safety equipment is functioning properly. See "Safety equipment" section.
Soil processing tools	– Check all soil processing tools for damage and wear. – Replace damaged or worn components.

14.4.3 Weekly checks

Check	What to do?
Bolted connections	– Tighten all screws and nuts on the implement to the appropriate tightening torque. – If necessary, secure the bolted connections with locking compound. See section entitled "Tightening torques".
Depth and transport wheel	– Check the working brake. Readjust, if necessary.
Outer concave discs	– Check the locking hooks and readjust, if necessary.

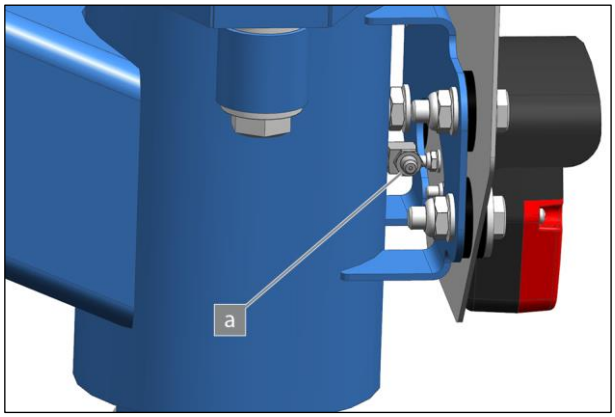
14.4.4 Lubrication schedule

– For all lubrication work use the high-grade grease Olistamoly 2 or an equivalent high-grade grease only.

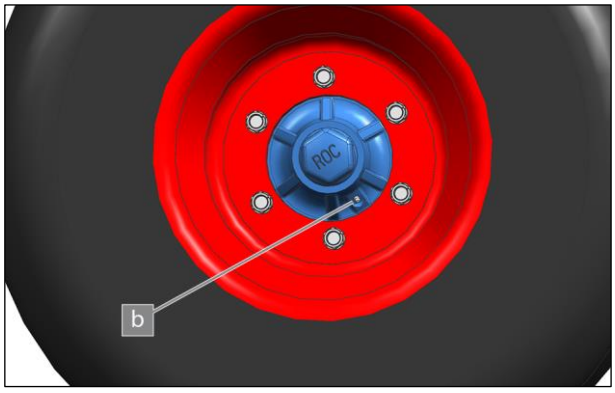
	Number of lubrication points	Every 50 service hours	Before and after the winter break
Wheel arm bearing (a)	1	x	x
Wheel hub (b)	1	x	x
Greasing of components			
Greasing of pins			x
Greasing of piston rods using acid-free grease			x
Blank surfaces of the levelling harrow			x

14.4.5 Overview of lubricating points

Depth and transport wheel



Wheel arm bearing (a)



Wheel hub (b)

14.5 Tightening torques

14.5.1 General

– Secure self-locking nuts that have been loosened against working themselves loose again by:
  - Replacing them against new self-locking nuts
  - Using lock washers
  - Using locking compounds such as Loctite

The tightening torques set out below refer to screw connections that are not specifically mentioned in these operating instructions. Specific tightening torques to be applied are mentioned in the text.

– Identify the relevant screw connection by means of the spare-parts list or the markings on the screw head.

14.5.2 Bolts and nuts made of steel

Diameter	Strength category		
	8.8 [Nm*]	10.9 [Nm*]	12.9 [Nm*]
M 6	9,7	13,6	16,3
M 8	23,4	32,9	39,6
M 10	46,2	64,8	77,8
M 12	80,0	113	135
M 14	127	178	213
M 16	197	276	333
M 20	382	538	648
M 24	659	926	1112
M 30	1314	1850	2217

*μ_g = 0,12

14.5.3 Wheel bolts and wheel nuts

Diameter / thread	[Nm]
M14	125
M18 x 1,5	290
M20 x 1,5	380
M22 x 1,5	510

14.6 Check the connections to the tractor

14.6.1 Hydraulic connections

Risk of accidents due to escaping hydraulic fluid

WARNING

Hydraulic fluid which is ejected under high pressure (hydraulic oil) can penetrate the skin and cause serious injuries. In the event of injuries, consult a doctor immediately.

- Due to the risk of injury, always use suitable tools when looking for leaks.
- Always wear appropriate protective clothing.

- Carry out a visual inspection of the hydraulic couplings.
- Look for leaking hydraulic oil at the hydraulic couplings.
- Connect the hydraulic lines to the tractor.
- Check that the hoses are leak-free when under pressure.

Faulty or leaking couplings must be repaired or replaced immediately by a specialist workshop.

14.6.2 Electrical connections

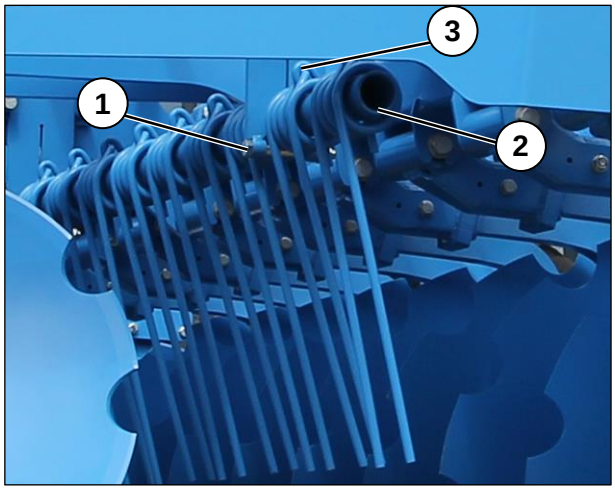
- Carry out a visual inspection of the plugs and cables.
- Look for bent or broken contact pins on the plugs and exposed areas on the cables.
- Apply anti-corrosion spray to the electrical contacts.

Faulty plugs or cables must be repaired or replaced immediately by a specialist workshop.

14.7 Replacing the harrow tines on the rebound harrow

The implement must be raised to replace the harrow tines.

– Secure the implement so that it does not sink accidentally.



– Remove the bolts (1) on the harrow tine holder.

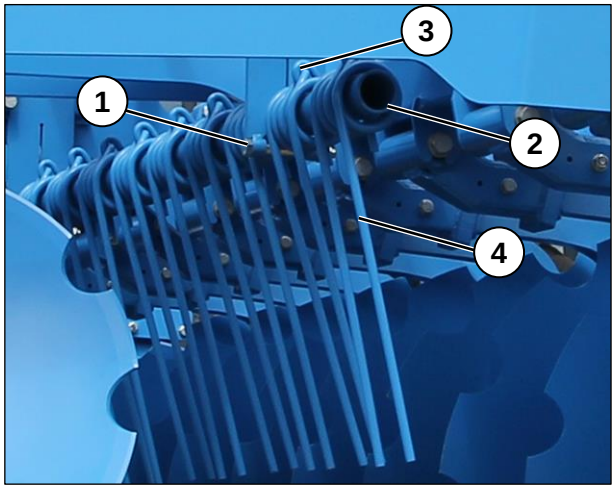
– Remove the harrow holder (2).

DANGER

The spring (3) is pre-tensioned

The spring (3) is pre-tensioned and can fly a long way during removal.

– Always take particular care when handling the spring (3).



– Knock the spring (3) out from below using a hammer.

– Push the harrow (4) off the harrow holder sideways.

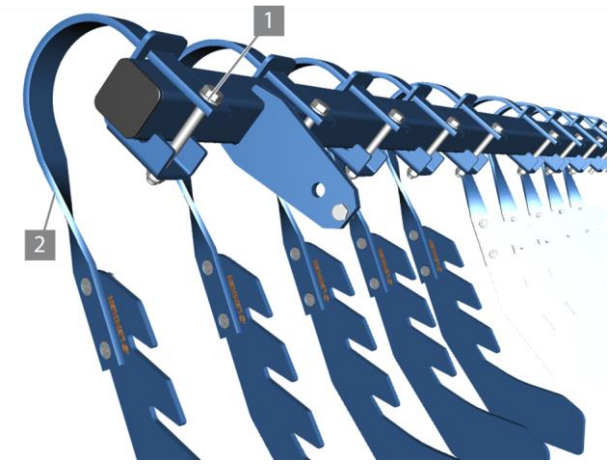
– Push the new harrow onto the harrow holder (2).

– Knock the spring (3) back into place from above.

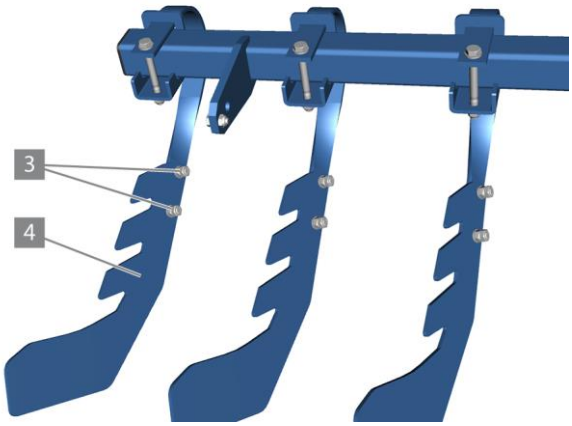
– Fix the harrow holder (2) in place with the bolts (1).

– Tighten the bolt (1) to 197 Nm.

14.8 Replacing levelling harrow



- Lift out the implement.
- Fold out lateral parts of folding implements.
- Secure the implement against lowering.
- Dismount screw (1).
- Remove levelling harrow (2).
- Push on new levelling harrow (2).
- Mount screw (1).
    - In doing so, align screw (1) parallel with the tube.
- Tighten the screws (1) to 80 Nm.



Replacing levelling foot:

- Remove pined connections (3).
- Remove levelling foot (4).
- Install new levelling foot.
- Tighten the screws to 70 Nm.

14.9 Replacing concave discs

Replace worn concave discs which have a diameter of less than 460 mm.

CAUTION

Risk of injury from worn concave discs and coulter discs

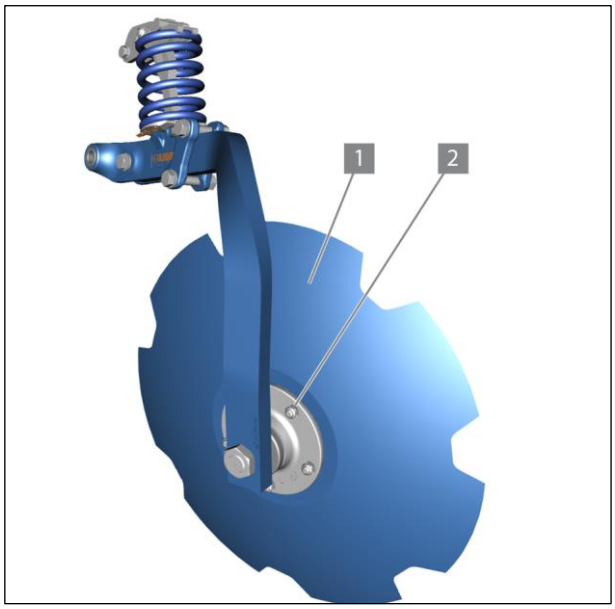
Worn concave discs and coulter discs may have sharp edges. This may result in cuts to the hands.

- Be careful when handling worn concave discs and coulter discs.
- Always wear suitable gloves and appropriate protective clothing.

- Correctly dispose of the removed discs, screws and nuts according to the applicable disposal regulations.
- Dispose of the wiped grease and the cleaning cloths according to the applicable disposal regulations.

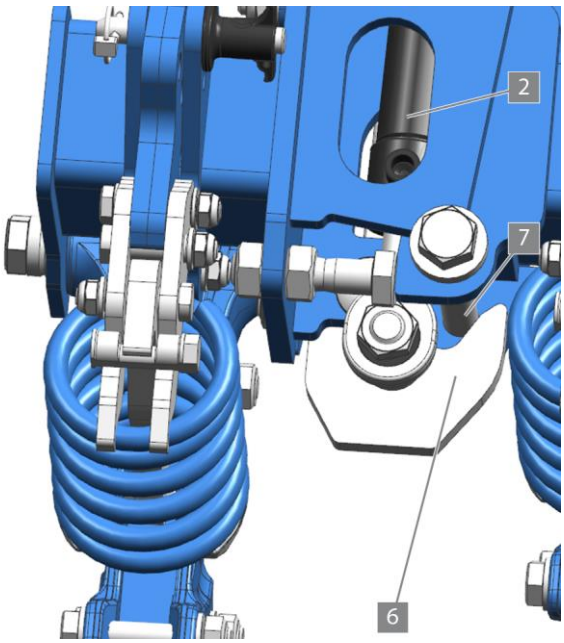
- Lift out the implement.
- Secure the implement against lowering.
- Carefully clean concave disc and bearing flange.

  Dirt must not get into the area of the bearing which is open and accessible when the concave disc has been removed.



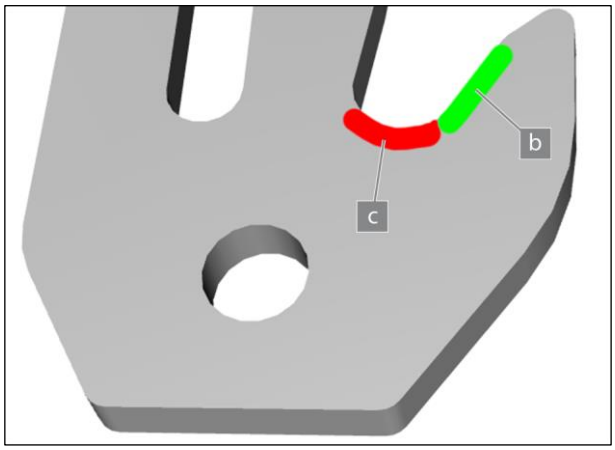
- Loosen five self-locking nuts (2).
- Completely unscrew self-locking nuts.
- Remove concave disc (1) from the bearing flange.
- Clean flange area of the bearing flange.
- Attach new concave disc.
- Use new self-locking nuts for the flat head screws.
- Tighten nuts between 80 and 100 Nm.

14.10 Readjusting locking device of the outer concave discs



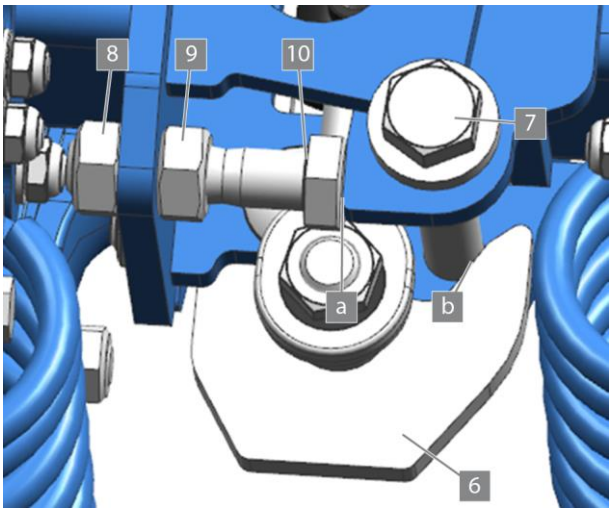
Outer concave discs with hydraulic folding:

The locking hook (6) on the hydraulic cylinder (2) must grip free of play behind the hexagon pin (7).



The hexagon pin must be positioned on the flank of the locking hook (b).

If the hexagon pin is positioned on the base (c) of the locking hook, the locking device must be readjusted.

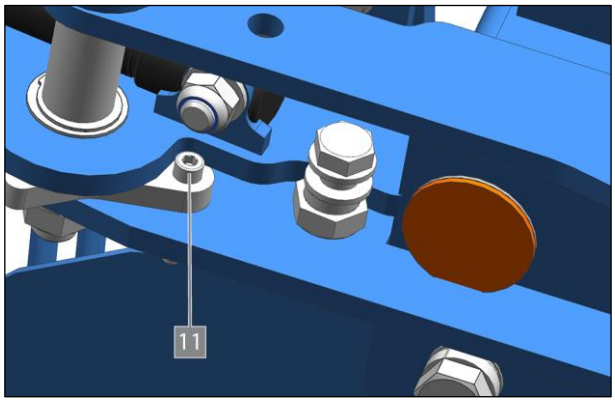


Readjusting locking device

– Loosen nuts (8, 9).
  - The hexagon pin (10) turns freely.
– Unscrew hexagon pin (10) until the following conditions have been met:
  - The screw head is in contact with the stop on the basic frame (a).
  - The locking hook (6) is positioned on the hexagon pin (7) on (b).
– Tighten nuts (8, 9).

In doing so, do not change the position of the hexagon pin (10).

14.10.1 Replacing shear pin



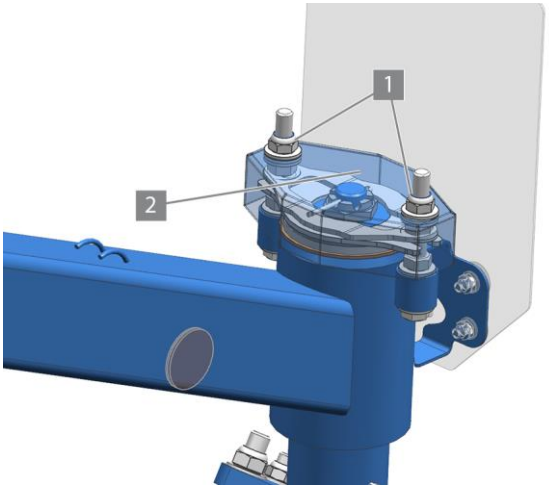
After actuating the overload protection:

– Immediately replace shear pin (11).

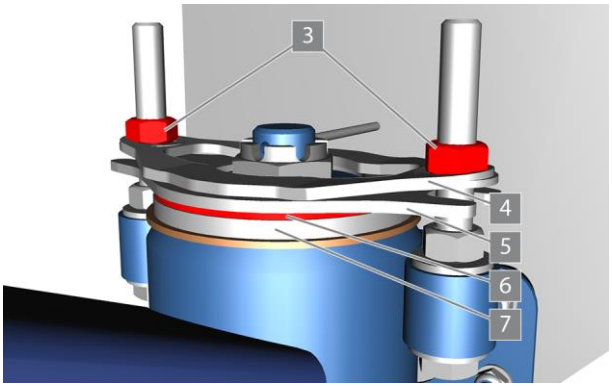
14.11 Readjusting the working brake of the depth and transport wheel

The depth and transport wheel is fitted with a tension disc as the working brake to prevent a rocking motion of the depth and transport wheel.

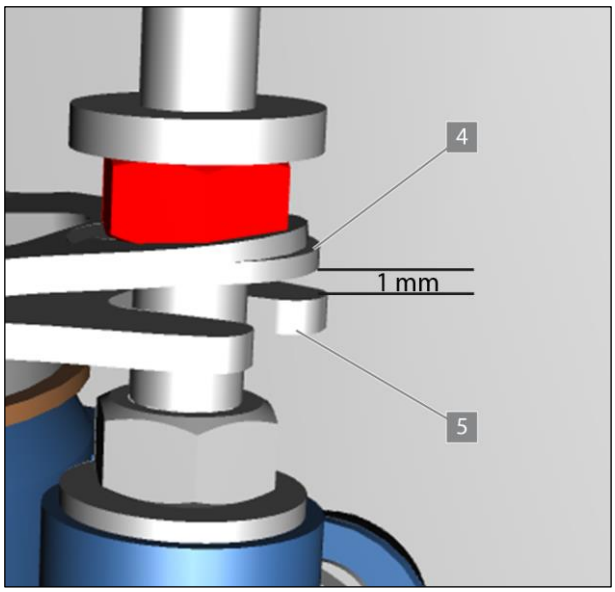
The tension disc must be readjusted with increasing wear of the brake lining.



– Loosen the nuts (1).
– Remove nuts and washers.
– Remove the cover (2).



– Tighten the nuts (3) on both sides evenly.
    - The flat spring (4) presses the sheet (5) and the brake lining (6) against the disc (7).



- The distance between the flat spring (4) and the sheet (5) must be 1 mm on the outside on both sides.

– Reinstall the cover (2).

– Insert the washers and nuts (1).

– Tighten the nuts (1).

14.12 Air pressure of the tyre

WARNING

Hazard due to incorrect air pressure

Excessive air pressure in the tyres may cause the tyres to burst, whereas insufficient air pressure may cause overloading of the tyres. This will have a negative influence on accurate towing of the implement. This causes an obstruction and a hazard to other road users.

Do NOT use the assembly air pressure stated on the tyres.

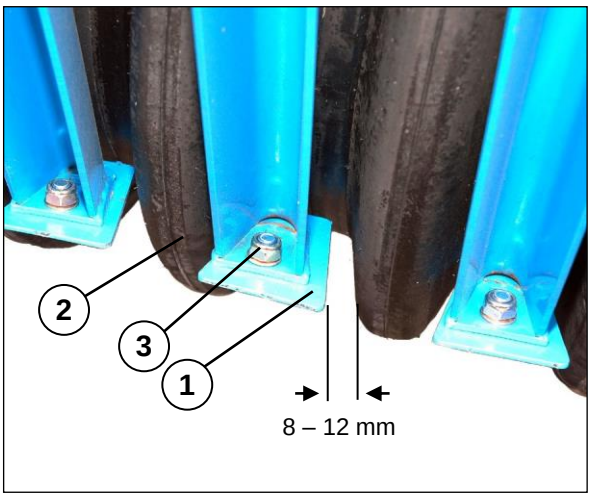
Adjust the air pressure according to the specifications in the operating instructions.

The PR figure or the load / speed index and the tread designation are stamped into the tyres.

Rubin 10 U – with depth and transport wheel					
Tyre size	**Manufacturer**	**Profile**	**Ply rating [PR]**	**Load + speed index**	**Air pressure [bar]**
400/60 x 15.5 TL	Trelleborg	T-405		145 A8	1.00

14.13 Scrapers

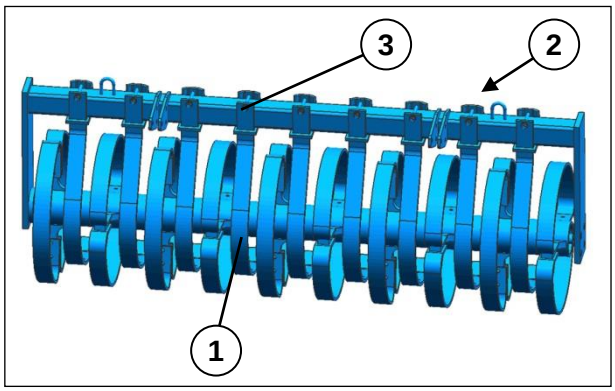
14.13.1 Scrapers on rubber ring roller



The scrapers (1) on the rubber ring rollers (2) have slots to allow adjustment.

- Release the self-locking nut (3).
- Adjust the relevant scraper on the roller so that it has a clearance of between 8 and 12 mm to the rings.
- Re-tighten the self-locking nut (3) (46 Nm).

14.13.2 Flex ring roller scrapers



The scrapers (1) on the flex ring roller (2) must be replaced when worn down to a thickness of 5 mm so as to prevent the remaining piece from being lost and subsequent damage from being incurred.

- Undo the bolt (3).
- Remove the worn scraper.
- Attach a new scraper.
- Tighten the bolt to a tightening torque of 93 Nm.

15 TECHNICAL DATA

15.1 Dimensions

Rubin 10 U* – without depth and transport wheel				
	250	**300**	**350**	**400**
Minimum length approx. [mm]		3060		
Maximum length approx. [mm]		3800		
Approx. working width [mm]	2500	3000	3500	4000
Approx. transport width [mm]		2996		
Implement height* approx. [mm]**		1563		
Centre of gravity approx. [cm]**		160.8		

* Observe applicable national regulations on transport width.
To determine the actual dimensions: Measure

** According to drawing.

*** Implement height – lowered onto ground.

Rubin 10 U* – with depth and transport wheel				
	250	**300**	**350**	**400**
Minimum length approx. [mm]		4775		
Maximum length approx. [mm]		5405		
Approx. working width [mm]	2500	3000	3500	4000
Approx. transport width [mm]		2996		
Implement height* approx. [mm]**		2038		
Centre of gravity approx. [cm]**		170.5		

* Observe applicable national regulations on transport width.
To determine the actual dimensions: Measure

** According to drawing.

*** Implement height – lowered onto ground.

15.2 Implement weights

Rubin 10 U* – without depth and transport wheel				
	250	**300**	**350**	**400**
Minimum gross weight approx. [kg]		2063		
Maximum implement weights approx. [kg]		2462		

* To determine the actual implement weights: Weigh

Rubin 10 U* – with depth and transport wheel				
	250	**300**	**350**	**400**
Minimum gross weight approx. [kg]		2390		
Maximum implement weights approx. [kg]		2810		
Minimum axle load approx. [kg]		0		
Maximum axle load approx. [kg]		600		

* To determine the actual implement weights: Weigh

15.3 Tractor power

Rubin 10 U				
	250	**300**	**350**	**400**
Tractor power from – to [HP / kW]		105 – 150/ 77 - 110		

15.4 Application conditions

Rubin 10 U				
	250	**300**	**350**	**400**
Minimum working depth [cm]	3	3	3	3
Maximum working depth [cm]	12	12	12	12
Recommended operating speed [km/h]	10 - 18	10 - 18	10 - 18	10 - 18

15.5 Permitted maximum speed

Rubin 10 U				
	250	**300**	**350**	**400**
Without depth and transport wheel [km/h]	permitted maximum speed of the tractor			
With depth and transport wheel [km/h]	40	40	40	40

16 NOISE, AIRBORNE SOUND

The noise level of the implement does not exceed 70 dB (A) during work.

17 NOTES

As the version of equipment is depending from the order, the equipment of your implement and its description concerned may deviate in some cases. To ensure a continuously updating of the technical features, we reserve the right to modify the design, equipment and technique.

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