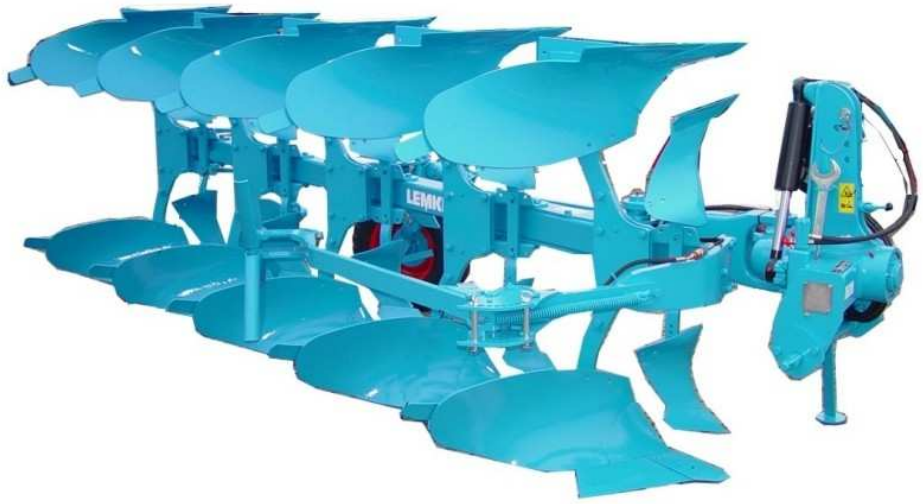
Operating Instructions

Mounted Reversible Ploughs

VariOpal



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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 rating 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 SAFETY INSTRUCTIONS

General Safety Instructions

- Before using the machine, always check both it and the tractor for roadworthiness and operational safety!
- As well as the notes in these instructions the operator is advised to comply with the generally applicable safety at work regulations and those relating to use of the public highway!
- When driving on public roads with a raised machine the lifting control lever should be locked against unintentional lowering!
- The fitted warning and advisory plates give important information for safe operation; adhering to these increases your own safety!
- When using public roads adhere to applicable traffic rules!
- The operator should familiarise him-/herself with all controls and their functions before starting work. During work could be too late!
- The clothing of the operator should fit tight. Avoid wearing any loose clothing!
- To avoid danger of fire keep the implement clean!
- Before beginning to drive check surroundings area (children)!
- Sitting or standing on the implement during operation or during transport is not permissible.
- Attach implements as advised and only to the stipulated positions!
- Special care should be taken when the implement is coupled to or uncoupled from the tractor.
- When coupling or uncoupling the implement bring the supporting stands into the corresponding position (standing safety)!
- Fit weights only to the fixing points provided for those purposes!
- Adhere to the maximum permissible axle loads, total weights and transport width!

- Fit and check transport gear, road lights and warning guards!
- The release ropes for quick coupler latches should hang freely and in the lowered position must not release the quick coupling by themselves.
- Never leave the driver's seat whilst in motion!
- Handling behaviour, steerability and braking are influenced by mounted implements, trailers and ballast weights. Check for sufficient steerability and braking!
- When driving round bends note the width of the machine and/or changing centre of gravity of the implement.
- Put implement into operation only when all guards are fixed in position!
- Never stay or allow anyone to stay within the operating area!
- Never stay in the turning and slew area of the implement!
- Do not operate any hydraulic controls while anybody is in the operating area!
- On all pivoting parts actuated by power assistance (e.g. hydraulics) exists danger of injury by bruising and crushing!
- Before leaving the tractor lower the machine to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Do not allow anybody between the tractor and implement if the parking brakes are not applied!
- Swing attachment arm to transport position and secure!

Mounted implements

- Before mounting or dismounting implements on/from the three-point linkage, move the raise / lower control to the position at which accidental raising or lowering cannot take place!
- In the case of three-point linkage mounting, ensure that the tractor balls and the mounting pins of the implement are of the same category!

- There is the risk of injury from pinch and shear points in the three-point linkage area!
- When operating the external lift controls for the three-point linkage, do not stand between the tractor and implement!
- Always ensure sufficient lateral limitation for the three-point linkage of the tractor in the transport position of the implement!
- When driving on roads with the implement raised, the raise/lower control must be locked to prevent lowering!

Hydraulic Equipment

- The hydraulic pipes are under pressure!
- When connecting hydraulic rams, the pipes must be connected as directed!
- Always release hydraulic pressure from both tractor and implement before coupling!
- When connecting hydraulic pipes to the tractor ensure that incorrect use is avoided. If the connections are reversed, the opposite function is carried out (e.g. raising/lowering) and there is a risk of accidents!
- Regularly check the hydraulic pipes and replace them in the event of damage or signs of ageing. The replacement pipes must comply with the technical specification as laid down by Lemken!
- When searching for leaks appropriate aids should be used because of the danger of injury!
- Hydraulic oil escaping at high pressure can penetrate the skin and cause serious injury! When injured see a doctor immediately! Danger of infection!
- Before working on any hydraulic equipment - lower all implements/attachments, release hydraulic pressure where possible and switch off the tractor engine!

Tyres

- When working on the tyres make sure that the implement has been placed on the ground safely and that it is secured by chocks against unintentional rolling!
- Fitting tyres requires knowledge and special tools!
- Repair work on tyres may only be conducted by trained staff and with suitable tools!
- Check air pressure regularly and adhere to the advised air pressure!

Maintenance

- Repair-, maintenance- and cleaning operations as well as adjustments and remedy of function faults should principally be conducted with engine stopped and brakes applied. Remove ignition key!
- Check and tighten nuts and bolts regularly!
- When conducting maintenance work on a lifted implement always place suitable supports underneath!
- For replacing any tools with cutting edges always use suitable tools and gloves!
- Dispose of old oils, grease and filters as prescribed by law.
- Before working on the electric gear disconnect battery cables!
- When conducting electrical welding operations on the tractor or on the mounted implement remove cable from the generator and the battery!
- Any spare parts fitted must meet with the implement manufacturer's fixed technical standards! This is for example ensured by using genuine spare parts!
- To avoid danger of explosion only use nitrogen for filling up gas tanks!

2 WARNING STICKERS

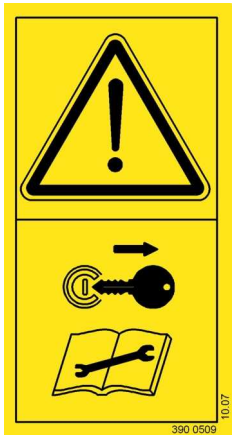
2.1 General Instructions

The LEMKEN implement is equipped with all features to ensure safe operation. Where potential danger areas of the implement can not be fully safeguarded, warning stickers are fitted which draw attention to these. Damaged, lost or unreadable warning stickers must be replaced immediately. The stated part numbers are used as order numbers.

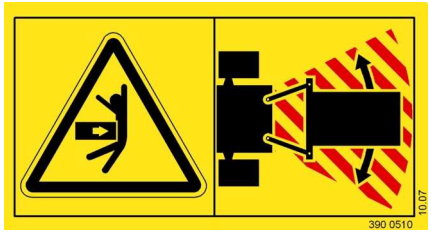
2.2 Meaning of the Stickers

Familiarise with the meaning of the stickers. The following descriptions inform about them in detail.

WARNING: Read and adhere to this instruction book and these „General Health- and Safety precautions„ before putting the implement to work!

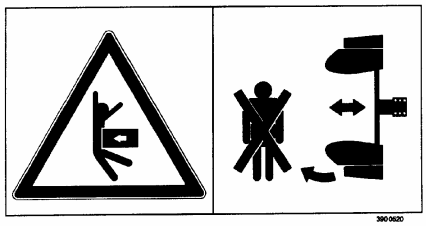


WARNING: Shut off engine and remove key before performing maintenance or repair work!



WARNING: Keep well clear of the working and swinging area of the implement!

WARNING: Pinch point!



WARNING: Keep well clear of the turning and swinging area of the implement!

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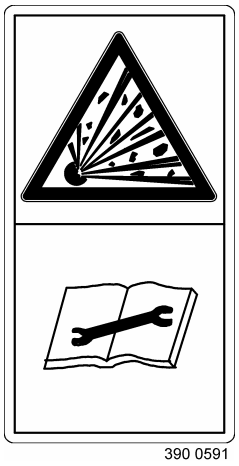

WARNING: Hydraulic accumulator contains gas and oil under pressure. For removal and repair instructions in technical manual must be followed!

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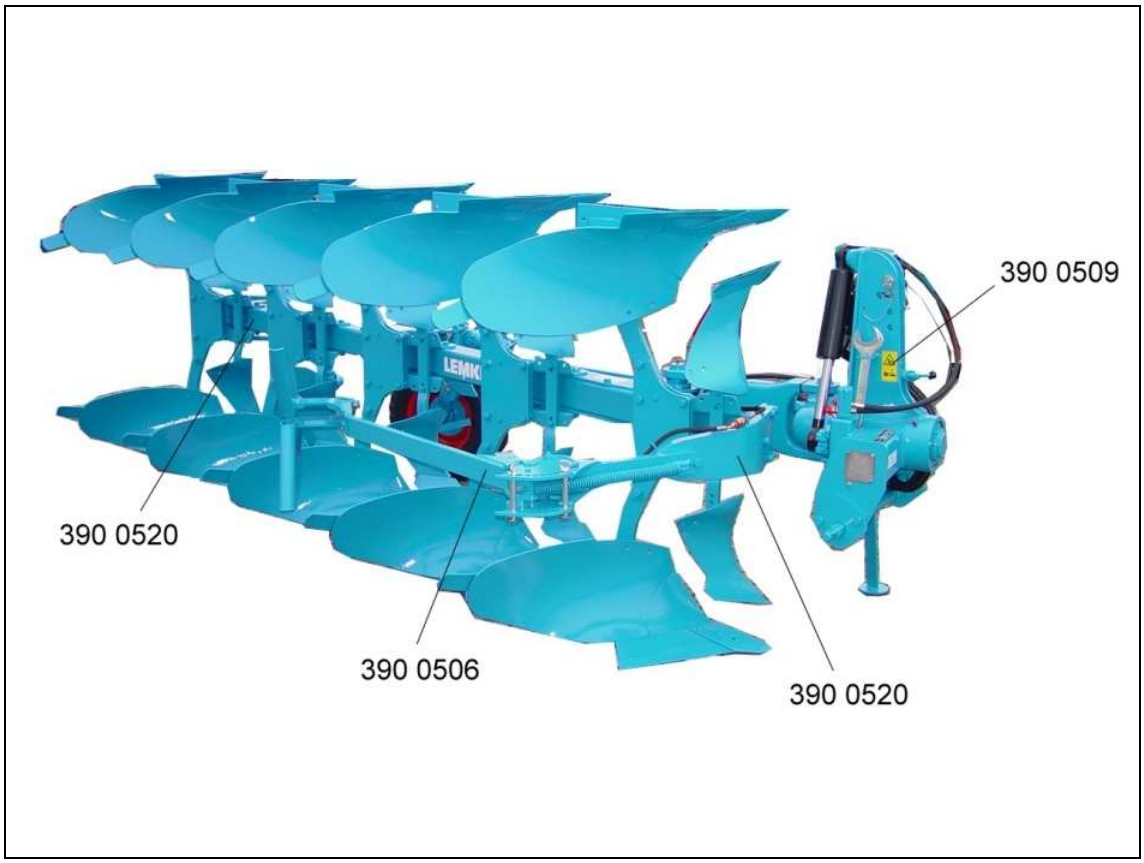
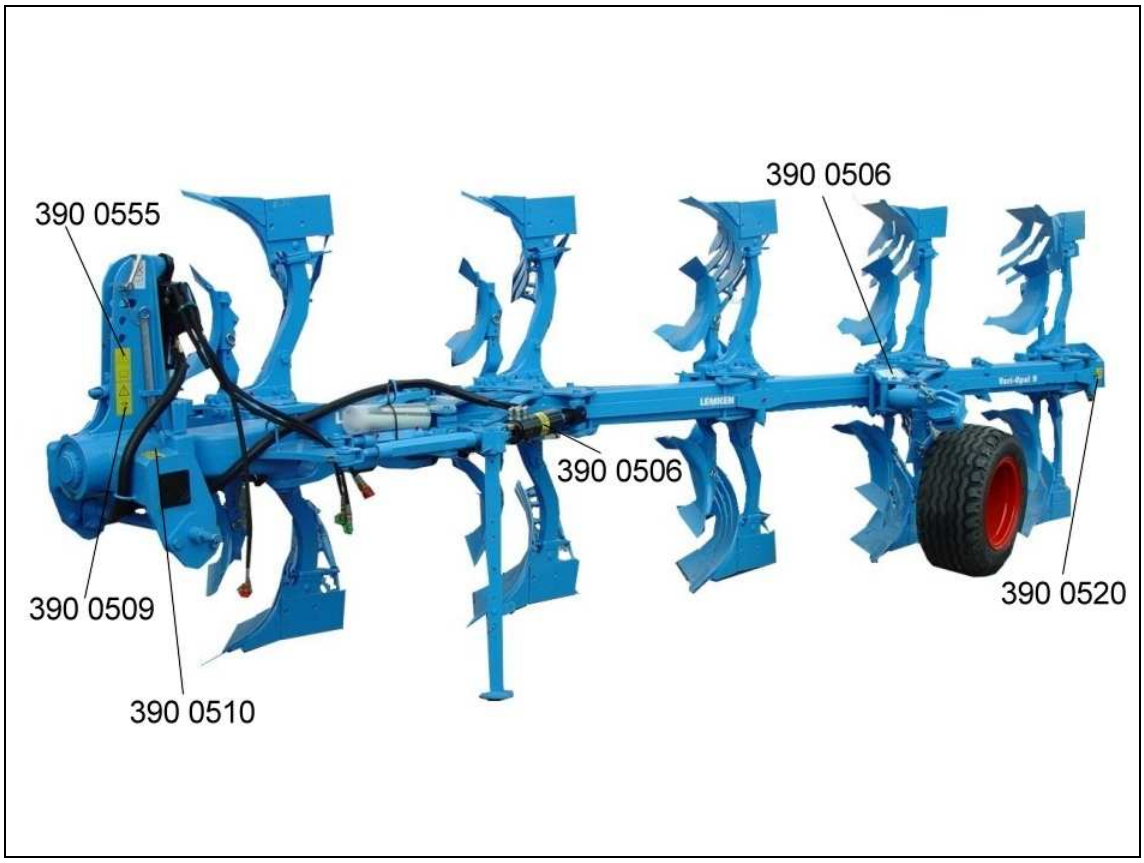
2.3 Position of the Warning Stickers





3 PREPARATION OF THE TRACTOR

3.1 Tyres

The pressure - especially in the rear tractor tyres - must be equal. In heavy conditions it may be necessary to add wheel weights and/or water ballast. (See manufacturer's instructions).

3.2 Lift Rods

Adjust lift rods to equal length. (See manufacturer's instructions).

3.3 Top Link

Where there are alternative fitting positions at the tractor for the top link, fit the top link tractor-sided as hight as possible.

3.4 Check Chains or Sway Blocks of the Three Point Linkage

Check chains or sway blocks MUST be adjusted so that the lower links are always free to move sideways during ploughing.

Attention! Some tractors are equipped with automatic „check devices" which require special adjustments. If a tractor suddenly shows side draft or if the L/H and R/H front furrow width of the plough is different, an unlocked „check device" could be the reason for that. In such a case the function of the automatic „check device" must be checked. (See manufacturer's instructions)

3.5 Hydraulics

For work the tractor hydraulics must be set to 'Draft' or 'Mixed' Control. See manufacturer's instructions.

3.6 Required hydraulic equipment

The tractor must be equipped with the following control units and return connections:

3.6.1 VariOpal (X, HX) – Manual hydraulic plough control system

		Required control units	
		Single-acting	Double-acting
Slewing cylinder	Double-acting connection	-	1
	Single-acting with return connection to oil tank* / **	1	-
	With Vari Stop**	-	1
	With Vari Stop plus	-	2
	With hydraulic tilt adjustment		2
Hydraulic working width adjustment		-	1
Memory cylinder		-	1
Driver arm connected to reversing cylinder		-	-
Driver arm connected straight to control unit		1	-
Hydraulic overload protection		-	1
Hydraulic uni wheel		-	1

3.6.2 VariOpal OF (X) – Manual hydraulic plough control system

		Required control units	
		Single-acting	Double-acting
Slewing cylinder	Double-acting connection	-	1
	With Vari Stop**	-	1
	With Vari Stop plus	-	2
	With hydraulic tilt adjustment		2
Hydraulic working width adjustment		-	1
Frame swing-in		-	-
Driver arm connected to reversing cylinder		-	-
Driver arm connected straight to control unit		1	-
Hydraulic overload protection		-	1
Hydraulic uni wheel		-	1
Hydraulic on-land horizontal swing ***		-	1

3.6.3 VariOpal (X, HX) – EPS electronic plough control system

	Required control units or hydraulic systems
Hydraulic overload protection	Double-acting control unit
Combination block for actuating all other hydraulic cylinders incl. hydraulic front-furrow width adjustment	Load sensing system with pressure, return and LS line or load sensing system, constant pressure system or constant flow system with pressure and return line

* Cannot be used in combination with Vari Stop and Vari Stop Plus.

** If a driver arm is mounted, the hydraulic cylinder for the driver arm must be connected to a separate single-acting control unit.

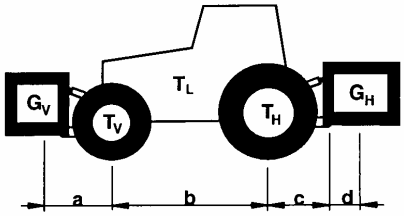
*** The hydraulic on-land horizontal swing can only be delivered in combination with a hydraulic working width adjustment and hydraulic frameswing-in.

3.7 Axle Loads

The attachment of implements to the front- and rear-three point linkage must not lead to exceeding the allowed total weight, the allowed axle load and the allowed tyre load of the tractor.

The tractor front axle must always be loaded with 20 % of the tractor dead weight at minimum.

Calculation of the minimum front ballast and the increasing of the rear axle load:



G_V = Weigth of front ballast (front implement)

T_V = Front axle load of the tractor without mounted implement

T_L = Tractor dead weight

T_H = Rear axle load of the tractor without mounted implement

G_H = Weight of the implement

Calculation of the minimum front ballast G_V min:

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

Calculation of the increasing of the rear axle load:

$$\textit{Minimum axle load increasing} \quad = G_H + \frac{G_H \bullet (c+d)}{b}$$

The calculation of the required minimum front ballast and the increasing of the rear axle load requires that all above mentioned measurements and weights are known. If they are unknown and cannot be found out, there will be only one way to avoid overloads:

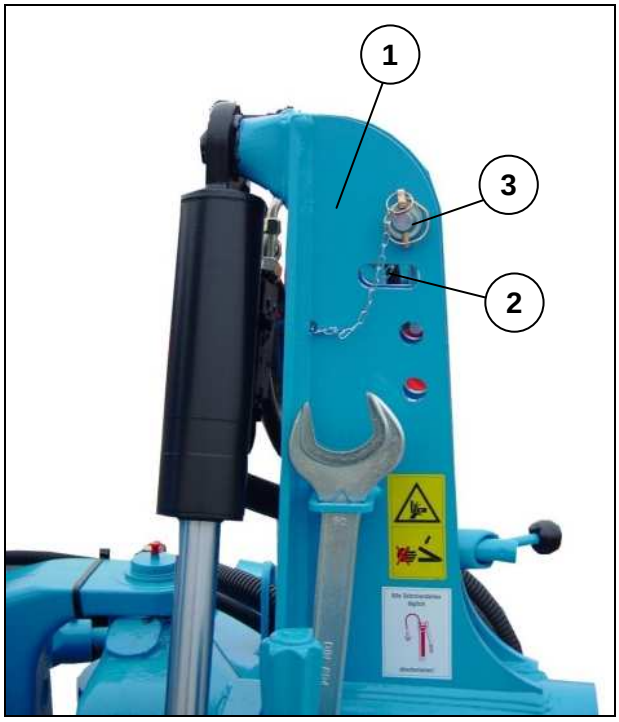
Please weigh your tractor with mounted and lifted implement to find out the actual rear axle loading and front axle unloading and that in comparison with the axle loads of the tractor without implement!

4 USE

4.1 General Instructions

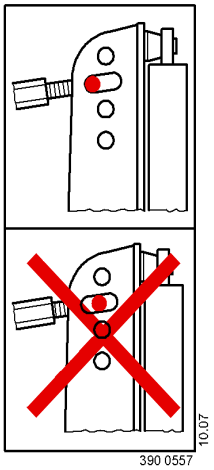
Before the first use it is recommendable - with fully lowered implement - to carry out the following adjustments at the farm. Afterwards only few adjustment corrections have to be carried out in the field.

4.2 Top Link Connection



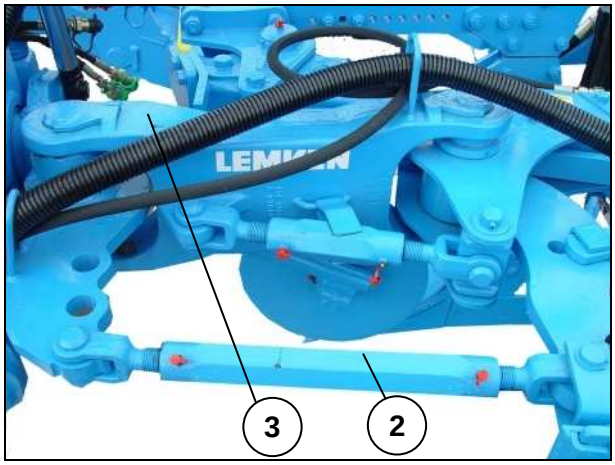
Connect top link to headstock (1) and ensure that the top link rises slightly towards the plough.

In hilly conditions use the slotted hole (2) with ploughs having 5-furrows or more.



Important!	When the top link is connected to the slotted hole (2) the top link pin (3) must always be positioned in front of the slotted hole (2) and the top link must always be tension loaded during work.

4.3 Adjustment of the outer Turnbuckle of the Adjustment Centre Optiquick



The outer turnbuckle (2) has been adjusted to the extreme to allow compact transport on lorries. Adjust this turnbuckle to a length similar to that of the main link (3). Final adjustments can take place in the field.

4.4 Length of the Top Link

Lower plough and adjust length of top link, so that the first body is approx. 1 to 3 cm higher than the rear one.

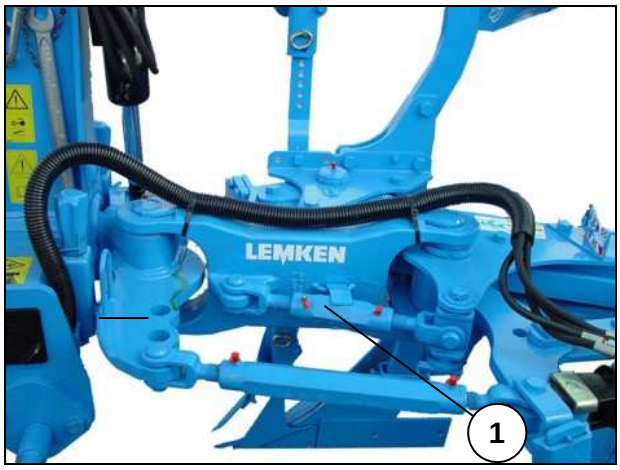
When the top link is fitted “in” the slotted hole, it must be adjusted with lowered plough until the top link pin is unloaded but is still positioned in front of the slotted hole and the plough is also 1 to 3 cm higher in front than in the rear.

4.5 Depth Control Wheel resp. Depth and Transport Wheel

Adjust the depth control wheel / depth and transport wheel to obtain the intended working depth.

Swing the wheel rearwards against its stop and measure the vertical distance between wheel and ground. Make adjustments as required.

4.6 Clearance for the Turnover Operation

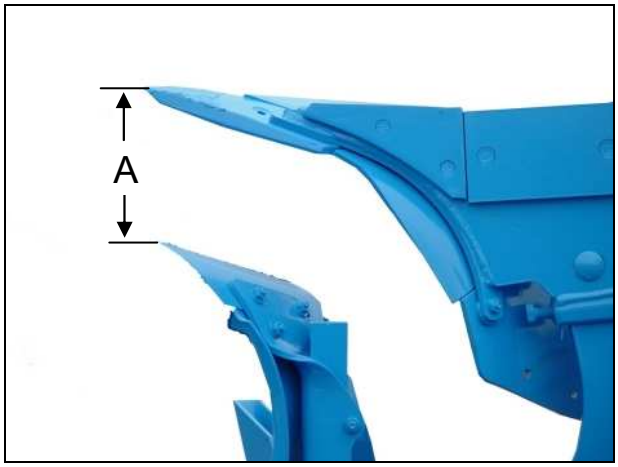


Check whether there is sufficient clearance between plough/depth wheel and ground. If not, shorten the inner turnbuckle (1), set drawbar deeper, fit top link to a higher hole in the headstock or use an hydraulic frame swing-in assy.

Raise the plough fully and then turn the plough carefully.

When a Memory ram is fitted, the plough frame can 1st be swung-in and 2nd the front furrow width can be adjusted from the tractor seat.

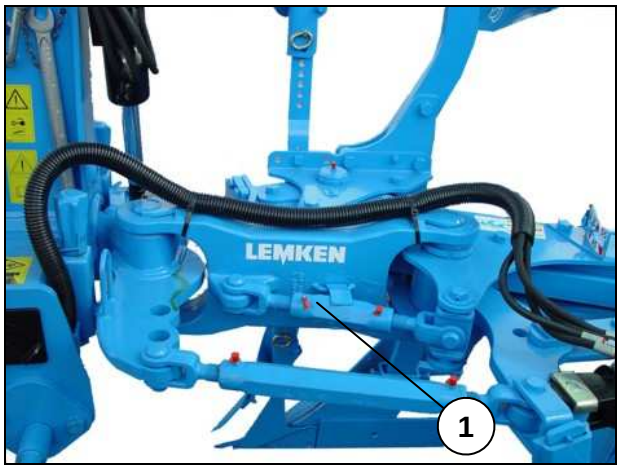
4.7 Skimmers



The skimmers should be set to a depth between 5 and 10 cm.

If the required working depth of the plough is 25 cm, the skimmers should be adjusted so that the distance **A** between the point of the skimmer and point of the plough body amounts to 15 to 20 cm.

4.8 On the Field



Set tractor hydraulics to ‘Draft Control’ or 'Mixed Control'.

Set in the plough and adjust the length of the top link, vertical pitch, front furrow width, working depth and depth control wheel / depth and transport wheel as required.

Attention: The plough wheel is a control wheel, not a carrying wheel. Thus the tractor hydraulics must be adjusted so that the top link is always under tension, especially with ploughs of 5 or more furrows. Due to that the weight will be transferred to the tractor resulting in less slippage and reduced fuel consumption.

Adjust the tractor plough line by means of the inner turnbuckle (1). This will eliminate side draft and optimise the pull point which again will reduce slippage and fuel consumption.

4.9 Three Point Attachment

4.9.1 General information

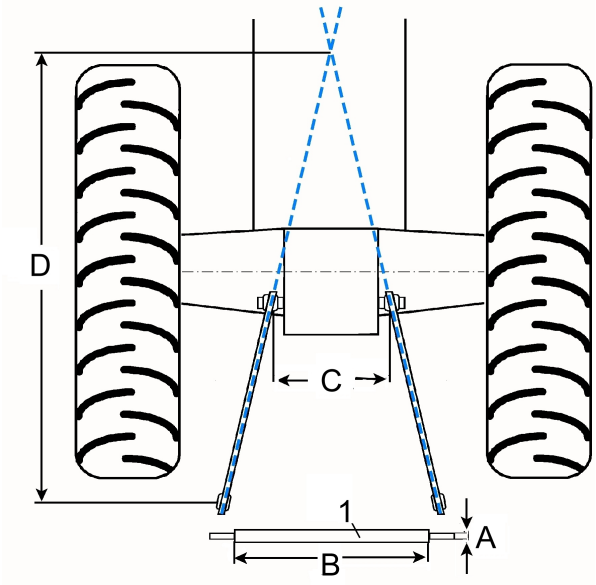
Loss of the implement

WARNING

The tractor's three-point linkage category and the category of the draw rail and top link pin must match. Otherwise, the draw rail and the top link pin may slip out of the linkage when driving over uneven ground or due to vibrations.

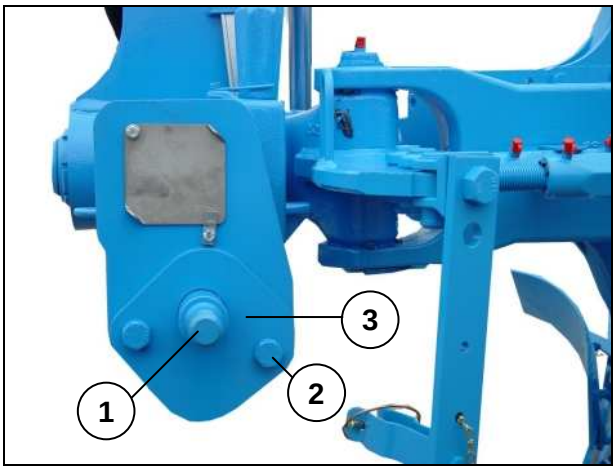
- Always ensure that the three-point linkage category exactly matches the diameter of the draw rail and the top link pins.

The maximum permissible tractor outputs and dimensions as per ISO 730-1 for the corresponding category are available in the following table.



Tractor output		Cat.	Pintle diameter of bar shaft (mm)	Length of bar shaft (shoulder distance) (mm)	Tractor-lower link distance (mm)	Distance between draw-in rail and lower link intersecting point extension (mm)
kW	**HP**		**A**	**B**	**C**	**D**
30 - 92	40 - 125	2	28	825	390 - 505	1800 - 2400
60 - 185	82 - 251	3N	36.6	825	390 - 505	1800 - 2400
60 - 185	82 - 251	3	36.6	965	480 - 635	1900 - 2700
110 - 350	150 - 476	4N	50.8	952	480 - 635	1900 - 2700

4.9.2 Height Adjustment of the Drawbar



The drawbar (1) can be set in two different heigth positions.

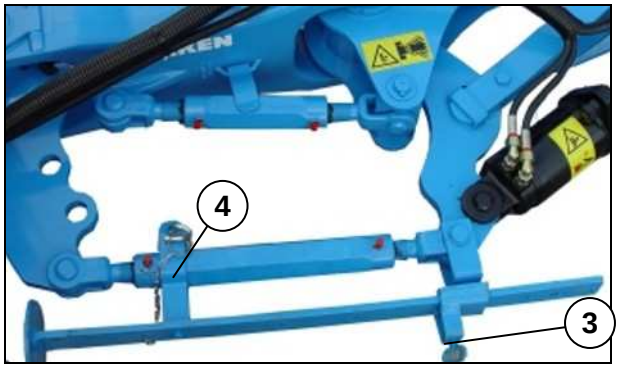
Fundamentally the top position should be chosen to reach a better entry of the implement. The lower position should be chosen, only when the implement cannot be lifted sufficiently for the turning procedure.

If it is required to change the position of the drawbar, the bolts (2) must be loosened, the plates (3) with drawbar turned by 180° and then fitted again.

The nuts of the bolts (2) must be tightened by a tightening torque of 580 Nm and secured with Loctite.

5 ATTACHING AND DETACHING THE PLOUGH

5.1 Attaching

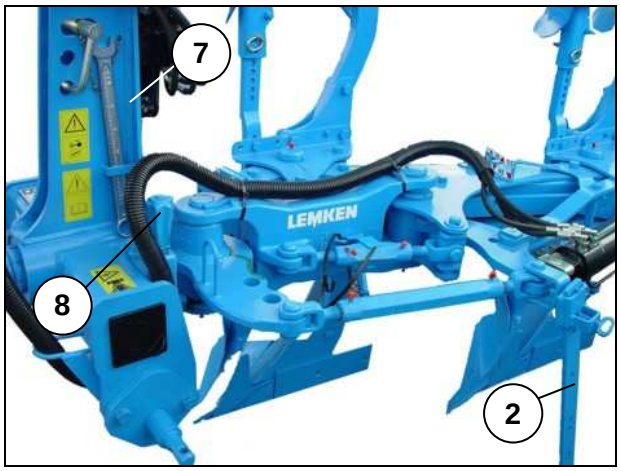


Attach the plough parked in working position to the tractor as follows:

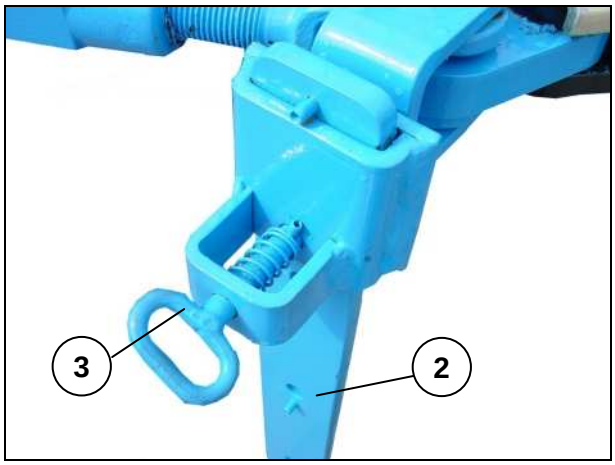
- Set tractor hydraulics to ‘Position Control’!
- Attach lower links to the drawbar (1) and secure!
- Relieve stand (2) and remove securing pin (3) up to the stop!
- Swing stand upwards and move in by approximately 30 cm! (It may not touch the turnover mechanism during turning operation.) Not required with VariOpal OF!
- Ensure that the securing pin (3) is locked!

- Push stand with spring clamp (4) above the spindle or with the OF-version above the outer hydraulic ram and secure!
- Fit top link to headstock so that it rises slightly towards the plough during work!
- Secure top link pin (5). Use top link pin delivered with the plough, only! In hilly soil conditions use slotted hole (6) for all 5-, 6- and 7-furrow ploughs!
- Connect hydraulic hoses!
- For work set tractor hydraulics to ‘Draft’ or ‘Mixed’ Control! See also the operating manual of the tractor manufacturer!
- If the plough is to be transported on public roads, fit warning boards respectively lighting equipment!

5.2 Detaching



- Park the plough on a firm and level ground!
- Turn plough to working position!
- Set tractor hydraulics to ‘Position Control’!
- Lower plough completely!
- Make hydraulic hoses pressureless! See operating manual of the tractors manufacturer!
- Remove top link from headstock!
- Remove hydraulic hoses and fit protective caps.
- Put hydraulic hoses with their couplings between headstock (7) and adjuster nut (8)!

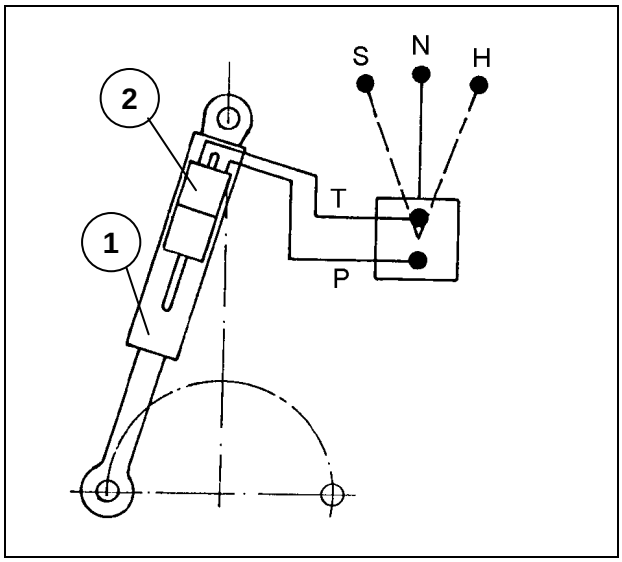


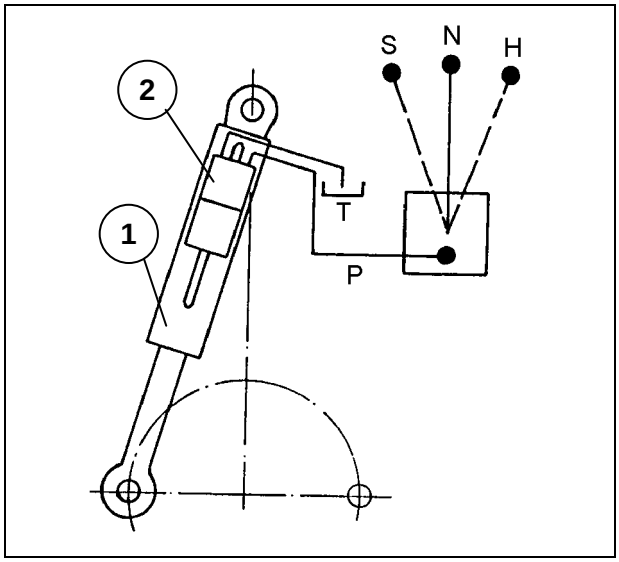
- Remove securing pin (3) up to the stop!
- Release stand (2), remove as required and swing-down!
- Lock securing pin (3) and check, whether it is locked correctly!
- Remove lower links from the drawbar!

Attention! When the plough is parked the headstock (7) is in oblique position, which can make a later re-attachment difficult. So before parking the plough the headstock (7) should be “set straight” by means of corresponding adjustment of the adjuster nut (8). This eases the later attachment. Before the next use, set the headstock to original position again by means of turning back the adjuster nut by the same amount!

Read and adhere to the General Safety Instructions as well as to the Instructions ’Mounted implements’!

6 TURNING THE PLOUGH FRAME





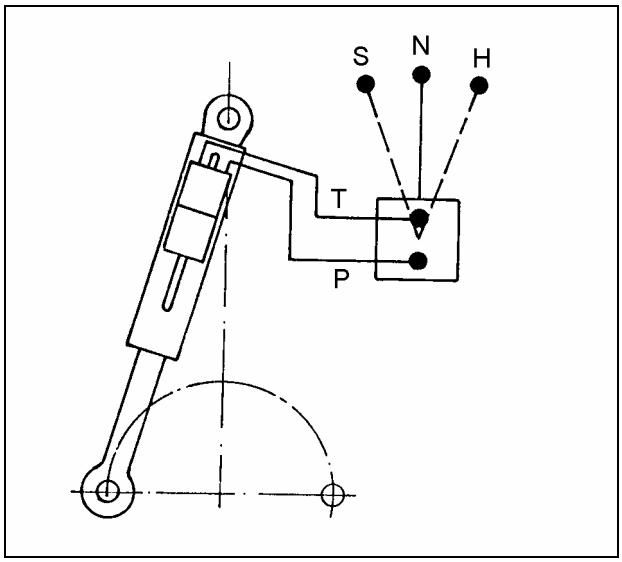
The turnover device is equipped with a double acting turnover ram (1) with automatic turnover valve and automatic lock valve for the connection to a double acting spool valve. In combination with a separate return pipe to the oil tank of the tractor it is possible to connect the turnover ram to a single acting tractor spool valve.

The turnover ram (1) is available in three different versions:

a) with one-piece lock valve for ploughs without frame swing-in assembly or without memory ram,

b) with two-piece lock valve (2) with sequence switch for ploughs with hydraulic frame swing-in assembly or Memory ram or

c) with two-piece lock valve (2) with sequence switch and return lock for ploughs in OF-version. This version **must** also be available at the plough when equipped with a FixPack.



– For the turning operation raise plough completly!
– Switch control lever to "H": Plough frame turns through about 180°!
– After completion of the turnover operation move the lever to the position ‘N’. After 3 - 6 seconds the next turnover can be started.

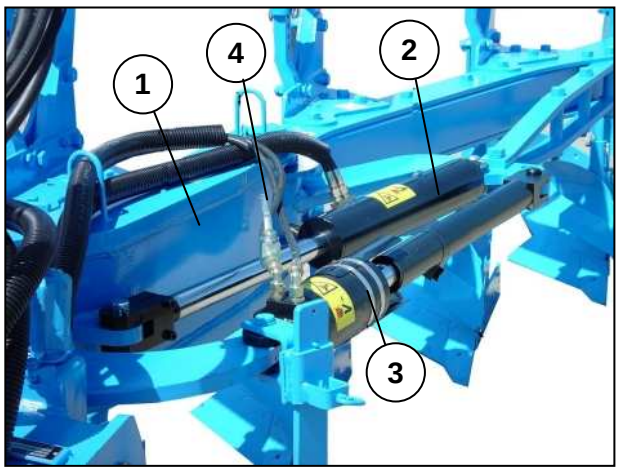
The next turnover can be started immediately when moving the lever to position ‘S’. (This is only possible when connected to a double acting service.)

Attention! In combination with hydraulic frame swing-in assembly (3) with a Memory ram the plough frame swings-in before the first turnover procedure and after that out again!

- Read and adhere to the General Safety Instructions as well as to the Instructions ‘Hydraulic Equipment’!
- Before each turnover procedure, it must be ensured that no persons are standing in the turning and swinging area of the plough!
- Operate turnover device from the tractor seat, only!
- Do not bend hydraulic hoses!
- Keep clean the hose connections!
- Pay attention to paragraph "ONLAND USE"!

7 ONLAND-USE (VARIOPAL OF)

7.1 General Instructions



The range 8 and 9 of the VariOpal are also available as onland version. This version can be used onland = O-operation or in the furrow =F-operation.

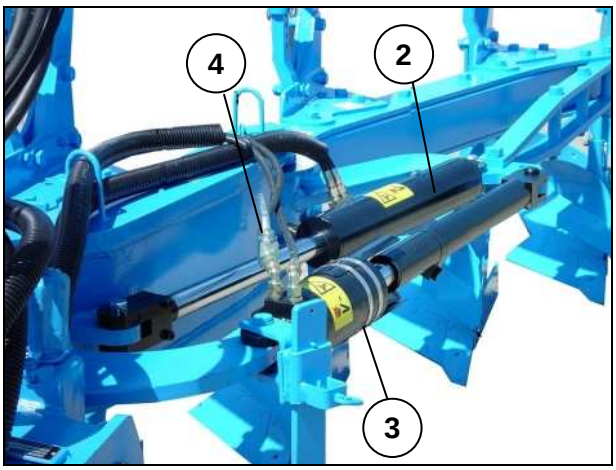
O-operation = onland use behind a crawler or a tractor

F-operation = use in the furrow behind a tractor

Contrary to the VariOpal the VariOpal OF shows the adjustment centre Optiquick with a long main link (1), a hydraulic ram (2) and a hydraulic ram (3) with lock valve (4) for the frame swing-in procedure.

Attention: The lock valve (4) is used for switching on or off the frame swing-in device during turning operation, only. In O-operation the lock valve should be closed.

7.2 Conversion from F-Operation to O-Operation

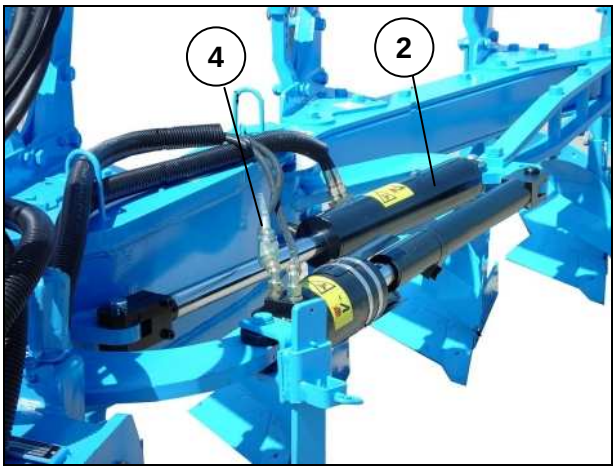


For the conversion from working in the furrow (F-operation) to working onland (O-operation) the inner hydraulic ram (2) must be closed.

The outer hydraulic ram (3) must be adjusted so that the headstock is nearly in right angle (90°) to the landslides of the plough bodies.

The lock valve (4) must be closed after that to switch off the frame swing-in assembly.

7.3 Converison from O-Operation to F-Operation



For the conversion from working onland (O-operation) to working in the furrow (F-operation) the hydraulic ram (2) must be opened.

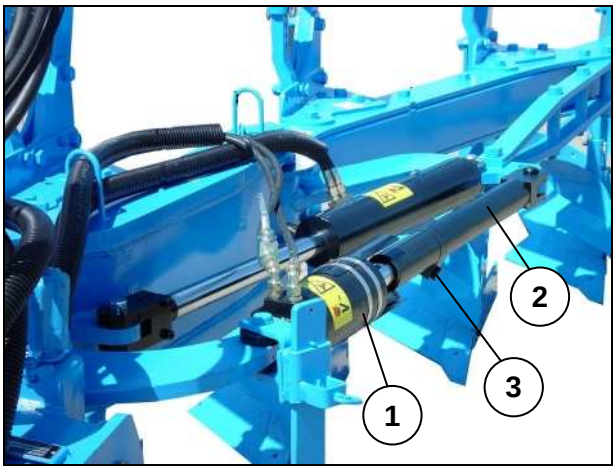
After that the lock valve (4) must be opened to activate the frame swing-in assembly.

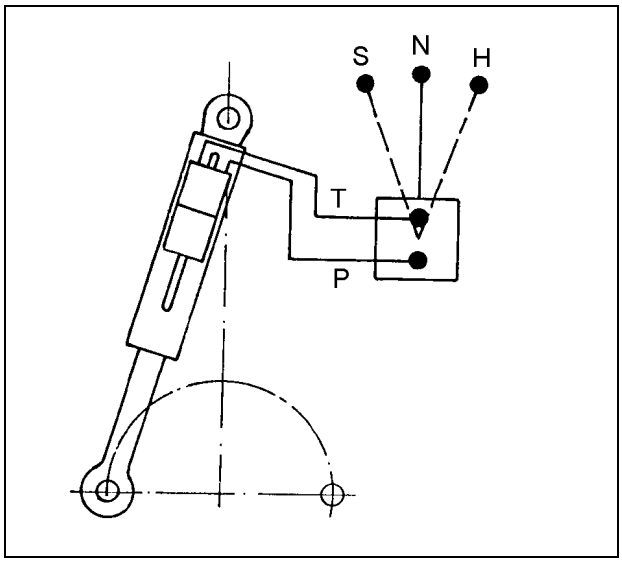
During turnover operation the plough frame will be swung-in and -out again.

If it is required to turn the plough frame without swinging-in and out, the lock valve (4) must be closed.

7.4 Adjustment Centre Optiquick

7.4.1 F-Operation





Front Furrow Width Adjustment

Before adjustment, open the hydraulic ram (1) a little to unload the adjuster sleeve (2). This will be done by lowering the plough fully and pressurising the port ‘P’ of the turnover ram briefly.

Adjust the front furrow width - with fully lowered plough - by means of the adjuster sleeve (2) of the hydraulic ram (1) after slackening the clamping bolt (3) so that it corresponds to the working width of the following bodies.

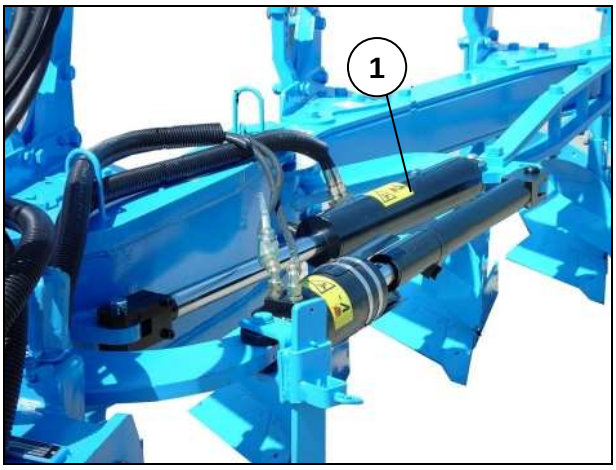
Front furrow too narrow

=> Adjust adjuster sleeve (2) anti-clockwise

Front furrow too wide

=> Adjust adjuster sleeve (2) clockwise

Tighten clamping bolt (3) carefully after adjustment and close swing-in ram by pressurising the port ‘T’ of the turnover ram.



Correction of the Lateral Draw respectively Adjustment of the Tractor/Plough Alignment

Operate the inner hydraulic ram (1) to adjust the tractor/plough alignment.

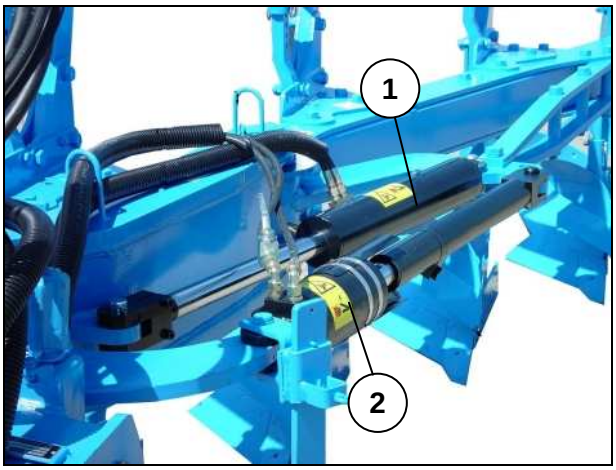
If the tractor pulls to the ploughed land

=> open inner hydraulic ram (1) slightly

If the tractor pulls to the unploughed land

=> close inner hydraulic ram (1) slightly

7.4.2 O-Operation



Distance from the Tractor to the Furrow Wall

The distance of the tractor to the furrow wall will be adjusted by means of the inner hydraulic ram (1).

Distance too narrow

=> close hydraulic ram (1) slightly

Distance too wide

=> open hydraulic ram (1) slightly

Correction of the Lateral Draw resp. Adjustment of the Tractor/Plough Alignment

Adjust the tractor/plough alignment by means of the hydraulic ram (2).

If the tractor pulls to the ploughed land

=> open hydraulic ram (2) slightly

If the tractor pulls to the unploughed land

=> close hydraulic ram (2) slightly

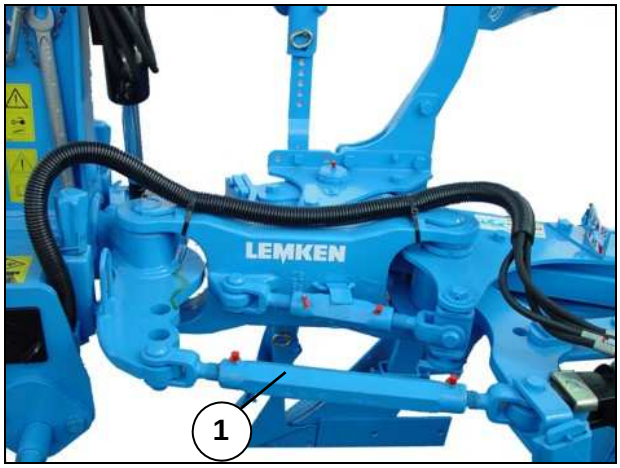
- Read and adhere to the General Safety Instructions as well as to the Instructions 'Hydraulic Equipment'!

8 ADJUSTMENTS

- Read and adhere to the General Safety Instructions!
- The implement may only be operated, maintained and repaired by such persons who have been made acquainted with it and who have been advised about the dangers!
- Adjustment- and maintenance operations as well as eliminations of malfunctions should principally be carried through with engine stopped and parking brake applied. Remove ignition key!

8.1 Front Furrow Width

8.1.1 Adjustment by means of a Turnbuckle

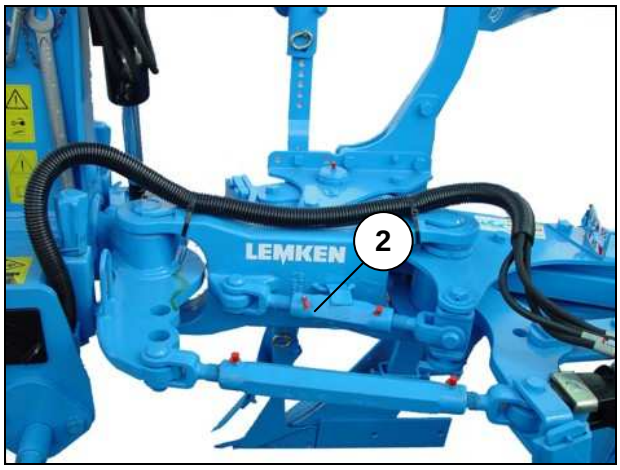


Adjust outer turnbuckle (1) to make the front furrow width equal in width to the other bodies.

Front furrow too narrow
=> lengthen outer turnbuckle (1)

Front furrow too wide
=> shorten outer turnbuckle (1)

8.2 Tractor/Plough Alignment



Adjust the tractor/plough alignment by means of the inner turnbuckle (2), so that there is no lateral draw.

Tractor pulls to the ploughed land

=> lengthen inner turnbuckle (2)!

Tractor pulls to the unploughed land

=> shorten inner turnbuckle (2)!

It is always positive to adjust the inner turnbuckle as short as possible (saving of turning energy, low oil heating, higher lift height, lower landslide wear and lower tractive-force requirement).

The inner turnbuckle is adjusted too short when the tractor runs into the ploughed land, the lower links are no more free respectively the lower links or the headstock touch parts of the tractor.

- Read and adhere to the Safety Instructions!
- There is a pinch point between hydraulic ram and adjuster sleeve. Keep distance!

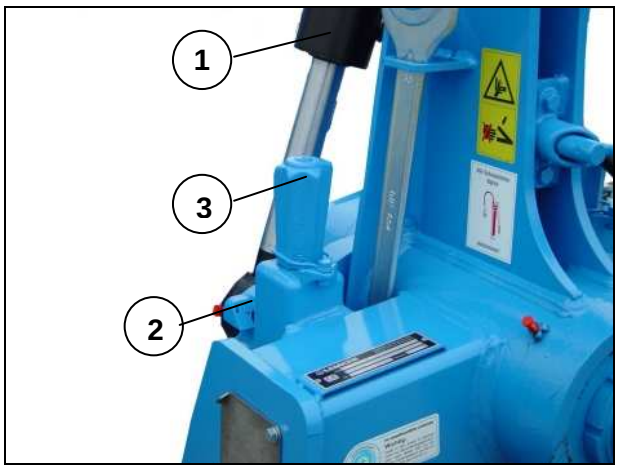
- In combination with the hydraulic frame swing-in assembly the plough frame swings-in first and then out again after turnover operation!

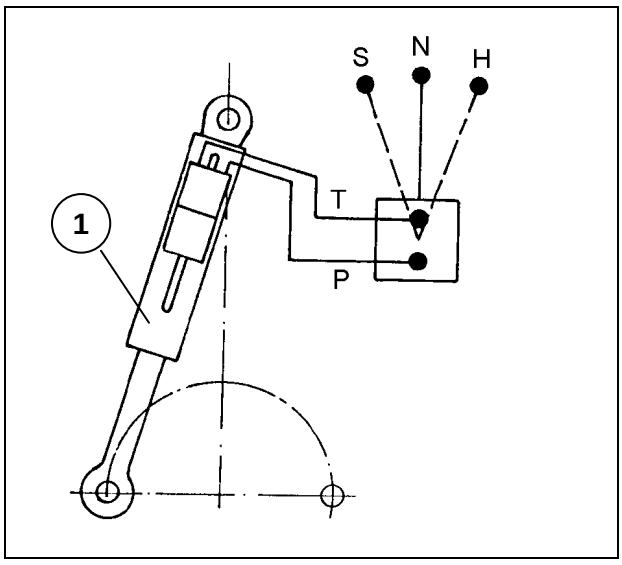
8.3 Angular adjustment

8.3.1 General information

When ploughing, the base blade should be almost vertical to the ground as seen from the direction of travel. If this is not the case, then the angular adjustment must be altered as described below.

8.3.2 Angular adjustment (double acting)





a) Raise plough by several centimetres (approx. 5 - 10 cm).

b) Briefly apply pressure to hydraulic hose that leads to hose terminal P on the slewing cylinder (1). While doing so the stopper arm (2) moves a few centimetres away from the end stop.

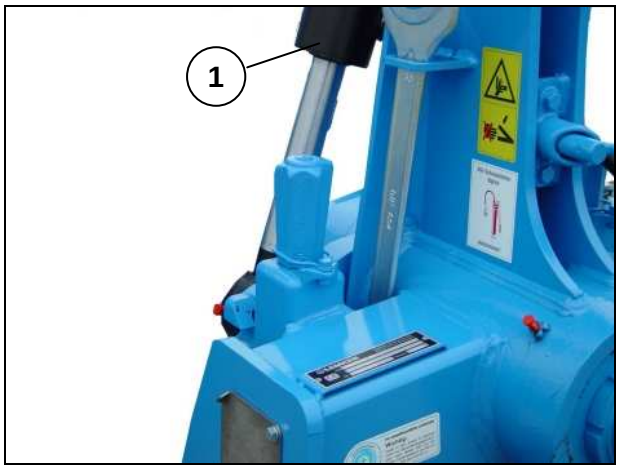
c) Use adjusting nut (3) to set angular adjustment as follows.

d) Switch actuation lever on tractor control unit to opposite pressure position. This causes the plough frame and thus the stopper arm (2) to turn back again.

e) Lower plough again.

Check whether the setting is good enough. If not, repeat setting as described above.

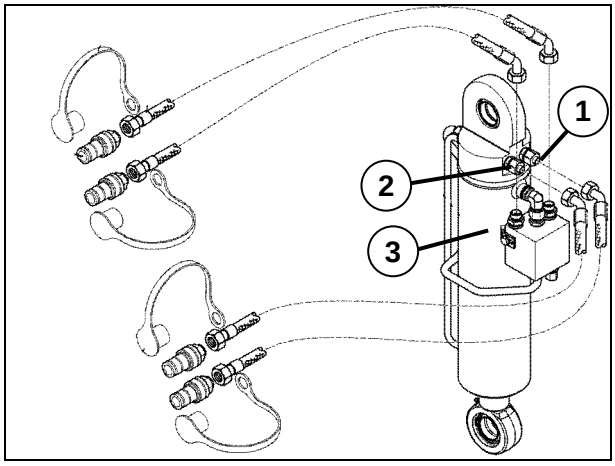
8.3.3 Angular adjustment (single acting)



In combination with a slewing cylinder (1) connected to a single-acting control unit with a return line to the tractor's oil tank, the angular adjustment is set as mentioned in points a) - c) of the previous section.

Following this raise the plough completely, turn it all the way and then back again after approx. 3 - 6 seconds, and then lower again. If the angular adjustment setting is not good enough then the adjustment procedure has to be repeated again.

8.3.4 Angular adjustment with slewing cylinder with hydraulic angular adjustment (memory function)



In combination with a slewing cylinder with memory function, the plough's angular adjustment is set directly through the slewing cylinder.

Angular adjustment is set through connections (1) and (2).

– To do so, move the cylinder (3) in or out.

If required, the slewing cylinder with memory function enables the angular adjustment to be moved over from the tractor seat.

If, e.g. the final furrow at the edge of a field is to be flat ploughed, then the preset angular adjustment should be moved over as far as possible until the final base adopts the desired working position.

Following each turning procedure, the slewing cylinder moves out far enough until the preset angular adjustment is reached again.

For slewing cylinders with hydraulic angular adjustment, an additional double-acting control unit on the tractor is required.

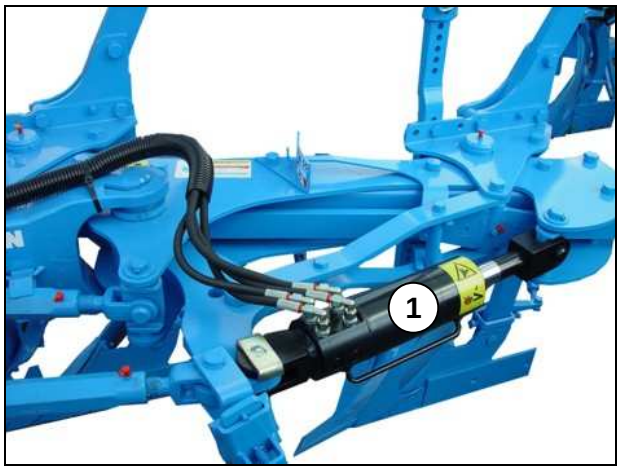
- Risk of crushing and shearing in the area between the stopper arm and the end stop! Keep to a sufficient safety distance!

8.4 Working Depth

The working depth adjustment occurs via the tractor hydraulics and the depth wheel of the plough. The instructions for the adjustment of the tractor hydraulics can be learned from the operating manual of the tractor manufacturer. In each case the tractor hydraulics must be set to ‘Draft’ or ‘Mixed’ control.

The depth wheel of the plough is used as control wheel and prevents that the plough works too deep. That is why the plough weight should be transferred to the tractor as far as possible to prevent too much slippage. Too much slippage leads to premature wear of the wheel and increased fuel consumption.

8.5 Hydraulic Frame Swing-in Assembly - Memory ram



The Memory ram is connected via 2 hoses to the turnover ram and via 2 further hoses with a separate double acting tractor spool valve.

Independently it is possible with the Memory ram to (1)

- swing-in and -out the plough frame for sufficient clearance between plough and ground during the turnover operation and
- to adjust the working width per body from the tractor seat. See "Working Width per Body"!

For turning the plough frame set connection P of the turnover ram under pressure:

The plough frame swings-in, will be turned by approximately 180 °and swings-out again.

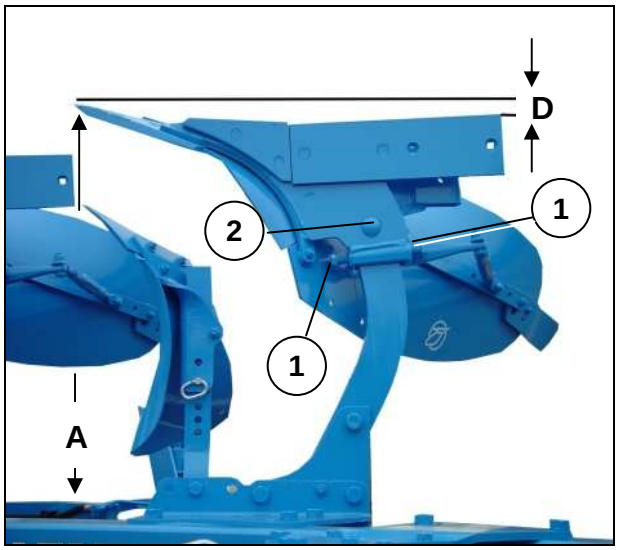
Set the connection P of the turnover ram under pressure until the plough frame is turned completely and swings-out again!

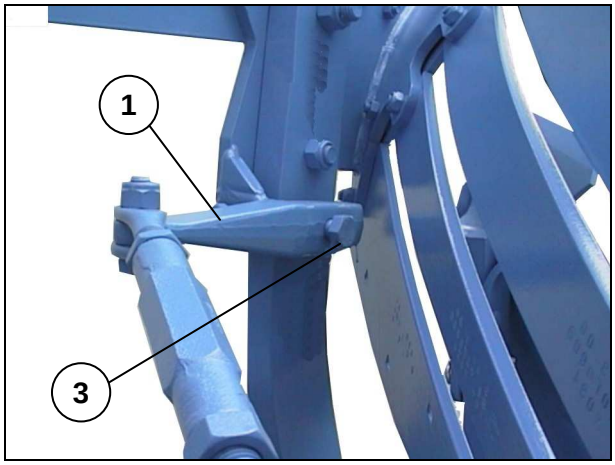
IMPORTANT! When changing the working width the three-point linkage of the tractor will be shifted laterally to adapt the front furrow width and the tractor-plough-alignment. Therefore ensure that the check chains or similar allows always sufficient lateral movement of the lower links.

- Read and adhere to the General Safety Instructions as well as to the Instructions 'Hydraulic Equipment'!

8.6 Plough Body Adjustments

8.6.1 Pitch





The distance **A** between point and plough frame should be the same with all plough bodies. The measurement **D** should be 1,5 cm.

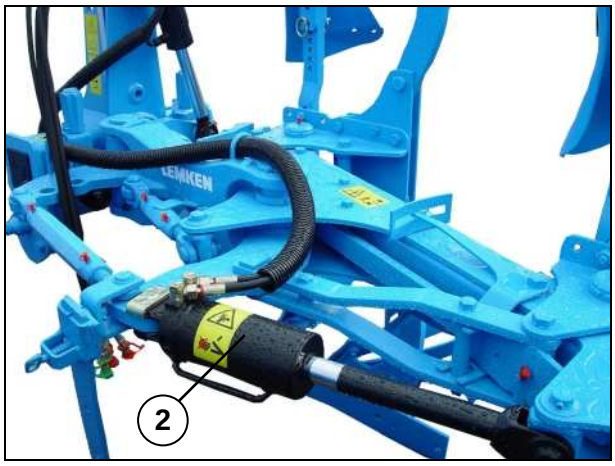
Required settings will be done by means of the set screws (1). Therefore slacken bolts (2) and clamp screws (3).

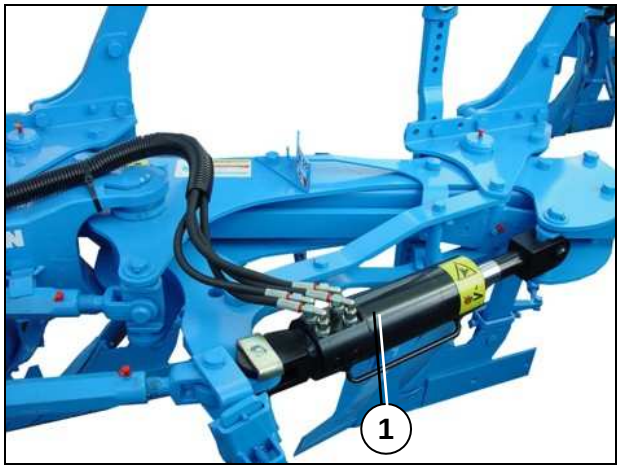
To improve penetration, increase pitch by a small amount on each body.

Excessive pitch will increase draft and effect depth control.

After adjustment the set screws (1), the bolts (2) and the clamp screws (3) must be tightened again carefully.

8.6.2 Working Width per Body

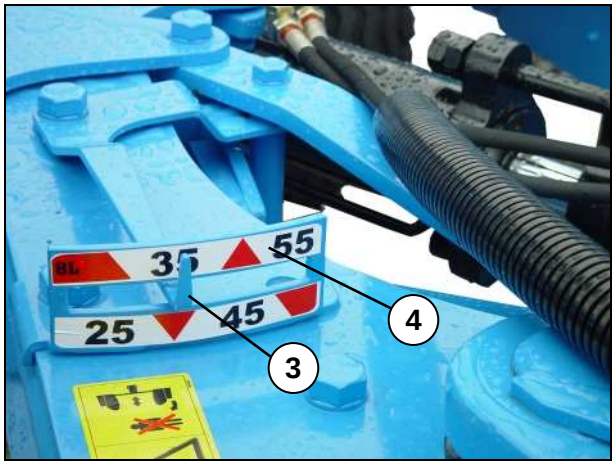




After the basic adjustment has been carried through by means of the OPTIQUICK-adjustment (Trulign), the working width per body can be adjusted from the tractor seat by means of a Memory ram (1) or an adjuster ram (2).

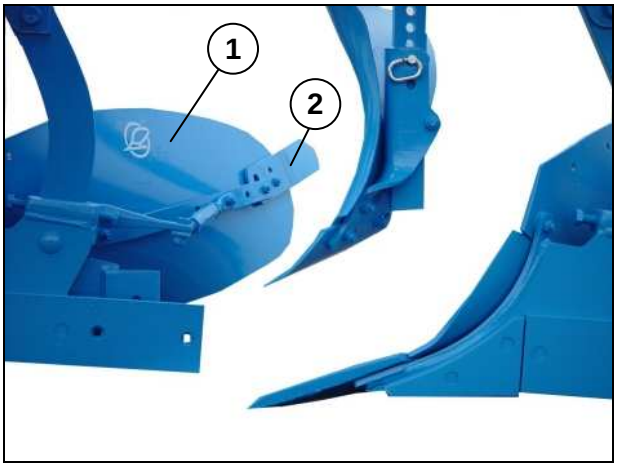
In connection with the Memory ram or the adjuster ram

- open piston rod to decrease the working width per body and
- close piston rod to increase the working width per body!



The adjusted working width is shown on the scale (4) by means of pointers (3).

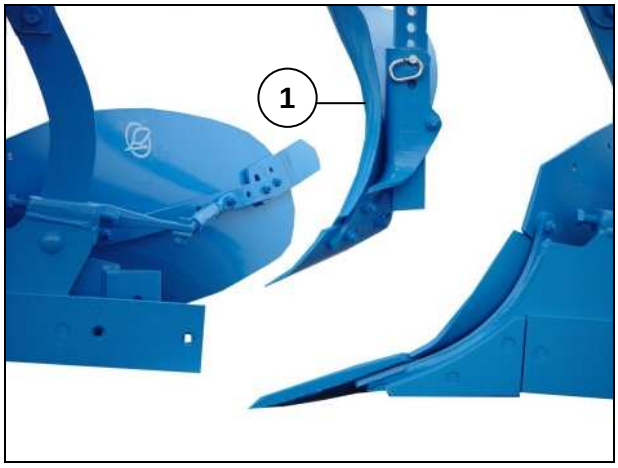
8.6.3 Tail Pieces

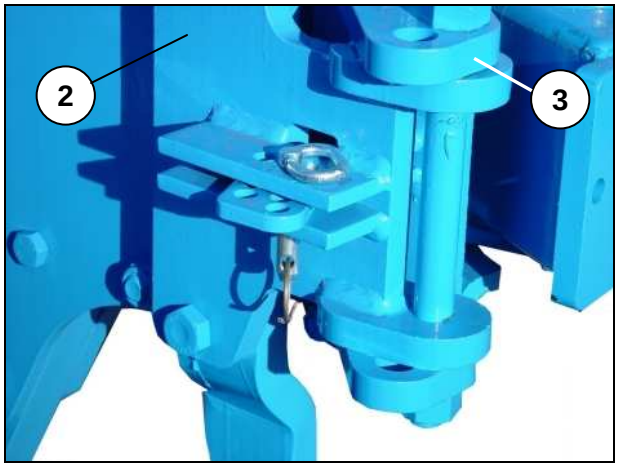


The tail pieces (2) being positioned at the end of the mouldboards (1) should be adjusted so that they help to turn the furrow slice. They should be adjusted uniformly. Set too deeply, they can cause soil to fall back into the furrow.

8.7 Skimmers

8.7.1 General Instructions

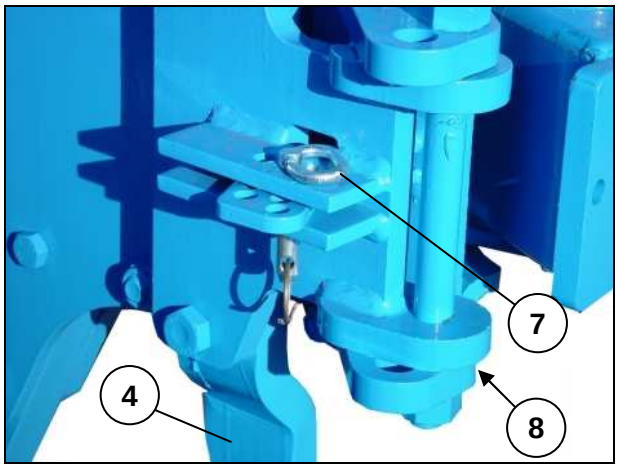


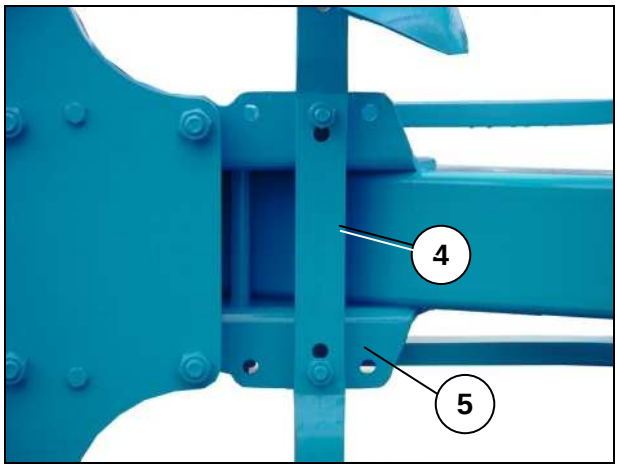


The skimmers (1) should be set to a depth between 5 and 10 cm. In plan view the skimmers should be positioned 2 to 3 cm to the side of the share line.

In combination with an angle adjustment the pivot bracket (2) can be fitted to the bracket (3) in three different positions. This enables always an optimum lateral position of the skimmers, also in combination with disc coulters.

8.7.2 Angle Adjustment



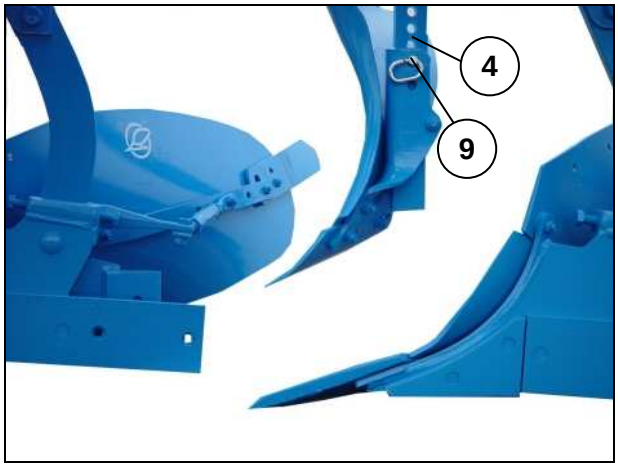


The angle of the skimmers which are fitted with their flat stalk (4) directly to the stalk bracket (5) or the beam of the X-ploughs, cannot be changed.

Otherwise the angle is adjustable either

– variably by means of clamp screws with the skimmers with round stalk or
– in steps by means of a pin (7) with skimmers with flat stalks (4) and angle adjustment (8).

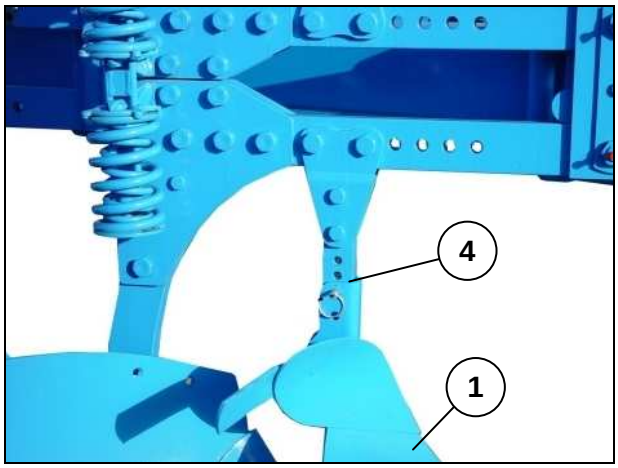
8.7.3 Working Depth



With skimmers with flat stalk (4) the working depth will be adjusted by means of the pin (9).

With skimmers with round stalk the working depth will be adjusted by means of clamp screws. After that tighten clamp screws carefully again.

8.7.4 Conversion to the front or rear

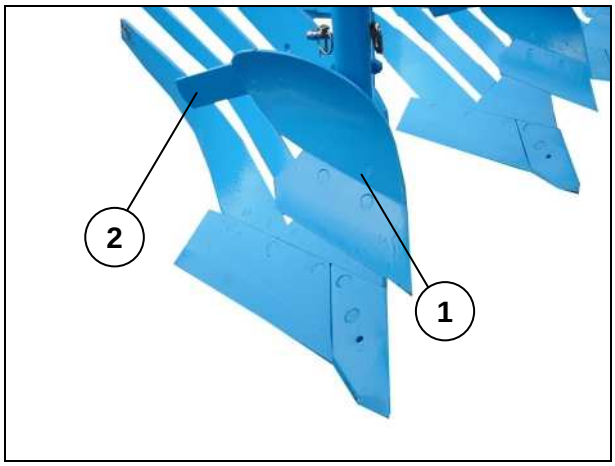


By means of re-positioning the skim stalk (4) or the bracket of the angle adjustment to the front or rear, the position of the skimmer (1) can be optimised.

To the rear = more clearance between skimmer and the plough body fitted in front.

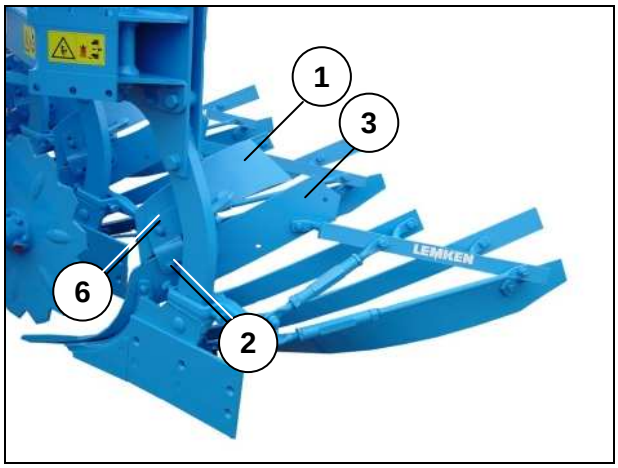
To the front = more clearance between skimmer and the plough body that goes with it (e.g. to prevent clogging of stones).

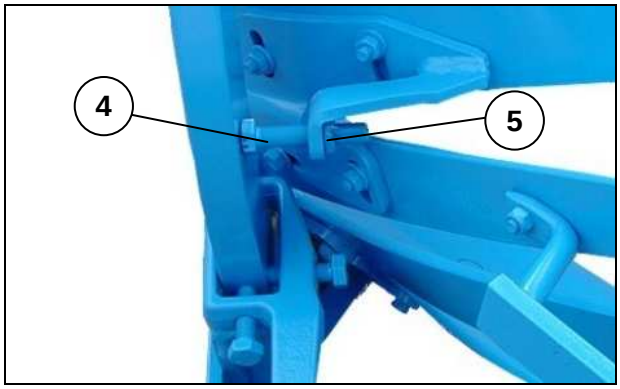
8.7.5 Tail pieces (for D1 and M2, only)

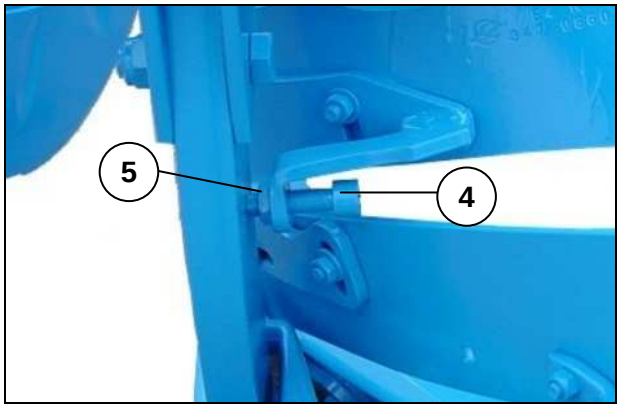


The tail pieces (2) will be connected to the corresponding bores of the skimmers (1) via the slotted holes. They are universally adjustable and support the work of the skimmers.

8.8 Trashboard





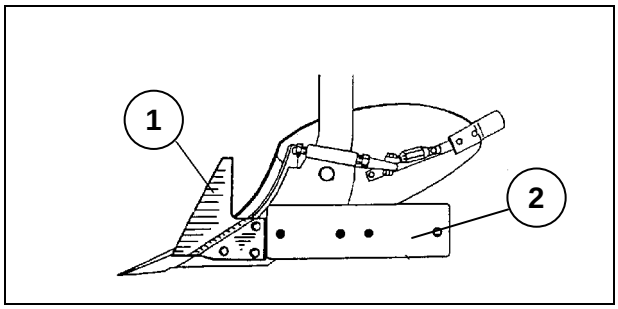


Fit trashboard (1) with holder (2) to the mouldboard (3). The holder is provided with slotted holes (6) which allow an universal adjustment.

Adjust support-bolt (4) so that it touches the leg.

Secure support-bolt (4) by means of the counter nut (5). The counter nuts must be tightened for work.

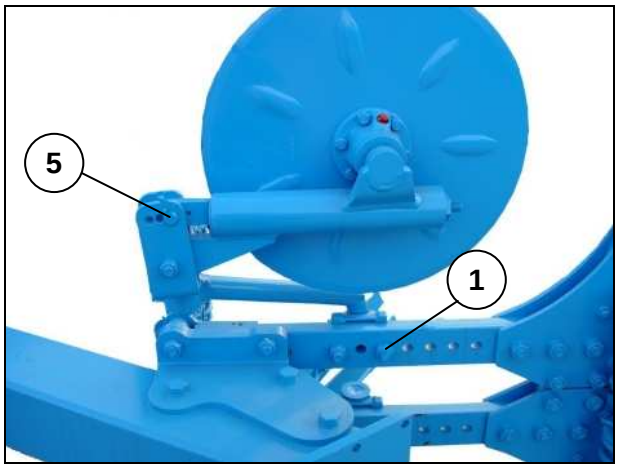
8.9 Sword Coulter



Fit sword coulter (1) in front of the landslide (2) of the plough body.

8.10 Disc Coulters

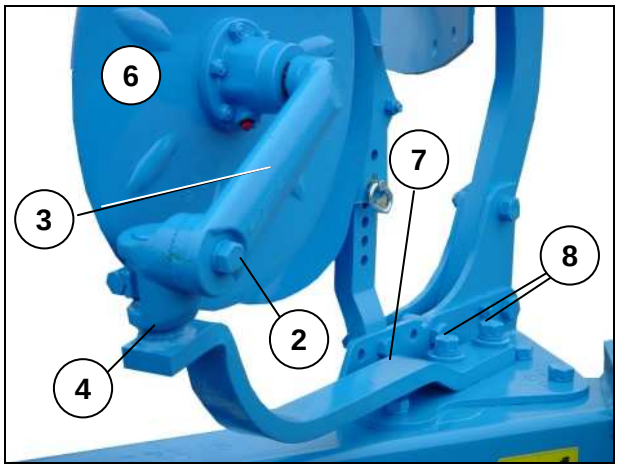
8.10.1 General Instructions



When fitted, disc coulters should be set to a working depth of 7 - 9 cm and 2 - 3 cm to the landslide of the body. With the X-ploughs the disc coulter will be fitted to the beam by means of the holder and bolts (1).

The front bores in the beam are provided for the disc coulters. If skimmers are fitted the disc coulters must always be fitted in front of the skimmers.

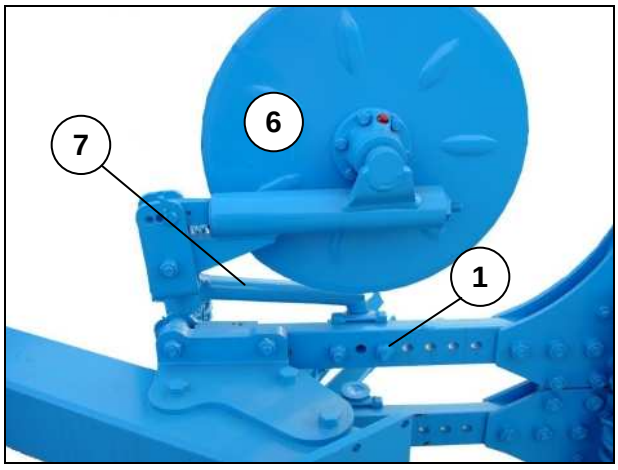
8.10.2 Working depth



Adjust the depth of the rigid disc coulter by slackening the screw (2) and setting the coulter arm (3) as required. Before tightening the screw (2), it must be ensured that the serrations mesh correctly.

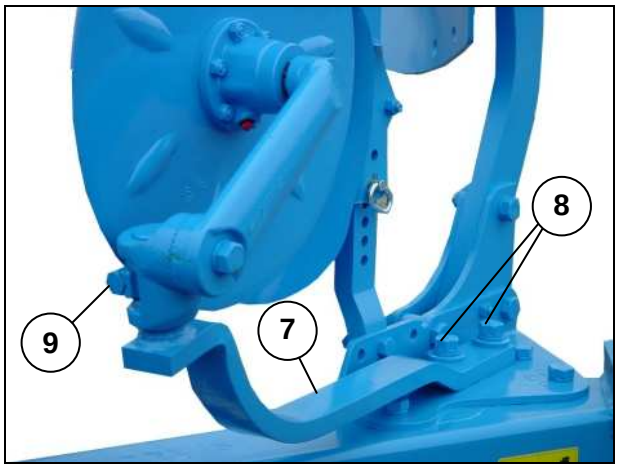
Use pin (5) to adjust the depth of the spring-loaded disc coulters (X-ploughs).

8.10.3 Lateral distance



For the lateral adjustment of the disc coulter (6), slacken bolts (1 resp. 8) and move round or flat stalk (7) to give required setting.

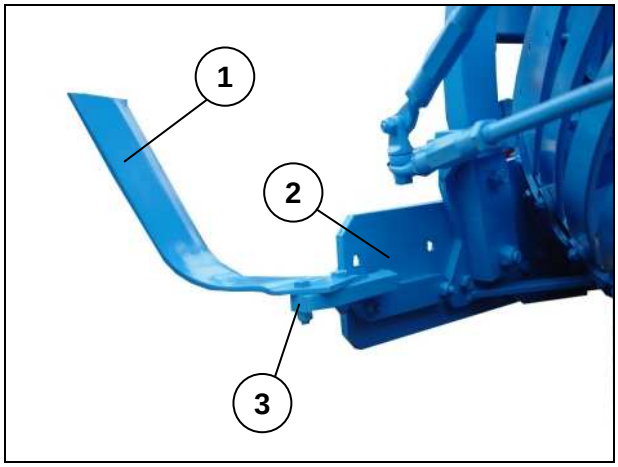
8.10.4 Swivelling limitation

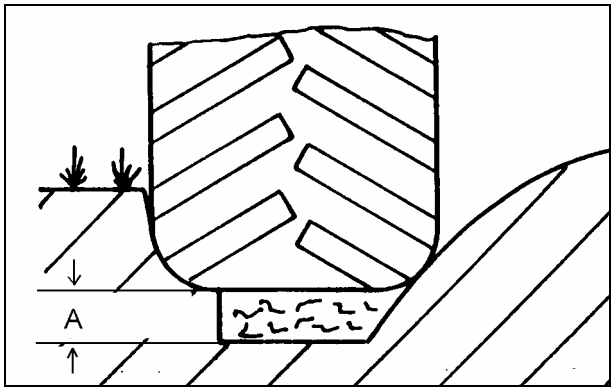


By means of the adjustable stop (9) the lateral swivelling range of the disc coulter will be adjusted.

IMPORTANT: All slackened bolts and nuts must be tightened carefully after adjustment. Never drive backwards with the plough when the disc coulters are still in the ground.

8.11 Wide Furrow Cutter





Fit wide furrow cutters (1) to the landslide (2) of each rear body.

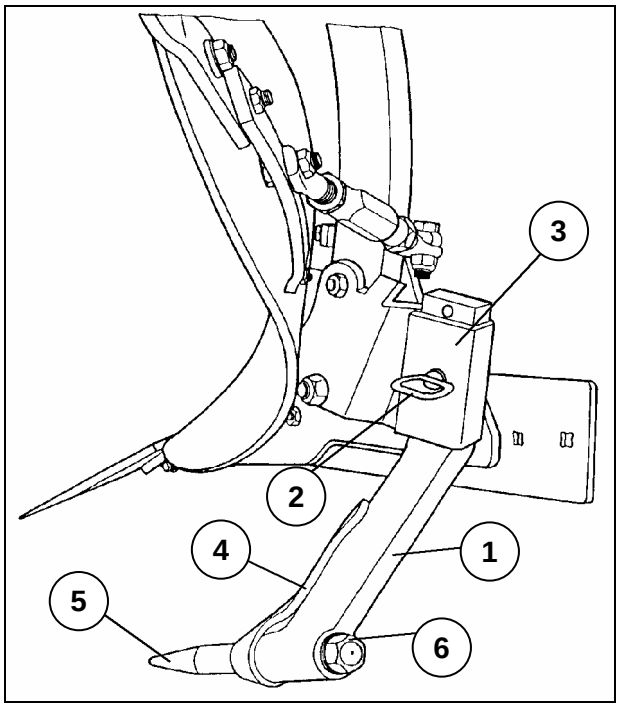
If the plough is equipped with C-bodies, to each rear body the landslide (part No. 340 1450) must be fitted so that the holder (3) of the wide furrow cutter can be fitted.

The wide furrow cutter increases the furrow of the rear bodies. It can be used in light and medium soil conditions. The wide furrow cutter provides a 15 cm wider but less deep furrow.

In heavy soil conditions the ploughed land may look uneven. This will be caused by the 15 cm wider furrow of the rear body compared to the others and the effect that a part of the soil in the furrow will be re-consolidated by the tractor tyres. Due to that the next furrow slice will be positioned a little shallower. This has only an inessential influence to the following working passes.

8.12 Soil Looseners

8.12.1 Subsoilers



The subsoiler UD6 will be fitted as shown in the sketch. By means of displacing the stalk (1) the working depth of the subsoiler can be adjusted.

Maximum working depth = 20 cm
Minimum working depth = 14 cm

For changing the working depth unsecure pin (2) and remove.

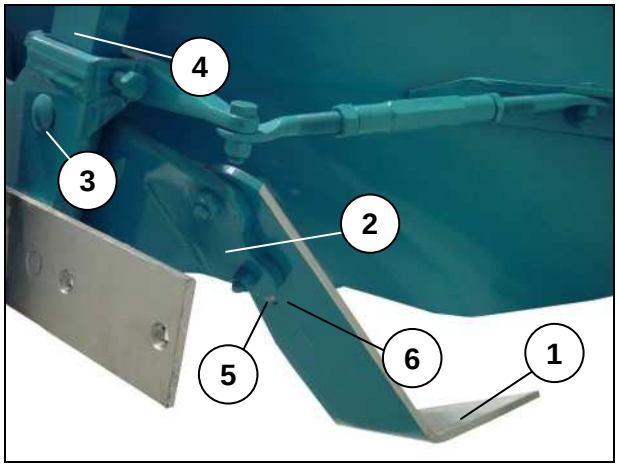
Displace stalk (1) in the leg bracket (3) correspondingly.

After the adjustment fit pin again and secure.

The stalk (1) is protected by a shin (4). The shin (4) and the tine (5) can be replaced when worn after removal of nut (6).

- When parking a plough with subsoilers, the lower subsoilers must be removed by removing pin (2) to ensure a safe parking.

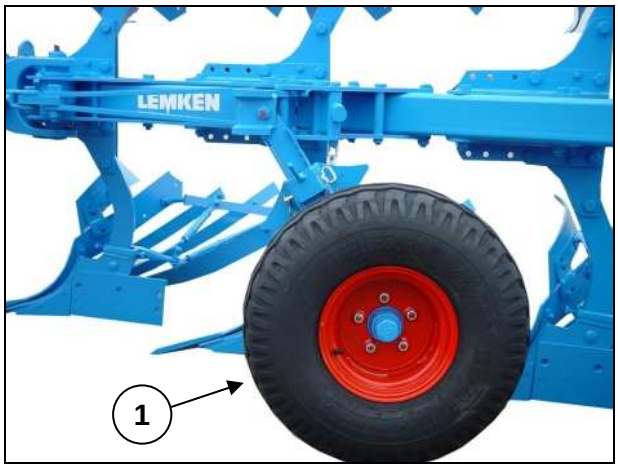
8.12.2 Subsoiler Shares



The subsoiler share (1) will be fitted to the leg (4) with its bracket (2) by means of longer bolts (3). The bores (5) enable the adjustment of the subsoiler share (6) for a shallower working depth.

8.13 Depth Control Wheel and Depth and Transport Wheel

8.13.1 General Instructions



The plough is available with depth control wheel (1) or depth and transport wheel.

The depth and transport wheel is required when the front axle - especially for transport - is unloaded too much and so the steerability of the tractor is no more ensured.

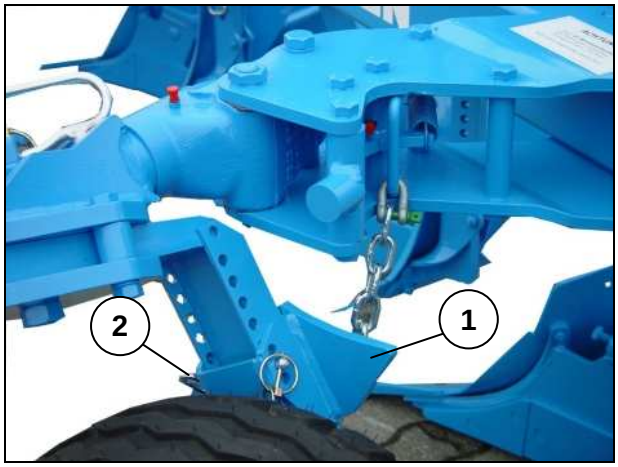
The depth control wheel (1) respectively the depth and transport wheel should work as control wheel, only.

The tractor hydraulics must be adjusted in accordance to that.

To prevent that the working depth of the plough with Non-Stop overload safety device (X-version) increases after tripping, the depth wheel should be loaded with more weight of the plough.

8.13.2 Depth Adjustment

a) Version with pin adjustment



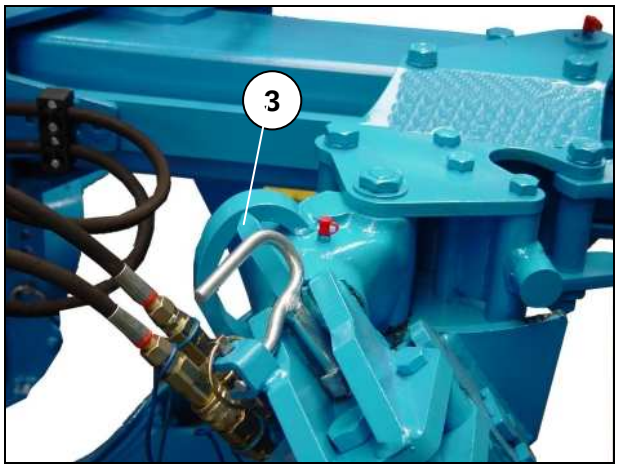
Slide stop (1) to adjust the working depth after removing the adjuster pin (2).

Slide stop (1) down towards the wheel axle to increase the working depth.

Slide stop (1) up towards the pivot axle to decrease the working depth.

Fit adjuster pin (2) after adjustment and secure.

b) Version with hydraulic adjustment



With the hydraulically adjustable depth and transport wheel the working depth can be adjusted in cab via the tractor spool valve. It is recommended after working depth adjustment to re-adjust beside the length of the top link and the angle adjustment also the tractor draft control, to prevent an increased slippage or an insufficient depth control.

The pointer (3) indicates the adjusted depth range.

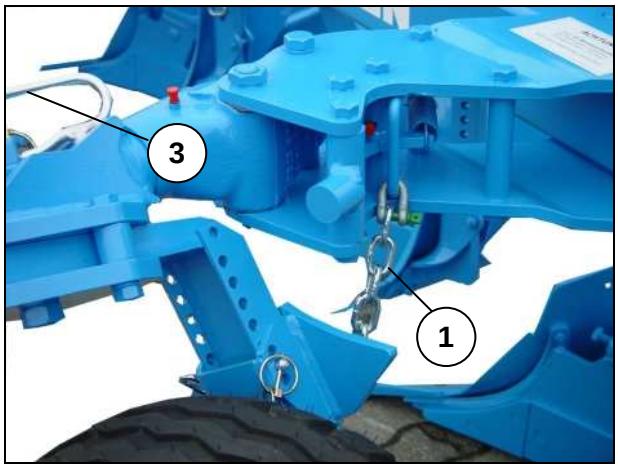
8.13.3 Air Pressure

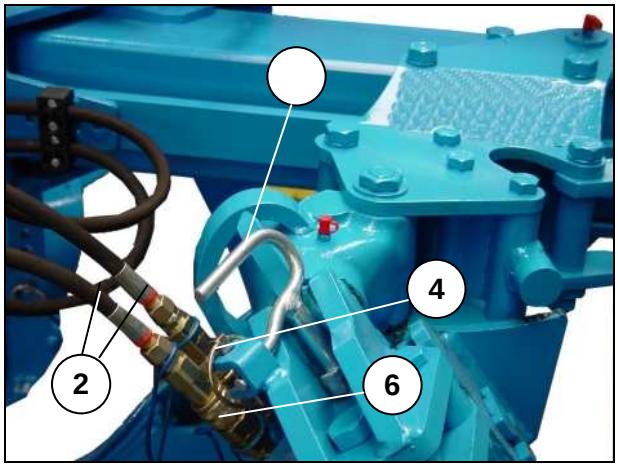
Depending on the wheel (tyre and wheel rim) the following air pressure values are allowed. The corresponding data of the wheel are printed on the wheel.

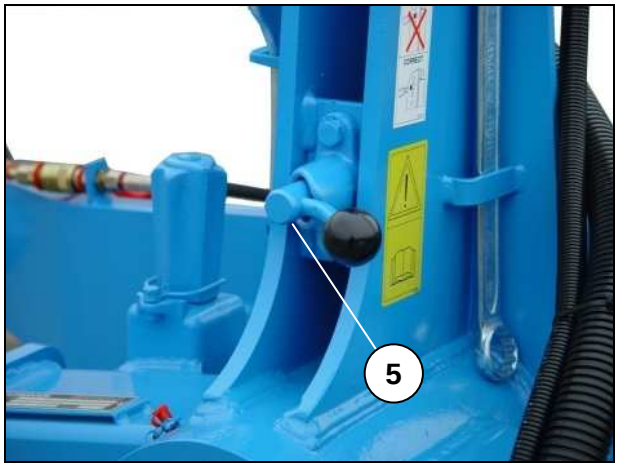
Tyre	Manufacturer	PR	max. allowed air pressure (bar)	min. allowed air pressure (bar)	Profile
10.0/75-15,3	Vredestein	14	7,0	3,0	AW
10.0/75-15,3	Vredestein	12	6,0	3,0	AW
10.0/75-15,3	Good Year	12	4,7	3,0	AW
10.0/80-12	Vredestein	8	4,0	2,0	AW
195 R 14	-----	4	2,3	1,5	XYZ
340/55-16	Viskafors	12	3,6	2,5	TL
350/50-16	Vredestein	12	4,7	3,0	TL

Never work with more or less pressure than stated as maximum and minimum allowed air pressure, in order to prevent an overload of the tyres and subsequent damage!

8.13.4 Converting uni wheel from working position into transport position







– Detach chain (1) from gear wheel!

– For the hydraulically-adjustable uni wheel, detach the hydraulic hoses (2) from the plug and socket connectors (6), plug the protective caps onto the hydraulic plug and socket connectors, and then place the hydraulic hoses such that they cannot be damaged.

– Raise plough slightly; release pin (3) and remove it!

– Swivel uni wheel through 90° and lock in place with pin (3)!

– Lock pin (3) in place using split ring (4)!

– Swivel locking pin (5) forwards on slewing gear through 180°,

– Raise plough completely and set to smallest working width.

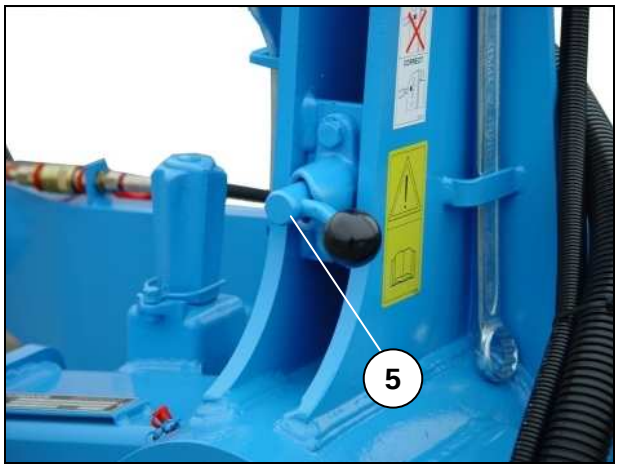
– Then rotate slowly until the locking pin (5) latches audibly into place!

– Check whether the locking pin is correctly latched into place!

– Lower plough and remove upper link from mast!

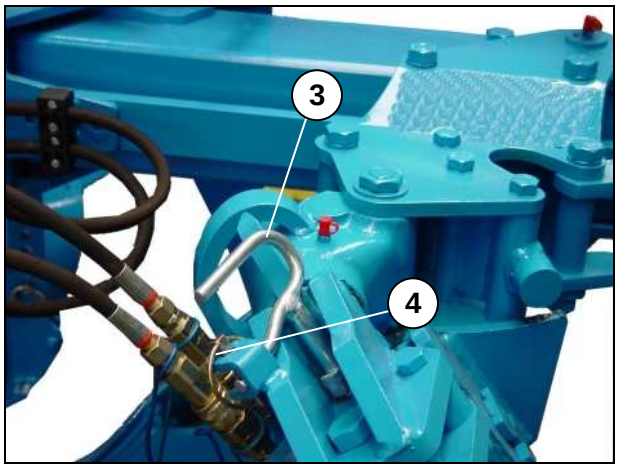
– Lift plough up completely = transport position!

8.13.5 Converting uni wheel from transport position into working position



– Connect and secure upper link to mast!

– Raise plough slightly and swivel locking pin (5) out through approx. 180°. The handle must engage at the front into the recess, to ensure that the locking pin does not slide back again of its own accord!



– Rotate plough into working position!

– Remove pin (3), swivel uni wheel through approx. 90° towards plough frame and use pin (3) to lock it in this position. Lock pin in place using split ring (4)!

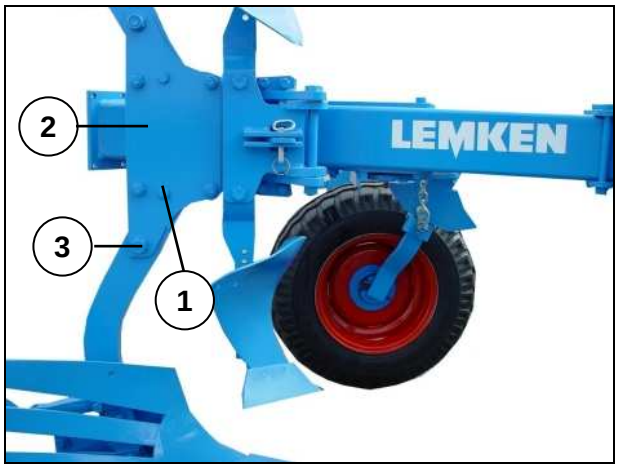
– Connect chain to gear wheel again!

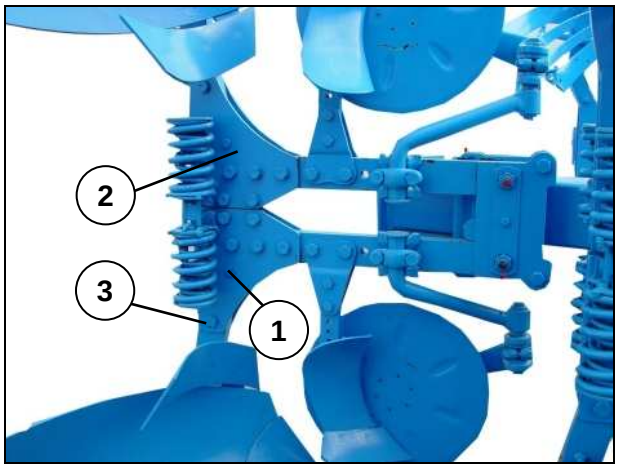
– Remove protective caps from plug and socket connectors, detach hydraulic plugs and connect hydraulic hoses again!

- Read and observe the General Safety Instructions as well as the ‘Hydraulic System Safety Instructions’ and the ‘Tyre Safety Instructions’!
- Risk of crushing and shearing in steering lock area, keep to a safe distance!
- Never exceed the maximum air inflation pressures!

9 OVERLOAD SAFETY DEVICES

9.1 Shearbolt Device





With the exception of the HX-version the plough is fitted with shearbolts (1) inside the leg brackets (2) as standard.

After a break of the shearbolt (1), swing back the tripped plough body with lifted plough after loosening the pivot bolt (3) and removing the shearbolt sections.

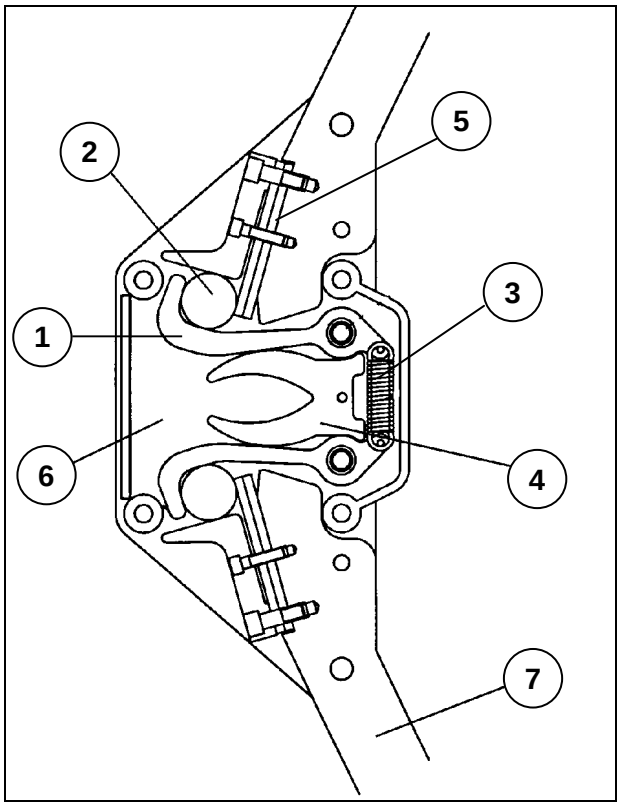
Fit new shearbolt and tighten it together with the pivot bolt (3).

Use only shearbolts of the following dimensions and quality, as only these bolts ensure an efficient protection against damage:

Type of Plough	Shearbolt	
	Part No	Dimension
VariOpal 5 and 6	301 3407	M 12X70 8.8
VariOpal 5 X and 6 X	301 3399	M 12X65 10.9
VariOpal 7 and 8	301 3424	M 12X75 LS 57X15 - 10.9
VariOpal 7 X and 8 X	301 3595	M 14X70 LS 51X15 - 10.9
VariOpal 9	301 3992	M 16X100 LS 70X25 - 8.8
VariOpal 9 (35)	301 3596	M 14X75 LS 56X15 - 8.8
VariOpal 9 (40)	301 3607	M 14X85 LS 61X20 - 10.9
VariOpal 9 X	301 3595	M 14X70 LS 51X15 - 10.9

- There are pinch positions in the area of the shearbolt device!
- Do not allow any body within the release area of the bodies!
- After a break of the shearbolt, the body releases upwards. Keep distance!

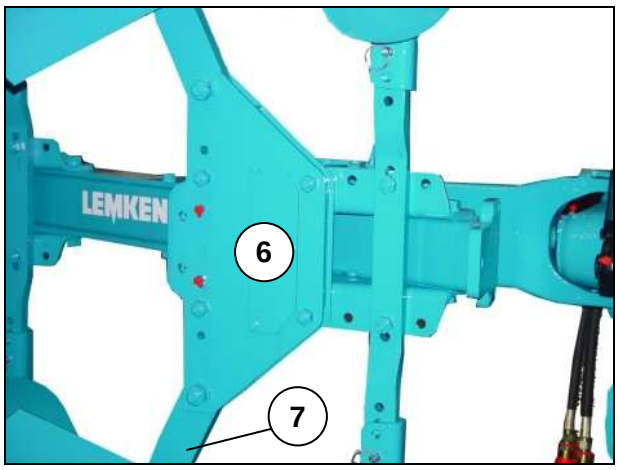
9.2 Semi-Automatic Overload Safety Device HX



The mounted reversible ploughs of the HX-range are equipped with a semi-automatic overload safety device.

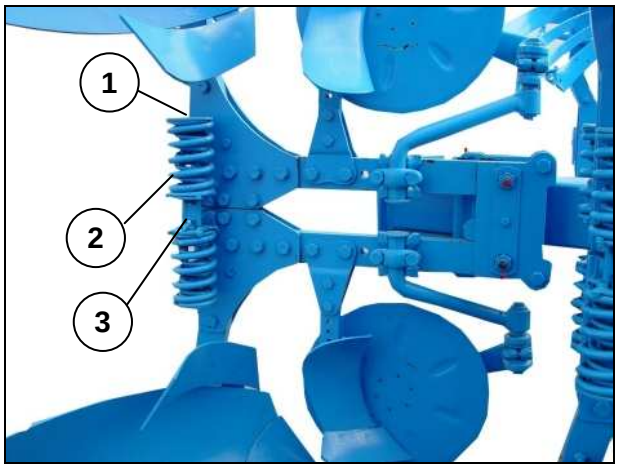
It is a compact device with hooks (1), roller (2) and springs (3, 4 and 5) located inside the leg bracket (6). The mechanism trips when the body touches an obstacle.

To re-load, simply lift the plough and allow the tripped leg to fall back into working position.



- In the area of the legs (7) and leg brackets (6) there are pinch points. Keep distance!

9.3 Automatic Non-Stop Overload Safety Device



The overload safety device is set at the factory for average conditions.

Should the mechanism still trip without touching an obstacle, the tripping force of the overload safety device must be increased. Therefore turn screws (1) clockwise.

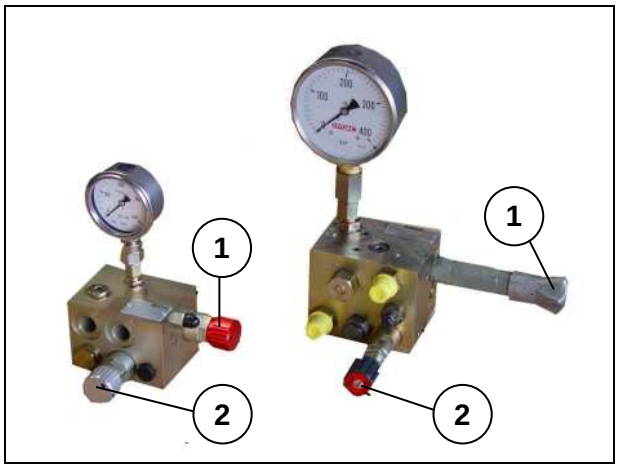
It is essential that all springs (2) are adjusted equally to ensure a troublefree function of the overload safety device.

- Do not allow any body within the trip area of the bodies.
- With an overload, the bodies trip upwards. Keep distance!
- Springs are under high spring tension!
- Damaged draw rods (3) must be replaced at once!

9.4 Hydraulic Non-Stop Overload Safety Device “HydriX“

With the hydraulic adjustable overload safety device two fix operation pressures can be adjusted, a minimum operation pressure, i.e. for shallow ground and light soil conditions, and a maximum operation pressure, i.e. for heavy soil conditions

9.4.1 Adjusting the Operation Pressure



After connecting the adjusting valve unit to the tractor spool valve, the system is operable with the maximum and minimum operation pressures adjusted by the factory.

If required the operation pressure can be adapted individually. For that adjustment the knobs (1) and (2) are used.

Increasing the maximum operation pressure

⇨ Turn knob (1) clockwise.

Decreasing the maximum operation pressure

⇨ Turn knob (1) anti-clockwise.

Increasing the minimum operation pressure

⇨ Turn knob (2) clockwise.

Decreasing the minimum operation pressure

⇨ Turn knob (2) anti-clockwise.

Important: During work the tractor spool valve must be set to floating position, otherwise the overload protection is no guaranteed, when several plough bodies trip at the same time.

9.4.2 Operation

During work the plough bodies will be kept in working position via the rolling system. When touching an obstacle the plough body trips upwards, therewith the oil will be led into the hydro-reservoir. If several bodies trip at the same time, the oil cannot be kept by the hydro-reservoir. Via a pressure relieve valve the oil can flow back to the tractor oil tank.

To save the system, the plough and the tractor, it is recommended to work with a operation pressure as low as possible.

The maximum operation pressure will be reached by means of pressurising connection A of the adjusting valve unit for a few seconds.

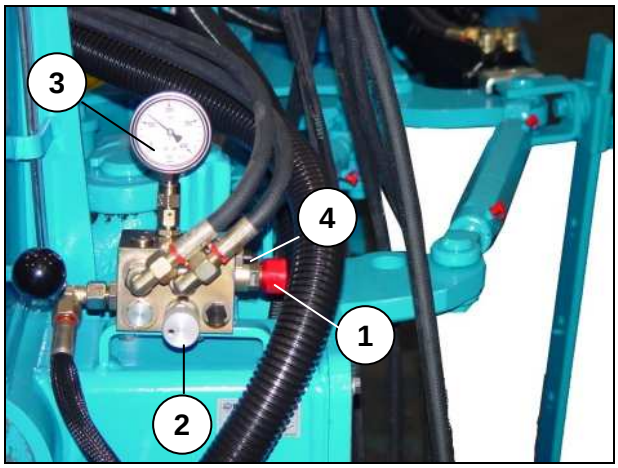
The minimum operation pressure will be reached by means of pressurising connection B of the adjusting valve unit for a few seconds.

Intermediate operating pressure values can be adjusted by means of short operation of the spool valve in the first or second pressure position and can be red from the pressure manometer (3).

Minimum adjustable operation pressure = 50 bar.

Maximum adjustable operation pressure = 140 bar.

9.4.3 Make hydraulic system pressureless



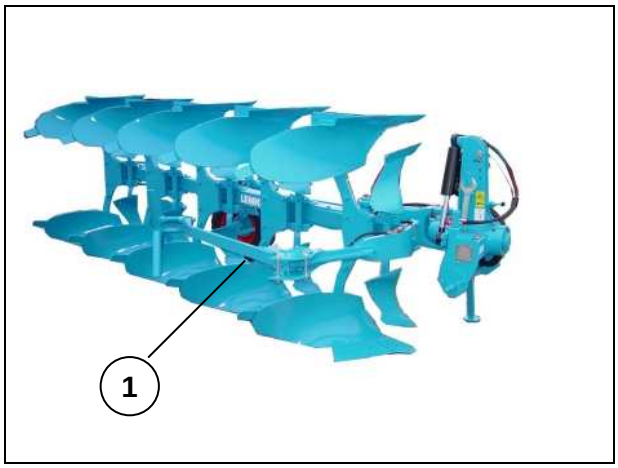
The hydraulic system must always be without pressure, for repair or service work for example. Therefore with lowered plough the tractor spool valve must be set to floating position and the relief valve (4) opened.

Before the next use, the relief valve (4) must be closed again and the operation pressure set to 50 bar minimum.

- Read and adhere to the General Safety Instructions as well as to the Instructions “Hydraulic equipment”!
- If required, the hydraulic system may only be made pressure-less by operating the relief valve (4), the tractor spool valve must be set to floating position then.

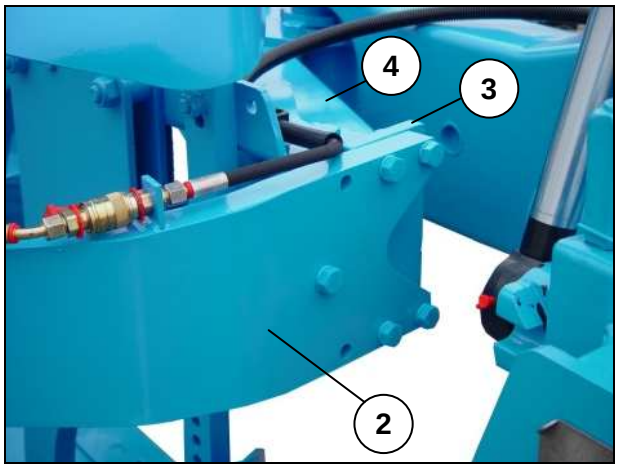
- Hydraulic system is permanently under pressure!
- With a drop pressure, the plough bodies swing downwards! Keep distance!
- Do not allow any body within the release area of the bodies.
- With an overload, the bodies trip upwards. Keep distance!

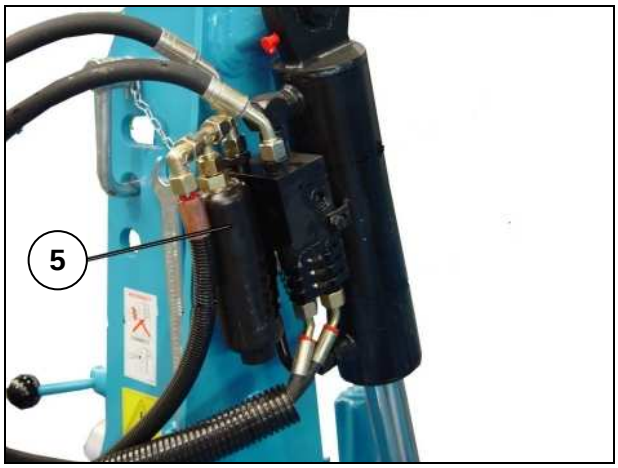
10 ATTACHMENT ARM



The attachment arm (1) will be fitted to the flange (3) in front of the plough fame (4) by means of the bracket (2).

See operating manual of the attachment arm.





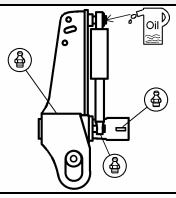
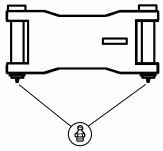
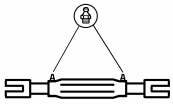
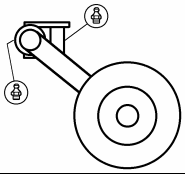
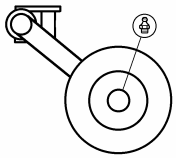
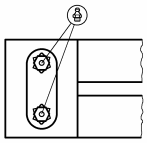
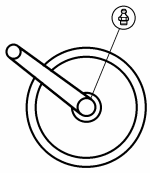
Attention!

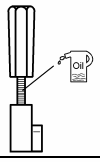
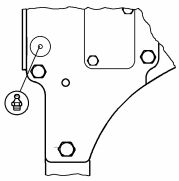
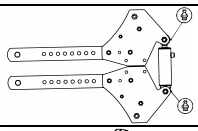
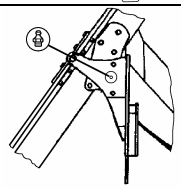
In combination with tractors having a long hydraulic pipe between spool valve and hydraulic coupling, an hydro reservoir (5) is required for the hydraulic assembly of the attachment arm to prevent an unintentional uncoupling of the attachment arm.

- Read and adhere to the General Safety Instructions!
- The attachment arm swings into catching position due to spring force. Keep distance!

11 MAINTENANCE

All lubrication points must be greased regularly with environmentally friendly grease according to the following table. For a long operation break the piston rods of the hydraulic rams must be greased with non-acid grease. The polished areas of wearing parts and the pins as well as adjusting devices must be treated with grease regularly.

		all 10 | 50 | 10 working hours			before and after winter break
Bearing of turnover device and pivot points		x			x
Adjustment centre Trulign/Optiquick		x			x
Turnbuckles					x
Swinging axle of depth control- and depth and transport wheels			x		x
Bearings of depth control- and depth and control wheels				x	x
Bearing of overload safety device		x			x
Bearings of disc coulters				x	x

Thread of angle adjustment					x
HX-overload safety device		x			x
Joints of all hydraulic rams		x			x
Swivel bracket and rod		x			x

– All bolts and nuts, especially the wheel bolts, must be checked regularly and tightened if required.

  Wheel bolt ø 14 mm = Tightening torque 125 Nm
  Wheel bolt ø 18 mm = Tightening torque 450 Nm

– At least 6 years after the date stated on the high pressure hose the high pressure hoses must be replaced against genuine LEMKEN-hoses. Porous or defective high pressure hoses must be replaced immediately.

– Worn shares, mouldboard edges, mouldboards, landslides and so on must be replaced on time, so that supporting parts will not be damaged.

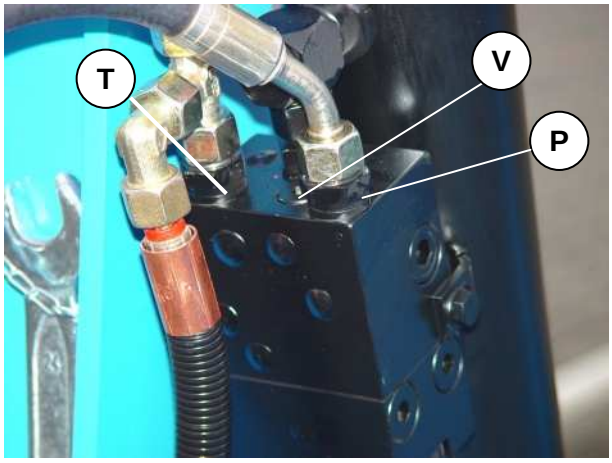
– If required, make the hydraulic overload safety device without pressure only by operating the relief valve; therewith the tractor spool valve must be in floating position.

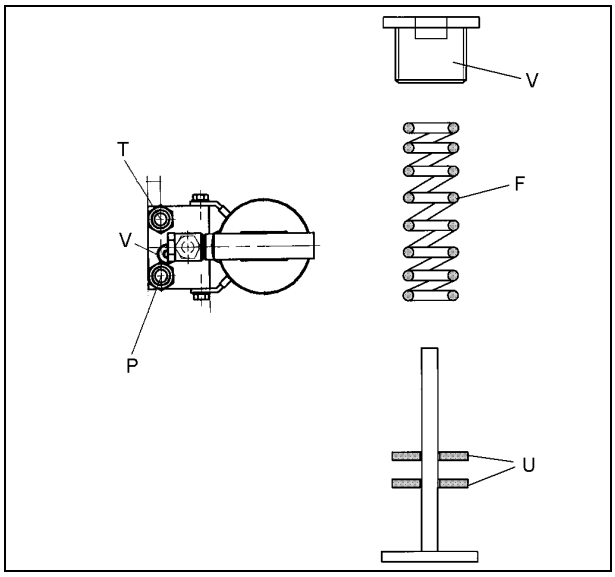
Important: Do not clean this implement with a Pressure Washer during the first 6 weeks. After this time a minimum nozzle distance of 60 cm must be observed with a maximum 100 bar pressure and 50°C temperature.

- Read and adhere to the General Safety Instructions as well as to the instructions ‘Maintenance‘!

12 TROUBLE SHOOTING

12.1 Hydraulic Equipment





Malfunction	Reason	Remedy
The plough frame starts turning before Memory ram is swung-in completely.	The friction of the frame pivot bolts is too high	Grease pivot bolts carefully, and that according to the maintenance table.
Memory ram does not open or close.	The throttle bores of the threaded throttle in the Memory ram are blocked.	Screw out the threaded throttles out of the ram connections by means of a circlip tong and clean them (Connection (S) has no throttle).
Plough turns rattling during the first turning phase.	Plough frame runs forward, a vacuum appears in the hydraulic ram.	a) Shorten inner turnbuckle. b) Fit a smaller throttle to the connection (T) of the turnover ram

Malfunction	Reason	Remedy
Plough frame turns up to the middle position and stops.	The required switch-over pressure for the turnover ram has not been reached by the tractor hydraulics.	a) By means of removing the washers (U) the pre-adjusted switch-over pressure will be reduced. Taking out of one disc means a pressure reduction of ca. 10 bar. The washers (U) will be found behind the plug (V). b) Check the hydraulic assembly of the tractor and if required maintain it.
The plough frame turns but the turnover ram switches over before reaching the half-turned position and the plough frame turns back again.	a) The pre-adjusted switchover pressure is too low. b) The inner turnbuckle is too long. c) The bearing of the turnover device is damaged.	a) Increase the pre-adjusted turnover pressure by means of fitting additional washers (U), one washer = 10 bar increase of the switch over pressure. b) Shorten inner turnbuckle. c) Check the bearings and replace if required.
The turnover ram switches over, without turning the plough frame.	a) The pre-adjusted turnover pressure is too low. b) The cone or its seat of the switch-over valve is damaged and leaky.	a) Increase the pre-adjusted switchover pressure by means of an additional washer (U). b) Replace hydraulic ram.

Malfunction	Reason	Remedy
Front furrow width changes during work.	The piston seal of the swing-in ram or Memory ram is leaky.	Replace the piston seal

12.2 Penetration and Depth Guidance of the Plough, Slippage

Malfunction	Reason	Remedy
Plough does not stay in the ground.	a) Penetration force too low b) Drawbar is fitted too deep.	a) Increase distance between point and frame (not more than 2 cm). b) Fit drawbar to the upper position.
Plough does not penetrate into the ground.	a) Penetration angle of the shares is too small. b) Drawbar fitted too deep. c) Top link fitted too high at the headstock.	a) Increase distance between the point and the plough frame (not more than 2 cm)! b) Fit drawbar to the upper position at the headstock! c) Fit top link in a deeper position!
Tractor shows too much slippage.	a) Drawbar is fitted too deep. b) Draft control is not adjusted correctly, weight of the plough is on the depth wheel.	a) Fit drawbar to the upper position. b) Adjust draft control again so that sufficient weight will be transferred to the tractor.

12.3 Others

Malfunction	Reason	Remedy
Shearbolt of the body shears often.	Incorrect shearbolt is fitted.	Use original shearbolts. Fit the shearbolts from the furrow side of the plough.

13 TRANSPORT ON PUBLIC ROADS

13.1 Laws and regulations

All laws and regulations with regard to transport on public roads must be adhered to.

13.2 Warning Boards and Lighting Equipment

If it is required to drive on public roads with the plough fitted to the tractor, fit warning boards and lighting equipment.

As option
carrier for light for ploughs without depth and transport wheel,

carrier for light for ploughs with depth and transport wheel and

warning boards with lighting equipment are available.

They ensure an orderly „marking“ of the plough.

The warning boards with lighting equipment must be detached before work, so that they cannot be damaged.

13.3 Transport Speed

The maximum allowed driving speed during transport with depth and transport wheel amounts to 30 km/h on even roads. In rough ground and on streets with potholes drive with reduced speed in order to avoid damages at the machine!

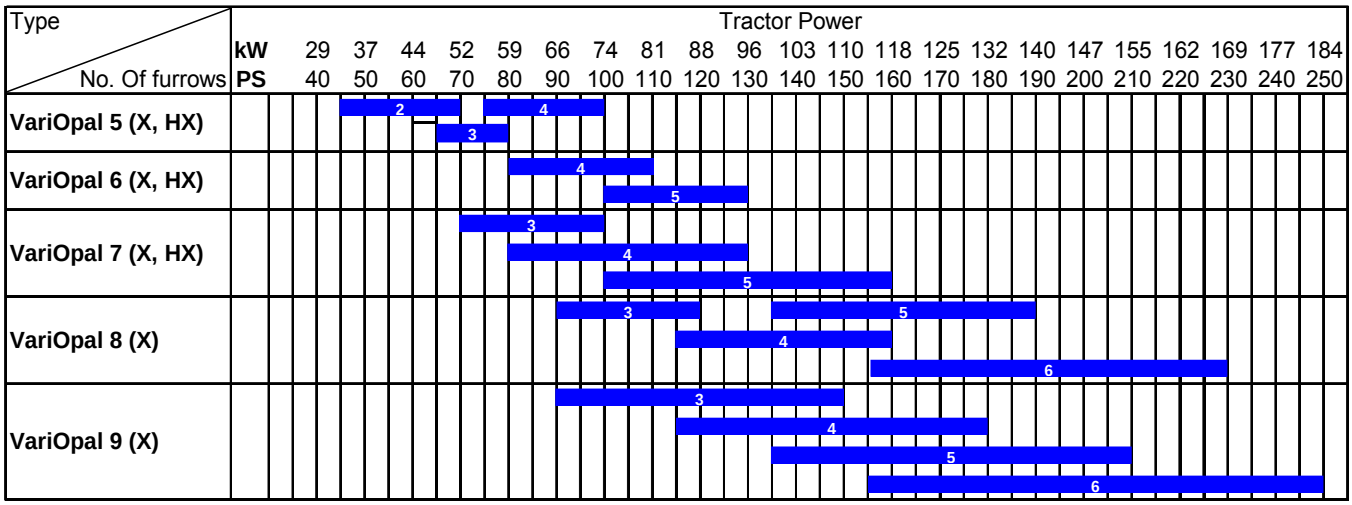
14 TECHNICAL DATA

14.1 Overview

Type	Turnover Device	Wall thickness Frame [mm]	Underframe Clearance[cm]	Interbody Clearance[cm]	Dimension of leg [mm]	No. Of furrows
VariOpal 5	E 90	110 x 110 x 8	75 / 80	90 / 100	70 x 30	(2), 3, 4
VariOpal 6	E 100	110 x 110 x 8 S*	75 / 80	90 / 100	70 x 30	4, 5
VariOpal 7	E 100	120 x 120x 10	75 / 80	90 / 100	80 x 30	3, 4, 5
VariOpal 8	E 120	140 x 140 x 10	75 / 80	90 / 100	80 x 30	3, 4, 5, 6
VariOpal 9	E 120	160 x 160 x 10	75 / 80	90 / 100	80 x 35	(3), 4, 5, 6
VariOpal 5 X	E 90	110 x 110 x 8	75 / 80	90 / 100	70 x 30	(2), 3, 4
VariOpal 6 X	E 100	110 x 110 x 8 S*	75 / 80	90 / 100	70 x 30	4, 5
VariOpal 7 X	E 100	120 x 120x 10	75 / 80	90 / 100	80 x 30	3, 4, 5
VariOpal 8 X	E 120	140 x 140 x 10	75 / 80	90 / 100	80 x 30	3, 4, 5, (6)
VariOpal 9 X	E 120	160 x 160 x 10	80	90 / 100	80 x 35	(3), 4, 5, 6

Some models are also available with 90 cm underframe clearance and 120 cm interbody clearance.

14.2 Allowed Range of Power



The table shows the allowed range of power applying to the type of plough and the number of furrows.

14.3 Weight

VariOpal	2-furrows	3-furrows	4-furrows	5-furrows	6-furrows
5	567	742	910		
6			1078	1276	
7	605	875	1134	1382	
8		1139	1412	1666	1910
9		1257	1553	1805	2067
5 X	685	956	1176		
6 X			1306	1561	
7 X		1053	1386	1707	
8 X		1331	1668	1986	2267
9 X		1464	1829	2150	

Weight in kg (2- to 4-furrows with depth wheel, from 5-furrows on with depth and transport wheel).

15 NOISE, AIRBORNE SOUND

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

16 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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