



Operating Instructions

Mounted Reversible Ploughs

Vari-EuroPlough



Safety is our concern!

Part No. 175 1265
GB-2/03.99

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Dear customer!

We would like to thank you for the confidence in buying this implement.

The advantages of this implement will be shown, only, when operated and used with due care and attention.

When handing over this implement your dealer has already instructed you with regard to operation, adjustment and maintenance. But this short introduction requires an additional detailed study of the instruction book.

Therefore read this instruction book carefully before the first use. Please pay attention to the safety instructions mentioned in this instruction book.

Any changes and modifications carried out not being mentioned expressly in this instruction book, may only be carried out with a written agreement of the manufacturer.

Ordering spare-parts

When ordering spare-parts please state type and serial No. of the implement. This information will be found on the identification plate.

Put down this data on the following table so that it is always available.

Type of implement:
No.:

Only use genuine Lemken spare-parts. Spurious parts negatively influence the function of the implement, show a shorter lifetime and increase in nearly all cases additional maintenance.

We trust that you will understand that LEMKEN unable to guarantee poor operation and damage caused by using spurious parts!

DEFINED USE



- Please familiarise yourself with the LEMKEN Vari-EuroPlough and its operations before putting the implement to work. Therefore use this instruction book with the „General Health- and Safety precautions“!

• The LEMKEN Vari-EuroPlough have been designed purely for the agricultural use!

Any use beyond the one stipulated above is no longer considered as defined use!

Under „defined use“ the manufacturer’s prescribed operation-, maintenance- and repair conditions are to be adhered to!

- The LEMKEN Vari-EuroPlough 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!
- The applicable accident prevention advice as well as the generally accepted safety technical, working, medical and road traffic rules should be adhered to!

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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!
- 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!
- 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 security!
- 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 that 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!

Attached 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!
- Repairwork 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!

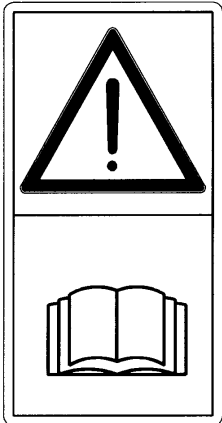
2 WARNING STICKERS

2.1 General Instructions

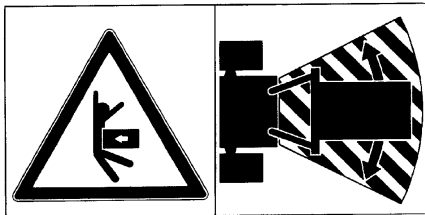
The LEMKEN Vari-EuroPlough is equipped with all features to ensure safe operation. Where potential danger areas of the implement can not be fully safeguarded, warning stickers are fitted which draw attention to these.

2.2 Meaning of the stickers

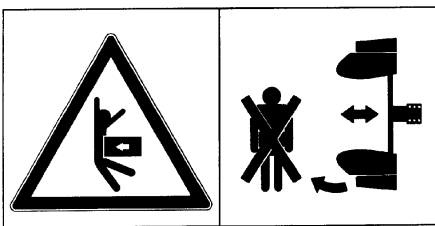
Familiarise with the meaning of the stickers. The following descriptions inform about them in detail.



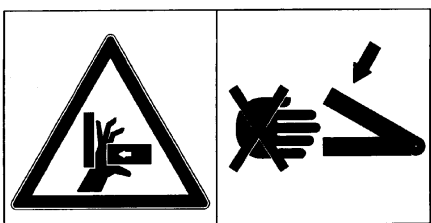
WARNING: READ AND ADHERE TO THIS INSTRUCTION BOOK AND THESE "GENERAL HEALTH- AND SAFETY PRECAUTIONS", BEFORE PUTTING THE IMPLEMENT TO WORK!



WARNING: KEEP WELL CLEAR OF THE WORKING AND SWINGING AREA OF THE IMPLEMENT!



WARNING: KEEP WELL CLEAR OF THE TURNING AND SWINGING AREA OF THE IMPLEMENT!



WARNING: PINCH POINT!

3 PREPARATION OF TRACTOR

3.1 Tyres

Ensure that all are at the manufacturer's recommended pressures, that left and right hand side tyre pressures are identical and state of wear is approximately the same. For 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 positions at the tractor end of the top link, use the hole recommended by the tractor manufacturer.

3.4 Check Chains or Sway Blocks

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

Some tractors are equipped with automatic check bars which must be adjusted carefully. If with the tractor suddenly sidedraw (crabbing) appears or if the plough works in right-handed working position wider or narrower than in the left-handed working position, a non unlocked check bar may be the reason for that. Check the locking device of the check bars and re-adjust it carefully if necessary. (See manufacturer's instructions).

NOTE: Restriction of the sideways movement of the lower links during ploughing can cause: Damage to plough and tractor. Inefficient ploughing. Excessive wear, fuel consumption and tyre wear.

3.5 Hydraulics

The hydraulics must be set to 'Position or Mixed Control' during work.

3.6 Hydraulic equipment

The following spool valves must be available at the tractor:

		Required spool valves	
		single acting	double acting
Turnover ram	double acting	-	1
	single acting connected with return pipe to the oil tank*	1	-
	with Vari-Stop*	-	1
	with Vari-Stop plus	-	2
Hydraulic working width adjustment		-	1
Memory ram		-	1
Attachment arm fitted to the turnover ram		-	-
Attachment arm fitted directly to the spool valve		1	-

* If an attachment arm is fitted, the hydraulic ram of the attachment arm must be fitted to a separate single acting spool valve.

3.7 Front Weights

Fit manufacturer's standard front weight kit or equivalent. Extra front ballast may be required following a check on stability with the plough raised or whilst ploughing with maximum weight transference.

4 ADJUSTMENTS OF THE PLOUGH BEFORE THE FIRST USE

4.1 First Use

Before the first use it is recommendable - with fully lowered plough - 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

Connect top link to headstock (P) and ensure that the top link raises slightly towards the plough. In most conditions use the slotted hole with ploughs having 4-furrows or more.

4.3 Adjustment of the outer Turnbuckle

This turnbuckle (10) has often been adjusted to the extreme to allow compact transport on lorries. Adjust this turnbuckle to a length similar to that of the main link (11). The distance between the pins is then 60 cm. Final adjustments can take place in the field.

4.4 Length of the Top Link

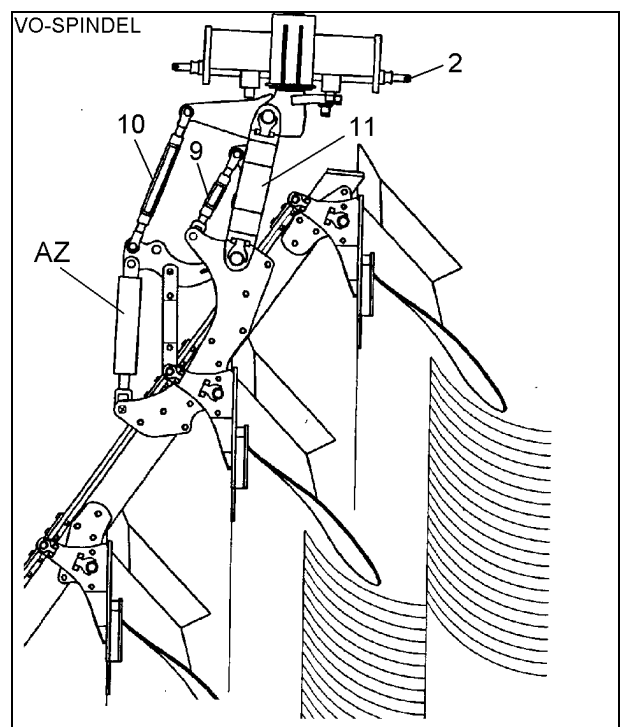
Lower plough and adjust length of top link, so that the first body is approx. 1 - 3 cm higher than the rear one.

4.5 Depth Wheel/Uni-Wheel

Adjust the depth 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 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 point distance of the skimmer and the plough body is 15 - 20 cm. The skim point should always work in solid soil to ensure a good flow of trash and soil. For this reason, in pre-cultivated soils the skimmer should work a little bit deeper.



4.7 Clearance for the Turnover Operation

Raise the plough fully and then turn the plough carefully. Check whether there is sufficient clearance between plough/depth wheel and ground. If not, lengthen the inner turnbuckle (9), set drawbar (2) deeper, fit top link to a higher hole in the headstock or use a hydraulic frame swing-in device. (5-, 6- or 7-furrow ploughs with wide working width per body require a frame swing-in device or Memory ram).

4.8 On the Field

Set tractor hydraulics to 'Draft Control'. Set in the plough and correct the length of the top link, vertical pitch, front furrow width and depth 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 4 or more furrows. If the top link is connected to the slotted hole (8), the top link pin (7) must always touch the front of the slotted hole. This way, weight will be transferred to the tractor resulting in less slippage and reduced fuel consumption.

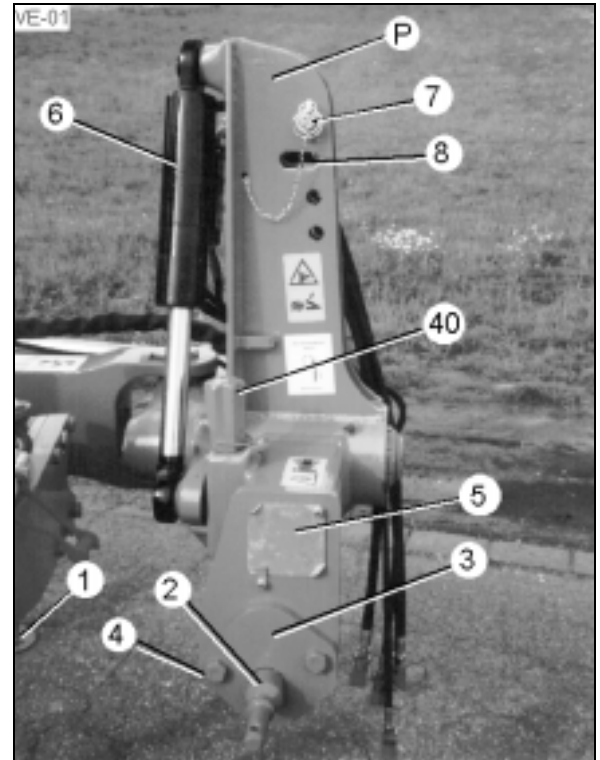
4.9 Tractor/Plough Alignment

The tractor/plough alignment will be adjusted by means of the inner turnbuckle (9). With this adjustment the side draw will be eliminated and the pull point optimised. This reduces the slippage and the fuel consumption.

5 ATTACHING AND DETACHING THE PLOUGH

5.1 Attaching to the Tractor

- Set tractor hydraulics to 'Position Control'.
- Attach lower links to the drawbar (2) and secure.
- Raise lower links slightly, swing up stand (1), slide on spring pin and secure to outer turnbuckle (10).
- Fit top link to headstock pin (7). Use slotted hole for all 5 and 6 furrow ploughs. On 3 and 4 furrow ploughs, the top link should rise slightly towards the plough when at working depth.
- Make hydraulic connections, ensuring that they are clean.
- Lubricate the plough as detailed in Section Maintenance.
- Set tractor hydraulics to 'Draft' or 'Mixed' Control.



- Check stability of tractor with plough raised and add front ballast if required further ballast may be found necessary whilst in work. It is essential that the front of the tractor is firmly in contact with the ground at all times.
- If the plough is to be transported along the public highway, fit marker boards and lighting equipment as described.

5.2 Detaching from the Tractor

- Choose a firm, level site.
- Turn plough to working position, fully close width adjusting ram so that the plough is at maximum ploughing width.
- Set tractor hydraulics to 'Position Control'.
- Adjust vertical adjuster nut (40) so that headstock is parallel to the ground. Remember to return headstock to the original position before going to work.
- Stop tractor engine and move both spool valve levers to release pressure.
- Remove top link from headstock.
- Remove hydraulic hoses and fit protective caps.
- Swing down stand (1), extend and secure.
- Before removing lower links from drawbar (2), ensure that the parked plough will be stable.



- Special care should be taken when the implement is coupled to or uncoupled from the tractor!
- Adhere to the maximum permissible axle loads, total weights and transport measurements!
- The release ropes for quick coupler 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!
- Mount the implement as prescribed. Handling characteristics, steerability and braking are influenced by mounted implements, trailers and ballast weights. Check sufficient steerability and braking!
- When fitting the hydraulic hoses to the tractor hydraulic sockets always ensure that the hydraulic system at the tractor's as well as at the implement side is without pressure!
- To avoid wrong hydraulic connection sockets and probes should be marked. This helps to prevent contrary function and reduces the danger of accident!
- Regularly check hydraulic hoses and pipings and exchange if found defective. The replacement hoses and pipings must meet with the implement manufacturer's technical standards!
- When fitting the machine to the three-point linkage of the tractor bring all control levers into such a position that unintended lifting or lowering is impossible!
- When fitting to the three-point linkage the mounting categories at the tractor and the implement must be compatible or must be made compatible!
- There is a danger of being crushed in the area of the three-point linkage. Be careful!
- When actuating the control levers for the three-point linkage from outside the tractor cab never step between tractor and implement!

6 TURNING THE PLOUGH FRAME

6.1 General Instructions

The double acting turnover ram of the VARI-EUROPLOUGH and VARI-EUROPLOUGH X ploughs is fitted with an automatic changeover valve and automatic lock valve making it completely independent of the tractor hydraulics whilst ploughing.

The standard hydraulic width adjusting ram connects directly to a second double acting spool valve on the tractor.

The Memory ram is connected to the turnover ram via 2 hoses. It must be ensured that ports 'M' and 'S' on both rams are connected. Ports 'A' and 'B' on the Memory ram connect directly to a second double acting spool valve on the tractor to adjust the width of ploughing. The hoses must not be mixed.

The Memory ram fulfils 2 functions:

- Alters working width of the plough
- To give greatly increased turnover clearance, the frame swings in before the plough turns and automatically swings out again to the pre-set ploughing width on completion of the turn.

During the turnover operation, the plough must be fully raised.

NOTE: A manual turnbuckle is available in place of either standard or Memory rams.

6.2 Turning the plough frame

Before turning raise the plough fully!

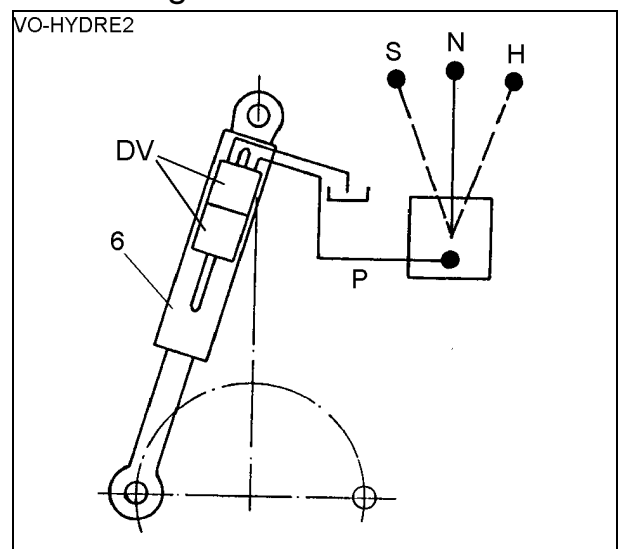
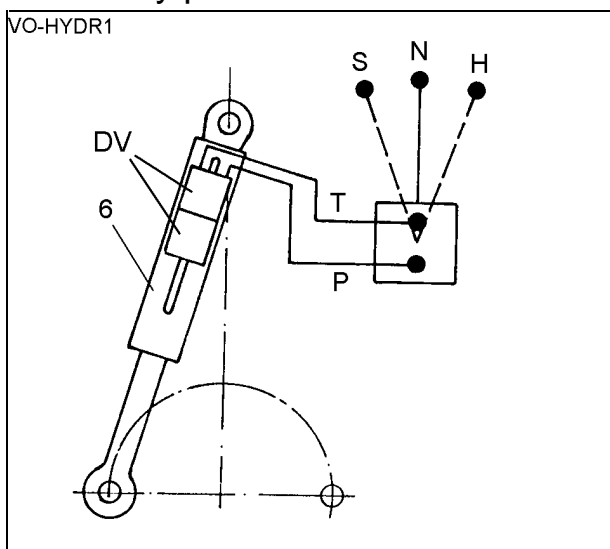
Move the lever of the double acting tractor spool valve into the position 'H' = pressurising port 'P'.

The plough frame turns through about 180 °.

After completion of the turnover operation move the lever to the position 'N'. After 5 - 10 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.



6.3 Turning the plough frame in connection with Memory ram

If there is insufficient clearance between plough and ground during the turnover operation, the plough frame must be swung-in.

Instead of the outer turnbuckle a Memory ram has to be used for swinging-in the frame.

The Memory ram fulfils 2 functions:

- Alters working width of the plough
- To give greatly increased turnover clearance, the frame swings in before the plough turns and automatically swings out again to the pre-set ploughing width on completion of the turn.

During the turnover operation, the plough must be fully raised.

6.4 Maintenance

Use acidless grease to protect the piston rods, if the plough is not used for a long period!

Use environmentally friendly grease, only!

Check hydraulic hoses regularly!

Replace damaged or defect hoses immediately!



- Never stay or allow anyone to stay within the operating area!
- Hydraulic turnover device and adjusters may only be actuated, if no persons are in the turning and slewing area.
- Before leaving the tractor lower the plough to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Do not allow anybody between tractor and implement if the tractor is not secured against rolling away by the parking brake and/or by the supplied chocks!
- The hydraulic system is under high pressure!
- When fitting the hydraulic hoses to the tractor hydraulic sockets always ensure that the hydraulic system at the tractor's as well as at the implement side is without pressure!
- To avoid wrong hydraulic connection sockets and probes should be marked. This helps to prevent contrary function and reduces the danger of accident!

Regularly check hydraulic hoses and pipings and exchange if found defective. The replacement hoses and pipings must meet with the implement manufacturer's technical standards!

7 FRONT FURROW WIDTH ADJUSTMENT AND TRACTOR/PLOUGH ALIGNMENT

7.1 Trulign

Adjusting front furrow width and tractor / plough alignment. This is a very simple, but essential 2 step adjustment designed to give maximum efficiency of the plough at all furrow widths.

1. step - Adjust front furrow width
2. step - Adjust the optimal tractor/plough alignment

The adjustment of the tractor/plough alignment neither influences the front furrow width nor the working width per body.

Using the tractor spool valve, adjust furrow width to approximately that required. Check by reading width pointer or measure from the point of a body to the landslide on preceding body.

7.2 Front Furrow Width Adjustment (to be carried out first)

Turn the outer turnbuckle (10) to make the front furrow width equal in width to the other bodies.

- To widen - lengthen outer turnbuckle (10).
- To narrow - shorten outer turnbuckle (10).

The front furrow is now set and no further adjustment is required.

7.3 Tractor/Plough Alignment (to be carried out second after front furrow adjustment)

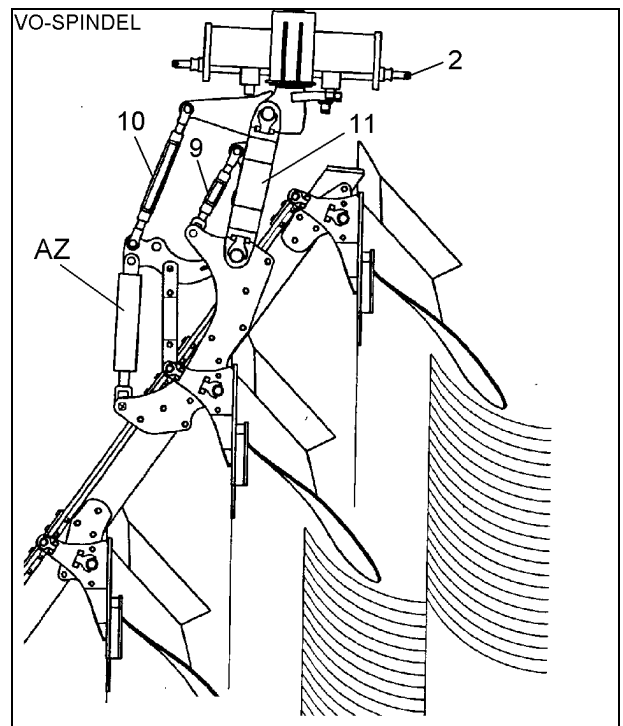
Turn the inner turnbuckle (9) to align tractor with plough.

If the tractor pulls to the unploughed land - shorten inner turnbuckle (9).

If the tractor pulls to the ploughed land - lengthen inner turnbuckle (9).

When making this adjustment it is preferable to operate with the inner turnbuckle (9) shorter rather than longer. This will hold the tractor front wheels gently against the furrow wall and minimise landslide pressure.

Once set, no further adjustment are required irrespective of furrow width, but remember **THE LOWER LINKS OF THE TRACTOR MUST BE FREE TO MOVE LATERALLY AT ALL TIMES WHILST PLOUGHING. IF SWAYBLOCKS OR CHECKCHAINS CAUSE RESTRICTION OF MOVEMENT, DAMAGE CAN RESULT AND EFFICIENCY WILL BE IMPAIRED.**



8 ADJUSTING THE WORKING WIDTH PER FURROW OF THE PLOUGH

After the basic-adjustment has been carried through by means of the unique Trulign-adjustment centre, the working width per body can be adjusted by means of a turnbuckle or from the tractor seat by means of an adjuster ram (B) or Memory ram (M). The Memory ram is connected with its rear ram unit via 2 hoses with the turnover ram. The front ram unit is connected via 2 hoses with a separate tractor spool valve. Independently it is possible with the Memory ram to

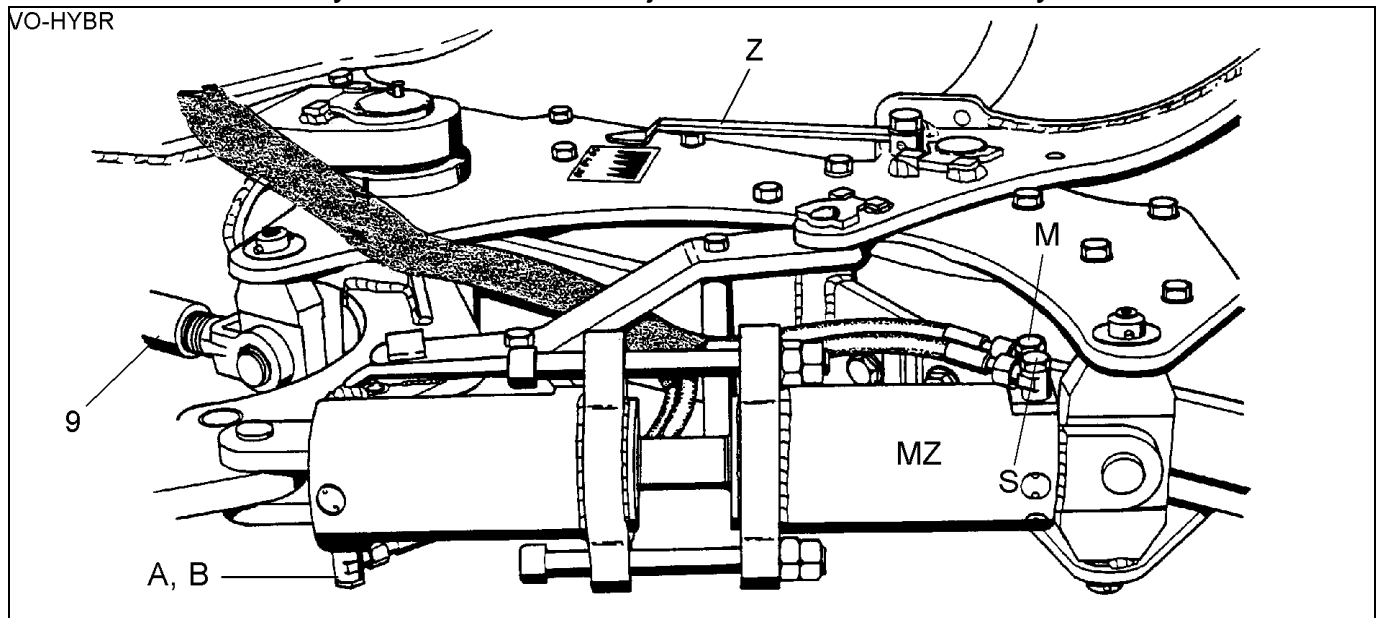
1. swing-in and -out the plough frame for sufficient clearance between plough and ground during the turnover operation and
2. to adjust the working width per body from the tractor seat.

The pointer (Z) points to a scale showing the chosen working width in cm.

To increase working width - close width adjusting ram.

To reduce working width - open width adjusting ram.

Whilst carrying out width changes, the front furrow and tractor/plough alignment correct automatically and no further adjustments are necessary.



Important: Having made a width adjustment, check that sway blocks or check chains do not restrict free lateral movement of the tractor lower links.



- Hydraulic turnover and adjusters may only be actuated, if no persons are standing in the turning and slewing area!
- In connection with the Memory ram before the turning operation the plough frame first swings-in and then out.
- Allow nobody to stay in the slewing and turning area!

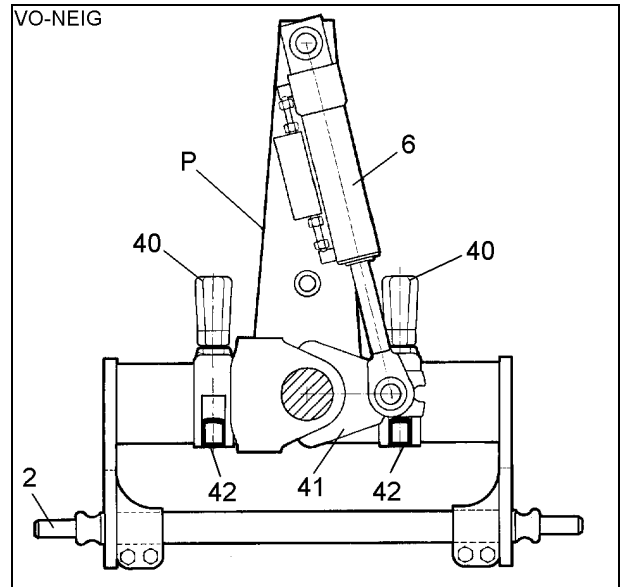
9 ANGLE ADJUSTMENT

9.1 General Instructions

With the plough in work at the required depth, the legs should be approximately vertically to the ground. If not, adjust as described following:

9.2 Angle adjustment with double acting turnover ram

- Lift the plough 5 - 10 cm (3 - 4 in).
- Momentarily pressurise port (P) of the turnover ram (6) to slightly turn the plough off its stop (42).
- Adjust nut (40) as required
- Set operation lever of the tractor spool valve into the opposite pressure position. After that return the plough frame to its stop.
- Lower plough again.
- Check whether this adjustment was sufficient. If not, repeat adjustment again.



9.3 Angle adjustment with single acting turnover ram with return pipe

In connection with a turnover ram (6) with return pipe to the oil tank of the tractor fitted to a single acting spool valve the angle will be adjusted as described in the last section point a) to c). After that the plough will be lifted and turned completely and after 3 – 6 seconds turned back again and lowered. If the angle is not sufficiently adjusted, the adjustment must be repeated again.

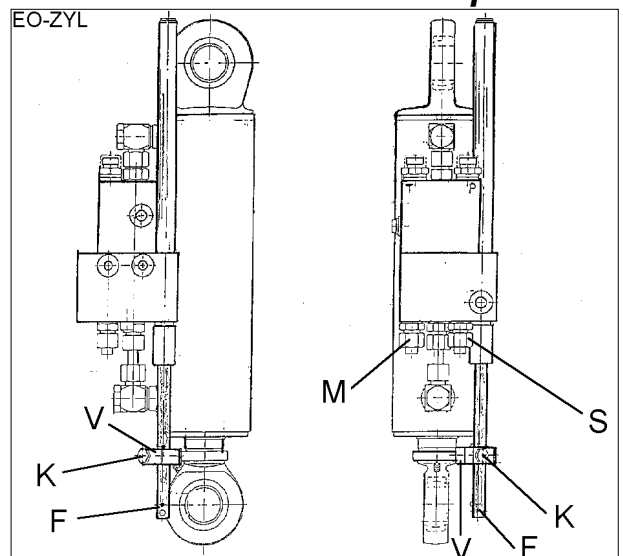
9.4 Angle adjustment with double acting turnover ram with Vari-Stop or Vari-Stop plus

In connection with a turnover ram with Vari-Stop or Vari-Stop plus the angle of the plough frame will not be adjusted by means of the lateral stops (28) with nuts (20), but directly via the turnover ram. At the turnover ram is a guiding rod (F) with adjusting clamp (V), about which an angle of the plough frame can be adjusted. For the adjustment the adjustment screw (K) must be loosened and the guiding rod (F) removed.

Moving guiding rod to the top = larger angle

Moving guiding rod down = smaller angle

After the adjustment the adjustment screw (K) must be tightened again.



The pre-adjusted angle adjustment will be overrun as follows:

The turnover ram with Vari-Stop allows an overrun of the angle-stop if required and that from the tractor seat. If for example the last furrow at the end of the field should be ploughed shallow, the angle-stop will be overrun so far, until the last body works as shallow as required. After the turnover-operation the turnover ram will open so far until the pre-adjusted angle adjustment is reached again.

a) Turnover ram with Vari-Stop

If the connection T of the turnover ram is pressurised, the wing stop can be overrun.

If an attachment arm for presses is fitted to the plough, the hydraulic hose of the hydraulic ram of the attachment arm must be connected directly to a separate single acting spool valve.

b) Turnover ram with Vari-Stop Plus (with Memory ram)

For the turnover ram with Vari-Stop Plus an additional double acting tractor spool valve is required. By operating the spool valve the pre-adjusted wing adjustment can be increased and decreased as required.



- There are pinch points between the stop arm (27) and stop (28)!
- Keep distance!
- Allow nobody to stay in the turning area!

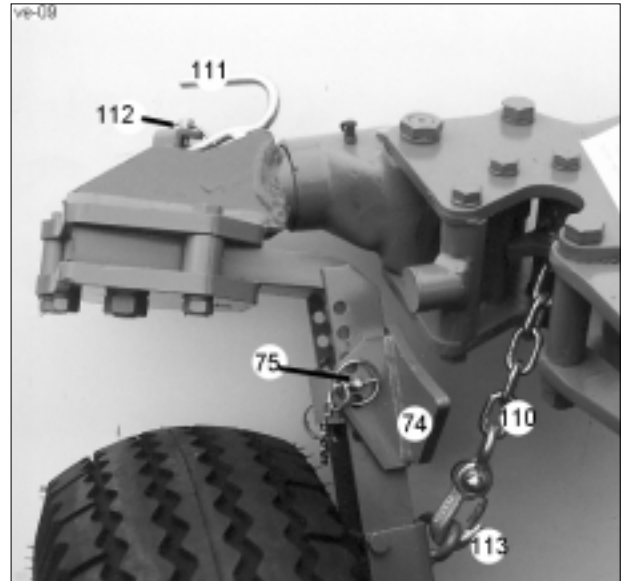
10 DEPTH ADJUSTMENT

10.1 General Instructions

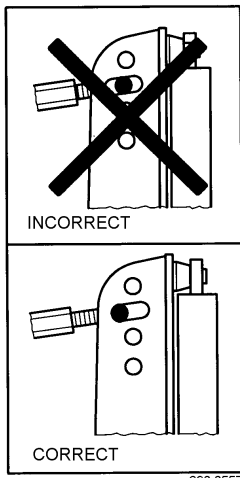
Adjust the working depth of the plough by means of the tractor hydraulics and the stop (74) of the depth wheel respectively Uni-Wheel.

Allow the plough to enter work with the tractor lift lever in the fully 'down' position ('Draft' or 'Mixed' control). When at working depth, stabilise depth using the tractor lift lever. Check the fore and aft plough level, in normal conditions the plough beam should be parallel to the ground, make level by using top link and depth wheel.

During work the weight of plough must be transferred on to the tractor. This saves fuel and reduces slippage. Too much slippage increases the wear of the tyres and the fuel consumption.

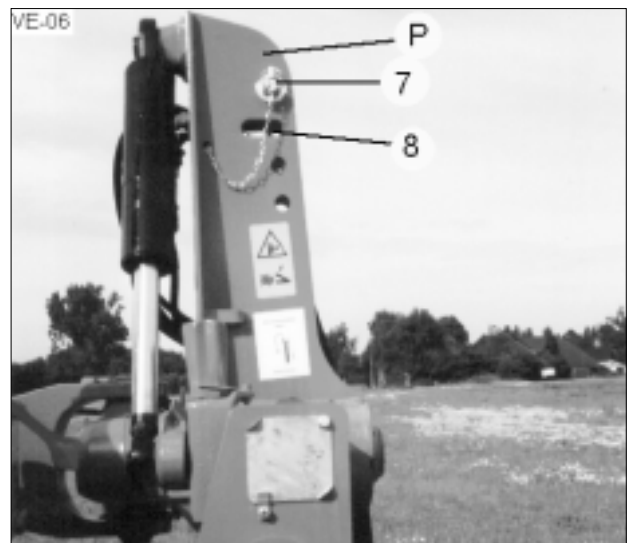


10.2 Slotted hole



In connection with ploughs having 5 furrows or more, the top link must be fitted to the slotted hole (8), if the conditions are hilly. Where the slotted hole (8) is used, the pin (7) must be at the **front** of the slot.

Correct as necessary by adjustment with the tractor draft control lever.



Final level adjustments should be made with the top link. Set the stop for the tractor lift lever after final adjustment is made.



- Before leaving the tractor lower the plough to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Do not allow anybody between tractor and implement if the tractor is not secured against rolling away by the parking brake and/or by the supplied chocks!
- Repair-, maintenance- and cleaning operations as well as adjustments should be switched off. Remove ignition key!
- When carrying out maintenance work on a raised implement always place suitable supports underneath!

11 SHEARBOLTS

All VARI-EUROPLOUGH and VARI-EUROPLOUGH X ploughs are fitted with shearbolts (60) as standard.

IMPORTANT: Only genuine LEMKEN shearbolts may be used. There is a serious risk of damage if other bolts are used and any warranty will be void.

Be very careful of the guillotine effect of a pivoting leg assembly and its support plates.

To replace a broken shearbolt proceed as follows:

Raise plough a little and slacken pivot bolt (63).

Remove broken sections of old shearbolt (60).

Swing body back into position.

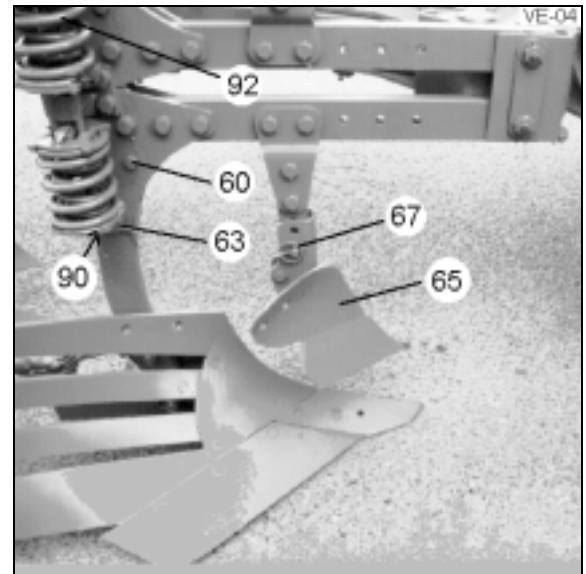
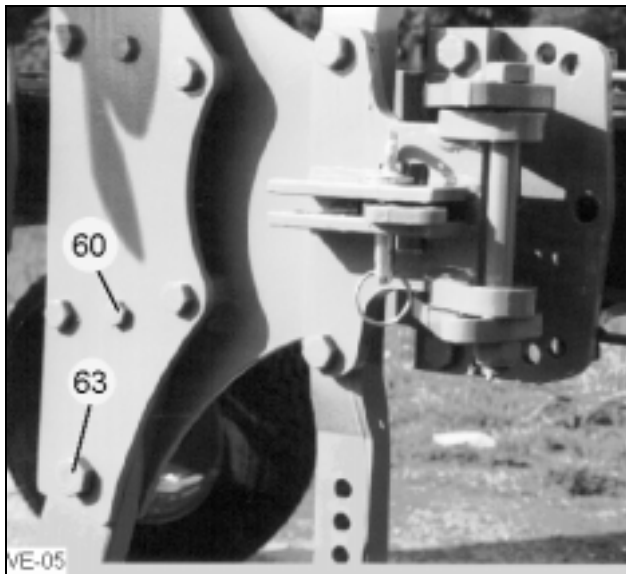
Fit new shearbolt of correct type and tighten securely.

Securely tighten pivot bolt (63).

NOTE: In conditions where frequent failure of the shearbolt is experienced:

Ensure that both shearbolt and pivot bolt are securely tightened.

After a number of shearings, it will be found an advantage to replace the pivot bolt (63).



Plough Model	Shearbolt		Pivot bolt	
	Part No.	Dimension	Part No.	Dimension
Vari-EuroPlough 5	301 3399	M12x65LS47x15/10.9	301 4606	M20x80LS40x25/10.9
Vari-EuroPlough 5 X	301 3409	M12x70LS52x15/12.9	301 4601	M20x70LS40x25/10.9
Vari-EuroPlough 7	301 3399	M12x65LS47x15/10.9	301 4606	M20x80LS40x25/10.9
Vari-EuroPlough 7 X	301 3409	M12x70LS52x15/12.9	301 4601	M20x70LS40x25/10.9
Vari-EuroPlough 8	301 3596	M14x75LS56x15/8.8	301 4370	M20x85LS55x25/10.9
Vari-EuroPlough 8 X	301 3409	M12x70LS52x15/12.9	301 4606	M20x80LS40x25/10.9
Vari-EuroPlough 9 (80x35)	301 3596	M14x75LS56x15/8.8	301 4370	M20x85LS55x25/10.9
Vari-EuroPlough 9 (80x40)	301 3607	M14x85LS61x20/10.9	301 4607	M20x90LS60x25/12.9
Vari-EuroPlough 9 X	301 3595	M14x70LS51x15/10.9	301 4606	M20x80LS50x25/10.9

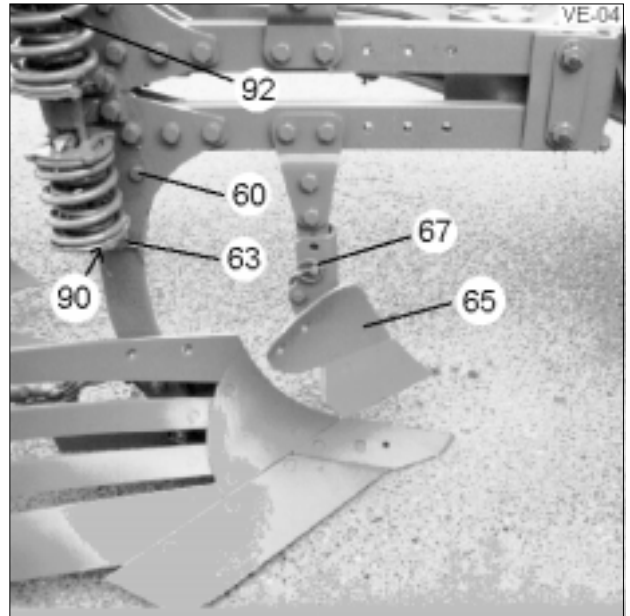


- There are pinch positions in the area of the shearbolt device.
- Do not allow any body within the release area of the bodies.
- After a break of a shearbolt, the body releases rearwards and upwards. Keep distance!

12 TRIP DEVICES

12.1 Vari-EuroPlough X with automatic reset legs

The automatic overload safety device protects the plough from damage when an obstacle is encountered. The mechanism breaks back upon impact and automatically returns the body to the working position once the obstacle has been passed. Additionally, each leg is fitted with a shearbolt (60) for protection when the body 'hooks' an obstacle. The preload on the breakback springs (92) is set at the factory for average conditions. In heavy conditions, this can be adjusted so that the legs only break back when an obstacle is encountered rather than through normal ploughing loads.



Adjust the mechanism as follows:

Tighten screws (90) 2 - 4 turns. This should prove adequate.

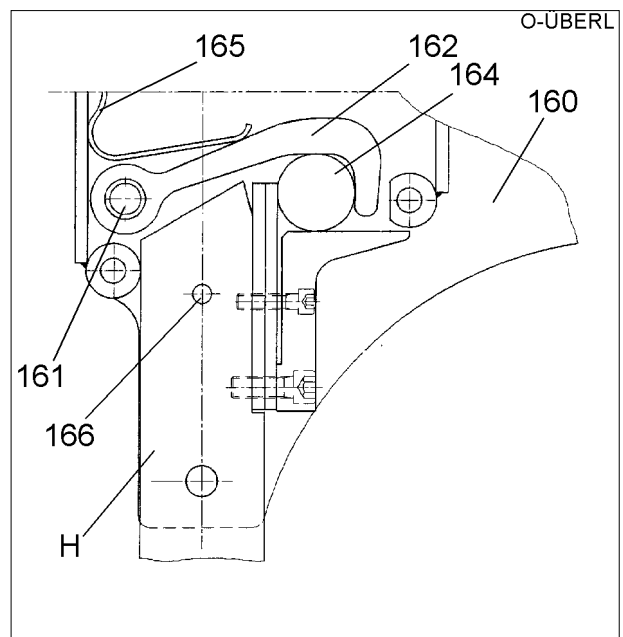
Should the mechanism still trip without meeting an obstacle, tighten screws (90) a further 2 - 3 turns.

IMPORTANT: It is essential that all 4 screws on each leg assembly are adjusted equally to ensure balanced operation.

12.2 Vari-EuroPlough HX with semi-automatic trip device

The HX-mechanism of the Vari-EuroPlough HX is a semi-automatic trip device with high release characteristics. It is a compact device with hooks (162), roller (164) and spring (165) located inside the leg bracket (160). 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.



No adjustment or maintenance is required except lubrication of the hook pins (161) as in the routine greasing of the plough,

IMPORTANT: Provision is made for fitment of shearbolts (166). This should only be necessary if a fault occurs in the trip mechanism and then **ONLY** after the mechanism has been de-activated. To achieve this, remove cover plate and roller (164) and dismantle then the hooks (162) and spring (165) and fit correct shear bolt = same shearbolt as with Vari-EuroPlough. If shearbolts are fitted and the HX mechanism is not de-activated, damage to the plough can result and any warranty will be void.



- Sitting or standing on the implement during operation or during transport is not permissible!
- Never stay or allow anyone to stay within the operating area!
- Repair-, maintenance- and cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off! Remove ignition key!
- The springs are under tension!
- Exchange the rods holding the springs if they show damages!
- The bodies trip upwards, keep distance!

13 BODIES

13.1 Pitch

To check correct pitch, measure from plough frame to underside of new point and end of landslide. Frame to point measurement should be 1,5 cm (5/8 in) greater than frame to landslide.

I e: Measurement D should be + 1,5 cm from parallel to frame.

This setting is for average conditions. To

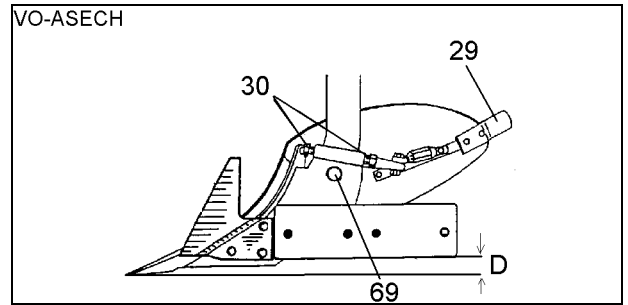
improve penetration, increase pitch by a small amount on each body. Slacken bolt (69) and clamp bolt (if provided) and adjust setscrews (30). Tighten bolt all bolts again after adjustment.

Excessive pitch will increase draft and effect depth control.

Having set one body as required, note measurement from point to beam and adjust remainder

to the same measurement.

Finally check alignment of all points and make any minor adjustments necessary.



13.2 Tail Pieces

The tail pieces (29) should be adjusted so that they help to turn the furrow slice. Set too low, they can cause soil to fall back into the furrow.

Warning - when worn, they can be very sharp.

14 SKIM COULTERS

14.1 Skim coulters with flat stalk

14.1.1 General Instructions

The skim coulters (65) should be finally set when the plough is operating at the required depth and speed.

The skim point should be set to a depth between 5 and 10 cm (2 - 4 in) and the tip of the point set to run 2 - 3 cm (3/4 - 1 1/4 in) to the landside of the body. If discs are fitted, that measurement may be a little bit smaller. 3 lateral fitting possibilities are provided with skimmers being equipped with angle adjustment (76).

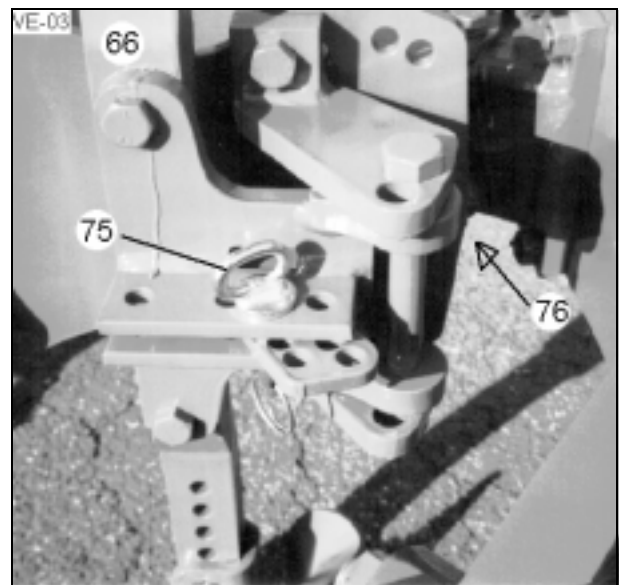
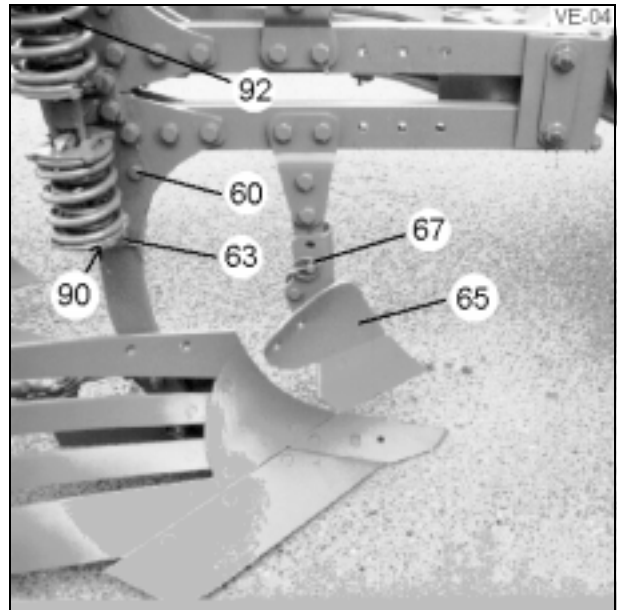
The skimmed slice should be seen to fall cleanly into the furrow bottom before the main furrow slice is turned by the plough body. The skim point should normally be positioned beside or just behind the plough point. Two force and aft positions are provided.

14.1.2 Working depth

Adjust the depth of the skims (66) by means of the adjuster pins (67).

14.1.3 Angle adjustment

The angle is not adjustable with those skimmers which have their flat stalk fitted directly to the leg bracket. The angle of skimmers (65) which are equipped with angle adjustment (76) can be adjusted by means of the pin (75).

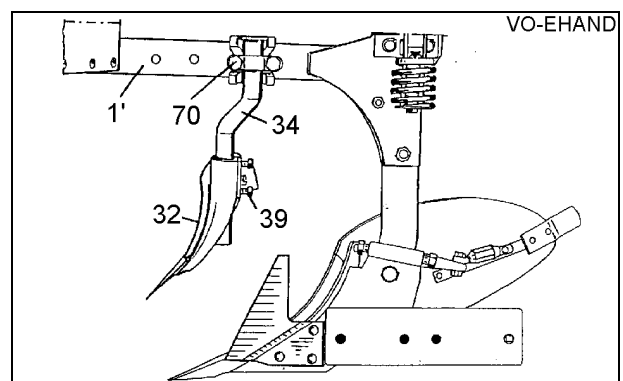


14.2 Skim coulters with round stalk

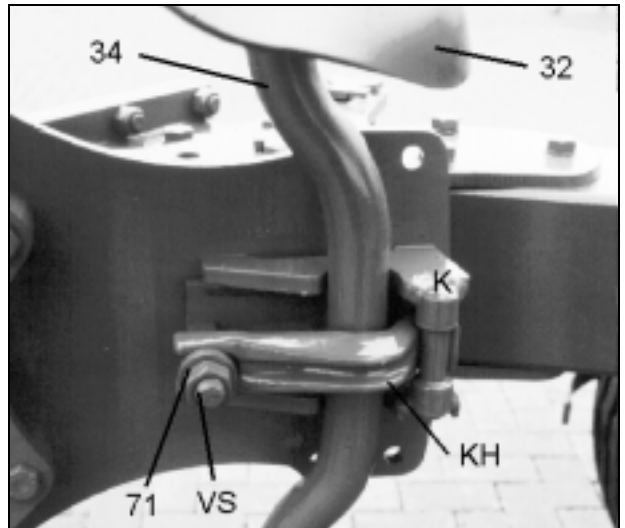
14.2.1 General instructions

The skim coulters (32) should be finally set when the plough is operating at the required depth and speed.

The skim point should be set to a depth between 5 and 10 cm (2 - 4 in) and the tip of the point set to run 2 - 3 cm (3/4 - 1 1/4 in) to the landside of the body. Skim angle approximately 45 ° - 50 °.



The skimmed slice should be seen to fall cleanly into the furrow bottom before the main furrow slice is turned by the plough body. The skim point should normally be positioned beside or just behind the plough point, but in conditions where large quantities of trash exist, the skim should be set more to the rear and at a more abrupt angle.



14.2.2 Depth and Angle Adjustment

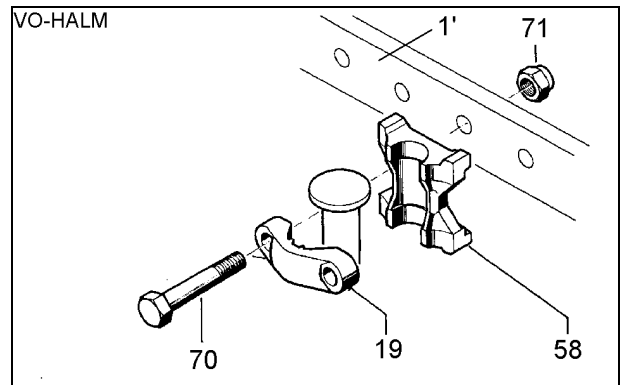
Slacken setscrews (39), set to depth 5 - 10 cm (2 - 4 in) and angle to the direction of ploughing of approximately 45° - 50°. Securely tighten setscrews (39).

14.2.3 Lateral Adjustment

Loosen nut (71) and swivel stalk until the skim point is positioned 2 - 3 cm (3/4 - 1 1/4 in) to landside of the body. Securely tighten nut (71). (This adjustment will affect angle of skim).

14.2.4 Fore and Aft Position of Skim Stalk (Vari-EuroPlough and Vari-EuroPlough HX)

After slackening the nut (71) swivel round stalk (34) in the required fore and aft position. The bracket (KH) is reversible to give 2 additional fore and aft positions. After adjustment tighten nut (71) of square bolt (VK) carefully.



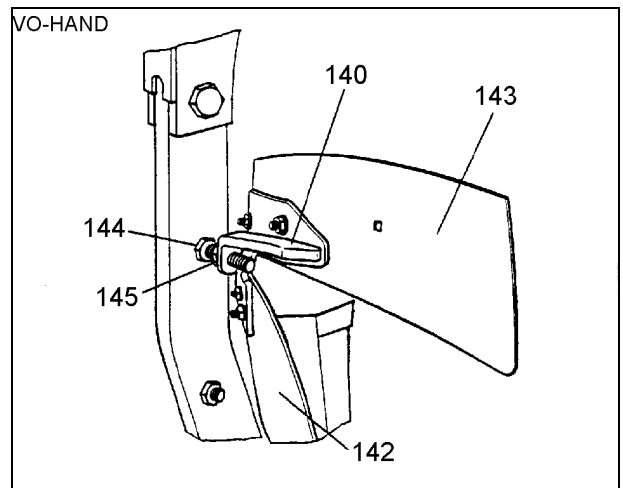
14.2.5 Fore and Aft Position of Skim Stalk (Vari-EuroPlough X)

After slackening the nut (71) swivel round stalk in the required fore and aft position. With the beam (1') a number of holes are provided. The clamp assembly (19) and (58) can be moved along the beam using additional holes provided. Generally use a forward position (skim point beside plough point) but in heavy trash, move to rear.

15 TRASHBOARDS

Bolt carrier (140) to the holes provided in the top of the mouldboard (142). Fit trashboard (143) to the carrier and adjust for optimum trash 'mix'.

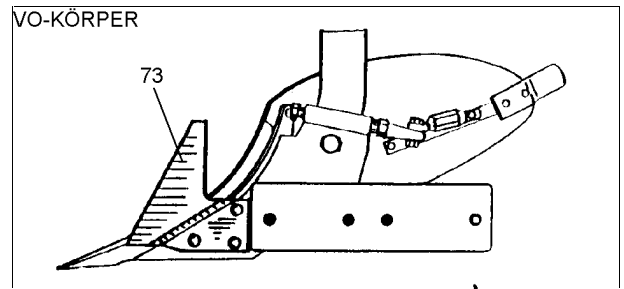
Adjust support-bolt (144) so that it touches the leg. Secure bolt (144) by means of locknut (145).



16 COULTERS

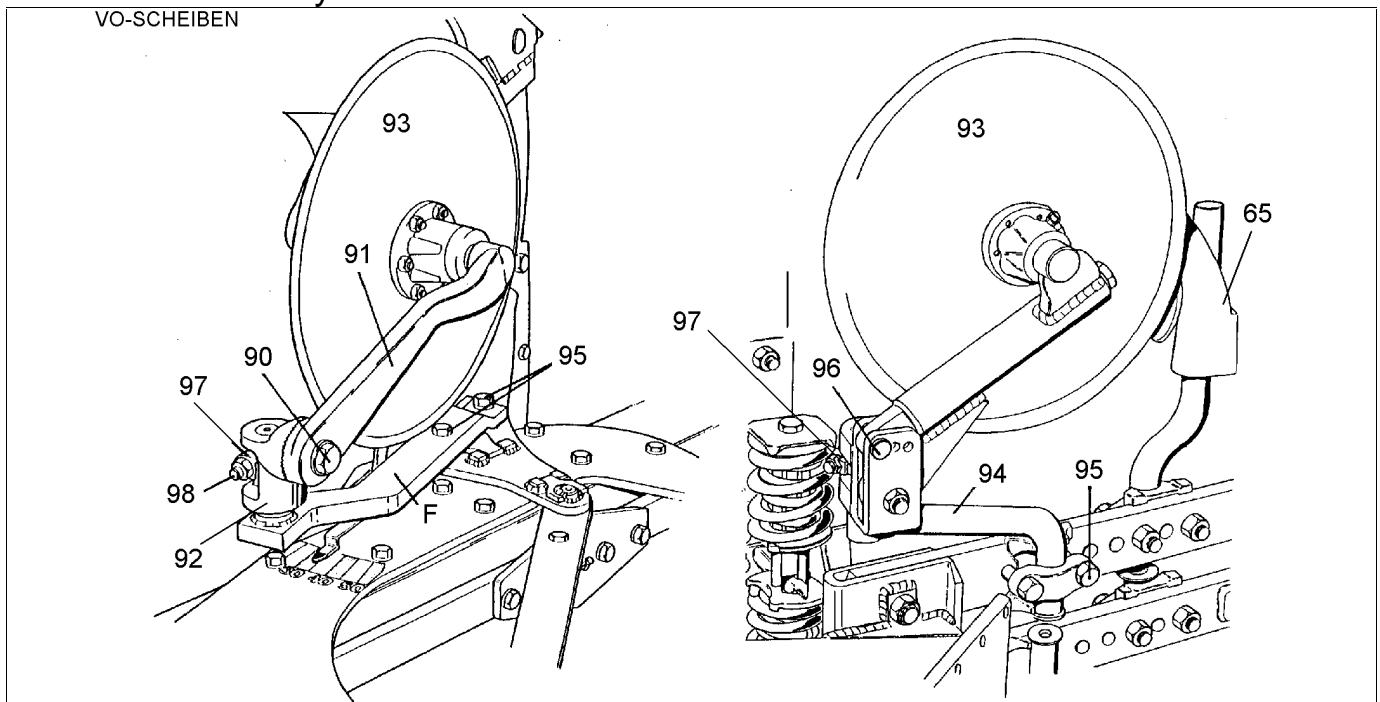
16.1 Sword Coulters

Sword coulters (73) are available. They are recommended for tough and heavy conditions.



16.2 Disc coulters

When fitted, disc coulters (93) should be set to a working depth of 7 - 9 cm (2 ³/₄ - 3 ¹/₂ in) and 2 - 3 cm (³/₄ - 1 ¹/₄ in) to the landside of the body.



Adjust depth by slackening setscrew (90), move arm (91) as required, after checking that serrations of bracket (92) and arm (91) mesh correctly, securely tighten setscrew (90). Use pin (96) to adjust the depth of the spring loaded disc coulters (Vari-EuroPlough X ploughs only). For lateral adjustment, slacken setscrew (95) and swing arm (F) or (94) to give required setting. Securely tighten setscrews (95). Use clamp with clamp bolt (98) to limit the castor effect.

IMPORTANT: All locking setscrews should be **very tight** after adjustment.



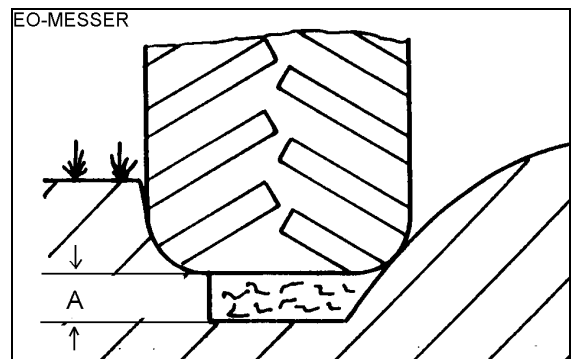
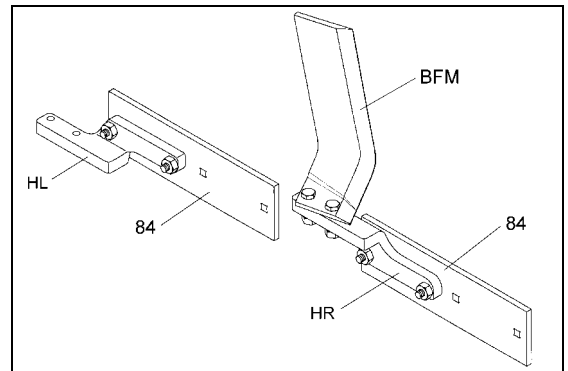
- The operator should familiarise him-/herself with all controls and their functions before starting work. During work could be too late!
- Sitting or standing on the implement during operation or transport is not permissible!
- Do not allow anyone within the operating area!
- Repair-, maintenance- and cleaning operations as well as adjustments and remedy of function faults should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When conducting maintenance work on a raised implement always place suitable supports underneath.

17 WIDE FURROW CUTTERS

If the tractor is equipped with wide tyres, it is recommendable to use a wide furrow cutter (BFM). This wide furrow cutter must be fitted to the landslide of the rear body.

If the plough is equipped with C-bodies, to the rear body the landslide 340 1450 must be fitted so that the holder (HL) or (HR) of the wide furrow cutter can be fitted. Two free bores must be available at the rear landslide.

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. It influences the height and width of a furrow which will look - especially in heavy soils - unequal. After a qualified seedbed preparation or after a natural re-consolidation period, the land is level again. The wide furrow cutter can be fitted in two different working depths. By turning the brackets (HR) and (HL) and fitting each of them to the opposite landslides of the plough bodies, the working depth of the wide furrow cutters can be changed.



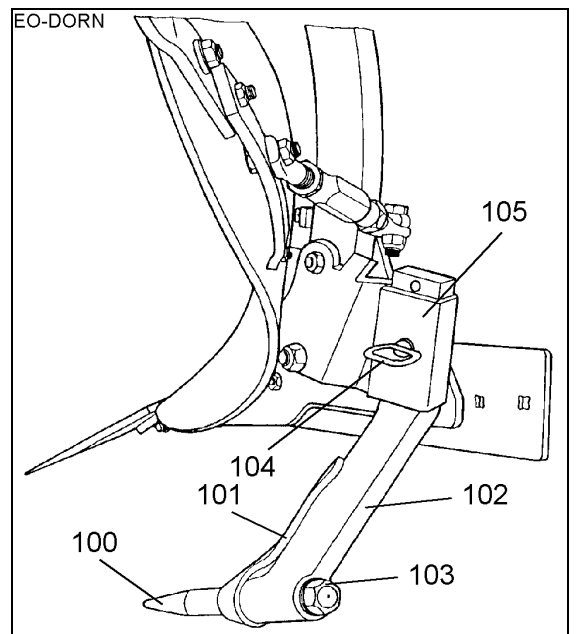
18 SUBSOILERS

The subsoiler UD6 will be fitted as shown in the sketch. By means of displacing the stalk (102) the working depth of the subsoiler can be adjusted.

Maximum working depth = 20 cm

Minimum working depth = 14 cm

For the adjustment of the working depth the pin (104) must be unlocked and pulled out and the stalk (102) removed accordingly in the bracket (105). After the adjustment the stalk (102) must be fitted again and secured. The stalk (102) is protected by shin (101). Also the shin (101) and the tine (100) can be replaced when worn after removal of nut (103).



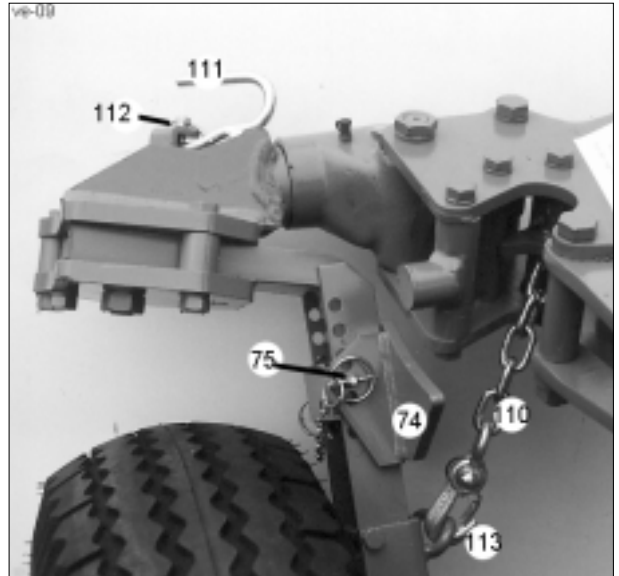
- When a plough is parked with subsoilers, the subsoilers of the lower side of the plough must be pulled out and removed after unlocking the pins (104) in order to secure the stability of the plough!
- For transport the subsoiler must be removed and placed in the tractor cabin!

19 DEPTH AND UNI-WHEEL

19.1 General instructions

The Vari-EuroPlough is available with depth wheel respectively a Uni-Wheel. The Uni-Wheel is a depth and transport wheel which must be used in any way, if the load on the tractor front axle – especially during transport – is too low, resulting in a unsafe steerability of the tractor.

The depth- and Uni-Wheel should assist the tractor hydraulics to hold the plough in its pre-adjusted working depth, it should not carry continuously the weight of the plough. The tractor hydraulics must be set in accordance to that.



19.2 Depth adjustment

Slide stop (74) to adjust the working depth after removing the adjuster pin (75). Slide stop (74) towards the wheel axle to increase the working depth. Slide stop (74) towards the pivot axle to decrease the working depth. The stop will be fixed by means of the adjuster pin (75), which must be unsecured and removed for the adjustment. After each adjustment the adjuster pin (75) must be fitted and secured again.

19.3 Tyre Pressures

Listed below are the maximum tyre pressures permitted on the various types of tyres fitted. The type of tyre fitted should be identified from its markings and the pressure listed must not be exceeded.

Tyre size	Ply rating	Profile	max. allowed pressure	min. allowed pressure	Tightening torque of wheel bolts (Nm)
10.80 - 12	8	AW	4,0 bar	2,0 bar	125
185 R 14	4		2,3 bar	1,5 bar	125
10.0/75 - 15.3	14	AW	5,0 bar	3,0 bar	300

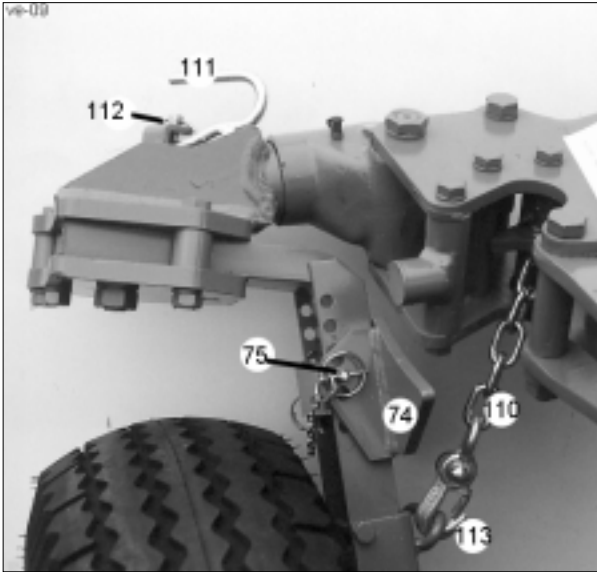
The stated maximum pressures may not be exceeded! The minimum pressures may also not be understepped, in order to prevent overwork of the tyres and subsequent damage.



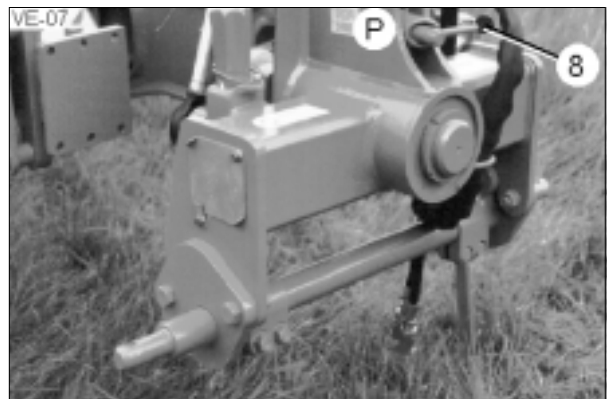
- When working on the tyres make sure that the implement has been placed on the ground safely and that it is secured by chocks against unintentional rolling!
- Mounting tyres requires knowledge and special tools!
- Repairwork on tyres may only be conducted by trained staff and with suitable tools!
-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

19.4 Uni-wheel

19.4.1 Conversion from Working to Transport Position

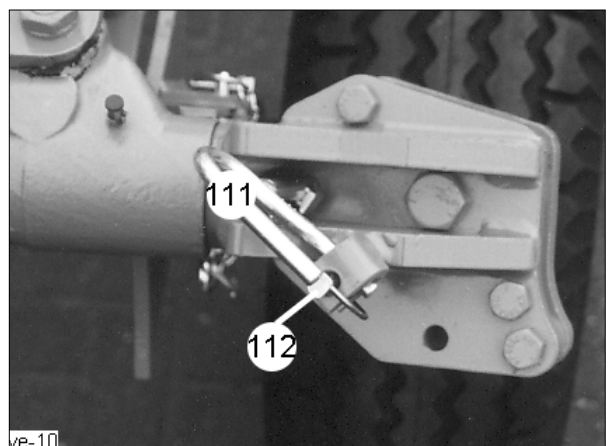


- Disconnect chain (110) from the wheel by means of unhooking the carbine swivel (113).
- Set tractor lift to 'Position Control'.
- Lift plough a little, remove pin (111).
- Turn wheel stalk and bracket 90° and lock in this position with pin (111) and secure with clip (112).
- On headstock, rotate lock pin (113) 180°, fully raise plough and slowly operate turnover device until pin (8) is heard and seen to lock plough in half turned position.
- Check whether pin (8) locks correctly.
- Lower plough and **DETACH TOP LINK**.
- Raise lower links fully for transport position.



19.4.2 Conversion from Transport to Working Position

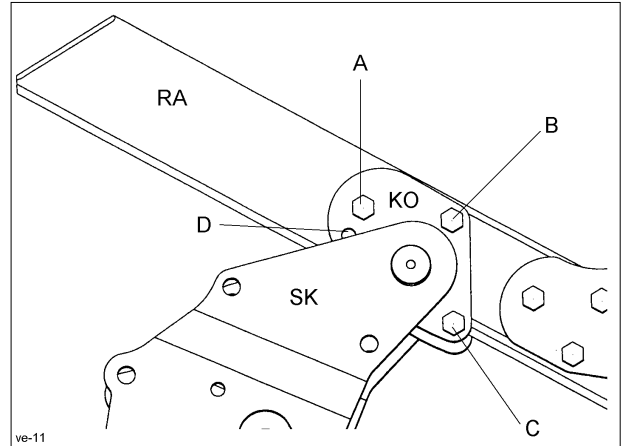
- Attach top link and fully raise plough.
- Rotate lock pin (8) 180° and locate lever in notch, raise plough fully and operate turnover to turn plough to working position.
- Partially lower plough, remove clip (112) and pin (111). Turn wheel stalk and bracket 90° and reposition pin (111) with clip (112) and secure.
- Fit chain (110) to lug of wheel.
- Lower plough and set tractor lift to 'Draft' or 'Mixed' Control.





- In the area of the wheel stops there are pinch points. Keep distance!
- The stated maximum wheel pressures may not be exceeded!
- When using the Uni-Wheel for transport, the top link must be detached!

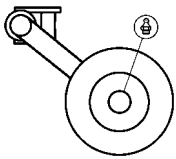
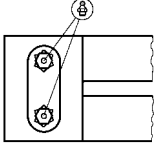
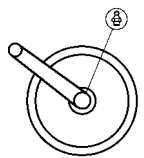
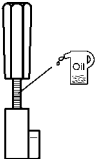
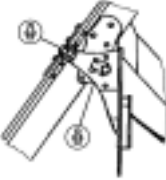

- When fitting the bracket (KO) to the frame (KA) the hole (D) may never be used!
- When using the hole (D) there is mortal danger, as when turning the swivel bracket (SK) the bolts being placed in the hole (D) shears and will be shot away like a missile!



20 MAINTENANCE

The Vari-EuroPlough plough requires a little maintenance, only. All pivot points must be greased regularly with an environmentally friendly grease according to the following table. For a long operation break all smooth areas of wearing parts, pins and adjusting devices must be greased regularly. The piston rod of the turnover rams must be greased with a non-acid grease.

Text		all working hours			Before and after a long winter break
		10	50	100	
Bearing of turnover device and pivot points		x			x
Adjustment centre Trulign		x			x
Turnbuckles					x
Swinging axle of depth- and Uniwheel			x		x

Text		all			Before and after a long winter break
		10	50	100	
		working hours			
Bearings of depth- and Uniwheel				x	x
Bearing of overload safety device		x			x
Bearings of disc coulters				x	x
Thread of angle adjustment					x
Swivel bracket and rod		x			
HX-trip device		x			x



- It is strongly recommended that a weekly check is carried out on all pivots and joints on the plough during the ploughing season.
- Great care has been taken to incorporate bushes at all points at which wear could occur.
- Grease well and replace any bush before it is finally worn!
- Check all bolts and tighten them carefully. Check wheel bolts before transport and tighten them if necessary. The correct tightening torque are shown in the para 'Tyre Pressures'!
- Regularly check hydraulic hoses and pipings and exchange if found defective. The replacement hoses and pipings must meet with the implement manufacturer's technical standards!
- Check for leaks with care!
- Liquids leaking under high pressure (Diesel fuel, hydraulic oil) can penetrate the skin and cause severe injury. When injured see a doctor immediately. Danger of infection!
- Before beginning hydraulic repair work lower the plough to the ground and stop the engine. Release system pressure!

21 FAILURES, REASONS AND REMEDY

21.1 Hydraulic Equipment

Failure: The plough frame starts turning before Memory ram or swing-in ram are swung-in completely.

Reason: The friction of the frame pivot bolts is too high.

Remedy: Grease pivot bolts carefully, and that according to the maintenance table.

Failure: Memory ram does not open or close.

Reason: The throttle bores of the threaded throttle in the Memory ram are blocked.

Remedy: Screw out the threaded throttles out of the ram connections by means of a circlip tong and clean them (Connection (S) has no throttle).

Failure: Plough turns rattling during the first turning phase.

Reason: Plough frame runs forward, a vacuum appears in the hydraulic ram.

Remedy: a) Lengthen inner turnbuckle.
b) Fit a smaller throttle to the connection (T) of the turnover ram.

Failure: Plough frame turns up to the middle position and stops.

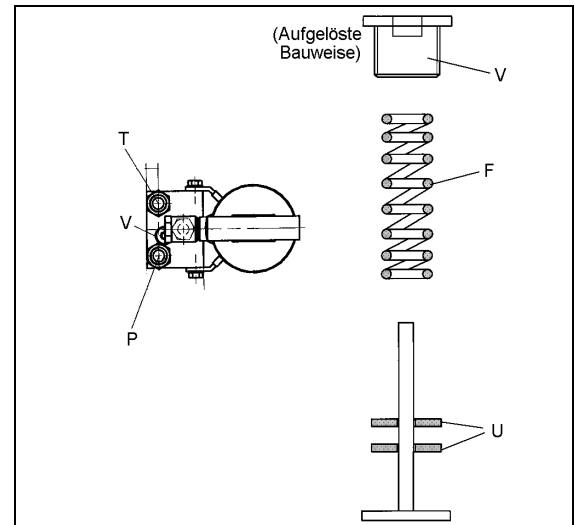
Reason: The required switchover pressure for the turnover ram has not been reached by the tractor hydraulics.

Remedy: a) By means of removing the washers (U) the pre-adjusted switchover 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.

Failure: The plough frame turns but the turnover ram switches over before reaching the half-turned position and the plough frame turns back again.

Reason: a) The pre-adjusted switchover pressure is too low.
b) The inner turnbuckle is too short.
c) The bearing of the turnover device is damaged.

Remedy: 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) Lengthen inner turnbuckle.
- c) Check the bearings and replace if required.

Failure: The turnover ram switches over, without turning the plough frame.

Reason: a) The pre-adjusted turnover pressure is too low.
b) The cone or its seat of the switchover valve is damaged and leaky.

Remedy: a) Increase the pre-adjusted switchover pressure by means of an additional washer (U).
b) Replace hydraulic ram.

Failure: Working width of the body changes during work.

Reason: The seal or the lock valve are leaky.

Remedy: As the result of the failures is the same in both cases and the lock valve can only be repaired in the factory, the hydraulic ram must be sent back for repairing. The lock valve may never be opened, as it contains a lot of single parts. If it is dismantled it may never work again.

21.2 Penetration and Depth Guiding of the Plough, Slippage

Failure: Plough does not stay in the ground.

Reason: a) Penetration force too low
b) Drawbar is fitted too low.

Remedy: a) Increase distance between point and frame (not more than 2 cm).
b) Fit drawbar to the upper position.

Failure: Tractor shows too much slippage.

Reason: a) Drawbar is fitted too low.
b) Hydraulics are not adjusted correctly, weight of the plough is on the depth wheel.

Remedy: a) Fit drawbar to the upper position.
b) Adjust hydraulics again so that sufficient weight will be displaced to the tractor

21.3 Others

Failure: Shearbolt of the body shears often.

Reason: Incorrect shearbolt has been fitted.

Remedy: Use original shearbolts. Fit the shearbolts from the furrow of the plough.

22 TRANSPORT ON PUBLIC ROADS

The general traffic rules have to be adhered to!



- Abide by all relevant traffic regulations (width, lights etc.) when on public roads.
- The operator should familiarise him-/her self with all controls and their functions before starting work. During work could be too late!
- Before moving off ensure good visibility!
- Sitting or standing on the implement during operation or during transport is not permissible!
- Adhere to the maximum permissible axle loads, total weights and transport measurements.
- When cornering allow for the width / length of the plough and also the change in handling characteristics brought about by having a large overhanging implement attached to the rear of the tractor!
- Before leaving the tractor lower the plough to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Do not allow anybody between the tractor and plough if the tractor is not secured against rolling away by the parking brake and/or by the supplied chocks!
- When driving on public roads with a raised machine the lifting control lever should be locked against unintentional lowering!

23 WEIGHTS

Type	Weight (kg) without equipment	Working width (cm)
Vari-EurOpal 5 3	735	66-150
Vari-EurOpal 5 3+1	910	88-200
Vari-EurOpal 7 3	864	66-156
Vari-EurOpal 7 3+1	1.134	88-208
Vari-EurOpal 7 4	1.123	88-208
Vari-EurOpal 7 4+1	1.382	110-260
Vari-EurOpal 8 3	1.139	75-165
Vari-EurOpal 8 3+1	1.412	100-220
Vari-EurOpal 8 4	1.397	100-220
Vari-EurOpal 8 4+1	1.666	125-275
Vari-EurOpal 8 5	1.651	125-275
Vari-EurOpal 8 5+1	1.910	150-330
Vari-EurOpal 9 4	1.529	100-220
Vari-EurOpal 9 4+1	1.805	125-275
Vari-EurOpal 9 5	1.790	125-275
Vari-EurOpal 9 5+1	2.067	150-300

Vari-EuroPlough X ploughs are approx. 50 kg heavier per pair of body than EuroPlough X ploughs.

24 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.

25 NOISE, AIRBORNE SOUND

The noise level of the VARI-EUROPLOUGH and VARI-EUROPLOUGH X ploughs does not exceed 70 dB (A) during work.

26 PRODUCT REGISTRATION / GUARANTEE

We would like to point out that the guarantee period starts, only when the completely filled-in and signed product registration has been returned to us .