LEMKEN

Operating Instructions

Mounted Reversible Ploughs

DL / DLX / DLHX

CE Safety is our concern!

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1.0 DEFINED USE

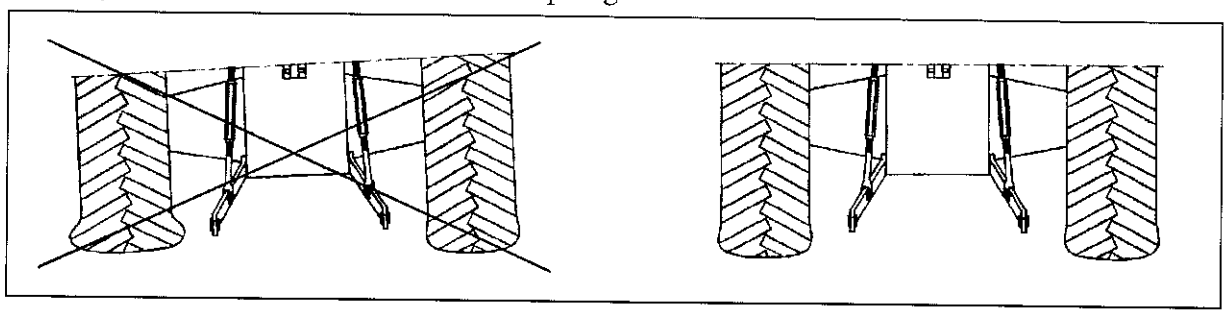
- Read and adhere to these "General Health- and Safety precautions" before putting the plough to work!
- The DL, DLX and DLHX ranges of ploughs have been designed for the exclusive use of agricultural soil cultivations!
- Any use beyond the one stipulated above is no longer considered as defined use. The manufacturer does not accept any responsibility for damages resulting from this; the operator himself carries the full risk!
- Under "defined use" the manufacturer's prescribed operation-, maintenance- and repair conditions are to be adhered to!
- The DL, DLX and DLHX 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 further generally accepted safety technical, working, medical and road traffic rules should be adhered to!
- Any damages resulting from unauthorised changes to the machine rule out the responsibility of the manufacturer!

2.0 CONTENTS

3.0 PREPARATION OF TRACTOR

3.1 Tractor suitability

Use only a tractor which has a horse power rating equal to or below that stated for the size and model of plough. Failure to observe this will render the Warranty void. Check that the lift capacity of the tractor is sufficient for the plough.

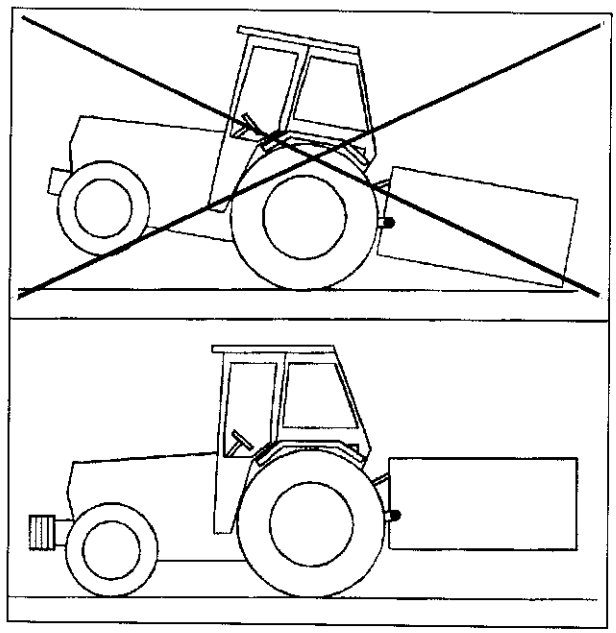


3.2 Tyres

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).

3.3 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.



3.4 Lift Rods

Adjust lift rods to equal length. This length has to be suitable for maximum lift clearance of the plough and also sufficient depth of ploughing. Where there are alternative positions for the lift rods on the lower links, use the rearmost position.

3.5 Top Link

Where there are alternative positions at the tractor end of the top link, use the hole recommended by the tractor manufacturer.

3.6 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.
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.

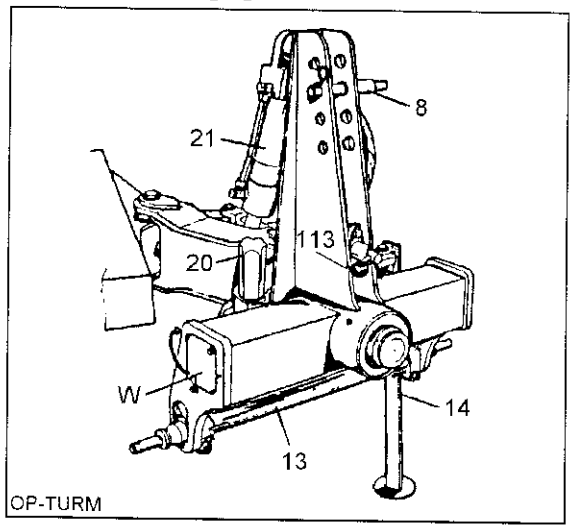
3.7 Hydraulics

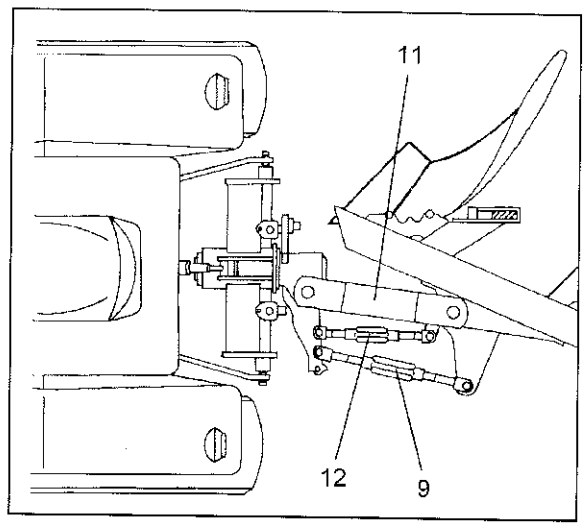
A double acting spool valve is required for the hydraulic turnover ram. A second double-acting spool valve is required for the hydraulic front furrow width adjusting ram. Whilst ploughing, the tractor hydraulics must be set to 'Draft' or 'Mixed' control.

4.0 ATTACHING AND DETACHING THE PLOUGH

4.1 Attaching to the tractor

- Set tractor hydraulics to 'Position Control'.
- Attach lower links to the drawbar (13) and secure.
- Raise lower links slightly, swing up stand (14), slide on spring pin and secure to outer turnbuckle (9).
- Fit top link to headstock pin (8). 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 14.3.
- 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.





4.2 Detaching from the tractor

- Choose a firm, level site.
- Turn plough to working position, fully close swing-in or front furrow width adjuster ram.
- Set tractor hydraulics to 'Position Control'.
- Adjust vertical adjuster nut (20) 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 (14) and secure.
- Before removing lower links from drawbar , 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!

5.0 HYDRAULIC FUNCTIONS

Turnover ram

The double acting turnover ram of the DL-, DLX- and DLHX-range ploughs is fitted with an automatic changeover valve and automatic lock valve making it completely independent of the tractor hydraulics whilst ploughing.

Front furrow adjuster ram

The hydraulic width adjusting ram connects directly to a second double acting spool valve on the tractor and gives "in-cab" control of the front furrow width. (See also section 7.4.)

Swing-in ram

The swing-in ram is connected to the ports 'M' and 'S' of the turnover ram via 2 hoses. The hoses must not be mixed.

The swing-in ram fulfils 2 functions:

- Front furrow width adjustment of the plough via an adjuster sleeve (24)
- To give greatly increased turnover clearance, the frame swings in as 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.

Keep well clear of the plough whilst it is turning over!

5.1.0 Turnover operation

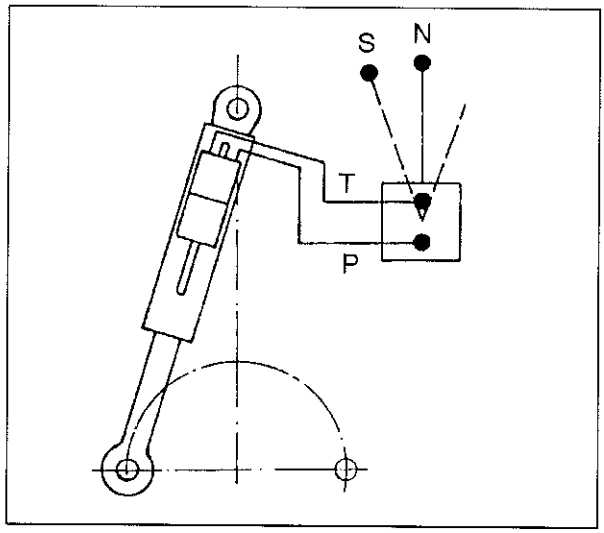
NEVER ATTEMPT TO TURN THE PLOUGH WHEN THE INNER TURNBUCKLE (12) IS SCREWED FULLY OPEN. RAM DAMAGE MAY RESULT!

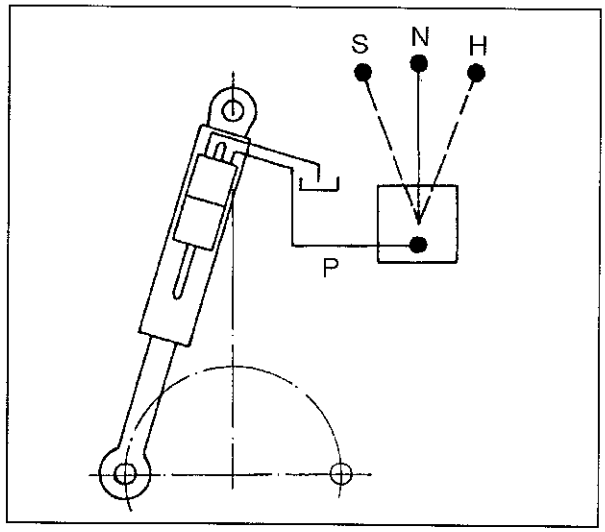
The UNITURN turnover device is equipped with a double acting ram (21) with internal lock valve and changeover valve.

Having attached the plough as described in section 4.1, connect the ram hoses to the tractor spool valve couplings when operating from a double-acting service. When operating from a single-acting service, the pipe connected to the ram port stamped "T" should be connected to a suitable dump connection to return the oil to the tractor's oil reservoir through a quick release coupling.

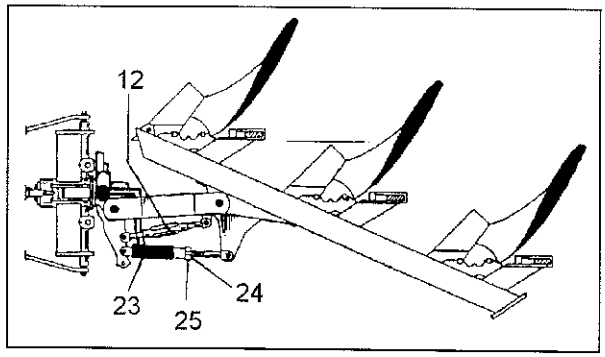
5.1.1 Turning without hydraulic frame swing-in device

Before turning raise the plough fully!
Move the lever of the double acting tractor spool into the position "H" = pressurising port "P".
The plough frame turns by about 180 °.
After completition 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".
That is only possible when connected to a double acting service.





5.1.2 Turning with frame swing-in device



If there is insufficient clearance between plough and ground during the turnover operation, a frame swing-in device has to be used.
Instead of the outer turnbuckle (9) a swing-in ram (23) is fitted to give greatly increased clearance.
The swing-in ram is connected in parallel with the turnover ram. During the turnover operation, the plough frame swings-in and out automatically.

5.2 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 defective hoses immediately!

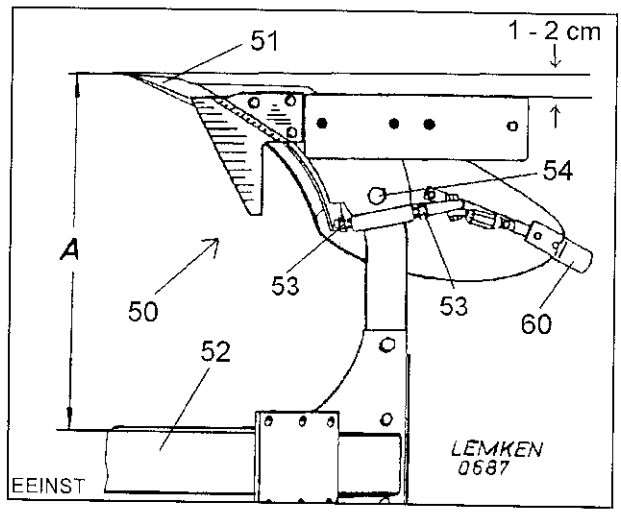
- Never allow anybody to stand within the operating area!
- Hydraulic turnover and adjuster rams may only be actuated if nobody is standing in the operating area!
- Before leaving the tractor lower the machine to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Allow nobody to stay between tractor and implement if the tractor parking brake is not applied!
- The hydraulic system is under high pressure!
- When fitting the hydraulic hoses to the tractor hydraulic spools 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!

6.0 PRELIMINARY SETTINGS

These should be carried out on firm, level ground before the plough is put to work.

6.1 Bodies

To check correct pitch, measure from plough frame to underside of new point (51) and end of landslide. Frame to point measurement should be 1 - 2 cm greater than frame to landslide.
I e: Measurement D should be 1 - 2 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 (54) and adjust setscrews (53). Tighten bolt (54) and setscrews (53). Excessive pitch will increase draft and effect depth control.
Having set one body as required, note measurement "A" from point to beam and adjust remainder to the same measurement.
Finally check alignment of all points and make any minor adjustments necessary.

6.2 Tail Pieces

The tail pieces (60) 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.

6.3 Depth or Depth/Transport wheel

Set for approximate ploughing depth by swinging the wheel fully rearwards until the stop is met. Measure vertically from wheel to ground and adjust to give required ploughing depth. (See also section 10.0 - 10.3)

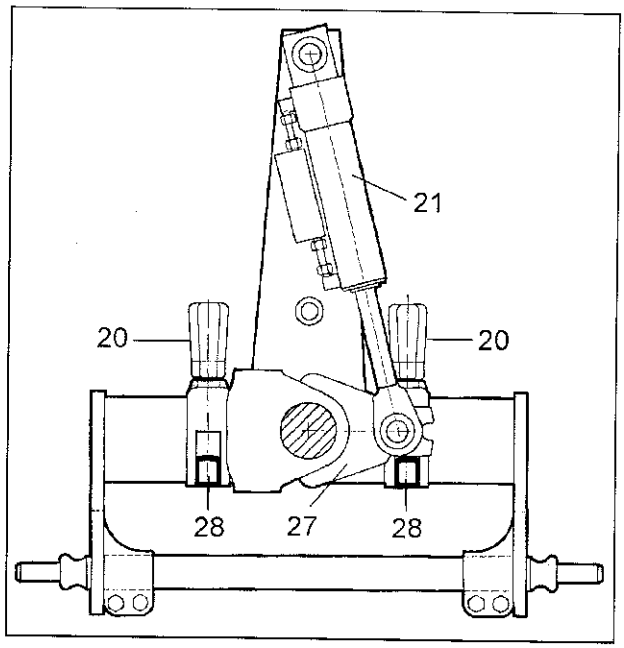
- Before leaving the tractor lower the machine to the ground. Apply the parking brake, stop the engine and remove the ignition key!
- Allow nobody to stay between tractor and implement if the tractor parking is not applied!
- Repair-, maintenance- and cleaning operations as well as adjustments should be carried out with tractor brakes applied and engine switched off!
- When conducting maintenance work on a lifted implement always place suitable supports underneath!

7.0 ADJUSTMENT IN WORK (after opening up)

7.1 Depth Adjustment

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, level using top link and depth wheel. Where the slotted hole is used in the headstock, the pin **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. (see also instructions of tractor's manufacturer)
The depth wheel must not carry a continuous load where the land is firm and level.

7.2 Angle Adjustment



With the plough in work at the required depth, the legs should be approximately vertical. Adjust as follows:

a) Lift the plough 5 - 10 cm (3 - 4 in).
b) Momentarily pressurise port "P" of the turnover ram (21) to slightly turn the plough off its stop (28).
c) Adjust nut (20) as required and return plough and arm to its stop by pressurising port "T" of the turnover ram (21). (Only possible with double acting service). In connection with a single acting service with a return pipe to a suitable dump connection of the tractor oil reservoir, the plough must be raised fully and then turned by pressurising the port "P" of the turnover ram (21). After some seconds the plough must be turned again to return the plough and the arm (27) to its stop (28).
d) Lower the plough and check that plough legs are vertical after ploughing a few metres, re-adjust if necessary.
e) Finally set opposite nut (20) to same setting to ensure plough is vertical on opposite hand.

7.3.0 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.

7.3.1 Front furrow width adjustment (to be carried out first)

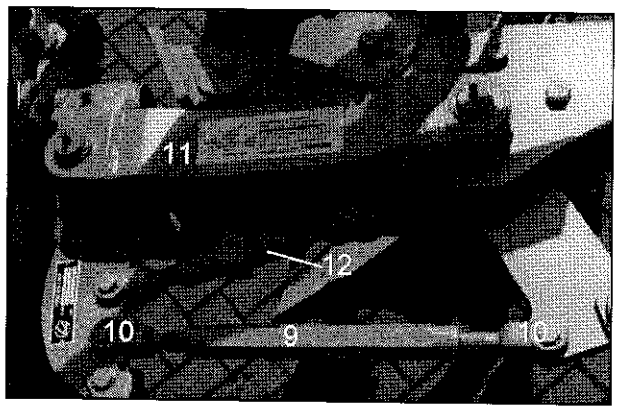
Turn the outer turnbuckle (9) to make the front furrow width equal in width to the other bodies.
To widen - lengthen outer turnbuckle (9).
To narrow - shorten outer turnbuckle (9).

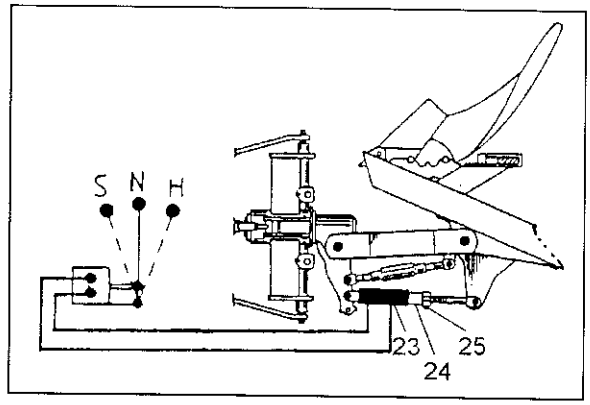
The front furrow is now set and no further adjustment is required.
If instead of the outer turnbuckle (9) a swing-in ram is fitted, the front furrow width will be adjusted by means of the adjuster sleeve 24) after slackening the clamping bolt (25). After adjustment, the clamping bolt (25) must be tightened securely.

7.3.2 Tractor/Plough alignment (to be carried out second after front furrow adjustment)

Turn the inner turnbuckle (12) to align tractor with plough.
If the tractor pulls to the unploughed land - lengthen inner turnbuckle (12).
If the tractor pulls to the ploughed land - shorten inner turnbuckle (12).
When making this adjustment it is preferable to operate with the inner turnbuckle (12) longer rather than shorter. This will hold the tractor front wheels gently against the furrow wall and minimise landslide pressure.

Once set, no further adjustments are required. The second adjustment has no effect upon the first (front furrow width) adjustment, 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.





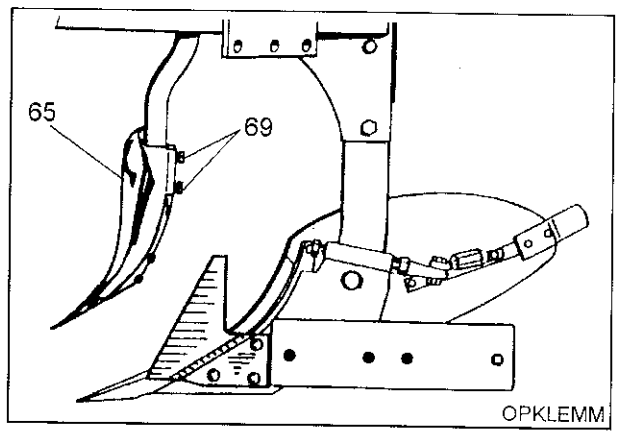
7.4 Hydraulic front furrow width adjustment

Instead of the outer turnbuckle (9) a hydraulic ram (23) is fitted. Operate the adjusting ram as follows:
To increase front furrow width - open adjusting ram (23).
To reduce front furrow width - close adjusting ram (23).
HAVING MADE A FRONT FURROW WIDTH ADJUSTMENT, CHECK THAT SWAY BLOCKS OR CHECK CHAINS DO NOT RESTRICT FREE LATERAL MOVEMENT OF THE TRACTOR LOWER LINKS.

- Hydraulic adjuster may only be actuated, if no persons are standing in the turning and slewing area!
- The hydraulic system is under high pressure!
- To avoid wrong hydraulic connection sockets and probes should be marked. This helps to prevent contrary function (lifting instead of lowering or vice versa) 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 technical standards of the manufacturer!
- There is a pinch point between ram and adjuster sleeve, keep well clear of that area!

7.5.0 Skim Coulters

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. 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.



7.5.1 Depth and Angle Adjustment

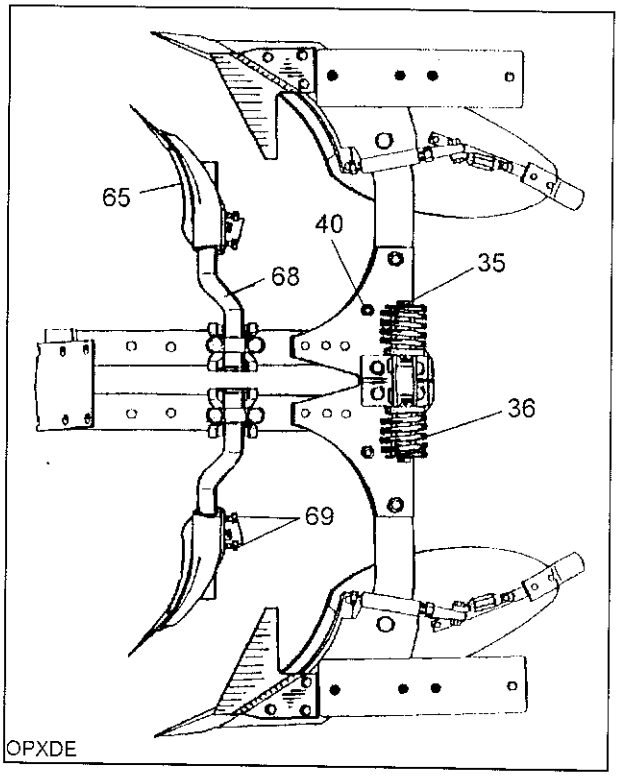
Slacken setscrews (69), set to depth 5 - 10 cm (2 - 4 in) and angle to the direction of ploughing to approximately 45 ° - 50 °.
Securely tighten setscrews (69).

7.5.2 Lateral Adjustment

Loosen nut (66) and swivel stalk (68) until the skim point is positioned 2 - 3 cm (3/4 - 1 1/4 in) to landside of the body. Securely tighten nut (66).

7.5.3 Fore and Aft Position of Skim Stalk (DL and DLHX)

Two positions are available (C+E). In addition, by turning the stalk (68) in the clamp, there is a range of approximately 18 cm (7 in) of fore and aft adjustment. To change clamp position, 1/2 turn the plough, slacken nut (66), hinge back hook (67), remove clamp lever (76), place stalk (68) in its alternative position and reverse positions of hook (67) and lever (76). Adjust stalk (68)

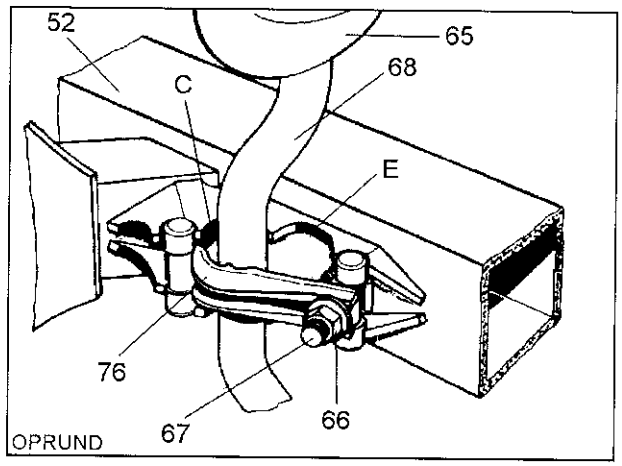


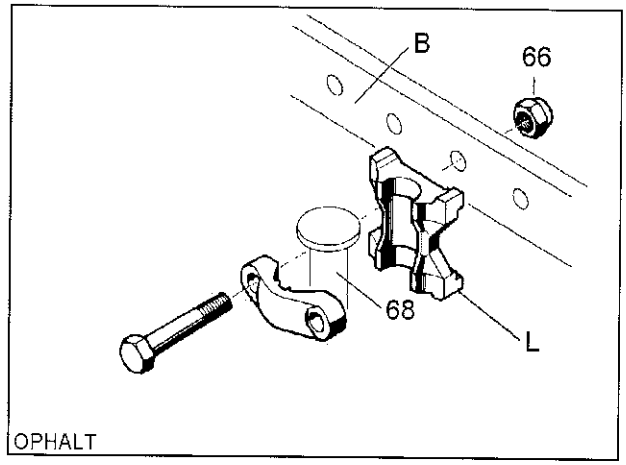
and securely tighten nut (66).

NOTE: If required, special trash skim breasts suitable for chopped maize straw can be fitted to the standard skim frog.

7.5.4 Fore and Aft Position of Skim Stalk (DLX)

For 30 cm (12 in) furrows, the skim assemblies must be fitted to the furrow side of the beam (B). For 35, 40 and 45 cm (14/16/18 in) furrows, the skim assemblies must be fitted to the landside of the beam (B).
Set the stalk by slackening nuts (66) and then turning the stalks (68) as required, the skims should run 2 - 3 cm (3/4 - 1 1/4 in) to the landside of the share.

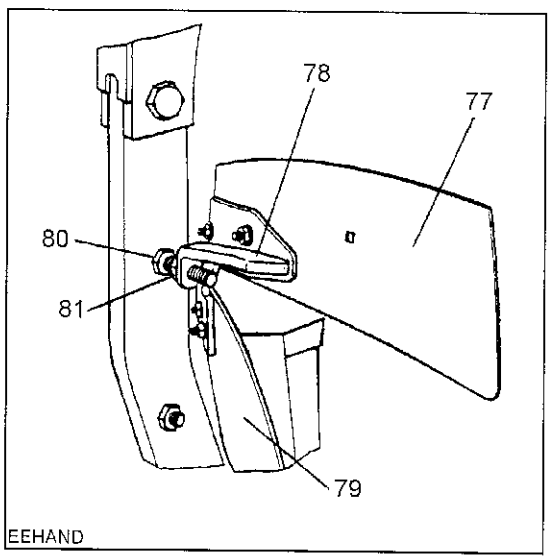




Also the brackets (L) have alternative positions on the beam (B) for a wider fore and aft adjustment range. Retighten setscrews (69) and nuts after each adjustment.

7.6 Trashboards

Bolt carrier (78) to the holes provided in the top of the mouldboard (79). Fit trashboard (77) to the carrier and adjust for optimum trash incorporation.
Adjust support-bolt (80) so that it touches the leg. Secure bolt (80) by means of counter nut (81).

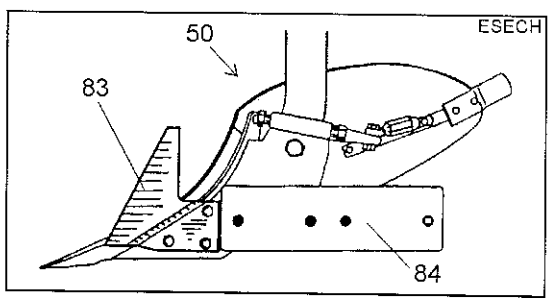


7.7 Sword Coulters

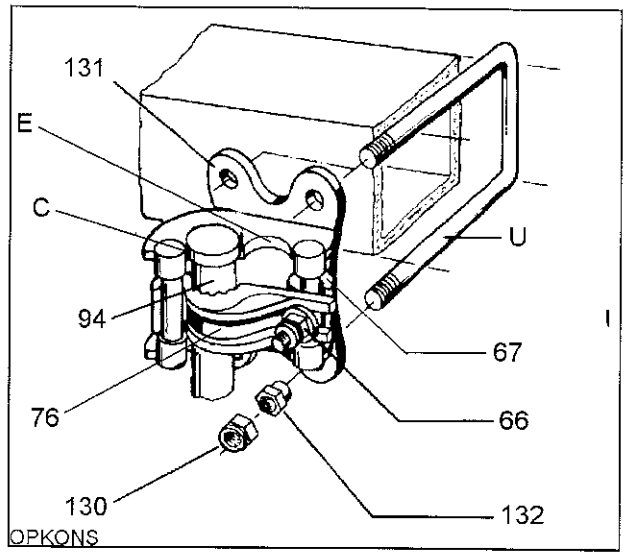
Sword coulters (83) are available. They are recommended for tough and heavy conditions. They have to be fitted to the body (50) in front of the landslide (84).

7.8.0 Disc Coulters

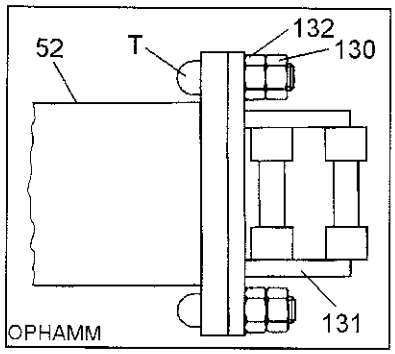
The disc coulters should be adjusted to a working depth of 7 - 9 cm. Their lateral position to the landside of the share should be approx. 2,5 cm (1 in).

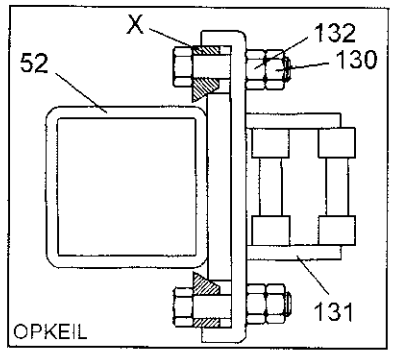


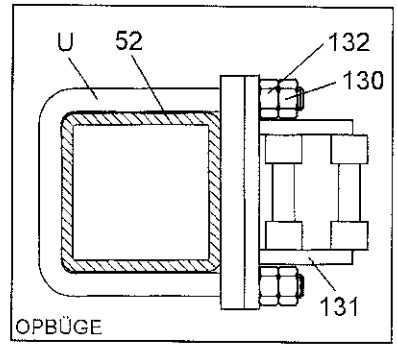
7.8.1 Fitting of the disc coulters



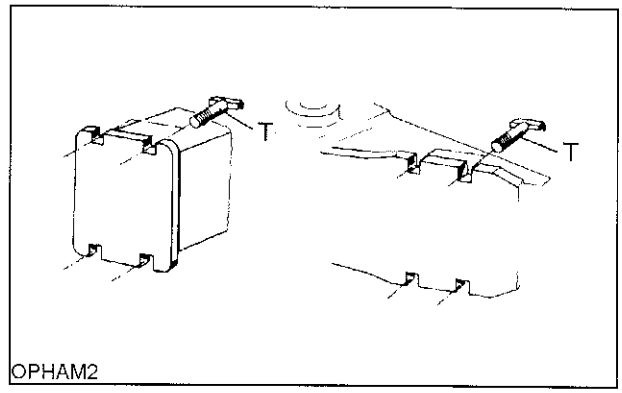
In connection with DL and DLHX ploughs the bracket (131) of the disc coulters will be fitted to the plough frame (52) by means of the U-bolts (U), T-bolts (T) or clamping wedges (C) with bolts.
Before tightening the nuts (130) the above bolts must be clamped against the plough frame (52) by means of the hexagon headed eccentric bushes (132).
After that the nuts (130) must be tightened securely.
In connection with DLX-ploughs, the bracket (L) will be fitted to the beam (B) by means of bolts (95) and nuts (66).
If skimmers are fitted, always fit the disc coulters in front of the skimmers.





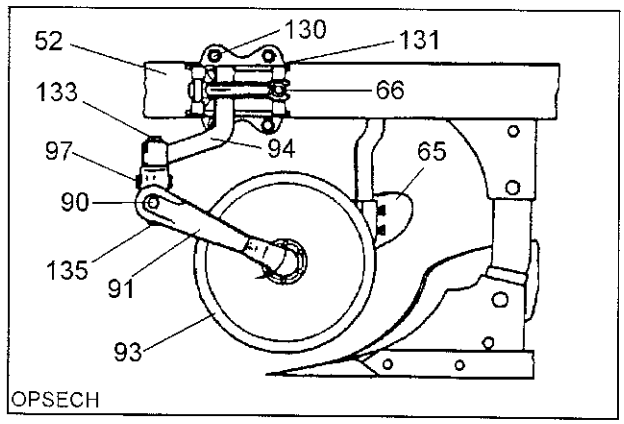


7.8.2 Fore and Aft Position



In connection with DL- and DLHX-ploughs an adjustment of the fore and aft position of the bracket (131) is possible after slackening the nuts (130) and the eccentric bushes (132).
Additionally the round stalk (94) can be fitted to the bracket (131) in two alternative positions C and E. The disc coulter of the DLX-ploughs can be fitted to the beam (B) in a number of positions by means of the bracket (L) and fittings (66) and (95).

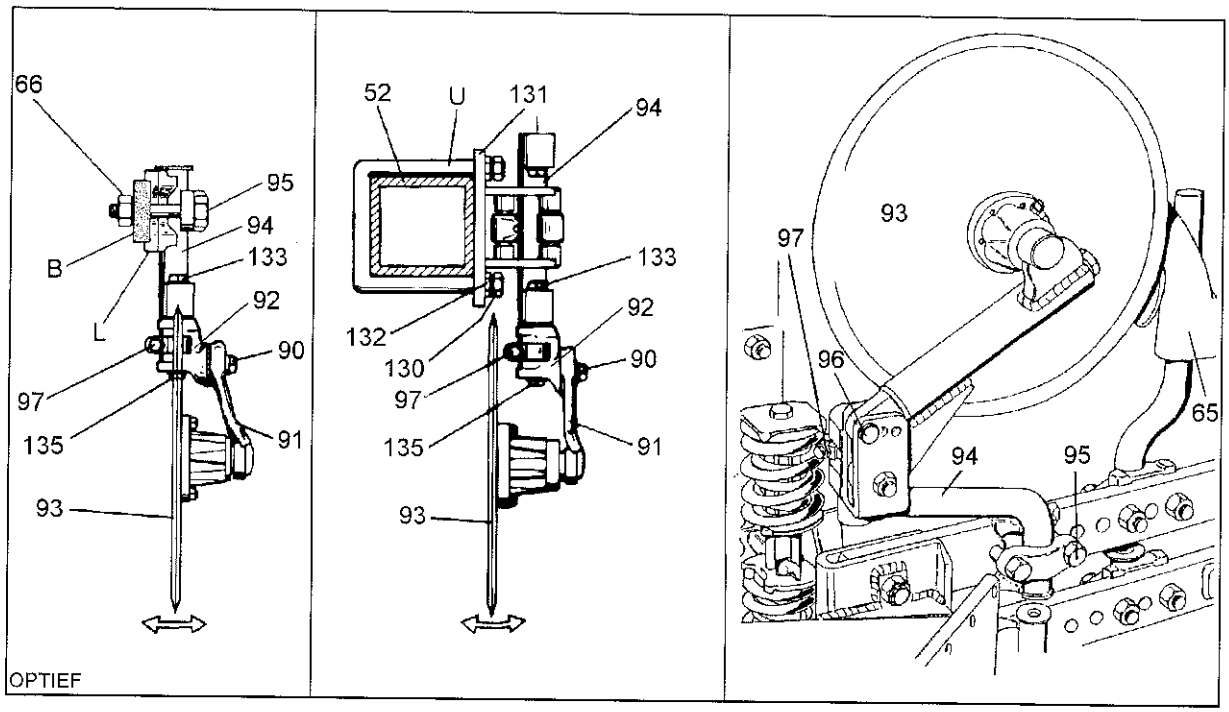
7.8.3 Angle Adjustment



After loosening the bolt (133) the angle of the disc coulter can be adjusted by means of the eccentric bolt (135). It could be necessary that the eccentric bolt (135) must be loosened with a lighty tap on the head of this bolt to free the taper lock.
After each adjustment tighten the slackened bolts and nuts securely. It might be necessary to loosen the eccentric bolt (135) with a

slight tap on the head of this bolt to free the taper lock.

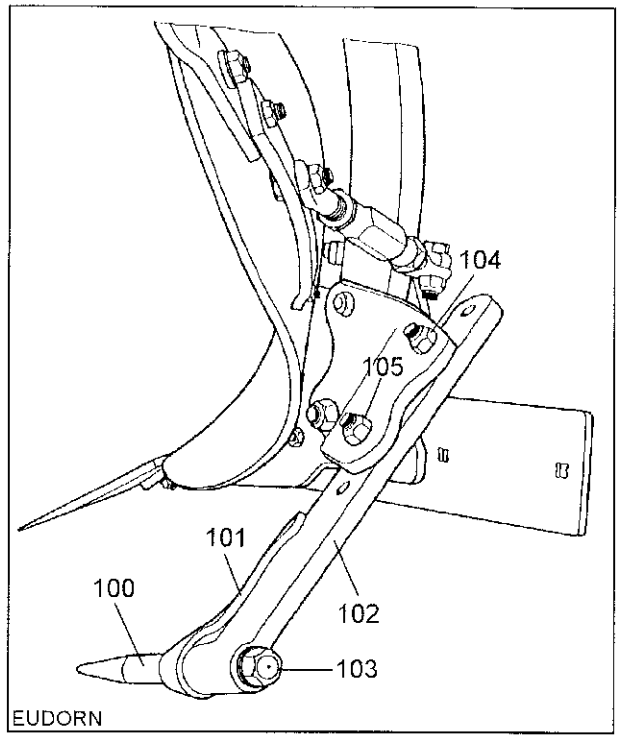
7.8.4 Depth Adjustment



After loosening the bolt (90) the working depth can be adjusted by disc arm (91) as required. Securely tighten bolt (90) having first checked that the serrations are correctly mershed. The lateral distance of the disc (93) to the landside of the share is adjustable. After slackening the bolts (95) or the nuts (66) the round stalk can be brought into the required position. Use the pin (96) for depth adjustment with spring loaded Non-Stop disc-coulters.
With the adjustable stop (97) the swinging movement of the disc can be limited.
Tighten all bolts and nuts securely after the adjustment.

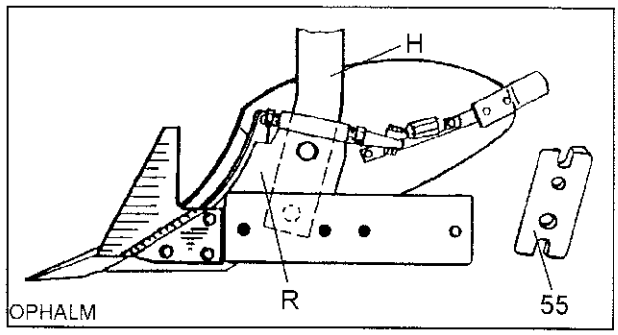
- The operator should familiarise his-/herself with all controls and their functions before starting work. During work could be too late!
- Sitting or standing on the implement during operation or during transport is not permissible!
- Do not allow anybody within the operating area!
- Repair-, maintenance-, cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When conducting maintenance work on a lifted implement always place suitable supports underneath.
- Check nuts and bolts regularly and tighten if necessary!
- Be careful when replacing worn parts with sharp edges. Always use suitable tools and gloves!
- Repair-, maintenance and adjusting operations may only be carried through by such persons who have been made acquainted with it and who have been advised about the dangers.

8.0 OFFSET SUBSOILERS

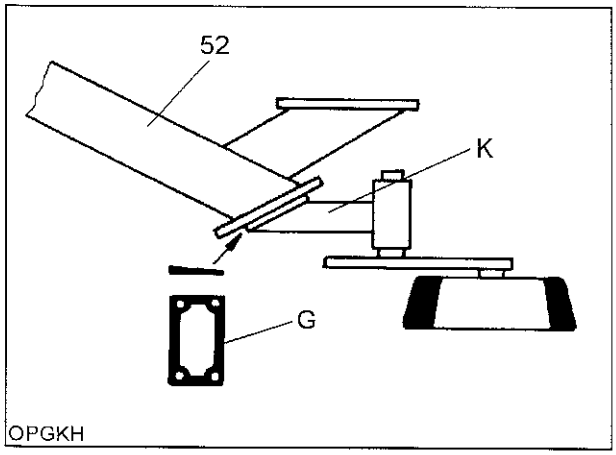


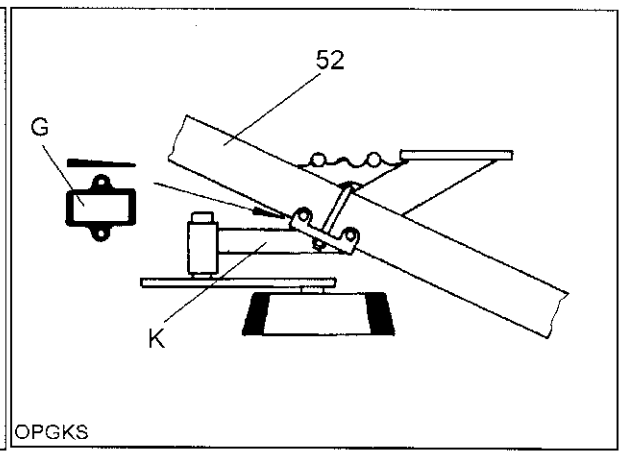
The subsoiler bracket is bolted to the plough leg using the leg/body bolts. They can be fitted to any number of bodies on the plough. By using the holes provided, 3 subsoiling depths below the body can chosen.
The tine (102) is protected by shin (101). This and the point (100) can be replaced when worn after removal of nut (103). The points are not handed, but the shins are marked L & R.
A shearbolt (105) protects the subsoiler. Use only the correct shearbolt M16X60/8.8 part No. 301 3838. With bodies having two mouldboard stays, the bolt M16X60/10.9 has to be used, part No. 301 3779.
Bodies with two mouldboard stays, for example C 40 or D 30 (BS- and US-bodies excepted) require a special bracket which enables the fitment of the additional mouldboard stay.
When parking a plough with subsoilers, the lower subsoilers must be swung back after removing the bolt (105) and slackening the bolt (104) to ensure safe parking of the plough.

9.0 WORKING WIDTH PER BODY



By means of wedges (55), the basic working width per body can be changed. To fit wedges remove the leg bolts and position the wedges between leg (H) and frog (R) as follows:
Narrow edge towards front of plough for narrower cut. Wide edge towards front of plough for wider cut.
If the plough is equipped with wedges (55), a counterwedge (G) is required to suit the wheel position accordingly.





The counter wedge (G) must be fitted between the ploughframe (52) and the bracket (K).

10.0 DEPTH WHEEL AND DEPTH/TRANSPORT WHEEL

When a depth wheel or depth/transport wheel is fitted, adjust the plough so that it just touches the ground where the land is level and firm. There should be no continuous load on the wheel which should only prevent the rear of the plough sinking in soft conditions.

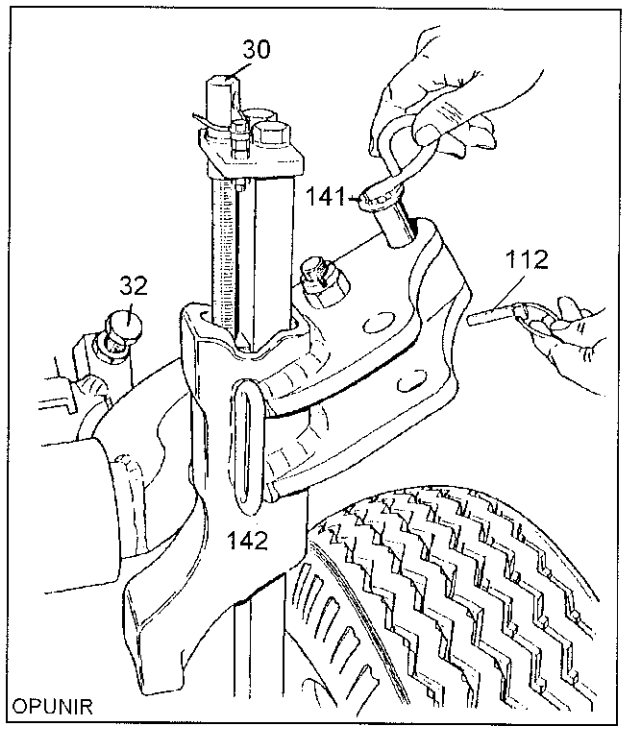
10.1 Swinging Depth Wheel

The swinging depth wheel (29) is normally fitted alongside the last-but-one body by means of its bracket. A scraper/spike is fitted to prevent the wheel running forward when entering work. On 2 furrow ploughs the wheel must be mounted on the rear flange to prevent contact with the plough stand when turning. A different bracket is required then.
Set for approximate ploughing depth by swinging the wheel fully rearwards until the stop is met. Measure vertically from underside of the wheel to the ground. Adjust depth control screw (30) to give the required depth of work.
To compensate for any variations in depth between left and right hand ploughing, 2 setscrews (32) are provided to eliminate this.

Important: When wedges are used to alter the furrow width of the plough, a special counter wedge must also be fitted between the mounting bracket and plough frame/rear flange to align the wheel to the direction of ploughing. (See also section 9.0)

10.2.0 Swinging Depth and Transport Wheel

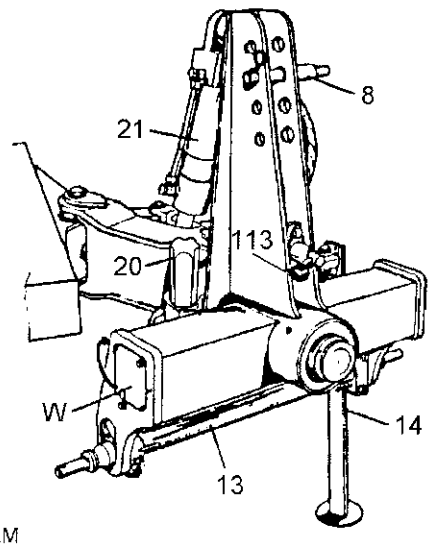
The Swinging Depth and Transport Wheel is normally fitted alongside the last-but-one body with the securing bolt located through the hole provided in the skim clamp fabrication, securely clamp with setscrews. However, any suitable position can be used alongside the plough frame.
When ploughing, this wheel operates, and is adjusted in the same way as the swinging depth wheel.



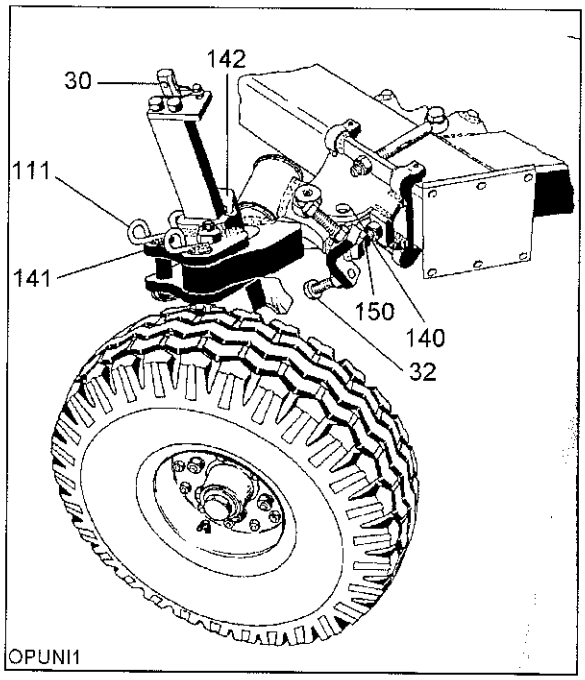
- Lateral pivot (151) must be free to move with the spare pin located in stowage hole (141).
- Adjust depth with adjuster screw (30). Compensate left and right hand depth with stop screws (32) if required.
- Tighten counter nut after adjustment.
- Adjust running alignment (in lieu of wedge) with setscrews (150) after slackening the counter nut.
- Tighten counter nut after adjustment.

10.2.1 Conversion from transport in ploughing position

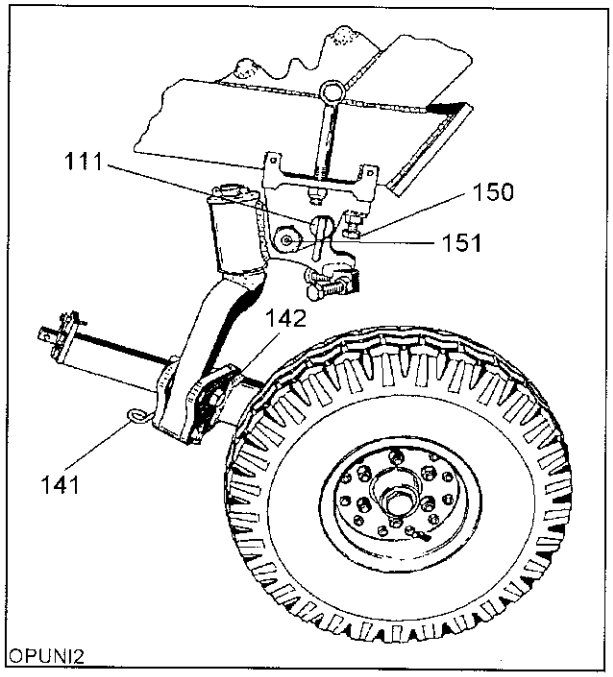
- Set tractor lift to "Position Control".
- Fit top link and secure.
- Raise the plough just clear of ground.
- Rotate lock pin (113) 180 ° and locate lever in notch, operate turnover to turn plough to working position.
- Lower the plough and remove securing pin and pin (141).
- Swing wheel stalk guiding (142) 90 ° and lock in this position with pin (141).
- Remove pin (111) out its hole and locate it in stowage hole of wheel stalk guiding (142).
- Set tractor lift to "Draft" or "Mixed" control.



OPTURM



OPUNI1



OPUNI2

10.2.2 Conversion from ploughing in transport position

- Set tractor lift to "Position Control".
- Raise the plough just clear of the ground and lock pivot (151) by putting pin (111) into hole (140). Secure pin (111) by means of the securing pin provided.
- Remove pin (141), swing wheel stalk guiding (142) with wheel 90 ° and lock in this position with pin (141). Secure pin with securing pin (112).
- On headstock, rotate lock pin (113) 180 °, fully raise plough and slowly operate turnover until pin (113) is heard and seen to lock plough in half turned position.
- Lower plough and detach top link!

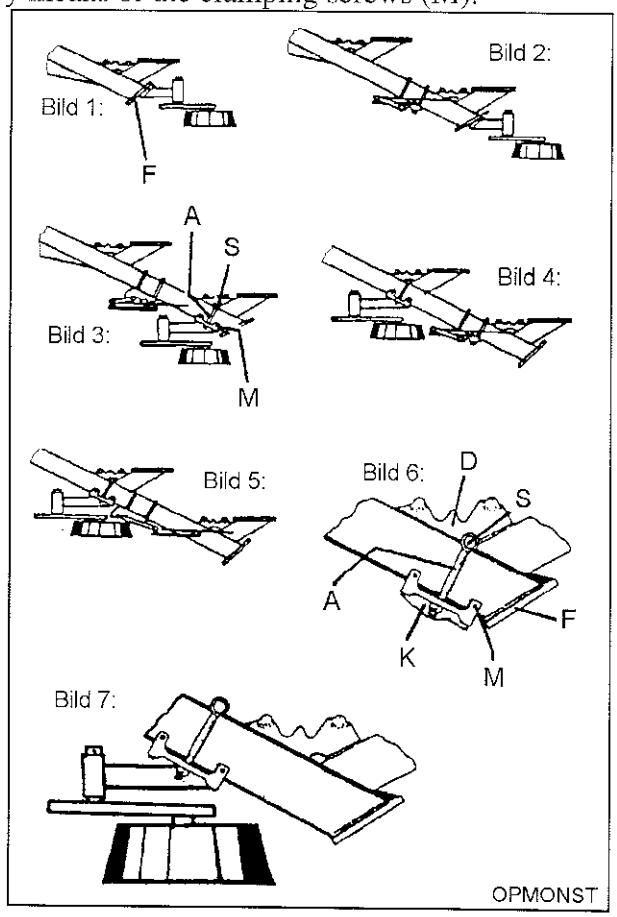
- If the depth and transport wheel is used for transport, the top link must be detached from the headstock!
- The pivot (151) must be locked for transport, the pin (111) must then be positioned in bore (140)!

- Abide by all relevant traffic regulations (width, lights, etc.) when on public roads!
- The operator should be familiarise his-/herself 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.
- Do not leave the drivers seat whilst in motion!
- When driving round bends note the width of the machine and/or the changing centre of gravity of the implement!
- Before leaving the tractor lower the machine to the ground. Actuate 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!
- When driving on public roads with a raised plough the lifting control lever should be locked against unintentional lowering!

10.3 Assembly instructions for swinging depth wheels and depth and transport wheels

The position of the depth or depth/transport wheel depends on the number of furrows on the plough. In connection with two furrow ploughs or three furrow ploughs with disc-coulters, the wheel must be fitted to the rear flange (F). (See also drawing No. 1 and 2). In connection with 4-, 5-, 6- and 7-furrow ploughs the wheel has to be fitted beside the last but one body, in front of or beside the skimmer bracket (D). (See also drawing No. 6 and 7). In connection with disc-coulters the swinging depth wheel or the depth and transport wheel has to be fitted in accordance to the drawings No. 3, 4 and 5. In this case the bracket (K) will be fitted in front of or beside the skimmer bracket (D). After tightening the eye bolt (A) and the bolts (S), the bracket (K) has to be fixed against the frame by means of the clamping screws (M).

Drawing No. 1: Fitment to the rear flange of 2-furrow ploughs. **Drawing No. 2:** Fitment to the rear flange (disc-coulter in front of or beside the skimmer). **Drawing No. 3:** Lateral Fitment of the depth wheel beside the rear body in connection with 3- to 7-furrow ploughs. (Disc-coulter is fitted in front of the rear skimmer). **Drawing No. 4**: Lateral Fitment beside the rear body in connection with 4- to 7-furrow ploughs. (Disc-coulter is fitted beside the skimmer). (Swinging depth wheel or depth and transport wheel). **Drawing No. 5**: Lateral Fitment beside the rear but one body in connection with 4 up to 7-furrow ploughs with 85 cm or 87.5 cm interbody clearance and with 600 mm wheel. (Disc-coulter is fitted beside the skimmer). The bracket of the disc-coulter will be fitted in this case more forward and the round stalk is pivoted to the rear.
Drawing No. 6: Fitment of the wheel beside the skim bracket. **Drawing No. 7:** Fitment in front of the skim bracket.



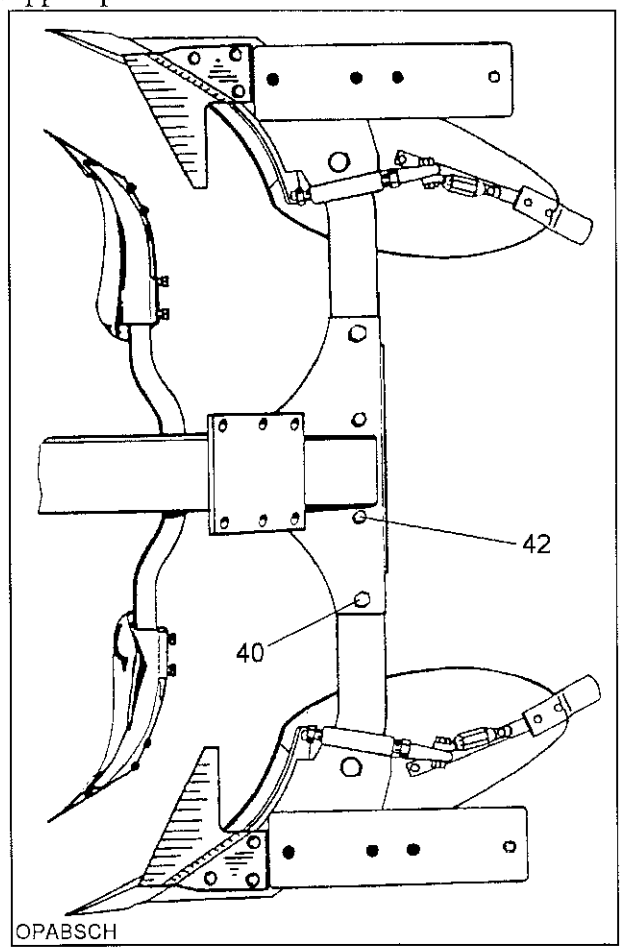
11.0 SHEARBOLTS

All DL and DLX ploughs are fitted with shearbolts (40) as standard.
IMPORTANT: Only genuine LEMKEN shearbolts should 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 freely pivoting leg assembly and its support plates.

To replace a broken shearbolt proceed as follows:

- Raise plough a little and slacken pivot bolt (42).
- Remove broken sections of old shearbolt (40).
- Swing body back into position.
- Fit new shearbolt of correct type and tighten securely.
- Slightly tighten pivot bolt (42).

After a number of shearings, the pivot bolt has to be replaced.



	Shearbolt		Pivot bolt	
Plough Model	**Part No.**	**Dimension**	**Part No.**	**Dimension**
DL 090	301 3584	M14X60LS41X15-8.8	301 4601	M20X70LS40X25/10.9
DL 110 / 120	301 3588	M14X65LS46X15-8.8	301 4601	M20X70LS40X25/10.9
DL 140 / 160	301 3596	M14X75LS56X15-8.8	301 4370	M20X85LS55X25-10.9
DLX 110 / 120	301 3409	M12X70LS52X15-12.9	301 4601	M20X70LS40X25/10.9
DLX 140 / 160	301 3409	M12X70LS52X15-12.9	301 4601	M20X70LS40X25/10.9

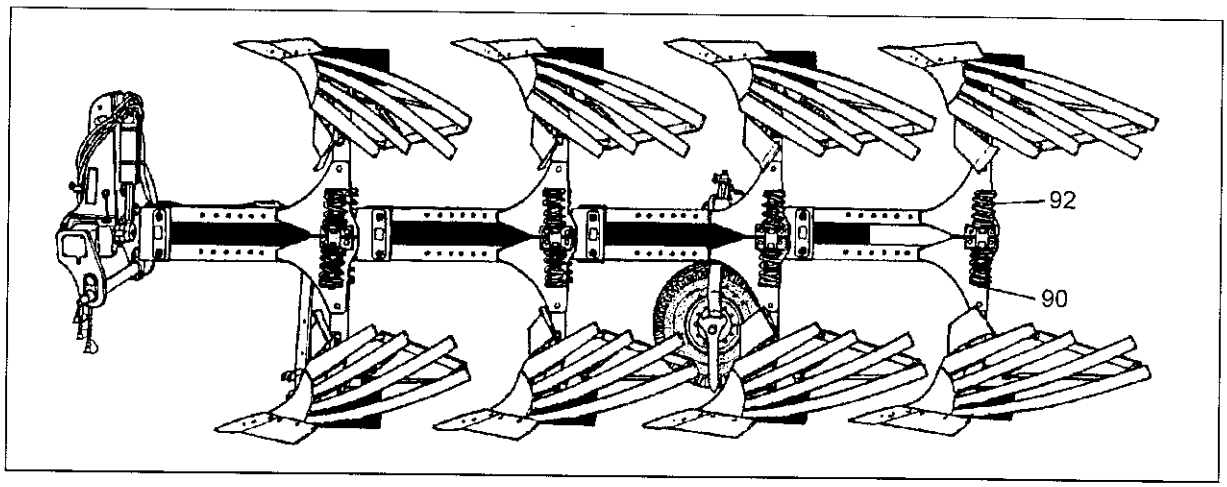
12.0 DLX WITH AUTOMATIC RESET LEGS

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 (40) for protection when the body 'hooks' an obstacle.

The preload on the breakback springs (36) 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 (35) 2 - 4 turns. This should prove adequate.
Should the mechanism still trip without meeting an obstacle, tighten screws (35) a further 2 - 3 turns.

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



12.1 Depth wheel and depth/transport wheel on DLX ploughs

It is essential that a wheel is fitted to these ploughs at all times.
The auto-reset facility dictates that the depth wheel carries more weight than a standard plough. This is achieved by slightly lengthening the tractor top link whilst lowering the depth control lever a little.

- 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-, cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When driving on public roads with a raised plough the lifting control lever should be locked against unintentional lowering!

13.0 ADDING OR REMOVING A FURROW

On all models of DL and DLX ploughs one extension can be added to the flange on the rear of the main frame. If an extension is already fitted it can, of course, be removed.

IMPORTANT: When adding or removing a furrow it is essential to ensure that the maximum horse power ratings are not exceeded.

The additional furrow is bolted to the flange plate at the rear of the main frame using the bolts and fittings supplied.

Reposition the depth or depth/transport wheel as required.
All flange bolts must be securely tightened to a torque of 200 Nm.

- Repair-, maintenance-, cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When conducting maintenance work on a lifted implement always place suitable supports underneath.

14.0 MAINTENANCE

Check tightness of all bolts, nuts, setscrews and clamps (see Notes below). This should be carried out after:
The first 2 hours work with the new plough.
The first 2 days work with the new plough.
Every week throughout the working life of the plough.

The turnover bearing housing is greased with high quality grease part No. 877 1620. The nut of the turnover axle is secured with 'Locktite' and requires no adjustment. In the event of this nut having to be removed, tighten it after re-fitting as follows:

Torque axle nut as follows:

Model	Torque in Nm	Part No. of Nut
DL / DLX / DLHX 110	580	303 0343
DL / DLX / DLHX 120	800	303 0342
DL / DLX 140	800	303 0342
DL / DLX 160	1.400	303 0347

Before tightening, apply 'Locktite' part No. 886 3000 to the thread of the axle!

14.1 Landslides

Ensure that these are kept in good condition. Worn landslides will affect the alignment, draft and performance of the plough. All landslides are common and can be reversed 4 ways to virtually quadruple normal life. Reverse end for end on the same frog then exchange between hands of body, then reverse end for end again.

14.2 Points and Wings

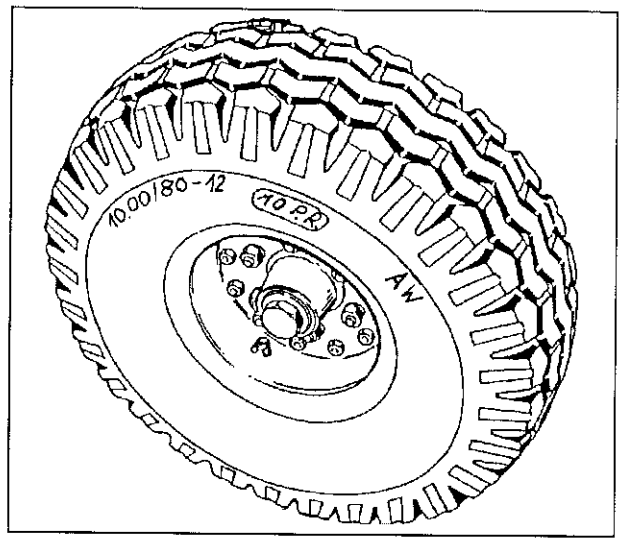
Good ploughing can only be achieved if these are kept in good condition. Worn or blunt parts will affect the penetration, alignment, draft and performance of the plough. A spare set of points and wings should always be available.

14.3 Lubrication and Protection

Lubricate all grease points DAILY with good quality grease. Also oil hydraulic ram pivot points and adjusting screws for Trulign, vertical adjustment, depth wheel and UNI-wheel (depth and transport wheel).
On DLX ploughs, lubricate the pivot pins of the horizontal beams WEEKLY.
At the end of each day's work, brush oil onto all parts of the plough which are in contact with the soil. Use oil only which is environmentally friendly.
When laying up for longer periods, thoroughly clean the plough and remove all soil. Treat all parts of the plough which are in contact with the soil, also adjuster threads, with a good quality preservative oil. That oil should be environmentally friendly.

14.4 Tyre Pressures on depth/transport wheel

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



Tyre size	Part Number	Ply Rating	Profile	max. allowed pressure (bar)	min. allowed pressure (bar)
7.50 - 10	549 8846	10	T523	6,5	3,5
7.00 - 12	549 8848	6	AF	3,5	2,5
10.80 - 12	549 8847	10	AW	5,4	3,0
10.80 - 12	549 8849	8	AW	4,0	2,0
10,5/65 - 16	549 8851	14	AW	7,2	4,0
185 R 14	549 8543	4		2,3	1,5
10,0/75 - 15.3	550 8863	14	AW	5,0	3,0
280/60 - 15.5	549 8859	14	478	2,3	3,0

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 worn!

- 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!
- Repair-, maintenance-, cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When conducting maintenance work on a lifted implement always place suitable supports underneath!

- Dispose of old oils, grease and filters as prescribed by law!
- Any spare parts used must at least meet the plough manufacturers minimum standards. This is essential by using genuine spare parts. Any warranty remaining can be declared null and void by the use of non-genuine spare parts!
- When conducting electrical welding operations on the tractor or on the mounted implement remove cable from the generator and the battery!

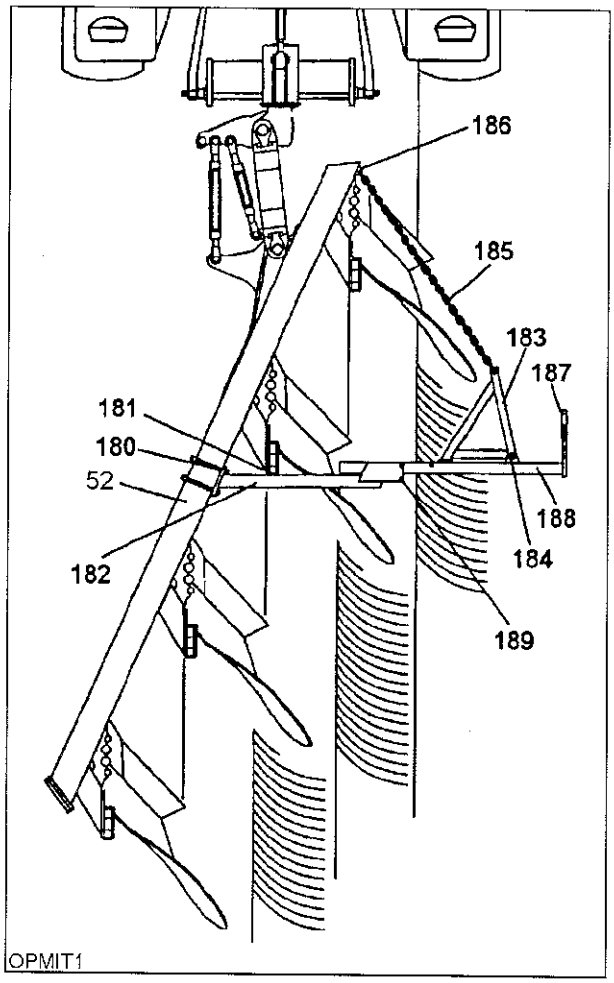
15.0 FURROW PRESS ATTACHMENT ARM

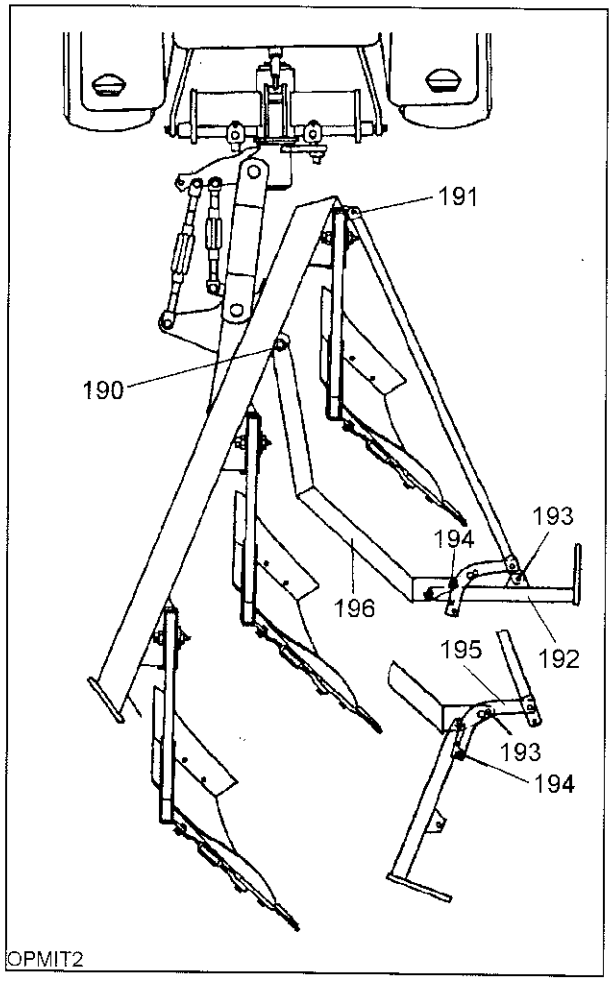
15.1.0 Attachment arm for DL and DLHX ploughs

15.1.1 Fitting of the attachment arm

- Fit the attachment arm by means of the bolts (180) to the plough frame (52) behind the leg bracket (181) of the second body.
- Shift the bracket (182) as far as possible forward, until it is touching the leg bracket (181) of the second body.
- Fit the triangular bracket (183) with bolt (184) to the attachment arm (the triangular bracket is standard with the attachment arms (140/180).
- Finally connect the chain (185) between the lugs on both the front of the plough frame and the attachment arm at such a length that the arm is at 90 ° to the direction of travel with the chain (185) under slight tension.
- Use pin (186) and secure.

15.1.2 Adjustments





The hook (187) of the attachment arm should be adjusted so that it is approximately 30 - 50 cm outside the line of the tractor rear tyre outer wall. The outer part (188) of the attachment arm is adjustable to the bracket (182).

15.1.3 Transport position

If the plough will not be transported in half-turned position or if it is necessary to work without a furrow press it is possible to swing-in the outer part (188) of the attachment arm. For that job the chain (185) must be disconnected from the plough frame, the pin (180) must be removed, the outer arm (188) must be pivoted to the rear and the pin (189) must be used to secure the arm against swinging back. Secure pin (189). The chain (185) will be fitted to the attachment arm in a way that it will not touch the ground or will cause problems.

15.2.0 Attachment arm for DLX ploughs

15.2.1 Fitting of the attachment arm

The attachment arm may be fitted to the DLX ploughs as shown with the sketch above.
Secure the bolt (190) and the pin (191) after fitting the attachment arm.

15.2.2 Transport position

If the plough will not be transported in half-turned position or if it is required to plough without a furrow press, the outer part (192) of the attachment arm must be swung-in. For that job the pins (193 and 194) must be removed, the outer arm must be pivoted to the rear and secured in that position by means of the pin (194). The pin (193) will be put in through the holes of the stay (195) and the bracket (196). Secure pin (193).

15.3 Hydraulic Connections

There are three possible methods of hydraulically connecting the single acting press release ram:

a) Using standard kit supplied, connect ram pipe to 'T' Adapter fitted to 'T' Port on Turnover Ram.

Operation:

With Turnover Ram and Swing-in Ram when piped to two 'T' Adapters on Turnover Ram - exhaust press ram by placing tractor spool valve in 'float' position, pressurise by placing tractor spool valve in position between 'float' and neutral. Turn plough by tractor spool valve in position furthest from 'float' (turnover pipes must be correctly positioned).
In all cases the pipe is routed through clamps on arm and frame, through the front jaw of the Trulign link and is clipped to the Turnover Ram.
Otherwise, for Turnover Rams when Swing-in Ram is fitted, place tractor spool valve in position opposite to turnover to pressurise press ram.

b) If tractor is fitted with a spare spool valve, connect press release pipe directly to this (single acting if possible) using long hose.

Operate spool valve as required.

or c) If tractor is fitted with trailer brake coupling, connect press release pipe directly to this using a long hose and suitable coupling.

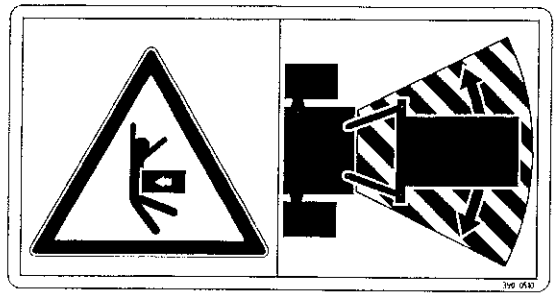
NOTE: Some tractors braking systems have to apply the tractor brakes before pressure is available at the trailer coupling. Such tractors are not suitable for operating the press arm in this manner. Consult tractor handbook.

- Do not allow anybody within the operating area!
- Press arms should be folded inwards and secured before driving on roads.
- Attachment arm is spring tensioned!

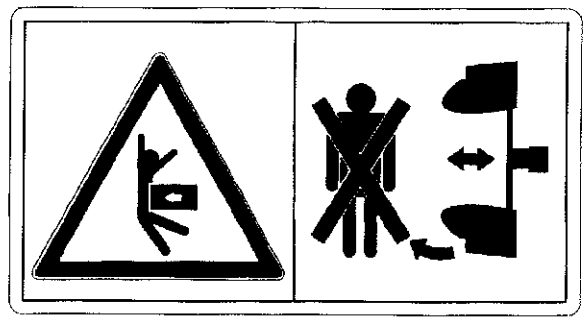
16.0 NOTES

It must be stated that these instructions apply only to the current design.

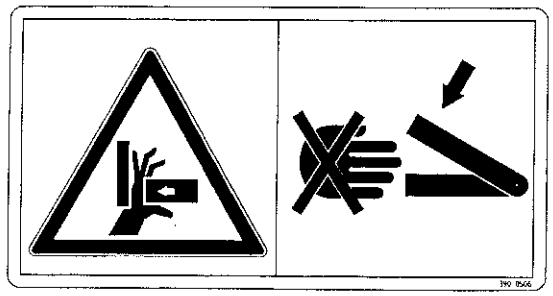
17.0 WARNING STICKERS



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!

18.0 NOISE, AIRBORNE SOUND

The noise level of the DL and DLX ploughs does not exceed 70 dB (A) during work.

19.0 WEIGHTS

Type	Interbody clearance (cm)	Max. KW (HP)	Working width ca. cm	Weight ca. kg
DL 090 1		29/40	bis 40	220
DL 090 2	85 and 95	44/60	50 - 70	340
DL 090 2+1	85 and 95	55/75	75 - 105	460
DL 090 3	85	55/75	75 - 105	460
DL 090 3+1	85	58/80	100 - 140	580
DL 110 2 *	85 and 97	52/70	60 - 80	452
DL 110 2+1 *	85 and 97	66/90	90 - 120	595
DL 110 3	85	66/90	90 - 120	595
DL 110 3+1	85	73/100	120 - 160	735
DL 120 3 *	85 and 97	74/100	90 - 120	728
DL 120 3+1 *	85 and 97	88/120	120 - 160	890
DL 120 4 *	85 and 97	88/120	120 - 160	890
DL 120 4+1 *	85 and 97	96/130	150 - 200	1.032
DL 140 2 *	88 and 100	59/80	70 - 90	530
DL 140 2+1 *	88 and 100	81/110	105 - 135	735
DL 140 3 *	88 and 100	81/110	105 - 135	735
DL 140 3+1 *	88 and 100	103/140	140 - 180	940
DL 140 4	88	103/140	140 - 180	940
DL 140 4+1	88	118/160	175 - 225	1.112
DL 160 4 *	88 and 100	110/150	140 - 180	1.067
DL 160 4+1 *	88 and 100	133/180	175 - 225	1.240
DL 160 5 *	88 and 100	133/180	175 - 225	1.240
DL 160 5+1 *	88 and 100	155/210	210 - 270	1.430
DL 160 5+1+1	88	177/240	245 - 280	1.620

*DLX ploughs are approx. 50 kg heavier per pair of body than DL ploughs. DLHX ploughs are approx. 10 kg heavier per pair of body than DL ploughs

All ploughs of 5 furrows or more, especially those used on tractors of 96 KW/130 hp or more require Cat III drawbars. (Either 461 7923 Cat III / II or 461 7925 Cat III / III).

20.0 SAFETY TECHNICAL ADVICES

- Read and adhere to these "General Health- and Safety precautions" before putting your plough to work (defined use).
- The DL, DLX or DLHX ranges of ploughs have been designed for the exclusive use of agricultural soil cultivations.
- Any use beyond the one stipulated above is no longer considered as defined use. The manufacturer does not accept any responsibility for damages resulting from this; the operator himself carries the full risk.

- Under "defined use" the manufacturer's prescribed operation-, maintenance- and repair conditions are to be adhered to!
- The DL-, DLX- and DLHX plough 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 further generally accepted safety technical, working, medical and road traffic rules should be adhered to!
- Any damages resulting from unauthorised changes on the machine rule out the responsibility of the manufacturer!
- The fitted warning- and advising plates give important hints for riskfree operation. Following these helps your own safety!
- When making use of public roads adhere to applicable road traffic regulations!.
- The operator should familiarise him-/herself with all controls and their functions before starting work. During work could be too late!
- Ensure good visibility before driving off!
- Sitting or standing on the implement during operation or during transport is not permissible!
- Attach implements as advised!
- 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 drivers seat whilst in motion!
- Mount the implement as prescribed. Handling characteristics are influenced by mounted implements, trailers and ballast weights. Check sufficient steerability and braking!
- When driving round bends note the width of the machine and/or the changing centre of gravity of the implement!
- Never stay or allow anyone to stay within the operating area!
- Do not operate any hydraulic controls while anybody is in the operating area!
- 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!
- The hydraulic system is under high pressure!
- Always release hydraulic pressure from both tractor and implement before coupling!
- 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 pipes and exchange if found defective. The replacement hoses and pipes must meet with the implement manufacturer's technical standards!
- When searching for leaks appropriate aids should be used because of the danger of injury!

- 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 starting any hydraulic repair work, lower the plough to the ground, apply the parking brake, stop the engine and release system pressure!
- Repair-, maintenance-, cleaning operations and adjustments should be carried out with tractor brakes applied and engine switched off. Remove ignition key!
- When conducting maintenance work on a lifted implement always place suitable supports underneath.
- Dispose of old oils, grease and filters as prescribed by law.
- Any spare parts used must at least meet the plough manufacturers minimum standards. This is ensured by using genuine spare parts!
- When conducting electrical welding operations on the tractor or on the mounted implement remove cable from the generator and the battery!
- Before working on the electric gear disconnect battery cables!
- 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 (CAT II or CAT III) of the tractor and the implement must be compatible or must be made compatible!
- There is 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 stand between tractor and implement!
- Ensure that sideways swing is minimised when the plough is in the transport position!
- When driving on public roads with a lifted machine the lifting control lever should be locked against unintentional lowering.
- In the event of any damage occurring to the plough its remedy should be completed before work continues!