

DALBO®

MINIMAX

(EU-type approval MMPRAR)



User instructions

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MADE IN DENMARK

MMPRAR
MINIMAX
450,630, 760, 830 cm

Congratulations on the purchase of your new roller. For **safety reasons** and to achieve optimum service from the product, please read the User Guide **before use**.

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This product has:

No.: _____ VIN no.: _____
Month of manufacture: _____ Net weight kg: _____

If contacting the manufacturer regarding spare parts or service, please state type and serial number. A spare parts list is included at the back of this manual.

EU DECLARATION OF COMPLIANCE

DALBO A/S
DK-7183 Randbøl

declares herewith that the above machine is manufactured in accordance with the provisions of directive 2006/42/EC, which replaced directive 98/373/EC and change directives 91/368/ECC, 93/44/ECC and 93/68/ECC on harmonisation of member state legislation concerning health and safety requirements related to the construction and manufacture of machines.



This machine corresponds to the safety requirements in the European Safety Guidelines.

DALBO A/S

Date: _____

Alessio Riulini, CEO

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Introduction and identification of serial number

Information

- This user manual is intended for the person who uses and maintains the drum. It contains all items concerning safety, use and maintenance. It is very important that all users read and understand the user guide before starting to use the drum.
- Every time there is a new user of the drum, it is very important that the person in question is instructed on the correct use of the drum. This includes a review and a read-through of the user guide and commissioning in the field.
- If there are doubts regarding reading the user guide or concerning the general use and safety of the drum, it is very important to stop its use and contact the DALBO A/S.

Location of user manual

The user manual can be found in a plastic case on the machine's side frame. Remove the plastic case before starting the drum and stow the user manual in a safe and accessible place for all users of the drum.

Fig. 1



MINIMAX 630

Location of serial number

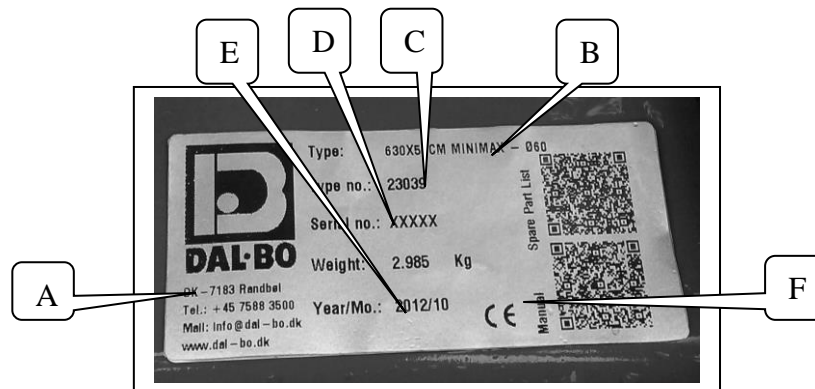
The data plate on the 450-830 is located centrally on the machine's draw-bar. The data plate can either be placed as self-adhesive foil (A), or as metal (B). The serial number of your machine can also be found on page 2 in the user guide.

Fig. 2



Every single machine is equipped with an identification plate. Below is shown a typical identification plate, which containing the following data:

- A: Name, company name and address of the manufacturer.
- B: Machine model.
- C: Machine type.
- D: Machine serial number.
- E: Year of manufacture.
- F: CE imprinting.



Warranty provision

By default, your MINIMAX is delivered with a 2-year warranty from the date of delivery. DALBO A/S shall bear no liability for damage caused by the improper use of the drum.

Safety

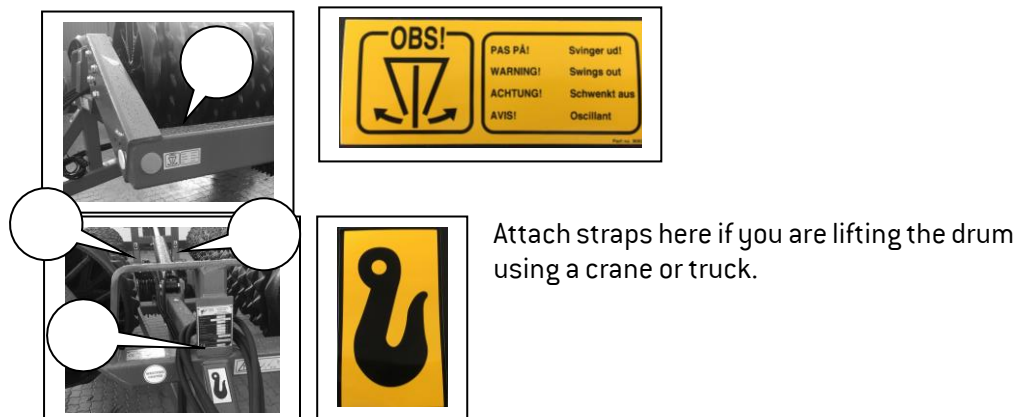


You will see this symbol in the instruction manual each time advice is given about your safety, the safety of other users, or the functional safety of the machine. All safety instructions must be observed and made available to all users of the machine.

General

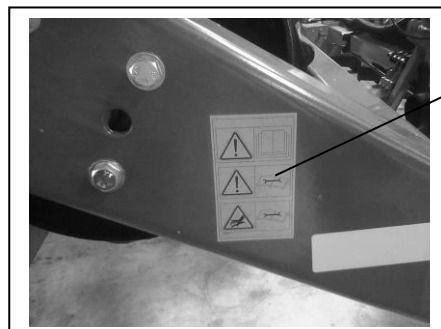
- Before starting its operation, the user must be familiar with all parts of the machine.
- Safety labels have been placed on the machine. These contain important instructions about your own safety and that of others, as well as the correct use of the machine. Always make sure, that these stickers are intact.

Fig. 3

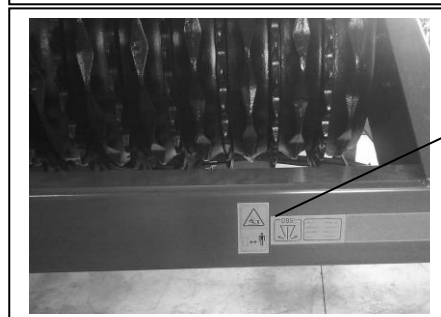


Attach straps here if you are lifting the drum using a crane or truck.

- Some safety stickers are on the machine. Pictures below show where these are mounted and a description of each.



Safety sticker:
Remember to read instruction manual.



Safety sticker:
Machine opening.



- Clean security labels daily.
- Replace security labels if they are damaged.
- If the part with a safety label needs to be replaced, install a new label. Remove the white foil sticker from the label and stick the label onto the new part.
- You can order a new safety label from the DALBO A/S

- There should be no passerby around the machine during work or transportation.
- When operating the drum, ensure that there are no people within the machine's operating radius. The machine may only be operated from inside the tractor.
- When the drum is folded up, be sure the side sections are engaged. Likewise, this will secure the control levers against accidental operation.
- Before leaving the tractor, performing any adjustments, maintenance or repairs to the drum, unfold the machine and lower it to the ground or, secure it in transport mode, apply the brakes on the tractor, turn off the engine and remove the ignition key so that the machine is secured against accidental starting.
- Remember to secure the supporting legs as well as the lifting arm with lynch pins.
- Never leave the driver's seat while the machine is being driven.
- The driving speed must always be adjusted to the conditions.
- Only use the machine if all safety devices have been mounted. Defective safety devices must be replaced immediately.
- The machine is not indicated for being used in other sectors apart from the agricultural one.
- The handbook must be always at reach in order to be able to consult it if needed. Should it be lost or damaged, it is necessary to request the substitutive copy to DALBO.
- Do not use the machine if tired, ill, or under the effect of alcohol, medicine or drugs.
- This machine is usually used during the day, but should it be, exceptionally, necessary to use the machine at night or in conditions of reduced visibility the lighting system supplied with the tractor must be used.
- Verify the machine carefully before starting it up.
- The staff must use the emergency equipment and the personal protective devices while operating and carrying out maintenance on the machine.

-
- We recommend the operator assigned to the machine not to wear clothing that could be caught by the machine.
 - During the use, the machine could emit dust. It is advised to verify the filters on the cabin ventilation system periodically or use suitable protection systems for the respiratory tracts such as anti-dust mask.
 - During use the operator must have sufficient visibility on working areas considered as dangerous, therefore it is opportune to keep the mirrors supplied on the tractor clean and in a perfect state.
 - Keep the machine clean from foreign material (detritus, tools, various objects), that could damage functioning or cause damages to the operator.
 - Avoid operating on muddy or loose soil.
 - Any alteration on the machine could cause safety problems. Should this occur the user will be held the only person liable for any accident.
 - Please make sure at any time to have enough clearance to overhead power lines.

Noise level

- Except of the interaction of the machine with external factors, no other noises from this machine exceed 80 db(A).

Hydraulics

- Prior to any repair work on the hydraulics unit, the machine's undercarriage must be lowered, the pressure must be removed from the unit, the engine must be switched off and the ignition key must be removed.
- Hydraulic connections must be cleaned thoroughly before connecting. When connecting the hydraulic hoses to the tractor's hydraulics, ensure that pressure is removed from the hydraulics and that all hoses are fixed so that there is no danger of them being damaged during transport, driving and operation.
- For hydraulic systems with built-in pilot-controlled non-return valves, it can be difficult to completely remove the pressure. You should hold a cloth around the fitting/part that is being removed to catch any oil that may leak.
- After repairs on the hydraulic system have been completed, all air must be completely removed from the system.
- Check the hydraulic hoses regularly for defects such as tears, cracks, wear or damage. Defective hoses must be replaced immediately.
- Avoid spilling oil on the ground. If this should happen, it should be collected and safely disposed of immediately.
- Clean hands thoroughly after skin contact with oil and grease. Change out of oil-soaked clothing immediately, as this can be harmful to the skin.

-
- Hydraulic oil that flies out under high pressure can penetrate through the skin and cause serious injuries. Seek professional medical assistance immediately in the event of any injury.
 - Do not use the controls or flexible tubes as handles. These components are mobile and do not offer a stable support.

Mounting

- There is a risk of crushing when carrying out mounting. People must not stand between the machinery and the tractor or between parts being connected.
- Pay the maximum attention during the equipment coupling and uncoupling phases.

Maintenance and repair

- The machine must be properly supported while undertaking all repair and maintenance work; the tractor and machine must have their brakes properly activated, the engine must have been turned off and the ignition key removed.
- Tighten all screw fittings after a few hours of use. All screw fittings must be checked at regular intervals and tightened when necessary. Check cotter pins and bolts to avoid breakdowns.
- Oil, grease and filters must be disposed of and in accordance with the applicable environmental legislation.

Driving on roads

- When driving on public roads, all safety arrangements and warnings required by law must be installed and tested. The driver is responsible for the correct use of lights, brake systems and traffic signs in accordance with traffic laws.
- With regard to the dimensions of the machinery, the driver must make enquiries with the traffic authorities to ensure that it may be transported on public roads.
- When transporting the machine, care must be taken not to exceed the total weight and axle load of the tractor and that the load on the front axle is no less than 20 per cent of the tractor's overall weight. In that case, use the front weight of the tractor.
- Before starting to drive on public road from a non-paved or dirty surface, it is required to clean the wheels of the tractor and machine from any presence of mud.
- When driving on a public road, the roller must be in transport position.
- Road transport must be done with a maximum speed of 25 km/h.

Correct use

- Correct use of the machine also includes compliance with the manufacturer's operating, maintenance and repair instructions, as well as the exclusive use of original spare parts.
- The drum may only be used, maintained and repaired by people who are familiar with the machine and who are aware of the dangers that can arise. We remind to refer to the manufacturer in case of doubts on the use of the machine and on the interpretation of this handbook.
- The manufacturer is not liable for damage resulting from changes to the machine carried out without the manufacturer's prior permission. Furthermore, the manufacturer is not liable for any damage that results from incorrect use. Responsibility for this rests solely with the user.
- No extra weight may be mounted on the drum.

Technical data

MINIMAX

Table 1. Technical data

Size [cm]	450	530	630	760	830
HP (maximum)	120	130	150	180	200
Gross Weight [kg]:					
• Cambridge 50	2190	2800	3145	4070	4160
• Cambridge 55	2610	3290	3720	4760	4930
• Cambridge 60	-	-	4515	-	5875
• Crosskill 53	1860	2325	2660	3545	3650
• Cross Combi 50	2230	2740	3215	4160	4310
• Cross Combi 55	-	-	3740	4940	5095
Sections (pcs)	3	3	3	3	3
Hydraulic requirements:					
1 DV + 1 EV ¹	X	X	X	X	X
1 DV for cracker boards	X	X	X	X	X
Gross weight of extra equipment [kg]					
Cracker boards	490	530	550	600	630
Air brakes	-	180	180	180	180
Hydraulic brakes	-	150	150	150	150
Axle load [kg]	0.73 x gross weight	0.72 x gross weight	0.72 x gross weight	0.71 x gross weight	0.71 x gross weight
Support load [kg]	0.27 x gross weight	0.28 x gross weight	0.28 x gross weight	0.29 x gross weight	0.29 x gross weight

¹ DV = dual action, EV = single action

How to read the instruction manual

It is possible that the order in which the topics are listed does not follow a specific logic. Please refer to the table of contents, where the titles for the relevant topics can be found.

The main points in the instruction manual are divided into 5 key sections:

- Safety
- Getting Started and Driving
- Extra equipment
- Maintenance
- Repairs

The following symbols are used in the instruction manual for:



Points that are especially important for the functionality as well as the lifetime of the machine.



Points that are relevant to safety.

Delivery

The drum is delivered fully assembled via a platform truck.

If the drum needs to be lifted, it is recommended that it is rigged with straps in the middle-section and secured with a drawbar, so that the machine is balanced. [See page 9, section on “General Security”]



Incorrect rigging and lifting can cause serious damage to the machine and to persons around it.



DALBO A/S does not accept liability for damage in connection with inappropriate or incorrect rigging and lifting.

Use

This is a standard roller, designed for rolling and levelling ploughed and sown areas. Rolling is intended on farming areas where better soil compaction is needed and to avoid the soil to dry out by extreme dry conditions.

Rollers equipped with crackerboard is able to level ploughed areas with a perfect result.

Fig. 4

The drum is a three-piece drum with integrated mechanic weight transfer, where the sections move independently of each other.



MINIMAX 630

As a drum, MINIMAX is used before sowing to crush tubers as well as after sowing to improve sprouting and push down stones.

Optionally, MINIMAX can be fitted with hydraulic cracker boards. The main application of the cracker board is to prepare the soil for sowing. The vibrating effect of the teeth decomposes tubers, processes and aligns the raw ploughed soil, as well as the previously prepared ground. If you do not wish to use the cracker board, tilt it upward and the machine can then be used exclusively as a drum.

First use or restart after a long break

- Verify that the machine has no damaging.
- Verify the mechanical units that must be in good state and not rusted.
- Verify the correct functioning of the light bars (if present).
- Grease carefully all mobile parts.
- Verify that no oil are leakages from connections and pipes.

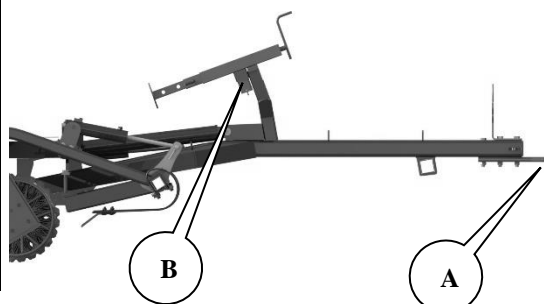
Connecting and disconnecting

Connecting

The drum is connected to the tractor's fixed drawbar, where the towing eye (A) must be between the drawbar's forks.

The lever is inserted, the support leg raised and placed in the working position (B).

Fig. 5



- Remember to secure the lever with lynch pins or similar.
- Remember to secure the supporting legs with a lynch pin or similar.



- The lift arms are adjusted so that they do not collide with the drawbar when turning.
- Hydraulic hoses and a lamp cord are fitted so that they are not damaged during operation.

Hydraulics

As a standard, the drum requires a double-acting and single-acting hydraulic outlet, in which the double-acting output extends and the single-acting output raises/lowers (tilts) the drum. If a cracker board is fitted, a double-acting outlet is required.

Table 2. Hose labels

Cylinder name	Colour	Outlet	Function
Tilt cylinders	White	Single-acting	Lift the drum up on the wheels and downward into working mode.
Folding	Red	Double-acting	Folds the side-sections together/out.



- Check that the hydraulic hoses have not been crushed.
- The floating position is recommended for the socket for the tilt cylinder/fold-in when transporting by road and working in the field.

Disconnecting

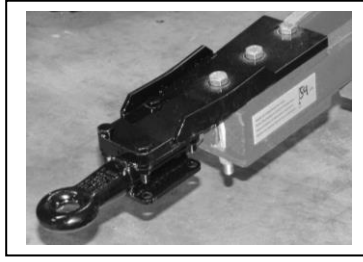
The drum must be folded (in transport position) or unfolded before disconnection. Screw out the support leg so that the drum's bar can be lifted from the tractor's drawbar, disconnect the hydraulic hoses and remove the nail.



Remember to release the pressure from the connecting hoses to the hydraulic system before disconnecting the hoses.

Drawbar

Some countries require a special turn able drawbar like shown on the picture below. Setup on this drawbar type must be done exactly the same way than described in section "Setting up" on page 18.



Settings

The drum is factory set at delivery, but fine tuning will always be necessary before use. Many different adjustment options make your drums more versatile and enable optimal use of the machine.

In order to achieve uniform pressure on the ground, the draw-bar must be adjusted correctly for the tractor concerned. Draw-bar height under the drum's red draw-bar towards the tractor should be shown in the table below (approx. measurement).

Tensile adjustment

In order to achieve uniform pressure on the ground, the bar must be adjusted correctly for the tractor concerned. Measured where the arrow is indicated in the picture.

Height under drawbar:
See table below

Fig. 6

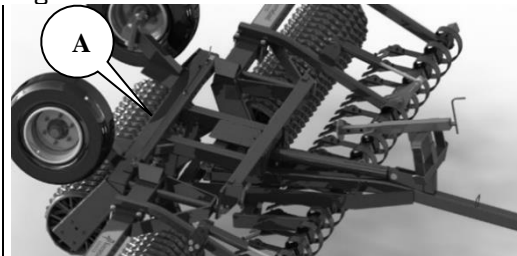


Table 3. Drawbar height

Ring\Type	450	530	630	760	830
50 cm cambridge	50 cm	58 cm	58 cm	57 cm	57 cm
55 cm cambridge	53 cm	61 cm	61 cm	60 cm	60 cm
60 cm cambridge	-	63 cm	63 cm	62 cm	62 cm
53 cm crosskill	49 cm	57 cm	57 cm	56 cm	56 cm
50 cm cross combi	48 cm	56 cm	56 cm	55 cm	55 cm
55 cm cross combi	-	58 cm	58 cm	57 cm	57 cm

Fig. 7

It is important that the middle section (A) of the machine is horizontal during operation in order to achieve uniform pressure against the earth.



To ensure correct settings, it is important that the machine is on a **horizontal** surface when the setting is set.

Driving and operation

Proper operation is important in order to get optimal performance from your drum. This applies to both work in the field and in terms of safety. It is therefore crucial that you have thoroughly read the safety precautions that cover the machine.

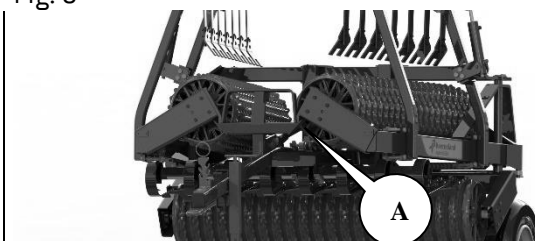
Unfolding and folding

Unfolding and folding are conducted with the tractor in parked position

Unfolding

- 1 The side section is lifted up by the carriers (A) with the tilt cylinder (marked: White).

Fig. 8



- 2 The cylinders for unfolding and folding (marked: Red) are activated and the side sections are completely folded.
- 3 The tilt cylinders are activated and the drum is lowered to the ground.
- 4 The cylinders for unfolding and folding (marked: Red) and the tilt cylinder (marked: White) are set in the float position.

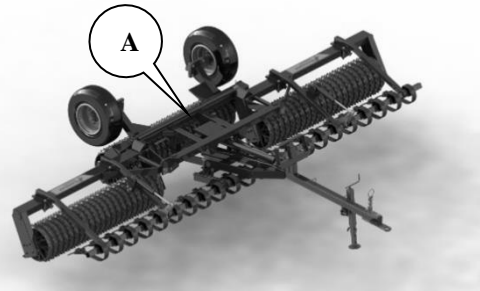
Fig. 9



Folding

1. The foldable and unfoldable cylinders (A) (marked: Red) are activated so that it is as short as possible.

Fig. 10



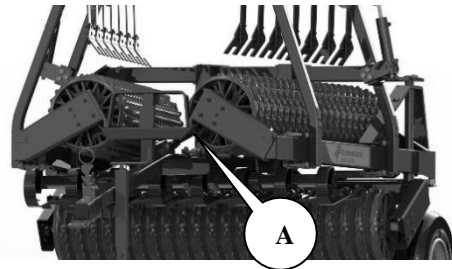
2. The tilt cylinders (marked: White) are activated to full length and the drum is tilted away from the ground.

Fig. 11



3. The foldable and unfoldable cylinders are activated again and the side sections are folded in.
4. The tilt cylinders are activated and the drum is lowered onto the transport hooks (A).

Fig. 12



Before transport by road, it is very important that the machine is cleaned to such an extent that no earth, stone or plant remains are spilled on public roads.

Driving speed

It is recommended that the machine is driven at 6-10 km/h, and always in compliance with weather conditions.

If speed is increased, wear will also increase, especially under dry conditions. There is also a risk of damaging the rings by driving at excessively high speeds under adverse conditions.

The power requirement is very dependent on the type of soil, work width and terrain as well as speed. See "Technical data" table.

Table 4, **Guide for power requirements in HP**

Working width (cm)	all
Power [HP]	120-200

Troubleshooting

Problem	Cause	Fixing
The central section is pressing too much	<ul style="list-style-type: none"> • Too little pressure is being transferred to the side sections 	<ul style="list-style-type: none"> • The hydraulic handle for folding out/in is activated so that it is in the float position.
	<ul style="list-style-type: none"> • The bar is too high 	<ul style="list-style-type: none"> • Adjust bar and middle section (see "Bar Height Adjustment").
	<ul style="list-style-type: none"> • The middle section is tilting backwards 	<ul style="list-style-type: none"> • Adjust the bar height downwards.
The outer parts of the side sections are pressing too much	<ul style="list-style-type: none"> • Too little pressure on the middle section 	<ul style="list-style-type: none"> • The hydraulic handle for folding out/in is activated so that it is in the float position.
	<ul style="list-style-type: none"> • The bar is too low 	<ul style="list-style-type: none"> • Adjust bar and middle section (see "Bar Height Adjustment").
The side sections are not following the terrain	<ul style="list-style-type: none"> • The hydraulic handle for folding out/in is not in the float position 	<ul style="list-style-type: none"> • Activate float position.

Extra equipment

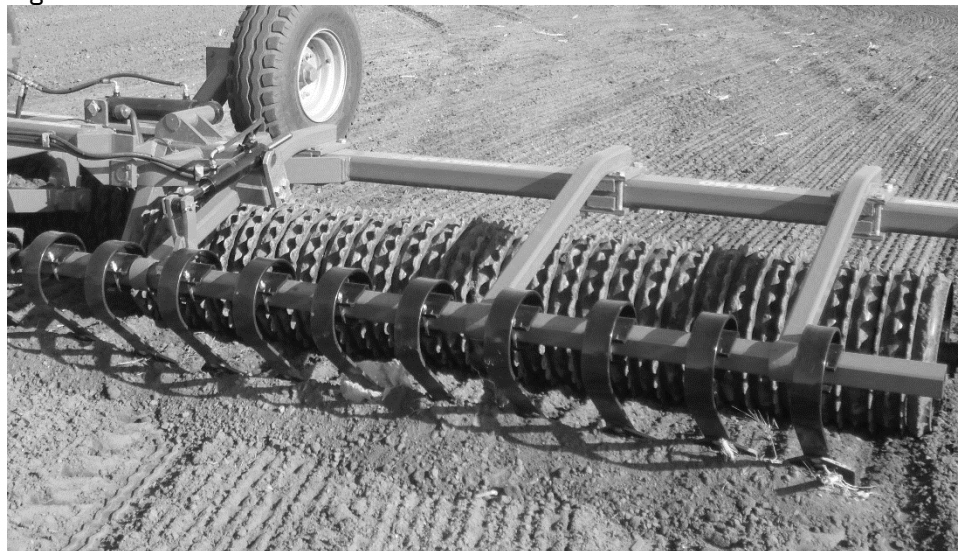
It is possible to equip the MINIMAX 450-830 with different types of extra equipment.

- Cracker boards with bowed worn parts
- Gabions
- Light Sets
- Air brakes
- Hydraulic brakes
- Lift bar

Cracker boards

The clear advantages of the cracker boards are that the teeth can be moved individually so that they give after meeting resistance locally. This ensures a strong level of flexibility in the cracker board as opposed to a regular board, as the entire levelling process does not need to start over simply because of an obstacle.

Fig. 13



Power

Compared to a regular board, the cracker board does not require as much power, although a lot depends on the kind of work the cracker board is doing.

Table 5, The cracker board's power requirements in HP

	[HP/metre]
Power requirement in [HP] per metre working width	7-10



By moving the least amount of soil possible, this reduces fuel consumption while reducing wear on the material.

Hose labels

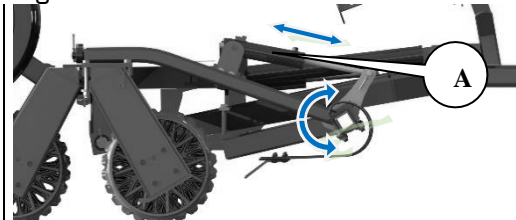
Table 6. Hose labels

Cylinder name	Colour	Outlet	Function
Depth adjustment/ Angle adjustment	Green	Double-acting	Adjusts the cracker board's working depth

Adjustment of the teeth's angle and depth

The cracker board's working depth and angle are hydraulically (A) adjustable. The depth and angle settings are undertaken in the same function.

Fig. 14



Driving and operation

The cracker board is a flexible unit with several possible applications. At a set depth of approx. 5 cm, the teeth, with their vibrating effect, will be able to crush the tubers.

Fig. 15

A deeper adjustment of the cracker board will give a greater plane result, similar to the plane board, in which a small bank is built up in front of the teeth.



It is **not** the purpose of the cracker board to act as a dozer blade, but rather to perform light tilling of the soil. Since each tooth can move individually and thus provide resistance locally, the cracker board is easy to drive.



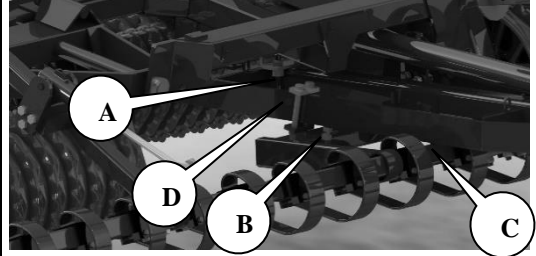
It is possible that sections of the cracker board may operate unevenly when in depth. Consequently, it may be necessary to “zero” the cracker board by lowering it to the bottom most position (cylinders fully pulled together). Afterwards, hold on to the tractor's hydraulic pump for approximately 30 seconds to remove any air in the system.

Retro-fitting

The cracker board can be mounted at the factory, or delivered later if the need arises. For mounting, a crane or similar auxiliary equipment will be required.

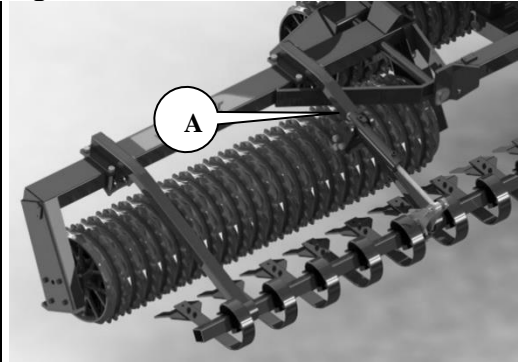
- 1 Unfolding the MINIMAX.
- 2 Mount the middle section via the U-piece (A) with the appropriate fixing clamp. Then adjust the bolts (B) and secure with a counter nut, so the mounting is sideways parallel to the drive and has approx. 1 cm clearance in (C). Finally, tighten (D).

Fig. 16



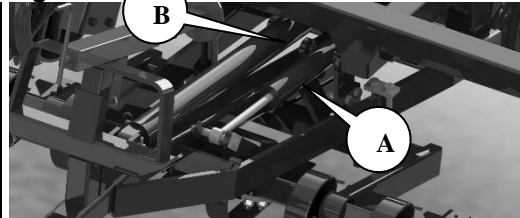
- 3 Mount the side sections according to the drawing provided by the DALBO A/S (A).
- 4 Mount the hydraulic cylinders (A).

Fig. 17



- 5 Mount the middle hydraulic cylinder as shown (A) with the nipples facing downwards.
- 6 Make sure that the plate (B) does not touch the tilt cylinder. Otherwise the tilt cylinder will be planed off and shift the opposite side.

Fig. 18



- 7 Mount the hoses according to the diagram shown in the “Hydraulic diagram” section.
- 8 The hoses are fastened to the hose holders (arrow) (not all hose holders can be seen in the figure).

Fig. 19



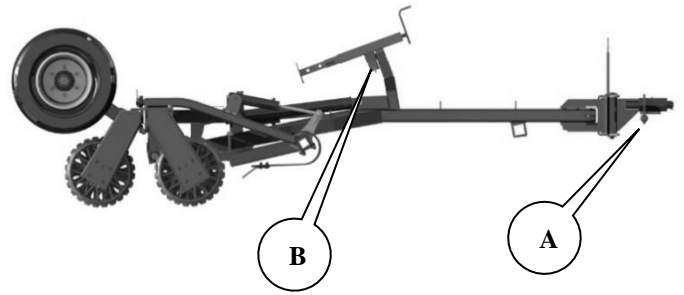
It is important to ventilate the system thoroughly in order to prevent personal injury. For this reason, the cylinders should be moved straight out into the outer positions a couple of times.

Connection with towing eye

The drum is connected to the tractor's fixed drawbar, where the towing eye (A) should be between the tractor's drawbar.

Insert a cotter key or bolt; raise the support leg and set in working position (B).

Fig. 20



- Remember to secure the lift arm balls with lynch pins or similar.
- Remember to secure the supporting legs with a lynch pin or similar.



- Adjust the lift arm so the draw bar height fits (see "Adjustment of draw bar height") section.
- Hydraulic hoses and a lamp cord are fitted so that they are not damaged during operation.

Maintenance

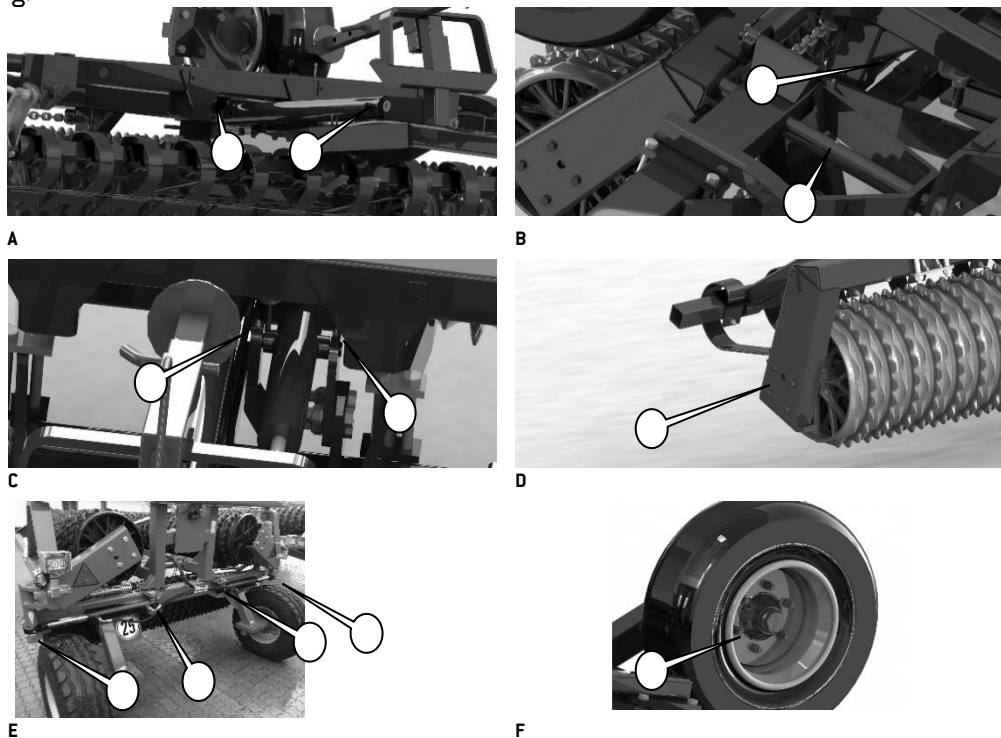
Good maintenance ensures a long life for the drum and therefore optimal use of the machine. Which is why grease fittings have been installed in places where wear is greatest.



All screw connections must be tightened after the first day of work. Cotter pins and bolts should be checked to avoid breakdowns. The hydraulic system should also be checked to ensure it is air-tight.

Lubrication

Fig. 21



Lubrication points	Number of nipples	Lubrication interval hours	Images
Tilt cylinders	2	8	A
Rotation pin for tilt/flap	3	8	B
Cylinders for cracker boards	6	8	C
Bearings	6	50	D
Cylinders flap 630 x 60 Cambridge ring + 760 + 830	4	8	E
Wheel hub	2	50	F



All lubrication points should be greased at least once a year. It is also recommended to spray protruding piston rods with oil when the drum has been cleaned, washed and parked for the longer term at the end of the season.



Some lubrication points most easily accessible with the machine unfolded. We recommend that the machine is placed (folded-in/folded-out) so that the lubrication nipples can be reached without having to go up onto the drum.

Adjustment

Adjustment of fittings

After the first season, the fittings will have worked themselves loose on the shaft. By moving the stop rings on the shaft, the fittings can be clamped together to remove any dirt and wear can be minimized.

Adjustment of fittings is best done with the MINIMAX folded.

- 1 The bolts (A) are loosened and the fittings pushed together.
- 2 The bolts in the stop rings are tightened and loosened in the same place on the axle a few times, so that the bolts better grip onto the axle.

Fig. 22



Wheels

The wheel bearing must be adjusted once a year. Also make sure you have the correct tyre pressure (see tyres and table in the “Tyre pressure” section).

Adjustments and lubrication of wheel bearings

1. Hub cap is removed.
2. The cotter is removed.
3. The castellated nut is tightened with a $1/6$ turn, so that the hole is aligned with the shaft. The wheel is spun around and there should be no resistance. Only a little bit of slack should be felt in the hub housing when the wheel is moved from side to side. If there is too much slack, repeat the process.
4. The cotter is installed.
5. The hub cap is filled $3/4$ with grease and fitted.

Tyre pressure

In the tables below you can see the load, speed and tyre pressure relative to each other for the different tyre combinations.

300/80-15.3 Starco

300/80-15.3 STARCO AW (SG-316) FREE WHEEL 131A8 (128B)													
1.0 bar	1.2 bar	1.4 bar	1.6 bar	1.8 bar	2.0 bar	2.2 bar	2.4 bar	2.6 bar	2.8 bar	3.0 bar	3.2 bar	3.4 bar	SPEED
1335	1485	1625	1755	1880	2000	2115	2225	2335	2435	2540	2635	2730	10km/h
1270	1410	1545	1670	1790	1905	2010	2115	2220	2315	2410	2505	2595	15km/h
1205	1340	1465	1585	1695	1805	1905	2005	2105	2195	2285	2375	2460	20km/h
1135	1260	1380	1495	1600	1700	1800	1895	1985	2070	2155	2240	2320	25km/h
1070	1190	1300	1405	1505	1600	1695	1785	1865	1950	2030	2110	2185	30km/h
1000	1115	1220	1320	1415	1505	1590	1675	1755	1830	1905	1980	2050	35km/h
955	1060	1160	1255	1345	1430	1510	1590	1665	1740	1815	1885	1950	40km/h
880	980	1070	1160	1240	1320	1395	1470	1540	1605	1675	1740	1800	50km/h

400/60-15.5 Alliance

Size	Rim	Unloaded Dimension		Loaded Static radius mm	Rolling Circumference mm	Load Index PR Symbols	Inflation Pressure bar	Recommended Load							
								Speed							
		Drive wheel						Free rolling							
		10 kmph	25 kmph					40 kmph	50 kmph	10 kmph	25 kmph	40 kmph	50 kmph		
400/60-15.5	13.00DC	404	874	377	2510	148A8 136A8	1	1320	1120	940	846	1860	1580	1330	1200
							2	1970	1680	1410	1269	2790	2370	1990	1790
							2.5	2250	1920	1610	1449	3180	2700	2270	2040
							3.5	2740	2330	1960	1764	3860	3280	2760	2480
							4	2970	2520	2120	1908	4170	3550	2980	2680
							4.4	3140	2670	2240	2016	4410	3750	3150	2840

10.0/75-15.3 Alliance

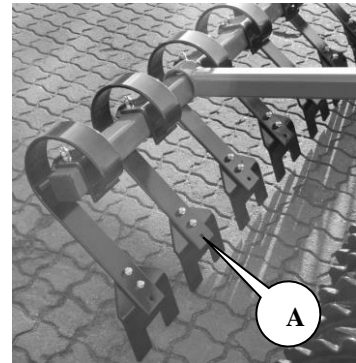
Size	Rim	Unloaded Dimension		Loaded Static radius mm	Rolling Circumference mm	Load Index PR Symbols	Inflation Pressure bar	Recommended Load							
								Speed							
		Drive Wheel						Free rolling							
		10 kmph	25 kmph					40 kmph	50 kmph	10 kmph	25 kmph	40 kmph	50 kmph		
10.0/75-15.3	9	268	784	343	2260	12PR	4.7	1650	1400	1180	1062	2380	2020	1700	1530
						126A8⊕ 114A8⊖									

Worn out parts

The wear parts are factory-fitted in the upper holes on the tooth. The wear slides must be moved to the lower holes (A) before wear starts to appear on the teeth.

After the wear parts are worn out. Positioned in the lower holes, replace the slides so that no wear occurs on the cracker board.

Fig. 23



Hydraulics



All hydraulic hoses must be checked for wear or damage. Ensure the hoses are not subjected to any crushing.



If left parked for longer periods of time, protruding plunger rods should be greased with oil or pressure grease, in order to avoid the build-up of rust on the plunger rod. Remember to remove it again before use.

Replacements and repairs



Safety is crucial in regard to **all** repair work on the drum. The following items must therefore be observed at all times, as well as all items under safety at the beginning of the instruction manual.



When replacing the cylinders, always fill the cylinder with oil before subjecting it to strain. It is therefore recommended that you mount the cylinder in the fixed part of the frame first, after which the cylinder is filled with oil and then mounted in the counterpart.



All maintenance and repair work on the drum must be conducted only when the machine is lowered to the ground or is set in transport mode, the tractor's brake is on, the engine is switched off and the ignition key is removed, so that the machine cannot move or start accidentally.



For all repair work on the hydraulics, always pay close attention to safety. Before starting any work, release the pressure in the hydraulics system and, if necessary, support the part.



Once the repair work on the hydraulics system is complete, the system must always be vented before use to prevent mechanical breakdown and/or personal injury.

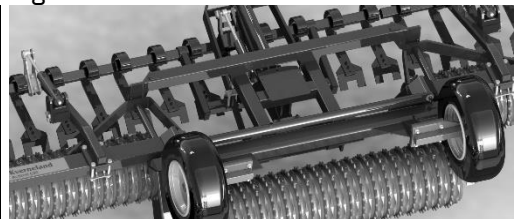
Hydraulics

Changing the cylinders for unfolding and folding the side sections

Any repairs must be carried out with the drum unfolded and resting on its undercarriage.

1. The pressure is removed from the cylinders.
2. The hoses are removed.
3. Cotter pins and nails are removed, and then the cylinder is free.
4. The new or repaired cylinder is installed. Remember to secure the nail in the nail stop and secure the nails with cotter pins.
5. The hoses are installed. After mounting, ensure that there is no risk of tearing or clamping the hoses.

Fig. 24





After mounting, the cylinders are activated for unfolding and folding until a small amount of movement can be felt in the cylinders. The cylinders are then activated in the opposite direction until the cylinders are back in the starting position. The cylinders are moved in this way a few times. The drum is then tilted up onto the wheels and the side sections move out completely into the outer positions to air out the system.



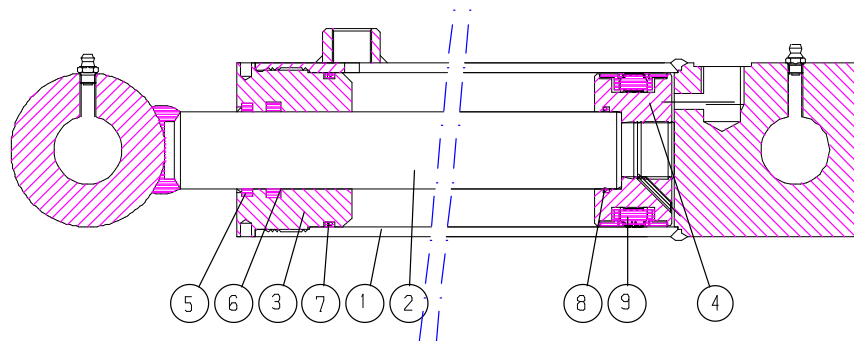
No individuals should ever be present within the tool's action radius.

Replacement of the gaskets

DISMANTLING:

1. Empty the cylinder of oil, (if necessary, use compressed air to move the piston back and forth to push the oil out).
2. Drive the piston to the centre position. The cap (pos. 3) is unscrewed 30 mm. If the cap is really stuck, it may help to warm up the front of the upper cap. When the cap is unscrewed, pull the piston towards the cap, after which the cap is completely unscrewed and the piston rod is pulled out.
3. The sleeves are removed, (pos. 4).
4. The cap is removed from the piston rod (pos. 2).
5. Remove the seals in the cap and sleeve (pos. 5+6+7+8+9), (use a needle or screwdriver, if necessary).
6. All parts are cleaned and checked for chips, burrs etc. Check for rust formation around the scraper ring (pos. 5) in the cap. If this is the case remove it.

Fig. 25:



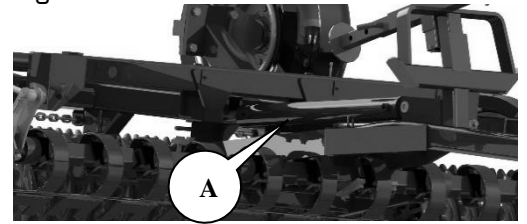
MOUNTING:

1. New seals are mounted in the cap and sleeve. The scraper ring, pos. 5, is mounted with the help of a piece of tubing that fits externally around the lip (or special mandrel). The cuff pos. 9 on the sleeve is mounted using a round bar/screwdriver.
2. The thread on the cap and cylinder tube are lubricated with grease, (anti-corrosive wear agent).
3. The cap pos. 3 is mounted on the piston rod.
4. The sleeve pos. 4 is mounted and secured with Loctite.
Make sure the thread is absolutely clean and free of oil and other impurities before using Loctite.
Do not fill with oil within 12 hours of using Loctite.
5. Grease the cuff pos. 9 on the sleeve as well as the outer end of the cylinder tube's inside with lubricating oil and push the piston into centre position.
6. Screw the cap on and tighten.

Changing the tilt cylinder

The drum is unfolded and lowered onto the base (working position). The pressure is removed from the tilting cylinder (A).

Fig. 26



1. The hoses are disconnected from the cylinder.
2. The cylinder is supported.
3. The cotter pins in the rivets are disconnected while the rivets are uninstalled.
4. The cylinder can be uninstalled.
5. New or repaired cylinders can be installed.



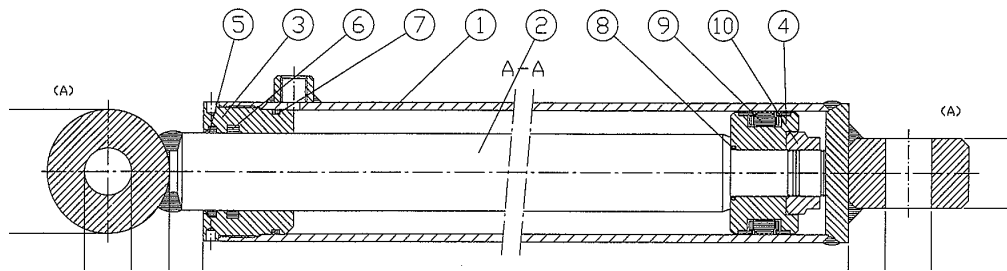
After mounting, the tilt cylinder is activated until a small amount of movement can be felt in the cylinder. The cylinder is then activated in the opposite direction until the cylinder is back at the starting position. The cylinder is moved in this way a few times, whereupon the cylinder is moved out to the outer positions a few times to air the system out.



No individuals should ever be present within the tool's action radius.

Change of gasket set on the tilt cylinder

Fig. 27



1. The cylinder is emptied of oil by carefully moving the piston back and forth.
2. Move the piston to the middle position, then unscrew the end cap (pos. 3) from the cylinder tube (pos. 1). A special tool must be used to remove the cap. If the cap is really stuck, it may help to warm up the front of the upper cap. When the cap is unscrewed from the cylinder tube, pull the piston towards the cap. The piston rod can then be removed from the cylinder tube (pos. 1).
3. The lock nut (pos. 10) that is holding the sleeve (pos. 4) is disassembled.
4. The sleeve (pos. 4) is removed from the piston rod (pos. 2).
5. The cap (pos. 3) is pulled off the piston rod (pos. 2).
6. The seals in the cap (pos. 5+6+7+8+9) as well as the sleeve are removed.
7. All parts are checked for chips, burrs etc. Check for rust around the scraper ring (pos. 5) in the cap. If this is the case remove it.

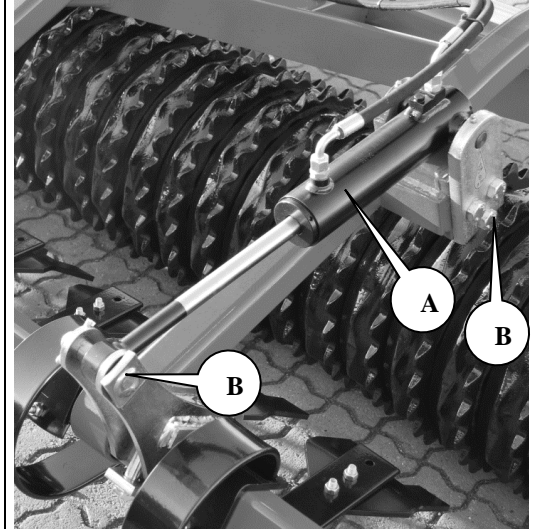
Mounting

1. New seals (pos. 5+6+7+8+9) are fitted in the cap and sleeve.
2. The thread on the cap (pos. 3) and the cylinder tube (pos. 1) are lubricated with oil.
3. The cap (pos. 3) is mounted on the piston rod.
4. The sleeve (pos. 4) is installed and the lock nut is screwed and **secured with Loctite**. Make sure the thread is absolutely clean and free of oil and other impurities before using Loctite. **Do not fill with oil within 12 hours of using Loctite.**
5. Lubricate the outermost seal on the sleeve that comes in contact with the cylinder tube and the cylinder tube internally with oil and push the piston into the middle position.
6. The cap is installed on the cylinder tube and tightened.
7. To mount the cylinder, refer to "Changing the tilt cylinder".

Additional Equipment - Changing the cylinder to the cracker board

Fig. 28

1. MINIMAX is unfolded while resting on the ground.
2. The cracker board is lowered and the pressure is removed from the hydraulic system.
3. The hoses are disconnected from the cylinders.
4. Bolts, cotter pins and rivets (B) are removed.
5. A new or repaired cylinder (A) is mounted.
6. Remember to install the cotter pins in the rivets.



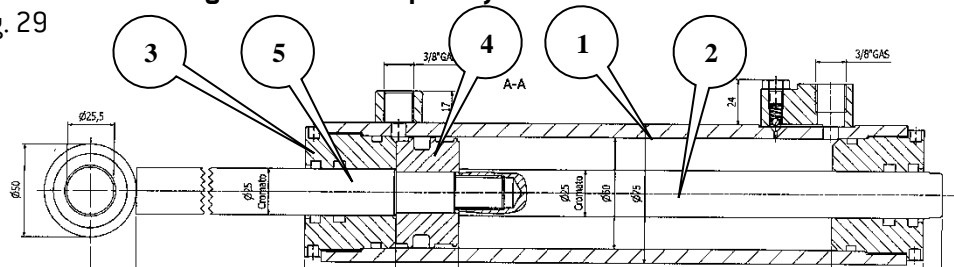
After mounting, the tilt cylinder is activated until a small amount of movement can be felt in the cylinder. The cylinder is then activated in the opposite direction until the cylinder is back at the starting position. The cylinder is moved in this way a few times, whereupon the cylinder is moved out to the outer positions a few times to air the system out.



No individuals should ever be present within the tool's action radius.

Replacement of the gasket set for depth adjustment

Fig. 29



Cylinder 25/60/25-205

- 1 The cylinder is emptied of oil by carefully moving the piston back and forth.
- 2 Move the piston to the middle position, then unscrew the end cap (pos. 3) from the cylinder tube (pos. 1). A special tool must be used to remove the cap. If the cap is really stuck, it may help to warm up the front of the upper cap. When the cap is unscrewed from the cylinder tube, pull the piston towards the cap. The piston rod can then be removed from the cylinder tube (pos. 1).
- 3 The piston rod (pos. 2) that holds the sleeve (pos. 4) in place is removed.
- 4 The sleeve (pos. 4) is removed from the piston rod (pos. 5).
- 5 The cap (pos. 3) is pulled off the piston rod (pos. 5).
- 6 The gaskets are removed.
- 7 All parts are cleaned and checked for chips, burrs etc. Check for rust around the scraper ring in the cap. If this is the case remove it.

Mounting

- 1 New seals and a sleeve are mounted.

-
- 2 The thread on the cap (pos. 3) and the cylinder tube (pos. 1) are lubricated with oil or grease.
 - 3 The cap (pos. 3) is mounted on the piston rod.
 - 4 The sleeve (pos. 4) is mounted and the piston rod (pos. 2) is **secured with Loctite**. Make sure the thread is absolutely clean and free of oil and other impurities before using Loctite. **Do not fill with oil within 12 hours of using Loctite.**
 - 5 Lubricate the outermost seal on the sleeve that comes in contact with the cylinder tube and the cylinder tube internally with oil and push the piston into the middle position.
 - 6 The cap is installed on the cylinder tube and tightened.
 - 7 To mount the cylinder, refer to "Additional Equipment - Changing the cylinder to the cracker board".

Removing/mounting wheels on the road

To remove a wheel on the road, hoist the drum with a strap and crane (A), or car jack (B) as shown in the pictures below. Make sure, that the car jack has a secure stand and the implement is connected with the tractor. The wheel will thus be free of the ground.

The wheel nuts are removed and the wheel can be replaced. After installing the new wheel, screw the nuts on and tighten with a “firm hand”. Next, lower the wheels so that they are touching the ground and tighten the nuts to 300 Nm.



It is important that the wheel nuts and wheel surfaces are clean, otherwise the wheel nuts may loosen.



It is important that the lifting device is able to manage 75% of the machine’s total weight. In addition, the machine must be properly braked and secured.

Fig. 30



Removing/mounting wheels on the ground

To remove wheels, unfold the drum with the rings resting on the base. The wheels will not therefore touch the ground.

The wheel nuts are removed and the wheel can be replaced. After installing the new wheel, screw the nuts on and tighten with a “firm hand”. Next, lower the wheels so that they are touching the ground and tighten the nuts with 300 Nm.



It is important that the wheel nuts and wheel surfaces are clean, otherwise the wheel nuts may loosen.



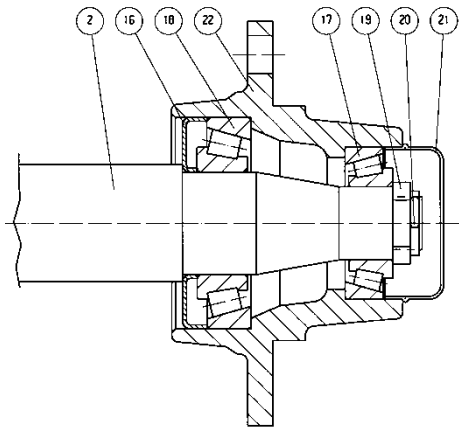
Re-tighten the wheels after 1-2 hours of use.

Replacing the bearings

1. The hub cap pos. 21 is removed.
2. The cotter pos. 20 is removed.
3. The castellated nut pos. 19 is removed.
4. The axle pos. 2 can now be removed.
5. The bearings pos. 17+18 are removed.
6. The sealant ring pos. 16 is removed.

Fig. 31

FL55-6



Mounting

1. The outer rings of bearings pos. 17+18 are installed in hub casing pos. 22.
2. The sealant ring pos. 16 is installed.
3. The inner bearing ring pos. 18 is installed on the shaft pos. 2 and the shaft is installed in the hub casing.
4. The inner bearing ring pos. 17 is installed on the shaft pos. 2.
5. The castellated nut is screwed onto the shaft pos. 2, while the hub casing pos. 22 is rotated. The castellated nut is tightened to the slowly rotating hub casing. Then loosen the castellated nut a quarter turn or until the hub casing turns around easily.
6. The splitter pos. 20 is installed.
7. The hub cap pos. 21 is filled halfway with ball bearing grease and the hub cap is installed.

Dismantling the drum body

Perform repairs on a flat surface with the drum connected to a tractor and unfolded with the rings resting on the ground. It would be very helpful to have a crane or something similar available for both the dismantling and assembly.

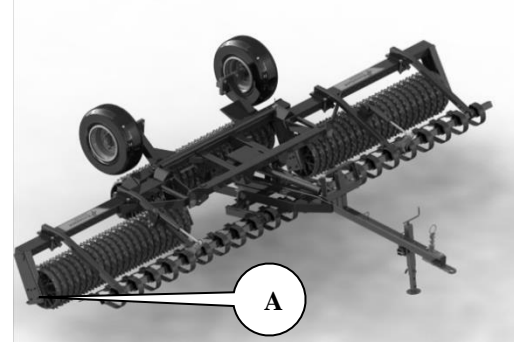
Replacement of the drum body on the side sections



If no crane is available, both axles on the side sections must be removed to prevent the drum from overturning.

1. Loosen the bolts (A).
2. Attach the square pipe to the side section and tighten the strap lightly until the bolts (A) are loose and can be removed.
3. The tilt cylinder is activated and the drum is tilted up onto the wheels.
4. Be aware that the hook for transport at the outer bearing plate can catch the axle when the drum is tilted up onto the wheels.
5. The rings can be rolled away from the drum.

Fig. 32



If no crane is available, the drum's folded cylinder can be easily activated and put in a position so that the bolts are loose and can be removed.

Mounting

1. The rings are placed in a position corresponding to the placement when the drum is unfolded.
2. The drum is unfolded and tilted carefully down over the rings.
3. Mount the bolts (A).

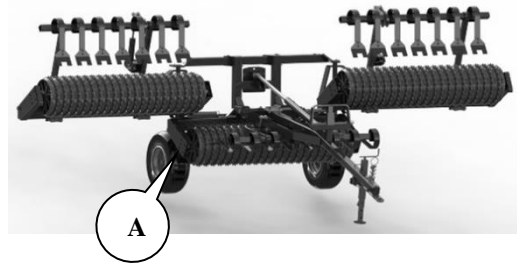


There must be no persons within the operating radius when/if the hydraulic system is activated.

Replacement of the centre drum body

1. Loosen the bolts (A).
2. The tilt cylinder is activated, the drum is tilted towards the wheels, the drum rings support the base and the bolts are loose.
3. Remove the bolts.
4. The drum is tilted up onto the wheels.
5. The rings can be rolled away from the drum.
6. Mounting is carried out in the reverse order.

Fig. 33



The hydraulic system must not be activated when there are persons within the machine's operating radius.

Disposal



The drum must be unfolded. It is crucial to release the pressure from **all** the cylinders.



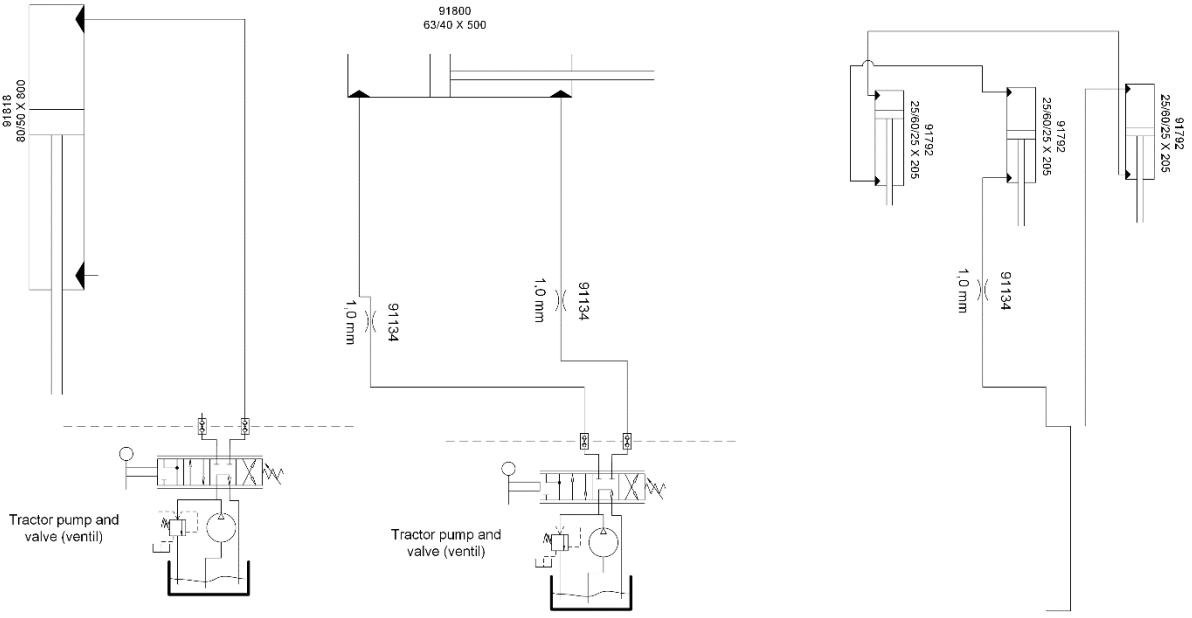
With disassembly/dismounting, attention should be directed towards the load on the part in question. It is therefore **important** that this part be supported or lifted, to avoid risk of collapse or overturning.

Hydraulic hoses and cylinders must be disconnected and any residual oil removed. The oil must be collected to avoid pollution. Oil and hoses must be sent for destruction.

All iron parts to the machinery can be sent for recycling.

Hydraulic diagram:

Minimax 530

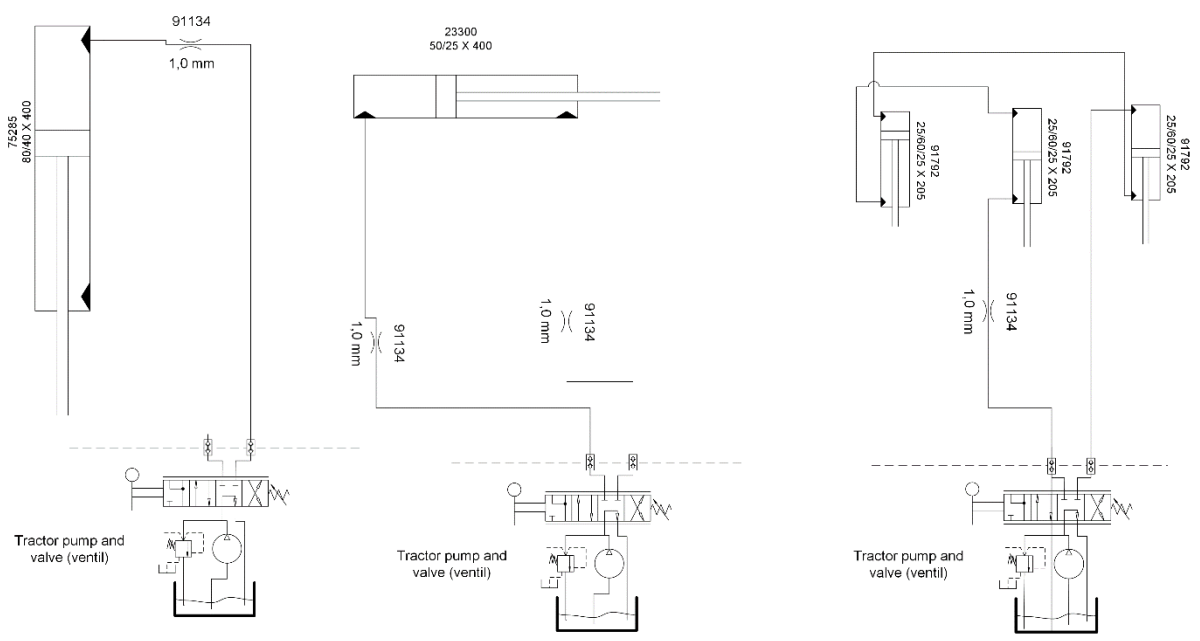


Vippecylinder
Tilting cylinder
White

Klappcylinder
Wing fold cylinder
Red

Lamelplanke
Crackerboard
Green

Minimax 450

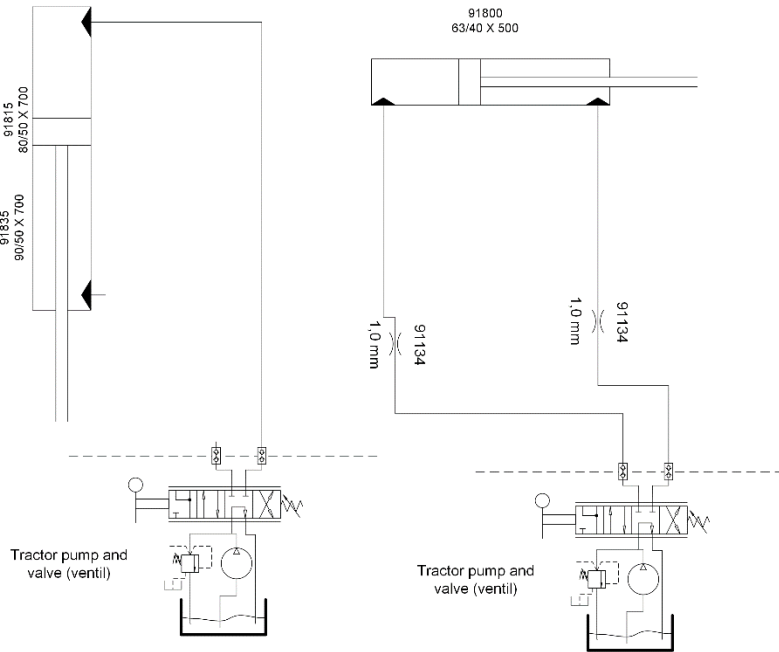


Vippecylinder
Tilting cylinder
White

Klappcylinder
Wing fold cylinder
Red

Lamelplanke
Crackerboard
Green

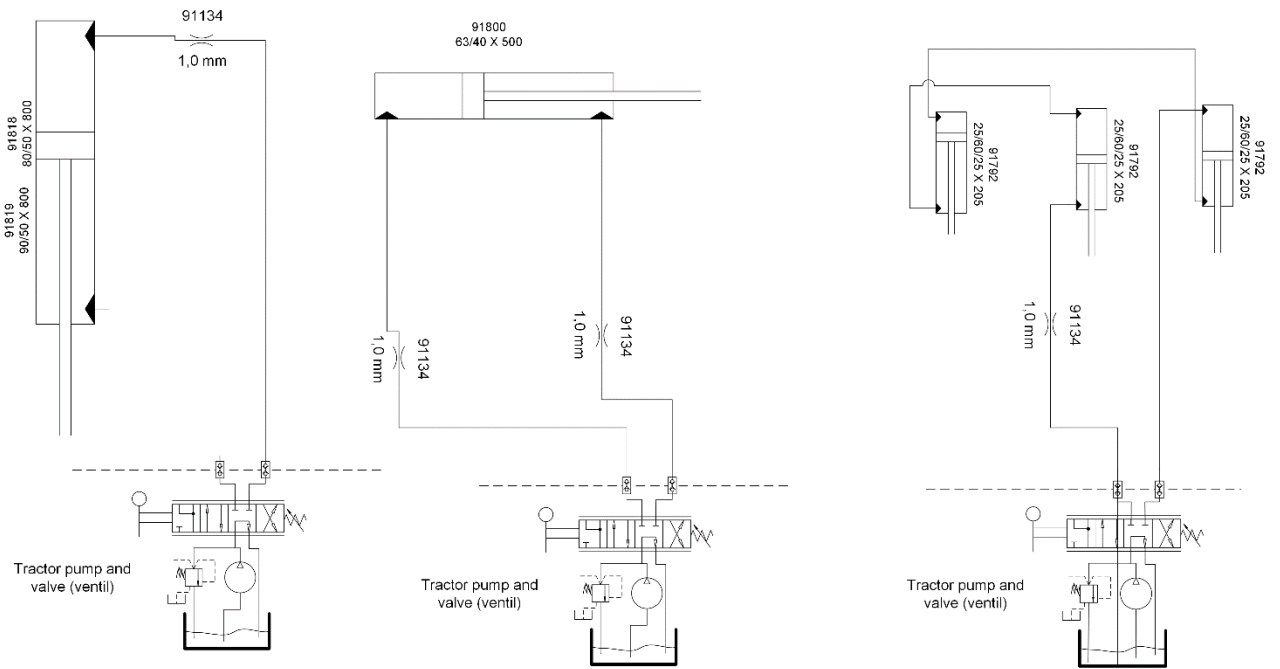
Minimax 630 cl.



Vippecylinder
Tilting cylinder
White

Klapcylinder
Wing fold cylinder
Red

Minimax 630

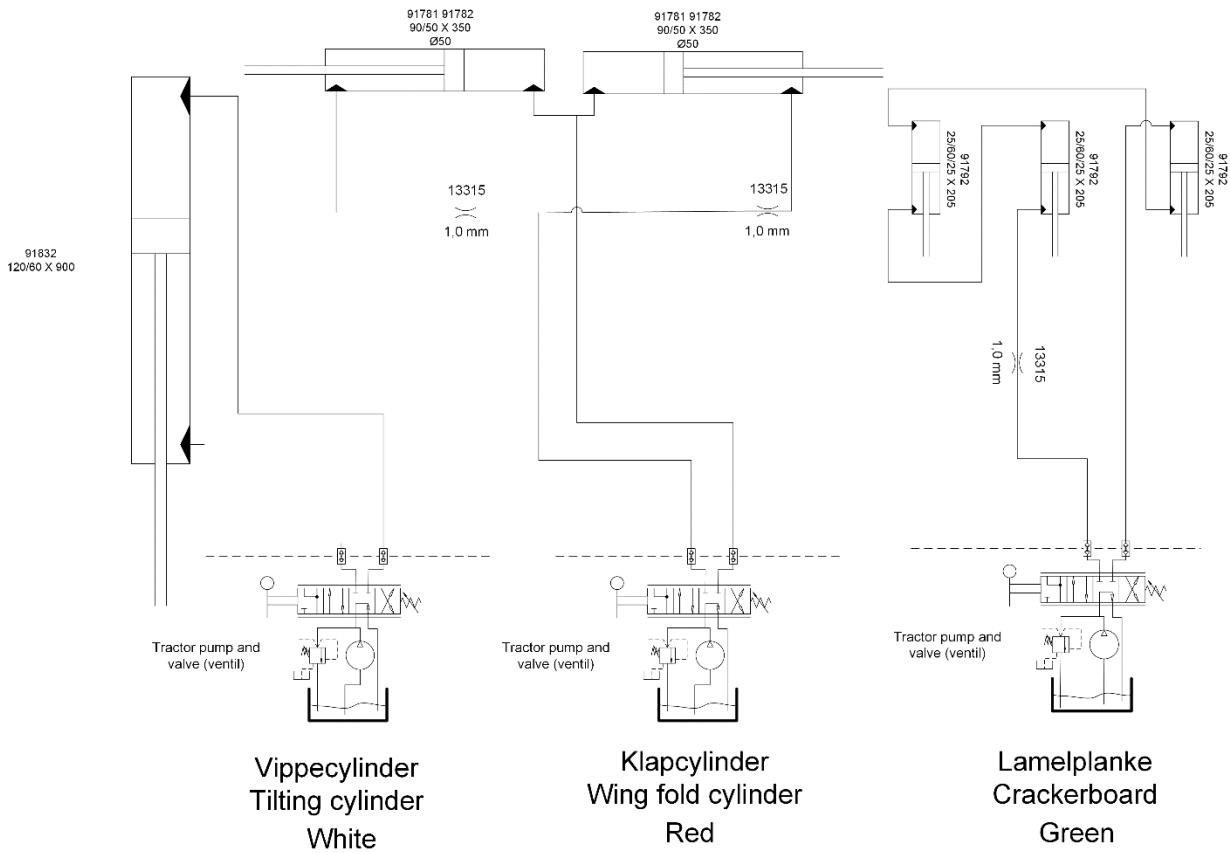


Vippecylinder
Tilting cylinder
White

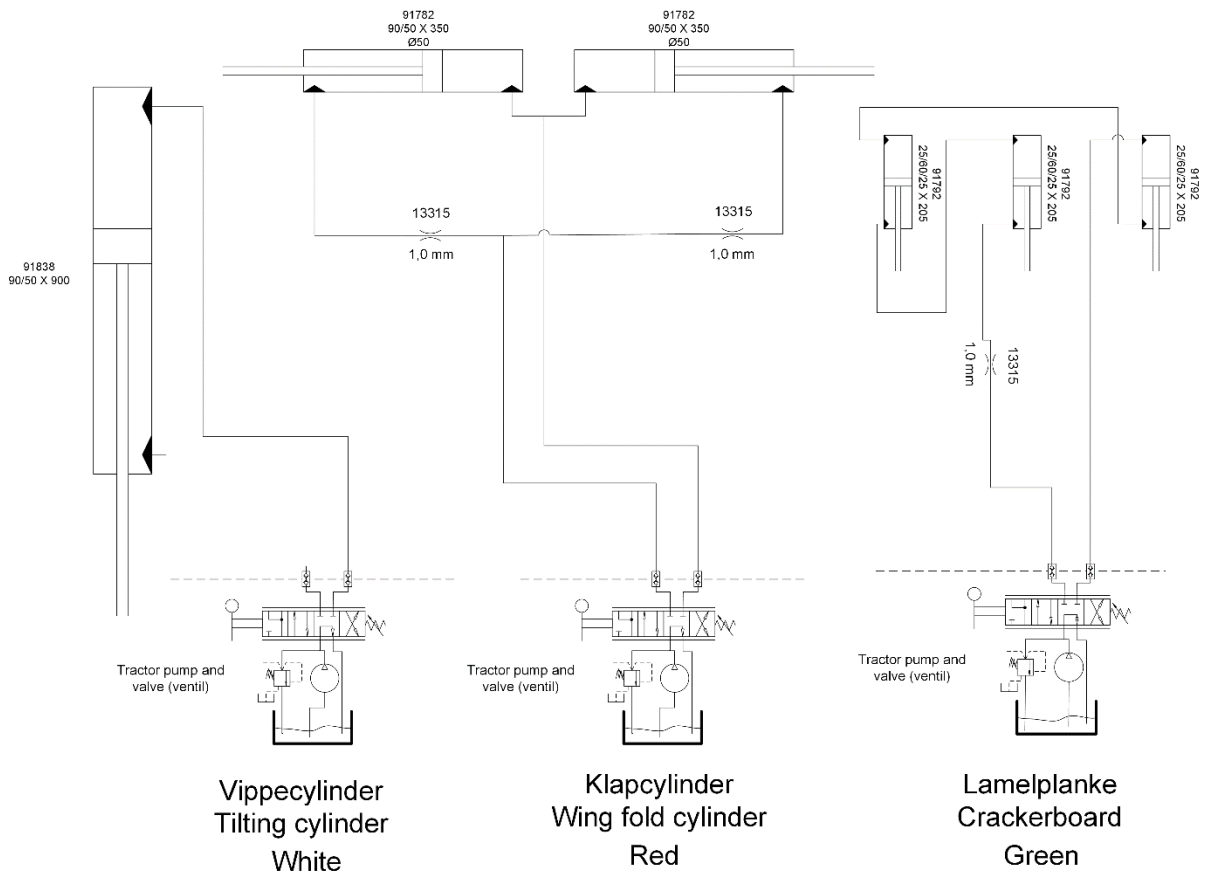
Klapcylinder
Wing fold cylinder
Red

Lamelplanke
Crackerboard
Green

Minimax 760 830



Minimax 630 60 cm cambridge



Spare parts

