

Compact



EN
450,630,830 cm
Serial no.: 50949-XXXXX

Minimax

Type 450,630,830 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:

Type no.: _____ Serial 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

DAL-BO A/S
DK-7183 Randbøl

declares herewith that the above machine is manufactured in accordance with the provisions of directive 98/37/EC, which replaced directive 89/392/ECC 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.

CE

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

DAL-BO A/S

Date: _____

Managing Director Kaj Pedersen

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Safety



This symbol appears in the instruction manual each time there is a safety warning concerning your safety, the safety of others or functionality of the machine. All safety instructions must be observed and made available to all users of the machine.

General

- Ensure you are familiar with all aspects of the machine before use
- There are safety stickers on the machine containing important instructions for the safety of yourself and others, and correct use of the machine.
- Do not carry passengers during operation or transport.
- Ensure there are no personnel within the machine's extension radius before operating. Operate machine only from inside the tractor.
- When roller is folded together, check the side sections are locked. Check all operating handles are secured against accidental operation.
- Before leaving the tractor or making adjustments, performing maintenance or repairs on the roller, extend fully and lower to ground, or maintain in transport position, apply tractor handbrake, switch engine off and remove ignition key to secure the machine against accidental operation.
- Remember to secure support legs and lift arm (if relevant) with split rings.
- Never leave driver's seat whilst machine is moving.
- Always adapt speed to conditions.
- Do not use machine unless all safety devices are in place. Defective safety devices must be replaced immediately.

Hydraulics

- Lower machine fully for any repair work on the hydraulic system. Relieve hydraulic pressure, switch engine off and remove ignition key.
- Clean hydraulic connections thoroughly before reconnecting. When connecting hydraulic hoses to tractor hydraulics, ensure they are not under pressure.
- It can be difficult to completely depressurise hydraulic systems with pilot-controlled non-return valves. Hold a cloth around the fittings/part to be removed to catch any oil.
- Bleed the hydraulic system thoroughly after any repairs.
- Check hydraulic hoses regularly for defects such as cracks, splits, crimps, wear or breaks. Defective hoses must be replaced immediately.
- Avoid spilling oil on the ground. If oil is spilt, collect and deliver to a destruction point.
- Clean hands thoroughly after contact with oil and grease. Change oil-stained clothing immediately. Hydraulic oil can be harmful to the skin.
- Hydraulic oil released under high pressure can penetrate the skin and cause severe injury. In the event of injury, seek medical help immediately.

Mounting

- Danger of crushing! Ensure no personnel are between implement and tractor, or between the parts to be connected.

Maintenance and repair

- Ensure machine is adequately supported or fully extended for all repair and maintenance work. Ensure tractor and machine are properly braked, engine stopped and ignition key removed.
- Tighten all screw connections after a few hours use. Check all screw connections regularly and tighten as required. Check all split pins and bolts to avoid mechanical failure.
- Dispose of oil, grease and filters in accordance with local environmental protection rules.

Road transport

- All safety and warning precautions mandatory by law must be fitted and tested before transporting the machine on public roads. The driver is responsible for correct lighting and warning signs in accordance with traffic regulations.
- Check with local traffic authorities whether transport on public roads is allowed given the machine's dimensions.
- When transporting, ensure permitted total weight for tractor is not exceeded and that loading on tractor front axle is not less than 20% of tractor net weight. If this is the case, use weights on tractor front.

Correct use

- Correct use of the machine includes observing the manufacturer's operating, maintenance and repair instructions, and that original spare parts are always used.
- The roller may only be used, maintained or repaired by personnel familiar with it and who are aware of the risks that can be involved.
- The manufacturer cannot be held liable for injury or damage arising from modifications made to the machine performed without prior permission from the manufacturer. Neither can the manufacturer be held liable for injury or damage arising from incorrect use. Such liability rests solely with the user.
- Do not add extra weight to the roller.

Technical data

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Size (cm)	450	630	830
HP (recommended)	60-90	90-140	140-200
*Gross weight kg:	2.075	3.010	4.010
Sections (pcs.)	3		
Axles (pcs.)	3		
Wheels	10.0/75-15.3		

*Depense on type of ringes (this weight are with 50cm cambrigde)

How to use this manual

The sequence of subject matter in this manual can seem illogical. Please refer to the table of contents for page numbers for individual items.

The manual is divided into 5 main sections:

- Safety
- Starting routine and running
- Accessories
- Maintenance
- Repairs

The following symbols represent:



Points which are important to functionality and service life.



Points relevant to safety.

Delivery

The roller is delivered complete on a trailer.

Always use a rig with straps attached to the mid section and ensure machine is balanced when lifting.

Uses

This is a standard roller, designed for rolling and levelling ploughed and sown areas.

The roller has three articulated sections and integrated mechanical weight equalisation, in which the sections can move independently of each other.

Fig. 1



Minimax 2008 830

Connecting and disconnecting

Connecting

Connect roller to the tractor's fixed towbar, where drawbar (A) must fit between the towbar forks.

Insert pin, retract support leg and place in working position (B)

Fig. 2



- Remember to secure towbar pin with a split pin or the like.
- Remember to secure the support leg with a split pin.



- If tractor towbar is too short, its lift arms can collide with the roller's support leg if cornering sharply to the left. Avoid by extending tractor towbar.

Hydraulics

The roller requires as standard a double-acting and single-acting hydraulic outlet, where the double-acting is used for extending and single-acting for raising/lowering.

Table 1. Hose markings

Cylinder name	Colour	Outlet	Function
Raise/lower cylinder	White	Single acting	Raises the drum up onto its wheels and down into working position.
Fold/weight equalisation	Red	Double acting	Folds side sections up/out and acts as weight equalisation from mid-section to side sections.

- Check hydraulic hoses for crimping



Disconnection

The roller must be folded up (transport position) or extended before disconnection.

Lower support leg to lift roller drawbar from tractor towbar. Remove pin and disconnect hydraulic hoses.

Remember to depressurise hoses before disconnecting them.



Setting up

The roller is supplied with factory settings, but fine adjustment will always be required before use. Numerous adjustment options make the roller more flexible and ensure maximum use.

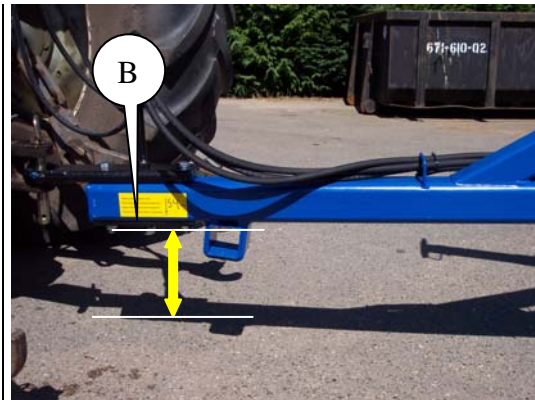
To achieve uniform pressure applied on the ground, the drawbar must be correctly set up for the tractor used. Towbar height on tractor must be approx. (40cm. under 450-630) and (54cm. under 830CM)

Adjusting drawbar height

Fig. 3

To achieve uniform pressure applied on the ground, the drawbar must be correctly set up for the tractor used.

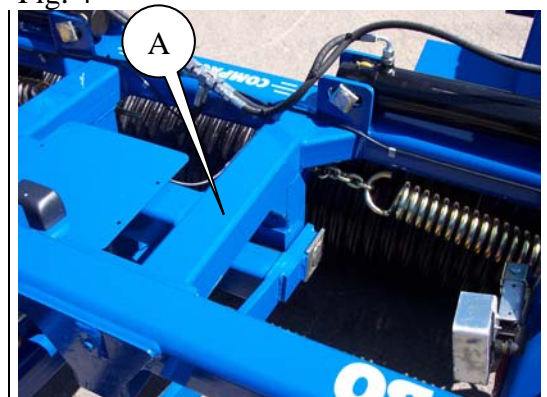
Height under drawbar must be approx. 54 cm.



Height under drawbar:
40cm on 450
40cm on 630
54cm on 830

Fig. 4

Always ensure machine mid-section (A) is horizontal during adjustment.



Always ensure machine is on a **level** surface to ensure correct setting.

Operation

Correct operation is vital for optimum use of the roller. This applies to working in the field and for safety. Always ensure you are fully familiar with all safety aspects of the machine.

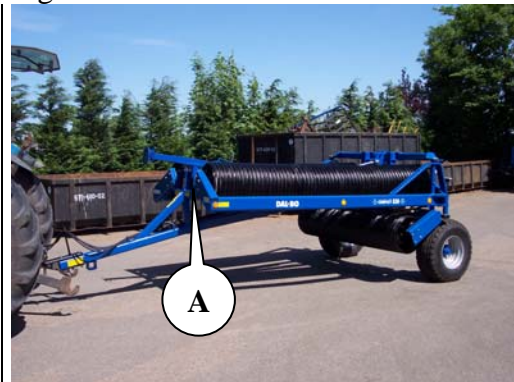
Extending and folding up

Extending and folding the machine up must always be performed with tractor parked.

Extending

- 1 Lift side sections from transport hook (A) using raise/lower cylinder (marked: White).

Fig. 5



- 2 Activate extend cylinder (marked: Red) to fully extend side sections.
- 3 Activate raise/lower cylinder to lower roller to ground.
- 4 Set extend cylinder (marked: Red) into flow position.

Fig. 6



Fold up

1. Activate extend cylinder (marked: Red) to lift end of side sections (A) as much as possible.

Fig. 7



2. Activate raise/lower cylinder (marked: White) to full length. Roller will lift from ground

Fig. 8



3. Activate extend cylinder to fold side sections in.
4. Activate raise/lower cylinder to lower roller into transport hooks.

Fig. 9



Weight equalisation

Spring-loaded weight equalisation spreads weight equally across roller sections. Weight equalisation is factory set, and must not be changed by user.

Operating speed

An operating speed of 6-10 km/h is recommended, but always operate according to conditions.

Power requirement will depend on soil type, terrain and speed.

Table 2, **Guide to power requirement in HP**

Working width	450	630	830
Power	60-90	90-140	140-200

Maintenance

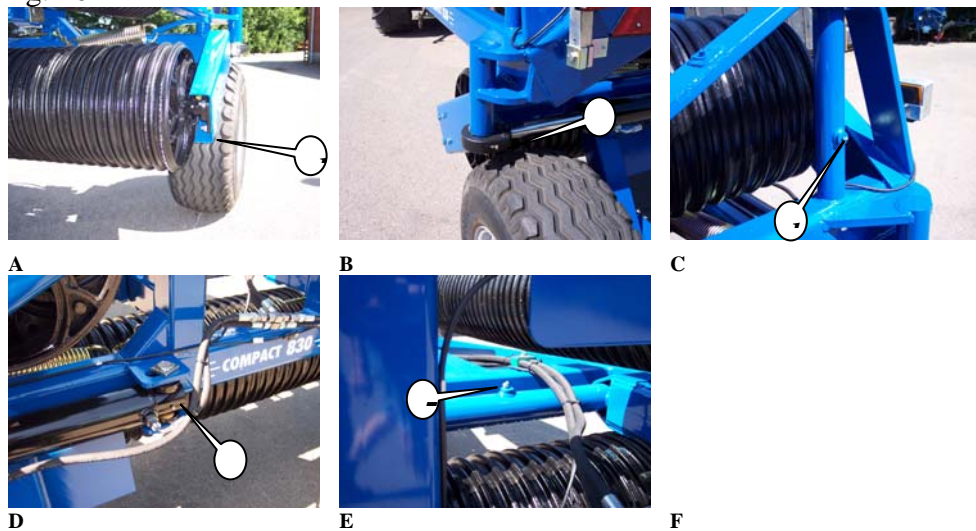
Good maintenance ensures long service life and optimum use. Grease nipples are fitted where wear is heaviest.



Tighten all screw connections after first working day. Check all split pins and bolts to avoid mechanical failure. Check hydraulic system for leaks.

Lubrication

Fig. 10



Lubrication points	Number of nipples	Lubrication intervals, hours	Illustration
Flange bearings	6	50	A
Rotation pin for extending side sections	2	25	C
Extend cylinder	2	50	B/D
Rotation pin for raise/lower	2	50	E



Lubricate all lubrication points at least once annually.

Adjustment

Wheels

Lubricate and adjust wheel bearings at least once annually. Check tyre pressures at least once annually (see recommended pressure on tyre).

Adjustment and lubrication of wheel bearings

1. Remove hub caps.
2. Remove split pin.
3. Tighten castle nut 1/6th of a turn until hole is aligned with axle. Turn wheel, check for resistance. A little play should be detected in the hub housing when rocking wheel from side to side. If play is excessive, repeat process.
4. Replace split pin
5. Fill hub cap $\frac{3}{4}$ full with grease. Replace.

Hydraulics



Check all hydraulic hoses for wear or cracks. Check all hoses for crimping.



Lubricate exposed rams with oil or pressure-resistant grease to avoid rust forming when storing for long periods. Remember to remove before use.

Replacement and repairs



Safety is vital for **all** repair work on the roller. Always observe the following points, plus those under Safety First in the instruction manual.



When replacing cylinders, always fill new cylinder with oil before pressurising system. We recommend fitting cylinder to frame first, fill with oil, before completing fitting at top.



All maintenance and repair work on the roller can only be performed when the machine is lowered to the ground or locked in transport position, tractor is braked, engine stopped and ignition key removed to prevent accidental start.



Particular attention must be paid to safety when repairing hydraulics. Before commencing work, depressurise hydraulic system and support part being worked on.



Always ensure hydraulic system is bled after repairs and before use to prevent mechanical breakdown and injury to person.

Hydraulics

Replacing extend cylinder for folding side sections

Roller must be fully extended and standing on ground for repairs.

1. Depressurise cylinder.
2. Disconnect hoses
3. Remove split pins and pins. Cylinder will now be free.
4. Fit new or repaired cylinder. Check pin locks into place, secure pins with split pins.
5. Connect hoses. Check there is no danger of hoses being ripped or crimped after fitting.

Fig. 17





Activate extend cylinder after fitting until cylinder shows movement. Reverse cylinder until it returns to start position. Move cylinder backwards and forward several times. Raise roller fully onto wheels, extend side sections fully to bleed system.

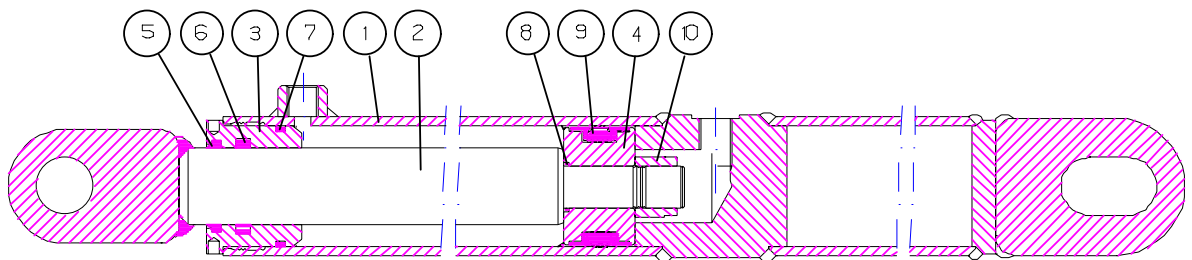


Ensure no personnel are within the extension radius of the side sections.

Replacing gaskets

REMOVAL:

1. Drain oil from cylinder, use compressed air to move ram backwards and forwards (if required) to force oil out.
2. Extend ram to centre position. Screw upper part (pos. 3) 30 mm outwards. If upper part is stuck, heat front of sleeve to approx. 300° C, allow to cool. When upper part has been unscrewed, extend ram towards upper part. Unscrew and remove upper part, extract ram.
3. Remove lock nut (pos. 10).
4. Remove collar shoe (pos. 4).
5. Remove upper part from ram, (pos. 2).
6. Remove gaskets in upper part and collar shoe, (pos. 5+6+7+8+9) (use an awl or screwdriver if necessary).
7. Clean all parts, check for particles etc. Check for rust around scraper ring (pos. 5) in upper part. If any is detected, remove thoroughly.



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ASSEMBLY:

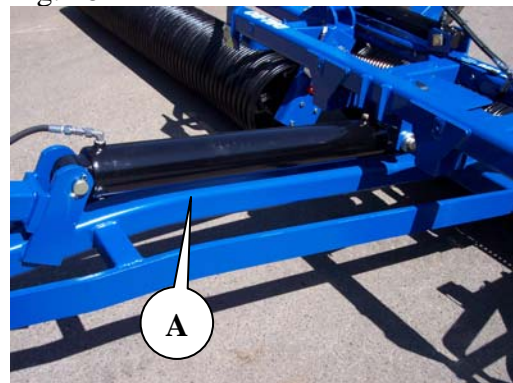
1. Fit new gaskets in upper part and collar shoe. Fit scraper ring pos. 5 using a piece of pipe, passed around outside of lip (or a special drift). Fit collar pos. 9 onto collar shoe using tubular bar or screwdriver.
2. Lubricate thread on upper part and cylinder tube with grease (rust-preventing anti-scratch).

3. Fit upper part pos.3 on ram shaft.
4. Fit collar shoe pos. 4 and secure lock nut pos. 10 with Loctite. Ensure that thread is absolutely clean and free of oil or other impurities before applying Loctite.
Do not fill with oil for 12 hours after use of Loctite.
5. Lubricate collar pos. 9 on collar shoe, and cylinder tube end inside using lubricating oil. Push ram into centre position.
6. Screw upper part pos. 3 into position and tighten.

Replacing raise/lower cylinder

Fully extend roller and lower onto ground. Depressurise raise/lower cylinder (A).

Fig. 18



1. Disconnect hoses from cylinder
2. Support cylinder
3. Remove split pins in pins, remove pins
4. Remove cylinder
5. Fit new or repaired cylinder



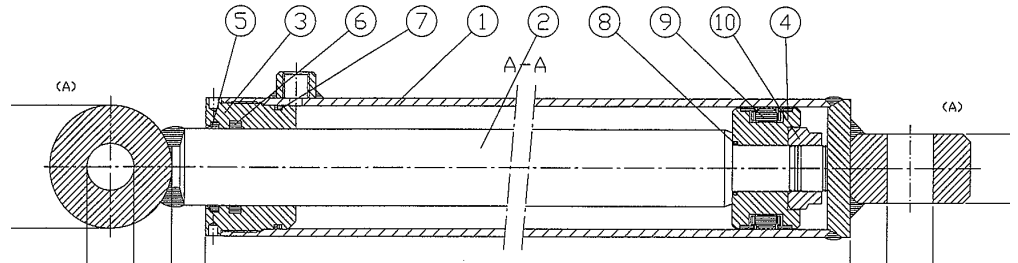
Activate raise/lower cylinder after fitting until cylinder shows movement. Reverse cylinder until it returns to start position. Move cylinder backwards and forwards several times. Fully extend cylinder several times to bleed system.



Ensure no personnel are within the extension radius of the side sections.

Replacing gaskets on raise/lower cylinder

Fig. 19



1. Drain oil from cylinder by moving ram carefully backwards and forwards.
2. Extend ram to centre position. Unscrew upper part (pos. 3) from cylinder tube (pos. 1). Use special tool to remove upper part. If upper part is stuck, heat front of sleeve. When upper part is detached from cylinder tube, pull ram up towards upper part and remove completely from cylinder tube (pos. 1).
3. Remove lock nut (pos. 10) retaining collar shoe (pos. 4).
4. Extract collar shoe pos. 4) from ram, (pos. 2).
5. Extract upper part (pos. 3) from ram, (pos. 2).
6. Remove gaskets in upper part (pos. 5+6+7+8+9) along with collar shoe.
7. Clean all parts and check for particles etc. Check for rust around scraper ring (pos. 5) in upper part. If detected, remove thoroughly.

Mounting

1. Fit new gaskets (pos. 5+6+7+8+9) in upper part, plus collar shoe.
2. Lubricate thread in upper part (pos. 3) and cylinder tube (pos. 1) with oil.
3. Fit upper part (pos. 3) on ram shaft.
4. Fit collar shoe (pos. 4) and screw on lock nut, **secure with Loctite**. Ensure that thread is absolutely clean and free of oil or other impurities before applying Loctite. **Do not fill with oil for 12 hours after use of Loctite.**
5. Lubricate outer collar shoe gasket in contact with cylinder tube and inside of cylinder tube with oil, push ram into centre position.
6. Fit upper part onto cylinder tube and tighten.
7. For fitting cylinder see "Replacing raise/lower cylinder".

Removal/fitting wheel

Before removing wheel, fully extend roller with rings resting on ground. Wheels will then be raised free of ground.

Remove wheel nuts. Remove wheel. Replace wheel, hand-tighten wheel nuts. Lower wheels to ground. Tighten wheel nuts to 300 Nm.



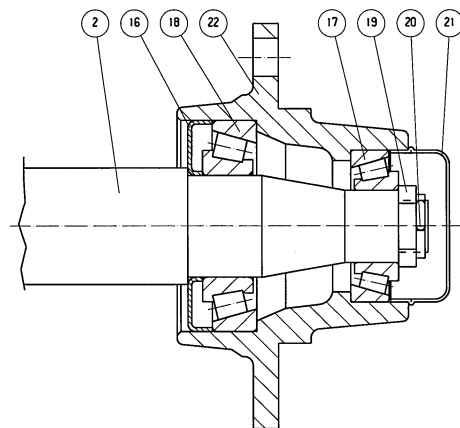
Ensure wheel nuts and wheel surfaces are clean to avoid nuts loosening.

Replacing wheel bearings

1. Remove hub caps pos. 21.
2. Remove split pin pos. 20.
3. Remove castle nut pos. 19.
4. Tap out axle pos. 2.
5. Remove bearings pos. 17+18
6. Remove seal ring pos. 16.

Fig. 22

FL55-6



Fitting

1. Fit bearing outer rings pos. 17+18 in hub housing pos. 22
2. Fit seal ring pos. 16
3. Fit bearing inner ring pos. 18 on axle pos. 2 and fit axle in hub housing
4. Fit bearing inner ring pos. 17 on axle pos. 2
5. Screw castle nut onto axle pos 2, whilst turning hub housing pos. 22. Tighten castle nut until hub housing revolves slowly. Slacken castle nut a quarter turn or until hub housing revolves easily.
6. Fit split pin pos. 20
7. Fill hub cap pos. 21 half full with ball bearing grease and fit to hub

Replacing rollers

Repairs must be performed with the roller connected to a tractor, resting on a level surface, fully extended with the rings resting on the ground. A crane is recommended for removal and replacement procedures.

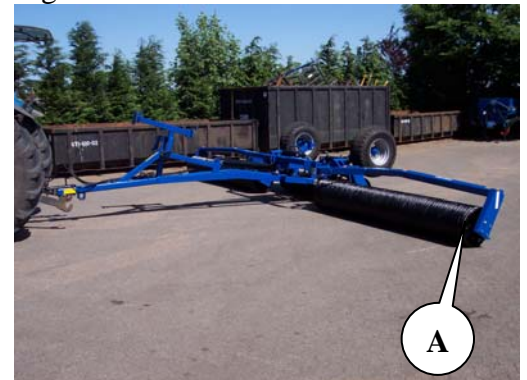


Replacing side section rollers

If no crane is available, remove both side section axles to prevent roller tipping over.

1. Slacken bolts (A)
2. Attach lifting gear to box section arm on side section. Tighten straps until bolts (A) are loose and can be removed.
3. Activate raise/lower cylinder, lift rollers from wheels
4. Rings can be rolled off roller.

Fig. 23



If there is no crane available, activate roller extend cylinder until bolts are loose and can be removed.

Fitting

1. Replace rings in a position corresponding to that when the roller is extended.
2. Extend roller, dropping carefully over rings.
3. Fit bolts (A)

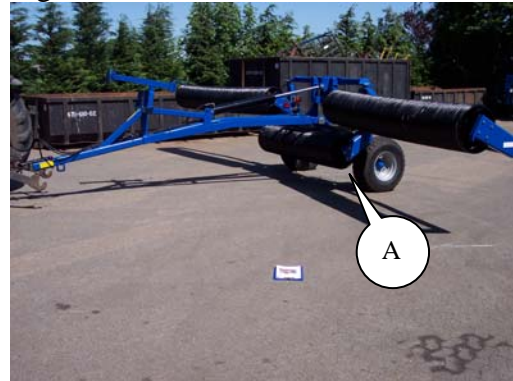


Ensure no personnel are within the machine's extension radius when activating hydraulics.

Replacing middle roller

1. Slacken bolts (A)
2. Activate raise/lower cylinder and lower roller until wheels and rollers are resting on ground and bolts are loose.
3. Remove bolts
4. Raise roller onto wheels.
5. Rings can be rolled off roller.
6. Reverse procedure for assembly

Fig. 24



Do not activate hydraulics if there are personnel within machine extension radius.

Scrapping



Fully extend roller. It is essential that **all** cylinders are removed.



Beware of the weight of any given part when removing or disassembling. All parts **must** be supported or lifted to avoid danger of falling.

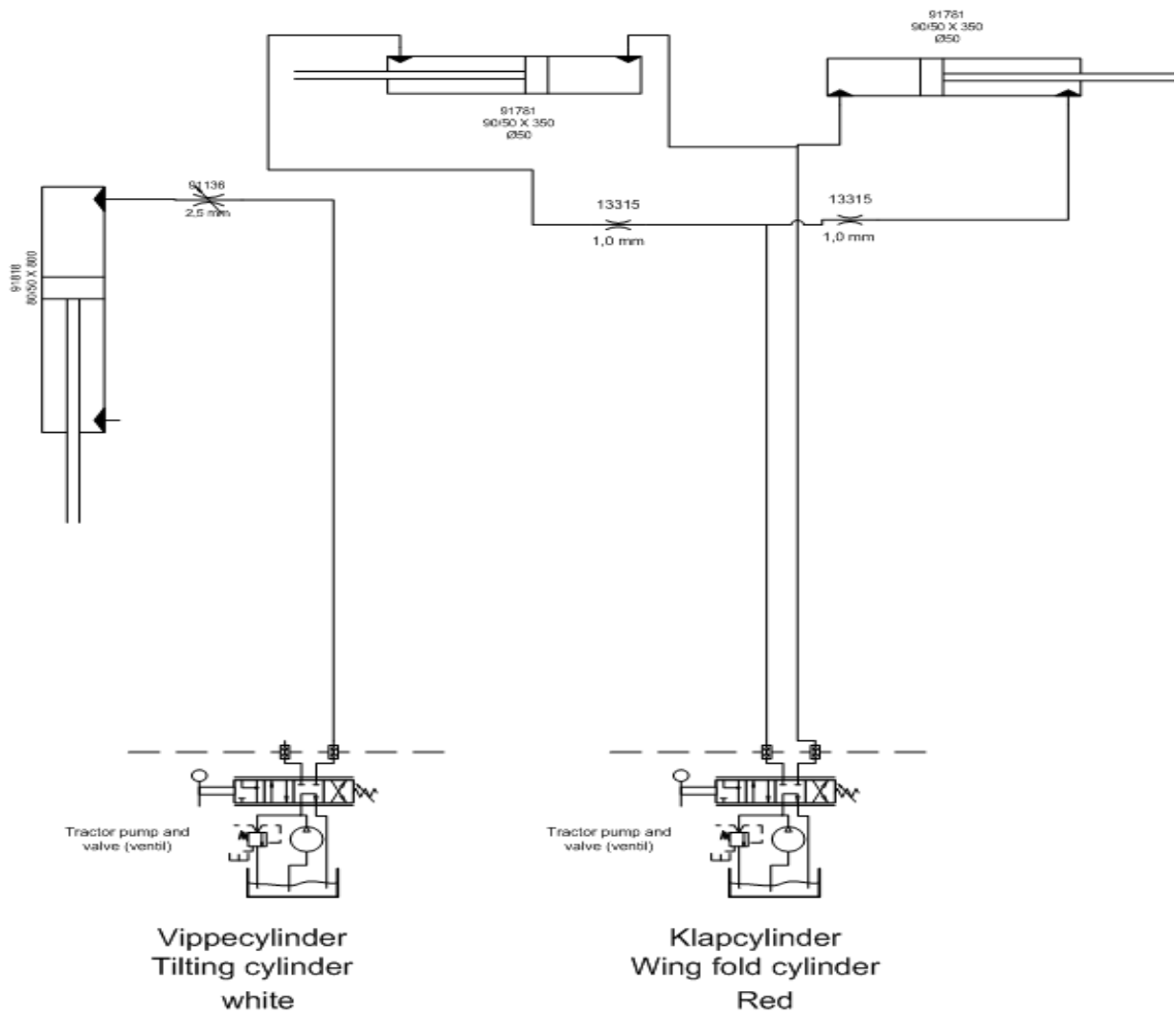
Disconnect hydraulic hoses and cylinders and drain oil. Collect oil in container to avoid pollution. Send oil and hoses for destruction.

All iron used in the machine can be recycled.

Hydraulic diagram

Fig. 25
Hydraulik diagram for

Minimax 2008 830



Spare parts

