

**DALBO®**

# POWERCHAIN 800



## **User instructions**

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Serial no.:	107023-xxxxxx

**MADE IN DENMARK**



# POWERCHAIN

Type 800 cm

Congratulations on your new disc harrow. For **safety reasons** and to achieve the best possible use out of your machine, you should read through the user instructions carefully **before use**.

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## Your disc harrow has:

Type no.: \_\_\_\_\_

Serial no.: \_\_\_\_\_

Month of manufacture: \_\_\_\_\_

Tare weight in kg: \_\_\_\_\_

When enquiring about spare parts or servicing, we kindly ask that you always provide the type number and serial number. At the back, you will find a list of spare parts, which helps give an overview of the individual parts.

## EU DECLARATION OF CONFORMITY

**DALBO A/S**  
**DK-7183 Randbøl**

hereby declares that the aforementioned machine is manufactured in accordance with the stipulations in Directive 2006/42/EC, which replaces Directive 98/37/EC and the amending Directives 91/368/EEC, 93/44/EEC, and 93/68/EEC on a mutual approach for member state legislation on machinery for health and safety requirements in connection with the construction and manufacture of machinery.



This machine complies with the requirements of the European safety guidelines.

DALBO A/S

Date: \_\_\_\_\_

Alessio Riulini, CEO

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## Introduction and identification of serial number

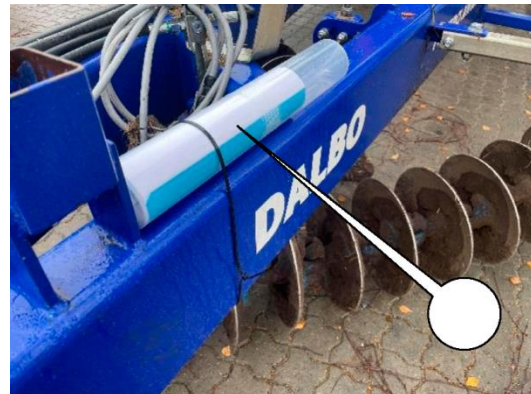
### Information

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

### Location of the user manual

The user manual can be found in a plastic case located on the machine's tow frame. Before starting up the disc harrow, remove the plastic case and store the user manual in a safe and accessible place for all users of the disc harrow.

Fig. 1



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## Location of the serial number

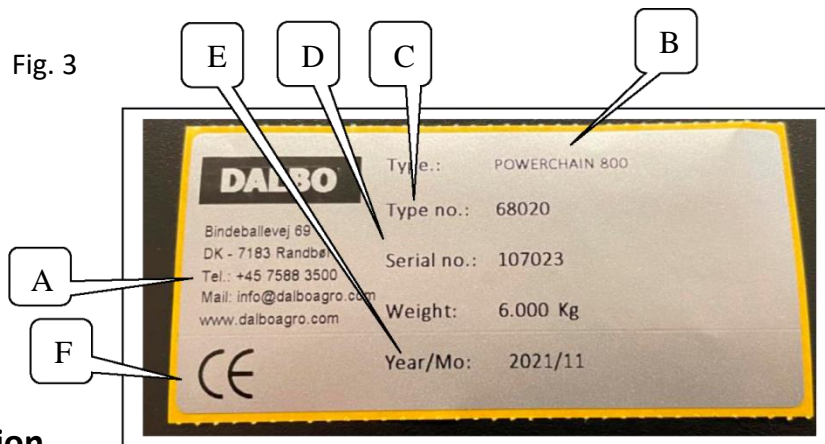
The data plate on the disc harrow is located centrally on the machine's drawbar. The data plate can either be placed as a self-adhesive foil (A), or as metal placed in the same area. The serial number of your machine can also be found on page 2 in the user manual.

Fig. 2



The disc harrow comes equipped with a data plate. A typical data plate is shown below which contains the following data:

- A: Name, manufacturer, and manufacturer's address.
- B: Machine model.
- C: Machine type.
- D: Serial number.
- E: Year of production.
- F: CE mark.



## Warranty provision

As standard, your disc harrow is delivered with a 2-year warranty from the date of delivery. DALBO A/S bears no liability for any damage caused by improper use of the disc harrow.

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## 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.
- The disc harrow must not be used for anything other than the cultivation of ordinary agricultural areas.
- The user manual must always be available if the need arises. Should it get damaged or go missing, it is important that a new one is obtained from DALBO A/S.
- Do not use the disc harrow if you are tired or unwell or in any other way affected by alcohol, drugs, or medication.
- The disc harrow should normally be used in daylight, but should the need arise to use the machine when it's dark, the tractor lights must be on.
- Check the disc harrow's functions thoroughly before starting the machine.
- During maintenance of the machine, appropriate personal protective equipment and safety gear must be used.
- The user of the disc harrow must not wear loose-fitting clothing that could become caught in the disc harrow.
- Dust can be generated from use of the disc harrow. Therefore, it is advisable to check the tractor's cabin filter regularly, or use some kind of dust mask while working.
- To avoid dangerous situations during use, it is important that the operator maintain a good line of sight. You must therefore ensure the tractor's mirrors are kept clean and intact.
- Keep the machine clean of foreign matter, including tools, waste, etc., so that no damage to the user or the disc harrow occurs.



- Avoid using the machine in muddy or loose soil.
- Any changes made to the disc harrow can result in problems with its safety. Should this happen anyway, the user shall be held accountable for an accident.
- 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 ensure that these stickers are intact.

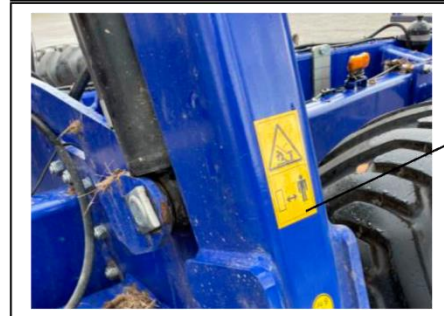
Fig. 4



Attach straps here if you are lifting the disc harrow using a crane or truck. 4 points.



Safety sign:  
**Remember to read the instruction manual.**



Safety sign:  
**The disc harrow swings out.**

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- Clean security labels daily.
- Replace security labels if they are damaged.
- If the part where the safety label is replaced, a new label must be fitted. Remove the white foil sticker from the label and stick the label onto the new part.
- New safety labels can be ordered from DALBO A/S

- There may be no passengers on the machine during work or transportation.
- When operating the disc harrow, ensure that there are no persons within the machine's radius of action. The machine may only be operated from inside the tractor.
- When the disc harrow is folded up, ensure that the side sections are pushed completely in. Likewise, this will secure the control levers against accidental operation.
- Before leaving the tractor or performing any adjustments, maintenance, or repairs to the disc harrow, unfold the machine and lower it onto the ground, or secure it in transport mode, put 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.

### Noise level

- With the exception of the impact of the machine with external objects, no other noise will exceed 80 dB(A).

## Hydraulics

- Before repair work on the hydraulics system, lower the machine to the ground, remove the pressure from the system, stop the engine, and remove the ignition key.
- Hydraulic connections must be cleaned thoroughly before connecting. When connecting the hydraulic hoses to the tractor's hydraulics, ensure that the pressure has been removed from the hydraulic system.
- For hydraulic systems with built-in pilot-controlled check valves, it can be difficult to release the pressure completely. 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, all air must be bled 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 flows out under high pressure can penetrate the skin and cause serious injuries. Seek professional medical assistance immediately in the event of any injury.
- Do not use discs or flexible hoses as handles, as these are movable parts that do not provide secure support.

## Mounting

- When mounting, there is a risk of crushing. There must be no persons between the implement and the tractor or between parts being connected.
- Do not use rings or flexible hoses as handles, these are moving parts that do not provide a secure support.

## Maintenance and repair

- During all repair and maintenance work, the machine must be properly supported or unfolded, the tractor and machine must have brakes properly activated, the engine stopped and the keys removed.
- Oil, grease and filters must be disposed of in accordance with current environmental regulations.

## POWERCHAIN

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- Tighten all screw connections after a few hours of use. All screw connections must be checked at regular intervals and tightened when necessary. Check split pins and bolts to avoid breakdowns. Gross negligence of this and any consequent damage is not covered by the warranty.

## Driving on roads

- When driving on public roads, all safety and warning devices required by law must be fitted and tested. The driver is responsible for proper lighting and markings in accordance with traffic laws. Damaged parts must be replaced before driving on public roads.
- With regard to the dimensions of the machinery, the driver must ensure with the traffic authorities 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 percent of the tractor's overall weight. If that is the case, use front weights on the tractor.
- Before starting of road transport from fields with muddy conditions, it is required that you clean the disc harrow and tractor's tyres of mud.
- The disc harrow must be in the transport position when driving on public roads.
- Max. 40 km/h when transported on roads.

## 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 disc harrow 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. Please contact the manufacturer if any doubts arise regarding the use of the disc harrow or the user manual.
- 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 additional weight may be mounted onto the disc harrow besides the original weight, which can be mounted on the disc chains as additional equipment.

Technical data

**POWERCHAIN**

Table 1. Technical data

Size [cm]	800
HP (maximum)	300
<b>Gross Weight [kg]:</b>	
Basic machine	5.590
Sections (pcs)	2
<b>Hydraulic requirements:</b>	
2 DV + 1 EV <sup>1</sup>	X
1 EV + free return for saw equipment	X
<b>Gross weight of extra equipment [kg]</b>	
Saw equipment	200
Additional weight (max.)	950
Brakes	50
Swivel support wheels	-
<b>Axle load [kg]</b>	0.84 x gross weight
<b>Support load [kg]</b>	0.16 x gross weight

<sup>1</sup> DV = dual action, EV = single action

## How to read the instruction manual

It may be that the order of the items described does not appear to be in logical order. Please refer to the table of contents, where the headings for the topics in question can be found.

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

- Safety
- Start-up and Driving
- Optional 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 disc harrow is delivered fully assembled via a extending trailer.

If the disc harrow is to be lifted, it is our recommendation to hitch with straps in the middle, so that the disc harrow can hang in a balanced position. (See page 8, section on "General safety")



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



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

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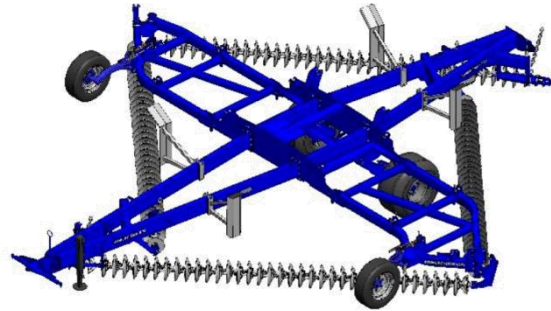
## Use

This is a standard disc harrow that has been designed to chop up, process, and smooth out the top layer of soil. The disc harrow is recommended for the establishment of false seedbeds after harvesting as well as the preparation of seedbeds for subsequent crops.

The disc harrow is equipped with 4 rows of chains in a diamond shape with discs mounted on them.

Fig. 5

The disc harrow has two parts, but due to its construction with discs mounted on chains, it is well-suited to following the contours of the field.



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Einbock seeders can be mounted on the disc harrow as additional equipment for the establishment of catch crops, for example. The seeds are spread out between the first and second row of discs for optimal soil contact and germination. If adequate tilling is not achieved in hard or dry conditions, up to 7.2 kg of additional weight can also be mounted per disc.

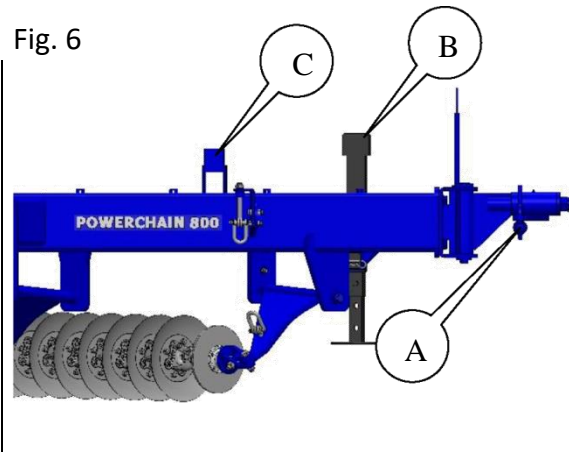


## Connecting and disconnecting

### Connecting

The disc harrow is connected to the tractor's lift arm, where the tow point (A) must be in the hook of the lift arm.

The lift arm balls are secured with a bolt and claw, after which the supporting leg (B) is raised and placed in the working position (C).



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



- Hydraulic hoses and lamp cords are fitted so that they are not damaged during operation.

### Hydraulics

As a standard, the disc harrow requires a double-acting and single-acting hydraulic outlet, in which the double-acting outlet extends to the wheel frame and hinge and the single-acting outlet works by tightening the disc chains. If seeders are mounted, an additional single-acting outlet with free return will also be needed.

Table 2. Hose labels

Cylinder name	Colour	Outlet	Function
Wheel frame	Yellow	Double-acting	Lift the disc harrow up on the wheels and downward into the working position.
Folding	Red	Double-acting	Folds the side-sections together/out.
Disc chains	White	Single-acting	Tighten the disc chains

### Disconnecting

The disc harrow must be folded together (in transport position). Disconnecting is done in the reverse order from connecting.



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

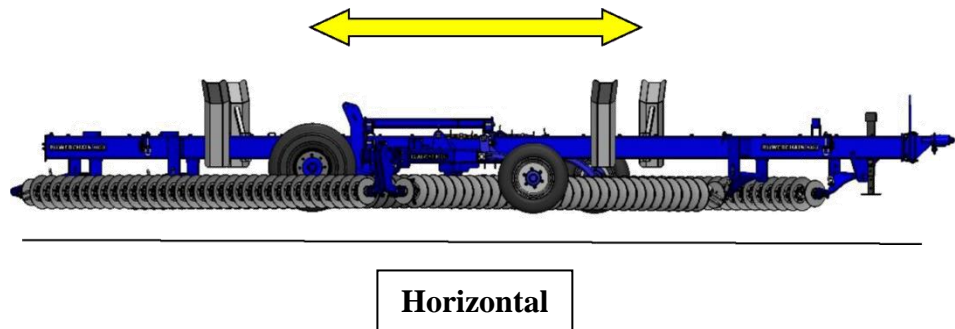
## Settings

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

### Adjusting the tow height of the lift arms

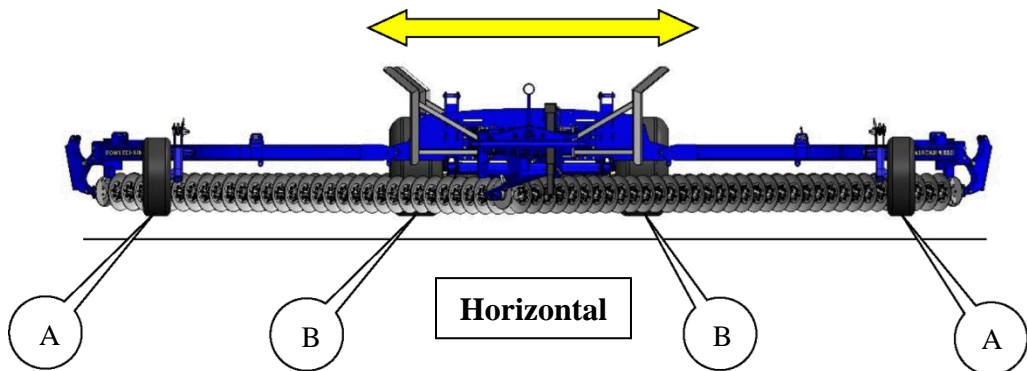
To achieve a uniform tilling of the field across the entire working width of the tool, the tractor's lifting arm must be set in such a way that the disc harrow's frame is in a horizontal position in the direction of travel when the discs are working in the ground.

Fig. 7



The same applies to the frames across the direction of travel, which similarly must be in a horizontal position when the discs are working in the ground.

Fig. 8



Horizontal setting across the direction of travel is achieved by adjusting the height at points (A) and (B) fig. 8 above. The height adjustment at the points (A) is made via spindles on the disc harrow's support wheels at the end of each side, and is set in such a way that the discs work at the end of each side to the desired depth. Then adjust the disc harrow's hydraulic wheel frame (B) so that the frames are horizontal across the direction of travel. All these settings must be based on the points of the wheel frame (B) being lowered completely down to the minimum cylinder length. You can always return to the desired working depth after the tilling of low-lying land, where it is recommended that you lift the machine up onto the transport wheels. If the discs are still not working at an equal depth across the entire working width, see the section "fine-tuning".

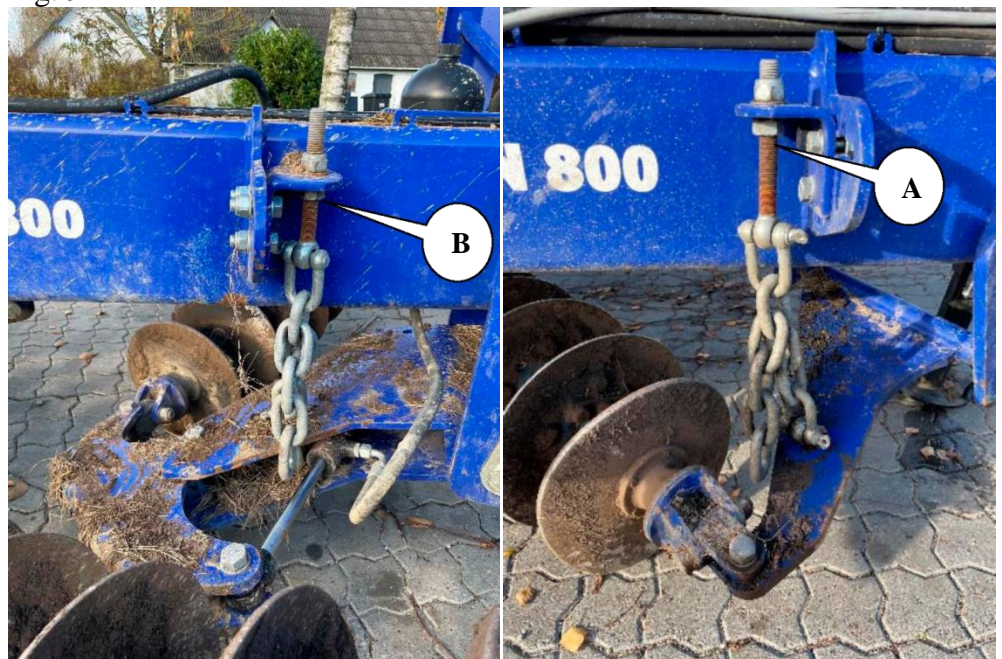


To ensure correct settings, it is important that the machine is on a **horizontal** surface when the setting is set.

### Fine-tuning

The disc harrow can be fine-tuned. At 2 points at the front and 2 points at the back, the disc harrow is hung in a chain link that can be finely adjusted using a threaded rod.

Fig. 9



Back

Front

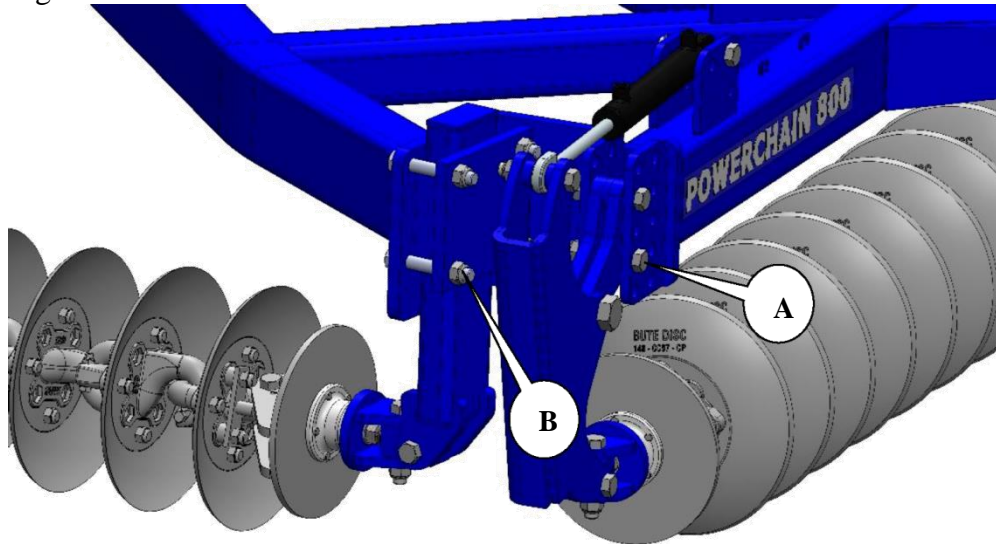
Fine-tuning is done to give as even a working image as possible behind the disc harrow at the transition between the two side sections. If there is a recess behind the centre of the disc harrow, then lower the threaded rods at the front (A) or raise the threaded rods at the back (B). And vice versa, if there is a

## POWERCHAIN

raised area behind the centre of the disc harrow then raise up the threaded rods at the front (A) or lower the threaded rods at the back (B). The setting depends upon soil type, planting depth, the moisture of the soil, and the forward speed.

There are also 2 points at the end of each side where fine adjustments can be made to the height of the disc chains. (A) refers to adjustment of the front chain, (B) refers to adjustment of the back chain.

Fig. 10

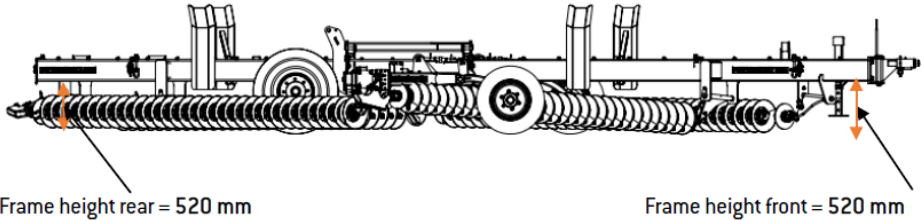
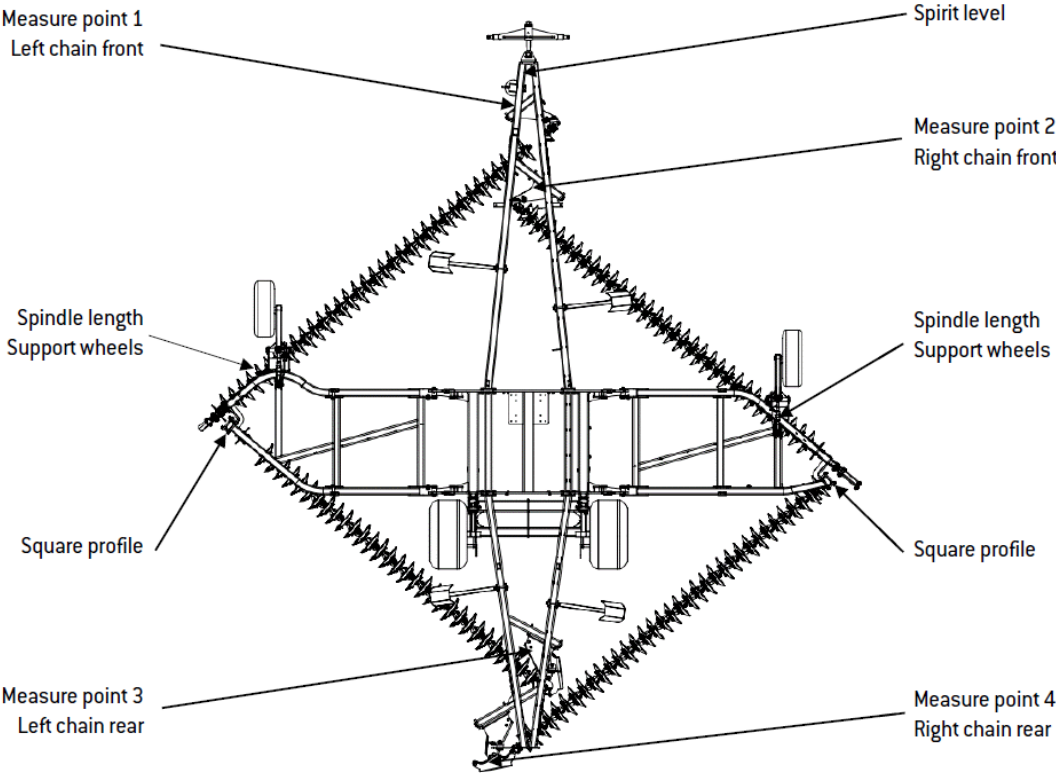


This adjustment option is intended for use once the disc harrow has started to become worn. When the disc harrow has become worn, the entire frame needs to be lowered further towards the ground to achieve the same level of tilling. This reduces the ground clearance between the lower edge of the frame and the surface of the ground, which results in an increased risk of plant residue building up underneath the machine. When adjusting the 2 points at the end of each side, it is important that corresponding adjustments up/down are carried out on the threaded rods at the front/back. This is to maintain the same fine-tuning of the working picture behind the centre of the machine.

Basic adjustments of machine

POWERCHAIN 800 – basic adjustments of machine

Overview of measuring points and their location.

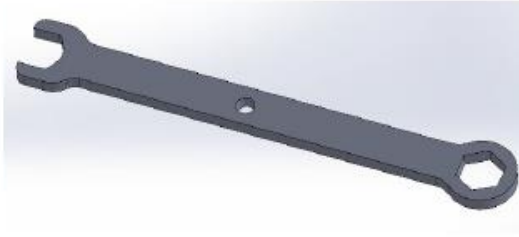


## POWERCHAIN

Tools:



Ruler or measuring tape



Ring fork wrenches: 2 x NV30 + 1 x NV60

Measure point 1 – left chain front 540 mm



Measure point 2 – right chain front 540 mm



Measure point 3 – left chain rear 440 mm



Measure point 4 – right chain rear 460 mm



Spindle length support wheels C-C = 505 mm



The length is equal in both sides.



**Spirit level**



When the tractor and harrow are standing on a horizontal area the spirit level can be used to adjust the harrow to a horizontal level.

**Square profile 65 mm**



The square profiles are adjusted equal in both sides.

## Driving and operation

Proper operation is important in order to get optimal performance from your disc harrow. 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.

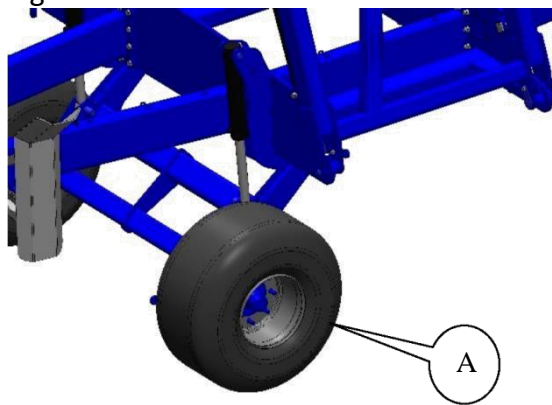
### Unfolding and folding

Unfolding and folding are conducted with the tractor parked

#### Unfolding

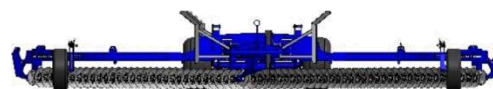
- 1 The machine is fully lifted onto the wheel frame (A) via the hydraulics (marked: Yellow).

Fig. 11



- 2 The cylinders for unfolding and folding (marked: Red) are activated and the side sections are completely folded. Then the float position is activated for "red" outlet.

Fig. 12



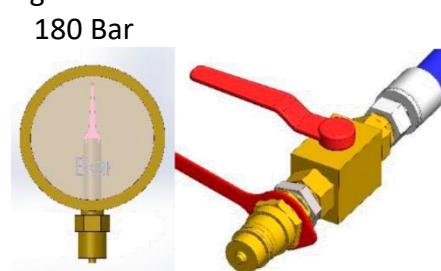
- 3 The disc chains will now hang loosely in the downward arcs, and must be tightened before starting work.

Fig. 13



- 4 With the tap open on the single-acting hose (marked: White), now raise the pressure to 180 Bar on the manometer, then close the tap. Then tighten up the chains and the disc harrow is ready for use.

Fig. 14



**Folding**

- 1 The machine is fully lifted onto the wheel frame (A) via the hydraulics (marked: Yellow).

Fig. 15

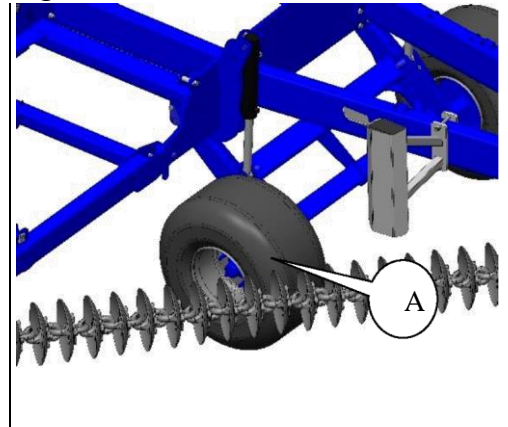
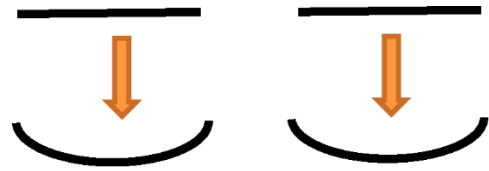
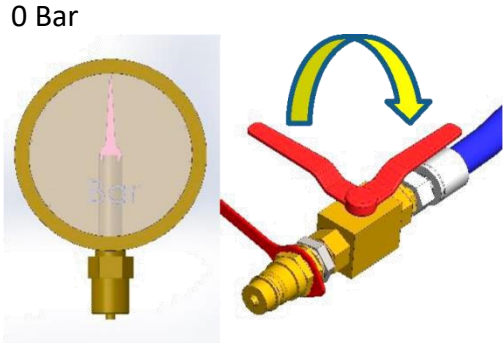


Fig. 16

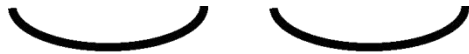
2 The disc chains are tight and must now be loosened so that they hang in downward arcs.



3 With the tap open on the single-acting hose (marked: White) now reduce the pressure down to 0 Bar on the manometer, then close the tap. Then loosen the chains.



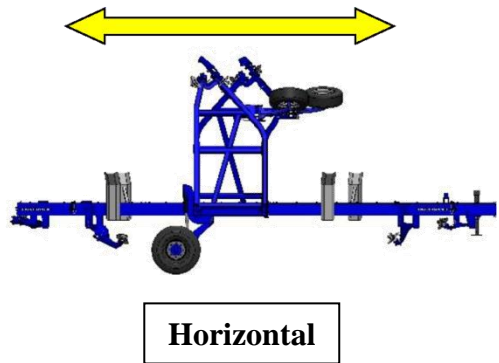
4 The disc chains are now hanging loose in downward arcs and the disc harrow is now prepared for folding.



5 The cylinders for unfolding and folding (marked: Red) are activated and the side sections are completely folded.



6 Adjust the height of the tractor's lift arm so that the disc harrow's frame is horizontal in the direction of travel before starting road transport.



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

### Driving speed

It is recommended that the machine is driven at 10-12 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 worn parts 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 table "Technical data".

### Tilling on low-lying land

When tilling on low-lying land, it is recommended that you raise the disc harrow free from the ground using the tractor's lift and the transport wheels on the harrow itself.

Table 3, **Guide for power requirements in HP**

Working width [cm]	800
Power [HP]	Max. 300

## Troubleshooting

Table 4:

Problem	Cause	Fixing
The sides are working the soil too deep	<ul style="list-style-type: none"> <li>The support wheels at the sides are set too high</li> </ul>	<ul style="list-style-type: none"> <li>Lower the support wheels</li> </ul>
	<ul style="list-style-type: none"> <li>The centre wheel frame needs to be raised</li> </ul>	<ul style="list-style-type: none"> <li>Raise the centre wheel frame</li> </ul>
The middle works too deep	<ul style="list-style-type: none"> <li>The support wheels at the sides are set too low</li> </ul>	<ul style="list-style-type: none"> <li>Raise the support wheels</li> </ul>
	<ul style="list-style-type: none"> <li>The centre wheel frame needs to be lowered</li> </ul>	<ul style="list-style-type: none"> <li>Lower the centre wheel frame</li> </ul>
The recess behind the disk harrow	<ul style="list-style-type: none"> <li>The disc harrow is not travelling in a horizontal direction. Tilts backward</li> </ul>	<ul style="list-style-type: none"> <li>Lower the tractor's lifting arm</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect adjustment of threaded rods at the front. See the section "fine-tuning" on p. 22</li> </ul>	<ul style="list-style-type: none"> <li>Lower the threaded rods at the front</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect adjustment of threaded rods at the back. See the section "fine-tuning" on p. 22</li> </ul>	<ul style="list-style-type: none"> <li>Raise the threaded rods at the back</li> </ul>
Raise behind the centre of the disc harrow	<ul style="list-style-type: none"> <li>The disc harrow is not travelling in a horizontal direction. Tilts forward</li> </ul>	<ul style="list-style-type: none"> <li>Raise the tractor's lifting arm</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect adjustment of threaded rods at the front. See the section "fine-tuning" on p. 22</li> </ul>	<ul style="list-style-type: none"> <li>Raise the threaded rods at the front</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect adjustment of</li> </ul>	<ul style="list-style-type: none"> <li>Lower the threaded rods at the back</li> </ul>

**POWERCHAIN**

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	threaded rods at the back. See the section "fine-tuning" on p. 22	
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## Optional equipment

It is possible to equip the POWERCHAIN with different types of extra equipment.

- Einböck seed drill
- Additional weight
- Air brakes
- Hydraulic brakes
- Swivel support wheels

### Einböck seed drill

The Einböck seed drill is designed for establishing combined and catch crops after harvesting as well as crops such as rapeseed and grass seeds. The diffuser plates distribute the seed evenly across the entire working area and places it between the first and second row of discs. This achieves the best possible ground contact for and germination of the seeds.

Fig. 17







By reducing the forward speed during sowing, the most uniform distribution of the sown seeds is achieved, as the row of discs at the very back does not toss as many seeds and soil to the sides.

**Hose labels**

Table 6. Marking hydraulic fan hoses

Cylinder name	Colour	Outlet	Function
Hydraulic fan	Black	Single-acting + free return	Provides air for sowing

**Setting, drive, and operation of the Einböck seed drill**

For driving and operating the Einböck seed drill, please see the separate user manual from Einböck. This also includes the correct setting of the hydraulic fan.

**Filling the Einböck seed drill**

Filling the seed drill must be done safely from the platform as shown below.  
Fig. 18



To obtain access to the platform (A), fold the machine out completely and lower it into the working position with the wheel frame before folding down the ladder (B).



Remember to fold up the ladder again once you have finished filling.



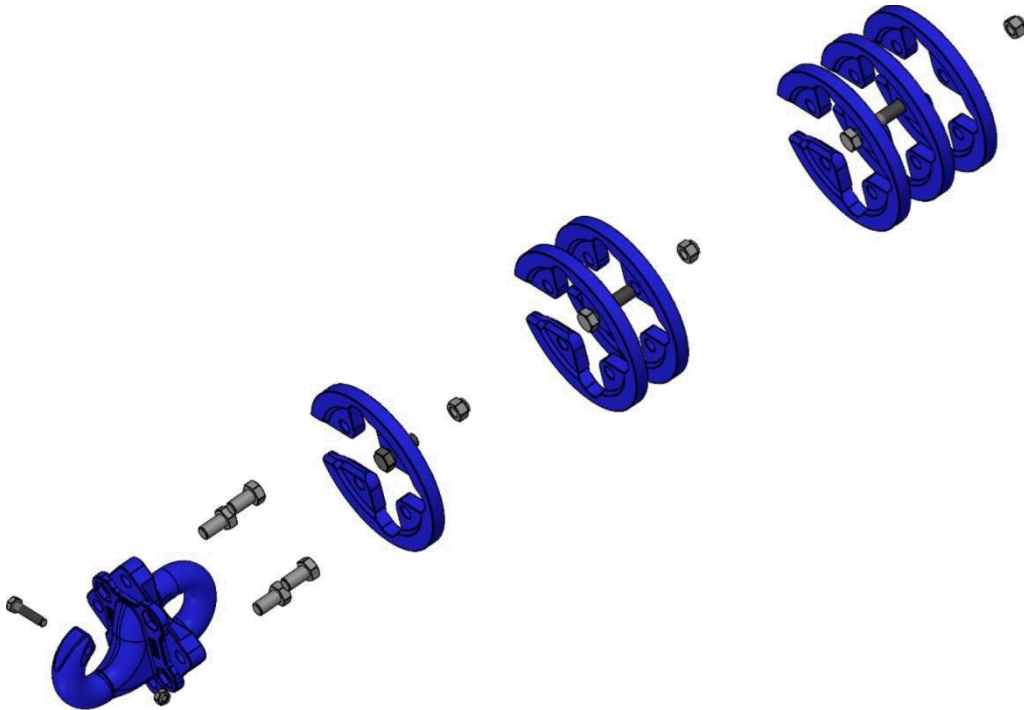
The platform must be freely accessible and must not be used to store seed.

## Additional weight on the discs

### Retro-fitting

For dry and extra-hard conditions, it can help to mount up to 3 weights of 2.4 kg per disc. This will increase the total weight of the disc harrow by up to 120 kg/metre working width. By mounting the weights, it will be easier for the discs to till the hard and dry soil at the desired working depth at the first attempt.

Fig. 19



See the spare parts book for item numbers of the weights with corresponding bolts.



It is important to mount all the weights correctly and with the right bolt length. This ensures the weights are not lost when working in the field or during transportation by road.

## Mounting of extra weight on discs

Tools:



Most nuts can be tightened with a ratchet wrench NV24.  
Some must be tightened with an open-end spanner NV24.

### 1 weight disc/plate unit

M16 x 40 bolts + M16 lock nut are used



### 2 weight discs/plate units

M16 x 60 bolts + M16 lock nut are used.



## POWERCHAIN

### 3 weight discs/plate units

M16 x 60 bolts + M16 lock nut are used.



In some cases, the nut by the locking bolt can only be tightened with an open-end wrench.

**In general:**

**Bolts must be fitted in all 4 holes, note that the nuts are on the same side as the weight plate and the bolt head fits in the 6 squared hole on the blue chain link.**

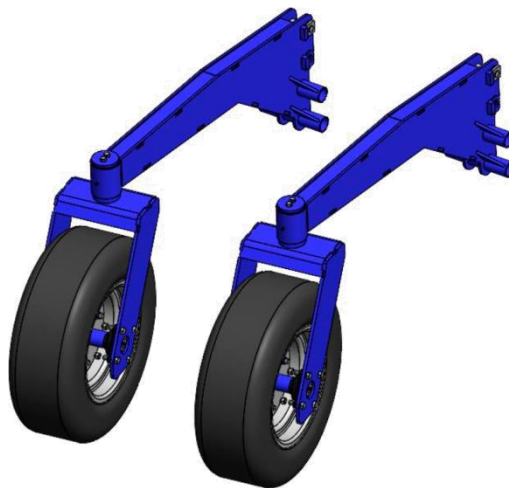
## Choice of brake system

When the machine's axle load exceeds 3.5 tonnes (see table 1), the disc harrow must be equipped with either a pneumatic or hydraulic fan. This legislation is applicable in all EU countries. The type of brake is selected based on the tractor that is used to drive the disc harrow and when ordering the disc harrow.

## Swivel support wheels

As an option, the machine can be equipped with swivel support wheels, which it is recommended that you add to the machine in cases where the user wishes to till low-lying land with the disc harrow in the soil. If you till low-lying land with the disc harrow in the soil while using standard mounted "non-swivel" support wheels, you may incur unnecessary wear on the support wheels' tyres or cracks on the frames.

Fig. 20



## Maintenance

Good maintenance ensures a long life for the disc harrow and therefore optimal use of the machine. Therefore, grease nipples are fitted in places where the wear is greatest.



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

## Lubrication

Table 7:

<p>E</p>	<p>F</p>

POWERCHAIN



G



H



I



J



K



L



M



N

## POWERCHAIN

	Lubrication points	Number of nipples	Lubrication interval hours	Images
	Lifting bar at the front	2	8	A
	Disc chain hanging at the front	2	8	B
	Swivel at side frames	4	8	C
	Support wheel sides, hanging	6	8	D
	Support wheel sides, hub	2	50	E
	Tightening cylinder for disc chain - front	4	8	F
	Cylinder for side frame - piston rod	4	8	G
	Cylinder for side frame - housing	4	8	H
	Tightening cylinder + hanger for disc chain - back	4	8	I
	Tightening cylinder for disc chain - back	2	8	J
	Cylinder for wheel frame - top	2	8	K
	Cylinder for wheel frame - bottom	2	8	L
	Wheel frame	2	8	M
	Wheel- wheel frame	2	50	N



All lubrication points should be greased at least once a year. It is also recommended that you spray protruding piston rods with oil once the disc harrow has been cleaned, washed, and long-term parked after the season.



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

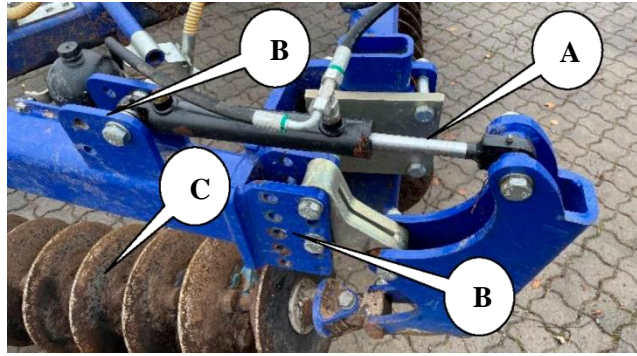
## Adjustment

### Adjusting disc chains

After the first season, there will be wear to both the discs and the disc chains. When the disc harrow is folded out and the disc chains tightened using the tightening cylinder, the manometer shows 180 Bar and the tap is turned off, a contraction of the cylinder will occur, as shown in the pictures fig. 21-22 (A) below.

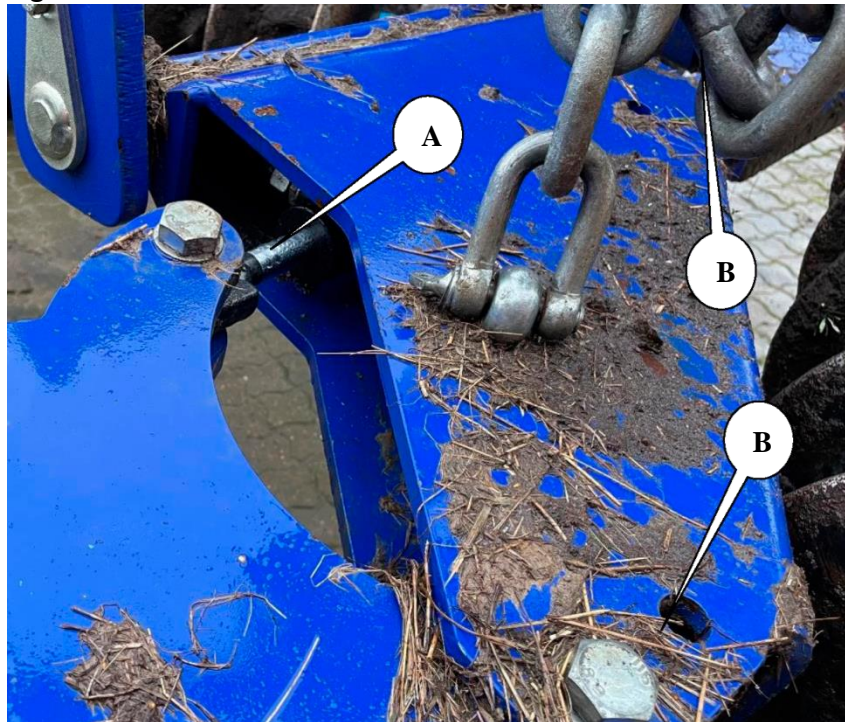


Fig. 21



Chain at the front

Fig. 22



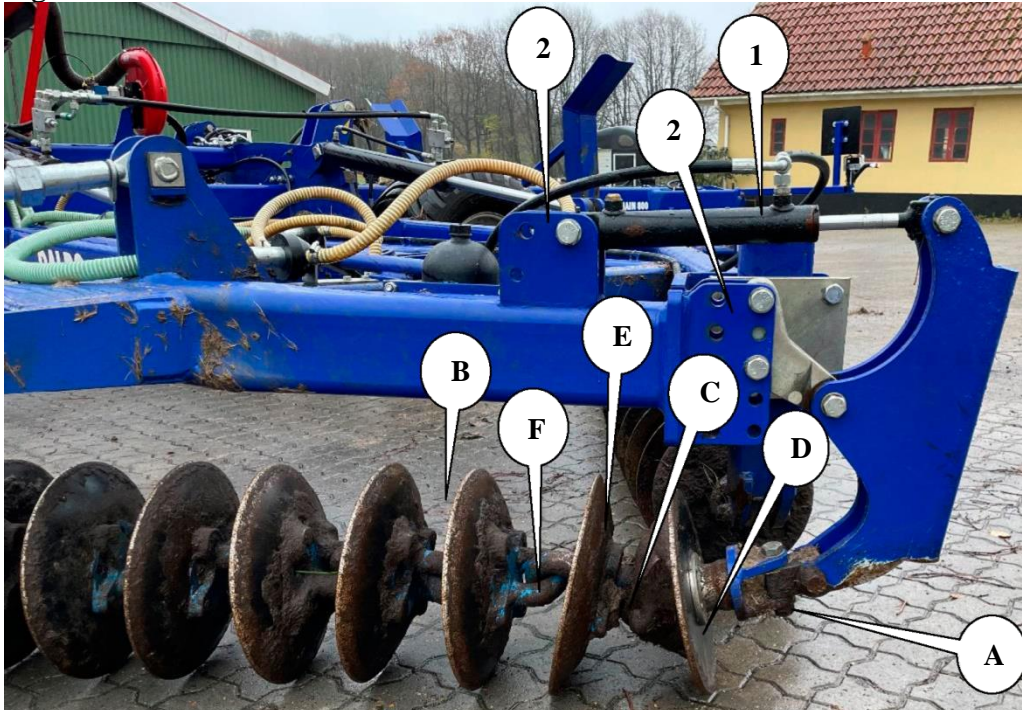
Chain at the back

As a general rule, there is no need to adjust or remove a chain link as long as some of the piston rod (A) fig. 20-21 is visible and 180 Bar is showing on the manometer. If, on the other hand, there is none of the piston rod (A) fig. 20-21 visible at 180 Bar of pressure, there is a need for sideways adjustment at the points (B) fig. 20-21, or alternatively the removal of an entire chain link with corresponding disc (C) fig. 20.

## Dismantling the chain link

Dismantling of disc chains and thus also individual chain links must be done to unfolded machinery, with all discs resting on the ground and 0 Bar on the manometer. Always carry this out at the end where the tightening cylinder (1) fig. 22 is mounted.

Fig. 23



Loosen the bolt (A) and roll the disc chain (B) to the side to make more room. Then dismantle the bolt (C) between the end disc (D) and the first link of the disc chain (E). Now the end disc (D) can be removed. The link in the disc chain (E) is then dismantled by first loosening the disc on the chain link itself and removing the small securing bolt (F). Then turn the chain link out of the chain.

Mounting with a smaller chain link in the row is now done in reverse order. When mounting of one fewer chain link in the row, lateral adjustment of the suspension in the points (2) may be required fig. 22.

### Wheels


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

#### Adjustments and lubrication of wheel bearings

1. Hub cap is removed.
2. The split pin 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 split pin is mounted.
5. The hub cap is filled  $\frac{3}{4}$  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.

	<p>When working in the field, it is recommended that the tyre pressure on the transport wheels 520/50-17 is decreased to 1.8 Bar, to prevent the disc harrow from starting to jump.</p>
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**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

**520/50-17 STARCO**

**Load/Speed/Pressure Schedule**

520/50-17 159B TL STARCO SG Flotation (FREE WHEEL)												
	1.0 Bar	1.3 Bar	1.6 Bar	1.9 Bar	2.2 Bar	2.5 Bar	2.8 Bar	3.1 Bar	3.3 Bar	3.5 Bar	3.8 Bar	4.0 Bar
10km/h	2895	3375	3810	4215	4595	4950	5290	5615	5825	6030	6325	6520
15km/h	2570	2995	3380	3735	4070	4385	4685	4975	5160	5340	5605	5775
20km/h	2430	2835	3200	3540	3855	4155	4440	4715	4890	5060	5310	5470
25km/h	2315	2700	3050	3370	3670	3955	4225	4485	4650	4815	5050	5205
30km/h	2175	2535	2860	3165	3450	3720	3975	4220	4375	4530	4755	4900
35km/h	2120	2470	2790	3085	3360	3620	3870	4105	4260	4410	4630	4770
40km/h	2065	2405	2715	3000	3270	3525	3765	3995	4145	4290	4500	4640
45km/h	2005	2335	2635	2915	3175	3420	3655	3880	4025	4165	4370	4505
50km/h	1945	2265	2555	2825	3080	3320	3550	3770	3910	4045	4245	4375

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## Hydraulics



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



For long-term parking, protruding piston rods should be lubricated with oil or pressure grease, thus avoiding rust on the piston rods. Remember to remove it again before use.

## Replacements and repairs



Safety is important in connection with **all** repair work on the disc harrow. Therefore, the following points must always be observed as well as the points under safety first in the instruction manual.



When replacing cylinders, the cylinder must always be filled with oil before it is subjected to load. 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 disc harrow 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 disc harrow unfolded and the side frames' transport wheels resting on the ground.

Fig. 24

1. The pressure is removed from the cylinders.
2. The hoses are removed.
3. Split pins and pins are removed, and then the cylinder is free.
4. The new or repaired cylinder is installed. Remember to secure the pin's engagement in the pin stop, and secure the pins with split pins.
5. Hoses are fitted. After mounting, ensure that there is no risk of tearing or clamping the hoses.



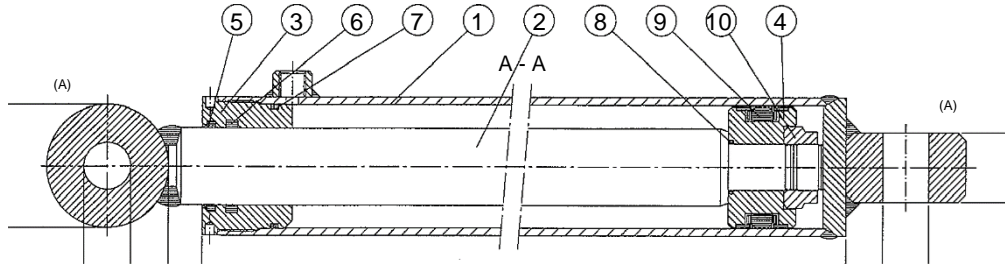
After mounting, the cylinders are activated for unfolding and folding until a small amount of movement can be felt in the cylinders. The cylinders are then activated in the opposite direction until the cylinders are back in the starting position. The cylinders are moved in this way a few times. Then lift the disc harrow onto the wheels and move the side sections all the way to the outer positions to vent the system.



Individuals must not be present within the action radius of the implement.

## Replacement of the gaskets

Fig. 25



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 upper cap (pos. 3) from the cylinder tube (pos. 1). A special tool must be used to remove the cap. If the upper cap is very tight, this can be remedied by a little heating of 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. Remove the gaskets in the upper cap (pos. 5+6+7+8+9) and the sleeve.
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.

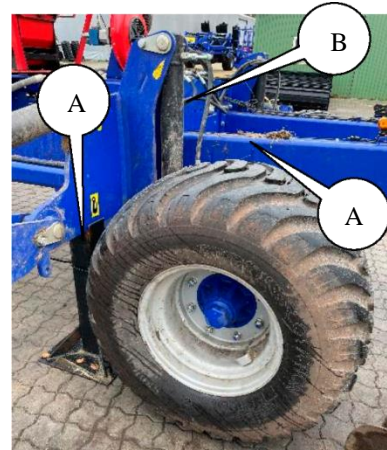
### Mounting

1. New gaskets (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 fitted 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 fitted on the cylinder tube and tightened.
7. To mount the cylinder, see "Changing of".

### Changing the wheel frame cylinder

The disc harrow is folded out and lowered down onto an appropriate support (A) on either side of the machine, as shown in fig. 24. The wheels are then lifted away from the supporting surface and re-lowered until they are resting on the ground. The pressure is taken off the tilting cylinder (B).

Fig. 26



1. The hoses are disconnected from the cylinder.
2. The cylinder is supported.
3. The split pins in the pins are disconnected while the pins are removed.
4. The cylinder can be removed.
5. New or repaired cylinders can be fitted.



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.



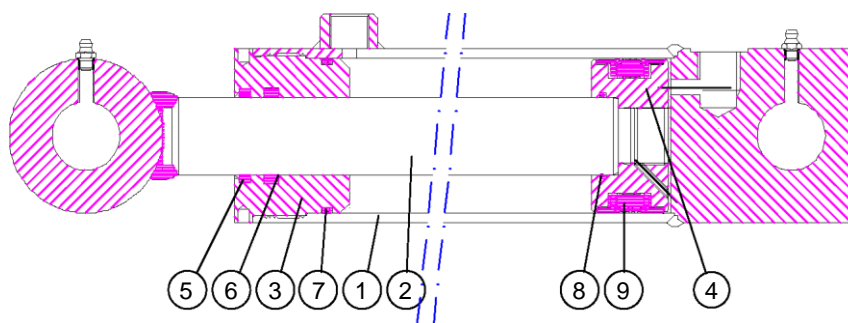
Individuals must not be present within the action radius of the implement.

### Replacing the set of gaskets in the wheel frame cylinder

#### 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 upper cap is very tight, this can be remedied by a little heating of 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 gaskets in the cap and sleeve (pos. 5+6+7+8+9), (use an awl 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. 27



#### MOUNTING:

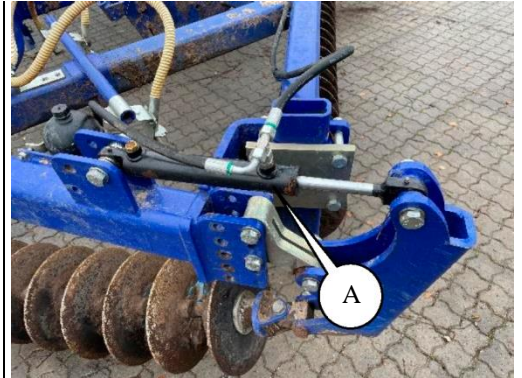
1. New gaskets are mounted in the cap and sleeve. The scraper ring, pos. 5, is mounted with the help of a piece of pipe that fits externally around the lip (or special mandrel). The cuff pos. 9 on the sleeve is mounted using a round bar/screwdriver.
2. The thread on the cap and cylinder tube are lubricated 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 cylinder for tightening the disc chain

Fig. 28

1. The disc harrow is folded out with the disc chains resting on the ground.
2. Check that the pressure has gone from the manometer so that the cylinder (A) is depressurised.
3. The hoses are disconnected from the cylinders.
4. Bolts, split pins and pins (B) are removed.
5. A new or repaired cylinder (A) is mounted.
6. Remember to install the split pins in the pins.



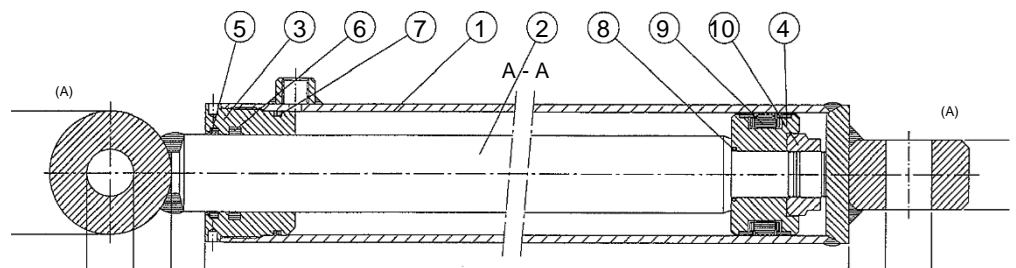
After mounting, the tilt cylinder is activated until a small amount of movement can be felt in the cylinder. The cylinder is then activated in the opposite direction until the cylinder is back at the starting position. The cylinder is moved in this way a few times, whereupon the cylinder is moved out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



Individuals must not be present within the action radius of the implement.

### Replacing the set of gaskets when tightening the disc chain

Fig. 29



8. The cylinder is emptied of oil by carefully moving the piston back and forth.
9. Move the piston to the middle position, then unscrew the upper cap (pos. 3) from the cylinder tube (pos. 1). A special tool must be used to remove the cap. If the upper cap is very tight, this can be remedied by a little heating of 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).
10. The lock nut (pos. 10) that is holding the sleeve (pos. 4) is disassembled.

11. The sleeve (pos. 4) is removed from the piston rod (pos. 2).
12. The cap (pos. 3) is pulled off the piston rod (pos. 2).
13. Remove the gaskets in the upper cap (pos. 5+6+7+8+9) and the sleeve.
14. 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

8. New gaskets (pos. 5+6+7+8+9) are fitted in the cap and sleeve.
9. The thread on the cap (pos. 3) and the cylinder tube (pos. 1) are lubricated with oil.
10. The cap (pos. 3) is mounted on the piston rod.
11. The sleeve (pos. 4) is fitted 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.**
12. 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.
13. The cap is fitted on the cylinder tube and tightened.
14. To mount the cylinder, see "Changing of".

### Removing/mounting wheels on the road

To remove wheels on the road, support the main frame of the disc harrow at point (A) fig. 28 using a trestle stand or jack, as shown in the pictures below. The wheel will thus be free of the ground.

Fig. 30



The wheel nuts are removed and the wheel can be replaced. After fitting 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 nut and bearing surfaces are clean, otherwise, the wheel nuts may loosen.

It is important that the lifting device can handle a minimum of 75% of the machine’s total weight. In addition, the machine must be properly braked and secured.

### Removing/mounting wheels in the field

To remove wheels, unfold the disc harrow with the disc chains resting on the ground. Then support the machine at the points (A) fig. 30, and the wheels will then be free from the ground.

Fig. 31



The wheel nuts are removed and the wheel can be replaced. After fitting 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 nut and bearing surfaces are clean, otherwise, the wheel nuts may loosen.



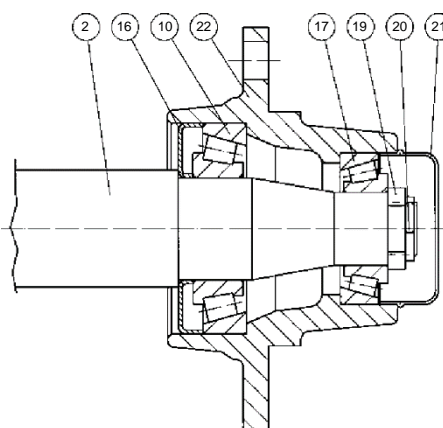
Re-tighten the wheels after 1-2 hours of use.

### Replacing the bearings

1. Remove hub cap pos. 21
2. Remove split pins pos. 20
3. Remove castellated nut pos. 19
4. You can now knock out axle pos. 2
5. Remove the bearings pos. 17 + 18
6. Remove the sealing ring pos. 16

Fig. 32

FL55-6



### Mounting

1. The outer rings from the bearings pos. 17+18 are mounted in hub casing pos. 22
2. Mount sealing ring pos. 16
3. The inner ring from the bearing pos. 18 is fitted on the shaft pos. 2 and the shaft is mounted in the hub casing
4. The inner ring from the bearing pos. 17 is fitted 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. Mount splitter pos. 20
7. The hub cap pos. 21 is filled halfway with ball bearing grease and the hub cap is fitted

## Disposal



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



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

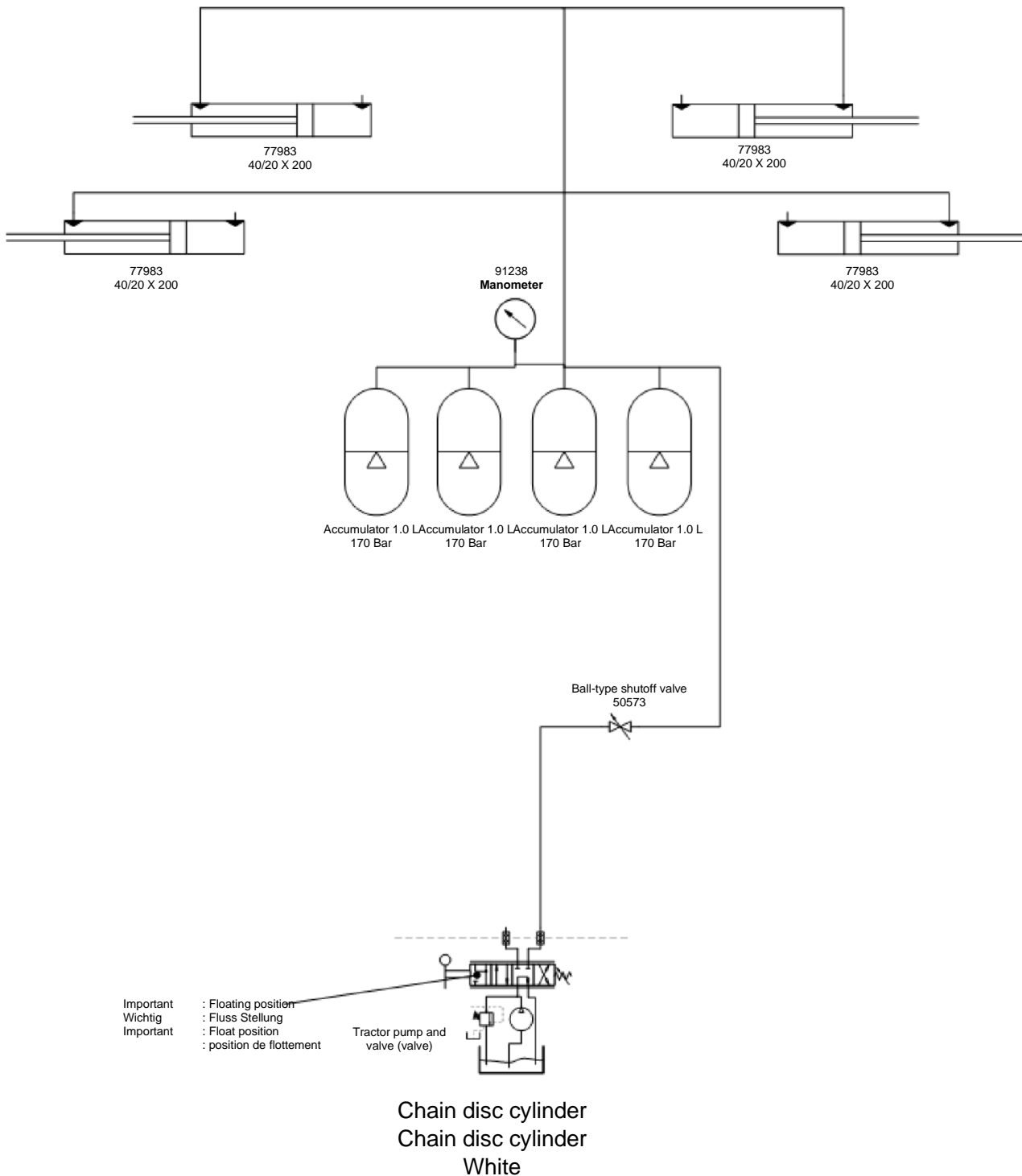
Hydraulic hoses and cylinders must be disconnected and any residual oil removed. The oil must be collected to avoid pollution. Oil and hoses must be sent for destruction.

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

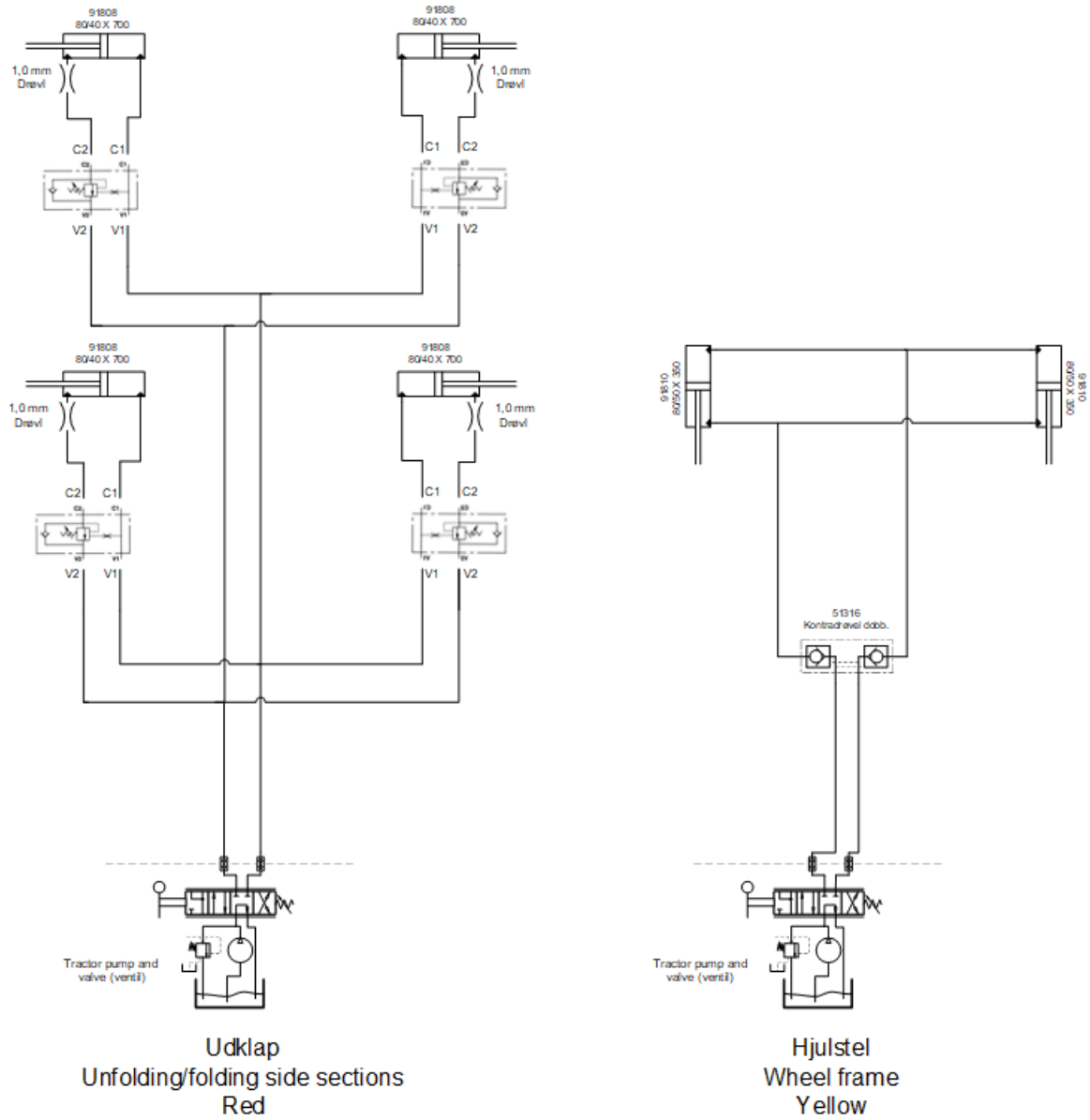
# Hydraulic diagram

Hydraulics diagram for

## POWERCHAIN 800



Hydraulics diagram for  
**POWERCHAIN 800**



Spare parts