

**DALBO®**

# FRONTFLEX



EN  
450/600  
Serial no.: 108422-xxxxxx

MADE IN **D**ENMARK



# FRONTFLEX

Type 450/600

Congratulations on your new FRONTFLEX. For **safety reasons** and to ensure the optimum utilisation of the machine, you should read this instruction manual **before commissioning**.

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## Your FRONTFLEX is equipped with:

Type no.: \_\_\_\_\_ Serial no.: \_\_\_\_\_  
Month of manufacture: \_\_\_\_\_ Tare weight in kg: \_\_\_\_\_

When enquiring about spare parts or service, always state the type- and serial number. There is a spare parts list on the back to make it easier to keep track of the individual parts.

## EU DECLARATION OF CONFORMITY

**DALBO A/S**  
**DK-7183 Randbøl**  
**+45 75 88 35 00**

hereby declares that the above machines have been manufactured in accordance with the provisions of 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 the harmonisation of the laws of the Member States relating to the design and manufacture of machinery.



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

DALBO A/S

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

Alessio Riulini, CEO

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## Safety



Before starting and using the machine on the tractor, the dealer must set the hydraulic valves for the transport lock.

The indicative setting is shown on page 26 but it may vary for each tractor.



You will find this symbol throughout these operating instructions wherever you are being advised on your safety, the safety of other users or the functional safety of the machine. Pay attention to all safety instructions and make these available to all users of the machine.

### General

- Before starting work, the user must be familiar with all arrangements and subassemblies of the machine.
- Safety signage has been attached to the machine containing important instructions for your safety and that of others, as well as for the correct use of the machine.
- There must be no passengers present during work or transport.
- When operating the FRONTFLEX, ensure that there are no people within the operating radius of the machine. Operate the machine from inside the tractor unit only.
- Before loading the tractor unit or if adjustments, maintenance or repair work is to be carried out on the FRONTFLEX, unfold the machine and lower it to the ground. Alternatively, if it is fixed in the transport position, apply the tractor unit brakes, switch off the engine and remove the ignition terminals so that the machine is completely secured against accidental activation.
- The driver must not leave the driver's seat while the machine is in motion.
- Always adapt the driving speed to the driving conditions.
- Only use the machine after all safety devices have been fitted. Replace defective safety devices immediately.

### Hydraulics

- Lower the machine to the ground before carrying out repair work on the hydraulic system. Depressurise the system, switch off the engine and remove the ignition key.

- Hydraulic connections must be carefully cleaned before connecting. When connecting the hydraulic hoses to the tractor unit's hydraulic system, ensure that the hydraulic pressure is released.
- After repair work, bleed the hydraulic system thoroughly.
- Check hydraulic hoses regularly for defects such as cracks, slits, wear and tear or breakage. Replace defective hoses immediately.
- Avoid oil splashes and oil spillages on the ground. If this happens, clean up the splash/spillage and dispose of it.
- Clean your hands thoroughly after the skin has come into contact with any oil or grease. Changed any oil-soaked clothing immediately as it is harmful to the skin.
- Hydraulic oil escaping under high pressure can penetrate the skin and cause serious injuries. Consult a doctor immediately in the event of injuries.

## Assembly

- There is a risk of crushing during installation. No persons must stand between the apparatus and the tractor unit or between components that are coupled together.

## Maintenance and repairs

- Support the machine must well or fold the machine out for all repair and maintenance work. Apply the tractor unit and machine brakes safely, switch off the engine and remove the key.
- Tighten all screw connections after the machine has been in operation for a few hours. Check all screw connections regularly and tighten them as required. Check split pin rings and bolts to prevent accidents.
- Dispose of any oil and grease in accordance with the applicable environmental regulations.

## Road transport

- When driving on public roads, all legally prescribed safety and warning devices must be installed and approved. The driver is responsible for proper lighting and labelling in accordance with the applicable road traffic law.
- With regard to the destination of the machine, the driver must check with the transport authorities that it may be transported on public roads.
- When transporting the machine, you must ensure that you do not exceed the maximum weight and axle load of the tractor unit and that the load on the front axle of the tractor unit is not less than 20% of the unladen weight of the tractor unit.

## Correct use

- Correct use of the machine includes compliance with the manufacturer's operating-, maintenance- and repair instructions, as well as the exclusive use of original spare parts.
- The FRONTFLEX may only be used, maintained and repaired by people who are familiar with the machine and who are aware of the potential hazards.
- The manufacturer is not liable for damage caused by modifications made to the machine without the manufacturer's prior authorisation. Furthermore, the manufacturer is not liable for damage caused by improper use. The user bears sole responsibility for this.
- No additional weight is to be attached to the FRONTFLEX.



## Technical Data

FRONTFLEX	450	600	
Working width (cm)	450	600	
HP (min. recommended)	50–100	50–100	
Parts (sections, pcs.)	3	3	
<b>Weight in kg:</b>			
	2,000	2,300	
<b>Requirements for the hydraulics:</b>			
Double-acting	2	2	
Single-acting			
Unpressurised return line			
<b>Transport:</b>			
Width (metres)	2.85	2.85	
Height (metres)	2.4	3.1	
Length (metres)	1.25	1.25	



## How to Read the Manual

It may be the case that the order of the elements described does not appear to be logical. Please, therefore, refer to the Table of Contents, in which headings for the relevant topics can be found.

The manual is divided into five main sections:

- Safety
- Commissioning and operation
- Additional equipment
- Maintenance
- Repairs

The following symbols are used in the manual for the following:

	Points that are particularly important for the functionality and durability of the machine.
	Points that have an impact on safety.

### Delivery

The FRONTFLEX is supplied complete on a block trailer.

If the FRONTFLEX is to be lifted, it is recommended that the straps are attached to the main frame and the front suspension so that the machine is balanced.

## Description of the Machine

The FRONTFLEX 450/600 is a machine that is mounted on the front lifting unit and is particularly suitable for use in combination with a seed set.

The FRONTFLEX is a roller up to 600 cm, equipped with Cross Combi Light rings. It can be extended hydraulically and has a valve lock.

The Cross Combi Light rings are ideal for seed preparation, as they have a 'crumbling' effect on tubers and are well suited for compacting the soil.

Fig. 1



FRONTFLEX 600

The FRONTFLEX is designed to be pulled over the surface despite front mounting. This is only possible if the apparatus is specially suspended, which also allows minor steering corrections to be made during work without having to lift the apparatus.

The recommended driving speed depends on the conditions but speeds of 7 to 10 km/h are recommended.



The machine has an extremely robust design to withstand high loads. However, it is always necessary to adapt the travelling speed to the conditions, namely, to reduce the travel speed if the area is uneven or contains a lot of large stones, for example.

## Coupling and Uncoupling

The front suspension is manufactured in accordance with ISO 730-1 category II/III. If the front lift of the tractor unit is not prepared accordingly, contact your dealer. The arms of the front lifter must not be able to move sideways.

### Coupling

First of all, fit the lifting arms with the lifting pins, then, fit the top rod. Adjust the upper bar so that the main frame is horizontal and, hence, parallel to the base. Raise the machine so that the support legs (B) Fig. 2-3 no longer touch the ground. Then, bring the machine into the working position.

#### Angle of the lifting arms

The lifting arms of the tractor unit (A), Fig. 2, with the machine lowered into the working position, preferably should have an angle that is a few degrees above the horizontal in the direction of travel or at least equal to the horizontal. With the front lift arms pointing a few degrees into the air, the machine can be rolled over a potential obstacle more easily, as the tractor unit pushes the machine upwards at an angle while maintaining the steering. (It can make steering even easier if the upper bar is shortened slightly so that the main frame points upwards a few degrees at the front)

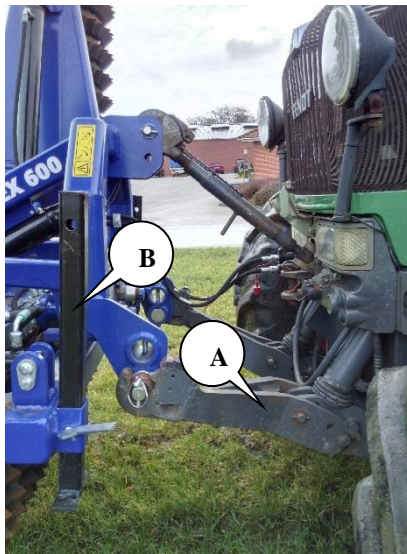


Fig. 2



Fig. 3



Always secure the pull lever with balls and a split pin ring.

## Hydraulics

The FRONTFLEX 450/600 requires a double-acting hydraulic outlet as standard

Labelling the hoses

Cylinder designation	Col-our	Outlet	Function
Folding and lifting into the transport position	Red	Double-acting	Lifts the side frames up/down.

## Uncoupling

Carry out uncoupling using the coupling sequence in reverse. **Remember to depressurise the cylinders before disconnecting the hydraulic hoses.**

It is important to connect the FRONTFLEX with rear (A), Fig. 4 and front (B) Fig. 4 support legs, as these prevent the machine from tipping over.

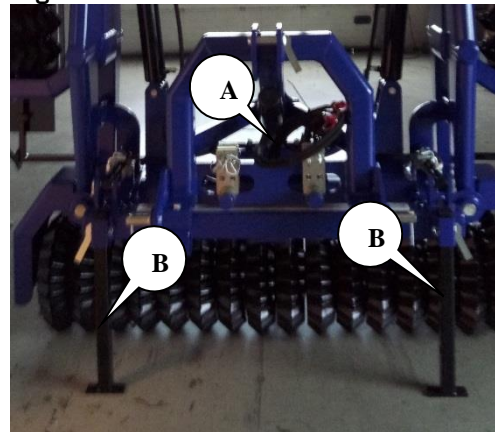
## Lifting the machine

If the machine is moved other than in the three-point suspension, it is recommended that it is secured to the main frame with straps and suspended in such a way that it hangs in a balanced manner.

When uncoupling the tractor unit, you must fold up the machine and lower it onto a firm surface.

Then, remove the hydraulic hoses and uncouple the machine from the tractor unit.

Fig. 4



Check the hydraulic hoses for possible crushing



Remember to depressurise the connection hoses of the hydraulic system before disconnecting the hoses.



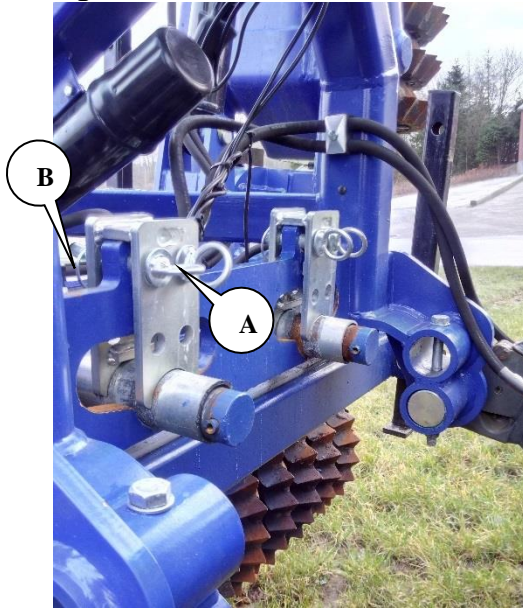
Always uncouple the machine must on a level and firm surface to ensure the best possible stability.

## Mechanical transport lock

The hydraulic models must be secured with a transport lock during transport. This prevents the centre section and the side sections from swaying from side to side.

The transport lock must be secured with a split pin (A), Fig. 5 and a split pin ring (B), Fig. 5.

Fig. 5



### Actuating the transport lock

Remove the transport lock before use on site. This is done by following the assembly sequence in reverse. Then, position it as shown (A) in Fig. 6.



Fig. 6

## Adjustment of the side and centre sections

On the FRONTFLEX, adjust the side sections with the screws (A), Fig. 7 so that the side sections and the centre section correspond/are parallel to each other (there is an adjustment screw on each side of the centre section).

This ensures a standardised work approach on site.



Fig. 7



It is important to ensure that the side section and centre section are horizontal/parallel.



The distance between the end panels of the centre section and the side section is approx. 65 cm.

## Hydraulics

Mount the pressure relief valve and the changeover valve in such a way that they exert optimum pressure on the sides of the centre section and do not stress the bearing.



## Driving and Operation

The FRONTFLEX 450/600 is designed so that the centre of gravity of the apparatus is close to the tractor unit. This reduces the load on the tractor unit and makes driving with the machine easier.

The machine is pulled across the field even though it is suspended from the front lift and, therefore, runs easily over smaller obstacles. Fix the centre section at three points (A, B), Fig. 8-9, whereby the traction is transmitted from the tractor unit via point (B) – the only fixed point. This ensures that the steering characteristics of the tractor unit are maintained. This is extremely important if the FRONTFLEX is to be integrated into a seedbed combination.

Fig. 8

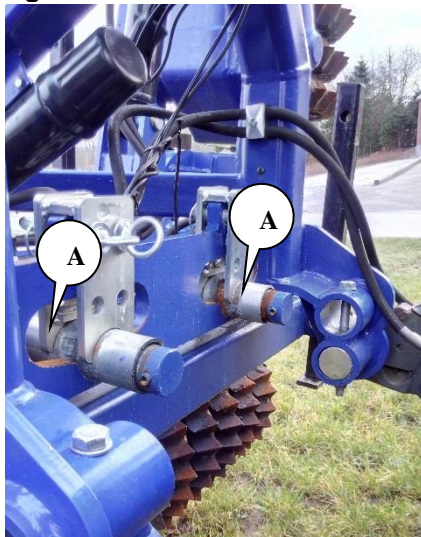
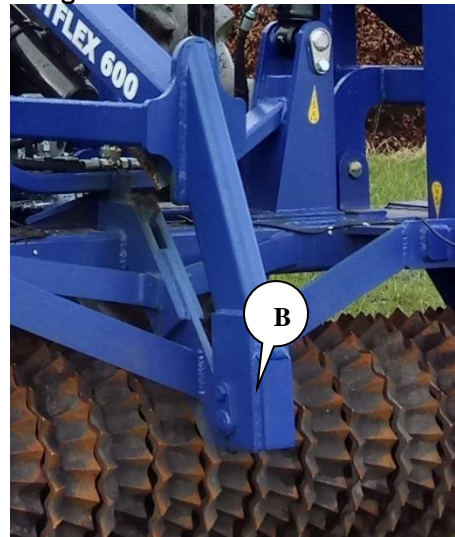




Fig. 9



On arrival at the workplace, release the mechanical transport lock; see page 16, Fig. 5-6. Then, activate the hydraulic system.

At the start of the work task, **lower the FRONTFLEX and lift it into the suspended position** so that the machine and the tractor unit can work independently of each other.

The FRONTFLEX must be lifted off the ground when turning and reversing.

	<p>Before folding and unfolding, make sure that no persons are in the vicinity of the machine.</p>
	<p>The lifting device must be placed in the floating position so that the machine and tractor unit can work independently of each other.</p>

## Folding

After the work task is complete, fold up the side panels.

Engage the mechanical transport lock; see page 16, Fig. 5-6. The machine may now be lifted off the ground and is ready for transport.



When travelling with the machine in the transport position, it is important that both the hydraulic and mechanical transport locks are activated.

## Travelling speed

The recommended driving speed depends on the conditions but speeds of 7 to 10 km/h are recommended.

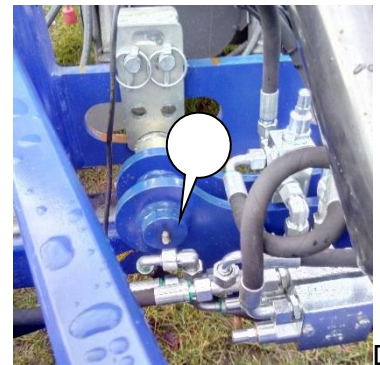
## Maintenance

Good maintenance ensures a long service life for the FRONTFLEX 450/600 and, hence, optimum utilisation of the machine. Grease nipples are thus fitted at points where wear and tear is greatest.

### Lubrication

It is important to lubricate the machine at the specified intervals to prevent unnecessary wear and tear on moving parts.

The lubrication points are shown on the following page.



Lubrication points	Number of grease nipples	Lubrication interval in hours	Illustration
Cylinder – Mounting on side panel	2	8	A
Cylinder – Mounting on the centre section	2	8	B
Roller axle – Lubrication of the roller tube	2	8	D
Bushing – Lubrication of side and centre sections	2	8	C
Bearings	6	50	E

Lubricate the bearings on the rings for every 50 hours of operation. Avoid lubricating too frequently, as this can destroy the seals.

The front suspension slides best on the nylon rail if it is clean and oil-free. Therefore, do not lubricate the nylon rail (A), as per Fig. 10. This will only increase wear and tear, as well as the accumulation of dust.



Fig. 10



Lubricate all lubrication points at least once a year.



Retighten all screw connections after the first working day. Check split pin rings and bolts to prevent accidents. This also ensures that the hydraulic system is tight.

## Hydraulics



Check all hydraulic hoses for wear and tear or breakage. Ensure that the hoses are not crushed.



In the event of a longer shutdown period, lubricate the protruding piston rods with oil or pressure-lubricating grease to prevent rust from forming on the piston rods. Remember to remove the lubricant before restarting.

## Replacement and Repairs



Safety is an important aspect of **all** repair work on the FRONTFLEX. Therefore, the following points and the points under 'Safety takes priority' must always be observed in the manual.



Maintenance and repair work on the FRONTFLEX may only be carried out when the machine is lowered to the ground or when it is fixed in the transport position. You must apply the tractor unit brake, switch off the engine and remove the ignition key so that the machine is secured against accidental activation.



When replacing bearings, axles and rings, the main frame must be firmly and securely supported. However, we recommend that the FRONTFLEX is fixed in the tractor unit's three-point linkage, with the FRONTFLEX lowered to the ground. When repairing the side panels, they must be lowered and rest on the ground.

### Removing the roller axles

Carry out the repair on level ground, with the FRONTFLEX coupled to a tractor unit or alternatively folded out while the roller rings rest on the ground. It can be helpful to have a crane, supports and straps on hand for both removal and installation.

Remember to support the parts if necessary to prevent the machine from tipping over.

1. Loosen the screws (A), as per Fig. 11.
2. Remove the nuts and bolts.
3. Lift the machine.
4. The axle with rings and bearings can be moved away from the machine.

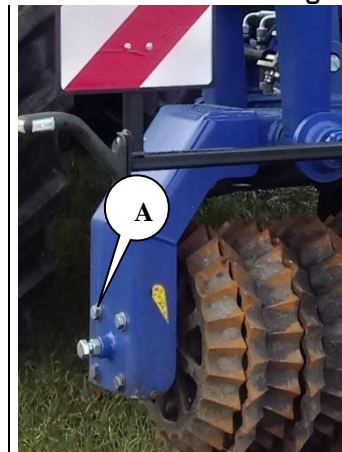


Fig. 11

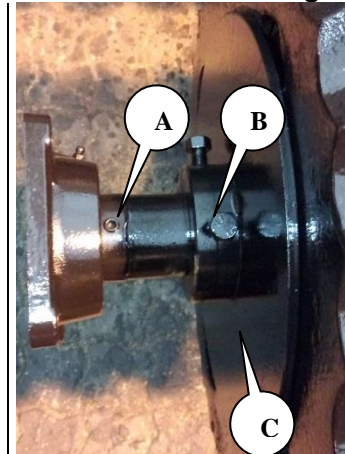
### Installation of the roller axles

1. Position the axle with rings and bearings so that the machine with rings and bearings can be lowered over the axle.
2. Attach the screws.
3. Tighten the screws and nuts.

### Replacing the axles, bearings or roller rings

Fig. 12

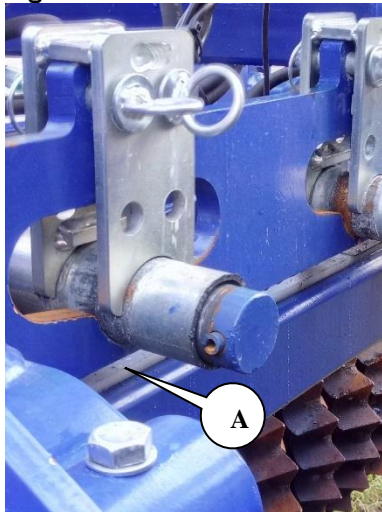
1. Loosen the pinol screws in the bearing.
2. Pull the bearing (A) from the axle, as per Fig. 12.
3. Loosen the screws in the stop rings.
4. Pull off the stop ring (B), as per Fig. 12.
5. Remove disc (C), as per Fig. 12.
6. The roller rings can now be removed.
7. Carry out the installation in reverse order.
8. Remember to secure the pinol screws in the bearing with LocTite.



## Replacing the nylon rail

1. Lift the machine in the front suspension with the three-point linkage of the tractor unit and support the front suspension so that there is no risk of crushing.
2. Remove the Taptite screws (self-tapping screws) from the nylon rail (A), as per Fig. 13.
3. Remove the nylon rail and fit a new rail.

Fig. 13



Pay special attention to safety during all repair work on the hydraulics. Depressurise the hydraulic system before starting work. Where necessary, support the parts.



Following repair work on the hydraulic system, the system must always be bled before commissioning in order to avoid any accidents or injuries.

## Hydraulics

## Replacing the cylinder for folding

Carry out the repair with the FRONTFLEX lowered and the side section turned downwards so that the entire machine is resting on the ground. Remember to depressurise the hydraulic system before disconnecting the hydraulic hoses.

1. Loosen and remove the hoses. (If necessary, collect the oil in a tray to prevent contamination of the machine and surfaces)
2. Remove the split pins, screws and nuts from the side panel (A), as per Fig. 14.
3. Raise the cylinder to the horizontal position.
4. Remove the split pins, screws and nuts from the centre section (B), as per Fig. 15.
5. The cylinder is free and can now be removed.
6. Install the new/repaired cylinder in the reverse order.
7. Attach the hoses.
8. After installation, activate the cylinder and move it up and down a few times to remove any air from the system.



Fig. 14



Fig. 15



## Scrapping

Position the machine on a flat surface and fold out the side panels.

Depressurise the cylinders and disconnect the tractor unit.

Fasten the belts to the front suspension and the centre section and hold taut with a crane.

Uncouple the machine from the three-point linkage on the tractor unit and suspend it using the crane.

Remove all hydraulic hoses and collect the oil. Drain the oil from the cylinder and then send the oil and hoses for disposal.

Remove the side sections from the centre section. Remember to use a support stand or something similar when removing the parts so that the machine does not fall over when the centre of gravity is removed.

Separate the centre section and the front suspension.

Remove the axle with the rings; see page 23.

Separate the axle, bearings and rings; see page 24.

The rings are made of cast iron and the frame consists of galvanised iron parts.

## Warranty

DALBO A/S offers a one-year warranty on all new machines sold by an authorised DALBO dealer. The warranty is valid for one year from the date of delivery to the end user.

**The warranty covers repair due to material and manufacturing defects.**

The warranty is not valid in the following cases:

- **The machine has been used for purposes other than those described in the operating instructions**
- **The machine has been misused or significantly overused**
- **Inadequate maintenance**
- **External accidents, for example, due to weather damage or fallen objects, etc.**
- **Transport damage**
- **Due to an improper or incorrect repair being carried out**
- **The design of the machine has been changed without written authorisation from DALBO A/S**
- **Original spare parts were not used**

In no event shall DALBO A/S be liable for consequential damages, loss of income or loss of performance due to defects or errors. DALBO A/S shall also not be liable for any other hourly labour costs except those reasonably incurred in the repair or replacement of warranty parts.

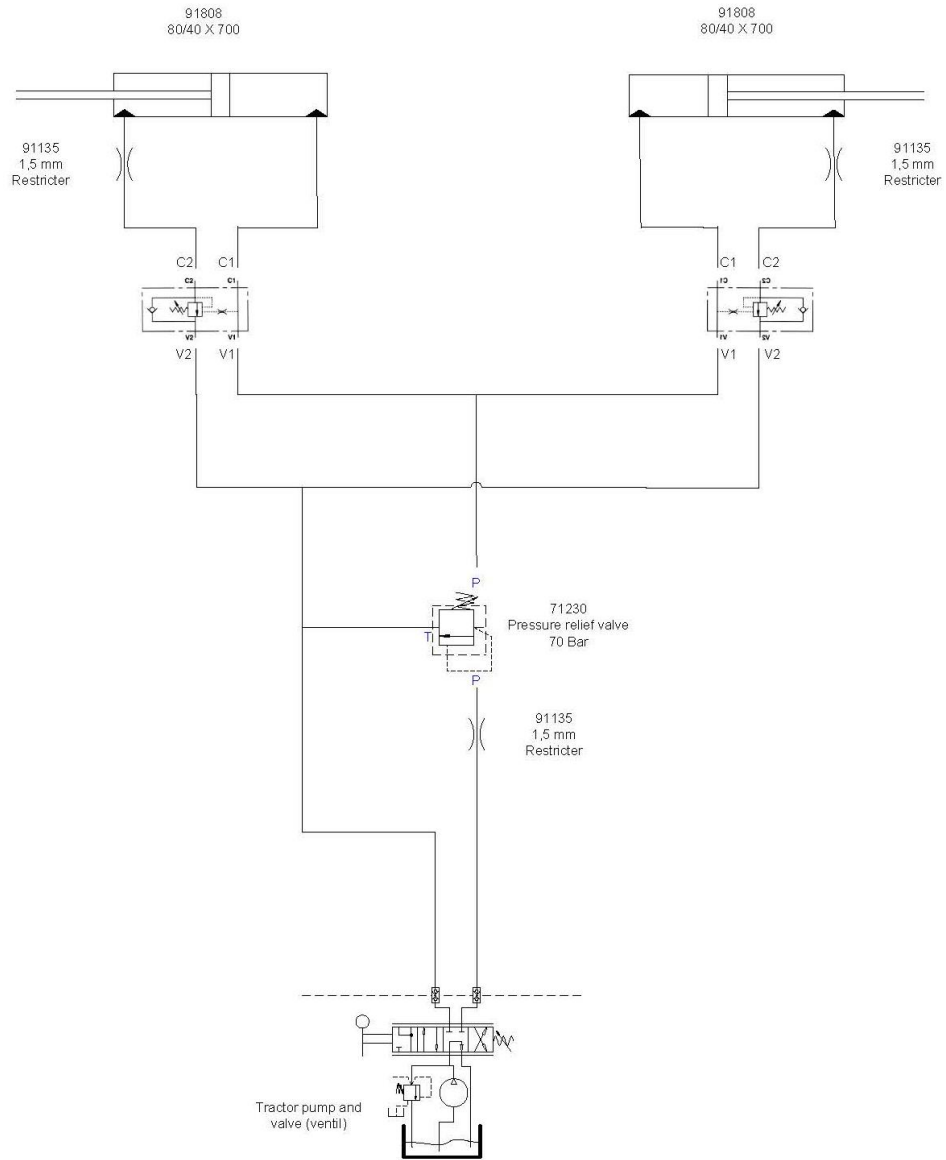
DALBO A/S is not liable for the following costs:

- **Setting up the machine**
- **Costs for normal maintenance, cleaning, lubrication and replacement of wear and tear parts**
- **Transport of the machine to and from the repair workshop**
- **Dealer costs, such as the transport of persons or parts to and from the machine and/or the repair workshop.**

The following facts are indispensable for the warranty:

- **The warranty is void if the dealer has not prepared the machine and has not instructed the user in the use of the machine.**

# Hydraulic Circuit Diagram for the FRONTFLEX



Unfolding/folding side sections  
Red