Fransgård

Manual

GB

PILL
WOOD CHIPPER

PC-2000-SEH

SAFETY AND
USER MANUAL
FOR CHIPPERS

TYPE
PC-2000-SEH

Serial number:

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Congratulations on your new PC-2000-SEH chipper.

In this instruction manual, you will find the chipper's specifications, operating conditions, safety measures and how to maintain it.

These safety and operating instructions apply only to wood chippers of the PC-2000-SEH series with hand feeders and must be read before use.

Please note that the illustrations in this manual may not be entirely consistent with the wood chipper. Certain drawings and sketches are therefore pre-drawn to facilitate understanding.

Best regards

Fransgård Maskinfabrik A/S

Table of contents

1 Specifications

Type	**PC-2000-SEH-1H**	**PC-2000-SEH-2H**
Number of infeed rollers	1	2
Feed type	Hand feeding	
Weight	900 kg	950 kg
Revolutions (PTO)	540 / 1,000 rpm	
Level	126 dB	
Effect Max. v. 540 rpm Max. v. 1,000 rpm	45 kW (60 Hp) 85 kW (114 BHP)	
Power transmission	PTO from tractor	
Mounting	Lift Suspension on Tractor	
Hydraulics	from tractor	
Oil pressure (operating pressure)	150 bar max.	
Oil flow	30 l/min max.	
Intake torque from hydraulic motor(s)	up to 1,096 Nm	
Minimum operating temperature	-10°C	
Height (H)	3.2 m (max)	
Width (B1)	1.38 m	
Width (B2) incl. turned spout	2.05 m	
Length (L)	2.62 m	
Rotor diameter	approx. 700 mm	
Rotor thickness	approx. 37 mm	
Rotor Weight (Assembled)	135 kg	135 kg
Number of chopping knives	4	4
Notspline on main shaft	1 3/4" x Z6	
Feed opening (height x width)	20 x 20 cm	
Capacity (depends on blade setting, wood type, etc.)	3 – 20 m3/hour	
Optional speed guard	yes	

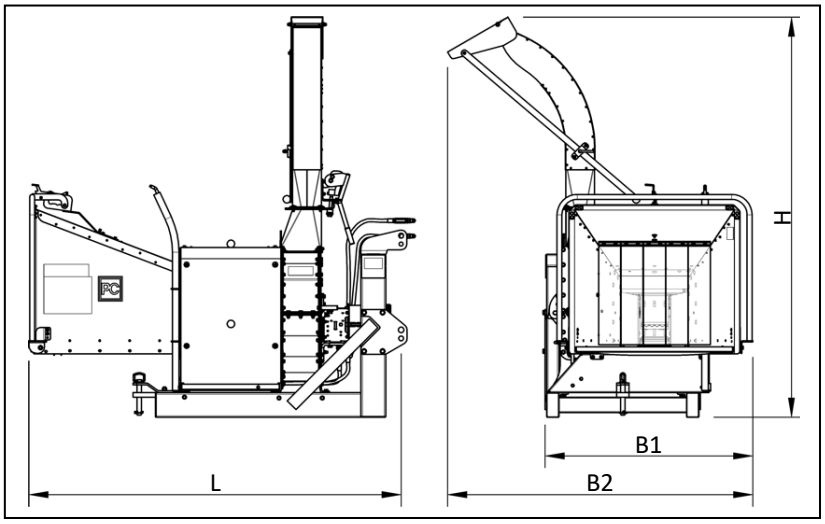


Figure 1

2 PTO Shaft

If the wood chipper is delivered with a PTO shaft, it is assumed that this is used with the wood chipper.

If you choose to find a PTO shaft yourself or if you need to replace a worn-out one, you must choose a shaft that complies with the following:

Type:	PTO shaft with freewheel and sliding clutch on the chipper side.
Mounting:	1 3/8" x Z6 internals Notspline (tractor side – may vary) 1 3/4" x Z6 internals notspline (chipper side)
Length:	The axle length must be adapted to the tractor on which the chipper is to be mounted, taking into account that it can telescope. In addition, the requirements for length, overlap between the 2 axle parts, etc., prescribed by the axle manufacturer must be complied with.
Rated Performance:	Shaft power rating is matched to chipper specifications (see section 1 for this information). Please note that transfers may be made fewer kW at 540 rpm than at 1,000 rpm.

Otherwise, read the manual supplied with the selected PTO shaft and observe all instructions given therein to ensure proper use and maintenance as well as safety regulations.

3 Checking the wood chipper before operation

Before starting the wood chipper, it is important that the wood chipper is inspected, as e.g. bolts may have come loose during transport. If this inspection is omitted, accidents can occur, and in the worst case, the chipper can break down and you can be injured.

Warning: When the chipper is opened or its guards are removed, the tractor must be stopped and the PTO shaft removed.

3.1 Rotor Control

It must be checked that the rotor is not damaged and that all parts of the rotor, be it knives, ejector blades, edge blades, etc., are also in good condition. If the rotor or its parts are not intact, it can be dangerous to drive with the wood chipper.

If, by accident, tools, metal or large stones have been in the chipper, it must not be used again until the bearing housings, shaft, rotor, blades, knives, etc. have been examined for cracking.

When the rotor is checked, it must be turned carefully one turn to ensure that the blades are free of the counter bars. See section 7.10 ff. for information on the counter-steels.

The ejector blades must be replaced for either every 1,000 operating hours or every 5,000 m3 of chipped chips (whichever occurs first) to avoid blade fatigue.

3.2 Checking Knives

To ensure a good chipping of the wood, the blades must be sharp. If the blades are too deaf or the edge has been chopped, they can be sharpened (see section 7.4 about sharpening knives). If the knife has become too worn to be sharpened, it may be necessary to install a new set of blades (see section 7.4.1 about changing chopping knives). Moreover shell All mounting bolts must be installed and in good condition before starting the chipper.

Warning: The blades are very sharp and it is not recommended to put your fingers into the rotor housing, even when the chipper is stopped and the PTO shaft is removed!

3.3 Checking Bolts

Before starting the chipper, it is important to check and, if necessary, retighten all bolts. In particular, it is important to check the bolts on the rotor and retighten, as it can be extremely dangerous if these fall off during operation. If you find bolts that need to be tightened on the rotor that are not for the blades, it is necessary to remove the bolt and give it screw protection such as locktite. If you retighten bolts that have been fitted with screw protection from the manufacturer, this screw protection no longer works and the risk of the bolt coming loose again is therefore great. In addition, it is important to check that the NordLock washers on the blades are correctly fitted (see further section 7.17).

The remaining bolts on the wood chipper must also be checked and, if necessary, tightened.

Warning: As there is a risk of getting your fingers pinched and the blades are sharp, it is not recommended to stick your fingers into the housing to tighten the bolts! See section 7.2 about locking the rotor when working on it.

3.4 Main Bearing Inspection

The bearings must be checked for play. If there is too much backlash, the wood chipper may not work properly and it may be necessary to replace the bearings.

Remember to lubricate the bearings regularly to ensure a long service life (see further sections 7.8).

Note that the tailscrews in the flange bearing on the feeder side **do not** need to be mounted/tightened, as the shaft must be able to move freely. This only applies to the 65 mm flange bearing that is located closest to the feeder!

3.5 Checking hydraulic hoses

It must be checked that all hydraulic hoses are intact and that there are no signs of leakage from the hydraulic system. Further, all snakes that are not hidden behind screens must be covered with a cloth bag.

3.6 Checking the screens and closing the rotor housing

It is checked that all fenders are intact and correctly clamped before starting the machine. All screens that must be mounted during operation can be found in section 6.4.

After checking the above points, the chipper must be closed and the three bolts (M12x40 with lock nuts) that hold the upper and lower parts together must be tightened (see Figure 2). If these bolts are not inserted and securely fastened, the wood chipper must not Start. It can be Extremely dangerous not to comply with this.

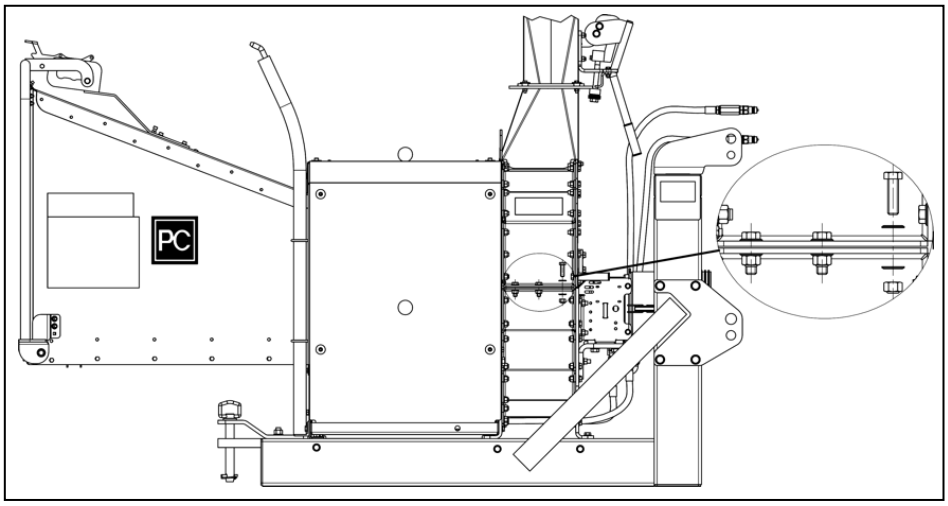


Figure 2

3.7 The first hours of operation

In the first hours of operation, it is important that you pay extra attention to the wood chipper. Should something unexpected happen, such as a noise, the tractor must be stopped immediately to avoid further problems.

If the problem cannot be solved immediately, contact the dealer/manufacturer who will then be able to help with a solution.

4 Preparing the wood chipper for operation

4.1 When delivering a new wood chipper

When the wood chipper is received as factory new, it can be mounted on some pieces of wood, or possibly on a EUR pallet. These pieces of wood are only intended for transport between dealer and customer and must therefore be removed before the wood chipper is put into use. In addition, all packaging and other items must be removed from the wood chipper.

4.2 Mounting a wood chipper on a tractor

The wood chipper must be mounted on the tractor's 3-point suspension with pull bolts. For safety reasons, it is important that the wood chipper is correctly attached in all 3 places.

Warning: The wood chipper must not be started unless the wood chipper is correctly mounted on the tractor's 3-point suspension.

4.3 Installation of PTO shaft between chipper and tractor

The PTO shaft is mounted first on the groove spline on the main shaft of the chipper and then on the PTO of the tractor. Note that the coupling mounted on the PTO shaft must face the chipper.

After the clutch end of the PTO shaft is mounted and tensioned, the SFT screen must be mounted. See section 6.4.4 how this is done.

It is important to check that the PTO shaft is not too long. If it is too long, there is no room for it between the tractor and the chipper when the chipper is lifted with the tractor's lift. This can cause serious breakdowns on the chipper and tractor.

Remember to attach the chains on the PTO shaft to the chipper and the tractor respectively, so that the plastic shield on the PTO shaft does not follow the shaft around during operation.

Otherwise, read the manual supplied with the selected PTO shaft and observe all instructions given therein to ensure proper use and maintenance, as well as safety regulations.

4.4 Installation of hydraulic hoses

The chipper's two loose hydraulic hoses are inserted into the tractor's valve block. The pressure hose (P) is inserted into the tractor's pressure port, and the return hose (with one-way valve) is inserted into the tractor's return port. See Figure 3.

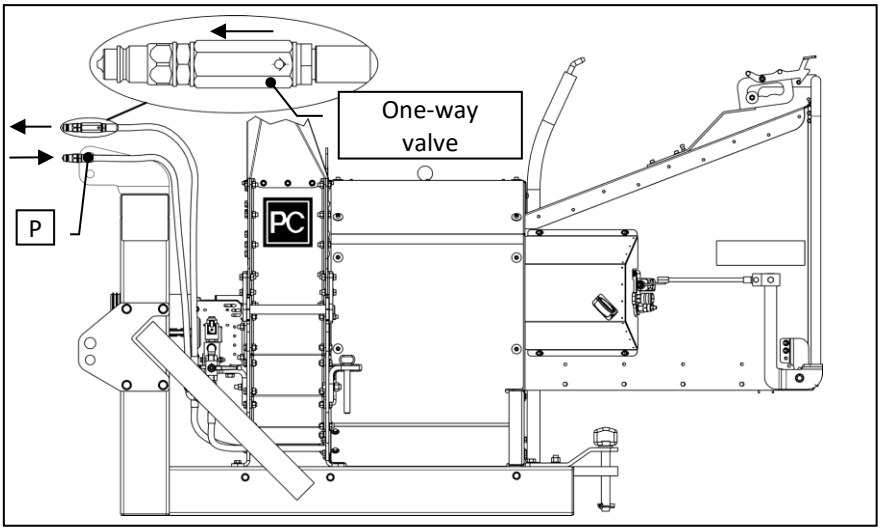


Figure 3

5 Operation of the wood chipper

Before starting the chipper, it must be placed on a level, stable surface. It is also extremely important that you are 100% sure that there are no bolts, nuts or other metal objects inside the machine, as these can be thrown out of the machine and otherwise cause damage to the machine. It is not recommended to use the hopper for storing tools etc. during transport of the chipper, as this may cause it to be pulled into the machine when it is started up.

It is recommended that the points in Chapter 3 are reviewed before start-up to ensure a long service life of the machine.

Warning: The wood chipper must be correctly mounted on the tractor's 3-point suspension when in use.

5.1 Start of stop of wood chipper

The wood chipper is started by turning on the tractor, and then the hydraulic supply to the wood chipper is turned on, the PTO is turned on, and the rotor will start.

The chipper is stopped by turning off the hydraulic supply and the PTO, after which the rotor will slowly slow down and stop by itself.

5.2 Start and stop of making

To start the feeding process, the activation button must be pressed so that the blue light stops illuminating. This Must be done every time you start up the chipper and every time the emergency stops have been activated. If you press the button and the light continues to illuminate, one or both emergency stop is pressed. See section 6.2 and 6.3 for more information about the emergency stops and the activation box.

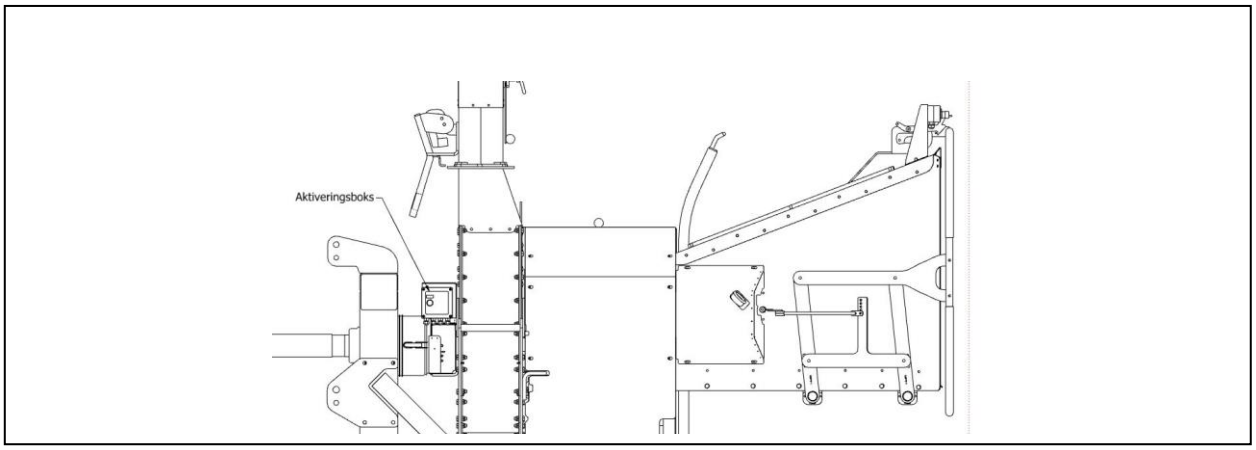


Figure 4

See Figure 4 for the location of the activation button.

The feeder is controlled by moving or pushing the handlebar. The handlebar has 3 settings:
1. The guide bar is in the 1st position and the feeder reverses, i.e. pulls the wood from the chipper.
2. The handlebar is in the 2nd position and the feeder is stationary.
3. The guide bar is in the 3rd position and the feeder pulls the wood into the chipper.

Activation box

The 3 positions are described at Figure 5.

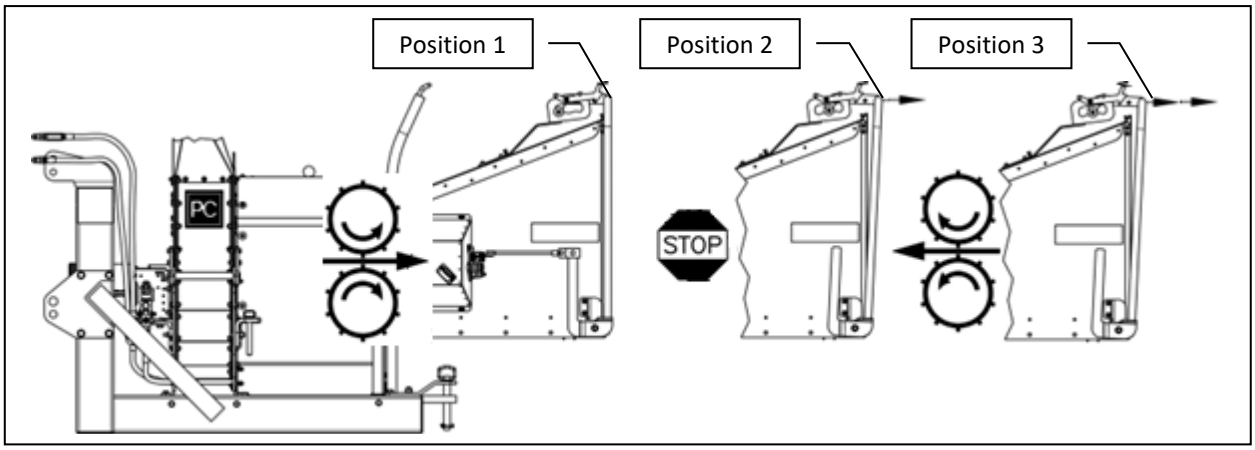


Figure 5

Figures explaining this can also be found on the wood chipper (the same figures are also depicted in sections 6.6.12).

The steering bracket must be in the 1st position when the chipper is started, and must also be set in this position when the chipper is not in use.

To avoid inadvertently starting the feed rollers to pull wood into the chipper, the guide bar is designed so that it is locked when it is moved to position 1.

To release the handlebar from position 1, the small hook (see Figure 6) is lifted and then the handlebar can be pulled to position 2.

Warning: For security reasons, be strongly warned not to circumvent, modify or remove this feature!

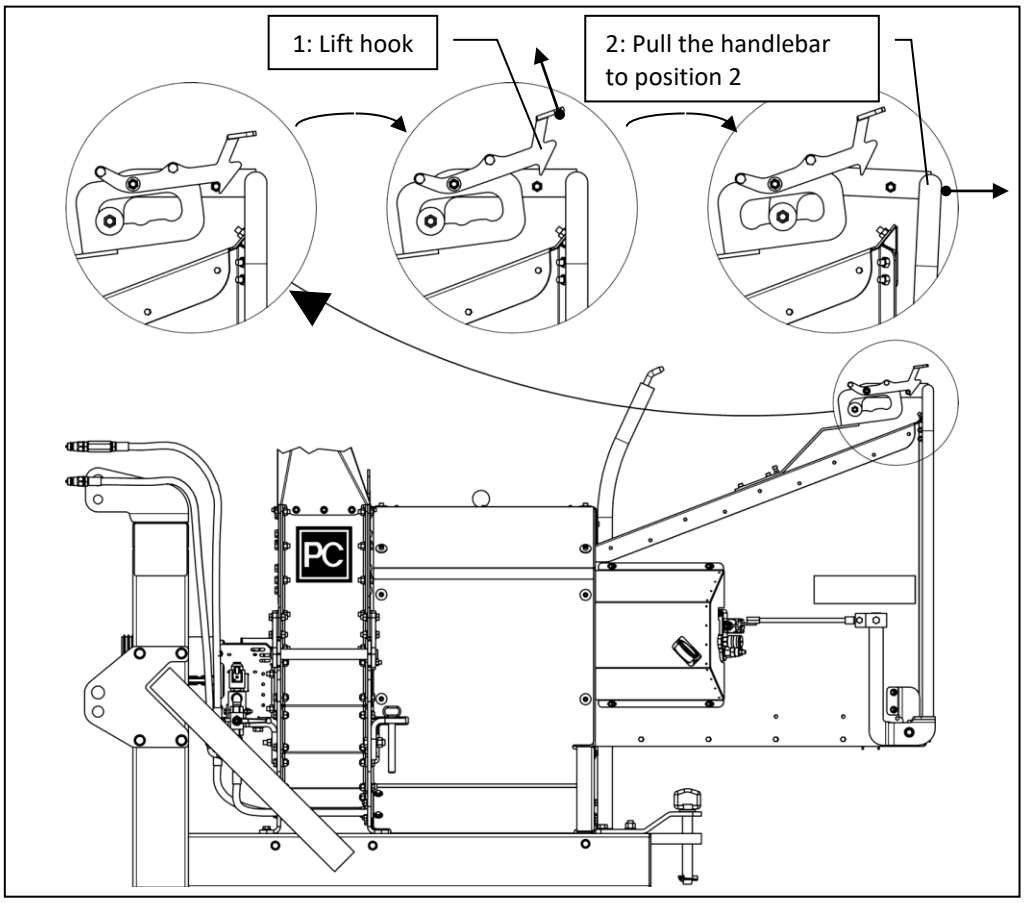


Figure 6

5.3 Hydraulics in general

When the wood chipper is running, it is important that the hydraulics are set correctly and work correctly.

The chipper's pressure relief valve is set to a permissible **operating pressure** of 150 bar by default. The operating pressure should not be confused with the idle pressure, without wood in the machine. To ensure a long service life of the hydraulic motors in particular, it is important to regularly check that this pressure is not exceeded. If the pressure is exceeded, there is a risk of pushing the gasket out of the hydraulic motor or pushing the motor housing, which consists of a number of rings, apart.

The hydraulic pressure can only be checked during operation. When the wood is cut in the chipper, it is checked that the hand on the pressure gauge does not exceed 150 bar at any time. If this is the case, the pressure must be adjusted down in the pressure relief valve. A description of this can be found in section 7.16. Note that the pressure varies depending on how hard the motors are working.

When starting the chipper, make sure that the feed roller(s) rotate correctly in relation to the position of the guide bar (see Figure 5). If this is not the case, it is checked whether the hydraulic hoses are correctly fitted. A description of this can be found in section 7.13.

If it is necessary to re-tighten a hydraulic hose, the tightening torque must be 70 Nm for the hydraulic hoses that were fitted to the machine from the factory. If the hose has been replaced, contact the supplier of this for information on correct installation.

The wood chipper must be turned off and disconnected from the tractor when working on the hydraulic system. In addition, you must ensure that there is no pressure on the hydraulic system.

Note that the direction of rotation of the feed roller(s) must not be changed by swapping the hydraulic hoses, and some of the hydraulic parts cannot withstand pressure on the wrong ports, and can therefore be damaged if the hoses are not installed correctly. It is recommended to read the manual that came with the tractor regarding the use of the hydraulic system and otherwise follow the recommendations regarding the possible installation of temperature gauge and oil cooler.

To ensure a long service life of the hydraulic components, it is not recommended to mix oil types. In addition, you must pay attention to the permissible operating temperature of the oil.

5.4 Setting the feed speed

The speed at which the wood is pulled into the machine can be adjusted. By turning the flow valve on the valve block (see Figure 7) changes the speed at which the feed rollers are turning, and thus the speed of the wood.

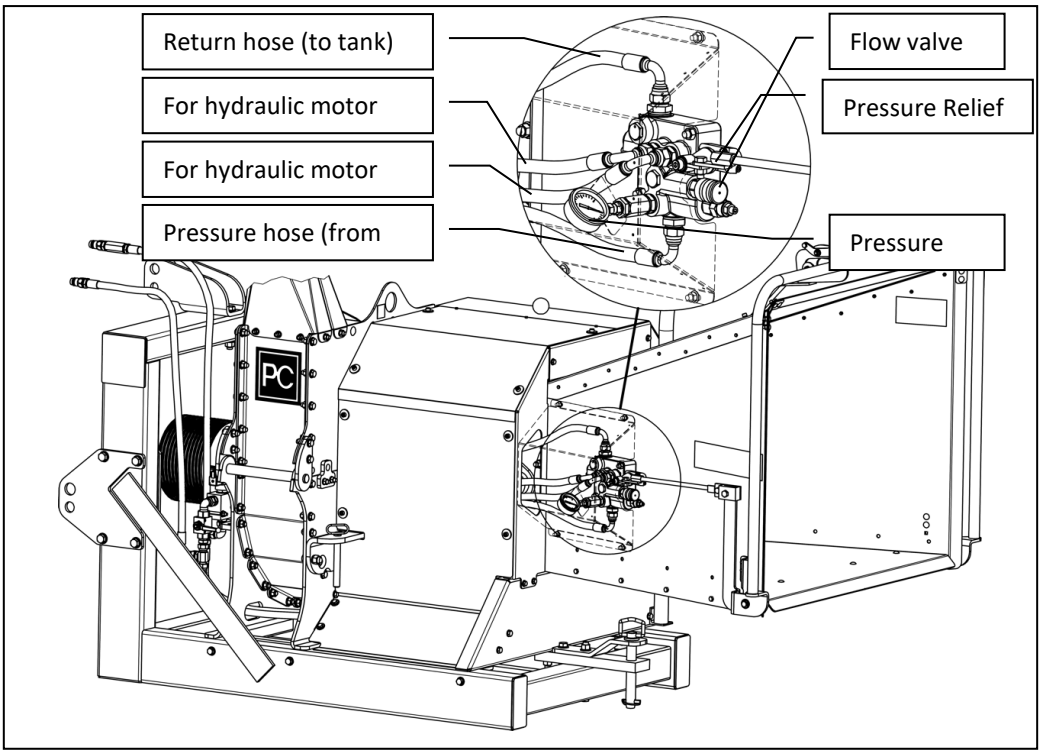


Figure 7

5.5 Setting the Spout

The wood chipper comes with a swivel spout that can turn 320°C. The swivel spout is infinitely rotated and can be locked around where you want in the swivel spout's working area. The swivel spout is limited so that it cannot point backwards towards the hopper. This ensures that you do not accidentally point the spout towards the work area where people can stay.

Pay close attention to where the spout points when you start putting wood in the machine. Pay special attention to whether the spout is pointing towards people, animals or other inappropriate objects and, if necessary, turn the spout away from these.

The spout is rotated by pulling the locking lever towards a horizontal position, after which the spout can be rotated with the locking lever to the desired position (see Figure 8). Then push the locking arm back into the vertical position and the spout is locked. Should the spout not be properly locked, the locking mechanism can be tightened by tightening the bolt at the bottom of it, just as the bolt can be loosened if the locking arm is too tight. If the spout has difficulty turning, the two surfaces around which the spout turns can be lubricated with a little oil.

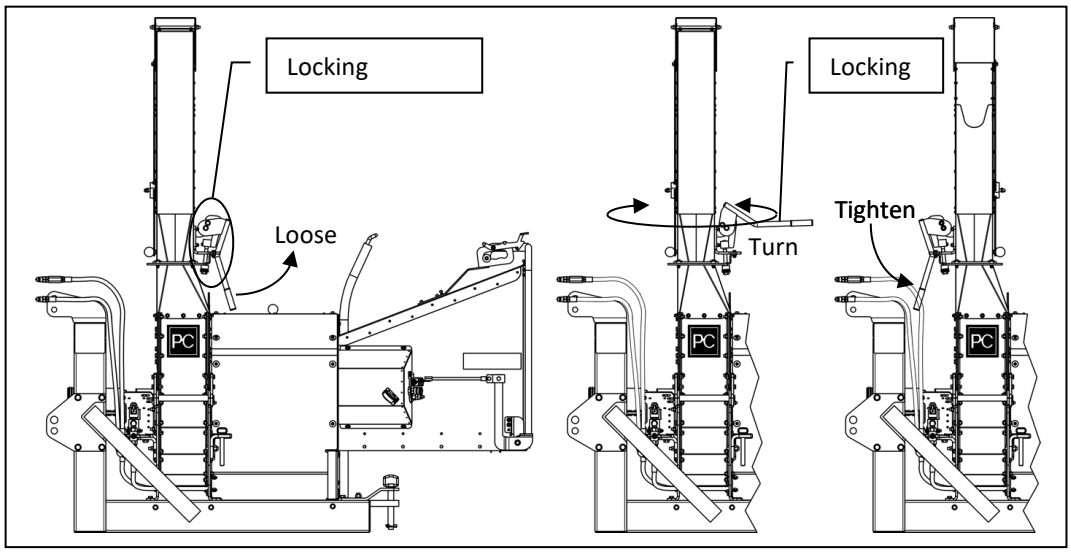


Figure 8

The height of the tile at which it is ejected from the spout can be adjusted by loosening the thumbscrew on the spout (see Figure 8) and pushing or pulling on the tilting blade arm until it has reached the desired setting. Then tighten the thumbscrew again.

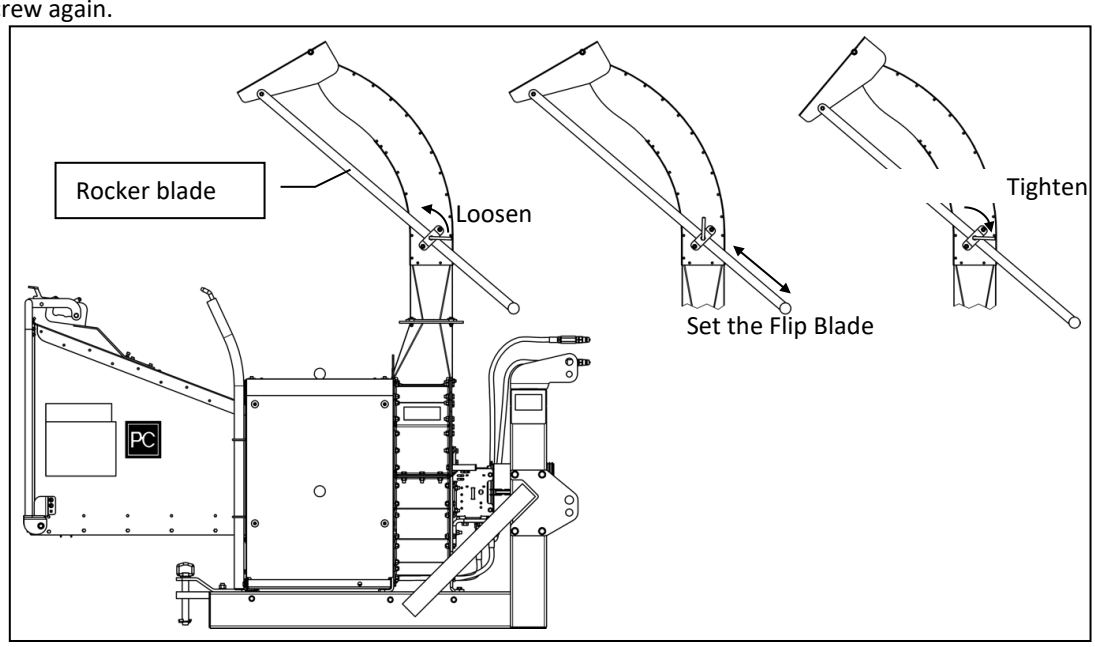


Figure 9

5.6 Feeding the wood chipper

When you are about to chop wood for wood chips, you need to do the following:

1. Go through the points mentioned in chapter 3 and then mount the chipper correctly on the tractor's 3-point suspension.
2. Turn on the tractor.
3. Engage the tractor's PTO.
4. Turn on the hydraulics in the tractor so that the chipper is supplied with hydraulic oil.
5. Check that the spout on the chipper is set correctly.
6. Put the handlebar in the 3rd position (see Figure 5).
7. Check the feed speed (see section 5.4) and adjust if necessary.
8. Insert the wood into the opening of the hopper and push it further into the feed roller(s), which grab the wood and pull it further into the wood chipper, which then begins to chop the wood into chips.
9. After chipping, the steering bracket is pushed back to the 1st position, the hydraulics are switched off and the tractor is switched off.

If you do not have an optional speed guard installed, or if this is turned off, and can hear that the chipper has difficulty keeping up (it loses too many revolutions during feeding), you can stop the feed for a moment by pushing the guide bar over to the 2nd or possibly 1st position, until you can hear that the rotor is up to speed again. Be aware that when the guide bracket is pushed into the 1st position, the direction of rotation of the feed rollers (i.e. the rollers turn in the opposite direction) is reversed and the wood is pulled out of the machine again. Watch your legs when the feed rollers reverse!

Warning: When the wood is pulled into the chipper, be aware that pieces of wood can be thrown back out of the hopper.

Warning: Be aware of loose clothing, string, rope and the like that can get caught in the chipper or the wood to be chopped, so that you do not, in the worst case, get pulled into the machine.

6 Safeguards

When using the wood chipper, there are a number of precautions that must be observed. To avoid any accidents, it is important to take care and adhere to the safety precautions outlined in this manual when using the wood chipper.

To further make sure, it is also important to maintain the machine and inspect it regularly.

6.1 General precautions

When the wood chipper is in operation, you should always be alert. Wood may be thrown out of the machine, foreign objects may have been drawn into the machine, or something else unexpected may happen with danger.

Therefore, always observe the following points:

- Pay attention.
- Never put your fingers into the openings of the machine.
- Never open the machine during operation - stop the tractor and check that the rotor is completely stopped before opening the chipper.
- Never open the machine while the PTO shaft is fitted.
- Never remove wood or anything that has become stuck while the machine is running.
- Make sure that all bolts are always tightened securely.
- Keep the machine in good maintenance condition.
- Never use the machine for anything other than what it is intended for.
- Never allow children under the age of 18 to operate or work at the machine.
- Never operate the machine without reading and understanding the safety instructions.
- Place the machine on a firm, level surface when chopping wood.
- Never operate the machine without the screens fully mounted.
- If something unexpected happens, turn off the machine immediately.
- Do not use the machine indoors.
- Never bypass the safety mechanisms built into the machine.

6.2 Emergency

On top of the feed hopper, two emergency stops are mounted (see Figure 10). The emergency stops have the function of stopping the feed rollers when they are pressed in, so that any danger can be stopped.

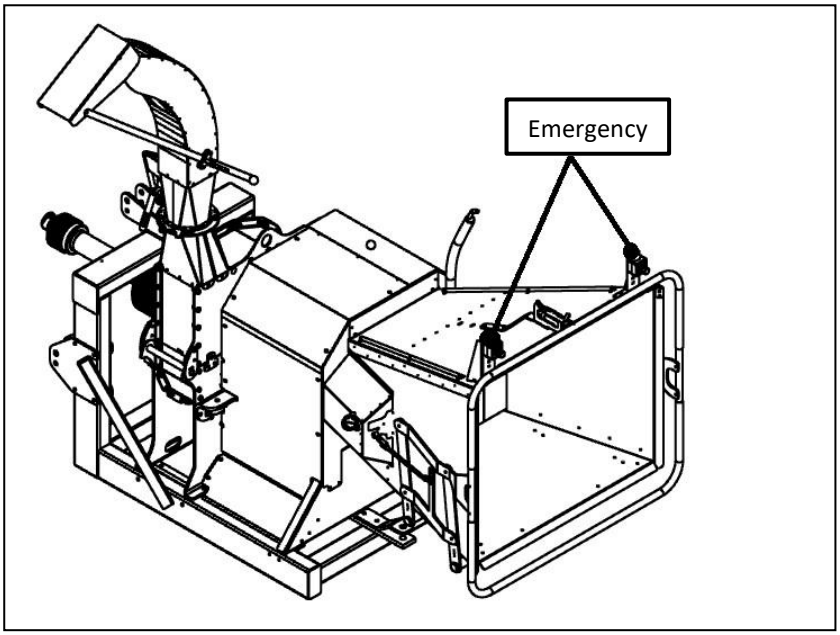


Figure 10

In order to reactivate the feed rollers, the emergency stops must be reactivated by turning the knob as shown in the Figure 11and the activation button must be pressed.

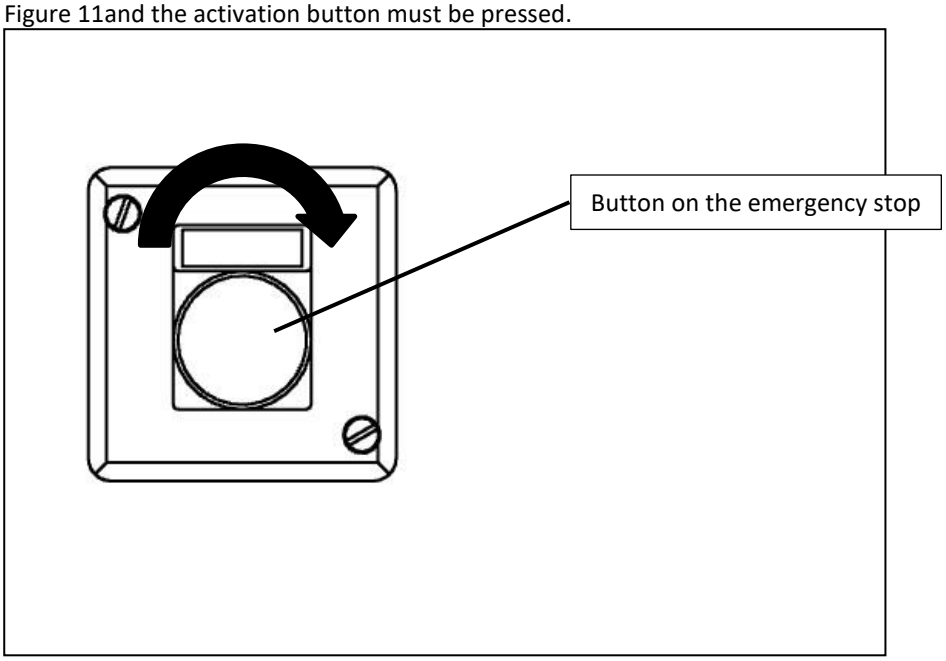


Figure 11

6.3 Activation box

The wood chipper is equipped with an activation box. The purpose of the actuation box is to ensure that the feed rollers do not start unintentionally if the safety bar is not positioned in position 2 as described in section 5.2.

When the blue light is on, it indicates that the connection to the valve block (see Figure 7) is interrupted and therefore the feed rollers cannot be activated. By pressing the blue button, the connection is re-established to the valve block and the start and stop of the feeder can now be activated as described in section 5.2.

If the blue button continues to light up after you have pressed it, it indicates that one or both emergency stops have been pressed. Check the emergency stops and trigger them as described in section 6.2.
If, contrary to expectations, this does not work even though you have triggered the emergency stops correctly, it could indicate that there is a break in the circuit from the activation box and out to the emergency stops. Contact your dealer/mechanic for help finding and rectifying the fault.

6.4 Foreclosure

When the wood chipper is in operation, shell all the screens must be mounted. If the screens have been damaged or cannot be mounted correctly, the wood chipper must not be put into use before this has been rectified. On Figure 12 there is an overview of the screens, all of which shell be installed during operation. Beyond the screens shell The spout and the transparent curtains in the feed hopper must also be fitted.

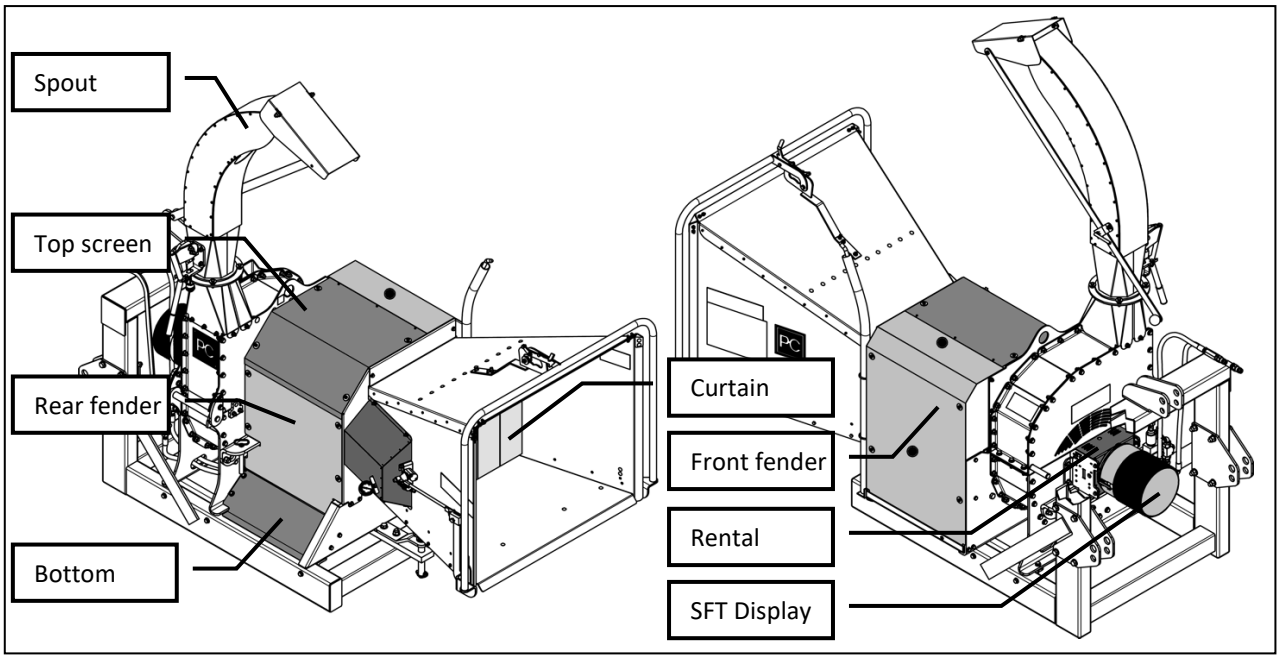


Figure 12

6.4.1 Mounting and dismounting the front fender

During general maintenance (cleaning, removal of stubborn pieces of wood, etc.), the front fender can be removed.

The front screen is removed by unscrewing the 4 screws in the screen, and then lifting the screen away by the two knobs.

Note that the screen itself can fall off if the 4 screws are not screwed in.

When the front fender is to be remounted, the front fender is held in place while the 4 screws are screwed in and tightened.

6.4.2 Mounting and dismounting of top and rear fenders

For further maintenance (thorough cleaning, installation of hydraulic hoses or lubrication of the rotor flange bearing, etc.), it may be necessary to remove the top and rear fenders. Note that the rear fender cannot be removed immediately unless the top fender is removed first.

First, remove the front screen following the procedure in section 6.4.1.

The top screen is removed by unscrewing the 4 screws. After this, the screen can be removed.

The rear fender is removed by unscrewing the 4 screws. After this, the screen can be removed.

When the fenders are to be mounted again, this is done by first holding the rear fender in place while the 4 screws are mounted and retightened. Then the top fender is held on and the 4 screws are mounted and tightened. Then the front fender is mounted again.

6.4.3 Mounting and dismounting the bottom screen

It is usually not necessary to remove the bottom screen. Only if the screen has been damaged may it be necessary to remove and replace it.

To remove the bottom fender, first remove the front, top, and rear fenders according to the instructions in section 6.4.1 and 6.4.2.

The two bolts that hold the guard firmly against the chopping house are unscrewed. Then remove the two bolts that hold the fender to the rear fender. Then remove the two long bolts that hold the screen firmly against the side beam. The screen can now be removed.

The screen is remounted by holding the screen in place, and then all the above 6 bolts are loosely inserted. Only when all bolts are inserted are the bolts and nuts tightened.

6.4.4 Attaching and dismounting SFT monitor

The SFT screen covers the clutch as well as part of the PTO shaft and can only be mounted when the part of the PTO shaft that will be on the chipper (the part with the coupling) is mounted on the shaft end of the chipper (notspline).

The SFT screen is mounted by holding it against the aluminium flange bolted to the bearing screen and locking it to it with the latches (see Figure 13).

The SFT screen is removed by loosening the latches and pulling the screen out of the aluminum flange.

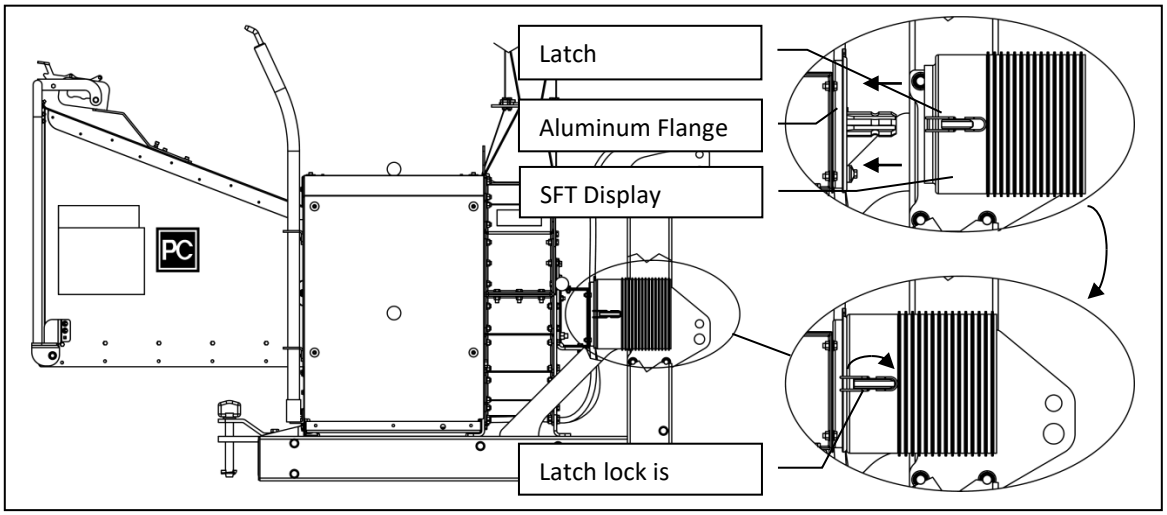


Figure 13

6.4.5 Mounting and dismounting the bearing screen

In order to lubricate the main bearing, it may be necessary to remove the guard that covers the bearing if there is not enough space in the bearing guard's lubrication hole for the lubrication gear.

To remove the bearing guard, first remove the PTO shaft and unscrew the six bolts that hold the bearing guard in place (see Figure). After this, the rental screen with SFT screen can be removed.

The bearing guard is mounted by placing the bearing guard in place above the bearing, and the six bolts with washers and nuts are put in place on either side of the guard and tightened.

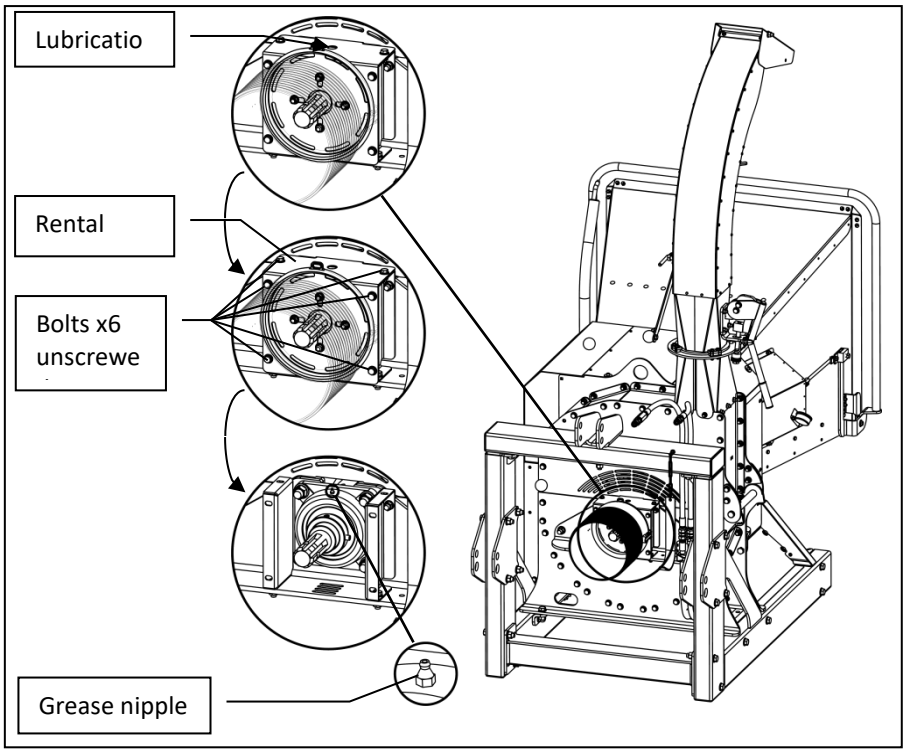


Figure 14

6.5 Safety equipment

When using the wood chipper, it is important to use personal safety equipment. As a minimum, you are required to wear eye protection and hearing protection. Furthermore, it is recommended that you wear safety footwear, work gloves and appropriate work clothes.

Warning: Be aware of loose clothing, string, rope and the like that can get caught in the chipper or the wood to be chopped, so that you are not, in the worst case, pulled into the machine.

6.6 Signage

On the wood chipper there are a number of signs. These signs are described and shown in this section. To avoid accidents and to operate the wood chipper in the most appropriate way, it is important that the signs are observed.

6.6.1 Read instructions

Meaning:
Before using the machine, **read** the operating instructions and follow them .

6.6.2 Pay attention

Meaning:
Be aware when working with or near the wood chipper.

6.6.3 Eye and hearing protection mandatory

Meaning:
When the wood chipper is in operation, safety glasses and hearing protection or similar must be worn.

6.6.4 Rotating Parts

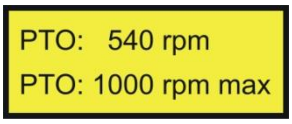
Meaning:
The wood chipper has rotating parts that can be injured. Therefore, pay attention!

6.6.5 Sharp knife

Meaning:
In the wood chipper there are sharp knives that you can cut yourself on. Therefore, pay attention!

6.6.6 RPM PTO

Meaning:
The rotor must only run at either 540 or 1000 rpm max (rpm = revolutions per minute).



6.6.7 Crushing hazard

Meaning:
There is a risk of getting squeezed. Therefore, keep your fingers away.

6.6.8 Do not open the rotor housing until the rotor has come to a complete stop

Meaning:
The wood chipper must **not** be opened when the rotor is turning.

6.6.9 The rotor housing must only be opened when the rotor has come to a complete stop

Meaning:
The chipper must only be opened when the rotor has come to a complete stop and the PTO shaft is removed.

6.6.10 Safety distance

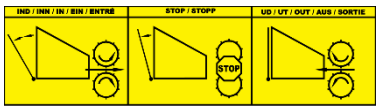
Meaning:
Be aware and keep a safe distance from the machine as far as possible.
This applies in particular to people who do not work with the machine.

6.6.11 Parts may be thrown out

Meaning:
When the machine is in operation, objects may be thrown out of the machine. Therefore, pay attention!

6.6.12 Control Rack Operation

Meaning:
The trackbar has the 3 settings shown. The function of the feeder follows the settings shown.



6.6.13 Risk of being drawn in

Meaning:
When the wood chipper is in operation, there is a risk of being pulled into it. Therefore, pay attention!

6.6.14 Don't enter the funnel

Meaning:
Do not insert any part of the body into the hopper of the chipper, as this can be extremely dangerous.

6.6.15 Noise

Meaning:
The wood chipper makes noise up to the displayed sound pressure.

6.6.16 Remove PTO shaft before maintenance

Meaning:

For safety reasons, the PTO shaft for the chipper must
be dismantled before the chipper is maintained.

6.6.17 Mount wood chipper on 3-point suspension before use

Meaning:
The wood chipper must be correctly mounted on the tractor's 3-point suspension before it is put into use.

6.6.18 Place wood chipper on flat surface before removal from tractor

Meaning:
The wood chipper must be placed on a flat, horizontal surface before it can be removed from the tractor.

6.6.19 Do not use a hook

Meaning:
Where this mark is located, do not use hook to lift the chipper.

6.6.20 Wear safety gloves

Meaning:
Gloves must always be worn when hand-feeding the chipper.

6.6.21 Direction of rotation

Meaning:
The direction of rotation of the rotor follows the arrow shown.

6.7 Location of signage

In order to easily find the safety signs on the wood chipper, there are Figure 15 made an overview where these are located. This can also be used if you find that some of the safety signs have been damaged and you therefore need to replace them.

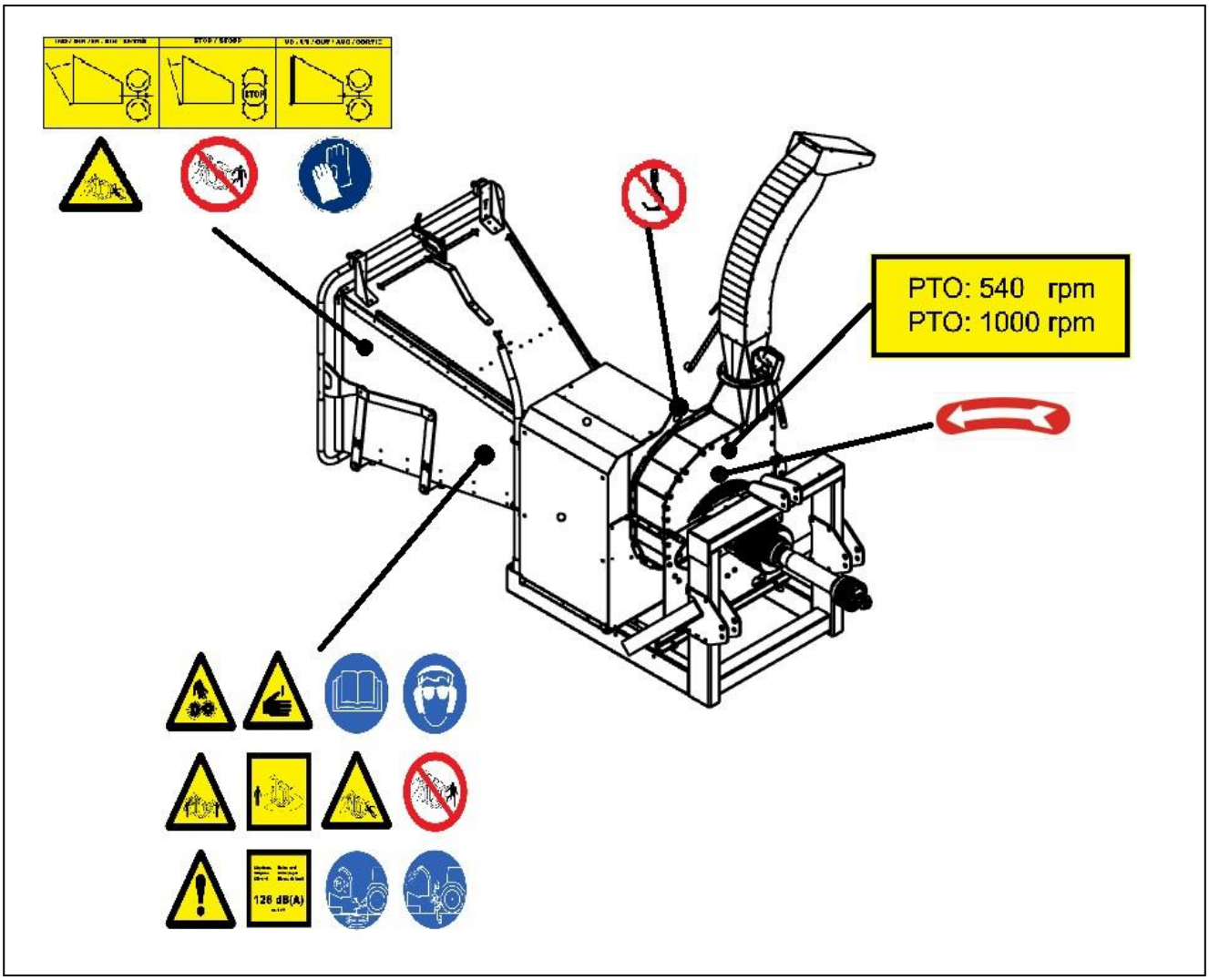


Figure 15

7 Maintenance

To reduce the risk of accidents and to ensure a long service life of the wood chipper, it must be regularly maintained. In general, you should pay attention to the machine's sound and other signals, and examine for and, if necessary, repair damage.

Once the season is over, it is recommended to thoroughly clean the chipper to ensure an easy start-up the next time it is put into use. It is recommended to further inspect the wood chipper, cf. section 3before it is put back into use for a new season.

Note: During all maintenance , the PTO shaft between the chipper and the tractor must be removed for safety reasons. In addition, you must make sure that there is no pressure on the hydraulic system. If the wood chipper is fitted with a speed monitor, the cable for this must also be removed from the socket on the tractor.

7.1 Access to rotor housing

When the wood chipper needs to be maintained, it may be necessary to open the top of the wood chipper so that you can get to the rotor.

7.1.1 Opening the rotor housing

Opening the wood chipper is easiest in the following way:

1. The chipper is disconnected from the tractor and the PTO shaft is dismantled.
2. The front fender is removed as per section 6.4.1 and 6.4.2.
3. Unscrew and remove the bolts in the joint between the upper and lower parts of the rotor housing.
4. The spout is rotated so that it does not hit anything when the upper part of the rotor housing is opened.
5. The upper part of the rotor housing can now be opened by grasping the handle on the upper part and lifting. See Figure 16.

Be aware that the lash blade on the spout does not hit anything and is bent when the upper part is opened. Therefore, if necessary, push the tilting blade into a position so that this does not happen. Alternatively, you can turn the spout in a position so that this does not happen before the wood chipper is opened.

Note: It is only necessary to remove the front fender to open the chipper, but it may be beneficial to remove multiple fenders to get more space and better visibility during maintenance.

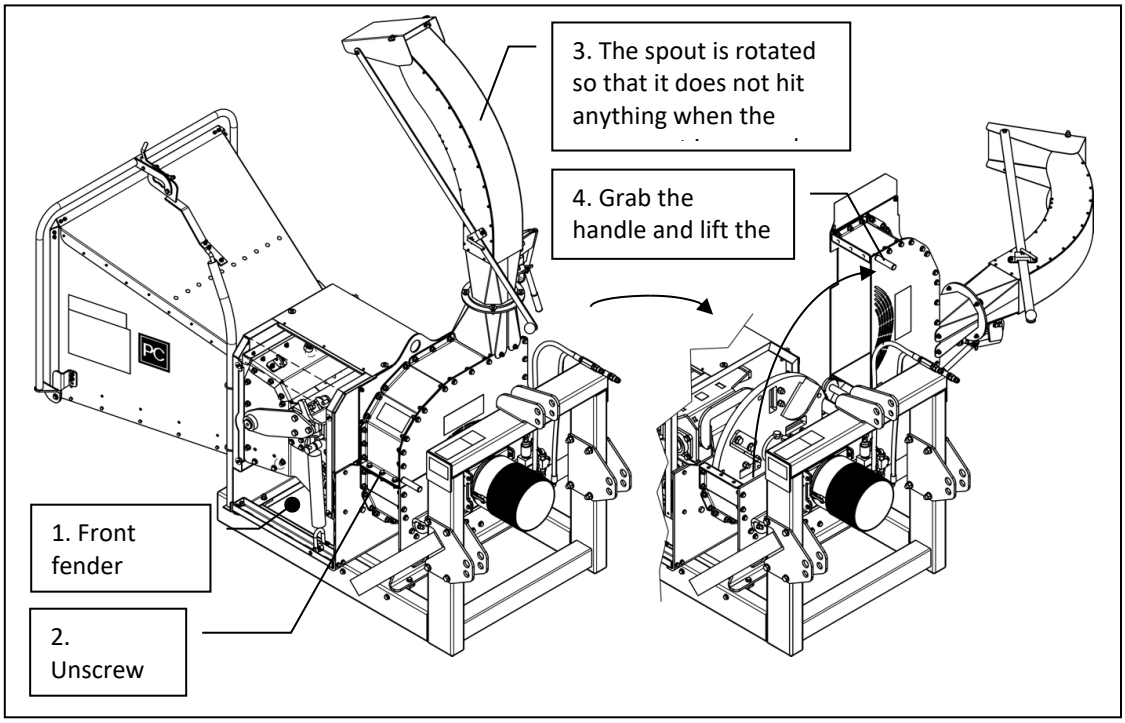


Figure 16

7.1.2 Closing of rotor housing

Before closing the rotor housing, it is ensured that no loose parts have been forgotten in the machine. In addition, you must be absolutely sure that all parts are correctly clamped. Finally, the rotor lock (see section 7.2) and the upper part of the rotor housing can now be closed down, taking care not to get fingers etc. pinched.

When the upper part of the rotor housing is closed, the 3 bolts that connect the upper and lower parts can be inserted and tightened.

7.2 Locking the rotor

When working with the parts of the rotor, it can be locked so that it does not rotate.

When the rotor housing is open, the rotor can be gently rotated so that one of the 4 holes in it fits next to the hole in the bracket on the rotor housing side. Then the tension bolt mounted in the front transverse boom can be inserted through both mentioned holes, and the rotor is now locked. In this way, the rotor can be locked in 4 positions, corresponding to the 4 holes mentioned in the rotor. See Figure 17.

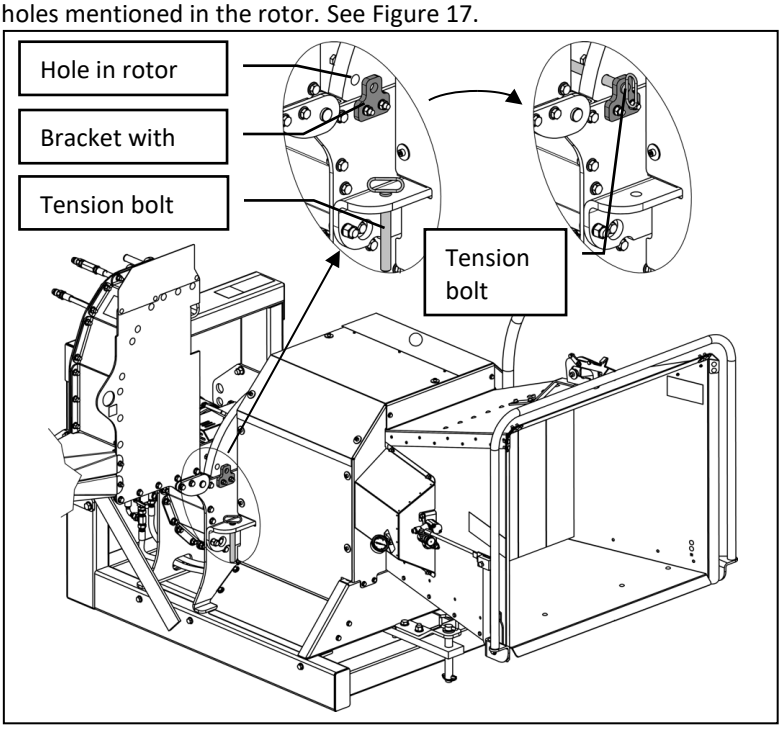


Figure 17

7.3 Changing chopping knives

When the chopping knives need to be sharpened, replaced or inspected thoroughly, it is necessary to dismantle them. Depending on the type of wood chipper, there are different mounting methods

Warning: The rotor is in balance with all blades fitted, and when one or more of these are removed, the rotor is no longer in balance, and it will therefore start to turn on its own if it is not locked. Therefore, take care of your fingers and never put your fingers into the machine.

Warning: Even if the blades are removed because they are deaf, there may still be places on the edge where they are sharp. Therefore, be aware and use strong gloves to handle the blades.

7.3.1 Removing the Chopping Knives, PC-2000-SEH-1H and PC-2000-SEH-2H

The easiest way to remove the blades is to follow the following procedure:

1. Front, top and rear fenders are removed cf. section 6.4.1 and 6.4.2.
2. The rotor housing is opened cf. section 7.1.1so that the rotor is accessible.

3. Lock the rotor in a suitable position, cf. section 7.2.
4. The first knife can now be removed by unscrewing the nuts of the two bolts that hold the knife in place. This may need to be taken care of, as the NordLock discs offer great resistance. The bolts must be held against to prevent them from following around.
5. Once the blade is removed, remove the tension bolt. As the rotor there is no longer in balance, it will start to turn by itself – **Therefore, be careful!**
6. Lock the rotor in a new position, cf. section 7.2and the next blade can now be removed.
7. Repeat the procedure in steps 4 to 6 until all 4 blades are removed.

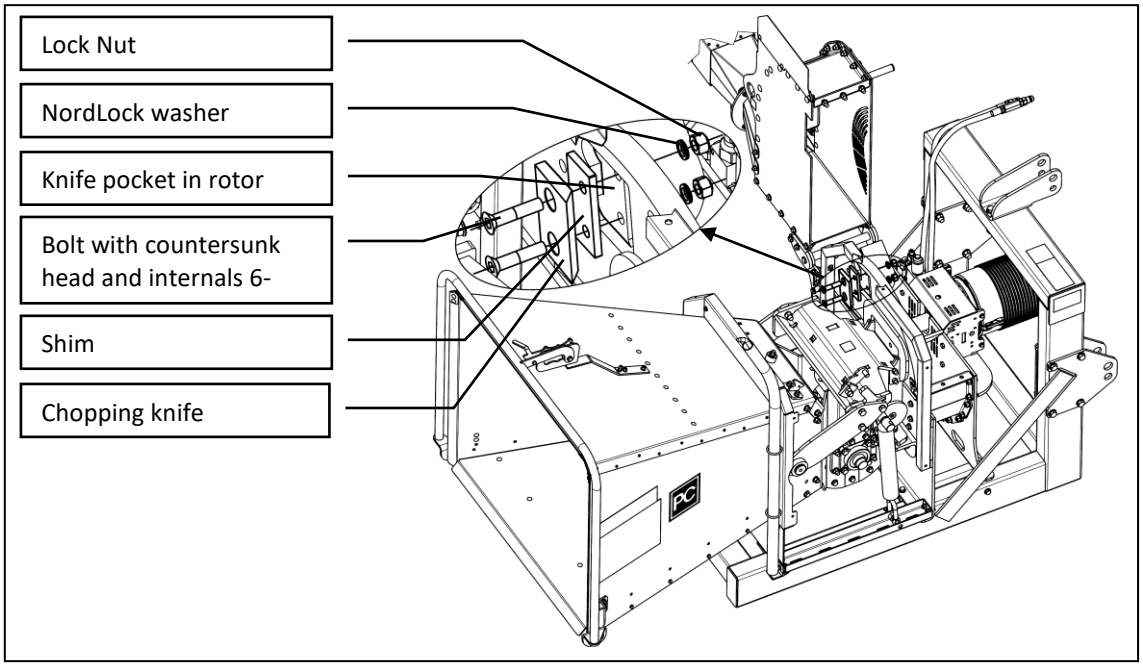


Figure 18

7.3.2 Mounting of chopping knives, PC-2000-SEH -1H and PC-2000-SEH -2H

Before the knives are mounted, it is decided how much knife height is to be driven with and a spacer corresponding to this is chosen.

The easiest way to mount the blades is to follow the following procedure:

1) The knife pockets in the rotor disc are checked, and any remnants of wood, etc., are scraped out so that the bottom surface is clean and level.
2) The rotor is locked in a suitable position, cf. section. 7.2.
3) Hold the shims and knife against the knife pocket and loosely insert the two bolts, attach NordLock washers and loosely screw on lock nuts. The order can be seen at Figure 18.
4) An Allen wrench is inserted into the inner 6-edge of the bolts and the nut is torque-tightened.
5) Lock the rotor in a new position, cf. section 7.2, and the next blade can now be mounted.
6) Repeat steps 2 to 5 until all 4 blades are fitted and tightened.
7) The rotor is carefully turned one turn to ensure that nothing is running on. At the same time, it is checked that there is the correct distance to the counter steel. See section 7.10 on setting the counter steel.

A total knife consists of:
1 x Knife
1 x Shimmer of suitable thickness.
2 x M16 bolts with countersunk head and 6-socket internal, strength class 10.9.
2 x NordLock washer for M16 (see section 7.17 on the correct use of NordLock washers)
2 x Lock Nut for M16
A total of 4 combined blades are needed for an entire rotor.

Remember that the rotor is not balanced when all the blades are not mounted, and it will therefore turn by itself when the tension bolt is not inserted.

Warning: If all parts are not present, the blades must not be mounted and the wood chipper must not be used. Not complying with this can be extremely dangerous!

Warning: When the blades are fitted, the balance of the rotor changes and it will therefore start to turn itself. Therefore, take care of your fingers and never put your fingers into the machine.

Warning: Never fit damaged blades. For example, if the knife is broken, or cracks are formed, do not mount the knife. Not complying with this can be very dangerous.

Warning: Always have all blades fitted with all bolts properly fitted and tightened during operation. If one or more blades and bolts are omitted, the rotor can become unbalanced and cause oscillations during operation, and the rotor can thus in the worst case cause breakdown.

Warning: When the blades are new or newly sharpened, they are very sharp and can therefore be cut. Therefore, be aware and use strong gloves when handling the blades.

7.4 Sharpening of chopping knives

When the wood chipper is in use, the blades wear out and the edge becomes deaf. It is therefore necessary to sharpen the blades regularly. The grinding interval depends on the type of wood that is put into the machine and whether soil and pebbles have been drawn with the wood to the blades.

Signs that the knives need sharpening:

- The tile quality is poor.
- The wood chipper has difficulty touching the wood, and the rotor quickly loses revolutions.

When sharpening the blades, they must first be removed from the machine, but before this, check whether the blades need to be replaced instead (see section 7.4.1). The blades are removed by following the instructions in section 7.3.

The blades are sharpened at an angle of 41° (See Figure 19) and it is important to adhere to this strictly to ensure good tile quality. The grinding angle is the same for both the PC-2000-SEH-1H and PC-2000-SEH-2H. If you are not able to sharpen the knives yourself, there are companies that specialize in this.

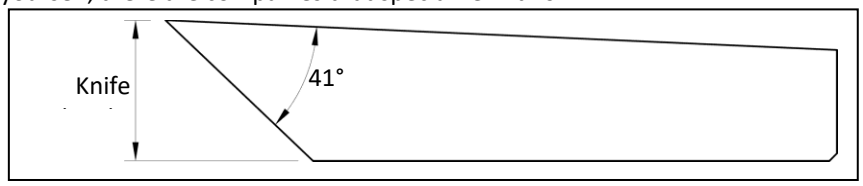


Figure 19

When sharpening the blades, it is important to sharpen them equally. In particular, the knife height must be the same on all 4 knives. If this is not observed, it can be difficult to adjust the bottom steel and thus difficult to ensure a uniform tile.

For the sake of the rotor's overall balance, it is important that the weight of the blades is equal.

To ensure the longevity of the blades, the following must be observed:

- Only use the machine for chopping wood.
- Make sure that the wood that is put into the machine is free of soil and pebbles as far as possible.
- Never allow large stones, iron and other metals or tools to enter the chipper.

Warning: Never attempt to sharpen the blades while they are still mounted on the rotor. It can be very dangerous.

Warning: When the blades are freshly sharpened, they are very sharp and can therefore be cut. Therefore, be aware and use strong gloves when handling the blades.

7.4.1 Changing chopping knives (when?)

When the chopping knives after a long period of use have been sharpened so far down that the edge surface comes behind the hole through the rotor (see Figure 20), the chopping knives must be replaced.

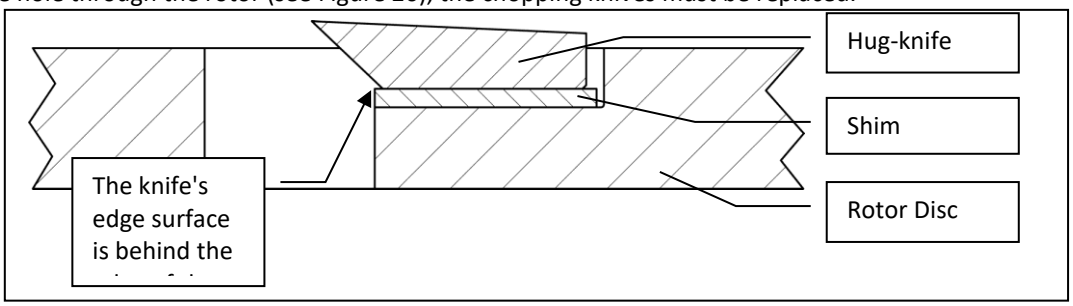


Figure 20

If the blades have been damaged (large nicks, breaks, etc.), e.g. if there has been something very hard (e.g. stone or metal) in the machine, the blades must also be replaced.

The worn chopping knives are replaced according to the instructions in section 7.3.

Warning: Never run the chipper with damaged blades. It can be very dangerous!

7.5 Changing the edge knives

On the chopping disc, in the periphery, some knives are mounted. On the PC-2000-SEH-1H and PC-2000-SEH-2H, these edge knives are designed as two angles.

7.5.1 Changing the edge knives, PC-2000-SEH-1H and PC-2000-SEH-2H

The purpose of the edge knives on the PC-2000-SEH-1H and PC-2000-SEH-2H is to break the rotor's periphery, so that no wood gets trapped between the periphery and the rotor housing. If the edge knife is not present, there is a real risk that friction between the rotor and a piece of wood can ignite wood in the rotor housing. It is therefore important to have these edge knives fitted!

The edge knives should be mounted as shown on the Figure 21.

A total edging knife is 2-part and consists of:
1 x Knife with countersunk hole
1 x Knife with round hole
1 x M10 bolt with countersunk head + NordLock washer + Lock nut

A total of 2 sets of edge knives are needed per rotor.

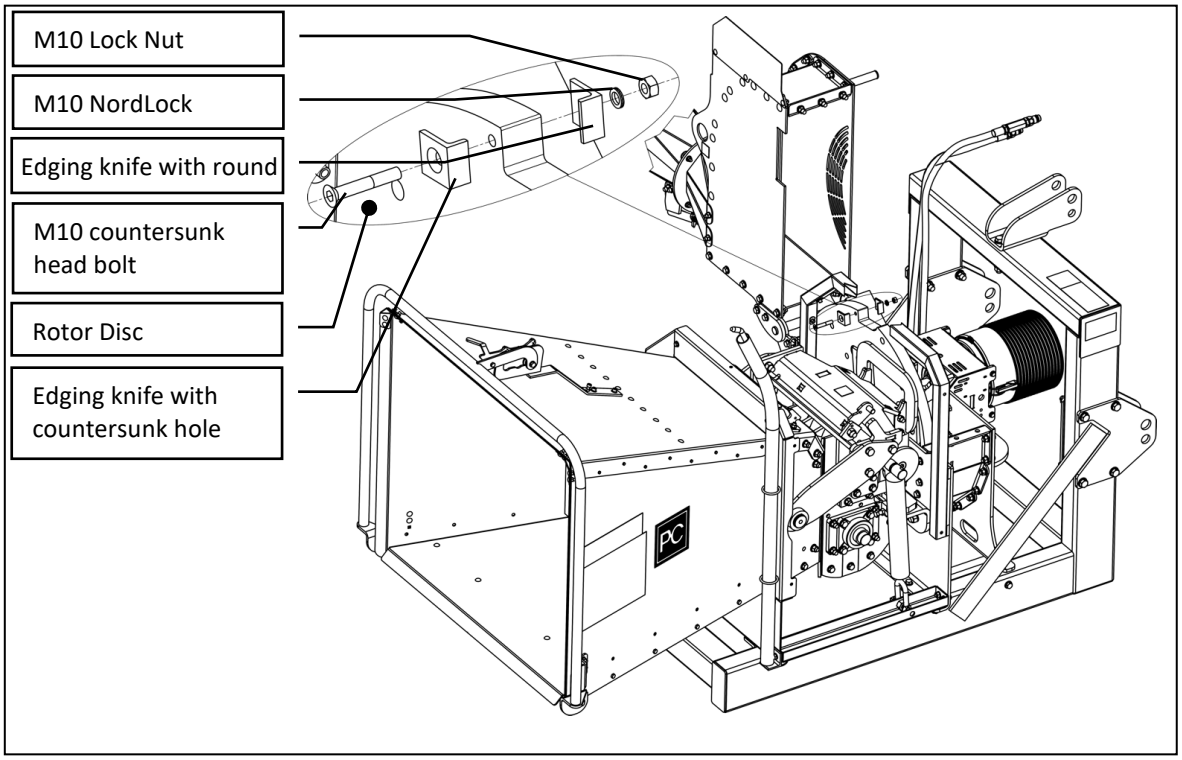


Figure 21

Warning: Lack of edge knives can create frictional heat and a real risk of ignition of wood. Therefore, always have the edge knives mounted!

7.6 Changing the ejector blades

It is usually rarely necessary to dismantle the ejector blades. However, should the blades be damaged, it may be necessary to maintain or replace them.

The wings (see section 12 for placement) is removed by first locking the rotor (see section 7.2) and then unscrew the bolts and remove the blade.

The blades are mounted by simply placing them over the holes in the rotor and screwing the bolts and washers back on and tightening them securely. Damaged bolts must also be replaced if necessary. Remember to turn the blade correctly.

After replacing the blades, the rotor must be properly rebalanced. It is important to adhere to this to ensure that the rotor does not get into unwanted oscillations! This must be observed!

The ejector blades must be replaced for either every 1,000 operating hours or every 5,000 m3 of chipped chips (whichever occurs first) to avoid blade fatigue.

Warning: Always have both ejector wings fitted with all bolts and washers properly fitted and tightened during operation. If one blade is omitted, the rotor can oscillate and, in the worst case, break down.

Warning: When the blades are removed/mounted, the balance of the rotor changes and it will therefore start to turn itself. Therefore, take care of your fingers and never put your fingers into the machine.

7.7 Changing tile size

The tile size can be changed to get a tile size that suits your needs.

The chip size you get with a given setting of the chipper depends on a number of conditions:

1. The type of wood
2. Wood moisture
3. The knife height
4. Feed rate

Re 1. Different types of wood have different hardness, which in turn has an impact on the tile size.

Re 2. The drier the wood, the greater the tendency it has to splinter, whereas more moist wood tends to make more uniform pieces of wood chips.

Re 3. The knife height above the front of the main rotor has an impact on how much each knife can take from the wood to be cut each time the knife passes this. If the knife height is low, a little can be removed, with generally small chips as a result. Conversely, if the knife height is high, a lot can be taken off, with correspondingly generally large chips as a result.

Re 4. By turning the flow valve on the control valve (see Figure 7) not only adjusts the speed of the feed rollers, but also to a certain extent the chip length. The faster the feed rollers run, the coarser the chips you get. Conversely, the wood chips will be finer if the feed rollers run slowly, as the wood will be hit by a knife and thus chopped before it hits the rotor. This means that the entire blade height is not utilized. To make optimal use of the knife height, the wood must precisely hit the rotor and then it must be hit by a knife.

As you can see, it is only points 3 and 4 that are immediately possible to change, but of the 2 it is only the knife height that has a real impact on the *general* tile size.

7.7.1 Setting the tile size with shims under the knife

By using a shimmer between the knife and the rotor, you can set the knife height and thus the general tile size. The shims are available in a variety of thicknesses and can be combined for most needs.

On Figure 22Figure 18 see how the shims are placed between rotor and knife for PC-2000-SEH-1H and PC-2000-SEH-2H

Once you have fitted or removed shims, remember to adjust the counter bars to fit the new knife height. In particular, it is also important to pay attention to the side counter blades when you have inserted shims that increase the knife height.

Note: The maximum blade height allowed is **20 mm!** See Figure 22.

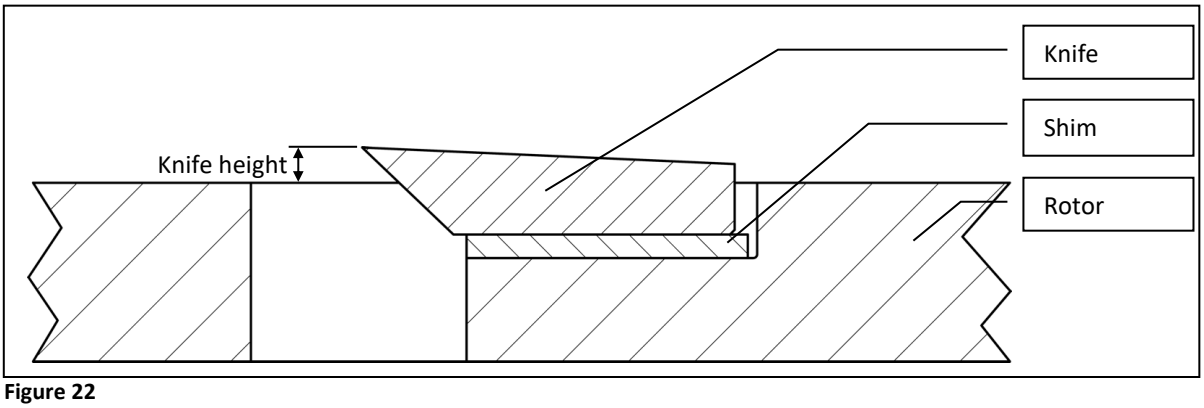


Figure 22

7.7.2 Setting the Chip Length When Adjusting Oil Flow

As mentioned earlier in section 5.4, by turning the flow valve on the control valve, you can adjust the speed of the feed rollers, and thus also to a certain extent the chip length. The faster the feed rollers run, the coarser the chips you get. Conversely, the wood chips will be finer if the feed rollers run slowly, as the wood will be cut over by a knife before it hits the rotor – You can say that the full knife height is not used in this way.

It is not recommended to use this method to generally adjust the tile length, as it is difficult to control. The ideal is to run the feed so fast that the wood just hits the rotor disc before it is chopped. But since this is difficult to achieve in practice, and since the rotor does not run at a constant speed due to it losing revolutions when the wood is chopped, you will drive best by feeding a little slower than necessary. In this way, you ensure that the wood does not hit and slow down the disc before it is chopped, and you therefore minimize the importance of the feed speed, and it is therefore the knife height that determines the chip size in the first place.

7.8 Lubrication of bearings/hinge arms

To ensure a long service life for the bearings, they must be lubricated regularly.

If the machine is used 8 hours a day, the bearing manufacturer recommends lubricating the bearings 1-2 times a year with a lithium soap grease where the minimum viscosity is 68 mm2s-1.

For lubrication of bearings and hinge arms, it can be advantageous to use a lubrication gun that fits the lubrication nipples, which can be found at all lubrication points. The location of the bearings, hinge arms and grease nipples can be found at Figure 23.

The bearings are lubricated by first removing the front, top and rear fenders as well as the bearing fender (see section 6.4.1). The two main bearings are given 3 pump strokes, and the small ones are given 11/2 pump strokes. If this amount is exceeded, there is a risk of overheating of the bearings during start-up. Please note that the tenants not must be filled with fat. Beware not To press too much grease in the bearings as this can push the gasket out of the bearing.

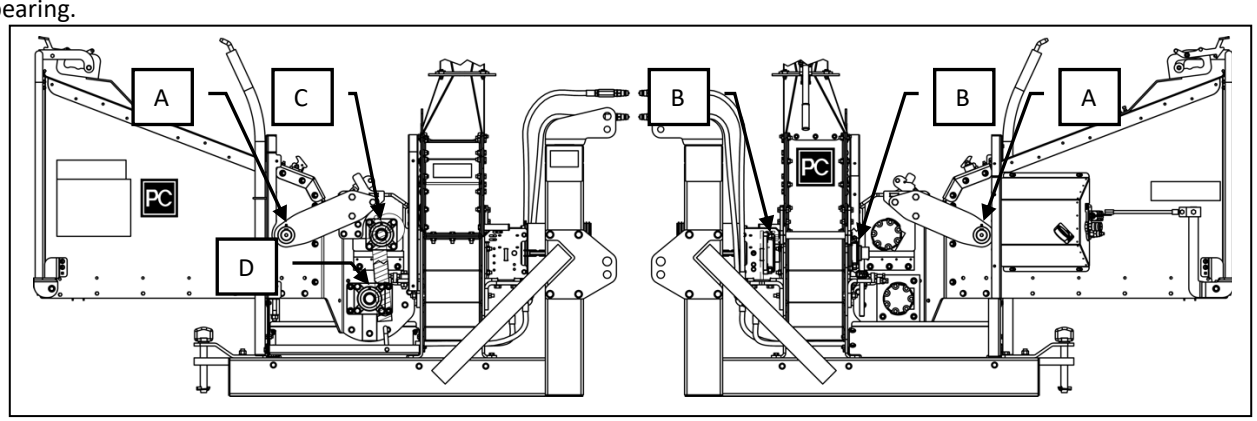


Figure 23

Lubrication points:

Selection	Place	Number	PC-2000-SEH-1H	PC-2000-SEH-2H
A	Hinge arm	2	x	x
B	Main bearing (rotor)	2	x	x
C	Bearing for overrollers	1	x	x
D	Bearing for underrollers	1		x

7.9 Lifting and lowering the upper part of the feeder

To get a better view of the setting of the counter steel, etc., the upper part of the feeder can be lifted and locked.

7.9.1 Lifting the upper part of the made-iron

The easiest way to lift the upper part is to follow the following procedure:

1. Remove front, top and rear fenders as described in section 6.4.1.
2. Loosen the spring by turning the pad clockwise using the supplied tube with spike (see Figure 24 B).
3. Remove the spring (which is now untensioned) from the axle pin welded to the roundabout.
4. Turn the hook on the upper part down (see Figure 24 B).
5. Lift the top of the feeder with the supplied tube and hold it in place with the hook (see Figure 24 D).
6. The split (see Figure 24 D) can now be inserted through the hook and hook holder that catches the hook so that the upper part is locked.

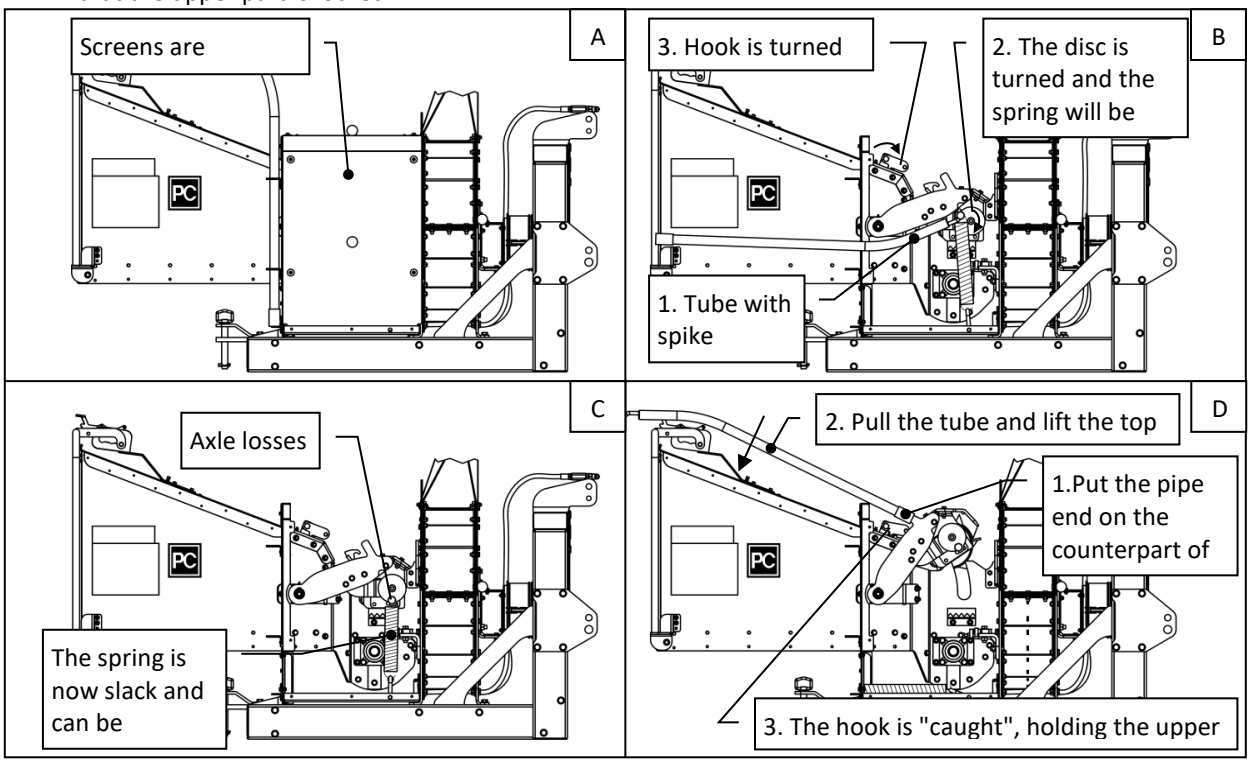


Figure 24

Warning: When the upper part of the feeder is lifted, never put your fingers under the top, even if the upper part is locked by the hook and secured by the split. The upper part opens only to be able to better see the counter-steels, etc.!

7.9.2 Lowering the upper part of the feeder

Before closing the feeder, check that all the counter bars are sufficiently clamped.
The closing of the feeder takes place in the opposite order of the opening of the feeder:

1. The supplied pipe is inserted its counterpart on the upper part of the feeder.
2. While pulling lightly on the tube, the hook holding the top can be twisted away. The upper can now be lowered into place.
3. The hook is turned backwards so that it does not catch the top part when the chipper is put into use.
4. The spring is lifted into place on the axle pin on the roundel, and this is turned with the spike at the end of the tube so that the spring is preloaded.
5. The screens can now be remounted (see section 6.4.1).

Warning: Take care of your fingers when lowering the upper.

7.10 Counter steel

On the chipper, a number of counter steel is placed, which ensures that there is a good cutting effect between the counter steel and the chopping knife.

7.10.1 Bottom Mod Steel

In the following sections, it will be described how to check, set, replace and correctly install the bottom mod steel. It is very important that you follow the procedures in these sections to avoid possible hazards and damage.

7.10.1.1 Setting the bottom counter bar

The bottom counter steel is easiest to adjust in the following way (see Figure 25):

1. The upper part of the feeder is lifted so that there is a view of the counter steel and rotor (see section 7.9.1). The upper part of the rotor housing may also be opened for additional visibility (see section 7.1.1).
2. The two locking bolts in the sides of the bottom counter steel are loosened (but not unscrewed), and one locking bolt (with an internal 6-edge) in the middle of the counter steel is also loosened, using a 6-edge socket (for a socket wrench) with a long extension to insert into the 6 edge of the bolt. Do not put your hand under the roller!
3. The counter steel can be adjusted by screwing on the set and check screws respectively (see Figure 25). Read more about the nomination below.
4. When the setting is satisfactory, screw both the set and check screws into the counter steel and tighten the jam nuts on these.
5. The two locking bolts on the sides are tightened tightly again, and also the middle locking bolt with an inside 6-edge is tightened in the middle of the long extension.

The counter bar must be set so that there is a distance of approx. 1-2 mm between the counter steel and the blades on the rotor. By **gently** turning the rotor around by hand, it is checked that the distance between the counter steel and all the blades is correct. If there is too much or too little space, screw on the set screws until the distance is right. Remember to check the entire width of the counter steel in case it is set slightly crooked.

When all The blades have passed the counter steel, it is recommended that you run another round with the rotor to ensure that the counter blades are completely free of the blades. If the setting is satisfactory, the 3 bolts that hold the counter steel to the boom during operation are torque-tightened. In addition, the set screws, check screws, and their jam nuts must also be tightened (see Figure 25), so the counter steel is completely locked in all directions.

To further secure the bolts, both the bolts that hold the counter steel firmly against the crossbar and the two set screws are locked with thread through the holes in the bolt heads – **This must be observed.**

Warning: Beware of sharp, freshly sharpened blades on the rotor as the rotor rotates.

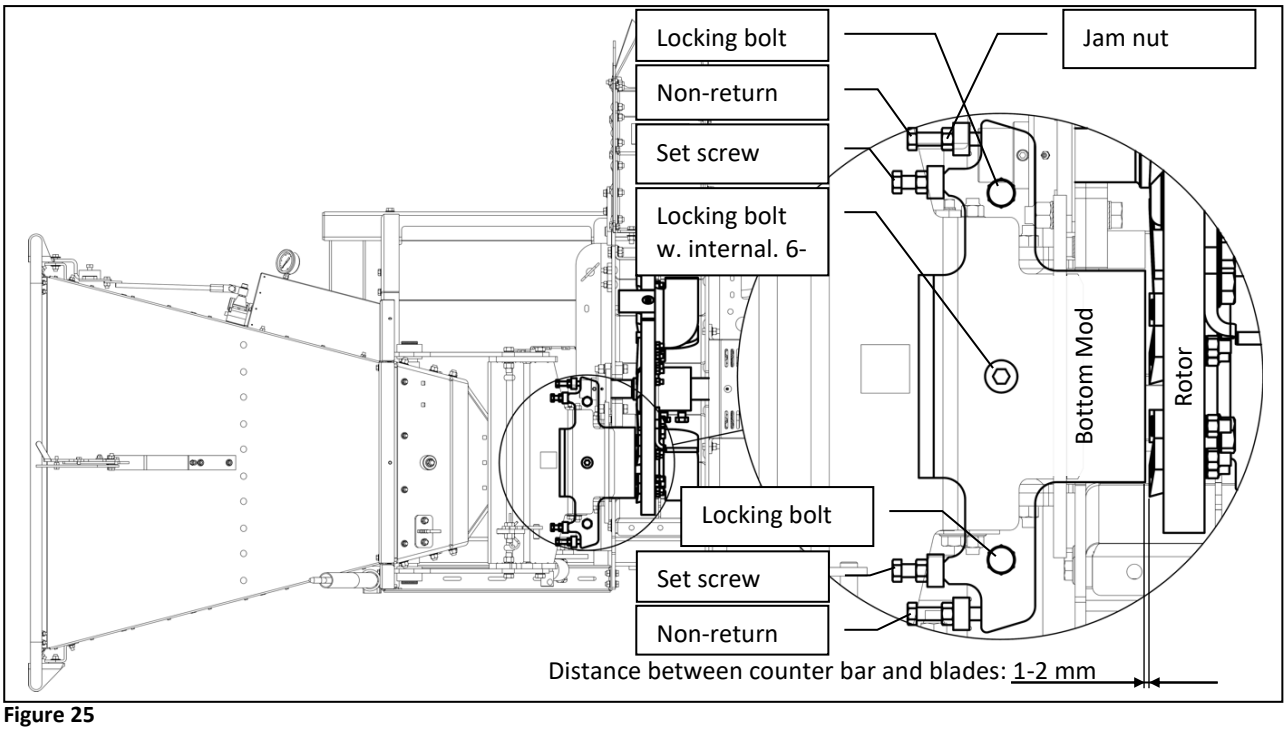


Figure 25

7.10.1.2 Changing the bottom steel

The bottom steel can be replaced by first dismantling the feeder (contact the manufacturer or representative for information on this). Then unscrew the 3 bolts that hold the counter steel. The new counter steel is put in place, one M16 bolt on each side and one countersunk bolt in the middle is loosely inserted together with the NordLock washers as shown on the Figure 26. The counter steel is set at the correct distance to the blades, cf. section 7.10.1, and tighten the bolts.

It is very important not to forget the NordLock washers.

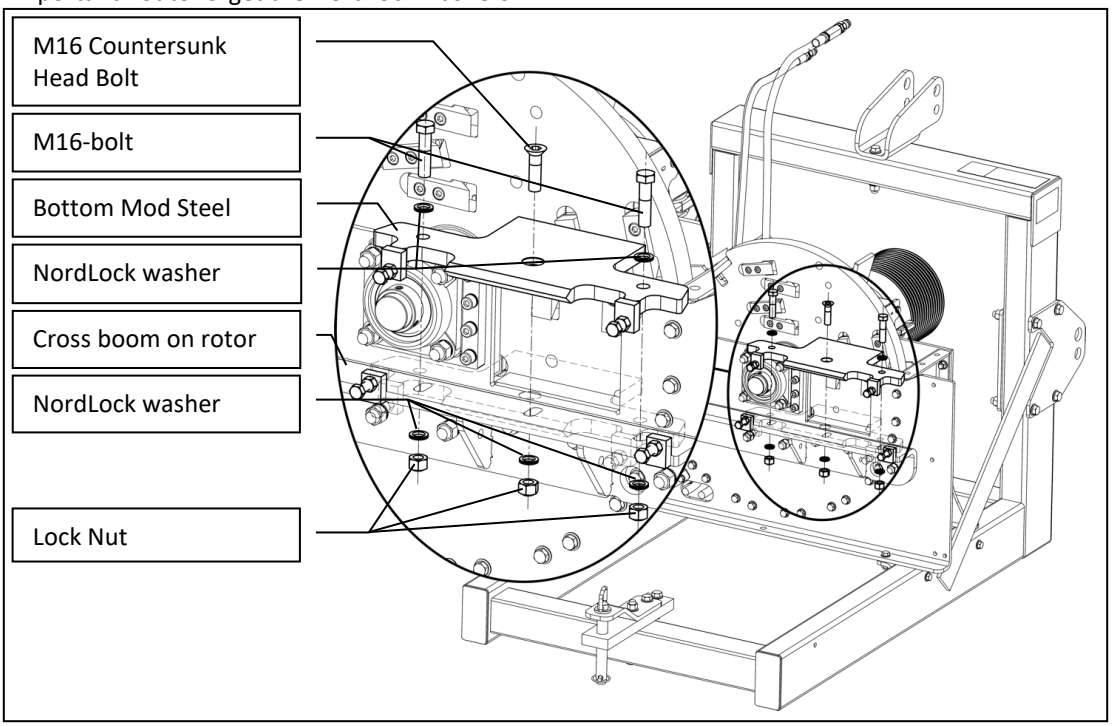


Figure 26

7.10.2 Side Stud Steel, PC-2000-SEH-1H and PC-2000-SEH-2H

In the following sections, it will be described how to check, set, replace and correctly install the side counter steels. It is very important that you follow the procedures in these sections to avoid possible hazards and damage.

7.10.2.1 Side Mod Steel Check, PC-2000-SEH-1H and PC-2000-SEH-2H

The side counter steels are permanently mounted on the inside of the rotor housing (see Figure 27), with M12 bolts cylinder head and 6-edge internal, as well as NordLock washers.

On delivery, the side counter bars have a distance to the blades of 2-3 mm. It is recommended that the side counter steel be replaced when this distance exceeds 4mm. If the distance approaches 6 mm, the side counter steel must be replaced for safety reasons!

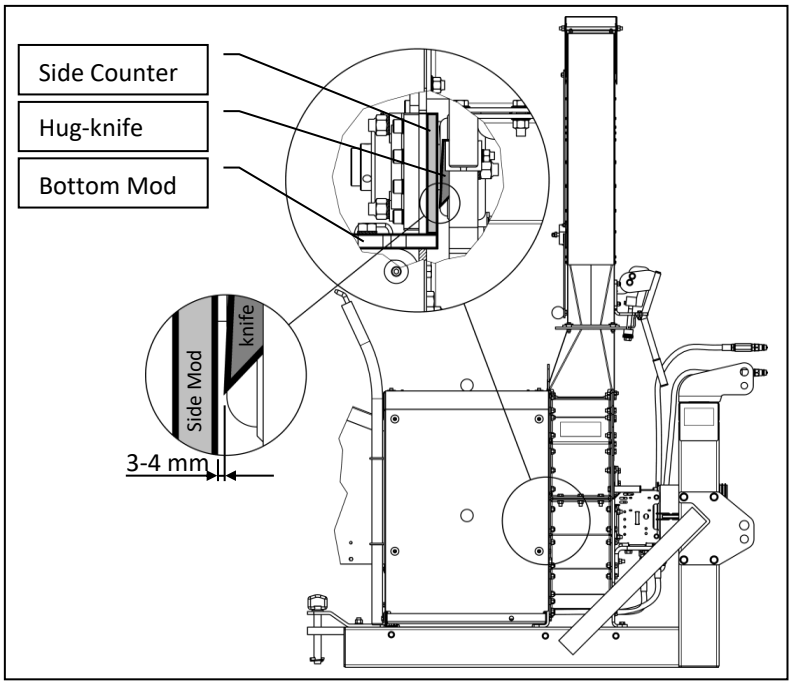


Figure 27

Please note that the stated distances between the side bar and the blades only apply to new blades.

7.10.2.2 Replacement and adjustment of side counter steels PC-2000-SEH-1H and PC-2000-SEH-2H

If the knife height changes, the side counter steel must be adjusted to the new knife height so that the distance between the knives and the side counter bar fits. The distance between the side bar and the knife is optimally 3-4 mm.

The easiest way to replace and adjust the side dies is to follow the following procedure (the procedure is the same for both side counters):

1. Remove the front, top and rear fenders cf. 6.4.1 and 6.4.2.
2. Open the upper part of the rotor housing (see section 7.1.1) and lock the rotor with the split bolt as shown under section 7.2.
3. There is now access to the side resistor (see Figure 28).
4. The bolts that hold the counter steel can now be unscrewed, making sure that the counter steel does not fall into the chipper when the last bolt is removed.
5. A new side counter steel, and shims that give the desired height of the counter steel, are found.
6. The new side mod steel can now be mounted as shown on the Figure 28, with a number of shims to provide the desired counter steel height, with M12 bolts with cylinder head and internal 6-edge, and NordLock washers.
7. After the first bolt has been inserted and tightened, check that it does not protrude outside the counter steel on the opposite side. If the bolt sticks through the side resist steel, a shorter bolt must be chosen or it must be shortened. This can be done, for example, by filing or grinding a little of it so that the bolt end is flush with

the side countersteel. There must be not Washers are used as shims to limit how much the bolt protrudes, as it will prevent the NordLock washers from working properly. Bolts that are too short must also not be used. See more Figure 29 for proper installation.

8. When the side counter bar is mounted and the bolts torque-tightened, check that the distance between the counter bar and the knife is between 2-3 mm. If this is not the case, remove or add shims, or possibly choose a different thickness of side facing steel.
9. Once the counter bar has been changed and adjusted, the rotor is carefully turned a few times, ensuring that all blades are at a suitable distance and that nothing is imposed.
10. When one side counter bar is correctly mounted, repeat the procedure for the counter bar on the other side of the feed hole.
11. When everything is satisfactory, the machine can be closed again, the screens mounted, etc., and the chipper is ready for use.

Warning: Beware of sharp blades, as there is a direct hole in the rotor when replacing the side counter steel.

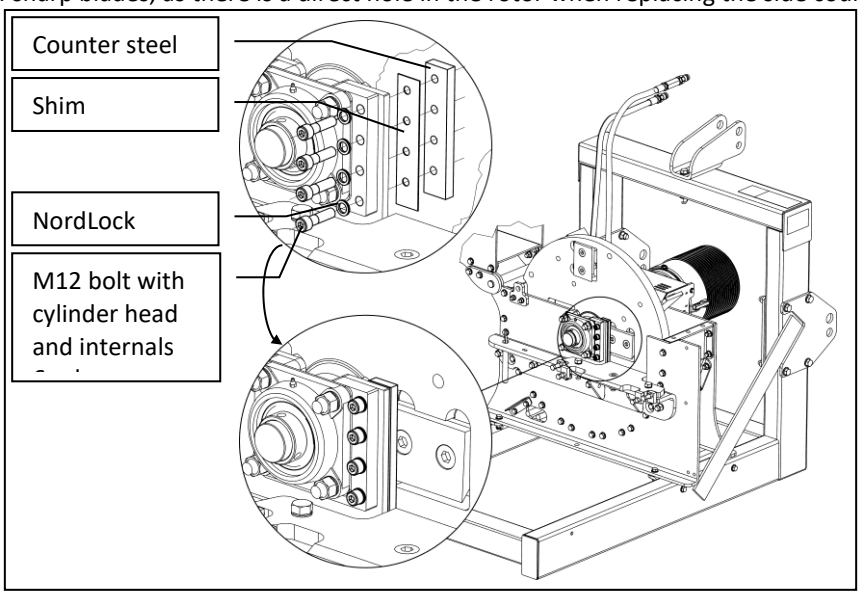


Figure 28

7.10.2.3 Correct installation of side counter steel

When the side counter steel is mounted, it is important that the bolts are not too long or too short. In addition, it is important not to use ordinary discs as shims, as this will prevent the NordLock discs from working as intended.

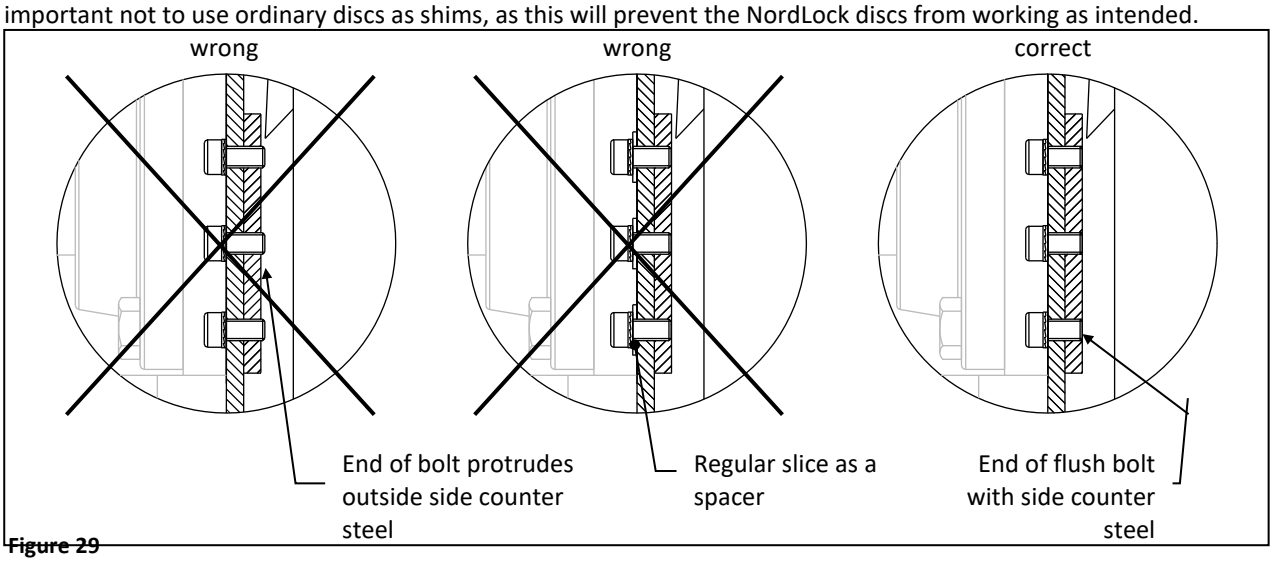


Figure 29

7.11 Hydraulic diagrams

If the hydraulic hoses have been removed or if they are replaced, it is important to install the hoses correctly.

When working with the hydraulic hoses, it is important to make sure that there is no pressure on the hydraulics. If there is pressure, there is a risk that hydraulic oil will spray out from the hoses when they are removed. Therefore, never have the hoses mounted on the tractor's hydraulic outlet when working with the hoses.

You can briefly put the handlebar in the feed position and then put it back in the stop position. In the feed position, the oil will have free flow to return, and the system should then be pressure-free. However, be careful when working with the hydraulics if there are still faults in the system. Do not blindly rely on the pressure gauge.

Warning: When working on the hydraulic system ¸ the hydraulic hoses must be removed from the tractor's hydraulic outlet!

Warning: When working on the hydraulic system ¸ the PTO shaft must be removed!

7.11.1 Hydraulic diagram for PC-2000-SEH-1H (single overhead roller)

To ensure that the feeder works as intended, the hydraulic hoses must be fitted correctly.

The hydraulic hoses are installed correctly by following the instructions on the Figure 30.

When working on the hydraulic system, remember to remove the hydraulic hoses from the tractor's outlet to ensure that there is no pressure on the hydraulic system.

Please note that the direction of rotation of the feed roller(s) must not be changed by swapping the hydraulic hoses fitted to the tractor.

At the first start-up after working on the hydraulic system, check that the feed roller rotates correctly in relation to the position of the steering bracket (see Figure 5). If this is not the case, the machine must be stopped immediately and the problem corrected. This shell be complied with.

Warning: When working on the hydraulic system, remove the hydraulic hoses from the tractor's hydraulic outlet!

Warning: When working on the hydraulic system, the PTO shaft must be removed!

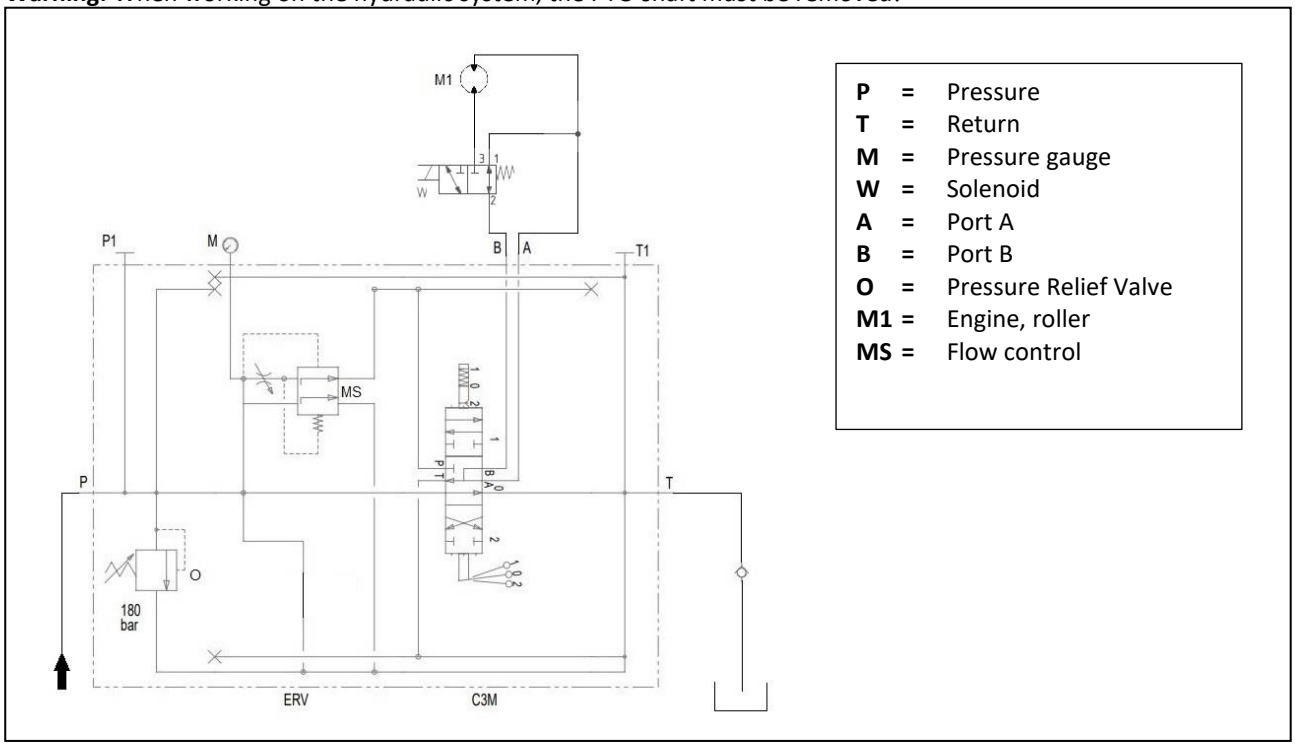


Figure 30

7.11.2 Hydraulic diagram for PC-2000-SEH-2H (two rollers)

To ensure that the feeder works as intended, the hydraulic hoses must be fitted correctly.

The hydraulic hoses are installed correctly by following the instructions on the Figure 31.

When working on the hydraulic system, remember to remove the hydraulic hoses from the tractor's outlet to ensure that there is no pressure on the hydraulic system.

Please note that the direction of rotation of the feed roller(s) must not be changed by swapping the hydraulic hoses fitted to the tractor.

At the first start-up after working on the hydraulic system, check that the feed roller rotates correctly in relation to the position of the steering bracket (see Figure 5). If this is not the case, the machine must be stopped immediately and the problem corrected. This shell be complied with.

Warning: When working on the hydraulic system , the hydraulic hoses must be removed from the tractor's hydraulic outlet!

Warning: When working on the hydraulic system, the PTO shaft must be removed!

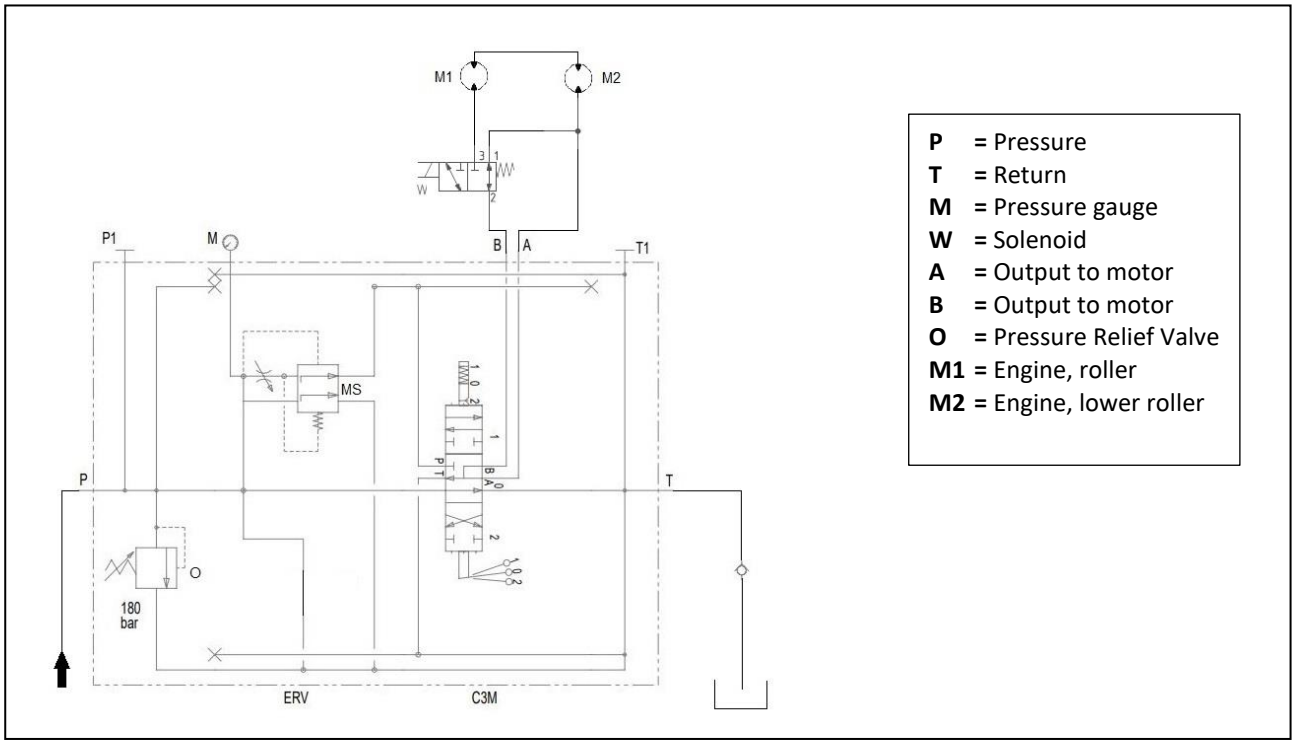


Figure 31

7.12 Replacement of hydraulic hoses

If a hydraulic hose has been damaged, for example if a hose has burst, it must be replaced.

When a new hose is purchased and installed, it is important that it complies with the following specifications:

Default : EN857 2SC
Dimension : 1/2"
Pressure (nominal) : 275 bar
Temperature range : -40 – 100 °C

Furthermore, hoses that are not covered by screens must be placed in a "sock" that ensures that oil does not spray on the person operating the chipper if the hose bursts a leak. This must be observed.

Hydraulic hoses purchased from the chipper manufacturer must be tightened with 70 Nm. If hydraulic hoses from another supplier are used, contact the latter for information on correct installation.

7.13 Check valve on hydraulic hose

Since the control valve must not be pressurized on the return gate, a non-return valve is screwed on the return hose to the tractor to ensure that you do not accidentally put pressure on the wrong hose.

The non-return valve works in such a way that it only allows oil flow in one direction, and it must therefore be mounted in such a way that it allows oil flow from the chipper to the tractor.

When the non-return valve is correctly installed and you accidentally switch the approach and return, nothing happens, as the non-return valve will block the hydraulic oil to the chipper.

For the check valve to function properly, it must be fitted as shown on the Figure 32. Note the symbol on the check valve indicating the flow direction.

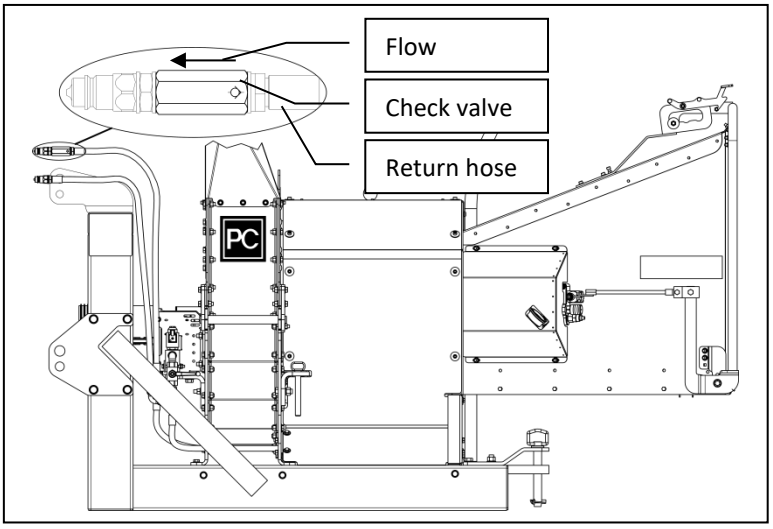


Figure 32

7.14 Setting the pressure relief valve on the control valve (hydraulic valve)

It may sometimes be necessary to set the permissible hydraulic pressure using the pressure relief valve on the control valve block located on the side of the hopper (see Figure 7).

If the pressure is too low, the machine does not perform optimally (the rollers cannot pull the wood into the machine), and it is advantageous to raise the permissible pressure with better performance as a result.
If the pressure is too high, there is a risk of reducing the service life of the hydraulic parts. Especially the hydraulic motors can only handle higher pressures than specified, for a very short time at a time.

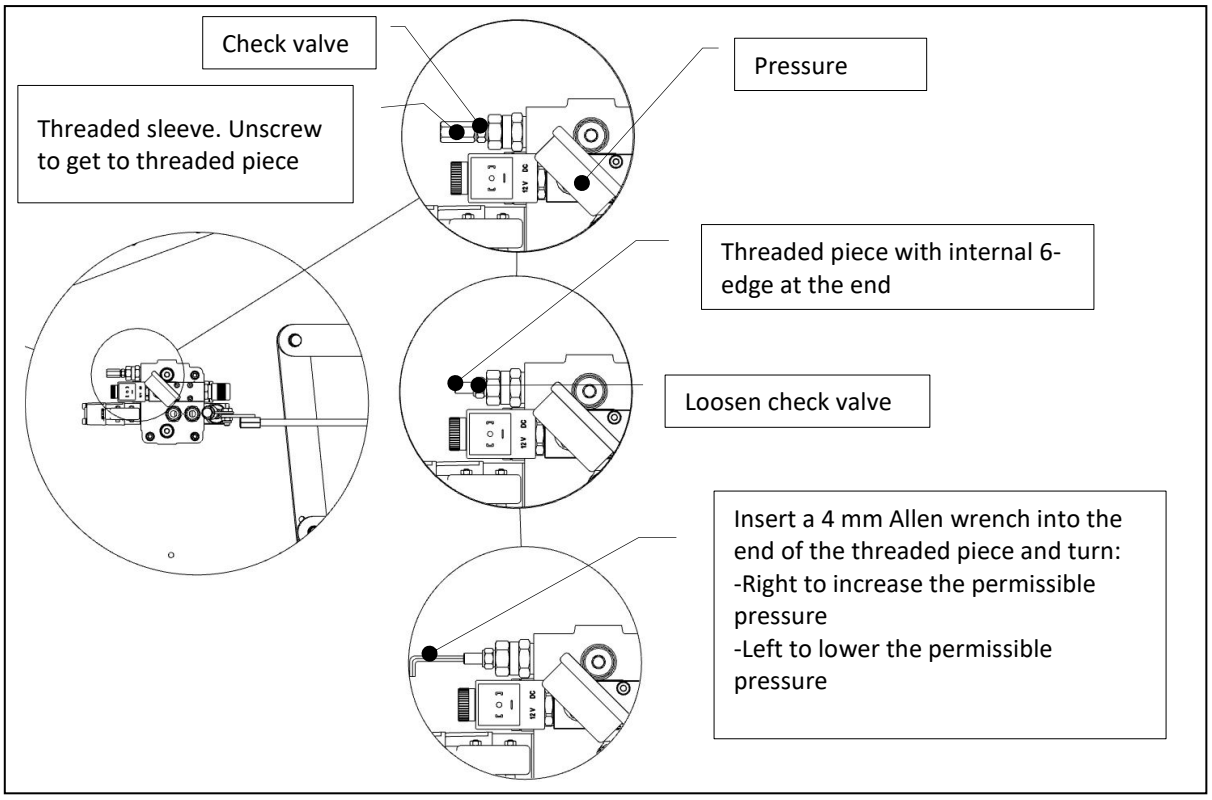


Figure 33

If the chipper pulls wood into the machine and suddenly stops feeding, it may be because the pressure is set too low. When the tree stops, the pressure in the hydraulic system will increase, which can be read on the pressure gauge. If the pressure read does not reach anywhere near 150 bar, it is worthwhile to set the pressure relief valve to allow a higher pressure. If the pressure exceeds 150 bar , the pressure relief valve must be adjusted downwards to ensure a long service life of the hydraulic components.

The above only applies if the rollers stop due to lack of pressure, NOT if it is the speed guard (optional) that turns off the feed.

It is important to understand that the pressure that can be read on the pressure gauge is an expression of how hard the pull is working; i.e. if the pull in is easy, a low pressure is shown, and if it has difficulty pulling a piece of wood in, a high pressure is shown – up to 150 bar. Therefore, if the wood in the machine is stationary and 150 bar is shown on the pressure gauge, then the upholstery has no more force to do with. You must therefore reverse and possibly try to turn the tree, or, if possible, remove some side branches on the tree. The solution is not to adjust the permissible pressure above 150 bar.

The pressure relief valve must be set to a maximum permissible pressure of 150 bar. This is easiest done in the following way:

1. Start the chipper according to the instructions in section 5.
2. Feed in wood measuring less than 20 cm at one end and over 20 cm at the other end, with the thin end first in the wood chipper to block the rollers.
3. When chipping wood, you can read the pressure on the pressure gauge (see Figure 33). The pressure will fluctuate depending on the operating conditions and if it exceeds 150 bar shell The pressure is adjusted downwards.
4. If the pressure is to be adjusted, loosen the jam nut on the threaded piece. Note that it is not necessary to unscrew the nut completely.
5. A 4 mm Allen wrench is inserted at the end of the thread piece and turned:
   -To the right (clockwise) to increase the permissible pressure.
   -Left (counterclockwise) to lower the permissible pressure.
6. By adding wood to the chipper, the pressure gauge checks whether the pressure is satisfactory.
7. When the pressure is set correctly, tighten the jam nut.

It can be an advantage to be two people when setting the pressure. One puts wood in the chipper, while the other checks and sets the pressure.

It is recommended to check the pressure regularly and, if necessary, re-adjust it to ensure the service life of the hydraulic parts.

Warning: It is important that the pressure does not exceed the permitted 150 bar as it will, sooner or later, destroy the hydraulic motor.

7.15 Fitting a spout

When the spout is to be mounted, it is an advantage to be two people.

The spout is two-part, and the lower part is fixed to the upper part of the rotor housing. The upper part of the spout is held to the lower part with a series of handlebars, and in order to mount the upper part of the spout, one of these guides must be removed.

The easiest way to install the top of the spout is to follow the following procedure (see Figure 34):

1. One of the guides that will hold the upper part of the spout is removed from the flange on the lower part of the spout.
2. The top of the spout is lifted into place, sideways, ensuring that the locking block on the bolt from the locking arm goes under the flange on the bottom of the spout. The flange of the upper part must be pushed under the three handlebars that are still on the lower part of the spout.
3. The handlebar that was first removed can now be remounted, and the upper part of the spout is now in place.
4. The locking arm is now moved into the locked position and it is checked whether it locks the spout sufficiently or too much. If it needs to be adjusted, follow the procedure in section 7.16.
5. The spout is now ready for use.

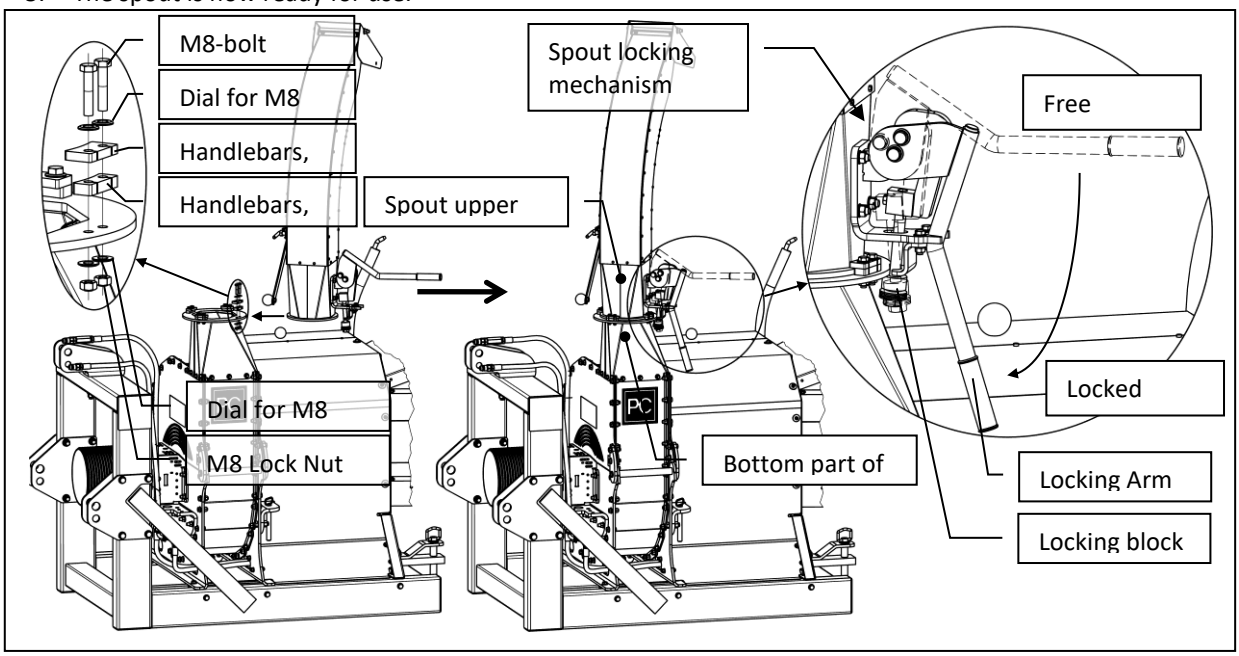


Figure 34

7.16 Adjusting the spout locking mechanism

If the locking mechanism is too loose or too tight, it can be adjusted. The mechanism must be so tight that it prevents the spout from turning when the chipper is in use and during transport. At the same time, it must be so loose that you can lift the locking arm in a free (horizontal) position without having to force.

The easiest way to adjust the locking mechanism is to follow the following procedure (see Figure 35):

1. Pull the locking lever into the free position (horizontal position).

2. Loosen the locking screw.
3. Adjust the set screw – up to tighten the mechanism, down to loosen the mechanism.
4. Pull the locking lever into the locked position (vertical position).
5. If the setting is not correct, pull the locking lever back into the free position and adjust the set screw again.
6. If the setting is satisfactory, tighten the locking screw and the spout is now ready for use.

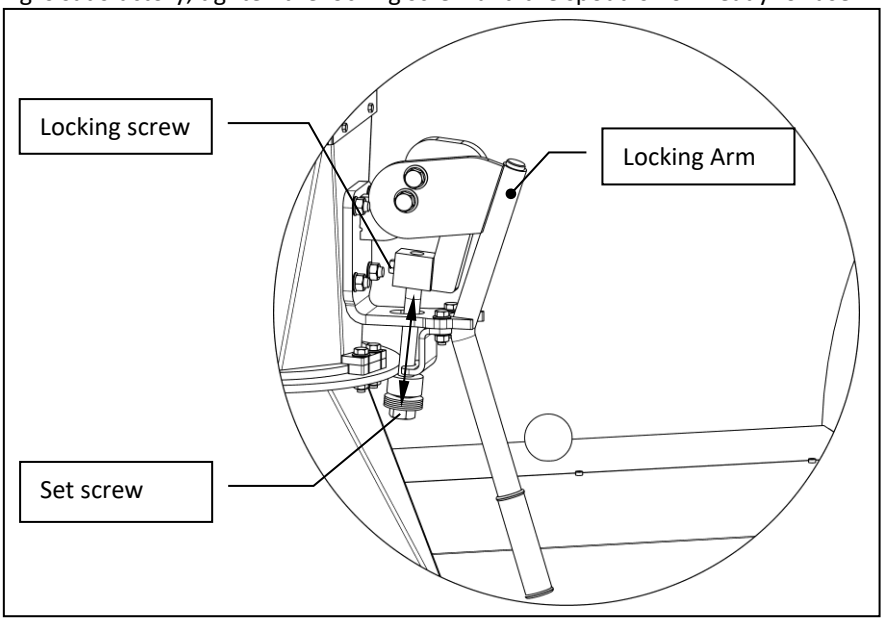


Figure 35

7.17 NordLock washers

NordLock washers are special washers that are intended for use in places where there needs to be extra good security against bolts and nuts rattling loose, e.g. when the blades are to be mounted on the rotor.

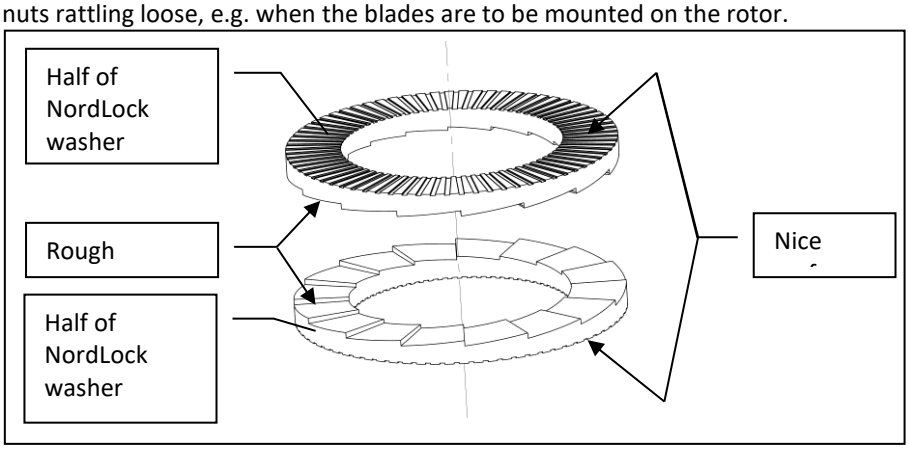


Figure 36

The NordLock washers must always Mounted in pairs with the rough surfaces (see Figure 36) against each other in order to function properly (see example Figure 37). If the bolt has a 6-sided or cylindrical head, NordLock washers must also be fitted between the The head and the subject that is tense.

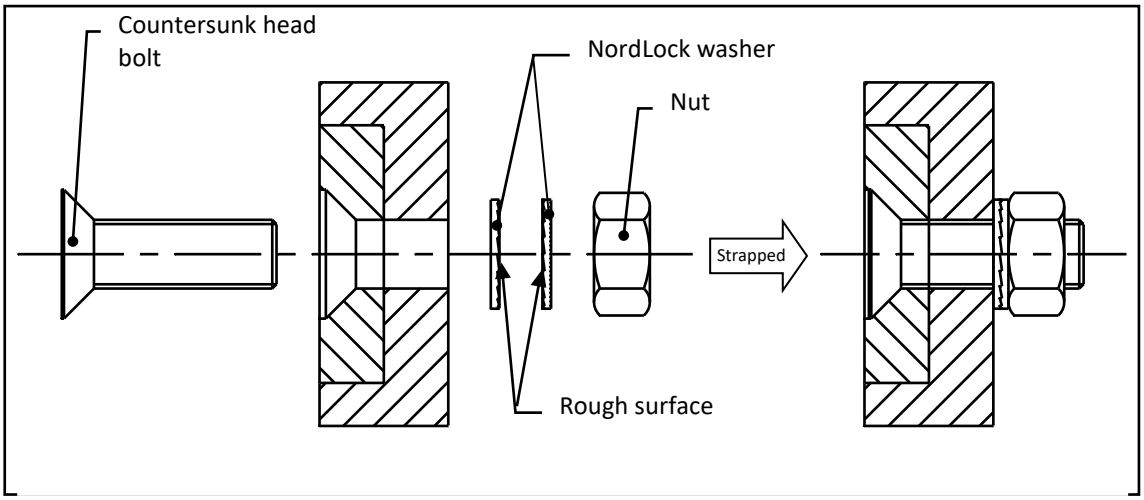


Figure 37

When tightening the bolt or nut, make sure that the NordLock washers are centered on top of each other to ensure that they are working properly.

Note: If the NordLock washers are tightened against a bolt or nut up to grade 8.8, the washers can be reused up to 5 times. If the quality of the bolt or nut is 10.9 or above, the washers must be replaced each time the bolt or nut is removed!

The bolt quality is read on the bolt head or on the nut.

7.18 PTO shaft cover

To avoid damage to the PTO shaft, it should be placed in the hook located at one side suspension when the chipper is not in use (see Figure 38).

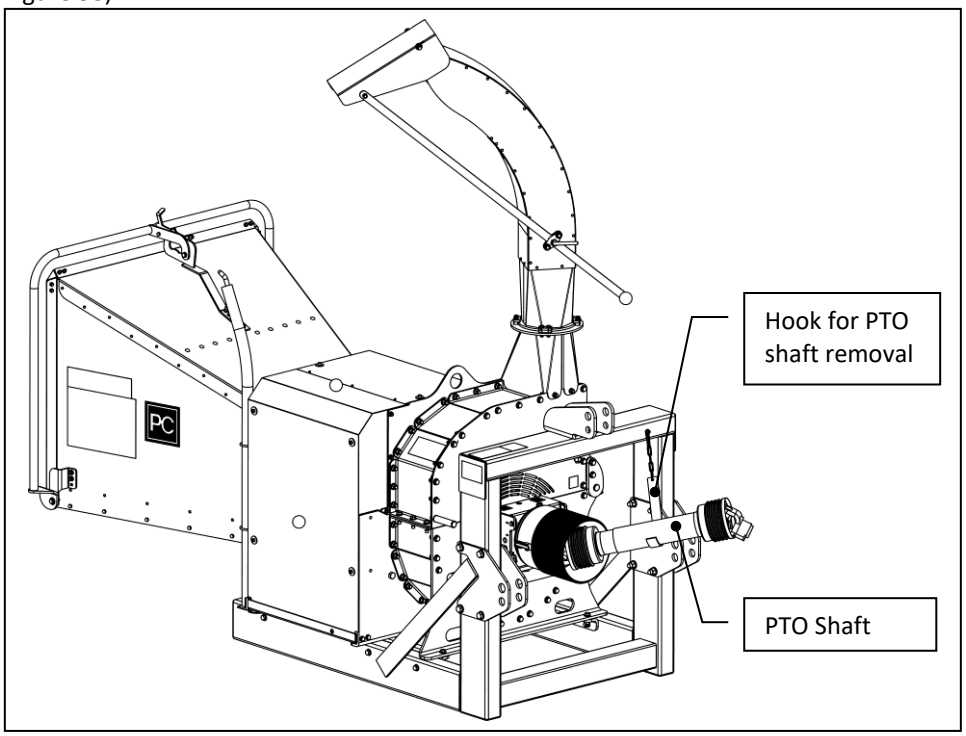


Figure 38

7.19 PTO shaft maintenance

To ensure a good service life of the PTO shaft, it must be properly maintained. Read the manual that came with the PTO shaft to see how to do this.

8 Key Diagram

The purpose of the key diagram is to show the function and composition of the electrical functions mounted on the chipper (see Figure 39).

The diagram can be used for troubleshooting if problems arise with the functionality of the chipper. It is recommended to contact trained personnel in troubleshooting electrical components to ensure the best possible troubleshooting.

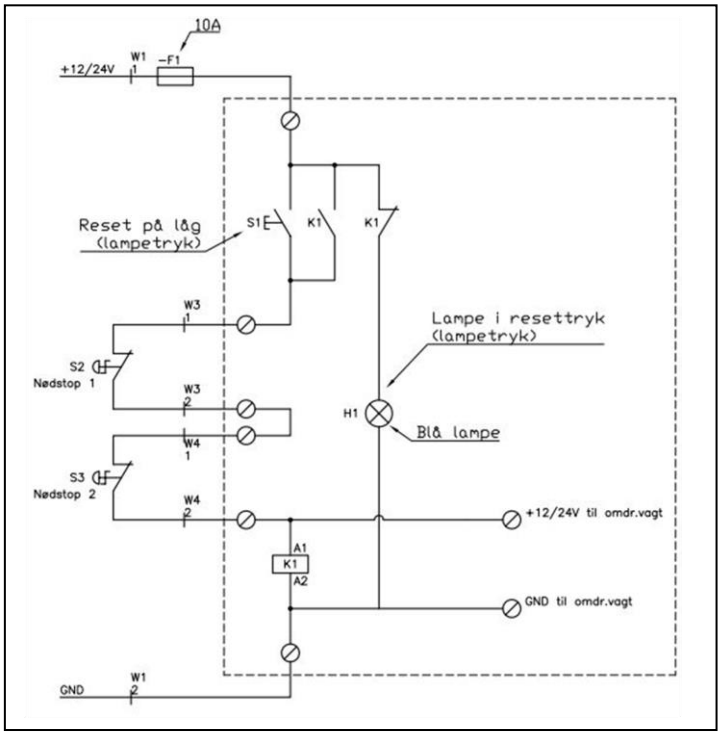


Figure 39

9 Rotation Guard (optional)

The speed monitor constantly measures the rotor's speed, and if this falls below a predetermined number, it is a sign that the tractor is running out of power and cannot keep up anymore. The speed guard therefore stops the feed rollers so that the tractor has time to get the rotor up to speed again, after which the feed rollers are started again. It all happens automatically.

9.1 Default speed setting

On delivery, the speed switch is set to **start** the feed rollers when the rotor speed exceeds 950 rpm and stop the feed rollers when the rotor speed drops below 750 rpm.

Of course, this does not apply if it has been agreed that the speed guard is delivered with a different setting.

9.2 Overall service

The Fransgård PC-Chipper enables rotational monitoring of the rotor and infeed rollers, as well as alarm setting when both low and high limit values are exceeded.

If used in accordance with the guidelines in this manual, the monitor will be a useful and reliable tool for many years to come.

9.2.1 Various functions and display views

The following features are included with your computer:

	Programmable tachometer (revolutions per minute). Used with sensor for rotor revolutions.
	Programmable tachometer with visual alarm (revolutions per minute). Used with feel for roller revolutions.
	Working hours (hours/minutes)
	Total working hours (hours/minutes)
Type	Choosing a machine type

The functions are further elaborated in the following Chapter 2.

9.2.2 Monitor Overview

Marker
Display marker (vertical or horizontal) on the left side of the display indicates which function is currently shown in the display.

Display

Control buttons
Switch between display views. Initiate changes to the marked value. Programming in new numerical values and resetting.

Display views
Shows the possible features (values) that can be shown in the display.

Plug
Input for included sensors and possible outputs.

9.2.3 Understanding the Control Keys

↓↓-Key

Pressing the key ↓↓ switches between the different display views (indicated in the pane to the left of the end of the display) and thus between the monitor's different functions. With each press of the key, the position of the cursor/display display changes by one step. The cursor starts in the top left corner and then moves "downwards".

The key is also used to exit the change menu (see next section).

SET-Key

The key SET is used for programming (changing/deleting) values in the computer, e.g. entering alarm values for high and low revs.
The key ↓↓ navigates to the function/display that you want to change/program. Then hold the key SET for about 1 second until the number flashes. With the key C 0 9, the first digit of the value to be programmed is now changed or deleted. When the key is SET pressed, the cursor moves to the next digit in the value and so on until all digits are changed/programmed. The programming menu is finally exited by pressing the key ↓↓ and the programmed value is stored in memory.

C 0 9-Key

The key C 0 9 changes or deletes the values to be programmed (and which have only been made to flash when using the key SET).

See also the examples below.

9.3 Review of features

9.3.1 Specification of functions and limit values

Symbol:	Name:	Limit:
	Rotational Rotor	1 – 9999 rpm (in practice not less than 12 rpm)
	Speed guard rollers with visual alarm (not available)	1 – 9999 rpm (in practice not less than 12 rpm)
	Working time	0:0 – 99:59 hours:minutes 9999 full hours
+	Total working hours	0:0 – 99:59 hours:minutes 9999 full hours
Type	Choosing a machine type	1 – 18

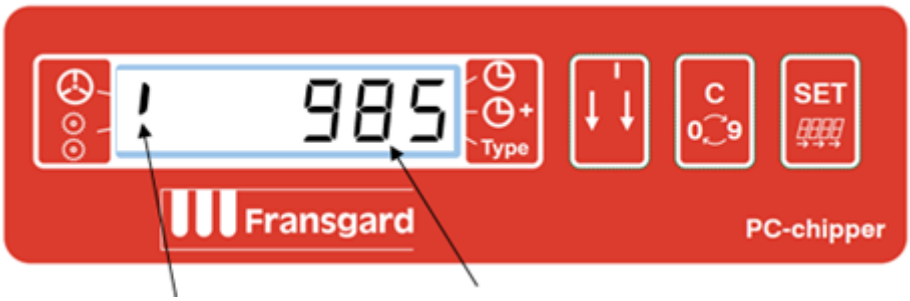
The computer is equipped with internal memory, which stores all values when the power is disconnected.

9.3.2 Speed switch of the rotor and infeed rollers[1] (rpm)

The alarm functions of the tachometers are programmable, i.e. it is possible to enter/change the alarm limit values. Both upper and lower limit values have been included. Alarms are only given on the infeed rollers. If the speed of the infeed rollers exceeds the upper limit value entered, the display flashes alternately between '0' and '9999'.

9.3.3 Display of current speed

At this display point, the top vertical marker (rotor) is marked, cf. the following figure.



Display marker at the rotor

Display of current rotor RPM

9.3.4 Programming access

To gain access to change values, one must know a password.

Display function which must have password.

Knife RPM
Roller RPM
Machine Type

[1] Revolutions on the infeed rollers are not available

9.3.5 Password

1221

9.3.6 Programming of alarm limit values

The tachometer is programmable. It is thus possible to instruct the computer to switch off the valve of the infeed rollers if the speed is less than the entered lower limit value 'L' or greater than the entered upper limit value 'h'.

9.3.7 Programming of limit values and low/high speed ratios.

Example of programming limit values on the rotor. Change of low value to 850 rpm and high value to 1000 rpm.

Example of changing low limit value to 850 Rpm and high limit value to 1000 Rpm		
Press the key:	**The display shows:**	**Explanation:**
↓↓	0	Find the rotor speed guard by repeatedly pressing the button
	c 0 0 0 0	Enter the password as follows:
SET	c x _ _ _	Hold the key for 1 sec until the "c" lights up on the left and the first digit (out of 4) flashes.
C	c x _ _	Press the key until the digit has the correct value.
SET		Press to set/change the next digit (the second digit will now flash)
↓↓	c xxxx	Press the "arrows" key to continue.
		When the password is correctly entered, the following comes:
C	L x _ _ _	Press the key until the digit has the correct value. Note that zero (0) cannot be written in this location.
SET	L x _ _	Press to set/change the next digit (the second digit will now flash)
C	L 800	Press the key until the desired digit is correct.
SET	L 800	Press to set/change the next digit (the third digit will now flash)
C	L 850	Press the key until the desired digit is correct.
SET	L 850	Press to set/change the last digit.
C	L 850	Press the key until the desired digit is correct.
↓↓	h x000	Press the "arrows" key and the "h" (high) lights up to the left and the first digit (out of four) flashes.
C	h 1000	Press the key until the desired digit is correct.
SET	h 1000	Press to set/change the next digit (the second digit will now flash).
C	h 1000	Press the key until the desired digit is correct.
SET	h 1000	Press to set/change the next digit (the third digit will now flash).
C	h 1000	Press the key until the desired digit is correct.

SET	h 1000	Press to set/change the last digit.
C	h 1000	Press the key until the desired digit is correct.
↓↓		Tap out of the programming menu. Or if the Heart rate factor and max/high need to be changed, see section 2.2.4

Below is an illustration of the change menus for the low and high limit values.

Display marker at the rotor

Change low alarm limit 'L' to 850

Change engagement value 'h' to 1000 rpm.
on the rotor

If the alarm limit values on the rotor are exceeded, the current speed is still displayed while the infeed rollers stop. If the rotor has been below the lower limit value, the inlet rollers will start up again when the rotor speed is again above the entered upper limit value 'h' (e.g. 1000 rpm).

9.3.8 Programming of values for Pulse factor and max/high 'H' rpm.

Example of programming the number of pulses per revolution – factor 'F' – on the rotor (the same principle applies to the inlet rollers) to a value of 3, and max/High value 'H' on the rotor to a value of 1100 revolutions per minute.

Press the key:	The display shows:	Explanation:
	h 1000	Continue after entering h XXXX
SET	c 0 0 0 0	Hold the key for 1 sec. until digit "c" flashes. Enter the password as follows:
C	c x _ _ _	Press the key until the digit has the correct value.
SET	c x _ _	Press to set/change the next digit (the second digit will now flash)
SET	c x _ _	Press to set/change the next digit (the second digit will now flash)
		Enter the password

↓↓	c xxxx	Press the "arrows" key to continue.
SE END	F x.00	The record shows." F" flashes.
C 0 9	F x0.00	Press the key until the digit has the correct value. Note that zero (0) cannot be written in this location.
SE END	F x.00	Tap to put the next digit
C 0 9	F 3.00	Press the key until the desired digit is correct.
SE END	F 3.00	Press to put the next digit.
C 0 9	F 3.00	Press the key until the desired digit is correct.
SE END	F 3.00	Press to insert the last digit.
C 0 9	F 3.00	Press the key until the desired digit is correct.
↓↓	H x000	Press the "arrows" key and digit 'H' flashes.
C 0 9	H 1000	Press the key until the desired digit is correct.
SE END	H 1000	Press to insert the next digit.
C 0 9	H 1100	Press the key until the desired digit is correct.
SE END	H 1100	Press to insert the next digit.
C 0 9	H 1100	Press the key until the desired digit is correct.
SE END	H 1100	Press to insert the last digit.
C 0 9	H 1100	Press the key until the desired digit is correct.
↓↓	0	Press out of programming.

Note: max/High value 'H' can only be set for the rotor.

9.4 Working hours on the machine

9.4.1 Displaying the Rotation Time on the Machine

In this display view, the top horizontal marker on the right side is activated. The total rotation time will be shown as illustrated in the following figure.

Above 99:59 hours/minutes only full hours are displayed

9.4.2 Resetting the Rotation Time on the Machine

Resetting the rotation time (operating time) of the machine can be performed at any time. First, press the key ↓↓ until the display for working hours appears. After this, the following entries are performed:

Operating time in hours and minutes

Display marker at the rotation time

Press the key:	The display shows:	Explanation:
↓↓	72:57 (example)	Find job hours by repeatedly pressing the key.
SET	72:57	Hold the key for 5 seconds until the number flashes.
↓↓	00:00	Press the key to reset the rotation time.

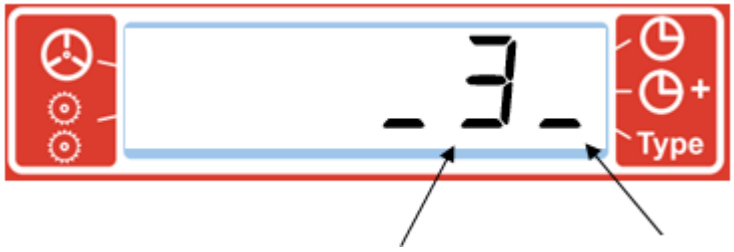
Note: The total time counter (middle horizontal cursor on the right side) cannot be reset. It is used to record the total working time of the machine.

9.5 Programming presets for machine type.

Example of changing machine type 3 to machine type 12.

Press the key:	The display shows:	Explanation:
↓↓	_3	Find the type of machine by repeatedly pressing the key.
SET	c 0 0 0 0	Hold the key for 1 sec. until digit "c" flashes. Enter the password as follows:
C 0 9	c x _ _ _	Press the key until the digit has the correct value.
SET	c x _ _	Press to set/change the next digit (the second digit will now flash)
↓↓	c xxxx	Press the "arrows" key to continue.
SE	x3	Hold the key for 1 sec until the line flashes.
C 0 9	13	Press the key until the digit has the correct value. Note that zero (0) cannot be written in this location.
SE	13	Tap to put the next digit
C 0 9	12	Press the key until the desired digit is correct
↓↓	12	Press out of programming.

Note: When selecting an obsolete machine type, automatic machine type 0 is selected!



Machine type selection display 1 - 18

Display marker for machine type.

9.5.1 Setup table for included machine types.

Model	L Stop Value Rotor	h Switch-on value rotor	H Upper Stop Value Rotor	Pulses/Rg. Rotor	Pulses/omg.. Roller	Roller flash. Alarm for roller rpm too high	Machine setup
1	750	910	1100	1	6	31	1
2	800	910	1100	1	6	31	2
3	670	910	1100	1	6	31	3
4	400	500	600	1	6	28	4

9.6 Mounting

9.6.1 Mounting a computer

Together with the computer, a plastic rail is supplied that fits the milling at the back of the computer housing. The rail is also attached to a rubber suspension on the machine so that the computer avoids the worst vibrations and at the same time sits appropriately for the user.

The sensors connect to the junction box, as indicated in the assembly diagram (see later section). The cables are installed so that they are protected against mechanical overload and so that they are not exposed to draughts (breakage) when the machine is turned or the hydraulics are operated.

9.6.2 Mounting sensors for rotational measurement

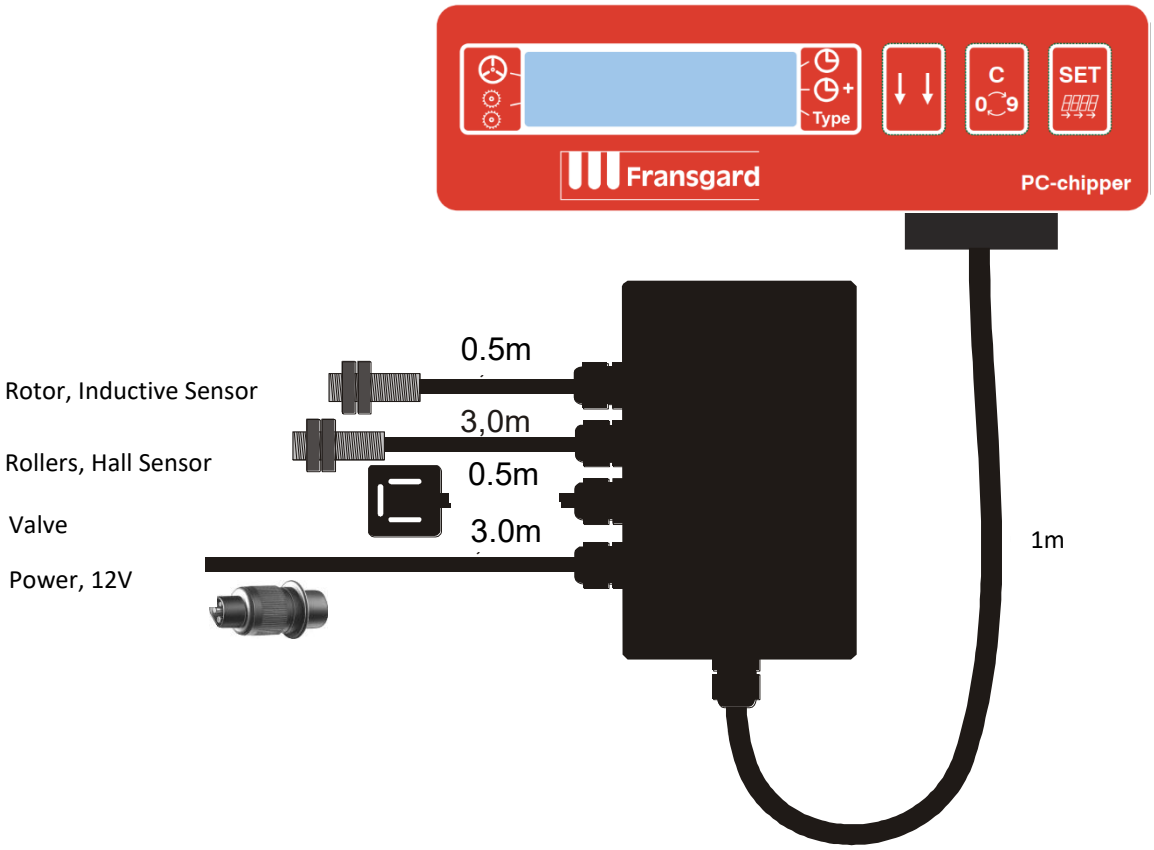
The inductive sensor is positioned so that the rotor's spokes pass the end surface of the switch at a distance of 2 – 6 mm when rotated.

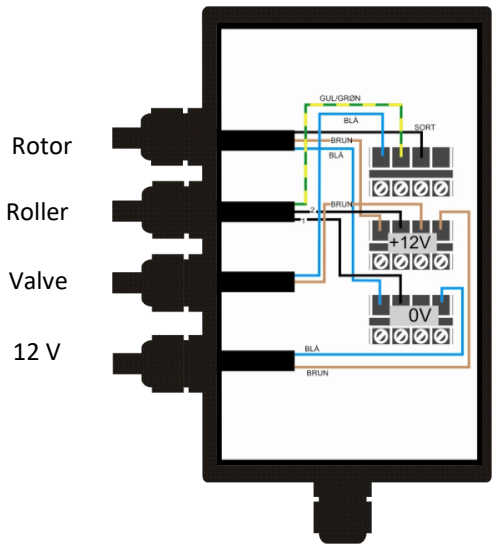
The magnetic ring with 6 magnets is mounted on the shaft at the upholstery rollers. The Hall sensor is positioned so that the magnets in the magnetic ring pass the end surface of the switch at a distance of 2 – 3 mm when rotated:

Since the electronic sensors (hall/inductive) use power, the "+V" for these sensors should preferably be connected via the ignition key so that it does not drain the battery when the machine has stopped.

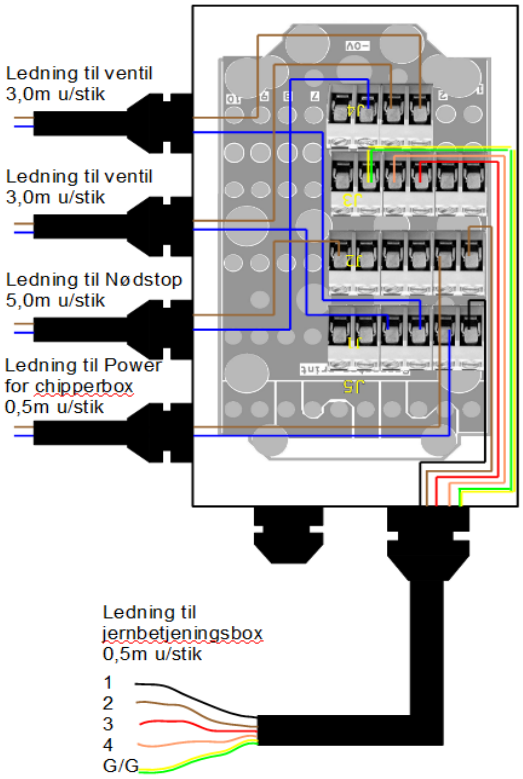
9.6.3 Mechanical setup and assembly diagram

Installation diagram using electronic sensors (hall or inductive sensors):





9.6.4 Remote conbox (PEC/PIC models only)



9.7 4. Technical data

Display:	6 digits	
Power supply:	12 V	
Temperature influences:	The Wood Chipper Monitor is fully operational within	-10 – 70c0
Heart rate signals from sensor:	Max. 225 pulses/sec.	

9.8 Note

The controller/monitor has been designed for use in connection with the function described. Any other use of the controller/monitor may involve significant risk and releases the controller supplier from any liability.

Attention is drawn to the fact that Lykketronic A/S is solely responsible for the electronic control/monitor and not for the overall function of the machine, including the safety aspects.

9.9 Important regarding the use of the speed guard

Note that the feed rollers only start to spin when the rotor is running at **least** *the operating speed* when the chipper is started.

This means that when the machine is started, you can only start putting wood in the machine when you have got the rotor running at least *the operating speed* (default = 950 rpm).

10 Debugging

10.1 The rollers will not turn

If you experience problems with the feed rollers, you can try to troubleshoot using the points in this section. If the problem cannot be rectified by means of this, please contact the dealer/manufacturer for further assistance.

10.1.1 The activation button lights up

Check the emergency stops and then press the activation button as described in section 6.2 and 6.3.

10.1.2 Rollers blocked

Try reversing the roller and see if the blockage loosens.
Stop the wood chipper, turn off the tractor and check where something is trapped, and fix this.

10.1.3 Emergency stop activated

Check if one or more emergency stops are activated.

10.1.4 Rotor speed too slow

If a speed guard is fitted[2] The rollers only start spinning when the rotor revolutions exceed the selected operating speed (e.g. 900 rpm). → Adjust rotor speed with the tractor's hand throttle.→ Set, if necessary, the rev switch[2]to suit the number of revolutions you want to drive at.

10.1.5 Rotor speed too fast

If a speed guard is fitted[2] and the rotor speed exceeds 1,100 rpm, the rollers stop. This is a safety against overload. Reduce the rotor speed to below 1,100 rpm.

10.1.6 Problem with hydraulic supply.

Check that the hydraulic hoses are installed correctly as described in section 4.4 and that the hydraulic outlet on the tractor is activated.
Hydraulic flow not turned up. Adjust flow rate on the flow valve as described in section 5.4.
Check the hydraulic pressure as described in section 7.14

10.2 There is no light in the display for the speed guard[2]

If you have installed a speed guard like on your wood chipper, Read section 9 for setting the speed shift.

10.2.1 Supply faults

Check if the supply cable is plugged into the tractor and that there is voltage on the tractor. Check the fuses in the tractor.
Check if the connector on the cable connecting the display unit to the junction box is properly assembled.
Check the supply cable. If necessary, open the lid of the grey speed control box and check for loose connections.
Check the fuse located inside the plug on the supply cable for the steering that plugs into the tractor.

10.2.2 Device Error

Variable speed defect. Contact supplier/manufacturer for solution.

10.3 Rotation Guard[2] does not work as intended

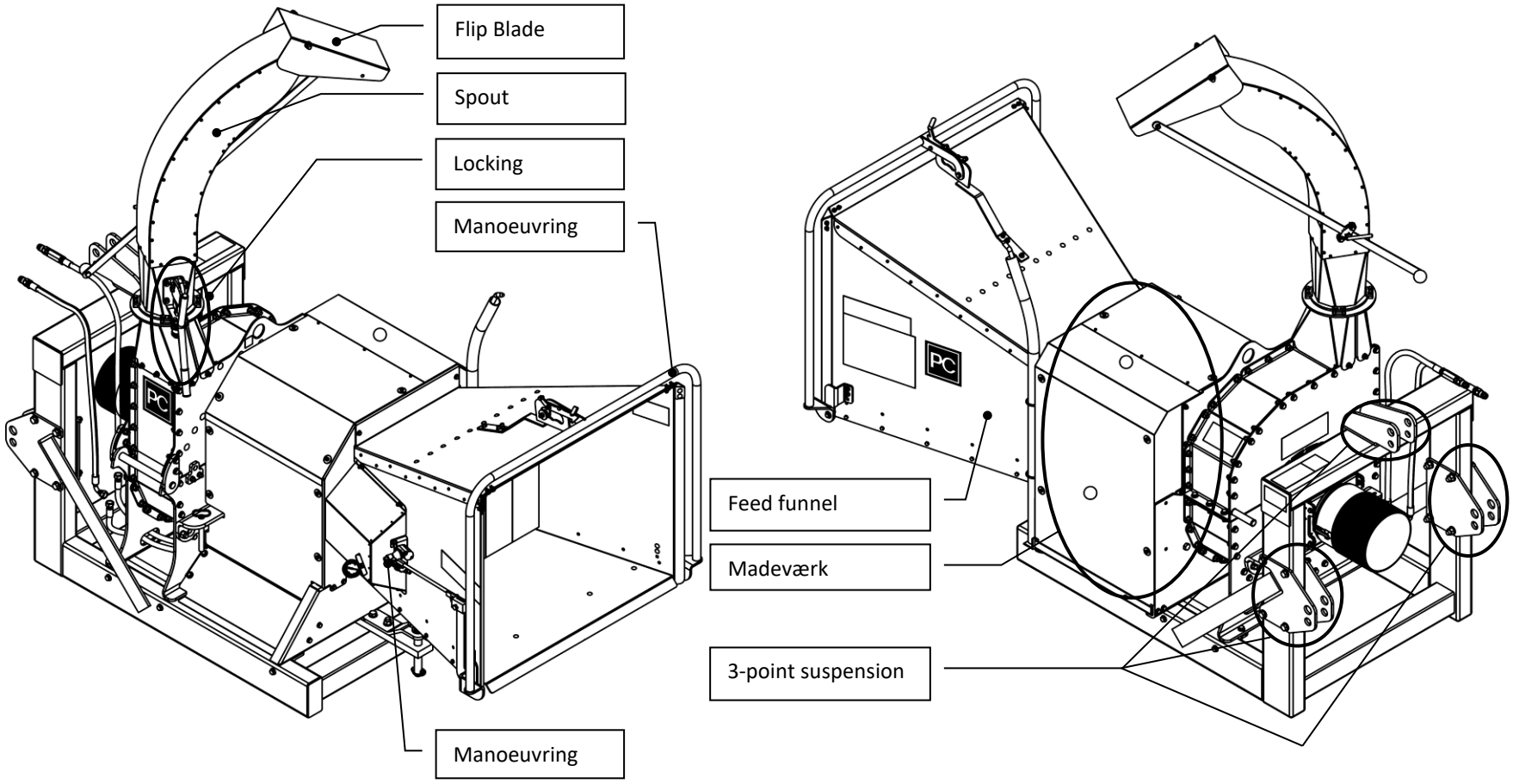
Read section 9 for setting the speed shift.

[2] A speed guard is an option and is therefore only installed if this has been ordered together with the wood chipper.

10.3.1 The display on the speed monitor does not show the current number of revolutions

When the machine is running, the diode at the end of the magnetic sensor should flash. A magnetic bolt will pass the sensor during operation and it will give a flash. Each flash corresponds to one revolution.
Check if the wires in the junction box are loose. Check if the distance between the sensor and bolt is correct (there should be 2-3 mm distance when the two parts are next to each other). Defective feeler. Contact supplier/manufacturer for solution.

11 Wood chipper overview



12 Rotor Overview

12.1 Rotor for PC-2000-SEH-1H and PC-2000-SEH-2H

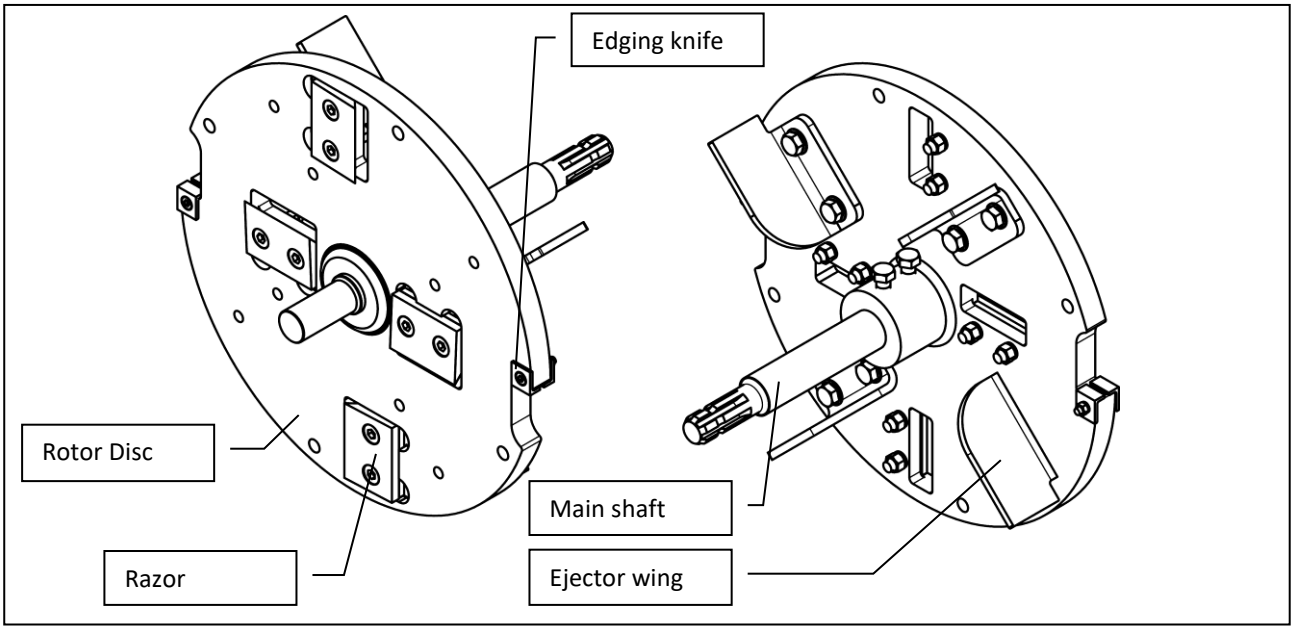
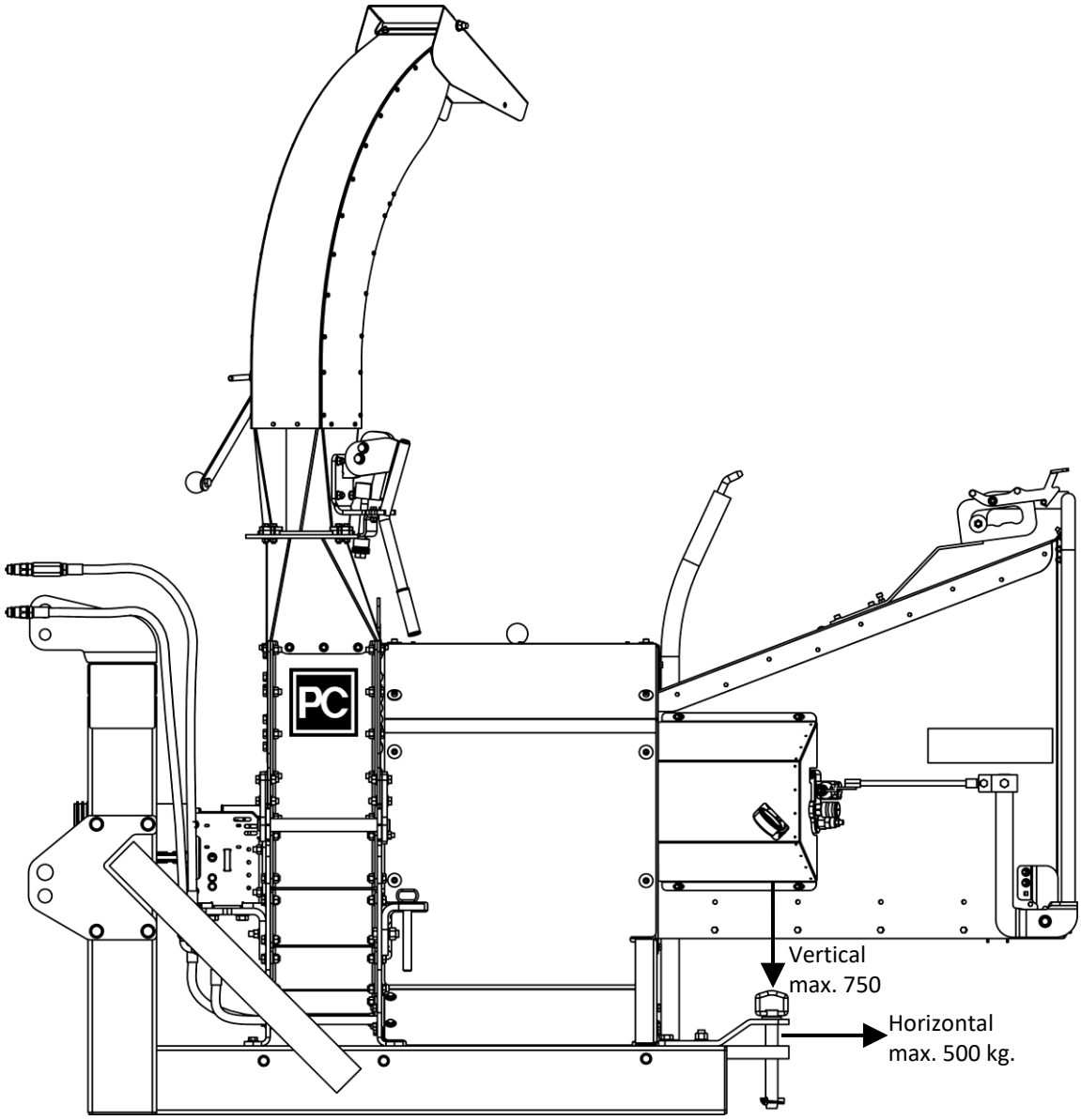


Figure 40

13 Trolley tow

The tow bar for the wagon may max. loaded with 750 kg vertically and 500 kg horizontally.



14 Miscellaneous information

14.1 Bolt tightening torques

When the bolts in the chippers need to be tightened, it must be done with torque. If the bolts are not tightened sufficiently, they will not hold together sufficiently. If they are too tight, you risk exhaustion and fractures.

	Tightening torque (Nm)	
	Quality / Strength class	
Thread size	**8.8**	**10.9**
M8	20	25
M10	39	49
M12	70	87
M16	180	220
M20	350	440

The bolt quality is read on the head of the bolt.


Fransgård