Fransgård

Manual

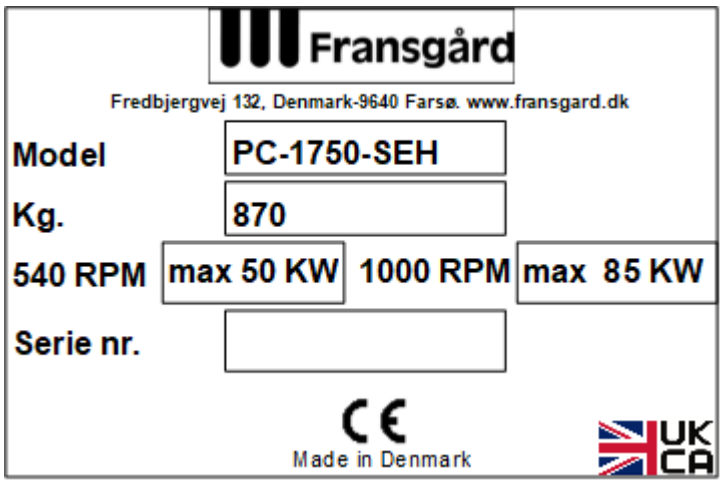
GB

WOODCHIPPER PC-1750-SEH

SAFETY AND
USER MANUAL
FOR WOOD CHIPPERS

TYPE
PC-1750-SEH

Serial number:_____



Fransgård Maskinfabrik A/S
Fredbjergvej 132
DK-9640 Farsø
Telephone: +45 98 63 21

Congratulations on your new PC-1750-SEH wood chipper.

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

This safety and user manual applies only to the PC-1750-SEH series hand-feeding wood chipper and must be read before use.

Please note that the illustrations in this manual may not correspond exactly to the wood chipper. Some drawings and sketches are therefore labelled to facilitate understanding.

Yours sincerely,

Fransgård Maskinfabrik A/S

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1 Specifications

Type	PC-1750-SEH
Tree diameter, max.	Ø17.5 cm
Weight	870 kg
Power Max. v. 540 rpm 1,000 Max. v. rpm.	37 kW (50 hp) 65 kW (85 hp)
PTO	PTO from the tractor
Mounting	Lift hitch on the tractor
Emergency spline on the main axle	1 ¾" x Z6
Number of chipping blades	2
Hydraulics	From the tractor
Oil pressure (operating pressure, **not** idle pressure!)	Max. 150 bar
Oil flow	Max. 30 litres/min
Infeed torque from the hydraulic motors	Up to 610 Nm
Minimum operating temperature	-10°C
Rotor weight (total)	124 kg
Sound level L_{Aeq}	107 dB
Sound level L_{WA}	119 dB
Trunk diameter	Ø17.5 cm
Capacity (depends on the blade setting, wood quality, etc.)	14 m^3
Speed monitor option (optional)	Yes

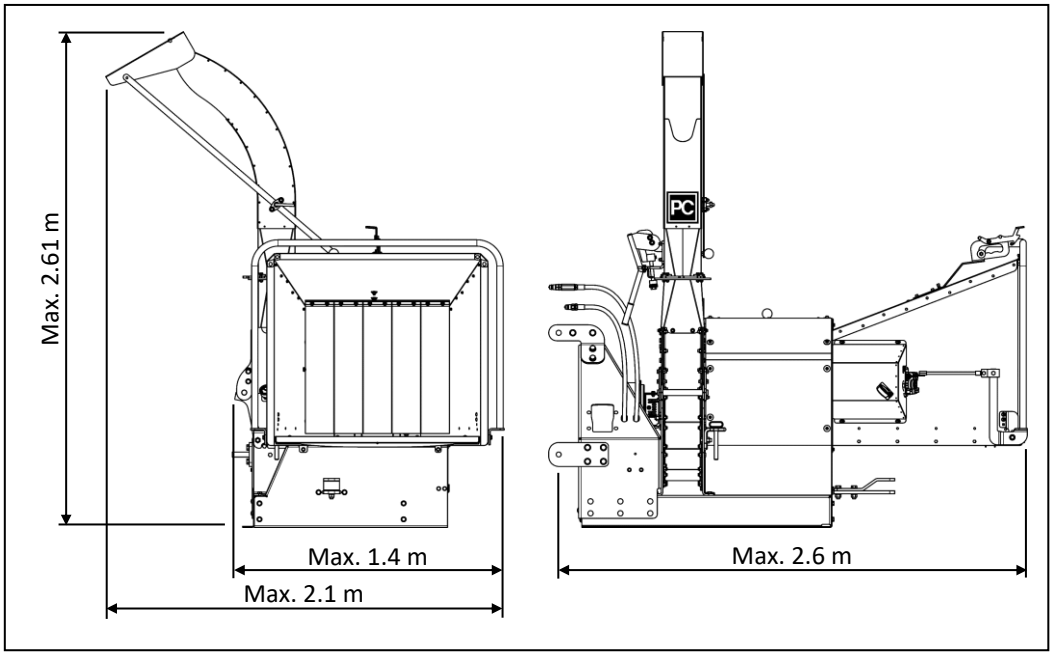


Figure 1

2 PTO axle

If the chipper comes with a PTO axle, it is assumed that this is used with the chipper.

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

Type:PTO axle with idling and a slip clutch on the chipper side.
Mounting:1 3/8" x Z6 internal groove spline (tractor side – may vary)
1 3/4" x Z6 internal groove spline (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 two axle parts, etc., specified by the axle manufacturer must be observed.
Rated output: The axle's rated output is adapted to the chipper's specifications (see Section 1 for details). Note that fewer kW may be transferred at 540 rpm than at 1000 rpm.

Furthermore, read the manual that comes with the selected PTO axle and follow all instructions in it to ensure proper use and maintenance, as well as safety regulations.

3 Checking the chipper before operation

Before starting the chipper, it is important that the chipper is inspected, especially the first time, as bolts may have loosened during transport. If there is no inspection, accidents can occur and, in the worst case scenario, the chipper could break down and you could be injured. In addition, it is recommended to inspect the machine regularly, e.g., every 20 hours of operation or at the start of the season, depending on how often it is used.

Warning: When opening the chipper or removing its guards, the tractor must be stopped and the PTO axle removed.

3.1 Checking the rotor

Check that the rotor is not damaged and that all parts of the rotor, such as blades, ejector wings, etc., are also in good condition. If the rotor or its parts are not intact, it can be dangerous to drive with the chipper.

If tools, metal or large stones have been accidentally left in the chipper, it must not be used again until the bearing housings, axle, rotor, blades, knives, screens, etc., have been checked for cracks.

While checking the rotor, gently rotate it one turn to ensure that the blades clear the anvils. If necessary, see Section 7.9 ff. for information about the anvils.

The ejector wings should be replaced either every 1,000 hours of operation or every 5,000 m^3 of chipped pellets (whichever occurs first) to avoid blade fatigue.

3.2 Checking blades

To ensure good chipping of the wood, the blades must be sharp. If the blades are too dull or the cutting edge has been chipped, they can be sharpened (see Section 7.4 on sharpening blades). If the blade has become too worn to sharpen, it may be necessary to fit a new set of blades (see Section 7.4.1 on changing chipping blades). Furthermore, all blade mounting bolts must be fitted and in good condition before starting the chipper.

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

3.3 Checking bolts

Before starting the chipper, it is important to check and, if necessary, tighten all bolts. In particular, it is important that all bolts on the rotor are tightened, as it can be extremely dangerous if they fall off during operation. In addition, it is important to check that the NordLock lock washers on the bolts for the blades are correctly fitted (see Section 7.16 for more information).

The remaining bolts on the chipper should also be inspected and, if necessary, retightened.

The bolts must not be overtightened and it is recommended to torque them. See Section 11.1 for tightening torque.

Warning: Due to the risk of pinching your fingers and the sharpness of the blades, it is not recommended to put your fingers into the housing to tighten the bolts! See Section 7.2 on locking the rotor when working on it.

3.4 Checking the main bearings

Bearings should be checked for play. If there is too much play, the chipper cannot function properly and the bearings may need to be replaced.

Remember to lubricate the bearings regularly to ensure a long operational life (also see Section 7.7).

Note that the pinion screws in the flange bearing on the feeder side **should not** be installed/tightened, as the axle must be able to move freely. This only applies to the main bearing closest to the feeder (infeed side)!

3.5 Checking hydraulic hoses

Check that all hydraulic hoses are intact and that there are no signs of leakage from the hydraulic system. In addition, all hoses that are not hidden behind guards must be covered with a fabric bag.

3.6 Checking the guards and closing the rotor housing

Check that all guards are intact and properly secured before starting the machine. All guards that must be installed during operation can be found in Section 6.2.

After checking the above points, close the chipper and tighten the two bolts (M12x40 with locknuts) that hold the top and bottom sections together (see Figure 2). If these bolts are not in and securely fastened, do not start the chipper. Failure to do so can be extremely dangerous.

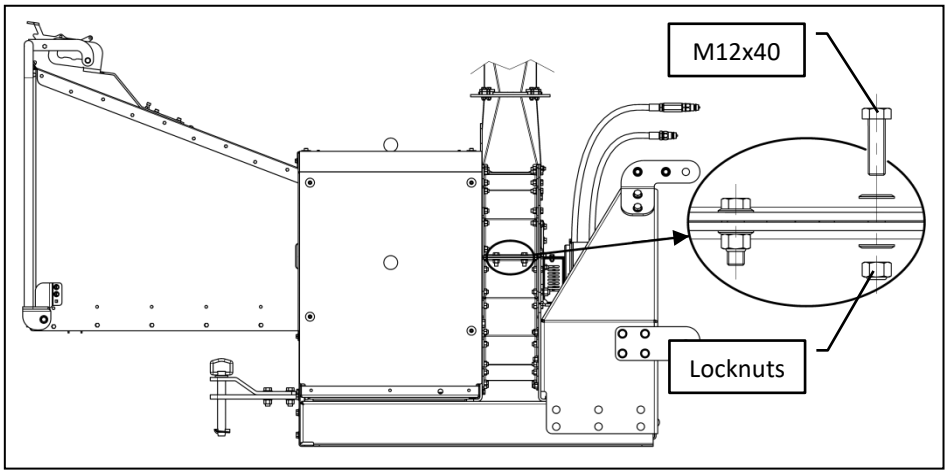


Figure 2

3.7 The first hours of operation

During the first hours of operation, it is important to pay extra attention to the chipper. Should something unexpected happen, such as a strange noise, stop the tractor immediately to avoid further problems.

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

4 Preparing the chipper for operation

4.1 On delivery of a new chipper

When the chipper is received new from the factory, it may be mounted on some pieces of wood, or possibly on a EUR pallet. These pieces of wood are intended solely for transport between the dealer and customer, and must therefore be removed before using the chipper. Furthermore, remove all packaging and other objects from the chipper.

4.2 Mounting a chipper on a tractor

The chipper must be mounted on the tractor's 3-point hitch. For safety reasons, it is important that the chipper is correctly secured in all 3 places.

Warning: Do not start the chipper unless the chipper is correctly mounted on the tractor's 3-point hitch.

4.3 Mounting the PTO axle between the chipper and tractor

The PTO axle is first mounted on the groove spline on the chipper's main axle and then on the tractor's PTO. Note that the clutch, which is mounted on the PTO axle, must face the chipper.

After the coupling end of the PTO axle has been fitted and tightened, fit the SFT guard. See Section 6.2.4 on how to do this.

It is important to check that the PTO axle 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 damage to the chipper and tractor.

Afterwards, remember to attach the chains on the PTO axle to the chipper and tractor respectively, so that the plastic guard on the PTO axle does not move around with the axle during operation.

Furthermore, read the manual that comes with the selected PTO axle and follow all instructions in it 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. Pressure hose (P) is plugged into the tractor's pressure port and the return hose (with one-way valve) is plugged into the tractor's return port. See Figure 3.

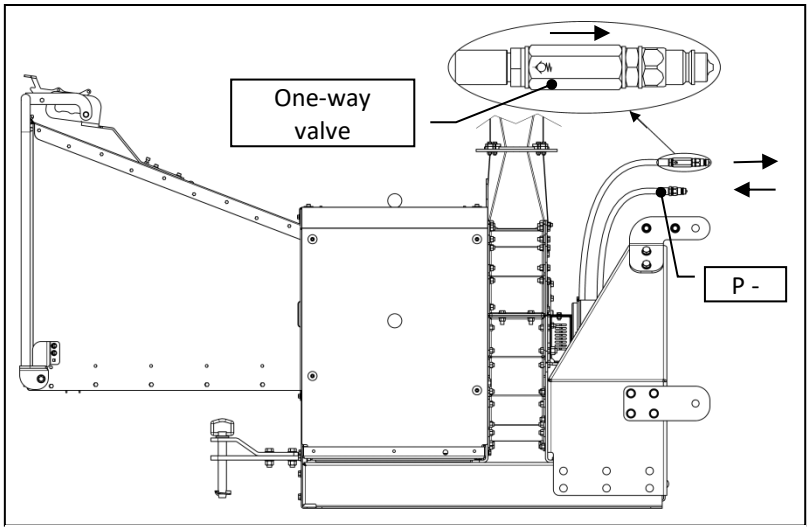


Figure 3

5 Chipper operation

Before starting the chipper, it must be placed on a flat, stable surface. It is also extremely important to make 100% sure that there are no bolts, nuts or other metal objects inside the machine, as these could be ejected from the machine and cause damage to the machine. It is not recommended to use the chute to store tools, etc., while transporting the chipper, as this can cause them to be drawn 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 operational life.

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

5.1 Start or stop the chipper

The chipper is started by switching on the tractor, then the hydraulic supply to the chipper is switched on, the PTO is engaged and the rotor will start.

To stop the chipper, switch off the hydraulic supply and the PTO, and the rotor will slowly slow down and stop on its own.

5.2 Starting and stopping the feeder

To start the feeder, press the activation button until the blue light goes out. This
must be done every time you start the chipper and whenever the emergency stops are activated. If you press the button and the light stays on, one or both emergency stops have been pressed. See Section 6.2and 6.3 for more information about the emergency stops and the activation box.
See Figure 4 for the location of the activation button.

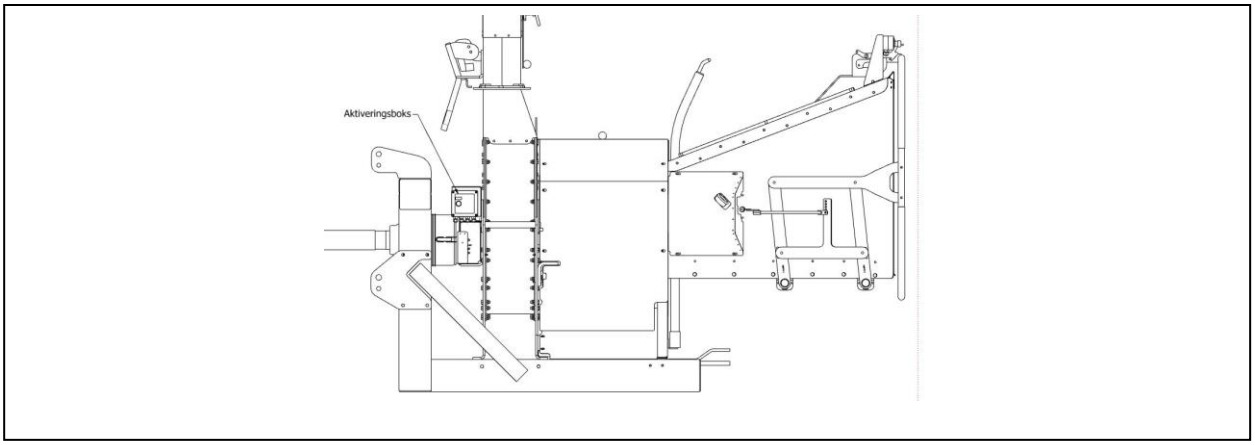


Figure 4

The feeder is controlled by pushing or pulling the control handle. The control handle has 3 settings:
1. The control handle is in position 1 and the feeder reverses, i.e. pulls the wood from the chipper.
2. The control handle is in position 2 and the feeder is stationary.
3. The control handle is in position 3 and the feeder pulls the wood into the chipper

The three positions are described in Figure 5.

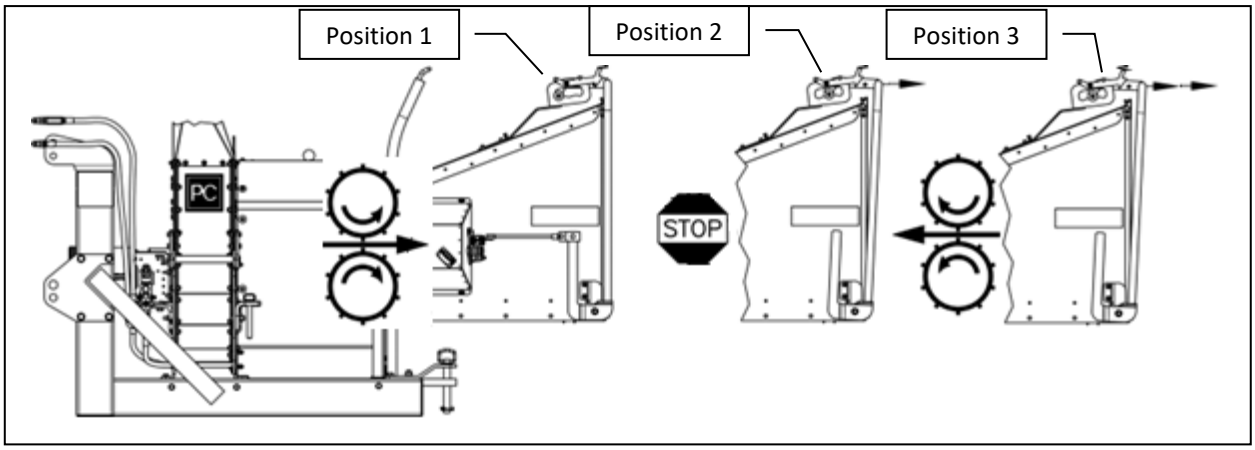


Figure 5

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

The control handle must be in position 1 when the wood chipper is started and must also be in this position when the chipper is not in use.

To avoid accidentally starting the feeder, the control handle is designed so that it locks when it is moved to position 1.

To release the control handle from position 1, lift the small hook (see Figure 6) and then pull the control handle to position 2.

Warning: For safety reasons, we strongly warn you not to bypass, modify or remove this feature!

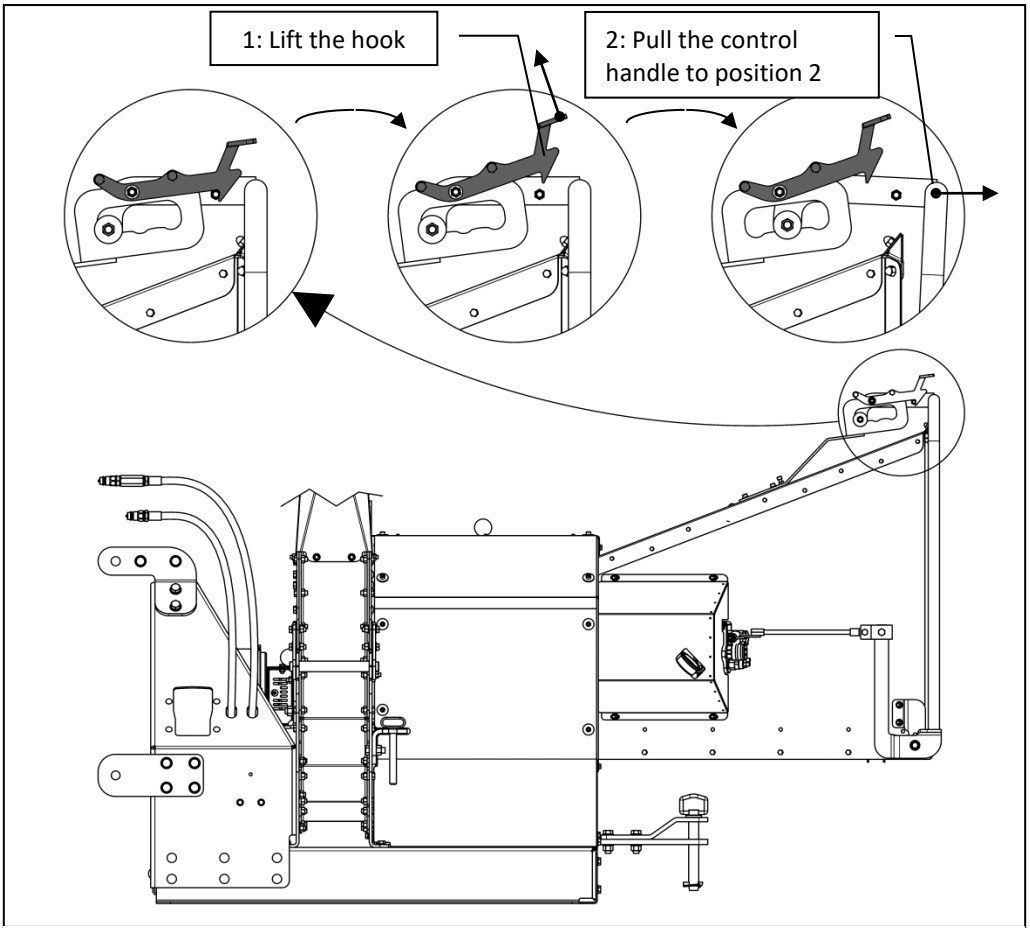


Figure 6

5.3 Hydraulics in general

When the chipper is running, it is important that the hydraulics are correctly adjusted and working properly.

The chipper's safety valve is set as standard to a permissible **operating pressure** of 150 bar. The operating pressure should not be confused with the idle pressure without wood in the machine. To ensure a long operational life of the hydraulic motors in particular, it is important to regularly check that this pressure is not exceeded. If the pressure exceeds the limit, there is a risk of pushing the stuffing box out of the hydraulic motor or separating the motor housing, which consists of a series of rings.

The hydraulic pressure can only be checked during operation. When chipping wood in the chipper, check that the pressure gauge does not exceed 150 bar at any time. If this is the case, the pressure in the safety valve must be reduced. A description of this can be found in Section 7.12. 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 control handle (see Figure 5). If this is not the case, check that the hydraulic hoses are correctly installed. A description of this can be found in Section 7.10ff.

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

The chipper must be switched off and disconnected from the tractor when working on the hydraulic system. In addition, make sure the hydraulic system is not pressurised.

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

To ensure a long operational life for hydraulic components, mixing oil types is not recommended. You should also pay attention to the permissible operating temperature of the oil.

5.4 Setting the feed speed

The speed at which the wood is drawn into the machine can be adjusted. Turning the flow valve on the valve block (see Figure 7) changes the speed at which the feed rollers rotate and thus the feed speed of the wood.

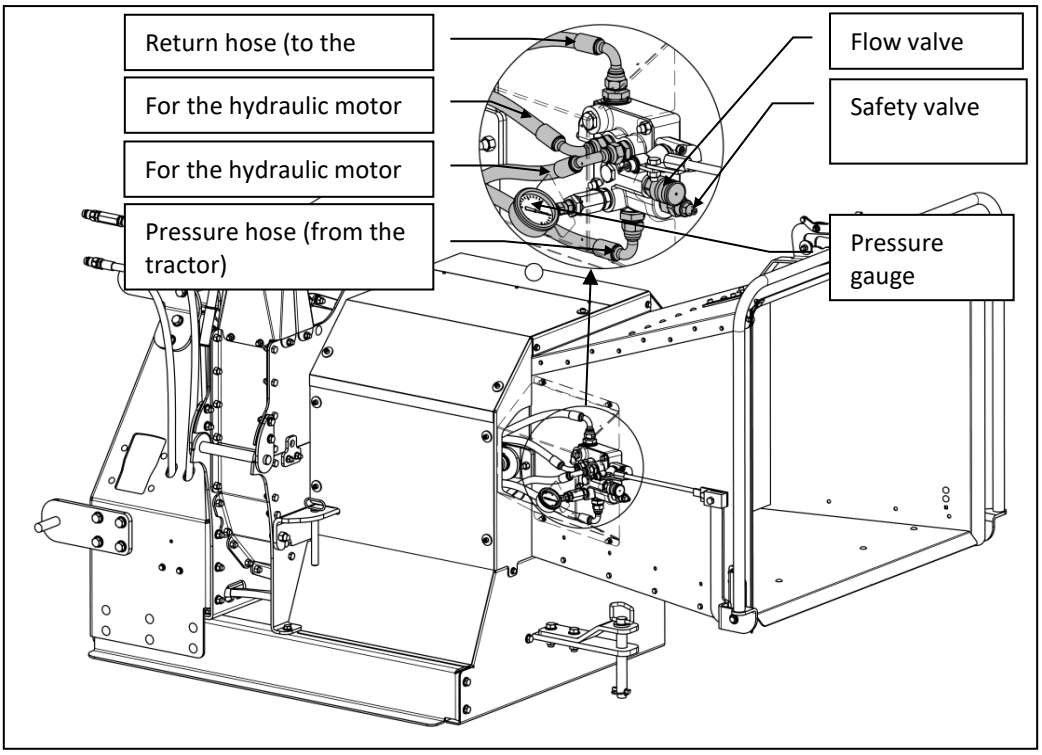


Figure 7

5.5 Setting the spout

The chipper is supplied with a 320° rotating spout. The spout rotates steplessly and can be locked where you want it in the spout's working area. The spout is limited so that it cannot point backwards towards the hopper. This ensures that you do not inadvertently point the spout into the work area where people may be present.

Pay close attention to where the spout is pointing when you start feeding wood into the machine. Pay particular attention to whether the spout is pointing towards people, animals or other inappropriate objects and, if necessary, turn the spout away from them.

The spout is rotated by pulling the locking arm towards the horizontal position, after which the spout can be rotated with the locking arm in the desired position (see Figure 8). The locking arm is then pushed back into the vertical position and the spout is now locked. If the spout is not properly locked, tighten the bolt at the bottom of the spout; loosen it 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.

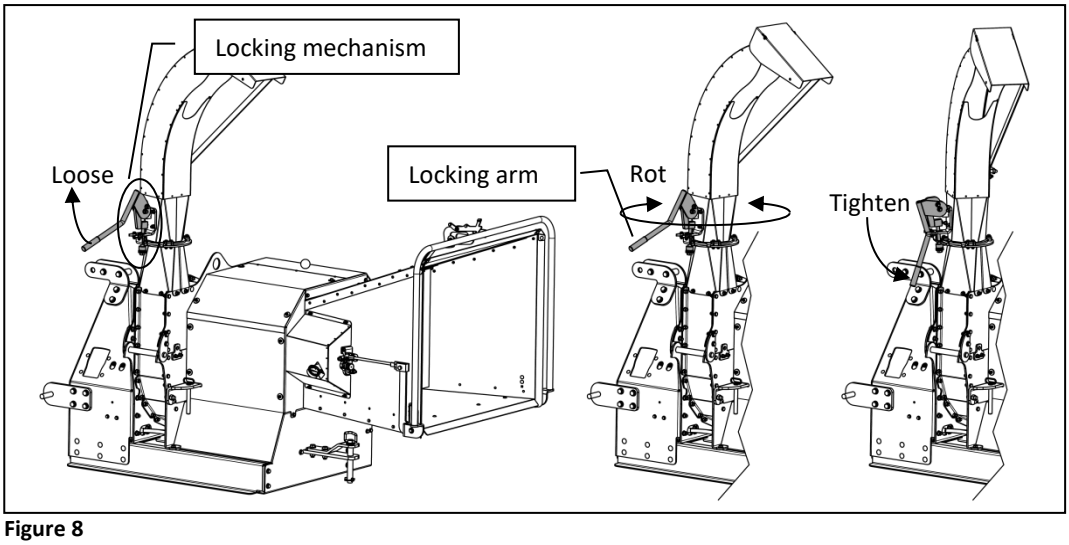


Figure 8

The height of the chipper at which it is ejected from the spout can be adjusted by loosening the thumbscrew on the spout (see Figure 9) and pushing or pulling the rocker blade arm until it reaches the desired setting. Then tighten the thumbscrew again.

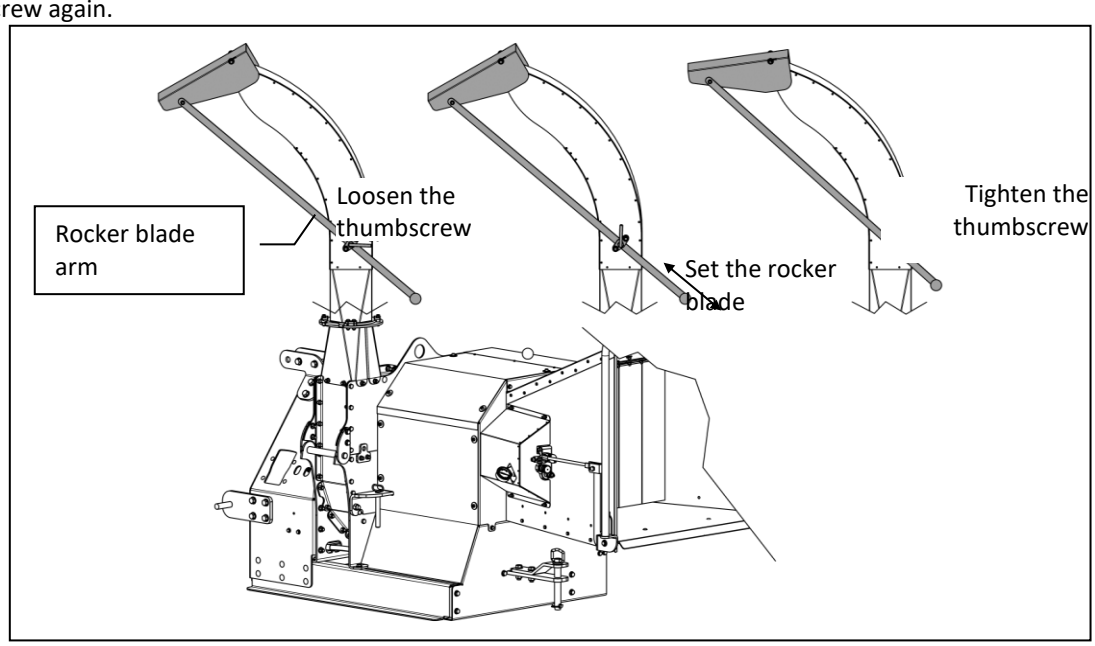


Figure 9

5.6 Feeding the chipper

When you are about to chip wood into chips, here's what you need to do:

1. Review the points mentioned in Chapter 3 and then mount the chipper correctly on the tractor's 3-point hitch.
2. Switch on the tractor.
3. Engage the tractor's PTO.
4. Switch on the tractor's hydraulics so the chipper is supplied with hydraulic oil.
5. Check that the spout on the chipper is correctly adjusted.
6. Move the control handle to position 3 (see Figure 5).
7. Check the feed speed (see section 5.4) and adjust if necessary.
8. Feed the wood into the chute opening and push it further into the feed roller(s), which grabs the wood and pulls it into the chipper, which starts chipping the wood.
9. When chipping is complete, push the control handle back to position 1, switch off the hydraulics and switch off the tractor.

If you do not have a speed monitor (optional extra) fitted or if it is switched off and you can hear that the chipper is struggling to keep up (it loses too many revolutions during feeding), you can stop feeding for a moment by pushing the control handle to position 2 or 1 until you can hear that the rotor is up to speed again. Please note that when the control handle is pushed to position 1, the direction of rotation of the feed rollers is reversed (i.e. the rollers turn the opposite way round) and the wood is pulled out of the machine again. Watch your legs when the feed rollers reverse!

Warning: When the wood is drawn into the chipper, be aware that pieces of wood can be ejected out of the chute.

Warning: Be aware of loose clothing, cords, ropes, etc., that can get caught in the chipper or the wood to be chipped, so that you do not get pulled into the machine in a worst-case scenario.

6 Safety precautions

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

To further ensure safety, it's also important to maintain the machine and inspect it regularly.

6.1 General precautions

When the chipper is in operation, always pay attention. Wood can be ejected out of the machine, foreign objects can be drawn into the machine, or something else unexpected and dangerous can happen.

Therefore, always observe the following points:

- Pay attention.
- Never put your fingers into the machine's openings.
- Never open the machine during operation - stop the tractor and make sure the rotor is completely stopped before opening the chipper.
- Never open the machine while the PTO axle is fitted.
- Never remove wood or anything else that has become stuck while the machine is running.
- Ensure that all bolts are always tightened securely.
- Keep the machine in a good maintained 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 on the machine.
- Never operate the machine without reading and understanding the safety instructions.
- Place the machine on a firm, level surface when chipping wood.
- Never use the machine without the guards fully mounted.
- If something unexpected happens, switch off the machine immediately.
- Do not use the machine indoors.
- Never bypass the safety mechanisms built into the machine.

6.2 Emergency stop

Two emergency stops are mounted on the top of the feed chute (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.

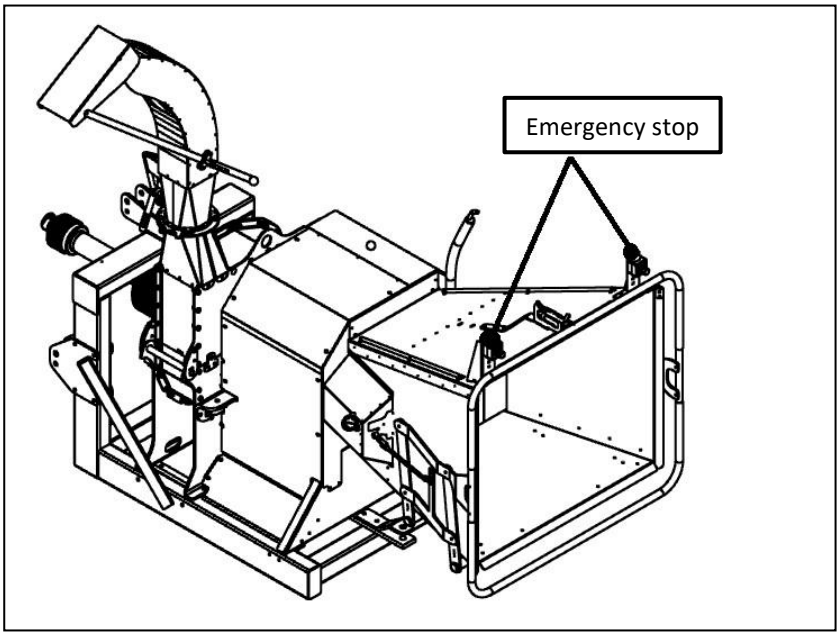


Figure 10

To reactivate the feed rollers, the emergency stops must be triggered again by turning the knob as shown in Figure 11, and the activation button must be pressed

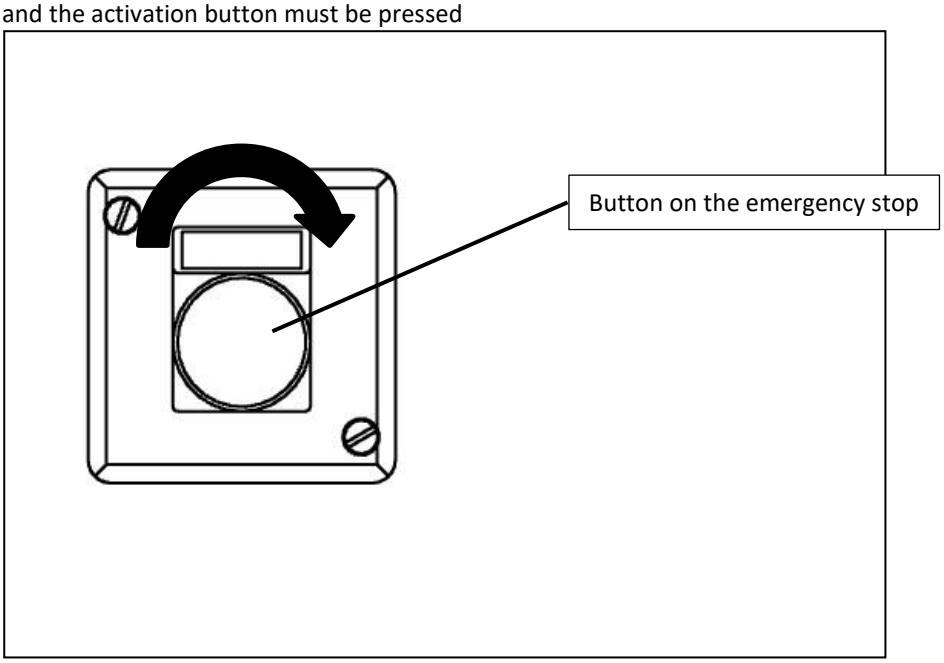


Figure 11

6.3 Activation box

The chipper is fitted with an activation box. The purpose of the activation box is to ensure that the feed rollers do not start unintentionally if the safety bar is not placed in position 2 as described in Section 5.2.

When the blue light is lit, it indicates that the connection to the valve block (see Figure 7**Fejl! Henvisningskilde ikke fundet.**) is disconnected and 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 remains lit after it has been pressed, it indicates that one or both emergency stops are 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 to the emergency stops. Contact your dealer/mechanic for help finding and fixing the fault.

6.4 Guards

When the chipper is in operation, all guards must be fitted. If the guards have been damaged or cannot be fitted correctly, do not use the chipper until this has been corrected. Figure 12 gives an overview of the guards, all of which must be fitted during operation. In addition to the guards, the spout and the transparent curtains in the feed hopper must also be fitted.

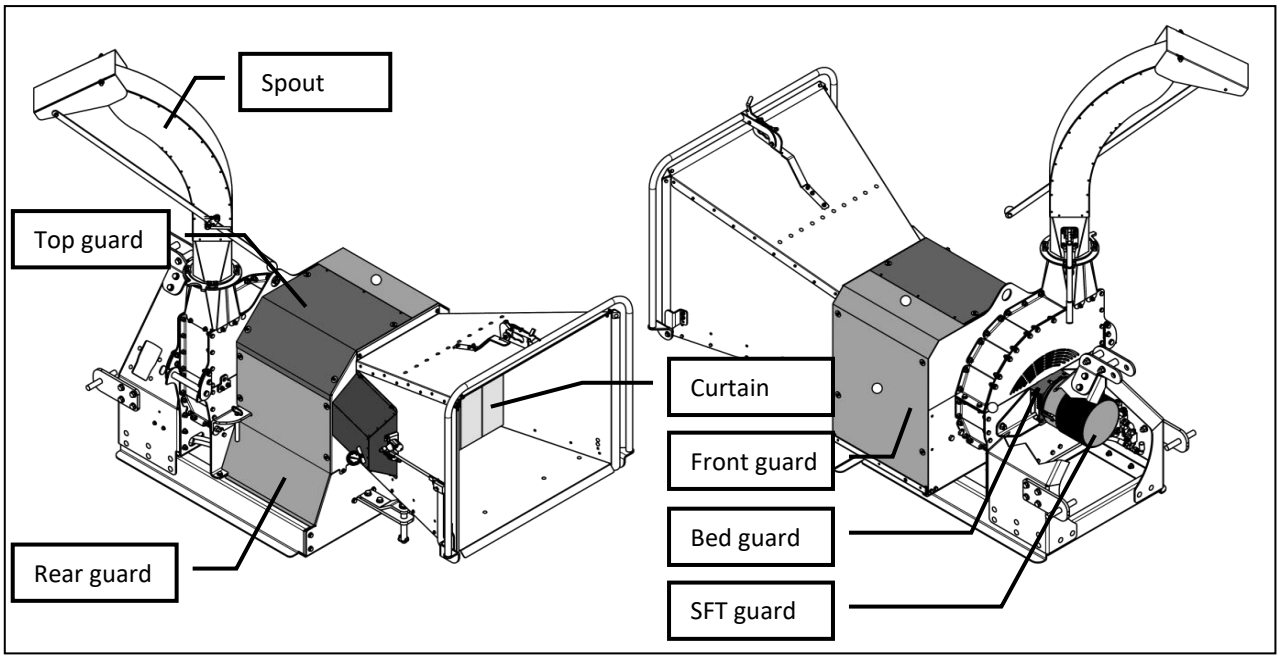


Figure 12

6.4.1 Removing and fitting the front guard

During regular maintenance (cleaning, removing stuck wood debris, etc.), the front screen can be removed.

The front guard is removed by unscrewing the four hexagonal screws in the screen and then lifting the guard away by the two knobs.

Note that the guard itself can fall off if the 4 screws are not tightened.

When reinstalling the curtain, hold the curtain in place while the four hexagonal screws are screwed in and tightened.

6.4.2 Top and rear guard removal and fitting

For additional maintenance (thorough cleaning, fitting hydraulic hoses or lubricating the rotor flange bearing, etc.) it may be necessary to remove the top and rear guard. Note that the rear guard cannot be removed unless the top guard is removed first.

First remove the front guard as described in Section 6.4.1.

Remove the top guard by unscrewing the 4 screws. The guard can then be removed.

Remove the rear guard by unscrewing the 4 screws. The guard can then be removed.

When refitting the guards, this is done by first holding the rear guard in place while the 4 screws are installed and tightened. Then hold the top guard in place and install and tighten the 4 screws. Then refit the front guard.

6.4.3 Removing and fitting the SFT guard

The SFT guard covers the clutch and part of the PTO axle and can only be installed when the part of the PTO axle that will be mounted on the chipper (the part with the clutch) is mounted on the chipper's groove spline.

To fit the SFT guard, hold it against the aluminium flange bolted to the bed guard and lock it to the bed guard with the snap locks (see Figure 13).

To remove the SFT guard, loosen the snap locks and pull the guard out of the aluminium flange.

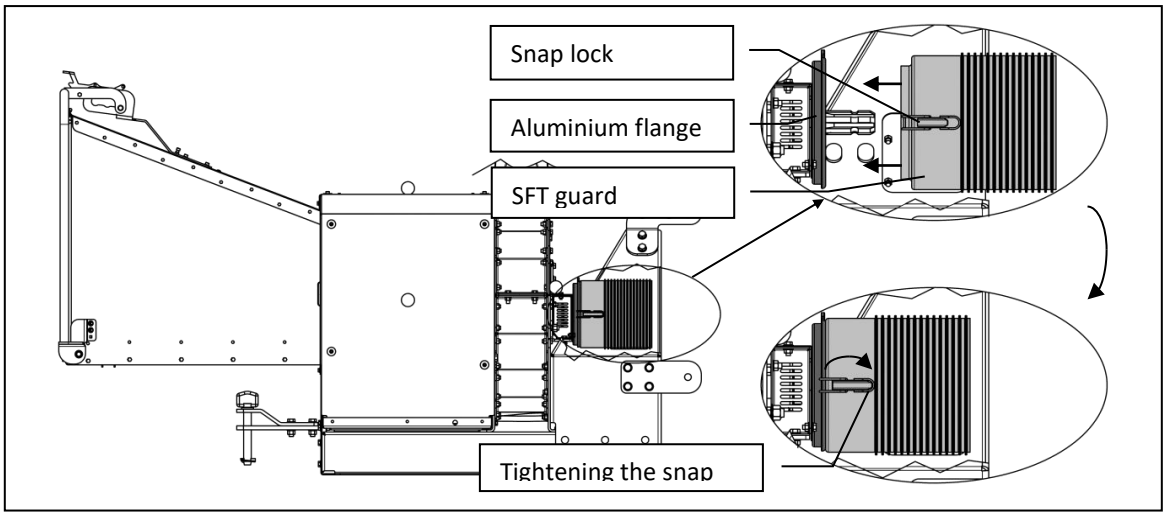


Figure 13

6.4.4 Removing and fitting the bearing guard

In order to lubricate the main bearing, it may be necessary to remove the guard covering the bearing if there is not enough room in the bearing guard lubrication hole for the lubricator.

To remove the bearing guard, first remove the PTO axle and unscrew the six bolts holding the bearing guard in place (see Figure 14). The bearing guard with the SFT guard can then be removed.

To fit the bed guard, place the bed guard in place over the bed and tighten the two bolts with washers and nuts on either side of the guard.

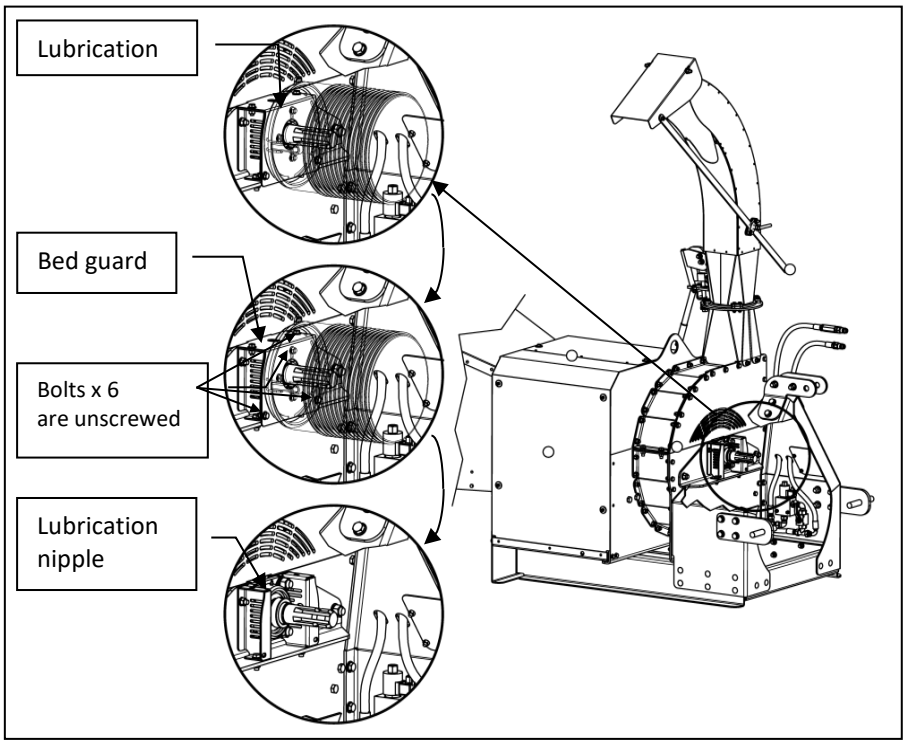


Figure 14

6.5 Protective equipment

When using the chipper, it is important to wear personal protective equipment. As a minimum, you are required to wear eye protection and hearing protection. It is also recommended to wear safety footwear, work gloves and appropriate workwear.

Warning: Be aware of loose clothing, cords, ropes, etc., that can get caught in the chipper or the wood to be chipped, so that you do not get pulled into the machine in a worst-case scenario.

6.6 Signage

There are a number of signs on the chipper. These signs are described and shown in this section. To avoid accidents and to operate the chipper in the best possible way, it is important that the signs are observed.

6.6.1 Read the user manual

Meaning:
Before using the machine, the user manual **must** be read and **must** be followed.

6.6.2 Beware

Meaning:
Pay attention when working with or near the chipper.

6.6.3 Eye and ear protection is mandatory

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

6.6.4 Rotating parts

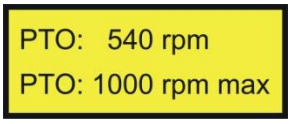
Meaning:
There are rotating parts in the chipper that can cause injury. So, pay attention!

6.6.5 Sharp blade

Meaning:
The chipper has sharp blades that you can cause cuts. So, pay attention!

6.6.6 Revolutions PTO

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



6.6.7 Risk of pinching

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

6.6.8 Do not open the rotor housing until the rotor has completely stopped

Meaning:
Do not open the chipper when the rotor is spinning.

6.6.9 Only open the rotor housing when the rotor has completely stopped

Meaning:
The chipper may only be opened when the rotor has completely stopped and the PTO axle is removed.

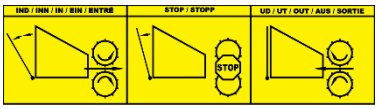
6.6.10 Safety distance

Meaning:
Pay attention and keep a safe distance from the machine as much as possible.
This applies in particular to persons who do not work with the machine.

6.6.11 Parts may be ejected

Meaning:
When the machine is in operation, things can be ejected from the machine. So, pay attention!

6.6.12 Operating the control handle



Meaning:
The control handle has the 3 settings shown. The feedr's operation follows the specified settings.

6.6.13 Risk of being pulled in

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

6.6.14 Do not enter the hopper

Meaning:
Do not insert body parts into the chipper hopper as this can be extremely dangerous.

6.6.15 Noise level

Meaning:
The chipper creates noise up to the sound pressure level shown on the machine.

6.6.16 Remove the PTO axle before maintenance

Meaning:
For safety reasons,
the PTO axle for the chipper must be removed before performing maintenance on the chipper.

6.6.17 Mount the chipper on the 3-point hitch before use

Meaning:
The chipper must be correctly mounted on the tractor's 3-point hitch before use.

6.6.18 Place the chipper on a flat surface before disconnecting it from the tractor

Meaning:
The chipper must be placed on a flat, level surface before it can be disconnected from the tract

6.6.19 Do not use a hook

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

6.6.20 Direction of rotation

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

6.6.21 Wear safety gloves

Meaning:
Always wear gloves when hand-feeding the chipper.

6.7 Placement of signage

To make it easy to find the safety signs on the wood chipper, we have Figure 15created an overview of where they are located. This can also be used if you find that some of the safety signs have been damaged and you need to replace them.

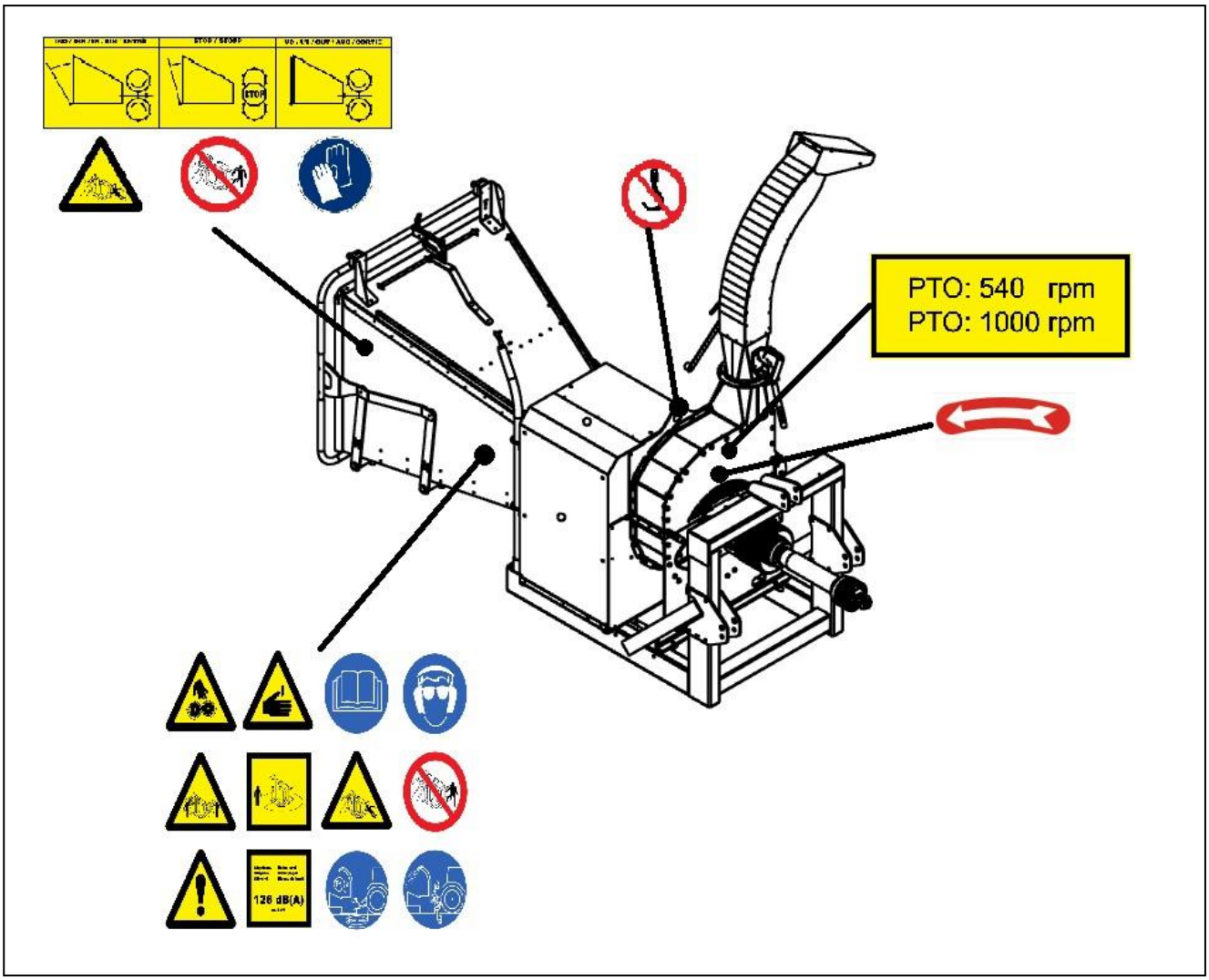


Figure 15

7 Maintenance

To minimise the risk of accidents and to ensure a long operational life, the machine must be regularly maintained. In general, pay attention to the machine's sound and other signals and check for and, if necessary, repair damage.

At the end of the season, it is recommended to thoroughly clean the chipper to ensure an easy start-up the next time it is used. It is also recommended to inspect the chipper, see Chapter 3, before using it again for a new season.

Note: For safety reasons, the PTO axle between the chipper and the tractor must be removed during all maintenance. In addition, make sure that the hydraulic system is not pressurised. If the chipper is fitted with a speed monitor, the cable for this must also be unplugged from the tractor's socket.

7.1 Access to the rotor housing

When servicing the chipper, it may be necessary to open the top of the chipper to access the rotor.

7.1.1 Opening the rotor housing

The easiest way to open the chipper is as follows:

1. Disconnect the chipper from the tractor and remove the PTO axle.
2. Remove the front guard, see Section 6.4.1Removing and fitting the front guard.
3. Loosen and remove the bolts in the joint between the top and bottom of the rotor housing.
4. Turn the spout so that it does not hit anything when opening the upper part of the rotor housing.
5. The top of the rotor housing can now be opened by grasping the handle on the top and lifting. See Figure 16.

Make sure that the rocker blade on the spout does not hit anything and bend as the top is opened. Therefore, if necessary, push the rocker blade into a position that prevents this from happening. Alternatively, you can turn the spout to a position so that this does not happen before opening the chipper.

Note: It is only necessary to remove the front guard to open the chipper, but it can be beneficial to remove multiple guards for more space and better visibility during maintenance.

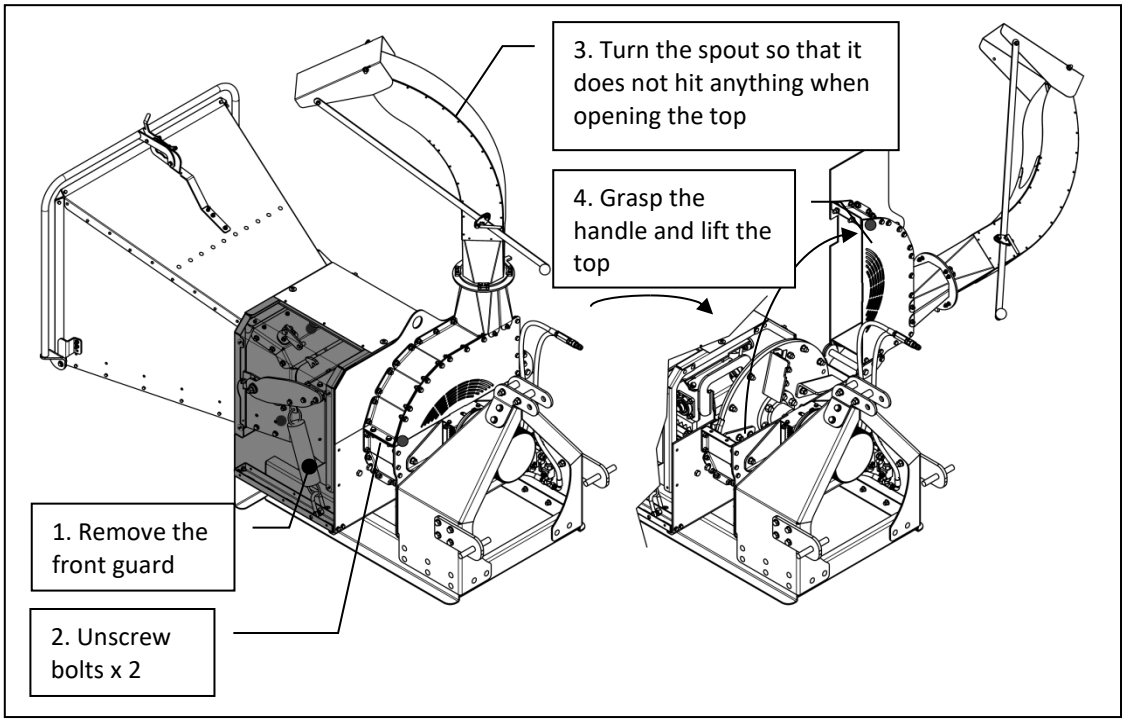


Figure 16

7.1.2 Closing the rotor housing

Before closing the rotor housing, make sure you have not left any loose parts in the machine. Also, make absolutely sure that all parts are correctly tightened. Finally, remove the rotor lock (see Section 7.2), and the upper part of the rotor housing can now be closed, taking care not to get fingers, etc., trapped.

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

7.2 Locking the rotor

When working with the rotor parts, the rotor can be locked to prevent it from rotating.

When the rotor housing is open, the rotor can be carefully turned so that one of the two holes in the rotor matches the hole in the bracket on the side of the rotor housing. Then the hitch pin mounted in the front crossbar can be inserted through both holes, and the rotor is now locked. In this way, the rotor can be locked in two positions, corresponding to the two holes in the rotor. See Figure 17.

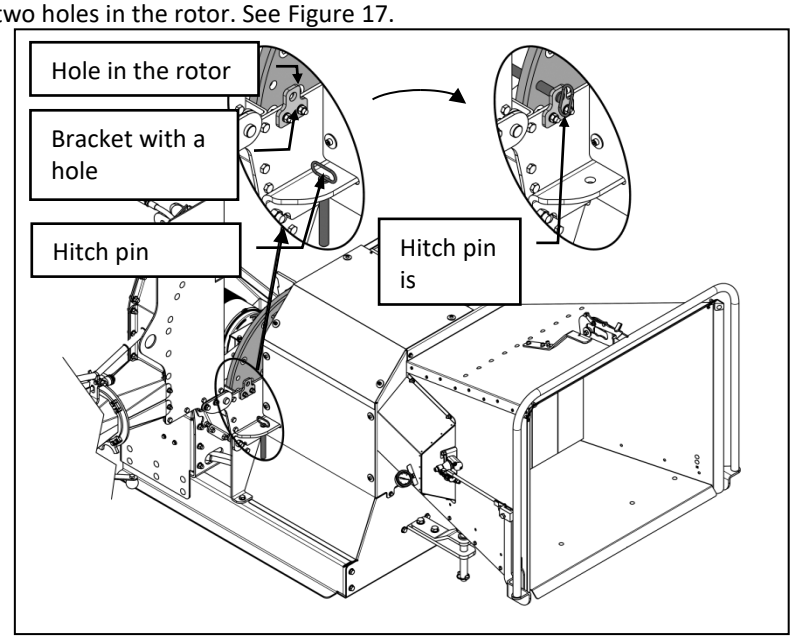


Figure 17

7.3 Changing chipping blades

When the chipping blades need to be sharpened, changed or thoroughly inspected, it is necessary to dismantle them. Depending on the chipper type, there are different fitting methods

Warning: The rotor is balanced with all blades attached, and when one or more of the blades are removed, the rotor is no longer balanced and will start turning on its own if not locked. Therefore, be careful with your fingers and never put your fingers into the machine.

Warning: Even if the blades are removed because they are dull, there may still be places on the cutting edge where they are sharp. Therefore, be careful and wear thick gloves when handling the blades.

7.3.1 Removing chipping blades

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

1. Remove the front, top and rear guards, see section 6.4.1ff.
2. Open the rotor housing, see Section 7.1.1, so that the rotor is accessible.
3. Lock the rotor in a suitable position, see Section 7.2.
4. The first blade can now be removed by unscrewing the nut from the three bolts holding the blade in place. You may need to be careful, as the NordLock washers offer a lot of resistance. The bolts must be held back to prevent them from moving around.

5. Once the blade is removed, take out the hitch pin. As the rotor is no longer in balance, it will start spinning on its own - **so be careful!**
6. Lock the rotor in a new position, see Section 7.2, and the next blade can now be removed.
7. Repeat the procedure in steps 4 to 6 to remove both blades.

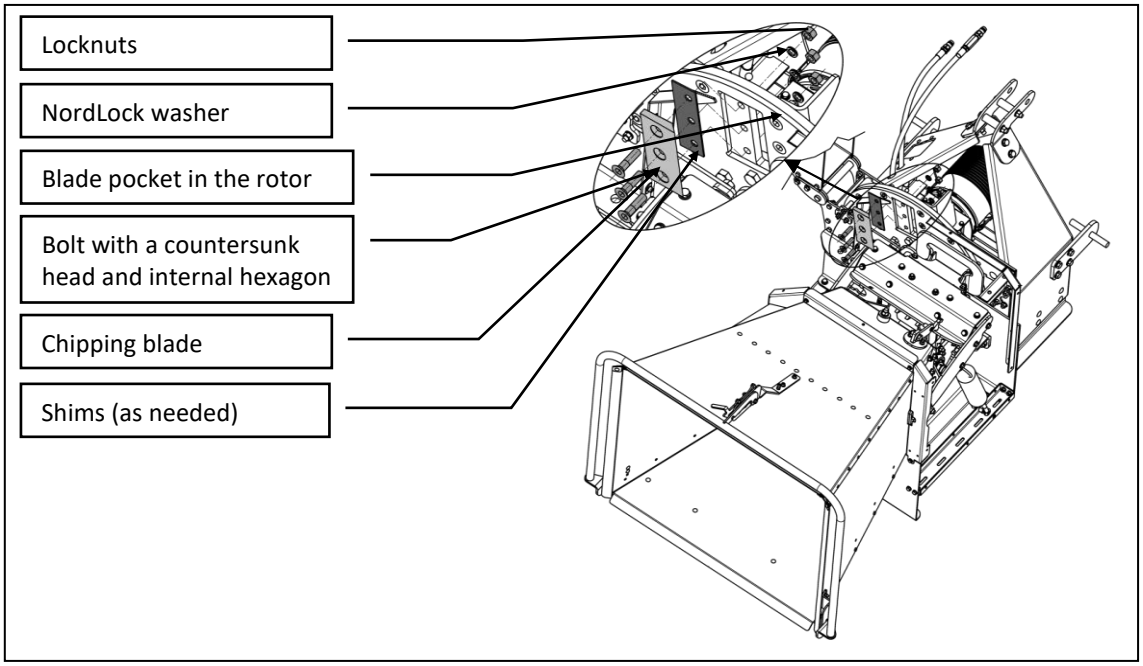


Figure 18

7.3.2 Mounting chipping blades

Before fitting the blades, decide on the blade height to be used and select a shim accordingly.

The knives are easiest to install by following these steps:

1) Check the blade pockets in the rotor disc and scrape out any remaining wood, etc., so that the bottom surface is clean and flat.
2) Lock the rotor in a suitable position, see Section 7.2.
3) Hold the shim and blade against the blade pocket and loosely insert the two bolts, attach the NordLock washers and loosely screw on the lock nuts. The sequence can be seen on Figure 14.
4) Insert an Allen key into the inner hexagon of the bolts and torque the nut.
5) Lock the rotor in a new position, see Section 7.2, and the next blade can now be fitted.
6) Repeat steps 2 to 5 until all blades are fitted and tightened.
7) Carefully turn the rotor one turn to ensure that nothing is stuck. At the same time, check that there is the correct distance to the anvil. If necessary, see Section 7.8ff on setting the anvil.

An assembled blade consists of:
1 x Blade
1 x Shim of the appropriate thickness.
3 x M16 bolts with countersunk heads and a hexagon socket, strength class 10.9.
3 x NordLock washers for M16 (see Section 7.15on the correct use of NordLock washers)
3 x Lock nust for M16
A total of two assembled blades are needed for a complete rotor.

Remember that the rotor is not in balance when all the blades are not fitted, and it will therefore turn on its own when the hitch pin is not inserted.

Warning: If all these parts are <u>not</u> present, the blades must not be fitted and the chipper must <u>not</u> be used. Failure to do so can be extremely dangerous!

Warning: When the blades are fitted, the balance of the rotor changes and it will start to turn on its own. Therefore, be careful with your fingers and never put your fingers into the machine.

Warning: Never fit damaged blades. For example, if the blade is broken or cracked, do not install the blade. Failure to do so can be very dangerous.

Warning: Always have all the blades fitted with all bolts correctly fitted and tightened during operation. If one or more blades and bolts are left out, the rotor may become unbalanced, which will cause oscillations during operation, and in the worst-case scenario, the rotor could cause a breakdown.

Warning: When the blades are new or newly sharpened, they are very sharp and can cause cuts. Therefore, be careful and wear thick gloves when handling the blades.

7.4 Sharpening chipping blades

When the chipper is in use, the blades become worn and the cutting edge becomes dull. It is therefore necessary to sharpen the blades regularly. The sharpening interval depends on the type of wood being fed into the machine and whether soil and pebbles have been dragged along with the wood to the blades.

Signs that the blades need sharpening:

- The chip quality is poor.
- The chipper struggles to grip the wood and the rotor loses speed quickly.

When the blades need to be sharpened, they must first be removed from the machine, but before doing so, check whether the blades need to be replaced instead (see Section 7.4.1). To remove the blades, follow 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 chip quality. If you are unable to sharpen the blades yourself, there are companies that specialise in this.

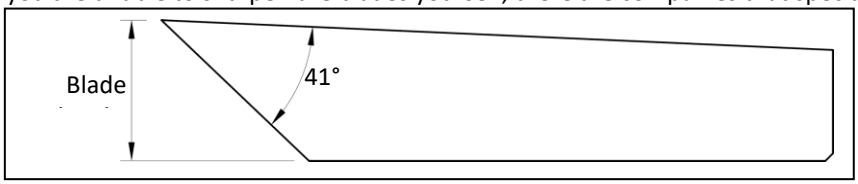


Figure 19

When sharpening blades, it is important to sharpen them evenly. In particular, the blade height must be the same on all the blades. If this is not adhered to, it can be difficult to set the bottom anvil and thus difficult to ensure a uniform chip.

For the overall balance of the rotor, it is important that the weight of the blades is the same.

To ensure the blade has a long operational life, observe the following:

- Only use the machine for chipping wood or similar biological material.
- Make sure that the wood being fed into the machine is as free of as much soil and pebbles as possible.
- Never put large stones, iron and other metals or tools in the chipper.

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

Warning: When the blades are newly sharpened, they are very sharp and can cause cuts. Therefore, be careful and wear thick gloves when handling the blades.

7.4.1 Changing chipping blades (when?)

When the chipping blades have been sharpened after a long period of use to the point where the edge surface is behind the hole through the rotor (see Figure 20), the chipping blades must be replaced.

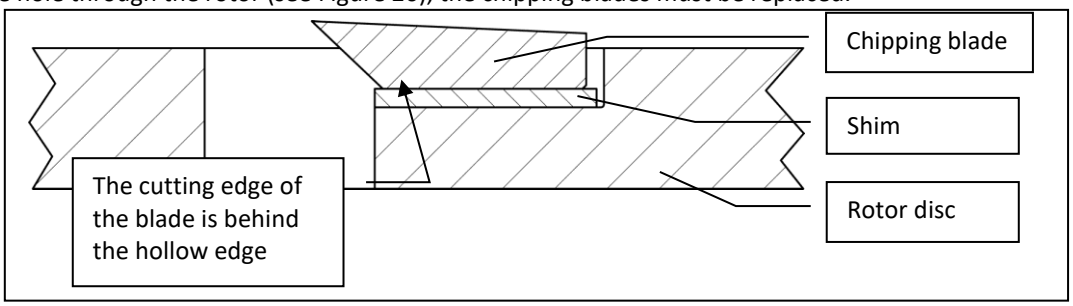


Figure 20

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

Change worn chipping blades according to the instructions in Section 7.3ff.

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

7.5 Changing the chip size

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

The chip size you get at a given chipper setting depends on a number of factors:

1. Wood type
2. Wood moisture
3. Blade height
4. Feed speed

Re 1. Different types of wood have different hardnesses, which in turn affects the chip size.

Re 2. The drier the wood, the greater the tendency for it to splinter, where more moist wood tends to make more uniform chips.

Re 3. The blade height above the front of the main rotor affects how much each blade can take of the wood to be cut each time the blade passes over it. If the blade height is low, too little may be cut off, generally resulting in small chips. Conversely, if the blade height is high, a lot can be cut off, resulting in correspondingly large chips.

Re 4. By turning the flow valve on the non-return valve (see Figure 7), you not only adjust the speed of the feed rollers, but also to some 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 blade and chipped before it hits the rotor. This means that the full blade height is not utilised. To optimally utilise the blade height, the wood needs to hit the rotor just right and then be hit by a blade.

As you can see, only points 3 and 4 can be changed immediately. But of the 2, only the blade height really matters for the *overall* chip size.

7.5.1 Adjust the chip size with shims under the blade.

By using shims between the blade and rotor, you can adjust the blade height and thus the overall chip size. The shims are available in a range of thicknesses and can be combined to suit most needs.

Shown Figure 18here is how the shims are placed between the rotor and blade.

Once you have installed or removed shims, remember to adjust the anvils to suit the new blade height. In particular, it is also important to pay attention to the side anvils when you have added shims that increase the blade height.

Note: The maximum permitted blade height is **13 mm!** See Figure 21.

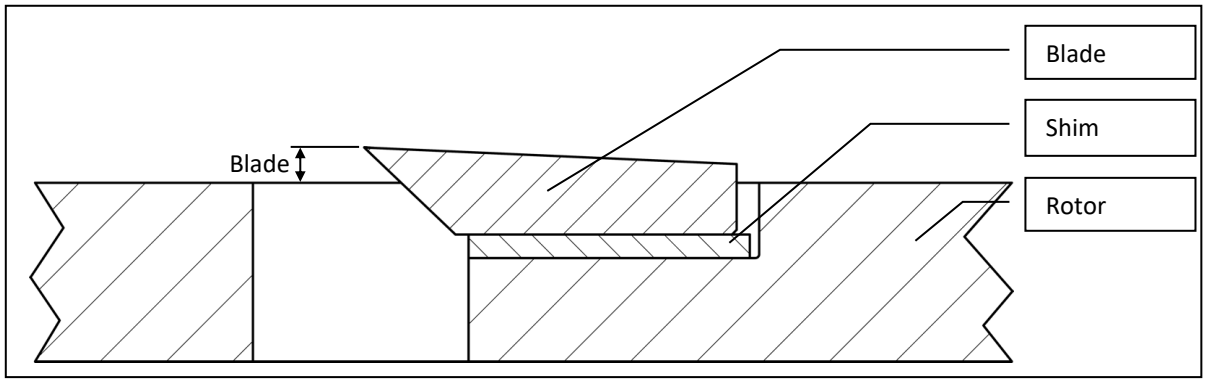


Figure 21

7.5.2 Setting the chip length by adjusting the oil flow.

As mentioned earlier, by turning the flow valve on the non-return valve, you can adjust the speed of the feed rollers and, to a certain extent, the chip length. The faster the feed rollers run, the coarser the chips you get. Conversely, the chips will be finer if the feed rollers run slowly, as the wood will be chopped by a blade before it hits the rotor - you could say that the full blade height is not utilised in this way.

It is not recommended to use this method to generally adjust the chip length as it is difficult to control. The ideal is to run the infeed so fast that the wood just hits the rotor disc before it is chipped. However, as this is difficult to achieve in practice, and as the rotor does not run at a constant rotation speed because it loses revolutions as the wood is chipped, you will run best by feeding a little slower than necessary. This ensures that the wood does not hit and slow down the blade before it is chipped, minimising the impact of the feed speed, which is why the blade height determines the chip size in the first place.

7.6 Lubrication of bearings/hinge arms

To ensure a long operational life, bearings should be lubricated regularly.

If the machine is used 8 hours a day, the bearing manufacturer recommends lubricating the bearings once or twice a year with a lithium soap-based grease with a minimum viscosity of 68 mm^2s^{-1}.

For lubricating bearings and hinge arms, use a grease gun that fits the grease nipples, available at all lubrication points. The location of the bearings, hinge arms and grease nipples is shown in Figure 18.

Lubricate the bearings by first removing the front, top and rear guards and the bearing guard (see Section 6.2.1ff), then pump in grease in an amount corresponding to that specified in the table below. <u>If this amount is exceeded, there is a risk of the bearings overheating during start-up</u>. Therefore, please note that the bearings should <u>not</u> be filled with grease. Be careful <u>not</u> to press too much grease into the bearings, as this can push the stuffing box out of the bed.

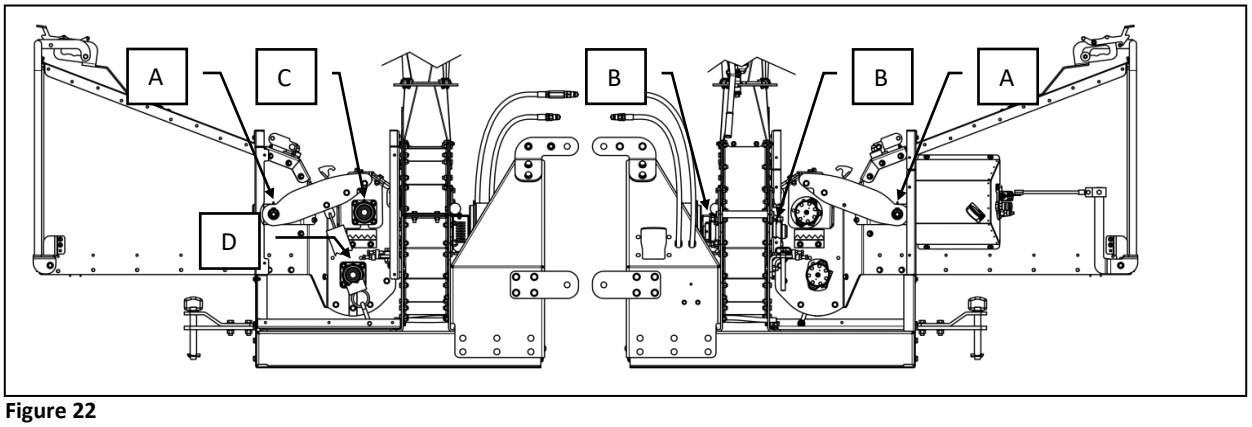


Figure 22

Lubrication points:

Marking	Location	Quantity	Amount
A	Hinge arm	2	1½ pump stroke
B	Main bearing (rotor)	2	3 pump strokes
C	Bearing for the top roller	1	1½ pump stroke
D	Bearing for bottom roller	1	1½ pump stroke

7.7 Lifting and lowering the upper part of the feeder

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

7.7.1 Lifting the upper part of the feeder

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

1. Dismantle the front, top and rear guard according to Section 6.4.1ff.
2. Remove the spring
3. Turn the hook on the upper part down (see Figure 23B).
4. Lift the upper part of the feeder up to the hook that "catches" and holds the upper part.

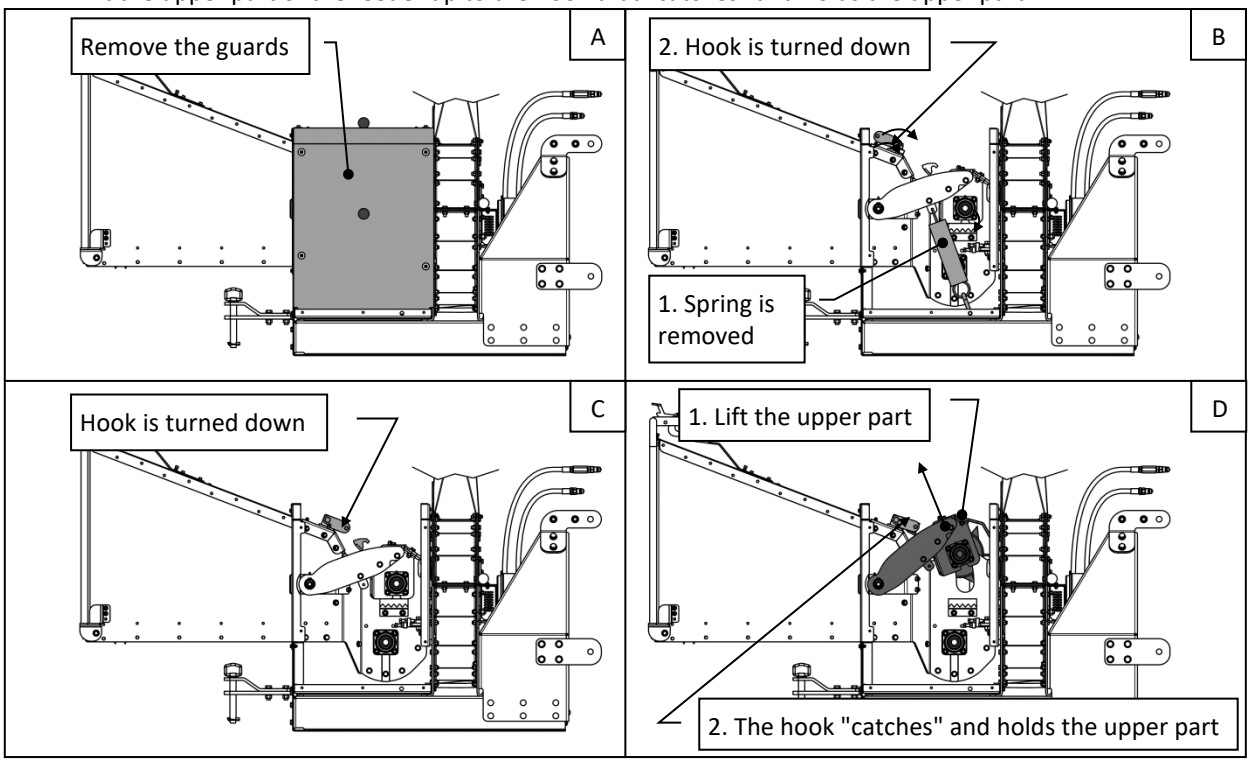


Figure 23

Warning: When the upper part of the feeder is lifted, never reach under the upper part, even if the upper part is locked by the hook and secured with the pin. The top only opens to see the anvil better!

7.7.2 Lowering the upper part of the feeder

Before closing the feeder, check that all anvils are sufficiently clamped.
Closing the feeder is done in the reverse order of opening of feeder:

1. While lifting the upper part, the hook holding the upper part can be turned away. The top can now be lowered into place.
2. The hooks swivel backwards so that they do not catch the top when the chipper is in use.
3. The spring is now remounted on the upper part.
4. The guards can now be mounted again (see Section 6.4.1ff).

Warning: Watch your fingers when lowering the top.

7.8 Anvil

The chipper is fitted with a series of anvils that ensure a good cutting effect between the anvil and the chipping blade.

7.8.1 Bottom anvil

The following sections will describe how to check, adjust, replace and correctly mount the bottom anvil. It is very important that you follow the procedures in these sections to avoid potential hazards and injuries.

7.8.1.1 Adjusting the bottom anvil

The easiest way to adjust the bottom anvil is as follows (see Figure 24):

1. Lift the upper part of the feeder so that you can see the anvil and the rotor (see Section 7.7.1). If necessary, the upper part of the rotor housing can also be opened for additional visibility (see Section 7.1.1).
2. Loosen (but do not unscrew) the two locking bolts on the sides of the bottom anvil and also loosen one locking bolt (with the internal hexagon) in the centre of the anvil, using a hexagon socket (for a socket wrench) with a long extension to insert into the hexagon of the bolt. Do not put your hand under the roller!
3. The anvil can then be adjusted by tightening the set and counter screws (see Figure 24). Read more about adjustment below.
4. When the adjustment is satisfactory, screw both the set and lock screws into the anvil and tighten the lock nuts on these.
5. Tighten the two locking bolts on the sides again, and also tighten the centre locking bolt with an internal hexagonal socket, again using a hexagonal socket on a long extension to avoid sticking your fingers into the machine.

The anvil should be set so that there is a distance of approximately 2 mm between the anvil and the blades on the rotor. **Carefully** turn the rotor round by hand to check that the distance between the anvil and all the blades is correct. If there is too much or too little space, adjust the adjusting screw until the distance is right. Remember to check the entire width of the anvil in case it is set slightly crooked.

Once all the blades have passed the anvil, it is recommended that you run the rotor one more time to ensure that the anvils are completely clear of the blades. If the setting is satisfactory, torque the three bolts that hold the anvil clamped to the boom during operation. In addition, the set screws, counter screws and their lock nuts must also be tightened (see Figure 24) so that the anvil is completely locked in all directions.

To further secure the bolts, both the bolts that hold the anvil to the crossbar and the two adjusting screws are locked with wire through the holes in the bolt heads - **this must be observed**.

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

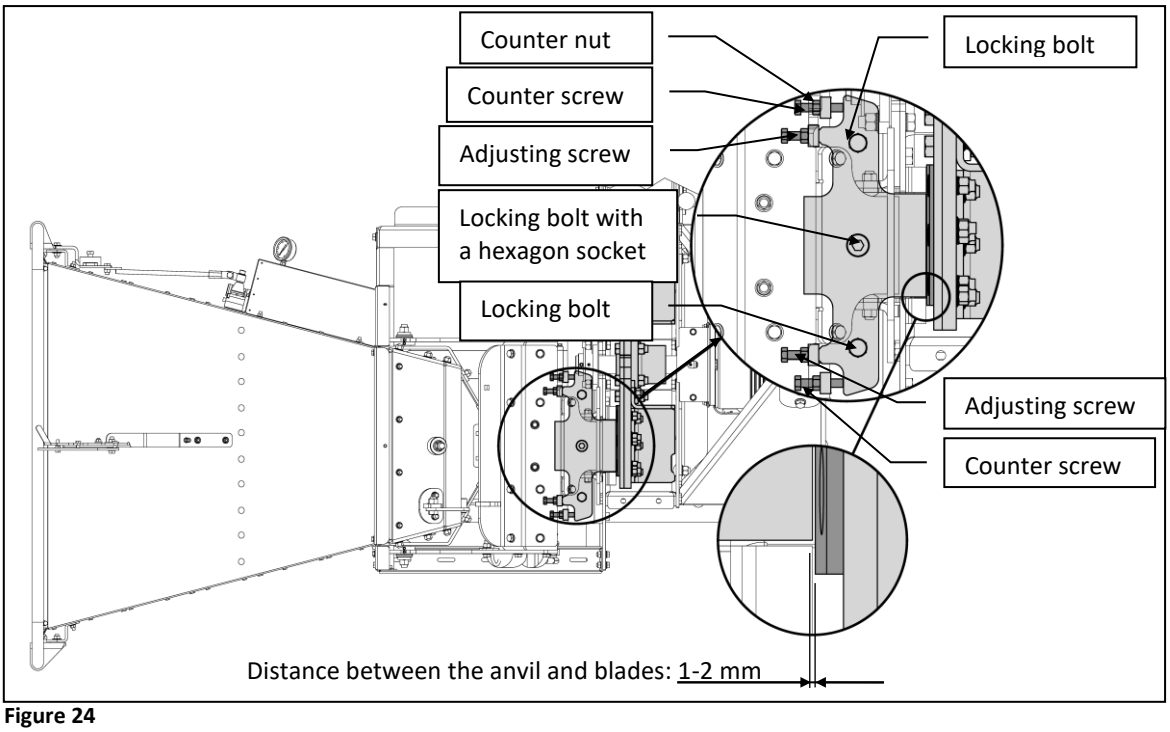


Figure 24

7.8.1.2 Changing the bottom anvil

The bottom anvil can be changed by first removing the feeder (contact the manufacturer or representative for information). Then unscrew the three bolts that hold the anvil in place. The new anvil is put in place, one M16 bolt on each side and a countersunk bolt in the middle are loosely inserted together with the NordLock washers as shown in Figure 25. Set the anvil at the correct distance from the blades, see Section 7.8.1.1, and tighten the bolts.

It's very important not to forget the NordLock washers. In addition, the bolts must be secured with wire so that they are fastened sufficiently to prevent loosening. Contact your dealer or manufacturer for more information about securing these bolts.

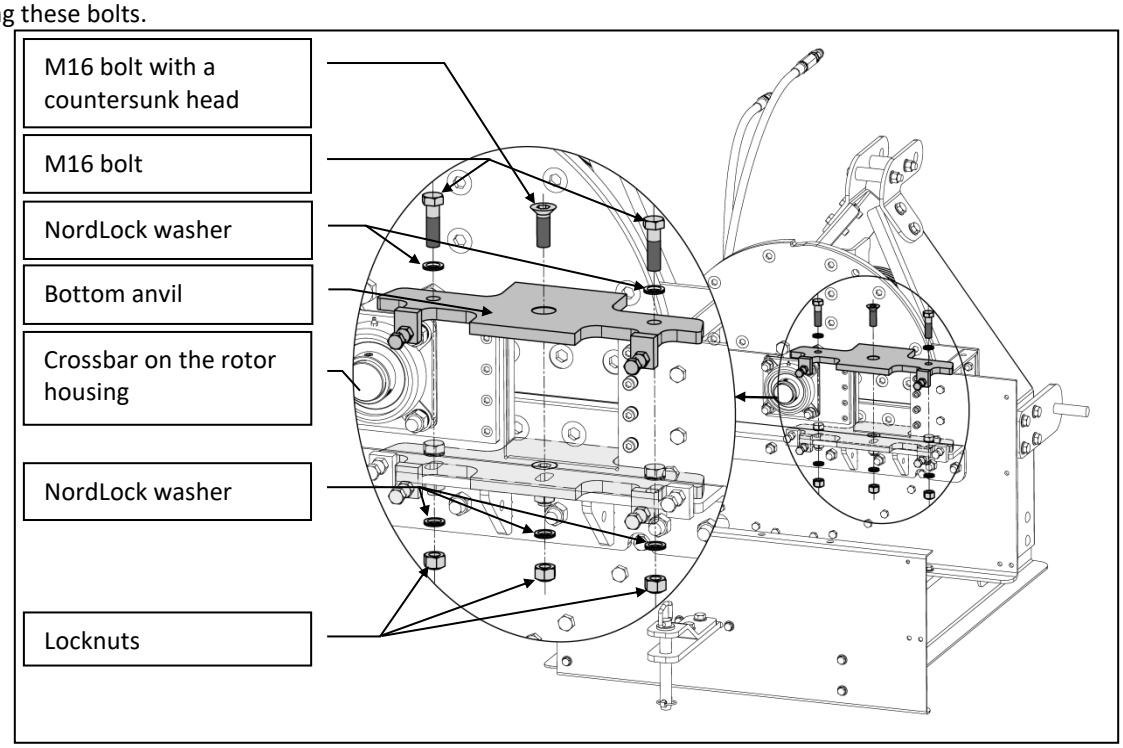


Figure 25

7.8.2 Side anvil

The following sections will describe how to check, adjust, replace and correctly mount the side anvils. It is very important that you follow the procedures in these sections to avoid potential hazards and injuries.

7.8.2.1 Checking the side anvil

The side anvils are fixed to the inside of the rotor housing (see Figure 26), with M12 bolts, the cylinder head, inner hexagon and NordLock washers.

On delivery, the side anvils are 2-3 mm from the blades. It is recommended to replace the anvils when this distance exceeds 5 mm. If the gap is approaching 6 mm, the anvils must be replaced for safety reasons!

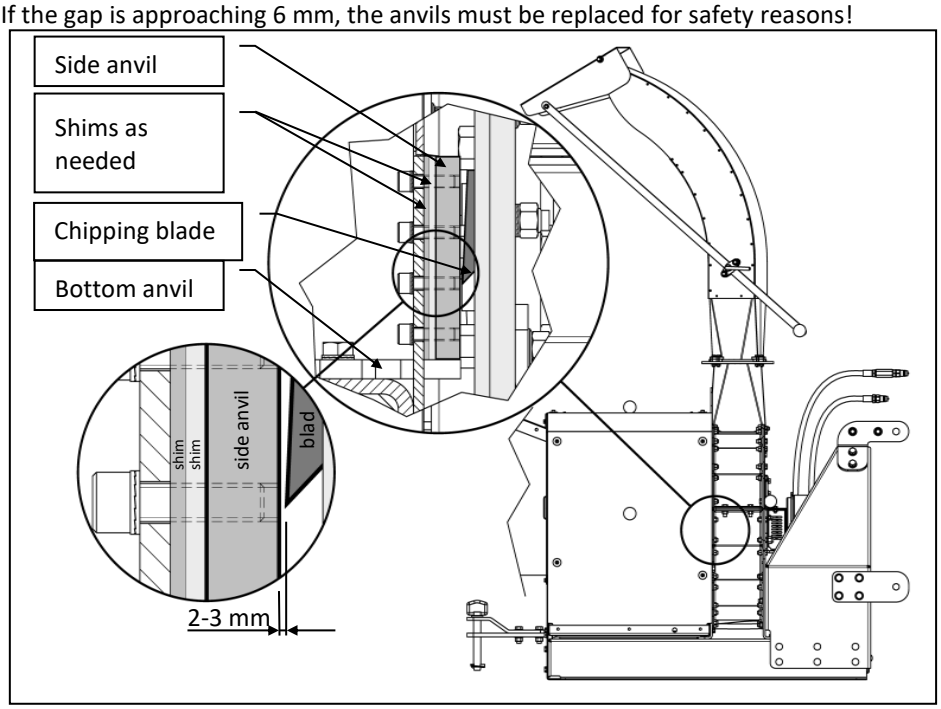


Figure 26

Please note that the specified distances between side anvils and blades only apply to new blades.

7.8.2.2 Replacing and adjusting the side anvil

If the blade height is changed, the side anvil must be adjusted to the new blade height so that the distance between the blades and side anvil matches. The optimal distance between the side anvil and blade is 2-3 mm.

The easiest way to replace and adjust the side anvils is to follow the procedure below (the procedure is the same for both side anvils):

1. Remove the front, top and rear guards as described in 6.4.1ff.
2. Open the top of the rotor housing (see Section 7.1.1) and lock the rotor with the hitch pin as shown in Section 7.2.
3. The anvil is now accessible (see Figure 27).
4. The bolts holding the anvils can now be unscrewed, ensuring that the anvils do not fall into the chipper when the last bolt is removed.
5. A new side anvil and shims that provide the desired anvil height can be found.
6. The new side anvil can now be mounted as shown in Figure 27, with a number of shims to give the desired anvil height, with M12 bolts with the cylinder head, inner hexagon and NordLock washers.
7. After the first bolt has been inserted and tightened, check that it does not protrude beyond the anvil on the opposite side. If the bolt protrudes through the side anvil, choose a shorter bolt or shorten it. This can be done, for example, by filing or grinding it down a little so that the bolt end is flush with the side anvil. Do not use washers as shims to limit how much the bolt protrudes through, as this will prevent the NordLock washers from working properly. Also, do not use bolts that are too short. Also see Figure 28 for the correct installation.

8. Once the side anvil is fitted and the bolts are torqued, check that the distance between the anvil and the blade is between 2-3 mm. If this is not the case, remove or add shims, or choose a different side-anvil thickness.
9. Once the anvil is adjusted, gently turn the rotor a few turns, making sure all blades are properly spaced and nothing is touching it.
10. Once one side anvil is correctly fitted, repeat the procedure for the anvil on the other side of the infeed hole.
11. When everything is satisfactory, the machine can be closed again, the guards fitted, etc., and the chipper is ready for use.

Warning: Beware of the sharp blades as there is a direct hole to the rotor when replacing the side anvil.

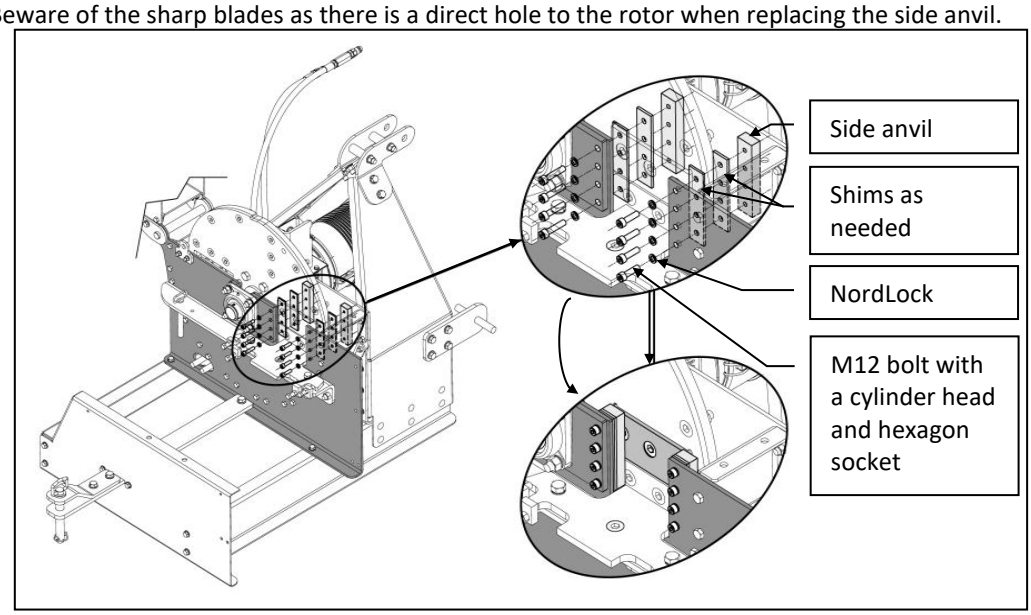


Figure 27

7.8.2.3 Correct fitting of the side anvil

When fitting the side anvil, it is important that the bolts are not too long or too short. It is also important not to use regular washers as shims to prevent the bolt from sticking out, as this will prevent the NordLock washers from working as intended.

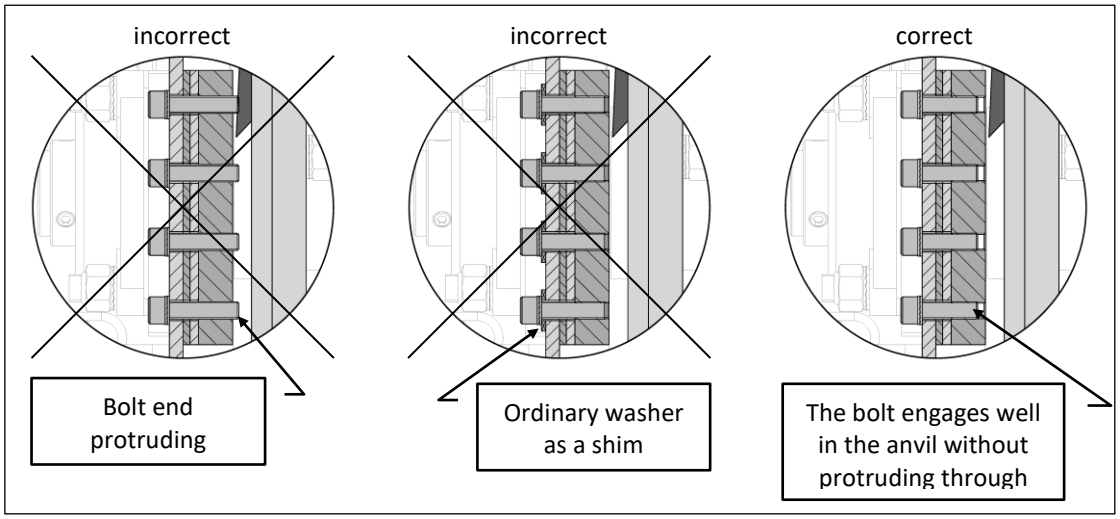


Figure 28

7.9 Hydraulic diagrams

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

When working with hydraulic hoses, it is important to ensure that the hydraulics are not pressurised. If pressurised, there is a risk of hydraulic oil spraying out of the hoses when they are removed. Therefore, never connect the hoses on the tractor's hydraulic outlet when working with them.

You can briefly move the control handle to the loading position and then return it to the stop position. In the loading position, the oil will flow freely back and the system should then be depressurised. However, be careful when working with the hydraulics in case there are faults in the system. Don't rely blindly 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 axle must be removed!

7.9.1 Hydraulic diagram

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

Install the hydraulic hoses correctly by following the instructions in Figure 29.

When working on the hydraulic system, remember to check that the hydraulic system is not pressurised.

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 guide bracket (see Figure 5). If this is not the case, stop the machine immediately and correct the problem. This must 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 axle must be removed!

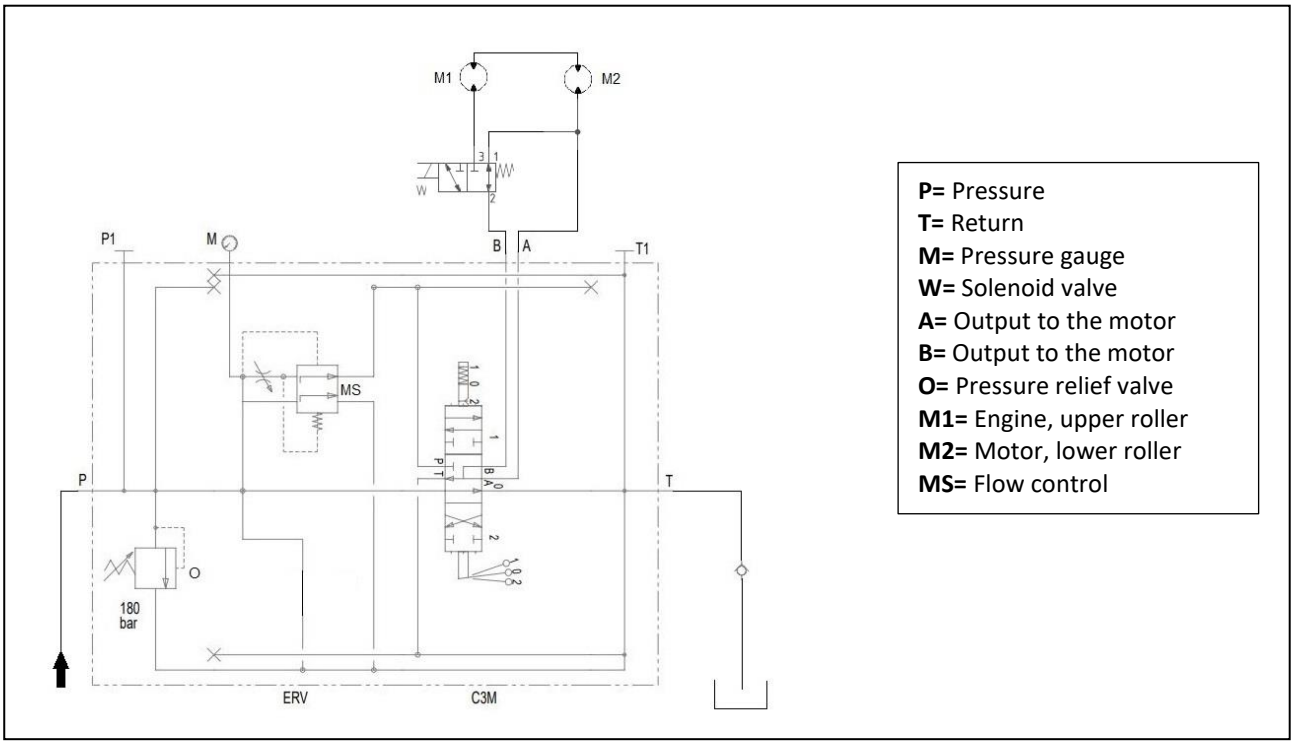


Figure 29

7.10 Replacing hydraulic hoses

If a hydraulic hose has been damaged, e.g. if a hose has burst, it must be replaced.

When purchasing and installing a new hose, it is important that it meets the following specifications:

Standard: EN857 2SC
Dimension: ½"
Pressure (nominal): 275 bar
Temperature range: -40 - 100°C

In addition, hoses that are not covered by guards should be placed in a "sock" to prevent oil from splashing onto the person operating the chipper if the hose springs a leak. This must be complied with.

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

7.11 Non-return valve on the hydraulic hose

As the non-return valve must not be pressurised at the return port, a non-return valve is screwed onto the return hose to the tractor to ensure that this port is not accidentally applied to the wrong hose.

The non-return valve works in such a way that it only allows oil flow in one direction, so it must be installed 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 supply and return, nothing will happen as the non-return valve will block the hydraulic oil to the chipper.

For the non-return valve to function properly, it must be installed as shown in Figure 30. Note the symbol on the non-return valve indicating the direction of flow.

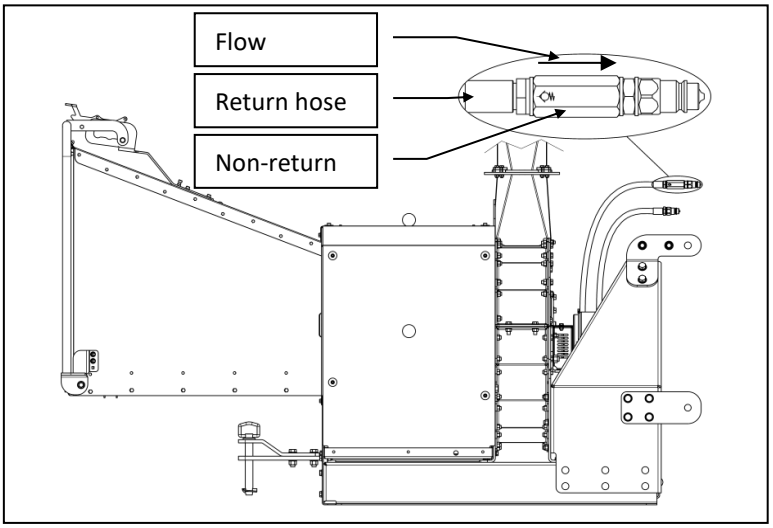


Figure 30

7.12 Setting the safety valve on the non-return valve (hydraulic valve)

It may sometimes be necessary to set the permissible hydraulic pressure using the safety valve on the non-return valve block located on the side of the funnel (see Figure 7).

If the pressure is too low, the machine will not perform optimally (the rollers cannot draw the wood into the machine) and it is a good idea to increase the permissible pressure for better performance.

If the pressure is too high, you risk reducing the operational life of the hydraulic parts. Hydraulic motors in particular can only handle higher pressures than specified for a short period of time.

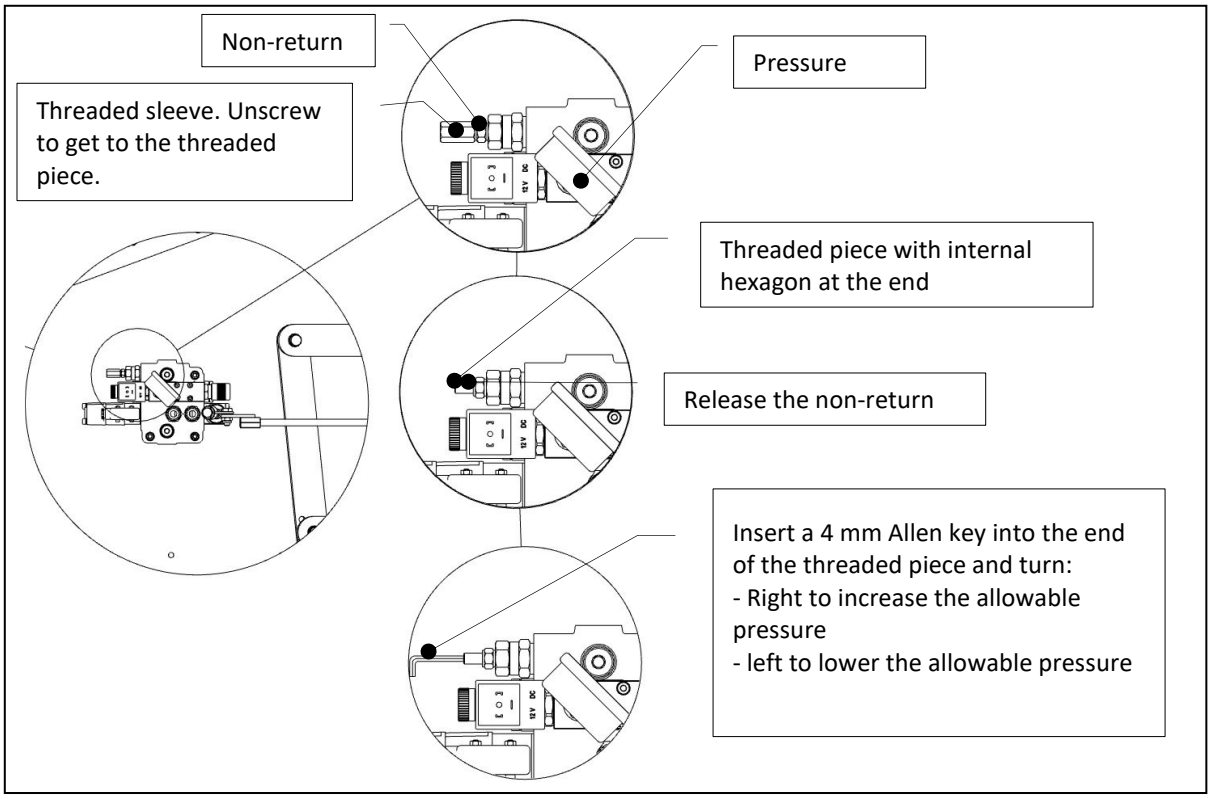


Figure 32

If the chipper draws wood into the machine and suddenly stops feeding, it could be because the pressure is set too low. When the wood stops, the pressure in the hydraulic system will increase, which you can read on the pressure gauge. If the operating pressure reading, **when the rollers are blocked**, is not close to 150 bar, it may be worthwhile to adjust the safety valve to allow a higher pressure. If the pressure exceeds 150 bar when **the rollers are blocked**, the allowable pressure in the safety 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 (optional extra), NOT if it's the stress system that turns off the feed.

It's important to understand that the pressure that you can currently read on the pressure gauge is an expression of how hard the infeed is working; i.e. if the infeed has an easy time pulling in a piece of wood, a low pressure is displayed and if it has difficulty pulling in a piece of wood, a high pressure is displayed - up to a maximum of 150 bar. Therefore, if the wood in the machine is stationary and 150 bar is displayed on the pressure gauge, the infeed has no more power to work with. You must therefore reverse and 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 safety valve must be set to a maximum permissible operating pressure of 150 bar. The easiest way to do this is as follows:

1. Start the chipper according to the instructions in Chapter 5.
2. Feed wood into the chipper.
3. When chipping wood, you can read the pressure on the pressure gauge (see Figure 32). The pressure will fluctuate depending on operating conditions and if it exceeds 150 bar, the pressure must be reduced.
4. If the pressure needs to be adjusted, loosen the lock nut on the threaded piece. Note that it is not necessary to unscrew the nut completely.
5. Insert a 5 mm Allen key into the end of the threaded piece and turn:
   - Right turn (clockwise) to lower the permissible pressure.

- Left turn (anti-clockwise) to increase the permissible pressure.

6. By adding more wood to the chipper, the pressure gauge checks whether the pressure is satisfactory.
7. When the pressure is set correctly, tighten the locknut.

It can be beneficial to have two people when setting the pressure. One puts wood into the chipper, while the other checks and adjusts the pressure.

It is recommended to check the pressure regularly and readjust it if necessary to ensure the hydraulic parts have a long operational life.

Warning: It is important that the pressure does not exceed the allowed 150 bar, as it will sooner or later cause a gasket in a hydraulic motor to leak.

7.13 Fitting the spout

When fitting the spout, it's an advantage to have two people.

The spout is in two parts, with the lower part fixed to the upper part of the rotor housing. The upper part of the spout is held to the lower part by a series of guides, and to fit the upper part, one of these guides must be removed.

The easiest way to fit the top of the spout is to follow the following procedure (see Figure 33).

1. Remove one of the guides that will hold the top part of the spout from the flange on the bottom part of the spout.
2. Lift the top of the spout 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 guides that are still attached to the lower part of the spout.
3. The handlebar that was originally removed can now be reinstalled and the upper part of the spout is now retained.
4. The locking lever is now moved to the locked position and check whether it locks the spout sufficiently or too much. If it needs to be adjusted, follow the procedure in Section 7.14.
5. The spout is now ready for use.

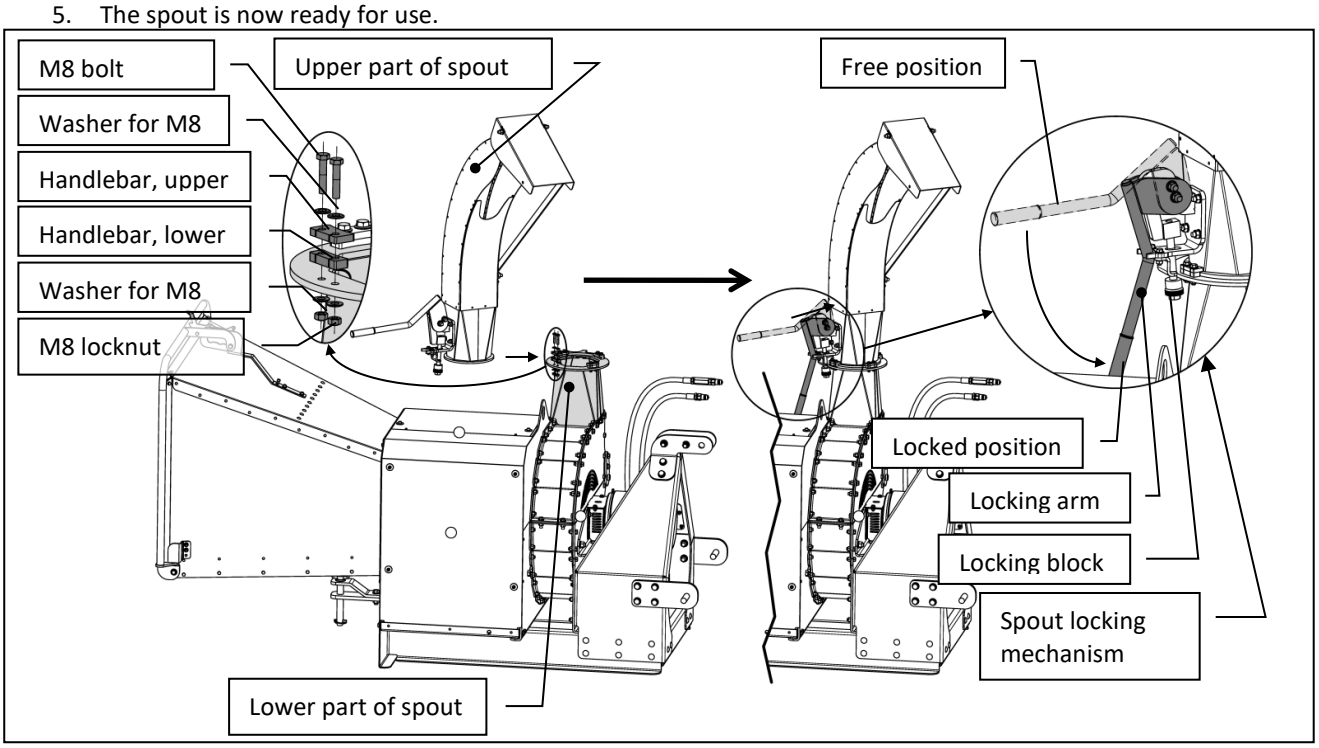


Figure 33

7.14 Adjusting the spout locking mechanism

If the locking mechanism is too loose or too tight, it can be adjusted. The mechanism should be tight enough to prevent the spout from turning when the chipper is in use and during transport. At the same time, it should be loose enough to lift the locking arm into a free (horizontal) position without forcing.

The easiest way to adjust the locking mechanism is to follow the procedure below (see Figure 34).

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

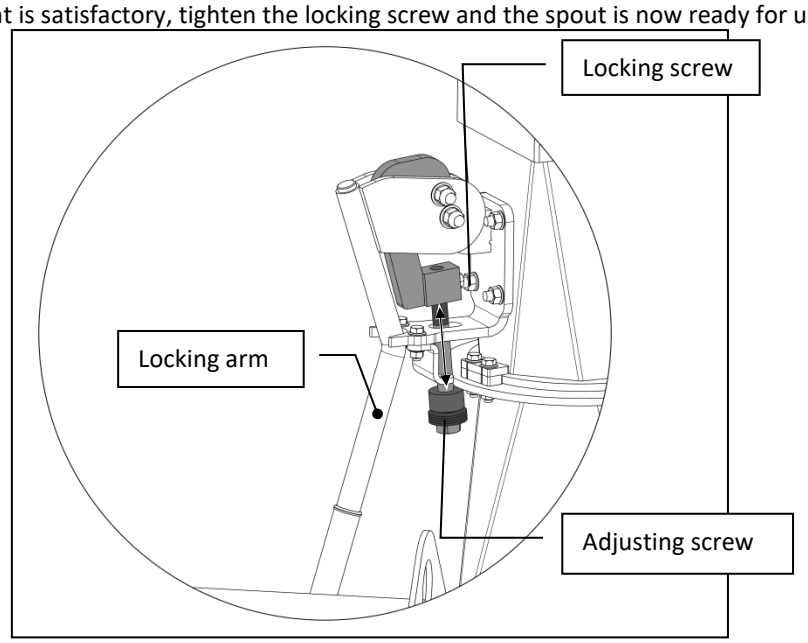


Figure 34

7.15 NordLock washers

NordLock washers are special washers designed for use in places where extra safety is needed to prevent bolts and nuts from rattling loose, for example, when fitting the blades on the rotor.

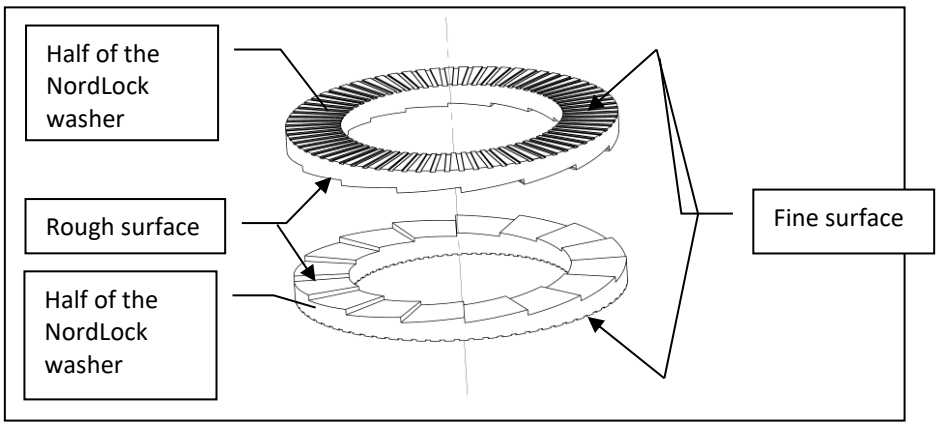


Figure 35

NordLock washers must always be fitted in pairs with the rough surfaces (see Figure 35) facing each other to function properly (see Figure 36 for an example). If the bolt has a hexagonal or cylindrical head, NordLock washers must also be fitted between the head and the item being tightened.

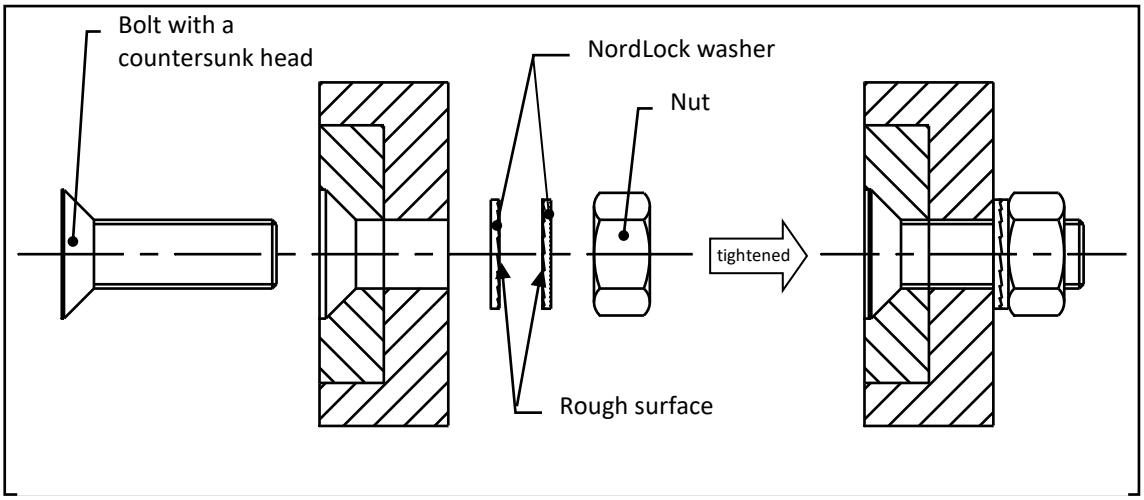


Figure 36

When tightening the bolt or nut, make sure the NordLock washers are centred over each other to ensure they work 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 grade of the bolt or nut is 10.9 or higher, the washers must be changed every time the bolt or nut is removed!

The bolt grade is on the bolt head or on the nut.

7.16 Shims for the PTO axle support

To avoid damaging the PTO axle, it should be placed in the hook located at one side suspension when the chipper is not in use (see Figure 37).

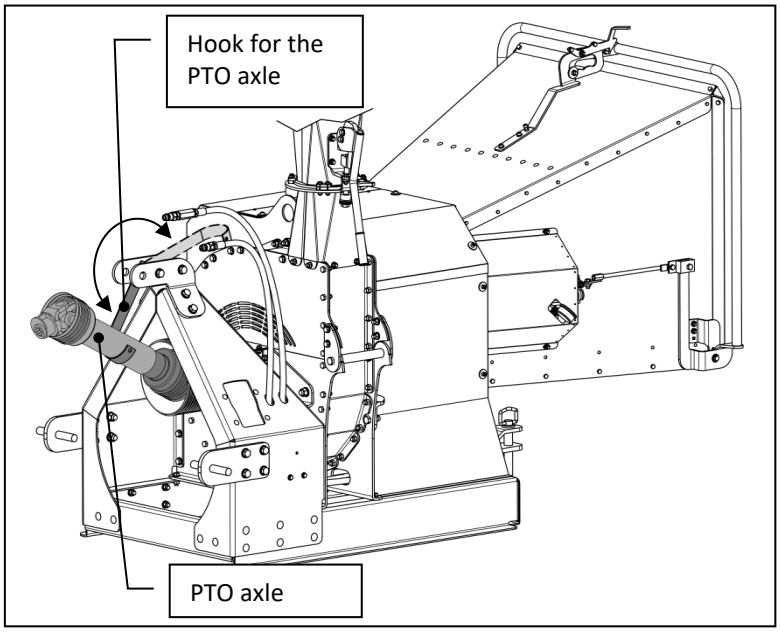


Figure 37

7.17 Maintenance of the PTO axle

To ensure a the PTO axle has a long operational life, it must be properly maintained. Read the manual that came with the PTO axle to see how to do this.

8 Single-line diagram

The key diagram is intended to show the function and composition of the electrical functions mounted on the chipper (see Figure 38).

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

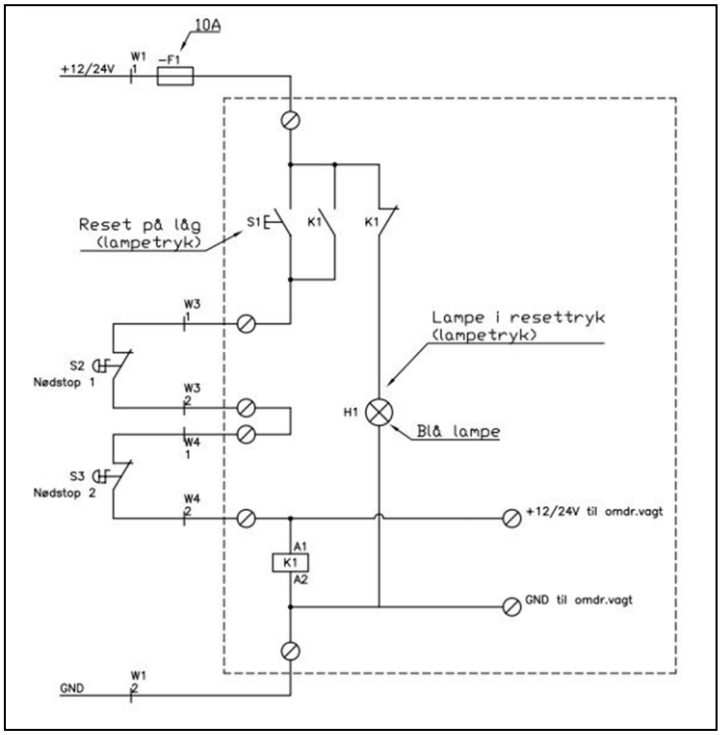
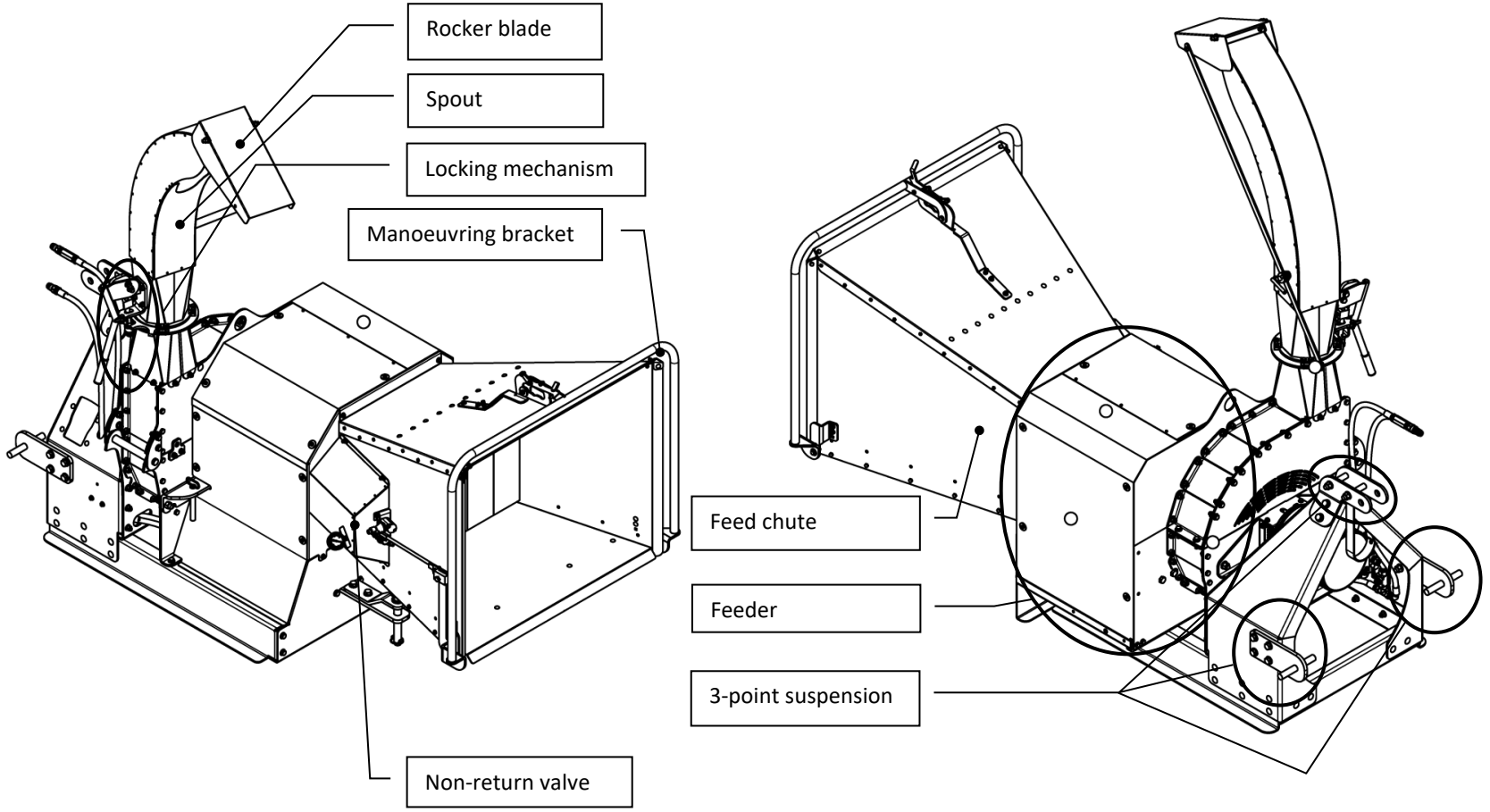


Figure 38

9 Chipper overview



10 Rotor overview

10.1 Rotor for PC-1750-SEH

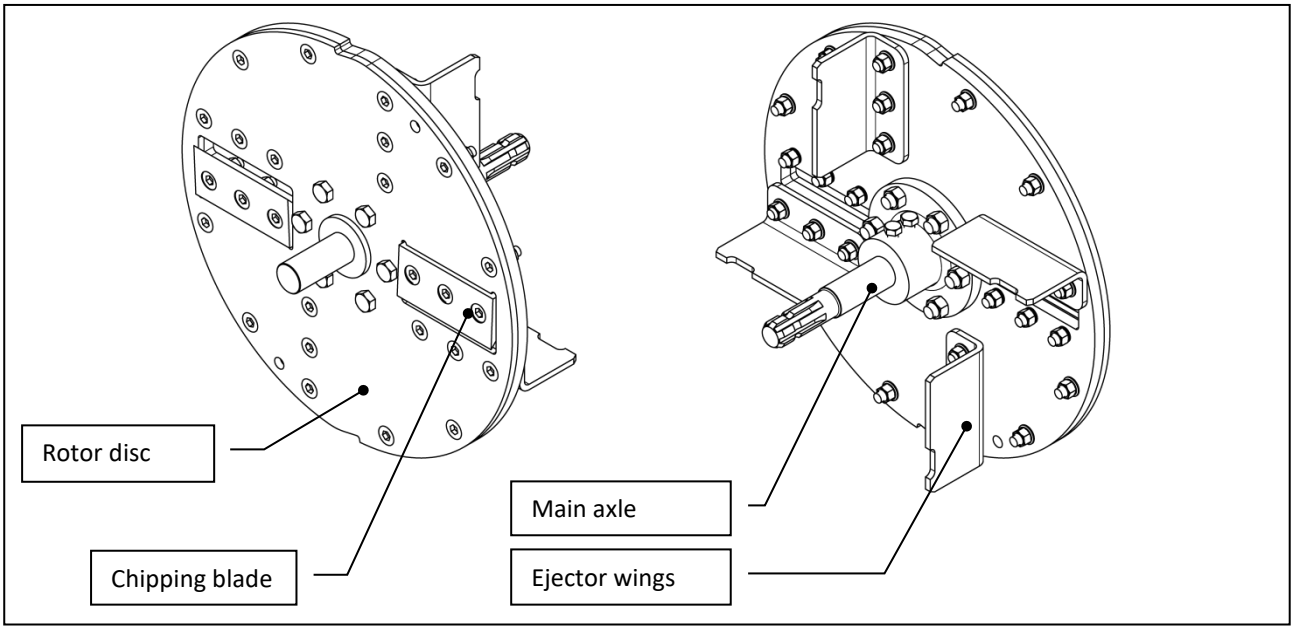
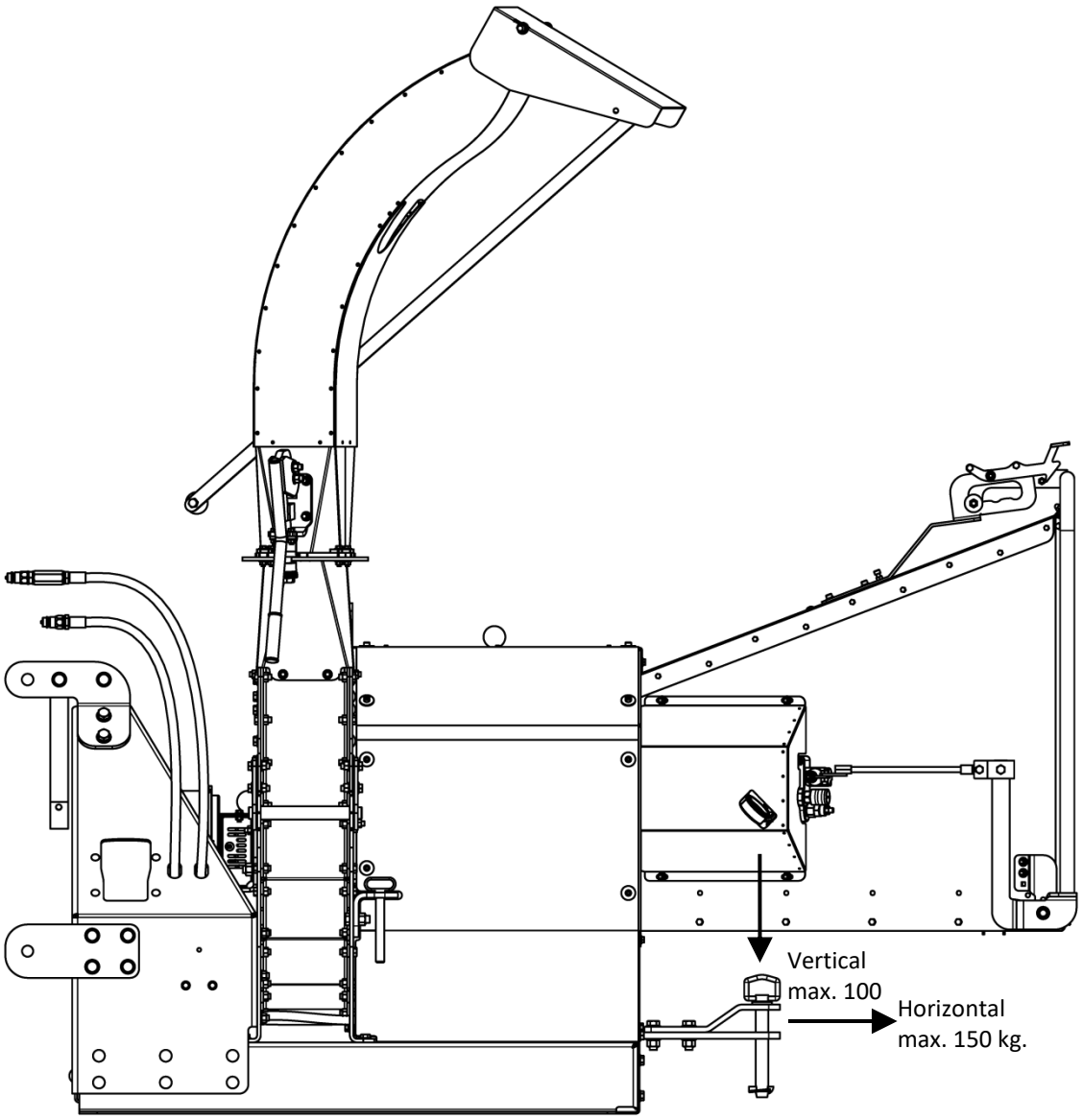


Figure 39

11 Vehicle load

The maximum load for the trailer is 100 kg vertically and 150 kg horizontally.



12 Miscellaneous information

12.1 Tightening torques for bolts

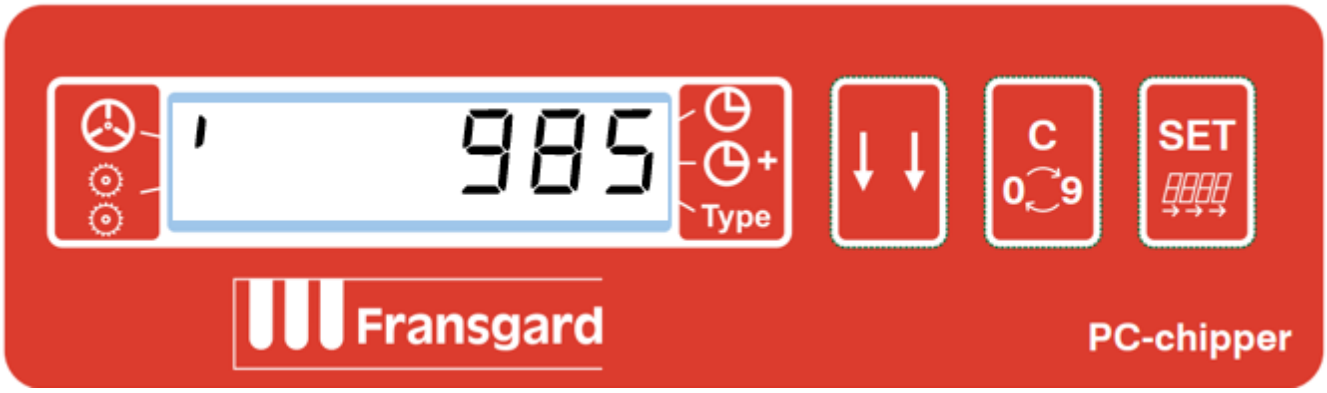
When tightening the bolts on the swath wilter, do so with torque. If the bolts are not tightened enough, they will not hold together sufficiently. If they are too tight, you risk fatigue and fractures.

	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 grade is on the bolt head.

13 Speed monitor (Optional)

Operating instructions
Fransgård PC-Chipper



System	Chipper
Item number	
Serial number	
Installed by	
Installation date	

13.1 Overall operation

Congratulations on the purchase of your new Fransgård PC-Chipper.

The Fransgård PC-Chipper allows for rotation monitoring of the rotor and infeed rollers, as well as alarm signalling when both low and high limit values are exceeded.

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

13.1.1 Different features and displays

The following features are included in the computer:


Programmable tachometer (revolutions per minute). Used with a rotor speed sensor.


Programmable tachometer with a visual alarm (revolutions per minute). Use with a roller speed sensor.


Working hours (hours/minutes)

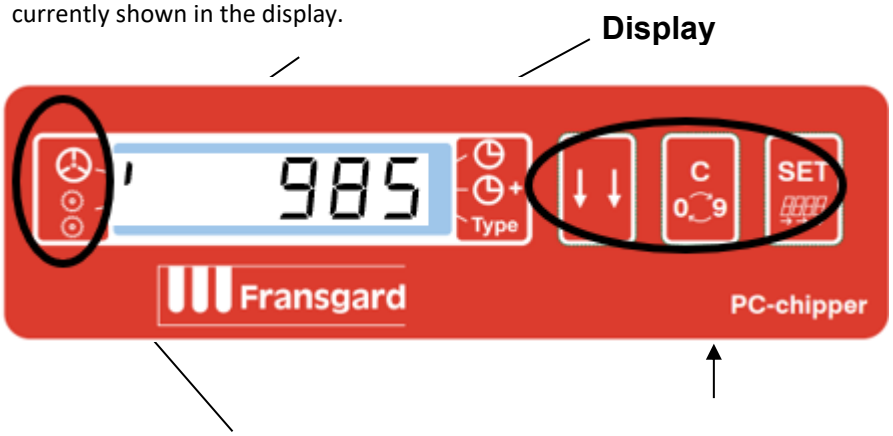

Total working hours (hours/minutes)

Type Selecting the machine type

The features are further elaborated on in the following Chapter 2.

13.1.2 Overview of the monitor

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

13.1.3 Explanation of the control buttons

↓↓-Buttons

Press the ↓↓ button to switch between the different displays (indicated in the pane to the left of the end of the display) and thus between the different features of the monitor. Each time the button is pressed, the position of the cursor/display changes by one step. The cursor starts in the top left corner and then moves "downwards".

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

SET-Buttons

The SET button is used for programming (changing/deleting) values in the computer, e.g. entering alarm values for high and low revs.

Use the ↓↓ button to navigate to the feature/display that you want to change or program. Then press and hold the SET button for approx. 1 second until the number flashes. Press C 0 9 to change or delete the first digit of the value to be programmed. Pressing the SET button moves the cursor to the next digit in the value and so on until all digits have been changed/programmed. Finally, press the ↓↓ button to exit the programming menu and save the programmed value in the memory.

-Buttons

Use the button to change or delete the values that are to be programmed (and which were first made to flash using the button).

Also see the examples below.

13.2 Review of features

13.2.1 Specification of features and limit values

Symbol:	Description:	Limit value:
	Speed monitor rotor	1 - 9999 rpm. (in practice, not below 12 rpm)
	Speed monitor rollers with visual alarm (not available)	1 - 9999 rpm. (in practice, not below 12 rpm)
	Working hours	0:0 - 99:59 hours:minutes 9999 full hours
+	Total working hours	0:0 - 99:59 hours:minutes 9999 full hours
Type	Selecting the machine type	1 – 18

The computer has an internal memory that saves all values when power is interrupted.

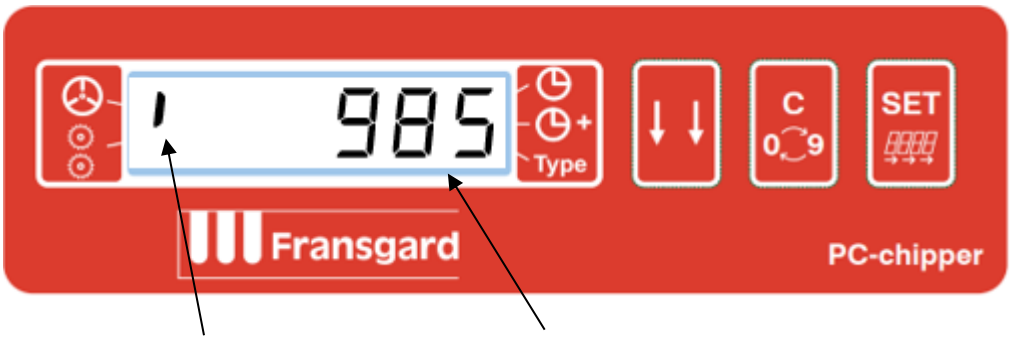
13.2.2 Speed monitor for the rotor and infeed rollers[1] (rpm)

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

13.2.2.1 Display of the current rotation speed

In this display view, the top vertical cursor (the rotor) is highlighted, as shown in the following figure.

[1] Rpm of the infeed rollers is not available



Display marker at the rotor

Display of the current rotor speed

13.2.2.2 Programming access

To gain access to change values, you need to know a password.

Display feature that requires a password.
- Blade RPM
- RPM roller
- Machine type

The password is: 1221

13.2.2.3 Programming alarm limit values

The tachometer is programmable. This makes it possible to instruct the computer to switch off the valve of the infeed rollers if the rotation speed falls below the entered lower limit value 'L' or exceeds the entered upper limit value 'h'.

13.2.2.4 2.2.3Programming of limit values and low/high rotation speed.

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

Example of changing the low limit value to 850 Rpm and the high limit value to 1000 Rpm		
Press the button:	**The display shows:**	**Explanation:**
↓↓	0	Find the speed monitor for the rotor by repeatedly pressing the button
	c 0 0 0 0	Enter the password as follows:

SET	c x _ _ _	Hold the button for 1 second until "c" lights up on the left and the first digit (out of 4) flashes.
C	c x _ _	Press the button 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 "arrow" button to continue.
		When the password is entered correctly, the following will appear:
C	L x _ _ _	Press the button 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 button 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 button until the desired digit is correct.
SET	L 850	Press to set/change the last digit.
C	L 850	Press the button until the desired digit is correct.
↓↓	h x000	Press the "arrow" key and "h" (high) will light up on the left and the first digit (out of four) will flash.
C	h 1000	Press the button until the desired digit is correct.
SET	h 1000	Tap to set/change the next digit (the second digit will now flash).
C	h 1000	Press the button 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 button until the desired digit is correct.
SET	h 1000	Press to set/change the last digit.
C	h 1000	Press the button until the desired digit is correct.
↓↓		Exit the programming menu. Or if the Pulse factor and max/High needs to be changed see Section 2.2.4

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

Display marker at the rotor

If the

Change low alarm limit 'L' to 850

alarm limit values on the rotor are exceeded, the current rotation speed continues to be displayed while the infeed rollers stop. If the rotor has been below the lower limit value, the infeed rollers will start

up again when the rotor speed is above the entered upper limit value 'h' (e.g. 1000 rpm).

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

13.2.2.5 Programming values for the Pulse factor and max/High 'H' rotation speed.

Example of programming the number of pulses per revolution - factor 'F' - on the rotor (the same principle applies to the infeed rollers) to a value of 3, and the max/high value 'H' on the rotor to a value of 1100 rpm.

Press the button:	The display shows:	Explanation:
	h 1000	Continue after entering h XXXX
SET	c 0 0 0 0	Hold the button for 1 second until the digit "c" flashes. Enter the password as follows:
C	c x _ _ _	Press the button 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 your password
↓↓	c xxxx	Press the "arrow" button to continue.

Display marker at the rotor

SET	F x.00	The display shows "F" flashing.
C 0 9	F x0.00	Press the button until the digit has the correct value. Note that zero (0) cannot be written in this location.
SET	F x.00	Press to set the next digit
C 0 9	F 3.00	Press the button until the desired digit is correct.
SET	F 3.00	Press to set the next digit.
C 0 9	F 3.00	Press the button until the desired digit is correct.
SET	F 3.00	Press to set the last digit.
C 0 9	F 3.00	Press the button until the desired digit is correct.
↓↓	H x000	Press the "arrow" key and the digit 'H' will flash.
C 0 9	H 1000	Press the button until the desired digit is correct.
SET	H 1000	Press to set the next digit.
C 0 9	H 1100	Press the button until the desired digit is correct.
SET	H 1100	Press to set the next digit.
C 0 9	H 1100	Press the button until the desired digit is correct.
SET	H 1100	Press to set the last digit.
C 0 9	H 1100	Press the button until the desired digit is correct.
↓↓	0	Exit the programming.

13.2.3 Work path on the machine

13.2.3.1 Displaying the rotation time on the machine

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

Operating time in hours and

Display marker for working time

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

13.2.3.2 Reset the rotation time on the machine

Resetting the rotation time (operating time) of the machine can be done at any time. First press the ↓↓ button until the working time display appears. The following entries are then made:

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

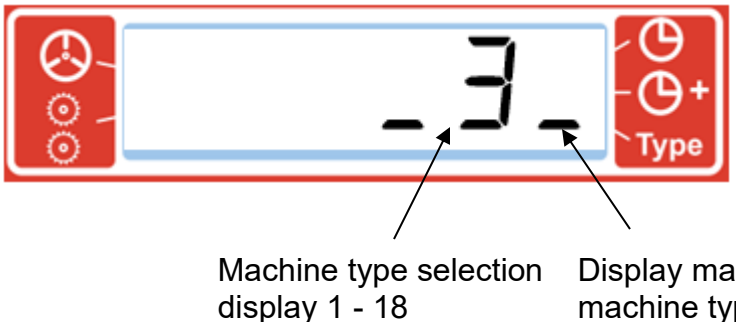
Note: The total hour counter (centre horizontal marker on the right side) cannot be reset. It is used to record the total working time of the machine.

13.2.4 Programming machine type presets.

Example of changing machine type 3 to machine type 12.

Press the button:	The display shows:	Explanation:
↓↓	_3	Find the machine type by repeatedly pressing the button.
SET	c 0 0 0 0	Hold the button for 1 second until the digit "c" flashes. Enter the password as follows:
C	c x _ _ _	Press the button 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 "arrow" button to continue.
SET	x3	Hold the button for 1 second until the line flashes.
C 0 9	13	Press the button until the digit has the correct value. Note that zero (0) cannot be written in this location.
SET	13	Press to set the next digit
C 0 9	12	Press the button until the desired digit is correct
↓↓	12	Exit the programming.

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



Machine type selection display 1 - 18

Display marker for machine type

Setup table for included machine types.

Table version 1

Model	L Stop value Rotor	h Switch-on value Rotor	H Upper stop value Rotor	Pulses/rpm rotor	Pulses/rmp... roller	Roller flashes. 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

13.3 Mounting

13.3.1 Mounting the computer

A plastic rail is supplied with the computer that fits the cut-out at the back of the computer housing. The rail also attaches to rubber mounts on the machine so that the computer avoids the worst shocks and at the same time sits comfortably for the user.

Connect the sensors to the junction box as indicated in the installation diagram (see the later section). The cables are installed in such a way that they are protected against mechanical damage and that they are not exposed to tension (breakage) when the machine is rotating or the hydraulics are operated.

13.3.2 Fitting sensors for rotation measurement

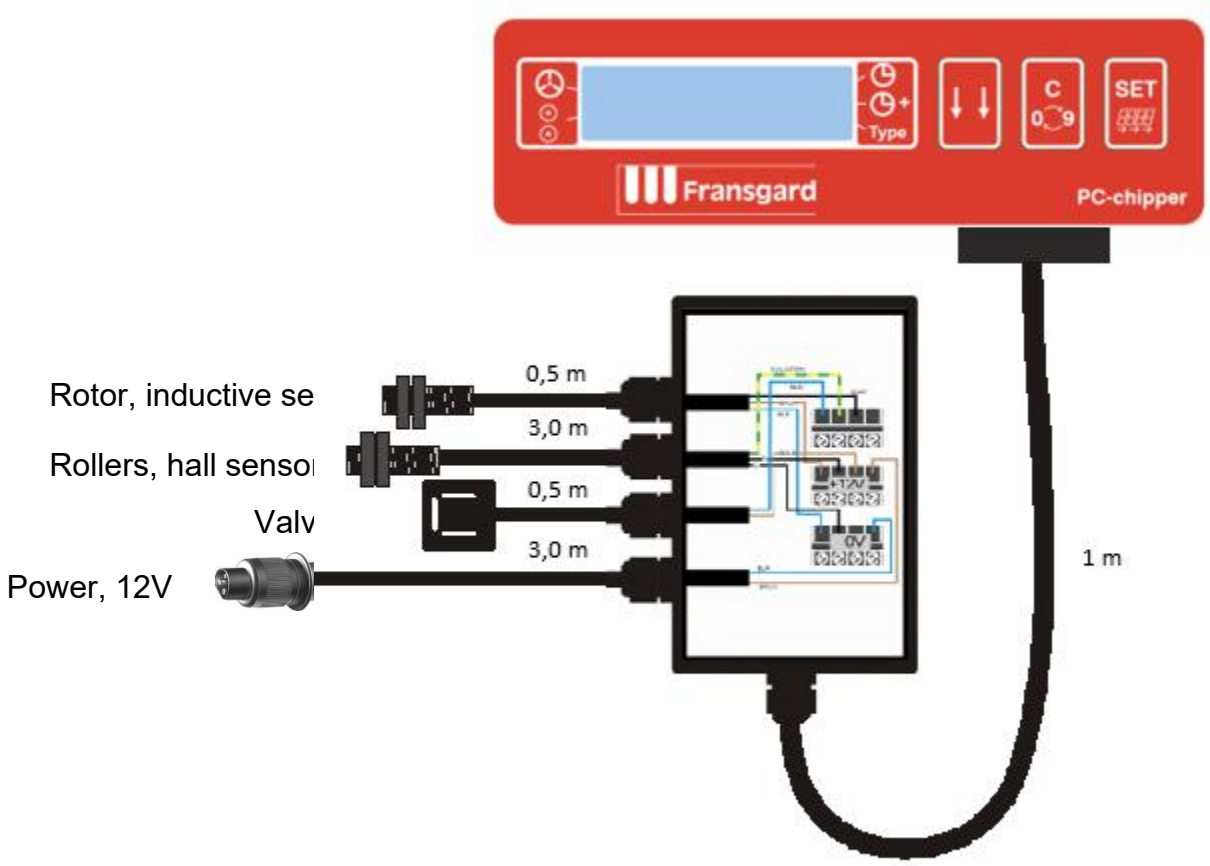
The inductive sensor is positioned so that the rotor's sidepieces/spokes pass the switch's terminal surface at a distance of 2 - 6 mm when rotating.

The magnetic ring with six magnets is mounted on the axle at the infeed rollers. The Hall sensor is positioned so that the magnets in the magnetic ring rotate past the switch's terminal surface at a distance of 2-3 mm:

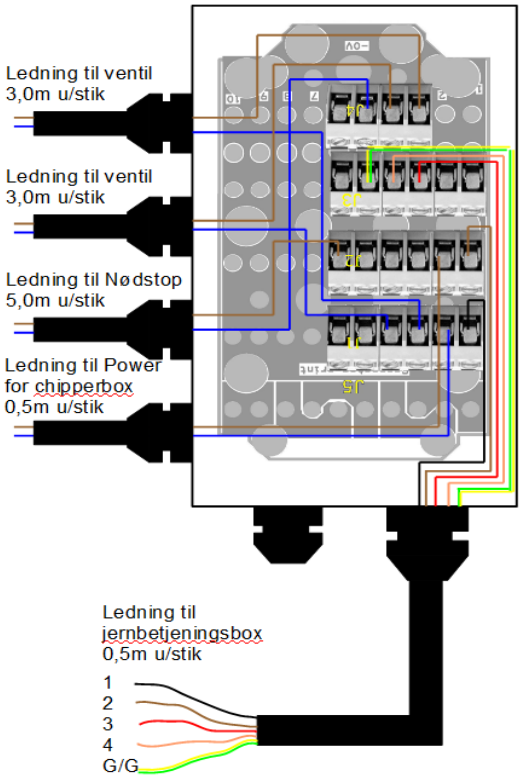
- As the electronic sensors (Hall/inductive) use power, the "+V" for these sensors should preferably be connected across the ignition key so that it does not drain the battery of power when the machine is stopped.

13.3.3 Mechanical setup and mounting diagram

Installation diagram when using electronic sensors (Hall or inductive sensors):



13.3.4 Remote conbox (PEC/PIC models only)



13.4 Technical data

Display:6 digits

Power supply:12 V

Temperature influences:The chipper Monitor is fully operational within-10 - 70c^{0}

Pulse signals from the sensor:Max. 225 pulses/sec.

13.5 Note

The controller/monitor is designed for use in connection with the described feature. Any other use of the controller/monitor may involve significant risk and relieves the controller supplier of any liability.

Please note that Lykketronic A/S is only responsible for the electronic controller/monitor and not for the overall function of the machine, including the safety aspects.


Fransgård