

# INSTRUCTION MANUAL

# **PALAX®** D410

Powered by PTO  
Powered by electric motor



SERIAL NUMBER \_\_\_\_\_

## **PALAX®**

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# 1. Overview

## 1.1. Foreword

This Instruction Manual is intended for a professional operator of the machine. The operator must have usual general knowledge and skills. For example, the buyer of a tractor-powered machine is expected to master the use of PTO shaft transmission.

Before installing and operating the machine, the user of the machine must thoroughly familiarise himself with this manual. This manual shall be kept for future reference. Before starting the operation, the user must also familiarise himself with the operating controls of the machine and the emergency stop mechanism. For more information about our products, please visit our website at [www.palax.fi](http://www.palax.fi).

**NOTE!        Keep this manual with the machine at all times.**

## 1.2.EU Declaration of Conformity

Directive 2006/42/EC

Manufacturer: TP Silva Oy  
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Product: PALAX D410 Pro+  
a firewood processor with 4,3-m discharge conveyor

Powered by: Tractor PTO or electric motor

Models:	TR	Powered by tractor, equipped with own hydraulic system
	TR/SM	Powered either by tractor or by electric motor

Serial number of the machine: \_\_\_\_\_

We hereby certify that the machine meets the requirements of the Government Decree 12.6.2008/400 on safety of machinery through which the Machine Directive 2006/42/EC has been put into effect, and that during the manufacturing process the following harmonized standards have been applied.

SFS-MANUAL 93-series, SFS-EN 349-1+A1, SFS-EN 609-1+A1, SFS-EN 618, SFS-EN 620, SFS-EN 847-1+A1, SFS-EN 953+A1, SFS-EN 954-1, SFS-EN 982+A1, SFS-EN 4254-1, SFS-EN 11684, SFS-EN 12100-1+A1, SFS-EN 12100-2, SFS-EN 13850, SFS-EN 13857, SFS-EN 14121-1, ISO/TR 14121-2, SFS-EN 60204-1+A1.

TP Silva Oy  
1.1.2023



Seppo Koiranen  
Managing Director





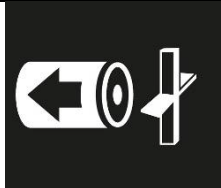
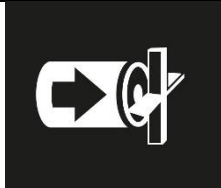







### 1.3. Intended use of the machine







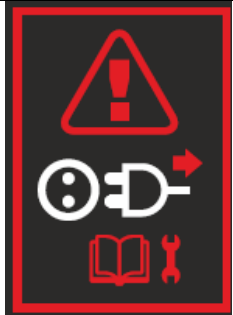
This firewood processor with conveyor is intended for production of firewood from round timber. Using the machine for any other purpose is prohibited.

#### Maximum size of the log

- ❑ For cutting, the maximum diameter of the log is 38 cm.
- ❑ For cutting, the maximum length of the log is 4 m.
- ❑ When handling long trunks, we recommend using a specific log-lifting deck with rollers or hydraulic feed.

### 1.4. Warning signs

	Read the instruction manual		
	Beware of the moving saw bar		
	Wear protective clothing	Interrupt the splitting	Launching the splitting
	Wear eye protection		
	Opening the safety net stops the operation of the machine	Adjusting the splitting wedge	Cutting
	Permissible revolution range of the PTO shaft		
		Direction of rotation of the motor. Direction of rotation of the chain	

 <p>Lifting point for loader</p>	 <p>Lifting point</p>	 <p>The machine may only be operated by one person</p>	 <p>Keep clear of the machine's moving parts</p>
 <p>Beware of the PTO shaft</p>	 <p>The danger zone around the conveyor is 5 meters</p>		 <p>Disconnect the machine from the power source before servicing</p>

## 1.5.Nameplates

### Nameplate on the machine

- ❑ The name and address of the manufacturer
- ❑ Designation of the machine type
- ❑ Serial number and year of manufacture
- ❑ Total weight of the machine
- ❑ The plate is located at the in-feed conveyor end of the machine.
- ❑ When ordering spare parts, always mention the serial number and year of manufacture.

### Nameplates on the electric drive

- ❑ 3-phase motor
- ❑ Voltage 230/380 V or 380/600 V, may vary depending on the country.
- ❑ Output 11 kW, fuse size min. 25 A slow. Recommendation 32 A slow.
- ❑ The plate is located on the connecting box of the electric motor.



## 1.6. The main dimensions and models of the machine



Figure 1

Machine model	D410 Pro+	
Driving power	TR	TR/SM
Weight	1044 kg	1080 kg
Powered by electricity	11 kW, fuse size min. 25 A slow. Recommendation 32 A slow.	
Height/width/length	In transport position 243 cm/118 cm/285 cm	
In-feed conveyor	Length 2.2 m, Height 0.9 m	
Saw-bar/saw-chain	16"; 325; 1.3 mm; 66 drive links	
Max. diameter of the log	Max. cutting diameter of the log; 38 cm	
Max./min. length of the log	Max. length of the log that can be split; 55 cm	

- The 4.3m-long firewood conveyor is included in the weight.

## 1.7.Safety instructions

### General regulations and restrictions

- ❑ Maximum length of the log that can be cut is 4 metres. If no log-stand or log-deck is used.
- ❑ Maximum diameter of the log that can be split is 40 cm.
- ❑ The machine is exclusively intended for the production of firewood.
- ❑ The machine may be operated by one person only.
- ❑ The danger zone around the conveyor is 5 metres to the sides and away from the conveyor.
- ❑ The machine must be equipped with additional lights for transport on public roads.
- ❑ The in-feed deck and the discharge conveyor must always be lifted up and locked in the transport position for transport.
- ❑ Only persons over 18 years of age are allowed to operate the machine.
- ❑ Never remove any safety-related devices from the machine.

### The operator

- ❑ Every person operating the machine, must thoroughly study the entire user manual.
- ❑ Always use eye guards and hearing protectors.
- ❑ Always wear protective shoes.
- ❑ Always wear work gloves.
- ❑ Do not wear loosely-fitting clothing.

### Before use

- ❑ Always carry out the required preparations on both the machine and the conveyor before starting the machine.
- ❑ Make sure that all other people stay outside the work area.
- ❑ Only use a fault-free PTO shaft and attach the chain for the shaft-guard. The permissible revolutions range of the PTO shaft is 400–450 r.p.m.
- ❑ Operate the machine on a sufficiently firm and level surface.
- ❑ Only operate the machine in an adequately lit space.
- ❑ Keep the tractor-powered machine connected to one of the drawbars. Ensure that sufficient space is provided for the PTO shaft and its guard.
- ❑ Always check that all the covers are intact and properly fastened.
- ❑ Always ensure that the saw-chain is in perfect condition.
- ❑ Always ensure that the electric conductors are intact.
- ❑ Always check that all the operating controls are operational.
- ❑ Always check the oil level and make sure that the hydraulic hoses and components are free of damage.
- ❑ Before starting the work, make sure that the machine stands firmly in position.

### During operation

- ❑ Carelessness during the cut-off operation constitutes a major hazard!
- ❑ During the cut-off operation, make sure that the log is always supported on the in-feed belt at the cutting point: danger of rolling over!
- ❑ Exercise particular caution when cutting knotty or crooked logs, as faulty cutting might roll the log over or twist the saw-bar with enough force to break it.
- ❑ Keep the work area clean and clear of foreign objects.
- ❑ Always stop the machine and disconnect the power supply cable or the PTO shaft before servicing.

- ❑ Only cut one log at a time.
- ❑ Danger! Stay away from moving parts.

### 1.8.Noise emission and vibration

- ❑ Equivalent continuous A-weighted sound-pressure level at the workstation is 89.5 dB (A) and the sound power level is 100.5 dB (A).
- ❑ The vibration emission values do not exceed the limit 2.5m/s<sup>2</sup>.

### 1.9.Responsibilities of the operator

- ❑ The machine may only be used to produce firewood.
- ❑ All the safety-related devices are necessary to ensure a sufficient level of safety.
- ❑ The Palax D410 Pro+ is a very safe machine provided that the given instructions are properly followed during the operation, the regular maintenance routines are duly executed and the work is carried out without haste.
- ❑ It is the responsibility of the operator to ensure before the work is started that all the safety-related devices are in perfect order and the machine has been serviced properly.
- ❑ The operator is responsible for ensuring that no one else is subjected to any danger.
- ❑ The structure of the machine must not be modified.
- ❑ The machine must never be operated under the influence of alcohol or drugs.
- ❑ Remember that as the operator you are responsible for any injuries caused if safety-related devices have been removed from the machine.

### 1.10. Operating conditions

- ❑ Always place the machine on as level a position as possible.
- ❑ Prevent risks, such as slipping in winter, by organising the work site in a due manner.
- ❑ Otherwise the weather conditions do not set any restrictions on the operation. When starting the machine in severe frost, allow it to idle at about 1/4 of the maximum speed for about 5 to 10 minutes.
- ❑ Only operate the machine in an adequately lit space.
- ❑ It is recommended that a suitable stand be purchased or made that enables the trees to be processed where the logs are ready at the level of the in-feed deck. Hence, unnecessary lifting may be avoided and the work can proceed much faster. We recommend using either the Palax Midi log-deck or the Palax Log log-stand.
- ❑ The most suitable temperature range for operation is approximately -20 to +30 degrees Centigrade. Otherwise, the weather conditions do not set any restrictions on the operation.
- ❑ Make sure that no other people, especially children, are present inside the operating range.
- ❑ Never use the machine indoors due to the risk of dust generation or emissions of exhaust gases.

### 1.11. Terms of warranty

The warranty period runs for 12 months from the date of purchase.

**The parts that affect the safety or the adjustment of the machine are sealed. The seal must not be broken without the consent of the manufacturer or the dealer. Breaking the seal voids the warranty, and transfers the liability from the machine's manufacturer to the person, who broke the seal.**

#### **The warranty covers**

- ❑ Parts which have been damaged during normal operation of the machine due to any defects in material or workmanship.
- ❑ The reasonable repair cost as set forth in the agreement between the seller or the buyer and the manufacturer.
- ❑ A new part delivered to replace a defective one.

#### **The warranty does not cover**

- ❑ Defects due to normal wear, faulty operation or negligent maintenance.
- ❑ The saw-bar, the drive sprocket, the saw-chain and the in-feed conveyor belt are wear parts that are not covered by the warranty.
- ❑ Defects in the machine due to any modifications which the buyer has made or ordered from a third party and which have affected the machine in such a way that it can no longer be considered to correspond to its original configuration.
- ❑ Other possible expenses or financial claims due to the above-mentioned measures.
- ❑ Indirect expenses and/or travel costs incurred while making repairs under warranty.
- ❑ For parts changed during the warranty period, the warranty expires at the same time as the warranty period of the machine.

### 1.12. Operating instructions for the winch

- ❑ Please refer to the user manual of the winch or visit our website at [www.palax.fi](http://www.palax.fi) for more detailed operating instructions for the winch.

## 2. Acceptance and setting up the machine for operation

### 2.1.State of delivery and acceptance control

- ❑ The machine is delivered almost ready-assembled, test driven and adjusted ready for operation.
- ❑ Check the delivered goods without delay.
- ❑ If the product shows transport damage, contact the transport company and your dealer immediately.

### 2.2.Lifting and transferring the machine

The machine may be lifted by the following points, see Fig. 2, all models.

- ❑ By means of a sling or chain by the lifting points A at the ends of the machine.
- ❑ Using a forklift truck, by points B on both sides, under the frame.



Figure 2



## 2.3. Main parts of the machine



Figure 3

1. In-feed belt
2. Conveyor support
3. Table extension
4. Table extension leg
5. Additional hydraulic circuit
6. Fittings of the optional hydraulics valve
7. In-feed deck
8. Touch screen for X-AIM
9. Hydraulic log clamp
10. Manual start of the splitting operation
11. Controls for the optional hydraulics valve
12. Joystick, hydraulic control of the in-feed conveyor and the crosscut saw-bar
13. Adjusting the splitting wedge height.
14. Saw-bar cover
15. Hydraulic height adjustment of the splitting wedge
16. Swing lock for the conveyor
17. Discharge conveyor

## 2.4. Oil cooler, optional

- ❑ The oil cooler is a piece of optional equipment suited to both tractor-driven and electrically driven models. The oil cooler should be used, if the machine is constantly operating under warm conditions. The cooler is controlled by a thermostat.
- ❑ In a tractor-driven machine, the voltage of 12V-is taken from the light outlet of the tractor and in an electrically driven machine it is taken from the main electric centre.



Figure 4



## 2.5. Optional hydraulics, all models

- ❑ For controlling the feed rollers of the log stand, Fig. 5, part A.
- ❑ The optional work attachment, connected to the connectors for the optional hydraulic circuit, will always run when the in-feed belt is rotating.
- ❑ Always remember to reconnect the hose as illustrated in the picture, when disconnecting the optional work attachment.
- ❑ Connectors on the optional hydraulics valve, Fig. 5, part B
- ❑ The optional hydraulics valve is intended, for example, for controlling the beams of the log-deck. The piece of optional equipment, connected to the connectors, is controlled via the control levers of the optional hydraulics valve, Fig. 3, part 11.

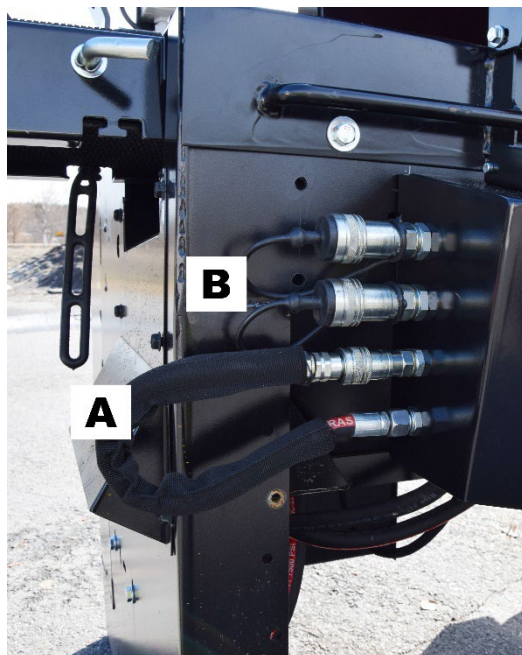


Figure 5

## 2.6. Main parts

1. Pusher
2. In-feed belt
3. Drive roller
4. Saw-bar
5. Drive motor for the saw
6. Safety wedge
7. Log-stop

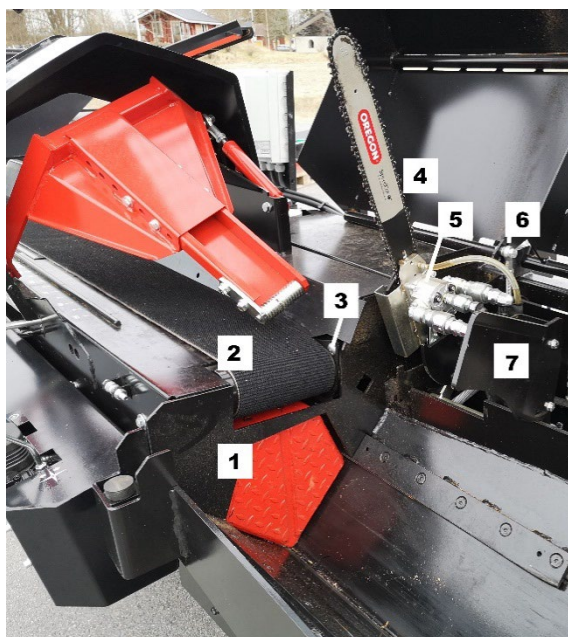


Figure 5



## 2.7.Main parts

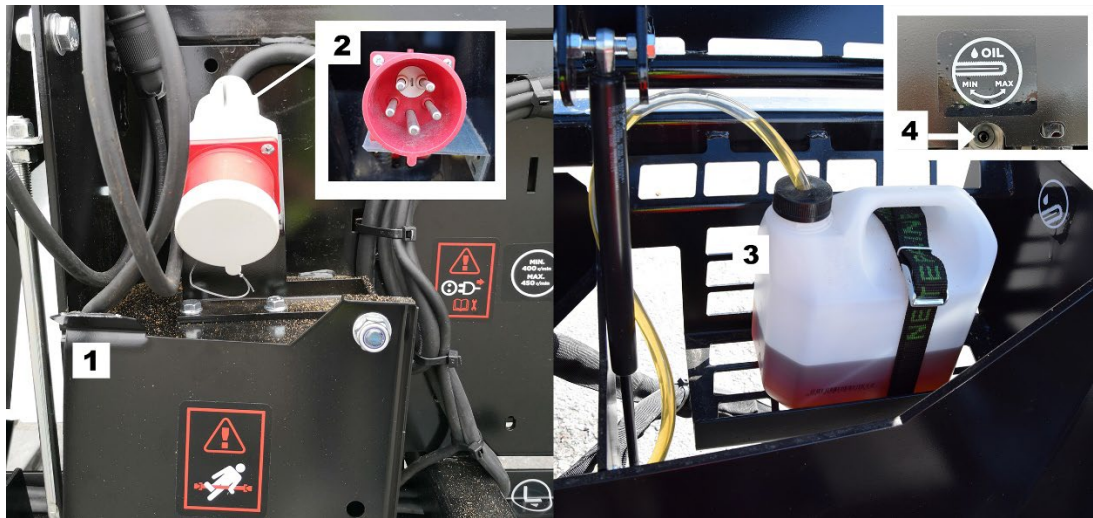


Figure 6

1. Prevention of simultaneous operation
2. Appliance inlet
3. Chain oil canister
4. Adjustment of the chain oil pump

## 2.8.Topping up hydraulic oil

- ❑ Oil volume, 70 litres, refill capacity.
- ❑ The oil quality should be Univis 32, Shell Tellus 32, NESTE HYDRAULI 32 or equivalent.
- ❑ Only use fresh, clean oil.
- ❑ Observe particular cleanliness when changing the oil, as the machine's smooth operation is highly dependent on the purity of the oil.
- ❑ The oil level must be at least about two centimetres higher than the lower edge of the dipstick on the filling cap.

Figure 8

1. Hydraulic oil filters
2. Filling opening for hydraulic oil

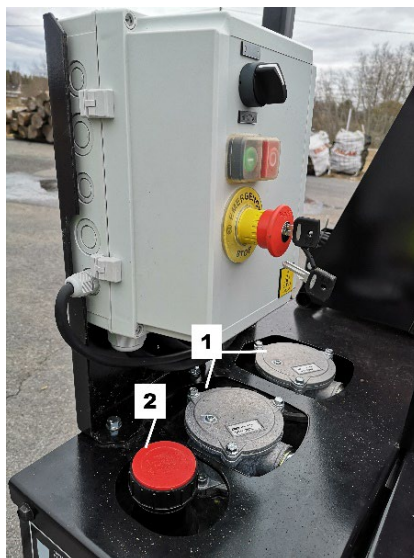


Figure 7

## 2.9. Topping up saw-chain oil

- ❑ Filling capacity of the tank is about 3 litres
  - ❑ Check the saw-chain oil level regularly.
- Top up the oil, as necessary. The canister 3 should always be at least a third full with oil.

## 2.10. Bringing the conveyor into the work position

1. Release the lock A and the lock chain B for the conveyor, Fig. 9.
2. Unwind the winch wire a few rounds.
3. Pull out the conveyor and leave it supported by the winch rope.
4. Lower the conveyor to the ground by means of the winch.
5. Pull open the lock A, Fig. 10.
6. Swing down the top of the conveyor.
7. Remove the support bar B for the conveyor chain, Fig. 10, and attach it to the holes C at the edge of the conveyor.



Figure 8

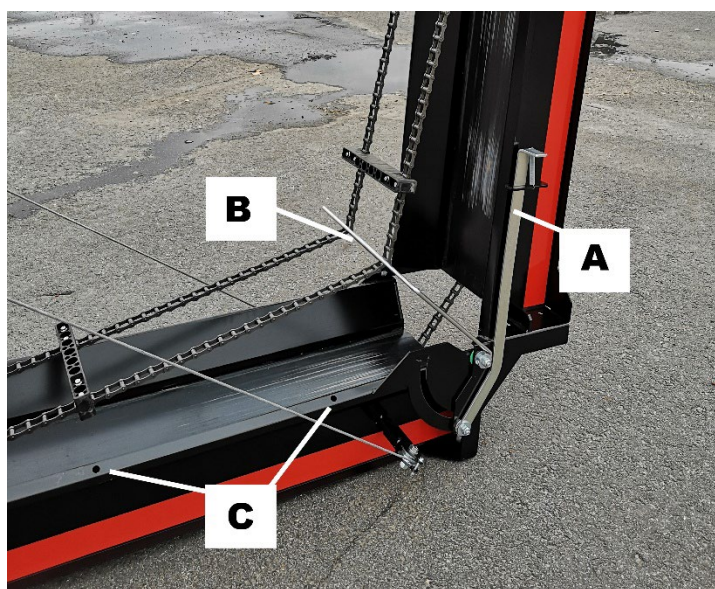


Figure 9

### **2.11. Bringing the conveyor into the transport position**

1. Lower the conveyor to the round, and connect the support bar B for the conveyor chain.
2. Pull open the lock A and lift up the top of the conveyor.
3. Ensure that the lock A locks properly.
4. Raise the conveyor by means of the winch.
5. Tighten the winch wire lightly to prevent it from uncoiling from the spool.
6. Lock the conveyor to the transport support using the lock, the chain and the pin.

#### **WARNING!**

**Always hold the winch handle when lowering the conveyor!**

## **3. Using the firewood processor, description of operation**

### **3.1. Transmission of the machine**

- ❑ The machine's all actuators – including the in-feed conveyor, the discharge conveyor and the chain-saw – are equipped with hydraulic motors.
- ❑ In a tractor-powered machine, the twin pump of the hydraulic system is driven via a gearbox and a PTO shaft or by an electric motor.

### **3.2. Testing the safety-related devices of the machine**

- ❑ Visually, check that the machine looks undamaged, and does not leak oil.
- ❑ Start the machine, and lift up the protective net for the splitting chute. The machine's all functions shall now stop.



### 3.3. Mechanical control of the Palax D410 Pro+

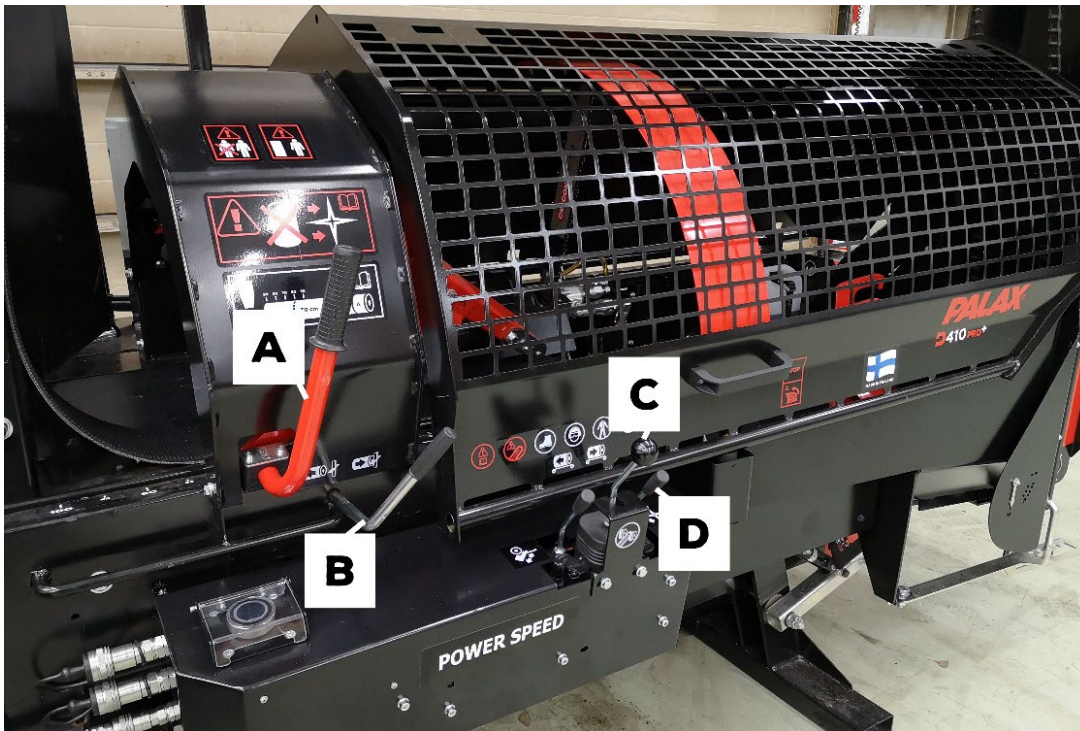


Figure 10

#### Lever A for hydraulic operation of the clamp

- ❑ The clamp automatically keeps the tree in position during the crosscut operation, controlled by the joystick C.
- ❑ The manual operating lever is required for relieving pressure from the clamp for feeding in small or lightweight trees or reversing on malfunction.

#### Lever B for starting and stopping the splitting operation

- ❑ Normally, the splitting operation starts and stops automatically.
- ❑ The manual lever is required in case of malfunction or for launching the splitting of the last log.

#### Joystick control C

#### Lever D for hydraulic operation of the splitting wedge

- ❑ Using this lever, the splitting wedge can be lifted or lowered as required by the size of the log.

### Operation of the Joystick C

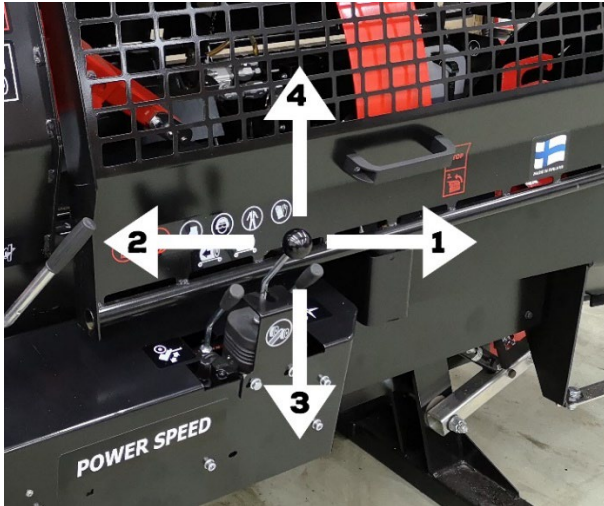


Figure 11

- ❑ In-feed conveyor forward (feeding), direction 1
- ❑ In-feed conveyor backward (reversing), direction 2
- ❑ Crosscut movement, direction 3
- ❑ Lifting the crosscut saw-bar and automatic launch of the splitting operation, direction 4

### Cutting to equal length and feeding into the splitting chute

- ❑ Cut off the undersized piece while there is still sufficiently material for two or three more pieces of appropriate size left in the billet. The last log must not be longer than the adjusted cut-off length.
- ❑ Use the scale at the edge of the in-feed deck as an aid.

### 3.4. Feeding the last log for splitting

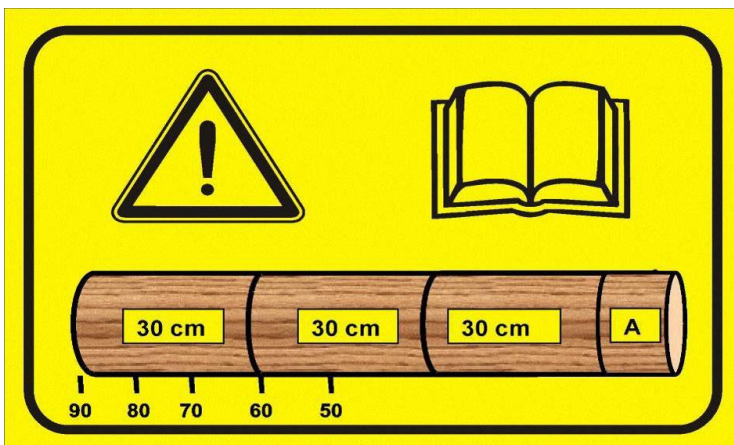


Figure 12

- ❑ Once the pusher has returned to its rear position, feed the last log into the splitting chute the normal way.
- ❑ Start the splitting operation manually.

**WARNING! Make sure that the tree will remain under the clamp throughout the cutting operation. The log must not be shorter than 25 cm.**



Figure 13

### 3.5. Lubricating the chain-saw

- ❑ The machine is equipped with an automatic lubricator for saw-chain oil.
- ❑ The feeding rate of the forced-action piston pump is adjustable and precise. The feeding rate of the lubricator pump is pre-adjusted.
- ❑ Filling capacity of the tank A is about 3 litres. Check the oil level regularly. The tank should always be at least a third full with oil.

**NOTE!** The oil volume is sufficient for lubricating the chain properly under normal conditions. If you cut a lot of thick trees, it advisable to increase the oil volume. Temporarily, the oil volume can be increased by lifting up the crosscut saw-bar and, immediately after that, resuming the cutting operation.

### 3.6. Adjusting the oil volume

- ❑ Turn the hexagon socket screw B in the desired direction. See the instruction decal C, Fig. 14.
- ❑ Turning the adjustment screw one round in the (-) direction reduces the oil flow.
- ❑ Turning the screw one round in the (+) direction, correspondingly increases the oil flow.

### 3.7. In-feed conveyor

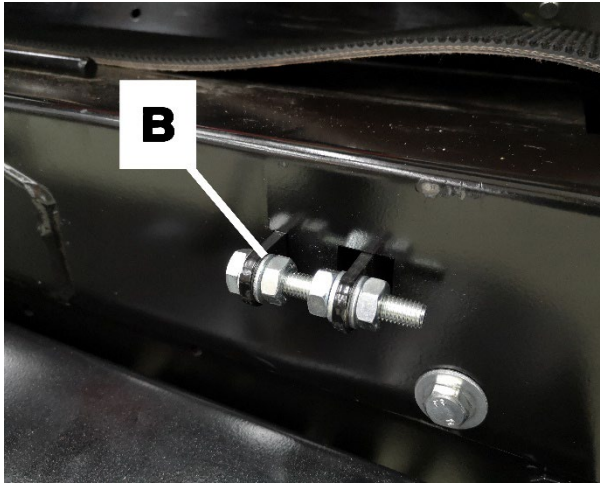


Figure 14

- ❑ The hydraulically driven in-feed conveyor is 200 mm wide and 2,200 mm long.
- ❑ The drive and return rollers of the in-feed conveyor are equipped with scrapers A, Fig. 15, which keep the rollers clean at all times. For example, in winter snow does not pack on the rollers.
- ❑ The travel path of the belt can be changed and the belt can be made to run straight by means of the adjustment screw B located at the saw-bar end of the in-feed conveyor. Fig. 16

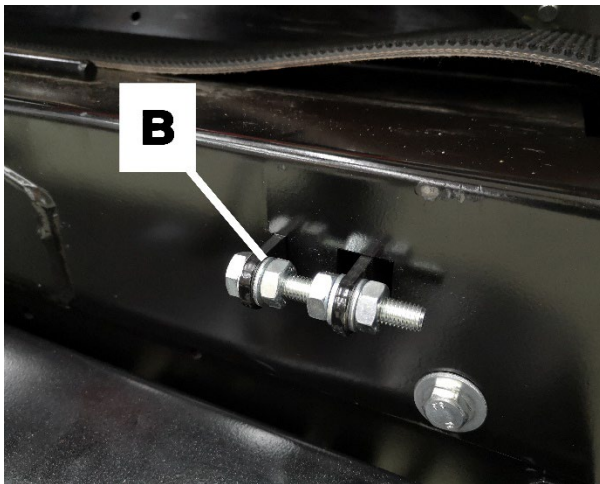


Figure 15

**NOTE!** The in-feed conveyor belt is a wear part, but using it in the correct way, increases its service life considerably.

#### How to use the belt

- ❑ Do not pull trees from the ground using the belt, because the belt wears quickly if it slips under the tree.
- ❑ Stop the in-feed operation immediately as soon as the tree comes in contact with the log-stop.
- ❑ Use a log-stand equipped with freely rotating rollers or hydraulic operation to make handling of the trees easier.
- ❑ Always keep the belt at a suitable tightness.



- ❑ Make sure that the belt does not chafe against the edges of the deck, and adjust as necessary.

When replacing the belt, make sure that the new belt rotates in the right direction.

### 3.8. Discharge conveyor

- ❑ The length of the discharge conveyor is 4,3 m and its width is 0.27 m.
- ❑ The folding and swinging conveyor is equipped with a transmission powered by a hydraulic motor.
- ❑ The conveyor has two chains and flights of polyethylene.
- ❑ The top end of the conveyor is fitted with automatic tightening of the chains.



Figure 16

### 3.9. Swinging the conveyor

- ❑ The swing of the conveyor is locked by means of a spring-loaded clamping iron.
- ❑ To swing the conveyor, release the clamping iron for the swing by depressing it with your foot, Fig. 18, and turn the conveyor with your hand in the desired direction.



Figure 17

**NOTE! The conveyor must not be swung by hand while the machine is running. Always switch off the machine before swinging the conveyor.**



### 3.10. Powered by tractor

- ❑ The tractor's output must be at least 30 h.p.
- ❑ Always hitch the machine to the three-point linkage of the tractor.
- ❑ When transporting the machine, the weight of the tractor must be at least 2,800 kg.
- ❑ A suitably sized PTO shaft is, for example, BONDIOLI 103 or WALTERSCHEID W 2200.
- ❑ No safety clutch is required in the PTO shaft.
- ❑ Only use a fault-free PTO shaft and always attach the shaft-guard chains to the machine.
- ❑ Ensure sufficient space for unobstructed operation of the PTO shaft.
- ❑ Hang the PTO shaft on the hook on the machine when disconnecting it from the tractor.

**NOTE!** When starting the machine in frosty conditions, let it idle for 5-10 minutes to warm up the oil. Max. rotational speed is 450 r.p.m.

### 3.11. Electrically powered machine

- ❑ The output of the motor is 11 kW and its speed of rotation is about 1,450 r.p.m.
- ❑ The machine is equipped with an automatic Y-D starter with emergency stop. Emergency stop, Fig. 19 - 4.
- ❑ All electric installation work has been completed.
- ❑ Correct fuse size for the 380 V system is 25 A slow. The recommended fuse size is 32 A slow.
- ❑ The required cross-section of the extension cord is 6 mm<sup>2</sup>.
- ❑ Before starting up the machine, check that it rotates in the direction shown by the arrow at the end of the motor.
- ❑ Check the direction of rotation by allowing the motor to run for a short while and, after that, stopping it immediately.
- ❑ The direction of rotation can be reversed using the phase-switch in the appliance inlet. Fig. 19 - 5.
- ❑ The machine may only be connected to a power supply with a fault current switch of 30 mA.
- ❑ The machine requires a 5-pole extension cable (L1, L2, L3, N and PE) to operate.

**NOTE!** Electric installation work may only be carried out by a professional.

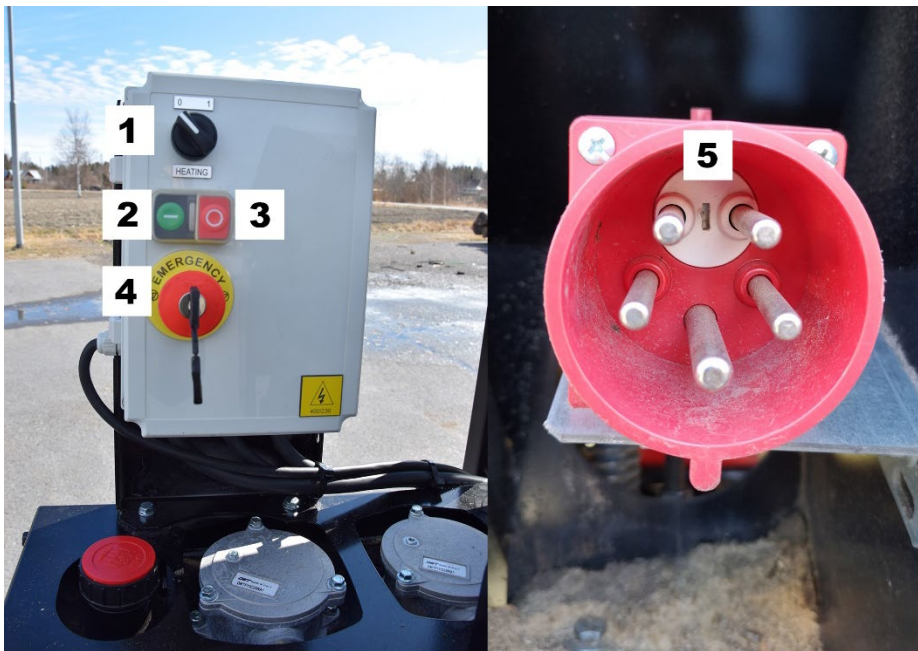


Figure 18

### Starting the electric motor

- ❑ The machine is equipped with an automatic Y-D starter.
- ❑ Press the start button. Fig. 19 - 2. In position Y, the motor starts rotating at a slow speed and a low output. The start phase takes several seconds.
- ❑ As the engine speed increases, the position D will be switched on and the motor quickly picks up full speed. The signal light between the start and stop switches will be illuminated as soon as the position D is switched on. Fig. 19 - 3.

**NOTE!** The machine must not be operated until the motor has picked up full speed, because the electric motor has a very low output in position Y.

## 3.12. Warming up the oil tank of an electrically powered machine

### A piece of optional equipment for cold conditions

- ❑ In frosty conditions, the hydraulic oil is cold and quite viscous. The firewood processor has parts that move during the starting phase, such as the conveyor that is driven by a hydraulic motor, and the two oil pumps.
- ❑ An electric motor has a tendency to pick up speed quite rapidly. Because the oil is viscous, the thermo-relay will trip preventing the motor from starting.
- ❑ If the machine is used under cold conditions, the hydraulic tank should preferably be equipped with a heater carpet.

## 3.13. Heater carpet for the oil tank

- ❑ The carpet is fixed to the lower part of the tank
- ❑ The output of the carpet is 300 W.
- ❑ The heater carpet is equipped with a thermostat that prevents it from overheating.
- ❑ Warming up for about an hour is sufficient at a temperature of -15 degrees Centigrade.
- ❑ There is a switch for the heater as standard in the starter box. Fig. 19 - 1.

### 3.14. PowerSpeed cylinder

- ❑ Normally the splitting movement is executed at the highest speed possible when the splitting force is the lowest.
- ❑ As the force requirement increases, the splitting force of the machine automatically increases. The splitting force is increased in steps so that it can be about 4, 8 or 13 tons. The change of the splitting force inversely affects to the splitting speed. When the force is low, the speed is high and vice versa.
- ❑ Once the log starts splitting, and the force requirement reduces, the machine switches to a lower splitting force, and at the same time, the splitting speed will increase.

#### In 2/4 ways, option

- ❑ A wedge for splitting the log in two or four ways.

#### In 2/6 ways, standard, fig 20

- ❑ A wedge for splitting the log in two or six ways.

#### In 2/8 ways, option

- ❑ A wedge for splitting the log in two or eight ways.

#### In 2/10 and 2/12 ways, option

- ❑ A wedge for splitting the log in two or ten ( twelve ) ways. 2/10 and 2/12 wedges are not suitable for hard wood.



Figure 19



Figure 20

### 3.15. Hydraulic adjustment of the splitting wedge, s model

- ❑ The splitting wedge can also be adjusted hydraulically by means of the lever A on the crosscut deck, Fig. 21.
- ❑ The wedge can be changed by lifting it up and opening the lock B. Remove the wedge and set the new wedge to position. Release lock and lift the wedge until locking pin is clicking to groove in the wedge.

### 3.16. Malfunctions during the splitting operation and how to remedy them

#### A stuck log

- ❑ If the logs are big and have big branches, the force of the splitting cylinder may sometimes not be sufficient.
- ❑ If the log sticks to the wedge, reverse the cylinder using the manual start/stop lever.
- ❑ Lift the splitting wedge slightly and retry splitting by using manual launch. Changing the position of the log may often help.
- ❑ If the log does not split, open the protective net. This makes the cylinder reverse and locks up the control valve, after which, it is safe to remove the log.
- ❑ If the log has a big branch, you can split it by turning the log around and pushing it against the wedge with its root end first. Doing it this way requires the least power.

#### Re-splitting the logs safely

- ❑ If you want to process small-sized firewood from large logs, even pieces split in 8 or 12 ways may still be too large.
- ❑ Proceeding as instructed below, you will be able to split the log safely into even smaller pieces.
  - 1 Open the protective net.
  - 2 Place the logs to be split into the splitting chute. E.g. one on top of the other. The pieces will stay in this position, if you hit them carefully against the wedge.
  - 3 Close the protective net.
  - 4 Start the splitting operation using the manual start lever.



## 4. How do the safety-related devices affect the machine's functionality

### 4.1. Protective net for the splitting chute

- ❑ The protective net must always be closed when the machine is being operated.
- ❑ The machine's hydraulic functions are not operational, if the protective net is open.
- ❑ If the net is opened amid the splitting operation, the splitting movement will stop and the cylinder will return to its rear position.

### 4.2. Active log-clamp

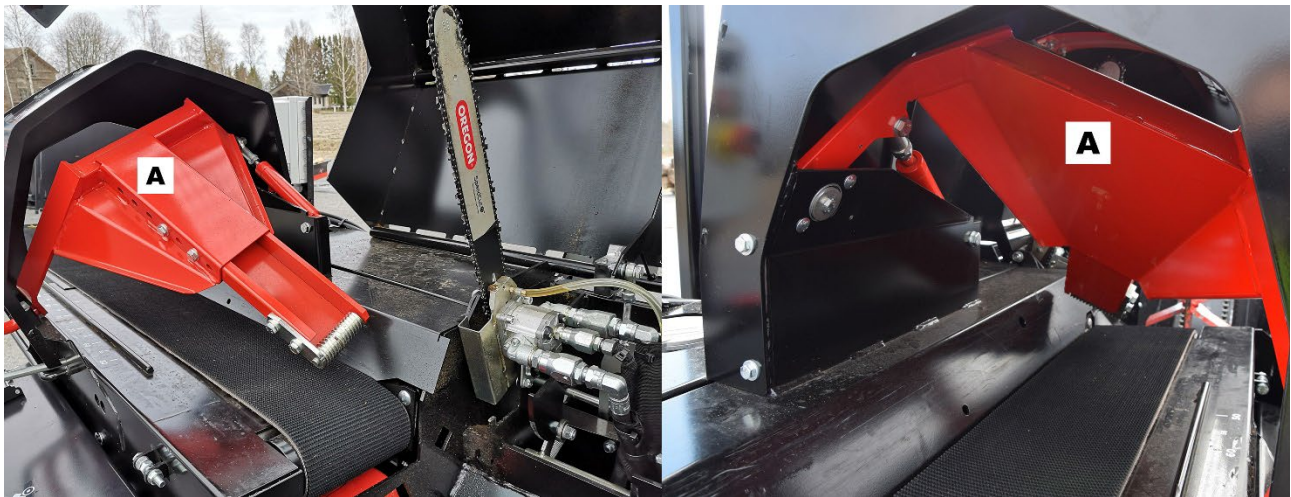


Figure 21

- ❑ The hydraulic log-clamp A, Fig. 22, is an easy-to-operate device that prevents the log from moving during cutting.
- ❑ The grooved roller of the log-clamp efficiently prevents the log from turning during cutting. Long and straight logs stay in position on the deck by their own weight during the cutting.
- ❑ The log-clamp shall always be used when cutting short or slender trees, because otherwise the saw-chain could easily "bite" in these small and light trees causing a hazard.
- ❑ As necessary, the pressing force of the clamp can be increased via the lever B, Fig. 23.
- ❑ Length of the log-clamp can be changed. When cutting long pieces log-clamp can be set to shortest position to add clamping force.

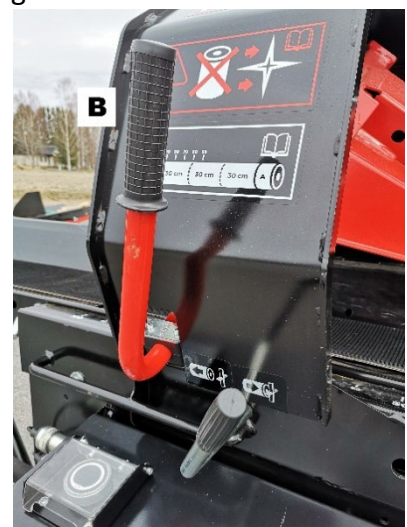


Figure 22

### **4.3.Log-clamp with a hydraulic cylinder**

- ❑ When the crosscut movement is launched, the log-clamp immediately presses the log against the in-feed conveyor and prevents it from moving during the cutting.
- ❑ When the crosscut saw-bar comes up, the pressure is relieved from the log-clamp cylinder and the log can be fed against the log-stop for the next cutting pass.
- ❑ The active log-clamp improves safety and reduces malfunctions.

**NOTE! All the safety-related devices are necessary to ensure a sufficient level of safety.  
Any safety-related devices must not be removed from the machine, and the operator is responsible for their flawless operation.**

## 5. Operation of the cutting, the splitting and the in-feed conveyor

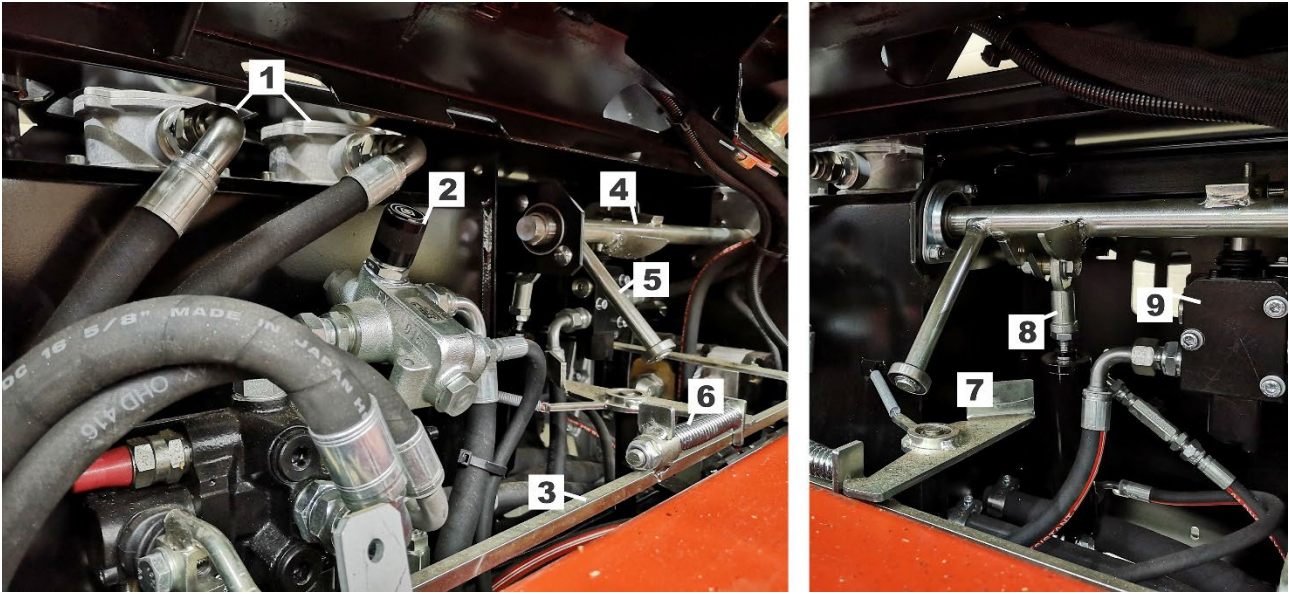


Figure 23

### Denomination of parts

1. Hydraulic oil filters
2. Splitting valve
3. Launch bar
4. Multi-purpose shaft
5. Launch trigger
6. Spring
7. Launch lever
8. Cutting cylinder
9. Ball head valve

### 5.1.Operation of the Joystick valve

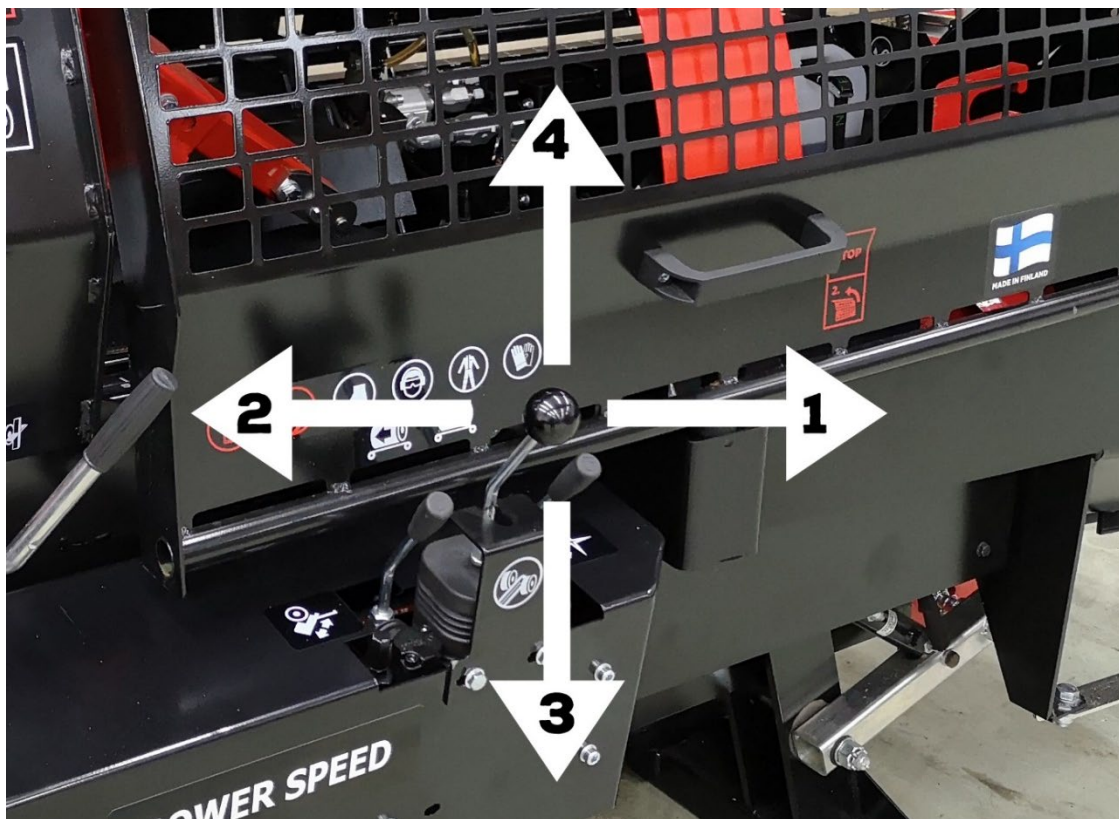


Figure 24

#### Cutting

- ❑ Pull the joystick D in direction 3, Fig. 25.
- ❑ The cylinder 8 (fig. 24) swings the multi-purpose shaft 4 (Fig. 24) to the rear, making also the launch trigger 5 swing to the rear.
- ❑ The valve 9 starts the saw-motor which cuts off the log.

#### Splitting

- ❑ Push the joystick D in direction 4, Fig. 25.
- ❑ The launch rod 5 on the multi-purpose shaft presses the launch lever 7, and the spring-loaded launch rod 3 activates the splitting valve 2.
- ❑ The splitting cylinder executes one stroke and then returns automatically to its initial position.
- ❑ The chain saw will stop immediately, if the lever is moved away from position 3.

#### Feeding the log

- ❑ Push the joystick to the right, in direction 1, to start the in-feed conveyor.
- ❑ The in-feed conveyor can be reversed by pushing the joystick in direction 2.

**NOTE! The operations can be executed simultaneously so that, while one log is being split, another one can be fed against the log-stop, enabling the crosscut operation to be started immediately. Malfunctions and their remedies**



## 6. Maintenance of the machine

We recommend using genuine spare parts.

**NOTE!** Always stop the machine and disconnect it from the power source before performing any service measures.

All the safety-related devices must be put in place after the service.

### 6.1. Opening the protective structures

Loosen the screw as much as is necessary to release the lock stud, and lift away the protective cover. You do not have to remove the screw entirely to open the cover.



Figure 25

### 6.2. Protective covers that need to be opened for service

The saw-bar is easily maintained by first opening the protective net for the splitting chute.



Figure 26

### 6.3. Protective covers that need to be opened for maintaining the hydraulic system

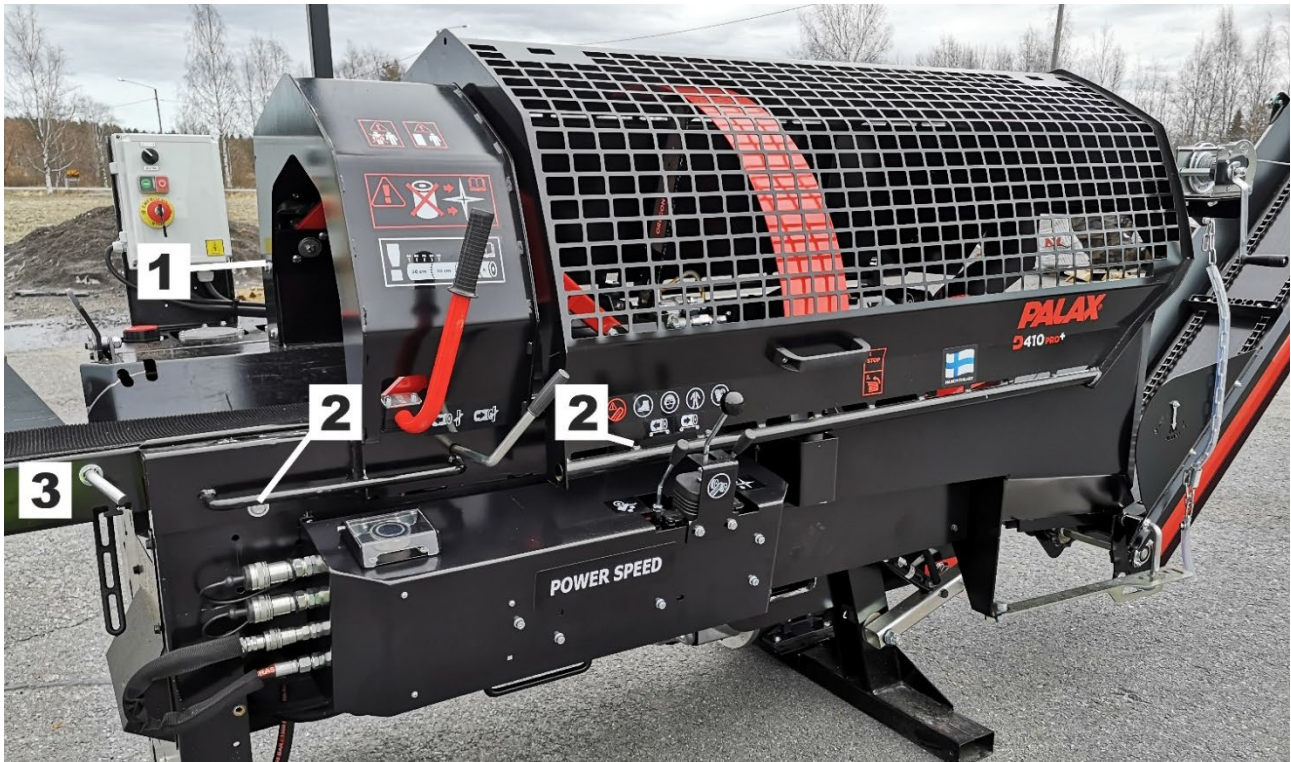


Figure 27

1. Detach the extension tunnel, attachment screws 1
2. Undo the attachment screws 2
3. Lift the in-feed conveyor extension 3 to upright position.
4. Unfold the in-feed deck and put the deck support in place.

### 6.4. Changing the gearbox oil

- ❑ The oil plug is located in the lower part of the gearbox.
- ❑ Top up about 0.52 litres of new oil.
- ❑ Oil type SAE 80.
- ❑ Note! The sight glass of the large gearbox is not in use.



### 6.5.Changing hydraulic oil and filter

- ❑ The oil plug C, Fig 29, is located in the bottom of the tank.
- ❑ The filters A must also be replaced, because the contaminants, that are constantly being released from the system, finally end up in these filters.
- ❑ The hydraulic oil tank cap B is fitted with a dipstick.
- ❑ The volume required for oil-change is about 70 litres.
- ❑ Leave an expansion space of about 5 cm in the upper part of the tank.

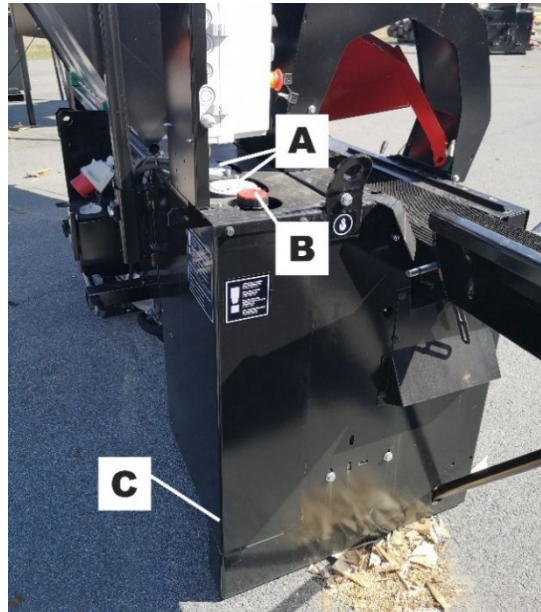


Figure 28

### 6.6.Maintenance of the valve

- ❑ To withstand strain and to operate flawlessly, the detent end A, Fig. 30, the spool shifter joint B and the ball joint of the control valve require regular lubrication.
- ❑ Lubrication of the valve is particularly important if the machine is left standing for several months. If the parts of the detent end have become rusty, the machine will not operate flawlessly.

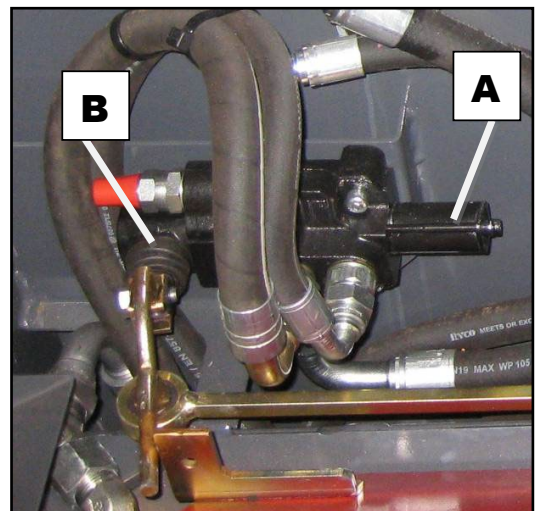


Figure 30

### 6.7.Detent end of the valve

- ❑ There is a small hole in the middle of the end plate of the detent end of the valve for spraying lubricant onto the moving parts of the valve detent. Fig. 31.
- ❑ Only use oil that does not congeal in frost.
- ❑ The easiest way is to use a spray bottle with a nozzle and pipe.
- ❑ Insert the spray pipe in the hole A and press 2-3 times for about 1 second at a time.
- ❑ The oil spreads smoothly on the moving parts of the detent end.



Figure 31

**NOTE!** Do not use Vaseline spray because it congeals in severe frost!

## 6.8. Lubricating the spool shifter

The spool shifter is equipped with a pin and a ball joint that require regular maintenance and lubrication.

Fig. 32.

- 1 Lift up the edge of the protective rubber for the spool shifter.
- 2 Spray lubricant on both sides of the pin and on the ball joint.
- 3 Also check that the protective rubber is intact.



Figure 32

## 6.9. Structure of the detent end and the correct order of the parts

- ❑ Keep the cover C of the detent end depressed while undoing the screws B, Fig. 33, as the stiff springs can throw away the cover. Then also the springs and the balls of the detent part can be thrown away.
- ❑ When re-assembling the detent end, apply a small amount of Vaseline into the holes A in the detent end. This ensures the small balls will stay properly in position during the assembly. Make sure that the parts D and E come in the right position, as shown in the picture, and the drain holes for condensed water always point downward.

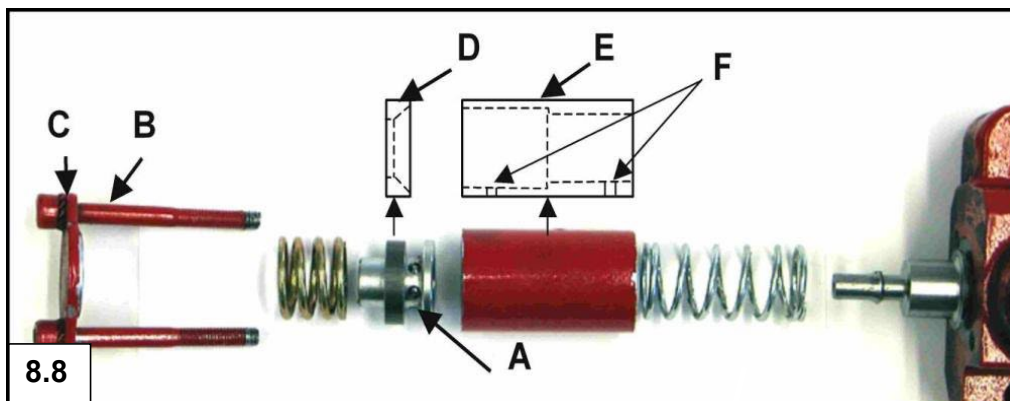


Figure 33

## 6.10. Initial settings of the valve

- ❑ The valve has been adjusted and test run at the factory.
- ❑ The initial settings do not usually change so there is rarely any need for readjustment.

## 6.11. Changing the saw-chain

**NOTE!** Stop the machine completely, and disconnect it from the power source before opening the saw-bar cover!

**NOTE!** The saw-chain is sharp: handle it with gloves.

- 1 Open the saw-bar cover as instructed in point 8.3.
- 2 Loosen the attachment nuts for the saw-bar (using a 13-mm wrench). Fig. 34 A.
- 3 Loosen the tightening screw for the saw-bar. Fig. 34 B.
- 4 Remove the attachment plate of the saw-bar.
- 5 Remove the saw-bar and the chain.
- 6 Put a new chain on the bar and the tip wheel and put the saw-bar in place.
- 7 Put the attachment plate in place and tighten it lightly.
- 8 After that, tighten the chain to a suitable tightness.

**NOTE!** Re-tighten the chain after cutting a few logs because a new chain always stretches slightly at the start.

**NOTE!** If you process small-sized logs only, you can use a shorter saw-bar and chain on your D410 machine. Take into account that then also the maximum diameter of the log that can be sawn will decrease.

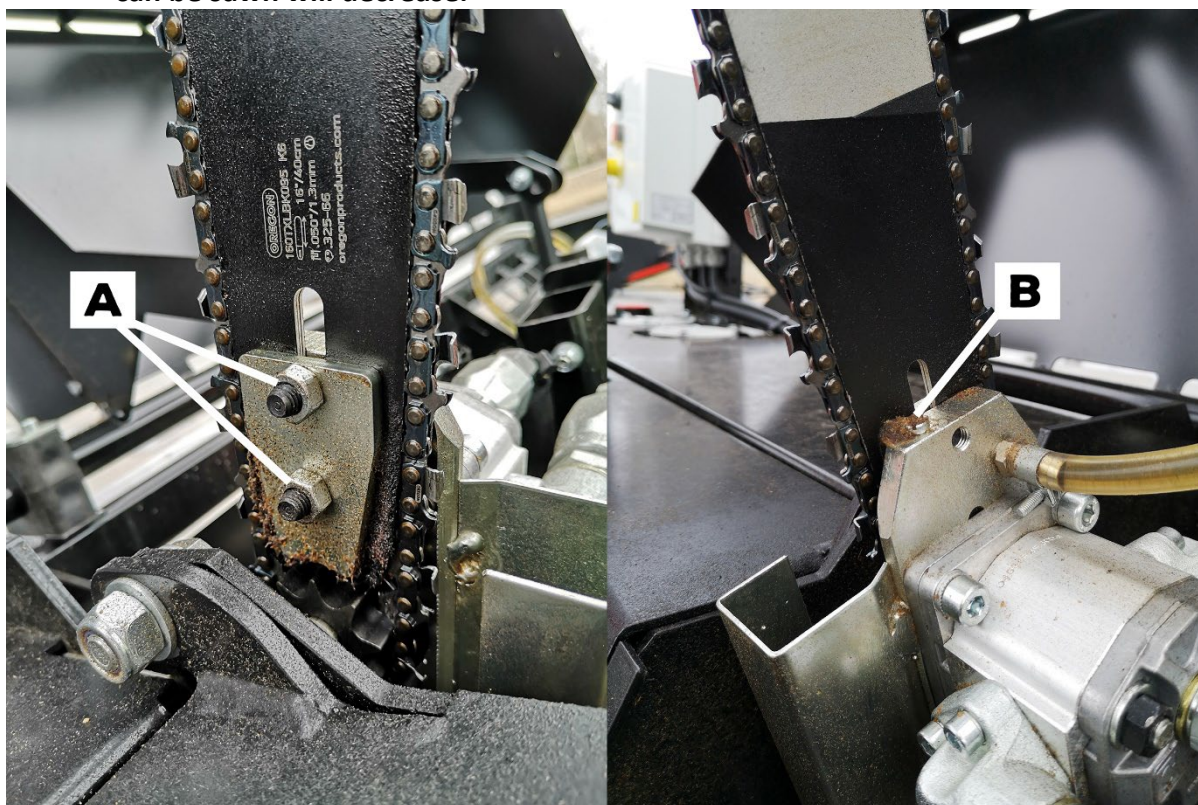


Figure 34



### 6.12. Sharpening the saw-chain in the firewood processor

- 1 Lift up the protective net for the splitting chute.
- 2 Turn the motor to a horizontal position by the saw-bar.
- 3 Now you can file the chain.

### 6.13. Lubricating the tip wheel

- 1 Open the protective net for the splitting chute
- 2 Clean the lubrication hole A that is shown in Fig. 35.
- 3 Lubricate with Vaseline using a grease gun

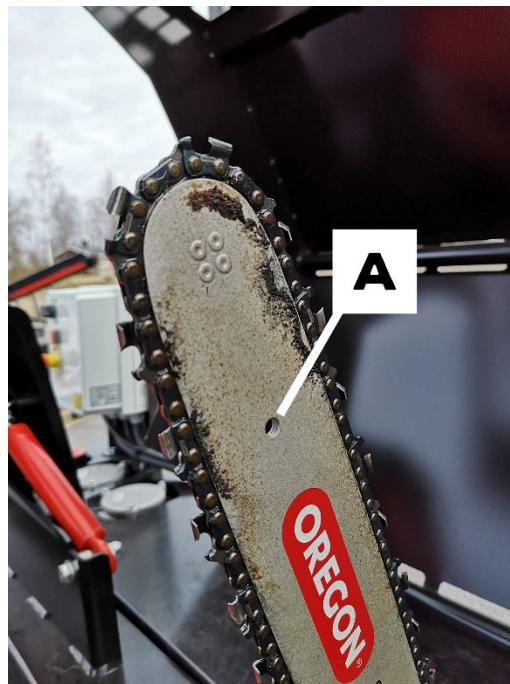


Figure 35

### 6.14. Sharpening the saw-chain in a vice

- ❑ Put the saw-chain on the saw-bar and attach the saw-bar to, for instance, a vice, Fig. 36 A
- ❑ Then the chain is easy to move forward, it stays properly in position in the saw-bar groove and is easy to file.
- ❑ Attach the saw-chain directly to the vice; the chain will stay firmly in position, Fig. 36 B.
- ❑ Strictly maintain the original sharpening angle of the saw-teeth and sharpen the teeth in the same way on both sides.

**NOTE!** A chain, sharpened incorrectly, will pull on one side and does not go straight into the wood.

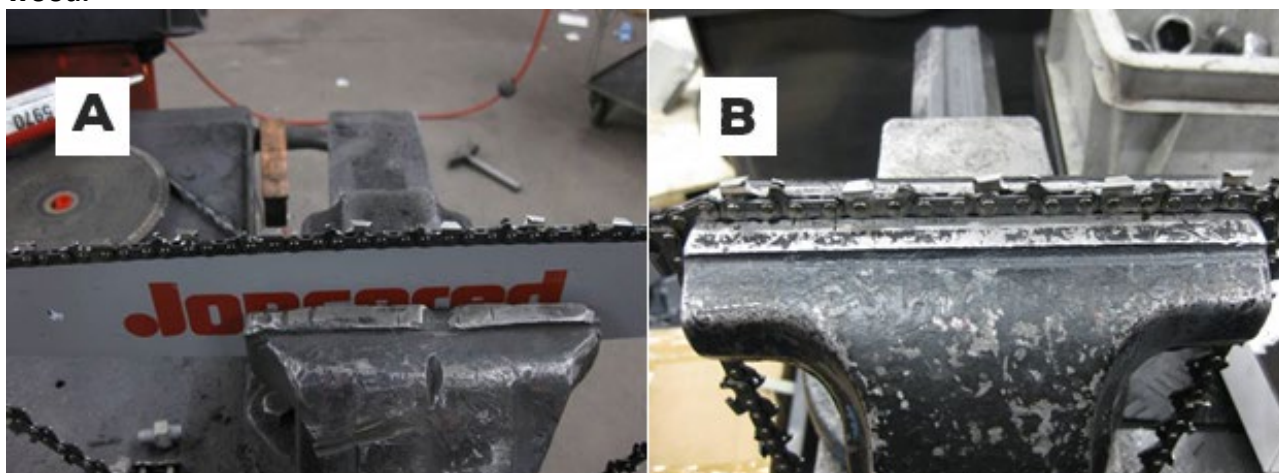


Figure 36

### 6.15. Conveyor chains

- ❑ In continuous operation the conveyor chains shall be lubricated daily.
- ❑ The easiest way to do this is to apply chain spray lubricant to the chain, while the conveyor is running at a low speed.
- ❑ A light daily lubrication is sufficient for the chain.
- ❑ If the machine is left standing for a longer period of time, it pays to lubricate the chain properly to prevent it from rusting.
- ❑ The bearings at the top end of the conveyor are lubed-for-life, so they do not need any maintenance.



Figure 37

### 6.16. Cleaning the machine

- ❑ Keep the conveyor free of debris to ensure its trouble-free operation.
- ❑ Especially in winter, it is important that the conveyor is always cleaned at the end of every working session.

### 6.17. Washing the machine

- ❑ Wash the machine occasionally with a high-pressure washer. This is especially important if the machine is left standing for a longer period of time. Lubricate the machine after the washing.

**NOTE!** Do not direct the water jet onto the electric appliances or bearings.

### 6.18. Storing the machine.

- ❑ The machine is intended for outdoor use but it is recommended to keep it under cover for longer standstills to avoid corrosion or malfunctions.
- ❑ For storing outdoors, cover the machine with a tarpaulin of suitable size.

**NOTE!** Contact the dealer for information about disposal of the machine.

## 7. Maintenance schedule

Object	Task	Daily	Service interval 100 t	Service interval 500 t	Service interval 1000 h	Material /Method
Gearbox TR-powered	Check 1 Change 2 Change		X	X	X	SAE 80 0.52 l
Hydraulic oil Normal conditions	Check 1 Change 2 Change		X	X	X	Volume 55 l E.g. Esso Unavis 32 Neste Hydraul 32
Oil filter	1 Change 2 Change			X	X	FIO 60/3
Valve	Lubrication		X			Lubrication oil, spray
All levers	Lubrication	X				Lubrication oil, spray
Conveyor bearing	Lubrication		X			Vaseline
Conveyor chain	Lubrication	X				Lubrication oil, spray
Crosscut saw-bar	Sharpening Change	As required				
Saw-bar	Change	As required				
Machine	Cleaning	X				
Electric motor	Cleaning	X				
Combustion engine	Service	X				Instruction manual of engine
Electric equipment	Cleaning	X				
Tip wheel of the saw-bar	Lubrication	X				Vaseline



## 8. Malfunctions and their remedy

<b>Disturbance</b>	<b>Cause</b>	<b>Remedy</b>
The saw-chain is heavy on power and gets hot	1. The chain is blunt	1. Sharpen or replace the chain
Oblique resulting surface	1. The other side of the chain is blunt, e.g. after sawing through a nail	1. Sharpen or replace the chain
Splitting is not operational	1. Protective net open	1. Close the protective net
Saw-bar does not come down	1. Protective net open	1. Close the protective net
Splitting cannot be launched	1. Wrong adjustment of the launch rod	1. Adjust
The splitting motion starts then stops	1. The valve does not lock up	1. Check the operation of the detent end 2. Check the adjustment of the launch linkage
The cylinder is moving erratically and jams	1. Malfunction of valve	1. Lubricate the detent end of the valve 2. Lubricate the spool shifter
The conveyor does not start up	1. Scrapers frozen to the bed 2. Pressure too low 3. Debris between the flight and the edge	1. Lift the chain 2. Raise the pressure, turn in the relief valve about half a round 3. Remove the debris
The high-speed valves operates only at one speed	1. Debris in the high-speed valve	1. Open and clean the valve

## 9. Wiring diagrams

