

## Instruction manual

# Palax KS 35 Ergo

# Palax KS 35 s

Powered by a tractor

Powered by electric motor



Serial number \_\_\_\_\_

Year of manufacture \_\_\_\_\_

PALAX  
Lahdentie 9  
FI-61400 Ylistaro, FINLAND  
Tel. +358 6 4745100  
Fax. +358 6 4740790  
Palax KS35

Translation

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# 1 Basic specifications and responsibilities

## 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 power take-off shaft transmission.

Before the installation and operation, the operator of the machine must become thoroughly familiar with the contents of the manual. The operator is also obliged to gain familiarity 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: Ylistaron Terästäkomo Oy  
www.palax.fi  
Lahdentie 9  
FI-61400 Ylistaro  
Finland  
+358 6 474 5100

The person in charge of Technical Construction File: Kai Koskela, kai.koskela@palax.fi  
Product: PALAX KS 35 Ergo and PALAX KS 35s  
a firewood processor with 4,3-m discharge conveyor

Powered by: Tractor P.T.O. or electric motor

Models: TR Powered by tractor equipped with own hydraulic system  
TR/SM Powered either by tractor or 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-HANDBOOK 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.

Ylistaron Terästäkomo Oy  
18.8.2015



Pekka Himanka  
Managing Director

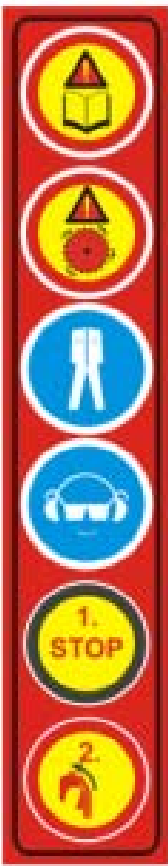









**1.3 Intended use of the machine**








This Firewood Processor with Conveyor is intended to be used for production of firewood from round timber. Use of the machine for any other purposes is prohibited.

**Maximum size of the wood**

- For cutting, the maximum diameter of the tree is about 35 cm.
- The maximum length of the log is 4-5 m.
- When handling long trees, we recommend using a specific log-lifting deck with rollers or hydraulic feed.

**1.4 Warning signs**

	<p><b>Read the instruction manual</b></p>	 <p>Reversing of the infeed conveyor</p>	 <p>Feeding with the infeed conveyor</p>
	<p><b>Beware of the moving saw-bar</b></p>	 <p>Interrupting the splitting</p>	 <p>Launch of splitting.</p>
	<p><b>Wear protective clothing</b></p> <p><b>Käytä silmä- ja korvasuojaimia</b></p>	 <p>Adjusting the splitting wedge height.</p>	 <p>Sawing</p>
<p><b>The cover cannot be opened, unless the saw-bar is in its upper position</b></p>	 <p>Opening the protective net for the splitting chute interrupts the splitting</p>		 <p>Direction of rotation of the motor</p>
 <p>Permissible revolutions range of the PTO-shaft</p>			

 <p><b>Lifting point for forklift truck</b></p>	 <p><b>Lifting point</b></p>	 <p><b>The machine may only be operated by one person</b></p>	 <p><b>Stay away from moving parts of the machines</b></p>
 <p><b>Beware of PTO-shaft</b></p>	 <p><b>The danger zone around the conveyor is 5 metres</b></p>		 <p><b>Disconnect the machine from the power source before servicing</b></p>

## 1.5 Nameplates

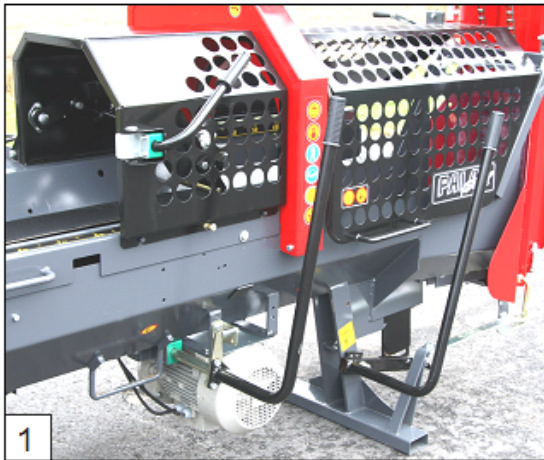
### Nameplate on the machine

- ❑ Name and address of the manufacturer.
- ❑ Mark showing type of machine.
- ❑ Serial number and year of manufacture.
- ❑ Total weight of the machine.
- ❑ Length of the saw-bar.
- ❑ Max. hydraulic pressure.
- ❑ The nameplate is affixed onto the side of the top-link bracket housing.

### Nameplates on the electric drive

- ❑ 3-phase motor.
- ❑ Voltage 230/380 V or 380/600 V, may vary depending on the country.
- ❑ Output 7.5 kW.

## 1.6 The main dimensions and models of the machine



### PALAX KS 35 Ergo

Powered either by tractor or electric motor, equipped with mechanical control for crosscut and splitting operations



### PALAX KS 35 s

Powered either by tractor or electric motor, equipped with fully hydraulic control for crosscut and splitting operations.

Machine model	KS 35 Ergo			KS 35 s		
	TR	SM	TR/SM	TR	SM	TR/SM
DRIVING POWER	TR	SM	TR/SM	TR	SM	TR/SM
Weight	720 kg	780 kg	800 kg	804 kg	864 kg	884kg
Powered by electricity	7.5 kW; fuse size: minimum 25A					
Height/width/length	Transport position 239cm / 95cm / 285m					
In-feed conveyor	Length 2.4m Height 0.9 m					
Saw-bar/chain	15'; 325; 1.3 mm; 64 links					
Max. diameter of the log	Max. cutting diameter of the log 35 cm					
Max./min. length of the log	The maximum length of log that can be split 60 cm					

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

## 1.7 Safety instructions

### General regulations and restrictions

- The maximum length of log that can be cut is 4 metres. If no log-stand or log-deck is used.
- The machine is exclusively intended for the production of firewood.
- The machine may only be operated by one person.
- The danger zone around the conveyor is 5 metres to the sides and to the rear.
- The machine must be equipped with additional lights for transportation on public roads.
- Lift and lock the infeed deck and the discharge conveyor in the transport position for transportation.
- Only persons over 18 years of age are allowed to operate this 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 operation.
- ❑ Make sure that all other people stay outside the operating range.
- ❑ 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.
- ❑ Only operate the machine on a sufficiently firm and level surface.
- ❑ Only operate the machine in an adequately lit space.
- ❑ Keep the tractor-powered machine attached to one of the lifting arms. Also 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 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 is firmly in position.

### During operation

- ❑ Carelessness during the cut-off operation constitutes a major hazard!
- ❑ During the cut-off operation, make sure that at the cutting point the tree is always supported by the support rollers of the cross-cut deck: danger of rolling over!
- ❑ Exercise particular caution when cutting knotty or crooked logs, because, as faulty cutting might roll the log over or twist the saw-bar with enough force to break it.
- ❑ Keep the working space clean and clear of foreign objects.
- ❑ Always stop the machine and disconnect the power supply cable or the power take-off 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 KS 35 is a very safe machine provided that the instructions supplied are properly followed, 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 in a due manner.
- ❑ The operator is responsible for ensuring that no one else is subjected to any danger.
- ❑ Modifying the construction of the machine is prohibited.
- ❑ 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 surface 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 Mega 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, owing to the risk of dust generation or the danger of exhaust gases for a unit powered by a combustion engine.

### **1.11 Terms of warranty**

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

#### **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 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 wheel, the saw-chain and the infeed 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 demands due to the above-mentioned measures.
- ❑ Any indirect costs and/or travel expenses incurred from making repairs under the guarantee.
- ❑ 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 visit our website at [www.palax.fi](http://www.palax.fi) for more detailed operating instructions for the winch.

## 2 Taking delivery and assembly of the machine

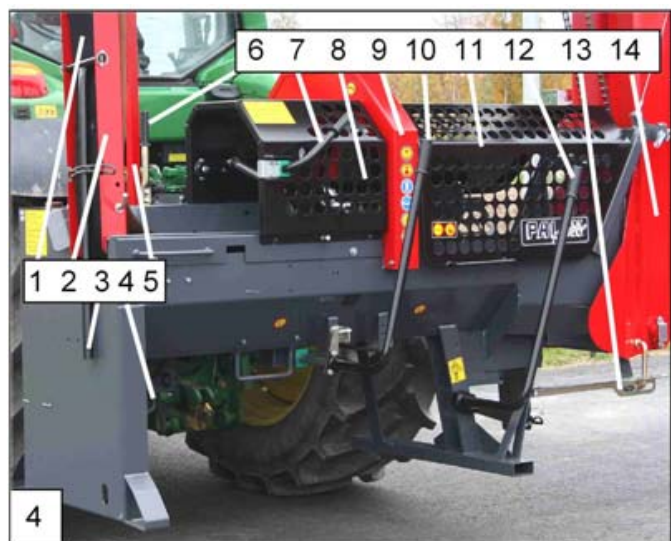
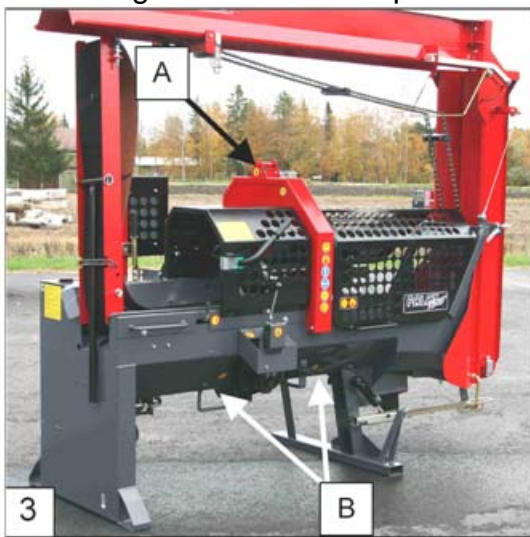
### 2.1 State of delivery and acceptance control

- ❑ The machine is delivered almost ready-assembled, test driven and adjusted ready for operation.
- ❑ To prevent transport damage, the adjustment lever for the crosscut saw and the splitting wedge of the Ergo model have been removed and packed separately.
- ❑ 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, Fig. 3, all models

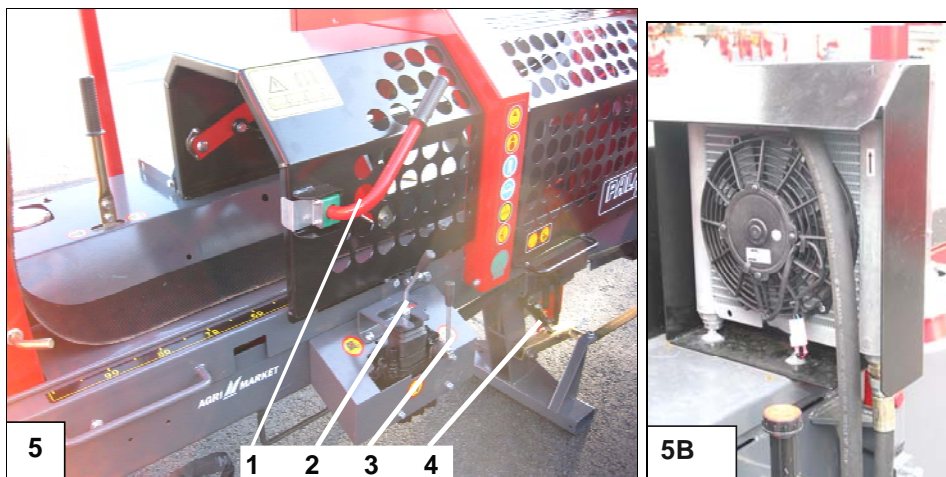
The machine may be lifted using the following points.

- ❑ If using a sling, by lifting point A on the upper part of the crosscut saw housing.
- ❑ If using a forklift truck at points B on both sides under the frame beams.



### 2.3 Main parts of the machine, Fig 4

1. In-feed belt
2. Table extension
3. Table extension leg
4. Optional hydraulics
5. Conveyor support
6. Manual start of the splitting cylinder
7. Spring-loaded clamp as a standard feature, Ergo model
8. Hydraulic clamp, optional
9. Protective cover for the infeed conveyor
10. Blade cover
11. Lever for launching the crosscut operation, Ergo model
12. Protective net for splitting chute
13. Adjustment lever for the splitting wedge, Ergo model
14. Swing lock for conveyor
15. Conveyor

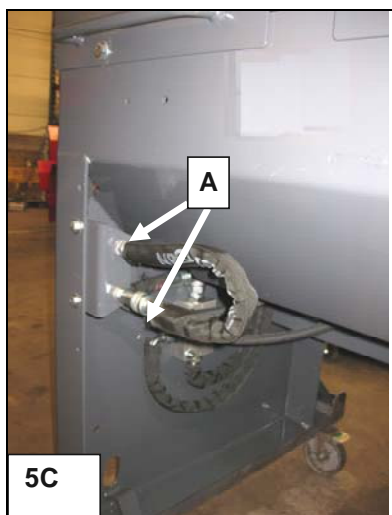


## 2.4 Main parts of the machine, S model, Fig. 5

1. Hydraulic clamp
2. Joystick, hydraulic control of the infeed conveyor and the crosscut saw-bar
3. Height adjustment lever for the splitting wedge
4. Adjustment cylinder for the splitting wedge

### Oil cooler 5B, optional

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



### Additional hydraulic circuit, all models, picture 5C

- The connectors A of the additional hydraulic circuit are intended for controlling optional equipment, such as, for example, feed rollers of the log-stand.
- The piece of optional equipment, connected to these connectors, runs always when the in-feed belt is rotating.
- When you disconnect the optional equipment, always remember to reconnect the hose as illustrated in the picture.



### 2.5 Main parts, Fig. 6, all models

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

### Main parts, Fig. 7, all models

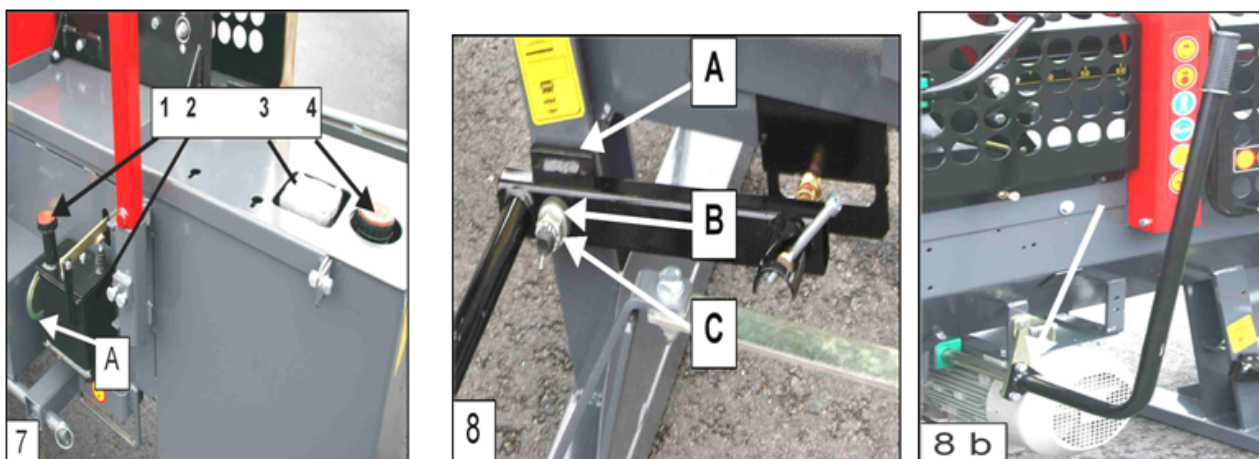
1. Fill cap for chain oil
2. Lubricator
3. Filter
4. Filling cap for hydraulic oil

### 2.6 Topping up hydraulic oil, Fig. 7, all models

- ❑ Oil volume, 55 litres, while changing oil.
- ❑ Oil type Unavis 32, SHELL Tellus 32, NESTE HYDRAULI 32 or equivalent.
- ❑ Only use fresh, clean oil.
- ❑ Observe particular cleanliness during the oil change, because smooth operation of the machine is highly dependent on the purity of the oil.
- ❑ The oil level must be at least about two centimeters higher than the lower edge of the dipstick on the filling cap.

### 2.7 Topping up chain-saw oil, Fig. 7, all models

- ❑ Filling capacity about 1,5 litres
- ❑ The surface of the oil must always be visible in the sight glass A, because the suction inlet of the pump is on the same level with the lower part of the sight class.



### 2.8 Installing the adjustment lever for the splitting wedge, Fig. 8, Ergo model

1. Remove the splint, nut and cup springs.
2. Position the adjustment lever so that the friction plate A comes between the frame bar and the lever.
3. Put the adjusting lever in place.
4. Install the cup springs B as instructed by the sticker.
5. Put the crown nut C in place, adjust the lever to a suitable tightness and put the splint in place.

### 2.9 Installing the adjustment lever for the crosscut saw-bar, Fig. 8b, Ergo model

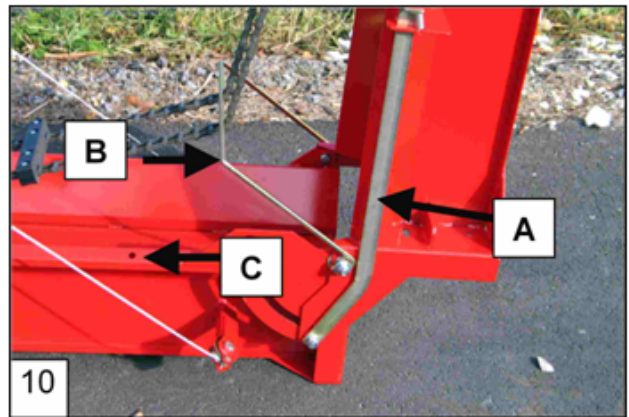
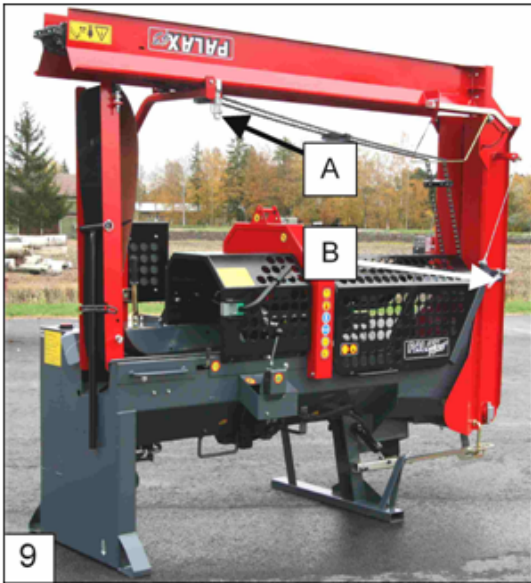
- Attach the adjustment lever to the shaft using three bolts.

### 2.10 Bringing the conveyor into the work position, Figs. 9 and 10

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 using the winch.
5. Pull open 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.

### 2.11 Bringing the conveyor into the transport position, Fig. 9 and 10

- Lower the conveyor to the ground and connect the support bar B for the conveyor chain.
- Pull lock A open and lift up the conveyor top.
- Ensure that lock A is properly locked.
- Raise the conveyor using the winch.
- Tighten the winch wire lightly in order to prevent it uncoiling from the spool.
- Lock the conveyor to the transport supports using the lock, the chain and the pin.



**WARNING!**

Always hold by the winch handle as you lower the conveyor.



### 3 Operating the Palax KS 35 firewood processor

#### 3.1 Transmission

- All actuators for the machine including the in-feed conveyor, firewood conveyor and chain-saw are equipped with hydraulic motors.
- The dual hydraulic pump of the tractor-driven machine is equipped with a gearbox and a power take-off shaft or an electric motor.

#### 3.2 Operating the Palax 35 Ergo model using the mechanical control, Fig. 11

- Push the multi-purpose lever A forward to feed in the tree using the in-feed conveyor.

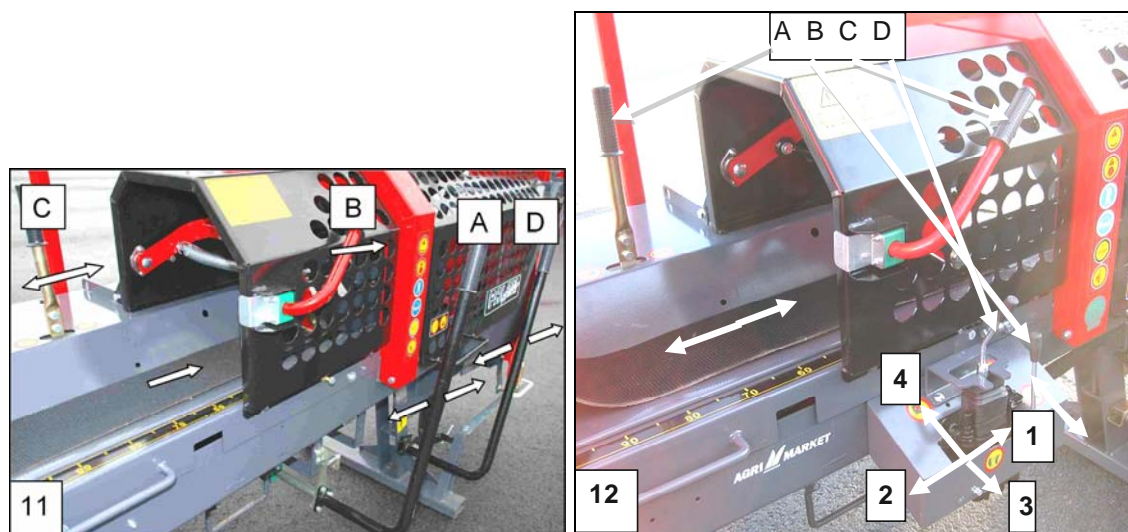
#### Log-clamp

- The spring-loaded clamp B presses the tree against the infeed belt. This ensures, the tree stays in position during the crosscut operation.
- When cutting short or slender trees, it is advisable to push the clamp lever B by hand. This ensures, the tree stays in position during the crosscut operation.

#### Cutting the wood

- Pull the multi-purpose lever A to the rear to launch the crosscut operation.
- The splitting operation starts automatically as soon as the lever A is pushed forward to the infeed position after the cutting.

**NOTE!** The infeed conveyor cannot be reversed. If you need to remove the log, pull it away using, for example, timber tongs and at the same time relieving pressure from the clamp B.



#### 3.3 Operating levers for full-hydraulic control of the Palax KS 35 s, Fig. 12

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

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

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

### Lever C for hydraulic operation of the clamp

- ❑ The clamp automatically keeps the tree in position as long as the crosscut operation, controlled by the joystick D, is in progress.
- ❑ The manual operating lever is required for relieving pressure from the clamp, while small or lightweight trees are fed in or reversed on malfunction.

### Operation of the Joystick D

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

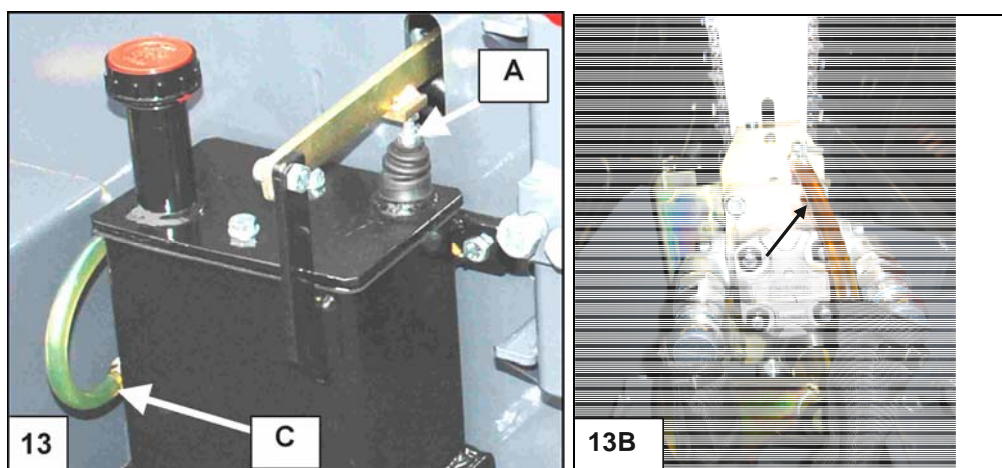
### 3.4 Lubricating the chain-saw, Fig. 13

- ❑ The machine is equipped with an automatic lubricator for applying saw-chain oil.
- ❑ The feeding rate of the forced-action piston pump is adjustable and precise. The oil flow may be adjusted from about 0,3 millilitres to 0,7 millilitres per crosscut operation.
- ❑ Filling capacity about 1,5 litres. The feeding rate of the applicator pump has been adjusted to about 0,5 millilitres per crosscut operation.

**NOTE!** The volume of oil applied at each pass is sufficient by a fair margin to lubricate the chain 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 operation.

### 3.5 Adjusting the oil feeding rate

- ❑ Undo the lock nut for the adjustment screw.
- ❑ Twisting the adjustment screw A by one turn reduces the oil rate by about 0,08 millilitres.
- ❑ Undoing the screw by one turn correspondingly increases the oil flow.



### 3.6 Checking the oil level, Fig. 13b

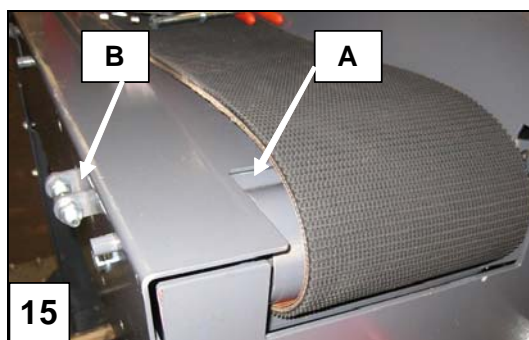
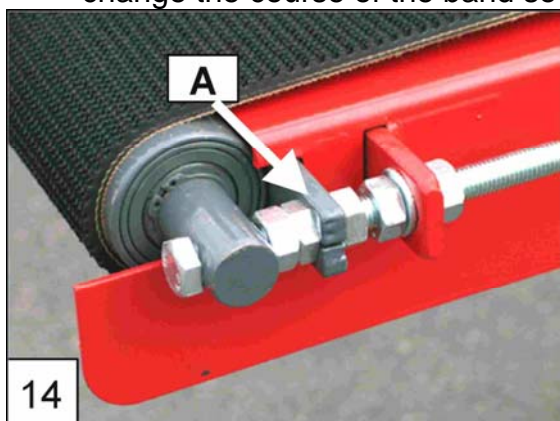
**NOTE!** Always stop the machine and disconnect it from the power source before performing any service measures

- Disconnect the hose from the motor and drain off some oil.
- Lift the hose to a vertical position and execute one complete pumping cycle by pressing the crosscut saw-bar all the way from top to bottom.
- The oil level in the hose rising by about 10 mm during the crosscut motion corresponds to an oil feeding rate of 0,5 millilitres/operation.
- The oil is applied evenly to the saw-chain throughout the entire crosscut operation.

**NOTE!** The surface of the oil must always be visible in the sight glass C, Fig. 13, because the suction point of the pump is on the same level with the lower part of the sight glass.

### 3.7 In-feed conveyor, Fig. 14 and 15

- The in-feed conveyor with hydraulic motor drive is 200 mm wide and 2200 mm long.
- The drive and return rollers of the in-feed conveyor are equipped with scrapers A which keep the rollers clean at all times. For example, in winter snow does not pack on the rollers.
- Using the adjustment screw (15B) at the blade end of the feeder belt, you can change the course of the band so that it will run straight.



**NOTE!** The infeed conveyor belt is a wear-part, but using the belt in an appropriate manner, considerably increases its service life.

#### 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 infeed operation immediately when 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.
- While replacing the belt, make sure that the new belt rotates in the right direction.



### 3.8 Discharge conveyor, Fig 16

- ❑ The length of the firewood conveyor is 4,3 m and the width is 0,27 m.
- ❑ The conveyor, which can be folded into the transport position and swung to the side, is equipped with a hydraulic motor.
- ❑ The conveyor has two chains and scrapers of polyethylene.
- ❑ The top end of the conveyor features an automatic device for tightening the chains.

### 3.9 Powered by a tractor

- ❑ Always hitch the machine to the three-point linkage of the tractor.
- ❑ A suitable size for power take-off drive shaft is, for example, a BONDIOLI 143 or WALTERSCHEID W 2100.
- ❑ No safety clutch is required for the PTO-shaft.
- ❑ Only use fault-free PTO-shafts and always attach the chains for the shaft-guard to the machine.
- ❑ Make sure that the PTO-shaft can move freely.
- ❑ When you disconnect the PTO-shaft from the tractor, hang it in the hook on the machine.

**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.**

### 3.10 Powered by electricity

- ❑ The power output of the motor is 7,5 kW at a speed of 1450 r.p.m.
- ❑ The machine is equipped with an automatic Y-D starter with an emergency stop feature.
- ❑ All electric installations must be completed.
- ❑ In the 380 V-system the fuse size is 25 A slow.
- ❑ The cross-section of the required extension cord is 6 mm<sup>2</sup>.
- ❑ When starting up the machine, check that the direction of rotation corresponds to the arrow at the end of the motor.

- ❑ To check the direction of rotation, run the motor for a short while and then stop it suddenly.

**NOTE!** Only a skilled craftsman is allowed to change the direction of rotation. Only use an extension cord equipped with a changeover switch for rotation direction of the motor that can be turned by screwdriver.

### Starting the electric motor

- ❑ The machine is equipped with an automatic Y/D starter.
- ❑ Press the start button. In the Y-position the motor starts rotating at slow speed with low output. The start phase takes several tens of seconds.
- ❑ As the engine speed increases, the D-position is switched on and the motor quickly reaches full speed. As the position D is switched on, the signal light between the start and stop switches illuminates.

**NOTE!** The machine must not be operated until the motor has reached full speed, because in the Y-position the output of the electric motor is very low.

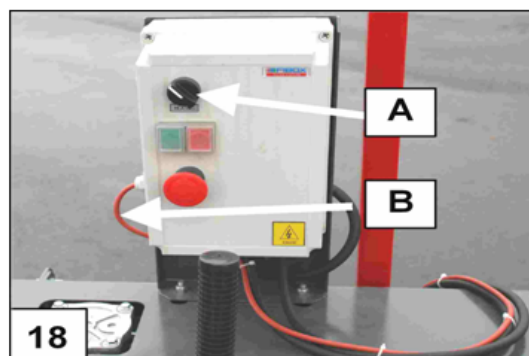
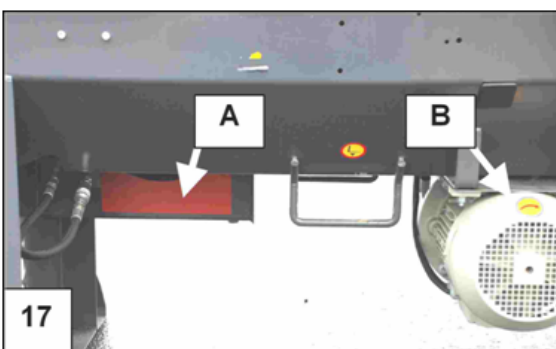
### 3.11 Heating the oil of an electrically driven machine.

#### Optional equipment for cold conditions

- ❑ In frosty conditions, the hydraulic oil is cold and quite viscous. The Firewood Processor has some parts that move during the starting phase, such as the hydraulically propelled conveyor and the two oil pumps.
- ❑ An electric motor tends to increase revolutions quite rapidly. The viscous oil makes the thermo-relay trip, and thus prevents the machine from starting.
- ❑ If the machine is to be used in cold conditions, it is advisable that the hydraulic tank be equipped with heater carpet A.

#### 3.12 Heater carpet for the oil tank, Figs. 17 and 18

- ❑ The heater carpet is fixed to the lower part of the tank, Fig. 17A.
- ❑ Capacity of the heater carpet is 300W.
- ❑ The heater carpet is equipped with a thermostat that prevents it from overheating.
- ❑ Warming for about an hour is sufficient at an ambient temperature of -15 degrees centigrade.
- ❑ Operating switch for the heater, Fig 18A The switch is a standard piece of equipment located in the starter console.
- ❑ Heater carpet cord, Fig 18B



## 4 Use of the firewood processor, crosscut operation

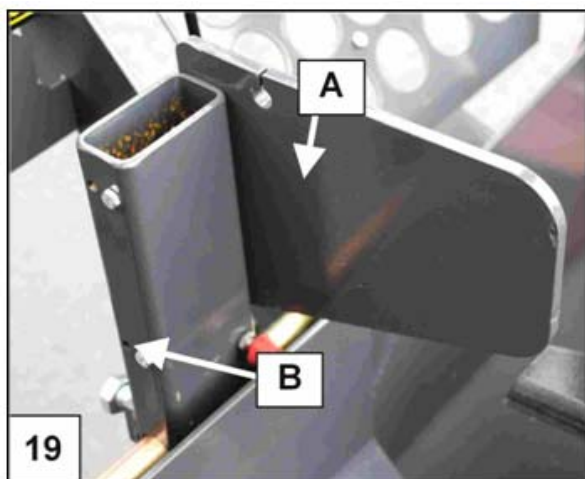
- ❑ The machine is intended for operation by one person only.
- ❑ Never leave the machine, which is easy to start, unattended.

### 4.1 Setting up the machine for operation

1. Position the firewood conveyor as instructed in point 2.7. Re-attach the lock chain in the slot.
2. Bring the in-feed conveyor into the horizontal position.
3. Put the rubber fastener of the support leg in place.
4. Adjust the log-stop to the correct length.

**NOTE!** The log-stop is always located on the right-hand side of the attachment pipe, as illustrated in Fig. 19.

- ❑ This setting enables the cutting of trees into pieces 28 cm in length or longer.
- ❑ If you want to cut, for example, pieces 25 cm-long, you have to transfer the log-stop to the left-hand side of the attachment pipe. The attachment bolts must then be installed in the rearmost holes, Fig. 19B.



### 4.2 Checking the chain-saw lubricator

- ❑ Check in the level pipe that there is oil in the tank.
- ❑ Check the oil level in the transparent pipe connected to the crosscut saw-bar.
- ❑ If the machine has not been used for a few hours, the oil level will drop from the upper part of the hose to the saw-bar. Operate the lever for the crosscut motion a few times to make the oil level rise.
- ❑ The pump has a check valve to prevent the oil flowing from the hose back to the tank.

### 4.3 Chain-saw

- ❑ Check the chain tightness and tighten as required.
- ❑ Check the chain for sharpness and sharpen or replace it as required.
- ❑ Never saw with a blunt chain.

### 4.4 During the operation

- ❑ Exercise caution, always keep your hands away from the saw-blade.

**NOTE! Never saw more than one tree at a time because, when several trees are sawn, some of them may roll over and the saw-chain may "bite" strongly in the tree and cause a dangerous situation.**

#### **4.5 Crosscut operation**

- ❑ Press the saw-bar lightly and evenly against the tree.
- ❑ Support the tree using the clamp.
- ❑ Be especially careful when cutting knotty or crooked trees.
- ❑ Ensure that the tree always travels near the rear edge of the in-feed belt.

#### **4.6 Disturbances during crosscut operation and their remedy**

##### **Crooked trees**

- ❑ Cut crooked trees where they bend.
- ❑ When cutting crooked trees, make sure that the log at the cutting point is supported by the in-feed deck.

##### **Big trees**

- ❑ Check that the rotational speed of the power-take-off drive shaft is correct (max. 450 r.p.m.).
- ❑ If the cutting sound is quiet, the cutting speed and the saw-chain speed are correct.
- ❑ If the cutting sound is loud and cracking, the saw-chain is proceeding too fast and the sawdust grooves are getting clogged. Check the rotational speed or reduce the advancing speed.

##### **Cutting small trees**

- ❑ Ensure that the log is travelling at the rear edge of the in-feed deck.
- ❑ Only cut one log at a time.
- ❑ Always press the saw-chain lightly into a small tree.
- ❑ Always use the clamp.

#### **4.7 Cross-cutting of the last log**

- ❑ One short piece is always left over from every tree.
- ❑ Using the scale on the deck as an aid, always cut this piece from the longer billet.
- ❑ If, for example, you are processing 33-cm long piece of firewood, leave the head of the billet, at the infeed stage, at about 66 centimetres and cut off the short piece. By doing so this piece will fall onto the bottom of the splitting chute in the correct position.
- ❑ After that, you can process the rest of the billet safely and the log will always remain under the log-clamp during cutting.
- ❑ Transfer the last piece onto the pusher and start the splitting operation from the hand-start lever.

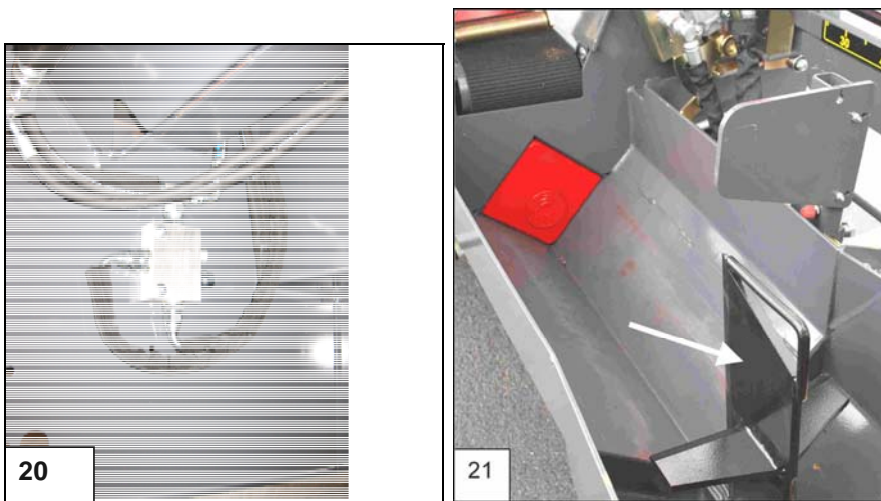
## 5 Use of the firewood processor, splitting operation

### 5.1 Splitting cylinder

- The machine can be equipped with a splitting cylinder of 3,5 tons, 5,6 tons or 8 tons.

### 5.2 High-speed valve with automatic operation, Fig. 20

- Optional equipment for Ergo model, as standard in S model.
- If the machine is equipped with an automatic high-speed valve, the splitting stroke is as standard performed at high speed.
- The speed then decreases for a short while as the required splitting force increases when thick logs are being processed. As the log starts to split, the force requirement immediately drops and the splitting stroke resumes the high-speed operation.
- The automatic high-speed valve speeds up processing of the firewood considerably and at the same time reduces the load on the transmission. The automatic high-speed valve is also available for retro-fitting.



### 5.3 Splitting wedges

#### Short, straight wedge, optional

- The firewood processor can be equipped with a short, straight wedge for splitting the log split in two parts. No splitting operation will occur, if the wedge is lowered down.

#### In 2/4 ways, standard, Fig. 21

- The standard wedge for splitting in two or four ways.

#### In 2/6 ways, option

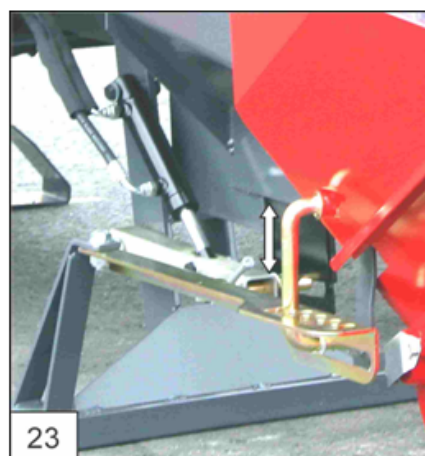
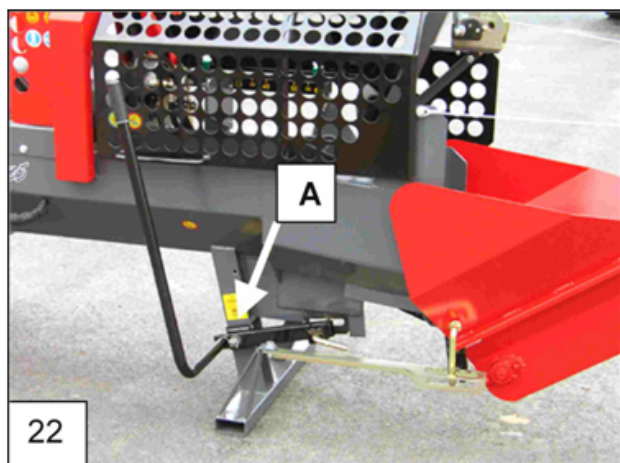
- A wedge for splitting the log in two or six ways
- Normally requires a cylinder of 5,6 tons or 8 tons.

### 5.4 Manual adjustment of the splitting wedge, Figure 22

- The machine is equipped with a manual system for height-adjustment of the wedge.
- The lever with friction plate A for stepless adjustment keeps the wedge at the correct height at all times.
- The stiffness of the lever movement can be adjusted by tightening the Belleville springs of the friction plate.



**NOTE!** Never use grease on the friction plate.

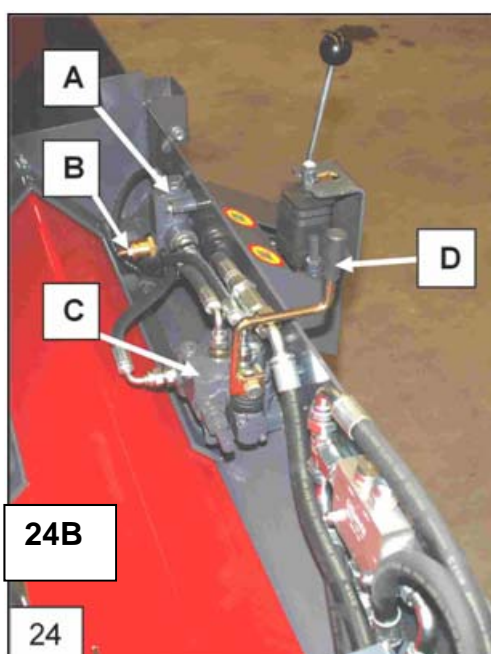
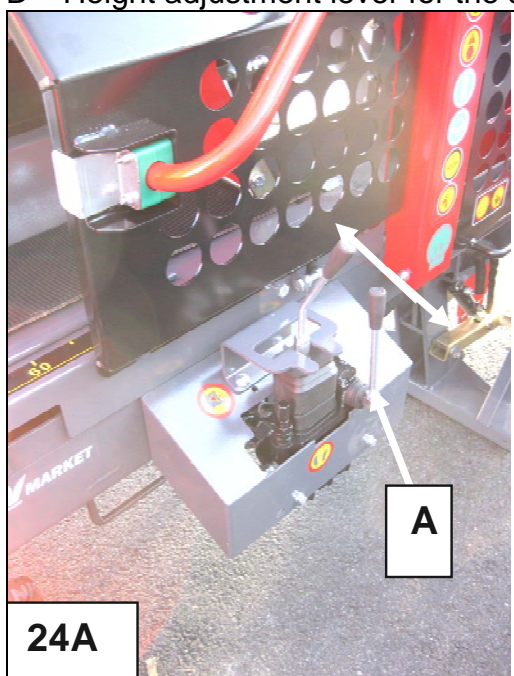


### 5.5 Hydraulic adjustment of the splitting wedge, S model, Fig. 23

- The splitting wedge can also be adjusted hydraulically by means of the lever on the crosscut deck, Fig. 24A.
- For hydraulic adjustment a small side flow is diverted from the main oil flow by means of a flow regulation valve.

### 5.6 Adjusting the speed of the splitting wedge adjustment cylinder, Figure 24B, Ergo HTS.

- A Flow regulation valve
- B Flow control knob
- C Valve for adjusting splitting wedge height
- D Height adjustment lever for the splitting wedge



### Adjusting the speed of the cylinder

- Turn the knob B to the left to increase the speed of the adjustment cylinder.

- Turn the knob B to the right to reduce the speed of the adjustment cylinder.

**NOTE! The basic adjustment of the valve has been carried out.**

### **5.7 Disturbances during the splitting operation and their remedy**

#### **A stuck log**

- When the logs are big and have big branches, the force of the in-feed cylinder may sometimes be insufficient.
- If the tree sticks to the wedge, reverse the cylinder using the manual start/stop lever.
- Lift the splitting wedge and retry the splitting using the manual launch. Changing the position of the log helps in many cases.
- If the log does not split, open the protective net to reverse the cylinder and lock up the control valve. This makes it safe to remove the log.
- If the log has a big branch, make the branch split by turning the log and pushing it towards the wedge with the root end first. Doing it this way requires the least power..

#### **Re-splitting the logs safely**

- If you wish to produce small-size firewood from large logs, even wood split by the 4- or 6-way wedge might still be too large in size.
- Proceeding in the following way will help you to split the wood safely into even smaller pieces.
  - 1 Open the protective net.
  - 2 Put the wood you intend to split into the splitting chute, e.g. one piece on top of another. The pieces of wood 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 manually operated start lever.

## 6 How the safety features affect the operation of the machine

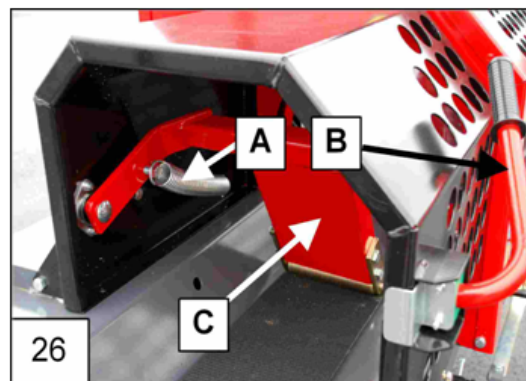
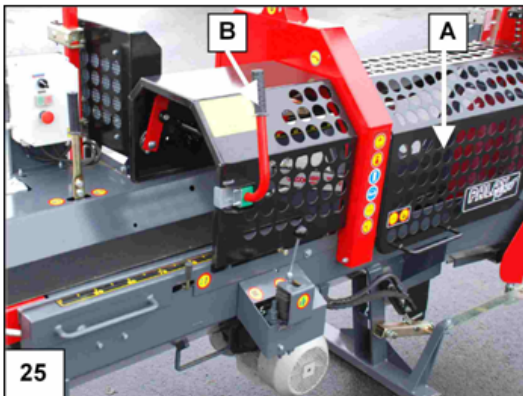
### 6.1 Protective net for splitting chute A, Fig. 25

- ❑ The protective net must always be closed when working with the machine.
- ❑ The chain-saw does not operate, if the net is open.
- ❑ The splitting cylinder does not operate, if the net is open.
- ❑ If the net is opened while the splitting operation is in progress, the splitting movement will stop and the cylinder will return to its initial position.

### 6.2 Active wood clamp B, Fig. 25

- ❑ The spring-loaded or hydraulic log-clamp, Fig. 25, 26 and 27, 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 trees stay in position on the deck by virtue of their own weight during cutting.
- ❑ Short and slender trees require the use of log-clamp because the saw-chain easily "bites" in small and light trees and thus causes a dangerous situation.

As necessary, the pressing force can be increased using the lever B.



### 6.3 Spring-loaded log-clamp of the Ergo model, Fig. 26

- ❑ The spring A keeps the clamp tight against the log at all times.
- ❑ The pressing force can be increased for short or lightweight trees using the hand lever B for the clamp.

#### 6.4 Log-clamp with hydraulic cylinder of the "s" model, Fig. 27

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



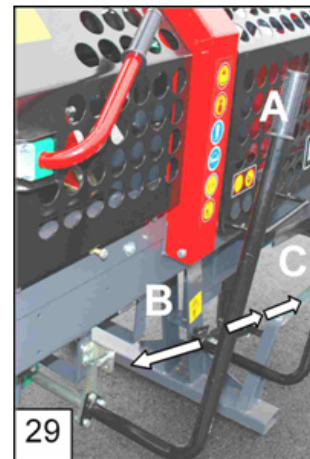
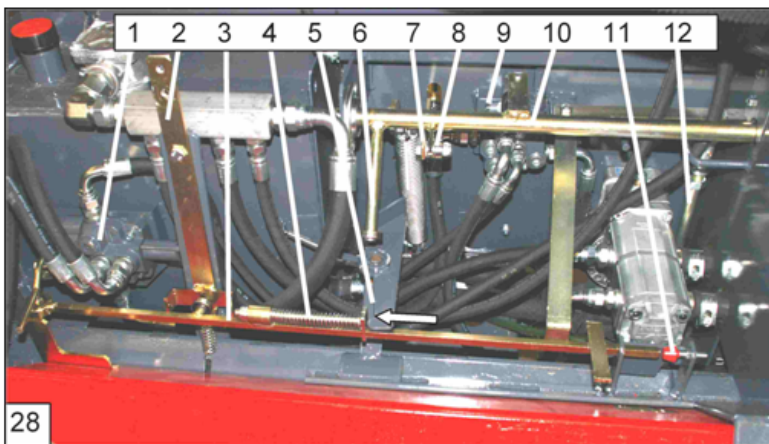
**NOTE! All the safety-related devices are necessary to ensure a sufficient level of safety.**

**Do not remove any of the safety features from the machine. The machine operator is responsible for the flawless operation of the safety-related devices.**

## 7 Operation of cutting, splitting and the infeed conveyor, Ergo model

### 7.1 Denomination of parts, Ergo model, Fig. 28

1. Splitting valve
2. Hand-start lever
3. Launch bar
4. Spring
5. Launch bar
6. Launch device
7. Spring
8. Oil pump lever
9. Valve for saw-motor and infeed conveyor
10. Multi-purpose shaft
11. Back stop
12. Launch bar



### 7.2 Operating principle of cutting, splitting and the infeed conveyor, Ergo model

#### Cutting

- ❑ Pull the multi-purpose lever A in direction B, Fig. 29.
- ❑ Multi-purpose shaft 10, Fig. 28, swings to the rear and the launch rod swing with it.
- ❑ The cam 7 of the multi-purpose shaft presses the oil pump lever 8, which applies oil to the saw-bar.

#### Splitting

- ❑ Push the multi-purpose lever A in direction C, Fig. 29. The launch rod 6 on the multi-purpose shaft 10 presses the launch lever 5. This makes the spring-loaded launch rod 3 activate the splitting valve 1.
- ❑ The splitting cylinder executes one stroke and then returns to its initial position.
- ❑ The chain-saw will stop as soon as the multi-purpose lever A comes in contact with the spring-loaded limiter in the front.

#### Feeding the tree

- ❑ Push the multi-purpose lever A in direction C against the spring-loaded limiter.

- ❑ Multi-purpose shaft 10 activates the valve 9 and the in-feed conveyor transfers the tree against the log-stop.

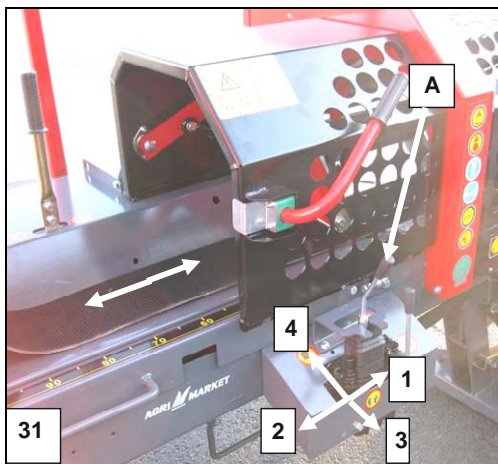
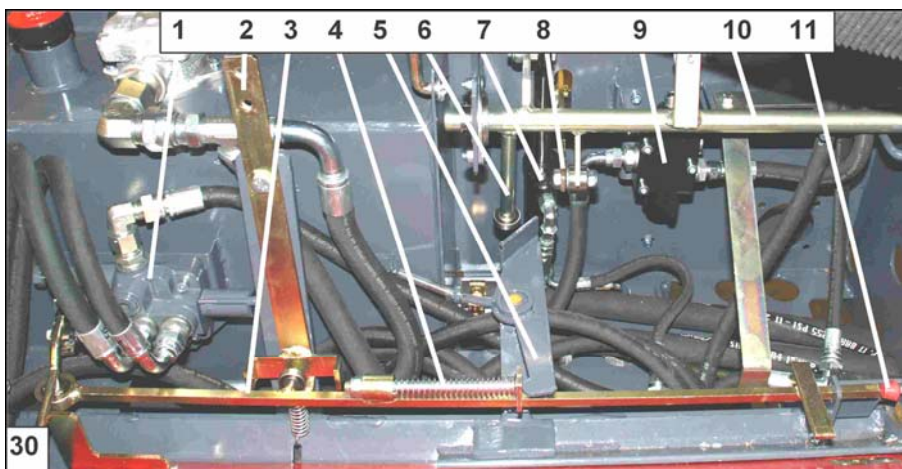
**Hand-start and stopping of the splitting operation**

- ❑ The splitting operation can also be started using the hand-start lever 2 by pushing the lever to the right.
- ❑ The hand-start lever starts the splitting operation by directly actuating the splitting valve 1 by means of the launch rod 3, Fig. 28.
- ❑ The splitting operation can also be stopped using the hand-start lever.

## 8 Operation of cutting, splitting and the infeed conveyor, S model

### 8.1 Denomination of parts, S model, Fig. 30

1. Splitting valve
2. Hand-start lever
3. Launch bar
4. Spring
5. Launch bar
6. Launch device
7. Cylinder
8. Oil pump lever
9. Infeed conveyor valve
10. Multi-purpose shaft
11. Back stop



### 8.2 Operation of joystick-valve, "s" model, Fig. 31

#### Cutting

- ❑ Pull the joystick A in direction 3, Fig. 31.
- ❑ Multi-purpose shaft 10, Fig. 30, swings to the rear actuated by the cylinder 7 and the launch rod 6 swings with it.
- ❑ The cam of the multi-purpose shaft presses the oil pump lever 8, which applies oil to the saw-bar.

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- The valve 9 starts the saw-motor for cutting the tree.

### **Splitting**

- Push the joystick A in direction 4, Fig. 31.
- The launch rod 6 on the multi-purpose shaft presses the launch lever 5. This makes the spring-loaded launch rod 3 activate the splitting valve 1.
- The splitting cylinder executes one stroke and then returns to its initial position.
- The chain saw stops immediately when the lever is shifted from position 3.

### **Feeding the tree**

- Push the joystick A to the right in direction 1 to start the infeed conveyor.
- Push the joystick in direction 2 to reverse the infeed conveyor.

**NOTE!** The operations can be performed simultaneously so that, while the log is being split, a new log can be fed against the log-stop and the crosscut operation can be started immediately.



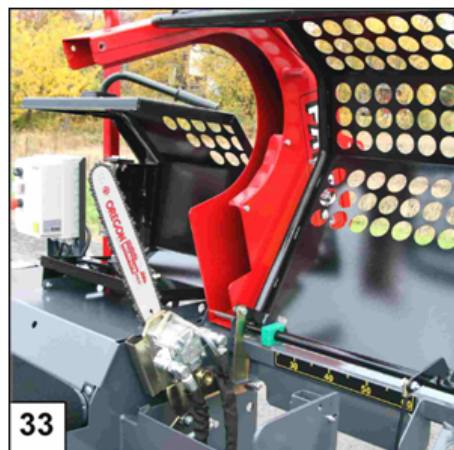
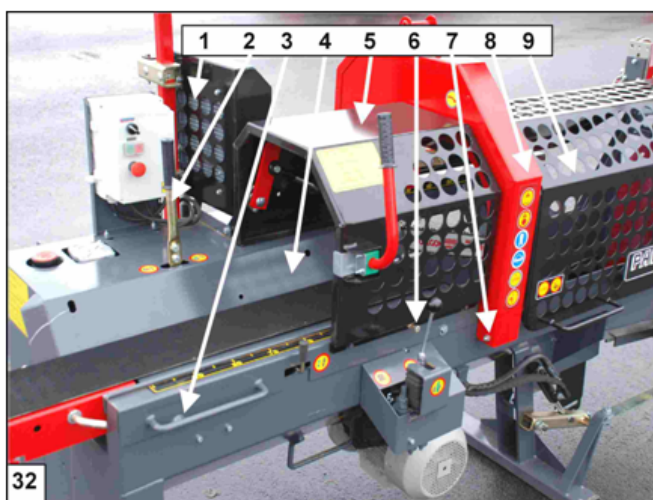
## 9 Maintenance of the machine

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

All protective devices must be put in place after the service.

### 9.1 Opening the protective structures, objects, Fig. 32

1. Hydraulic oil cooler, optional
2. Hand-start handle
3. Attachment bolts M10 for infeed deck
4. In-feed deck
5. Protective cover for infeed deck
6. Attachment bolt M10 for protective cover
7. Attachment bolt M10 for saw-bar cover
8. Blade cover
9. Protective cover for splitting chute



### 9.2 Covers that need to be opened for maintenance work on the saw-bar, Figs. 32 and 33.

1. Open the protective net 9 for the splitting chute.
2. Remove the attachment bolt 7 for the saw-bar cover and open the cover.
3. Open the quick-release lock for the oil cooler and turn the cooler to the side (if installed).
4. Remove the attachment bolt 6 for the infeed deck cover and open the cover.



### 9.3 Covers that need to be opened for maintenance work on the hydraulic system, Fig. 32 and 34.

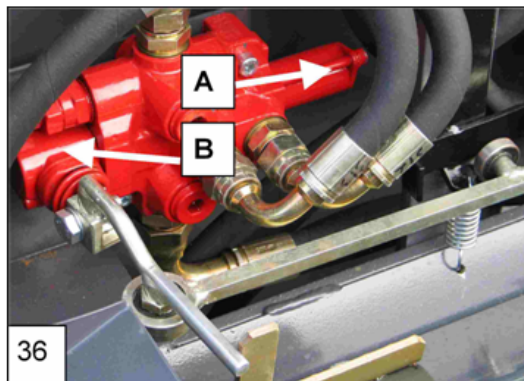
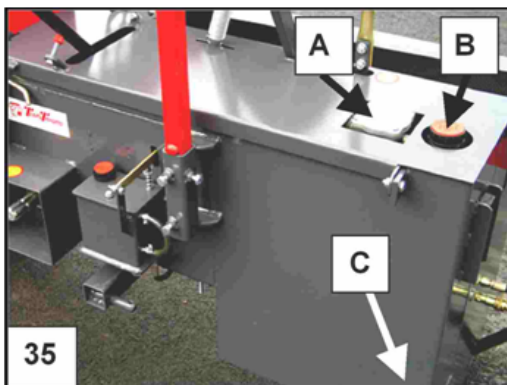
1. Open the protective net 9 for the splitting chute.
2. Remove the attachment bolt 7 for the saw-bar cover and open the cover.
3. Open the quick-release lock for the oil cooler and turn the cooler to the side (if installed).
4. Remove the hand-start handle 2.
5. Remove the attachment bolts for the infeed deck.
6. Lift the infeed conveyor extension to the upright position.
7. Open the in-feed deck and put the deck support in place.

### 9.4 Changing the gearbox oil

- ❑ The oil plug is in the lower part of the gearbox.
- ❑ Fill up with about 0,52 litres of new oil.
- ❑ Oil type SAE 80.
- ❑ Note! The sight glass of the large gearbox is not in use (3063->).

### 9.5 Changing the hydraulic oil and the filter, Fig. 35

- ❑ The oil plug C is located in the bottom of the tank.
- ❑ The filter A must also be replaced, because contaminants that end up in the filter are constantly extracted from the system.
- ❑ The volume required for oil-change is about 55 litres.
- ❑ Leave an expansion space of about 5 cm in the upper part of the tank.



### 9.6 Servicing the valve, Fig. 36

- ❑ To withstand and operate flawlessly, the detent end A, 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 to be left standing for several months. If the parts of the detent have become rusty, the machine will not operate flawlessly.

### 9.7 Detent end of the valve, Fig. 37

- ❑ 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.
- ❑ 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.

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



### 9.8 Lubricating the spool shifter, Fig. 38

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

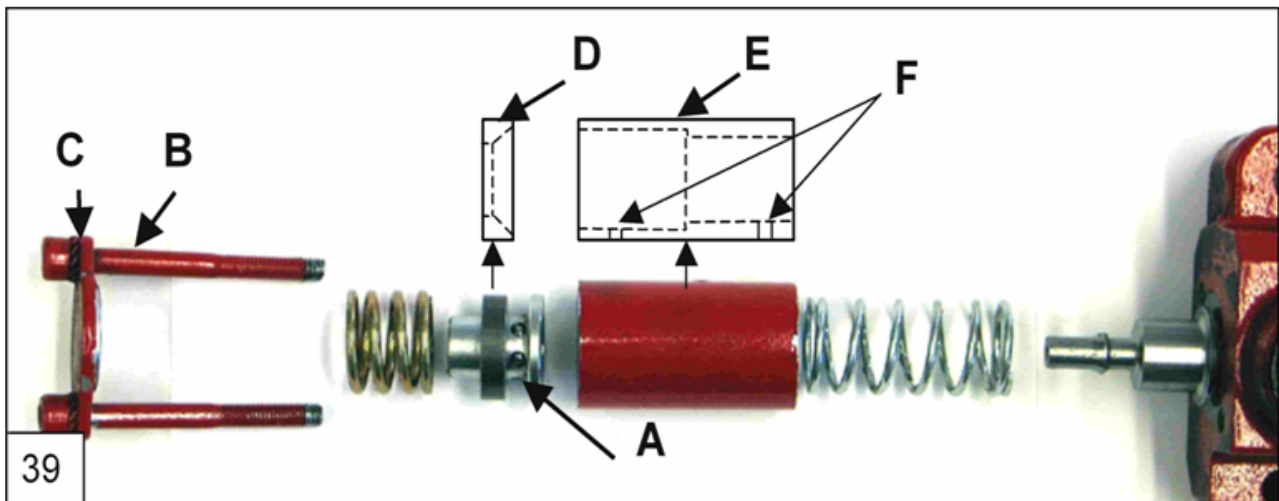
1 Lift up the edge of the protective rubber of the spool

shifter.

- 2 Spray lubricant on both sides of the pin and on the ball joint.
- 3 At the same time, check that the rubber is intact.

### 9.9 Structure of the detent end and the correct order of parts, Fig. 39

- Keep cover C of the detent end depressed while opening screws B, as the stiff springs can throw the cover off. This can also make the springs and balls of the detent fly off.
- In connection with assembly of the detent end, apply a small amount of Vaseline to holes A of the detent. This ensures the balls stay properly in position during assembly. Make sure that parts D and E line up in the right way, as shown in the picture, and that the condensed-water drain holes always point downwards.



### 9.10 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.

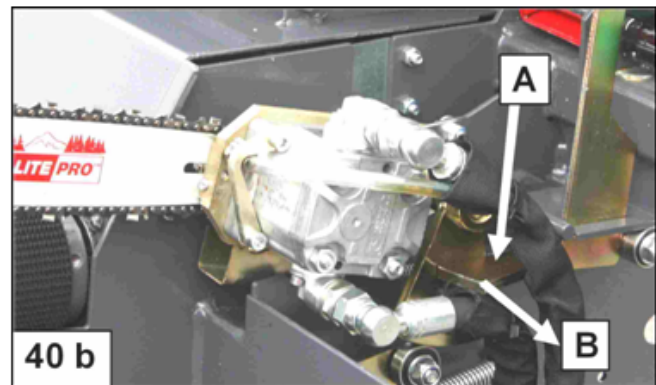
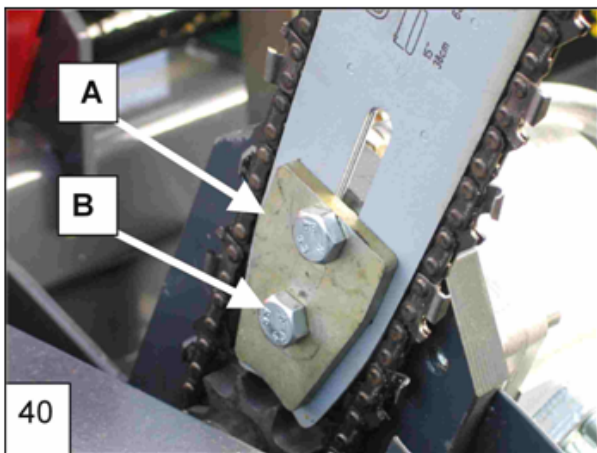
### 9.11 Changing the saw-chain, Fig. 40

**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 9.2.
- 2 Loosen the attachment screws for the saw-bar.
- 3 Loosen the tightening screw for the saw-bar.
- 4 Remove the attachment plate for the saw-bar (using a 13-mm wrench).
- 5 Remove the saw-bar and the chain.
- 6 Put a new chain on the bar and the end sprocket and put the saw-bar in place.
- 7 Put the attachment plate in place and tighten lightly.
- 8 After that, tighten the chain to the appropriate tightness.

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



### 9.12 Sharpening the chain in the machine, Fig. 40b

- 1 Pull the release lever A for the saw-motor in the direction shown by arrow B.
- 2 Holding by the saw-bar, turn the motor to a horizontal position.
- 3 Now you can file the chain.



### 9.13 Lubricating the nose wheel

- 1 Open the housing following the instructions in paragraph 9.2
- 2 Clean the lubrication hole illustrated in Fig. 40c
- 3 Lubricate with vaseline, using a grease gun

### 9.14 Sharpening the chain in a vice, Figs. 41 and 42

- Put the saw-chain on the saw-bar and attach the saw-bar to, for instance, a vice, Fig. 41
- The saw-chain is easy to move forward and the chain stays well in the sawbar groove and is easy to file.
- Attach the saw-chain directly to the vice. The chain will stay solidly in position, Fig. 42.
- 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.



### 9.15 Conveyor chains, Fig. 43

- When operated continuously, the conveyor chains should be lubricated daily.
- The easiest way to do this is to apply chain spray lubricant to the chain while the conveyor is rotating at low speed.

- ❑ The chain only requires light daily lubrication.
- ❑ When the machine is left standing for longer periods, it pays to lubricate the chain properly to prevent it from rusting.
- ❑ The bearings at the top of the conveyor are lubed-for-life so they do not require any maintenance.



### **9.16 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.

### **9.17 Washing the machine**

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

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

### **9.18 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.

## 10 Maintenance schedule

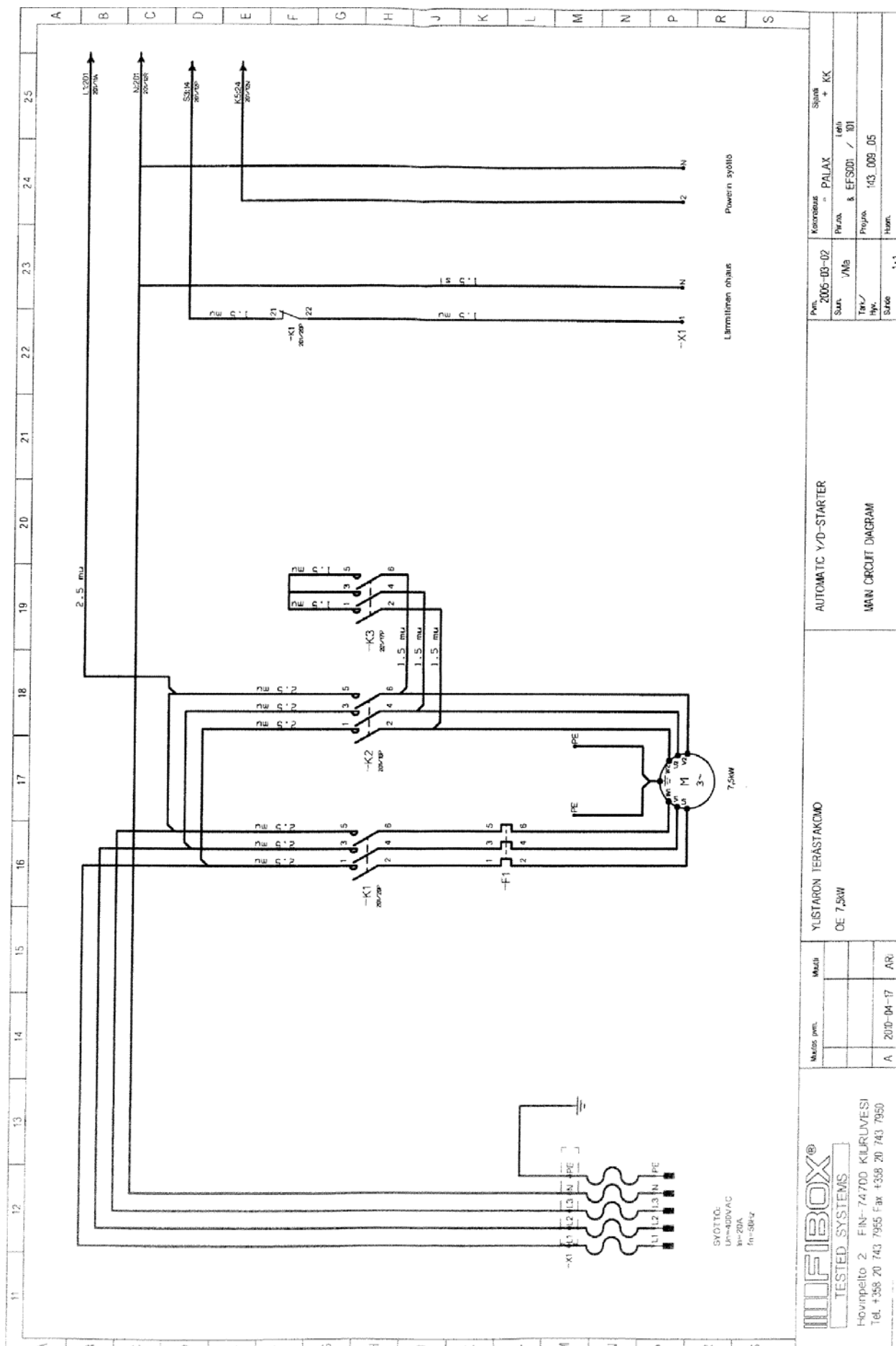
Object	Task	Daily	Service interval 100 t	Service interval 500 h	Service interval 1000 h	Material /Method
Gearbox TR-powered	Check 1 Change 2 Change		X	X	X	SAE 80 0.52 l
Hydraulic oil Normal conditions	Check 1 Change 2 Change		X	X	X	Volume 55 l e.g. Esso Unavis 32 Neste Hydraul 32
Oil filter	1 Change 2 Change			X	X	FIO 100/ 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-blade	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				
Nose wheel	Lubrication	X				Vaseline

## 11 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 operation of the detent end. 2. Check 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, screw the relief valve up about $\frac{1}{2}$ a turn. 3. Remove the debris.
The high-speed valves only operates at one speed.	1. Debris in the high-speed valve.	1. Open and clean the valve.



## 12 Wiring diagrams



Projekti	2006-03-02	Kokonaisuus	Palax	Sijainti	Siuna + KK
Siuna	/Ma	Palax	Lehti		
Tekijä		& EFS001 / 101			
Hyväksyjä		Projekti	143_009_05		
Skala	1:1	Huom.			

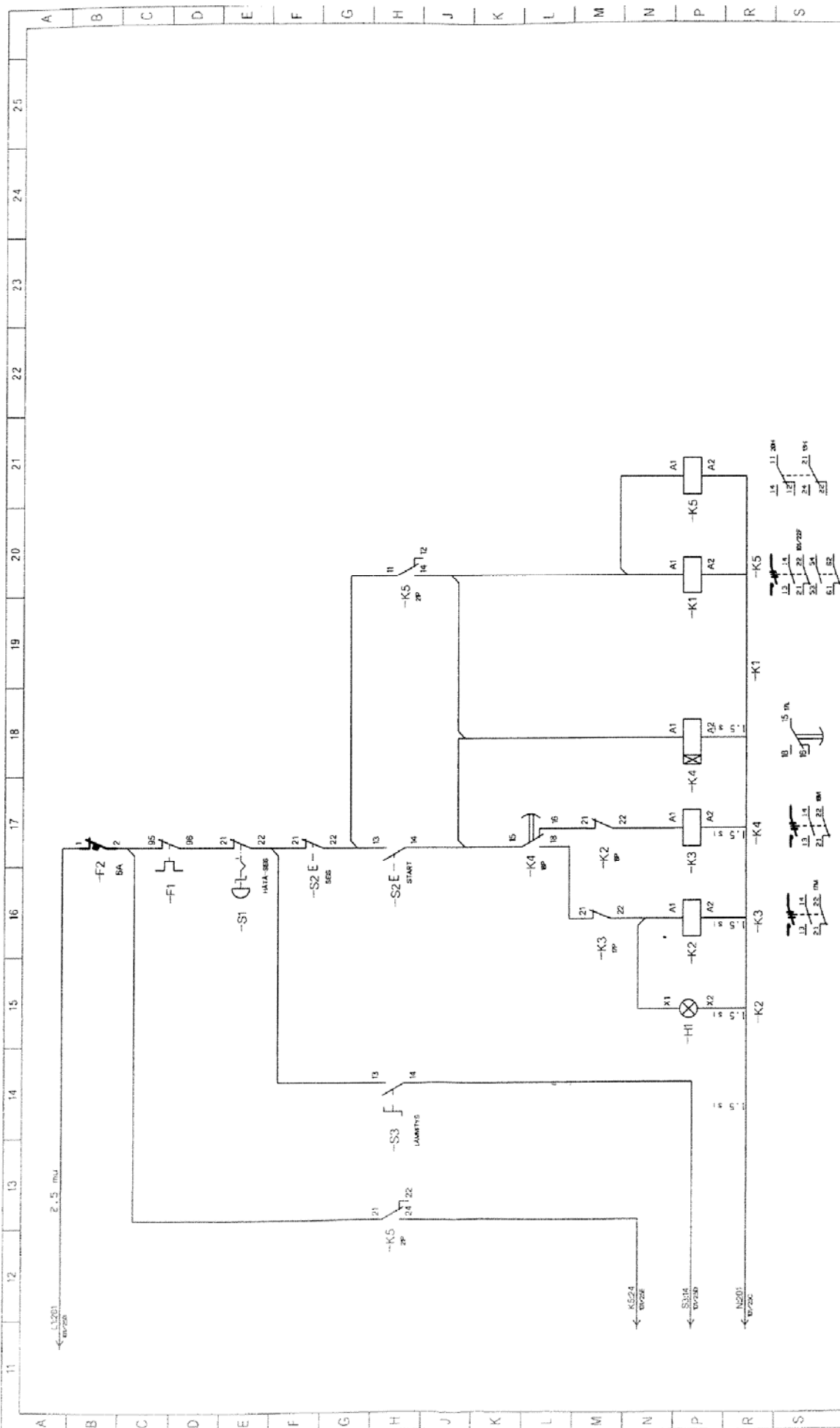
AUTOMATIC Y/D-STARTER  
 MAIN CIRCUIT DIAGRAM

Muutos nro.	Muutt.
A	2010-04-17
AR:	

**WIFI BOX**  
 TESTED SYSTEMS  
 Hövinkö 2 FIN-74700 KILJUVESI  
 Tel. +358 20 743 7955 Fax +358 20 743 7950

Palax  
 KS35

Translation  
 1-2017



<b>WIPIBOX®</b> TESTED SYSTEMS Hovirpeltto 2 FIN-74700 KIJURUVESI Tel. +358 20 743 7955 Fax +358 20 743 7950		Moduli p.m. A 2010-04-17 AR1	YLUSTARON TERASTAKOMO OE 7,5kW	AUTOMATIC Y/D-STARTER MAIN CIRCUIT DIAGRAM	Pirt. 2005-03-02 Suur. VMB Tek./Hyv. HK_009_05 Suhte 1:1	Koostaja PALAX Eijäni KK Pirt. & EFS001 / 201 Propos. HK_009_05 Huom. Jotined mu/15/AR1EM
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