

Instruction manual

Palax Power 90 s

Palax Power 90sG

Powered by tractor

Powered by electric motor



SERIAL NUMBER _____

YEAR OF MANUFACTURE _____

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CONTENTS

1.1	Foreword	5
1.2	EU Declaration of Conformity	6
1.3	Intended use of the machine	7
1.4	Warning signs	7
1.5	Nameplates	9
1.6	The main dimensions and models of the machine	9
1.7	Safety instructions.....	9
1.8	Noise emission and vibration	10
1.9	Responsibilities of the operator	11
1.10	Operating conditions	11
1.11	Terms of warranty.....	11
1.12	Operating instructions for the winch	12
2	Taking delivery and setting up the machine for operation.....	12
2.1	Lifting the machine.....	12
2.2	The transport set-up and unpacking	12
2.3	Acceptance inspection	12
2.4	Main parts of the machine, Fig 1	13
2.5	Bringing the table extension into the work position, Fig. 2.....	13
2.6	Bringing the conveyor into the work position, Figs. 3 and 4.....	14
2.7	Bringing the conveyor into the work position, Fig. 5.....	15
2.8	Adjusting the cutting length, Fig. 6	15
3	Operation of the firewood processor powered by different power sources	15
3.1	Testing the machine	15
3.2	Powered by a tractor	16
3.3	Suitable revolutions range for the PTO shaft	16
3.4	Disengagement lever for transmission, Fig. 7	16
3.5	Required measures in an emergency situation.....	17
3.6	Starting under cold conditions (machine powered by a tractor)	17
3.7	Electric drive, start and emergency stop.....	17
3.8	Starting the electric motor using the Y/D starter, Fig. 8.....	18
3.9	Emergency stopping of an electrically powered machine, Fig. 8.....	18
3.10	The machine is equipped with a system to prevent simultaneous operation in two modes, Fig. 9.....	18
3.11	Operation under cold conditions	19
3.12	Electric heater for oil tank.....	19
4	Full-hydraulic control.....	20
4.1	Mastering the safety devices.....	20
4.2	Joystick-valve, Fig. 10	20
4.3	Other hydraulic operating controls, Fig. 11	20
5	Use of the firewood processor, crosscut operation	22
5.1	Operating the crosscut saw, before the operation.....	22
5.2	During the operation	22

5.3	Cutting to equal length and feeding into the splitting chute	22
5.4	Feeding the last log for splitting	23
6	Disturbances during crosscut operation and their remedy	24
6.1	Crooked trees	24
6.2	Big trees	24
6.3	Cutting of small trees without splitting	24
7	Disturbances during the splitting operation and their remedy.....	25
7.1	Stuck wood.....	25
7.2	Re-splitting the logs safely.....	25
7.3	If the log has fallen into the splitting chute in a wrong position	25
8	Accessories for the firewood processor.....	26
8.1	Splitting cylinder	26
8.2	Automatic high-speed valve	26
8.3	Splitting wedges	26
9	Maintenance of the machine	27
9.1	Removal and change of the crosscut blade, Figs. 13 and 14.....	27
9.2	Changing the wedge cassette (Power 90sG model), Figs. 15, 16 and 17	27
9.3	Tightening the V-belts	29
9.4	Replacement of the V-belts, centre shaft / saw-blade shaft.....	29
9.5	Sharpening the blade, hard-metal blade	29
9.6	Setting the saw-blade, hard-metal blade.....	29
9.7	Spare blade.....	29
9.8	Replacement of V-belts, angular gear /centre shaft.....	29
9.9	Tightening the in-feed conveyor belt, Figs. 18 and 19.....	30
9.10	Replacing the in-feed conveyor belt	30
9.11	Direction of rotation of the belt.....	31
9.12	Changing the oil in the angular gear.....	31
9.13	Change of the hydraulic oil.....	32
9.14	Lubricating the machine: refer to the Maintenance Schedule	32
9.15	Servicing the main valve, Fig. 26	33
9.16	Structure of the detent end and the correct order of the parts, Fig. 27.....	33
9.17	Tightening and lubrication of the conveyor chain	34
9.18	Cleaning the conveyor	34
9.19	Washing the machine	34
9.20	Storing the machine.	34
10	Maintenance schedule	35
11	Malfunctions and their remedy.....	36
12	Electric diagrams.....	37

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 PTO 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.

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

1.2 EU Declaration of Conformity

Directive 2006/42/EC

Manufacturer: Ylistaron Terästäkomo Oy
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Product: Palax Power 90 s, Palax Power 90 sG
 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 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 847-2+A1, SFS-EN 847-3, SFS-EN 953+A1, SFS-EN 954-1, SFS-EN 982+A1, SFS-EN 1870-3+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.

Notified body No. 2157: Spitzenverband der landwirtschaftlichen Sozialversicherung Prüf- und Zertifizierungsstelle
 Weißensteinstraße 70/72
 D-34131 Kassel

Ylistaron Terästäkomo Oy
 4.9.2017



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:







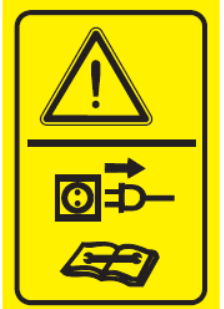

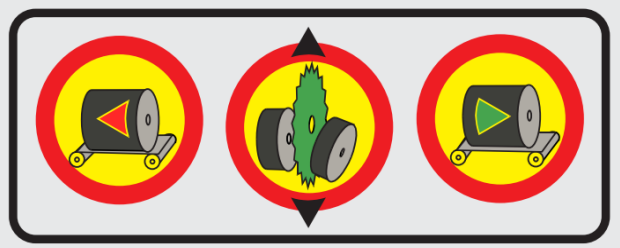

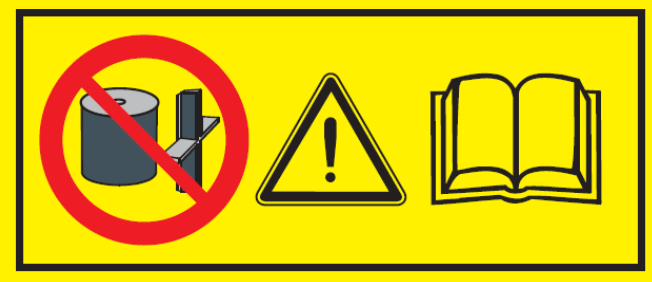

For cutting, the maximum diameter of the tree is about 37 cm.

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>Read the instruction manual: Beware of the crosscut saw-blade: Do not wear loosely hanging clothes: Use eye guards and hearing protectors: Wear safety shoes</p>		
 <p>Lifting point of the machine</p>	 <p>The protective net for the splitting chute cannot be opened unless the crosscut saw-blade is in its upper position</p>	
 <p>Lubrication point</p>	 <p>Emergency stop (SM)</p>	 <p>Direction of rotation of the blade/PTO shaft</p>
 <p>Interrupting the splitting</p>	 <p>Launch of splitting.</p>	 <p>Safe distance from the conveyor</p>

 <p>Revolutions range of the PTO shaft</p>	 <p>Lifting point of the machine</p>	 <p>Beware of PTO shaft</p>	 <p>Read the User Manual for the machine</p>
 <p>Beware of rotating blade</p>	 <p>Stay away from moving parts of the machine</p>	 <p>Disconnect the machine from the electric supply before taking to any service measures</p>	 <p>The machine may only be operated by one person</p>
			 <p>Stopping the functions of the machine by slackening the V-belts</p>
<p>Reversing the in-feed conveyor</p>	<p>Sawing</p>	<p>Feeding with the in-feed conveyor</p>	
 <p>Take care that the log is not in an upright position when being fed for splitting</p>			 <p>Adjustment of cutting length</p>

- The legend for the pictorials, presenting the machine's various control operations, will be explained in greater detail in chapter 4.

1.5 Nameplates

Nameplate on the machine:

- ❑ Name and address of the manufacturer.
- ❑ Mark showing type of machine.
- ❑ Total weight of the machine
- ❑ Diameter of the crosscut blade 900 mm, hole 40 mm.
- ❑ The highest permitted rotational speed 1400 r.p.m
- ❑ Max. hydraulic pressure 210 bar
- ❑ Serial number and year of manufacture
- ❑ Nameplate is at the end of the machine

Nameplates on the electric drive:

- ❑ 3-phase motor
- ❑ Voltage 230/400 V or 400/600 V, may vary depending on the country.
- ❑ Output 15 kW

1.6 The main dimensions and models of the machine

Models	Power 90 s		Power 90 sG	
	TR	TR/SM	TR	TR/SM
DRIVING POWER	TR	TR/SM	TR	TR/SM
Weight	1,450 kg	1,550 kg	1,700 kg	1,800 kg
Height/width/length	Transport position 2.55 m / 1.4 m / 2.83 m			
In-feed conveyor	Length 2.2 m Height 0.9 m			
Diameter of blade/hole	900 mm/ 40 mm			
Max. rotation speed of blade	1,400 r.p.m.			
Max. diameter of the log	Max. cutting diameter of the log 37 cm			
Max./min. length of the log	At splitting, max.diameter of the log 55 cm, min. length of the log 25 cm			

- ❑ The 4.3 m firewood conveyor is included in the weight.
- ❑ A machine powered by electricity must be equipped with a fuse of at least 25 A. However, using a fuse of 32 A or more is recommended.

1.7 Safety instructions

General regulations and restrictions

- ❑ The maximum length of the log to be cut is 4 metres. Danger of turning over! 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 machine must be equipped with additional lights for transportation on public roads.
- ❑ The danger zone around the conveyor is 5 metres to the sides and to the rear.
- ❑ Lift and lock the in-feed deck and the discharge conveyor in the transport position for transportation.

- ❑ The three-point linkage of the tractor is of size-category two. If using a tractor larger in size, check that there is sufficiently space for the PTO shaft and its protective guard.
- ❑ Only persons over 18 years of age are allowed to operate this machine.
- ❑ Never remove any safety-related devices from the machine.
- ❑ The width of the machine equipped with the 4,3-m conveyor is about 2.83 m. This means that, depending on the size of the tractor, the transport width of the conveyor may extend outside the rear wheel on the right-hand side.
- ❑ The frame of the electrically powered machine is earthed.

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 450–480 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 connected to the three-point linkage. 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 check that the crosscut saw-blade is intact.
- ❑ 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 the tree at the cutting point always leans against the support roller of the crosscut deck and the in-feed roller: danger of rolling over!
- ❑ Exercise particular caution when cutting knotty or crooked logs, because, as a result of faulty cutting, the log might roll over or twist the saw-blade 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 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 87.5 dB (A)

and the sound power level is 102,0 dB (A). The vibration emission values do not exceed 2.5 m/s².

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 Power 90 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.

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 is delivered as a replacement for the defective one.

The warranty does not cover:

- ❑ Defects due to normal wear, faulty operation or negligent maintenance.
- ❑ The crosscut saw-blade, the in-feed belt, the V-belts and oils.
- ❑ 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.
- ❑ Consult your dealer about matters related to the warranty.

1.12 Operating instructions for the winch

Please refer to the user manual of the winch or visit our website at www.palax.fi for more detailed operating instructions for the winch.

2 TAKING DELIVERY AND SETTING UP THE MACHINE FOR OPERATION

2.1 Lifting the machine

The machine can be lifted with a forklift truck from both sides. The places for the lifting forks are marked with decals. There is also a lug for lifting the machine on the upper part of the machine frame.

2.2 The transport set-up and unpacking

- ❑ The machine is delivered almost ready assembled and with the conveyor attached.
- ❑ In order to avoid damage during transportation, the machine is delivered partly dismantled so that all the protruding levers and the hitching parts of a tractor-powered machine and part of the protective covers have been removed and packed separately.
- ❑ The extension table for the in-feed conveyor and the loading conveyor are in the transport position.
- ❑ The angular gear is filled with transmission oil.

2.3 Acceptance inspection

- ❑ Check the delivered goods without delay.
- ❑ If the product shows transport damage, contact the transport company and your dealer immediately.

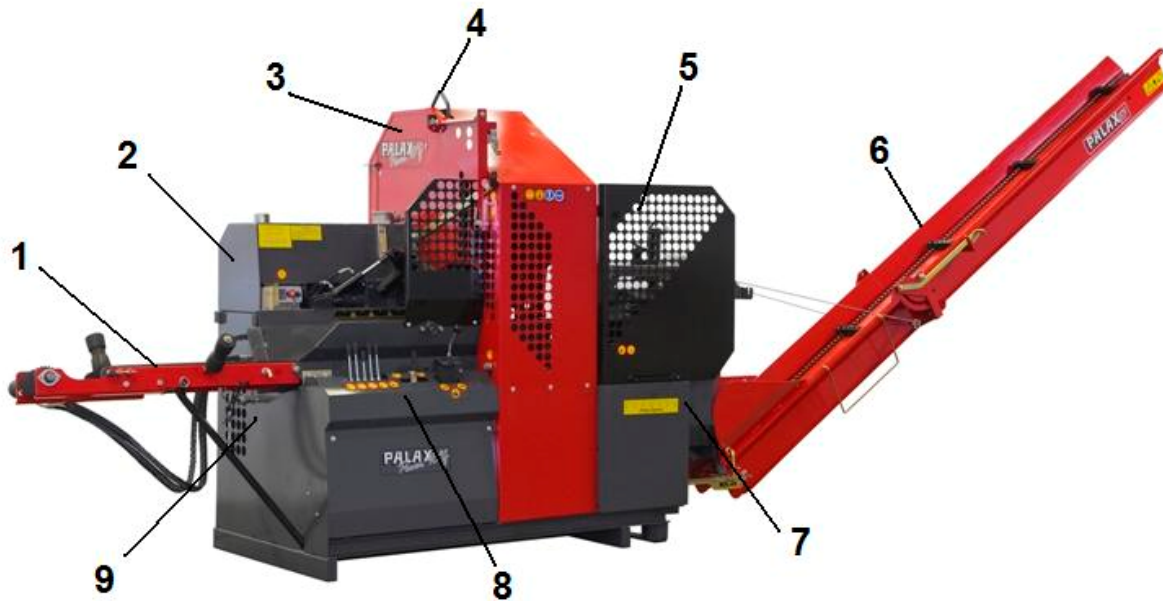


Fig. 1

2.4 Main parts of the machine, Fig 1

1. In-feed conveyor
2. Oil tank
3. Saw-blade cover
4. Lifting lug
5. Splitting chute cover
6. Discharge conveyor
7. Splitting chute
8. Operating panel
9. Hydraulic connectors for log-table

2.5 Bringing the table extension into the work position, Fig. 2

1. Disconnect the rubber strap A.
2. Pull open the locking lever B.
3. Swing the conveyor down and place the leg into the opening C in the frame. Re-connect the rubber strap.

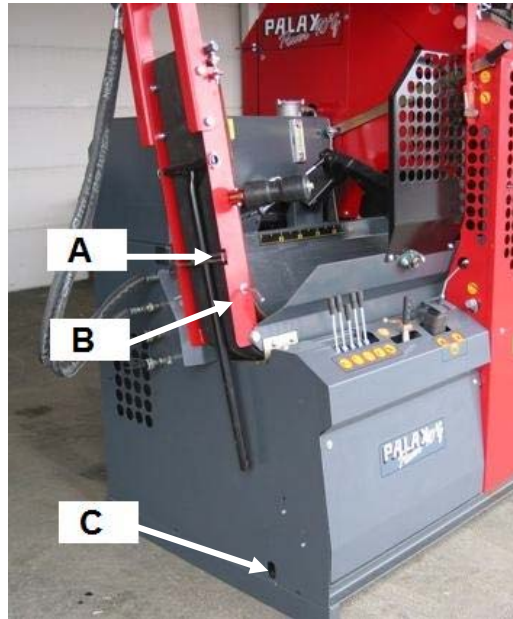
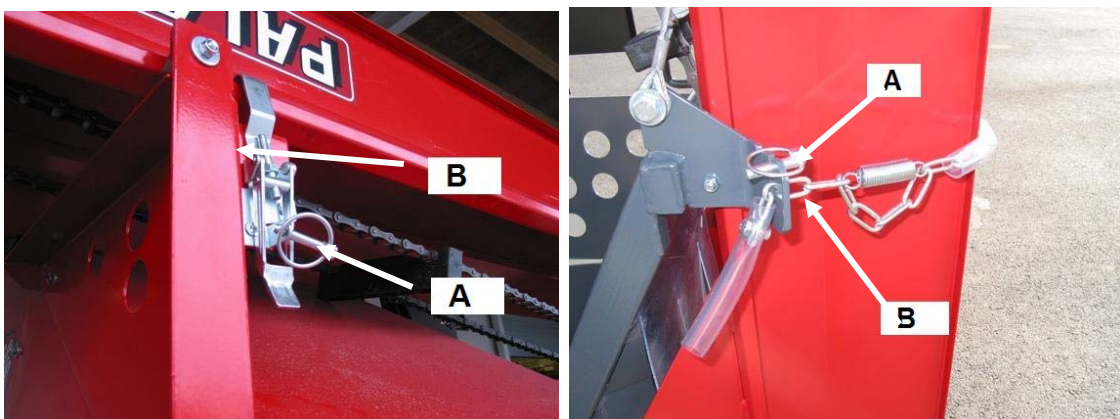


Fig. 2

2.6 Bringing the conveyor into the work position, Figs. 3 and 4

1. Remove the locking pins A for the conveyor, Fig. 3 and 4
2. Release the locks B.
3. Unwind the winch wire a few rounds.
4. Pull out the conveyor and leave it supported by the winch rope.
5. Lower the conveyor to the ground using the winch.
6. Pull open lock A, Fig. 5
7. Swing down the top of the conveyor.
8. Remove support bar B for the conveyor chain (Fig. 5) and place it in the holes at the edge of the conveyor.
9. Put the splints back in place.



Figs. 3 and 4

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

2.7 Bringing the conveyor into the work position, Fig. 5

1. Lower the conveyor to the ground and connect the support bar B for the conveyor chain (Fig. 5).
2. Raise the splitting wedge to its uppermost position (on the Power 90 sG-model).
3. Turn the lifting arm for the wedge cassette to the side (on the Power 90sG-model).
4. Pull lock A (Fig. 5) open and lift up the conveyor top.
5. Ensure that lock A is properly locked.
6. Raise the conveyor using the winch.
7. Tighten the winch wire lightly in order to prevent it uncoiling from the spool.
8. Lock the conveyor to the transport support using the lock, the chain and the pin.

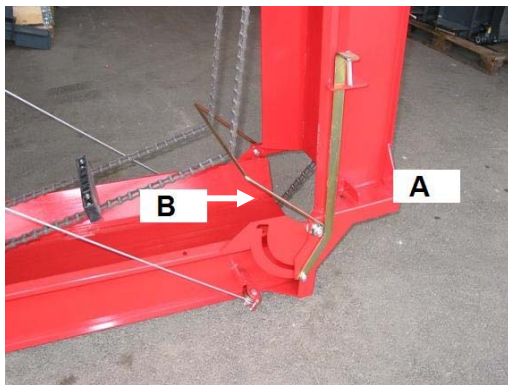


Fig. 5



Fig. 6

2.8 Adjusting the cutting length, Fig. 6

- The machine is equipped with a special Palax Optimi cutting length adjuster, which adjusts the stroke length of the splitting cylinder in accordance with the desired cutting length.
- Adjust the cutting length using the control lever (OPTIMI, Fig.11) and the scale on the machine's frame (Fig. 6).
- As the crosscut blade lowers, the log-stop automatically turns away from the log, allowing it to fall down freely.
- The log-stop is equipped with one shear-pin.
- The shear-pin is intended for protecting the log-stop structure against damage that may occur if a tree of excess length ends up in the splitting chute and the pusher pushes it to a vertical position against the log-stop.
- Bolt size M6 x 50, partial thread, strength class 8.8, M6 Nyloc nut.

3 OPERATION OF THE FIREWOOD PROCESSOR POWERED BY DIFFERENT POWER SOURCES

3.1 Testing the machine

- When starting the machine in severe frost, allow it first to idle at low speed for about 5 minutes; this warms up the oil.

- ❑ While the motor is running, check that the hydraulic system and the controls for shutting off are operational.
- ❑ Test that the safety limit switches are operating when the cover is opened. Once the cover is open, the hydraulic valves cannot be operated with the exception of the fire-wood conveyor.
- ❑ If you observe even a minor malfunction in the operation of the machine, find out the cause and repair it!
- ❑ The machine must always be tested before starting its use.

NOTE ! Stop the machine and disengage the power take-off of the tractor or disconnect the power cord from the socket to locate and repair a possible fault in the machine!

3.2 Powered by a tractor

- ❑ The PTO shaft must be able to transmit an output of about 26 kW: for example, BONDIOLI 143, WALTERSCHEID W 2300 or EGT40.
- ❑ 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.
- ❑ When you disconnect the PTO shaft from the tractor, hang it on the hook on the machine.
- ❑ The suitable range of speeds for the PTO shaft is from min. 450 to max. 480 r.p.m.

3.3 Suitable revolutions range for the PTO shaft

- ❑ The recommended rotation speed for the PTO shaft is about 470 r.p.m.
- ❑ If the angular gear revolutions and the cutting speed of the crosscut blade are sufficient, less load will be subjected to the transmission.

3.4 Disengagement lever for transmission, Fig. 7

- ❑ The machine is equipped with a special device for disengaging the transmission between the angular gear and the machine to make the hydraulic pumps and the crosscut saw-blade stop.
- ❑ In the event of emergency, pull the lever A downward. Thus will the lock-up bolt B lock the lever and the V-belts will remain slack.

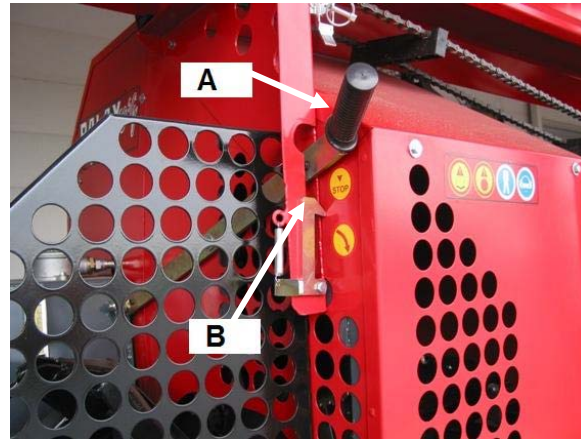


Fig. 7

NOTE ! Only use the lever in an emergency, because the V-belts, which slightly chafe the angle-drive pulley, may wear too quickly.

3.5 Required measures in an emergency situation

If the switch has been used in an emergency situation, e.g. when a log has stuck in the circular saw-blade as a result of a mistake during the sawing, immediately also switch off the power take-off transmission of the tractor (tractor-powered machine), because the pulley of the angle drive can wear down the V-belts unnecessarily.

NOTE! Release the disengagement lever for the transmission before restarting the machine.

3.6 Starting under cold conditions (machine powered by a tractor)

- ❑ When starting the machine in severe frost, allow it first to idle at low speed for about 5 minutes; this warms up the oil.
- ❑ Warming up the oil reduces wear on the hydraulic system significantly and prevents damage.

3.7 Electric drive, start and emergency stop.

- ❑ The output of the motor is 15 kW and its speed is 1,480 rpm.
- ❑ The machine is equipped with an automatic Y-D starter with an emergency stop feature.
- ❑ All the electric installations have been made ready.
- ❑ The cross-section of the extension cord required for a tension of 400 V must be 6 mm².
- ❑ When starting up the machine, check that the direction of rotation corresponds to the arrow on the blade cover.
- ❑ To check the direction of rotation, run the motor for a short while and then stop it suddenly.
- ❑ The direction of rotation is reversed using the phase-switch in the appliance inlet.
- ❑ The machine may only be connected to a power supply equipped with a fault current switch of 30 mA.
- ❑ The machine must be equipped with a 5-pole extension cord (L1, L2, L3, N ja PE) to operate.

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

3.8 Starting the electric motor using the Y/D starter, Fig. 8

- ❑ Press the start button A. 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 automatically switched on and the motor quickly reaches full speed.
- ❑ At the same time, the signal light B between the pushbuttons illuminates.
- ❑ Stop the engine using the pushbutton C.

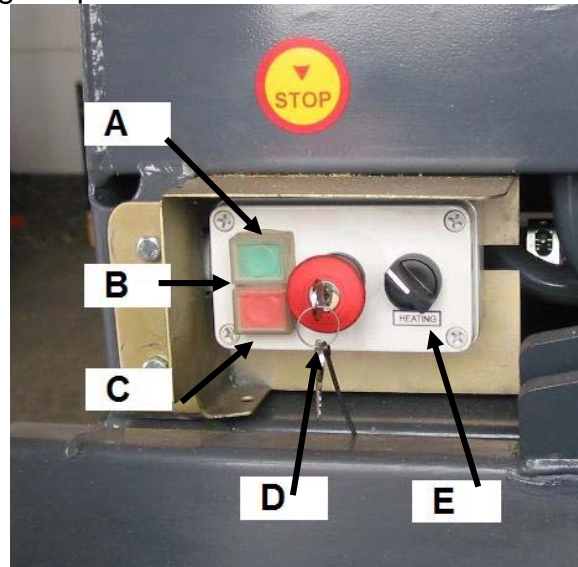


Fig. 8

NOTE ! The machine must not be operated until the motor is running at full speed.

3.9 Emergency stopping of an electrically powered machine, Fig. 8

- ❑ Push down the emergency stop button D.
- ❑ Turn the pushbutton clockwise to release it.

3.10 The machine is equipped with a system to prevent simultaneous operation in two modes, Fig. 9

- ❑ When the cover plate B is turned down, it is possible to connect the extension cord. When the cover is raised up, it is possible to connect the PTO shaft.
- ❑ Suspension hook A for the PTO shaft.

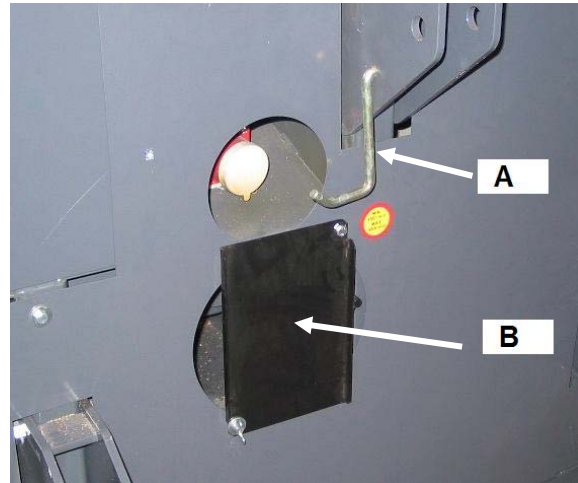


Fig. 9

**WARNING! Never remove from the machine the plate that prevents the simultaneous operation in two modes.
Always remove the PTO shaft before operating the machine by electricity.**

3.11 Operation under cold conditions

When an electrically powered machine is operated in a temperature below -10 degrees Centigrade, we recommend using less viscous hydraulic oil, such as ISO VG22S multi-grade oil or synthetic hydraulic fluid, because a machine with electric drive takes full revolutions right from the start of operation.

In cold weather, it pays to reduce the speed of the discharge conveyor to a minimum. Doing it this way requires the least power at the start-up stage.

It also pays to pull down the disengagement lever for the transmission for a cold start. Then only the angular gear will start running and the gearbox oil will warm up. After this, stop the machine, release the disengagement lever for the transmission and restart the machine.

NOTE ! The protective net for the splitting chute shall be closed during start-up of the electric motor.

3.12 Electric heater for oil tank

A 300 W electric heater carpet with adhesive tape attachment and a thermostat is available as an option for the hydraulic oil tank. The starter comes as standard equipped with an operating switch for the heater, Fig 8 E. Heating the oil for 1-2 hours is sufficient to enable smooth starting.

- ❑ The size of the heater carpet is 200 x 300 mm
- ❑ Output 300 W
- ❑ Equipped with a thermostat
- ❑ Strongly adherent glue for attachment of the carpet

NOTE! Only a skilled craftsman is allowed to carry out electrical work for the heater.

4 FULL-HYDRAULIC CONTROL

Crosscutting, automatic starting of the splitting and operation of the in-feed conveyor are effortlessly controlled using the fully hydraulic joystick-valve.

4.1 Mastering the safety devices

While the protective net for the splitting chute is closed, access is prevented to the operating area of the crosscut saw-blade and the pusher. As the protective net for the splitting chute is opened, the crosscut saw-blade cover is activated and the operation of the crosscut saw-blade, the pusher, the wood length adjuster (Palax Optimi) and the adjustment of the splitting wedge are impeded.

4.2 Joystick-valve, Fig. 10

- ❑ Push the joystick forward and move it in direction B - D; the conveyor feeds the log against the log-stop.
- ❑ Push the joystick forward and move it in direction B - C; the conveyor reverses.
- ❑ Pull the joystick back in direction A; the saw-blade comes down and cuts through the wood.
- ❑ Push the joystick forward in direction B; the crosscut blade comes up and, at the same time, launches the splitting.

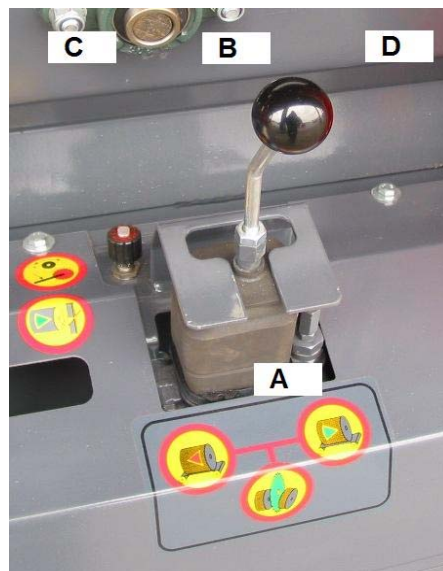


Fig. 10

4.3 Other hydraulic operating controls, Fig. 11

1. Control lever for the splitting wedge.

- Pull it back, the splitting wedge lowers.
 - Push it forward, the splitting wedge raises.
2. **Adjustment valve for the descent speed of the crosscut saw-blade.**
 - When the valve is turned clockwise, the descending speed decreases, and when turned counter-clockwise, it increases.
 - For thick logs, it pays to reduce the speed. This decreases the load on the transmission and the crosscut blade.
 - Reducing the proceeding speed slightly does not affect the total processing time, because splitting a thicker log also takes more time.
 3. **Lightening of the pusher**
 - To raise the clamp, push the lever forward.
 4. **Manual start lever for the splitting stroke**
 - Press the lever to the right to launch the splitting.
 - Press the lever to the left to stop the splitting and to reverse the cylinder.
 5. **Adjustment of the cutting length (Palax Optimi)**
 - Use this lever to adjust the cutting length to that desired. The adjusted value can be read out from the scale.
 6. **Adjustment of discharge conveyor speed**
 - Use this knob for adjustment of the discharge conveyor speed.
 7. **Additional operation, if provided**
 8. **Control lever for the log-deck**
 - Use the operating lever for the Palax Mega log-deck to operate the stepfeeder and the transfer chains on the deck.

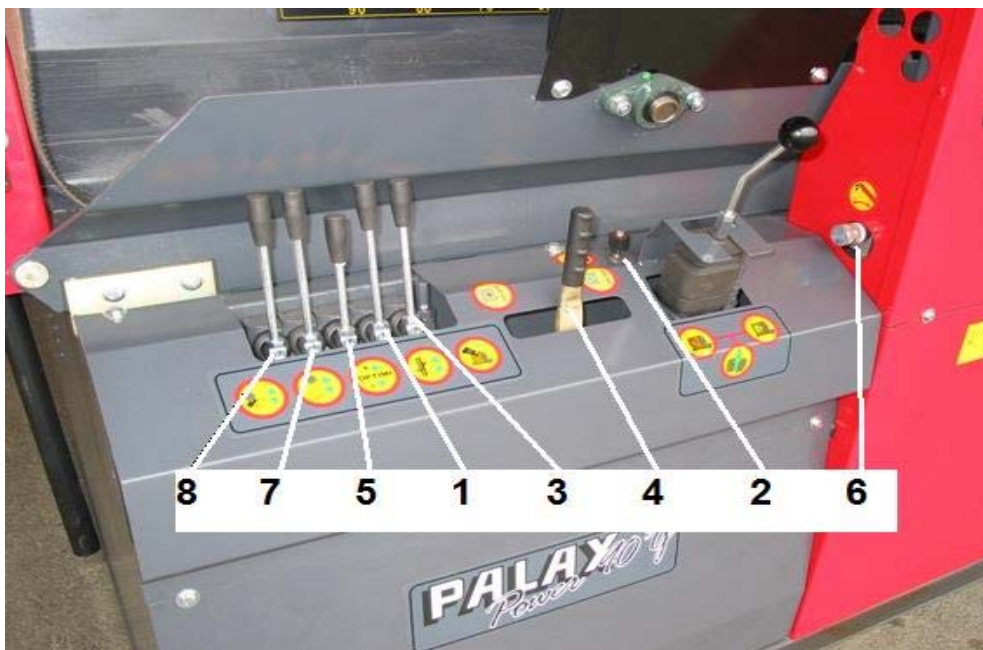


Fig. 11

5 USE OF THE FIREWOOD PROCESSOR, CROSSCUT OPERATION

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

5.1 Operating the crosscut saw, before the operation

Cleanse the new circular saw-blade of any protective grease, because a greasy blade accumulates resin easily, making it heat up, lose its tension and start to jerk.

5.2 During the operation

- ❑ Exercise caution.
- ❑ Do not cut slender logs more than one at a time, because if many logs are being cut at the same time, some of them may twist the blade strongly, causing it to heat up and lose its tension.
- ❑ Never stop the rotation of the blade by pressing the blade against the log.
- ❑ During the crosscut operation, make sure that the log is always supported on the roller.
- ❑ Make sure that the log stays firmly under the clamp during sawing to keep it reliably in position on the deck. This is particularly important when sawing crooked trees and, generally, when the last piece is being cut and the log is short and lightweight.
- ❑ Cut very crooked trees where they bend. Doing so makes the crosscut operation significantly easier.

WARNING! Crooked trees may be turned on the deck by the cutting force thus twisting the blade so strongly that it breaks.

5.3 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, Fig. 12.

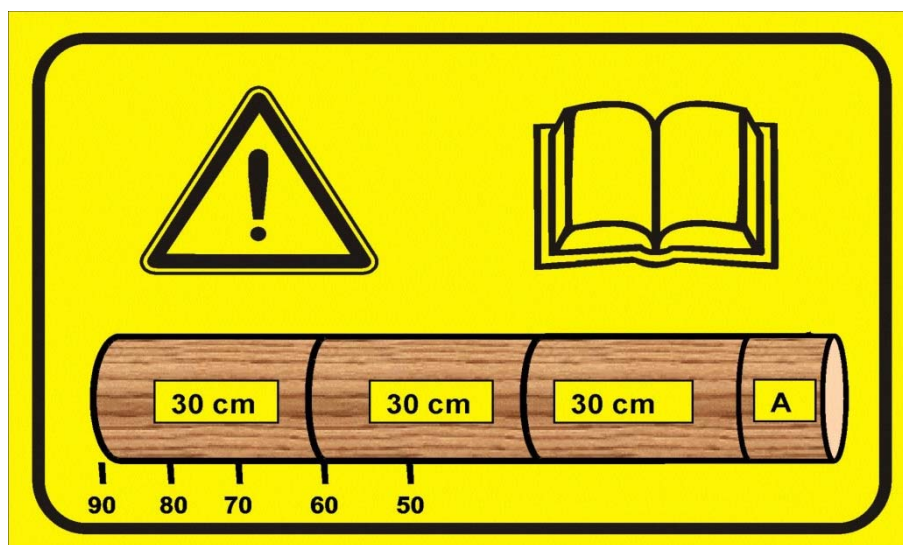


Fig. 12

5.4 Feeding the last log for splitting

- Feed the last log the usual way to the splitting chute as soon as the pusher has returned to its rear position.
- Start the splitting movement manually.

WARNING! Make sure that the tree always remains under the clamp during cutting. The minimum length for the log is 25 cm.

6 DISTURBANCES DURING CROSSCUT OPERATION AND THEIR REMEDY

6.1 Crooked trees

- Cut crooked trees where they bend.
- As you cut crooked trees, make sure that the log is leaning against the support roller.

6.2 Big trees

- If the cutting sound is soft, the cutting speed and the saw-blade revolutions are correct.
- If the cutting sound is loud and cracking, the blade is proceeding too fast and the saw-dust grooves get clogged. Check the rotational speed, proceeding speed of the cross-cut blade and sharpness of the blade.
- If the tree gets stuck in the blade as a result of faulty cutting, stop the machine immediately using the emergency stop button on the electrically-powered machines, or the disengagement lever for transmission on the tractor-powered machine. Also disengage the PTO shaft on the tractor-powered machine.
- Inspect the stuck saw-blade before continuing the cutting and verify no cracks have appeared in the roots of the teeth.

WARNING! A faulty saw-blade must not be used for cutting.

6.3 Cutting of small trees without splitting

- It is also possible to cut small trees by first removing the wedge and then pushing the firewood straight onto the conveyor.

7 DISTURBANCES DURING THE SPLITTING OPERATION AND THEIR REMEDY

7.1 Stuck wood

- As the logs are big and have big branches, the cylinder force may not be sufficient.
- If the log sticks to the wedge, reverse the cylinder using the manual control.
- Raise the splitting-wedge and retry the splitting using the manual control. Changing the position of the log will help in many cases.
- If the log will not split, open the cover and knock the stuck log loose using another log.
- If there is a big branch on the tree, turn the tree so you can push it towards the wedge with the root end first to make the branch split. Doing it this way requires the least power.

7.2 Re-splitting the logs safely

- If you want to produce small-size firewood from large logs, even wood split by the 4- 6- or 8-way wedge may 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 cover.
 2. Place the logs to be split into the splitting chute. E.g. one on top of the other. The pieces of wood will stay in this position, if you hit them carefully against the wedge.
 3. Close the cover and start the splitting using the lever for manual control.

7.3 If the log has fallen into the splitting chute in a wrong position

- After the cutting operation, if the log for some reason falls into an upright position, then the splitting motion may be prevented by pushing to the left the control lever for forced splitting (Fig. 11, lever 4), and simultaneously lifting up the cutting blade. This ensures the crosscut blade will come up in a normal way, but the splitting motion will not start.
- After that, correct the position of the log and start the splitting motion manually by pushing the lever for forced splitting to the right.

8 ACCESSORIES FOR THE FIREWOOD PROCESSOR

8.1 Splitting cylinder

- The Power 90s model can be equipped with a splitting cylinder of 5.6 tons or 8 tons or a Booster-cylinder of 8.0 tons and the Power 90sG model can be equipped with a splitting cylinder of 10 tons or 16 tons.

8.2 Automatic high-speed valve

- The Palax Power 90 models are equipped with automatic high-speed valve as standard. The valve reduces the splitting speed only when the pressure exceeds 120 bar.
- As the tree starts splitting and the pressure decreases, the high-speed movement is immediately resumed.
- This valve speeds up even the splitting of thick logs, as the approach stroke against the wedge is performed at high speed.

8.3 Splitting wedges

Standard wedge:

- The Power 90 s model is equipped as standard with a 2/4 wedge for splitting the wood in 2 or 4 ways.
- The Power 90 sG model is equipped as standard with a 2/6-way wedge

Optional wedges for the Power 90 s model:

- The short straight wedge for splitting the wood in 2 ways or, if the wedge is lowered, no splitting will take place.
- The 2/6 wedge for splitting the wood in 2 or 6 ways.
- The 2/8 wedge for splitting the wood in 2 or 8 ways.

Optional wedges for the Power 90 sG model:

- wedge for splitting in 2/4 ways
- wedge for splitting in 2/8 ways.

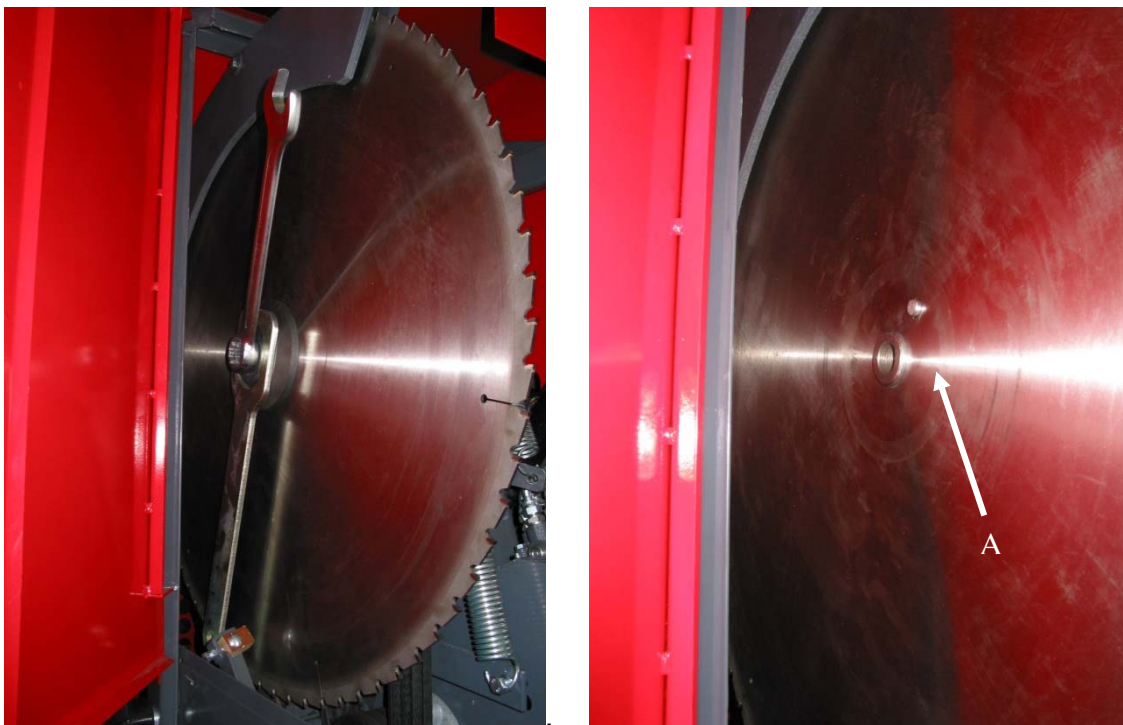
9 MAINTENANCE OF THE MACHINE

NOTE ! Always use genuine spare parts prescribed by the manufacturer.

NOTE ! To clean up the guide rails for the pusher, drive the Palax Optimi once a day to its extreme position (55 cm) and after that, return it to the desired cutting length.

WARNING! Always stop the machine and disconnect it from the power sources before performing any service measures.

9.1 Removal and change of the crosscut blade, Figs. 13 and 14



Figs. 13 and 14

- The crosscut saw-blade must conform to the standard EN 847-1+A1.
 1. Loosen the attachment screws for the protective cover, a 13 mm wrench.
 2. Open the protective covers.
 3. Loosen the blade-bolt using the special wrench delivered with the machine. Right-hand thread, a 36 mm wrench
 4. Carefully clean the surfaces of the flanges before re-installation of the blade.
 5. The gap between the guide blocks and the blade must not be less than 5 mm.

NOTE ! While installing the blade, make sure that the locking pin (A) is in place!

9.2 Changing the wedge cassette (Power 90sG model), Figs. 15, 16 and 17

1. Open the rear cover B, Fig. 15.

2. Open the locks for the wedge cassette, Fig. 16.
3. Unreel the winch, Figs 15 and 17.
4. Lift out the used wedge cassette using the winch C and the lift beam A and put the new cassette into place, Figs 15 and 17.
5. Lock up the wedge cassette, fasten the winch and close the rear cover.

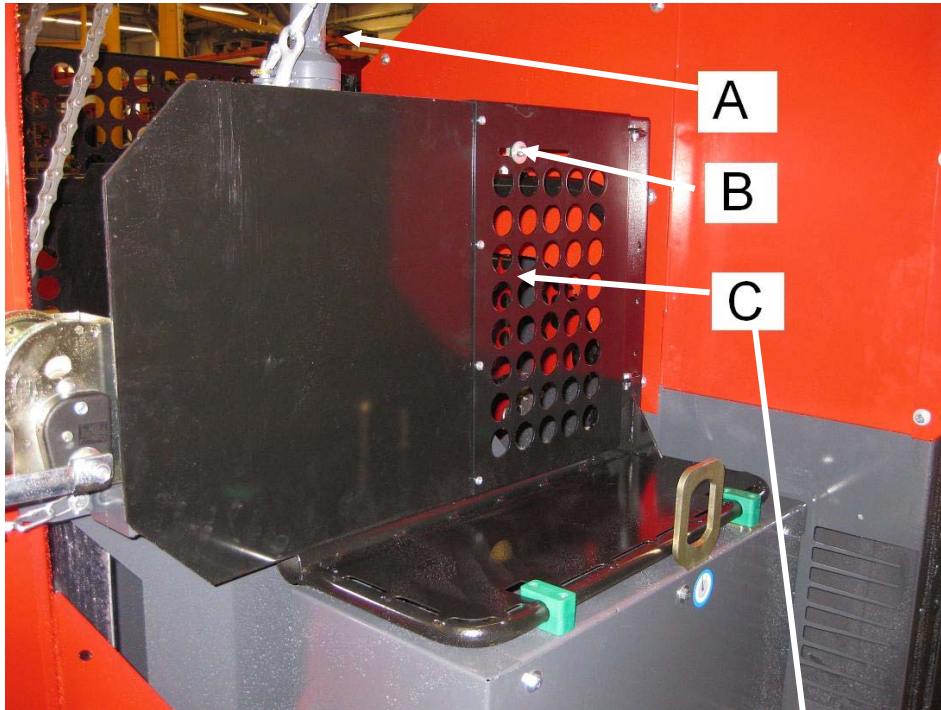


Fig. 15



Figs. 16 and 17

9.3 Tightening the V-belts

- The Palax Power 90 models are equipped with automatic tightening devices for the belts.

9.4 Replacement of the V-belts, centre shaft / saw-blade shaft

1. Remove the crosscut blade as instructed in point 9.1.
2. Slacken the tightening device of the belt.
3. Change the belts, 4 pcs. Type SPA 1457.
4. Carefully clean the surfaces of the flanges before re-installation of the blade.
5. Attach the protective covers.

9.5 Sharpening the blade, hard-metal blade

- The hard-metal blade can be sharpened "lightly" using a diamond file.
- Depending on the cleanliness of the wood, as many as 500-1000 bulk cubic metres of wood can be processed with a hard-metal saw-blade without re-sharpening.
- The best sharpening result and durability of the blade is achieved when the saw-blade is sharpened using an appropriate grinding machine with a diamond disc.

9.6 Setting the saw-blade, hard-metal blade

- The hard-metal blade does not normally show any tendency for tension fault, but especially when a blunt saw-blade is used for cutting and it gets very hot, tension faults can occur.
- Leave the prestressing of the hard-metal blade to a professional.

9.7 Spare blade

- If you are processing a lot of firewood, we recommend that you obtain a spare blade

9.8 Replacement of V-belts, angular gear /centre shaft

1. Remove the rear cover plate from the machine.
2. Slacken the V-belts using the disengagement lever for the transmission.
3. Remove the attachment plate of the oil pumps from the frame, 4 pcs. M 10 screws, 17-mm wrench.
4. Replace the old belts by new ones, type SPA 1557, 4 pcs.
5. Tighten the V-belts by releasing the disengagement lever for the transmission.
6. Install the pumps in place.
7. Replace the rear cover.
8. If the machine is equipped with an electric motor, loosen the attachment of the motor and move the motor outwards as much as is necessary to slip the belts between the claws of the claw clutch.

9.9 Tightening the in-feed conveyor belt, Figs. 18 and 19

- There are tightening screws A and B at the end of the infeed deck table extension, which can be used for tightening the belt.
- As you tighten the belt, make sure that the belt travels in the centre of the roller.
- Ensure that the scraper C is as close to the roller as possible. The scraper is intended for always keeping the roller clean and ensuring that the belt runs straight.

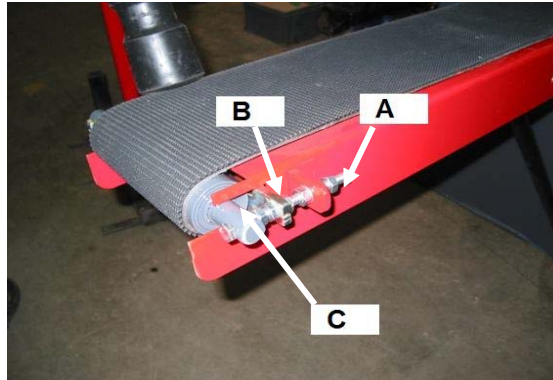


Fig. 18

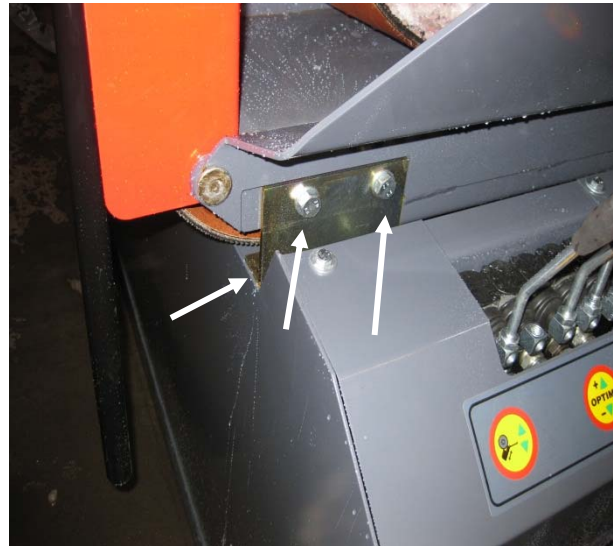


Fig. 19

- There is an adjustment screw at the blade side end of the in-feed conveyor with which you can change the path of the belt and make it run straight.

9.10 Replacing the in-feed conveyor belt

1. Remove the bearing of the pusher on the operator's side from the frame.
2. Remove the cover, Fig. 20
3. Remove the support plate, Fig. 21
4. Remove the old belt from its place.
5. Thread the new belt in place.
6. Fix the removed parts and tighten the belt, refer to point 9.9.



Figs. 20 and 21

9.11 Direction of rotation of the belt

- ❑ Check the correct direction of rotation of the belt in accordance with the arrow, while replacing the belt.
- ❑ During the infeed operation, the belt must run in the direction of the arrow.
- ❑ The belt joint may break, if the belt is installed in the wrong way.
- ❑ Check the belt for tightness at regular intervals.
- ❑ The drive roller must not slip.

9.12 Changing the oil in the angular gear

1. Twist open the bottom plug, Fig. 22, and drain off the old oil. Put the plug in place.
2. Remove the plugs at the top and in the centre. Refill with oil through the upper plug opening to level with the plug opening in the centre.
3. Filling capacity about 0,5 l. Oil type SAE 80.
4. Put the plugs in place.



Fig. 22

9.13 Change of the hydraulic oil

- ❑ The normal hydraulic oil volume is 80 litres. In professional use, the oil volume can be 120 litres.
- ❑ The quality of oil should be ISO VG 32, e.g. Univis 32, SHELL Tellus 32, NESTE HYDRAULI 32 or equivalent.
- ❑ For continuous operation under warm conditions, use ISO VG46.
- ❑ If a machine powered by electric motor is operated in temperatures below -15 degrees, it is recommended that a less viscous hydraulic oil be used, e.g. ISO VG 22S multi-grade oil or synthetic hydraulic fluid, because a machine with electric drive works at full speed right from the start of operation
- ❑ Observe particular cleanliness during the oil change, because the flawless operation of the machine is highly dependent on the purity of the oil.

9.14 Lubricating the machine: refer to the Maintenance Schedule

- ❑ Blade beam bearings, 6 nipples, Fig. 23.
- ❑ Bearings of the conveyor's lower shaft, Fig. 24.
- ❑ Nipples on the roller bearings of the shaft, 2 pcs.
- ❑ Spherical bearings on the operating levers for the blade.
- ❑ Log-stop shaft, Fig. 25.
- ❑ Clamp bearings 2 pcs.
- ❑ Cylinders with a grease nipple.



Figs. 23 and 24



Fig. 25

9.15 Servicing the main valve, Fig. 26

- 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.

Lubricating the detent end of the valve, Fig. 26, point A

- Removing the hexagon socket screw in the middle of the end plate of the detent end of the valve, lubricant can be sprayed 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.
 1. Insert the spray pipe in the hole and press 2-3 times for about 1 second at a time.
 2. The oil spreads smoothly on the moving parts of the detent end.

Lubricating the spool shifter, Fig. 26, point B

- 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.

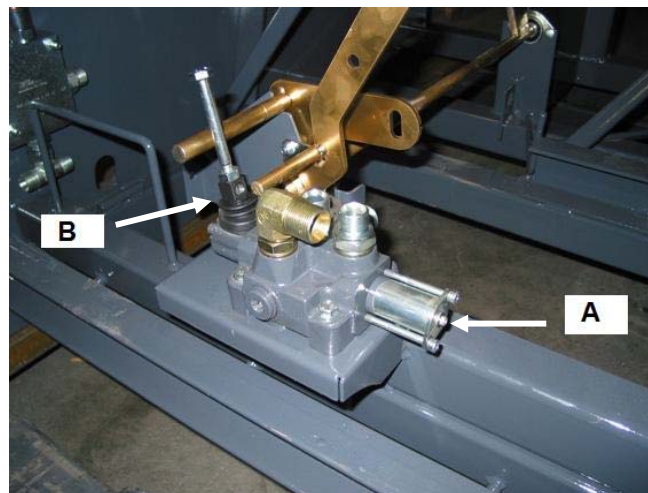


Fig. 26

9.16 Structure of the detent end and the correct order of the parts, Fig. 27

- Keep cover C of the detent end depressed while opening screws C, 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 F always point downwards.

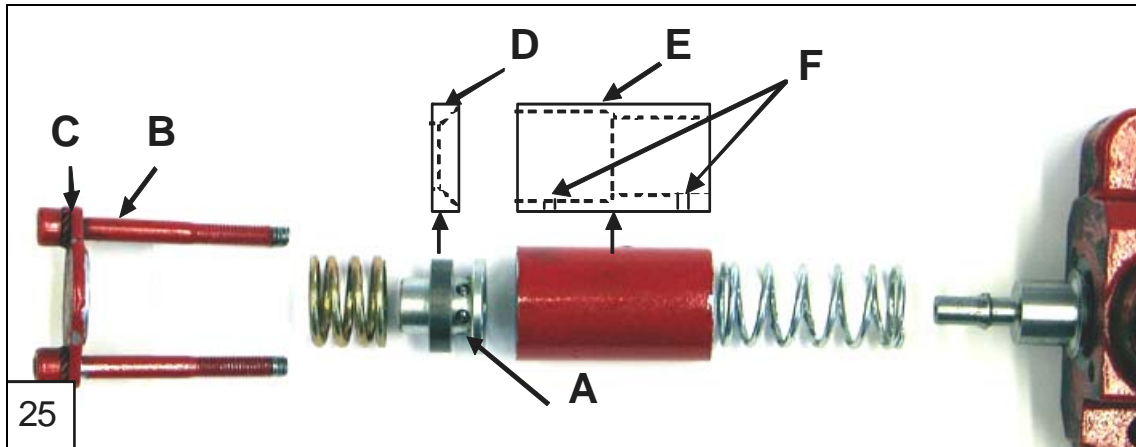


Fig. 27

9.17 Tightening and lubrication of the conveyor chain

- ❑ The conveyor is hydraulically driven and equipped with automatic tightening of the chain.
- ❑ Lightly lubricate the chain every day.

9.18 Cleaning the conveyor

- ❑ 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.
- ❑ The conveyor can also be washed with a high-pressure washer. The chain must be lubricated after washing.

9.19 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.

9.20 Storing the machine.

The machine is intended for outdoor use but it is recommended to keep it under cover or indoors for longer standstills to avoid corrosion and malfunctions the corrosion may cause.

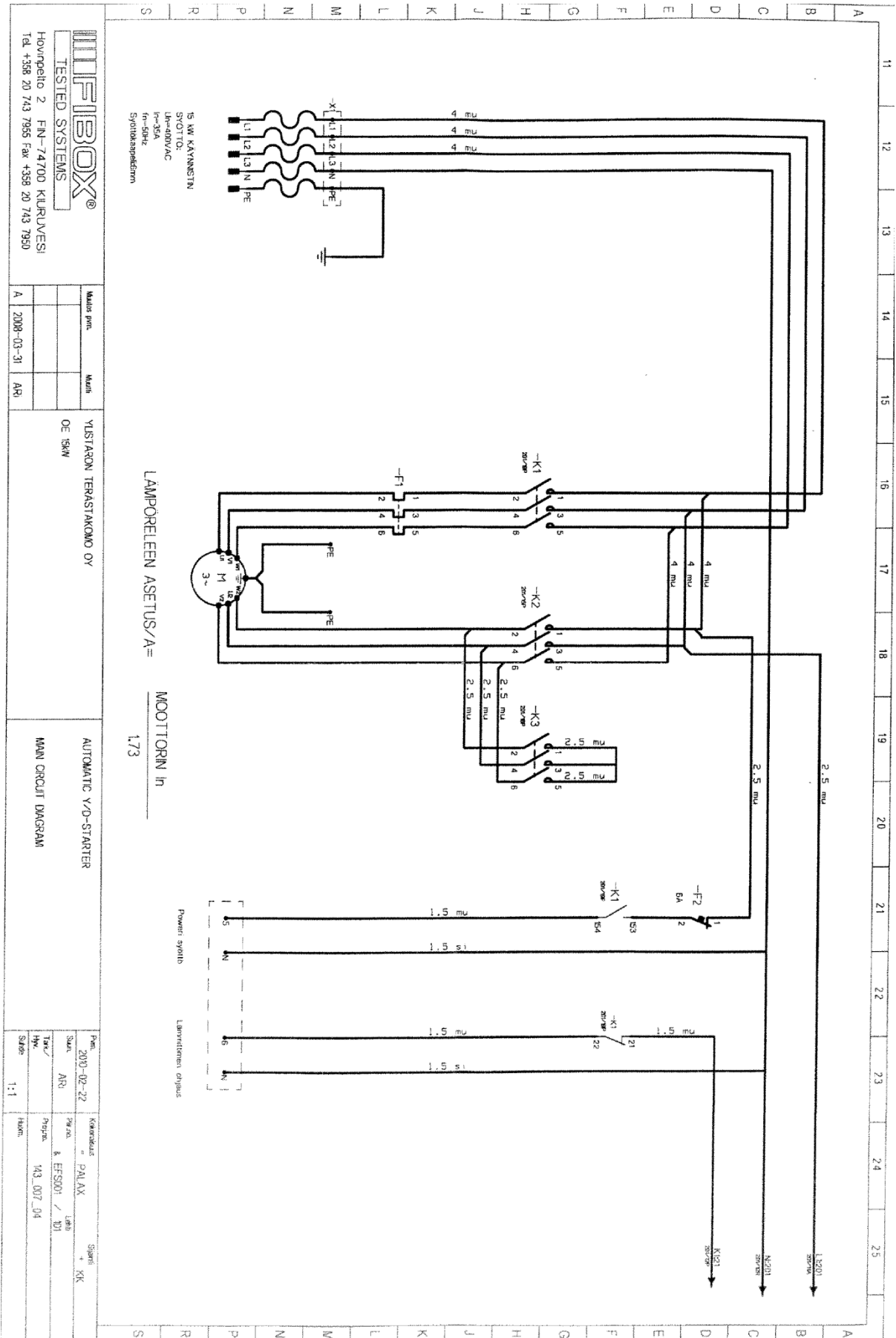
10 MAINTENANCE SCHEDULE

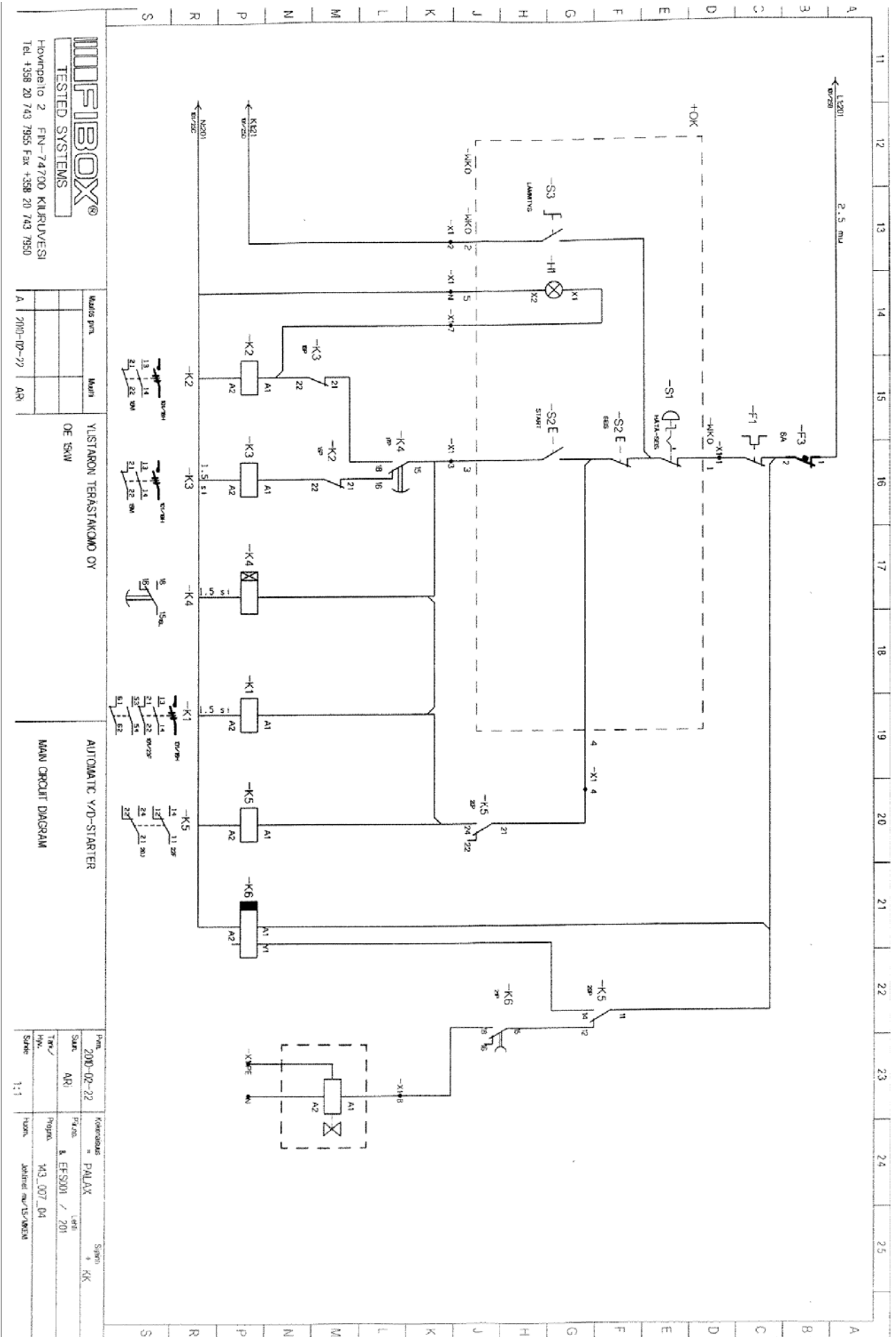
Object	Task	Daily	Service interval 100 h	Service interval 500 h	Service interval 1000 h	Material /Method
Angular gear	Check 1 Change 2 Change		X	X	X	SAE 80 0.5 l
Hydraulic oil Normal conditions	Check 1 Change 2 Change		X	X	X	Volume 80 l E.g. Esso Unavis 32 Neste Hydraul 32
Oil filter	1 Change 2 Change			X	X	FIO 100/3
Blade-shaft bearings	Lubrication			X	X	Ball-bearing lubricant
Valve	Lubrication		X			Lubrication oil, spray
All levers	Lubrication		X			Lubrication oil
V-belts Angular gear Blade shaft	Check and tighten as required					SPA 1557 SPA 1457
Crosscut saw-blade	Sharpen as required					
Machine	Cleaning	X				
Electric motor	Cleaning	X				
Electric equipment	Cleaning	X				

11 MALFUNCTIONS AND THEIR REMEDY

Disturbance	Cause	Remedy
The crosscut saw-blade is heavy on power and gets hot.	<ol style="list-style-type: none"> 1. The blade is dull. 2. Too much resin in the blade. 	<ol style="list-style-type: none"> 1. Sharpen the saw-blade. <ol style="list-style-type: none"> 1. Clean the blade.
The saw-blade wobbles. The crosscut blade starts to wobble after a short period of working.	<ol style="list-style-type: none"> 1. Impurities between the flanges. 2. Blunt blade and problems with stressing. 3. Faulty crosscut operation, the log has rolled over 	<ol style="list-style-type: none"> 1. Clean the flanges and the blade. 2. Sharpen and pre-stress the blade 3. The blade is damaged, do not use. Replace the blade.
The blade whines.	<ol style="list-style-type: none"> 1. Too high speed, the max. permissible rotational speed of the saw-shaft is 1400 r.p.m. 2. Root-crack at the tooth 	<ol style="list-style-type: none"> 1. Reduce the speed. 2. Do not use, replace the blade.
Saw-blade is rotating in the wrong direction (EM)	<ol style="list-style-type: none"> 1. Wrong phase-order. 	<ol style="list-style-type: none"> 1. Switch the phase order of the appliance inlet.
The electric motor does not start.	<ol style="list-style-type: none"> 1. Emergency stop button has been depressed. 2. Makes loud noise, but does not start. 3. The power supply cable defect. 4. Protective cover for the chute is open. 	<ol style="list-style-type: none"> 1. Reset the emergency stop. 2. The fuse has blown, replace it. 3. Replace the cable. 4. Close the cover for the splitting chute.
The motor stops several times and the thermo-relay trips.	<ol style="list-style-type: none"> 1. The blade is dull. 2. Incorrect setting of the thermo-relay. 	<ol style="list-style-type: none"> 1. Sharpen the saw-blade. 2. Contact the dealer that supplied the combustion engine.
Whining sound during the sawing operation and the revolutions drop.	<ol style="list-style-type: none"> 1. V-belts are worn. 	<ol style="list-style-type: none"> 1. Change the belts.
Blade does not come down.	Protective cover for the chute is open.	Close the cover for the splitting chute.
The blade cover (of plywood) does not come up. The blade cover does not come or comes up slowly.	<ol style="list-style-type: none"> 1. The discharge conveyor is not running. 2. The oil pressure in the line is too low. 	<ol style="list-style-type: none"> 1. Start up the discharge conveyor using the speed regulator knob. 2. Push the joystick of the valve forward for a moment.
Protective cover for the chute cannot be opened.	Crosscut blade not in its upper position.	Start the machine and lift the blade using the joystick-valve.
Splitting cannot be launched manually.	Protective cover for the chute is open.	Close the cover.

12 ELECTRIC DIAGRAMS





MPIBOX®
TESTED SYSTEMS

Homopolis 2 FN-74700 KILIRUYESI
Tel. +358 20 743 7955 Fax +358 20 743 7950

Materia pinta	Materia
A	2000-02-22
AR1	

YILSTARON TERASTAKIMO OY
OE ISW

AUTOMATIC VFD-STARTER
MAIN CIRCUIT DIAGRAM

Pain.	Kokorotus	Sigmi
2000-02-22	PALAX	+
AR1	LEH	KK
Projekt	Projekt	
M3_007_04		
1:1		