

Instruction and Spare Parts manual

Palax X 600

- Powered by a tractor
- Powered by electric motor
- Powered by combustion engine



Serial number _____

Year of manufacture _____

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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.

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

1.2 EU Declaration of Conformity

Directive 2006/42/EC

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Product: X 600
Hydraulic wedge splitter for firewood
Powered by: Tractor PTO, electric motor, combustion engine
Models: TR Powered by tractor equipped with own hydraulic system
SM Powered by electric motor
PM Powered by combustion engine

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 730-1, 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
18.10.2016



Pekka Himanka
Managing Director

1.3 Intended use of the machine

This hydraulic splitting machine is intended for splitting firewood.

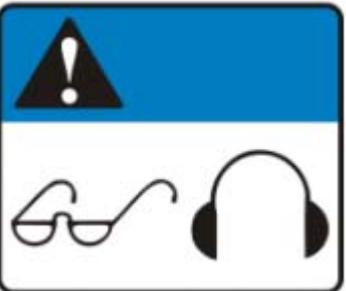
Use of the machine for any other purposes, such as for example cutting, is prohibited.

Maximum size of the wood:

Max. diameter of the log 40 cm.

Max. length of the log 60 cm

1.4 Warning signs

 <p>Read the User Manual for the machine</p>	 <p>Wear eye guards and hearing protectors</p>	 <p>Keep clear of moving parts To be operated by one person only</p>
 <p>Lifting point of the machine</p>	 <p>Disconnect the machine from the electric supply before taking to any service measures</p>	 <p>Beware of PTO shaft</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.
- Max. hydraulic pressure 180 bar.
- Serial number and year of manufacture.
- Nameplate on the frame beam

Nameplates on the electric drive:

- ❑ 3-phase motor.
- ❑ Voltage 230/400 V or 400/600 V, may vary depending on the country.
- ❑ Output 3 kW.
- ❑ A machine powered by electricity must be equipped with a fuse of at least 10 A.

1.6 The main dimensions and models of the machine

Models	X 600		
DRIVING POWER	TR	SM	PM
Weight	150kg	200kg	180kg
Height/width/length	Transport position 1.1m / 0.8m / 1.86m		
Max. diameter of the log	Max. length of log that can be split 40 cm		
Max./min. length of the log	Max. length of log that can be split 60cm		

1.7 Safety instructions**General regulations and restrictions**

- ❑ The machine is exclusively intended for the production of firewood.
- ❑ The machine may only be operated by one person.
- ❑ The three-point linkage of the tractor is of size-category one.
- ❑ 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

- ❑ Make sure that all other people stay outside the operating range.
- ❑ Only operate the machine on a sufficiently firm and level surface.
- ❑ Only operate the machine in an adequately lit space.
- ❑ The exhaust pipe of the combustion engine-powered machine may get hot and cause a fire hazard. Ensure that the exhaust pipe is at least one metre's distance from anything that might catch fire.
- ❑ Keep the tractor-powered machine connected to the three-point linkage.
- ❑ Always check that all the covers are intact and properly fastened.
- ❑ 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 splitting operation constitutes a major hazard!
- ❑ If the log slips aside from the pusher, interrupt the splitting immediately, because such a log constitutes a hazard and could break the machine.

- ❑ When splitting short logs, do not place two logs one after the other, but adjust the stroke to a suitable length.
- ❑ When splitting a log with an oblique end, place the log in such a way that its longer side is lowest, so the log cannot slip to the side from the log feeder.
- ❑ Be careful when splitting knotty or crooked trees.
- ❑ Keep the working space clean and clear of foreign objects.
- ❑ Always stop the machine by disconnecting the power supply cable, stopping the combustion engine or the tractor before servicing.
- ❑ Stop the combustion engine for refuelling.
- ❑ Only split one log at a time.
- ❑ Danger! Stay away from moving parts.

1.8 Noise emission and vibration

The equivalent continuous A-weighted sound-pressure level at the workstation and the sound power level vary depending on the power source. Refer to the user manual of the respective combustion engine or tractor for noise emission values. 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 X 600 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.
- ❑ 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 – risk of exhaust gas.

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.
- ❑ 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.
- ❑ 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.
- ❑ Consult your dealer about matters related to the warranty.

1.12 Operating instructions for the combustion engine

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

2 TAKING DELIVERY AND SETTING UP THE MACHINE FOR OPERATION

2.1 Lifting the machine

There is a lug for lifting the machine on the upper part of the machine frame.

2.2 The transport set-up and unpacking

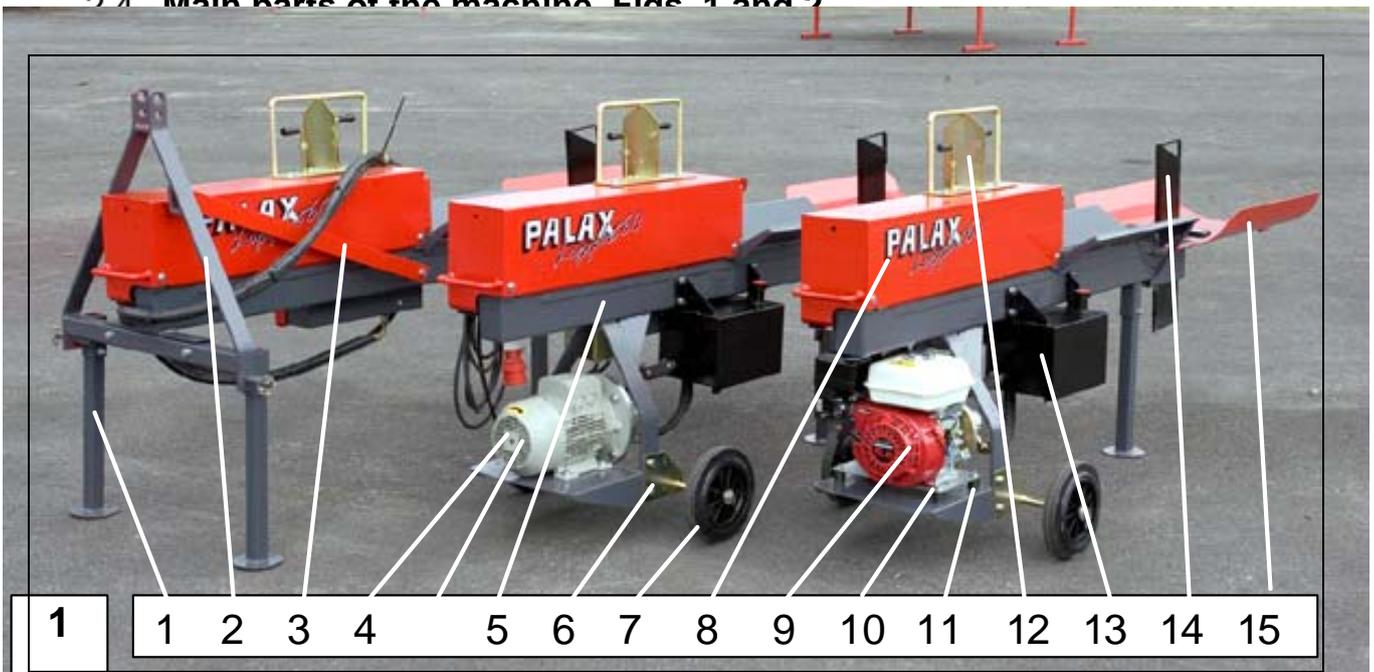
- ❑ To save costs and avoid transport damage, the machine is delivered partly dismantled with the leg of the frame, the legs of the tractor-powered machine, the lifting triangle, the table extension and sometimes also the wheels and the axle having been packed separately.
- ❑ Check the delivered goods without delay.
- ❑ If the product shows transport damage, contact the transport company and your dealer immediately.
- ❑ All the required adjustments of the splitting machine have been finalised at the factory.

2.3 Acceptance inspection and setting up the machine for operation

- ❑ The hydraulic system has already been charged with oil, but the engine oil of the combustion-engine-powered machines is delivered in a plastic bottle and needs to be poured into the engine. See the instruction manual for the engine.
- ❑ Fix the axle of the electrically powered or combustion engine-powered machine to the motor bed, and put the leg of the frame in place, as illustrated in Fig. 1.
- ❑ Using bolts, fix the lifting triangle and the oblique support of the tractor-powered machine to the machine's frame, as illustrated in Fig. 1. Fix the three legs of the machine in place.
- ❑ For the electric-motor-powered machines, check the direction of rotation.
- ❑ Start the motor and then stop it immediately. Check whether the fan wings rotate in the direction indicated by the arrow.
- ❑ The attachment bolts for the table extension are in place in the machine.
- ❑ Put the table extension in place and tighten the bolts properly. A 17-mm wrench
- ❑ If the motor is rotating in the wrong direction, turn the shifter of the direction of rotation in the plug 180 degrees either to the right or to the left using a screwdriver.

NOTE ! The direction shifter cannot be turned more than 180 degrees.

2.4 Main parts of the machine. Figs. 1 and 2



- 1 Leg
- 2 Lifting triangle
- 3 Support for lifting support
- 4 Electric motor 3.0 kw, 3-phase
- 5 Frame
- 6 Shaft
- 7 Wheel
- 8 Protective cover
- 9 Combustion engine
- 10 Motor rack
- 11 Rubber pad
- 12 Operating lever guide
- 13 Oil tank
- 14 splitting wedge
- 15 Table extension
- 16 Lock screw for splitting wedge
- 17 Valve housing cover
- 18 Bolt for adjustment of stroke



3 OPERATION OF THE FIREWOOD PROCESSOR POWERED BY DIFFERENT POWER SOURCES

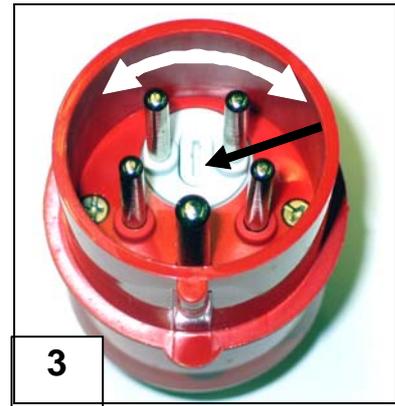
3.1 Powered by a tractor

- ❑ Keep the machine hitched to the three-point linkage of the tractor at all times.
- ❑ Connect the hydraulic hoses to the tractor.
- ❑ Connect the return hose of the hydraulics to the free-return connector on the tractor. If connected wrongly, the hydraulics might cause malfunctions in the operation of the machine.

NOTE ! The pressure hose of the machine is fitted with a protective tube.
The machine cannot operate if the hoses are connected to the tractor in the wrong order.

3.2 Electric drive, start and emergency stop.

- The power output of the motor is 3 kW and the speed is 1,480 rpm.
- The machine is ready-for-use and already charged with hydraulic oil.
- Check the direction of rotation of the engine. Fig. 3.
 1. Start the motor.
 2. Stop the engine immediately.
 3. Check that the cooler fan at the end of the motor is rotating in the direction of the arrow.
 4. If the motor is running in the wrong direction, turn the direction shifter in the plug 180 degrees either to the right or left.



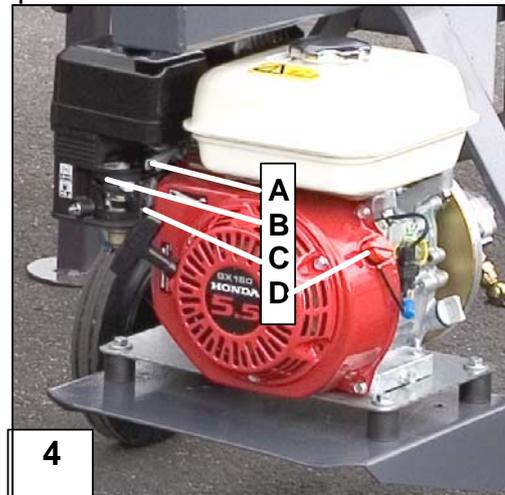
NOTE ! The motor must rotate in the correct direction during the operation of the machine.

3.3 Powered by combustion engine

- The machine is fully adjusted.
- Combustion-engine-powered machines come ready-charged with hydraulic oil.
- The engine oil for the combustion engine is in the plastic bottle. Pour it in.

Starting up the combustion engine

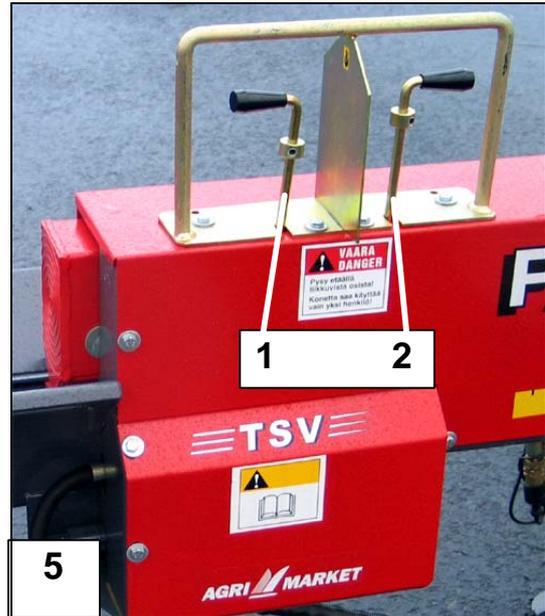
1. Check that the stop button D is in the ON position.
2. Open the fuel cock – turn the lower lever to the right.
3. Adjust the throttle - turn the upper lever B to its extreme position on the left.
4. Turn the gas lever A to about halfway.
5. Start the motor.
6. Turn off the throttle B gradually.
7. Increase the engine speed as required.



4 HYDRAULICS OF THE MACHINE

4.1 Hydraulic valve with high-speed operation, Fig. 5

- ❑ The machine comes with the valve 1, featuring the high-speed operation as standard.
- ❑ The relief valve has been set to 180 bar.
- ❑ The valve always requires a pressure connector and a free return oil connector to the tractor.
- ❑ When the machine is not in operation, the valve spool is always in its centre position and the circulation of oil is free.



4.2 Operation of the 2-speed valve; max. thrust force and the force at high speed

- ❑ The max. thrust force is about 5 tonnes and the force at high speed is about 2.4 tonnes.
- ❑ The valve spool is equipped with a soft spring and a hard spring.
- ❑ The maximum thrust force is achieved when both operating levers 1 and 2 are pushed to almost as far as they go, all the way to the harder springs.
- ❑ When the levers are pushed to as far as they go, the splitting force will be doubled, but at the same time the force will be decreased to a half.
- ❑ At the high speed, the stroke speed will increase by about 60 % and the total time required for splitting will decrease by about 37 %.

4.3 The valve is easy to use after a small amount of training.

- ❑ Small logs up to about 15-20 cm in diameter are easily split into two halves at the higher speed.
- ❑ If the force is not sufficient at the high speed, lift the operating levers about 10 mm to double the force and launch the splitting.
- ❑ After that you can push the levers down to shift the splitting movement back to high-speed operation.
- ❑ We recommend using a wedge with straight splitting edge, because then almost the entire splitting operation can be carried out at high speed.

4.4 Adjusting the stroke and the height of the splitting wedge

- ❑ To change the stroke length, extend the splitting cylinder completely, and adjust the stroke length as desired.
- ❑ Because the hardness and toughness of the logs varies a lot, it pays to seek the correct settings by experimenting.
- ❑ It pays to split thick and especially knotty logs first into two parts.

- When splitting in four ways, adjust the height of the horizontal wedges so that the firewood coming from below the wedge is of the correct size.
 1. Hold the horizontal wedges by their rear part.
 2. Loosen the tightening screw of the wedge and adjust the height of the wedge as desired.
 3. Lower the wedge for splitting in 2 ways.

NOTE ! Beware of the sharp wedge!

4.5 Placing the log on the deck

- Always place the log with its thick end against the splitting wedge.
- If the log has a big branch, turn the log so that the branch points upward.
- It pays to first split big and thick logs into two parts.
- The end of the pusher has been shaped so logs that have been cut askew, can also stay in contact with the pusher and do not slip to the side or rise up.
- If possible, place the oblique-ended log with its longer side against the splitting deck. Doing this prevents the log slipping away.

4.6 Stuck log

- If the log is very knotty and thick, it may happen that the splitting force of 5 tonnes is not sufficient.
- If the log gets stuck, do the following:
 1. Loosen the wedge's attachment screw and lift up the wedge with the log so that there is sufficient space between the log and the splitting deck for, for example, a batten or a crowbar, and tighten the wedge's attachment screw.
 2. Wrench the log loose.
 3. Find a point on the log that is easier to split and try again.

4.7 Safe splitting

- The machine is intended for operation by one person only.
- Make sure that there are no people behind the splitting wedges, because especially the hard wood species can bounce forward slightly propelled by the splitting force.

5 TRANSPORTATION AND STORAGE OF THE MACHINE

5.1 Transportation

- The machine can be transported, for example, by a van or a passenger car trailer.
- If the machine is to be transported frequently, it's worth constructing special ramps to make loading the machine onto the trailer easier.
- Two people are required for loading the machine onto the trailer.
- Always tie the machine down properly on the vehicle so that it neither falls nor moves, even as a result of abrupt braking.
- Both ends of the machine are fitted with large handles for easy transfer.

5.2 Storing the machine.

- If the machine is to be left unused for a longer period of time, it's worth cleaning it properly.
- Always keep a combustion-engine-powered machine in a horizontal position so that no oil will leak out of the engine.
- To save space, it is possible to remove the front deck from the machine.
- Drain the fuel tank and the float-chamber of the carburettor, because many modern petrols do not store well over time. The engine does not start if the petrol is old.

6 SERVICE

Note! Always stop the machine before servicing.

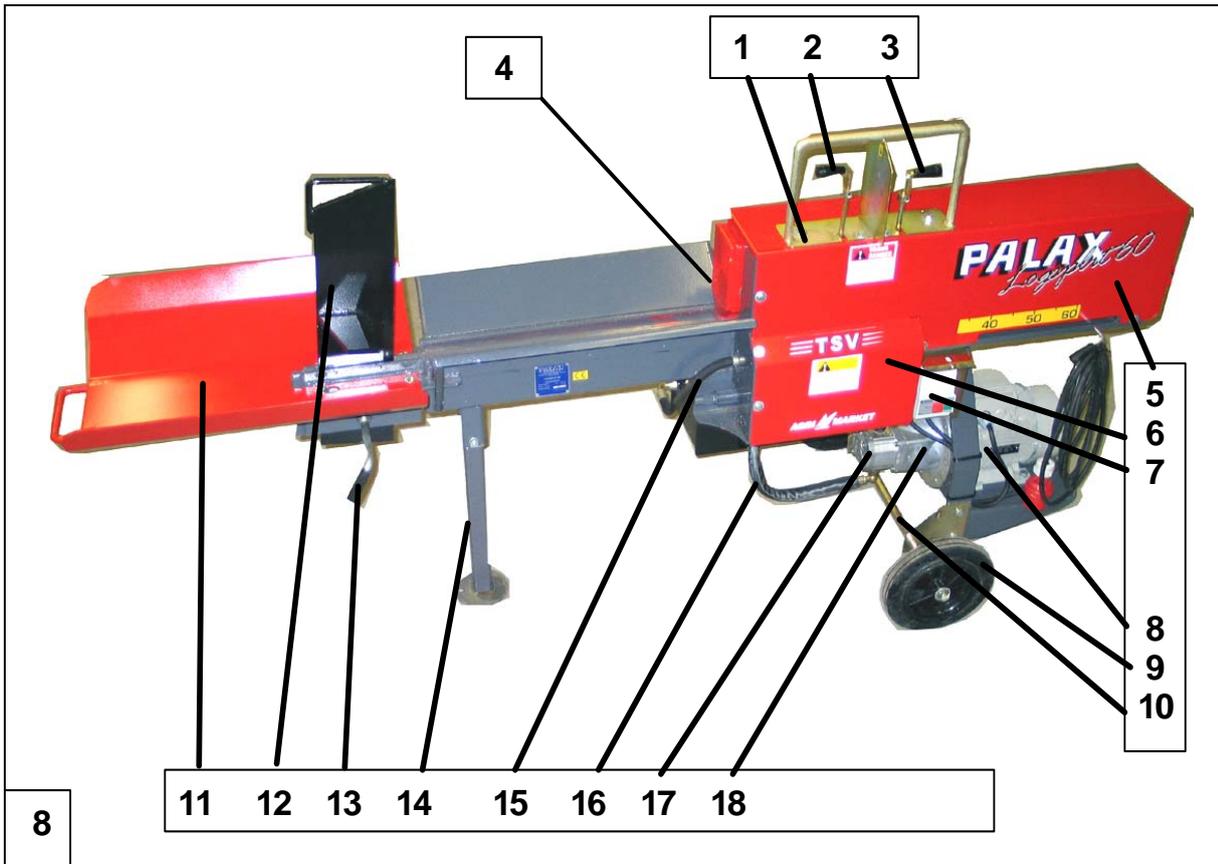
Object	Task	Daily	Service interval 100 h	Service interval 1000 h or every other year	
Hydraulic oil	Check or change	Check the oil level in the tank with the dipstick.	First oil change	Following oil changes	Oil type e.g. Esso Univis 32, Shell Tellus 32, Neste hydraul 32
Operating levers	Lubrication	-		X	Vaseline (sprayvaseline)
Combustion engine	Cleaning Service	X			See Service manual
Electric motor	Cleaning	X			
Machine	Cleaning				x)Wash

- 1) If you are using a high-pressure washer, never direct the water jet at the exhaust opening of the engine, the bearings or the electric appliances.
- 2) Make sure the machine is in a horizontal position, when checking the oil level. The amount of oil is sufficient if its surface is visible in the lower edge of the level glass.

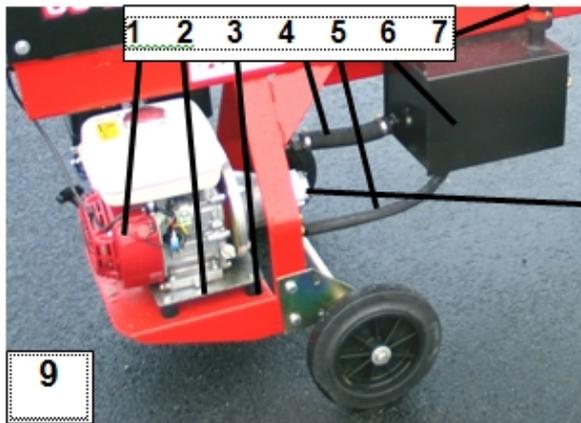
7 MALFUNCTIONS AND THEIR REMEDY

Disturbance	Cause	Remedy
The electric motor does not start.	The fuse has blown.	Replace the fuse.
The electric motor does not keep running.	The earth conductor is missing.	Check that the earth conductor for the power supply cable is connected
The electric motor makes a loud noise.	The fuse has blown, and the motor is only running on two phases.	Replace the fuse.
The cylinder does not move, although the engine is running.	The electric motor rotates in the wrong direction.	Shift the direction of rotation using the phase shifter in the plug.
The Honda engine dies.	Out of fuel. The engine oil has run out.	Refuel Top up engine oil.
The engine does not start.	The stop-switch is in the OFF position.	Turn the switch to the ON position.
The engine does not start after a long standstill.	The petrol is old.	Drain the fuel from the tank and also empty the float-chamber of the carburettor by opening the drain screw at the bottom of the chamber. See the engine's instruction manual. Refuel with new petrol, 95 oct.

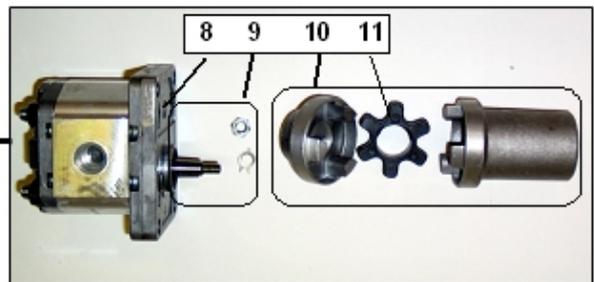
8. SPARE PARTS LIST

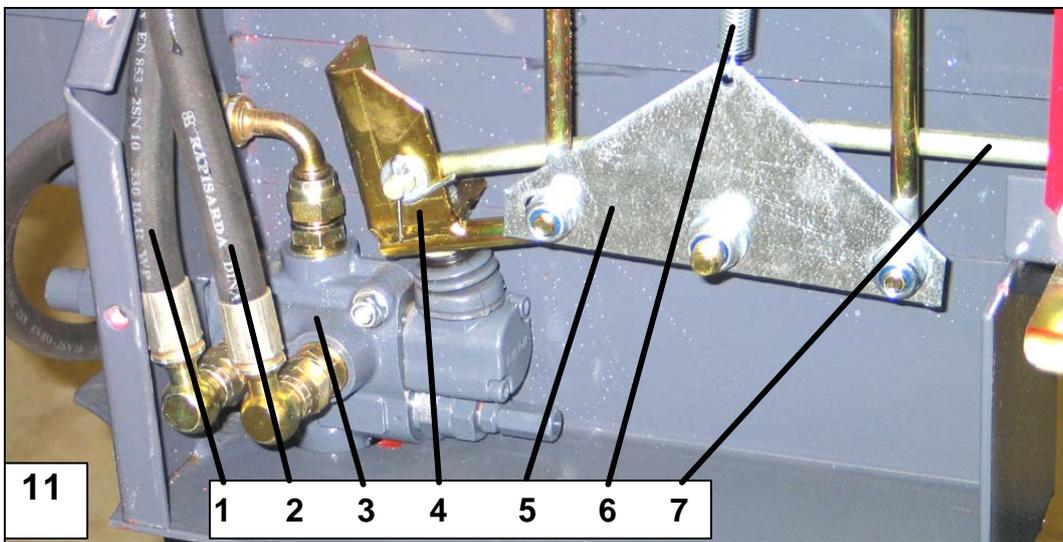
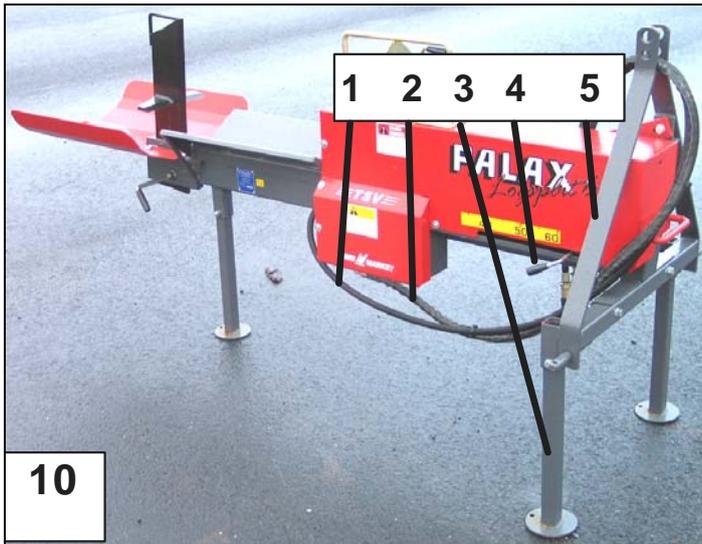


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Pic- ture	Part	Code	Item	Note !
8	1	10134	Lever guide	
8	2	10132	Lever, left	Complete
8	3	10135	Lever, right	Complete
8	4	13980	Pusher	
8	5	14027	Protective cover	
8	6	14028	Cover	
8	7	14063	Starter, 3-phase	Complete
8	7	16104	Starter, 1-phase	Complete
8	8	14064	Electric motor	3.0 kW, 3-phase
8	9	14034	Wheel	
8	10	14303	Shaft	
8	11	14020	Front deck	
8	12	14548	Splitting wedge	
8	13	13986	Tightening screw	

8	14	10121	Front leg	
8	15	14986	Return oil hose	Valve - tank
8	16	14984	Pressure hose + protect. tube	Pump valve/ SM
8	17	14065	Pump 3-phase motor	2/ 8 cm ³
8	18	14067	Intermediate flange	3 and 2.2 kW
9	1	15675	Honda 5.5 h.p.	
9	2	10158	Motor rack	
9	3	16108	Cylindric insulator	
9	4	14068	Suction hose	
9	5	16109	Pressure hose + protect. tube	Pump valve/ Honda
9	6	14037	Oil tank	
9	7	16110	Fill cap	
9	8	14085	Pump 3.7 cm ³	1/3,7 cm ³
9	9	16111	Wedge+nut	5.5 h.p. ce/ pump
9	10	14089	Coupling, complete	Honda
9	11	16112	Rubber	K-48
10	1	16113	Return hose TR	2600, female
10	2	16114	Pressure hose TR	2300, male
10	3	10121	Leg	
10	4	16115	Adjustment lever	
10	5	16116	Lifting triangle	
11	1	14982	Pressure hose	Valve - front end of cylinder
11	2	14983	Pressure hose	Valve - rear end of cylinder
11	3	10130	Valve	
11	4	14000	Valve guide	
11	5	13606	Spring	1x11x65
11	6	16103	Rocker lever	
11	7	14002	Back stop	
		14051	Cylinder	60/40-680 5 tonnes

