User Manual and Spare Parts Catalogue

TP 160 PTO
TP 160 MOBILE
TP 160 TRACK

DESIGNED
MANUFACTURED
DENMARK

RELIABLE CHIPPING



Linddana A/S . Ølholm Bygade 70 . 7160 Tørring, Denmark . Tel.: +45 75 80 52 00 . Email: tp@linddana.com . www.linddana.com

1 Introduction

Congratulations on your new TP wood chipper.

Linddana produces TP wood chippers of the finest quality by using the most modern production technologies, such as laser cutting, CNC technology and robot technology in bright and open production facilities.

For safety reasons and in order to get the maximum benefit from your wood chipper, it is important you read the user manual before use.

Originally written in Danish, the user manual provides an explanation of safety, use and maintenance, to ensure working with the wood chipper will be safe and profitable.

Linddana A/S



Hans Anker Holm, CEO

Your local dealer is always available with spare parts, advice and guidance.

Dealer stamp

Applies to Denmark (for all other countries contact the local TP dealer):
Linddana provides a knife sharpening service, so your knives can be sharpened and sent back on the same day as they are received (for more details tel.: +45 76904045).

To keep your wood chipper in top condition and prolong its lifetime, Linddana offers a service contract, under which the wood chipper will be checked once a year by our technician, ideally in collaboration with the user. In addition to a technical check, the user will be given advice on the use and maintenance of the wood chipper.

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2 EU DECLARATION OF CONFORMITY

Manufacturer:

LINDDANA A/S, Ølholm Bygade 70, 7160 Tørring, Denmark
hereby declares that

Wood chipper:

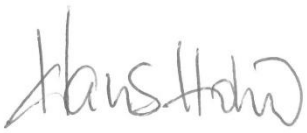
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and accompanying extra equipment is in conformity with the requirements of the Machinery Directive (Directive 2006/42/EC) and with the national legislation which translates this directive.

It is also in conformity with the EC Directive
2000/14/EC.

Furthermore it is stated that
EN 13525 (harmonised standard), has been applied.

Title: CEO
Name: Hans Anker Holm



Ølholm, 17 August 2017

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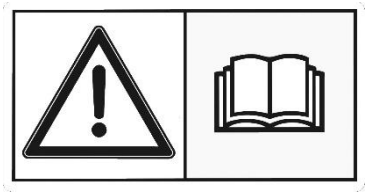
4 Use and safety

This TP wood chipper is specially designed as a **stationary** wood chipper, which chips wood in the form of branches, bushes and waste wood from windbreaks, parks, roadside trees, etc.

Any modification to the design of the machine is strictly prohibited. In the event that modifications are made, Linddana A/S disclaims all liability.

4.1 Mandatory Instructions and Warnings

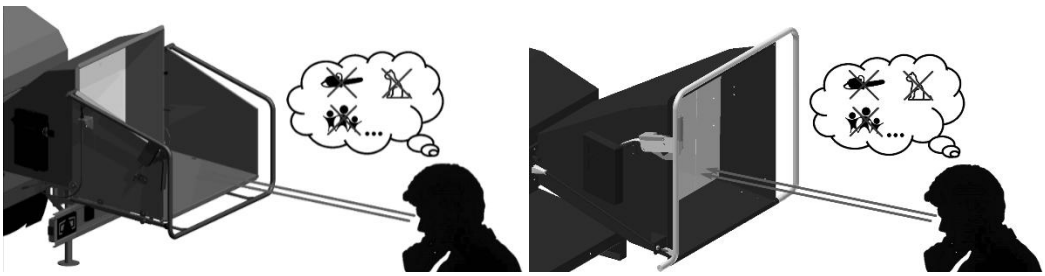
4.1.1 Before use



ALWAYS read the user manual before using the wood chipper.
Remember to store the user manual in the manual box.



ALWAYS wear ear defenders, safety goggles, close fitting safety clothing and safety shoes.

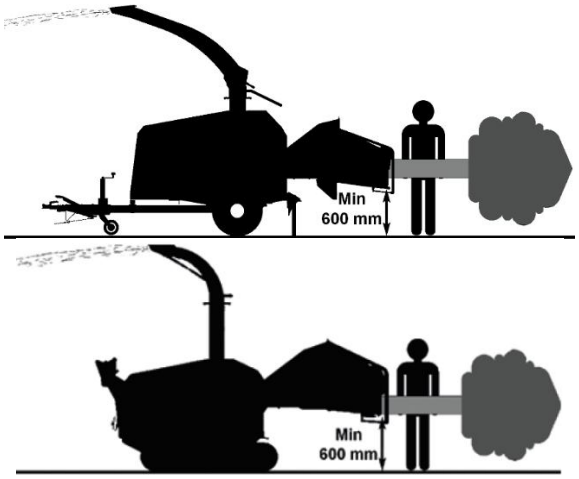


ALWAYS ensure that the funnel is free of people, animals and other foreign bodies before starting the wood chipper.

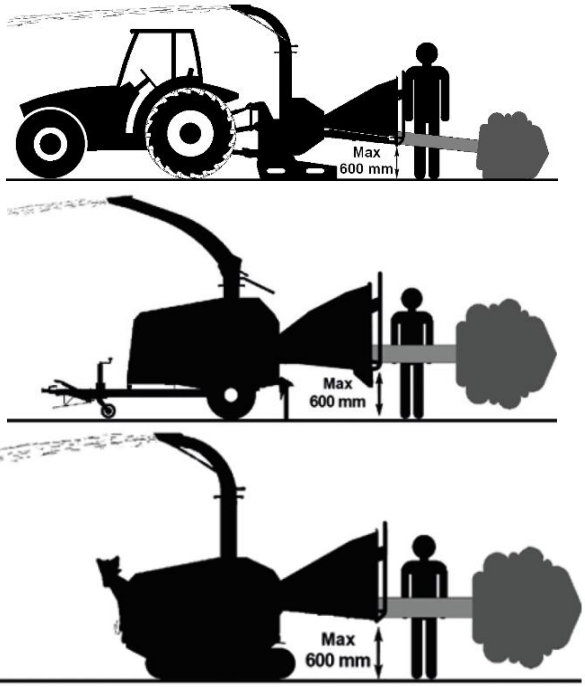
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	**ALWAYS** ensure that all of the guards are securely closed/fitted before starting the wood chipper.
	**ALWAYS** ensure that the tractor which drives the wood chipper is safely parked with the brake engaged before starting the wood chipper (applies to the PTO model). **ALWAYS** ensure that the wood chipper is safely parked with the brake engaged before starting the wood chipper (applies to the MOBILE model). **ALWAYS** ensure that the wood chipper is at a standstill, and thus automatically safely parked before starting the wood chipper (applies to the TRACK model).

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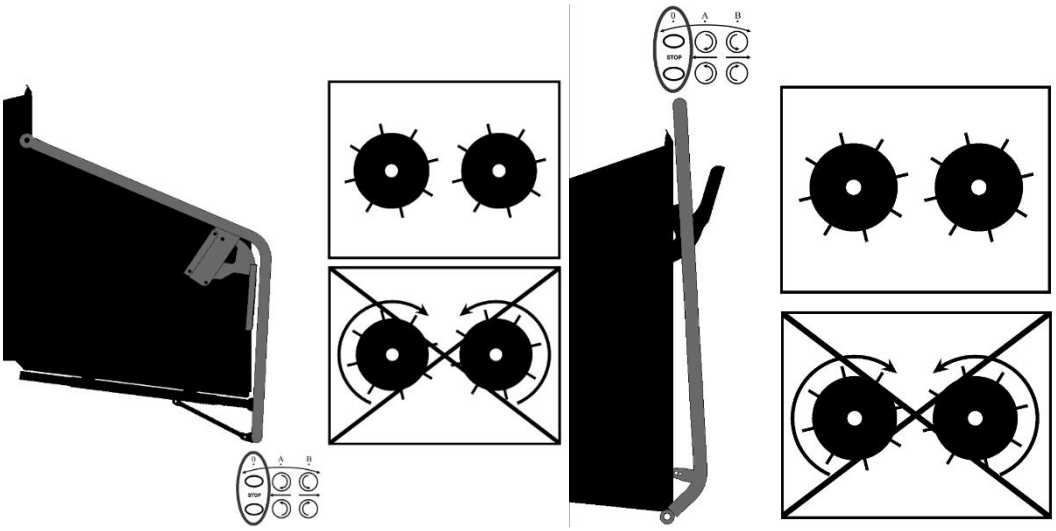
ALWAYS ensure there is more than 600 mm of clearance between the ground and the wood chipper's lowest funnel edge and that it stands on a level surface (applies to the MOBILE and TRACK model with foldable funnel).



ALWAYS ensure there is less than 600 mm of clearance between the ground and the wood chipper's lowest funnel edge and that it stands on a level surface (applies to the PTO, MOBILE and TRACK model with fixed funnel).

ALWAYS ensure that the wood chipper is fitted to the tractor's three-point linkage (applies to the PTO model).

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ALWAYS ensure that all of the safety devices function correctly before starting the wood chipper. This applies in particular to the safety bar's STOP function.

ALWAYS observe the ground conditions around the wood chipper. Falling down in the vicinity of the wood chipper is hazardous.

ALWAYS ensure the length of the PTO shaft is suitable for the tractor in accordance with the instructions from the supplier of the PTO shaft (applies to the PTO model).

ALWAYS ensure that the PTO shaft's tube guard and cover is intact and that the safety chains on the transmission shaft are safely fitted (applies to the PTO model).

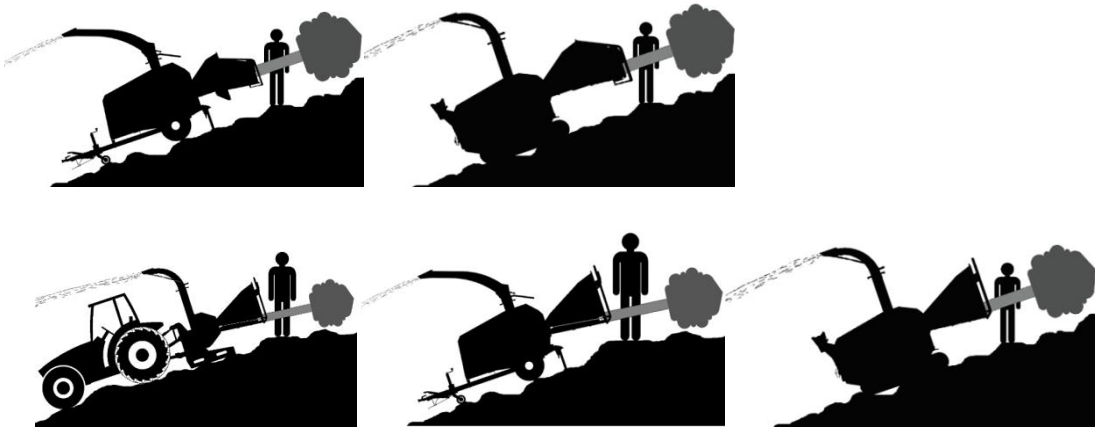
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NEVER allow anyone under 18 years of age to operate the wood chipper (however, anyone who is 16 years old and over may do so under the supervision of an adult).



NEVER operate the wood chipper if under the influence of alcohol or narcotic substances.



NEVER operate the wood chipper on uneven or inclined surfaces.

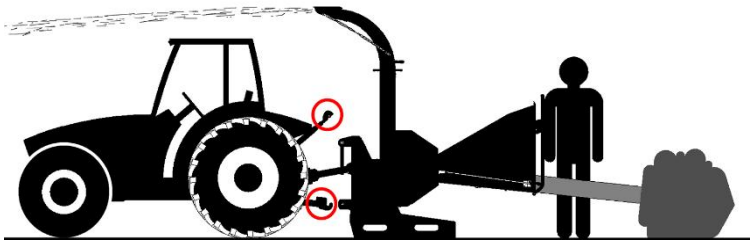
NEVER start the wood chipper without the ejector spout fitted.

NEVER use the wood chipper in enclosed or poorly ventilated spaces, because of the danger of carbon monoxide poisoning.

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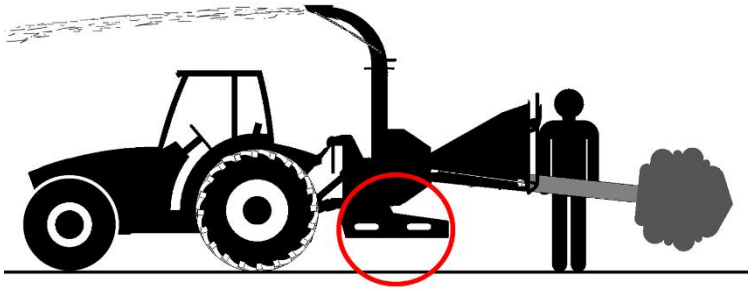


NEVER point the ejector spout in the same direction as people or at an area that people move around in.
A safe distance of 20 m must be maintained in the direction of where the woodchip is ejected.

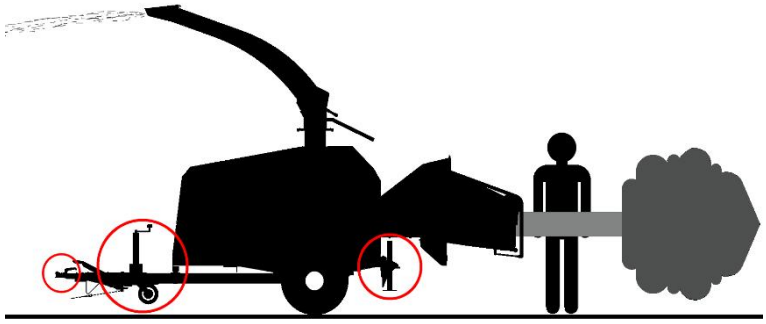


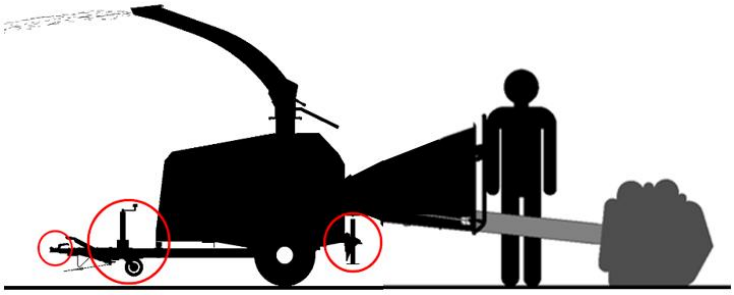
NEVER start or operate the wood chipper before it has been fitted to the tractor's three-point linkage (applies to the PTO model).

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NEVER start or operate the wood chipper if it does not stand on the ground (applies to the PTO model).





NEVER operate or park the wood chipper without support from the jack and support leg or from the vehicle's trailer hitch (applies to the MOBILE model).

NEVER use the wood chipper with material that is not wood.

NEVER use the wood chipper to push trees, stumps, etc.

NEVER transport equipment in the funnel, such as forest chains, axes, chainsaws, etc.

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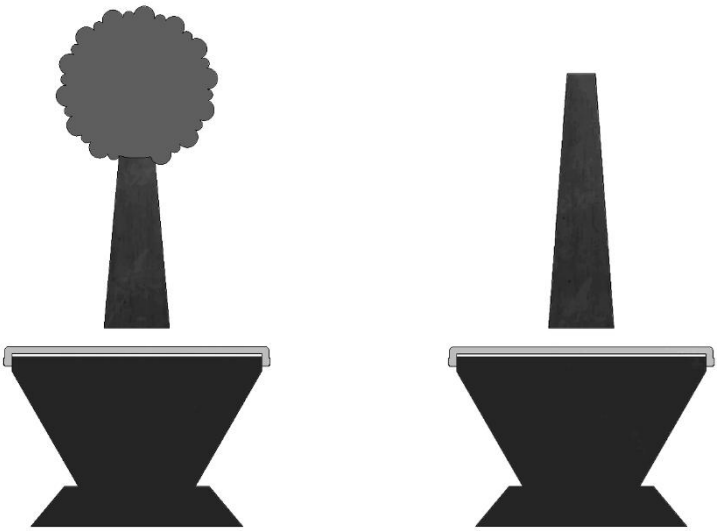
4.1.2 During operation

	ALWAYS push the safety bar into the STOP position if a dangerous situation arises (see chapter 7).
	ALWAYS keep body parts away from the funnel and wood chipper's other moving parts.
	  **ALWAYS** stand at the side of the funnel when the wood chipper is chipping trees that have branches.
	 **ALWAYS** push logs in from the rear of the log.

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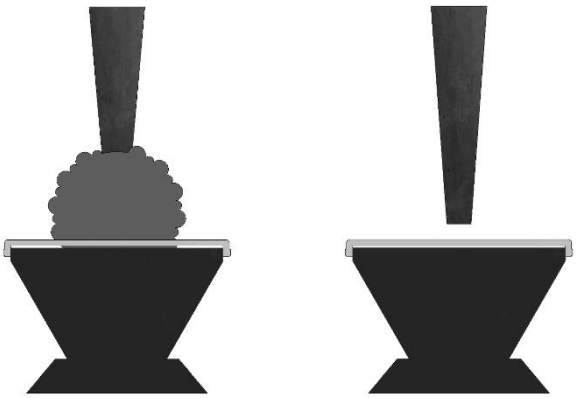
ALWAYS use a rod to push short pieces of tree into the rollers.



ALWAYS feed the wood chipper with the thick end of the log first.

ALWAYS feed the wood chipper so that the tree crown points away from the funnel.

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NEVER feed the tree crown into the wood chipper first.

NEVER feed the wood chipper with the thin end of the log first.

NEVER exceed the wood chipper's nominal rpm (see chapter 15) (applies to the PTO model).

NEVER attempt to remove any trapped material from the feed rollers before the wood chipper has stopped and the roller console has been opened as described in chapter 8.2.

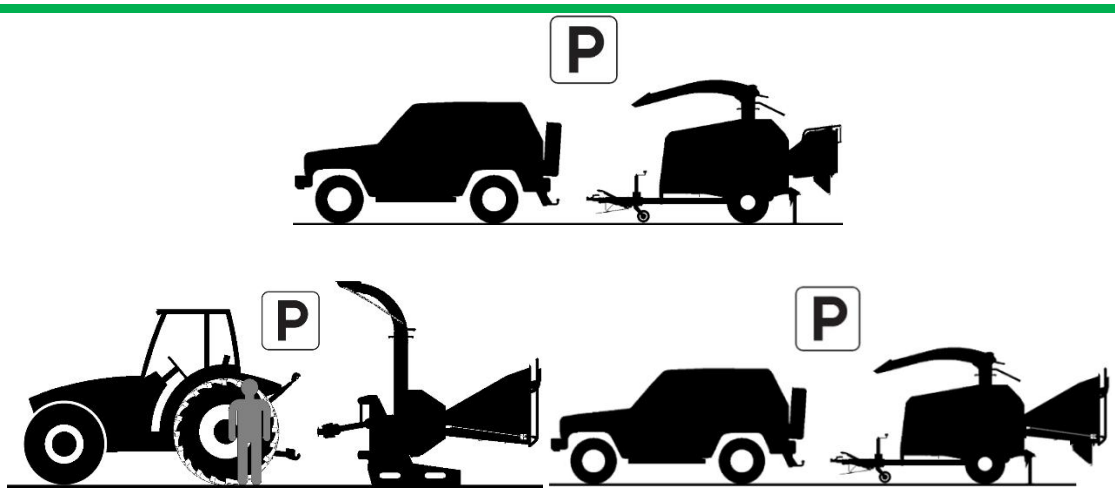


NEVER reach into the funnel to push wood into the rollers.

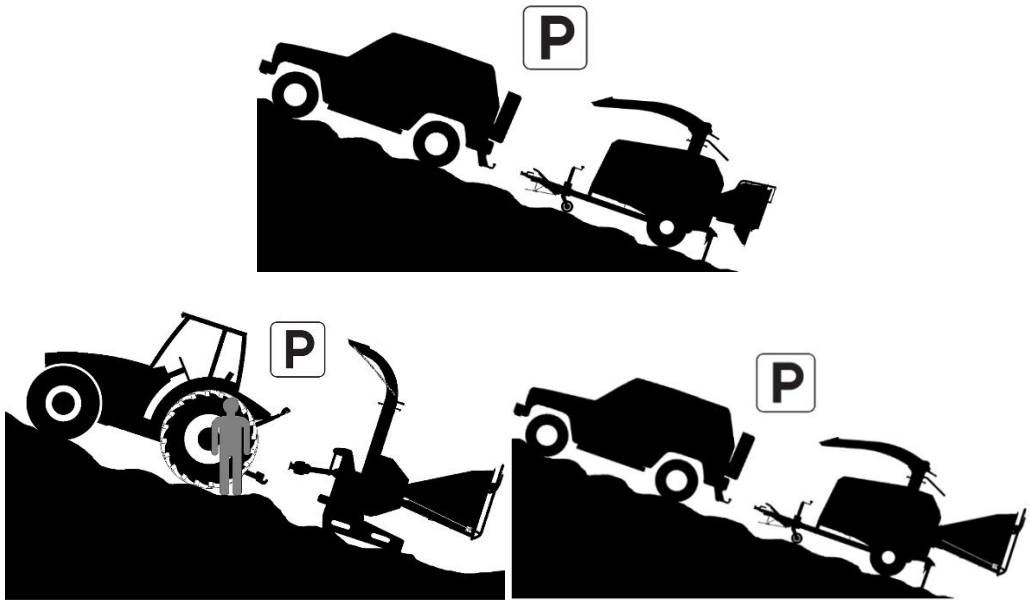
NEVER open or remove the guard while the wood chipper is operating.

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4.1.3 Transport and parking

	 **ALWAYS** park the wood chipper on a level surface.
	ALWAYS keep the ejector spout within the width of the machine during transport. Remember to ensure that the ejector spout is securely fastened.
	ALWAYS keep the PTO shaft in the carrier shackle when removed (applies to the PTO model).
	ALWAYS place the foldable funnel in the transport position during transport (the funnel must be folded up and locked using the pin). (Applies to the MOBILE and TRACK model with foldable funnel).
	ALWAYS ensure that all of the wood chipper lights work correctly before operating (applies to the MOBILE model).
	ALWAYS comply with local public authority regulations when transporting the wood chipper on public roads.

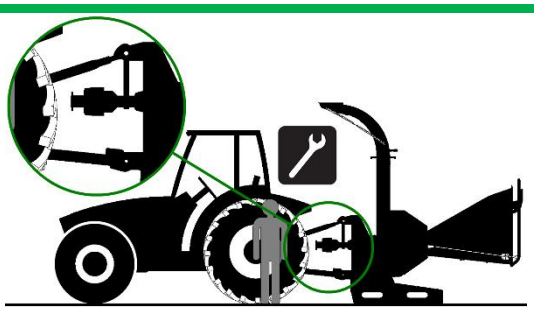
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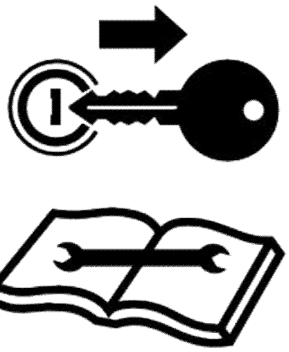
NEVER park the wood chipper on inclined or uneven surfaces.

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4.1.4 Service and repairs



ALWAYS disconnect the wood chipper from the tractor and ensure the disc has stopped moving before carrying out service or repairs (applies to the PTO model).

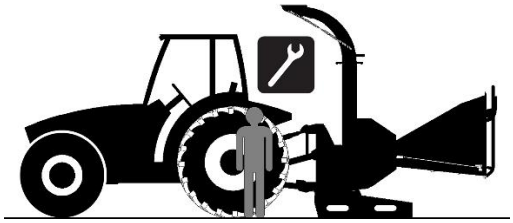


ALWAYS remove the key from the ignition and ensure the disc has stopped moving before carrying out service or repairs (applies to the MOBILE and TRACK model).

ALWAYS after service or repair, ensure that all of the wood chipper bolts are fitted and tightened securely and that all of the safety devices are fitted and function properly.

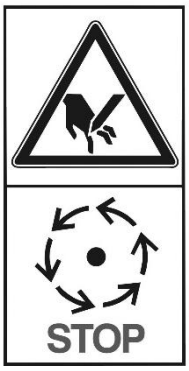
ALWAYS ensure that the knives, counterknives and rollers are kept sharp. This results in smoother in-feed, higher woodchip quality and less fuel consumption.

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NEVER carry out service or repairs on the wood chipper while it is connected to the tractor (applies to the PTO model).

NEVER carry out service or repairs on the wood chipper while the key is in the ignition lock (applies to the MOBILE and TRACK model).



NEVER remove or open the guards before the disc has stopped moving and the PTO shaft has been removed (applies to the PTO model).

NEVER remove or open the guards before the disc has stopped moving (applies to the MOBILE and TRACK model).

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4.2 Pictograms used



Warning: Ejected Objects!

Warning: Safe distance of 20 m!



Warning: Rotating knives!

Warning: Wait for disc to stop!



Warning: Crushing hazard!

Warning: Rotating rollers!



Warning: Crushing hazard!

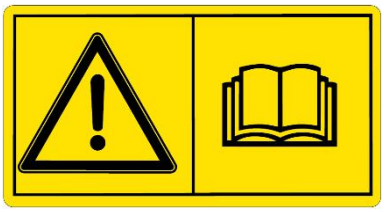
Warning: Rotating belts!



Warning: Hot surface! (Fitted on the MOBILE and TRACK model).



Warning: Amputation hazard!
Warning: Crushing hazard!
Warning: Do not step on the funnel!
Warning: Do not touch the funnel!
Warning: Do not crawl up into the funnel!

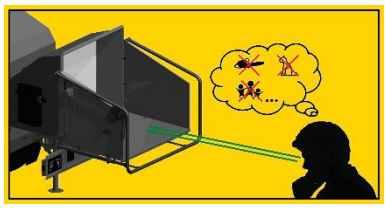


Warning: Read the user manual before use!

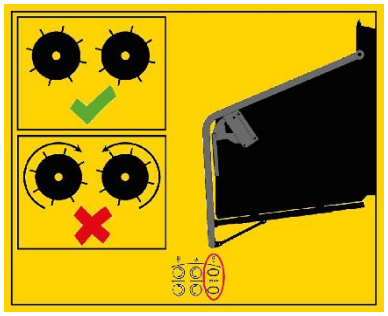


Warning: Remove the ignition key and read the user manual before service or repairs.
(Fitted on the MOBILE and TRACK model).

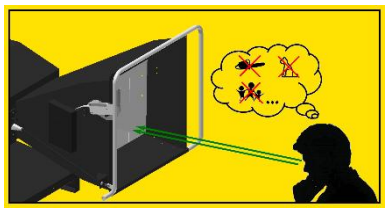
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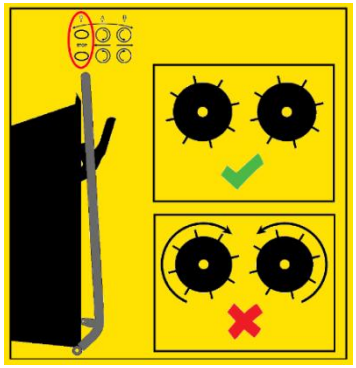
Warning: Ensure that the funnel is free of people, animals and other foreign bodies!
(Fitted on foldable funnel)



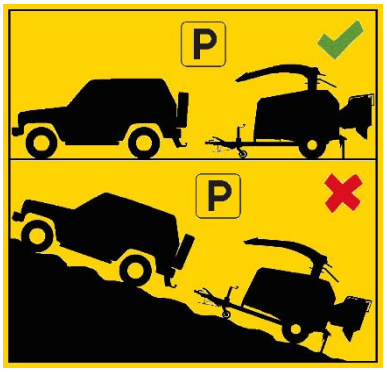
Warning: Ensure the safety bar works!
(Fitted on foldable funnel)



Warning: Ensure that the funnel is free of people, animals and other foreign bodies!
(Fitted on fixed funnel)

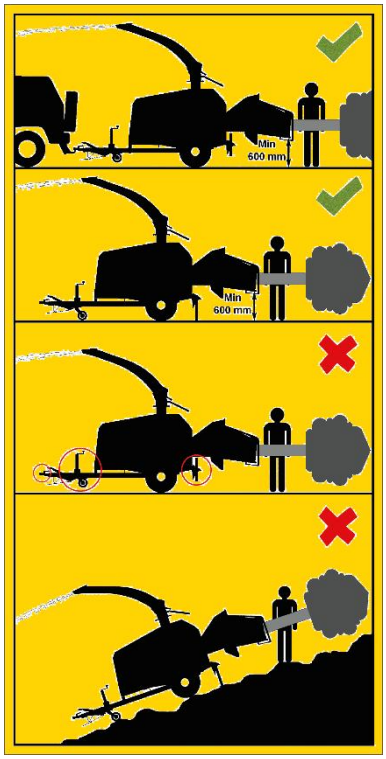


Warning: Ensure the safety bar works!
(Fitted on fixed funnel)



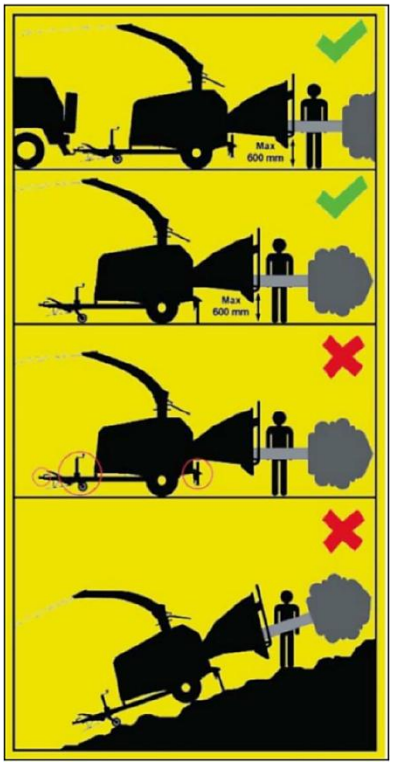
Warning: Do not park on uneven or inclined surfaces!
(Fitted on the MOBILE model)

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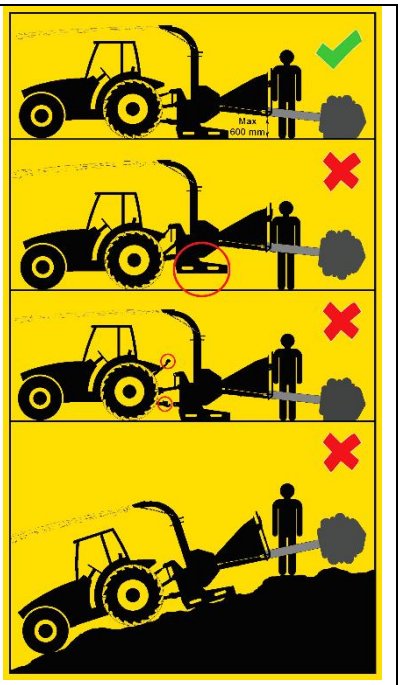
Warning: Do not operate the wood chipper without support from the jack and support leg or from the vehicle's trailer hitch!

Warning: Do not operate the wood chipper on uneven or inclined surfaces!
(Fitted on the MOBILE model with foldable funnel)



Warning: Do not operate the wood chipper without support from the jack and support leg or from the vehicle's trailer hitch!

Warning: Do not operate the wood chipper on uneven or inclined surfaces!
(Fitted on the MOBILE model with fixed funnel)

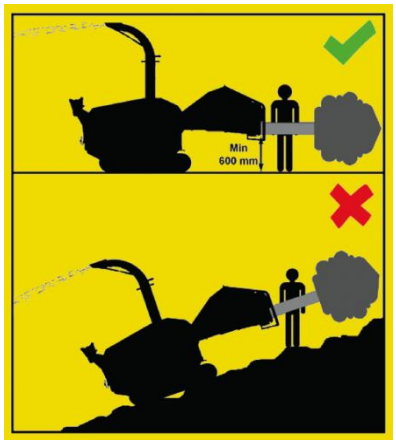


Warning: Do not operate the wood chipper if it is raised!

Warning: Do not operate the wood chipper if it is not fitted to the tractor's three-point-linkage!

Warning: Do not operate the wood chipper on uneven or inclined surfaces!
(Fitted on the PTO model with fixed funnel)

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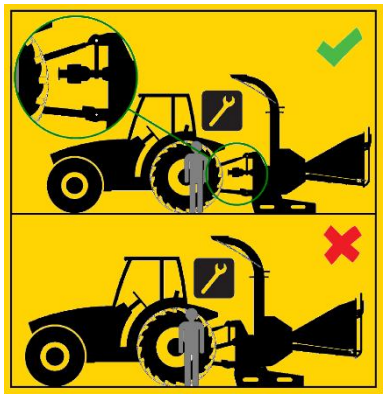
Warning: Do not operate the wood chipper on uneven or inclined surfaces!
(Fitted on the TRACK model with foldable funnel)



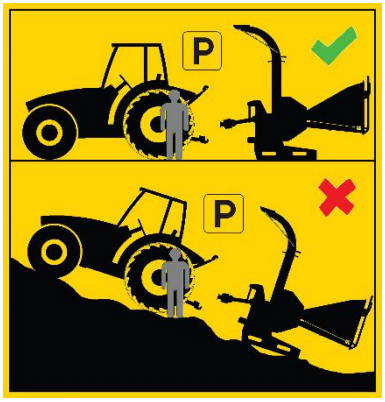
Warning: Do not operate the wood chipper on uneven or inclined surfaces!
(Fitted on the TRACK model with fixed funnel)



Warning: Max. 540 rpm, anticlockwise direction of rotation!
(Fitted on the PTO model)



Warning: Never carry out service or repairs on the wood chipper while it is connected to the tractor's PTO!
(Fitted on the PTO model)



Warning: Do not park on uneven surfaces!
(Fitted on the PTO model)



Warning: Scalding hazard!
(Fitted on the MOBILE and TRACK model).

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 Lifting point for forklift truck! (Fitted on the PTO model)	 Ear defenders and eye protection mandatory!	 Lifting point for crane!

For safety information and pictograms relating to the engine, see the engine manual.

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5 Fitting instructions

5.1 Before use

The wood chipper is equipped with a lifting point, which must be used whenever it is lifted by a crane or other lifting gear (with hooks). (See Figure 1). The machine can also be lifted using a forklift truck. This is done by using the forklift fork pockets made for this purpose on both sides of the foot (see Figure 2). Make sure that the forks of the forklift truck are inserted all the way through, otherwise the machine can tip over. The TP 160 MOBILE is mainly transported on the trailer wheels, but it can also be lifted by a fork lift truck (see Figure 3) The TRACK model is lifted on a pallet by a forklift truck (see Figure 4).

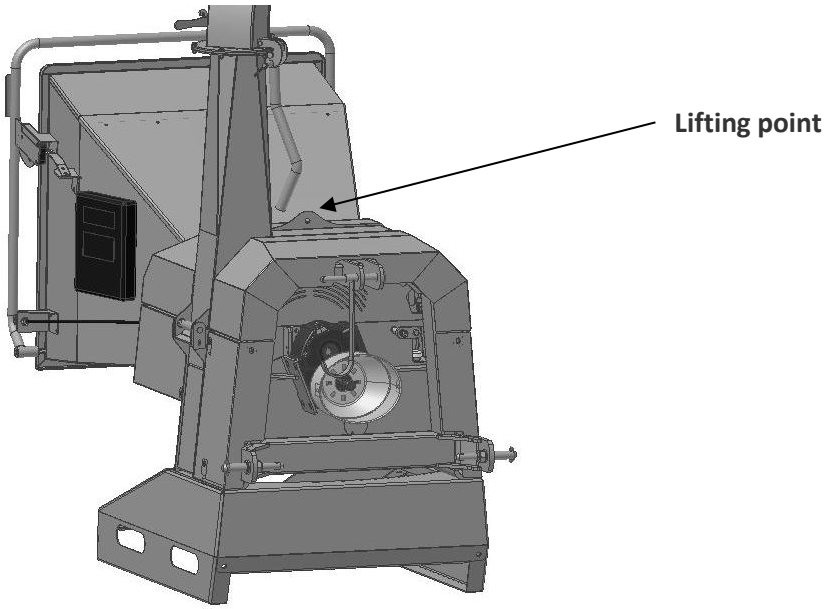


Figure 1 Lifting point on the machine

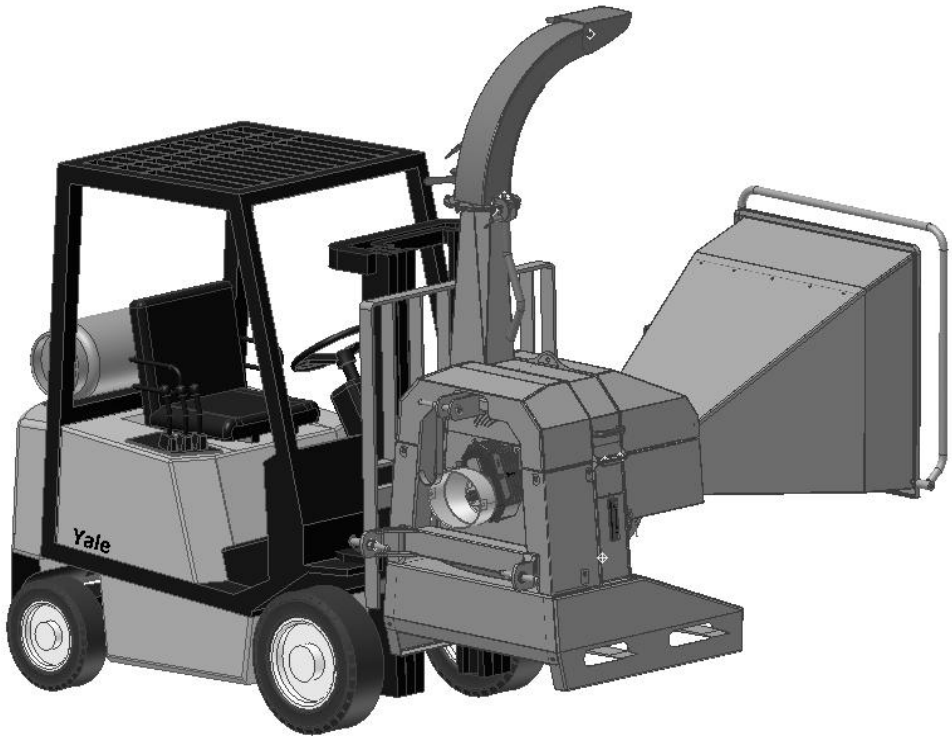


Figure 2 Lifting with forklift truck

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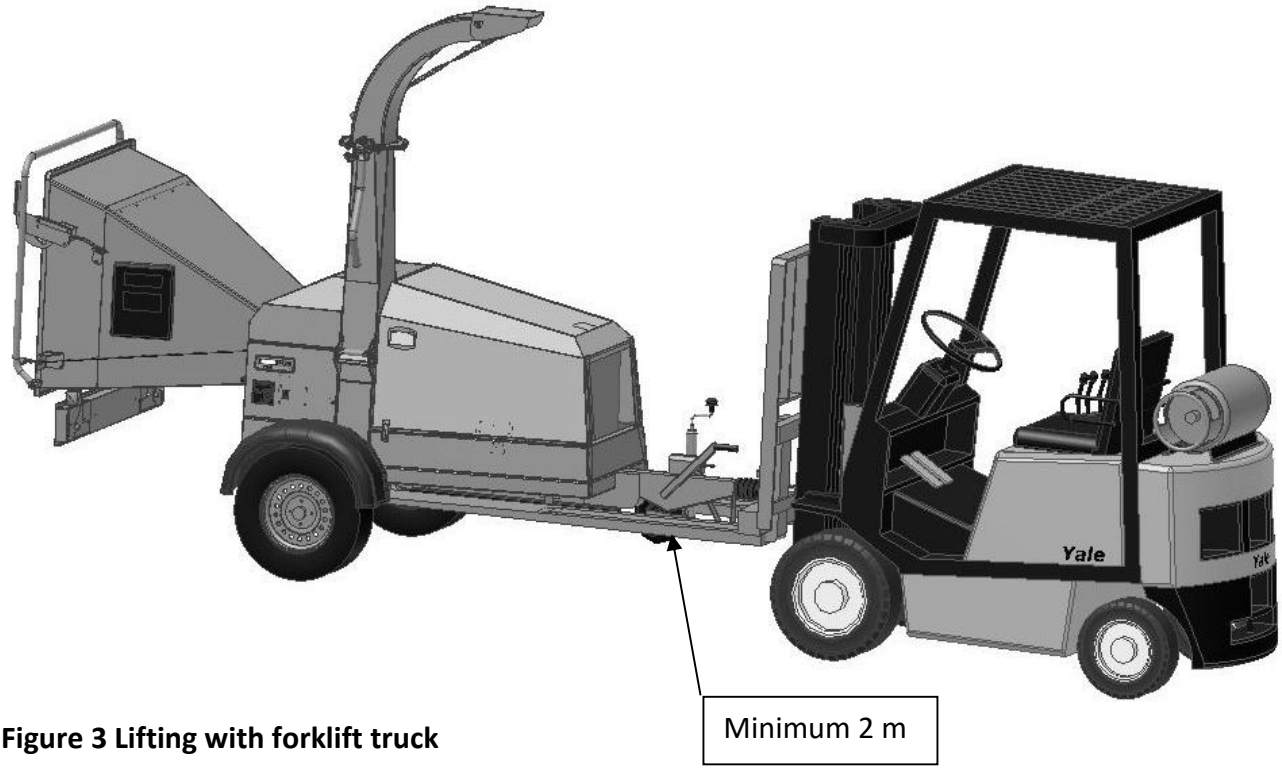


Figure 3 Lifting with forklift truck

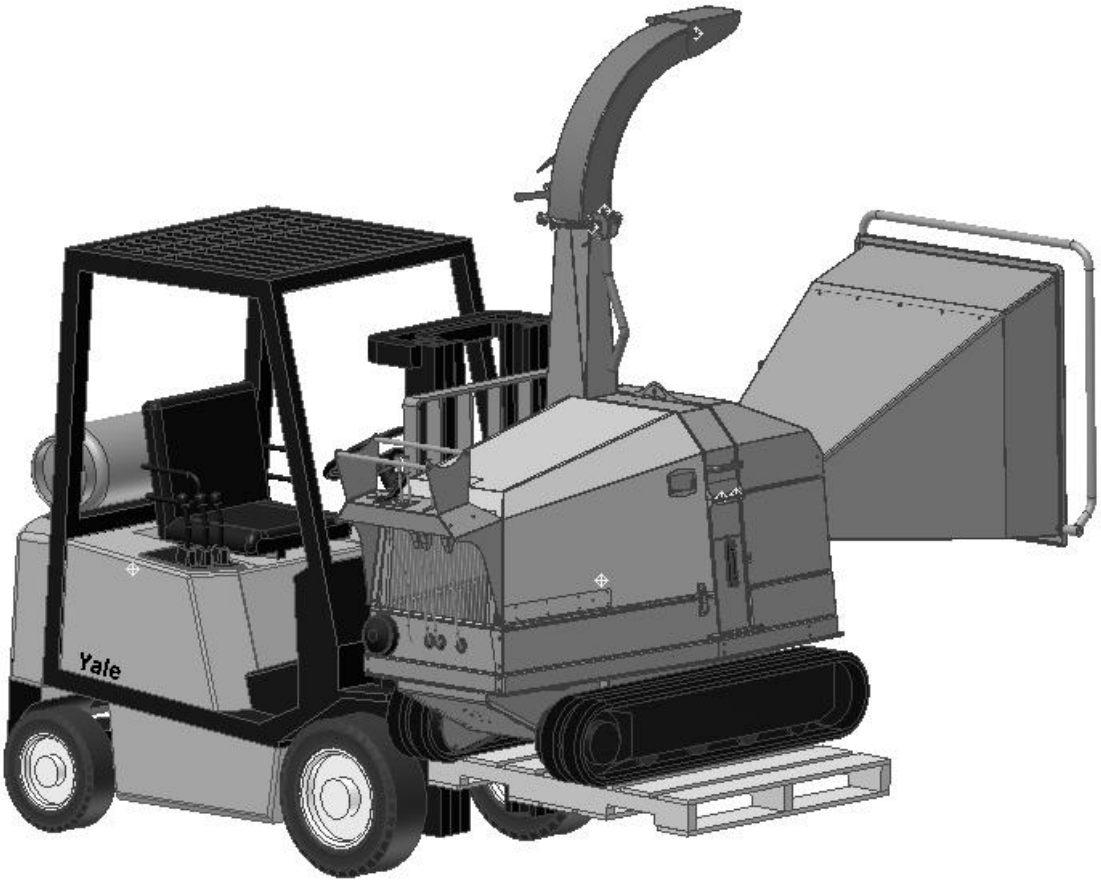


Figure 4 Lifting with forklift truck

Store the user manual for the PTO shaft with this user manual in the manual box on the machine.

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Before start-up, ensure that the wood chipper is free of foreign bodies. The machine **must** be disconnected from the tractor's PTO, and for MOBILE and TRACK models, the key **must** be removed from the ignition before opening the disc housing. Ensure that the disc is at a complete standstill. Turn the ejector spout so that it faces the opposite direction of the disc housing (Figure 5). Loosen the bolts that hold the upper and lower disc housing together. Lift the top part of the disc housing up until the ejector spout rests on its own. Turn the disc a few times by hand. Remove any foreign bodies.

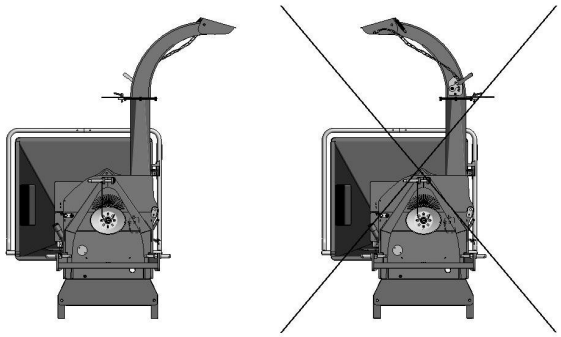


Figure 5

Position of the ejector spout when opening the disc housing

Check that the distance between the knives and counterknives is correct = **0.5–0.9 mm**. The knives have a fixed position of **10 mm**. Check that the knives run clear of the counterknives.

Lift the top part of the disc housing back into position and tighten the bolts.

Ensure that all bolts, nuts and screws are tightened securely.

NB: Lubricate all of the lubrication points (see maintenance schedule, page 32).

Old hydraulic oil and motor oil and used oil filters and air filters must be disposed of at an approved waste disposal station.

5.2 Fitting instructions

The machine is designed to be fitted to a tractor three-point linkage or fitted to a trailer with its own engine.

Machines that shall be fitted to a tractor three-point linkage are delivered with a PTO shaft with either 1 3/8" - 6 splines or 1 3/8" - 21 splines.

The PTO shaft **must** have free running fitted on the machine side.
Linddana uses a Walterscheid W400 with free running, which is supplied with the machine.
The length of the PTO shaft must be adapted to the tractor in accordance with the instructions from the PTO shaft supplier. See the attached PTO shaft user manual.
The machine must stand on a secure and a level surface during use and tractor-fitted machines must be attached to the tractor's three-point-linkage (see figure 6). The tractor must be safely parked with the brake engaged.
Trailer-fitted machines must also be safely parked with the brakes engaged when they are used (see figure 7).
When starting the machine: Attach only when the motor is running at idle speed or at as few revolutions as possible to avoid overloading the PTO shaft, gearbox, tractor or wood chipper.

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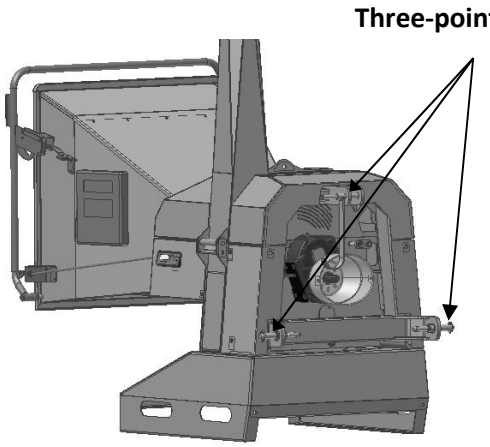


Figure 6 TP 160 PTO three-point linkage

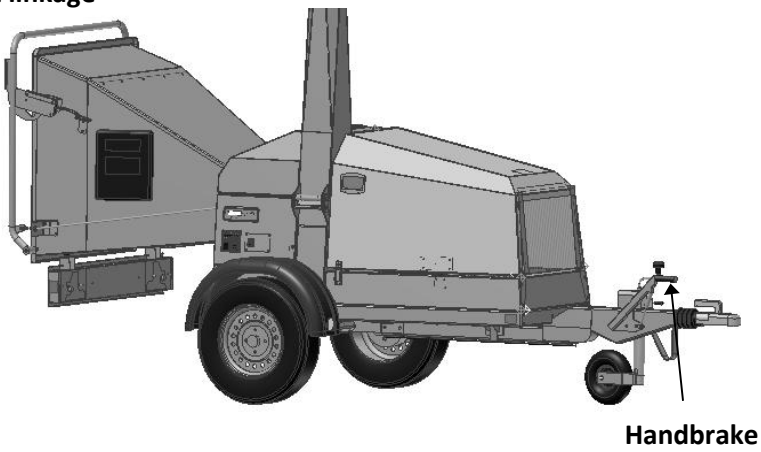


Figure 7 TP 160 MOBILE handbrake

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6 Noise level

The sound output level and the sound pressure level from the TP 160 PTO have been measured during use with the disc running at 1000 rpm, powered by a tractor.

The sound output level and the sound pressure level from the TP 160 MOBILE have been measured during use with 1000 rpm on the disc, powered by the Lombardini LDW 1404 engine.

The measurements have been conducted in accordance with testing provisions
Directive 2000/14/EC, 3 July 2000
EN ISO 3744, 1995
ISO 11201, 1995
ISO 4871, 19 March 1997
EN 13525, 17 February 2005

The guaranteed sound output level which must be stated by the manufacturer in accordance with Directive 2000/14/EC is as follows:

TP 160 PTO: **125 dB (A) relative to 1 pW**

TP 160 MOBILE, Lombardini: **123 dB (A) relative to 1 pW**

TP 160 TRACK, Lombardini: **123 dB (A) relative to 1 pW**

The machine's sound pressure level at the operator's position is measured in accordance with ISO 11201 and measured as:

TP 160 PTO: **108 dB (A)**

TP 160 MOBILE, Lombardini: **102 dB (A)**

TP 160 TRACK, Lombardini: **102 dB (A)**

The values stated above are subject to the common uncertainty of the measuring method and the estimated variation in a product series for the type of machine. Detailed information about the measurements and results and estimation of uncertainty are found in a detailed report, which can be supplied on request.

As a result of the actual sound levels, the wearing of ear defenders is mandatory when using the machine.

6.1 Environmental instructions

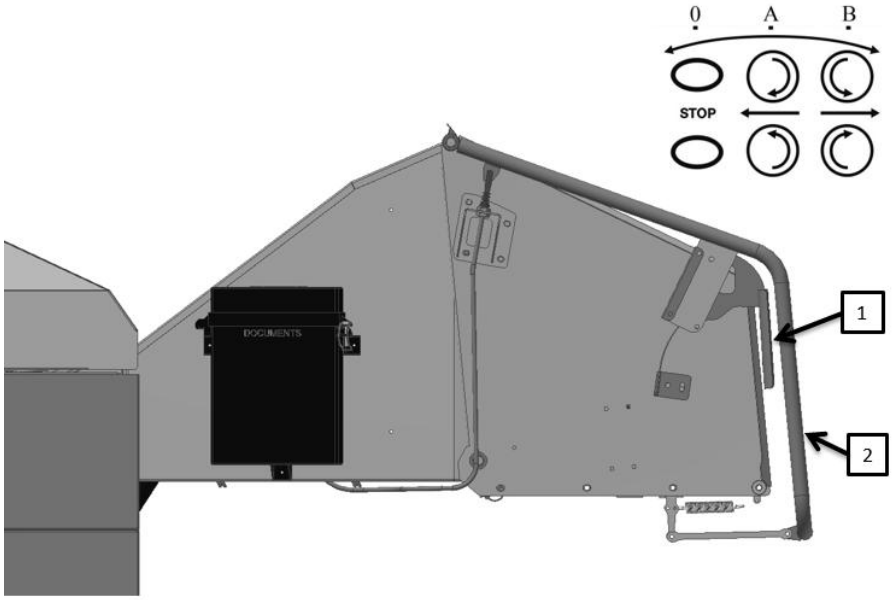
When changing hydraulic oil or engine oil, oil and used oil filters and air filters must be disposed of at an approved waste disposal station.

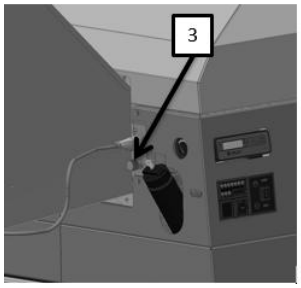
Oil spillage must be avoided as far as possible. Should oil spillage occur, the spilled oil must be cleaned up and disposed of at an approved waste disposal station.

Worn out parts must be disposed of for recycling.
When the machine reaches the end of its operating life, it must be disposed of responsibly.
Hydraulic oil and engine oil must be drained and disposed of along with oil filters and air filters at an approved waste disposal station.
The rest of the machine must be disposed of at an approved recycling centre.

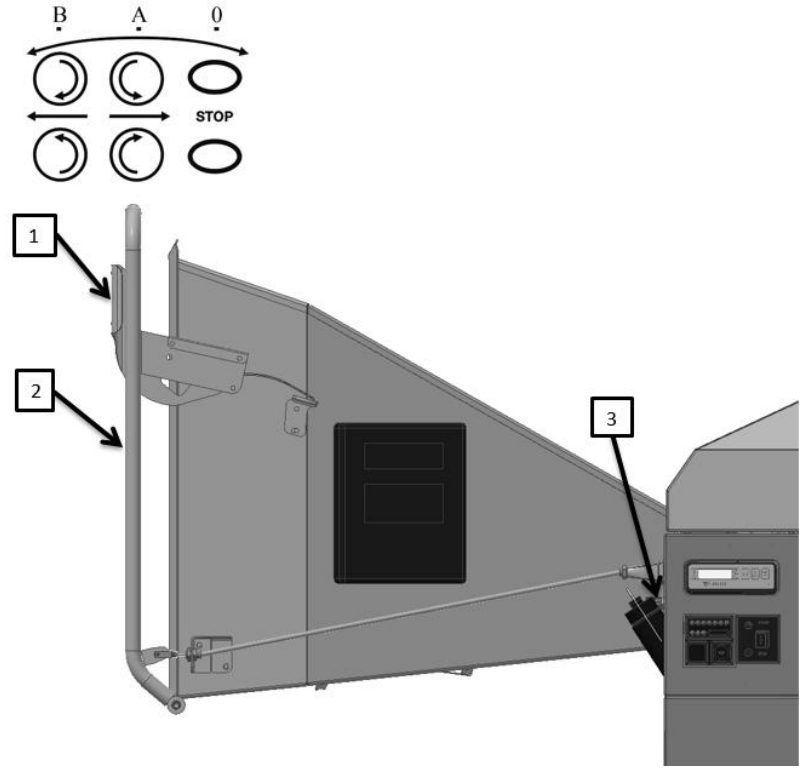
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7 Operation of the machine





(Model with foldable funnel)



(Model with fixed funnel)

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The wood chipper is equipped with two hydraulic rollers, which are controlled by a safety bar (2) with a reset handle (1) and a roller speed controller (3) (see illustration above).

Position A
The rollers rotate inwards and the material is drawn into the wood chipper.

Position B
The rollers rotate outwards and the material is pushed out of the wood chipper.

Position 0
The rollers are stopped.

When the safety bar has been pushed into position 0, the bar is locked. This is to ensure the rollers are not unintentionally re-started.
To subsequently move the safety bar into position A or B, activate the reset handle.

During start-up, the safety bar must always be in position 0.

IN CASE OF POTENTIAL HAZARDS PUSH THE SAFETY BAR INTO THE STOP POSITION (position 0).

Transport position of foldable funnel

1. Fold the funnel up by lifting the outside in the safety bar (use both hands).

2. Once the funnel is folded up, secure it using the ring pin in the right side. The funnel is now in the transport position.

Operating position of foldable funnel
To put the foldable funnel into the operating position, repeat the transport position procedure in reverse order.

Roller speed
Adjust the wood chipper's in-feed speed by turning the roller speed controller. Never operate too quickly with the rollers because the wood will act like a brake if the pressure on the disc is too great, with the risk of overheating, overloading and increased fuel consumption. Branches may become wrapped around the rollers if the rpm is too high.

7.1 Setting the rpm for the feed rollers

The table shown below provides the recommended rpm of the feed rollers with the respective desired woodchip length.

Woodchip length Model	Disc rpm	4 mm rpm	6 mm rpm	8 mm rpm	10 mm rpm
TP160	1000	15	22	29	36

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8 Maintenance

In the case of all maintenance and repair work, the machine and the drive must be at a complete standstill before any work can be carried out. Tractor-fitted machines must be placed on a secure and level surface and must be uncoupled from the tractor's PTO.

8.1 Maintenance schedule

Interval=> hours	**8**	**50**	**100**	**200**	**500**	**1000**	**1000 m³**	**10,000 m³**
Lubricate the PTO shaft[1]	X							
Check knives and counterknives	X							
Tighten all bolts and nuts[2]	(X)	X						
Lubricate disc main bearings[3]			X					
Clean/lubricate tube connection for PTO shaft[4]				X				
Oil change power shuttle[5]		(X)			X			
Lubricate roller bearings[6]				X				
Replace hydraulic pump return filter[7]		(X)				X		
Change hydraulic oil[8]						X		
Reverse/replace counterknife[9]						X		
Replace facing plate in top disc housing[10]						X		
Reverse/replace triangle and square wipers[11]							X	
Grind carriers on feed rollers[12]							X	
Check V-belts[13]		X						
Check ejector wings for wear						X		
Check casing for wear and tear								X

[1] Remove the PTO shaft and lubricate the four lubrication nipples using Uniway Li62 or equivalent lubricant.
[2] Tighten bolts and nuts, the first time after eight hours and then at intervals of 50 hours.
[3] Lubricate two lubrication nipples using Uniway Li62 or equivalent lubricant.
[4] Remove the PTO shaft and pull apart the tube connection, clean and lubricate it.
[5] Change the oil, the first time after 50 hours and then every 500 hours. Fill with W80/90 until it can be seen in the sight glass, 1.5 l.
[6] Lubricate two lubrication nipples using Uniway Li62 or equivalent lubricant.
[7] Change for the first time after 50 hours and then every 1000 hours.
[8] Drain the hydraulic oil and fill with new oil using 20 litres of **Hydraway HVXA 46** or an oil that has the equivalent specifications. The interval between changing oil can be extended by using biodegradable hydraulic oil, such as the type **Hydraway SE 46 HP** and taking oil samples on an ongoing basis.
[9] Reverse/change the counterknife when necessary.
[10] If fitted, change the facing plate in the top disc housing, as necessary.
[11] Reverse/replace the triangle wipers in the disc housing. Reverse/replace the square wiper on the disc.
[12] Grind the feed rollers sharp.
[13] Check tensioning of the pump V-belts.

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8.1.1 Lubrication and oil

The wood chipper is as standard, factory-filled with mineral-based hydraulic oil of the type **Hydraway HVXA 46**. When replacing the oil, use the same type of oil or an oil with equivalent specifications. Do not mix oils of different types/brands.

As an accessory, the wood chipper can be delivered factory-filled with biodegradable oil of the type saturated ester, Statoil **Hydraway SE 46 HP.**
When replacing the oil, use the same type of oil or an oil with equivalent specifications. Do not mix oils of different types/brands.

Old hydraulic oil and engine oil as well as used oil filters and air filters must be disposed of at the municipal waste disposal station.

Lubricate the nipples in accordance with the maintenance schedule using Statoil **Uniway Li62** or equivalent product that can be mixed with Uniway Li62.

The machine is equipped with a hydraulic oil tank which is integrated in the disc housing. The tank is equipped with a filler neck, a bleeder valve, a level glass, a drain plug and a return filter.

When changing the hydraulic oil, open the filler neck (see Figure 8).
Unscrew the drain plug. Drain the oil into a suitable disposal container. When the tank is almost empty, suck the tank empty using an oil suction device. Screw the drain plug back on and slowly fill up with new hydraulic oil (20 litres for TP 160).
Fill the oil until the oil level is at the middle of the level glass.

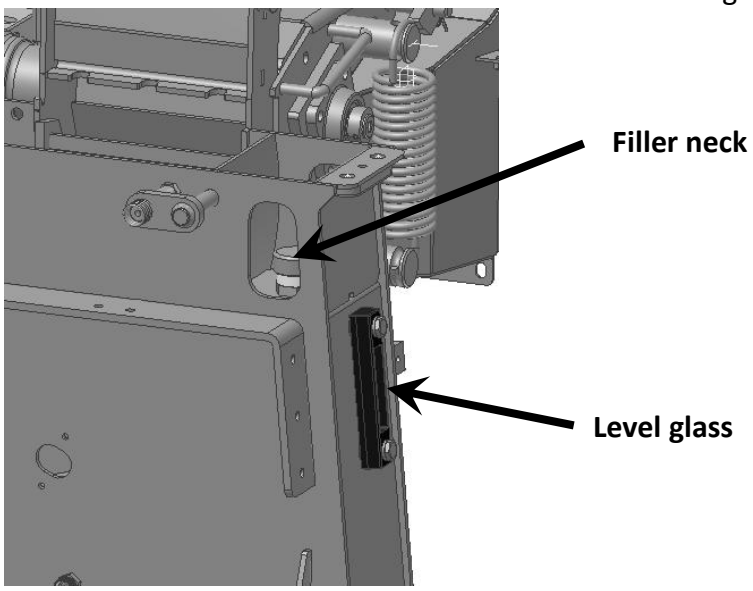


Figure 8 Filling hydraulic oil

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8.2 Maintenance of the feed rollers

The feed rollers draw material into the disc and the knives.

The lamellae on the bottom feed roller must be kept sharp in order to maintain the feed force.

Procedure:

Stop the machine and the drive. Uncouple the tractor's PTO. Ensure that the disc is at a **complete** standstill. Turn the ejector spout so that it faces away from the disc housing (see Figure 5). Loosen the bolts that hold the two parts of the disc housing together and open the disc housing. Using multigrip pliers or similar, lift the spring from the top feed roller.
Hold the handle and lift the roller housing, and push the locking pawl in the side plate (see Figure 9). Next, secure the roller housing by letting it fall.
Now the carriers on the bottom feed roller can be sharpened with an angle grinder.

Carefully turn the disc using the safety bar in a forward or reverse position. By doing this, the feed roller is turned so all of the lamellae can be sharpened.

NB: The weld seams must not to be ground away!

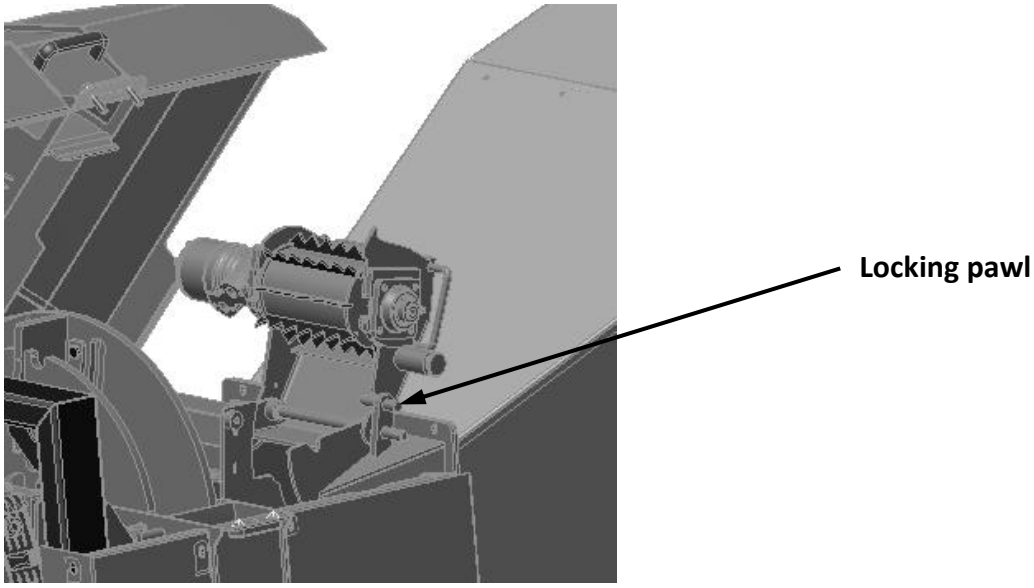


Figure 9 Securing using the locking pawl

When the roller has been grounded, lower the top feed roller back in position. Put the spring back using multigrip pliers. Close the disc housing and tighten the bolts

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8.3 Replacement of wearing parts

8.3.1 Counterknives

The counterknives in the machine are used by the knives to cut the wood. The counterknives must have a sharp edge otherwise the wood will bend and the cutting face become frayed. The machine is equipped with one horizontal counterknife with two cutters and a perpendicular counterknife. The horizontal counterknife can be reversed.

Procedure:

Stop the machine and the drive. Uncouple the tractor's PTO. Ensure that the disc is at a **complete** standstill. Turn the ejector spout so that it faces the opposite direction of the disc housing (see Figure 5). Loosen the bolts that hold the two parts of the disc housing together and open the disc housing. Using multigrip pliers, lift the spring of the top feed rollers and lift the feed roller housing. Next, secure the roller housing using the locking pawl (see Figure 9).

Remove the three bolts which hold the horizontal counterknife. Take out the counterknife and reverse/replace. Carefully clean both the counterknife and the contact surface before reinserting the counterknife. The distance between the edge of the knife and the counterknife must be **0.5–0.9 mm**. (See Figure 10). The bolts in the horizontal counterknife must be tightened to **100 Nm / 10 KPm.** (Extra equipment: the tool kit comes with a torque wrench).

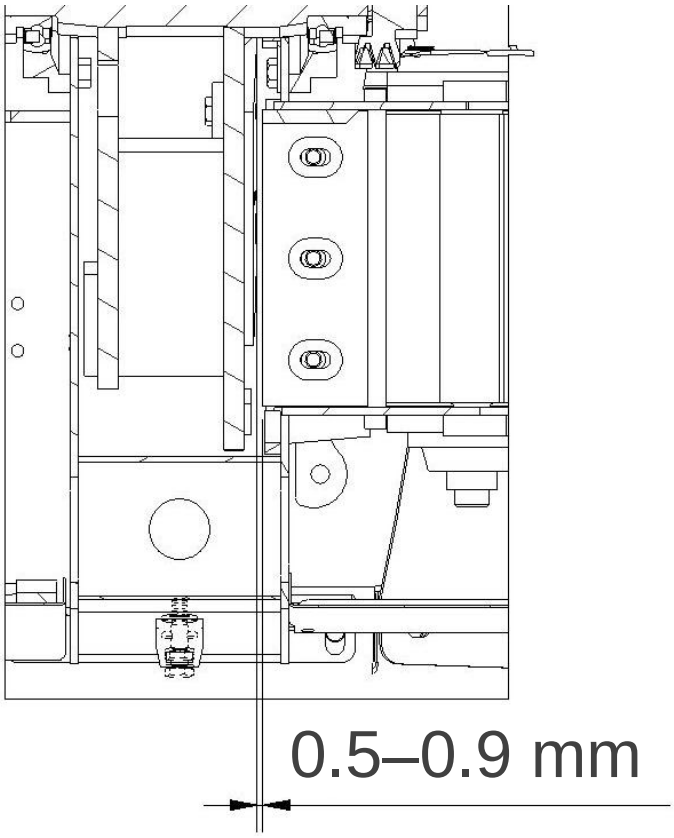


Figure 10 Distance between counterknife and knife

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Unscrew the vertical counterknife and remove it from the inside. Before a new one is inserted, the counterknife and the contact surface must be cleaned carefully. Set the counterknife distance to the knives to **0.5–0.9 mm**. Use a precision feeler gauge. Tighten the bolts on the vertical counterknife to **50 Nm/5 KPm**. (Extra equipment: the tool kit comes with a torque wrench).

When the counterknives have been reversed or replaced and all the bolts are tightened, lower the roller housing into position using the top feed roller. Put the spring back using multigrip pliers.

Turn the disc a few times to make sure that there are no objects in the disc housing. Close the disc housing and tighten the bolts (see Figure 11).

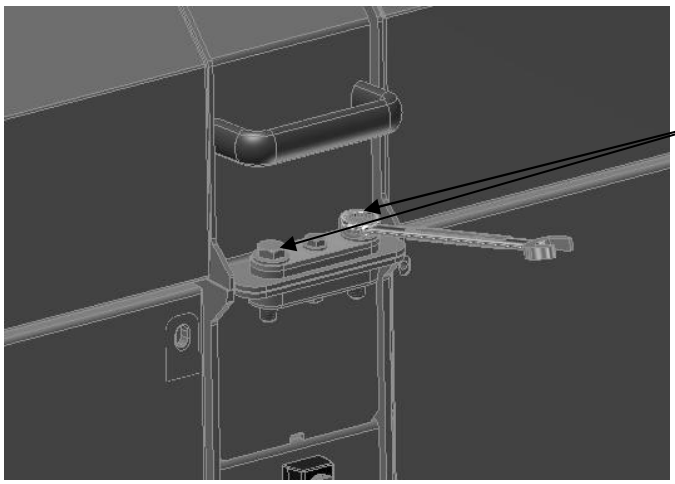


Figure 11 Tightening bolts in disc housing

8.3.2 Knives

The machine is equipped with two knives.

The knives must always be changed as a set. The knives belong together in sets, also when they are ground so that they are always of equal width. If the knives are not of equal width, the disc will be out of balance, which will lead to unnecessary strain on the bearings and vibrations in the whole machine.

Always store the knives in the wooden box provided for that purpose (see Figure 12).



Figure 12 Wooden box for storing knives

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Procedure:

Stop the machine and the drive. Uncouple the machine from the tractor's PTO. Ensure that the disc is at a **complete** standstill. Turn the ejector spout so that it faces away from the disc housing (see Figure 5). Loosen the bolts that hold the two parts of the disc housing together and open the disc housing.

Turn the disc until the disc lock can go into one of the holes on the disc. The disc is now locked. (see Figure 13). Keep fingers away from the knives when turning the disc around.

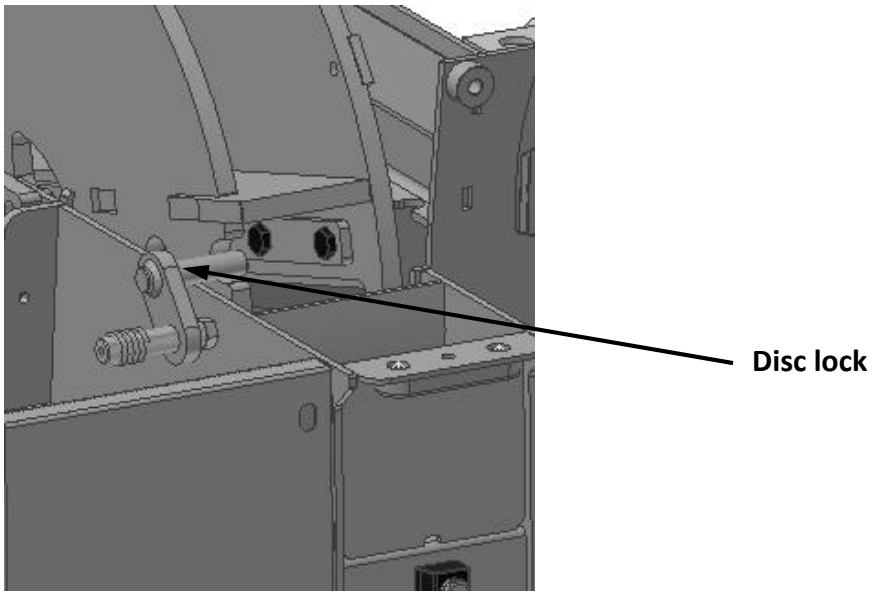


Figure 13 Disc lock

Remove the three bolts that hold the knife and the tension plate to the disc. Remove the knife. The bearing surfaces on the chipping disc and the knife must be cleaned properly before fitting the knives.
When fitting, the bolts **must** be lightly oiled (μ = 0.125), i.e. light oil, WD 40 or an equivalent product. Do **not** use copper grease, MoS_2 or similar low friction grease.

Check that the distance between the knife's edge and the counterknife is set correctly to **0.5–0.9 mm**.

Tighten the bolts to **110 Nm/11 KPm** (Use a torque wrench which is included in the tool kit for this purpose. It can also be purchased as an accessory).

When the knives have been replaced, turn the disc a few times to make sure that there are no objects in the disc housing. Close the disc housing and tighten the bolts (see Figure 11).

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8.3.3 Wipers and facing plate

The machine is equipped with two square wipers on the disc, a triangle wiper in the disc housing and a facing plate in the ejector spout (see Figure 14):

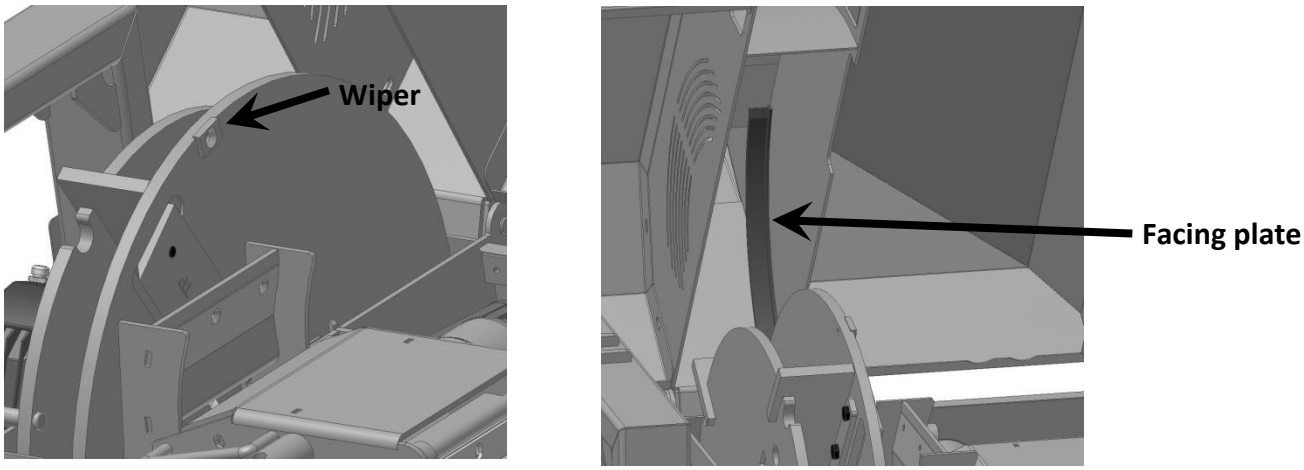


Figure 14 Positioning of wipers and facing plate

The purpose of the wipers is to remove material that can become stuck to the knives.
At the same time, the square wiper on the disc removes material which falls off in front of the chipping disc.
This reduces fuel consumption and wear on the casing.

The square wipers can be turned once before being replaced, while the triangle wipers and the facing plate should always be replaced when they are worn.

Procedure:

Turn the disc until the disc lock can go into one of the holes on the disc. The disc is now locked. (see Figure 13). Keep fingers away from the knives when turning the disc around.

Remove the countersunk bolts which hold the square wiper on the disc. Turn the square so that a sharp corner points up. Clean the block and the bearing surface. Re-fit the square wiper. If it is worn on two corners, the square wiper must be replaced. Always change the square wiper on the disc in sets. Replace the triangle wiper when it is worn.

The facing plate is fitted in the top part of the disc housing and can easily be replaced by removing the two bolts on the outside of the disc housing. If woodchip quality is not an important factor, it is a good idea to remove the facing plate in the ejector spout. This will increase the capacity of the machine and save fuel. The facing plate must be removed when chipping wet conifer wood that has a lot of needles. This ensures good ejection.

When the wipers have been reversed or changed, turn the disc a few times to make sure that there are no objects in the disc housing. Close the disc housing and tighten the bolts (see Figure 11).

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8.3.4 Adjusting the V-belts

Pump transmission (PTO and MOBILE models)

The feed rollers are driven hydraulically. The hydraulic pump for the feed rollers is driven by V-belts. The V-belts must be checked regularly or whenever the belts are suspected of being slack.

Procedure:

Stop the machine and the drive. Uncouple the tractor's PTO. Ensure that the disc is at a **complete** standstill. Turn the ejector spout so that it faces away from the disc housing (see Figure 5). Loosen the bolts that hold the two parts of the disc housing together and open the disc housing.

Loosen the four screws which hold the hydraulic pump in place and adjust the tension by turning the adjusting screw. Used belts are allowed to bend 5.5 mm when they are pushed down with 37 N (3.7 kg), for new belts this value is 42 N (4.2 kg). (See Figure 15). The belts' tension can be measured with a suitable gauge, which can be purchased as an accessory.

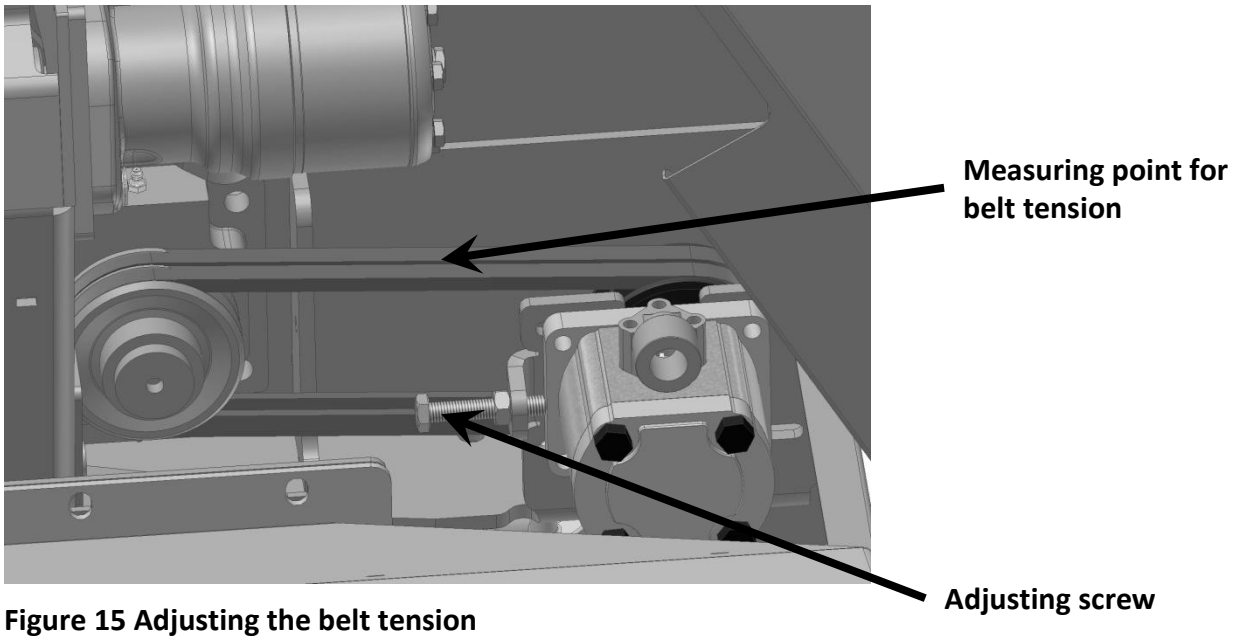


Figure 15 Adjusting the belt tension

When the V-belts have been tightened, turn the disc a few times to make sure that there are no objects in the disc housing. Close the disc housing and tighten the bolts (see Figure 11).

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Pump transmission (TRACK model)

The feed rollers and the belts are driven hydraulically. The hydraulic pump for the feed rollers and belts is run by a V-belt. The V-belt must be checked regularly or whenever it is suspected that it may be slack.

Procedure:

Stop the engine. Ensure that the disc is at a **complete** standstill. Turn the ejector spout so that it faces away from the disc housing (see Figure 5). Loosen the bolts that hold the two parts of the disc housing together and open the disc housing.

Loosen the four bolts that hold the hydraulic pump in place and adjust the tension by turning the adjusting screw. Used belts are allowed to bend 3.6 mm when they are pushed down with 46 N (4.6 kg), for new belts this value is 52 N (5.2 kg). (See Figure 16). The belts' tension can be measured with a suitable gauge, which can be purchased as an accessory.

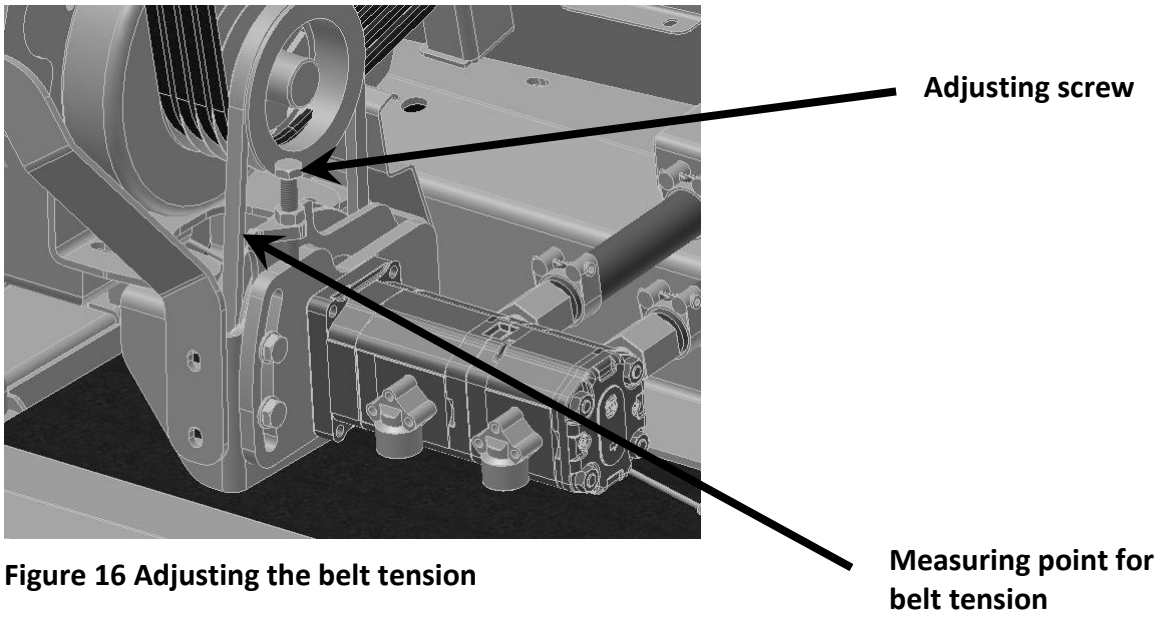


Figure 16 Adjusting the belt tension

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8.4 Sharpening knives

It is very important for the quality of woodchips that the knives are sharp. They must be checked at least once a day. The grinding interval of the knives can be prolonged by grinding them regularly with a carborundum stone.

The grinding process must be **wet grinding** with a cup wheel (see Figure 17). **Never** use an angle grinder or a similar tool for grinding the knives.

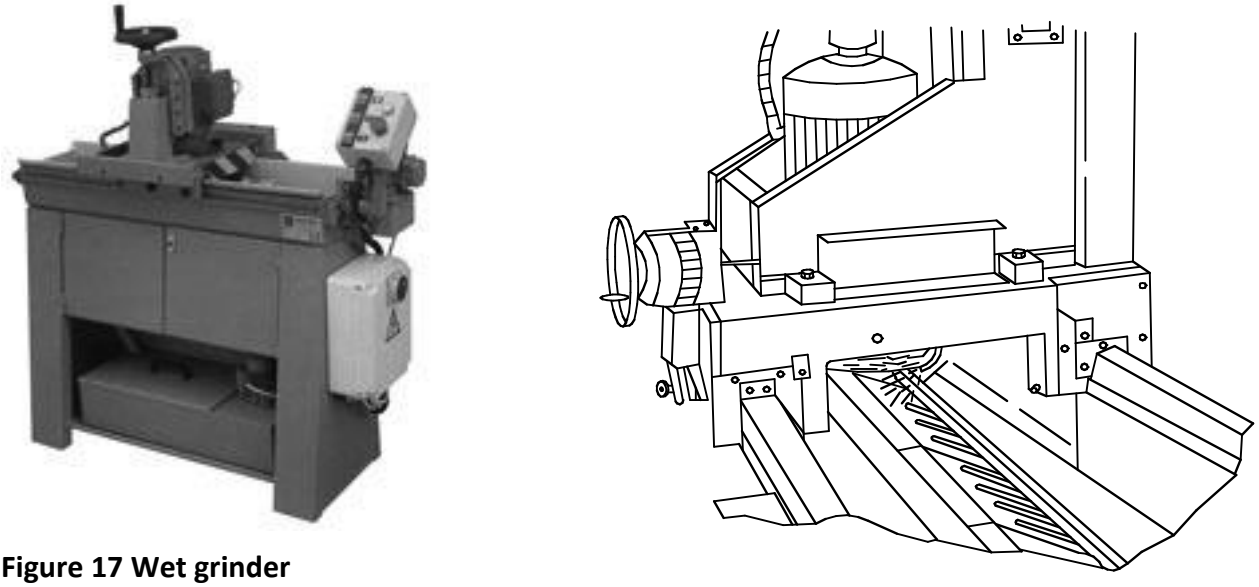


Figure 17 Wet grinder

When grinding knives, ensure that the width of the knives in the set are uniform. Their widths must be the same to keep the disc in balance. This means that the knives must always to be ground in sets. The knives must not be ground down to a width of less than 75 mm (see Figure 18). After that they must be discarded.

The edge of the knives must be ground at an angle of 30° (see Figure 18).

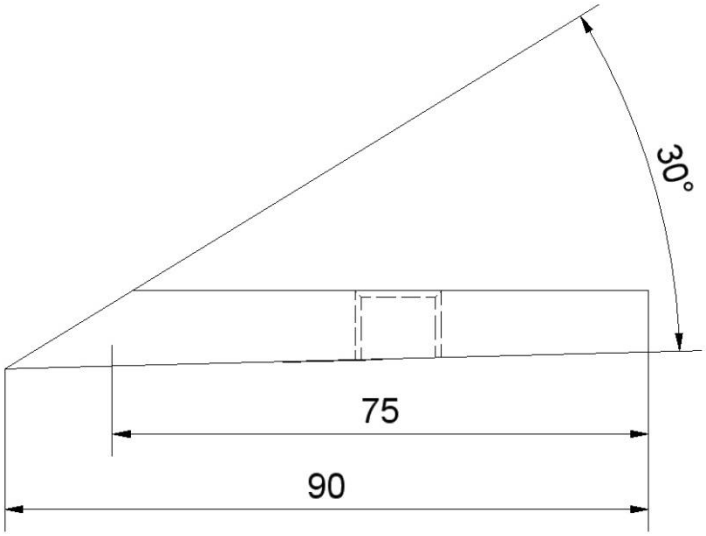


Figure 18 Grinding angle and minimum knife width for chipping knifes

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9 Special instructions for TP 160 MOBILE and TP 160 TRACK

TP 160 MOBILE is a trailer-fitted wood chipper, consisting of a trailer on which a wood chipper with its own engine is fitted and is registered as a trailer tool. The trailer can be fitted to a vehicle with a ball and socket head as a coupling without requiring inspection. When coupling, the 7/13-pole connector and the safety chain must be connected to the vehicle and the support leg must be raised. Release the handbrake before driving.
Check that lights, brake lights and turn signal lights work before driving.
TP 160 TRACK is a wood chipper on caterpillar tracks, consisting of a frame, under which is fitted a caterpillar tracks undercarriage. The two tracks can be extended out on each side, to achieve greater stability when driving on terrain.

	TP 160 MOBILE
Tyre assembly:	155/80R13
Tyre pressure:	4.5 bar = 65 psi
Engine type:	Lombardini LDW 1404
Dimensions, see:	Technical data wood chipper chapter 18
	TP 160 TRACK
Track fitting per track:	Width: 190 mm Length: 1182/1482 mm
Engine type:	Lombardini LDW 1404
Dimensions, see:	Technical data wood chipper chapter 18

To avoid irreparable damage to the electrical system, the following points must be followed:

1. Battery connections must be clean.

2. When using a battery charger, the ground cable on the battery must be removed.

During transport on public roads, the ejector spout must be turned in the opposite direction of the traffic direction and properly secured.

WARNING:
Always stop the engine before carrying out service of the wood chipper or the engine. When changing knives, the bonnet must be lifted first, and then the two bolts which hold the top of the machine can be loosened.
A safety switch ensures that the engine cannot be started when the bonnet is lifted.
The switch will stop the engine if the bonnet is opened before the engine has been switched off.
If the safety switch is defective, it must be changed immediately.

Instructions for wood chipper: See TP 160 PTO

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TP 160 MOBILE and TP 160 TRACK are equipped with a 26 kW (35 HP) Lombardini engine.
See the operating instructions for the engine.

When registering for repairs you must register if it is a warranty matter. Doing this ensures that we can write a report and keep and test the parts in accordance with the factory's instructions.

It is too late to claim warranty after repairs have been carried out.

The factory warranty is valid for one year from the date of purchase.
See current sales and delivery terms and conditions.

When ordering spare parts
Ensure you state: Model, year of manufacture and spare part number.

NB: Failure to use original parts renders the warranty void.

Warnings:
EXERCISE CAUTION, if you are going to touch an engine that is running or has recently stopped. Different components – especially the exhaust system can be red hot even though you cannot see it.

The oil dipstick may only be removed from the engine to check the oil or to fill new oil in the engine.

The radiator filler cap on the radiator may only be removed when checking the fluid level or when filling the radiator with new coolant. Only remove the radiator filler cap when the engine is cold. When the engine is hot, the cooling system is pressurised and loosening the radiator cap is hazardous because there is a risk you may become scalded.
The radiator's draining plug may only be removed when draining liquid. After draining, ensure the draining plug has been put back.

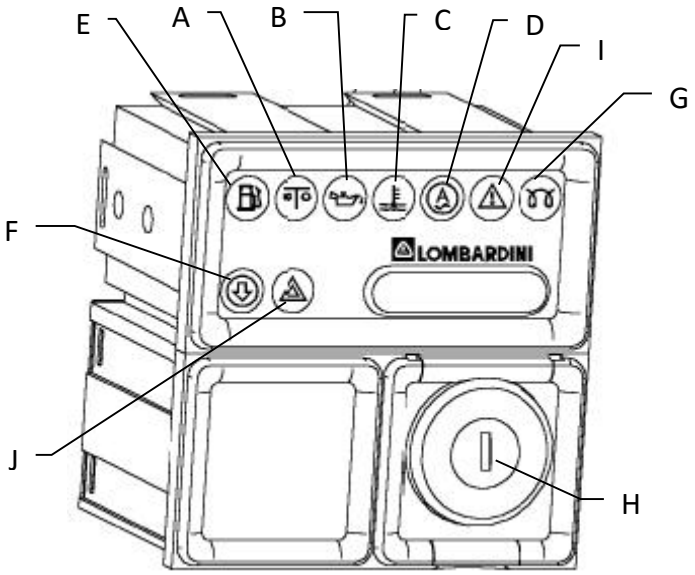
When filling up with fuel you must avoid open flames.

Never let the engine run in closed, poorly ventilated spaces.

Before start-up, electrical wiring, connections and insulation must be checked.

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Start box



A = Normal operation
B = Oil light
C = Temperature
D = Charging light
I = Warning light (not used)
E = Fuel indicator (not used)
F = Air filter indicator, lights up when air filter is clogged
G = Heater plug/preheat
H = Ignition key
J = Warning light (not used)

Start:
The key is turned clockwise and the light for preheat lights up. When the light turns off the engine can be started.
NB: All warning lights must be turned off during operation.
If the engine does not start after 20 seconds then wait for one minute and try again.
If the engine does not start after two attempts, then start troubleshooting and use the troubleshooting table.

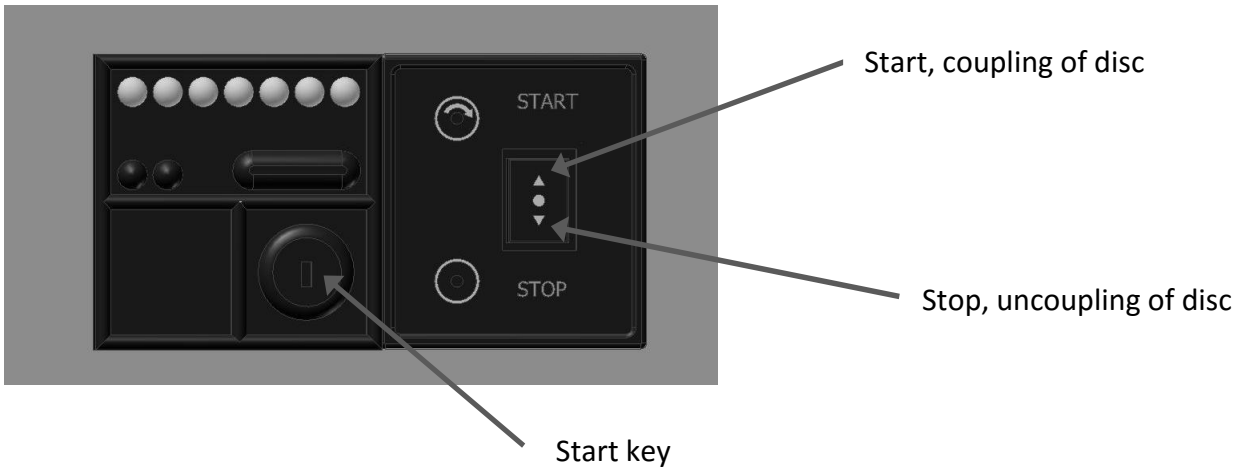
When the engine has started, it must run idle in order to heat up completely.

-20°C and less	approx. 5 minutes
-20°C to -10°C	approx. 2 minutes
-10°C to +5°C	approx. 1 minute
over +5°C	approx. 20 seconds

During the first 50 hours of work the engine must not be run at more than 70% of its maximum performance.

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TP STARTER®



Starting the wood chipper:

Start the engine with the key and let it run idle for a few minutes.
Next, press the top of the switch (Start), TP STARTER® will now automatically cut in the disc and at the same time the engine revolutions will increase to the max. engine rpm. The wood chipper is now ready for operation.

Stop:

Stop putting material into the wood chipper and wait until nothing comes out of the ejector spout.
Next, press the bottom of the switch (Stop), TP STARTER® will now automatically uncouple the disc, and at the same time the engine revolutions are slowed to idle running.
The engine must run idle for a few minutes before it is stopped.
Stop the engine by turning the start key anticlockwise.

If the engine is switched off with the key before TP STARTER® has uncoupled completely, the motor cannot be started:

> Turn the key so that there is power to the system, TP STARTER® automatically completely uncouples and the engine can subsequently be started again (dependent on the model).
>
> Or:
>
> Turn the key so that there is power to the system and press the toggle switch (Stop).
> TP STARTER® will uncouple and the engine can subsequently be started again (dependent on the model).

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Cleaning the filter in front of the radiator

There is a filter that is fitted in front of the radiator. This filter collects particles that are too big to pass through the actual radiator.
Cleaning procedure:
Stop the wood chipper and the engine. Open the bonnet and lift the filter out of the “track”. Filter cleaning procedure:
- Knock the dust off carefully by hitting the frame of the filter on the ground or on a piece of wood.
- Clean using compressed air from the "radiator side".
- Clean using a high-pressure cleaner. Only used for extreme clogging and must be dried before starting the wood chipper.

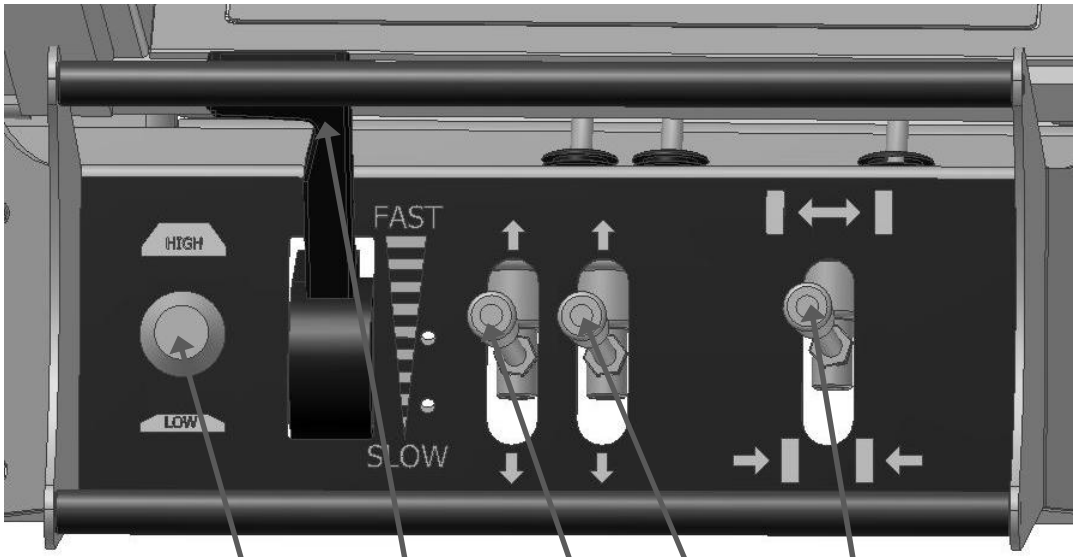
Generally you get fewer stoppages by ensuring the wind does not blow dust from the ejector spout directly into the radiator.

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10 Operating instructions for TP 160 TRACK

10.1 Operation

The TP 160 TRACK is operated using the control console.



Forward: Belts in outer pos.
Back: Belts in inner pos.

Forward: Right belt in forward drive.
Back: Right belt in reverse drive.

Forward: Left belt in forward drive.
Back: Left belt in reverse drive.

Forward drive speed, engine rpm.

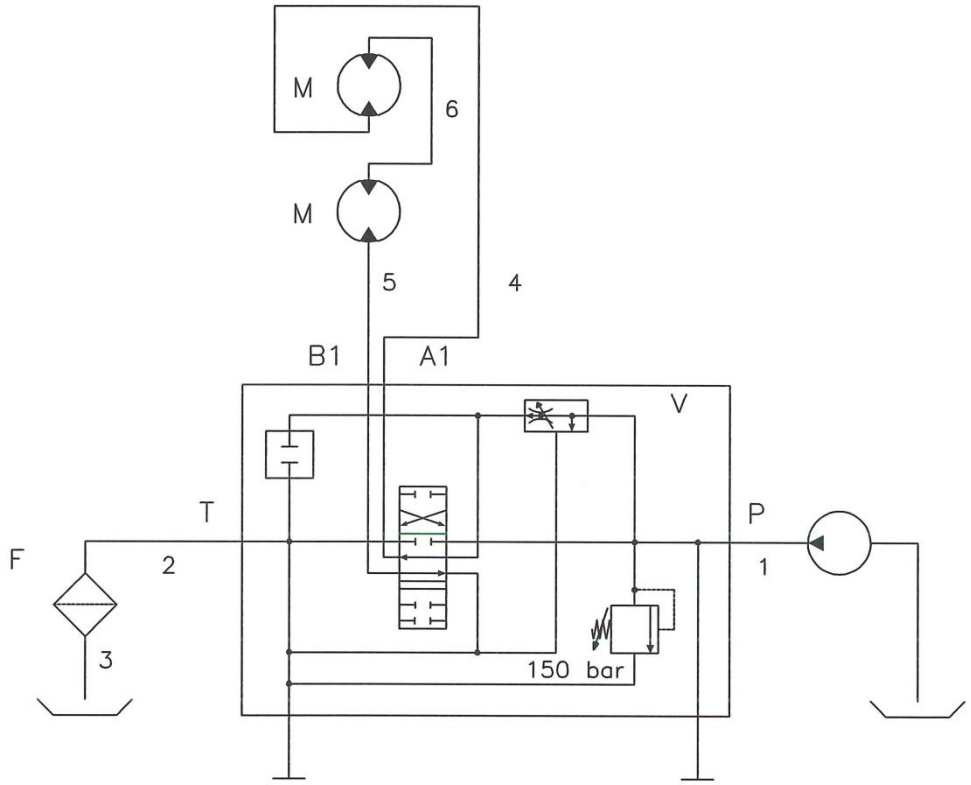
Hydraulic gear change

When the engine has started, the machine can be driven around the terrain. Activate the two drive handles in forward drive at the same time, and the machine will drive straight forward. If only the left handle is pushed forward, the machine will turn to the right. If only the right handle is pushed forward, the machine will turn to the left. If the two handles are activated in opposite directions, the machine will rotate.
The handle on the right side controls the width setting for the tracks. They are activated so the tracks are either together or completely apart.
The forward drive speed can be regulated from 0.35–3.7 km/h with the hydraulic gear change (HIGH is twice the speed of LOW) and with the engine rpm, which is regulated with the throttle.
If the wood chipper is running and the forward drive handles are activated, the feed rollers will stop until the forward drive handles are released again.

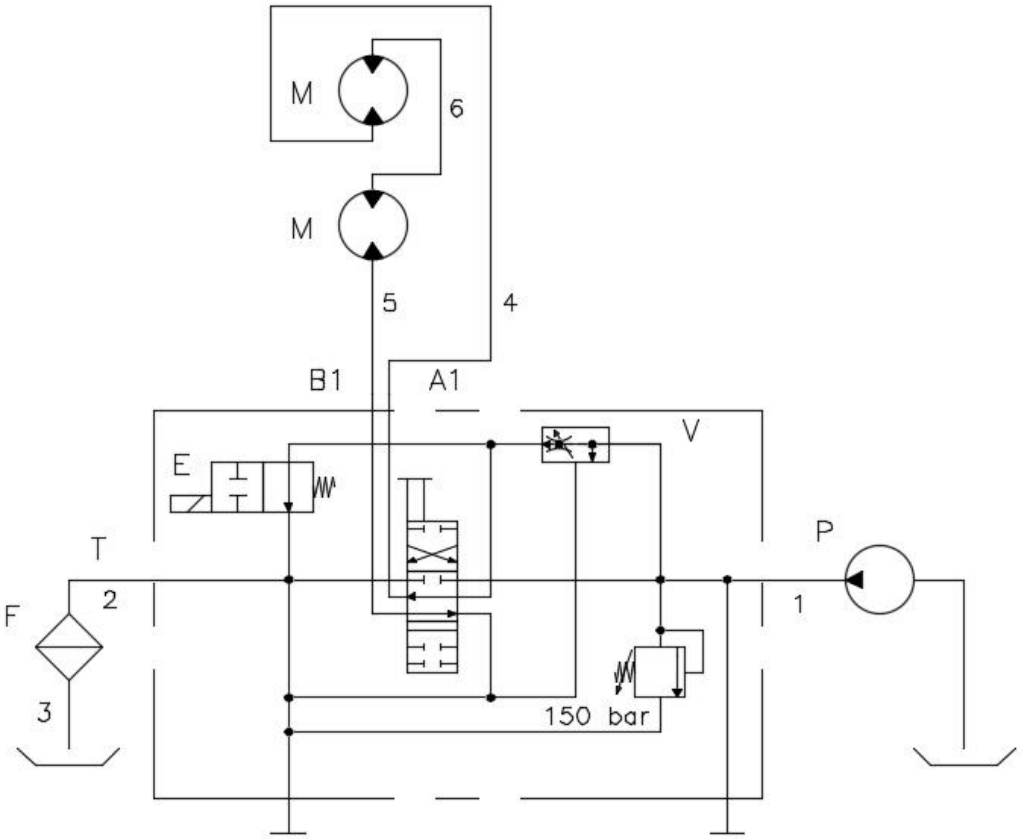
NB:
In case of continual operation, the TP 160 TRACK may operate on max. 20° inclines, when used for short operations (max. 10 minutes duration) on 30° inclines.

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11 Hydraulics diagram, TP 160 without rpm monitor

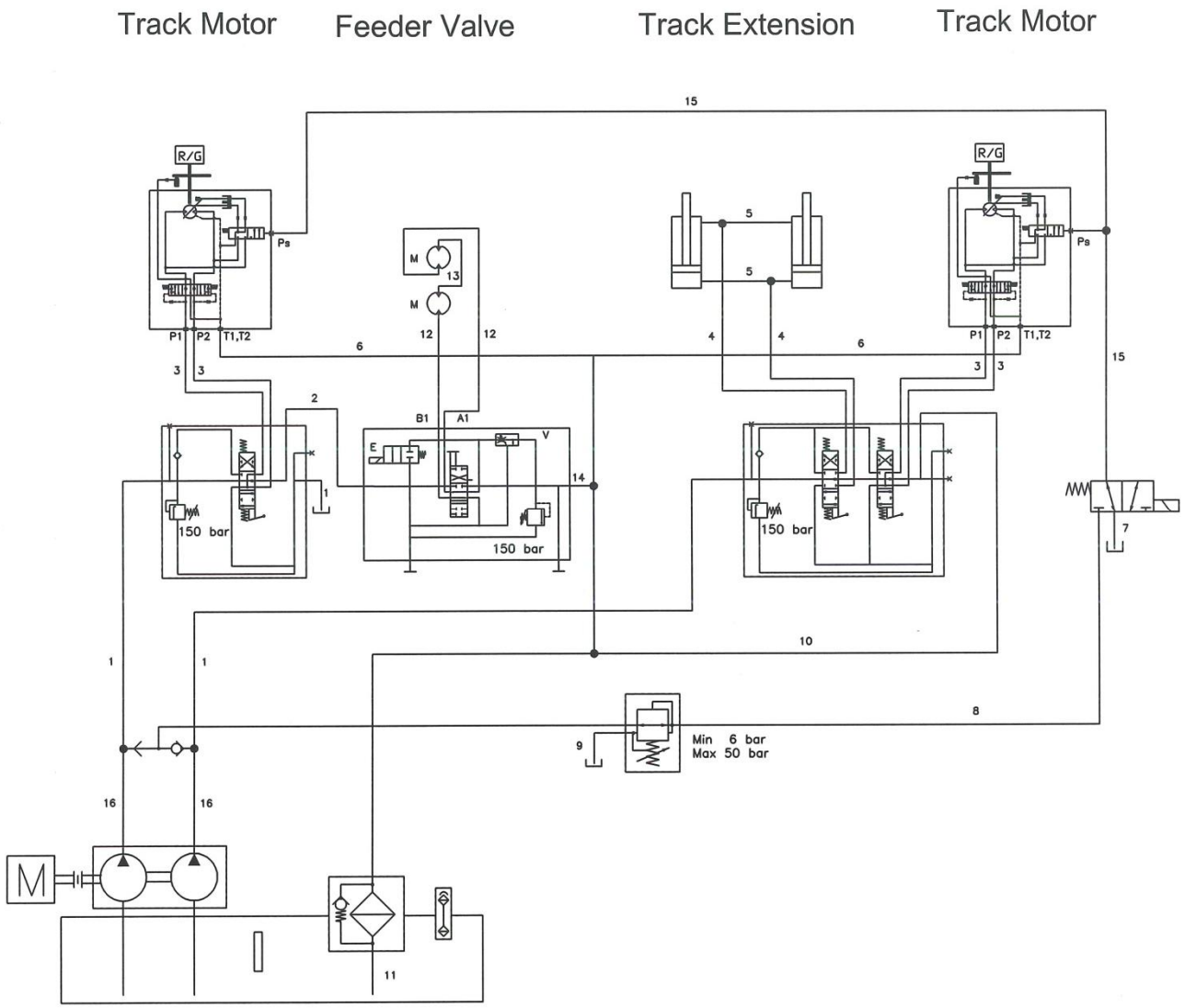


12 Hydraulics diagram, TP 160 with rpm monitor



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13 Hydraulics diagram, TP 160 TRACK with rpm monitor

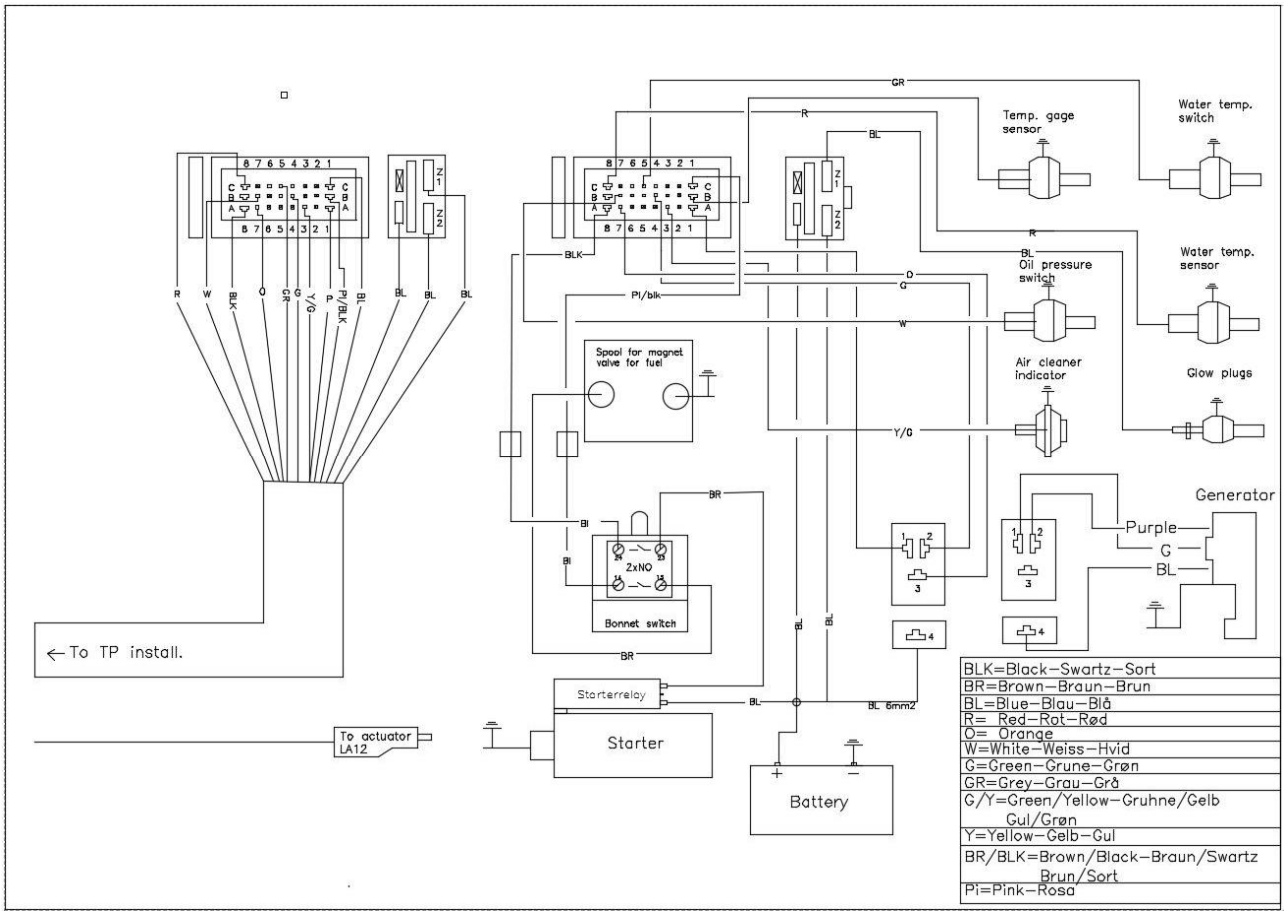


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14 Electrical diagram (TP 160 MOBILE and TP 160 TRACK)

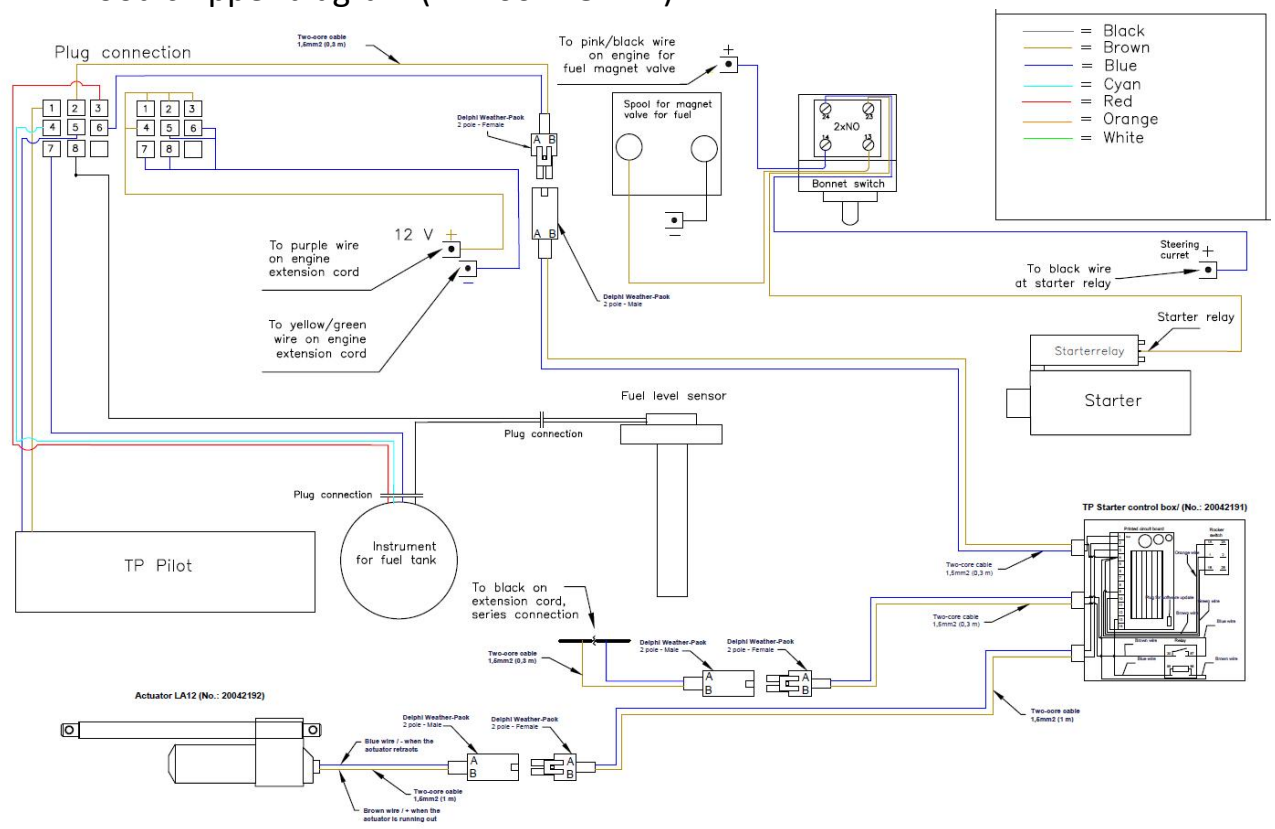
The electrical diagram for both the engine and wood chipper's power circuit is shown here.
The diagrams and power circuit are so comprehensive that they are divided into several images, with interfaces where appropriate. Note that the cable "To TP Installation" in the diagram below is the engine extension cable to the start box.

14.1 Engine diagram (TP 160 MOBILE and TP 160 TRACK)



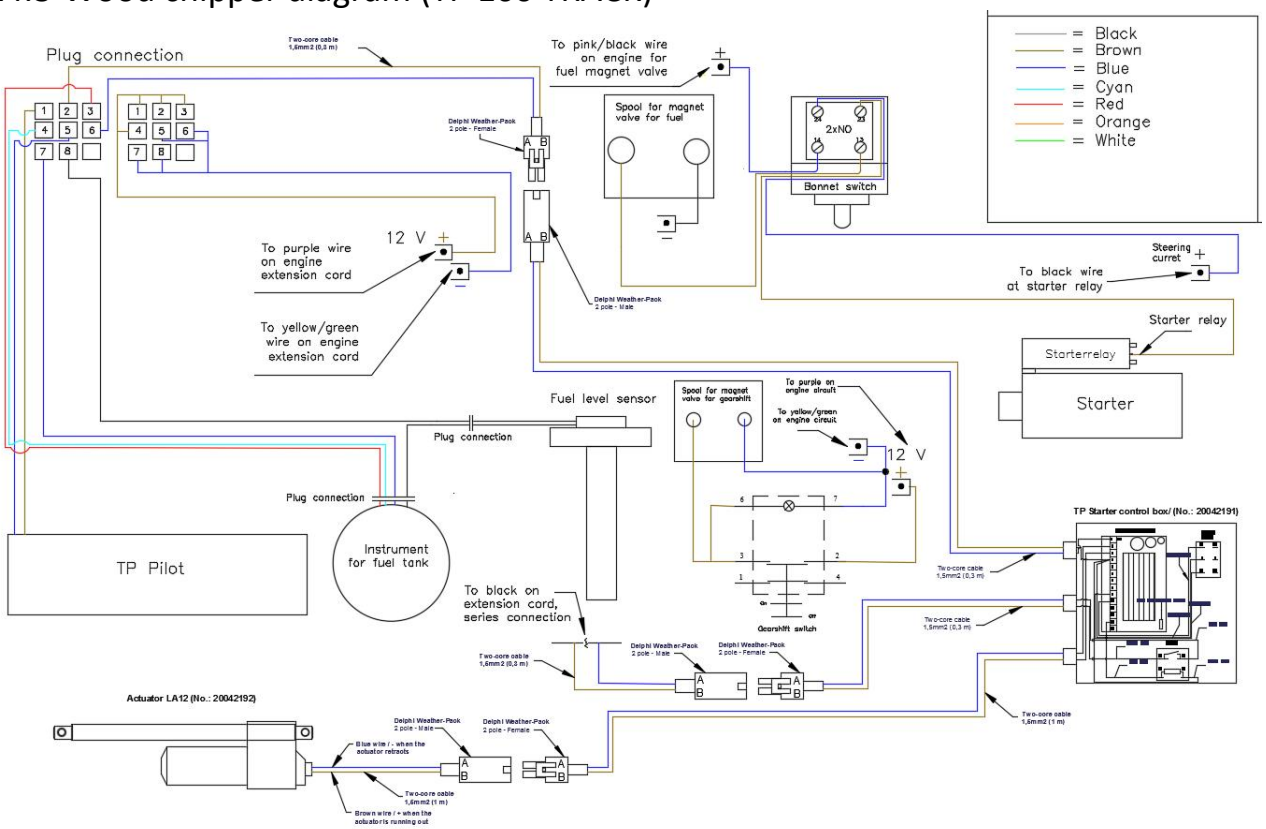
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14.2 Wood chipper diagram (TP 160 MOBILE)



For engine circuit, see user manual for Lombardini engine

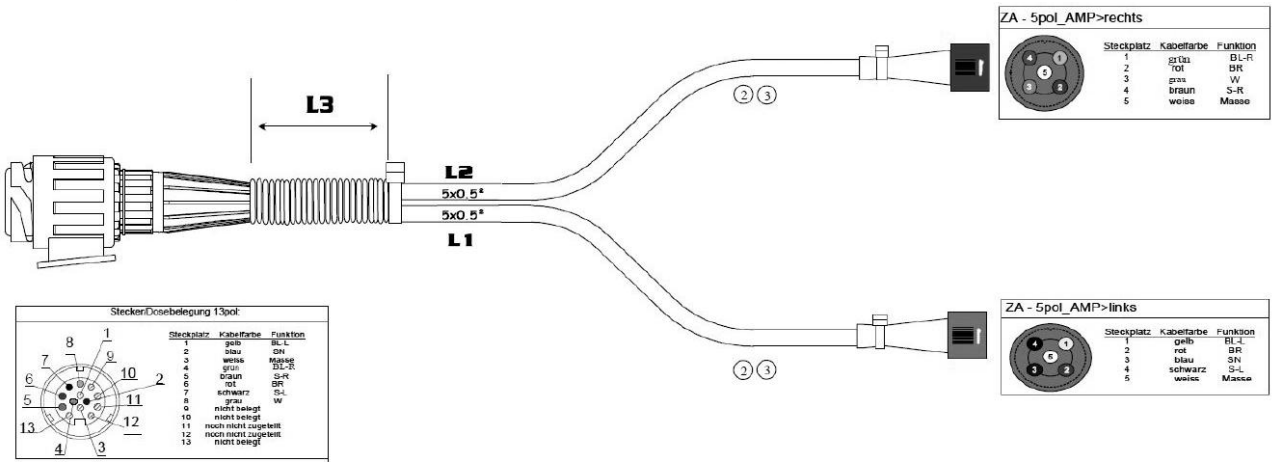
14.3 Wood chipper diagram (TP 160 TRACK)



For engine circuit, see user manual for Lombardini engine

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14.4 Trailer diagram (TP 160 MOBILE)



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15 Instructions for rpm monitor TP PILOT

15.1 Overall operation

The TP Pilot allows the user to monitor the revolutions of the disc and feed rollers and sounds an alarm when low or high limit values are exceeded.
The parameters for limit values and choice of machine type may be changed by entering a code, applicable from version 816.14. See the set-up table for the machine type.

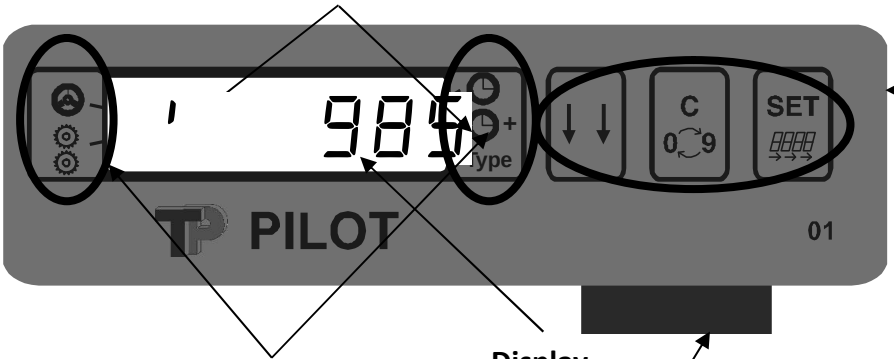
Different functions and display indications

The following functions are included in the computer:

Symbol:	Term:	Limit value:	Required code:
	Programmable revolutions monitor **Disc** (used with sensor for disc rpm)	1–9999 rpm (in practice not under 12 rpm)	X
	Programmable revolutions monitor **Roller** (used with sensor for roller rpm)	1–9999 rpm (in practice not under 12 rpm)	X
	Work time	0:0 – 99:59 hours:minutes 9999 whole hours	
+	Work time total	0:0 – 99:59 hours:minutes 9999 whole hours	
Type	Choice of machine type	1–26	X

Overview of the monitor

Marker
- Display marker (vertical or horizontal) at the sides of the display indicates which function is shown at the moment



Operation keys
- Change between display indications
- Starting changes to the marked value
- Programming of new numerical values and resetting.

Display indications
- Shows the possible functions (values) which can be shown in the display

Display

Connector
- Inputs to enclosed sensors and any outputs

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Explanation for operation keys

 **Key**

Press the  key to change between the different display indications (seen in the window at the left end of the display) and through that the different functions of the monitor. With every press of the key, the position of the marker/display indication changes one step. The marker starts in the top left corner and then moves “down”.

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

 **Key**

Use the  key for programming (change/delete) values in the computer, e.g. entering alarm values for high or low rpm.

 **Key**

Press the  key to change or delete the values that shall be programmed (must first flash by using the  key).

The computer is equipped with an internal memory which saves all values when the power is cut.

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15.2 Changing parameters and machine type

The TP Pilot is pre-programmed with 26 machine types with which the factory settings for the current machine type can be chosen.
The following parameters can be finely-adjusted, as needed:

Parameter	Meaning	Comment
L(ow)	Least rpm	Deviation from normal rpm. If the machine is loaded to under “lowest rpm”, the feeding is uncoupled so that the machine has the possibility of reaching normal rpm, at which point the rollers are re-coupled.
h(igh)	Normal rpm	Normal rpm, which the disc must maintain and at which point the feeding in starts.
T(ype)	Machine type	According to the set-up table for machine types

Triggers an alarm on the feed roller. If the rpm on the feed roller exceeds the upper limit value (Roller flashes) the display will blink between the current **rpm** and **high**.
Adjust the roller speed by turning the manual regulation of the oil quantity for the oil engines.
When the roller speed falls below the limit value again, the current rpm is displayed.

<u>Entering code</u>

When changing parameters and machine type, the code **1001** must be entered.
Procedure for entering code:

Use the  key to select what is required to be changed on the display.

Press the 

key for one second until _c0000 flashes.

Use the 

key to enter the first digit of the code number. Press the 

key to move the marker to the next digit in the number and so on, until all the digits are changed/programmed.

Finally, press the  key once to exit the menu.
The code must be entered with every change.

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Here you can see an example of the programming of limit values on the disc.

Example of changing low limit value to 850 rpm and high limit value to 1025 rpm		
Press the key:	**The display shows:**	**Explanation:**
↓↓	0	Find the revolution monitor for the disc by pushing the key repeatedly.
SET	L X800	Press the key for one second and **enter the access code**. L lights up on the left and the first digit (four digits in total) flashes.
C	L _800	Press the key until the digit has the correct value. NB: Zero is shown as _ in this position.
SET	L _X00	Press to set/change the next digit (the second digit will flash).
C	L _800	Press the key until the desired digit is correct.
SET	L _8X0	Press to set/change the next digit (the third digit will flash).
C	L _850	Press the key until the desired digit is correct.
SET	L _85X	Press to set/change the last digit.
C	L _850	Press the key until the desired digit is correct.
↓↓	h X000	Press the “arrow” key and “h” (high) will light up to the left and the first digit (of four) will flash.
C	h 1000	Press the key until the desired digit is correct. NB: Zero is shown as _ in this position.
SET	h 1X00	Press to set/change the next digit (the second digit will now flash).
C	h 1000	Press the key until the desired digit is correct.
SET	h 10X0	Press to set/change the next digit (the third digit will now flash).
C	h 1020	Press the key until the desired digit is correct.
SET	h 102X	Press to set/change the last digit.
C	h 1025	Press the key until the desired digit is correct.
↓↓		Press to exit the programming menu.

When an alarm limit on the disc is exceeded, the current rpm is still shown while the feed rollers are stopped.
If the disc has been under the lower limit value, the feed rollers will start when the disc’s rpm is again above the set upper limit value ‘h’ (e.g. 1000 rpm).

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Set-up table for included machine types.

Model	Disc rpm	rpm 1 L	rpm 1 h	Type No.
TP 160	*1000*	850	1000	13

Table for the rollers' rpm on the basis of the knife position.

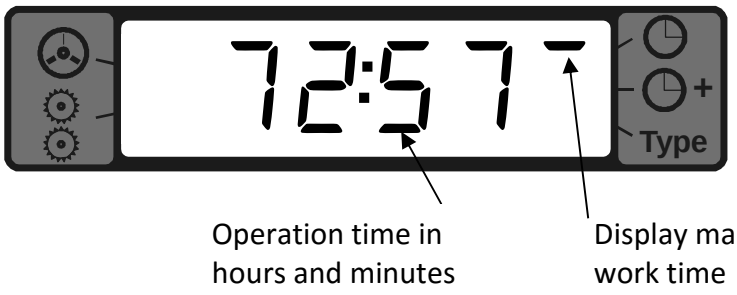
Knife position / Model	Disc rpm	4 mm rpm	6 mm rpm	8 mm rpm	10 mm rpm
TP 160	*1000*	15	22	29	36

From the above table the roller's rpm can be seen for the current position of the knives.
The rpm is set by means of the regulation screw on the control valve.

Working time on the machine:

Indication of rotation time on the machine

In this display indication, the middle horizontal marker is activated on the right side.
The complete rotation time will be shown as illustrated in the following figure.



- Over 99:59 hours/minutes, only whole hours are shown.

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Resetting the rotation time on the machine

Resetting the rotation time (operation time) on the machine can be done at any time. First, press the ↓↓ key until the display for work time appears. Next, enter the following:

Press the key:	**The display shows:**	**Explanation:**
↓↓	72:57 (example)	Find job hours by repeatedly pressing the key.
SET	72:57	Press the key for five seconds until the number blinks.
↓↓	00:00	Press the key to reset the rotation time.

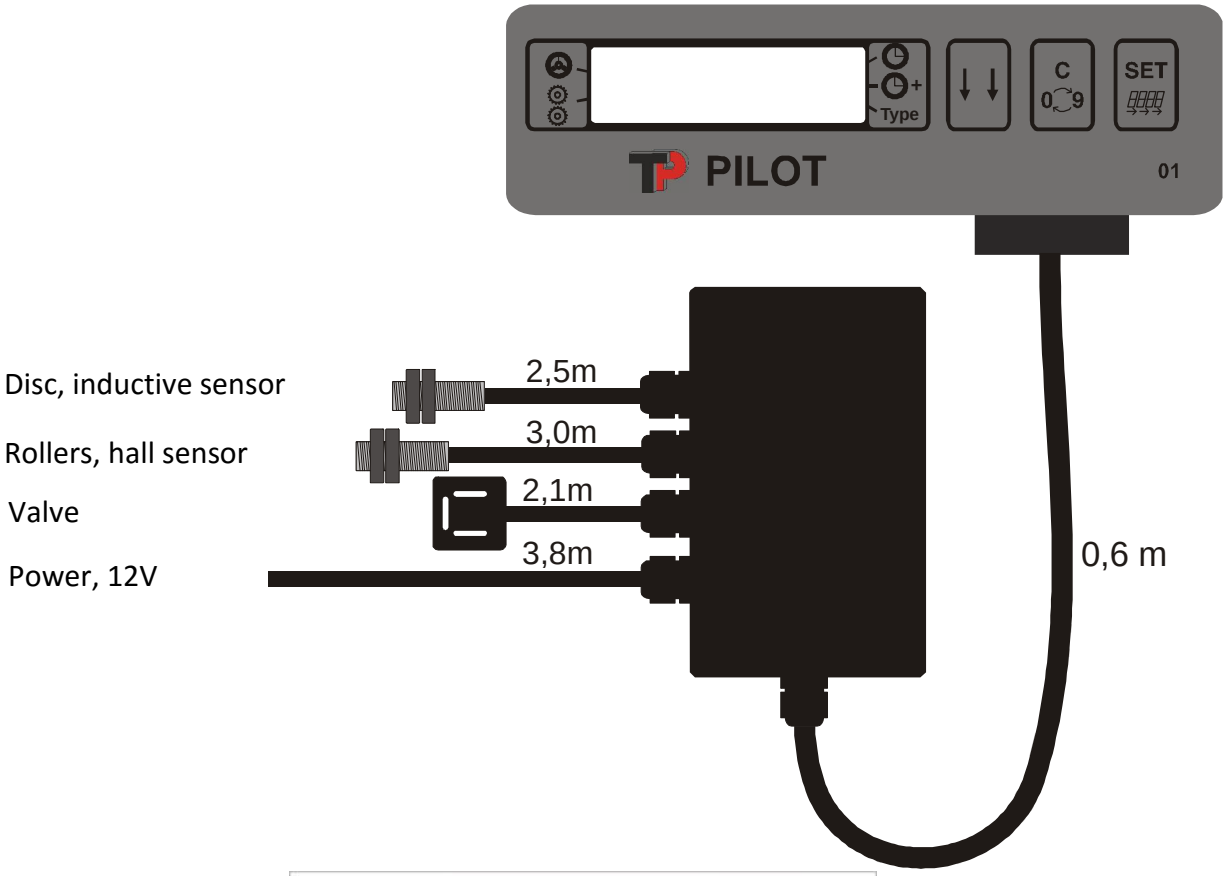
NB: Total hour counter (bottom vertical marker) cannot be reset. It is used for registering the machine's total work time.

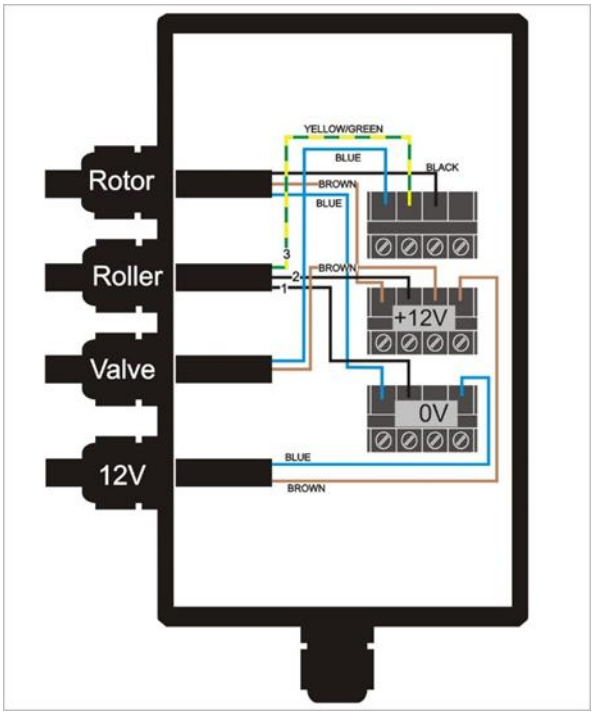
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15.3 Fitting

Mechanical setup and installation diagram

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





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15.4 Technical data

Display:	Six digits
Power supply:	12 VDC / 1.24 A
Temperature ranges:	TP Pilot is fully operational in the temperature range -10 to +70 °C.
Pulse signals from sensor:	Max. 225 pulses/second

NB:

The control/monitoring system has been designed for use in connection with the functions described. Any other use of the control/monitoring system may be associated with significant hazards and exempts the supplier of the control system from liability.

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16 Troubleshooting the TP 160 wood chipper

Check possible causes before contacting the supplier.

Problem/Possible Cause	Solution
The rollers are not turning around satisfactorily:	
Not enough oil in the hydraulics system	Fill up with hydraulic oil
The flow valve is screwed out too far	Turn up the flow
The fixed feed roller is blocked	Clean under and behind the roller
The bypass valve is dirty	Clean the bypass valve
The revolutions monitor is blocking operation	Increase the rpm on the disc
The safety bar is in the 0 position	Put the safety bar in the A position
The rollers are not pulling satisfactorily:	
Not enough flow	Screw out further the flow valve (opened)
The V-belts are too slack	Tighten the V-belts
The hydraulic oil is becoming too hot	Let the machine cool down while checking why
Poor viscosity of the hydraulic oil	Change the hydraulic oil
The hydraulic filter is clogged	Replace the hydraulic filter
The oil pump is worn or damaged	Replace the hydraulic pump
The oil engine is defective	Replace the oil engine
The pressure control valve in the control valve is dirty	Clean the pressure control valve
Unsatisfactory woodchip quality:	
The knives are blunt	Sharpen the knives
The counterknives are worn	Reverse/replace counterknives
The knives are worn too far down	Replace the knives
The distance between knives and counterknives is too great	Adjust the distance between the knives and counterknives
Sliver breaker not mounted or worn	Fit or replace the sliver breaker
Poor ejection of woodchip:	
Not enough driving power	Not enough power on the PTO shaft or the engine
Wiper is worn	Replace the wipers
The facing plate in the top part	Remove the facing plate from the top part
Too low rpm on the machine	Increase speed to maximum revolutions

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17 Warranty terms wood chipper

Refer to the issued warranty certificate.

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18 Technical data wood chipper

Type	TP 160 PTO (model with fixed funnel)	TP 160 MOBILE (model with foldable funnel)	TP 160 MOBILE (model with fixed funnel)
Chipping principle	Disc chipper	Disc chipper	Disc chipper
Disc diameter, mm	660	660	660
PTO rpm*	540	1000	1000
Total number of knives	2	2	2
Power requirement min./max. kW/(HP)	22–59/(30-80)	26/(35)	26/(35)
Max. wood diameter, mm	160	160	160
Max. woodchip length, mm	10	10	10
Weight, kg	585	834	830
Height, mm	2352	2440	2440
Width, mm	1170	1416	1416
Length, mm	2094	3857	3573

Type	TP 160 TRACK (model with foldable funnel)	TP 160 TRACK (model with fixed funnel)
Chipping principle	Disc chipper	Disc chipper
Disc diameter, mm	660	660
PTO rpm*	1000	1000
Total number of knives	2	2
Power requirement min./max. kW/(HP)	26/(35)	26/(35)
Max. wood diameter, mm	160	160
Max. woodchip length, mm	10	10
Weight, kg	1199	1195
Height, mm	2416	2416
Width, mm	1154	1130
Length, mm	3166	2878

*PTO transmission shaft: Free running Walterscheid type W400.

We reserve the right to make changes to the design and specifications without notice.

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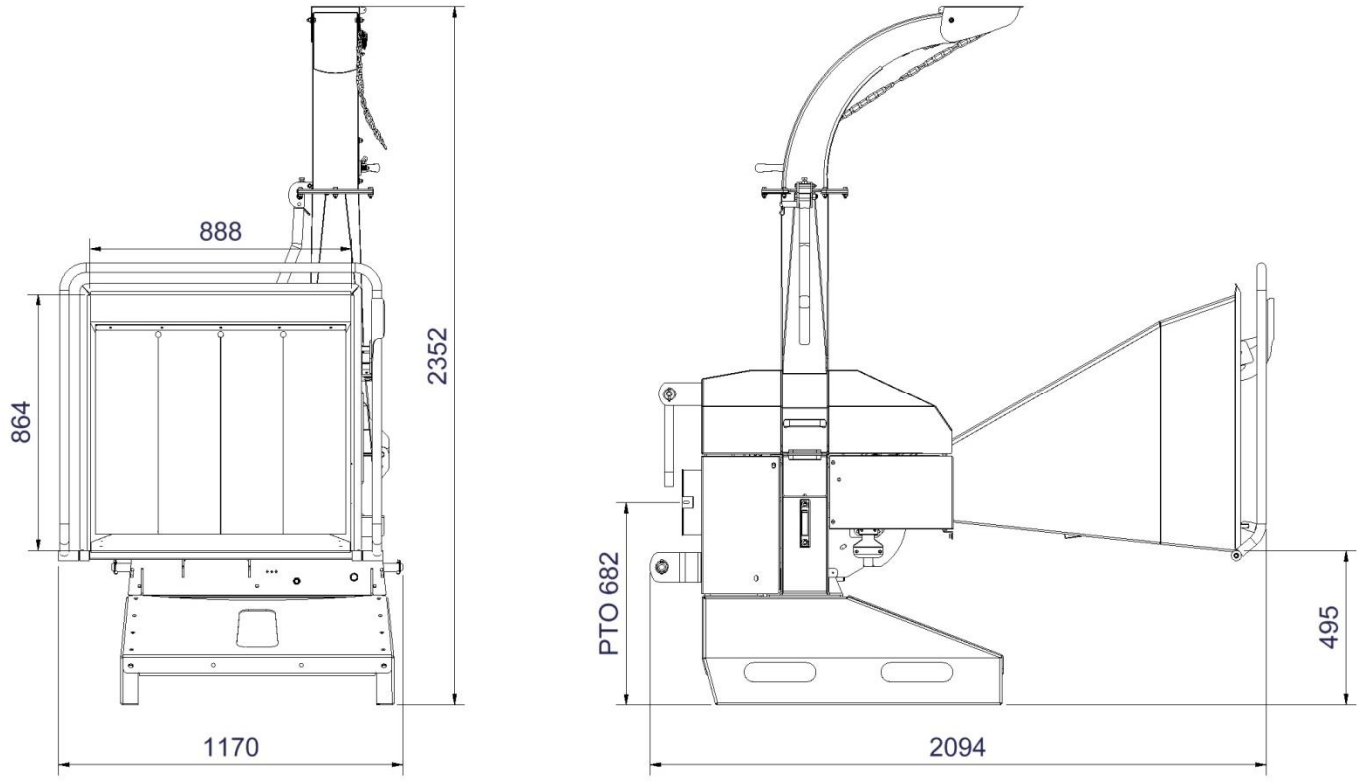


Figure 19 Dimensional drawing for TP 160 PTO with fixed funnel

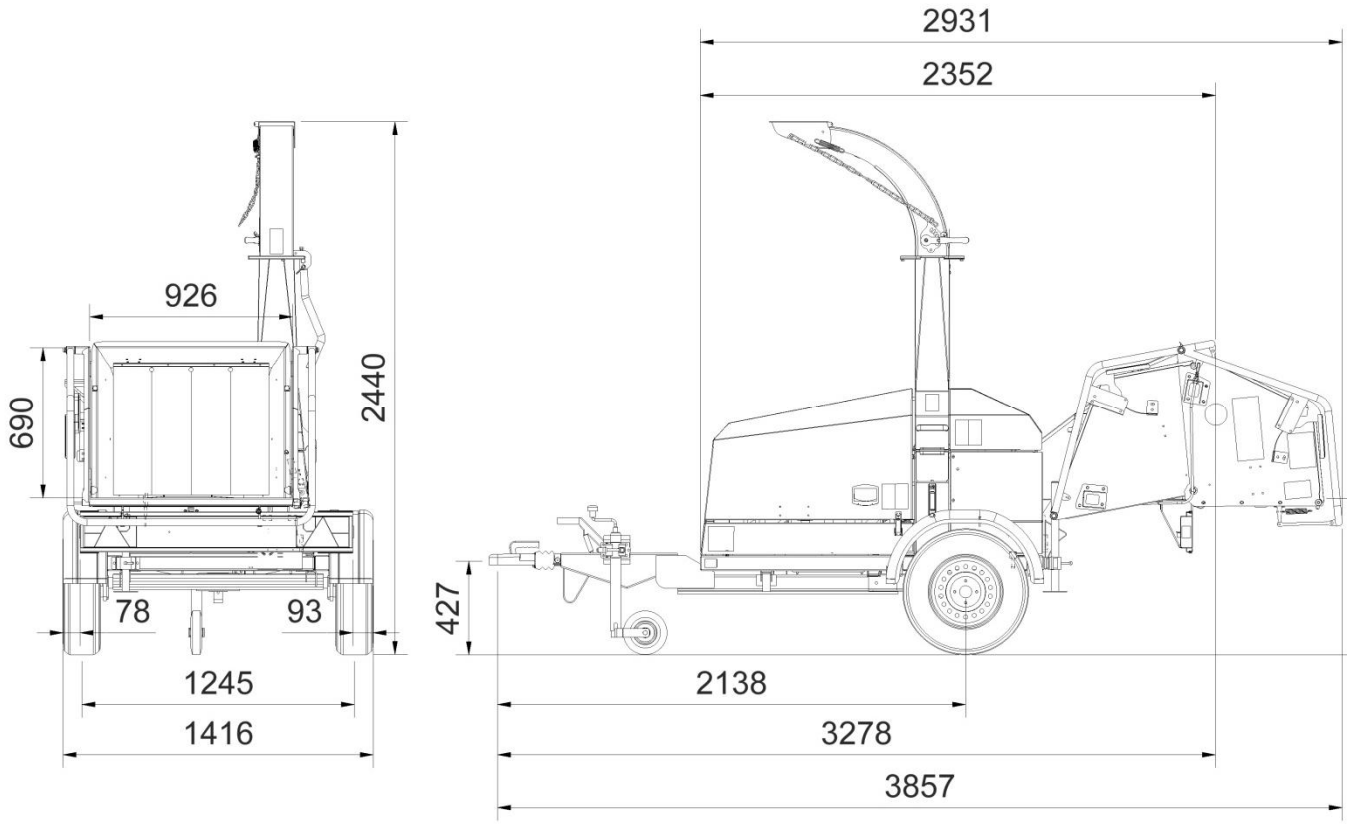


Figure 20 Dimensional drawing for TP 160 MOBILE with foldable funnel

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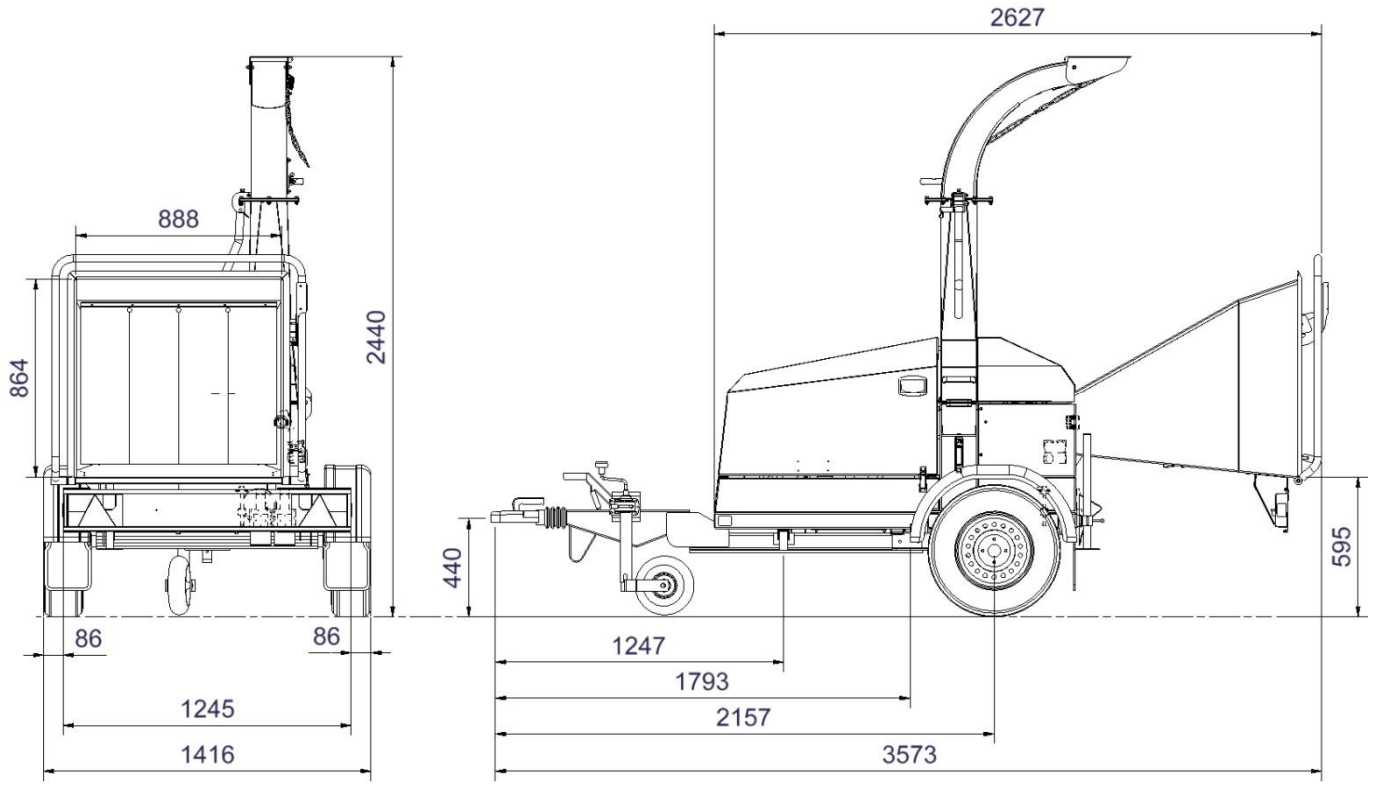


Figure 21 Dimensional drawing for TP 160 MOBILE with fixed funnel

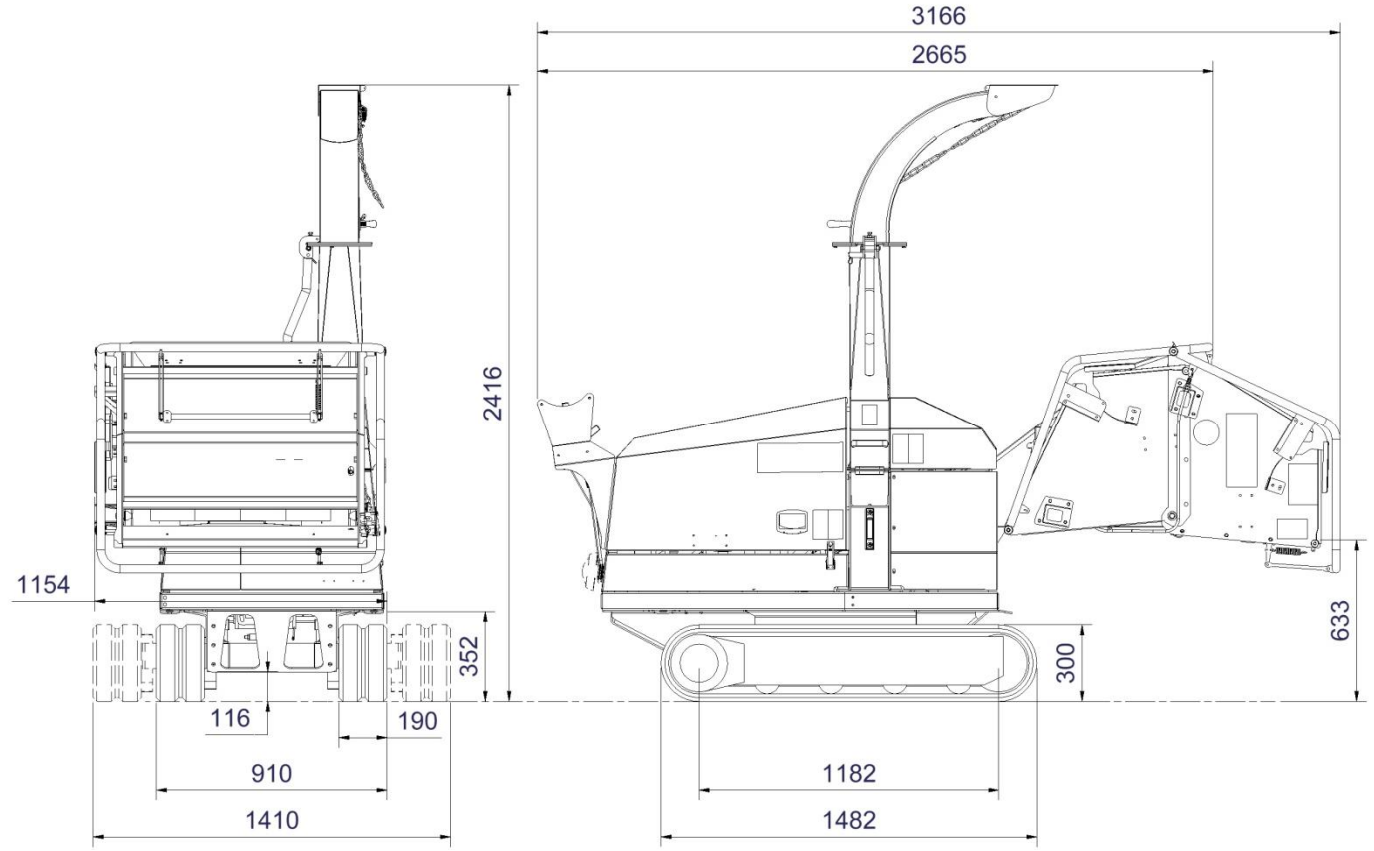


Figure 22 Dimensional drawing for TP 160 TRACK with foldable funnel

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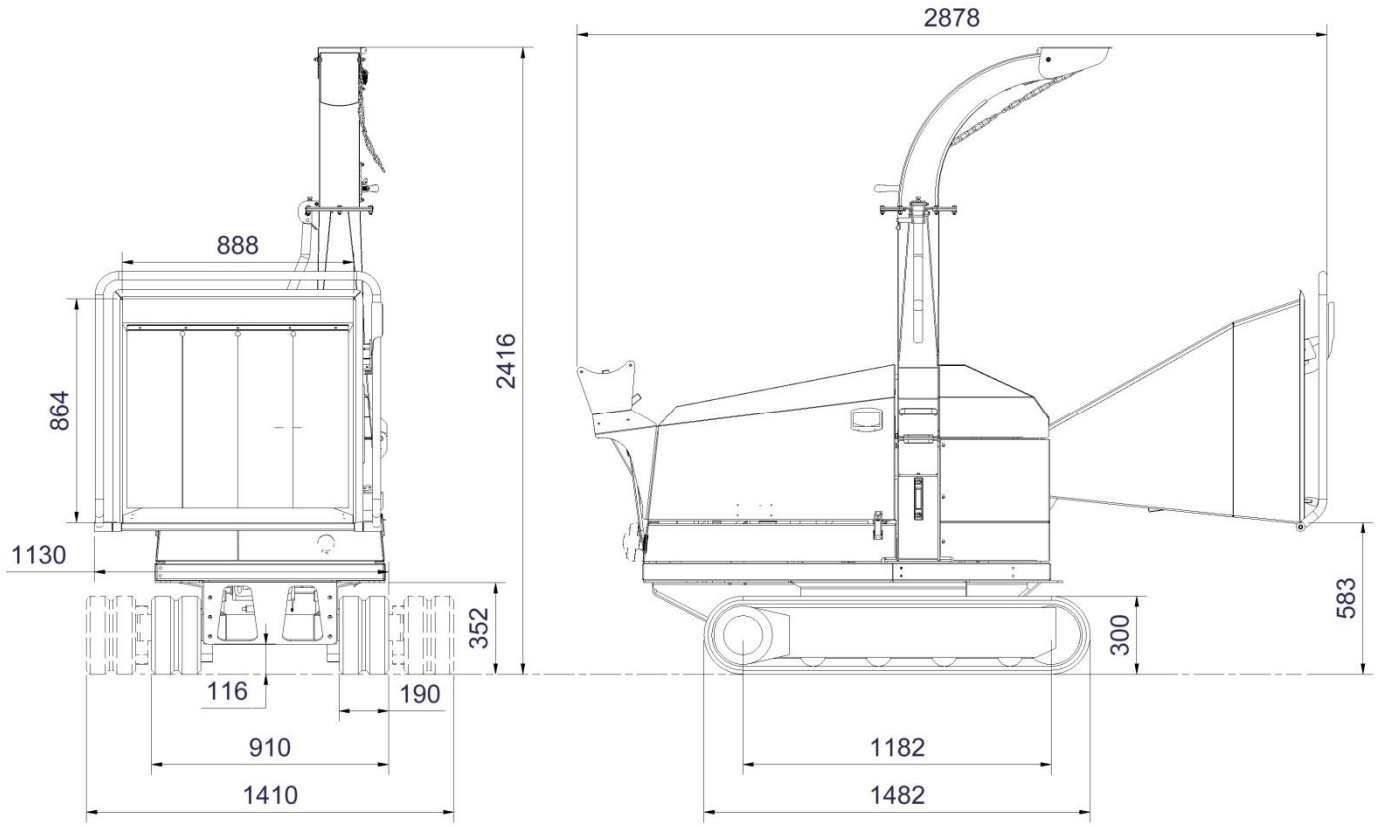


Figure 23 Dimensional drawing for TP 160 TRACK with fixed funnel

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19 Extra equipment

- Tool kit including torque spanner
- Extended ejector spout, horizontal
- Extension for ejector spout, vertical
- Lock for ball and socket coupling (TP 160 MOBILE)
- Light bar (TP 160 PTO)
- Trailer coupling (TP 160 PTO)

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20 Spare Parts Catalogue

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