

LASKI

SMRŽICE 263
798 17 ČR

email : info@laski.cz, www.laski.cz, tel. +420/582 305 740, 582 305 741

OPERATING INSTRUCTIONS



CHIPPER LS 160 model LS 160TT

version 02.2019





LS 160TT

Foreword

Thank you very much that you have just purchased our product, the chipper . Our company has been engaged in production of equipment for wood residues crushing and disposal for many years and has gained considerable experiences in this field. Quality of our small and also powerful machines is proven in 40 countries of Europe and Asia we export to.

Permanent innovation of the Laski s.r.o. manufacturing assortment was crowned by the Gold Medal for our complex family of shredding and chipping equipment KDO and LS at the occasion of the International Trade Fair.



Grand Prix Techagro 1998
Grand Prix Silva Regina 2002
Grand Prix Silva Regina 2008

This manual brings important instructions for users, i.e. instructions for putting the machine into operation, work safety and operating experiences. You will learn how to carry out maintenance, repairs and servicing and who is authorised for doing checks and other actions on the machine.

Your local dealer will give you this manual with instructions for operation and maintenance while taking this new machine over. Make sure, if you understand everything. If not, do not hesitate and contact your dealer and ask him for explanation. It is very important for you and your work safety to understand all instructions given in this manual.

The firm Laski spol. s r.o. does not bear any responsibility for any claims resulting from disobedience to the instructions given in this manual.

This operation manual includes also work safety instructions in various parts of the text. If there is any work safety rule or instruction in general description, then this instruction is indicated with the following symbol:



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EC CONFORMITY DECLARATION

issued in compliance with applicable EC Directives

We, as the manufacturer,
LASKI, s.r.o.
Blíšťka 263/16
CZ-798 17 Smržice
CRN: 45479593

declare hereby that our product: - designation: **Chipper**

- type: **LS 160**

- model: **LS 160 TT**

-serial number:

complies with the given CE directives

2006/42/EC – MD

List of technical standards, specifications and harmonised norms used for review of its conformity:
EN 13525+A2, EN ISO 14120, EN ISO 3744, ISO 3767-1, EN ISO 12100, EN ISO 19353, EN ISO 13732-1, EN ISO 13857, EN 1175-2+A1, EN ISO 4413, EN ISO 4254-1, ISO 11 684

Basic technical parameters:

Parameter	UnitJednotka	ValueVeličina
Length	mm	2350/2110
Width	mm	1400
Height operation/transport	mm	2590/1990
Weight	kg	740
Power needed	kW	22 – 40
Speed P.T.O.	min ⁻¹	1000 (540)
Max. Ø of material to be chipped	mm	160

Completion of technical documentation:

Ing. Jiří Kvasnička
Petra Bezručů 205
CZ-664 43 Želešice

In Smržice, on 7.10.2018



Ing. Jiří Kvasnička

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- designation: **Chipper**
- type: **LS 160**
- model: **LS 160 TT**
serial number:

complies with the given EC Directives:

Directive No. 2014/30/EC - EMC

List of technical standards,
specifications and
harmonised norms used for
assessment of its conformity

ČSN EN ISO 14982

Basic technical parameters:

Parameter	Unit	Value
Length	mm	2350/2110
Width	mm	1400
Height operation/transport	mm	2590/1990
Weight	kg	740
Max. Ø of material to be chipped	mm	160

In Smržice, on 7.10.2018



Ing. Jiří Kvasnička



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Product Identification

Our product is identified with its serial number stamped also on the type plate on its three-point hitch. Upon take-over of the product we recommend you to fill required data in the following form concerning the given product and your dealer

Type of product:

Serial number of product:

Dealer's address:

Address of authorised service:

Date of delivery:

Warranty expiration date:

Interruption of warranty period:

This type plate includes:



- manufacturer's data
- product trade name
- type
- model
- year of manufacture and serial number
- weight of machine
- drive and PTO shaft speed





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Work Safety Instructions

Utilisation

This chipper, being coupled with a tractor three-point hitch, is designed for disposal of wood waste, twigs, barks, branch-wood and other above-ground biomass or for manufacture of chips from aforesaid materials and also for disposal of redundant timber, such as sticks, deals, pickets etc.

This chipper is designed for material loading while the tractor is standing on flat and compact surface. In front of the loading chute there should be an area with minimum free space of about 5 m. The chipper can dispose all these materials with diameter up to 160 mm or flat boards and plates with thickness up to 60 mm. These wooden pieces must be free of metal, glass and other similar objects. While working, the chipper must be relatively levelled.

The chipper should be controlled and operated by two attendants who in turns load materials to be chipped in a loading chute.

On the machine rear side there is a hitch for towing of a trailer during chipping. It is only a two-axle trailer allowed to be coupled to the chipper. Max. permissible gross weight of the trailer to be towed is 8000 kg. Min. gross weight of a towing tractor should be 5000 kg. In this case the tractor on its front axle should bear min. ballast weight of 500 kg. It is forbidden to couple a trailer to the chipper for its transport/towing on public roads. It is not allowed to exceed max. permissible speed of the tractor respectively of the trailer, i.e. 5 km/h on even ground.

Not Allowed Use

The chipper is not allowed to be used for disposal of aforesaid materials with foreign matters and objects, such as metal, steel binding bands, glass cullet, stony debris, ceramics etc.

It is not possible to use the chipper in the presence of unauthorised persons who may stand or move in direction of discharge ducting. At work in residential zones use the machine in accordance with regulations of the local authorities to avoid disturbing of local inhabitants (noise level). While chipping, it is not allowed to enter the area of ejected flying wooden chips.

On hilly terrain its loading chute height should not be lower than 600 mm.

It is not allowed to stand on higher spots around the machine while loading materials into the chute.



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Should some bar materials be loaded, then particular bars should be only up to 3 m long.

Do not load materials with diameters exceeding 160 mm or wooden boards with thickness more than 60 mm.

It is strictly forbidden to start the chipper with its cardan shaft damaged.

It is strictly forbidden to start the chipper without observance of all routine maintenance intervals. For work safety reasons it is always very important to carry out all regular checks and service inspections, especially on working elements, as specified in this manual and to keep this machine in good operating condition. The manufacturer provides warranty on this product for a period as stated in the enclosed Letter of Indemnity. The manufacturer bears no responsibility for damages resulted from disobedience to instructions given in this manual. Strict observance of all routine maintenance intervals belong also to the given conditions of the warranty provided by the manufacturer. Any breach of these conditions means cancellation of the given warranty.

The owner of this machine is responsible for the operators who should be demonstrably instructed and trained in attendance, safety work and routine maintenance of this machine. In proof of this demonstrably made training the operators shall sign the enclosed Letter of Indemnity.

It is strictly forbidden to couple to the hitch on the machine the following variants:

- a single-axle semi-trailer (doesn't matter if braked or unbraked),
- an unbraked two-axle trailer,
- a braked two-axle trailer that is equipped only with a single-line air brake,
- a trailer if gross weight of a towing tractor is lower than 5000 kg; the tractor on its front axle should bear min. ballast weight of 500 kg.
- an approved trailer to be coupled while chipping.

Generally

- This machine is allowed to be operated only by operators who are over 18 yrs old, physically and mentally capable and demonstrably instructed and trained in its operation.

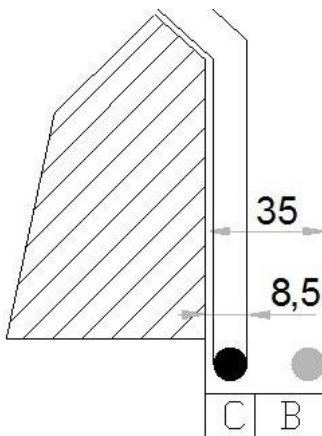
The owner of this machine is also responsible for the operators who should be demonstrably instructed and trained in attendance, safety work and routine maintenance of this machine. In proof of this demonstrably made instruction and training the operators shall sign the enclosed Letter of Indemnity. Without



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this signature any warranty claims, if submitted, cannot be accepted by the manufacturer.

- The chipper should be controlled and operated by two operators. Persons under the influence of drugs, alcohol or medication affecting reaction time must never work on or with this machine.
- One of two attendants at least (a tractor driver) should have a respective driver's license, group "T".
- Training courses for the operating staff should include also practical operation under supervision of an experienced person or your dealer and with explanation of necessary work safety instructions.
- Before working learn all functions of individual controls and safety elements and carry out functional checks before any use. Check especially loading of materials, functionality and height of the controller frame.
- By pushing the concerned controller in direction of material input the machine should stop material loading immediately. Any repeated putting machine into operation is possible only after bringing the frame in its initial position and pushing the green button on the chute. **The controller frame has to be advanced in front of the hinged loading chute edge so that the attendant stops the loading rolls at pushing the frame by hand (or leg or belly).**
- It is strictly forbidden to change or to set the controller frame so that the STOP position is under the loading chute edge.



- To stop loading it is also possible to press the STOP button under the loading chute. For deactivation turn the STOP button slightly and pull it up. Any other

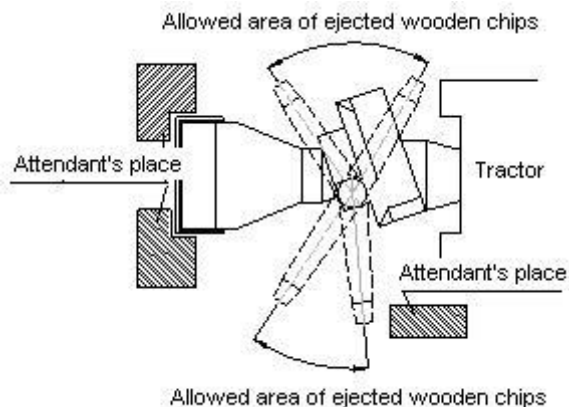


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repeated putting machine into operation is analogical, i.e. after bringing the frame in its initial position and pushing the green button on the chute.

- It is forbidden to tighten the fixing nuts on the safety frame with intend to increase its resistance against unwished switching off. Required force for switching control should remain on values preset by the manufacturer, i.e. up to 80 N in the lower horizontal frame part.
- Any removal of safety elements and guards from the machine and any further operation without them are strictly forbidden.
- While chipping it is not allowed to enter the area of ejected flying wooden chips Every operator of this machine is fully responsible for any injury or damage caused to the third persons within the operating reach of the machine.
- The end piece of the discharge duct (its upper turnable part) can be set only in angles, see following figure. Never direct it toward the attendant's place!!
- **This product is equipped with a swivel base on the upper frame part. It enables also extra-axial turning of the chipper with its loading chute, especially in case of need to couple a trailer. In this case the discharge duct should be set perpendicularly or in an angle exceeding 90°. Turn the discharge duck in the required direction but never direct it to the attendant's place or to directly surrounding space.**
- **While turning the loading chute as needed, do not direct the discharge duct towards the towing tractor.**
- Before work check up, if the swivel base is properly blocked in its position and if its locking pin is in the required hole on the base.
-

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Swivel base locking

- On the machine rear side there is a hitch for towing of a trailer during chipping. Insert the drawbar of the trailer in the hitch and lock it properly with a corresponding locking pin.
- For displacement of the chipper with a coupled trailer to another site on short distances the tractor driver must keep all local regulations valid for public roads. It is not allowed to exceed max. permissible speed of the tractor or of the trailer, i.e. 5 km/h on even ground. Min. gross weight of a towing tractor should be 5000 kg. In this case the tractor on its front axle should bear min. ballast weight of 500 kg.



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- While chipping, the chipper should fully rest on the ground with its supporting feet.
- It is forbidden to couple any semi-trailer to this machine.
- It is strictly forbidden to let the chipper sink and work in any trenches and similar undulation of the ground. On hilly terrain avoid changes of its loading chute height up or down.
- Keep this machine beyond children's and unauthorised person's reach. Avoid their attendance while chipping.
- When using the chipper without any container or closed bin, keep anybody beyond the area where chips are being thrown.
- It is not allowed to look into closed trailer bodies or containers (if used) while chipping.
- When using the chipper with such a bin, never look inside if the chipper is still working.
- When leaving the machine take always the switch key out of ignition.
- Every operator of this machine is fully responsible for any injury or damage caused to the third persons within the operating reach of the machine.
- At work in residential zones use the machine in accordance with regulations of the local authorities to avoid disturbing of local inhabitants (noise, flying chips).
- Warning!!! Be aware of ejected particles. They have substantial kinetic energy. If the wooden material to be loaded contains not allowed parts, such as metal, sand, glass etc., then such objects can reach a longer distance than wooden chips. Therefore direct the discharge duct in order to regulate ejecting as needed.
- Instructions for use of the cardan shaft operation and the trailing tractor are an integral part of this manual and should be always respected.
- Warning!!! Be aware of ejected particles. They have substantial kinetic energy. If the wooden material to be loaded contains not allowed parts, such as metal, sand, glass etc., then such objects can reach a longer distance than wooden chips. Therefore direct the discharge duct in order to regulate ejecting as needed.
- While backing to couple a trailer, nobody is allowed to stand between the chipper and the trailer. Ask other person to assist you at coupling. The tractor driver must always keep an eye on the person who attends this operation.
- While backing to couple a trailer, nobody is allowed to stand between the chipper and the trailer. Ask other person to assist you at coupling. The tractor driver must always keep an eye on the person who attends this operation.



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- First it is necessary to couple the cardan shaft to the chipper input shaft, then the lower linkage, the upper drawbar of the three-point hitch and finally the tractor PTO shaft.
- Before uncoupling the chipper from the tractor, first set the chipper parts in their transport position, see art. "Transport on public roads."
- It is strictly forbidden to couple the drawbar of a trailer if the hitch or its locking means are damaged. Check up also the air-brake couplers and the plug of electric installation for contingent damage and completeness.
-

While chipping the operator is obliged:

- ❑ to use only such a chipper which is in optimal operating condition, not damaged through transport, storage or from previous operation,
- ❑ For transport on public roads the machine chassis must comply with instructions in its operating manual. For work this chipper must be always kept in good technical order, particularly with stress laid on its working and safety elements.
- Do not work with the input and PTO shaft guards damaged.
- Turn the chipper immediately off if any safety elements on the in-feed and chipping devices or on the chassis are found damaged, incomplete or non-functional.
- ❑ to check functions of all controls and safety elements, particularly the controller frame, before putting the chipper into operation,
- ❑ to avoid disturbing of other people with noise, exhaust fumes or ejected flying particles (at windy weather),
- Keep traffic rules and local regulations while going or working on or nearby public roads.
- Before work, i.e. before setting the PTO shaft in motion, first set the loading chute and the discharge duct as needed.
- Do not turn the swivel base while the PTO shaft is still running.
- ❑ Clean the duct **at standstill only**. For cleaning use only suitable hooks or bars to release pressed materials. After repeated putting the chipper into operation let the machine run idle in the chipping mode to empty the whole discharge ducting. If proper cleaning is required, then take always the switch key out of ignition before removing its hoods.
- While working, never lean over the loading chute and never push wooden materials by hand or foot. While being loaded, short and fine materials may



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clog the space in the loading chute. To avoid such problems put occasionally also some longer branches or use always a wooden stick 160 cm long at least to push materials between the loading rolls.

- If necessary, turn off the PTO shaft and the tractor engine and clean the loading chute or the discharge duct at standstill only. For cleaning use only a suitable hook or a stick to release the pressed material.
- If the wooden stick were chipped, just take a new one and then go on working.
- ❑ While working wear always personal protective equipment - protecting shield or goggles, protective gloves, working shoes and working cloth properly buttoned. Avoid wearing free parts, such as ties, scarves and shawls, belts etc. In case of longer hairs use always a proper head piece. Otherwise, such a person is not allowed to operate this machine.
- ❑ While working, wear always personal protective aids – protecting shield or goggles, protective gloves, working shoes and working cloth properly buttoned. Avoid wearing free parts, such as ties, scarves and shawls, belts etc. In case of longer hairs use always a proper head piece. Otherwise, such a person is not allowed to operate this machine.
- ❑ In case of two attendants it is necessary to make simple signals clear before working and to appoint one who will manage the work.
- Keep traffic lights and work safety symbols in proper order
- While chipping, keep always an eye on the wooden pieces to be chipped. The chipper is not allowed to be used for disposal of wood with foreign matters and objects such as metal, steel binding bands, nails, glass cullet, stony debris, ceramics etc. If you find any, stop working immediately, turn the engine off, wait for run-out of all rotary parts and check all working elements and blades for good condition.
- While chipping hard or dry wood, shorten the given intervals for checking the blades accordingly. It is valid also for any heavy dirt on the wooden pieces, such as clay and mud. It is strictly forbidden to go on working with blunt blades, broken and chipped cutting edges that may cause damage also of other assembly groups.
- The wooden pieces to be chipped must be free of glass cullet, metal (wires, nails), stones and other similar objects.
- This manual describes problems and faults which could occur at work and which may be remedied by an instructed person. In case of other problems and faults do not hesitate and contact the manufacturer. He is always ready to help you.



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- Never do any technical changes or any actions which are neither given in this manual nor allowed by the manufacturer. The machine, not correctly installed or adjusted, may run without problems now but in the future it could damage any of important parts. Pay regular attention to all joints and bolts. Keep them properly tightened.
- Do not put any objects or tools on the machine.
- The manufacturer does not bear responsibility for any damages or injuries caused to the third persons or to other equipment resulted from disobedience to instructions given in this manual..
- When handing the machine over to another person make sure if all controls, guards and other safety elements are complete and fully functional.
- Never remove guards and other safety elements. They serve for your safety.
- Keep the given intervals for checks of bolted joints.
- Always after work clean all parts of the machine properly. Pay your attention especially to any oil spots or fuel leakage. Clean any oily spots.
- Some parts of the machine can be hot while in operation. Avoid any settling of flammable chipped materials or dust on such parts and close to the hydraulic oil tank. Stop working if such deposits exceed 1 mm and clean such spots immediately.
- Any servicing can be done only if the machine was put out of operation, its battery was disconnected and the cardan shaft was uncoupled. If the chipper is still coupled to the three-point hitch, block the tractor (wheels) against unwanted motion.
- Do not use petrol as a cleaning agent.
- Keep open fire away while filling the tank.
- Some parts of the machine run warm, such as hydraulic elements, belts and pulleys. Do not touch them when the engine is still running or having been just stopped.
- Do not let the engine running in high speed unreasonably.
- Do not start the machine in confined or ill-ventilated spaces. Combustion gases outgoing from a tractor are toxic!
- Do not use the machine under conditions of low visibility, especially at foggy weather on public roads.
- Do not use the machine without prior reading this manual.
- Do not carry out any repairs that are specified for authorised services only Do





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not carry out any repair where its solution exceeds your experiences.

- It is strictly forbidden to work with the chipping device damaged (out-of-balance, vibrations while running).
- While servicing the chipping device, or in the vicinity thereof, it should be always blocked against unwilling motion (with its safety pin inserted).

Before transport on public roads:

- ❑ Set the swivel base and upper movable parts of the chipper in the transport position, i.e. its discharge duct turned, folded down in the loading chute support, the loading chute folded down so that the marker lamps must remain visible, the swivel base turned so that the loading chute, resp. the marker lamps remain visible from behind (perpendicularly to the longitudinal axe of the machine), see fig.
- ❑ Fold down the prolonged end piece of the discharge duct and lock it in its transport position.
- ❑ Before going on public roads, check up proper coupling and all locks in the three-point hitch on the tractor.
- ❑ Plug and check traffic lights of the chipper.
- ❑ If necessary, remove all mud, especially from tires, before coming to a public road.
- ❑ Fold down the prolonged end piece of the discharge duct and lock it in its transport position.



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Motor Vehicle Construction and Use Regulations

1. This machine is allowed to be coupled to a tractor provided that actual weight of the tractor in such an attachment does not exceed its maximum permissible value and its actual front axle load does not fall under 20% of its gross weight.
2. At public road transport the machine rear must be completed with a portable set of rear lamps and reflector glasses supplied by the manufacturer.
3. Under conditions of very low visibility any public road transport is not allowed.
4. Any public road transport without this portable set of rear lamps and reflector glasses is not allowed – these lamps must always be turned on.
5. This portable set should comprise:
 - 2 plates with red-white hatching with reflecting surface
 - 2 rear combined lamps with side, stop and direction indicator lights
 - 2 rear triangular red reflector glasses
 - 1 warning triangle for marking of slow-moving vehiclesShould the tractor speed be higher than 40 km/h, then the warning triangle for slow-moving vehicles is unnecessary.
6. The distance between the outer edge of lamps and reflector glasses in the portable set and the contour line of the vehicle should not exceed 400 mm.
7. At public road transport this machine must be lifted up in its transport position, see instructions in this manual.











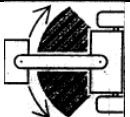

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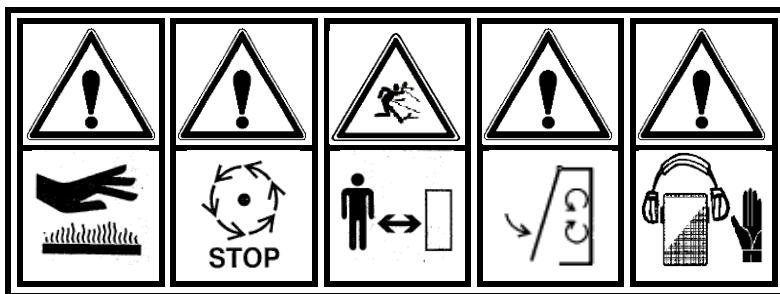
8. In the transport position all functions of the chipper are stopped and turned off: the PTO shaft of the tractor is off, the chipper is lifted up (with clear height of 300-350 mm), the charge duct turned, folded down in the loading chute support and mechanically locked, the loading chute is set rearwards, folded down and mechanically locked, the hinged part of the loading chute is folded upwards and mechanically locked and the seven-pin plug of electric installation is engaged in the tractor receptacle.
9. For work on public roads the towing vehicle must be equipped with a beacon of orange colour for flashing and as a road obstacle labelled.
10. The max. permissible speed on public roads without trailer should be 40 km.h⁻¹ or in accordance with the tractor certificate of roadworthiness.
11. Should the max. speed sign on the tractor be covered by the coupled machine, then it should be attached to the left plate on the machine rear.
12. Always before coming to a public road it is necessary to remove all mud, especially from the tractor tires and accumulated sediments from the machine.
13. At public road transport the driver must keep the utmost diligence due to the fact that the rear part of the coupled machine swings out while manoeuvring.
14. At public road transport the tractor driver must keep also all local regulations valid for public roads.
15. It is forbidden to couple a trailer to the chipper for its transport/towing on public roads. It is forbidden to use the hitch on the machine for transport of a trailer. The hitch is intended solely for towing a trailer on even ground, i.e. for displacement of the chipper with a coupled trailer to another site on short distances during chipping. In this connection it is not allowed to exceed max. permissible speed of the tractor respectively of the trailer, i.e. 5 km/h on even ground, see also art. "Range of Use".
16. This machine is approved for road traffic in accordance with applicable traffic rules and related local regulations. Other technical conditions are stated in the concerned certificate supplied by the manufacturer with every machine.
17. For purposes of contingent traffic police checking the driver should always have the concerned vehicle identification card.

Work Safety Symbols

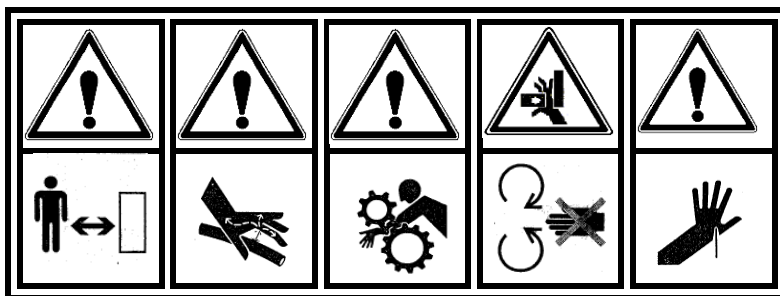


This article introduces work safety symbols (pictographs) used on this machine. Under the given pos. number there is their location on the machine. These work safety symbols warn the operator against risks connected with the machine use. Your respect to the symbol meanings is a precondition for your work safety.

				
				
1	2	3	4	5
Read this operating manual before use.	Always follow the manual while maintaining, servicing or repairing the machine and take always the switch key out of ignition.	Do not stand between tractor and equipment while coupling.	Warning! It swings out while turning.	Warning! Rotating parts - accident risk.



6	7	8	9	10
Warning! Hot parts.	Warning! Turning part is running out.	Warning! Ejected objects hazard. Keep away.	Warning! Close all guards before starting the machine.	Wear personal protective equipment.



11	12	13	14	15
Keep safety distance.	Warning! Risk of high-pressure liquid leakage	Warning! Rotating rolls. Pull-in hazard.	Warning! Hazard of extremity injury by rotating part	Warning! Accident risk.



The user is obliged to keep all the work safety symbols legible, clear and undamaged. In case of any damage or illegibility ask your local dealer or an authorised service for a new relevant pictograph.

Residual Risks



OIL PRODUCTS

Hydraulic oil can be injurious to the skin - wash it off as soon as



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possible. If taken internally, seek immediate medical attention. Refer to your local fuel supplier for the MSDS sheet.

Store hydraulic oil only in approved containers, in well ventilated, unoccupied buildings and away from naked flames.

EXHAUST FUMES

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odourless, colourless and can cause death if inhaled. Avoid inhaling exhaust fumes and let never run the tractor engine in a closed building or confined area with insufficient ventilation.

HOT PARTS

Some machine components (rotating parts, metal parts of hydraulics, hydromotor etc.) can get extremely hot from operation. To prevent severe burns, do not touch these areas while the machine is still running - or immediately after it is turned off.

ELECTRICAL SHOCKS

Never touch electrical wires or components while the machine is still running - they can be sources of electrical shocks.

ROTATING CHIPPING WHEEL

When the drive is turned off, the chipping wheel could continue to rotate for a short while. Its teeth are sharp and could cause damage or injury even while not in motion.

PERSONAL SAFETY

The following personal protective equipment (PPE) must be worn by the person operating this machine and also all personnel within a 20 metre radius of the machine:

- forestry safety helmet as to EN 397 fitted with a visor as to EN 166
- heavy duty gloves as to EN 388
- full ear protection as to EN 352-3
- close fitting heavy-duty fully protecting clothing
- steel toe protection boots as to EN ISO 20346
- dust mask if working under dusty conditions.

NOISE



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The operating noise level depends on the given tractor type. Before putting the machine into operation the user is obliged to take corresponding measures accordingly.

DUST

If the material to be loaded is very dry, a large amount of airborne dust might occur. In this situation a corresponding respiratory mask should be worn.

HAZARDOUS BRASH

Some species of trees and bushes are poisonous and can irritate the skin or give respiratory problems. Do not work in confined areas and, if in doubt, wear a respiratory mask in addition to the PPE already described. Seek professional advice if you are unsure what you are dealing with.

LIGHTING

Operate only at daylight or with sufficient lighting in the workplace.

Vehicle Train Instability

While coupling a trailer to the hitch on the chipper, be aware of contingent instability of the entire vehicle train. In this case keep always the pre-specified corresponding conditions, see also art. "Range of Use". This instability may occur also at coupling of a not allowed trailer, or of an unbraked trailer, or of a two-axle trailer that is equipped only with a single-line air brake.

Transport of Product/Handling

- This product is delivered completely mounted and attached to a wooden pallet (or loaded in bulk without a pallet).
- While handling you may use a lift truck.
- Coupling of this machine to a tractor can be done as an attachment in the top and bottom draw rods of the three-point linkage, category II. At handling the coupled machine does not restrict the tractor stability.
- Any work with the chipper is supposed on slopes with gradient up to 8° only.

Precautions in Design

This product is equipped with hoods and covers protecting rotary and hot parts against touching. Protective covers are usually fixed, bolted down on framing.



Chipper LS 160TT



The switch box is completed with a removable switch key. Confusion of switch keys is not possible. First turn the key in the RUN position. A red signal lamp indicates that the electric circuit on the chipper is on and properly interconnected with the tractor wiring. For proper functionality of the loading rolls it is necessary to turn the key in the START position and finally to release the key. A yellow signal lamp lights up that means the machine safety circuit is activated. After any interruption of the safety circuit, or for repeated starting, this circuit must be activated again.



The safety frame for material loading serves as an actuator for the loading rolls control, i.e. for their stopping to protect attending persons against their getting caught by loaded materials. The additionally installed buttons can control reversing and putting the rolls in motion repeatedly.



The space under the guard of the loading rolls is protected by a terminal switch for turning the drive off if the shield was opened or got loose.



Chipper LS 160TT



A safety pin of the chipping device rotor serves for rotor blocking at blades exchange and servicing. The pin is hinged on the rotor box. The chipping device is blocked if the pin is put in a recess on the rotor periphery.



Chipper LS 160TT



Terminal switch of a hinged part of the loading chute turns the driving engine off if the chute is tilted.



Emergency STOP button blocks loading immediately – similar function as that of the safety frame. To deactivate the button just turn the knob in the arrow direction.

Controls



Ignition box – used for supply and control of the safety circuit.

CAUTION: Despite the fact that this machine is not equipped with any driving engine, its ignition key, analogously to engine starting, must be set in the **START** position and afterwards in the **RUN** position.

The "S" key serves for control of the running hours counter (daily, total)



Chipper LS 160TT



The safety frame for material loading serves as an actuator for loading rolls control.

Its operating positions, as seen from the attendant's place:

- MATERIAL LOADING – initial position
- EMERGENCY STOP – while pushing the frame

The control buttons for loading and rolls reversing.

By pressing the green button set the loading rolls in motion for chipping or anytime after putting the machine out of operation or after emergency stop caused by pushing the safety frame.

By pressing the yellow button set the loading rolls in reverse motion. This button can be used also for rolls inching at reversion (while being pushed).



Loading speed regulation

This actuator is installed under the loading chute and can regulate the roll speed within the range of 0 – 40 m/min

Use

Storage

Store the chipper always in a dry shelter to protect it against weather effects.

- During storage keep the switch key separately.
- Keep the stored machine beyond unauthorised persons reach.



Chipper LS 160TT

- Before storage clean all parts of the machine. For cleaning use pressure water. Should the water be in the chipping device space, wipe it off and let it dry.
- Clean especially oily spots.
- Exchange all damaged or worn parts. Use always original spare parts. For spare parts contact your dealer or authorised services.
- Do not apply any grease or similar agents on elastic hydraulic hoses.
- Always put the machine aside on a flat and solid floor or on a wooden pallet for further handling.
- Do not put any objects or tools on the machine.

Before Putting into Operation

- Before the first putting into operation check up the machine for contingent damages and completeness after its transport and storage.
- Check tightening of bolted joints, especially guards, grids and completeness of other parts.
- Check movability of turnable parts (discharge duct etc.).
- Check work safety labels for completeness and legibility. Replace any damaged and illegible label, if necessary.
- Grease bearings and sliding parts.
- Check up the hydraulic oil level. While being cold, the oil level should be between the MAX and MIN marks on the oil tank gauge.



- Do not try to repair the machine if it is beyond your competence. Any servicing, especially of rotating parts, should be carried out by authorised persons only. Check conditions of blades. Replace them if worn or damaged. It is strictly forbidden to work with blunt blades, broken and chipped cutting



Chipper LS 160TT

edges. Continuation of work is held for breach of warranty conditions and means cancellation of the provided warranty. In relation to this any warranty claims, if submitted, cannot be accepted by the manufacturer.

- The chipping wheel can be optionally completed with a breaker. According to the material to be chipped install/remove a breaker on/from the chipping wheel.
- For replacement use always original spare parts. Parts, such as rotors and blades, must be balanced properly.
- All blades should be replaced always at the same time as a set. Pay special attention to their fixing bolts. Replace them if worn or damaged.
- Hydraulic oil and oil filters should be changed regularly.
- Do not use petrol or similar inflammable matters as a cleaning agent.
- It is strictly forbidden to do any technical changes on the machine without any prior approval of the manufacturer in writing.
- If any adjustment is required, do it always at standstill only. Remember blocking the wheels against unwilling motion.
- Carry out functional checks of all safety elements through their activating
- Check conditions and proper tightening of V-belts.
- It is strictly forbidden to start the chipper with removed hoods and guards.

Coupling to Tractors

This chipper is designed for coupling to a tractor equipped with a corresponding three-point linkage and to be powered by its PTO shaft.



Before coupling to a tractor, be aware of its max. PTO speed. If the tractor does not reach the speed as required for the machine input shaft, it is strictly forbidden to couple the machine to this tractor type.

Thanks to its A-frame the chipper can be coupled to a tractor equipped with a corresponding three-point linkage, cat. 2. Couple the chipper in the top and bottom draw rods and lock it properly with corresponding locking pins, Ø27 mm.



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Thanks to its A-frame the chipper can be coupled to a tractor equipped with a corresponding three-point linkage, cat. 2. Couple the chipper in the top and bottom draw rods and lock it properly with corresponding locking pins, Ø27 mm. Die locking pins in the draw rods should be properly locked against disengagement.

Coupling of this machine to a tractor can be done as an attachment in the three-point linkage. Let the bottom draw rods sink until they are levelled with the concerned connecting pins. Drive the tractor carefully back to the machine hinge.



While coupling the chipper no person is allowed to stand between the chipper and the tractor

Attach the bottom draw rods of the three-point linkage and lock its pins by cotters or put the pin through the draw rod ball. Lock the pin/draw rod against loosening.

Plug the electric supply cables of the machine in the socket for a portable lamp on the tractor rear. This socket is intended for power supply of the control unit.



Chipper LS 160TT

Cardan Shaft Adjustment



Before use it is necessary to check up cardan shaft adjustment as to its proper length. The cardan shaft length must be always adapted to the given tractor type.

Check up the cardan shaft length as follows:

- Couple the machine in the top and bottom draw rods of the tractor three-point linkage.
- Lift up the linkage (for adjustment the machine must be lifted in its top position) so that the PTO shaft and the input shaft on the machine are approximately levelled and the cardan shaft is squeezed utmost.
- Measure the distance between safety splines on both shafts.
- Press both ends of the cardan shaft together by hand as much as possible and measure the distance between both safety pins on the cardan shaft.
- **The distance measured on the cardan shaft should be shorter at least by 20 mm than that between two safety splines on both shafts (input and PTO shaft). Should this length be longer, the cardan shaft should be shortened accordingly, see instructions of the cardan shaft manufacturer.**



It is not allowed to use such a cardan shaft, if its length (distance between two safety pins), is longer than that measured between safety splines on the input and PTO shafts. Otherwise it may bring damage on the shaft or even on the tractor.

- Pay special attention to maximum retraction of the cardan shaft. Lift up the machine in its top position. The overlap as measured inside the shaft must be sufficient. For more details, see instructions of the cardan shaft manufacturer.
- Try to swing out the machine to the left or to the right – max. permissible angle of the cardan shaft crank should not be exceeded. Otherwise it may bring damage on the shaft. For more details, see instructions of the cardan shaft manufacturer.
- We recommend to use a cardan shaft completed with a freewheel clutch.
- Use always such a cardan shaft that provides transmission of power 20 – 50 kW according to the tractor type and max. rated speed permissible for the machine.



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Putting into Operation



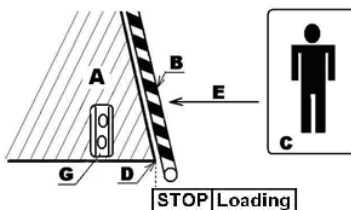
Before start check if the loading chute and the discharge duct are free of any materials. Direct the discharge duct out of possible motion of other persons or prevent other persons to enter the working area. At work proceed always very carefully.

- Let the three-point hitch go down on the ground.
- Swing away the hinged part of the loading chute and lock it.
- Avoid directing the discharge duct to the area of possible motion of other persons. Lock the duct end piece in its working position.
- Set the safety frame in the initial position for loading.
- Close all guards (if opened).
- Turn the PTO shaft on and let it running at slightly increased speed, as rated for 1000 rpm shaft speeds



As soon as the PTO shaft starts turning, the chipping wheel and V-belts are set in motion. Keep off such places and space of the loading rolls while in motion.

- Turn the switch key in the START position and then release the key in the position RUN. In this way the NOSTRESS unit is activated.
- Press the green button for loading. CAUTION!! The loading rolls start turning immediately.
- Having turned the chipping device on wait for speed stabilization. With that you may soever increase or reduce the tractor PTO shaft speed.
- **CAUTION!!! As soon as the PTO shaft starts turning, the hydraulically powered elements can be set in motion as the hydraulic system of the machine is already pressurized.**
- **CAUTION !!! As soon as the PTO shaft is ON then chips from previous operation may be ejected from the discharge duct.**
- Carry out functional checks of the safety frame for loading. Push the frame in the in-feed position and the loading rolls start turning (loading). By next short pushing the frame the rolls should stop turning immediately – EMERGENCY STOP position.



Legend:

A - loading chute, B - safety frame, C - attendant's place, D - loading chute edge,
E - infeed direction, G – buttons for control of loading and reversing



- The safety frame must be always adjusted so that the EMERGENCY STOP must be activated before the point D – loading chute edge.
- **Do not leave the machine unattended.**

Coupling of a trailer to the machine



Hitch under the loading chute intended for coupling a trailer



Chipper LS 160TT



It is only a two-axle trailer allowed to be coupled to the chipper that is equipped with a two-line air brake.

It is strictly forbidden to couple to the hitch on the machine the following variants:

- a single-axle trailer (doesn't matter if braked or unbraked), or
- a two-axle semi-trailer, or
- a braked two-axle trailer that is equipped only with a single-line air brake.

Having inserted the drawbar of the trailer in the hitch, lock it properly with a corresponding locking pin. After snapping, lock the pin by its locking spring against unwilling uncoupling. Press the locking spring before inserting/releasing (see arrow).

Finally connect also the air-brake couplers and the plug of electric installation.

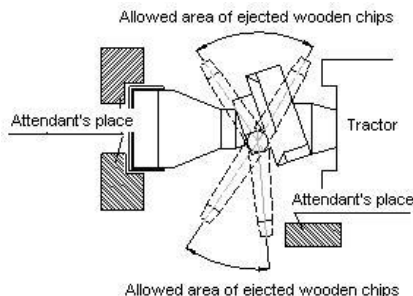
Chipping



- The chipper is powered by a tractor combustion engine. Do not start it in confined or ill-ventilated spaces or under conditions of low visibility.
- While chipping the chipper must always be properly coupled to a tractor.
- It is not allowed to use the cardan shaft with its damaged guard. This guard must be properly locked against turning. Check up locks on the sliding shaft.
- Set the discharge duct in required direction. The discharge duct cannot be directed to the attendant's place, see following figure.

Chipper LS 160TT

- To use a trailer for gathering of ejected wooden chips, first set the loading chute aside and out of the drawbar space.



- When loading materials and during operation of the chipper the attendant should always stand in the attendant's place, see fig.
- Turn the PTO shaft on and wait for tractor engine speed stabilisation. Raise or reduce the speed of the engine as needed. For proper functions of the chipper, the PTO speed should be stabilised on 1000 rpm.
- Wooden chips can be gathered in bulk or into a container located on a towing vehicle.
- While discharging into a container, pay your attention to ejecting to avoid ejecting chips back out off the container.
- Before displacement of the chipper to another workplace, first turn the PTO shaft off and wait for run-out of all rotary parts. Afterwards, lift up the machine in the top (transport) position. Never pull the machine while resting on the ground!
- Do not load materials with parts of metal, glass, ceramics and other similar objects.
- Do not chip or load materials while driving.
- Having put materials in the loading chute/between loading rolls, release the loaded material immediately and keep a certain distance from the chute.
- Do not load materials with diameters exceeding 160 mm and 3 m in length. Do not load wooden boards with thickness more than 60 mm.
- When working, never lean over the loading chute and never pull out wooden materials, already loaded, from the chute.
- Do not load materials with diameters exceeding 160 mm. Speed of loading should correspond with quantity and characteristics of the material to be loaded.



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- If loaded materials are spreading with risks of catch holding of attendant's dress being drawn in the loading chute then it is necessary to prepare such materials accordingly (trimming, cutting).
- Pay special attention to thorny materials, such as acacia and roses, which may easily catch your sleeves.
- Be careful while loading since materials may unexpectedly move in unwished directions.
- In case of two attendants it is necessary to make simple signals clear before working. During operation it is not easy to make any agreements because of operating noise.
- Observe the working area. If any person, children or animals approach while chipping, then stop working immediately.
- Be aware that there is a certain time period required between loading, chipping and final ejection of chips.
- As far as possible load the chipper evenly, adapt loading speed accordingly and keep continuous chipping.
- While loading, stand aside the loading chute.
- While loading short materials, throw them in the chute and push them forward between the loading rolls by means of a wooden stick or a board, more than 160 cm long, to push materials between the loading rolls.
- Never use metal objects. They could cause serious damage of the loading rolls and blades.
- When finishing the work, first wait for emptying of the loading chute.

Recommendations:

- ❑ **Do chipping at rated PTO shaft speed only, i.e. at sufficient power of the chipping wheel for ejecting chips.**
- ❑ **Being loaded short and fine materials may deposit or clog the space behind the loading rolls in front of the chipping wheel. To avoid such problems and clogging put occasionally also some longer branches.**
- ❑ **To prolong service life of blades never put any materials with parts of impurities, such as of metal, glass, ceramics and other similar objects.**
- ❑ **Optimal sharp blades reduce operating costs of the loading and chipping equipment (reduced wear of the chipping device).**
- ❑ **If loaded material is free of any impurities then a grinding interval for blades may last several months or several hundreds m3 of loaded materials.**
- ❑ **Blunt blades are evident on chipped edges which are not clean but broken.**



Chipper LS 160TT

The chipper is optionally equipped with its speed regulation and the NOSTRESS system intended particularly for tractors with power less than 30 HP.

This regulator reduces material feeding upon contingent overloading (PTO shaft speed dropping).

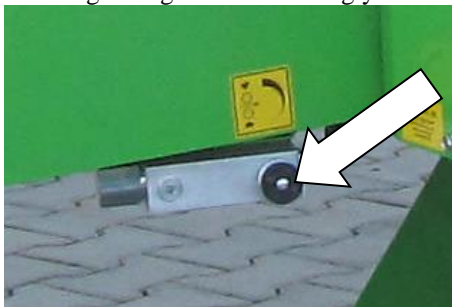
The chipping wheel speed is set by the manufacturer to 900 (1100) rpm to turn the rolls off and to 910 (1110) rpm to turn the rolls on again.

Recommendations!!

Should the loading rolls be frequently turned off while chipping, it means that there is too much material loaded and the chipping device is overloaded. To avoid this overloading:

- ❑ reduce volume of material to be loaded, or
- ❑ reduce infeed speed of the loading rolls

The loading rolls infeed speed can be reduced by the regulating screw (see arrow on following figure) under the hinged part of the loading chute. To change the infeed speed, just turn the regulating screw accordingly.



Putting out of Operation

If you want to stop chipping:

- In case of loaded material wait for emptying of the loading chute.
- Wait for emptying of the discharge duct.
- Turn the tractor PTO shaft off.



Warning! The cardan shaft is equipped with a freewheel clutch. When turned off, the rotor of the chipping device runs out – approximately 120 sec.



Chipper LS 160TT

- Regardless of this running out, turn the switch key in the STOP position.

Use of the chipper equipped with a hitch

Our chipper LS 160TT is equipped with the hitch Rockinger, type 810B30, intended for coupling of a trailer.

The hitch, mounted on the chipper rear, is intended solely for towing of a trailer while chipping, i.e. for gathering of ejected wooden chips. It is forbidden to couple a trailer to the chipper for its transport/towing on public roads.

For coupling of a trailer and for chipping with this machine you should satisfy the following conditions:

- Coupling of a trailer should be done always on even ground.
- It is only a two-axle trailer allowed to be coupled to the chipper. Max. permissible gross weight of the trailer to be towed should be 8000 kg. This trailer should be always equipped with a two-line braking system.
- Min. gross weight of a towing tractor should be 5000 kg. In this case the tractor on its front axle should bear min. ballast weight of 500 kg.
- It is forbidden to couple a trailer to the chipper for its transport/towing on public roads. It is not allowed to exceed max. permissible speed of the tractor respectively of the trailer, i.e. 5 km/h on even ground.
- On the machine rear there is also a 7-pin receptacle installed for the trailer lights which should be interconnected through the corresponding plug on the machine with the 7-pin receptacle on the tractor rear. For towing on public roads the trailer should be equipped also with a warning triangle for marking of slow-moving vehicles.
- The air-brake couplers of a two-line braking system are in red and yellow colour. It is necessary to keep the same colour while connecting them to the opposite couplers on the machine rear.



Chipper LS 160TT



Conditions for use of the hitch for towing of a trailer during chipping

1. The hitch mounted on the machine rear side is intended solely for towing a trailer at primary loading and chipping operations, at travel speed up to 5 km/h and only in straight direction on even ground.
2. It is forbidden to couple a trailer to the chipper for its transport/towing on public roads.
3. While working on or nearby public roads the towing tractor must be equipped with a beacon of orange colour for flashing and the chipper must be equipped with 2 safety plates with red-white hatching, sight lights, reflector glasses and a warning triangle for marking of slow-moving vehicles. The beacon on the tractor cab must be turned on.
4. Keep traffic rules and local regulations while going or working on or nearby public roads.
5. Max. permissible trailer gross weight is 8 000 kg.
6. Max. permissible vertical coupling load is 50 kg.
7. Min. gross weight of a towing tractor should be 5000 kg. In this case the tractor on its front axle should bear min. ballast weight of 500 kg.



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8. Due to low permissible vertical coupling load it is forbidden to couple single-axle trailers, resp. semi-trailers with axles centrally mounted.
9. The trailer to be coupled must be in good technical condition and its brakes, tyres, lights and reflector glasses must be fully functional. It is strictly forbidden to couple an unbraked trailer or a braked two-axle trailer that is equipped only with a single-line air brake.
10. Min. drawbar length of the trailer must comply with legal requirements applicable for tractor trailers. In case of doubts this length is to be checked before the first use: the drawbar must not collide with the chipper in any working position of the chipper or trailer.
11. While coupling, you must always interconnect both air-brake couplers and the 7-pin plug of the trailer with the tractor.
12. While chipping, the chipper should rest properly on even ground and the entire train must be braked mechanically or blocked on wheels by scotch blocks.
13. Set the loading chute so that it is accessible in any position of the coupled trailer for material loading. When using a coupled trailer, you should direct the discharge duct and its end piece to allow safe gathering of ejected chips in its loading space.
14. While chipping in the vicinity of a road-side ditch or close to a terrain slope, pay special attention to undulations of the ground to avoid any risk of slipping or falling and to prevent any accident.
15. For displacement of the chipper to another site on short distances it is necessary to set the loading chute in the tractor axis, to lift up the chipper about 30 to 35 cm above the ground and to release the trailer brakes respectively to remove the scotch blocks. For this displacement the trailer brakes and lights must be fully functional and the chipper engine must be turned off.
16. If the chipper works in the same workplace for a longer time, it is necessary, before its displacement, to check out safe coupling of the trailer, its air-brake couplers and electric plug and to test their functionality. Remove also dust sediments, if any.
17. For displacement of the chipper with a coupled trailer to another site on short distances the tractor driver must keep all local regulations valid for public



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roads. It is not allowed to exceed max. permissible speed of the tractor or of the trailer, i.e. 5 km/h. Avoid any threatening to proper stability of the entire train.

18. Always before work with the trailer it is necessary to make checks of the hitch, safe trailer coupling, interconnection of the tractor/trailer braking and lightning systems and to keep them in proper technical condition. Having coupled a trailer, check out safe coupling of the trailer, its air-brake couplers and electric plug and test their functionality.

Emergency Situations



Put the chipper out of operation immediately in following cases:

- If any person or animal approaches under 20 m while chipping, then stop working immediately.
- If any breakage, damage or disengagement occurs, stop chipping immediately.
- If you heard any strange noise or vibrations or felt a strange smell while chipping, then turn off the machine immediately and contact your dealer or directly the manufacturer.
- In case of fire or breakdown, stop chipping immediately.
- In case of fire use foam extinguishers only.
- If you cannot damp the fire down yourself, call for a fire brigade.
- If an attending person gets caught by rotating parts or loaded materials, stop the loading rolls by pushing the safety frame (STOP position). Stop working and go on only if the attending person is uninjured and fully concentrated.
- If the discharge duct gets clogged, stop loading immediately and reverse the loading rolls by pushing the safety frame (position REVERS). Turn the PTO shaft off and having all rotary parts stopped (after about 1-2 min) use an elastic rod and try to release the clogged material in the end piece of the discharge duct. Having released clogging materials, try to turn on the chipper again. If it is not possible yet, hinge away the upper hood part and try to remove all materials by hand (the PTO shaft must be OFF). Be aware, the chipping wheel must be blocked properly.
- To release the discharge duct clogged, do it always at standstill only.
- At reach of permissible gross trailer weight.



Chipper LS 160TT

Technical Description

This machine consists of following main parts:

- **chipping device**
 - ❖ - loading chute
 - ❖ - loading rolls
 - ❖ - chipping wheel
 - ❖ - discharge duct
 - ❖ -frame

Chipping Device

❖ Loading chute

The loading chute is made of welded steel plates consisting of two parts: fixed and hinged one. The hinged part serves as an extension of the chute with a safety frame and is protected by a terminal switch. This frame, if pushed by an attending person or branchy materials being caught, turns the loading rolls off. The chute itself, shaped as a square pyramid, is decreased in width toward the loading rolls and in this way loaded materials are pressed together.

❖ Loading rolls

These rolls take over loaded materials and move them to the chipping wheel. Their speed can be regulated according to the given sort of material and expected results – chips.

Both rolls are ribbed and enable loading of materials and also pulling them out at reverse turning if necessary (chipping wheel overloaded). Both rolls are powered by a hydraulic motor.

If required, both rolls are outwards movable in order to adapt working to the material to be loaded.

This machine is equipped also with loading speed regulation with sensing actual speed of the chipping wheel. Assessment of actual speed and following speed regulation are controlled by the NOSTRESS unit.

❖ Chipping wheel

It is a steel disc serving also as a flywheel for absorption of shocks while chipping. This wheel is put in ball bearings; a drive pulley is fitted on its shaft. The wheel is equipped with two blades for cutting of loaded materials. Vanes welded on its rear side serve for ejecting chips in the discharge duct.



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The chipping wheel is installed in a rigid frame and protected by a steel plate. Its protective shield consists of two parts and particular parts are bolted together. By safety reasons the upper part is protected with a terminal switch for turning the drive off if the shield was opened or got loose.

❖ Discharge duct

This duct continuously extends the chipping wheel shielding and serves for directing the ejected chips. The duct is turnable and its end piece (tilting gate) serves also for setting the range of ejected chips.

Chassis

Its sturdy frame on front side is adapted to three-point linkage. A swivel base on the upper frame part enables extra-axial turning of the chipper with its loading chute, especially in case of need to couple a trailer. This swivel base can be turned in seven positions.

In the bottom part of the frame there are a belt gear and an input shaft to drive the chipper.

Technical Parameters

Parameter	Unit	Value
Overall length/transport length	mm	2350/2110
Overall width/transport width	mm	1400
Overall height/transport height	mm	2590/1990
Weight	kg	740
Chipping device:		
Chipping wheel – diameter	mm	600
- number of blades	-	2
- number of breakers	m.s ⁻¹	40
- rate of cutting		
Max diameter disposed materials	mm	160
Chipping wheel drive	-	3 x belts XBP 1525 Ld
Loading device:		
Infeed hole size	mm	240 x 170
Number of loading rolls	-	2
Diameter of rolls	mm	160
Feeding speed	m.min ⁻¹	10 - 35
Drive	-	hydrostatic
Loading roll speed for turning-off	min ⁻¹	900 (1100)
Loading roll speed for turning-on	min ⁻¹	910 (1110)



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Speed regulation	-	NOSTRESS II
Loading chute:		
Feeding profile	mm	1040 x 800
Drive:		
Type	-	PTO shaft
PTO shaft speed	min ⁻¹	1000
Shaft	-	six-spline
Hydraulic oil:	-	OH HV 46 ISO VG 46, ISO 6743/4 typ HV CETOP RP 91 H Category HV DIN 51 524 část 3-HVLP Poclain P00552-13P
Hydraulic pump drive	-	1 pc belt AVX 13/850 La
Capacity of hydraulic oil tank:	l	15
Electric wiring		
Supply voltage	V	12
Coupling		
Type, category	-	rear three-point linkage, cat. 2
Hitch for trailer	-	for drawbar eye Ø40 mm



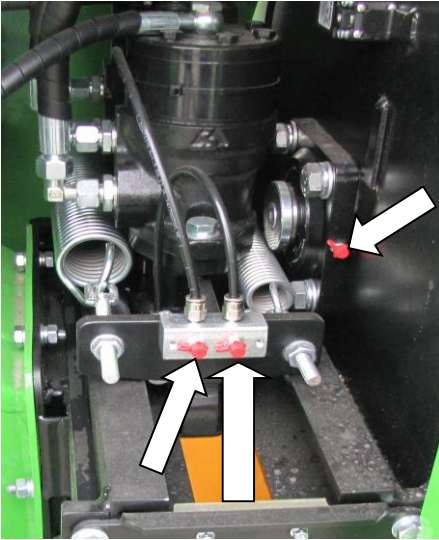
Maintenance

- Any servicing of the chipper should be carried out by authorised persons only.
- Check up the machine for completeness and its general condition.
- Any maintenance and servicing on the machine can be done at standstill only, i.e. the PTO shaft off, the switch key being pulled out from the ignition box, tractor wheels blocked against unwished motion.
- While servicing the chipper should be lowered on the ground.
- Pay special attention to all safety elements.
- Check up V-belts for tightness and wear.
- Keep regular intervals for lubrication of bearings.
- Verify good condition of all working elements, blades, counter-blades, chipping device vanes and breakers.
- Check up hydraulic hoses for wear. Replace them if necessary or every five years.

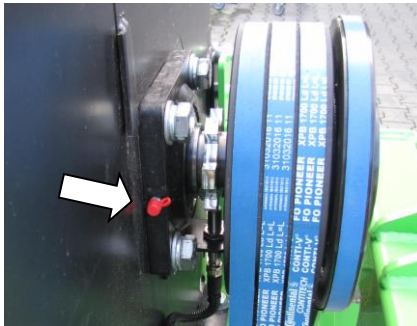
Lubrication



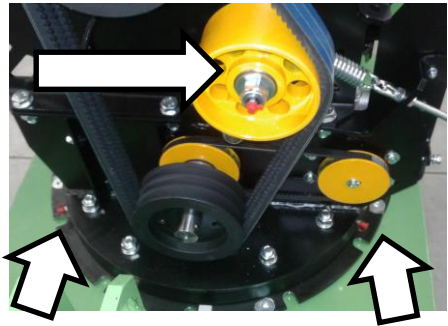
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Grease cup of chipping wheel (left) and
sliding guides of loading rolls
Lubrication every 40 running hrs
(LTA 3EP MOL Lition)



Grease cup of chipping wheel (right)
Lubrication
every 40 running hrs(LTA 3EP MOL
Lition)

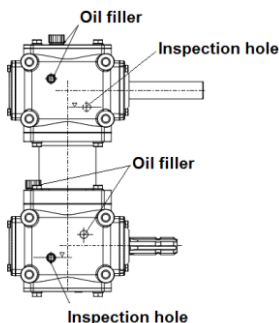


Grease cup of tension pulley
3 grease cups on swivel base



Chipper LS 160TT

Oil change in gearboxes



Gearbox oil - SAE 80W/90, API GL-4

Oil charge – 1,5l per 1 gearbox, in total 3l oil

Oil change after 2500 working hours or 5 years

Blade Wear

Blunt blades and counter-blades on the chipping device are exposed to wear and tear depending on actual operational conditions. A right shape prolongs blade service life and reduces running costs. This abrasion depends also on quality of materials to be loaded. If you load hard or dry wood, shorten the given intervals for checking the blades accordingly. It is valid also for any heavy dirt on the wooden pieces, such as clay and mud.

The chipper is not allowed to be used for disposal of wood with foreign matters and objects such as metal, steel binding bands, nails, glass cullet, stony debris, ceramics etc. If you find any, stop working immediately, turn the engine off, wait for run-out of all rotary parts and check all working elements and blades for good condition. It is strictly forbidden to go on working with blunt blades, broken and chipped cutting edges that may cause damage also of other assembly groups. Blunt blades have negative impacts on quality of chips and stress of particular mechanical groups.



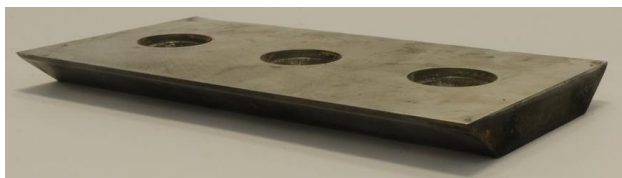
It is strictly forbidden to start the chipper without observance of all routine maintenance intervals. For



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work safety reasons it is always very important to carry out all regular checks and service inspections, especially on blades. It is strictly forbidden to work with blunt blades, broken and chipped cutting edges. Continuation of work is held for breach of warranty conditions and means cancellation of the provided warranty. In relation to this any warranty claims, if submitted, cannot be accepted by the manufacturer.

The following picture shows the blade in good condition and ready for use



Its cutting edge is plain and smooth, undamaged from impact on hard objects, not yet blunt from previous use.

The following pictures show the blades unsuitable for further use of the chipper. Such blades should be replaced or reground immediately.



On one side the blade is unevenly worn. Max. abrasion (material wear) allowed should be only 0,5 mm. The next abrasion brings unwished radius on the cutting edge and mechanical shocks at further use of the chipper.



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Cutting edges worn after contacts with hard objects



Cutting edge chipped

The condition of blades, as shown above, can be seen also on the counter-blades that should also undergo regular inspections of their condition.

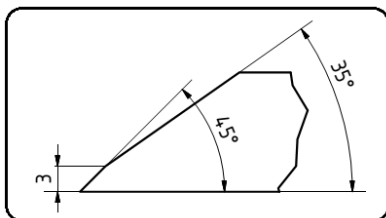
Blade Grinding

Blades, fitted on the chipping wheel, are double-sided, i.e. reversible if one side is blunt.

Blades edge regrinding requires high demands for keeping cutting edge shape. While grinding it is necessary to keep its optimal geometry, see following figure. Proper shapes prolong blade service life.



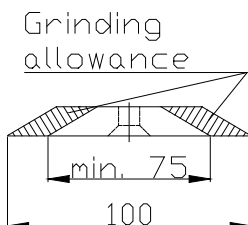
While regrinding it is necessary to keep the same weight of particular blades because of balance of their rotating mass. For grinding use always a grinder with its magnetic table and a special jig.



Detailed geometry of blade edge



Grind every blade only up to minimum distance from edge to its fixing bolt. i.e. 37,5 mm. This distance on a new blade is 100 mm, see following figure.

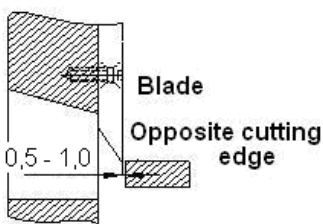
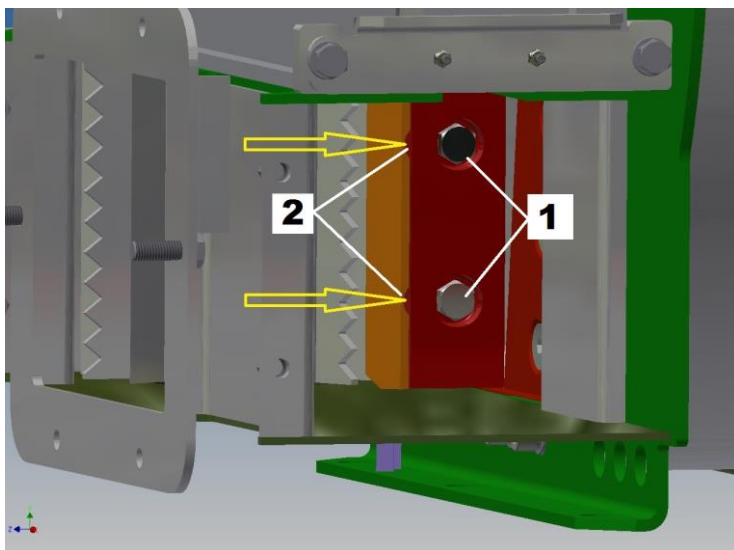


Max. wear/grinding of cutting edge

Chipping device setting

Optimal operation of the chipping device requires proper setting of a clearance between the blade and the opposite cutting edge. This distance should be set (see following figure) and checked after fitting ground blades, then it grows with their wear and chipped branches may be squeezed between the blade and the opposite edge. It brings deterioration in quality of chipping.

Pay attention also to blades exchange. In such case set the given clearance bigger to avoid damage of a new blade and its opposite cutting edge.



1. Unscrew slightly the screws 1 on the counter-blade (2x).
2. Use a screwdriver to move the counter-blade in pt. 2 (see fig. - recess in holder – 2x).
3. Keep the distance between the blade and the counter-blade from 0,5 to 1 mm.
4. Screw up the screws on the counter-blade again - torque of 100 Nm

While regrounding the blades you do not need to set up the counter-blade again provided the fixed blades were not replaced.

The counter-blade edge should be only checked resp. kept sharp.



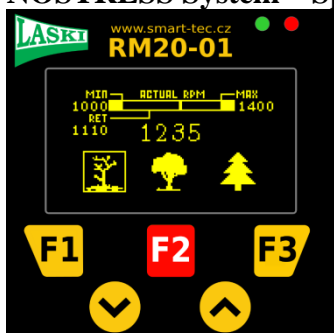
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Recommendation: Check out conditions of blades every 40 operating hours. Regrind blade edges if they are found blunt



Joining elements (bolts and nuts) should be replaced together with The blades exchange. Safety nuts should be used only once, since they lose their self-locking properties if used repeatedly. The fixing bolts should be tightened with torque of 100 Nm

NOSTRESS System – Speed Regulation



This system is intended for overload protection of the combustion engine consisting of an electronic control unit and a speed sensor installed on the rotor shaft.

- Control unit:

This control unit displays actual rotor speed values. When the rotor stops, the unit displays a total number of running hours "TH" or a daily number of running hours "DH".

To reset the daily counter first open the main menu (MENU), enter the relevant submenu by pressing the arrow key ↓ or ↑ and browse up or down until you find the submenu **3. Operating hours**. Enter the initial PIN „1000“.

The daily counter can be reset in the submenu **3.1 Reset hours** by pressing the key **ENTER (F2)**. This resetting should be confirmed by the RESET OK indication for approximately 1 s. Finally the counter of daily operating hours indicates 0:00.



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- Right function of NOSTRESS system:

The speed regulator reduces material feeding upon contingent overloading. For example, the chipping wheel speed is set to 900 (1100) rpm to turn the loading rolls off at speed loss and to 910 (1110) rpm to turn the rolls on again. Actual rotor speed values are displayed on the control unit. However, actual engine speed values are not displayed.

This control unit enables to set the speed according to the material to be loaded:

F1 – light branch-wood, shrubbery, twigs, hedges

F2 – medium hard wood, branch and leaf wood

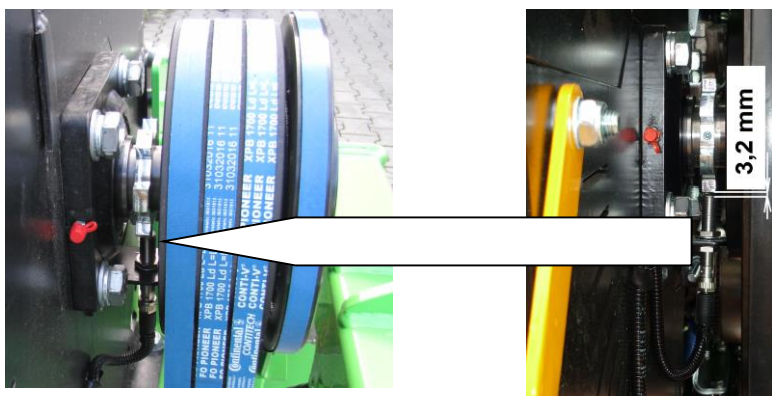
F3 – hard wood, needle-leaved trees, bough, timber

- Speed sensor:

This encapsulated sensor is fitted on a holder keeping its distance of 3,2mm from the cam lobe. In the rear part of the sensor sleeve there is an orange LED installed flashing in case of proper sensing.

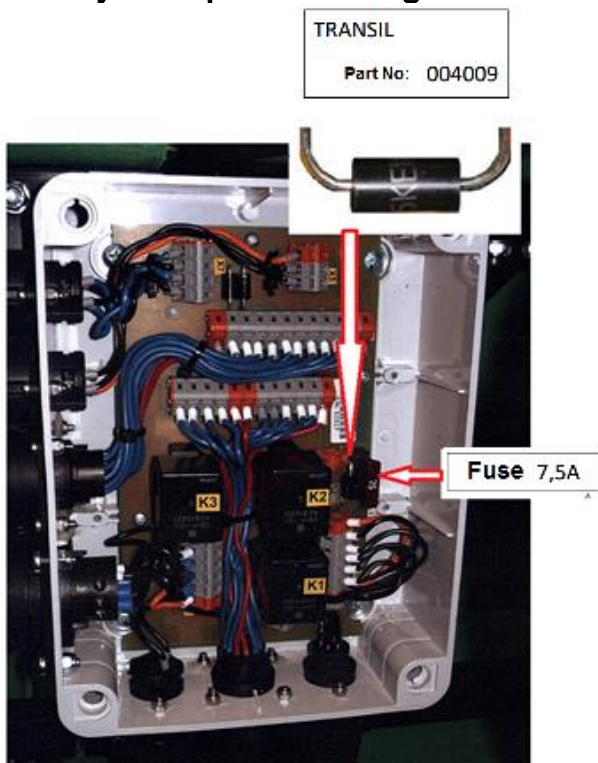


Set-up of the speed sensor distance should be done at machine standstill only



Location of sensor under hood

NOSTRESS system protection against overvoltage



Overvoltage occurrence in the electric installation blows the fuse and breaks the TVS diode (Transient Voltage Suppressor / Transil) used to protect sensitive NOSTRESS electronics against voltage spikes. Should the fuse (7,5 A) be blown again, first replace the damaged TVS diode and then put a new fuse.



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V-belt Tension



V-belt Tension

It is necessary to pay special attention to the routine maintenance and proper belt tension adjustment because the V-belts on this machine transfer the engine torque to the chipping wheel and to the hydraulic pump.

For belt tension adjustment remove the front belt guard fixed here by fixing bolts. Under the guard there is a belt gear for power transmission to the chipping wheel and to the hydraulic pump.

While tightening the belts proceed as follows:

- **Check up tension of new belts after first 5 service hours and afterwards always in intervals of 25 hours.** Excessive slipping or excessive tension will wear out the belts prematurely and reduce their life essentially.
- Adjustment of particular belts on the hydraulic pump and on the chipping wheel can be done independently.
- In case of three V-belts for the chipping wheel it is necessary to shift the belt pulley on the input shaft.
- For adjustment of the belts for the hydraulic pump it is necessary to shift the pump body.

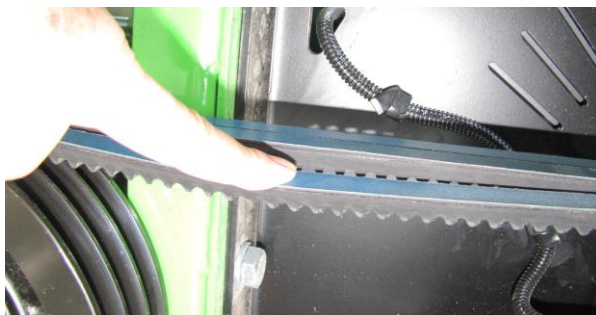


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Recommended belt slack and finger pressure values, see the following chart:

Belts as to drive (belt pulleys)	Finger pressure F /N/	Slack p /mm/
Input shaft – chipping wheel	50	12
Chipping wheel – hydraulic pump	50	7,5



While tightening the belts proceed as follows:

Chipping wheel drive

- Loosen four nuts on the stretching bolts in the direction intended for pulley shifting. For tightening loosen the nuts over the supporting plate and also the nuts directly on the plate uniformly by 0,5 – 1 turn to let the belt pulley slide. Having reached the recommended belt slack value, retighten all the bolts by means of their lock nuts.

Hydraulic pump drive

- Loosen four nuts of the fixing bolts holding the pump on the frame uniformly approximately by 0,5 turn to let the pump slide in the intended



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direction by means of the stretching bolt. Having reached the recommended belt slack value, retighten the fixing bolts on the frame and the lock nut on the stretching bolt. To make all the bolts accessible first it is necessary to remove the belt guards over the belt pulley of the chipping wheel shaft.



Having finished the belt tension adjustment, replace the belts guards.

Hydraulic oil filter change

The oil filter is installed in the hydraulic circuit and accessible left under the loading chute.

We recommend changing the oil filter element always together with the hydraulic oil change. This oil filter element is in fact a replaceable cartridge fixed on the central bolt of the filter body. For its exchange it is necessary first to loosen it by means of a special wrench.

Before filling new oil first screw up a new filter element.

Fill the hydraulic oil tank up to 17 litres only (up to the MAX mark on the oil tank).



It is strictly forbidden to put this chipper into operation without any oil filter or with its filter element clogged or damaged.



**Replace the filter element only at stillstand of the machine.
Hydraulic oil temperature should be lower than 45°C.**



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Full-flow filter allocation

Maintenance Intervals

Electric Installation	Protect all wires against contact with oil products. Keep all elements clean and avoid any damage of wires - short circuit risk. All connections must have clean and proper contact surfaces to avoid intermediate resistance at a wrong contact point.
Hydraulic Oil Change	Do the first oil change after the first 500 running hours or after the first season. Next oil changes always after 1000 running hours. It is recommended changing the filter element together with the oil change.
Hydraulic Oil Filter Change	We recommend changing the filter element together with the oil change.

Checking, Oil Exchange

Operation	Component	Interval (hrs)							
			10	100	250	500	1000	2500	5000
Exchange	Hydraulic oil in circuit					Δ	*		
	Hydraulic oil filter					Δ	*		
Checking	Hydraulic oil in tank		*						
Cleaning	Hydraulic oil tank						*		

(*) clean daily under special conditions

(**) clean every 4 – 5 hrs under extreme dusty conditions

(***) see recommended oils

(o) if clogging indicated

(Δ) first exchange



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Failures and Troubleshooting

Failure	Cause	Remedy	
Wrong chipping or loading	Blunt blades	Remove and regrind blades. If worn, replace them for new ones.	Wrong chipping or loading
	Worn opposite cutting edge	Remove and regrind cutting edge; set optimal clearance between blade and opposite cutting edge	
	Malfunction of loading rolls	See Problems with hydraulics	
	Wrong angle geometry	Regrind in accordance with detailed figure of edge geometry	
	Damage/wear of loading rolls	Replacement	
	Too small, dry or rotten materials	Mix before loading	
	Loading rolls do not turn – rotor runs idle	Wrong setup of sensor for turning the loading rolls on	servis
Tractor engine overloaded while chipping	Wrong sensor setting for min. speed	Switching-off speed is set too high	Tractor engine overloaded while chipping
	Blown fuse in regulation circuit	Fuse replacement	
	Faulty control unit in regulation circuit	Replacement	
	Speed sensor defective	Replacement	
Loading rolls do not turn	Safety circuit not closed	Tilt rear part of the loading chute and check up hood position protected with terminal switch	Loading rolls do not turn
	Throttle valve closed	Check up manual speed regulation for loading	
	Loading activated	Press the green button for loading	
	Failure of NOSTRESS system	Measure voltage on coil of electromagnetic valve; it should be > 0 at max. speed	
	Faulty coil of electromagnetic valve	Coil replacement	
	Broken leads	Check up wiring for integrity	
	Faulty hydraulic pump	Check up oil pressure Pump replacement	
	Faulty electric switchboard	Coil replacement	



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<p>Loading rolls turn off also while chipping</p> <p>Loading rolls cannot be set in motion again after turning the machine off</p>	Excessive speed of chipping wheel and PTO shaft	<p>Reduce the PTO shaft speed</p> <p>Working speed of the chipping wheel must not exceed 1500 rpm.</p>	<p>Loading rolls turn off also while chipping</p> <p>Loading rolls cannot be set in motion again after turning the machine off</p>
Blades touch opposite edge	Wrong setting of clearance	Set distance to 0,5 – 1 mm	Blades touch opposite edge
	Loosen blade bolts	Tighten up fixing bolts	
	Clearance of chipping wheel bearings	Tighten up fixing bolt of wheel on its shaft	
NOSTRESS system out of function	Blown fuse	Replacement of fuse 7,5 A	NOSTRESS system out of function
	Faulty electronic control unit	Replacement of fuse 4 A (inside control unit)	
	Faulty speed sensor – LED is not flashing	Check up wiring	
	Loading chute gets clogged	Sensor replacement	
Discharge duct gets clogged	Too low speed of PTO shaft	Stop loading and increase speed at chipping. Min. working speed of PTO shaft at chipping is 350 rpm	Discharge duct gets clogged
	Discharge duct deformed	Repair/replacement	



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	Too small, dry or rotten materials	Mix before loading	
	Loading rolls overloaded with material	Reduce loading roll speed	
Bearings overheated	Insufficient lubrication or wrong lubricant used	Lubrication and lubricants should be in accordance with recommended intervals and sorts (LTA 3EP MOL Lition)	Bearings overheated
	Too high speed of chipping wheel	Working speed of the chipping wheel must not exceed 1500 rpm.	
	Bearing loosened	Tighten up bearing housing bolts with required torque	
	Bearing worn	Replacement	

Waste Disposal

Any waste materials resulting from the machine operation should be disposed in accordance with laws and regulations applicable in the given country. Protect nature and water resources against used oil and filter elements.

Any parts of the machine should be disposed in accordance with laws and regulations applicable in the given country.



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Warranty

The manufacturer provides warranty on this product for a period as stated in the enclosed Warranty Certificate. The given warranty period begins after delivery to the customer.

This warranty covers all failures resulted from faulty assembly, manufacture and used materials.

The manufacturer bears no responsibility for damages resulted from own user's wrong usage, such as:

- Usage by an unauthorised person.
- Unauthorised changes, repairs and actions on the machine.
- Usage of unoriginal spare parts or parts intended for other models.
- Disobedience to instructions for use.
- Damage of the machine caused by faulty handling, maintenance or overloading.
- This warranty does not cover faults resulted from damages caused by the user.
- This warranty does not cover parts being subject to ordinary wear and tear.
- This warranty does not cover any damage of machine caused by usage of unoriginal spare parts.
- This warranty does not cover consequences resulted from weather effects.
- The manufacturer bears no responsibility for damages resulted from disobedience to instructions given in this manual.

Any warranty claims must be submitted in writing with papers concerning acceptance for warranty or post-warranty repair.

Záruka musí být uplatněna písemně, tj. musíte mít vystaven doklad o převzetí výrobku do záruční, pozáruční opravy



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Service Report

Type of machine:	Serial number:
Day of inspection: after six months	Working hours: after 100 hours

Operations done:

- | | | |
|---|-----|----|
| o Engine oil - change | Yes | No |
| Sort / viscosity | | |
| o Oil filter – change | Yes | No |
| o Air filter – change | Yes | No |
| o Fuel filter – change | Yes | No |
| o Solidification point of coolant | | °C |
| o Hydraulic oil – change | Yes | No |
| Sort / viscosity | | |
| o Oil filter element – change | Yes | No |

Stamp of service station; technician's signature

Additional data:

Date: Working hours:

.....

.....

Date: Working hours:

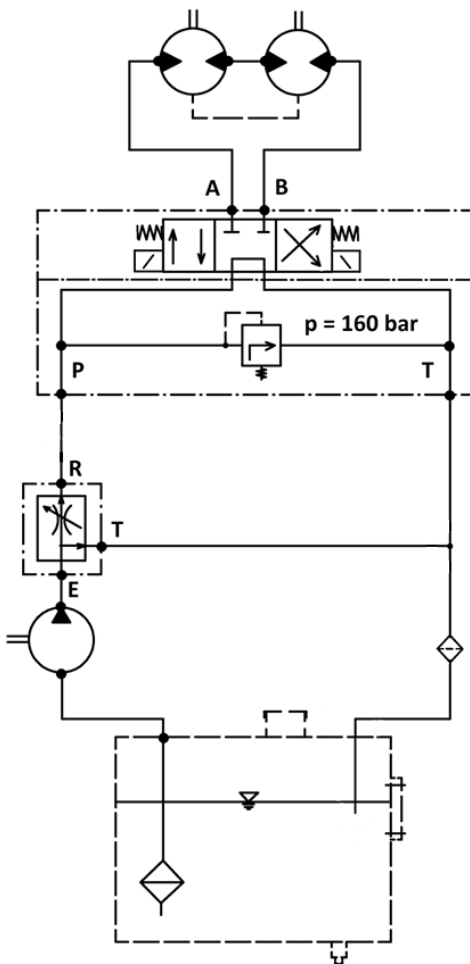
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Next service inspection (whichever occurs first)

Date: Working hours:

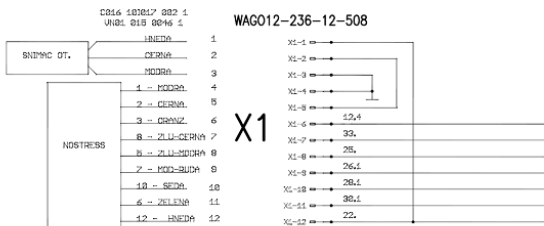
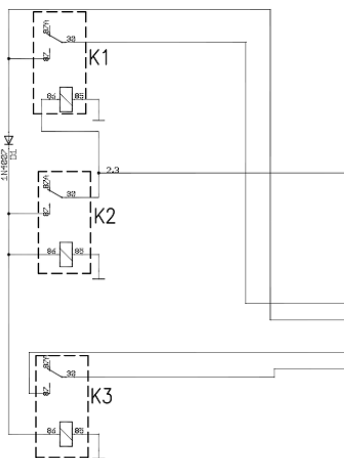
Hydraulic scheme





Chipper LS 160TT

ELEKTRICKÉ ZAPOJENÍ / ELEKTRISCHE SCHEMA / WIRING DIAGRAM



Chipper LS 160TT

ELEKTRICKÉ ZAPOJENÍ / ELEKTRISCHE SCHEMA / WIRING DIAGRAM

