



WS/16-35DT

OPERATING MANUAL

SAELEN[®] TS_{INDUSTRIE}[®]



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DECLARATION OF CONFORMITY

The **TS industrie** Company

Weserstrasse 2
47506 NEUKIRCHEN-VLUYN

HEREBY DECLARE THAT THE MACHINE:

Trade Name: **TS Industrie**

Type : **WS 16-35 DT**

Engine performance: **25,35 kW**

Technical documentation held by Mathieu Willerval.

is in conformity with the following european directives:

- **2006/42/EC** Directive „Machinery"
- **2004/108/EC** Directive „Electromagnetic compatibility"
- **97/68/EC** Directive „Emissions"
- **2000/14/EC** Directive „Noise emissions"

Conformity evaluation procedure concerning directive 2000/14/CE
Annex V.

<i>Power at 3000 1/Min</i>	<i>Measured sound pressure level</i>	<i>Guaranted sound pressure level (Lwa)</i>
25,35 Kw	124 dBA	126 dBA

RONCHIN, september 22, 2014



Mathieu Willerval (Directeur Fabrication TS Industrie)

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Attention!

Before our machines are delivered they pass a tight quality control in the works.

Given that we no longer have a bearing on the machine after it leaves the works, the dealer has to perform another check before the delivery to the end customer.

The following is to be checked:

- Exterior damages produced by transport etc.
- Tight seat of all screw and hose connections
- Filling level of oil, water and fuel
- Complete functional control of all parts

This control is to be confirmed with stamp and signature on the **Machine Delivery Document**. If the fully completed and signed delivery document is not returned there is no right for warranty!

Furthermore, it is required to check all screw connections for tight seat and the laid hoses for marks of abrasion!

Agree a date for this directly with your customer.

Regular inspections according to the operating manual are to be met!

Controlled quality – an important step towards customer satisfaction!
Play your part!

It is strictly forbidden to use the machine if emergency stops, cables, or any other safety device or control device are damaged or not present

Guarantees

Processing of warranty claims

Warranty claims according to the General Business Terms of the manufacturer are valid for the period of 1 year starting with the day of delivery.

Determinative for the moment of the transfer of risk is the date written in the **Machine Delivery Document**. As a matter of principle, warranty claims are to be announced to the supplying franchised dealer. For the preservation of evidence, all parts of the delivered machine covered by this have always to be stored unchanged until the final processing of the warranty claim brought to notice.

Technical modification at machines and/or parts thereof will result in loss of any and all right of warranty claims. The same is applicable in case of inappropriate treatment or use of lubricants and spare parts or accessories not approved by the manufacturer. Transport damages and damages caused by usual wear after commissioning of the machine do not create any warranty claims.

The delivered machine has to be subjected to the obligatory check and inspection intervals specified in the enclosed maintenance schedule. If the obligatory visual check and inspection schedule is not complied with, any and all warranty claims become void. Another requirement for a valid warranty claim is the presentation of a complete proof about the executed obligatory visual checks and inspections.

All warranty and maintenance works are only allowed to be carried out by a specialist dealer authorised by **TS Industrie**.

It is pointed out that warranty works exceeding an amount of 150.00 € is unconditionally to be agreed with **TS Industrie** and authorised by **TS Industrie**. In this case, the manufacturer reserves the right that he carries out the repair.

Prerequisite for the assertion of a warranty claim is the return of the fully completed and signed Machine Delivery Document.



Modifications on the equipment and programming of the electronic system are prohibited because these might have a negative effect on the operational safety and life time of the machine.

**DO NOT FORGET TO REGISTER THE WARRANTY,
OTHERWISE IT WILL BECOME VOID**

**www.ts-industrie.eu
Section: Services / Warranty**

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Preface

We thank you very much for deciding to purchase an universal chipper from **TS Industrie**. Your universal chipper was manufactured with utmost care and high quality standards. In order to meet these requirements also for the mostly professional applications, we kindly ask you to diligently read this operating manual and to comply especially with the warning and maintenance information. Only if complying with all maintenance works within the specified maintenance intervals we can concede the full manufacturer's warranty for your universal chipper from **TS Industrie**.

The operating manual includes several models such that in the introduction is explained how to orient yourself with the help of small pictographs.



Location of the serial number

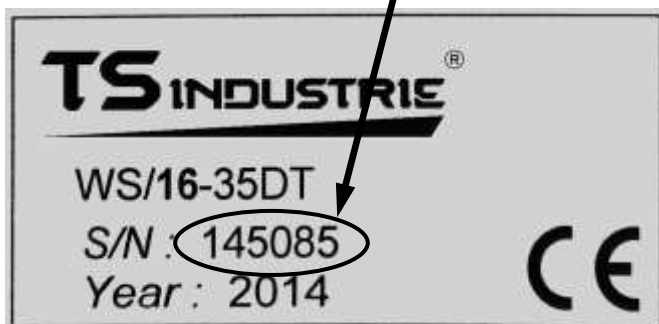
For any spare parts order or a question regarding technical information have always the serial number of your **WS 16-35 DT** at hand.

Manufacturer's type plate



The serial number is located as shown in the image.
It does always have **five- or six-digit number**.

Serial number



Do not state the number on the
type plate of the trailer.

Safety instructions

- 1.** The machine is only allowed to be used according to the operating manual!
- 2.** In case of machines with engine also the operating instructions of the engine are to be observed.
- 3.** Folding the intake extension up (as far as present) is only allowed after standstill of the chipper disk.
- 4.** Maintenance, cleaning and setting works as well as the removal of protective devices are only allowed after the engine is shut down, the ignition switched off, the drive decoupled and the tools immobile. Remove the ignition key such that unintended start is impossible.
- 5.** Prior to operation it is required to remove foreign matters, e.g. ferrous parts, stones etc.
- 6.** After maintenance or repair it is to be checked if all protective devices are mounted.
- 7.** The wood chipper is not allowed to be operated in closed spaces because of the risk of intoxication.
- 8.** The chipper disk must not be uncovered before it has reached standstill. That is to say, the propulsion engine (tractor) is parked and the ignition is in 0-position.
- 9.** The machine operator is responsible that no third persons are staying in the working and danger area.
- 10.** For repairs it is to be observed to use approved original spare parts only.
- 11.** Only persons of over 18 years are allowed to operate the wood chipper.
- 12.** Safety shoes and tight fitting clothes, work gloves with tight gauntlets as well as ear protection and goggles are to be used.
- 13.** For transporting the wood chipper it must be moved into transport position.
 - A) Fold the hopper (as far as present) up and check if the locking device is engaged.
 - B) Move the wood chipper into transport position and check if the safety pin has engaged.
 - C) Turn the ejection channel such that it does not jut laterally out over the machine.
 - D) If necessary lift all parking sustainers.
- 14.** When driving on public roads the lighting must correspond to the Highway Code.
- 15.** For work, the wood chipper must be parked stable.

16.

a) Single-axle machines with engine are attached to tractor vehicles, and the parking brake is applied as far as present.

In case of machines without brakes it is required to push the supplied chocks under the wheels.

b) For operation without tractor vehicle it is required to lower the parking sustainers (front and rear).

17. For safety reasons a minimum distance of 10 metres should be kept from the machine.

The expulsion must always be directed away from the operating personnel.

18. Only after the engine is shut off and the chipper disk is standing still, it is allowed to reach with the hands into the infeed mouth.

19. The admissible hydraulic operating pressure set ex works is not allowed to be changed.

20. Only trunks up to a diameter of 16 cm are allowed to be processed.

21. The hydraulic system is to be competently checked every year. The hydraulic hoses are to be replaced after 5 years.

22. During feed of the wood chipper do not reach into the feed hopper. Congestions are to be removed in a safe manner (shut the engine down, use an aid). For pushing in short pieces or shrubby material do only use solid wooden rods or other aids made of wood. Our wood chippers are designed only for manual feed. Do not use mechanical resources (gripper) for feeding the machine.

Do not move in the area of the expulsion.

23. Carry out an functional check every day before starting the machine, especially of the safety equipment (**trailer coupling**, gear linkage, shifting block, cut-off switch on the hoods in case of the M version etc.). Chipping knives and counter-knives are also to be checked for proper functioning and tight seat.

24. Prior to starting the machine the operator must be trained in detail.

25. The chipper disk must not be uncovered before standstill and the engine is switched off.

26. Danger because of flying off pieces. It is to be observed that also in the operating range pieces such as wood chips might fly out of the hopper area. Body protection is always to be used. Operation is to be carried out lateral of the hopper.

27. Note for all machines with engine:

The inclination of the engine during operation (driving) must amount to max. 25°. In case of reduced oil level the lubrication of the engine is not ensured even at 25°!

28. Caution when parking the machine on a slope. The machine operator has to ensure that the machine is safely stationed for the time of the work.

29. After connecting the machine to the tractor vehicle, remove and store the support wheel.

30. The machine must only be fed with wood. Ensure that no stones or metal objects enter the machine.

31. The machine must not be used for transporting material or persons.

32. The machine must not be used for pushing or towing.

33. Battery acid is a caustic fluid. Therefore any contact with eyes, skin and clothes must be avoided. In case of contact rinse all affected areas with water and go see a doctor, if required.

34. Always disconnect the battery before any work on the electric installation.

35. Only **trained personnel** is authorised to carry out these works. The execution of all installation and removal works as well as special maintenance works is reserved for an authorised specialist dealer.

36. Pay attention that you are not drawn into the infeed roller with the clothes.

37. Regularly clean the lateral skirt such that it remains transparent.

Pictographs

Wear eye and ear protection!



Use protective gloves with specially tight gauntlets!



Wear safety shoes!



For transporting the machine on public roads, fold the feed table up, turn the chipper into **TRANSPORT POSITION** and latch with the safety hook underneath the table.

Do only drive with the support wheel pulled up.



Do only touch machine parts after they are at a complete standstill!



Pictographs

Keep sufficient distance to rotating machine parts!



While the drive is running never open and remove protective devices!



Read the operating manual before start-up!



Do not stay in the area of the expulsion if the machine is running! Hazard area!



Shut down the engine and remove the key prior to any maintenance and repair work!



Caution! Entanglement.

Never reach into the infeed hopper while the engine is running.



Fill the fuel tank with **diesel fuel**.

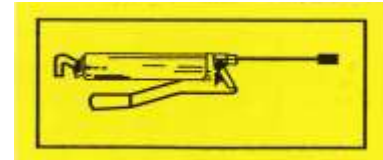


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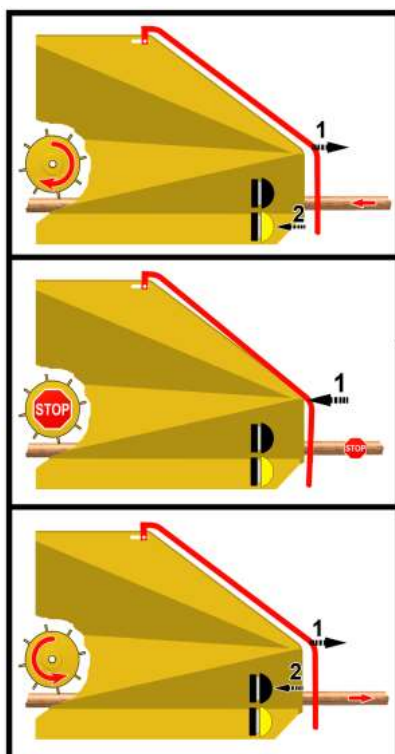
The machine is operated with hydraulic oil HV46.

HYDRAULIC

Lubrication points



The sound level of the working machine is not the value of the standard level on the sticker.



Moving direction commands for the conveyor belt

Material chipping (forward **max. speed**)

Stopping rotation of the infeed rollers

Loosening material (backwards)

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WS/16-35 DT 2014-10-06

Safe transport

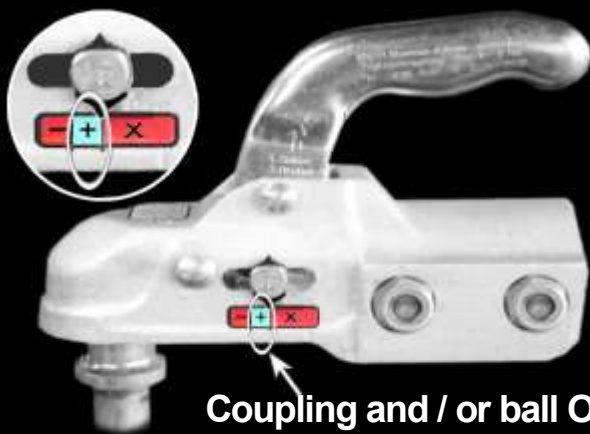
- 1) Observe the valid Highway Code.
- 2) Ensure that the machine is always fitted with signal lights, which are clean and visible for other road users.
- 3) Reduce speed when driving on rural roads and unlevel routes.
- 4) Remove all remaining material from the hopper.
- 5) Turn the expulsion chimney completely to the front and fold the expulsion hatch completely down.

- 6) For transporting the machine on public roads, fold the feed table up, turn the chipper into **TRANSPORT POSITION** and latch with the safety hook underneath the table (see page 20).
- 7) After connecting the machine to the tractor vehicle, remove and store the support wheel.

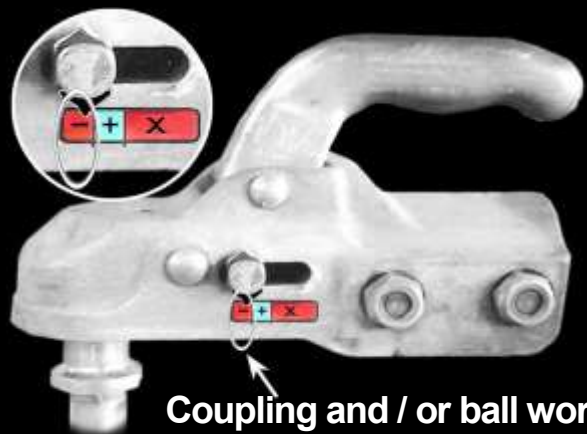


Coupling wear indication:

Check the wear indication each time the machine is hooked up to the tractor vehicle. Acquire the habit to replace the coupling dog and / or coupling ball of the vehicle as soon as the wear indication hits the negative area, such that you cannot lose the chipper when driving on rough roads or driving against a kerb when reversing.



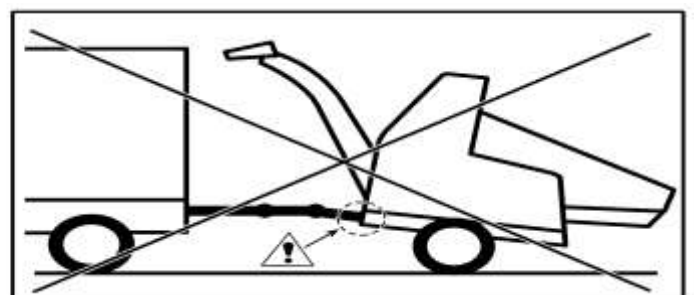
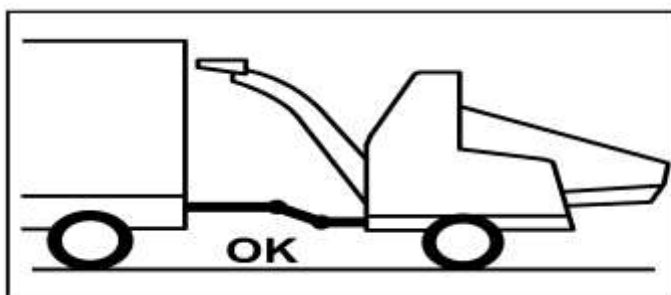
Coupling and / or ball OK



Coupling and / or ball worn

Coupling to a vehicle:

The chipper should always be coupled in horizontal position such that the machine is prevented from tilting backwards **AND** check every day that the drawbar adjusting devices are secured to prevent jerky movements, which damage coupling and towing device and reduce the life span.



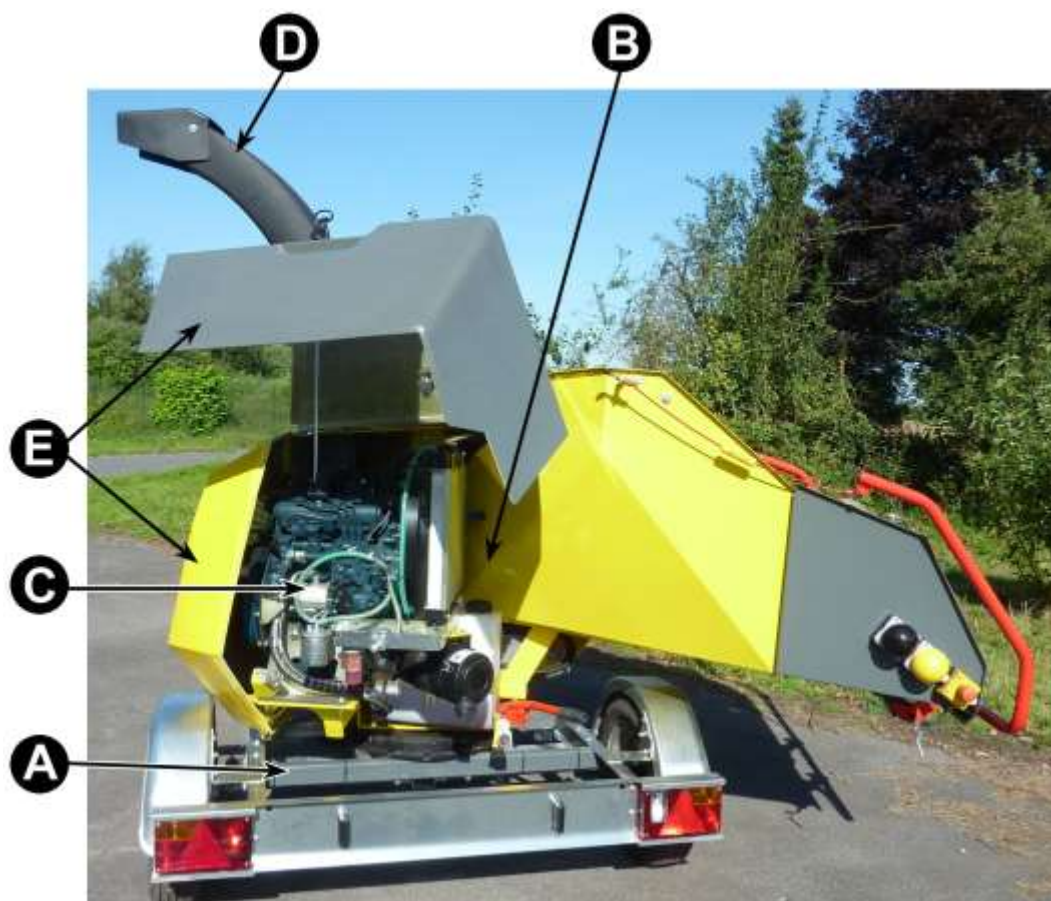
General description and functions

DESCRIPTION OF THE MACHINE

The chipper **WS 16-35 DT TS Industrie** is designed for chipping branches up to a **diameter of 160 mm**.

The machine consists of the following main components:

- (A) : Frame
- (B) : Chipping unit
- (C) : Engine and drives
- (D) : Expulsion chimney
- (E) : Noise protection hoods



General description and functions

A. Frame

The frame is used for allocating the different components of the chipper WS/16-35 and allows an independent movement of the machine.

B. Chipping unit

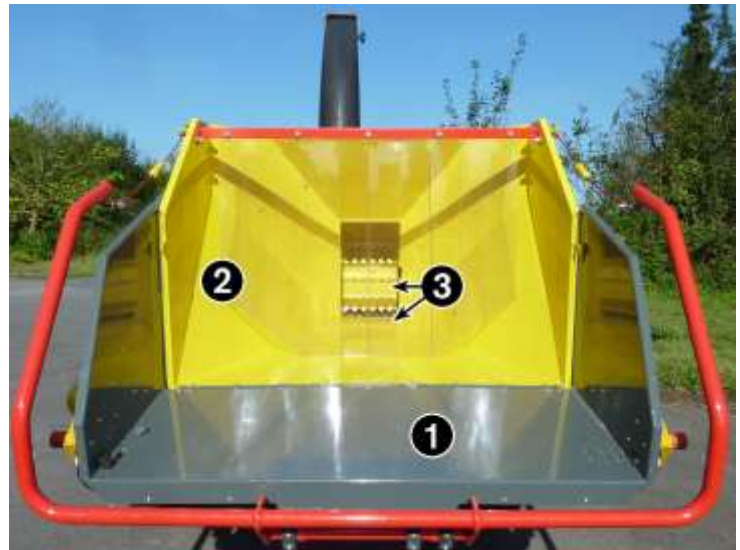
The unit consists of a foldable infeed table (1), an infeed hopper (2), two serrated infeed rollers (3) and one chipping disk.

Infeed rollers:

They transport the chipping material at constant speed in direction chipping disk. An anti-blocking system disconnects the infeed if the speed of the chipping disk falls below the minimum speed (chipping unit jammed) and automatically connects again after the speed of the chipping disk is sufficient for correct chipping work.

The infeed can turn into both directions (forward and backwards) when using the yellow and the black button (4) located on the left side of the infeed hopper.

The turning speed can be adjusted to the diameter of the chipping material using the regulating screw (5) on the left side of the cover panel.



Chipping disk:

The disk is the main component of the machine and has the task to chip the material coming from the infeed roller. After the engine accelerates, the disk connects and rotates at a constant speed.



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General description and functions

C. Engine and drives

The diesel engine is located beside the chipping unit. It supplies the required energy for the drive of the chipping disk and the hydraulic oil pump (1).

The machine is driven by a 3-cylinder diesel engine with an output of 34 HP at 3000 rpm. Further information regarding the engine can be taken from the manual of the manufacturer.

The chipping disk is driven via the output shaft, the centrifugal clutch with belt pulley (2) and 2 V-belts. The hydraulic pump is connected to the diesel engine and drives the hydraulic motors of the infeed rollers.



D. Expulsion channel

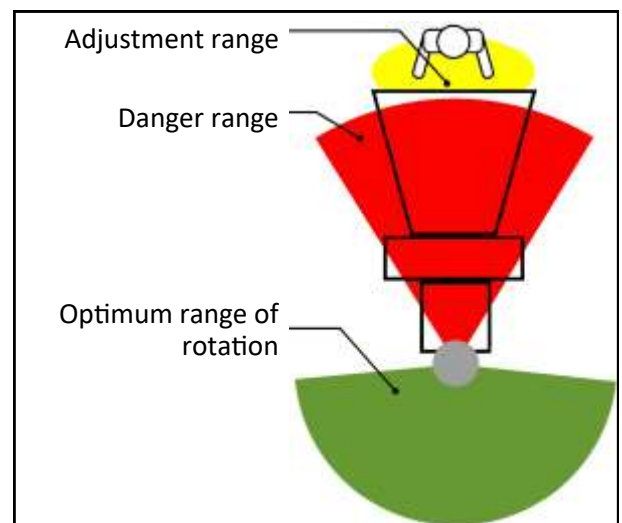
This expulsion channel expulses the chipped material. The upper part can be swivelled by 270° in horizontal position. The expulsion hatch can be adjusted in vertical position.



Caution:

When connecting the wood chipper residual chips can be expulsed.

The electric circuit disconnects the engine and prevents a restart if the expulsion chimney is open towards the chipping disk.



E. Lateral skirt and engine hood

Different hoods protect against rotating parts making work safe.

An electric switch disconnects the engine and prevents a restart when opening the hoods.

MATERIAL INFEEED

The **WS/16-35** is fitted with an electrically controlled hydraulic distributor, which is activated with two buttons at the rear of the infeed hopper for running forwards and backwards, and with a red control rod for disconnection of the infeed roller and the conveyor belt.

Note: The engine has to run at max. speed for making the conveyor belt and the infeed roller turn.

FORWARDS MODE:

1. Move the red control rod back such that the infeed roller moves to forward motion.
2. Push the **yellow** button to make the roller move forwards.

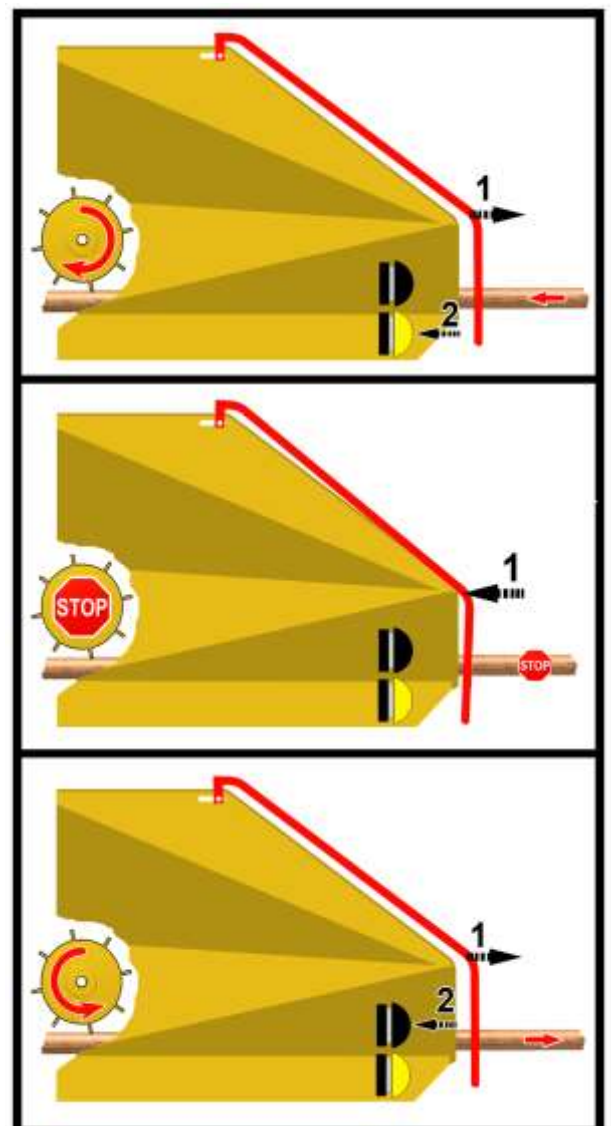
STOP THE INFEEED:

1. Push the red control rod to make the in-feed stop.

BACKWARDS MODE:

1. Move the red control rod back
2. Push the **black** button.

NOTE: The infeed can be switched directly from forwards to backwards and vice versa without operating the control rod.



Operation

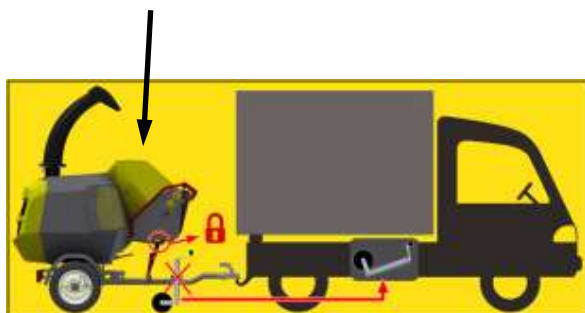
Coupling the machine to a vehicle

When hooking the wood chipper to a vehicle the procedure is as follows.

With the support wheel adjust the height of the drawbar such that the trailer coupling is standing above the vehicle. Now reel the support wheel in and the open ball head coupling has to engage on the ball of the trailer coupling. Ensure that the trailer coupling safely engages!

Then connect the arrestor cable with the vehicle and plug in the connector for the lighting. Reel the support wheel completely in, put up the rear safety sustainer, and move the expulsion chimney back into driving direction and arrest; then **check the lighting**.

IMPORTANT: The wear indication on the coupling must be in the green area (see page 15). Fold the infeed table up, turn the chipping unit into **TRANSPORT POSITION** and latch it with the **safety hooks** underneath the table.



CHECKS PRIOR TO INITIAL START-UP OF THE MACHINE

Every operator has to read and understand the provisions, and has to observe all safety measures included in this chapter. A list with the checks for initial start-up is available to the operator. These checks have to be carried out for safety reasons to ensure the safe and efficient operation of the chipper.

The following points are to be checked before using the machine:

1. The machine is sufficiently lubricated as indicated in the operating manual?
2. Check the following filling levels:
 - Engine oil
 - Coolant
 - Fuel
3. Check the hydraulic oil level.
4. Check that the air filter is clean.
5. Check that the engine radiator is clean.
6. Ensure that all hoods are closed and locked.
7. The machine must not be operated in confined spaces. Risk of intoxication because of the diesel engine exhaust gases and dust generation by the chipper.
8. The expulsion channel and the expulsion hatch are only allowed to be adjusted by an authorised operator.

Operate the machine only with Non-Road fuels or commercially available diesel fuel.

ATTENTION!

In case the machine shows difficulties in chipping the material and has to be switched off, **restart the engine only after having removed the cause and the material was removed from the chipping disk!!!**

START-UP

Each time before start-up of the machine ensure that it is standing stable on solid ground.

1. Check if the hatch of the expulsion channel is open.
2. Remove the safety pin, open the latch and lower the infeed table.
3. Turn the key to position **1** and connect the ignition.
4. Wait until the preheat lamp is off (approx. 10 sec.).
5. Turn the key to position **2** and start the engine. Let the engine run until it has reached operating temperature.
6. On the Pilot System choose the desired range **1, 2 or 3** (see page 38).
7. Accelerate the engine up to max. speed.



See page 40 if the engine immediately shuts down again and the message **“Slip Error“** is displayed on the Pilot System.



8) As soon as the engine has reached working speed, the message **Press Start** appears and a **Smiley**.

9. Press the **yellow** button on the infeed table to connect the infeed rollers.

10. Now work can be started.



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Material infeed and operation

INSTRUCTIONS FOR CHIPPING

Watch out for solid foothold of the operating personnel!

Place chipping material on the hopper bottom and move it with the thicker end (trunk) towards the infeed rollers (chamfer the thick end of the trunk).

As soon as the material is captured by the rollers move to the side, because due to unevenness of the trunk there might be material kick-out,

The captured material now is automatically chipped and hurled into the direction (distance) into which the expulsion chimney was set to beforehand,

After the material infeed from time to time attention is also to be paid to the thrown out chippings, and maybe readjust the direction of ejection. The ejection distance of the material is controlled with the ejection hatch.

When chipping splints, barks and brush-wood splintering can be avoided by always feeding the material side-by-side and lengthwise positioned into the infeed channel,

If the feed stops (jamming because of too much material or forked branches), press the **black** button (rollers rotate backwards) and the chipping material is pushed back. Now reduce the material quantity, cut the forked branch, and restart the infeed,

The hopper can only be cleaned using appropriate wooden aids.

Caution:

While the machine is running do not reach into the hopper! If required, push the kindling further using a wooden slat or wood slider! Never push the chipping material into the hopper using a metal rod or metal slider! It is also prohibited to stay in the danger area! In case of especially thick or hard wood, it makes sense to slow down the engine, reduce the speed until it has reached the rated speed.



If the area of the expulsion chimney is jammed, the hood must not be opened before standstill of the chipping disk and shut-down drive engine, and then the material can be removed with an appropriate tool.

Noise emission

The chipper produces a guaranteed sound power level according to Directive le 2000/14/EC :

Model	Sound power level EVA [dB]	Sound pressure level [dB(A)]
WS/16-35DT	126	124



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SHUT-DOWN

1. Have the chipper run for some minutes empty for removing the residual material behind the infeed roller in the chipper to prevent that the chipping disk becomes jammed in the next application, and the message "SLIP ERROR" is indicated (see page 40).

2. For stopping the infeed roller move the control rod forward.



3. Set the engine to idle speed.

Have the engine run at idle speed for approx. 10 seconds for temperature compensation in the turbocharger.

4. Turn the key on the control element to the left and shut the engine off.



BIODEGRADABLE LUBRICANTS FOR REDUCING ENVIRONMENTAL POLLUTION

Just by their function, the chippers from **TS Industrie** are used as a solution for the sustainable development for the production of compost, mulch and wood chips.

TS Industrie chippers are often used in woods, parks, landmarks, in the proximity of lakes and rivers, where leaks and hydraulic fluids signify a risk for the environment.

Therefore, the company **TS Industrie** contributes to the environmental protection by supplying their machines with **biodegradable high performance lubricants**.

Corresponds to the agricultural Directive 2006/11/EG.

Advantage of biodegradable lubricants:

- No risk for the environment
- Increase biodegradability
- Not toxic (based on rapeseed and sunflower oil)
- Regenerative
- Very high viscosity
- Excellent wear and anticorrosive properties
- Increased safety for the user
- Increased duration of the components
- Reduced volatility properties





SAFETY INSTRUCTIONS



1. Securely park the machine, remove the contact key and wait until the standstill of all mobile parts before starting the maintenance and repair works,
2. After termination of the maintenance works ensure that all protective devices are properly mounted and are operative,

All machines pass a test-drive before leaving the works. On delivery the hydraulic tank is filled up to the upper mark of the sight-glass with hydraulic oil. The filter has to be replaced after 150 operating hours. Thereafter, the replacement takes place according to the maintenance schedule. The first inspection is integral part of the warranty terms.

Only trained personnel is allowed to carry out maintenance and repair works.

The maintenance of the engine is to be carried out according to the enclosed operating instructions of the engine manufacturer.

On delivery, the bearings are lubricated and the transmissions are filled with oil. It is recommended to perform an inspection of the machine prior to initial start-up.

LUBRICANT: Filling quantity:

Fuel: 17 l.

Hydraulic oil: 8 l.

Engine: See operating instructions of the engine manufacturer



Recommended LUBRICANTS :

1. Lubricants for bearings, joints and different components:
Multi-purpose high-performance grease SAE (EP).
"SAELEN BIOPLEX "
2. Hydraulic oil:
AFNOR NFE 48603 Type HV ISO VG 46
"MINERVA BIO HYDRO 46 "
3. Engine oil: See operating instructions of the engine manufacturer

ENGINE MAINTENANCE INTERVALS:
See operating instructions of the engine manufacturer

MACHINE MAINTENANCE INTERVALS

Operating hours	Maintenance works
Every day	<ul style="list-style-type: none"> - Check tight seat of the adjusting joints front side of the trailer coupling/drawbar - Check function of the safety switches and the red control rod - Check the engine oil level - Check the coolant level - Check the cleanliness of engine radiator - Check the trailer coupling - Check the tight seat of wheel nuts - Check the lighting equipment
First time after 4 operating hours	<ul style="list-style-type: none"> - Check the tight seat of all fastening screws - Check the tension of the chipping disk drive belts
Every 50 operating hours	<ul style="list-style-type: none"> - Check both bearings of the chipping disk - Check the vertical/horizontal knives and counter-knives - Check if material is wrapped around the bearings and remove - Check the tension of the chipping disk drive belts
Every 150 operating hours	<ul style="list-style-type: none"> - 1. Replace the hydraulic oil filter (thereafter all 500 operating hours or every 2 years) - Lubricate the pivot bearing
Every 300 operating hours	<ul style="list-style-type: none"> - Check the battery acid level
Every 500 operating hours	<ul style="list-style-type: none"> - Change the hydraulic oil (or every 2 years) - Replace the hydraulic oil return filter (or every 2 years) - Replace the intake strainer in the hydraulic oil tank

Maintenance

OPEN THE HOOD

The engine bonnet, which has to be opened first, is fitted with a lock needing a special key for unlocking. This key should not be kept together with the contact key, otherwise the operation of the engine could be disturbed (see page 35).



This key is also used for unlocking the locks of the hood for access to the drive belts.

Before transporting the machine ensure that the hood is correctly locked.

Mounting the hood after removal:

- Hold the hood at both handles and move it to the frame slightly inclined backward.
- Move the two conical rubber buffers under the hood into the respective seats.
- Push the upper part of the hood against the frame and ensure that the lateral and upper metal guides are properly introduced into the frame.
- Lock the locks with the key (turn clockwise).



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LUBRICATING POINTS



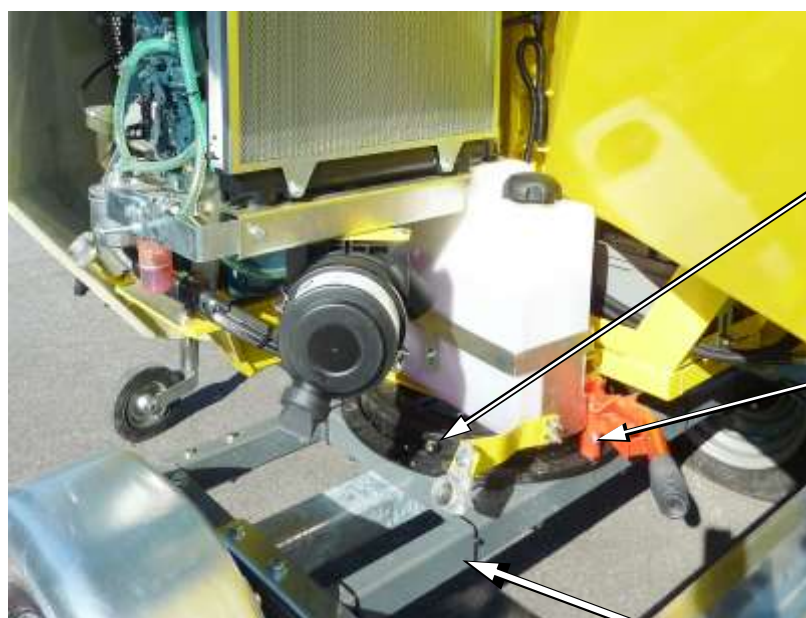
Shut the engine off and remove the key before the lubricating and maintenance works.



CHIPPING DISK BEARING FRONT



CHIPPING DISK BEARING REAR



PIVOT BEARING (3 grease nipples)

PIVOT BEARING LOCKING

OIL LEVELS



DIP STICK HYDRAULIC OIL



DIP STICK ENGINE OIL

REPLACEMENT OF KNIVES AND COUNTER-KNIVES

The state of knives and counter-knives is to be checked every 50 operating hours. Fibrous chips and reduced performance are clear proof of blunt knives and counter-knives.

Remove the contact key before beginning to work



ACCESS TO KNIVES AND COUNTER-KNIVES

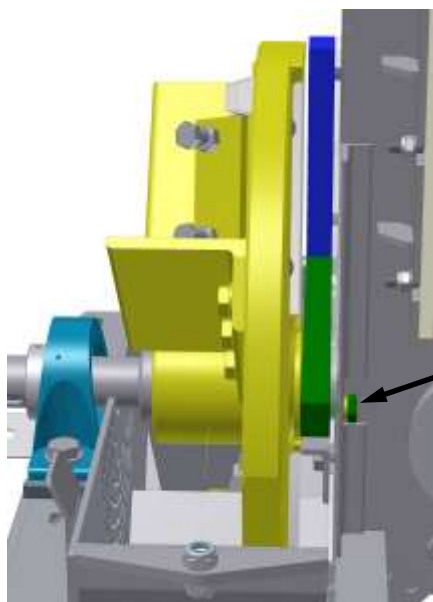
Access to the chipping disk is as follows:

Unscrew the self-locking nut of the chipping disk cover.

Open the cover and turn it around the hinge until the expulsion hatch is on the ground.

TURNING OR REPLACING THE COUNTER-KNIVE

The chipping disk is fitted with two (vertical and horizontal) opposite counter-knives. The counter-knives have to be turned as soon as they are blunt. For this all 4 edges of the counter-knives can be used.



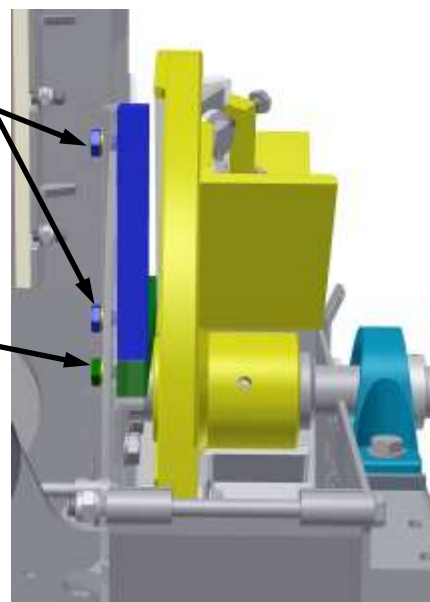
The vertical counter-knife is fastened with two screws

The horizontal counter-knife is fastened with one screw on each side

Clean the contact surfaces well before installing the counter-knives.

Always use new screws (class 8.8).

Tighten all screws well.



TS INDUSTRIE®

Maintenance

KNIFE REPLACEMENT

Instructions:

Knives and counter-knives are made of a special steel and cannot be opened by welding. Only correspondingly trained personnel is allowed to replace the knives.

Notched knives produce chips of poor quality and complicate the infeed of material.

The distance between knife and counter-knife is to be re-adjusted after each replacement.

Too big a distance (1 mm) leads to defibration of the material and an increased power requirement of the machine. With too small a distance (less than 1 mm) the knife might strike against the counter-knife.

- Ex works, the hexagon screws M16 for fastening the knives are degreased and tightened without thread-locking fluid with a torque of 221 Nm.

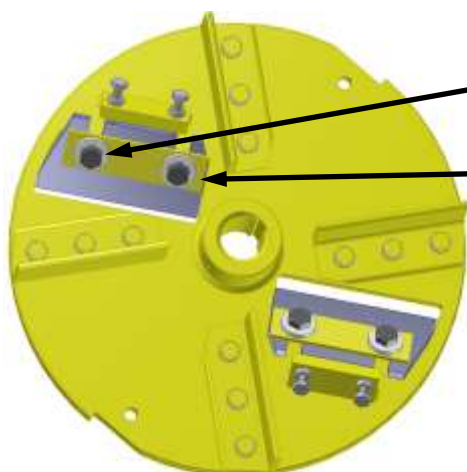


Caution: Risk of injuries!

Before any work on chipping disk or knives, it has to be secured with the locking bolt at the rear part of the disk.

This requires to introduce the pin into one of the holes in the chipping disk.

Do not forget to remove the safety pin after terminating all works and before restarting the machine.



Unscrew both screws from each knife and remove it with washer.

Remove the support plate.

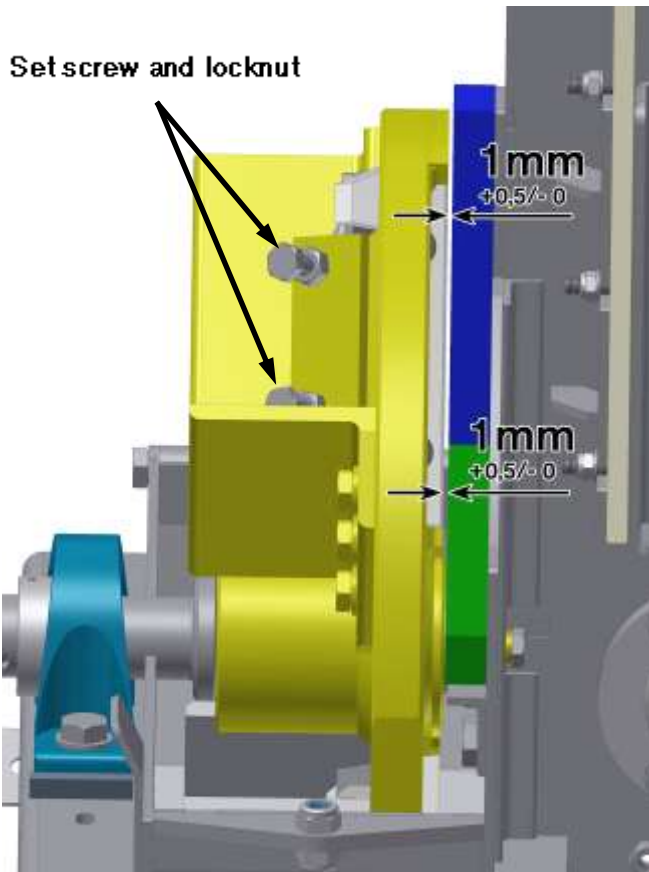
Clean all contact surfaces of chipping disk and knives.

Screw down new screws of class 8.8 (degreased and without thread-locking fluid) and tighten only slightly to be able to adjust the clearance between knife and counter-knife.

continued
→

Maintenance

KNIFE REPLACEMENT (continued)



Place the knife parallel opposite to the vertical counter-knife, and check the clearance ($1\text{ mm}^{+0.5/-0}$).

Repeat the procedure with the horizontal counter-knife.

The clearance is adjusted by means of the two set screws. After the adjustment is finished, ensure that the set screws are in tight contact with the knife, and then tighten the locknut.

Repeat the procedure with the second knife.

Tighten the screws M16 of the knives using a torque spanner applying a torque of 221 Nm.

Tightening with the correct torque is important to prevent the screws from coming loose.



Pull the safety pin out and fasten with the pin.

Clean the contact surfaces of the chipping disk cover.

Close chimney and hoods again.

Start the machine and perform a functional check.



SHARPENING KNIVES

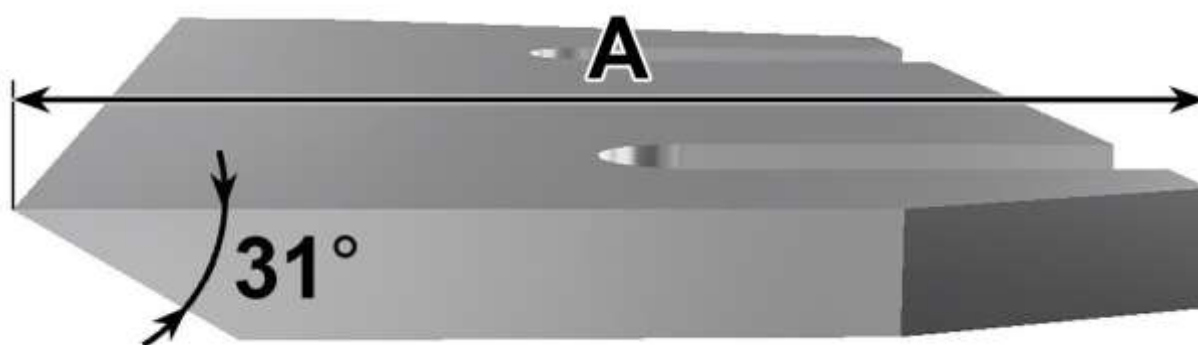
The knives are to be sharpened or replaced as soon as they have become blunt, or the infeed of material in the machine becomes difficult (the knives push the material off).

IMPORTANT: Only a specialist is allowed to sharpen the knives on an appropriate machine and not on a portable grinding machine.

The knives can be re-sharpened several times. However, it must be observed that both knives have the same weight to ensure a perfect concentricity of the chipping disk.

After sharpening, the length **A** must not fall below **80 mm** (a new knife has a length of **95 mm**).

Comply with the sharpening angle of 31°



Do only use screws type TH 16 X 40 class 8.8 DIN EN 24017. Tighten screws with a torque of 221 Nm.

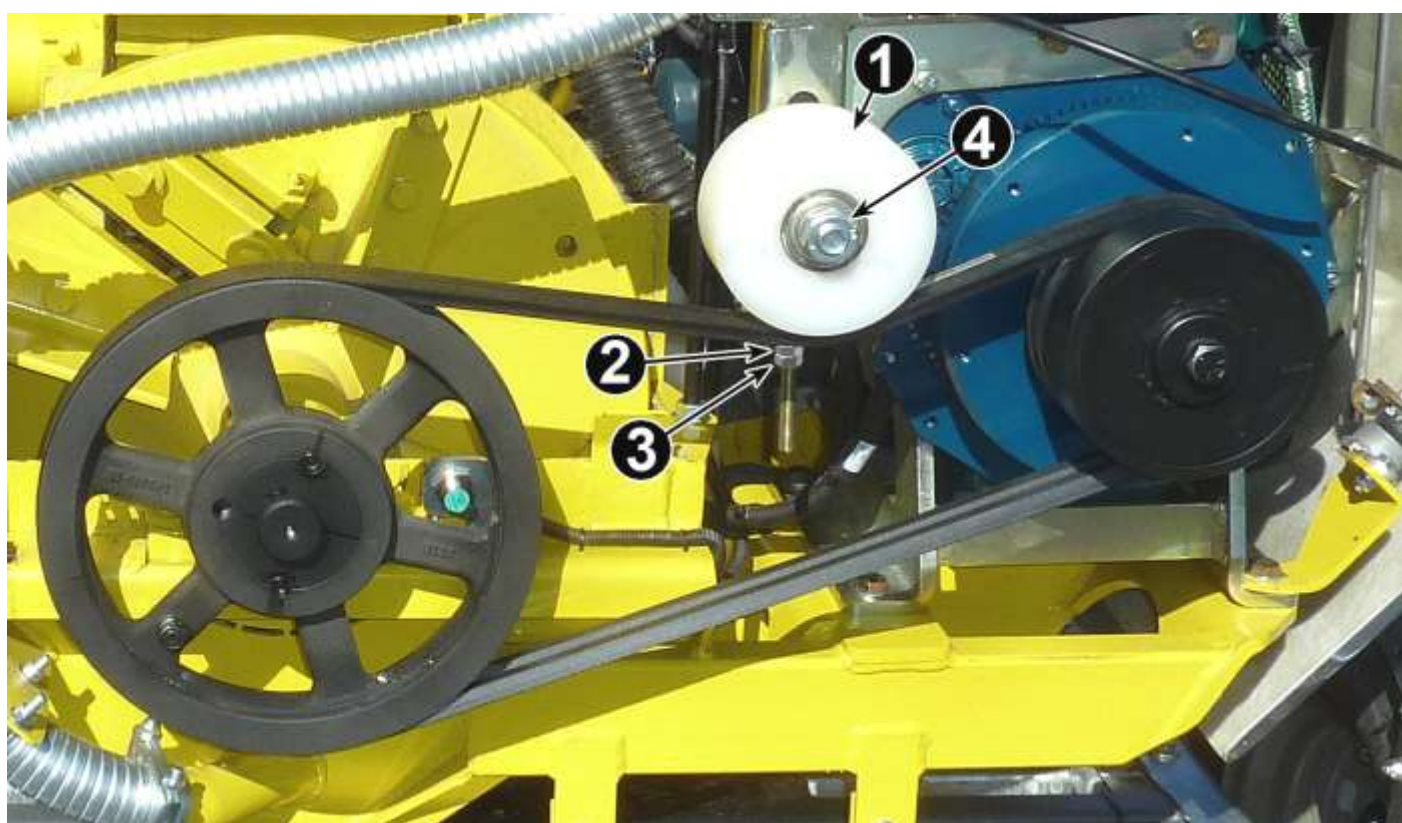
Tightening with the correct torque is important to prevent the screws from coming loose.

TENSIONING THE V-BELT FOR THE CHIPPING DISK DRIVE

The tension of the V-belts is ensured by a belt pulley.

The adjustment of the V-belt tension is carried out by loosening the nut (4) on the belt pulley as well as the locknut (3) and readjusting the belt pulley with help of the screw (2).

ONLY TRAINED PERSONNEL CAN CARRY OUT THIS WORK

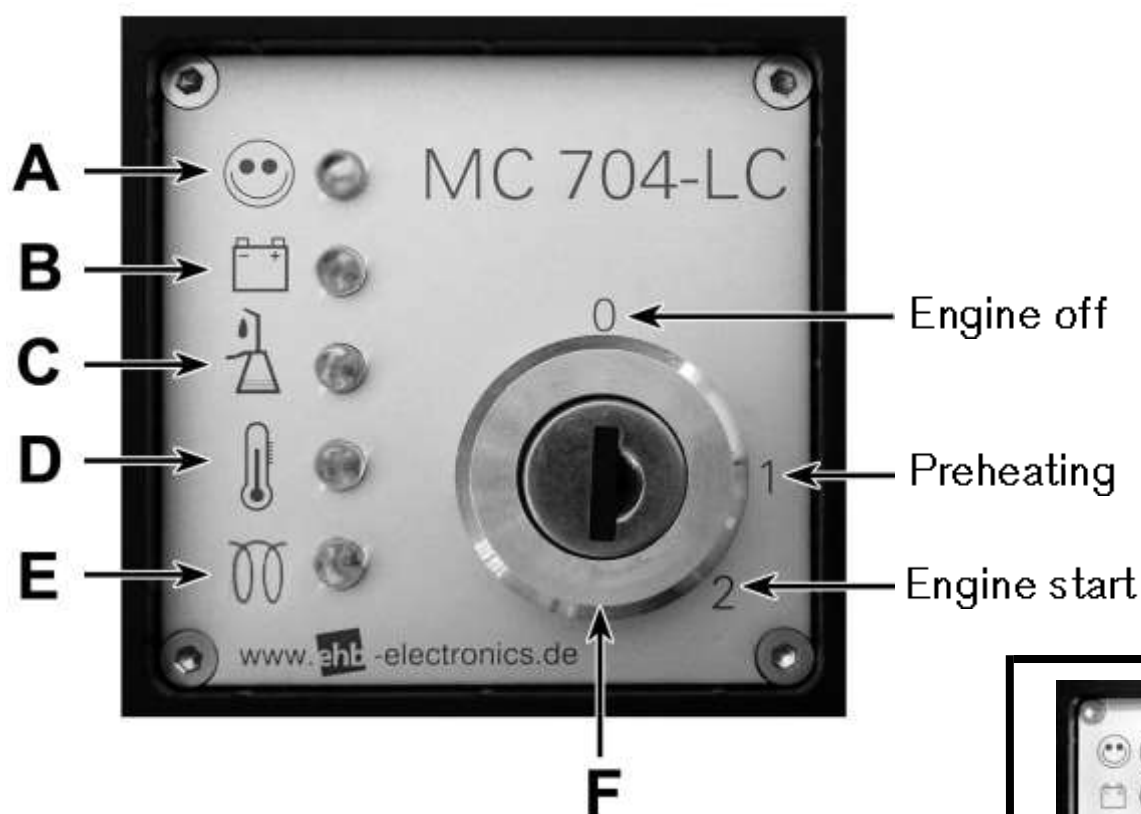


DESCRIPTION AND OPERATION

CONTROL ELEMENT OF THE ENGINE

- A:** Green warning light - operating control light (OK)
- B:** Warning light battery charge control
- C:** Warning light oil pressure
- D:** Warning light coolant temperature
- E:** Preheating light (8 seconds)
- F:** Ignition lock

In case of a defect, the engine is automatically shut off, and the warning lights C and D light up.



Do not put the contact key on a heavy bunch of keys, this might produce disconnection of the ignition during the operation.



PILOT SYSTEM

AVAILABLE FUNCTIONS

1. Continuous indication of the engine speed
2. Continuous indication of the chipping disk speed
3. Continuous indication of the daily operating hours
4. Continuous indication the total operating hours
5. INDICATION FOR OPERATION AND OF THE PULSES FROM THE CHIPPING DISK ENCODER WITH GREEN LED
6. INDICATION OF ERRORS WITH RED LED
7. Hydraulic test: a fast forward and backward travel speed serves for testing the hydraulic system
8. A fast forward movement of the infeed roller serves for testing the No Stress System
9. 3 No Stress (Vario Stress) Options for choosing the type of wood
10. Service management : Intervals for oil change
11. Belt slip, clutch and hydraulic coupling system (ideal for rental equipment)
12. CUT-OUT FUSE FOR ENGINE AND START INTERLOCK IF HOODS ARE OPEN
13. ERROR MEMORY
14. 21 Machine types are lodged in the memory
15. 4 optional selectable languages: English, French, German and Spanish



DESCRIPTION AND OPERATION

DESCRIPTION

LED:

- Green - continuous: ON
- Green - flashing: Pulses from chipping disk encoder
- Red - continuous: Engine hood or access to chimney open

LCD DISPLAY WITH BACKGROUND LIGHTING

ENGINE SPEED

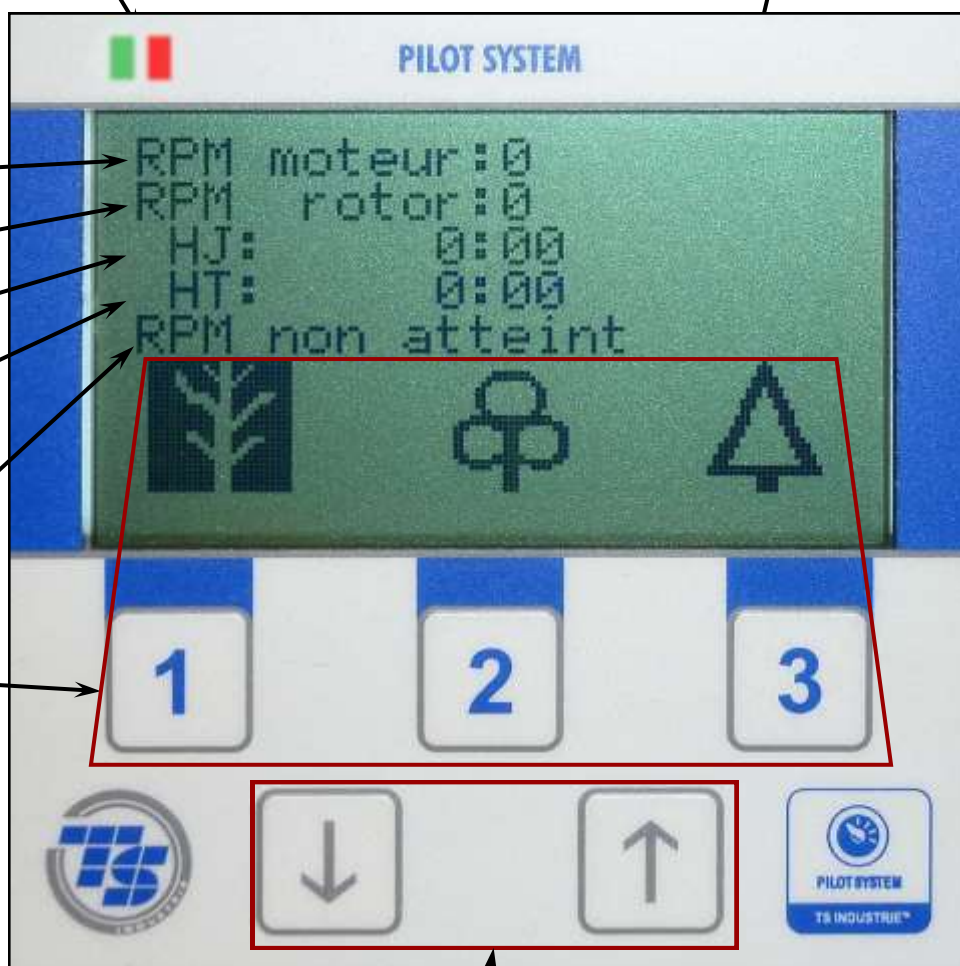
CHIPPING DISK SPEED

DAILY OPERATING HOURS

TOTAL OPERATING HOURS
(SINCE INITIAL START-UP)

CURRENT OPERATING STAGES

FUNCTION KEYS **1** TO **3** FOR
SELECTING THE NO STRESS
SETTINGS



The input of the access code and the menu navigation
is carried out with the arrow keys ↓ and ↑



It is strictly prohibited to change the factory settings of the Pilot System. The programming person is responsible for any change of the parameters outside the works of TS Industrie.

THE VALUES INDICATED ON THE FOLLOWING PAGES ARE REFERENCE VALUES ONLY

TSINDUSTRIE®

SELECTING NO STRESS SETTINGS

The Pilot System has 3 No Stress settings

Above each key there is a symbol for the according setting, showing a black background when selecting this setting.

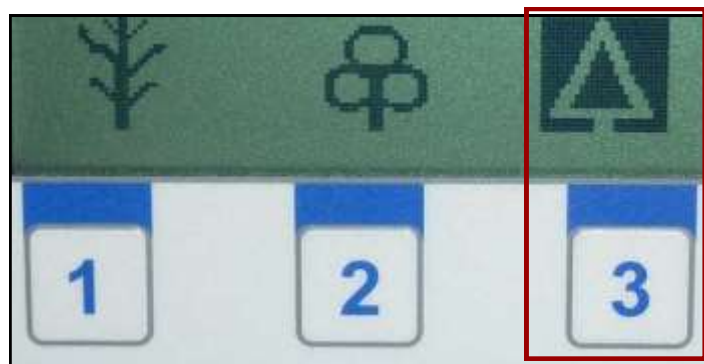
Key 1 for wooden waste: Utilises an amplified engine speed



Key 2 for average waste: Utilises a medium speed range. Branches and coniferous wood can be processed



Key 3 for coniferous wood and vegetation, e.g. coniferous wood and humid green wood

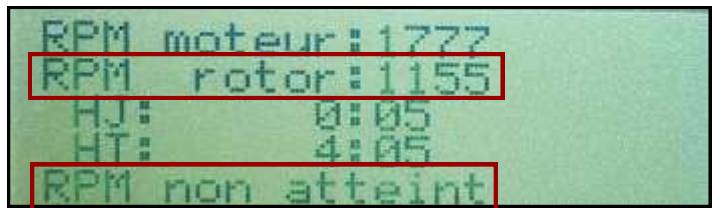


In case the settings shall be changed during the work, it is required to press the yellow button on the infeed hopper for re-starting the infeed rollers.

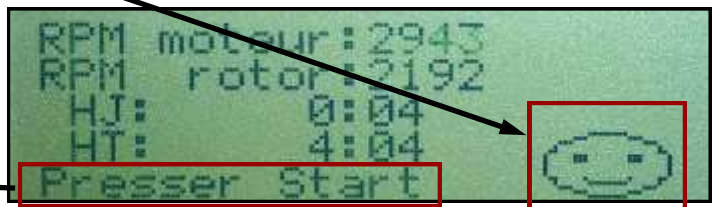
STANDARD OPERATION AND OVERSPEED

The speed of the chipping disk is the essential data for the functional check of the machine.

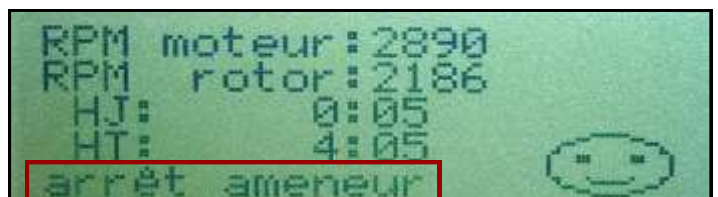
The indication **RPM too low** shows that the engine speed is insufficient for continuous material infeed to the disk.



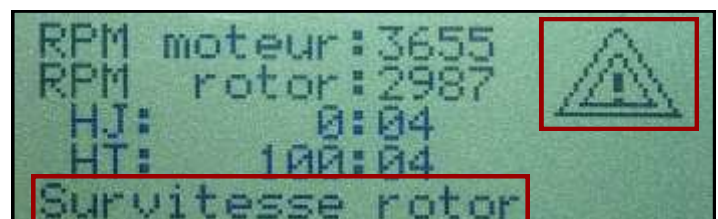
Adjust engine to max. speed. A **Smiley** is shown as soon as the minimum speed is reached for connecting the infeed roller. Now the **yellow** button can be activated.



As soon as the infeed roller is rotating and the rear red control rod is activated, appears the message **infeed stop**.



If the chipper disk speed is too high, the infeed roller is automatically stopped to protect the machine. At the same time appears the symbol Attention as well as the message **overspeed**.



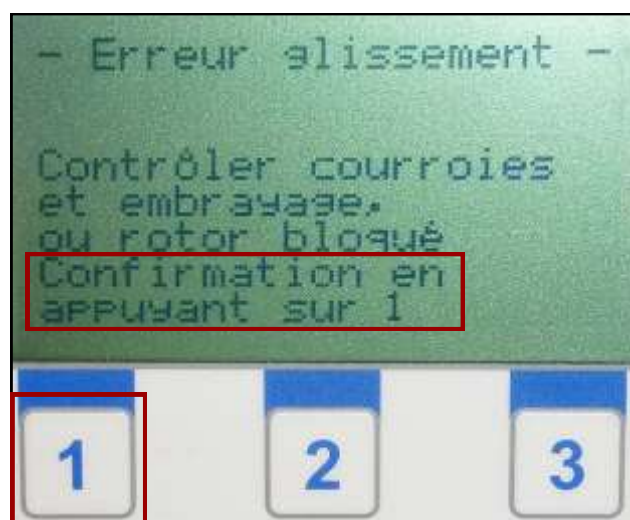
After having removed the cause for the overspeed it is required to reduce the engine speed to idle running, then increasing it again to max. Speed, to allow the infeed roller to re-connect.

SLIP FUNCTION

The Pilot System controls the slip between the belt pulleys of chipping disk and engine by continuous comparison of both speeds. For the protection of V-belts, centrifugal clutch and hydraulic coupling, a slip of one per cent is admissible. If slip increases to over one per cent, the engine is shut off and the following messages appears on the display.

Different reasons for slip:

- Chipping disk blocked
- V-belt loose
- Coupling worn



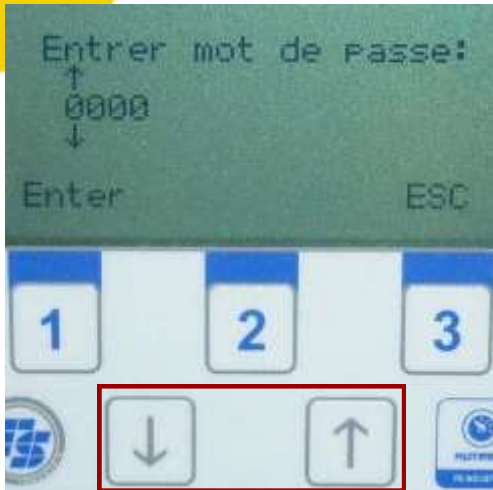
Note: Slip can be produced if the machine from standing is accelerated very slowly.

After stopping/checking the drive press key 1 to be able to continue work.

Date and time of this message are saved in the memory of the Pilot System, and can be read by the dealer.

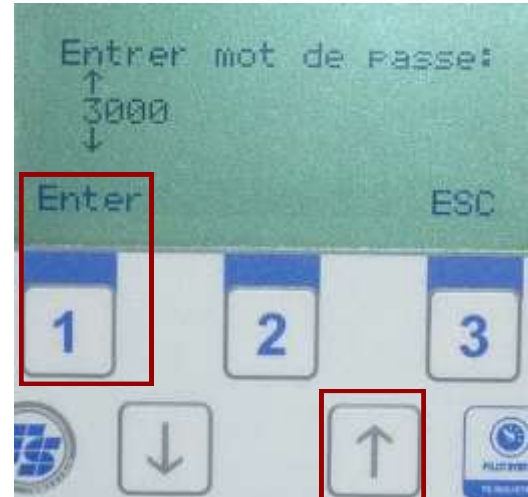
Access to the CUSTOMER Parameters Code 3003

1



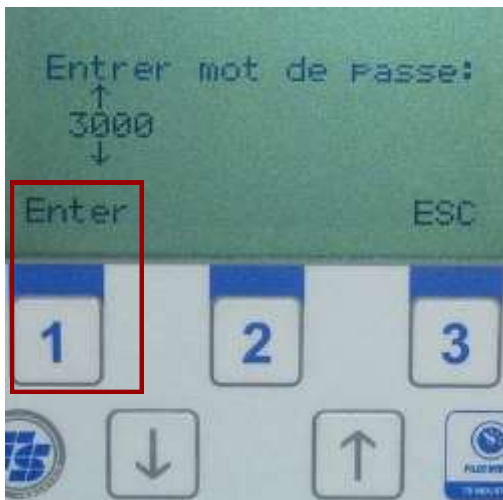
Keep key ↓ and ↑ pressed for 4 seconds.

2



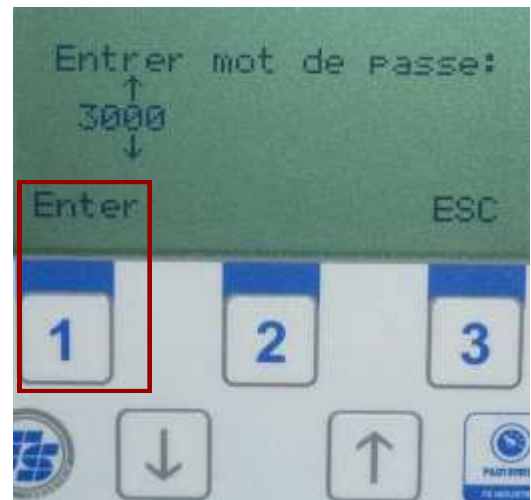
Press key ↑ **3 times** until the number 3 is displayed, than confirm with key 1.

3



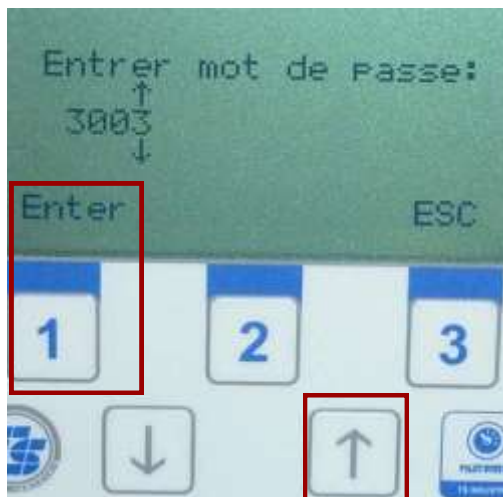
Press key **1** for confirmation and go to the first 0.

4



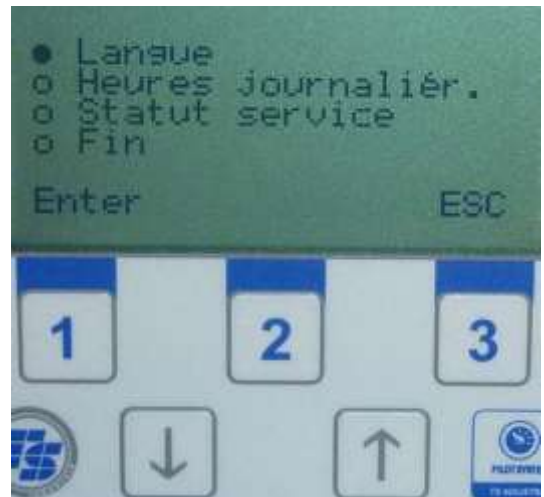
Press key **1** again for confirmation and go to the second 0.

5



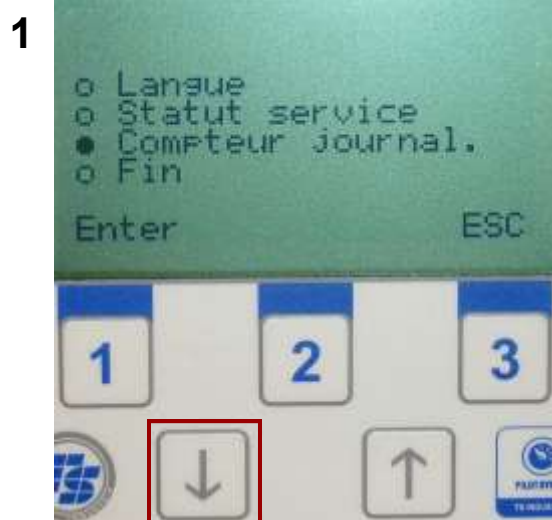
Press key ↑ **3 times** until the number 3 is displayed, the confirm with key **1**.

6



Now, the user has access to different functions and **END** navigation.

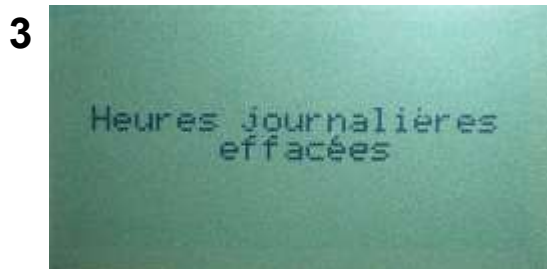
Reset of the daily operating hour counter



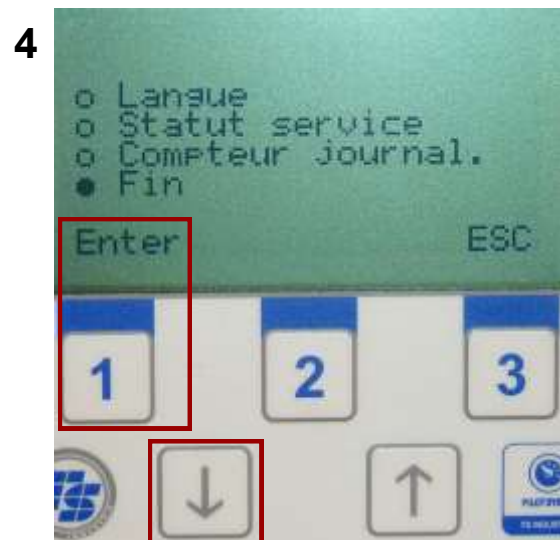
Press key ↓ and put the cursor on **Daily oper. hrs.**



Press key **1** to confirm deletion of the daily operating hours.



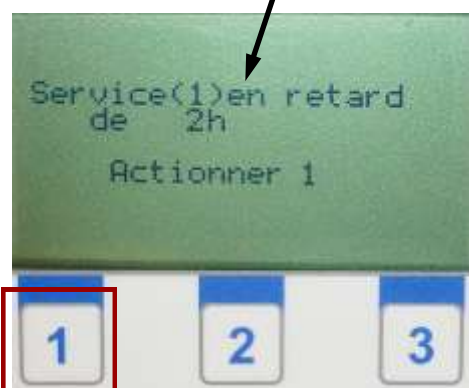
The process is indicated with a corresponding message.



Press key ↓ and put the cursor on **End**. Confirm with key **1 Enter**.

Overdue service and further service information *(engine oil change)*

When starting the machine, the system shows a warning message and a corresponding symbol as soon as maintenance is due or overdue.



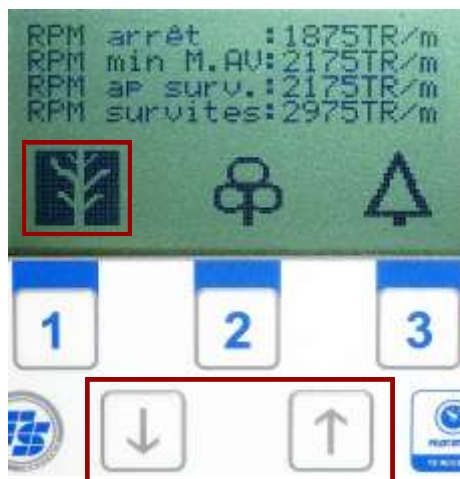
Agree with your dealer a date for an oil change. The message is saved in the Pilot System. Press key 1 for confirming the message and to be able to continue work.



Press key ↓ or ↑ once or twice for displaying the next oil change or service. Contact your dealer to agree a date.

Chipping disk speeds of the No Stress settings

(The examples are reference values only)



Press key ↓ or ↑ once or twice at any time for indication of the **chipping disk speed** for the selected NO Stress setting:

Example setting 1:

Minimum: Speed below 1875 rpm. The infeed roller is disconnected.

Return: As from a speed of 2175 rpm. The infeed roller is restarted.

Normal: After an overspeed of the engine, the speed of the chipping disk must be reduced to below 2175 rpm for the infeed roller to reconnect.

Over: Overspeed. The infeed roller is switched off at a speed of 2975 rpm.

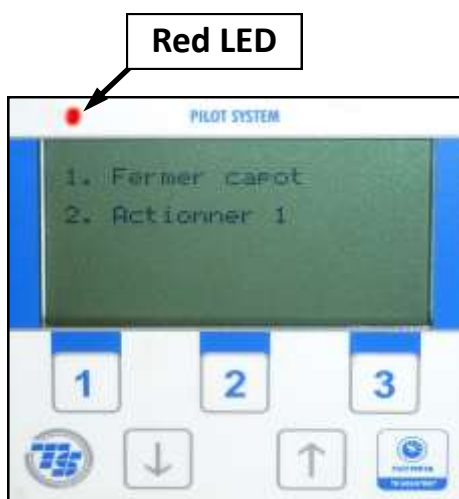
Attention:



It is strictly prohibited to change the factory settings of the Pilot System. The programming person is responsible for any change of the parameters outside the works of TS Industrie.

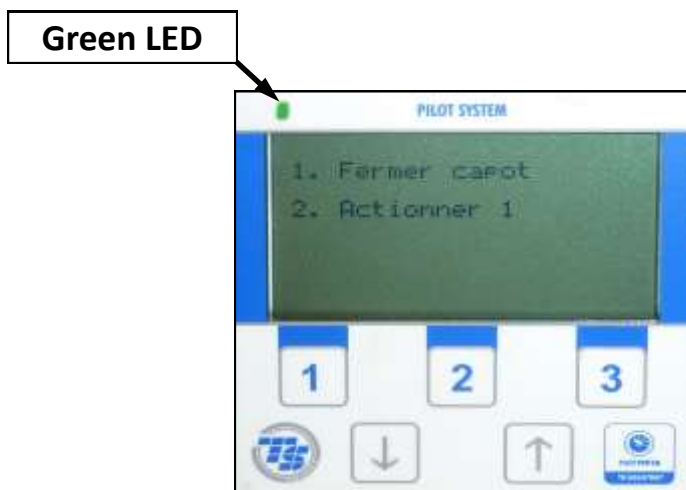
Hood safeguard

An open or incorrectly closed hood is indicated by a **red LED** and a corresponding message. The safety system shuts the engine off and impedes a restart. In this case, close the affected hood correctly and then press key **1**. The message disappears.



Chipping disk speed encoder pulses

A permanently shining **green LED** shows that chipping disk and system are operating. The LED starts flashing when it receives a signal from the speed encoder M18 on the chipping disk. The frequency of the flashing changes with the speed of the chipping disk.

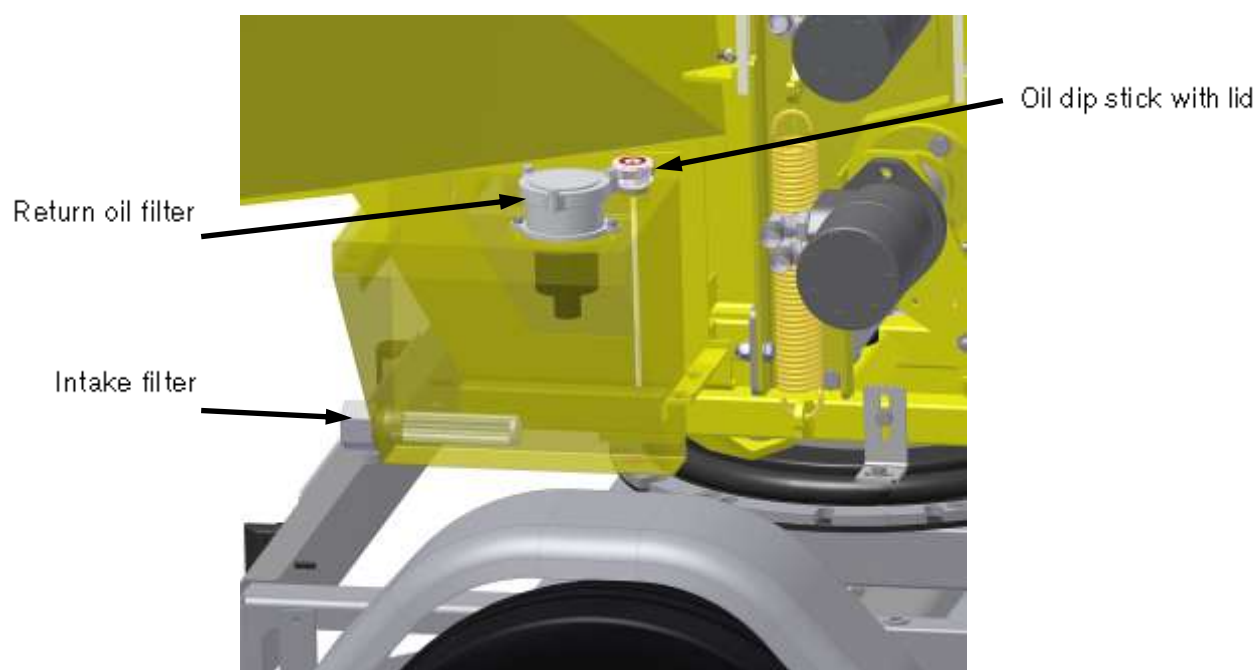


DESCRIPTION AND OPERATION

TANKS

The machine is fitted with two tanks:

Hydraulic oil tank with a capacity of 8 litres, consisting of:



Fuel tank with a capacity of 17 litres

Hood safeguard

The machine is fitted with a hood safeguard:

This safeguard consists of one proximity sensor (1), which is fastened to the grey engine hood. The electric switching contact is established if the sensor approaches the magnet (2) on the yellow hood. When opening the hood the contact is interrupted and the engine is shut off.



The proximity switch must not enter in contact with the magnet. The distance between sensor and magnet must amount to 6 mm \pm 5



EMERGENCY STOP SWITCH

The machine is also fitted with four emergency stop switches, one on each side of the machine.

When activated, these switches have the following functions **(the Pilot System is switched off)**:

1. Diesel engine shut off
- 2) Infeed roller shut off



DESCRIPTION AND OPERATION

PROXIMITY SENSOR AND FUSES

The proximity sensor M18 (Ø18) on the V-belt pulley of the chipping disk captures the speed and sends it to the Pilot System.

The distance between sensor and metal pin opposite of the V-belt pulley must amount to **4 mm ± 1** .



If after the start the engine is shut off again after some seconds and on the Pilot System appears the message "Slip error", it is required to find the cause for the error: *Chipping disk blocked by chipping remains, loose or broken V-belts, defective coupling, defective sensor M18.*



**Blade-type fuse
Type U 40 A.**



One blade-type fuse **12 V/40 A** is located in the fixture on the battery cable beside the starter motor.

EXPULSION CHANNEL

The expulsion channel can be turned by 270° and blocked with the latch on the carrier.



In this chapter we have compiled a list of possible errors, their causes and their solutions. In case an error appears, which is not listed in chapter "Troubleshooting", please contact your dealer. Have your operating manual and the serial number of your machine on hand.

FAILURE	CAUSE	REMEDY
The engine is shut off and the Pilot System shows the message "Slip error".	-See page 40	
Not possible to connect the Pilot System	- Emergency stop switch activated	- Unlock switch
The engine does not start	<ul style="list-style-type: none"> - Emergency stop switch activated - Hood open - Hood safeguard wrong adjusted or defective - 40A-fuse defective - Battery empty - Supply cable damaged 	<ul style="list-style-type: none"> - Unlock switch - Check locking of the hoods - Check sensor (see page 47) - Replace fuse (see page 49) - Charge or replace battery - Check electric circuits
Reduced engine output	<ul style="list-style-type: none"> - Radiator clogged - Knives blunt - Fuel filter clogged 	<ul style="list-style-type: none"> - Clean radiator - Sharpen or replace knives - Replace filter

FAILURE	CAUSE	REMEDY
The engine shuts off and cannot be restarted	<ul style="list-style-type: none"> - Hood not correctly locked - Hood safeguard defective - Fuel tank empty 	<ul style="list-style-type: none"> - Check locking of the hoods - Check sensor (see page 47) - Fill with fuel
No forward or backward motion of the conveyor belt or of the infeed roller	<ul style="list-style-type: none"> - Regulating screw at infeed completely screwed down - Hydraulic motor or pump defective - Oil deficiency in hydraulic tank 	<ul style="list-style-type: none"> - Loosen the regulating screw - Check defective part or replace - Check oil level
The machine is chipping with difficulties	<ul style="list-style-type: none"> - Knives blunt - V-belt damaged or loose 	<ul style="list-style-type: none"> - Sharpen or replace knives - Replace or tension V-belt
The infeed roller does not regulate, neither under the switch-on limit of the Pilot System	<ul style="list-style-type: none"> - Failure of the electric or hydraulic installation 	<ul style="list-style-type: none"> - Contact dealer

Specifications

WS / 16 - 35 DT	
Performance:	160 mm
Length:	3.70 m
Width:	1.68 m
Height:	2.45 m
Weight:	750 Kg
Number of knives:	2
Chipping disk diameter:	515 mm
Weight of chipping disk:	50 Kg
Engine:	34 PS, Kubota D1105T, 3 cylinders
Fuel tank capacity:	17 l
Engine speed:	3000 rpm (idle speed ca. 9200 1/min)
Chipping disk speed:	1500 rpm
Overload protection:	Yes
Hydraulic supply:	Yes
Hydraulic oil tank capacity:	8 l
Hydraulic pressure:	150 bar
Test drive:	Yes
Number wheels:	2
Tyres:	155/70R13
Tyre pressure:	2.5 bar
CO2 REDUCTION:	No

Hydraulic connections

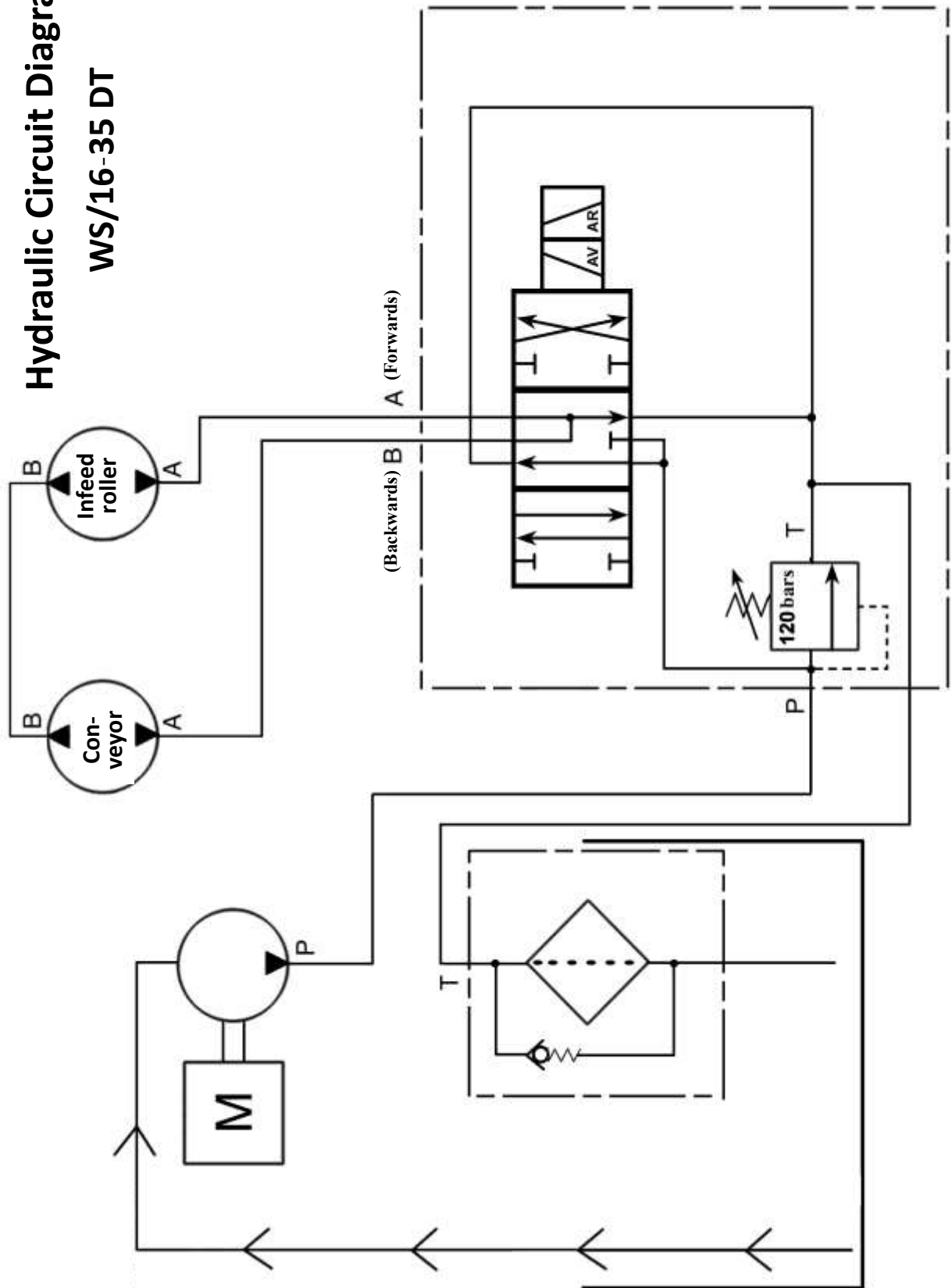


❶ 600mm Or. 180° ❷ 550 mm Or. 0° ❸ 600mm ❹ 450mm Or. 90° ❺ Asp. 1750 mm ❻ Pres. 2100 mm

Hydraulic Circuit Diagram

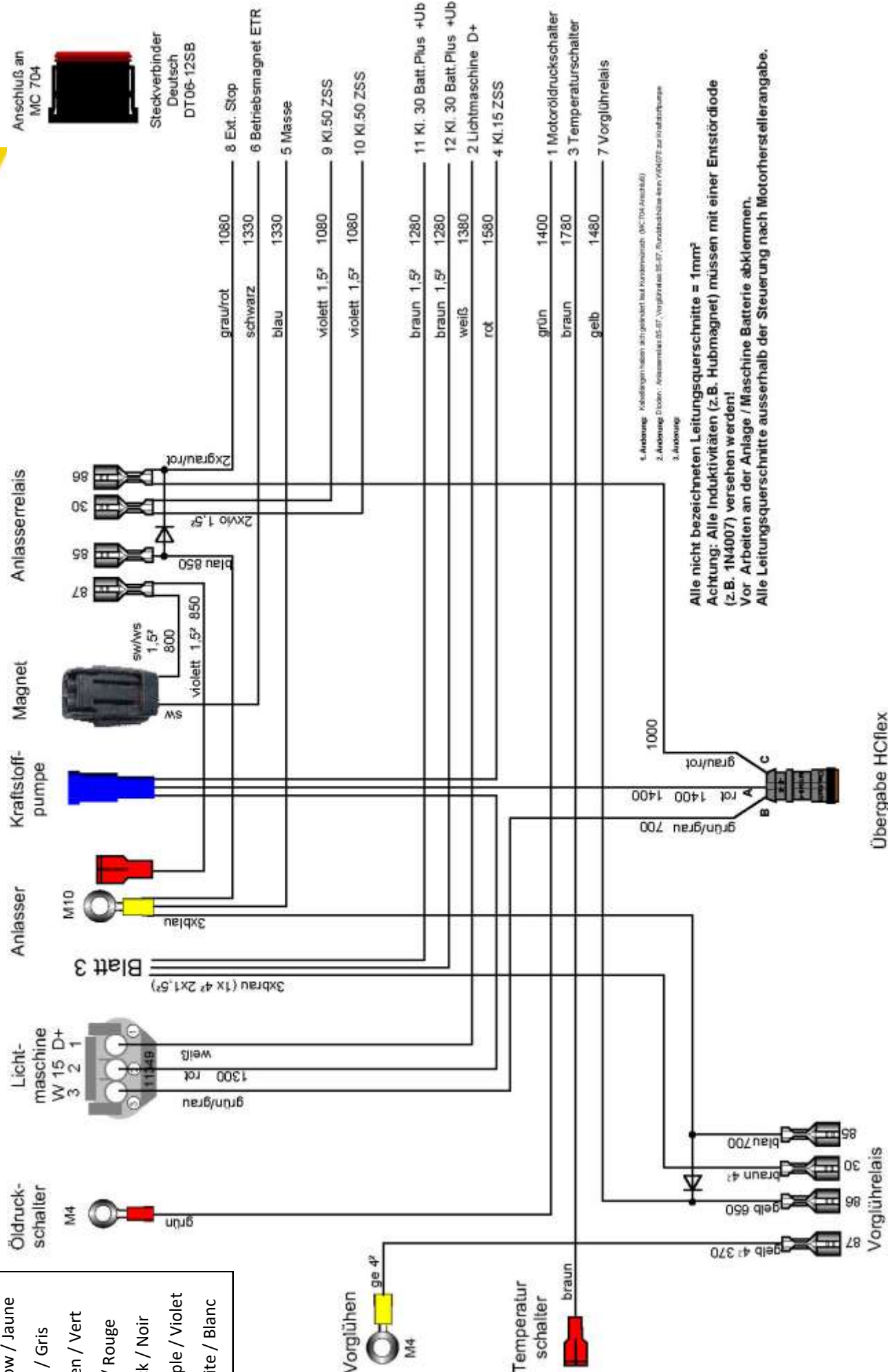
Hydraulic Circuit Diagram

WS/16-35 DT



Electric Circuit Diagram Engine 1/2 EHB2275

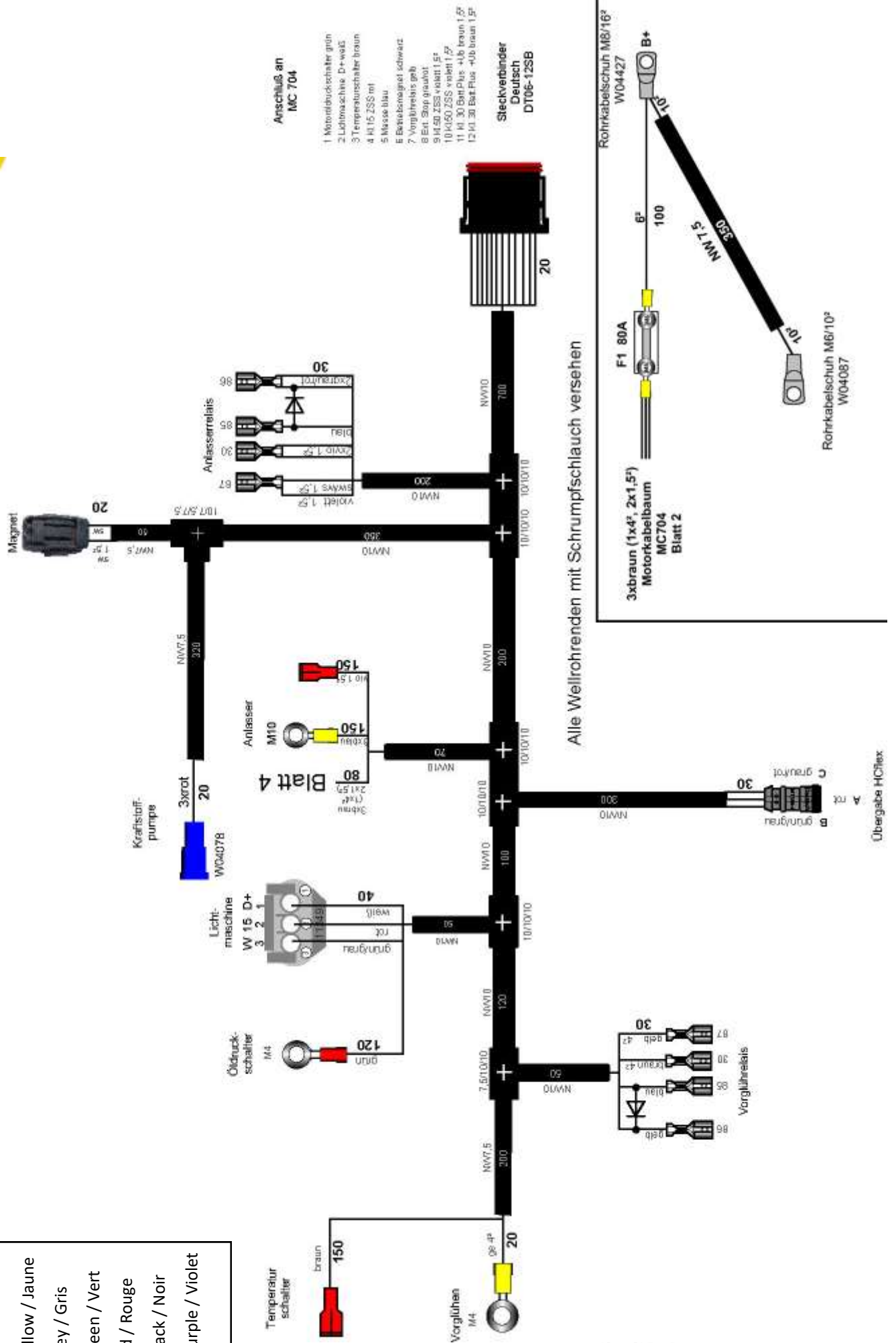
bl - Blue / Bleu
br - Brown / Marron
ge - Yellow / Jaune
gr - Grey / Gris
gn - Green / Vert
rt - Red / Rouge
sw - Black / Noir
vio - Purple / Violet
we - White / Blanc

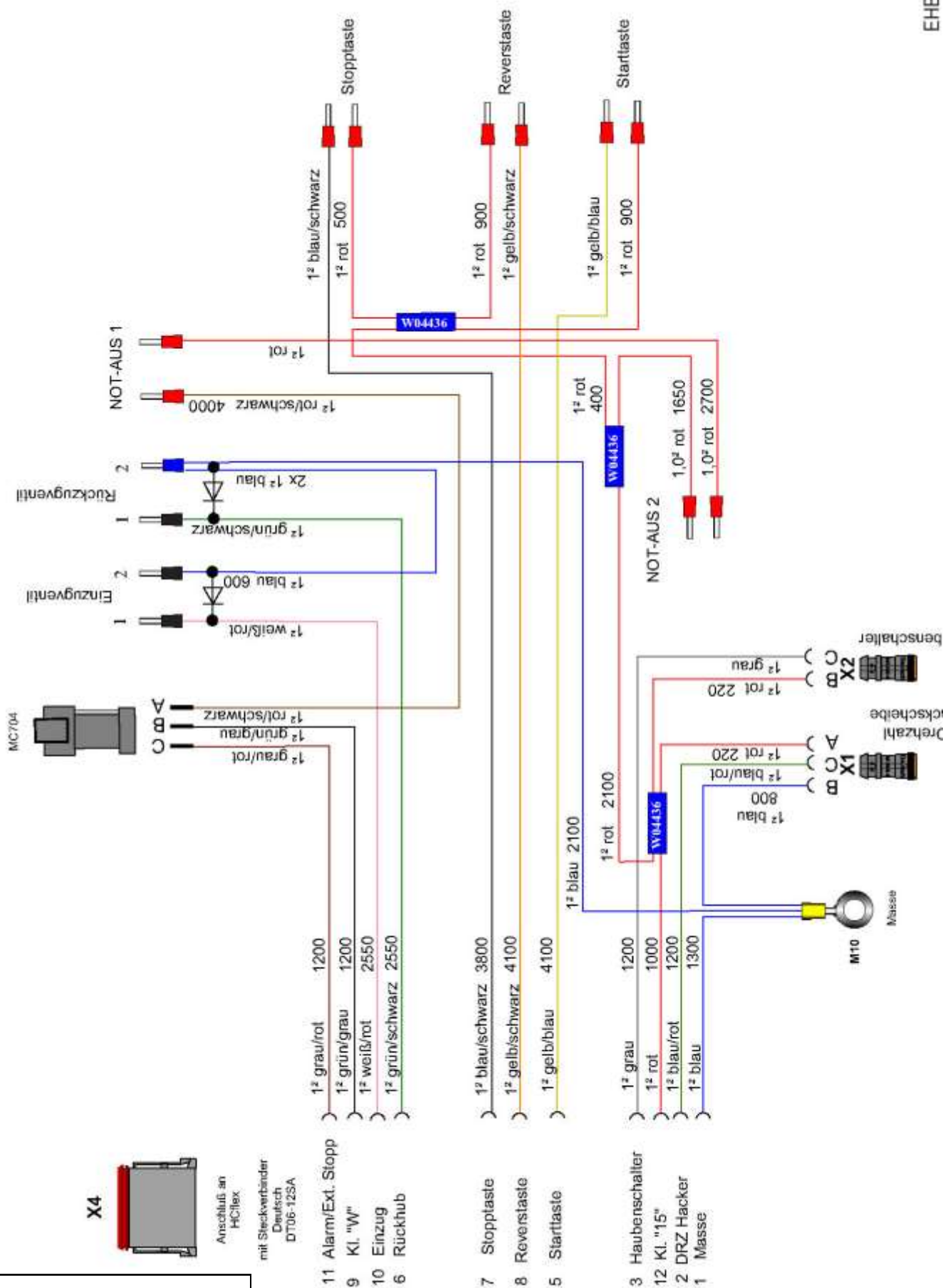


TS INDUSTRIE®

Electric Circuit Diagram Engine 2/2 EHB2275

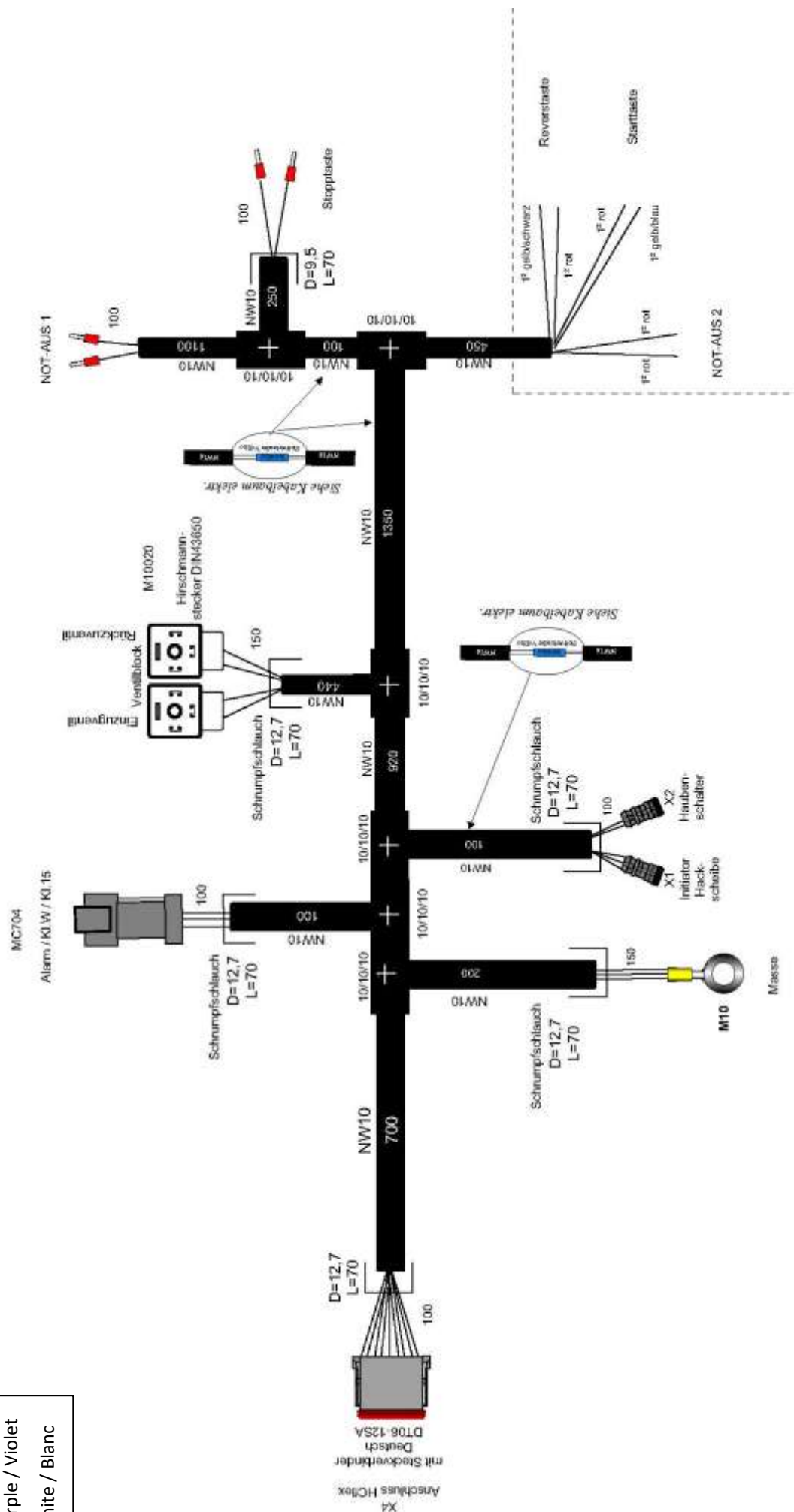
bl - Bleu / Bleu
br - Brown / Mar- ron
ge - Yellow / Jaune
gr - Grey / Gris
gn - Green / Vert
rt - Red / Rouge
sw - Black / Noir
vio - Purple / Violet





Electric Circuit Diagram Machine 2/2 EHB2286b

bl - Blue / Bleu
br - Brown / Marron
ge - Yellow / Jaune
gr - Grey / Gris
gn - Green / Vert
rt - Red / Rouge
sw - Black / Noir
vio - Purple / Violet
we - White / Blanc



Saelen

3 rue Jules Verne
L'Orée du Golf - BP 17
59790 Ronchin
Tél : + 33 (0)3 20 43 87 87
Fax : +33 (0)3 20 34 12 73
contact@saelen.fr www.salen.Fr

Pièces détachées

Tél : + 33 (0)3 20 43 24 89
Fax : +33 (0)3 20 34 12 73

TS Industrie

TS Industrie GmbH
Weserstr. 2
D - 47506 Neukirchen - Vluyn (Germany)
Tel.: +49 2845 / 9292-0
Fax: +49 2845 / 9292-28
kontakt@ts-industrie.de
