

WS/**20**DT / WS/**23**DT Stage V

OPERATING MANUAL

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SAELEN® TS INDUSTRIE®

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DECLARATION OF CONFORMITY

The **TS industrie** Company

Industriering Ost 48
47906 KEMPEN (Germany)

Tel.: +49 2152 / 99294545

HEREBY DECLARE THAT THE MACHINE:

Trade Name: **TS industrie**
Type : **WS/20DT**
Engine performance: **41,2 kW**
Technical documentation held by Mathieu Willerval.

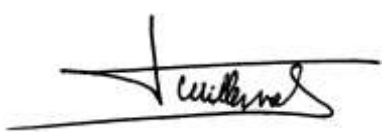
is in conformity with the following european directives:

- **2006/42/EC** Directive „Machinery“
- **2014/30/EU** Directive „Electromagnetic compatibility“
- **2016/1628** Directive „Emissions“
- **2000/14/EC** Directive „Noise emissions“

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

Power at 2600 rpm	*Measured sound pressure level*	*Guaranted sound pressure level (Lwa)*
41,2 Kw	**116 dBA**	**119 dBA**

RONCHIN, january 14, 2021



Mathieu Willerval (Directeur Fabrication TS Industrie)

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HEREBY DECLARE THAT THE MACHINE:

Trade Name: **TS industrie**
Type : **WS/23DT**
Engine performance: **55,4 kW**
Technical documentation held by Mathieu Willerval.

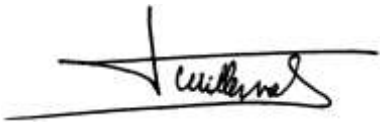
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Power at 2600 rpm	*Measured sound pressure level*	*Guaranted sound pressure level (Lwa)*
55,4 Kw	**119 dBA**	**121 dBA**

RONCHIN, january 14, 2021



Mathieu Willerval (Directeur Fabrication TS Industrie)

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 cause 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 inspections 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 Euro 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

Préface

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/20DT** and **23DT** at hand.

Manufacturer's type plate



The serial number is located as shown in the image. It does always have **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 an 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 20 and 23 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 shrubbery 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. The machine must only be fed with wood. Ensure that no stones or metal objects enter the machine.

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

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

32. 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.

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

34. 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.

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

36. 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!



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



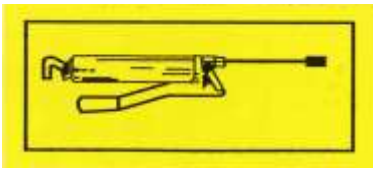
Fill the fuel tank with **diesel fuel**.



The machine is operated with hydraulic oil HV46.

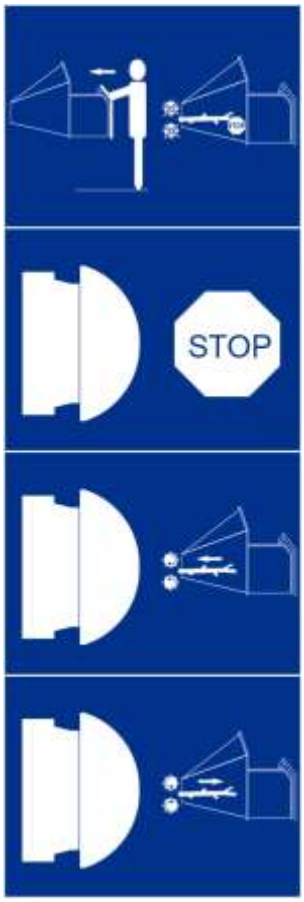


Lubrication points



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

Stopping rotation of the infeed rollers

Engine emergency stop and roller advance

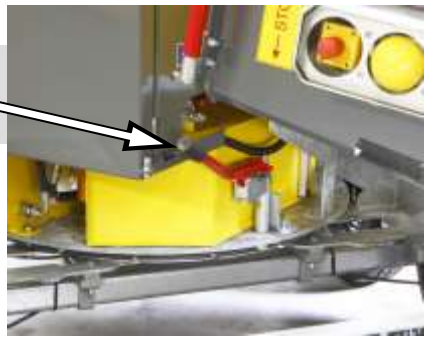
Material chipping (forward **max. speed**)

Loosening material (backwards)

Sécurité de 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 machine.
5) Turn the expulsion channel completely to the front and fold the expulsion hatch completely down.

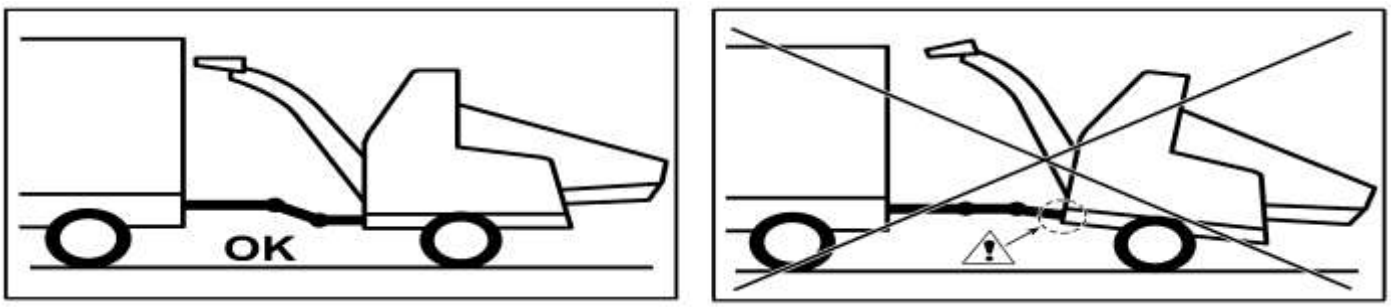
6) For transporting the machine on public roads, fold the feed table up, turn the chipper into **TRANSPORT POSITION**



<u>Coupling wear indication</u>:
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 loose the chipper when driving on rough roads or driving against a kerb when reversing.



<u>Coupling to a vehicle</u>:
The chipper should always be coupled in horizontal position such that the machine is prevented from tilting backwards <u>AND</u> 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.

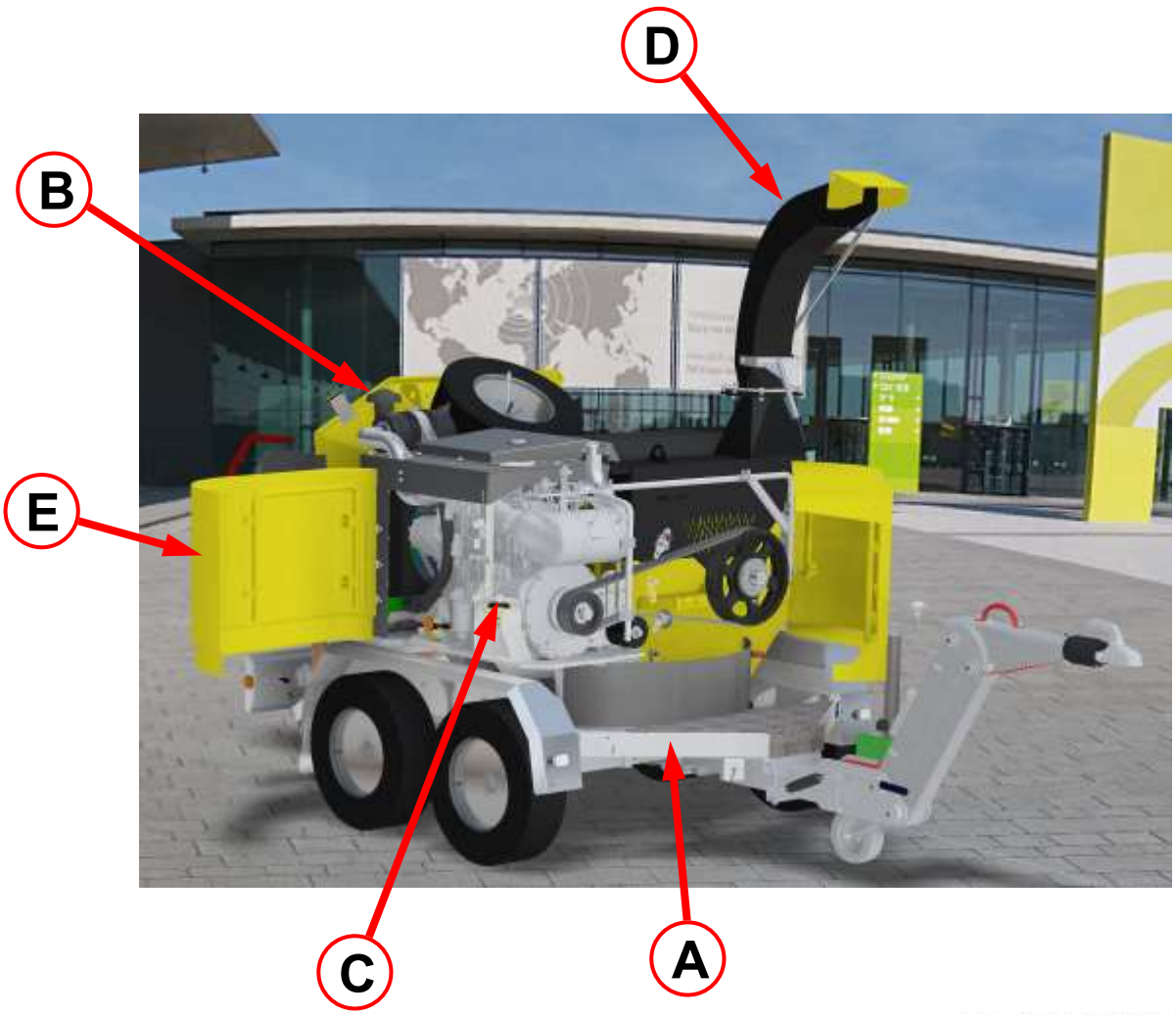


GENERAL DESCRIPTION OF THE MACHINE

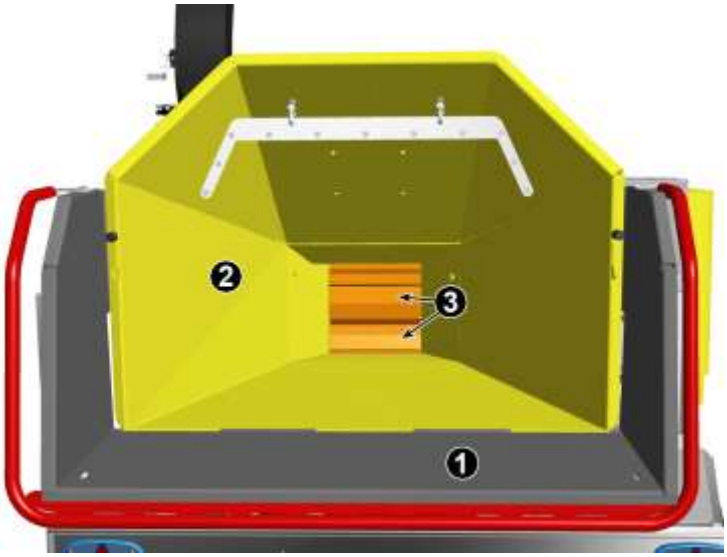
The chipper **WS/20DT** is designed for chipping branches up to a **diameter of 200 mm**.
The chipper **WS/23DT** is designed for chipping branches up to a **diameter of 230 mm**.

The machine consists of the following main components:

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



A. Frame
The frame is used for allocating the different components of the chippers WS/20DT and 23DT 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.

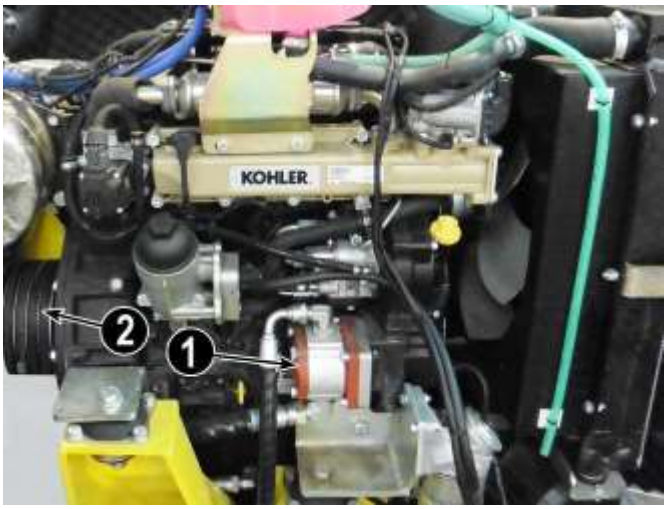


C. Engine and drives

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)**.
WS/20DT: The machine is driven by a 3-cylinder diesel engine with an output of **56 HP** at 2900 rpm (41,2 kW).
WS/23DT: The machine is driven by a 4-cylinder diesel engine with an output of **75 HP** at 2600 rpm (55,4 kW).

Further information regarding this engine you can find in the operating instructions of the manufacturer.

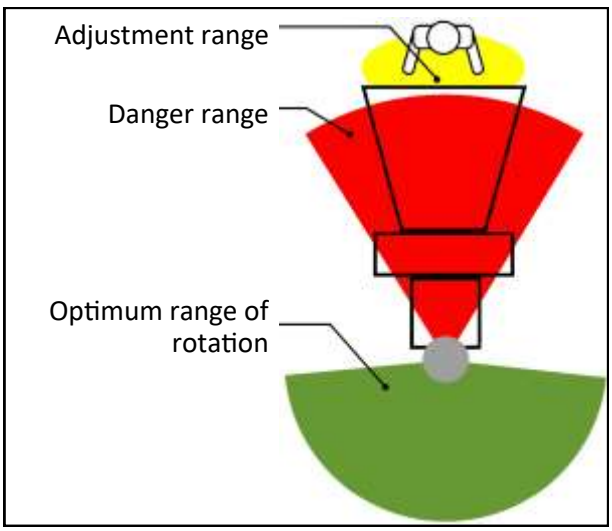
The chipping disc is driven by the output shaft, the centrifugal clutch with pulley **(2)** and 2 V-belts. The hydraulic pump is connected to the diesel engine and drives the hydraulic motors of the infeed rollers.



D. Expulsion channel

This expulsion channel expulses the chipped material. The upper part can be swivelled by 170° in horizontale 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 channel is open towards the chipping disk.

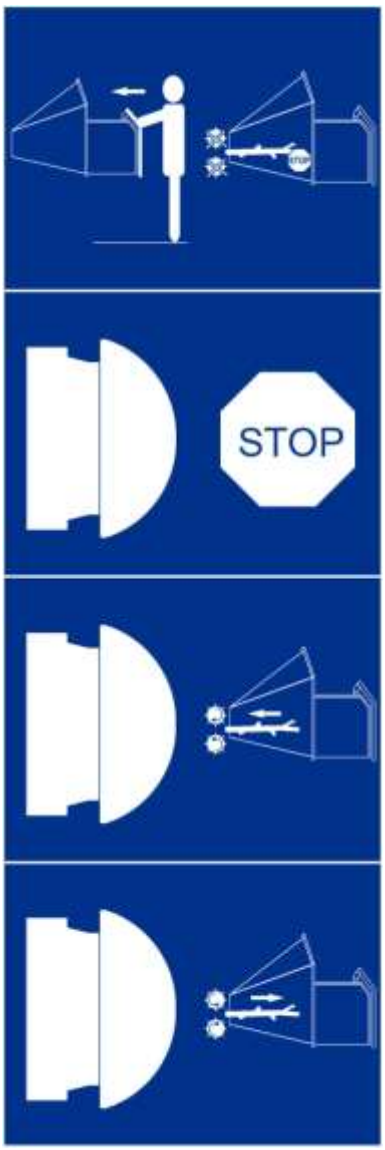
E. Engine hood

Different hoods protect against rotating parts making work safe.
An electric switch disconnects the engine and prevents a restart when opening the engine hood.

MATERIAL INFEED

The **WS/20DT** and **WS/23DT** are 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.

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



<u>STOP THE INFEED:</u>

1. Push the red control rod to make the infeed stop.

<u>EMERGENCY STOP</u>

Stops the diesel engine and immediately stops the rotation of the infeed roller.

<u>FORWARDS MODE:</u>

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.

<u>BACKWARDS MODE:</u>

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

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.

check the lighting.

IMPORTANT: The wear indication on the coupling must be in the green area (see page 16). Fold the infeed table up, turn the chipping unit into **TRANSPORT POSITION**.

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.

IMPORTANT !
N'utiliser que du carburant type GNR ou gasoil routier blanc. Jamais de Fioul domestique.

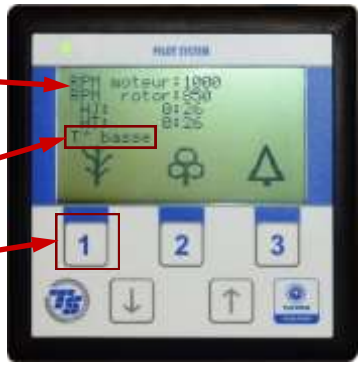
ATTENTION !
Si pour une raison inconnue le broyeur a de la difficulté à broyer la matière, et que vous devez l'arrêter: **ne pas remettre en marche le moteur sans en avoir éliminé la cause et dégager la matière hors du rotor de broyage !!!**

START-UP



Each time before start-up of the machine ensure that is is standing stable on solid ground and the parking brake is applied.

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 ignition key.
4) Start the engine after approx. 30 seconds, as soon as the **Pilot System** opens the screen.



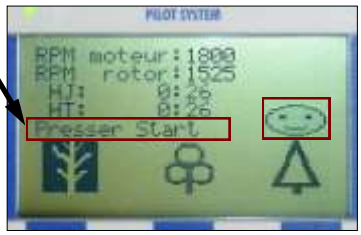
- If the engine is cold, the message appears **Temperature too low**

5) Press **1x key 1**. <u>The engine remains at idle speed as long as the minimum operating temperature is not reached</u>.

<u>Minimum operating temperature reached:</u> In **field 1** the **Icon** is activated and the engine accelerates up to working speed. Press key **2** or **3**, if it is desired to work in range **2** or **3** **(see page 36)**. The engine accelerates accordingly.



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



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

7) Now work can be started.

In case of overheat the engine output (not the speed) at first drops by 20%. In this case check radiator and the coolant level, otherwise the engine output drops by another 50% and it is no longer possible to use the machine.



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 en (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 channel 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 channel 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 2000/14/CE:

Model	Sound power level LWA [dB]	Sound pressure level [dB(A)]
WS/20DT	116	119
WS/23DT	119	121



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 38)**

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



3) Press the key of the **activated area** again to put the engine back into 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.

BIO
LUBRIFIANT
DÉGRADABLE



BIODEGRADABLE LUBRICANTS FOR REDUCING ENVIRONMENTAL POLLUTION

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

SAELEN 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 **SAELEN** 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 capacities:

Fuel: 48 l.

Hydraulic oil: 30 l.

Engine: See operating instructions of the engine manufacturer

Freewheel drive for cutting wheel: see page 30

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	**- 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	- Check the tight seat of all fastening screws - Check the tension of the chipping disk drive belts
First time after 20 operating hours	- Change the oil in the cutting wheel drive freewheel (then every 2000h)
Every 50 operating hours	- Check the vertical/horizontal knives and counter-knives - Check both bearings of the chipping disk - Check if material is wrapped around the bearings and remove - Check the tension of the chipping disk drive belts - **1. Replace** the hydraulic oil filter (thereafter all 500 operating hours or every 2 years) - Check the hydraulic oil level
Every 150 operating hours	- Lubricate pivot bearing
Every 300 operating hours	- Check the battery acid level
Every 500 operating hours	- Replace the hydraulic oil filter (or every 2 years)
Every 2000 operating hours	- Change the oil in the cutting wheel drive freewheel

OPEN THE HOOD

Special key





The side hood, which has to be opened first, is fitted with a lock needing as special key for unlocking. This key should not be kept together with the contact key, otherwise the operation of the engine could be disturbed

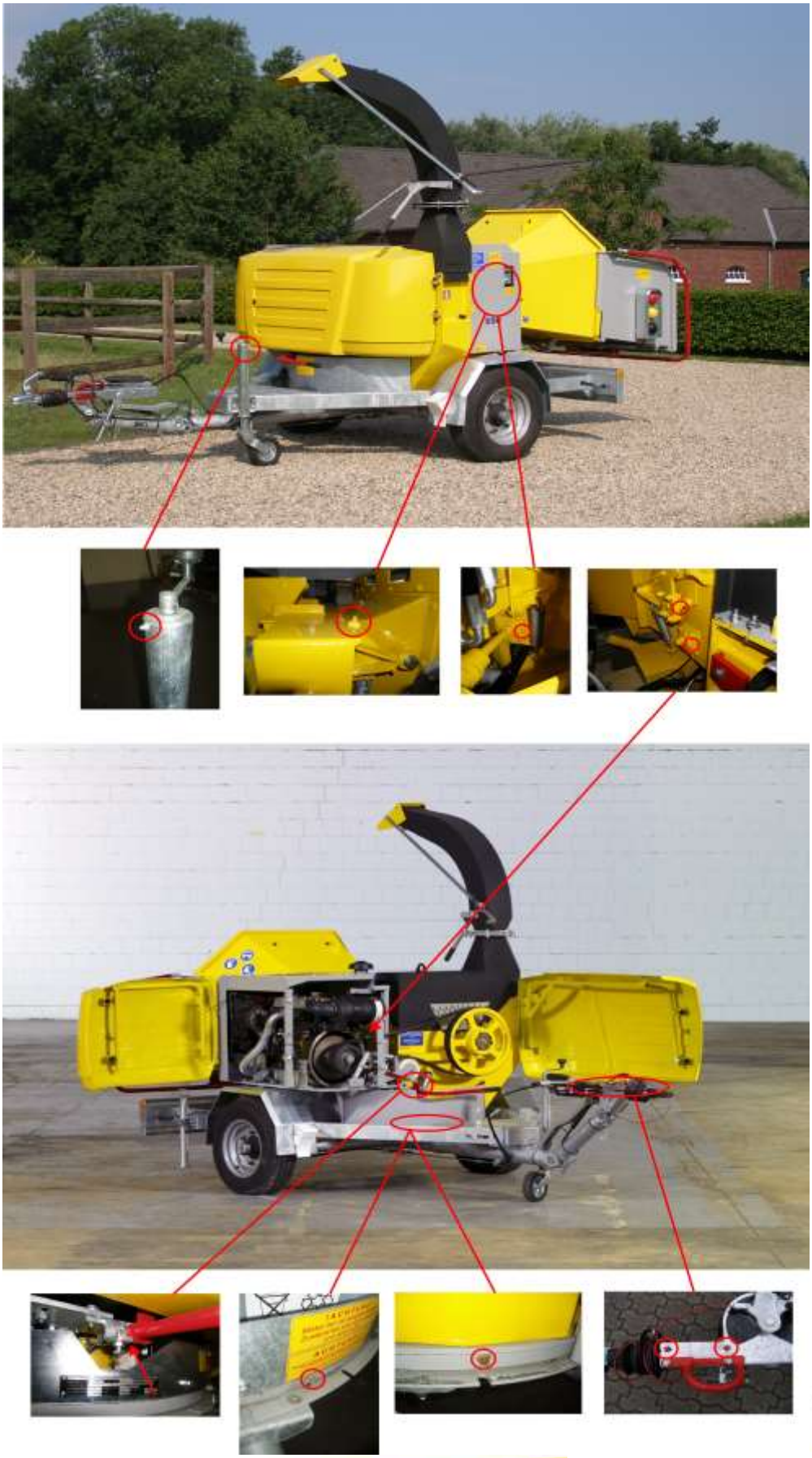


This key is also used for unlocking the locks of the hood for access to the drive belts. **Before transporting the machine ensure that the hood is correctly locked.**

LUBRICATING POINTS



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



OIL LEVELS

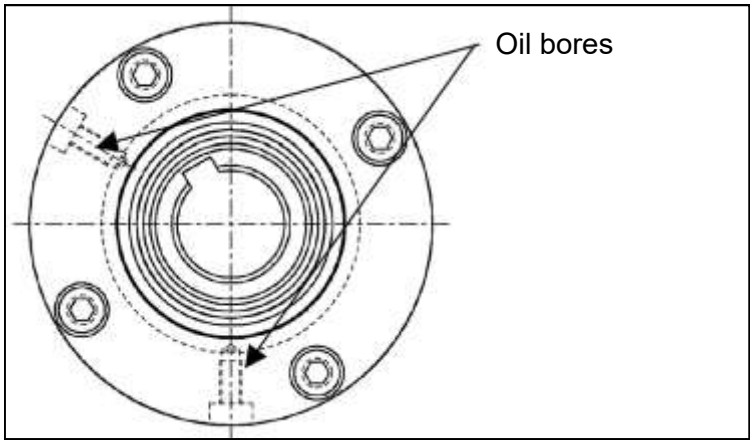
Shut the engine off and remove the key before the lubricating and maintenance works.

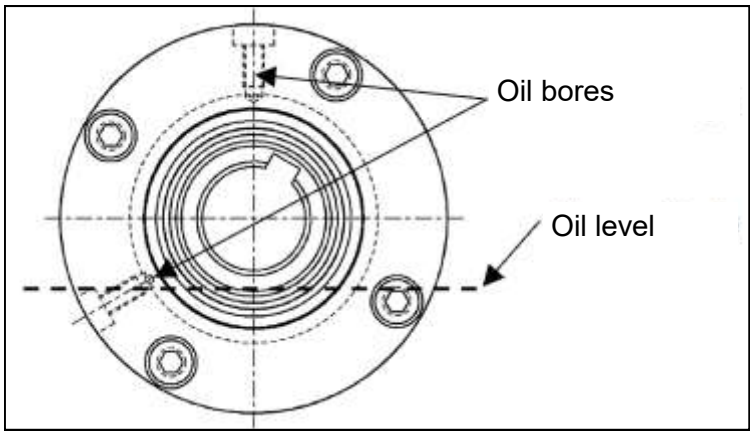
CUTTING WHEEL FREEWHEEL



Attention!
The first oil change must be performed after 20 hours of operation!

During the first oil change, all particles accumulated during the "running in" procedure should be removed from the freewheel. That is why this oil change is required to ensure the service life of the freewheel.
Subsequent oil changes must be performed after every 2,000 operating hours, at a minimum





Drainage procedure:

· Turn the freewheel so that an oil hole in the cover points vertically downwards

· Remove the two screws and oil seals from the cover.

· Collect and dispose of the old oil in accordance with applicable regulations.

· Clean the freewheel with cleaning oil and dispose of the cleaning oil in accordance with applicable regulations.

· Turn the freewheel so that an oil bre stands vertically upwards.

· Fill oil into the vertical oil bore until its runs out of the opposite oil bore.

· Close the two oil bores with the gaskets and screws.

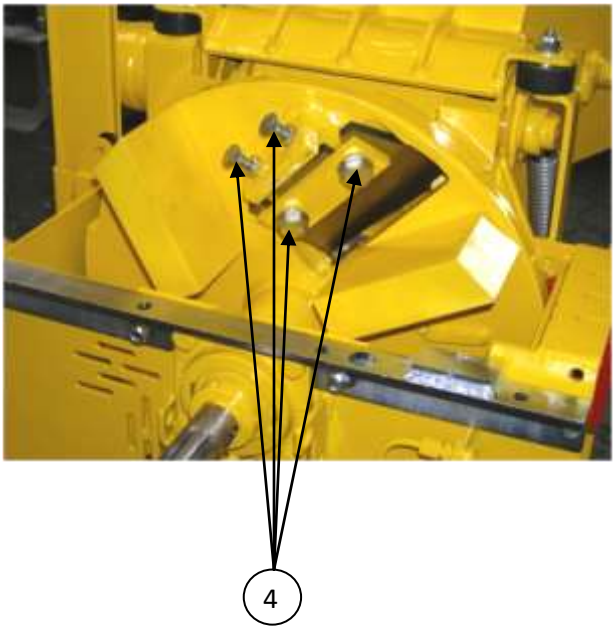
For ambient temperatures from 0° to 50° C	**For ambient temperatures from – 15° to + 15° C**
Gearbox or hydraulic oils without solid lubricants **ISO-VG 46/68**	Gearbox or hydraulic oils without solid lubricants **ISO-VG 32**
Caution! Oils that contain friction-reducing additives like molybdenum disulfide or the like, may only be used with our authorisation.	

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.

The chipping knives are removed by loosening the screws Pos.4. These have to be tightened again after the replacement.

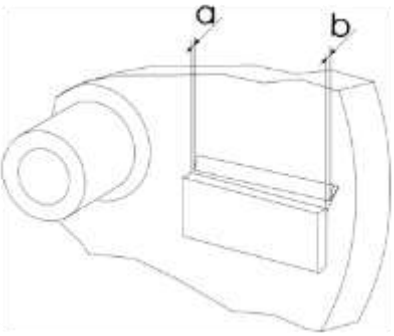


Knives and counter-knives are made of special steel and cannot be cut open by welding. Only correspondingly trained personnel is allowed to replace the knives.

After sharpening pay attention that the edges are completely smooth and regular. Burrs, which might still be existing have to be removed by honing.
Please, observe the following sharpening instructions! (see page 41)

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 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.



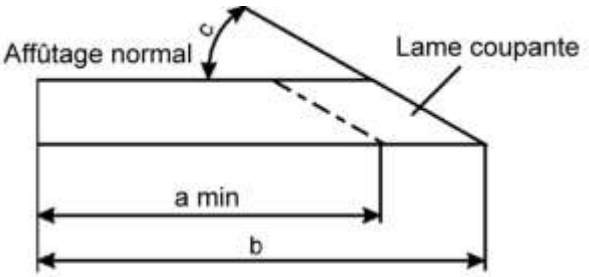
Caution:
Please, never open worn chipping knives with a welding torch.

Caution:
The tightening moment of the knife screws (rotating - static knife) is of 221 Nm (approx. 22 Mkg).

Model	Size a [mm]	Size b [mm]
WS20-50DT	1	2
WS23-75DT	1	2

Chipping knives and counter-knives are to be checked every day before use for optimal adjustment and condition. Blunt knives and counter-knives demand an enormously high force, and produce very high wear of the drive belt. The bearings are submitted to excessive strain, and the fuel consumption increases.

By standard the chipping disc is fitted with two chipping knives, which cut the fed material into slices. Then these slices are crumbled because of the special arrangement of the knives.
The chipping knives have to be sharpened or replaced as soon as they look blunt, or the infeed becomes difficult (i.e. the knives push the wood back). When opening the cover have in mind that there is a stop delay of the chipping disk.



Caution:
Only instructed persons are allowed to change the knives.

Caution:
Before executing adjustment, cleaning and maintenance works the drive must be uncoupled and the tools in standstill. For working on the chipping disc or the cutting tools (e.g. knife change), the chipping disc must always be arrested with the supplied chipping disk pawl. Risk of injuries!

Type	Side a [mm]	Side b [mm]	Side c [°]
WS20DT	80	100	30
WS23DT	110	125	30

Sharpening instructions

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).

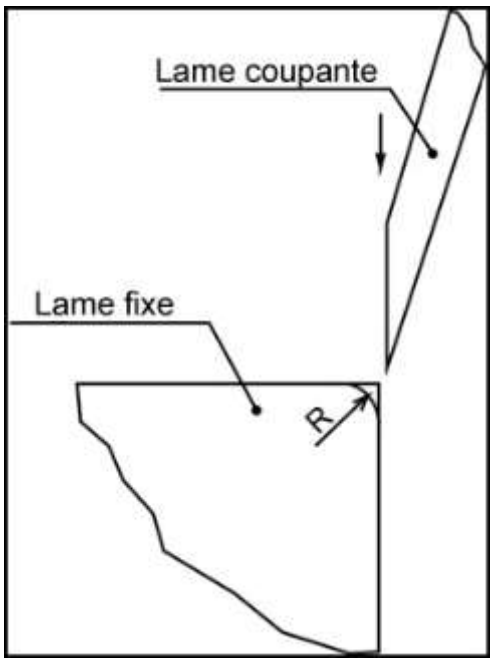
IMPORTANT: Only a specialist is allowed to sharpen the knives on an appropriate machine and not on a portable grinding machine.

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.

- Set the angle right (30 °)
- Forward this instruction sharpener sharpening your customers.

Should the chipping quality decline, it is required to check the condition of cutting knives and counter-knife.

As soon as the radius of the counter-knife hem is bigger than 1mm it should be turned or replaced. The proper counter-knife can be turned and the four sides can be used. Contrary to the chipping knife it cannot be re-sharpened.



For detaching the counter-knife it is required to loosen the retainer at the side of the housing.
Behind there is the counter-knife, which then can be turned or replaced.
There is a thread in the counter-knife facilitating the extraction with the help of a screw.



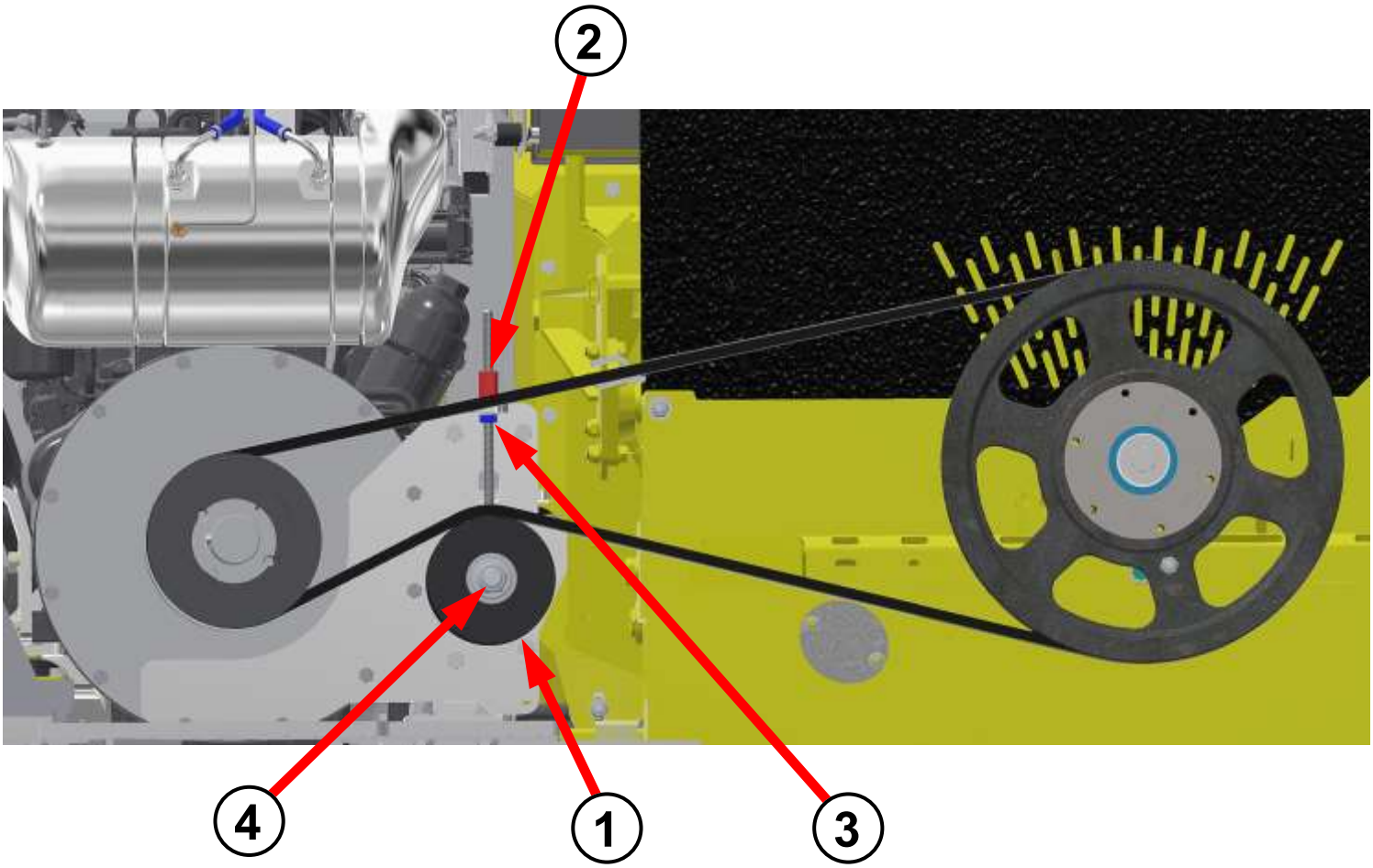
In case of the vertical counter-knife, first the big cover hood has to be removed. Thereafter, the two tension springs are detached and the upper frame is tilted up and secured. Now, the screws on the left side of the hood are loosened.
The hood has to be tilted up, to be able to loosen the screws of the vertical counter-knife and to pull the knife upwards out.

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 **(1)** 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



PILOT SYSTEM *"SWING"*



The system is connected with the electronic engine control ECU, used for optimisation of fuel consumption and rotor power by matching the engine speed to the material to be chipped.

FUNCTIONS MODELS:

1. Continuous indication of the engine speed
2. Continuous indication of the chipping rotor 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 rotor 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

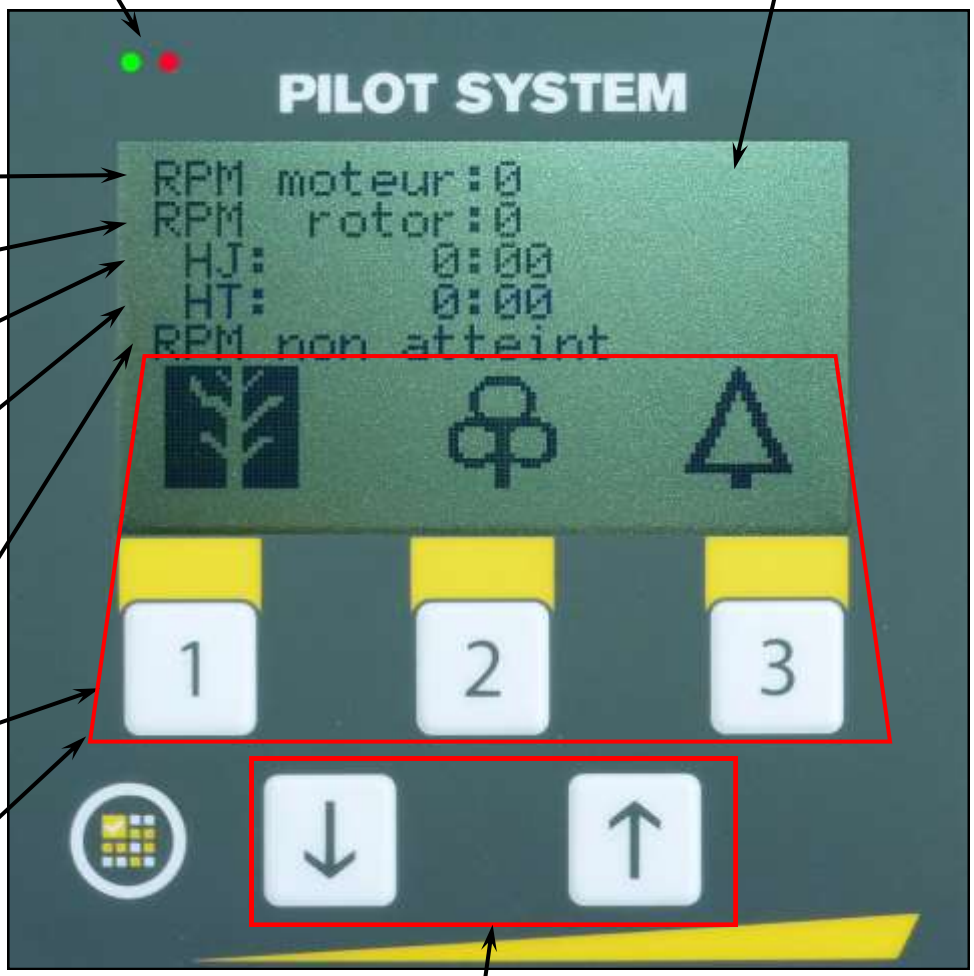
FUNCTIONS ENGINE:

16. 3 working speed matched to 3 NoStress chipping ranges
17. Display of engine data and errors: oil pressure, coolant temperature, engine load etc.

Description

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

LCD display with background lighting



Engine speed

Chipping disk speed

Daily operating hours

Total operating hours since initial start-up (in case of model 23-75 displayed after approx. 10 sec.)

Current operating stages

Function keys **1** to **3** for selecting the No Stress settings

Acceleration/ engine idling (The speed in NoStress is connected to the engine speed)

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 SAELEN.

The values indicated on the following pages are reference values only

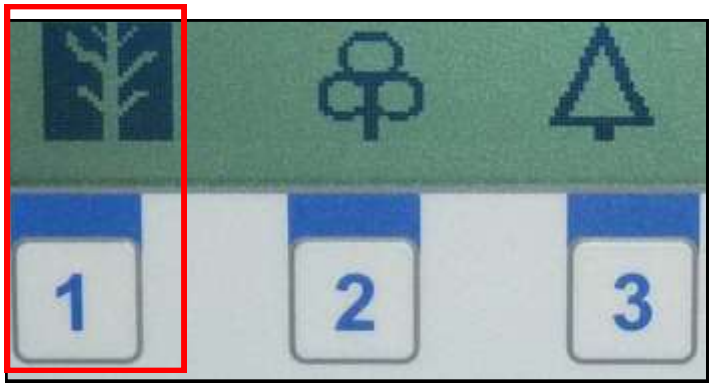
Select mode of application engine/NoStress

The Pilot System has 3 settings. Above each key there is a symbol for the according setting, showing a black background when selecting this setting.

Key 1: The engine runs at moderate maximum speed (1800 rmp) and NoStress matches the control of feed rollers and conveyor belt to this speed.

Appropriate for chipping medium-size branches.

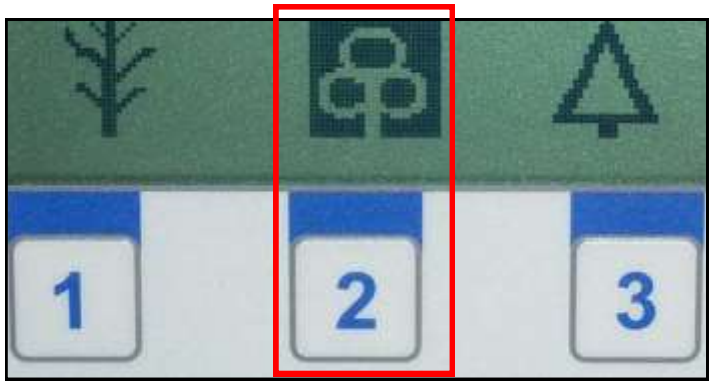
This application mode uses a very low amount of fuel and works at a reduced noise level.



Key 2: Normal working speed of the Pilot System. The engine runs at medium speed (2200 rpm) according NoStress control.

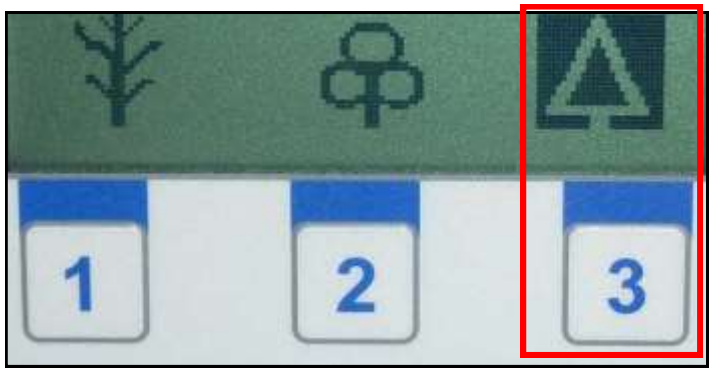
Appropriate for chipping of large-size branches.

This mode of application consumes a low amount of fuel and does also work at a reduced noise level at maximum utilisation of the machine power.



Key 3: High-performance mode of the machine. The engine runs at the maximum power (2200 rpm) allowed by the ECU and maximum utilisation of engine and expulsion power of the machine under extreme application conditions.

Appropriate for chipping branches with a max. diameter and coniferous wood demanding high expulsion power.

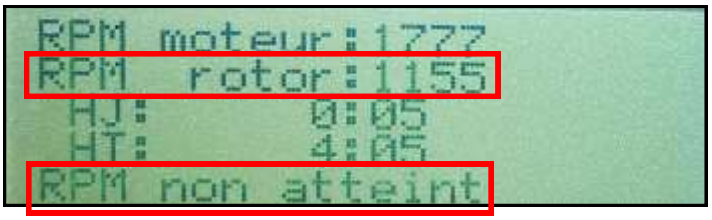


In case the settings shall be changed during the work, it is required to press the yellow button on the infeed hopper for re-starting the infeed rollers.

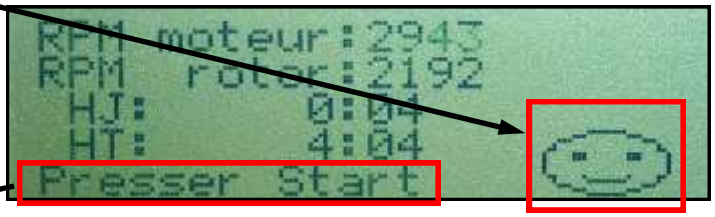
Standard operation and overspeed

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.

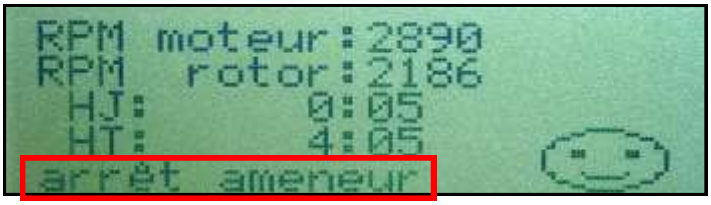


Adjust engine to max. speed. A **Smiley** is shown as soon as the minimum speed is reached for connecting the infeed roller.
Now the **yellow** button can be activated.

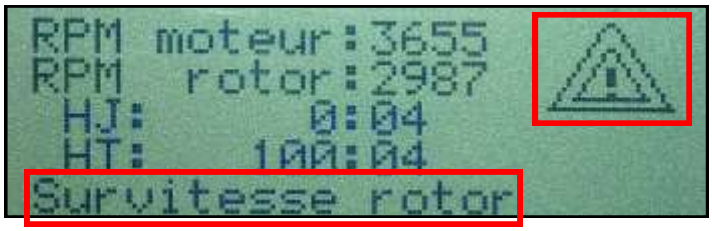




As soon as the infeed roller is rotating and the rear red control rod is activated, appears the message **infeed stop**.



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**.



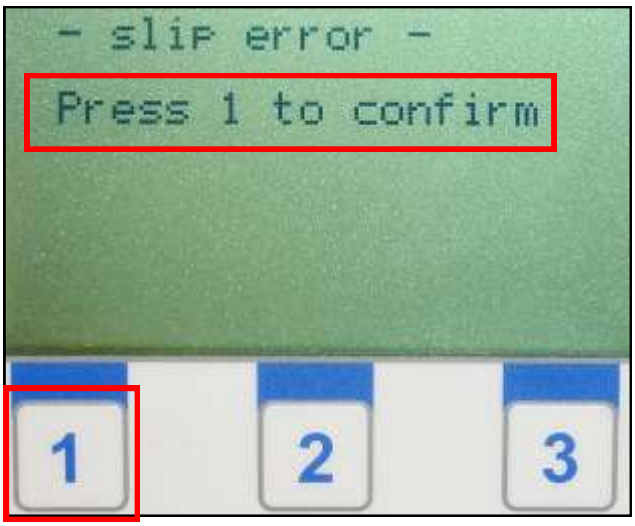
After having removed the cause for the overspeed it is required to reduce the engine speed to idle running, then increasing it again to max. Speed, to allow the infeed roller to re-connect.

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**



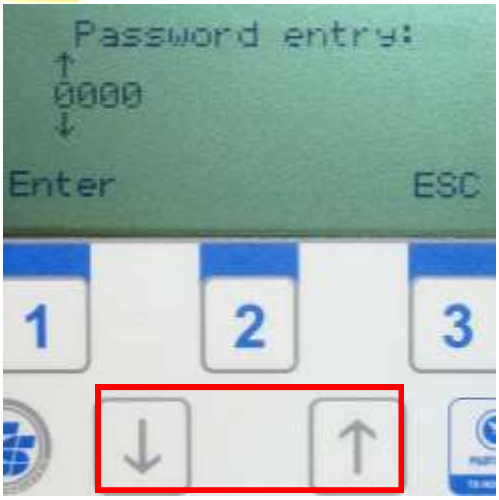
Note: Slip can be produced if the machine from standing is accelerated very slowly.

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.

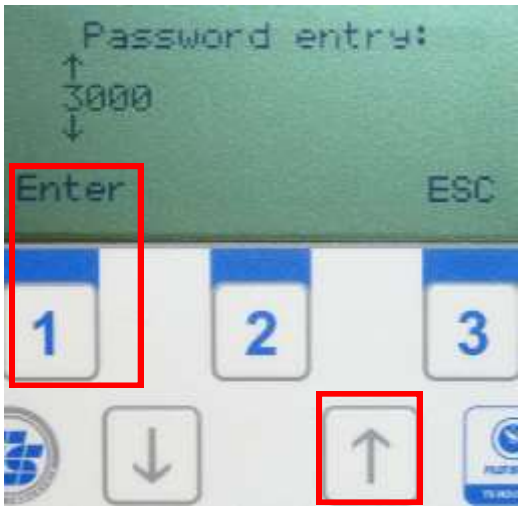
Access to the CUSTOMER Parameters Code 3003

1



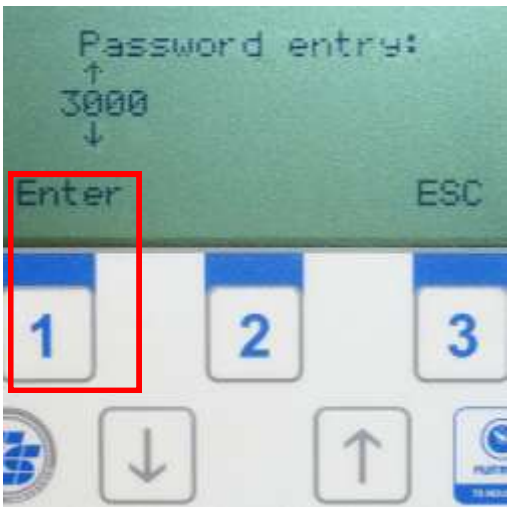
Keep key ↓ and ↑ pressed for 4 seconds.

2



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

3



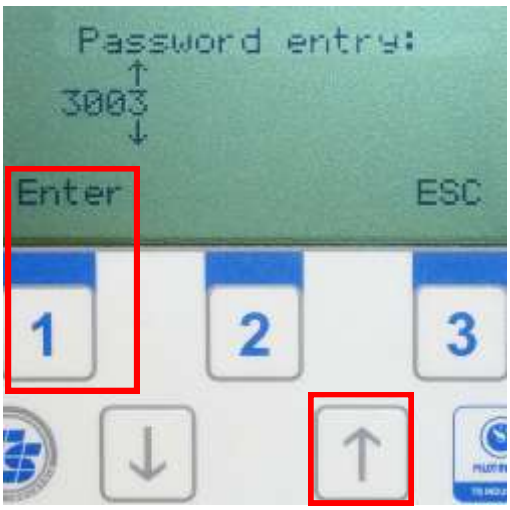
Press key **1** for confirmation and go to the first **0**.

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**.

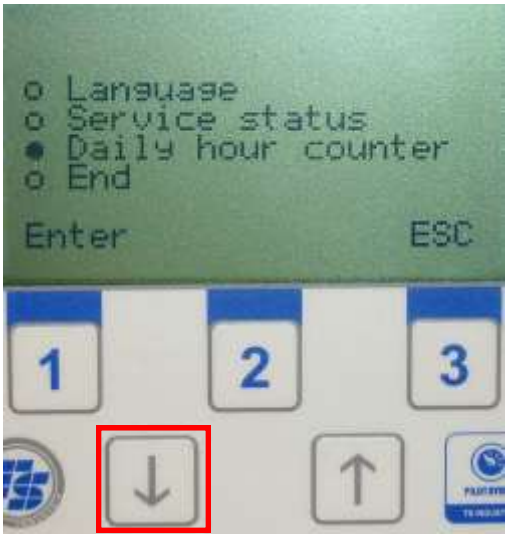
6



Now, the user has access to the menus Language, daily operating hours, Service (oil change) and **END** navigation.

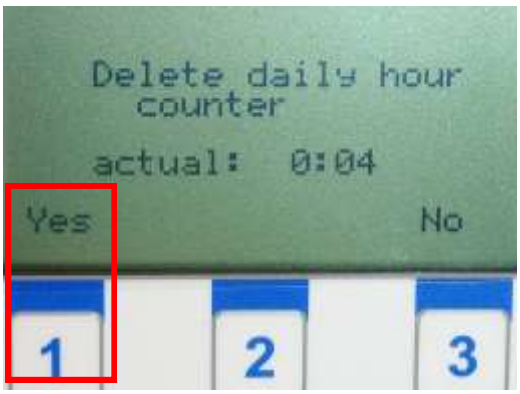
Reset of the daily operating hour counter

1



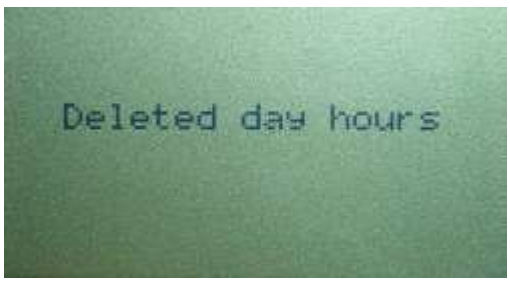
Press key ↓ and put the cursor on **Daily oper. hrs.**

2



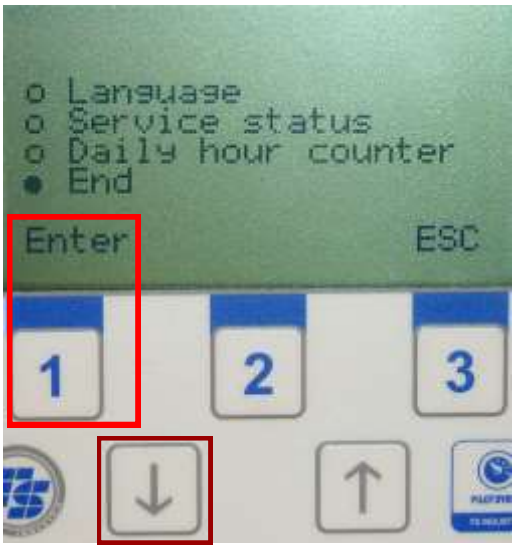
Press key **1** to confirm deletion of the daily operating hours.

3



The process is indicated with a corresponding message.

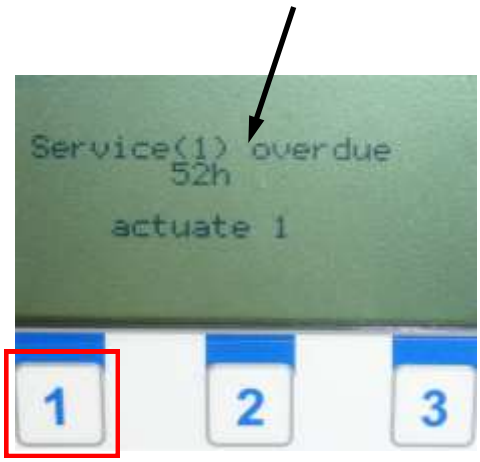
4

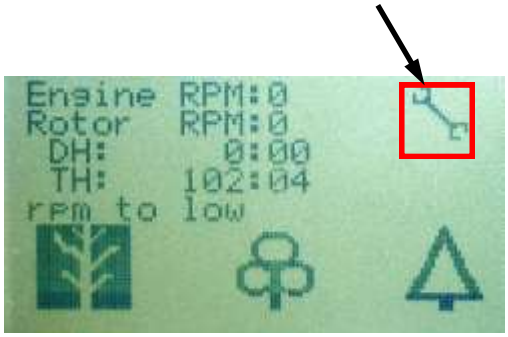


Press key ↓ and put the cursor on **End**. Confirm with key **1 Enter**.

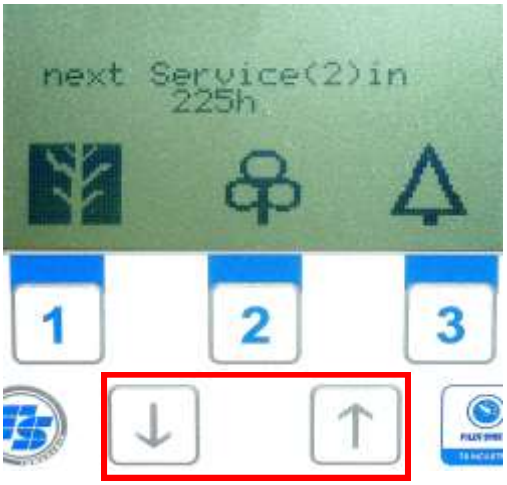
Overdue service and further service information *(engine oil change)*

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





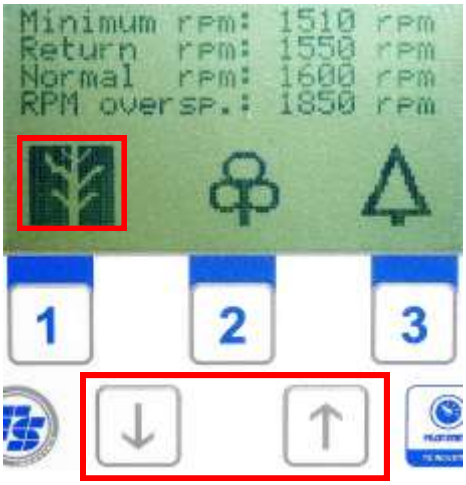
Agree with your dealer a date for an oil change. The message is saved in the Pilot System. Press key 1 for confirming the message and to be able to continue work.



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

(valeurs exemples fournis à titre indicatif)



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

Example <u>setting **1**</u>:

RPM arrêt: Speed below 1875 rpm. The infeed roller is disconnected.

RPM min M.AV: As from a speed of 2175 rpm. The infeed roller is re started.

RPM ap*rès* surv*itesse*: After an overspeed of the engine (or chipping disk on PTO machines), the speed of the chipping disk must be reduced to below 2175 rpm for the infeed roller to reconnect.

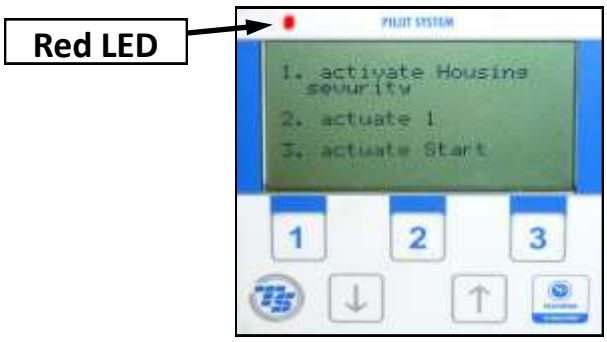
RPM survites*se*: Overspeed. The infeed roller is switched off at a speed of 2975 rpm.

Reminder:

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 SAELEN.

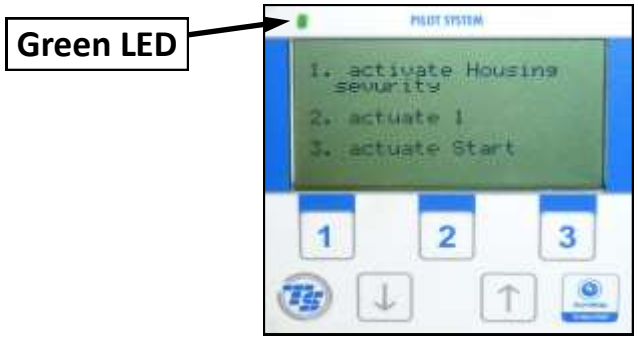
Hood safeguard

An open or incorrectly closed hood is indicated by a **red LED** an 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.



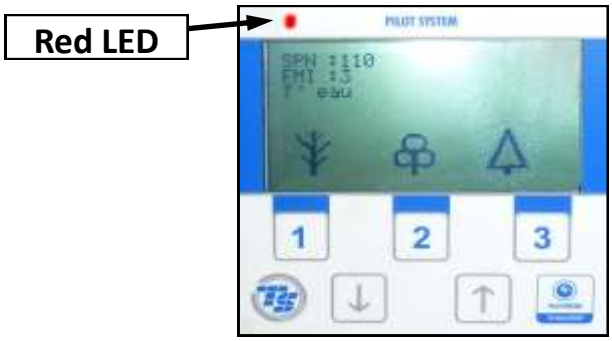
Chipping disk speed encoder pulses

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.



Engine error codes

In case of engine failure, the engine ECU sends a **SPN** code at Pilot System .
Red LED flashing: error display without engine stop
Red LED continue: error display with engine stop

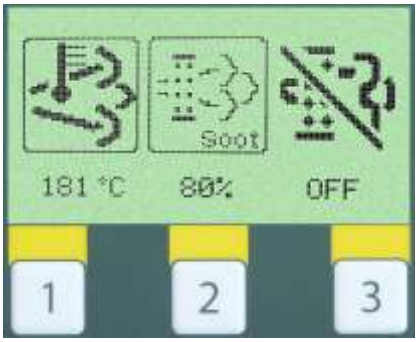


Engine error code list known to the Pilot System:

SPN: **97** Water in diesel filter
SPN: **100** Oil pressure
SPN: **110** Water temperature
Unknown SPN: **Unknown error.** (*See table on page 55*)

Exhaust DPF





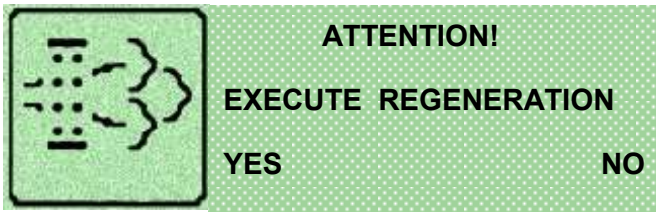
To meet the new European emission standards STAGE V, the engine is equipped with a DPF; exhaust with particulate filter, whose regeneration is controlled by the engine ECU.
When the level of soot in the DPF requires a "cleaning" called regeneration, the engine needs to run at full capacity for the time necessary to perform this maintenance.
This can be done in 2 ways:

1) in a "**passive**" way if he uses his machine for a sufficient time to complete the task.

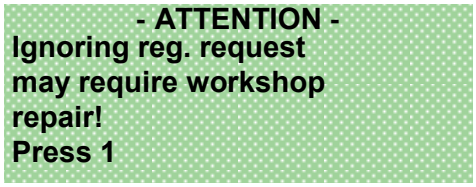
A particular engine noise and odour as well as black fumes may be perceived by the user, indicating a transparent passive regeneration in progress without displaying a message on the Pilot System screen.

2) in a "**active**" way with warning on the Pilot System display and blocking of the feeder roller/conveyor belt. **The engine will accelerate at 1800 RPM and should not be stopped until the message of the end of the task appears, ~45 to 60 mn.**

When the Engine requires active regeneration, the following information message appears on the display and the red LED lights up of Pilot System.
Note that the Speed will be changed to the idle one and the feed roller will be deactivated.



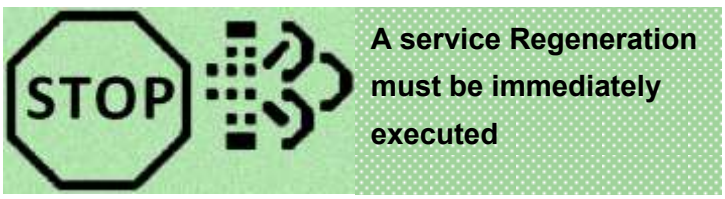
When answering the request with "**No**", button **3**, the following message will be displayed:



The Regeneration request will appear once again in 30 min in case it was declined.

Note: If the user repeatedly refuses regeneration, it may cause premature and irreparable damage to the DPF, requiring its replacement and intervention by the Kohler engine network. Both messages will appear:

Red code (red LED)
SPN 4781
FMI 15



The state of the engine becomes critical when this message will be displayed, because the user has chosen to ignore performing the generation many times. In this case the machine has to be brought to a motor workshop to perform urgently a service generation.
Note that the Speed will be changed to the idle one and the feed roller will be deactivated and the user will be no longer able to work with the machine.

See next page

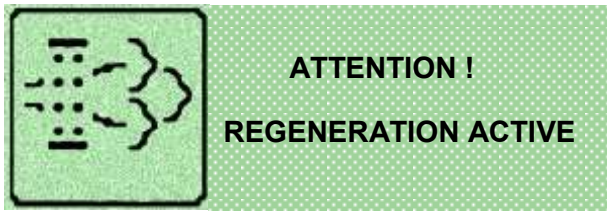
When you answer the request with "Yes", key 1, the following message is displayed during the heating time of the engine:

ATTENTION !

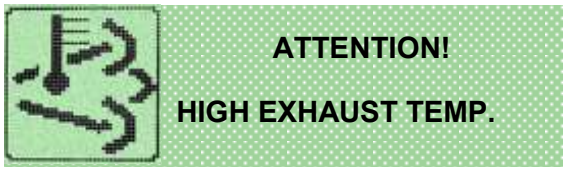
Regeneration will be started

For regeneration to begin, the motor must be at least 60°C.

As soon as the active regeneration starts, the following message is displayed:



When an active regeneration is executed, the exhaust temperature can be high. The following information message is displayed:



The following message will be displayed once the regeneration has been successfully executed:

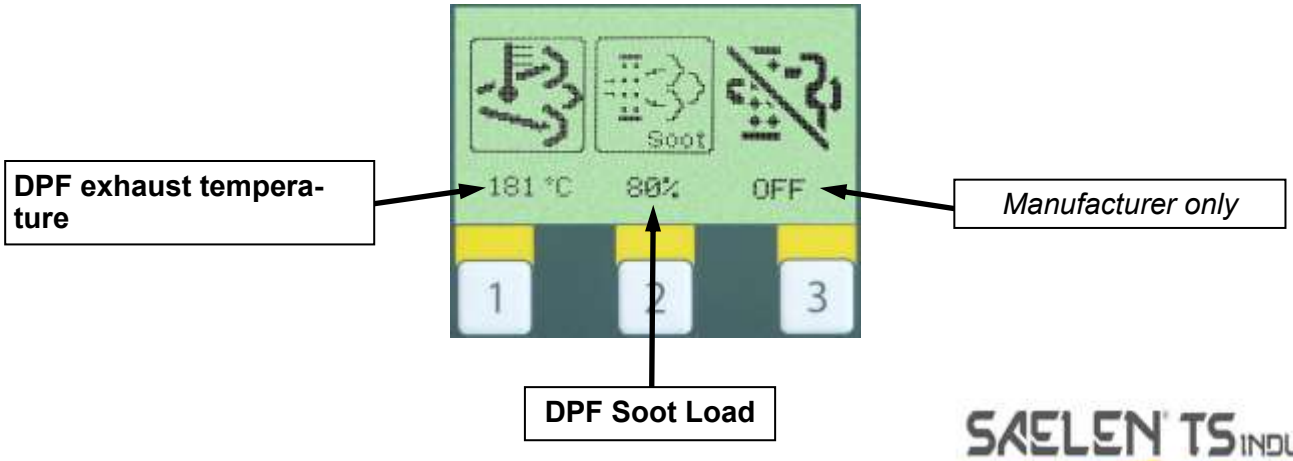


Press "**OK**" button **2** to close the window. **When regeneration is complete, the engine will automatically return to idle, leave the engine running for 5 minutes to dissipate the heat from the exhaust.**

The user can use the machine again.

The message **HIGH EXHAUST TEMPERATURE** may also be displayed when the exhaust temperature is above 500 ° C during normal use.

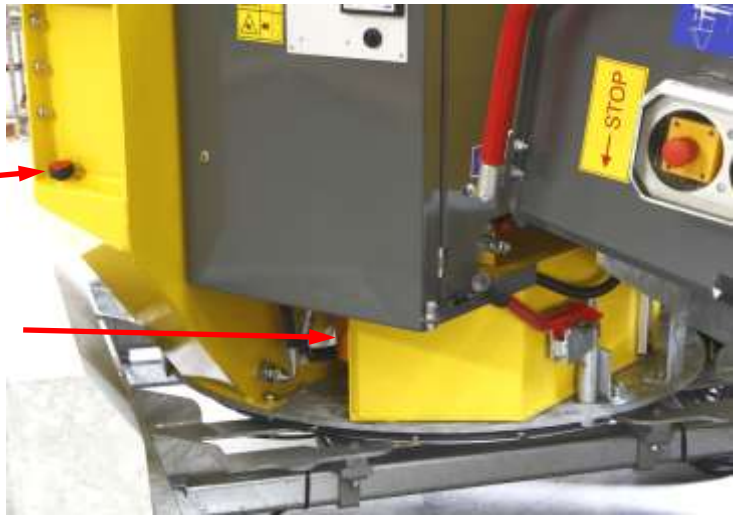
A particular engine noise and odour may be perceived by the user, indicating a passive regeneration in progress without displaying a message on the Pilot System screen.



TANKS

The machine is fitted with two tanks:

Hydraulic oil tank with a capacity of 20 litres, consisting of:



Oil filler plug

Hydraulic oil filter

Oil dip stick





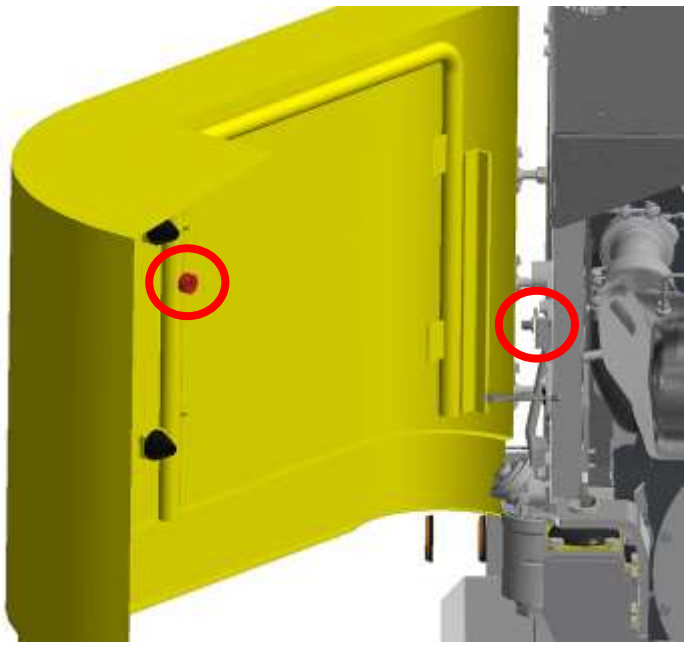
Fuel tank

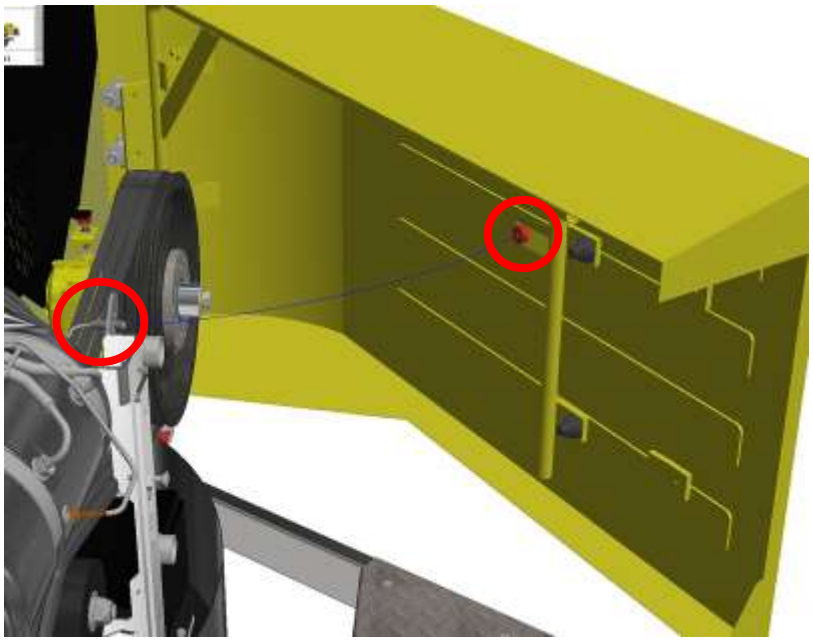
capacity 48 litres

HOOD SAFEGUARDS

The machine is fitted with a hood safeguard:

This safeguard consists of one proximity sensor, which is fastened to the engine/pulley hood. The electric switching contact is established if the sensor approaches the magnet on the yellow hoods. 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 +/-	

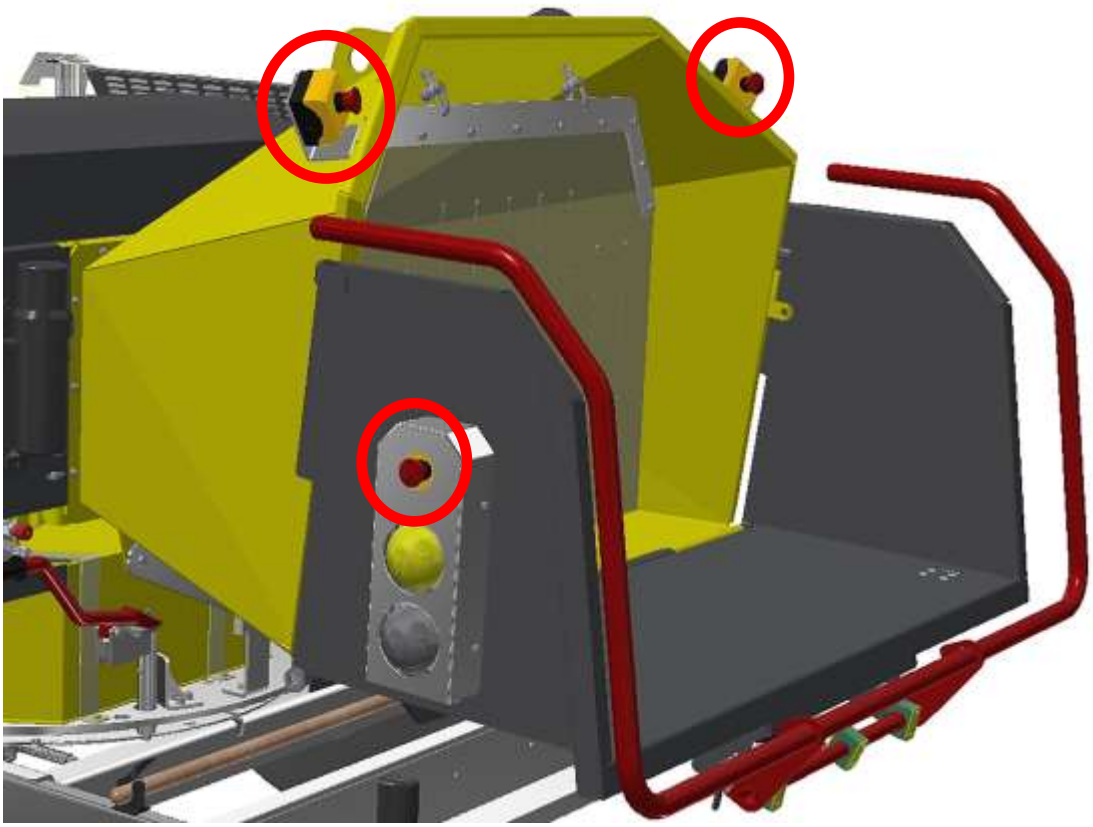
EMERGENCY STOP SWITCH

The machine is also fitted with two 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



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.***

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



Blade-type fuse type U 40 A.

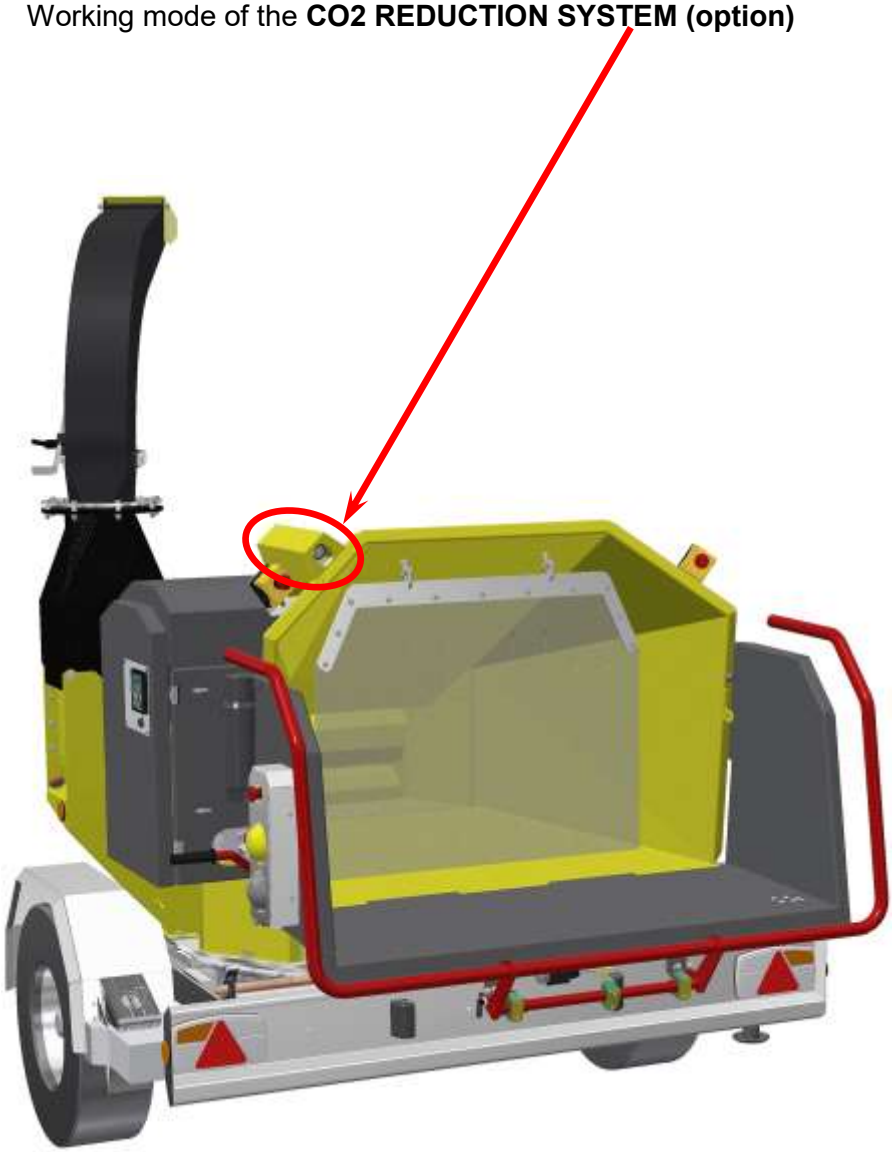
EXPULSION CHANNEL

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



CO2 Reduction

Working mode of the **CO2 REDUCTION SYSTEM (option)**



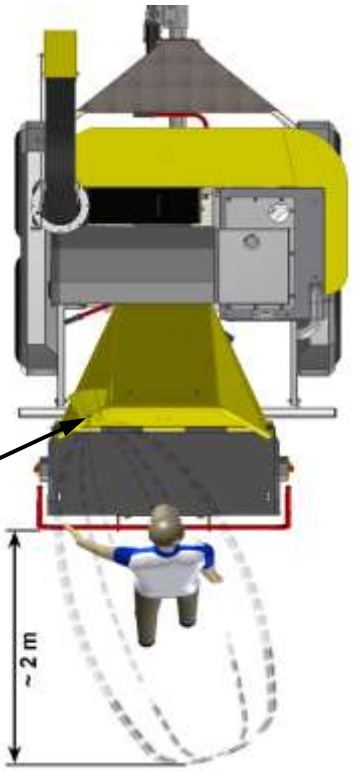
The chipper is a machine running continuously at an increased engine speed, depending on changing load, extremely high or low, depending on operating conditions. The outcome of this operating mode is high fuel consumption and noise level, as well as high exhaust gas values.

In order to exclude these disadvantages and to protect the environment, for CO2 reduction the engine changes to idle speed after a defined time, after the operator has moved away from the machine. As soon as the motion detector of the CO2 reduction system has captured the operator the engine accelerates again to working speed, and rotor and conveyor belt are reconnected after 2 seconds.
The CO2 reduction furthermore contributes to a longer lifetime of the important components (diesel engine, drive, belt conveyor, infeed roller, motors and hydraulic circuits) of the machine.

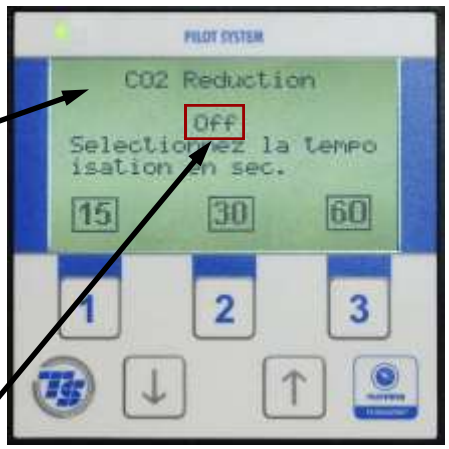
Continuation next page

The presence detector on the backside of the housing identifies the operator within an area of 2 m behind the infeed funnel. The funnel area is dead area, which is not considered by the detector. Objects within this area will not increase the speed of the diesel engine or engage the infeed roller.

All objects, also immobile objects, such as a wall or a vehicle within the area of 2 m behind the chipper, activate the automatic increase of the engine speed.



The system for CO2 reduction is not automatically connected (off). I.e. the engine does not accelerate automatically at the first start, after the operator is captured by the motion detector.



Use of the machine with CO2 Reduction:

After engine start press Sie **1x** the button ↓

(or **4x** the button ↑) for opening the **screen CO2-Reduction**.
The system is disconnected (**off**) and all 3 delay times are shown on a light background.



Note: The activation procedure is identical for all 3 delay times.

Activation of the **15 seconds delay time** :

-Press button **1**

-The delay time of **15** seconds is displayed with dark background

Continuation next page

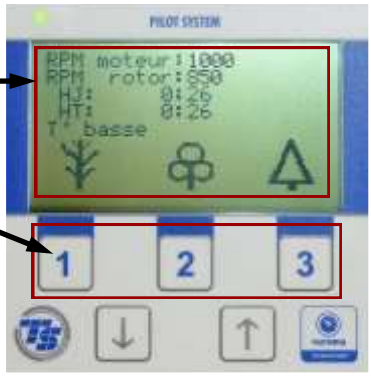
CO2 Reduction

- Press the button to go to the main screen.

- Choose the demanded field of application **1**, **2** or **3**.

- Position yourself in the detection range behind the infeed table.

- The engine accelerates up to working speed. Press the **yellow** button to start the infeed roller.





The engine runs at maximum speed as long as the operator is within the detection range.
If the operator leaves the detection range the infeed rollers are switched off after **15** seconds.

The engine accelerates again and the infeed rollers are reconnected as soon as the operator is captured by the motion detector.

The CO2-Reduction and the selected delay (15 sec.) remain active as long as not being deactivated for switching the CO2 reduction off.

End of work
In case the operator leaves the detection range before, and there is still material on the infeed table to be chipped, the infeed roller continues to run and the engine remains at high speed until all the material was chipped, also after the delay time has elapsed.
Note: This system is not activated for branches with a diameter of under 10 to 15 mm.

Note: The use of the CO2 reduction is described on page 22.

Causes for a failure of the detection range of the motion detector:

- Never change the inclination angle of the motion detector bracket.

- **Strong rain** or **wind**.

TROUBLESHOOTING

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 38	
Not possible to connect the Pilot System	- Emergency stop switch activated	- Unlock switch
The engine does not start	- Emergency stop switch activated - Hood open - Hood safeguard wrong adjusted or defective - 40A-fuse defective - Battery empty - Supply cable damaged	- 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	- Radiator clogged - Knives blunt - Fuel filter clogged	- Clean radiator - Sharpen or replace knives - Replace filter
The engine shuts off and cannot be restarted	- Hood not correctly locked - Hood safeguard defective - Fuel tank empty	- 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	- Regulating screw at infeed completely screwed down - Hydraulic motor or pump defective - Oil deficiency in hydraulic tank	- Loosen the regulating screw - Check defective part or replace - Check oil level
The machine is chipping with difficulties	- Knives blunt - V-belt damaged or loose	- 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	- Failure of the electric or hydraulic installation	- Contact dealer

4 Diagnostic

KOHLER.

ECU can manage hardwired lamps or CAN dashboard:

- SVS: Service Vehicle Soon (hardwired) yellow lamp
- MIL: Malfunction Indicator Lamp (hardwired) red lamp
- AW: Amber Warning (CAN) lamp
- RS: Red Stop (CAN) lamp
- SPN: Suspect Parameter Number
- FMI: Failure Mode Indicator

The standard list of diagnostics is reported in the following table:

N.	Code	Name	Description	Wired		CAN			
				MIL	SVS	RS	AW	SPN	FMI
1	P0563	VBRH	Vehicle system voltage too high (> 16 V)	1	1	1	1	168	3
2	P0562	VBRL	Vehicle system voltage too low (< 8 V)	1		1		168	4
3	P0643	VCC1H	Battery 5V reference 1 circuit high (5V power supply for sensor)	1		1		3509	3
4	P0642	VCC1L	Battery 5V reference 1 circuit low (5V power supply for sensor)	1		1		3509	4
5	P0653	VCC2H	Battery 5V reference 2 circuit high (5V power supply for sensor)	1		1		3510	3
6	P0652	VCC2L	Battery 5V reference 2 circuit low (5V power supply for sensor)	1		1		3510	4
7	P0118	THWH	Coolant temperature sensor signal too high	1		1		110	3
8	P0117	THWL	Coolant temperature sensor signal too low	1		1		110	4
9	P0116	THWP	Coolant temperature sensor performance invalid	1		1		110	2
10	P0113	THAH	Air temperature sensor signal too high	1		1		105	3
11	P0112	THAL	Air temperature sensor signal too low	1		1		105	4
12	P0183	THFH	Fuel temperature (w/pump) sensor signal too high	1		1		174	3
13	P0182	THFL	Fuel temperature (w/pump) sensor signal too low	1		1		174	4
14	P0191	PCP	CRail press. Sensor signal keeping the middle range	1		1		157	9
15	P0191	PCO	PC sensor offset diagnosis (drifted high or low)	1		1		157	2
16	P0191	PCONOX	PC sensor offset diagnosis for NOX requirement (drifted high or low)	1		1		157	14
17	P0191	PCOH	PC sensor high offset	1		1		157	20
18	P0193	PCH	CRail pressure sensor signal too high	1		1		157	3
19	P0192	PCL	CRail pressure sensor signal too low	1		1		157	4
20	P2229	PATMH	Atmosphere pressure sensor signal too high	1		1		108	3
21	P2228	PATML	Atmosphere pressure sensor signal too low	1		1		108	4
22	P0238	PIMH	Boost pressure sensor signal too high	1		1		102	3
23	P0237	PIML	Boost pressure sensor signal too low	1		1		102	4
24	P0236	PIMF1	Boost pressure sensor performance invalid	1		1		102	2
25	P0123	ACCP1H	Accelerator pedal sensor No.1 signal too high	1		1		91	3
26	P0122	ACCP1L	Accelerator pedal sensor No.1 signal too low	1		1		91	4
27	P0223	ACCP2H	Accelerator pedal sensor No.2 signal too high	1		1		29	3
28	P0222	ACCP2L	Accelerator pedal sensor No.2 signal too low	1		1		29	4
29	P0228	PTOPH	Accelerator pedal for ASC (PTO) sensor signal too high	1		1		28	3
30	P0227	PTOPL	Accelerator pedal for ASC (PTO) sensor signal too low	1		1		28	4
31	P0486	EGRRH	EGR (exhaust gas recirculation) lift sensor signal too High	1		1		2791	3
32	P0485	EGRRL	EGR (exhaust gas recirculation) lift sensor signal too low	1		1		2791	4
33	P0503	SPDH	Vehicle speed sensor frequency too high	1		1		84	8
34	P0502	SPDL	Vehicle speed sensor input open/short	1		1		84	5
35	P0501	SPDSG	Vehicle speed sensor signal invalid	1		1		84	2
36	P0337	NENOP	Crank position (CKP) sensor no pulse	1		1		249	8
37	P0336	NEPUM	Crank position (CKP) sensor performance invalid	1		1		249	2
38	P0342	GNOP	Camshaft position (CMP) sensor no pulse	1		1		637	8
39	P0341	GPUM	Camshaft position (CMP) sensor performance invalid	1		1		637	2
40	P0385	NEGNON	Crank position and camshaft position sensor no pulse	1		1		190	9
41	P2148	BSTWV1	COM1 Injector drive system output short to BATT (Injector1 or Injector3 (4cyl engine)/Injector2 (3cyl engine) output short to BATT	1		1		1387	3
42	P2147	GSTWV1	COM1 Injector drive system output short to GND (Injector1 or Injector3 (4cyl engine)/Injector2 (3cyl engine) output short to GND	1		1		1387	4
43	P2146	NCOM1	COM1 Injector drive system output open load both Injector1 and Injector4 (4cyl engine)/Injector2 (3cyl engine) open load	1		1		1387	5
44	P0201	NCTWV1	Injector1 output open load injector coil open	1		1		1393	5
45	P0205	NCTWV2	Injector3 output open load injector coil open	1		1		1394	5
46	P0203	NCTWV3	Injector4 (4cyl engine)/Injector2 (3cyl engine) output open load injector coil open	1		1		1395	5
47	P0204	NCTWV4	Injector2 (4cyl engine) output open load injector coil open	1		1		1396	5
48	P0611	LCHG	Capacitor charge-up circuit malfunction injector (insufficient charge) within ECU	1		1		167	31
49	P0200	OCHG	Capacitor charge-up circuit malfunction injector (excessive charge)	1		1		167	1
50	P0263	ANGSPD1	Engine angle speed error1 (Injector1)	1		1		1393	2
51	P0275	ANGSPD2	Engine angle speed error2 (Injector3)	1		1		1394	2
52	P0269	ANGSPD3	Engine angle speed error3 (Injector4 (4cyl engine)/Injector2 (3cyl engine))	1		1		1395	2
53	P0278	ANGSPD4	Engine angle speed error4 (Injector2)	1		1		1396	2
54	P1602	QRNOT	Q8 data is not written	1		1		2802	13
55	P0642	QRERR	Q8 data error		1		1	2802	11
56	P1601	ABNQR	Q8 definition error (definition concerning Q8 correction is not right)		1		1	2802	9
57	P0628	BSSCV	SCV(+) output short to BATT, SCV(-) output short to BATT	1		1		94	3
58	P0627	DSSCV	SCV(+) output open load/short to GND; SCV(-) output open load/short to GND; SCV coil open/short	1		1		94	6
59	P0088	PCEH3	CRail pressure exceeds hi upper limit3	1		1		157	0
60	P1220	PCOVR	CRail pressure control cannot achieve target fuel		1		1	157	31
61	P1221	PCUND	CRail pressure falls below the control limit of the target pressure	1		1		157	1
62	P2293	PCEH2	CRail pressure exceeds hi upper limit2	1		1		157	16
63	P1217	PCEH1	CRail pressure exceeds hi upper limit1	1		1		157	15
64	P1219	PLACT	PrL (pressure limiter) activated	1		1		156	14
65	P2269	WGTHR	Water in fuel filter failure		1		1	97	2
66	P1222	FIPRES1	Fuel filter diagnosis level 1		1		1	1382	16
67	P1223	FIPRES2	Fuel filter diagnosis level 2	1		1		1382	0
68	P0234	TBOPH	Boost pressure sensor exceeds upper limit	1		1		1127	0
69	P0299	TBOPL	Boost pressure sensor exceeds lower limit	1		1		1127	1
70	P0541	GRELGD	Glow relay output open load/short to GND		1		1	626	4
71	P0542	GRELBT	Glow relay output short to BATT		1		1	626	3
72	P0615	STSWBT	Starter switch short to BATT	1		1		630	3
73	P0704	CLSW	Clutch switch circuit malfunction (manual transmission only)		1		1	598	2
74	P0850	NEUTSW	Neutral switch circuit malfunction (manual transmission only)		1		1	604	2
75	P0524	POILDN	Engine oil pressure low	1		1		100	1
76	P0217	THWOT	Coolant temperature exceeds upper limit	1		1		110	0
77	P0219	NEOR	Engine over speed condition	1		1		190	0
78	P0607	SCPU	CPU fault; watchdog IC fault	1		1		2802	31
79	P0606	MCPU	CPU fault; main CPU fault	1		1		2802	12
80	P0601	FROM	Check sum error - flash area	1		1		2802	14
81	U0101	CANOPENGENU	CAN bus-line open from general unit		1		1	1683	31
82	U0073	CANB1	CAN1 node error		1		1	1683	19
83	U1001	CANB2	CAN2 node error		1		1	1684	19
84	P0694	CFANLBT	Coolant fan low speed relay short to battery		1		1	1639	5
85	P0693	CFANLGD	Coolant fan low speed relay short to GND		1		1	1639	6
86	P0696	CFANHBT	Coolant fan high speed relay short to battery	1		1		1639	3
87	P0695	CFANHGD	Coolant fan high speed relay short to GND	1		1		1639	4
88	P0480	EFAN	Electric fan open load/short to GND/short to battery	1		1		1639	31
89	P2280	AFC	Air filter clogging error	1		1		107	2
90	P2280	PAFDPH	Air filter differential pressure sensor signal too high		1		1	107	3
91	P2280	PAFDPL	Air filter differential pressure sensor signal too low		1		1	107	4
92	P0463	FLEVH	Fuel level sensor signal too high		1		1	96	3
93	P0462	FLEVL	Fuel level sensor signal too low		1		1	96	4
94	P0935	PHYDH	Hydraulic pressure sensor signal too high		1		1	1762	3
95	P0934	PHYDL	Hydraulic pressure sensor signal too low		1		1	1762	4
96	P1219	PLVHIRP	Multiple high rail pressure error/ Engine stall after PLV opening	1		1		156	2
97	P268B	IPNPSTUDYNOT	Pump learning uncompleted		1		1	1349	2
98	P0404	EGRBM	EGR battery/motor failure (for CAN)	1		1		2791	14
99	P0401	EGRFPD	EGR feedback/position sensor/Dynamic range failure (for CAN)	1		1		27	7
100	U0411	EGRNTNR	EGR: no transmission/not received failure (for CAN)	1		1		2791	2
101	P2425	EGRT	EGR: valve temperature failure (for CAN)	1		1		2791	31
102	P0488	EGRVI	EGR: valve stuck/initialization failure (for CAN)	1		1		2791	7
103	P2123	PTOP2H	Accelerator pedal for ASC (PTO) sensor 2 signal too high	1		1		28	20
104	P2122	PTOP2L	Accelerator pedal for ASC (PTO) sensor 2 signal too low	1		1		28	21
105	P0403	EGRCLEAN	EGR: Cleaning failure (valve stuck open/poppet much lower than normal)		1		1	2791	13
106	U0107	TSC1TMEER	TSC1 Time out error	1		1		3349	9
107	U0408	TSC1RC	TSC1 Rolling count test	1		1		3349	10
108	U0408	TSC1CS	TSC1 Checksum test	1		1		3349	2
109	P0232	ELPUMPBT	Electric lift pump relay short to battery		1		1	4082	3
110	P0231	ELPUMPGD	Electric lift pump relay short to GND		1		1	4082	4
111	P0617	STARELBT	Starter relay short to battery	1		1		630	5
112	P0616	STARELGD	Starter relay short to GND	1		1		630	4
113	P0016	NEGUM	Crankshaft and Camshaft synchronous error	1		1		190	2

Troubleshooting CO2 reduction (option)

FAILURE	CAUSE	REMEDY
The engine does not accelerate automatically	- Beam of the motion detector wrong adjusted	- Ensure that the beam is directed slightly downwards
	- Sensor beam disturbed	- Check if there is no branch interrupting the beam
	- Motion sensor defective	-**Warm engine switched off:** Check on the backside of the motion detector if **approx. 10 seconds after connecting the ignition**: * The 1st **green** LED shines * The 2nd **yellow** LED shines as soon as a person is behind the feed table * The 2nd red LED flashing: Contact dealer

Spécifications

	WS/**20**DT	WS/**23**DT
Performance:	200 mm	230 mm
Length:	4.00 m	4.00 m
Width:	1.90 m	1.90 m
Height:	2.70 m	2.70 m
Weight:	2000 Kg	2200 Kg
Number of knives:	2	2
Chipping disk diameter:	900 mm	900 mm
Weight of chipping disk:	218 Kg	218 Kg
Engine:	56 HP Kohler KDI 1903 TCR	75 HP Kohler KDI 2504 TCR
Fuel tank capacity:	48 l	48 l
Engine speed:	2600 rpm	2600 rpm
Chipping disk speed:	760 / 930 / 1100 rpm	760 / 930 / 1100 rpm
Overload protection:	YES	YES
Hydraulic supply:	YES	YES
Hydraulic oil tank capacity:	30 l	30 l
Hydraulic pressure:	190 bars	190 bar
Test drive:	YES	YES
Number wheels:	2 or 4	4
Tyres:	2x 205R14 or 4x 185R14	185R14
Tyre pressure:	4.5 bar	4,5 bar
CO2 REDUCTION:	Option	Option

Hydraulic connections

MACHINE WS20DT

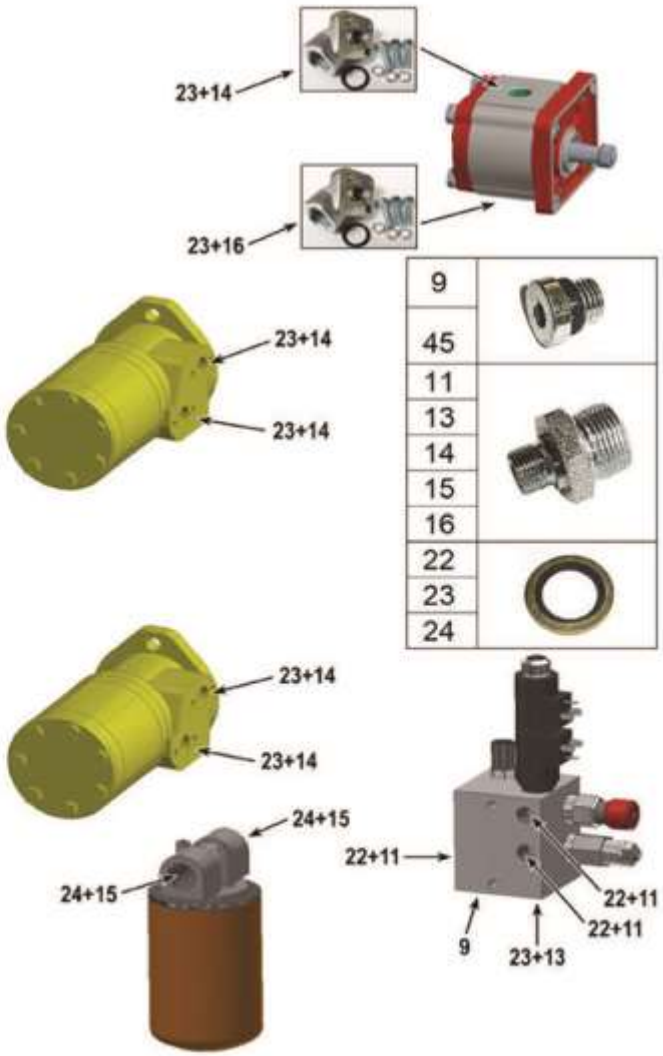
lg ht mm	Ref SAELEN	Rep sur plan
560	HYDP/0059	5
730	HYDP/0113	3
580	HYDP/0060	1
420	HYDP/0061	2
1500	HYDP/0065	4
1350	HYDP/0066	7
470	HYDP/0064	6

MACHINE WS23DT

lg ht mm	Ref SAELEN	Rep sur plan
560	HYDP/0059	5
730	HYDP/0113	3
580	HYDP/0060	1
420	HYDP/0061	2
1150	HYDP/0062	4
1200	HYDP/0063	7
470	HYDP/0064	6

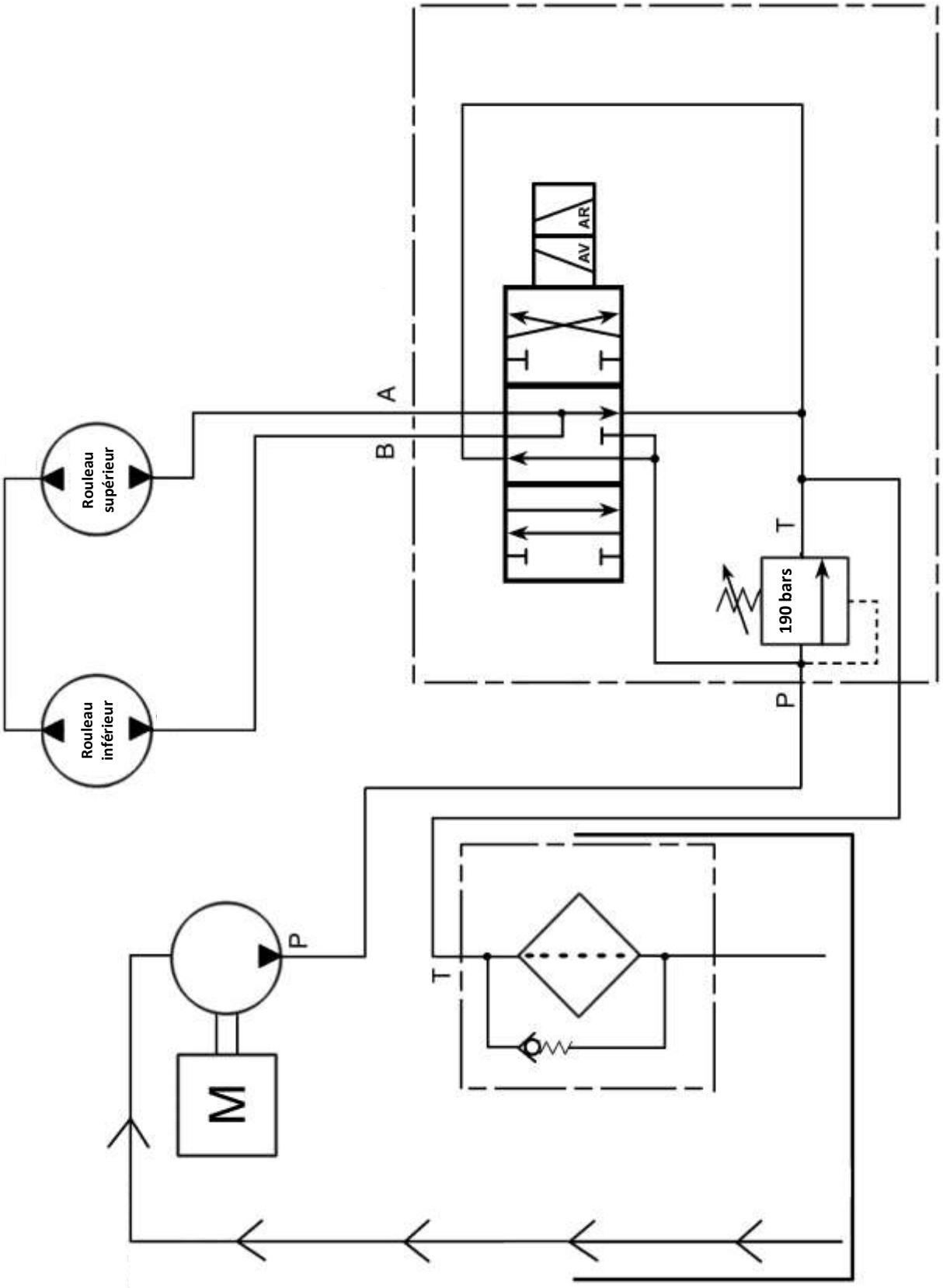
Qté	Réf SAELEN	N° sur plan	
1	HYDC/0002	9	
2	HYDC/0008	45	
3	HYDF/0003	11	
1	HYDF/0004	13	
5	HYDF/0002	14	
2	HYDF/0005	15	
1	HYDF/0006	16	
3	HYDR/0003	22	
7	HYDR/0002	23	
2	HYDR/0004	24	





9	
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22	
23	
24	

Hydraulic Circuit Diagram



Electric Circuit Diagram Engine 3/3

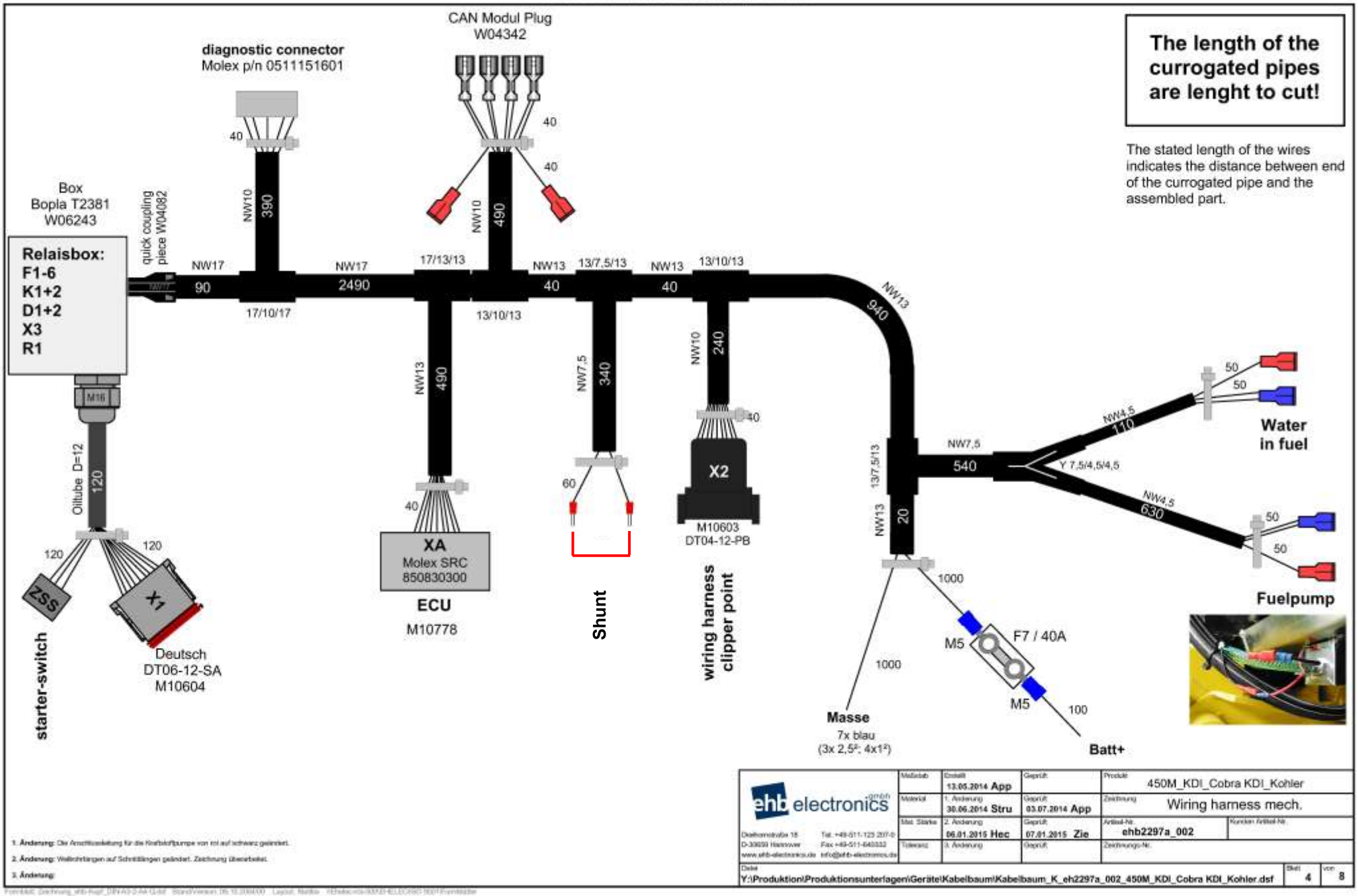


Schéma électrique moteur 2/3

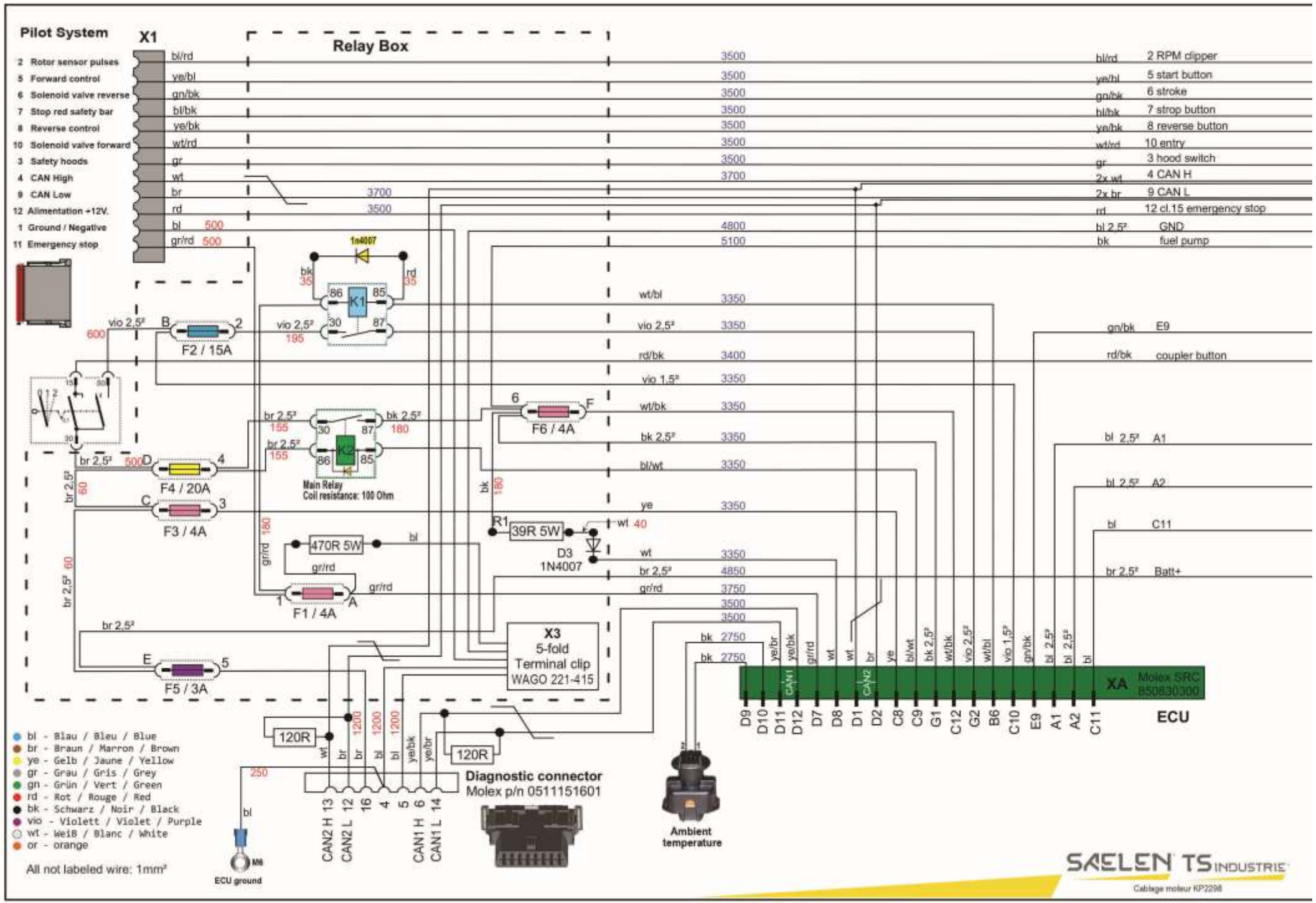
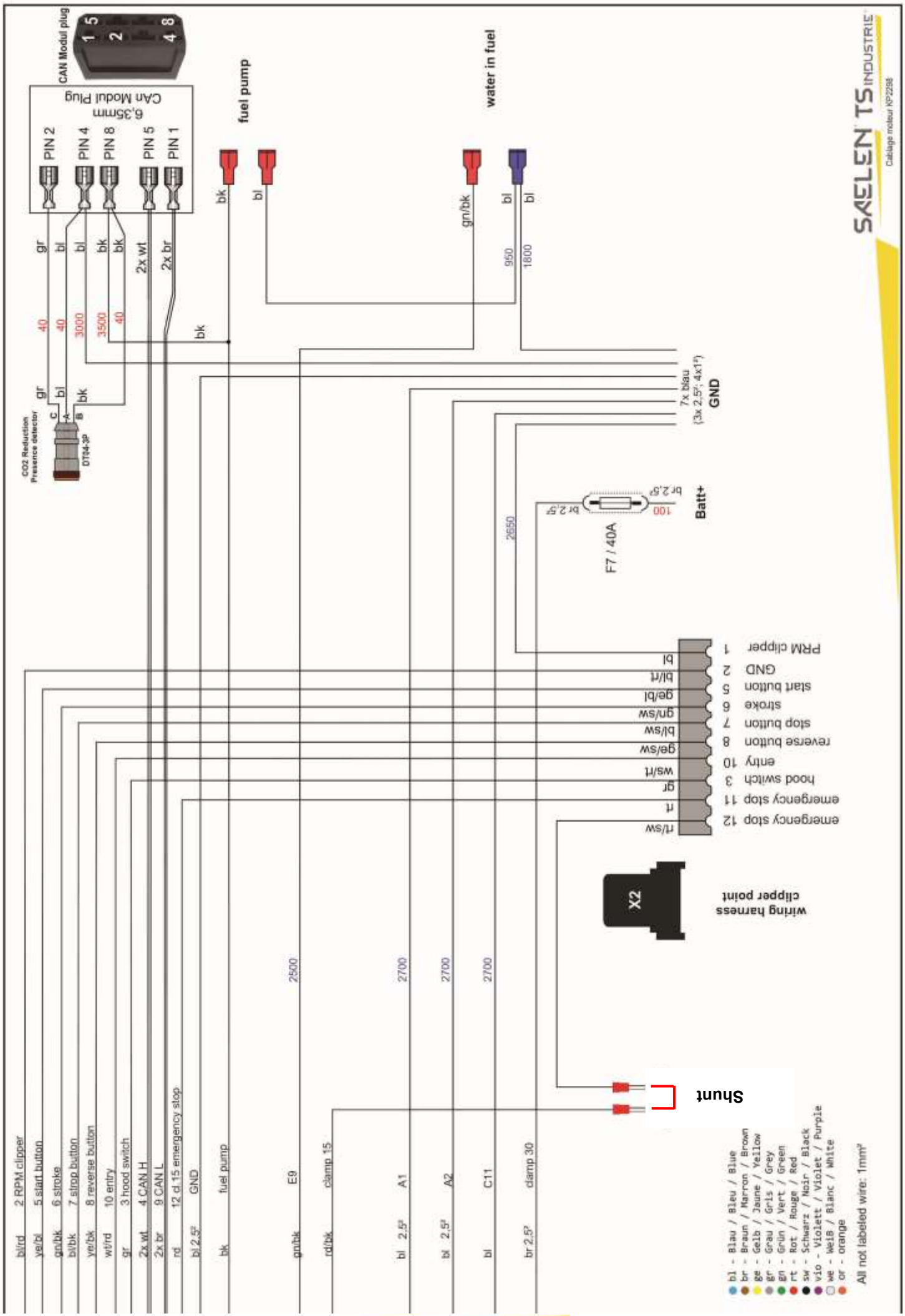
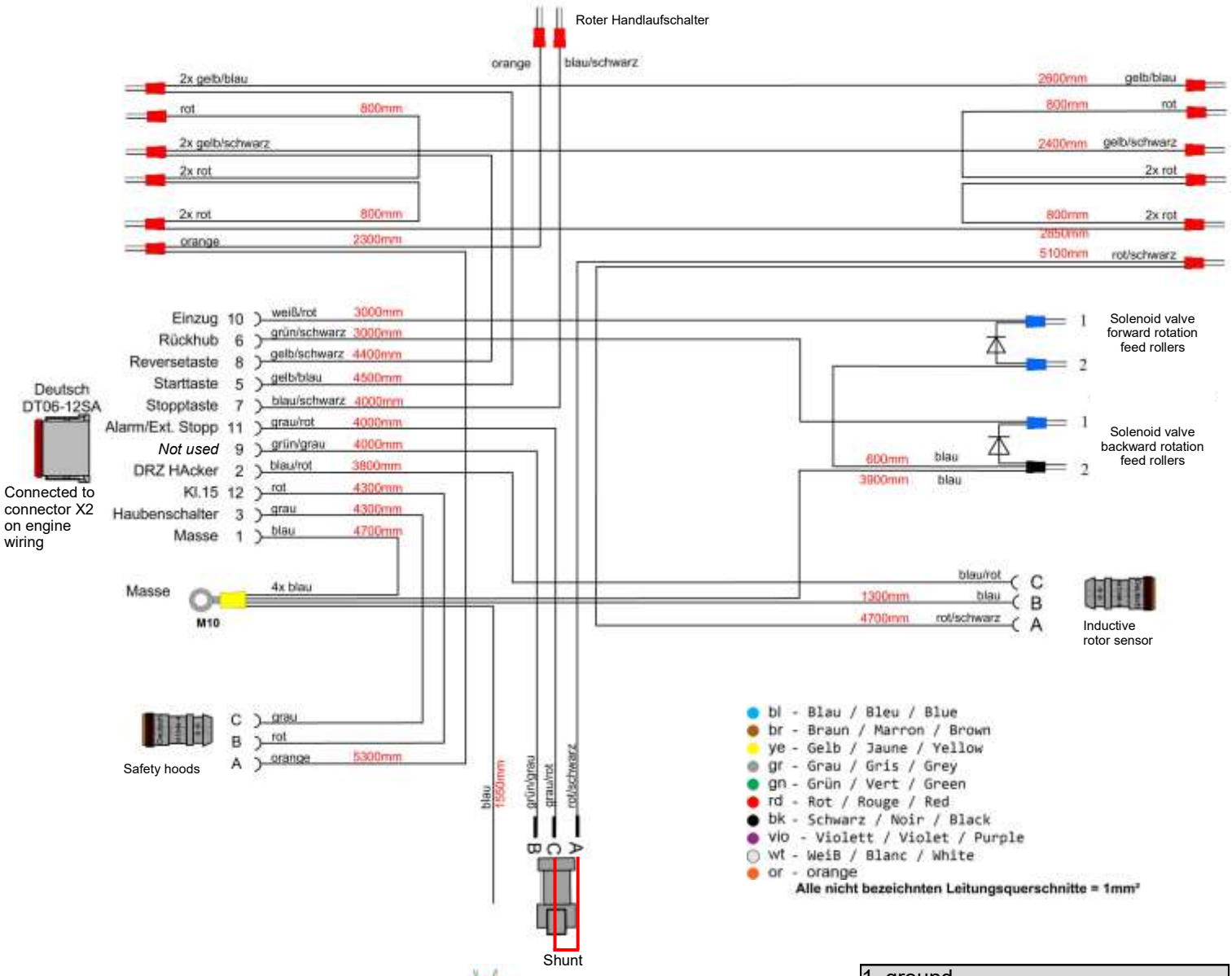
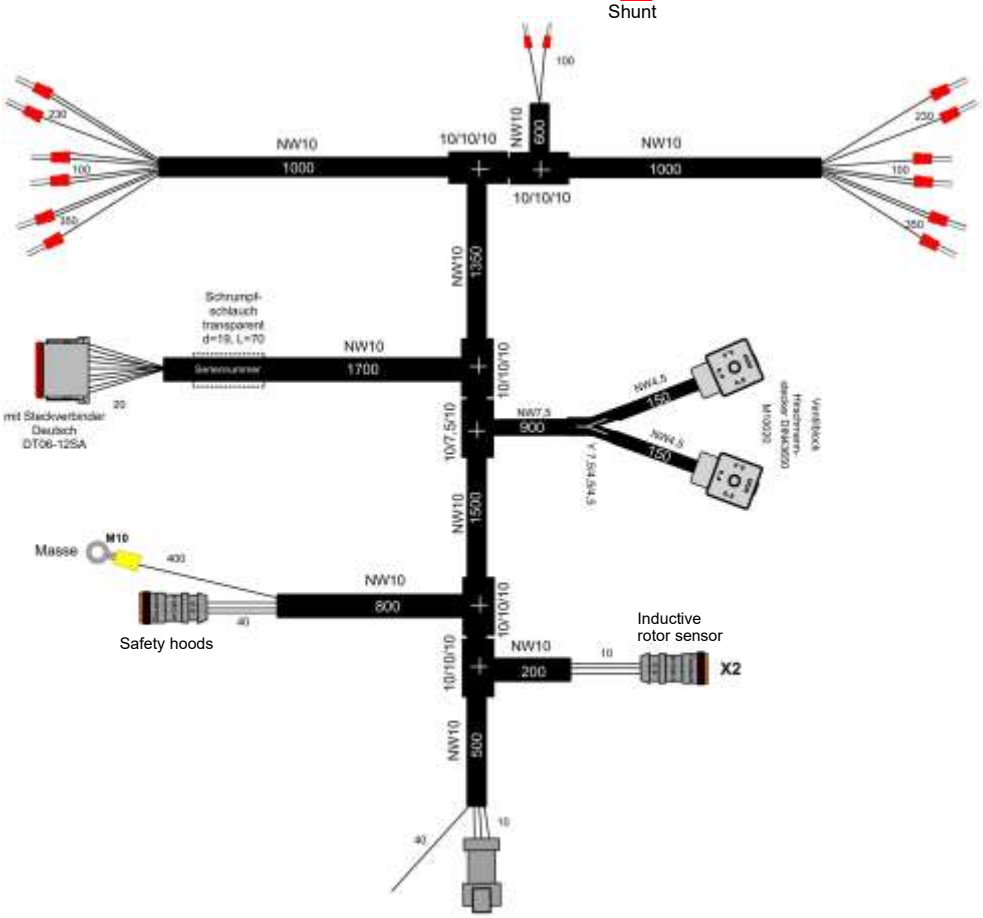


Schéma électrique moteur 3/3



Elektroschaltplan Maschine





1. ground
2. rotor sensor M18
3. open hood security
4. /
5. command front rotation feedroller
6. solenoid rear feedroller
7. red handrail switch
8. command rear rotation feedroller
9. /
10. solenoid front feedroller
11. emergency stops
12. +12V after contact

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