FÖRST™

Rely on it

ST6D42

OPERATOR AND MAINTENANCE MANUAL

Redwood Global Ltd

CE

UK CA

The English language is used for the original instructions.
Other languages are a translation of the original instructions.
(Directive 2006/42/EC)

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DISCLAIMER

This manual has been written by Redwood Global Ltd, to detail the safe operation and maintenance of the Först machine.

This document provides information on the design of the product, procedures for routine maintenance, servicing, operating instructions and offers a troubleshooting guide to follow in the event of an unexpected occurrence.

It is always the responsibility of the customer to train and advise not only his or her personnel, but also any contractors' personnel who are servicing, repairing, or operating the equipment, in all safety aspects.

Whilst great care and attention has been taken to ensure all information provided in this manual is safe and correct, Redwood Global Ltd accepts no responsibility whatsoever for any damage to equipment or injury or death to any person(s) which may occur while carrying out any of the instructions or procedures described within this manual.

All customer personnel must always satisfy themselves with the safety of any procedures described herein, being mindful of the circumstances in which any work is being carried out.

Please take the time to study all of the owner/operator literature supplied with your machine as soon as possible.

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PREFACE

DESCRIPTION OF THE USER

These instructions are intended for the end-user of the ST6D42.

The end-user can be described as each person who interacts directly with the machine. The end-user typically includes, but is not limited to:

- Operator/Owner
- Hirer
- Maintenance personnel or technician

All use of this machinery shall only be carried out by an authorised and properly qualified person of 18 years or older, who;

- Has read and understood this manual
- Is familiar with operating similar equipment
- Knows how to control this machinery
- Is aware of all possible dangers and acts accordingly
- Obeys advice on safe working practices

PURPOSE OF THESE INSTRUCTIONS

Thank you for purchasing/hiring this Redwood Global Ltd, Först wood chipping machine.

The purpose of this document is to make you familiar with the operation and maintenance of the machine, so that you can safely operate it as an end-user. This documentation should therefore be regarded as an integral part of the machine.

By observing the contents of this manual, we hope the machine gives safe and productive service. This user manual is intended for the owner/operator to safely and effectively operate this machine and carry out routine maintenance between services.

This is not a comprehensive service manual. Refer to the Service Schedule for routine maintenance and when to take the machine to a service specialist.

This machine has been through a pre-delivery inspection before leaving the factory and is ready to use.

CAUTION
Before use and as a minimum, the safety and machine operation sections covered in Chapters 3 and 4 must be read and understood. Failure to do so could result in serious injury or loss of life to the operator and others nearby.

Also, damage to property and this machine may occur. Please observe and obey all warning signs (decals) located on the machine. Their meaning is covered in Refer to "Decals" on page 50.

Redwood Global Ltd endeavour to continuously develop and improve its products. They reserve the right to make changes at any time, without notice or incurring any obligation.

Continuous improvement will affect machine design and production so there may be minor discrepancies between the actual product and this manual.

CONVENTIONS IN THIS DOCUMENT

This document uses the following safety notices and tips:

DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
Indicates a hazardous situation which, if not avoided, could result in serious injury.

CAUTION
Indicates a hazardous situation which, if not avoided, could result in injury or damage the product.

NOTICE
Indicates an important situation which, if not avoided, may seriously impair operations.

Additional information relating to the current section.

Cross references:

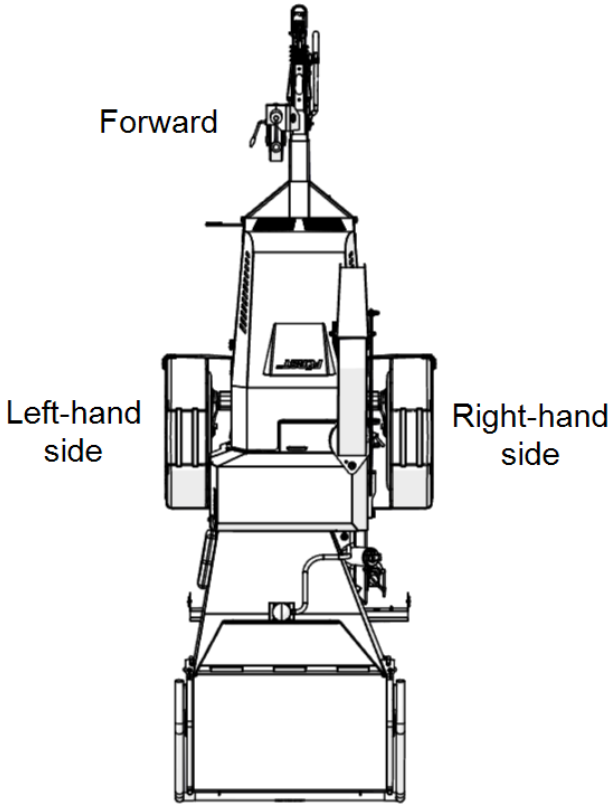
► Refer to... A cross-reference to a related or more detailed topic.

Image references

(3, Figure 2) A reference to item 3 in Figure 2.

LEFT-HAND AND RIGHT-HAND SIDE

In this manual "left-hand" and "right-hand" mean your left and right when you are standing facing forward, feeding material into the machine.



OBTAINING DOCUMENTATION AND INFORMATION

The latest version of the documentation is available at the following address:

https://forstglobal.com/my-forst/manuals

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CHAPTER 1: MACHINE OVERVIEW

In this chapter:

1.1 INTENDED USE

The Först ST6D42 is designed to reduce wood material up to 150mm (6 inch) wide in diameter to woodchip. This machine is capable of processing up to 5 tons of wood per hour.

1.2 TECHNICAL DATA

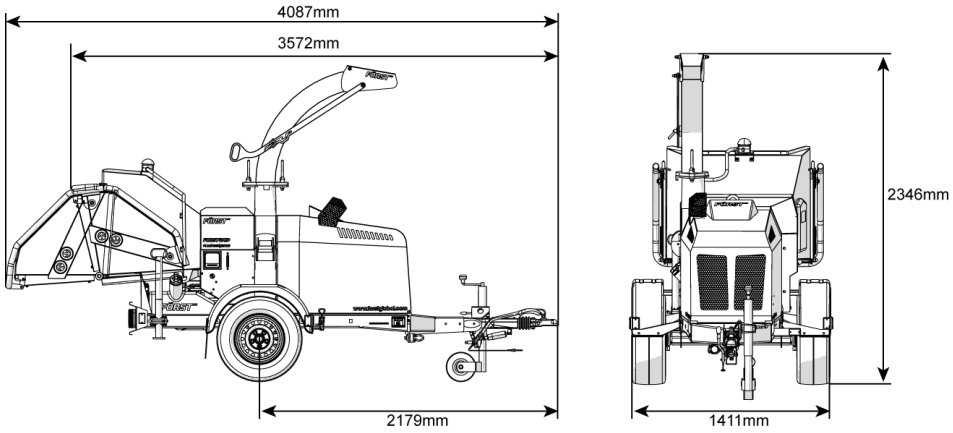
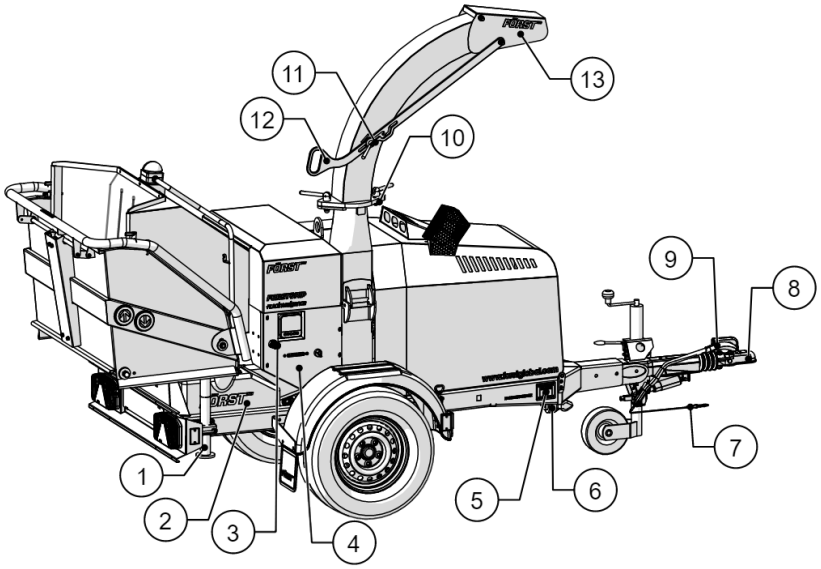


Table 1 - Technical data

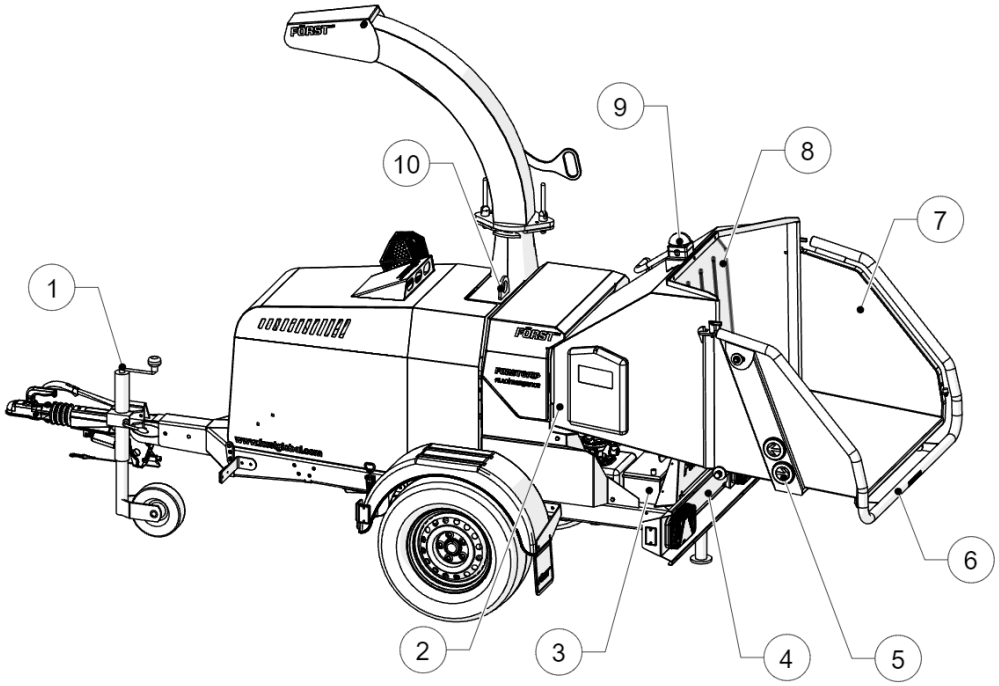
Technical Data	ST6D 42
Part number	12-A-076
Weight	
Overall weight	1165kg
Engine	
Engine Type	Doosan D18
Maximum Power	31kW (42hp)
Engine Oil	HD SAE 10w40 E9
Cooling Method	Water cooled
Starting Method	Electric
Fuel Type	Diesel
Fuel Capacity	30 litres
Hydraulic system	
Hydraulic Oil Capacity	17 litres
Hydraulic Oil Type	ISO 46 (VG 46)
Wheels	
Tyre Type	Wheel & tyre tubeless steel belted radial
Tyre Size	205/65R15
Tyre Pressure	2.8 bar (41 psi)
Wheel Nut Torque Settings	100Nm
Brakes	Fully braked chassis and handbrake.
Electrical System	
Voltage	12V DC Negative Earth
Battery	063 44Ah
Rollers	
Roller Feed	Twin series hydraulic motors
Material Processing	
Maximum Material Diameter	150mm
Material Processing Capacity	5 Tonnes /Hour
Feed Roller Aperture	6"x 8" (150 x 200mm)
Flywheel System	Open top flywheel (640 x 25mm) twin 8" blades

1.3 EXTERIOR COMPONENTS



1 Prop stand
2 Fuel tank
3 Control valve speed adjust
4 Control panel
5 Vehicle identification (vin) plate
6 Light socket
7 Breakaway cable
8 Tow hitch head
9 Handbrake lever/cable
10 Chute rotation clamp
11 Chute handle clamp
12 Chute handle
13 Chute hood

Figure 1 - Exterior components, right-hand side

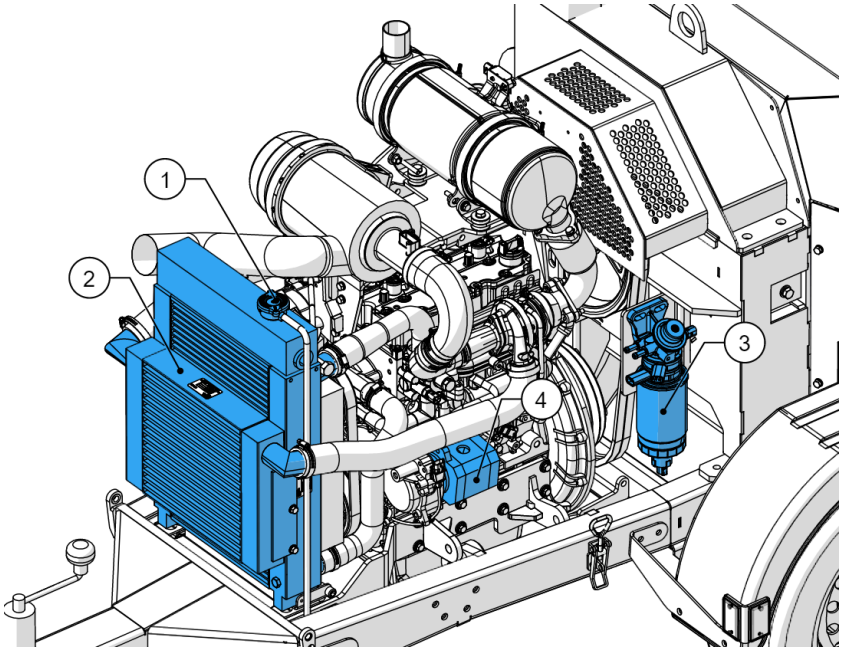


1	Jockey wheel handle	6	Red stop bar
2	Hopper	7	Hopper tray
3	Battery	8	Safety curtains
4	Number plate	9	Emergency stop
5	Hopper tray buttons	10	Lift point

Figure 2 - Exterior components, left-hand side

1.4 ENGINE COMPARTMENT OVERVIEW

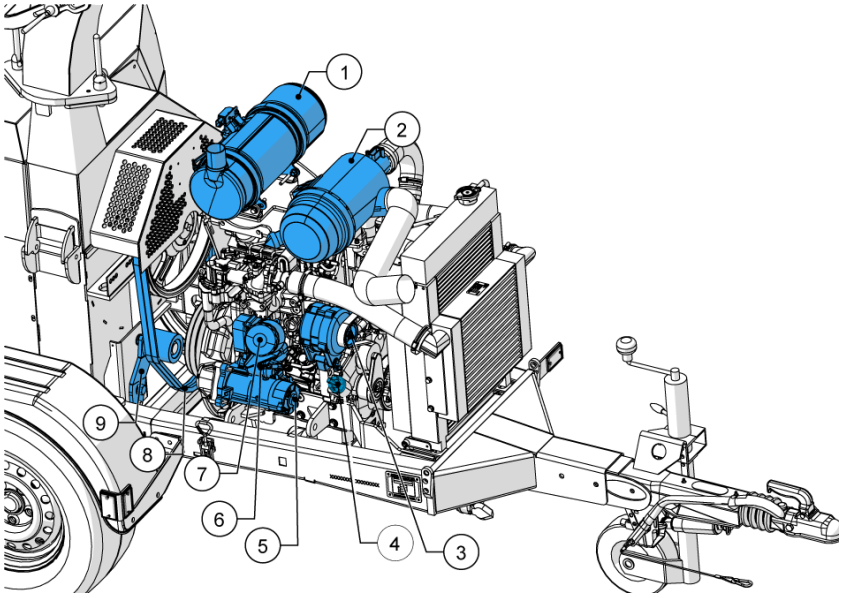
Below are the components of the engine located on the left side of the machine:



1	Radiator filler cap	3	Fuel pump
2	Intercooler	4	Hydraulic oil pump

Figure 3 - Left-hand side engine components

Below are the components of the engine located on the right side of the machine:



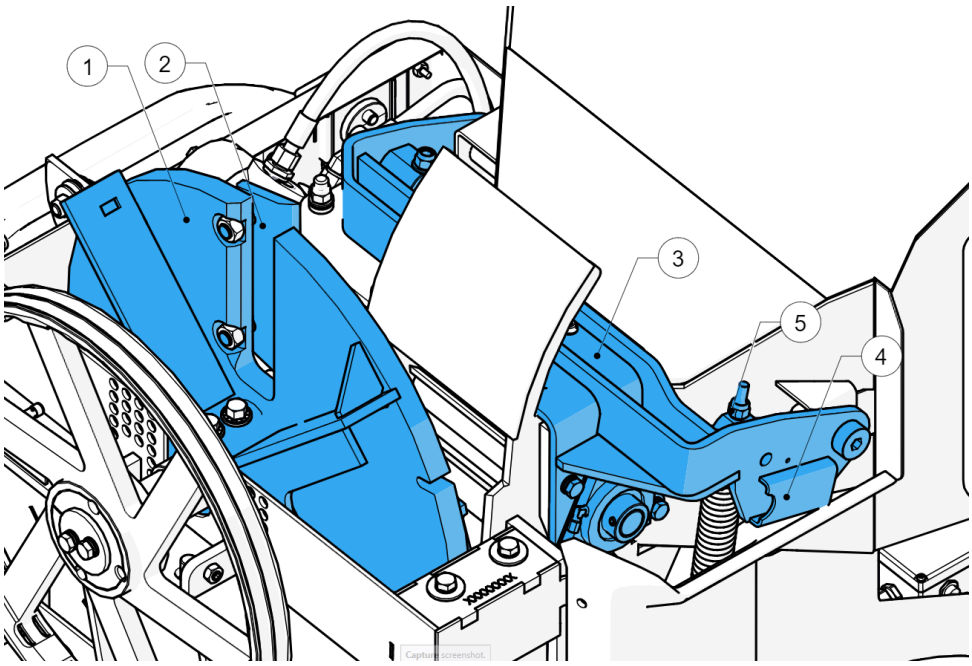
1 Diesel particulate filter (DPF)
2 Air filter assembly
3 Alternator
4 Enginer oil filler cap
5 Engine oil dipstick
6 Starter motor
7 Engine oil filter
8 V belt
9 V belt tensioner

Figure 4 - Right-hand side engine components

1.5 CHIPPING CHAMBER OVERVIEW

To access the chipping chamber:

► *Refer to "Opening the chipping chamber cover" on page 95*



1	Flywheel	4	TFR lifting tool slot
2	Flywheel blade	5	Feed roller spring
3	Top feed roller (TFR) assembly		

Figure 5 - Chipping chamber

1.6 AUTOINTELLIGENCE SYSTEM

The ST6D42 incorporates the Först Autointelligence system. This system monitors and manages the machine's electrical system.

For example, the Autointelligence system:

- Will stop and start the feed rollers, making sure that the cutting conditions remain within the optimum limits. This maximises throughput while minimising jams and blockages.

  When the flywheel speed drops below the lower threshold, the Autointelligence system stops the feed rollers. the feed rollers will stop, the flywheel speed will increase past the middle threshold, and the feed rollers will restart and feed wood into the machine again.
- Will inform you when the machine requires routine maintenance or service.

WARNING
There will be times when the material is being cut, and the feed will momentarily stop until engine speed increases. At this point, the feed rollers will start without warning.

1.7 FEED ROLLER CONTROLS

Red stop bar

The red stop bar (1, Figure 6) located on the folding tray is used to stop the feed rollers during normal operation. When pushed, the spring-loaded bar interrupts power to the feed rollers, and they stop instantly.

The stop bar must be pushed through its full travel to activate the proximity switch.

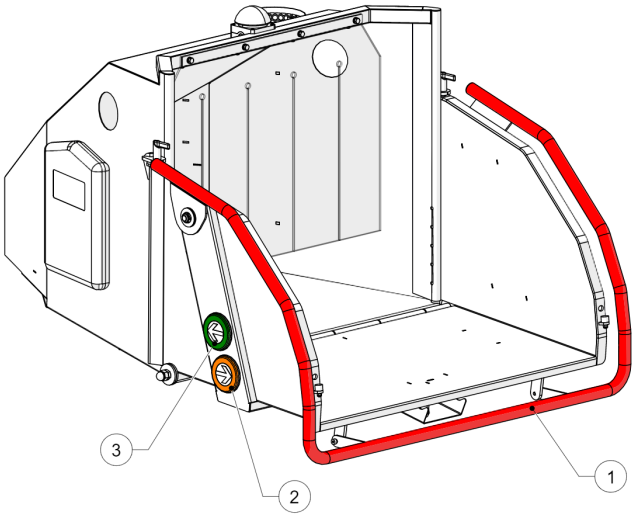
CAUTION
When the red stop bar is pushed, the engine will continue to run and the flywheel will still be turning.

WARNING
If you push the red stop bar in an emergency, you must also push an E-stop button, this will make sure the feed rollers do not start moving accidentally.

Forward and backwards buttons

The green and orange buttons are used to control the feed roller direction.

- The green button (3, Figure 6) turns the feed rollers forward.
- The orange button (2, Figure 6) turns the feed rollers backward.



1 Red stop bar
2 Orange reverse button
3 Green forward button

Figure 6 - Feed roller controls

1.8 CONTROL PANEL

The control panel is located on the right-hand side panel. On the control panel you will find the following:

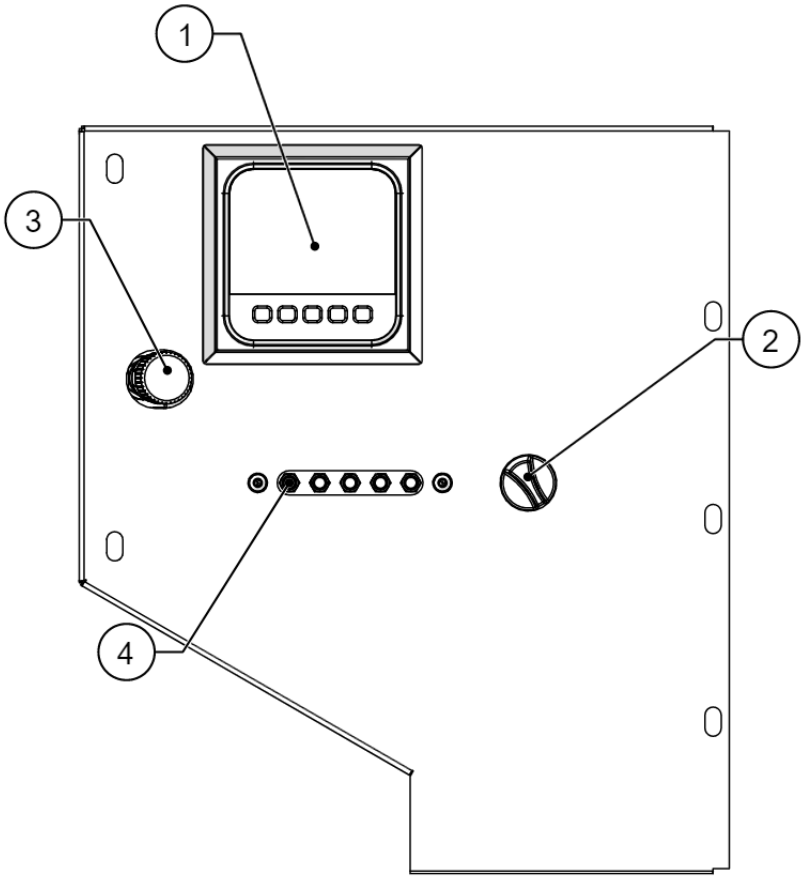
- Display screen

▶ *Refer to "Control Screen" on page 29*

- Ignition switch

▶ *Refer to "Ignition switch" on page 39*

- Grease bank
- Feed roller speed adjuster



1 Display screen
2 Ignition switch
3 Feed roller speed knob
4 Grease bank

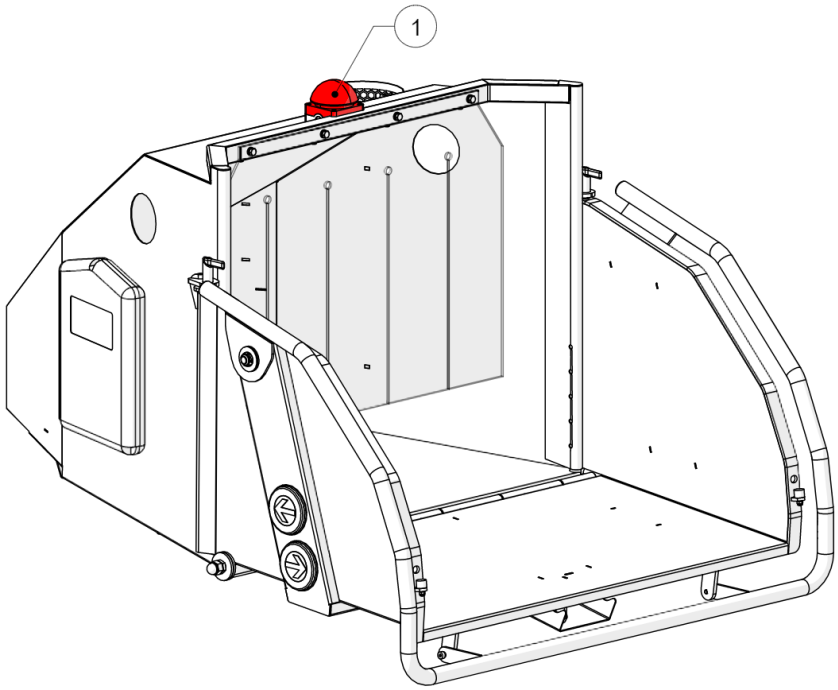
Figure 7 - Control panel

1.9 EMERGENCY STOP BUTTONS

WARNING
Pushing an emergency stop button does not stop the engine.

There is one emergency stop button located on the top of the hopper.

Push the emergency stop to stop the feed rollers instantly.



1 Emergency stop button

Figure 8 - Emergency stop button

NOTICE
Pull the emergency stop button up to reset.

1.10 CONTROL SCREEN

The control screen houses the Först Autointelligence software. The software maintains and controls all functionality of the machine.

The control screen also displays information for all aspects of the machine, such as:

- Flywheel speed
- Engine speed
- Machine sensor status
- Throttle type
- Engine type

The control screen also shows all current and archived errors that the machine may have experienced. Först service personnel will need this information if a fault occurs in the machine.

1.10.1 BUTTON FUNCTIONS

Each page displays different information therefore each button performs multiple functions depending on which screen is displayed.

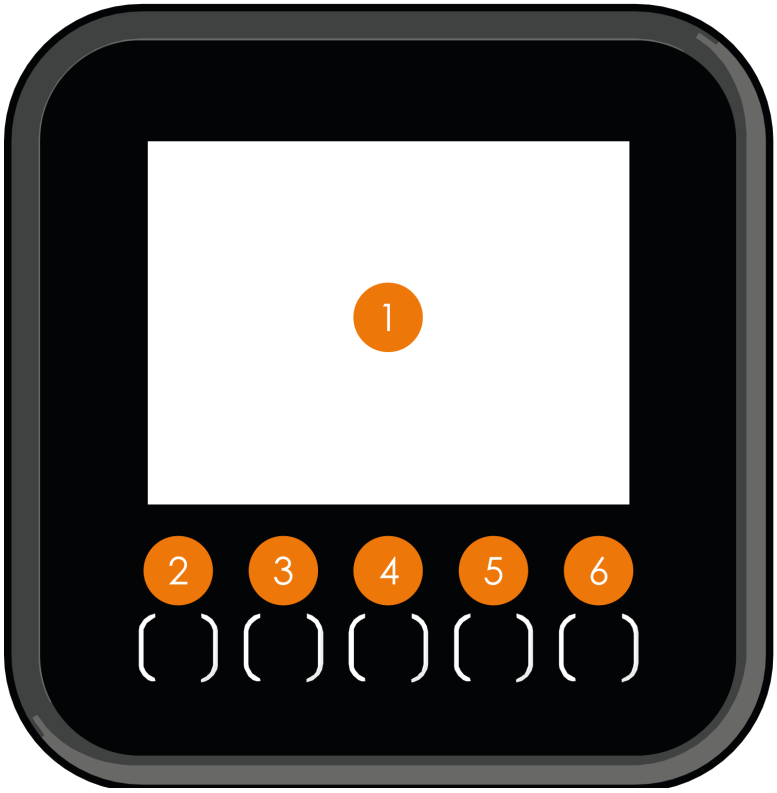


Figure 9 - Button functions

No.	Description
1	Screen - displays information
2	Minus button - press to switch between options of highlighted icon, this button also activates the DPF (Diesel Particulate Filter) forced regeneration sequence, or reduces engine speed
3	Left button - press to navigate left through the on-screen icons and reset the fuel counter to zero
4	Menu button - press to cycle through screens, press and hold to return to the home screen
5	Right button - press to navigate right through the on-screen icons and reset the timer to zero
6	Plus button - press to switch between options of highlighted the highlighted icon, this button also inhibits the DPF regeneration sequence. When in TR mode pressing the button increases the engine speed, when in ST mode pressing the button toggles between high and low engine speed

1.10.2 NAVIGATION

This section describes how to navigate within the software.

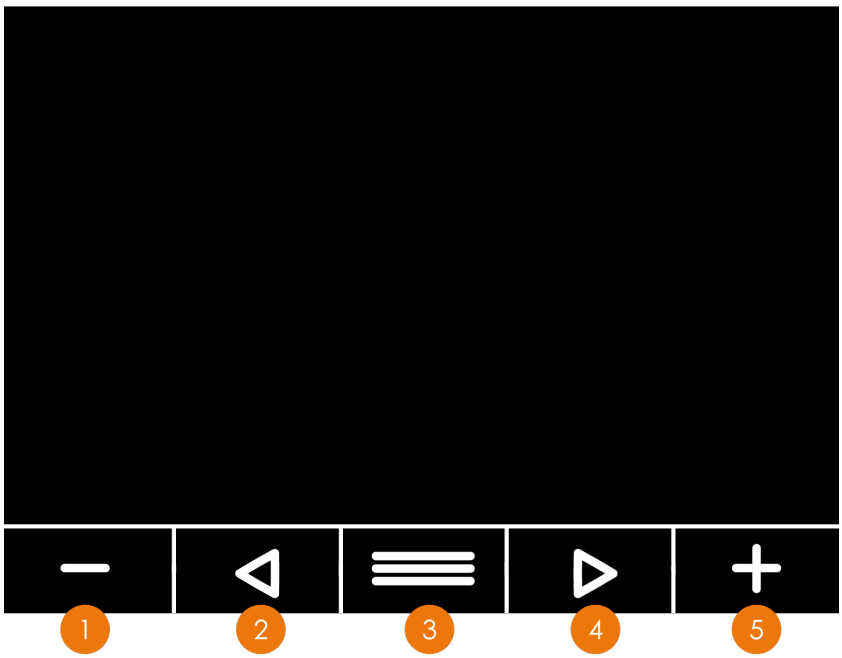


Figure 10 - Screen navigation

No.	Description
1	Minus button - when an icon is highlighted, press this button to navigate left through the icons options
2	Left arrow - use this button to navigate left through the icons on the screen
3	Menu - use this button to cycle through all screens on the control screen
4	Right arrow - use this button to navigate left through the icons on screen
5	Plus button - with an icon highlighted, press this button to cycle right through the icons options

1.10.3 HOME SCREEN

The home screen displays by default once the machine is powered on. On the home screen you can see the actual engine speed, the target speed of the flywheel, the amount of fuel used and the engine running time since the last manual reset.

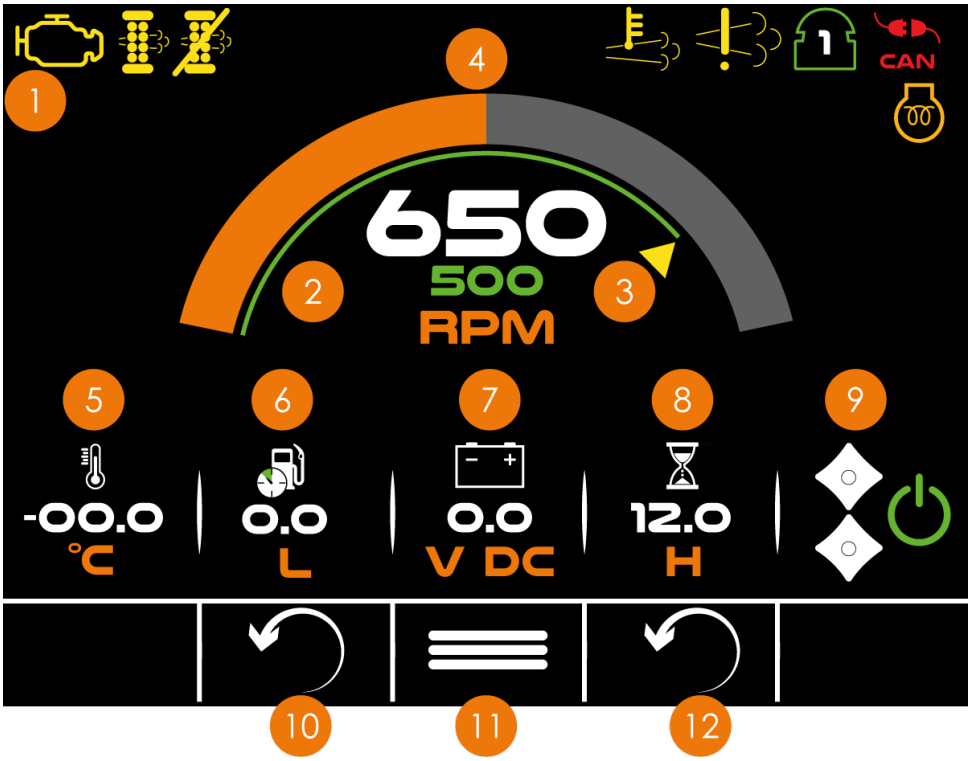


Figure 11 - Home screen

No.	Description
1	Warning icons - these display if the machine has a fault
2	Actual speed - displays the actual engine speed
3	Target speed - displays the engine target speed
4	Flywheel speed - displays the actual flywheel speed
5	Thermometer - displays the air temperature
6	Fuel - displays the fuel consumed since the last manual reset
7	Battery - displays the battery voltage
8	Hours - displays the hours since last manual reset
9	Feed rollers - displays if feed rollers are active
10	Fuel reset button
11	Menu button
12	Hour reset button

1.10.4 SENSORS AND DPF

The sensors and DPF page displays the sensor and DPF status. If a sensor is tripped the corresponding icon will illuminate or extinguish.

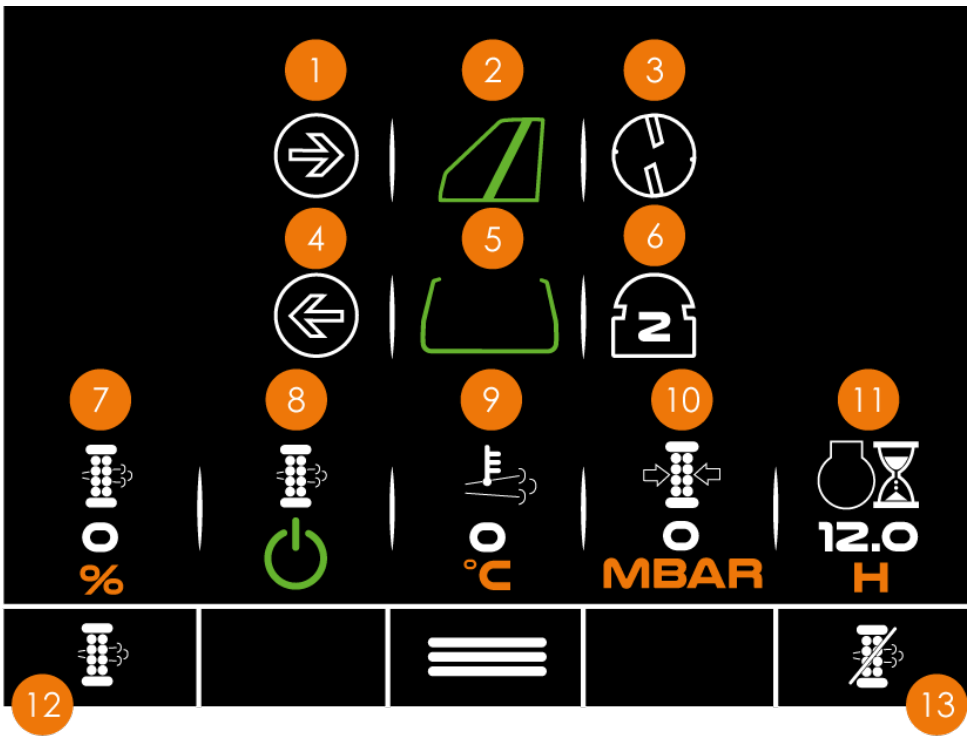


Figure 12 - Sensors and DPF screen

No.	Description
1	Forward button sensor - while this is active the icon illuminates green
2	Tray sensor - if the tray is down the icons illuminates green
3	Flywheel sensor - every time a spoke passes the sensor, the icon flashes green
4	Reverse button sensor - while this is active, the button illuminates green
5	Stop bar sensor - if the stop bar is pressed the icon illuminates white
6	E-Stop sensor - The E-Stop illuminates green when pressed, red if there is a fault and the number indicates which E-Stop has been pressed
7	Soot percentage - displays how much soot is in the system
8	Regen active - the power icon illuminates green when the system regeneration is active
9	Exhaust gas temperature- shows the temperature of the exhaust gas
10	DPF pressure differential - displays the pressure in the DPF system
11	Engine hours - displays the total amount of engine hours
12	Forced regeneration - press the button below this icon to force the machines DPF system to regenerate
13	Inhibit regeneration - press the button below this icon to prevent the DPF system to regenerate

1.10.5 MACHINE INFORMATION

This screen displays all of the machines information such as its engine type and how many spokes it has. By default all features in this screen are locked and any changes to these settings are password protected. Only qualified Först service personnel should change any settings in this screen.

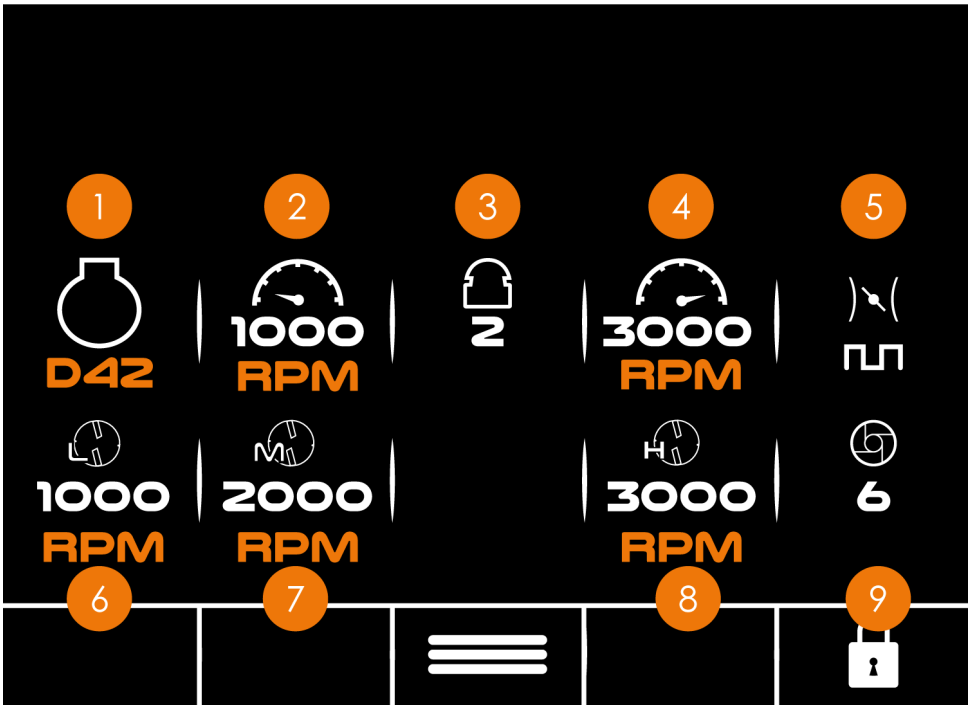


Figure 13 - Machine information screen

No.	Description
1	Engine type - Displays the engine type of this machine
2	Min RPM (Revolutions per minute) - displays the idle speed of the engine with the throttle on its lowest setting
3	E-Stop count - display show many E-Stops are on this machine
4	Max RPM - Displays the maximum speed of the engine with the throttle in its highest setting
5	Throttle type - displays the throttle type on this machine
6	Flywheel low threshold - displays the lowest chipping threshold
7	Medium threshold - displays the medium chipping threshold
8	High threshold - displays the highest chipping threshold
9	Spokes - displays the number of spokes the machines flywheel has

1.10.6 ACTIVE ENGINE CODES (DM1)

This screen displays any active fault codes. If your machine has a problem, the corresponding fault code displays on this screen. If this happens contact Först service personnel and quote the error code shown on this screen when asked.

You can navigate to this screen by pressing the menu button until the screen appears.

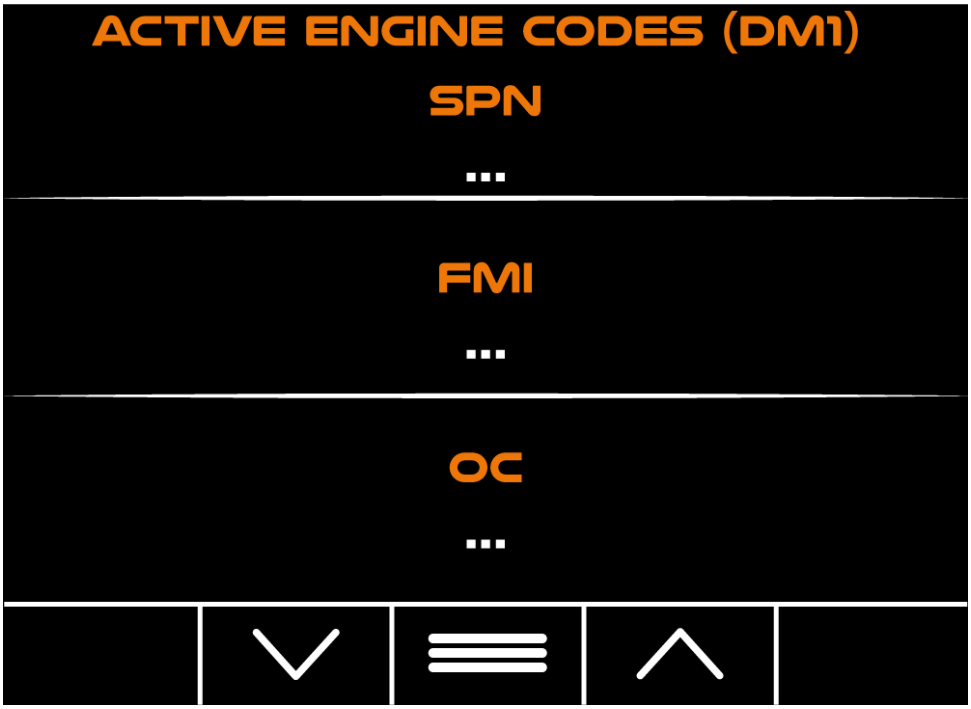


Figure 14 - Fault screen DM1

1.10.7 HISTORIC ENGINE CODES (DM2)

this screen displays archived fault codes. Först service personnel may need to access this information to see a full history of your machine.

You can navigate to this screen by pressing the menu button until the screen appears.

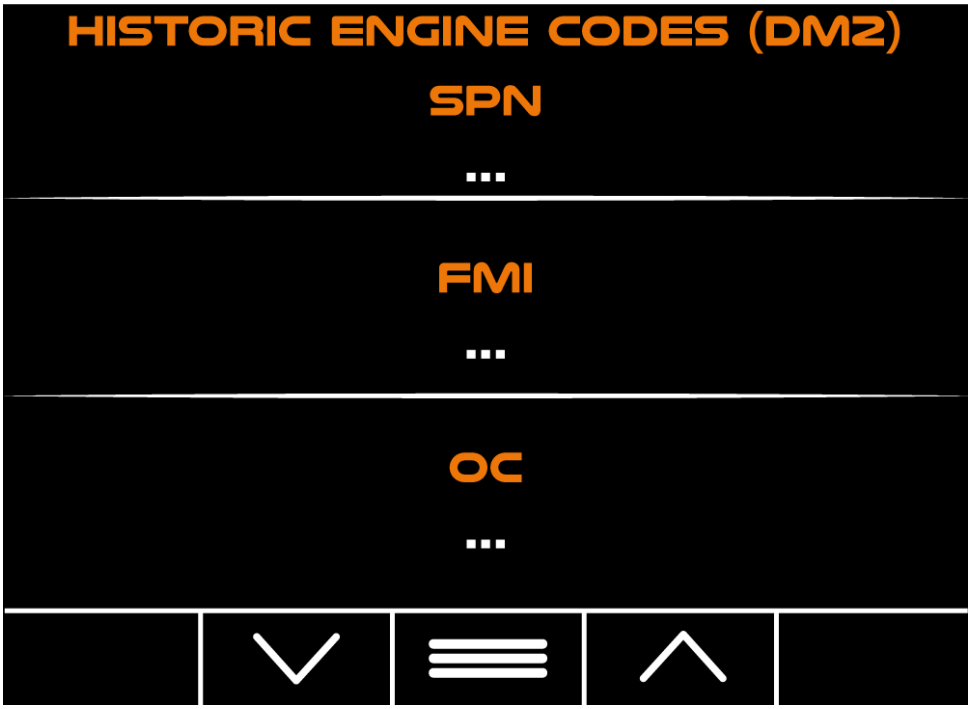


Figure 15 - Fault screen DM2

1.10.8 SETTINGS

In this screen you can adjust the pressure unit type, fuel unit type and the screen brightness.

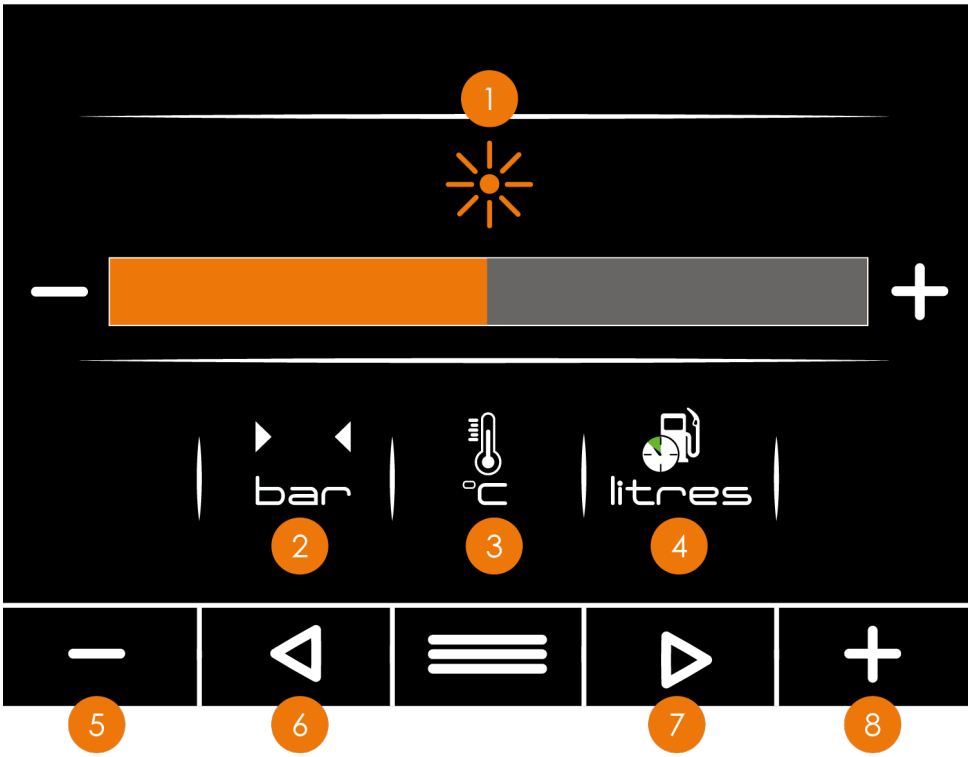


Figure 16 - Settings screen

No.	Description
1	Brightness - displays the current brightness level
2	Pressure unit - displays the unit of pressure you have selected
3	Temperature unit - displays the unit of temperature you have selected
4	Fuel unit - displays the unit of fuel you have selected
5	Minus button - with an icon highlighted, press the button to cycle through unit types
6	Left arrow - use this button to navigate left through the icons on screen
7	Right arrow - use this button to navigate right through the icons on screen
8	Plus button - with an icon highlighted, press this button to cycle through the unit types

1.10.9 ALARM SPLASH SCREEN

If there is an alarm, the alarm splash screen appears. The screen shows details about the alarm Contact Först service personnel immediately and describe the alarm message displayed on screen.

To exit this screen, press the menu button, this will take you back to the home page.

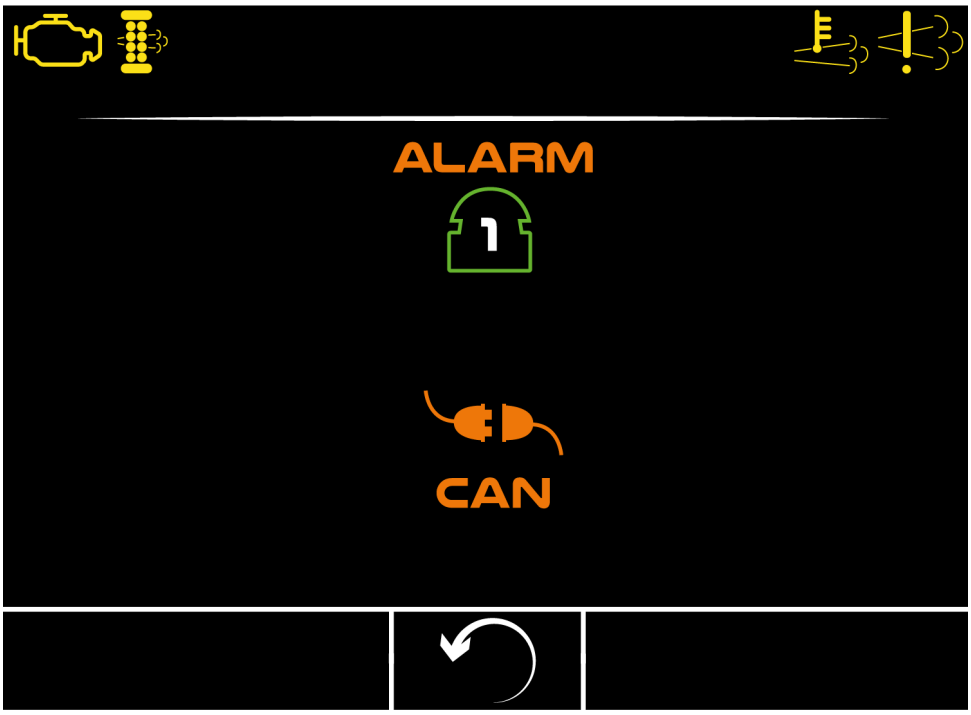


Figure 17 - Alarm screen

1.11 IGNITION SWITCH

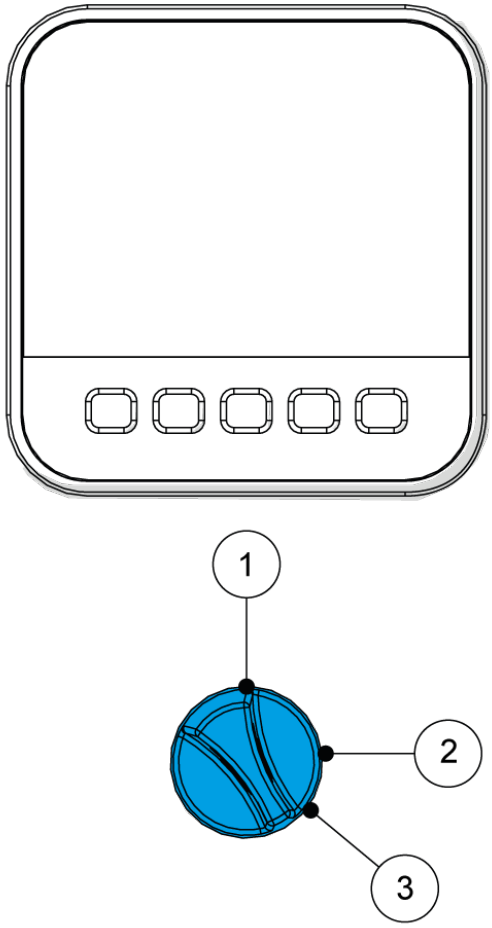


Figure 18 - Ignition switch

Off position (1, Figure 18)

This is the normal position when the machine is not in use.

On position (2, Figure 18)

This is the normal operating position. All electrical systems are on.

Start position (3, Figure 18)

This is the position for starting the engine. The key should be released from this position as soon as the engine starts.

1.12 MANUFACTURER'S STATUTORY PLATE

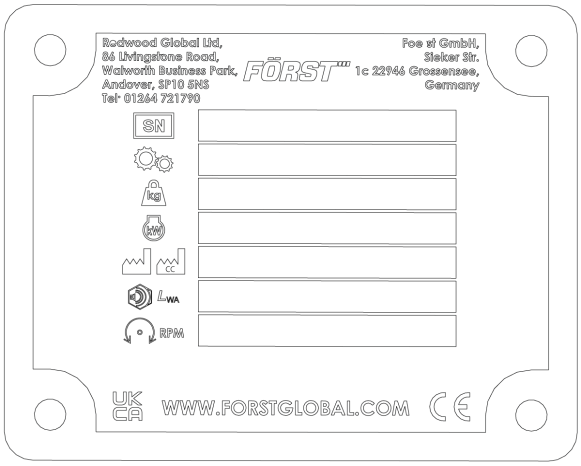


Figure 19 - Manufacturer's statutory plate

Information on the Manufacturer's Statutory Plate in line order from top to bottom is as follows:

- Manufacturing company and address
- Serial Number
- Machine designation
- Mass
- Power of prime mover
- Year of manufacture
- Sound power level
- Drive rotation and speed
- Website and CE Mark

1.13 VEHICLE IDENTIFICATION NUMBER (VIN) PLATE

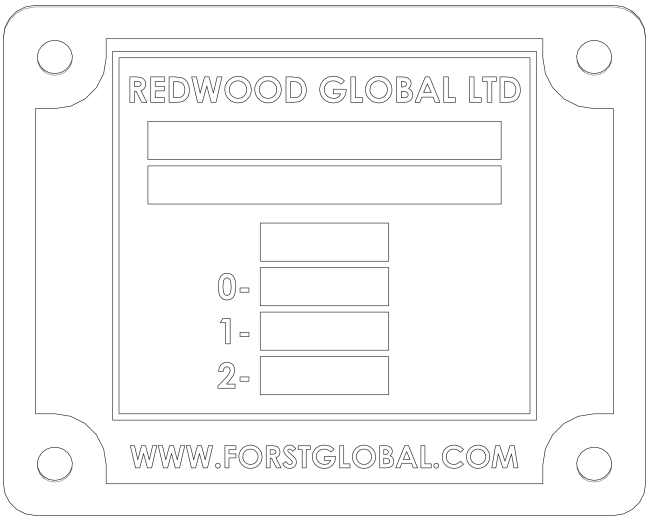


Figure 20 - Vehicle identification number

Information on the VIN Plate in line order from top to bottom is as follows:

1. Manufacturing company
2. Vehicle type approval number
3. 17-digit Vehicle Identification Number (VIN) construction
4. Gross Vehicle Weight (GVW)
5. 0- Nose weight
6. 1 - Axle 1 mass
7. 2 - Axle 2 mass

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CHAPTER 2: SAFETY INSTRUCTIONS

In this chapter:

2.1 SAFE WORKING

Before using this machine, make sure that you are trained and competent in its operation.

- Know the location of and how to use all the safety features.
- Know how to control the feed and stop the machine in an emergency.
- Be familiar with the hazards and safe working practices to prevent injury, damage to property, and machine.
- Also, be aware of the legal restrictions for personnel and towing with vehicles.

DANGER
NEVER operate the machine without the discharge chute attached. Doing so could result in serious injury.

DANGER
ALWAYS load wood from the sides of the hopper and never directly behind it.

WARNING
Only suitability trained or qualified personnel must operate this machine.

- Operators and service personnel must be above the minimum school leaving age (MSLA).
- Do not let anyone operate or service the machine who has not been fully trained.

WARNING
Always wear suitable personnel protective equipment (PPE) when operating the woodchipper machine.

Recommended PPE:

- Chainsaw safety helmet (EN 397) with mesh visor (EN 1731)
- Correctly rated ear defenders (EN 352)
- Work gloves with elasticated wrist bands (EN388)
- Steel toe cap boots (EN 345-1)
- Close fitting heavy duty non-snag clothing. High visibility clothing (EN 471), if needed

Avoid:

- Wearing rings, bracelets, watches or jewellery

WARNING
When the machine is In use, woodchip and debris are ejected with considerable force from the chute.

- Make sure the discharge chute directs woodchip in a safe direction to avoid injury or property damaged

WARNING
Keep children and animals away from the working area.

WARNING
Protect breathing with a face mask if appropriate. Some plant material can give off harmful dust and poisonous vapours. This may cause respiratory problems or serious poisoning. Check the material to be processed before starting.

WARNING
All personnel operating or feeding material into the machine must wear heavy duty non-snag clothing to help prevent being caught on material and drawn into the machine. The feed mechanism of this machine uses high powered hydraulic motors to drive sharp toothed rollers that feed material into the cutting blades. **DO NOT** take risks with it.

WARNING
Never climb onto the hopper area while the engine is running. If access is required for maintenance or to clear blockages:

- Stop the engine
- Remove the ignition key

WARNING
Never assist any material into the feed rollers with hands or feet. Use the wooden paddle or further long material if necessary.

WARNING
Material can be forcibly ejected from the hopper towards the operator. Make sure full head and face protection is worn.

WARNING
Very twisted material should be trimmed into manageable pieces. Failure to do this can result in material extending outside the hopper, moving aggressively side-to-side creating a hazard to the operator.

WARNING
Keep hands and feet outside the hopper. Do not attempt to force material into the machine by hand – use a piece of wood if necessary.

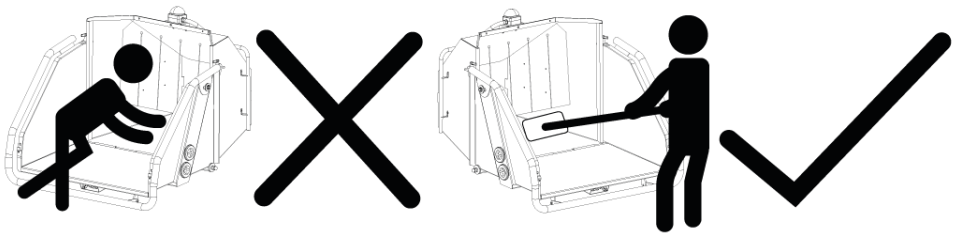
WARNING
Keep all guards and shields around any moving parts in place while the machine is operational.

WARNING
Do not remove, jam, disable or otherwise impede the effectiveness of any stop and reset controls.

WARNING
Do not position the machine in such a way that the in-feed chute is lower to the ground than the rest of the machine.

WARNING
Do not operate the machine inside a building or structure.

WARNING
Stay clear of chipping area while machine is operational.



CAUTION
When operating the machine, be aware of your surroundings and work in a safe location.

- Position the machine:
  - on as firm a surface as possible and stabilise the machine
  - so that operators do not have to stand on embankments/slopes when feeding material into the machine
  - furthest from any local danger. For example, when working next to a road, position the machine on the road verge
  - away from drains and manhole covers
- Make sure the machine cannot move or topple when in use. If necessary, chock the wheels
- Do not use the machine in poor visibility or insufficient light
- Make sure ventilation is adequate and any exhaust fumes are vented into open air if working in an enclosed space
- Create a 10m exclusion zone around the woodchipper machine while machine is in operation On all reasonably foreseeable approaches to the work-site, erect warning and prohibition signs conforming to the Health and Safety (Safety Signs and Signals) Regulations 1996, indicating a hazardous work site and that unauthorised access is prohibited. In areas of very high public access, additional controls (e.g. barrier tape, barriers, extra manning) may be required
- A Code of Practice Make sure all operations near to highways are adequately signed with the appropriate notices as specified in the Department of Transport's Safety at street works and road works: A Code of Practice
- Make sure the discharge chute is positioned to prevent chips being blown onto the highway during roadside operations or in any direction where they can affect colleagues or members of the public
- Keep the work area free of material build up

NOTICE
If you are operating the machine outside the United Kingdom please refer to in-country safety standards.

CAUTION
Do not try to force material over 150mm in diameter into the machine.

2.2 GENERAL SAFETY

DO stop the machine before making any adjustments, refuelling or cleaning.

DO make sure all moving parts in the machine have stopped. Remove the ignition key before starting any maintenance or when the machine is left unattended.

DO make sure that the machine is level, well supported and cannot move during use.

DO run the machine at maximum throttle.

DO conduct regular machine checks for visual fluid leaks.

DO take regular breaks. Wearing protective equipment can be hot and tiring leading to a lack of concentration, increasing the risk of having an accident.

DO keep hands, feet and clothing out of the feed area, discharge chute and moving parts.

DO remove any debris attached to the wood, such as nails, wire or mesh before commencing work.

DO NOT use machine in poor visibility or insufficient light to see clearly.

DO NOT use or attempt to start the machine without the discharge chute or guards correctly and securely fitted.

DO NOT stand directly in front of the in-feed hopper when using the machine. Stand to one side.

DO NOT allow the following to enter the machine as damage is likely:

BRICKS	METAL
STRING	GLASS
CLOTH	RUBBER
PLASTIC	ROOTS
STONES	BEDDING PLANTS

DO NOT stand in front of the discharge chute.

DO NOT smoke when refuelling. Fuel is highly flammable and explosive in certain conditions.

DO NOT let anyone who has not received instruction, operate the machine.

DO NOT climb on the machine at any time except for the ride on plate fitted to tracked machines

DO NOT handle material partially engaged in the machine while in operation.

DO NOT touch any exposed wiring while the machine is running.

2.3 NOISE TEST INFORMATION

Machine ST6D42

Notes Tested chipping 50 x 50mm pine or an equivalent type of timber 4m in length.

Noise levels above 91dB will be experienced at the working position and within a metre radius. Operators and personnel within a metre radius must wear appropriate ear protection at all times while machine is in operation to prevent the risk of hearing damage.

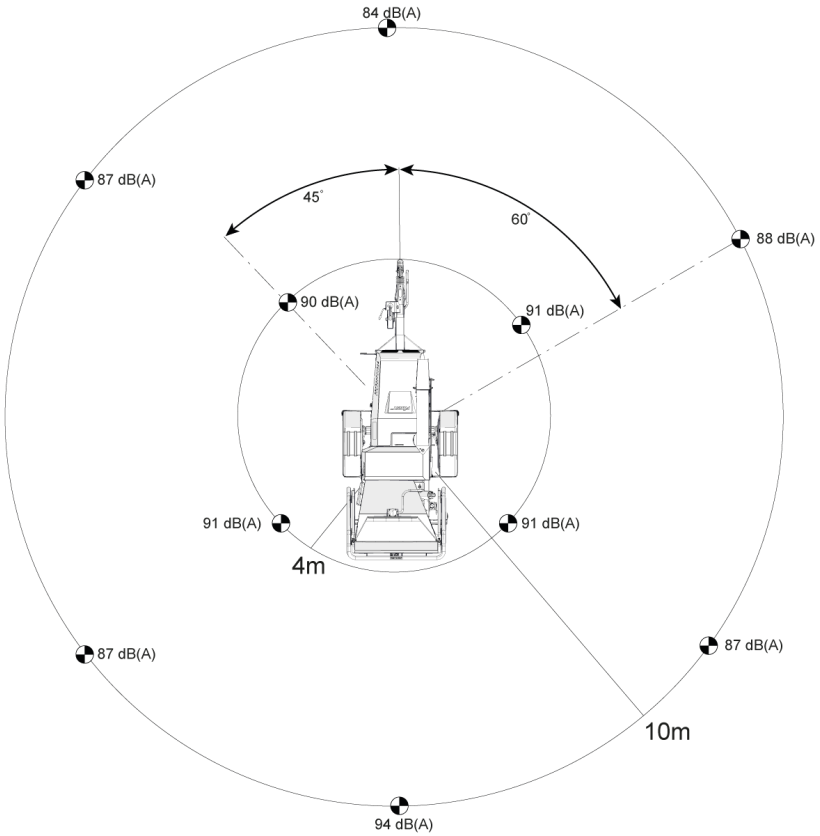


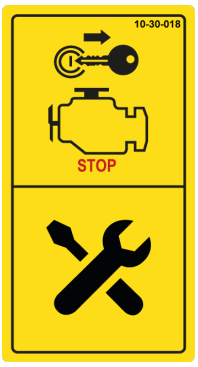
Figure 21 - Test results

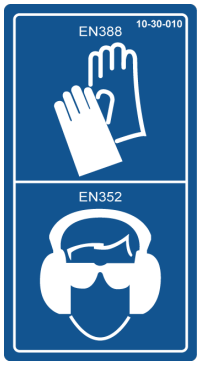
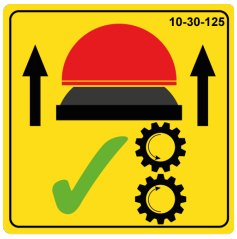
A-weighted emission sound pressure (beside operator's ear) LpA = 106.3 Peak C-weighted instantaneous sound pressure (beside operator's ear) LCpeak = 128.4 dB(C). Results at 10 metre radius are calculated.

Guaranteed sound power: 118dB(A)

As required by Forestry machinery - Wood chippers – Safety BS EN 13525 and in line with Machinery Directive 2006/42/EC.

2.4 DECALS

Decal	Description	Decal	Description
	CE (Conformité Européenne or European Conformity) mark. Manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environment protection legislation.		Ensure that all rotating parts have stopped before maintenance
	Warning: Risk on access to the infeed and/or chipping components (cutting, crushing and entanglement)		Warning: Risk of being pulled into the infeed mechanism. Warning: Stay within the designated manual loading area when feeding the chipper. Warning: Do not climb into the infeed chute
	Warning: Read the operators manuals before working on the machine		Turn the feed roller controls to 4.5 for optimal results when chipping leafy material.

Decal	Description	Decal	Description
	Use only close fitting gloves, suitable hearing protection and eye protection to protect against the risk of ejected material.		Apply 2x parts of grease to each grease nipple once a week.
	Tighten the flywheel nuts to 310Nm. Warning: danger of cutting		Warning: Do not run the engine with the discharge chute removed.
	Use only Diesel EN590 fuel for this machine		Pull the E-Stop up to engage the feed rollers if feed rollers are stopped.

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CHAPTER 3: TRANSPORTATION AND STORAGE

In this chapter:

3.1 CONNECTING TO THE TOW VEHICLE

NOTICE
When the machine is not connected to a tow vehicle, make sure:

- The handbrake is applied
- Secure the machine is place by using chocks behind each wheel

WARNING
Make sure there is enough space behind the machine when parking. The machine can roll back 25-30 cm.

1. Lift the machine hitch by turning the jockey wheel handle anticlockwise until the hitch tow head is above the height of the vehicle ball hitch.
2. Make sure the vehicle ball hitch is greased and reverse the vehicle until the ball hitch is directly below the machine tow head.
3. Attach the breakaway cable to a suitably strong point on the vehicle (Figure 22).

CAUTION

- The breakaway cable must pass correctly through the cable guide space
- The breakaway coupling cable must not wrap around the jockey wheel

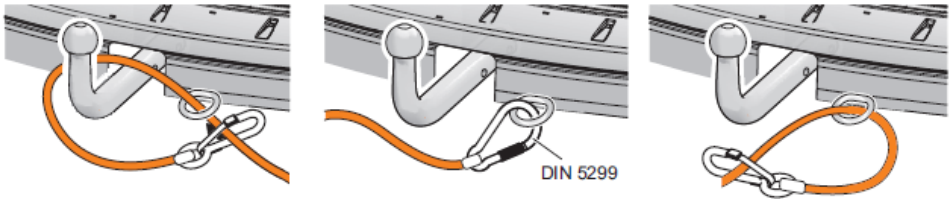


Figure 22 - Breakaway cable

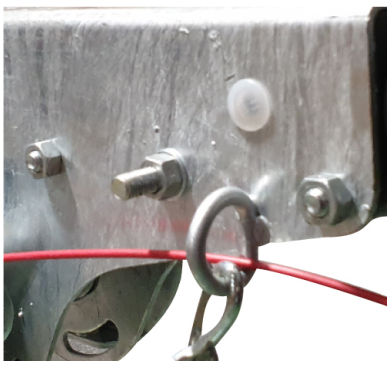


Figure 23 - Breakaway cable guide

4. Release the barrel lock.
5. Hold the handle on tow head, squeeze the catch (1, Figure 24) with your forefinger and lift the handle.

6. Wind the jockey wheel handle clockwise to lower the tow head onto the ball hitch.
7. Release the tow head handle and continue to wind the jockey wheel handle clockwise. The tow head should snap into place on the ball hitch. If it doesn't, repeat the previous two steps.

NOTICE
The ball hitch is fully inserted and secure when the handle returns to the horizontal position and the green indicator is visible.

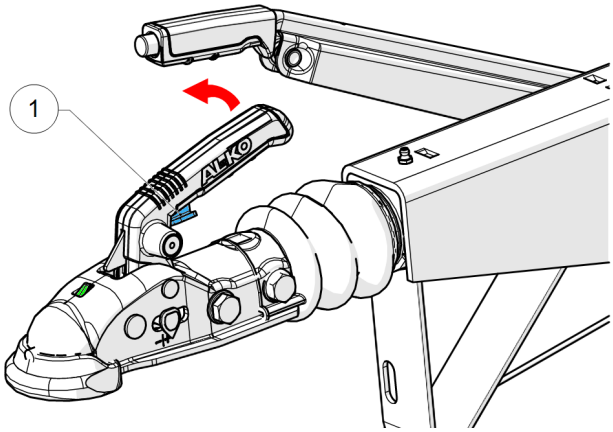


Figure 24 - Tow hitch handle

8. Wind jockey wheel up until fully retracted and the jockey wheel frame is seated in its notch on the stem. The machine's weight should be fully on the vehicle.
9. Release the jockey wheel clamp and slide the jockey wheel assembly fully up, then tighten the clamp.
10. Check that the wear indicator (1, Figure 25) is on the positive side of the limit mark (2, Figure 25).

WARNING
If the wear indicator is on the negative side of the limit mark, either the machine tow hitch or vehicle ball hitch have worn past their safe limit. Correct the defect before you tow the machine.

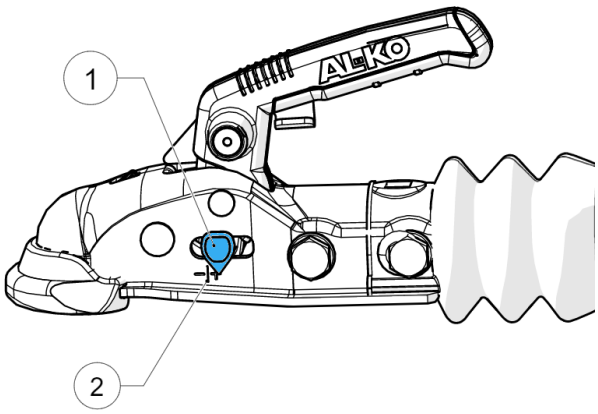


Figure 25 - Tow hitch wear indicator

11. Insert the barrel lock for security.
12. Connect the machine trailer extension plug into the vehicle trailer socket.
13. Check all machine lights and tow vehicle lights are working correctly.
14. The machine is now correctly connected to the tow vehicle.
15. Release the handbrake.
16. Remove the chocks.

3.2 TOWING THE MACHINE

1. Make sure that the machine is in transportation mode before departing:
   a. Hopper tray is closed in the up position and the locking latch is fully engaged.
   b. The discharge chute is securely fixed at the inboard position.
   c. The jockey wheel is up, fully retracted.
   d. The handbrake is released.

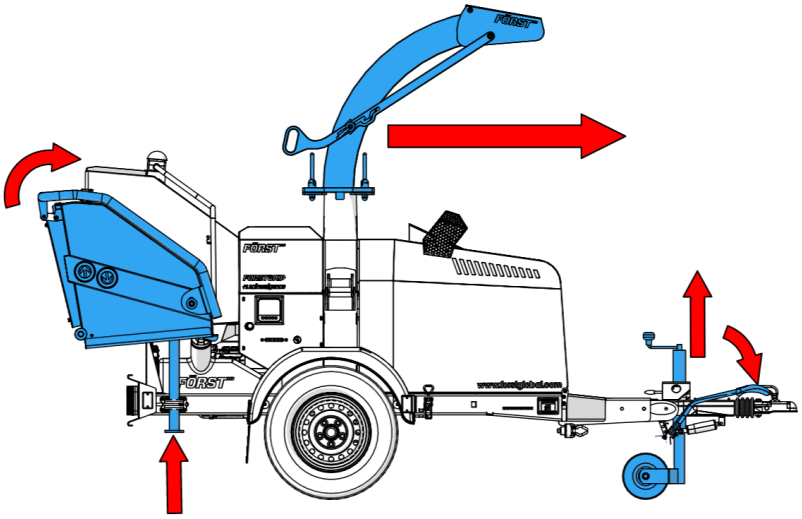


Figure 26 - Tow position

2. When towing the machine, obey the maximum legal towing limit for your country.
3. On very rough and uneven road surfaces, reduce the speed to protect the machine from undue vibration.
4. When off road:
   a. Avoid objects that may collide with the underside of the machine
   b. Avoid steep gradients
5. Avoid excessively pot holed ground.
6. Exercise extreme caution when reversing the machine as the short wheel base will react quickly to steering.
7. Clear the machine of any loose wood chip material before departing.
8. Keep tyre pressures inflated to 2.8 Bar or 41 psi.

3.3 DISCONNECTING FROM THE TOW VEHICLE

WARNING
Make sure there is enough space behind the machine when parking. The machine can roll back 25-30 cm.

CAUTION
Make sure that the jockey wheel is fastened tight before unhitching the machine. A loose jockey wheel may result on the machine dropping unexpectedly.

NOTICE
Unhitch the machine **before** lifting the handbrake. Lifting the handbrake before unhitching the machine will cause the machine to roll backwards.

NOTICE
When the machine is not connected to a tow vehicle, make sure:

- The handbrake is applied
- Secure the machine is place by using chocks behind each wheel

1. Apply the handbrake.
2. Put chocks, if available, against the main wheels.
3. Release the jockey wheel clamp and slide the jockey wheel assembly fully down, then tighten the clamp.
4. Disconnect the breakaway cable from the tow vehicle.
5. Disconnect the machine trailer lighting plug from the vehicle trailer socket.
6. Release the barrel lock.
7. Hold the handle on tow head, squeeze the catch with your forefinger and lift the handle.
8. Wind the jockey wheel handle anticlockwise to until the tow head is away from the ball hitch.
9. Release the tow head handle.
10. Drive the tow vehicle clear of the machine.
11. Level the chassis by turning the jockey wheel handle clockwise or anticlockwise.
12. Insert the barrel lock for security.
13. The machine is now correctly disconnected from the tow vehicle.

3.4 MACHINE LIFTING

DANGER
The lifting eye should not be used as the single point for lifting.

WARNING
When lifting the woodchipper, be aware that the lifting eye can securely hold the woodchipper's weight only.

- Use a correctly rated safety shackle.
- Inspect the lifting eye before each use.
- Do not use the lifting eye if damaged.
- Do not use a hoist hook directly on the lifting eye.

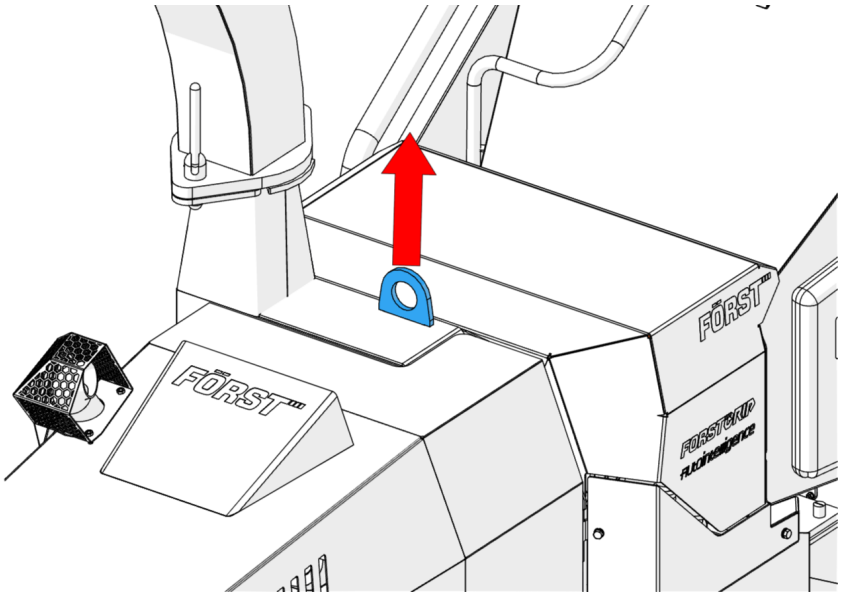


Figure 27 - Lifting eye

3.5 REMOVING THE DISCHARGE CHUTE

DANGER
Do not remove the rear clamp when removing the chute. Doing so will result in the chute falling.

The discharge chute only needs to be removed for storage and transportation purposes. Under no other circumstances should the discharge chute be removed.

1. Stop the engine.
2. Remove the ignition key and keep in a safe place.
3. Rotate the discharge chute so that it is not hanging over the machine.
4. Loosen the front chute rotation clamp by rotating the clamp lever anti-clockwise.

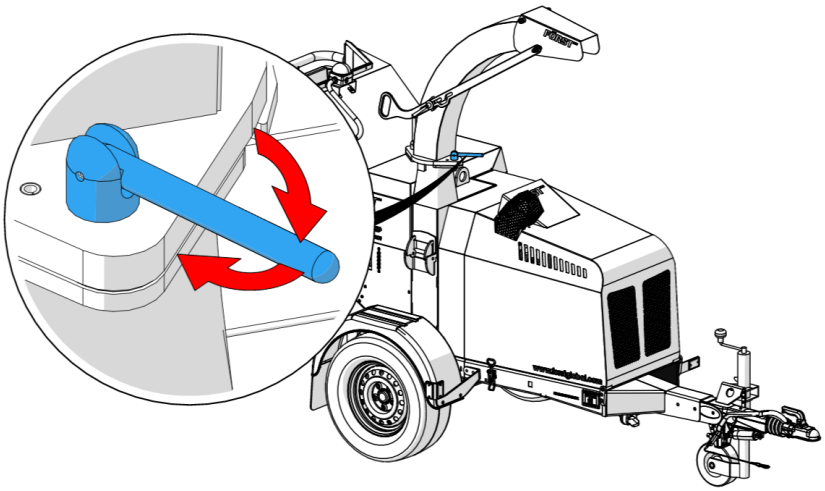


Figure 28 - Chute front rotation clamp

5. Remove both the clamp and the clamp nut and put them somewhere safe.

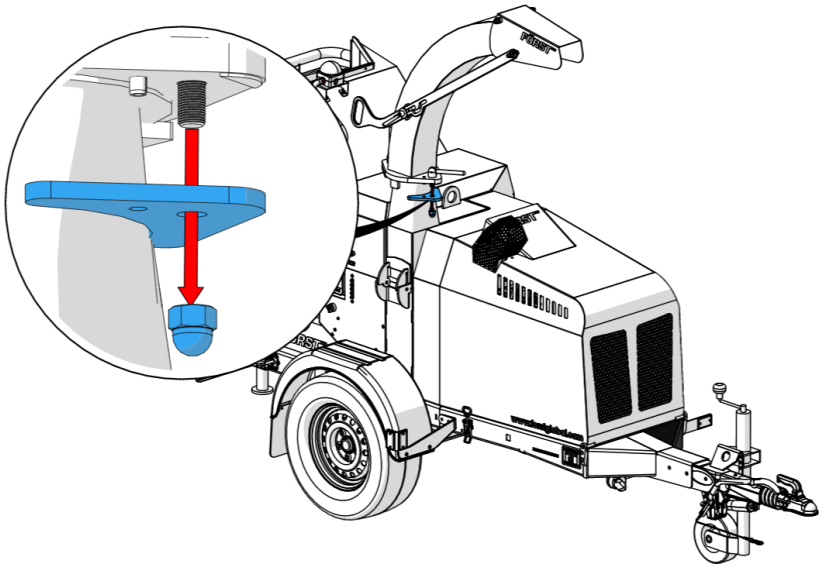


Figure 29 - Remove clamp and nut

6. Loosen the rear clamp by rotating the clamp lever anti-clockwise.

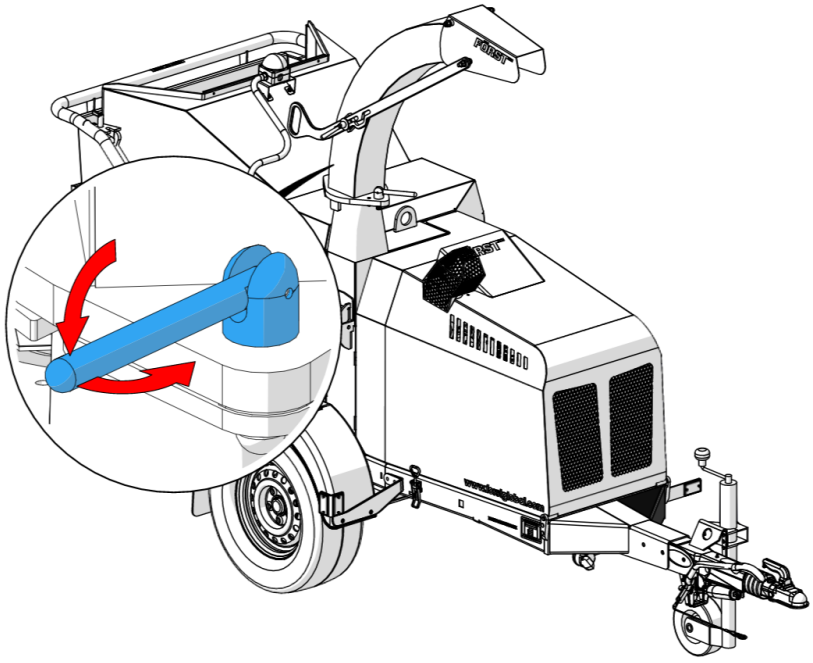


Figure 30 - Loosen the rear clamp

7. Using both hands, carefully slide the chute backwards removing it from the machine.

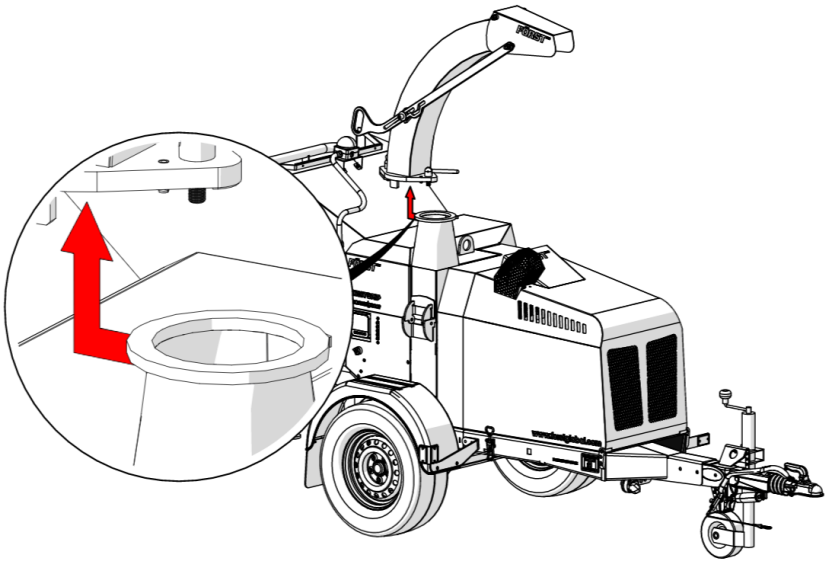


Figure 31 - Remove chute

3.6 STORAGE

If the machine will not be used for an extended period, you must store the machine correctly. If you prepare the machine carefully and apply on-going care you can prevent deterioration and damage to the machine while it is in storage.

3.6.1 PREPARING THE MACHINE FOR STORAGE

1. Clean the machine to remove all unwanted material and corrosive products.
2. Dry the machine to remove solvents and moisture.
3. Apply grease to the moving parts.
4. Examine the machine for worn or damaged parts. Replace if necessary.
5. Fill the fuel tank to prevent a build up of condensation in the tank.
6. Examine all fluid levels. Top up if necessary.
7. Disconnect and remove battery (place in suitable storage).
8. Make sure tyre pressures are correct (low pressures can result in cracks in the side wall).
9. Rotate the discharge chute so that it is positioned over the centre of the machine or remove the discharge chute.

3.6.2 PUT INTO STORAGE

1. Park the machine on solid, level ground.
   a. Park the machine in an area where it is easy to access. (In case the machine does not start at the end of the storage period).
   b. Put suitable timbers under the machine to eliminate direct contact with the ground.
2. Remove the ignition key.
3. Remove the battery.
   a. Keep the battery in warm, dry conditions.
   b. Charge the battery periodically.
4. If you keep the machine outdoors, cover the machine with tarpaulins or plastic sheets.

3.6.3 DURING STORAGE

Operate the machine functions each week to prevent a build up of rust in the engine and hydraulic circuits and to minimise the deterioration of the hydraulic seals.

1. Remove any covers.
2. Examine all fluid levels. If necessary, add more fuel.
3. Install a charged battery.
4. Start the engine.
5. Operate the feed roller controls. Make sure that the feed roller functions operate correctly.
6. Prepare the machine for storage.

3.6.4 TAKE OUT OF STORAGE

1. Remove any covers.
2. Examine all fluid levels. If necessary replace the fluid or add more fluid.
3. Check the pressure and condition of the tyres.
4. Clean the machine to remove all unwanted material and corrosive products. Dry the machine to remove solvents and moisture.
5. Install a charged battery.
6. Start the engine.
7. Operate the feed roller controls. Make sure that the feed roller functions operate correctly.

CHAPTER 4: OPERATION

In this chapter:

4.1 PREPARATION FOR USE

Do not attempt to operate a newly delivered machine before complying with the preparation for use instructions. The operator must be thoroughly familiar with the operating and safety instructions before using the machine.

General

The machine has been lubricated, adjusted and tested by the manufacturer prior to delivery; however a new unit must be properly prepared for service by carrying out the daily checks.

> NOTICE
> When the machine is new, the hydraulic oil level may drop during initial use. Regularly check the level and top-up until the level settles at the bottom of the sight glass when cold. If a top-up is required, thoroughly clean around the filler cap before removing to help prevent debris falling into the oil tank, top up as required and replace the filler cap.

4.2 POSITIONING THE MACHINE FOR USE

WARNING
Take care when lowering and lifting the hopper. Improperly handling the hopper can result in injury.

CAUTION
Obey all relevant safety warnings when positioning the machine for operation.For more information, refer to "Safety instructions" on page 43

NOTICE
Keep the machine connected to the tow vehicle during operation.

Only disconnect the machine from the tow vehicle for operation if the machine has a rear support stand that can be lowered, wheel chocks are against the main wheels and you are satisfied that the machine is stable and safe to operate.

To set up the machine for operation follow the procedure below.

1. Make sure the machine is on even, level, and stable ground.

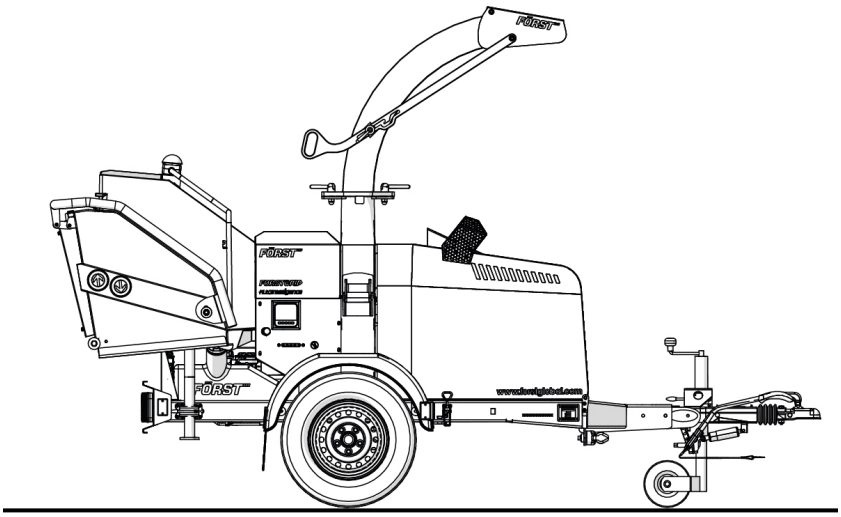


Figure 32 - Positioning the machine

2. Disengage both hopper tray locking latches (1, Figure 33).

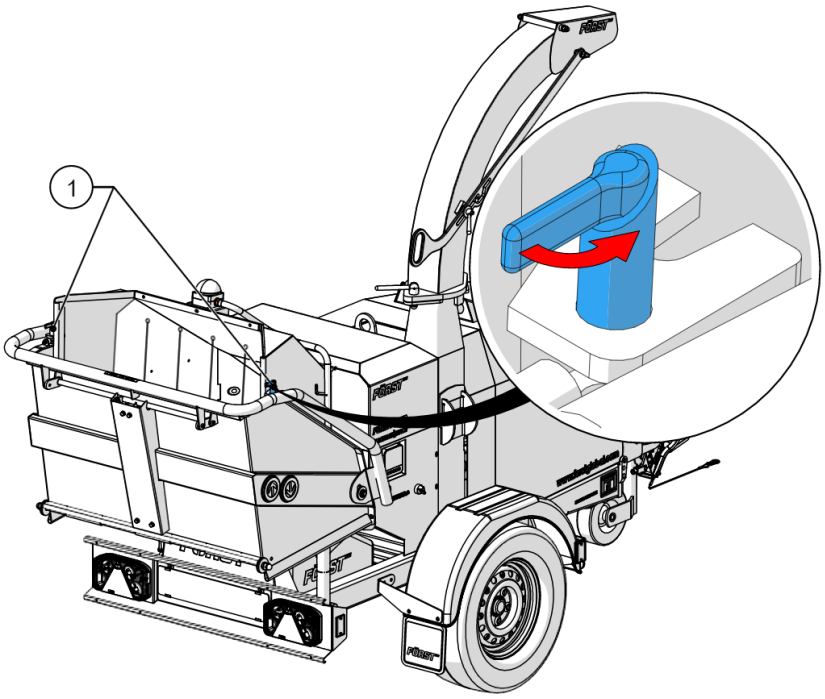


Figure 33 - Hopper tray locking latch

3. Lower the hopper tray in a controlled manner (do not drop the hopper tray).
4. Engage the locking latches, locking the hopper tray in the down position.

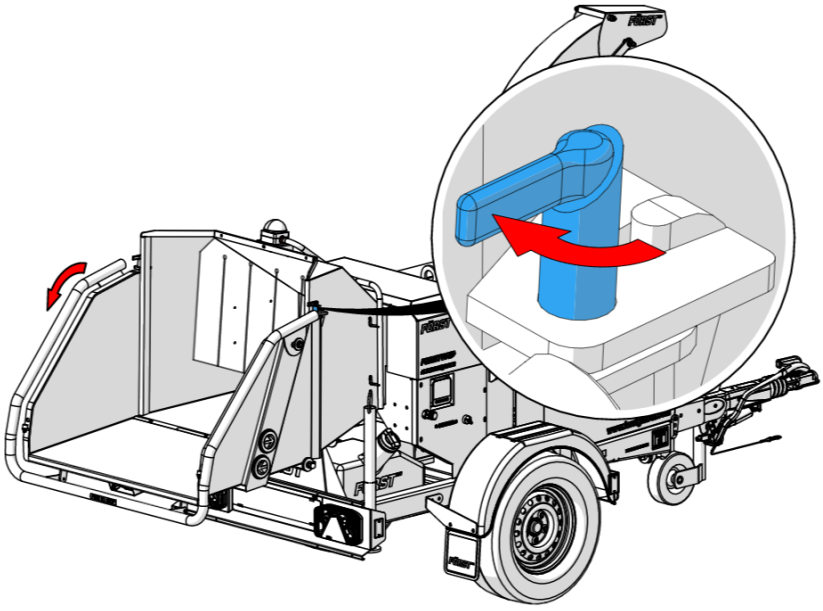


Figure 34 - Hopper tray locked down

5. Rotate the discharge chute to direct woodchip in a safe direction to avoid injury or property damaged.
6. You are now ready to start the engine.

4.3 STARTING THE MACHINE

Carry out daily checks before first use of machine everyday.

To start safely, follow the start up procedure below.

1. Insert the key into the ignition.
2. Make sure that the discharge chute is pointing in a safe direction.
3. Turn the key 90° clockwise.
   The screen switches on.

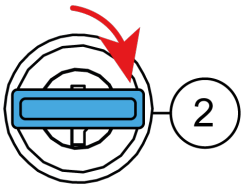


Figure 35 - Key in the ON position

4. After the screen has switched on, turn the key 45° clockwise. Hold the key in this position until the engine starts or the crank cycle finishes.

CAUTION
Do not operate the starter motor for more than 10 seconds. If the engine does not start turn the ignition key to off, wait 30 seconds, and then start the engine.

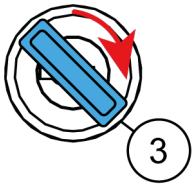


Figure 36 - Key in the engine crank position

- If the engine doesn't fire, turn the key to the OFF position and return to step 3.
- If the engine doesn't fire after trying three times, check for faults.
  ► *For more information, refer to "Troubleshooting" on page 123*

5. Once engine has started, allow the engine to idle for 30 seconds for the oil to flow around the engine before slowly increasing the speed to maximum.

NOTICE
Increase and decrease the engine speed slowly, especially during the first 50 hours of operation.

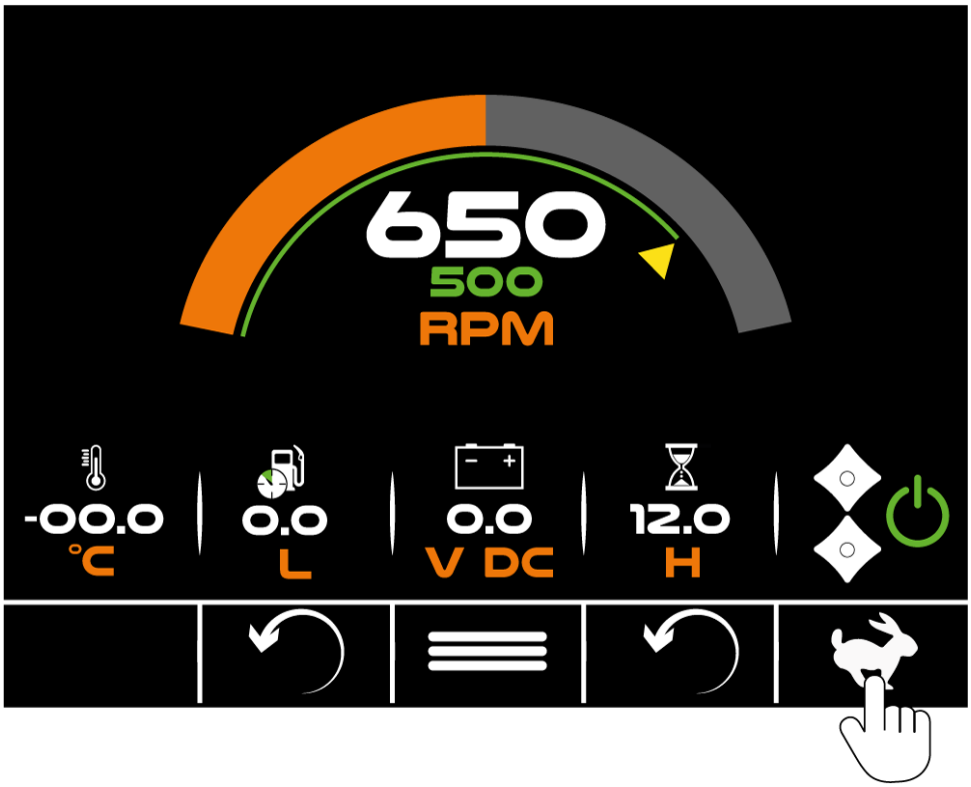


Figure 37 - Increase speed

6. Check the safety system is functioning correctly.
7. The machine is now ready for use. Wait until the engine is warm before heavy use.

4.4 SAFETY & FUNCTION TEST

The safety & function test makes sure that the safety devices and controls on the machine are working correctly.

WARNING
If any of these checks fail, turn off the machine, remove the key from the ignition switch, and contact FörstAssist.

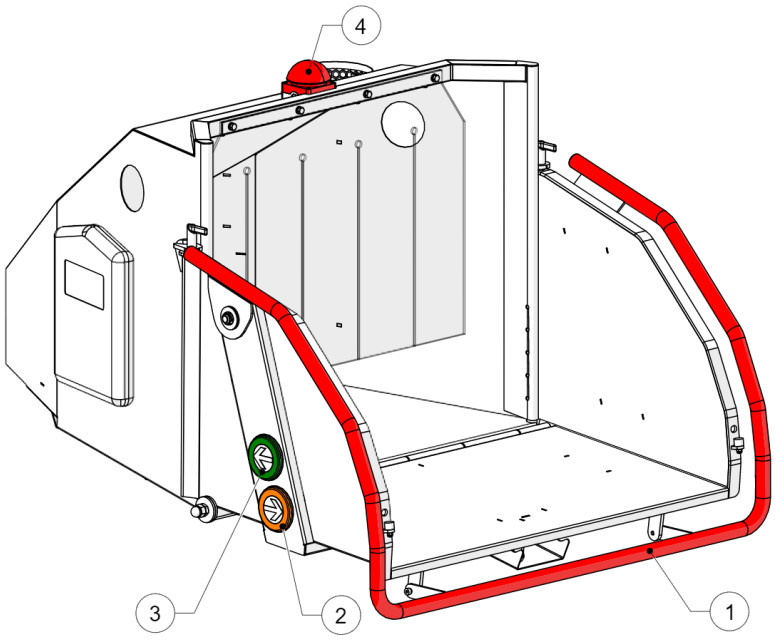
CAUTION
Faulty or malfunctioning safety devices and controls can put users at risk of injury. If the machine fails any of the safety and function checks, do not use it.

GREEN AND ORANGE HOPPER BUTTONS

Table 2 - Safety and function test

	Action	Expected outcome	
1	Visually inspect the stop bar, stop bar damper, stop bar sensor, hopper tray sensor and hopper tray buttons.	No signs of damage.	☐
2	Visually inspect the E-stops.	No signs of damage and in reset position.	☐
3	Start the engine.		☐
4	Visually inspect the hopper tray buttons.	Green button- LEDs are on when pushed. Orange button - The LEDs flash red when pushed, and are off when released.	☐
5	Push the green and orange hopper tray buttons on either side of the hopper tray.	The rollers do not turn.	☐
6	Lower the hopper tray.		☐
7	On the right-hand side of the hopper tray, do the following:		☐
	a. Push the green hopper tray button.	The feed rollers do not turn.	☐
	b. Push and hold the orange hopper tray button.	The feed rollers turn backwards continuously while held.	☐
8	On the left-hand side of the hopper tray, repeat step7		☐
9	Increase the engine speed to maximum RPM.	The speed is 1330-1360 RPM.	☐
10	On the right-hand side of the hopper tray, do the following:		☐
	a. Push the green hopper tray button.	The feed rollers turn forwards.	☐
	b. Push and hold the orange hopper tray button.	The feed rollers turn backwards continuously while held.	☐
	c. Push the stop bar.	The feed rollers stop.	☐
11	On the left-hand side of the hopper tray, repeat step 10.		☐
12	Push any green hopper tray button.	The feed rollers turn forwards.	☐
13	Reduce the engine speed to idle.	The feed rollers stop.	☐
14	Increase the engine speed to maximum RPM.	The feed rollers turn forwards.	☐

	Action	Expected outcome	
15	Turn the feed roller flow control valve between 1 and 10.	The speed of the feed rollers decreases and increases.	☐
16	Close the hopper tray.	The feed rollers stop.	☐
17	Reduce the engine speed to idle.	Allow the machine to run for 30s.	☐
18	Push the orange or green hopper tray buttons.	The feed rollers do not turn.	☐
19	Open the bonnet.	The engine shuts down.	☐
20	Close the bonnet.		☐
21	Do the following for each E-Stop button.		☐
	a. Restart the woodchipper.		☐
	b. Lower the hopper tray.		☐
	c. Increase the engine speed to maximum RPM.		☐
	d. Push any green hopper tray button.	The feed rollers turn forwards.	☐
	e. Push the E-Stop button.	The feed rollers stop or the woodchipper shuts down.	☐
	f. Reduce the engine speed to idle.		☐
	g. Reset the E-Stop button.		☐
22	Turn the key to the off position and remove it from the ignition.		☐



1 Red stop bar
2 Orange reverse button
3 Green forward button
4 E-stop

Figure 38 - Feed roller controls

4.5 FEED ROLLER SPEED ADJUSTMENT

The feed roller speed can be adjusted to suit the material being chipped, refer to Figure 39.

1. Turn dial to align number with paint spot.
2. Set the feed roller speed so that the No-Stress operates as little as possible, this will give the highest throughput.
3. When feeding Leylandii or leafy material, set the feed roller speed to **4.5**.
4. Control valve speed adjustment.

   Position indicated by paint spot. (1, Figure 39):

   - 0 = Minimum
   - 10 = Maximum

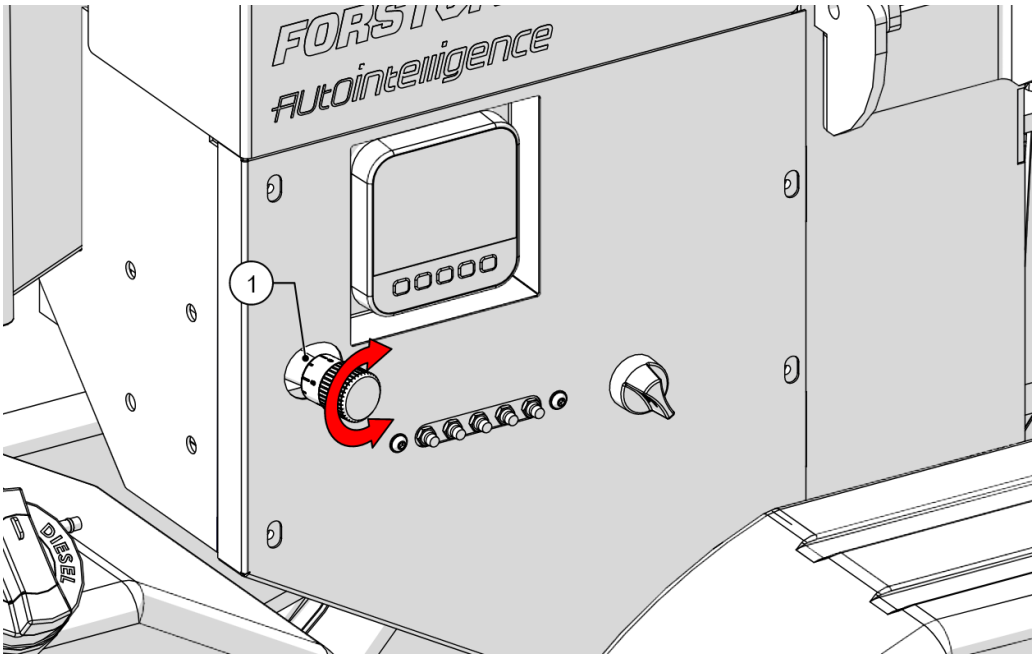


Figure 39 - Feed roller speed adjustment

4.6 SHUTTING DOWN THE MACHINE

To shut down safely, follow the procedure below.

> **NOTICE**
> Increase and decrease the engine speed slowly, especially during the first 50 hours of operation.

1. Reduce the speed to idle.

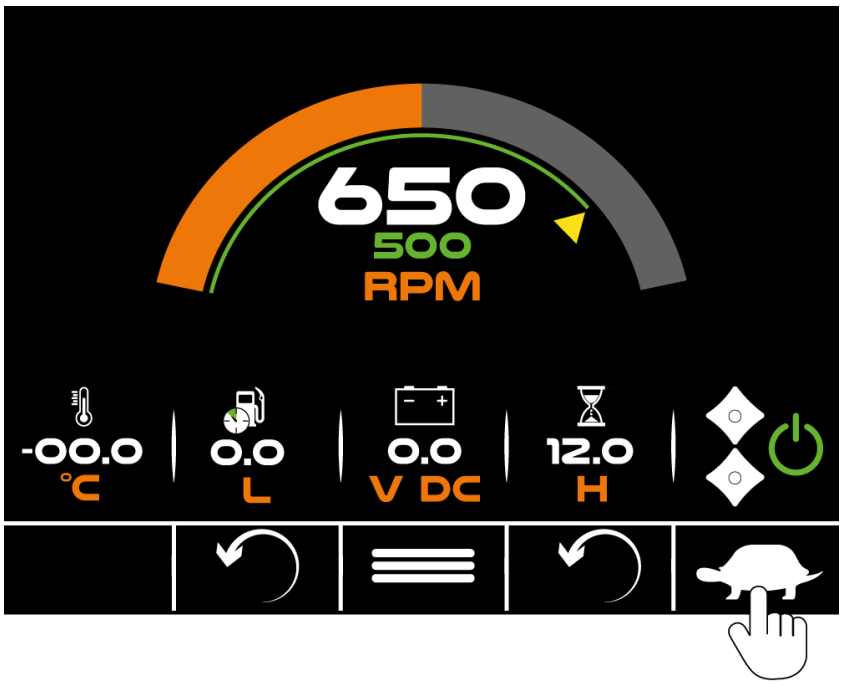


Figure 40 - Idle

2. Allow the engine to run unloaded and idle for 30 seconds.
3. Turn the key 90° anticlockwise.

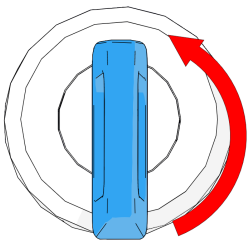


Figure 41 - Key in the OFF position

4. Wait until the engine comes to a complete stop.
5. Remove the ignition key and keep it in a safe place.

4.7 REMOVING BLOCKAGES

Be careful, whatever is fed into the machine has to come out of the discharge chute.

DANGER
Stop the engine before attempting to remove any blockages in the machine. Failure to do so may result in serious injury and loss of life.

CAUTION
Take care when clearing any blockages, potential energy in the machine can cause sudden movements between the teeth and in feed components.

CAUTION
Always monitor the woodchip flow out of the discharge chute. If the flow stops, **stop feeding material immediately**. Continuing to feed material will further compact a blockage and make it more difficult to clear.

1. Stop the engine
2. Remove the ignition key and keep in a safe place.

Check the discharge chute:

3. Remove the discharge chute.
4. Make sure that there is no blockage in the discharge chute.
   If the discharge chute is blocked, remove the unwanted material.

Check the flywheel and chipping chamber:

WARNING
When moving the flywheel in either direction, position your hands correctly to avoid injury. Position your hands as shown in Figure 42 and Figure 43.

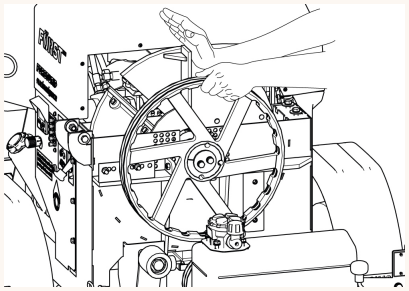


Figure 42 - Pushing the flywheel away from you

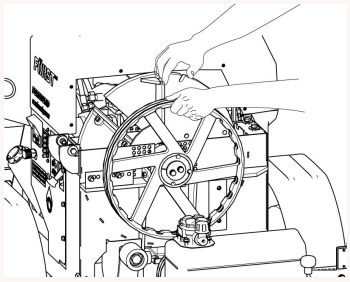


Figure 43 - Pulling the flywheel towards you

5. Check if the flywheel is free to rotate.
6. If the flywheel does not rotate freely do the following:
7. Wearing protective gloves and using a **piece of wood**, carefully clean out the chipping chamber.

Check the feed rollers:

8. Open the bonnet.
9. Open the chipping chamber cover.

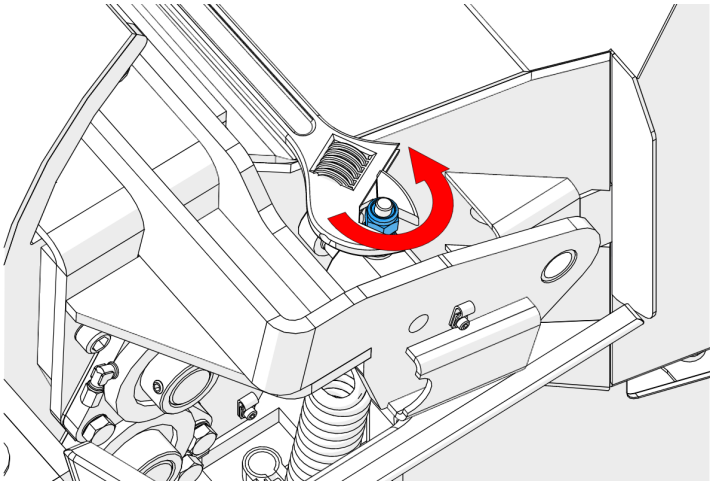


Figure 44 - Spring hanger

10. Release the feed roller spring tension on both sides. Remove the spring if necessary.
11. Put the top feed roller lifting tool (2, Figure 45) into the slot (3, Figure 45).

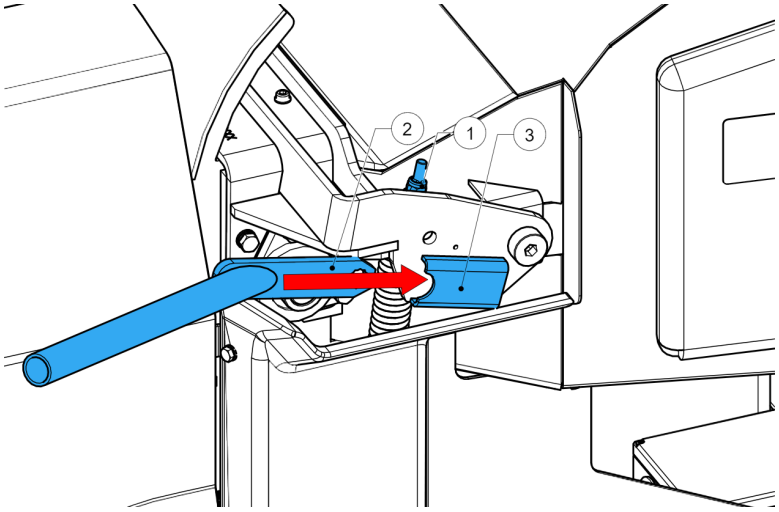


Figure 45 - Feed roller spring tension

12. Lift the top feed roller (2, Figure 46) to the fully open position.

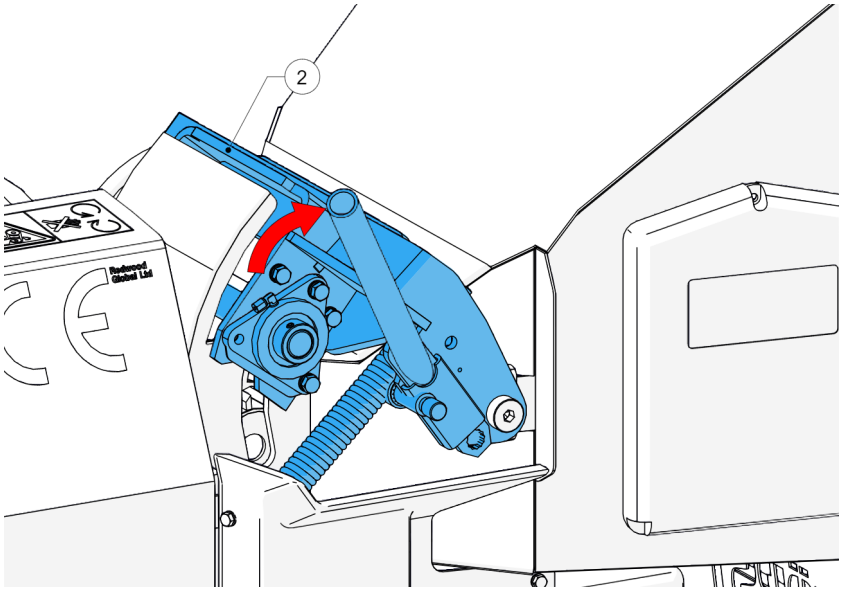


Figure 46 - Raising the top feed roller housing

13. You should now have access to the feed chamber.

WARNING
Be careful; this is the machines cutting zone. The top and bottom feed rollers have sharp teeth and, the flywheel cutting blades are not far from them. **Do not put your hands into this area**.

14. Wearing protective gloves and using a piece of wood, carefully clear the blockage from inside the feed chamber.

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CHAPTER 5: MAINTENANCE

In this chapter:

5.1 ROUTINE MAINTENANCE

WARNING
Make sure the key is removed from the ignition before commencing any service or maintenance on the machine.

NOTICE
When the machine is new, the hydraulic oil level may drop during initial use. Regularly check and top-up until the level settles. If a top up is required, thoroughly clean around filler cap before removing to help prevent debris falling into oil tank, top up as required and replace filler cap.

WARNING
Exercise extreme care to avoid injury when removing and replacing blades and anvils. The flywheel can turn creating crush and cutting points in and around the chipping chamber.

WARNING
Beware of hydraulic oil leaks, they can cause serious injury while the engine is running and the system is under pressure. A leak can easily inject high pressure oil deep into flesh and blood stream requiring immediate medical attention. **Do not check for leaks while the engine is running**. Hoses to the feed roller hydraulic motors are the most likely to become damaged as they are constantly moving during use. If hoses are replaced, all seals must be replaced at the same time.

WARNING
Damaged hydraulic hoses can cause fatal accidents. Inspect the hoses regularly. Do not use the machine if a hose or hose fitting is damaged.

WARNING
Fluid Under Pressure.
Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses and gloves. **turn off the engine before checking for leaks**. If fluid penetrates your skin, get medical help immediately.

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5.2 DAILY CHECKS

Perform the following checks before putting the unit into operational service and before each operational day.

Table 3 - Daily checks

Item	Check	Further action	✓ /✗
1	Nuts, bolts and washers secure	Visual check of all nuts, bolts, and washers for security	☐
2	Check the reflectors	All reflectors fitted and undamaged	☐
3	Check the tow hitch assembly	• Wear indicator OK when connected • Brake away cable condition	☐
4	Check the handbrake lever	Operates correctly Holds machine when applied If faulty, contact an agent	☐
5	Check the jockey wheel assembly	Free to operate correctly	☐
6	Check the lighting cable and adaptor	Undamaged	☐
7	Check all fluid levels	• Engine oil • Coolant • Hydraulic oil	☐
8	Check the radiator	Free from dirt and debris	☐
9	Check the cooling fan	Free from dirt and debris	☐
10	Proximity sensors are not damaged and work correctly	• Bonnet • Hopper tray • Stop bar	☐
11	Discharge chute	• Chute clamps – function and security • Deflector handle – fitted and secure	☐
12	Throttle	Tight enough to hold maximum RPM	☐
13	Fuel tank	Fuel level and free from debris inside	☐
14	Check the stop bar	• Free to operate • Feed rollers stop when pressed	☐
15	Check the E-Stop (if fitted)	• Free to operate • Feed rollers or engine stop when pressed	☐
16	Check the hopper tray buttons	• Free from damage • Function correctly ► *For more information, refer to "Safety & function test" on page 71*	☐

Item	Check	Further action	✓ /✗
17	Feed roller function	Feed rollers operate backwards and forwards at maximum RPM	☐
18	Check the hopper tray catches	Secure hopper tray	☐
19	Check the battery	• Terminals secure • Clamp secure	☐
20	Check the bonnet catches	• Secure • Function correctly	☐
21	Check for fluid leaks	Visual check for any fluid leaks	☐
22	Check the lights	All lights working correctly and in good condition	☐
23	Check the tyre pressure	2.76 bar (40 psi)	☐
Additional comments:			
Date of check: Individual (Print Name): Individual (Signature):			

5.3 WEEKLY MAINTENANCE CHECKS

Perform the following checks every week, or after every 8 hours of use.

Table 4 - Weekly checks

Item	Check	Further action	✓ /✗
1	Carry out all pre-use checks	►	☐
2	Grease the bearings: Five grease nipples in the grease manifold	Apply 2 pumps of grease per grease nipple. (If in a low ambient temperate, grease with engine running and feed rollers turning)	☐
3	Grease the tow hitch assembly: Two grease nipples in the tow hitch assembly	2 pumps of grease at both grease nipples	☐
4	Check for any debris accumulated around the exhaust system	Remove if present	☐
5	Check the main belt tension	Adjust if required	☐
6	Check the blade condition	Replace if required	☐
7	Check the anvils	Turn or replace if required ► *Refer to "Turning or replacing the main anvil" on page 104*	☐
8	Check the Flywheel main bearings	• Good general condition • Free from damage	☐
9	Check the pulleys and taper lock on the flywheel	• Undamaged	☐
10	Check the top feed roller spring tension	Adjust if required	☐
11	Check for any debris accumulated in the top feed roller assembly and around the assembly	Remove if present	☐
12	Check the feed roller motor mounts	Secure and undamaged Tighten if required	☐
13	Check the side panels	Behind panel is clear of debris – remove panel if required	☐
14	Check the battery terminals	Tighten if loose	
15	Visually check all electrical wiring	Cables and conduit secure and undamaged	☐

Item	Check	Further action	✓ /✗
16	Visually check all hydraulic components	• Hoses secure • All components free of leaks	☐
17	Check the safety decals	Decals are fitted, legible and undamaged	☐
18	Check the axle condition	• Wheel alignment • Axle mount condition, both sides	☐
19	Check the tyre and rim assembly	• Tyre tread depth • Sidewall undamaged • Rim undamaged	☐
20	Check the wheel nuts	Check wheel nut, tighten (100Nm)	☐
21	Check the brakes	Check that the brakes are working correctly and adjust if required	☐
22	Make sure the service schedule is up to date	Is the machine due a service	☐
Additional comments:			
Date of check: Individual (Print Name): Individual (Signature):			

NOTICE
If any fault is found, contact FörstAssist immediately.

For additional sheets go to www.forstglobal.com.

5.4 ENGINE MAINTENANCE

Please refer to the engine manual supplied with this machine for the following:

- Checking the engine oil.
- Changing the engine oil and oil filter.
- Changing the fuel filter.

5.5 ROUTINE CLEANING

5.5.1 PRESSURE WASHING

CAUTION
The engine and other components could be damaged by high pressure washing systems. Special precautions must be taken if the machine is to be washed using a high pressure system.

NOTICE
Make sure that the alternator, starter motor, electrical control box and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system. Do not aim the water jet directly at bearings, oil seals or the engine air induction and cooling system.

5.6 AFTERTREATMENT SYSTEM

5.6.1 DIESEL PARTICULATE FILTER (DPF)

The DPF (Diesel Particulate Filter) system serves to prevent particulate matter (PM) in emissions from being discharged into the air and consists of a DPF body, one exhaust gas temperature sensors, and one differential pressure sensor. The DPF is composed of a porous wall capable of filtering out particulate matter. As exhaust gas pass through the DPF to the SCR system. Following this, PM collected from the DPF is eliminated using a suitable regeneration method.

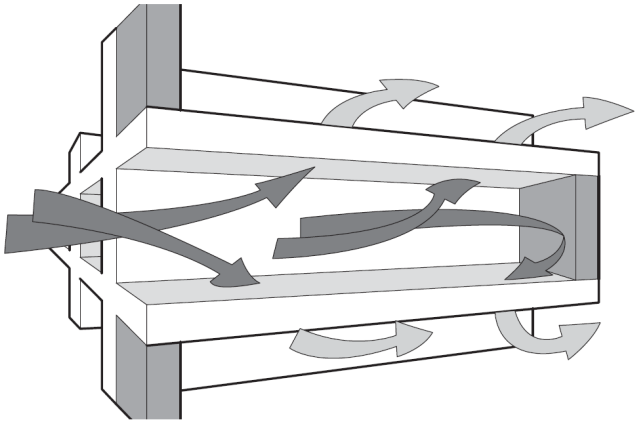


Figure 47 - DPF (Diesel particulate filter)

5.6.2 DPF REGENERATION

The DPF serves to filter out soot and ash, a contaminant found in the emissions of Diesel engines. An excessive build-up of soot in the DPF leads to issues such as a drop in engine power due to increased back pressure in the engine, making it crucial to perform regeneration in order to eliminate PM in the DPF. The ECU (Engine Control Unit) calculates the amount of exhaust smoke using the signal from the DPF differential sensor, the vehicle operating time, the vehicle fuel consumption and engine simulation data. Once this amount reaches a certain level, the ECU performs DPF regeneration.

Regeneration involves burning accumulated PM, it increases the temperature upstream of the DOC (Diesel Observation Catalyst) by means of adjustment to the engine throttle and near post injection, as well as raising the DPF temperature higher than the exhaust combustion temperature (580^{o} or higher) to burn exhaust gas by means of far post injection. After DPF regeneration, only ash remains in the DPF.

5.6.3 STAGE V DPF REGENERATION

Step	Soot Quantity	DPF Lamp	Torque de-rate	Remark
1	Below 99%	Off	No	No action (passive regeneration dependent on machine CUP)
2	100-105%	Off	No	To start active regen. With high temp. (580-640^{o}C) during running
3	106%-110%	Slow Blink	No	Forced regeneration inducement (Alarm only)
4	111%-120%	Slow Blink	Mild Torque de-rate	Forced regeneration inducement (Torque de-rate)
5	Above 120%	Fast Blink	Severe torque de-rate	Regeneration is disabled Service call needed for starting service regeneration by a service toll to release Torque de-rate

- The regeneration lamp turns on when the DPF soot level exceeds 100%
- The regeneration lamp blinks when the DPF soot level exceeds 105%
- The regeneration lamp blinks slowly, the CE lamp turns on and the engine power is reduced (25%) when the DPF soot level exceeds 111%
- The regeneration lamp blinks quickly, the CE lamp turns on and the engine power is reduced (50%) when the DPF soot level exceeds 121%

DPF regeneration consists of passive and active regeneration while driving and forced regeneration is activated manually by the operator.

When the DPF soot level is less than 105%, active regeneration is activated manually while driving. However, at 105% or higher the system notifies the operator that forced regeneration must be performed manually. At 120% or higher the engine warning light lamp turns on, engine power drops 50% and the operator must call for service.

- DPF soot level 105% or less: Active regeneration
- DPF soot level 105%-120%: Forced regeneration + decrease in engine power
- DPF soot level 105%-120%: Notify the operator that forced regeneration needs to be performed
- DPF soot level 120% or higher: Regeneration is not possible/must call for service to regeration the DPF

5.6.4 DPF REGENERATION METHODS

Stage V engines are designed to perform passive regeneration of soot accumulated in the DPF even under normal exhaust conditions without needing to be initiated by the operator. The DPF regeneration modes are divided into the following four stages depending on soot build up in the DPF.

1. Soot level 80% or less: Normal operating conditions
2. Soot level 80-100%: Automatic regeneration during operation (Active Regeneration)
3. Soot level: 100-120% Regeneration initiated by the operator (Forced Regeneration)
4. Soot level 120% or higher: Call for service (DPF Regeneration lamp blinking, engine warning lamp on, drop in engine power)

5.6.5 DPF REGENERATION LAMP AND SWITCH

1. The HEST (High Exhaust System Temperature) Lamp notifies the operator when hot exhaust gas is being discharged from the engine during DPF regeneration. Be sure to keep the area around the exhaust manifold free of flammable materials.

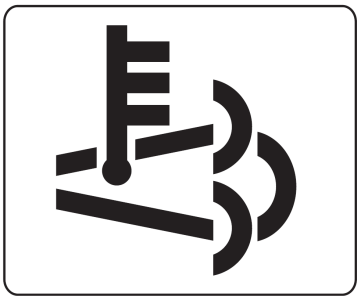


Figure 48 - HEST lamp

2. The DPF Regeneration Lamp turns on either during regeneration or when regeneration is needed and turns off during active regeneration while operating if the soot level is less than 100%. The lamp appears as shown on the right when the operator disables regeneration.

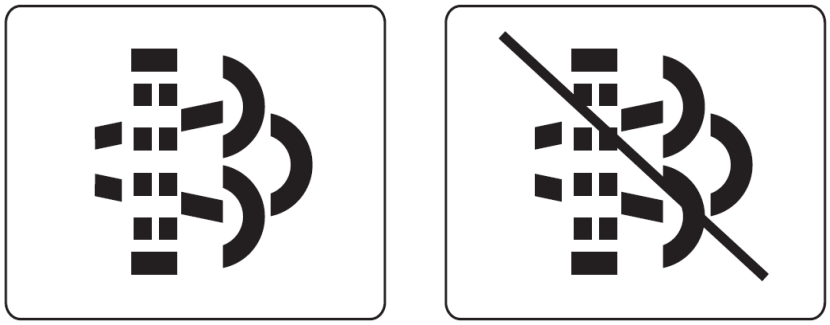


Figure 49 - DPF regeneration lamp

5.6.6 REGENERATION MODE DURING OPERATION (PASSIVE AND ACTIVE REGENERATION)

The regeneration mode is performed automatically by the ECU to regenerate the DPF when any of the following regeneration modes are met. During regeneration, the regeneration lamp and HEST lamp turn on to warn the operator of the hot exhaust gas. At this time, normal operation is possible, although with caution to safety. Once regeneration is complete after 20-30 minutes, the regeneration lamp and HEAT lamp turn off.

5.6.7 MANUAL REGENERATION MODE (FORCED REGENERATION)

This regeneration mode is performed by the operator while the vehicle is in operation. Forced regeneration (Active Regeneration) may not be performed under the following operating conditions, so the operator must perform manual regeneration according to the vehicle warnings as befits the circumstances.

- Working under a low load or driving at low speeds over short distances
- Frequent idling

5.6.8 CONDITIONS FOR FORCED REGENERATION

1. Coolant (engine oil) temperature of 40^{o} or higher.
2. Engine rpm: idling
3. Bonnet down and secured
4. Hopper tray in the raised position and secured

5.6.9 REMOVAL

Remove the temperature sensor and differential pressure sensor installed in the DPF, perform a visual inspection upstream and downstream of the DPF to check for any damage or melting. Take care not to damage the DPF.

1. Inspect upstream and downstream of the DPF to check for any damage or melting on the DPF.
2. Check downstream of the DPF for soot. If any spot (black) is found during visual inspection and cannot be removed even after being wiped with a cloth or paper towel, there is a problem with the DPF. If this is the case contact FörstAssistimmediately.

5.6.10 REMOVING ASH AND CLEANING THE DPF

During the regeneration soot in the DPF, ash accumulates in the DPF. Once a certain amount of ash accumulates, engine performance and fuel efficiency are affected due to a build up of back pressure from the exhaust system, so ash cleaning must be performed regularly to prevent any worsening of engine performance or fuel efficiency. The DPF part of the DPF assembly must be disassembled in order to clean out ash.

Although the interval varies depending on operating conditions, operating environment and type of engine oil used, ash cleaning is usually performed every 5000 hours of engine operating time under normal conditions.

CAUTION

1. Use only EN590 Ultra Low Sulpher Diesel
2. Use only CJ-4 or ACEA E9 engine oil

5.7 OPENING THE BONNET

To access the engine:

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Release the two bonnet catches.
4. Open the bonnet cover.

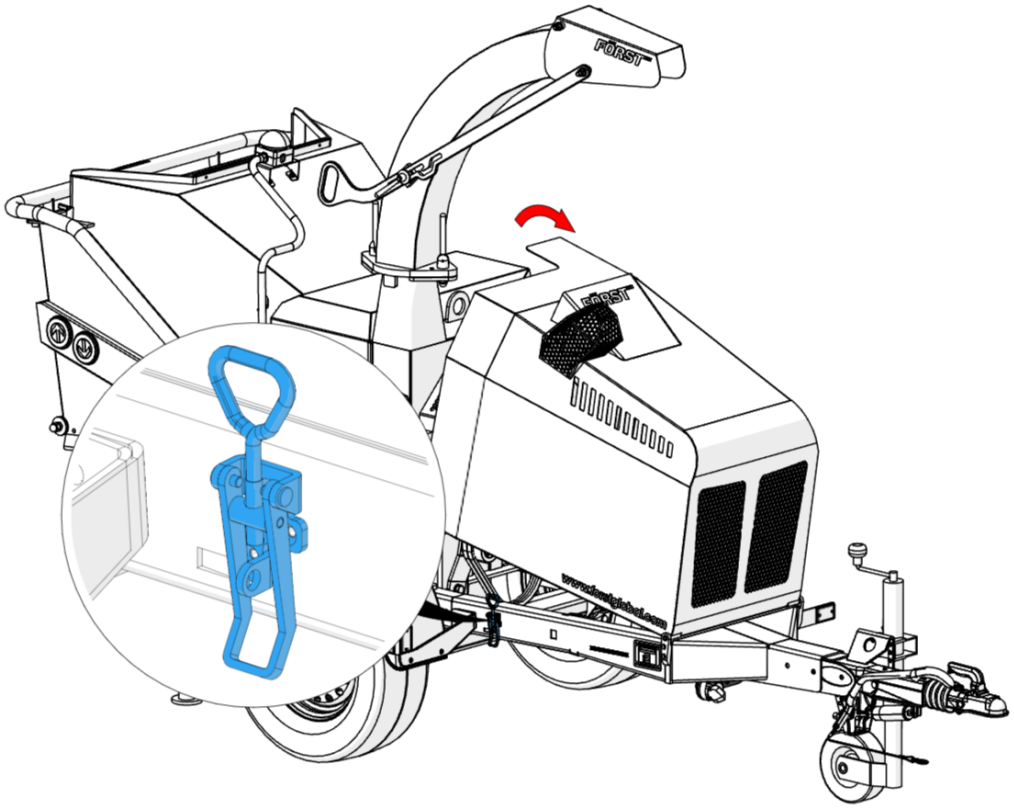


Figure 50 - Bonnet

5.8 OPENING THE CHIPPING CHAMBER COVER

To access the chipping chamber:

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Open the bonnet.
4. Rotate the discharge chute to point over the side of the machine.

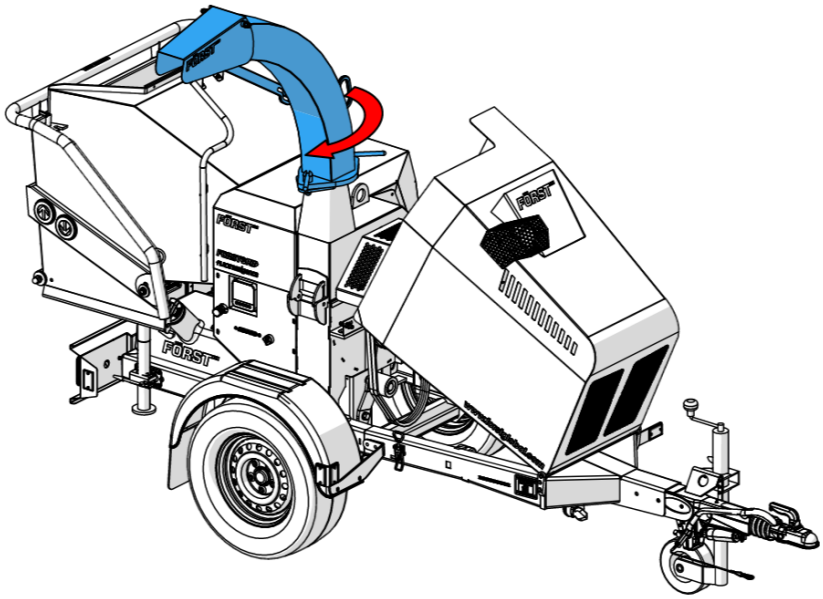


Figure 51 - Rotate the discharge chute

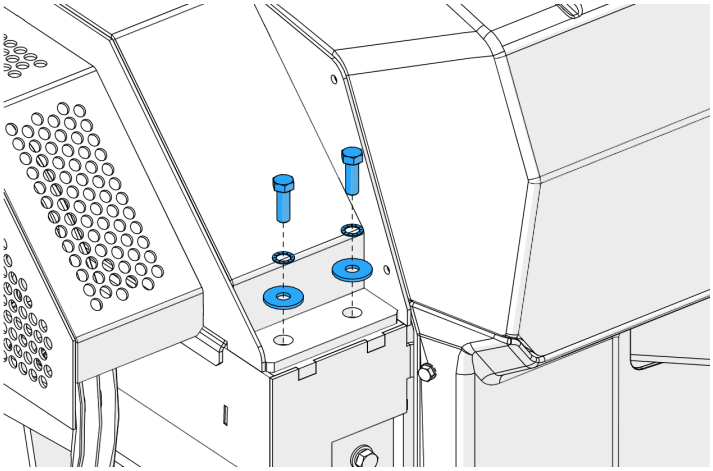


Figure 52 - Chipping chamber cover bolts

5. Using the discharge chute as a lever, carefully open the chipping chamber cover and let it come to rest on the hinge stops.

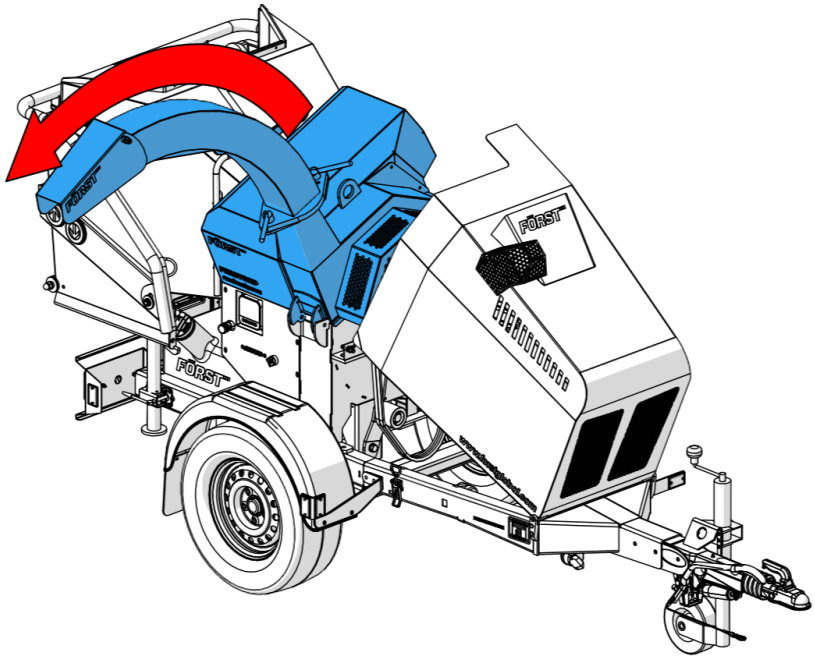


Figure 53 - Open chipping chamber cover

NOTICE
When closing the chipping chamber, carry out these tasks in reverse. When installing the two chipping chamber cover bolts bolts, torque to **86Nm**.

5.9 REMOVING THE PANEL

Removing the panel will give you access to the following:

- Battery
- Stone trap
- Fuses
- Spring

To remove the side panel:

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Remove the bolts securing the panel (2,Figure 54).
4. Remove the side panel (1, Figure 55).

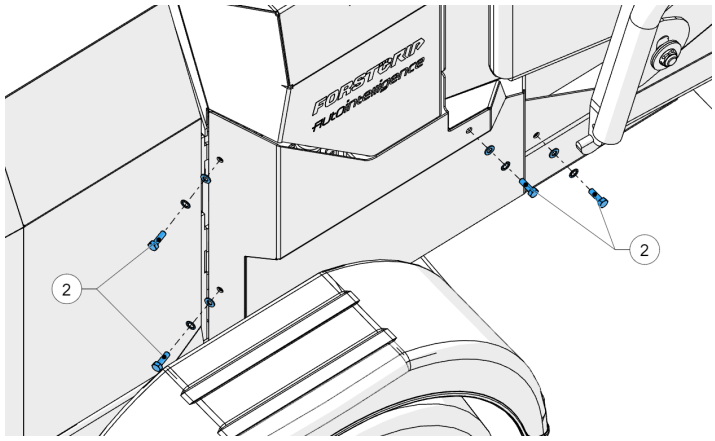


Figure 54 - Remove bolts

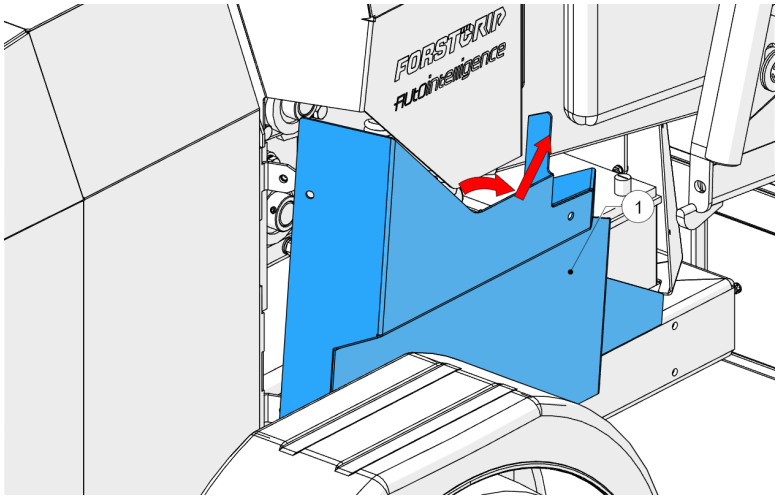


Figure 55 - Remove side panel

5.10 CHANGING THE BLADES

WARNING
The blades must not be used beyond the wear mark. Failure to comply with this could result in damaging the machine, injury, or loss of life.

WARNING
When changing the blades, be extremely careful of sharp edges.

WARNING
Rigger gloves must be worn whilst changing the blades. Hold the blades by the flat end.

WARNING

When moving the flywheel in any direction, position your hands correctly to avoid injury. Position your hands as shown below:

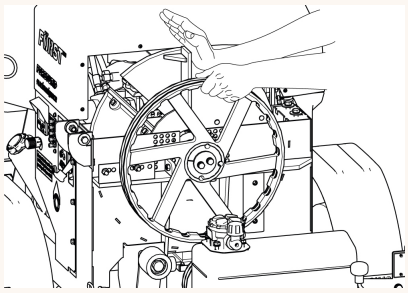


Figure 56 - Pushing the flywheel away from you

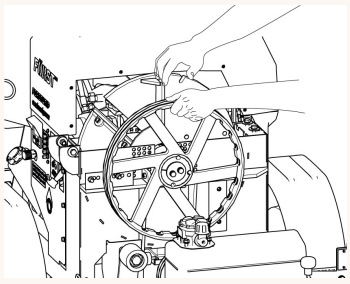


Figure 57 - Pulling the flywheel towards you

CAUTION
Failure to keep blades sharp will overload the engine and bearings which could result in a machine breakdown.

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Disconnect the battery leads.
4. Open the bonnet.

5. Open the chipping chamber cover.

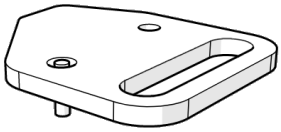


Figure 58 - Flywheel locking tool

6. Turn the flywheel until it is in the locking position. (Figure 59).
7. Insert the flywheel locking tool into the groove on the flywheel. The groove becomes visible once the wheel is in the correct position (Figure 59).
8. Insert the locking pin into the bolt hole on the locking tool.
9. Secure the flywheel locking tool in place using the M12 bolt.

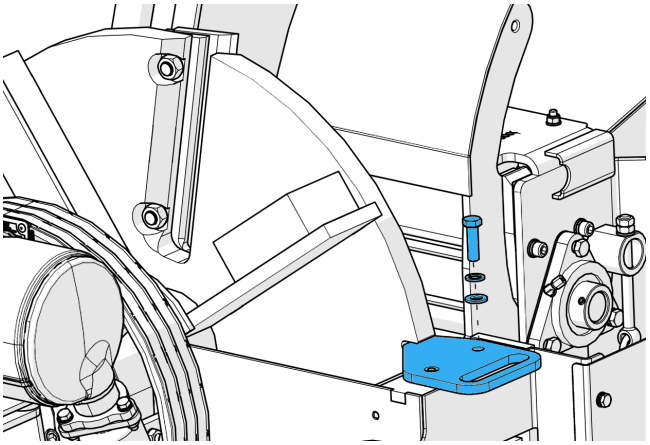


Figure 59 - Installing the flywheel locking tool

Removing the old blades:

1. Clean any debris from the knife bolts and nuts
2. Use the 24mm socket from the tool pouch and a breaker bar to loosen the two blade bolt sets.
   - Leave the blade bolts in place until the blade is ready for removal.
   - When removing the two bolt sets, do not drop any nut, bolt, or washer into the chipping chamber.
3. Remove the lower blade bolt set.

CAUTION
New or resharpened blades are sharp, rigger gloves must be worn. During the next step hold the blade with one hand to make sure it does not fall.

4. Holding onto the blade, remove the upper blade bolt set.

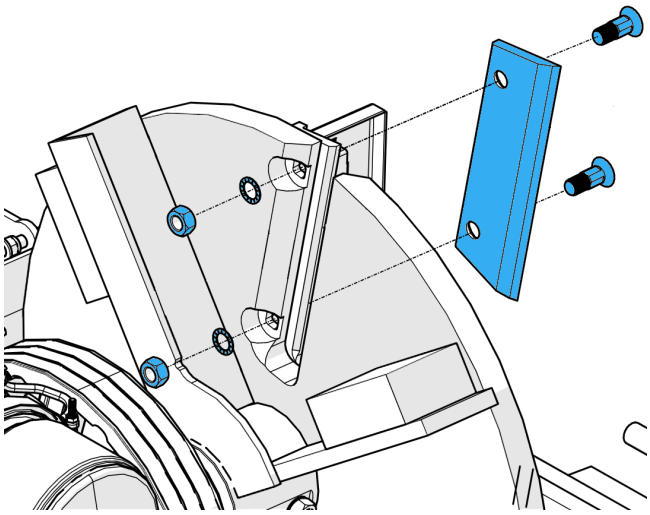


Figure 60 - Blade removal

Installing the replacement blades:

CAUTION
Use genuine Först blades and blade bolt sets only. Replace the blade bolt sets every time the blades removed

CAUTION
When fitting a blade bolt set, NO lubricant or anti-seize compound is to be applied to the bolts. (310Nm is a dry torque).

CAUTION
The replacement blades must not have any debris underneath them when tightened, the smallest amount of debris behind the blade could result in blade failure causing damage to the machine.

5. Clean the blade bed thoroughly and remove any surface rust and debris.
6. Thoroughly clean and degrease the replacement blade.
7. Put the replacement blade against the blade bed.
8. Attach the blade using a new blade bolt set in the upper hole.
9. Fit the blade bolt set into the lower hole.
10. To locate the countersink of the bolt and blade, gently wiggle the blade when tightening the nut by hand.
11. Before you torque the blade bolt set, make sure that the back edge of the blade is tight against the flywheel blade bed heel.

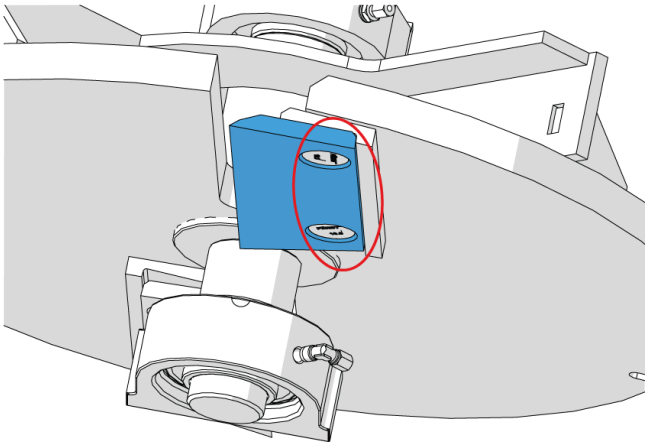


Figure 61 - Correct position of the back edge of the blade

CAUTION
Shims may be required to keep the gap between the blade and the anvil on the inner edge (closest to the flywheel shaft) at 1mm.

► *Refer to For more information, refer to "About blade sharpening" on page 102.*

12. Torque the two blade bolt sets to **310Nm** with a calibrated torque wrench and 24mm socket.

NOTICE
You can only torque a blade bolt set once. Never re-use a blade bolt set once fitted to the flywheel and torqued to 310Nm.

13. Make sure the blade is fitted correctly.
14. Remove the flywheel locking tool.
15. Carefully turn the flywheel to the next blade position and repeat the process for the second blade.

NOTICE
If you need to carry out further work with the chipping chamber lid open, rotate the flywheel so that both blades are inside the chipping chamber.

16. When the work is complete, close the chipping chamber cover, install the two M12 bolts, and torque to 86Nm.
17. Connect the battery leads.

5.11 ABOUT BLADE SHARPENING

- After sharpening, reset the blade gap by using a blade shim.
  - Shims are available in the following thicknesses:

For optimum performance, keep the blades on the woodchipper sharp.

Only professionals can sharpen blades for the woodchipper.

Blade sharpening requirements

The minimum safe blade size is shown in Figure 62.

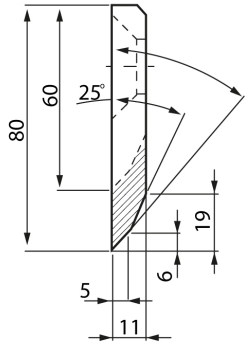
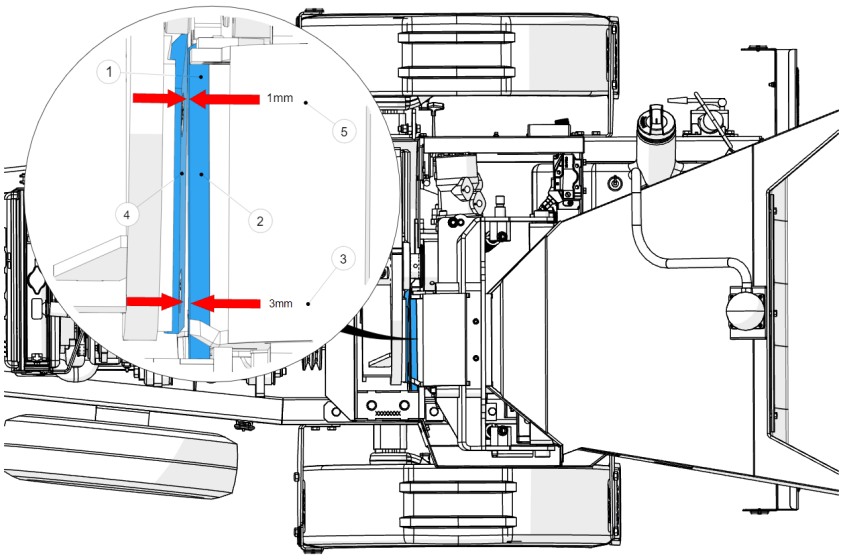


Figure 62 - Blade sharpening wear limit: 80mm to 60mm

Table 5 - Shim part numbers

Size mm	Part Number
0.5	12-03-093.05
1	12-03-093.10
1.5	12-03-093.15
2	12-03-093.20
2.5	12-03-093.25

  - Do not fit more than one shim under each blade.
  - Set a gap of 1 mm from the inner blade tip to anvil after sharpening. To do so, place an appropriate shim under the blade.
- The outer blade tip is automatically set, as the anvil is set at an angle to the blade.
- With a 1 mm gap at the inner blade tip, the outer blade tip should be 3 mm from the anvil.



1 Side Anvil
2 Anvil
3 Outside Blade Gap
4 Flywheel Blade
5 Inside Blade Gap

Figure 63 - Blade gaps

When changing the blades, make sure each blade bolt set is replaced every time the blades are changed. Make sure each blade bolt set is torqued up to 310Nm.

CAUTION
When fitting a blade bolt set, NO lubricant or anti-seize compound is to be applied to the bolts. (310Nm is a dry torque).

5.12 TURNING OR REPLACING THE MAIN ANVIL

If an anvil is worn or damaged, turn or replace it with a new one.

You can turn an anvil 180° to use it a second time.

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Open the bonnet and chipping chamber cover to improve access and visibility.
4. Locate the anvil clamp (1, Figure 64).
5. Remove the M12 clamp bolt, spring washer, and plain washer.
6. Remove the anvil clamp.

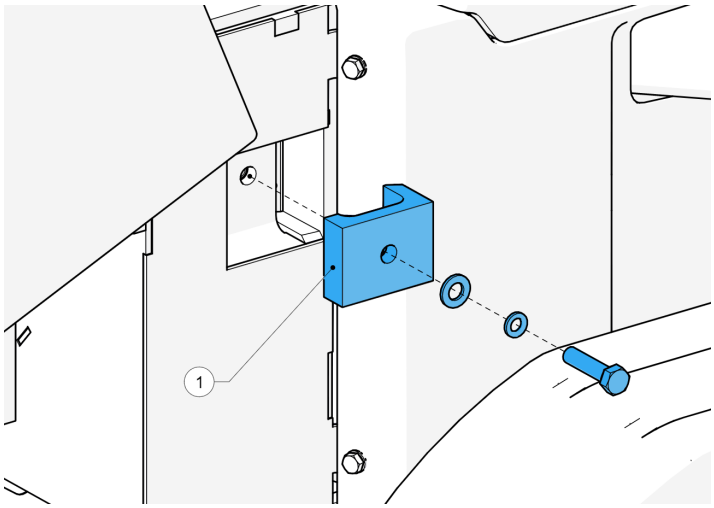


Figure 64 - Anvil clamp position

7. Clear any debris to gain access to the end of the anvil.
8. Insert a suitable slide hammer into the M8 hole (2, Figure 65).

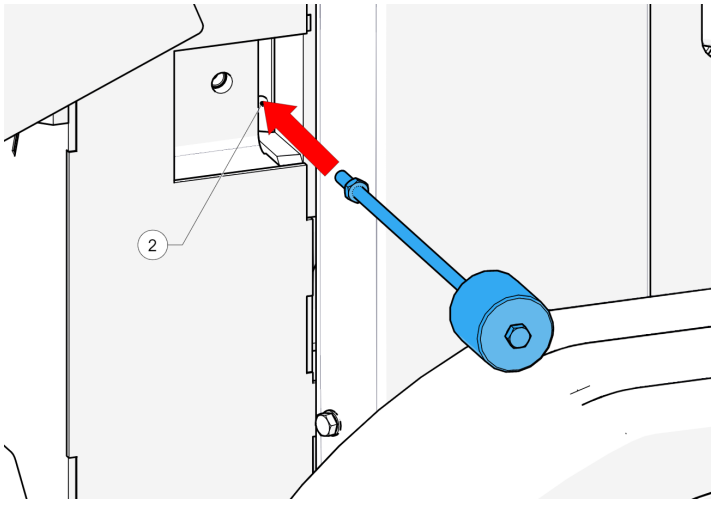


Figure 65 - Slide hammer

9. Lubricate the anvil surface to make it easier to remove.

10. Using the slide hammer, extract the anvil (3, Figure 66) through the side of the chamber.

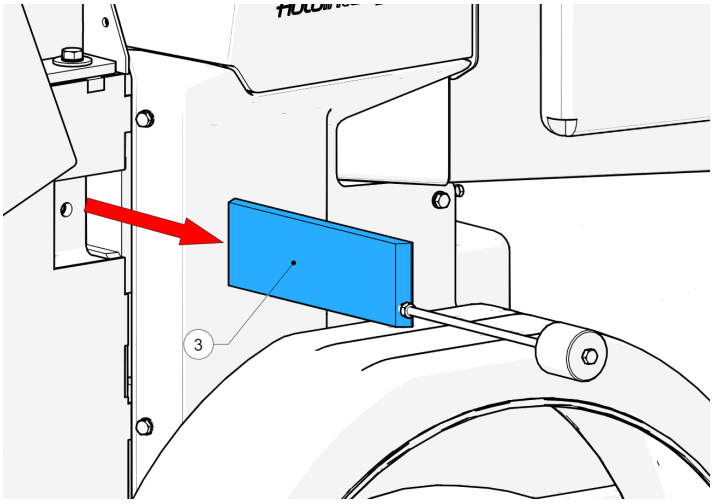


Figure 66 - Anvil removed

11. Check the anvil seats inside the chamber for damage or wear.
12. Make sure the anvil seats are free from dirt and debris before inserting anvil. (4, Figure 67).

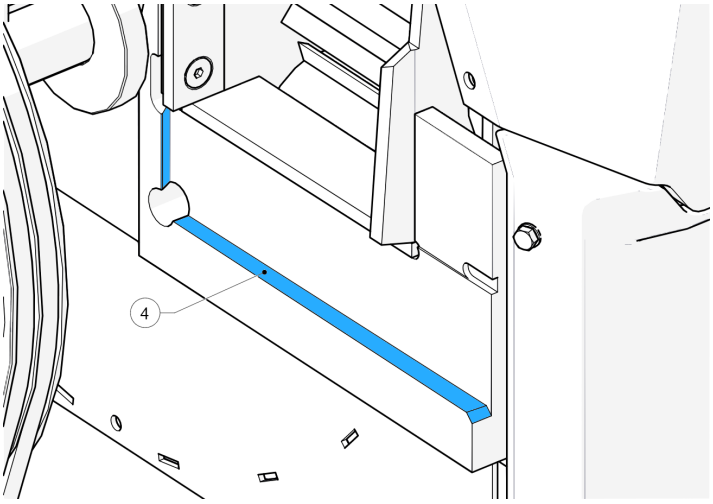


Figure 67 - Anvil seat

13. Make sure you:
    a. Clean all surfaces of the anvil.
    b. Inspect the anvil for any damage that would prevent further use.
    c. If using the same anvil turn it 180° from its previous position.
14. Insert the anvil through the side of the chamber, making sure that the anvil stays tight to the bed plate (5, Figure 68).

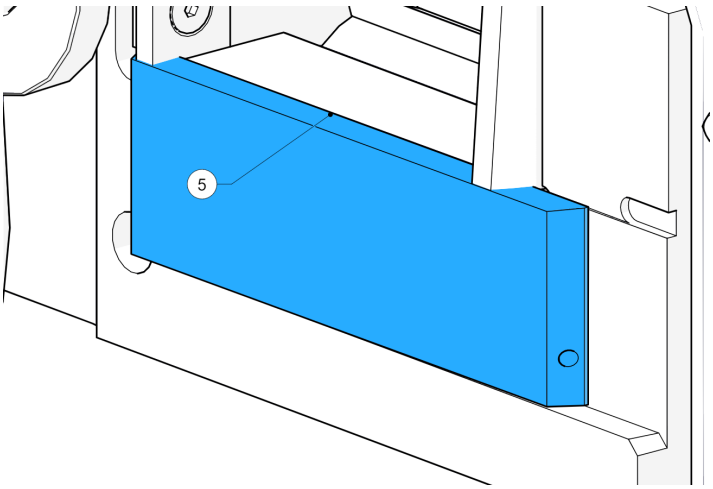


Figure 68 - Anvil tight to the bedplate

15. Push the anvil along the lower seat.
16. Push the anvil into the seat under the side anvil (6, Figure 69).

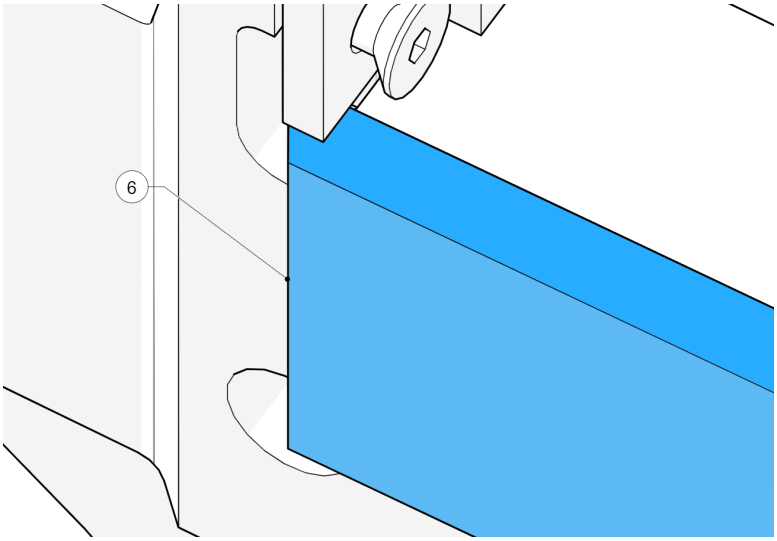


Figure 69 - Anvil in vertical seat

17. Inspect the M12 bolt and washers.
    If there are signs of damage or wear, replace them.
18. Attach the anvil clamp and the securing bolt.
19. Torque the M12 clamp bolt to 86Nm.
20. Make sure the anvil is fitted correctly.
21. Close the chipping chamber cover and bonnet.

5.13 ADJUSTING THE MAIN BELT TENSION

The flywheel V belts must be checked for tension and condition. If any belt shows sign of wear, surface damage, shredding, excessive glazing, or have been stretched to their limit, they must be replaced.

Multiple belt drives must have all belt drives replaced at the same time. Belts that are too loose will cause poor cutting performance, excessive belt and pulley wear.

To check the main belt tension and adjust it if required, do the following:

1. Stop the engine.
2. Remove the ignition key and put it in a safe place.
3. Open the bonnet.
4. Locate the main belt tensioner (1, Figure 70).

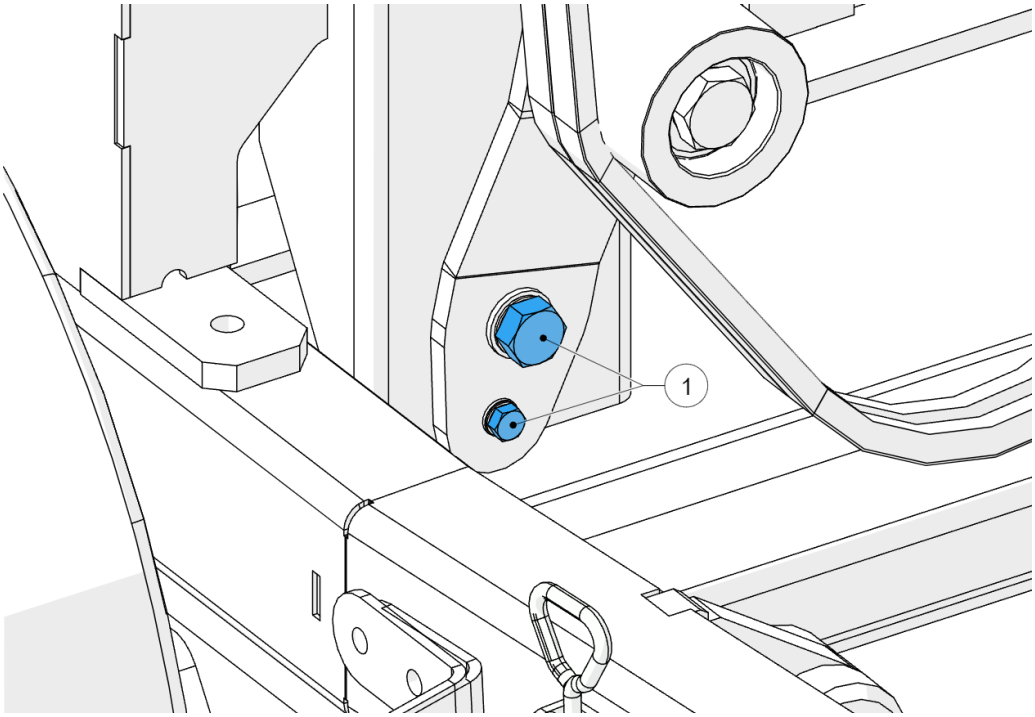


Figure 70 - Main belt tensioner

5. For the main belts, check the belt tension. The deflection should be the width of one belt.

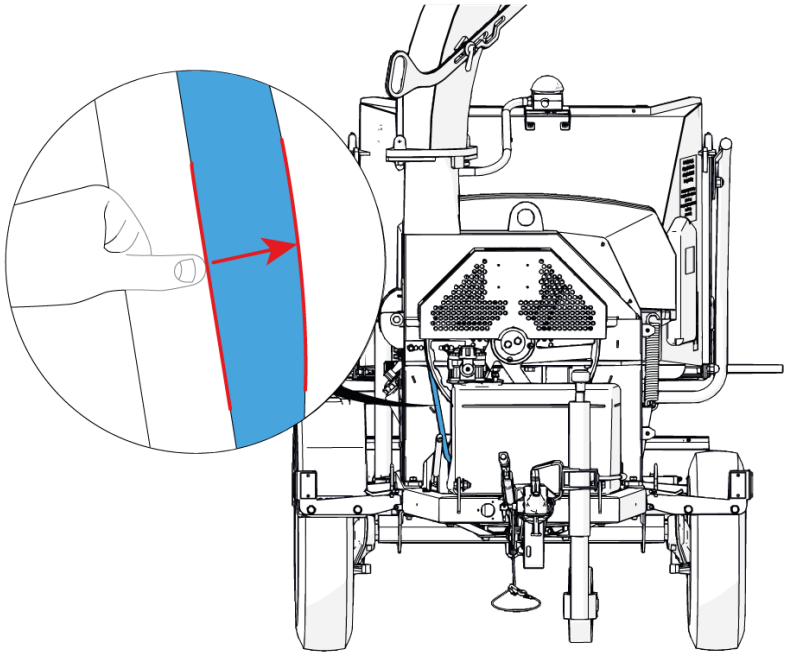


Figure 71 - Correct main belt tension

6. To adjust the tension:
   a. Using a suitable tool, loosen the main tension belt.
   b. With the bolts loosened, use a suitable tool to move the belt tensioner. Pressing against the belt will increase the tension and moving away from the belt reduces the tension.

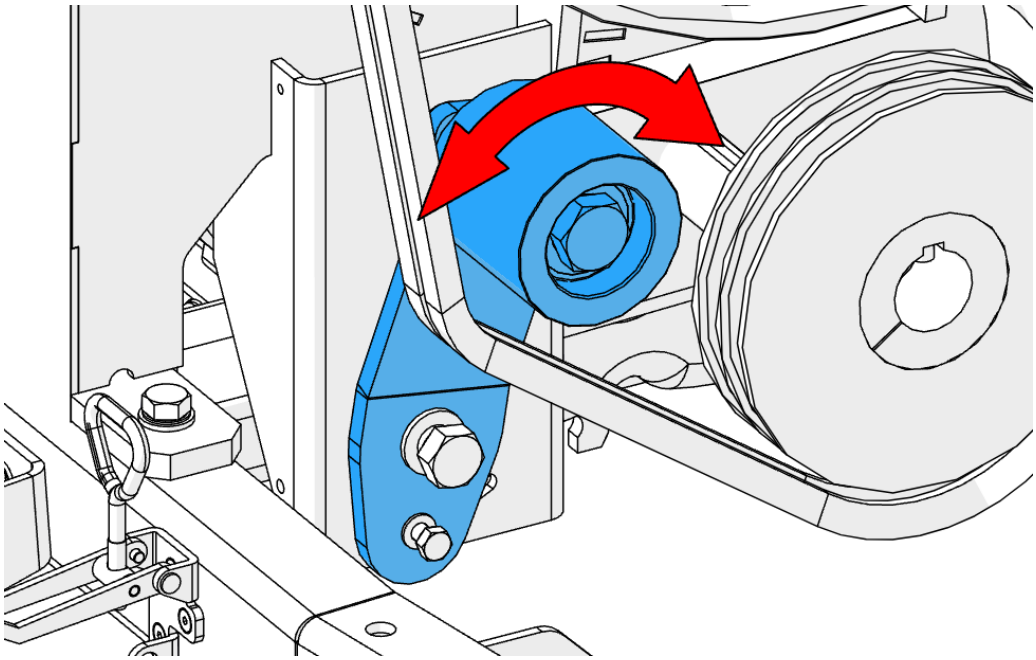


Figure 72 - Adjust tension

7. Once the tension has been adjusted, close the bonnet.
8. Start the engine.

9. Allow the engine to idle for 30 seconds.
10. Turn the engine off and remove the key from the ignition switch.
11. Open the bonnet.
12. Check the main belt tension.
    If the tension is incorrect, adjust the tension again.

5.14 HYDRAULIC OIL FILTER

CAUTION
Use suitable protective gloves to prevent fluid contact with skin.

CAUTION
Use approved local authority environmental procedures when disposing of fluids and filters.

Use protective plastic gloves to keep oil off skin, dispose of oil and filter in an environmentally responsible manner.

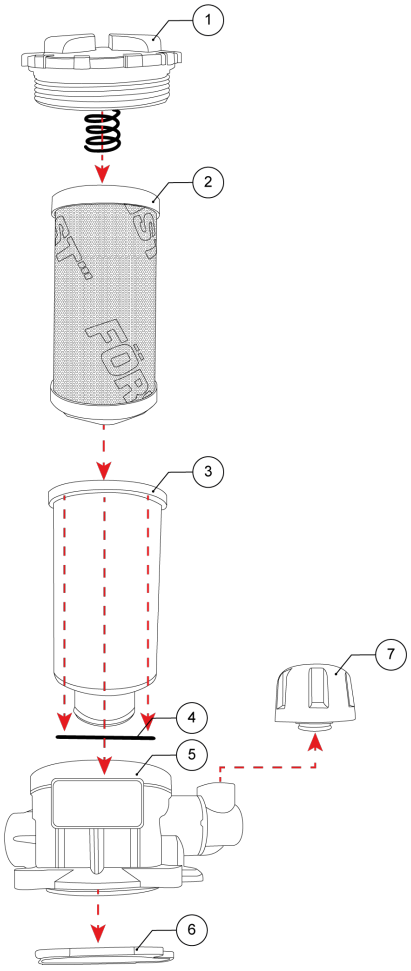


Figure 73 - Hydraulic oil filter

Item	Description	Qty	Item	Description	Qty
1	Filter cap	1	5	Housing	1
2	Filter Element	1	6	Gasket	1
3	Filter bowl	1	7	Breather	1
4	O-ring	1			

5.15 CHANGING THE HYDRAULIC FILTER

CAUTION
Use suitable protective gloves to prevent fluid contact with skin.

CAUTION
Use approved local authority environmental procedures when disposing of fluids and filters.

1. Turn off the engine.
2. Remove the ignition key and keep it in a safe place.
3. Lift the bonnet and locate the hydraulic filter housing.
4. Using a suitable tool, unscrew and remove the cap from the hydraulic filter housing.
5. Locate the lifting tab on top of the hydraulic filter and gently lift the tab by a small amount.
   This allows the oil on top of the filter to leak back into the tank.

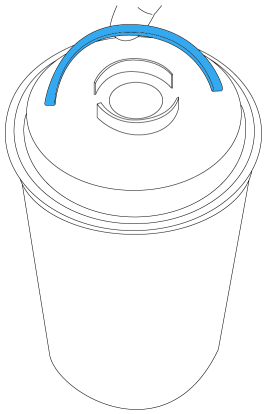


Figure 74 - Lifting tab

6. When the oil level has dropped, remove the filter and the filter bowl together.
7. Remove the filter from the filter bowl.
8. Dispose of the filter.
9. Clean the filter bowl.
10. If the level of hydraulic oil in the tank is low, add more oil.
11. Before refitting a new filter, apply a small amount of hydraulic oil to the filter O-ring.
12. Place the filter in the filter bowl.
13. Place the filter and the filter bowl into the filter housing.
14. Screw the cap onto the filter housing and torque to 30 Nm.
15. Clean the filter housing with a suitable degreaser.
16. Close the bonnet.
17. Start the engine of the woodchipper.
18. When the engine of the woodchipper is warm, stop it and check the hydraulic filter housing for leaks.

5.16 DRAINING THE HYDRAULIC OIL

CAUTION
Use suitable protective gloves to avoid contact with skin.

CAUTION
Use suitable protective eye wear to protect eyes from contact with oil.

CAUTION
Use approved local authority environmental procedures when disposing of fluids.

You may need to drain the hydraulic oil from the machine if:

- A leak has been detected on the machine
- The machine needs servicing
- The machine needs maintenance

1. Stop the engine.
2. Remove the ignition key and keep in a safe place.
3. Remove the hydraulic oil filter from its housing.
4. Using a suitable tool capable of sucking oil, insert the tool into the hydraulic oil filter housing and suck the old oil out of the tank.
5. Dispose of the old oil safely and correctly.

5.17 BATTERY

Before using and charging batteries, read the following safety information:

WARNING
Battery acid is highly corrosive. Always wear eye protection when handling a battery. Do not tilt battery as acid could escape from vents.

WARNING
Keep children away from acid and batteries.

WARNING
When charged, battery emits highly explosive hydrogen gas. Do not allow fires, sparks, naked flames or smoking near the battery. Also avoid electrostatic discharges and electrical sparks when dealing with cables and electrical equipment.

CAUTION
Avoid short-circuiting the battery terminals.

Do not short-circuit from the positive terminal to any metal machine part. Take care not to short-circuit the battery due to loose metal parts and tools.

NOTICE
Dispose of old batteries at an authorised collection point. Never dispose of batteries in household waste.

5.17.1 FIRST AID

- If acid is splashed into eyes, immediately rinse with clean water for several minutes and consult a doctor.
- If acid is swallowed, consult a doctor immediately.

5.17.2 GOING INTO LONG TERM STORAGE

Charge the battery and store in one of the following locations:

- Remove from machine and store in a cool, frost-free place.
- On the vehicle, with the negative terminal disconnected.
- Check the battery charge at regular intervals. If the battery charge is low, charge the battery.

5.17.3 REPLACING THE BATTERY

You can replace an old battery with a new one.

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Remove the panel covering the battery.
4. Remove any debris from around the battery.
5. Remove the negative lead at the battery (1, Figure 75), then the positive lead (2, Figure 75).

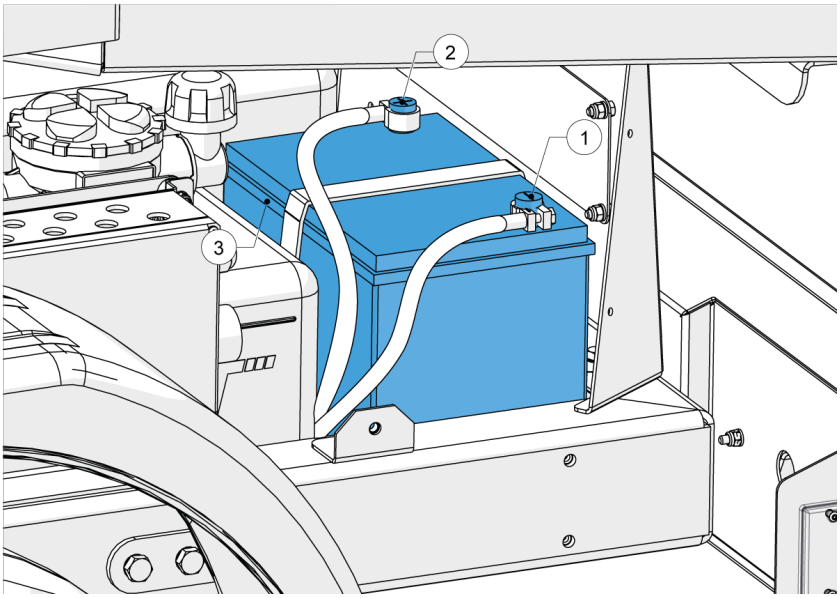


Figure 75 - Battery terminals

6. Loosen battery clamp screw and remove clamps.
7. Remove the battery.
8. Clean the battery tray.
9. Install the new battery.
10. Tighten battery clamp screw.
11. Connect the positive lead to the battery (2, Figure 75), then the negative lead (1, Figure 75).
12. Install the panel covering the battery.

To help prevent short circuits and sparks, swap the new battery positive terminal protective cover with the old battery positive terminal.

5.17.4 CHARGING THE BATTERY

If the woodchipper has a flat battery, charge the battery.

> NOTICE
> When charging the battery, take the following into consideration:
>
> - Ensure good ventilation
> - Use suitable direct current mains chargers only
> - The charging current should be 10% of the battery Ah power rating
> - Use a charger with a constant charging voltage of 14.4V
> - If the acid temperature rises above 38°C, stop charging

To charge the battery:

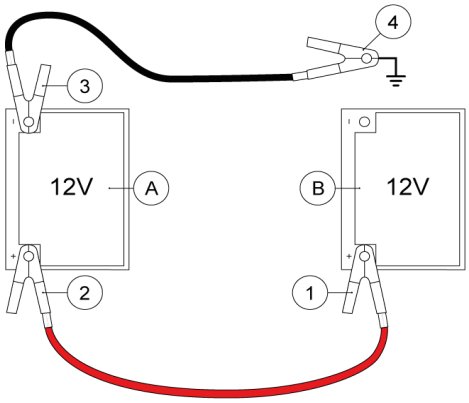
1. Replace the battery as described in "*Replacing the battery*" on the previous page.
2. Remove the battery from the woodchipper.
3. Connect the battery's positive terminal to the charger output positive.
4. Connect the battery's negative terminal to the charger output negative.
5. Switch on the charger.
   The battery is fully charged when the charging voltage or acid specific gravity has stopped rising for two hours.
6. When charging is complete, switch off the charger, then disconnect the battery.
7. Install the battery.

5.17.5 JUMP STARTING THE BATTERY

If the woodchipper has a flat battery, you can use a support vehicle to jump start the battery.

> **CAUTION**
> When attaching jump leads to a battery, make sure that only the lead ends make contact with the battery terminals.

1. Stop the engine.
2. Remove the key from the ignition and keep in a safe place.
3. Remove the panel covering the battery.
4. Attach the red jump lead to the positive battery terminal on both the woodchipper and the support vehicle.
5. Attach the black jump lead to a good earth on the woodchipper and the negative battery terminal on the support vehicle.
6. Start the engine.
7. After the engine of the woodchipper starts, disconnect the black jump lead.
8. Disconnect the red jump lead.
9. Install the panel covering the battery.
   If the battery is still flat, contact a repair agent.



A Support vehicle battery
B Machine battery
1 Positive machine
3 Negative support vehicle
2 Positive support vehicle
4 Earth

Figure 76 - Jump start

5.18 OILS, FLUIDS AND LUBRICANTS

Table 6 - Oils, fluids and lubricants

Oils, Fluids, and Lubricants		
Item	Assembly	Product
1	Engine oil	HD SAE 10w40 (API CJ-4 or ACEA E9)
2	Coolant	Mono-Ethylene glycol 50/50 mix
3	Hydraulic oil	ISO 46 (VG 46)
4	Fuel	Diesel EN590
5	General greasing[1]	Lithium EP1 General Purpose
6	General oil lubrication	

Please consult your engine operator's manual for oil quantities relating to your engine type.

[1]The greasing points can be found on the control panel. Please do not over grease, 2 x pumps per grease nipple should be sufficient.

5.19 FASTENER TIGHTENING TORQUES

All machine fastener torques should be regularly checked in accordance with the table below. In particular, those for the flywheel blades, flywheel bearings, axle assembly, hitch, road wheels and engine mounts.

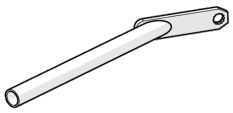
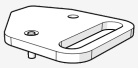
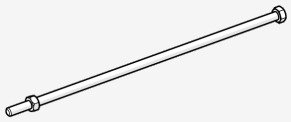
Table 7 - Torque settings

Tightening Torques for class 8.8 and 10.9 fasteners				
	Class 8.8		Class 10.9	
Thread Size (mm)	Nominal Torque (Nm)	Max/Min Torque (Nm)	Nominal Torque (Nm)	Max/Min Torque (Nm)
M6	10	9.5/10.4	14.5	14/15.3
M8	25	23.1/25.3	35	34/37.2
M10	49	46/51	72	68/75
M12	86	80/87	125	117/128
M12 x1.5 wheel nuts	95	90/100		
M16	210	194/214	310	
M20	410	392/431	610	558/615
M24	710	675/743	1050	961/1059

5.20 TOOLS AND ACCESSORIES

The following is a list of tools and accessories supplied with the machine.

Table 8 - Tools and accessories

Item	Part Number	Quantity	Item Description	Reference
1	12-19-124	1	Lifting Tool - Top Feed Roller 	*"Removing blockages"* on page 75.
2	29-19-023	1	Flywheel Locking Tool 	
3	12-02-061	1	Blade bolt socket 	
4	98-98-096	1	13/17 mm combination spanner	
5	98-98-097	1	19/24 mm combination spanner	
6		1	Flywheel block (not supplied if locking lock is issued)	
7	12-02-060	1	Slide hammer weight 	*"Turning or replacing the main anvil"* on page 104.
	12-99-009		Bolt (M8 x 300) 	
8	N/A	2	Machine key	

5.21 RUNNING GEAR – HITCH & AXLE

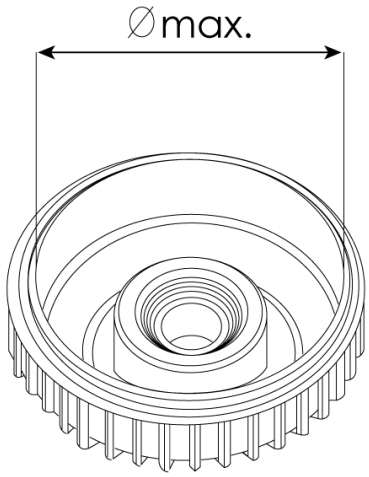
Först uses AL-KO Kobler break drums.

Please refer to maintenance instruction manual supplied with the machine.

Check the internal diameter of the wheel drum for ware.

The brake drum also shows wear over time and must be replaced when the minimum measure is no longer met.

CAUTION
Replace the brake drum if the maximum brake drum diameter is reached or exceeded as otherwise brake malfunctions or brake failure may occur.



Wheel brake type	Diameter
WB 1637	max. 161mm
WB2051	max. 202mm
WB2361	max. 232mm
WB3062	max. 303mm
WB3081 A/B	max. 303mm

Figure 77 - Wheel drum internal diameter

5.22 SERVICE SCHEDULE

The service schedule must be carried out by a competent person familiar with the machine.

Table 9 - Service schedule

Hours of operation	Tasks	Requirements and part number
50	Replace the hydraulic filter element	12-24-028
	To pup hydraulic oil, if required	VG ISO 46
	Check all engine components are in good working order	
250	Replace the external air filter component	50-99-003
	Drain any water that has accumulated in the air filter	
	Check if a forced regeneration is need and perform if necessary / applicable	
	Check the engine wiring to make sure none are loose / damaged and all are secure and in good working order	
	Check all coolant hoses and clamps to make sure they are secure and in good working order	
	Check the feed rollers are on good working order and sharpen the feed rollers is necessary	
	Replace the lower feed roller if necessary	12-01-052
	Lubricate the engine	Lithium EP1 General Purpose
500	Complete all 250 hour tasks	
	Replace the internal air filter component	50-99-004
	Drain and replace the engine oil	10w40 (API CJ-4 or ACEA E9)
	Replace the engine oil filter	50-99-001
	Replace the fuel filter	50-99-002
	Replace the hydraulic filter element	12-24-028
	Check the specific gravity (SG) of the coolant (-25C or less)	
750	Complete all 250 hour tasks	
1000	Complete all 500 hour tasks	
	Replace the cooling fan belt	
	Drain and replace the coolant	Monoethylene glycol with a mixing ratio of 50/50
	Drain and replace the hydraulic oil	ISO 46 (VG 46)
	Replace the hydraulic filter element	12-24-028
	Replace the flywheel belts	12-10-184

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CHAPTER 6: TROUBLESHOOTING

In this chapter:

6.1 THE ENGINE DOESN'T CRANK

Possible cause	Check	Corrective action
Battery	Check battery terminals	Tighten if loose
	Check battery is charged	Charge if flat
	Check red and black battery cables at the engine connection	Tighten if loose
	Check battery condition	Replace if damaged
Bonnet sensor	Check condition	Replace if damaged
	Check if **Bonnet** is lit up on the P2 screen when the bonnet is down	Replace sensor or tighten connector plug
	Check sensor gap	Adjust to approx. 3-4 mm
	Check plug security	Tighten if loose
Blown fuse	Check fuse for controller	Replace if blown Check fuse security
Flywheel seized	Check flywheel and chamber for blockages	Clear blockages
Ignition switch	Check plug and wiring	Refit or replace
Starter motor	Check wiring and connections	Refit or replace

6.2 THE ENGINE CRANKS BUT DOESN'T FIRE

Possible cause	Check	Corrective action
Fuel is not flowing	Check fuel level	Top up if empty
	Check fuel tank for debris	Remove any debris
	Check the fuel filter for debris	Replace filter
	Check fuel lines for damage or kinks	Replace or remove kinks
	Check banjo bolt for blockage	Clear blockage
	Check fuel cap vent	Clean vent or replace cap
Poor quality fuel or wrong fuel	Check fuel	Drain and refill fuel system
Air in the fuel system	Check for loose fuel line clips or damaged hoses	Tighten or replace
Water in the fuel system	Drain water from the system	
Battery	Check battery terminals	Tighten if loose
	Check battery is charged	Charge if flat
	Check red and black battery cables at the engine connection	Tighten if loose

Possible cause	Check	Corrective action
	Check battery condition	Replace if damaged
Ignition switch is damaged	Check plug and wiring	Refit or repair
Debris in chamber	Check chamber for debris	Remove any debris

6.3 THE DISPLAY SCREEN IS BLANK

Possible cause	Check	Corrective action
Loose CAN cable (communication cable between screen and controller)	Check both ends of cable for security	Tighten if loose
Blown fuses	Check fuses	Replace if blown Check fuse security
Battery	Check battery terminals	Tighten if loose
	Check battery is charged	Charge if flat
	Check red and black battery cables at the engine connection	Tighten if loose
	Check battery condition	Replace if damaged

6.4 THE FEED ROLLERS ARE NOT TURNING

Possible cause	Check	Corrective action
Lack of hydraulic oil	Check hydraulic oil level	Top up if required
Loose belts	Check belt tension	Tension correctly
Low RPM	Check throttle	Ensure throttle is in the max position.
Damaged shaft or coupling at feed rollers	Check feed roller shaft and coupling	If faulty, contact repair agent
Speed sensor	Check sensor for damage	Replace if damaged
	When the ignition is on and there is metal in front of the sensor, the orange indicator light is ON	
	Check sensor gap	Adjust to approx. 3 to 4 mm
	Check plug security	Refit or replace as required
Valve block solenoid plugs	Check for function, security and condition	Refit or repair

Possible cause	Check	Corrective action
Flow control valve	Check valve is free to rotate	Set the dial to **5**
E-stop button depressed	Check E-stop button	Reset E-stop button
Faulty stop bar or hopper tray sensor	Check stop bar sensor Check hopper tray sensor Perform a function check. When the ignition is on and there is metal in front of the sensor, the orange indicator light is OFF	Replace sensor if damaged or not working

6.5 THE WOODCHIPPER SUDDENLY STOPS RUNNING

Possible cause	Check	Corrective action
Loss of oil pressure	Check oil level	Top up if required
	Check oil pressure switch	Replace if damaged or faulty
Overheated	Check cooling fan and belt	Replace if damaged
	Check fan guard for blockages	Clear blockages
	Check coolant level **WARNING** Pressurised system. Hot coolant. Wait until the radiator is cool, then loosen the cap slowly to relieve pressure.	Top up if required
Flywheel seized	Check flywheel and chamber for blockages	Clear blockages
Bonnet catches	Check condition and security	Refit or replace
Bonnet sensor	Check condition	Replace if damaged
	Check if **Bonnet** is lit up on P2 when the bonnet is down	Replace sensor or tighten connector plug
	Check sensor gap	Adjust to approx. 3 to 4mm
Fuel not flowing	Check fuel level	Top up if empty
	Check fuel tank for debris	Remove any debris
	Check in-line fuel filter for debris	Replace filter
	Check fuel lines for damage or kinks	Replace or remove kinks
	Check banjo bolt for blockage	Clear blockage
	Check fuel cap vent	Clean vent or replace cap
Electrical issue	Check battery and connections	Replace, charge or tighten
	Check ignition switch	Refit plug
	Check wiring and connections	Replace, tighten or refit
	Check fuses	Replace if blown

6.6 THE WOODCHIPPER IS STRUGGLING TO CHIP WOOD

Possible cause	Check	Corrective action
Lack of fuel	Check fuel system	Clean or refill fuel system as required
Lack of air	Check air filter	Clean or replace as required
Poor quality fuel	Check fuel	Drain and refill fuel system with a better quality fuel

Possible cause	Check	Corrective action
No stress occurring too soon	Check main belts	Tension correctly
Low RPM	Check throttle	Adjust as required
Blade condition	Check blade sharpness	Replace if dull

6.7 HYDRAULIC OIL IS LEAKING

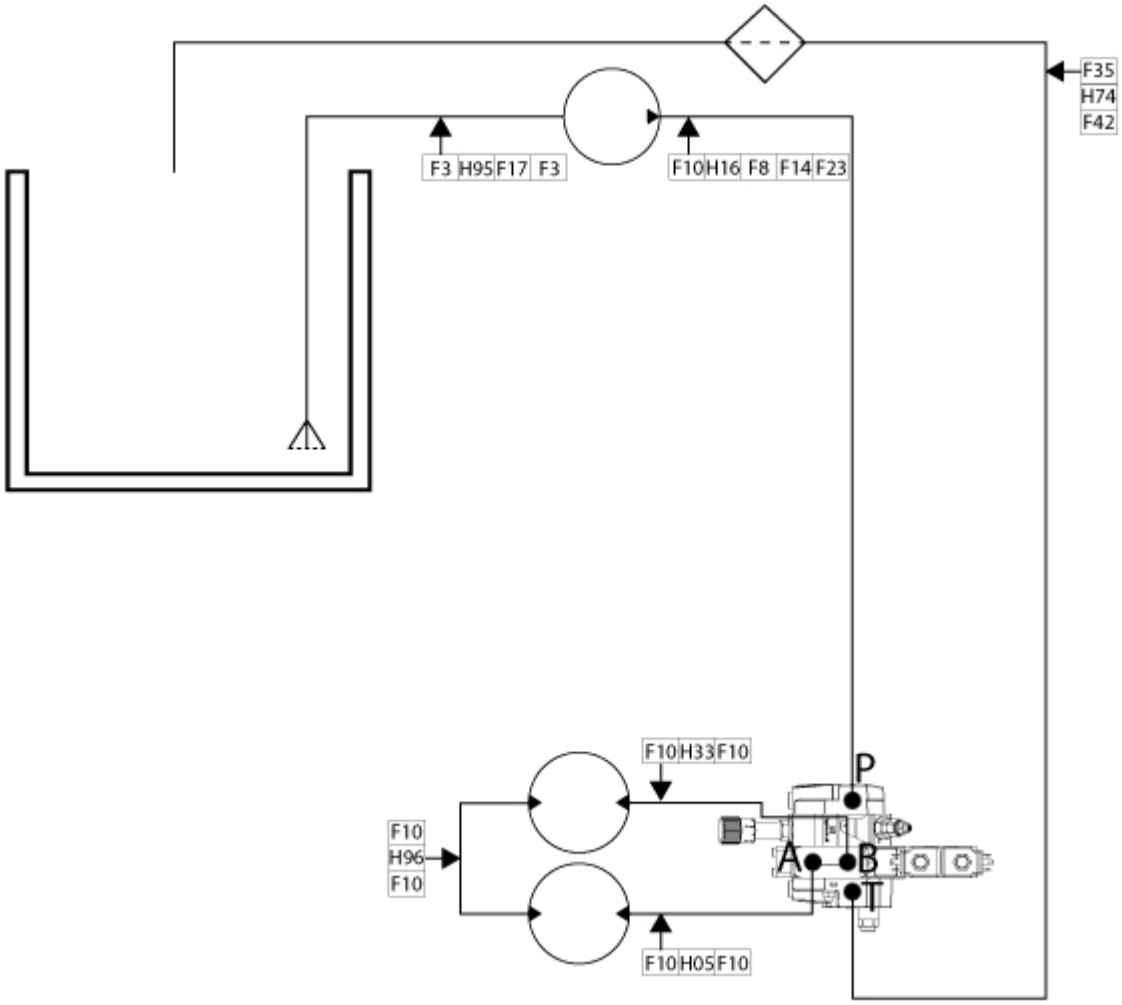
Possible cause	Check	Corrective action
Hydraulic oil level is too high	Check hydraulic oil level	Drain to correct level
Loose hydraulic fitting	Locate leaking fitting	Tighten or replace fitting

6.8 THE TYRES ARE WEARING UNEVENLY

Possible cause	Check	Corrective action
Incorrect tyre pressure	Check tyre pressures	Adjust to 2.76 bar (40 psi)
Loose wheel nuts	Check wheel nut torque settings	Adjust to 90Nm
Damaged wheel bearings	Check bearing free play	Contact repair agent

NOTICE
If any of these issues persist, contact FörstAssist immediately.

HYDRAULICS SCHEMATIC



FÖRSTASSIST

FÖRSTASSIST

The FörstAssist technical support team is there to back you up and give you assistance in the event of a mechanical issue or if you have a product-related technical question.

 service@forstglobal.com

 +44 (0) 1264 721792

WARRANTY

WARRANTY STATEMENT

1. Redwood Global Ltd guarantee all Först equipment supplied by them against any defect in manufacture and assembly – this guarantee is for a period of 3 years commencing on the date of sale to the first end user.
2. The guarantee will not apply to a failure where normal use has exhausted the life of a component.
3. Engine units are covered independently by their respective manufacturer's warranties.
4. Redwood Global Ltd's liability under this guarantee is limited to repair at Redwood Global Ltd's premises, selected Först dealer or authorised Först Service Partner.
5. No liability will be accepted for consequential lost or damage of any kind.
6. The owner is responsible to make sure the chipper is operated at all times in accordance with the user manual.
7. The Redwood Global Ltd guarantee will be invalidated if any of the following points apply:
   - Failure to use genuine Först parts
   - Failure to perform routine servicing and maintenance
   - Failed parts or assembly have been interfered with
   - Chipper has been modified without written approval from Redwood Global Ltd
   - Chipper has been used to performed tasks contrary to those stated in the Redwood Global Ltd User Manual
   - Exclusions to the above warranty terms are – fair wear and tear on fuses and bulbs, tyres and brakes, lubrications, filters, blades, anvils, feed rollers, and paintwork.
   - Where an extended warranty has been given this will be stated on the original chipper invoice and will be subject to further conditions as stated in our supplementary warranty terms.

WARRANTY CLAIMS

To obtain warranty service please contact Redwood Global Ltd for the nearest approved Först Dealer. Your nearest dealer can be obtained from Redwood Global Ltd at the address on the front of the User Manual. In the event of a failure Redwood Global Ltd must be notified within 7 working days.

CERTIFICATION

DECLARATION OF CONFORMITY FOR CE MARKING

The certification is provided separately with the associated machine.

Company contact details: Redwood Global Ltd,Unit 86, Livingstone Road, Walworth Business Park,Andover, SP10 5NS

Hereby declare that this declaration of conformity is issued under our sole responsibility and that the following objects of the declaration:

Description of machinery:Först Tracked, towed and PTO woodchippers

ST6 (Petrol and Diesel) towed ST600000283001, onwards

TR6 (Petrol and Diesel) on tracks TR600000283001, onwards

ST8 (Petrol and Diesel) towed ST800000283001, onwards

TR8 (Petrol and Diesel) on tracks TR800000283001, onwards

PT6 (PTO) PT600000283001, onwards

PT8 (PTO) PT800000283001, onwards

XR8 on tracks XR800000283001, onwards

TT6 (Petrol) towed TT600000283001, onwards

are classified within the following EU Directives:

Machinery Directive 2006/42/EC

Forestry Machinery-Woodchippers-Safety BS EN 13525:2020

Signed on location at: Redwood Global Ltd,Unit 86, Livingstone Road, Walworth Business Park,Andover, SP10 5NS by:

Mr Raymond Gardner (Managing Director): 

Dated: 30/11/2021

SERVICE HISTORY

Date	Service type	Hours	Agent stamp		Date	Service type	Hours	Agent stamp

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INDEX

FÖRST

Rely on it

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Scan for www.forstglobal.com