



User Manual

Mower


F302 and R302

roberine.com



Translation of the original manual Version V1.5

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● TYPE		Des. Code	
<input type="text"/>		<input type="text"/>	
SERIAL NUMBER			
<input type="text"/>			
MASS	KG	<input type="text"/>	
MAX TOTAL MASS	KG	<input type="text"/>	
MAX LOAD FRONT AXLE	KG	<input type="text"/>	
MAX LOAD REAR AXLE	KG	<input type="text"/>	
		MANUF. YEAR <input type="text"/> REVS. RPM <input type="text"/> POWER KW <input type="text"/>	
		CE UK CA	
			
Herculesweg 6, 4338 PL, Middelburg (NL)			



NOTICE Keep the information on the type plate in a safe place. If you have any questions about your machine or want to order a part, the information on the type plate will enable us to assist you quickly and efficiently.



NOTICE Please read this instruction manual carefully. Failure to do so may lead to severe injuries or damage to the machine. Keep this manual in a safe place. Always ensure that the people who use or maintain the machine have read the manual and understand the instructions.

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Roberine reserves the right to change parts at any time, without prior or immediate notice to the buyer. The contents of this manual may also be changed without prior notice. For information on adjustments, maintenance and repairs not described in this manual, contact your supplier's technical customer service. Roberine cannot be held liable for any errors in this publication or the consequences of those errors.

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1 Preface

This is the user manual and maintenance manual for the mowers F302 and R302.

This manual contains important information and instructions for safety, optimum operation and proper maintenance. Read all the information and follow the instructions and guidelines described in this manual carefully. This ensures long-term optimum operation and prevents accidents and injuries.

In addition to this user manual, you have also received another manual for your Roberine mower. The other manual covers your machine's engine and provides you with all the information you need to maintain and repair it. Both manuals are mainly intended for service technicians.

1.1 For whom is this manual intended?

This manual is intended for users and service technicians of the F302 and R302 mowers. Anyone unfamiliar with operating or maintaining the mower is advised to read the following sections in full and follow the instructions exactly. Personnel familiar with operating and maintaining the mower can use this manual for reference. For normal routine use of the mower, users and service technicians must:

- have sufficient technical knowledge and experience to perform the tasks
- be able to recognise and avoid hazards
- have read this manual and understood its contents
- have been sufficiently trained
- be able to follow the procedures in this manual

1.2 Storing the manual

This manual is part of your machine. Store the manual in the immediate vicinity of the machine. Always give people who will work with or on the machine a copy of the manual for the mower. Make sure that everyone who will work with the machine has fully read and understood the contents and acts accordingly.

1.3 Warnings used in this manual

The following symbols are used for all operations where there is a risk to the safety of the user and/or technician and where caution is therefore required:



DANGER! Warns of a hazardous situation which, if the safety instruction is not followed, will result in serious personal injury or even death.



WARNING Warns of a hazardous situation which, if the safety instruction is not followed, could lead to serious personal injury or even death and possibly cause serious material damage to the machine or its surroundings.



CAUTION! Warns of a hazardous situation which, if the safety instruction is not followed, could lead to minor or moderate personal injury and possibly cause serious material damage to the machine or its surroundings.



NOTICE Provides additional information useful to complete a task or prevent problems.

1.4 Manufacturer's data

If you need help, contact your dealer. If you still have any questions after reading this manual, we encourage you to contact us. We appreciate all advice, feedback and suggestions from our customers. Contact:

Manufacturer:	Roberine
Visiting address and postal address:	Herculesweg 6 4338 PL Middelburg The Netherlands
Telephone:	+31 (0)118 679500
Email:	info@roberine.com
Website:	www.roberine.com

1.5 Warranty and liability

See the order confirmation and general terms and conditions of delivery for applicable warranty and liability.

1.6 Trademarks

All trademarks mentioned in this manual are registered trademarks of Roberine or its suppliers.

1.7 Legal standards and guidelines

The instructions in this document do not take into account any specific local regulations and laws that must be followed when operating the mower. The buyer is solely responsible for compliance with these provisions and laws.

1.8 Recommissioning

If the machine must be recommissioned (such as when moving a machine or transferring it to a new owner), you must contact Roberine or a responsible subcontractor to discuss the procedures, general terms and conditions, maintenance contract, etc., to ensure that the machine functions properly and safely after it is recommissioned. This manual must always be transferred together with the mower.

If Roberine is not involved in a recommissioning, Roberine is not liable for any third party claims arising from that recommissioning.

1.9 Version history

Every effort has been made to ensure that this manual is as accurate and complete as possible. Please inform your local Roberine maintenance department or distributor of any errors or omissions you discover so that we can revise this manual. This allows us to improve our documentation.

During the life of the mower, technical developments may result in the need to revise this manual. It is then up to Roberine to determine whether a revision/new version of this manual is necessary.

This table shows the major changes in each version of this manual.

Version	Date	Changes
V1.2	October 2022	Original version
V1.4	December 2022	Dutch as source language
V1.5	April 2025	Addresses adjusted

The information in this document focuses solely on the use and maintenance of the mower as intended by Roberine. In the event that the products, components or procedures are applied in a way that differs from the instructions in this manual, you must check with Roberine to determine whether such use is correct and appropriate.

2 Safety

The F302 and R302 mowers are carefully designed and expertly manufactured for safe use, which is confirmed by the declaration of conformity (see *Appendices* on page 88). Unfortunately, however, it is not possible to mitigate all hazards and safety risks. These risks are inherent in the operation of the machine by users and service technicians.

This chapter focuses on safety instructions and precautions, how they are indicated and what the driver must do and not do.



WARNING It is very important that you read the safety instructions and precautions carefully and also understand and follow them under all circumstances. Failure to do so can lead to serious physical injury or even death.

2.1 General safety instructions

WARNING



- Do not run the engine in an enclosed space, as dangerous carbon monoxide fumes may collect there.
- Do not leave the machine unattended while the engine is still running.
- Never raise the mowing platforms while the blades are still rotating.
- Do not use the machine if a protective cover is defective or if the safety provisions are not in place.
- Do not change the speed controller settings or make changes to the engine to increase the power. Running the engine at a speed that is too high for the engine increases the risk of personal injury.
- Turn off the engine and remove the ignition key before:
 - > checking, cleaning or working on the machine
 - > refuelling
 - > changing the height adjustment of the mowing units
 - > clearing a blockage or removing a foreign object Always inspect the machine for damage and make any repairs before restarting the machine.
- Do not use the machine if you are under the influence of alcohol, drugs or medicines that affect driving ability.
- Do not wear headphones or earbuds to listen to music. Your full attention is required for safe operation and maintenance of the machine.

CAUTION!



- Mow only in daylight or sufficient artificial light.
- Remember that there is no such thing as a safe slope. Pay close attention, especially when driving on grassy slopes. To prevent rollover:
 - > Do not stop or start the machine suddenly when driving up or down slopes.
 - > Drive slowly on slopes.
 - > Always watch out for uneven surfaces, holes and other hidden dangers.
 - > Never mow across a slope.
 - > For the maximum inclination angle, see the sticker present on the machine.
 - > When driving on a slope, a buzzer sounds and a warning appears on the display.
 - > Optionally, an inclination sensor can be fitted. Then the slope angle is shown on the display.
- Drive slowly through sharp bends. Be cautious when approaching blind corners, bushes, trees and other objects that obstruct your view.
- Look out for traffic when crossing or working near public roads.
- Stop the mower blades before driving over ground that is not covered with grass.
- Never eject material towards bystanders, and prevent people from coming near the machine when it is in use. Stop the machine if anyone enters the work area.
- Only use accessories and additional parts approved by the manufacturer.
- Do not transport passengers:
 - > Only the driver may sit on the machine. Passengers on the machine or additional parts may be hit by flying objects or thrown off the machine, which can lead to serious injury.
 - > Passengers can obstruct the driver's view and can lead to unsafe operation of the machine.

2.2 Hazards

2.2.1 Mowing units

DANGER! Contact with the cutting edges of a rotating mowing unit will result in serious personal injury or even death:



- Rotating mower blades can cut arms and legs and eject objects.
- Keep hands, feet, long hair and clothing away from the mowing units and rotating parts when the engine is running.
- Always stay alert and drive forward carefully. People may enter the area to be mowed without you being immediately aware of their presence.
- Before driving backwards, switch off the mowing units and check whether anyone is behind or beside the machine.
- Do not mow while driving backwards.
- Switch off the mower blades when you are not mowing.
- Always park the machine safely before leaving the driver's seat.
- Keep all body parts away from the edges of the mower blades. If the locking mechanism is disengaged, the mower blades may rotate unexpectedly due to residual hydraulic pressure or other energy stored in the system.
- Make sure that bystanders stay away from the mowing units when you are adjusting them or performing maintenance on them.
- Always wear gloves when turning the mower blades manually.
- If one of the mower blades is turned manually, the other cylinders may also start rotating.

2.2.2 Protect children

WARNING Children find lawnmowers and mowing interesting and fun. They do not understand the risks of the spinning blades and do not realise that the user is unaware of their presence.



- Never let children ride on the machine or any part of the machine, even when the blades are switched off. Serious injury or even death could result.
- A child may be involved in a serious accident if the driver does not pay attention to the possible presence of children, especially when a child approaches the machine from behind. You must switch off the mowing units before and while driving backwards and check if anyone is behind or beside the machine.
- Never use the machine as a toy or to entertain children.
- Always pay attention to the presence of children. Never assume children will stay where you last saw them. Stop the machine if a child enters the work area.

2.2.3 Preventing rollovers

WARNING Slopes play an important role in accidents where the operator has lost control of the machine and/or the machine has rolled over, often with serious or fatal consequences. Extra caution is required when working on a slope:



- Do not mow on a slope if you do not feel safe.
- Drive straight up and down slopes, never across them.
- Never use the machine on a slope steeper than indicated on the sticker on the machine. See *Safety symbols on the machine* on page 10
- Watch out for holes, uneven surfaces, rocks, stones or other hidden obstacles. The machine may roll over on uneven surfaces. Objects can be hidden from view by tall grass.
- Driving the machine on a slope with wet grass is not recommended. The wheels may lose their grip, even if the brakes are working properly.
- Whenever possible, do not start, stop or turn the machine on a slope. If the tyres lose their grip, switch off the mowing cylinders and drive slowly straight down the slope.
- Make sure all movements on a slope are performed slowly and carefully. Do not suddenly change speed or direction.
- Do not mow close to steep slopes, ditches, banks, embankments or water. The machine may roll over suddenly if one of the wheels travels over the edge or one of the edges collapses. Maintain a safe distance between the machine and dangerous areas.

- Always drive very slowly and avoid sudden stops when the mowing units are raised.
- Lower the mowing units when driving on slopes, as this makes the machine more stable.

2.2.4 Avoid pressurised liquids

WARNING Contact with released pressurised fluids can result in serious physical injury or even death.

- Depressurise the hydraulic systems before performing maintenance on your machine.
- Make sure all hydraulic fluid connections are tightened before pressurising the system.
- Check hydraulic fluid connections regularly for leaks. These can become loose due to damage or vibration. Tighten loose connections.
- Check hydraulic hoses and pipes regularly. Hydraulic hoses can fail due to damage, kinking, ageing and exposure to the elements. Replace damaged hoses and pipes.



CAUTION! In the event of an accident, contact a medical specialist immediately. If the fluid penetrates the skin, it must be surgically removed within a few hours to prevent gangrene. Medical specialists unfamiliar with this type of injury are urged to consult reliable medical sources.



2.2.5 Tyres

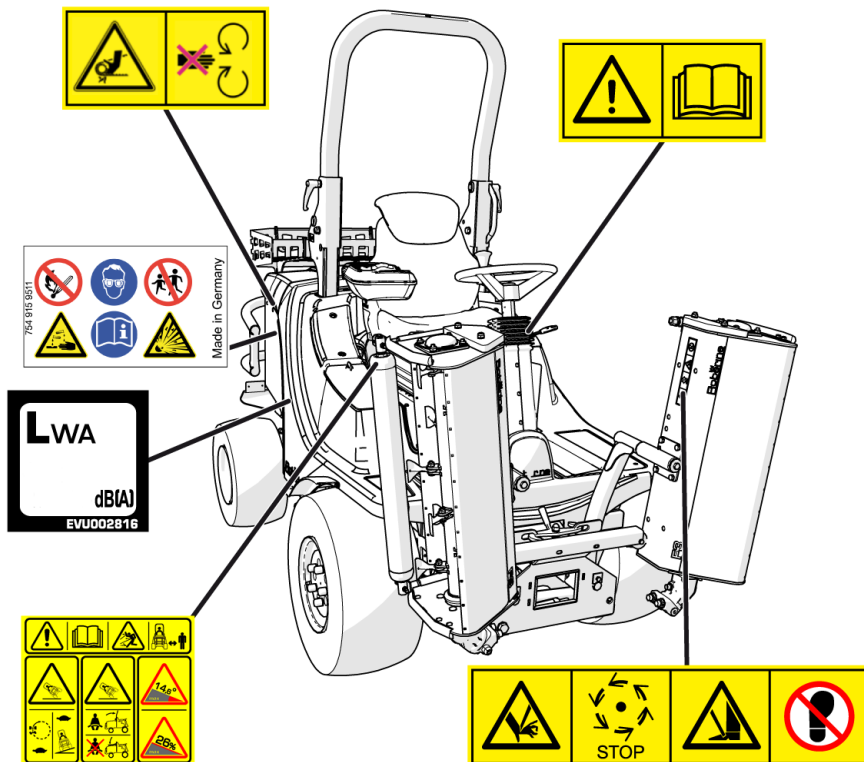
WARNING Tyres or rims that come off unexpectedly can cause serious or even fatal injuries.

- Do not fit tyres if you do not have the right equipment or sufficient experience.
- Make sure the tyre pressure is correct. Do not inflate tyres to more than the recommended pressure.
- Never perform welding on or heat a wheel while a tyre is still mounted. The heat can increase the pressure and cause the tyre to explode. Welding can also weaken the structure of or deform the wheel.
- When inflating the tyres, use a clamp-on connector with an extension hose long enough to allow you to stand at the side of the tyre so that you do not have to stand in front of the tyre or hang over it.
- Check tyres regularly for cuts and bulges, damaged rims and missing nuts or bolts.



2.3 Safety symbols on the machine

The following safety symbols are found on the machine:





CAUTION!

This user manual contains information important for safe operation of the machine. Observe all safety rules to avoid accidents.



CAUTION!

Avoid injury from rotating blades. Keep hands and feet away from rotating blades. Turn off the engine before servicing, lubricating or removing cutting units. Remember that the machine may continue to move for a while after the engine has been switched off. Wait until all parts have completely stopped.



CAUTION!

Avoid injury from the fan. Do not open or remove the safety guards while the engine is running.



Version with cab

CAUTION!

- Read the user manual before using the machine.
- Risk of flying objects. Stay away from the machine when it is in use.
- Risk of rollover: drive slowly through bends and on slopes.
- Do not use the machine on a slope steeper than indicated on the sticker.



Version with ROPS (RollOver Protection System)

CAUTION!

- Read the user manual before using the machine.
- Risk of flying objects. Stay away from the machine when it is in use.
- Risk of rollover: drive slowly through bends and on slopes.
- Always wear the seat belts when the ROPS is folded out. DO NOT wear the seat belt when the ROPS is folded down.
- Do not use the machine on a slope steeper than indicated on the sticker. Always use the ROPS when driving on a slope.



CAUTION!

- Do not smoke near the battery, and keep fire away from the battery.
- Wear eye protection and gloves when performing battery maintenance.
- Keep children away from the battery when you are performing battery maintenance.
- Do not spill electrolyte on your skin.
- Read the user manual before carrying out battery maintenance.
- Batteries produce a flammable, explosive gas.



This label on your machine indicates that this model conforms to the applicable requirements of Directive 2000/14/EC on noise emissions in the environment.

2.4 Safety functions

2.4.1 Safety mechanisms

Seat belt



- Always wear a seat belt when operating the machine to minimise the risk of injury due to an accident, such as rolling over.
- You must never adjust, dismantle or repair the seat belt.
- Replace the entire seat belt when the mounting components, buckle, belt or retractor show signs of damage.
- Inspect the seat belt and mounting components at least once each year. Check for indications that parts have become loose or the belt has been damaged, such as cuts, fraying, extreme or unusual wear, discolouration or abrasions. Replace parts only with replacement parts approved by Roberine.
- Layers of thick clothing can prevent proper seat belt positioning and can reduce the effectiveness of the seat belt.

Roll-over protection structure



CAUTION! Keep the ROPS properly installed.

- Never operate the machine without the ROPS installed.
- Ensure that all parts of the ROPS are correctly installed after the ROPS has been detached or removed for any reason. All ROPS hardware must be tightened to the correct torque in accordance with the manufacturer's recommendations.
- Any modifications to the ROPS must be approved by the manufacturer. The protection provided by the ROPS will be compromised if the ROPS is subjected to structural damage, involved in a rollover incident or altered in any way by welding, bending, drilling or cutting.
- The seat is part of the ROPS safety zone. Replace parts only with replacement parts approved by Roberine.
- Never try to repair a damaged or modified ROPS. It must be replaced to maintain the manufacturer's certification of the structure.

Safety system

The machine is equipped with an active safety system which ensures that the machine is only operable under certain conditions.

Test the safety system for correct operation before each use of the machine. See *Testing safety systems* on page 38.

2.4.2 Emergency stop



CAUTION! Always stay seated and hold the steering wheel if you need to make an emergency stop. Getting up from the seat or letting go of the steering wheel can result in dangerous situations.

In an emergency:

1. Quickly lift your foot from the foot pedals.
This engages the hydraulic brake.
2. If necessary, activate the parking brake until the machine slows down.

2.5 Instructions for the driver



WARNING The driver is responsible for the safe use of the mower. Failure to follow safety rules and instructions may result in serious personal injury or damage to the machine.

The driver:

- is trained and authorised to operate the machine.
- is aware of and prevents dangerous situations.
- always inspects the machine before use.
- tests the operation of the machine.
- inspects the work area.
- keeps bystanders at a safe distance.
- only uses the machine as intended.
- wears the correct safety equipment and clothing.
- does not operate the machine when he/she is under the influence of medicine, alcohol or drugs.
- has fully read and understood the safety and operating instructions.
- is familiar with local laws and regulations.

2.6 Personal protective equipment



WARNING It is important to wear protective equipment to avoid physical injury.

- Always wear safety glasses with side shields when operating the machine.
- Wear close-fitting clothing and use personal protective equipment suitable for the job.
- When mowing, always wear sturdy shoes and long trousers. Do not operate the machine with bare feet or open sandals.
- Use the required personal protective equipment, such as earplugs. Loud noise can damage your hearing or cause deafness.

2.7 Parking safely



WARNING Always park the machine safely before performing maintenance tasks or storing the machine. Failure to do so can lead to serious physical injury or even death.

1. Park the machine on a horizontal surface, not on a slope.
2. Switch off the mowing units.
3. Lower the mowing units to the ground.
4. Engage the parking brake and lock it.

5. Turn off the engine.
6. Remove the ignition key and put it in your pocket.
7. Wait until the engine and all moving parts have come to a stop before leaving the driver's seat.
8. Close the fuel shut-off valve if the machine has one.
9. Disconnect the negative cable from the battery before carrying out any maintenance work on the machine.
10. If necessary, block the wheels.

2.8 Environmental aspects

2.8.1 Disposal

The owner and/or user of the mower is responsible for disposing of waste material (e.g. oil) in accordance with applicable local laws or regulations.

2.8.2 REACH declaration

The REACH Regulation came into force on 1 June 2007. The REACH Regulation aims to improve the protection of human health and the environment against chemical substances.

Roberine manufactures articles in accordance with the current revision of the REACH Regulation and is a downstream user of chemical substances.

Roberine intends to fully comply with the REACH Regulation and has audited its suppliers to ensure that they comply with REACH requirements for all materials and substances used in our products.

Roberine provides relevant information, such as a material safety data sheet (MSDS), upon request.

2.8.3 End-of-life disposal

When the mower has reached the end of its usable life, the owner and/or user is responsible for safely dismantling the mower and disposing of its parts in accordance with local laws, regulations and recommendations.

3 Introduction

3.1 Mowing

The Roberine F302 and R302 are specially designed to mow grass in sports parks, parks and green spaces. The flail mower unit of the F302 was designed by Roberine. The specially designed mowing head and unique flails allow for a relatively high mowing speed, even when the grass is long. This results in evenly cut grass. Moreover, the cut grass is spread evenly, giving a smooth mowing result. Thanks to the easily adjustable mowing height, the machine can perform highly varied work, and a perfect mowing result is guaranteed even on uneven ground.



CAUTION! Only use the mower as intended and for the purpose for which it was designed. If the machine is used for other, unintended purposes without prior written permission from Roberine, the warranty will be void!

3.2 Engine

The engine used to power the mower's drive unit and the oil supply pump for the hydraulic functions is the Yanmar 3TNV86CT-DVX.

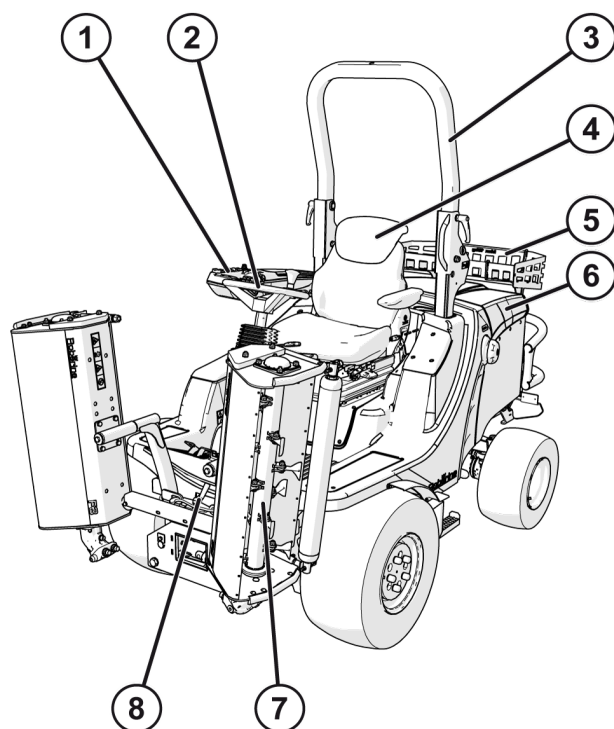


NOTICE Information about the engine's characteristics and its use, maintenance and repair is given in the engine's manual. You have received this manual from us.

4 Description

4.1 Machine

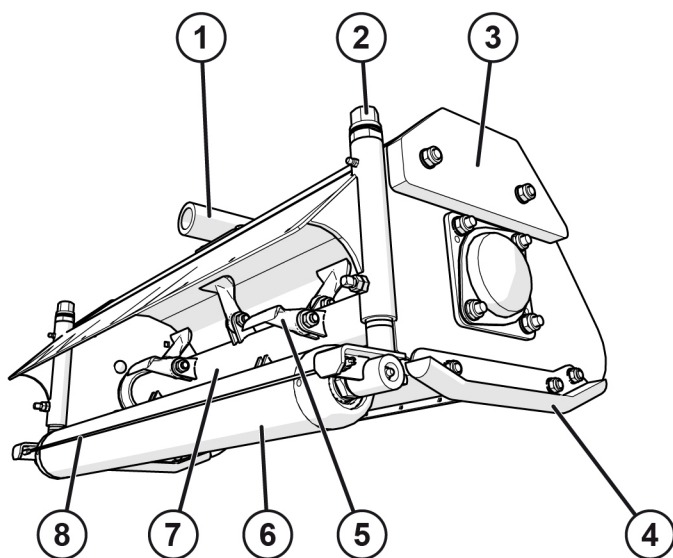
Your machine is the mower F302 or R302. Both models can be supplied with a ROPS or cab.



1. Command arm: This is where all control buttons and the display are located.
2. Steering wheel.
3. ROPS. The rollover protection system (ROPS) prevents the operator from being crushed if the machine tips over.
4. Seat.
5. Storage basket.
6. Engine. The engine provides the hydraulic drive for the mower.
7. Mowing units. These are flail units (F302) or reel units (R302).
8. Locking levers for mowing units.

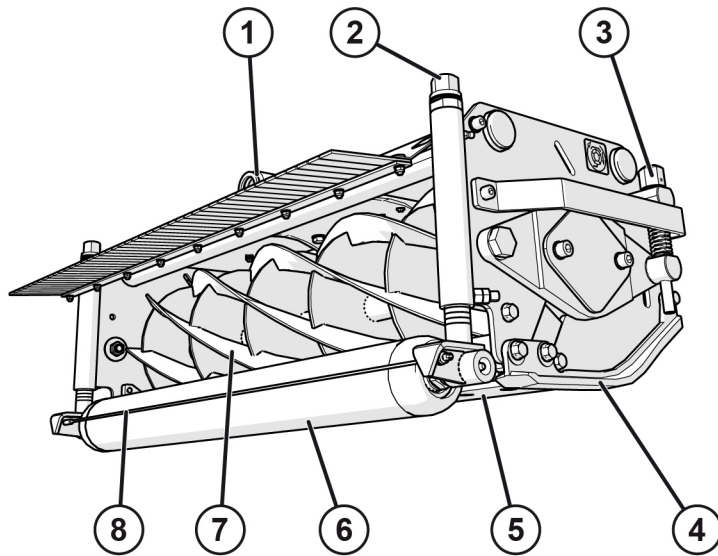
4.2 Mowers

4.2.1 Flail mower



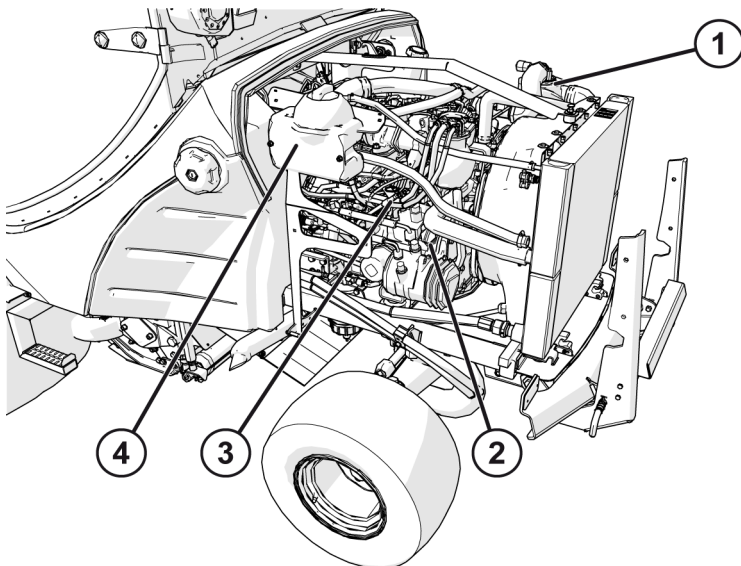
1. Attachment point
2. Mowing height adjustment
3. Counterweight
4. Skid shoe
5. Flail
6. Roller
7. Rotor shaft
8. Scraper

4.2.2 Cylinder mower



1. Attachment point
2. Mowing height adjustment
3. Adjustment of cutting blade in relation to fixed blade
4. Skid shoe
5. Fixed blade
6. Roller
7. Blade reel
8. Scraper

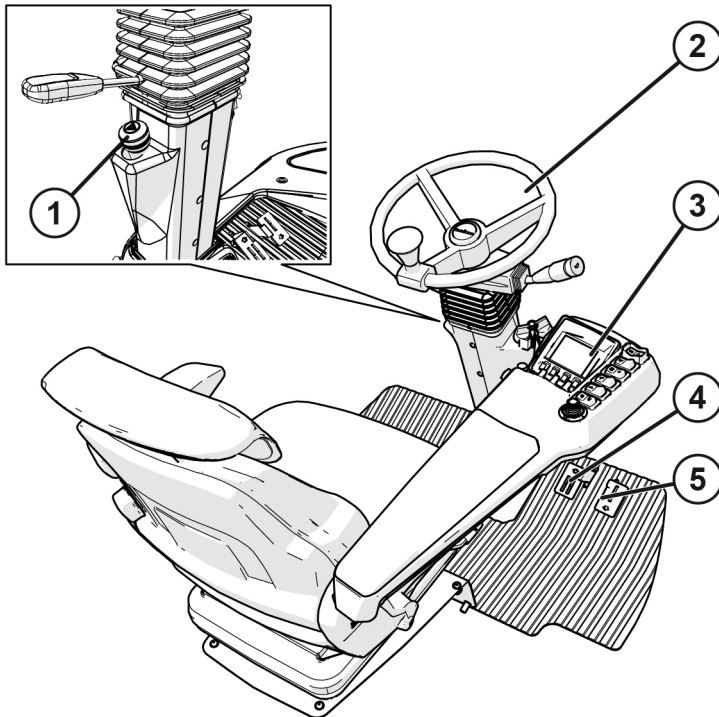
4.3 Engine compartment



1. Air filter
2. Oil filler cap
3. Oil dipstick
4. Coolant tank and filler cap

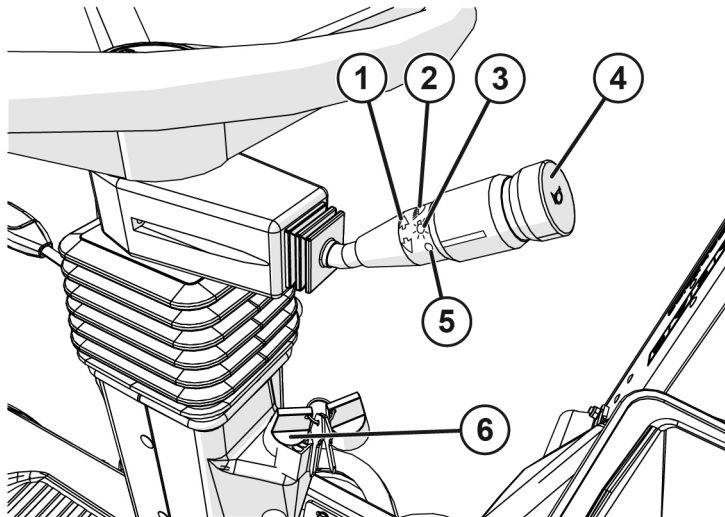
4.4 Controls

Overview



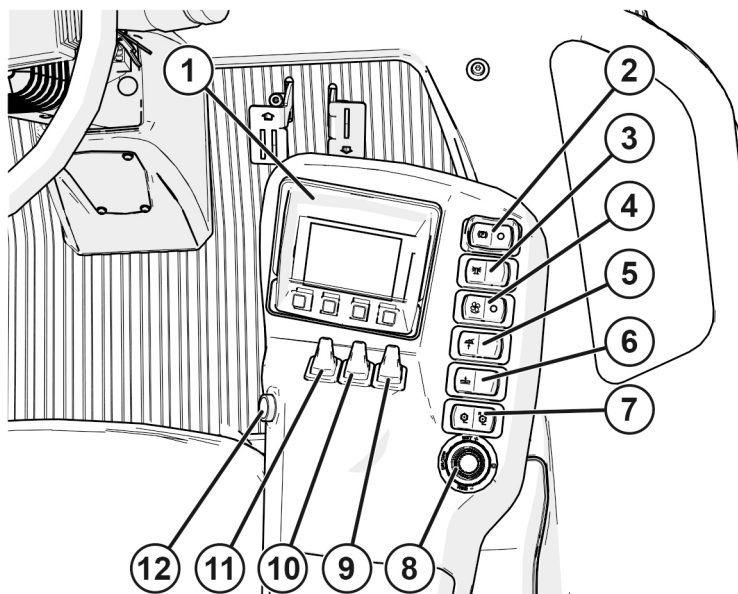
1. Switch for hazard lights
2. Steering wheel
3. Command arm
4. Forwards pedal
5. Reverse pedal

Steering column



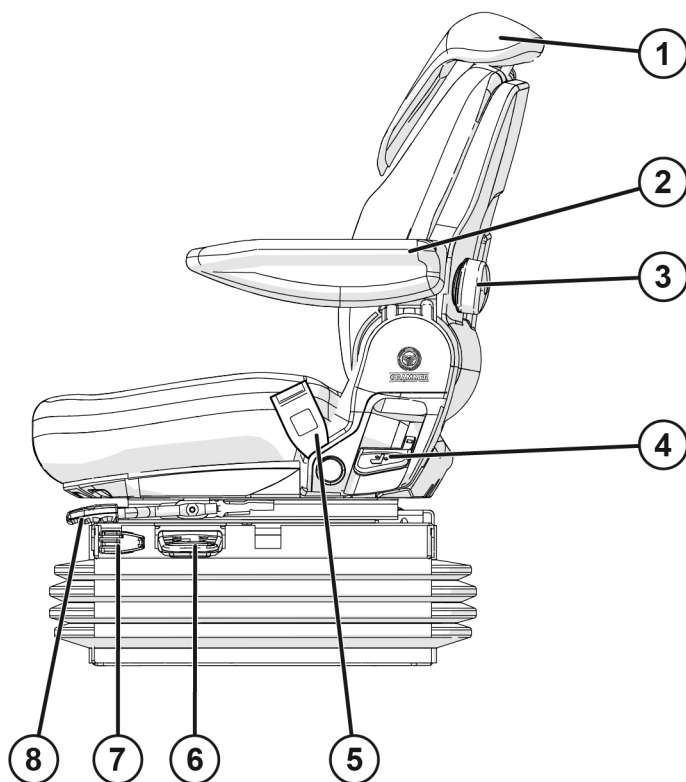
1. Direction indicator left, right
2. Lights off
3. Parking lights on
4. Horn
5. Headlights on
6. Ignition

Command arm



1. Display with controls
2. Parking brake: on/off
3. Flashing light: on/off (ROPS)
4. Cooling fan direction: manual/auto/off
5. Mowing unit float position: on/off
6. Mowing unit lift function: on/off
7. Mowing unit operation: mowing/neutral/backlapping
8. Cruise control
9. Raise/lower right mowing unit
10. Raise/lower centre mowing unit
11. Raise/lower left mowing unit
12. Cross-cut: activates simultaneous raising/lowering of all mowing units

4.5 Seat

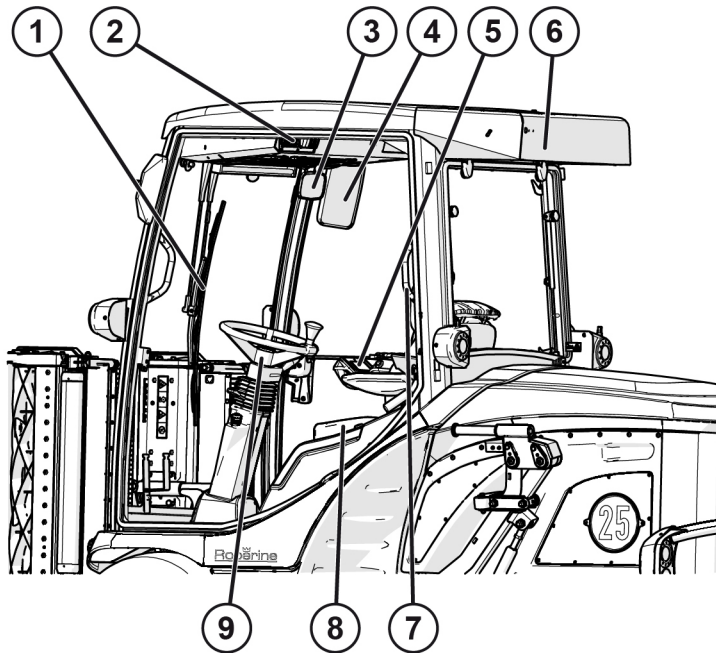


1. Backrest extension
2. Armrest
3. Lumbar support adjustment
4. Backrest adjustment lever
5. Seat belt receptacle
6. Seat height adjustment lever
7. Horizontal shock absorber lever
8. Seat position lever

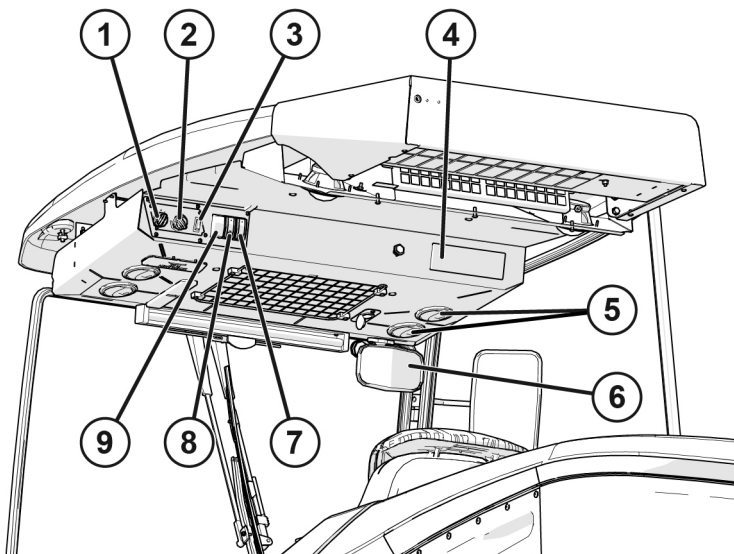
4.6 Cab



NOTICE This is the description of the machine that has a cab instead of a ROPS (rollover protection system).



1. Windscreen wiper
2. Control panel
3. Rear-view mirror
4. Side mirror
5. Command arm
6. Air conditioning
7. Handle
8. Seat
9. Steering wheel



1. Rotary switch for speed of blower fan
2. Temperature controller (thermostat)
3. Switch for air conditioning

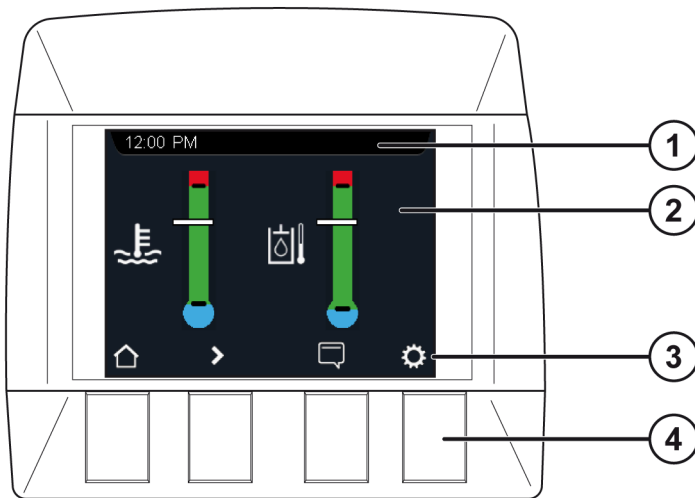


NOTICE Only turn on the air conditioning when the engine is running. Without the engine running, the air conditioning will drain the battery.

4. Radio preparation
5. Vents
6. Rear-view mirror
7. Switch for flashing light
8. Windscreen washer
9. Switch for windscreen wiper

5 Display

Overview of display functions.



1. Status bar
2. Screen
3. Button functions:
 - Start
 - Next screen
 - Alarms
 - Settings
4. Buttons



NOTICE Open a new screen or press a button to open the bar with button functions (3). The four buttons always correspond to the icons at the bottom of the screen.

5.1 Navigation

5.1.1 Status bar

Overview of icons in the status bar:



1. Time
2. DPF regeneration active
3. Float position mowing units active
4. Maintenance required
5. Parking brake ON
6. Cruise control active
7. Mowing active
8. General alarms
9. General warnings

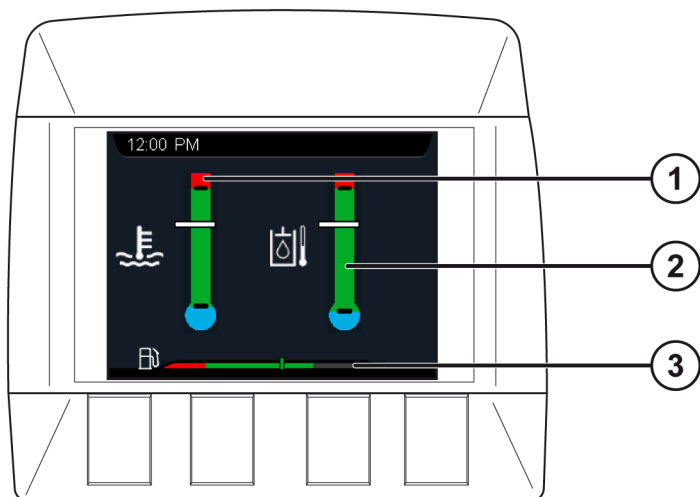


NOTICE Open a new screen or press a button to open the bar with button functions (3).

5.1.2 Main screens

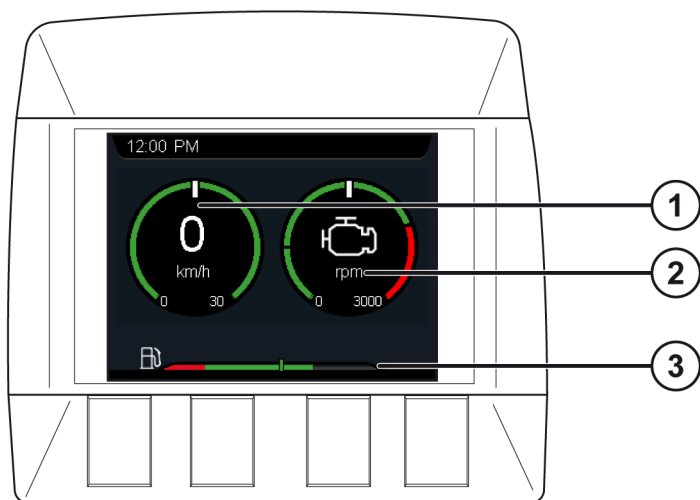
Overview of icons in the status bar

Screen 1



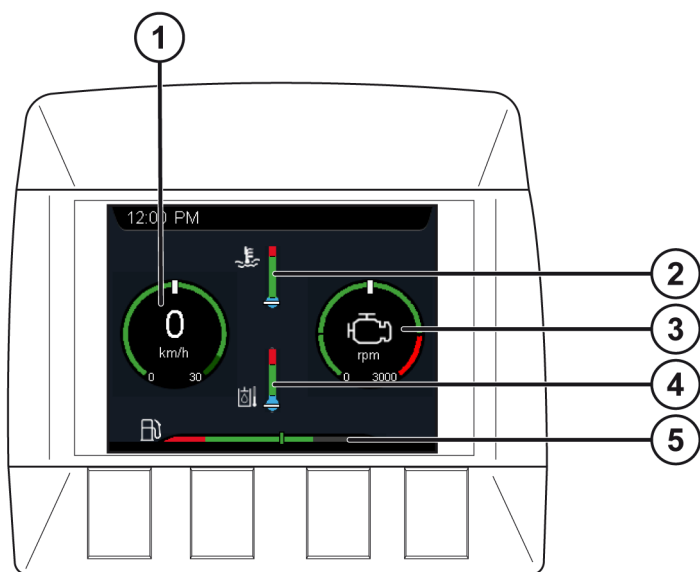
1. Engine coolant temperature
2. Hydraulic oil temperature
3. Fuel level

Screen 2



1. Speedometer
2. Tachometer
3. Fuel level

Screen 3



1. Speedometer
2. Engine coolant temperature
3. Tachometer
4. Hydraulic oil temperature
5. Fuel level

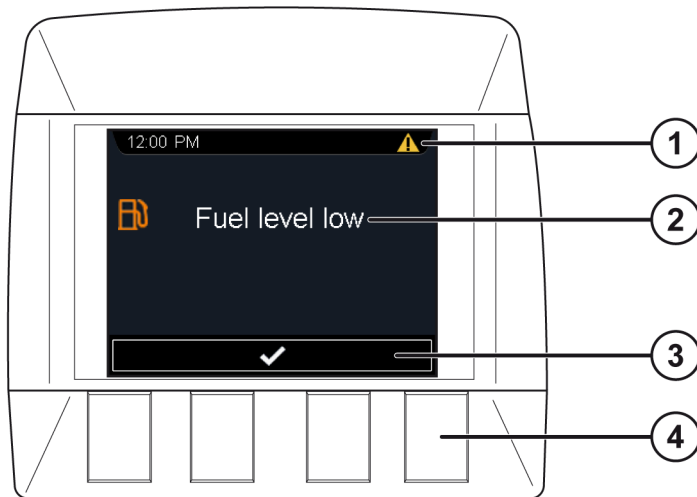
5.1.3 Alarms

Pop-up messages



NOTICE Alarm messages appear in a pop-up on the screen and disappear after a few seconds. Press one of the four buttons (4) to make the message disappear.

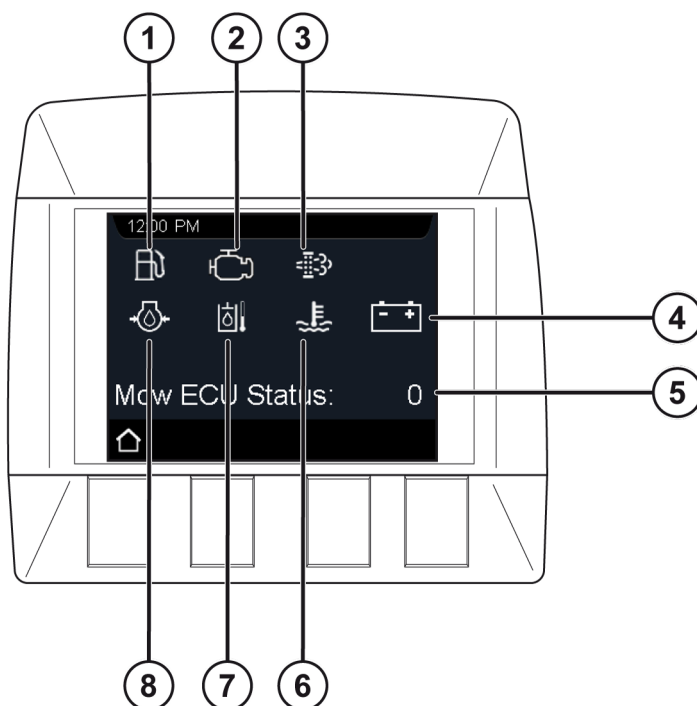
Example of a pop-up



1. General alarm
2. Alarm
3. Confirm
4. Buttons

Alarm screen

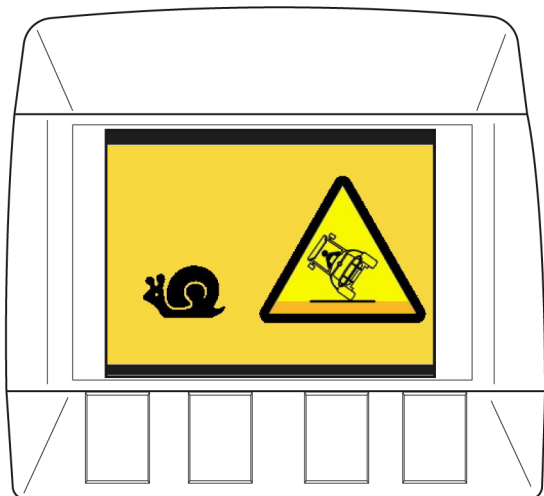
This screen shows all possible alarms and the status of the mowing ECU (Electronic Control Unit). During normal operation the symbols are white. The alarm is active when a symbol changes colour. The status of the mowing ECU is indicated by a number. A complete list of the numbers and fault codes is provided in *Appendices* on page 88.



1. Fuel level low
2. Engine fault
3. DPF regeneration
4. Battery discharged
5. Mowing ECU status
6. Engine coolant temperature too high
7. Hydraulic oil temperature too high
8. Engine oil pressure too low

Slope angle warning

If the machine is driving on a gentle slope, a buzzer sounds. The display shows a warning triangle on a slowly flashing orange background.



NOTICE If this message is on the display, the mowing units cannot be lifted higher than the cross-cut height.

If the machine is driving on a steep slope, a buzzer also sounds. The display shows a warning triangle on a rapidly flashing red background.

Slope angle alarm



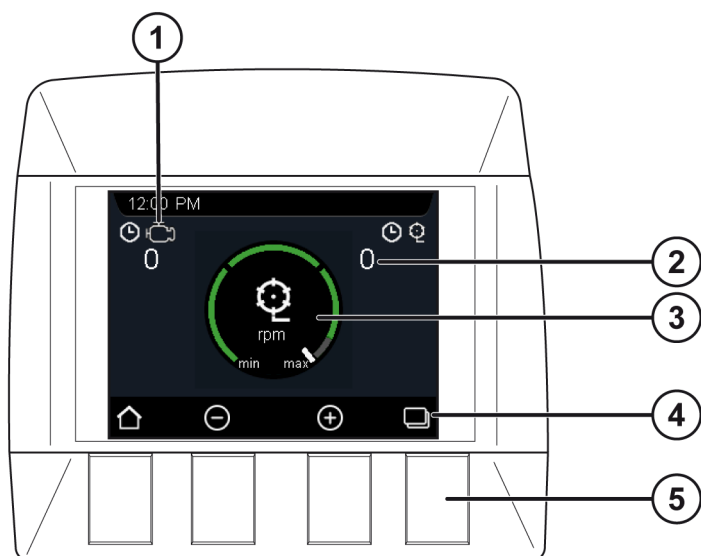
5.1.4 Status and settings screens



NOTICE Use the **Pages** button to switch between screens.

Mower speed, mowing hours, engine hours and mower speed adjustment

Settings screen 1 shows information on mower speed, mowing hours, engine hours and mower speed adjustment.



1. Engine hours
2. Alarm hours
3. Rotational speed of mowing units
4. Button functions:
 - Start
 - Decrease rotational speed of mowing units
 - Increase rotational speed of mowing units
5. Buttons

The table below shows the available speeds of the mowing units.

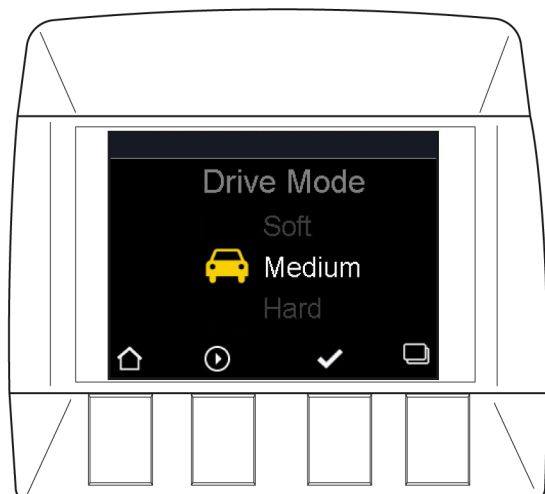
Type	Standard	Min 10%	Min 20%	Min 30%
R302	950	855	760	655
F302	3500	3150	2800	2450

Follow these steps to decrease or increase the speed:

1. Press the button below the minus symbol (-) to decrease the speed.
2. Press the button below the plus symbol (+) to increase the speed.

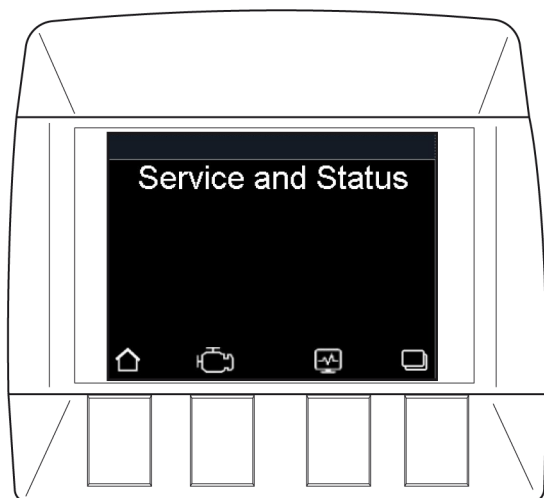
Driving mode

On settings screen 2 the driving mode can be adjusted.



Maintenance and status

Settings screen 3 provides access to detailed maintenance and status information.



1. Press the button below **Engine** to go to the **Diesel engine faults** page.
2. Press the button below **Display** to go to the **Statistics**.



NOTICE If this message is on the display, the mowing units cannot be lifted higher than the cross-cut height.

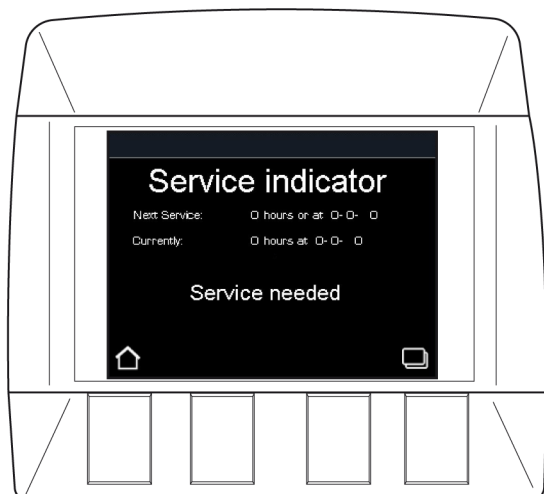
Maintenance indicator

The service indication screen indicates when the next service must be performed.

The 50, 100 and 250 hour maintenance intervals are set at the factory. After that, the operating hours or intervals set by the dealer apply.

The dealer can set service intervals of 0 to 2,500 operating hours and 0 to 12 months. If both are set to 0, no messages will appear on the screen.

Contact your dealer if you want to have the service message reset.



When the machine needs service, the flashing text 'Service Needed' appears on the screen during machine start-up.

- Press the **Home** button to return to close the notification.

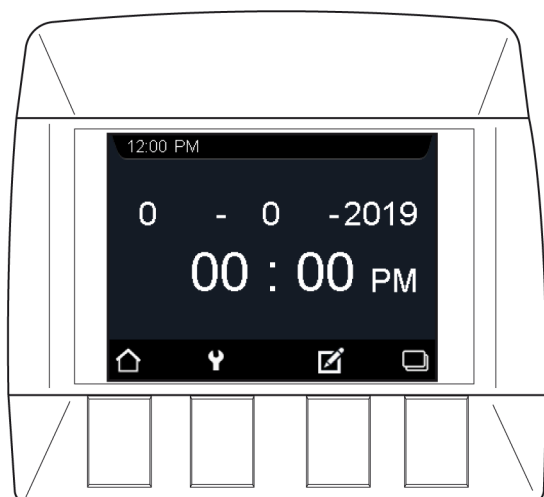
DPF regeneration

On settings screen 5 the DPF regeneration can be started. See



Date and time

On settings screen 6 the date and time can be set.



1. Press the button below **Edit** to adjust the date or time.

Display settings

On settings screen 7 the brightness of the display can be adjusted.

Localisation

On settings screen 8 the language, speed unit and time and date format can be changed.



- Language
 - > English
 - > Dutch
 - > German
 - > French
- Speed unit
 - > km/h
 - > mph
- Time format
 - > 24 hour
 - > 12 hour
- Date format
 - > dd-mm-yyyy
 - > yyyy-mm-dd

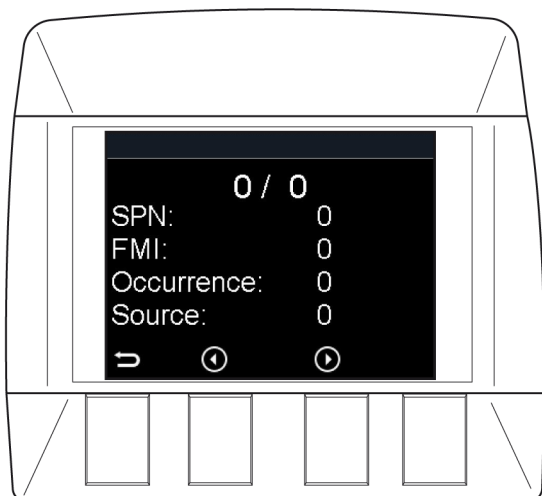
Maintenance and status information



NOTICE These screens can be accessed from the **Maintenance and status** screen. See screen 3 above.

Diesel engine faults

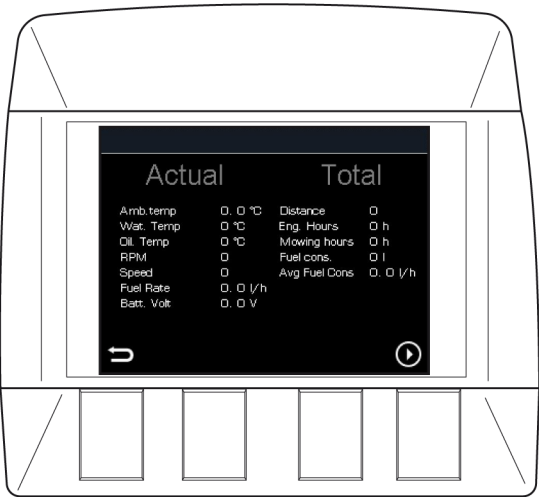
Faults in the diesel engine are shown on this screen.



NOTICE See the engine manual for explanation of these faults.

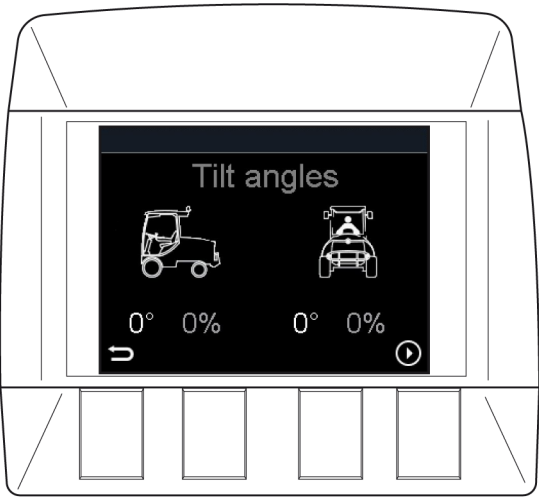
Statistics

The **Statistics** screen shows important information about your machine and the engine.



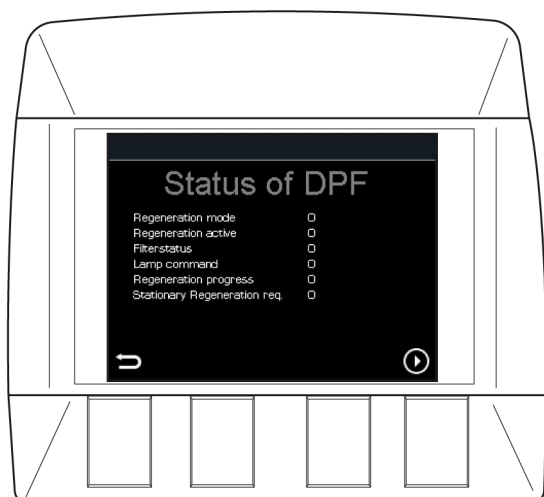
Slope angles

The mower can be optionally equipped with a tilt sensor. If this option is fitted, the slope angles are shown on this screen.



Status of the DPF

This screen shows the status of the DPF.



5.1.5 DPF regeneration

The diesel engine has a DPF (Diesel Particulate Filter). This filter collects particulates from the exhaust, which are then removed from the filter through thermal regeneration. Filter regeneration can be performed at five different levels:

1. Self-regeneration
2. Assisted regeneration
3. Reset regeneration
4. Stationary regeneration
5. Recovery regeneration

Self-regeneration and assisted regeneration

The first two regeneration levels take place automatically, without operator intervention.



NOTICE The machine can be used as normal during self-regeneration and assisted regeneration.



NOTICE During self-regeneration and assisted regeneration the engine produces more noise and white smoke may come out of the exhaust.



CAUTION! If the DPF is too full for self-regeneration or assisted regeneration, a reset regeneration or stationary regeneration is required.

Reset regeneration

The machine also performs reset generation automatically. However, the operator can postpone this regeneration. 'Automatic DPF regeneration requested' appears on the display.

1. Press the button below the tick mark to perform the regeneration.
2. Press the button below the clock icon (-) to postpone the regeneration.



NOTICE We advise against postponing a reset regeneration. If this is done too often, it can cause damage to the engine or necessitate a lengthy recovery regeneration.



NOTICE During regeneration a process indicator appears on the display. The indication disappears automatically when the process is completed.



NOTICE The machine can be used as usual during self-regeneration and reset regeneration.



NOTICE During self-regeneration and reset regeneration the engine produces more noise and white smoke may come out of the exhaust.

Stationary regeneration



CAUTION! The machine cannot be used during a stationary regeneration.



NOTICE A stationary regeneration takes 30 to 35 minutes.

A message appears on the screen that stationary regeneration can be performed. Follow these steps to perform a stationary regeneration:

1. Park the machine in a safe location.
2. Engage the parking brake.
3. Make sure there is enough fuel in the tank.
4. Press the suppression switch.
5. Press the **Allow stationary regeneration** switch for 3 seconds to confirm regeneration.
6. Press the **allow** switch again for 1 second.



CAUTION! We recommend that a stationary regeneration only be suppressed if the machine is not in a safe place. For example, if the machine is in an area with dry material that may catch fire during the process, due to high temperatures. Stay far enough away from flammable material.



CAUTION! Never interrupt the stationary regeneration process. Half a regeneration does not result in a half-clean engine. After an interruption the entire cycle must be carried out again.

Recovery regeneration



CAUTION! The machine cannot be used during a recovery regeneration.



NOTICE A recovery regeneration takes about 4 hours.

If the regeneration process has been postponed too many times, the machine must perform a recovery regeneration. A message appears on the screen that recovery regeneration must be performed. Follow these steps to perform a recovery regeneration:

1. Park the machine in a safe location.
2. Engage the parking brake.
3. Make sure there is enough fuel in the tank.
4. Press the **suppression switch**.
5. Press the **Allow stationary regeneration** switch for 3 seconds to confirm regeneration.
6. Press the **Allow recovery regeneration** switch for 1 second. Recovery regeneration is now active.



CAUTION! We recommend that a recovery regeneration only be suppressed if the machine is not in a safe place. For example, if the machine is in an area with dry material that may catch fire during the process, due to high temperatures. Stay far enough away from flammable material.



CAUTION! Never interrupt the recovery regeneration process. Half a recovery regeneration does not result in a half-clean engine. After an interruption the entire cycle must be carried out again.

6 Technical specifications

Engine specifications	
Manufacturer	Yanmar Engine
Model number	Yanmar 3TNV86CT-DVX
Power	30.7 kW/41.5 hp at 2600 rpm
Type	Vertical, water-cooled inline, four-stroke, diesel engine
Cylinders	3
Bore	86 mm (3.39 inches)
Stroke	90 mm (3.54 inches)
Cylinder volume	1568 cc
Speed, high	2600 rpm
Speed, low idle	1100 rpm
Cooling type	Coolant
Oil filter	Replaceable element, see Roberine spare parts manual.
Air filter	Cyclone filter and air filter
Maximum driving speed	25 km/h (15.6 mph)
Maximum mowing speed	13 km/h (8.1 mph)
Electrical system	
Charging system	55 A V-belt driven alternator
Starter motor	Engagement via solenoid valve
Battery voltage	12 volts
Battery capacity	45 Ah
Volume	
Fuel tank	45 litres
Hydraulic oil	55 litres
Cooling system	7.2 litres
Engine oil	5.5 litres
Recommended lubricants	
Hydraulic oil	Univis N46
Biodegradable hydraulic oil	Panolin HLP Synth 46
Engine oil	15W40 Delvac MX
Grease	Mobilgrease XHP 222
Tyres	
Front	320/55-12 (26x12-12 8-ply)
Rear	250/50-10 (20x10-10 6-ply)
Tyre pressure, front	1.2 bar / 120 kPa (17.4 psi)
Tyre pressure, rear	1.0 bar / 100 kPa (14.5 psi)

Dimensions	
Overall height of standard machine	148 cm
Overall height with ROPS	234 cm
Overall height with cab	228 cm
Overall length with mowing units	294 cm
Overall width	155 cm
Empty weight with mowing units and ROPS	1448 kg
Empty weight with mowing units and cab	1685 kg

Mowing units, F302	
Number of units	3
Type	Flail
Diameter	25 cm
Number of flails	12
Overall mowing width	215 cm
Flail rotation speed	3500 rpm

Mowing units, R302	
Number of units	3
Type	Reel/cylinder
Diameter	25 cm
Number of blades	6 or 8
Overall mowing width	215 cm
Cylinder rotation speed	950 rpm

Sound level measurement	
Average sound pressure level (open seat)	Lwa 103 dB(A)
User's ear	84 +/- 1 dB(A)
Average sound pressure level (closed cab)	Lwa 103 dB(A)
User's ear	84 +/- 1 dB(A)

7 Commissioning

This chapter describes how to commission the F302 and R302 mower.



NOTICE First, read the chapter *Safety* on page 8 carefully.

7.1 Pre-commissioning checks

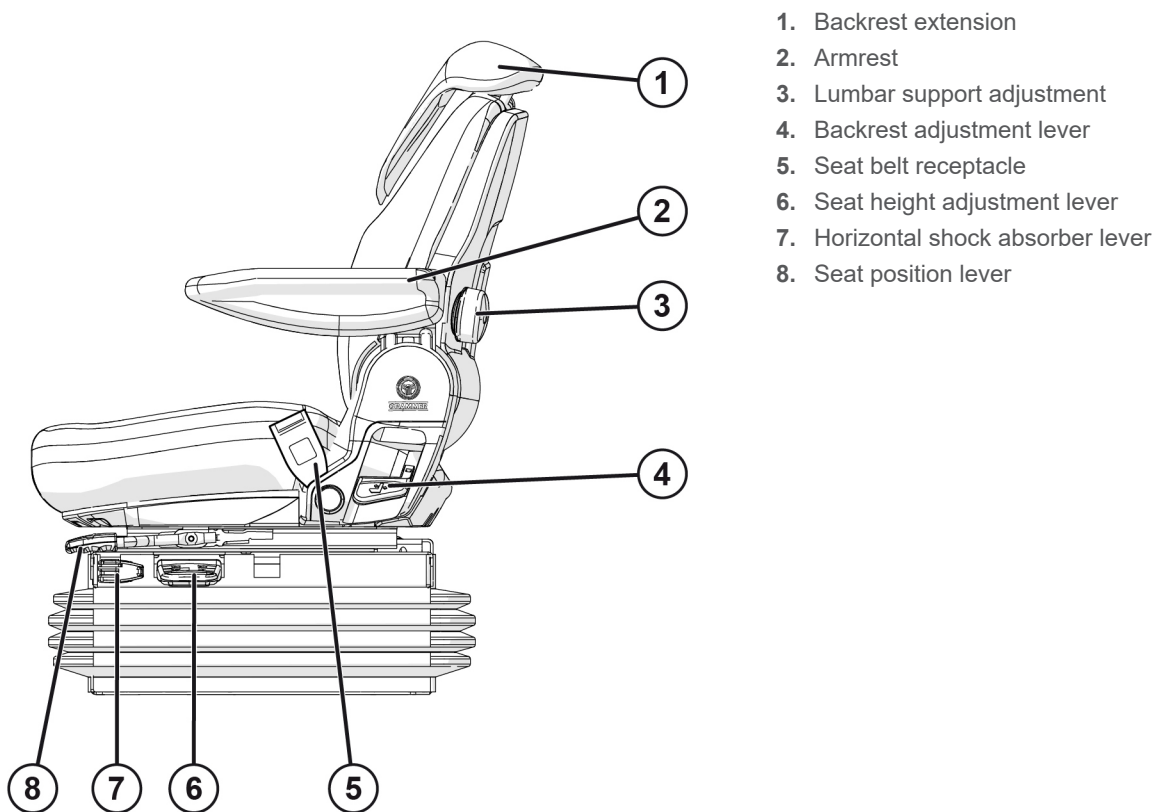
Before using your mower, check that:

- there is no transport damage
- there are no oil leaks
- you have received the spare parts for your machine
- the engine oil level is correct
- the hydraulic oil level is correct
- the coolant level is correct
- the mowing height is correct (see *Adjusting mowing height* on page 44)

7.2 Adjusting the seat



CAUTION! Never adjust the seat when the machine is in motion. Stop the machine before adjusting the seat to avoid losing control of the machine.



Height and weight adjustment

- Pull the seat height lever (6) up to raise the seat.
The seat automatically adjusts to the driver's weight.
- Push the seat height lever (6) down to lower the seat.

Adjusting the damper

- Push the lever of the horizontal shock absorber (7) backwards to activate horizontal shock absorption to dampen vibrations in the direction of travel.
- Push the lever of the horizontal shock absorber (7) forwards to lock horizontal movement of the seat.

Adjusting the backrest

- Move the backrest lever (4) up or down to adjust the backrest to the desired position.

Forward/backward adjustment

- Pull the seat position lever (8) up and slide the seat forwards or backwards to the desired position. Release the lever to lock the seat in this position.

Adjusting the armrest

- Turn the armrest lever (2) to adjust the angle of the armrest.

Adjusting the lumbar support

- Turn the lumbar support lever (3) to adjust the angle of the lumbar support.

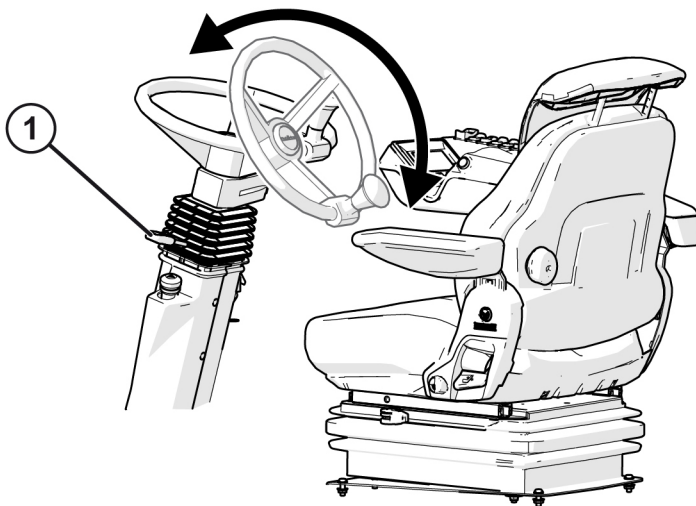
7.3 Adjusting the steering wheel

CAUTION!



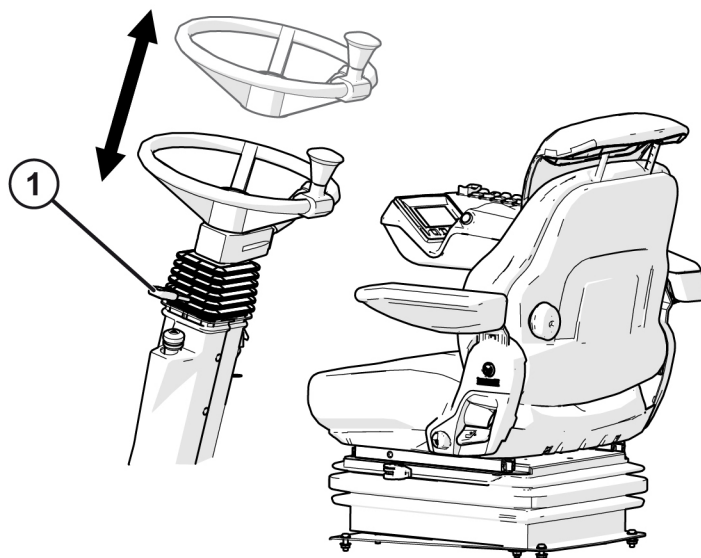
- Avoid injury! Never adjust the steering wheel when the machine is in motion. Stop the machine before adjusting the steering wheel to avoid losing control of the machine.
- Lock the steering wheel in the desired position before driving the machine.

Adjusting tilt angle



1. Push the lever (1) down.
2. Adjust the steering wheel position.
3. Release the lever to lock the steering wheel in this position.

Height adjustment



1. Pull the lever (1) up.
2. Pull the steering wheel up or push the steering wheel down.
3. Release the lever to lock the steering wheel in this position.

7.4 Fuel



WARNING Be careful with fuel. Do not top up the fuel when the engine is running. Do not smoke while refilling the fuel tank or while performing maintenance on the fuel system.



CAUTION!

Using the wrong fuel additives may damage the engine's fuel injection system. Never mix diesel fuel with engine oil or any other lubricating oil, as this will damage the engine.

Use the right type of diesel fuel for optimum engine performance and to reduce exhaust emissions. Failure to observe the fuel requirements below will void the warranty. Ask your local fuel supplier for the properties of the diesel fuel available in your area. Generally, diesel fuel is a blend so that the fuel meets the requirements for the lowest outdoor temperature in the region where the diesel fuel is sold.

Required diesel properties

It is recommended to use diesel fuel that conforms to the EN 590 standard. See the engine manual for more details on the required fuel properties.

Use of biodiesel

Biodiesel may only be used if its properties conform to the latest version of the EN 14214 standard or similar specifications. The current maximum allowed biodiesel concentration is a 5% blend with normal petroleum diesel (also known as B5).



NOTICE Ask your Roberine dealer if you want to know whether the recommendations for the use of biodiesel have changed.

7.5 Testing safety systems

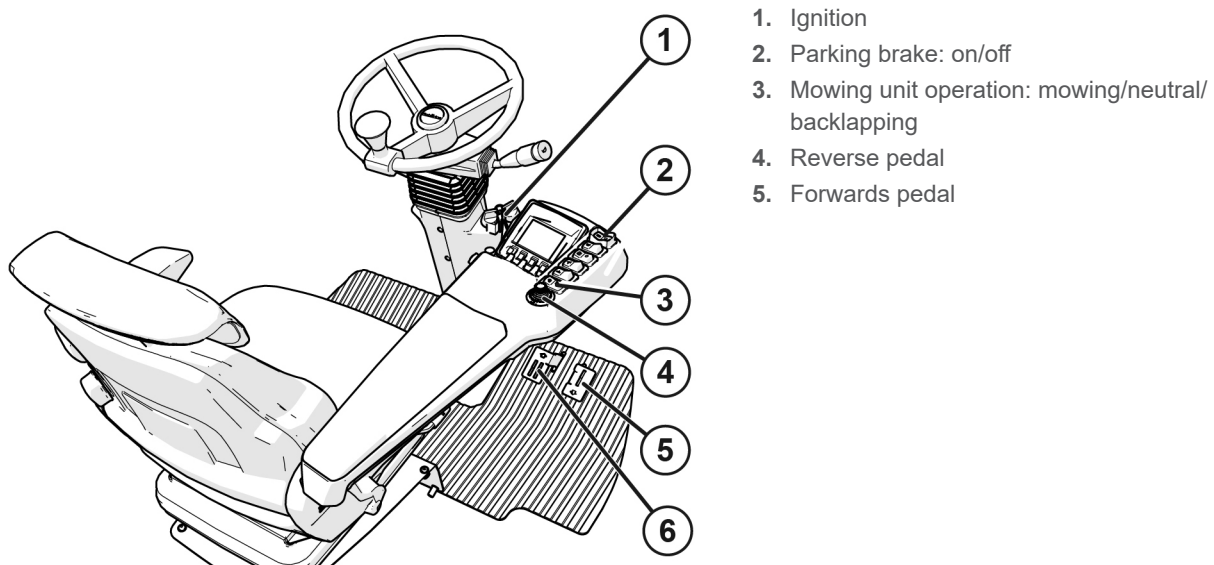
WARNING



- Whenever possible, move the machine outside before starting the engine.
- Never run the engine in an enclosed space without adequate ventilation. If there is insufficient ventilation, connect an extension hose to the engine's exhaust to remove exhaust fumes from the room.
- Let fresh air in so that exhaust fumes are removed from the work area.
- Perform the tests in an area free of obstacles, and keep at least 5 metres of free space around the machine. Keep bystanders out of the area.
- Do not use the machine if a malfunction is found while testing the safety system.

The machine has a number of active safety systems. Test them before using the machine.

Controls



Testing mowing unit operating switch

This test checks the function of the safety circuit for the **Mowing unit operation** switch.

1. Park the machine safely.
2. Sit in the seat.
3. Set the **Mowing unit operation** switch (3) in the mowing position.
4. Insert the key in the ignition (1).
5. Try to start the engine.

The engine should not start. If the engine does start, there is a problem with the safety circuit.

Testing parking brake switch

This test checks the function of the safety circuit for the **Parking brake** switch.

1. Park the machine safely.
2. Sit in the seat.
3. Set the **Parking brake** switch (2) to the off position.
4. Insert the key in the ignition (1).
5. Try to start the engine.

The engine should not start. If the engine does start, there is a problem with the safety circuit.

Testing parking brake

This test checks the general operation of the parking brake.

1. Sit in the seat.
2. Insert the key in the ignition (1).
3. Start the engine.
4. Place the machine facing uphill on a 26% (15°) incline.
5. Set the **Parking brake** switch (2) in the on position.
6. Stop the engine.

The parking brake should ensure that the machine remains stationary. If the machine does not remain stationary, there is a problem with the safety circuit.

Testing seat mechanism

This test checks the function of the safety mechanism for the seat.

1. Park the machine safely.
2. Sit in the seat.
3. Insert the key in the ignition (1).
4. Start the engine.
5. Set the **Mowing unit operation** switch (3) in the mowing position.
6. Stand up, but do not leave the mower.

The engine should stop running. If the engine keeps running, there is a problem with the safety circuit.

Testing the released position of the drive pedal

This test checks the function of the safety mechanism for the drive pedal.

1. Park the machine safely.
2. Sit in the seat.
3. Insert the key in the ignition (1).
4. Operate a foot pedal (4 or 5).
5. Try to start the engine.

The engine should not start. If the engine does start, there is a problem with the safety circuit.

8 Operation

This chapter describes how to operate the F302 and R302 mower.



NOTICE First, read the chapter *Safety* on page 8 carefully.

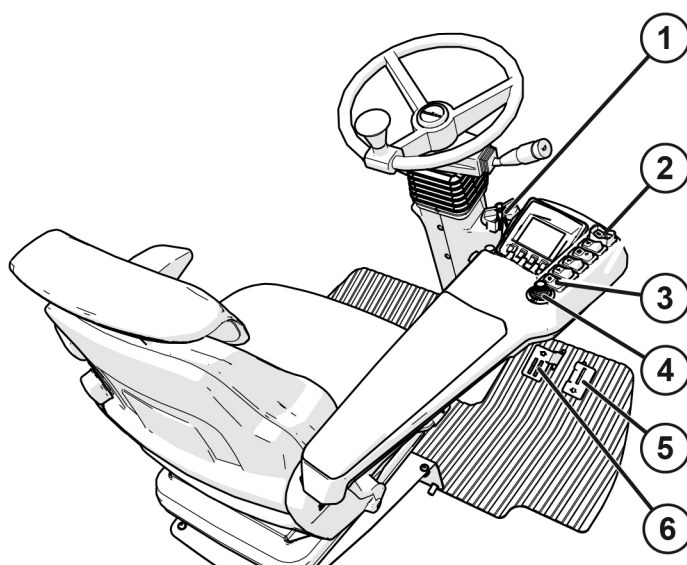
8.1 Pre-use checks

Before every use, check that:

- all safety guards and covers are in place
- there are no loose, missing or damaged parts
- the safety checks have been carried out as described in *Testing safety systems* on page 38
- the direction indicators work
- the engine oil level is correct and has been topped up if necessary
- the hydraulic oil level is correct and has been topped up if necessary
- no hydraulic oil is leaking from the machine
- the coolant level is correct and has been topped up if necessary
- the machine has sufficient fuel
- the tyres show no signs of damage and the tyre pressure is correct
- the wheel bolts are firmly tightened
- the red plunger of the air resistance indicator is not visible
- there is no dirt on/in the air intake grille, radiator and engine compartment
- there is no water in the water separator
- the rear axle and the rollers and bearings of all the mowing units are lubricated

8.2 Basic functions

Controls



1. Ignition lock
2. Parking brake: on/off
3. Mowing unit operation: mowing/neutral/backlapping
4. Cruise control
5. Reverse pedal
6. Forwards pedal

8.2.1 Starting the engine

CAUTION!



- Before starting the engine, ensure that all the daily checks, described in *Pre-use checks* on page 40, have been carried out.
- If possible, start the engine outdoors.
- Never run the engine in an enclosed space without adequate ventilation.
- Only start the engine when you are in the seat and all bystanders are at a safe distance.

1. Sit down and fasten the seat belt.

2. Insert the key in the ignition (1).

INFO: Do not operate foot pedals (5 and 6) while starting the engine.

3. Set the **Parking brake** switch (2) in the on position.

4. Set the **Mowing unit operation** switch (3) in the neutral position.

5. Operate the ignition key until the engine starts.

INFO: The starter motor may be damaged if it is used for more than 15 seconds. If the engine does not start, wait 30 seconds and try again.

6. Release the ignition key.



NOTICE After a cold start (<5 °C), let the engine and hydraulic system idle at low speed for the first few minutes.

8.2.2 Driving

CAUTION!



- Check that bystanders are at a safe distance before driving forwards or backwards.
- Switch off the mowing units before driving backwards.
- Stop the machine before changing from mowing speed to driving speed or vice versa. The operator may be thrown forwards if a different driving speed is selected while the machine is in motion.

Driving forwards

1. Start the engine.

2. Set the **Parking brake** switch (2) to the off position.

3. Depress the left pedal (6) to drive forwards.

4. Stop the machine by slowly releasing the foot pedal.

Driving backwards

1. Start the engine.

2. Set the **Parking brake** switch (2) to the off position.

3. Depress the right pedal (5) to drive backwards.

4. Stop the machine by slowly releasing the foot pedal.

8.2.3 Cruise control

Use cruise control (4) to save a driving speed and continue driving without using the foot pedals. The cruise control has the following options:

	SET + ↑	
ON/OFF ←	O	→ CANCEL
	↓ RESUME -	

ON/OFF

- Switch cruise control on: the driving speed is not changed or saved.
- Switch cruise control off: the stored driving speed is forgotten.

NOTICE The cruise control is switched off when:



- The right pedal (reverse) is depressed.
- The brake is used.
- The seat is unoccupied.

CANCEL

- Switch off the stored driving speed: the stored driving speed is not forgotten.

SET +

- Save the current driving speed.
- Increase the stored driving speed.

RESUME -

- Resume the stored driving speed.
- Decrease the stored driving speed.



NOTICE When the cruise control is switched on and you use the foot pedal (6) to increase the driving speed, the machine speeds up. When you release the foot pedal, the machine returns to the stored driving speed.

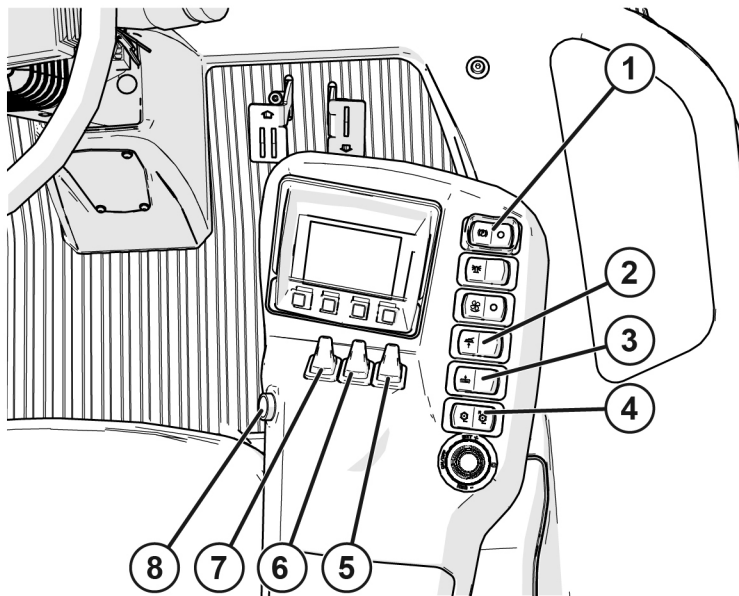
8.2.4 Turning the engine off

1. Remove your foot from the pedals (5 and 6).
2. Set the **Mowing unit operation** switch (3) in the neutral position.
3. Set the **Parking brake** switch (2) in the on position.
4. Allow the engine to cool.
5. Turn the ignition key to the off position.

INFO: The display is switched off.

8.3 Operating mowing units

Controls



1. Parking brake: on/off
2. Mowing unit float position: on/off
3. Mowing unit lift function: on/off
4. Mowing unit operation: mowing/neutral/backlapping
5. Raise/lower right mowing unit
6. Raise/lower centre mowing unit
7. Raise/lower left mowing unit
8. Cross-cut: activates simultaneous raising/lowering of all mowing units

8.3.1 Before you start mowing

Inspect the site

- Remove objects from the area to be mowed that could be thrown by the machine.
- Keep people and animals away from the area to be mowed.
- Make sure there are no low-hanging branches or similar obstacles within the area to be mowed that could obstruct the operator. Remove these obstacles.
- Follow a safe mowing pattern. Do not mow in areas with insufficient grip or stability.

8.3.2 Lowering the mowing units

Park the machine in a safe location.



CAUTION! Thrown objects can be dangerous. Before operating the mowing units:

- Make sure no one is in the work area, especially children.
- Remove objects that can be thrown by the mowing units.

1. Unlock the mowing units by turning the locking levers (8). See *Machine* on page 16
2. Start the engine.
3. Set the **Parking brake** switch (2) to the off position.
4. Set the **Mowing unit operation** switch (4) in the mowing position.
5. Set the **Mowing unit lift function** switch (3) in the on position.
6. Operate the **Raise/lower** switches:
 - a) Push the right switch (5) forwards to lower the right mowing unit.
 - b) Push the centre switch (6) forwards to lower the centre mowing unit.
 - c) Push the left switch (7) forwards to lower the left mowing unit.



NOTICE The first time you lower a mowing unit, the **Cross-cut** button must be pressed.



NOTICE Push all three **Raise/lower** switches forwards simultaneously to lower all the mowing units at the same time.

8.3.3 Raising the mowing units

Park the machine in a safe location.

1. Set the **Mowing unit operation** switch (4) in the mowing position.
2. Set the **Mowing unit lift function** switch (3) in the on position.
3. Operate the **Raise/lower** switches:
 - a) Pull back the right switch (5) to raise the right mowing unit.
 - b) Pull back the centre switch (6) to raise the centre mowing unit.
 - c) Pull back the left switch (7) to raise the left mowing unit.
4. Set the **Mowing unit lift function** switch (3) in the off position.
5. Set the **Mowing unit operation** switch (4) in the neutral position.
6. Lock the mowing units by turning the locking levers (8). See *Machine* on page 16



NOTICE Pull all three **Raise/lower** switches back simultaneously to raise all the mowing units at the same time.

8.3.4 Cross-cut

Using the cross-cut switch, you can fully or partially raise all lowered mowing units simultaneously.

1. Short press the **Cross-cut** switch (8) to raise the mowing units 30 cm.
2. Long press the **Cross-cut** switch (8) to raise the mowing units completely.
3. Press the **Cross-cut** switch (8) again to lower the mowing units.



NOTICE Using the cross-cut switch can be useful when you want to quickly raise all mowing units before reversing or turning.

8.3.5 Use of the float position

Use the float position to slightly raise all the mowing units to increase wheel traction or protect the ground. In the float position the mowing units still touch the ground.

- Set the **Mowing unit float position** switch (2) in the on position to slightly raise the mowing units.
- Set the **Mowing unit float position** switch (2) in the off position to lower the mowing units.

8.3.6 Adjusting mowing height

CAUTION!

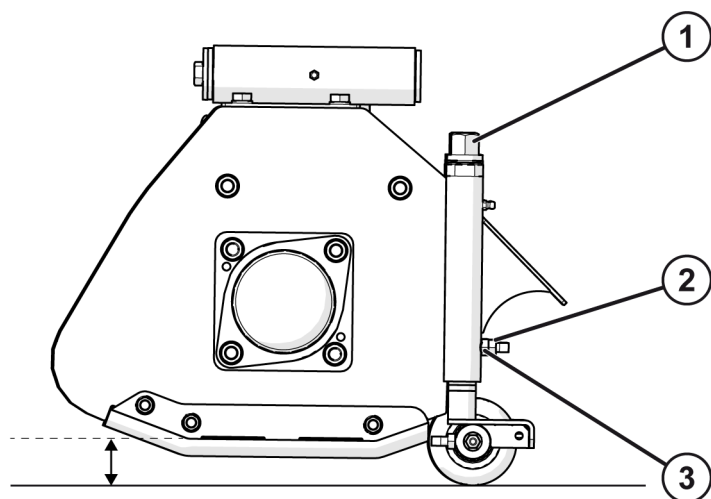


- Always wear protective gloves when performing maintenance on or near a mowing unit. Contact with the sharp cutting edges can result in serious injury.
- When a mowing cylinder is turned by hand, it is possible that other mowing cylinders will also turn.

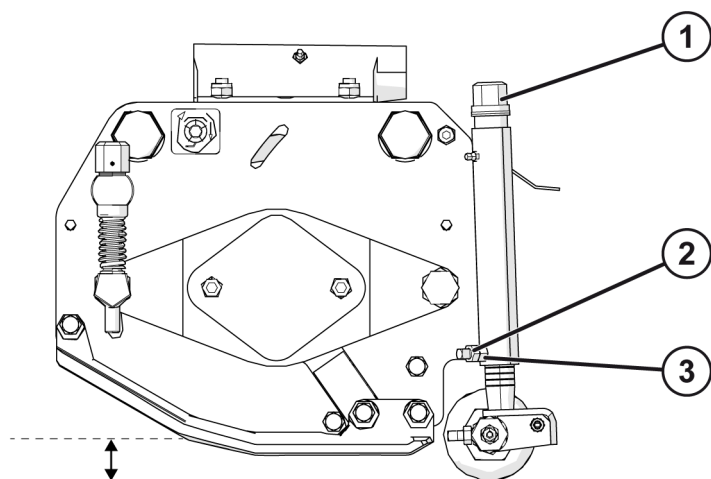
Before you start:

- Park the machine safely
- Lower the mowing units
- Switch off all mowing units
- Wait until the mowing units are completely stopped.
- Turn off the engine.
- Remove the key from the ignition and put it in your pocket.

Model F302



Model R302



1. Clean the mowing units. See *Cleaning the mowing units* on page 62.
2. Place a plate under the mowing units or make sure the units are over a flat surface.
3. Unscrew nut (3).
4. Loosen nut (2) a quarter turn.
5. Set the desired mowing height by turning bolt (1):
 - Clockwise to lower the mowing height.
 - Anticlockwise to raise the mowing height.
 - Each full turn adjusts the height 2 mm.
6. Measuring mowing height:
 - F302: from the bottom of the skid shoe (minimum 5 mm) to the ground.
 - R302: from the top of the fixed blade to the ground.



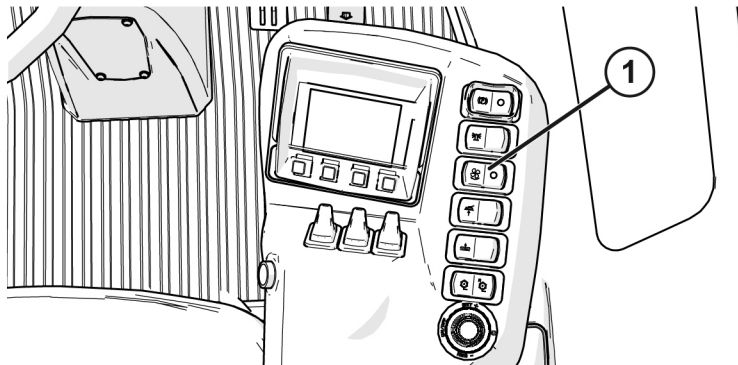
NOTICE Measure the mowing height on both sides of the unit for an even mowing result.

7. Tighten nut (2) to 25 Nm
8. Tighten nut (3) to 25 Nm

8.4 Cooling and reversing fan

Cooling and reversing fan: this is a special fan that always runs with the engine. Every 4 minutes, the blades automatically turn in the other direction for 5 seconds, to blow dirt and dust out of the radiator.

The reversal function of the cooling fan can be operated manually by means of the cooling fan direction switch.



1. Cooling fan direction: manual/auto/off.

1. **Manual:** Press the **Cooling fan direction** switch (1) to the left to activate the reversal function of the fan. After releasing the switch, it returns to the centre (auto) position.
2. **Auto:** The is the spring-return position of the **Cooling fan direction** switch (1), in the centre. The automatic reversal function of the fan is active.
3. **Off:** Press the **Cooling fan direction** switch (1) to the right to deactivate the fan's automatic reversal function. After releasing the switch, it returns to the centre (auto) position. After 4 minutes the fan's automatic reversal function switches on again.



NOTICE The intervals for cooling, mowing and temporary deactivation of the automatic mode are stored in the mowing ECU. Contact your Roberine dealer if you want to change the settings.

8.5 Use of the towing provision

If the machine breaks down and needs to be towed, the front wheels' freewheel mechanism must be engaged.

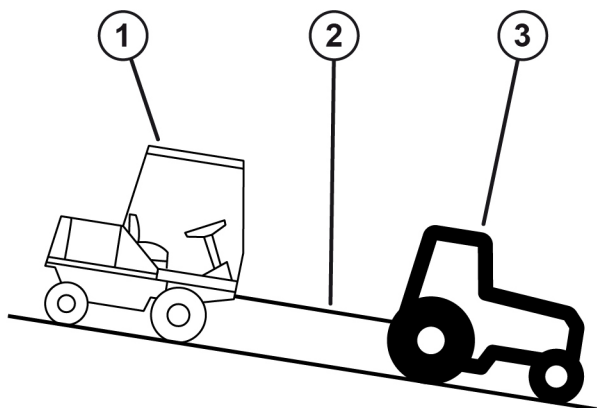
WARNING



- The installed freewheel aids allow unrestricted movement. If the machine is on an incline, it may roll away unchecked after the wheel motors are disengaged. Prevent the machine from rolling away by attaching it to another machine with a sturdy tow bar.
- Do not tow the machine more than necessary. Towing the machine may cause damage to the hydraulic system. The machine may be towed a maximum of 1000 m at a maximum speed of 2 km/h.

Incline

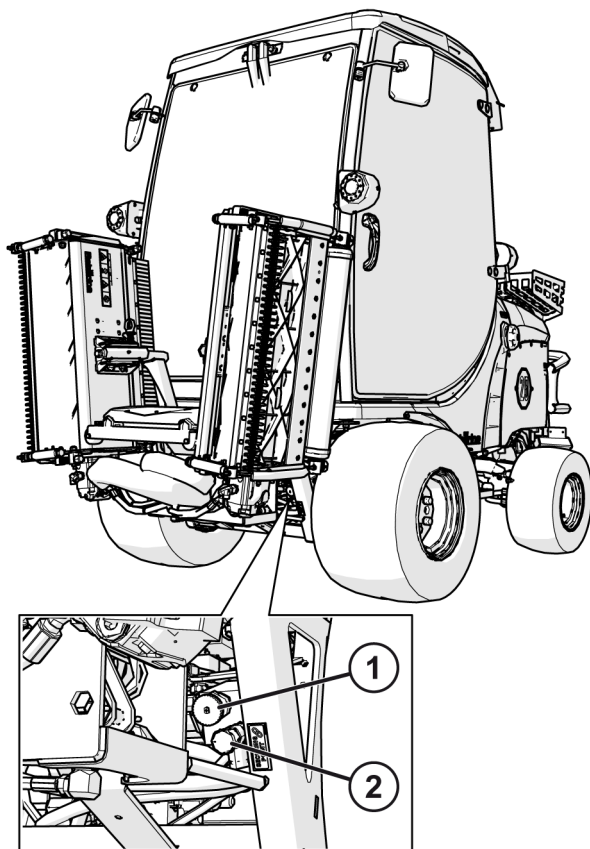
Follow these steps first if the machine breaks down while on an incline.



1. Attach the mower (1) to another machine (3) with a sturdy tow bar (2) to prevent the mower from unintentionally rolling away.

Engaging freewheel mechanism

The freewheel mechanism can be operated at the left front of the machine.



1. Block the wheels.
2. Straighten the wheels by turning the steering wheel.
3. Turn the handwheel (1) clockwise until it stops.
4. Press the manual pump button (2) about 10 times to release the brakes.

The machine may be towed a maximum distance of 1000 m at a maximum speed of 2 km/h.



CAUTION!

- The machine can now move freely.
- With the engine switched off, steering will take more effort.

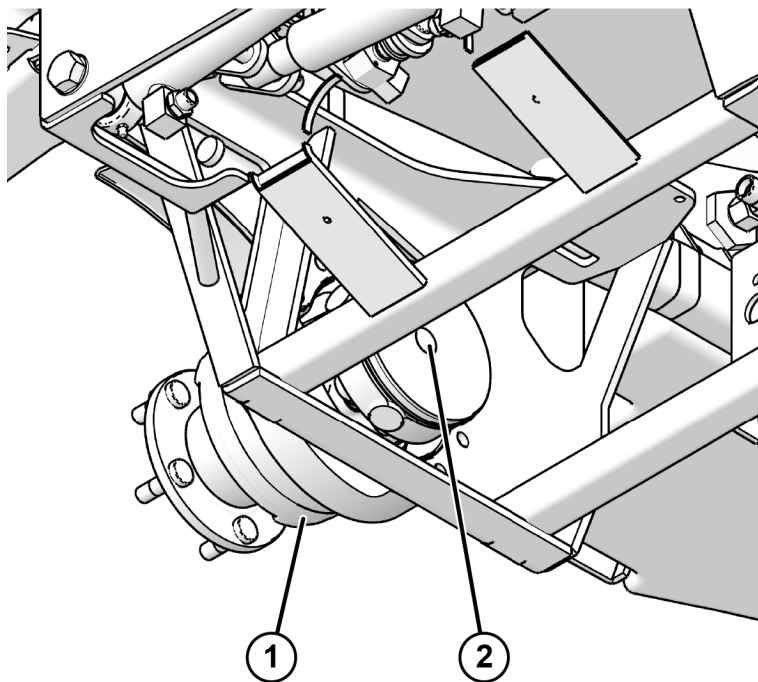
Disengaging freewheel mechanism

- Turn handwheel (1) anticlockwise until it stops.
- The freewheel mechanism is now disengaged and the machine's original settings are restored.

Towing the machine over longer distances

If it is necessary to tow the machine a longer distance, merely pumping the brakes free is not sufficient.

Perform the additional steps below if you need to tow a longer distance.



1. Perform steps 1 to 4 of the previous procedure.
2. Remove the rubber cap (2) in the middle of the back of both wheel motors (1).
3. Screw an M12x30 bolt into the exposed screw hole and tighten it to a torque of 60 Nm.

The machine may be towed at a maximum speed of 2 km/h.

Disengaging

- Remove the two M12x30 bolts.
- Fit the rubber caps on both wheel motors.
- Turn handwheel anticlockwise until it stops.
- The freewheel mechanism is now disengaged and the machine's original settings are restored.

8.6 After using the machine

When you have finished with the machine:

- Park the machine in a safe location.
- Turn off the engine and remove the ignition key.
- Clean the mowing units (see *Cleaning the mowing units* on page 62).
- Refill the diesel tank (see *Refilling fuel* on page 74).

9 Maintenance

Professional, regular maintenance on your mower is important. A well-maintained mower will allow you to do better work, more safely. Moreover, proper maintenance ensures a longer service life, prevents possible damage and expensive, time-consuming repairs. This chapter provides information about the maintenance you must perform daily and at other regular intervals. These are simple maintenance tasks, but they are important. We therefore strongly recommend following the maintenance recommendations carefully and having the maintenance carried out. Roberine has an excellent dealer network of trained service technicians who can carry out maintenance and repairs for you.



NOTICE First, read the chapter *Safety* on page 8 carefully.

9.1 Maintenance tables

Use the following tables for the routine maintenance of your machine.

NOTICE Additional maintenance may be required under extreme conditions:



- Extreme heat, excessive dust or extreme conditions can cause engine parts to become dirty or clogged.
- The quality of the engine oil may degrade if the machine is constantly driven too slowly or a low engine speed is used, or if the machine is used intensively for short periods.

9.1.1 After the first 5 hours

Material	Maintenance type
Tyres	Check for damage and wear; replace if necessary.
Tyre pressure	Check that the tyre pressure is correct.
Mounting hardware	Inspect, and adjust if necessary.
Hoses	Check for damage and wear; repair or replace if necessary.
Wheel bolts	Inspect, and adjust if necessary.
Parking brake	Check the operation.
Hydraulic system	Check for oil leaks.

9.1.2 Daily maintenance

Material	Maintenance type
Engine air filter	Clean
Cab air filter	Clean
Cooler	Clean
AC cooler on cab roof	Clean
Engine coolant	Check and top up. See <i>Cooling system</i> on page 59.
Lubrication points	See <i>Lubrication</i> on page 52.

9.1.3 After the first 50 hours

Material	Maintenance type
Air intake and coolant hose clamps	Inspect, and replace if necessary.
Water separator	Inspect, and drain if necessary.
Engine oil and oil filter	Replace.

Material	Maintenance type
Hydraulic filters	Replace.
Fan belt	Check voltage.
Fan belt	Inspect for damage and wear; replace if necessary.

9.1.4 Every 50 hours

Material	Maintenance type
Lubrication points	Lubricate (see also <i>Lubrication</i> on page 52).
Parking brake switch	Check the operation.
Battery	Inspect.
Hoses	Check for damage and wear; repair or replace if necessary.
Hydraulic system	Check for oil leaks.
Sealing surfaces between the engine cover and cooler	Inspect for damage and wear; adjust if necessary.
Wheel bolts	Inspect, and adjust if necessary.
ROPS	Inspect the system for damage and wear. Maintenance may only be carried out by your Roberine dealer.
Mowing units	Inspect the mounting hardware and adjust if necessary.
Engine cover	Clean under the engine cover and check the lock.
Flails	Check for damage and wear.

9.1.5 Every 250 hours

Material	Maintenance type
Engine oil and oil filter	Replace.
V-belt	Inspect for damage and wear.
V-belt	Check voltage.
Air intake hoses, hydraulic pipes and hoses, radiator hoses and hose clamps	Check for damage and wear; replace if necessary.
Radiator fins	Check and clean. See <i>Cleaning air intake grille and engine cooler</i> on page 57.

9.1.6 Every 500 hours or once every year

Material	Maintenance type
Hydraulic oil and filters	Replace.
Coolant	Inspect the clarity and freezing point; replace if necessary.
Fuel filter	Replace. See <i>Fuel filter and water separator</i> on page 59.
Engine oil and filters	Replace. See <i>Changing engine oil and filter</i> on page 55 ¹ .
Battery terminals	Inspect.

1. May vary depending on application or engine oil capacity. If the engine is fitted with a shallow oil sump, a service interval of every 250 hours must be adhered to.

9.1.7 Every 1,000 hours

Material	Maintenance type
Intake and exhaust valve clearance	Contact your Roberine dealer.

9.1.8 Every 1,500 hours or once every 2 years

Material	Maintenance type
Fuel injectors	Contact your Roberine dealer.
Battery terminals	Clean

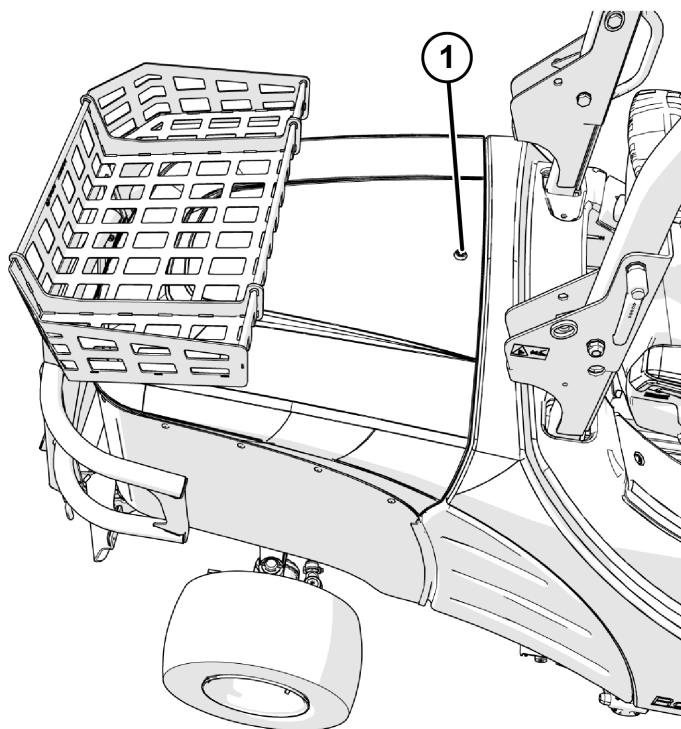
9.1.9 Every 2,000 hours or once every 2 years

Material	Maintenance type
Coolant	Replace.
Thermostat	Replace.

9.1.10 Every 3,000 hours or once every 3 years

Material	Maintenance type
Diesel injection pump	Inspect. See the technical instruction manual or contact your Roberine dealer.

9.2 Opening the engine cover



1. Engine cover lock

Opening the engine cover:

1. Turn the lock (1) clockwise to unlock the engine cover.
2. Lift the engine cover.



NOTICE If the mower is equipped with an optional bumper, lower the bumper before opening the engine cover. Pull out the locking pins at the rear and lower the bumper.



NOTICE If present, empty the storage basket completely before opening the engine cover.

Closing the engine cover:

1. Carefully lower the engine cover.
2. Turn the lock anticlockwise to lock the engine cover.



NOTICE If applicable, return the bumper to its position and secure the locking pins.

9.3 Lubrication

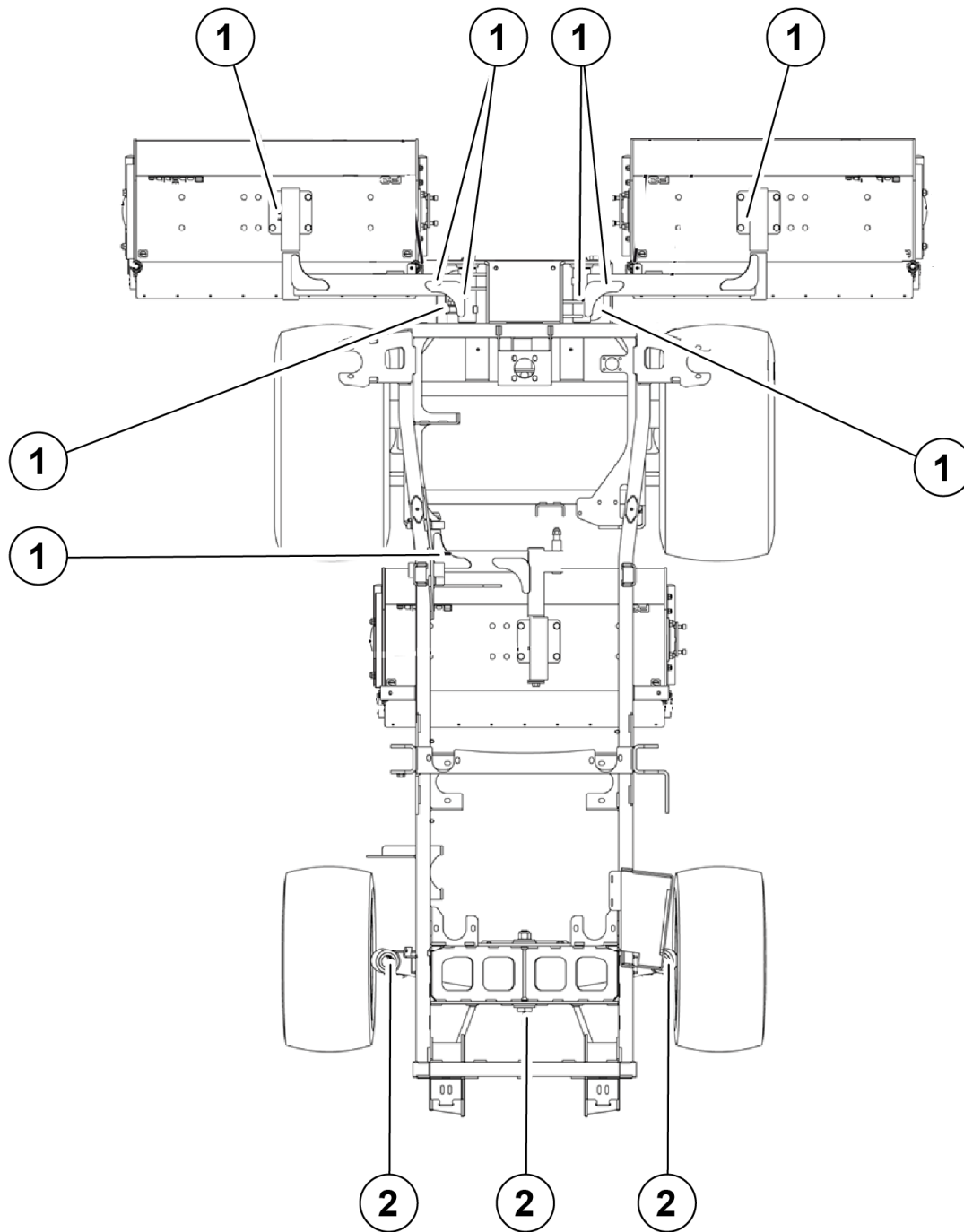
9.3.1 Lubricants



NOTICE Which lubricants should be used is shown in *Technical specifications* on page 33.

9.3.2 Machine lubrication points

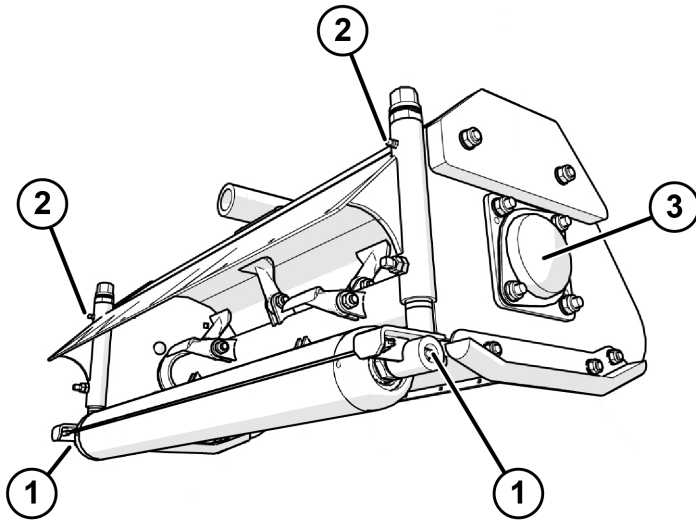
The following points must be lubricated regularly, on a daily (1) or weekly (2) basis:



9.3.3 Flail mower lubrication points

The following points must be lubricated regularly:

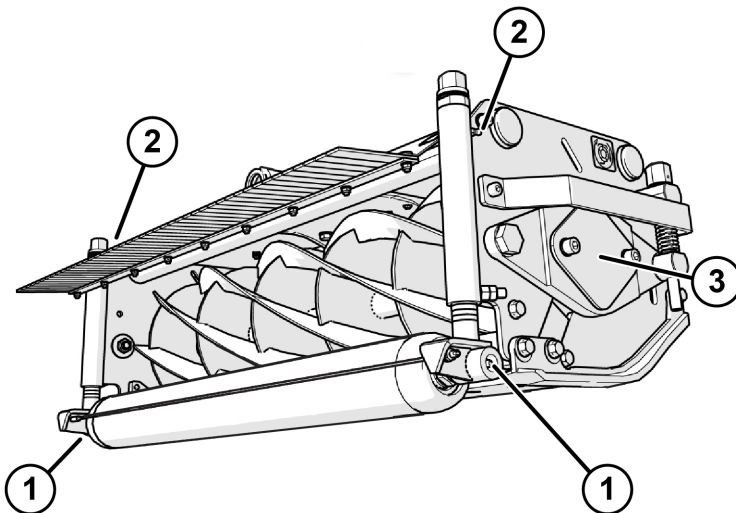
1. Daily.
2. Weekly.
3. Yearly.



9.3.4 Cylinder mower lubrication points

The following points must be lubricated regularly:

1. Daily.
2. Weekly.
3. Yearly.



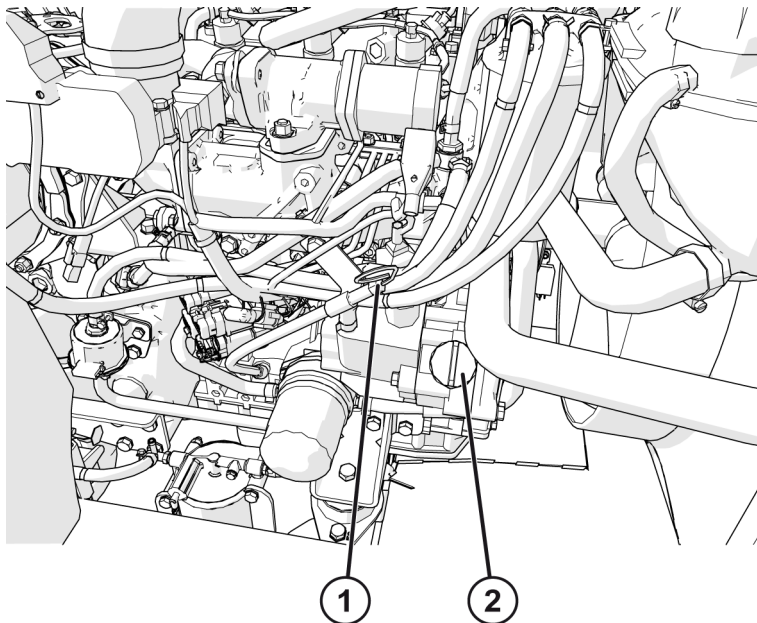
9.4 Engine oil

See *Technical specifications* on page 33 for specific information on the types of engine oil to be used.

9.4.1 Checking engine oil level

Check the oil level regularly. Engine problems may occur if the oil level is too low. Check the level before each use and twice a day if you run the engine for more than four hours a day.

Before you start: Make sure the machine is safely parked on level ground and the engine is cold.



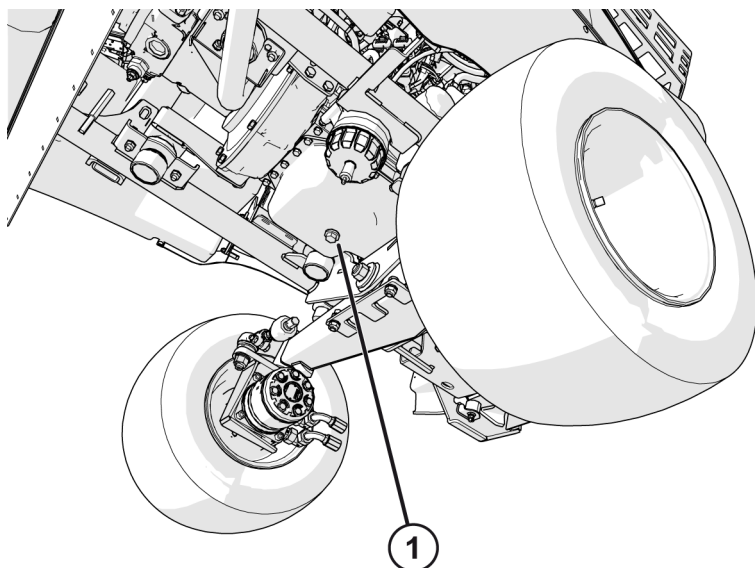
1. Dipstick
2. Oil filler cap

1. Open the engine cover
2. Clean the area around the dipstick
3. Pull out the dipstick (1) and wipe the dipstick clean
4. Push the dipstick in
5. Pull out the dipstick and check the oil level
6. Check whether the oil level is between the two lines
 - If the oil level is too low, top up the oil until the level is below the top line on the dipstick.
 - If the oil level is above the top line, drain the oil until the correct level is reached. See *Changing engine oil and filter* on page 55.
7. Push the dipstick in
8. Close the engine cover

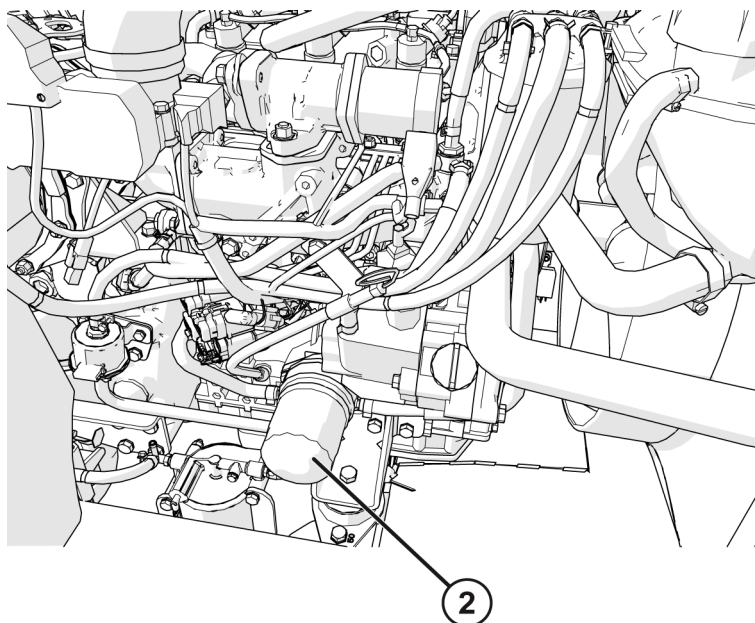
9.4.2 Changing engine oil and filter

Change the oil more frequently if the vehicle is used under extreme conditions, such as extremely dusty conditions, regular low-speed or low-rpm operation or regular short trips.

Before you start: Run the engine to warm up the oil, and park the machine safely.



- 1. Drain plug
- 2. Oil filter



1. Clean the drain plug (1) and the area around the plug.
2. Place a container under the drain point to catch the oil:
3. Remove the drain plug and drain the oil.
4. Remove the oil filter (2) by turning it anticlockwise.
5. Apply a layer of clean engine oil to the seal of the new filter.
6. Fit the new filter. Turn the filter until the seal makes contact with the mounting surface. Turn an additional one-half to three-quarter turn after the seal makes contact.
7. Fit the drain plug.
8. Remove the filler cap. Add about 4.8 litres of oil.
9. Check the oil level as explained in *Checking engine oil level* on page 55.
10. Fit the filler cap and tighten it.
11. Run the engine at low speed for two minutes. Check for leaks around the filter.
12. Stop the engine, wait a few minutes and check the oil level again. Add oil if necessary. Be careful not to add too much oil.

9.5 Cleaning air intake grille and engine cooler

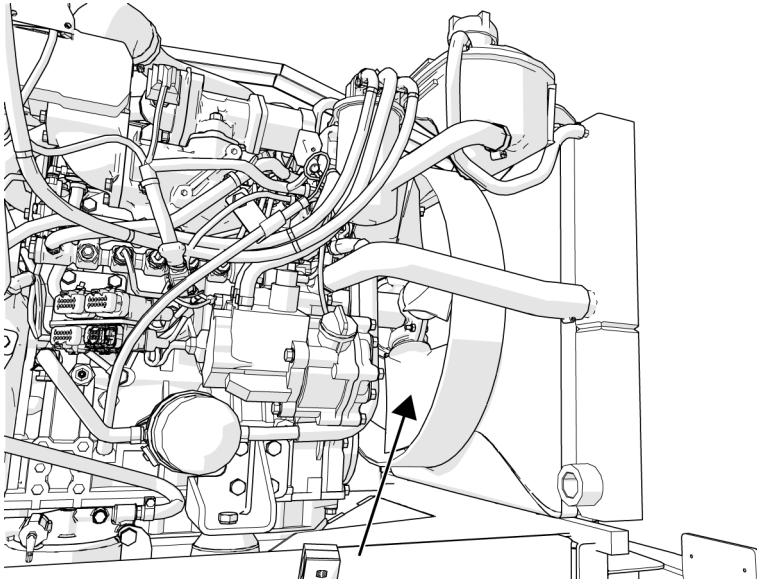
It is important to clean the air intake grilles and the other external surfaces of the engine (including the engine cooler) to allow sufficient air to enter. A clogged air intake grille can cause engine damage due to overheating.

CAUTION! Compressed air can cause grit to travel a long distance. Make sure that:



- there are no bystanders
- you are wearing eye protection
- you reduce the pressure of the compressed air to 2.1 bar (30 psi)

Before you start: Park the machine in a safe location.

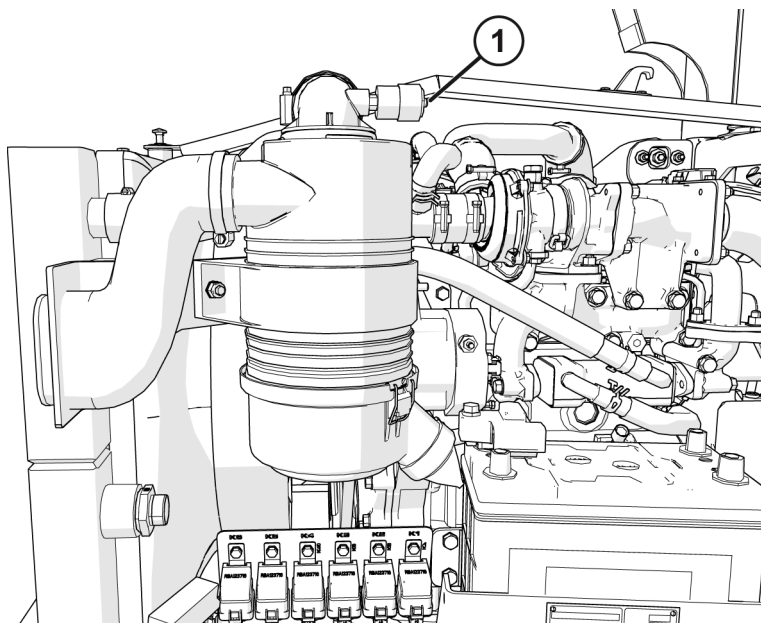


1. Open the engine cover.
2. Use compressed air to blow the radiator clean from the inside (see arrow).
3. Use a soft brush to clean the back of the radiator.
4. Use a soft brush or compressed air to clean the radiator fins.
5. Clean the inside and outside of the inlet grilles.
6. Close the engine cover.

9.6 Checking air resistance indicator

Clean the engine air filter daily. Check the air resistance indicator regularly to determine whether it is time to replace the filter.

Before you start: Park the machine in a safe place and let the engine cool.



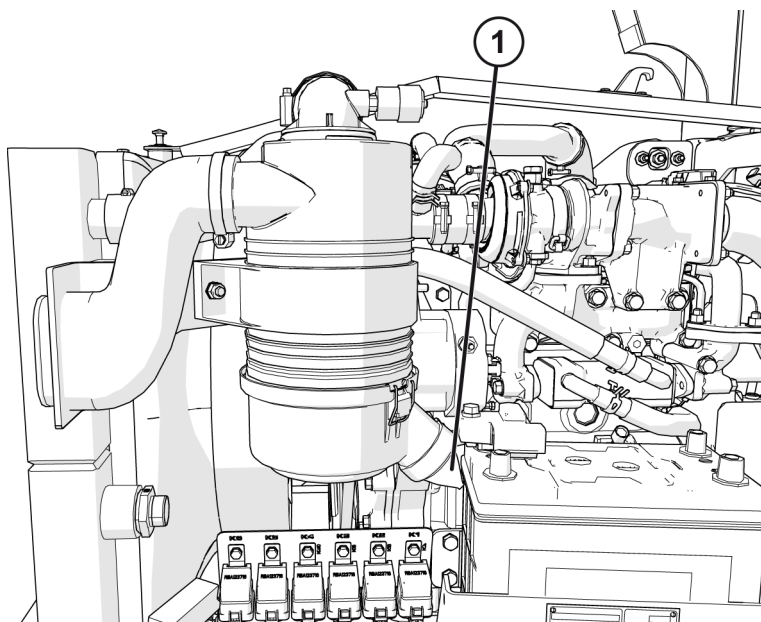
1. Open the engine cover.
2. Check the air resistance indicator (1).
 - If the red plunger in the indicator is visible, the air filter must be serviced immediately.
3. Replace the air filter, if necessary.
4. Close the engine cover.



NOTICE The indicator will not work properly if the indicator housing is cracked or broken.

9.7 Cleaning dust-removal valve

Before you start: Park the machine safely and allow the engine to cool.



1. Open the engine cover.
2. Squeeze the dust-removal valve (1) to clean it.
3. Remove and replace the valve if damaged.
4. Check the inside of the cyclone filter cap.
5. Clean the primary filter.

9.8 Cooling system

Roberine recommends the following coolant:

- Havoline AFC + B 50/50 (BL01)

If the recommended coolant is not available, use a low silicate, ethylene glycol-based coolant concentrate in a 50% mixture with good quality water. This provides protection against freezing down to a temperature of -37 °C.

Use a coolant with an additive or add an additive before use.

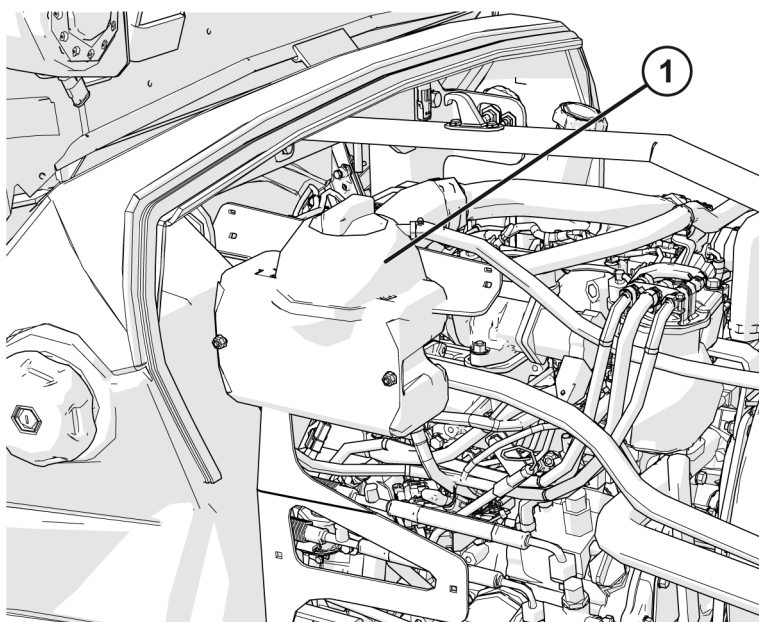
In certain regions, protection against lower temperatures may be needed. Read the label on the coolant container or contact your Roberine dealer for the latest information and recommendations.

9.8.1 Checking coolant level



CAUTION! The radiator is hot and can cause burns. Built-up pressure may cause the coolant to spray out forcefully when the radiator cap is removed.

Before you start: Park the machine safely and allow the engine to cool. Make sure the engine and radiator have cooled to the point that you can touch them with bare hands.



1. Open the engine cover.
2. Slowly open the cap of the filler tank (1) up to the first stop to release the pressure.
3. Remove the cap of the filler tank.
4. Check the coolant level.

The coolant level should be between the maximum and minimum level.

5. If the level is low, top up the coolant.
6. Fit the cap and tighten it.
7. Remove dirt from the air intake grille and radiator.
8. Check the hoses for leaks and loose connections.
9. Close the engine cover.

9.9 Fuel filter and water separator

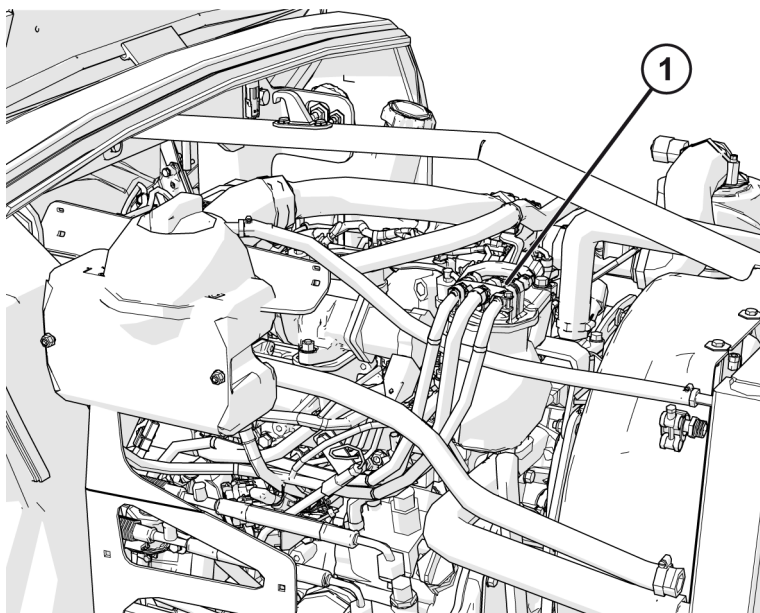
Inspect the water separator after the first 50 hours of operation. Replace the fuel filter every 500 hours or once every year.

Before you start: Park the machine safely and allow the engine to cool.

Replacing the fuel filter

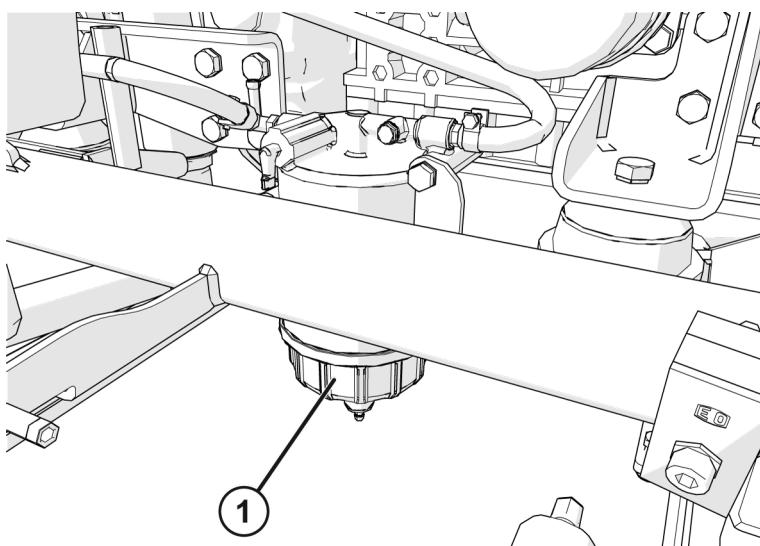


NOTICE Make sure the fuel level is low before you change the fuel filter.



1. Open the engine cover.
2. Unscrew the fuel filter housing (1) and remove the filter.
3. Fit a new fuel filter.
4. Check the strainer.

Checking the water separator



1. Check that there is no water in the water separator (1).

The red ring inside floats on water.

2. Drain the water if necessary, via the tap, or clean the water separator and replace the filter:
 - a. unscrew the container from the top
 - b. replace the filter
 - c. screw the container back into the top
3. Close the engine cover.

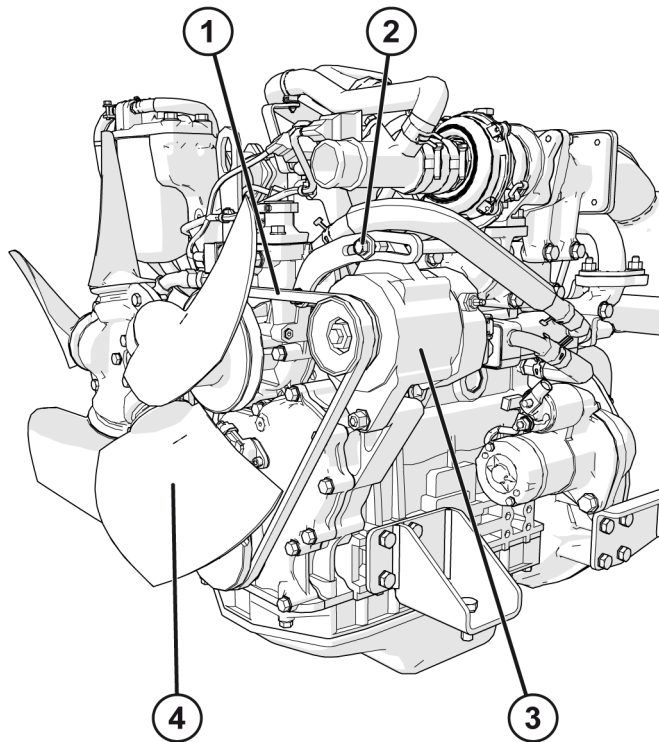


NOTICE Tightening torque for water separator fixing strap: 15-20 Nm.

9.10 V-belt

Check the V-belt for wear every 250 hours. Consult your Yanmar engine manual for more specific information.

Before you start: Park the machine safely and allow the engine to cool.



1. V-belt measuring point
2. V-belt adjustment screw
3. Alternator
4. Fan

1. Open de engine cover.
2. Inspect the V-belt:
 - There must not be any visible cracks or hairline cracks.
 - Press the belt with your thumb or finger at point 1. It should not be possible to press the belt more than 1-2 cm. An overtightened V-belt can damage the alternator bearings.
3. If the V-belt requires service, contact your Roberine dealer.

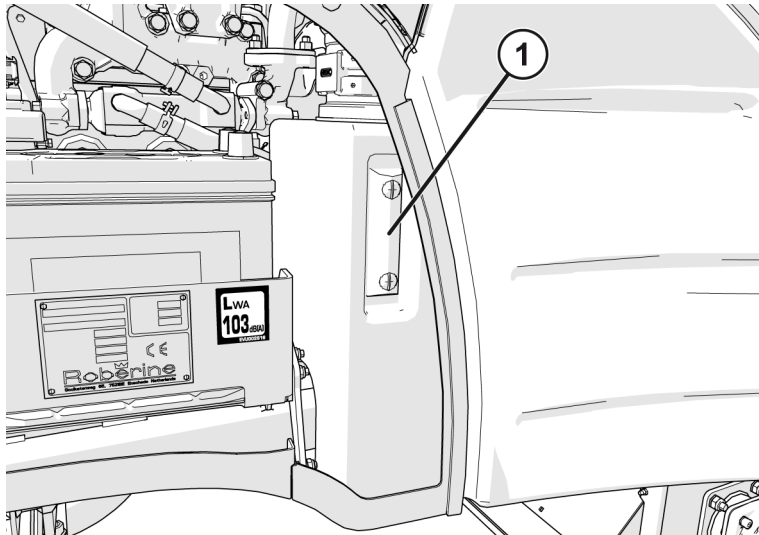
9.11 Hydraulic oil

It is recommended to have the oil analysed annually.



NOTICE Use only the recommended oil, as described in *Technical specifications* on page 33.

Before you start: Park the machine safely and allow the engine to cool.



1. Oil gauge glass

1. Check the oil through the gauge glass (1):
 - The oil level must be between the minimum and maximum marks.
2. Add oil if necessary.

9.12 Cleaning the mowing units

Clean the mowing units after each use.

CAUTION!



- Always wear protective gloves when performing maintenance on or near a mowing unit. Contact with the sharp cutting edges can result in serious injury.
- When a mowing unit is turned by hand, other mowing units may also turn.

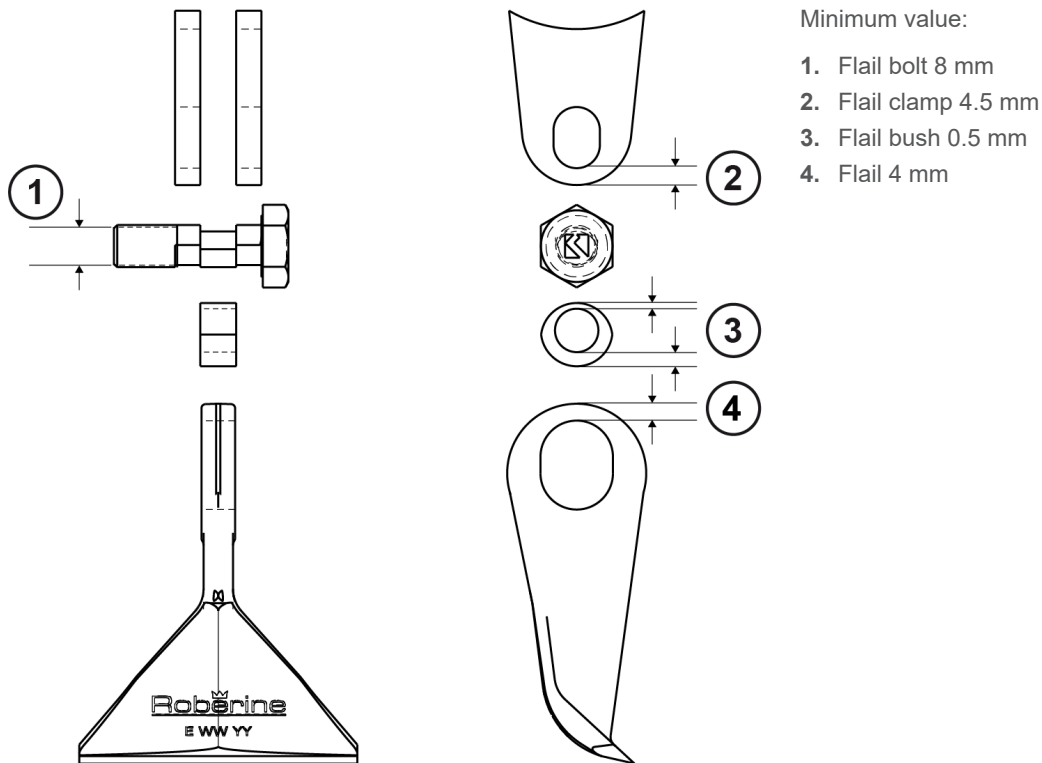
Before you start: Park the machine safely and turn off the engine. Wait until the mowing units are completely stopped. Remove the ignition key and put it in your pocket.

1. Clean the mowing units with a low-pressure sprayer.
2. Lubricate the mowing units. See *Lubrication* on page 52.

9.13 Checking and replacing the flails

Measuring flail wear

If the flails are lost, damaged or excessively worn, they must be replaced to prevent damage to the rotor shaft due to imbalance.

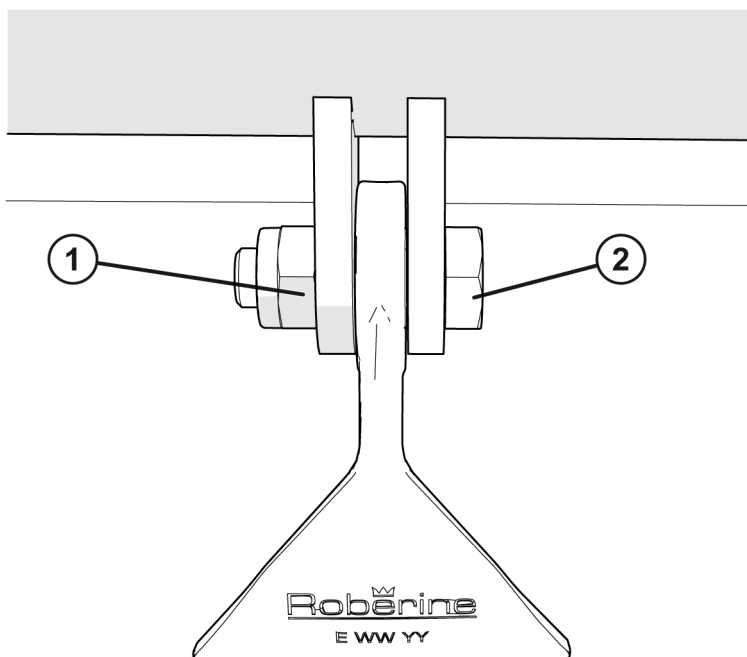


Minimum value:

1. Flail bolt 8 mm
2. Flail clamp 4.5 mm
3. Flail bush 0.5 mm
4. Flail 4 mm

Replacing flails

Before you start: Park the machine safely and turn off the engine and mowing units. Wait until the mowing units are completely stopped. Remove the ignition key and put it in your pocket.



1. Unscrew the nut (1).
2. Remove the flail bolt (2).
3. Remove the flail and replace it with a new one.
4. Fit the flail bolt (2). Replace worn flail bolts and bushes if necessary.
5. Fit the nut (1) and tighten to a torque of 48 Nm.

9.14 Maintaining the mowing reels

Safety

DANGER! Contact with the cutting edges of a rotating mowing unit will result in serious personal injury or even death.



- Always wear protective gloves and safety shoes when performing maintenance on or near a mowing unit.
- Keep bystanders away from the machine.



CAUTION!

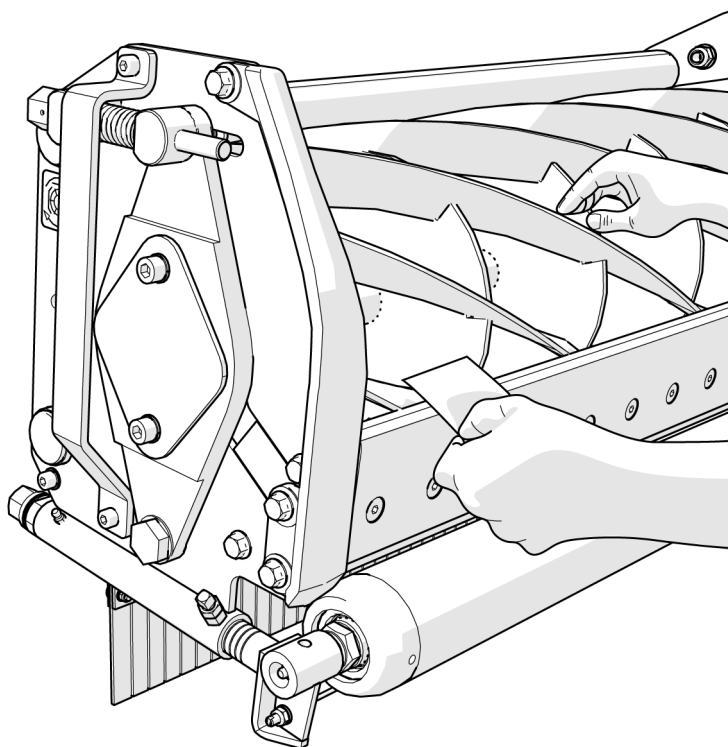
- When a mowing unit is turned by hand, other mowing units may also turn.

9.14.1 Checking the mowing units

Check the mowing units regularly to ensure good mowing quality.

Required materials:

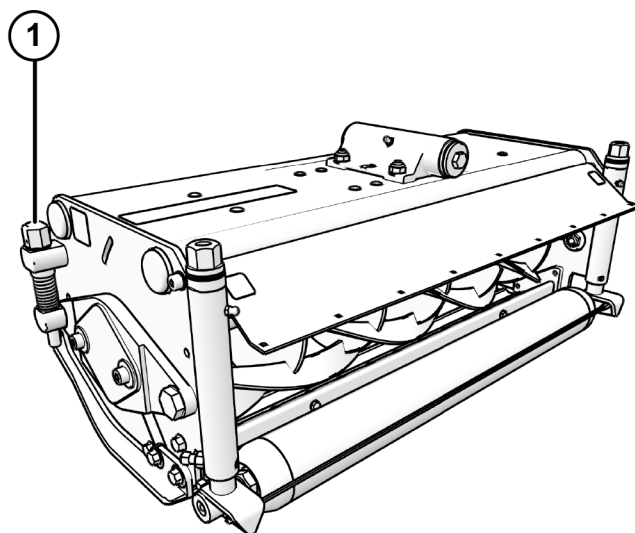
- Several strips of 80 g/m² paper.



1. Raise the mowing units so that you can access their undersides.
2. Secure the front mowing units with the transport and safety latches.
3. Park the machine safely, turn off the engine and remove the ignition key.
4. Fold a sheet of paper in half, and place it flat on the fixed blade.
5. Turn the mowing unit (very carefully!) by hand in the cutting direction. The paper should be cut completely, without fraying.
6. Repeat steps 4 and 5 in different places along the fixed blade until you have checked the entire blade.

The adjustment is correct when at least one sheet of paper is cut completely. It is normal to hear a bit of noise as the cutting blade and fixed blade contact each other. If no paper strips are cut or the cutting blade and fixed blade overlap, the mowing cylinders require adjustment.

9.14.2 Adjusting cutting blade to the fixed blade



1. Turn bolt 1 to adjust the mowing clearance:
 - Clockwise: reduces the mowing clearance.
 - Anticlockwise: increases the mowing clearance.
2. Check the clearance using the procedure *Checking the mowing units* on page 64. Repeat the steps until the cutting blade is adjusted correctly.

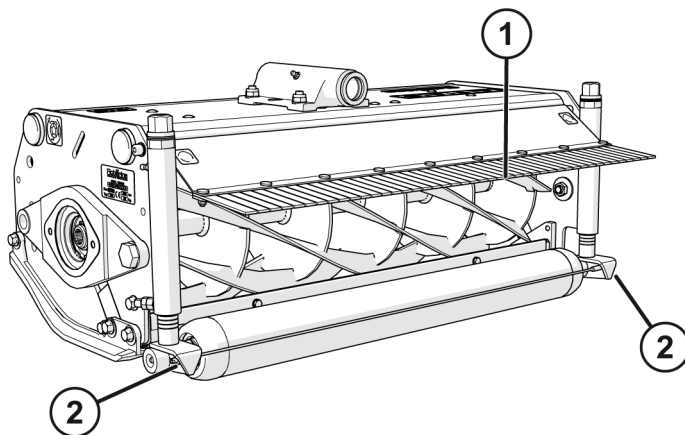


NOTICE Change the starting points every time you adjust the mowing cylinders. This prevents uneven wear of the mower blades.

9.14.3 Adjusting grass deflector and scraper

You can adjust the grass deflector to suit the grass characteristics.

For a clean and smooth roller, it is important to keep the scraper properly tensioned.



Adjusting the grass deflector:

1. Manually tilt the grass deflector (1) to the desired position.

Adjusting the scraper:

1. Turn the nuts (2) clockwise to secure the scraper.



CAUTION! To avoid damaging the material, do not overtighten the scraper against the roller.

9.14.4 Backlapping mower blades

This procedure may only be carried out by an experienced, qualified technician.

DANGER! Contact with the cutting edges of a rotating mowing unit will result in serious personal injury or even death.



- Always wear protective gloves and safety shoes when performing maintenance on or near a mowing unit.
- Keep bystanders away from the machine.

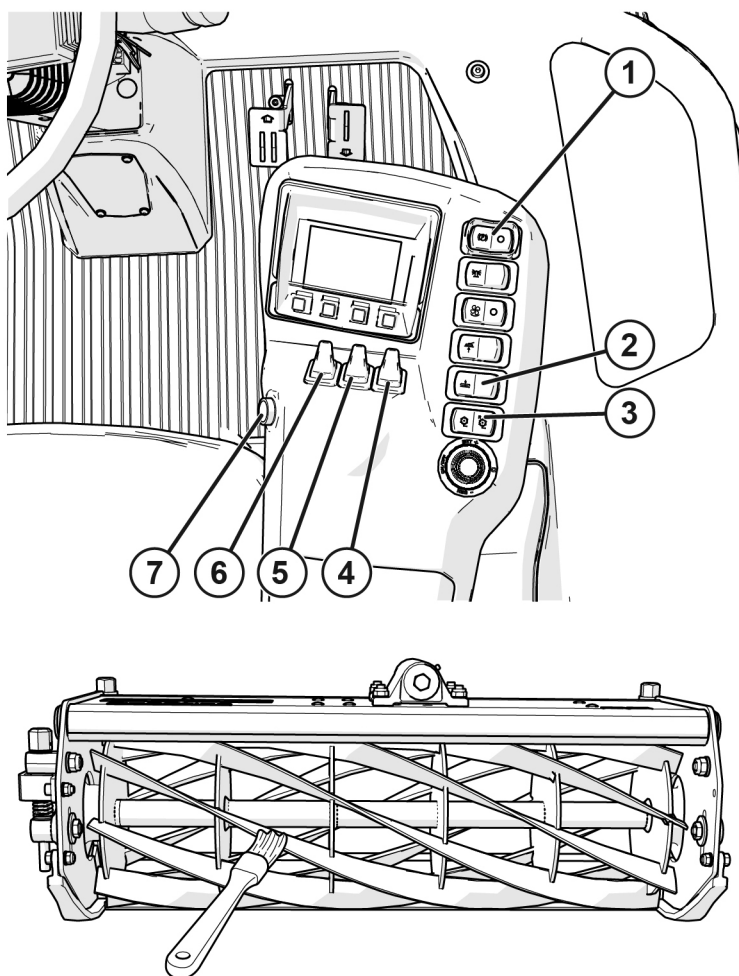
By backlapping the mower blades regularly, you extend the life of the mowing units and ensure good cut quality. Each mowing unit should be backlapped separately.

Required materials:

- Lapping paste: 80 or 120 grit
- Brush with long handle

Before you start:

- Make sure the mowing units are clean and properly adjusted (see *Adjusting cutting blade to the fixed blade* on page 65).



1. Parking brake: on/off
2. Mowing unit lift function: on/off
3. Mowing unit operation: mowing/neutral/backlapping
4. Raise/lower right mowing unit
5. Raise/lower centre mowing unit
6. Raise/lower left mowing unit
7. Cross-cut: activates simultaneous raising/lowering of all mowing units

Backlapping the mowing unit

1. Step onto the machine and sit in the seat.
2. Start the machine and let the engine idle.
3. Set the **Parking brake** switch (1) in the on position.
4. Step off of the machine.
5. Unlock the mowing unit you want to backlap.



NOTICE The centre mowing unit does not have a locking mechanism.

6. Step onto the machine and sit in the seat.
7. Set the **Mowing unit lift function** switch (2) in the on position.
8. Push the **Raise/lower** switch (4/5/6) forwards to the lower position.
9. Press the **Cross-cut** button (7) to lower the mowing unit.
10. Step off of the machine.
11. Set the **Mowing unit operation** switch (3) in the backlapping position.
12. Press the **Cross-cut** button (7) to lower the mowing unit.
13. Apply lapping paste to the mowing unit with a brush.



NOTICE Apply the paste evenly along the entire length of the mower blades.

14. Repeat until you no longer hear an abrasive noise (*).
15. Press the **Cross-cut** button (7) to stop the mowing unit.

16. Pull the **Raise/lower** switch (4/5/6) back to raise the mowing unit.
17. Lock the mowing unit.
18. Repeat steps 4 to 17 for the other mowing units.
19. Set the **Mowing unit operation** switch (3) in the off position.
20. Set the **Mowing unit lift function** switch (2) in the off position.



NOTICE *) If necessary, reduce the mowing clearance for better results (see *Adjusting cutting blade to the fixed blade* on page 65).

9.15 Maintaining electrical system

9.15.1 Battery

Inspect the battery and battery terminals every 50 hours, and clean the battery every 1,500 hours or every other year.

CAUTION!

Battery electrolyte contains sulphuric acid. This is toxic and can cause severe burns.

- Wear eye protection and gloves.
- Cover your skin.
- If electrolyte is swallowed, seek medical attention immediately.
- If electrolyte gets into the eyes, flush them immediately with water for 15-30 minutes and seek medical attention.
- If electrolyte gets on the skin, rinse immediately with water and seek medical attention if necessary.



The battery produces a flammable, explosive gas. The battery can explode.

- Do not smoke near the battery.
- Avoid direct contact between the battery terminals via metal.
- When disconnecting the battery, remove the negative cable first.
- When connecting the battery, connect the negative cable first.



NOTICE Do not attempt to open the battery, add battery electrolyte or perform maintenance on the battery. Doing so will void the warranty.

9.15.1.1 Checking the battery

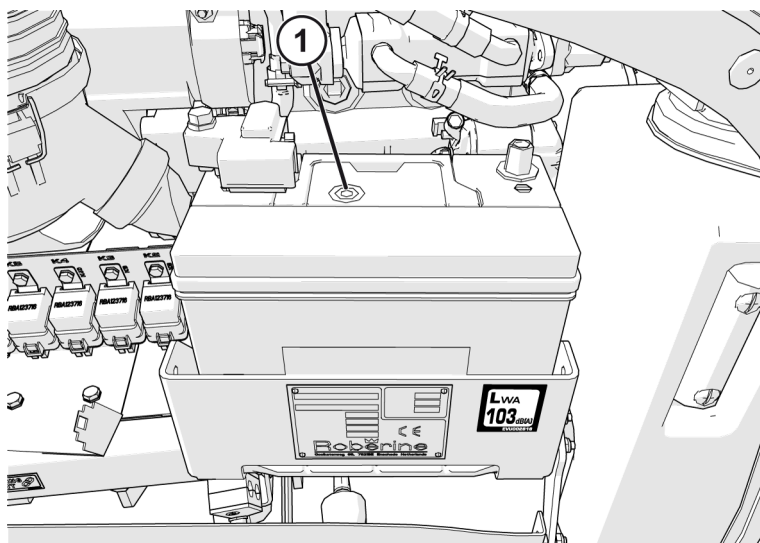
The battery is fully charged on delivery of the machine. If the machine is not used before the battery's use-by date, recharge the battery fully again.

CAUTION!



- Charge batteries in an open, well-ventilated area away from sparks and open flame.
- Wear protective clothing and use insulated tools.
- Unplug the battery charger from the mains before connecting or disconnecting it to/from the battery.

Before you start: Make sure the battery is clean, the battery mounting bolts are tightened and the vents are not blocked.



1. Check the battery indicator (1):
 - Green: the battery is working properly.
 - Black: the battery requires charging.
 - White: the battery must be replaced.
2. If necessary, charge the battery for one hour at 6-10 A.

9.15.1.2 Cleaning battery terminals

Before you start: Park the machine safely and allow the engine to cool.

1. Disconnect the negative battery cable (-).
2. Push the red cover away from the positive terminal (+) and disconnect the battery cable.
3. Clean the poles and ends of the battery cable with a wire brush until they shine.
4. Apply an acid-free lubricant spray to the poles to prevent corrosion.
5. First connect the positive cable (+) to the positive battery terminal (+) and then the negative cable (-) to the negative battery terminal (-).
6. Slide the red cover over the positive battery terminal.

9.15.1.3 Battery replacement

When replacing the battery, always replace it with a battery specified by Roberine. Contact your Roberine dealer.

Before you start: Park the machine safely and allow the engine to cool.

1. Disconnect the negative battery cable (-).
2. Push the red cover away from the positive terminal (+) and disconnect the battery cable.
3. Undo the battery holder.
4. Remove the battery.
5. Place the new battery in the battery holder.
6. Apply an acid-free lubricant spray to the battery terminals to prevent corrosion.
7. First connect the positive cable (+) to the positive battery terminal (+) and then the negative cable (-) to the negative battery terminal (-).
8. Slide the red cover over the positive battery terminal.
9. Fit the battery holder.

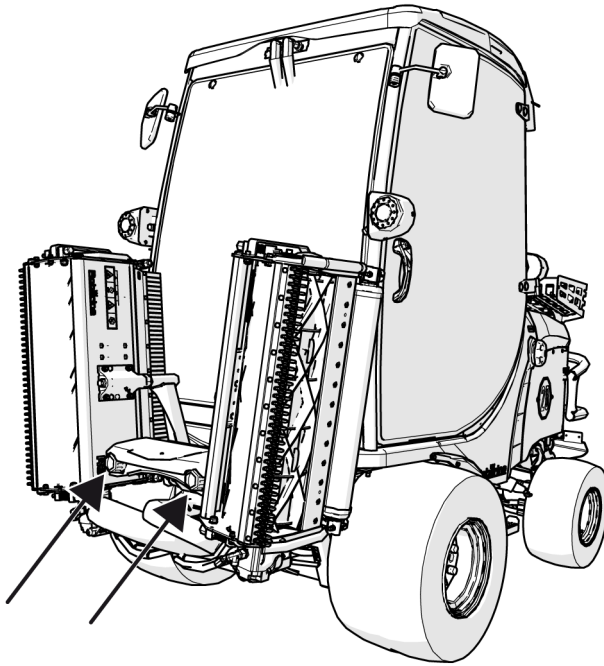
9.15.2 Replacing light bulbs

Replace defective bulbs immediately.

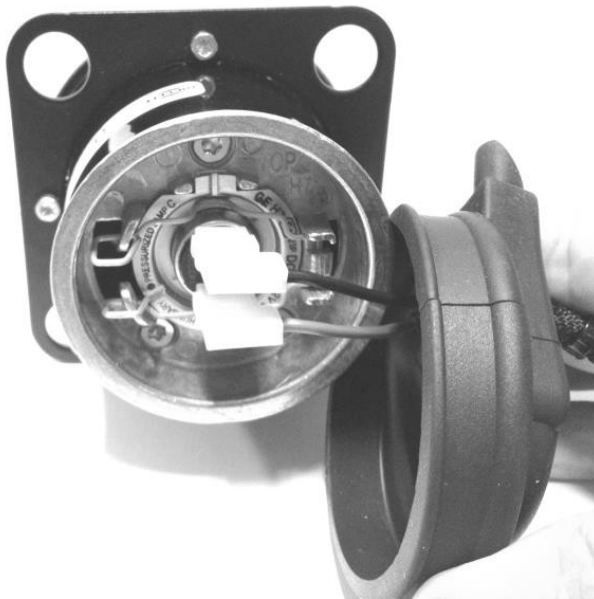
CAUTION!



- Halogen bulbs contain pressurised gas. The bulb may break if the glass is scratched or if you drop it. Wear eye protection and take care when replacing the bulb.
- Do not touch the glass of the headlight bulb with your bare skin, otherwise the bulb may fail prematurely. Use gloves or a cloth when inspecting or replacing the bulb.



1. Determine where the headlights are located.

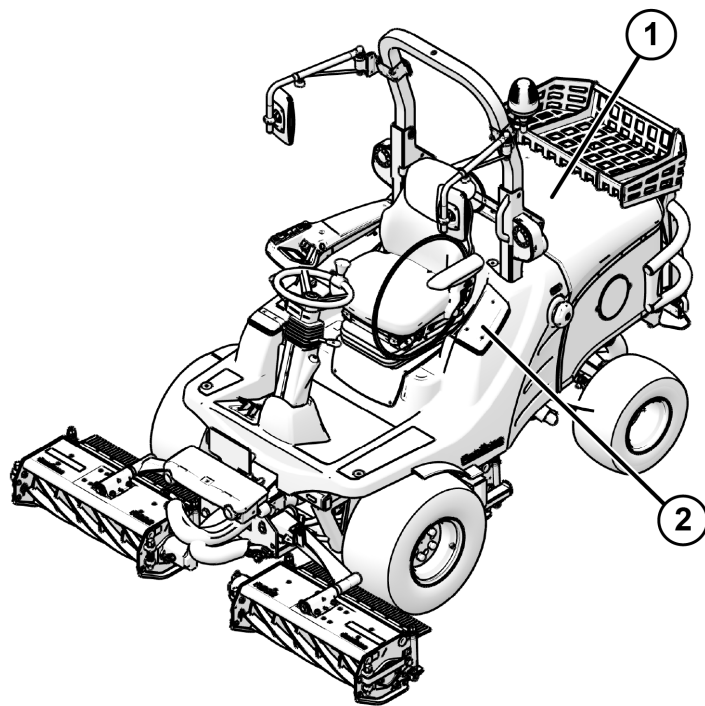


1. Remove the rubber cover.
2. Disconnect the plugs.
3. Release the retainer clip.
4. Replace the bulb.
5. Connect the plugs and secure the bulb with the retainer clip.
6. Mount the rubber cover.
7. Check the operation of the bulb.

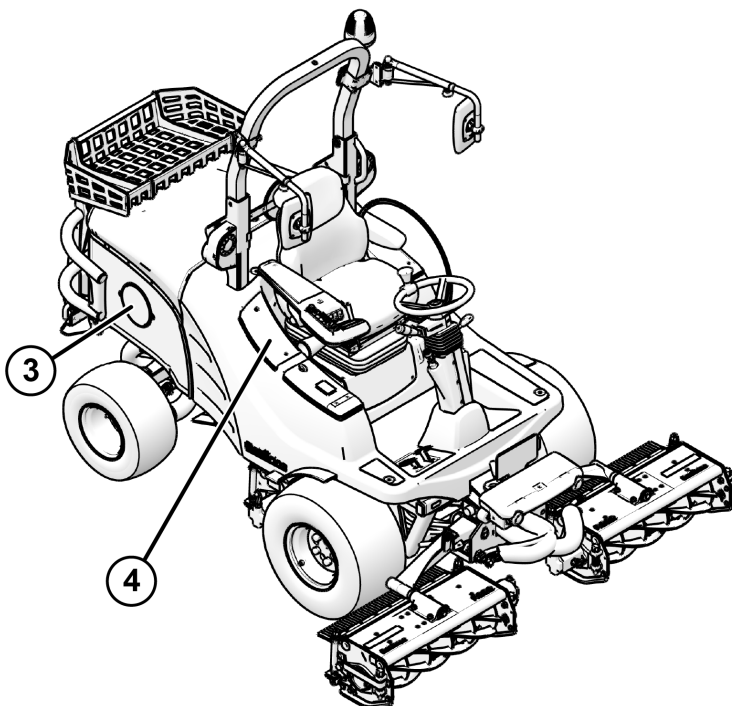
9.15.3 Replacing fuses

When an electrical function stops working, a fuse may be blown. It must then be replaced.

There are fuses, relays and ECUs in four locations on the machine. An overview of where they are found is shown below.



1. Diesel engine
2. Fuse box FH3, ECU A1
3. Battery, relays K1 to K10, fuse boxes FH1 and FH2
4. ECUs A2 and A3



NOTICE All fuse and relay boxes have stickers that indicate which electrical component each fuse or relay is for. A complete overview can also be found in this manual in *Fuses* on page 93.

Replacing



NOTICE Always make sure the new fuses have the correct specifications. An incorrect specification may cause serious damage to the electrical system.

1. Find the blown fuse that is causing the fault.



NOTICE It is easy to see whether the fuse is blown because the fusible wire is broken.

2. Remove the fuse
3. Check whether it is actually defective.
4. Fit a new fuse, if necessary.



NOTICE If the fault persists after replacing the fuse, contact your Roberine dealer. Also contact your Roberine dealer if the fault is not caused by a defective fuse. Then it will be necessary to investigate what else could be causing the fault.

9.15.4 Replacing a relay

When an electrical component stops functioning, a relay may be defective. It must then be replaced.

You cannot see whether a relay is defective. Therefore, without the proper measuring equipment, it is more difficult to determine whether a relay is faulty and causing the problem.

Contact your Roberine dealer. They can determine if a faulty relay is the cause of the fault or if there is another cause.

Replacing



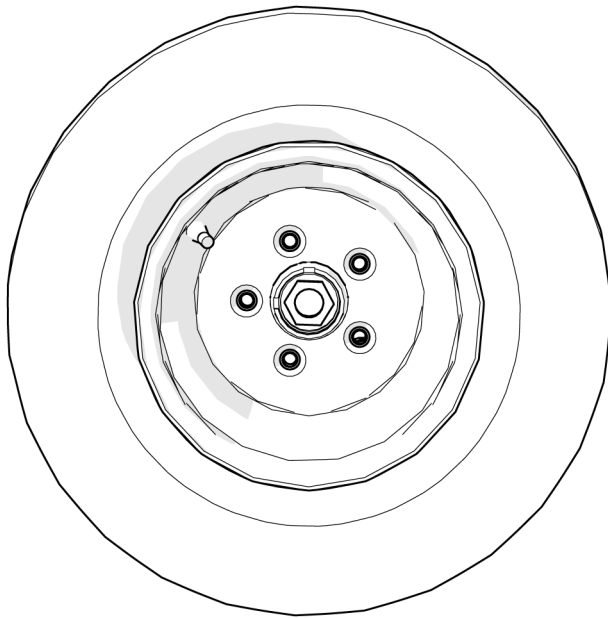
CAUTION! Use a relay with the correct specifications. An incorrect relay can cause serious damage to the machine's electrical system.



NOTICE For the location of the relay sockets on the machine, see *Replacing fuses* on page 71.

1. Find the defective relay that is causing the fault.
2. Remove the relay.
3. Fit the new relay.

9.16 Checking the wheel bolts



1. Retighten the wheel bolts after the first 5 hours and every 50 hours thereafter.
2. Tighten the wheel bolts and nuts with a torque spanner to a torque of 140 Nm.



CAUTION! Loose wheel bolts may come off of the wheels, causing a serious accident resulting in severe personal injury.

9.17 Cleaning surfaces

Keep plastic and metal surfaces clean to prevent damage to these surfaces. Use a soft, clean cloth (towel, linen cloth, special wash glove) to wash plastic surfaces. Wash plastic surfaces with clean water and a mild automotive shampoo. Regularly use a high-quality car wax for painted surfaces.

Do not use abrasives, such as polishing pastes, on plastic and metal surfaces.

9.18 Refilling fuel

WARNING Fuel vapours are flammable and may explode:



- Turn off the engine before refuelling.
- Do not smoke while handling fuel.
- Keep fuel away from sparks and open flame.
- Fill the tank outside or in a well-ventilated room.
- Clean up any spilled fuel immediately.

CAUTION! Dirt and water in the fuel tank can cause engine damage:



- Remove all dust and dirt around the opening of the fuel tank.
- Use clean, fresh, stabilised fuel.
- Use a funnel made of a material other than metal with a plastic sieve for filling the fuel tank or container.

Before you start: Park the machine safely and allow the engine to cool.

1. Make sure the area around the fuel tank cap is clean.
2. Loosen the fuel tank cap slowly to release the pressure in the fuel tank.
3. Fill the fuel tank to the bottom of the funnel neck. Be careful not to add too much fuel.
4. Screw the cap back on the tank.

10 Transport and storage



NOTICE First, read the chapter *Safety* on page 8 carefully.

10.1 Transport

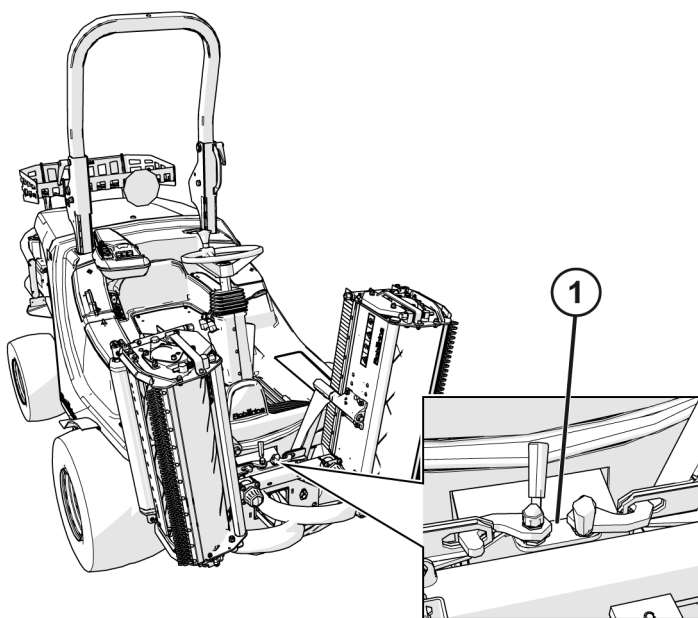
The machine can be transported on a trailer.

NOTICE

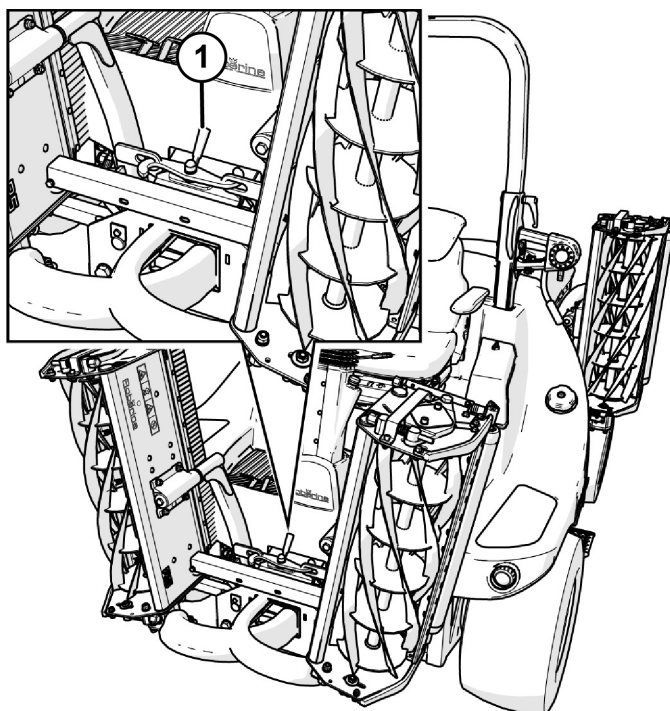


- The load capacity of the trailer must be greater than the weight of the machine plus the weight of the mowing units (see *Technical specifications* on page 33).
- Make sure the trailer has all legally required lights and direction indicators.

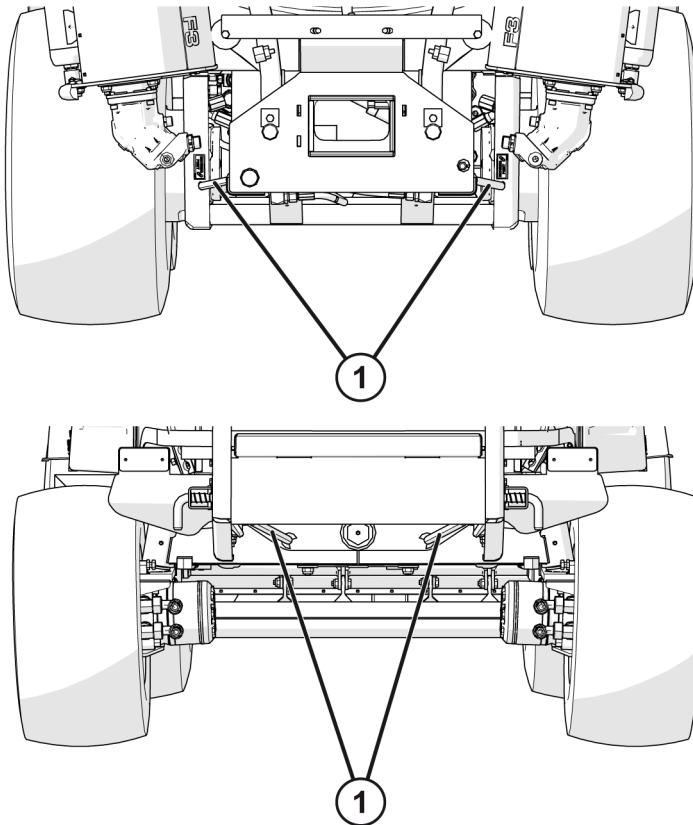
Driving up the ramp



1. Raise the three mowing units and lock them in the transport position with the locking levers. (1)
2. Drive the machine forwards, onto the trailer. Make sure that:
 - the trailer deck is horizontal
 - you keep the wheels away from the edges
 - the weight of the machine is centred above the trailer's wheels
3. Turn off the engine.
4. Remove the ignition key.



Lashing down



1. Secure the machine at the front with strong straps, chains or cables. Use the lashing rings (1) on the left and right sides of the machine to guide the lashing straps down and out.
2. Secure the machine at the rear with strong straps, chains or cables. Use the brackets (2) on both sides of the rear frame to guide the lashing straps down and out.



CAUTION! Make sure the materials you use to secure the machine do not come into contact with other parts of the machine.

3. Latch the mower's engine cover carefully.



CAUTION! The engine cover may pop open if not properly secured. Make sure the machine is facing forwards on the trailer.

10.2 Preparing machine for storage

Before you put the machine in storage:

1. Remove grass and debris from the machine and mowing units.
2. Repair or replace any worn or damaged parts.
3. Tighten any loose fasteners.
4. Repair scratched or damaged metal surfaces to prevent rust.
5. Wash and apply wax to the surfaces concerned.
6. Run the engine for five minutes to allow the belts and pulleys to dry.
7. Apply a thin layer of engine oil to all rotating parts and wear points to prevent rust.
8. Lubricate the grease nipples and check the tyre pressure.

CAUTION! Fuel vapours are flammable and may explode. The engine's exhaust gases contain carbon monoxide and can cause severe symptoms or even death. Make sure that:



- You do not leave the engine running longer than absolutely necessary to drive the machine into or out of the storage location.
- You let the engine cool before the machine enters the storage location.
- You have removed all debris around the engine and silencer.
- You store the machine at a safe distance from flammable materials.
- You do not store the machine in a building where any fuel vapours could come into contact with sparks or open flame.

10.3 Preparing fuel and engine for storage

Fuel:

1. Fill the tank completely with fuel.



NOTICE Filling the fuel tank reduces the volume of air in the tank, slowing the decline in fuel quality.

2. Park the machine in a safe, well-ventilated place.

Engine:



NOTICE The engine storage procedure must be followed if the machine will not be used for 60 days or more.



NOTICE Refer to your Yanmar engine manual for detailed information on engine storage.

1. Disconnect the negative battery cable (-).
2. Push the red cover away from the positive terminal (+) and disconnect the battery cable.
3. Undo the battery holder.
4. Remove the battery.
5. Clean the poles and ends of the battery cable with a wire brush until they shine.
6. Apply an acid-free lubricant spray to the battery terminals to prevent corrosion.
7. Store the battery in a cool, dry, frost-free location.



NOTICE A stored battery must be recharged every 30 days.

8. Perform maintenance on the air filter if necessary.
9. Remove dirt from the air intake grille for the engine.
10. Clean the engine and engine compartment.
11. Store the machine in a dry, safe location. If the machine is stored outside, cover it with a waterproof cover.

11 Recommissioning



NOTICE First, read the chapter *Safety* on page 8 carefully.

When removing the machine from storage:

1. Check the engine oil level (see *Checking engine oil level* on page 55).
2. Check the electrolyte level if the battery is not maintenance-free. Charge the battery if necessary (see *Checking the battery* on page 68).
3. Reinstall the battery (see *Battery replacement* on page 69).
4. Grease all lubrication points (see *Lubrication* on page 52).
5. Run the engine for five minutes without running the mowing units to distribute the oil evenly throughout the engine.
6. Check that all covers, screens and protective guards are present.

11.1 Safety checks

Check the safety system to make sure the electronic safety interlock circuit is working properly (see *Testing safety systems* on page 38).

1. Test the mowing unit operation switch.
2. Test the parking brake.
3. Test the seat mechanism.
4. Test the neutral position (if applicable).
5. Test the parking brake.
6. Test the raise/lower switch.

11.2 Tyre inspection

1. Check the tyres for damage.
2. Check tyre pressure with an accurate pressure gauge. See *Technical specifications* on page 33.

12 Troubleshooting



NOTICE First, read the chapter *Safety* on page 8 carefully.

12.1 Safety problems

The SOS (Sitting on Seat) system checks the status of various system functions and determines whether the machine can start. If not, a message appears on the display. The following messages may appear:

Message	Cause
Activate parking brake to start	The parking brake is not engaged.
Switch off mowing unit operation switch to start	The mowing unit operation switch is in the mowing position.
Switch off backlapping switch to start	The mowing unit operation switch is in the backlapping position.
Disengage towing to start	The knob on the hydraulic towing valve is closed.



NOTICE For any other problem, contact your Roberine dealer.

12.2 Engine problems

Problem	Possible cause	Solution
The engine runs poorly.	The fuel system is contaminated or the fuel is old.	Replace the fuel with new, stabilised fuel. Buy the new fuel from a different fuel supplier before assuming there is something wrong with the machine. Suppliers blend their fuels in different ways, and using fuel from a different fuel supplier usually solves performance problems.
The engine will not start.	The seat switch is faulty.	Contact your Roberine dealer.
	The foot pedals are not in neutral.	Put the foot pedals in neutral.
	The mowing unit operation switch is not in neutral.	Set the mowing unit operation switch in neutral.
	The parking brake is in the OFF position.	Set the parking brake in the ON position.
	Battery voltage too low.	Charge the battery.
	A fuse has blown.	Replace the fuse. See <i>Replacing fuses</i> on page 71.
	The fuel level is too low.	Top up the fuel tank.
	The fuel filter is clogged.	Replace the fuel filter. See <i>Fuel filter and water separator</i> on page 59.
	The tank vent is clogged.	Clean the vent valve.
	The battery is sulphated or worn out.	Replace the battery.
	The battery connections are loose or corroded.	Clean and tighten the battery clamps.

Problem	Possible cause	Solution
The engine is difficult to start.	You are using the wrong type of fuel.	Replace the fuel.
	The electrical connections are dirty.	Check and clean the connections.
	The oil level is too high.	Drain the excess oil.
	The injectors are faulty.	Test de injectors.
	The fuel supply lines or fuel filters are clogged.	Clean the fuel system.
	The air filter is dirty.	Clean the air filter. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	There are air bubbles in the fuel line.	Bleed the fuel system.
The engine overheats.	The fuel is contaminated.	Replace the fuel and bleed the fuel system.
	The coolant level is too low.	Top up the coolant. See <i>Cooling system</i> on page 59.
	The cooling system is dirty.	Flush the cooling system.
	The cap of the expansion tank is defective.	Replace the cap of the expansion tank.
	The thermostat is faulty.	Contact your Roberine dealer.
	The water temperature indicator or sending unit is faulty.	Contact your Roberine dealer.
	The engine oil level is too low.	Top up the engine oil.
	The V-belt is loose or defective.	Tension or replace the V-belt. See <i>V-belt</i> on page 61.
	The idle speed is too low.	Increase the idle speed.
	The grille, radiator screen or radiator fins are dirty.	Clean the grille, radiator screen and radiator.
	The driving speed is too high for the conditions.	Drive slower.
	The V-belt is broken.	Replace the V-belt. See <i>V-belt</i> on page 61.
The engine is rattling.	The engine oil level is too low.	Top up the engine oil.
	You are using the wrong type of fuel.	Replace the fuel.
	The injectors are faulty.	Test de injectors.
	There is water in the fuel system.	Replace the fuel and bleed the fuel system.
The engine runs erratically or stalls.	The engine is overheated.	Clean the radiator and cover panels.
	The fuel filter is clogged.	Replace the fuel filter.
	The air intake system is blocked.	Clean the air intake system. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The vent in the fuel cap is dirty.	
	The seat switch is faulty.	Contact your Roberine dealer.

Problem	Possible cause	Solution
The engine is making unusual combustion noises.	You are using old fuel or the wrong type of fuel.	Replace the fuel.
	The fuel level is too low.	Top up the fuel tank.
	The injectors are faulty.	Test de injectors.
	The fuel level is too low.	Top up the fuel tank.
The engine speed is erratic.	There is water in the fuel system.	Replace the fuel and bleed the fuel system.
	The fuel is contaminated.	Replace the fuel and bleed the fuel system.
The engine stalls when under load.	The air filter is dirty.	Clean the air filter. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The fuel filter is clogged.	Replace the fuel filter.
	The fuel is contaminated.	Replace the fuel and bleed the fuel system.
	The fuel filter is dirty.	Replace the fuel filter.
The engine will not run at low speed.	The throttle cable is loose.	Reconnect the throttle cable.
	You are using the wrong type of fuel.	Replace the fuel.
	The fuel is contaminated.	Replace the fuel and bleed the fuel system.
	The fuel filter is dirty.	Replace the fuel filter.
There is no electrical power to the engine.	The fuel filter is clogged.	Replace the fuel filter.
	The air intake system is blocked.	Clean the air intake system. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The engine is overheated.	Clean the radiator and cover panels.
	The driving speed is too high for the conditions.	Drive slower.
The engine runs erratically.	The oil level is too high.	Drain the excess oil.
	It is out of balance.	Rebalance it.
	The engine is overloaded.	Reduce the load.
	The viscosity of the engine oil is too high.	Use a different type of engine oil. See <i>Technical specifications</i> on page 33 for the correct type of engine oil.
The engine runs erratically.	The fuel is contaminated.	Replace the fuel and bleed the fuel system.
	The air filter is dirty.	Clean the air filter. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The electrical connections are dirty or corroded.	Clean and tighten the electrical connections.

Problem	Possible cause	Solution
The oil pressure is low.	The engine is overheated.	Clean the radiator and cover panels.
	The engine oil level is too low.	Top up the engine oil.
	The oil filter is clogged.	Replace the oil filter.
	You are using the wrong type of engine oil.	Use a different type of engine oil. See <i>Technical specifications</i> on page 33.
The engine consumes too much oil.	There is an oil leak.	Locate the leak and fix it.
	There is an oil leak.	Locate the leak and fix it.
	You are using the wrong type of engine oil.	Use a different type of engine oil. See <i>Technical specifications</i> on page 33.
	The oil filter is clogged.	Replace the oil filter.
The engine produces white smoke.	The air intake system is blocked.	Clean the air intake system. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	You are using the wrong type of engine oil.	Use a different type of engine oil. See <i>Technical specifications</i> on page 33.
	The engine temperature is low.	
The engine produces black or grey smoke.	You are using the wrong type of fuel.	Replace the fuel.
	The air intake system is blocked.	Clean the air intake system. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The driving speed is too high for the conditions.	Drive slower.
High fuel consumption.	You are using the wrong type of fuel.	Replace the fuel.
	The air intake system is blocked.	Clean the air intake system. See <i>Cleaning air intake grille and engine cooler</i> on page 57.
	The driving speed is too high for the conditions.	Drive slower.
	The engine temperature is low.	
	The mowing units are set incorrectly.	Readjust the mowing units. See <i>Operating mowing units</i> on page 43

12.3 Electrical problems

Problem	Possible cause	Solution
The battery is not being charged.	The alternator is faulty.	Check the V-belt. See <i>V-belt</i> on page 61.
	The V-belt is loose or defective.	Check the V-belt. See <i>V-belt</i> on page 61.
	The connections are loose or corroded.	Clean and tighten the battery clamps.
	The battery has a dead cell.	Replace the battery.

Problem	Possible cause	Solution
The battery warning light remains on while the engine is running.	The engine speed is too low.	Increase the engine speed.
	The V-belt is loose or defective.	Check the V-belt. See <i>V-belt</i> on page 61.
	The battery is faulty.	Replace the battery. See <i>Battery replacement</i> on page 69.
	The alternator is faulty.	Check the V-belt. See <i>V-belt</i> on page 61.
The starter motor does not work.	The seat switch is faulty.	Contact your Roberine dealer.
	The parking brake is in the OFF position.	Set the parking brake in the ON position.
	The mowing unit operation switch is not in neutral.	Set the mowing unit operation switch in neutral.
	The foot pedals are not in neutral.	Put the foot pedals in neutral.
	A fuse has blown.	Replace the fuse. See <i>Replacing fuses</i> on page 71 and charge the battery.
The starter motor runs too slowly.	The battery connections are loose or corroded.	Clean and tighten the battery clamps.
	The battery voltage is low.	Charge the battery.
	The viscosity of the engine oil is too high.	Use a different type of engine oil. See the technical specifications for the correct type of engine oil.
One of the lighting circuits does not work.		Replace the fuse. See <i>Replacing fuses</i> on page 71.

12.4 Vehicle problems

Problem	Possible cause	Solution
Engine vibrates too much	The engine speed is too low.	Increase the engine speed.
The engine is running but the machine does not move.	The parking brake is engaged.	Release the parking brake.
	The transmission oil level is too low.	Top up the transmission oil. See <i>Hydraulic oil</i> on page 62.
	The transmission is cold.	Allow the engine to warm up.

12.5 Steering problems

Problem	Possible cause	Solution
Steering does not work	The tyres are not set to the correct pressure.	Check tyre pressure as described in technical specifications.
	The steering joints are dry.	Lubricate the steering joints. See <i>Lubrication</i> on page 52.
	The hydraulic oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.

12.6 Hydraulic problems

Problem	Possible cause	Solution
The hydraulic system is not working.	The hydraulic oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	The pressure relief valve is faulty.	Contact your Roberine dealer.
	The pump or motor is faulty.	Contact your Roberine dealer.
	The suction line is clogged.	Check the tank filter.
The hydraulic pump makes noise.	The oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	You are using the wrong type of hydraulic oil.	Use a different type of hydraulic oil, as described in technical specifications.
	There is an air leak.	Tighten the connections and check the O-rings for damage.
The oil is foaming.	The oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	You are using the wrong type of hydraulic oil.	Use a different type of hydraulic oil, as described in technical specifications.
	There is an air leak.	Tighten the connections and check the O-rings for damage.
The mower blades rotate slowly.	The oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	You are using the wrong type of hydraulic oil.	Use a different type of hydraulic oil, as described in technical specifications.
	The pressure relief valve is faulty.	Contact your Roberine dealer.
The oil is getting overheated.	The oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	You are using the wrong type of hydraulic oil.	Use a different type of hydraulic oil, as described in technical specifications.
	There is an internal high-pressure leak.	Contact your Roberine dealer.
	The float valve is closed due to excessive weight.	Set the float switch in the ON position.
	The oil cooler is clogged.	Clean the oil cooler.
	The ambient temperature is high and the hydraulic system is under heavy load.	Contact your Roberine dealer.

12.7 Driving problems

Problem	Possible cause	Solution
The machine cannot be driven forwards or backwards.	The parking brake is in the ON position.	Set the parking brake in the OFF position.
	The hydraulic oil level is too low.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	The hydraulic pump has internal damage.	Contact your Roberine dealer.

Problem	Possible cause	Solution
The machine accelerates slowly.	You are using the wrong type of hydraulic oil.	Use a different type of hydraulic oil, as described in technical specifications.
	The engine speed is too low.	Increase the engine speed.
	The parking brake is stuck.	Contact your Roberine dealer.
	The hydraulic oil level is too low.	Bleed the hydraulic system or contact your Roberine dealer
	There is air in the hydraulic system.	Bleed the hydraulic system or contact your Roberine dealer.

12.8 Mowing units

Problem	Possible cause	Solution
The mowing result is poor.	The machine drives too fast.	Drive slower.
	The engine speed is too low.	Increase the engine speed.
The terrain is uneven or hilly.	The machine drives too fast.	Drive slower.
	The engine speed is too low.	Increase the engine speed.
Grass is accumulating on the rollers.	The scraper is set incorrectly.	Check and adjust the scraper.
The mowing units cannot be raised/ lowered.	There is not enough hydraulic oil in the reservoir.	Top up the hydraulic oil. See <i>Hydraulic oil</i> on page 62.
	The engine speed is too low.	Increase the engine speed.
The mowing units do not turn.	There is not enough hydraulic oil in the reservoir.	Check the hydraulic oil level and top up if necessary. See <i>Hydraulic oil</i> on page 62.
	The proximity switch is out of range.	Contact your Roberine dealer.
	The wiring is broken or there is a short circuit.	Contact your Roberine dealer.

13 Warranty conditions

The warranty is 12 months or 1,500 hours, whichever comes first, from the date of delivery of the machine. The warranty is extended to 24 months if the dealer submits the signed transfer form to Roberine.

The warranty covers the repair and/or replacement of parts that fail during the warranty period due to a latent defect of the machine. The warranty is not extended after a repair or replacement.

The warranty does not cover repairs and replacement of defective parts necessitated by normal wear during use of the machine.

The warranty does not cover parts that require regular replacement as part of machine maintenance.

The warranty does not cover defects resulting from deliberate damage, failure to follow the instructions in this manual, operating errors or repairs not carried out by Roberine or on behalf of Roberine.

Warranty repairs must be carried out by your local authorised Roberine dealer using original Roberine parts.

Any costs incurred, such as loss of income, travel expenses, installation costs, shipping costs, etc., are not covered by the warranty and will not be reimbursed.

Situations not covered by the preceding provisions are subject to the most recent general terms and conditions of delivery issued by Koninklijke Metaalunie.



NOTICE Roberine is **not** liable for direct or indirect damage resulting from operating errors, a lack of maintenance carried out by experts or use of the machine other than described in this manual. The liability of Roberine also lapses if you or third parties carry out work on the machine, such as installation of additional equipment or accessories, without the consent of Roberine.

14 Appendices

14.1 Declaration of conformity

Your mower meets all legal requirements on integrated safety as stipulated by the European machinery directive. We are therefore authorised to issue the following CE declaration for your machine:



The CE type plate on your machine and the following *declaration of conformity* mean that the manufacturer has complied with the principles of integrated safety established in the machinery directive.

This includes:

1. designing the product to eliminate or reduce risks,
2. taking the required safety measures for risks that cannot be eliminated, and
3. informing the user of the residual risks (via this manual and the safety symbols).

EC declaration of conformity

IN ACCORDANCE WITH ANNEX II SUB A OF DIRECTIVE 2006/42/EC

we,

Alamo Group The Netherlands Middelburg B.V.
Herculesweg 6
4338 PL Middelburg
The Netherlands

declare under our own responsibility that your machine:

Manufacturer:	Roberine
Type:	mower
Model:	F302 and R302
Serial number:	See manufacturer's plate
Description:	Tool carrier with flail mowing units (F302) or mowing reels (R302).

to which this declaration relates, is in conformity with the provisions of the following directives:

Machinery Directive 2006/42/EU
EMC Directive 2014/30/EU
Noise Directive 2000/14/EC

and in conformity with the following standard(s) or other normative documents:

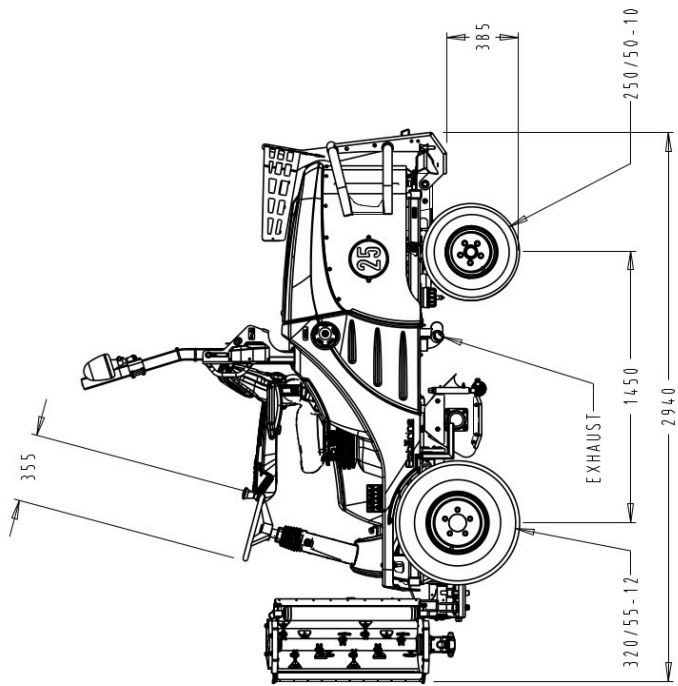
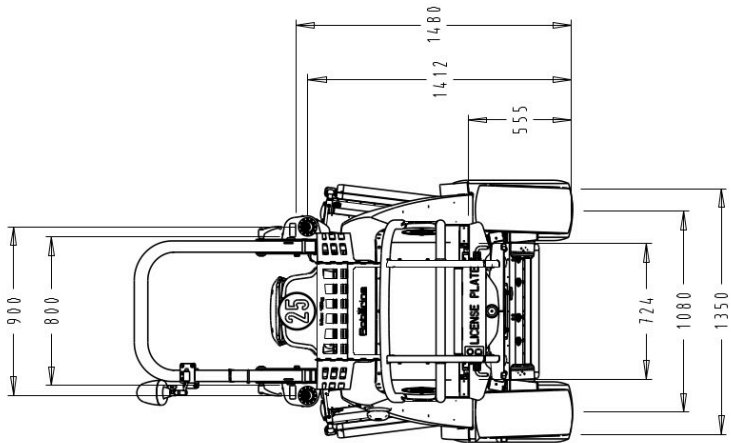
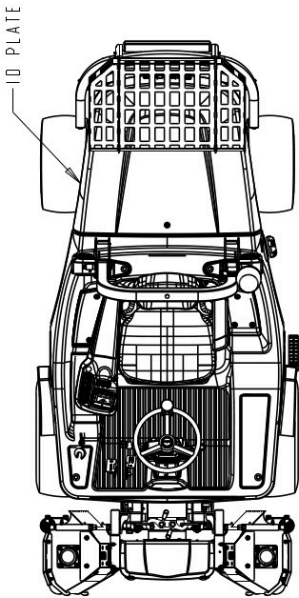
NEN 5509 User manuals

Signed: NL-Middelburg, april 2025

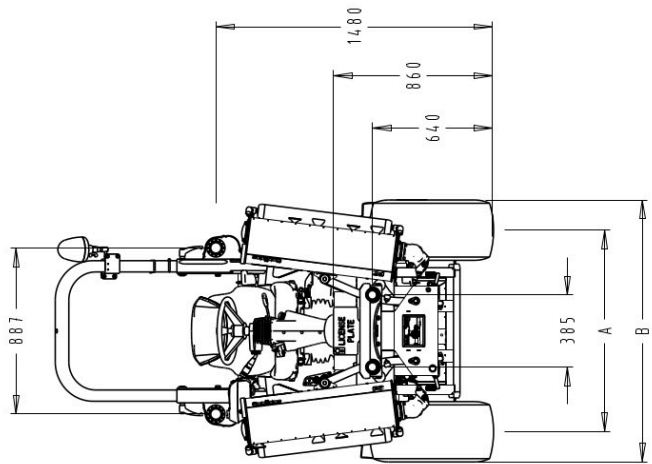
A.Prince
General manager

14.2 Dimensions

ROPS version

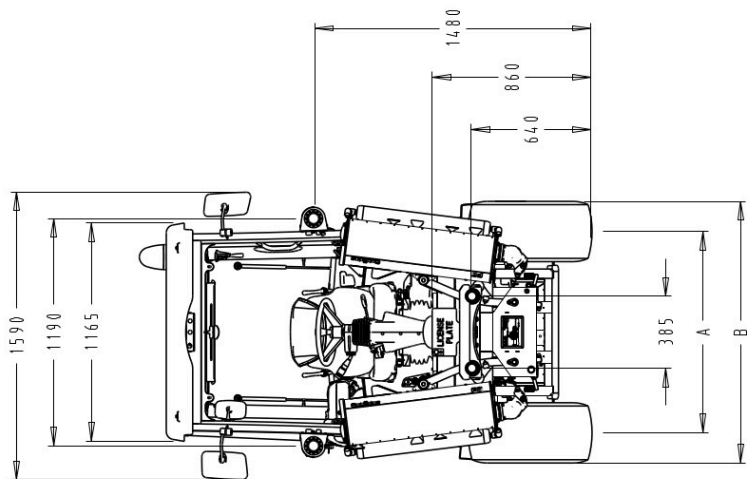
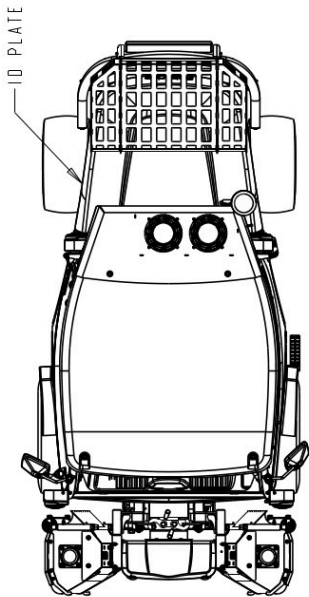


FRONT AXLE LOAD	875kg
REAR AXLE LOAD	573kg
TOTAL WEIGHT	1448kg

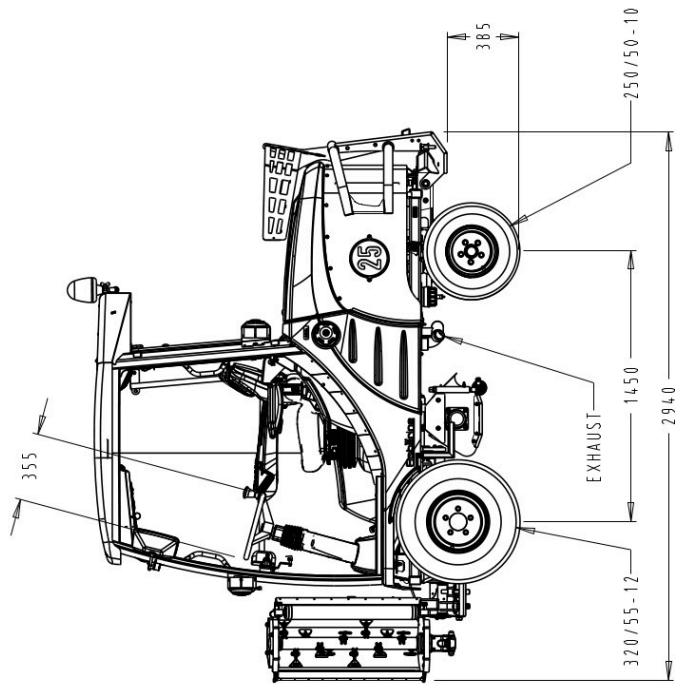


ET	TRACK WIDTH (A)	TOTAL WIDTH (B)
0	954	1400
-25	1004	1450
-75	1104	1550

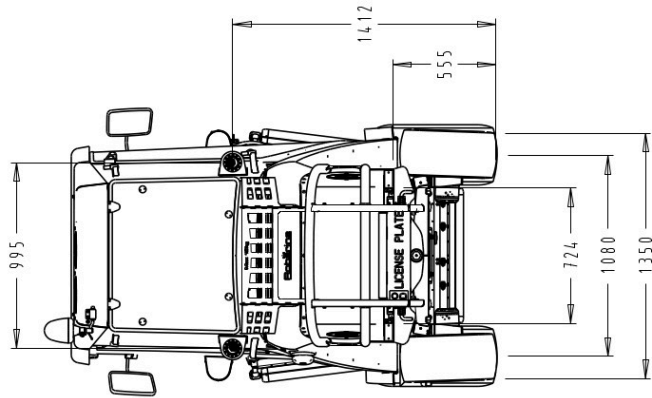
Cab version



ET	TRACK WIDTH (A)	TOTAL WIDTH (B)
0	954	1400
-25	1004	1450
-75	1104	1550



FRONT AXLE LOAD	1000kg
REAR AXLE LOAD	685 kg
TOTAL WEIGHT	1685kg

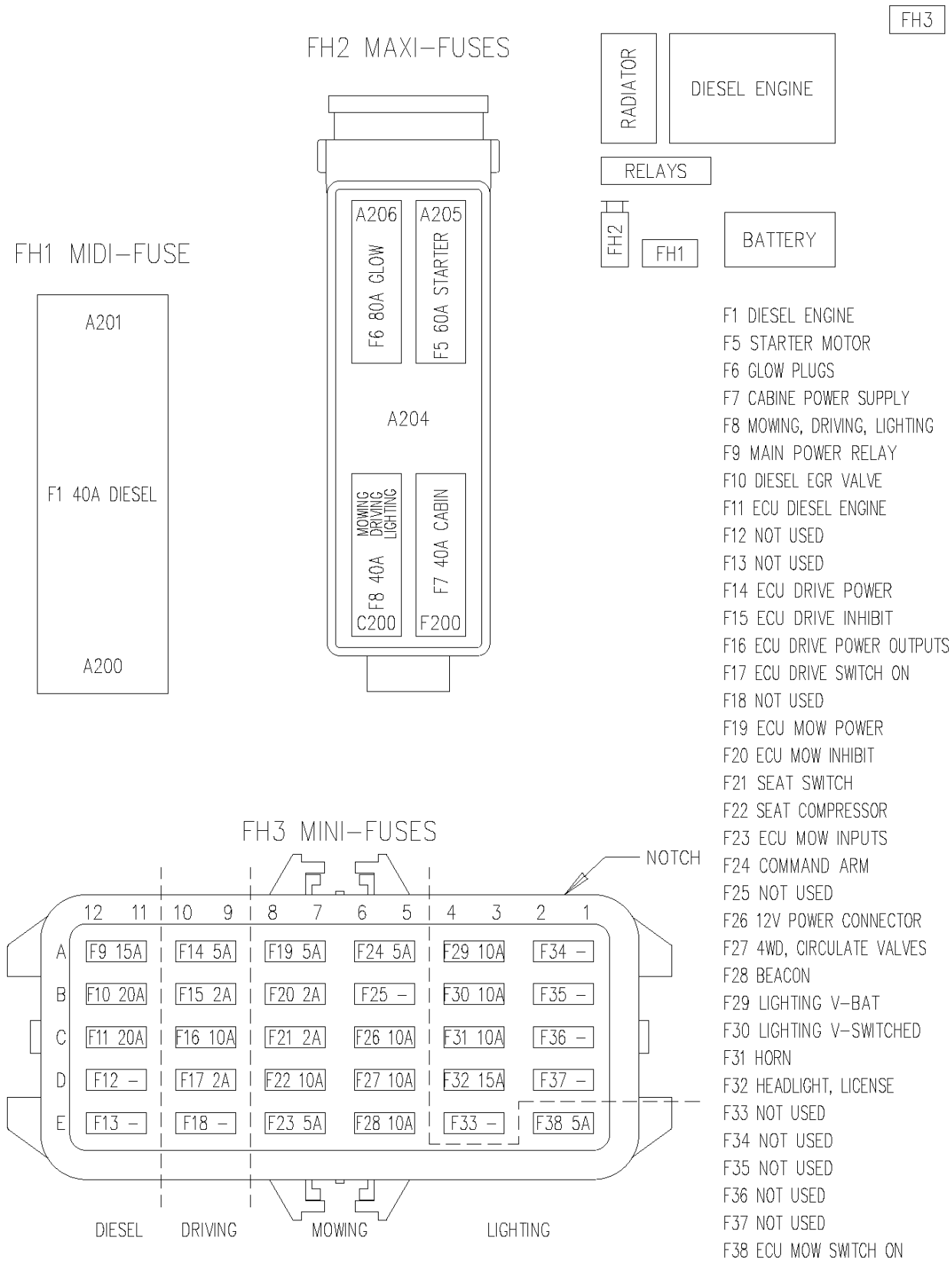


14.3 Fault codes

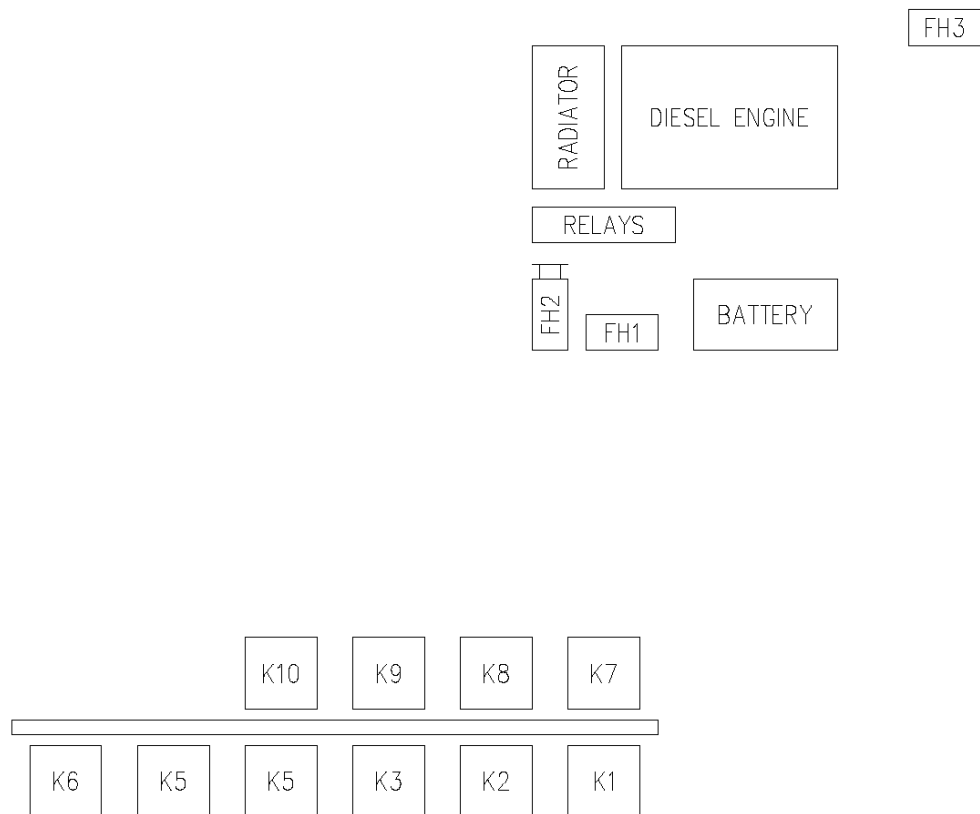
Code	Description
0	ECU, no fault
1	ECU battery supply voltage too high
2	ECU battery supply voltage too low
3	ECU voltage Vss1 supply
4	ECU voltage Vss2 supply
5	ECU voltage Vss3 supply
6	ECU CAN1
7	ECU CAN2
8	ECU CAN3
9	ECU CAN4
10	ECU activation, power supply too low
11	ECU activation, sensor power supply
12	ECU activation, monitor 1
13	ECU activation, start condition 1 user
14	ECU activation, battery voltage too high
15	ECU activation, engine speed
16	ECU activation, monitor 2
17	ECU activation, start condition 2 user
18	ECU activation fault, battery voltage too low
19	ECU activation fault, CAN time-out
20	ECU activation fault, broken cable
21	ECU activation fault, short circuit
22	ECU activation, Vss1
23	ECU activation, Vss2
24	ECU activation, Vss3
25	ECU activation, power switch failed 1
26	ECU activation, no power
27	ECU activation, power switch failed 2
28	ECU activation, power supply reversed
29	ECU activation, emergency stop active
30	Input pedal sensor no. 1
31	Input pedal sensor no. 2
32	Drive pedal, redundancy
33	Seat switch
34	Output mower pump no. 1 high-side discharge

Code	Description
35	Output mower pump no. 1 low-side discharge
36	Output mower pump no. 2 high-side discharge
37	Output mower pump no. 2 low-side discharge
38	Output lower left mowing unit
39	Output lower centre mowing units
40	Output lower right mowing unit
41	Output raise mowing units
42	Output circulation left mower manifold
43	Output backlapping left mower manifold
44	Output left mower manifold left solenoid valve high side
45	Output left mower manifold left solenoid valve low side
46	Output left mower manifold centre solenoid valve high side
47	Output left mower manifold centre solenoid valve low side
48	Output left mower manifold right solenoid valve high side
49	Output left mower manifold right solenoid valve low side
50	Output circulation right mower manifold
51	Output backlapping right mower manifold
52	Output right mower manifold left solenoid valve front high side
53	Output right mower manifold left solenoid valve front low side
54	Output right mower manifold right solenoid valve front high side
55	Output right mower manifold right solenoid valve front low side
56	Output 4WD no. 1
57	Output 4WD no. 2
58	Output parking brake high side
59	Output parking brake low side
60	Output brake lights
62	Output cooling fan
62	Output weight transfer
63	Output alarm buzzer
64	Attempt to start without the parking brake
65	Attempt to start with switch in mowing position
66	Attempt to start with switch in backlapping position
67	Attempt to start with towing valve in towing position

14.4 Fuses



14.5 Relays



- K1 DIESEL, SWITCHED VOLTAGE
- K2 DIESEL, GLOW PLUGS
- K3 DIESEL, START
- K4 DIESEL, EGR VALVE
- K5 CABIN, SWITCHED VOLTAGE
- K6 MOWING & DRIVING, SWITCHED VOLTAGE
- K7 LIGHTING, SWITCHED VOLTAGE
- K8 LIGHTING, FLASHER RELAY
- K9 LIGHTING, HEADLIGHTS RELAY
- K10 LIGHTING, PARKING LIGHTS LATCH RELAY



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