Publication 1112
March 2026
Part No. 24216.13

McCONNEL

ROBO MULCHER 1300 HEAD

Robocut Attachment (4.4040106)

Operation Manual

IMPORTANT

VERIFICATION OF WARRANTY REGISTRATION

Dealer Warranty Information & Registration Verification

It is imperative that the selling dealer registers this machine with McConnel Limited before delivery to the end user – failure to do so may affect the validity of the machine warranty.

To register machines; log onto https://my.mcconnel.com and select 'Machine Registration' which can be found in the 'Warranty' section of the site. **Confirm to the customer that the machine has been registered by completing the verification form below.**

Registration Verification

Serial No.

Dealer Name: ……..……..

Dealer Address: ……..……..

Customer Name: ……..……

Date of Warranty Registration: ……/……/..…. Dealer Signature: ……..……

Note to Customer / Owner

Please ensure the section above has been completed and signed by the dealer to verify your machine has been registered with McConnel Limited.

IMPORTANT: During the initial 'bedding in' period of a new machine it is the customer's responsibility to regularly inspect all nuts, bolts and hose connections for tightness and re-tighten if required. New hydraulic connections occasionally weep small amounts of oil as the seals and joints settle in – where this occurs it can be cured by re-tightening the connection – *refer to torque settings chart below.* The tasks stated above should be performed on an hourly basis during the first day of work and at least daily thereafter as part of the machine's general maintenance procedure.

CAUTION: DO NOT OVER TORQUE HYDRAULIC FITTINGS AND HOSES

Torque Settings for Hydraulic Fittings

Hydraulic Hose Ends		
BSP	**Setting**	**Metric**
1/4"	18 Nm	19 mm
3/8"	31 Nm	22 mm
1/2"	49 Nm	27 mm
5/8"	60 Nm	30 mm
3/4"	80 Nm	32 mm
1"	125 Nm	41 mm
1.1/4"	190 Nm	50 mm
1.1/2"	250 Nm	55 mm
2"	420 Nm	70 mm

Port Adaptors with Bonded Seals		
BSP	**Setting**	**Metric**
1/4"	34 Nm	19 mm
3/8"	47 Nm	22 mm
1/2"	102 Nm	27 mm
5/8"	122 Nm	30 mm
3/4"	149 Nm	32 mm
1"	203 Nm	41 mm
1.1/4"	305 Nm	50 mm
1.1/2"	305 Nm	55 mm
2"	400 Nm	70 mm

WARRANTY POLICY

WARRANTY REGISTRATION

All machines must be registered, by the selling dealer with McConnel Ltd, before delivery to the end user. On receipt of the goods it is the buyer's responsibility to check that the Verification of Warranty Registration in the Operator's Manual has been completed by the selling dealer.

1. LIMITED WARRANTIES

1.01. All mounted machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months, unless a different period is specified.
All Self Propelled Machines supplied by McConnel Ltd are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 12 months or 1500 hours. Engine warranty will be specific to the Manufacturer of that unit.

1.02. All spare parts supplied by McConnel Ltd and purchased by the end user are warranted to be free from defects in material and workmanship from the date of sale to the original purchaser for a period of 6 months. All parts warranty claims must be supported by a copy of the failed part invoice to the end user. We cannot consider claims for which sales invoices are not available.

1.03. The warranty offered by McConnel Ltd is limited to the making good by repair or replacement for the purchaser any part or parts found, upon examination at its factory, to be defective under normal use and service due to defects in material or workmanship. Returned parts must be complete and unexamined. Pack the component(s) carefully so that any transit damage is avoided. All ports on hydraulic items should be drained of oil and securely plugged to prevent seepage and foreign body ingress. Certain other components, electrical items for example, may require particular care when packing to avoid damage in transit.

1.04. This warranty does not extend to any product from which McConnel Ltd's serial number plate has been removed or altered.

1.05. The warranty policy is valid for machines registered in line with the terms and conditions detailed and on the basis that the machines do not extend a period of 24 months or greater since their original purchase date, that is the original invoice date from McConnel Limited.
Machines that are held in stock for more than 24 months cannot be registered for warranty.

1.06. This warranty does not apply to any part of the goods, which has been subjected to improper or abnormal use, negligence, alteration, modification, fitment of non-genuine parts, accident damage, or damage resulting from contact with overhead power lines, damage caused by foreign objects (e.g. stones, iron, material other than vegetation), failure due to lack of maintenance, use of incorrect oil or lubricants, contamination of the oil, or which has served its normal life. This warranty does not apply to any expendable items such as blades, belts, clutch linings, filter elements, flails, flap kits, skids, soil engaging parts, shields, guards, wear pads, pneumatic tyres or tracks.

1.07. Temporary repairs and consequential loss - i.e. oil, downtime and associated parts are specifically excluded from the warranty.

1.08. Warranty on hoses is limited to 12 months and does not include hoses which have suffered external damage. Only complete hoses may be returned under warranty, any which have been cut or repaired will be rejected.

1.09. Machines must be repaired immediately a problem arises. Continued use of the machine after a problem has occurred can result in further component failures, for which McConnel Ltd cannot be held liable, and may have safety implications.

1.10. If in exceptional circumstances a non McConnel Ltd part is used to effect a repair, warranty reimbursement will be at no more than McConnel Ltd's standard dealer cost for the genuine part.

1.11. Except as provided herein, no employee, agent, dealer or other person is authorised to give any warranties of any nature on behalf of McConnel Ltd.

1.12. For machine warranty periods in excess of 12 months the following additional exclusions shall apply:

1.12.1. Hoses, exposed pipes and hydraulic tank breathers.

1.12.2. Filters.

1.12.3. Rubber mountings.

1.12.4. External electric wiring.

1.12.5. Bearings and seals

1.12.6. External Cables, Linkages

1.12.7. Loose/Corroded Connections, Light Units, LED's

1.12.8. Comfort items such as Operator Seat, Ventilation, Audio Equipment

1.13. All service work, particularly filter changes, must be carried out in accordance with the manufacturer's service schedule. Failure to comply will invalidate the warranty. In the event of a claim, proof of the service work being carried out may be required.

1.14. Repeat or additional repairs resulting from incorrect diagnosis or poor quality previous repair work are excluded from warranty.

NB Warranty cover will be invalid if any non-genuine parts have been fitted or used. Use of non-genuine parts may seriously affect the machine's performance and safety. McConnel Ltd cannot be held responsible for any failures or safety implications that arise due to the use of non-genuine parts.

2. REMEDIES AND PROCEDURES

2.01. The warranty is not effective unless the Selling Dealer registers the machine, via the McConnel web site and confirms the registration to the purchaser by completing the confirmation form in the operator's manual.

2.02. Any fault must be reported to an authorised McConnel Ltd dealer as soon as it occurs. Continued use of a machine, after a fault has occurred, can result in further component failure for which McConnel Ltd cannot be held liable.

2.03. Repairs should be undertaken within two days of the failure. Claims submitted for repairs undertaken more than 2 weeks after a failure has occurred, or 2 days after the parts were supplied will be rejected, unless the delay has been authorised by McConnel Ltd. Please note that failure by the customer to release the machine for repair will not be accepted as a reason for delay in repair or submitting warranty claims.

2.04. All claims must be submitted, by an authorised McConnel Ltd Service Dealer, within 30 days of the date of repair.

2.05. Following examination of the claim and parts, McConnel Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnel Ltd and appropriate labour and mileage allowances if applicable.

2.06. The submission of a claim is not a guarantee of payment.

2.07. Any decision reached by McConnel Ltd. is final.

3. LIMITATION OF LIABILITY

3.01. McConnel Ltd disclaims any express (except as set forth herein) and implied warranties with respect to the goods including, but not limited to, merchantability and fitness for a particular purpose.

3.02. McConnel Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.

3.03. Except as provided herein, McConnel Ltd shall have no liability or responsibility to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the goods including, but not limited to, any indirect, special, consequential, or incidental damages resulting from the use or operation of the goods or any breach of this warranty. Notwithstanding the above limitations and warranties, the manufacturer's liability hereunder for damages incurred by the purchaser or others shall not exceed the price of the goods.

3.04. No action arising out of any claimed breach of this warranty or transactions under this warranty may be brought more than one (1) year after the cause of the action has occurred.

4. MISCELLANEOUS

4.01. McConnel Ltd may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.

4.02. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.

4.03. Applicable law may provide rights and benefits to the purchaser in addition to those provided herein.

McConnel Limited

For Safety and Performance…

ALWAYS READ THE BOOK FIRST

McCONNEL LIMITED

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www.mcconnel.com

This manual must be read and used in conjunction with:

ROBOCUT Operation Manual

Robocut operation manuals are available on our website via the links below;

In line with our policy of constant improvement this publication may be periodically updated. To ensure you have access to the latest version of this manual please visit the manuals library on our website where an up-to-date version can be referenced online or downloaded.

To access manuals use the QR code opposite or the web address below;

https://my.mcconnel.com/service/pdf-manuals/pdf-operator-manuals/remote-control-technology-manuals/

SAFETY FIRST

MACHINE SAFETY DECALS MUST BE KEPT IN CLEAN READABLE CONDITION AT ALL TIMES;
Any safety decals that are missing, damaged or illegible must always be replaced immediately.
McConnel have a policy of providing replacement safety decals and manuals free of charge.

CONTENTS

1 - GENERAL DESCRIPTION

1.1 - PRELIMINARY INFORMATION

This manual must be kept in good readable condition for reference by the operator when needed.
If this manual becomes damaged or in any way unreadable, a free of charge replacement copy can be request from McConnel quoting the publication reference and/or part number below.

Publication:	**1112**
Part No.	**24216.13**
Date:	**March 2026**
Machine type:	**Mulcher Head**
Model:	**MULCHER 1300**

The manual is valid from serial number: **M2271355**

McConnel Limited
Temeside Works,
Ludlow, SY8 1JL, UK

Telephone number:	+44 (0)1584 873131
Website address:	https://www.mcconnel.com
Email:	sales@mcconnel.com

1.2 - TRAINING REQUIRED FOR THE OPERATOR

Read this manual thoroughly:

- All machine operators and maintenance personnel must read this entire manual thoroughly and pay maximum attention to its requirements.
- The employer has an obligation to ensure that the operator possesses the required abilities to operate the machine, and that they have read this manual.

1.3 - WARNINGS ON USE AND STORAGE

The operating instructions contained in this manual are valid exclusively for the **MULCHER 1300** model.

The instruction manual must be read and used as follows:

- Carefully read the instruction manual, the manual is considered an integral part of the machine;
- The instruction manual must be readily accessible by all personnel assigned to operate it and to perform maintenance on it;
- This manual should be kept for the entire service life of the machine;
- Make sure that any received updates are incorporated into the manual;
- Pass on the manual to any other user or subsequent owner of the machine;
- Use the manual in such a way as not to damage it;
- Do not remove, tear out or rewrite parts of the manual for any reason;
- Store the manual in areas protected from moisture and heat;
- If the manual is lost or partially damaged and it is no longer possible to read its contents either partially/completely, it is advisable to request a new manual from the manufacturer.

Pay maximum attention to the following symbols and heir meanings, they serve to highlight particular information such as:

WARNING

Reference to additions or suggestions for the correct use of the machine.

ATTENTION

Reference to dangerous situations that may occur by using the machine and which may cause serious injury to persons or damage to property.

DANGER

Reference to dangerous situations that can occur when using the machine and which could cause severe injury or death if not avoided.

1.4 - INTRODUCTION

This manual provides the essential information needed to operate the machine safely and correctly.
Rushed and/or incomplete preparations lead to improvisation, which is the cause of many accidents.

Before starting work, carefully read and comply with the following advice:

- Become familiar and confident with all permitted operations and operating positions before using the machine.
- The operator must always keep this instruction manual available for reference.
- Plan each task or intervention carefully before starting work.
- Obtain all necessary information for transporting the machine on the road, such as distance, route, height restrictions, bridge clearances, etc.
- Understand in detail where and how the machine will be used, including the ground load-bearing capacity.
- Before starting work, ensure that all safety devices are functioning correctly. If there is any doubt about their operation, do not use the machine under any circumstances.
- Carefully read and follow all warnings related to specific hazards contained in this manual.
- Regular and thorough preventive maintenance ensures high operational safety. Never delay necessary repairs; ensure they are carried out only by qualified personnel using original spare parts.

1.4.1 - UPDATING THE MANUAL

The information and illustrations contained in this manual are relevant to the machine when the manual was published.

The manufacturer reserves the right to make changes to the machines at any time for technical or commercial reasons. In the event that such changes are made, the manufacturer has no obligation (for safety reasons) to modify the other machines sold up to that point or to send updates for the manual. Therefore, this publication shall not be considered inadequate. Any additions that the manufacturer deems appropriate to provide as a result of any changes made must be kept with the manual and should be considered an integral part thereof.

1.4.2 - COPYRIGHT

1.5 - WARRANTIES

The parts supplied by McConnel are covered by a 12-month warranty, that becomes valid upon commissioning, proven by the documentation delivered to the customer. In any case, refer to the machine order confirmation or to any specific agreements entered into during the sale.
McConnel shall repair or replace parts recognised as defective during the warranty period.

By replacing the defective part, McConnel shall consider itself free from any other expenses borne by the Dealer and the Dealer's Customer, for instance alleged damage, either present or future, such as lost earnings, conventional penalties, etc.
Ordinary and extraordinary maintenance must be performed in accordance with the instructions contained in this manual. For all cases not included and for every type of assistance, contact the company McConnel directly by registered letter, even in the case of agreements made by telephone.
McConnel shall not be held responsible for any delays or missed interventions.
McConnel shall not be held responsible for any damage or malfunctions due to technical operations carried out on the machine by unauthorised personnel.

1.6 - RESPONSIBILITIES

McConnel considers itself exempted from all liability and obligations for accidents involving personal injuries or damage to property which may occur due to:

- Failure to observe the instructions given in this manual to run, operate and perform maintenance on the machine;
- Abrupt actions or incorrect manoeuvres when operating or performing maintenance on the machine;
- Modifications made to the machine without prior written authorisation from McConnel;
- Any other events that cannot be considered normal and correct use of the machine.

In any case, whenever the user blames the accident on a defect of the machine, it is necessary to prove that the consequent damage was a main and direct consequence of such defect.
Any tampering or the use of non-original spare parts will create the conditions for voiding the warranty and put the operator's safety at risk.

ATTENTION

- **For repairs or maintenance always use genuine replacement parts.**
- **McConnel declines all liability for any damage that may be caused as a result of non-compliance with the above.**
- **The machine is guaranteed according to the contractual agreements entered into upon sale.**
- **The warranty, however, will not apply if the rules and instructions of use contained in this manual have not been complied with.**

1.7 - PERMITTED USES

The MULCHER 1300 flail head is a machine built to be used by professional personnel, mainly for green maintenance work and chopping of material that grows or is found on the ground such as: grass, reeds, bushes and shrubs with a maximum diameter of 10 cm.
The machine works due to the high tangential speed with which the tools act on the processed material, driven by the hydraulic motor via hydrostatic transmission transmitted by a belt around two pulleys.
Appropriate use involves not working with the flail head raised from the ground and/or without protective devices.
Every other use is not appropriate and the manufacturer declines any responsibility for any damage to persons, property or to the machine itself that might derive from such inappropriate use.
The machine is suitable for shredding shrubs up to a speed of 4-5 km/h.

This machine should normally be used during the day; if exceptional night use is required or in conditions of reduced visibility, it must be used with an auxiliary lighting system.
Operate in daylight or with artificial lights which guarantee a visibility of at least 100 metres.

1.8 - IMPROPER OR PROHIBITED USES

ATTENTION

This paragraph provides examples of improper or unauthorised use only, as it is impossible to anticipate every potential misuse. If there are specific situations where the machine may be used that are not listed among the permitted uses, consult McConnel before carrying out the work.

The following uses must always be strictly avoided:

- Use of the machine by minors, inexperienced, untrained or unlicensed persons;
- Use of the machine to lift and/or to transport persons or property;
- Use of the flail mower head as a piledriver;
- Use of the machine for towing vehicles;
- Use of the machine for crushing of waste wood and hedges in excess of 10 cm maximum diameter.
- It must not be used on surfaces contaminated by glass, loose stones, metal or other foreign bodies that may be ejected by the blades or cause damage to the flail head;
- Lifting or pulling loads;
- Putting the machine into contact with accessories or equipment classified as dangerous due to their chemical or physical properties (e.g. materials which are flammable, toxic, explosive, etc.);
- Overloading the machine beyond its allowed limits;
- Use of the machine with tools not authorised by McConnel;
- Making changes to the machine (hydraulic, electrical or mechanical);

DANGER

Use of the machine without suitable protections can be dangerous both for the operator and for persons or animals within the operating range of the machine.

Range of action *means the distance around the machine that should be free from animals and/or persons as a hazard may occur.*

1.9 - RUNNING-IN AND TESTING OF THE MACHINE

Each machine is carefully adjusted and tested before delivery.
A new machine must however be used with caution for the first 100 hours for the purpose of efficient 'running-in' of the various components.
If the machine is subjected to an excessive workload during the initial phase of operation, its potential performance will be prematurely compromised and its functionality reduced in a short period of time.

During the running-in period, pay close attention to the following points:
- after starting, allow the engine to run at a low speed for 5-6 minutes.
- avoid making the machine work to its full limit during the first 100 hours of operation. Avoid sudden accelerations or decelerations.

1.10 - FOR YOUR SAFETY

- Do not remove the safety guards when the flail head and/or accessories are moving
- During the work of the flail head, it is advisable to keep a safety distance of 50 meters and check that there are no persons and/or animals within the danger area of the machine. If persons and/or animal enter the danger area, stop the machine immediately.
- During work the tools must never touch the ground.
- Before carrying out any work on the flail head, for example cleaning or maintenance operations, stop the hydraulic motor, wait for the rotor to come to a complete stop and turn off the operating machine's engine.
- Do not transport persons on the machine during transport or work.
- When the rotor is moving, do not attempt to introduce or remove material with any tools, especially with your hands or feet.
- Do not lift the flail head with the rotor moving, as this may cause the ejection of dangerous material at high speed.

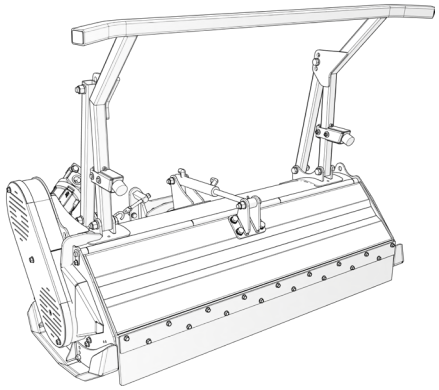
ATTENTION

- **Safety stickers are applied to the machine as a visual warning to inform operators and bystanders of potential dangers. It is therefore extremely important to replace them if they are damaged or no longer legible.**
- **The operator must not be an occasional one, but must be experienced with this type of machine, and be trained.**
- **If the direct view of the work area from the driving position is not sufficient, the operator must be assisted by an expressly appointed person.**
- **The person assisting the activity must always stand to the side of the machine and NEVER in front or behind it in order to be protected and at a safe distance (greater than 50 meters).**
- **Daily check the integrity and functionality of the parts subject to wear resulting from use: (pins, valves, piping etc.). Where necessary, replace parts with original parts.**
- **Never, under any circumstances, tamper with the hydraulic system and in any case do not remove the seal from the valves as this would invalidate the warranty. For valve adjustments, contact an authorised McConnel workshop.**

2 - MACHINE SPECIFICATIONS

2.1 - MACHINE DESCRIPTION

The MULCHER 1300 forestry header was designed for professional use in the field of ground shredding of woody/ vegetable residues on typical woodland terrain and for the reclamation of uncultivated land.



The machine is useful for chopping vegetation and branches in the forestry sector that have a diameter no greater than that indicated in the technical data table, and for clearance of undergrowth.
Other uses can be the shredding of residual branches after logging, the formation of fire-breaks and shredding of pruning residues. Its use is intended for open countryside and wooded areas away from people, traffic, buildings, etc.

Use of the machine for any purpose other than what it was designed for is strictly forbidden.

2.2 - STANDARDS COMPLIED WITH

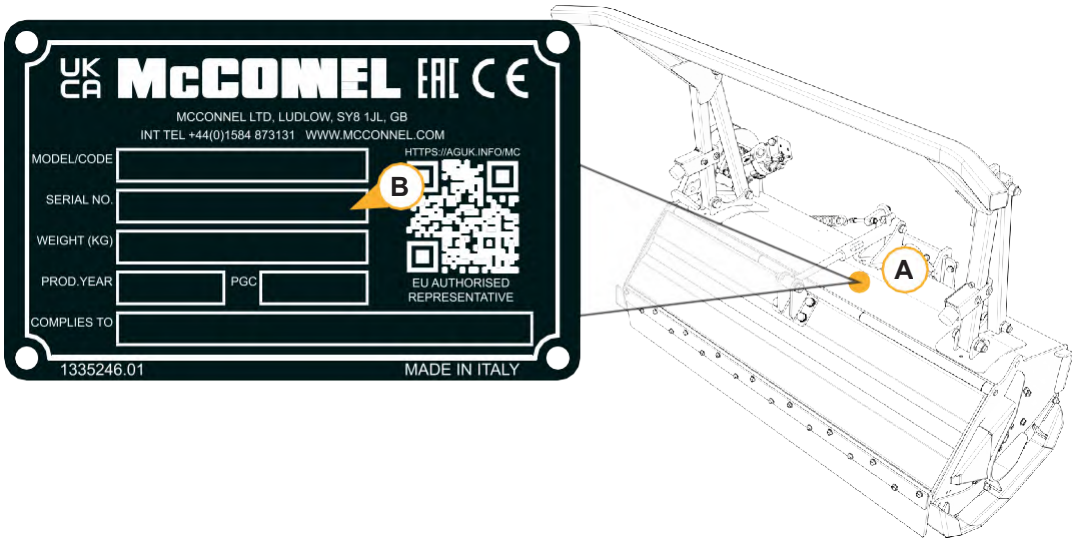
The machine has been designed and constructed in respect of the Machinery Directive 2006/42/CE.

The following standards were taken into account in the design:
- UNI EN ISO 12100:2010 "machinery safety";

The following technical specifications were used to update the machine:
- ISO 3767-1:2016;
- ISO 11684:1995.
- ISO 3864-3:2012

2.3 - MACHINE IDENTIFICATION

The machine identification plate (**A**) is attached to the machine in the location indicated below.
The machine serial number (**B**) and operating hours should always be stated when requesting service assistance and/or when ordering replacement parts.

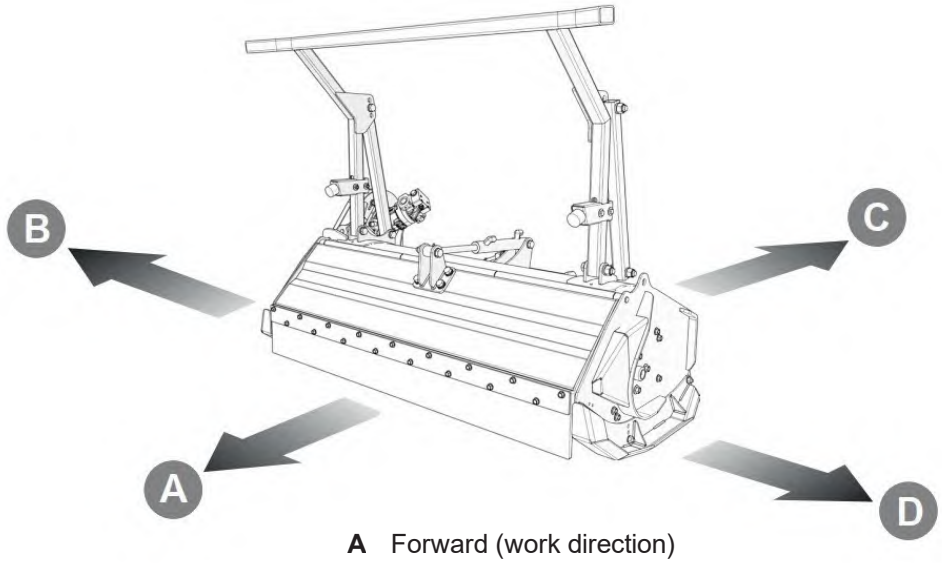


WARNING

The serial number must always be stated for assistance requests and spare parts orders.

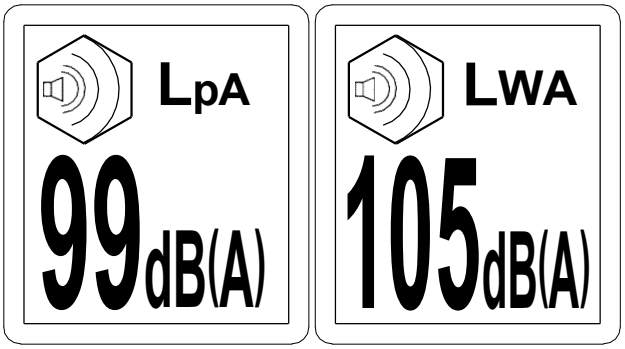
2.3.1 - MACHINE DIRECTIONS

Left or right terms are with respect to the forward direction of movement.



A Forward (work direction)
B Right side
C Back
D Left side

2.4 - NOISE LEVEL



LpA = the value indicates the maximum sound level perceived by the operator at a distance of 1m from the machine.

Lwa = the value indicates the sound level outside the machine and refers to the noise perceived by those who are in the vicinity of the work area.

Standards:
- S.I. 2008 No. 1597

ATTENTION

ALWAYS WEAR EAR PROTECTION WHEN MACHINE IS RUNNING.

3 - SAFETY REQUIREMENTS

3.1 - GENERAL SAFETY RULES

3.1.1 - GETTING TO KNOW THE MACHINE THOROUGHLY

The machine must only be used by qualified personnel who are familiar with the location and function of all aspects of controls and components.

3.1.2 - WEAR PROTECTIVE CLOTHING

Wear tight fitting clothing and use personal protective equipment in accordance with current regulations. In particular, users are required to wear:

- Noise protection;
- Eye protection;
- Safety footwear;
- Overalls;
- Work gloves.

During use, the machine may produce dust emissions. If working with dry products (straw or stretches of bare earth) it is advisable to use protective devices such as:

- Eye protection goggles;
- Respiratory dust masks.

3.1.3 - WARNINGS FOR CHECKS AND MAINTENANCE

When the machine is under maintenance:

- Remove the ignition key from the machine before carrying out any maintenance or verification operations;
- Clearly display a sign on the machine which reads, “DO NOT START THE ENGINE”.
- Delimit the area with road cones;
- When performing maintenance, be sure to first check which operations are to be performed;
- In the event of extraordinary maintenance involving lifting the machine or parts of it, the machine must be taken to a workshop which is suitably equipped with appropriate lifting devices;
- In the event of routine maintenance, the head can be placed on flat ground. Make sure the machine is secure at all times.

3.1.4 - CHECKING THE MACHINE

- Carefully check the machine every day prior to use, checking integrity and functionality of the parts affected by wear and tear deriving from use: (pins, valves, piping etc.). Where necessary, replace all worn or damaged parts with genuine original parts.
- Only start an engine in well-ventilated areas and make sure there are no persons within the operating range of the machinery.
- Covers and safety elements must not be removed; they are designed and installed for your safety.
- Do not use the machine if protective devices or covers are damaged or missing.
- After cleaning or repair, all protective devices must be reinstalled immediately.
- Always keep the machine and its accessories clean and in a good general condition, always remove shredded debris and deposits from the machine after use.

ATTENTION

- **It is strictly forbidden to make changes to the machine without prior authorisation from the manufacturer.**
- **Changes to the machine can cause dangers, hazards, and injuries.**
- **If these instructions are not observed, the manufacturer assumes no responsibility for the machine.**

3.2 - GENERAL PRECAUTIONS

- Operators must be suitably trained and experienced in the use of machinery of this type;
- 'Operator' refers to a person trained to work with these types of machines and/or equipment;
- It is mandatory to read and follow the instructions given in the use and maintenance manual before performing any operation or manoeuvre with the machine. It is too late to do so while working. Improper use or an incorrect manoeuvre can result in serious damage to people or property;
- The operators and maintenance technicians must be familiar with the machine, in particular they must know the dangers deriving from incorrect use or incorrect repairs;
- If the direct view of the work area from the driving position is not sufficient, the operator must be assisted by an expressly appointed person.
- Before starting the machine, carry out all checks on the self-propelled vehicle and tool concerning:
  1. Operation;
  2. Road safety;
  3. Accident prevention regulations;
  4. Safety precautions.
- Even when using the machine correctly, stones or other objects can be ejected from the machine. ***Therefore, no-one must be in the range of danger equivalent to 50 meters.*** Pay close attention when working near roads or buildings;
- Before starting the work, always check the integrity of the tools and all guards; if damaged or missing, replace them before using the machine;
- Make sure that nobody can involuntarily start the machine during checks and repairs.

- Do not wear loose clothing;
- Never lift persons or objects using the flailhead;
- Never work, walk or stand under the flailhead;
- Never transport persons on the flailhead;
- Never stand near the tool until it is completely still or stopped;
- Before each operation, check that there are no people and/or animals within the machine's range of operation;
- Before leaving the machine, proceed as follows:
  1. Inhibit every function;
  2. Brake the machine and in the case of steep slopes insert wheel chocks;
  3. Turn engine off and remove ignition key.
- Immediately replace any missing, damaged or illegible safety warning stickers;
- Never underestimate or ignore safety regulations;
- If safety devices are not working, replace them immediately.

3.2.1 - SAFETY WARNINGS

The machine has been designed and built according to the technical requirements in force for operations such as mowing grass, hedges, maintenance of green areas of roadsides, slopes, canals, water drainage, etc. Observe the laws, provisions, requirements, ordinances and directives in force for such machines.
The materials used and the equipment parts, as well as the production procedures, quality guarantee and checks meet the highest safety and reliability standards.
Use the machine for the purposes specified in this manual of use, manoeuvre it with the due diligence and carry out accurate maintenance and revisions as envisaged to obtain the highest performance, continuous operation and ensure a long lifespan of the machine.
When operating on public land, comply with all road traffic regulations in force in the country where the machine is being used.

3.2.2 - SAFETY REQUIREMENTS FOR ROAD TRAFFIC CIRCULATION

The manufacturer shall not be held responsible for any accidents, while using the machine, if the user were not to comply with laws, requirements, regulations and the rules in force for machines used for mowing grass, shrubs, maintenance of green areas of roads, embankments, canals, water drainage, etc.
The machine is designed to work in normal weather conditions at a temperature ranging from -10 C° to +40 C° and should only be used under these environmental conditions.
Regarding mowing on public roads, refer to the instructions given by the work supervisor as this is a mobile site.

- During road transfers, moderate the speed, especially on bumpy roads;
- During transit on public roads, respect the applicable regulations;
- Never transport the machine with the tool in operation, even for short distances.

3.2.3 - OPERATIONAL SAFETY

The manufacturer shall not be held responsible in case of malfunction and damage if the machine:

- is used for purposes other than those for which it was intended;
- is not manoeuvred, started and maintained according to the service instructions specified in the following manual;
- does not periodically and constantly undergo maintenance as prescribed or non-original spare parts are used;
- The equipment is modified or replaced without written authorisation from the manufacturer, especially when the effectiveness of the safety systems has been intentionally reduced or eliminated;
- is used outside the authorised temperature range and the purposes for which it was designed;

The machine user is responsible for all property damage or personal injuries caused by the machine's operation.

3.2.4 - SAFETY RULES WHEN USING THE MACHINE

- When working, be very careful not to come into contact with resistant objects, such as manholes, wells, pavements, guardrails, railway lines, stony ground, etc. This could cause the tools to break, and they could be dangerously projected at very high speed.
- Should wires, cables, chains or other such items become caught in the rotor, immediately stop the machine to avoid damage or dangerous situations. Stop the rotation of the machine, switch off the engine and remove the key. Wearing protective work gloves and safety glasses, clear the obstruction from the rotor with the help of pliers or shears.
- Do not continue to use the flailhead in the presence of vibrations that could cause breakage and serious damage. Ascertain the cause of the problem and eliminate it.
- It is forbidden to intervene for maintenance, cleaning, adjustments or similar actions with the machine in motion, on any part of it or on the interchangeable equipment connected to it. Any activity for maintenance, cleaning or adjustment must be carried out strictly with the machine stopped and the engine off.
- During operation, pay attention to electrical cables, especially if you need to pass under them, as you could lose the radio signal. In these situations the machine immediately switches off the engine and stops.
- Before lifting/lowering the equipment with the lifting device, make sure that there are no persons within 50 metres of the machine.

DANGER

- **Do not attempt to free the rotor by reversing rotation.**
- **Danger of projection of materials.**

If a danger is perceived, operate the emergency stop button on the machine and/or on the radio remote control.

The two emergency stop buttons, however, do not perform the same function: the one on the radio remote control is used to interrupt all the functions of the machine while keeping the engine on; whereas the one on the machine, in addition to interrupting all the functions of the machine, also turns the engine off.

DANGER

If there is a danger that requires the entire machine to be turned off, operate the emergency stop button on the radio remote control and turn off the engine or alternately operate the emergency stop button on the machine.

3.2.5 - HYDRAULIC SYSTEM SAFETY REQUIREMENTS

- Stop immediately if you notice oil leaks.
- Periodically check the hoses; replace immediately if they are worn or damaged.
- Before working on the hydraulic system, place the head on the ground and turn off the engine.
- Oils and greases must be disposed of in compliance with environmental rules and regulations.
- Do not interfere with the hydraulic system for any reason and do not remove the seal on the valves, as this would invalidate any form of warranty. To adjust the valves, contact an authorised workshop.
- Excessive heating of the oil causes damage to the gaskets of the hydraulic circuit and deterioration of the fluid itself. Heating is caused by lamination of the oil through the maximum pressure valve. For this reason, avoid continued operation of hydraulic rams at the end of their stroke.

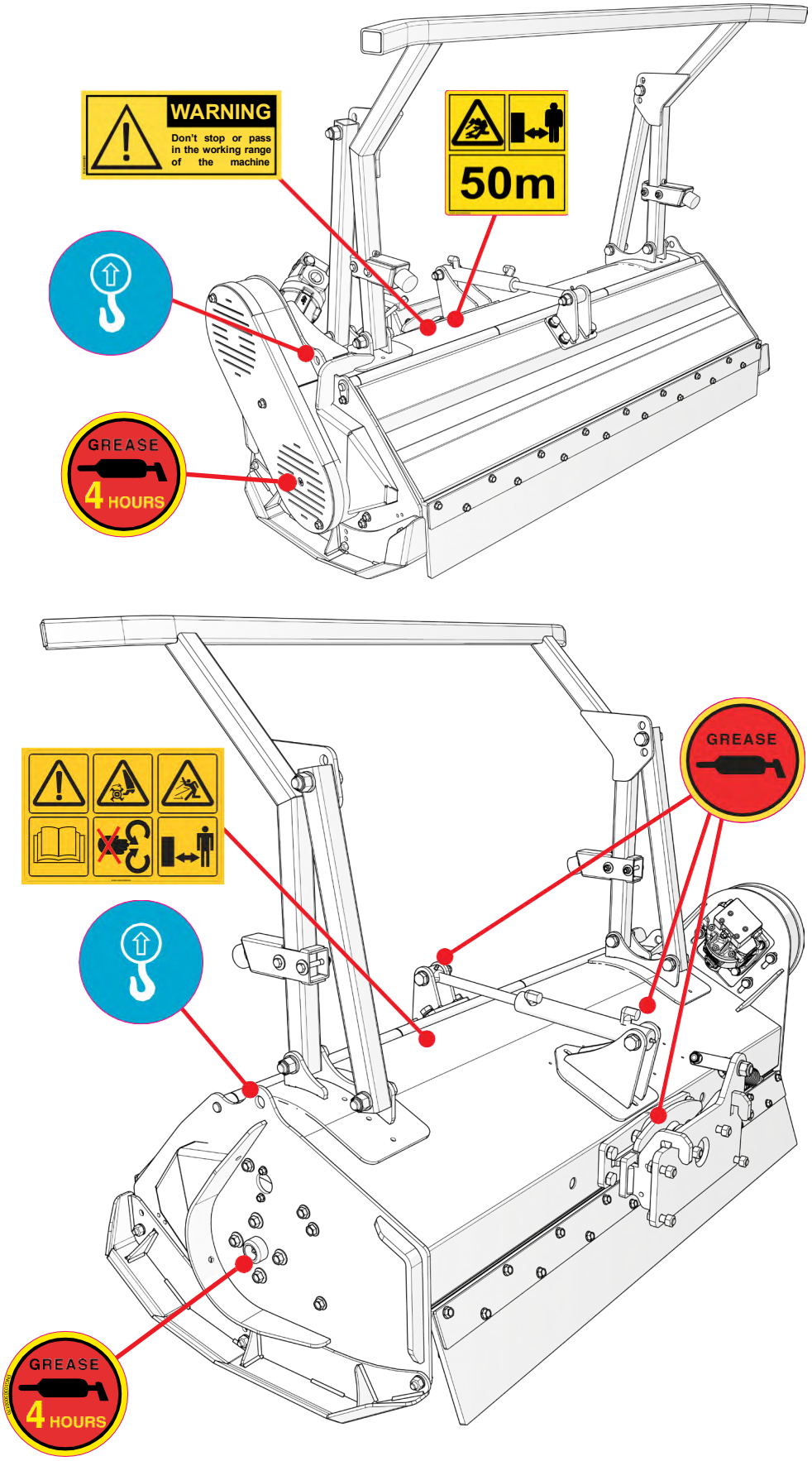
WARNING

- **Never search for oil leaks with bare hands or other body parts; use cardboard or cloths to locate a leak.**
- **Always wear waterproof gloves and goggles.**
- **Wait until the oil has cooled before intervening.**
- **Discharge the oil pressure before disconnecting the hoses or when performing maintenance on the system.**
- **High pressure oil may penetrate the skin and cause serious infections; in such case seek medical attention immediately.**
- **These operations must be carried out by authorised and adequately trained personnel.**

ATTENTION

Replace hydraulic hoses immediately if they become damaged, and in all cases ensure they are replaced within a maximum of 6 years.

3.2.6 - LOCATION OF THE SAFETY PLATES



3.2.7 - DESCRIPTION OF THE SAFETY SIGNS

WARNING

Ensure safety decals are kept in good clean condition. If safety decals are damaged, they must be replaced with new original decals that can be requested from McConnel and placed in the position indicated in the manual. Make sure that the safety decals are legible at all times. Clean them using a damp cloth with soap and water.

Warning signal
Read the manual fully before using the machine.

Warning Sign – Rotating Tools
Risk of injury to the lower or upper limbs. Ensure rotor is stopped during maintenance operations of the machine and keep at a safe distance when it is working.

Danger Sign - Flying Objects
Indicates the possibility of stones or other objects being ejected, remain at a safe distance from machine during operations.

Lifting Point Decal
Identifies the lifting points of the machine.

Greasing Point Decal
Identifies the greasing points of the machine. Lubricate as prescribed in the manual.

Greasing Point Decal
Identifies the greasing points of the machine. Indicates obligation to lubricate every 4 hours.

Danger Sign - Flying Objects
This indicates that stones or other objects may be ejected by the machine and instructs persons to remain at least 50 metres from the machine when operating.

Warning Sign
Do not stand or pass within the working range of the machine

3.3 - SAFETY PRECAUTIONS FOR MAINTENANCE

3.3.1 - CARE AND MAINTENANCE

The cause of damage and accidents can be attributed to mistakes or insufficient maintenance, such as:

1. Insufficient oil, grease;
2. Insufficient cleaning;
3. Failure in the hydraulic system (damaged hoses, loose connections, etc.);
4. Inaccurate maintenance or alterations of the systems without permission.
5. Work on stony ground or where there is material that can be projected at high speed.

- All maintenance operations must be carried out by qualified and trained personnel, with the machine stopped.
- Maintenance and repairs must be performed in a suitably equipped workshop.
- During the phases of use, adjustment, maintenance, repair or handling, the operator must use appropriate Personal Protective Equipment (PPE).
- Used oil must be properly recovered and disposed of in compliance with environmental rules and regulations in accordance with current legislation, it is classified as hazardous waste and, as such, must be taken to an appropriate waste collection centre. Contact the closest body approved to handle used oil.

Before starting any maintenance, the following operations must be carried out:

- During maintenance, the machine must be placed on a firm, level site.
- Turn off the machine motor, remove the ignition key.
- Set up all forms of accident prevention envisaged for the type of operation in progress.
- If compressed air is used to clean the machine, it is necessary to protect yourself with appropriate safety glasses and dust mask.
- Do not perform any repairs with which you are not familiar. Always follow the instructions and, in the absence of these, contact the supplier or an expert.
- Before any maintenance operation, ensure any hot parts are left to cool.
- Attention: replace damaged hydraulic hoses immediately, and in all cases ensure they are replaced within a maximum of 6 years.
- Only use the dedicated lifting points.
- Make sure that any lifting equipment used is suitable for the operations to be carried out and complies with safety regulations.
- Before carrying out operations under suspended parts or with the machine raised from the ground, secure with suitable supports capable of supporting the weight.
- Do not keep an engine running in an enclosed space unless a suitable ventilation system is installed that is capable of disposing of harmful exhaust gases.
- Avoid prolonged and repeated skin contact with fuels, lubricants, fluids as they can lead to skin disorders and other health issues.
- Do not ingest any fuel, lubricant or fluid. In the event of accidental contact with the eyes, wash the affected area with plenty of water and if necessary, seek medical advice.
- Do not perform any welding in an enclosed space or inadequately ventilated area.

- Do not perform welding on painted surfaces, or near painted surfaces, in order to avoid toxic vapours from being generated.
- Remove paint with suitable products then wash the surfaces and leave them to dry.
- Discharge pressure from hydraulic circuits before carrying out any intervention.
- Do not use your hands to locate leaks of pressurised fluids.
- Leaks of fluids under pressure can penetrate the skin and eyes with extremely serious consequences.
- The interventions described in the following points do not require any specialisation. The operator must be aware of and follow the instructions precisely and must have put the machine out of service.
- Periodic inspections and maintenance must be performed at the specified intervals and in the prescribed manner and are the responsibility of the operator.
- Failing to observe the standards and timing for maintenance threatens the proper operation of the machine and its lifespan and consequently invalidates the warranty.
- Intensify the frequency of maintenance in severe operating conditions (frequent stops and starts, prolonged winter season, etc.).
- Never leave the operating position of the machine with the machine switched on.
- ATTENTION: Due to vibrations, regularly check that all bolts, nut and connectors are firmly tightened. This check should be performed for the first time after 8 hours of operation. Check the fastening of the cutter blades and that the bolts are correctly tightened.
- If for any reason the rotor starts to vibrate, stop the machine immediately and determine the cause, if necessary, re-balance the rotor. McConnel declines all responsibility for issues caused by operator negligence.
- Clean the machine after use. Do not use petrol or solvent-based products to clean the machine. Do not clean electrical parts with water under pressure.
- During operation, and in particular in windy conditions, the user must carefully choose his position in order not to be exposed to exhaust gases, dust or mown grass.
- Do not manoeuvre the tool if it cannot be seen (behind sloping terrain, corners of buildings, tall grass etc.).

3.3.2 - WARNING PLATES

Before performing any maintenance operation, place the machine on firm, level ground, lower the equipment to the ground and stop the engine. If other people start the engine and use the control levers while maintenance is being performed, there is a risk of serious injuries or death. To avoid these dangers, before carrying out the maintenance, put the remote control in a safe position, remove its battery and hang warning signs on the machine.

3.3.3 - TOOLS

Only use tools specified by the manufacturer; in order to avoid injury, discard worn or damaged, poor quality or improvised tools.

3.3.4 - PERSONNEL

The routine maintenance indicated in the manual must be carried out exclusively by authorised and trained personnel. To perform maintenance on or service components not specified in this manual, please contact McConnel.

3.3.5 - KEEPING THE MACHINE CLEAN

Cleaning the flail head is an integral part of the machine’s routine maintenance and is an essential activity in order to check the state of the machine itself.

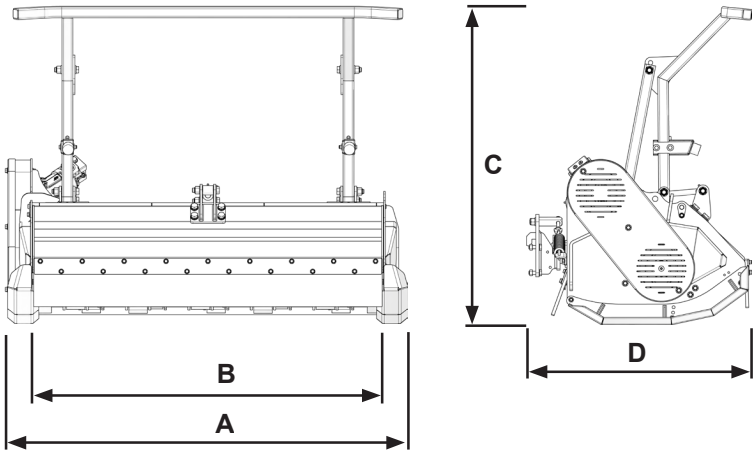
3.3.6 - PERIODIC REPLACEMENT OF ESSENTIAL SAFETY COMPONENTS

Periodically check the following components:

- Front and rear rubber protections. If deteriorated or damaged, it must be replaced immediately otherwise the machine's safety could be compromised.
- Knives and/or cutting tools: if cracked or broken they must be replaced (in opposite pairs); if they are not replaced, parts of them may be ejected and/or the rotor may be unbalanced causing the possibility of damaging moving parts of the rotor (bearings, etc.).
- Carefully check effectiveness and cleanliness of the quick couplings supplied with the machine; even if they appear to be in good condition, these components have to be replaced periodically as they tend to deteriorate over time.
- In the event that one of these parts is faulty, replace or repair immediately.

4 - TECHNICAL DATA

4.1 - DIMENSIONS AND WEIGHTS



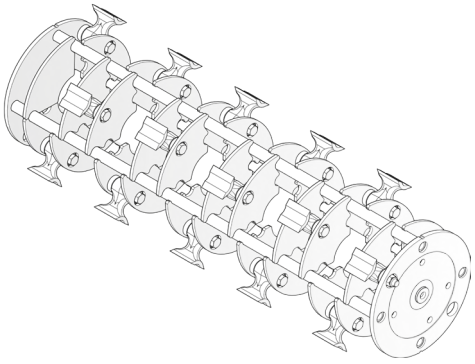
MULCHER 1300		
WIDTH (max)	A	1480 mm
WORKING WIDTH	B	1300 mm
HEIGHT (max)	C	1256 mm
DEPTH (max)	D	930 mm
WEIGHT	355 kg	

4.2 - TECHNICAL SPECIFICATIONS

MULCHER 1300		
MOTOR	cc	23
	bar	290
TRANSMISSION	belt-type	
ROTOR DIAMETER	mm	380
ROTOR SPEED (min - max)	rpm	2430 - 2500
CUTTING DIAMETER	max	10 cm

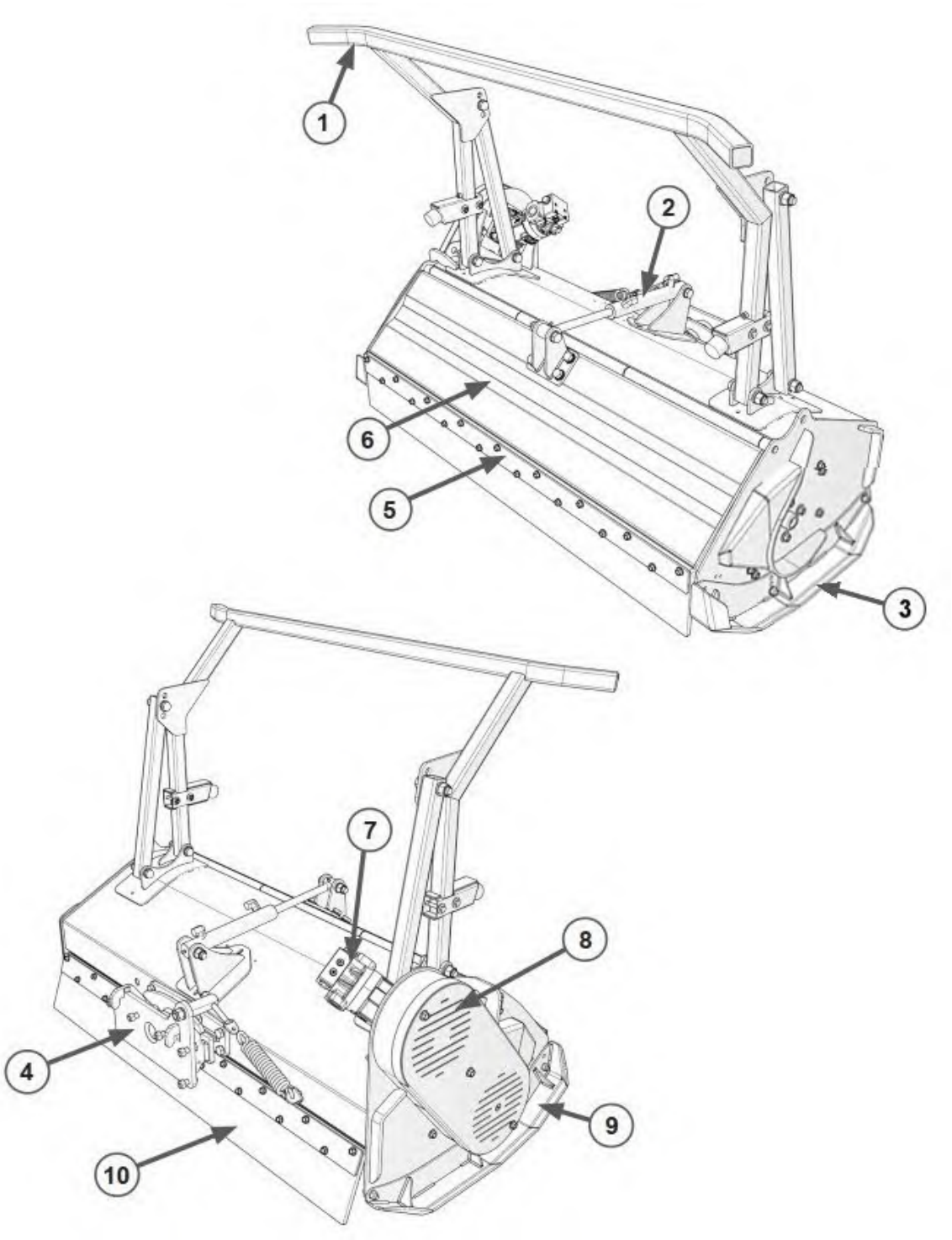
4.3 - ROTOR

ROTATING BLADE ROTOR

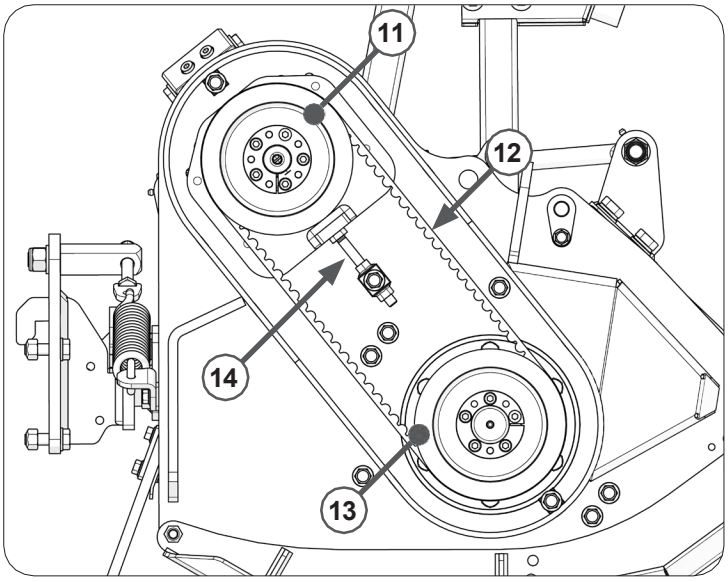


Teeth kit	22
Recommended for chopping:	
Wood with a maximum diameter of 10 cm.	

4.4 - MACHINE COMPONENT IDENTIFICATION



No.	DESCRIPTION	No.	DESCRIPTION
1	Push Bar	6	Front Hood
2	Hydraulic Ram (Front Hood)	7	Hydraulic Motor
3	Left Skid	8	Belt Cover
4	Mounting Bracket	9	Right Skid
5	Rubber Guard (Front)	10	Rubber Guard (Rear)



No.	DESCRIPTION
11	Drive Pulley
12	Drive Belt
13	Rotor Pulley
14	Belt Tension Adjuster

5 - TERMINOLOGY

5.1 - DEFINITION OF THE TERMS USED

OPERATOR

A person assigned to operating and manoeuvring the machine during work and movement, as well as carrying out normal control and cleaning tasks on the machine.
Must not have disabilities of any kind or health problems.

SPECIALISED OR MAINTENANCE PERSONNEL

Personnel responsible for carrying out routine maintenance, assembly, disassembly and reassembly of certain machine components.
Must not have disabilities of any kind or health problems.

AUTHORISED PERSONNEL

Personnel trained to carry out extraordinary maintenance operations, assembly, disassembly and reassembly of machine components. Must be authorised by McConnel to intervene on the machine.
Must not have disabilities of any kind or health problems.

OPERATOR ASSISTANT

Personnel assigned to assist the operator in certain machine manoeuvres (manoeuvres on site with reduced visibility, loading and unloading from means of transport, manual pump operation, etc.), assisting with activities in a mobile site location (mowing on public road).
Must have knowledge of the main safety procedures and requirements.

AUTHORISED WORKSHOP

Workshop consisting of personnel assigned to performing operations of extraordinary maintenance, assembly, disassembly and reassembly of particular components of the machine.
Must be authorised in writing by McConnel to intervene on the machine.

The operator is recommended to refer to the Standard EN 12100-2010 for definition of other terms used.

6 - USE OF THE MACHINE

6.1 - PRELIMINARY CHECKS

The operator must verify that the equipment is accompanied by a use and maintenance manual; In case of resale as a 'second-hand machine' the customer/user must provide the buyer with the use and maintenance manual intact in all its parts, as well as the registration certificate (if required).

6.2 - CHECKS BEFORE THE START OF EACH WORKING DAY

Carry out an external inspection of the machine (joints, hoses, hydraulic components, etc.) and check if oil or other liquids are leaking.

Check condition of hydraulic hoses on the machine and ensure there are no cuts, holes, leakages, etc.

Check that the safety guards are correctly positioned and intact. If they are damaged, replace them. If they are incorrectly positioned, reset them in their correct position.

WARNING

Never search for oil leaks with bare hands or other body parts; use cardboard or cloths to locate the leak. Always wear waterproof gloves and eye protection.

6.3 - ATTACHMENT OF THE HEAD

DANGER

- **When coupling or uncoupling equipment, stand at the side of the machine away from the equipment (at least one metre away).**
- **Before connecting the quick fit attachments, the equipment must be mounted to the Robocut.**
- **The hydraulic connecting must be performed with the engine switched off.**

ATTENTION

- **Before making a hydraulic connection between machine and equipment, clean the quick couplings of both with a clean cloth; this prevents risk of oil contamination.**
- **Firmly tighten the screw-on hydraulic couplings after mounting the equipment.**
- **Failure to tighten the quick couplings (even partially) can cause damage to the hydraulic motor and / or the oil seal to be ejected.**

ATTENTION

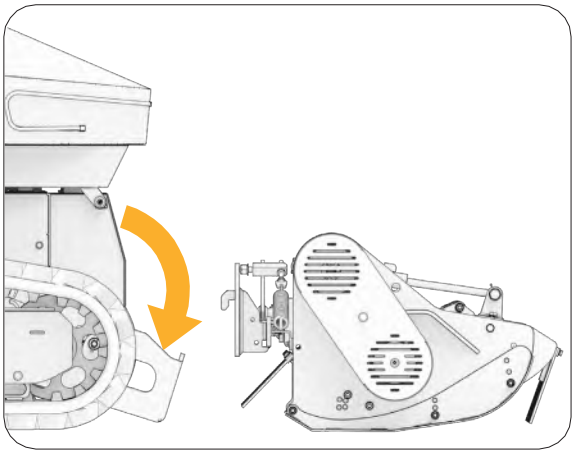
- **Read and follow the instructions provided to ensure safe operation of equipment.**
- **Comply with the indications provided by the equipment manufacturer.**
- **Use the safety devices prescribed and ensure they are in good useable condition.**
- **Make sure that the equipment is correctly attached to the Robocut.**

ATTENTION

Depending on the particular application, adding certain types of equipment could cause the overall centre of gravity to shift which may make the Robocut unstable. If applicable, contact McConnel regarding the addition of ballast to correct the machine's centre of gravity.

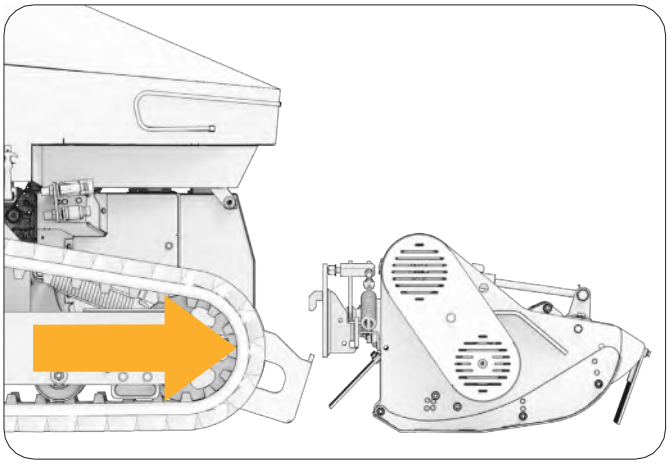
Robocuts are equipped with a lifting device on which the various approved tools can be attached.
To do this, follow the steps below:

1. Start the diesel engine, connecting it with the radio remote control;
2. Lower the lifting device as far as possible using the right-hand joystick (**B**);

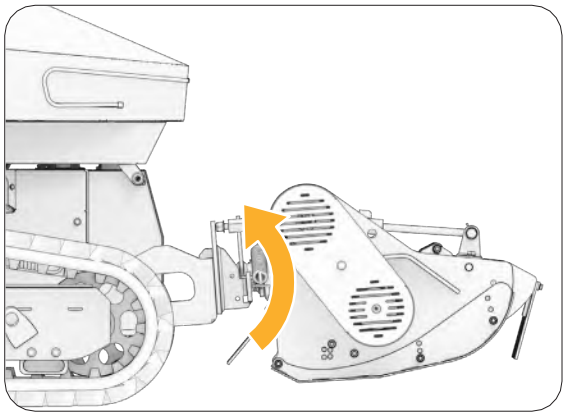


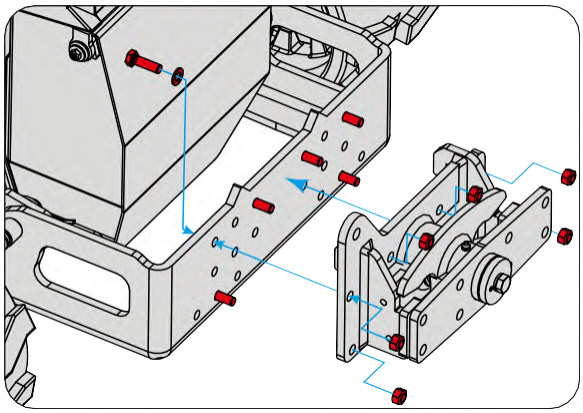
NOTE: Controls information stated in this manual relate to Hetronic Controls that featured on Robocuts prior to 06/2025, for Robocuts 06/2025 onwards with Autec Controls refer to the Robocut Manual to identify the controls relevant to operating this head attachment.

3. Slowly and evenly manoeuvre the Robocut toward the machine until it is correctly positioned for attachment;

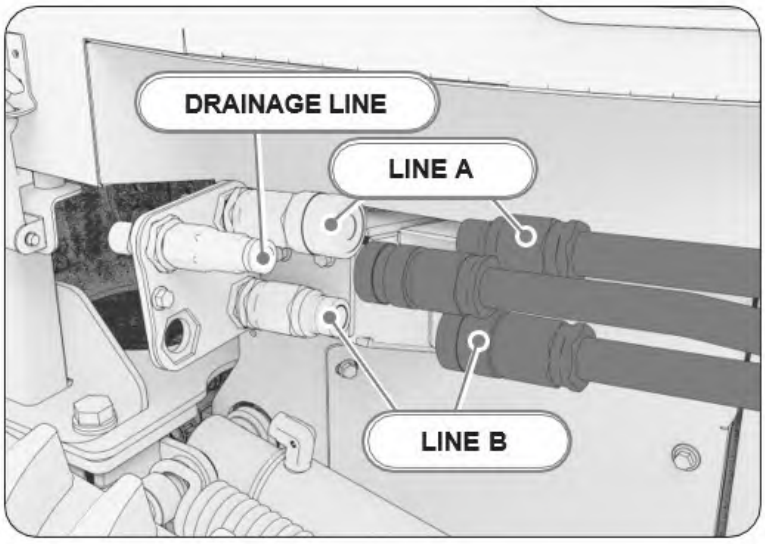


4. Using the right-hand joystick (**B**), raise the lifting device to attach the machine;
5. Fasten the machine to the Robocut mounting bracket using six M12 x 40 bolts
6. Turn engine off;





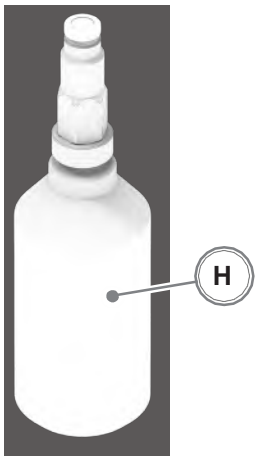
7. Connect the machines hydraulic hoses to the quick couplings on the right-hand side of the Robocut; taking care to clean them before making the connection. The outermost coupling is for the drainage line, while the inner two are for lines (**A**) and (**B**).



8. Connect the hydraulic hoses of the machines front hood ram to the quick couplings on the left-hand side of the Robocut, taking care to clean all couplings before connection.
   - The outermost couplings are used for this auxiliary function (AUX 1).

ATTENTION

- **Whenever the machine is removed from the Robocut the expansion bottle (H) must be fitted to drain line, failure to observe this can cause motor seal failure.**
- **McConnel is not responsible for any damage or malfunction due to non-compliance with this warning.**
- **Connect the expansion bottle to the female coupling of the machine drain line**



6.4 - TRANSMITTER UNIT

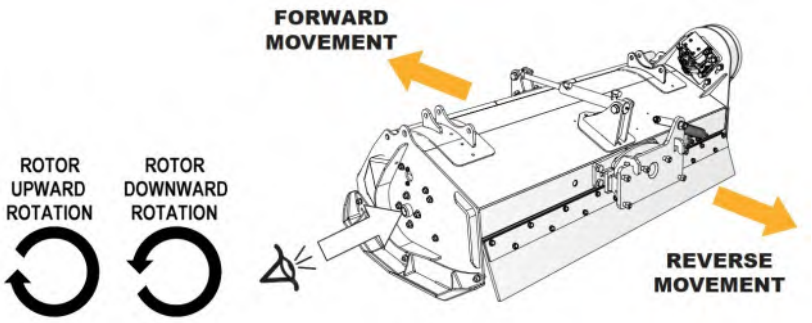
ROTOR ROTATION

Upward Rotation (Up-Cut)
The rotor spins so the flails **move upward at the front of the machine**.

- Flails hit the vegetation and pull it upward into the rotor.
- Material is lifted, chopped, and thrown forwards.

Downward Rotation (Down-Cut)
The rotor spins so the flails **move downward at the front of the machine**.

- Flails push vegetation downward to the ground while cutting.
- Material is chopped and kept under the machine.



6.4.1 - OPERATING THE MACHINE

The hydraulic motor on the machine is started using the rotor switch (**5**) and controlled using the Potentiometer dial (**11**).
Follow the instructions below to start it.

- Enable rotation of the rotor, in the required working direction, using the rotor switch (**5**). When the rotor starts to move, gradually turn the potentiometer dial (**11**) clockwise to achieve 100% rotor speed.
- Operate button (**14A**) on the Robocut controls to increase engine rpm to desired working speed.

The correct rotor speed during normal work is in the range **2900 ÷ 3050 rpm**.

NOTE: Controls information stated in this manual relate to Hetronic Controls that featured on Robocuts prior to 06/2025, for Robocuts 06/2025 onwards with Autec Controls refer to the Robocut Manual to identify the controls relevant to operating this head attachment.

6.4.2 - STOPPING THE MACHINE

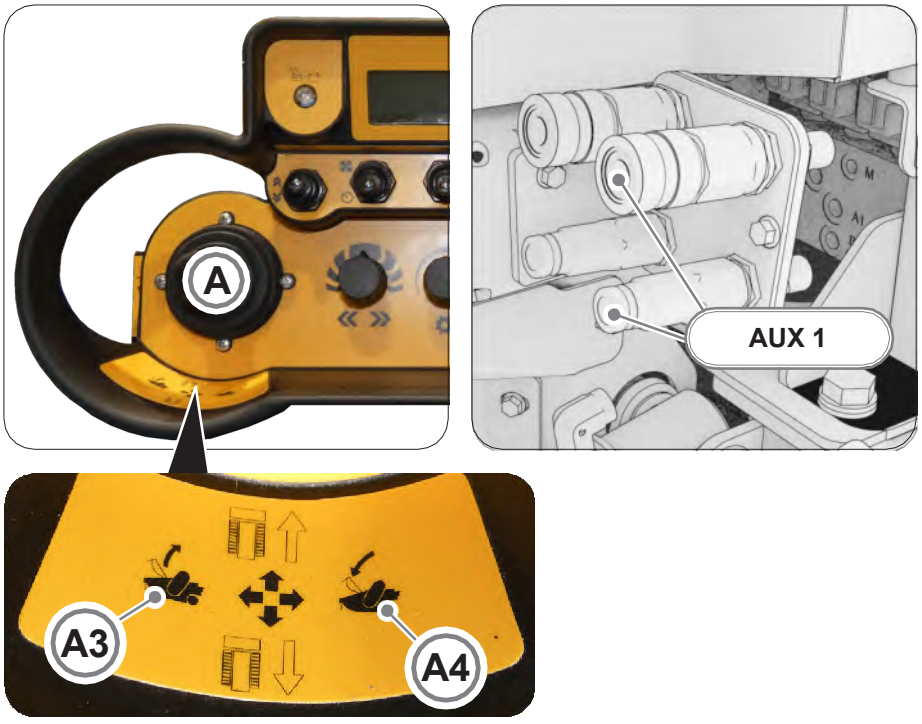
To stop the tool, proceed as follows:

- Decrease the heat engine rpm by pressing the button (**14B**) until you reach the minimum speed.
- Turn the potentiometer anti-clockwise (**11**) to the minimum setting. The tool's hydraulic motor then stops.
- Disable the hydraulic motor by putting the switch (**5**) in the central position.

6.4.3 – FRONT HOOD OPERATION (AUX 1)

The auxiliary function (AUX 1) is controlled by the left-hand proportional joystick (**A**).

- Move the joystick to the left (**A3**), to open the front hood.
- Move the joystick to the right (**A4**), to close the front hood.



6.4.4 - LIFTING DEVICE

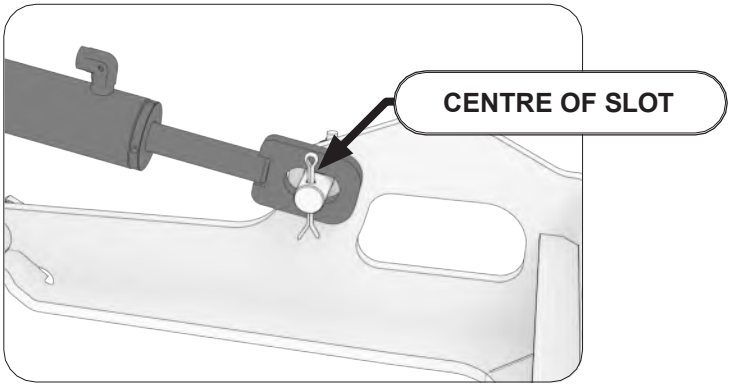
The lifting and lowering the machine is controlled by the right-hand proportional joystick (**B**).

- Move the joystick forward (**B1**) to lower the machine.
- Move the joystick backwards (**B2**) to raise the machine.

WARNING

FLOATING FUNCTION

Lower the lifting device so that the machine is resting on the ground. Extend the cylinder rod of the lifting device until the pin reaches the *centre of the slot*. In this position, the machine will follow the contours of the ground more accurately.



ATTENTION

- **It is recommended not to adjust the lifting device when the equipment is in operation to prevent cutting residues from being thrown long distances.**
- **It is recommended not to adjust the lifting device if you are on a slope with the front of the machine facing uphill.**

6.5 - CUTTING HEIGHT ADJUSTMENT

The cutting height refers to the distance between the ground and the rotor; it can be adjusted via the side skids. Ensure when adjusting cutting height that skids are set at same height positions on both sides.

ATTENTION

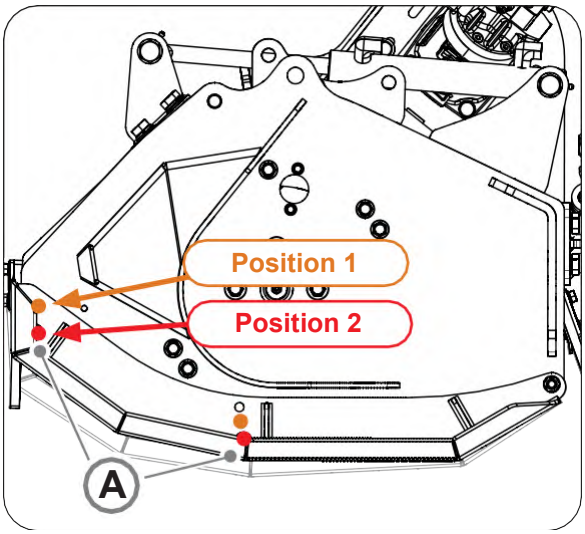
The cutting height must only be adjusted with machinery switched off and the starting key removed.

SKID HEIGHT ADJUSTMENT

To adjust the height of the skids, proceed as follows;

1. Park machines on a firm level site.
2. Raise the head clear of the ground using lift control on the remote-control unit.
3. Switch Robocut off and remove starting key.
4. Position chocks beneath the head to prevent accidental lowering or dropping.
5. Remove the two M10 bolts (**A**) (two on each side) that secure the skids.
6. Position the skids at the required height using the designated adjustment holes.
7. Refit bolts (**A**) and torque to 67 Nm.
8. Ensure flails never touch the ground.
9. Remove chocks before lowering the head.

Skids must be set at the same height setting on both sides of the machine.



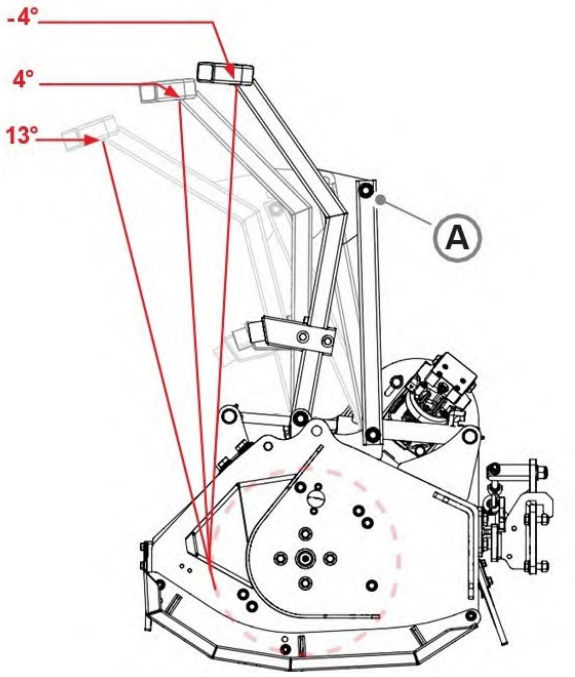
	Cutting height
Position 1	20 mm
Position 2	33 mm

6.6 – PUSH BAR ADJUSTMENT

To adjust the push bar, proceed as follows:

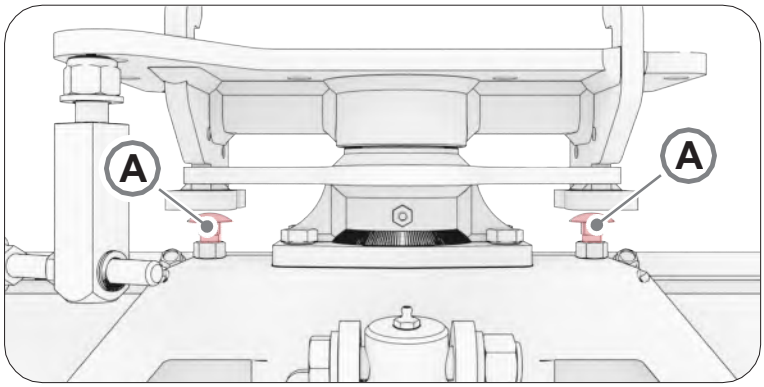
1. Park machines on a firm level site.
2. Lower head to rest on the ground using lift control on the remote-control unit.
3. Switch Robocut off and remove starting key.
4. Remove bolts (**A**) (one on each side) that are used to secure the push bar.
5. Adjust the push bar to align with the hole that achieves the desired working position.
6. Refit bolts (**A**) (one on each side) and secure tightly.

Push bar must be set in the same hole positions on both sides of the machine.



6.7 - ADJUSTMENT OF THE LIMIT PINS

Two adjustable limit pins (**A**) are positioned on the equipment to protect the pivot mounting from damage that could occur from accidental impacts. For correct adjustment, rotate the pins to bring them outwards until they are in 'touch contact' with the mounting plate, *refer to illustration below*.



ATTENTION

Pins must always be in contact with the support to avoid risk of breaking the pivot.

6.8 - PROBLEMS, CAUSES AND SOLUTIONS

Malfunction	Cause	Solution
Strange noises coming from the flail head.	Poor lubrication on rotor bearings.	Grease indicated points.
	Foreign bodies wrapped on the rotor.	Switch machine off and remove any foreign bodies.
	Unsuitable operation of the transmission unit.	Check belt tension and alignment, correct if necessary.
Excessive vibrations.	Excessively worn or damaged blades.	Replace the blades.
	Worn or broken blades.	Replace the blades.
	Foreign bodies wrapped on the rotor.	Switch machine off and remove any foreign bodies.
Irregular cut.	Worn or broken blades.	Replace the blades.
	Blades clogged or blocked by material or debris.	Switch machine off and check reason for blockage (stuck material, stuck screws, etc.). Unclog the blades.
Rapid blade wear.	Blades touching the ground.	Adjust the cutting height (Skid height setting).
Early belt failure.	Excessive or insufficient tension causing premature wear and/or damage to the drive belt.	Check that the belt tension is correct. Check belt pulley alignment is correct.
Rotor not working.	Broken or damaged belt. Broken or damaged hydraulic motor.	Check the condition of the belt (replace it if damaged). Check condition of the hydraulic motor.
Whistling noise from belt transmission area.	Insufficient belt tension.	Check belt tension and reset if necessary.
The rotor continues to spin when the rotor control is not activated.	Pump zero not calibrated correctly.	Recalibrate pump zero. Contact McConnel
NOTE: If the fault or the cause of the fault is not indicated in the table above, contact your local dealer for advice and/or repair.		

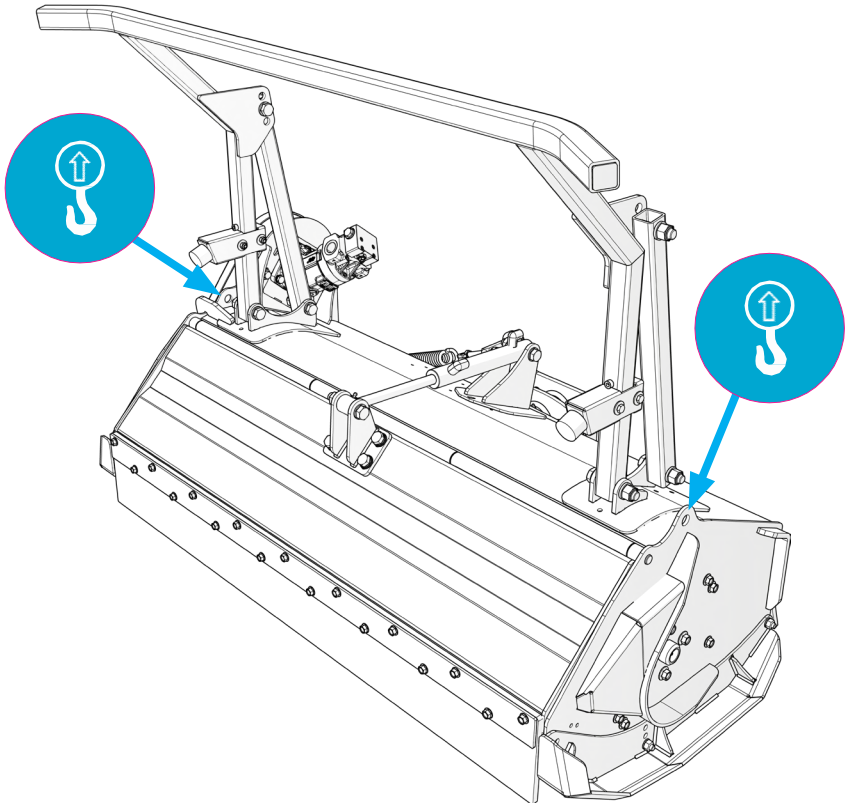
7 - TRANSPORTATION AND HANDLING

7.1 - LIFTING

Ensure that all loading and unloading operations are carried out safely by properly trained personnel, such as crane and forklift operators.

When lifting the machine, it is mandatory to use the dedicated lifting points, these are indicated on the machine by lift point decals.

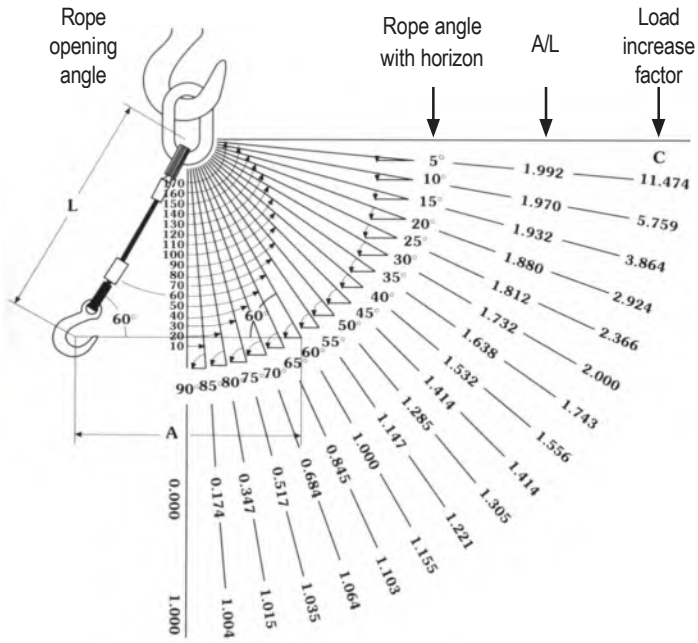
Ensure that ropes, slings, chains, and lifting equipment used for handling the machine is suitable and capable of supporting the entire weight of the machine in a safe manner.



For transportation of the machine, a suitably sized vehicle with appropriate power must be used. The machine should be transported on a flatbed vehicle or trailer and secured by anchoring ropes.

Ensure the machine is stable and safely secured during transportation.

Note: Refer to the load factor calculation chart below when using ropes, slings or chains for lifting;



Apex angle	Load increase factor
0°	1
10°	1,004
20°	1,015
30°	1,035
40°	1,064
50°	1,103
60°	**1,155**
70°	1,221
80°	1,305
90°	**1,414**
100°	1,556
110°	1,743
120°	**2,000**
130°	2,336
140°	2,924
150°	3,864
160°	5,759
170°	11,474

ATTENTION

Do not attempt to lift the machine using ropes, slings or chains attached to the push bar, this component is not designed for lifting. Failure to observe will risk machine damage.

8 - STORAGE

If the machine is parked up for lengthy periods, it should be stored in a location where it is protected from the elements to prevent damage. Before storing the machine, it is advisable to clean it thoroughly and to lubricate all the mechanical components to protect them from rust.
Wherever possible, the storage temperature should be between 0°C and 40°C.

Before storing the machine for long periods, it is advisable to perform the following operations:

- Clean the rotor and blades to remove any shredding residues;
- Clean the machine thoroughly;
- Perform a visual inspection on the whole machine to identify any structural damage or deep scratches on the paintwork, and ensure that the original safety decals are still in good condition, legible and in their original positions;
- Check for damage to the front and rear guards and fixings;
- Grease all mechanical parts subjected to friction, and any machine parts no longer coated with their original paint layer in order to prevent rust from forming;
- Connect the expansion vessel (**A**) supplied with the machine to the drain line.
- If possible, store the machine in a covered area, on a firm level site, ensure the machine will remain in a safe stable condition.

WARNING

- **Ensure the expansion vessel is installed on the drain line whenever the machine is disconnected – failure to observe this may result in damage to hydraulic motor seal.**
- **McConnel are not responsible for any damage or malfunction due to non-compliance with this warning.**

8.1 - FIRST USE OR RE-COMMISSIONING AFTER A LENGTHY PERIOD OF INACTIVITY

Before using the machine for the first time, or after a long period of inactivity, proceed as follows:

- Check the machine is not damaged;
- Check mechanical parts, which must be in a good condition and not rusty;
- Check the state of wear of the blades;
- Carefully grease all moving parts;
- Check that there are no oil leaks from fittings or hoses;
- Check that all guards are in good condition and fitted correctly.

8.2 - DISMANTLING, DECOMMISSIONING

When the machine reaches the end of its usable lifespan it should be decommissioned, dismantled and disposed in accordance with rules and regulations in force;

- Before scrapping, the plastic/rubber parts and electrical and electronic materials must be separated and dispose of in an environmentally friendly manner in line with legal requirements.
- Collect any waste oil and dispose of it via an appropriate collection service or recycling centre.

ATTENTION

If the machine or any part of it has been taken out of service, the component likely to cause any danger must be made harmless.

ATTENTION

It should be remembered that when replacing oils, rubber hoses and other replaceable parts of the machine, they must be disposed of separately in an environmentally friendly manner in line with legal requirements; contact your local authority for advice.

9 - MAINTENANCE

ATTENTION

- **During coupling/uncoupling operations, pay particular attention to the work area between the machine and the Robocut. The task must only be performed by trained personnel.**
- **Before starting the machine, ensure that persons and/or animals remain at a safe distance from the machine at all times.**

9.1 - INTRODUCTION

For best performance and maximum durability of machine components, the instructions in this manual must be followed carefully by the machine operators.

9.2 - GENERAL RULES

Before carrying out any maintenance, checks or inspections on the machinery, Robocut engine must be switched off and the starting key removed.

- Wear suitable work gloves, safety glasses, and mask (if necessary) when performing repairs and/or maintenance on the machine.
- When disassembling or reassembling parts of the machine, always use suitable tools and equipment to avoid damaging components.
- If components require tapping to release solidly adhered parts, use wooden or rubber mallets only.
- Clean parts using brushes or rags, then wash using petroleum or warm water and remove residues using compressed air.
- When reassembling components, make sure that they are clean and lubricate them appropriately.
- Pay attention to safety rings and lock pins, replace them immediately if missing or broken.
- Maintenance operations on the equipment must be carried out by authorised personnel.

9.3 - EXTRAORDINARY MAINTENANCE

These are repairs or replacements of one or more components of the machine, which usually become necessary after a few years of use and which do not alter the characteristics of the machine. In the case of considerable changes, the manufacturer cannot be held responsible for possible hazards which might occur. These interventions must be performed by authorised personnel.

9.4 - RECOMMENDED FLUIDS

9.4.1- OILS & GREASE TABLE

COMPONENT	RECOMMENDED LUBRICANT	Specification INTERNATIONAL
HYDRAULIC SYSTEM Mineral Oil	ISO 46; Q8 HELLER 46	DIN 51 524, 2-HLP DIN 51 524, 3-HLP API CD, CE, CF
HYDRAULIC SYSTEM Biodegradable Oil	PANOLIN BIO HLP SYNTH E	FZG Test A/8.3/90 stage 12 ISO 15380 HEES
	Q8 HOLBEIN HP SE Bio 46	ISO 11158 Category HV Din 51524, Part 3 Category HVLP ISO 15380 / CEC-L33-A-93 - Water Hazard Class (VwVwS) WGK 1 - Category HEES
PINS, BUSHINGS AND FIFTH WHEELS	MOLY GREASE EP NLGI2 or NLGI3EP GREASE	Black greased with lithium soap with molybdenum disulphide. For automatic greasing the use of added CONTACT GREASE NLGI2 with purple lithium soap is recommended
BEARINGS	PAKELO GREENPLEX EP NLGI 2 GREASE	EP ADHESIVE Grease, Aluminium complex soap

9.5 - DAILY MAINTENANCE

At the start of each working day, systematically carry out the following operations:

- Check and, if necessary, tighten loose bolt and nuts;
- Check the effectiveness of guards, replace immediately if signs of excessive wear or damage.
- Check the integrity of hydraulic hoses and connections, replace if worn or damaged.

9.5.1 - CLEANING THE MACHINE

Clean the equipment at the end of the working day using pressurised water; removing shredding residues, earth, dust, etc., in particular residues of flammable material.

9.6 - TRANSMISSION MAINTENANCE

9.6.1 - BELT TENSIONING

WARNING

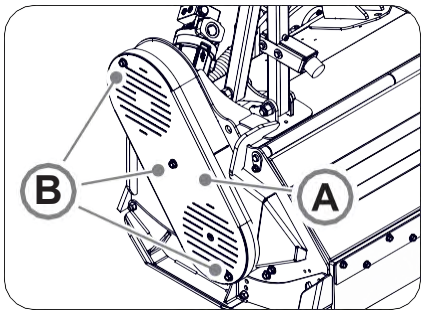
- **On a new machine and after every belt replacement, the belt tension must be checked and tensioned after *an initial 4 hours* of work;**
- **The belt must be tensioned *every week* or *every 40 hours*.**

ATTENTION

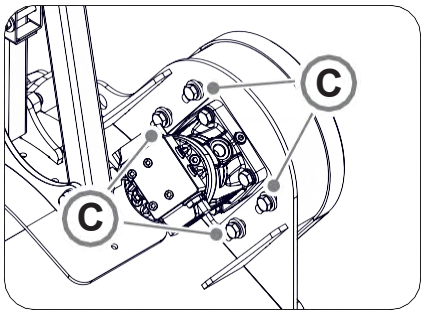
Ensure correct belt tensioning; excessive or insufficient tension can result in premature wear or belt failure.

To adjust the tension of the belt, perform the following procedure:

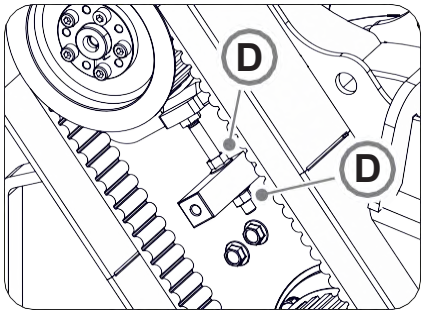
1. Remove belt drive cover (**A**); cover is secured with three M10 bolts (**B**).



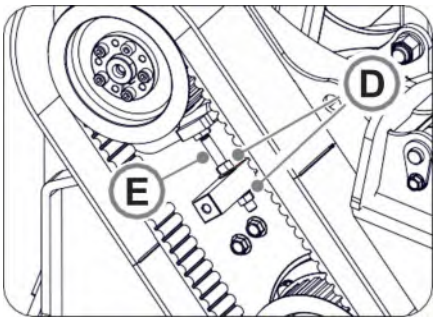
2. Loosen the four M10 bolts (**C**) that secure the motor mounting plate.

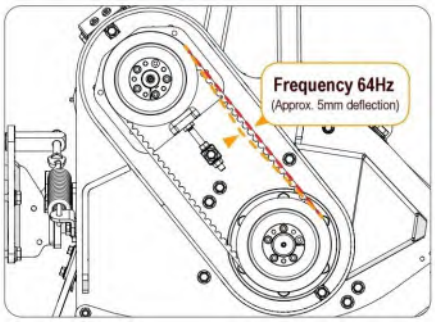


3. Loosen the two M10 nuts (**D**) on the adjuster bolt.



4. Unscrew or tighten the M10 adjuster bolt (**E**) to achieve the correct belt tension.
   Use a frequency meter to detect the correct tension. **Frequency for correct tension is 64Hz.**





5. When correct belt tension is achieved, retighten the two M10 nuts (**D**) on adjuster bolt.
6. Retighten the four M10 bolts (**C**) that secure the motor mounting plate.
7. Replace drive belt cover (**A**); and secure with the three M10 bolts (**B**).

   For tightening torques refer to chapter 11 in this manual.

ATTENTION

Ensure belt is tensioned correctly; excessive or insufficient tension can result in premature wear or belt failure.

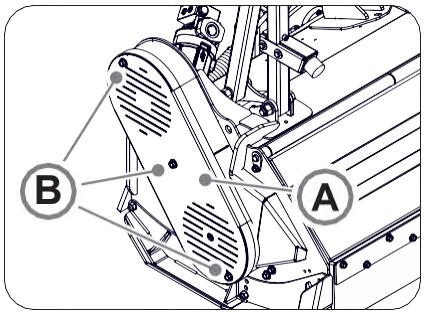
9.6.2 - REPLACEMENT OF THE BELT

WARNING

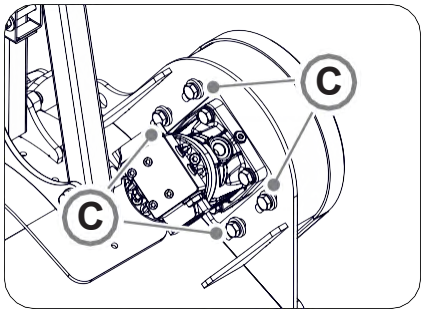
- **On a new machine and after every belt replacement, the belt tension must be checked and tensioned after *an initial 4 hours* of work;**
- **The belt must be tensioned *every week* or *every 40 hours*.**

To replace the belts, proceed as follows:

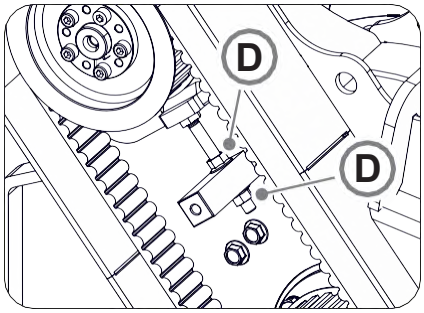
1. Remove belt drive cover (**A**); cover is secured with three M10 bolts (**B**).



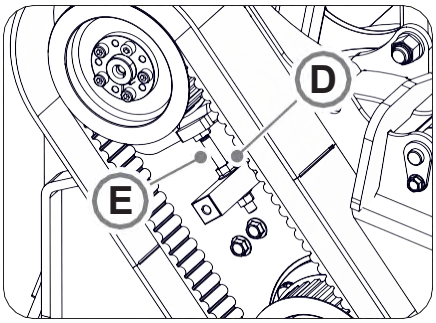
2. Loosen the four M10 bolts (**C**) that secure the motor mounting plate.



3. Loosen the two M10 nuts (**D**) on the adjuster bolt.



4. Unscrew the M10 adjuster bolt (**E**) sufficient enough to permit removal of the belt.



5. Replace the belt with a new one.
6. Proceed with tensioning the belt; *refer to belt tensioning procedure (paragraph 9.6.1).*
7. When belt is correctly tensioned, retighten motor plate bolts and refit the belt drive guard.

   For tightening torques refer to chapter 11 of this manual.

ATTENTION

Ensure belt is tensioned correctly; excessive or insufficient tension can result in premature wear or belt failure.

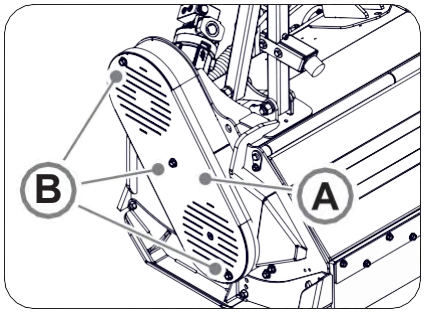
9.7 - ROTOR MAINTENANCE

9.7.1 - ROTOR REPLACEMENT

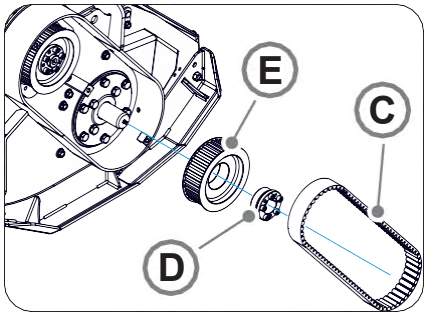
ATTENTION

- **Ensure the machine is safely parked on a firm level location with ample workspace.**
- **It is advisable to harness the rotor to avoid sudden fall and aid subsequent extraction.**

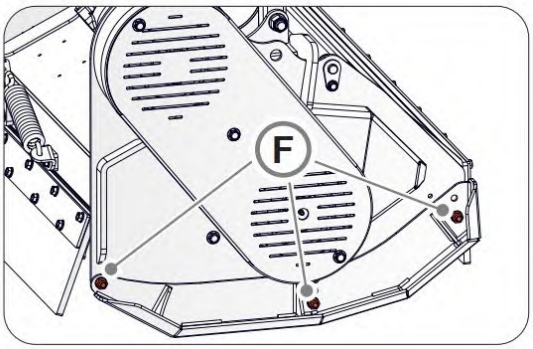
1. Remove belt drive cover (**A**); cover is secured with three M10 bolts (**B**).

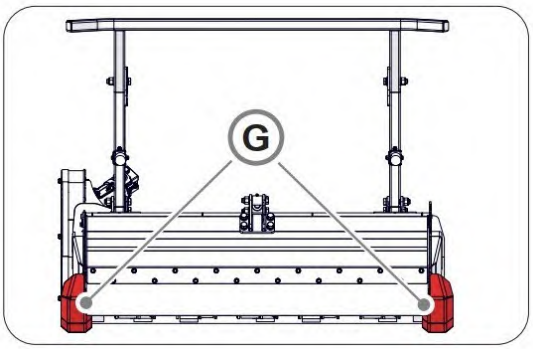


2. Loosen belt adjuster sufficient enough to permit belt removal; extract the belt (**C**).
3. Loosen and remove taperlock (**D**) from the rotor pulley (**E**).
4. Extract rotor pulley (**E**) from rotor shaft.

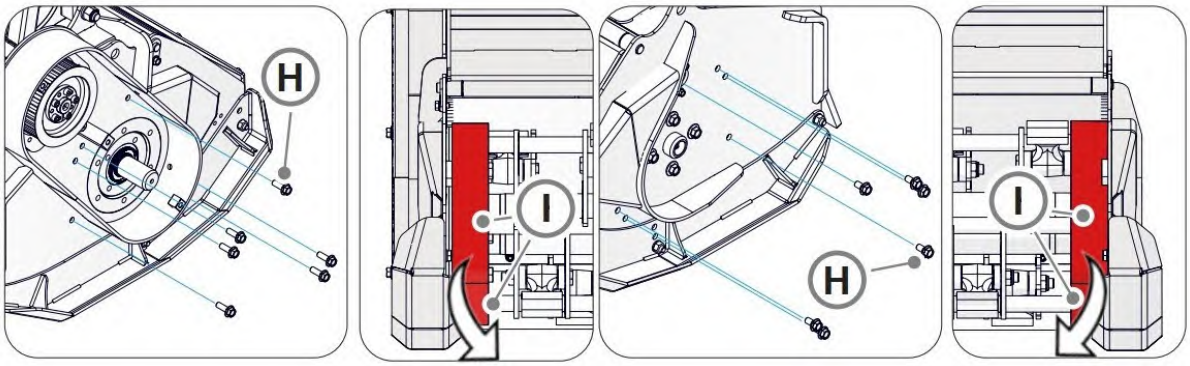


5. Remove the three M10 nuts and bolts (**F**) from the skids on each side of the machine and remove both skids (**G**).





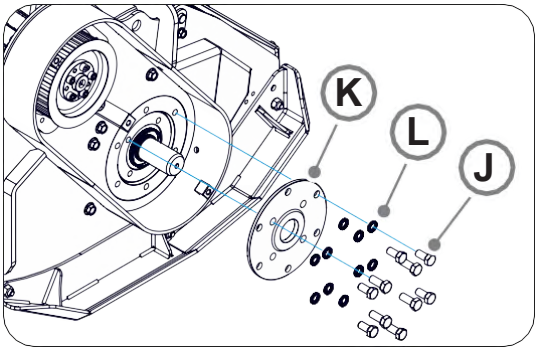
6. Remove the six M10 bolts (**H**) that secure the dust covers to the casing.
7. Remove the two dust covers (**I**).
8. Repeat the same procedure on the other side of the machine.



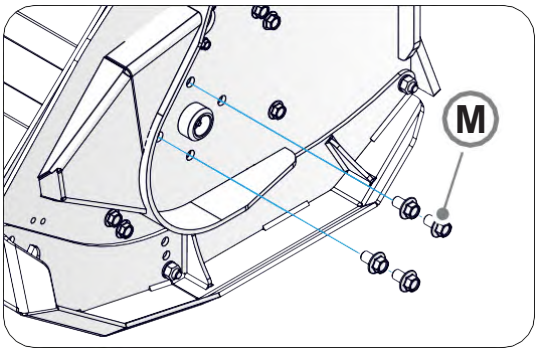
DANGER

The following instructions relate to removal of the rotor from the frame, it is vital during this procedure that the rotor is harnessed and/or safely supported at all times during the removal process in order to avoid a sudden fall that could injure persons and/or damage the machine.

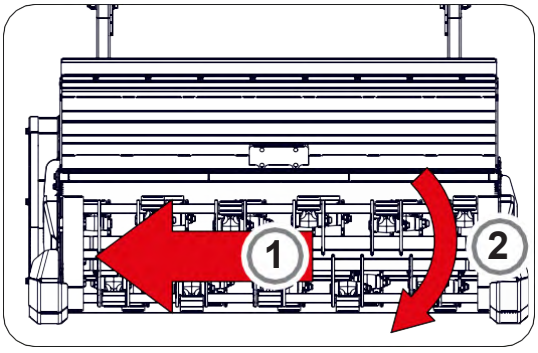
9. On the transmission side, remove the ten M12 bolts (**J**) and washers (**L**) to permit removal of centring plate (**K**).

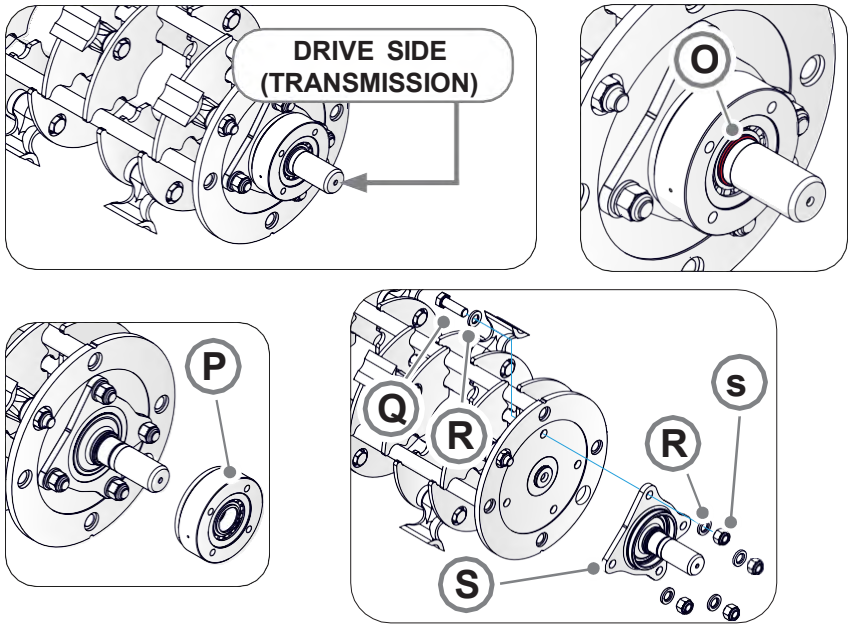


10. Remove the four M12 bolts (**M**) on the opposing side of the machines.



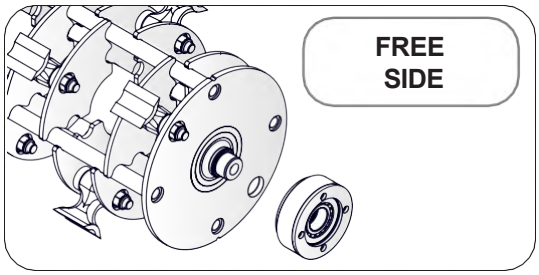
11. Carefully move the rotor towards the drive side of the casing (**1**).
12. Carefully tilt the rotor just enough to allow it to be extracted (**2**).





On rotor drive side:

13. Remove circlip (**O**);
14. Using an extractor, remove the bearing support (**P**);
15. Remove the M12 bolts (**Q**) washers (**R**) and nuts (**S**) to release the bearing stub shaft (**T**).



On rotor free side:

16. Using an extractor, remove the bearing support (**P**);

When refitting the rotor; reassemble by following the removal instructions in reverse order.

WARNING

- **If the operator detects vibrations or abnormal noises coming from the machine, immediately stop the rotation of the rotor, and check for any missing or damaged blades or damage on the rotor itself.**
- **CONTINUOUS OPERATION OF THE ROTOR WITH DAMAGED PARTS MAY LEAD TO MALFUNCTION AND INCREASE THE RISK OF MACHINE FAILURE.**

DANGER

- **Use appropriate equipment and protective clothing when working on the machine.**
- **Do not attempt any checks or maintenance with machine running or parts moving.**

9.7.2 - REPLACEMENT OF ROTOR SUPPORT BEARINGS

DANGER

- **Use appropriate equipment and protective clothing when working on the machine.**
- **Do not attempt any checks or maintenance with machine running or parts moving.**

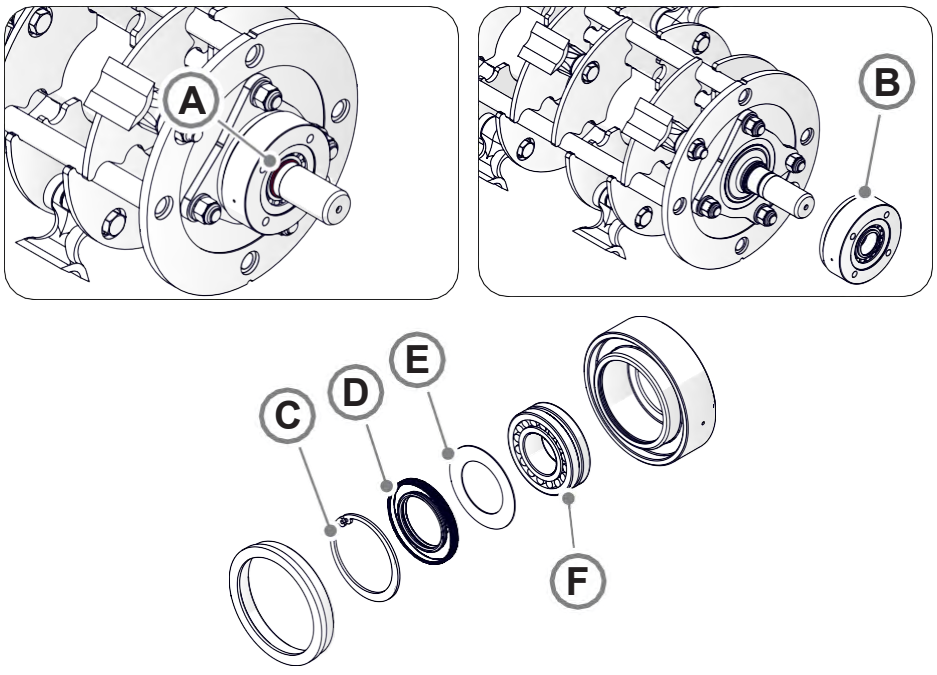
ATTENTION

- **For all service and maintenance repairs, always use genuine McConnel parts.**
- **McConnel declines all liability for any damage that may be caused as a result of non-compliance with the above.**
- **The warranty cover will not apply if the rules and instructions of use contained in this manual have not been complied with.**

Replacement of a worn or damaged bearings on the rotor will require removal and dismantling of the rotor; refer to the previous paragraph for instructions of this procedure.

ROTOR SUPPORT BEARING - DRIVE END

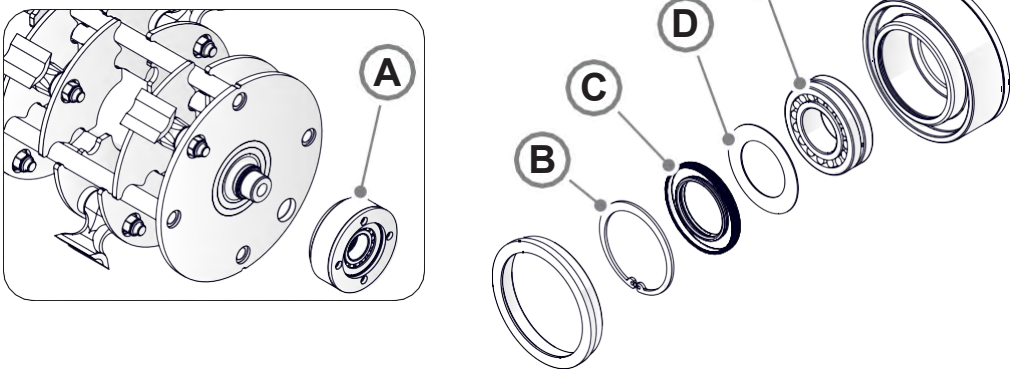
With the rotor removed and dismantled, proceed as follows.



1. Remove the circlip (**A**);
2. Using an extractor, remove the bearing support (**B**);
3. Open the bearing support by removing the circlip (**C**);
4. Extract the oil seal (**D**) and the shim (**E**);
5. Extract and replace the bearing (**F**);
6. Reassemble by following the dismantle instructions above in reverse order.

ROTOR SUPPORT BEARING – FREE END

With the rotor removed and dismantled, proceed as follows.



On the rotor free end:

1. Using an extractor, remove the bearing support (**A**);
2. Open the bearing support by removing the circlip (**B**);
3. Extract the oil seal (**C**) and the shim (**D**);
4. Extract and replace the bearing (**E**);
5. Reassemble by following the dismantle instructions above in reverse order.

ATTENTION

- **For all service and maintenance repairs, always use genuine McConnel parts.**
- **McConnel declines all liability for any damage that may be caused as a result of non-compliance with the above.**
- **The warranty cover will not apply if the rules and instructions of use contained in this manual have not been complied with.**

DANGER

- **Use appropriate equipment and protective clothing when working on the machine.**
- **Do not attempt any checks or maintenance with machine running or parts moving.**

9.7.3 - BLADE & FIXINGS CHECKS

Blades must be checked ***every 8 hours* of use** or ***daily***.

WARNING

- **If the operator detects vibrations or abnormal noises coming from the machine, immediately stop the rotation of the rotor, and check for any missing or damaged blades or damage on the rotor itself.**
- **CONTINUOUS OPERATION OF THE ROTOR WITH DAMAGED PARTS MAY LEAD TO MALFUNCTION AND INCREASE THE RISK OF MACHINE FAILURE.**

Always replace blades and/or fixings immediately when:

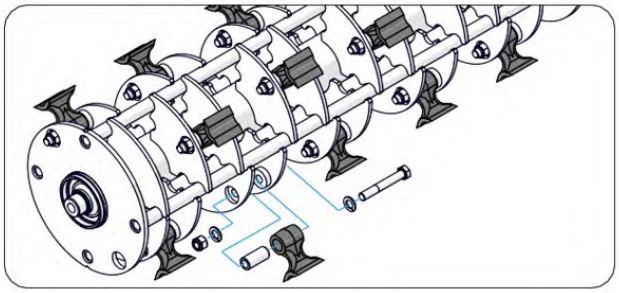
- Cracks are detected in the blades;
- Excessive wear of the bolt is detected;
- Excessive wear or blade damage is detected;
- Excessive rotor vibration is experienced.

9.7.4 - BLADE REPLACEMENT

ROTATING BLADE ROTOR

DANGER

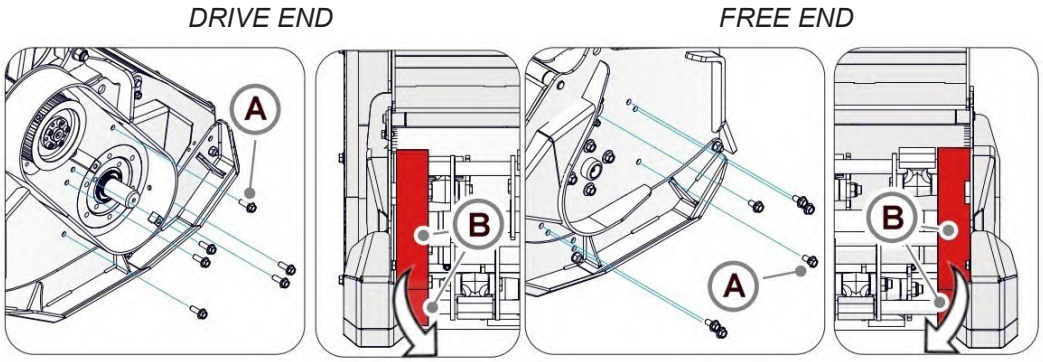
- **Use appropriate equipment and protective clothing when working on the machine.**
- **Do not attempt any checks or maintenance with machine running or parts moving.**



Replacement of blades requires the use of two spanners or socket wrenches.

1. Undo and remove the nut, bolt and washer that secures the blade on the rotor;
2. Remove and replace the blade;
3. Replace bolt, washer and nut and tighten with a torque of **187 Nm**.

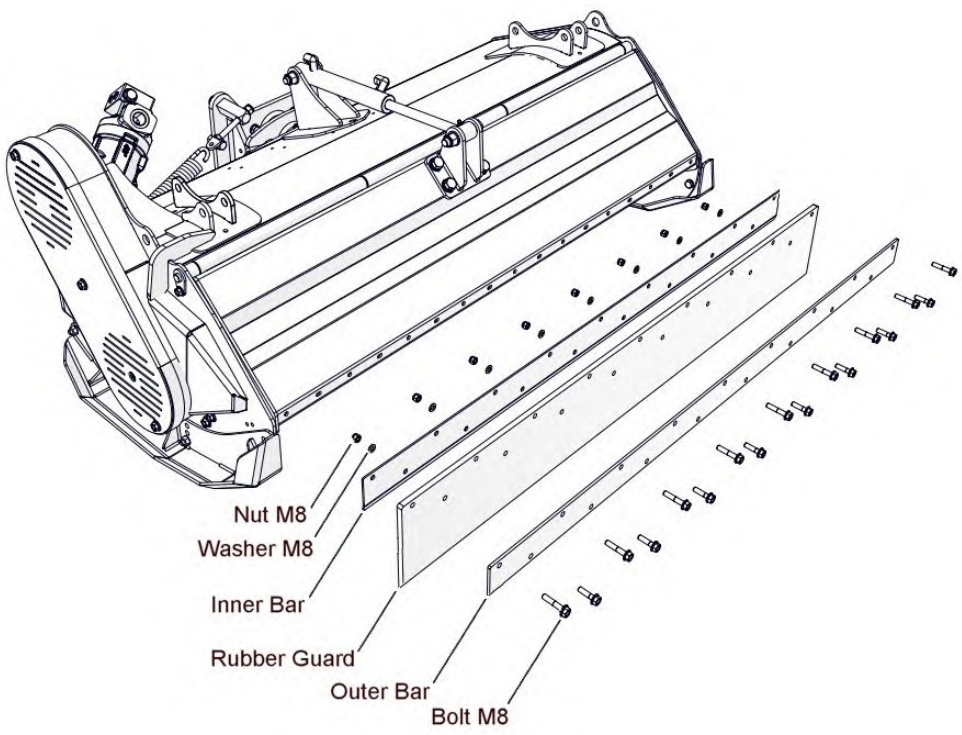
For the outermost blades on the rotor only, is it recommended to remove the four rotor dust covers (2 each side) in order to provide access to the blade fixings.



1. Remove the six M10 bolts (**A**) that secure the dust covers to the casing.
2. Remove the two dust covers (**B**).
3. Repeat the same procedure on the other side of the machine.

9.8 - PROTECTIONS MAINTENANCE

9.8.1 - REPLACEMENT OF THE FRONT RUBBER GUARD

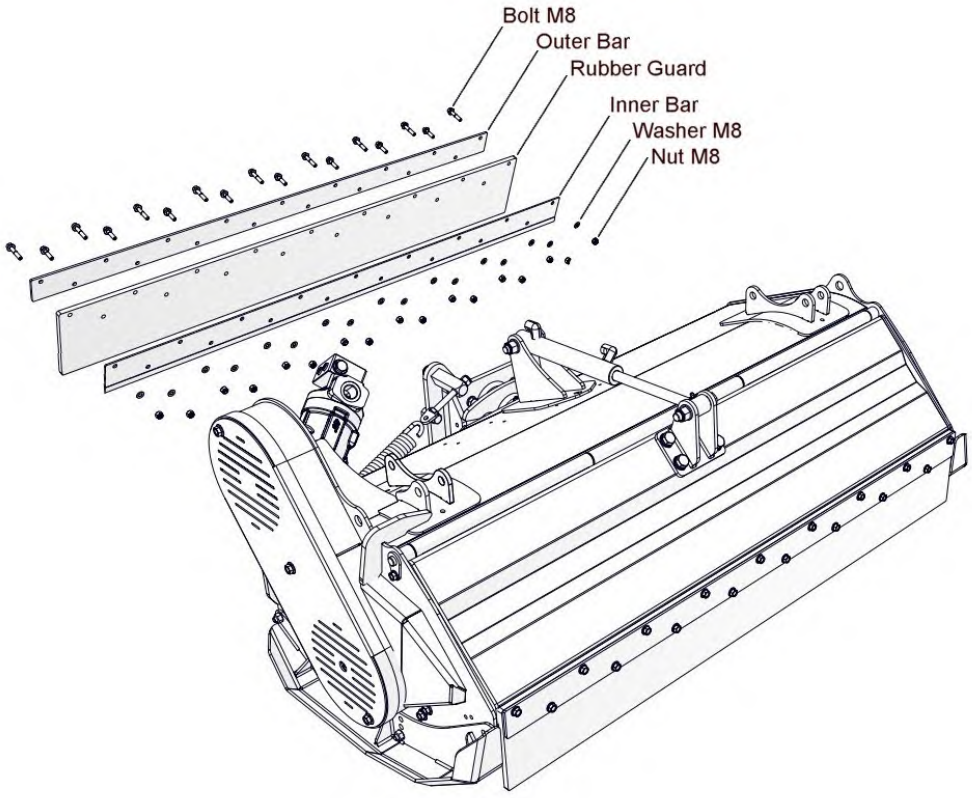


The rubber safety guards on the front of the machine should be inspected regularly to ensure they provide protection against materials and objects that may be ejected during operation. The integrity of the guards and fixings should be checked on a daily basis and always prior to starting operations.

If the rubber guards (**C**) are excessively worn or damaged they must be replaced immediately, the replacement procedure is as follows;

1. Park the machine on a firm level site.
2. Remove the M8 bolts, nuts and washers from the frame using spanners or sockets.
3. Remove and replace the rubber guard; locates between inner and outer mounting bars.
4. Secure the guard assembly to the frame using the M8 bolts, washers and nuts using spanners or sockets.
5. Tighten bolts with a torque of **23 Nm**.

9.8.2 - REPLACEMENT OF THE REAR RUBBER GUARD



The rubber safety guards on the rear of the machine should be inspected regularly to ensure they provide protection against materials and objects that may be ejected during operation. The integrity of the guards and fixings should be checked on a daily basis and always prior to starting operations.

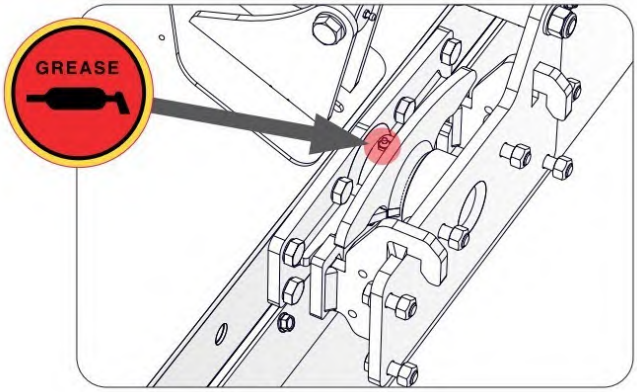
If the rubber guard is excessively worn or damaged it must be replaced immediately, the replacement procedure is as follows;

6. Park the machine on a firm level site.
7. Remove the M8 bolts, nuts and washers from the frame using spanners or sockets.
8. Remove and replace the rubber guard; locates between inner and outer mounting bars.
9. Secure the guard assembly to the frame using the M8 bolts, washers and nuts using spanners or sockets.
10. Tighten bolts with a torque of **23 Nm**.

9.9 - GREASING THE MACHINE

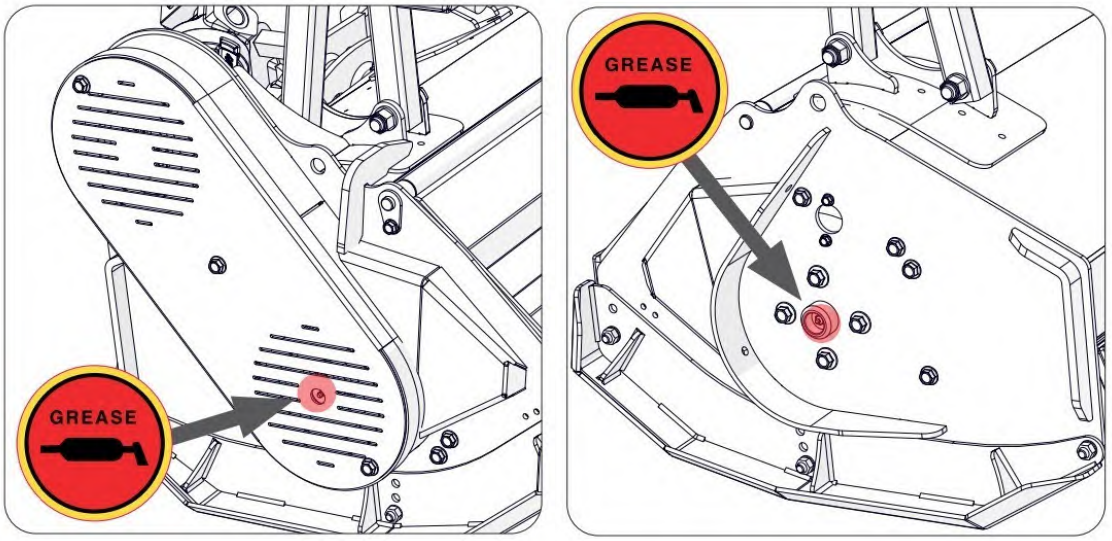
9.9.1 - GREASING THE MOUNTING ATTACHMENT

Every 8 hours or daily, grease the mounting attachment at the location indicated below;



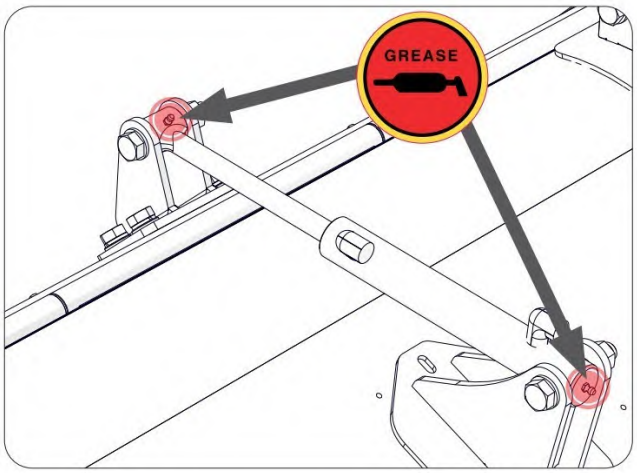
9.9.2 - GREASING THE ROTOR BEARINGS

Every 4 hours, grease the rotor bearings at the locations indicated below;



9.9.3 - GREASING THE FRONT HOOD OPENING RAM

Every 8 hours or daily, grease the front hood opening ram at the locations indicated below;



9.10 - PERIODIC REPLACEMENT OF HYDRAULIC HOSES

Hydraulic hoses must be replaced **every 4000 hours or every 6 years**, *whichever occurs first*.

Inspect the hydraulic hoses on a daily basis, if signs of excessive wear or damage are detected they must be replaced immediately

9.11 - MAINTENANCE OPERATIONS

MAINTENANCE FREQUENCY

Component	Period	After the first 4 hours	Every 4 hours	Every 8 Hours / Daily	Every 40 hours / Weekly	4000 hours
BELT	Tensioning	X(A)			X	
CUTTING BLADES	Check			X		
PROTECTIONS	Check			X		
ROTOR BEARINGS	Greasing		X			
MOUNTING ATTACHMENT	Greasing			X		
HYDRAULIC RAM	Greasing			X		
HYDRAULIC HOSES	Check			X		
	Replacement					X

(A) Only for the first check.

10 - INSTRUCTIONS FOR EMERGENCY SITUATIONS

10.1 - FIRE

If a machine catches fire, follow these safety steps immediately:

1. Stop the machine

- Turn off the power supply or hit the emergency stop if it is safe to do so.

2. Raise the alarm

- Alert nearby workers and notify a supervisor or emergency contact.

3. Use a fire extinguisher (if trained and safe)

- Use the correct type of extinguisher (usually CO_2 or dry powder for electrical/mechanical fires).
- Keep a safe distance and aim at the base of the fire.

4. Evacuate the area

- Move away from the machine and follow emergency evacuation procedures.
- Do not attempt to fight large or spreading fires.

5. Call emergency services

- Contact emergency responders if the fire cannot be controlled quickly.

6. Do not restart the machine

- Wait until it has been inspected and declared safe by qualified personnel.

11 - TIGHTENING TABLES

11.1 - CLASSES OF COARSE PITCH BOLTS

Diameter (mm)	Pitch (mm)	Friction coefficient	8.8		10.9		12.9	
			Preload	Tightening torque	Preload	Tightening torque	Preload	Tightening torque
			N	Nm	N	Nm	N	Nm
M2	0.40	0.14	899	0.37	1,264.3	0.52	1,517.1	0.63
M2.5	0.45	0.14	1499.8	0.77	2,109.1	1.08	2,531	1.30
M3	0.50	0.14	2,251.9	1.34	3,166.7	1.88	3,800	2.26
M3.5	0.60	0.14	3,022.6	2.05	4,250.6	2.89	5,100.7	3.47
M4	0.70	0.14	3,901.9	3.06	5,487	4.30	6,584.4	5.16
M5	0.80	0.14	6,393.7	6.04	8,991.1	8.50	10,789.3	10.20
M6	1.00	0.14	8,998.2	10.37	12,653.7	14.59	15,184.4	17.51
M7	1.00	0.14	13,199.2	17.21	18,561.4	24.20	22,273.6	29.04
M8	1.25	0.14	16,531.2	25.07	23,247	35.26	27,896.5	42.31
M10	1.50	0.14	26,334.8	49.52	37,033.3	69.64	44,439.9	83.56
M12	1.75	0.14	38,408	84.84	54,011.2	119.31	64,813.5	143.17
M14	2.00	0.14	52,522.4	135.13	73,859.6	190.02	88,631.5	228.03
M16	2.00	0.14	72,728.5	211.61	102,274.4	297.58	122,729.3	357.09
M18	2.50	0.14	87,372.3	290.32	123,711	402.26	148,453.2	489.92
M20	2.50	0.14	113,494.2	412.78	156,601.2	580.47	191,521.5	696.56
M22	2.50	0.14	141,583.7	567.58	199,102.1	798.16	238,922.5	957.80
M24	3.00	0.14	16,523.6	713.68	229,955.1	1,003,61	275,946.1	1,204.33
M27	3.00	0.14	21,488.3	1,050.16	302,179.2	1,476,79	362,615	1,772.15
M30	3.50	0.14	26,541.2	1,428,97	367,792.3	2,009,49	441,350.8	2,411.39
M33	3.50	0.14	326,115.9	1,940,86	458,600.5	2,729,33	550,320.6	3,275.19
M36	4.00	0.14	382,483.6	2,496,81	537,867.6	3,511,14	645,441.1	4,213.37
M39	4.00	0.14	459,805.2	3,241,92	646,601	4,558,96	775,921.3	5,470.75
M42	4.50	0.14	525,878	4,010,93	739,516	5,640,37	887,419.2	6,768.44
M45	4.53	0.14	618,303.6	5,039,09	869,489.3	7,086,23	1,043,387	8,503.47
M48	5.00	0.14	691,725.8	6,036,23	972,739.4	8,488,45	1,167,287	10,186.14

11.2 - CLASSES OF FINE PITCH BOLTS

Diameter (mm)	Pitch (mm)	Friction coefficient	8.8		10.9		12.9	
			Preload	Tightening torque	Preload	Tightening torque	Preload	Tightening torque
			N	Nm	N	Nm	N	Nm
M8	1	0.14	18,159.1	27.05	25,536.2	38.04	30,643.4	45.65
M10	1	0.14	28,350.1	52.55	39,867.3	73.89	47,840.8	88.67
M10	1	0.14	30,443.3	55.61	42,810.8	78.2	51,373	93.84
M12	2	0.14	40,811.6	89.06	57,391.3	125.24	68,869.5	150.29
M12	1	0.14	43,338.4	93.41	60,944.6	131.36	73,133.5	157.63
M14	2	0.14	58,691.9	147.85	82,535.4	207.91	99,042.5	249.49
M16	2	0.14	79,175.5	226.12	111,340.6	317.98	133,608.7	381.57
M18	2	0.14	95,503.3	310.05	134,301.6	436	161,161.9	523.2
M 18	2	0.14	103,155.2	329.35	145,062.1	463.15	174,074.5	555.77
M20	2	0.14	121,772.4	436.34	171,242.5	613.61	205,491	736.33
M20	2	0.14	130,638.1	461.1	183,709.9	648.42	220,451.9	778.1
M22	2	0.14	151,067.8	597.49	212,439.1	840.22	254,927	1,008.27
M22	2	0.14	160,663.6	626.82	225,933.2	881.46	271,119.8	1,057.75
M24	2	0.14	183,386.5	780.67	257,887.3	1,097.82	309,464.8	1,371.38
M24	2	0.14	194,192.1	816.24	273,082.6	1,147.84	327,699.1	1,377.41
M27	2	0.14	238,370.1	1,139,34	335,207.9	1,602.2	402,249.5	1,922.64
M30	2	0.14	299,914	1,590,29	421,754.2	2,236.34	506,105	2,683.61
M33	2	0.14	368,980.2	2,136,49	518,878.4	3,004.43	622,654	3,605.32
M36	3	0.14	413,097.9	2,652,26	580,918.9	3,729.74	697,102.7	4,475.68
M39	3	0.14	494,054.1	3,430,3	694,763.5	4,823.86	833,716.1	5,788.63
M42	3	0.14	582,537.4	4,349,18	819,193.3	6,116.04	983,031.9	7,339.24
M45	3	0.14	676,135.5	5,401,43	950,815.6	7,595.77	1,140,979	9,114.92
M48	3	0.14	774,830.6	6,594,93	1,089,606	9,274.12	1,307,527	11,128.94
M45	4.53	0.14	618,303.6	5,039,09	869,489.3	7,086.23	1,043,387	8,503.47
M48	5.00	0.14	691,725.8	6,036,23	972,739.4	8,488.45	1,167,287	10,186.14

11.3 - FITTINGS TIGHTENING TABLE

Series	Ø Pipe	THREADING - TIGHTENING TORQUE					
		Ø Threaded metric	Form B MT (Nm)	Shape E MT (Nm)	Ø Metric Gas	Shape B MT (Nm)	Shape E MT (Nm)
Light	6	M 10x1.0	18	18	G 1/8	18	18
	8	M 12 x 1.5	30	25	G 1/4	35	35
	10	M 14 x 1.5	45	45	G 1/4	35	35
	12	M 16 x 1.5	65	55	G 3/8	70	70
	15	M 18 x 1.5	80	70	G 1/2	140	90
	18	M 22 x 1.5	140	125	G 1/2	100	90
	22	M 26 x 1.5	190	180	G 3/4	180	180
	28	M 33 x 2.0	340	310	G 1	330	310
	35	M 42 x 2.0	500	450	G 1 1/4	540	450
	42	M 48 x 2.0	630	540	G 1 1/2	630	540
Strong	6	M 12 x 1.5	35	35	G 1/4	55	40
	8	M 14 x 1.5	55	45	G 1/4	55	40
	10	M 16 x 1.5	70	70	G 3/8	90	80
	12	M 18 x 1.5	110	90	G 3/8	90	80
	14	M 20 x 1.5	150	125	G 1/2	150	115
	16	M 22 x 1.5	170	135	G 1/2	130	115
	20	M 27 x 2.0	270	180	G 3/4	270	180
	25	M 33 x 2.0	410	310	G 1	340	310
	30	M 42 x 2.0	540	450	G 1 1/4	540	450
	38	M 48 x 2.0	700	540	G 1 1/2	700	540

12 - NOTES

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