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McCONEl

ROBOPOWER

140HP UNMANNED TRACTOR

Sanreco & Autec Controlled Models
Operator Manual

Machines from Serial No. 0616000111 ►



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 go to the McConnel Limited web site at www.mcconnel.com, log onto 'Dealer Inside' and select the 'Machine Registration button' which can be found in the Service Section of the site. Confirm to the customer that the machine has been registered in the section below.

Should you experience any problems registering a machine in this manner please contact the McConnel Service Department on 01584 875848.

Registration Verification

Dealer Name:
Dealer Address:
Customer Name:
Date of Warranty Registration:/...../..... Dealer Signature:

NOTE TO CUSTOMER / OWNER

Please ensure that the above section above has been completed and signed by the selling dealer to verify that 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 machines 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 McConnell 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. McConnell 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 McConnell 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 McConnell 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 McConnell 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 McConnell 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 McConnell Ltd Service Dealer, within 30 days of the date of repair.*
- 2.05. *Following examination of the claim and parts, McConnell Ltd will pay, at their discretion, for any valid claim the invoiced cost of any parts supplied by McConnell 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 McConnell Ltd. is final.*

3. LIMITATION OF LIABILITY

- 3.01. *McConnell 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. *McConnell Ltd makes no warranty as to the design, capability, capacity or suitability for use of the goods.*
- 3.03. *Except as provided herein, McConnell 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



DECLARATION OF CONFORMITY

Conforming to EU Machinery Directive 2006/42/EC

We,

McCONNEL LIMITED, Temeside Works, Ludlow, Shropshire SY8 1JL, UK

Hereby declare that:

The Product; *Radio Controlled Tracked Mower*

Product Code; *RMOW*

Serial No. & Date Type

Manufactured in; *Italy*

Complies with the required provisions of the Machinery Directive 2006/42/EC
The machinery directive is supported by the following harmonized standards;

- BS EN ISO 12100 (2010) Safety of machinery – General principles for design – Risk assessment and risk reduction.
- BS EN 349 (1993) + A1 (2008) Safety of machinery - Minimum distances to avoid the entrapment with human body parts.
- BS EN ISO 14120 (2015) Safety of machinery - Guards general requirements for the design and construction of fixed and movable guards.
- BS EN 4413 (2010) Hydraulic fluid power. Safety requirements for systems and their components.

McCONNEL LIMITED operates an ISO 9001:2008 quality management system, certificate number: FM25970.

This system is continually assessed by the;

British Standards Institution (BSI), Beech House, Milton Keynes, MK14 6ES, UK
BSI is accredited by UK Accreditation Service, accreditation number: UKAS 003.

The EC declaration only applies if the machine stated above is used in accordance with the operating instructions.

Signed *Responsible Person*
CHRISTIAN DAVIES on behalf of McCONNEL LIMITED

Status: *General Manager*

Date: *January 2018*



For Safety and Performance...

ALWAYS READ THE BOOK FIRST

McCONEL LIMITED

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www.mcconel.com**

▲ WARNING

Cancer and Reproductive Harm
www.P65Warnings.ca.gov

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Operating, servicing and maintaining this equipment can expose you to chemicals including gasoline, diesel fuel, lubricants, petroleum products, engine exhaust, carbon monoxide, and phthalates, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov. This website, operated by California's Office of Environmental Health Hazard Assessment, provides information about these chemicals and how individuals may be exposed to them.

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1 - GENERAL DESCRIPTION

1.1 - PRELIMINARY INFORMATION

This use and maintenance manual complies with the Machinery Directive 2006/42/EC and subsequent amendments and integrations.

Do not destroy or modify it; any additions must be made by adding files.

Manual code:	EENUM11002
Revision no.:	02
Edition:	04/2017
Machine type:	Remote-controlled, self-propelled machine
Model:	RoboPOWER

The manual is valid from serial number: **ROBOP061600011**



READ THE BOOK FIRST

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United Kingdom

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<http://www.mcconnel.com>



1.2 - OPERATOR TRAINING

Reading this manual thoroughly:

- All machine operators and maintenance personnel must read this entire manual thoroughly and carefully and follow the instructions provided.
- It is the duty of the employer to ensure that operators possess the skills required to operate the machine and that they have read this manual carefully.

1.3 - INSTRUCTIONS FOR USE AND STORAGE

The operating instructions contained in this manual are valid exclusively for RoboPOWER models.

This instruction manual must be read and used as follows:

- The instructions manual must be considered an integral part of the machine and must be read carefully;
- The instructions manual must be easily accessible to operators and maintenance technicians;
- Keep the manual for the entire lifetime of the machine;
- Ensure that any updates are incorporated in the text;
- Give the manual to any other user or subsequent owner of the machine;
- Use the manual in such a way as not to damage it or its contents;
- Do not remove, tear out or rewrite any part of the manual for any reason;
- Keep the manual away from moisture and heat;
- In the event that the manual is lost, damaged or it is otherwise not possible to read all of its content, a new copy should be requested from the manufacturer.

Pay the maximum attention to the following symbols and their meanings. They serve to highlight particular information such as:

CAUTION:

Refers to supplements or suggestions for correct use of the machine.

WARNING:



Refers to dangerous situations which can occur when using the machine, that could cause serious injuries or property damage.

DANGER:



Refers to dangerous situations that may arise when using the machine, which if not avoided, could cause serious injuries or death.



1.4 - INTRODUCTION

The service standards outlined in this manual represent an integral part of the machine supply contract.

These instructions are also addressed to operators already specifically trained to operate this kind of machinery and contain all information necessary and essential for safe operation and correct/optimal use of the machine. Rushed and incomplete preparations lead to improvisation, the cause of many accidents. Read the following suggestions carefully and put them into practice before starting work:

- Familiarise yourself with all the operations that can be performed and work positions before manoeuvring the machine.
- The instructions manual must be available to the operator at all times.
- Programme all interventions carefully.
- Get all the information necessary for the transporting the machine on the road such as distance, route, height of level crossing, bridge capacity etc.
- Have a detailed understanding of where and how the machine is intended to be used: ground bearing capacity, boom scope needed, limitations to movement due to the presence of buildings, power lines etc.
- Before starting work, make sure that the safety devices are working correctly and that there are no doubts regarding their functionality. If they are not working correctly or you have doubts, do not under any circumstances use the machine.
- While travelling on the road comply with all the rules and regulations of the highway code.
- Carefully follow the warnings regarding specific hazards indicated in this manual.
- Regular and thorough preventive maintenance will guarantee that the machine is always at its highest possible level of operational safety. Never put off the necessary operations, and ensure they are performed exclusively by specialised personnel, using only original spare parts.

1.4.1 - MANUAL UPDATES

The information, the descriptions and the illustrations contained in this manual reflect the state of the art at the moment the machine was sold.

The manufacturer reserves the right to make modifications to its products at any time for technical or commercial reasons. In the event that such modifications are made, the Manufacturer is under no obligation (for safety reasons) to modify the other machines sold up to that moment or issue updates to the manual. Moreover, this publication shall not be considered lacking in any way. Any supplements that the Manufacturer considers appropriate to supply at a later date must be kept together with the manual and considered an integral part of it.

1.4.2 - COPYRIGHT

The copyright of this manual belongs to the machine's manufacturer. This manual contains technical texts, drawings and illustrations which may not be divulged or transmitted to third parties, in whole or in part, without the written authorisation of the machine manufacturer.

1.5 - WARRANTIES

The parts supplied by McConnel are covered by a 12-month warranty, that becomes valid from commissioning, proven by the documentation delivered to the customer. In any case, refer to the machine order confirmation for special arrangements agreed during the sale.

McConnel reserves the right to repair, or substitute, the pieces it agrees are defective during the warranty period (refer to McConnel Warranty Policy).



By replacing the defective part, McConnell shall consider itself absolved from any other expense borne by the Dealer and the Dealer's Customer, for instance presumed damages, either present or future, such as lost earnings, liquidated damages, etc.

Scheduled and extraordinary maintenance must be performed in accordance with the instructions given in this manual. For all the cases not included and for any type of customer assistance you should contact McConnell Limited directly by means of registered letter or fax even when agreements are made over the telephone. McConnell does not accept any liability for any delays or failure to intervene. McConnell shall not be held liable for any damage or malfunctions due to work of a technical nature being carried out on the machine by unauthorised personnel.

1.6 - RESPONSIBILITIES

McConnell shall not be held liable for any incident involving personal injury or property damage which may occur due to:

- Failure to comply with the instructions provided in this manual regarding the operation, use and maintenance of the machine.
- Abrupt movements or incorrect manoeuvres when operating or carrying out maintenance on the machine.
- Modifications made to the machine without the prior written authorisation from McConnell Limited.
- Events that fall outside the normal and correct use of the machine.

In any event, should the user ascribe any incident or accident to a machine defect, they must be able to demonstrate that the consequent damage was a principal and direct consequence of such a defect. Any tampering with the machine or the use of non-original spare parts can be grounds for voiding the warranty and put the operator's safety at risk.

WARNING:



- **Always use original spare parts for repairs and maintenance.**
- **McConnell shall not be held responsible for any damage which should occur due to failure to follow the above requirements.**
- **The machine is guaranteed according to the contractual agreements specified at the time of sale.**
- **The warranty shall nevertheless lapse whenever the regulations and instructions laid out in this manual should not be followed.**

1.7 - PERMITTED USES

RoboPOWER is a machine built to be used by skilled personnel. The machine is a self-propelled radio-controlled vehicle that can be used in both the agricultural field with the chance to be able to apply different equipment to be applied to the raiser equipment front and/or rear.

RoboPOWER (hereinafter called the machine) and the equipment are not toys but a WORKADAY MACHINE. Always respect the conditions of use specified by the producers of the machine. The machine is suitable for performing flail mowing operations at a speed of up to 4-5 km/h, depending on the conditions of the ground and the type and condition of material to be cut (length, whether dry or wet, density, etc.) and on slopes having a maximum inclination of 45°. It is a self-propelled, remote controlled machine suitable for bearing equipment with interchangeable attachment in Category 2 ISO 730 - 1 1994. This machine is generally used during daylight hours. If, under exceptional circumstances, it has to be used at night or in conditions of reduced visibility, an auxiliary lighting system must be used. Always operate in daylight or with artificial lighting which guarantees visibility of at least 100 m.



1.8 - IMPROPER OR UNAUTHORISED USES

WARNING:



This section indicates some of the uses considered improper or otherwise not permitted. Because it is impossible to predict all possible improper uses, in the event that you wish to use the machine for an alternative use, contact McConnell before carrying out any work.

CAUTION:

Instructions for the permitted optional accessories are given in the corresponding use and maintenance manuals. If this equipment is supplied by McConnell, these publications are supplied as an annex to this manual. Instructions for installing permitted equipment, controls requiring a provision on the machine, and the hydraulic attachments necessary for the equipment to operate are included in the final section of this manual.

The following uses must always and absolutely be avoided:

- Use of the machine by minors, inexperienced, untrained or unlicensed persons.
- Use of the machine to lift and/or transport persons or things.
- Use of the flail mower head as a piledriver.
- Use of the machine to tow damaged vehicles.
- It must not be used on surfaces contaminated by glass, loose stones, pieces of iron or other extraneous bodies that could be kicked up by the blades of the tool.
- 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. flammable, toxic, explosive, etc. materials).
- Overloading the machine beyond its permitted limits.
- Increasing the operational length with heights without Energreen's authorisation.
- The machine must not be used on public roads.

DANGER:



Using the machine as mentioned above can cause tipping hazards or structural failure that could result in injuries or even death.



1.9 - THE RUNNING IN AND TESTING OF THE MACHINE

Every machine is scrupulously adjusted and tested before delivery.

A new machine must however be used with caution for the first 100 hours, to carry out a good running-in of the various components.

If the machine is subjected to an excessive work load when it is first used, its performance may be affected and its functionality reduced within a short space of time.

During the running-in period, pay great attention to the following points:

- After start-up, allow the engine to turn at a low number of revs for 5-6 minutes;
- Avoid operating machine at its maximum capacity for the first 100 hours of operation. Avoid sudden acceleration or deceleration.

Refer to the coupons booklet appended for various maintenance activities; to this manual; to the engine manual and to the equipment manual for the methods of intervention.

WARNING:



When replacing oil filters, inspect them internally to check if there are any deposits. If there are, check for possible causes before restarting the machine.



2 - MACHINE CHARACTERISTICS

2.1 - DESCRIPTION OF THE MACHINE

Multi-purpose self-propelled and remote controlled machine designed for cutting grass, shrubs, maintenance of roadside verges, slopes etc. Equipped with hydraulic attachments with quick couplings which allow the replacement of various equipment depending on the operational needs.

Authorised equipment:

- PROPOWER 210 flail head;
- FORESTRY 190 forestry head;
- Snow turbine;
- Agricultural equipment (Cat. 2);
- Hydraulic PTO @ 1000 rpm - with clockwise and counter-clockwise rotation direction;
- Mechanical PTO @ 1000 rpm.
- HERCULES raiser (front/ back)



McConnel declines all responsibility for damage of any kind caused by improper use or use other than that described above.

For custom machines refer to the appendix of this manual.

2.2 - STANDARDS APPLIED

This machine was designed and constructed in compliance with EC directives on safety and approximation of the laws of Member States, Specifically to the Machinery Directive 2006/42/EC, where applicable.

The following Standards were also taken into account during the machine's design:

- EN 121002010 "Safety of machinery" (Terminology)
- EN 60204 "Safety of machinery" (Electrical equipment)

the following harmonised standards were used for the machine update.

- EN ISO 4254-1:2013;

as well as the following technical specifications:

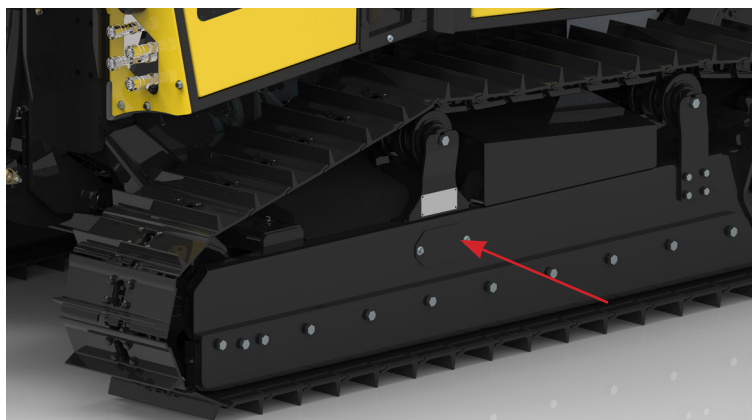
- ISO 11684:1995;
- EN ISO 3767-2:1998;



2.4 - IDENTIFICATION OF THE MACHINE

		CE	
DENOMINAZIONE-FUNZIONE DENOMINATION-FUNCTION	PORTATTREZZI RADIOCOMANDATO REMOTE-CONTROLLED EQUIPMENT CARRIER MACHINE		
NUMERO DI SERIE SERIAL NUMBER	ROBO		
MODELLO MODEL		POTENZA MOTORE ENGINE POWER	103 kW
MASSA WEIGHT	4600 kg	ANNO FABBRICAZIONE MANUFACTURE YEAR	201
		E13010913158	

The machine's identification plate is fixed to the left-hand side of the frame in the central part of the truck. In the case of an engine with flexible speed in accordance with the Emissions Directive for mobile, not road going machines 97/68/EC, the serial number of the motor produced for its category is stamped.



2.5 - NOISE LEVEL

This value indicates the maximum sound level perceived by the operator's ear inside the fully enclosed cab.

This value indicates the sound level outside of the machine and refers to the noise perceived by those who are close to the work area.

Standards EN ISO 3744:2010, EN ISO 11201:2010

LpA 71	LWA 102
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WARNING:



- Adhesive warning/information plates have been affixed to the machine, the purpose of which is to make it safer to use. For this reason, they must be replaced if they are no longer legible.
- The operator must not be someone who works occasionally on this machine. He must have accumulated a certain experience with this type of machine, therefore skilled and trained.
- Whenever direct visibility of the work zone from the control station is not sufficient the operator must be assisted by a specifically assigned person
- Check the condition and operation of any part subject to wear daily: (pins, valves, piping, etc.). When necessary, replace with original materials.
- Do not tamper with the hydraulic system for any reason, and in any case never remove the seal from the valves, or any and all warranties shall lapse. Contact an authorised repair shop if the valves should require adjustment.
- Excessive heating of the hydraulic fluid can damage the seals of the hydraulic circuit and lead to the deterioration of the fluid itself. Heating is caused by the rolling oil by means of the pressure relief valve. For this reason, avoid prolonged operation with the jacks at the end of stroke.



3 - SAFETY REGULATIONS

3.1 - GENERAL SAFETY REGULATIONS

3.1.1 - KNOW YOUR MACHINE INSIDE OUT

The machine must be used exclusively by qualified personnel, who must be familiar with the location and function of all controls, tools, indicators, indicator lights and the various safety plates.

3.1.2 - WEARING PROTECTIVE CLOTHING

Wear tight-fitting clothing and use safety equipment which meets applicable regulations.

While being used, the machine may give rise to dust emissions. If you are working with dry materials (straw or soil) you are advised to wear personal protective equipment for the airways such as dust masks.



3.1.3 - FIRE EXTINGUISHER AND FIRST AID

While using the machine you should have an easy to reach first aid kit and a carbon dioxide fire extinguisher so that you can intervene in case of emergency. Keep a cell phone close by with numbers of the emergency services saved on it, e.g. the doctor, ambulance, hospital and fire brigade.



CAUTION:

The owner of the machine and/or employer is responsible for the provision of the fire extinguisher and the first aid kit and for making sure they are efficient



3.1.4 - NOTICES FOR INSPECTION AND MAINTENANCE



Place a card saying **UNDER MAINTENANCE** on the machine. Remove the keys from the ignition before performing any checks or maintenance.

3.1.5 - CHECKING THE MACHINE'

- Inspect the machine thoroughly every day before using it, following the checklist indicated in this manual.
- Start the engine only in a well ventilated area and ensure that there are no persons in the machine's working range.
- Covers and safety devices must not be removed. They are designed and manufactured for your safety.
- Do not use the machine if the safety devices or covers are damaged or missing.
- Make sure all safety devices are put back in place immediately after cleaning or repair work has been carried out.
- Keep the machine and all its accessories clean and in good working order at all times.
- It is strictly prohibited to make changes to the machine without the prior authorisation of the manufacturer. Changes to the machine can cause hazards and injuries. - The manufacturer shall not be held responsible for the machine if these instructions are not followed.
- Only refuel when the machine is switched off, if possible before having turned it on, and when the fuel tank is cold. If you need to refuel whilst work is in progress, do not add fuel to the tank if the tank is hot or if the engine is still warm. Allow the machine to cool down.



DANGER:



DANGER OF EXPLOSION OR FIRE

During normal daily maintenance do not clean with high pressure water (pressure washer) electrical components, such as:

- Receiver unit and remote control;
- Fuse box and relays;
- Engine control unit and the machine ECUs;

Put a guard or cover adequately before washing so as to isolate the electrical components.

3.2 - GENERAL PRECAUTIONS

- It is mandatory to read and follow the instructions indicated 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 persons or property;
- Operators and maintenance technicians must be very familiar with the machine, especially regarding the dangers associated with misuse or making incorrect repairs.
- Before starting carry out all the checks on the tractor and equipment regarding:
 - Operation;
 - Accident prevention regulations;
 - Guards.
- Even when the machine is being used correctly, stones or other things can be thrown a considerable distance by the machine. Therefore, there must be nobody in the range of danger. Pay great attention when working near roads or buildings;
- Before beginning a day's work, always check the condition of the tools and all the guards. If they are damaged or missing, replace them.
- Make sure that nobody can start the machine by mistake whilst the machine is being inspected or repairs are being carried out. Do not wear loose clothing.
- Never accept passengers on the machine;
- Never carry persons on the flail head or on any equipment fitted;
- Never stand near the machine until the equipment is at completed standstill;
- Before starting the machine make sure that there are no people and/or animals around it;
- Work on flat, firm ground, avoiding banks or slopes with steep gradients;
- Before leaving the machine unattended, proceed as follows:
 1. Park the machine on a flat surface.
 2. Reduce the rpm of the engine before turning it off. Press the remote control red button and turn the ignition key to the "O" position.
 3. Remove the ignition key and take the remote control away with you.
- Replace any missing or worn warning plates or pictograms immediately.
- Never underestimate or ignore safety regulations.
- Go to an authorised workshop if the safety devices are not working (e.g. dead man's brake, operator's seat etc...)
- Keep the remote control out of the reach of unauthorised personnel and especially children.



3.2.1 - SAFETY WARNINGS

The machine has been designed and constructed according to the current state of the art and technical standards for mowing grass, cutting hedges, maintenance of road verges, slopes, canals, drainage ditches etc... . Observe the laws, dispositions, prescriptions, 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.

If the machine is used for the purposes specified in this manual, manoeuvred with care and maintenance and servicing is carried out carefully and correctly, the machine can provide constant reliability and high performance over time.

3.2.2 SAFETY REQUIREMENTS FOR ROAD TRAVEL

The manufacturer accepts no liability for accidents whilst the machine is being used if the user does not comply with current legislation, directives, recommendations and regulations for machines used for mowing grass, shrubs, the maintenance of roadside verges, slopes, canals, drainage ditches etc...

The machine has been designed to work in normal weather conditions with temperatures between - 10°C and +40°C so it must only work in these environmental conditions.

As regards the mowing on public roads, please refer to the instructions given by the work supervisor as this is a mobile site.

WARNING:



Check that the overall dimensions shown in the technical data comply with the standards that regulate the road travel in the country the machine is used in.

3.2.3 - OPERATION SAFETY

The manufacturer cannot 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, operated and maintained according to the instructions specified in the following manual;
- is not regularly and periodically maintained as indicated, or non-genuine spare parts are used;
- is modified or its equipment is replaced without the written permission of the manufacturer, especially when the efficiency of the safety systems has been reduced or has intentionally been removed;
- is used outside the permitted temperature range;

3.2.4 - SAFETY WHEN USING GRASS MOWING EQUIPMENT

- Before using the machine, remove from the mowing area all stones, sticks, glass, metal wires, bones, branches and any other objects that could be collected and tossed around by the flail rotor or that could damage the mower.
- Avoid obstacles during machine operation. Do not use the machine near steep slopes, unstable terrain or areas in which it could tip over.
- When the machine is being used, be very careful not to let it come into contact with hard



objects such as drain covers, manhole covers, curbs, guard rails, railway tracks etc. This could cause the tools to break and they could be projected at very high speed.

- Whenever wire, cables, chains or other objects become caught in the rotor, stop immediately in order to avoid damage or dangerous situations. Stop the rotation of the cutter, switch off the engine and remove the key. After having put on work gloves, remove any materials that have been caught in the rotor with the aid of pliers or shears.
- Do not continue to use the machine if there vibrations from the flail and/or forestry head that could cause breakages or serious damage. Ascertain the cause of such problem and eliminate it.
- During operation, pay attention to the electrical cables, especially if you need to pass under them, as you could lose the radio signal. In this case the machine immediately switches off the engine and stops.
- Before raising/lowering the equipment with the raiser, make sure nobody is within ten meters of the machine.

DANGER:



**Do not try to free the rotor by making it turn in a counterclockwise direction.
Danger of projection of materials.**

WARNING:



If you are using other equipment, refer to the manual of that equipment.

3.2.5 SAFETY REQUIREMENTS FOR THE HYDRAULIC SYSTEM

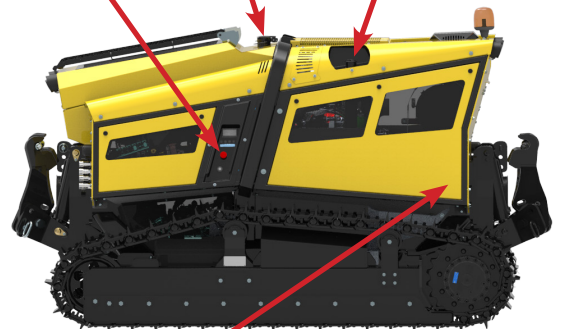
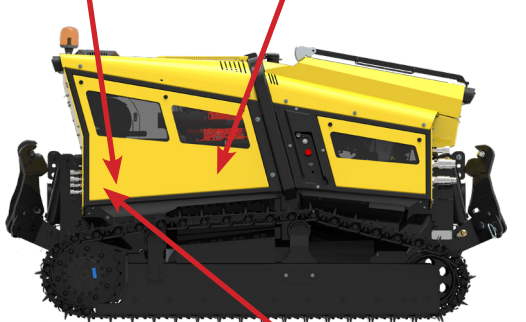
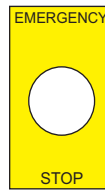
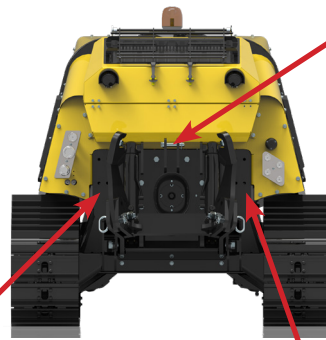
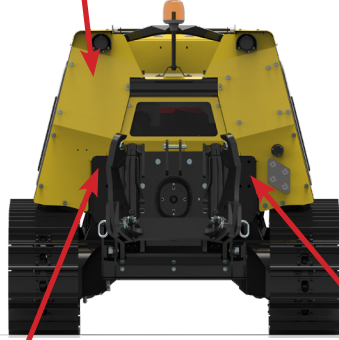
- Stop immediately if you notice oil leaks.
- Periodically check hoses. If they are worn, contact McConnell Parts to obtain replacements.
- Before working on the system lay the head on the ground (or any other mounted equipment) and turn off the engine.
- Oils and greases must be disposed of according to anti-pollution standards.

CAUTION:

- **Do not look for oil leakages with your bare hands or other parts of your body. Use paper or rags to identify the leak.**
- **Always wear waterproof gloves and safety goggles.**
- **Wait for the oil to cool down before performing any work.**
- **Bleed out the oil pressure before disconnecting pipes or during maintenance of the system.**
- **High pressure oil could penetrate the skin and cause serious infections. If this happens, see a physician immediately.**
- **These operations must be performed by authorised personnel.**



3.2.6 - LOCATION OF THE SAFETY PLATES





3.2.7 - DESCRIPTION OF THE SAFETY PLATES

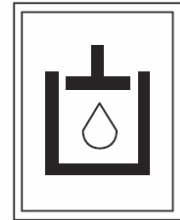
Rotating tools hazard warning. Never place bare hands or feet within their range of action.

Flying objects hazard warning: this indicates the possibility that stones or other objects may be thrown clear of the machine, and requires bystanders to stay out of its radius of operation.

Crushing or shearing hazard warning: Do not insert limbs in the moving parts of the machine where this symbol is affixed.



Hydraulic oil tank.



Fuel tank.



Hazards associated with the battery:

- Keep flames, lighted matches and sparks away from the battery. Battery gas can explode.
- Do not check the charge of the battery by connecting the two poles with a metal object. Use an acidimeter or a voltmeter.
- Do not charge a frozen battery. Explosion hazard! Warm the battery to 16°C (60°F).
- Danger of electric shock
- Danger of corrosion





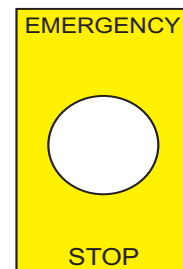
Hazard warning signs: moving parts

Contact with rotating parts may cause serious accidents. Avoid wearing work clothes with belts, flaps or parts that could act as hooks. In particular, reference is made to the presence of the cardan shaft; do not get close and wait for it to come to a standstill and the three phase motor has been stopped.

Hooks to lift the machine.

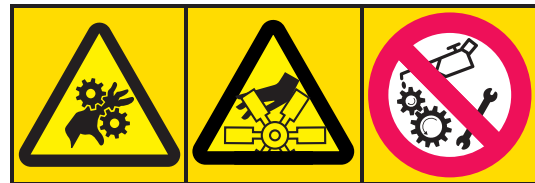


Emergency stop button.



Moving parts danger warning signs: indicates the presence of moving mechanical parts.

Do not lubricate: indicates that it is strictly forbidden to lubricate moving parts and that the engine must be switched off.



Hot parts warning sign: indicates the present of hot parts, such as exhaust pipes or casings. Do not touch the areas around the sign.



Personal Protective Equipment (PPE):

All operators and personnel should be provided with appropriate PPE.





3.2.8 - PRECAUTIONS CONCERNING THE EQUIPMENT

- When optional equipment is installed and used, carefully read the relative manual and abide strictly by the instructions it contains.
- Do not use optional or special equipment without being authorised to do so in writing by McConnell Limited.
- Fitting and using equipment that has not been authorized by McConnell could cause safety problems and damaging effects both for operations and the life of the machine.
- All damage, accidents or reduction in machine efficiency deriving from the application and use of non authorised equipment does not involve McConnell's liability.

3.3 - GENERAL SAFETY RULES

3.3.1 - CARE AND MAINTENANCE

The cause of many damages and accidents can be attributed to mistakes or lack of maintenance, such as:

- Lack of oil, grease and anti-freeze.
 - Lack of cleaning
 - Failure in the hydraulic system (damaged hoses, loose screws, etc.).
- Carry out maintenance works carefully as they are also important for your own safety.
 - Never put off repairs.
 - Assign only specialised or authorised personnel to carry out repairs.
 - Always follow the safety instructions given below, even when you are fully familiar with all the controls.
1. Adapt the speed to the conditions of the travel path.
 2. Before beginning work, check that all the movements of the protective devices are functioning properly.
 3. Check that the emergency stop devices are in perfect working order (on the remote control and the fuse box).
 4. Continually make sure that there are no people in the machine danger area (they must stay more than 100 m away). Shout an alert, sound your horn to warn people and stop work if these people do not leave the danger area.
 5. Do not allow anyone to climb onto the machine.
 6. Do not use the machine to lift persons.
 7. Never leave the operating position when the machine is on.
 8. If for some reason the rotor of the equipment begins to shake, stop the machine **immediately** and reestablish balance, McConnell declines all liability towards people and things due to the operator's non compliance.
 9. Clean the machine after use. Do not use petrol or solvent-based products to clean the machine.
 10. 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.
 11. Do not operate the equipment if you are unable to see it (behind ridges, round corners of buildings, in tall grass etc...).



WARNING:



- Due to vibrations, regularly check that all screw connections are firmly tightened.
- This check must be carried for the first time after eight hours of operation and repeated at least weekly.

WARNING:



Do not clean electrical parts with water under pressure.

3.3.2 - SAFETY DURING FILLING AND TOPPING UP

- Fuel, oil and some types of anti-freeze are highly flammable.
- Keep away from naked flames.
- Turn off the engine and do not smoke when fuelling up.
- Fuel up only when the engine is off and in a well-ventilated area.
- Do not let unauthorised persons come near.
- During filling, hold the fuel pump pistol or the jerry can and keep them always touching the fuel filler hole until the filling operation is over to avoid sparks due to static electricity.
- When refuelling is complete, tighten the safety caps.
- Do not fill the tank completely. Leave some space in order for the fuel to expand.
- Immediately dry off the fuel that might have spilled out.



3.4 - MAINTENANCE REQUIREMENTS

3.4.1 - WARNING PLATES

Position the machine on a firm and flat surface, rest the equipment on the ground and turn off the engine before performing any maintenance operation. If other persons start the engine and activate the control levers while maintenance works are being carried out, serious injuries or death can result. To avoid these dangers, before carrying out the maintenance, put the remote control in a safe position, remove its battery and hang the warning signs on the machine.



3.4.2 - TOOLS

Use only tools specified by the machine manufacturer. To prevent personal injury discard worn, damaged, poor quality or makeshift tools.

WARNING:



Tools not indicated or modified without authorisation release the manufacturer from any responsibility for damage to persons or property.

3.4.3 - PERSONNEL

The routine maintenance indicated in the manual must be carried out exclusively by authorised and trained personnel. For the maintenance or overhaul of components that are not specified in this manual, contact McConnell.

3.4.4 - WORKS PERFORMED UNDER THE MACHINE

The routine maintenance indicated in the manual must be carried out exclusively by authorised and trained personnel. For the maintenance or overhaul of components that are not specified in this manual, contact McConnell.

DANGER:



- **Do not climb on or get under the machine when it is raised and not properly supported as indicated in the safety standards.**
- **Make sure that you use cables, chains and lifting means appropriate for the load and for the lifting of objects.**

3.4.5 - KEEPING THE MACHINE CLEAN

The routine maintenance indicated in the manual must be carried out exclusively by authorised and trained personnel. For the maintenance or overhaul of components that are not specified in this manual, contact McConnell.

Regularly remove all flammable materials (dry grass and leaves) from the area around the exhaust pipe, engine, battery and all the points in which they can come into contact with oil or fuel and therefore ignite.

- Clean the machine after use. Do not use petrol or solvent-based products to clean the machine.
Do not clean electrical parts with high pressure water.



3.4.6 - PERIODIC REPLACEMENT OF PARTS FUNDAMENTAL FOR SAFETY

Check periodically the following components, important for fire prevention:

- Fuel feed system: fuel delivery and return tubes;
- Hydraulic system: main hydraulic pump delivery tubes;
- Hydraulic system: user tubes from hydraulic cylinder type distributor.

Carefully check the state of efficiency and cleanliness of the quick fit connectors the machine is fitted with.

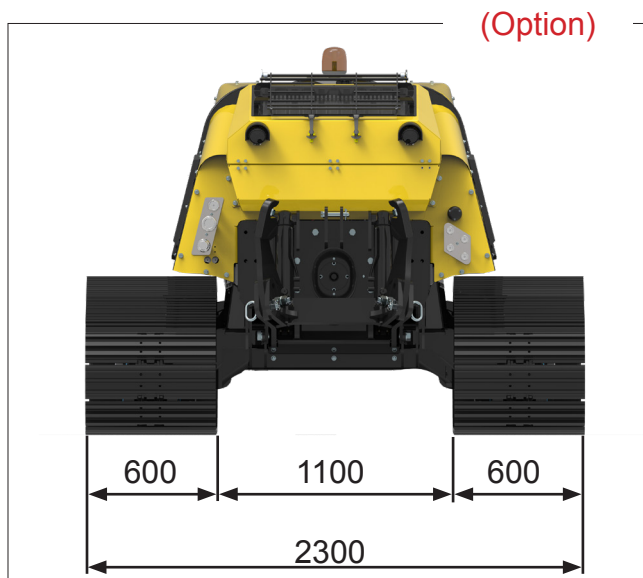
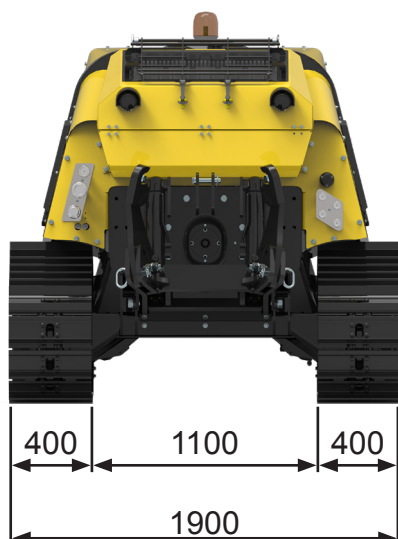
Even if they appear to be in good condition, these components have to be periodically replaced with new ones. These components tend to deteriorate with time. If one of these parts is defective, replace or repair it even if it is still not scheduled to be replaced.



4 - TECHNICAL DATA

4.1 - TECHNICAL CHARACTERISTICS

DIMENSIONS





WEIGHT

The total mass of the RoboPOWER machine (with rubber tracks and without equipment) is 4900 Kg.

ENGINE TYPES

Make	JOHN DEERE	Type	4045HFC93
No. of cylinders	4	Displacement:	4525 cc
Power	129 KW / 173 CV	Peak torque	645 Nm @ 1600 rpm
Cooling	Liquid	Air filte	Dry
Exhaust gas standard	USA	EPA Tier 4i	
	EU	Stage IIIB	

Make	DEUTZ	Type	TCD 2012 L04 2V
No. of cylinders	4	Displacement:	4038 cc
Power	104 kW / 140 CV	Peak torque	520 Nm @ 1600 rpm
Cooling	Liquid	Air filte	Dry
Exhaust gas standard	USA	EPA Tier 3	
	EU	Stage IIIA	

ELECTRICAL SYSTEM

Operating voltage 12 VDC
 Alternator 150 A
 Battery 180 Ah

HYDRAULIC SYSTEM

Circuit	Pump type	No.	Maximum capacity	
			l/min.	Bar
Translation:	Variable displacement pistons in closed circuit	2	100 each	420
Front PTO	Variable displacement pistons in closed circuit	1	160	350
Rear PTO	Variable displacement pistons type in closed circuit	1	160	350
Services	Gear pump	1	35	180
Fan Drive	Gear pump	1	35	180

TRANSFER SPEED

Speed	Forwards		Reverse	
	1 (Slow)	2 (Fast)	1 (Slow)	2 (Fast)
Km/h @ 2200 rpm	4.4	8.8	4.4	8.8



WARNING:



If the machine is fitted with iron tracks you are advised **ON Y** to work in first gear otherwise you risk damaging the track

TRACKS

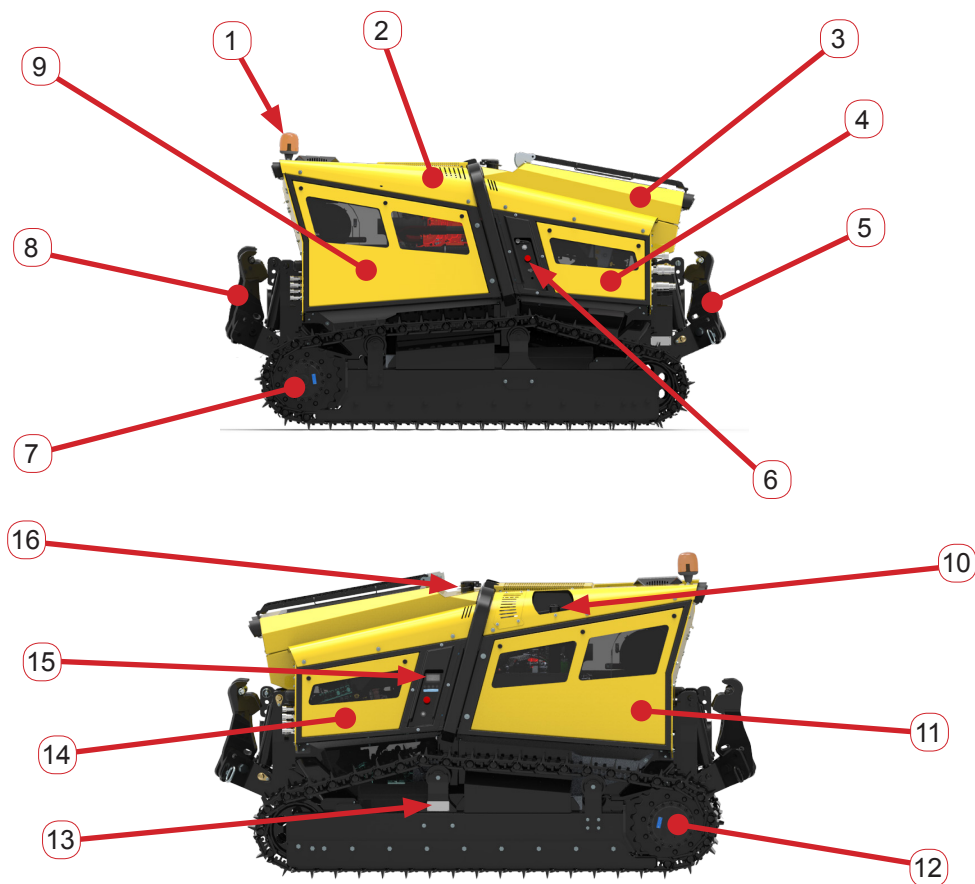
Type	Width (mm)	Cup weight/single track (kg)
Rubber	400	270 / 135
Steel	400	855 / 427.5
	600	1053 / 526.5

SUPPLIES

	Quantity			
Engine oil	JOHN DEERE 4045HFC93	20.5 L	DEUTZ TCD 2012 L04 2V	11 L
Diesel tank capacity	135 L			
Hydraulic oil tank capacity	100 L			



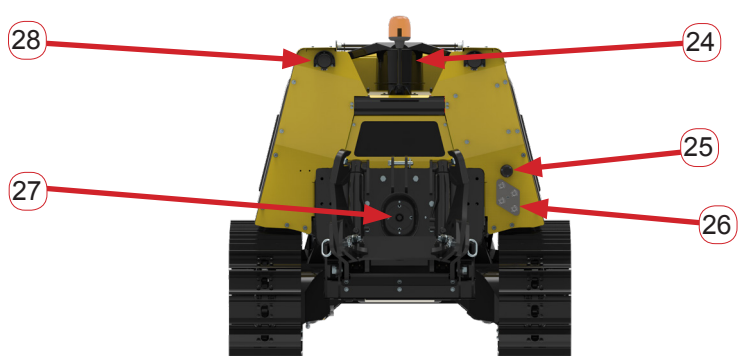
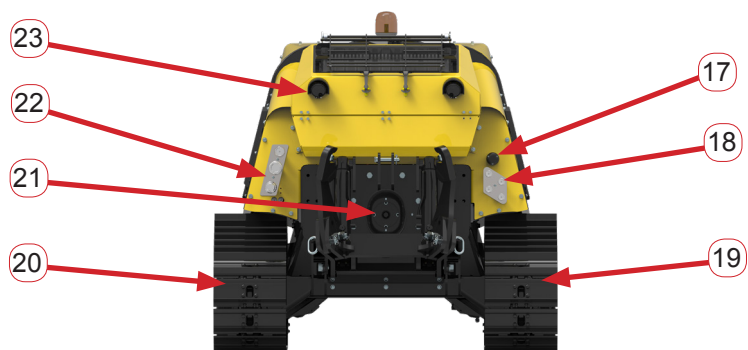
4.2 - MACHINE NOMENCLATURE



Pos.	Description	Pos.	Description
1	Rotating beacon	9	Right-hand rear panel
2	Bonnet	10	Diesel filling
3	Radiator casing	11	Left-hand rear panel
4	Right-hand front panel	12	Left hand side wheel drive
5	Front lifting device	13	Machine plate
6	Emergency mushroom-headed switch	14	Left-hand front panel
7	Right-hand drive wheel	15	Trouble shooting display
8	Rear raiser	16	Silencer



McCONNEL ROBOPower



Pos.	Description	Pos.	Description
17	Front electric socket	23	Front auxiliary headlights
18	Front services quick fit connectors	24	Air filter
19	Left track	25	Rear electric socket
20	Right track	26	Rear services quick fit connectors
21	Front PTO	27	Rear PTO
22	Rapid milling machine connectors	28	Front auxiliary headlights



5 - TERMINOLOGY

5.1 - DEFINITION OF THE TERMS USED

OPERATOR

Personnel trained to manoeuvre the machine when in operation, to move it and carry out normal machine inspection and cleaning.

They must not have health problems.

SPECIALISED OR MAINTENANCE PERSONNEL

Personnel trained to carry out ordinary maintenance, mounting, disassembly and reassembly of some machine components.

They must not have health problems.

AUTHORISED PERSONNEL

Personnel trained to carry out operations of extraordinary maintenance, mounting, disassembly and reassembly of particular machine components.

They must be authorised in writing by McConnell to intervene on the machine.

They must not have health problems and they must be properly trained.

OPERATOR ASSISTANT

Personnel trained to assist the operator with certain machine manoeuvres (manoeuvres on worksites with reduced visibility, loading and unloading from vehicles, using the manual pump etc.) and assists the activities on a mobile worksite (public road verge maintenance).

Must know the main work safety requirements.

AUTHORISED REPAIR WORKSHOP

Repair workshop with personnel trained to carry out extraordinary maintenance, mounting, disassembly and reassembly of specific machine components.

Must be authorised in writing by McConnell Limited to intervene on the machine.

The operator is asked to refer to standard UNI EN 12100-2010, for the definition of the other terms in this manual.



6 - USE OF MACHINE

6.1 - PRELIMINARY CHECKS

The operator must check that the machine has been supplied with the:

- Machine and equipment user manual
- Inspection log / coupons booklet
- Registration certificate (if requested)
- Third party liability insurance policy (if requested)
- Three-phase motor;
- Technical appendix;

If the machine is resold as a “second hand” machine, the customer / user must provide the purchaser with the complete use and maintenance manual as well as the inspection log book.

6.2 - CHECKS TO PERFORM AT THE START OF EACH WORKING DAY

Carry out an external inspection of the machine (joints, hoses, hydraulic components, etc.) and check for any leaks of oil or other liquids.

Check the rubber hoses and make sure there are no cuts, holes, wear, leaks etc.

CAUTION:

**Do not look for oil leakages with your bare hands or other parts of your body. Use paper or rags to identify the leak.
Always wear waterproof gloves and safety goggles.**



6.2.1 - CHECKING THE CHROME-PLATED PARTS

Inspect the chrome-plated parts of the machine (cylinders) and make sure that they are not scored or damaged. In the case of damage, replace.

6.2.2 - CHECKING THE SAFETY DEVICES

Verify that the safety devices installed on the machine (micro on seat and on the lever, horn, beacon, lights) work properly.

WARNING:



In case one or more of the parts listed above malfunction or break; do not use the machine and contact specialised personnel and report the problem.



6.2.3 - TECHNICAL DOCUMENTATION AND REMOTE CONTROL BOX

The remote control equipment and the technical documentation are kept in a box that is provided with the machine. The technical documentation is an integral part of the machine, it must be kept and looked after carefully, it must accompany the machine so that it is always available to the operator.

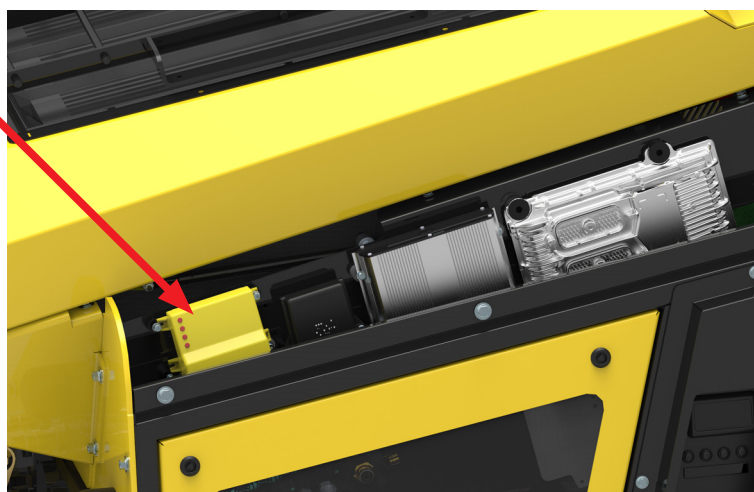
RoboPOWER can be equipped with two types of remote control:

1. AYTEC;
2. SCANRECO.

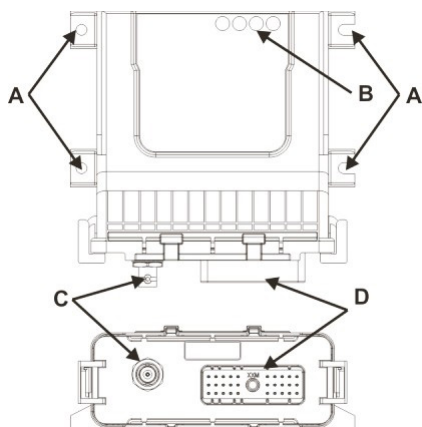


6.3 - AYTEC RECEIVER UNIT

The receiver unit is in the front right-hand side section of where all the control units are positioned



6.3.1 - DESCRIPTION OF THE AYTEC RECEIVER UNIT



A	Fastening holes
B	LED
C	Aerial connector
D	Plug



6.3.2 - AUTECH RECEIVER UNIT IDENTIFICATION PLATE

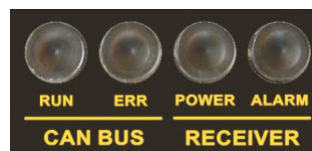
The following plates are on the receiver unit:

Plate	Position	Information contained
Remote control unit identification plate	This is found on the casing of the receiver unit on the connectors side:	The serial number of the remote control, a bar code and the year of manufacturer.
Rating plate	This is found on the left-hand side of the casing.	The MODEL, TYPE and main technical data of the receiver, the markings and any remote control trademarks.

6.3.3 - AUTECH RECEIVER UNIT BACKLIT SIGNS

The remote control unit feature four LEDs:

- RUN green
- ERR red
- POWER green
- ALARM red



RUN LED (GREEN)

The RUN LED indicates the status of the remote control's communication status with the CAN network Master node.

RUN LED	
SIGNAL	MEANING
Off	The remote control unit as a node in the CAN network is off.
Flashing	The remote control unit is not sending commands to the CAN network.
Access	The remote control unit as a node in the CAN network is working properly.

ERR LED (RED)

The ERR LED indicates the status of the CAN communication.

ERR LED	
SIGNAL	MEANING
Off	The CAN communication is working properly.
Flashing	The CAN communication is not working properly.
Access	No CAN communication.



POWER LED (GREEN)

The POWER LED indicates the status of the receiver unit and the radio-electric connection.

POWER LED	
SIGNAL	MEANING
Off	The receiving unit is off.
Flashing	The receiving unit is powered up and there is no radio-electric connection.
Access	The receiving unit is powered up and there is a radio-electric connection.

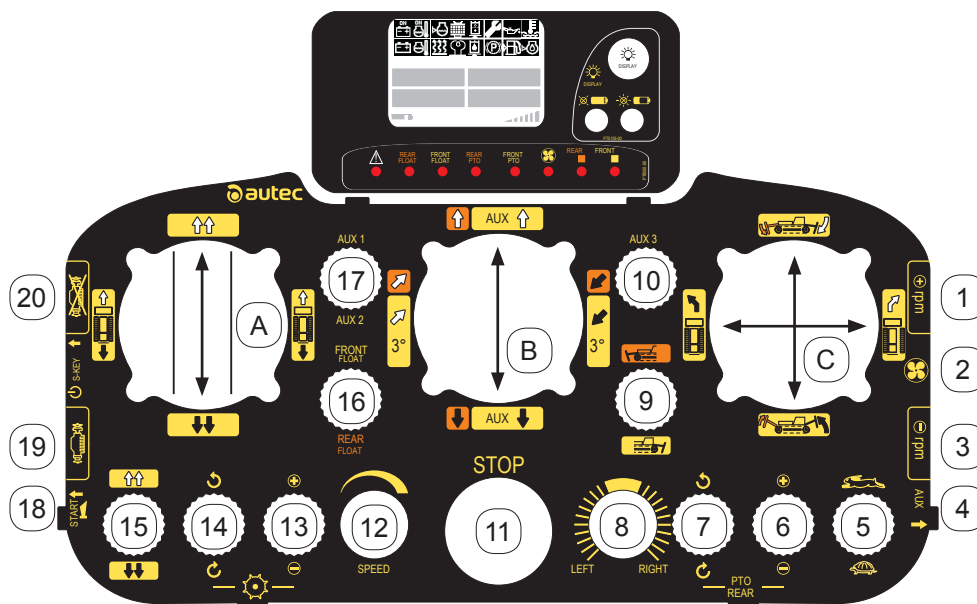
ALARM LED (RED)

The ALARM LED indicates faults in the receiver unit.

ALARM LED	
SIGNAL	MEANING
Off	The receiver unit is working properly
Flashes once	The receiving unit is powered up and there is no radio-electric connection
Flashes twice	The receiving unit is powered up and there is a radio-electric connection
Flashes three times	There is an error on the outputs relative to the direction commands.
Access	The receiver unit is not working properly



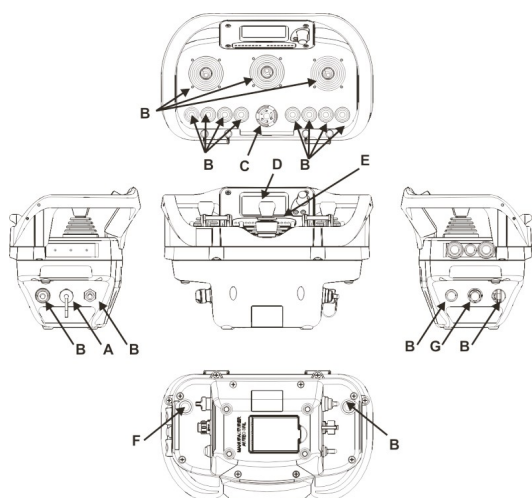
6.4 - AUTEC REMOTE CONTROL



AUTEC REMOTE CONTROL	
A	Forward movement/ backward movement joystick
B	Equipment function joystick (front / rear quick fit)
C	Steering / equipment lifting joystick
1	Diesel engine rpm speed increase button
2	Fan rotation reversal button
3	Diesel engine rpm speed decrease button
4	Auxiliary service button
5	Speed selector switch
6	Rear PTO rpm increase / decrease selector switch
7	Rear PTO clockwise / anti clockwise rotation selector switch
8	Right / left direction corrector potentiometer
9	Front /rear raiser selector switch.
10	Auxiliary service selector switch
11	Emergency button
12	Speed of progress regulation potentiometer
13	Front PTO rpm increase / decrease selector switch
14	Rear PTO clockwise / anti clockwise rotation selector switch
15	Manoeuvre progress reversal selector switch
16	Front /rear floating unit selector switch.
17	Auxiliary service selector switch
18	Remote control - receiver unit connection search button
19	Engine ignition button
20	Engine power down button



6.4.1 - DESCRIPTION OF THE AUTEC REMOTE CONTROL



A	Connector for wire command (if present)
B	Actuators (joystick, selector switches, buttons)
C	Emergency Stop Button
D	Display or LED (if present)
E	LED
F	ENTER button
G	S-KEY (electronic ignition key)



S-KEY

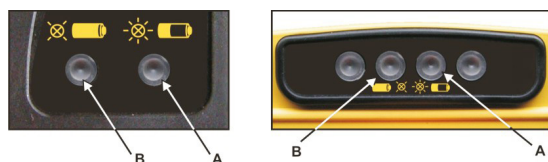
6.4.2 - THE AUTEC REMOTE CONTROL PLATES

The following plates are present in the transmitter unit.

Plate	Position	Information contained
Remote control unit identification plate	This is found in the S-KEY: to read it extract the S-KEY.	The serial number (S/N) of the remote control
The transmitter unit identification plate	This is to be found in the battery housing, take the battery out to read it.	The year of manufacture, the battery code and the identification number of the transmitter unit (TU ID)
Rating plate	This is to be found in the battery housing, take the battery out to read it.	The MODEL, TYPE and main technical data of the transmitter unit, the markings and any remote control trademarks.

6.4.3 - AUTEC REMOTE CONTROL UNIT BACKLIT SIGNS

The transmitter unit may feature two or four LEDs.



A	Red LED (a)
B	Green LED

In both cases there is always a green LED and a red LED that give information concerning the remote control.

In the 4 LED version, the side LEDs are red and give data coming from the machine (Data Feedback Function).

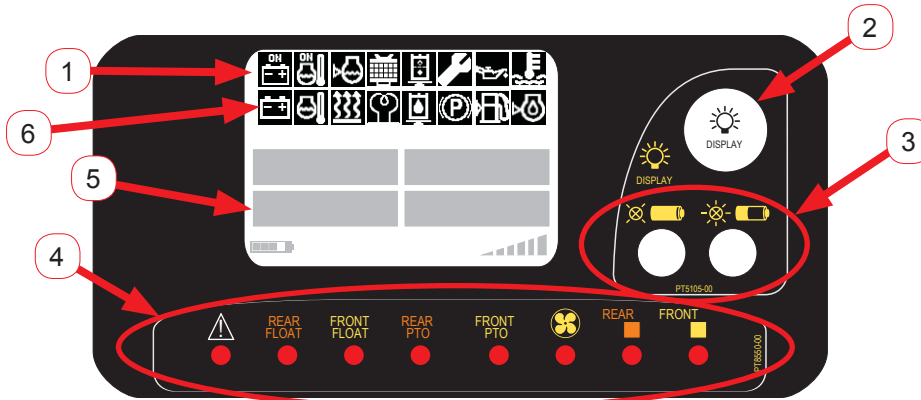


GREEN LED	
SIGNAL	MEANING
Off	The transmitting unit is off.
Flashes quickly	The transmitting unit is on and there is no radio-electric connection.
Flashes slowly	The remote control is activated with a radio-electric connection present.

RED LED ^(a)	
SIGNAL	MEANING
Off	The transmitter unit is working properly.
Flashing	The battery is running down.
On for 2 seconds ^(b)	The transmitter unit is not working properly
Flashes once ^(b)	When the transmitter unit lights up, it shows that the STOP button is active or it is broken.
Flashes twice ^(b)	When the transmitter unit lights up, it shows that a digital command or SAFETY command is active or it is broken.
Flashes three times ^(b)	When the transmitter unit lights up it shows that the battery is dead.
Flashes four times ^(b)	When the transmitter unit lights up, it shows that an analogue command is active or it is broken.

















(a) -When the red LED comes on it is accompanied by a beep.
 (b) -The signal is followed by the transmitter unit turning off.

6.4.4 - AUTEK REMOTE CONTROL DISPLAY WARNING LIGHTS



1	Primary icons
2	Display button
3	Check warning lights
4	On/Off service warning lights
5	Machine command replica
6	Secondary icons



SYMBOL	MEANING	SYMBOL	MEANING
	Battery (alternator) voltage problems		Engine oil pressure
	Glow plugs		Fuel reserve
	Emergency		Coolant temperature
	Air filter		Battery voltage threshold exceeded high battery voltage
	Hydraulic oil filter		Low coolant level
	Hydraulic oil level		Engine coolant temperature exceeds the maximum limit (Engine shut down)
	Maintenance		High engine coolant temperature
	Park		Low engine oil level

6.4.5 - SUBSTITUTION OF THE AUTEC REMOTE CONTROL (IMPRINTING)

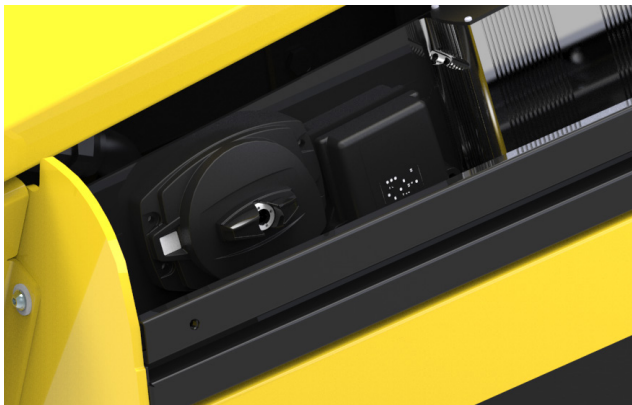
The address of the remote control is stored on the internal receiver board in the transmitter unit. The substitution of the remote control (or the central unit) makes the updating of this code necessary to be able to resume functioning. This operation called "IMPRINTING" is performed as listed below:

3. Remove the battery from the new remote control;
4. Press the emergency button (11) of the new remote control;
5. Remove the S-Key from the old remote control and insert it in the new remote control;
6. Insert the battery in the new remote control;
7. Press the START button (18) and hold it down until the green LED goes off.
8. Release the emergency button (18);
9. Connect the RoboPOWER;

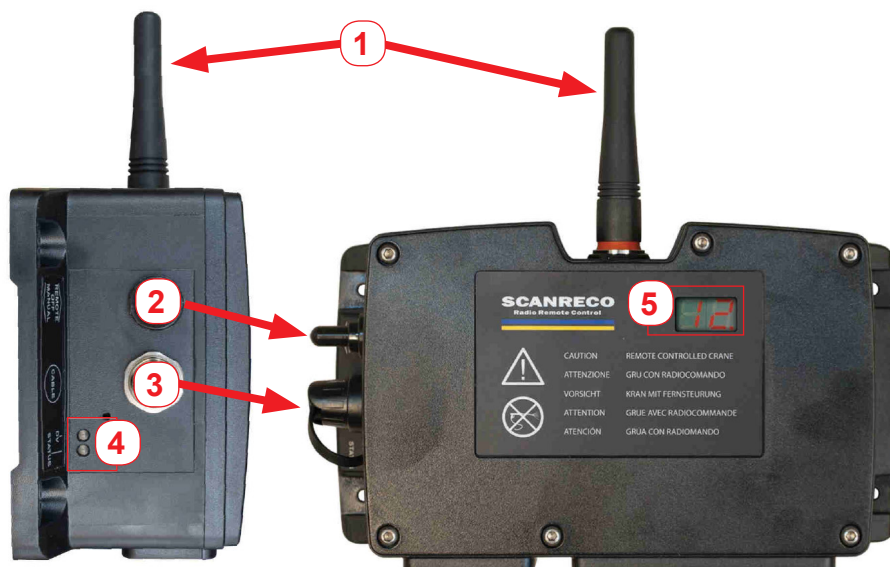


6.5 - SCANRECO RECEIVER UNIT

The receiver unit is in the front right-hand side section of where all the control units are positioned



6.5.1 - DESCRIPTION OF THE SCANRECO RECEIVER UNIT



6.5.2 - OPERATING STATUSES OF THE SCANRECO RECEIVER UNIT

The receiver unit uses the LED STATUS and DV to indicate the functioning status and the alarms.

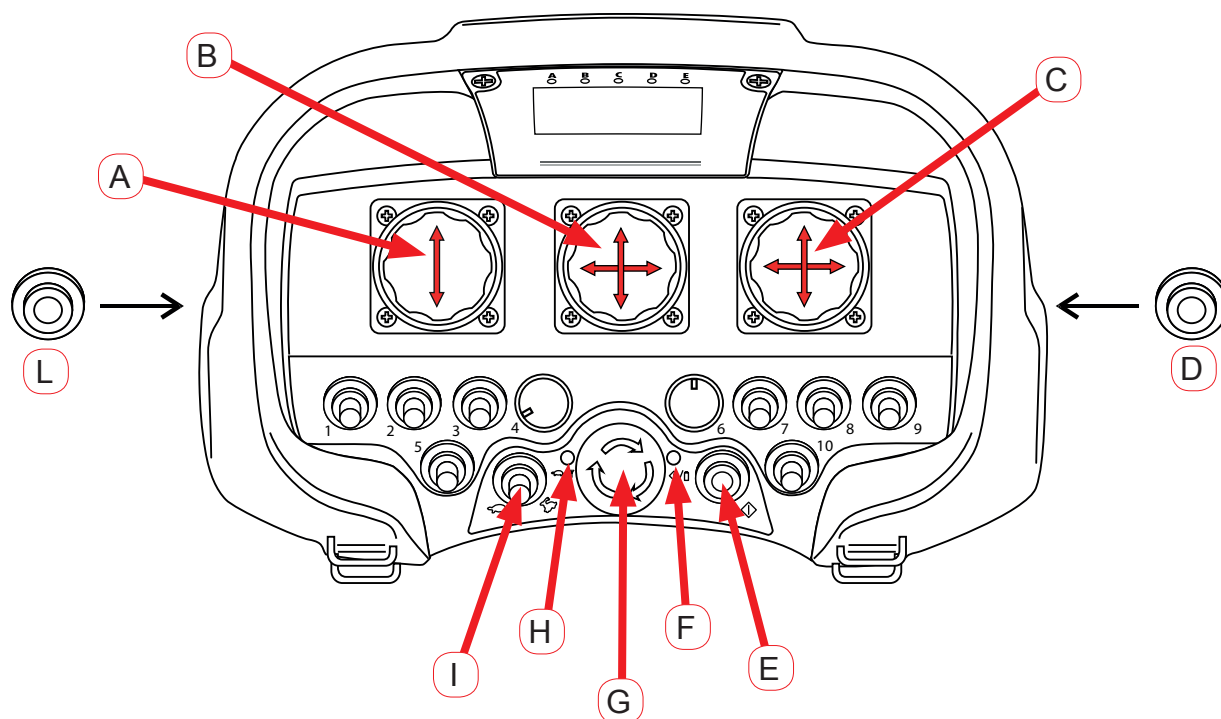
- **LED STATUS RED ON:** the central unit is on in stand-by mode (awaiting connection with the button pad).
- **LED STATUS GREEN ON:** the central unit is on in operational mode (connection with the button pad effected).

The DV LED is used to indicate the safety solenoid (DV) command output status.

- **LED DV RED ON:** indicates that the DV output is active.



6.6 - SCANRECO REMOTE CONTROL



SCANRECO FUNCTIONS

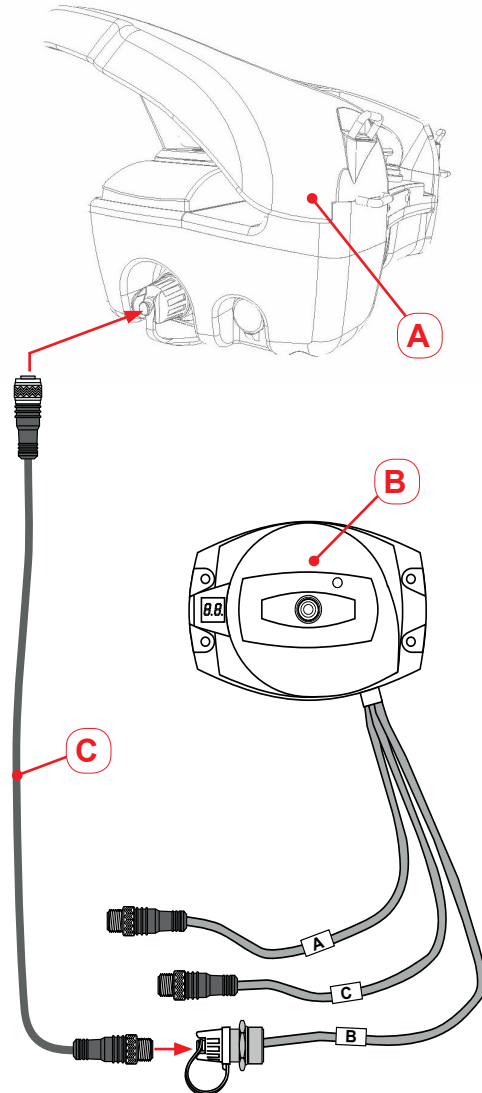
A	Track activation joystick for movement (front/back)
B	Hydraulic grip activation joystick (front/back)
C	Activation joystick <ul style="list-style-type: none"> • Tracks for steering (right/left) • Front/rear raiser activation (raising/lowering)
D	Gear change command
E	Remote control receiver unit /horn connection button
F	Battery charge status warning light
G	Emergency button
H	Movement warning light on
I	Transfer movement selection
L	Reversible fan
1	Raiser floating unit button
2	Front PTO activation button
3	Front PTO RPM increase
4	Potentiometer for controlling speed of progress
5	Diesel engine start/stop button
6	BIOS steering adjustment control
7	Rear PTO activation button
8	Progress command inversion
9	Option
10	Diesel engine rpm speed increase button



6.6.1 - SUBSTITUTION OF THE SCANRECO REMOTE CONTROL (IMPRINTING)

The address of the remote control is stored on the internal receiver board in the transmitter unit. The substitution of the remote control (or the central unit) makes the updating of this code necessary to be able to resume functioning. This operation called "imprinting" is carried out as listed below using the cable provided with the machine (C):

1. Remove the battery from the remote control. Connect the serial cable (C) between the remote control (A) and the control unit (B).
2. Press the emergency button (G) on the button pad and turn off the central unit (move the ignition key to "OFF"). The indicator lights on the remote control unit and main unit must be off.
3. Turn on the central unit (turn the ignition key) and release the emergency button on the button pad.
4. Keep the ON/SIGNAL button pressed for approximately 10 seconds (the red indicator light on the remote control unit turns on and short repeated audible signals are emitted to indicate that programming is in progress. The internal display on the main unit displays "Po" and "Id" in sequence).
5. When the program has finished, the remote control unit turns off and goes back to standby mode.
6. Leave the cable connected and turn the remote control unit on again. If the procedure has been successful, the display inside the receiver unit will read "1".



Note: If the remote control unit is fitted with a graphics display, after the second time it is turned on, it may be necessary to wait a minute or two while the display configuration is loaded. In this case, during the loading procedure, messages are shown on the display that indicate the state of progress, while the display of the receiver continues to change.

When loading is complete, the display of the receiver will indicate "1-".

7. Disconnect the cable, put the battery in and test the remote control.
8. If it doesn't work, repeat the procedure.



6.7 - OPERATIONS

WARNING:



- Before starting up the machine, the information and safety instructions contained in the user manual must be read and understood.
- Professional operators must be instructed and trained.
- Familiarise yourself with the controls before starting operation.

DANGER:



- DO not take drugs or drink alcohol before or while using the machine and tools. The use of drugs and alcohol or being in a non-optimal psycho-physical condition can affect responsiveness and coordination, and therefore, impair the capability to use the equipment safely.
- Before using the machine or equipment, the operator who usually takes medicines must consult a physician as regards the side effects of the drug that might impair the ability to use the equipment safely.
- NEVER consciously allow anyone to use the machine when their attention or coordination is compromised.
- This could result in serious injuries or death of the operator or third parties if the operator is under the influence of drugs or alcohol

6.7.1 - STARTING THE DIESEL ENGINE

- Observe safety instructions.
- Start the machine only outdoors, never indoors, otherwise you could be poisoned by exhaust fumes.
- Check the level of diesel and fill up if necessary.
- Deactivate RoboPOWER's emergency button by turning the mushroom head
- Enable ignition by turning the ignition key towards the right. Wait a few seconds for the check of the active functions, continue with the ignition through:
 1. Key in the machine
 2. Remote control

WARNING:



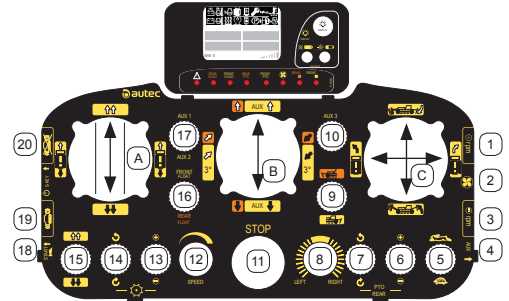
If the engine is started using the key it is no longer possible to connect with the remote control!



Starting up of the diesel engine - Autec

1. Activate the remote control by turning the emergency button (11) clockwise;
2. Enable the connection between the remote control and receiver unit by pressing the button (18);
3. You will hear an auditory signal (horn) of confirmation the connection has been made;
4. Press the engine ignition button (19) and the engine will start up.
5. Increase the number of rpms by pressing the button (1).

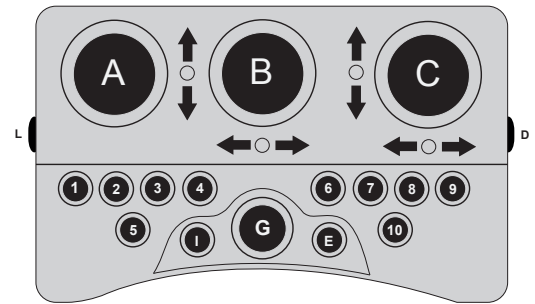
When the engine is turned off, care must be taken to reduce the number rpms by means of the button (3) leaving it in this condition for at least 30 seconds before commanding the shut off by pressing the button (20).



Starting up of the diesel engine - SCANRECO

1. Activate the remote control by turning the emergency button (G) clockwise;
2. Enable the connection between the remote control and receiver unit by pressing the button (E);
3. You will hear an auditory signal (horn) of confirmation the connection has been made;
4. Press the engine ignition button (5) and the engine will start up.
5. Increase the number of rpms by pressing the button (10).

When the engine is turned off, care must be taken to reduce the number rpms by means of the button (10) leaving it in this condition for at least 30 seconds before commanding the shut off by pressing the button (5).



WARNING:



- The starter motor must only be operated continuously for a maximum of 30 seconds.
- Trying to start the engine for too long will damage the starter motor.
- Burnt out starter motors are not covered by the warranty.

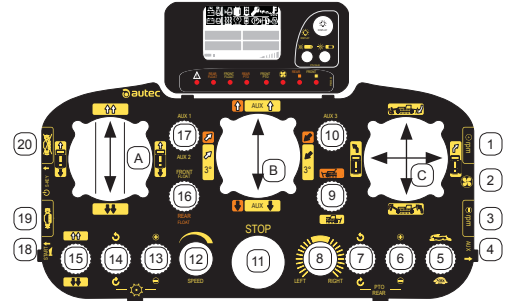


6.7.2 - STOPPING THE DIESEL ENGINE

Stopping the diesel engine - Autec

Do the following to stop the engine:

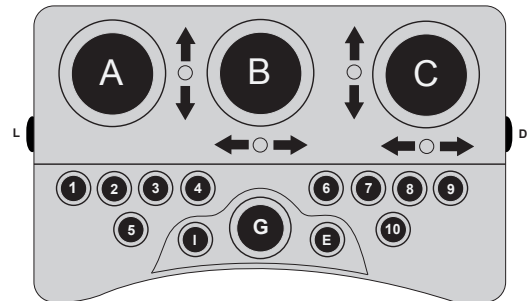
- Lower the number of rpms by pressing the button (3).
- Press the “ENGINE STOP” button (20);
- Press the emergency button (11);
- Turn the key to OFF.



Stopping the diesel engine - SANRECO

Do the following to stop the engine:

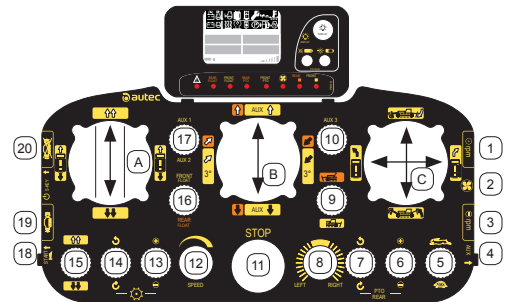
- Lower the number of rpms by pressing the button (10).
- Press the “ENGINE STOP” button (5);
- Press the emergency button (G);
- Turn the key to OFF.



6.7.3 - STOPPING THE DIESEL ENGINE IN AN EMERGENCY

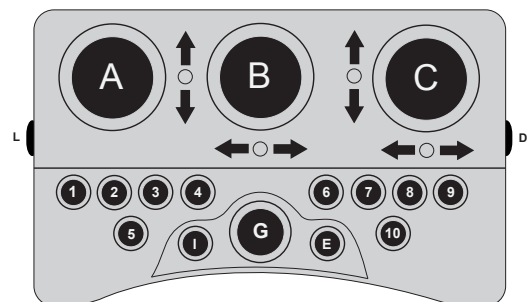
6.7.3 - Stopping the diesel engine in an emergency - AUTEC

1. In an emergency press the emergency button (11) on the remote control.
2. The diesel engine will continue to run at idle speed and all operational functions will be cancelled.
3. Turn the key to OFF.



Stopping the diesel engine in an emergency - SANRECO

1. In an emergency press the emergency button (G) on the remote control.
2. The diesel engine will continue to run at idle speed and all operational functions will be cancelled.
3. Turn the key to OFF.

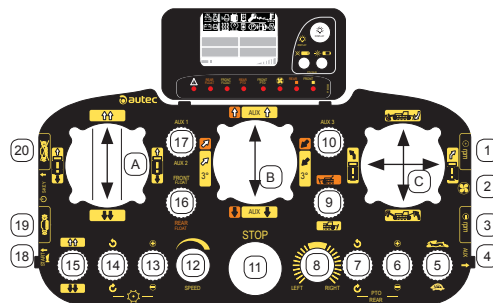




6.7.4 - SLOW/FAST MOVEMENT SELECTION

Slow / fast movement selection - AUTEK

By moving selector switch (5) upwards fast is engaged, by moving it downwards slow is engaged.

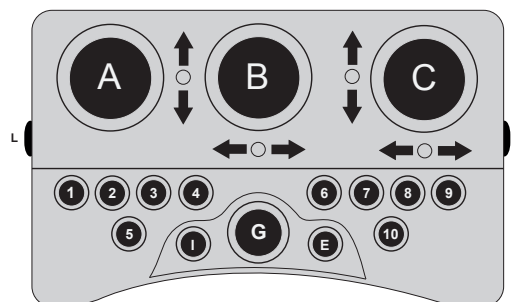


Slow / fast movement selection - SANRECO

By moving selector switch (1) upwards fast is engaged, by moving it downwards slow is engaged.

WARNING:

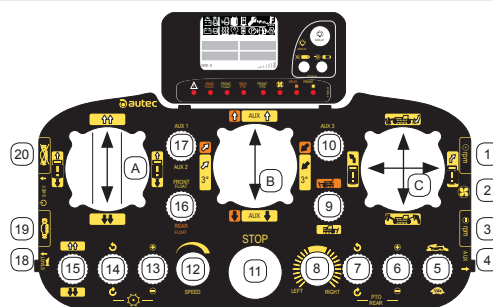
Every time the machine is switched off, "slow" is automatically engaged.



6.7.5 - THE MACHINE'S PROGRESS

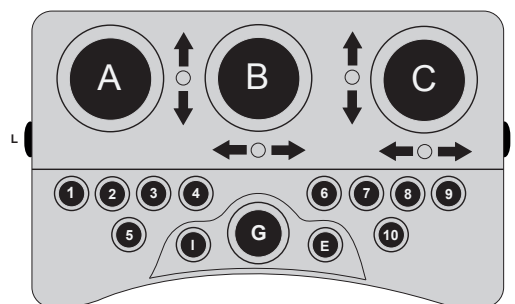
Machine progress - AUTEK

To move the machine forwards and backwards move the left hand side joystick (A) forwards and backwards. It is a proportional control so the more you move the joystick the faster the machine moves. The top speed that can be achieved will be determined by the potentiometer position (12) and the speed selected (5).



Machine progress - SANRECO

To move the machine forwards and backwards move the left hand side joystick (A) forwards and backwards. It is a proportional control so the more you move the joystick the faster the machine moves. The top speed that can be achieved will be determined by the potentiometer position (4) and the speed selected (I).

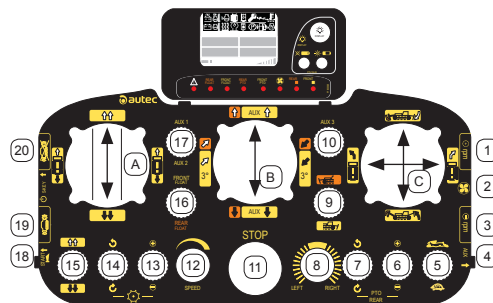




6.7.6 - SPEED ADJUSTMENT POTENTIOMETER

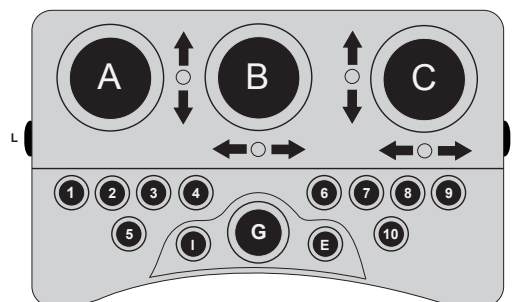
Speed potentiometer - AUTEK

The potentiometer (12) regulates the maximum speed of the machine from 0 to 100%. The potentiometer setting chosen will depend on the various work conditions that the operator will come across and should always ensure maximum control over the machine.



Speed potentiometer - SCANRECO

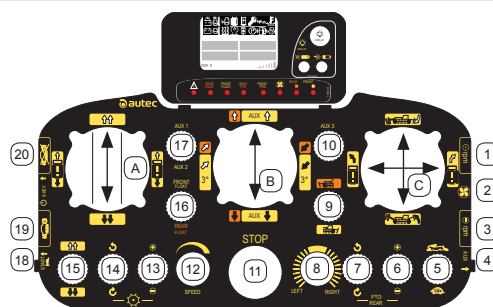
The potentiometer (4) regulates the maximum speed of the machine from 0 to 100%. The potentiometer setting chosen will depend on the various work conditions that the operator will come across and should always ensure maximum control over the machine.



6.7.7 - STEERING

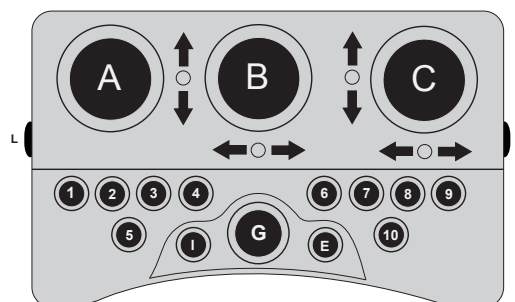
Steering- AUTEK

Machine steering is controlled by the right-hand joystick (C). Move it to the right or left in to steer the machine. Used in combination with the left-hand joystick (A) it makes it possible to steer the machine by 180° (counter-rotation).



Steering- SANRECO

Machine steering is controlled by the right-hand joystick (C) Move it to the right or left in to steer the machine. Used in combination with the left-hand joystick (A) it makes it possible to steer the machine by 180° (counter-rotation).





WARNING:

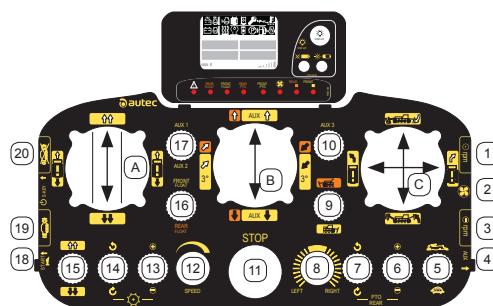


Carry out the steering manoeuvre with the machine on a flat level surface

6.7.8 - STEERING BIAS CONTROL

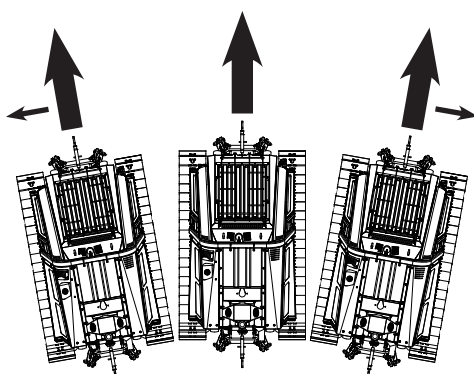
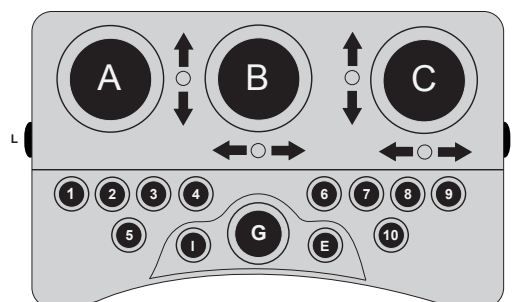
Steering bias control - AUTECH

Potentiometer (H) enables the direction of travel to be compensated when working on steep slopes. Turn the potentiometer to the right or left to correct the path of the machine.



Steering bias control - AUTECH

Potentiometer (H) enables the direction of travel to be adjusted when working on steep slopes. Turn the potentiometer to the right or left to correct the path of the machine.

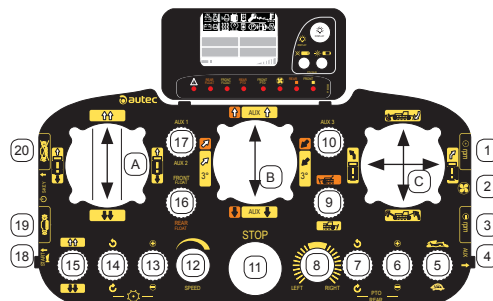




6.7.9 - TRANSLATION COMMAND INVERSION

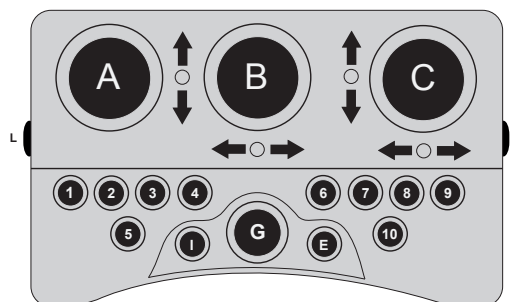
Translation command inversion -AUTEC

If the selector switch (15) is activated the functions of the joystick (A) will be inverted.



Translation command inversion -SCANRECO

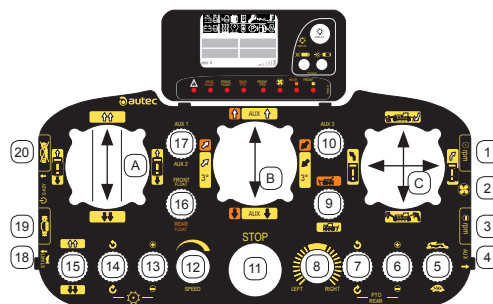
If the selector switch (8) is activated the functions of the joystick (A) will be inverted.



6.7.10 - FRONT/REAR RAISER SELECTOR SWITCH (OPTIONAL)

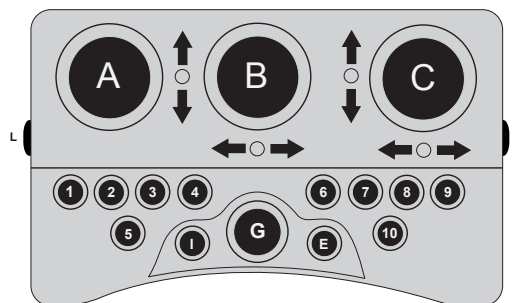
Front/rear raiser selector switch (option) - AUTEC

When selector switch (9) is moved upwards, the front raiser is selected (option), when it is moved downwards the rear raiser is selected.



Front/rear raiser selector switch (option) - SANRECO

When selector switch (D) is moved upwards, the front raiser is selected (option), when it is moved downwards the rear raiser is selected.



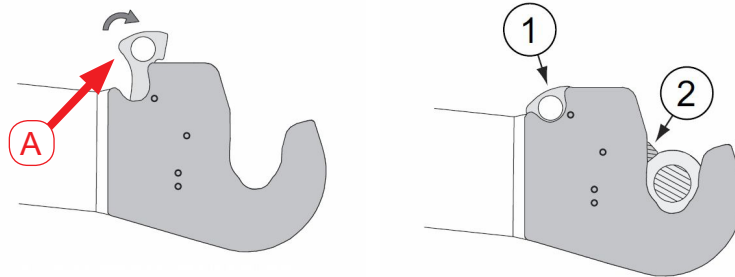


CAUTION:

Depending on the raiser selected the quick fit connectors of the corresponding auxiliary service will be used.

6.7.11 - HOW TO ATTACH EQUIPMENT

The machine can fit two raisers (front/back) with a third point attachment in accordance with ISO 730-1:1994 where it is possible to attach the various pieces of equipment approved. To do this, follow the steps below:



- Start the diesel engine and connect using the remote control (see chapter 6.4.1).
- Lower the raiser as far as possible with the right-hand joystick (C).
- Lift the lever (1) and lock it in position (A) to allow the hooking of the ball joints.
- Slowly move the machine forwards until coupling with the equipment that has been previously placed in front of the machine.
- Slowly lift the raiser until the equipment is properly coupled.
- Lower the lever (1) and ensure that stop (2) is in position.
- Connect the hydraulic service tubes to the quick connectors.

WARNING:



- Read and follow the instructions provided to ensure safety during the use of the equipment moved by the PTO.
- Comply with the indications provided by the equipment manufacturer.
- Use the safety devices prescribed and make sure that they are in good condition.
- Make sure that the equipment is correctly connected and that it does not hit other parts of the machine when raised.

DANGER:



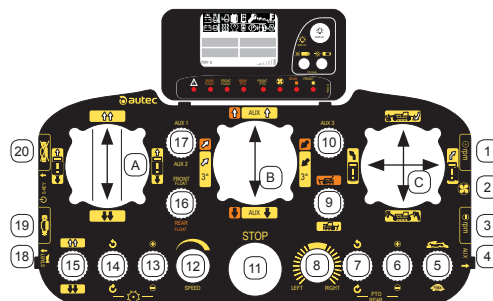
- When coupling or uncoupling equipment, stay at the side of the machine away from the equipment. Do not stand or sit on the equipment or between the machine and the equipment-
- Before connecting the quick fit attachments, the equipment must be connected to the machine mechanically.



6.7.12 - FRONT RAISER (OPTION)

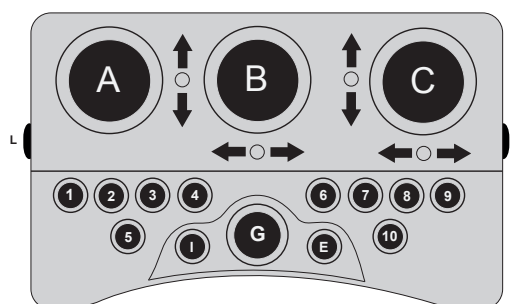
Front raiser (option) - AUTECH

Through the selector switch (9) moved upwards and the right-hand joystick (C) the height of the equipment coupled at the front can be adjusted (see authorised equipment). Move the joystick forwards to lower the equipment, move it backwards to lift it.



Front raiser (option) - SANRECO

The height of the equipment attached to the front of the machine can be adjusted using the right hand side joystick (C) (see authorised equipment). Move the joystick forwards to lower the equipment, move it backwards to lift it.



WARNING:

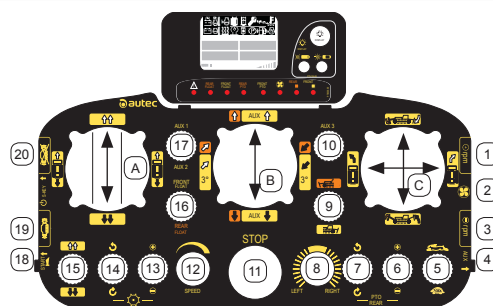


Only work on the raisers with the equipment not in operation.

6.7.13 - REAR RAISER

Rear raiser - AUTECH

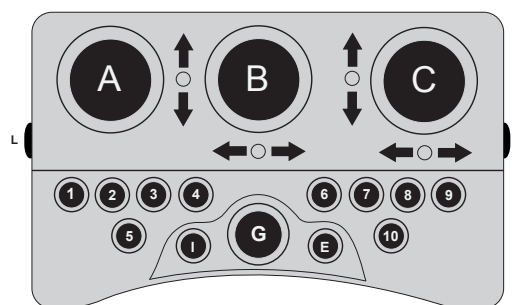
Through the selector switch (9) moved downwards and the right-hand joystick (C) the height of the equipment coupled at the rear can be adjusted (see authorised equipment). Move the joystick forwards to lower the equipment, move it backwards to lift it.





Rear raiser - SCANRECO

The height of the equipment attached to the rear of the machine can be adjusted using the right hand side joystick (C) (see authorised equipment). Move the joystick forwards to lower the equipment, move it backwards to lift it.



WARNING:



Only work on the raisers with the equipment not in operation.

6.7.14 - FRONT MECHANICAL PTO ACTIVATION (OPTIONAL)

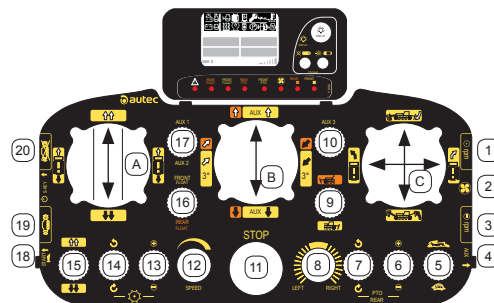
Front mechanical PTO activation (option) -ONLY FOR AUTEC

Front mechanical PTO operation is controlled by selector switches (13) and (14)

Follow the instructions below to start it.

1. Open the lower arms of the raiser attachment using the locking pins. Positioned horizontally, position the pins and fix them with the relative cotter pins;
2. Act with the remote control to lower the arms of the raiser;
3. Couple the equipment on the raiser (see section 6.4.9);
4. Fix the third upper point with the relative arm;
5. Turn off the three-phase motor the and disable all the functions;
6. Connect the equipment with the cardan of the machine making sure that the length of the same is the same;
7. The rotation sensor is activated moving the selector switch (14) from the central "OFF" position upwards to select the anti-clockwise rotation and downwards clockwise rotation;
8. To increase the number of rpms, move the the selector switch (13) upwards repeatedly. On the contrary, move it downwards repeatedly to decrease the number of rpms.

At this point, you can increase the speed of the diesel engine to the required working speed by pressing button "1". Take account of the fact that at 1800 rpms of the diesel engine correspond to 1000 rpms on the mechanical PTO.

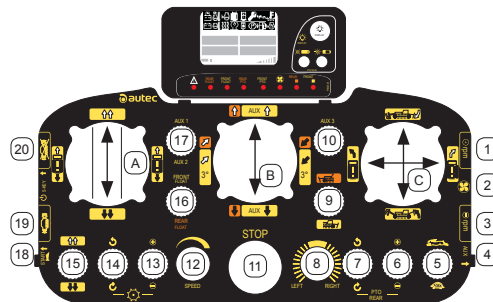




6.7.15 - STOP OF THE FRONT MECHANICAL PTO (OPTION)

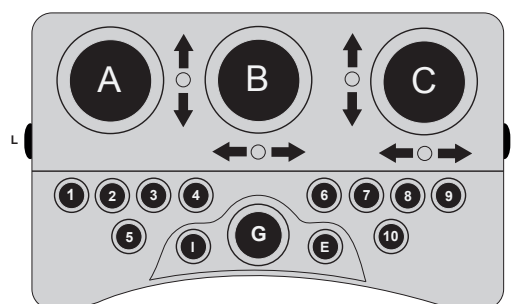
Stop of the front mechanical PTO (option) - AUTECH

To stop the rotation of the front mechanical PTO you just need to move the selector switch (14) to the central position (OFF). Then lower the diesel engine by pressing the button (1).

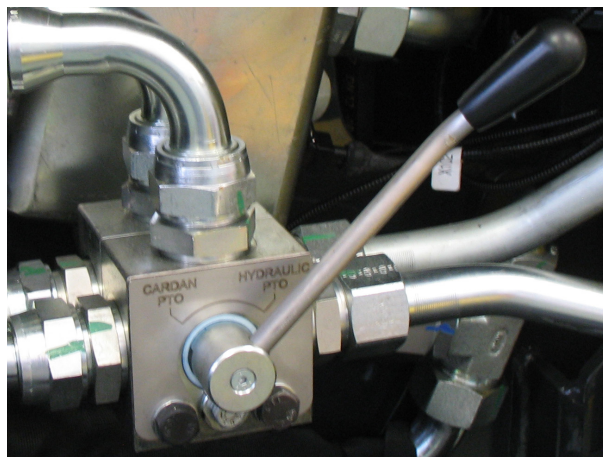
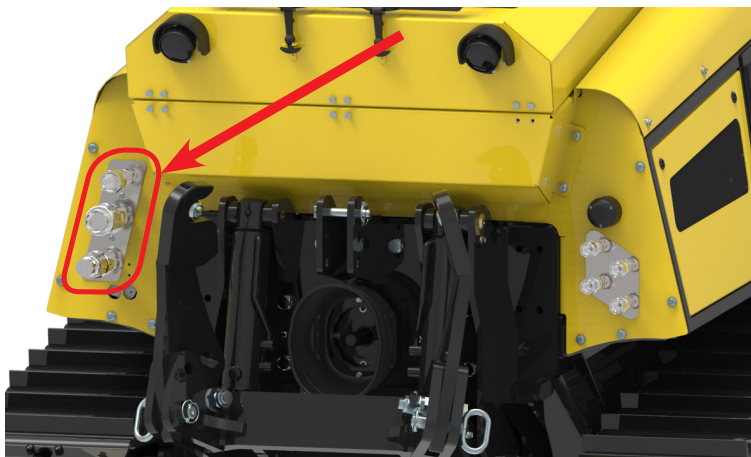


Stop of the front mechanical PTO (option) - SCANRECO

To stop the rotation of the front mechanical PTO you just need to move the selector switch (7) to the central position (OFF). Then lower the diesel engine by pressing the button (1).



6.7.16 - ACTIVATING THE FRONT HYDRAULIC PTO



If there is both a mechanical PTO (rear) and a hydraulic PTO (front) it is possible to select one of the two using a manual selector switch situated inside the machine. To work the front hydraulic PTO move the manual selector switch (to access it remove the front right-hand panel) into the "HYDRAULIC PTO" position as in the figure.

N.B.: OF COURSE THERE IS NO MANUAL SELECTOR SWITCH ON THE MACHINE IF THERE IS JUST A FRONT HYDRAULIC PTO OR JUST A REAR MECHANICAL ONE (WITH HYDRAULIC ACTIVATION).



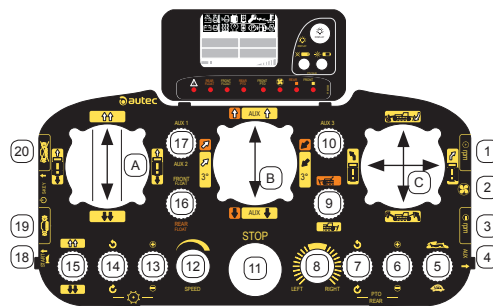
Activation of the front hydraulic PTO - AUTEC

Front hydraulic PTO operation is controlled by selector switches (6) and (7).

Follow the instructions below to start it.

1. Open the lower arms of the raiser attachment using the locking pins. Positioned horizontally, position the pins and fix them with the relative cotter pins;
2. Act with the remote control to lower the arms of the raiser;
3. Couple the equipment on the raiser (see section 6.4.9);
4. Fix the third upper point with the relative arm.
5. Turn off the three-phase motor the and disable all the functions.
6. Connect the tubes in the relative connectors. A and B (power outputs), D (drainage);
7. The rotation sensor is activated moving the selector switch (7) from the central "OFF" position upwards to select the anti-clockwise rotation and downwards clockwise rotation;
8. To increase the number of rpms, move the the selector switch (6) upwards repeatedly. On the contrary, move it downwards repeatedly to decrease the number of rpms.

At this point, you can increase the speed of the diesel engine to the required working speed by pressing button (1).



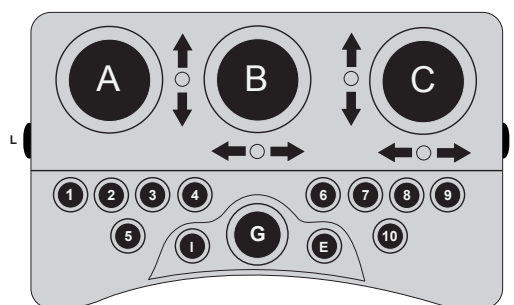
Activation of the front hydraulic PTO - SCANRECO

Front hydraulic PTO operation is controlled by selector switches (2) and (3).

Follow the instructions below to start it.

1. Open the lower arms of the raiser attachment using the locking pins. Positioned horizontally, position the pins and fix them with the relative cotter pins;
2. Act with the remote control to lower the arms of the raiser;
3. Couple the equipment on the raiser (see section 6.4.9);
4. Fix the third upper point with the relative arm.
5. Turn off the three-phase motor the and disable all the functions.
6. Connect the tubes in the relative connectors. A and B (power outputs), D (drainage);
7. The rotation sensor is activated moving the selector switch (2) from the central "OFF" position upwards to select the anti-clockwise rotation and downwards clockwise rotation;
8. To increase the number of rpms, move the the selector switch (3) upwards repeatedly. On the contrary, move it downwards repeatedly to decrease the number of rpms.

At this point, you can increase the speed of the diesel engine to the required working speed by pressing button (3).

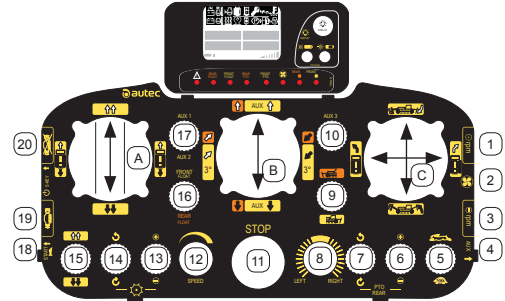




6.7.17 - - STOPPING THE FRONT HYDRAULIC PTO

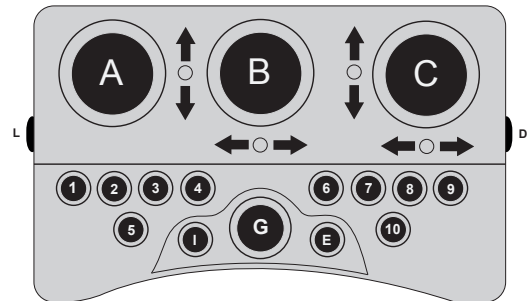
Stopping the front hydraulic PTO - AUTECH

To stop the rotation of the front hydraulic PTO you just need to move the selector switch (7) to the central position (OFF). Then lower the diesel engine by pressing the button (1).

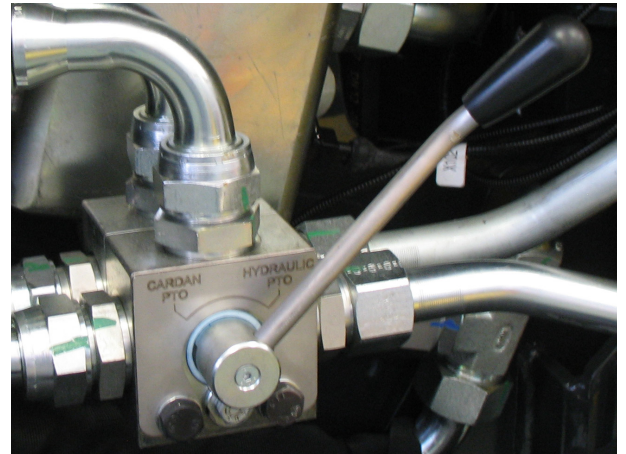


Stopping the front hydraulic PTO - SANRECO

To stop the rotation of the front hydraulic PTO you just need to move the selector switch (2) to the central position (OFF). Then lower the diesel engine by pressing the button (10).



6.7.18 - - ACTIVATING THE REAR HYDRAULIC PTO



If there is both a mechanical PTO (rear) and a hydraulic PTO (front) it is possible to select one of the two using a manual selector switch situated inside the machine. To work the front hydraulic PTO move the manual selector switch (to access it remove the front right-hand panel) into the "CARDAN PTO" position as in the figure.

N.B.: OF COURSE THERE IS NO MANUAL SELECTOR SWITCH ON THE MACHINE IF THERE IS JUST A FRONT HYDRAULIC PTO OR JUST A REAR MECHANICAL ONE (WITH HYDRAULIC ACTIVATION).



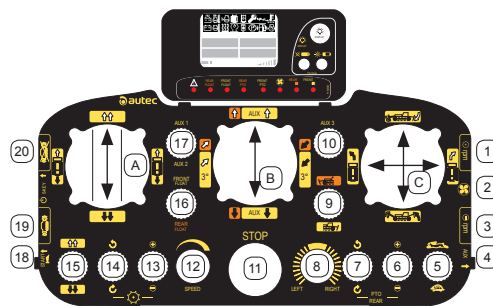
Activation of the rear mechanical PTO - AUTEC

Front mechanical PTO operation is controlled by selector switches (6) and (7)

Follow the instructions below to start it.

1. Open the lower arms of the raiser attachment using the locking pins. Positioned horizontally, position the pins and fix them with the relative cotter pins;
2. Act with the remote control to lower the arms of the raiser;
3. Couple the equipment on the raiser (see section 6.4.9);
4. Fix the third upper point with the relative arm.
5. Turn off the three-phase motor the and disable all the functions.
6. Connect the equipment with the cardan of the machine making sure that the length of the same is the same;
7. The rotation sensor is activated moving the selector switch (7) from the central "OFF" position upwards to select the anti-clockwise rotation and downwards clockwise rotation;
8. To increase the number of rpms, move the the selector switch (6) upwards repeatedly. On the contrary, move it downwards repeatedly to decrease the number of rpms.

At this point, you can increase the speed of the diesel engine to the required working speed by using button (1).



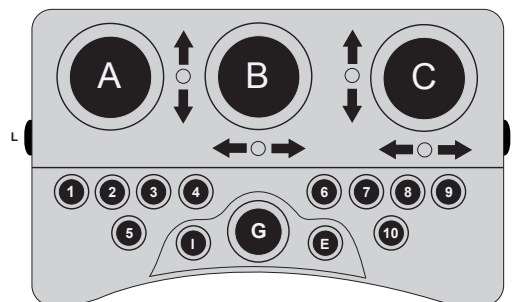
Activation of the rear mechanical PTO - SANRECO

Front mechanical PTO operation is controlled by selector switches (7).

Follow the instructions below to start it.

1. Open the lower arms of the raiser attachment using the locking pins. Positioned horizontally, position the pins and fix them with the relative cotter pins;
2. Act with the remote control to lower the arms of the raiser;
3. Couple the equipment on the raiser (see section 6.4.9);
4. Fix the third upper point with the relative arm.
5. Turn off the three-phase motor the and disable all the functions.
6. Connect the equipment with the cardan of the machine making sure that the length of the same is the same;
7. Move the selector switch (P) from the central position (OFF) upwards to select anticlockwise rotation.

At this point, you can increase the speed of the diesel engine to the required working speed by pressing button (1).

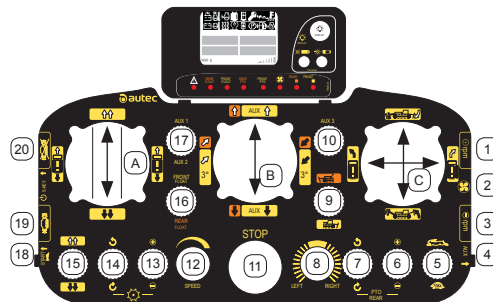




6.7.19 - ACTIVATING THE REAR MECHANICAL PTO

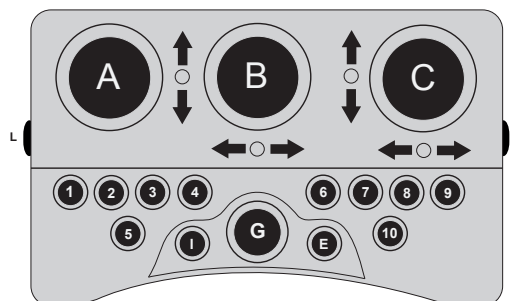
Stopping the rear mechanical PTO - AUTECH

To stop the rotation of the rear mechanical PTO you just need to move the selector switch (7) to the central position (OFF). Then lower the diesel engine by pressing the button (1).



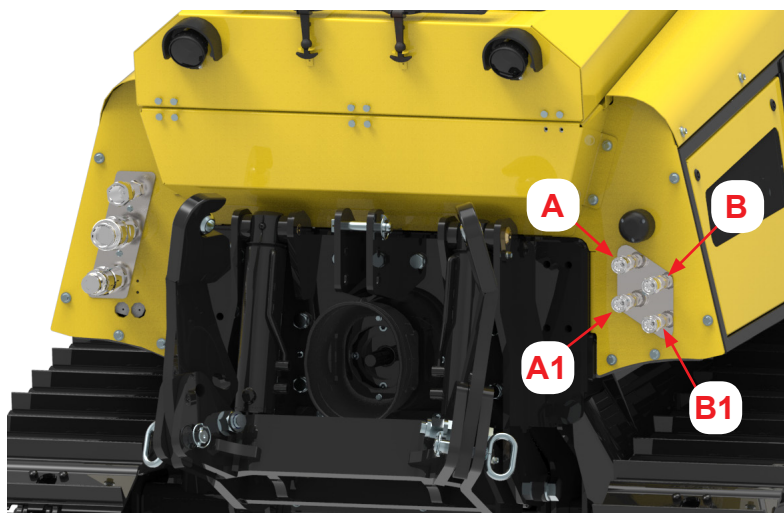
Stopping the rear mechanical PTO - SCANRECO

To stop the rotation of the rear mechanical PTO you just need to move the selector switch (7) to the central position (OFF). Then lower the diesel engine by pressing the button (1).



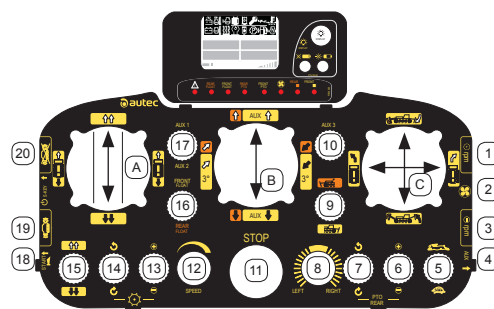


6.7.20 - SERVICES (FRONT QUICK CONNECTORS A-A1 / B-B1)



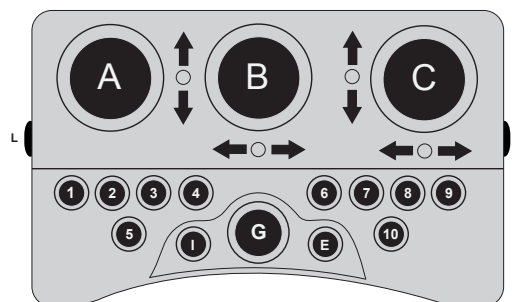
Services (front quick connectors A-A1 / B-B1) AUTEC

The machine is equipped with auxiliary hydraulic sockets. To activate the function move the selector (9) upwards and use the central joystick (B).



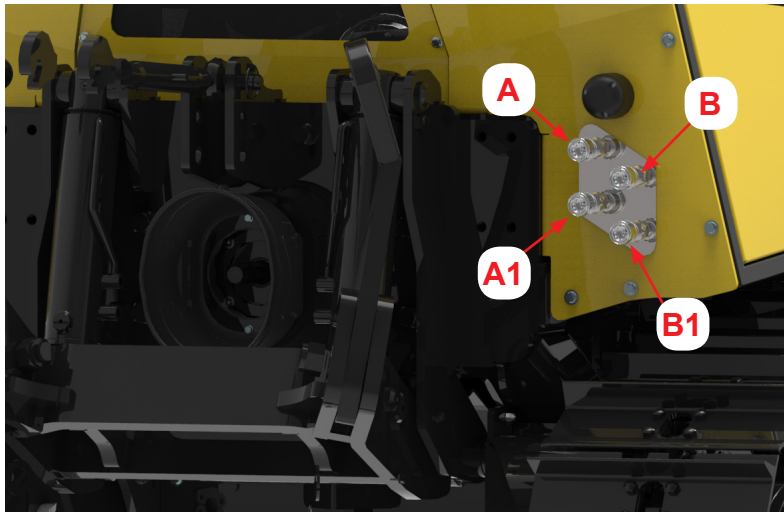
Services (front quick connectors A-A1 / B-B1) SCANRECO

The machine is equipped with auxiliary hydraulic sockets. To activate the function move the selector (D) upwards and use the central joystick (B). Move right or left to command A-A1, while up and down to command B-B1.



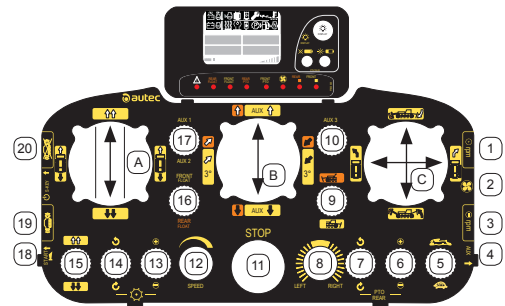


6.7.21- SERVICES REAR QUICK CONNECTORS A-A1 / B-B1



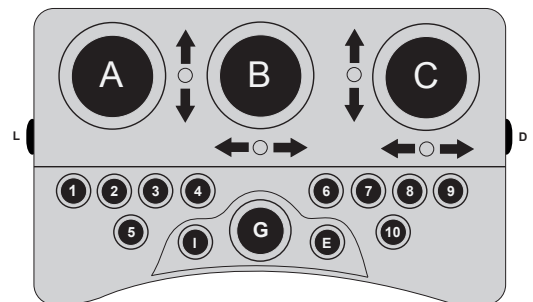
Services (rear quick connectors A-A1 / B-B1) AUTECH

The machine is equipped with auxiliary hydraulic sockets. To activate the function move the selector (9) downwards and use the central joystick (B).



Services (rear quick connectors A-A1 / B-B1) SCANRECO

The machine is equipped with auxiliary hydraulic sockets. To activate the function move the selector (D) downwards and use the central joystick (B). Move right or left to command A-A1, while up and down to command B-B1.



6.7.22 - FAN DRIVE COMMAND

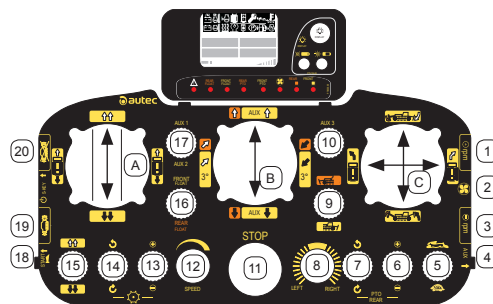
The machine features a ventilation system controlled by a FAN DRIVE system. One of the advantages of this system is that it allows the radiator to be cleaned, removing any cutting residuals.





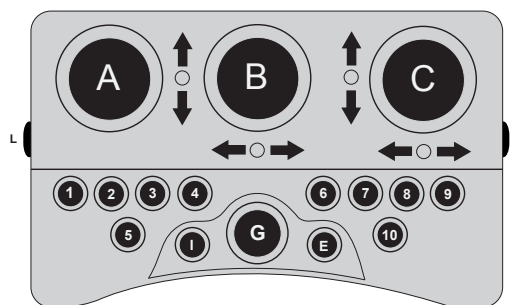
FAN-DRIVE command - AUTECH

By pressing button (2) the fan rotation inversion command will be activated. The fan in automatic mode will reduce the number of rpms to then reverse the direction of rotation. After around 20/25 seconds the cycle will finish to resume normal functioning.



FAN-DRIVE command - SCANRECO

By pressing button (L) the fan rotation inversion command will be activated. The fan in automatic mode will reduce the number of rpms to then reverse the direction of rotation. After around 20/25 seconds the cycle will finish to resume normal functioning.

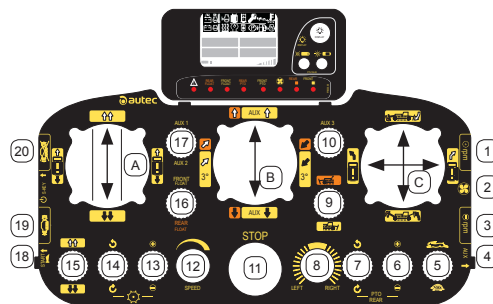


6.7.23 - FRONT /REAR FLOATING UNIT.

Both the raisers are fitted with floating units in the cylinders to allow the positioned equipment to be adjusted according to the ground.

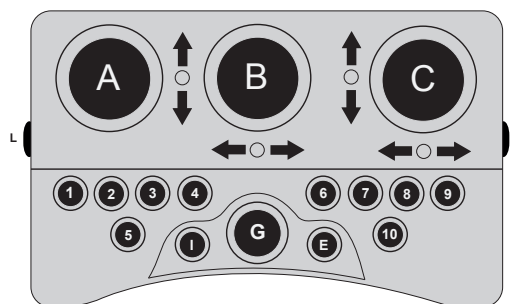
Front /rear floating unit - AUTECH

To activate the front floating unit move the selector switch upwards (16) To deactivate move the selector switch downwards again.
To activate the REAR floating unit move the selector switch downwards (16) To deactivate move the selector switch upwards again.



Front /rear floating unit - SCANREC

To activate the front floating unit move the selector switch upwards (1) To deactivate move the selector switch downwards again.
To activate the REAR floating unit move the selector switch downwards (1) To deactivate move the selector switch upwards again.



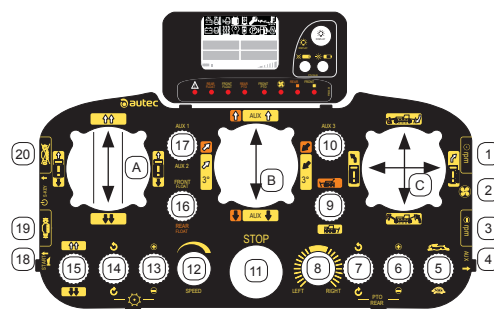


6.7.24 - AUXILIARY SERVICES

Auxiliary services - AUTECH

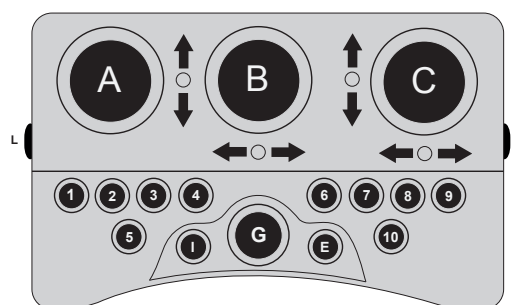
There are other selector switches/buttons for the additional auxiliary services in the remote control.

- The button (4) has the possibility of controlling the AUX service that can be activated/deactivated
- The selector (17) has the possibility of commanding two auxiliary services AUX 1 and AUX 2. The first can be activated/deactivated by moving the selector (17) upwards while AUX 2 can be activated/deactivated by moving the selector switch (17) downwards.
- The button (10) has the possibility of controlling the AUX3 service that can be activated/deactivated by moving the selector switch in question upwards.



Auxiliary services - AUTECH

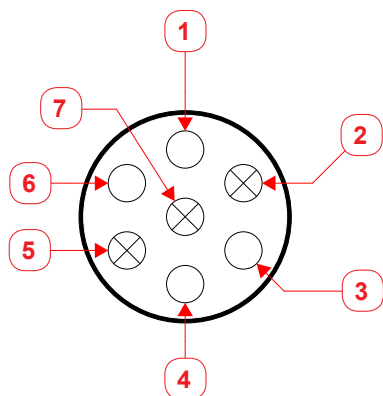
The remote control features a further selector switch (9) for an additional auxiliary service.



6.7.25 - FRONT /REAR ELECTRICAL SOCKET

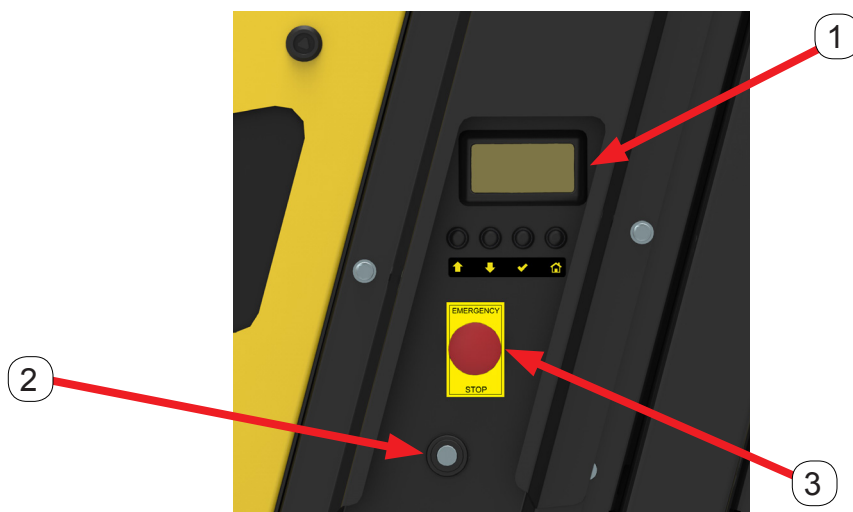
Seven-pole sockets are in the front/rear part of the machine where it is possible to connect the equipment's electrical system if necessary.





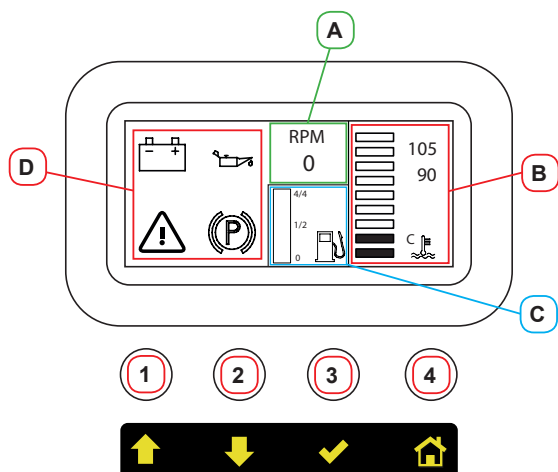
Pole	Front socket	Rear socket
1	Positive (+)	Positive (+)
2	Negative (-)	Negative (-)
3	Input 1	Not used
4	Input 2	Not used
5	Input 3	Not used
6	Not used	Not used
7	Not used	Not used

6.9 - LEFT-HAND CONTROL PANEL



1. LCD Display - CANBUS
2. Ignition panel
3. Emergency mushroom-headed switch

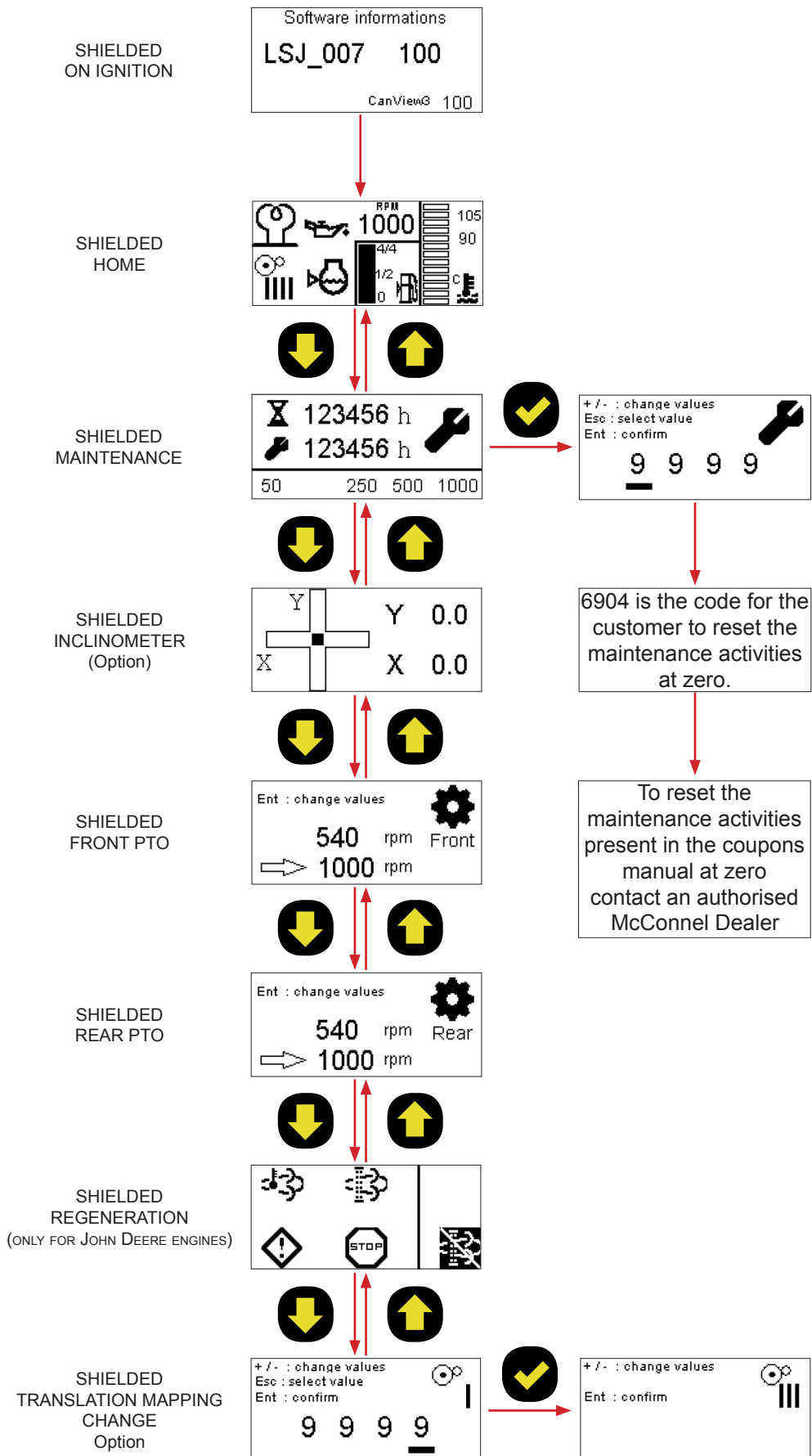
6.9.1 - LCD



A	Rev counter
B	Coolant temperature indicator
C	Fuel level indicator
D	Warning light/fault area
1	Page UP button
2	Page DOWN button
3	ENTER button
4	HOME button







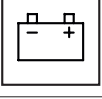


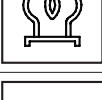


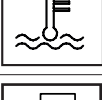
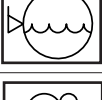

HOW TO MOVE AROUND IN THE MENU





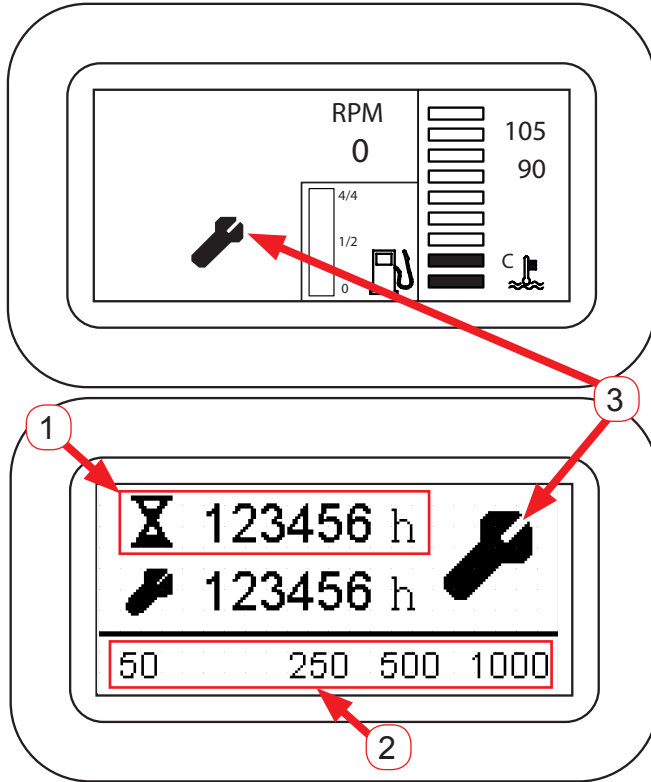
6.9.2 - WARNING LIGHTS

The following indicator lights/warnings may appear on the display according to the faults that may arise.

	HORN	STOPPING THE ENGINE	CAUSE	SOLUTION
	YES	NO	Fuel tank less than 1/4 full	Top up
	NO	NO	The parking brake is on	Move the left hand side joystick forwards/backwards
	YES	NO	Hydraulic oil level less than 2/3	Top up and/or check for leaks
	NO	YES	Oil level too low	Top up and/or check for leaks
	NO	NO	The alternator does not charge the battery	Check the alternator and/or contact customer care
	NO	YES	The air filter is clogged	Clean the filter elements
	NO	YES	The hydraulic oil filter is clogged	Replace the cartridge
	NO	NO	Glow plug preheating is active (optional)	Wait for the indicator light to turn off and start the machine
	NO	YES	Engine oil pressure too low	Check the engine oil level and/or the engine oil sensor
	NO	YES	Engine stop	Release the emergency button
	NO	YES	Coolant temperature > 110°C	Clean the radiator and/or check the level of coolant
	NO	NO	Low coolant level	Top up
	NO	NO	Change mode	---



6.9.3 - HOUR /MAINTENANCE COUNTER SCREEN



The display shows the machine hours (1) and the times established for the coupons (2).

See the Maintenance section when the scheduled number of hours have been reached.

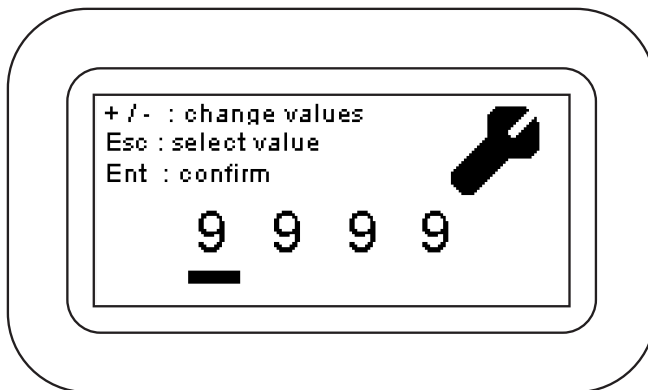
The service indicator light (3) appears when the time for maintenance has been reached. Press the page UP or page DOWN button to display the planned coupon and counter.

WARNING:



The Service indicator light will flash every time the engine is started until the release code is entered (once the machine has been serviced).

MAINTENANCE CODE



When the service has been completed, enter the numeric code (4 digits) supplied with the machine or contact McConnell customer care.

Keep the Enter button pressed for 3 seconds in order to display the page.

Enter the code by moving from left to right using the Home button.

Confirm the operation by pressing the Enter button.

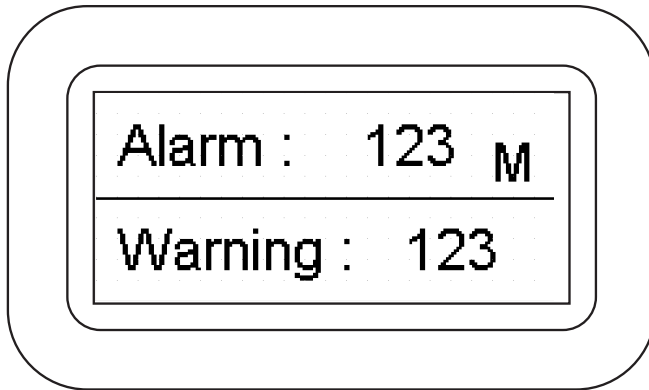
WARNING:



Entering the code without having carried out the required service will invalidate the McConnell warranty.



6.9.4 - ALARM SCREEN



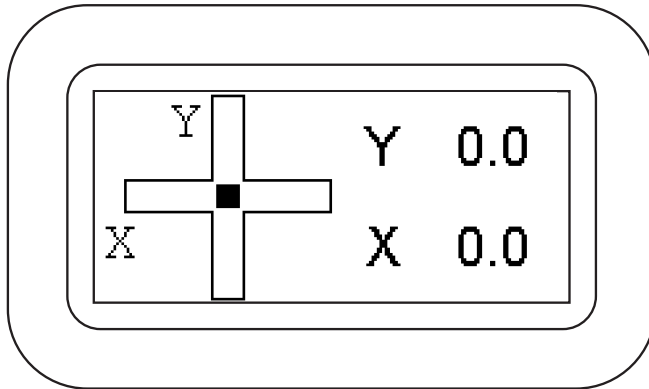
If the machine breaks down and/or malfunctions, "Alarm" codes will appear on the display followed by a number that identifies the type of error.

WARNING:



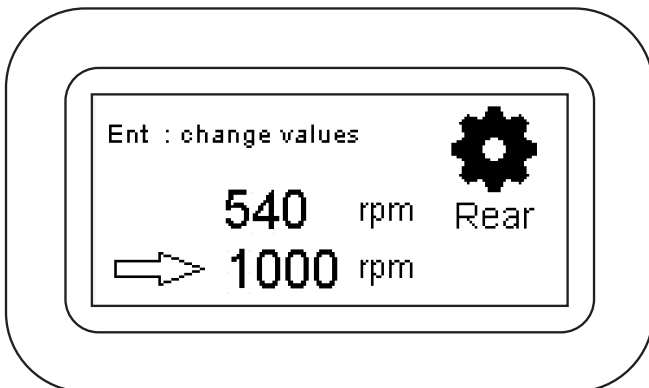
Contact McConnell Service for further information.

6.9.5 - INCLINOMETER SCREEN (OPTION)



As an optional it is possible to have an inclinometer menu screen.

6.9.6 - REAR PTO SCREEN



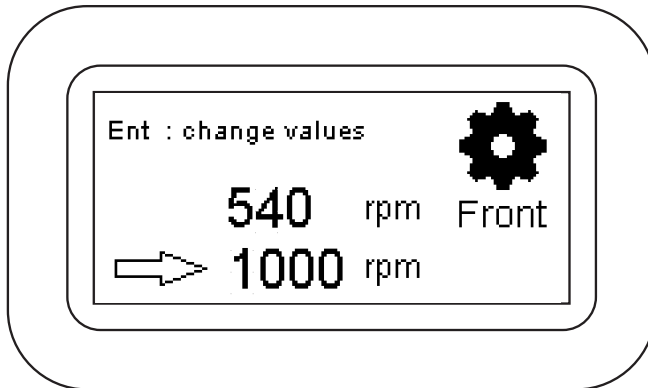
On the "REAR PTO" screen it is possible to set the rear pto at 540 rpms or at 1000 rpms.

To do this, follow the procedure below.

- Select the "REAR PTO" screen with the UP or DOWN arrows. Press ENTER.
- Move onto the number of rpms required confirming it with ENTER.



6.9.7 - FRONT PTO SCREEN (OPTION)

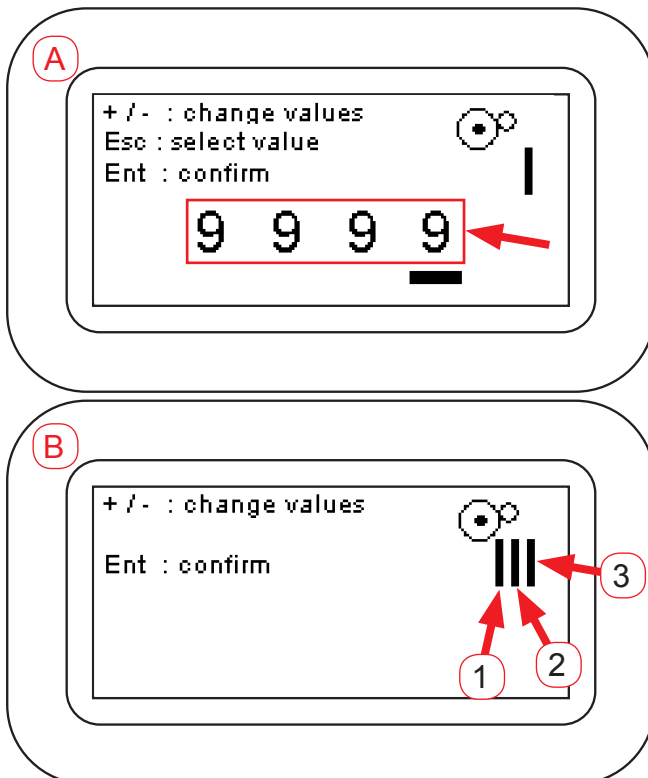


On the "FRONT PTO" screen it is possible to set the front pto at 540 rpms or at 1000 rpms.
To do this, follow the procedure below.

- Select the "FRONT PTO" screen with the UP or DOWN arrows. Press ENTER.
- Move onto the number of rpms required confirming it with ENTER.

The screen is only available if the front PTO is fitted.

6.9.8 - MODE CHANGE SCREEN (OPTION)



In the RoboPOWER it is optionally possible to set three different work modes on the basis of the type of activity required.

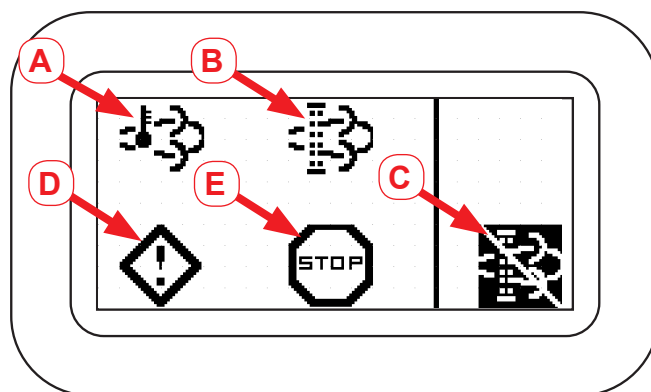
It is possible to access the menu in the following way:

- Scroll in the menu with the UP and DOWN arrows to the screen (A).
- Insert the numerical code (4 digits) provided at the time of purchase or contact McConnell Service.
- When screen (B) is accessed it will be possible to select the modes (1), (2) and (3) via UP and DOWN keys; press ENTER to confirm.



6.9.9 - REGENERATION SCREEN (ONLY FOR JOHN DEERE ENGINES)

The figure below shows all the buttons and warning lights that are seen and used for the exhaust filter cleaning process initiated by the operator or automatic and the de-activation.



A	Exhaust filter cleaning warning light
B	Automatic cleaning de-activation warning light
C	Exhaust filter warning light
D	Danger warning light
E	Warning light

NOTE: The troubleshooting screen is never seen with all the lights on at the same time, as shown. The figure is only useful to show the warning lights that might be seen during operation.

The exhaust filter warning light (A) comes on when the temperature of the exhaust gas reaches the optimal value for regeneration, the approximate idling speed is active or the filter itself is being cleaned.

When this warning light (A) is on, it is possible to continue to operate the machine unless the operator deactivates the automatic cleaning because he believes that the machine is not in a safe position for the high exhaust gas temperatures.

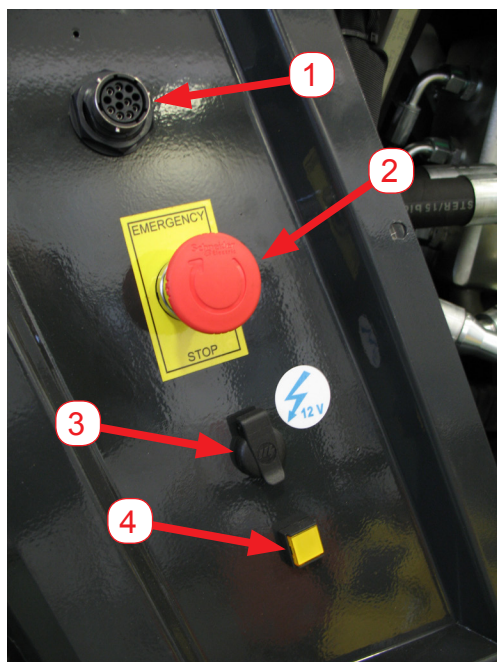
The automatic cleaning deactivation warning (B) comes on if the operator has activated the request for deactivation of the exhaust filter cleaning function on the troubleshooting display. This icon remains on until the operator reactivates the automatic exhaust cleaning on the troubleshooting display. The deactivation of the automatic mode is not advisable in any situation unless is accompanied by a safety measure or in the case of the fuel tank leaking that would compromise the cleaning process being completed.

The exhaust gas warning light (C) comes on if the filter needs to be clean and the operator has deactivated the automatic filter cleaning function. The DTC 3719.15 is shown on the display for troubleshooting (for further information, see the list of error codes for troubleshooting in section 6.14.2). If the conditions are safe, the operator must activate the filter's self cleaning function, carry out the manual regeneration for the purposes of maintenance or follow the DTC procedure. If the exhaust filter warning light (C) is linked to the danger warning light (D), the ECU reduces engine performance because the soot level in the exhaust gas filter is moderately high. The DTC 3719.16 is shown on the troubleshooting display (for further information, see the list of error codes for troubleshooting in section 6.14.2) and the warning light on the display comes on. In conditions of safety, the operator should enable the automatic exhaust filter cleaning function. In conditions where safety is not guaranteed, the operator should take the machine to a safe position and activate the automatic exhaust filter cleaning mode. Carry out the manual regeneration for the purposes of maintenance or following the DTC procedure.



If the exhaust filter warning light (C) is combined with the engine stop warning light (E), the ECU reduces engine performance still further because the soot level in the filter is very high. The DTC 3719.00 is shown on the troubleshooting display (for further information, see the list of error codes for troubleshooting in section 6.14.2) and the red backlit warning light on the display comes on. Contact the authorised dealer if you have this combination.

6.10 - RIGHT-HAND CONTROL PANEL



Description	
1	Manual control socket
2	Emergency mushroom-headed switch
3	12V socket
4	Clogged hydraulic filter warning light

1 - MANUAL CONTROL SOCKET

Refer to section “7.3 - USE OF THE MANUAL CONTROL” - to move the machine if the remote control is not working.

2 - EMERGENCY MUSHROOM HEADED SWITC

In an emergency press the emergency button. The diesel engine will continue to run at idle speed and all operational functions will be cancelled.

3 - 12 VOLT SOCKET

There is a 12 volt electrical socket on the right-hand side of the control panel. From here it is possible to recharge the remote control or it is possible to charge the machine batteries.

4 - CLOGGED HYDRAULIC FILTER WARNING LIGHT

The job of the warning light on the right-hand control panel is to signal the clogging of the hydraulic filter. You should substitute the filter immediately if it comes on. Refer to section 9.6.2 for its replacement.



6.11 - FUSES AND RELAYS

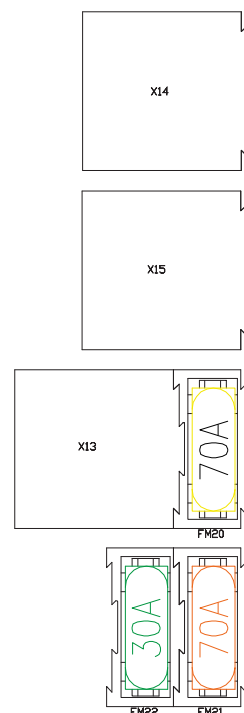
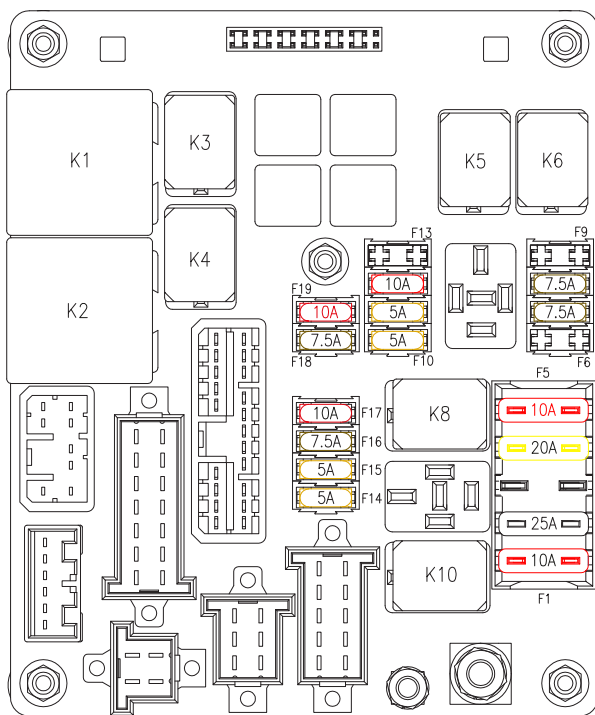
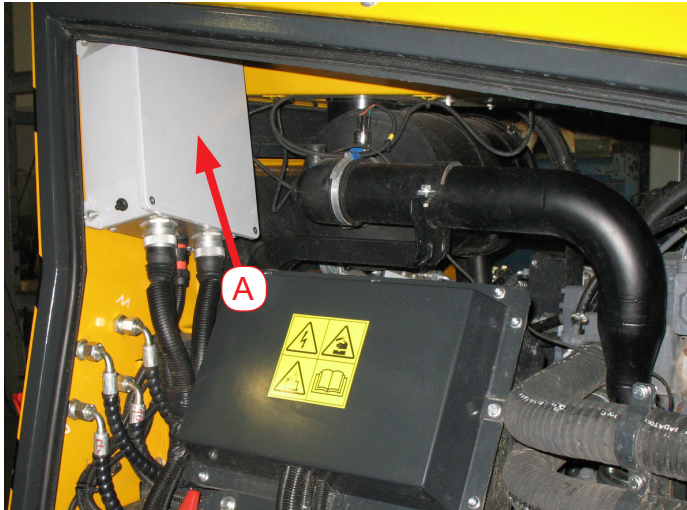
WARNING:



Before replacing a fuse, make sure that you have removed the ignition key. If the fuses are oxidised, corroded or not properly held in position, replace them with fuses that have the same rating. If the engine does not turn on when the starter switch is set to the on position, check the main fuse and replace it, if necessary.

6.11.1 - FUSES AND RELAYS OF THE CENTRAL CONTROL UNIT

The fuses and the relays are situated in fuse box (A) on the right-hand side of the machine in the rear engine compartment; remove the lid and change the fuses and relays if necessary.

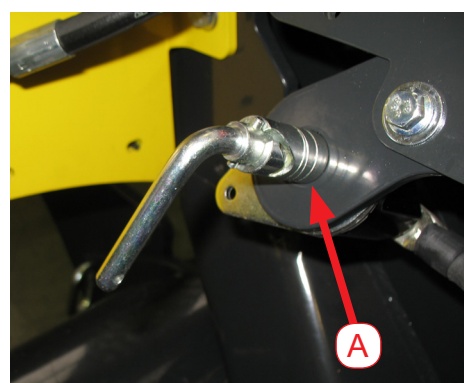




KEY TO FUSES					
Fuse	Description	Ampere (A)	Fuse	Description	Ampere (A)
F1	Fuel feed Remote control	10	F12	+ Stalk/horn	10
F2	Control unit LE70	25	F13	---	---
F3	---	---	F14	Alternator	5
F4	Work lights	20	F15	Supply sensors	5
F5	Option	10	F16	+30 central control unit LE70	7.5
F6	---	---	F17	Trailer socket	10
F7	Rotating beacon	7.5	F18	+30 Single pole socket	7.5
F8	+15 Diesel engine	7.5	F19	+30 Ignition panel	10
F9	---	---	F20	Starter fuse	20
F10	Fan Drive	5	F21	Main fuse	70
F11	+30 Display	5	F22	+30 Engine	30

RELAY TABLE			
Relay	Description	Relay	Description
K1	Work lights	K10	Power supply Remote control
K2	Start up enabling	K11	---
K3	Klaxon	K12	Oil level check
K4	Second gear	K13	PTO Stalk solenoid valve
K5	Power down	K14	Manual translation
K6	Flashing	X13	Start up relay
K7	---	X14	Engine relay
K8	---	X15	Services relay
K9	---		

6.12 - BATTERY CUT OFF SWITCH



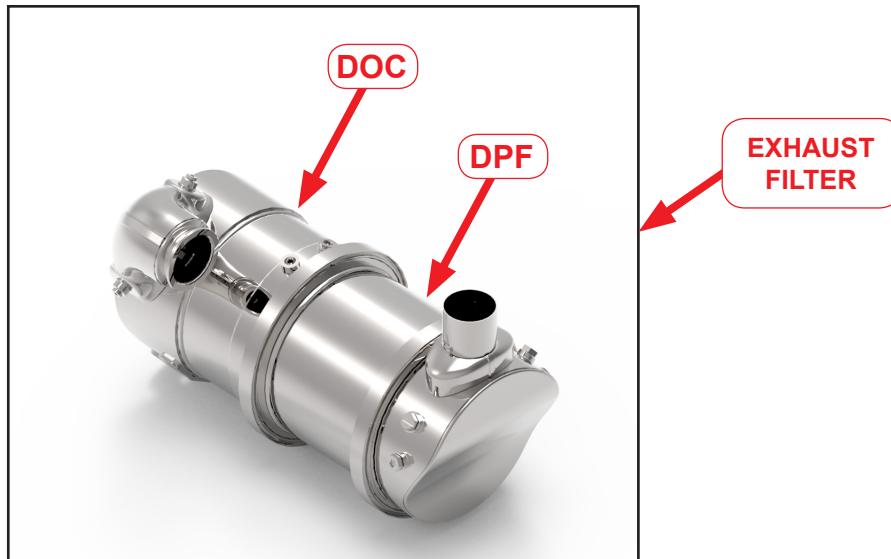
The battery cut-off switch can be accessed by removing the rear right-hand panel, it is situated under the battery compartment.

To disconnect the battery, turn the crank anti-clockwise and reach position (A) indicated above.

You are advised to use the battery cut-off switch when the the machine is to stored for long periods or when welding operations are to be done.



6.13 - EXHAUST GAS POST TREATMENT SYSTEM (ONLY JOHN DEERE ENGINE)



6.13.1 - EXHAUST FILTER SYSTEM OVERVIEW

John Deere has developed an exhaust gas filter consisting of a diesel oxidation catalyst (**DOC**) and a diesel particulate filter (**DPF**) precisely to meet the requirements of the applications over every type of terrain. The DOC reduces the carbon monoxide, hydrocarbons and particulate. The DPF downstream separates and traps the residual particulate in the exhaust gas flow. The particles trapped are possible oxidised inside the DPF through a well-known process known as regeneration or exhaust gas filter cleaning.

When the machine is functioning under normal conditions and the system is in the AUTO mode, the exhaust gas filter system needs minimum attention by the operator.

To avoid the superfluous build up of diesel particulate or soot in the exhaust gas filter system:

1. Use the automatic exhaust gas filter cleaning mode (AUTO).
2. Avoid superfluous idling.
3. Use a suitable engine oil (see section "9.4.1 - Grease table").
4. Only use oil with a low sulphur content (see section "9.4.3 - "Fuel").

Deposits of ash build up slowly in the DPF in addition to the soot and these cannot be removed through the engine exhaust gas filter cleaning process. To remove the deposits of ash from the DPF, see the the Maintenance and Assistance of the diesel particulate filter in the Post treatment section.

6.13.2 - MAINTENANCE AND ASSISTANCE FOR THE PARTICULATE FILTER

The exhaust filter consists of an oxidising catalyst (DOC) and the particulate filter (DPF) The particulate filter has been designed to trap residual ash resulting from the non-combustion of the additives used in the fuel and in the engine base block lubrication oils. The particulate filter ensures many hours of maintenance-free operation. At a certain point, the particulate filter requires profession maintenance for the removal of the ashes that have built up. The precise number of duty hours before the maintenance is necessary varies according to the engine power output category, the work cycle, the operating conditions, the ash content in the engine oil and the quality of the fuel. Conformance with the specifics recommended by John Deere for the oil and the fuel make it possible to optimise the duty hours before it is necessary to have the particulate filter maintained professionally.



The owner of the engine is responsible for carrying out the necessary maintenance operations described in the operator's handbook. The exhaust filter warning light on the dashboard or the diagnostic codes indicate the moment in which the particulate filter requires the removal of the ashes.

The removal of the ashes from the particulate filter must be done by extracting the filter from the machine and placing it in the specific equipment. Do not remove the ashes using water or other chemical substances. If these methods are used to remove the ashes, there is a risk of damaging the particulate filter fixing material inside the casing thereby causing the loosening of the relative cartridge in the casing so the particulate filter becomes more susceptible to damaged caused by the vibrations.

The failure to respect the methods approved for the removal of the ashes could cause damage to the DPF filter producing the potential annulment of the guarantee on the exhaust filter emissions for diesel engines. The DPF filter should be taken to an authorised John Deere assistance centre or another provider of qualified assistance to have it maintained.

WARNING:



- **The removal of ashes from the DPF filter must be done exclusively by a qualified assistance provider.**
- **During the manipulation and cleaning of a DPF filter it is necessary to wear personal protection equipment and protective clothing kept in hygienic and reliable conditions.**
- **For advice, contact the McConnel Service or a qualified assistance provider.**

WARNING:



An exhaust filter that has reached the end of its useful life must be treated properly since the ashes or substances of the catalytic converter in the device could be classed as hazardous waste in terms of the law or local regulations. Spent exhaust filters, including particulate filters can be ordered direct from your local McConnel Dealer.

6.13.3 -PASSIVE REGENERATION OF THE EXHAUST GAS FILTER

Periodically the exhaust gas filter shows higher levels of heat due simply to the functioning of the engine with high loads. During these periods, following the higher heat of the exhaust gas, a small amount of soot deposited in the exhaust filter will be eliminated. On the other hand, superfluous idling could cause the additional build up of soot in the exhaust filter. So that the engine functions in the best way possible thereby reducing direct operator action run it with a load that is higher every time it is possible and keep idling to a minimum.

6.13.3 -AUTOMATIC REGENERATION OF THE EXHAUST GAS FILTER

If you operate the engine in AUTO mode, the ECU can carry out "smart" cleaning of the exhaust gas filter as necessary. The exhaust filter cleaning warning light comes on if the system is actively cleaning this filter. During this process, the doer injects small amounts of fuel into the exhaust gas flow to assist the exhaust filter in the cleaning operation. Once the exhaust filter cleaning cycle is complete, the cleaning warning light goes out automatically. Automatic cleaning may last on average 35 - 45 minutes.



WARNING:



- Carrying out the maintenance on the machine or the equipment during the cleaning of the filter may lead to serious injuries
- Avoid exposure and direct contact with the exhaust components and gases at high temperature.
- During the automatic or manual/stationary cleaning of the exhaust gas filter, the engine functions in high no-load mode with very high temperatures for around 30 minutes
- The temperature of the exhaust gas filter components and the gases themselves is high enough to cause burns, fires or melt normal materials

WARNING:



- If the machine is not in a safe position because of high exhaust gas temperatures, make sure that it is and make sure that the fuel level is adequate before cleaning the exhaust gas filter.
- All the devices activated by PTO (if supplied as standard) must be disengaged.

If it is not possible to move the machine to a safe position, the operator must temporarily deactivate the automatic exhaust gas filter cleaning function (see section 6.13.5). When the machine is in a safe position, the automatic mode must always be activated.

6.13.3 - MANUAL REGENERATION OF THE EXHAUST GAS FILTER

The manual cleaning of the exhaust filter is a process that takes place when the operator requests it. This process allows the system to clean the exhaust gas filter in cases where the operator has previously had to deactivate the cleaning of said filter due to certain conditions. During this process the engine speed is controlled by the ECU and the machine must be parked for the procedure to be completed. The time necessary for manual exhaust filter cleaning depends on the degree to which the filter in question is clogged, the ambient temperatures, and the current temperature of the exhaust gases.

The overall duration of the cleaning varies on the basis of various criteria such as the type of fuel and oil, the service cycle and the number of requests for the cleaning of the exhaust gas filter broken off previously. Automatic cleaning may last on average 40 - 50 minutes or more.

WARNING:



- Carrying out the maintenance on the machine or the equipment during the cleaning of the filter may lead to serious injuries
- Avoid exposure and direct contact with exhaust components and gases at high temperature.
- During the automatic or manual/stationary cleaning of the exhaust gas filter, the engine functions in high no-load mode with very high temperatures for around 30 minutes
- The temperature of the exhaust gas filter components and the gases themselves is high enough to cause burns, fires or melt normal materials



WARNING:



- If the machine is not in a safe position because of high exhaust gas temperatures, make sure that it is and make sure that the fuel level is adequate before cleaning the exhaust gas filter .
- All the devices activated by PTO (if supplied as standard) must be disengaged.

NOTE: During the cleaning of the filter, the engine speed is controlled by the ECU.

The exhaust gas filter warning light goes on permanently once the filter has been cleaned. If the machine is not to be used again immediately after the cleaning procedure, wait a little before turning off the engine in such a way as to allow the engine and the exhaust filter to reach the normal operating temperature again. Over the course of the procedure in a parked position it is possible to annul the procedure at any time.

Do not deactivate the cleaning procedure unless it is absolutely necessary. If the cleaning procedure is deactivated multiple times or the request to carry it out is repeatedly ignored, the engine's power output could be reduced further and it could be necessary for the dealer to intervene to carry out the maintenance.

Use the AUTO exhaust gas filter cleaning method to avoid extra maintenance operations.

6.14 - TROUBLESHOOTING

Given that most of the functioning defects occur because of the improper use of the machine, the following table shows a number of possible malfunctions that could arise and steps to take to avoid them.

NOTE: in the case an anomaly or problem that does not come under the defects indicated, contact the McConnel Service Department on +44 (0)1584 875848.



6.14.1 - DIESEL ENGINE

Malfunctions	Causes	Measures
The engine does not start but does so with difficulty	Fuel tank empty	Bleeding the fuel distribution system
	Fuel aspiration pump blocked	Check
	Temperature limit for start up not reached	Check
	With the starter device cold	Check/replace
	Wrong SAE engine oil viscosity	Change the lubricating oil
	The type of fuel does not correspond to the instruction manual	Change the fuel
	The battery is defective or flat	Check the battery
	Cable connections with the starter loose or oxidised	Check the cable connections
	Starter broken or the pinion does not engage	Check the starter
	Engine stop lever still in the stop position. Mechanical injection system	Check/replace
	Stop magnet broken (enabling circuit)	Check/replace
	Wrong valve clearance	Check the valve clearance, set if necessary
	Dirty air filter /broken exhaust gas turbo-charger	Check/replace
	Air in the fuel system	Bleeding the fuel distribution system
	Compression value too low	Check the compression value
Exhaust gas counter pressure too high	Check	
Injection piping not hermetic	Check the injection piping	
The engine does not start and the diagnosis warning light flashes	The engine electronics are preventing the start up	Check the anomaly on the basis of the error code, if necessary remove the anomaly.
The engine start however it functions irregularly or misfires	V-type belt/ribbed v-type belt (fuel pump in the belt transmission)	Check to see if it is torn or has become loose
	Wrong valve clearance	Check the valve clearance, set if necessary
The engine start however it functions irregularly or misfires	Compression value too low	Check the compression value
	With the starter device cold	Check/replace
	Glow plug broken	Replace
	Air in the fuel system	Bleed
	Dirty fuel pre-filter	Clean
	The type of fuel does not correspond to the instruction manual	Change the fuel
	Injector broken	Replace
Injection piping not hermetic	Check the injection piping	
Modifications in the number of rpms may occur and the troubleshooting warning light may come on	The engine electronics has recognised a system area and has activated a substitute number of rpms	Check the anomaly on the basis of the error code, if necessary remove the anomaly.



Malfunctions	Causes	Measures
The engine overheats The temperature alarm cuts in	Clogged breather pipe	Clean
	Wrong SAE engine oil viscosity	Change the lubricating oil
	Lubricating oil radiator broken	Check/replace
	Dirty lubricating oil filter on the air side and/or lubricating oil	Replace
	Lubricating oil level too high	Check the level of the lubricating oil, empty if necessary
	Lubricating oil level too level	Load lubricating oil
	Wrong valve clearance	Check the valve clearance, set if necessary
	Injector broken	Replace
	Coolant heat exchanger dirty	Clean
	Broken coolant water pump (toothed v-type belt broken or has come loose)	Check to see if it is torn or has become loose
	Coolant insufficient	Top up.
	Resistance in the coolant system too high / flow rate too low	Check the cooling system
	Cooler blower or exhaust gas thermostat broken, v-type belt torn or loose.	Check / replace / tighten
	The turbocharger air pipe is leaking.	Check the turbocharger air pipe.
	The turbocharger air radiator is dirty.	Check / clean
	The engine is developing little power	Dirty air filter /broken exhaust gas turbo-charger
Air filter maintenance switch / indicator broken		Check/replace
The engine is developing little power	Cooling fan defective /track broken or loose	Check / possibly change fan /v-type belt
	Lubricating oil level too high	Check the level of the lubricating oil, empty if necessary
	Dirty lubricating oil radiator blades	Clean
	Engine stop lever still in the stop position. Mechanical injection system	Check/replace
	Oxygen aspiration temperature too high	Check the system
	The type of fuel does not correspond to the instruction manual	Change the fuel
	Dirty air filter /broken exhaust gas turbo-charger	Check/replace
	Air filter maintenance switch / indicator broken	Check/replace
	Cooling fan defective /track broken or loose	Check / possibly change fan /v-type belt
	The turbocharger air pipe is leaking.	Check the turbocharger air pipe.
	The turbocharger air radiator is dirty.	Clean
	Resistance in the coolant system too high / flow rate too low	Check the cooling system
	Injector broken	Replace



Malfunctions	Causes	Measures
The engine delivers little power and the troubleshooting warning light comes on.	The engine electronics are reducing the power	Contact McConnell Service.
The engine is not firing on all cylinders	Injection piping not hermetic	Check the injection piping
	Injector broken	Replace
	The turbocharger air pipe is leaking.	Check the turbocharger air pipe.
	Lubricating oil level too high	Check the level of the lubricating oil, empty if necessary
The engine oil pressure is too low or is lacking completely.	Lubricating oil level too level	Load lubricating oil
	Position of the engine is too inclined	Check the engine support / reduce inclination
	Wrong SAE engine oil viscosity	Change the lubricating oil
The engine is consuming too much lubricating oil	Lubricating oil level too high	Check the level of the lubricating oil, empty if necessary
	Position of the engine is too inclined	Check the engine support / reduce inclination
	Engine block venting channel	Check/replace
Lubricating oil in the exhaust gas	Engine always operating with a load that is too low (< 20-30%)	Check the load factor
The engine is emitting blue smoke	Lubricating oil level too high	Check the level of the lubricating oil, empty if necessary
	Position of the engine is too inclined	Check the engine support / reduce inclination
The engine is emitting white smoke	Temperature limit for start up not reached	Check
	With the starter device cold	Check/replace
	Wrong valve clearance	Check the valve clearance, set if necessary
	The type of fuel does not correspond to the instruction manual	Change the fuel
	Injector broken	Replace
The engine is emitting black smoke	Dirty air filter /broken exhaust gas turbocharger	Check/replace
	Air filter maintenance switch / indicator broken	Check/replace
	Full load stop depending on the air pressure broken	Check
	Wrong valve clearance	Check the valve clearance, set if necessary
	The turbocharger air pipe is leaking.	Check the turbocharger air pipe.
	Injector broken	Replace

If the fault or the reason for it is not indicated in the list of faults shown in the tables, contact McConnell Service.



6.14.2 - TROUBLESHOOTING CODES (DOC) JOHN DEERE ENGINE

SPN / FMI CODES

The troubleshooting fault codes stored and active are displayed on the John Deere troubleshooting indicator, in conformance with standard J1939, in the form of two part codes, as illustrated in the tables on the following pages.

The first part is a number of the suspect parameter (SPN) followed by an identification code of the error mode (FMI). To determine exactly what the problem is, both parts of the code are necessary (SPN and FMI).

The suspect parameter number (SPN) identifies the system or the component presenting the problem, e.g. SPN 000110 identifies a problem in the engine coolant temperature circuit.

FMI identifies the type of problem that has arisen; e.g. code FMI 03 indicates a value higher than the norm. The combination of SPN 000110 and FMI 03 indicates an "excessive engine coolant temperature sensor input voltage". A corrective action is then displayed "check the sensor and the cabling". If this check does not lead to a solution of the problem in the engine, contact a dealer who is qualified to carry out maintenance.

Always contact McConnel Service to get the help you need in the processing of troubleshooting error codes displayed regarding the engine.

FMI CODES

FMI code	FMI name
0	Very high
1	Extremely low
2	Not valid
3	Over the maximum limit specified
4	Under the minimum limit specified
5	High resistance
6	Low resistance
7	Discrepancy
8	Signal absent
9	Communication loss
10	Anomalous change

FMI code	FMI name
11	Activated
12	Error
13	Problem
14	Wrong message
15	Slightly elevated
16	Moderately high
17	Slightly low
18	Moderately low
19	Communication error
31	Existing condition

SPN CODE

SPN code	SPN name
27	EGR valve position signal
28	Digital accelerator signal
29	Secondary analogue accelerator signal
51	Air throttle valve actuator position signal
54	Accelerator signature
91	Main analogue accelerator signal
94	Low pressure fuel signal
96	Fuel level
97	Condensate in the fuel



SPN code	SPN name
100	Engine oil pressure signal
101	Engine block pressure signal
102	Air manifold pressure signal
103	Turbocharger speed signal
105	Air manifold temperature signal
107	Air filter differential pressure
108	Barometric pressure signal
109	Engine coolant pressure signal
110	Engine coolant temperature signal
111	Engine coolant level alarm switch
127	Transmission oil pressure signal
157	Fuel rail flute pressure signal
158	ECU release
168	Power battery voltage not on
174	Fuel temperature signal
177	Transmission oil temperature signal
189	Engine power reduction
190	Engine speed
191	Engine/pump speed
237	VIN safety data
412	EGR temperature signal
569	Rear axle differential block signal
611	Injector 1 command
612	Injector 2 command
620	Sensor power voltage
627	All the injector circuits
628	ECU programming
629	EEPROM ECU
632	Fuel stop valve
636	Camshaft position signal
637	Crankshaft position signal
638	Rack position
639	CAN Bus
640	External engine protection
641	VGT actuator
644	Initial ECU synchronisation circuit
647	Engine fan command circuit
651	Injector 1
652	Injector 2
653	Injector 3



SPN code	SPN name
654	Injector 4
676	Cold starting auxiliary device relay output signal
729	Input air heater signal
833	Rack position signal
834	Rack actuator
898	Required engine speed signal
970	External stop switch
898	Required engine speed signal
970	External stop switch
971	External reduction switch
974	Remote accelerator signal
1075	Low pressure supply pump data
1076	Fuel injection pump adjustment valve
1077	Fuel injection pump adjustment valve
1078	Fuel injection pump position speed/sensor
1079	Sensor power voltage 1
1080	Sensor power voltage
1109	Imminent engine protection
1110	Engine protection
1136	ECU temperature signal
1172	Aspiration air temperature
1176	Aspiration air pressure
1180	Calculated VGT turbine input temperature
1209	Exhaust fume pipe pressure signal
1321	Starter motor command circuit
1347	Aspiration control valve circuit
1348	Supply pump adjustment valve 2
1349	Redundant Fuel rail flute pressure signal
1485	Pump supply relay
1568	Selection of the torque curve
1569	Engine power reduction
1638	Hydraulic system oil temperature signal
1639	Fan speed signal
1762	Hydraulic system oil pressure signal
2000	ECU wrong
2002-2253	Original address 2-253
2629	Fixed turbocharger compressor outlet temp. signal.
2630	Air post cooler outlet temp signal
2659	EGR flow signal
2790	Turbo air temperature
2791	EGR valve command circuit
2795	VGT calibration version
2797	High voltage supply injector 1



SPN code	SPN name
2798	High voltage supply injector 2
3246	DPF filter output temperature
3251	DPF differential pressure sensor
3464	Air throttle valve actuator command circuit
3471	Fuel dosage valve signal
3480	Fuel dosage input pressure signal
3482	Fuel dosage closure valve signal
3509	Sensor power voltage 1
3510	Sensor power voltage 2
3511	Sensor power voltage 3
3512	Sensor power voltage 4
3556	Fuel dosage nozzle
3587	Automatic wireless command circuit
3597	Injector power voltage
3598	Injector power voltage 2
3659	Deaeration valve circuit no. 1
3660	Deaeration valve circuit no. 2
3661	Deaeration valve circuit no. 3
3662	Deaeration valve circuit no. 4
3711	DOC input temperature
3719	Calculated level of soot
3720	Calculated level of ash
3822	Rear EGR system valve position signal
3936	DPF filter error occurrences
4077	Fuel dosage output pressure signal
4490	Aspiration air humidity
4765	DOC input temperature
4766	DOC output temperature
4795	DPF filter absent
5018	DOC error occurrences
5125	Sensor power voltage 7
5126	Sensor power voltage 8
5298	DOC error occurrences
5456	Fuel dosage input temp. signal
522458	Fuel dosage pump data
522494	Air power sensor communication
522495	Unloading filter temperature module
523379	Individual earth point 7
523744	Air conditioning plant compressor
524037	Mechanical front traction switch circuit
524223	Rear axle differential block signal
524225	Engine start up protection
524235	Mechanical front traction solenoid circuit voltage



6.14.3 - ELECTRICAL CIRCUIT

Malfunctions	Causes	Measures
Lights are not properly lit even when the engine is running at a high number of revolutions.	Defective cables.	Check and repair defective terminals and cables (*)
Lights are not steadily lit while the engine is running.	Defective fan belt tensioning.	Adjust the tension of the belt.
The alternator's charger indicator light does not turn off when the engine is running and accelerated.	Defective alternator.	Replace.(*)
	Defective cables.	Replace.
The starter does not run when the key is turned to the ignition position.	Defective cables.	Check and repair.(*)
	Insufficient accumulator charge.	Charge the accumulator.
	Defective main fuse.	Replace.
The starter pinion is inserted and then released.	Insufficient accumulator charge.	Charge the accumulator
The starter makes the engine run slowly.	Insufficient accumulator charge.	Charge the accumulator
	Starter motor defective.	Replace (*)
The starter deactivates before the engine starts.	Defective cables.	Check and repair (*)
	Insufficient accumulator charge.	Charge the accumulator
The charge indicator light of the alternator does not turn on when the engine is stopped (ignition key on "I").	Defective lamp.	Replace (*)
	Defective cables.	Check and repair (*)

(*) If the fault or the reason for it is not indicated in the list of faults shown in tables, contact McConnel Service.

6.14.4 - HYDRAULIC SYSTEM

Malfunctions	Causes	Measures
The pump emits a strange noise.	Defective pump	Repair or replace (*)
	Insufficient oil in the tank	Restore the level
The equipment work at low speed.	Defective pump	Repair or replace (*)
	Maximum pressure valve out of calibration or not closed due to impurities.	Calibrate or replace (*)
	Dirty unloading filter	Replace the cartridge

(*) If the fault or the reason for it is not indicated in the list of faults shown in tables, contact McConnel Service.



6.14.5 - TRANSMITTER UNIT (REMOTE CONTROL) AUTEK

Malfunctions	Causes	Measures
The green LED does not come on when the START button is pressed even if both the battery and the S-KEY are in.	The battery is flat.	Exchange the battery with one that is charged.
The green LED flashes rapidly.	The radio electric connection is absent.	Bring the transmitter unit towards the receiver unit.
The red LED lights up for 2 seconds and then the unit goes out.	The transmitter unit is not working properly.	Carry out the address storage procedure. Contact McConnell Service.
The red LED flashes once on start up.	The STOP button is on or it is broken.	Reset the STOP BUTTON. If this signal persists contact McConnell Service.
The red LED flashes twice on start up.	At least one of the actuators relative to the digital commands and the SAFETY is active or it is broken.	Move the actuators into the rest position. If this signal persists contact McConnell Service.
The red LED flashes three times on start up.	The battery is flat	Exchange the battery with one that is charged.
The red LED flashes four times on start up.	At least one of the actuators relative to the analogue commands and the SAFETY is active or it is broken	Move the actuators into the rest position. If this signal persists contact McConnell Service.

If the fault or the reason for it is not indicated in the list of faults shown in tables, contact McConnell Service.

6.14.6 - AUTEK RECEIVER UNIT

Malfunctions	Causes	Measures
The POWER LED is off.	The receiving unit is off.	Correctly couple the connecting plug and power the receiver unit.
The POWER LED is on.	The radio electric connection is absent.	Bring the transmitter unit towards the receiver unit.
The ALARM LED flashes once.	There is an error on the STOP outputs.	Correctly couple the connecting plug. Check the correct wiring of the STOP outputs.
The ALARM LED flashes twice.	There is an error on the SAFETY outputs.	Correctly couple the connecting plug. Check the correct wiring of the SAFETY outputs.
The ALARM LED flashes three times.	There is an error on the outputs relative to the direction commands.	Check the correct wiring of the outputs relative to the direction commands. Contact McConnell Service.
The ALARM LED is on.	The receiver unit is not working properly.	Contact McConnell Service.



Malfunctions	Causes	Measures
The RUN LED is flashing	The remote control unit is not sending commands to the CAN network.	Contact McConnell Service.
The ERR LED is flashing	There is an CAN communication error.	Contact McConnell Service.

If the fault or the reason for it is not indicated in the list of faults shown in tables, contact McConnell Service.

6.14.7 - SCANRECO RECEIVER UNIT ERROR CODES

In the case of malfunctioning the receiver unit will indicate the anomaly by making the STATUS LED flash red while the internal display will display "Er" followed by the four characters divided into two blocks corresponding to the error code encountered.

Example of the error code:

"Er" > "15" > "1A"

If the problem encountered is considered "temporary", the error code will be repeated three times and then the remote control will return to stand-by, as just turned on.

Otherwise, if the malfunction is considered "blocking" the display will show the error code continuously until the remote control is off.

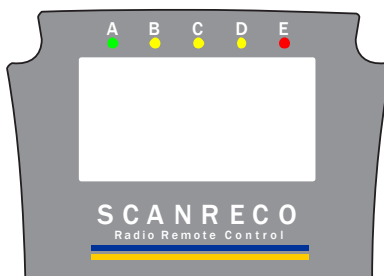
The error code can appear after the start up of the central control unit, after the start up of the button pad (operational mode enabling) or after the output activation.

Indication		Meaning
Block 1	Block 2	
01	01-07	Checksum error (block 2 indicates the type)
02	02	Short circuit on the DV output
04	01-14	Short circuit on the digital output (block 2 indicates which output)
07	1A-8B	Error on the analogue output (block 2 indicates which output)
15	1A-8B	Short circuit on the analogue output (block 2 indicates which output)
16	1A-8B	Interruption on the analogue output (block 2 indicates which output)
17	01	Power voltage too low
17	02	Power voltage too high



6.14.8 - SCANRECO TRANSMITTER UNIT ERROR CODES

The button pad carries out a check on its parts on each power up and if anomalies are detected it gives an error code making the red LED flash and the internal beeper sound a certain number of times according to the type of error encountered.



Number of flashe	Meaning
1	The manipulator of the first function is not in the neutral position in the button pad start up phase or it is defective.
2	The manipulator of the second function is not in the neutral position in the button pad start up phase or it is defective.
3	The manipulator of the third function is not in the neutral position in the button pad start up phase or it is defective.
4	The manipulator of the fourth function is not in the neutral position in the button pad start up phase or it is defective.
5	The manipulator of the fifth function is not in the neutral position in the button pad start up phase or it is defective.
6	The manipulator of the sixth function is not in the neutral position in the button pad start up phase or it is defective.
7	The manipulator of the seventh function is not in the neutral position in the button pad start up phase or it is defective.
8	The manipulator of the eighth function is not in the neutral position in the button pad start up phase or it is defective.
13	The emergency stop was found to be defective during the self test.



6.14.9 - GEAR REDUCTION UNITS

Malfunctions	Cause	Solution
Oil seeping from the seals	Stiffening through being stored for too long.	Clean the area and check in a day or two
	Damage or slight wear	Apply to a customer care centre.
	Excessive amount of lubricant	Checking the oil level
Vibrations and/or excessive noise	Wheel gear reduction unit not installed properly	Apply to a customer care centre
	Internal anomalies	
	Badly lubricated or defective bearings	
	Teeth with bruises or chipping	
Multiple disk parking brake cannot be released	No pressure in the braking circuit.	Check the brake connection
	Bonding of the disks due to the length of time parking.	Apply pressure to the brake and make the wheel turn by activating the engine.
	Defective brake hold	Apply to the customer care centre
Multiple disk parking brake cannot be engaged.	Residual pressure in the circuit	Check the hydraulic circuit
	Worn discs	Apply to a customer care centre
When the engine is in operation the gear reduction unit does not turn	Wrong engine installation	Check the coupling between the engine and the wheel reduction unit.
	Brakes locked	Check the braking system
	Internal anomalies	Apply to a customer care centre
	Disengaged wheel reduction unit	See the DISENGAGEMENT paragraph
Excessive heating	Too much or too little oil	Check the oil level.
	Unsuitable lubricant	Check the type and state of the lubricant.
	Badly lubricated or defective bearings	Apply to a customer care centre
	Multiple disc brake does not open completely	Check the pressure of the brake opening
	High thermal power	Apply to a customer care centre.



6.15 - USE OF THE MECHANICAL PTO

Before connecting the equipment to the machine's PTO make sure the equipment is compatible with the speed of the PTO being used (1000 rpm front/back)



WARNING:



- Observe all the safety standards regarding the equipment activated by the PTO.
- Stop the engine and the PTO before attaching the equipment to the machine.
- Check that the equipment working area is uncluttered before inserting the PTO.
- Any maintenance on the PTO shaft must only be done with the PTO disengaged, the engine stopped and the ignition key removed.
- When using the rear PTO (mechanics connected directly to the drive shaft) you are advised to adopt a cardan with clutch to avoid damaging the joint or other parts of the machine.

- After disengaging the PTO, the equipment continues to turn for a short while (regardless of the brake) Do not get too close to the equipment before it has come to a complete stop.
- Make sure that the length of the PTO shaft is correct compared with the tool being activated by the PTO.
- The PTO shaft must be able to function in the whole curve vertically and horizontally.
- Fit the shaft of the PTO following the manufacturer's instructions.

CAUTION:

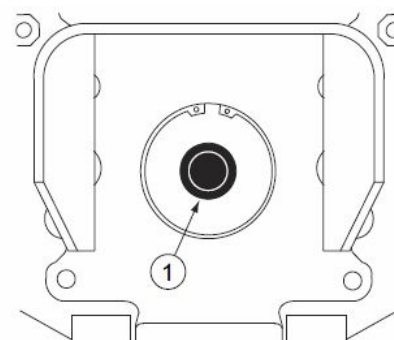
A cardan that is too long can damage the gearbox of the equipment or the machine itself.

DANGER:



When fixing the PTO shaft, make sure that the guard is not damaged. Always secure the guard to a fixed part of the frame of the machine or the equipment

- Engage the PTO at low revs to protect the PTO.
- During the winter period, make sure that the transmission oil and hydraulic oil are warm before engaging the PTO.
- When not in use, always protect the ends of the PTO shaft with the cover for the purpose (1).





6.16 - HOW TO WORK WITH THE MACHINE

DANGER:



Before moving the machine, make sure that you are familiar with the controls and the relative safety regulations. The operator must be in the vicinity of the machine. Before moving the machine, ensure that no persons are in the range of action of the machine and that the area of action is free of obstacles. Use great caution before starting the reverse motion and always check for the presence of people, equipment or obstacles.

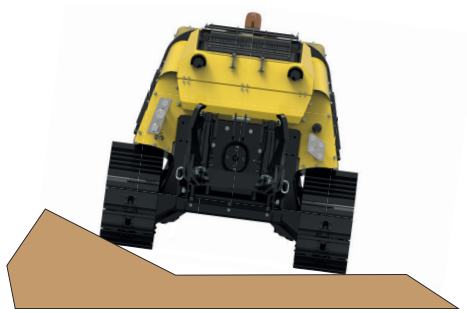
- Before starting to cut, check that there are no foreign bodies such as stones, pieces of metal or animals on the surface to be mowed.
- Only cut grass and light brushwood that the machine is capable of processing without difficulty.
- When mowing slopes always start from the bottom.
- Always turn round in an upwards direction.
- Never go down slopes that have an inclination greater than 45°
- Never stand directly in the line of fall of the machine.



Never change the direction of the machine while moving on curbs, rocks or surfaces with large differences in height (greater than 20 cm). In these cases, always proceed perpendicular with respect to any obstacles.



When reversing uphill, do not change direction in the transition area between the flat ground and the slope. If it is unavoidable to do so, carry out the manoeuvre gradually.



Avoid moving along the edge of a slope or on uneven ground with one track in a horizontal position and the other inclined or partially raised (with the machine inclined more than approximately 10°). In order not to damage the tracks, always proceed with the shoes resting on the same horizontal plane.



When the machine manoeuvres over an obstacle it creates an empty space between the bearing rollers and the tracks and there is a risk that the track may come out of its seat.

The same may happen if the machine is reversing uphill and you try to make a sharp turn. An empty space is created between the bearing roller, the front idler roller and the track, and there is a risk that it may come out of its seat.

When changing direction and the track cannot move sideways due to an obstacle, the track could become damaged and come out of its seat.



DANGER:

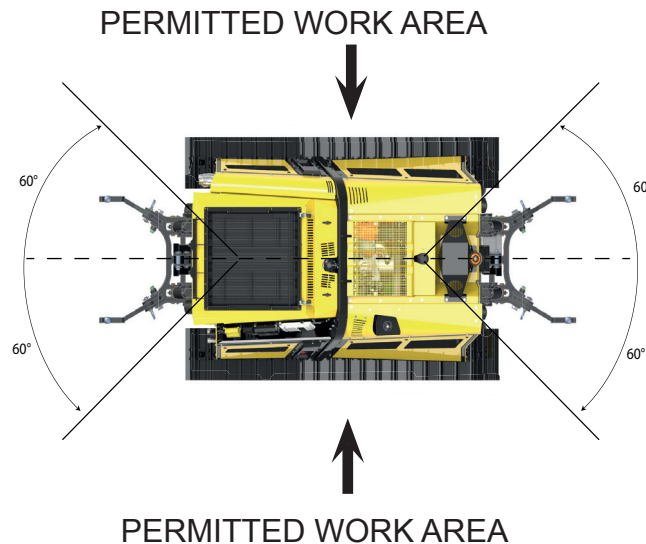


SLIPPING OR OVERTURNING

In order to avoid serious risks or the death of the operator it is prohibited to work on slopes that have hard surfaces (e.g. cement). Under these working conditions, always stand behind the machine or sufficiently far away from it (more than 20 m)

6.17 - COMMAND POST - OPERATOR WORKING AREA

- The operator must always be at a minimum distance of at least 5 m from the machine.
- The operator should have personal protective equipment PPE (footwear, overalls and protective glasses) Furthermore, in the case of particularly dusty work he or she is also advised to wear a mask.
- The operator must try to position him or herself with respect to the machine in the recommended work cone both to avoid being outside the movement area of the machine and in the area where objects might be kicked up.



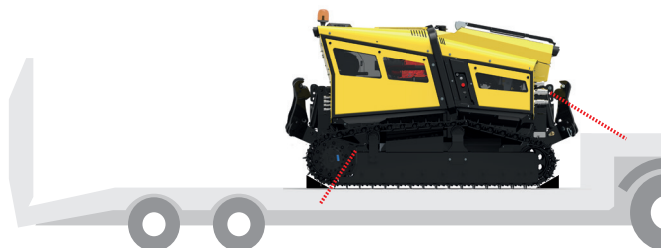


7- TRANSPORT AND HANDLING

7.1 - LOADING AND UNLOADING OPERATIONS FOR ROAD TRANSPORT

Use suitable vehicles with a carrying capacity of greater than 8000 kg to transport the machine to/from the work area.

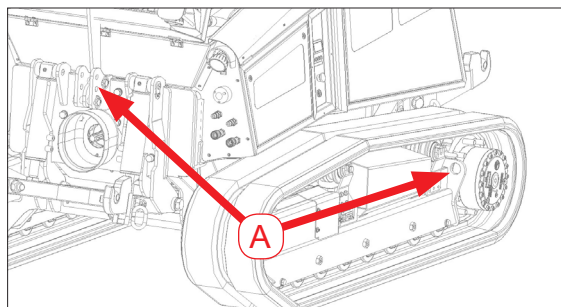
Use loading ramps hooked to the floorbed of the vehicle and positioned the correct distance from the tracks.



WARNING:

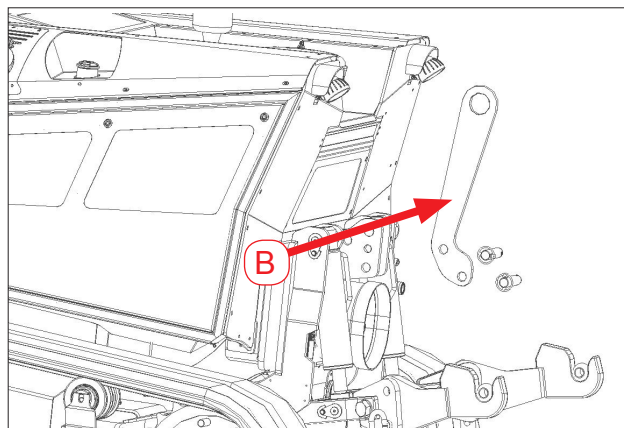
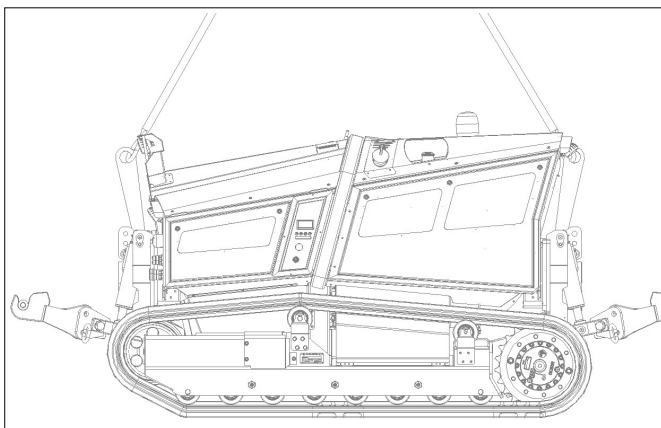


Use the appropriate hooks (A) on the truck to fix the machine to the vehicle



If the machine has to be lifted in order to load it, make sure to use suitable chains or wire ropes for lifting it.

Hook the ropes or chains to the raising hooks provided (B).





7.2 - TOWING THE MACHINE

DANGER:



- When the machine is to be towed, use a metal cable that is strong enough to tow the machine.
- It must be said that this manoeuvre is difficult and dangerous because the machine has tracks the weight of the machine and the frictions generated are considerable.

Should it be necessary to tow the machine because of faults in the diesel engine or other fundamental components, you must disengage the drive wheel reduction unit of the tracks on both sides mechanically

WARNING:



The disengagement device must be turned on and off only when the reduction unit is at a standstill on a flat surface

Do the following to carry out the disengagement:

1. Remove the closure cap (A).
2. Screw up on M6x1 screw (B).
3. With the assistance of the screw extract the pin until the limit switch.
4. Repeat the procedure on the other reduction unit.

At this point, both reducers are released and you can tow the vehicle.

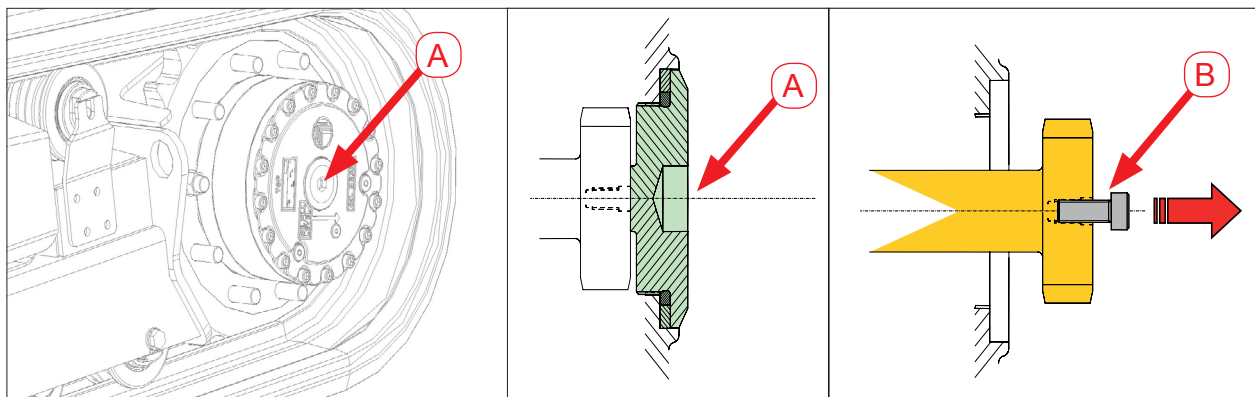
CAUTION:

Use the traction in a continuous and constant way, without revving. Arrange and fix the couplings of the machine to be removed in line with the towing vehicle and apply traction parallel to the axis of transfer.

Do not use worn out, broken, twisted or deformed cables.

Only tow the machine for short distances and only to enable it to be loaded onto a transport vehicle.

While towing the reduction unit must never exceed 90 rpms.





7.3 - USING THE MANUAL CONTROL

In the event that it is necessary to move the machine without using the remote control (e.g. batteries discharged), it can be done by connecting the manual control unit supplied with the machine.

In order to do this follow the instructions below:

1. Remove the cap of the socket on the control box (A).
2. Insert the connector and tighten the locking ring.

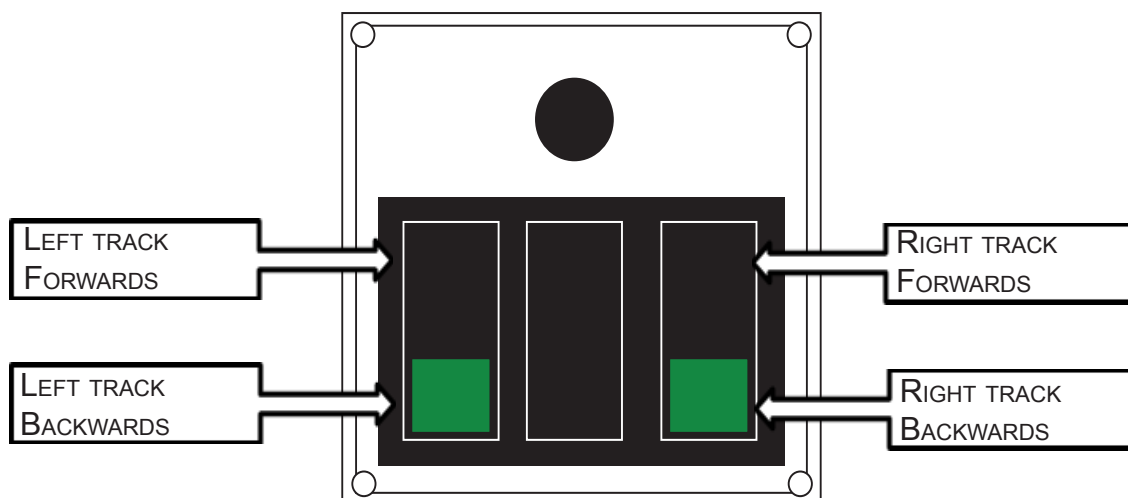
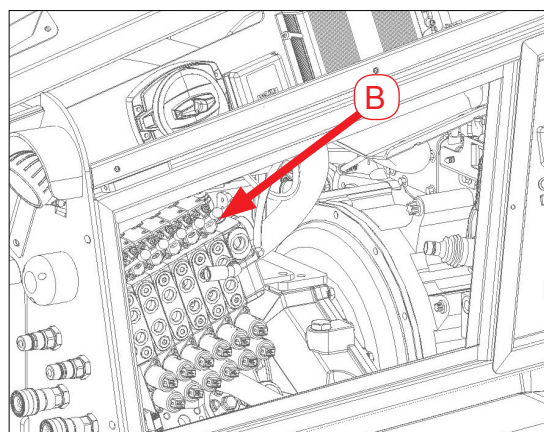
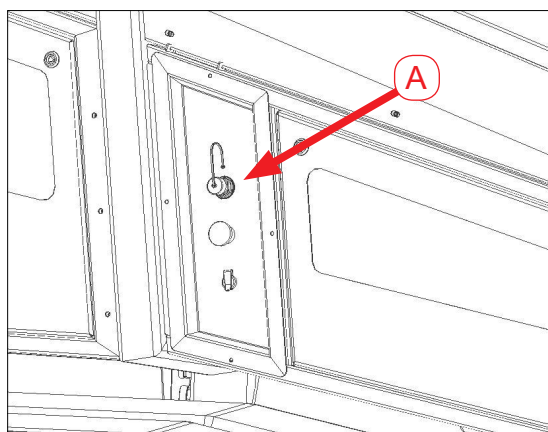
The engine can now be started using the ignition key.

To move the raisers (front-rear) use the levers (B) directly on the distributor.

WARNING:



Only use the manual control in the event of emergencies. With the manual command on, all the remote control operating functions are disabled.



In the case of the SCANRECO remote control, it is possible to transform the remote control into a wire control through the connection between the transmitter and receiver units with an appropriate cable.



8 - STORAGE

If the machine is stopped for long periods, it must be stored in a place protected from the elements to prevent damage. Before storing the machine, it is recommended that you clean it thoroughly and lubricate all mechanical components to protect them from rust. The machine should be stored at a temperature between 0°C and 40°C.

Before storing the machine for long periods, you are recommended to perform the following steps:

- Free the equipment (e.g. the rotor and the tools) from any cutting or other residuals;
- Clean the machine carefully;
- Visually inspect the whole machine to identify any structural damage or deep scratches on the paintwork. Make sure that the original safety signs are still present in their proper positions and that they are integral and legible;
- Grease all mechanical parts that are subject to friction, the locking pins and all machine parts that are no longer covered with their original coating of paint in order to prevent rust from forming;
- If possible, store the machine in a covered area and on a flat and firm surface;
- The machine must be stored with the equipment in the transport position;
- Make sure that the cabin is closed and that the controls are not accessible.

8.1 - DISMANTLING AND DECOMMISSIONING

Should you decide to no longer use the machine or part of it, it must be dismantled and decommissioned. Before scrapping, the plastic/rubber parts and electrical and electronic materials must be separated. Drain any used fluids and dispose of them in a dump/recycling facility equipped to handle this product. Carry out these operations according to the regulations in force.

WARNING:



If the machine or parts of it were decommissioned, all parts that could constitute a hazard must be made safe.

WARNING:



- Remember that every time you change the oil, replace batteries, rubber pipes, tyres and any other parts of the machine that should be disposed of separately, always refer to current legislation regarding waste disposal.
- Take used hydraulic fluid to a dump/recycling facility equipped to handle this product.



9 - MAINTENANCE

WARNING:



- Maintenance must only be carried out by suitably qualified personnel.
- Always wear personal protective equipment when performing any form of work on the machine.



9.1 - INTRODUCTION

To obtain the machine's best performances and ensure maximum durability of all its components, the instructions for use and maintenance must be followed carefully by machine operators. Therefore, we recommend our customers to carefully read these instructions and consult the manual any time they need advice on how to eliminate possible inconveniences. Because the machine usually operates in contact with water, sand, earth, etc., regular lubrication is necessary. This is of vital importance not only to ensure the long life of the machine, but also to keep running costs low. For further information, please contact our service centre:

McConnel Service Department: +44 (0)1584 875848

9.2 - GENERAL REQUIREMENTS

- - Before carrying out any maintenance or inspecting and / or checking the machine, turn off the diesel engine and remove the ignition key.
- - When removing or reinstalling machine parts, always use suitable extractors, spanners and equipment that will not damage the specified components.
- - To release parts that are solidly adherent, use copper or wooden hammers.
- - Separate the pieces of the various units and partially screw the nuts onto their corresponding pins or stud bolts. Clean the parts using brushes or rags, then wash them using paraffin or warm water and remove all residues using compressed air.
- After grinding or finishing using abrasive tools, thoroughly clean the parts, making sure that all the abrasive dust has been removed.
- - When re-assembling the pieces, make sure that they are clean. and then lubricate appropriately.
- - Pay great attention to the safety rings and cotter pins. Replace them immediately if there are signs of breakage.
- Maintenance of the machine and/or 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 only usually become necessary after years of good operation and which do not alter the characteristics of the machine. In the case of substantial modifications, the manufacturer cannot be considered liable for any risks that could arise.

These interventions must be performed by authorised personnel.



9.4 - INDICATIONS FOR THE CHOICE OF FLUIDS OR GREASES

9.4.1 - TABLE OF GREASES

COMPONENT	RECOMMENDED LUBRICANT	STANDARDS 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 AND BUSHINGS	MOLY GREASE EP NLGI2 or NLGI3EP GREASE	Black lithium soap grease with Molybdenum Disulphide For automatic greasing the use added CONTACT GREASE NLG2 with purple lithium soap is recommended.
BEARINGS	PAKELO GREENPLEX EP NLGI 2 GREASE	EP ADHESIVE Grease, Aluminium complex soap
REDUCTION UNIT Mineral oil	SAE 85W/140	API GL 5 MIL-L-2105 C
REDUCTION UNIT Synthetic oil	SAE 80W/140 SAE 75W/140	
COUPLER	PAKELO EROLUBE EP C ISO150	DIN 51517 Part 3, US STEEL 224, AGMA 250.04
MECHANICAL PTO	SAE 90 EP	API GL-4
JOHN DEERE		
ENGINE	JOHN DEERE PLUS-50 JOHN DEERE PLUS-50 II	API CJ-4, ACEA E9, ACEA E6
DEUTZ		
ENGINE	Q8 T905 10W-40	API CI-4/CH-4, API CJ-4, JASO DH-2, ACEA E6/E7/E9, DEUTZ DQC II-10 LA DEUTZ DQC III-10 LA DEUTZ DQC IV-10 LA

WARNING:



- When biodegradable oil is used with a mixture of more than 5%, no other oils can be mixed.
- If the machine was delivered with mineral oil contact McConnell Service for information regarding the procedure for replacing it with biodegradable oil.
- The use of non-recommended lubricants and/or grease results in the forfeiture of the warranty.



9.4.2 - COOLANT

Two types of coolant can be used in RoboPOWER:

1. **JOHN DEERE COOL-GARD II;**
2. **GLACELF AUTO SUPRA;**

1. JOHN DEERE COOL-GARD II (only for a OHN DEERE engine)

COOL-GARD II Premix coolant is available in different concentrations with antifreeze protection limits as shown in the following table.

COOL-GARD II Premix	Limit of antifreeze protection
COOL-GARD II 20/80	-9 °C
COOL-GARD II 30/70	-16 °C
COOL-GARD II 50/50	-37 °C
COOL-GARD II 55/45	-45 °C
COOL-GARD II PG 60/40	-49 °C
COOL-GARD II 60/40	-52 °C

Not all pre-mixed COOL-GARD II products are available in all countries.
USE COOL-GARD II PG when a coolant with a non-toxic formulation is required.

Also recommended is:

- *John Deere COOL-GARD II Concentrate* in a 40% to 60% concentrate solution in water of the quality indicated.

WARNING:

When you mix the coolant concentrate with water, do not use a coolant concentrate of less than 40% or more than 60%. If less than 40% it does not provide sufficient additives for rust protection. If more than 60% the freezing of the coolant and problems with the cooling system can occur.

- Coolant concentrate that meets ASTM D6210 requirements in 40% to 60% solution in water with indicated quality.

2. GLACELF AUTO SUPRA (JOHN DEERE and DEUTZ engines)

- Diluted GLACELF AUTO SUPRA in demineralised water becomes a permanent coolant that can be used all year round.
- To ensure a perfect mix it is essential to mix the antifreeze liquid with the dilution water mechanically.
- Protection from ice depends on the proportion of GLACELF AUTO SUPRA diluted in the water.

GLACELF AUTO SUPRA;	33	40	50	68
Temperature reached for the appearance of the first crystals, C°.	-20	-26	-37	-69



- A volume of 33% of GLACELF AUTO SUPRA is to be recommended in the final mixture.
- The maximum protection against ice is achieved at 68%.
- Do not use in concentrations higher than 70%.

GLACELF AUTO SUPRA corresponds with the main international antifreeze specifications (AFNOR NFR 15-601, ASTM D 3306, ASTM D 4656, ASTM D 4985, BS 6580).

9.4.3 - FUEL

- - We recommend the use of fuels compliant with Standards EN 590 or ASTM D975. Other fuels with different specifications can damage the engine or reduce its power. For further details and/or explanations, consult the annexed engine manual.
- When refuelling, check that there is no water on the lid of the fuel drum and do not suck up condensed water from the bottom.
- After running out of fuel, or after changing the fuel filter, bleed the air from the fuel lines.

DANGER:



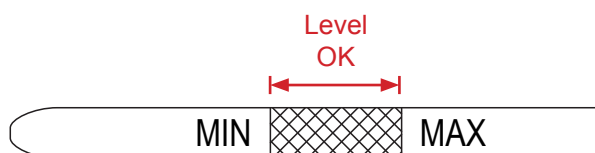
When handling fuel or coolant, do not smoke or work near heat sources or sparks. Store flammable fluids away from areas with risk of fire. Do not incinerate or burn containers t machine is free from dirt, grease or inflammable residuals.

9.5 - ENGINE MAINTENANCE

9.5.1 - ENGINE OIL CHECK

To check the level of engine oil, remove the rear left-hand panel using the appropriate spanner. The engine oil level **is checked daily** on a marked dipstick (**A**) and must be between the MIN. and MAX signs. The engine oil level must be checked when the engine cold and with the machine parked on a horizontal surface.

If the engine oil level is near the MIN sign. Top it up by unscrewing the cap (**B**) and adding oil until the level is in the field between MIN and MAX, when verifying this situation during the top up wait a few moments before carrying out the check.



WARNING:

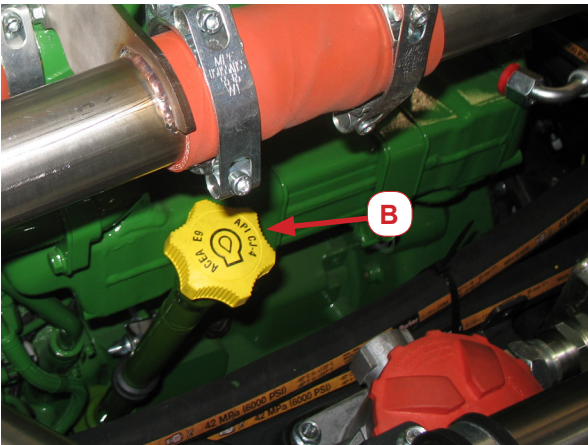
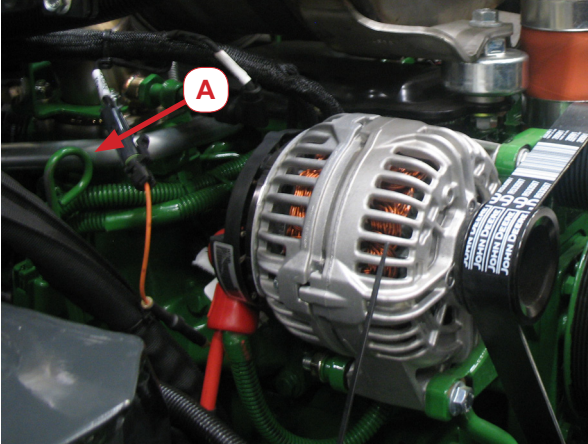


The choice of engine oil is to be made very carefully, refer to the table in section 9.4.

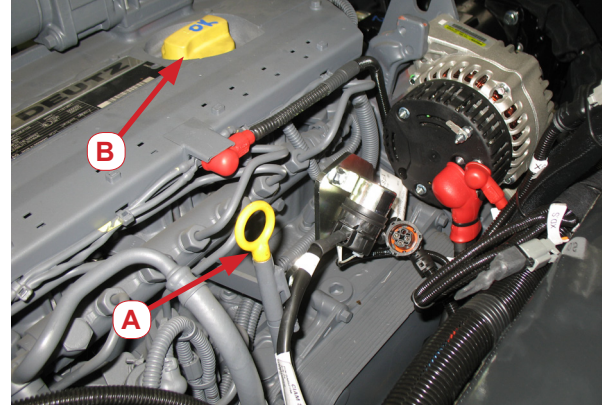


Engine oil check

JOHN DEERE



DEUTZ



DANGER:



When the engine has just been switched off it may be very hot. Therefore, do not check the engine oil until the engine has cooled down.

Wear protective clothing when checking the oil level or topping it up.

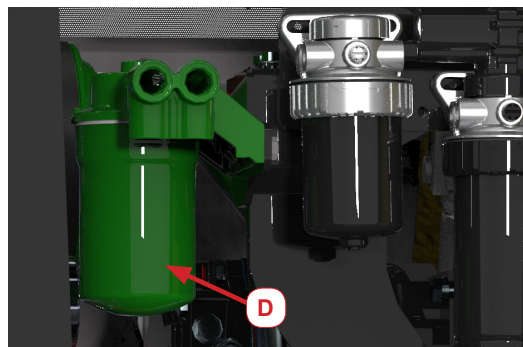
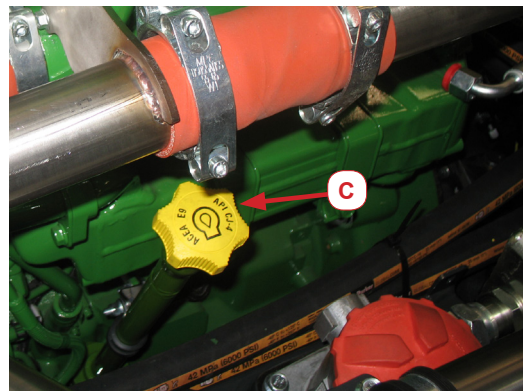
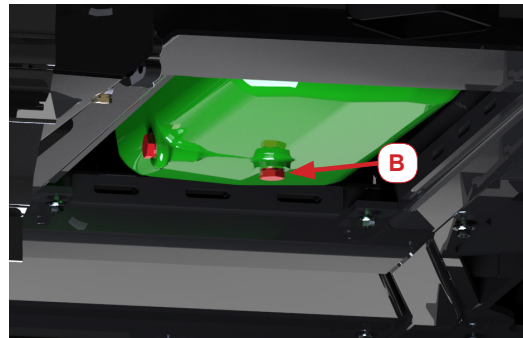
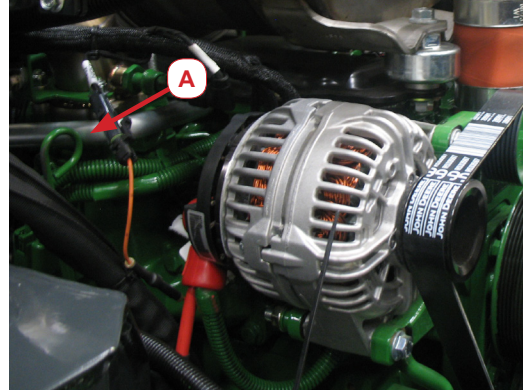


9.5.2 - REPLACEMENT OF THE FILTER AND THE ENGINE OIL

JOHN DEERE - Replacement of the filter and the engine oil

Perform the operations listed below for the replacement of the filter and engine diesel oil (**every 250 hours**):

- Run the engine for around five minutes to heat the oil.
- Position the machine on a level surface, turn off the engine and remove the ignition key
- Remove the bottom guard.
- Open the oil filler cap (C)
- Remove the oil sump drainage cap (B).
- Drain the oil from the bottom whilst it is still warm and collect it in appropriate tanks.
- Put back the plug (B) of the oil sump once all the oil has drained out.
- Turn the filter cartridge (D) with the appropriate spanner and remove it.
- Apply a thin film of clean oil to the new filter in the external and internal seal and the thread of the filter.
- Dry the filter seal head properly with a clean rag and refit the filter tightening it with the spanner (max torque 15-17 Nm);
- Fill the sump with **20.5 litres** of oil using suitable engine oil (see the oils and greases table 9.4.1) and close the filler cap.
- Start the engine and leave it running for approximately 5 minutes, turn the engine off and after approximately 3 minutes check the oil level using the dipstick (A).

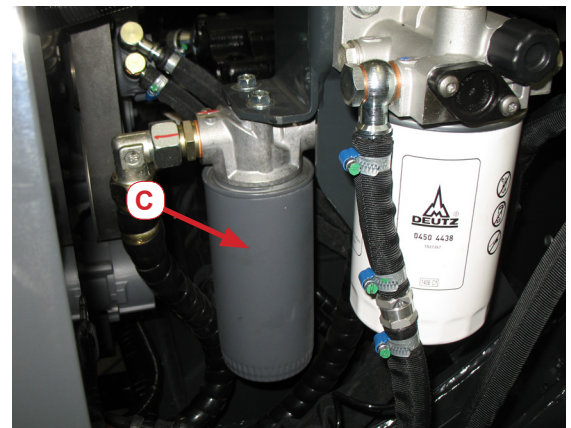
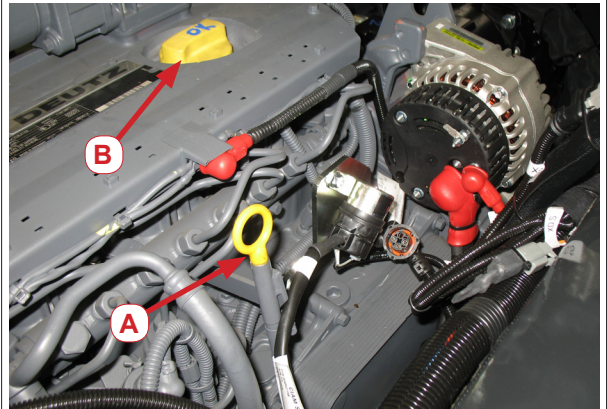




DEUTZ - Replacement of the filter and the engine oil

Perform the operations listed below for the replacement of the filter and engine diesel oil (**every 250 hours**)-

- Run the engine for approximately 5 minutes to warm the oil and then turn it off.
- Position the machine on a level surface, turn off the engine and remove the ignition key.
- Remove the bottom guard.
- Open the oil filler cap (B).
- Remove the oil sump drainage plug.
- Drain the oil from the bottom whilst it is still warm and collect it in appropriate tanks.
- Put back the oil sump plug back once all the oil has drained out.
- Turn the filter cartridge (C) with the appropriate spanner and remove it.
- Apply a thin film of clean oil to the new filter in the external and internal seal and the thread of the new filter.
- Dry the filter seal head properly with a clean rag and refit the filter tightening it with the spanner (max torque 15-17 Nm);
- Fill the sump with **11 litres** of oil using suitable engine oil (see the oils and greases table 9.4.1) and close the filler cap again.
- Start the engine and leave it running for approximately 5 minutes, turn the engine off and after approximately 3 minutes check the oil level using the dipstick (A).



DANGER:



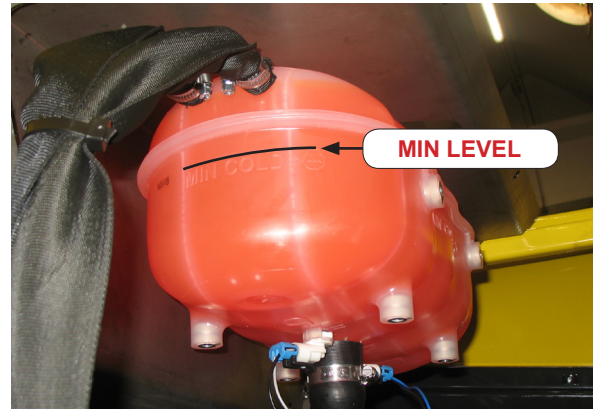
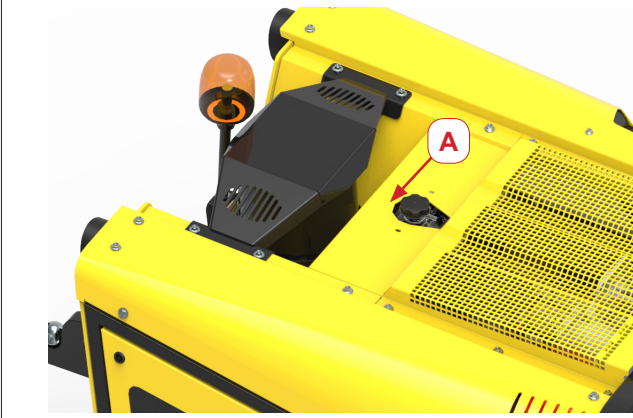
- Do not carry out these operations if the engine has just been switched off. Wait until the engine becomes warm (40-45°C).
- The oil spilled during the change can cause personnel to slip. Wear protective clothing and anti-slipping shoes and immediately remove any traces of oil.
- Since the oil and filter are considered special waste, they must be disposed of according to the antipollution regulations in force.



9.5.3 - COOLANT LEVEL CHECK

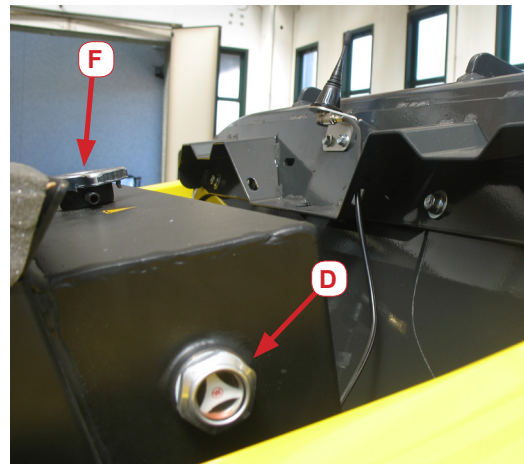
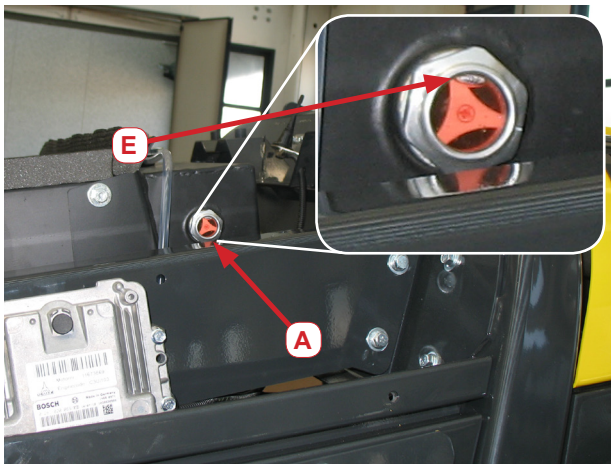
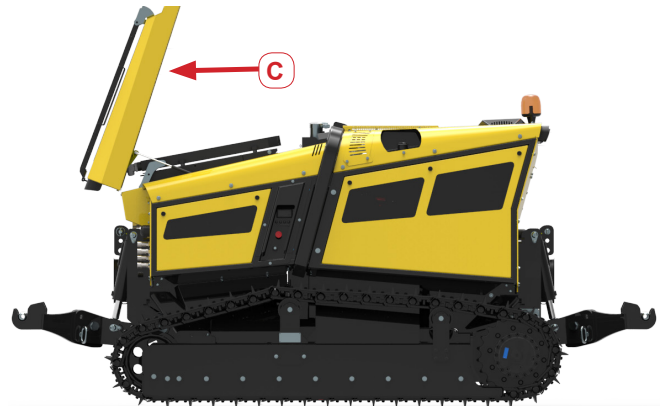
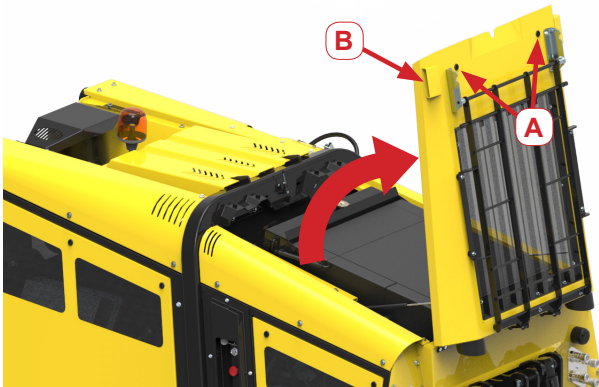
JOHN DEERE - Coolant level check

The level of the coolant must be **checked every day** on the tank, accessible from both sides of the machine. You can access them by removing the rear side panels after undoing the locks. Top it up as in the figure if required. To restore the level, open the cap (A) and top up.



DEUTZ - Coolant level check

The level of the coolant must be **checked every day** on the tank, accessible from both sides of the machine. You can access them by removing the rear side panels after undoing the locks. Top it up as in the figure if required. To restore the level, open the cap (A) and top up.





DANGER:



Explosive release of fluids from pressurised cooling system can cause serious burns.

- Stop the engine.
- Only remove the filler cap when the engine is cold or when it is cool enough to touch with bare hands.
- Before removing the cap, loosen the cap slowly to the first stop to relieve the pressure. There can be a danger of ejection of the pressurised fluid at high temperatures.
- The check must be carried out with the machine parked on level ground with the engine stopped and the equipment on the ground.
- The coolant contains antifreeze and it is inflammable. Do not use naked flame around it and do not smoke while topping up.

9.5.4 - COOLANT LEVEL CHANGE

DANGER:

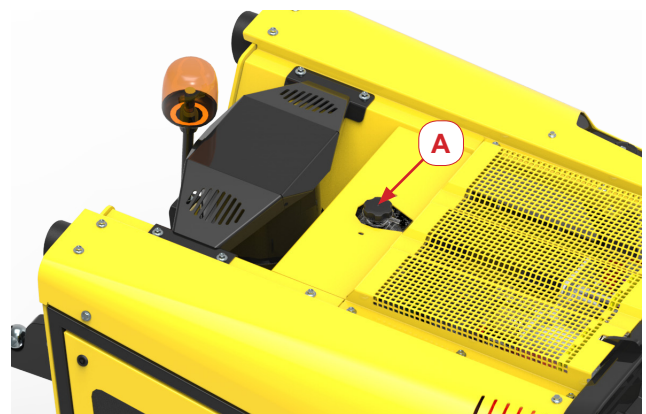


- The violent expulsion of coolant under pressure can cause serious burns.
- Turn off the engine.
- Remove the fuel filler cap only when it has cooled down enough to be touched with the bare hand. Before removing the cap, slowly loosen it until the first stop to relieve the pressure.

Coolant	Changing frequency	
	Hours	Years
<i>John Deere COOL-GARD II</i>	6000	6
<i>Glacelf AUTO SUPRA</i>	2000	2
<i>Other coolants</i>	2000	2

JOHN DEERE - Coolant change

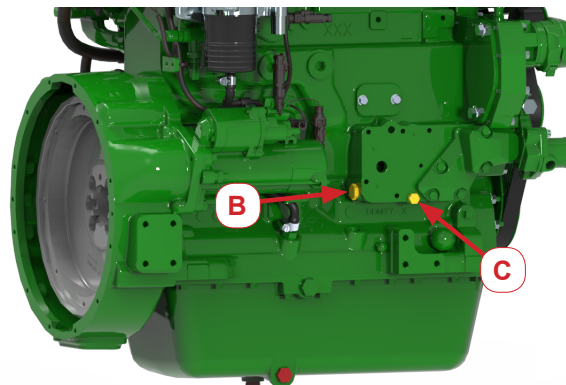
1. Gingerly open the cap of the expansion tank (A) to relieve the pressure and to allow the coolant to flow out more quickly.
2. Open the coolant drainage cap on the oil heat exchanger box (B) or the single block drainage cap (C)
3. Open the radiator drainage valve. Drain all the coolant from the radiator.
4. Remove the thermostats at this point if this has not already been done. Install the cap (without seals or thermostats) and tighten the screws to the specified torques.
5. Test the thermostat opening temperature.
6. After draining all the liquid close all the drainage valves.





JOHN DEERE - Coolant change

7. Fill the coolant plant with clean water. Run the engine for approximately 10 minutes to remove any rust or sediment.
8. Stop the engine, remove the lower radiator hose and remove the radiator cap. Drain the water immediately from the system before the rust and sediment settle.
9. After draining the water close the drainage valve. Fit the radiator cap, hose and relative clamp again. Fill the coolant tank with clean water and a heavy-duty detergent for coolant systems e.g. Fleetguard® RESTORE™ and RESTORE PLUS™. Follow the manufacturer's instructions on the plate.
10. After cleaning the coolant system, drain the detergent and fill with water to wash the system. Turn the engine for around ten minutes, remove the radiator cap and remove the lower radiator hose to drain off the washing water.
11. Close all the engine and radiator drainage valves. Refit the radiator hose and tighten the clamp properly. Install the thermostats.
12. Add the coolant to the expansion tank. The coolant level must be at the bottom of the expansion tank filler hole or the radiator filler hole. If there is a translucent expansion tank, the level of the coolant must be on the filler indicator on the said tank. Install the radiator cap. The capacity of the engine coolant system is **14 litres** of coolant.
13. Turn the engine over until reaching the operating temperature. In this way the solution is mixed evenly and is circulated through whole system. The normal engine coolant temperature range is 85/97 °C.
14. After turning the engine over, check the coolant level and the sealing of the entire coolant system.



DANGER:



- Do not turn the engine over for more than 10 minutes.
- If you do it is possible that the engine could overheat causing burns while the radiator water is drained off.

WARNING:



- During filling it is necessary to vent the cooling system
- Check that the expansion tank is full to the proper level and that the automatic exhaust tubes are free from obstructions.
- The cooling system must be absolutely air free while the engine is functioning otherwise there is a danger of damaging the EGR heat exchanger.



DANGER:

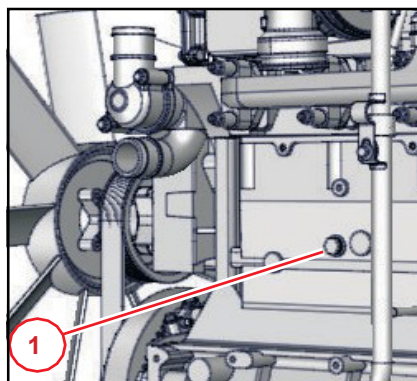


- Dispose of the coolant that has come out in conformance with the relative norms and do not let it penetrate the soil.
- Improper disposal of waste can threaten the environment and nature. For the correct disposal or recycling of waste, refer to the appropriate bodies.
- Only use recommended protective agents in the coolant system of the machine.
- Never use the motor without coolant even for a short time!

Deutz - Coolant change

Perform the operations listed below to change the coolant (*every 1000 hours*):

- Turn off the engine.
 - Wait for coolant cap to cool down.
 - Very carefully loosen the coolant cap as far as the first stop thus releasing the pressure that has been left in the radiator.
-
- Undo the radiator cap.
 - Place a suitable collection receptacle.
 - Remove the closure key (1) from the engine block.
 - Drain off the coolant.
 - Reapply the key (1) with sealant adhesive;
 - Fill with coolant up to the filling of the indicator as in figure (2);
 - Close the radiator cap;
 - Turn on and heat up the engine until you reach the operating temperature (thermostat opening temperature);
 - Stop the engine;
 - Check the level of the cooled engine coolant and, if necessary, top up until the indicator is full as in figure (2).



DANGER:



- **Burning hazard from very hot coolant!**
- **The cooling system is under pressure!**
- **Only open the cap when it has cooled down.**
- **When handling fuel or coolant, do not smoke or work near heat sources or sparks.**



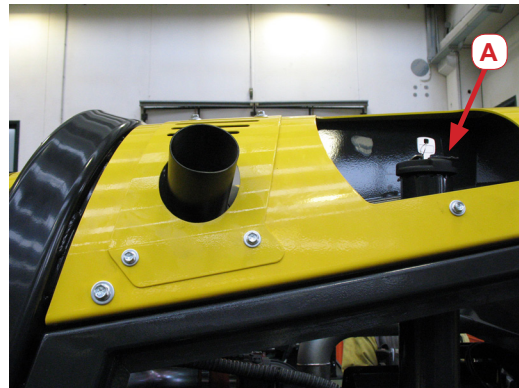
DANGER:



- Dispose of the coolant that has come out in conformance with the relative norms and do not let it penetrate the soil.
- Improper disposal of waste can change the environment and the eco-system. For the correct disposal or recycling of waste, refer to the appropriate bodies.
- Only use recommended protective agents in the coolant system of the machine.
- Never use the motor without coolant even for a short time!

9.5.5 - FUEL LEVEL CHECK

The fuel level is checked visually on the LCD when the machine on a level surface. If the level falls to reserve a warning light comes on and a beeper sounds. To top up the fuel, turn off the engine, open with the spanner and unscrew the fuel filler cap (A) and fill up; do not fill the tank to the brim but leave space for expansion. Lock the cap with the key.



DANGER:



- When refuelling, avoid spilling fuel as it could cause a fire
- If fuel is spilt accidentally, clean the contaminated area thoroughly.
- The fuel is highly inflammable, therefore do not use naked flames and do not smok when refuelling. Also keep the fuel dispenser nozzle or fuel can in contact with the fuel filler to avoid sparks
- Use protective clothes when refuelling.



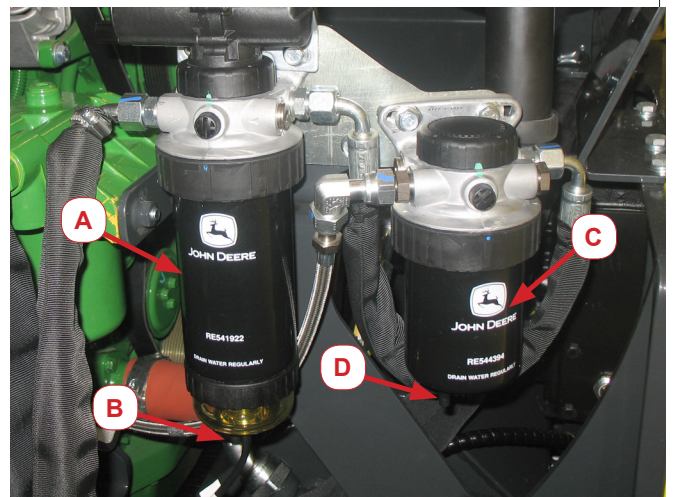
9.5.6 - DRAINAGE OF THE FUEL DECANter

JOHN DEERE - Drainage of the fuel decanter

The engine is fitted with a sensor detector water in the fuel for the main fuel filter (C). The warning light shows the operation when it is necessary to drain water from the filter cup.

Check that the main fuel filter (A) and the final fuel filter (C) are free of water or detritus **C**. If the filter is fitted with a transparent cup, drain on the basis of the daily visual inspection.

1. Undo the drainage hole caps by half a turn or one turn (B)(D) from the bottom of the fuel filter.
2. As soon as the oil starts to flow out, tighten the drainage hole plugs. After draining the water from the fuel filters, ready them for the purpose by venting the fuel feed system completely.



DANGER:



- This operation must be carried out with engine off.
- Because the fuel is highly inflammable, do not get close to it with naked flames a do not smoke whilst performing this operation.
- Clean the area soiled by the fuel immediately.
- Wear protective clothing when carrying out this operation.

DEUTZ- Drainage of the fuel decanter

If there is condensate in the fuel decanter, an error code will appear on the screen (89/97/FIFCD_WtLvl). Drain the decanter (**every day**) by opening the vent plug (A) until all the condensate has drained out and clear fuel begins to flow out. Tighten the drain plug as soon as fuel starts to flow out.

IMPORTANT: Collect the water in a suitable container and dispose of it properly.





DANGER:



- This operation must be carried out with engine off.
- Because the fuel is highly inflammable, do not get close to it with naked flames and do not smoke whilst performing this operation.
- Clean the area soiled by the fuel immediately.
- Wear protective clothing when carrying out this operation.

9.5.7 - REPLACING THE FUEL FILTERS

JOHN DEERE - Replacing the fuel filters

Perform the operations listed below to change the fuel filters (*every 500 hours or 12 months*)

NOTE: Both the main filter and the final filter cartridges will always be replaced together.

Removal of the main fuel filter cartridge

NOTE: refer to the coupon manual for the necessary information about proper maintenance and replacement frequency in hours.

Removal of the main fuel filter cartridge

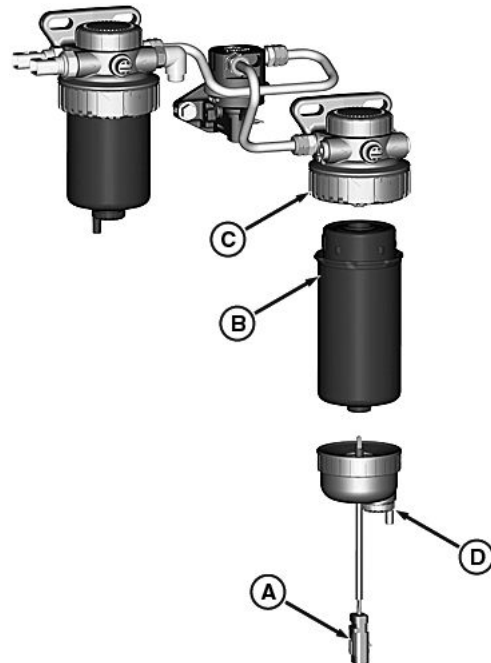
NOTE: refer to the coupon manual for the necessary information about proper maintenance and replacement frequency in hours.

1. Carefully clean the filter head and the area around it to prevent dirt or impurities getting into the fuel feed system.
2. Connect the hose to the filter drainage valve (E) at the bottom of the filter and run off all the fuel from the filter box.
3. Disconnect the water in the fuel presence detector (A).
4. Remove the fuel filter box (B).
5. Pull the filter cartridge (C) down.

Installation of the main fuel filter cartridge

1. Place the new o-ring (D) on the filter box.
2. Apply a thin fuel layer on the o-ring.
3. Place the cartridge in the filter box ensuring that the tabs at the bottom in the box are properly inserted.
4. Position the new cartridge properly inside the assembly base then tighten the check ring by approximately 1/3 of a turn until inserting it in the restraint. Do not tighten to much.
5. Reconnect the water in the fuel presence detector.

IMPORTANT: do not fill the new filter with fuel before installation so as not to contaminate the fuel system with non-filtered fuel.





JOHN DEERE - Replacing the fuel filters

Removal of the final fuel filter cartrid

NOTE: refer to the coupon manual for the necessary information about proper maintenance and replacement frequency in hours.

1. Carefully clean the filter head and the area around it to prevent dirt or impurities getting into the fuel feed system.
2. Connect a hose to the filter drainage valve (C) at the bottom of the filter and run off all the fuel from the filter cartridge.
3. Undo the fuel filter cartridge (A) and remove it.

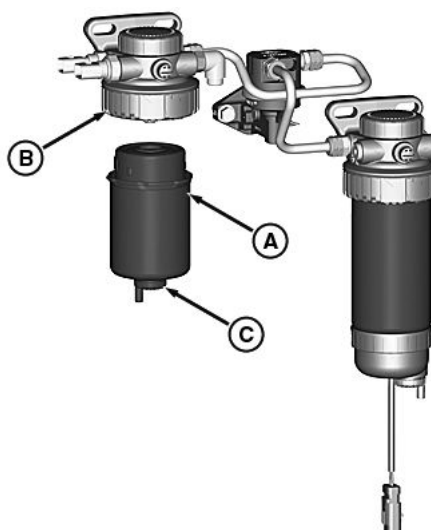
Installation of the final fuel filter cartrid

1. Insert the new seal (B) on the filter cartridge.
2. Apply a thin fuel layer on the seal.

IMPORTANT: do not fill the new filter with fuel before installation so as not to contaminate the fuel system with non-filtered fuel.

3. Position the new cartridge properly inside the assembly base then tighten the check ring by approximately 1/3 of a turn until inserting it in the restraint. Do not tighten to much

NOTE: Before starting the engine, turn on the ignition for sixty seconds to prime the fuel flow.



DEUTZ - Replacing the fuel filters

Perform the operations listed below to change the fuel filters (**every 1000 hours**):

1. Stop the engine.
2. Stop the fuel feed.
3. Place a suitable container to catch the fuel that flows out.
4. Detach the electrical cables.
5. Loosen the drain plug and let the fluid flow out.
6. Dismantle the filtering element.
7. Remove any dirt from the sealing surface of the new filter cartridge and the side opposite the filter head.
8. Slightly moisten the sealing surfaces of the filter cartridge with fuel and screw it to the head of the filter clockwise (17-18 Nm).
9. Fit the drainage plug. Tightening torque 1.6 +/- 0.3 Nm.
10. Attach the cable connections.
11. Open the fuel closure tap and bleed the system.





9.5.8 - BLEED THE FUEL DISTRIBUTION SYSTEM

DEUTZ - Bleeding the fuel distribution system

1. Loosen the bleed screws (A).
2. Unlock the bayonet lock (B) of the fuel delivery pump by pressing and simultaneously turning anticlockwise. The pump piston is now pushed out by the spring.
3. Pump until no more air comes out of the bleed screw.
4. Tighten the bleed screw completely. Tightening torque 6.5 +/- 1.3 Nm
5. Lock the bayonet lock of the fuel delivery pump by pressing and simultaneously turning clockwise.
6. Start the engine for about 5 minutes at idle or at a reduced load. Check the tightness of the pre-filter.



9.5.9 - CLEANING OR REPLACING AIR FILTERS

DANGER:



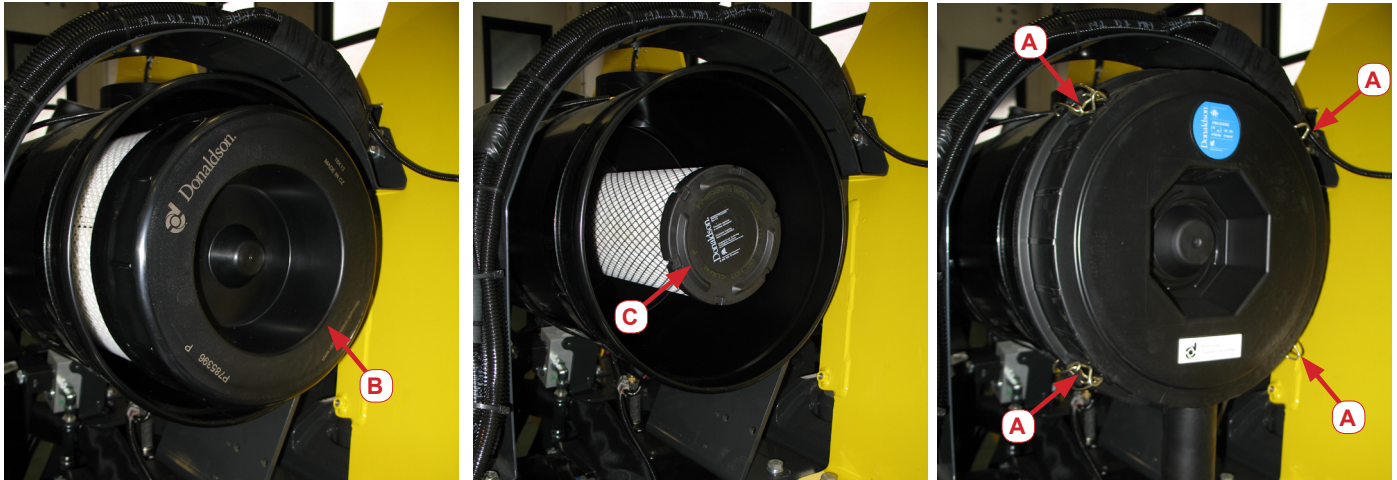
Remove the filter only with the engine off and do not start the engine with the air filter open. Wear protective clothing when carrying out cleaning.

CAUTION:

The air filter assembly consists of a primary large capacity cartridge and a safety cartridge. The primary cartridge can be cleaned with a jet of air and the safety cartridge must be replaced only. Replace the primary cartridge after 6 cleaning operations or after 1 year. Whenever you replace the primary cartridge, replace also the safety cartridge.

To clean (**daily**) and replace (**at 1000 hours**) the air filter assembly cartridges:

- Remove the rear left-hand panel with the key for the purpose;
- Open the four fixing hooks (A). And remove the cover.
- Pull the primary cartridge (B), if the extraction of the cartridge is difficult, make small rotation movements and at the same time pull the cartridge, clean it with a jet of air or replace it as needed.



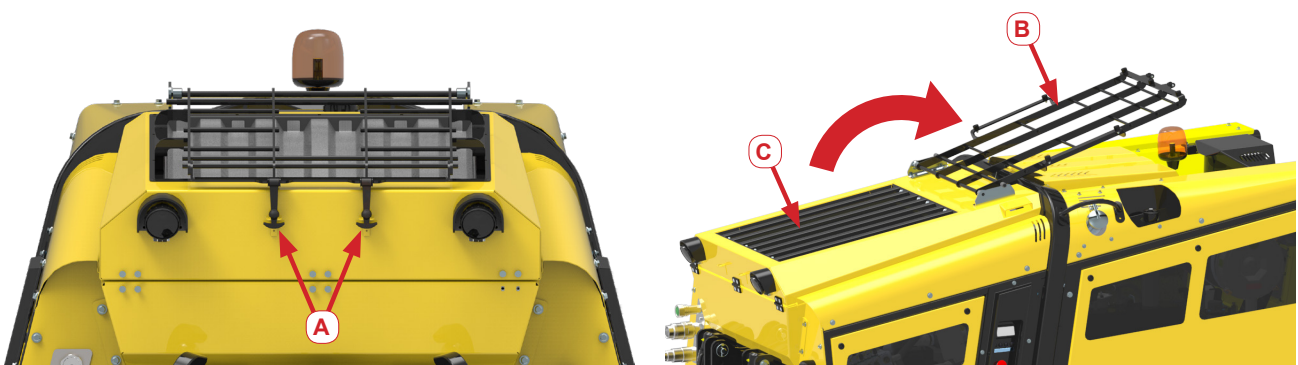
- Pull the safety cartridge (C) out, if the extraction is difficult, make small rotation movements and at the same time pull the cartridge, replace the safety cartridge every time the primary cartridge is changed.
- Reinsert the cover and fix it with the four hooks (A).

WARNING:



- Do not wash the air filter elements
- Do not use solvents.
- Do not use compressed air, it could damage the cartridge.
- Do not oil the cartridges.

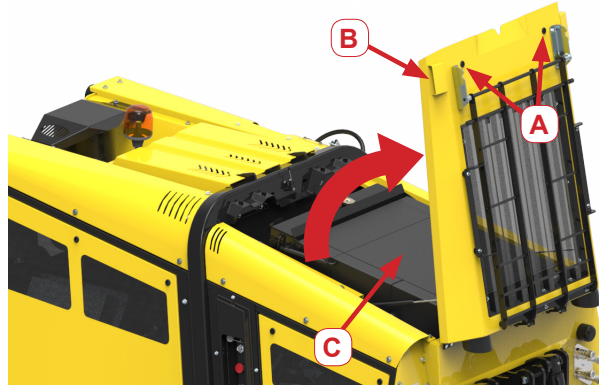
9.5.10 - EXTERNAL CLEANING OF THE RADIATOR GRILLE



To clean the outside of the radiator grille (**daily**) unhook the two tie rods (A) lift the grille guard (B). Clean the grille (C) externally with a jet of compressed air or with special products following the instructions on the container of the aforesaid products. At the end of the operations, dry the washed parts. Close the guard (B) and hook the two tie rods (A).



9.5.11 - CLEANING THE RADIATOR AND INTERCOOLER



For greater cooling system efficiency, you should check the radiator **before it is used each time** and **clean it if necessary** in addition to the FAN DRIVE system cleaning (paragraph 6.4.22). For cleaning the radiator, open the two locks (A) with the key supplied for the purpose, lift the radiator lid using the handles. Clean the radiator (C) externally with a jet of compressed air or with specific products following the instructions on the container of said products. At the end of the operations, dry the washed parts. Close the radiator casing and the two locks (A).

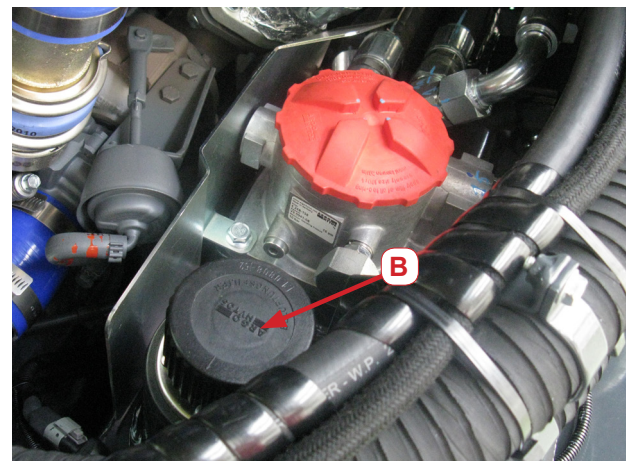
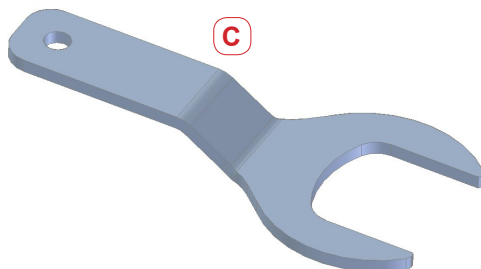
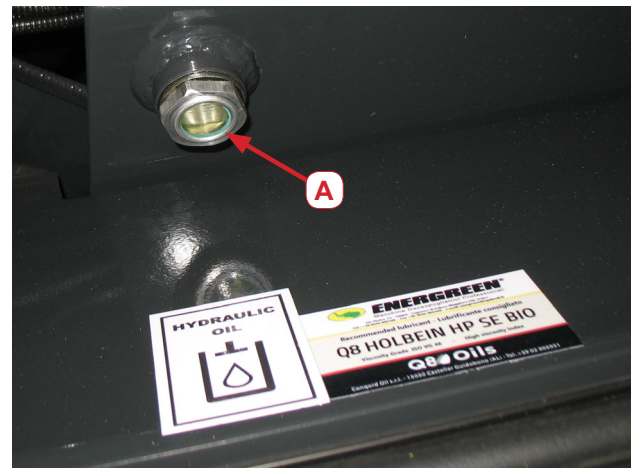
9.6 - MAINTENANCE OF THE HYDRAULIC SYSTEM

9.6.1 - CHECK OF THE HYDRAULIC OIL LEVEL

By removing the rear right-hand panel, you can check the hydraulic oil level from the indicator (A) on the hydraulic circuit oil tank. To check the oil, the machine must be on a level surface. The oil level must fall between the MIN and MAX signs. If the oil level is near the MIN level, top up.

To top up, unscrew the cap (B), with the relevant safety key (C) provided, and top up with oil until the level has been restored. Close the cap.

Check the oil level every day.





CAUTION:

- Do not top up oil beyond the **MAX** level, this could cause oil to leak from the tank.
- Restore the level only using the hydraulic oil shown in the table (see 9.4).
- When using biodegradable Panolin HLP Synth E oil , avoid mixing it with other oils.
- The use of non recommended lubricants and/or grease results in the forfeiture of the warranty.

DANGER:



- Top up the oil level of the hydraulic circuit after having turned off the diesel engine and having closed all the cylinders of the boom.
- Use protective clothes when topping up.
- If the hydraulic oil level is too low, it is not possible to activate the front and rear hydraulic PTO.

9.6.2 HYRAULIC OIL CHANGE

The hydraulic oil must be changed at regular intervals in order to ensure proper lubrication and viscosity in the hydraulic pumps. Refer to the following table for the frequency of substitutions and the type of oil to be used.

WARNING:



Always fill with the same type of oil that was removed. Do not mix different types of oil

Type	Make	Substitution by
Mineral	Q8 HELLER 46	1000 hours
Biodegradable	Q8 HOLBEIN HP SE BIO 46	2000 hours
	PANOLIN HLP SYNTH E 46	15000 hours

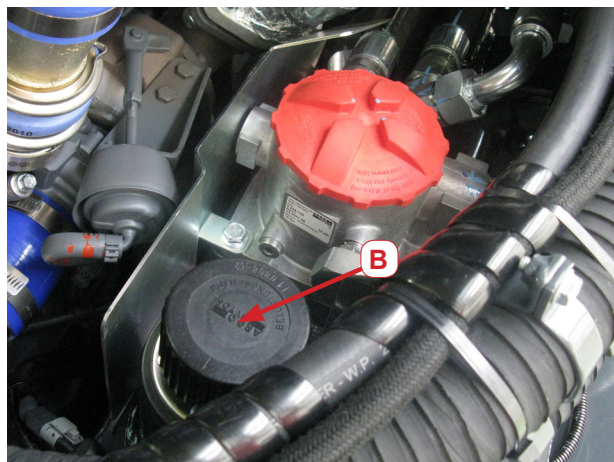
Do the following for for the oil change:

- Stop the machine on a level surface and raised off the the ground in order to be able to carry out the operations in safety.
- Remove the guard at the bottom and carefully clean all the parts before opening the oil drainage plug (A).





- Open the oil tank top up cap (B).
- Remove the drainage plug from the tank using the 10 mm spanner being careful to collect the spent oil in a container of at least 100 litres.
- Tighten the cap (A) at the end of the operation.
- Put around **100 litres** of new oil in according to the type used (make reference to the previous table).
- Check the level on the visual control indicator.
- As soon as the correct oil level between the MIN and the MAX has been reached, start up the engine and let it run for ten seconds, repeat the operation until the supercharging pressure is reached on the pumps (20-22 bar).
- Turn the engine off again and recheck the oil level.
- If necessary, top up the oil pressure until the relative level lies between maximum and minimum.



DANGER:

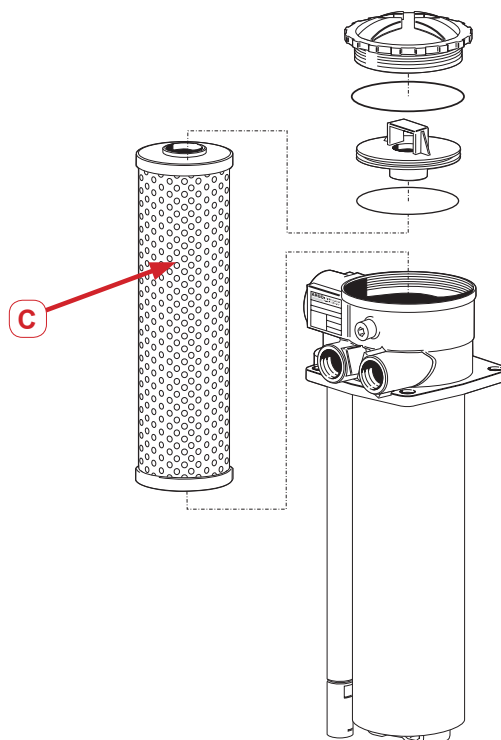


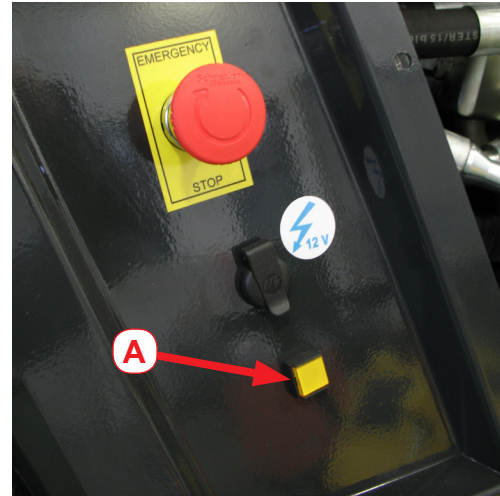
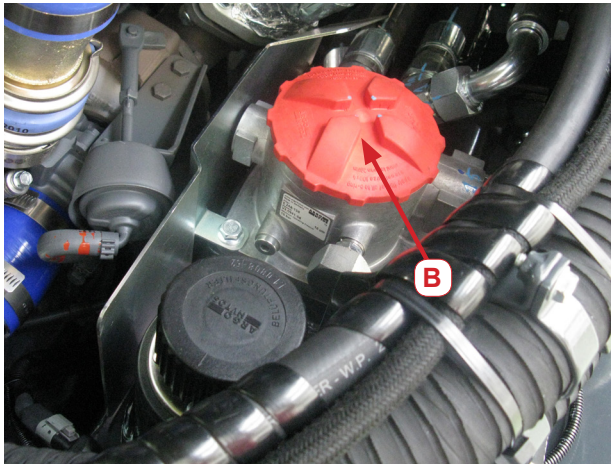
The check must be made with the machine off, the equipment resting on the ground and with cold oil. The machine must be on solid and flat ground

9.6.3 - CHECK AND REPLACEMENT OF THE HYDRAULIC OIL FILTER

The hydraulic oil filter **must be replaced every 1000 hours or when the clogging warning light (A) on the right-hand control panel turns on** (paragraph 6.7).

- Unscrew the red cap (B) above the filter.
- Extract the filtering element (C);
- Filters should only be replaced with original filters and before they become completely clogged.
- Check always the O-ring status when a component of the hydraulic circuit is dismantled or is replaced. If broken or damaged, replace them.
- Close the cap again and tighten it with the spanner with a maximum torque of 20 Nm.



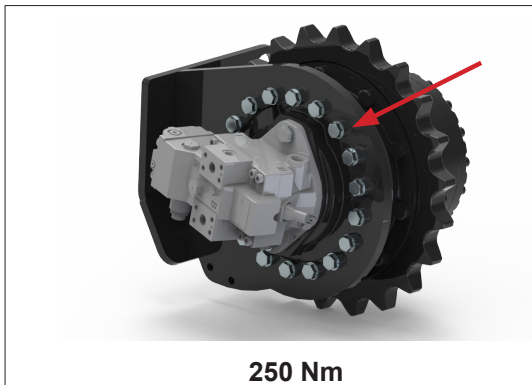


9.7 - CHECKING AND MAINTAINING THE REDUCTION GEAR

When functioning normally the motor reduction gear does not require any maintenance beyond the checking and changing of the oil.

Every 250 hours the tightness of the fastening screws **must be checked**.

Check the tightness of all the screws with a torque wrench.



The reduction gear oil must be changed for the first time when the first 150 hours have elapsed. While the **subsequent changes** must be made every **500 hours**.

Perform the operations listed below:

- Position the machine on a level surface then turn the tracks until the drainage plug (B) is at the lower part of the reduction unit.
- Turn off the engine and remove the ignition key
- Open the plug on the higher level (A).

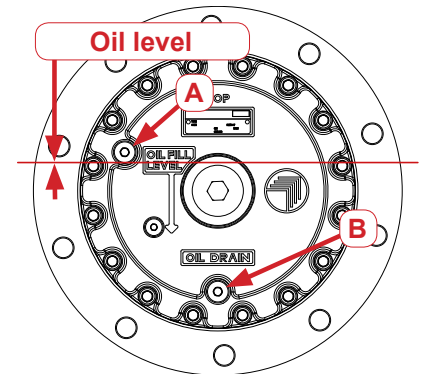


WARNING:



Remove the oil caps very carefully because a possible overpressure inside the gear reducer could expel them violently outwards.

- Undo the drainage plug (B) and let the oil flow out into a sufficiently large receptacle; to facilitate the drainage operation you should work while the oil is warm.
- Wait for a few minutes until all the oil has run out then screw the plug (B) back in.
- Refill the reduction gear with the appropriate oil (see paragraph 9.4.1.) through the hole of the cap (A);
- Screw up the cap (A).



Check the level of the oil in the reduction gear **every 250 hours**.

DANGER:



- The oil spilled during the change can cause personnel to slip. Wear protective clothing and anti-slipping shoes and immediately remove any traces of oil.
- Since the oil is considered special waste, it must be disposed of according to the anti-pollution regulations in force.

9.8 - MAINTENANCE OF THE HYDRAULIC MOTORS AND HYDRAULIC VALVES

Periodically check that:

- There are hydraulic motor and hydraulic oil leaks. If there are try tightening the fixing screws.
- The hydraulic fittings connected to the motor and valves are not loose. If they are, tighten them.

If the problem persists, Contact ENERGREEN's customer services.

DANGER:



- At operating temperature the hydraulic oil is boiling and sometimes under pressure too.
- Avoid the skin coming into contact with the boiling oil or its conduits.



9.9 - CHECKING AND MAINTAINING THE ELECTRICAL SYSTEM

This is a visual inspection that must be carried out with the utmost care in order to avoid short-circuits in the system that would damage the machine.

Specifically check **every 250 hours**

- Fuses, if corroded or rusty, replace them with fuses of the same capacity.
- Batteries (B), check the battery clamp connections and if they are rusted, if they are, remove the rust and cover them with the appropriate grease. When carrying out this operation, be very careful not to let the earth wire (black) touch the power supply wire (red).
- Starter motor, check the cables.
- Alternator, check the cables.
- Check the tightness of connectors

WARNING:



If the cables show signs of a short circuit, look for the causes and contact the McConnel Service Department.

Electrical system maintenance tasks are:

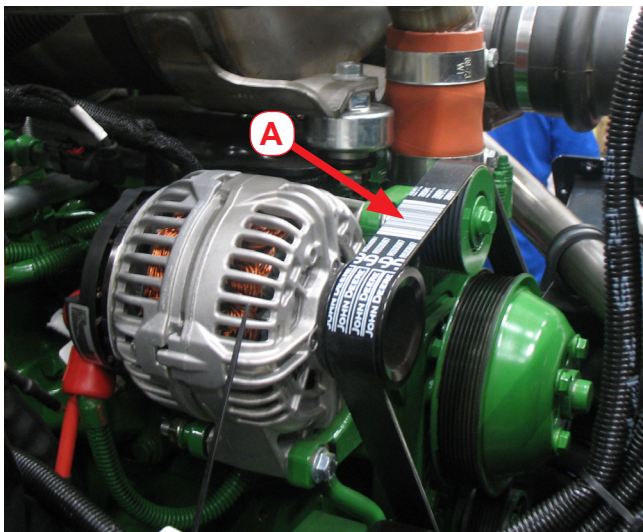
- Checking the tension of the timing belt (A).
- Checking the battery charge (B).

Furthermore, make sure that:

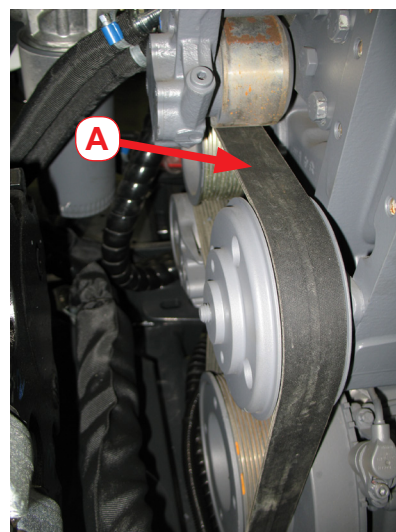
- No modifications should be made to the electrical system without the authorisation of McConnel.
- Do not remove or install any components without the prior authorisation of McConnel.
- Prevent the electrical system from coming into contact with water.
- Protect the connection pins with anti-corrosives.

Checking and maintaining the electrical system

JOHN DEERE



DEUTZ

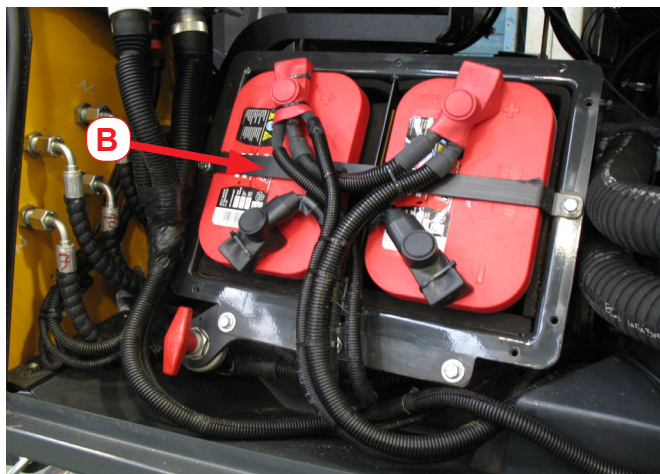




Checking and maintaining the electrical system

JOHN DEERE

DEUTZ



DANGER:



- Never check the battery charge status by connecting the two poles with a metal object, use the voltmeter.
- Always disconnect the earth connector (—) of the battery first and reconnect it last.
- The sulphuric acid in the battery electrolyte is poisonous. It can cause burns to the skin get through fabrics and cause blindness if it comes into contact with the eyes.
- Please note that lead and its compounds cause cancer and other damage to reproductive organs. These substances are present in the battery poles, terminals and accessories. Wash your hands after touching them.

9.10 - PERIODIC REPLACEMENT OF THE SAFETY COMPONENTS

To guarantee safety at any time while the machine is being used, the operator is required to make the replacements listed below.

Periodically replace the safety components		
Component	Years	Hours
Fuel pipes	2	4000
Hydraulic pipes	4	4000

9.11 - CHECKING THE BELT TENSION PRESSURE.

This is a check to carry out **every 50 hours** for the conservation and the best maintenance of the belts to avoid the accidental movement out of their seats.

To check the pressure:

- Remove the protective cap (A);
- Insert the nozzle of the pump on the grease valve (B) check the pressure obtained on the pressure gauge by pumping grease inside, refer to the following table for the pressures of the various tracks.



- Close the cover.

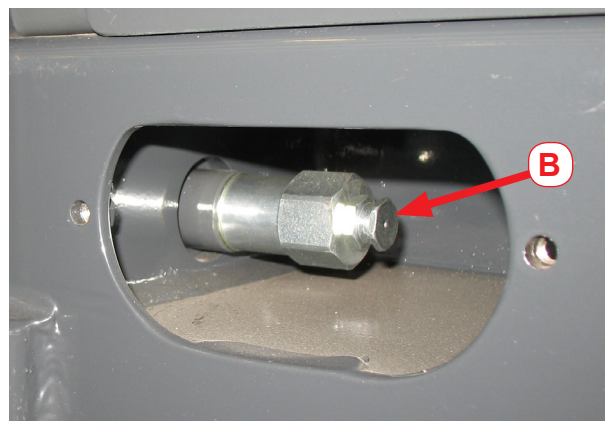
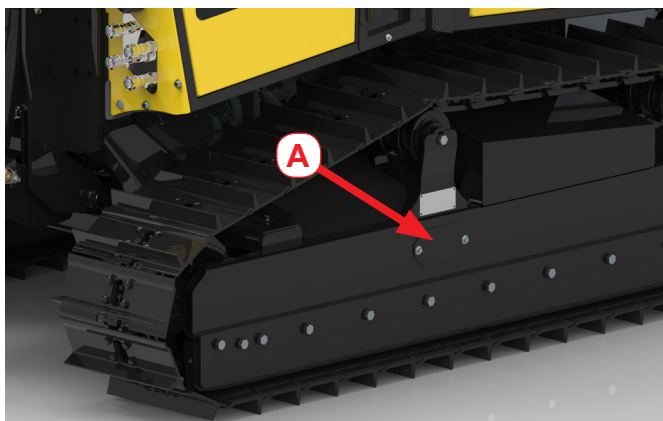
Track tightening pressure	
Track in	Pressure
Rubber	150÷160 bar
Iron	80÷90 bar

WARNING:



When a new set of tracks is to be fitted, it is necessary to provide for a tensioning of 20 bar above the data given.

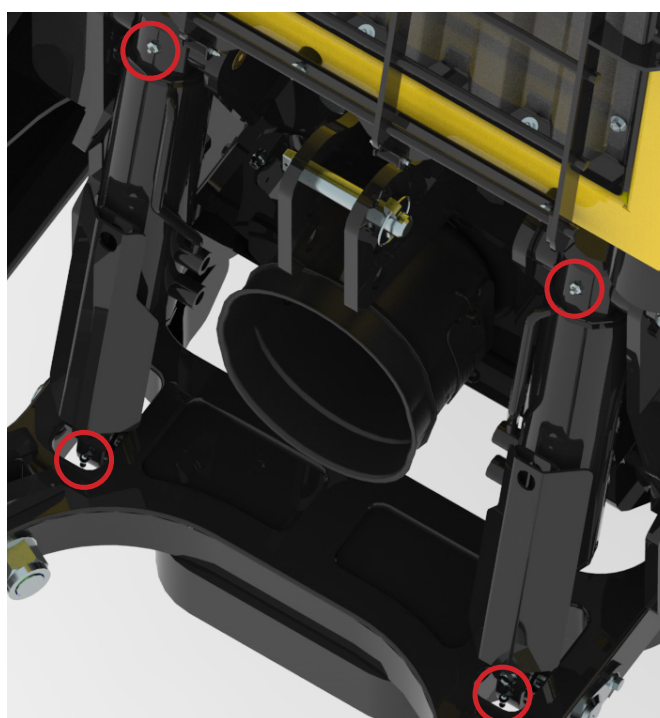
You are also advised to recheck the tensioning after 8 -10 duty hours and bring it up to the data provided.



9.12 - GREASING THE RAISERS

All the moving parts of RoboPOWER that need to be greased have the necessary grease nipples. To proceed with the greasing it is necessary to have an appropriate pump, then connect the pump nozzle to the grease nipple on the machine and pump in grease until it a small amount comes out of the joints. Refer to the grease table in section 9.4.1 for what grease to choose. Proper lubrication is important. Insufficient and infrequent lubrication may cause premature faults or overheating in some of the working parts as well as damage to the gaskets.

Grease every *50 duty hours*.





9.12.1 - CHECKING THE CHROME-PLATED PARTS

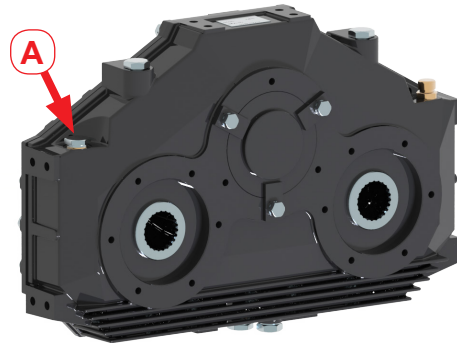
Inspect the chrome-plated parts of the machine (cylinders) and make sure that they are not scored or damaged.

9.13 - CHECKING THE COUPLER OIL

To check the level of the oil in the coupler make sure that the machine is on a flat level surface with the engine off for at least five minutes.

- Unscrew the cap (A) and check the dipstick to make sure the oil is between the MAX and MIN marks;
- If the coupler is around the MIN mark, top up again using the hole of the cap (A) until the level is back in the range between MIN and MAX.
- Tighten the cap (A).

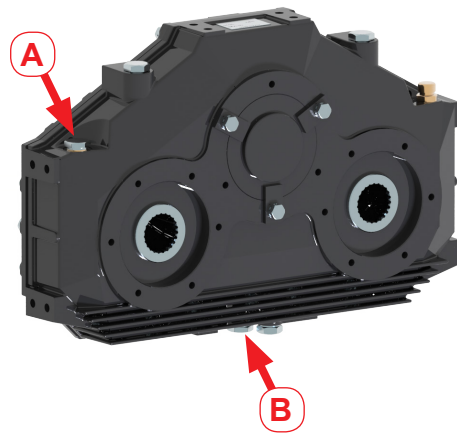
Consult the table in section 9.4 for the choice of oil to choose. You are advised to check the oil level in the coupler every **500 hours**.



9.14 - CHANGING THE OIL IN THE COUPLER

To change the oil in the coupler, make sure that the machine is on a flat level surface with the engine off for at least five minutes.

- Unscrew the cap (A).
- Undo the drainage plug (B) and let the oil flow out into a sufficiently large receptacle; to facilitate the drainage operation you should work while the oil is warm;
- Wait for a few minutes until all the oil has run out then screw the plug (B) back;
- Refill the coupler with **1.4 litres** of the appropriate oil (see section 9.4.1.) through the hole of the cap (A);
- Screw up the cap (A).



The first oil change must be done when the first **50 duty hours** have elapsed while subsequent changes must be done every **1000 hours**.

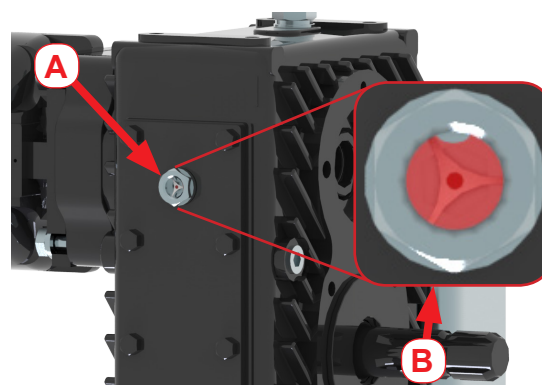


9.15 - CHECKING THE OIL IN THE PTO GEARBOX.

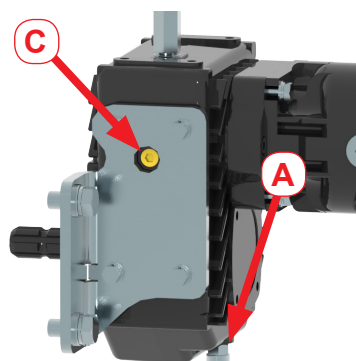
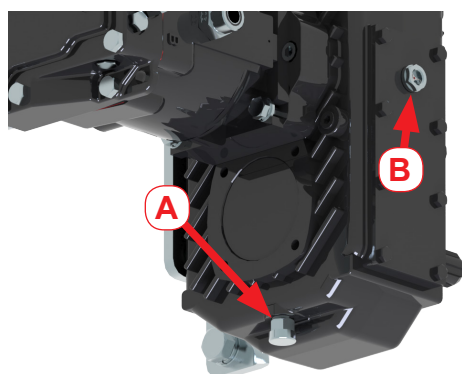
To check the level of the oil in the PTO gearbox, make sure that the machine is on a flat level surface with the engine off for at least five minutes.

By means of warning light (A) check that the oil is above the red point as in the photo (B). If it is insufficient, top up.

Consult the table in section 9.4 for the choice of oil to choose. You are advised to check the oil level in the PTO gearbox every **500 hours**.



9.15 - CHANGING THE OIL IN THE PTO GEARBOX.



To change the oil in the PTO gearbox, make sure that the machine is on a flat level surface with the engine off for at least five minutes.

- Unscrew the cap (C).
- Undo the drainage plug (A) and let the oil flow out into a sufficiently large receptacle; to facilitate the drainage operation you should work while the oil is warm;
- Wait for a few minutes until all the oil has run out then screw the plug (A) back;
- Refill the coupler **1.6 litres** of the appropriate oil (see section 9.4.) through the hole of the cap (C);
- Screw up the cap (C).
- Check the oil level on the indicator (B) and if it is insufficient, top up.

Change the PTO gearbox oil **every 1000 hours**.



9.13 - MAINTENANCE OPERATIONS

MAINTENANCE FREQUENCY

Component		Period	Daily	Every 50 hours	150 hours	250 hours	500 hours	750 hours	1000 hours	1250 hours	1500 hours	1750 hours	2000 hours	2250 hours	2500 hours	2750 hours	3000 hours		
JOHN DEERE	ENGINE OIL	Check / top-up	X																
		Substitution				X	X	X	X	X	X	X	X	X	X	X	X	X	X
	ENGINE OIL FILTER	Substitution				X	X	X	X	X	X	X	X	X	X	X	X	X	
	FLUID COOLANT	Check / top-up	X																
		Substitution											X(*)						
	FILTERS FUEL	Substitution					X		X		X		X		X		X		X
	FUEL DECANTOR	Drainage	X																
Substitution						X		X		X		X		X		X		X	
DEUTZ	ENGINE OIL	Check / top-up	X																
		Substitution				X	X	X	X	X	X	X	X	X	X	X	X	X	X
	ENGINE OIL FILTER	Substitution				X	X	X	X	X	X	X	X	X	X	X	X	X	
	FLUID COOLANT	Check / top-up	X				X		X		X		X		X		X		X
		Substitution							X				X						X
	FILTERS FUEL	Substitution							X				X						X
	FUEL DECANTOR	Drainage	X																
Substitution								X				X						X	
FUEL	Check / top-up	X																	
ENGINE AIR FILTER	Control / Cleaning	X																	
	Substitution								X				X					X	
SYSTEM ELECTRIC	Check				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
BATTERY	Check				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
HYDRAULIC OIL	Check / top-up	X																	
	Substitution							X(**)				X(**)						X(**)	
HYDRAULIC OIL FILTER	Substitution							X				X						X	
REDUCTION GEARS	Screw tightening				X	X	X	X	X	X	X	X	X	X	X	X	X	X	



Component	Period	Daily	Every 50 hours	150 hours	250 hours	500 hours	750 hours	1000 hours	1250 hours	1500 hours	1750 hours	2000 hours	2250 hours	2500 hours	2750 hours	3000 hours
OIL REDUCTION GEARS	Check				X		X		X		X		X		X	
	Substitution			(**)		X		X		X		X		X		X
RADIATOR GRILLE	Cleaning	X														
RADIATOR AND INTERCOOLER	Cleaning	X														
TENSIONING TRACKS	Check		X													
RAISERS	Greasing		X													
OIL COUPLER	Check					X				X				X		
	Substitution		(**)					X				X				X
MECHANICAL PTO BOX OIL	Check					X				X				X		
	Substitution							X				X				X

(*) Replace on the basis of the type of coolant present. (Refer to section 9.4.2 and the table in section 9.5.4).

(**) Replace on the basis of the hydraulic oil present. (Refer to the table in the sections 9.4.2 and 9.6.2).

(***) Only for the first replacement.



10 - INSTRUCTIONS FOR EMERGENCY SITUATIONS

10.1 - FIRE

In case of fire, use a fire extinguisher in accordance with current regulations. If the machine catches fire or if the machine finds itself in the proximity of a fire get out of the cab immediately, raise the alarm on the site and call the fire brigade.



12 - TIGHTENING CHART

12.1 - SCREW TIGHTENING CHART

Rated thread measurement	actual area section As sq.mm	Resistance class								
		12.9			10.9			8.8		
		Ribbing load	Tightening tightening force	Tightening tightening force	Ribbing load	Tightening tightening force	Tightening tightening force	Ribbing load	Tightening tightening force	Tightening tightening force
		kgf	kgf	kgf x cm	kgf	kgf	kgf x cm	kgf	kgf	kgf x cm
M 3×0.5	5.03	563	394	17	482	338	15	328	230	10
M 4×0.7	8.78	983	688	40	842	589	34	573	401	23
M 5×0.8	14.2	1590	1113	81	1362	953	69	927	649	47
M 6×1	20.1	2251	1576	138	1928	1349	118	1313	919	80
M 8×1.25	36.6	4099	2869	334	3510	2457	286	2390	1673	195
M10×1.5	58	6496	4547	663	5562	3894	567	3787	2651	386
M12×1.75	84.3	9442	6609	1160	8084	5659	990	5505	3853	674
M14×2	115	12880	9016	1840	11029	7720	1580	7510	5257	1070
M16×2	157	17584	12039	2870	15056	10539	2460	10252	7176	1670
M18×2.5	192	21504	15053	3950	18413	12889	3380	12922	9045	2370
M20×2.5	245	27440	19208	5600	23496	16447	4790	16489	11542	3360
M22×2.5	303	33936	23755	7620	29058	20340	6520	20392	14274	4580
M24×3	353	39536	27675	9680	33853	23697	8290	23757	16630	5820

12.2 - FITTING TIGHTENING CHART

Series	Pipe diam.	THREAD - TIGHTENING TORQUE					
		Thread diam - Gas	B form MT (Nm)	E for, MT (Nm)	Thread diam - metric.	B MT (Nm) shape	E for, MT (Nm)
Light	6	G 1/8"	25	20	M 10 x 1	25	20
	8	G 1/4"	45	40	M 12 x 1.5	30	30
	10	G 1/4"	45	40	M 14 x 1.5	50	50
	12	G 3/8"	85	80	M 16 x 1.5	80	60
	15	G 1/2"	160	100	M 18 x 1.5	90	80
	18	G 1/2"	105	100	M 22 x 1.5	150	140
	22	G 3/4"	230	200	M 26 x 1.5	240	200
	28	G 1"	390	380	M 33 x 2	400	380
	35	G 1" 1/4	600	500	M 42 x 2	600	500
42	G 1" 1/2	800	600	M 48 x 2	800	600	
Strong	6	G 1/4"	60	60	M 12 x 1.5	45	45
	8	G 1/4"	60	60	M 14 x 1.5	60	60
	10	G 3/8"	110	90	M 16 x 1.5	95	80
	12	G 3/8"	110	90	M 18 x 1.5	120	100
	14	G 1/2"	170	130	M 20 x 1.5	170	140
	16	G 1/2"	140	130	M 22 x 1.5	190	150
	20	G 3/4"	320	200	M 27 x 2	320	200
	25	G 1"	390	380	M 33 x 2	450	380
	30	G 1" 1/4	600	500	M 42 x 2	600	500
38	G 1" 1/2	800	600	M 48 x 2	800	600	



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