ENERGREEN®
Professional Machines

USE AND MAINTENANCE INSTRUCTION MANUAL

ILF ALPHA

SELF-PROPELLED VEGETATION CONTROL MACHINE

Dynamic solutions with men and equipment always in the forefront

CE

ENGLISH (EN-GB)

Translation of the original instructions

Rev. 03
08/2023

ILF ALPHA

SELF-PROPELLED VEGETATION CONTROL MACHINE

CAUTION

READ THIS MANUAL CAREFULLY BEFORE USING THE MACHINE.

Dear Customer,

Thank you for having purchased an “ENERGREEN” product. We are pleased to provide you with this user manual to enable you to use our product correctly and obtain the best results with your work.

Please read the recommendations in the following pages with care and make the manual available to the personnel who will be responsible for operating and maintaining machine.

ENERGREEN S.P.A. is at your complete disposal for any clarifications you may require when commissioning or using the machine.

Should you require routine or extraordinary maintenance interventions, ENERGREEN S.P.A. puts its personnel at your disposal to give you all the support, assistance and spare parts you might need.

Please find below a list of our useful phone numbers and address in order to receive faster assistance:

ENERGREEN S.P.A.
Via Sabbioni, 16
36026 Poiana Maggiore (Vicenza) - Italy
Phone: +39 0444 1511 200
Fax: +39 0444 1511 252
Website: http://www.energreen.it
E-mail: service@energreen.it

ENERGREEN®
Professional Machines

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:	**EENUM35003**
Revision no.:	**03**
Modifications index:	**0**
Edition:	**08/2023**
Machine type:	**Self-propelled machine**
Model:	**ILF ALPHA**

The manual is valid from serial number: **ZA9ALPHJDDPL49257**

Manufacturer data:

ENERGREEN S.P.A.
Via Sabbioni, 16
36026 Poiana Maggiore (VI) - Italy
Phone: + 39 0444 1511 200
Fax: + 39 0444 1511 252
http://www.energreen.it
e-mail: to receive sales information: commerciale@energreen.it
sales@energreen.it
to receive assistance: service@energreen.it
for spare parts: parts3@energreen.it
ricambi@energreen.it

Annex list:
- Equipment manual, if present
- Three-phase engine use and maintenance
- Warranty coupon booklet

1.2 MAKE A NOTE OF YOUR MACHINE INFORMATION

Dear Customer, please enter the data of your machine below. This will help when requesting technical assistance and ordering spare parts. Write down the information found on the identification plates on your machine in the space below.

Machine serial number: .....

Engine model: .....

Engine serial number: .....

Date of purchase: .....

For the location of the identification plates, please refer to the following sections ***"2.5 Machine identification"*** e ***"2.6 Engine identification"***.

1.3 TRAINING REQUIRED OF THE OPERATOR

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.

1.4 INSTRUCTIONS FOR USE AND STORAGE

The operating instructions contained in this manual are valid exclusively for the machine ENERGREEN S.P.A. Mod. ILF ALPHA.

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 or partially damaged or it is otherwise not possible to read part or 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.

HAZARD

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

1.5 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, rout, 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, arm 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 and dangers 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 repairs, and ensure they are carried out exclusively by specialised personnel and that only original spare parts are used.

1.5.1 Updates to the manual

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.

1.5.2 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.

1.6 WARRANTIES

Materials supplied by ENERGREEN S.P.A. are covered by a 12-month warranty from the date of commissioning as indicated on the delivery note. In any case, refer to the machine order confirmation for special arrangements agreed during the sale.

ENERGREEN S.P.A. reserves the right to repair, or substitute, the pieces it agrees are defective during the warranty period (see the coupon booklet enclosed).

By replacing the defective part, ENERGREEN S.P.A. 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, please contact ENERGREEN S.P.A. directly by registered letter or fax, even if agreements have already been made by telephone. ENERGREEN S.P.A. does not accept any liability for any delays or the failure to carry out work. ENERGREEN S.P.A. 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.

1.7 LIABILITY

ENERGREEN S.P.A. shall not be held liable for any accidents involving personal injury or damage to property that 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 ENERGREEN S.P.A.;
- 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.**
- **ENERGREEN S.P.A. shall not be held liable for any damage as a result of failure to follow the above instructions.**
- **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.**

1.8 PERMITTED USES

The ILF ALPHA machine has been built for professional use, mainly to cut plants that are growing in or located on the ground such as grass, reeds, bushes and shrubs (refer to the equipment manual). Do not work with the mulching head raised from the ground. Any other use shall be considered inappropriate, and the manufacturer shall not be held responsible for any damage to the machine or other property, or for injuries which may result.

The machine is suitable for performing cutting operations at a speed of up to inserire variabile nel capitolo km/h , depending on the conditions of the ground and the type and condition of the material to be cut (length, whether dry or wet, density etc.). For working speeds greater than 5 km/h, it is recommended to use an electronic arm suspension system (optional). The machine is also approved for use on roads if it is registered and has a number plate.

1.9 IMPROPER OR NON-PERMITTED USES

CAUTION

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 uses other than those indicated, contact ENERGREEN S.P.A. before carrying out any work.

WARNING

Instructions for the permitted optional accessories are given in the corresponding use and maintenance manuals. 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 persons.
- Use of the machine to lift persons or things.
- Use of the machine to tow accident-damaged vehicles.
- Use of the arm to lift or pull oblique loads.
- Use of the arm and relative terminal equipment as a piledriver.
- Use of the arm as a means to lift the machine.
- Use the arm to push and/or pull objects.
- 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, width and distance using equipment without prior authorisation from ENERGREEN S.P.A.;
- Using the machine with equipment that has not been authorised by ENERGREEN S.P.A.;
- Making modifications to the machine (hydraulic, electric or mechanical) without prior authorisation from ENERGREEN S.P.A..

HAZARD

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

1.10 RUNNING IN AND TESTING 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:

- Avoid operating the machine at its maximum capacity for the first 100 hours of operation.
- Avoid accelerating or decelerating suddenly.

Refer to the service booklet attached for the various types of maintenance to be carried out. Also refer to the engine manual and to the equipment manual for any type of work that has to be carried out.

WARNING

When replacing oil and fuel 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 MACHINE DESCRIPTION

Multi-purpose machine or agricultural tractor designed for cutting grass, shrubs, maintenance of roadside verges, embankments etc.

Equipped with hydraulic attachments with quick couplings which allow the replacement of various equipment depending on the operational needs.

2.2 AUTHORISED EQUIPMENT

All the equipment validated by ENERGREEN S.P.A. and listed here, does not alter the stability of the vehicle, including the equipment, up to the permitted gradient (both for equipment with and without ballast).
The approved equipment enables the machine to remain stable at the maximum permitted gradients.

CAUTION

- **ENERGREEN S.P.A. 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.**

Equipment permitted on the arm:

Mulching head	NEW SPEED
Conveyor head	CONVEYOR HEAD
Forestry head	FORESTRY HEAD
Cutter bar	CUTTER BAR
Grass fork	FORK
Extra trunk	EXTRA TRUNK
River bucket	RIVER BUCKET
Ditch bucket	DITCH BUCKET
Ditch cleaner	DITCH CLEANER
Iron brush	IRON BRUSH
Power shears	POWER SHEARS
Disc bar	SAW BAR
Trunk pincer	TRUNK PINCER
Stump grinder	STUMP GRINDER

Equipment permitted on the front plate:

Lifter	HERCULES 10T
Barrier mower	DISCOVERY 840 BARRIER MOWER

Equipment permitted on the rear plate:

Blower	BLOWER

2.3 STANDARDS FOLLOWED

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:

- UNI EN ISO 12100:2010 "Safety of machinery" (terminology);
- EN 60204-1:2016 "Safety of machinery" (electrical equipment);
- 2014/30/EU Electromagnetic compatibility;

The following harmonised standards were used for updating the machine:

- ISO 12100:2010
- EN ISO 4254-1:2015
- EN ISO 4254-12:2018

As well as the following technical specifications:

- EN ISO 3767-1:2016;
- ISO 11684:1995;

2.4 COPY OF EC DECLARATION

ENERGREEN®
Professional Machines

Mod. EENAT35001

Declaration EC of compliance

(Directive 2006/42/CE Attachment II A)

THE MANUFACTURER — ENERGREEN S.P.A.
Via Sabbioni, 16
I-36026 CAGNANO DI POJANA MAGGIORE (VI)

DECLARES THAT THE FOLLOWING MACHINE:

Generic denomination – Function	PROFESSIONAL CUTTING MACHINE
Model – Type – Commercial denomination	ILF ALPHA
Serial number	ALPHA

EQUIPPED WITH:

Generic denomination – Function	HORIZONTAL AXLE CUTTING HEAD
Model – Type – Commercial denomination.....	
Serial number.....	XXXXXXXXX

IS IN ACCORDANCE WITH THE REGULATIONS WITH REFERENCE TO THE FOLLOWING DIRECTIVES AND THE RELATING NATIONAL REGULATIONS OF REALIZATION:

2006/42/CE MACHINE DIRECTIVE.....

- Person authorized to write the technical dossier (1)
  - Name: ENERGREEN S.P.A.– Ivo Fraron - Responsible in charge
  - Address: Via Sabbioni, 16 I-36026 Cagnano di Pojana Maggiore (VI)

Technical regulations
UNI EN 13524:2003 + A2:2014

Technical specifications

- ISO 3767-1:2016
- ISO 11684:1995

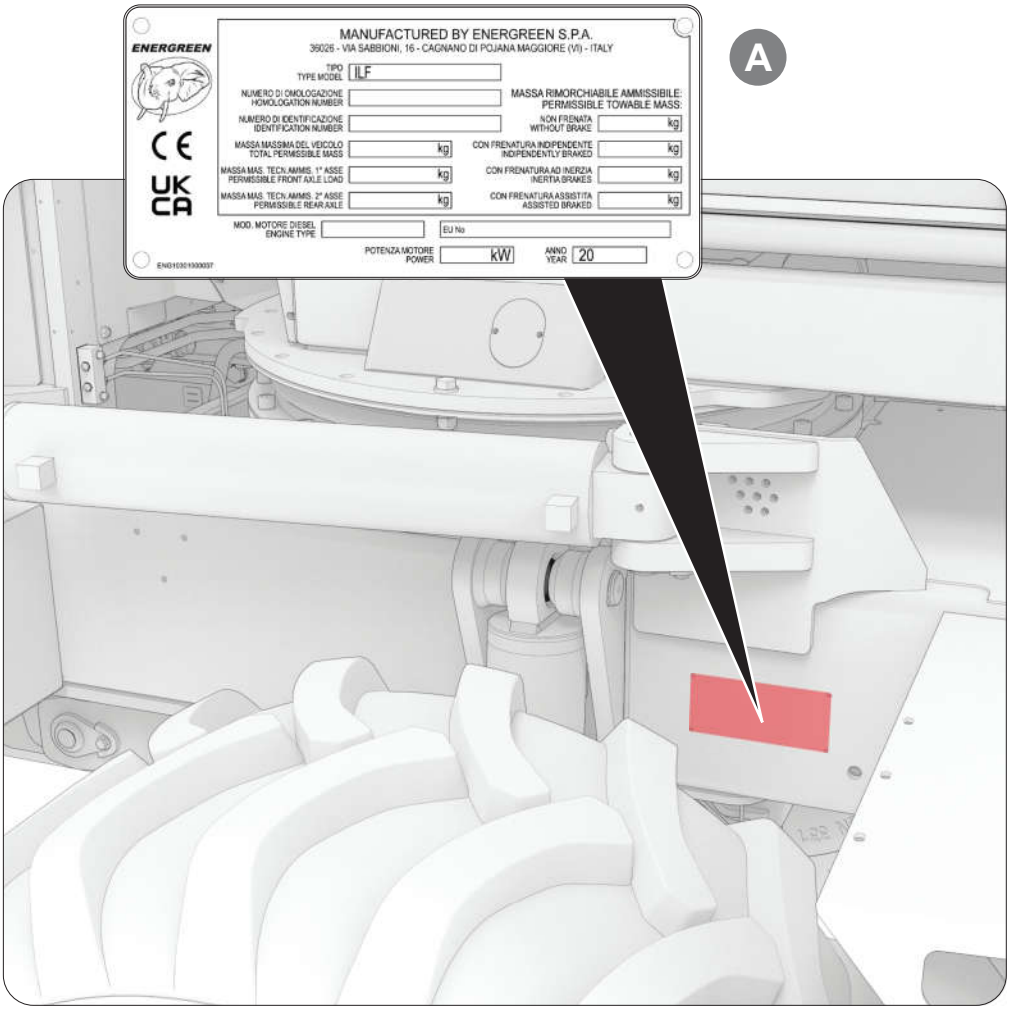
2014/30/UE DIRECTIVE ABOUT ELECTROMAGNETIC COMPATIBILITY.....

Place (country) – date 00/00/0000	36026 Cagnano di Pojana Maggiore (VI) – ITALIA
Name and Surname of the signatory.....	Ivo Fraron
Function	Responsible in charge
Signature and Stamp.....	ENERGREEN S.P.A. Via Sabbioni, 16 36026 Pojana Maggiore (VI) Part. IVA 02799730243

2.5 IDENTIFICATION OF THE MACHINE

2.5.1 Location of the identification plate

An identification plate (**A**) is attached to each machine / tractor. For its location, please refer to the figure below.

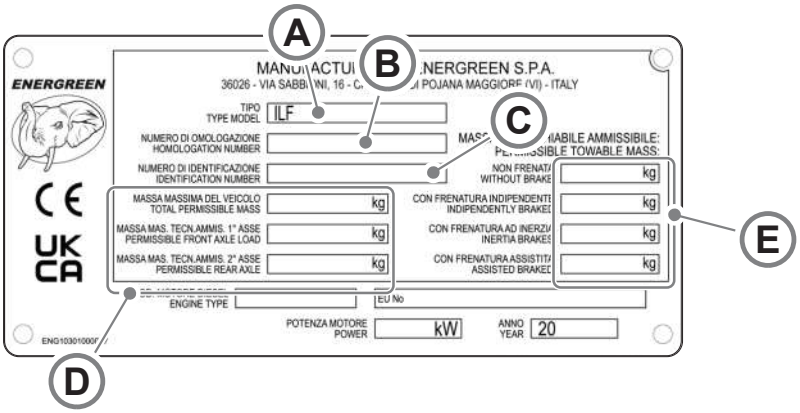


Depending on the countries in which the machine is sold, the transposition of the machine's approval for use on roads may be stamped on it.

CAUTION

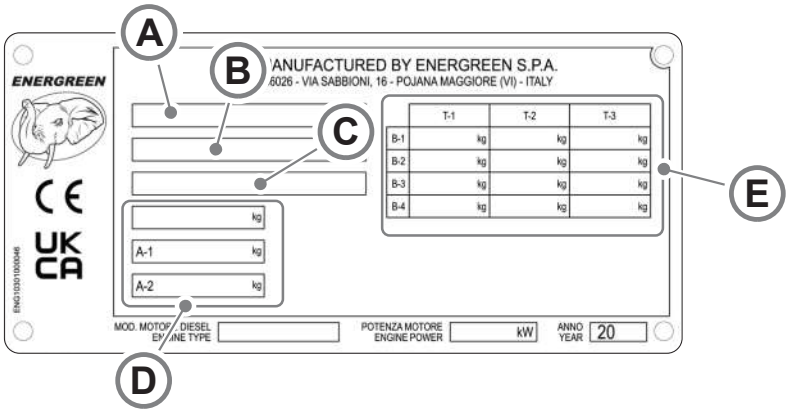
The serial number and year of manufacture must always be indicated in assistance requests and spare parts orders.

2.5.2 Machine identification plate



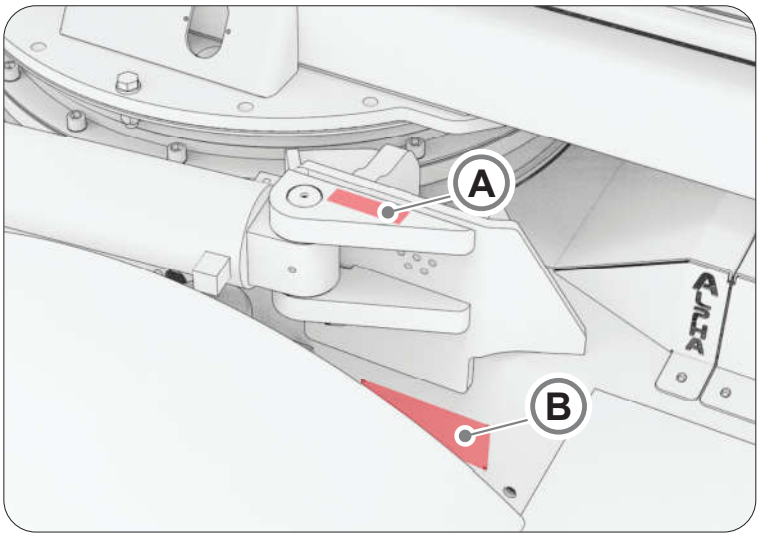
Pos.	Description
A	Machine model
B	Approval number
C	Machine serial number (vehicle identification number (VIN)
D	Total weight of the machine
E	Maximum towing capacity according to the type of trailer

2.5.3 Tractor identification plate



Pos.	Description
A	Category of tractor
B	Approval number
C	Machine serial number (vehicle identification number (VIN)
D	Total weight of the machine
E	Maximum towing capacity according to the type of trailer

2.5.4 Vehicle identification number (VIN)



The VIN code is stamped on the frame of the machine (**A**) and shown on the identification plate (**B**). The code consists of 17 alphanumeric characters. It is composed as follows:

WMI	VDS	VIS
ZA9	ALPHJD	***MY***L49***XXX***

where, in the VIS part:

- "***M***" indicates the month of production

Code	Month	Code	Month
A	January	**B**	February
C	March	**D**	April
E	May	**F**	June
G	July	**H**	August
J	September	**K**	October
L	November	**M**	December

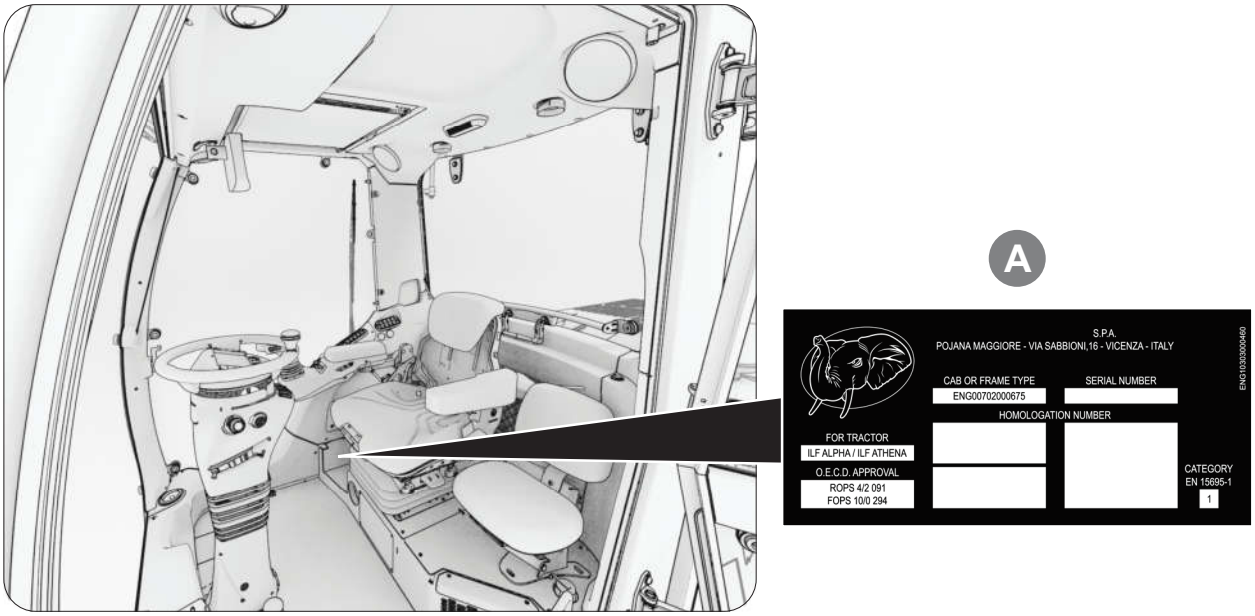
- "***Y***" indicates the year (according to ISO 3779 coding)

Code	Y	L	M	N	P	R	S
Year	2019	2020	2021	2022	2023	2024	2025

- "***XXX***" indicates the progressive serial number.

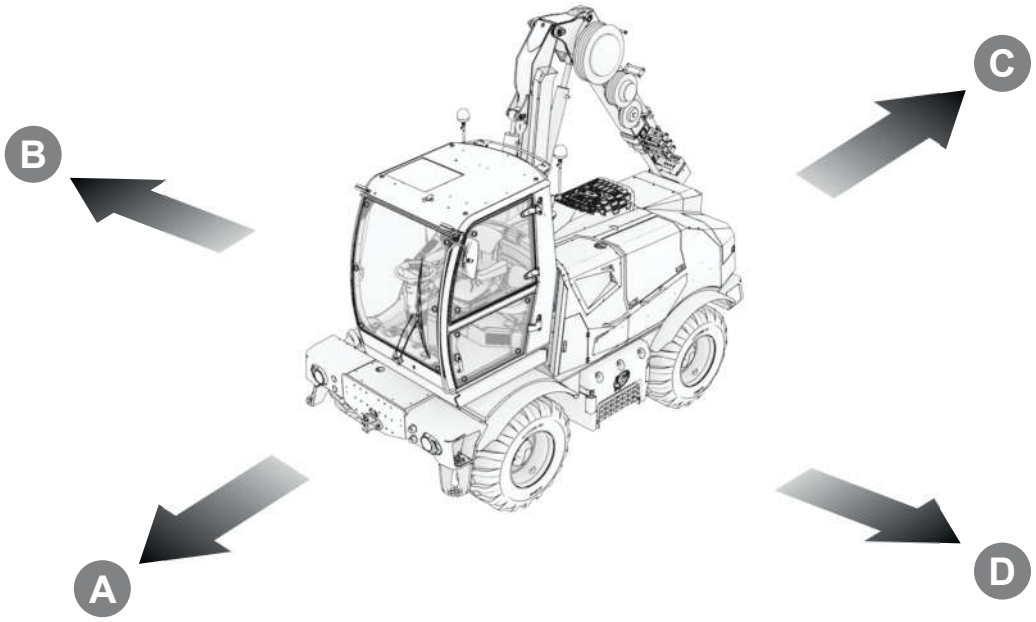
2.5.5 *Cabin identification plate*

An identification plate (**A**) is attached to each cabin. For its location, please refer to the figure below.



2.5.6 *Definitions of machine directions*

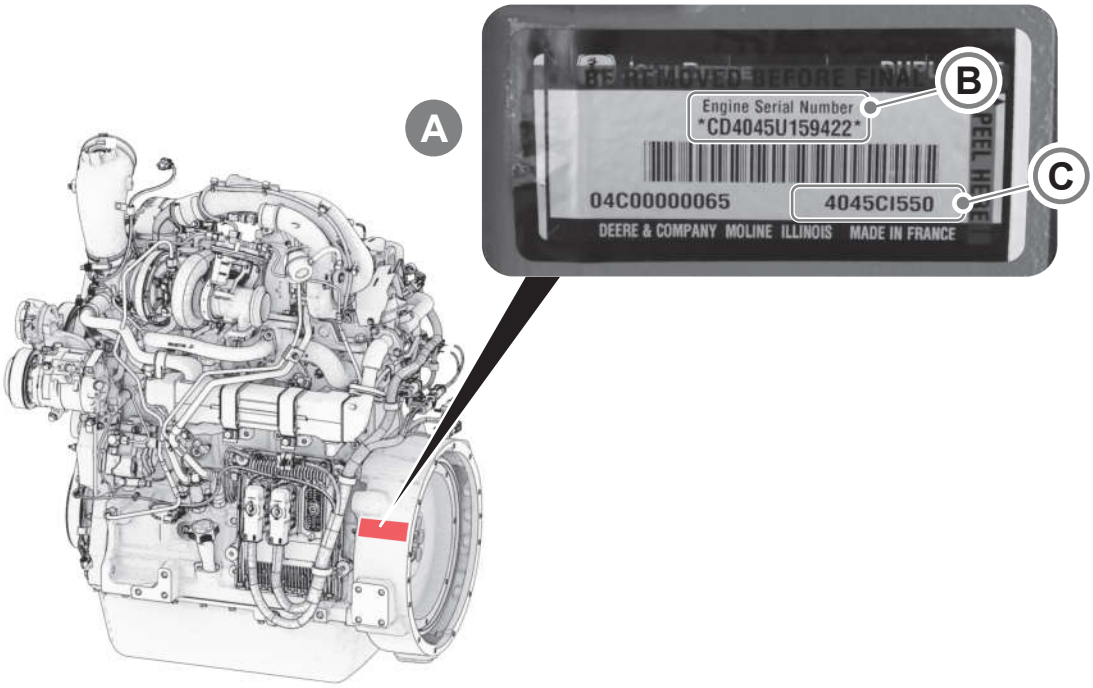
Left or right means with respect to the forward direction of movement.



Pos.	Direction of movement
A	Forwards
B	Right
C	Backwards
D	Left

2.6 ENGINE IDENTIFICATION

An identification plate (**A**) is attached to each engine. For its location, please refer to the figure below.



No.	Description
A	Machine plate
B	Engine serial number
C	Engine model

CAUTION

The serial number and year of manufacture must always be indicated in assistance requests and spare parts orders.

2.7 NOISE LEVEL

Exposure to excessive noise and/or prolonged exposure can cause serious damage, not only to the hearing system, but also to health in general. The tractor has been designed to ensure that noise levels are within the maximum levels set by current European legislation at the time of design, but prolonged working times can cause damage to health.

The level of risk depends on the noise level and the exposure time. The unit of measurement that considers these two factors is LEP (Individual Exposure Level).

WARNING

If the LEP reaches or exceeds 85 dB(A) you must wear hearing protection such as earplugs, earmuffs or helmets.

To avoid hearing impairment, deafness or tinnitus:

- Before putting the tractor with equipment or trailer into service, assess the risk caused by the noise generated by the two units.
- Establish rules for use and use hearing protectors according to environmental conditions, working hours and working conditions.
- Establish working hours that avoid the prolonged use of the tractor if there are high noise emissions.
- Make sure that personnel exposed to noise undergo health surveillance.
- Keep the cabin windows and doors closed during operation.
- If you hear unusual noises, park the tractor, switch it off and then contact an authorized workshop.
- Do not make modifications to the tractor that could cause an increase in noise emissions.
- After carrying out maintenance and repairs, put back all the soundproofing panels and materials correctly.

The sound level was measured according to method 2 of regulation EU1322/2014 annex XIII. The results were as follows:

- with openings open 82.5 dB(A);
- with openings closed 79.5 dB(A).

2.8 VIBRATION LEVEL

The vibration values indicated below are declared in compliance with the Delegated Regulation (EU) N ° 1322/2014, Annex XIV and subsequent amendments

The measured vibration level is: a_{vs}<1.25 m/s^2

The combined vibrations generated from the machine and equipment or trailer can cause serious damage to health and delayed effects. The type of work carried out and the mounted equipment, the number of working hours, speed, tyre pressure and the characteristics of the terrain are all factors that have and effect on it.

In order to minimize vibrations transmitted to the entire body:

- Before using the tractor with the mounted equipment or a trailer, assess the risk caused by the vibration generated by both units;
- Establish rules for use and use protective devices according to environmental conditions, working hours and working conditions;
- Establish working hours that avoid the prolonged use of the tractor if there is a lot of vibration;
- Use equipment that is suitable for the tractor and the type of work to be carried out;
- Make sure that the seat is adjusted correctly according to your weight and height;
- Periodically check the condition of the cabin suspension and replace if damaged;
- Check the tyre pressure;
- During transfers, adjust the speed of the tractor in order to minimize vibration.

2.8.1 Operator seats

Below is the list of operator seats that can be installed on the tractor, depending on its configuration.

Seat description	Approval
Seats valid for EU regulation 167/2013	
Activo Alto + S55	e13*1322/2014*2018/830W3*00070*01
Maximo XXL	e1*1322/2014*2018/830W3*00090*02
Seats NOT valid for EU regulation 167/2013	
Actimo Evolution	MSG95EL/742/722
Maximo Evolution Dynamic	MSG95EL/741

3. SAFETY INSTRUCTIONS

3.1 GENERAL SAFETY RULES

WARNING

- **Adhesive warning/information plates have been affixed to the machine, the purpose of which is to make it safer to use. They must be replaced if they are no longer legible.**
- **Operators must not be occasional users, but those who have a certain amount of experience with this type of machine.**
- **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 on a monthly basis: (pins, valves, piping, etc.). When necessary, replace with original materials.**
- **Do not, for any reason, tamper with the hydraulic system and in any case never remove the seal from the valves, as this will void all warranties. Contact an authorised repair shop if the valves should require adjustment.**
- **Excessive heating of the oil 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 stop.**
- **Check that the machine's emergency stop button is working correctly. If the emergency stop button is damaged, the machine must not be started or must be stopped immediately.**
- **The machine user is responsible for all property damage or personal injuries caused by machine operation.**
- **It is strictly forbidden to carry out maintenance, cleaning, adjustments or similar operations on any part of the machine or the interchangeable equipment connected to it when the machine is running. Any maintenance, cleaning or adjustments must always be performed with the engine off.**
- **It is forbidden to remove or modify the guards for the moving parts or hot surfaces of the machine, or interchangeable equipment connected to it.**

3.1.1 Fully understand the machine

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.
In particular the following should be worn:

Noise protection earmuffs

Safety footwear

Overalls

Work gloves

While being used, the machine may give rise to dust emissions. If you are working with dry materials (straw or bare soil), it is recommended that you wear personal protective equipment such as:

Protective eyewear

Respiratory protection dust mask

3.1.3 Using safety equipment

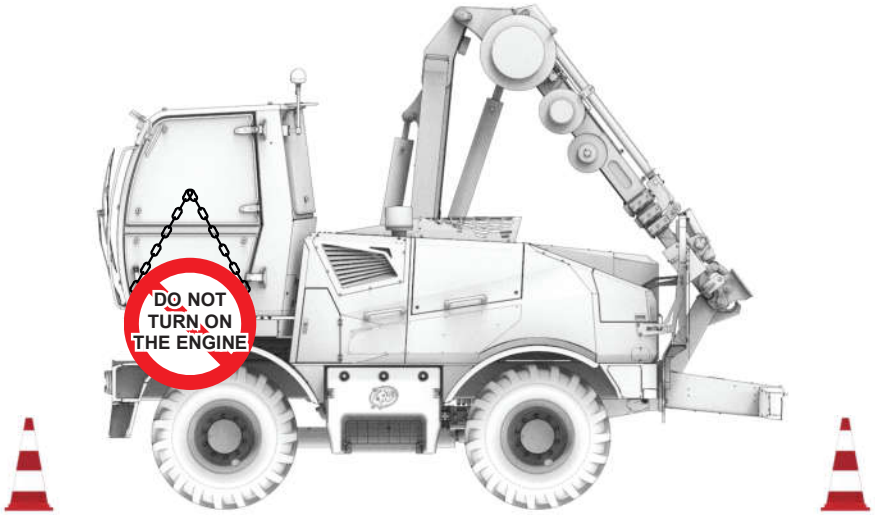
- A first aid kit should be on hand when the machine is in use.
- A fire extinguisher should be on hand when the machine is in use so that you can take action quickly in case of an emergency.
- Always make sure that the extinguisher is full
- Use the extinguisher according to current regulations
- Be prepared to fight a fire and / or handle an emergency
- Have the numbers of emergency services at hand:
  - Doctor;
  - Ambulance;
  - Hospital;
  - Fire brigade.

CAUTION

- **The owner of the machine and/or employer is responsible for providing a fire extinguisher and a first aid kit and for periodically making sure that they are in good order.**
- **A CO_2 fire extinguisher is specific for extinguishing fires of an electrical nature. We recommend using a powder fire extinguisher on the machine in general.**

Upon request, ENERGREEN S.P.A. can provide a special configuration in order for a powder fire extinguisher to be attached to the machine.

3.1.4 Instructions for carrying out inspections and maintenance



Apply a “DO NOT START THE ENGINE” sign to the machine. Remove the keys from the ignition before carrying out checks or maintenance work and delimit the area (for example with road cones).

3.1.5 Inspecting the machine

- Inspect the machine thoroughly every day before using it, following the checklist indicated in this manual.
- Do not allow unauthorized people to access the machine while it is in operation.
- To get in and out, use the appropriate hand holds and steps.
- Start the engine only in a well ventilated area and ensure that there are no persons in the machine’s working range.
- Guards 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 guards are damaged or missing.
- Make sure all safety devices and guards 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 modifications to the machine without prior authorisation from 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.

CAUTION

RANGE OF ACTION means an area that should be free of people, as it could be hazardous. Also consider the information contained in the individual equipment manuals and the different work modes in which the machine operates.

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;
  - Road safety;
  - 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 not be anyone in the danger area (20 metres). 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;
- Do not transport unauthorized personnel on the machine;
- Do not carry persons on any equipment that is mounted on the machine;
- Do not 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;
- Before leaving the machine unattended, proceed as follows:
  - If possible, park the machine on a level surface. In the case of even slight slopes, use wheel chocks;
  - Deactivate the "dead man" function: see section ***"6.23.7 Dead man"***;
  - Reduce the engine speed before switching it off. Turn the ignition key to position "**O**";
  - Remove the ignition key and take it with you;
- Replace any missing or worn warning plates or pictograms immediately;
- Never underrate or ignore safety regulations;
- Contact an authorised workshop if the safety devices are not working;
- It is not permitted to use the machine with a front loader bucket;
- It is not permitted to use the machine with a sprayer.

3.2.1 Safety instructions

The machine has been designed and constructed according to the current state of the art and technical standards for mowing grass, cutting shrubs and the 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.

When being used on public land, comply with all the rules and regulations of the Highway Code for the country in which the machine is being used.

3.2.2 Road safety regulations

The manufacturer accepts no liability for accidents whilst the machine is being used if the operator 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 is designed to work in normal weather conditions at a temperature ranging from

-10°C to +45°C. It should therefore only be operated in these conditions.

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

- During road transfers, moderate the speed, especially on uneven roads;
- During the transit on public roads, comply with the applicable regulations;
- Never transport the machine with the tool in operation, even for short distances;
- Lock the arm and the equipment in position (see section ***"7.2 Use on roads: regulations"***).

WARNING

Check that the overall dimensions of the machine, which are also shown in the technical data, comply with the regulations governing road traffic in the country the machine is used.

3.2.3 Operational 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-original 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 they have been removed;
- is used outside the permitted temperature range.

3.2.4 Safety when using grass mowing equipment

- Before using the machine, remove any stones, sticks, glass, metal wires, bones, loose branches and any other objects from the mowing area that could be swept up and thrown into the air by the rotor or that could damage the mulching head.
- 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 dangerously 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 are unusual vibrations coming from the equipment. This could lead to breakage and/or serious damage. Ascertain the cause of such problem and eliminate it.
- Before raising/lowering the equipment with the arm, make sure nobody is within 20 of the machine.

DANGER

- **Do no try to free the rotor by making it turn in a counterclockwise direction.**
- **Danger of projection of materials.**
- **Do not reach out with the arm if slope angles (transversely with respect the direction of travel) are greater than 5°: TIPPING HAZARD.**

WARNING

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

3.2.5 Precautions regarding 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 ENERGREEN S.P.A..
- Fitting and using equipment that has not been authorised by ENERGREEN S.P.A. could cause safety issues and affect both the operation and the service 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 ENERGREEN S.P.A. liability.

3.2.6 *Safety rules concerning the hydraulic system*

- Stop immediately if you notice oil leaks.
- Periodically check hoses. If they are worn, contact ENERGREEN S.P.A.. 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.**
- **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.**

3.2.7 *Electrocution prevention*

Always keep a suitable safety distance when there are power lines within the working range of the machine. This is especially true for aerial cables that were not disconnected by specialist personnel or if you do not know whether they are live.

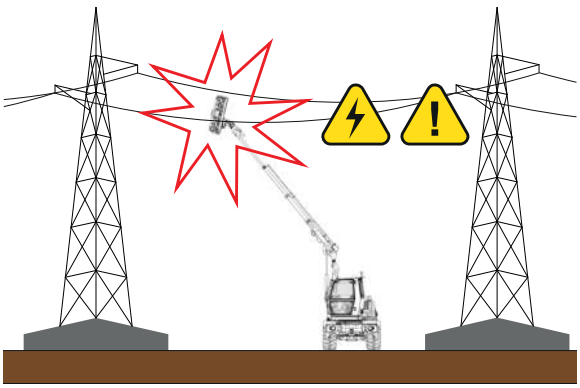
DANGER

Keep at an adequate safety distance from power lines. Observe specific local standards. If the nominal current of the line is not known, always keep the arm and/or the machine at a minimum distance of five metres.

To prevent fatal electric shocks or fires due to electric arcs or currents that discharge onto the machine:

- Keep a safe distance when manoeuvring equipment close to high voltage pylons and/or power lines.
- Do not get off from the machine near overhead power lines.

Voltage	Minimum distance (m)
Up to 1 kV	1
Over 1 kV up to 110 kV	3
Over 110 kV up to 220 kV	4
Over 220 kV up to 380 kV	5



3.2.8 What to do in case of electric arcs from overhead power lines

Electric arcs can occur accidentally if there are overhead power lines. These electric arcs produce very high voltages externally to the tractor and high voltage differences are created on the surrounding ground.

To avoid often potentially fatal voltages:

- Do not walk with long strides; do not lie on the ground or touch the ground with your hands.
- Do not leave the cabin.
- Do not touch metal parts.
- Do not make contact with the ground.
- Warn any people that may be present: DO NOT approach the machine. Voltages on the ground can cause severe electrical shocks.
- Wait for specialized rescue personnel. Power to the overhead power line has to be disconnected.

If you are forced to leave the cabin despite the electric arc because of a fire:

- Jump away from the tractor. Then jump to a safe position. Do not touch the outside of the tractor.
- Move away from the tractor with small steps.

3.2.9 What to do during a thunderstorm

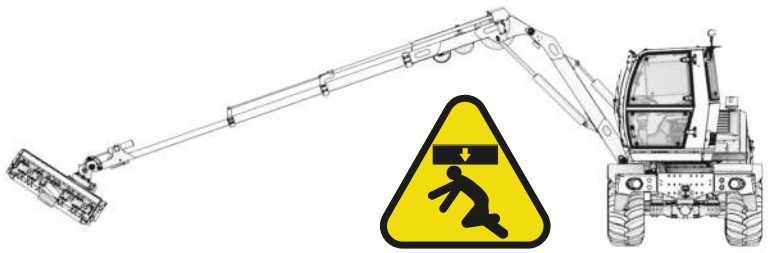
When working in a field, if there is a thunderstorm, the tractor may be struck by lightning.

To avoid fatal electric shocks or serious damage to the electrical system due to the tractor being struck by lightning:

- Do not leave the cabin;
- Stop doing any work you were carrying out;
- Raise any metal tools / equipment that are in contact with the ground;
- Avoid contact with metal parts.

3.2.10 Prevention against crushing from above

- Do not stand within the range of action of the equipment attached to the arm (at least 20 metres around the machine) when there is an operator on board and the engine is running (see the equipment manual).
- Do not stand or work under the arm or the joints when the arm is raised.



3.2.11 Precautions regarding the cabin frame

If the cabin is inadvertently knocked or the machine overturns during work operations, the cabin may become damaged. This may reduce its rigidity and therefore the active protection that it has to provide for the operator.

DANGER

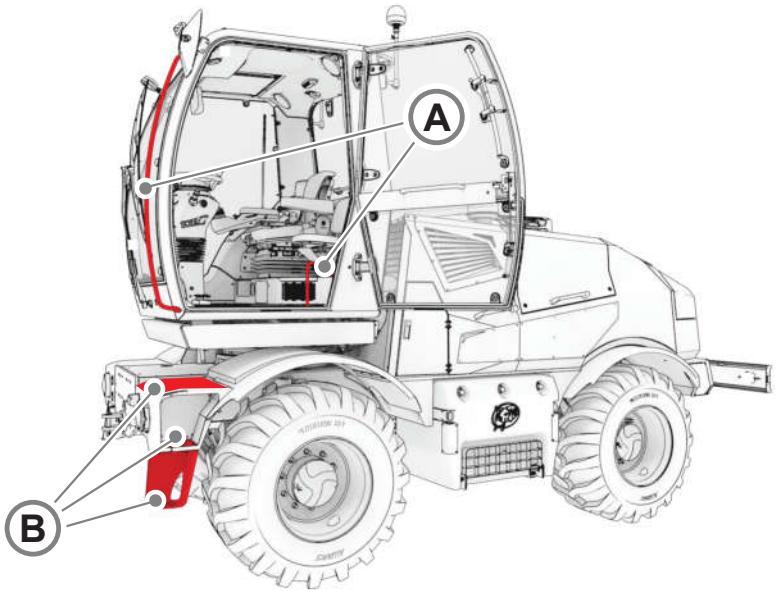
Contact ENERGREEN S.P.A. to have the frame and integrity of the cabin checked before you continue working.

Machine operating limits:

- The machine cannot work with the arm extended on slopes greater than 5° to prevent tipping over due to sudden irregularities of the ground (holes, slope variations etc.);
- If aerial work has to be carried out, the machine must not be used on slopes greater than 1° to prevent tipping over due to sudden irregularities of the ground (holes, slope variations etc.);
- A device (optional) is available that activates a buzzer when you work close to or exceed the angle of risk.

3.2.12 Getting into the cabin

You should use the handles (**A**) when accessing the driver's cab. To get in and out of the cabin, use the appropriate handholds (**A**) and steps (**B**). The handholds and step mounted on the machine are shown by arrows in figure at the side. Always keep the handholds and cabin access steps clean and free from oil, grease, earth etc. to avoid slipping.



CAUTION

Always get on and off using the three gripping points (step and two hand gripping points).

WARNING

DO NOT GET OFF THE MACHINE BY JUMPING FROM THE CABIN!

3.2.13 Getting off the machine

When you have to leave the driver's seat, even momentarily, ensure that the machine is positioned in a safe zone.

Before leaving the driver's seat, carry out the following operations:

- Position the cabin in the direction of travel (longitudinal);
- Place the equipment on the ground or position the machine in the configuration for use on roads;
- Apply the park brake;
- Put the gear selector in neutral;
- Stop the engine by turning the ignition key to position "**O**".

If you have to move so far away from the machine that it is no longer visible, remove the ignition key.

3.2.14 Precautions when using the PTOs (power take-offs) (optional)

People may become caught in and entangled by PTOs and parts driven by them.

To avoid serious or fatal injury, before starting the PTO:

- Make sure that the selected PTO speed and direction of rotation comply with the permissible machine speed and direction of rotation.
- Make sure that there is no one within the maximum range of action of the connected tool / equipment.
- Disable the PTO when it is no longer in use.
- When the PTO guard is removed, install a cover or shield on it.

3.2.15 Precautions when using the cardan shaft

People may be caught in and dragged by the cardan shaft and parts driven by it. Follow the instructions in the cardan shaft user manual.

To avoid serious or fatal injury, before starting the cardan shaft:

- Make sure that the cardan shaft guard is installed and working.
- Keep the hollow profile sufficiently covered and protect the cardan shaft.
- Engage the locks of the cardan shaft.
- Secure the cardan shaft guard by hooking it to the chains.
- Disable the PTO if the cardan shaft is excessively inclined. The machine may become damaged. Parts may be thrown into the air and cause injury.

3.2.16 Follow the regulations for hitching / connecting trailers

DANGER

Incorrectly hitching / connecting a machine and trailer can lead to dangerous situations.

To avoid serious injuries due to the incorrect hitching / connecting of trailers:

- Follow the instructions in the respective tractor and trailer user manuals during hitching, connection and use.
- Adjust the towed load according to the power of the machine.
- Follow the hitching / connection instructions.
- Take into account the different ways of driving when a trailer is connected.
- Make sure there are no people on or close to the tractor or trailer.
- Before starting the tractor with the trailer connected, assess the risk caused by the noise generated by the two units.
- Keep a safe distance from the tow hitch when checking to make sure that the trailer is correctly hitched / connected to the machine.

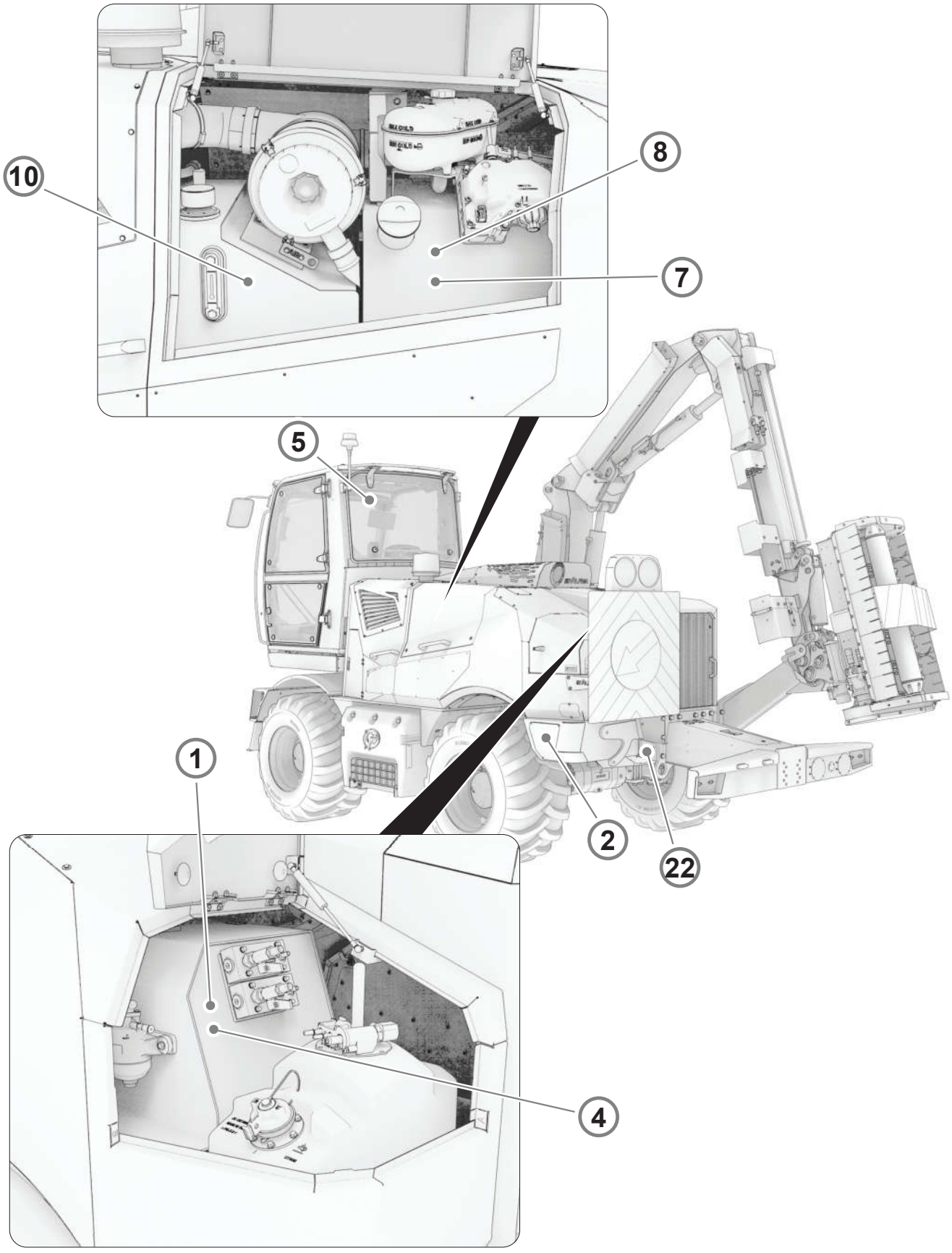
DANGER

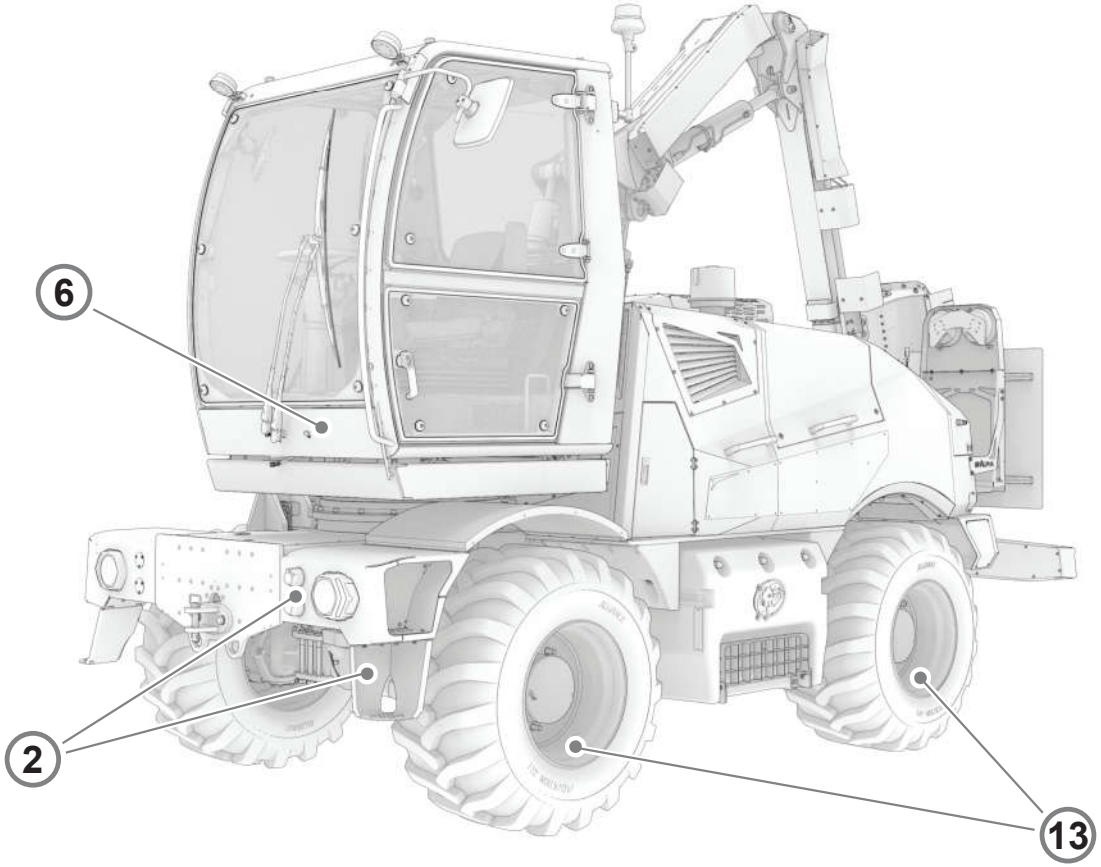
Do not stand between the tractor and the trailer. The tractor may move forwards suddenly or the trailer may start moving suddenly.

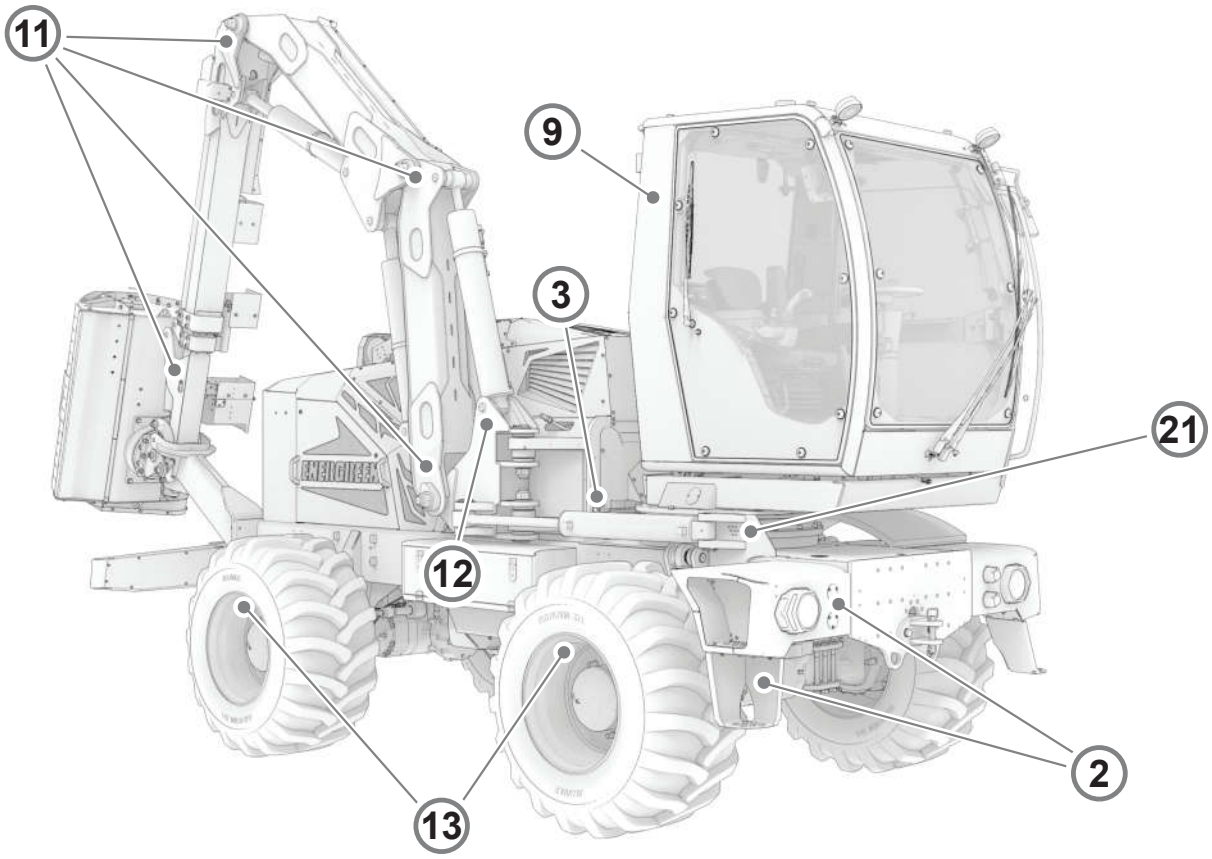
To avoid serious or fatal injury due to the tractor or the tool / equipment moving:

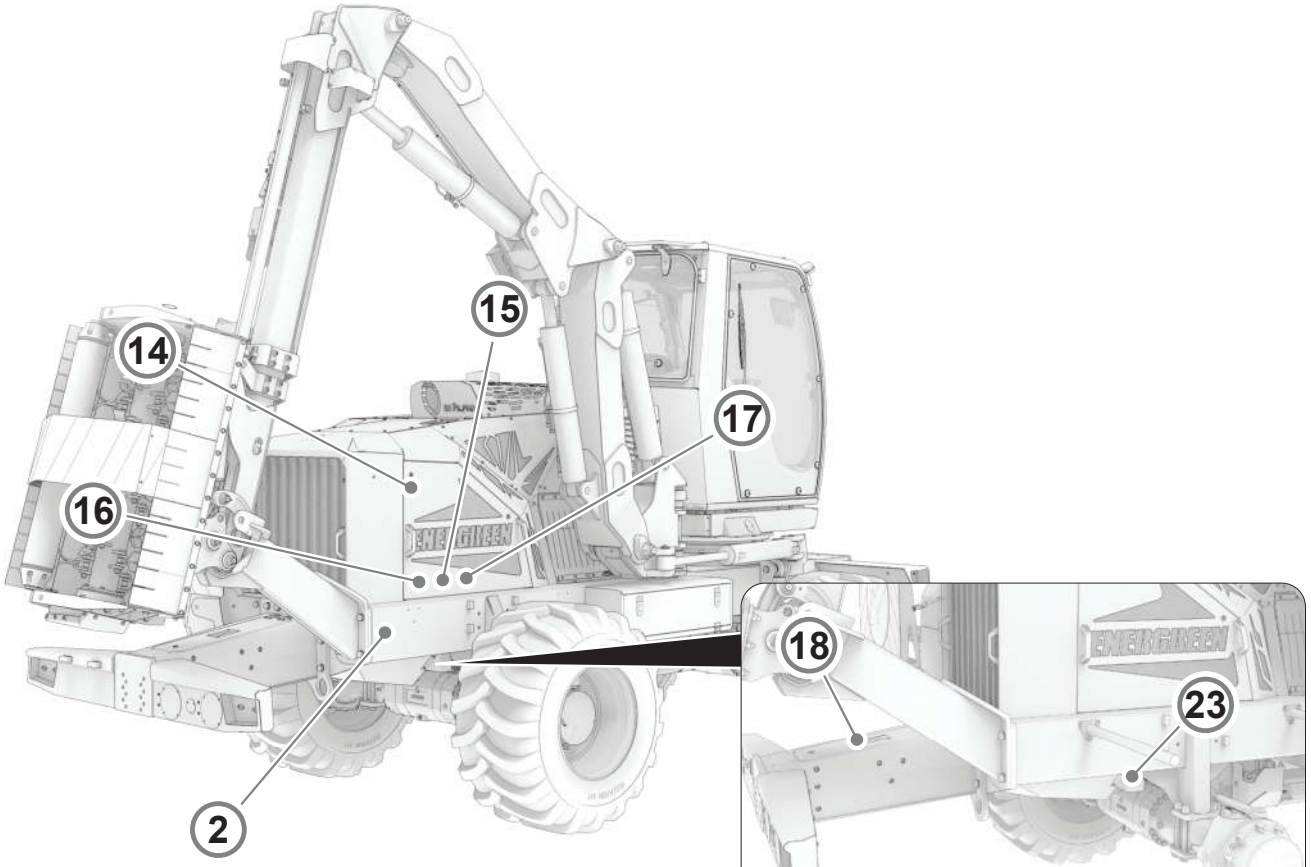
- Before carrying out any operations between the tractor and the tool / equipment, switch off the engine and stop the tool / equipment. Pay particular attention when carrying out short inspections. Many serious injuries are caused by inattention and moving machines.
- Sound the horn a few times before starting the engine.

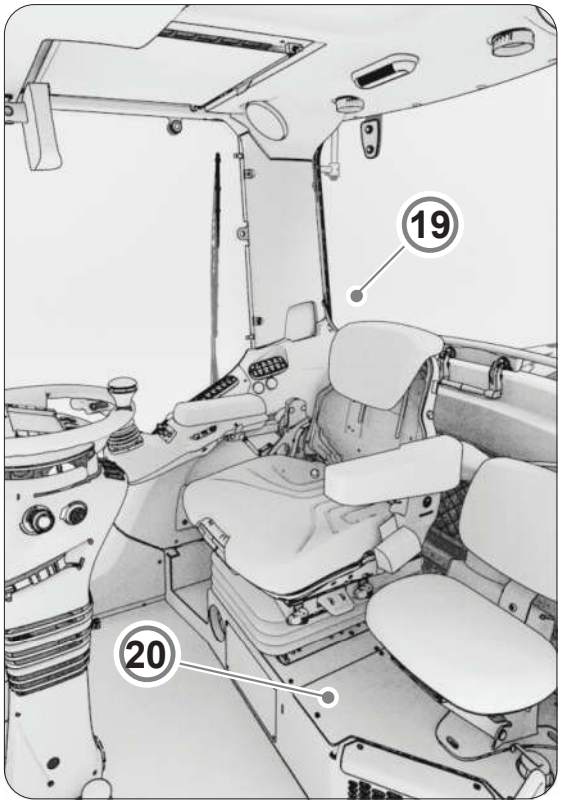
3.2.17 Location of the safety plates

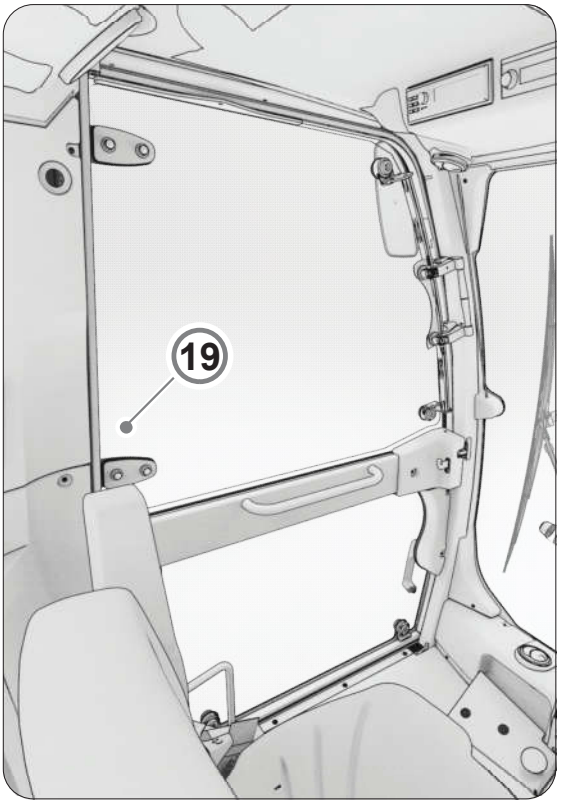



6
2
13


11
9
3
21
12
2
13


14
15
16
17
18
23
2


19
20

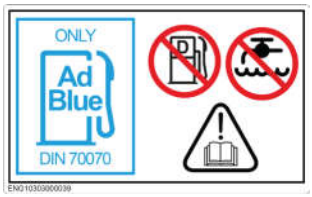

19

3.2.18 Description of the safety plates

CAUTION

Make sure that the safety plates are in good condition. If the plates are damaged, they must be replaced with original plates that can be requested from ENERGREEN S.P.A. and placed in the position indicated in the manual. Make sure that the safety decals are readable. Clean them using a damp cloth dipped in soap and water.

POS.	SIGNS	DESCRIPTION
1		Attached next to the DEF / AdBlue® tank. Indicates the minimum amount of DEF / AdBlue® to top up (min. 10 litres). It is only permitted to top up less than the amount indicated if there is not enough space in the tank at the time of topping up.
2		**Danger sign - Flying objects** This indicates that stones or other objects may be thrown out by the machine and instructs you to work at a safe distance.
3		**Lubrication zone sign** Indicates the greasing and lubrication points (and possibly the frequency).

4		Attached next to the DEF / AdBlue® tank.
		• Only use DEF / AdBlue® with the following characteristics:
		  • DIN 70070
		  • ISO 22241-1
		• Do not mix with any other type of liquid (e.g. fuel, water etc.).
		• Read this manual before use.

5	 *Italy* *France* *Spain*  *Germany*	Speed limit 40 km/h.
6		Attached near to a 12 Volt socket.
7		Fuel tank.

POS.	SIGNS	DESCRIPTION
8		**Warning signs - Flammable materials** • Indicates the presence of flammable material. • Keep away from open flames.
9		**Warning signs** regarding dangers due to the lack of knowledge of the machine, its functions and the consequent risks. Read the use and maintenance manual carefully before using the machine.
10		Hydraulic oil tank.
11		**Crushing or shearing hazard warning signs** Be careful not to put arms or legs into the moving parts of the machine where this symbol is affixed.
12		**Crushing hazard from above warning signs** Do not stand or pass close to suspended loads. Move away and keep a safe distance.
13		Indicates correct tyre pressure. It may vary depending on the tyres that were mounted when the machine was first fitted out.
14		**Do not carry out maintenance on moving parts warning sign** It is prohibited to carry out maintenance moving parts. Turn off the engine when maintenance is being carried out.
15		**Hot parts warning sign** Indicates the presence of hot parts such as exhaust pipes or bonnets. Do not touch the areas around the sign.
16		**Amputation hazard warning sign** Indicates the risk of limb amputation due to moving machine parts.

POS.	SIGNS	DESCRIPTION
17		**Crushing of limbs hazard warning sign** Indicates the risk of crushing limbs with moving parts of the machine.
18		**Hazards associated with the battery** • Read the use and maintenance manual carefully before using the machine. • 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. • Danger of electric shock. • Danger of corrosion. To check the battery, refer to section ***"9.15 Electrical system maintenance"***.
19		Emergency exit.
20		Wear seat belts.
21		**Centralized lubrication zone - front** Indicates the greasing and lubrication points. (Standard version)
22		**Centralized lubrication zone - rear** Indicates the greasing and lubrication points. (Standard version)
23		**Engine oil drainage** Indicates the engine oil drainage point.

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.
- Lack of hydraulic system maintenance (damaged hoses, loose fittings etc.).
- Delaying maintenance or repair work.
- Appointing non-qualified or non-authorized personnel to carry out maintenance or repair work.

Always follow the safety instructions given below, even when you are fully familiar with all the controls.

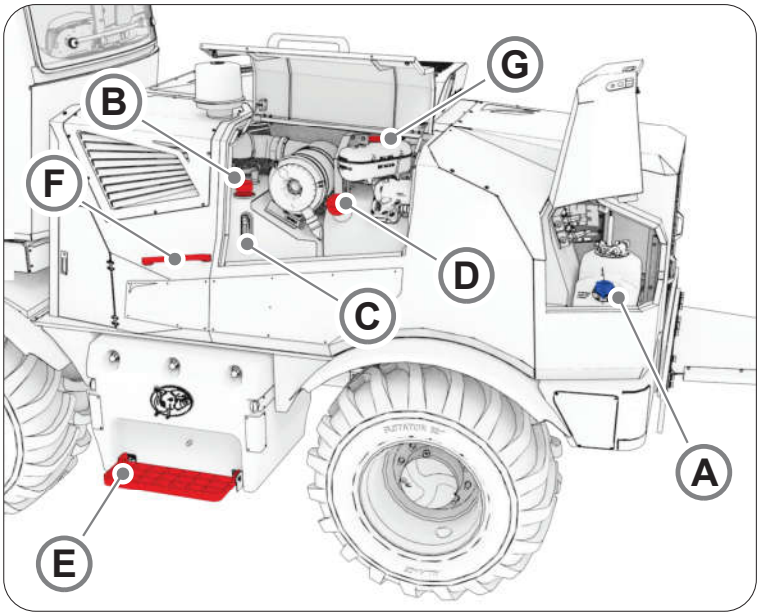
- Adapt the speed to the conditions of the travel path.
- Comply with the clearance requirements when passing under bridges, roofs, electric lines and similar (see the Highway Code).
- Make sure that the cabin windows are always clean.
- Before beginning work, make sure that all the guards / safety devices are intact and operating properly.
- Before starting to work, check that all the movements, the limit switches and safety devices operate properly.
- Make sure that the „dead man" device is working properly (the sensor located under the seat and the button (**L**) on the main keypad) see section ***"6.23.7 Dead man"*** .
- Continually make sure that there is nobody in the machine danger zone (less than 20 metres). Warn them using the horn or verbally and stop working if they do not leave the danger zone.
- Do not allow unauthorised persons to enter the cabin of the machine and anyway never when the engine is running.
- Do not use the machine to lift persons.
- Never leave the operating position when the machine is on.
- If for any reason you notice unusual vibrations from the machine or equipment, stop the equipment immediately and try to understand the reason for it and/or restore normal operation. ENERGREEN S.P.A. declines all liability for injury to people or damage to property if the operator fails to comply with these instructions.
- Clean the machine after use. Do not use petrol or solvent-based products to clean the machine.
- During operation with the door or windows open, and in particular in windy conditions, the user should choose his position carefully so as not to be exposed to exhaust gases, dust or mown grass.
- Do not operate the equipment if you are unable to see it (behind ridges, round corners of buildings, in tall grass etc.).

WARNING

- **Do not clean electrical parts (for example the fuse box, actuator and control units) with high pressure water.**
- **Cover electrical parts with a plastic bag to protect them during washing.**

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.



A	DEF tank cap	**B**	Hydraulic oil tank cap
C	Hydraulic oil level indicator	**D**	Diesel tank cap
E	Foldaway step	**F**	Handle
G	Coolant tank filler cap	**-**	-

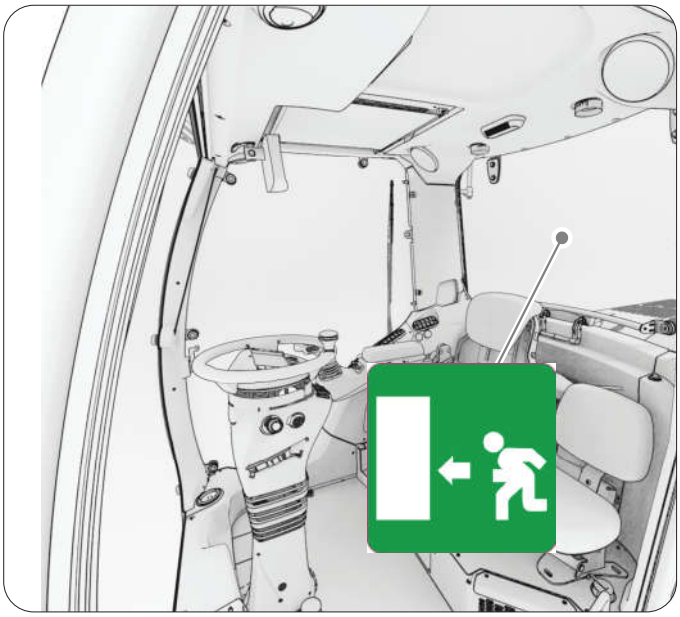
Stand on the foldaway step (**E**) with both feet. Hold the handle (**F**) firmly with one hand and refill. NEVER JUMP FROM THE STEP! Always get off one foot at a time while holding the handle (**F**).

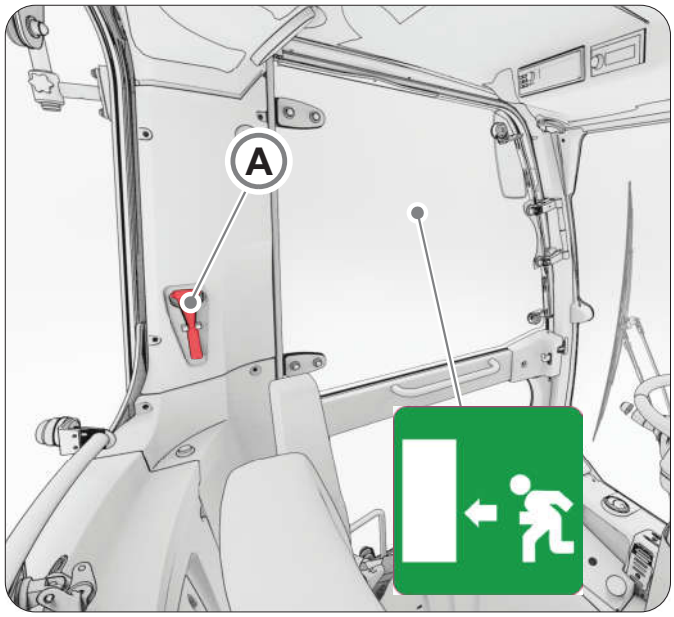
WARNING

- **To reach the filling points, use exclusively ladders that comply with the safety regulations specified in Italian Legislative Decree 81/2008 or the transpositions of the safety regulations in the country in which you are working.**
- **If you use tanks for filling, remember that the capacity of each tank must not exceed 25 litres.**

3.3.3 Cabin emergency exits

The emergency exits are indicated on the rear window and on the window of the door. There is a hammer (**A**) in the cabin that should be used to break the glass in an emergency (see section ***"6.5 Cabin emergency exits").***





3.3.4 Using the machine on sloping ground

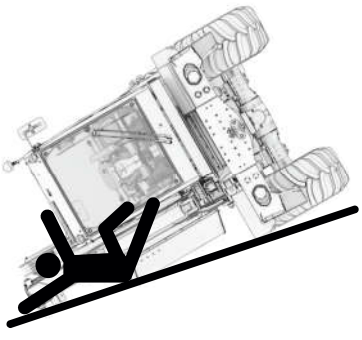
WARNING

- **As well as the recommendations below, you should drive with the utmost care on sloping ground and roads.**
- **For these reasons, the user should assess the risk of tipping over before using vehicle on a slope.**

The machine can tip over when being used on a slope. This can result in serious injury or death. The risk of tipping over depends on many factors.

When the machine is being driven on sloping ground and roads, the safety conditions depend on the:

- Speed of the vehicle;
- Pressure and wear of the tyres;
- Load on the machine;
- Orientation of the vehicle;
- Presence of obstacles (logs, boulders etc.);
- Presence of holes or depressions in the ground;
- Ground conditions (dry, wet, soft etc.);
- Weather conditions.



Below is a non-exhaustive list of instructions for avoiding accidents due to poor machine operation on sloping ground:

- Fasten the seat belts.
- Moderate speed on inclined roads or with heavy loads. The braking distance required is greater both on inclined roads with the machine unloaded and on flat roads with the machine loaded.
- Do not disengage the clutch or try to change gear while driving on inclined roads.
- When on sloping ground, place any front and/or rear attachments as close as possible to the ground.
- On sloping ground and with tools / equipment connected to the front of the machine, use forward gears uphill and reverse gear when going downhill. If, on the other hand, the machine does not have tools / equipment mounted at the front and there are tools / equipment connected to the rear, use reverse gear when going uphill and forward gear when going downhill.
- DO NOT manoeuvre the machine transversely with respect to the direction of the slope.
- If you have to park the machine, remember that it operates differently with heavy loads, on sloping ground.

3.3.5 What to do if the machine tips over

Below is a non-exhaustive list of instructions for avoiding accidents if the machine tips over:

- Fasten the seat belts.
- If the machine tips over, hold the steering wheel firmly and stay in the driver's seat until the tractor has come to a complete stop. Only then, leave the driver's seat using the emergency exits indicated by the specific pictogram.

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 hazards, place warning signs on the steering wheel, control levers and ignition key; if necessary, before performing maintenance work, also place warning signs around the machine and especially on the grip handles.

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 that are not indicated or modified without authorisation will void the warranty and release the manufacturer from any liability for injury to people or damage to property.

3.4.3 Staff

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 ENERGREEN S.P.A..

3.4.4 Under machine maintenance

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 ENERGREEN S.P.A..

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 ENERGREEN S.P.A..

- Regularly remove all deposits of flammable materials (dry grass and leaves) from the area around the engine and its exhaust system, the battery and all the points in which they may 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 water under pressure.

3.4.6 Periodic replacement of essential safety components

Check periodically the following components, important for fire prevention:

- **Fuel supply system:** fuel delivery and return pipes;
- **Hydraulic system:** main hydraulic pump delivery pipes;
- **Hydraulic system:** services pipes from hydraulic cylinder distributor and hydraulic motor.

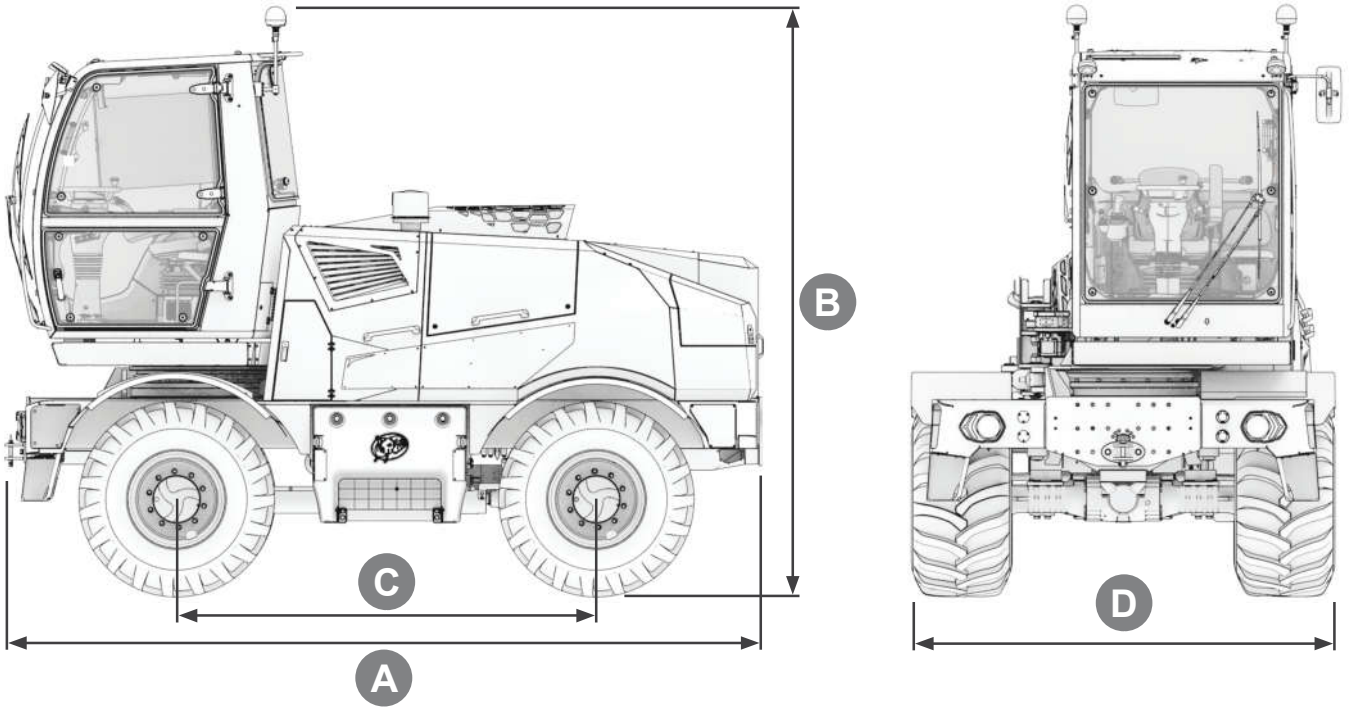
Carefully check the condition of the quick couplers of the machine.

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

4.1.1 Dimensions



POS.	DIMENSIONS
A	4440 mm
B	3490 mm
C	2500 mm
D	2540 mm

The maximum dimensions of the ILF ALPHA machine may vary according to the arm and the equipment mounted on the machine. Refer to the technical appendix.

4.1.2 Weights

The total weight of the ILF ALPHA machine, without equipment, is 13.5 t (the weight of the machine may vary depending on the arm and the equipment installed on it). The permissible weight of the arm is 16100 kg.

Arm	Tare (kg)		
	Total	axle 1	axle 2
T1	13150	5475	7675
T2	13400	5550	7850
T3	13850	5750	8100
L1	13400	5600	7800
L2	13600	5650	7950
L3	13700	5700	8000
M2	13550	5650	7900

Key to arms	
T1	T8 - Articulated arm, two parts, the last of which is telescopic with 1 extension (L= 8m)
T2	T10 - Articulated arm, two parts, the last of which is telescopic with 2 extensions (L= 10m)
T3	T12 - Articulated arm, two parts, the last of which is telescopic with 3 extensions (L= 12m)
L1	F9.5 - Articulated arm, three parts, the last of which is telescopic with 1 extension (L= 9.5m)
L2	F11 - Articulated arm, two parts, the last of which is telescopic with 2 extensions (L= 11m)
L3	F12 - Articulated arm, two parts, the last of which is telescopic with 2 extensions (L= 12m)
M2	3P 9.7 - Articulated arm, three parts, the last of which is telescopic with 1 extension (L= 9.7m)

4.1.3 Engine

Make	John Deere	**Type**	4045CI550
No. of cylinders	4	**Displacement:**	4500 cc
Power	129 kW / 173 CV	**Peak torque**	667 Nm @ 1600 rpm
Cooling	Liquid	**Air filter**	Dry

The engines comply with EU Stage V - EPA Tier 4 Final exhaust emissions regulations.

4.1.4 Electrical system

Voltage	12V DC
Alternator	200 A - 12V DC
Battery ILF ALPHA	174 Ah

4.1.5 Hydraulic system

Circuit	Pump type	No.	Flow rate	Pressure
			Maximum	
			L/min	Bar
Translation	Danfoss H1 P100	1	220	480
Auger	Danfoss H1 P78	1	122	310
Arm movements	Casappa 43	1	94	250
Power steering	Casappa 19	1	40	170
Brakes	Casappa 19	1	40	150

4.1.6 Transfer speed

	Forwards		Reverse	
Speed	1 (slow)	2 (fast)	1 (slow)	2 (fast)
km/h @ 2200 rpm	12 - 15	40	12 - 15	40

4.1.7 Axles

	Type	Maximum permissible load (kg)
Front	**Swing** Steering + automatic differential lock 100%	8400
Rear	**Fixed** Steering + automatic differential lock 100% + gearbox + four-wheel drive release	9500

4.1.8 Machine brakes

With operating machine approval:

Service	Front	No. 8 hydraulically controlled oil bath discs.
	Rear	
Parking	Negative with electro-hydraulic control. Automatically engaged each time the engine is stopped.	

With tractor approval:

Service	Front	No. 8 hydraulically controlled oil bath discs.
	Rear	
Parking	Negative with electro-hydraulic control. Automatically engaged each time the engine is stopped.	

4.1.9 Tyres

Make	Measure	Pressure (bar)		Capacity (kg) at 40 km/h
		Min	Max	
Alliance	445/70 R19.5	6.7	7.5	6500
	445/70 R22.5	6.7	7.5	6900
	600/50 22.5	5.5	6	6000
Continental / Mitas	445/65 R22.5	5.5	6	5175
Trelleborg	650/45 22.5	4.7	6	6500
Michelin (*)	445/70 R19.5	6.7	7.5	6500
	445/70 R22.5	6.7	7.5	6900
Nokian (*)	600/50 R22.5	3.6	4	5960

(*) Tyre NOT valid for Regulation (EU) 167/2013.

4.1.10 Capacities table

		Quantity
Engine oil		20 litres
Fuel tank capacity		214 litres
AdBlue® - DEF tank capacity		23 litres
Hydraulic oil tank capacity		274 litres
A/C system	**Gas R134a**	1.65 kg
	Oil ND-OIL 8	160 cm^3

4.2 TOWING DEVICES

The following values are indicated on the tractor registration document and the technical appendix (document issued for the Italian market only) of the tractor.

- maximum permissible load on the tow hitch (horizontal and vertical)
- maximum permissible height of tow hitch for use on roads
- maximum towing capacity for:
  - unbraked;
  - with mechanical braking;
  - with inertia braking;
  - with hydraulic or pneumatic braking;

Note: CUNA NC338-02 approved towbars and hitches can be used in Italy.

CAUTION

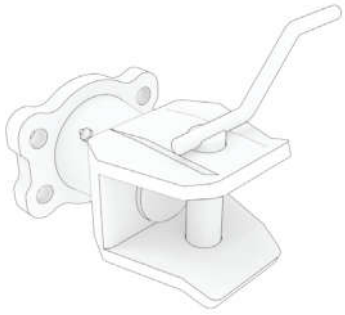
Any damage caused by failure to comply with the instructions regarding loads and the information provided in the vehicle registration document will be considered the full responsibility of the operator.

4.2.1 Fixed tow hitch

Tow hitch specifications	
Model	MEC-1
Type	Fixed
Trailer towing eye type	Swivel
Pin diameter (mm)	31.5
Maximum vertical load (kg)(*)	750
Approval	e24*2015/208*2018/829ND*00008*01

(*) maximum authorized load of machine without equipment.

4.2.2 Swivel tow hitch



Tow hitch specifications	
Model	MH31H
Type	Swivel
Trailer towing eye type	Fixed
Pin diameter (mm)	32
Maximum vertical load (kg)(*)	750
Approval	e3-2015-208-2018-829ND-30010-02

(*) maximum authorized load of machine without equipment.

4.2.3 Fixed automatic tow hitch

Tow hitch specifications	
Model	GA250
Type	Swivel
Trailer towing eye type	Fixed
Pin diameter (mm)	25
Maximum vertical load (kg)(*)	250
Approval	e3*55R-01*3007*01

(*) maximum authorized load of machine without equipment.

4.2.4 Calculating the maximum permissible vertical load

- If equipment is fitted to the machine, the maximum vertical load on the tow hitch has to be reduced according to the actual weight exerted on the rear axle, in order not to exceed that the maximum permissible weight on the rear axle. It is calculated using the following formula:

$$S=((9500-Mp)*2500)/(2500+c)$$

where:

- *Mp* is the actual mass (in kg) on the rear axle with the equipment installed
- *c* is the distance (in mm) between the tow hitch and the rear axle.

Tow hitch	*c* (mm)
MEC-1	2120
MH31H	2108
GA250	2060

4.2.5 Maximum towing capacity

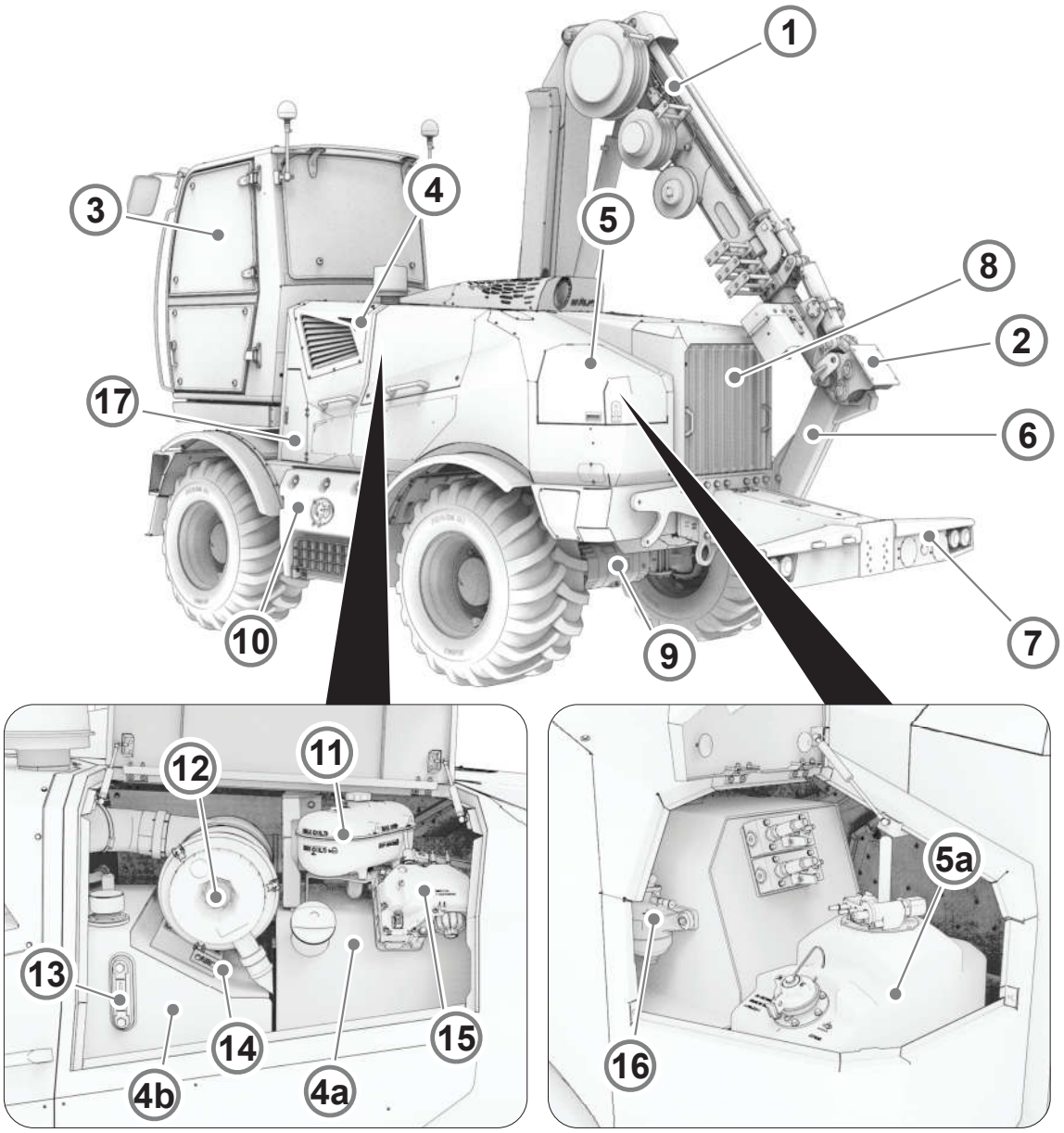
With tow hitch MEC-1 and MH31H, these weights apply to all types of drawbar, rigid drawbar and centre-axle trailers:

- 2000 kg with unbraked trailers;
- 8000 kg with trailers fitted with inertia braking;
- 14000 kg with trailers fitted with hydraulic braking;

With tow hitch GA250:

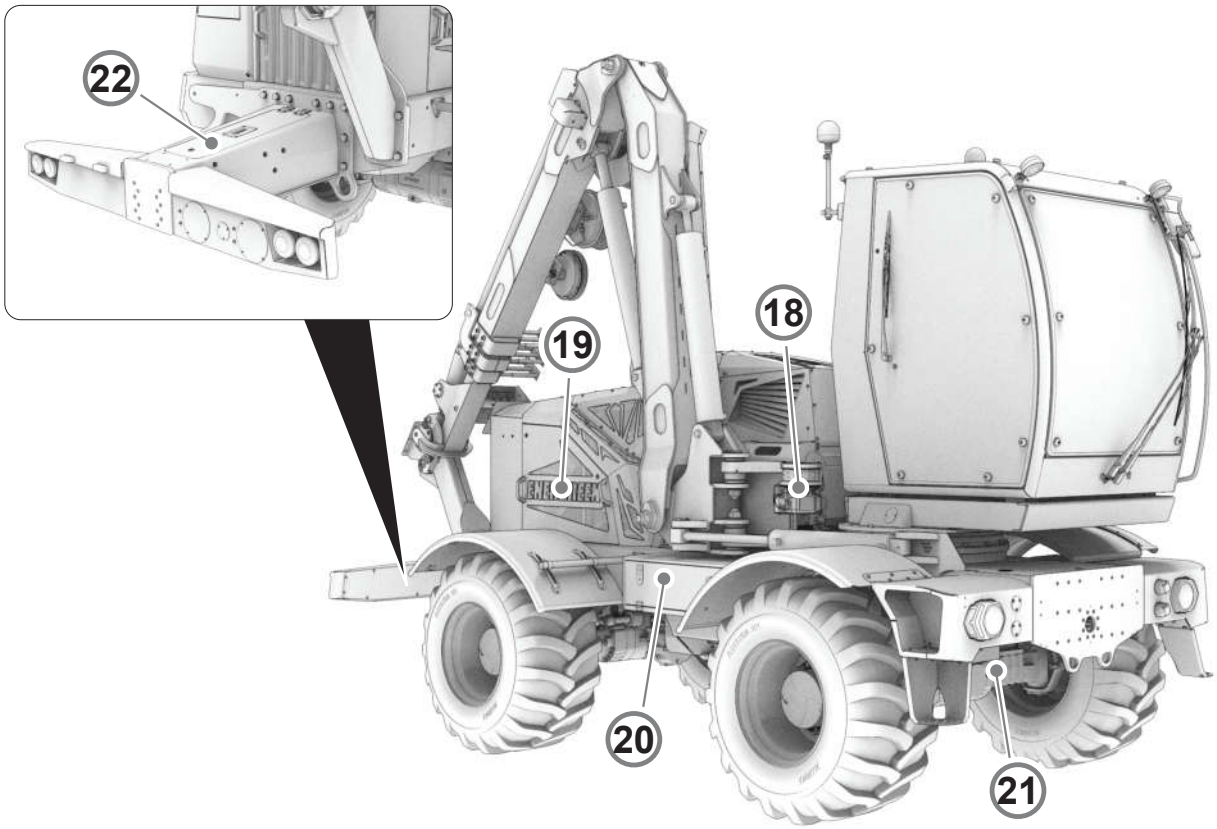
- 2000 kg with unbraked trailers, this weight applies to all types of drawbar, rigid drawbar and centre-axle trailers;
- 3500 kg with trailers fitted with inertia braking, this weight applies to rigid drawbar and centre-axle trailers;
- 5500 kg with trailers fitted with inertia braking, this weight applies to drawbar trailers;
- 3500 kg with trailers fitted with hydraulic braking, this weight applies to rigid drawbar and centre-axle trailers;
- 5500 kg with trailers fitted hydraulic braking; this weight applies to drawbar trailers;

4.3 MACHINE NAME



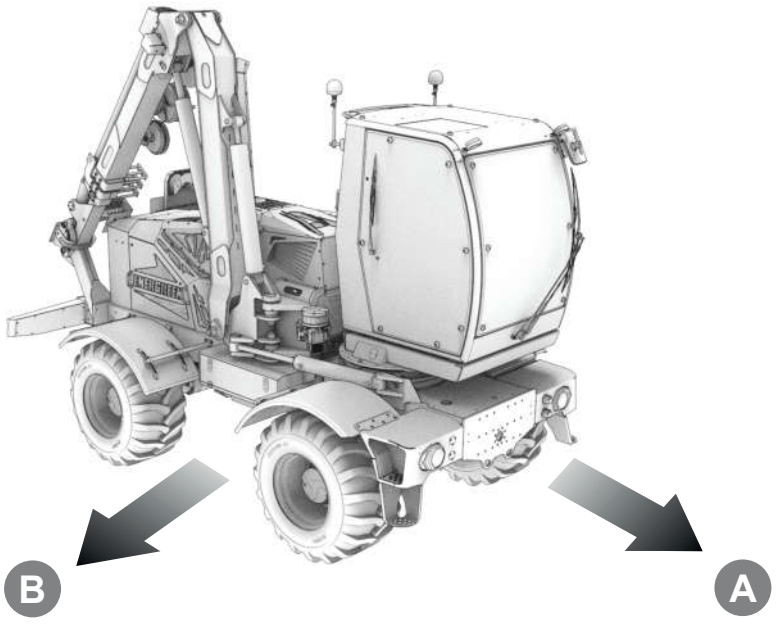
POS.	DESCRIPTION
1	Arm
2	Terminal equipment attachment
3	Cabin.
4	Bonnet: Fuel tank and hydraulic oil tank
4a	Fuel tank
4b	Hydraulic oil tank
5	Bonnet: AdBlue® / DEF tank
5a	AdBlue® / DEF tank
6	Arm support
7	Lights bar
8	Radiator grille and intercooler

POS.	DESCRIPTION
9	Fixed rear axle
10	Removable ballast
11	Coolant tank
12	Air filter
13	Hydraulic oil level indicator
14	Compressed air connection (optional)
15	AdBlue® / DEF pump
16	AdBlue® / DEF filter
17	Bonnet: Hydraulic control valve

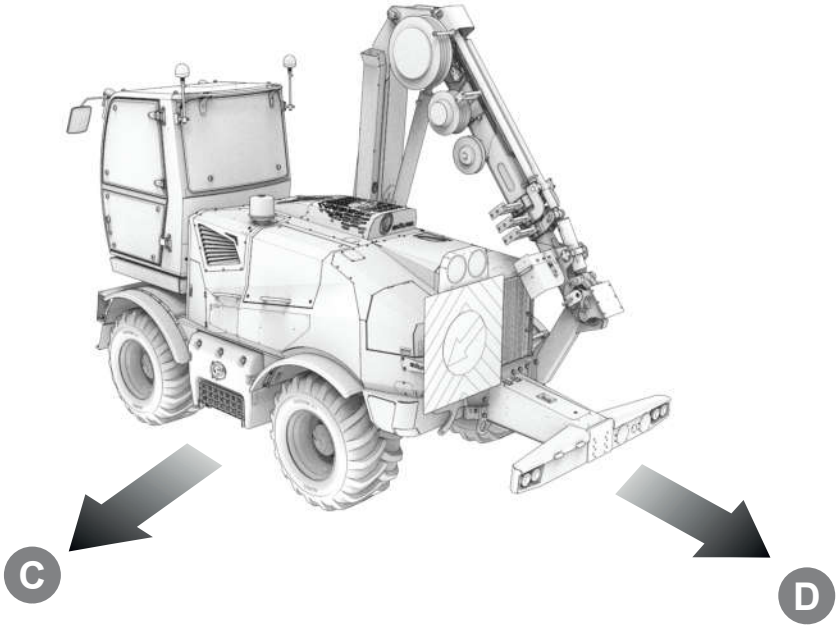


POS.	DESCRIPTION
18	Automatic greaser (optional)
19	Engine cover
20	Storage compartment

POS.	DESCRIPTION
21	Oscillating front axle
22	Battery compartment



POS.	DESCRIPTION
A	Front side
B	Right side



POS.	DESCRIPTION
C	Left side
D	Rear side

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.

Must not have disabilities of any kind or health problems.

SPECIALISED OR MAINTENANCE PERSONNEL

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

Must not have disabilities of any kind or health problems.

AUTHORISED PERSONNEL

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

Must be authorised in writing by ENERGREEN S.P.A. to work on the machine.

Must not have handicaps of any kind or health problems.

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 ENERGREEN S.P.A. to work 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. USING THE 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 engine;
- 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 and registration certificate (if requested).

A copy of each type of key (ignition, cabin, bonnets etc.) is supplied with the machine. One copy should be given to the operator and the other should be kept in a safe place by the person responsible for the site (NOT INSIDE THE MACHINE!) to be able to assist the operator in the event of sudden illness (See section ***“10.2 Assisting the operator in case of illness”***).

6.2 CHECKS TO BE PERFORMED AT THE START OF EACH WORKING DAY

Some checks should be carried out before the start of each working day: see section ***“9.23 Maintenance operations”*** on how to carry out the checks.

6.3 USING THE ARM

WARNING

All the parts that make up the machine, the arm and the equipment have been designed to withstand high stresses, provided they are used correctly.

The correct use of the arm during cutting occurs when:

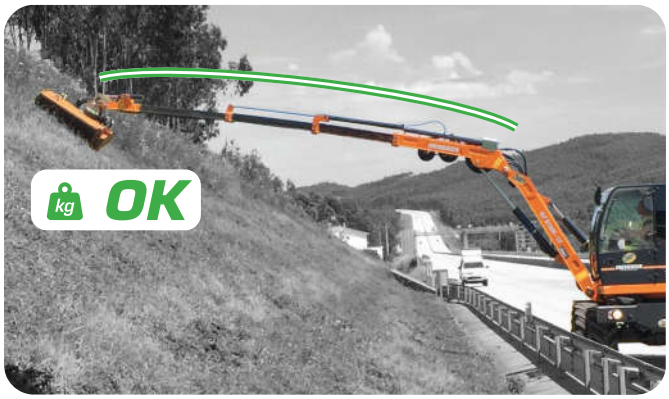
- The mulching head rests on the ground, without forcing it further with the arm to increase the adhesion of the head to the ground;
- the arm is kept in suspension (unless force majeure requires otherwise).

In order to obtain the best from the mulching head and to avoid excessive stress on the arm, the pressure applied to the head support roller must always be the same exerted by the weight of the mulching head and the weight of the arm (the total weight will be distributed partly on the machine and partly on the ground).

Otherwise, if too much pressure is applied to the ground, two main problems will arise:

- Excessive sinking of the support roller into the ground, which generates friction, if not excessive restraint of the arm (this means that the operator will be forced to make continuous corrections to the arm position);
- Unnatural bending of the telescopic parts of the arm (see point (**A**)): the telescopic part is designed and built to withstand high lateral and downward stresses, but it is NOT designed to flex with upward stresses (the telescopic parts form a “U”).

INCORRECT BENDING



CORRECT BENDING

WRONG work includes, for example, actions such as the following:

- Excessive arm thrust on the ground;
- Failure to avoid natural and/or artificial obstacles with the equipment, arm and machine;
- Use of the arm for lifting purposes;
- Using the equipment installed on the arm for purposes other than the one it was designed for;
- The use of terminal equipment not authorised by ENERGREEN S.P.A..

6.4 GENERAL INFORMATION ABOUT THE CABIN

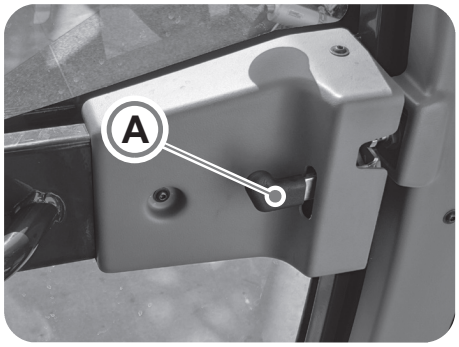
The new generation cabin is very spacious, mounted on special elastic supports and studied down to the smallest details. It provides a quiet and comfortable environment, certified by ROPS and FOPS testing:

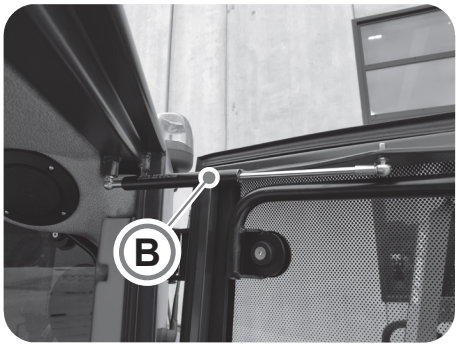
- ROPS OECD Code 4;
- FOPS OECD Code 10.

Particular attention has been paid to the high-readability instruments, with a wide adjustable console. An efficient air conditioning system and the large windows makes the position of the driver's seat ideal. Taking into account the comments of operators who work every day with traditional vehicles, we have built a cabin rotation system that allows the operator to adjust the driver's position in order to achieve maximum visibility and control when working. Thanks to the use of a multifunctional joystick and other pedal controls, machine operation is intuitive and direct, which facilitates and optimises the use of the machine.

6.4.1 *Getting out of the cabin*

To open the door of the driver's cabin, press the handle (**A**). The amount by which the door opens is limited by a piston located at the top of the door. It is recommended to close the door during transport.





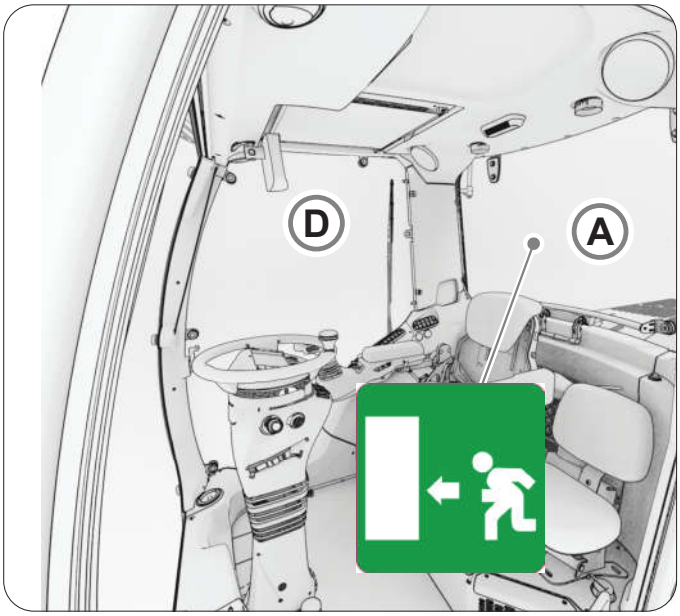
6.5 CABIN EMERGENCY EXITS

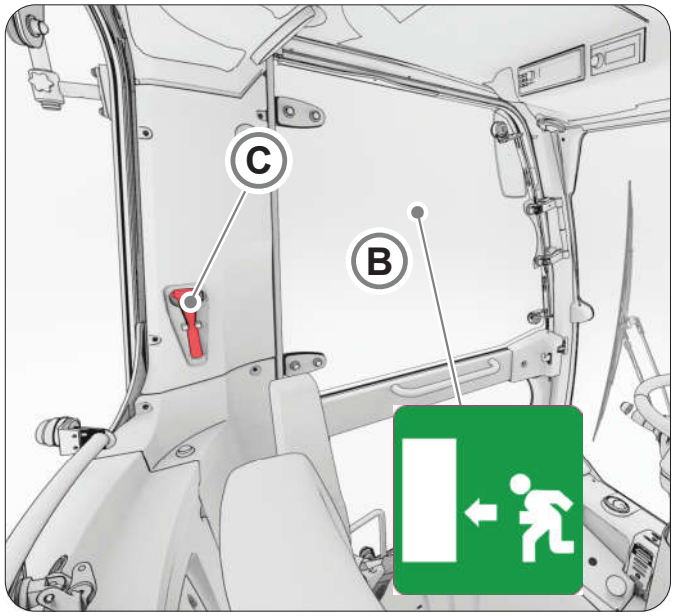
The emergency exits are indicated on the rear window and on the window of the door. The window glass hammer (**C**) is located inside the cabin. It should be used to break the rear window of the cabin or the window of the door in an emergency.

The windscreen is made of tempered glass, approved for use in road vehicles travelling at up to 40 km/h. ENERGREEN S.P.A. can also provide the machine with a laminated glass windscreen (and/or right side windows) which will not shatter in the event of a stone or other impact. This is also approved for use.

CAUTION

If you wish to protect the operator from possible glass breakage, an additional protection can be mounted on the right hand side window (D).





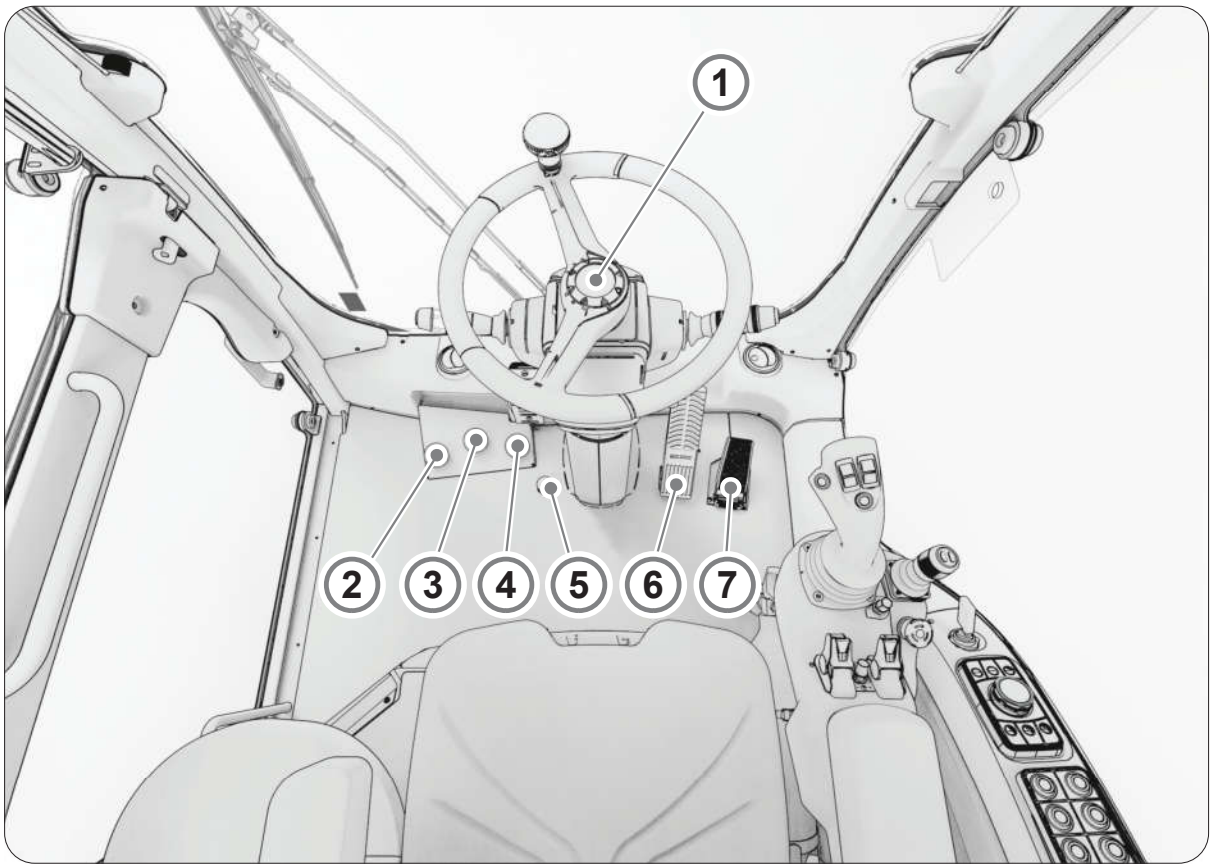
6.6 SEAT BELTS

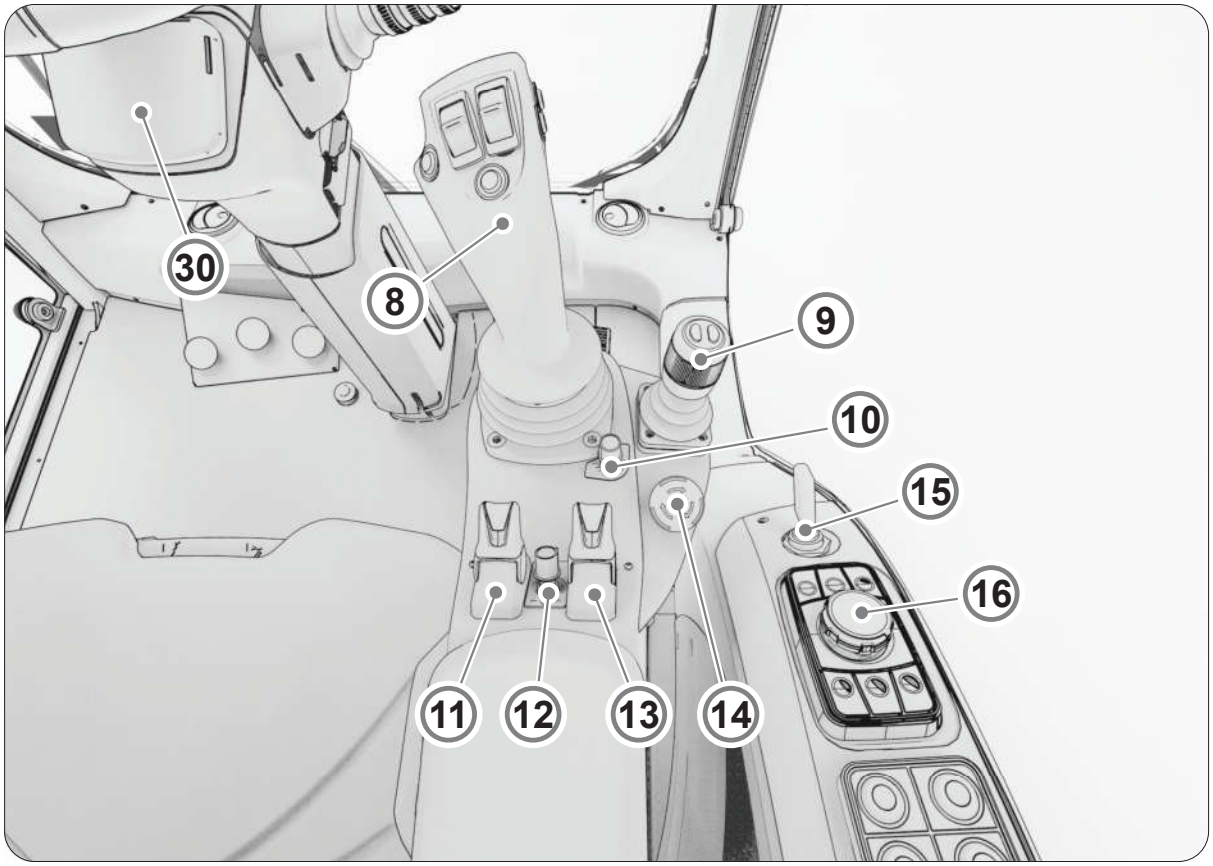
The seat belt on the driver's seat is provided with two attachment points and length adjustment. The belt should always be worn and fastened properly, restraining the operator at the level of the pelvis as shown in the figure.

DANGER

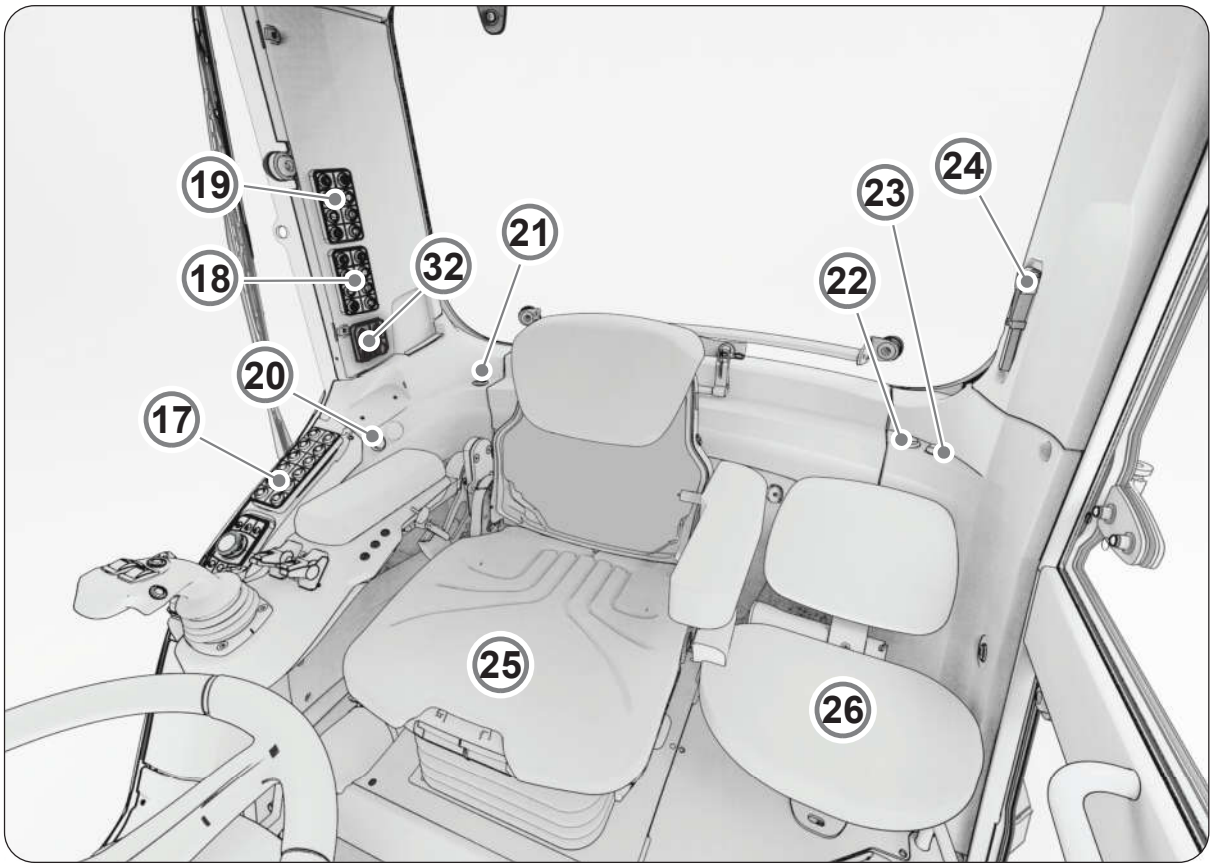
- **The seat belt should be fastened before carrying out any operation.**
- **The seat belt should be replaced every 4 years or if it shows signs of fraying, damage or wear.**
- **In the event of an accident, it should be checked. Replace in case of doubt.**

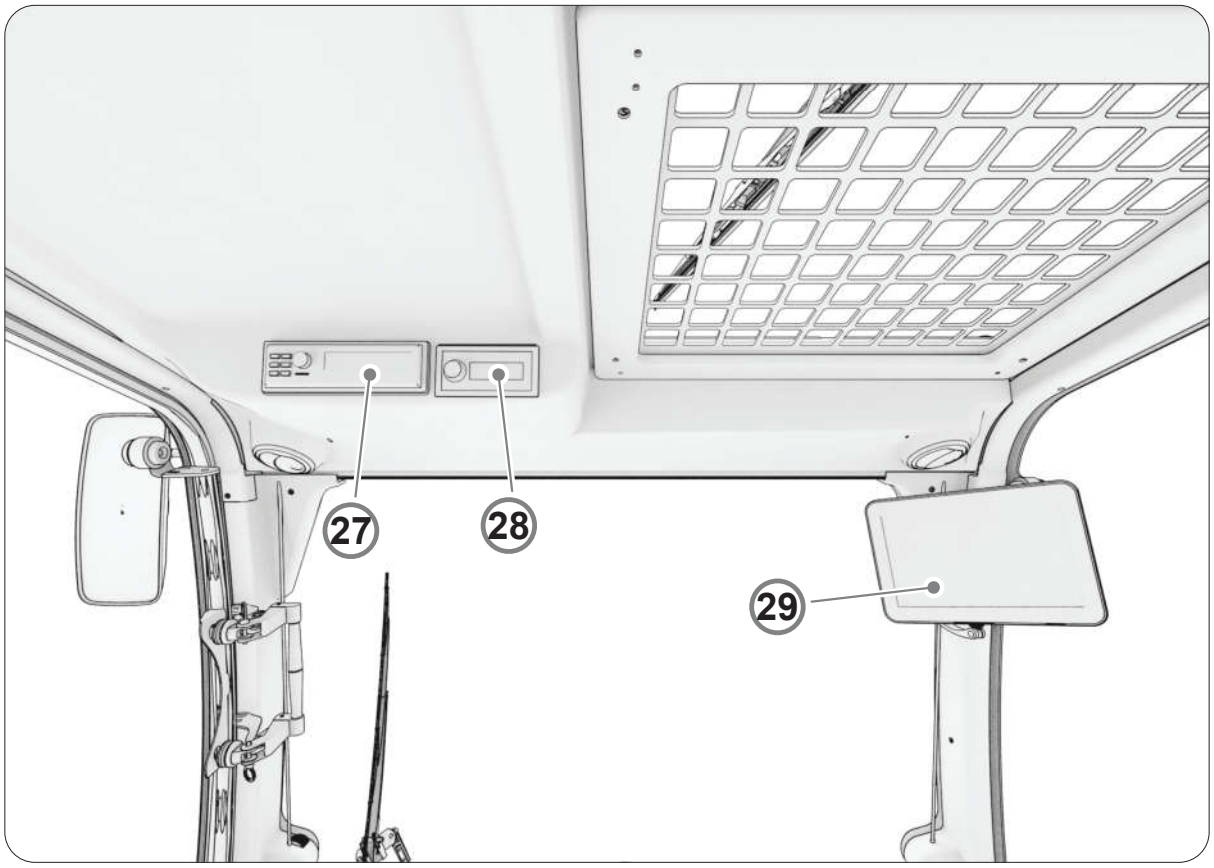
6.7 CABIN INSTRUMENTATION

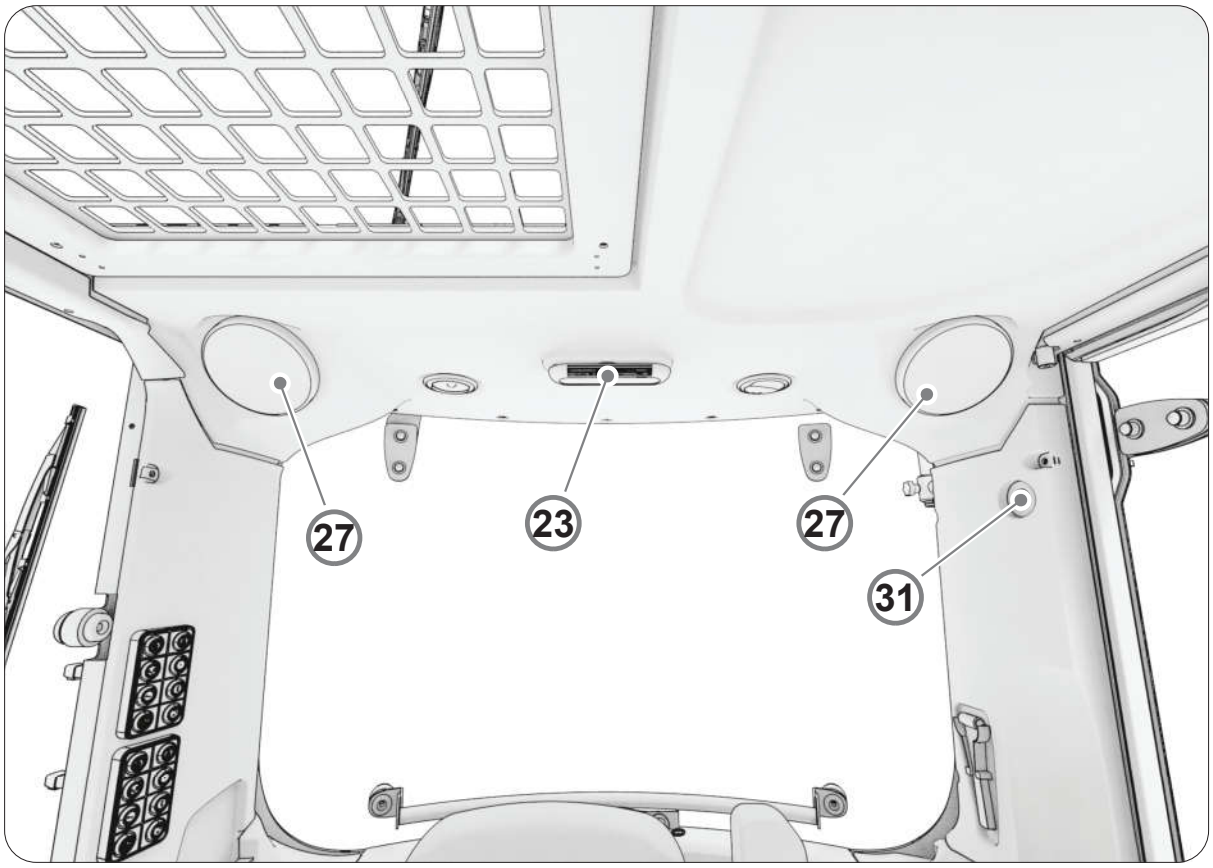




06-Cabina (ILF)


19
18
32
21
20
17
23
24
22
25
26


27
28
29


27
23
27
31

	Section	
1	6.10	Steering column
2	6.26.1	Function F1 with independent hydraulics (optional)
	6.26.2	Function F1 with hybrid hydraulics (optional)
	6.26.3	F2 function (optional)
	6.26.4	F3 function (optional)
3	6.26.1	Function F1 with independent hydraulics (optional)
	6.26.2	Function F1 with hybrid hydraulics (optional)
	6.26.3	F2 function (optional)
	6.26.4	F3 function (optional)
4	6.38	Reverser (optional)
5	6.39	Differential lock
6	6.15	Service brake pedal
7	6.16	Accelerator pedal
8	6.17	Right joystick
9	6.18	Mini-joystick
10	6.19	SPP potentiometer (optional)
11	6.23.1	Work mode
12	6.26.1	Function F1 with independent hydraulics (optional)
	6.26.2	Function F1 with hybrid hydraulics (optional)
	6.26.3	F2 function (optional)
	6.25.4	F3 function (optional)
13	6.23.8	Cruise control (optional)
14	6.20	Emergency button
15	6.30	Ignition panel
16	6.28	Powertrack
17	6.23	Main keypad
18	6.25	Functions keypad (optional)
19	6.26	Options keypad (optional)
20	6.31	Emergency indicators
21	6.32	USB socket
22	6.33	Cigarette lighter
23	6.34	Courtesy light
24	6.5	Cabin emergency exits
25	6.8	Seat
26	6.9	Passenger seat (optional)
27	6.41	Radio (optional)
28	6.40	Climate control and heating
29	6.42	ECI - Energreen Control Interface
30	6.14	Steering column button pad
31	6.35	Coat hook
32	6.24	Suspension keypad (Easy Ride version)

6.8 SEAT

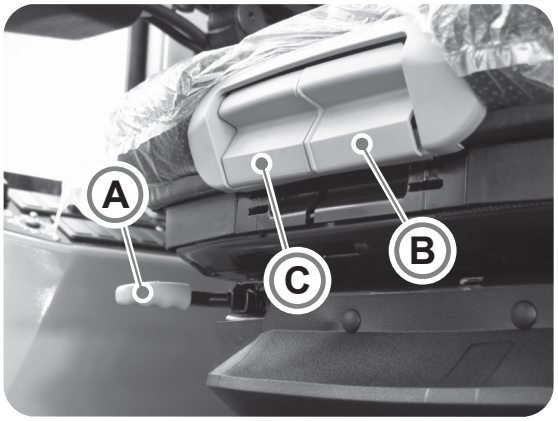
The operator must be sitting in the driver's seat in order for the ***"6.23.1 Work mode"*** and ***"6.23.7 Dead man"*** functions to be enabled and used.

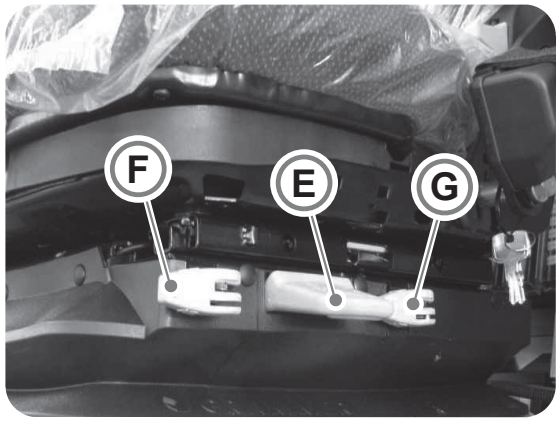
If the operator gets up from the seat:

1) The ***"6.23.1 Work mode"*** and ***"6.23.7 Dead man"*** functions will be disabled.
2) Neutral gear will be engaged.
3) The parking brake will be activated.

The following symbol will appear on the screen.

Symbol	Description
	Operator not seated.





6.8.1 Longitudinal adjustment

The seat is moved longitudinally using the lever (**A**) and sliding the seat forwards and backwards as required. Once the ideal position has been found, release the lever and move the seat slightly until the lever goes back into its seat.

6.8.2 Seat cushion tilt adjustment

Pull the left handle (**B**) upwards to adjust the angle of the seat cushion.

6.8.3 Seat cushion depth adjustment

Pull the right handle (**C**) upwards to adjust the depth of the seat cushion to the required position.

6.8.4 Backrest adjustment

The backrest can be tilted using the locking lever (**D**) and increasing or decreasing the pressure exerted on the backrest.

6.8.5 Weight adjustment

The driver's seat should be adjusted according to the weight of the driver, when seated, by briefly pulling the automatic weight and height adjustment lever (**E**).

6.8.6 Horizontal suspension

With the horizontal suspension (**F**) active, shocks in the direction of travel can be more easily absorbed by the seat; the possible settings are:

- Off
- On

6.8.7 Damping

The seat damping setting (**G**) can be varied to suit on and off-road driving conditions. The type of suspension has three settings:

- Soft
- Medium
- Hard

6.8.8 Armrests

The armrests can be folded back, if necessary, and brought to the required height. To adjust the inclination, turn the cap.

6.8.9 Lumbar support

The curvature of backrest padding can be adjusted using the upper and lower switches to suit individual requirements.

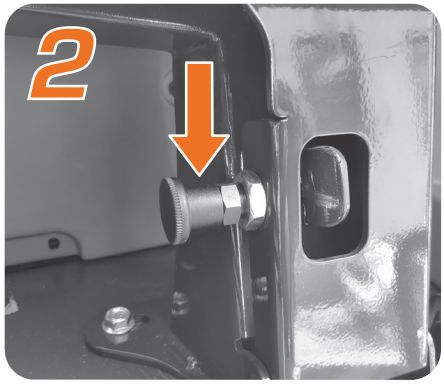
6.8.10 Seat belt

DANGER

- **The seat belt should be fastened before carrying out any operation.**
- **The seat belt should be replaced every 4 years or if it shows signs of fraying, damage or wear.**
- **In the event of an accident, it should be checked. Replace in case of doubt.**

The seat belt on the driver's seat is provided with two attachment points and length adjustment. The belt should always be fastened properly and restrain the operator at the level of the pelvis as shown in the figure.

6.9 PASSENGER SEAT (OPTIONAL)

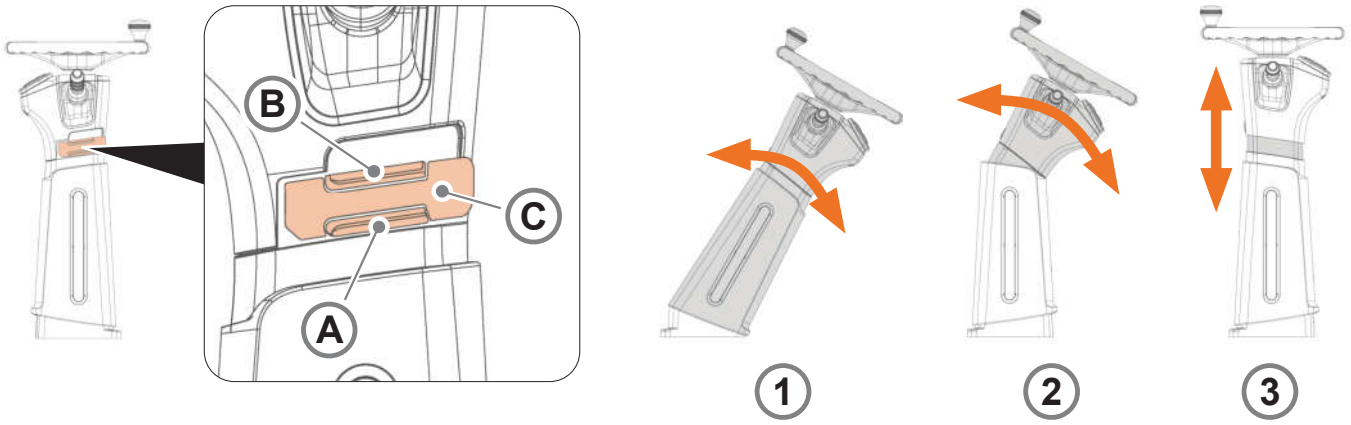


1. To the left of the main seat, there is a second seat, which is only to be used for training purposes. This seat can be reclined.
2. To recline the seat, move the pin (indicated by the orange arrow) in the support under the seat, to the left
   - Once the pin has been moved, lift the seat upwards.
   - When finished, release the pin to fix the seat in this position.
3. To return the seat to the position of use, move the pin (indicated by the orange arrow) to the left again.
   - With the pin tensioned, move the seat downwards.
   - Once the seat has been lowered, release the pin to fix the seat in the position of use.
4. The seat belt for the 2nd seat has two attachment points and length adjustment. The belt should always be fastened properly and restrain the operator at the level of the pelvis as shown in the figure.

DANGER

- **The seat belt should be fastened before carrying out any operation.**
- **The seat belt should be replaced every 4 years or if it shows signs of fraying, damage or wear.**
- **In the event of an accident, it should be checked. Replace in case of doubt.**

6.10 STEERING COLUMN



6.10.1 Tilt adjustment

The tilt (**1**) of the steering column can be adjusted by pushing down the lever (**A**). As long as the lever is down, adjust the tilt, then lock by releasing the lever.

6.10.2 Intermediate tilt adjustment

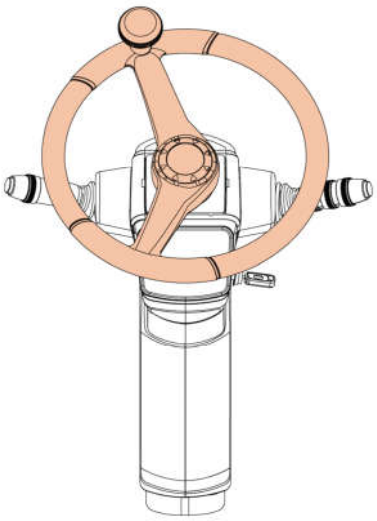
The intermediate tilt (**2**) of the steering column can be adjusted by pushing up the lever (**B**). As long as the lever is raised, adjust the intermediate tilt, then lock by releasing the lever.

6.10.3 Telescopic height adjustment

The height of the steering column (**3**) can be adjusted by pulling and releasing the lever (**C**). After adjusting the height of the column, push and lock the lever (**C**) back into place.

6.11 STEERING WHEEL

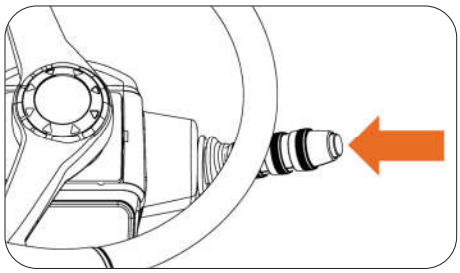
Turning the steering wheel clockwise, you steer to the right, turning it anticlockwise, you steer to the left.



6.12 LIGHT STALK

CAUTION

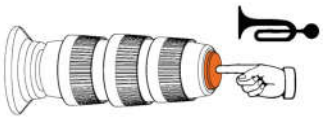
Do not rest your hand on the light stalk while driving the vehicle.



The lever to the right of the steering column controls the horn, lights, windscreen wipers and direction indicators.

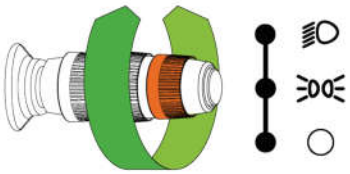
6.12.1 Klaxon

Pressing the button on the end of the lever activates the horn.



6.12.2 Sidelights / low beam headlights

- Turning the first right ring nut clockwise:
  a) one click activates the parking lights;
  b) the second click activates the dipped beam headlights.
- Turning the ring nut fully anticlockwise will switch the lights off.



Symbols on the screen:

PARKING LIGHTS

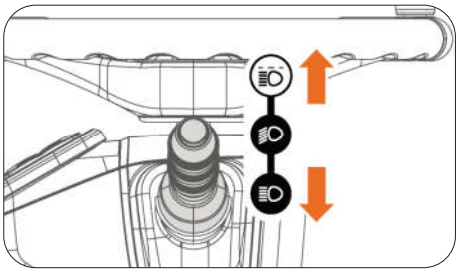
LOW BEAM HEADLIGHTS

CAUTION

- **The work lights and the signboards can only be activated if the engine and sidelights are switched on.**
- **The auxiliary sidelights, rear fog lights and flashing lights can only be activated if the sidelights are on.**

6.12.3 *Full-beam headlights*

- Pulling the lever upwards causes the high beam headlights to flash.
- Moving the lever to the centre position activates the dipped beam headlights.
- Pushing the lever down activates the high beam headlights.

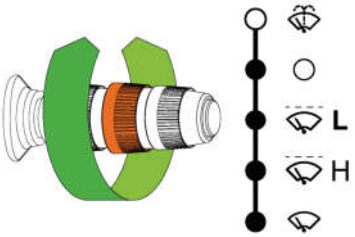


Symbols on the screen:

FULL-BEAM HEADLIGHTS

6.12.4 *Windscreen washers / wipers*

- Turning the central ring anticlockwise by one click activates the windscreen washer.
- Turning the ring to position (0) deactivates the windscreen wipers.
- Turning the central ring nut clockwise:
  a) one click activates the wiper in slow timer mode;
  b) the second click activates the wiper in fast timer mode;
  c) the third click activates the wiper with continuous speed.



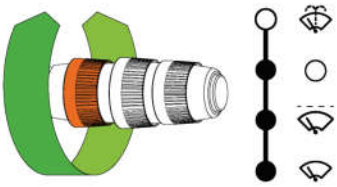
Symbols on the screen:

WINDSCREEN WIPER

WINDSCREEN WASHER

6.12.5 *Right side window washer / wiper*

- Turning the first ring anticlockwise activates the right side window washer.
- Turning the ring to position (**0**) deactivates the side window wiper.
- Turning the first left ring nut clockwise:
  a) One click activates the side wiper in timer mode;
  b) The second click activates the wiper with continuous speed.

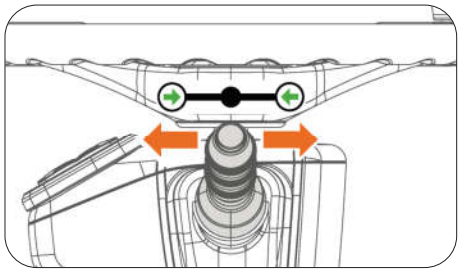


Symbols on the screen:

RIGHT SIDE
WINDOW WIPER

RIGHT SIDE
WINDOW WASHER

6.12.6 *Direction indicators*



- Pushing the lever forward will activate the left directional indicator;
- Pulling the lever backward will activate the right directional indicator;
- The lever returns to the central position automatically and is used in this way:
  a) with one pulse on the lever, the indicator is activated for three flashes and then switches off automatically;
  b) if the pulse on the lever lasts for more than half a second, the indicator is activated until it receives a switch-off signal (see following points).

The indicators are deactivated when:

- after the manoeuvre is complete, you turn the steering wheel to bring the wheels back into the longitudinal position with respect to the direction of travel;
- a further pulse is given to the lever.

Symbols on the screen:

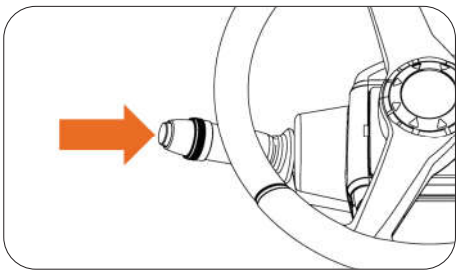
LEFT DIRECTION
INDICATOR

RIGHT DIRECTION
INDICATOR

6.13 DRIVING STALK

CAUTION

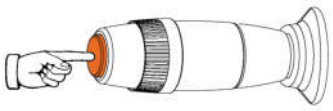
Do not rest your hand on the gear selector while driving the vehicle.

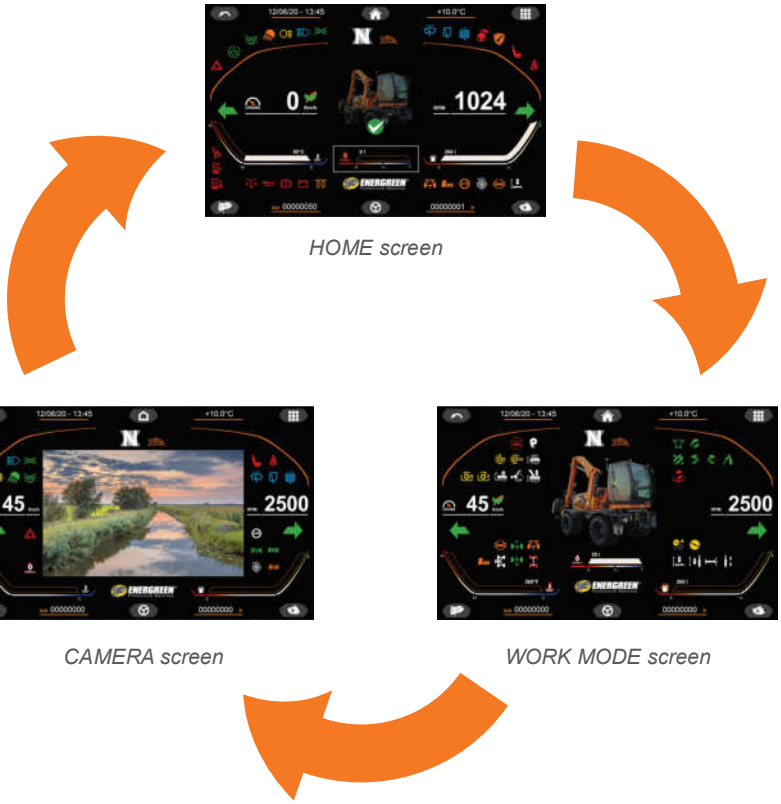


The lever on the left of the steering column controls the movement of the machine.

6.13.1 Page selection

Pressing the button on the end of the lever switches between the HOME, WORK MODE and CAMERA screens.



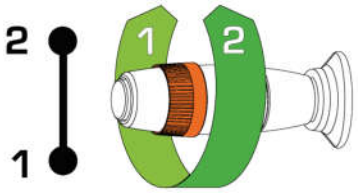


HOME screen

CAMERA screen

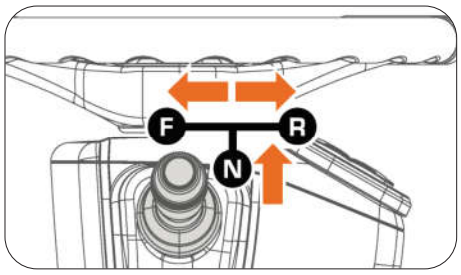
WORK MODE screen

6.13.2 *First / second gear*



- Turning the ring clockwise engages first gear (**1**); the tortoise indicator light on the screen lights up to confirm that the gear is engaged;
- Turning the ring anticlockwise engages second gear (**2**); the hare indicator light on the screen lights up to confirm that the gear is engaged.

6.13.3 *Forward / neutral / reverse*



- With the lever in the central position, the machine will be in neutral gear (**N**);
- Moving the lever up and pushing it forward engages the forward travel (**F**);
- Moving the lever up and pulling it back engages the reverse gear (**R**);

1 - Gear (first): turning the selector switch to this position the machine is prepared for the transfer in the first gear. The tortoise indicator light on the screen lights up (steadily) up to confirm that the gear is engaged.

2 - Gear (second): turning the selector switch to this position the machine is prepared for the transfer in the second gear. The hare indicator light on the screen lights (steadily) up to confirm that the gear is engaged.

F - Forward gear: pushing the lever forward the machine is prepared for the forward motion.

N - Neutral position (idle): in this position the transfer is enabled and the machine engine can be started.

R - Reverse: pulling back the lever prepares the machine for reversing and the intermittent buzzer sounds to signal the operation to any persons near to the machine.

The following symbols will be displayed according to the combination of the three positions on the gear selector:

Gear selector position	Displayed symbol	Description
F + 2		Second gear forward
F + 1		First gear forward
N	**N**	Neutral gear
R + 1		Slow reverse
R + 2		Fast reverse

CAUTION

THE GEAR CAN ONLY BE CHANGED WHEN THE MACHINE IS STATIONARY WITH THE BRAKE PEDAL PRESSED ALL THE WAY DOWN.

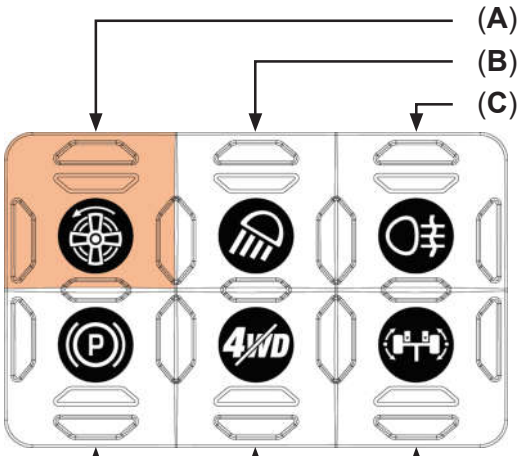
In addition, in order to engage 2nd gear:

- **the operator must be seated;**
- **the wheels must be aligned (whe;n the request to change into 2nd gear is made, front wheel steering is automatically selected);**
- **the cabin must be aligned (it must be in the correct longitudinal position with respect to the direction of travel);**
- **the mobile ballast (if present) must be retracted.**

CAUTION

If the tortoise or hare symbols flash after first or second gear has been selected, it means that the gear has not been engaged. Make sure that the conditions required for engaging the selected gear are correct.

6.14 STEERING COLUMN BUTTON PAD



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

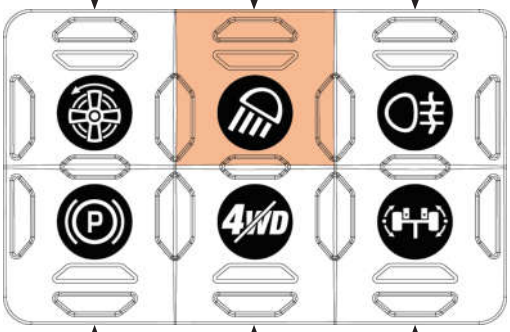
6.14.1 Radiator forced cleaning

Radiator cleaning is controlled independently by the machine, via a reversible blade fan. However, it is possible to force the procedure by pressing button (**A**), which once pressed forces the machine to take over the request, thus initiating early cleaning.

If the button is pressed with the engine off but the ignition is on, the request remains in memory until the engine is started. Once the engine has started, the procedure will be carried out by the machine.

The status of the indicators is as follows:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	-	-	Normal fan status
	Flashing	-	-	Cleaning request
	On		On	Cleaning in progress (automatic or requested by operator)
	Flashing		On	Cooling system fault. Refer to section ***"6.62 Troubleshooting the vehicle"*** to correct the error.



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

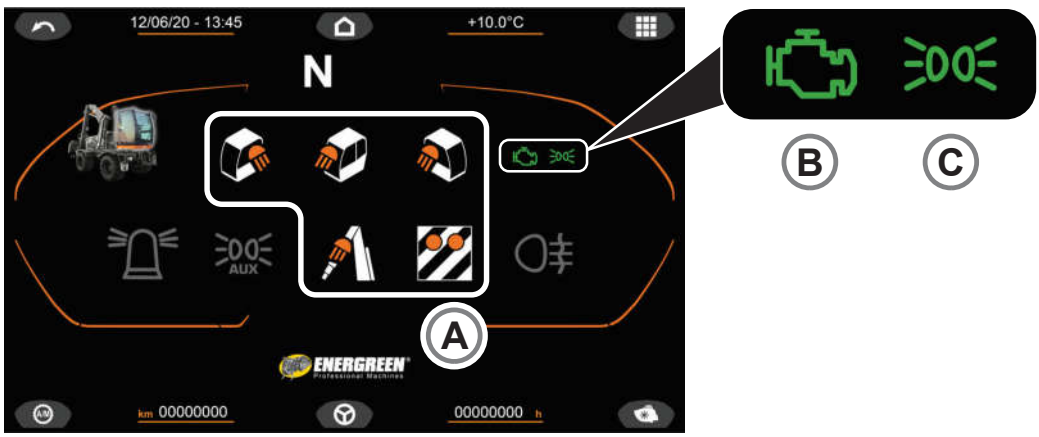
6.14.2 Light management page

Pressing the on-screen button (**B**) takes you to the lights management page (work / road). The work lights are selected via the Powertrack or the touch screen function.

The status of the indicators is as follows:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	See following table		Lights deactivated or second gear engaged.
	Flashing			Requires the sidelights and/or the engine to be switched on beforehand.
	On			Work lights on (cabin, arm, signboard).

The work lights (**A**) can only be activated if the engine and the sidelights are on; this can be checked directly via the respective warning lights (**B**) and (**C**) on the work / road lights screen.



During the work phase, the switching on of only some of the work lights can be saved to memory (pre-selection). The pre-selection is saved to memory even if the machine is switched off.

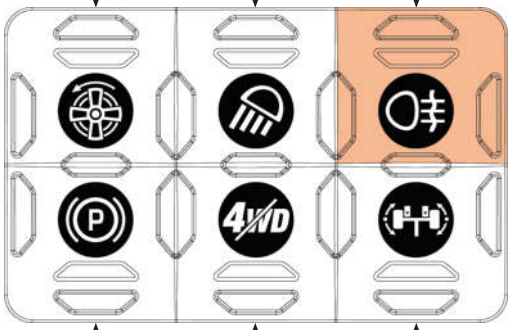
See the table below for the symbols that are displayed.

WORK LIGHTS					
Cabin work lights -left-hand side	Cabin work lights - front	Cabin work lights - right hand side	Arm work lights	Signboard	**Lights management screen** / **Description**
					Not selected
					Pre-selected (via the touch function or Powertrack)
					Light on (the engine has to be running and the sidelights switched on).

The road lights (**A**) can only be turned on if the sidelights are on; this can be checked directly via the relative light (**B**) on the work / road lights screen.

ROAD LIGHTS			
Rotating beacon	Auxiliary headlights	Rear fog light	**Lights management screen** / **Description**
			Not selected
			Pre-selected (via the touch function or Powertrack)
			Light on (the sidelights have to be switched on).

- The beacon is activated automatically by the machine when the second gear is engaged. It can be deactivated later using the touch screen function.
- If a lights bar (supplied by ENERGREEN S.P.A.) is connected to the machine, the auxiliary lights are automatically activated by the machine. They can be deactivated later using the touch screen function.



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

6.14.3 Rear fog light

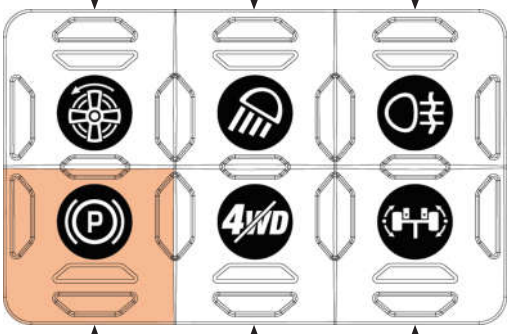
The rear fog light is activated by pressing button (**C**). The sidelights must be on in order for the rear fog light to be turned on.

The status of the indicators is as follows:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	-	-	Light off
	Flashing	-	-	Request submitted; requires the sidelights to be switched on beforehand.
	On		On	Light on

The status of the rear fog light can also be controlled / viewed from the lights management screen (work / road). The work lights can also be selected / activated via the Powertrack or the touch screen function.

Lights management screen	Description
	Not selected
	Pre-selected
	Rear fog light on (the sidelights have to be switched on).



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

6.14.4 ***Handbrake***

Pressing button (**D**) activates the parking brake.
The status of the indicators is as follows:

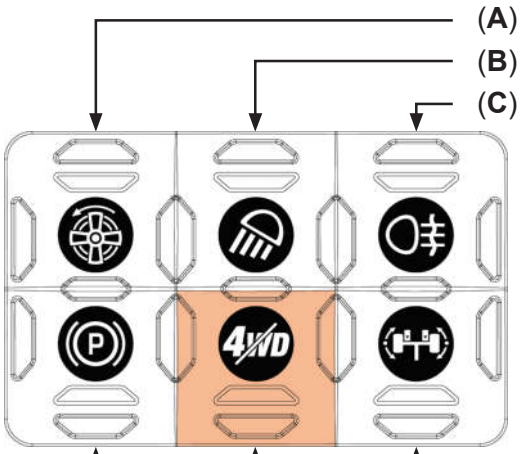
Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	-	-	Handbrake
	On			Active parking brake

WARNING

- **Moving with the park brake engaged, as well as being a forced manoeuvre, may damage the axial group.**
- **In case of malfunction, do not force forward motion and contact the ENERGREEN S.P.A. Customer Care.**

CAUTION

- **The park brake is engaged automatically every time that the machine is switched off.**
- **Each time the engine is restarted, it is necessary to release it before moving.**



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

6.14.5 All-wheel drive disengagement (Easy Ride version)

CAUTION

- **It is recommended that you use two-wheel drive when transferring the machine by road in top gear.**
- **In order to reduce wear on the tyres it is advisable to disable the all-wheel drive.**
- **The machine is automatically set to all-wheel drive each time the engine is restarted.**

Pressing button (**E**) deactivates the four-wheel drive and switches the drive to the rear two-wheel drive only. To activate the function, the machine must be stationary with the service brake fully depressed.
Below is the behaviour of the warning lights:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	4WD	On	Four-wheel drive engaged
	Flashing	-	-	Move forward slowly with the machine until the disengagement is activated
	On	2WD	On	Active two-wheel drive

6.14.6 All-wheel drive disengagement (Easy Ride version)

CAUTION

- **It is recommended that you use two-wheel drive when transferring the machine by road in top gear.**
- **In order to reduce wear on the tyres it is advisable to disable the all-wheel drive.**

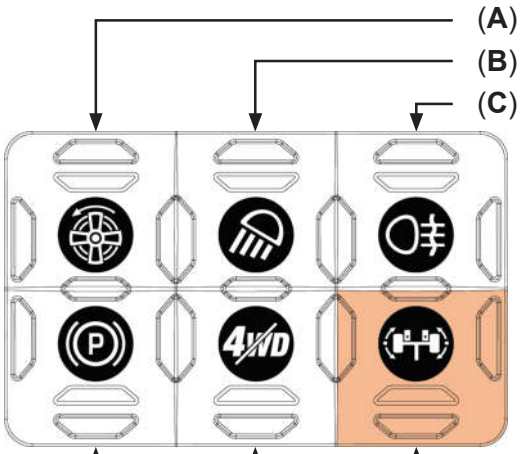
- Pressing button (**E**) deactivates the four-wheel drive and switches the drive to the rear two-wheel drive only. To activate the function, the machine must be stationary with the service brake fully depressed.
- Once second gear has been engaged, the machine is automatically set to two-wheel drive to reduce tyre wear.

CAUTION

In second gear, under poor grip conditions, you can still enable all-wheel drive by pressing the button (E).

Below is the behaviour of the warning lights:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off	4WD	On	Four-wheel drive engaged
	Flashing	-	-	Move forward slowly with the machine until the disengagement is activated
	On	2WD	On	Active two-wheel drive



(**A**) Radiator forced cleaning
(**B**) Light management page
(**C**) Rear fog light
(**F**) Oscillating front axle / Axle suspension (Easy Ride version)
(**E**) All-wheel drive disengagement (Easy Ride version)
(**D**) Handbrake

6.14.7 Oscillating axle release

WARNING

- **When the first gear is engaged, the axle lock is activated automatically.**
- **When engaging second gear for road transfers, the axle is released automatically, allowing it to oscillate.**

Pressing button (**F**) deactivates the front axle lock, allowing it to oscillate.
Always lock the axle, ensuring that the machine is in a level position: the locking system does not force the alignment of the axle, but simply locks it in the position it is in. This means that if a wheel is in a depression or on a bump, the axle will lock in an oblique position, giving rise to the phenomenon known as “twist” (oblique oscillation of the machine due to the fact that not all the wheels are resting on the ground in certain situations). To align the axis correctly with the ground it is recommended to move the machine so that it is horizontal, bring the arm close to the machine and place the tool on the ground without forcing it; press button (**F**).

Below is the behaviour of the warning lights:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off		On	Axle lock active: axle locked
	On	-	-	Axle locked: function deactivated. The warning light remains on when second gear is engaged.

6.14.8 Axle suspension (Easy Ride version)

WARNING

- **Engaging second gear requires the suspension to be activated by the machine (axle unlocked).**
- **The suspensions are locked when the machine is switched off.**

CAUTION

When the suspension is activated, the machine may settle due to differential pressures in the hydraulic system.

To activate the suspension, during transport, you have to engage second gear and go faster than 3 km/h.

In second gear, the warning lights operate as follows:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off		Fixed	Suspension deactivated (axle locked).
	On and flashing		Fixed	Activation requested: exceed 3 km/h to activate the suspension.
	Steady on		Fixed	Suspension activated (axle unlocked).
	On and flashing		Fixed	Suspension system error.

To deactivate the suspension, press button (**F**) again.

WARNING

- **Engaging first gear requires the suspension to be deactivated by the machine (axle locked).**
- **The suspensions are locked when the machine is switched off.**

Make sure that the machine is level, then select first gear and lock the suspension: the system does not force the alignment of the axle, but simply locks it in the position it is in. This means that if a wheel is in a rut or on a bump, the axle will lock in an oblique position, giving rise to what is known as “twist” (oblique oscillation of the machine due to the fact that in certain situations not all the wheels are resting on the ground).

During work (first gear engaged) on uneven ground, the traction of the machine can be increased by pressing the button (**F**) to unlock the left suspension.

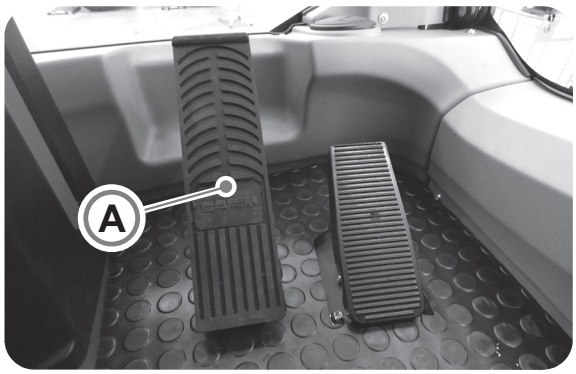
In first gear, the warning lights operate as follows:

Button pad warning light	Warning light status	Displayed symbol	Symbol status	Description
	Off		Fixed	Suspension deactivated (axle locked).
	Steady on		Fixed	Left suspension unlocked.
	Flashing		Fixed	Manual height adjustment

To align the axle correctly with respect to the ground, it is recommended that you:

1) Move the machine into a horizontal position.
2) Bring the arm into the transport position or if you are working with the machine, bring it as close as possible to the machine.
3) Then press the button (**F**): if it is not sufficient to use just the specific suspension controls, see paragraph ***“6.24 Suspension keypad (Easy Ride version)”***.

6.15 SERVICE BRAKE PEDAL



Vehicle braking is obtained by pressing the service brake pedal (**A**) all the way down. Press the brake pedal gradually so as to avoid sudden braking.

WARNING

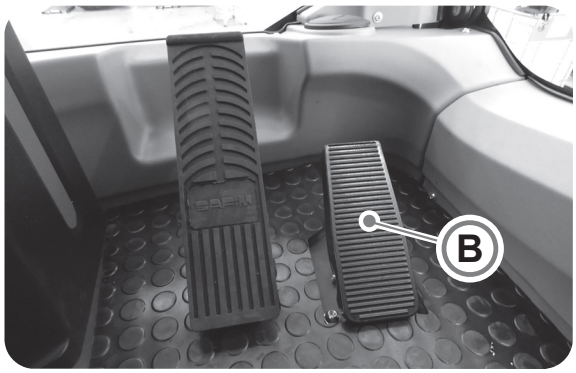
- **If the engine appears to have difficultly when the machine is travelling/ moving, check the operation and status of the brakes and parking brakes.**
- **DO NOT FORCE THE MACHINE TO MOVE IF THE BRAKES ARE ON AS THIS COULD DAMAGE THEM.**

DANGER

- **Before starting to move downhill, activate the brake pedal to control the brake efficiency.**
- **Do not operate the brake pedal abruptly when travelling down a steep slope; the wheels may slip.**

6.16 ACCELERATOR PEDAL

Press the pedal (**B**) gradually to avoid sudden movements of the machine.



6.17 RIGHT JOYSTICK

6.17.1 Floating function

The head floating function is activated by pressing the button (**12**) on the right joystick.

This function remains active until:

- no corrective action is carried out via the roller (**5**), which means that to reactivate it, button (**12**) must be pressed again;
- it is not deactivated by pressing button (**12**) again.

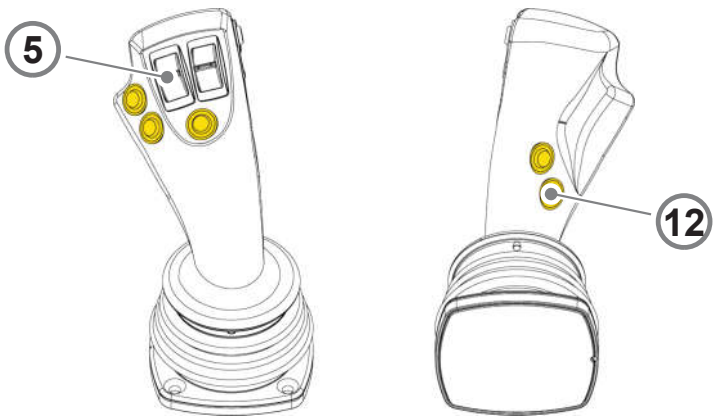
6.17.2 Permanent floating function

The head permanent floating function is activated by pressing for two seconds button (**12**) on the right joystick. Its activation is confirmed by an acoustic signal (beep) and the turning on of indicator light (**A**) on the screen.

In this case, if a corrective action is carried out using the roller (**5**), the floating function is momentarily inhibited until the roller is released. Then, when the roller is released, the float is automatically activated.

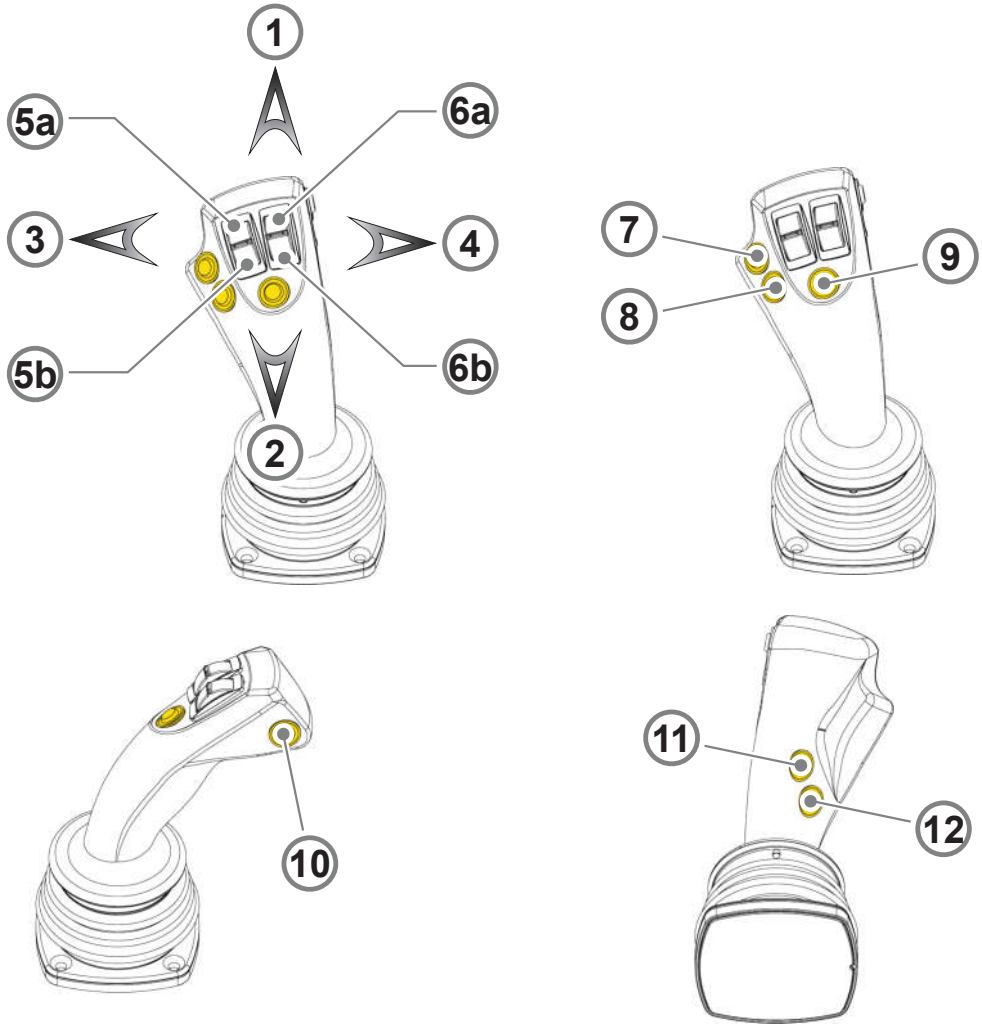
It can only be deactivated by pressing button (**12**).

The precision / speed of the arm movements can be increased / decreased; see section ***"6.29 Joysticks: speed settings (optional)"***.



6.17.3 Arm “T” movements

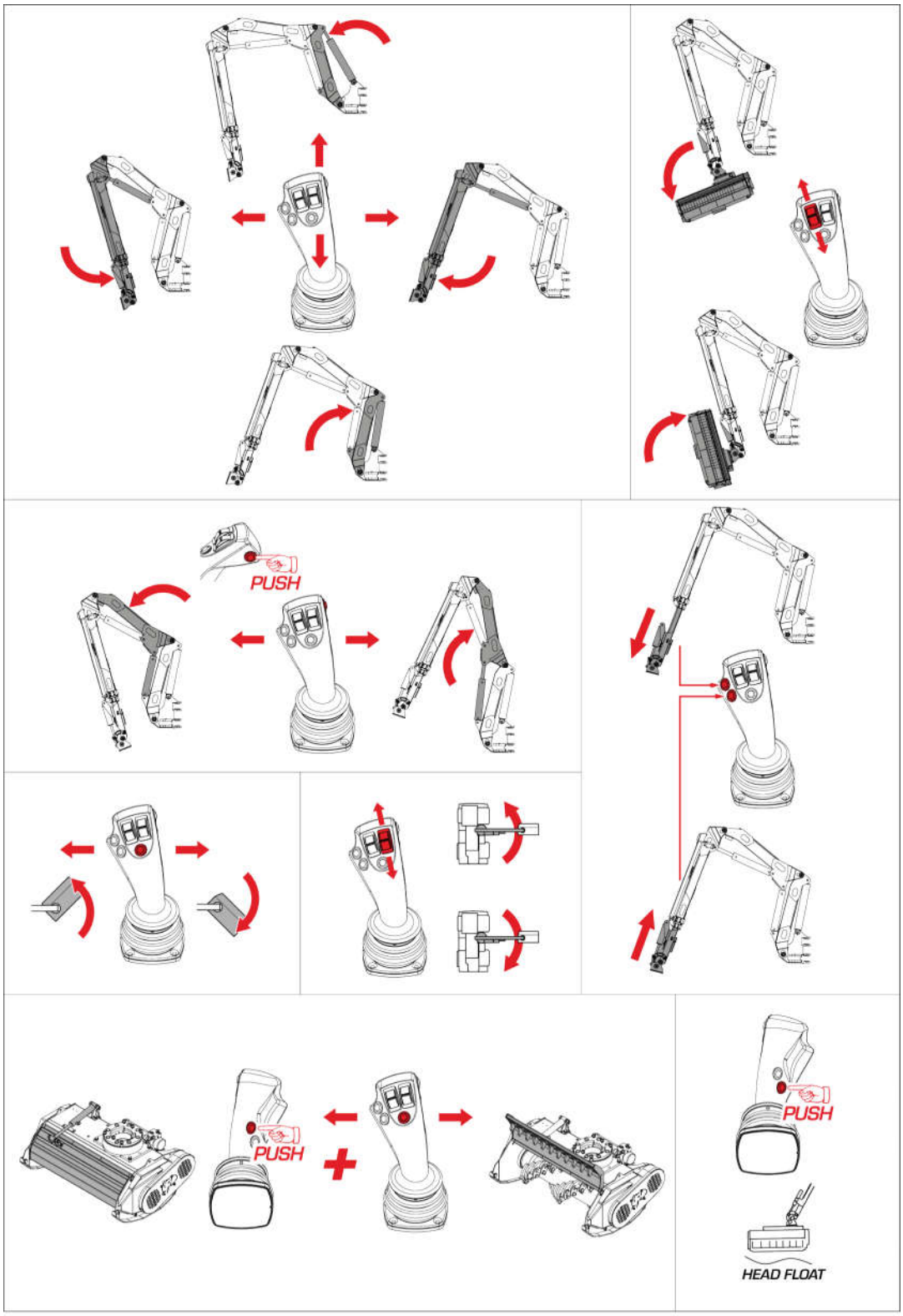
ENG10303000391



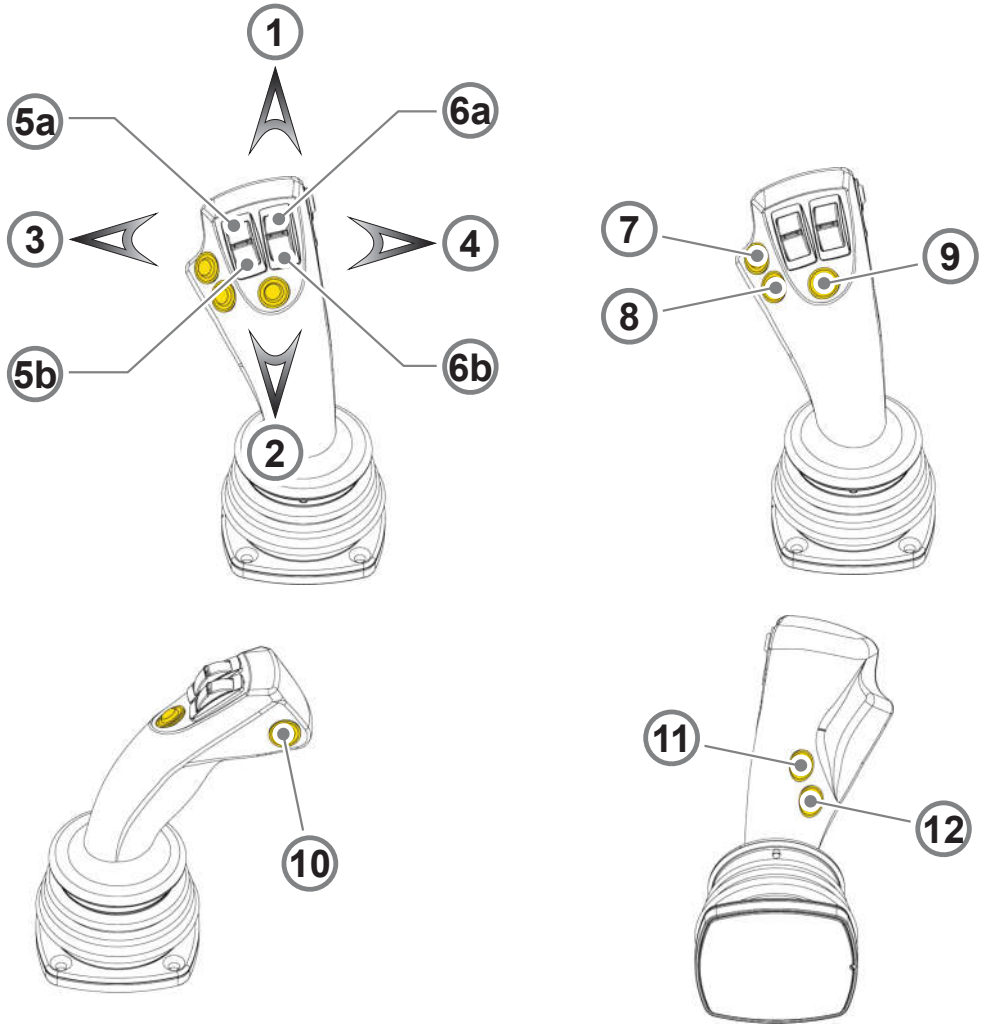
06-Bracciolo destro (ILF)

Arm “T” controls	
1	First arm opening
2	First arm closure
3	Close second arm
4	Open second arm
5a	Head forward tilt
5b	Head backward tilt
6a	Rotate arm anticlockwise
6b	Rotate arm clockwise
7	Extend extensions
8	Retract extensions
9+3	Head anticlockwise rotation
9+4	Head clockwise rotation
10	Not used
11+9+3	Head guard closure
11+9+4	Head guard opening
12	Head float

6.17.4 Arm “F” movements



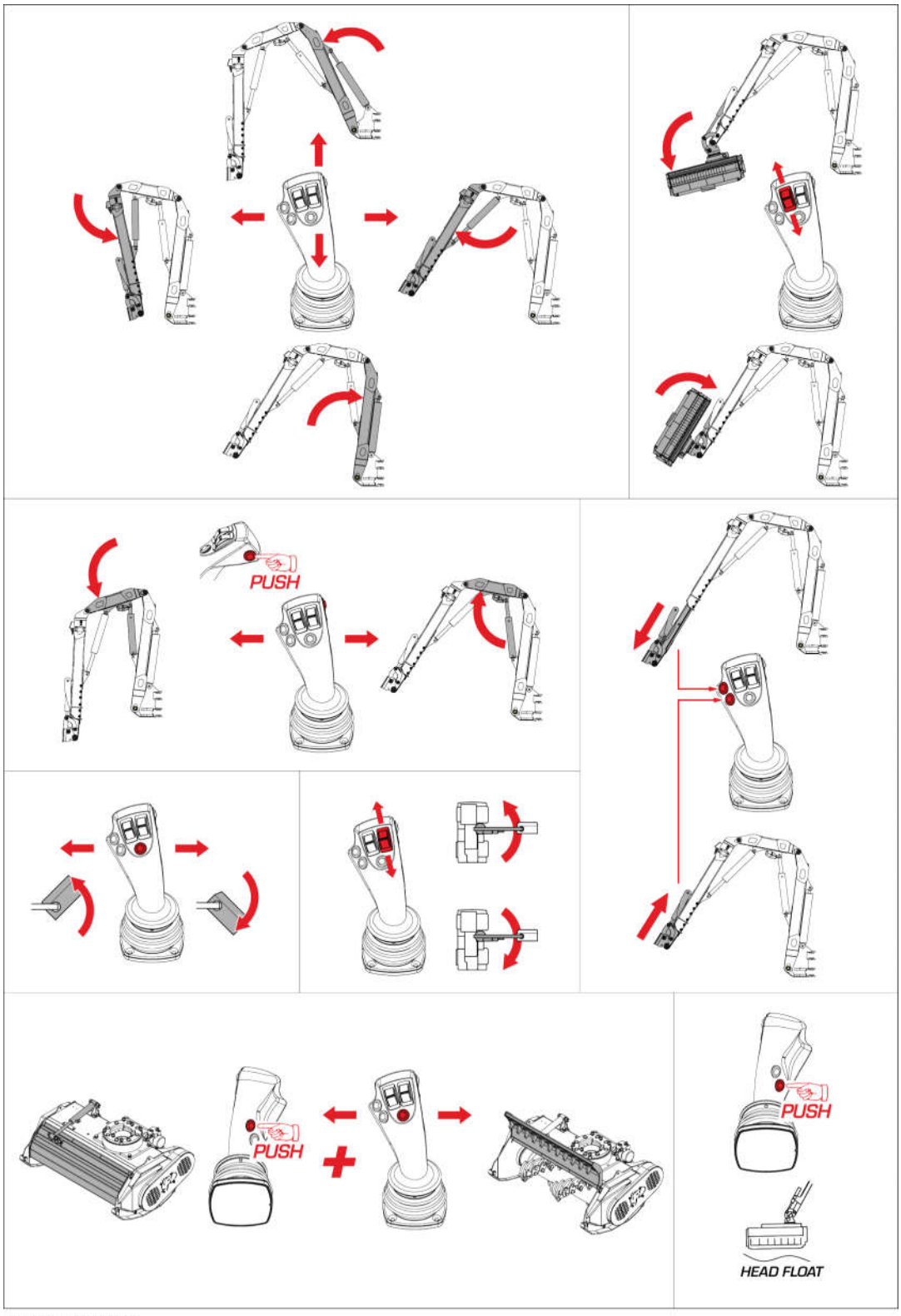
ENG10303000393



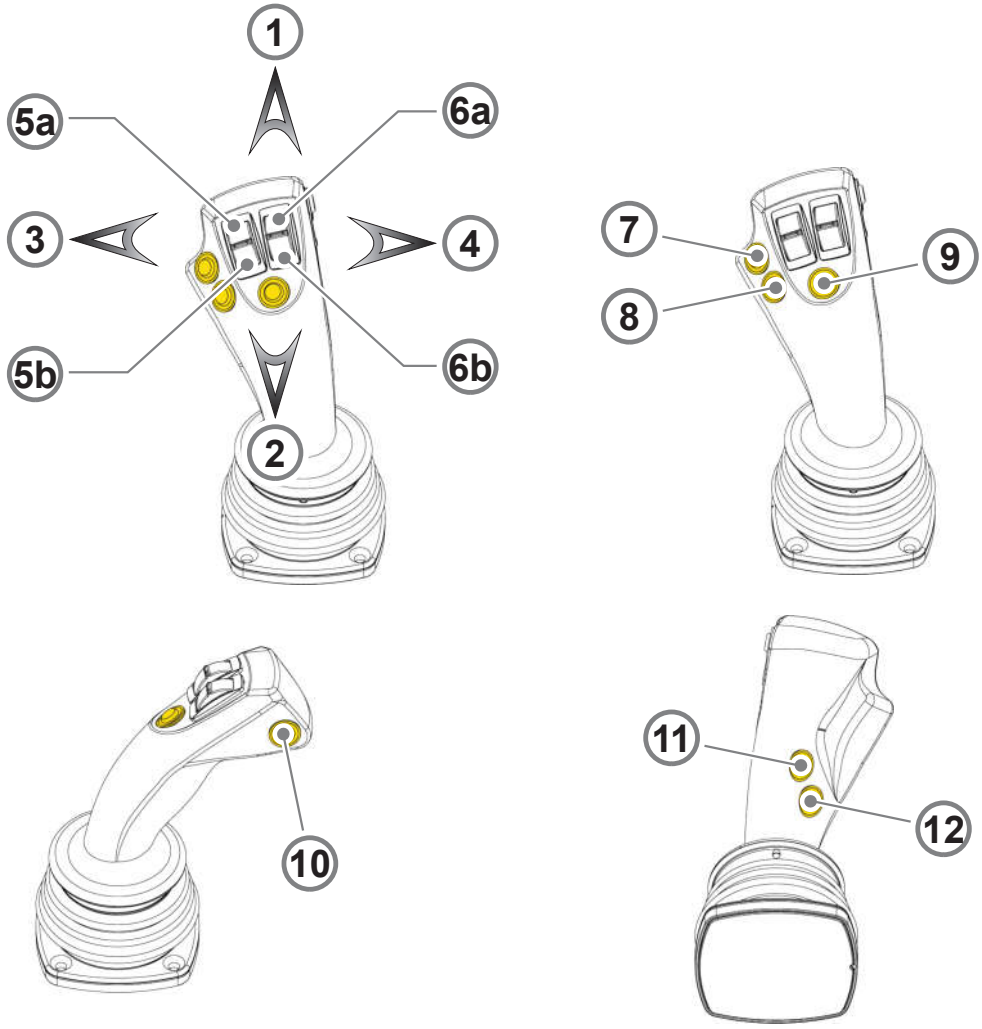
06-Bracciolo destro (ILF)

Arm “F” controls	
1	First arm opening
2	First arm closure
3	Third arm closure
4	Third arm opening
5a	Head forward tilt
5b	Head backward tilt
6a	Rotate arm anticlockwise
6b	Rotate arm clockwise
7	Extend extensions
8	Retract extensions
9+3	Head anticlockwise rotation
9+4	Head clockwise rotation
10+3	Close second arm
10+4	Open second arm
11+9+3	Head guard closure
11+9+4	Head guard opening
12	Head float

6.17.5 Arm “3P” movements



ENG10303000398

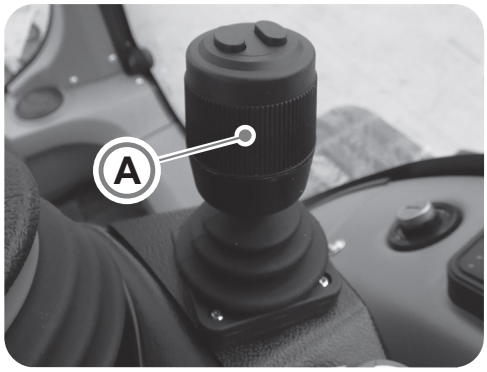


06-Bracciolo destro (ILF)

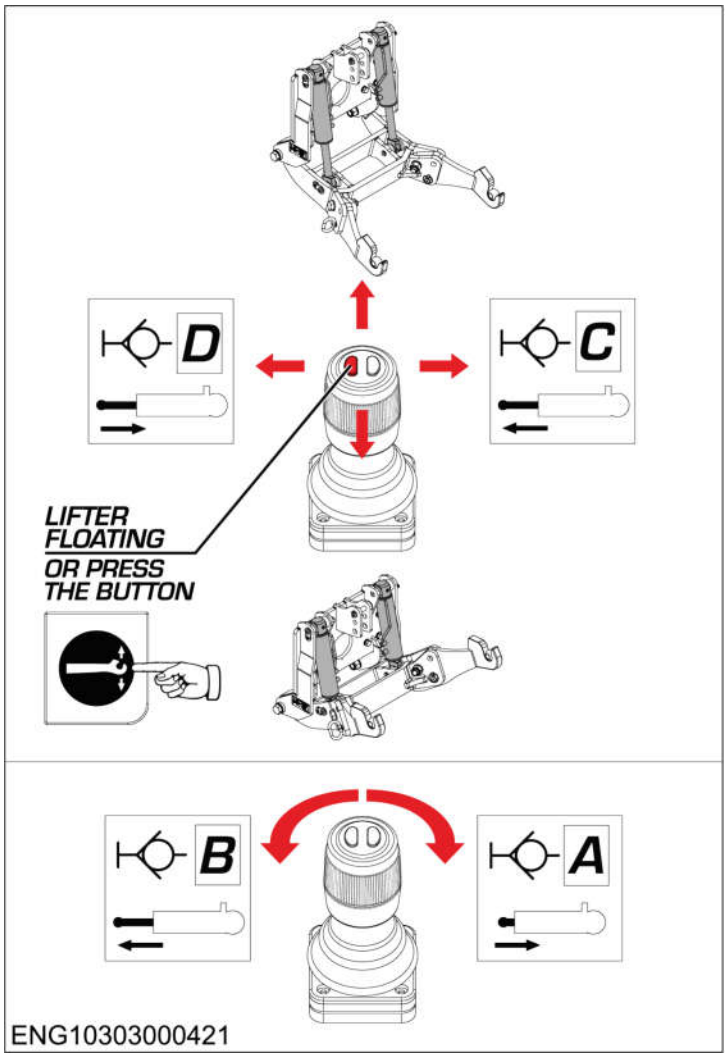
Arm “3P”controls	
1	First arm opening
2	First arm closure
3	Third arm closure
4	Third arm opening
5a	Head forward tilt
5b	Head backward tilt
6a	Rotate arm anticlockwise
6b	Rotate arm clockwise
7	Extend extensions
8	Retract extensions
9+3	Head anticlockwise rotation
9+4	Head clockwise rotation
10+3	Close second arm
10+4	Open second arm
11+9+3	Head guard closure
11+9+4	Head guard opening
12	Head float

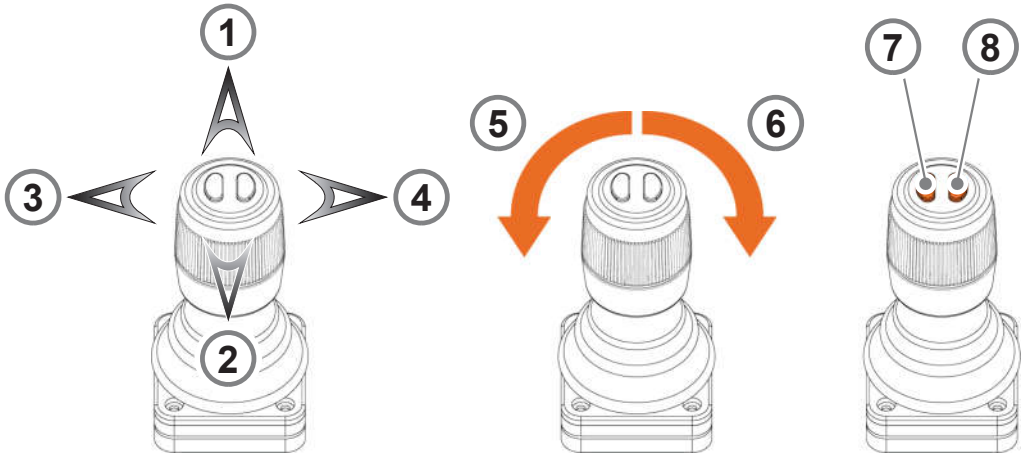
6.18 MINI-JOYSTICK

On the right armrest of the seat, there is a mini-joystick (**A**) that is used to operate any equipment connected to the front of the machine. Refer to the equipment use and maintenance manual for instructions on how to use the controls. The mini-joystick can be used to increase / decrease the precision / speed of the equipment movements; see section ***"6.29 Joysticks: speed settings (optional)"***. The controls of some of the most common applications are indicated below.



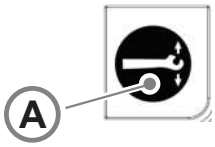
6.18.1 "Hercules 10T" (optional) lifter movements





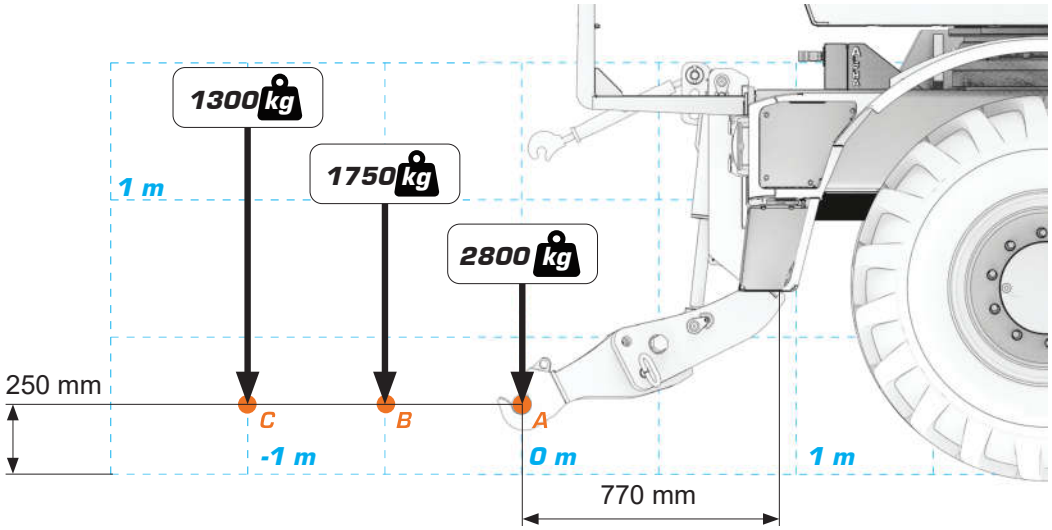
“Hercules 10T” (optional) lifter controls	
1	Lower lifter
2	Raise lifter
3	Auxiliary outlet D
4	Auxiliary outlet C
5	Auxiliary outlet B
6	Auxiliary outlet A
7	Float function activation
8	Not used

The lifter float function can be activated both via the button (**7**) on the mini-joystick and by the button (**A**) on the Functions keypad, see section ***“6.25.7 Lifter float (optional)”***.



6.18.2 "Hercules 10T" lifter (optional)

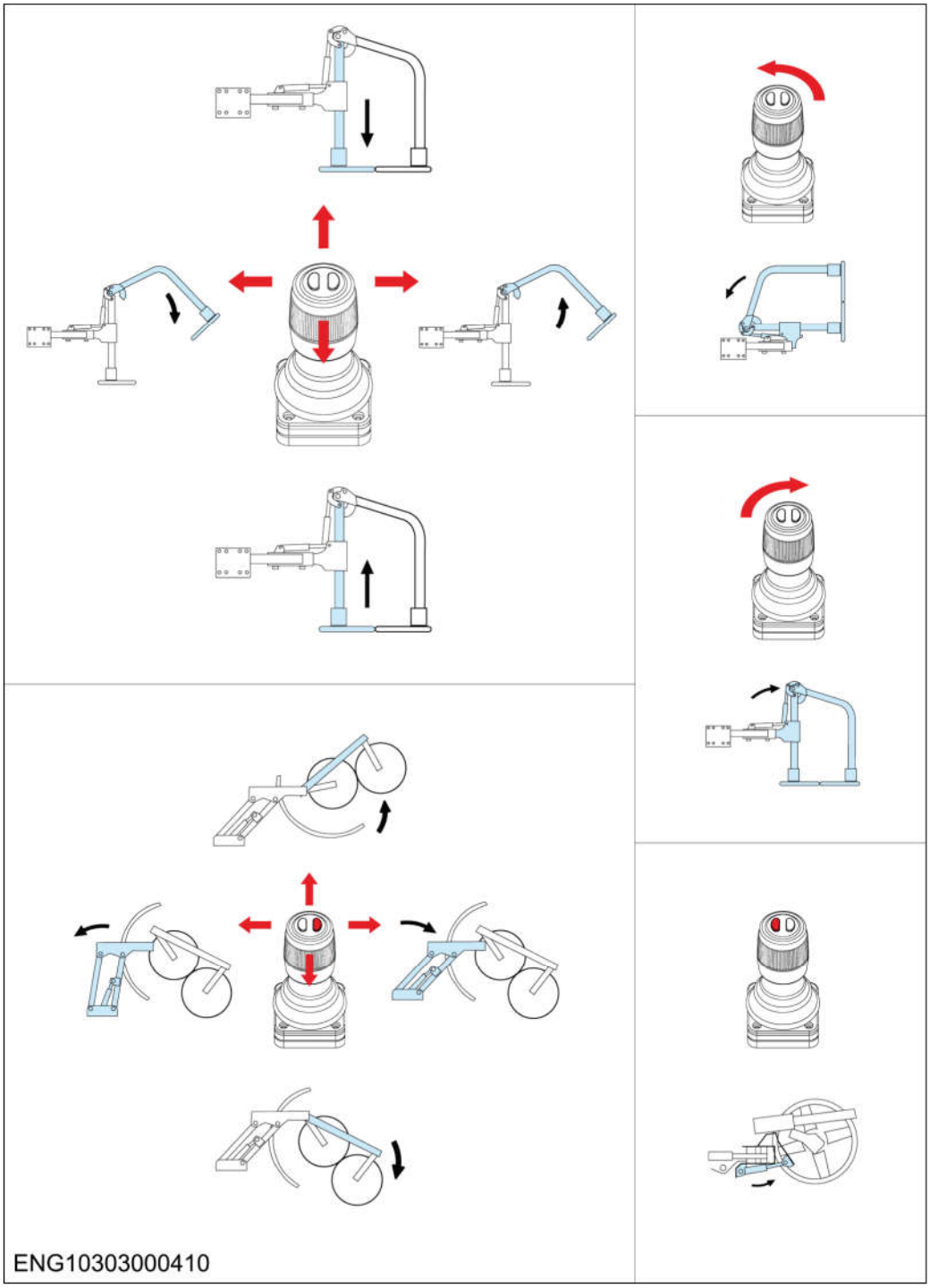
The machine can be fitted with an optional Hercules 10T lifter. The three-point hitch with a reversible hydraulic power take-off (optional) makes this an extremely effective piece of equipment for an infinite number of applications. A very wide range of ENERGREEN S.P.A. and third party commercial equipment can be mounted on it, which can be controlled directly from the cabin, allowing the direct and complete control of all operations.



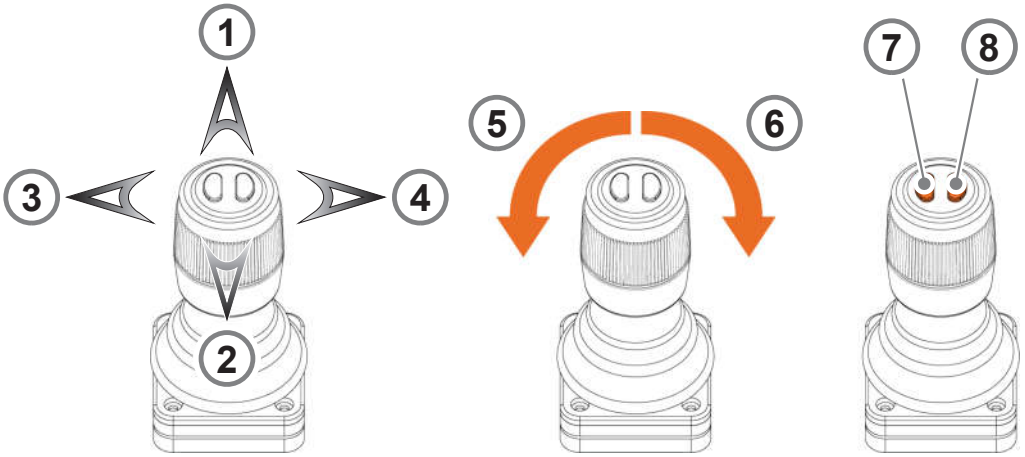
The table below indicates the weights that can be lifted (with three different overhangs) starting from a height of 250 mm.

Overhang / Link	0	0.5	1
	m		
A	2800 kg	-	-
B	-	1750 kg	-
C	-	-	1300 kg

6.18.3 "Discovery 840" barrier mower (optional) movements



06-Bracciolo destro (ILF)



“Discovery 840” barrier mower (optional) controls	
1	Lower barrier mower
2	Raise barrier mower
3	Close barrier mower
4	Open barrier mower
5	Transport position
6	Work position
7	Open discs (optional)
8	Not used
8+1	Rotate barrier mower anticlockwise
8+2	Rotate barrier mower clockwise
8+3	Move parallelogram to the left
8+4	Move parallelogram to the right

6.19 SPP POTENTIOMETER (OPTIONAL)

The SPP function potentiometer (**A**) is located next to the joystick. See section ***"6.23.5 Arm proportional suspension - SPP (optional)"*** for its use.

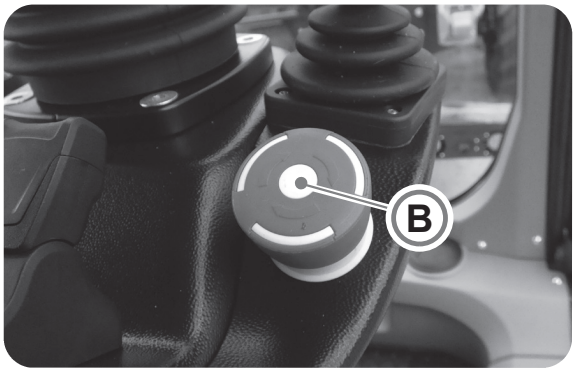
6.20 EMERGENCY BUTTON

In case of an emergency, press the red button (**B**); the engine will remain on at idle speed, while all machine operating functions will be stopped immediately.

To rearm the machine, turn the button clockwise.

Once pressed, the following symbol appears on the screen:

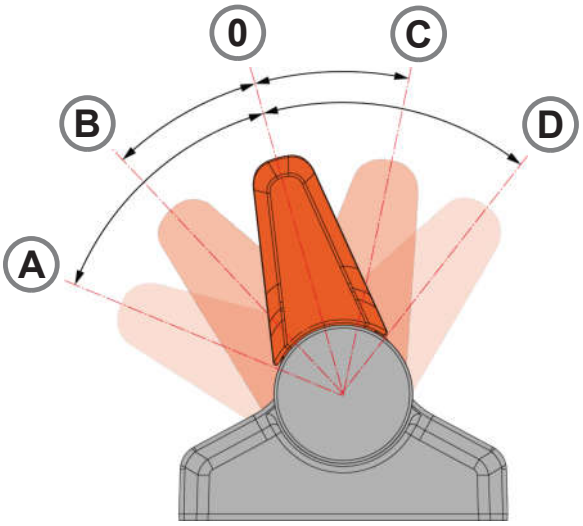
Symbol	Description
	Emergency stop button pressed.



6.21 FINGERTIP JOYSTICK

The fingertip joystick has two incremental speed levels:

- In the first level, the increase / decrease is slow
- In the second level, the increase / decrease is fast



A	Fast increase
B	Slow increase
0	Neutral
C	Slow decrease
D	Fast decrease

6.21.1 Fingertip WORK MODE

The fingertip joystick (**1**) controls the speed of the engine when WORK MODE is active. See section ***"6.23.1 Work mode"***.

- If the lever is pushed, the engine rpm decrease;
- If the lever is pulled, the engine rpm increase.

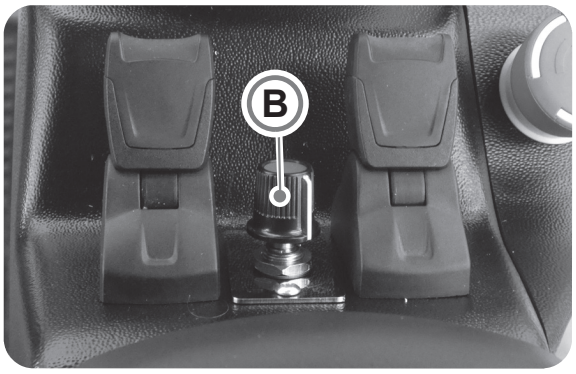
6.21.2 Fingertip Cruise Control (optional)

The fingertip joystick (**2**) controls the transfer speed of the machine when the Cruise Control is active. See section ***"6.23.8 Cruise control (optional)"***.

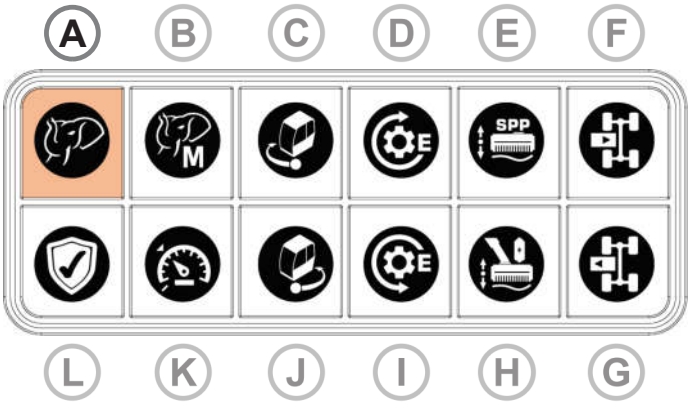
- If you push the lever, the speed decreases;
- If you pull the lever, the speed increases.

6.22 FUNCTION F1 / F2 POTENTIOMETER (OPTIONAL)

The function F1 / F2 potentiometer (**A**) is located between the WORK MODE and Cruise Control fingertip joysticks. See paragraphs ***"6.26.1 Function F1 with independent hydraulics (optional)"*** and ***"6.26.3 Function F2 (optional)"*** for its use.



6.23 MAIN KEYPAD



6.23.1 WORK MODE

The WORK MODE function allows you to keep the speed of the engine constant whilst working.

CAUTION

In order to use WORK MODE, the operator must be seated, the engine must be switched on and the gear in neutral. See sections *"6.13 Gear selector"* and *"6.30 Ignition panel"*.

To activate the WORK MODE function, proceed as follows:

1) Press the WORK MODE button (**A**) to activate the function. To indicate the change in status, the button changes colour from purple to orange;
2) Pull on the fingertip joystick (**1**), increase the speed of the engine as required: push the fingertip joystick to decrease the RPM of the engine.

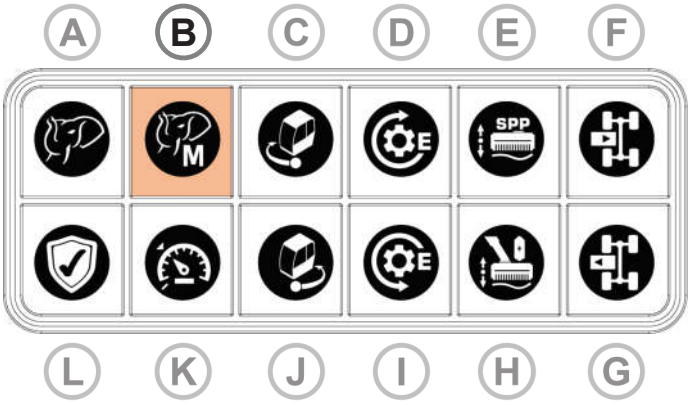
The WORK MODE function is deactivated if:

- It is deactivated via the relative button;
- The operator gets up from the seat;
- Second gear is engaged;
- There is a fault with the fingertip joystick (**1**) related to the WORK MODE function;
- The engine switches off.

CAUTION

Always deactivate the work mode function before powering the machine off.

Once WORK MODE is activated, you are automatically taken to the relative screen on the display.



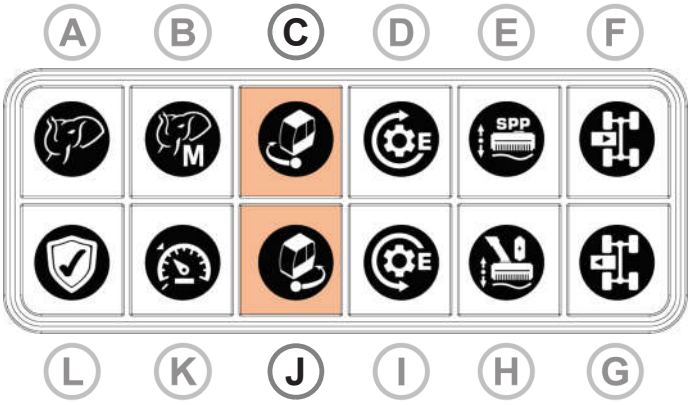
6.23.2 WORK MODE Memory

CAUTION

- **The WORK MODE Memory function can only be used if the WORK MODE function is active.**
- **Each time the machine is turned off, the value stored in the WORK MODE Memory is reset to 1650 RPM.**

This function allows you to memorize the RPM value of the engine you using and to recall it later without having to use the fingertip joystick again.

- If the button is pressed, the value of the WORK MODE Memory function will automatically set the engine to 1650 RPM by default. To indicate the change in status, the button changes colour from purple to light blue.
- From now on, the fingertip joystick can be used to increase or decrease the speed of the engine. Once the WORK MODE Memory value has been changed, the function button flashes to warn you that the value has changed and no longer saved.
- To save the modified value, press the function button for one second. The button stops flashing and becomes steady to confirm that it has been saved successfully.
- The function can be deactivated by pressing the function button again or by exiting WORK MODE.



6.23.3 Cabin rotation

The cabin is rotated using buttons (**C**) and (**J**):

- Button (**C**) rotates the cabin clockwise;
- Button (**J**) rotates the cabin anticlockwise.

CAUTION

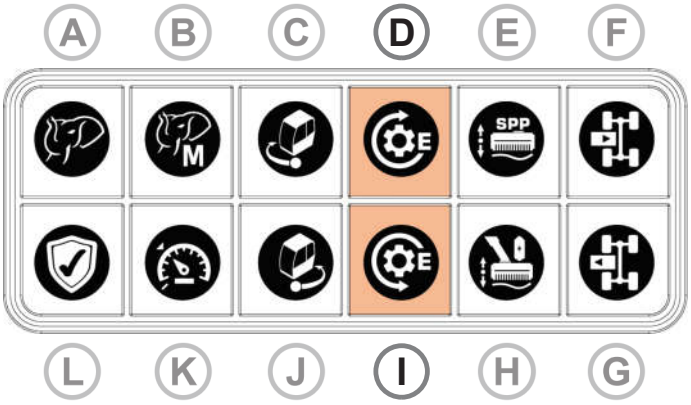
- **To rotate the cabin, the dead man function has to be activated and 1st gear has to be engaged. See sections *"6.13 Gear selector"* and *"6.23.7 Dead man"*.**
- **In order to use 2nd gear, the cabin has to be aligned longitudinally with respect to the direction of travel.**

When one of the two buttons (**C**) or (**J**) are pressed to rotate the cabin, they change colour from purple to green to confirm that the function is in use. In this transitory stage, the symbol (**1**) appears on the screen.

To make the cabin return to its longitudinal position with respect to the direction of travel, press the button (**J**): when the cabin is close to the correct longitudinal position, the colour of the button will begin to alternate between red and green. The correct position will be indicated on the screen when the symbol (**2**) appears.

If the cabin is not aligned, second gear is selected and button (**J**) is pressed, the symbol (**3**) appears on the screen and the button flashes green.

	Symbol	Description
1		Cabin not aligned, 1st gear engaged
2		Aligned cabin
3		Cabin not aligned and request to engage 2nd gear. See section *"6.62 Troubleshooting the vehicle"*.



6.23.4 Activating the equipment

DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **When the mulching head is started, be very careful not to let it come into contact with hard objects such as drain covers, manhole covers, pavements, guard rails, railway tracks etc. This could cause the tools to break and they could be projected dangerously at very high speed.**

CAUTION

The WORK MODE function must first be activated in order to activate the hydraulic motor of the equipment connected to the arm. See section *"6.23.1 Work mode"*.

The hydraulic motor of the equipment connected to the arm, for example the mulching head, is activated by buttons (**D**) and (**I**).

- The button (**D**) activates the hydraulic motor with a clockwise rotation;
- The button (**I**) activates the hydraulic motor with an anticlockwise rotation.

The button changes colour according to the status of the hydraulic motor of the equipment:

- The button is purple when the hydraulic motor is deactivated;
- The button is orange when the hydraulic motor is active and has reached the set RPM;
- The button is orange and flashes when the hydraulic motor is active but one of these three situations occurs:
  1) The RPM of the hydraulic motor is set to zero and so it does not rotate;
  2) The hydraulic motor is gradually increasing the number of RPM to reach the set speed;
  3) The function has been deactivated: the hydraulic motor is gradually decreasing the number of revolutions until it stops rotating.
- The button is red when there is a fault the hydraulic circuit. See section ***"6.62 Troubleshooting the vehicle"***.

One of the following symbols will appear on the WORK MODE screen:

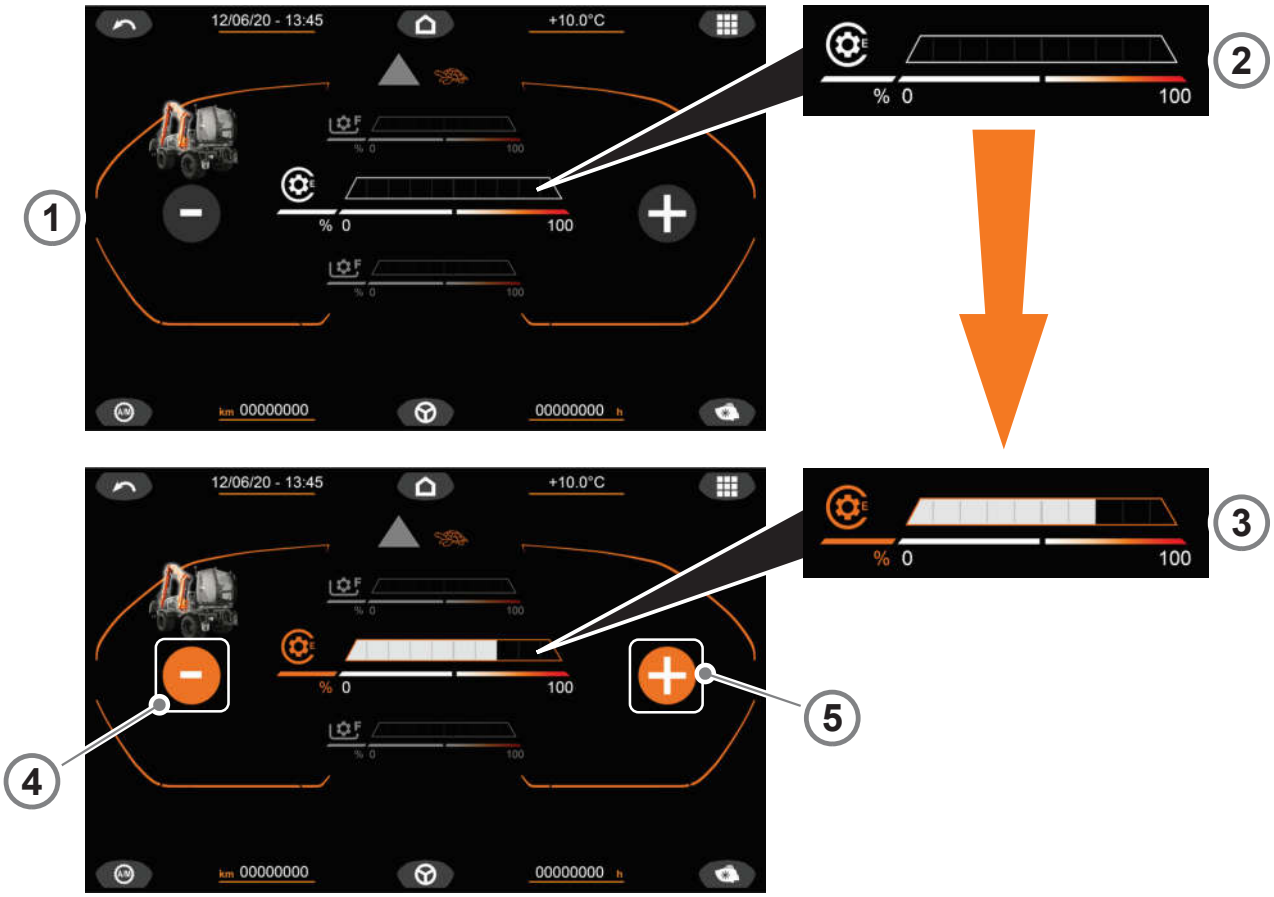
Symbol	Description
	Clockwise rotation selected
	Anticlockwise rotation selected

Once the direction of rotation has been selected, you will be taken to the “TOOLS” screen (**1**). The percentage of the maximum RPM of the equipment (**2**) can be controlled on this screen (**1**) using the touch function or the Powertrack.

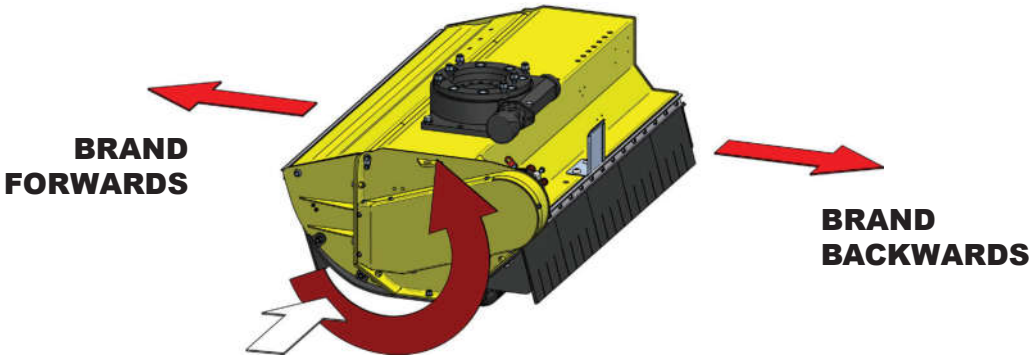
Proceed as follows:

- Use the touch function or press the rotary selector on the Powertrack to select the field for the equipment connected to the arm (**3**); once selected it becomes orange.
- Use the buttons (**4**) and (**5**) to increase or decrease the percentage.

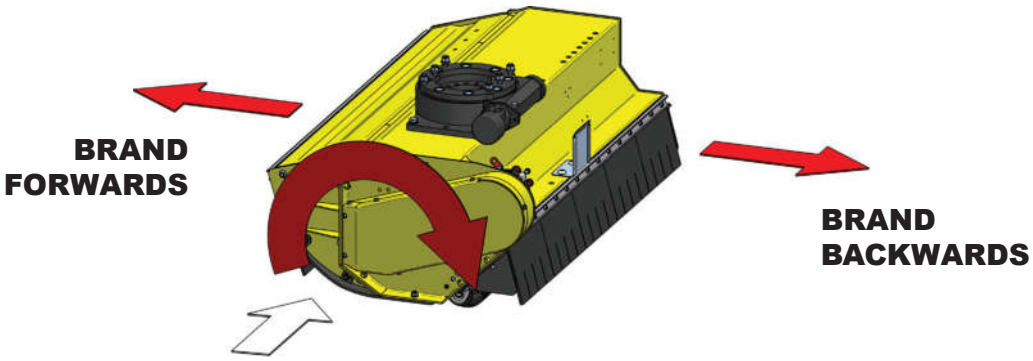
Press the button (**D**) or (**I**), depending on the previously selected direction of rotation again to turn off the equipment.



Anti-clockwise rotation of the mulching head rotor

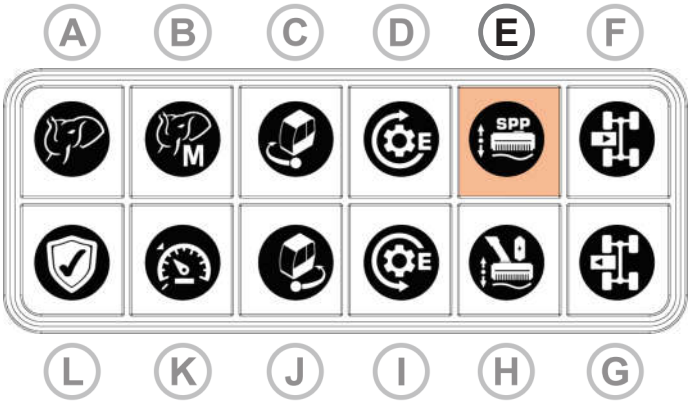


Clockwise rotation of the mulching head rotor



To determine whether the rotor is rotating forwards or backwards:

- The belt guard of the mulching head must be facing towards the cabin;
- Look at the mulching head in the direction indicated by the white arrow.



6.23.5 Arm proportional suspension - SPP (optional)

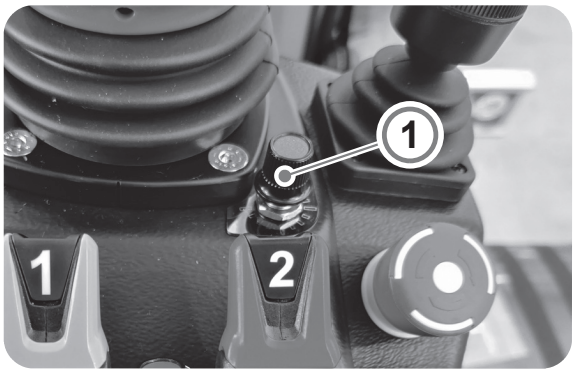
The machine could be fitted with an electro-proportional system for the suspension of the telescopic arm. This system allows work to be carried out while protecting the mulching head and arm. The arm keeps about half of the weight lifted off the ground so that the entire structure is subjected to less stress.

DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **Before activating the suspension, make sure that the potentiometer (1) is set to minimum, the equipment is resting on the ground and at "minimum reach".**
- **Before deactivating the suspension, move the arm and equipment close to the machine and then place it on the ground; gradually set the potentiometer (1) to zero while doing this. Then deactivate the function using the button (E).**

CAUTION

The dead man function has to be enabled in order to use the arm suspension function. See section *"6.23.7 Dead man"*.



The operating logic of the system is as follows:

- “minimum reach” arm = minimum suspension pressure, potentiometer (**1**) must therefore be set to minimum;
- “Extended” arm = maximum suspension pressure, potentiometer (**1**) must therefore be set to maximum.

To activate the arm suspension:

- Press the key (**E**) to activate the function;
- Increase or decrease the suspension pressure according to the position of the arm.

To deactivate the arm suspension function:

- Move the arm close to the machine, placing the equipment on the ground and at the same time gradually set the potentiometer to zero;
- Press the key (**E**) to disable the function.

The following symbol will appear on the WORK MODE screen:

Symbol	Description
	Arm proportional suspension active

6.23.6 Mobile ballast (optional)

CAUTION

- **The dead man function has to be activated and 1st gear has to be engaged in order to control the ballast. See sections *"6.13 Gear selector"* and *"6.23.7 Dead man"*.**
- **The ballast has to be fully retraced in order to use 2nd gear.**

The machine can be equipped with a mobile ballast to increase its stability while working with the arm extended.

The mobile ballast is controlled by keys (**F**) and (**G**):

- The button (**F**) retracts the ballast;
- The button (**G**) extends the ballast;

- The light of the button in standby mode is purple.
- The light of the button turns green when the button is pressed.
- When the ballast is fully retracted, the retract button (**F**) flashes and alternates between green and red.

The following symbol will appear on the WORK MODE screen:

Symbol	Description
	Mobile ballast extended, 1st gear engaged.
	Mobile ballast extended, request for 2nd gear. See section *"6.62 Troubleshooting the vehicle"*.
	Ballast fully retracted.

6.23.7 Dead man

CAUTION

- **The operator must be seated in order to activate the dead man function.**
- **The function is deactivated if:**
  - **The button (L) is pressed again once the function has been activated;**
  - **The operator gets up from the seat;**
  - **Second gear is requested;**
  - **The emergency button is pressed;**
  - **The engine is switched off.**

The dead man function is activated using the button (**L**). Press the button again to deactivate it.

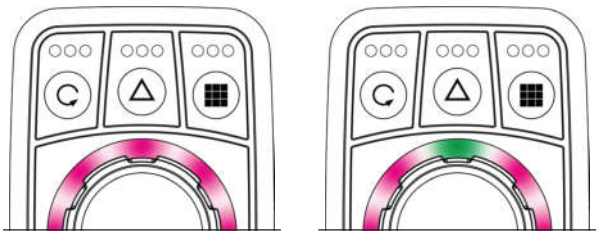
- The button lights up purple in standby mode.
- The button turns blue when the function is active.

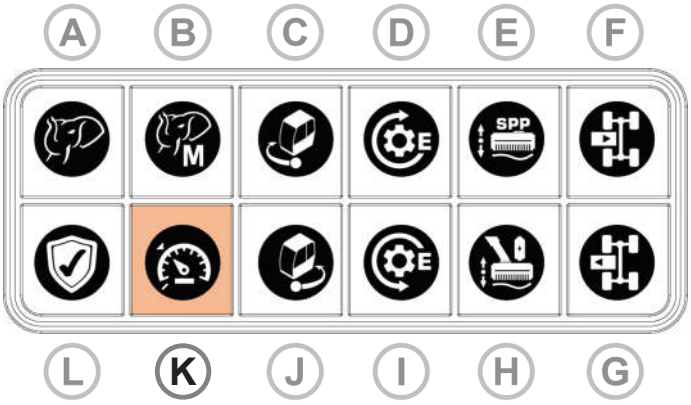
The following symbol will appear on the HOME screen:

Symbol	Description
	Dead man enabled

while on the Powertrack, the purple dead-man LED (off) turns green (on).

Off ***On***





6.23.8 Cruise control (optional)

CAUTION

The dead man function has to be activated and 1st gear has to be engaged in order to activate the cruise control. See sections *"6.23.1 Work mode"* and *"6.13 Gear selector"*.

Once activated, the cruise control function allows the speed of travel of the machine to be kept constant.
To activate the cruise control, proceed as follows:

1) Move the machine;
2) Press the button (**K**) to activate the cruise control: the symbol (**1**) appears on the display and the LED of the button lights up (light blue);
3) Pull the fingertip joystick (**2**) to increase the speed as required. Push the fingertip joystick to decrease the speed;

Cruise control is paused automatically when:

- You press the brake pedal;
- A U-turn is carried out using the reverser or the gear selector;

the symbol (**C**) flashes on the display.

To exit from pause mode, reactivating the cruise control:

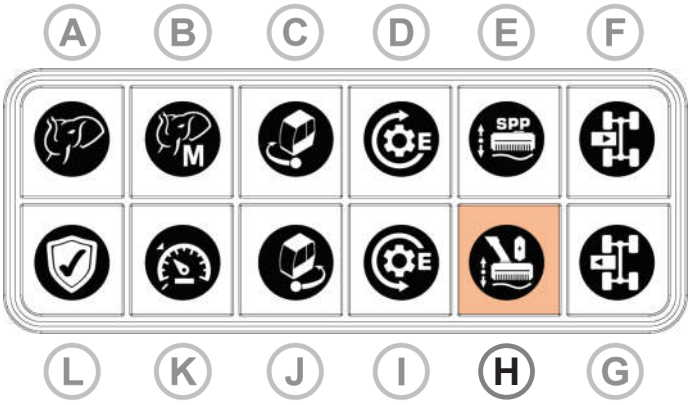
- Accelerate slightly using the pedal;
- Pull or push the fingertip joystick (**2**) again (one pulse).

The cruise control is deactivated when:

- The operator gets up from the seat;
- The WORK MODE function is deactivated;
- There is a fault in the hydraulic brake system;
- Second gear is selected;
- There is a fault with the fingertip joystick (**2**) related to the cruise control function.

The following symbol will appear on the WORK MODE screen:

Symbol	Description
	Cruise control active



6.23.9 First arm suspension

DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **Before activating the suspension system, make sure that the equipment connected to the arm is resting on the ground.**
- **If it is activated with the arm extended and the equipment not resting on the ground, the arm may lower in an UNCONTROLLED manner, depending on the weight of the equipment and how far the arm is extended.**

CAUTION

- **The dead man function has to be enabled and 1st gear has to be engaged in order for the arm suspension function to be used. See sections *"6.13 Gear selector"* and *"6.23.7 Dead man"*.**
- **Always enable the arm suspension system when working.**
- **The function is deactivated if:**
  - **The button (H) is pressed again once the function has been activated;**
  - **The operator gets up from the seat.**

The machine is fitted with a suspension system for the first arm. This device allows the irregularities and the unevenness of the ground to be followed, making cutting operations easier.

To activate the function:

- Rest the equipment connected to the arm on the ground.
- Activate the first arm suspension by pressing the button (**H**). The relative symbol appears on the screen to confirm its activation.

Press button (**H**) again to deactivate the function.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the first arm suspension function is active.

The following symbol will appear on the WORK MODE screen:

Symbol	Description
	First arm suspension active

6.24 SUSPENSION KEYPAD (EASY RIDE VERSION)

6.24.1 Unlock / lock left suspension

CAUTION

- **First gear has to be engaged in order to unlock the left suspension. See section *"6.13 Gear selector"*.**
- **Unlocking the left suspension automatically locks the right suspension, if it is active.**

HAZARD

OVERTURNING HAZARD

Both suspensions must be locked when carrying out aerial work. Otherwise, the machine could overturn.

- Press the button (**A**) for one second to unlock the left suspension: the button will become backlit green.
- Press the button (**A**) again for one second to lock the left suspension.

CAUTION

The left suspension can also be locked/unlocked by pressing the button (F) on the steering column control panel, see *section "6.14.8 Axle suspension (Easy Ride version)"*.

The following symbol will appear on the HOME or WORK MODE screen:

Symbol	Description
	Left suspension unlocked

This function is very useful if you work with the arm close to the machine as the machine has greater traction and is easier to drive.

6.24.2 Unlock / lock right suspension

CAUTION

- **First gear has to be engaged in order to unlock the right suspension. See section *"6.13 Gear selector"*.**
- **Unlocking the right suspension automatically locks the left suspension, if it is active.**

WARNING

- **Only unlock the right suspension if you have to carry out maintenance or restore the height of the suspensions after the machine has been subjected to the "twist" effect: see section *"6.14.8 Axle suspension (Easy Ride version)"*.**
- **The machine is not designed to work continuously with the right suspension unlocked: for safety reasons, the suspension is locked when you exceed 3 km/h.**

HAZARD

- **OVERTURNING HAZARD: unlocking the right suspension may compromise the stability of the machine.**
- **CRUSHING HAZARD: make sure that there are no people, animals or objects within the range of action of the machine before unlocking the right suspension.**

- Press the button (**B**) for five seconds to unlock the suspension: the button will become backlit green.
- Press the button (**B**) again for five seconds to lock the suspension.

The following symbol will appear on the HOME or WORK MODE screen:

Symbol	Description
	Right suspension unlocked

6.24.3 Manual height adjustment

CAUTION

- **First gear has to be engaged in order to adjust the height of the machine. See section *"6.13 Gear selector"*.**
- **When second gear is engaged, the machine adjusts itself to the correct height for travelling on the road.**

WARNING

- **The height adjustment should only be carried out when the arm is in the transport position. Otherwise, the entire structure of the frame could become damaged.**
- **When loading and unloading the machine from a trailer, pay attention to the minimum height between them. If it is insufficient, the machine or the equipment connected to it may become damaged.**

HAZARD

DANGER OF CRUSHING, SHEARING OR HURLING OF MATERIALS

It is strictly forbidden to adjust the height of the machine while there are objects, people or animals in the danger area or under it.

This function allows the operator to adjust the distance between the frame and the ground manually. It is therefore very useful when:

- connecting equipment at the front of the machine;
- loading and unloading the machine from a trailer.
- carrying out maintenance;

To use the function, press and hold for three seconds:

- button (**C**) to raise the machine: the button becomes backlit orange;
- button (**D**) to lower the machine: the button becomes backlit orange.

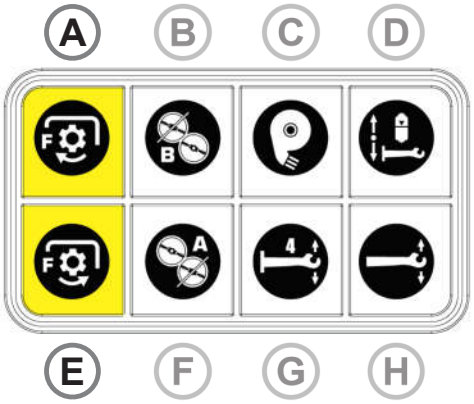
The following symbol will appear on the HOME or WORK MODE screen:

Symbol	Description
	Increase distance between frame and ground.
	Decrease distance between frame and ground.

The machine can be brought to the “zero” position in two ways:

- by resetting the height (levelling), pressing button (**F**) on the steering column keypad.
- by operating the machine at more than 3 km/h, it will carry out levelling independently and move to the “zero” position.

6.25 FUNCTIONS KEYPAD (OPTIONAL)



6.25.1 Activating the front PTO (optional)

DANGER

Make sure that there is nobody within the working range of the machine.

CAUTION

The WORK MODE function has to be activated in order to activate the front PTO. See section *"6.23.1 Work mode"*.

The front PTO is activated using buttons (**A**) and (**E**).

- Button (**A**) activates the PTO with a clockwise rotation. Clockwise rotation is inhibited according to Regulation (EU) 167/2013.
- Button (**E**) activates the PTO with an anticlockwise rotation.

The buttons change colour according to the status of the front PTO:

- The button is purple when the PTO is deactivated;
- The button is orange when the PTO is active and has reached the set RPM;
- The button is orange and flashes when the PTO is active but one of the following situations occurs:
  1) The RPM of the PTO is set to zero and so it does not rotate;
  2) The PTO is gradually increasing the number of RPM to reach the set speed;
  3) The function has been deactivated: The PTO is gradually decreasing the number of RPM until it stops rotating.
- The button is red when there is a fault the hydraulic circuit. See section ***"6.62 Troubleshooting the vehicle"***.

One of the following symbols will appear on the WORK MODE screen:

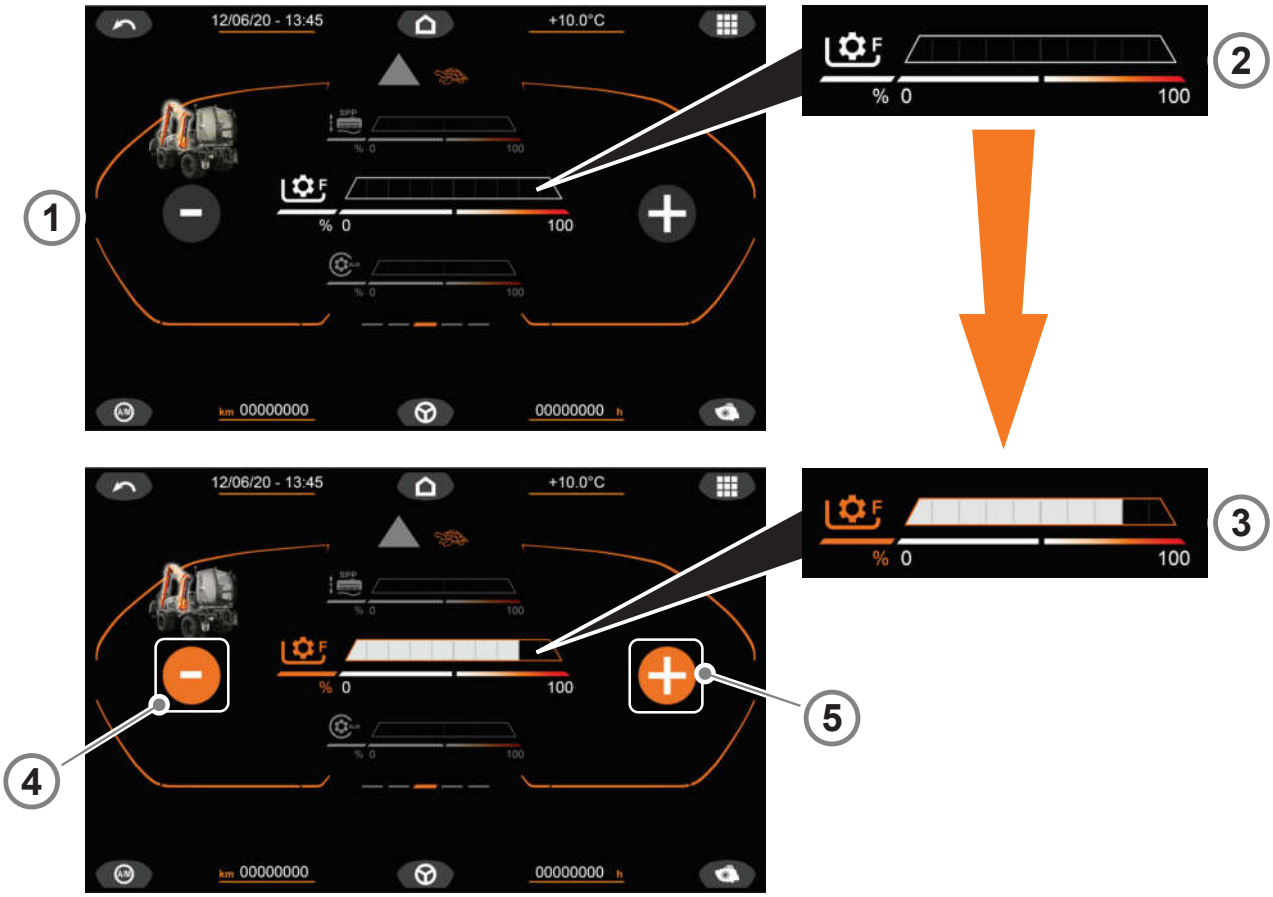
Symbol	Description
	Front PTO - Clockwise rotation selected
	Front PTO - Anticlockwise rotation selected

Once the direction of rotation has been selected, you will be taken to the “TOOLS” screen (**1**). The percentage maximum RPM of the front PTO (**2**) can be controlled via this screen (**1**) using the touch function or the Powertrack.

Proceed as follows:

- Use the touch function or press the rotary selector on the Powertrack to select the field for the equipment connected to the arm (**3**); once selected it becomes orange.
- Use the buttons (**4**) and (**5**) to increase or decrease the percentage.

Press button (**A**) or (**E**), depending on the previously selected direction of rotation again to turn off the equipment.

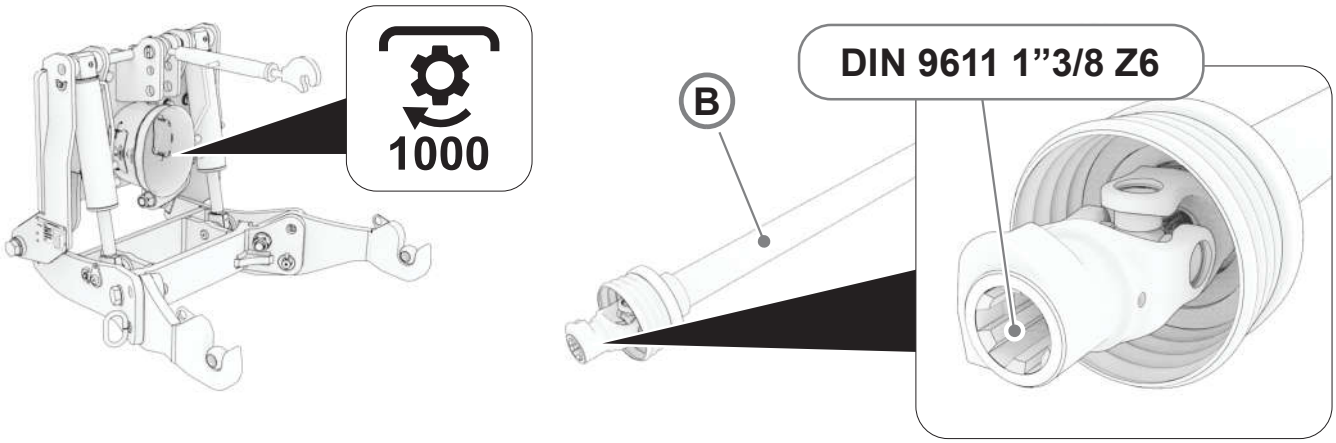


Mechanical PTO

DANGER

- **Dangerous operation. Serious injury. When connecting and disconnecting, wear all the personal protective equipment required for using the tool / equipment, work on ground that is level and in good condition, turn off the engine and remove the key from the control panel.**
- **Moving parts. Collisions, entanglement, entrainment and shearing. Make sure that all the protective devices are present before starting the PTO, move away from the PTO and the cardan shaft during operations that use it. Only remove the guard when the engine is off and when connecting the equipment.**
- **Moving parts. Collisions, entanglement and shearing. Before carrying out work within the maximum range of action of the tool / equipment, wait for it to stop, make sure that it is completely on the ground, in a stable position and that no part is moving and/or under pressure. Switch off the engine and remove the ignition key.**

The mechanical PTO installed on the machine has a rotation speed of 1000 rpm. It has a type 1 size 1-3/8” Z6 connecting shaft, according to DIN 9611. Clockwise rotation is inhibited according to Regulation (EU) 167/2013.



Cardan shaft

The cardan shaft (**B**) is a mechanical element that allows rotary motion to be transmitted between two axes arranged differently in space.

Before installing a cardan shaft, refer to the relative operator manual for information regarding the:

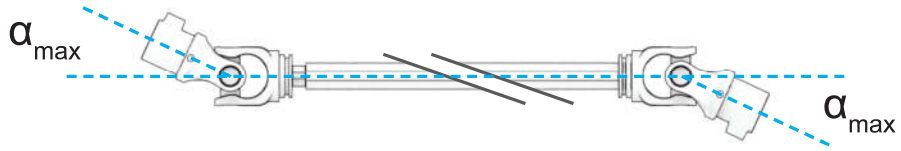
- correct installation;
- correct use;
- maximum permitted angle;
- maximum possible length;
- maximum permitted power;
- speed of rotation.

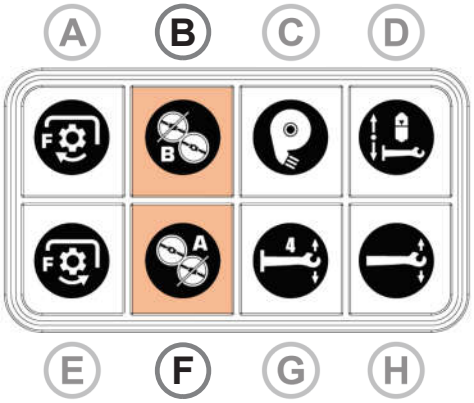
Work with maximum and equal angles (α_{max}) on both articulated joints. In any case, comply with the parameters indicated below:

	C	D
α_{max}	25°	45°

Where:

- (**C**) cardan shaft in continuous operation;
- (**D**) cardan shaft rotating temporarily without load or not rotating.





6.25.2 Barrier mower discs (optional)

CAUTION

In order to activate the barrier mower discs, the operator must be seated and WORK MODE has to be active. See section *"6.23.1 Work mode"*.

The barrier mower discs are activated using buttons (**B**) and (**F**).

- Button (**B**) activates disc B (external disc);
- Button (**F**) activates disc A (internal disc).

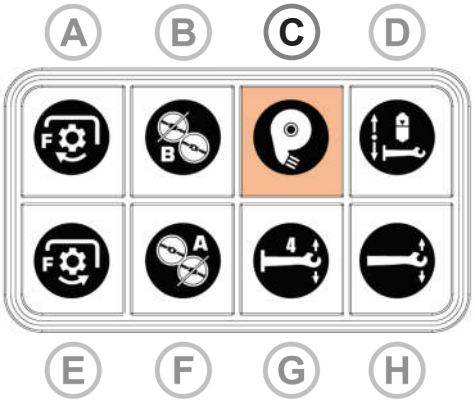
The buttons change colour according to the status of the discs:

- The button is purple when the disc is deactivated;
- The button is orange when the disc is active.

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Barrier mower - internal disc (A) active - (B) off
	Barrier mower - external disc (B) active - (A) off
	Barrier mower - discs (A) and (B)

To turn off the disc, press button (**B**) and/or (**F**) again.



6.25.3 ***Blower (optional)***

CAUTION

The dead man function has to be active in order to activate the blower. See section *"6.23.7 Dead man"*.

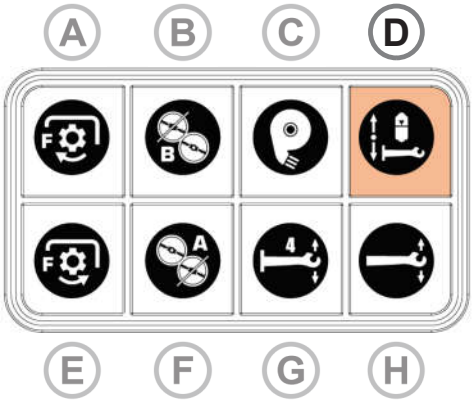
The blower is activated using the button (**C**).

The button changes colour according to the status of the blower:

- The button is purple when the blower is off;
- The button is orange when the blower is on;

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Blower on



6.25.4 Lifter suspension (optional)

CAUTION

- **2nd Gear has to be engaged in order to activate the suspension system. See section *"6.13 Gear selector"*.**
- **It is recommended to activate this function when transferring the machine by road.**
- **Deactivate the function when working.**

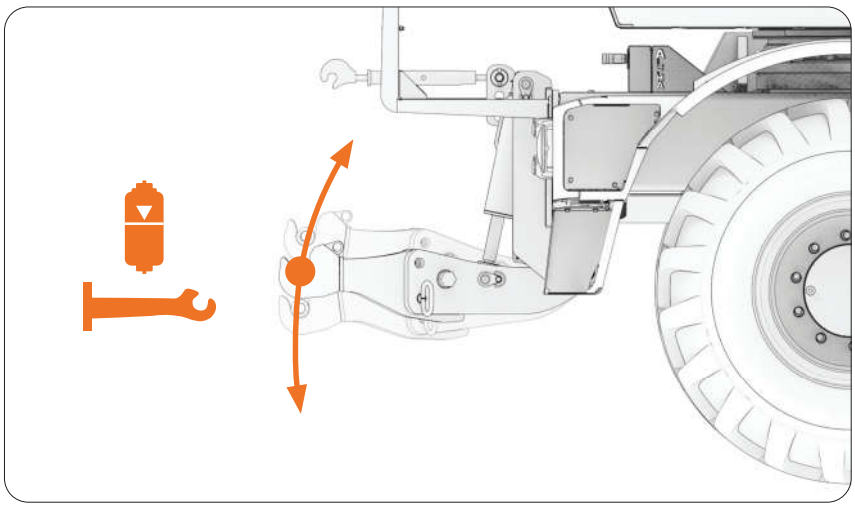
The lifting system can be made less rigid so it can absorb the roughness / vibration / impact of the ground when travelling on roads.

To activate the suspension press button (**D**). The relative symbol appears on the screen to confirm its activation. Press button (**D**) again to deactivate the function.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.

The following symbol will appear on the HOME and WORK MODE screen:

Symbol	Description
	Lifter suspension

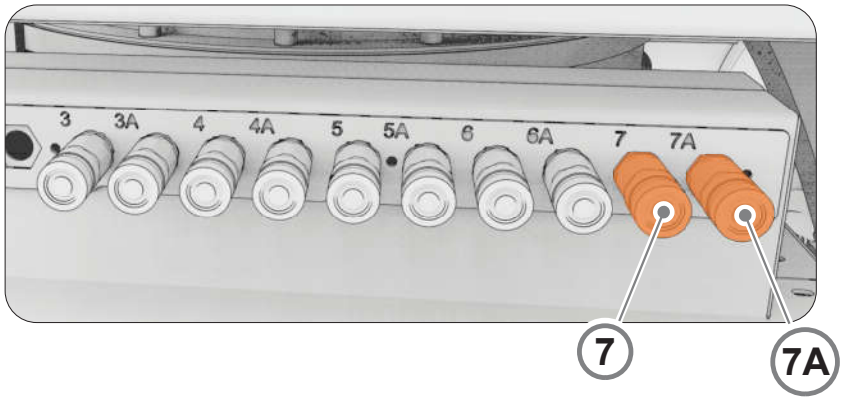


6.25.5 Suspension 7th function (optional)

CAUTION

- **2nd Gear has to be engaged in order to activate the suspension system. See section *"6.13 Gear selector"*.**
- **It is recommended to activate this function when transferring the machine by road.**
- **Deactivate the function when working.**

The equipment mounted on the front of the machine and hydraulically connected to the couplings (**7**) - (**7A**) can use the suspension function. For example, activating this function with the lifter connected makes the lifting system less rigid, allowing it to absorb the roughness / vibration / impact of the ground when travelling on roads.



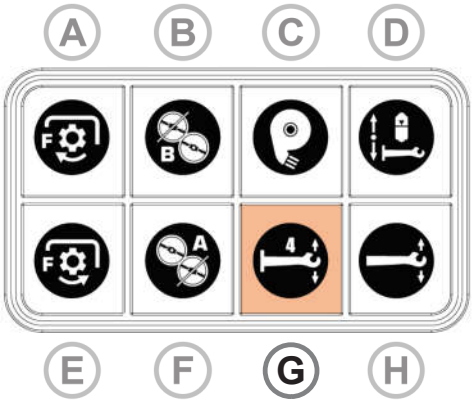
To activate the suspension press button (**D**). The relative symbol appears on the screen to confirm its activation. Press button (**D**) again to deactivate the function.

The button lights up purple in standby mode.

- The button lights up green when pressed.
- The button lights up green when the function is active.

The following symbol will appear on the HOME and WORK MODE screen:

Symbol	Description
	Suspension 7th function



6.25.6 Float 4th function (optional)

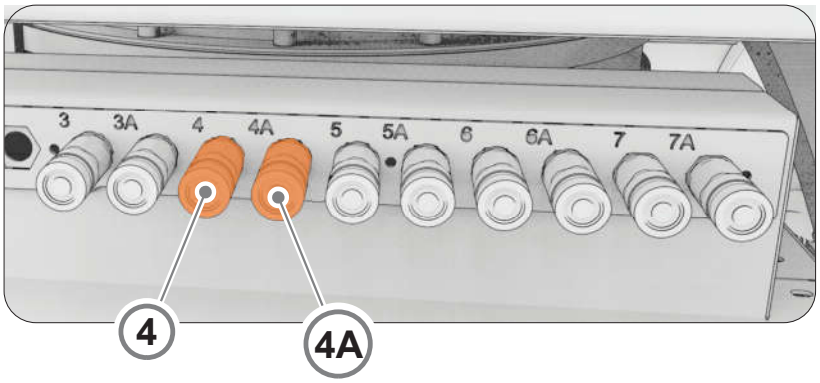
DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **Before activating the float function, make sure that the mounted equipment is resting on the ground.**
- **If the function is activated when the equipment is not resting on the ground, it may be lowered in an UNCONTROLLED manner, depending on its weight.**

CAUTION

The dead man function has to be active in order to activate the 4th function float. See section *"6.23.7 Dead man"*.

The equipment mounted on the front of the machine and hydraulically connected to the couplings (**4**) - (**4A**) can use the float function. By activating this function, the valve opens and communicates directly with the drainage valve. This allows the hydraulic cylinder to extend or retract freely, permitting the tool to follow the contours of the ground.



To activate the function:

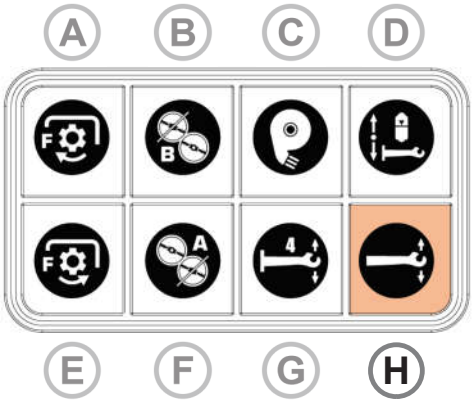
- Rest the equipment on the ground.
- Activate the float function by pressing the button (**G**). The relative symbol appears on the screen to confirm its activation.
- Press button (**G**) again to deactivate the function.

It is also possible to carry out a corrective action using the mini-joystick; the float function is momentarily inhibited until the mini-joystick is released. The float function is then automatically reactivated when the joystick is released.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	4th function float activated



6.25.7 Lifter float (optional)

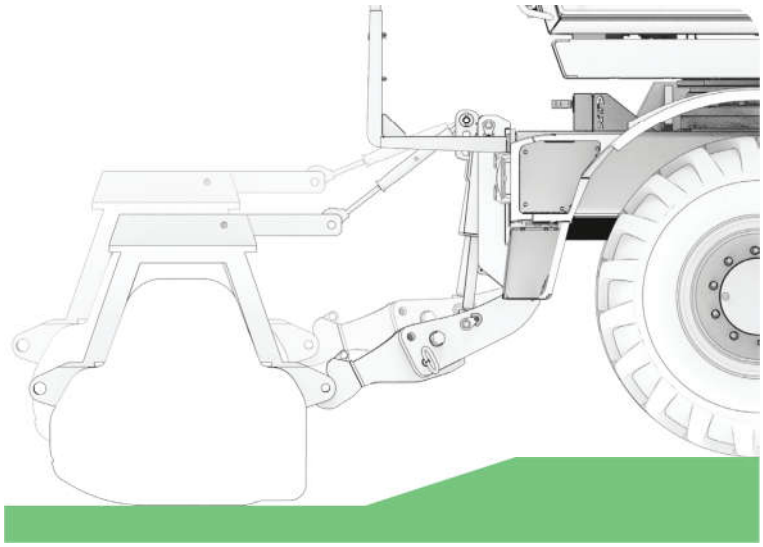
DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **Before activating the float function, make sure that the mounted equipment is resting on the ground.**
- **If the function is activated when the equipment is not resting on the ground, it may be lowered in an UNCONTROLLED manner, depending on its weight.**

CAUTION

The dead man function has to be active in order to activate the lifter float function. See section *"6.23.7 Dead man"*.

The lifter connected to the front of the machine can use the float function. By activating this function, the valve opens and communicates directly with the drainage valve, this allows the hydraulic cylinders to extend or retract freely, allowing the tool to follow the contours of the ground.



To activate the function:

- Rest the equipment on the ground.
- Activate the float function by pressing the button (**H**). The relative symbol appears on the screen to confirm its activation.
- Press button (**H**) again to deactivate the function.

It is also possible to carry out a corrective action using the mini-joystick; the float function is momentarily inhibited until the mini-joystick is released. The float function is then automatically reactivated when the joystick is released.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Lifter float activated

6.25.8 Float 7th function (optional)

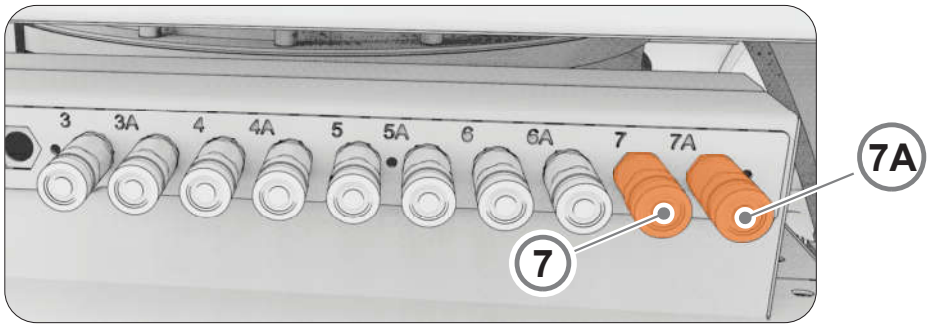
DANGER

- **Make sure that there is nobody within the working range of the machine.**
- **Before activating the float function, make sure that the mounted equipment is resting on the ground.**
- **If the function is activated when the equipment is not resting on the ground, it may be lowered in an UNCONTROLLED manner, depending on its weight.**

CAUTION

The dead man function has to be active in order to activate the 7th function float. See section *"6.23.7 Dead man"*.

The equipment mounted on the front of the machine and hydraulically connected to the couplings (**7**) - (**7A**) can use the float function. By activating this function, the valve opens and communicates directly with the drainage valve. This allows the hydraulic cylinder to extend or retract freely, permitting the tool to follow the contours of the ground.



To activate the function:

- Rest the equipment on the ground.
- Activate the float function by pressing the button (**H**). The relative symbol appears on the screen to confirm its activation.
- Press button (**H**) again to deactivate the function.

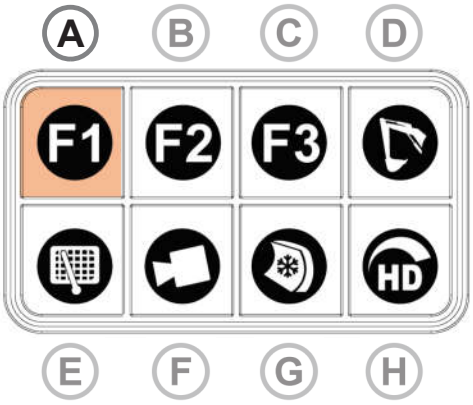
It is also possible to carry out a corrective action using the mini-joystick; the float function is momentarily inhibited until the mini-joystick is released. The float function is then automatically reactivated when the joystick is released.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	7th function float activated

6.26 OPTIONS KEYPAD (OPTIONAL)



6.26.1 Function F1 with independent hydraulics (optional)

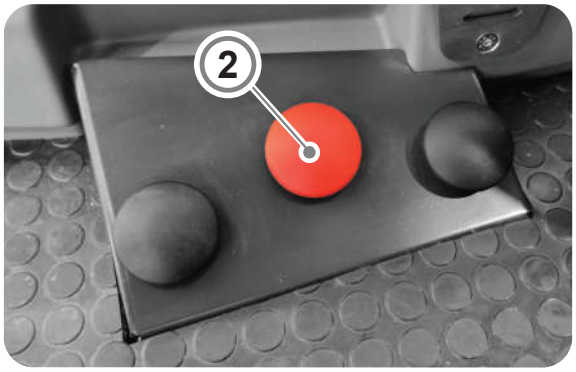
CAUTION

- **The dead man and WORK MODE functions have to be active in order to activate function F1. See sections *"6.23.7 Dead man"* and *"6.23.1 Work mode"*.**
- **To increase or decrease the precision / speed of movements see section *"6.29 Joysticks: speed settings (optional)"*.**

A hydraulic line specifically for equipment requiring low oil flow rates can be supplied as an optional and can be installed on machine and therefore on the arm. This line is used by three pre-set functions: F1, F2 and F3. Activating Function F1 allows you to use equipment such as a mowing bucket (RIVER BUCKET).

How to activate the function:

1) Press the button (**A**), which will start flashing orange to indicate that the function is active;
2) Turn the potentiometer (**1**) as required: allowing further adjustment of the pump flow rate, where 0% is the minimum and 100% is the maximum flow rate. Press pedal (**2**) to activate the equipment. In this case, the button changes from flashing orange to steady orange.



To deactivate the function:

1) Press button (**A**), which will stop flashing and become purple to indicate that the function is deactivated;

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Auxiliary PTO - clockwise rotation selected

6.26.2 Function F1 with hybrid hydraulics (optional)

CAUTION

- **The dead man and WORK MODE functions have to be active in order to activate function F1. See sections *"6.23.7 Dead man"* and *"6.23.1 Work mode"*.**
- **To increase or decrease the precision / speed of movements see section *"6.29 Joysticks: speed settings (optional)"*.**

Another option is to request only function F1. In this case, the existing hydraulic line is used. The potentiometer will no longer be fitted to the armrest of the seat in the cabin; the „TOOLS" screen (**1**) will be used instead. The percentage of the maximum RPM of the equipment (**2**) can be controlled on this screen using the touch function or the Powertrack.

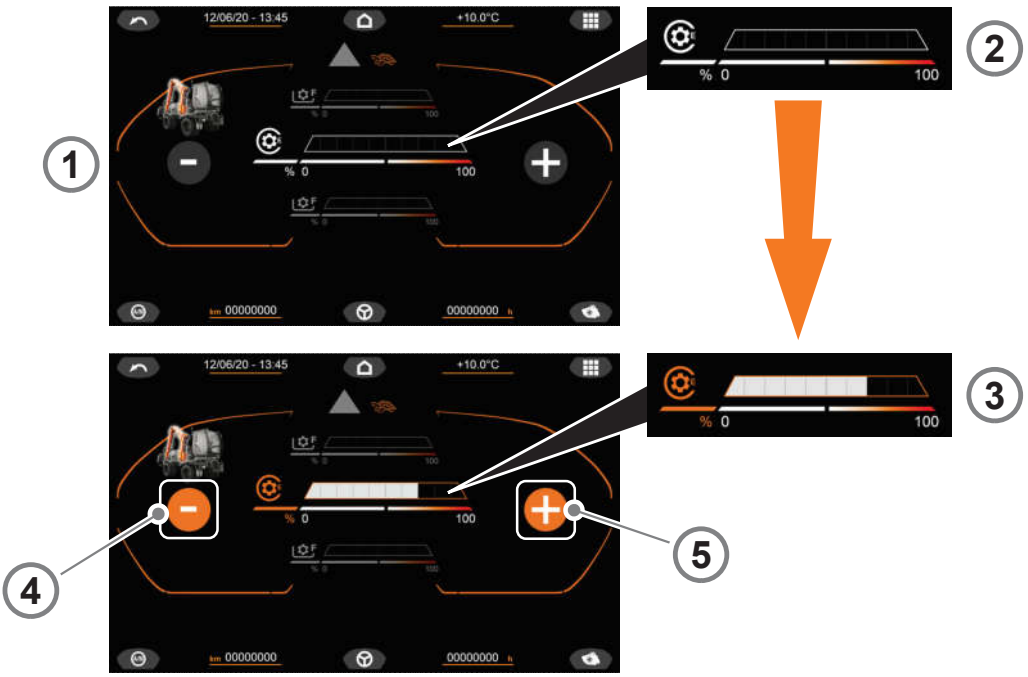
Activating Function F1 allows you to use equipment such as a mowing bucket (RIVER BUCKET).

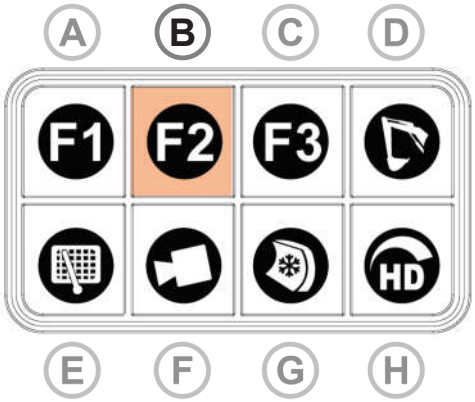
To activate the function temporarily, proceed as follows:

1) Press the button (**A**), which will start flashing orange to indicate that the function is active;
2) Use the touch function or press the rotary selector on the Powertrack to select the field for the equipment connected to the arm (**3**); once selected it becomes orange;
3) Use the buttons (**4**) and (**5**) to increase or decrease the percentage: where 0% is the minimum and 100% is the maximum flow rate;
4) Press the pedal (**2**) to activate the equipment. In this case, the button changes from flashing orange to steady orange;

To deactivate the function:

1) Press button (**A**), which will stop flashing and become purple to indicate that the function is deactivated;





6.26.3 F2 function (optional)

CAUTION

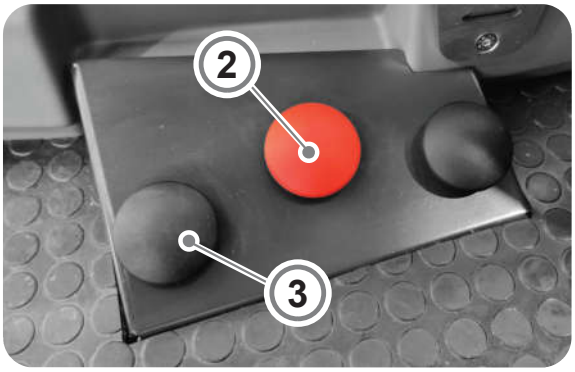
- **The dead man and WORK MODE functions have to be active in order to activate function F2. See sections *"6.23.7 Dead man"* and *"6.23.1 Work mode"*.**
- **To increase or decrease the precision / speed of movements see section *"6.29 Joysticks: speed settings (optional)"*.**

To start the mulching head conveyor (CONVEYOR HEAD), activate function F2.

How to activate the function:

1) Press the button (**B**), which will start flashing orange to indicate that the function is active;
2) Turn the potentiometer (**1**) as required: allowing further adjustment of the pump flow rate, where 0% is the minimum and 100% is the maximum flow rate;
3) Press the pedal (**2**) to rotate the conveyor clockwise. In this case, the button changes from flashing orange to steady orange;
4) Press the pedal (**3**) to rotate the conveyor anticlockwise. In this case, the button changes from flashing orange to steady orange;

To deactivate the conveyor, press the pedal (**2**) or (**3**) again, depending on the direction of rotation that is currently active. If you activate the rotation and press the pedal to select the opposite direction of rotation, the current rotation is deactivated and the opposite direction is activated: this step is carried out gradually.

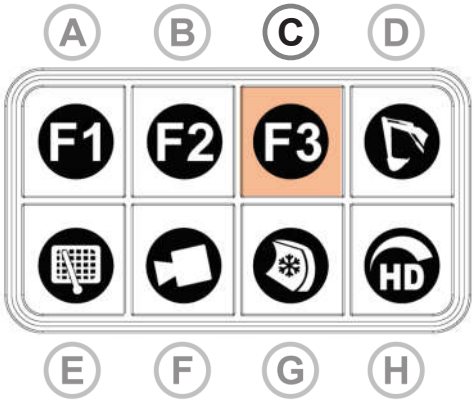


To deactivate the function:

1) Stop the conveyor rotation;
2) Press the button (**B**), which will stop flashing and become purple to indicate that the function is deactivated;

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Auxiliary PTO - clockwise rotation selected
	Auxiliary PTO - anticlockwise rotation selected



6.26.4 F3 function (optional)

CAUTION

- **The dead man and WORK MODE functions have to be active in order to activate function F3. See sections *"6.23.7 Dead man"* and *"6.23.1 Work mode"*.**
- **To increase or decrease the precision / speed of movements see section *"6.29 Joysticks: speed settings (optional)"*.**

To activate the pruning pincers (EXTRA TRUNK), activate function F3.

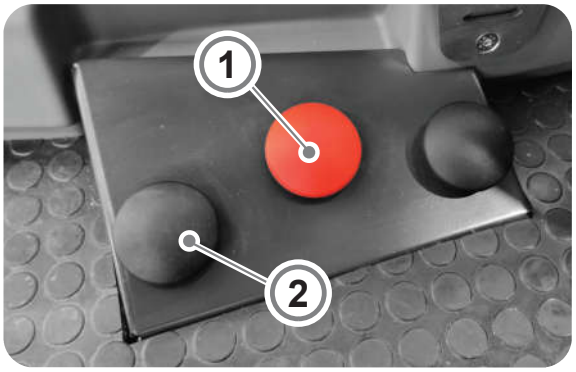
How to activate the function:

1) Press the button (**C**), which will start flashing orange to indicate that the function is active;
2) Press pedal (**1**) to close the pincers. In this case, the button changes from flashing orange to steady orange;
3) Press pedal (**2**) to open the pincers. In this case, the button changes from flashing orange to steady orange;

CAUTION

This function does require the potentiometer as it uses the maximum available flow rate.

As soon as the pedal (**1**) or (**2**) are released, the respective closing or opening is stopped.

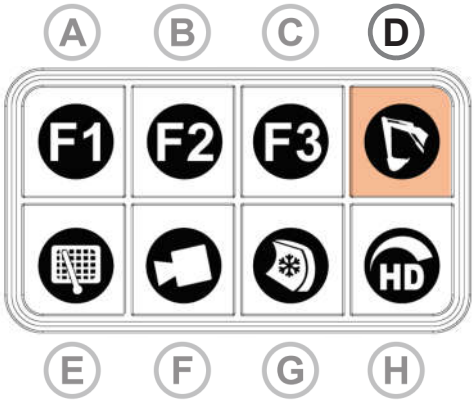


To deactivate the function:

1) Press button (**C**), which will stop flashing (and switch off) indicating that the function is deactivated;

One of the following symbols will appear on the WORK MODE screen:

Symbol	Description
	Auxiliary PTO - clockwise rotation selected
	Auxiliary PTO - anticlockwise rotation selected



6.26.5 Digging mode (optional)

WARNING

This function must be activated before the dead man function. See section *"6.23.7 Dead man"*.

The machine can be supplied with a second joystick that will be located on the left armrest of the seat. With this second joystick and the function active, the movements of an excavator arm can be replicated.

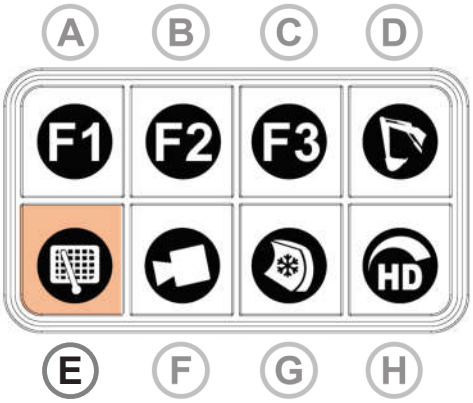
1) Press the button (**D**) to activate the function.
2) Activate the "Dead man" function to use the controls.
3) Press button (**D**) again to deactivate the function.

WARNING

- **NEVER USE the machine for handing earth or similar inert materials.**
- **Use the machine and equipment properly, bearing in mind that it has been designed for the maintenance of public green areas.**

See section ***"6.37 Left Joystick (optional)"*** for its use.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.



6.26.6 Round window wiper (optional)

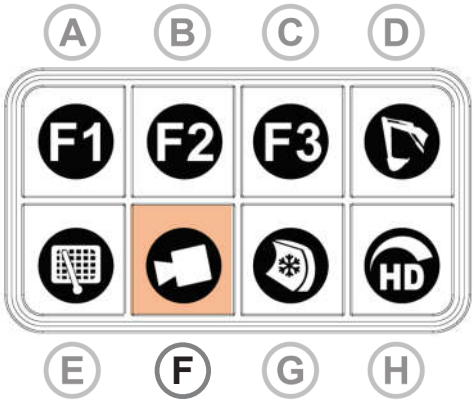
Pressing the button (**E**) activates the round window wiper. Press the button again to deactivate the function.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.

The following symbol will appear on the HOME screen:

Symbol	Description
	Round window wiper

06-Tastiera opzioni (ILF)

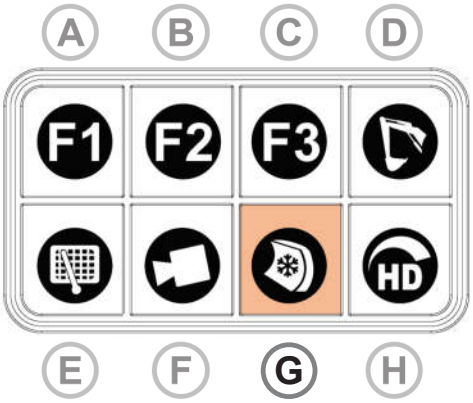


6.26.7 Activating additional cameras (optional)

The machine can be fitted with an additional camera system in addition to the rear camera. This requires an additional screen and can manage up to a maximum of four cameras.

Pressing the button (**F**) activates the circuit for the additional cameras. Press the button again to deactivate the function.

- The button lights up purple in standby mode.
- The button lights up green when pressed.
- The button lights up green when the function is active.



6.26.8 ***Snow blade function (optional)***

Once enabled, this function allows you to activate the front control valve and to move the equipment connected to the front of the machine, while moving forwards in second gear.

CAUTION

- **In order to use snow blade function, the operator has to be seated, the engine must be switched on and the gear selector must be in neutral. See sections *"6.13 Gear selector"* and *"6.30 Ignition panel"*.**
- **This function does not allow the PTOs to be used.**

WARNING

Only two types of steering are available in this mode:

- **steering using the two front wheels with a maximum speed of 40 km/h**
- **concentric steering with a maximum speed of 20 km/h (when exceeded, steering with the two front wheels will be enabled automatically)**

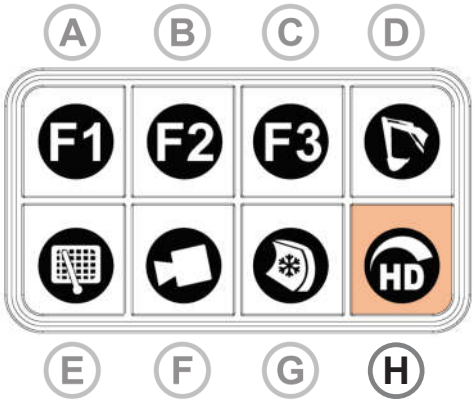
To activate the snow blade function, proceed as follows:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) Press the snow blade button (**G**);
5) Press the dead man button; see section ***"6.23.7 Dead man"***, to enable control of the equipment;
6) Engage the forward / backward gear using the gear selector and press the accelerator.

The function is deactivated if:

- The relative button is pressed;
- The operator gets up from the seat;
- First gear is engaged;
- The engine switches off.

- The button lights up purple in standby mode.
- The button turns green when the function is active.



6.26.9 HEAVY DUTY function (optional)

Once activated, this function allows you to use equipment such as the snow blower that require average speeds, control and activation of the equipment.

This mode allows the machine to be used in second gear (maximum 20 km/h), allowing you to control the equipment and operate their PTOs.

CAUTION

In order to use snow blade function, the operator has to be seated, the engine must be switched on and the gear selector must be in neutral. See sections *"6.13 Gear selector"* and *"6.30 Ignition panel"*.

To activate the snow blade function, proceed as follows:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) Press the button (**H**);
5) Press the dead man button; see section ***"6.23.7 Dead man"***, to enable control of the equipment;
6) Press the work mode button, see section ***"6.23.1 Work mode"***, to activate the PTOs;
7) Engage the forward / backward gear using the gear selector and press the accelerator.

The function is deactivated if:

- The relative button is pressed;
- The operator gets up from the seat;
- First gear is engaged;
- The engine switches off.

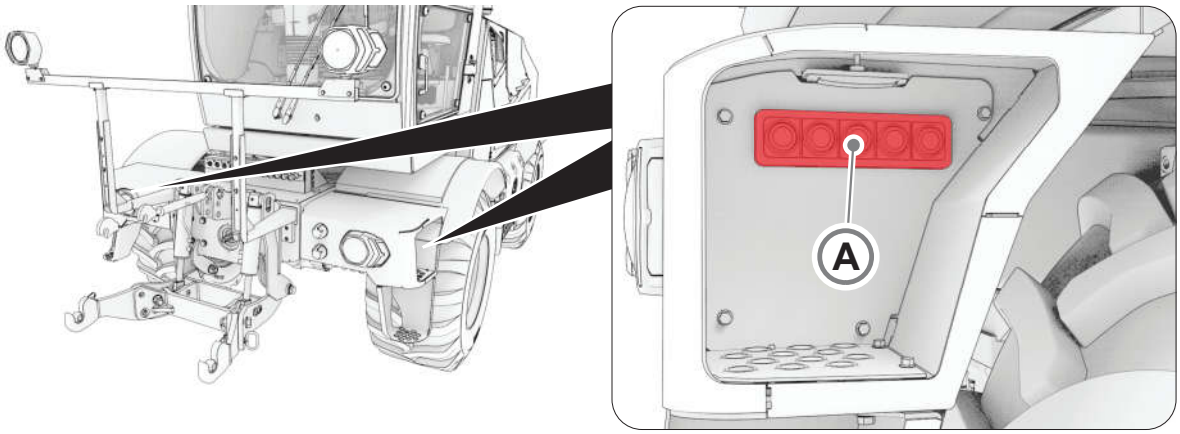
- The button lights up purple in standby mode.
- The button turns green when the function is active.

6.27 REMOTE KEYPAD (OPTIONAL)

Two versions of the remote keypad (**A**) can be installed and can be found in the front headlight compartment of the machine. They are mounted optionally in the machine to control the lifter, the mechanical PTO, the work lights or a third hydraulic top link. The keypads are enabled and backlit only after the STATIONARY WORK MODE has been enabled, see section ***„6.45.7 STATIONARY WORK MODE”***.

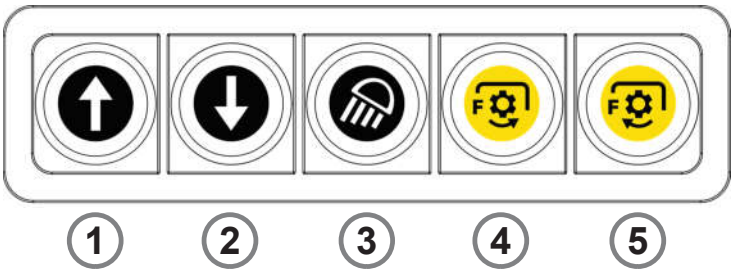
CAUTION

If the remote keypads are enabled, the controls inside the cabin are disabled.



06-Tastiera remotata (ILF)

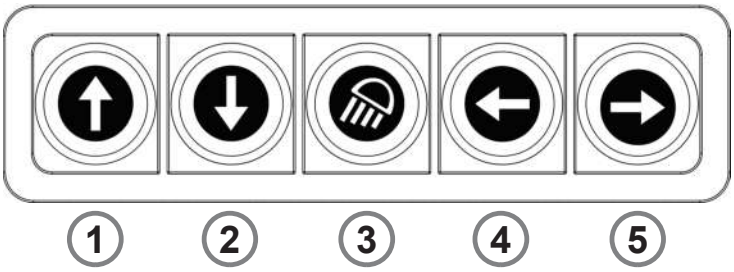
6.27.1 Five-function keypad (version A)



1	Lift tool
2	Lower tool
3	Switch cabin work lights on / off
4	PTO anticlockwise rotation (*)
5	PTO clockwise rotation (*)

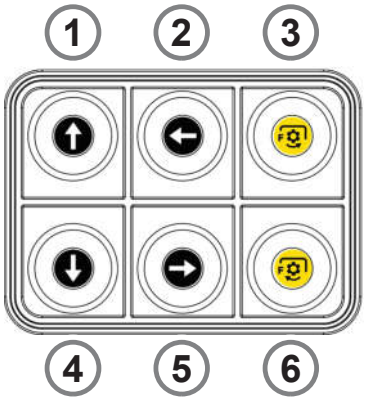
(*) The button does not activate the PTO but rotates it just enough to allow the cardan shaft to engage correctly.

6.27.2 *Five-function keypad (version B)*



1	Lift tool
2	Lower tool
3	Switch cabin work lights on / off
4	Extend top link
5	Retract top link

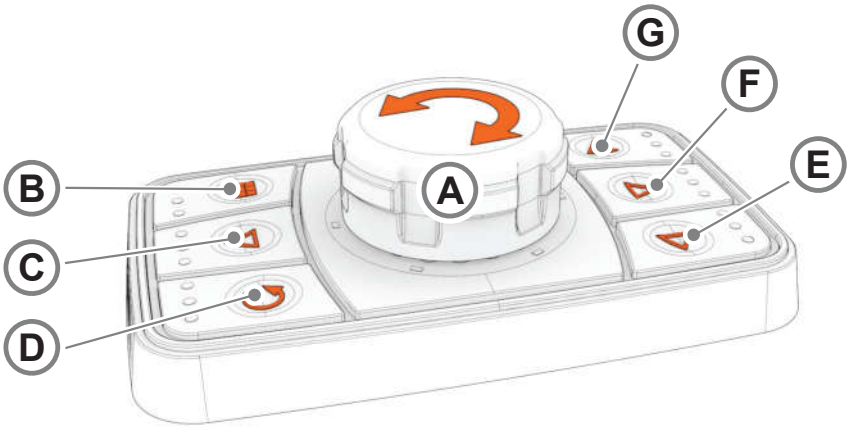
6.27.3 *Six-function keypad*



1	Lift tool
2	Extend top link
3	PTO anticlockwise rotation (*)
4	Lower tool
5	Retract top link
6	PTO clockwise rotation (*)

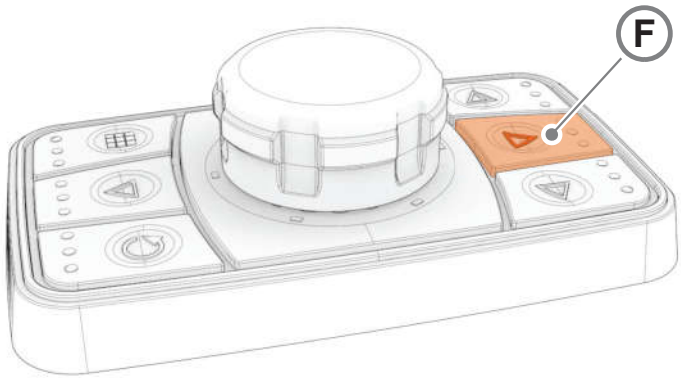
(*) The button does not activate the PTO but rotates it just enough to allow the cardan shaft to engage correctly.

6.28 POWERTRACK



The powertrack features a rotary knob with a button and allows the operator to manage the navigation functions on the display. It also has six keys, which are also used for navigation.

	Button pad symbol	Description
A	-	Rotary knob, when pressed it works as ENTER
B		MENU screen / Steering sentinel
C		HOME screen
D		BACK function
E		WORK screen
F		STEERING screen
G		TOOLS screen



6.28.1 Steering screen button

HAZARD

Before moving on road, make sure that 2-wheel steering is selected.

WARNING

- **Only select the type of steering when the machine is stationary and carry out the alignment with first gear engaged. Then, while moving slowly over short distances, proceed with wheel alignment.**
- **When working with 4-wheel steering, remember to align the rear wheels from time to time.**
- **IT IS NOT POSSIBLE TO ENGAGE SECOND GEAR IF TWO-WHEEL STEERING IS NOT SELECTED AND IF THE REAR WHEELS ARE NOT CORRECTLY ALIGNED.**
- **Forcing the gear engagement when the vehicle is not stopped may cause mechanical damage to the gearbox.**

CAUTION

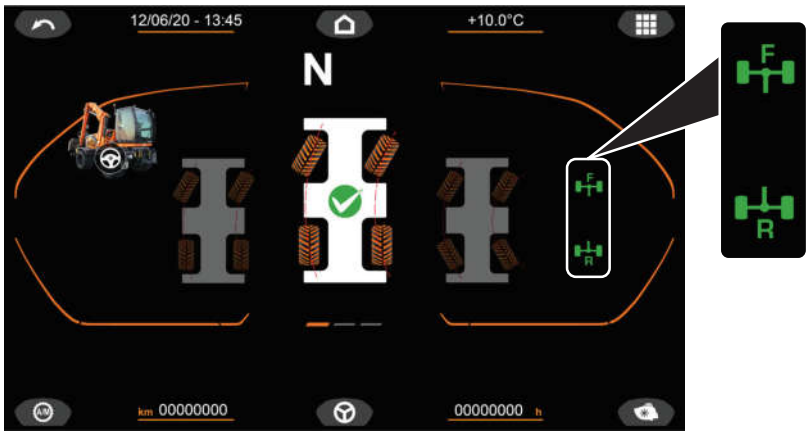
- **The second gear or first gear can be engaged only when the machine is stopped with the brake pressed.**
- **Once a steering change is requested, the relative indicator light on the screen will start flashing until the change has been made.**
- **After a machine restart, two-wheel steering is activated automatically: realign the rear wheels if they are not already aligned after the restart.**

Pressing button (**F**) takes you directly to the steering screen where you can select the method by which the machine should be steered.

By keeping the button (**F**) pressed, with each passing second, the machine automatically changes the steering mode by switching to the next one. The machine issues an audible signal each time the steering mode changes.

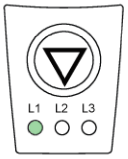
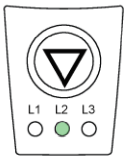
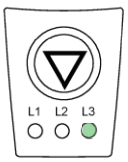
- In ***two wheel steering*** mode, the steering wheel controls the two front wheels. This selection must be used to perform fast transfers and on public roads.
- In ***round steering*** mode, the steering wheel controls the front and rear wheels. The front wheels turn in the same direction as the steering wheel, while the rear wheels turn in the opposite direction. This selection is used for movements and bends in restricted spaces. The corresponding indicator light on the display comes on to confirm that round steering mode has been selected. If round steering is selected and the operator attempts to engage second gear, the red round steering symbol appears on the screen and the machine does not move.
- In ***crab steering*** mode, the steering wheel controls the front and rear wheels; both the front and rear wheels turn in the direction of rotation of the steering wheel. This selection is used for transversal right or left movements. The system does not allow you to switch directly from crab to round steering mode and vice versa. You first have to switch to front wheel mode and then to the required steering mode. The corresponding indicator light on the display comes on to confirm that crab steering mode has been selected. If crab steering is selected and the operator attempts to engage second gear, the red crab steering symbol appears on the screen and the machine does not move.

The following indicators can be found on the steering screen:



Displayed symbol	Symbol status	Description
	Green	Front axle aligned.
	Grey	Front axle not aligned.
	Red	Front axle not aligned. Request alignment to select the required steering mode.
	Green	Rear axle aligned.
	Grey	Rear axle not aligned.
	Red	Rear axle not aligned. Request alignment to select the required steering mode.

The indicators on the WORK MODE screen are as follows:

Stop	LED	LED status	Displayed symbol	Symbol status	Description
	L1	On		Green	Active two-wheel steering
				Red	Two-wheel steering is active but the rear wheels are not aligned. Align the wheels.
	L2	Off	-	-	-
	L3	Off	-	-	-
	L1	Off	-	-	-
	L2	On		Green	Concentric steering active
				Red	Concentric steering active but the wheels are not aligned. Align the wheels.
	L3	Off	-	-	-
	L1	Off	-	-	-
	L2	Off	-	-	-
	L3	On		Green	Crab steering active
				Red	Crab steering active but the wheels are not aligned. Align the wheels.

Displayed symbol	Symbol status	Description
	Green	Front axle aligned
	Green	Rear axle aligned

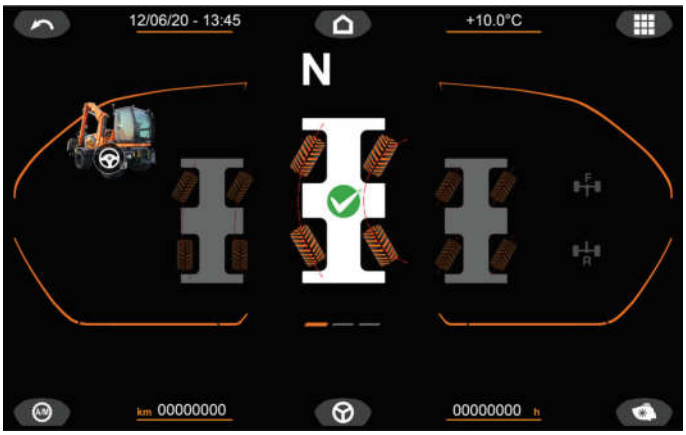
Changing the steering mode

CAUTION

Align the wheels of the front and rear axles before each steering change.

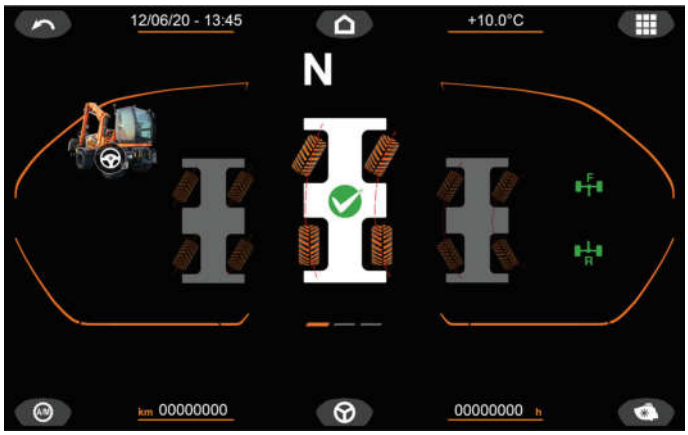
If the machine is in concentric steering mode, the wheels are not aligned and you have to switch to two-wheel steering mode. Proceed as follows:

1) Move to the steering screen by pressing the Powertrack button (**F**). The following screen will appear.



2) Select steering using only the two front wheels. At this point, the machine has two ways of warning the operator that the wheels are not aligned: the first is by alternating the red machine symbol with the steering wheel symbol, the second is the rear axle symbol that appears in red.

3) Use the steering wheel to align the wheels of the front and rear axles. Once aligned, the axle alignment symbols will become green.

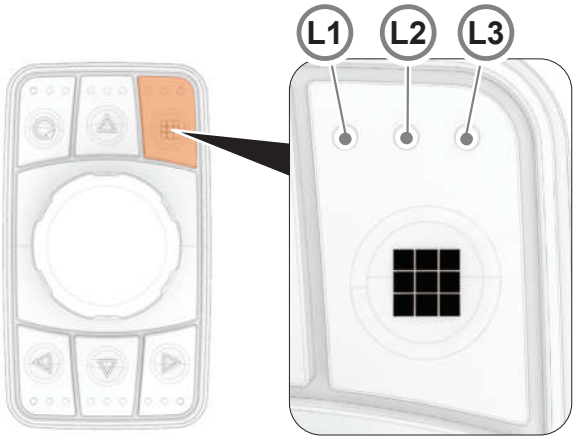


4) A tick sign will appear on the central symbol to confirm the steering change.

6.28.2 Steering sentinel button

Check the misalignment of the rear axle while concentric steering or crab steering is active (steering used in work mode (1st gear)). This sentinel checks the centring of the axes.

The sentinel status is displayed in the powertrack via the three LEDs above the MENU screen button.



LED	Function
L1	LOG LED
L2	RUN LED
L3	PRE LED

6.28.3 Operation

Machine OFF

LED	Status		
L1	◯	Off	• Ignition key in position “I” • Engine: off.
L2	◯	Off	
L3	◯	Off	

LED	Status		
L1	◯	Off	• Engine: on. • Two-wheel steering: on. • Ready for control cycle activation: waiting for activation of concentric steering or crab steering.
L2	◯	Off	
L3	◔	Flashing	

Activation of concentric steering or crab steering

LED	Status		START-UP
L1	○	Off	• Concentric steering or crab steering: on. • L3 flashing for 60 seconds • Control cycle: starting.
L2	○	Off	
L3	◔	Flashing	

LED	Status		READING
L1	○	Off	• Concentric steering or crab steering: on. • Control cycle: on, reading.
L2	○	Off	
L3	●	Fixed	

Axle misalignment is detected during the control cycle.

LED	Status		ALIGNMENT REQUEST
L1	○	Off	• Concentric steering or crab steering: on. • Control cycle: LED L2 switches on; axle alignment therefore required. Using the steering wheel, steer to the opposite side passing through the centre of the front axle.
L2	●	Fixed	
L3	●	Fixed	

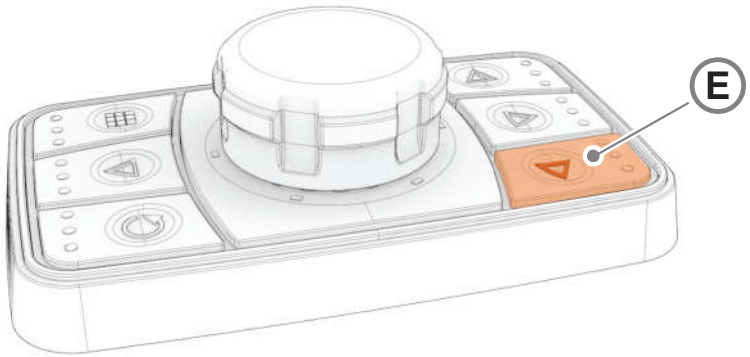
CAUTION

If the alignment of the axes is not carried out within 10 seconds, LED L2 turns off and the READ-REQUEST ALIGNMENT cycle is carried out again.

LED	Status		ALIGNMENT COMPLETED
L1	●	Fixed	• Concentric steering or crab steering: on. • Control cycle: LED L1 switches on and stays on for 5 minutes. When lit, it indicates that the alignment has been carried out. After five minutes, the system reverts to READING status
L2	○	Off	
L3	●	Fixed	

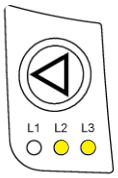
CAUTION

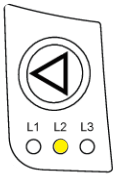
The control cycle is paused temporarily while reversing.

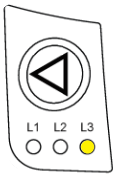


6.28.4 WORK screen button

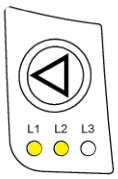
- Pressing button (**E**) access the WORK screen directly.
- Keeping button (**E**) pressed for at least one second allows you to select which joystick to use during the work phase.

Stop	LED	LED status	Description
	L1	Off	Left joystick not enabled (optional)
	L2	On	Right joystick enabled
	L3	On	Mini-joystick enabled

Stop	LED	LED status	Description
	L1	Off	Left joystick not enabled (optional)
	L2	On	Right joystick enabled
	L3	Off	Mini-joystick not enabled

Stop	LED	LED status	Description
	L1	Off	Left joystick not enabled (optional)
	L2	Off	Right joystick not enabled
	L3	On	Mini-joystick enabled

If digging mode (optional) is activated:

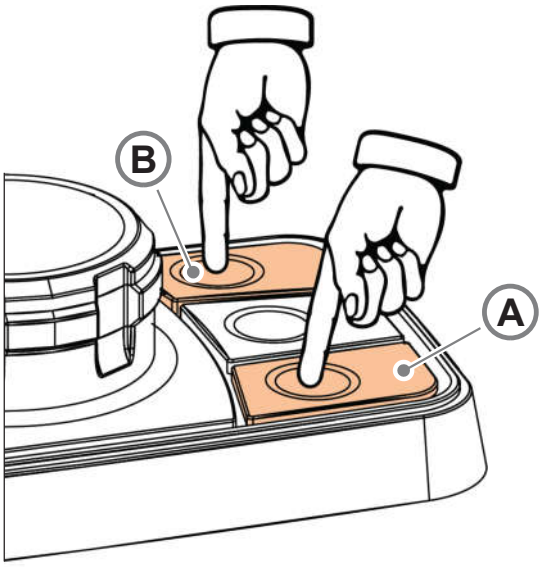
Stop	LED	LED status	Description
	L1	On	Left joystick enabled (optional)
	L2	On	Right joystick enabled
	L3	Off	Mini-joystick not enabled

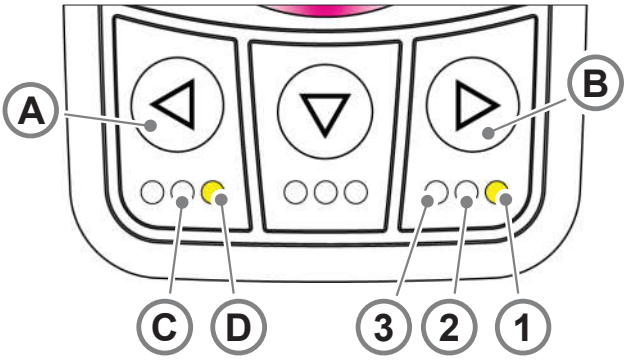
6.29 JOYSTICKS: SPEED SETTINGS (OPTIONAL)

As an option, it is possible to increase / decrease the precision / speed of movement of the arm and all the equipment that is moved via the joysticks.

CAUTION

The joysticks can only be set if the dead man function is deactivated and if both joysticks are not selected (LEDs (C) and (D) lit at the same time).





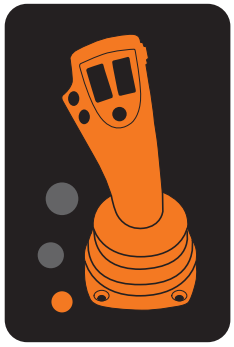
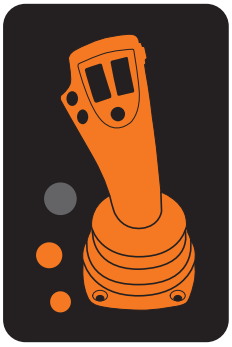
	Description
A	WORK screen button
B	TOOLS screen button
C	Right joystick LED
D	Mini-joystick LED
1	Speed 1 LED
2	Speed 2 LED
3	Speed 3 LED

To set the precision / speed of the joystick movements, proceed as follows:

1) It is recommended that you move to the WORK screen to see which joystick has been selected.
2) Use button (**A**) to select the right joystick (LED (**C**) on) or the mini-joystick (LED (**D**) on); see section ***"6.28.4 WORK screen button"***. Keep the button pressed for at least one second; the system will emit two beeps (the first prompts you to change joystick; the second confirms it has been changed).
3) Select the speed with which to move the equipment using button (**B**). A higher speed means that the movements will be less precise, while a lower speed increases precision. Keep the button pressed for at least one second, the system will emit two beeps (the first prompts you to change speed; the second confirms it has been changed). Three pre-set speeds can be selected: Speed 1 (LED (**1**) on), Speed 2 (LED (**1**) and (**2**) on), Speed 3 (LED (**1**), (**2**) and (**3**) on). Depending on the level selected, green LEDs will light up around the rotary knob, while the relative icons appear on the display. See the table below for the various combinations.

6.29.1 Right joystick settings

LED (**C**) on:

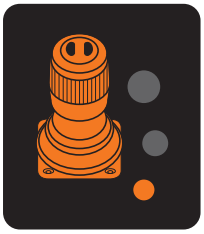
Speed 1	Speed 2	Speed 3
Powertrack		
		
Display		
		
Speed 1 LED: on Speed 2 LED : off Speed 3 LED : off	Speed 1 LED: on Speed 2 LED: on Speed 3 LED : off	Speed 1 LED: on Speed 2 LED: on Speed 3 LED: on
LOW speed	MEDIUM SPEED	HIGH SPEED
HIGH precision	MEDIUM precision	LOW precision

CAUTION

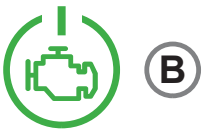
The settings for the right joystick are replicated on the left joystick (optional) if present.

6.29.2 Mini-joystick settings

LED (**D**) on:

Speed 1	Speed 2	Speed 3
Powertrack		
		
Display		
		
Speed 1 LED: on Speed 2 LED : off Speed 3 LED : off	Speed 1 LED: on Speed 2 LED: on Speed 3 LED : off	Speed 1 LED: on Speed 2 LED: on Speed 3 LED: on
LOW speed	MEDIUM SPEED	HIGH SPEED
HIGH precision	MEDIUM precision	LOW precision

6.30 IGNITION PANEL



The ignition panel is located on the dashboard near the right-hand side window (**A**). Turning the key to position “**I**” gives power to all electrical equipment.

The engine can only be started when the indicator light (**B**) is on steadily.

To start the engine, turn the key to position “**II**”; release the key as soon as the engine has started running (the key goes back to position “**I**” automatically). To shutdown the engine, turn the ignition key to “**O**”.

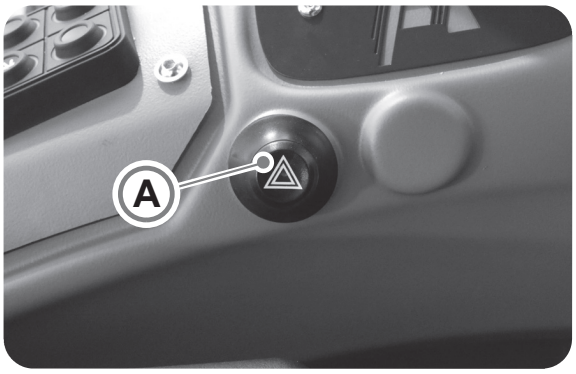
CAUTION

- **If the machine has been switched off and has to be restarted, it is recommended to wait at least ten seconds before turning the key back to position "I". Turning the key too quickly between the "I-O-I" positions generates a system error that prevents the engine from starting.**
- **The following conditions are required In order for the engine to be started:**
  - **The operator must be seated;**
  - **Park brake on (or brake pedal fully pressed);**
  - **Gear in neutral;**
  - **Correct level of hydraulic oil;**
  - **Indicator light (B) on steadily.**
- **If the engine is off, the key is in position "I" and the gear is engaged, the machine emits a beep with a frequency of 1Hz (once per second). This is to warn the operator that neutral gear has to be selected.**

The warning light (**B**) has three modes:

- ***Off***: indicates that the engine has been started (for at least three seconds) or that the conditions required for starting it are incorrect.
- ***Flashing***: indicates that the engine signal is missing or not detected in the CAN-bus line.
- ***On (steady)***: the engine can be started.

6.31 EMERGENCY INDICATORS

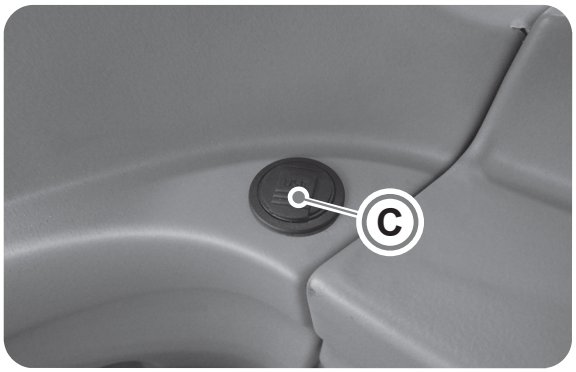


Pressing the switch (**A**) turns on the four emergency indicators (**B**) and the two flashing arrows also appear on the screen. To deactivate them, press the button again.

The following symbol will flash on the WORK MODE and CAMERA screen:

Symbol	Description
	Emergency indicators active

6.32 USB SOCKET



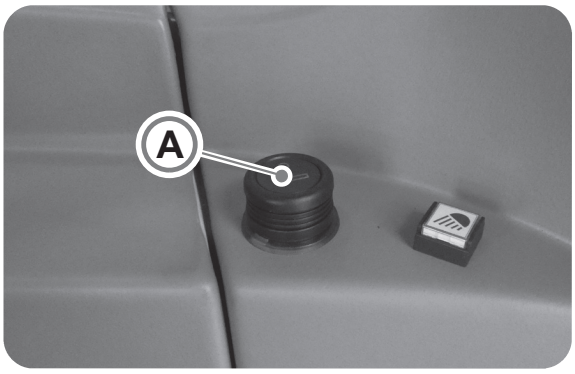
To the right of the seat is a dual USB socket (**C**) that which can be used for charging mobile devices.

6.33 CIGARETTE LIGHTER

To the left of the seat there is a cigarette lighter (**A**).

- Press the cigarette lighter to heat the heating element.
- When ready for use, the cigarette lighter is partially expelled and so it can be pulled out.

DO NOT keep the cigarette lighter pressed when the heating element is heating up, it could overheat.



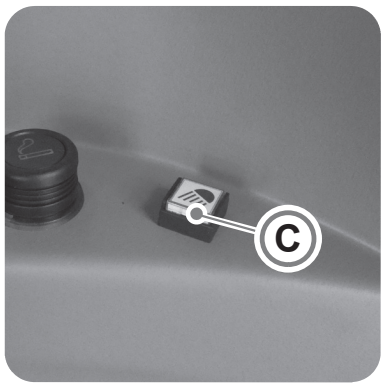
DANGER

- **DANGER OF BURNS: hold the cigarette lighter by the grip only.**
- **Do not connect accessories to the cigarette lighter socket, unless these have been approved by ENERGREEN S.P.A..**

6.34 COURTESY LIGHT

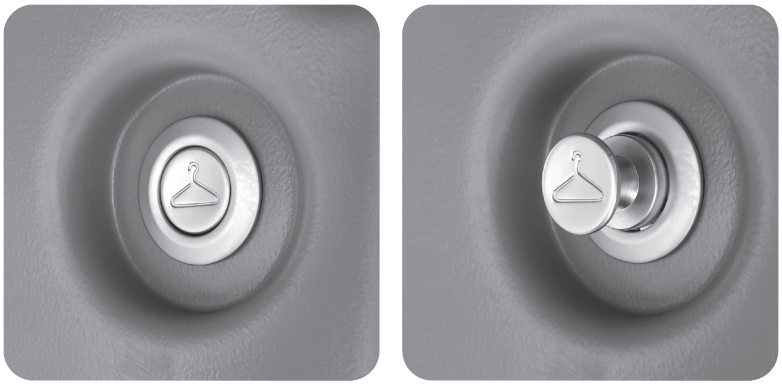
The cabin is fitted with a courtesy light (**B**) that turns on as soon as the cabin door is opened. If you need to switch on the courtesy light, press the yellow button (**C**) to the left of the seat, next to the cigarette lighter. Press the button again to switch it off.

When the door is opened, the courtesy lights on the cabin access steps also turn on.



6.35 COAT HOOK

There is a coat hook on the rear left upright. Press the hook to extend it and use it. Press it again to retract it.



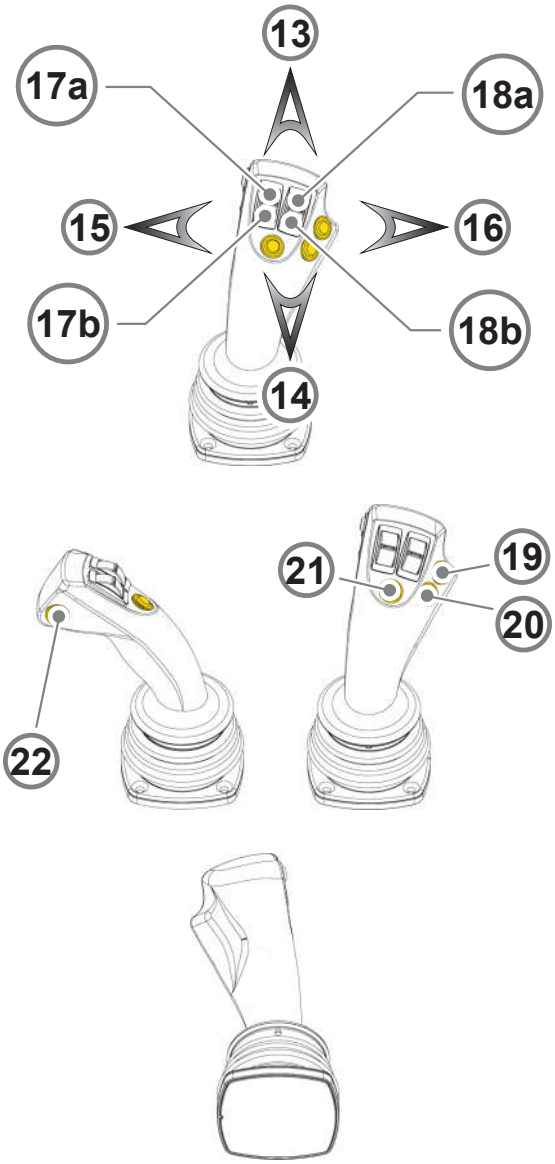
6.36 TECHNICAL DOCUMENTATION COMPARTMENT

This use and maintenance manual should be kept carefully. It should always be on board the machine: specifically in the documentation compartment on the panel behind the seat.

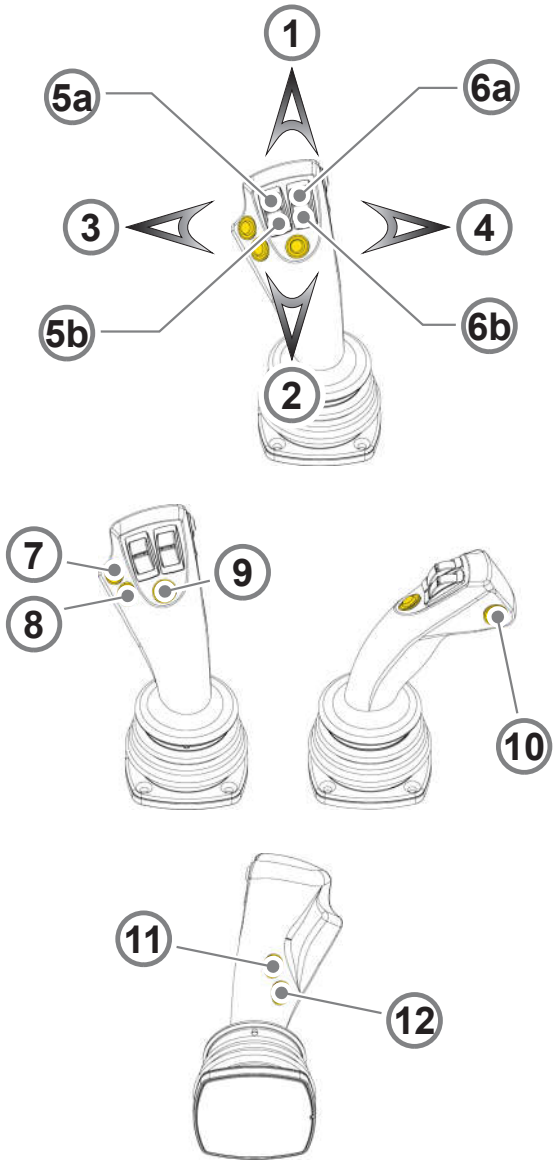
6.37 LEFT JOYSTICK (OPTIONAL)

6.37.1 Arm 3P movements with DIGGING function (optional)

Left joystick



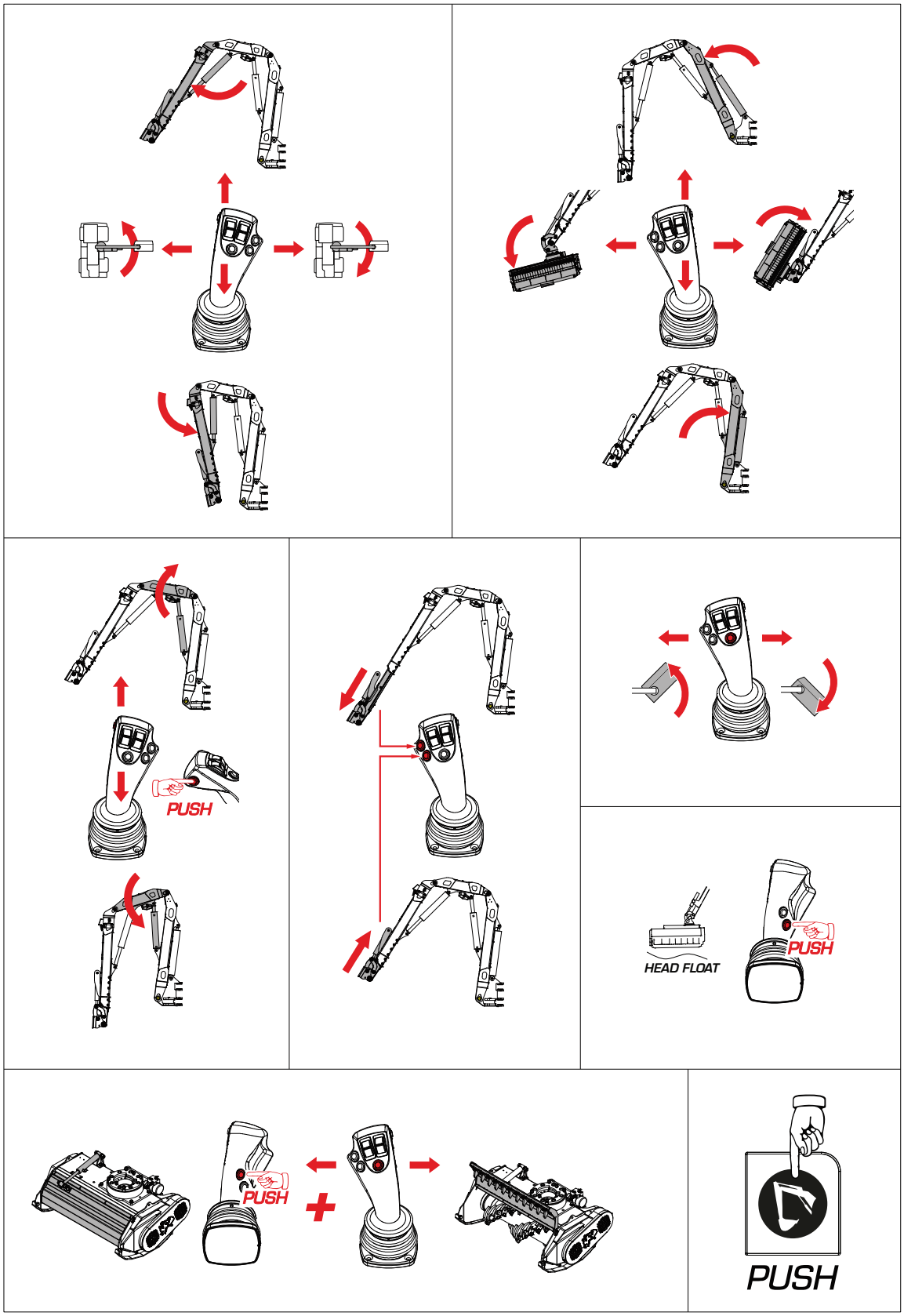
Right joystick



CAUTION

- **To activate the digging function (optional) see section *"6.26.5 Digging mode"*.**
- **The buttons on the right joystick are replicated on the left joystick and have the same function; with the exception of buttons (11) and (12) which have no corresponding button on the left joystick. So:**

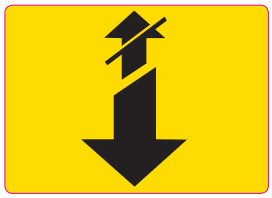
(7) = (19)
(8) = (20)
(9) = (21)
(10) = (22)

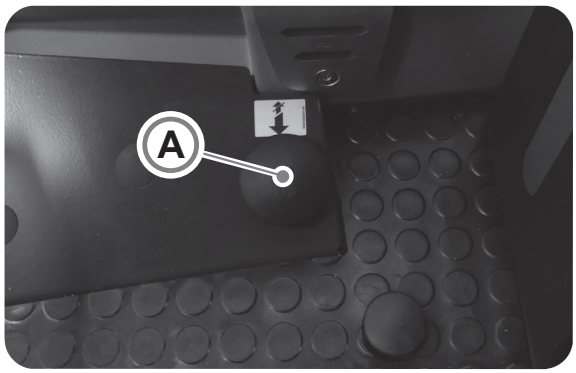


ENG10303000399

3P arm controls with DIGGING function	
1	First arm opening
2	First arm closure
3	Head forward tilt
4	Head backward tilt
7	Extend extensions
8	Retract extensions
9+3	Head anticlockwise rotation
9+4	Head clockwise rotation
11+9+3	Head guard closure
11+9+4	Head guard opening
12	Head float
13	Third arm opening
14	Third arm closure
15	Rotate arm anticlockwise
16	Rotate arm clockwise
22+13	Open second arm
22+14	Close second arm

6.38 REVERSER (OPTIONAL)





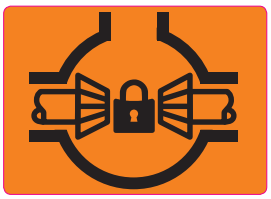
To optimize working times, pedal (**A**) can be used if you need to reverse the direction of travel frequently. It is possible to perform this action without acting on the gear selector lever. Release the pedal to move forward.

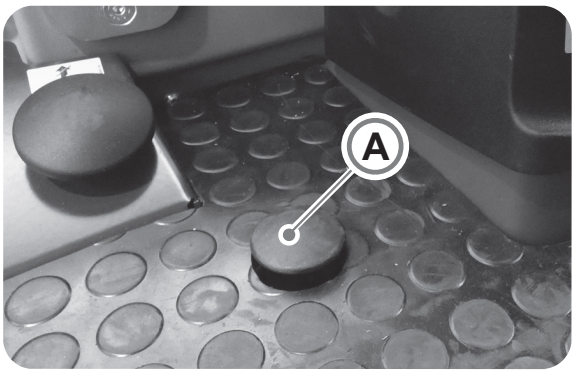
The function is available in comfort and prestige cabins.

CAUTION

- **The reverser only works if you are moving forwards in first gear; it cannot be enabled when in second gear.**
- **When the reverser is pressed, the grey triangle (B) on the screen flashes.**

6.39 DIFFERENTIAL LOCK





If the wheels fail to adhere to the surface, activate the differential lock holding the pedal pressed on the left of the steering column (indicated by the red arrow).

Proceed as follows:

- Press the brake pedal (fully down) and the differential lock pedal (**A**) at the same time.
- Once the lock is activated, the indicator light on the screen turns on.
- Release the brake pedal and drive forward at reduced speed.

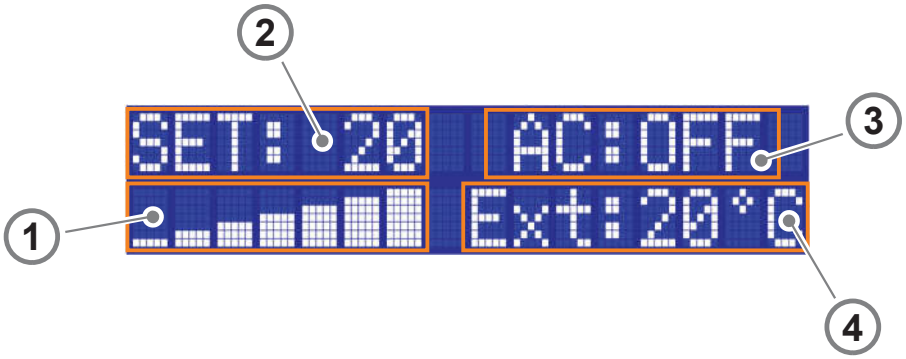
The following symbol will appear on the HOME and WORK MODE screen:

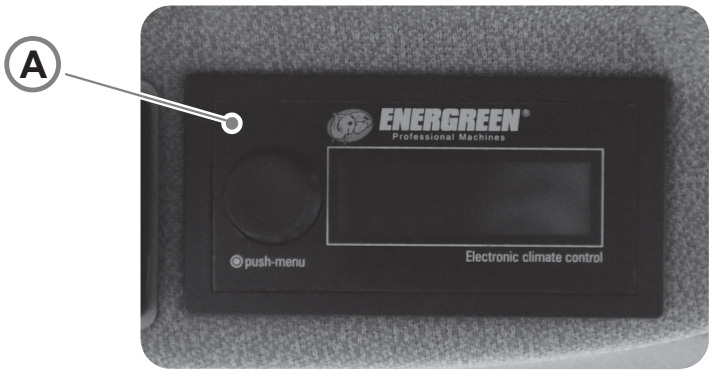
Symbol	Description
	Differential lock activated

WARNING

- **The differential lock is only activated with the first gear engaged.**
- **With the differential lock inserted, it is very difficult to steer the machine; avoid many steering manoeuvres in this mode. Using this mode and performing continuous steering manoeuvres could result in consistent wear/damage to the tyres.**

6.40 CLIMATE CONTROL AND HEATING





Climate control, heating and ventilation are controlled via the control unit (**A**).
Press and hold the selection button (indicated by the red arrow) for two seconds.
The display will switch on and show the following screen.

1) Fan speed bar
2) Hot / cold air mixing ratio
3) Air conditioning operating status indicator
4) External temperature.

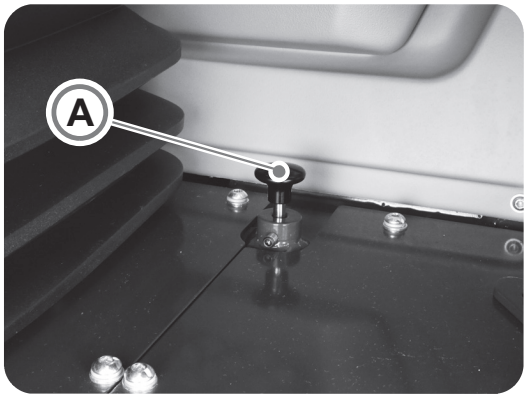
Once the control unit is on:

- Turn the button to increase/decrease the speed of the fan (**1**).
- Press the selection button once and rotate it to set the hot/cold air mixing ratio (**2**).
- Press the selection button twice. Turn the selection button, the air conditioning will be switched on or off (**3**).
- Press the selection button for 3 seconds to switch off the control unit.

6.40.1 Air recirculation

Four levels of air recirculation can be selected using the rod (**A**).

- Internal recirculation is active when the rod is pushed fully downwards;
- External recirculation is active when the rod is pulled upwards.



INTERNAL RECIRCULATION

EXTERNAL RECIRCULATION

6.41 RADIO (OPTIONAL)

The machine features a radio system. For installation and connections follow the instructions in the radio user and maintenance manual.

In case of doubt, please contact the ENERGREEN S.P.A. Customer Care.

If this optional is chosen, ENERGREEN S.P.A. uses a radio with DAB+ technology, which allows for audio digital reception.

6.42 ECI - ENERGREEN CONTROL INTERFACE

WARNING

The operator is responsible for the safety of the machine. Only use the ECI system if conditions permit. For further information, please refer to this manual.

The ECU graphical interface developed by ENERGREEN S.P.A. is integrated on a 10 “LCD touch screen. This new interface allows the information regarding the status of the machine to be checked and exchanged in a fast and practical manner.

The three main screens of the ECI are:

- ***HOME***
- ***WORK MODE***
- ***CAMERA***

6.42.1 Navigation buttons

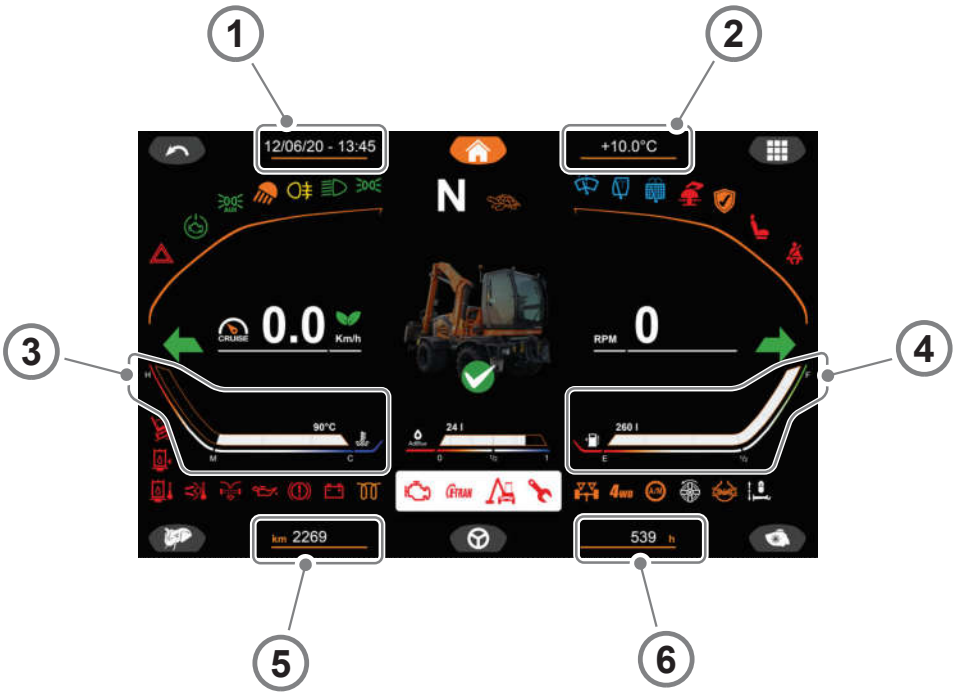
There are six navigation buttons on each screen of the ECI. These six buttons have exactly the same functions as the buttons on the Powertrack. See section ***“6.28 Powertrack”***.

No.	Description
1	BACK button
2	HOME button
3	MENU button
4	WORK button
5	STEERING button
6	TOOLS button

- Press the button on the touch-screen to access the relative screen or use the function.
- Via Powertrack:
  - Turn the knob to scroll through the navigation buttons. The selected button will become orange.
  - Press the rotary knob to confirm your choice.

6.42.2 Service indicators

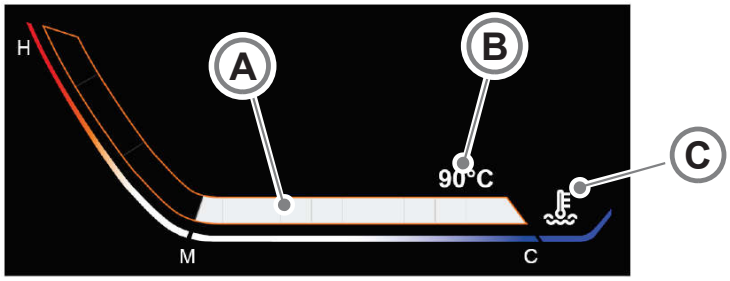
The following indicators are present on each screen of the ECI:

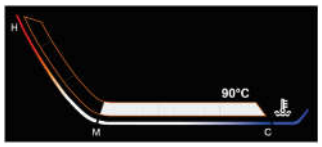


No.	Description
1	Date and time indicator
2	Outside air temperature indicator
3	Coolant temperature indicator
4	Fuel level indicator
5	Odometer
6	Counter

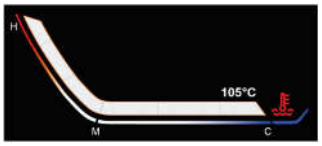
6.42.3 *Coolant temperature indicator*

The temperature of the coolant is shown on the display via the indicator bar (**A**). The temperature of the cooling system is also shown in degrees (**B**). The symbol (**C**) changes colour according to the temperature of the cooling system.



Status	Symbol (C)	Temperature	Engine warning light	Machine warning light	Engine power reduction
		85 ÷ 97 °C	NO	NO	NO

No action to be taken: the engine is working properly.

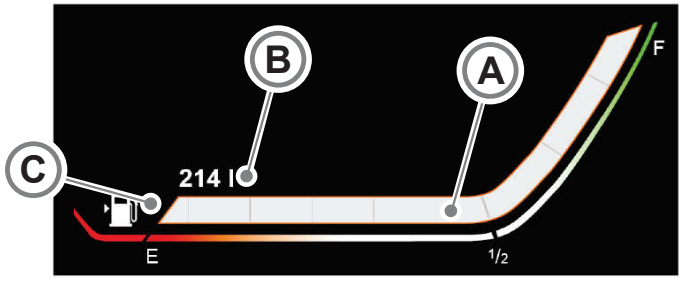
Status	Symbol (C)	Temperature	Engine warning light	Machine warning light	Engine power reduction
		> 105°C	YES	YES	YES

CAUTION

- **If the temperature exceeds 105°C, the engine automatically reduces the power output. Unless the temperature falls quickly, stop the engine and investigate the cause before starting it again.**
- **After starting the engine, run it for the first 15 minutes with a lighter load and at a lower speed than normal. DO NOT run the engine at idle speed with no load.**

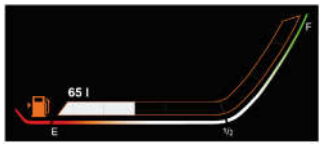
6.42.4 Fuel level indicator

The fuel level is shown on the display via the indicator bar (**A**). The amount of fuel (**B**) in the tank is also shown. The symbol (**C**) changes colour according to the amount of fluid in the tank.



Status	Symbol (C)	Amount of fuel in the tank	Engine warning light	Machine warning light	Engine power reduction
		> 66 litres	NO	NO	NO

No action to be taken.

Status	Symbol (C)	Amount of fuel in the tank	Engine warning light	Machine warning light	Engine power reduction
		< 66 litres	NO	NO	NO

Refuel as soon as possible.

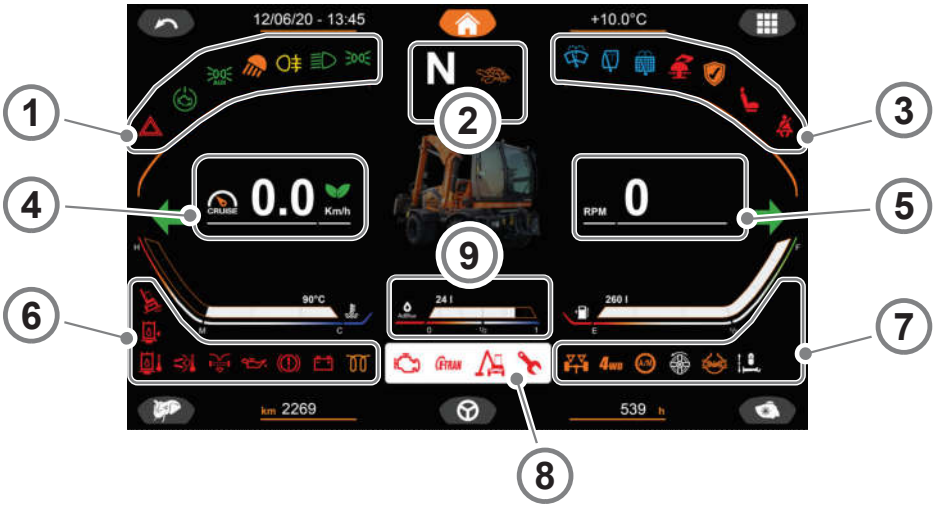
6.42.5 Power on screen

The following screen will appear whenever the ignition key (see section ***"6.30 Ignition panel"***) is moved from position (**0**) to position (**I**):

You will then be taken directly to the HOME screen. See section ***"6.42.6 HOME screen"***.

6.42.6 HOME screen

The HOME screen shows the information required for transferring the machine by road.



No.	Description
1	Zone 1 - Active Items
2	Gear indicator
3	Zone 2 - Active Items
4	Speedometer
5	Engine rev counter
6	Zone 3 - Warning lights
7	Zone 4 - Active functions
8	Alarm indicator
9	AdBlue® / DEF level indicator

You can switch between the HOME, WORK and CAMERA screens using the button on the gear selector. See section ***"6.13.1 Page management"***.

6.42.7 WORK screen

The WORK screen shows the information required during the work phase.

No.	Description
1	PTO - Arm / head functions indicators
2	Work / road lights - Cab position indicators
3	Active Functions indicators
4	Barrier mower - Lifter indicators

You can switch between the HOME, WORK and CAMERA screens using the button on the gear selector. See section *"6.13.1 Page management"*.

6.42.8 CAMERA screen (optional)

The less visible part at the back of the machine can be seen on the CAMERA screen.

You can switch between the HOME, WORK and CAMERA screens using the button on the gear selector. See section *"6.13.1 Page management"*.

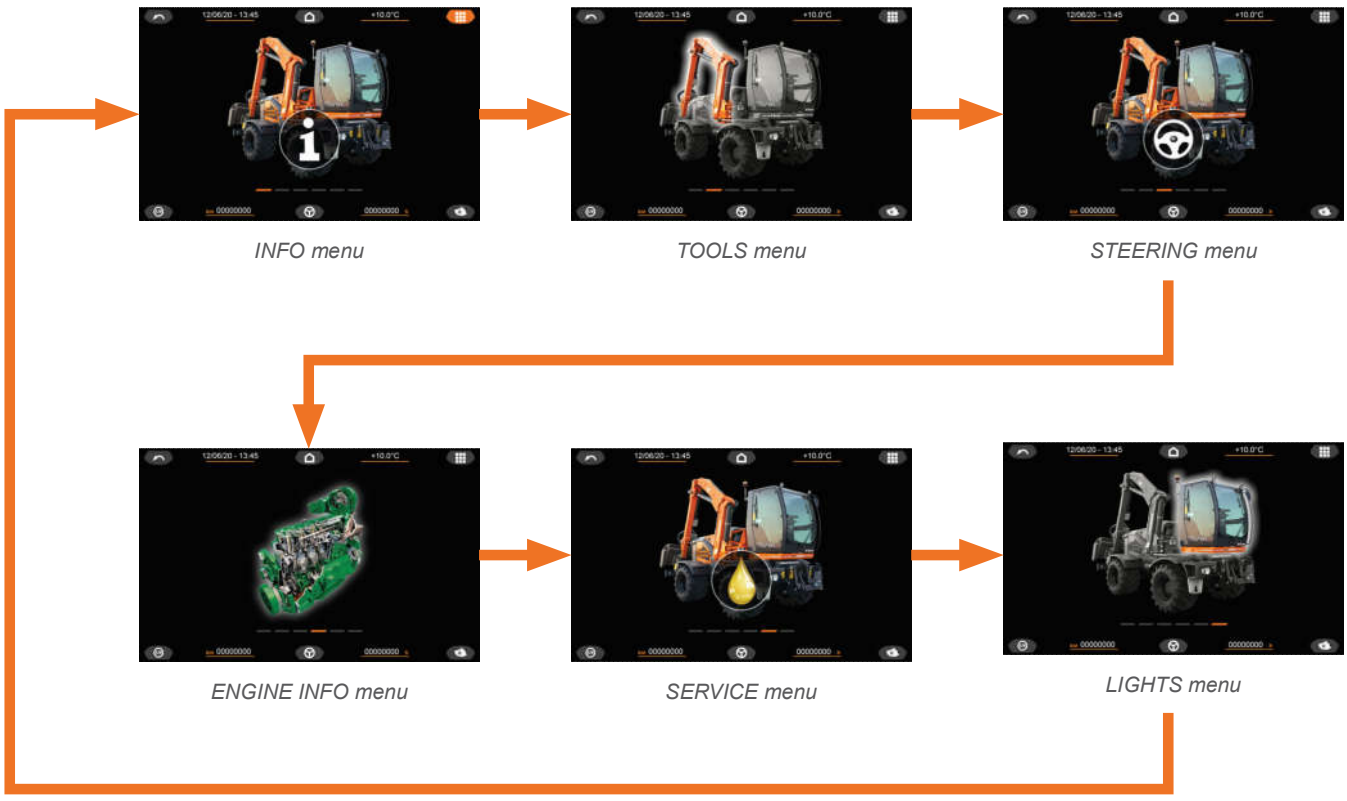
6.43 MENU

Pressing the MENU button on the screen or on the Powertrack accesses the machine control screens. This section is divided into six menus that contain screens according to the information they provide.

The MENUS section is arranged as follows:

1) INFO menu:
   a) Industry 4.0 telemetry screen
   b) Industry 4.0 hours counter screen
   c) ECI system screen
2) TOOLS menu:
   a) PTO / SPP screen
3) STEERING menu:
   a) STEERING screen
4) MOTOR INFO menu:
   a) MOTOR / MACHINE INFO screen
   b) SPN / FMI ERRORS screen.
   c) REGENERATION screen
5) SERVICE menu:
   a) INFO screen
   b) SERVICE screen
6) LIGHTS menu:
   a) LIGHTS screen

You can use the rotary knob of the Powertrack to scroll through the menus as follows. The sequence of the menus indicated below, corresponds to when the knob is turned clockwise. Press ENTER to access the required menu.



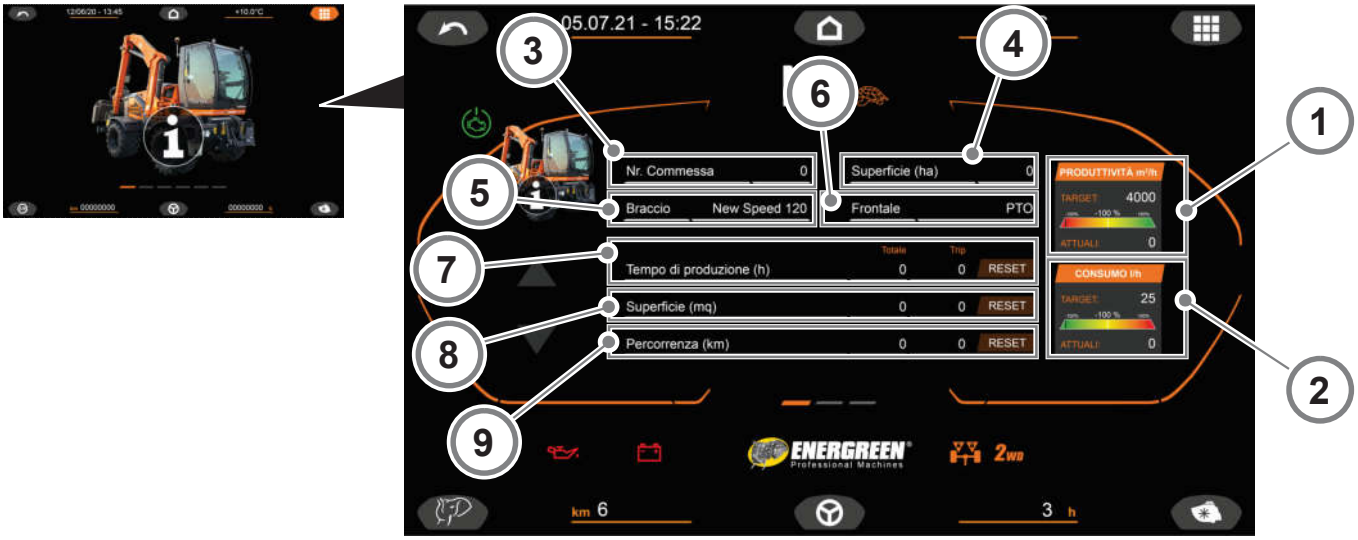
6.43.1 INFO menu

Once you have accessed the INFO menu, there are three screens. The powertrack knob can be used to scroll between the screens. The screens are:

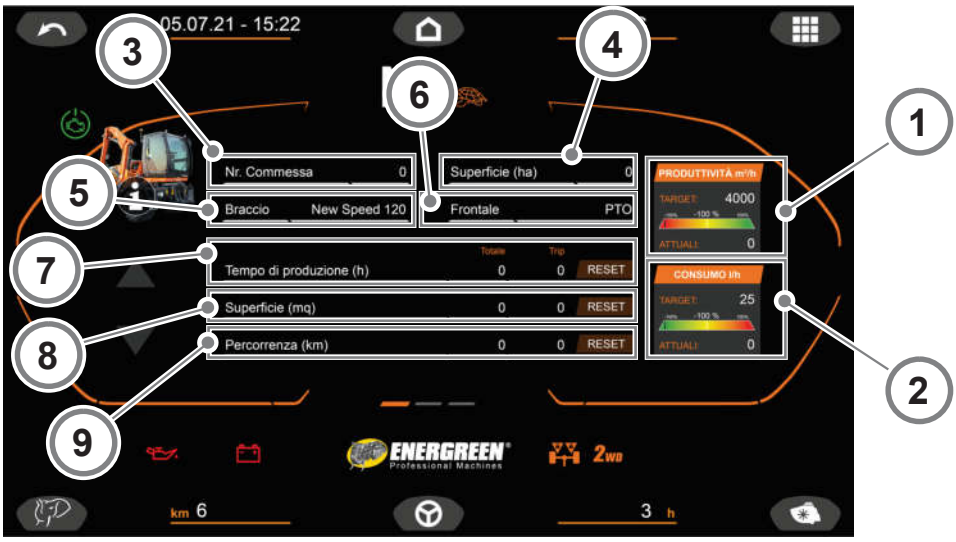
1) Industry 4.0 telemetry screen
2) Industry 4.0 hours counter screen
3) ECI system screen

Industry 4.0 telemetry screen

The system communicates with the various devices of the machine and can provide the vehicle operator with the following information. On the first screen:



1) Estimated production efficiency (m^2/ h):
   a) Productivity target for the work order (can only be set if the optional Industry 4.0 package is installed).
   b) Bar chart indicating the ratio between the actual m^2/h and the target set in the work order (can only be set if the optional Industry 4.0 package is installed).
   c) Value of m^2/h actually worked;
2) Fuel consumption (average value) in Work mode (l/h);
   a) Average consumption target for the work order (can only be set if the optional Industry 4.0 package is installed).
   b) Bar chart indicating the ratio between the actual average consumption and the target set for the work order (can only be set if the optional Industry 4.0 package is installed).
   c) Actual average fuel consumption in l/h;
3) Work order number: (can only be set if the optional Industry 4.0 package is installed).
4) Surface (ha): value (in hectares) (can only be set if the optional Industry 4.0 package is installed).



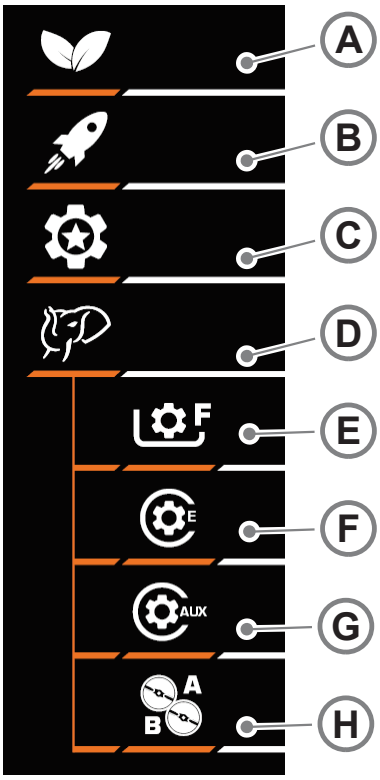
5) Arm: field that can be set by the operator who uses the machine. Indicates the terminal equipment mounted on the arm. The types of equipment that can be selected are:
   a) New Speed 120;
   b) New Speed 150;
   c) Cutting Head 180;
   d) Forestry Head 100;
   e) Forestry Head 120;
   f) Cutter Bar 175;
   g) Cutter Bar 235;
6) Front: field that can be set by the operator who uses the machine. Indicates the terminal equipment at the front of the machine. The types of equipment that can be selected are:
   a) PTO;
   b) Barrier mower;
   c) Snow;
7) Operating time (h): indicates the Total and Trip (partial) hours worked. There is also a RESET button that can be used to reset the “Trip” value.
8) Surface (m2): indicates the Total and Trip (partial) area worked. There is also a RESET button that can be used to reset the “Trip” value.
9) Distance (km): indicates the kilometres travelled during the work; it shows the Total and Trip (partial) distances. There is also a RESET button that can be used to reset the “Trip” value.

The total hours counters are reset when the following are modified:

- the work order number (**3**), (can only be set if the optional Industry 4.0 package is installed).
- the surface area to be worked (**4**), (can only be set if the optional Industry 4.0 package is installed).
- the type of equipment mounted on the arm (**5**);
- the type of equipment mounted at the front of the machine (**6**).

Industry 4.0 counters screen

The hours of operation, distance and fuel litres can be found on the second screen. These will increase according to the mode in which the machine is used.



Pos.	Counter
A	ECO mode
B	BOOST mode
C	STAR mode
D	WORK mode
E	WORK mode: front-mounted equipment
F	WORK mode: arm-mounted equipment
G	WORK mode: aux equipment
H	WORK mode: Barrier mower

ECI system screen

The third screen contains the system settings where the following can be set:

- the system language: the possible languages are Italian, English, German, Spanish and Portuguese.
- the date: can be set in the [dd/mm/ yyyy] format.
- the system of measurement: the systems available are SI (International System [km/h, °C, litres ...]) and the BSI (British Imperial System [mph, °F, gallons ...]).
- the time: can be set the [hh:mm 24h] format.
- display brightness

The four-digit numeric PIN code can be entered on this screen. Permissions to make modifications will be granted according to the PIN code entered, some and the user icon will change.

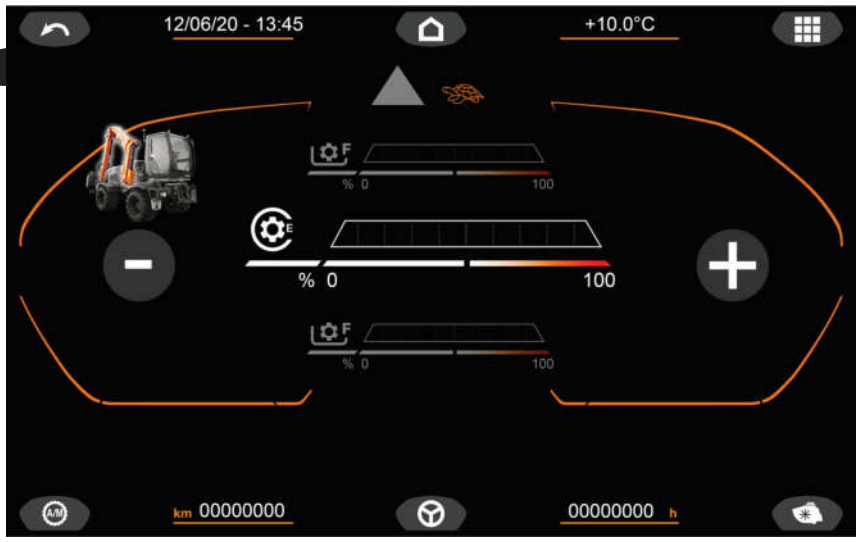
STANDARD user permissions are set by default when the machine is switched on. When resetting maintenance counters, the appropriate PIN has to be entered which will enable service user permissions, see section ***"6.43.5 SERVICE menu"***.

STANDARD user: set by default each time the machine is switched on.

SERVICE user: access granted only after the maintenance PIN has been entered. To log out the user, switch the machine off.

In addition, next to the user icon, you can see the machine software version (VCM) and the version of the graphic interface (HMI).

6.43.2 TOOLS menu



The TOOLS menu allows you to adjust the maximum percentage RPM of the PTOs connected to the machine. You can use the powertrack knob to scroll between the PTOs. Once the PTO has been selected, press ENTER on the powertrack, the -/+ buttons and the PTO symbol become orange. Turn the powertrack knob to modify the value. Press ENTER to confirm the set value.

Arm PTO

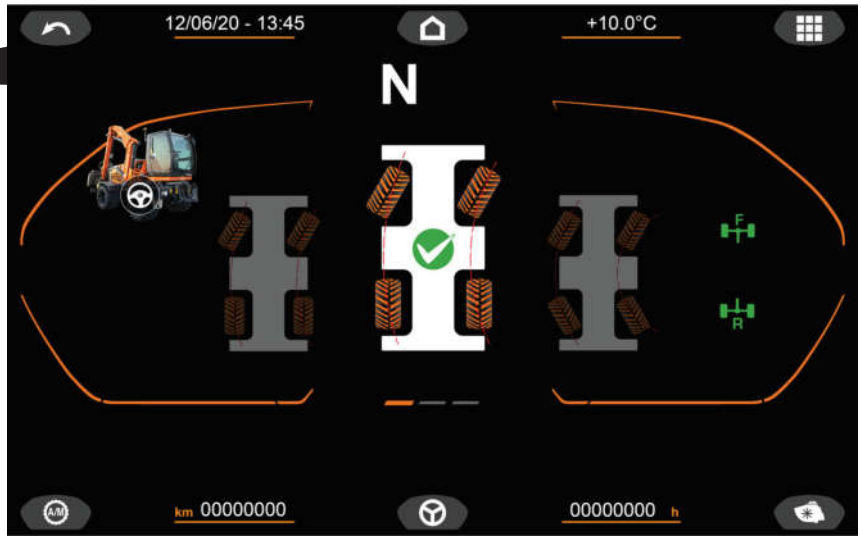
Auxiliary PTO: cannot be set on this screen. It only displays the value given by the potentiometer, see section ***"6.26.1 Function F1 with independent hydraulics (optional); 6.26.2 Function F1 with hybrid hydraulics (optional); 6.26.3 Function F2 (optional)"; 6.26.4 Function F3 (optional)"***.

Front PTO

SPP: cannot be set on this screen. It only displays the value given by the potentiometer; see section ***"6.23.5 Arm proportional suspension - SPP (optional)"***.

6.43.3 STEERING menu

You can set the way the machine will steer in the STEERING menu. For further information, see section *"6.28.1 Steering screen button"*.



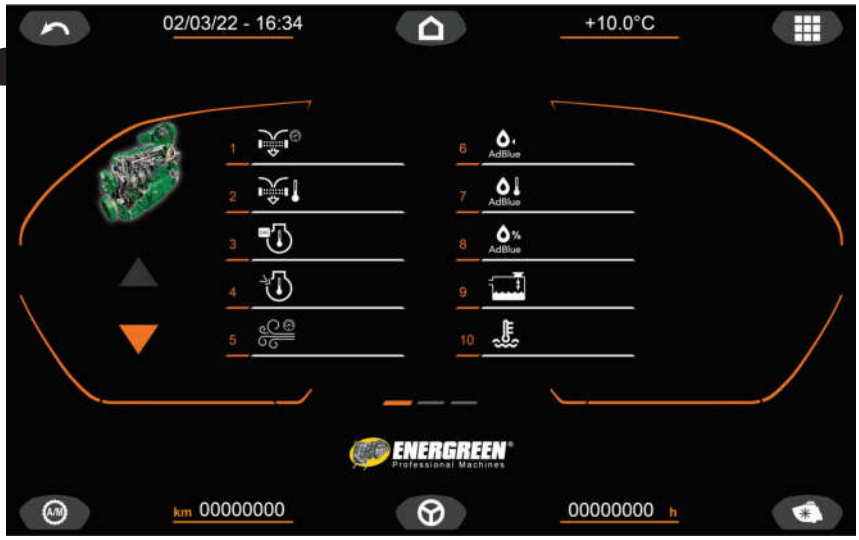
6.43.4 ENGINE INFO menu

Once you have accessed the ENGINE INFO menu, there are three screens. The powertrack knob can be used to scroll between the screens. The screens are:

1) ENGINE / MACHINE INFO screen
2) SPN / FMI ERRORS screen
3) REGENERATION screen

ENGINE / MACHINE INFO screen

These two screens show the main engine parameters in real time.



Air filter pressure difference. Value expressed in [kPa].

Filter inlet air temperature. Value expressed in [°C] or [°F].

Supercharger circuit outlet air temperature. Value expressed in [°C] or [°F].

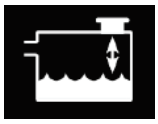
Combustion chamber inlet air temperature. Value expressed in [°C] or [°F].

Ambient air pressure. Value expressed in [kPa].

AdBlue® / DEF level. Value expressed in [%].

AdBlue® / DEF temperature. Value expressed in [°C] or [°F].

AdBlue® / DEF concentration. Value expressed in [%]. The correct value is 32.5. For further information, see section ***"6.46 Exhaust gas post-treatment system".***



Coolant level. Value expressed in [%].

Coolant temperature. Value expressed in [°C] or [°F].

Engine RPM. Value expressed in [rpm].

Instantaneous power delivered by the engine. Value expressed in [%].

Instantaneous fuel consumption. Value expressed in [l/h] or [gal/h].

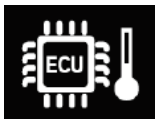
Engine oil pressure. Value expressed in [kPa].

Fuel temperature. Value expressed in [°C] or [°F].

Total fuel used. Value expressed in [l/h] or [gal/h].

Total working hours. Value expressed in [h].

Battery voltage. Value expressed in [V].



Engine ECU temperature. Value expressed in [°C] or [°F].

Hydraulic oil temperature. Value expressed in [°C] or [°F].

SPN / FMI ERRORS screen

CAUTION

If the user accesses this screen when there is a DTC error, any sound error signal will be muted.

If the value that triggered the error should goes back to a normal level, it is possible to view the DTC error code until the machine is restarted.

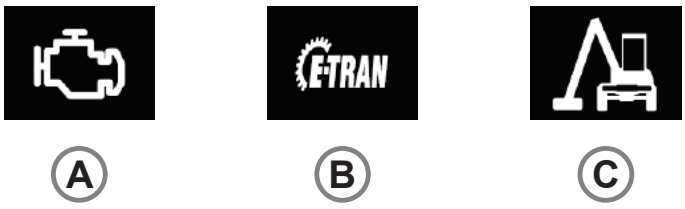
This screen displays all the DTC errors regarding the engine, translation and the machine.

The diagnostic trouble codes (**DTC**) consist of two parts: the first part (**SPN**) is the number of the system or component that is thought to cause the problem; while the second (**FMI**) is the number that identifies the type of problem that has occurred. To determine exactly what the problem is, both parts of the code are necessary (SPN and FMI).

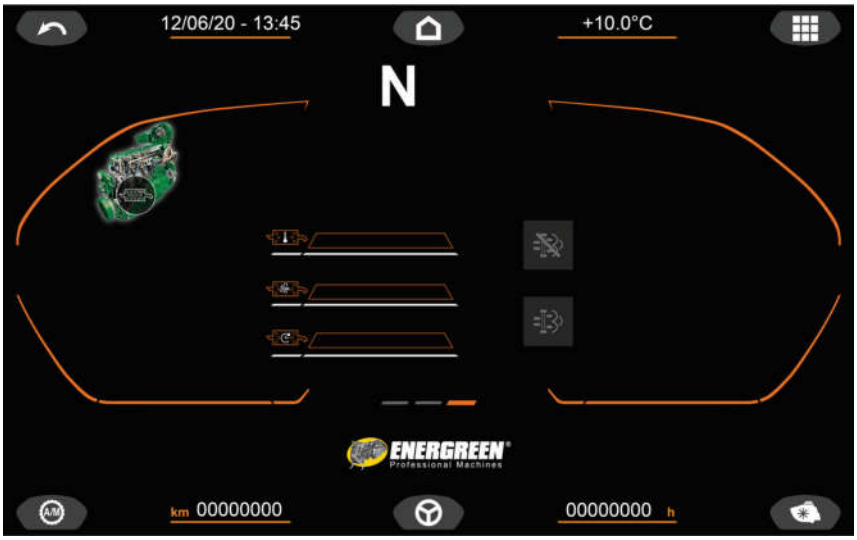
- Engine errors are indicated by light (**A**): to diagnose errors, see section ***"6.61 Engine faults"***.
- Translation errors are indicated by light (**B**): to diagnose errors, see section ***"6.63 Translation troubleshooting"***.
- Machine errors are indicated by light (**C**): to diagnose errors, see section ***"6.62 Troubleshooting the vehicle"***.

If this does not solve the problem, contact ENERGREEN S.P.A. customer care.

Always contact ENERGREEN S.P.A. customer care to help understand the diagnostic trouble codes displayed.



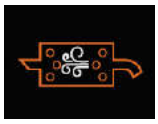
REGENERATION screen



The regeneration screen shows the status of the exhaust gas post-treatment system. The three exhaust symbols take on different meanings according to the status of the machine: if it is being used normally or if it is carrying out a regeneration cycle.

During normal machine use, the meanings of the three symbols is as follows:

Level of ash in the exhaust system.

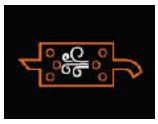


Level of soot in the exhaust system.

How long has it been since the last regeneration.

while during regeneration the meanings of the three symbols is as follows:

Percentage progress of the "pre-cleaning" phase, during which the engine gradually increases the temperature of the exhaust gases before starting the cleaning cycle. The light (**A**) comes on during this phase.



Percentage progress of the cleaning cycle. The light (**B**) is on during this phase.

It indicates the percentage of the regeneration cycle that has been completed, which includes the pre-cleaning, cleaning and the cooling of the system.

During the cleaning cycle, it is only possible to disable the regeneration for safety reasons. To do this, press button (**D**) on the screen, the light (**C**) appears on the screen.

You can use button (**E**) to request a regeneration cycle: the engine will carry out a regeneration cycle as soon as possible (if it considers it necessary).

A B C D E

If the light (**F**) is on, see section ***"6.47 Exhaust gas post-treatment system symbols"***.

F

6.43.5 SERVICE menu

Once you have accessed the ENGINE INFO menu, there are three screens. The powertrack knob can be used to scroll between the screens. The screens are:

1) INFO screen
2) SERVICE screen

INFO screen

This screen contains information for identifying the machine.

The information includes:

SYS: machine name
S.N.: machine serial number
ENG: engine manufacturer
S.N.: engine serial number

It also includes fields indicating the total kilometres (km), partial kilometres (Trip), total hours (h) and partial hours (Trip).

The partial fields (Trip) can be reset. To reset them:

1) Turn the powertrack knob to select the partial counter to be reset (Trip).
2) Confirm the partial counter by pressing enter.
3) The partial reset button becomes orange; press enter to confirm the reset.

SERVICE screen

This screen includes the machine maintenance counters.

CAUTION

Only reset only the service that has been carried out; any resets carried out by mistake cannot be cancelled. It is therefore not possible to go back to the previous condition.

If the machine enters the range in which maintenance should be carried out, you will be notified via the pop-up (red key symbol). Refer to this manual for the services and maintenance to be carried out on the machine.

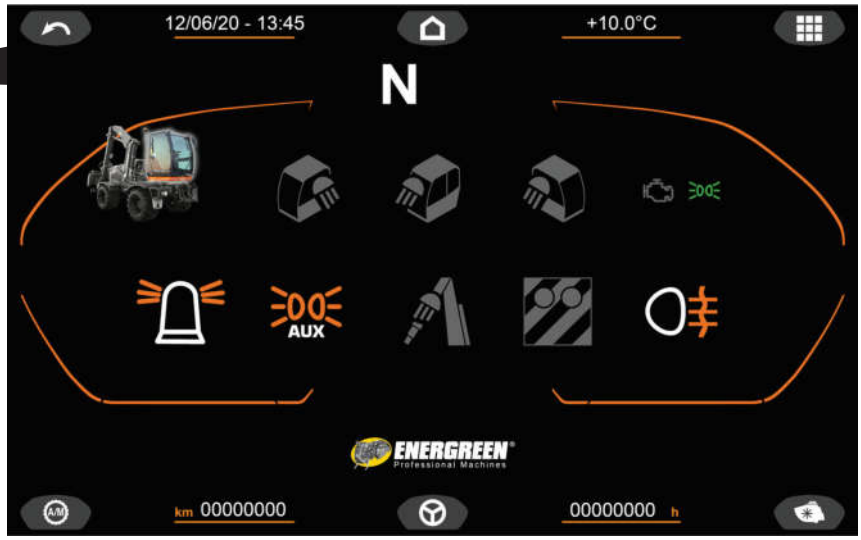
Once the service has been completed, the counter has to be reset to confirm that maintenance has been carried out.

To reset it:

1) Grant access to the SERVICE user by entering PIN 9232 in the INFO menu, see section ***"6.43.1INFO menu"***.
2) Go to the SERVICE screen.
3) Turn the powertrack knob to select the service, which indicates the hours in orange and press enter.
4) When the RESET button is lit, press enter again, the RESET button flashes; after a few seconds the hours (**h**) are reset and the number of resets (**n**) increases, indicating how many times the service has been carried out.
5) Switch off the machine.

6.43.6 LIGHTS MANAGEMENT menu

In the LIGHTS MANAGEMENT menu, you can select the vehicle lights and/or work lights as required. For further information, see section ***"6.14.2 Lights management page"***.



6.44 ECI - SYMBOLS

6.44.1 Status symbols

Symbol	Description
	Left direction indicator
	Right direction indicator
	Hazard warning lights: on.
	Engine check OK: start the machine.
	Sidelights: on.
	Low beam headlights: on.
	Full-beam headlights: on.
	Auxiliary headlights: on.
	Rear fog light: on.
	Work light: on.
	Forward gear: engaged.
	Neutral gear: engaged.

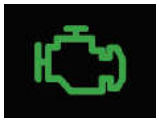
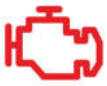
Symbol	Description
	Reverse gear: engaged.
	Low gear: engaged.
	Low gear: engaged.
	Windscreen wiper: on.
	Windscreen washer: on.
	Emergency stop button pressed.
	Operator not seated.
	Seat belt not fastened.
	Dead man on.
	ECO Mode: on.
	BOOST Mode: on.
	WORK Mode: on.
	Coolant temperature: normal.

Symbol	Description
	Coolant temperature: high.
	AdBlue® level: normal.
	AdBlue® / DEF level: in reserve, refill as soon as possible.
	AdBlue® / DEF level: low, refill immediately.
	Fuel level: normal.
	Fuel level: in reserve, refuel as soon as possible.
	Hydraulic oil level: low, refill immediately.
	Hydraulic oil temperature: high.
	Regeneration in progress / Exhaust gas system fault.
	Regeneration inhibited manually.
	Increase in the exhaust gas temperature / Exhaust gas system fault.
	Fault in the exhaust gas system.
	Engine air filter clogged.

Symbol	Description
	Engine oil pressure too low.
	Parking brake on.
	Braking system fault.
	Electrical system fault.
	Engine glow plug preheating.
	Oscillating front axle: locked.
	Two-wheel drive: on.
	Four-wheel drive: on.
	Radiator cleaning: in progress.
	Differential lock: on.
	Arm PTO on: clockwise rotation.
	Arm PTO on: anti-clockwise rotation.
	Arm equipment float: active.

06-ECI Icone (ILF)

Symbol	Description
	Arm equipment float: active, permanent.
	Cabin aligned.
	Cabin not aligned, 1st gear engaged.
	Cabin not aligned, 2nd gear engaged, alignment required.
	Front axle: aligned.
	Front axle: not aligned.
	Front axle: not aligned, alignment required.
	Rear axle: aligned.
	Rear axle: not aligned.
	Rear axle: not aligned, alignment required.
	Two-wheel steering: on.
	Two-wheel steering: on, alignment required.
	Crab steering: on.

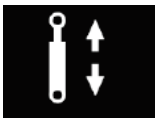
Symbol	Description
	Crab steering: on, alignment required.
	Concentric steering: on.
	Concentric steering: on, alignment required.
	Engine off.
	Engine on.
	Maintenance required.
	Engine fault.
	Translation fault.
	Machine fault.

06-ECI Icone (ILF)

6.44.2 Status symbols (optional)

Symbol	Description
	Right side window wiper: on.
	Round window wiper: on.
	Arm work light: on.
	Cabin work light - right hand side: on.
	Cabin work light - left hand side: on.
	Cabin work light - front: on.
	Beacon light: on.
	Signboard: on.
	Cruise control: on.
	Suspension activated (axle unlocked).
	Increase distance between frame and ground.
	Decrease distance between frame and ground.
	Left suspension unlocked.

Symbol	Description
	Right suspension unlocked.
	Suspension system error.
	Ballast: retracted.
	Ballast: extended.
	Ballast: extended with 2nd gear engaged, retraction required.
	Arm proportional suspension: active.
	First arm suspension: active.
	Front PTO on: clockwise rotation.
	Front PTO on: anti-clockwise rotation.
	Auxiliary PTO on: clockwise rotation.
	Auxiliary PTO on: anticlockwise rotation.
	Barrier mower discs: on.
	Barrier mower disc (A): on.

Symbol	Description
	Barrier mower disc (B): on.
	SNOW Mode: on.
	HEAVY DUTY Mode: on.
	Float 4th function: active.
	Lifter float / 7th function: active.
	Lifter suspension / 7th function: active.
	Automatic greasing: in progress.
	Automatic greasing system fault.
	Blower: on.
	TILT system: dangerous inclination reached.

6.45 OPERATING MODES

The machine can be used in various operating modes, each of which is specific for the work the machine is intended to be used for. The machine automatically adjusts itself according to the mode enabled. The available modes are:

- ***ECO mode;***
- ***BOOST mode;***
- ***DRIVE mode;***
- ***WORK mode;***
- ***HEAVY DUTY mode;***
- ***SNOW mode;***
- ***STATIONARY WORK MODE.***

CAUTION

In order to enable these modes:

1) **the machine must be stationary;**
2) **the gear selector must be in neutral;**
3) **the operator must be sitting in the driver's seat;**

6.45.1 ECO mode

ECO mode is mainly used during road transfers: when enabled, it reduces the fuel consumption of the machine as well as making driving easier.

Operation:

- When accelerating: once the engine reaches 2200 rpm and 40 km/h, it automatically adjusts to 1750 rpm while maintaining the machine speed constant;
- When decelerating, the machine has less engine braking power than in BOOST mode;

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) The symbol (**A**) confirms that ECO mode has been enabled;
5) Engage forward / backward gear using the gear selector and press the accelerator.

6.45.2 BOOST mode

BOOST mode is also used during road transfers: it can be activated after having enabled the ECO mode. In this mode, the machine is more responsive but consumes more fuel compared to the ECO mode.

Operation:

- When accelerating: once the engine reaches 2200 rpm and 40 km/h, the machine automatically switches to ECO mode (it will still keep the speed of the machine constant). When the accelerator is released, the machine will switch back to BOOST mode.
- When decelerating, the machine has much more engine braking power than in BOOST mode.

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) Press the work mode button; see section ***"6.23.1 Work mode"***, to activate the PTOs;
5) The symbol (**B**) confirms that BOOST mode has been enabled;
6) Engage forward / backward gear using the gear selector and press the accelerator.

CAUTION

We recommend using BOOST mode when moving downhill, taking advantage of the greater engine braking power available and therefore requiring less use of the brakes.

6.45.3 DRIVE mode

DRIVE mode allows you to use the machine in first gear (maximum 13 km/h), allowing you to move the equipment connected to the machine. For example, the movements of the arm, the lifter (optional) and the barrier mower (optional) etc ... are enabled. This mode does not require the PTOs to be active.

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage first gear using the gear selector;
4) Press the dead man button; see section ***"6.23.7 Dead man"***, to control the equipment;
5) Engage forward / backward gear using the gear selector and press the accelerator.

6.45.4 WORK mode

WORK mode allows you to use the machine in first gear (maximum 13 km/h), allowing you to operate the PTOs of the equipment connected to the machine. For example, the PTOs of the equipment connected to the arm and the front-mounted equipment (if present) are enabled. There is a specific screen in the ECI for this mode; see section ***„6.42.7 WORK screen"***.

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage first gear using the gear selector;
4) Press the work mode button; see section ***"6.23.1 Work mode"***, to activate the PTOs;
5) Engage forward / backward gear using the gear selector and press the accelerator.

6.45.5 HEAVY DUTY mode (optional)

HEAVY DUTY mode is used to work with equipment such as the snow blower that require average speeds, the control and activation of the equipment.

This mode allows the machine to be used in second gear (maximum 20 km/h), allowing you to control the equipment and operate their PTOs.

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) Press the heavy duty button; see section ***"6.26.9 Heavy duty function (optional)"***;
5) The symbol (**V**) confirms that HEAVY DUTY mode has been enabled;
6) Press the dead man button; see section ***"6.23.7 Dead man"***, to activate the equipment control;
7) Press the work mode button; see section ***"6.23.1 Work mode"***, to activate the PTOs;
8) Engage forward / backward gear using the gear selector and press the accelerator.

6.45.6 SNOW mode (optional)

SNOW mode is used to work with equipment such as the snow blade that require high speeds and the control of the equipment.

This mode allows the machine to be used in second gear (maximum 40 km/h), allowing you to control the connected equipment.

Activation:

1) Fully depress the service brake pedal;
2) Release the parking brake (if on);
3) Engage second gear using the gear selector;
4) Press the snow blade button; see section ***"6.26.8 Snow blade"***;
5) Symbol (**D**) confirms that SNOW mode has been enabled;
6) Press the dead man button; see section ***"6.23.7 Dead man"***, to activate the equipment control;
7) Engage forward / backward gear using the gear selector and press the accelerator.

WARNING

There are two types of steering available in this mode:

- **steering using the two front wheels with a maximum speed of 40 km/h;**
- **concentric steering with a maximum speed of 20 km/h (when exceeded, steering with the two front wheels will be enabled automatically);**

6.45.7 STATIONARY WORK MODE (optional)

STATIONARY WORK MODE allows the operator to leave the driver's seat with the WORK MODE and the DEAD MAN function both active. This mode is useful for controlling the lifter and the PTO remotely, making it easier to connect the equipment to the machine.

CAUTION

- **If this mode is activated, all the controls in the cabin are disabled.**
- **The mode is deactivated if the operator sits in the driver's seat or if he presses the button again.**

WARNING

When using remote controls, keep a safe distance from the area between the lifter and the connected equipment.

DANGER

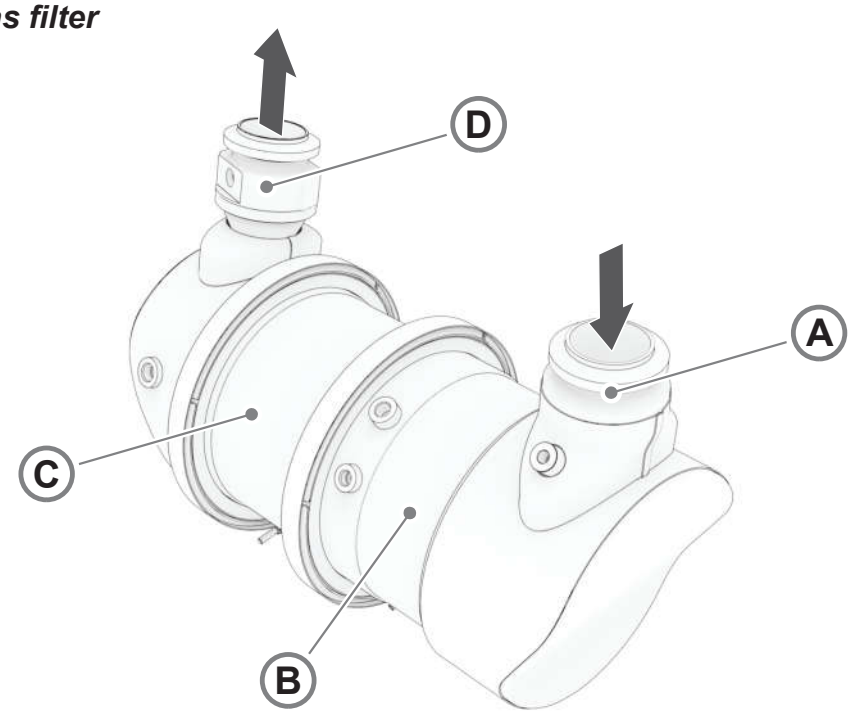
- **Always connect / disconnect equipment when on level ground that is in good condition.**
- **Never leave the machine unattended with the engine running.**
- **Make sure that all the protective devices are present before starting the PTO, move away from the PTO and the cardan shaft during operations that use it.**

Activation:

1) Fully depress the service brake pedal;
2) Turn the parking brake on (if off);
3) Press the work mode button; see section ***"6.23.1 Work mode"***;
4) Set the engine speed using the potentiometer;
5) Press the dead man button for five seconds; see section ***"6.23.7 Dead man"***, the light of the button flashes blue;
6) The seat light flashes on the screen; the operator can now leave the driver's seat, get out of the cabin and use the remote keypads; see section ***„6.27 Remote keypads (optional)"***.

6.46 EXHAUST GAS POST-TREATMENT SYSTEM

6.46.1 Exhaust gas filter



A	Exhaust gas inlet (from engine)
B	DOC (Diesel oxidation catalyst)
C	Diesel particulate filter (DPF)
D	Exhaust gas outlet (towards SCR system)

John Deere has developed an exhaust gas filter consisting of a diesel oxidation catalyst (**DOC**) and a diesel particulate filter (**DPF**) specifically to meet the demands of all terrain applications. 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.

The Particulate Filter (DPF) is an essential component of the emissions management system and is required in order to meet government emissions regulations. The exhaust filter captures diesel particulates or “soot” to prevent them being released into the atmosphere. This soot has to be eliminated from the DPF In order for it to operate correctly. The procedure for eliminating the soot is called “regeneration” and is controlled by the engine control unit (ECU). During this procedure, there is an increase in the temperature of the exhaust gases, which allows the soot in the DPF to become oxidised.

Under normal machine operating conditions, the exhaust gas system works in AUTO mode and the system requires minimal operator intervention.

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 running the engine at idle speed, unless absolutely necessary.
3. Use original John Deere engine oil (see section ***9.4.1 Lubricants table***).
4. Only use ultra-low sulphur content fuel (see section ***“9.4.2 “Fuel recommendations”***).

WARNING

The machine warranty becomes void if non-original John Deere products are used such as coolant, engine oil filters, engine oil, AdBlue® / DEF filters, unapproved AdBlue® / DEF, fuel filters and unapproved fuel.

WARNING

IT IS NOT RECOMMENDED leaving the machine running (to allow it to warm up) without using it with a minimum load. This can cause damage, especially during running-in and can reduce the service life of the engine. It also causes excessive build-up of diesel particulates or soot in the exhaust gas filter system.

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 ash deposits from the DPF see the next section ***"6.46.2 Exhaust gas filter maintenance and assistance"***.

WARNING

Do not wash the machine if the external temperature of the filter unit exceeds 50°C.

6.46.2 *Exhaust gas filter maintenance and assistance*

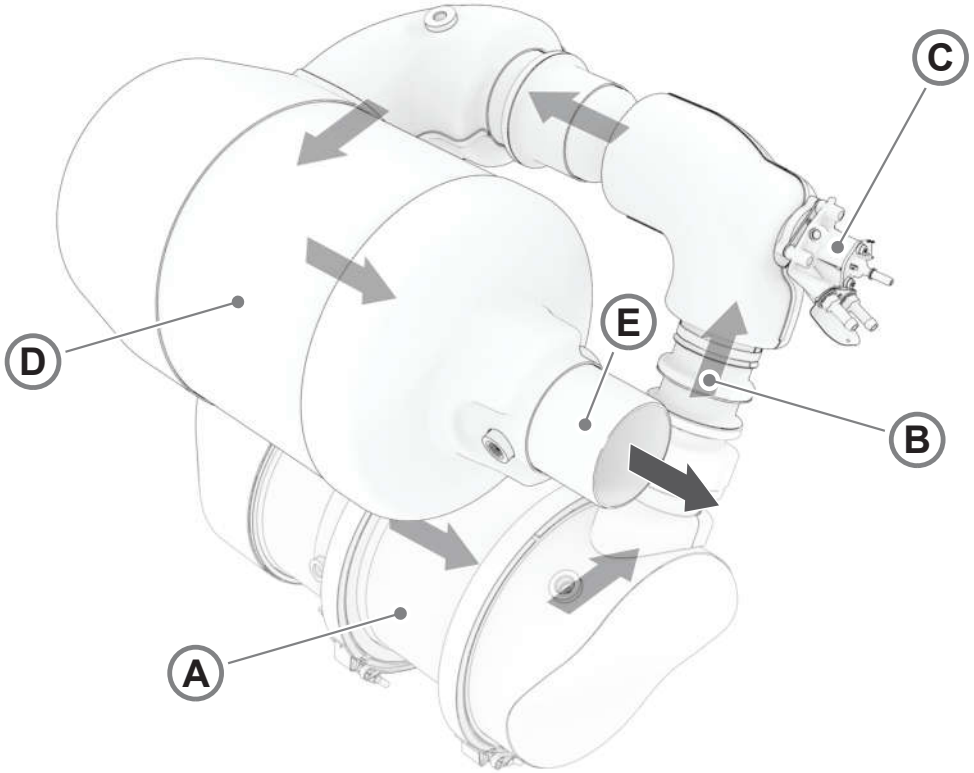
The particulate filter has been designed to trap residual ash resulting from the non-combustion of the additives used in the fuel and in the engine base block lubrication oils. The particulate filter ensures many hours of maintenance-free operation. At a certain point, the particulate filter requires 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. Generally, the scheduled maintenance interval for ash removal far exceeds the minimum EPA requirements of 3,000 hours for engines less than175hp/130kW and 4,500 hours for engines to or greater than 175hp/130kW.

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.

Failure to comply with the approved ash removal methods may violate US federal, state and local hazardous waste laws and could also damage the DPF. It could also void the diesel engine exhaust filter emissions warranty. Please contact ENERGREEN S.P.A. Customer Care.

6.46.3 SCR (selective catalytic reduction system)



A	Diesel particulate filter (DPF)
B	Exhaust gas inlet (from the DPF)
C	DEF dosing injector
D	SCR
E	Exhaust gas outlet (towards SCR system)

WARNING

- **Do not remove the battery leads for at least 4 minutes after the engine stops.**
- **The SCR system automatically purges the DEF as soon as the engine stops. If adequate time is not allowed for lines to be purged, residual DEF can freeze and possibly damage components of the SCR system during cold weather.**

In order to meet national and local emissions requirements, this engine is fitted with a Selective Catalytic Reduction (**SCR**) system. The main components of the SCR system include the SCR catalyst (**D**), the DEF dosing injector (**C**), the DEF dosing pump, the DEF tank header assembly and the DEF tank. The SCR system helps to reduce nitrogen monoxide (NO_x) emissions. Nitrogen oxides are one of the main components of smog and acid rain.

During combustion, NO_x molecules form in the exhaust. DEF is injected into the exhaust gas stream upstream of the SCR catalyst. Nitrogen oxides are converted into nitrogen and water by a chemical reaction in the SCR.

Water vapour is a normal by-product of combustion. When operating at low temperatures and equally low exhaust gas temperatures, water vapour can condense and appear as white smoke from the exhaust. It disperses as the operating temperature increases and the water evaporates further. This is normal.

The DEF solution begins to crystallize and freeze at -11°C. In climates where the temperature can reach much lower values, the DEF can freeze in the tank. The DEF tank is therefore fitted with a heating element that quickly unfreezes the DEF before start-up. The heating element operates cyclically as required in order to keep the fluid flowing during operation. DEF is not dosed on initial start-up, so it is not necessary to have liquid DEF at cold start-up.

If the quality of DEF decreases and no longer falls within the specifications, the power of the engine may derate. DEF should appear clear and colourless and smell slightly of ammonia. If the DEF appears cloudy, slightly coloured, or smells strongly of ammonia, it probably no longer falls within the required specifications.

WARNING

- **If a pump or funnel is used to full up with AdBlue® / DEF, make sure that they have not been used to fill up other liquids.**
- **If the AdBlue® / DEF injection system and consequently the SCR come into contact with other types of liquid, the system should be replaced, as it will be irreparably damaged.**

WARNING

Do not wash the machine if the external temperature of the filter unit exceeds 50°C.

6.46.4 Diesel Exhaust Fluid (DEF)

In some cases, DEF may be referred to by one or more of the following names:

- Urea;
- Aqueous Urea Solution 32;
- AUS 32;
- AdBlue®;
- NO_X reduction agent;
- Catalyst solution.

6.46.5 Storing Diesel Exhaust Fluid (DEF)

WARNING

- **Avoid contact with eyes. In case of contact, rinse immediately with plenty of water for at least 15 minutes. Refer to the product safety data sheet (MSDS) for further information.**
- **Do not swallow DEF. If swallowed, seek medical advice immediately. Refer to the product safety data sheet (MSDS) for further information.**

WARNING

- **Do not tamper with or remove any component of the post-treatment system. Do not use DEF that does not meet the required specifications or operate the engine without DEF.**
- **Do not attempt to make your own DEF by mixing agricultural grade urea with water. Agricultural grade urea does not meet the required specifications and could damage the post-treatment system.**
- **Do not add other chemicals or additives to the DEF to prevent freezing. The addition of chemicals or additives to DEF can cause damage to the post-treatment system.**
- **Do not add water or other fluids in place of or in addition to DEF. Running the engine with a modified or unapproved DEF can damage the post-treatment system.**

We recommend that you do not store DEF in areas in which there are extreme ambient temperatures. DEF freezes at -11°C.

Exposure to temperatures above 30°C can cause DEF to degrade over time.

The specific DEF storage containers should be sealed after use to prevent evaporation and contamination. We recommend using polyethylene, polypropylene or stainless steel containers to transport and store DEF.

The ideal storage conditions for DEF are:

- Store at temperatures of between -5°C and 30°C.
- Store in specific containers to avoid contamination and evaporation.

Storing DEF at higher temperatures can reduce its useful life by approximately 6 months for temperatures 5°C above 30°C.

WARNING

- **Test the DEF if you are unsure about the conditions in which it has been stored.**
- **It is not recommended to use DEF if it has been stored for a long time (over 12 months) in the DEF tank of the machine.**
- **We recommend that you purchase DEF in amounts that can be used within 6 months.**

6.46.6 Refilling diesel exhaust fluid (DEF) tank

WARNING

- **If a pump or funnel is used to full up with AdBlue® / DEF, make sure that they have not been used to fill up other liquids.**
- **If the AdBlue® / DEF injection system and consequently the SCR come into contact with other types of liquid, the system should be replaced, as it will be irreparably damaged.**

WARNING

- **Avoid contact with eyes. In case of contact, rinse immediately with plenty of water for at least 15 minutes. Refer to the product safety data sheet (MSDS) for further information.**
- **Do not swallow DEF. If swallowed, seek medical advice immediately. Refer to the product safety data sheet (MSDS) for further information.**

WARNING

- **Only use distilled water to rinse components that are used to deliver DEF. Tap water can contaminate DEF. If distilled water is not available, rinse with clean tap water and then thoroughly rinse with a large quantity of DEF.**
- **If the DEF leaks or comes into contact with any surface other than the storage tank, immediately clean the surface with clean water. DEF is corrosive to painted and unpainted metallic surfaces and can deform some plastic and rubber components.**
- **If DEF is added to other tanks by mistake, do not operate the engine until the system has been properly purged of DEF. Contact ENERGREEN S.P.A. immediately to determine how to clean and purge the system.**

Be careful when filling the DEF tank. Make sure that the area around the cap of the DEF tank is clean before removing cap. Seal the DEF containers between use in order to prevent evaporation and contamination.

Avoid splashing DEF and do not allow DEF to come into contact with skin, eyes or mouth.

DEF is not dangerous to handle, but it can be corrosive to materials such as steel, iron, zinc, nickel, copper, aluminium and magnesium. Use suitable containers to transport and store DEF. Containers made of polyethylene, polypropylene, or stainless steel are recommended.

Avoid prolonged contact with skin. In case of accidental contact, wash the affected area immediately with soap and water.

Keep anything used to store or dispense DEF free of dirt and dust. Wash and rinse containers or funnels thoroughly with distilled water to remove contaminants.

If an unapproved fluid, such as diesel or coolant has been added to the DEF tank, contact ENERGREEN S.P.A. immediately to determine how to clean and purge the system.

Clean the DEF tank if water has been added to it. See Cleaning the DEF tank section in this manual. Check the concentration of the DEF after filling the tank. See Testing diesel exhaust fluid (DEF).

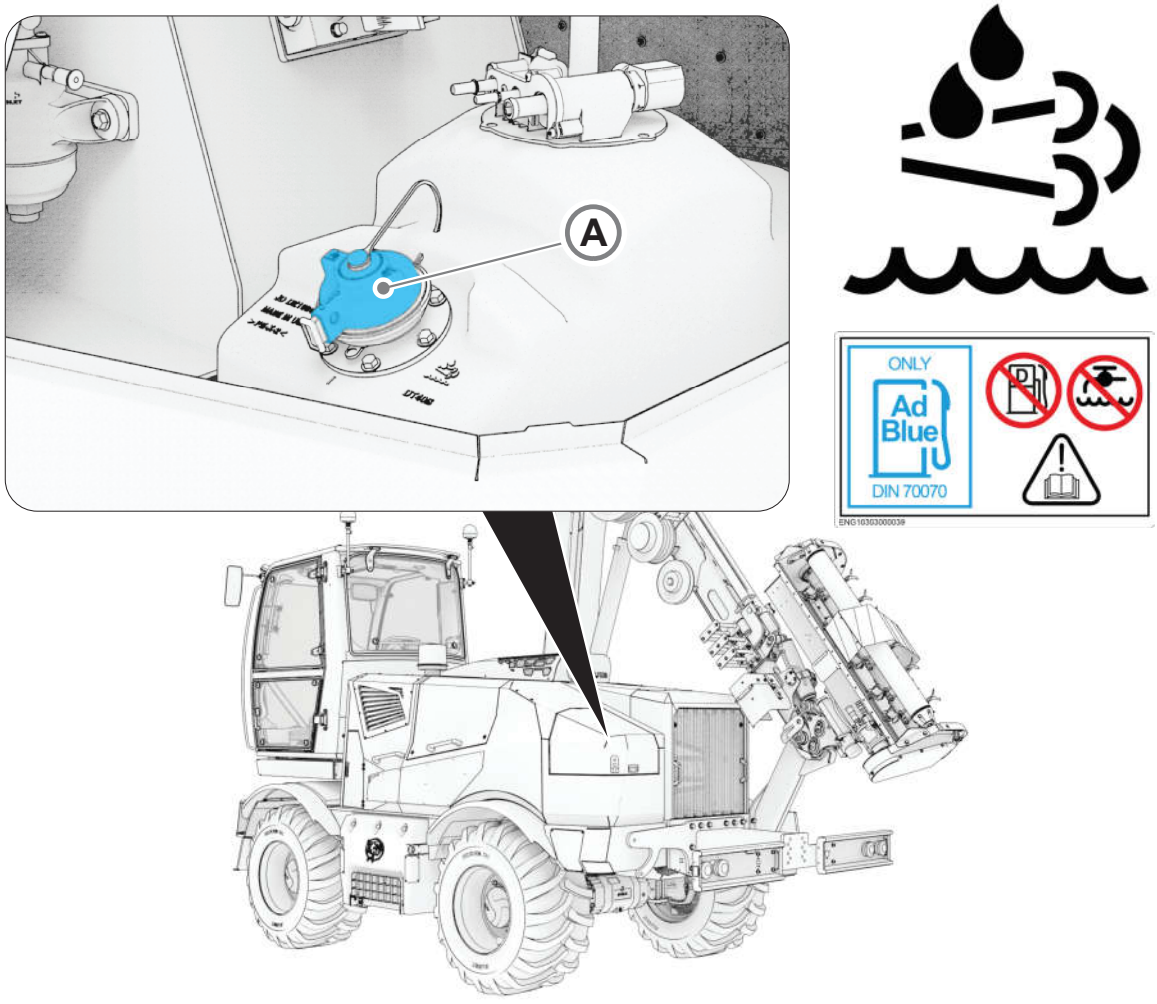
The operator must maintain proper DEF levels at all times. Check the DEF level daily and refill the tank as needed.

A typical engine with EGR will consume approximately 40:1 Fuel:DEF while the ratio for an engine without EGR is 15:1 (by volume).

The filling port is identified by a blue coloured cap (**A**) embossed with the DEF symbol, shown in the figure below.

CAUTION

It is recommended to keep the DEF tank full, as there is less chance of product deterioration.



6.46.7 Testing diesel exhaust fluid (DEF)

WARNING

Using DEF with the correct concentration is critical for the performance of the engine and the exhaust gas post-treatment system. Extended storage and other conditions can adversely affect the DEF concentration.

If the quality if the DEF is questionable, take a sample from the DEF tank or storage container and place it in a clean container. DEF should be clear and colourless sand smell slightly of ammonia.

If it appears cloudy, slightly coloured, or smells strongly of ammonia, it probably no longer falls within the required specifications. DEF should not be used in this condition. Drain the tank, flush it with distilled water and refill with new or usable DEF. Check the concentration of the DEF after topping up the tank.

If the DEF passes the visual and smell test, check the DEF concentration with a hand-held refractometer calibrated to measure DEF.

The concentration of the DEF should be checked when the engine has been unused for a long time, or if you suspect that the engine or packaged DEF has been contaminated with water.

Two approved tools are available through your John Deere dealer:

- JDG11594 Digital DEF Refractometer: a digital tool providing an easy to read concentration measurement;
- JDG11684 DEF Refractometer: a low-cost alternative tool providing an analogue reading;

Follow instructions included with either tool to obtain the measurement.

The correct DEF concentration is 31.8% - 33.2% urea. If the DEF concentration is not within the specifications, drain the DEF tank, flush with distilled water and fill it with new or usable DEF. If the packaged DEF is not within the specifications, dispose of it and replace with new or usable DEF.

6.46.8 Disposal of Diesel Exhaust Fluid (DEF)

Although minor spillages of DEF are not a problem, larger spillages should be contained and prevented from entering the ground. If large spills occur, contact the local environmental authorities to request assistance with clean-up.

If a large amount of DEF is found not to be within the required specifications, contact your DEF supplier for assistance with its disposal. Do not discharge large quantities of DEF into the ground or allow it to enter waste water treatment facilities.

6.47 EXHAUST GAS POST-TREATMENT SYSTEM SYMBOLS

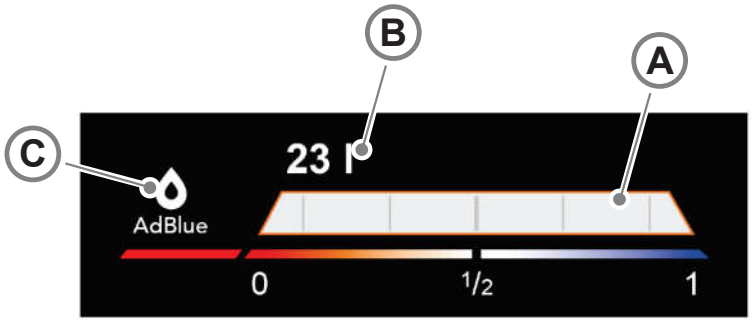
CAUTION

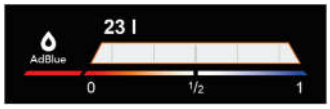
The signalling system warns the operator if the emissions control system is not working properly and/or the engine control unit detects an engine fault. If the warning signals are ignored, an emissions-related decrease in engine power occurs.

Any malfunctions should be eliminated immediately; use and maintain the emissions control system according to the procedure indicated in the instructions below.

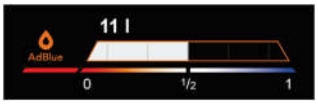
6.47.1 DEF tank level indicator

The DEF level is shown by the indicator bar (**A**) on the display. The amount of DEF in the tank (**B**) is also displayed. The symbol (**C**) changes colour according to the amount of fluid in the tank.



Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
		between 100% and 50%	NO	NO	NO

No action to be taken: the engine is working properly

Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
		between 50% and 10%	NO	NO	NO

It is recommended that you refill the tanks as soon as possible: the engine is working properly.

Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
	AdBlue	between 10% and 5%		NO	NO

Refill immediately: the engine warning light appears on the screen, indicating that the level of the DEF tank is in reserve.

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** if the problem cannot be solved contact ENERGREEN S.P.A. customer care.

Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
	AdBlue	between 5% and 0%			NO

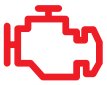
Refill immediately: the engine and machine warning lights appear on the screen, indicating that the DEF tank is in reserve and continues to decrease.

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** and ***"6.50 Troubleshooting the vehicle"***. If the problem cannot be resolved, contact ENERGREEN S.P.A. Customer Care.

Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
	AdBlue	0 %			**Level 1**

If you do not refill immediately, the engine error and machine error lights on the screen remain active to indicate that the DEF tank is empty. In this case, the engine automatically carries out a **"Level 1 power reduction"** which consists of a 25% reduction in torque (this occurs gradually over five minutes).

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** and ***"6.62 Troubleshooting the vehicle"***. If the problem cannot be resolved, contact ENERGREEN S.P.A. Customer Care.

Status	Symbol (C)	DEF tank level	Engine warning light	Machine warning light	Engine power reduction
	AdBlue	0 %			**Level 2**

If you do not refill the DEF tank after the first power reduction, the engine automatically performs a **"Level 2 power reduction"**, which is added to the previous reduction and for each minute that passes:

- Torque is reduced by 5%;
- The engine speed is reduced (-150 rpm);
- The engine continues to decrease its power output until it reaches idle speed;
- Switch off the machine and top up.

The engine error and machine error lights anyway remain active on the screen. Refer to the errors screen: refer to section ***"6.61 Engine faults"*** and ***"6.62 Troubleshooting the vehicle"***. If the problem cannot be resolved, contact ENERGREEN S.P.A. Customer Care.

Symbol (**D**) will light up on the screen if all the previous warnings are ignored.
See section ***"6.47.5 Exhaust system fault symbol"***

6.47.2 Exhaust gas temperature symbol

When the exhaust gas temperature symbol (**E**) appears on the screen, it indicates that the regeneration phase is about to start. In this pre-phase, the engine gradually increases the temperature of the exhaust gases.

Once the ideal temperature has been reached, system regeneration begins; the regeneration in progress symbol will also appear. See section ***"6.47.3 Regeneration symbol".***

When the symbol (**E**) lights up together with the engine warning symbol (**F**), engine performance is reduced by the ECU because the exhaust gas temperature is higher than the expected value.

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** if the problem cannot be solved contact ENERGREEN S.P.A. customer care.

6.47.3 Regeneration symbol

When the symbol (**G**) appears on the screen, it means that the exhaust gas post-treatment system is in operation.

When the exhaust gas filter symbol (**G**) comes on together with the engine warning light (**F**), engine performance is decreased by the ECU because there is a fault in the post-treatment system or because there is an abnormal amount of soot in the exhaust gas filter.

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** if the problem cannot be solved contact ENERGREEN S.P.A. customer care.

6.47.4 Regeneration inhibited symbol

CAUTION

Deactivating automatic regeneration mode is not recommended unless it is accompanied by a safety measure or there is a leak in the fuel tank that would affect the cleaning process from being completed.

Exhaust gases can reach very high temperatures during regeneration, so the operator can inhibit regeneration if he considers that the position of the machine is not safe enough. To inhibit this procedure, access the regeneration screen and press the inhibit symbol: once pressed, the regeneration inhibited symbol (**H**) appears on the screen. Once you have reached a safe position: press the inhibition symbol again; the system will then start the regeneration cycle and the symbol (**H**) will disappear.

6.47.5 Exhaust system fault symbol

When the symbol (**D**) appears on the screen together with the symbol (**F**), it means there is a fault in the exhaust gas post-treatment system. This may be due to:

- Engine emissions outside the normal operating range
- A fault in the engine emissions system.

Refer to the errors screen: refer to section ***"6.61 Engine faults"*** if the problem cannot be solved contact ENERGREEN S.P.A. customer care.

6.48 REGENERATION METHODS

6.48.1 Passive regeneration

The exhaust gas filter periodically detects higher temperatures simply because the engine is operating with high loads. During these periods, after higher exhaust gas temperatures are detected, a small amount of soot deposited in the exhaust filter will be eliminated. On the other hand, unnecessary engine idling could lead to additional soot build-up in the exhaust gas filter. In order for the engine to provide the best performance, reducing direct operator interventions, run the engine with a higher load as often as possible and keep the number of times the engine speed runs at idle speed to a minimum.

6.48.2 Automatic (AUTO) cleaning of the exhaust filter

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, manual or 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 some 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 the PTO (if supplied as standard) should be disengaged.

If you operate the engine in automatic mode, the ECU can carry out “smart” cleaning of the exhaust gas filter whenever required. The exhaust filter cleaning warning light comes on if the system is actively cleaning the filter (see section ***“6.47.3 Regeneration symbol”***). 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.

If it is not possible to move the machine to a safe position, the operator should temporarily disable the automatic exhaust gas filter cleaning function (see “Deactivating exhaust gas filter cleaning”, later in this section). When the machine is in a safe position, the automatic mode must always be activated.

6.48.3 Manual or stationary cleaning of the exhaust gas filter

The manual / parked position cleaning of the exhaust filter is a process that takes place when requested by the operator. 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 / parked position exhaust filter cleaning depends on the amount of clogging, the ambient temperature and the actual 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 of the exhaust gas filter broken off previously. Standard cleaning may take 20 - 50 minutes or more on average.

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, manual or 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 some materials.

WARNING

Always park the machine in a safe position and make sure there is enough fuel before starting the exhaust gas filter cleaning process. All the devices activated by PTO (if supplied as standard) must be disengaged.

The exhaust gas filter warning light (see section ***"6.47.3 Regeneration symbol"***) switches off once the filter has been cleaned. If the machine is not to be used again immediately after the cleaning procedure, wait before turning off the engine to allow the engine and the exhaust filter to reach the normal operating temperature again. The procedure can be cancelled at any time in a parked position by pressing the inhibit symbol.

Do not deactivate the cleaning procedure unless it is absolutely necessary. If the manual or stationary 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 automatic exhaust gas filter cleaning mode to avoid having to carry out additional maintenance.

6.48.4 Inhibiting exhaust gas filter cleaning

CAUTION

It is not recommended to deactivate / inhibit the exhaust gas filter cleaning request. The automatic exhaust gas filter cleaning function should only be inhibited if absolutely necessary. Leave automatic mode selected and allow cleaning whenever possible. Soot deposits in the exhaust gas filter system are minimized if automatic mode is left on.

CAUTION

When automatic, manual, or stationary exhaust filter cleaning is activated, the exhaust gas temperature may be high under no load or light loads at certain times during the exhaust filter cleaning cycle. Only deactivate the exhaust filter cleaning function if high exhaust gas temperatures can compromise safety.

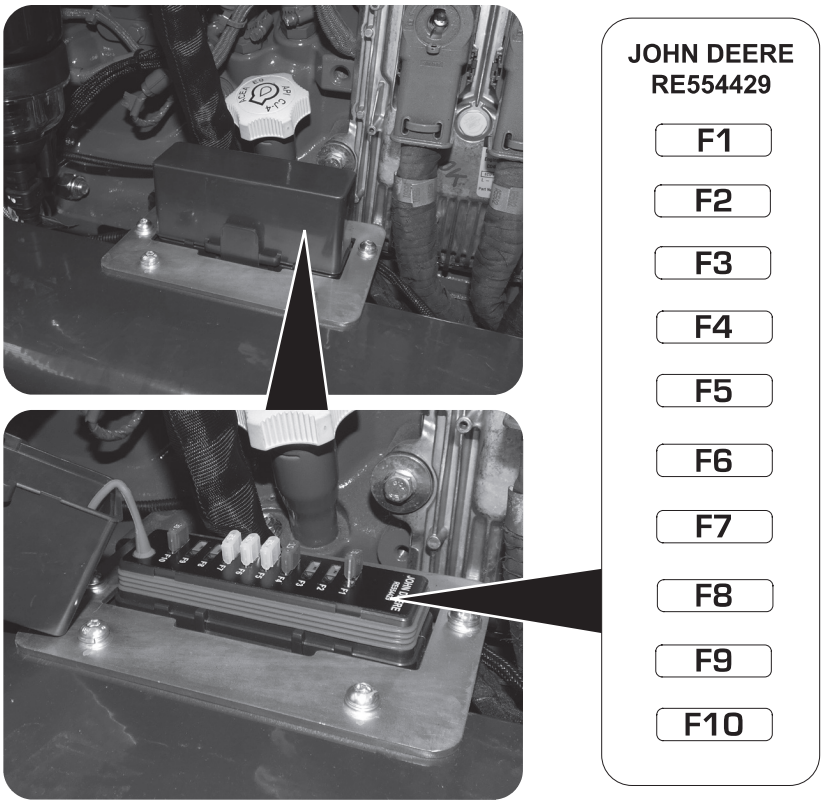
6.48.5 Required exhaust gas filter maintenance

The exhaust gas filter cleaning procedures, listed earlier in this section, remove ash from the exhaust filter. During this process, the exhaust gas filter also separates ash deposits that were not removed during filter cleaning. After the exhaust gas filter has operated for several thousand hours, the ash deposits can decrease engine performance due to an increase in exhaust back pressure. To solve this problem, the exhaust gas filter should be replaced: contact ENERGREEN S.P.A. Customer care.

6.49 FUSES

Before replacing a fuse, make sure that you have removed the ignition key. If the fuses are oxidised, corroded or loose, only replace them with fuses that have the same rating.

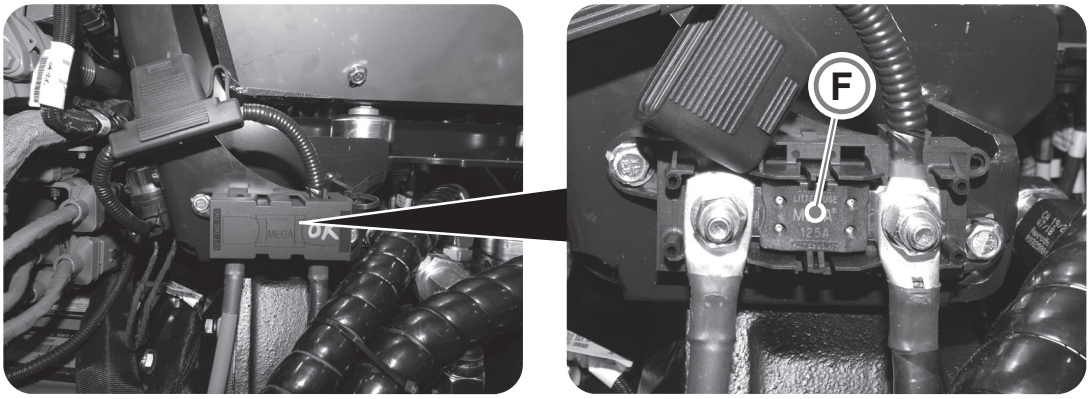
6.49.1 Engine fuses



Pos.	A	Function
F1	30	Control panel
F2	-	-
F3	-	-
F4	10	John Deere Link
F5	25	ECU power supply
F6	25	ECU power supply
F7	25	ECU power supply
F8	-	-
F9	-	-
F10	30	TVP Transient voltage protection

The engine fuse box, located close to the engine oil filler cap, can be accessed once the engine cover has been removed. Remove the cover by pressing the two tabs on it.

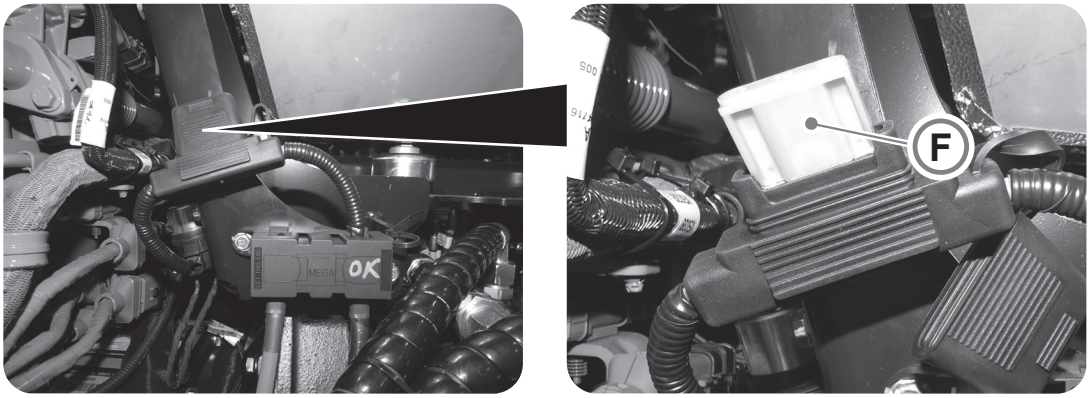
6.49.2 Engine line fuse



Pos.	A	Function
F	125	Cabin line power supply

The engine fuse box, located close to the coupler can be accessed once the engine cover has been removed.

6.49.3 Engine start relay fuse

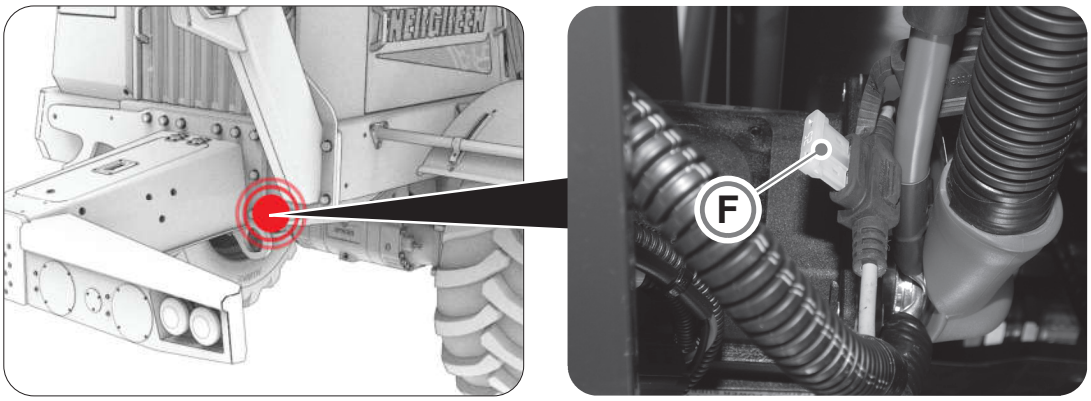


Pos.	A	Function
F	40	Engine start relay power supply

The engine start relay fuse, located close to the coupler can be accessed once the engine cover has been removed.

6.49.4 Battery isolator fuse

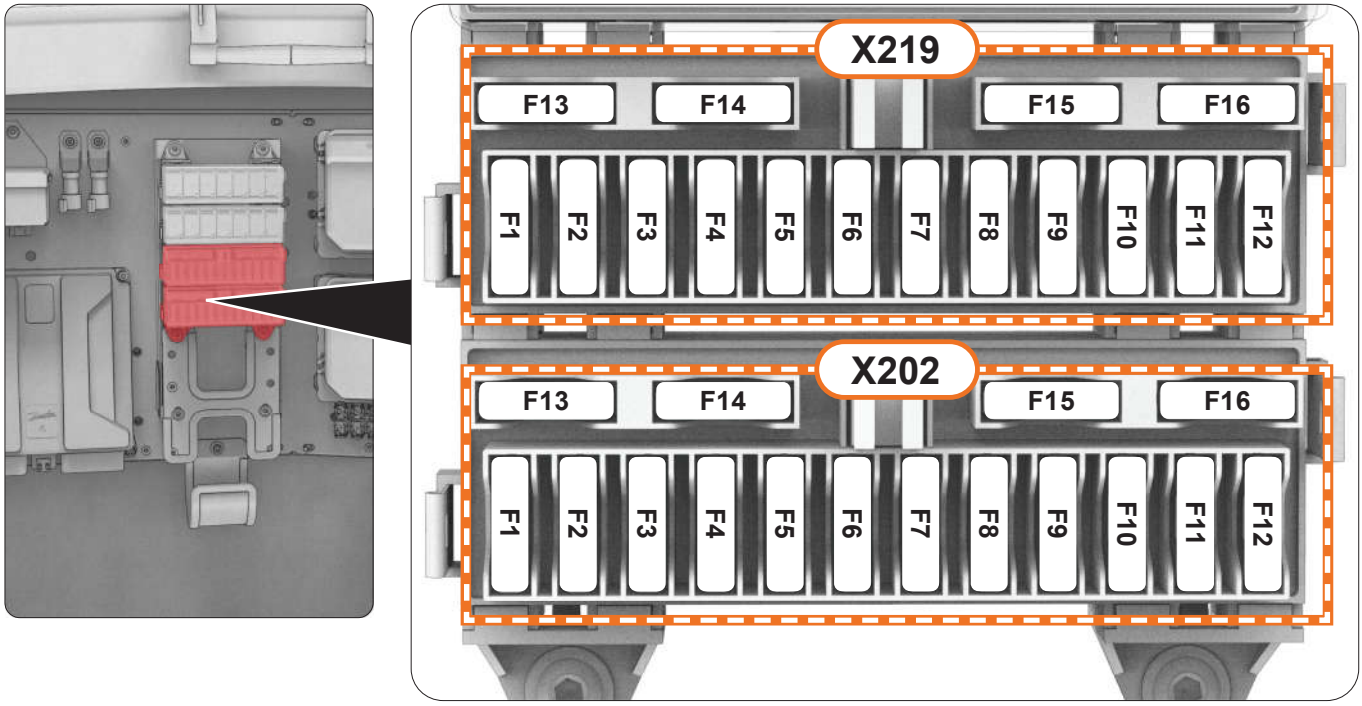
The battery isolator fuse (**F**) is located behind the plate at the back of the machine. It should be replaced if services such as the courtesy light, emergency lights and radio do not work.



Pos.	A	Function
F	25	Services power supply

6.49.5 ***Cabin fuses***

The fuses in the cabin are located in the compartment behind the operator's seat. Remove the document holder panel in order to access the compartment.



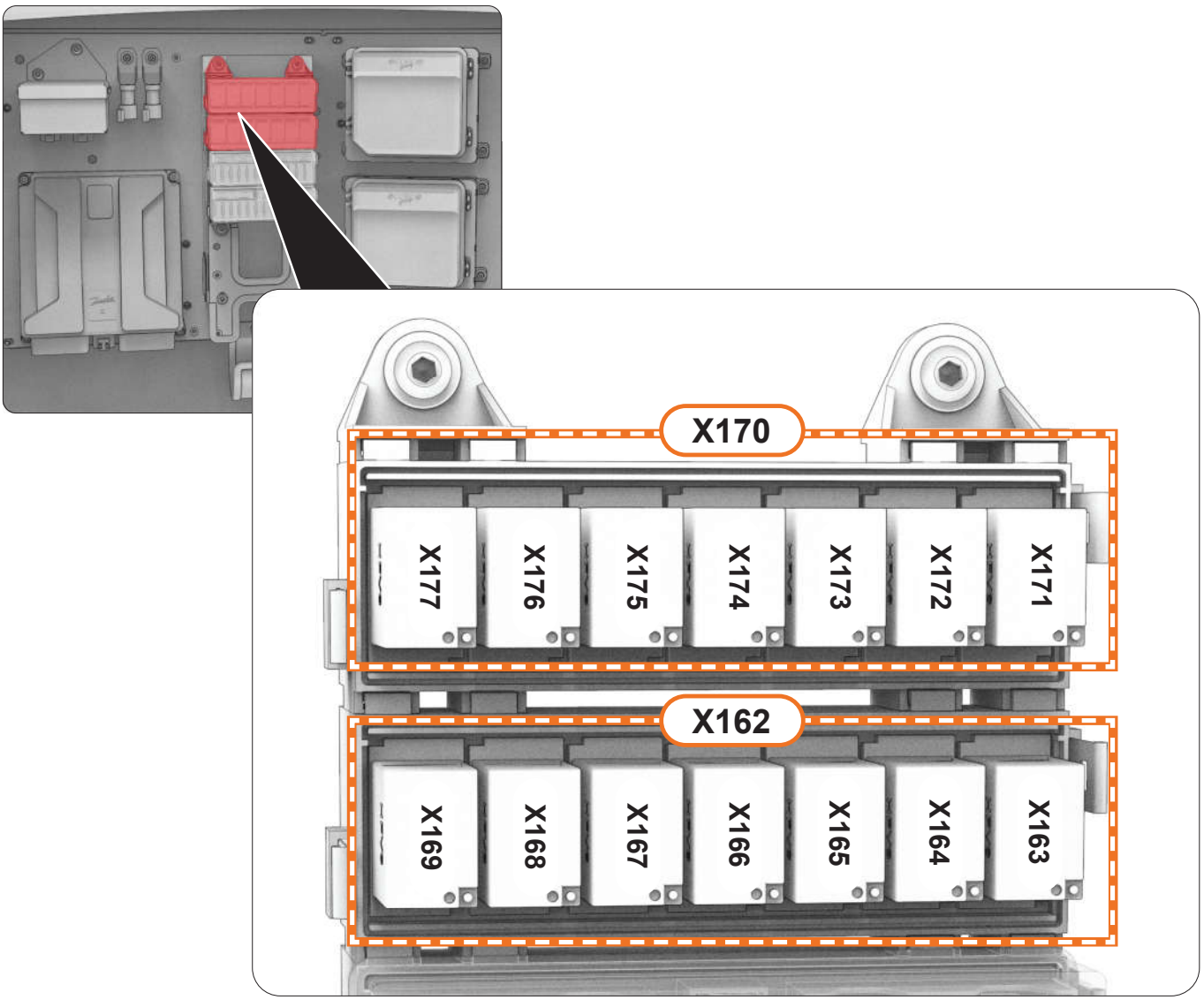
X219		
Pos.	**A**	**Function**
F1	15	Low beam headlights
F2	15	Full beam headlights
F3	20	Power supply
F4	10	Power supply
F5	10	Start-up
F6	10	Limit switch power supply
F7	15	Steering column
F8	20	Power supply
F9	20	Power supply
F10	10	Suspended axle power supply (optional)
F11	5	Hydraulic oil sensor
F12	10	Display
F13	15	Heating
F14	5	Diagnosis socket
F15	-	-
F16	10	Battery isolator

X202		
Pos.	**A**	**Function**
F1	7.5	Horn
F2	15	Seat
F3	10	CAN
F4	15	CPU power supply
F5	10	Power outlet
F6	7.5	Alternator
F7	7.5	Emergency
F8	15	Translation pump
F9	5	Radio
F10	40	A/C fans
F11	30	A/C
F12	25	Power supply
F13	-	-
F14	15	Beacon light
F15	10	Courtesy lights
F16	15	Radio

6.50 RELAYS

6.50.1 Cabin relays

The relays in the cabin are located in the compartment behind the operator's seat. Remove the document holder panel in order to access the compartment.



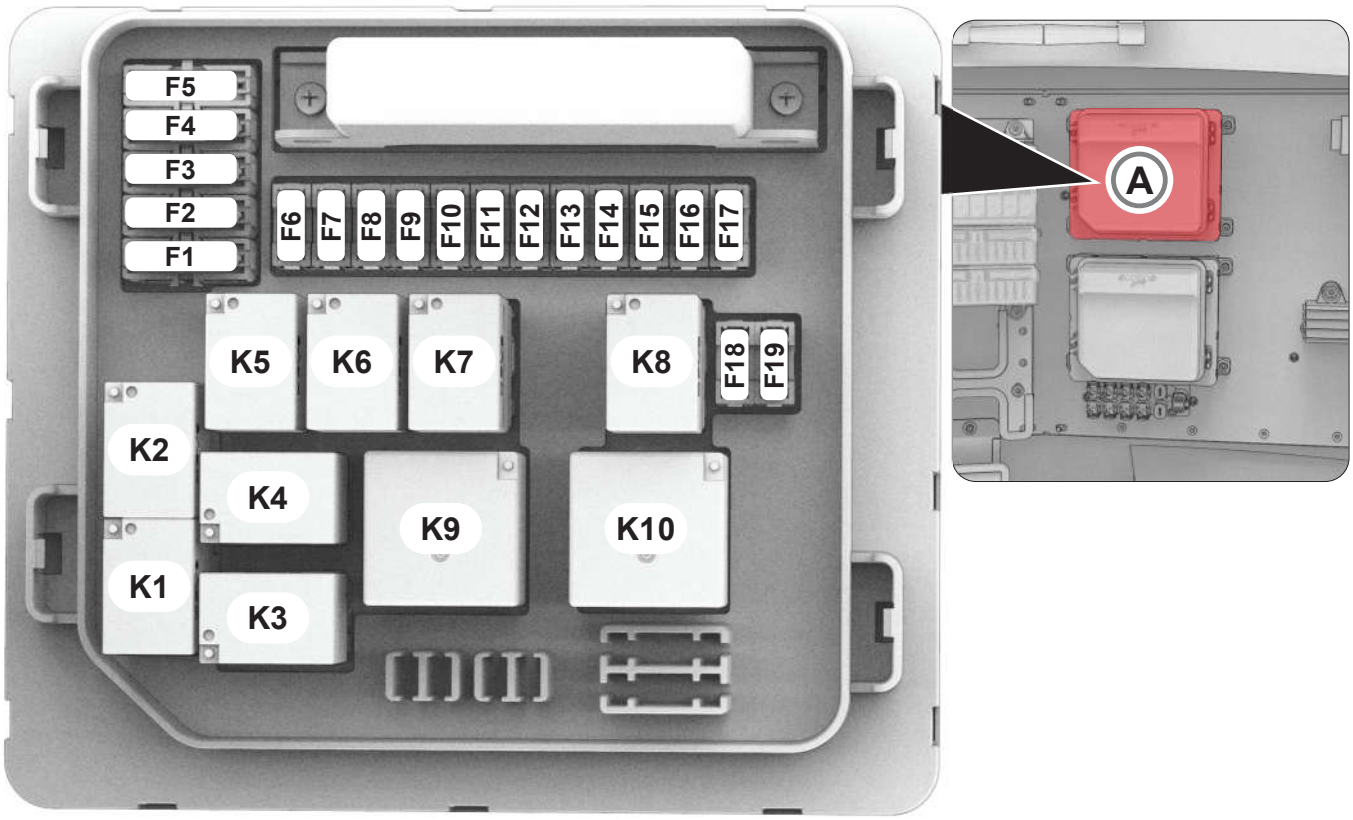
X170	
Pos.	**Function**
X171	-
X172	-
X173	-
X174	Heating
X175	-
X176	-
X177	Courtesy lights

X162	
Pos.	**Function**
X163	Low beam headlights
X164	Auxiliary low beam headlights
X165	Full-beam headlights
X166	Auxiliary high beam headlights
X167	Start-up
X168	Flashing triangle (optional)
X169	Horn

6.51 QPL CONTROL UNITS

The QPL control units in the cabin are located in the compartment behind the operator's seat. Remove the document holder panel in order to access the compartment.

6.51.1 QPL (A) - Fuses and relays

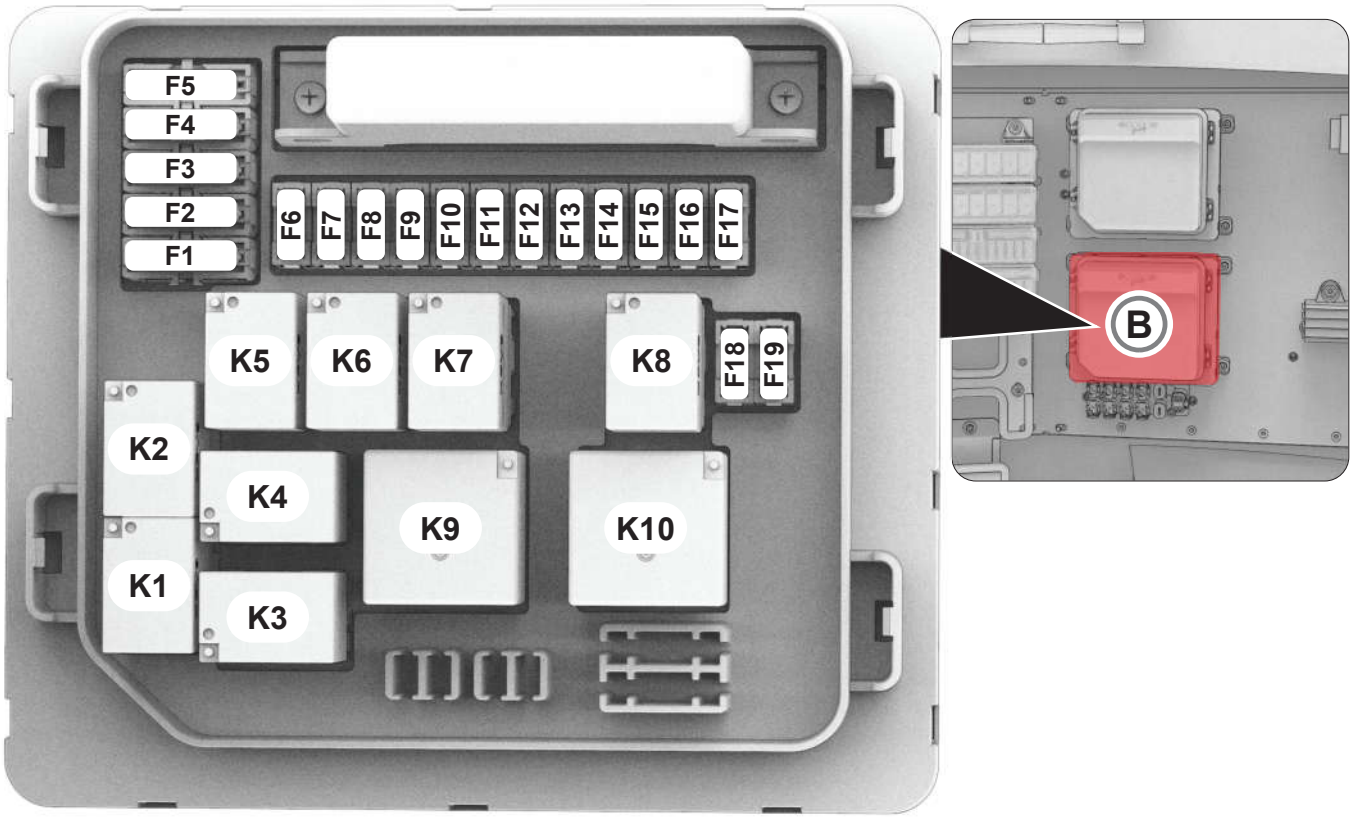


Pos.	A	Description
F1	10	Position lights
F2	10	Arm work lights
F3	15	Front windscreen wiper
F4	10	Cabin work lights
F5	-	-
F6	5	Liberty Link positive
F7	10	Reverse
F8	7.5	Stop lights
F9	7.5	CC safety
F10	5	Liberty Link positive
F11	7.5	Telematics
F12	5	Steering
F13	5	Position lights
F14	5	Position lights
F15	10	Windscreen wiper pump
F16	7.5	Rear fog light
F17	7.5	Signboard

Pos.	A	Description
F18	-	-
F19	10	Rotating beacon

Pos.	Description
K1	Cabin work lights
K2	Arm work lights
K3	Rotating beacon
K4	Rear signboard
K5	Position lights
K6	Reverse
K7	Grease pump
K8	Stop lights
K9	Windscreen wiper
K10	Windscreen wiper

6.51.2 QPL (B) - Fuses and relays

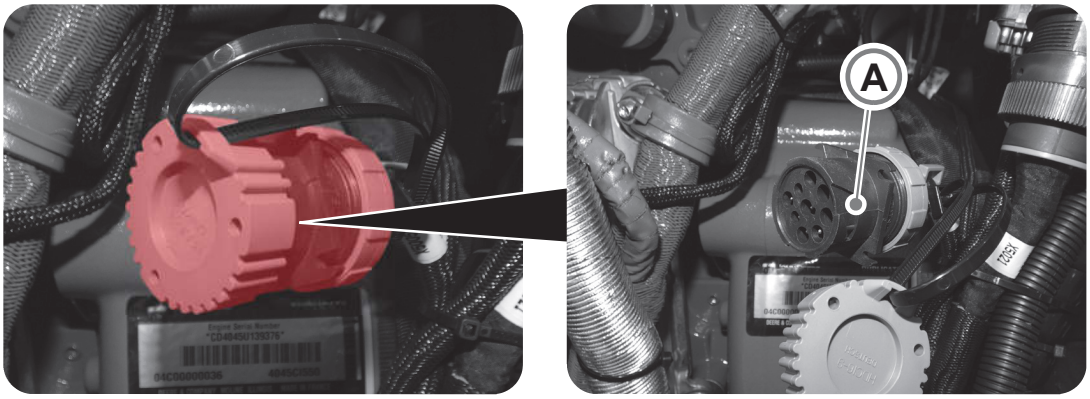


Pos.	A	Description
F1	10	Handbrake
F2	7.5	Axle block (stabilizers)
F3	-	-
F4	10	Blower (optional)
F5	15	Work lights
F6	5	Liberty Link positive
F7	7.5	Control valve safety
F8	10	Round window wiper
F9	10	Lubrication pump
F10	5	Liberty Link positive
F11	7.5	Second camera
F12	-	-
F13	-	-
F14	-	-
F15	10	Windscreen wiper
F16	-	-
F17	10	Differential lock and 4x4 release
F18	15	Work lights
F19	10	Arm float

Pos.	Description
K1	Blower (optional)
K2	Axle block (stabilizers)
K3	Work lights
K4	Work lights
K5	Parking brake release
K6	Control valve
K7	Auxiliary light bar
K8	Side window wiper
K9	-
K10	Round window wiper

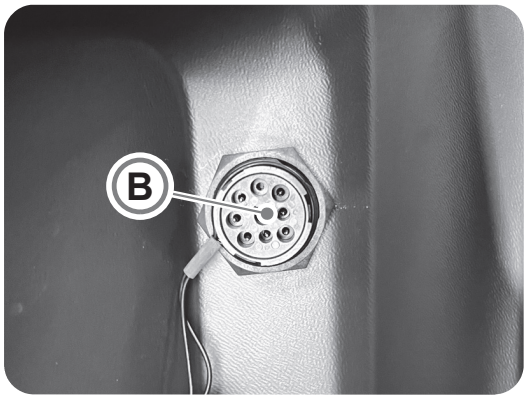
6.52 ENGINE DIAGNOSTICS CONNECTOR

The engine diagnostics connector, located close to the coupler, can be accessed once the engine cover has been removed.



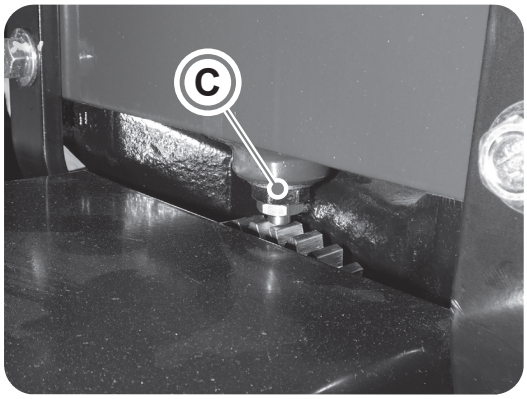
6.53 TRANSLATION CONTROL UNIT DIAGNOSTICS CONNECTOR

The translation control unit diagnostics connector (**B**) is located next to the seat, to the right of the operator.



6.54 SPEED SENSOR

The speed sensor (**C**) is installed in the frame close to the front axle and the toothed wheel. If the sensor is damaged or is not working, the machine continues to work, but for safety reasons does not allow the displacement of the translation engine to change, reducing the speed of both gears by half.



6.55 HERCULES 10T LIFTER (OPTIONAL)

DANGER

Accidental movement of the machine and attached equipment. Risk of collision and/or entanglement. Do not stand between the machine and the equipment. If you have to intervene in this area: lower all the equipment and attachments to the ground, apply the park brake, stop the engine and remove the key from the control panel.

DANGER

Make sure that the arm and attached equipment are in the transport position or resting on the ground when you leave the cab. Do not leave the arm or the equipment suspended.

DANGER

Failure to comply with the maximum permissible loads. Risk of accidents, overturning. Before connecting the equipment, check the load capacity of the lifter, the category of the lifter and the maximum permissible load.

DANGER

Moving parts. Danger of collision, entanglement, shearing. Before carrying out work within the maximum range of action of the equipment, wait until it has come to a complete stop, make sure that it is firmly on the ground, in a stable position and that no part of it is moving and/or under pressure. Switch off the engine and remove the ignition key.

WARNING

The operations described in the following paragraphs must be carried out by trained and qualified personnel.

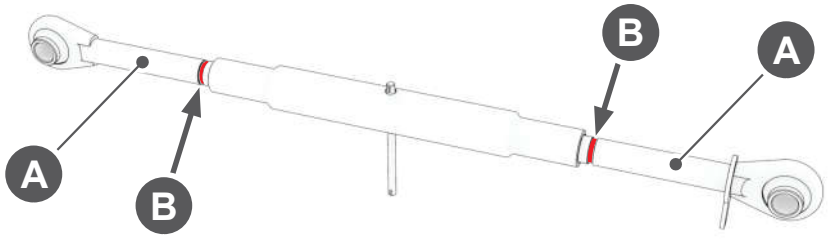
6.55.1 Adjusting the length of the top link

The length of the top link is adjusted in order to make sure that the working angle of the equipment is correct with respect to the ground.

Adjust the top link after connecting the equipment to the lifter.

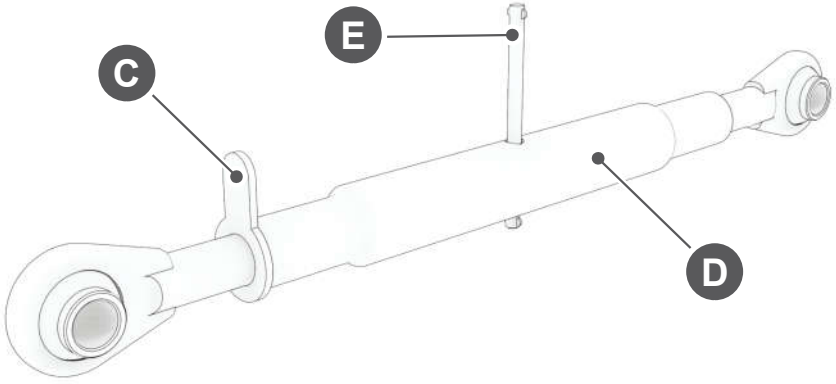
DANGER

Insufficient strength provided by the thread. Danger of accidents. When extending the top link, make sure that you do not exceed the maximum extension mark (B) on the threaded part (A).



To adjust the length of the top link:

1) Loosen the locking collar (**C**).
2) Rotate the central part of the top link (**D**) using the handle (**E**):
3) Make sure that you do not exceed the maximum extension mark (**B**) on the threaded part (**A**).
4) Tighten the locking collar (**C**) to lock it in position.



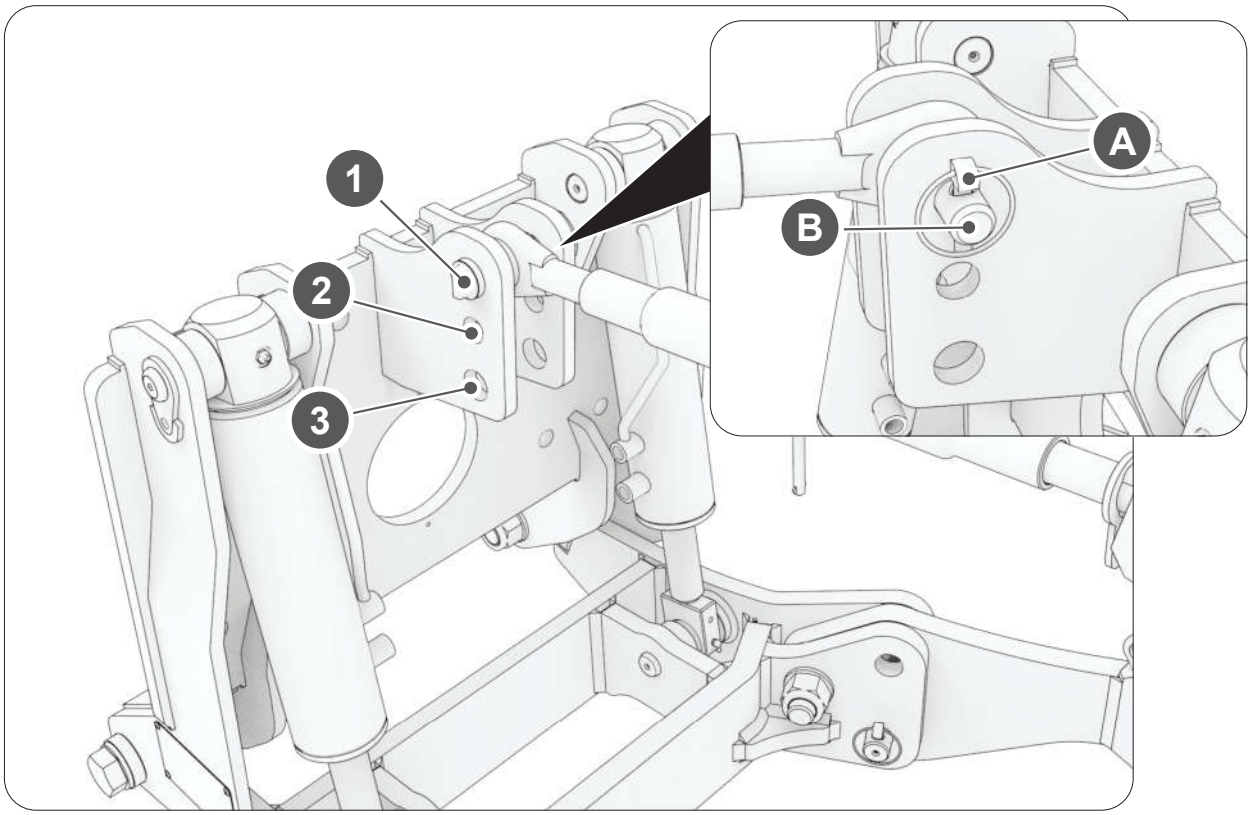
6.55.2 Positioning the top link

To adjust the position of the top link:

1) Release the stop bracket.
2) Remove the locking pin (**A**).
3) Remove the pin (**B**).
4) Position the top link at the height required (**1**), (**2**) or (**3**).
5) Replace the pin (**B**).
6) Insert the locking pin (**A**).
7) Lock the top link in place using the locking collar.

It is recommended to use the top link:

- In the highest position (**1**) when using equipment
- In the lowest position (**3**) for road transport



6.55.3 Attaching/releasing equipment to/from the three-point hitch

DANGER

Breakage of mechanical parts. Accidents. Only use the specific attachment points provided (three-point hitch) to attach equipment.

DANGER

Failure to comply with the maximum permissible loads. Accidents, overturning. Before connecting equipment, check the load capacity of the lifter, the category of the lifter and the maximum permissible loads. Refer to section 4 of this manual.

DANGER

Accidental movement of the machine and attached equipment. Collision, entanglement. Do not stand between the machine and the attached equipment. If you have to intervene in this area: lower all the equipment and attachments to the ground, apply the park brake, stop the engine and remove the key from the control panel.

DANGER

Failure to comply with the maximum permissible loads. Accidents, overturning. Comply with the maximum permissible load limits. These limits may be less depending on the current highway code.

DANGER

Incorrect equipment connection. Accidents, death or serious injury. Before attaching equipment, refer to the relative operator manual for information regarding how to attach it correctly, any additional safety measures to be taken and PPE to be used.

DANGER

Inadequate information and training. Accidents, death or serious injury. Always comply with the warnings and instructions for use of the equipment described in the relative operator manual.

DANGER

Accidental movement of tools / equipment. Death or serious injury. Before connecting or disconnecting equipment, make sure there is no one within its range of action.

DANGER

Accidental movement of the machine. Collision. Always connect/disconnect equipment on stable and level ground.

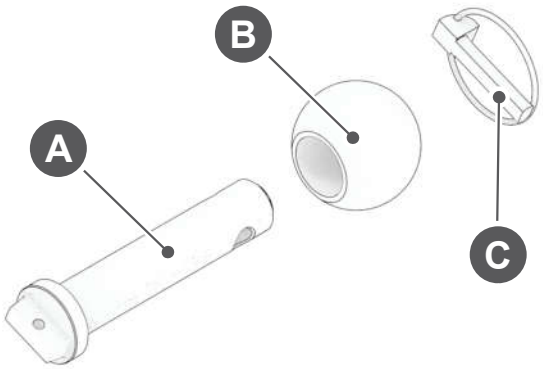
Preparing the three-point hitch

Before attaching equipment to the three-point hitch:

1) Check the category of equipment that has to be connected.
2) Adjust the three-point hitch (lifting cylinders and top link).

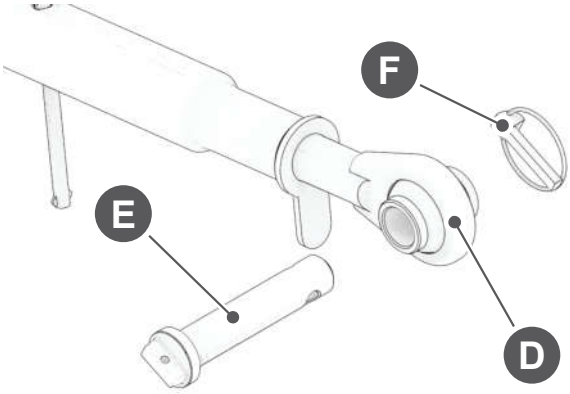
Adapters should be installed on the attachment points when using 2nd category equipment.
To install the adapters on the lower pins of the equipment:

1) Insert the adapter (**B**) onto the pin (**A**).
2) Insert the locking pin (**C**).



To install the upper pin on the top link:

1) Insert the pin (**E**) into the top link (**D**).
2) Insert the locking pin (**F**).



The categories of equipment may differ for the top link. The connecting pins may vary according to the category.

Reference	Category							
	1N	1	2N	2	3N	3	4N	4
Lower pin diameter (mm)	22.4	22.4	28.7	28.7	37.4	37.4	51	51
Upper pin diameter (mm)	19.3	19.3	25.7	25.7	32	32	45.2	45.2

Attaching equipment

The attachment system of the lower lifting arm is equipped with quick coupler hooks that allow the equipment to be attached to the machine quickly and easily.

DANGER

Accidental movement of the equipment:

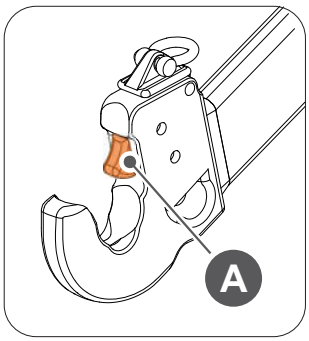
- **Crushing. Before attaching equipment, lock the hydraulic system and make sure there is no one in the area between the machine and the equipment.**
- **Accidents. After attaching a tool, make sure that the hooks are properly locked.**

To attach equipment to the lifter, proceed as follows:

- Attach the lower arms.
- Attach the top link.

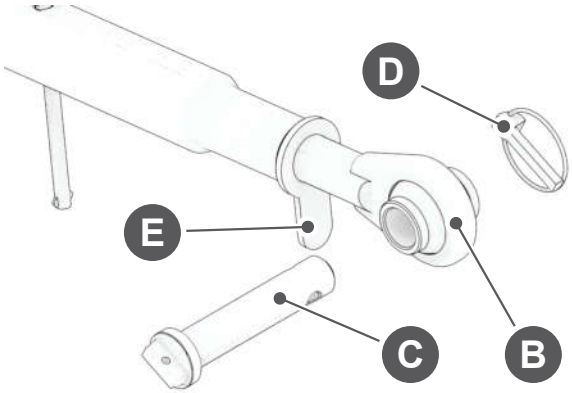
To attach the lower arms:

1) Completely lower the lower arms of the lifter.
2) Move the machine closer to the equipment until the quick coupler hooks of the lifting arms are below the coupling pins of the equipment.
3) Raise the arms until the equipment is attached and secured by the locking mechanism (**A**).



To attach the top link:

1) Insert the pin (**C**) into the top link (**B**).
2) Insert the locking pin (**D**).
3) Adjust the length of the top link and tighten the locking collar (**E**) to lock it in position.



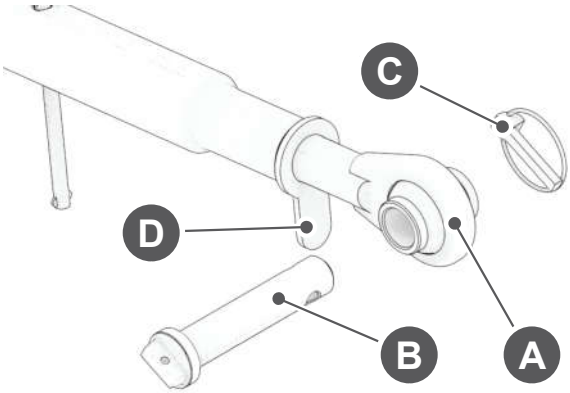
Releasing equipment

To disconnect equipment from the lifter, proceed as follows:

1) Release the top link.
2) Release the lower arms.

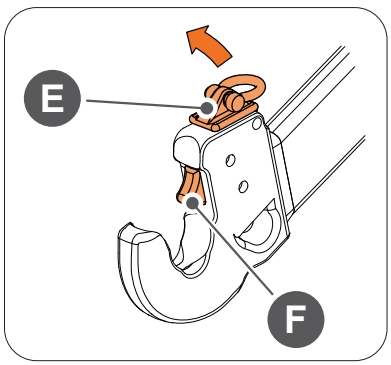
To release the top link:

1) Lower the equipment until the top link (**A**) is no longer under load.
2) Loosen the locking collar (**D**).
3) Remove the locking pin (**C**).
4) Remove the pin (**B**).



To release the lower arms:

1) Lift and pull the locking device (**E**) forwards: the locking mechanism (**F**) retracts and releases the coupling pins of the tool/equipment.
2) Lower the lifter to disengage the tool/equipment from the lower lifting arms.
3) Move the machine backwards.
4) Push the locking device (**E**): the locking mechanism (**F**) returns to its position and locks.



Securing the locking mechanisms on the hooks

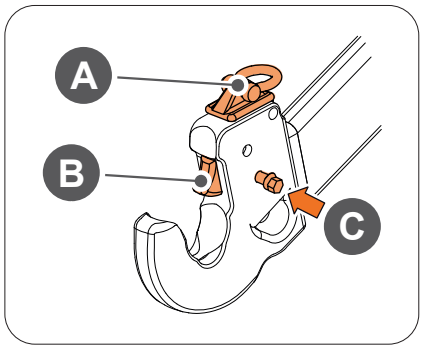
DANGER

Accidental movement of the equipment. Accidents. During road transport or in difficult working conditions (for example on sloping ground and/or with overhanging equipment) the locking mechanisms on the hooks should always be secured.

In some cases, when driving on rough terrain, it may be useful to secure the locking mechanisms on the hooks to prevent accidental release.

To secure the locking mechanisms on the hooks:

- Connecting tools/equipment.
- Check that the locking device (**A**) is correctly positioned.
- Insert a pin (**C**) as shown in the figure: the locking mechanism (**B**) remains locked in position.



6.56 ARM 180° ROTATION SYSTEM (OPTIONAL)

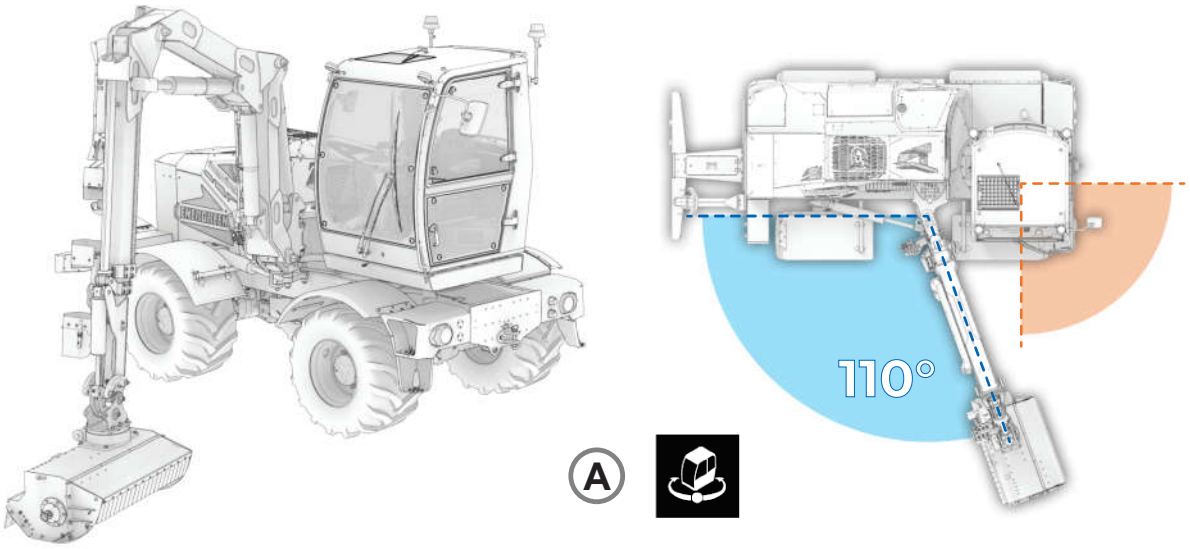
This system allows the arm to be rotated by 180°, making aerial work and mowing easier by providing greater visibility.

Once the arm has been rotated by 180°, it allows the equipment connected to it to be moved frontally. In this way:

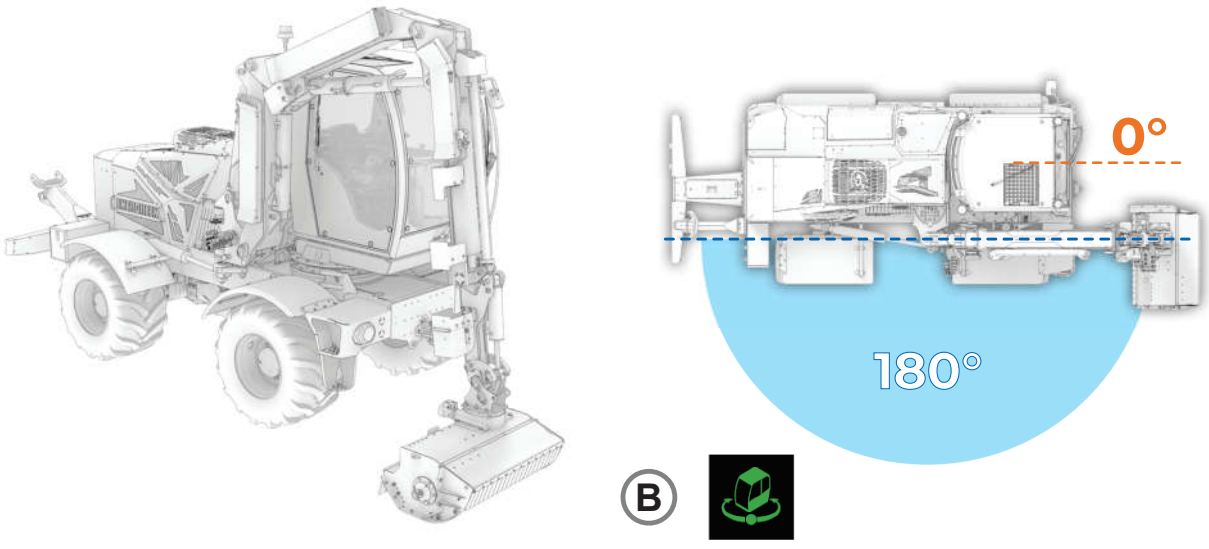
- it prevents the cut material (during aerial work) from falling onto the machine;
- it is possible to mow grass in front of the wheels.

6.56.1 Operation

1) With the cabin rotated, the rotation of the arm is limited to 110°. If the cabin is rotated, it is indicated on the screen by the symbol (**A**).



2) The arm can be rotated by 180° only if the cabin is aligned. The cabin is aligned when the light (**B**) turns on.



06-Sistema rotazione braccio 180 (ALPHA)

6.56.2 Safety interlock

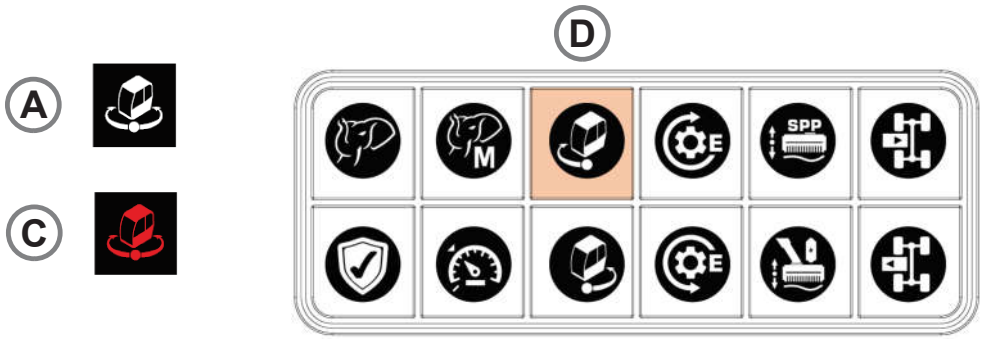
A safety interlock prevents the cabin and the arm from coming into contact with one another, avoiding possible damage to the structure of the machine.

The safety interlock triggers when:

- you are working with the cabin rotated and you try to rotate the arm beyond 110°;
- you are working with the arm beyond 110° and you try to rotate the cabin.

In this case, the arm is locked, the lights (**A**) and (**C**) alternate on the screen and the button (**D**) on the main keypad flashes red.

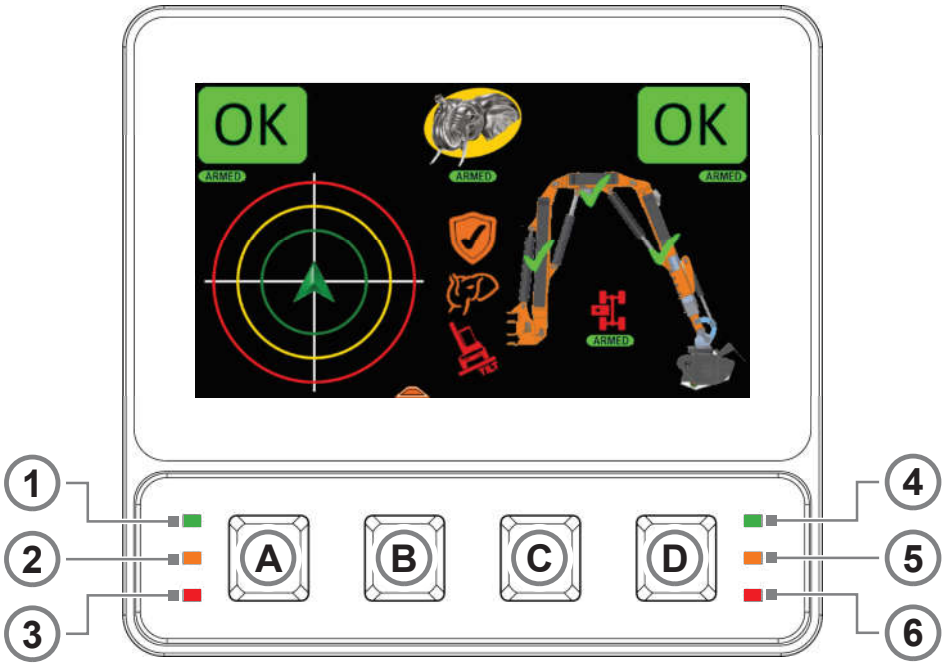
To go back to using the arm, either decrease the working angle of the arm or align the cabin.



6.57 ANTI-TIPPING SYSTEM (OPTIONAL)

WARNING

- **The operator is responsible for the safety of the machine. Only use the anti-tipping system if conditions permit. For further information, please refer to this manual.**
- **It is only permitted to bypass the anti-tipping system to return the machine or arm to a safe position.**
- **ENERGREEN S.P.A. shall not be held liable for any accidents involving personal injury or damage to property that may occur due to failure to comply with the instructions provided in this manual regarding the use and operation of the machine.**



6.57.1 Navigation buttons

There are four navigation buttons on the anti-tip system display:

- Button (**A**): if pressed, displays the TILT screen. If kept pressed (for about three seconds), it bypasses the TILT system.
- Button (**B**): if pressed, displays the HOME screen. If kept pressed (for about three seconds), it bypasses the entire anti-tipping system (TILT system + ARM system + BALLAST system).
- Button (**C**): if pressed, displays the SYSTEM screen. If kept pressed (for about three seconds), it bypasses the BALLAST system.
- Button (**D**): if pressed, displays the ARM screen. If kept pressed (for about three seconds), it bypasses the ARM system.

Once the bypass has been enabled, the systems move from an “ARMED” status to a “BYPASS” status. See the icons below.

To bring the system back into the “ARMED” status, press the relative button again for three seconds.

6.57.2 Status LEDs

There are six status LEDs on the anti-tipping system display. Those on the left refer to the tilt safety system, while those on the right refer to the arm safety system.

The system switches the LEDs on or off according to the position in which the machine or the arm is found.

Pos.	System	Colour	Meaning
1	Tilt	Green	Safe zone / system shows no errors
2	Tilt	Orange	Dangerous tilt
3	Tilt	Red	Dangerous situation / system error (if flashing)
4	Arm	Green	Safe zone / system shows no errors
5	Arm	Orange	Dangerous tilt
6	Arm	Red	Dangerous situation / system error (if flashing)

6.57.3 Displays

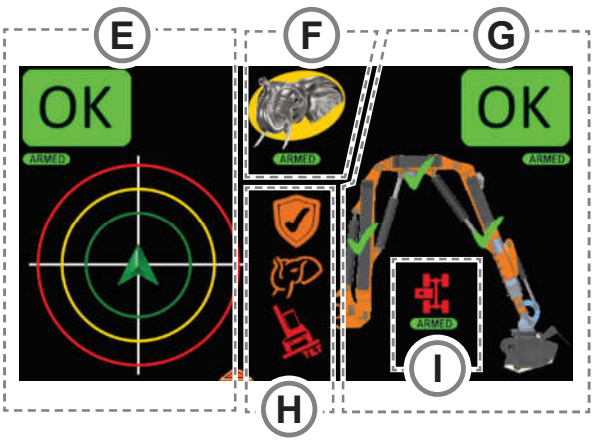
The anti-tip system is used in conjunction with some types of arm. It has four screens:

- ***HOME;***
- ***TILT***;
- ***ARM;***
- ***SYSTEM.***

HOME screen

This screen summarizes the main information about the systems and the lights that interact with them. The HOME screen includes:

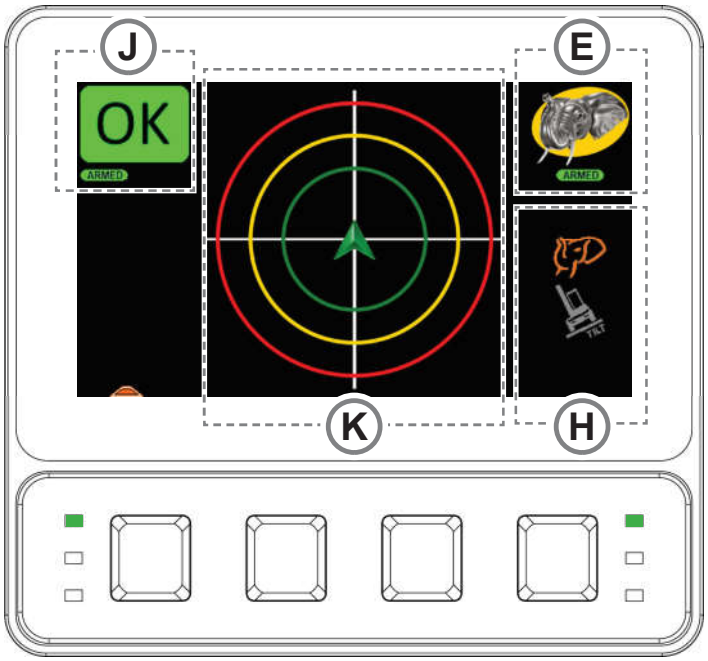
- an area that indicates the status of the TILT system (**E**);
- an area that indicates the general status of the anti-tipping system (**F**);
- an area that indicates the status of the ARM system (**E**);
- a warning lights area (**H**);
- an area that indicates the status of the BALLAST (**I**);

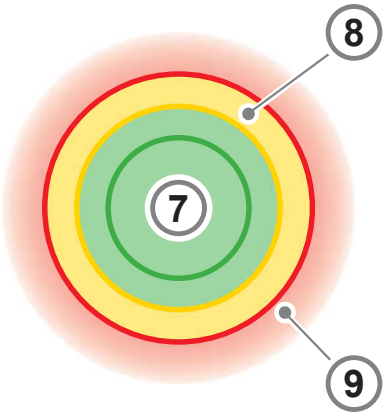


TILT screen

This screen summarizes the main information about the TILT system and the lights that interact with it. The TILT screen includes:

- an area for the status of the TILT system (**J**);
- an area for the gyroscope (**K**);
- an area that indicates the general status of the anti-tipping system (**E**);
- a warning lights area (**H**);





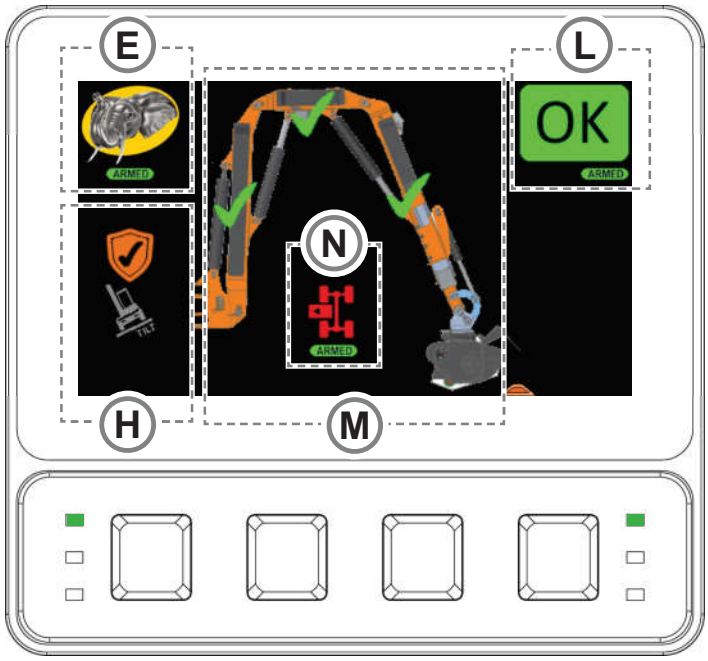
WORK MODE has to be activated in order to arm the TILT system.

System status		Work mode	Tilt	Tilt system LEDs	Meaning
OFF	-------				The system is online but disabled.
OK	ARMED				The system is online and enabled.
OK	BYPASS				The system is online and bypassed. The cursor is in the green zone (**7**).
Warning	ARMED				The system is online and enabled. The cursor is in the yellow zone (**8**). The system detects a possibly dangerous inclination. The tilt light flashes.
ALARM	ARMED				The system is online and enabled. The cursor is in the red zone (**9**). The system detects a dangerous inclination. The tilt light flashes. The arm movements are inhibited.

ARM screen

This screen summarizes the main information about the ARM system and the lights that interact with it. The ARM screen includes:

- an area for the status of the ARM system (**L**);
- an area for the position of the ARM (**M**);
- an area for the status of the BALLAST system (**N**);
- an area that indicates the general status of the anti-tipping system (**E**);
- a warning lights area (**H**);



The dead man function has to be activated in order to arm the ARM system.

System status		Dead man	Tilt	Arm system LEDs	Meaning
OFF	-------				The system is online but disabled.
OK	ARMED				The system is online and enabled.
OK	BYPASS				The system is online and bypassed.
Warning	ARMED				The system is online and enabled. The system detects a possibly dangerous position of the arm. The tilt light flashes.
ALARM	ARMED				The system is online and enabled. The system detects several dangerous arm positions. The tilt light flashes. The arm movements are inhibited.

To make the ARM system safer, an additional system can be enabled that controls the position of the mobile ballast.

The dead man function has to be activated in order to arm the BALLAST system.

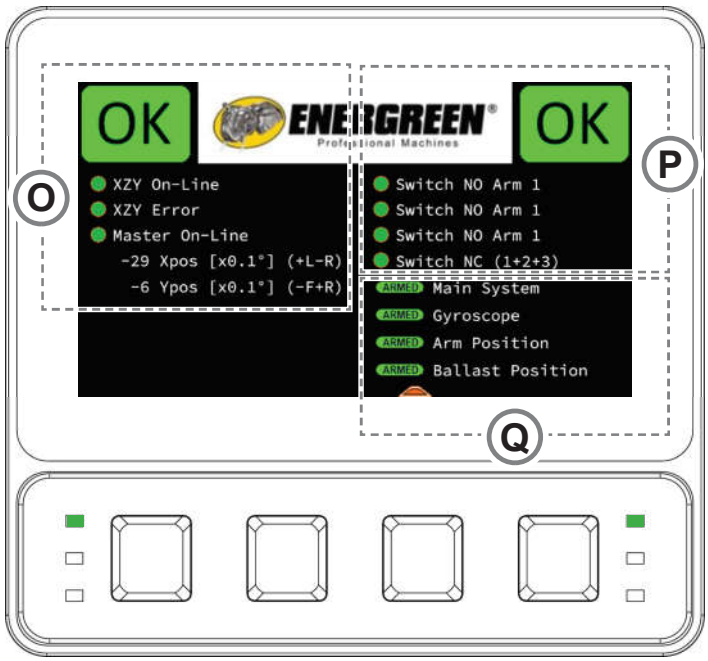
System status		Dead man	Meaning
			The system is online but disabled. The ballast is retracted.
			The system is online but disabled. The ballast is extended.
			The system is online and enabled. The ballast is retracted.
			The system is online and enabled. The ballast is extended.
			The system is online and bypassed. The ballast is retracted.
			The system is online and bypassed. The ballast is extended.

If the arm system considers that the position of the arm is “SAFE”, the symbol (**10**) appears on the screen. Otherwise, if these conditions are not met, the symbols (**11**) appear on the screen.

SYSTEM screen

This screen summarizes the main information about the two systems. The screen includes:

- an area for information regarding the TILT system (**O**);
- an area for information regarding the ARM system (**P**);
- an area that indicates the general status of the anti-tipping system (**Q**);



Malfunctions

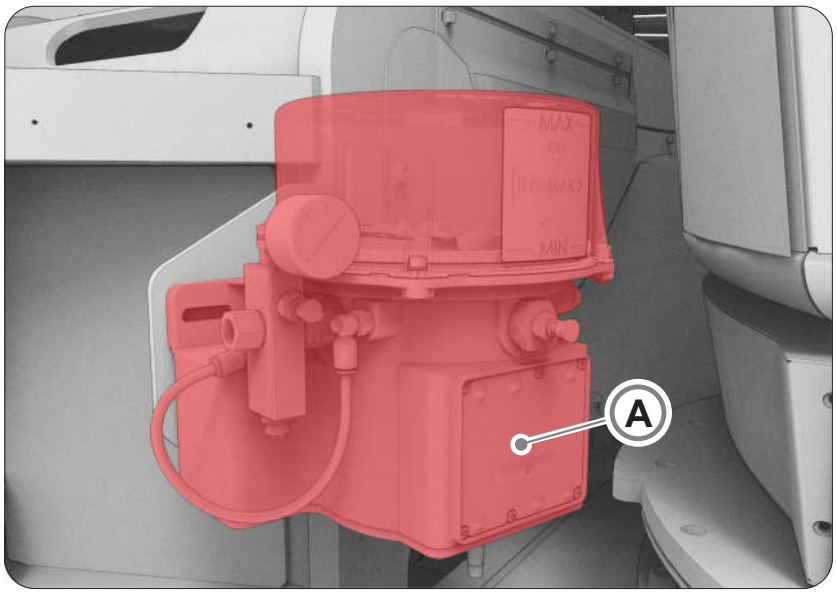
If the (**R**) symbol appears, contact ENERGREEN S.P.A. Customer Care.

If it appears on the TILT screen, it indicates that:

- the gyroscope is reading a value that is out of range;
- the gyroscope is offline.

If it appears on the ARM screen, it indicates a fault in the micro switches that indicate the position of the arm.

6.58 AUTOMATIC GREASING SYSTEM (OPTIONAL)



The automatic grease pump (**A**) is fitted for lubricating the friction points. This system greatly reduces the maintenance costs of the machine on which it is installed, eliminating machine downtime for lubrication purposes while lengthening the service life of the lubricated components.

The following symbol will be present on the WORK MODE screen during greasing:

Symbol	Description
	Greasing in progress

The warning light flashes red when the lubricant in the tank reaches the minimum level or if there is a fault (see section ***"6.69 Troubleshooting the automatic greasing system"***).

Fill with PAKELO CONTACT GREASE PLUS: a semi-synthetic, stringy purple grease thickened with lithium soap. It is formulated with selected lubricant bases and special Extreme Pressure (EP), anti-wear, antioxidants, anti-rust and anti-corrosion additives.

6.58.1 Service mode

Service mode is used to keep the grease pump powered, until the machine # ProductName # is shut down. This mode is useful for refilling the entire greasing circuit if the tank is topped up, see section ***"9.14.1 Filling the automatic grease pump"*** or when setting the pump.

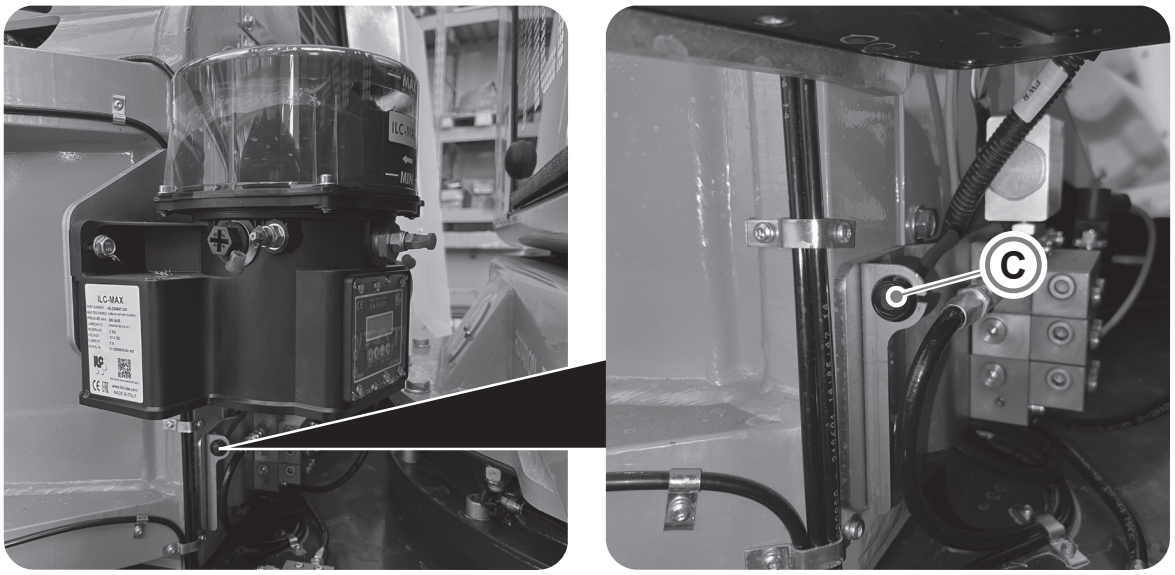
CAUTION

- **In order to enable service mode, the dead man function must not be active.**
- **Turn off the machine to exit service mode.**

To activate service mode, press the anticlockwise cabin rotation button (**A**) and the clockwise cabin rotation button (**B**) at the same time for five seconds.

6.58.2 Reset button

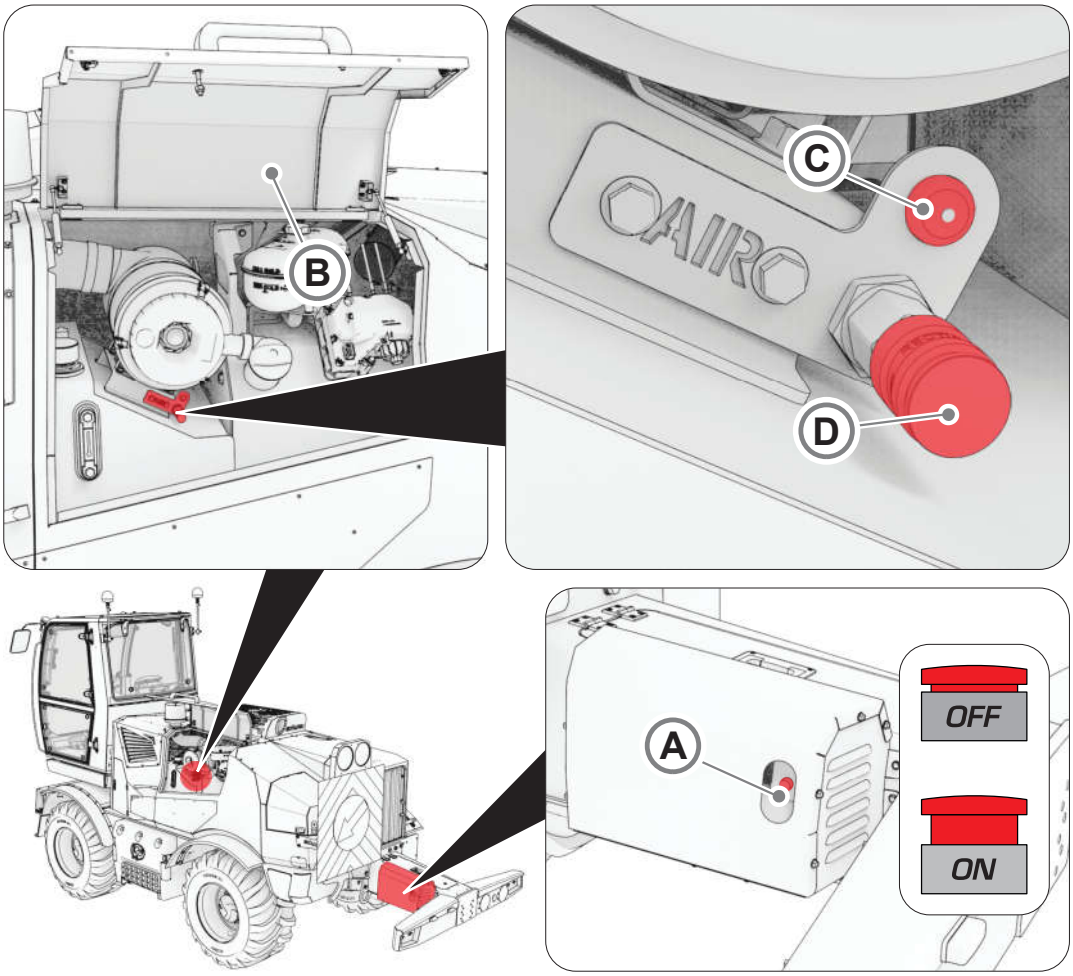
Pressing the reset button (**C**) restarts the pump and causes any alarms on its display to disappear.



6.59 ELECTRIC AIR COMPRESSOR (OPTIONAL)

The ILF ALPHA can be fitted with an optional electric air compressor. Maximum pressure in the circuit
To start the compressor charge the compressed air system, proceed as follows:

1) Enable STATIONARY WORK MODE; see section ***"6.45.7 Stationary work mode (optional)"***;
2) Get off the machine and go to the back of it, near the air compressor: pull out the switch (**A**);
3) Open the bonnet (**B**);
4) Start the compressor by pressing button (**C**): the LED in the button lights up;
5) Wait a few minutes for the circuit to reach the optimal working pressure;
6) Connect the required tool to the quick coupling (**D**);
7) To turn off the compressor, press button (**C**) again; the LED in the button switches off. Press button (**A**) as well.



6.60 USING THE TRAILER

6.60.1 Hitching and unhitching the trailer

DANGER

- **Trailer braking system fault. Accidents. Always make sure that the trailer braking system is working correctly (if fitted).**
- **Tractor instability. Wheelie or overturning. Only use towing devices to connect the trailers to the tractor. Do not connect the trailer to the lifter.**
- **Limited visibility. Death or serious injury. Adjust the rear-view mirror each time the trailer is changed.**
- **Accidental movement of the tractor and tool / equipment. Crushing. Do not allow anyone to stand between the tractor and the trailer.**
- **Accidental movement of the trailer. Accidents. Repeat the operation if the towing device is not properly connected / locked.**
- **Vehicle in motion. Accidents. When driving on the road with a trailer, comply with the Highway Code regarding towing.**
- **Vehicle in motion. Fall, impact, crushing. Do not get onto trailers unless operator presence is required by the user manual.**
- **Accidental movement of tools / equipment. Accidents. Only use the pins provided for each specific model.**
- **Towing device incompatible. Accidents. Before connecting a trailer to the towing device, make sure that it is compatible, according to the regulations in force.**
- **Accidental movement of the trailer. Crushing. Only unhitch the trailer after having emptied it.**
- **Tractor instability. Tipping over / accidents. Coupling and uncoupling the tool / equipment or trailer on level ground and in good condition.**
- **Accidental movement of the tractor and tool / equipment. Crushing. During coupling and uncoupling operations, make sure there is no one in the area between the tractor and the trailer or the tool / equipment.**

WARNING

- **Loss of control of the machine. Accidents. The engine brake function of the machine does not activate trailer braking, use the brakes to slow down.**
- **Accidental movement of the tractor. Accident. If the tractor with the trailer attached has to be parked on an uneven surface, place chocks under the wheels of the trailer as well.**
- **Incorrect maintenance. Accidents. Keep the towing device clean and greased.**
- **Warning. Breakage of mechanical parts. Accidents. When carrying out manoeuvres that require a high steering angle of the trailer, make sure that there is no interference between parts of the trailer and the tractor.**

CAUTION

Incorrect operation. Damage to the tractor and trailer. Only use the towing device for connecting a trailer to a tractor, do not use it for any other purpose.

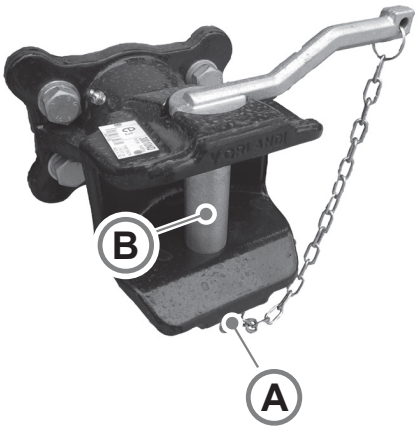
CAUTION

Use protective clothing (gloves and shoes) to protect against injury and abrasions.

Towing hitch with locking pin

To hook up the trailer:

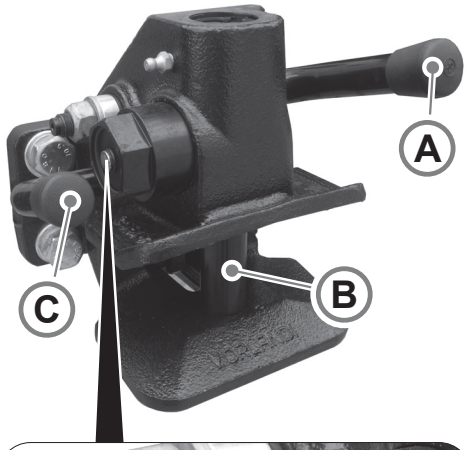
1) Remove the locking pin (**A**).
2) Remove the pin (**B**).
3) Move the tractor slowly backwards until the eye of the drawbar enters the towing device.
4) Insert the pin.
5) Replace the locking pin and make sure that it is firmly fastened.



To unhitch the trailer:

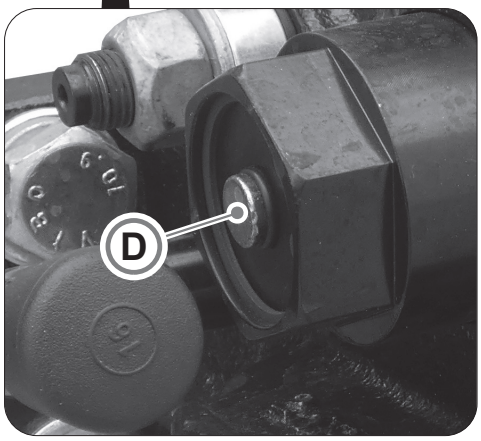
1) Remove the locking pin (**A**).
2) Remove the pin (**B**).
3) Move the tractor slowly forwards until the eye of the drawbar is fully out of the towing device.
4) Insert the pin.
5) Replace the locking pin and make sure that it is firmly fastened.

Towing hitch with safety lock



To hook up the trailer:

1) Rotate the safety lever upwards (**A**);
2) The pin (**D**) comes out of its seat, indicating that the locking pin (**B**) has been raised and the connection has been unlocked;
3) Move the machine slowly backwards until the eye of the drawbar enters the towing device, releasing the pin (**B**) and therefore connecting it to the trailer;
4) Make sure that the pin (**D**) enters its seat completely (see photo). If it does not fit completely into the seat, it means that the connection has not been made correctly: check the cause (hitch components jammed and/or the pin has not entered the eye correctly).

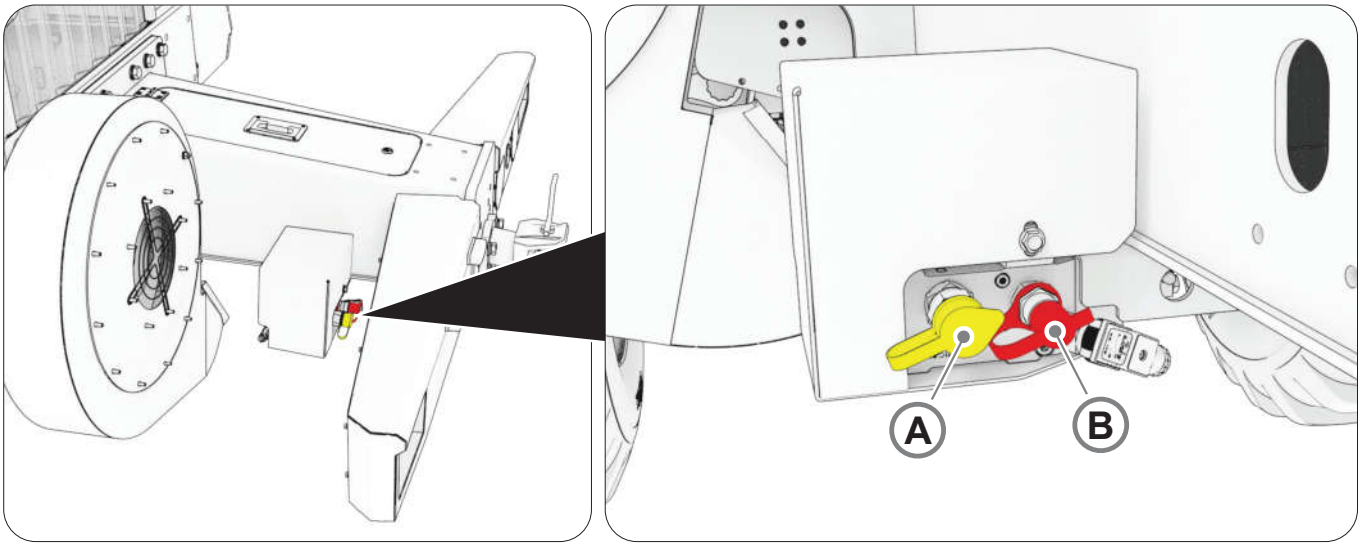


To unhitch the trailer:

1) Rotate the safety lever upwards (**A**);
2) The pin (**D**) comes out of its seat, indicating that the locking pin (**B**) has been raised and the connection has been unlocked;
3) Move the machine slowly forwards until the eye of the drawbar exits from the towing device;
4) Push the lever (**C**) downwards to release the pin (**B**).

6.60.2 *Connecting a trailer with hydraulic braking*

The machine can be fitted with a dual line braking system specifically for the trailer, according to Regulation (EU) 2015/68.



At the back of the machine, there are two couplings (**A**) and (**B**). Coupling (**A**) is for the service brake line, while coupling (**B**) is for the park brake line.

WARNING

It is prohibited to tow machines fitted with hydraulic braking systems with stored energy.

6.60.3 Leaving the machine unattended in a safe condition with the trailer connected

DANGER

Trailer braking system fault. Accidents. Always make sure that the trailer braking system is working correctly (if fitted).

If you have to leave the machine unattended with the trailer connected, proceed as follows. Trailers can be classified according to their type of braking:

- Unbraked trailers;
- Trailers with inertia braking;
- Trailers with hydraulic or pneumatic braking.

Leaving the machine unattended with an unbraked trailer connected:

1) Stop the machine on a flat surface.
2) Switch off all equipment.
3) Place the gear selector into neutral.
4) Apply the machine park brake.
5) Make sure that the machine and the trailer remain stationary.
6) Make sure there is no one near the machine.
7) Lower any equipment attached to the front lifter (if fitted) to the ground.
8) Turn off the engine and remove the ignition key.
9) Get off the machine.
10) Place chocks under the wheels of the trailer and the machine.

Leaving the machine unattended with a trailer fitted with inertia braking connected:

1) Stop the machine on a flat surface.
2) Switch off all equipment.
3) Place the gear selector into neutral.
4) Apply the machine park brake.
5) Make sure that the machine and the trailer remain stationary.
6) Make sure there is no one near the machine.
7) Lower any equipment attached to the front lifter (if fitted) to the ground.
8) Turn off the engine and remove the ignition key.
9) Get off the machine.
10) Apply the trailer park brake, see the trailer operator’s manual.
11) Place chocks under the wheels of the trailer and the machine.

Leaving the machine unattended with a trailer fitted with hydraulic or pneumatic braking connected:

1) Stop the machine on a flat surface.
2) Switch off all equipment.
3) Place the gear selector into neutral.
4) Apply the machine park brake, this will cause the trailer park brake to be applied.
5) Make sure that the machine and the trailer remain stationary.
6) Make sure there is no one near the machine.
7) Lower any equipment that is attached to the front lifter (if fitted) to the ground.
8) Turn off the engine and remove the ignition key.
9) Get off the machine.
10) Place chocks under the wheels of the trailer and the machine.

6.61 ENGINE FAULTS

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.61.1 Using the diagnostic troubles codes (DTC)

The diagnostic trouble codes (**DTC**) consist of two parts: the first part (**SPN**) is the number of the system or component that is thought to cause the problem; while the second (**FMI**) is the number that identifies the type of problem that has occurred. To determine exactly what the problem is, both parts of the code are necessary (SPN and FMI).

For example, diagnostic code DTC 000110.03 consists of:

	Code	Meaning
SPN:	000110	Engine coolant temperature signal
FMI:	03	Over the maximum limit specified

The combination of the two codes indicates an “excessive engine coolant temperature sensor input voltage”. You should then take corrective action “check sensor and wiring”. If this does not solve the problem, contact ENERGREEN S.P.A. customer care.

Always contact ENERGREEN S.P.A. customer care to help understand the diagnostic trouble codes displayed.

6.61.2 FMI codes

FMI	FMI description
00	Very high
01	Extremely low
02	Not valid
03	Over the maximum limit specified
04	Under the minimum limit specified
05	High resistance
06	Low resistance
07	Discrepancy
08	Signal absent
09	Communication loss
10	Anomalous change
11	Activated
12	Error
13	Fault
14	Wrong message
15	Slightly elevated
16	Moderately high
17	Slightly low
18	Moderately low
19	Communication error
31	Existing condition

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.61.3 SPN codes

SPN	SPN description
000027	EGR valve position signal
000051	Air throttle valve actuator position signal
000094	Low pressure fuel pressure signal
000097	Water in fuel signal
000100	Engine oil pressure signal
000101	Crankcase pressure signal
000102	Air manifold pressure signal
000103	VGT speed signal
000105	Manifold air temperature signal
000107	Air filter differential pressure
000108	Barometric pressure signal
000109	Engine coolant pressure signal
000110	Engine coolant temperature signal
000111	Engine coolant level alarm switch
000157	Fuel rail flute pressure signal
000158	ECU release
000168	Unswitched battery voltage
000174	Fuel temperature signal
000189	Decrease in engine speed
000190	Engine speed
000412	EGR temperature signal
000611	Injector 1 command
000612	Injector 2 command
000613	Fuel pressure control valve drive
000629	EEPROM ECU
000636	Camshaft position signal
000637	Crankshaft position signal
000651	Injector 1
000652	Injector 2
000653	Injector 3
000654	Injector 4
000655	Injector 5
000656	Injector 6
000695	Unapproved engine speed request
000970	External stop switch
001075	Low pressure supply pump data
001136	ECU temperature signal
001172	Intake air temperature
001176	intake air pressure
001180	Calculated VGT turbine input temperature

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	SPN description
001209	Exhaust manifold pressure signal
001347	Fuel pump pressure control valve 1
001348	Fuel pump pressure control valve 2
001321	Starter motor command circuit
001569	Engine power reduction
001761	DEF tank fuel level signal
002002	Original address 2-253
002253	Original address 2-253
002629	Turbo compressor air temperature sensor
002630	Air post cooler outlet temp signal
002659	EGR flow signal
002790	Turbo compressor air temperature sensor
002791	EGR valve command circuit
002795	VGT calibration version
002797	High voltage supply injector 1
002798	High voltage supply injector 2
003031	DEF tank fluid temp. signal
003216	DPF outlet NO_x
003226	SCR outlet NO_x
003246	DPF outlet temperature
003251	DPF differential pressure sensor
003361	DEF dosing injector signal
003464	Air throttle valve actuator command circuit
003509	Supply voltage sensor 1
003510	Supply voltage sensor 2
003511	Supply voltage sensor 3
003512	Supply voltage sensor 4
003513	Supply voltage sensor 5
003514	Supply voltage sensor 6
003516	Post-treatment system DEF concentration
003517	DEF tank fluid level
003597	Injector power voltage
003719	Calculated level of soot
003720	Calculated level of ash
003936	DPF filter error occurrences
004334	DEF dosing unit outlet pressure
004341	DEF dosing unit delivery line heater
004343	DEF dosing unit delivery circuit heater
004345	DEF dosing unit return circuit heater
004360	SCR inlet temperature
004363	SCR outlet temperature
004364	SCR catalyst conversion efficiency

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	SPN description
004366	DEF tank heater coolant valve
004376	Reversing valve
004490	Aspiration air humidity
004765	DOC inlet temperature
004766	DOC outlet temperature
004795	DPF filter missing
005018	DOC error occurrences
005125	Supply voltage sensor 7
005126	Supply voltage sensor 8
005127	Supply voltage sensor 9
005298	DOC efficiency
005435	DEF dosing unit pump
005571	HPCR pressure relief valve
005743	SCR temperature module
005745	DEF dosing unit heater
522494	Air power sensor communication
522495	Exhaust filter temperature module

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.61.4 Intermittent fault diagnostics

A possible solution for diagnosing intermittent faults is to try and reproduce the operating conditions that were present when the DTC code was generated.

6.61.5 *Engine troubleshooting*

Malfunction	Cause	Solution
The engine does not start	Low battery output voltage or discharged battery	Charge or replace batteries.
The engine does not start	Loose or corroded connectors	Clean and tighten the connections.
The engine does not start	Faulty start circuit relay	Contact ENERGREEN S.P.A. customer care.
The engine does not start	Blown fuse	Replace fuse.
The engine does not start	Defective main switch or start safety switch	Repair switch as required.
The engine does not start	Starter solenoid defective	Replace solenoid.
The engine does not start	Starter motor faulty	Replace starter motor.
Starter motor cranks slowly	Low battery output voltage or discharged battery	Charge or replace batteries.
Starter motor cranks slowly	Engine oil too heavy	Drain the engine oil and refill with correct viscosity oil.
Starter motor cranks slowly	Loose or corroded connectors	Clean and tighten the connections.
Engine hard to start or will not start	Engine starting under load	Disengage PTO.
Engine hard to start or will not start	Improper starting procedure	Review starting procedure.
Engine hard to start or will not start	Exhaust restricted	Check and correct exhaust restriction.
Engine hard to start or will not start	No fuel	Check fuel tank.
Engine hard to start or will not start	Air in fuel line	Bleed fuel lines.
Engine hard to start or will not start	Poor quality fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.
Engine hard to start or will not start	Water, dirt, or air in fuel system	Drain, flush, fill, and bleed the fuel system.
Engine hard to start or will not start	Fuel filter restricted or full of water	Replace fuel filter or drain water from the fuel filter.
Engine hard to start or will not start	Dirty or faulty fuel injectors	Contact ENERGREEN S.P.A. customer care.
Engine hard to start or will not start	Electronic fuel system problem	Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Engine hard to start or will not start	Cold weather	Use cold weather starting aids. See Cold weather operation in the Engine operation section.
Engine hard to start or will not start	Engine oil too heavy	Drain the engine oil and refill with correct viscosity oil.
Engine hard to start or will not start	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Engine misfiring or runs irregularly	Poor quality fuel	Incorrect fuel /dirty fuel
Engine misfiring or runs irregularly	Poor quality fuel	Test fuel, drain water from fuel bowl.
Engine misfiring or runs irregularly	Clogged fuel filter	Replace the fuel filter cartridge.
Engine misfiring or runs irregularly	Water, dirt, or air in fuel system	Drain, flush, fill, and bleed the fuel system.
Engine misfiring or runs irregularly	Low coolant temperature	Remove and check thermostat.
Engine misfiring or runs irregularly	Dirty or faulty fuel injectors	Contact ENERGREEN S.P.A. customer care.
Engine misfiring or runs irregularly	Electronic fuel system problem	Contact ENERGREEN S.P.A. customer care.
Engine misfiring or runs irregularly	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Lack of engine power	Air intake restriction	Service the air filter.
Lack of engine power	Exhaust restricted	Check and correct exhaust restriction.
Lack of engine power	Poor quality fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.
Lack of engine power	Clogged fuel filter	Replace the fuel filter cartridges.
Lack of engine power	Engine overloaded	Reduce engine load
Lack of engine power	Improper crankcase oil	Drain the engine oil and refill with correct viscosity oil.
Lack of engine power	Low coolant temperature	Remove and check thermostat.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Lack of engine power	Wrong valve clearance	Adjust valve clearance. See Adjusting valve clearances in the Lubrication and maintenance section - every 3000 hours/36 months.
Lack of engine power	Dirty or faulty fuel injectors	Contact ENERGREEN S.P.A. customer care.
Lack of engine power	Turbocharger not operating correctly	Contact ENERGREEN S.P.A. customer care.
Lack of engine power	Air leak in engine intake manifold or exhaust pipe	Check intake and exhaust manifolds and relative gaskets; repair as required. Contact ENERGREEN S.P.A. customer care.
Lack of engine power	Engine power reduced due to a DTC	Contact ENERGREEN S.P.A. customer care.
Lack of engine power	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Engine Idles poorly	Poor quality fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.
Engine Idles poorly	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Excessive fuel consumption	Engine overloaded	Reduce engine load.
Excessive fuel consumption	Air filter restricted or dirty	Replace air filter element as required.
Excessive fuel consumption	Compression too low	Determine cause of low compression and repair as required.
Excessive fuel consumption	Leaks in fuel supply system	Locate source of leak and repair as required.
Excessive fuel consumption	Improper type of fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.
Excessive fuel consumption	Poor quality fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Excessive fuel consumption	Wrong valve clearance	Adjust valve clearance. See Adjusting valve clearances in the Lubrication and maintenance section - every 3000 hours/36 months.
Excessive fuel consumption	Dirty or faulty fuel injectors	Contact ENERGREEN S.P.A. customer care.
Excessive fuel consumption	Electronic fuel system problem	Contact ENERGREEN S.P.A. customer care.
Excessive fuel consumption	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Excessive fuel consumption	Turbocharger not operating correctly	Inspect turbocharger. Contact ENERGREEN S.P.A. customer care.
Excessive fuel consumption	Low engine temperature	Remove and check thermostat.
Fuel in oil	Clogged fuel return pipe	Check and repair fuel return pipes.
Fuel in oil	Engine load too light	Increase engine load
Fuel in oil	Leaking fuel injectors	Contact ENERGREEN S.P.A. customer care.
Low pressure fuel system - fuel pressure low	Clogged fuel filter	Replace fuel filter.
Low pressure fuel system - fuel pressure low	Clogged fuel line	Locate restriction and repair as required.
Low pressure fuel system - fuel pressure low	Defective transfer pump	Contact ENERGREEN S.P.A. customer care.
Low pressure fuel system - fuel pressure low	Faulty high-pressure fuel pump	Remove pump and repair or replace as required. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn main or connecting rod bearings	Determine bearing clearance. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Excessive crankshaft end play	Check crankshaft end play. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Loose main bearing caps	Check bearing clearance; replace bearings and bearing cap screws as required. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Abnormal engine noise	Worn connecting rod bushings and piston pins	Inspect piston pins and bushings. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Scored pistons	Inspect pistons. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn timing gears or excessive backlash	Check timing gear backlash. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Excessive valve clearance	Check and adjust valve clearances (see Adjusting valve clearances in the Lubrication and maintenance section - Every 3000 hours/36 months).
Abnormal engine noise	Worn camshaft lobes	Inspect camshaft. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn rocker arm shaft(s)	Inspect rocker arm shafts. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn valve guides	Inspect valve guides for wear. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Damaged valve retainers	Inspect retainer and retainer locks for excessive wear. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn or loose rocker arms	Inspect rocker arms for wear. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Bent pushrods	Inspect pushrods for straightness and check contact ends for wear and damage. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Abnormal engine noise	Broken valve springs	Inspect valve springs. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Bent connecting rods	Inspect connecting rod and cap for damage. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Worn flywheel	Inspect flywheel and ring gear for damage. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Loose flywheel	Check flywheel mounting screw. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Excessive piston to liner clearance	Check and adjust piston liner clearance. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Excessive thrust bearing clearance	Check and adjust thrust bearing clearance. Contact ENERGREEN S.P.A. customer care.
Abnormal engine noise	Engine oil too heavy	Drain the engine oil and top up with correct viscosity oil
Turbocharger “Screams”	Leak in intake air system	Check air system for loose clamps, damaged tubes, leaks from the intercooler and the air intake manifold gasket; repair as required. Contact ENERGREEN S.P.A. customer care.
Turbocharger noise or vibration	Bearings not lubricated (insufficient oil pressure)	Determine cause of lack of the lack of lubrication. Repair as required. Contact ENERGREEN S.P.A. customer care.
Turbocharger noise or vibration	Air leak in engine intake manifold or exhaust pipe	Check intake and exhaust manifolds and relative gaskets; repair as required. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Turbocharger noise or vibration	Improper clearance between turbine wheel and turbine housing	Inspect turbocharger; repair or replace as required. Contact ENERGREEN S.P.A. customer care.
Turbocharger noise or vibration	Broken blades (or other wheel failures)	Inspect turbocharger; repair or replace as required. Contact ENERGREEN S.P.A. customer care.
Engine has reached “Maintenance Only” soot Level	Automatic filter cleaning is disabled for an extended period of time	Enable exhaust filter cleaning.
Engine has reached “Maintenance Only” soot Level	Frequent engine shutdowns during automatic cleaning	Let engine run for 30 min to clean the exhaust gas filter.
Engine has reached “Maintenance Only” soot Level	Interlock switches are not properly set to allow DPF / regeneration	Machine must be stationary (parked). Engine speed must be above the minimum setpoint. Any PTO-driven device must be stopped. Engine load must be stable.
SCR high NO_x outlet	DEF tank is low	Fill DEF tank with new diesel exhaust fluid.
SCR high NO_x outlet	Fluid other than DEF has been added to the DEF tank	Drain, flush and fill DEF tank with new DEF. Cleaning the DEF tank in the maintenance section of this manual.
Engine emits white smoke	Engine compression too low	Determine cause of low compression and repair as required. Contact ENERGREEN S.P.A. customer care.
Engine emits white smoke	Defective thermostat(s) (stuck open)	Test thermostats; replace thermostats as required
Engine emits white smoke	Coolant entering combustion chamber (failed cylinder head gasket or cracked cylinder head)	Repair or replace as required. Contact ENERGREEN S.P.A. customer care.
Engine emits white smoke	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Engine emits white smoke	Improper type of fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Engine emits white smoke	Poor quality fuel	Drain fuel and replace with quality fuel of the proper grade for the operating conditions.
Engine emits white smoke	Low engine temperature	Warm up engine to normal operating temperature.
Engine emits white smoke	Defective thermostat	Remove and check thermostat.
Engine emits white smoke	Defective fuel injectors	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Engine overloaded	Reduce engine load.
Engine emits black, grey or blue smoke	Engine burning oil	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Air filter restricted or dirty	Replace air filter element as required.
Engine emits black, grey or blue smoke	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Exhaust filter cracked or damaged	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Improper type of fuel	Use proper type of fuel.
Engine emits black, grey or blue smoke	Injectors dirty	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Electronic control system problem or basic engine problem	Contact ENERGREEN S.P.A. customer care.
Engine emits black, grey or blue smoke	Turbocharger not operating correctly	Contact ENERGREEN S.P.A. customer care.
Engine overheats	Air filter restricted or dirty	Replace air filter element as required.
Engine overheats	Lack of coolant in cooling system	Fill cooling system to proper level. Check radiator and hoses for loose connections or leaks.
Engine overheats	Engine oil level low	Check oil level. Add oil as required.
Engine overheats	Radiator core dirty	Clean cooling system as required.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Engine overheats	Flush cooling system as required	Flush cooling system. (See Flushing and filling the cooling system in the Lubrication and maintenance section - Every 6000 hours/72 months.)
Engine overheats	Engine overloaded	Reduce engine load.
Engine overheats	Loose or defective fan belt	Check belts and automatic tensioner. Replace as required. (See “Checking the belt tensioner spring tension” in the “Lubrication and maintenance” section - Every 500 hours/12 months.)
Engine overheats	Defective or incorrect thermostats	Test thermostat opening temperature; replace thermostats as required.
Engine overheats	Damaged cylinder head gasket	Replace cylinder head gasket. Contact ENERGREEN S.P.A. customer care.
Engine overheats	Cylinder head gasket leaking	Replace cylinder head gasket. Contact ENERGREEN S.P.A. customer care.
Engine overheats	Defective coolant pump	Contact ENERGREEN S.P.A. customer care.
Engine overheats	Defective radiator cap	Replace radiator cap as required.
Engine overheats	Defective temperature gauge or sensor	Check coolant temperature with a thermometer. Replace if necessary.
Engine overheats	Incorrect grade of fuel	Use correct grade of fuel.
Coolant temperature below normal	Defective thermostat(s)	Test thermostats; replace thermostats as required.
Coolant temperature below normal	Defective temperature gauge or sensor	Check gauge, sensor and connections.
Coolant in crankcase	Head gasket defective	Replace cylinder head gasket. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Coolant in crankcase	Cylinder head or block cracked	Locate crack and repair/replace components as required. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	Cylinder liner seals leaking	Remove and inspect cylinder liners. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	Cylinder liners pitted	Remove and inspect cylinder liners. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	Leaking oil cooler	Pressure test oil cooler; repair/ replace as required. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	Defective oil cooler O-rings	Remove and inspect oil cooler O-rings; replace as required. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	EGR cooler leaking	Pressure test EGR cooler; repair/ replace as required. Contact ENERGREEN S.P.A. customer care.
Coolant in crankcase	Faulty coolant pump seal; weep hole plugged; coolant leaking through bearings	Replace coolant pump seals. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Low crankcase oil level	Fill crankcase to proper oil level.
Low oil pressure	Defective pressure sensor	Replace sensor. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Clogged oil cooler or filter	Remove and inspect oil cooler. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Low oil pressure	Excessive oil temperature	Remove and inspect oil cooler. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Defective oil pump	Remove and inspect oil pump. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Incorrect oil	Drain crankcase and refill with the correct oil.
Low oil pressure	Oil pressure regulator valve failure	Remove and inspect oil pressure regulating valve. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Clogged oil pump screen or cracked pick-up tube	Remove oil sump and clean pick-up tube screen / replace pick-up tube.
Low oil pressure	Excessive main or connecting rod bearing clearance	Determine bearing clearance. Contact ENERGREEN S.P.A. customer care.
Low oil pressure	Engine oil level too high	Drain oil until oil level is correct.
High oil pressure	Improper oil classification	Drain crankcase and refill with the correct oil.
High oil pressure	Defective pressure sensor	Replace sensor. Contact ENERGREEN S.P.A. customer care.
High oil pressure	Oil pressure regulator valve failure	Remove and inspect oil pressure regulating valve. Contact ENERGREEN S.P.A. customer care.
High oil pressure	Stuck or damaged filter bypass valve	Remove and inspect filter bypass valve. Contact ENERGREEN S.P.A. customer care.
High oil pressure	Stuck or damaged oil cooler bypass valve	Remove and inspect oil cooler bypass valve. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Engine oil viscosity too low	Drain the engine oil and refill with correct viscosity oil.
Excessive oil consumption	Engine oil level too high	Drain oil until oil level is correct.
Excessive oil consumption	External oil leak	Determine source of oil leak and repair as required.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Excessive oil consumption	Excessive oil pressure	(See High oil pressure.)
Excessive oil consumption	Oil control rings not seated correctly	Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Oil control rings worn or broken	Replace piston rings. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Clogged crankcase vent tube	Clean vent tube, check that crankcase oil level is not too high.
Excessive oil consumption	Defective turbocharger	Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Scored cylinder liners or pistons	Remove and inspect cylinders and liners; replace as required. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Worn valve guides or rods	Inspect and measure valve rods and valve guides; repair as required. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Piston ring grooves excessively worn	Remove and inspect pistons. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Piston rings sticking in ring grooves	Remove and inspect pistons. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Insufficient piston ring tension	Remove and inspect pistons. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Piston ring gaps not staggered	Remove and inspect pistons. Contact ENERGREEN S.P.A. customer care.
Excessive oil consumption	Front and/or rear crankshaft oil seal faulty	Replace oil seal. Contact ENERGREEN S.P.A. customer care.
Undercharged electrical system	Excessive electrical load from added accessories	Remove accessories or install higher output alternator. Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Undercharged electrical system	Excessive engine idling	Increase engine rpm when heavy electrical load is used.
Undercharged electrical system	Poor electrical connections on battery, ground strap, starter motor or alternator	Inspect and clean as necessary.
Undercharged electrical system	Defective battery	Test batteries.
Undercharged electrical system	Alternator faulty	Test charging system.
Battery uses too much water	Cracked battery case	Check for moisture and replace component as necessary.
Battery uses too much water	Check for moisture and replace component as necessary.	Test battery.
Battery uses too much water	Battery charging rate too high	Test charging system.
Battery will not charge	Loose or corroded connectors	Clean and tighten the connections.
Battery will not charge	Sulphated or worn-out batteries	Replace batteries.
Battery will not charge	Stretched belt or defective belt tensioner	Adjust belt tension or replace belts.
Starter motor functions correctly; rest of electrical system does not function	Blown fuse	Replace fuse.
Starter motor functions correctly; rest of electrical system does not function	Faulty battery connection	Clean and tighten the connections.
Starter motor functions correctly; rest of electrical system does not function	Sulphated or worn-out batteries	Replace batteries.
Starter motor functions correctly; rest of electrical system does not function	Blown fuse	Replace fuse.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

This page has been left empty intentionally.

6.62 TROUBLESHOOTING THE VEHICLE

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.62.1 Using the diagnostic troubles codes (DTC)

The diagnostic trouble codes (**DTC**) consist of two parts: the first part (**SPN**) is the number of the system or component that is thought to cause the problem; while the second (**FMI**) is the number that identifies the type of problem that has occurred. To determine exactly what the problem is, both parts of the code are necessary (SPN and FMI).

If this does not solve the problem, contact ENERGREEN S.P.A. customer care.

Always contact ENERGREEN S.P.A. customer care to help understand the diagnostic trouble codes displayed.

6.62.2 SPN - FMI codes

SPN	FMI	Description
3000	1	001/7 - 3000/7.1 - VCU IN C1
3001	1	002/8 - 3001/8.1 - VCU IN C2
3002	1	003/9 - 3002/9.1 - VCU OUT C1
3003	1	004/10 - 3003/10.1 - VCU OUT C2
3004	1	005/11 - 3004/11.1 - VCU OUT Exp1
3005	1	006/12 - 3005/12.1 - VCU OUT Exp2
3006	1	001/7 - 3000/7.1 - VCU IN C1
3007	1	002/8 - 3001/8.1 - VCU IN C2
3008	1	003/9 - 3002/9.1 - VCU OUT C1
3009	1	004/10 - 3003/10.1 - VCU OUT C2
3010	1	005/11 - 3004/11.1 - VCU OUT Exp1
3011	1	006/12 - 3005/12.1 - VCU OUT Exp2
3012	1	013 - 3012.1 - VCU HW Fault Supply Analog C1
3013	1	014 - 3013.1 - VCU HW Fault Supply AnalogC2
3014	1	015 - 3014.1 - VCU HW Fault Supply CPU C1
3015	1	016 - 3015.1 - VCU HW Fault Supply CP
3016	1	017 - 3016.1 - VCU HW Fault Supply Exp1
3017	1	018 - 3017.1 - VCU HW Fault Supply Exp2
3018	1	019 - 3018.1 - VCU HW Fault Safety-Yellow Led
3019	1	020 - 3019.1 - VCU CAN0 BusOff

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
3020	1	021 - 3020.1 - VCU CAN0 DriveError
3021	1	022 - 3021.1 - VCU CAN0 ErrorPassive
3022	1	023 - 3022.1 - VCU CAN0 Overflow
3023	1	024 - 3023.1 - VCU CAN1 BusOff
3024	1	025 - 3024.1 - VCU CAN1 DriveError
3025	1	026 - 3025.1 - VCU CAN1 Error Passive
3026	1	027 - 3026.1 - VCU CAN1 Overflow
3027	1	028 - 3027.1 - VCU CAN2 BusOff
3028	1	029 - 3028.1 - VCU CAN2 DriveError
3029	1	030 - 3029.1 - VCU CAN2 Error Passive
3030	1	031 - 3030.1 - VCU CAN2 Overflow
3031	2	032/3/4 - 3032/3/4 - VCU LibLinkA
3032	1	032/3/4 - 3032/3/4 - VCU LibLinkA
3033	1	032/3/4 - 3032/3/4 - VCU LibLinkA
3034	2	035/6/7 - 3034/5/6 - VCU LibLinkB
3035	1	035/6/7 - 3034/5/6 - VCU LibLinkB
3036	1	035/6/7 - 3034/5/6 - VCU LibLinkB
3037	2	038 - 3037.2 - VCU CAN PKP4A OffLine
3038	2	039 - 3038.2 - VCU CAN PKP4B OffLine
3039	2	040 - 3039.2 - VCU CAN PKP6A OffLine
3040	2	041 - 3040.2 - VCU CAN PKP6B OffLine
3041	2	042 - 3041.2 - VCU CAN PKP8A OffLine
3042	2	043 - 3042.2 - VCU CAN PKP8B OffLine
3043	2	044 - 3043.2 - VCU CAN PKP12A OffLine
3044	2	045 - 3044.2 - VCU CAN PKP12B OffLine
3045	2	046 - 3045.2 - VCU CAN PK10 OffLine
3046	2	047 - 3046.2 - VCU CAN PK14 OffLine
3047	2	048 - 3047.2 - VCU CAN PT OffLine
3048	2	049/50 - 3048/9.2 - VCU KP6 1
3049	1	049/50 - 3048/9.2 - VCU KP6 1
3050	2	051 - 3050.2 - VCU CAN APEM OffLine
3051	2	052/3 - 3051/2 - VCU JS1H Dx
3052	1	052/3 - 3051/2 - VCU JS1H Dx
3053	2	054/5 - 3053/4 - VCU JS1H Sx
3054	1	054/5 - 3053/4 - VCU JS1H Sx
3055	2	056/7 - 3055/6 - VCU Steer Sx
3056	1	056/7 - 3055/6 - VCU Steer Sx
3057	2	058/9 - 3057/8 - VCU Steer Dx
3058	1	058/9 - 3057/8 - VCU Steer Dx
3059	2	060 - 3059.2 - VCU CAN Display OffLine
3060	2	061 - 3060.2 - VCU CAN E-Trans H1 OffLine
3061	2	062 - 3061.2 - VCU CAN Engine OffLine

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
3062	2	063 - 3062.2 - VCU CAN Telemetry OffLine
3063	3	064 - 3063.3 - VCU HW Fault Analog WorkMode
3064	3	065 - 3064.3 - VCU HW Fault AnalogOhm Level fuel
3065	3	066 - 3065.3 - VCU HW Fault AnalogOhm Hydraulic Temp
3066	3	067 - 3066.3 - VCU HW Fault Emergency Button
3067	3	068 - 3067.3 - VCU HW Fault Analog Aux
3068	3	069 - 3068.3 - VCU HW Fault Analog CC
3069	3	070 - 3069.3 - VCU HW Fault Analog SPP
3070	3	071 - 3070.3 - VCU HW Fault Analog Pitch Flexxair
3071	3	072 - 3071.3 - VCU HW Fault HeadlightAuxEnable
3072	3	073 - 3072.3 - VCU HW Fault PressSwitch BrakeFailure
3073	3	074 - 3073.3 - VCU HW Fault PressSwitch Stop
3074	3	075 - 3074.3 - VCU HW Fault Switch Brake
3075	3	076 - 3075.3 - VCU HW Fault Reverse Gear
3076	3	077 - 3076.3 - VCU HW Fault ButtonAuxDxUse
3077	3	078 - 3077.3 - VCU HW Fault Analog_PedalSpeed
3078	3	079 - 3078.3 - VCU HW Fault 4x4 Active
3079	3	080 - 3079.3 - VCU HW Fault Steering Crab
3080	3	081 - 3080.3 - VCU HW Fault Steering Front
3081	3	082 - 3081.3 - VCU HW Fault Steering Conc.
3082	3	083 - 3082.3 - VCU HW Fault Switch Pos.Cabin
3083	3	084 - 3083.3 - VCU HW Fault Gear Active
3084	3	085 - 3084.3 - VCU HW Fault Switch Pos.Ballast
3085	3	086 - 3085.3 - VCU HW Fault Level Fuel Low
3086	3	087 - 3086.3 - VCU HW Fault Emergency Arrow
3087	3	088 - 3087.3 - VCU HW Fault Pump Grease
3088	3	089 - 3088.3 - VCU HW Fault Differential Gear Active
3089	3	090 - 3089.3 - VCU HW Fault Switch Axle Front
3090	3	091 - 3090.3 - VCU HW Fault Switch Axle Rear
3091	3	092 - 3091.3 - VCU HW Fault Pedal Differential Gear
3092	3	093 - 3092.3 - VCU HW Fault Switch Seat
3093	3	094 - 3093.3 - VCU HW Fault ButtonAuxSxUse
3094	3	095 - 3094.3 - VCU HW Fault Level Oil Low
3095	3	096 - 3095.3 - VCU HW Fault Switch Safe RotArm
3096	3	097 - 3096.3 - VCU HW Fault Switch Safe Arm
3097	3	098 - 3097.3 - VCU HW Fault Level Oil Very Low
3098	3	099 - 3098.3 - VCU HW Fault Barrier mower Switch MontRib
3099	3	100 - 3099.3 - VCU HW Fault Supply PVG 1&2
3100	3	101 - 3100.3 - VCU HW Fault Supply PVG 4&5
3101	3	102 - 3101.3 - VCU HW Fault Div.Open Head
3102	3	103 - 3102.3 - VCU HW Fault Div.Ballast.
3103	3	104 - 3103.3 - VCU HW Fault Div.Rot Head

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
3104	3	105 - 3104.3 - VCU HW Fault Enable Engine On
3105	3	106 - 3105.3 - VCU HW Fault Analog. 1 Arm
3106	3	107 - 3106.3 - VCU HW Fault Analog. 2 Arm
3107	3	108 - 3107.3 - VCU HW Fault Analog. Rot Arm
3108	3	109 - 3108.3 - VCU HW Fault Analog. Incl Head
3109	3	110 - 3109.3 - VCU HW Fault Analog. HeadCut cw
3110	3	111 - 3110.3 - VCU HW Fault Analog. HeadCut ccw
3111	3	112 - 3111.3 - VCU HW Fault High Headlights
3112	3	113 - 3112.3 - VCU HW Fault Dipped Headlights
3113	3	114 - 3113.3 - VCU HW Fault Supply PVG Aux
3114	3	115 - 3114.3 - VCU HW Fault Div.Rot Cabin
3115	3	116 - 3115.3 - VCU HW Fault Analog. Telescopic
3116	3	117 - 3116.3 - VCU HW Fault Analog. Aux
3117	3	118 - 3117.3 - VCU HW Fault Analog/Div 3 Arm
3118	3	119 - 3118.3 - VCU HW Fault Analog. Flexxair
3119	3	120 - 3119.3 - VCU HW Fault Float Head
3120	3	121 - 3120.3 - VCU HW Fault Valv. SPP
3121	3	122 - 3121.3 - VCU HW Fault Lock Incl Head
3122	3	123 - 3122.3 - VCU HW Fault Analog. PTO cw
3123	3	124 - 3123.3 - VCU HW Fault Analog. PTO ccw
3124	3	125 - 3124.3 - VCU HW Fault Steering Crab
3125	3	126 - 3125.3 - VCU HW Fault Steering Conc.
3126	3	127 - 3126.3 - VCU HW Fault First Gear
3127	3	128 - 3127.3 - VCU HW Fault Second Gear
3128	3	129 - 3128.3 - VCU HW Fault Barrier Mower Disk SX
3129	3	130 - 3129.3 - VCU HW Fault Barrier Mower Disk DX
3130	3	131 - 3130.3 - VCU HW Fault Analog. SPP
3131	3	132 - 3131.3 - VCU HW Fault Barrier Mower forward
3132	3	133 - 3132.3 - VCU HW Fault Barrier Mower back
3133	3	134 - 3133.3 - VCU HW Fault Lock Hercules
3134	3	135 - 3134.3 - VCU HW Fault Lock Hercules1
3135	3	136 - 3135.3 - VCU HW Fault Barrier Mower Supply PVG1&2
3136	3	137 - 3136.3 - VCU HW Fault Barrier Mower Supply PVG4&5
3137	3	138 - 3137.3 - VCU HW Fault Barrier Mower Analog.Lift.
3138	3	139 - 3138.3 - VCU HW Fault Barrier Mower Analog.Transl.
3139	3	140 - 3139.3 - VCU HW Fault Barrier Mower Analog.Mont.
3140	3	141 - 3140.3 - VCU HW Fault Barrier Mower Analog.Rib
3141	3	142 - 3141.3 - VCU HW Fault Barrier Mower Open Disk
3142	3	143 - 3142.3 - VCU HW Fault Float Hercules
3143	3	144 - 3143.3 - VCU HW Fault Float Hercules1
3144	3	145 - 3144.3 - VCU HW Fault Susp Hercules
3145	3	146 - 3145.3 - VCU HW Fault Susp Hercules1

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
3146	1	147 - 3146.1 - VCU HW Fault SafetyBank1 off
3147	1	148 - 3147.1 - VCU HW Fault SafetyBank2 off
3148	1	149 - 3148.1 - VCU HW Fault SafetyBank3 off
5000	1	150 - 5000.1 - VCU Level Fuel Fault AVR
5001	12	151 - 5001.12 - VCU Level Oil Low
5002	1	152 - 5002.1 - VCU Level Fuel Low
5003	1	153 - 5003.1 - VCU Level DEF Low
5004	1	154 - 5004.1 - VCU Err Internal Prof6Pt
5005	1	155 - 5005.1 - VCU First Gear Coil Fault
5006	1	156 - 5006.1 - VCU Second Gear Coil Fault
5007	1	157 - 5007.1 - VCU First Gear Err.Insert
5008	1	158 - 5008.1 - VCU Second Gear Err.Insert
5009	1	159 - 5009.1 - VCU Err. Internal WM
5010	1	160 - 5010.1 - VCU Err. Internal SpeedPot
5011	1	161 - 5011.1 - VCU Steering System
5012	1	162 - 5012.1 - VCU Axle Out Position Second Gear
5013	1	163 - 5013.1 - VCU Steering Incomplete
5014	1	164 - 5014.1 - VCU Err. Internal ARM
5015	1	165 - 5015.1 - VCU Err. Internal SPP
5016	1	166 - 5016.1 - VCU Pump Grease
5017	1	167 - 5017.1 - VCU Err. Internal AUX
5018	1	168 - 5018.1 - VCU Err. Internal PTO
5019	1	169 - 5019.1 - VCU Err. Internal Head
5020	1	170 - 5020.1 - VCU Err. Internal Barrier Mower
5021	13	171 - 5021.13 - VCU Level Oil Very Low
5022	10	172 - 5022.10 - VCU Temperature Oil high
5023	13	173 - 5023.13 - VCU Brake Low Pressure
5024	1	174 - 5024.1 - VCU Err.Internal Flexxair
5025	1	175 - 5025.1 - VCU Flexxair Meccancal Mismatch
5026	1	176 - 5026.1 - VCU Flexxair Out of Calibration
5027	1	177 - 5027.1 - VCU Flexxair Faul Coil
5028	1	178 - 5028.1 - VCU Flexxair Pitch V-high
5029	1	179 - 5029.1 - VCU Flexxair Pitch V-low
5030	1	180 - 5030.1 - VCU Flexxair WindUp
8000	11	181 - 8000.11 - ECU Temperature Coolant High
8001	10	182 - 8001.10 - ECU Temperature Coolant Very High
8002	11	183 - 8002.11 - ECU Press Oil High
8003	12	184 - 8003.12 - ECU Press Oil Low
8004	1	185 - 8004.1 - ECU Air Filter Cleaning
8005	12	186 - 8005.12 - ECU Battery/Alternator Fault
8006	1	187 - 8006.1 - ECU UnreliableValue
3149	2	188 - 3149.2 - VCU CAN Exp1 OffLine

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
3150	2	189 - 3150.2 - VCU CAN Exp2 OffLine
5031	1	190 - 5031.1 - VCU Err. Internal CC
3151	1	191 - 3151.1 - VCU HW Fault LibLinkA OutEn
3152	1	192 - 3152.1 - VCU HW Fault LibLinkB OutEn
3153	1	193 - 3153.1 - VCU HW Fault LibLinkA Kxx
3154	1	194 - 3154.1 - free-available
3155	1	195 - 3155.1 - free-available
3156	1	196 - 3156.1 - free-available
3157	1	197 - 3157.1 - free-available
3158	1	198 - 3158.1 - free-available
3159	1	199 - 3159.1 - free-available
3160	1	200 - 3160.1 - free-available
3161	1	201 - 3161.1 - free-available
3162	1	202 - 3162.1 - free-available
3163	1	203 - 3163.1 - free-available
3164	1	204 - 3164.1 - free-available
3165	1	205 - 3165.1 - free-available
3166	1	206 - 3166.1 - free-available
3167	1	207 - 3167.1 - VCU HW Fault LibLinkB Kxx
3168	1	208 - 3168.1 - free-available
3169	1	209 - 3169.1 - free-available
3170	1	210 - 3170.1 - free-available
3171	1	211 - 3171.1 - free-available
3172	1	212 - 3172.1 - free-available
3173	1	213 - 3173.1 - free-available
3174	1	214 - 3174.1 - free-available
3175	1	215 - 3175.1 - free-available
3176	1	216 - 3176.1 - free-available
3177	1	217 - 3177.1 - free-available
3178	1	218 - 3178.1 - free-available
3179	1	219 - 3179.1 - free-available
3180	1	220 - 3180.1 - free-available
3181	1	221 - 3181.1 - VCU HW Fault Probe Level Fuel
3182	1	222 - 3182.1 - VCU HW Fault Probe Temp. Oil
223	1	223 - 223.1 - VCU HW Fault Div.Second Incl.
224	1	224 - 224.1 - VCU HW Fault ByPassPumpH1
225	1	225 - 225.1 - VCU HW Fault Inclinometer
226	1	226 - 226.1 - VCU CAN Inclinometer OffLine
227	1	227 - 227.1 - VCU Inclinometer Danger
228	2	228 - 228.2 - VCU CAN PKP6C OffLine
229	1	229 - 229.1 - VCU HW Fault Hercules AM
230	1	230 - 230.1 - VCU Fault Front Axle Suspension

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

SPN	FMI	Description
231	1	231 - 231.1 - VCU Front Axle Suspension OffLine
232	1	232 - 232.1 - free-available
233	1	233 - 233.1 - free-available
234	1	234 - 234.1 - free-available
235	1	235 - 235.1 - free-available
236	1	236 - 236.1 - free-available
237	1	237 - 237.1 - free-available
238	1	238 - 238.1 - free-available
239	1	239 - 239.1 - free-available
240	1	240 - 240.1 - free-available
241	1	241 - 241.1 - free-available
242	1	242 - 242.1 - free-available
243	1	243 - 243.1 - free-available
244	1	244 - 244.1 - free-available
245	1	245 - 245.1 - free-available
246	1	246 - 246.1 - free-available
247	1	247 - 247.1 - free-available
248	1	248 - 248.1 - free-available
249	1	249 - 249.1 - free-available
250	1	250 - 250.1 - free-available
251	1	251 - 251.1 - free-available
252	1	252 - 252.1 - free-available
253	1	253 - 253.1 - free-available
254	1	254 - 254.1 - free-available
255	1	255 - 255.1 - free-available
256	1	256 - 256.1 - free-available

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.62.3 Intermittent fault diagnostics

A possible solution for diagnosing intermittent faults is to try and reproduce the operating conditions that were present when the DTC code was generated.

6.63 TRANSLATION TROUBLESHOOTING

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.63.1 E-TRAN diagnostics codes

When an error occurs in the translation system, the E-TRAN diagnostic codes are displayed in the specific column on the machine diagnostics screen.

Contact ENERGREEN S.P.A. customer care to help understand the diagnostic codes displayed to resolve the problem.

Code	Description	Status
11	Internal reference voltage failed	Protected
12	Analogue injection channel	Protected
13	Watchdog	Protected
14	The battery voltage will be monitored	Protected
15	< 9V the status is protected > 16V the status is limited	Protected Limited
16	Sensor voltage error. Nominal 5V. < 4.875V or > 5.125V is out of range.	Protected
19	Pump coil wiring crossed	Protected
21	Pump control valve error: forward and reverse	Protected
22	Pump control valve error: forward Feedback error / valve resistance out of range	Limited
23	Pump control valve error: reverse Feedback error / valve resistance out of range	Limited
25	Digital outputs A1 (PSCp03) / A2 (PSC2p04) Feedback error	Protected
26	Digital outputs B1 (CC2p10) / B2 (CC2p09) Feedback error	Protected
28	Hydraulic motor control valve error Feedback error / valve resistance out of range	Limited
31	Motor RPM / pump RPM error Input frequency > 10,000 Hz /> 8000 RPM Pump RPM < "Minimum allowed motor / pump RPM"	Limited
35	FNR shortcut error	Protected
39	Inch sensor error	Protected
41	Inch sensor not calibrated	Start protection

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Code	Description	Status
43	Driving sensor error	Limited
47	Mode switch B error Inputs not inverted	Limited
58	Hydraulic motor RPM error / input frequency > 8000 Hz	Limited
71	CAN hardware error	Limited
72	CAN RX message timeout	Limited
75	Engine speed potentiometer error	Limited
77	Temperature sensor error	Limited
100	Parameter error	No action

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.64 TROUBLESHOOTING THE TRANSMISSION

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.64.1 Troubleshooting the gearbox

Malfunction	Cause	Solution
Second gear does not engage	Cabin not correctly aligned with the direction of travel	Place cabin in the correct position. Check the seal of the rotation cylinder. If the problem persists, contact ENERGREEN S.P.A. customer care.
Second gear does not engage	Gearbox damaged	Inspect / replace. Contact ENERGREEN S.P.A. customer care.
Second gear does not engage	Gear shift / speed sensor not working	Inspect / replace Contact ENERGREEN S.P.A. customer care.
Second gear does not engage	Front wheel steering mode not selected	Select correct mode
Second gear does not engage	Rear axle wheel alignment lost	Restore alignment

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

06-Inconvenienti trasmissione (DANA)

6.64.2 *Troubleshooting the axles*

Malfunction	Cause	Solution
Oil seeping from the seals	Stiffness due to long storage	Clean the area and check in a day or two
Oil seeping from the seals	Damage or slight wear	Contact ENERGREEN S.P.A. customer care.
Oil seeping from the seals	Excessive amount of lubricant	Checking the oil level
Vibrations and/or excessive nosiness	Wheel gear reduction unit not installed properly	Contact ENERGREEN S.P.A. customer care.
Vibrations and/or excessive nosiness	Internal anomalies	Contact ENERGREEN S.P.A. customer care.
Vibrations and/or excessive nosiness	Badly lubricated or defective bearings	Contact ENERGREEN S.P.A. customer care.
Vibrations and/or excessive nosiness	Teeth with bruises or chipping	Contact ENERGREEN S.P.A. customer care.
Multiple disk parking brake cannot be released	No pressure in the braking circuit.	Check the brake connection
Multiple disk parking brake cannot be released	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.
Multiple disk parking brake cannot be released	Defective brake hold	Contact ENERGREEN S.P.A. customer care.
Multiple disk parking brake cannot be released	Residual pressure in the circuit	Check the hydraulic circuit
Multiple disk parking brake cannot be released	Worn discs	Contact ENERGREEN S.P.A. customer care.
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.
When the engine is in operation the gear reduction unit does not turn	Brakes locked	Check the braking system
When the engine is in operation the gear reduction unit does not turn	Internal anomalies	Contact ENERGREEN S.P.A. customer care.
When the engine is in operation the gear reduction unit does not turn	Gear mechanically disengaged	Re-engage the gear in the gearbox
Excessive heating	Too much or too little oil	Check the oil level
Excessive heating	Unsuitable lubricant	Check the type and state of the lubricant.
Excessive heating	Badly lubricated or defective bearings	Contact ENERGREEN S.P.A. customer care.
Excessive heating	Multiple disc brake does not open completely	Check the pressure of the brake opening
Excessive heating	High thermal power	Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.64.3 *Troubleshooting the brakes*

Malfunction	Cause	Solution
Braking is not adjusted on both wheels	Worn brake discs	Replace
Braking is not adjusted on both wheels	Air in the brake lines	Bleed the brake lines
Braking is not adjusted on one side	Air in the brake lines	Replace
Braking is not adjusted on one side	Worn brake disc	Bleed the brake lines
Continuous recharging of the accumulators	Accumulators broken or with too low pre-charge.	Replace
The machine runs continuously with an excessive engine load (> 85%)	Oil in the gearbox	Check the oil level. Top up or contact ENERGREEN S.P.A. Customer Care.
The machine runs continuously with an excessive engine load (> 85%)	Hydraulic oil in the brakes	Contact ENERGREEN S.P.A. customer care.
The machine runs continuously with an excessive engine load (> 85%)	Disc brakes on (service and parking)	Contact ENERGREEN S.P.A. customer care.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

This page has been left empty intentionally.

6.65 TROUBLESHOOTING THE HYDRAULIC SYSTEM

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.65.1 Troubleshooting the hydraulic system

Malfunction	Cause	Solution
The pump emits an unusual noise	Defective pump	Repair or replace
The pump emits an unusual noise	Insufficient oil in the tank	Restore the level
The equipment works only at low speed	Defective pump	Repair or replace
The equipment works only at low speed	Maximum pressure valve out of calibration or not closed due to impurities.	Calibrate or replace
The equipment works only at low speed	Dirty unloading filter	Replace the cartridge

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.66 TROUBLESHOOTING THE ELECTRICAL SYSTEM

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.66.1 Troubleshooting the electrical system

Malfunction	Cause	Solution
Lights are not properly lit even when the engine is running at a high number of revolutions.	Defective cables.	Check and repair the 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.
The alternator's charger indicator light does not turn off when the engine is running and accelerated.	Defective cables.	Replace.
The starter does not run when the key is turned to the ignition position.	Defective cables.	Check and repair.
The starter does not run when the key is turned to the ignition position.	Insufficient accumulator charge.	Charge the accumulator
The starter does not run when the key is turned to the ignition position.	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
The starter makes the engine run slowly.	Starter motor defective.	Replace.
The starter deactivates before the engine starts.	Defective cables.	Check and repair.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
The starter deactivates before the engine starts.	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.
The charge indicator light of the alternator does not turn on when the engine is stopped (ignition key on "I").	Defective cables.	Check and repair.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.67 TROUBLESHOOTING THE CLIMATE CONTROL SYSTEM

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.67.1 Error table

If a fault occurs in the climate control system, the relative error is indicated on the control unit display; the diagnostic table below indicates the main faults that may occur. In case of doubt and/or problems that cannot be solved, do not attempt to look for the fault by disassembling parts of the system. Contact ENERGREEN S.P.A. Customer Care.

Error	Malfunction
E2	Valve error
E3	External probe error
E4	Internal probe error
E5	Compressor probe error
E6	Mixing probe error
E7	RS485 serial error (fan communication)

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.68 TROUBLESHOOTING THE HERCULES 10T LIFTER (OPTIONAL)

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.68.1 Troubleshooting the hydraulic system

Malfunction	Cause	Solution
Oil leaking from the hoses	Hydraulic hose or fitting damaged or incorrectly tightened	Check hoses and/or fittings. Replace if damaged or tighten correctly
Oil leaking from the hydraulic cylinders	Cylinder seals or rod damaged	Investigate the cause of the problem. Repair the cylinder: replace damaged parts
The lifter moves downwards in an uncontrolled manner	Breakage of the blocking valve or its calibration	Check the blocking valves. Replace if the problem persists
Possible cracks on the lifter.	Due to having lifted a load greater than the maximum permissible load, or having hit an obstacle	Get a qualified person to weld / repair the arm in an emergency. Do not use the lifter if it is damaged. Replace the damaged components.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.69 TROUBLESHOOTING THE OPTIONAL AUTOMATIC GREASING SYSTEM

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

CAUTION

- **Always contact ENERGREEN S.P.A. when you have to carry out this operation, indicating the machine identification number and its hours of operation.**
- **If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.**

6.69.1 Troubleshooting the automatic grease pump

Symbol	Description
	Grease pump fault

If the red symbol on the display lights up, it indicates that there is a fault in the automatic greasing pump. When you see this warning symbol, get out of the cabin, go to the side of the machine and see the type of error indicated on the pump display.

Below is a diagnostic table showing the main faults that may occur, the probable causes and the possible action to take. In case of doubt and/or problems that cannot be solved, do not attempt to look for the fault by disassembling parts of the pump. Contact ENERGREEN S.P.A. Customer Care.

Display	Meaning
	No alarm
	Cycle alarm
	Overpressure alarm
	Low level alarm
	Pump rotation alarm
	High temperature alarm
	Low voltage alarm
	Driver status alarm

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

6.69.2 *Troubleshooting the automatic greasing pump*

Malfunction	Cause	Solution
Agitator Pump in the grease tank does not turn when the greasing pump cycle is running.	Mechanical damage, engine faulty	Replace the pump.
	Undervoltage	Check the cable assembly for damage.
		Loosen the main line at the outlet of the pressure regulator valve.
		Loosen the electrical connection.
		Loosen three fastening screws.
		Remove the faulty pump.
		Install the new pump and connect the lubrication line and electrical cable.
		Prepare for commissioning and carry out a functional check.
		Make sure that the interval and contact times are correct.
	Electrical connection interrupted	Check the electrical connections
	Pumping element not installed correctly	Instructions as per data plate
The pump does not run when the button is pressed, even though all the electrical connections are fine.	Electrical check failed	Check the fuse
	The pump drive / motor is faulty.	Replace the pump
	The level of lubricant in the tank is below the minimum.	Fill the lubricant tank to the “max” mark.
	The agitator does not rotate.	Replace the pump element
	Pumping element not installed correctly	Instructions as per data plate
The pump does not deliver lubricant although the agitator is rotating.	Suction problems due to air pockets in the grease	Remove the pump element and operate the pump using the D-key until all the grease drains out from the outlet on the housing.
	The pump element does not build up pressure; the pump element is worn. (This is indicated when the outlet can be sealed with a finger once the main line is removed.)	Replace the pump element
	Lubricant too stiff	If necessary, adjust the lubricant so that it works properly at the lowest operating temperature.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

Malfunction	Cause	Solution
Pressure regulator valve on pump opens and lubricant drains out.	The system pressure is higher than 200/250 bar, for example due to a feed pump being jammed or a blocked lubrication point.	Check the system and repair / reset the system so that the maximum system pressure at 20°C is 200 bar.
	The valve is damaged or dirty, so it does not close properly.	Replace the pressure regulator valve.

If the fault or the reason for it is not indicated in the list of faults shown, contact ENERGREEN S.P.A. in order for repairs to be carried out.

7. TRANSPORT AND HANDLING

7.1 LOADING AND UNLOADING FOR ROAD TRANSPORT

WARNING

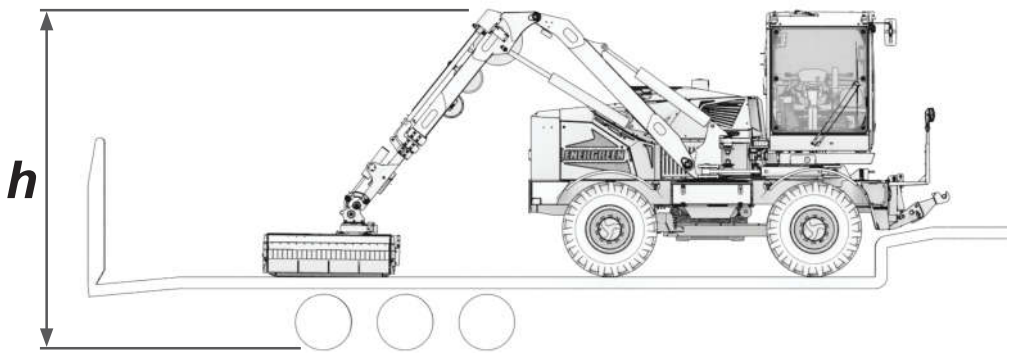
- **The ILF ALPHA machine is able to self-load and unload from trucks or from any type of flatbed with normal ramps. These operations must be carried out in a perfectly level area with the lorry or platform braked.**
- **Make sure that the overall dimensions comply with those specified in the Highway Code.**

To position the machine on the lorry, operate as follows:

1) The positioning of the machine on the means of transport must be carried out by the operator with the help of an assistant on the ground. The arm of the machine must be in the road transport position (see section ***"7.2 Use on roads: regulations"***).
2) The driver of the transport vehicle should block the wheels of the machine with chocks and fasten them to the bed of the vehicle.
3) Extend the arm and place the mulching head on the floor of the vehicle.
4) The driver should secure the machine properly to the bed of the transport vehicle using straps or chains (see section ***"7.1.1 Anchor points for transport"***).
5) Turn the cabin transversally, switch off the engine of the machine. Get out of the cabin only after having removed the ignition key.
6) Lock the cabin using the key.
7) Lower the beacon light and secure it.

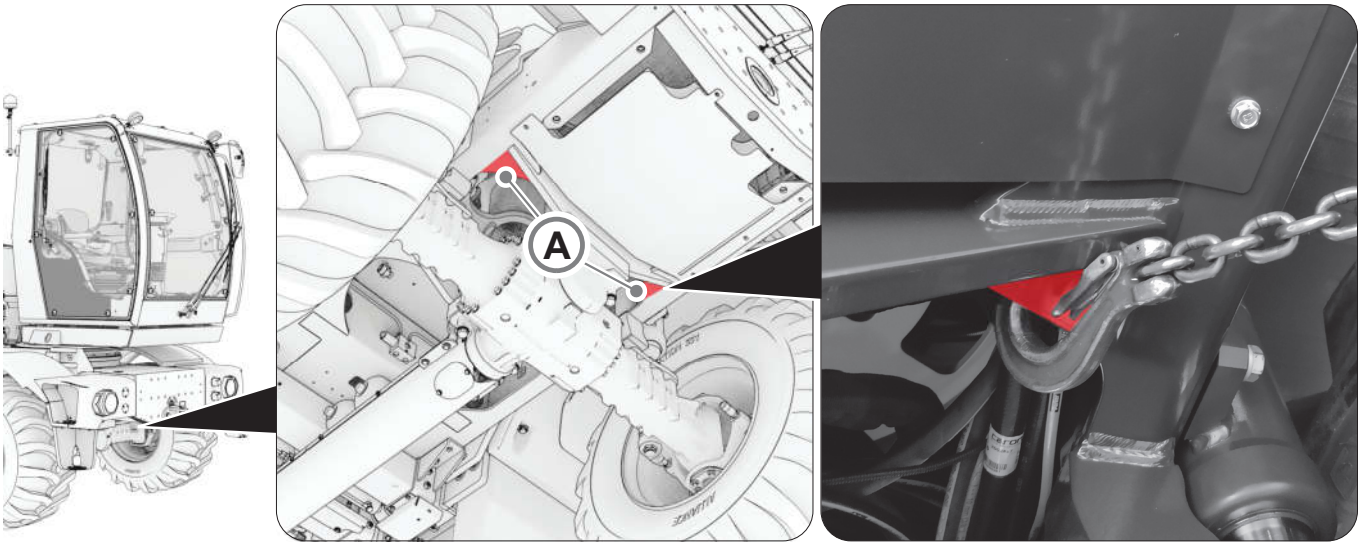
CAUTION

- **Pay attention to the maximum height (h) from the ground.**
- **Special hooks have been fitted on the front and back plate of the machine for securing it to the truck using belts or chains.**

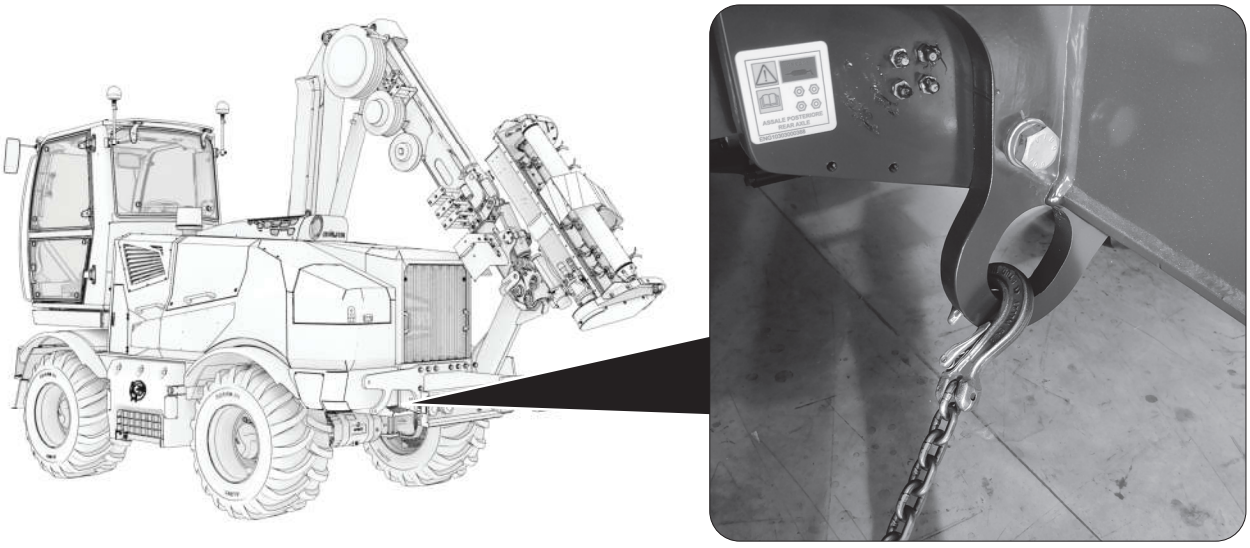


7.1.1 Anchor points for transport

The machine is provided with following anchor points. Anchor points (**A**) can be found at the front of the machine.



While the two points (**B**) can be found at the back.



7.2 USE ON ROADS: REQUIREMENTS

CAUTION

- **The machine is equipped with homologation. For the circulation on roads, strictly follow the indications of the registration certificate of the vehicle and the road circulation code in force.**
- **When driving on the road, you must follow the highway code.**
- **When driving on the road, any work lights must be switched off or masked.**
- **Keep the front and/or rear lights clear and visible. If you wish to install equipment different to the one that was originally mounted, please contact ENERGREEN S.P.A..**

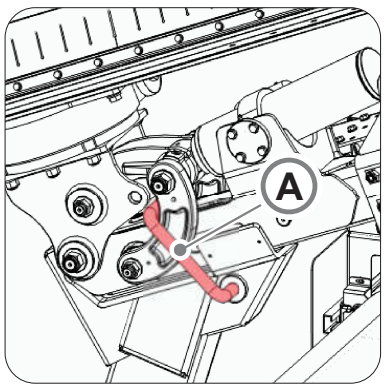
The operator assigned to driving the machine on roads must have category B driving licence. The machine is equipped with safety stops for travelling on public roads.

When the machine has to be transferred:

- After finishing the work, stop the machine and the tool connected to the arm and any other optional tools mounted on it.
- Deactivate WORK MODE.

Place the arm in the road transport position:

1) Retract all the extensions;
2) Fold the arm back;
3) Move close to the arm support;
4) Close the last arm until it rests on the support;
5) Block the arm by inserting the pin (**A**) and then lock it in place using the relative cotter pin;
6) Align the cabin with the direction of travel;
7) Align the wheels with the direction of travel and activate steering with the front wheels only;
8) Fully retract the mobile ballast;
9) Raise the beacon lights on the cabin and switch them on;
10) Position the reflective sign on the head and fasten it with the special springs;
11) Engage second gear.



7.3 IF THE MACHINE BREAKS DOWN

7.3.1 Towing points and towing the machine

DANGER

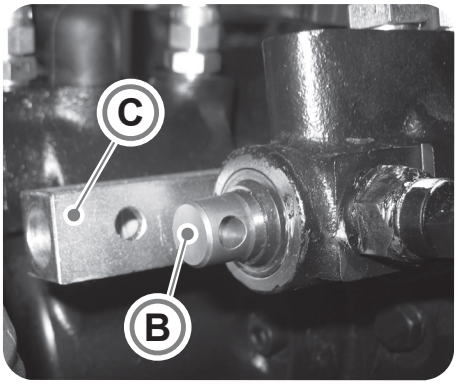
- **When the machine has to be towed, use a metal cable that is strong enough to tow the weight of the machine and any mounted equipment.**
- **The machine is not fitted with lifting points. Do not try to find/identify possible attachment points on the machine. Such actions could compromise the integrity of the machine, as well as result in serious accidents.**

WARNING

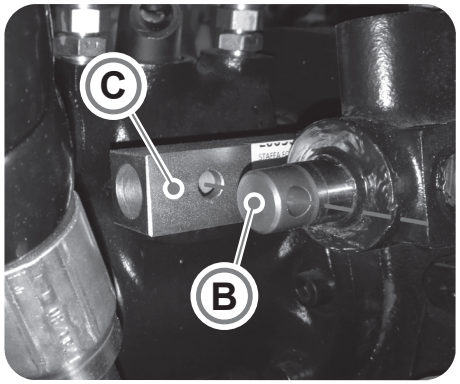
- **Use the traction in a continuous and constant way, without revving.**
- **Arrange and fix the couplings of the machine to be removed in line with the towing vehicle and apply traction parallel to the axis of transfer. Do not use worn out, broken, twisted or deformed cables.**
- **If the engine is not working, it is not possible use the power steering so it will be more difficult to turn the steering wheel.**

Before towing the machine, place the gear lever into neutral.

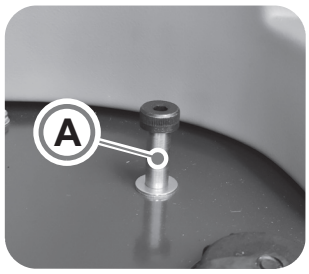
1) To disengage the gear, take the fixing screw (**A**) under the left armrest of the seat in the cabin.
2) Withdraw the release piston (**B**) until the hole is aligned with the hole on the bracket (**C**) and insert the screw (**A**).
3) Deactivate the rear axle park brake lock (see section ***"7.3.2 Releasing the park brake manually"***).
4) For towing, use the appropriate towing hooks (**D**).
5) When towing, no persons must come close to the machine or to the cable. Do not climb saddle-like on the cable.
6) Tow the machine for short distances, in order to be able to carry out possible repairs. If the machine is stuck in mud and cannot come out under its own power or is broken down, use a metallic cable of adequate strength, attaching it to it the hooks (**D**).

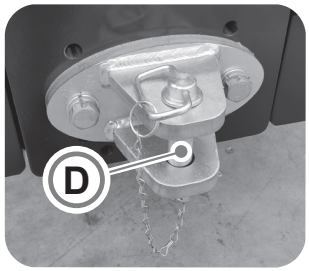


GEAR ENGAGED



GEAR DISENGAGED





7.3.2 Releasing the park brake manually

WARNING

- **The park brake is activated In the event of an engine or hydraulic system malfunction; the park brake must be released before removing the machine.**
- **Wear protective clothing when releasing the park brake.**

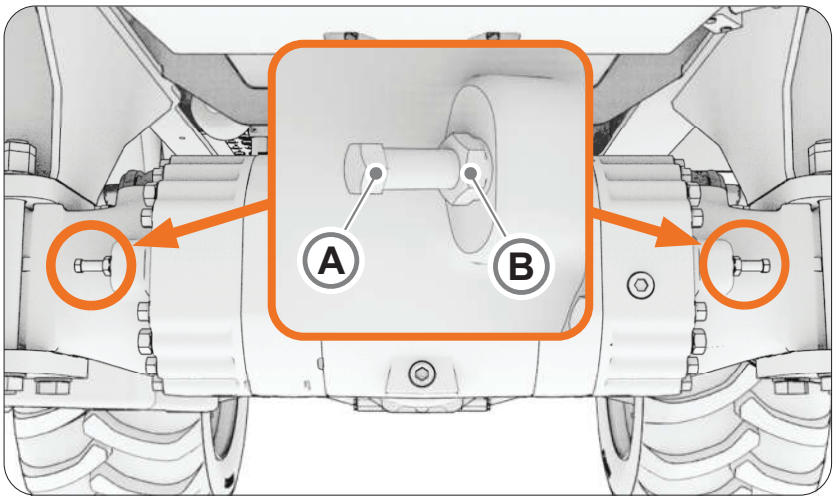
You have to use the brake circuit in order to release the park brake.

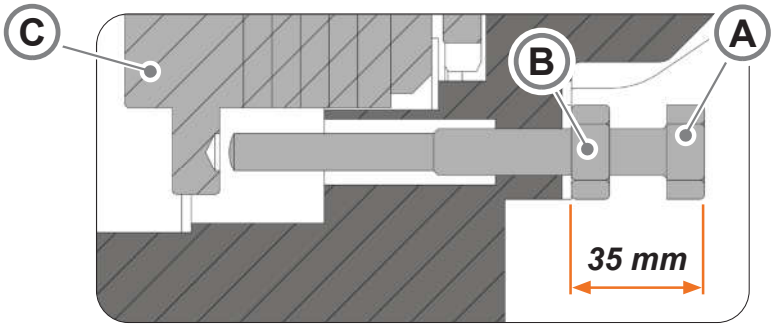
Perform the operations listed below:

1) Loosen the locknuts (**B**) of the four screws (**A**) on the rear axle of the manual mechanical release and withdraw the nuts by about 6 mm.
2) Tighten the screws (**A**) until they rest against the pressure plate (**C**).
3) Use a wrench to tighten the two screws on the right hand side (front and rear) alternately by 1/4 of a turn at a time to compress the Belleville washer and release the brake discs.
4) The amount of travel required for release corresponds to one turn.
5) Carry out the same procedure for the screws on the left.

After every manual release:

- Adjust the heads of the screws (**A**) so that they project by 35 mm with respect to the arm.
- Secure the screws (**A**) in position using the locknuts (**B**) and carefully check by how much the screws protrude.





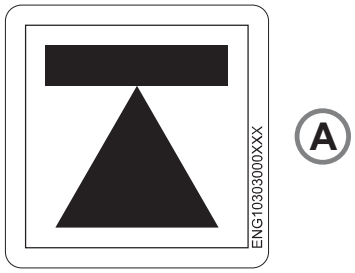
7.4 LIFTING THE MACHINE

The machine can be lifted as follows:

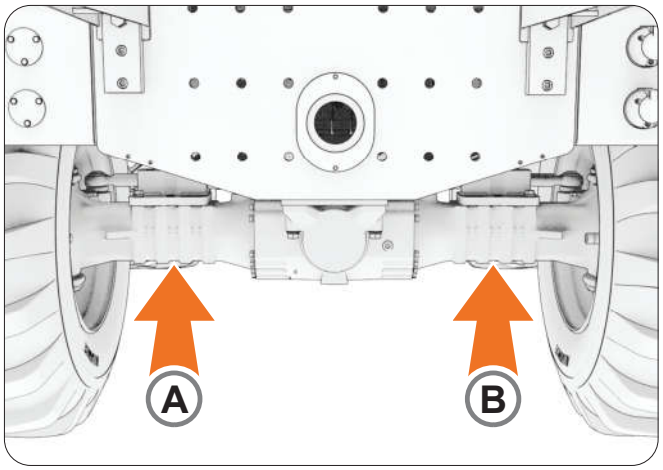
- Complete lifting;
- Partial lifting:
  - Of a wheel;
  - Of the front or rear of the machine for adjusting the steering angle;
  - Of the front part due to the swinging of the bridge;

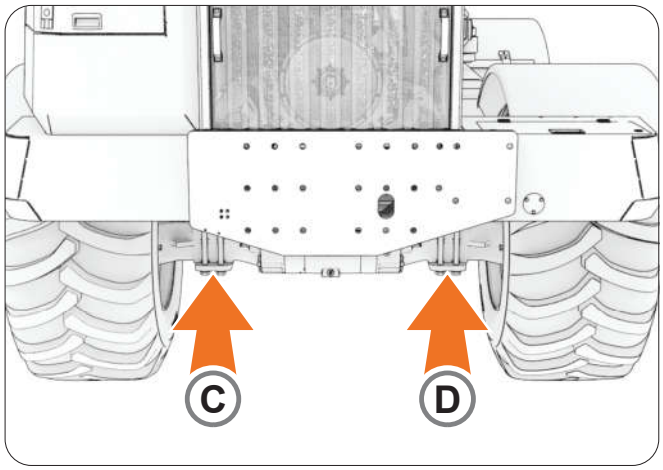
7.4.1 Lifting points

The lifting points on the machine are indicated by the pictogram (**A**).



The position of the lifting points are shown below.





Front axle	
A	Right lifting point
B	Left lifting point

Rear axle	
C	Left lifting point
D	Right lifting point

7.4.2 Complete lifting

The machine should only be lifted completely at an authorized workshop.

7.4.3 Lifting a wheel

This has to be done to lift one of the four wheels, for example, to change the tyres.
Before starting, make sure that the following conditions are met:

- Machine parked on level ground;
- Engine switched off;
- Machine made safe, see section *"3.1.4 Instructions for carrying out inspections and maintenance"*.

DANGER

- **Crushing hazard**
- **Danger of one of the machine and wheel tipping over.**
- **High speed particle projection hazard.**
- **A wheel must only be lifted by suitably trained personnel and with equipment suitable for the purpose.**

CAUTION

Wear safety clothing (gloves, footwear, protective eyewear and overalls) suitable to prevent the crushing of the hands and feet, and to protect against particles projected at high speed.

Proceed as follows:

- Locate the lifting point;
- Position the lifting jack;
- Lift the machine.

8. STORAGE

Before placing the equipment into storage, we recommend that you:

- Remove any cuttings or other types of residue from the machine components (e.g. filters, radiators, cylinders and/or all moving parts).
- Remove any cuttings or other types of residue from the components of connected equipment (e.g. rotor, flails, cylinders and/or all moving parts).
- Thoroughly wash and clean the machine and the equipment connected to it.
- Lubricate all mechanical parts that are subject to friction, as indicated in this manual.
- Inspect the entire structure for cracks/breakages. If you notice any damage, do not use the equipment; contact ENERGREEN S.P.A. Customer Care.
- Check the integrity of the guards and safety devices, replace if necessary.
- Inspect the equipment for any scratches that may have damaged the paintwork, repair if necessary.
- Make sure that all the safety signs are present and integral, replace if necessary.

If the equipment is to be stored for long periods, we recommend that you:

- Store it indoors, in an area sheltered from atmospheric agents, humidity and dust.
- The machine should be stored at a temperature between 0 °C and 40 °C.
- Position the machine on a flat, firm surface and make sure it is stable.
- Connect a battery maintainer to the battery. If you do not have a battery maintainer, disconnect the battery(ies), by disconnecting the negative terminal.

8.1 FIRST USE OR COMMISSIONING AFTER A LONG PERIOD OF INACTIVITY

Before using the equipment for the first time, or after a long period of inactivity, the following should be carried out:

- Check that the equipment has not been damaged.
- Check the mechanical components, which must be in good condition and not rusty.
- Check the flails for wear (if present).
- Thoroughly grease all moving parts.
- Check that there are no oil leaks in the piping or unions.
- Check that all guards are correctly positioned.
- Check the condition of the battery(ies).

8.2 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

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.

We therefore recommend, and it is in our Customer's own interest, to read these instructions carefully and that they consult the manual every time they might need advice on how to overcome possible faults. 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 ENERGREEN S.P.A. Customer Care:

Phone	+39 0444 1511 200
E-mail	service@energreen.it

9.2 GENERAL INSTRUCTIONS

- Maintenance of the machine and/or equipment must be carried out by authorised personnel.
- Before carrying out any maintenance or inspecting and/or checking the machine, turn off the engine and remove the ignition key.
- When removing or reinstalling parts of the machine, always use suitable extractors, spanners and equipment that will not damage the 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.

9.3 EXTRAORDINARY INTERVENTIONS

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, ENERGREEN S.P.A. cannot be considered liable for any risks that could arise. These interventions must be performed by authorised personnel.

9.4 FLUIDS AND GREASES

9.4.1 Lubricants table

WARNING

- **When using biodegradable hydraulic oils, avoid mixing them with more than 5% of other oils.**
- **The use of non recommended lubricants and/or grease results in the forfeiture of the warranty.**

COMPONENT	RECOMMENDED LUBRICANT	INTERNATIONAL SPECIFICATIONS
ENGINE *(in the run-in period)*	John Deere Break-In Plus™ SAE 10W-30	• API CK-4 / API CJ-4 • ACEA E9 / ACEA E6
ENGINE	John Deere Plus-50™ II SAE 15W-40	
HYDRAULIC SYSTEM *Mineral oil*	Q8 HELLER 46 ISO 46	• DIN 51524 Part 3 category HVLP • ISO 11158 category HV • AFNOR 48-603 category HV • ISO 6743-4 category HV • DIN 51502 category HVLP
HYDRAULIC SYSTEM *Biodegradable oil*	Q8 HOLBEIN HP SE BIO 46	• DIN 51524 Part 3 category HVLP • ISO 11158 category HV • ISO 15380 • Class HEES; HF-DU • CEC L 33-A-93 Biodegradability: >80% • Water hazard class: WGK1
	PANOLIN BIO HLP SYNTH E	• FZG Test A/8.3/90 stage 12 • ISO 15380 HEES
COUPLER	• PAKELO EROLUBE EP-C • ISO 150 • SAE 150W	• DIN 51517 Part. 3, • US STEEL 224, • AGMA 250.04
GEARBOX	• UTTO FLUID ISO 100 J20/C • SAE 80W/90	• API GL4 • API GL5
DIFFERENTIAL		
OIL BATH BRAKES		
PLANETARY HUBS		
FOUR-WHEEL DRIVE RELEASE		
PINS, BUSHES AND SLEW RING *Manual greasing*	• PAKELO MOLY GREASE • Greases: NLGI 2	DIN 51502: KPF X M-20

COMPONENT	RECOMMENDED LUBRICANT	INTERNATIONAL SPECIFICATIONS
PINS, BUSHES AND SLEW RING *Automatic greasing*	• PAKELO CONTACT GREASE PLUS • Greases: NLGI 2	DIN 51502: KP 2 N-20
BOOM EXTENSION	ENI GREASE MU EP 2	• ISO 12924 L-XBCHB 2 • DIN 51825 KP 2K -20
BEARINGS	• PAKELO GREENPLEX EP • Grease: NLGI 2	DIN 51502: KP 1 P-10, KP 2 P-10
A/C SYSTEM	DENSO ND-OIL 8	-

PART (Optional)	RECOMMENDED LUBRICANT	INTERNATIONAL SPECIFICATIONS
PTO - GEARBOX OIL	TOTAL TRANSMISSION SYN FE 75W-90	• API GL-4/GL-5; • API MT-1; • MIL-PRF-2105E

9.4.2 *Fuel recommendations*

For information on the properties of diesel fuel available in your area, contact your supplier.

We recommend the use of fuel compliant with Standards EN 590 or ASTM D975. Biodiesel produced by hydrotreating animal fats and vegetable oils is virtually identical to conventional diesel fuel. Biodiesel that complies with Standards EN 590, ASTM D975 or EN 15940 is suitable for use in all mixing ratios.

The fuel must meet the requirements set out below:

1) The minimum cetane value is 40. For temperatures below -20°C or for altitudes above 1675 metres, a cetane value above 47 is preferable.
2) Only use ultra-low-sulphur diesel fuel (ULSD) with a maximum sulphur content of 15 mg/kg (15 ppm).
3) DO NOT USE synthetic diesel fuel (mixture of diesel fuel and ethanol). The use of synthetic diesel fuel (e-diesel) in any ENERGREEN S.P.A. machine may invalidate its warranty.

CAUTION

Failure to comply with the following points will invalidate the machine's warranty.

- **Do not use non-approved fuels.**
- **Do not modify the engine to operate with alternative fuels.**
- **Do not mix oil used for engines or any other type of lubricating oil with the fuel.**
- **Improper use of fuel additives can damage the injection system of the engine.**
- **The use of non-approved fuels will cause damage to engine components**
- **We recommend using biodiesel with a low percentage of recycled substances as over time it can lead to algae forming in the fuel system and create problems with the engine system.**
- **We recommend using fuel with a low sulphur content as the presence of sulphur lowers regeneration temperatures. This will increase regeneration times and may necessitate stationary regeneration having to be carried out.**

WARNING

- **Handle fuel with care.**
- **DO NOT top up the fuel tank while the engine is running.**
- **DO NOT smoke when refuelling or stand near a source of heat or sparks when working on the fuel system.**
- **DO NOT use automatic fuel filling systems without the written consent of ENERGREEN S.P.A..**
- **Ensure that the machine is free from dirt, grease or other flammable residues.**

9.4.3 Recommendations related to AdBlue® / DEF

In order to maintain the emission performance of the engine, it is essential to use AdBlue® / DEF according to the specifications.

The diesel emissions additive (AdBlue® / DEF) is a fluid with great purity, which is injected into the exhaust system of engines with selective catalytic reduction systems (SCR). Maintaining the purity of the AdBlue® / DEF is important to prevent failures in the SCR system.

The engines that require AdBlue® / DEF must use products compliant with the requirements for aqueous solution of urea 32 (AUS 32) according to:

- ISO 22241-1;
- DIN 70070.

WARNING

When topping up, do not use pumps that have been used to refill tanks with other liquids as this could lead to the entire AdBlue® / DEF system becoming contaminated and possibly damaged.

9.4.4 Coolant recommendations

WARNING

The use of coolants other than those indicated below may cause serious damage to the engine and consequently invalidate the machine's warranty.

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

COOL-GARD II Premix	Limit of anti-freeze 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.

Recommended additional coolants

We also recommend John Deere COOL-GARD II, in a concentration of 40 to 60% diluted in deionised or demineralised water.

CAUTION

When mixing concentrated coolant with water, do not use a liquid concentration lower than 40% or higher than 60%:

- **A concentration of less than 40% offers an inadequate quantity of additives for anti-corrosive action.**
- **A concentration of more than 60% can lead to freezing of the coolant and problems with the cooling system.**

9.5 ENGINE MAINTENANCE

9.5.1 Running in the engine

The engine run in period is the first 100 hours of machine operation. Taking care during this period will ensure longer engine life and optimum performance.

1) This engine was filled with John Deere Break-In Plus™ oil before leaving the factory. During the running in period, run the engine with high loads at idle speed.
2) If the engine is run at idle speed for long periods, at constant speeds with light loads, or if the oil needs to be topped up during the first 100 hours of operation, a longer running in period may be required. Under these conditions, we recommend an additional 100-hour running in period.
3) Check the engine oil frequently during the engine running in period. If necessary, top up the special oil during the running in period. For information regarding other types of oil that can be used, see section ***"9.4.1 Lubricants table".***

WARNING

- **When topping up, DO NOT exceed the knurled area or the MAX mark, depending on the type of indicator. Any point in the knurled area corresponds to an acceptable level of oil.**
- **If you have to top up the oil during the running in period, you should use John Deere Break-In Plus™.**

4) Avoid running the engine at idle speed without a load for long periods during the first 100 hours of operation. Do not allow the engine to run at idle speed for more than 5 minutes: switch it off.

CAUTION

- **When using low viscosity oils, an increase in oil consumption is to be expected. Check the oil level more often.**
- **If the temperature is less than 0°C, auxiliary starting devices for low temperatures may have to be used.**
- **Use an engine block heater if the ambient temperature is less than 0°C.**

5) Check the coolant temperature gauge frequently when the engine is running. If the coolant temperature exceeds 113°C, the engine automatically reduces the power output. Unless the temperature falls quickly, stop the engine and investigate the cause before starting it again. Make sure that the oil pressure and the coolant temperature are within the specifications.

Oil pressure at rated speed at full load	**370 kPa**	**(3.70 bar)**	**(54 psi)**
Minimum oil pressure at idle speed	**150 kPa**	**(1.50 bar)**	**(22 psi)**
Coolant temperature range	**85 - 97 °C**		

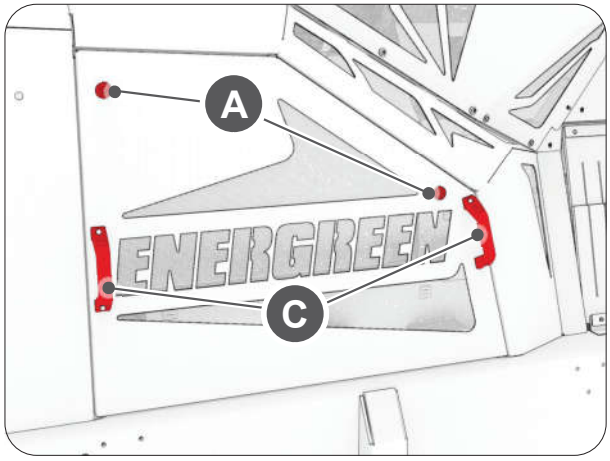
6) Make sure that the belt is seated correctly in the grooves of the pulley.

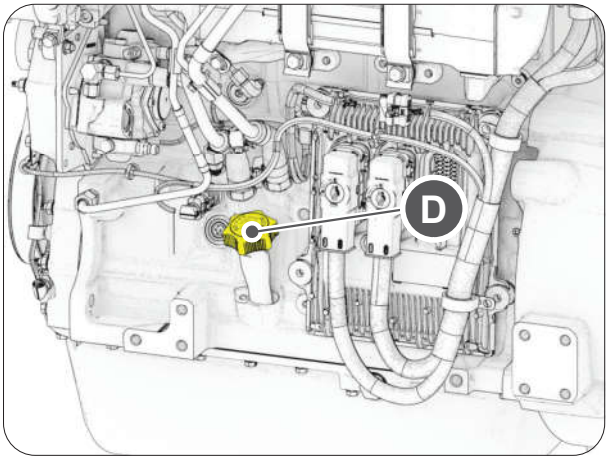
9.5.2 *Checking the engine oil level*

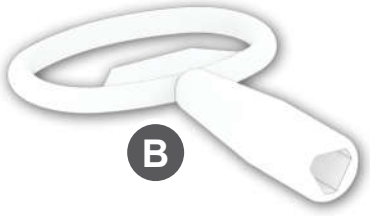
CAUTION

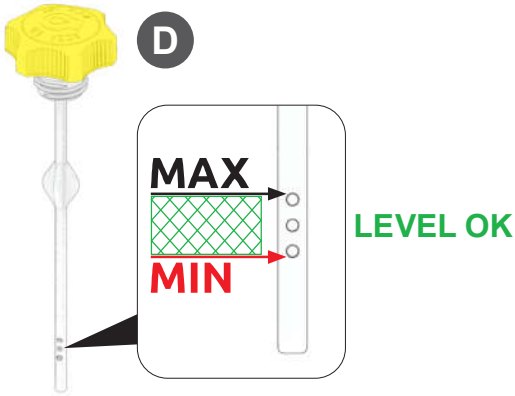
Check the engine oil level *daily or before each use*.

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The engine oil level should be checked when the engine is cold.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section ***"9.4.1 Lubricants table"***.









1) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine.
2) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it.
3) Unscrew the dipstick (**D**).
4) The coolant level is correct when it is between the MIN and MAX marks.
5) If the oil level is low, top up with the same type of oil that is used in the engine. Wait a minute before checking the oil level again.
6) Replace the dipstick (**D**).

9.5.3 *Changing the filter and engine oil*

CAUTION

- **Be very careful when choosing the type of engine oil: refer to the table in section *"9.4.1 Lubricants table"* for the types of oil that can be used.**
- **Replace the engine oil and filter every *500 hours* if John Deere Plus-50™ II oil is used.**
- **If other types of oil are used, *change the oil every 250 hours*.**
- **Quantity of oil to be used *20 litres*.**

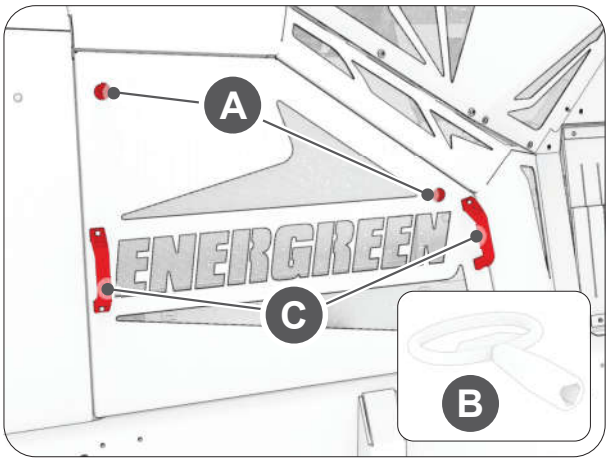
CAUTION

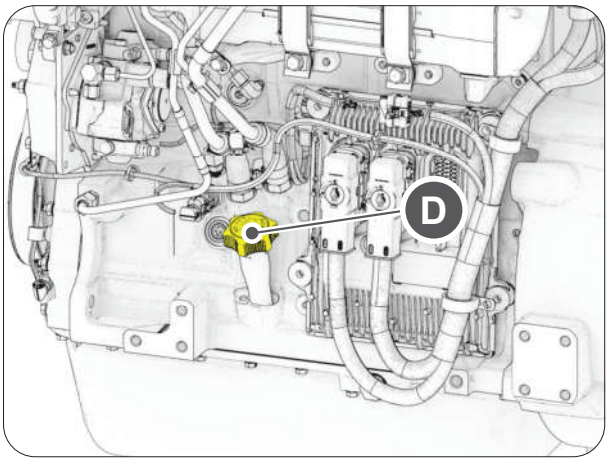
- **The used oil and filter is classified as hazardous waste and must be disposed of correctly.**
- **Do not dispose of with household waste.**
- **Contact your local authority, service centre or dealer for disposal/recycling facilities.**

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 slip resistant shoes and immediately remove any traces of oil.**

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The engine oil should be changed when the engine is warm to the touch.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.



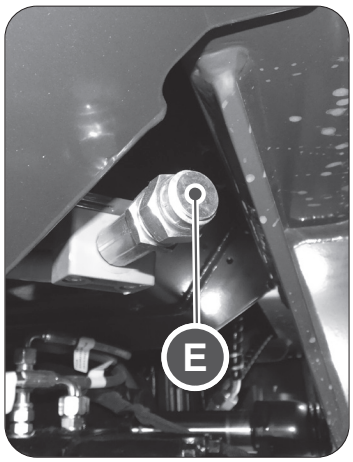


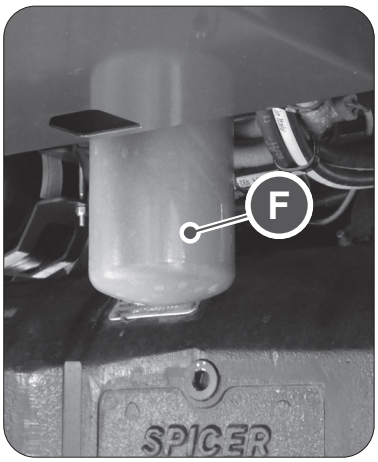
1) Start the machine and run it for five minutes before switching it off again.
2) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine.
3) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it.
4) Unscrew the dipstick (**D**).
5) Place a suitably sized container under the engine oil drainage port to collect the used oil.
6) Unscrew the plug (**E**) using a 27 mm wrench. Drain all the oil while it is still warm.
7) Screw the drain plug (**E**) back on.
8) Unscrew the oil filter (**F**) and remove it. If it is difficult to remove, use an oil filter wrench.

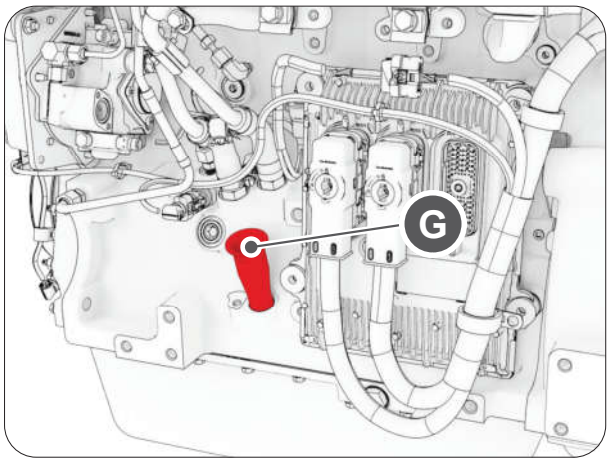
CAUTION

- **The filter should only be installed and tightened by hand!**
- **It is only permitted to use a filter wrench to remove the filter!**

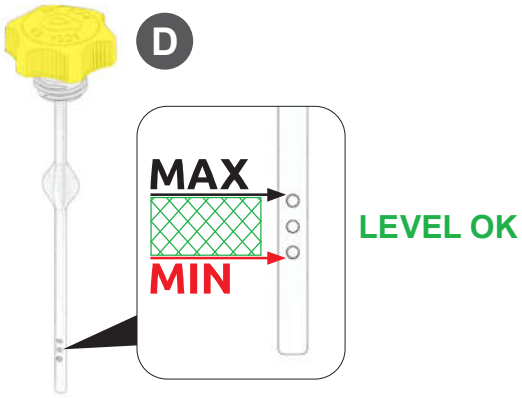
9) Apply engine oil (clean) to the internal and external seals and the thread of the new filter.
10) Wipe all the sealing surfaces that come into contact with the filter with a clean rag.
11) Install the oil filter and tighten it by hand.
12) Fill the engine with oil via the filler hole (**G**).







13) Replace the dipstick (**D**).
14) Start the engine and make sure there are no leaks.
15) Stop the engine and check the oil level again after 10 minutes. The coolant level should be between the knurled reference marks on the dipstick (**D**).



9.5.4 *Checking the coolant level*

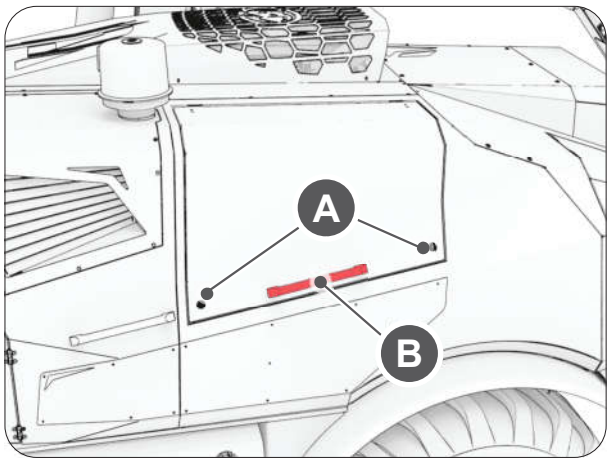
WARNING

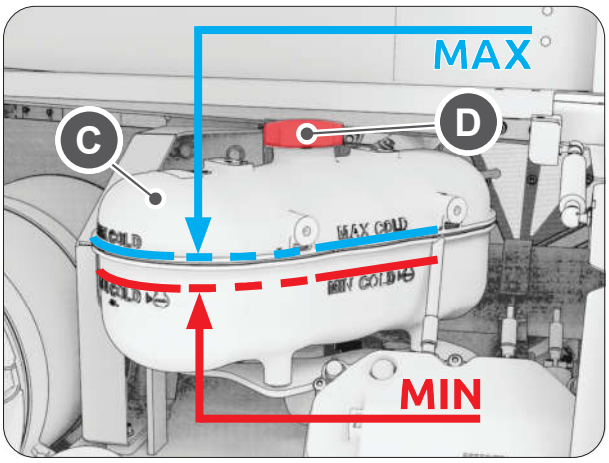
Check the coolant level *daily or before each use*.

DANGER

- **The coolant level should be checked with the engine switched off and cold.**
- **The violent expulsion of coolant under pressure can cause serious burns.**
- **Only remove the filler cap (D) once the entire system has cooled down enough to be touched with bare hands. Before completely removing the cap, slowly loosen it as far as the first stop to discharge pressure from the cooling circuit.**
- **The coolant contains anti-freeze, which is inflammable. Do not use naked flames around it and do not smoke while topping it up.**

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- First clean the checking and filling area to reduce the possibility of contaminating the coolant with impurities.
- For topping up, refer to section ***"9.4.4 Coolant recommendations".***





1) Open the locks (**A**) using the key supplied with the machine.
2) Use the handle (**B**) to open the inspection cover by lifting it upwards.
3) Check the coolant level in the tank (**C**).
4) The coolant level is correct when it is between the MIN and MAX marks.
5) If the coolant level is low, top it up using the same type of liquid used in the engine.
6) Close the cap and tighten it (**D**).

9.5.5 *Changing the coolant*

WARNING

- **Replace the coolant *every 6000 hours* or *every 6 years*.**
- **Quantity of coolant to be used approx. *30 litres*.**

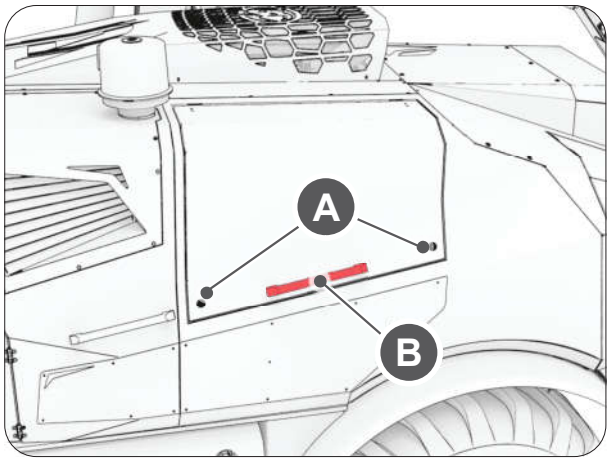
CAUTION

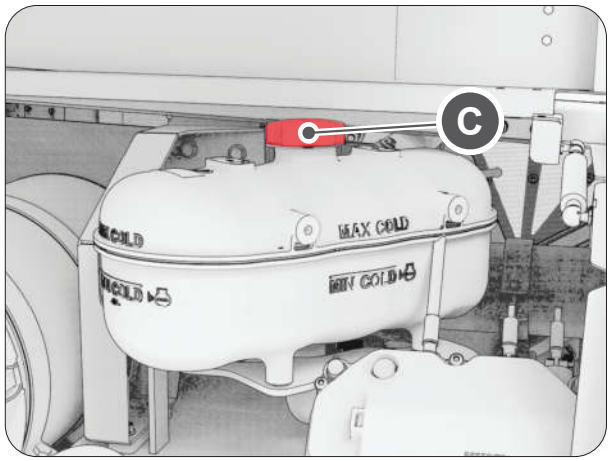
When choosing the type of coolant, refer to section *"9.4.4 Coolant recommendations"*. Using any other type of refrigerant not specified in the above section will immediately void the machine warranty.

DANGER

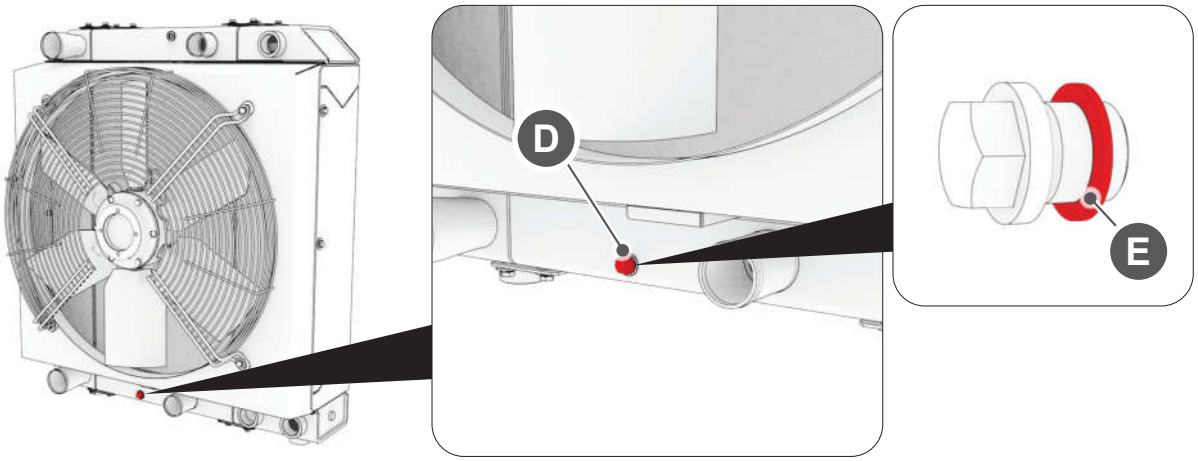
- **The coolant level should be checked with the engine switched off and cold.**
- **The violent expulsion of coolant under pressure can cause serious burns.**
- **Only remove the filler cap (D) once the entire system has cooled down enough to be touched with bare hands. Before completely removing the cap, slowly loosen it as far as the first stop to discharge pressure from the cooling circuit.**
- **The coolant contains anti-freeze, which is inflammable. Do not use naked flames around it and do not smoke while topping it up.**

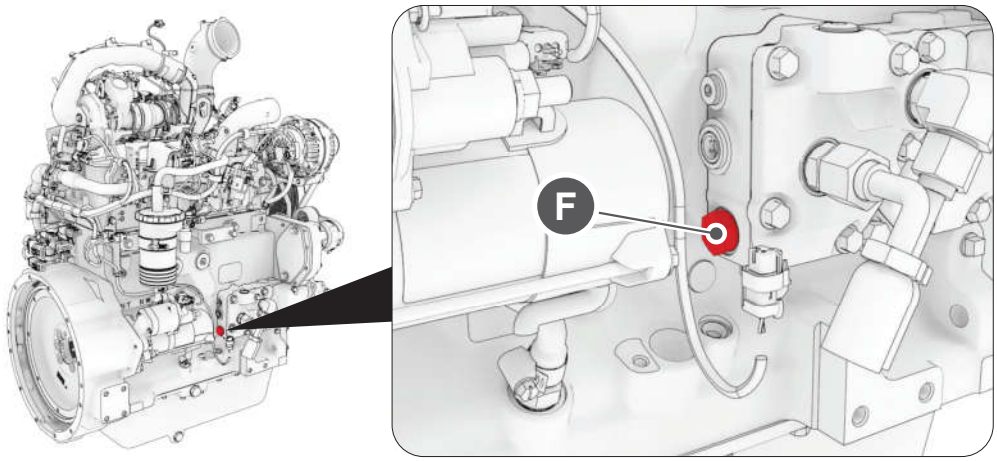
- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- First clean the checking and filling area to reduce the possibility of contaminating the coolant with impurities.

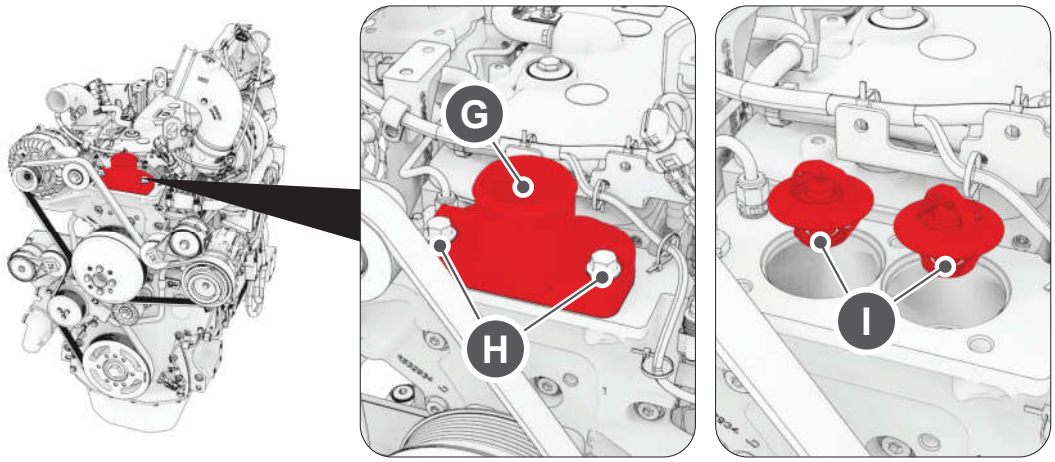




1) Open the locks (**A**) using the key supplied with the machine.
2) Use the handle (**B**) to open the inspection cover by lifting it upwards.
3) Unscrew the cap of the compensation tank (**C**).

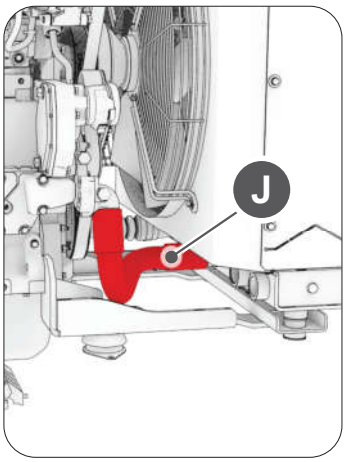


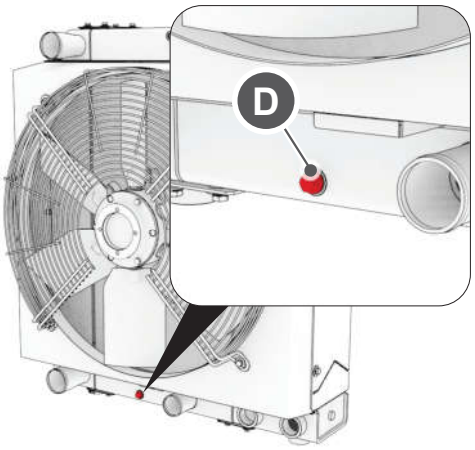


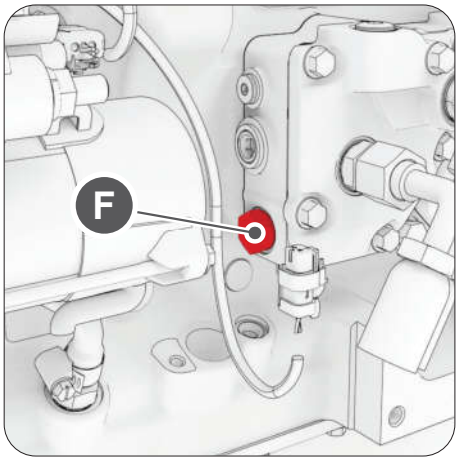


4) Unscrew the radiator plug (**D**) using a 13 mm wrench.
5) Drain the refrigerant and collect it in suitable containers.
6) Unscrew the plug (**F**) from the engine block using a 24 mm wrench.
7) Drain all the coolant from the engine block.
8) Replace the old washer (**E**) on the plug (**D**) with a new one.
9) Unscrew the three screws (**H**) and remove the thermostat cover (**G**).
10) Remove the two thermostats (**I**).
11) Replace the cover (**G**) without the thermostats and the seals, tightening the screws (**H**) with a torque of 73 Nm.

12) Screw the drain plug (**D**) back on.
13) Screw the drain plug (**F**) back on.
14) Close the tank cap (**C**). Fill the cooling system with clean demineralized water. Run the engine for approximately seven minutes to remove any contaminants or foreign particles.
15) Stop the engine and remove the lower radiator hose (**J**), the radiator plug (**D**) and the plug (**F**) on the engine block. Immediately drain the water from the system before any contaminants or foreign particles can settle.







16) After draining the water, screw the radiator drain plug (**D**) and the plug (**F**) back on. Reinstall the hose (**J**) and relative hose clamp.
17) Fill the cooling system with clean water and a detergent for heavy-duty cooling systems such as: Restore or Restore Plus. Follow the manufacturer's instructions on the product label.
18) After cleaning the coolant system, drain the detergent and fill with water to wash the system. Run the engine for approximately seven minutes, but no longer. Stop the engine, remove the radiator plug (**D**) and the plug (**F**) on the engine block and drain the water.
19) Put all the drain plugs back on the engine block and the radiator.
20) Make sure that the two thermostats (**I**) are working correctly.
21) Remove the cover (**G**) and install the thermostats (**I**) using a new gasket.
22) Replace the cover (**G**) and tighten the screws (**H**) that secure the thermostat cover with a torque of 73 Nm.
23) Add coolant to the compensation tank.
24) Turn the engine over until reaching the operating temperature. In this way the solution is mixed evenly and is circulated through whole system. The temperature of the coolant during normal engine operation should be 85-103°C.
25) After turning the engine over, check the coolant level and the sealing of the entire coolant system.

DANGER

Do not run the engine for more than seven minutes. If you do, the engine could overheat and increase the water temperature. This could cause serious burns when it is drained from the cooling circuit.

WARNING

- **During filling it is necessary to vent the cooling system.**
- **Make sure that the compensation 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 change the environment and the eco-system. For the correct disposal or recycling of waste, refer to the appropriate bodies (COBAT COOU, etc.).**
- **The protective agents for the coolant system must be ordered from your partner ENERGREEN.**
- **Never use the motor without coolant even for a short time!**

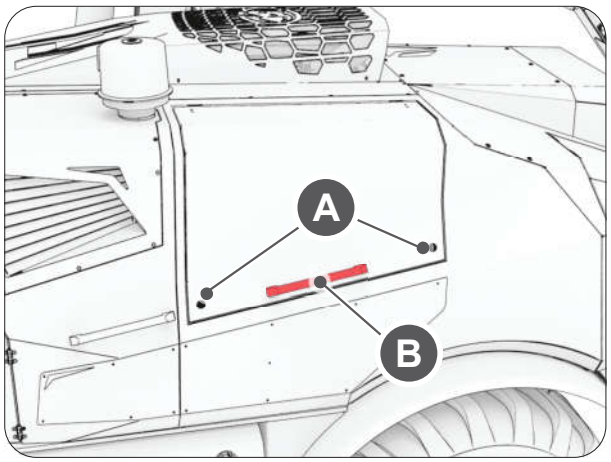
9.5.6 Checking the fuel level

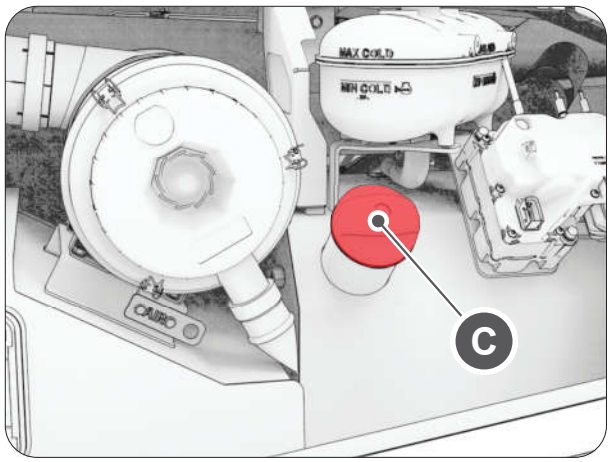
WARNING

Check the fuel level *daily or before each use.*

The fuel level should be checked daily on the display when the machine on a level surface.
To top up with fuel, proceed as follows:

1) Open the locks (**A**) using the key supplied with the machine.
2) Use the handle (**B**) to open the inspection cover by lifting it upwards.
3) Unscrew the cap of the tank (**C**) after opening it with the relative key.
4) Refuel the machine: do not fill the tank all the way to the top; leave a space for expansion.
5) Screw the cap back on and lock it using 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 smoke 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.**
- **Do not use automatic fuel filling systems without the written consent of ENERGREEN. Any tampering with or modification to the fuel system and/or the electrical system is not permitted unless authorized.**

9.5.7 *Draining water from the fuel separator*

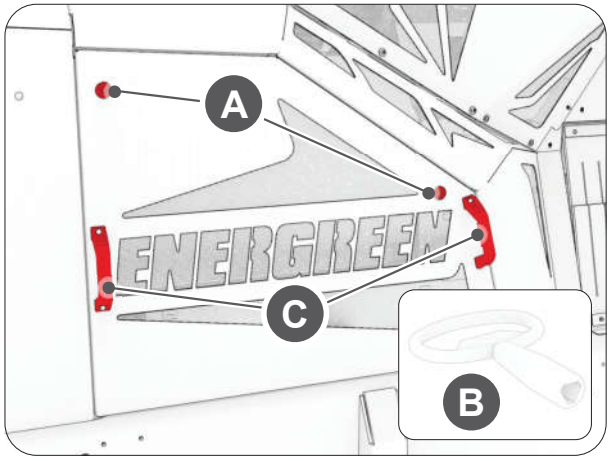
The engine is equipped with two fuel filters: a main filter with water separator (decanter) and a final fuel filter.

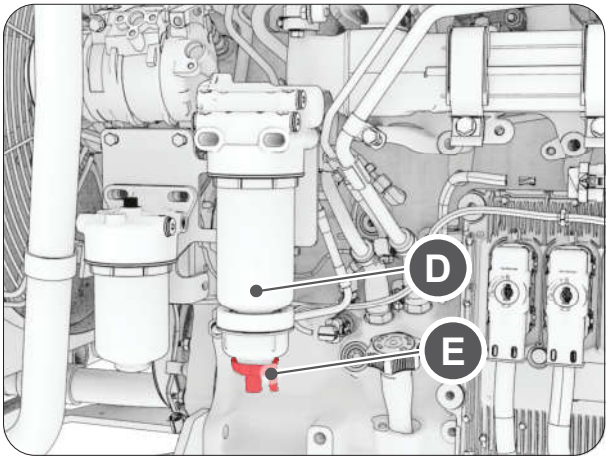
WARNING

Check for the presence of water in the fuel separator *daily or before each use*. Drain it if necessary.

The fuel separator (**D**) is fitted with a sensor that detects the presence of water in the fuel filter cartridge. If alarms are triggered due to the presence of other liquids, STOP THE ENGINE IMMEDIATELY and drain the water from the fuel separator (**D**).

1) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine.
2) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it.
3) Loosen the drainage valve (**E**) and drain the water and contaminants as and when necessary.
4) Then, tighten the valve (**E**) firmly.





WARNING

Replace all fuel filter cartridges if the diagnostic trouble code (DTC) indicates that the fuel filters are clogged ("low supply pressure").

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.**

9.5.8 *Replacing the fuel filters*

The engine is equipped with two fuel filters: a main filter with water separator (decanter) and a final fuel filter.

WARNING

- **Change the fuel filters *every 500 hours or every 12 months.***
- **Both the main filter (separator) and the final filter cartridges should always be replaced at the same time.**

DANGER

Jets of pressurized liquid can penetrate the skin and cause serious injury. Discharge pressure before disconnecting the fuel system lines or other lines. Tighten all fittings before pressurizing the system again. Keep hands and body away from holes and injectors from which high pressure fluid could escape. Use a piece of cardboard or paper to search for leaks. Do not use your hands. Any fluid that enters the skin should be removed surgically within a few hours by a doctor experienced in this type of injury.

WARNING

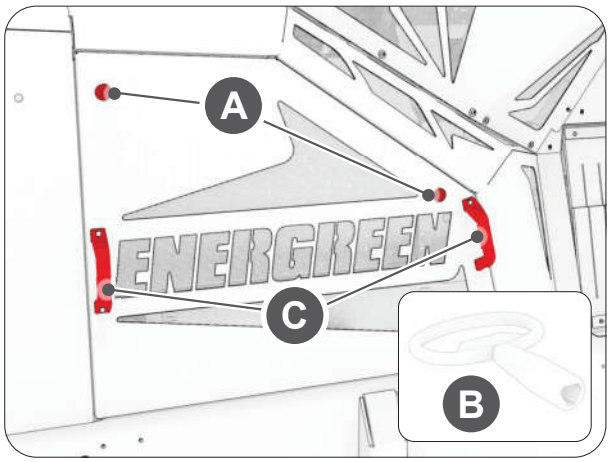
Replace all fuel filter cartridges if the diagnostic trouble code (DTC) indicates that the fuel filters are clogged ("low supply pressure").

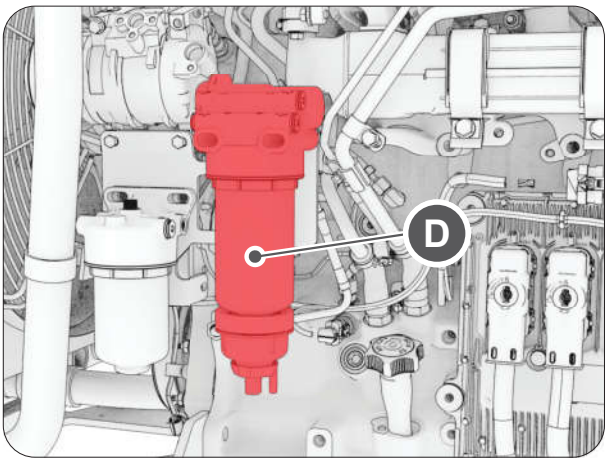
WARNING

Do not fill the new cartridges with fuel before installation so as not to contaminate the fuel system with non-filtered fuel.

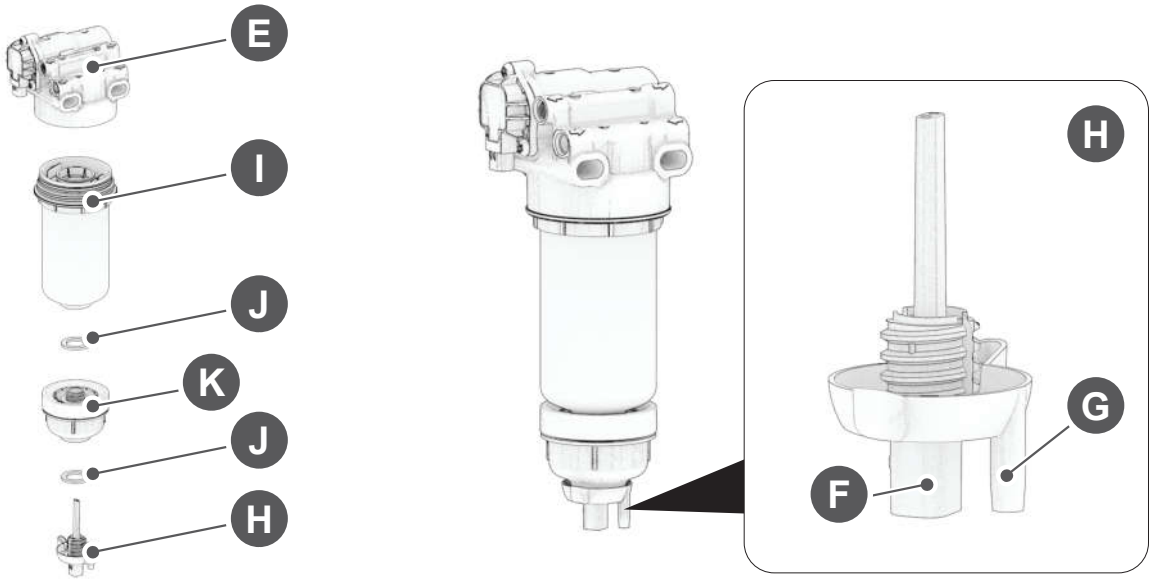
Replacing the main fuel filter cartridge (separator) (D)

1) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine.
2) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it.





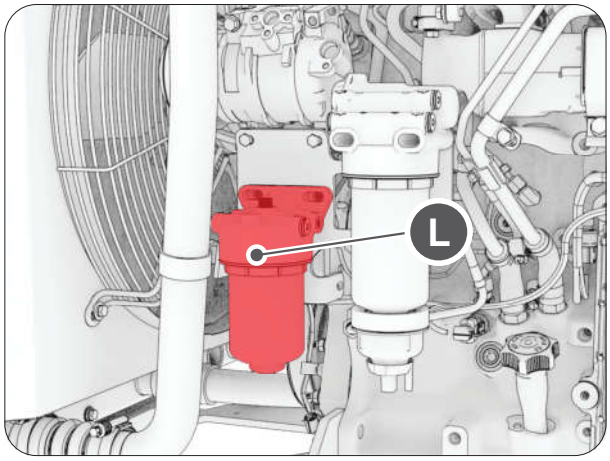
3) Carefully clean the filter head (**E**) and the area around it to prevent dirt or impurities getting into the fuel system.
4) Disconnect the sensor for detecting condensate in the fuel (**F**).
5) Connect a hose to the end (**G**) of the filter drainage valve (**H**).
6) Slightly loosen the filter drainage valve (**H**) and drain all the fuel from the filter cartridge (**I**).
7) Remove the fuel filter cartridge (**I**).
8) Smear the new O-rings (**J**) with a small amount of oil before installing them on the filter.
9) Install the new cartridge and tighten it until the upper section of the filter comes into contact with the filter head assembly (**E**).
10) Reconnect the water in the fuel presence detector.
11) Replace the second filter cartridge.

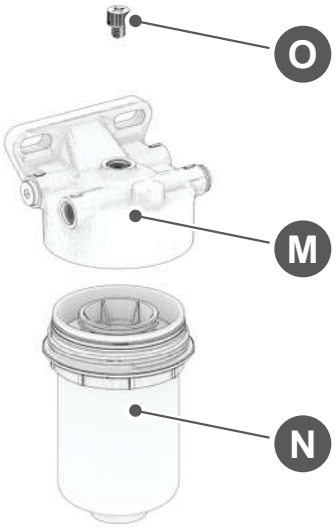


E - Filter assembly head
G - Valve drain
I - Filter cartridge
K - Sedimentation tank
F - Sensor connector
H - Sensor / Drainage valve
J - O-Ring

Replacing the secondary fuel filter cartridge (L)

12) Carefully clean the filter head assembly (**M**) and the area around it to prevent dirt or impurities getting into the fuel system.
13) Unscrew the fuel filter cartridge (**N**) and remove it.
14) Apply a thin film of fuel to the seal of the new cartridge.
15) Install the new filter and tighten until the upper section of the cartridge comes into contact with the filter head assembly.





M - Filter assembly head
O - Vent screw
N - Filter cartridge

WARNING

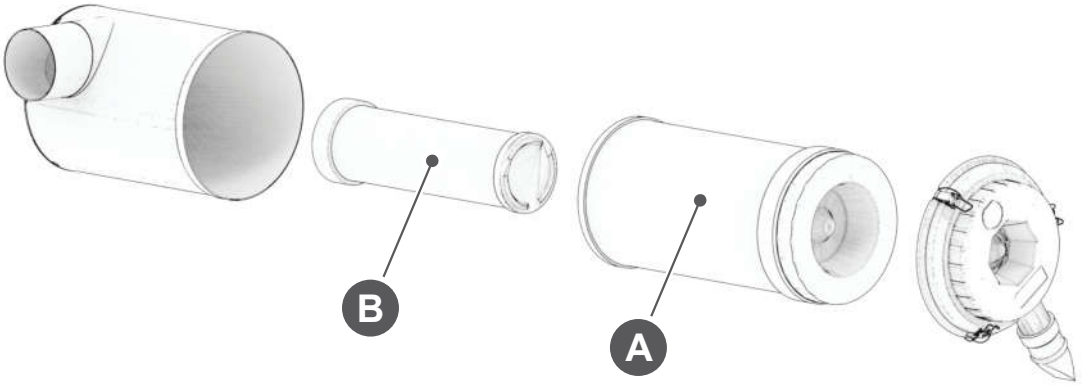
Once both cartridges have been replaced, prime the fuel system before starting the engine. Turn the ignition key to the ON position for 60 seconds.

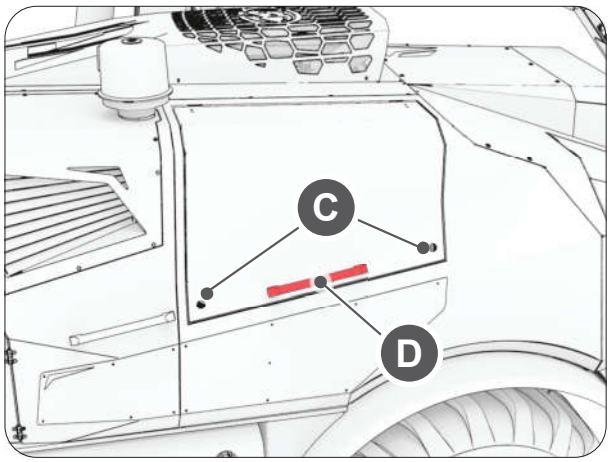
9.5.9 *Cleaning or replacing the air filter cartridges*

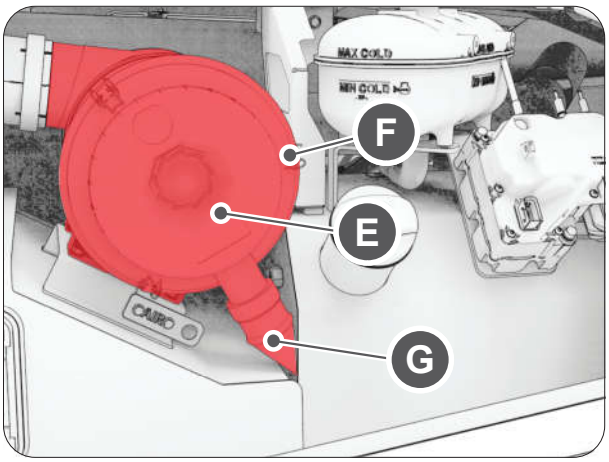
The air filter assembly consists of a large capacity primary cartridge (**A**) and a safety cartridge (**B**).

WARNING

- **Clean the air filter cartridges *daily or before each use.***
- **Replace both air filter cartridges every *1000 hours.***





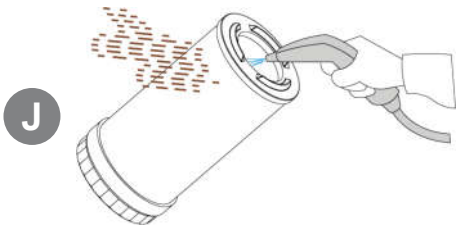


To clean or replace the air filter cartridges, proceed as follows:

1) Open the locks (**C**) using the key supplied with the machine.
2) Open the inspection cover by lifting the handle (**D**) upwards.
3) Press the ends of the valve (**G**) in order to discharge the dust that has collected.
4) First release the three hooks (**F**) and then remove the cover (**E**).
5) Pull out the primary cartridge (**A**). If it is difficult to remove, turn the cartridge slightly whilst pulling it at the same time. Clean it with a jet of air or replace it if necessary.
6) Pull out the safety cartridge (**B**). If it is difficult to remove, turn the cartridge slightly whilst pulling it at the same time. Replace the safety cartridge every time the primary cartridge is changed.
7) Reinstall the cover (**E**) and secure it with the three hooks (**F**).

WARNING

- **The primary cartridge can be cleaned with a jet of air and the safety cartridge must be replaced only.**
- **When using compressed air for cleaning, take care when directing the jet of air as it could damage the primary cartridge (A). The air jet must always flow from the inside to the outside, otherwise the filter will not work and when the engine is running, it will allow dust to enter the motor intake system and damage the engine. See figure (J)**
- **Replace the primary cartridge (A) after it has been cleaned six times or once a year. Whenever you replace the primary cartridge (A), replace the safety cartridge as well.**
- **Do not wash the air filter cartridges. Do not use solvents to clean them. Do not oil the cartridges.**



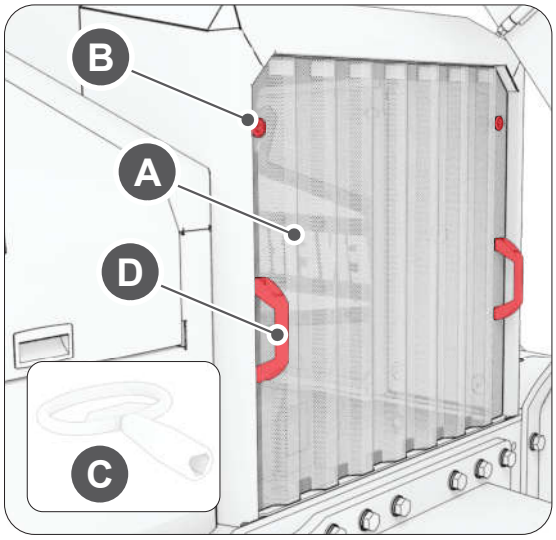
9.5.10 Cleaning the radiator grille

WARNING

The radiator grille should be cleaned *daily or before each use*.

To clean the radiator grille (**A**):

1) Open the locks (**B**) using the triangular key (**C**) supplied with the machine.
2) Use the handles (**D**) to remove the radiator grille (**A**) by tilting it towards you and lifting it.
3) Clean the grille with a jet of compressed air or with special products following the instructions on the container of the aforesaid products.
4) At the end of the operations, dry the washed parts. Put back the grille and lock it in position using the key.



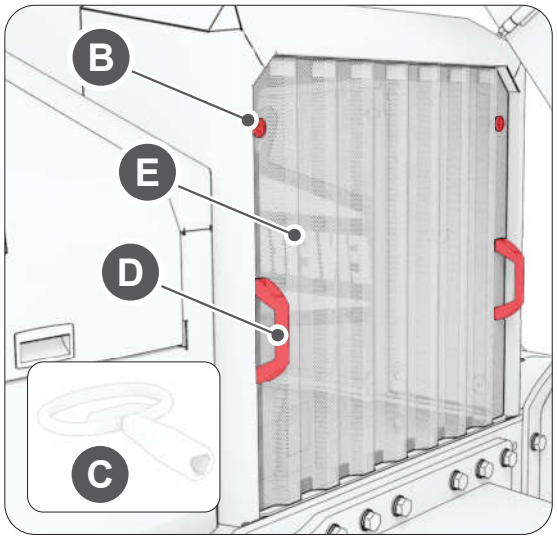
9.5.11 Cleaning the radiator

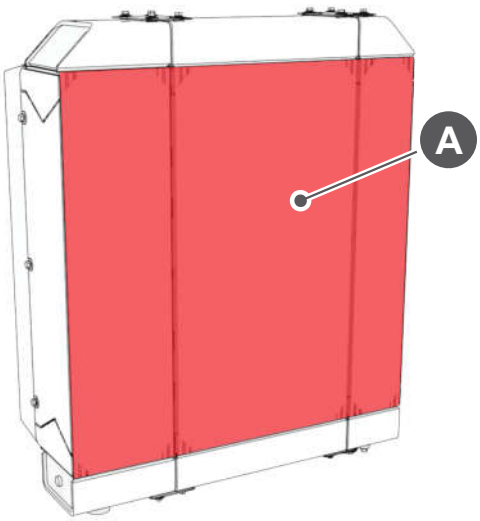
WARNING

The radiator should be cleaned *daily or before each use*.

To clean the radiator (**A**):

1) Open the locks (**B**) using the triangular key (**C**) supplied with the machine.
2) Use the handles (**D**) to remove the radiator grille (**E**) by tilting it towards you and lifting it.
3) Clean the surface of the radiator (**A**) with a jet of compressed air or with specific products following the instructions on the container of the products.
4) At the end of the operations, dry the washed parts. Put back the grille and lock it in position using the key.





WARNING

If you notice that the engine temperature tends to increase to around 100°C, make sure that the radiator is clean (use the button to carry out a forced radiator cleaning cycle and check the trend of the temperature). If the problem persists, contact ENERGREEN customer care services.

9.5.12 Checking the level of DEF

WARNING

- **The DEF level should be checked *daily or before each use*.**
- **Maximum tank capacity *23 litres*.**

WARNING

- **Personal protective equipment (PPE) such as gloves, goggles etc. must be worn when carrying out work on components of the SCR (Selective Catalytic Reduction) system.**
- **If the DEF / AdBlue® leaks or comes into contact with any surface other than the storage tank, clean the surface immediately with clean water. DEF / AdBlue® can corrode painted and unpainted metal surfaces. It can also can deform some plastic and rubber components.**
- **DEF / AdBlue® leaves a white residue if it is allowed to dry or is wiped with a cloth. DEF / AdBlue® leaks or spillages that are not properly eliminated can affect the diagnosis of leaks in the selective catalytic reduction (SCR) system.**

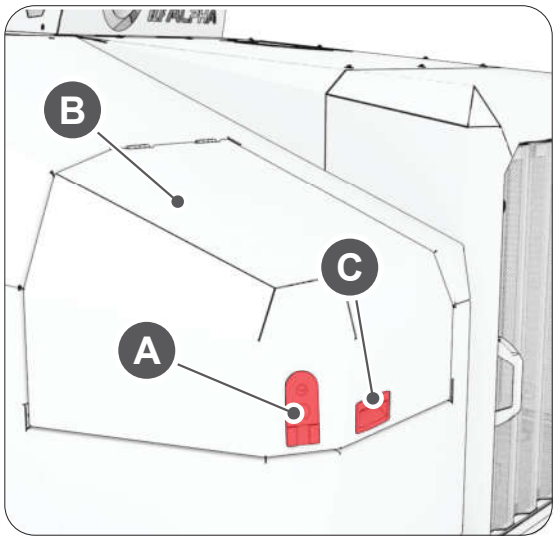
DANGER

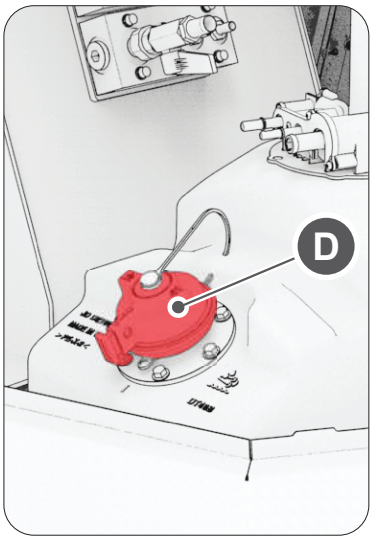
Avoid contact with eyes. In case of contact, immediately flush the eyes with plenty of water for at least fifteen minutes. If this happens, contact your doctor or go to an A&E department.

The DEF / AdBlue® level is shown on the display: see section ***„6.47.1 DEF tank level indicator”***. In order to select DEF / AdBlue®, refer to section ***“9.4.3 Recommendations related to AdBlue® / DEF”***.

To top up:

1) Open the lock (**A**) using the appropriate key.
2) Use the handle (**C**) to lift the cover (**D**) upwards.
3) Unscrew the cap of the tank (**D**).
4) Top up. Do not fill up to the rim but leave a space for expansion. Close the cap.





9.5.13 Replacing the DEF pump filter

WARNING

- **The filter (A) in the DEF pump (B) should be replaced *every 4500 hours or every 36 months*.**
- **The filter of the DEF pump (A) should be replaced together with the filter mesh in the suction tube of the DEF tank.**

WARNING

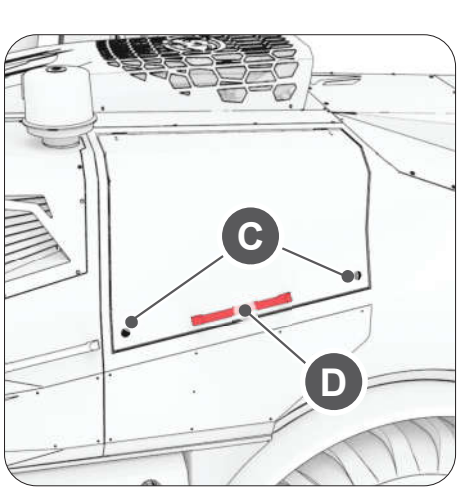
- **Personal protective equipment (PPE) such as gloves, goggles etc. must be worn when carrying out work on components of the SCR (Selective Catalytic Reduction) system.**
- **If the DEF / AdBlue® leaks or comes into contact with any surface other than the storage tank, clean the surface immediately with clean water. DEF / AdBlue® can corrode painted and unpainted metal surfaces. It can also can deform some plastic and rubber components.**
- **DEF / AdBlue® leaves a white residue if it is allowed to dry or is wiped with a cloth. DEF / AdBlue® leaks or spillages that are not properly eliminated can affect the diagnosis of leaks in the selective catalytic reduction (SCR) system.**

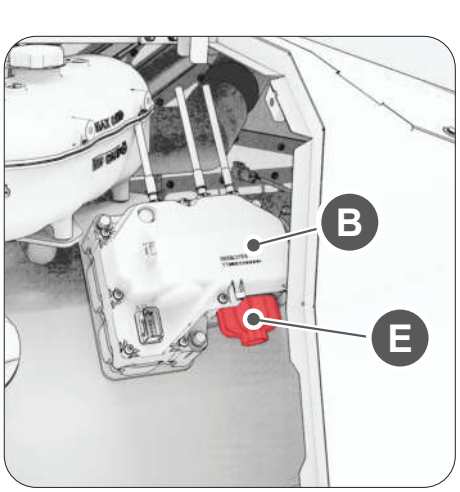
DANGER

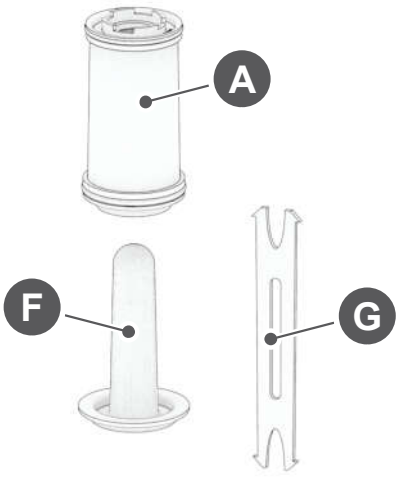
Avoid contact with eyes. In case of contact, immediately flush the eyes with plenty of water for at least fifteen minutes. If this happens, contact your doctor or go to an A&E department.

To replace filter (**A**) in the DEF pump (**B**), proceed as follows:

1) Open the locks (**C**) using the key supplied with the machine.
2) Open the inspection cover by lifting the handle (**D**) upwards.
3) Unscrew the DEF pump plug (**E**) using a 27 mm wrench.
4) Remove and discard the balancing cartridge (**F**).
5) Use the key (**G**) to remove the filter (**A**). Insert the „black" end of the key (**G**) into the filter (**A**) until you hear or hear a „click". This indicates that the tool is fully engaged.







6) Use distilled water to clean the threads and mating surfaces of the DEF pump (**B**) and the plug (**E**).
7) Lubricate the O-rings of the new filter (**A**) with clean DEF.
8) Carefully insert the new filter **(A**) into the DEF pump (**B**).
9) Install the new balancing cartridge (**F**) into the new filter (**A**).
10) Manually screw the plug (**E**) into the DEF pump (**B**).
11) Tighten the plug (**E**) with a torque of 23 Nm using a 27 mm wrench.

9.5.14 Replacing the DEF pump in-line filter

WARNING

The DEF pump in-line filter should be replaced *every 8000 hours or 36 months.*

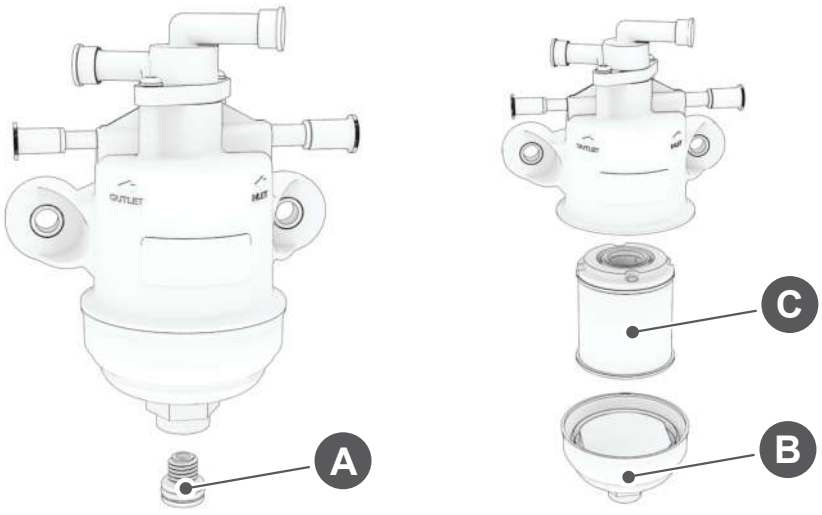
WARNING

- **Personal protective equipment (PPE) such as gloves, goggles etc. must be worn when carrying out work on components of the SCR (Selective Catalytic Reduction) system.**
- **If the DEF / AdBlue® leaks or comes into contact with any surface other than the storage tank, clean the surface immediately with clean water. DEF / AdBlue® can corrode painted and unpainted metal surfaces. It can also can deform some plastic and rubber components.**
- **DEF / AdBlue® leaves a white residue if it is allowed to dry or is wiped with a cloth. DEF / AdBlue® leaks or spillages that are not properly eliminated can affect the diagnosis of leaks in the selective catalytic reduction (SCR) system.**
- **Avoid damaging the system and filter. Make sure the DEF system is not frozen before replacing the filter. If frozen, run the engine until it is completely thawed.**

DANGER

Avoid contact with eyes. In case of contact, immediately flush the eyes with plenty of water for at least fifteen minutes. If this happens, contact your doctor or go to an A&E department.

1) Unscrew and remove the plug (**A**) from the filter drainage hole.
2) Drain the DEF into a suitable container.
3) Turn the filter cover (**B**) anticlockwise and push it downwards.
4) Remove the filter (**C**) from the cover (**B**) and discard it.



5) Remove and discard the O-ring (**D**) and the expanded polyethylene compensation element (**E**).

WARNING

Before installing the new components, clean the filter housing with clean DEF to remove any debris or impurities.

6) Install the new O-ring (**D**) and the expanded polyethylene compensation element (**E**) in the filter cover (**B**).
7) Insert the new filter (**C**) in the filter cover (**B**).
8) Screw the cover (**B**) clockwise onto the filter and tighten it with a torque of 25 Nm.
9) Screw the new plug (**A**) into the drain hole. Tighten with a torque of 4 Nm.

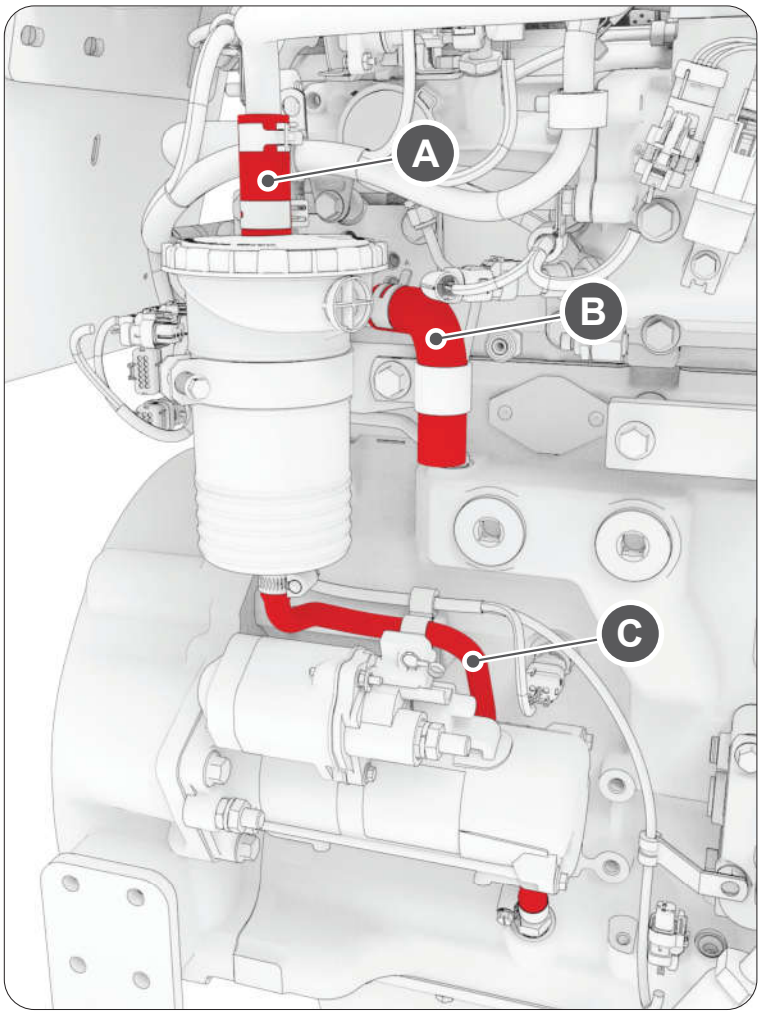
9.5.15 *Checking the open crankcase ventilation (OCV) breather system*

WARNING

This check should be carried out *every 500 hours* or every *12 months*.

Inspect the OCV hoses (**A**), (**B**) and (**C**) and see if they are worn, cracked, leaking or bent. Make sure that the relative hose clamps are tightly secured. Replace any worn or damaged parts.

(**A**) OCV inlet hose;
(**B**) Oil drainage hose;
(**C**) Air outlet hose.



9.5.16 Replacing the open crankcase ventilation (OCV) system filter

WARNING

Replace *every 1500 hours* or whenever the display prompts you to carry out a diagnosis.

DANGER

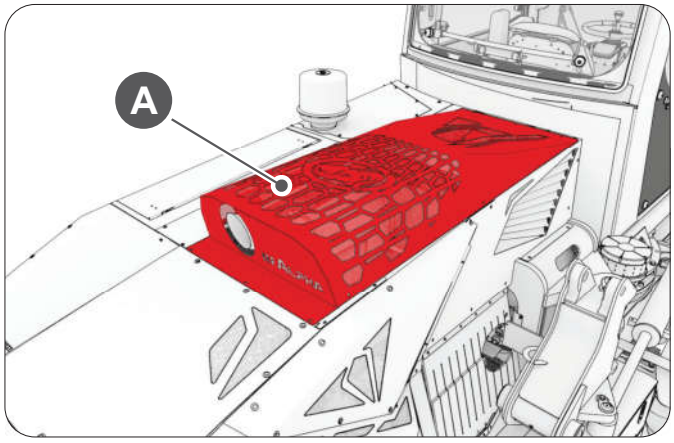
DANGER OF BURNS!

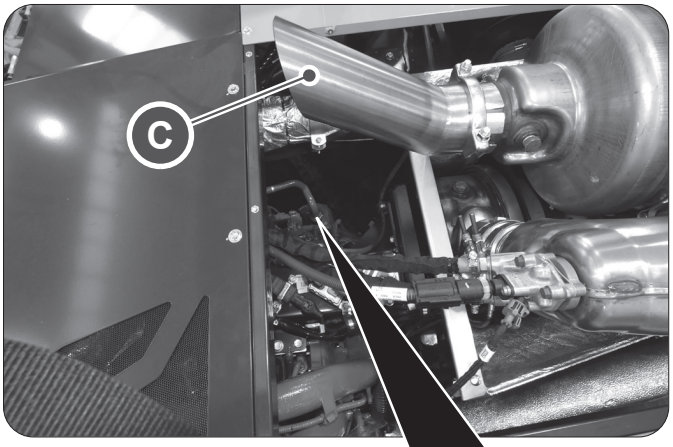
Only carry out this procedure when the machine is cold!

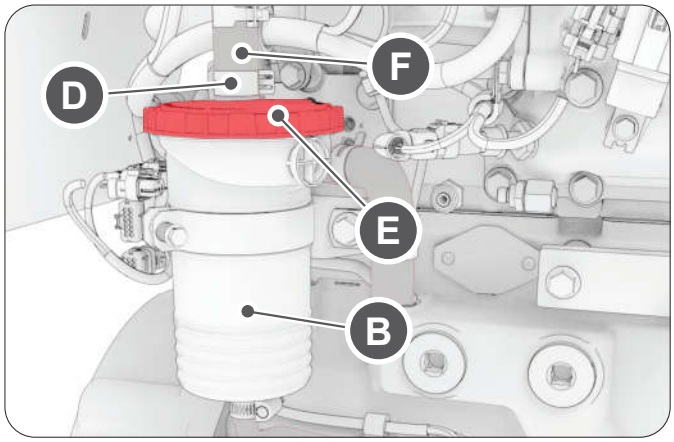
Make sure that the engine and its exhaust system have not been switched on before the carrying out the work and that they are therefore at room temperature.

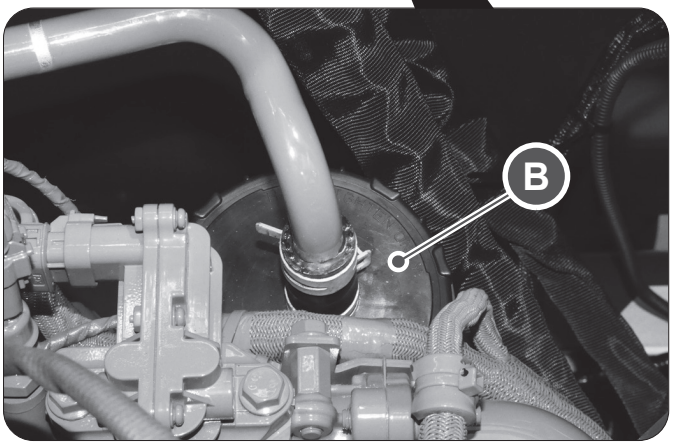
Proceed as follows:

1) Remove the bonnet (**A**) by unscrewing the screws that secure it;
2) To make it easier to access to the filter (**B**), remove the exhaust terminal (**C**) by loosening the collar that secures it;
3) Loosen the hose clamp (**D**) and remove the hose (**F**) from the cap (**E**);
4) Unscrew the cap (**E**);
5) Remove the filter cartridge from the OCV filter;
6) Install the new cartridge (**G**);
7) Screw the cap (**E**) back on and tighten it by hand;
8) Reinstall everything following the instructions in reverse.









9.6 MAINTENANCE OF THE HYDRAULIC SYSTEM

9.6.1 Hydraulic oil level check

WARNING

The hydraulic oil level should be checked *daily or every 8 hours.*

To check the oil, the machine must be on a level surface and with the arm jacks retracted.

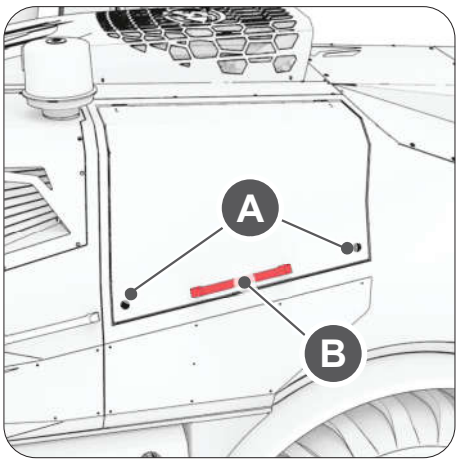
Proceed as follows:

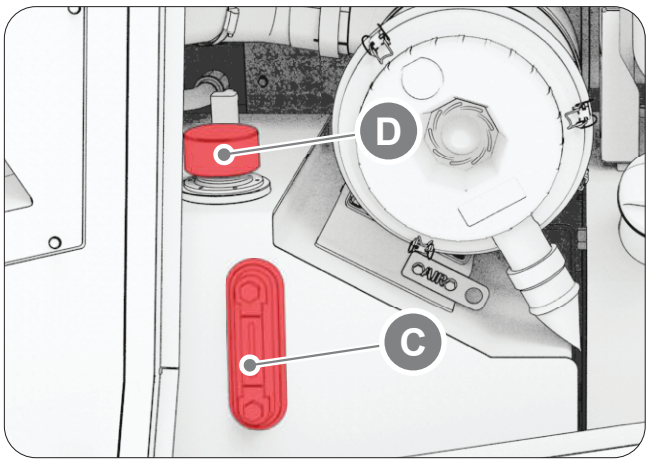
1) Open the locks (**A**) using the key supplied with the machine.
2) Use the handle (**B**) to open the inspection cover by lifting it upwards.
3) Make sure the oil level is between the MIN - MAX marks on the indicator (**C**). Top up if the oil level is close to the MIN mark.

To top up

4) Unscrew the cap (**D**) using the special anti-vandalism key provided, pour in oil until the level has been restored. Close the cap.

- The indicator light (**E**) on the display lights up if the oil level is low.
- If the level of oil is too low, the engine switches off.





E

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 *"9.4.1 Lubricants table"*).**
- **When using Panolin HLP Synth E biodegradable oil, avoid mixing it with other oils.**
- **The use of non recommended lubricants and/or grease results in the forfeiture of the warranty.**

WARNING

- **Use protective clothes when topping up.**

- **Restore the oil level of the hydraulic circuit only after having closed all the cylinders of the arm and switching off the engine.**

9.6.2 Changing the hydraulic oil

DANGER

The oil change must be carried out with the machine switched off, the equipment resting on the ground and the oil cold. The machine must be on solid and flat ground.

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 change the oil with the same type that was removed. Do not mix different types of oil.**
- **Quantity of oil required for filling: 274 litres**
- **Change the hydraulic oil only after having closed all the cylinders of the arm and switching off the engine.**

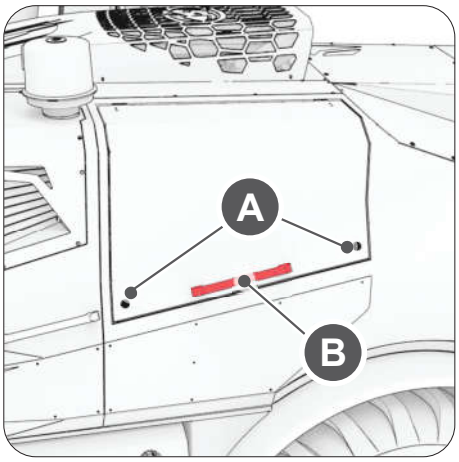
DANGER

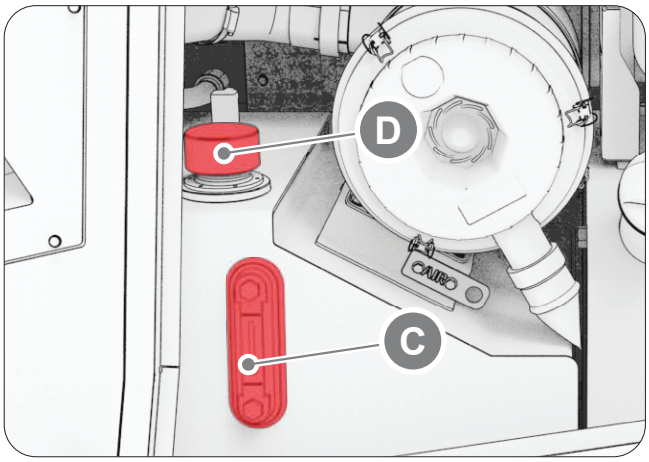
- **Do not carry out the following operations if the engine has just been switched off. Wait until the engine becomes warm (40 - 45°C).**
- **The hydraulic oil and filter are considered special waste, so they must be disposed of according to the anti-pollution regulations in force.**
- **Wear protective clothing while performing these operations.**

The hydraulic oil must be changed, see table below:

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

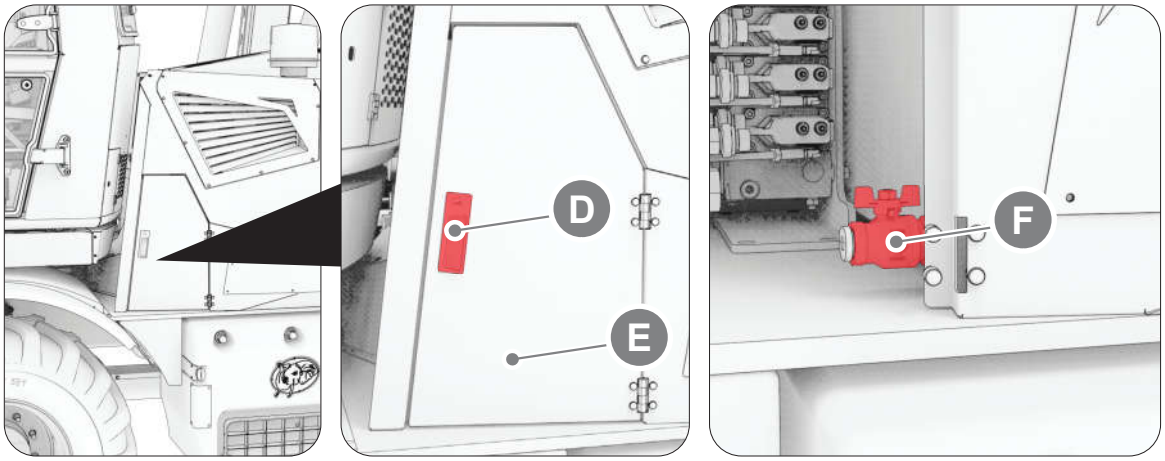
Before changing the hydraulic oil, make sure that the ILF ALPHA is on a stable and horizontal surface during maintenance operations.





Proceed as follows to replace the hydraulic oil:

1) Open the locks (**A**) using the key supplied with the machine.
2) Use the handle (**B**) to open the inspection cover by lifting it upwards.
3) Remove the filler cap (**D**) and release any pressure there may be in the hydraulic oil tank.
4) Open the lock (**D**) using the key supplied with the machine.
5) Open the door (**E**).
6) Connect a hose to the tap (**F**), after removing the 1/2” plug.
7) Open the tap (**F**) and drain the oil into a suitably sized container.
8) Once the tank has been completely drained, turn the tap (**F**) off and screw the 1/2” plug back on.
9) Lock the door (**E**).
10) Fill the tank with hydraulic oil while checking the level on the indicator (**C**).



WARNING

DO NOT TURN THE ENGINE ON FOR ANY REASON IF THE HYDRAULIC OIL TANK IS EMPTY: OTHERWISE THE HYDRAULIC PUMPS WILL BREAK.

9.6.3 *Changing the hydraulic oil filter cartridge*

WARNING

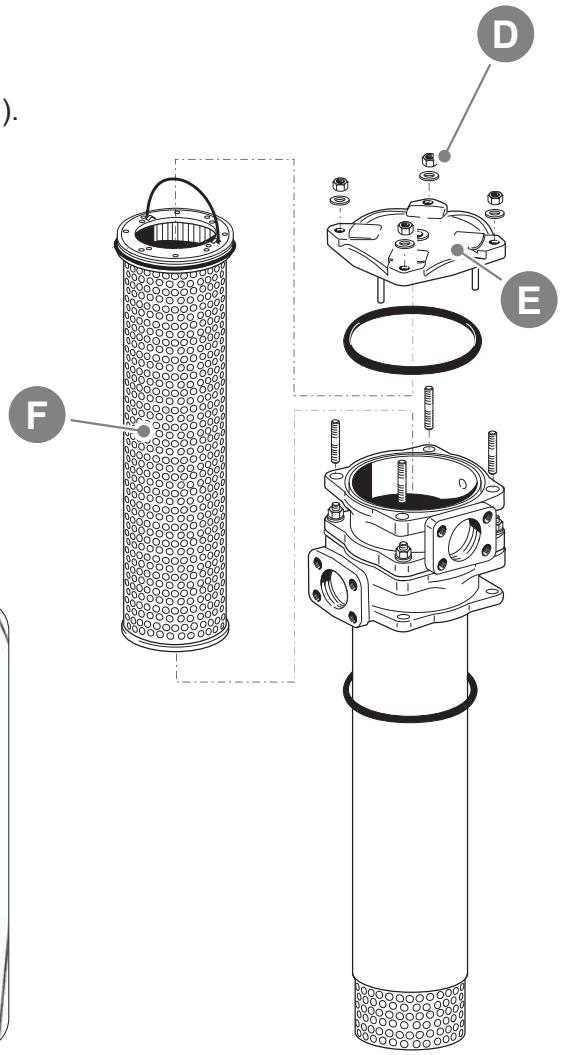
The hydraulic oil filter cartridge should be replaced *every 1000 hours* if the needle of the pressure gauge (on the filter) has moved from the green to the red zone when the engine running.

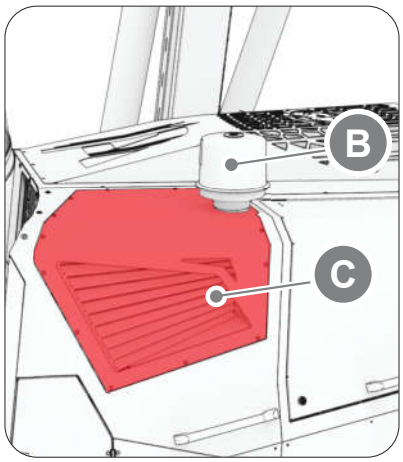
DANGER

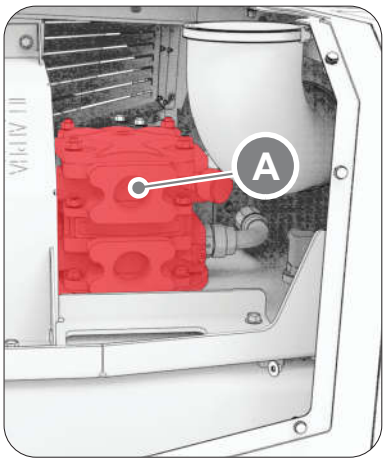
- **Do not carry out the following operations if the engine has just been switched off. Wait until the engine becomes warm (40 - 45°C).**
- **The hydraulic oil and filter are considered special waste, so they must be disposed of according to the anti-pollution regulations in force.**
- **Wear protective clothing while performing these operations.**

To change the hydraulic oil filter (**A**) proceed as follows:

1) Loosen the hose clamp that secures the vortex filter (**B**).
2) Remove the vortex filter (**B**).
3) Unscrew the screws that secure the bonnet (**C**).
4) Remove the bonnet (**C**).
5) Loosen plug of the hydraulic oil tank.
6) Unscrew the four screws (**D**) that secure the cover (**E**).
7) Remove the cover (**E**).
8) Remove the cartridge (**F**) and replace it with a new one.
9) Close the cover (**E**) and fasten it using the four screws (**D**).
10) Screw the plug of the hydraulic oil tank back on.
11) Install the bonnet and secure it (**C**).
12) Replace the vortex filter and secure it (**B**).







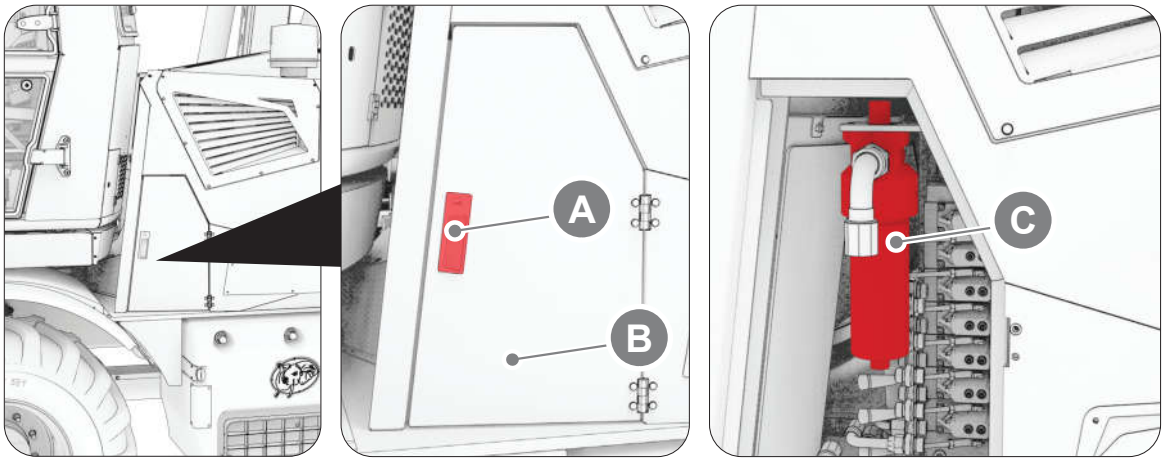
9.6.4 Checking the high pressure inline filter

WARNING

The high pressure inline filter (A) should be checked *every 250 hours, with the engine running.*

Proceed as follows:

1) Open the lock (**A**) using the key supplied with the machine.
2) Open the door (**B**).
3) Check the indicator (**D**) on the filter (**C**).
4) If the indicator (**D**) is in the red area, replace it immediately together with the relative cartridge.



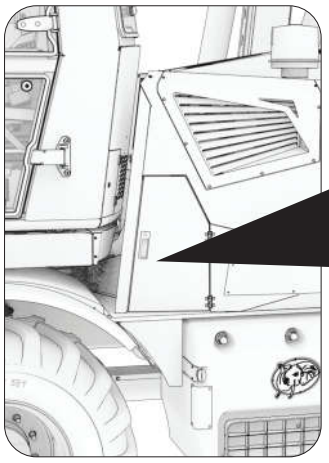
9.6.5 *Replacing the high pressure inline filter cartridge*

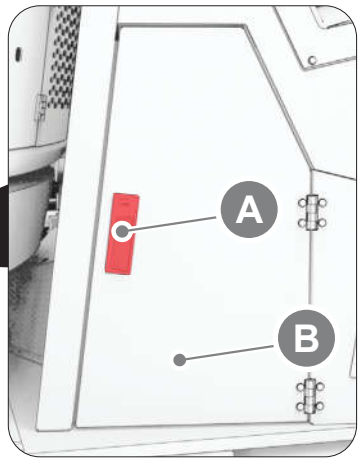
WARNING

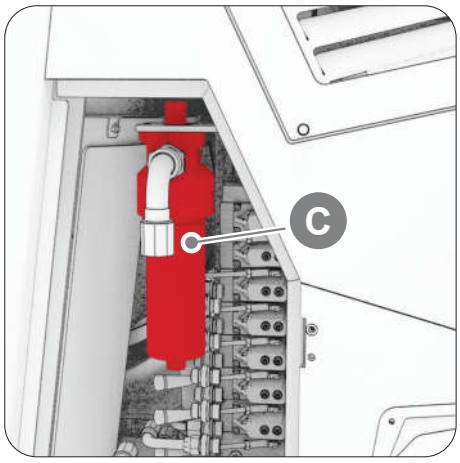
The high pressure inline filter cartridge (C) should be replaced *every 1000 hours*; or before, if the indicator (F) on the filter has moved into the red zone.

For the replacement, proceed as follows:

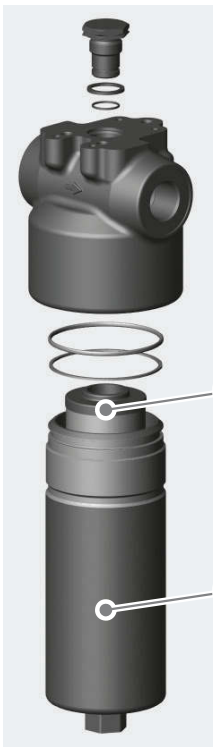
1) Switch off the machine;
2) Release the pressure in the filter circuit;
3) Open the lock (**A**) using the key supplied with the machine;
4) Open the door (**B**);
5) Place a suitably sized container for containing any oil spills under the filter (**C**);

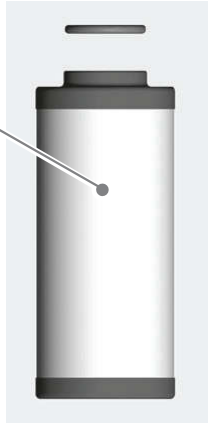






6) Unscrew the filter cover (**D**) using a 24 mm wrench;
7) Remove the filter (**E**) (checking that there is no thick metal residue on its surface, this indicates damage to components in the circuit);
8) Lubricate all sealing surfaces such as filter head, filter cover, and O-Ring. Replace damaged O-Rings.
9) Replace the cartridge (**E**);
10) Fully tighten the filter cover (**D**) and then loosen it by 1/4 turn;
11) Start the machine, then bleed the hydraulic system by carrying out all the arm movements;
12) Check for leaks from the filter.





9.7 COUPLER MAINTENANCE

9.7.1 Checking the coupler oil level

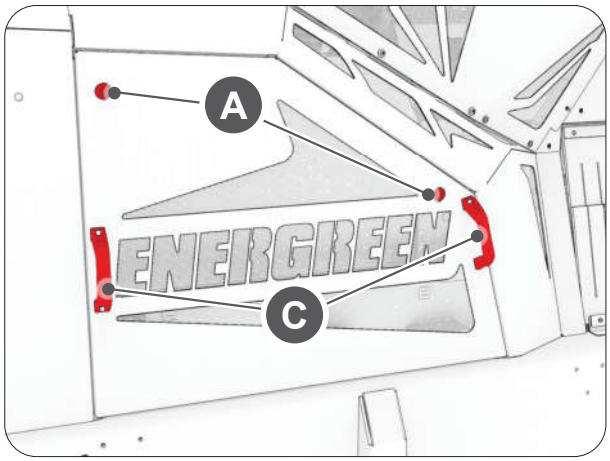
WARNING

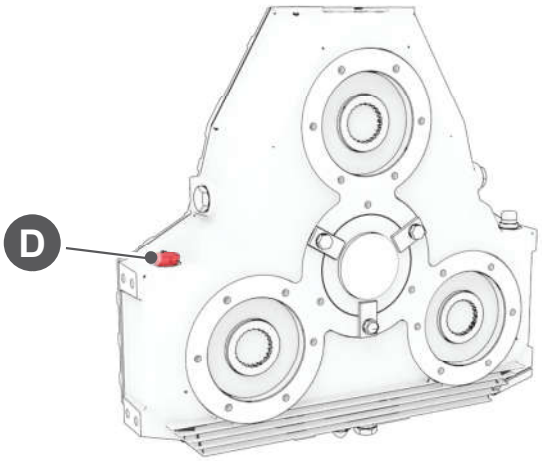
The coupler oil level should be checked *every* 500 hours.

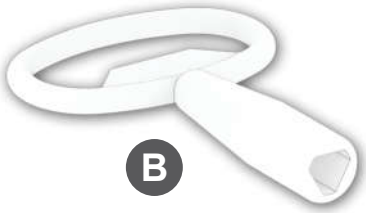
- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The coupler oil level should only be checked after the engine has been switched off for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section ***"9.4.1 Lubricants table"***.

To check the level of oil in the coupler:

1) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine;
2) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it;
3) Unscrew the plug (**D**) and check the dipstick to make sure that the oil level is between the MAX and MIN marks;
4) If the level of oil in the coupler is close to the MIN mark, top it up via the hole of the plug (**D**) until the level is between the MIN and MAX;
5) Screw the plug (**D**) back on.







9.7.2 *Changing the coupler oil*

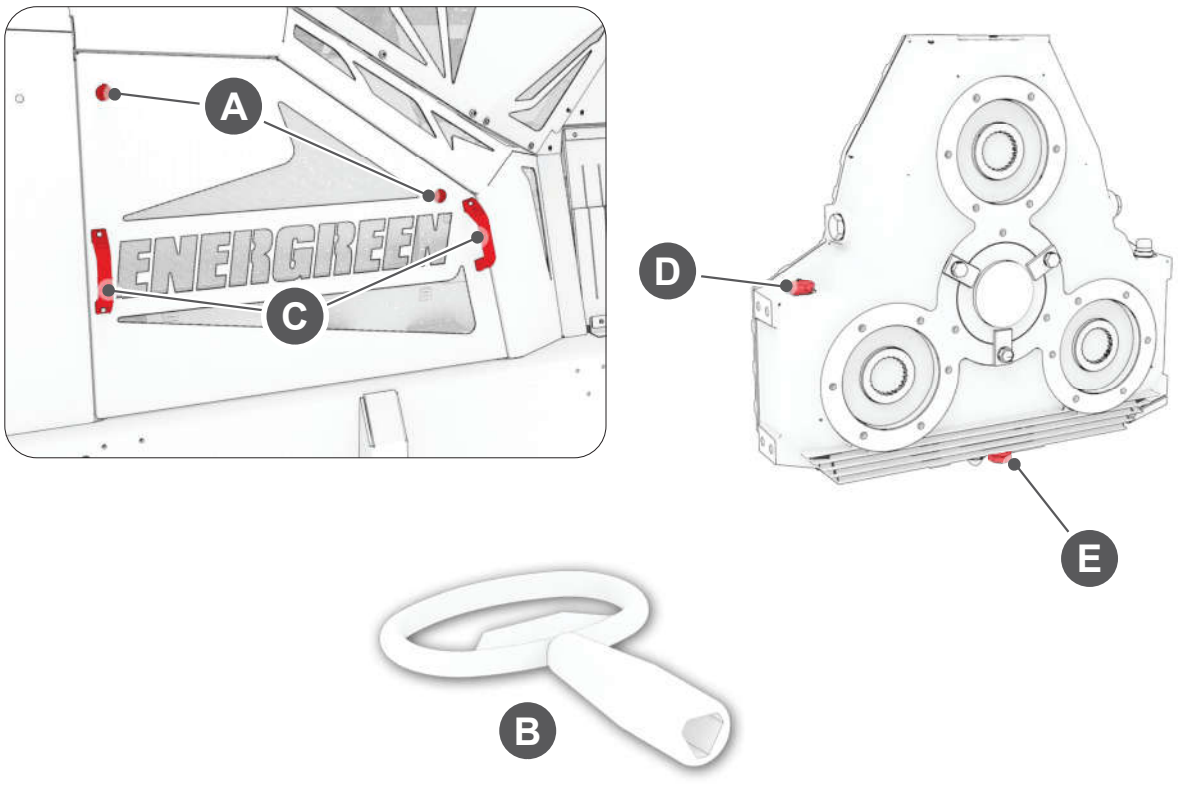
WARNING

- **The first oil change should carried out after the *first 100 hours* of operation.**
- **Subsequent oil changes should be carried out *every 1000 hours*.**
- **Quantity of oil to be used *1.4 litres.***

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The coupler oil should only be changed after the engine has been switched off for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- Refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use.

To change the oil in the coupler:

1) Release the engine cover at points (**A**) using the triangular key (**B**) supplied with the machine;
2) Use the handles (**C**) to remove the engine cover by tilting it towards you and lifting it;
3) Unscrew the plug (**D**);
4) Unscrew the drainage plug (**E**) and drain the oil into a sufficiently large container. To make drainage easier, this should be done while the oil is warm;
5) Wait for a few minutes until all the oil has drained, then screw the plug (**A**) back on;
6) Fill the coupler with oil through the hole of the plug (**D**);
7) Screw the plug (**D**) back on.



9.8 REDUCTION GEARBOX MAINTENANCE

9.8.1 Checking the oil level in the reduction gearbox

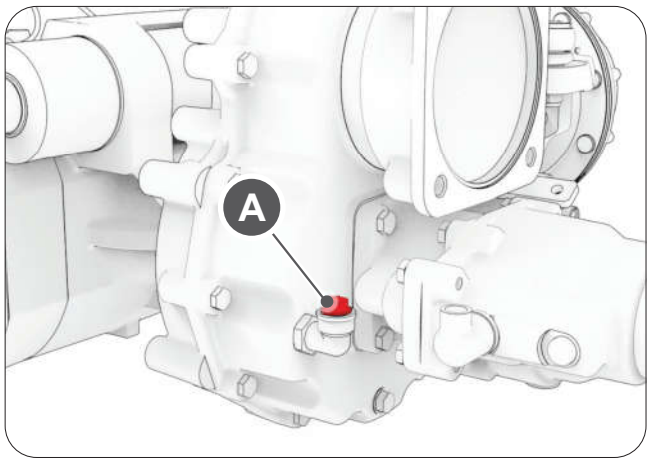
WARNING

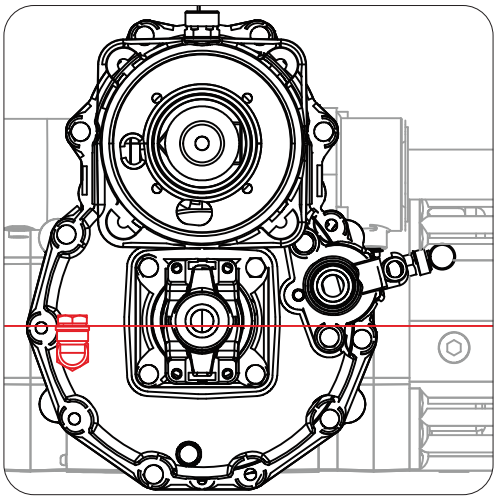
The oil level in the reduction gearbox should be checked *every 250 hours.*

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil level in the reduction gearbox should only be checked after the machine has been stationary for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section ***"9.4.1 Lubricants table"***.

To check the oil level in the reduction gearbox:

1) Remove the level control screw (**A**).
2) Check to see if the level is flush with the screw.
3) If it is below, top up with specific oil, through the same hole using an oil pump.





Level OK

9.8.2 Changing the oil in the reduction gearbox

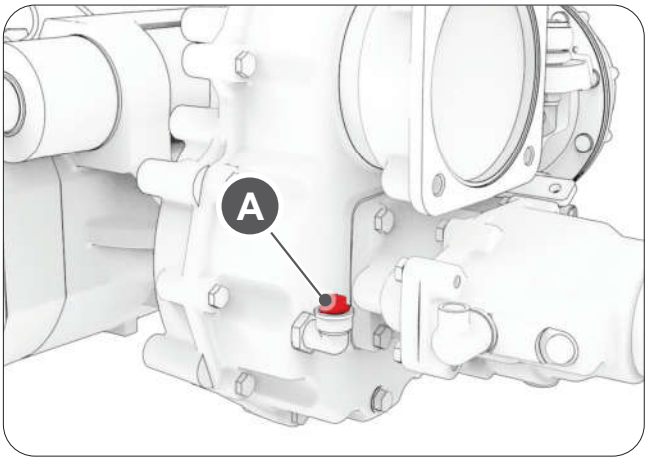
WARNING

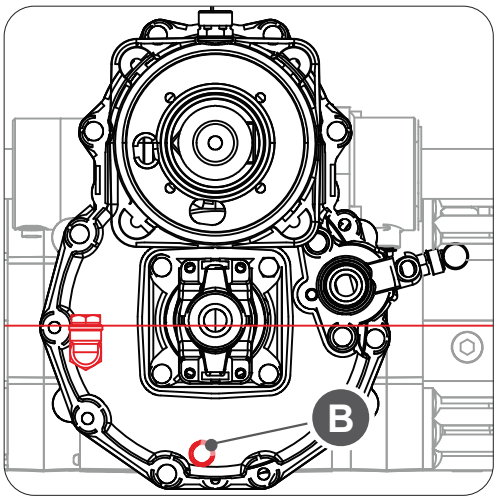
- **The first oil change should carried out after the *first 100 hours* of operation.**
- **Subsequent oil changes should be carried out *every 500 hours*.**
- **Quantity of oil to be used *1.8 litres.***

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil in the reduction gearbox should only be changed with the engine switched off.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- Refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use.

To change the oil in the reduction gearbox:

1) Remove the filler plug (**A**).
2) Remove the drain plug (**B**) and drain the oil completely into specific containers. Wait until it has finished dripping.
3) Once all the oil has drained out, replace the drain plug (**B**).
4) Fill through the filler hole until reaching the hole level.
5) Replace the filler plug (**A**).
6) Perform some transfers with the machine and check the oil level again. Top up if necessary.





Level OK

9.8.3 Checking the oil level of the four-wheel drive release

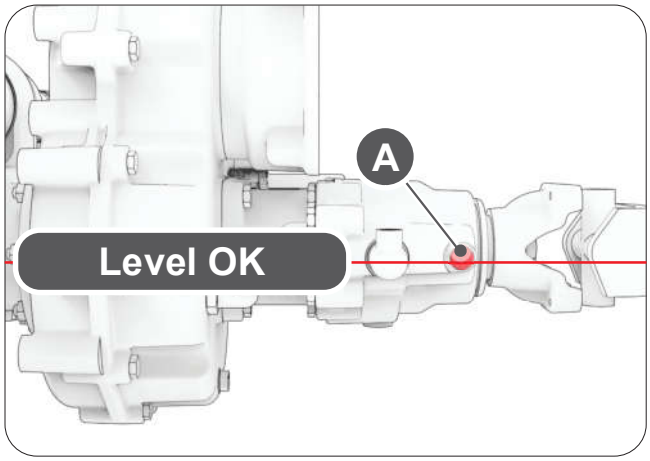
WARNING

The oil level of the four-wheel drive release should be checked every *250 hours*.

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil level of the four-wheel drive release should only be checked after the machine has been stationary for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section *"9.4.1 Lubricants table"*.

To check the oil level of the four-wheel drive release, proceed as follows:

1) Remove the level check plug (**A**) and make sure that the level is flush with the hole.
2) If it is below, top up with specific oil, through the same hole using an oil pump.



9.8.4 Changing the oil in the four-wheel drive release

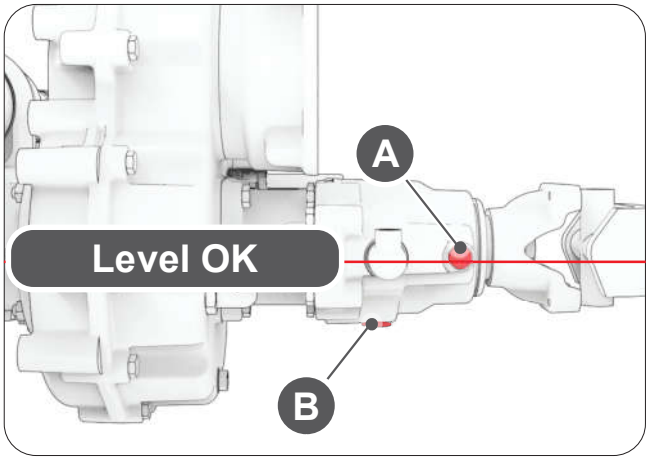
WARNING

- **The first oil change should carried out after the *first 100 hours* of operation.**
- **Subsequent oil changes should be carried out *every 500 hours*.**
- **Quantity of oil to be used 0.4 litres.**

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The four-wheel drive release oil should only be changed with the engine switched off.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- Refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use.

To change oil in the four-wheel drive release:

1) Remove the filler plug (**A**).
2) Remove the drain plug (**B**) and drain the oil completely into a specific container. Wait until it has finished dripping.
3) Once all the oil has drained out, replace the drain plug (**B**).
4) Fill via the filler hole until it is flush with hole.
5) Replace the filler plug (**A**).
6) Perform some transfers with the machine and check the oil level again.



9.9 AXLE MAINTENANCE

9.9.1 Checking the axe oil level

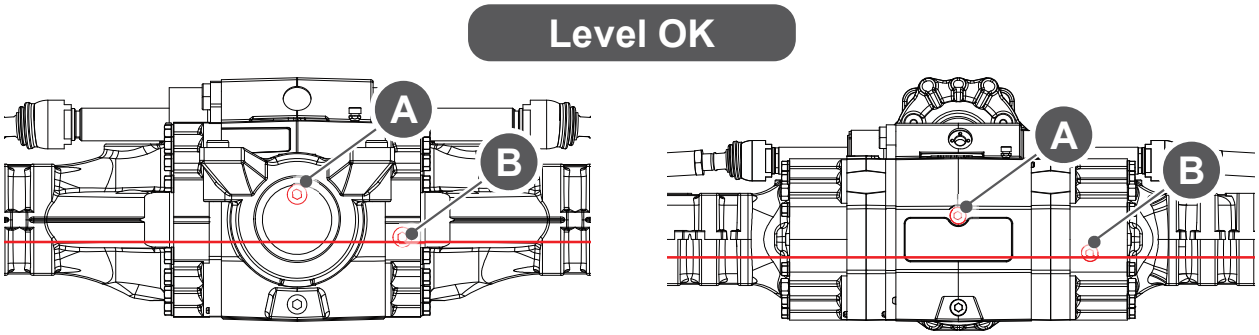
WARNING

The axis oil level should be checked *every* 250 hours.

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil level of the axles should only be checked after the machine has been stationary for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section ***"9.4.1 Lubricants table"***.

To check the oil level of the axles:

1) Remove the oil level check plug (**B**) and see if the level is flush with the hole.
2) If it is lower, top up with specific oil, via the same hole (**A**) using an oil pump.



Front axle *Rear axle*

9.9.2 *Changing the axle oil*

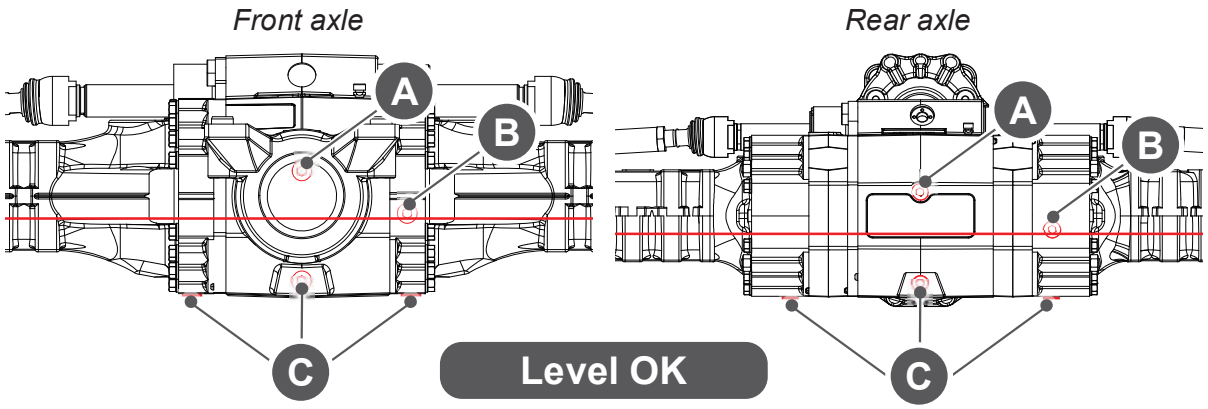
WARNING

- **The first oil change should carried out after the *first 100 hours* of operation.**
- **Subsequent oil changes should be carried out *every 500 hours*.**
- **Quantity of oil to be used *7.2 litres.***

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The axle oil should only be changed with the engine switched off.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- Refer to section *"9.4.1 Lubricants table"* for the choice of oil to use.

To change the axle oil:

3) Remove the oil filler (**A**) and level plug (**B**).
4) Remove the three drain plugs (**C**) and collect the oil in specific containers. Drain the oil come out completely, waiting until the dripping has finished.
5) Replace the three drain caps (**C**) once all the oil has drained.
6) Fill the axle through the filler hole (**A**) until the oil is flush with the hole (**B**).
7) Replace the filler (**A**) and level plug (**B**).
8) Perform some transfers with the machine and check the oil level again. Top up if necessary.



9.9.3 Checking the oil level of the planetary hubs

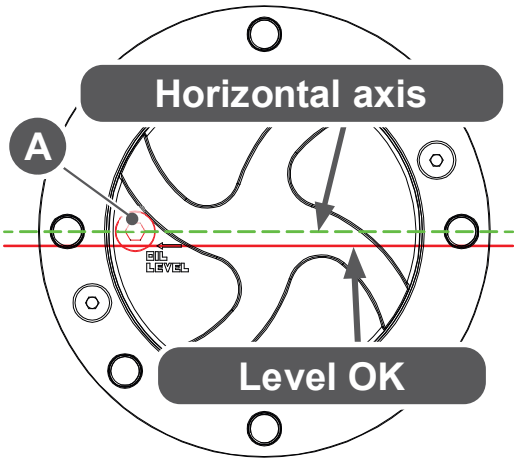
WARNING

The oil level of the planetary hubs should be checked *every* 250 hours.

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil level of the planetary hubs should only be checked after the machine has been stationary for at least five minutes.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- For topping up, refer to section ***"9.4.1 Lubricants table"***.

Proceed as follows:

1) The level check plug (**A**) must be on the horizontal axis of the machine. Remove the cap and check that the oil level is flush with the hole.
2) If it is below, top up with specific oil, through the same hole using an oil pump.



9.9.4 Changing the oil of the planetary hubs

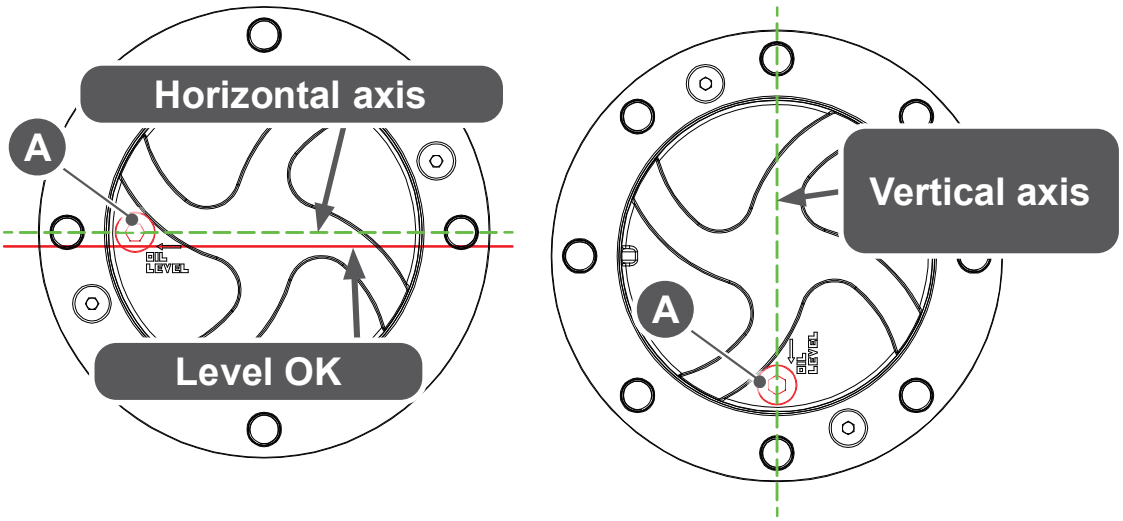
WARNING

- **The first oil change should carried out after the *first 100 hours* of operation.**
- **Subsequent oil changes should be carried out *every 500 hours*.**
- **Quantity of oil to be used *2.1 litres.***

- Place the ILF ALPHA machine in a horizontal position before carrying out maintenance.
- The oil of the planetary hubs should only be changed with the engine switched off.
- First clean the oil checking and filling area to reduce the possibility of contaminating the engine oil with impurities.
- Refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use.

To change the oil of planetary hubs:

1) Move the machine until the plug (**A**) is on the vertical axis of the machine.
2) Remove the plug (**A**) and drain the oil completely into specific containers. Wait until it has finished dripping.
3) Once all the oil has drained out, move the machine until the plug (**A**) is on the horizontal axis of the machine.
4) Fill through the filler hole (**A**) until the oil is flush with the hole.
5) Replace the plug (**A**).
6) Perform some transfers with the machine and check the oil level again.
7) Repeat the operations on both sides (right and left) and on both axles of the machine.



9.10 CABIN MAINTENANCE

9.10.1 Cleaning or replacing the external air filter

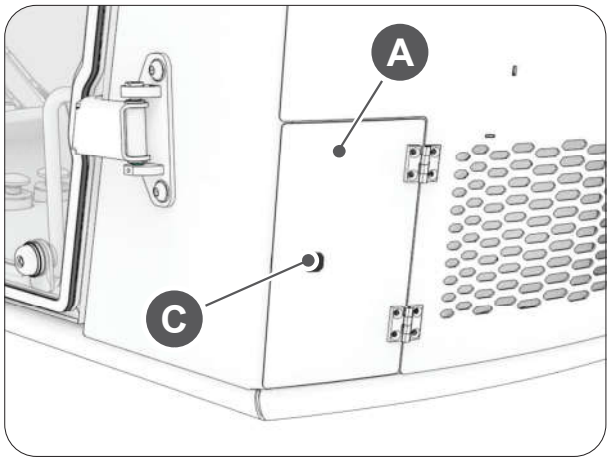
WARNING

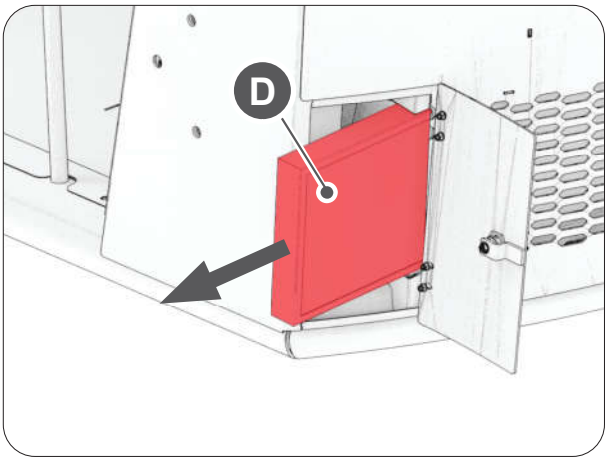
- **The cabin air filters should be cleaned *every week*.**
- **The cabin air filters should be replaced every 1000 hours or at least once a year.**

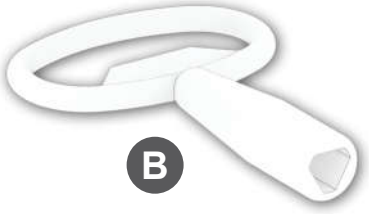
WARNING

- **The direction in which the filter should be installed is indicated on the air filter. Make sure that you install it correctly.**
- **Poor cleaning of the filters can lead to:**
  - **health problems, since the operator breathes unclean air through filters that can retain particles that are harmful to health**
  - **internal evaporator efficiency issues and the risk of damaging it.**

1) Open the lock (**C**) using the triangular key (**B**) supplied with the machine.
2) Open the door (**A**).
3) Remove the filter (**D**) and clean (only with a jet of air) or replace it.
4) Reinstall the filter (**D**), close the door (**A**) and lock it using the key (**B**).







9.10.2 Cleaning or replacing the internal air filter

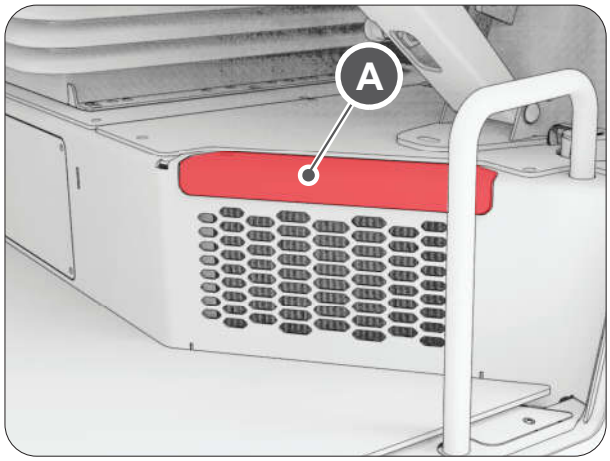
WARNING

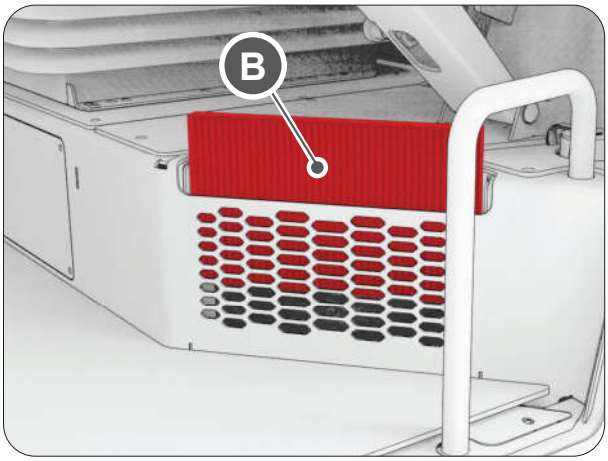
- **The cabin air filters should be cleaned *every week*.**
- **The cabin air filters should be replaced every 1000 hours or at least *once a year.***

WARNING

- **The direction in which the filter should be installed is indicated on the air filter. Make sure that you install it correctly.**
- **Poor cleaning of the filters can lead to:**
  - **health problems, since the operator breathes unclean air through filters that can retain particles that are harmful to health**
  - **internal evaporator efficiency issues and the risk of damaging it.**

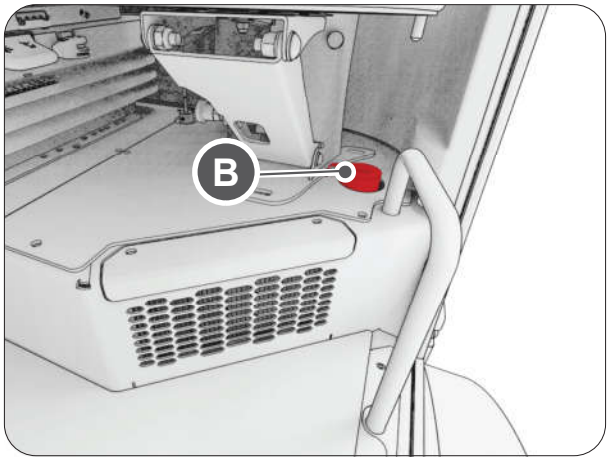
1) Unscrew the four screws that secure the cover (**A**).
2) Remove the cover (**A**).
3) Remove the filter (**B**) and clean (only with a jet of air) or replace it.
4) Reinstall the filter (**B**), replace the cover (**A**) and secure it with the screws.





9.10.3 Topping up the windscreen washer fluid

The windscreen washer fluid tank (**A**) is next to the seat. If the liquid has run out, open the cap of the tank and top it up.



9.10.4 Greasing the cabin slew ring

WARNING

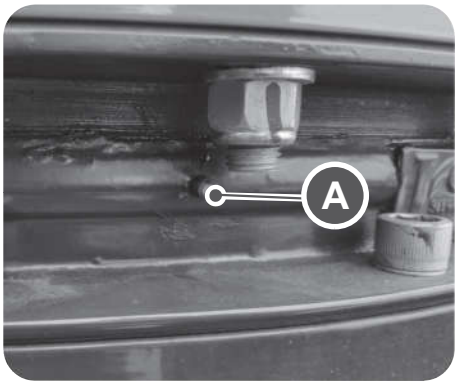
The cabin slew ring should be greased *every 100 hours*.

DANGER

- **Perform this operation with the assistance of qualified, suitable personnel.**
- **As this operation is performed with the machine switched on and the slew ring moving, be careful when carrying out movements and carry them out in compliance with safety regulations.**

Refer to section ***"9.4.1 Lubricants table"*** for the choice of grease to use.

Inject grease into the two grease nipples (**A**) on the left and right of the slew ring.



9.11 MOBILE BALLAST MAINTENANCE (OPTIONAL)

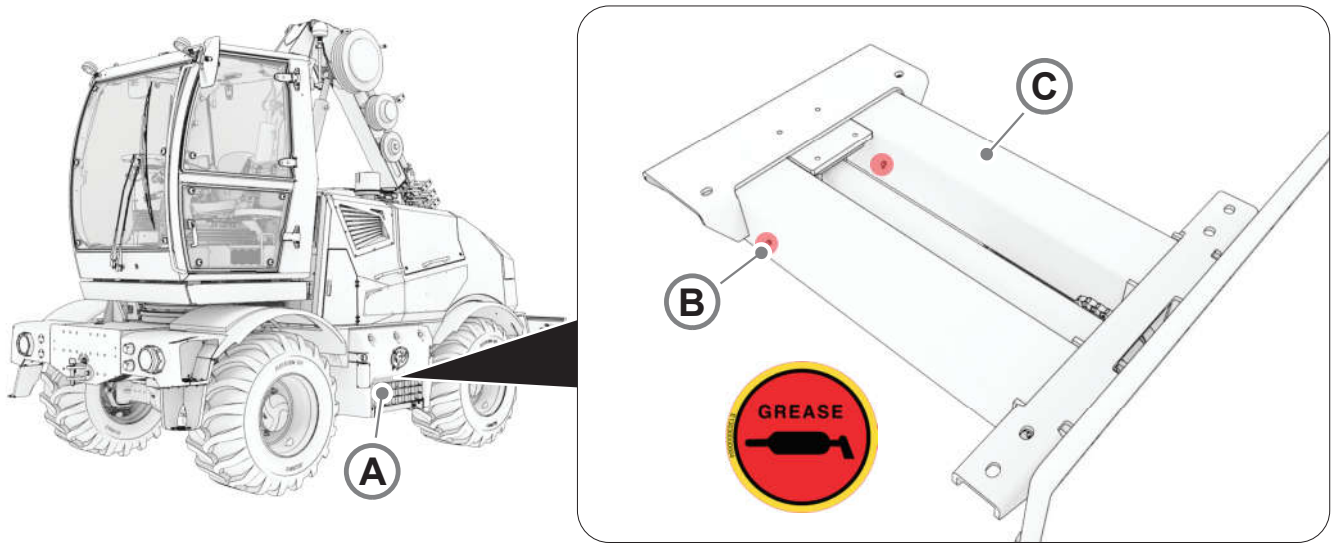
9.11.1 Greasing

WARNING

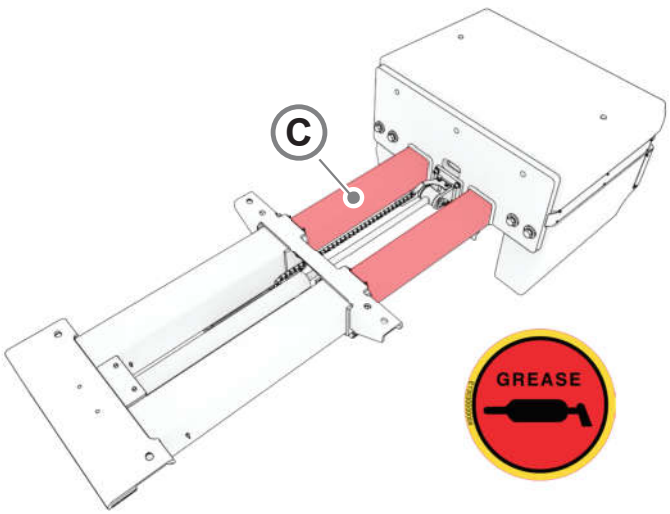
The mobile ballast (if present) should be greased *every 40 hours* or ***every week*.**

Grease manually if the machine is fitted with mobile ballast. Proceed as follows:

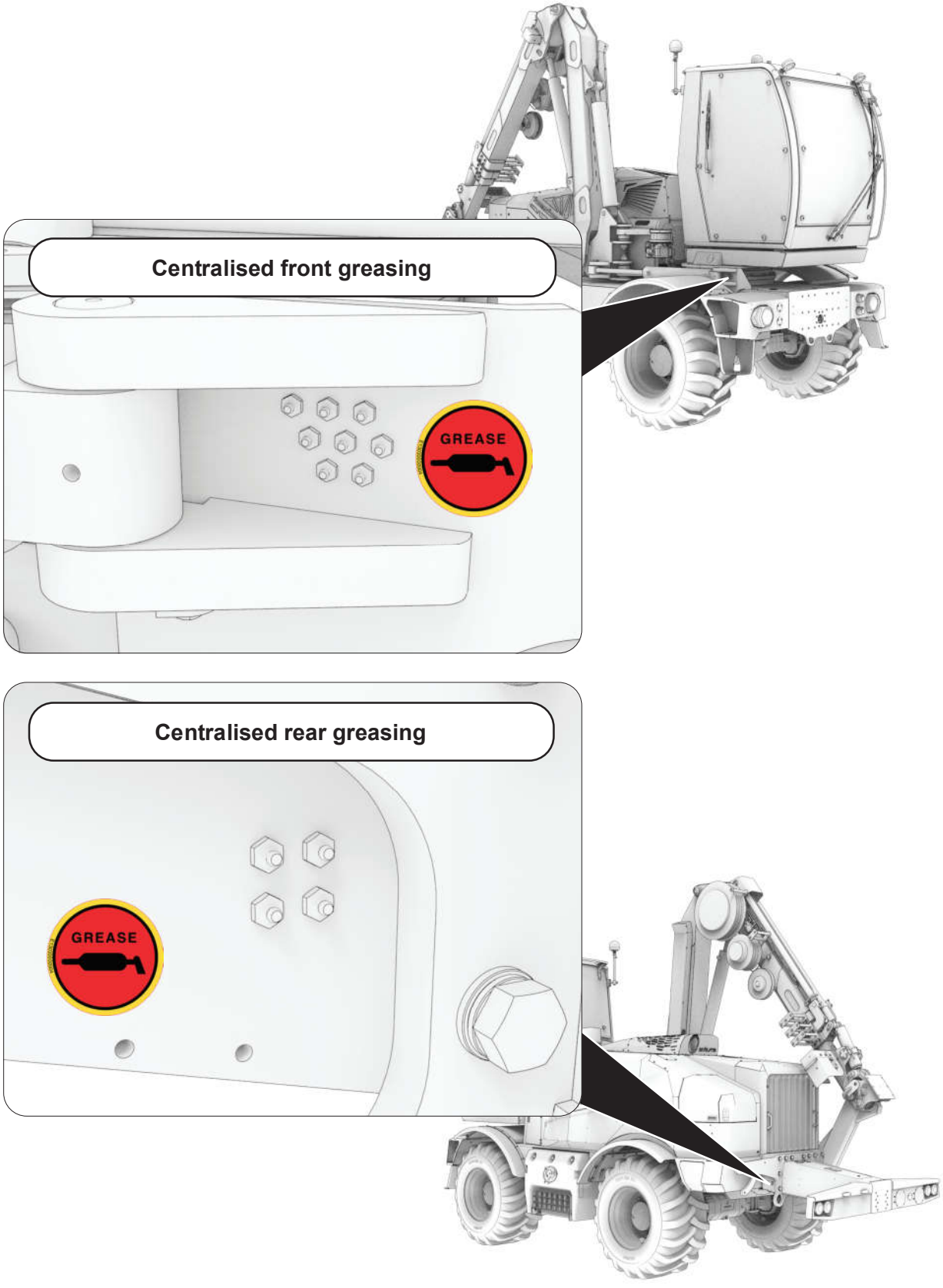
1) Fully retract the mobile ballast (**A**);
2) Clean the four grease nipples (**B**) before greasing;
3) Pump grease into the four grease nipples (**B**) on the fixed frame (**C**);

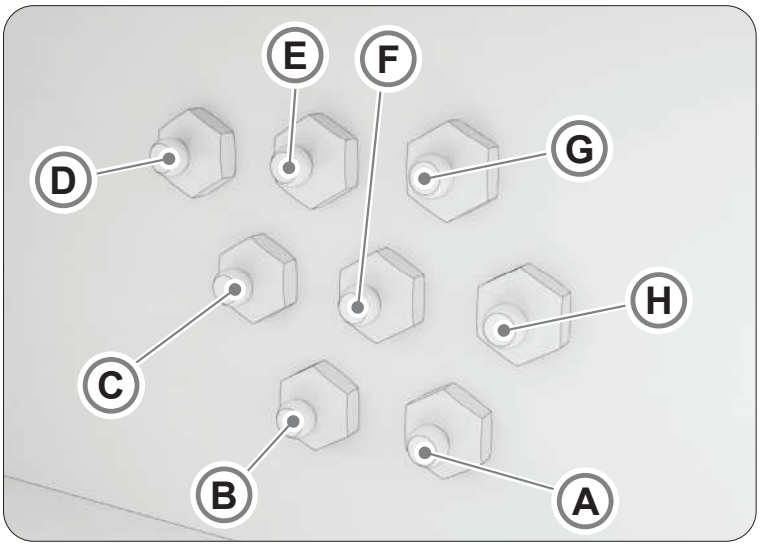


4) Extend the ballast and use a brush to apply grease to the two side rails (**D**) of the mobile frame. The type of grease to use is ENI GREASE MU EP 2.



9.12 CENTRALISED AXLE GREASING (STANDARD VERSION)





9.12.1 Cabin rotation cylinder

WARNING

The cabin rotation cylinder should be greased *every 8 hours or every day.*

The cabin rotation cylinder is greased by pumping grease into the grease nipples (**A**) and (**B**).

9.12.2 Front axle pivot joint

WARNING

The front axle pivot joint should be greased *every 100 hours.*

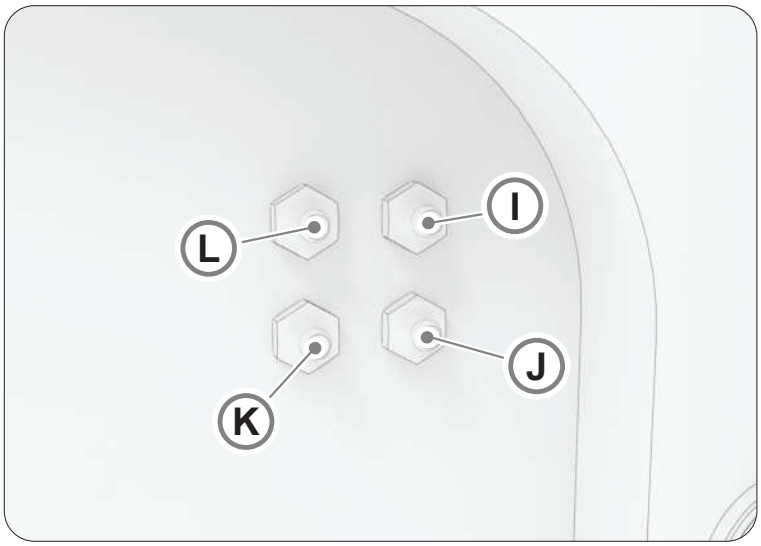
The front axle pivot joint is greased by pumping grease into the grease nipples (**C**) and (**D**).

9.12.3 Front axle hubs

WARNING

The front axle hubs should be greased *every 100 hours.*

The front axle hubs are greased by pumping grease into the grease nipples (**E**), (**F**), (**G**), and (**H**).



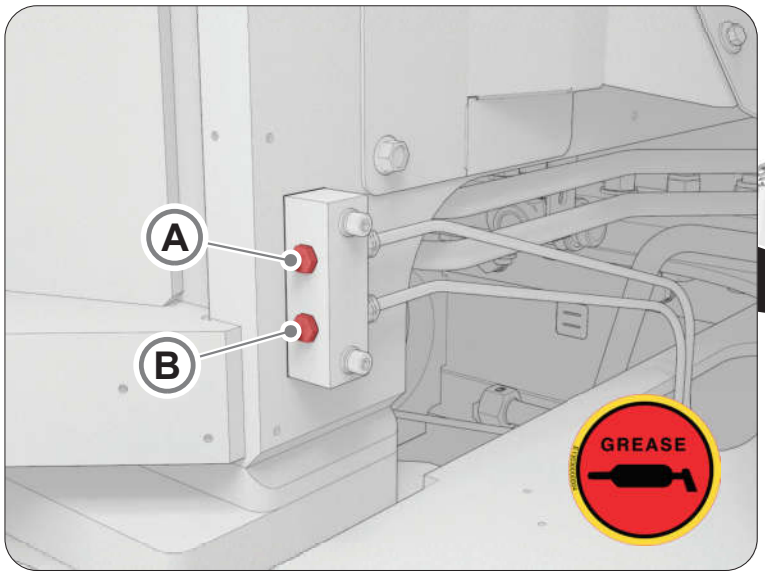
9.12.4 ***Rear axle hubs***

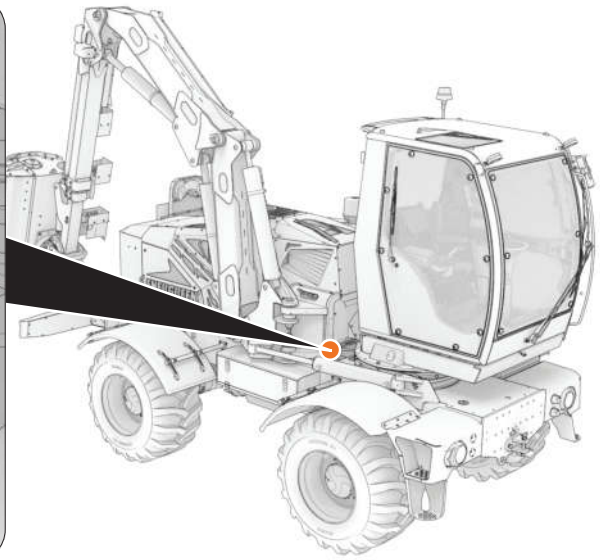
WARNING

The rear axle hubs should be greased *every 100 hours.*

The rear axle hubs are greased by pumping grease into the grease nipples (**I**), (**J**), (**K**), and (**L**).

9.13 CENTRALISED GREASING (EASY RIDE VERSION)



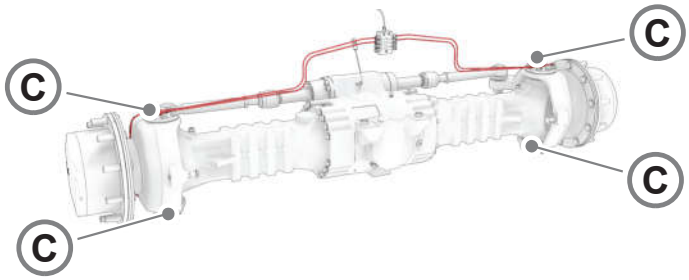


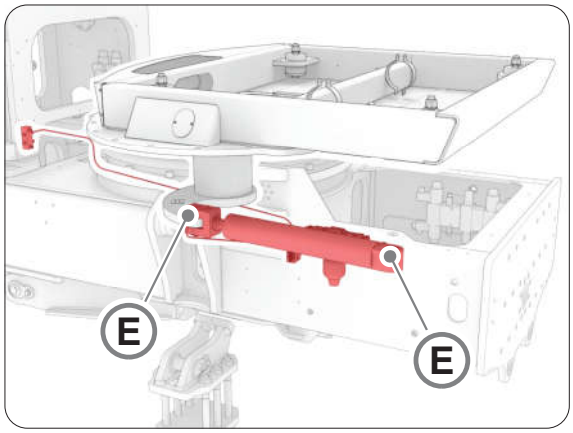
9.13.1 Front zone

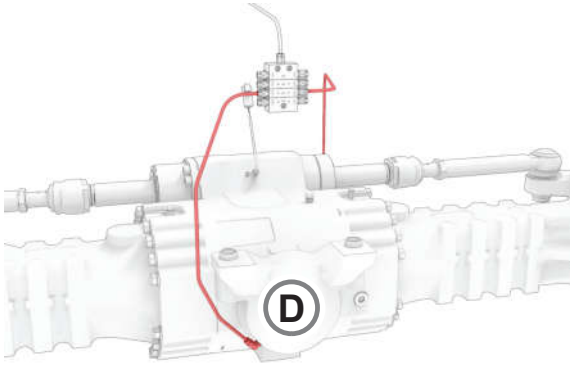
WARNING

The front zone should be greased *every 8 hours or every day.*

Pump grease into the grease fitting (**A**) to lubricate: the hubs (**C**), the front axle pivot joint (**D**) and the pins of the cylinder that allows the cabin to rotate (**E**).





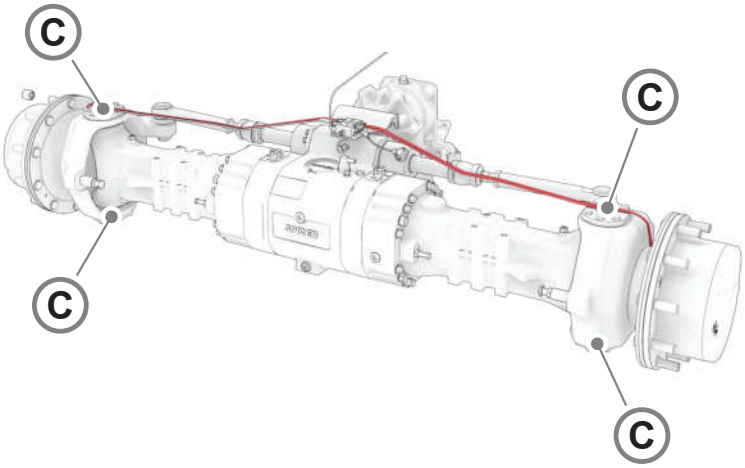


9.13.2 Rear zone

WARNING

The rear zone should be greased *every 8 hours or every day.*

Pump grease into the grease fitting (**B**) to lubricate: the hubs (**F**).



9.14 AUTOMATIC GREASE PUMP (OPTIONAL) MAINTENANCE

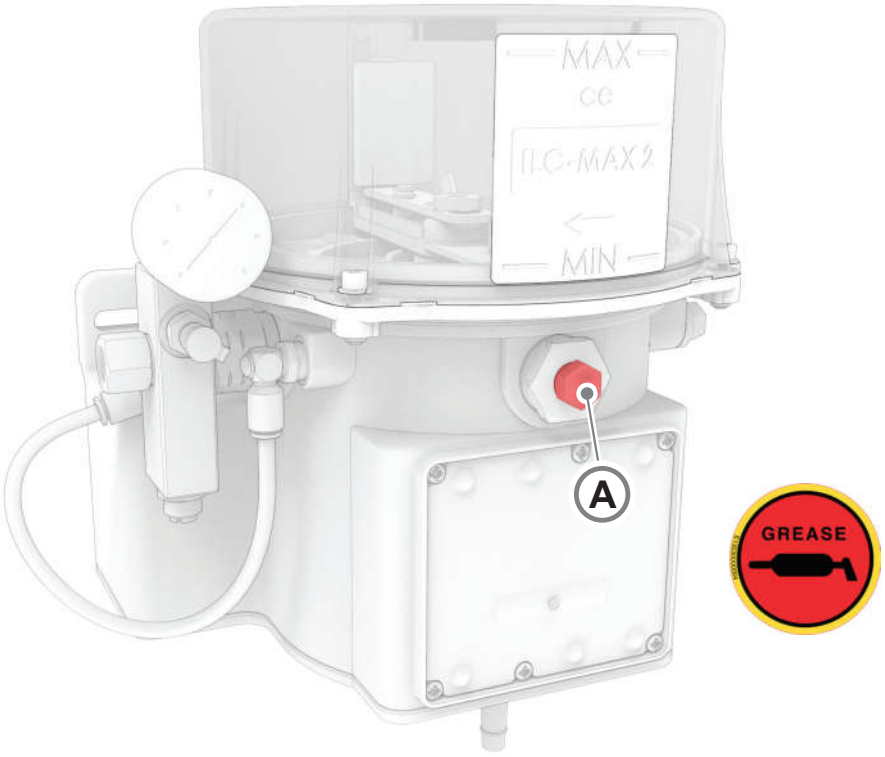
9.14.1 Filling the automatic grease pump

CAUTION

Refer to section *"9.4.1 Lubricants table"* for the choice of grease to use.

To fill the tank of the automatic grease pump, proceed as follows:

1) Go to service mode, see section ***"6.58.1 Service mode"***.
2) Clean the nipple (**A**).
3) Connect the nozzle of the pneumatic grease gun to the nipple (**A**) and inject grease up to the MAX level mark.
4) Disconnect the pneumatic grease gun from the pump.
5) Force the automatic pump greasing if it is not already enabled. See the attached pump manual.
6) During greasing, carry out movements with the arm until a small amount of grease comes out.



9.15 MAINTENANCE OF THE ELECTRICAL SYSTEM

WARNING

Check the electrical system *every 250 hours.*

WARNING

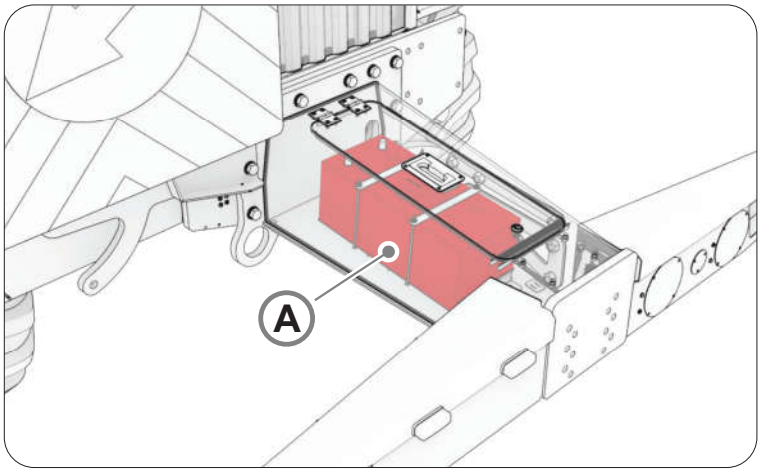
- **Prevent the electrical system from coming into contact with water.**
- **Do not remove or install any components without the prior authorisation of ENERGREEN S.P.A..**
- **No modifications are made to the electrical system without ENERGREEN S.P.A. authorisation.**
- **If the voltage of the batteries with the engine switched off is too low (at least 12 - 12.5 Volts), but the machine does not start, DO NOT CONTINUE.**

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.**

Electrical system maintenance tasks are:

- Check that the tension of the timing belt is correct.
- Battery electrolyte level check (**A**).
- Clean the electrical terminals to remove any oxides and protect them with anti-corrosives.



9.16 WHEEL MAINTENANCE

9.16.1 Checking the tyre pressure

WARNING

- **The first check should be carried out after 50 hours *of use.***
- **Subsequent checks should be carried out *every* 250 hours.**

The check must be performed to ensure optimal tyre preservation and maintenance.
To check the tyre pressure:

1) Unscrew the valve cap.
2) Insert the nozzle of the pressure gauge onto the valve and check the pressure on the pressure gauge.
3) Screw the cap back onto the valve.

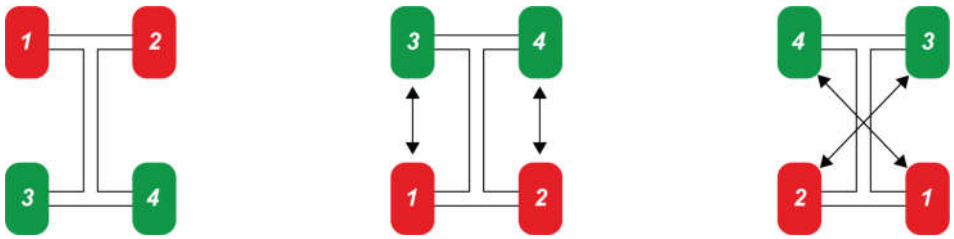
The tyre pressure varies according to the model. Refer to section ***"4.1.9 Tyres"*** for the pressures to be used. Any pressure variation from the value indicated implies abnormal tyre wear.

9.16.2 Inspecting for wear and inverting the tyres

WARNING

- **Check the tyres for wear *every 500 hours.***
- **It is recommended that you invert the front and rear tyres *every 1000 hours*, taking care to avoid crossing them over (the left front wheel must be mounted in place of the left rear wheel).**

The check must be performed to ensure optimal tyre preservation and maintenance.
Periodically check the height of the bead. If the difference between the front and rear tires is greater than 3%, invert them.



Before | After | **NO!!!**

9.16.3 Checking the tightness of the wheel nuts

WARNING

- **The first check should be carried out after 50 hours *of use.***
- **Subsequent checks should be carried out *every* 250 hours.**

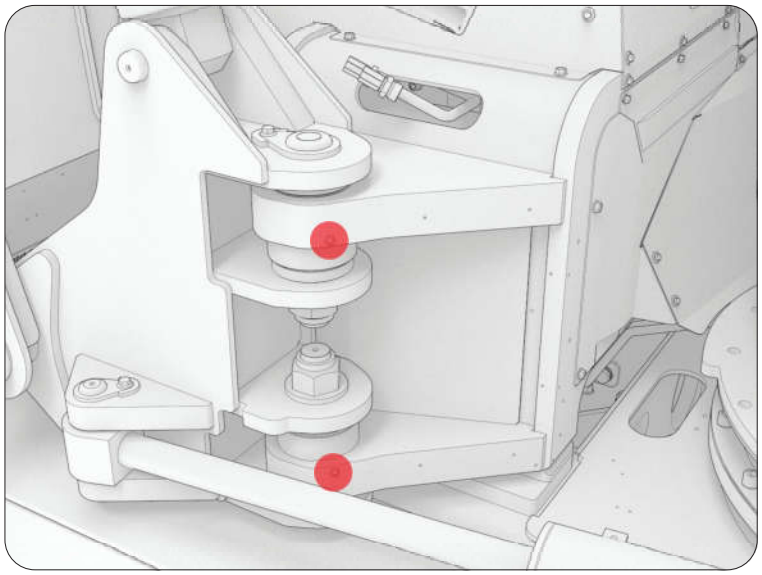
This check should be carried out to ensure safety.
To check the tightening torque of the wheel nuts, use a torque wrench set to 550 ± 20 Nm.

9.17 ARM MAINTENANCE

9.17.1 Greasing the coupling joint - arm support

WARNING

Grease *every 4 hours*.

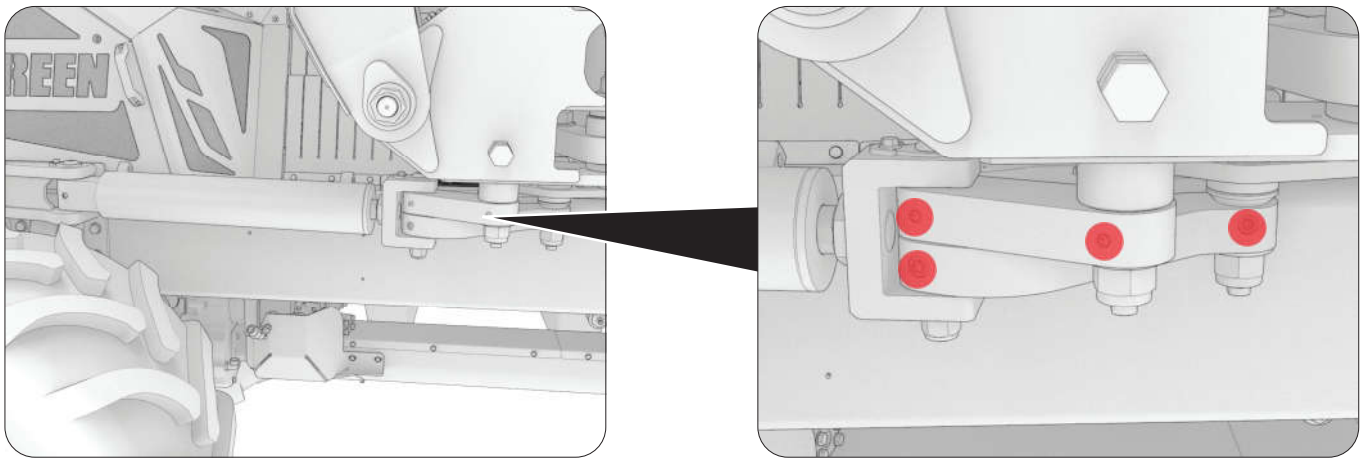


1) Clean the grease fittings with a cloth.
2) Connect the nozzle of the grease gun to the grease fitting.
3) Pump in grease into it until a small amount seeps out from the joints.

9.17.2 Greasing of levers - 180° arm rotation (optional)

WARNING

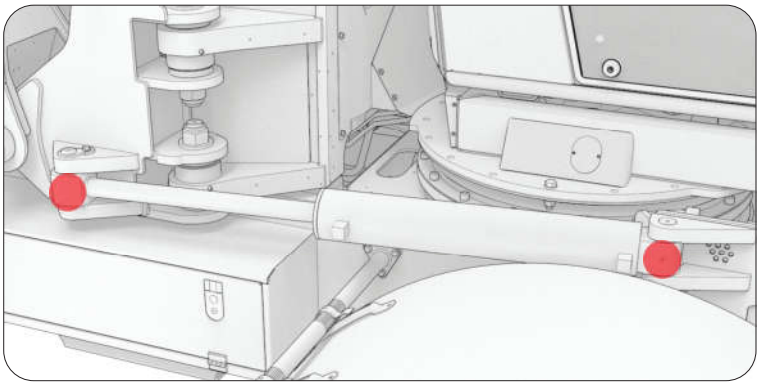
Grease *every 4 hours*.



9.17.3 Greasing the arm rotation cylinder

WARNING

Grease *every 4 hours*.

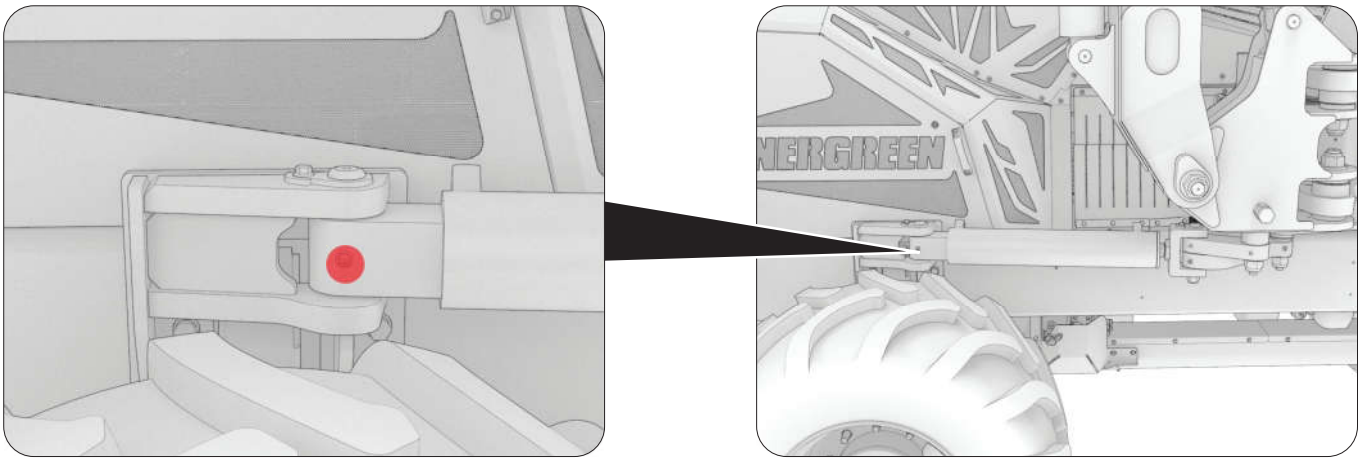


1) Clean the grease fittings with a cloth.
2) Connect the nozzle of the grease gun to the grease fitting.
3) Pump in grease into it until a small amount seeps out from the joints.

9.17.4 Greasing the 180° arm rotation cylinder (optional)

WARNING

Grease *every 4 hours*.

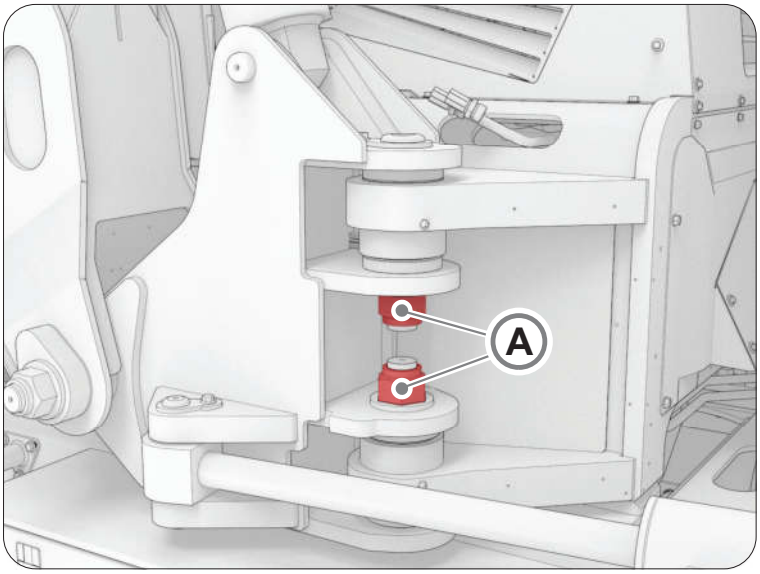


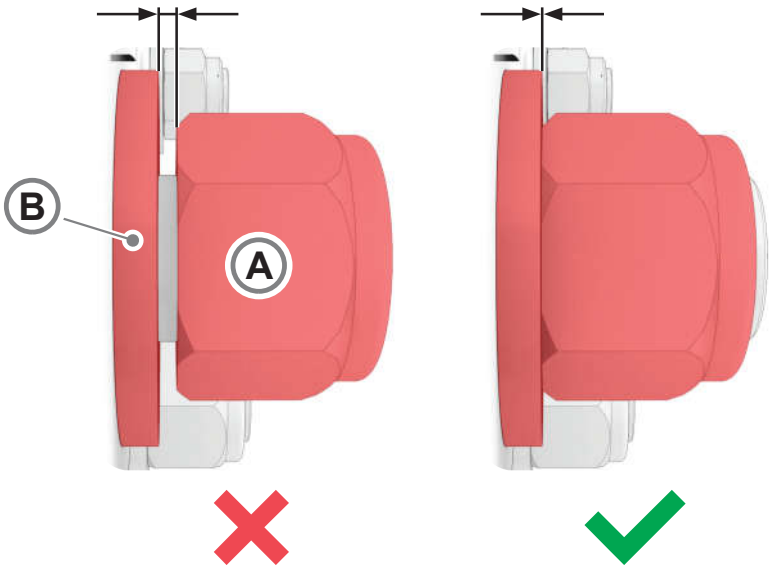
9.17.5 Nut tightness - arm support

WARNING

- **Check the tightness of the nuts *every 40 hours* or *every week*.**
- **It is recommended not to overtighten the nut as the head of the relative pin might break or the parts may produce a squeaking noise when they rub against one another.**

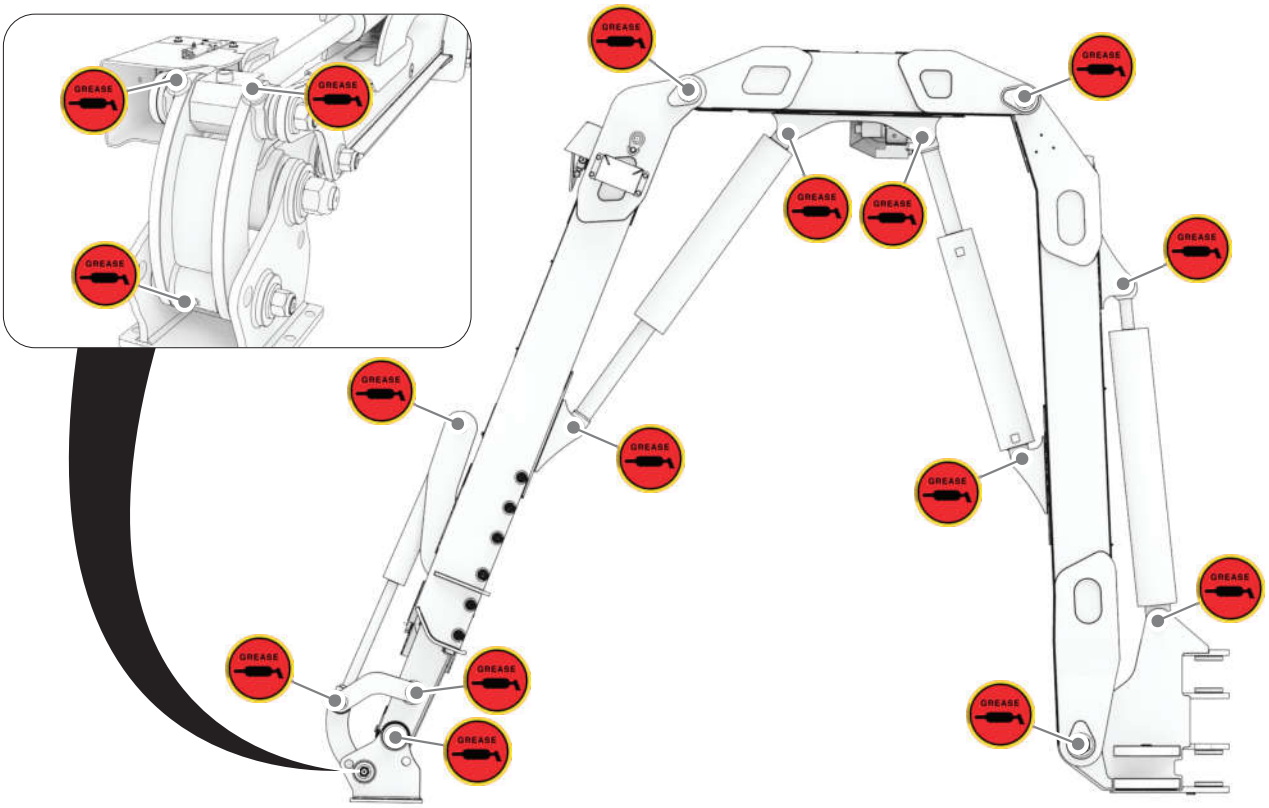
This consists of checking to see if any nuts have become loose at the points indicated in the figure. If there are: use a spanner to tighten the nut (**A**) by hand until it comes into contact with the washer (**B**); do not overtighten it.





9.17.6 Greasing the bushings and pins - Arm 3P

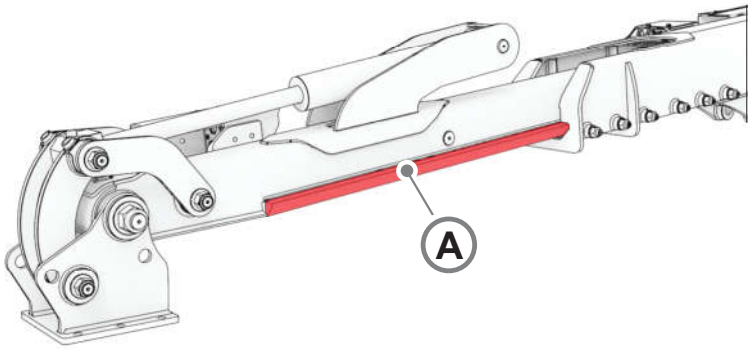
Grease the points, connecting the pump nozzle to the grease nipples and pump in grease until a small amount comes out.



9.17.7 Greasing the extensions - Arm 3P

To grease the extensions, proceed as follows:

- Extend the extensions fully.
- Rest the equipment connected to the arm on the ground.
- Grease the arm in the areas (**A**) in which the extensions slide.

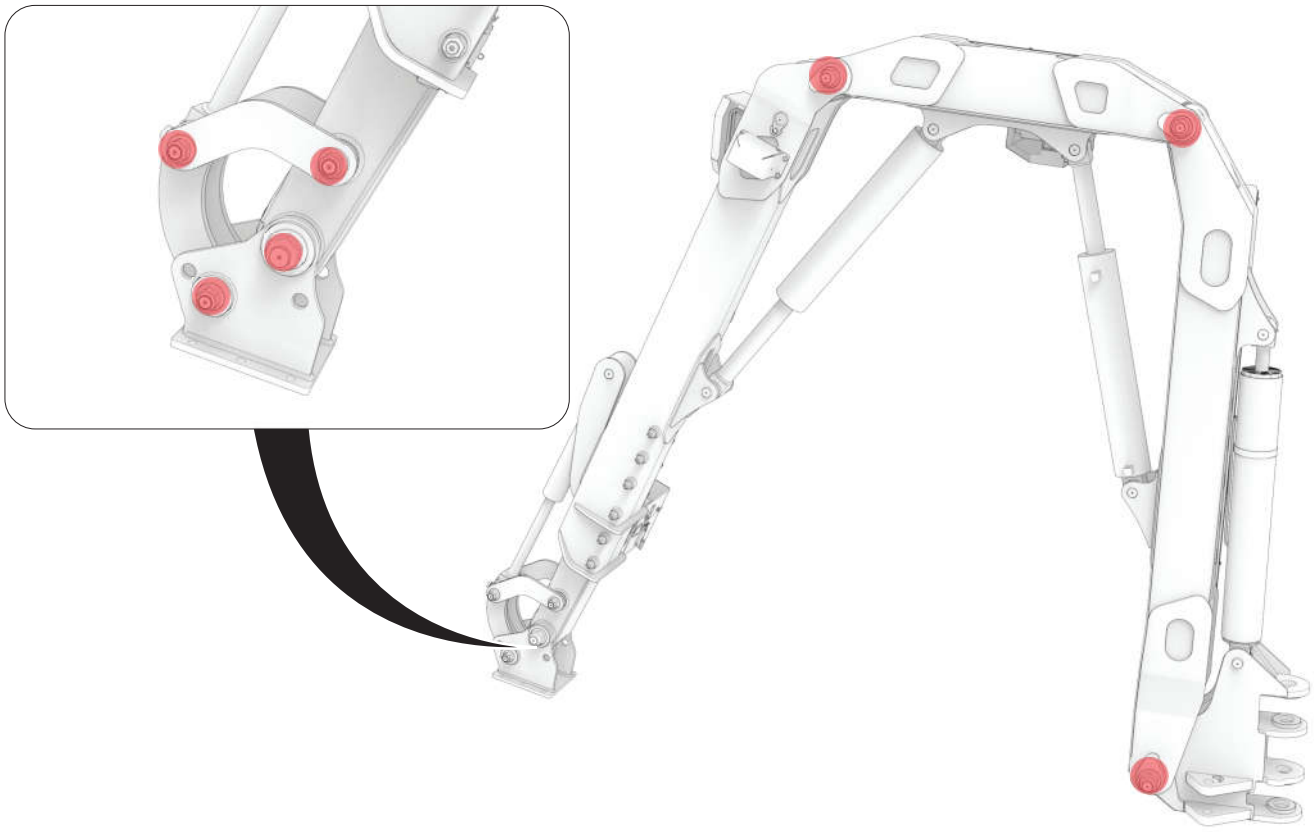


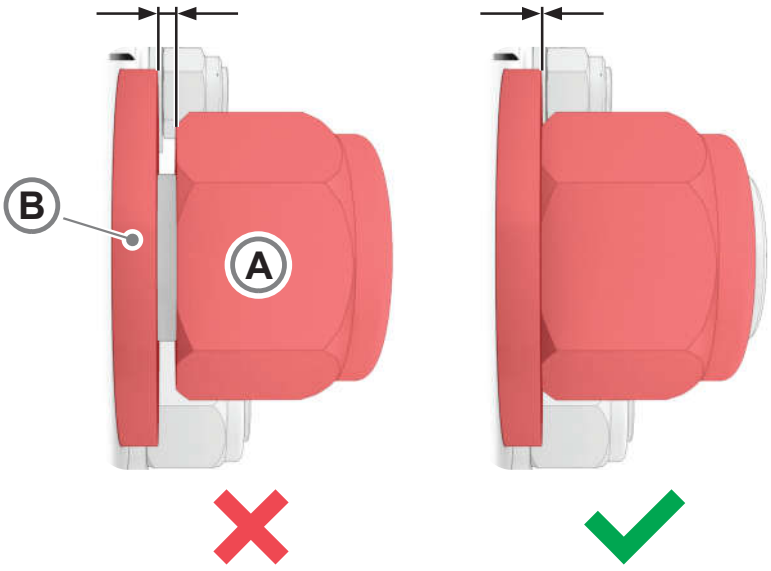
9.17.8 Nut tightness - Arm 3P

WARNING

- **Check the tightness of the nuts *every 40 hours* or *every week*.**
- **It is recommended not to overtighten the nut as the head of the relative pin might break or the parts may produce a squeaking noise when they rub against one another.**

This consists of checking to see if any nuts have become loose at the points indicated in the figure. If there are: use a spanner to tighten the nut (**A**) by hand until it comes into contact with the washer (**B**); do not overtighten it.



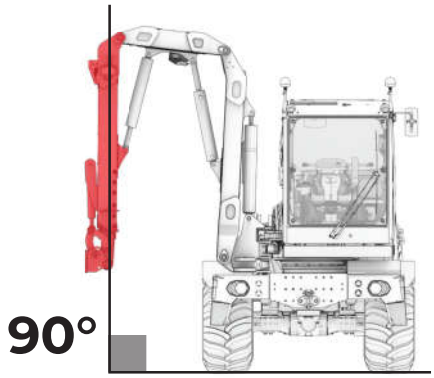


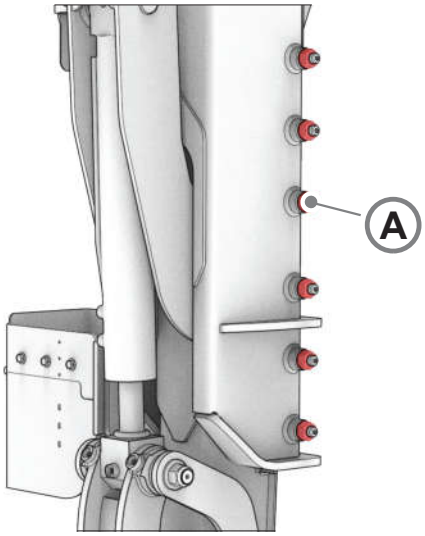
9.17.9 Adjusting the sliding blocks - Arm 3P

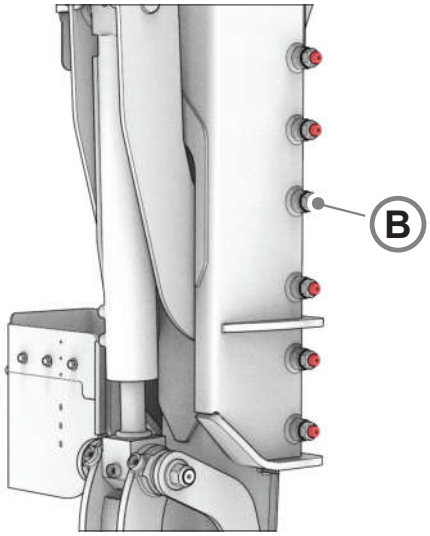
WARNING

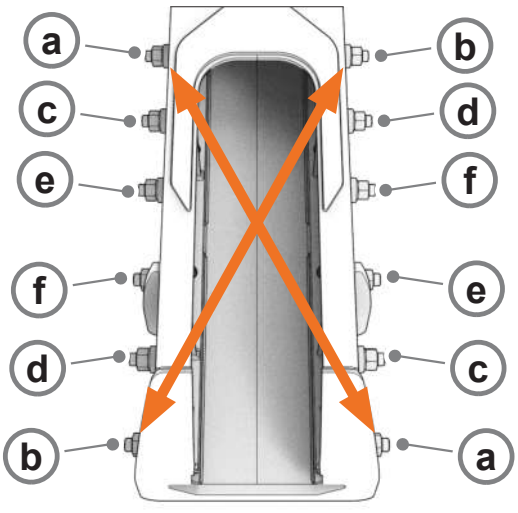
Adjust the sliding blocks *every 100 hours* or whenever you notice that there is play between the extension and the sliding block.

1) Place the third arm in a downward position, perpendicular to the ground, without resting it on the ground.
2) Loosen the twelve locknuts (**A**) (six on each side) on the third arm using a 30 mm wrench.
3) Loosen the twelve screws (**B**) (six on each side) on the third arm using an 8 mm Allen key.
4) Tighten the twelve screws of the upper sliding block with a torque of less than 10 Nm; they should be tightened in an "X" sequence (see image showing the sequence (**a**), (**b**), (**c**), (**d**), (**e**), (**f**)) to avoid producing an uneven pressure on the block and centring the last extension inside the second arm.
5) Once the adjustment has been completed, use the 8 mm Allen key to keep the adjustment screws in position and at the same time use a 30 mm wrench to tighten the twelve locknuts with a torque of 412 Nm.
6) Grease the extension using a brush.









9.17.10 *Checking the wear of the sliding blocks - Arm 3P*

WARNING

Check the sliding blocks for wear *every 100 hours.*

To determine the state of wear of the sliding blocks, you have to inspect the blocks and the surface of the extension from both sides.

The sliding blocks are damaged if:

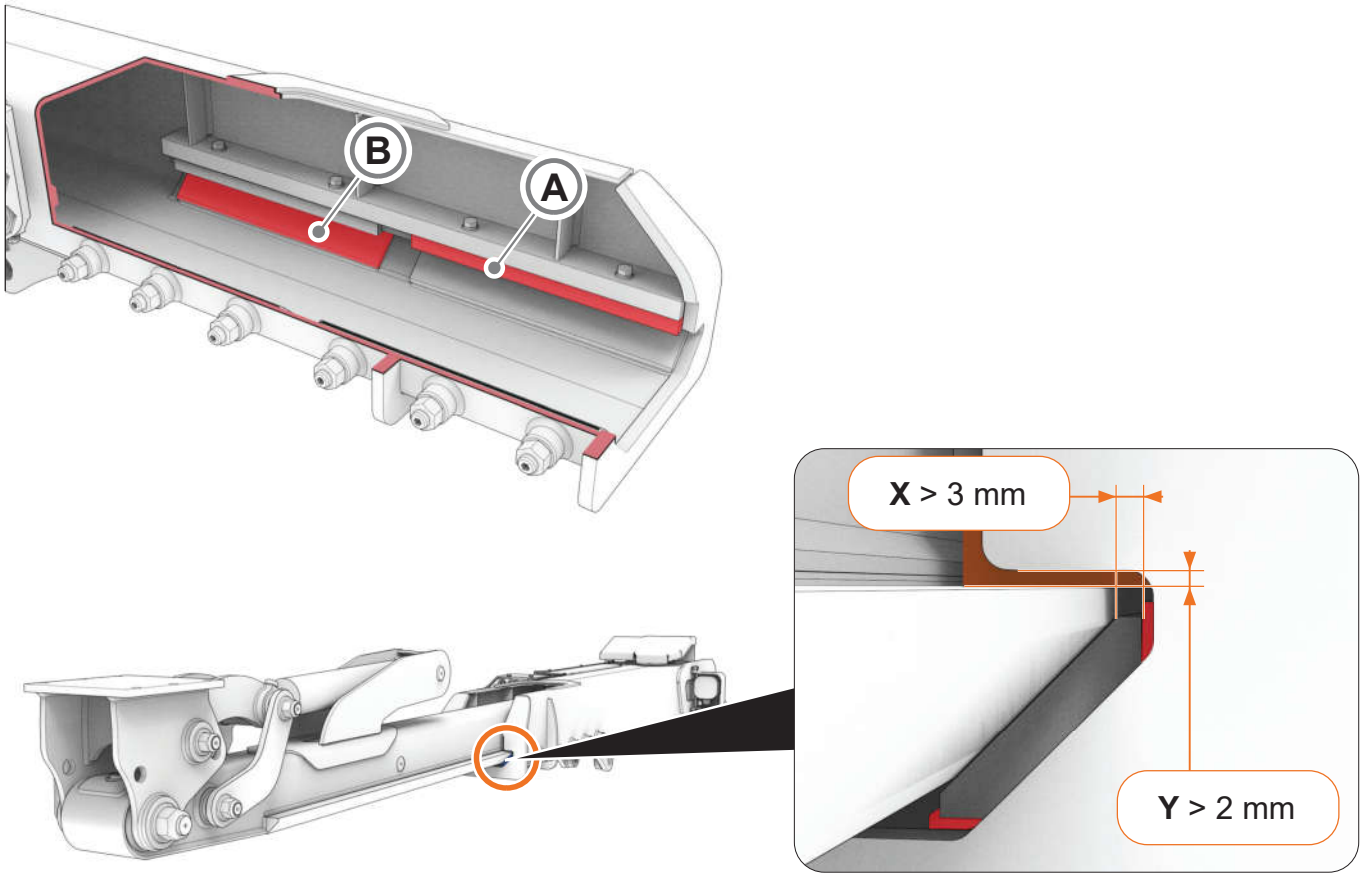
- the surface of the extension that slides on the sliding block shows "large" streaks of grease, this indicates that the sliding block is scored: replacement is recommended.

The upper sliding blocks (**A**) are worn if:

- the clearance (**Y**) between the third arm and the extension, provided by the upper sliding blocks (**A**) is equal to or less than 2 mm: replacement is recommended.

The lateral sliding blocks (**B**) are worn if:

- the clearance (**X**) between the extension and the sliding block support, provided by the lateral sliding blocks (**B**) is equal to or less than 3 mm: replacement is recommended.



9.17.11 *Replacing the sliding blocks - Arm 3P*

DANGER

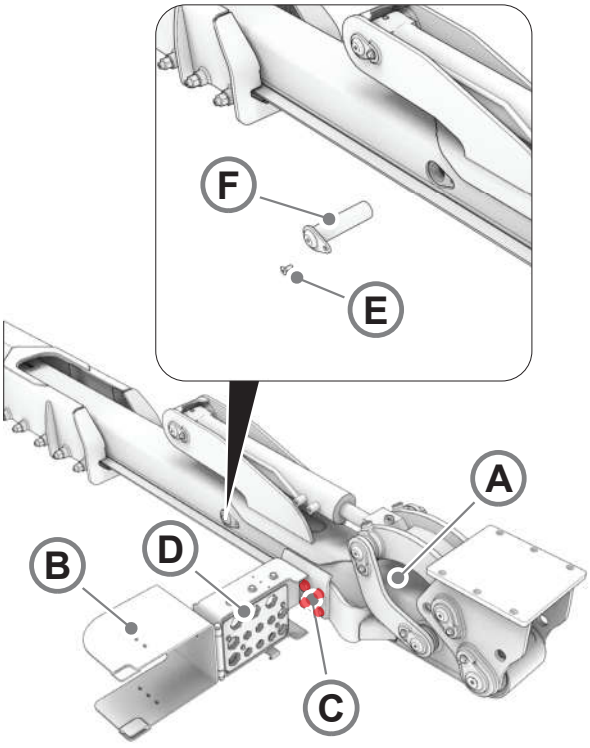
CRUSHING HAZARD: Do not stand or pass close to suspended loads.

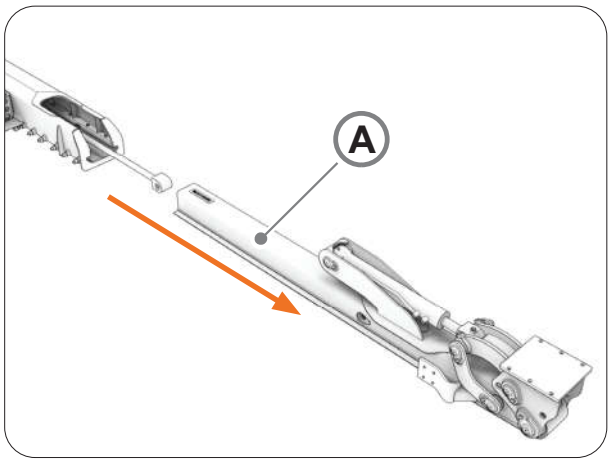
WARNING

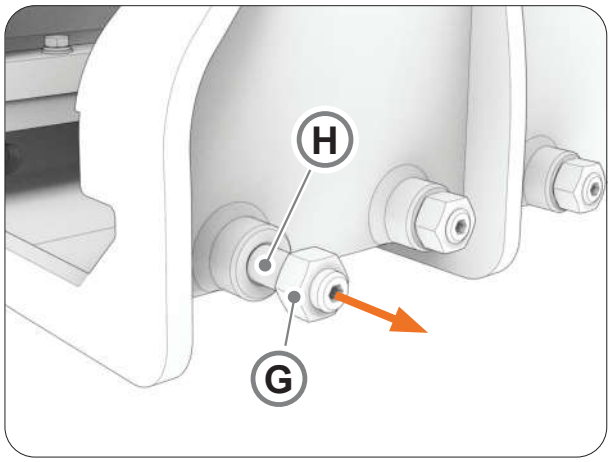
- **At least two people are required to carry out this operation.**
- **Use lifting straps with a capacity greater than the weight to be lifted.**

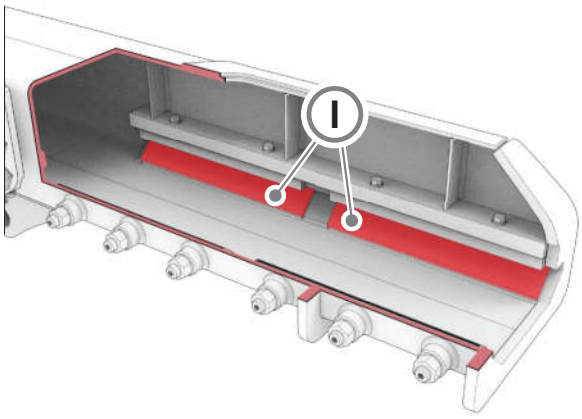
To replace the sliding blocks, proceed as follows:

1) Switch off the machine
2) Disconnect any equipment connected to the arm.
3) Extend the extension (**A**) completely.
4) Open the hydraulic couplings guard (**B**).
5) Unscrew the four screws (**C**) that secure the coupling support (**D**), taking care to rest it on the ground once the screws have been removed.
6) Unscrew the screw (**E**).
7) Remove the pin (**F**).
8) Sling the extension (**A**) and then withdraw it from the third arm.

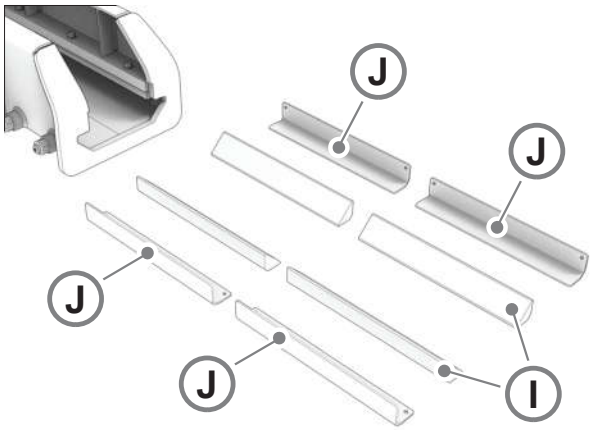


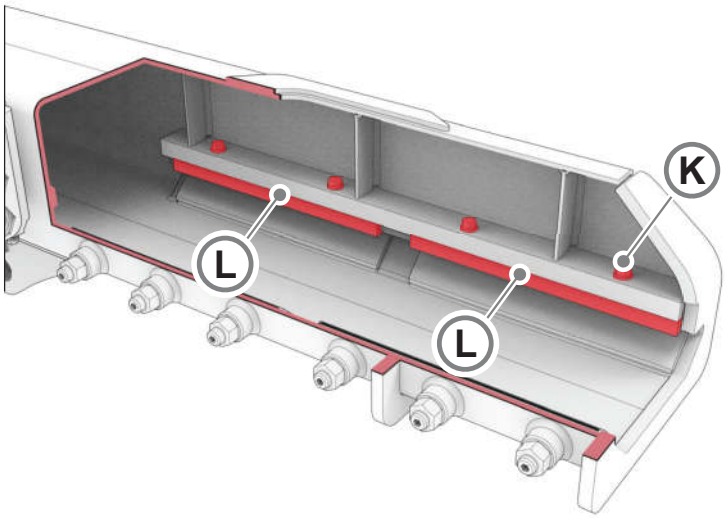




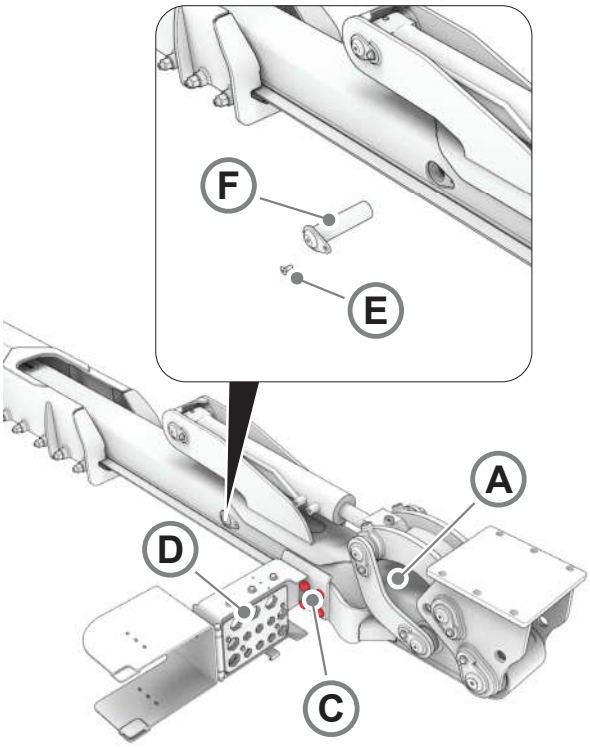


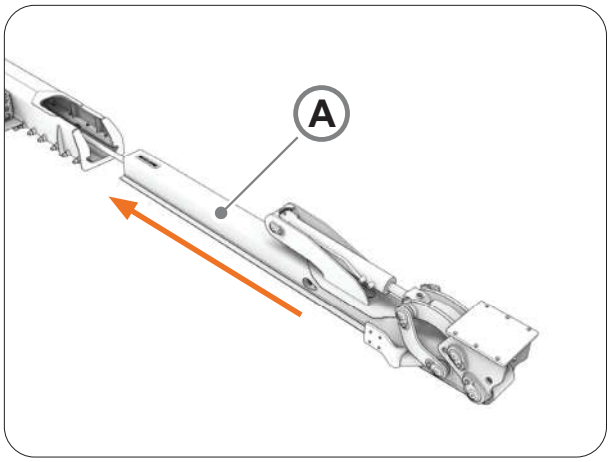
9) Loosen the twelve nuts (**G**) and then the twelve screws (**H**).
10) Remove the four lateral sliding blocks (**I**) and replace them with new ones: to make installation easier and to keep the sliding blocks in position in the arm, apply grease between the sliding block and the support (**J**) and on the support: on both the sides in contact with the third arm.
11) Insert the four supports with the sliding blocks into their seat, inside the arm.





12) Unscrew the eight screws (**K**).
13) Remove the four upper sliding blocks (**L**) and replace them with new ones.
14) Install new sliding blocks, tightening the eight screws with a torque of 69 Nm.

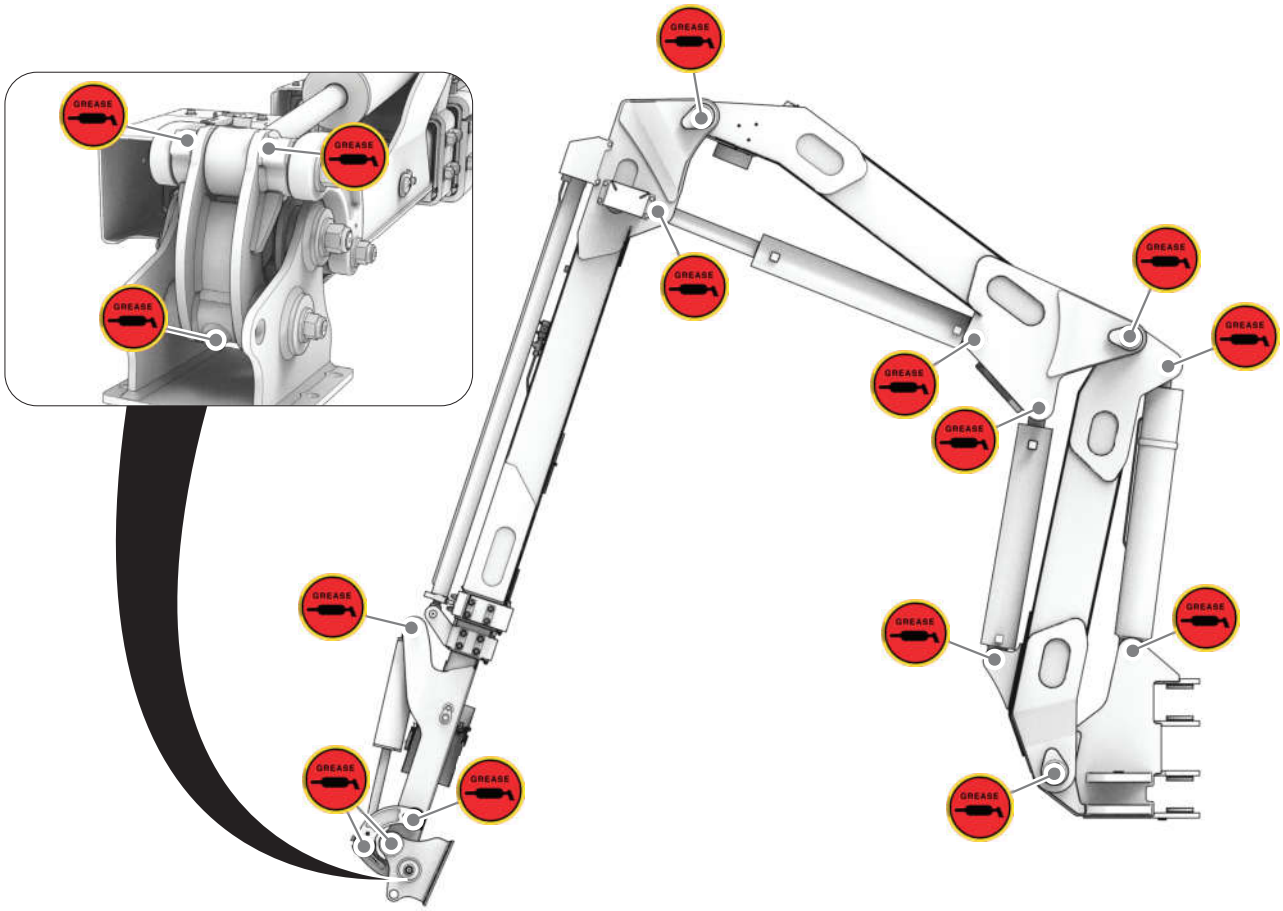




15) Insert the extension (**A**) into the third arm.
16) Insert the pin (**F**).
17) Tighten the screw (**E**) with a torque of 69 Nm.
18) Secure the coupling support (**D**) to the arm, tightening the four screws (**C**), with a torque of 190 Nm.
19) Adjust the sliding blocks, see section ***"9.17.7 Adjusting the sliding blocks - Arm 3P"***.
20) Connect any equipment required to the arm.

9.17.12 Greasing the bushings and pins - Arm F

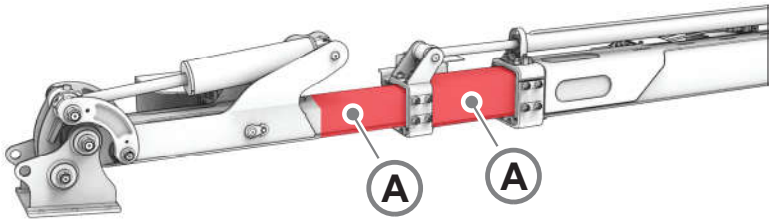
Grease the points, connecting the pump nozzle to the grease nipples and pump in grease until a small amount comes out.



9.17.13 Greasing the extensions - Arm F

To grease the extensions, proceed as follows:

- Extend the extensions fully.
- Rest the equipment connected to the arm on the ground.
- Grease the arm in the areas (**A**) in which the extensions slide.

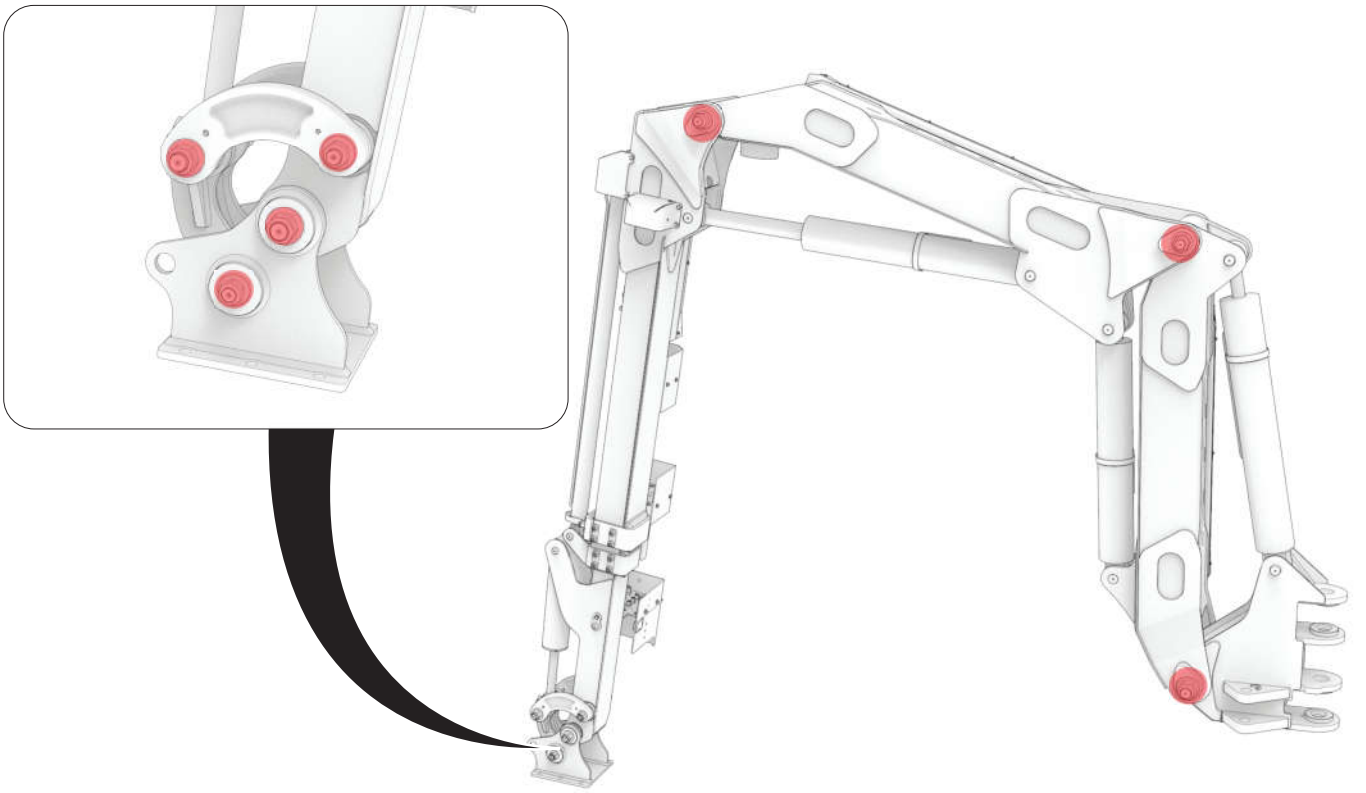


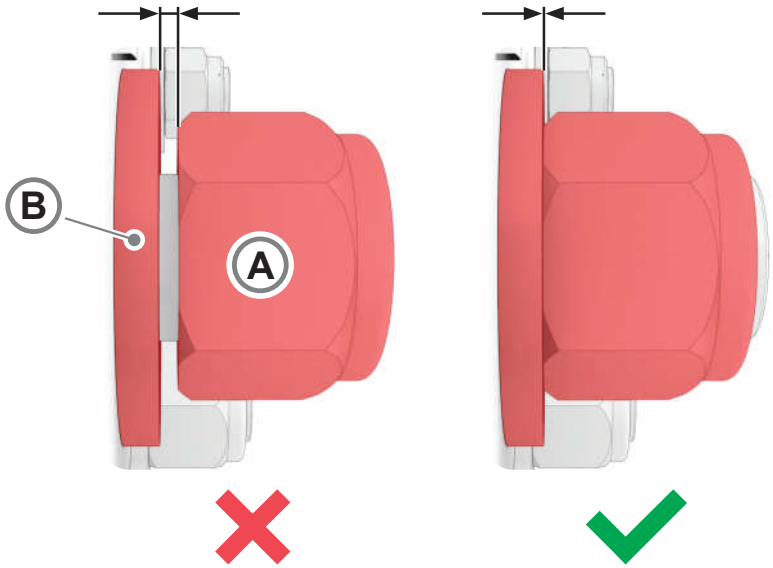
9.17.14 Nut tightness - Arm 3F

WARNING

- **Check the tightness of the nuts *every 40 hours* or *every week*.**
- **It is recommended not to overtighten the nut as the head of the relative pin might break or the parts may produce a squeaking noise when they rub against one another.**

This consists of checking to see if any nuts have become loose at the points indicated in the figure. If there are: use a spanner to tighten the nut (**A**) by hand until it comes into contact with the washer (**B**); do not overtighten it.

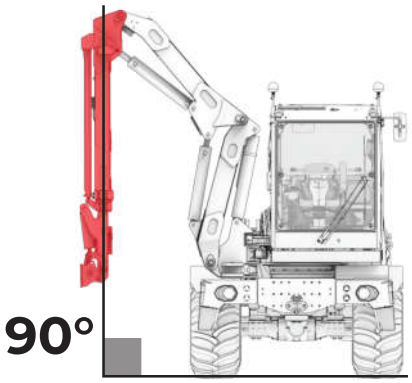




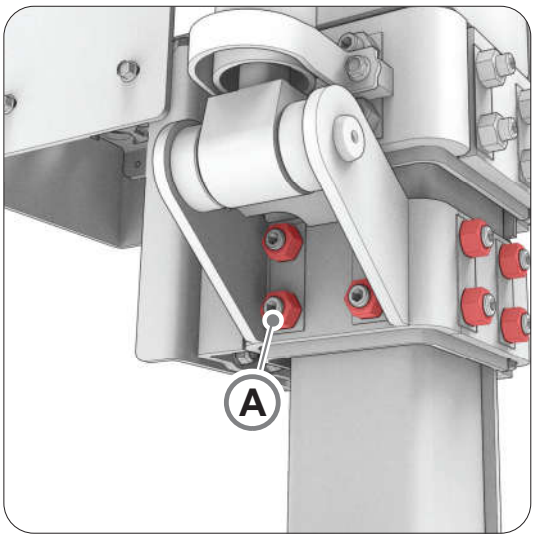
9.17.15 *Adjusting the sliding blocks - Arm F*

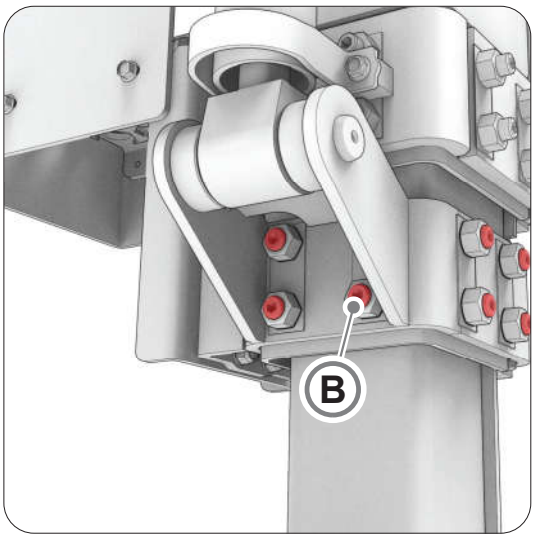
WARNING

Adjust the sliding blocks *every 100 hours* or whenever you notice that there is play between the extension and the sliding block.



1) Place the third arm in a downward position, perpendicular to the ground, without resting it on the ground.
2) Loosen the twelve locknuts (**A**) (four on each side) on the third arm / extension using a 24 mm wrench.
3) Loosen the twelve screws (**B**) (four on each side) on the second arm / extension using an 8 mm Allen key.
4) Tighten the four screws of the upper sliding block with a torque of less than 10 Nm; they should be tightened in an “X” sequence to avoid producing an uneven pressure on the block.
5) Continue with the lateral sliding blocks in order to centre the extension inside the second arm / extension.
6) Once the adjustment has been completed, use the 8 mm Allen key to keep the adjustment screws in position and at the same time use a 24 mm wrench to tighten the twelve locknuts with a torque of 211 Nm.
7) Repeat the operations for any other extensions there may be.
8) Grease the extensions using a brush.





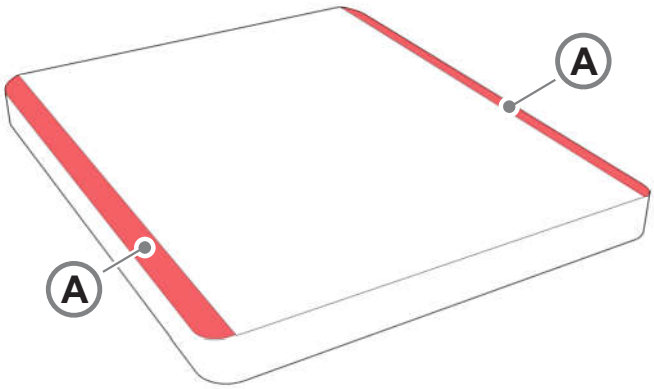
9.17.16 Checking the wear of the sliding blocks - Arm F

WARNING

- **Check the sliding blocks for wear *every 100 hours.***
- **The thickness of sliding blocks and of extension must never be less than 7 mm.**

To determine the state of wear of the sliding blocks, you have to inspect the block and the surface on which it slides.

- If the surface of the extension that slides on the sliding block shows "large" streaks of grease, this indicates that the sliding block is scored, replacement is recommended.
- If the chamfers (**A**) are missing from the sliding blocks, this prevents grease from flowing between the sliding block and the extension to make it easier for the extension to move. It is recommended to replace them.



9.17.17 *Replacing the sliding blocks - Arm F*

DANGER

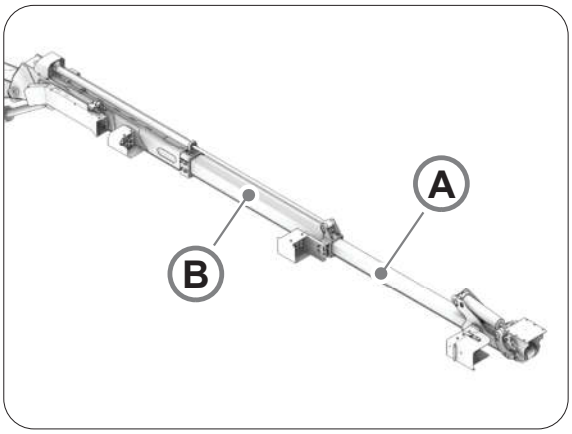
CRUSHING HAZARD: Do not stand or pass close to suspended loads.

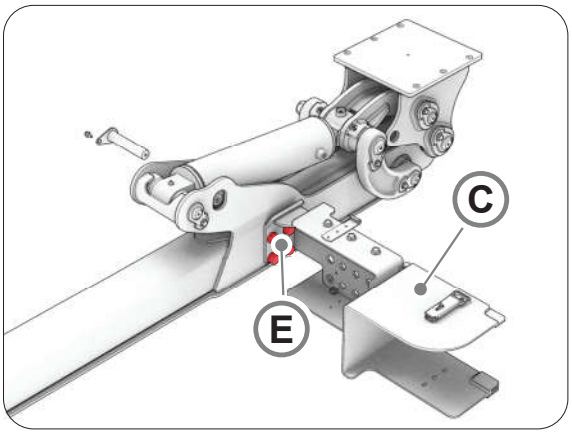
WARNING

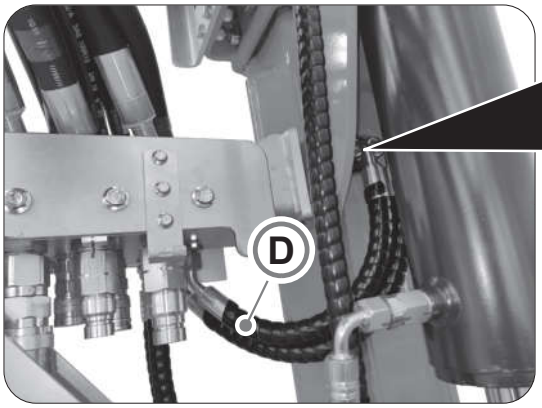
- **At least two people are required to carry out this operation.**
- **Use lifting straps with a capacity greater than the weight to be lifted.**

To replace the sliding blocks, proceed as follows:

1) Disconnect any equipment connected to the arm.
2) Extend the extensions (**A**) and (**B**) completely.
3) Switch off the machine
4) Open the hydraulic coupling support guard (**C**).
5) First disconnect the two hoses (**D**), which are connected to the plate, from the cylinder, then the nipples on the cylinder.
6) Unscrew the four screws (**E**) that secure the hydraulic coupling support (**C**), taking care to rest it on the ground once the screws have been removed.

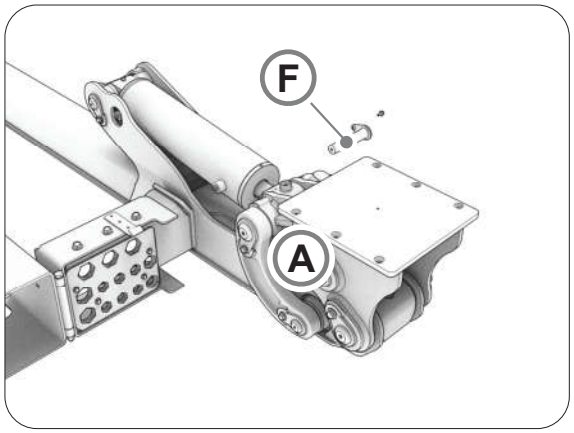


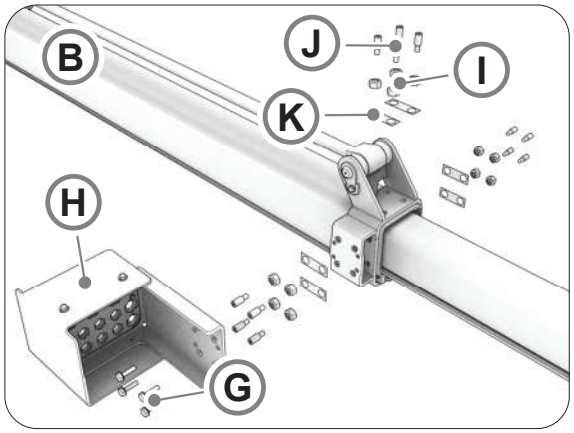


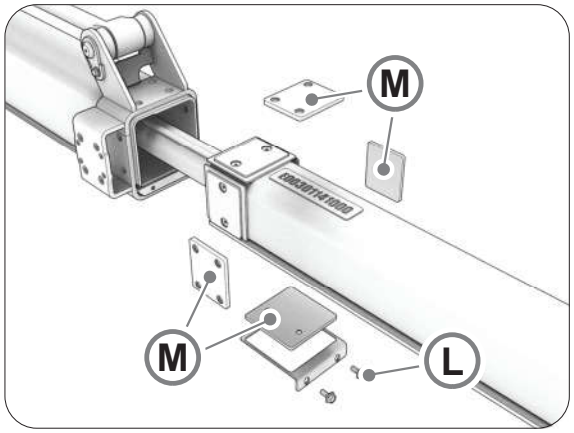


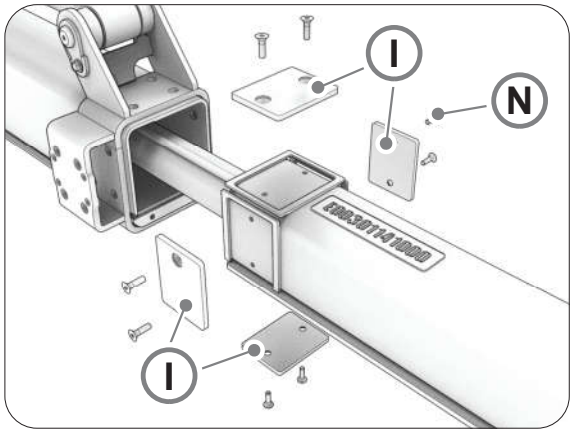
Removing the first extension

7) Sling the first extension (**A**), unscrew the screw and remove the pin (**F**).
8) Remove the hydraulic couplings support (**H**) from the second extension (**B**), by unscrewing screws (**G**).
9) Loosen the nuts (**I**), remove the screws (**J**) and shims (**K**), making a note of their position.
10) Unscrew the screws (**L**) and partially withdraw the first extension (**A**) from the second extension (**B**), the sliding blocks (**M**) will then come out by themselves. If there are any nuts inside the extension (**A**), remove them.
11) Extend the first extension (**A**) completely, unscrew the screws (**N**) and replace the sliding blocks (**P**): apply threadlocker to the screws (**N**) and tighten them with a torque of 35 Nm. If there were any nuts inside the extension (**A**), fasten the sliding blocks with them.







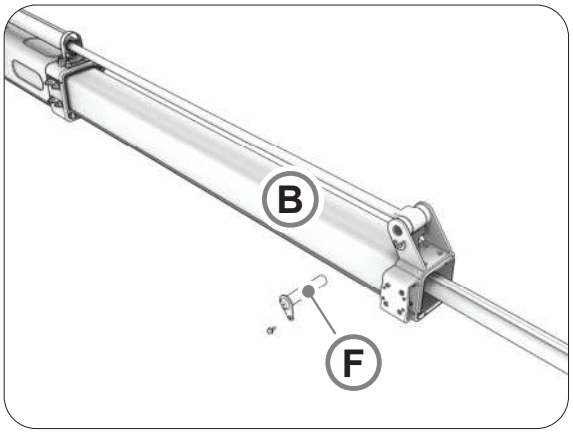


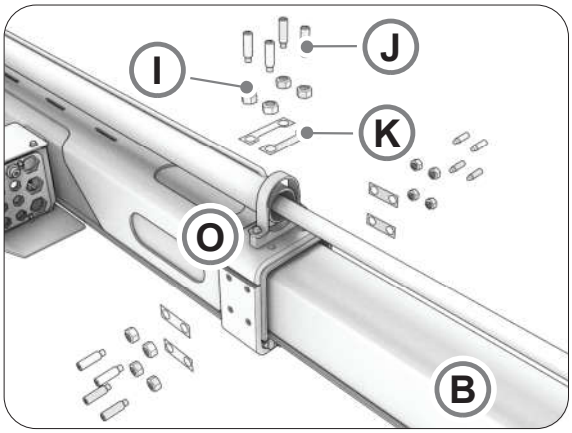
Removing the second extension

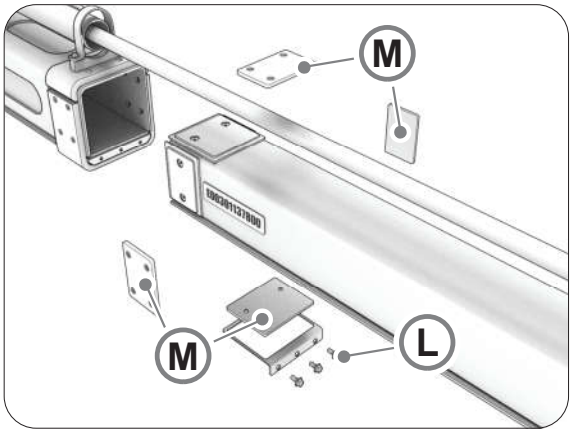
12) Sling the second extension (**B**), unscrew the screw and remove the pin (**F**).
13) Loosen the nuts (**I**), remove the screws (**J**) and shims (**K**), making a note of their position.
14) Unscrew the screws (**L**) and partially withdraw the second extension (**B**) from the third arm (**O**), the sliding blocks (**M**) will then come out by themselves. If there are any nuts inside the extension (**B**), remove them.
15) On the second extension (**B**), unscrew the screws (**N**) and replace the sliding blocks (**I**): apply threadlocker to the screws (**N**) and tighten them with a torque of 35 Nm. If there were any nuts inside the extension (**B**), fasten the sliding blocks with them.

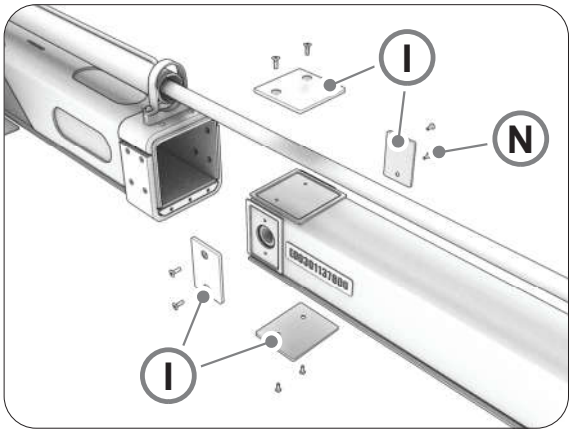
Installing extensions and tightening

16) Install the extensions following the above procedure in reverse.
17) Adjust the sliding blocks, see section ***"9.17.15 Adjusting the sliding blocks - Arm F"***.



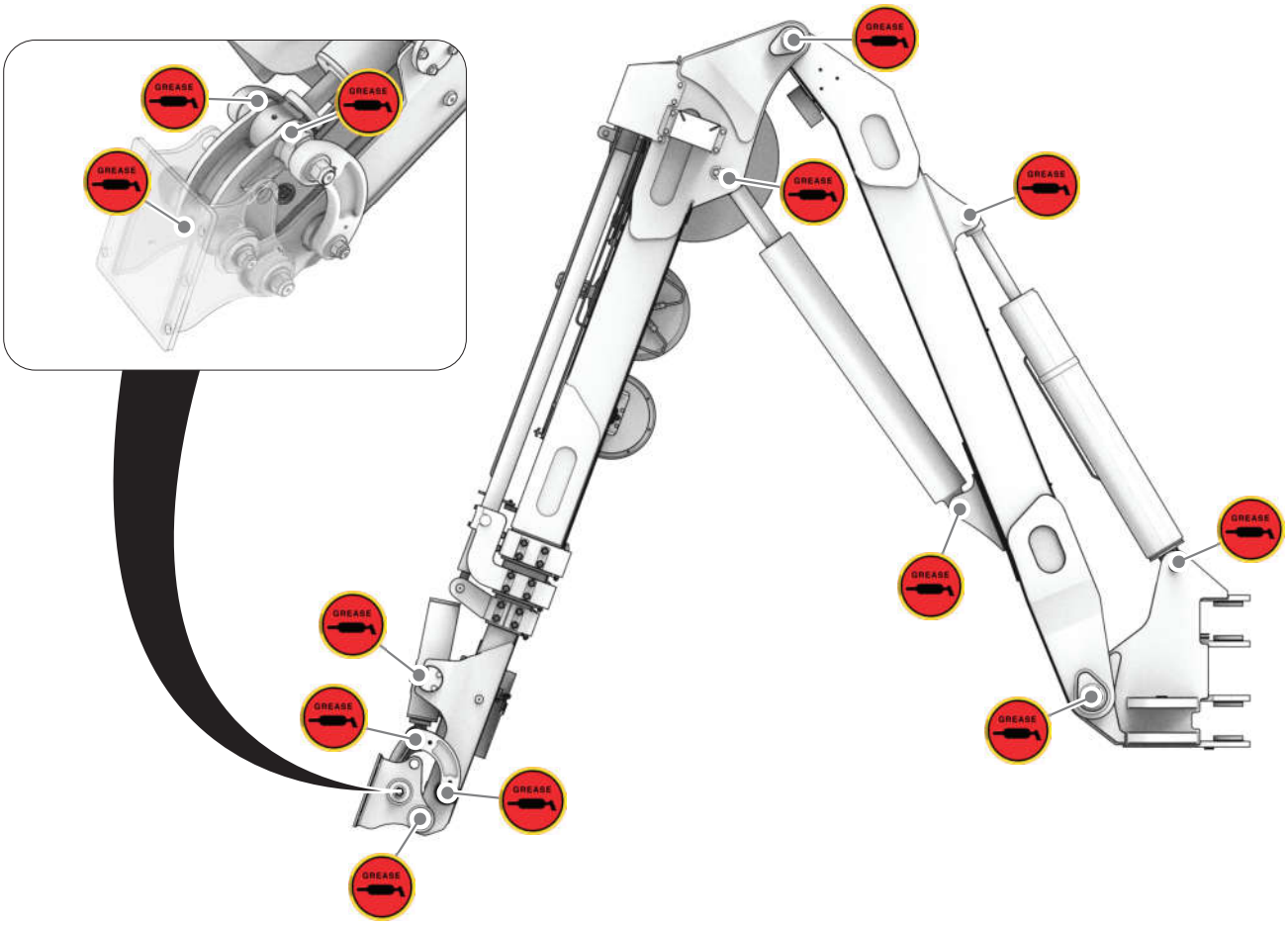






9.17.18 Greasing the bushings and pins - Arm T

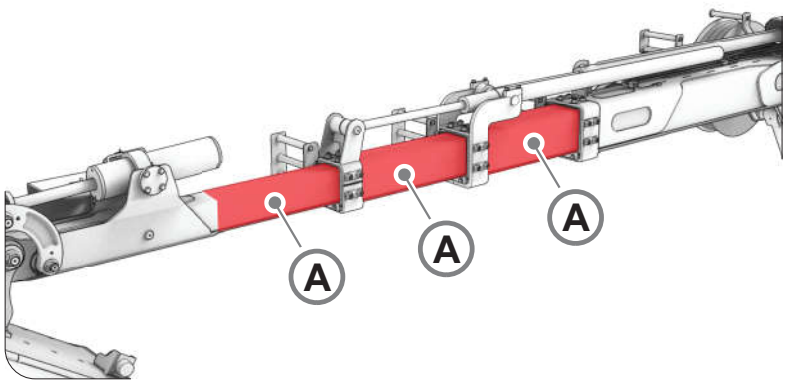
Grease the points, connecting the pump nozzle to the grease nipples and pump in grease until a small amount comes out.



9.17.19 Greasing the extensions - Arm T

To grease the extensions, proceed as follows:

- Extend the extensions fully.
- Rest the equipment connected to the arm on the ground.
- Grease the arm in the areas (**A**) in which the extensions slide.

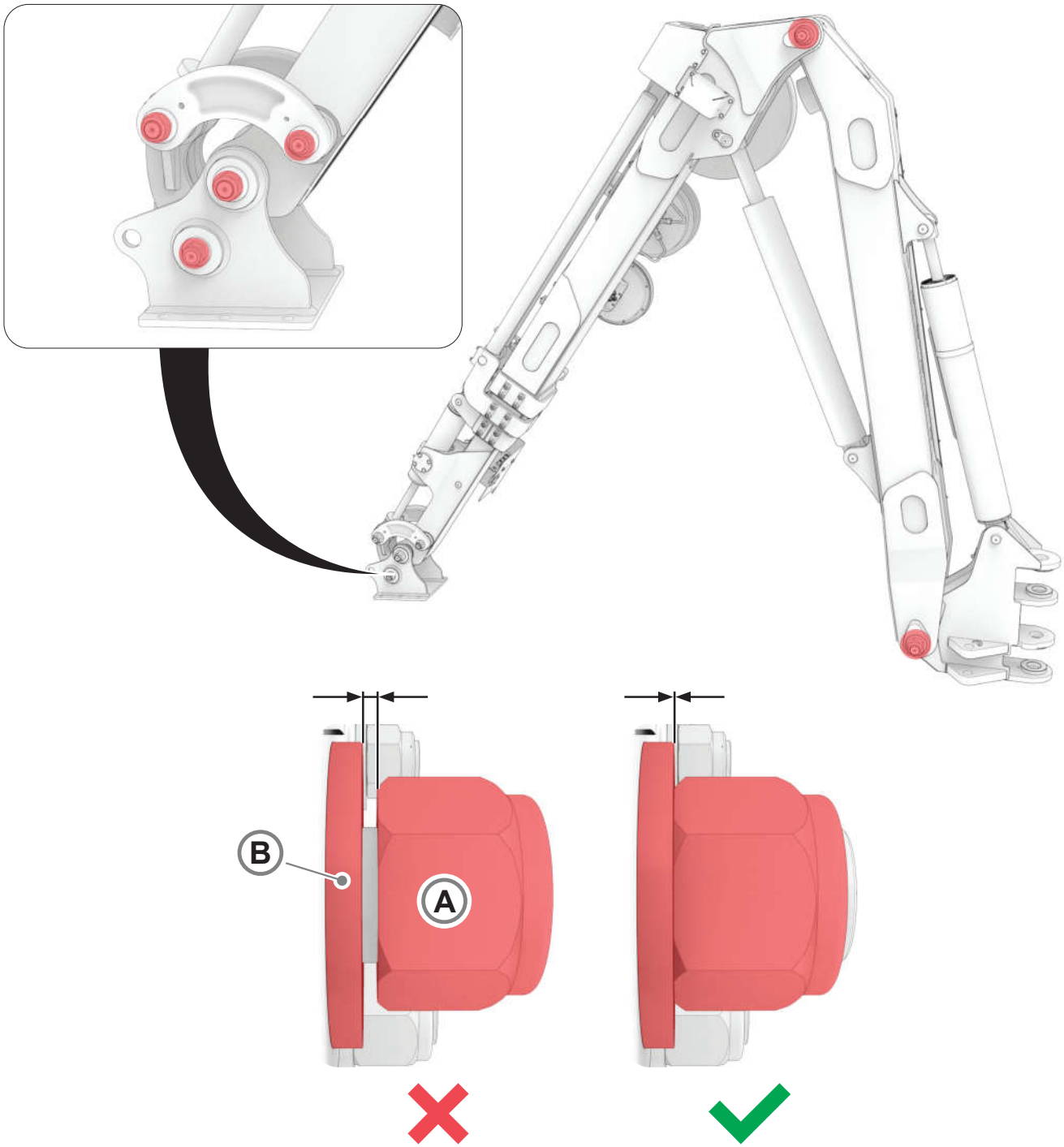


9.17.20 *Nut tightness - Arm 3F*

WARNING

- **Check the tightness of the nuts *every 40 hours* or *every week*.**
- **It is recommended not to overtighten the nut as the head of the relative pin might break or the parts may produce a squeaking noise when they rub against one another.**

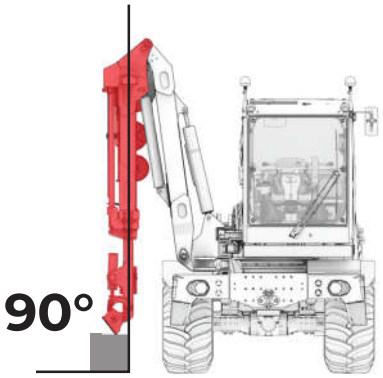
This consists of checking to see if any nuts have become loose at the points indicated in the figure. If there are: use a spanner to tighten the nut (**A**) by hand until it comes into contact with the washer (**B**); do not overtighten it.



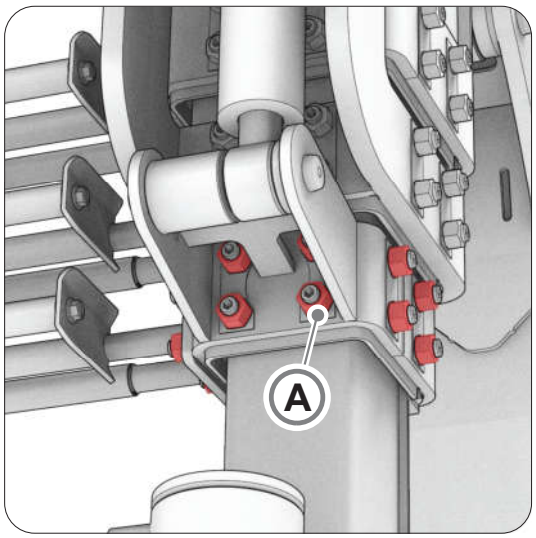
9.17.21 *Adjusting the sliding blocks - Arm T*

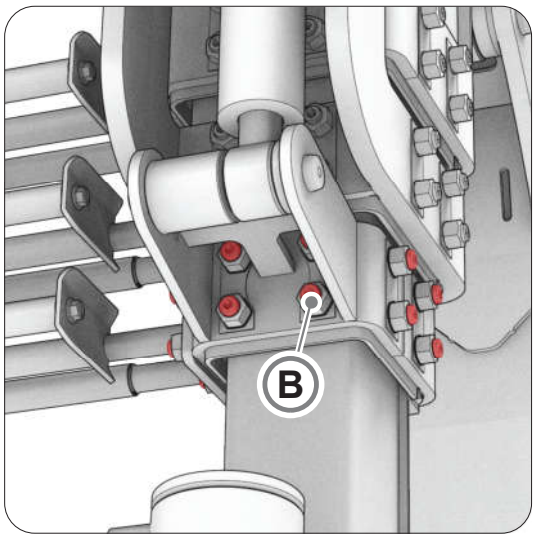
WARNING

Adjust the sliding blocks *every 100 hours* or whenever you notice that there is play between the extension and the sliding block.



1) Position the second arm downwards, perpendicular to the ground, without resting it on the ground.
2) Loosen the twelve locknuts (**A**) (four on each side) on the second arm / extension, using a 24 mm wrench.
3) Loosen the twelve screws (**B**) (four on each side) on the second arm / extension using an 8 mm Allen key.
4) Tighten the four screws of the upper sliding block with a torque of less than 10 Nm; they should be tightened in an “X” sequence to avoid producing an uneven pressure on the block.
5) Continue with the lateral sliding blocks in order to centre the extension inside the second arm / extension.
6) Once the adjustment has been completed, use the 8 mm Allen key to keep the adjustment screws in position and at the same time use a 24 mm wrench to tighten the twelve locknuts with a torque of 211 Nm.
7) Repeat the procedure for any other extensions there may be.
8) Grease the extensions using a brush.





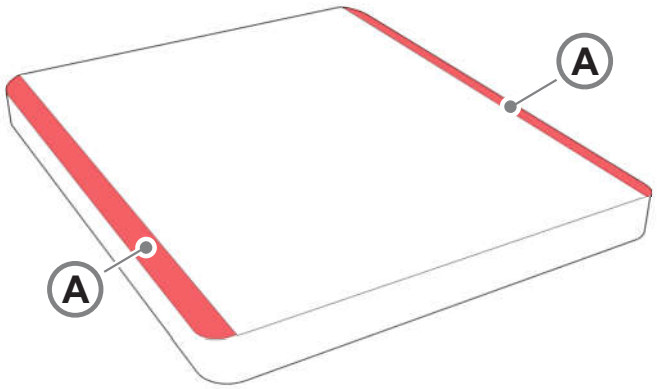
9.17.22 *Checking the wear of the sliding blocks - Arm T*

WARNING

- **Check the sliding blocks for wear *every 100 hours.***
- **The thickness of sliding blocks and of extension must never be less than 7 mm.**

To determine the state of wear of the sliding blocks, you have to inspect the block and the surface on which it slides.

- If the surface of the extension that slides on the sliding block shows "large" streaks of grease, this indicates that the sliding block is scored, replacement is recommended.
- If the chamfers (**A**) are missing from the sliding blocks, this prevents grease from flowing between the sliding block and the extension to make it easier for the extension to move. It is recommended to replace them.



9.17.23 *Replacing the sliding blocks - Arm T*

DANGER

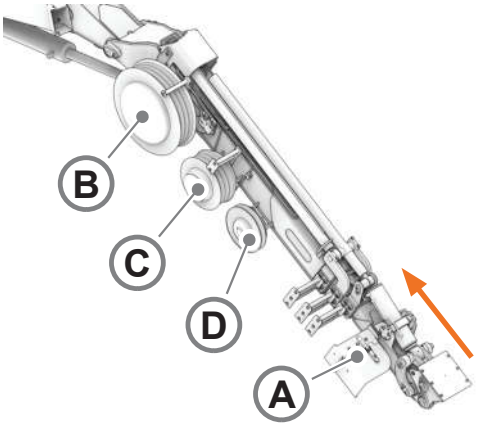
- **CRUSHING HAZARD: Do not stand or pass close to suspended loads.**
- **DANGER SUDDEN RETRACTION of HOSE REELS: the hose reels are preloaded internally by a spring under tension. This means that once the hoses have been disconnected the must be held firmly or secured to the arm and then gradually released.**

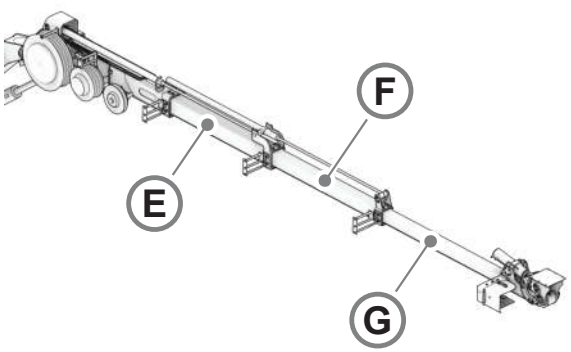
WARNING

- **At least two people are required to carry out this operation.**
- **Use lifting straps with a capacity greater than the weight to be lifted.**

To replace the sliding blocks, proceed as follows:

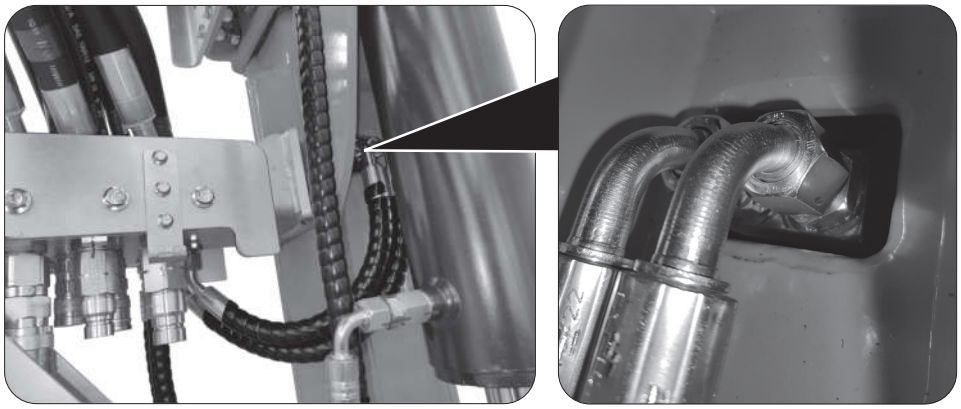
1) Completely retract all the extensions into the second arm.
2) Switch off the machine
3) Disconnect any equipment connected to the arm.
4) The first operator should prevent the hose reel (**B**) from retracting the hoses while the second operator disconnects the hydraulic hoses coming from the hose reel (**B**) from the plate (**A**). Collect any hydraulic oil that drains out in suitable containers. Plug the hoses that were disconnected.
5) Once the hoses have been disconnected from the plate, the second operator should accompany the hoses back to the reel while the first operator releases the spring preload, allowing the hose reel to rotate slowly until it stops. Count the number of turns it made before stopping so that you can restore the same preload.
6) Carry out points 4 and 5 above for hose reels (**C**) and (**D**) as well.
7) Switch on the machine and completely extend the extensions (**E**), (**F**) and (**G**).
8) Switch off the machine.

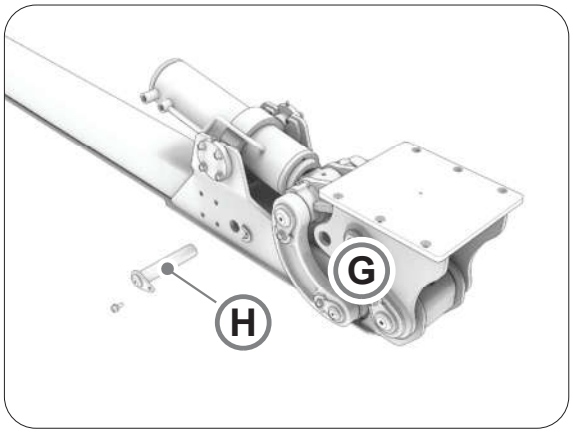


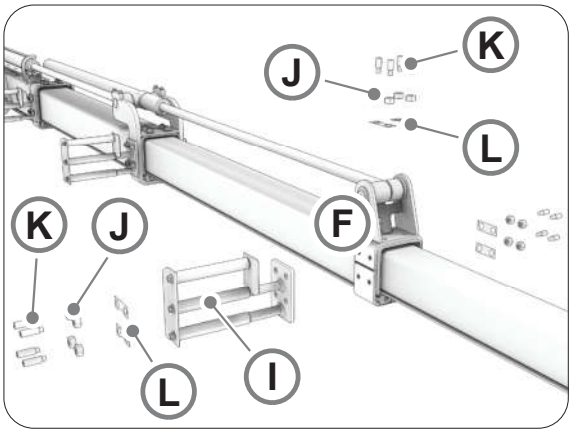


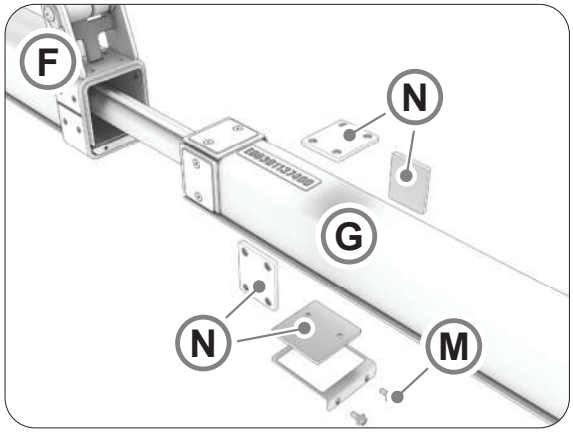
Removing the first extension

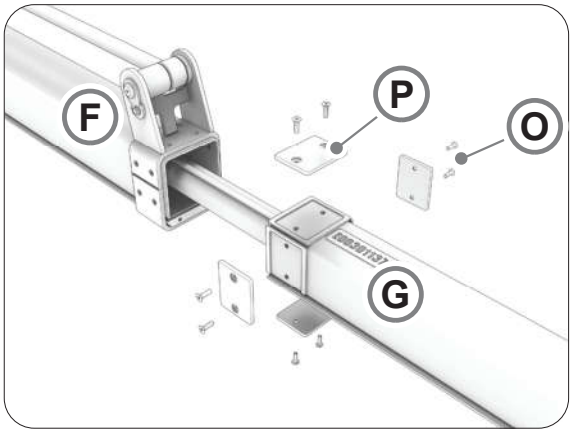
9) First disconnect the two hoses that are connected to the plate, then the nipples on the cylinder.
10) Sling the first extension (**G**).
11) Unscrew the screw and remove the pin (**H**).
12) Remove the roller (**I**) from the second extension (**F**): loosen the nuts (**J**), remove the screws (**K**) and the shims (**L**), making a note of their position.
13) Unscrew the screws (**M**) and partially withdraw the first extension (**G**) from the second extension (**F**), consequently the sliding blocks (**N**) come out by themselves. If there are any nuts inside the extension (**G**), remove them.
14) Extend the first extension (**G**) completely, unscrew the screws (**O**) and replace the sliding blocks (**P**): apply threadlocker to the screws (**O**) and tighten them with a torque of 35 Nm. If there were any nuts inside the extension (**G**), fasten the sliding blocks with them.





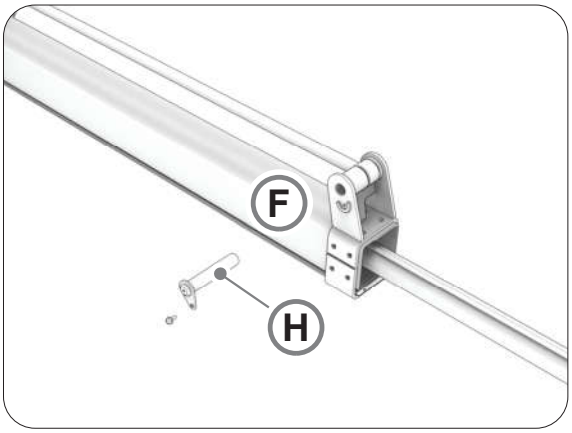


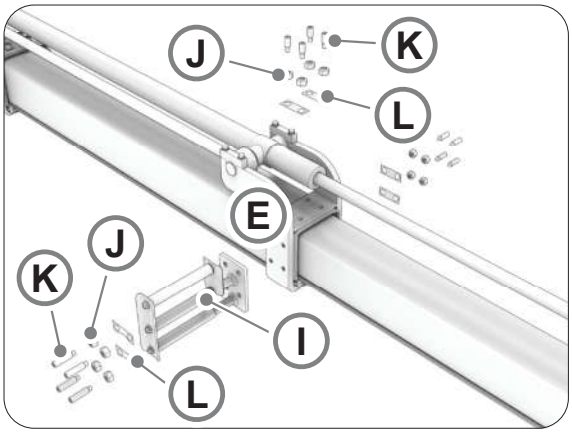


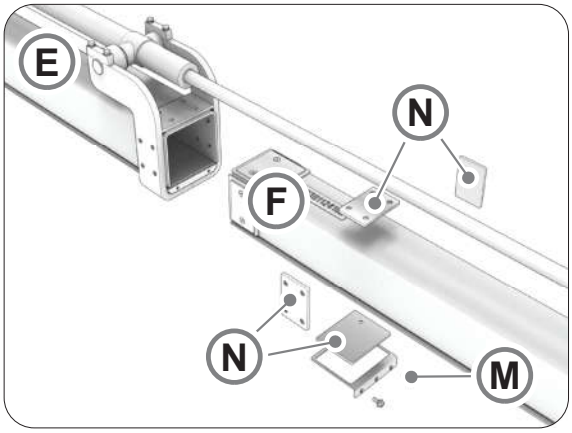


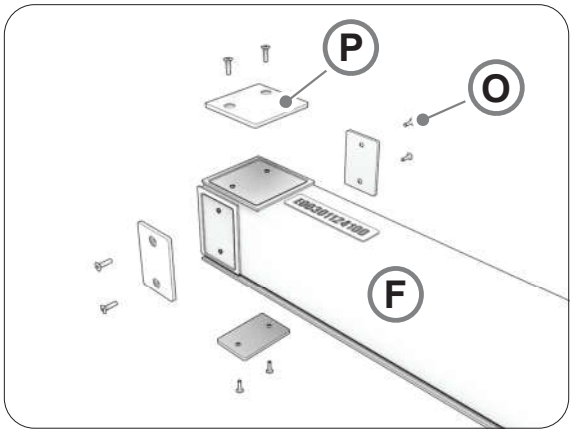
Removing the second extension

15) Sling the second extension (**F**).
16) Unscrew the screw and remove the pin (**H**).
17) Remove the roller (**I**) from the third extension (**E**): loosen the nuts (**J**), remove the screws (**K**) and the shims (**L**), making a note of their position.
18) Unscrew the screws (**M**) and remove the second extension (**F**) from the third extension (**E**), consequently the sliding blocks (**N**) come out by themselves. If there are any nuts inside the extension (**F**), remove them.
19) On the second extension (**F**), unscrew the screws (**O**) and replace the sliding blocks (**P**): apply threadlocker to the screws (**O**) and tighten them with a torque of 35 Nm. If there were any nuts inside the extension (**F**), fasten the sliding blocks with them.



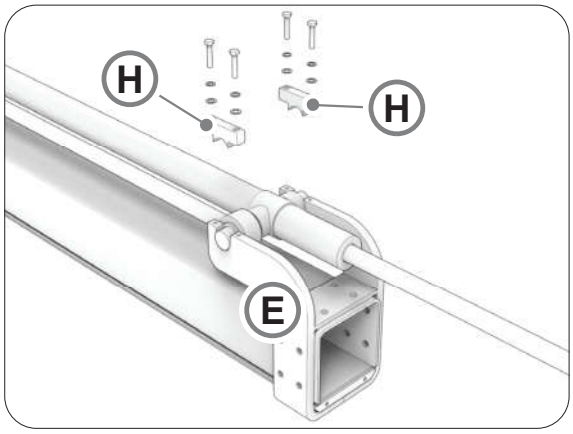


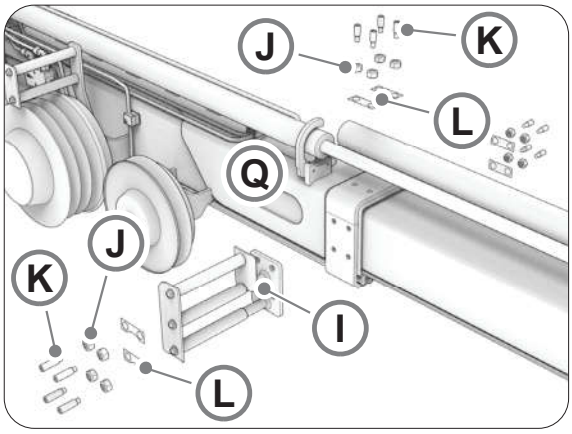


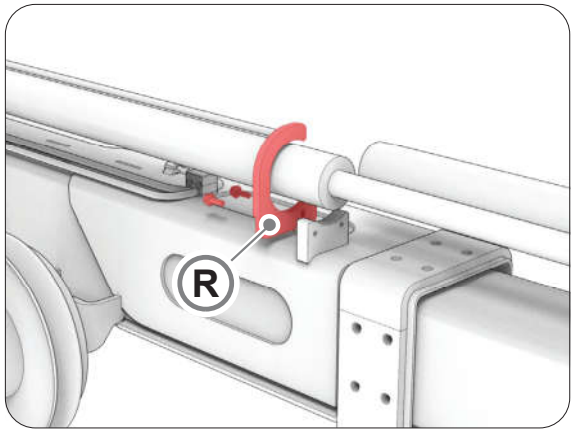


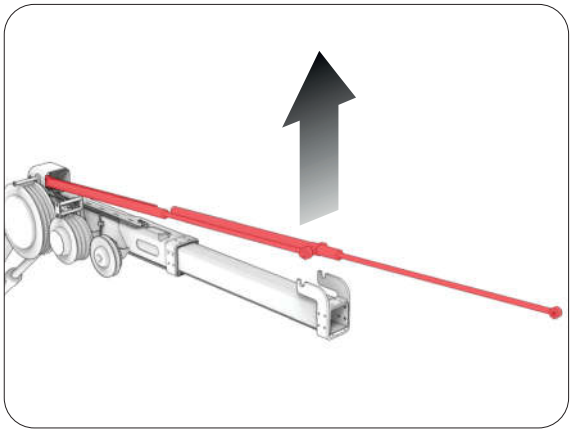
Removing the third extension

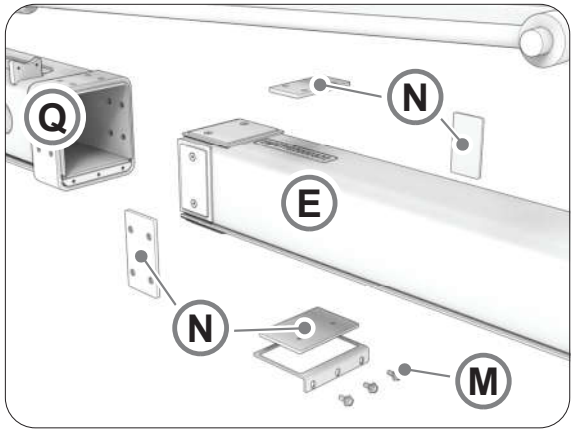
20) Sling the third extension (**E**).
21) Unscrew the four screws and remove the clamps (**H**)
22) Remove the roller (**I**) from the third extension (**E**): loosen the nuts (**J**), remove the screws (**K**) and the shims (**L**), making a note of their position.
23) Unscrew the four screws and remove the retainer (**R**)
24) Lift the cylinders just enough to allow the third extension to be removed.
25) Unscrew the screws (**M**) and remove the third extension (**F**) from the second arm (**Q**), consequently the sliding blocks (**N**) come out by themselves. If there are any nuts inside the extension (**E**), remove them.
26) On the third extension (**E**), unscrew the screws (**O**) and replace the sliding blocks (**P**): apply threadlocker to the screws (**O**) and tighten them with a torque of 35 Nm. If there were any nuts inside the extension (**E**), fasten the sliding blocks with them.

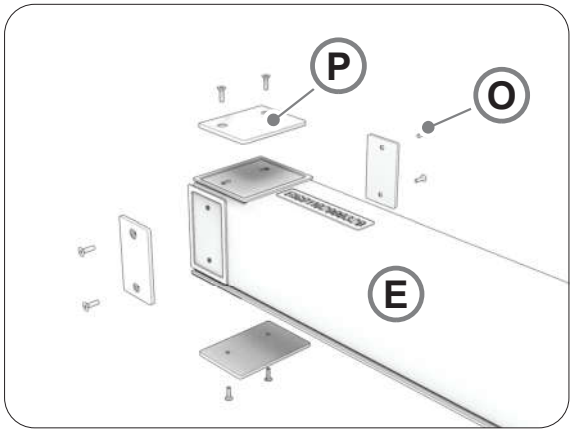












Installing extensions and tightening

WARNING

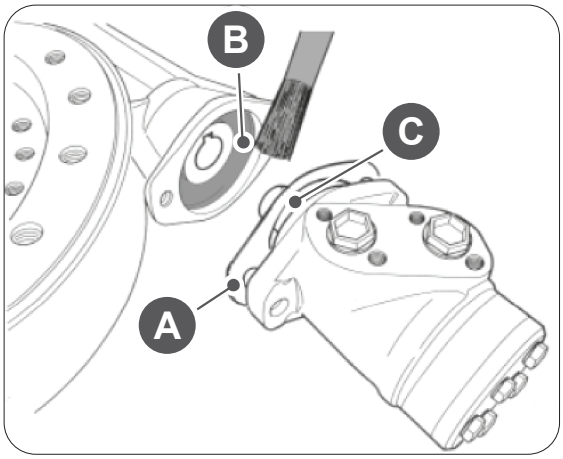
When preloading the hose reels, DO NOT turn them in the opposite direction to the one indicated by the direction of "ROTATION" arrow, otherwise the internal spring will become damaged.

27) Install the extensions following the above procedure in reverse.
28) Adjust the sliding blocks, see section ***"9.17.19 Adjusting the sliding blocks - Arm T"***.

9.18 EQUIPMENT SLEW RING MAINTENANCE

9.18.1 Replacing the hydraulic motor

Carefully clean the engine rotation coupling surfaces. Fill the cavity that encloses the inlet shaft (**A**) with grease. Insert the seal (**B**) or, alternatively, seal it with suitable mastic. Lubricate the drive shaft (**C**) before inserting it, with the relative key, into the housing. Secure with M12 class 8.8 screws and tighten, using a torque wrench, to a torque of 73 Nm.



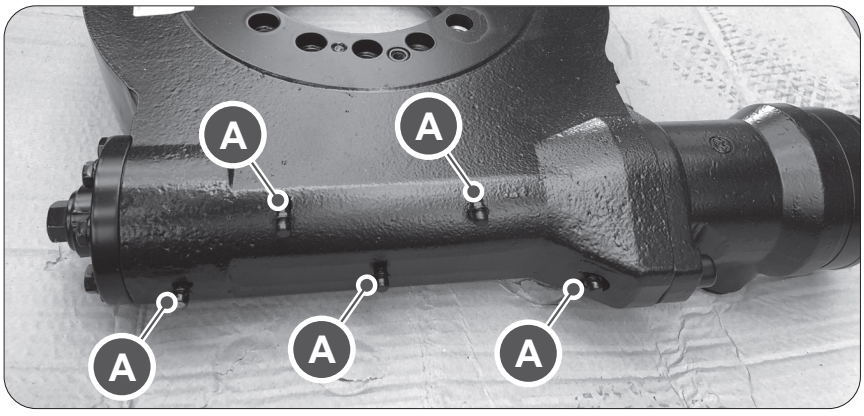
9.18.2 Greasing the slew ring and worm screw

The rotation components must be greased with water-repellent grease using the specific grease nipples on the inner ring (**A**). While rotating the fifth wheel, pump grease into all the grease nipples until it comes out of the gasket, forming a light, uniform ring.

Grease the worm screw using the grease nipples (**A**) on the casing.

WARNING

The slew ring and worm screw should be greased *every 250 hours.*



9.18.3 ***Securing the slew ring***

Secure the slewing ring by using bolts with minimum ISO class of 10.9 or SAE grade 8. Tighten the M16 screws using a torque wrench with a tightening torque of 280 Nm.

WARNING

The screws should be tightened every *every 250 hours*.

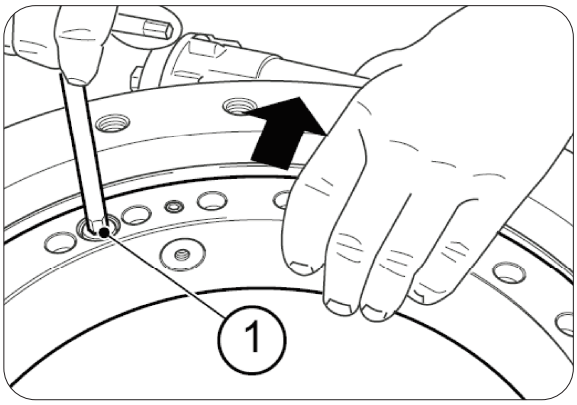
9.18.4 ***Adjusting the crown wheel***

When play is detected between the crown wheel and the worm screw, this must be eliminated.

Loosen the 3 / 4 M8x45 Allen screws (**1**) that fasten the crown wheel, pull it towards the worm screw as shown in the figure, then re-tighten the Allen screws that were previously removed.

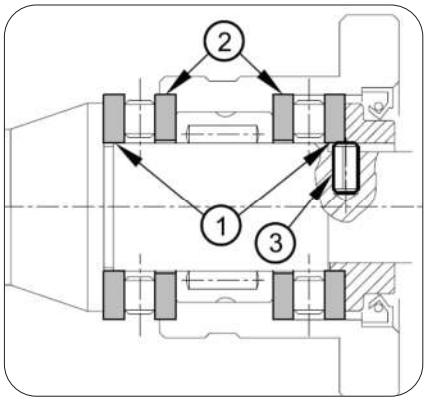
WARNING

Adjustment should be carried out *every 250 hours*.



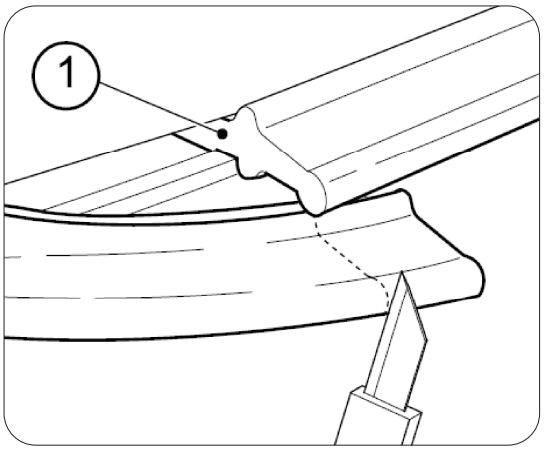
9.18.5 ***Replacing the thrust bearings***

If the two thrust bearings (**1**) have to be replaced, great care should be taken during assembly that centring is performed correctly on the internal diameter on the outer rings of the bearings (**1**) and on the external diameter on the internal rings (**2**). Make sure that the pin (**3**) NEVER extends beyond the diameter of the shaft.



9.18.6 Installing / replacing the seal

To install the seal, insert it in its channel (**1**), arranging it uniformly around the entire circumference. Once the entire circumference has been covered, use a sharp knife to cut the end of the seal so it lines up with the edge of the beginning.



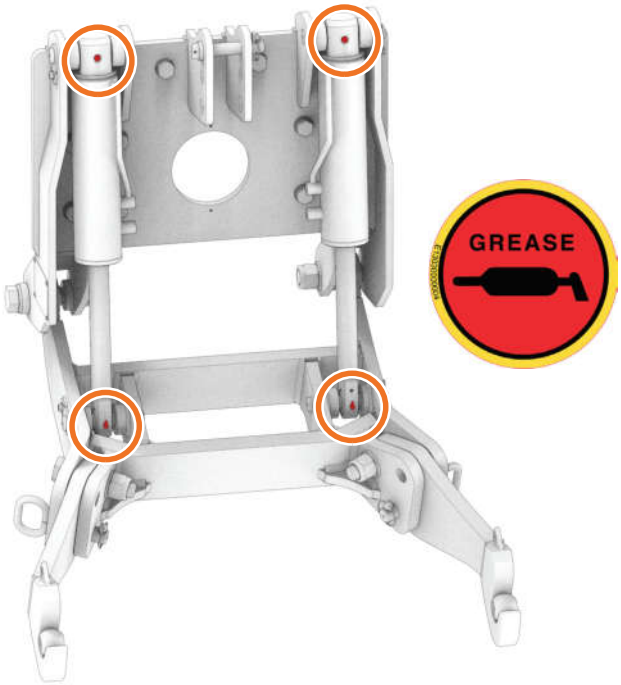
9.19 HERCULES 10T LIFTER (OPTIONAL) MAINTENANCE

9.19.1 Greasing the lifting cylinders

WARNING

Grease *every 8 hours or every day*.

Grease via the grease nipples.



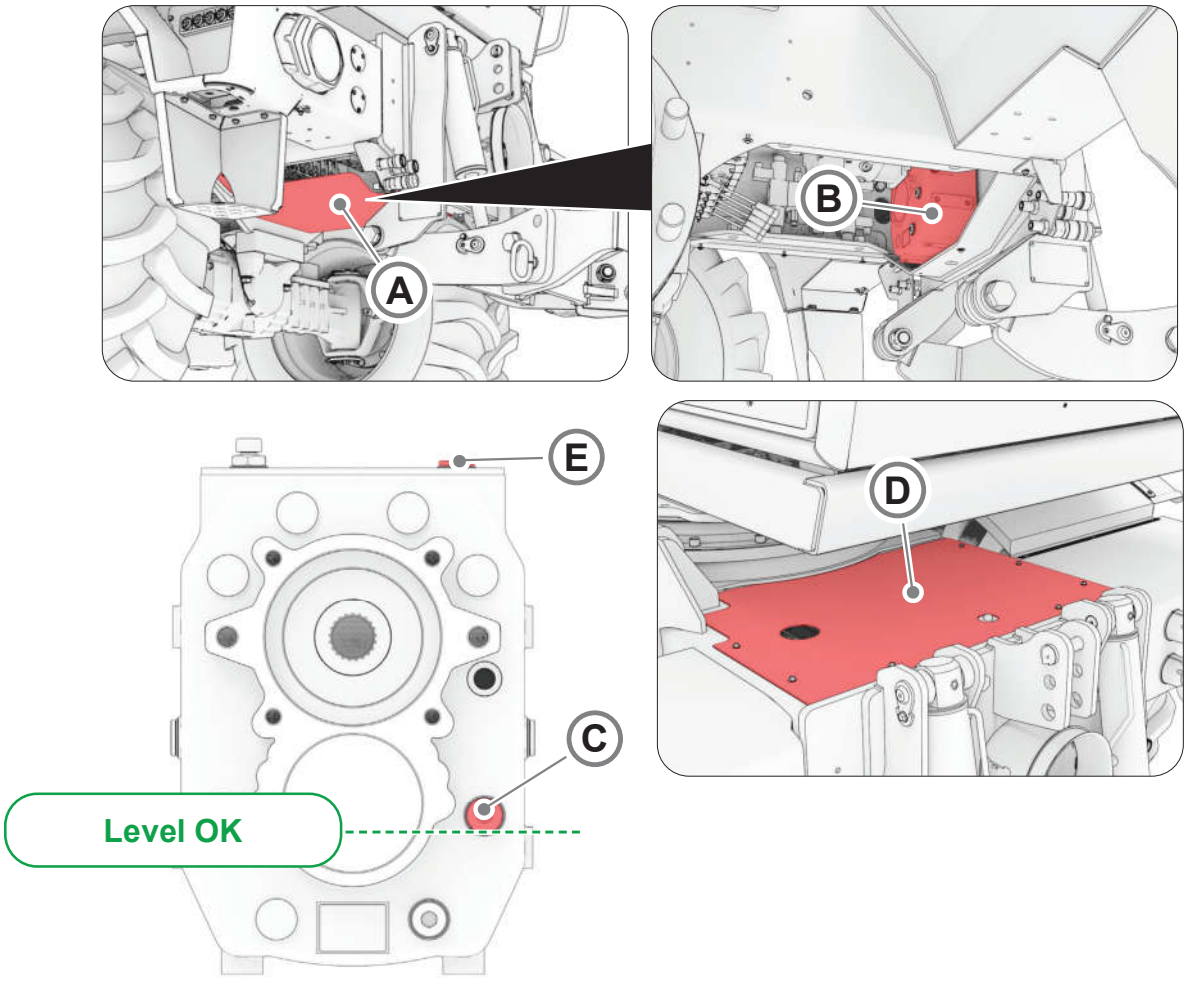
9.20 PTO (OPTIONAL) MAINTENANCE

9.20.1 Checking the oil level in the gearbox

WARNING

The gearbox oil level should be checked *every 500 hours.*

1) Place the ILF ALPHA machine on firm and level ground;
2) Remove the lower casing (**A**);
3) Unscrew the plug (**C**) on the gearbox (**B**) make sure that the oil level is level with the hole;
4) If the level is lower, remove the upper casing (**D**), unscrew the plug (**E**) and top up via the hole. For topping up, refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use;
5) Screw the plugs (**C**) and (**E**) back on and reinstall the casing (**A**) and (**D**).

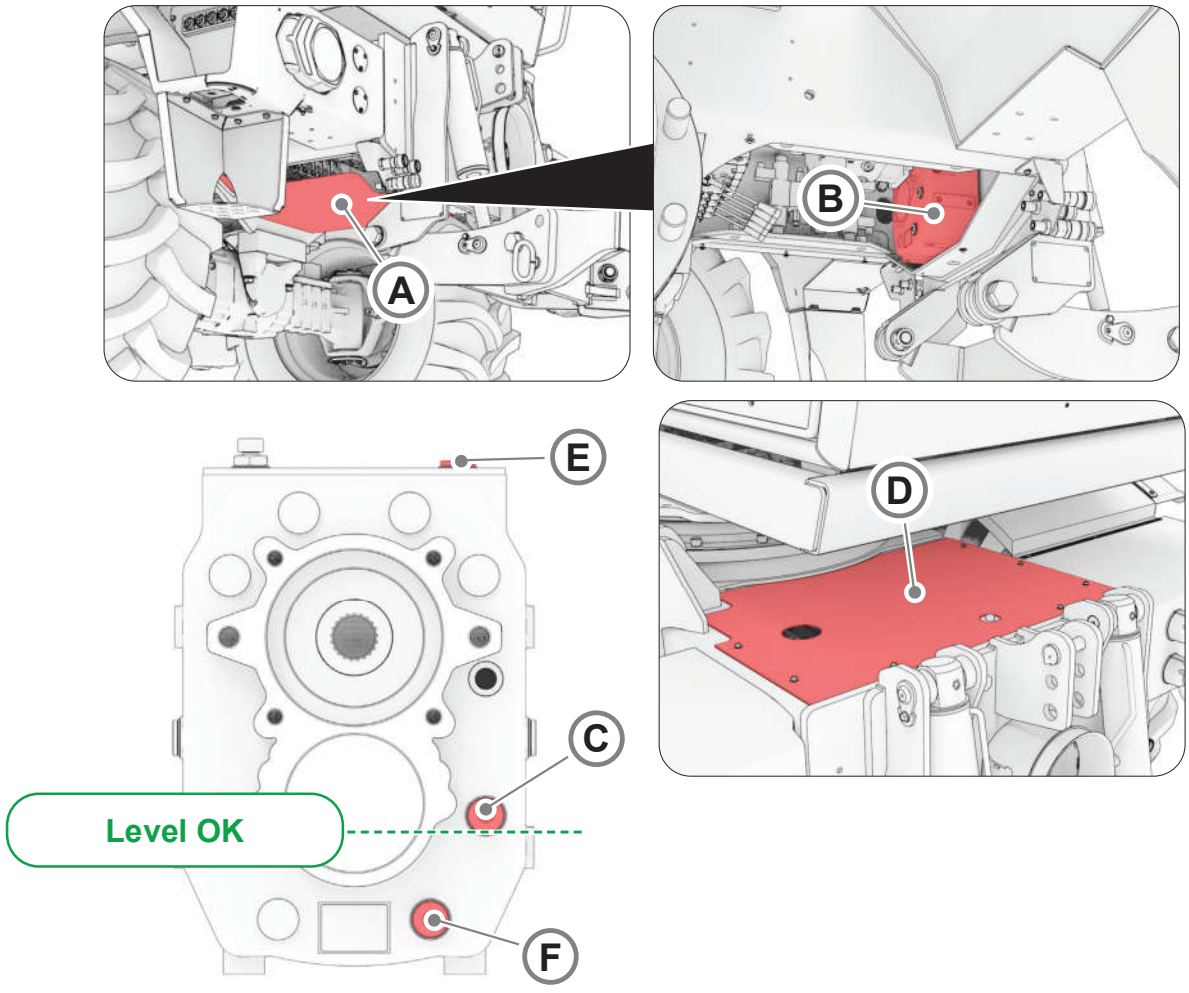


9.20.2 Changing the oil in the gearbox

WARNING

- **The oil in the gearbox should be changed every *every 2000 hours.***
- **Amount of oil to replace: *2 litres*.**

1) Place the ILF ALPHA machine on firm and level ground;
2) Remove the upper casing (**D**);
3) Remove the lower casing (**A**);
4) Place a suitably sized container under the gearbox to collect the used oil;
5) Unscrew the filler plug (**E**) on the gearbox (**B**) and then the drain plug (**F**): allow all the oil to drain out;
6) Screw the drain plug (**F**) back on;
7) Unscrew the plug (**C**) and fill with the specific gearbox oil via the hole (**E**) until the oil level reaches the hole (**C**). Refer to section ***"9.4.1 Lubricants table"*** for the choice of oil to use;
8) Screw the plugs (**C**) and (**E**) back on and reinstall the casing (**A**) and (**D**).



9.21 PERIODICALLY REPLACE 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	2000
Hydraulic pipes	4	4000
Seat belt	4	4000

9.22 CHECKING THE CHROME-PLATED PARTS

CAUTION

Inspect the chrome-plated parts of the machine (cylinders) and make sure that they are not scored or damaged every *40 working hours or weekly*.

9.23 MAINTENANCE OPERATIONS

9.23.1 Maintenance Frequency

		Every 4 hours	Daily	Weekly	Every 100 hours	50 hours	100 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	4500 hours	6000 hours	8000 hours
ENGINE OIL	Check / top-up		●																			
	Substitution							▲	●	▲	●	▲	●	▲	●	▲	●	▲	●	●	●	●
ENGINE OIL FILTER	Substitution							▲	●	▲	●	▲	●	▲	●	▲	●	▲	●	●	●	●
COOLANT	Check / top-up		●																			
	Substitution																				●	
FUEL	Check / top-up		●																			
FUEL SEPARATOR	Drainage		●																			
SEPARATOR CARTRIDGE FUEL	Substitution								●		●		●		●		●		●	●	●	●
FUEL FILTER CARTRIDGE	Substitution								●		●		●		●		●		●	●	●	●
ENGINE AIR FILTER CARTRIDGES	Control / Cleaning		●																			
	Substitution										●				●				●			
RADIATOR GRILLE	Cleaning		●																			
RADIATOR AND INTERCOOLER	Cleaning		●																			
FLUID DEF / AdBlue®	Check / top-up		●																			
PUMP FILTER DEF / AdBlue®	Substitution																			●		

● Standard maintenance
■ Maintenance to be performed only for the first check / first replacement
▲ Early maintenance if engine oil other than John Deere Plus-50™ II is used
✕ Replace according to the hydraulic oil present. (Refer to the tables in sections ***"9.4.1 Lubricants table"*** and ***"9.6.2 Changing the hydraulic oil"***)

		Every 4 hours	Daily	Weekly	Every 100 hours	50 hours	100 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	4500 hours	6000 hours	8000 hours
INLINE FILTER CARTRIDGE DEF / AdBlue®	Substitution																					●
OCV SYSTEM	Check								●		●		●		●		●		●	●	●	●
OCV FILTER CARTRIDGE	Substitution												●						●	●	●	
HYDRAULIC OIL	Check / top-up		●																			
	Substitution										X				X				X		X	X
ENGINE OIL FILTER	Substitution										X				X				X		X	X
HIGH-PRESSURE INLINE FILTER	Check							●	●	●		●	●	●		●	●	●		●		
	Substitution										●				●				●		●	●
COUPLER OIL	Check / top-up								●				●				●			●		
	Substitution						■				●				●				●		●	●
GEARBOX REDUCER OIL	Check / top-up							●		●		●		●		●		●				
	Substitution						■		●		●		●		●		●		●	●	●	●
FOUR-WHEEL DRIVE RELEASE OIL	Check / top-up							●		●		●		●		●		●				
	Substitution						■		●		●		●		●		●		●	●	●	●

● Standard maintenance

■ Maintenance to be performed only for the first check / first replacement

▲ Early maintenance if engine oil other than John Deere Plus-50™ II is used

X Replace according to the hydraulic oil present. (Refer to the tables in sections *"9.4.1 Lubricants table"* and *"9.6.2 Changing the hydraulic oil"*)

		Every 4 hours	Daily	Weekly	Every 100 hours	50 hours	100 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	4500 hours	6000 hours	8000 hours
AXLE OIL	Check / top-up							●		●		●		●		●		●				
	Substitution						■		●		●		●		●		●		●	●	●	●
PLANETARY OIL HUBS	Check / top-up							●		●		●		●		●		●				
	Substitution						■		●		●		●		●		●		●	●	●	●
AXLES	Greasing				●																	
CABIN AIR FILTERS	Cleaning			●																		
	Substitution										●				●							
CABIN ROTATION CYLINDER	Greasing		●																			
CABIN SLEW RING	Greasing				●																	
ELECTRIC SYSTEM	Check							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TYRES PRESSURE	Check					■		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TYRES WEAR	Check								●		●		●		●		●		●	●	●	●
TYRES	Reversing										●				●				●		●	●
WHEELS NUT TIGHTENING	Check					■		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ARM	Greasing	●																				
ARM PIN NUTS	Tightening			●																		

● Standard maintenance

■ Maintenance to be performed only for the first check / first replacement

◀ Early maintenance if engine oil other than John Deere Plus-50™ II is used

✕ Replace according to the hydraulic oil present. (Refer to the tables in sections *"9.4.1 Lubricants table"* and *"9.6.2 Changing the hydraulic oil"*)

		Every 4 hours	Daily	Weekly	Every 100 hours	50 hours	100 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	4500 hours	6000 hours	8000 hours
ARM SLIDING BLOCKS	Check				●																	
EQUIPMENT SLEWING RING	Greasing							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Screw tightening							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Adjustment							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TERMINAL EQUIPMENT NUTS	Tightening			●																		
LIFTER (OPTIONAL)	Greasing		●																			
OIL PTO GEARBOX (OPTIONAL)	Check								●		●		●				●		●	●	●	●
	Substitution														●							
MOBILE BALLAST (OPTIONAL)	Greasing			●																		
CHROME-PLATED PARTS	Check			●																		

● Standard maintenance

■ Maintenance to be performed only for the first check / first replacement

▲ Early maintenance if engine oil other than John Deere Plus-50™ II is used

X Replace according to the hydraulic oil present. (Refer to the tables in sections *"9.4.1 Lubricants table"* and *"9.6.2 Changing the hydraulic oil"*)

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 it is close to a fire, raise the alarm and contact the fire service.

10.2 ASSISTING THE OPERATOR IN CASE OF ILLNESS

If the operator feels unwell, you need to act quickly, following the steps indicated below:

Get to the operator, if you are unable to do so safely, contact medical or first aid personnel.

Lay the operator on the ground following first aid procedures.

Contact a doctor or the emergency services if you have not already done so.

11. PRELOADS AND TIGHTENING TORQUES TABLES

11.1 COARSE PITCH BOLTS

Diameter (mm)	Pitch (mm)	Coefficient of friction	8.8		10.9		12.9	
			Preload	Tightening torque	Preload	Tightening torque	Preload	Tightening torque
			N	Nm	N	Nm	N	Nm
M2	0.40	0.14	899	0.37	1,264.3	0.52	1,517.1	0.63
M2.5	0.45	0.14	1,499.8	0.77	2,109.1	1.08	2,531	1.30
M3	0.50	0.14	2,251.9	1.34	3,166.7	1.88	3,800	2.26
M3.5	0.60	0.14	3,022.6	2.05	4,250.6	2.89	5,100.7	3.47
M4	0.70	0.14	3,901.9	3.06	5,487	4.30	6,584.4	5.16
M5	0.80	0.14	6,393.7	6.04	8,991.1	8.50	10,789.3	10.20
M6	1.00	0.14	8,998.2	10.37	12,653.7	14.59	15,184.4	17.51
M7	1.00	0.14	13,199.2	17.21	18,561.4	24.20	22,273.6	29.04
M8	1.25	0.14	16,531.2	25.07	23,247	35.26	27,896.5	42.31
M10	1.50	0.14	26,334.8	49.52	37,033.3	69.64	44,439.9	83.56
M12	1.75	0.14	38,408	84.84	54,011.2	119.31	64,813.5	143.17
M14	2.00	0.14	52,522.4	135.13	73,859.6	190.02	88,631.5	228.03
M16	2.00	0.14	72,728.5	211.61	102,274.4	297.58	122,729.3	357.09
M18	2.50	0.14	87,372.3	290.32	123,711	402.26	148,453.2	489.92
M20	2.50	0.14	113,494.2	412.78	156,601.2	580.47	191,521.5	696.56
M22	2.50	0.14	141,583.7	567.58	199,102.1	798.16	238,922.5	957.80
M24	3.00	0.14	16,523.6	713.68	229,955.1	1,003.61	275,946.1	1,204.33
M27	3.00	0.14	21,488.3	1,050.16	302,179.2	1,476.79	362,615	1,772.15
M30	3.50	0.14	26,541.2	1,428.97	367,792.3	2,009.49	441,350.8	2,411.39
M33	3.50	0.14	326,115.9	1,940.86	458,600.5	2,729.33	550,320.6	3,275.19
M36	4.00	0.14	382,483.6	2,496.81	537,867.6	3,511.14	645,441.1	4,213.37
M39	4.00	0.14	459,805.2	3,241.92	646,601	4,558.96	775,921.3	5,470.75
M42	4.50	0.14	525,878	4,010.93	739,516	5,640.37	887,419.2	6,768.44
M45	4.53	0.14	618,303.6	5,039.09	869,489.3	7,086.23	1,043,387	8,503.47
M48	5.00	0.14	691,725.8	6,036.23	972,739.4	8,488.45	1,167,287	10,186.14

11.2 FINE PITCH BOLTS

Diameter (mm)	Pitch (mm)	Coefficient of friction	8.8		10.9		12.9	
			Preload	Tightening torque	Preload	Tightening torque	Preload	Tightening torque
			N	Nm	N	Nm	N	Nm
M8	1	0.14	18,159.1	27.05	25,536.2	38.04	30,643.4	45.65
M10	1	0.14	28,350.1	52.55	39,867.3	73.89	47,840.8	88.67
M10	1	0.14	30,443.3	55.61	42,810.8	78.2	51,373	93.84
M12	2	0.14	40,811.6	89.06	57,391.3	125.24	68,869.5	150.29
M12	1	0.14	43,338.4	93.41	60,944.6	131.36	73,133.5	157.63
M14	2	0.14	58,691.9	147.85	82,535.4	207.91	99,042.5	249.49
M16	2	0.14	79,175.5	226.12	111,340.6	317.98	133,608.7	381.57
M18	2	0.14	95,503.3	310.05	134,301.6	436	161,161.9	523.2
M 18	2	0.14	103,155.2	329.35	145,062.1	463.15	174,074.5	555.77
M20	2	0.14	121,772.4	436.34	171,242.5	613.61	205,491	736.33
M20	2	0.14	130,638.1	461.1	183,709.9	648.42	220,451.9	778.1
M22	2	0.14	151,067.8	597.49	212,439.1	840.22	254,927	1,008.27
M22	2	0.14	160,663.6	626.82	225,933.2	881.46	271,119.8	1,057.75
M24	2	0.14	183,386.5	780.67	257,887.3	1,097.82	309,464.8	1,371.38
M24	2	0.14	194,192.1	816.24	273,082.6	1,147.84	327,699.1	1,377.41
M27	2	0.14	238,370.1	1,139.34	335,207.9	1,602.2	402,249.5	1,922.64
M30	2	0.14	299,914	1,590.29	421,754.2	2,236.34	506,105	2,683.61
M33	2	0.14	368,980.2	2,136.49	518,878.4	3,004.43	622,654	3,605.32
M36	3	0.14	413,097.9	2,652.26	580,918.9	3,729.74	697,102.7	4,475.68
M39	3	0.14	494,054.1	3,430.3	694,763.5	4,823.86	833,716.1	5,788.63
M42	3	0.14	582,537.4	4,349.18	819,193.3	6,116.04	983,031.9	7,339.24
M45	3	0.14	676,135.5	5,401.43	950,815.6	7,595.77	1,140,979	9,114.92
M48	3	0.14	774,830.6	6,594.93	1,089,606	9,274.12	1,307,527	11,128.94
M45	4.53	0.14	618,303.6	5,039.09	869,489.3	7,086.23	1,043,387	8,503.47
M48	5.00	0.14	691,725.8	6,036.23	972,739.4	8,488.45	1,167,287	10,186.14

11.3 FITTINGS TIGHTENING CHART

Series	Pipe diam.	THREAD - TIGHTENING TORQUE					
		Ø Thread metric	Shape B MT (Nm)	Shape E MT (Nm)	Ø Thread Gas	Shape B MT (Nm)	Shape E MT (Nm)
Light	6	M 10 x 1.0	18	18	G 1/8	18	18
	8	M 12 x 1.5	30	25	G 1/4	35	35
	10	M 14 x 1.5	45	45	G 1/4	35	35
	12	M 16 x 1.5	65	55	G 3/8	70	70
	15	M 18 x 1.5	80	70	G 1/2	140	90
	18	M 22 x 1.5	140	125	G 1/2	100	90
	22	M 26 x 1.5	190	180	G 3/4	180	180
	28	M 33 x 2.0	340	310	G 1	330	310
	35	M 42 x 2.0	500	450	G 1 1/4	540	450
	42	M 48 x 2.0	630	540	G 1 1/2	630	540
Strong	6	M 12 x 1.5	35	35	G 1/4	55	40
	8	M 14 x 1.5	55	45	G 1/4	55	40
	10	M 16 x 1.5	70	70	G 3/8	90	80
	12	M 18 x 1.5	110	90	G 3/8	90	80
	14	M 20 x 1.5	150	125	G 1/2	150	115
	16	M 22 x 1.5	170	135	G 1/2	130	115
	20	M 27 x 2.0	270	180	G 3/4	270	180
	25	M 33 x 2.0	410	310	G 1	340	310
	30	M 42 x 2.0	540	450	G 1 1/4	540	450
	38	M 48 x 2.0	700	540	G 1 1/2	700	540

12. NOTES

13. MODIFICATIONS INDEX

REV.	MOD.	DATE
00	0	14/05/21

• Draft new manual.

00	A	20/05/21

• Sect.1: added modifications index.
• Sect.9: added remote engine oil drain.

00	B	28/06/21

• Changed logo.
• Sect.1: added fields for customer information.
• Sect.4: modified data; added nomenclature.
• Sect.6: highlighted the steering column button pad;
modified paragraphs (6.13.2), (6.13.3), (6.18.1), (6.18.2), (6.24.4); added (6.24.5); modified (6.24.6), (6.24.7) added (6.24.8); modified (6.25.1); added (6.25.2); modified (6.25.4), (6.26.2), (6.34.1), (6.35), (6.37.1), (6.39), (6.39.1), (6.44.3), (6.49.1) , (6.49.4), (6.49.5), (6.50.2), (6.51.1).
• Sect.7: modified (7.3.1).
• Sect.9: modified (9.4.1), (9.5.1).
• Sect.11: modified (11.1), (11.2), (11.3).

00	C	29/11/21

• Changed logo; Changed machine description from operating to self-propelled.
• Sect. 2: added (2.5.3), (2.5.4), (2.5.5), (2.7), (2.8).
• Sect. 3: added (3.2.12), (3.2.13), (3.2.14), (3.3.4), (3.3.5).
• Sect. 4: updated tractor approval.
• Sect. 6: updated (6.23.7), (6.24), (6.25.8), (6.25.9), (6.26), (6.28), (6.42), (6.50.5), (6.51). Added (6.43), (6.44), (6.49), (6.56).
• Sect. 7: updated (7.1.1). Added (7.4).
• Sect. 9: updated (9.4), (9.14). Added (9.13), (9.16), (9.18).

00	D	18/07/22

• Sect. 3: updated (3.1.4), (3.2.17), (3.3.3);
• Sect. 4: updated (4.3);
• Sect. 6: updated (6.18), (6.20), (6.21.2), (6.22), (6.23.1), (6.23.8), (6.25.1), (6.25.3), (6.42.2), (6.42.4), (6.51), (6.55), (6.59.2). Added (6.48), (6.65);
• Sect. 9: updated (9.12), (9.17.2). Added (9.18);

01	0	01/12/22

• Supplement ILF ALPHA EASY RIDE;
• Sect. 2: updated (2.5.1), (2.5.4);
• Sect. 3: updated (3.2.17);
• Sect. 6: updated (6.7), (6.8), (6.25), (6.26), added (6.14.7), (6.24), (6.44), (6.51), (6.68);
• Sect. 9: updated (9.17), (9.23), added (9.13), (9.14);

02	0	11/01/23

• Supplement arm 180;
• Sect. 8: updated;

02	A	18/07/23

• Sect. 6: updated (6.14), (6.24), (6.28), (6.49.5);

03	0	30/08/23

• Sect. 6: updated (6.49.5), (6.53);

ENERGREEN S.P.A.
Via Sabbioni, 16
36026 Poiana Maggiore (VI) - ITALY
Tel. +39 0444 1511 200
Fax. +39 0444 1511 252

www.energreen.it
commerciale@energreen.it

ENERGREEN®
Professional Machines