MANITOU

HANDLING YOUR WORLD

649310EN-USMG(A-04/2022)
(WORLDWIDE)

OPERATORS MANUAL
(NOTICE ORIGINALE)

MHT 10200 210 Y ST5 S1
MHT-X 10200 210 Y ST3A S1
MHT 11250 210 Y ST5 S1
MHT-X 11250 210 Y ST3A S1

LEGAL NOTICE

MANITOU BF S.A. Public limited company with a board of directors.

Head Office: 430 rue de l’Aubinière - 44150 Ancenis - France

Share capital: €39,548,949

Entered in the Nantes Trade and Companies Register under No. 857 802 508.

Tel.: +33 (0)2 40 09 10 11

www.manitou.com

00. EXPLANATION OF SYMBOLS

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or damage to property. It is also used to warn users of unsafe practices.

NOTICE

Indicates a practice not related to a physical injury which, if not avoided, may damage the machine.

Indicates a message to draw attention to important information regarding environmental protection.

Indicates special tools for performing a task.

Indicates the value of tightening torque to be applied.

Indicates the weight of an item.

e.g. it helps to anticipate an action linked to a person's health or the choice of lifting equipment.

1. SAFETY

1.1. PREAMBLE

1.1.1 PREAMBLE

⚠ WARNING

The risk of accident while using, servicing or repairing your vehicle can be restricted if you follow the safety instructions and safety measures detailed in these instruction. Failure to respect the safety and operating instructions, or the instructions for repairing or servicing your vehicle may lead to serious, even fatal accident.

- Only the operations and manoeuvres described in these operator's manual must be performed. The manufacturer cannot predict all possible risky situations. Consequently, the safety instructions given in the operator's manual and on the vehicle itself are not exhaustive.
- At any time, as an operator, you must envisage, within reason, the possible risk to yourself, to others or to the vehicle itself when you use it.

⚠ WARNING

In order to reduce or avoid any danger with a MANITOU-approved attachment, follow the instructions of paragraph: ADAPTABLE ATTACHMENTS IN OPTION ON THE RANGE: INTRODUCTION.

1.1.2 THE SITE

Proper management of vehicle's area of travel will reduce the risk of accidents:

- ground not unnecessarily uneven or obstructed,
- no excessive slopes,
- pedestrian traffic controlled, etc.

1.1.3 THE OPERATOR

- Only qualified, authorized personnel can use the vehicle. This authorization is given in writing by the appropriate person in the establishment with respect to the use of vehicles and must be carried permanently by the operator.

⚠ WARNING

Experience has shown that there are a number of inappropriate ways in which the vehicle might be used. Such foreseeable misuse, of which the main examples are listed below, are strictly forbidden.

The foreseeable abnormal behaviour resulting from ordinary negligence, but which does not result from any wish to put the machinery to any improper use.

The reflex reactions of a person in the event of a malfunction, incident, fault, etc. during operation of the vehicle.

Behaviour resulting from application of the "principle of least effort" when performing a task.

For certain machines, the foreseeable behaviour of such persons as: apprentices, teenagers, handicapped persons, trainees tempted to drive a vehicle, operators tempted to operate a vehicle for the purposes of a bet, a competition or for their own personal experience.

The person in charge of the equipment must take these criteria into account when assessing the suitability of a person to drive.

1.1.4 THE INSTRUCTIONS

- The operator's manual must always be in good condition and kept in the place provided on the vehicle and in the language used by the operator.
- The operator's manual and any plates or stickers which are no longer legible or are damaged, must be replaced immediately.

1.1.5 THE MAINTENANCE

- Maintenance or repairs other than those detailed in part: MAINTENANCE must be carried out by qualified personnel (consult your dealer) and under the necessary safety conditions to maintain the health of the operator and any third party.

⚠ WARNING

Your vehicle must be inspected periodically to ensure that it remains in compliance. The frequency of this inspection is defined by current legislation in the country in which the vehicle is used.

- Example for France "The manager in charge of the establishment using a vehicle must open and maintain a maintenance log for each machine (order of 2 March 2004) and undergo a general periodic inspection every 6 months (order of 1 March 2004)".

- The operator must immediately advise his superior if his vehicle is not in good working order or does not comply with the safety notice.
- The operator is prohibited from carrying out any repairs or adjustments himself, unless he has been trained for this purpose. He must keep the vehicle properly cleaned if this is among his responsibilities.
- The operator must carry out daily maintenance.
- The operator must ensure tyres are adapted to the nature of the ground. There are optional solutions, consult your dealer.
  - SAND tyres.
  - LAND tyres.
  - Snow chains.

⚠ WARNING

Do not use the vehicle if the tyres are incorrectly inflated, damaged or excessively worn, because this could put your own safety or that of others at risk, or cause damage to the vehicle itself. The fitting of foam inflated tyres is prohibited and is not guaranteed by the manufacturer, excepting prior authorisation.

1.1.6 ORIGINAL SPARE PARTS AND EQUIPMENT

⚠ WARNING

Our forklifts must imperatively be maintained with original parts.

By authorizing the use of non-original parts, you risk:

- Legally involving your liability in the event of an accident.
- Technically causing malfunctions to the longevity of the vehicle.

⚠ WARNING

The use - by the user - of counterfeit parts or non-approved components can put an end to the contractual warranty conditions and lead the manufacturer to withdraw the Certificate of Conformity.

By using the original parts during maintenance operations, you are legally protected:

- The user who supplies elsewhere does so at his own risk.
- The user who modifies, or has the vehicle modified by third parties, must be aware that a new material is put on the market, which involves his liability.
- The user who copies or has copies made of the original parts exposes himself to legal risks.
- The Certificate of Conformity implies the liability of the manufacturer only for the parts chosen or processed under his control.
- Practical maintenance conditions are set by the manufacturer. If the user does not respect them, the liability of the manufacturer is not involved.

The manufacturer provides the user with:

- Savoir faire and its expertise.
- The guarantee of the quality of the works carried out.
- The original spare parts.
- Preventive maintenance assistance.
- Effective diagnosis assistance.
- The improvements due to an exchange of expertise.
- The training of the staff in charge.
- Only the manufacturer knows in detail the design of the vehicle and therefore the best technological capabilities to ensure its maintenance.

NOTICE

Original spare parts are distributed exclusively by MANITOU and the dealer network.

1.1.7 LIFTING PEOPLE

- The use of working equipment and load lifting attachments to lift people is:
  - either forbidden
  - or authorized exceptionally and under certain conditions (see current regulations in the country in which the vehicle is used).
- The pictogram posted at the operator station reminds you that: Left-hand column
  - It is forbidden to lift people, with any kind of attachment, using a non PLATFORM-fitted vehicle.

  Right-hand column
  - With a PLATFORM-fitted vehicle, people can only be lifted using platforms designed by MANITOU for the purpose.
- MANITOU sells equipment specifically designed for lifting people (OPTION PLATFORM vehicle, contact your dealer).

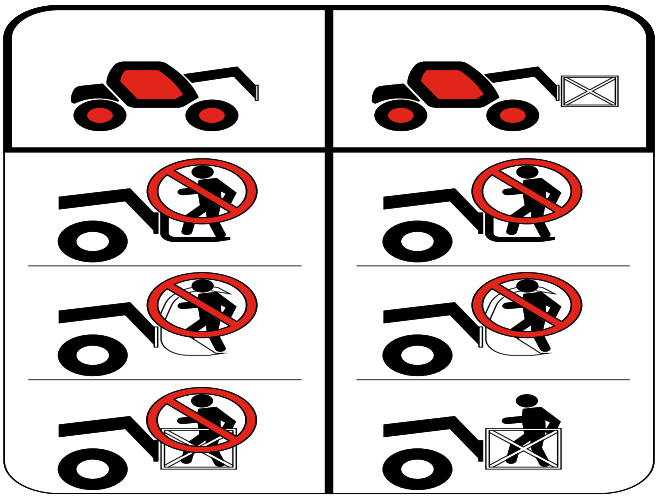


Figure 1:

1.1.8 AUTHORISATION FOR USE IN FRANCE

(or see current legislation in other countries).

- Only qualified, authorized personnel can use the vehicle. This authorization is given in writing by the appropriate person in the establishment with respect to the use of vehicles and must be carried permanently by the operator.
- The operator is not competent to authorise the driving of the vehicle by another person.

1.2. GENERAL INSTRUCTIONS

1.2.1 ROUTINE MAINTENANCE

The user who finds that his vehicle is not working well or does not comply with safety regulations must immediately inform the person in charge.

⚠ DANGER

The driver is prohibited from making any repairs or adjustments unless he has been trained for such a task.

You will need to keep your vehicle in perfect condition if you have been instructed to do so.

Carry out daily maintenance.

Check that the tires are suitable for the type of terrain.

⚠ DANGER

Do not use worn or deteriorated tires.

⚠ DANGER

Fitting tires inflated with polyurethane foam is prohibited and is not guaranteed by the manufacturer, unless authorized.

⚠ DANGER

Do not modify the structure or the adjustment of the various components of the vehicle (hydraulic pressure, setting of the limiters, engine speed, installation of additional attachments, etc.).

The same applies to the deactivation or modification of the safety systems. In these cases, the manufacturer will be released from any liability.

To keep the vehicle in a "state of conformity", it is mandatory to carry out periodic checks. The frequency of checks is defined by the legislation in force in the country of use of the vehicle. Maintenance operations or repairs must be carried out by qualified personnel and respecting the safety conditions to ensure your safety and that of others.

1.2.2 ENVIRONMENTAL CONDITIONS OF USE

Equip the vehicle with a fire extinguisher if the machine is used in a place without extinguishing equipment. There are optional solutions. For more information, contact your agent or dealer.

Always take into account the climatic and atmospheric conditions of the place of use.

The filling of lubricants has already been carried out in the factory using lubricants for average climatic conditions of use, i.e. from -15° C to + 35° C. For use in extreme conditions it is necessary, before starting, to empty and refill, using lubricants suitable for such temperatures. The same applies to the coolant (-21° C).

⚠ CAUTION

Use of the vehicle in adverse weather conditions (very cold temperatures) is only allowed with suitable fuels and/or with antifreeze.

Failure to do so could cause your vehicle to malfunction.

⚠ CAUTION

The use of the vehicle is prohibited in protected spaces (e.g. : Refineries, explosive atmosphere).

For use in these spaces, specific optional attachments exists. Contact your agent or dealer.

1.3. DRIVING INSTRUCTIONS

1.3.1 DRIVING AUTHORIZATION

Observe the legislation in force in the country of use

Only qualified and specially trained personnel can use the vehicle. Its use is compulsorily subject to the driving authorization issued by the manager of the plant where the machine is used.

- The user is advised to always have driving authorization with him during service.
- The user is advised to always have driving authorization with him during service.
- The use must also comply with the rules of the profession.

1.3.2 DRIVING THE VEHICLE ON THE ROAD

- Drivers of vehicle traveling on the road must comply with the general regulations relating to road traffic.
- The vehicle must comply with the traffic regulations of your country.

⚠ DANGER

The transport of loads by road is prohibited and the attachments mounted on the vehicle must be equipped with the required equipment or be disassembled.

⚠ DANGER

The vehicle can travel on public roads only empty, i.e. unladen.

Transportation of people is prohibited.

1. Verify that the flashing lights are installed and functioning.
2. Always fasten and adjust the seat belt.
3. Close the door.
4. Dipped beam headlights also on during the hours and in the streets where the use of visual signaling and lighting devices is not required.
5. Check the correct operation and cleanliness of the headlights, indicator lights and windscreen wipers.
6. Check the position of the rear view mirrors.
7. Check wheel alignment and push the steering selector to the drive position with front steering wheels only.
8. Make sure there is enough fuel.
9. Fit all the attachments required for road traffic (according to model and country).
10. Put the boom in the transport position, i.e. boom retracted and 300 mm (11.8 in) above the ground.
11. Level the machine with the chassis parallel to the ground using the tilt corrector.
12. Raise and retract the stabilizers as far as possible.
13. The vehicle can travel on public roads only empty, i. e. unladen.

1.3.3 DRIVING THE VEHICLE PUBLIC HIGHWAY

(or see current legislation in other countries)

FRENCH ROAD TRAFFIC RULES

- The driving of non EC type-approved tractors on the public highway is subject to the provisions of the highway code relating to special machines, defined in article R311-1 of the highway code, in category B of the Equipment Order of 20 November 1969 that determines the procedures applicable to special machines. The vehicle must be fitted with a licence plate.
- The driving of EC type-approved tractors on the public highway is subject to the provisions of the highway code regarding agricultural tractors, defined in article R311-1 of the highway code. The vehicle must be registered.
- The vehicle must be driven on the public highway in accordance with the instructions given in the manual supplied with the vehicle (Gross weight, Gross combination weight, towing load, axle loads, maximum speeds, etc. according to type/version). The operator must be in possession of the vehicle's registration document.
- The operator must hold an HGV licence, unless granted an exemption.
- When towing a trailer or agricultural equipment, the travelling speed of the vehicle is limited to 25 km/h. In this case, a "25" disc must be affixed to the rear of the convoy. When driving with a trailer, the fact of not engaging 4th gear will ensure compliance with the towing speed limit (max. 25 km/h). On

"POWERSHIFT" models, as 3rd gear is slower than on other models, it is preferable to use 5th gear and disable automatic upshifting to 6th gear.

SAFETY INSTRUCTIONS

- Operators driving on the public highway must comply with current highway code legislation.
- The vehicle must comply with current road legislation. If necessary, there are optional solutions. Contact your dealer.

INSTRUCTIONS

- Make sure the revolving light is in place, switch it on and verify its operation.
- Make sure the lights, indicators and windscreen wipers are working properly.
- Switch off the working headlights if the vehicle is fitted with them.
- Select the steering mode "HIGHWAY TRAFFIC" (as model of vehicle).
- Fully retract the boom and set the attachment approximately 300 mm off the ground.
- Place the roll corrector in the central position, i.e. the transverse axis of the axles parallel to the chassis (as model of vehicle).
- Fully raise the stabilizers and turn the blocks inwards (according to model of vehicle).

⚠ DANGER

Never coast in neutral (forward/reverse selector or gear lever in neutral or transmission cut-off button pressed) to preserve the vehicle engine brake. Failure to observe this instruction on a slope will lead to excessive speed which may make the vehicle uncontrollable (steering, brakes) and cause serious mechanical damage.

DRIVING THE VEHICLE WITH A FRONT-MOUNTED ATTACHMENT

- You must comply with current regulations in your country, covering the possibility of driving on the public highway with a front-mounted attachment on your vehicle.
- If road legislation in your country authorizes circulation with a front-mounted attachment, you must at least:
  - Protect and report any sharp and/or dangerous edges on the attachment.
  - The attachment must not be loaded.
  - Make sure that the attachment does not mask the lighting range of the forward lights.
  - Make sure that current legislation in your country does not require other obligations.

OPERATING THE VEHICLE WITH A TRAILER

- For using a trailer, observe the regulations in force in your country (maximum travel speed, braking, maximum weight of trailer, etc.).
- Do not forget to connect the trailer's electrical equipment to that of the vehicle.
- The trailer's braking system must comply with current legislation.
- If pulling a trailer with assisted braking, the tractor vehicle must be equipped with a trailer braking mechanism. In this case, do not forget to connect the trailer braking equipment to the vehicle.
- The vertical force on the towing hook must not exceed the maximum authorised by the manufacturer (consult the manufacturer's plate on your vehicle).
- The authorised gross vehicle weight must not exceed the maximum weight authorised by the manufacturer.

IF NECESSARY, CONSULT YOUR DEALER.

1.3.4 FRENCH ROAD TRAFFIC RULES

(or see current legislation in other countries)

- Only one certificate of conformity is issued. It must be kept in a safe place.
- The driving of non EC type-approved tractors on the public highway is subject to the provisions of the highway code relating to special machines, defined in article R311-1 of the highway code, in category B of the Equipment Order of 20 November 1969 that determines the procedures applicable to special machines. The vehicle must be fitted with a licence plate.
- The driving of EC type-approved tractors on the public highway is subject to the provisions of the highway code regarding agricultural tractors, defined in article R311-1 of the highway code. The vehicle must be registered.

SPECIAL INSTRUCTION APPLYING TO "EC TRACTOR" TYPE-APPROVED VEHICLES

- All EC tractor type-approved vehicles are supplied with an "EC tractor" certificate complying with directive 2003/37/EC, to be retained by the owner, and a page of administrative details together with a CNIT number (national type approval code) for registration at the prefecture.

- The vehicle owner is responsible for carrying out the necessary procedures for obtaining the vehicle registration document within the time limit defined by the regulations.
- The operator must hold an HGV licence, unless granted an exemption.
- The vehicle must be driven on the public highway in accordance with the instructions given in the manual supplied with the vehicle (Gross weight, Gross combination weight, towing load, axle loads, maximum speeds, etc. according to type/version). The operator must be in possession of the vehicle's registration document.

⚠ WARNING

When towing a trailer or agricultural equipment, the travelling speed of the vehicle is limited to 25 km/h. In this case, a "25" disc must be affixed to the rear of the convoy.

1.3.5 DRIVER SEAT PROVISIONS

1. Wear clothing suitable for driving the vehicle, avoiding those that are too loose. Never ride with wet or greasy hands or shoes.
2. For better comfort, adjust the driver's seat and adopt a good driving position.
3. The driver must always maintain the normal driving position.
4. Always fasten and adjust the seat belt.
5. The control components must never be used for purposes other than those for which they are designed (e.g. : Getting on or off the vehicle, hanging clothes, etc.).

⚠ DANGER

Never allow passengers to get on the vehicle or in the driver's seat.

⚠ DANGER

It is forbidden to protrude arms and legs and, in general, any part of the body, outside the driving position of the vehicle.

1.3.6 RECOMMENDATIONS FOR USE FOR THE DRIVER

⚠ WARNING

Most of the accidents related to the use, maintenance and repair of the telehandler are due to the non-application and non-observance of the most basic safety rules.

By identifying the risks to which you expose yourself and taking all necessary precautions, you can avoid these accidents.

⚠ WARNING

All operations or maneuvers not described in the instruction manual must be avoided, and in any case anyone who uses another method must first ensure that his own safety, that of others and the good condition of the telehandler are guaranteed.

Therefore, not being able to foresee all the dangerous situations, the recommendations and safety standards relating to the telehandler, given by the manufacturer and reported in this manual, are not to be considered exhaustive.

⚠ WARNING

Failure to comply with the safety regulations or the recommendations for use, maintenance or repair of the telehandler can cause serious injury, even death.

⚠ WARNING

We draw the attention of users to the risks they face, going at an excessive speed compared to the conditions of circulation, in particular:

Risk of losing control on a rough road.

Increased braking distance.

⚠ WARNING

The user must always be able to control the telehandler and therefore must:

Adapt the speed to any situation to preserve your own safety, that of others and that of your machine

Continuously evaluate the braking distance.

⚠ WARNING

Experience teaches us that there may be some contraindications to the use of the telehandler.

These foreseeable anomalous uses, the main ones of which are listed below, are formally prohibited.

1. The predictable abnormal behavior, which results from ordinary negligence, but which does not result from the will to misuse the machine.
2. The reflex behavior of a person in case of malfunction, accident, anomaly, etc. while using the telehandler.
3. The behavior resulting from the application of the “law of least effort” when performing a task.
4. For some machines, the predictable behavior of certain categories of people, such as:
   - 4.1.apprentices,
   - 4.2.handicapped,
   - 4.3.staff in training.
5. Drivers tempted to use the telehandler for betting, competitions or from personal experience

⚠ WARNING

The plant or site manager must take these criteria into account when assessing a person's ability to drive.

Familiarize yourself with the telehandler on the ground where it will be used.

Transport the load in the low position and with the telescopic boom retracted to the maximum (transport condition).

Position the forks perpendicular to the load to be lifted.

Drive the telehandler at a speed appropriate to the conditions and condition of the ground.

Never go too fast or brake hard with a load.

When picking up a load, make sure the ground is as even as possible.

Do not attempt to perform operations that exceed the capabilities of the telehandler.

Do not lift a load greater than the capacity of the telehandler and do not increase the size of the counterweight.

Go around the obstacles.

Pay attention to electric cables, ditches, recently excavated or brought back land.

Never leave the engine running in the absence of the driver.

Use the parking brake when placing a difficult load or on sloping ground.

Never leave the telehandler parked with a raised load.

Do not allow anyone to approach or pass under a load.

Always think about safety and only carry well-balanced loads.

Never lift a load using only one fork.

Drive carefully and alert.

When the telehandler is not in use, lower the forks to the ground and apply the parking brake.

Never leave the ignition key on the telehandler when the driver is absent.

Do not leave the telehandler loaded on a slope greater than 15% even with the parking brake applied.

When lifting a load, make sure that nothing or no one hinders the movement and avoid making false maneuvers.

Observe the data indicated on the load diagrams.

Never carry another person on the telehandler.

⚠ WARNING

Whenever a tool is changed, to avoid damaging the hydraulic fittings it is necessary to:

stop the engine and wait about 1 minute to release the pressure from the circuit.

Wait about 1 minute to release the pressure from the circuit.

1.4. VEHICLE SAFETY INFORMATION

1.4.1 GENERAL INSTRUCTIONS

- Ensure the area is sufficiently ventilated before starting the vehicle.
- Wear clothes suitable for the maintenance of the vehicle, avoid wearing jewellery and loose clothes. Tie and protect your hair, if necessary.
- Stop the engine and remove the ignition key, when an intervention is necessary.
- Read the operator's manual carefully.
- Carry out all repairs immediately, even if the repairs concerned are minor.
- Repair all leaks immediately, even if the leak concerned is minor.
- Make sure that the disposal of process materials and of spare parts is carried out in total safety and in a ecological way.
- Be careful of the risk of burning and splashing (exhaust, radiator, engine, etc.).

1.4.2 THE VEHICLE'S SUITABILITY FOR THE JOB

- MANITOU has ensured that this vehicle is suitable for use under the standard operating conditions defined in this operator's manual, with a STATIC test coefficient OF 1,33 and a DYNAMIC test coefficient OF 1, as specified in harmonised standard EN 1459 for variable range vehicles.
- Before commissioning, the company manager must make sure that the vehicle is appropriate for the work to be done, and perform certain tests (in accordance with current legislation).

1.4.3 BEFORE STARTING THE VEHICLE

- Perform the daily service.
- Make sure the lights, indicators and windscreen wipers are working properly.
- Make sure the rear view mirrors are in good condition, clean and properly adjusted.
- Make sure the horn works.

1.4.4 STARTING THE VEHICLE

SAFETY INSTRUCTIONS

⚠ DANGER

The vehicle must only be started up or manoeuvred when the operator is sitting in the driver's cab, with his seat belt adjusted and fastened.

⚠ CAUTION

Never try to start the vehicle by pushing or towing it.

Such operation may cause severe damage to the transmission. If necessary, to tow the vehicle in an emergency, the transmission must be placed in the neutral position.

⚠ WARNING

Failure to respect polarity between batteries can cause serious damage to the electrical circuit. The electrolyte in the battery may produce an explosive gas. Avoid flames and generation of sparks close to the batteries. Never disconnect a battery while it is charging.

INSTRUCTIONS

- If using an emergency battery for start-up, use a battery with the same characteristics and respect battery polarity when connecting it. Connect at first the positive terminals before the negative terminals.
- Check the closing and locking of the hood(s).
- Check that the cab door is closed.
- Check that the forward/reverse selector is in neutral, and that the parking brake is applied.
- Press on the service brake pedal and maintain it down.
- Turn the ignition key to the position I to activate the electrical and pre-heating system.
- Whenever you switch on the vehicle, perform the automatic check on the longitudinal stability limiter and warning device. Do not use the vehicle if it does not conform to the regulations.
- Check the fuel level on the indicator.
- Turn the ignition key fully, the engine should then start. Release the ignition key and let the engine run at idle.

⚠ DANGER

Do not engage the starter motor for more than 15 seconds and carry out the preheating for 10 seconds between unsuccessful attempts

- Make sure all the signal lights on the control instrument panel are off.
- Check all control instruments when the engine is warm and at regular intervals during use, so as to quickly detect any faults and to be able to correct them without any delay.
- If an instrument does not show the correct display, stop the engine and immediately carry out the necessary operations.
-

⚠ DANGER

Wait until the heat engine and hydraulic systems have warmed up properly before operating in very cold climates.

1.4.5 DRIVING THE VEHICLE

SAFETY INSTRUCTIONS

⚠ WARNING

The operators' attention is drawn to the risks involved in using the vehicle, in particular:

-Risk of loosing control.

- Risk of loosing lateral and frontal stability of the vehicle.

The operator must remain in control of the vehicle.

In the event of the vehicle overturning, do not try to leave the cabin during the incident.

YOUR BEST PROTECTION IS TO STAY FASTENED IN THE CABIN.

- Always fasten and adjust your seat belt.
- Observe the company's traffic regulations or, by default, the public highway code.
- Do not carry out operations which exceed the capacities of your vehicle or attachments.
- Always drive the vehicle with the forks or attachment to the transport position, i.e. at 300 mm from the ground, the boom retracted and the carriage sloping backwards.
- Only carry loads which are balanced and properly anchored to avoid any risk of a load falling off.
- Ensure that palettes, cases, etc, are in good order and suitable for the load to be lifted.
- Familiarise yourself with the vehicle on the terrain where it will be used.
- Ensure that the service brakes are working properly.
- Ensure that the service horn is working properly.
- Drive smoothly at an appropriate speed for the operating conditions (land configuration, load on the vehicle).
- Slow down before making a turn.
- Do not use the hydraulic boom controls when the vehicle is moving.
- Never change the steering mode whilst driving.
- Do not manoeuvre the vehicle with the boom in the raised position unless under exceptional circumstances and then with extreme caution, at very low speed and using gentle braking. Ensure that visibility is adequate.
- Take bends slowly.
- In all circumstances make sure you are in control of your speed.
- On damp, slippery or uneven terrain, drive slowly.
- Brake gently, never abruptly.
- Only use the vehicle's forward/reverse selector from a stationary position and never do so abruptly.
- Do not drive with your foot on the brake pedal.
- Always remember that hydrostatic type steering is extremely sensitive to movement of the steering wheel, so turn it gently and not jerkily.
- Never leave the engine on when the vehicle is unattended.
- Do not leave the cab when the vehicle has a raised load.
- Look where you are going and always make sure you have good visibility along the route.
- Use the rear-view mirrors frequently.
- Drive round obstacles.
- Never drive on the edge of a ditch or steep slope.
- It is dangerous to use two vehicles simultaneously to handle heavy or bulky loads, since this operation requires particular precautions to be taken. It must only be used exceptionally and after risk analysis.
- The ignition switch has an emergency stop mechanism in case of an operating anomaly occurring in the case of vehicles not fitted with a punch-operated cut-out.
- Do not operate your vehicle in an environment that is not properly illuminated.
- At night, make sure your vehicle is equipped with working lights.
- Do not enter a loading bridge without checking:
- That it is properly positioned and anchored.
- That the vehicle to which it is attached (wagon, truck, etc.) cannot move.

- That such bridge can support the full weight of the vehicle and its load, if any.
- That the width of the bridge is appropriate for the width of the vehicle.
- Never enter a platform, gangway or freight elevator without being sure that they are designed for the weight and dimensions of the vehicle and its load, if any, and without checking that they are in good condition.

INSTRUCTIONS

-

⚠ DANGER

Always drive the vehicle with the forks or attachment to the transport position, i.e. at 300 mm from the ground, the boom retracted and the carriage sloping backwards.

- Check transmission oil level.
- For vehicles with gearboxes, use the recommended gear.
- Select the steering mode appropriate for its use and/or working conditions (as model of vehicle).
- Release the hand brake.
- Shift the forward/reverse selector to the selected direction of travel and accelerate gradually until the vehicle moves off.
-

⚠ CAUTION

The driving speed of the loaded vehicle must not exceed 5 km/h (3.1 mph) under any circumstances.

⚠ DANGER

Starting and driving a vehicle on a slope can present a very real danger.

The vehicle being parked or stopped, scrupulously follow the following instructions for moving off:

- Press the service brake pedal.

- Engage 1st or 2nd gear and select forward or reverse.

- Check that there is nothing and no-one obstructing the vehicle's path.

- Release the service brake pedal and increase the engine revs.

The risk is increased if the vehicle is laden or towing a trailer, requiring extreme vigilance.

1.4.6 VEHICLE CAB PROTECTION

- All vehicles comply with the requirements of ISO 3471 (wheel loader code) regarding cab rollover protection (ROPS) and ISO 3449 (Level II) regarding the protection of the cab against falling objects (FOPS).
- "EC TRACTOR" type-approved vehicles comply, in addition, with Directive 79/622/EC (OECD Code 4) regarding cab rollover protection (ROPS).

⚠ WARNING

Structural damage or overturning, a modification, changes or a poorly executed repair can reduce the protective efficiency of the cab, cancelling its compliance.

Do not perform welding or drilling on the cab structure. Consult your dealer to determine the limits of this structure without cancelling its compliance

1.4.7 VISIBILITY

- The safety of people within the vehicle's working area, as well as that of the vehicle itself and the operator are depend on good operator visibility of the vehicle's immediate vicinity in all situations and at all times.
- This vehicle has been designed to allow good operator visibility (direct or indirect by means of rear-view mirrors) of the immediate vicinity of the vehicle while travelling with no load and with the boom in the transport position.
- Special precautions must be taken if the size of the load restricts visibility towards the front:
  - moving in reverse,
  - site layout,
  - assisted by a person directing the manoeuvre (while standing outside the vehicle's area of travel), making sure to keep this person clearly in view at all times,
  - In any case, avoid reversing over long distances.
- Certain special accessories may require the vehicle to travel with the boom in the raised position. In such cases, visibility on the right hand side is restricted, and special precautions must be taken:
  - site layout,
  - assisted by a person directing the manoeuvre (while standing outside the vehicle's area of travel).
  - replacement of a suspended load by a load on a pallet.

- If visibility of your road is inadequate, ask someone to assist by directing the manoeuvre (while standing outside the vehicle's area of travel), making sure to keep this person clearly in view at all times.
- Keep all components affecting visibility in a clean, properly adjusted state and in good working order (e.g. windscreens, windows, windscreen wipers, windscreen washers, driving and work lights, rear-view mirrors).

1.4.8 TRANSVERSE ATTITUDE OF THE VEHICLE

Depending on the model of vehicle

The transverse attitude is the transverse slope of the chassis with respect to the horizontal. Raising the jib reduces the vehicle's lateral stability. The transverse attitude must be set with the jib in down position as follows:

1. VEHICLE WITHOUT ROLL CORRECTOR USED ON TYRES
   - Position the vehicle so that the bubble in the level is between the two lines.
2. VEHICLE WITH ROLL CORRECTOR USED ON TYRES
   - Correct the roll using the hydraulic control and check horizontally with the spirit level. The bubble in the level must be between the two lines.
3. VEHICLE USED ON STABILIZERS
   - Set the two stabilizers on the ground and raise the two front wheels of the vehicle.
   - Correct the roll using the stabilizers and check horizontally with the spirit level. The bubble of the level must be between the two lines. In this position, the two front wheels must be off the ground.

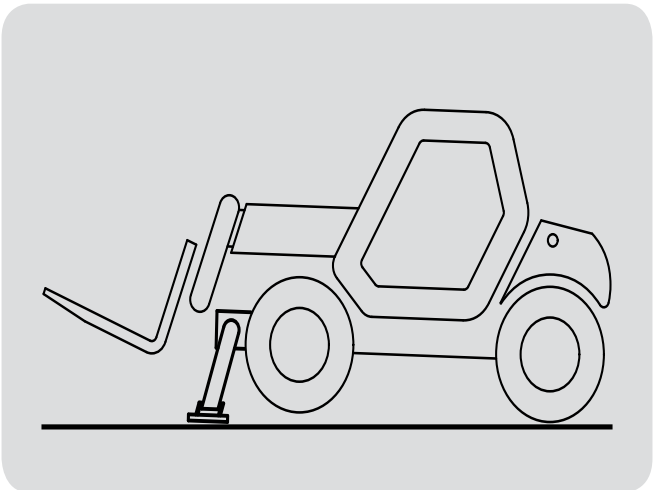


Figure 2:

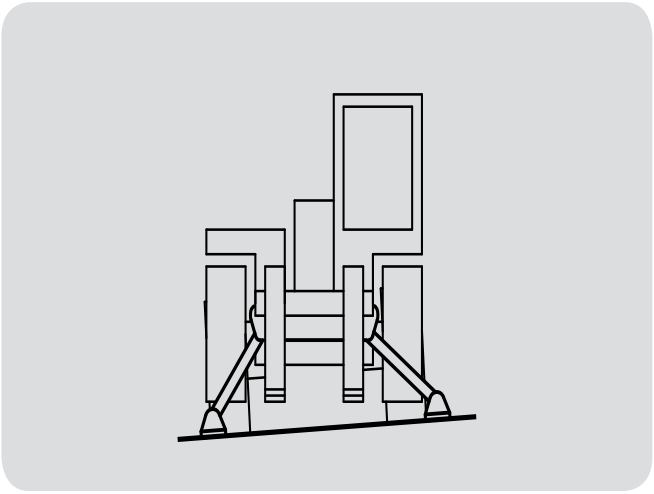


Figure 3:

1.4.9 STOPPING THE VEHICLE

SAFETY INSTRUCTIONS

- Before stopping the vehicle after heavy work, let the heat engine idle for a few moments to allow the coolant and oil to lower the temperature of the engine and transmission.
- Never leave the ignition key in the vehicle during the operator's absence.
- When the vehicle is stationary, or if the operator has to leave his cab (even for a moment), place the forks or attachment on the ground, apply the parking brake and place the forward/reverse selector in neutral.
- Make sure that the vehicle is not stopped in any position that will interfere with the traffic flow and at less than one meter from the track of a railway.
- In the event of prolonged parking on a site, protect the vehicle from bad weather, particularly from frost (check the level of antifreeze), close and lock all the vehicle accesses (doors, windows, cowls, etc.).

⚠ DANGER

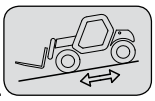
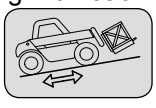
Before leaving the driver's seat, make sure that you have properly performed all vehicle stop operations.

INSTRUCTIONS

- Park the vehicle on flat ground or on an incline lower than 15 %.
- Set the forward/reverse selector to neutral.
- Engage the parking brake.
- For vehicles with gearboxes, place the gear lever in neutral.
- Fully retract the boom.

- Lower the forks or attachment to rest on the ground.
- When using an attachment with a grab or jaws, or a bucket with hydraulic opening, close the attachment fully.
- Before stopping the vehicle after a long working period, leave the engine idling for a few moments, to allow the coolant liquid and oil to lower the temperature of the engine and transmission. Do not forget this precaution, in the event of frequent stops or warm stalling of the engine, or else the temperature of certain parts will rise significantly due to the stopping of the cooling system, with the risk of badly damaging such parts.
- Stop the engine with the ignition switch.
- Remove the ignition key.
- Lock all the accesses to the vehicle (doors, windows, cowls…).

1.4.10 ENVIRONMENT

- Comply with site safety regulations.
- If you have to use the vehicle in a dark area or at night, make sure it is equipped with working lights.
- During handling operations, make sure that no one is in the way of the vehicle and its load.
- Do not allow anybody to come near the working area of the vehicle or pass beneath an elevated load.
- When using the vehicle on a transverse slope, before lifting the boom.
- Travelling on a longitudinal slope:
  - Drive and brake gently.
  - Moving without load: Forks or attachment facing downhill. 
  - •Moving with load: Forks or attachment facing uphill. 
- Take into account the vehicle's dimensions and its load before trying to negotiate a narrow or low passageway.
- Never move onto a loading platform without having first checked:
  - That it is suitably positioned and made fast.
  - That the unit to which it is connected (wagon, lorry, etc.) will not shift.
  - That this platform is prescribed for the total weight of the vehicle to be loaded.
  - That this platform is prescribed for the size of the vehicle.
- Never move onto a foot bridge, floor or freight lift, without being certain that they are prescribed for the weight and size of the vehicle to be loaded and without having checked that they are in sound working order.
- Be careful in the area of loading bays, trenches, scaffolding, soft ground and manholes.
- Make sure the ground is stable and firm under the wheels and/or stabilizers before lifting or removing the load. If necessary, add sufficient wedging under the stabilizers.
- Make sure that the scaffolding, loading platform, pilings or ground is capable of bearing the load.
- Never stack loads on uneven ground, they may tip over.

⚠ DANGER

If the load or the attachment must remain above a structure for a prolonged period of time, there is the risk that it will bear on the structure as the boom descends due to cooling of the oil in the cylinders.

To eliminate this risk:

- Regularly check the distance between the load or the attachment and the structure and readjust this if necessary.

- If possible use the vehicle at an oil temperature as close as possible to ambient temperature.

- When working near aerial lines, ensure that the safety distance is sufficient between the working area of the vehicle and the aerial line.

⚠ WARNING

You must consult your local electrical agency. You could be electrocuted or seriously injured if you operate or park the vehicle too close to power cables. In the event of high winds, do not carry out handling work that jeopardises the stability of the vehicle and its load, particularly if the load catches the wind badly.

1.4.11 ADAPTATION OF THE VEHICLE TO STANDARD ENVIRONMENTAL CONDITIONS

- In addition to series equipment mounted on your vehicle, many options are available, such as: road lighting, stop lights, revolving light, reverse lights, reverse buzzer alarm, front light, rear light, light at the jib head, etc. (according to the vehicle model).

- The operator must take into account the operating conditions to define the vehicle's signalling and lighting equipment. Contact your dealer.
- Take into account climatic and atmospheric conditions of the site of utilisation.
  - Protection against frost.
  - Adaptation of lubricants (ask your dealer for information).
  - Engine filtration.

⚠ WARNING

For operation under average climatic conditions, i.e.: between -15 °C and +35 °C, correct levels of lubricants in all the circuits are checked in production. For operation under more severe climatic conditions, before starting up, it is necessary to drain all the circuits, then ensure correct levels of lubricants using lubricants properly suited to the relevant ambient temperatures. The same applies to the cooling liquid

- A vehicle operating in an area without fire extinguishing equipment must be equipped with an individual extinguisher. There are solutions, consult your dealer.

⚠ WARNING

Your vehicle is designed for outdoor use under normal atmospheric conditions and indoor use in suitably aerated and ventilated premises. It is prohibited to use the vehicle in areas where there is a risk of fire or which are potentially explosive (e.g. Refineries, fuel or gas depots, stores of flammable products, etc.). For use in these areas, specific equipment is available (ask your dealer for information).

- Our vehicles comply with Directive 2004/108/EC concerning electromagnetic compatibility (EMC), and with the corresponding harmonized standard EN 12895. Their proper operation is no longer guaranteed if they are used within areas in which the electromagnetic fields exceed the limit specified by that standard (10 V/m).
- Directive 2002/44/EC requires company managers to not expose their employees to excessive vibration doses. There is no recognized code of measurement for comparing the machines of different manufacturers. The actual doses received cannot therefore be measured under actual operating conditions at the user's premises.
- The following are some tips for minimizing these vibration doses:
  - Select the most suitable vehicle and attachment for the intended use.
  - Adapt the seat adjustment to the operator's weight (according to vehicle model) and maintain it in good condition, as well as the cab suspension. Inflate the tires in accordance with recommendations.
  - Ensure that the operators adapt their operating speed to suit the conditions on site.
  - As far as possible, arrange the site in such a way as to provide a flat running surface and remove obstacles and harmful potholes.

1.4.12 DRIVER'S OPERATING INSTRUCTIONS

- Whatever his experience, the operator is advised to familiarize himself with the position and operation of all the controls and instruments before operating the vehicle.
- Wear clothes suited for driving the vehicle, avoid loose clothes.
- Make sure you have the appropriate protective equipment for the job to be done.
- Prolonged exposure to high noise levels may cause hearing problems. It is recommended to wear ear muffs to protect against excessive noise.
- Always face the vehicle when getting into and leaving the driving seat and use the handle(s) provided for this purpose. Do not jump out of the seat to get down.
- Always pay attention when using the vehicle. Do not listen to the radio or music using headphones or earphones.
- Never operate the vehicle when hands or feet are wet or soiled with greasy substances.
- For increased comfort, adjust the seat to your requirements and adopt the correct position in the driver’s cab.

⚠ WARNING

Under no circumstances must the seat be adjusted while the vehicle is moving.

- The operator must always be in his normal position in the driver’s cab. It is prohibited to have arms or legs, or generally any part of the body, protruding from the driver’s cab of the vehicle.
- The safety belt must be worn and adjusted to the operator's size.
- The control units must never in any event be used for any other than their intended purposes (e.g. climbing onto or down from the vehicle, portmanteau, etc.).

- If the control components are fitted with a forced operation (lever lock) device, it is forbidden to leave the cab without first putting these controls in neutral.
- It is prohibited to carry passengers either on the vehicle or in the cab.

1.4.13 MODIFICATION OF THE VEHICLE

- For your safety and that of others, you must not change the structure and settings of the various components used in your vehicle (hydraulic pressure, calibrating limiters, engine speed, addition of extra equipment, addition of counterweight, unapproved attachments, alarm systems, etc.) yourself. In this event, the manufacturer cannot be held responsible.

1.5. VEHICLE MAINTENANCE

1.5.1 RECOMMENDATIONS FOR MAINTENANCE

Before carrying out any routine or extraordinary maintenance on the vehicle, follow the instructions below.

⚠ WARNING

The vehicle is equipped with three ladders (front, rear and right side) that allow access to the walkable surface above the vehicle's undercarriage. The latter must only be used during maintenance operations and only to access the walkable surface.

It is not allowed to use the front, rear or right side ladder to access the vehicle cabin.

1. Read carefully and understand the instruction manual.
2. Switch off the engine before any intervention on the vehicle.
3. Wear appropriate clothing for the maintenance operations of the vehicle, avoiding jewelry and clothing that is too loose. If necessary, tie and protect the hair.
4. Make sure that the room is sufficiently ventilated before starting the vehicle.
5. Make any necessary repairs, even minor ones, immediately.

NOTICE

Incorrect disposal of consumables and used parts

Pay particular attention to the disposal of consumables and used parts, making sure that it is carried out in maximum safety and in an eco-friendly way.

6. Repair any leaks, even the smallest ones, immediately.
7. Do not try to loosen fittings, hoses or a hydraulic component with the circuit under pressure.

⚠ WARNING

The modification of the adjustment and the disassembly of the counterbalance valves or of the safety valves which, at times, equip the jacks of the vehicle can be dangerous.

A counterbalance valve can only be removed with the concerned jack at rest and with the hydraulic circuit without pressure. This operation can only be carried out by authorized personnel.

8. Do not smoke or approach the vehicle with open flames when the fuel tank is open or filling.
9. Pay attention to the risk of burns (fume treatment system, hood, radiator, engine, etc.).
10. Disconnect the negative pole (-) from the battery before working on the electrical system.
11. Do not place metal pieces on the battery.
12. To carry out an electric welding on the vehicle, place the clamp of the negative cable of the welding machine directly on the piece to be welded in order to prevent very strong current from flowing through the alternator.

1.5.2 CHOICE OF ATTACHMENTS

- Only attachments approved by MANITOU can be used on its vehicles.
- Make sure the attachment is appropriate for the work to be done.
- If the vehicle is equipped with the Single side-shift carriage OPTION (TSDL), use only the authorised attachments.
- Make sure the attachment is correctly installed and locked onto the vehicle carriage.
- Make sure that your vehicle attachments work properly.

- Comply with the load chart limits for the vehicle for the attachment used.
- Do not exceed the rated capacity of the attachment.
- Never lift a load in a sling without the attachment provided for the purpose, as the sling risks to slip.
- Do not handle loads that are hung directly from the forks with straps (e.g.: big-bag), as there is a risk that the straps will shear against the sharp edges. Use an attachment designed for this purpose.

1.5.3 WELDING

- Disconnect the battery before any welding operations on the vehicle.
- When carrying out electric welding work on the vehicle, connect the negative cable from the equipment directly to the part being welded, so as to avoid high tension current passing through the alternator.
- Never carry out welding or work which gives off heat on an assembled tyre. The heat would increase the pressure which could cause the tyre to explode.
- If the vehicle is equipped with an electronic control unit, disconnect this before starting to weld, to avoid the risk of causing irreparable damage to electronic components.

1.5.4 TRANSPORTING THE VEHICLE

⚠ WARNING

Transporting the vehicle involves real risks for the operator and others involved.

- Towing, slinging or transporting the vehicle.

1.5.5 MAINTENANCE

- Perform the periodic service to keep your vehicle in good working conditions. Failure to perform the periodic service may cancel the contractual guarantee.

MAINTENANCE LOGBOOK

- The maintenance operations carried out in accordance with the recommendations for MAINTENANCE and the other inspection, servicing or repair operations or modifications performed on the vehicle or its attachments shall be recorded in a maintenance logbook. The entry for each operation shall include details of the date of the works, the names of the individuals or companies having performed them, the type of operation and its frequency, if applicable. The part numbers of any vehicle items replaced shall also be indicated.

1.5.6 WASHING THE VEHICLE

- Clean the vehicle or at least the area concerned before any intervention.
- Remember to close and lock all accesses to the vehicle (doors, windows, cowls…).
- During washing, avoid the articulations and electrical components and connections.
- If necessary, protect against penetration of water, steam or cleaning agents, components susceptible of being damaged, particularly electrical components and connections and the injection pump.
- Clean the vehicle of any fuel, oil or grease trace.

1.5.7 LUBRICANT AND FUEL LEVELS

- Use the recommended lubricants (never use contaminated lubricants).
- Do not fill the fuel tank when the engine is running.
- Only fill up the fuel tank in areas specified for this purpose.
- Do not fill the fuel tank to the maximum level.
- Do not smoke or approach the vehicle with a flame, when the fuel tank is open or is being filled.

1.5.8 ELECTRICITY

- Do not short-circuit the starter relay to start the engine. If the forward/reverse selector is not in neutral and the parking brake is not applied, the vehicle may suddenly start to move.
- Do not drop metallic items on the battery.
- Disconnect the battery before working on the electrical circuit.

1.5.9 HYDRAULIC

- Any work on the load handling hydraulic circuit is forbidden except some MAINTENANCE procedures described in the service manual.
- Do not attempt to loosen unions, hoses or any hydraulic component with the circuit under pressure.

⚠ DANGER

BALANCING VALVE: It is dangerous to change the setting and remove the balancing valves or safety valves which may be fitted to your vehicle cylinders. The HYDRAULIC ACCUMULATORS that may be fitted on your vehicle are pressurised units. Removing these accumulators and their pipework is a dangerous operation and must only be performed by approved personnel (consult your dealer).

1.6. VEHICLE DOWNTIME MAINTENANCE

1.6.1 INTRODUCTION

The following recommendations are intended to prevent the vehicle from being damaged when it is withdrawn from service for an extended period.

For these operations, we recommend the use of a MANITOU protective product, reference 603726.

Instructions for using the product are given on the packaging.

⚠ CAUTION

Procedures to follow if the vehicle is not to be used for a long time and for starting it up again afterwards must be performed by your dealership.

1.6.2 PREPARING THE VEHICLE

- Clean the vehicle thoroughly.
- Check and repair any fuel, oil, water or air leaks.
- Replace or repair any worn or damaged parts.
- Wash the painted surfaces of the vehicle in clear and cold water and wipe them.
- Touch up the paintwork if necessary.
- Shut down the vehicle.
- Make sure the jib cylinder rods are all in retracted position.
- Release the pressure in the hydraulic circuits.

1.6.3 PROTECTING THE VEHICLE

- Set the vehicle on axle stands so that the tyres are not in contact with the ground and release the handbrake.
- Protect cylinder rods which will not be retracted, from corrosion.
- Wrap the tyres.

If the vehicle is to be stored outdoors, cover it with a waterproof tarpaulin.

1.6.4 BRINGING THE VEHICLE BACK INTO SERVICE

- Remove the waterproof adhesive tape from all the holes.
- Refit the intake hose.
- Refit and reconnect the battery.
- Remove the protection from the cylinder rods.
- Perform the daily service.
- Put the handbrake on and remove the axle stands.
- Empty and replace the fuel and replace the fuel filter.
- Refit and set the tension in the drive belts.
- Turn the engine over with the starter, to allow the oil pressure to rise.
- Reconnect the engine cut-off solenoid.
- Lubricate the vehicle completely.

⚠ CAUTION

Ensure the area is sufficiently ventilated before starting the vehicle.

- Start up the vehicle, following the safety instructions and regulations.
- Run all the jib's hydraulic movements, concentrating on the ends of travel for each cylinder.

1.6.5 PROTECTING THE ENGINE

- Fill the tank with fuel.
- Empty and replace the cooling liquid.
- Leave the engine running at idling speed for a few minutes, then switch off.
- Replace the engine oil and oil filter.
- Add the protective product to the engine oil.
- Run the engine for a short time so that the oil and cooling liquid circulate inside.
- Disconnect the battery and store it in a safe place away from the cold, after charging it to a maximum.
- Remove the injectors and spray the protective product into each cylinder for two seconds with the piston in low neutral position.
- Turn the crankshaft once slowly and refit the injectors (see engine REPAIR MANUAL).

- Remove the intake hose from the manifold or turbocharger and spray the protective product into the manifold or turbocharger.
- Cap the intake manifold or turbocharger hole with waterproof adhesive tape.
- Remove the exhaust pipe and spray the protective product into the exhaust manifold or turbocharger.
- Refit the exhaust pipe and block the outlet with waterproof adhesive tape.

The spray time is noted on the product packaging and must be increased by 50 % for turbo engines.

- Open the filler plug, spray the protective product around the rocker arm shaft and refit the filler plug.
- Cap the fuel tank using waterproof adhesive tape.
- Remove the drive belts and store them in a safe place.
- Disconnect the engine cut-off solenoid on the injection pump and carefully insulate the connection.

1.7. HANDLING INSTRUCTIONS

1.7.1 HANDLING INSTRUCTIONS

- Check the conformity of the attachments with the calibration of the safety system of the machine.
- Check the proper functioning of the vehicle attachments.
- Do not perform operations that exceed the capabilities of the vehicle or attachment.
- It is forbidden to increase the counterweight value whatever the artifice used.
- It is strictly forbidden to transport or lift people with the vehicle, unless it is equipped for this purpose and provided with the certificate of conformity relating to lifting people.
- Avoid making long journeys in reverse.
- Carry out slow and progressive maneuvers to raise and lower the telescopic boom (even without load).
- Check that the attachment is correctly installed and locked on its holder.
- Verify that you have set the safety system in the cabin in accordance with the attachment fitted.
- Respect the limits of the attachment load chart.
- Check that the pallets, crates, etc. are in good condition and suitable for the load to be lifted.
- Position the forks perpendicular to the load to be lifted, taking into account the position of the center of gravity of the load.
- Never lift a load with only one fork.
- Never lift a sling load with a single fork or with a forks carriage.
- If not used, place the attachment horizontally on the ground (prop up unstable attachments correctly).
- Check that the hydraulic quick couplings of the attachment circuit are clean and protected.

⚠ WARNING

Before each change of hydraulic attachment, in order to avoid deterioration of the hydraulic quick couplings it is necessary to:

Wait about 1 minute to release the pressure in the hydraulic circuit.

- Verify that there is adequate lighting.
- When lifting a load, be careful that nothing or nobody hinders the correct execution of the operation and avoid any false maneuvers.
- In the case of work carried out near overhead power lines, make sure that the safety distance between the working area of the vehicle and the power line is sufficient.

⚠ DANGER

You risk being electrocuted or seriously injured if you work or park the vehicle too close to electrical cables.

We strongly advise you to make sure that the safety rules applied on the site comply with local regulations in force regarding all types of work carried out in the vicinity of power lines.

- Forbid anyone to approach the maneuvering area of the vehicle or to pass under a load.

⚠ DANGER

For use on sloping ground, before raising the boom, check that the ground is level.

Vehicles equipped with level corrector and/or stabilizers can operate on transverse slopes, provided that this inclination is corrected.

- Check that the scaffolding, the loading surface or the stack can support the load.
- Make sure of the stability and compactness of the ground before placing the load.
- Movements on longitudinal slopes:
  - Advance and brake smoothly.

- Unladen movement: The forks or attachment facing downstream.

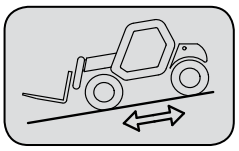


Figure 4:

- Laden movement: The forks or attachment facing upstream.

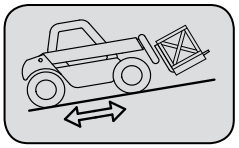


Figure 5:

⚠ DANGER

Always observe the safety rules, always carry loads balanced and correctly arranged to avoid any risk of overturning.

1. Fully insert the forks under the load and move it to transport position (forks 300 mm from the ground, boom fully retracted and forks tilted back).
2. For obvious reasons of vehicle stability and good visibility, move the vehicle only when the boom is in the transport position.
3. Only operate the vehicle with the boom raised in exceptional cases; then operate with extreme caution, at very low speed and braking very gently.
4. Make sure you always have sufficient visibility, possibly be guided by another person.
5. Keep the load stable when the vehicle is in motion.
6. Never advance too fast or brake sharply with a load.
7. During handling operations, drive at reduced speed.
8. Monitor the load, especially when cornering, especially if it is bulky.
9. Sling unstable loads.
10. Handle loads carefully, at low speed and without jerks, especially when you take them to great heights and with considerable overhang.
11. In case of strong wind or storm, do not carry out movements that are potentially dangerous for the stability of the vehicle and the load, do not change direction abruptly and at high speed.
12. Use the parking brake to place or lift a difficult load or on sloping ground.
13. Never leave the vehicle stationary with a lifted load.
14. Do not leave the vehicle, laden or empty, with the parking brake applied on a slope greater than 15%.
15. Always have good visibility of the route, both in direct vision and in indirect vision, i.e. with panoramic rear view mirrors, to check for the possible presence of people, animals, holes, obstacles, slope variations, etc.
16. Visibility may be reduced on the right side when the boom is raised; therefore make sure that the route is well visible before raising the boom and before maneuvering.
17. If forward visibility is insufficient due to the bulk of the load, drive in reverse. This maneuver has an exceptional character and can only be carried out for short distances.
18. Make sure you have good visibility (clean windows, sufficient lighting, adjusted rear view mirror, etc.).
19. The signaling systems and lights of the vehicle must be suitable for the conditions of use. The standard illumination of the machine is not sufficient for use in low-light environments or for use at night.

⚠ DANGER

If the vehicle overturns, do not attempt to get out of the cabin during the accident.

Always drive with seat belts fastened. Being seated in the cabin is your best protection.

1.8. HANDLING A LOAD

1.8.1 TAKING UP A LOAD ON THE GROUND

- Approach the vehicle perpendicular to the load, with the jib retracted and the forks in a horizontal position.

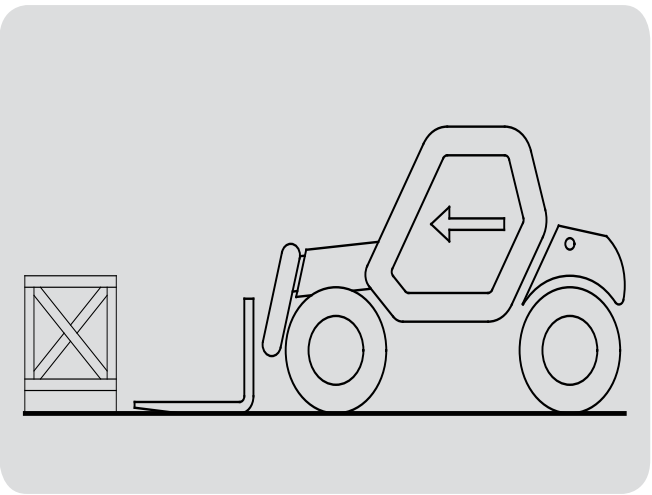


Figure 6:

⚠ WARNING

Manual fork adjustment

Beware of the risks of trapping or squashing limbs when manually adjusting the forks.

Always maintain an equal distance between the forks and the centerline of the board to ensure perfect load stability.

- Adjust the fork spread and centring relative to the load to ensure stability (optional solutions exist, consult your dealer).
- Never lift a load with a single fork.

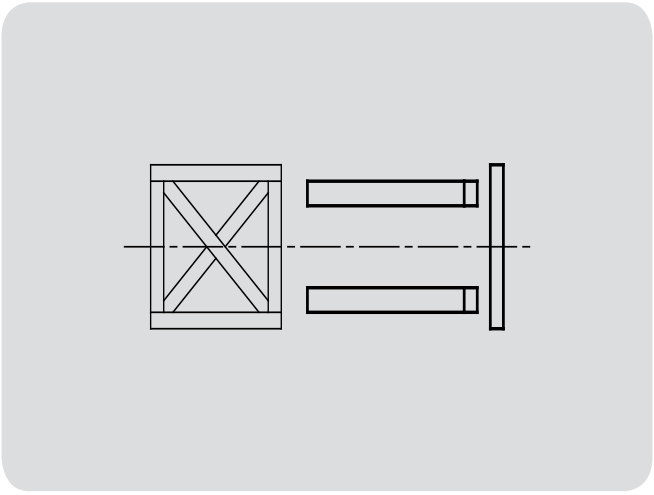


Figure 7:

Move the vehicle forward slowly (1) and insert the forks under the load as far as they will go. If necessary, slightly lift the jib (2) while taking up the load.

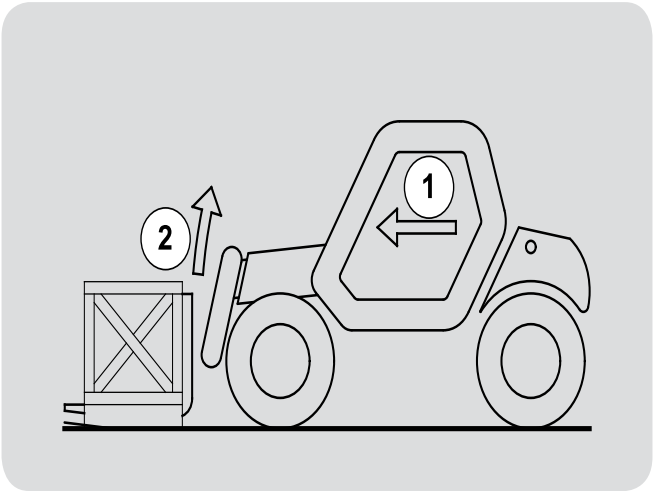


Figure 8:

- Apply the parking brake and place the reverse lever in idleoff.
- Slightly raise the load (1), tilt the forks carriage (2) back into transport position.

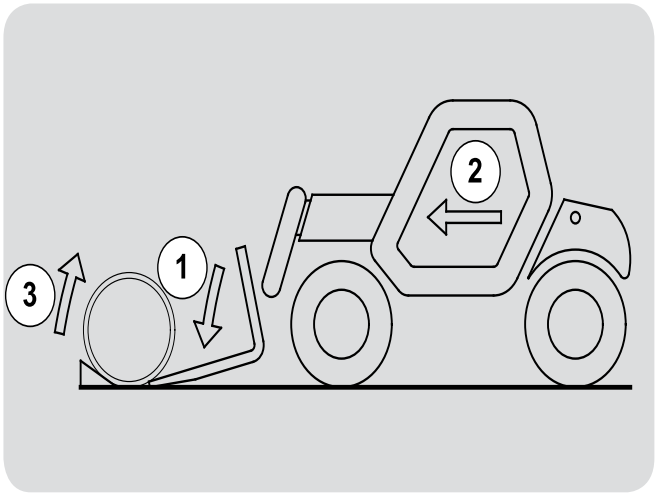


Figure 9:

- Bring the load into the transport position.

⚠ WARNING

Load stability

Tilt the load far enough backwards to ensure stability (loss of load on braking or going downhill), but be careful not to change the balance.

1.8.2 TAKING UP A HIGH LOAD ON TYRES

⚠ WARNING

You must not raise the jib if you have not checked the transverse attitude of the vehicle.

⚠ WARNING

Load lifting

It is strictly forbidden to pick up a load unless the vehicle is positioned on a flat surface.

REMINDER: Make sure that the following operations can be performed with good visibility.

TAKING UP A HIGH LOAD ON TYRES

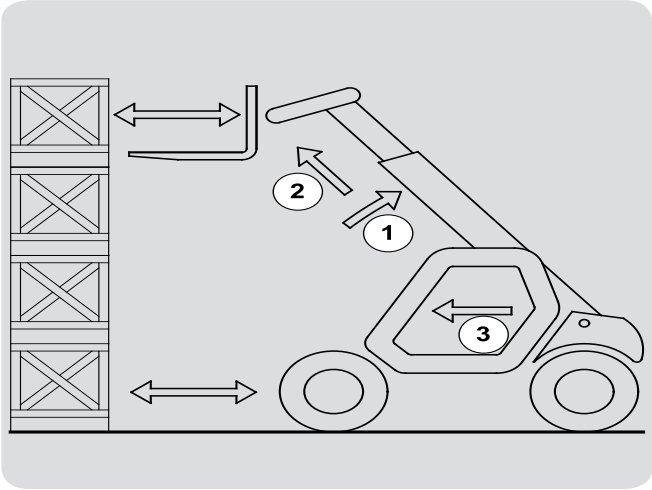


Figure 10:

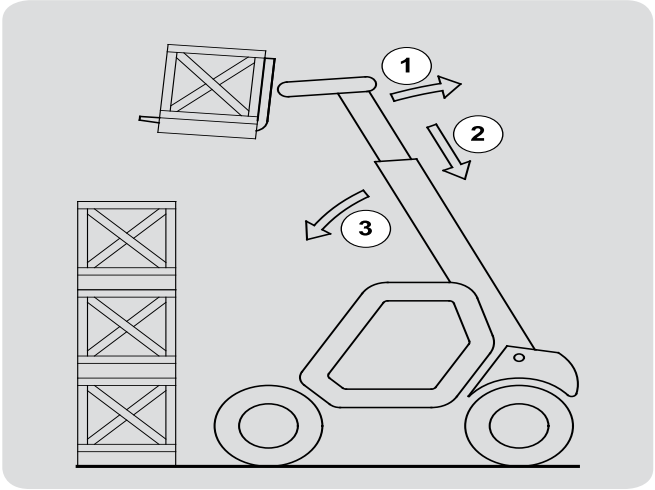


Figure 13:

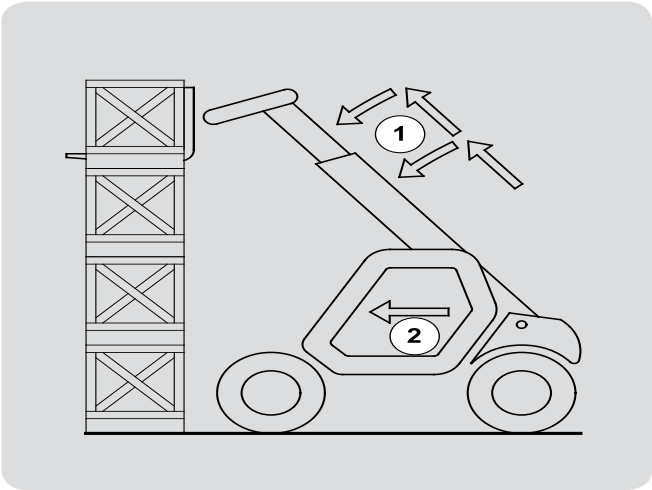


Figure 11:

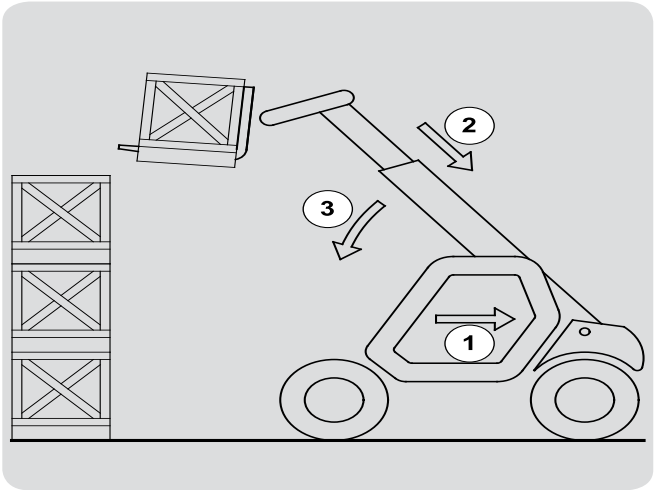


Figure 14:

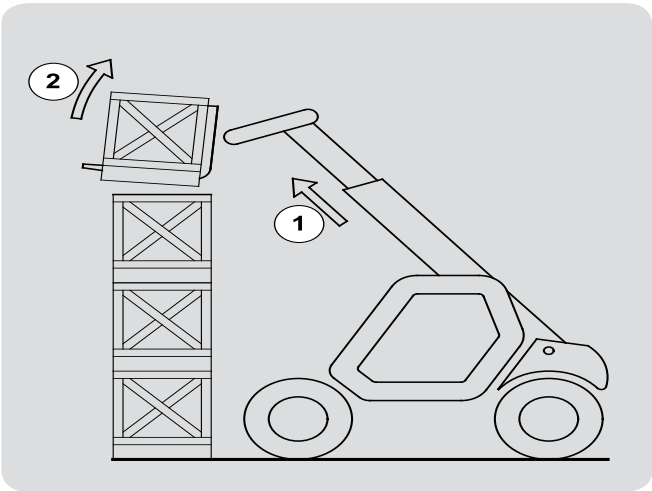


Figure 12:

- Ensure that the forks will easily pass under the load.
- Lift and extend the jib (1) (2) until the forks are level with the load, moving the vehicle (3) forward if necessary, moving very slowly and carefully.

⚠ WARNING

Always remember to keep the distance necessary for inserting the forks under the load, between the stack and the vehicle and use the shortest possible length of jib.

- Insert the forks under the load as far as they will go by alternately extending and lowering the jib (1) or, if necessary, moving the vehicle forward (2). Apply the handbrake and place the forward/reverse selector in neutral.
- Slightly raise the load (1) and tilt the carriage (2) backwards to stabilize the load.

⚠ WARNING

Load instability

Tilt the load sufficiently backwards to ensure its stability (loss of load during braking), but be careful not to change the balance.

- Monitor the longitudinal stability limiter and warning device. If it is overloaded, set the load back down in the place from which it was taken.
- If possible lower the load without shifting the vehicle. Lift the jib (1) to release the load, retract (2) and lower the jib (3) to bring the load into the transport position.
- If this is not possible, back up the vehicle (1), manoeuvring very gently and carefully to release the load. Retract (2) and lower the jib (3) to bring the load into the transport position.

1.8.3 LAYING A HIGH LOAD ON TYRES

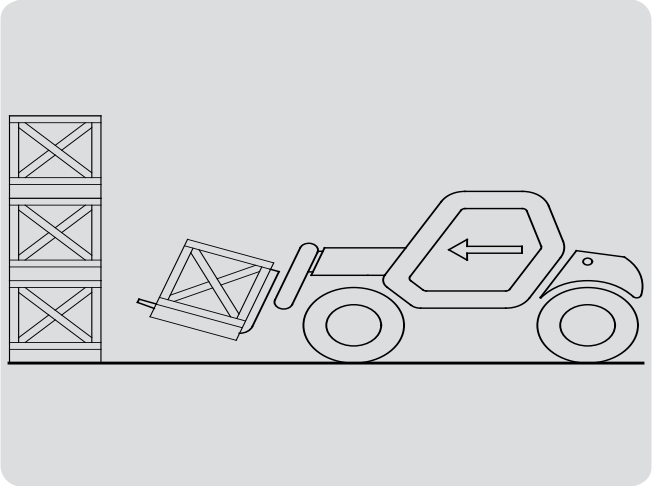
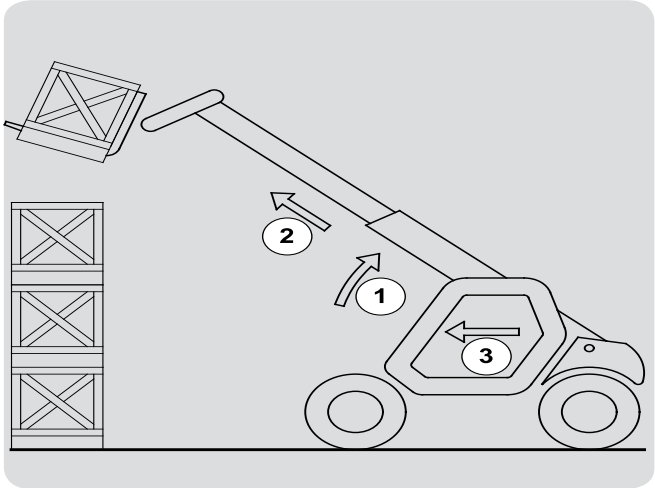


Figure 15:



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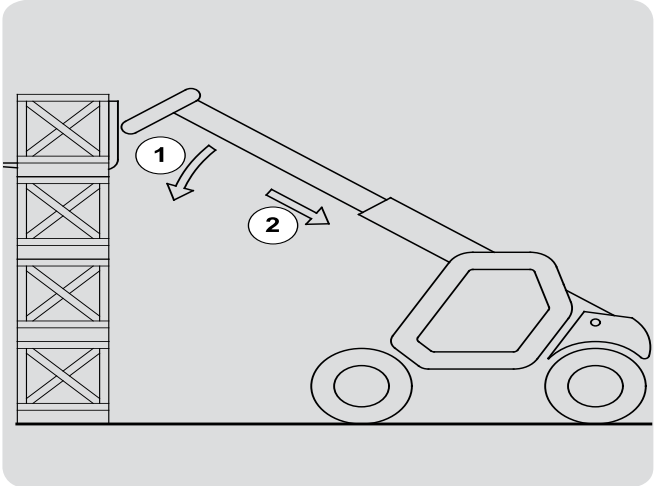

Figure 17:

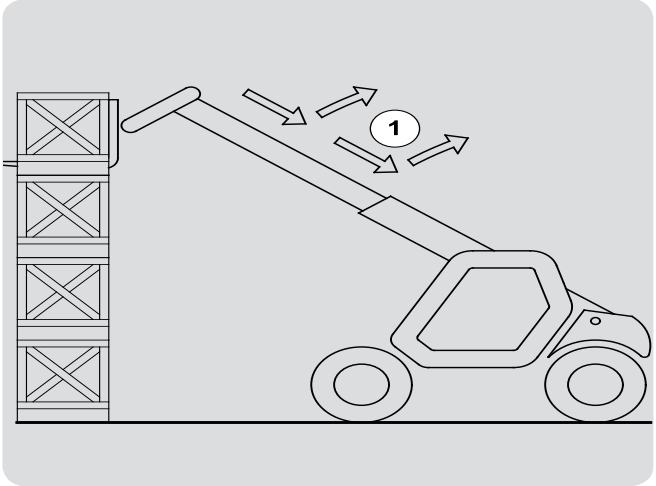

Figure 18:

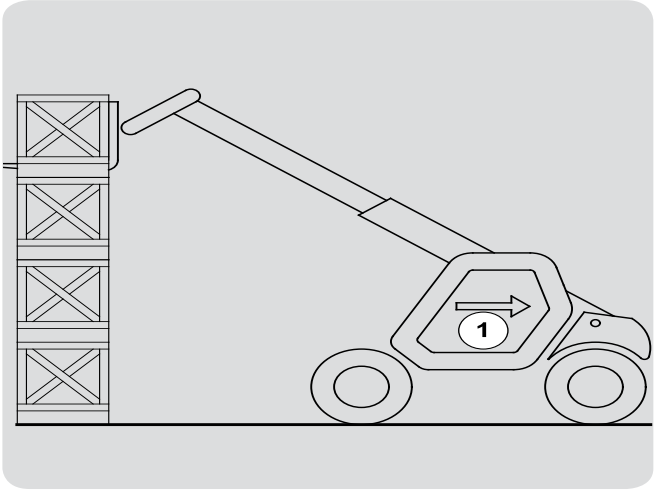

Figure 19:

- Approach the load in the transport position in front of the stack.
- Apply the parking brake and place the forward/ reverse selector in neutral.
- Raise and extend the jib (1) (2) until the load is above the stack, while monitoring the longitudinal stability limiter and warning device. If necessary, move the vehicle (3) forward, driving very slowly and carefully.
- Place the load in a horizontal position and lay it down on the pile by lowering and retracting the jib (1) (2) in order to position the load correctly.
- If possible, release the fork by alternately retracting and raising the jib (1). Then set the forks into transport position.
- If this is not possible, reverse the vehicle (1) very slowly and carefully to release the forks. Then set them into transport position.

1.8.4 TAKING UP A LOAD WITHOUT PALLET

1. Tilt the carriage (1) forwards and move the vehicle slowly forwards (2), to insert the fork under the load (block the load if necessary)
2. Continue to move the vehicle forwards (2) tilting the carriage (3) backwards to position the load on the forks and check the load's longitudinal and lateral stability.

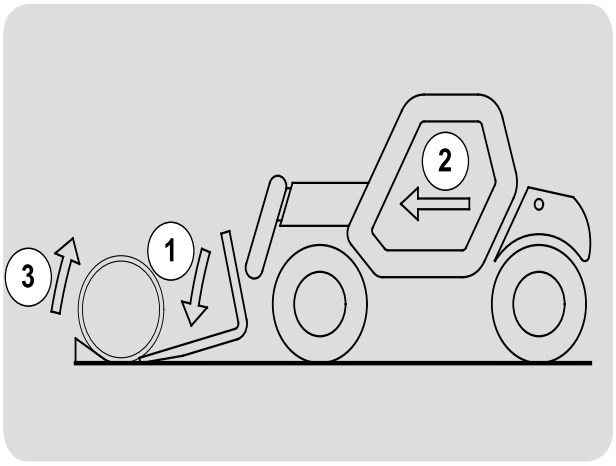

Figure 20:

1.8.5 LOAD STATUS INDICATOR

1. Always observe the load status indicator during handling.

1.8.6 LONGITUDINAL STABILITY LIMITER AND WARNING DEVICE

This device gives an indication of the longitudinal stability of the vehicle, and limits hydraulic movements in order to ensure this stability, at least under the following operating conditions:

- when the vehicle is at a standstill,
- when the vehicle is on firm, stable and consolidated ground,
- when the vehicle is performing handling and placing operations.
- Move the jib very carefully when approaching the authorized load limit.
- Always watch this device during handling operations.
- In the event that “AGGRAVATING” hydraulic movements are cut-off, only perform de-aggravating hydraulic movements in the following order: if necessary, raise the jib (1), retract the jib as far as possible (2) and lower the jib (3) to set down the load.

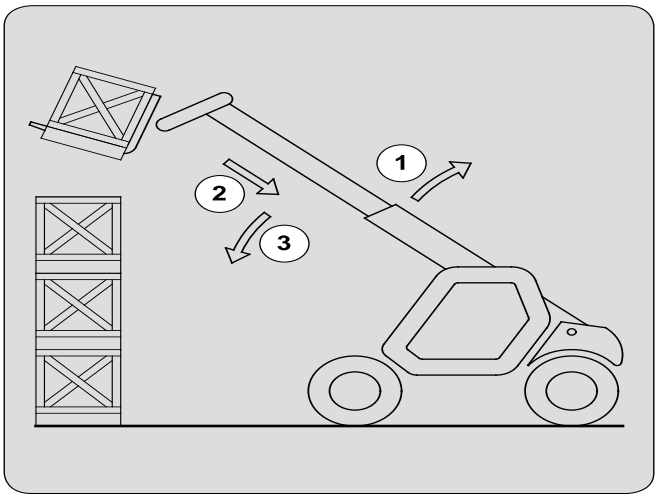

Figure 21:

⚠ WARNING

The instrument reading may be erroneous when the steering is at full lock or the rear axle is oscillated to its maximum extent. Before lifting a load, make sure that the vehicle is not in either of these situations. It is forbidden to move a load heavier than the effective capacity defined on the vehicle load chart. For loads with a moving centre of gravity (e.g. liquids), take account of the variations in the centre of gravity in order to determine the load to be handled and be vigilant and take extra care to limit these variations as far as possible.

C1/C2 - LONGITUDINAL STABILITY INDICATOR

(Depending on the model of vehicle)

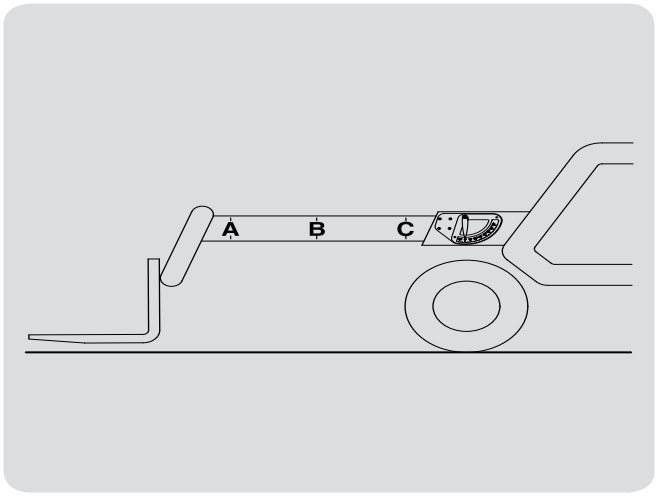

Figure 22:

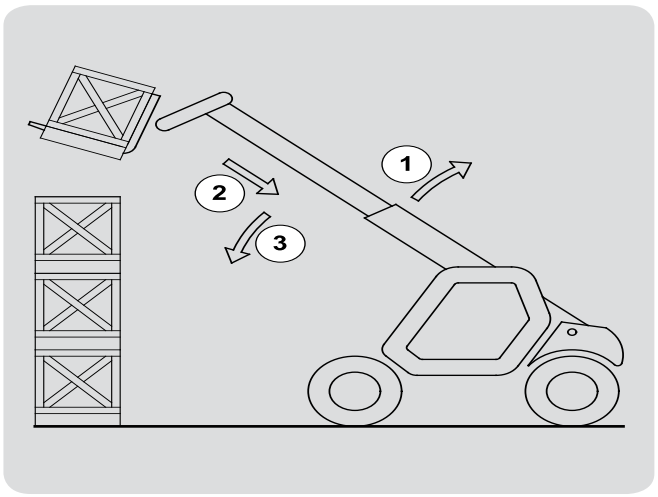

Figure 23:

- Always watch this device during handling operations.
- Letters and angle indicator allow to read and respect load capacities of the vehicle according to the load chart.
- When the device is in limit stability, it is forbidden to perform so-called «AGGRAVATING» movements, these being:
  - A - Extending the jib.
  - B - Lowering the jib.
- Perform movements to relieve aggravation in the following order: if necessary, raise the jib (1), retract the jib as far as possible (2) and lower the jib (3) to release the load.

1.8.7 WEIGHT OF LOAD AND CENTRE OF GRAVITY

- Before taking up a load, you must know its mass and its centre of gravity.
- The load chart for your vehicle is valid for a load in which the longitudinal position of the centre of gravity is 500 mm from the base of the forks. For a higher centre of gravity, contact your dealer.
- For irregular loads, determine the transverse centre of gravity before any movement and set it in the longitudinal axis of the vehicle.

⚠ WARNING

It is forbidden to move a load heavier than the effective capacity defined on the vehicle load chart. For loads with a moving centre of gravity (e.g. liquids), take account of the variations in the centre of gravity in order to determine the load to be handled and be vigilant and take extra care to limit these variations as far as possible.

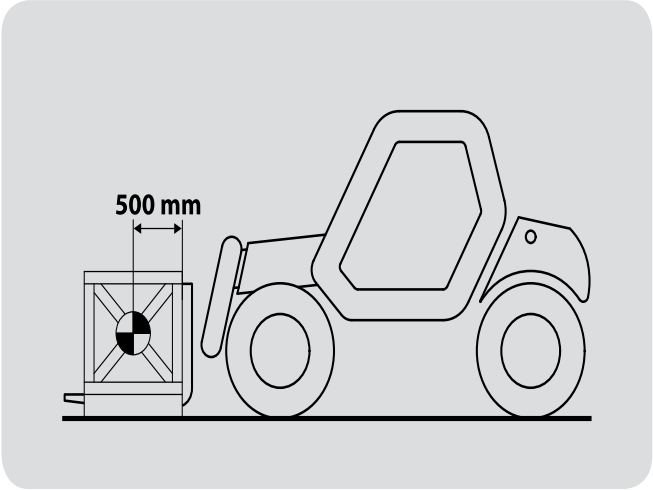

Figure 24:

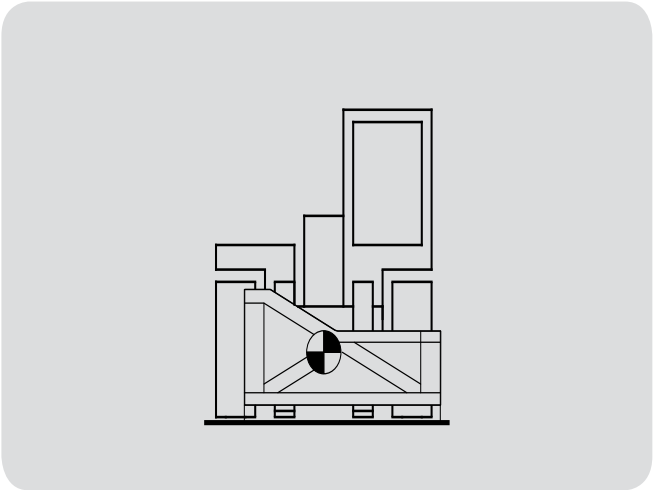

Figure 25:

1.8.8 TAKING UP AND LAYING DOWN A SUSPENDED LOAD

⚠ WARNING

Failure to follow the above instructions may lead the vehicle to loose stability and overturn. MUST be used with a vehicle equipped with an operational hydraulic movement cut-out device.

CONDITIONS OF USE

- The length of the sling or the chain shall be as short as possible to limit swinging of the load.
- Lift the load vertically along its axis, never by pulling sideways or lengthways.

HANDLING WITHOUT MOVING THE vehicle

- Whether on stabilizers or on tyres, the lateral attitude must not exceed 1 % and the longitudinal attitude must not exceed 5%, the bubble of the level must be held at "0".
- Ensure that the wind speed is not higher than 10 m/s.
- Ensure that there is no one between the load and the vehicle.

1.8.9 TRAVELLING WITH A SUSPENDED LOAD

- Before moving, inspect the terrain in order to avoid excessive slopes and cross-falls, bumps and potholes, or soft ground.
- Ensure that the wind speed is not higher than 36 km/h (22.3 mph).
- The vehicle must not travel at more than 0,4 m/s [1.3 ft/s](1,5 km/h - 0.9 mph, i.e., one quarter walking speed).
- Drive and stop the vehicle gently and smoothly to minimise swinging of the load.
- Carry the load a few centimeters above the ground (max. 300 mm - 11.8 in) the shortest possible jib length. Do not exceed the offset indicated on the load chart. If the load begins to swing excessively, do not hesitate to stop and lower the jib to set down the load.
- Before moving the vehicle, check the longitudinal stability limiter and warning device, only the green LEDs and possible the yellow LEDs should be lit.
- During transport, the vehicle operator must be assisted by a person on the ground (standing a minimum of 3 m from the load), who will limit swinging of the load using a bar or a rope. Ensure that this person is always clearly in view.
- The lateral attitude must not exceed 5 %, the bubble in the level must be kept between the two "MAX" marks.
- The longitudinal attitude must not exceed 15 %, with the load facing uphill, and 10%, with the load facing downhill.
- The jib angle must not exceed 45°.
- If the first red LED of longitudinal stability limiter and warning device comes on while travelling, gently bring the vehicle to a halt and stabilise the load. Retract the telescope to reduce the offset of the load.

1.8.10 TAKING UP AND LAYING A HIGH LOAD ON STABILIZERS

Depending on the model of vehicle

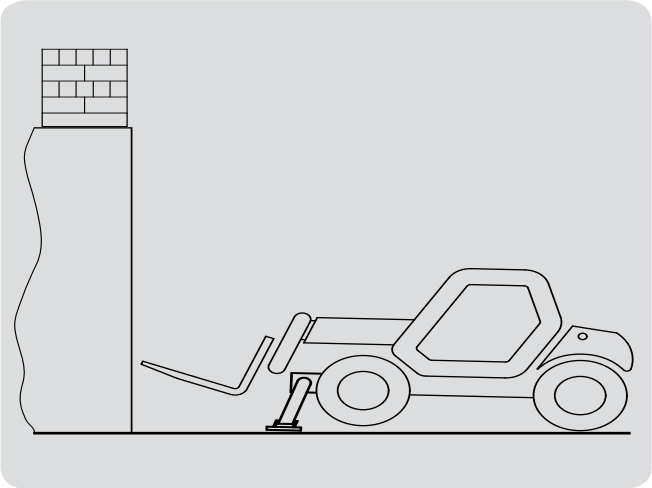

Figure 26:

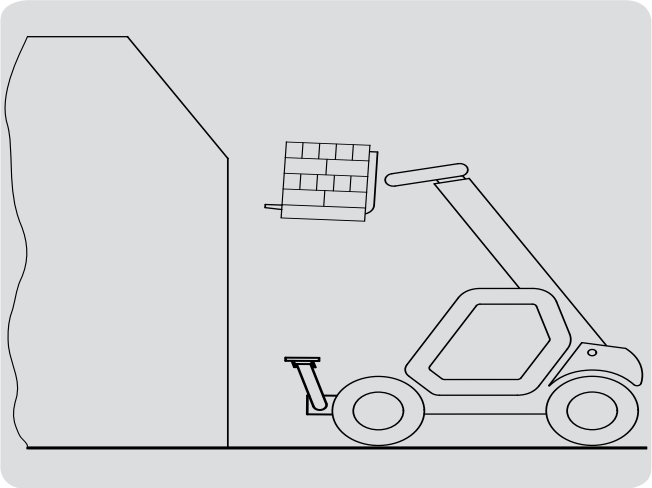

Figure 27:

⚠ CAUTION

You must not raise the jib if you have not checked the transverse attitude of the vehicle.

REMINDER: Make sure that the following operations can be performed with good visibility.

The stabilizers are used to optimize the vehicle's lifting performances. POSITION THE STABILIZERS WITH THE FORKS IN TRANSPORT POSITION (UNLADEN AND LADEN)

- Set the forks in transport position in front of the elevation.
- Stay far enough away to have room for the jib to be raised.
- Apply the parking brake and place the forward/ reverse selector in neutral.
- Set the two stabilizers on the ground and lift the two front wheels of the vehicle, while maintaining its transverse stability.

RAISE THE STABILIZERS WITH THE FORKS IN TRANSPORT POSITION (UNLADEN AND LADEN)

- Raise both stabilizers fully and at the same time.

LOWERING OF STABILIZERS WITH JIB UP (UNLADEN AND LADEN).

⚠ CAUTION

This operation must be exceptional and performed with great care.

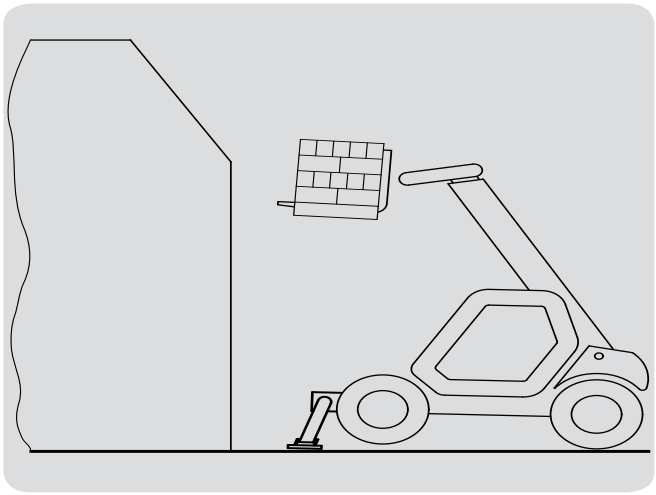

Figure 28:

- Raise the jib and retract the telescopes completely.
- Set the vehicle in position in front of the elevation moving very slowly and carefully.
- Apply the parking brake and place the forward/ reverse selector in neutral.
- Move the stabilizers very slowly and gradually as soon as they are close to the ground or in contact with it.
- Lower the two stabilizers and lift the two front wheels of the vehicle. During this operation, transverse attitude must be permanently maintained: the bubble in the level must be kept between the two lines.

SETTING THE STABILIZERS WITH THE JIB UP (UNLADEN AND LADEN)

⚠ CAUTION

This operation must be exceptional and performed with great care.

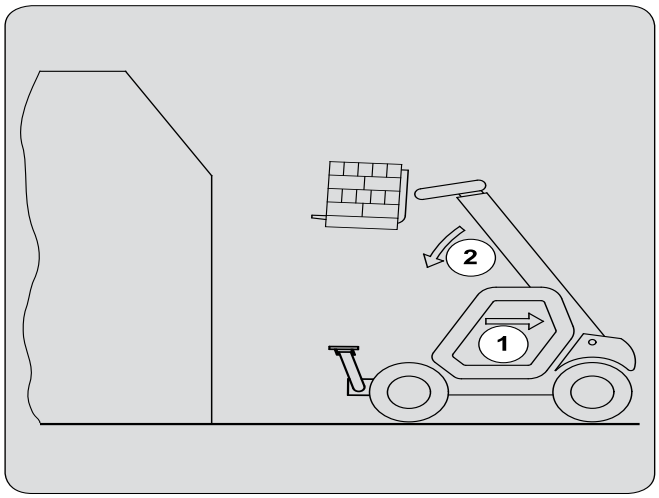

Figure 29:

- Keep the jib up and retract the telescopes completely.
- Move the stabilizers very slowly and gradually as soon as they are in contact with the ground and when they leave the ground. During this operation, the transverse attitude must be permanently maintained: the bubble in the level must be kept between the two lines.
- Raise both stabilizers completely.
- Release the parking brake and reverse the vehicle (1) very slowly and carefully, to release it and lower the forks (2) into transport position.

TAKING UP A HIGH LOAD ON STABILIZERS

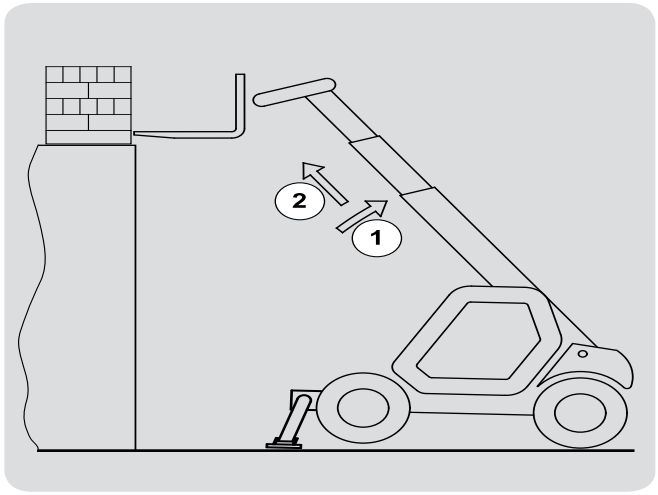

Figure 30:

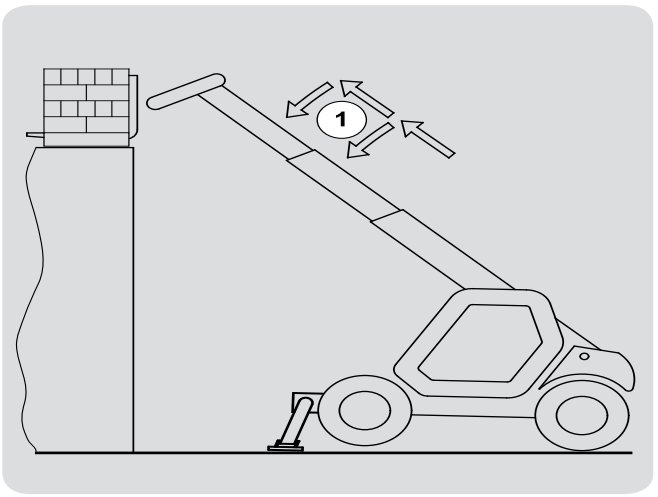

Figure 31:

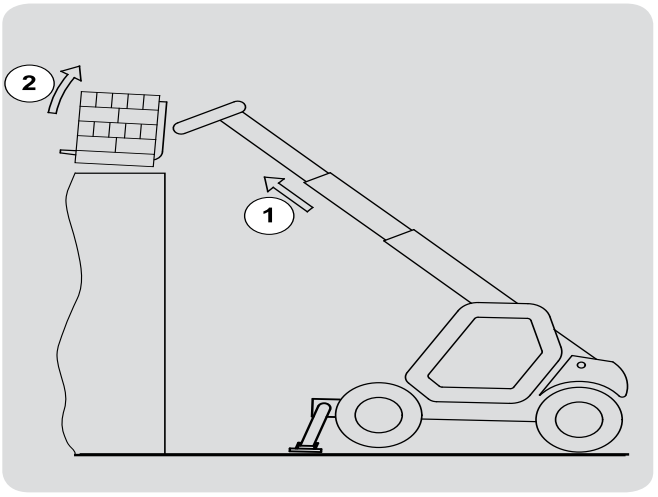

Figure 32:

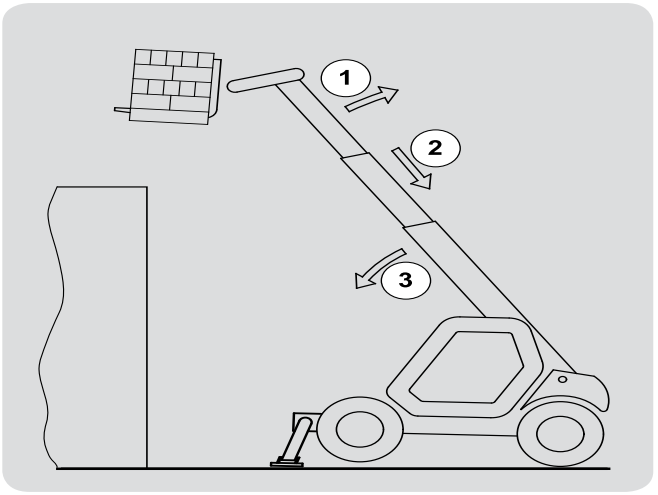

Figure 33:

- Ensure that the forks will easily pass under the load.
- Check the position of the vehicle with respect to the load and make a test run, if necessary, without taking the load.

- Raise and extend the jib (1) (2) until the forks are at the level of the load.
- Insert the forks under the load as far as they will go by alternately extending and lowering the jib (1).
- Lift the load slightly (1) and tilt the carriage (2) backwards to stabilise the load.
- Monitor the longitudinal stability limiter and warning device. If it is overloaded, set the load back down in the place from which it was taken.
- If possible lower the load without moving the vehicle. Raise the jib (1) to release the load, retract (2) and lower the jib (3) to set the load into transport position.

LAYING A HIGH LOAD ON STABILIZERS

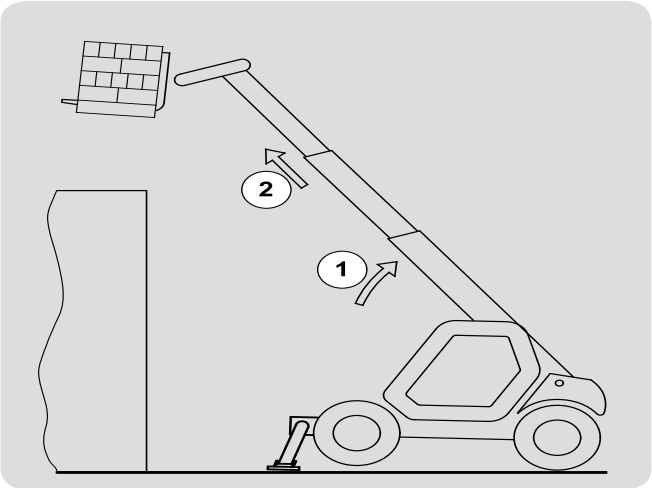

Figure 34:

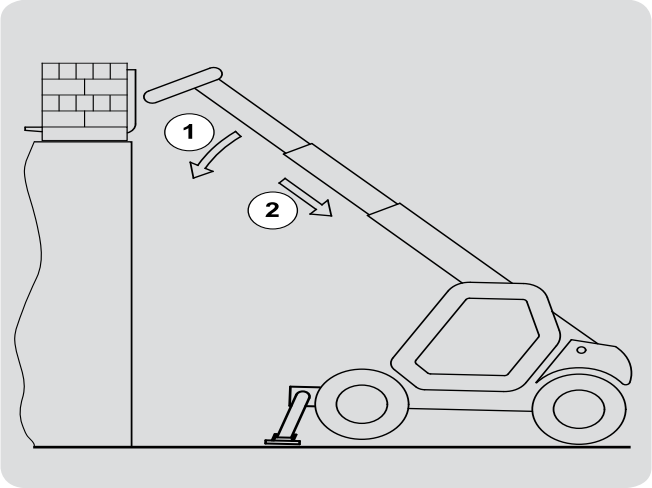

Figure 35:

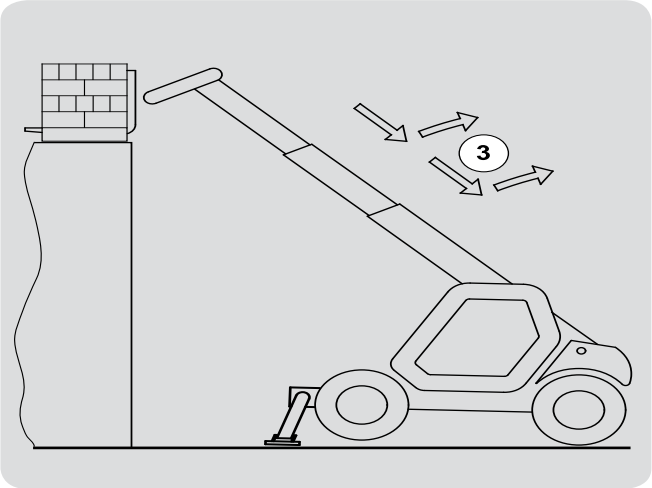

Figure 36:

- Raise and extend the jib (1) (2) until the load is above the elevation, while monitoring the longitudinal stability limiter and warning device.
- Position the load horizontally and release it by lowering and retracting the jib (1) (2)to position the load correctly.
- Free the forks by alternating retracting and raising the jib (3).
- If possible, set the jib in transport position without moving the vehicle.

1.9. PLATFORM OPERATING INSTRUCTIONS

1.9.1 AUTHORISATION FOR USE

- Operation of the platform requires further authorisation in addition to that of the vehicle.

1.9.2 VEHICLE SUITABILITY FOR USE

- MANITOU has ensured that this platform is suitable for use under the normal operating conditions defined in this operator's manual, with a STATIC test coefficient OF 1,25 and a DYNAMIC test coefficient OF 1,1, as specified in harmonised standard EN 280 for "mobile elevating work platforms".
- Before commissioning, the company manager must make sure that platform is appropriate for the work to be done, and perform certain tests (in accordance with current legislation).

1.9.3 PRECAUTIONS WHEN USING THE PLATFORM

- Wear suitable clothing when using the platform, avoid loosely-fitting garments.
- Never operate the platform when hands or feet are wet or soiled with greasy substances.
- Remain alert at all times when using the platform. Do not listen to the radio or music using headphones or earphones.
- For increased comfort, adopt the correct position at the platform's operator station.
- The platform's guard rail exempts the operator from wearing a safety harness under normal operating conditions. As a result, you are responsible for deciding whether to wear a safety harness.
- The control units must never in any event be used for any other than their intended purposes (e.g. climbing onto or down from the vehicle, portmanteau, etc.).
- Safety helmets must be worn.
- The operator must always be in the normal operator's position. It is prohibited to have arms or legs, or generally any part of the body, protruding from the basket.
- Ensure that any materials loaded onto the platform (pipes, cables, containers, etc.) cannot fall out. Do not pile these materials to the point where it is necessary to step over them.

1.9.4 PLATFORM OPERATING INSTRUCTIONS

For vehicles fitted with a PLATFORM

⚠ CAUTION

Installation of the platform on the vehicle is only possible if the shields "operating the platform" of the vehicle and the platform are identical.

1.9.5 USING THE PLATFORM

- However experienced they may be, operators must acquaint themselves with the emplacement and operation of all control instruments prior to operating the platform.
- Check before use that the platform has been correctly assembled and locked onto the vehicle.
- Check before operating the platform that the access gate has been properly locked.
- The platform should be operated in an area free of any obstructions or danger when it is lowered to the ground.
- The operator using the platform must be aided on the ground by a person with adequate training.
- You should stay within the limits set out in the platform load chart.
- The lateral stresses are limited pressure.
- It is strictly forbidden to hang a load from the platform or the vehicle jib without a specially designed attachment.
- The platform cannot be used as a crane or a lift for permanently transporting people or materials, nor as jacks or supports.
- The vehicle must not be moved with one (or more) person(s) in the platform.
- It is forbidden to transport people on the platform using the hydraulic controls in the vehicle's driver's cab (except in case of rescue).
- The operator must not climb onto to off the platform when it is not on ground level (jib retracted and in the down position).
- The platform must not be fitted with attachments that increase the unit's wind load.
- Do not use ladders or improvised structures in the platform to gain extra height.
- Do not climb onto the sides of the platform to gain extra height.

1.9.6 MAINTENANCE

⚠ CAUTION

Your platform must be periodically inspected to ensure its continued compliance. The inspection frequency is defined by the legislation applying in the country in which the platform is used. In France, a general periodic inspection every 6 months (order of 1 March 2004).

1.9.7 ENVIRONMENT

⚠ WARNING

It is forbidden to use the platform close to electricity cables. Maintain the specified safe distances.

Table 1.

RATED VOLTAGE	DISTANCE ABOVE GROUND OR FLOOR IN METRES
50 < U < 1000	2,30 M
1000 < U < 30000	2,50 M
30000 < U < 45000	2,60 M
45000 < U < 63000	2,80 M
63000 < U < 90000	3,00 M
90000 < U < 150000	3,40 M
150000 < U < 225000	4,00 M
225000 < U < 400000	5,30 M
400000 < U < 750000	7,90 M

⚠ WARNING

It is strictly forbidden to use the platform when the wind speed exceeds 45 km/h.

Table 2.

BEAUFORT scale (wind speed at a height of 10 m on a flat site)						
Force	**Type of wind**	**Speed (knots)**	**Speed (km/h)**	**Speed (m/s)**	**Effects on Land**	**Sea conditions**
0	Calm	0 - 1	0 - 1	<0,3	- Smoke rises vertically.	- Sea is like a mirror.
1	Light air	1 - 3	1 - 5	0,3 - 1,5	- Smoke indicates direction of wind.	- Ripples with appearance of scale, no foam crests.
2	Light breeze	4 - 6	6 - 11	1,6 - 3,3	- Wind felt on face, leaves rustle.	- Short wavelets, but pronounced.
3	Gentle breeze	7 - 10	12 - 19	3,4 - 5,4	- Leaves and small twigs in constant motion.	-Very small waves, crests begin to break.
4	Moderate breeze	11 - 16	20 - 28	5,5 - 7,9	- Wind raises dust and loose pieces of paper; small branches are moved.	- Small waves, becoming longer, numerous whitecaps.
5	Fresh breeze	17 - 21	29 - 38	8 - 10,7	- Small tees in leaf begin to sway.	- Wavelets form on inland waters; moderate waves, taking longer form.
6	Strong breeze	22 - 27	39 - 49	10,8 - 13,8 ,	- Large branches in motion, whistling heard in overhead wires, umbrella use becomes difficult.	- Larger waves forming, whitecaps everywhere some spray.

BEAUFORT scale (wind speed at a height of 10 m on a flat site)						
Force	***Type of wind***	***Speed (knots)***	***Speed (km/h)***	***Speed (m/s)***	***Effects on Land***	***Sea conditions***
7	Near gale	28 - 33	50 - 61	13,9 - 17,1	- Whole trees in motion, inconvenience felt when walking against the wind.	- Sea heaps up; white foam from breaking waves begins to be blown in streaks along the direction of the wind.
8	Gale	34 - 40	62 - 74	17,2 - 20,7	- Wind breaks twigs off trees; impedes progress.	- Moderately high waves of greater length; edges of crests begin to break into spindrift.
9	Strong gale	41 - 47	75 - 88	20,8 - 24,4	- Wind damages roofs (chimneys, slates, etc.).	- High waves, crests of waves begin to topple, streaks of foam; reduced visibility.
10	Storm	48 - 55	89 - 102	24,5 - 28,4	- Seldom experienced inland; trees uprooted; considerable structural damage occurs.	- Very high waves; white streaks of foam; reduced visibility.
11	Violent storm	56 - 63	103 - 117	28,5 - 32,6	-Very rare, widespread damage.	- Exceptionally high waves able to hide medium sized ships from view, reduced visibility.
12	Hurricane	64 +	118 +	32,7 +	- Devastating damage.	- Sea completely white; air filled with foam and spray, very reduced visibility.

1.10. RADIO CONTROL OPERATING INSTRUCTIONS

1.10.1 SAFETY FUNCTIONS

Radio remote controls are equipped with some functions that provide high safety levels, in order to safeguard the safety of people and property.

STOP FUNCTION

The stop function brings the machine to a safe state every time it is necessary to stop it due to a potentially hazardous situation. This function is either voluntarily enabled by the user (active stop), as appropriate, or it cuts in automatically and autonomously (passive stop).

ACTIVE STOP

Active stop is a function enabled by the STOP pushbutton.

The transmitting unit sends to the receiving unit a command that immediately stops the machine. When the STOP pushbutton is pressed, the machine stops in shorter time than when passive stop cuts in.

PASSIVE STOP

Passive stop is a function that cuts in when a fault occurs during operation. When the radio link is incorrect or interrupted, the receiving unit autonomously stops the radio remote control.

Protection against unintended movements from the standstill position (UMFS).

This safety function protects the system “machine +radio remote control” from unintended movements, namely machine movements not activated intentionally by the user, but resulting from possible electrical and mechanical failure of the radio remote control.

Such safety function checks the neutral (rest) position of the actuators that control the machine’s movements. Each time one of those actuators is operated, the transmitting unit sends both the movement command and the “SAFETY” command. Depending on the specific application, outputs related to these commands are wired in series; alternatively the SAFETY command’s outputs drive the safety device provided on the machine.

1.10.2 SAFETY

Depending on the application, the outputs relating to these commands are wired in series or the outputs of the SAFETY command pilot the safety device provided on the machine.

⚠ WARNING

In addition to all the indications imposed by the manufacturer of the machine, by the installer of the remote control and by the person in charge of safety in the work area, an operator must always respect the following warnings:

The transmitter unit must be used in an easy and comfortable way, preventing it from falling accidentally. The strap supplied with the remote control serves this purpose.

Put yourself in a position that allows direct control of the remote controlled machine and of the movements of the load, as well as in a position that guarantees its safety conditions with respect to other operations and/or activities and/or processes that take place in the workplace .

Never start up or use the transmitter unit in work situations in which you may lose your balance or trip.

Always check the correct mechanical functioning of the STOP button. If it is impossible or difficult to operate this button, do not use the remote control.

Never start the transmitter unit except to start working: improper use could cause dangerous situations.

Never start or operate the transmitter unit in closed places, out of sight or out of the range of action typical of the radio control: even in these cases it is possible to create a radio connection with the risk of making the remote controlled machine execute unwanted commands.

During normal operation, follow all the movements of the machine and of the load by direct visual control while remaining within the operating range of the remote control.

Pay attention to visual and acoustic warnings and signals and take all precautions and actions necessary to prevent the movement of the remote controlled machine from creating dangerous situations for people and/or things.

Pay attention to the entire work area and intervene immediately by pressing the STOP button when a dangerous situation arises.

Avoid touching the metal part of the receiving unit as it could reach high and potentially dangerous temperatures.

In case of malfunction, shut down the "machine + remote control" system until the problem is completely eliminated.

After using the remote control, turn off the transmitter unit when suspending or temporarily interrupting work, avoiding leaving the load suspended (even when replacing the discharged battery).

Never leave the transmitter unit unattended with the S-KEY inserted.

Always store the S-KEY in a safe place whenever it is removed from the transmitter unit.

If this key is lost, it is impossible to operate the remote control as the transmitting unit needs the address stored in the key to work with the relative receiving unit.

1.10.3 REMOTE CONTROL LIFE CYCLE

To ensure safe and long-lasting use of the remote control, it is necessary to carefully follow the instructions relating to each phase of the product's life:

- transport: a remote control must be transported and kept in its original packaging until it is installed on the machine.
- installation: the installation and testing of the remote control must be carried out exclusively by qualified personnel, possessing the necessary technical knowledge to carry out these operations and qualified according to the provisions of the country in which the assembly is carried out.

Only a correct installation can ensure a safe use of the remote control.

Usage:

a radio remote control must be used by qualified and adequately trained personnel.

Radio remote control maintenance.

The following instructions provide information to safely carry out routine and extraordinary maintenance operations on the remote control:

- routine maintenance is the operation or set of operations necessary to maintain the normal conditions of use of the remote control through set-up, verification, scheduled replacement of the parts, which are made necessary by normal use of the remote control.
- Extraordinary maintenance is the operation or set of repair operations necessary for breakdowns, breakages or malfunctions of the remote control, which have the purpose of restoring the original conditions of use and operation.

Before calling in the service technicians of the machine manufacturer, it is advisable:

- to have read and understood this manual in all its parts, checking that all the instructions contained therein have been correctly carried out
- to have followed the instructions to search for possible malfunctions and their causes.

Any faults can only be repaired by authorized personnel, contact the MANITOU assistance service.

To make a faster and more effective intervention possible, the data for a correct and complete identification of the remote control must be communicated:

1. serial number (S/N) of the remote control and the TU ID (identification number of the transmitter unit)
2. date of purchase (shown on the certificate of warranty)
3. anomaly found
4. address and telephone number of the place where it is used

All remote control set-up and maintenance interventions must be checked and recorded by the machine maintenance manager.

In case of breakdown, emergency, or damaged parts, the "machine + remote control" system must be put out of service until the problem is completely eliminated.

Before any maintenance operation, remove the transmitter unit battery and the receiver unit power supply.

After each maintenance operation, always check that the commands sent by the transmitting unit only activate the planned maneuvers.

1.10.4 GENERAL OPERATING INSTRUCTIONS

STARTING THE REMOTE CONTROL

The start-up of the remote control consists in establishing the radio connection between the transmitter and receiver units. To achieve this, it is necessary:

- to power the receiving unit respecting the voltage limits indicated in the technical data. The POWER LED lights up,
- insert a fully charged battery in the transmitter unit,
- insert the S-KEY in the transmitter unit
- press the START button on the transmitter unit until the POWER LED on the receiver unit and the green LED on the transmitter unit start flashing slowly.

ACTIVATION OF COMMANDS

With the remote control started, it is possible to operate the joysticks, buttons and selectors relating to the command to be carried out.

To know the correspondence between the actuators and the operations of the machine, the operator must be adequately trained regarding the symbols present on the panel of the transmitting unit.

With the remote control started, it is possible to operate the joysticks, buttons and selectors relating to the command to be carried out.

To know the correspondence between the actuators and the operations of the machine, the operator must be adequately trained regarding the symbols present on the panel of the transmitting unit.

DATA FEEDBACK FUNCTION

The Data Feedback function makes the information and/or signals regarding the machine he is controlling available to the operator.

During normal operation of the remote control, pay attention to the indications displayed and signaled by the display or by the LEDs: they are an aid in assessing the operating situation in which the machine is located.

When operating and controlling the machine, consider that the remote control does not intervene autonomously in the potential danger situations displayed and signaled.

OPERATION WITH DISPLAY

If there is a display in the transmitting unit, the signaling icons, the values of the measurements carried out in the machine and their descriptions can be displayed.

OPERATION WITH LEDs

If there are LEDs in the transmitter unit, when they turn on, it indicates particular conditions of the machine.

Interruption of the radio connection.

When the radio connection is incorrect or interrupted for a certain time, the passive stopping function intervenes.

The green LED of the transmitter unit changes from slow to fast flashing.

The POWER LED of the receiving unit changes from flashing to steady on.

To start the remote control, press the START button.

Automatic switching off of the transmitter unit.

The automatic switching off of the transmitting unit occurs when:

- the battery is flat, the remote control is not used for a set time,
- the transmitting unit remains powered for eight hours without ever being turned off.
- The green LED of the transmitter unit goes out.
- The POWER LED of the receiving unit changes from flashing to steady on.
- To start the remote control, press the START button.

LOW BATTERY

The transmitter unit signals if the battery is not sufficiently charged (the red LED flashes accompanied by an acoustic signal). After 3.5 minutes from the start of the signal, the transmitting unit switches off automatically. You need to replace the battery with a charged one.

NON-USE OF THE TRANSMITTER UNIT

If the transmitting unit remains on for a time equal to the “auto-off time” without the commands being activated, it switches off automatically.

CONTINUOUS USE

The transmitter unit signals if it has never been switched off after eight hours (the red LED flashes accompanied by an acoustic signal). After 3.5 minutes from the start of the signal, the transmitting unit switches off automatically.

SWITCHING OFF OF THE TRANSMITTER UNIT

The transmitter unit must be switched off every time work is suspended: remove the S-KEY and always put it in a safe place.

SWITCHING OFF THE RECEIVER UNIT

The receiver unit must be switched off every time the remote control is not used to control the machine. To turn off the unit, it is necessary to disconnect the power supply.

1.10.5 INSTRUCTIONS FOR USING THE RADIO-CONTROL

For vehicles with RC radio control

1.10.6 RADIO LINK

The two units constantly communicate with one another through a radio link. This is an essential requirement to ensure safety for the radio remote controlled machine. An address is stored in the S-KEY and in the address key on the connector in the receiving unit; the units use this address to code their messages. This address is unique, univocal (specific for each radio remote control) and not reproducible. Each unit can only decode the messages coming from the unit with the same address. This prevents messages from other radio equipment from activating any system function.

The units send coded messages to one another:

- messages sent by the transmitting unit contain operational commands to be carried out by the machine
- messages sent by the receiving unit contain information useful for the automatic management of the working frequency and information about measurements collected from the machine (Data Feedback function).

1.10.7 CONFORMITY

Each Dynamic series radio remote control is in conformity with the (R&TTE) Directive 1999/5/EC and its essential requirements.

Each radio remote control is also in conformity with the harmonised standards given in the EC Declaration of Conformity.

1.10.8 WARNINGS

In addition to all instructions provided by the machine manufacturer, by the installer of the radio remote control and by the person responsible for the safety of the work area, users shall always respect the following warnings.

Before starting to work

- The transmitting unit shall be used in a simple and comfortable way, avoiding accidental falls. The harness provided with the radio remote control serves as such.
- Stand in a position that allows the direct supervision of the remote controlled machine and its load, and

stay in a place ensuring safety conditions in respect of other operations and/or activities and/or processes that are carried out in the working environment.

- Never start up or use the transmitting unit if the working conditions present the risk of losing balance or tripping.
- Always check that the mechanical operation of the STOP pushbutton is correct.
- If it is impossible or difficult to press this pushbutton, do not use the radio remote control.
- Only start up the transmitting unit when starting work: improper use may cause hazardous situations.
- Never start up or use the transmitting unit in closed spaces, with the machine not in sight, or outside the radio remote control typical working range: in such cases it is in fact still possible to build a radio link, thus causing the risk that unwanted commands be carried out by the machine.

During normal operation

- Visually and directly follow all movements of the machine and its load and remain inside the radio remote control working range.
- Pay particular attention to warnings and visual and acoustic signals, and take all measurements and steps to avoid that movements of the remote controlled machine may lead to hazardous situations for people and/or property.
- Pay attention to the entire work area. Immediately press the STOP pushbutton when a hazardous situation occurs.
- Do not touch the receiving unit's metal parts as they may reach high, potentially dangerous temperatures.
- In case of malfunction, disable the system "machine+radio remote control" until the problem has been completely solved.

After using the radio remote control.

- Switch off the transmitting unit when work is stopped or temporarily interrupted.
- Do not leave the load hanging (even when changing the battery).
- Never leave the transmitting unit unguarded when the S-KEY is inserted.
- Always store the S-KEY in a safe place each time it is removed from the transmitting unit. If this key is lost, the radio remote control cannot work, since the transmitting unit needs the address stored in the key to work with its receiving unit.

Radio remote control lifecycle.

- To ensure a safe and long-lasting operation of radio remote controls, carefully follow the instructions provided for each stage of the product lifecycle:
  - Transportation: radio remote controls must always be transported and stored inside their original packing until they are installed on the machine
  - Installation: The radio remote control can only be installed and tested by competent staff that masters the technical knowledge required to carry out these procedures and is qualified according to the regulation of the country where the radio remote control is mounted. Only if the radio remote control is installed correctly can it be used safely.
  - Use: the use of radio remote controls is strictly limited to skilled and properly trained personnel, (See chapter: 2-DESCRIPTION)
  - Radio remote control maintenance: the following instructions provide information to safely carry out routine and special maintenance operations for the radio remote control
  - Routine maintenance, consists of operations needed to preserve the radio remote control normal usage conditions, thus implementing fine-tuning, checks, planned replacement actions that necessarily arise from the normal use of the radio remote controls.
  - Routine maintenance carried out as described in this manual is fundamental for using the radio remote control safely (See chapter: 3-MAINTENANCE).
  - Special maintenance, consists of repairs needed due to radio remote control failure, damage or malfunction, carried out with the aim of restoring the original usage and working conditions (See chapter: 3-MAINTENACE).

⚠ CAUTION

Prior to contacting the support service technicians of the machine's manufacturer:

- read and understand all parts of this manual, and make sure that all the instructions it contains have been accomplished correctly

- follow the instructions to detect possible malfunctions and their origins.

⚠ CAUTION

Any fault should be repaired by authorised personnel only, contact the support service of MANITOU.

- The following radio remote control data must be reported in order to make interventions faster and more reliable:

1. radio remote control serial number (S/N) and TU ID (transmitting unit identification number)
2. purchase date (given on the certificate of guarantee)
3. description of the problem found
4. address and telephone number of the place where the device is being used (with the name of the person to contact)

NOTICE

All fine-tuning, checking and maintenance actions carried out on the radio remote control shall be verified and recorded by the person in charge of carrying out maintenance on the machine.

⚠ WARNING

In case of failure, emergencies or damaged parts, disable the system “radioremote control+machine” until the problem has been completely solved.

⚠ WARNING

In case of failure, emergencies or damaged parts, disable the system “radioremote control+machine” until the problem has been completely solved.

⚠ WARNING

After any maintenance operation, always make sure that commands sent by the transmitting unit only activate the corresponding expected operations.

Disposal

When disposing of a radio remote control, give it to the waste separate collecting services in the user’s country.

Please pay particular attention when recycling the batteries: apply local rules.

Do not throw them away with domestic trash.

1.10.9 FREQUENCIES

The radio link between the units radio remote controls is built at one of the frequencies permitted by the European standards in force when the system is put on the market.

1.10.10 SCRAPPING OF THE REMOTE CONTROL

For scrapping, entrust the remote control to the differentiated scrap recovery service existing in the area.

In particular, be careful when recycling batteries by applying local regulations.

Do not dispose of them with household waste.

1.11. ENVIRONMENT INFORMATION

1.11.1 RECYCLING OF MATERIALS

METALS

- Metals are 100 % recoverable and recyclable.

PLASTICS

- Plastic parts are identified with a marking in accordance with current regulations.
- A limited range of materials is used to simplify the recycling process.
- The majority of plastic components are made of "thermoplastic" plastics, that are easily recycled by melting, granulating or grinding.

RUBBER

- Tyres and seals can be ground for use in cement manufacture or to obtain reusable granules.

GLASS

- Glass items can be removed and collected for processing by glaziers.

1.11.2 VEHICLE DISPOSAL

MANITOU complies with the regulations deriving from Directive 2000/53/EC relating to vehicle end-of-life.

This vehicle contains no substances or materials forbidden by Directive 2000/53/EC.

Consult your dealer before disposing of your vehicle.

1.11.3 ENVIRONMENTAL PROTECTION

By entrusting the maintenance of your vehicle to the MANITOU network, the risk of pollution is limited and

the contribution to environmental protection contribution is made.

WORN OR DAMAGED PARTS

- Do not dump them in the countryside.
- MANITOU and its network have signed-up to a scheme of environmental protection through recycling.

USED OIL

- The MANITOU network organises the collection and processing of used oil products.
- By handing over your waste oil to MANITOU, the risk of pollution is limited.

USED BATTERIES

- Do not throw away batteries, as they contain metals that are harmful for the environment.
- Return them to the MANITOU network or any other approved collection point.

NOTICE

MANITOU aims to manufacture vehicles that provide the best performance and limit polluting emissions.

2. TECHNICAL DATA AND DESCRIPTION

2.1. MACHINE IDENTIFICATION

2.1.1 MANUFACTURER PLATE

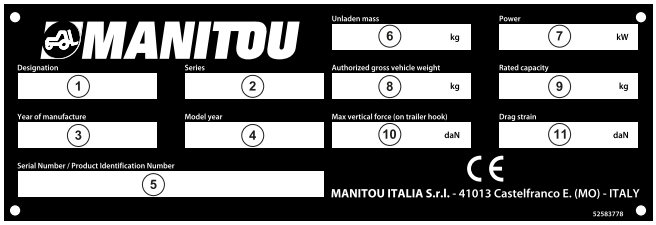

Figure 37: Manufacturer plate

Table 3. Manufacturer plate

Item	*Description*	
1	**"Designation"** Designation	
2	**"Series"** Series	
3	**"Year of manufacture"** Year of manufacture	
4	**"Model year"** Model year	
5	**"Serial number / Product identification number"** Serial number / Product identification number	
6	**"Unladen mass"** Unladen weight	
7	**"Power"** Power	
8	**"Authorized gross vehicle weight"** Authorized grass vehicle weight	
9	**"Rated capacity"** Rated capacity	
10	**"Max vertical force (on trailer hook)"** Max vertical force (on trailer hook)	
11	**"Drag strain"** Pulling force	

2.1.2 VEHICLE IDENTIFICATION

In order to make constant improvements to our products, some changes can be made to our range of vehicles, without any obligation to inform our customers on our part.

For each spare part order or for each request for technical information, it is necessary to specify the following information.

In order to communicate all the numbers more easily, it is recommended to write them in the appropriate spaces upon delivery of the vehicle

2.1.3 HEAT ENGINE PLATE

Figure 38: Heat engine plate

Table 4. Heat engine plate

1	Model	
2	Engine code	
3	Engine number	

2.1.4 HYDROSTATIC PUMP PLATE

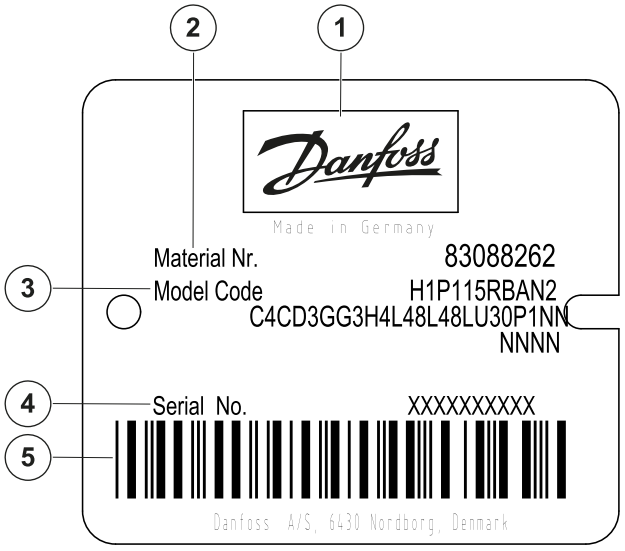

Figure 39: Hydrostatic pump plate

Table 5. Hydrostatic pump plate

Ref.	*Description*	
1	Manufacturer	
2	Material code	
3	Model code	
4	Serial No.	
5	Bar code	

2.1.5 HYDROSTATIC MOTOR PLATE

HYDROSTATIC MOTOR PLATE

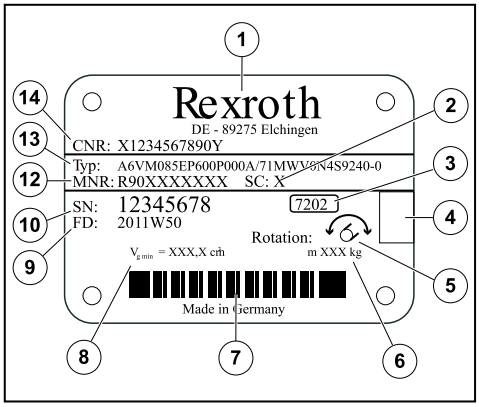

Figure 40: Hydrostatic motor plate

Table 6. Hydrostatic motor plate

1	Manufacturer	
2	Indoor plant designation	
3	Category (optional)	
4	Direction of rotation (seen on the motor shaft) - here: clockwise	
5	Specific area for inspection marking	
6	Weight (optional)	
7	Power	
8	Bar code	
9	Rotation speed	
10	Manufacturing date	
11	Serial number	
12	Material code of the axial piston unit	
13	Ordering code	
14	Customer material number	

2.1.6 GEARBOX PLATE

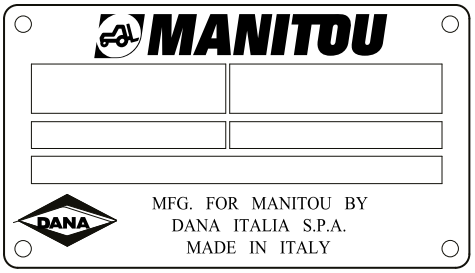

Figure 41: Gearbox plate

Table 7. Gearbox plate

1	Group type and model	
2	Serial No.	
3	MANITOU Reference	
4	Index of alteration	
5	Lubricant	

2.1.7 REAR AXLE PLATE

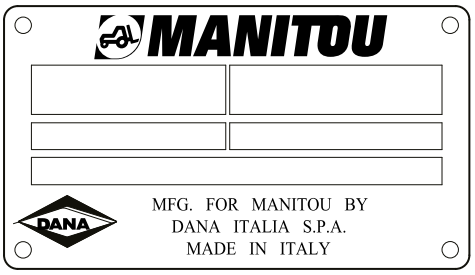

Figure 42: Rear axle plate

Table 8. Rear axle plate

1	Group type and model	
2	Serial No.	
3	MANITOU Reference	
4	Index of alteration	
5	Lubricant	

2.1.8 FRONT AXLE PLATE

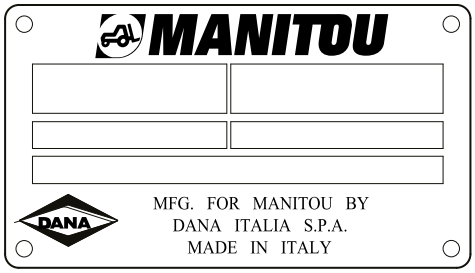

Figure 43: Front axle plate

Table 9. Front axle plate

1	Group type and model	
2	Serial No.	
3	MANITOU Reference	
4	Index of alteration	
5	Lubricant	

2.1.9 CABIN PLATE

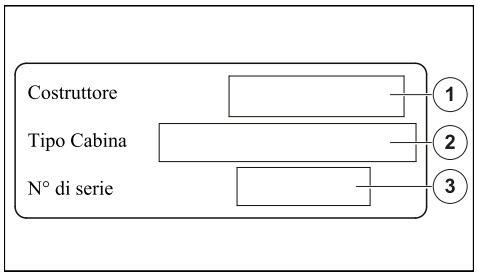

Figure 44: Cabin plate

Table 10. Cabin plate

1	Manufacturer	
2	Cabin type	
3	Serial No.	

2.1.10 CHASSIS PLATE

Figure 45: Chassis plate

Table 11. Chassis plate

Serial number / Product ID number	

2.1.11 ACCESSORY MANUFACTURER'S PLATE

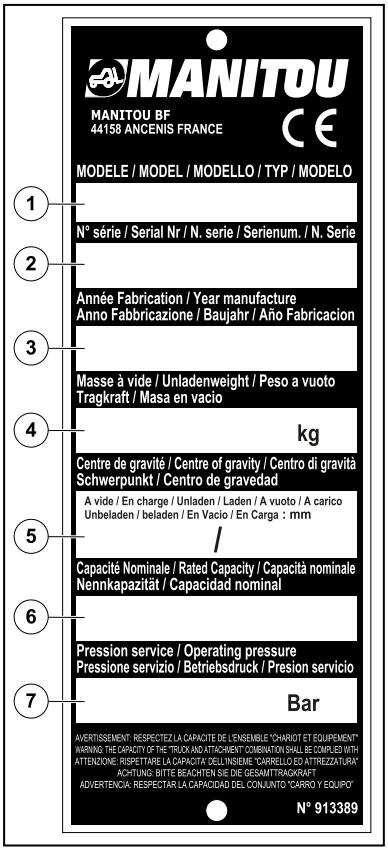

Figure 46: Accessory manufacturer's plate

Table 12. Accessory manufacturer's plate

1	Model	
2	Serial number	
3	Year of manufacture	
4	Unladen mass	
5	Center of gravity	
6	Nominal capacity	
7	Service pressure	

2.2. TECHNICAL SPECIFICATIONS

2.2.1 CAPACITY, WEIGHT AND DIMENSIONS MHT 10200, MHT-X 10200

WEIGHT AND DIMENSIONS

Table 13. Capacity and weight

Description	Unit	Characteristics
Capacity		
Maximum rated capacity with standard carriers and forks	kg - lb	19999 - 44090
Forward reach with fork-carrier and standard forks	m - ft	5,40 - 17.7
Standard lifting height	m - ft	9,70 - 31.8
Weight distribution with standard carriage and forks		
Vehicle weight (unloaded)	kg - lb	26850 - 59194
Standard carriage and forks		
Type		CAF 2500/20000 F1200
Fork section (length / width / section)	mm - in	1200x200x80 - 47.24x7.87x3.14

DIMENSIONS

Figure 47: Dimensions (side, front and top view)

Description	Ref.	Unit	Measurements	
Tilt-up angle	a4	°	12	
Tilt-down angle	a5	°	105	
Chassis leveling correction +/-	a9	°	10	
Overall width	b1	m - ft	2,52	8,23
Overall cabin width	b4	m - ft	0,95	3,12
Overall height	h17	m - ft	2,97	9,81
Total length (with forks)	l1	m - ft	7,90	24,11
Length to the face of the forks	l2	m - ft	6,70	20,18
Ground clearance	m4	m - ft	0,41	1,41

Description	Ref.	Unit	Measurements	
Wheelbase	y	m - ft	3,75	11,06
External turning radius (above the tires)	Wa1	m - ft	5,75	17,62

2.2.2 ENGINE

ENGINE - YANMAR 4TN107TT - 155 kW ST3A

Table 14. ENGINE - YANMAR 4TN107TT - 155 kW ST3A

Description	Unit	Values
Engine brand		Yanmar
Engine Type	Stage / Tier	Stage 3A
Engine model		4TN107TT-6SMU2
Rated power (ISO/TR 14396)	Hp / kW @ rpm	211/155 @ 2200
Maximum torque	Nm - kgf @ rpm	805 - 82.08@ 1500
Number of cylinders — Displacement	- cm^3 / l	4 — 4567 / 4.567
Volt - Batteries		(24V) 2x12V
Cooling system		
Water cooling		YES

2.2.3 ENGINE

ENGINE - YANMAR 4TN107FTT - 155 kW ST5

Table 15. ENGINE - YANMAR 4TN107FTT - 155 kW ST5

Description	Unit	Values
Engine brand		Yanmar
Engine Type	Stage / Tier	EU Stage V / US EPA Tier 4
Engine model		4TN107FTT-6SMU2
Rated power (ISO/TR 14396)	Hp / kW @ rpm	211/155 @ 2200
Maximum torque	Nm - kgf @ rpm	805 - 82.08@ 1500
Number of cylinders — Displacement	- cm^3 / l	4 — 4567 / 4.567
Volt - Batteries		(24V) 2x12V
Cooling system		
Water cooling		YES

2.2.4 TIRES 16.00-25

Table 16. Tires (standard)

Description	Characteristics
Measurement	16.00-25
Pressure	10 bar -142 PSI
Driving wheels (front / rear)	2 / 2
Driving modes	2-wheel steer, 4-wheel concentric steer, 4- wheel "crab" steer

2.2.5 TRANSMISSION MHT 10200, MHT-X 10200, MHT 11250, MHT-X 11250

Table 17. Transmission

Description	Unit	Characteristics
Type		Hydrostatic
Number of gears (F/R)		(2/2)
Max. travel speed	km/h - mph	25 - 15.5
Parking brake		Automatic with negative action
Service brake	Hydraulic	Multi-disc type in oil bath integrated in the front and rear axles

2.2.6 HYDRAULIC CIRCUIT MHT 10200, MHT-X 10200, MHT 11250, MHT-X 11250

Table 18. Hydraulic circuit MHT 10200, MHT-X 10200, MHT 11250, MHT-X 11250

Description	Unit	Characteristics
Type of hydraulic pump		LS pump
Hydraulic flow	l/min	275 l/m
Hydraulic pressure	Bar - PSI	350 - 5076

2.2.7 LIQUID CAPACITY MHT 10135, 10160, 10200, 11250, MHT-X 10135, 10160, 10200, 11250

Table 19. Liquid capacity MHT 10135, 10160, 10200, 11250, MHT-X 10135, 10160, 10200, 11250

Description	Unit	Characteristics
Motor oil	L - US gal	13 - 2.85
Hydraulic oil tank and transmission	L - US gal	290 - 76.6
Fuel tank	L - US gal	315 - 83.21
DEF (Diesel Emission Fluid) Tank	L - US gal	24 - 6.34

2.2.8 MISCELLANEOUS

Table 20. Miscellaneous

Description	Values
Controls	Joystick
Safety cabin approval	ROPS / FOPS (Level 2)
Attachment recognition system (E-Reco)	E-Reco

2.2.9 NOISE AND VIBRATIONS MHT 10200

Table 21. Noise and vibrations

Description	Unit	Characteristics
Acoustic pressure in the driver's cabin LpA (according to NF EN 12053)	dB (A)	-
Guaranteed noise level in the environment LwA (according to Directive 2000/14 / EC modified by Directive 2005/88 / EC)	dB (A) dB (A)	110 guaranteed (110 measured)
The weighted average acceleration transmitted to the boom system/ driver's hand (according to ISO 5349-2)	m/s^2	-

2.2.10 CAPACITY AND LOAD CHARTS

The following pages show the load charts of each machine model with the standard attachment CAF (fork carrier).

MHT 10200 210Y ST3A S1 + CAF 2500/ 20000 F1200 (standard), MHT-X 10200 210Y ST3A S1 + CAF 2500/20000 F1200 (standard)

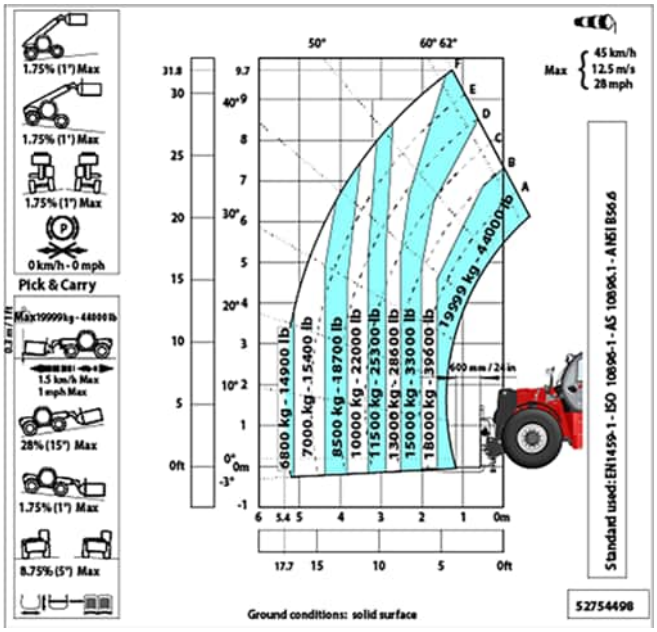

Figure 48:

MHT 11250 210Y ST5 S1 + CAF 2000/25000 F1800 (standard), MHT-X 11250 210Y ST5 S1 + CAF 2000/25000 F1800 (standard)

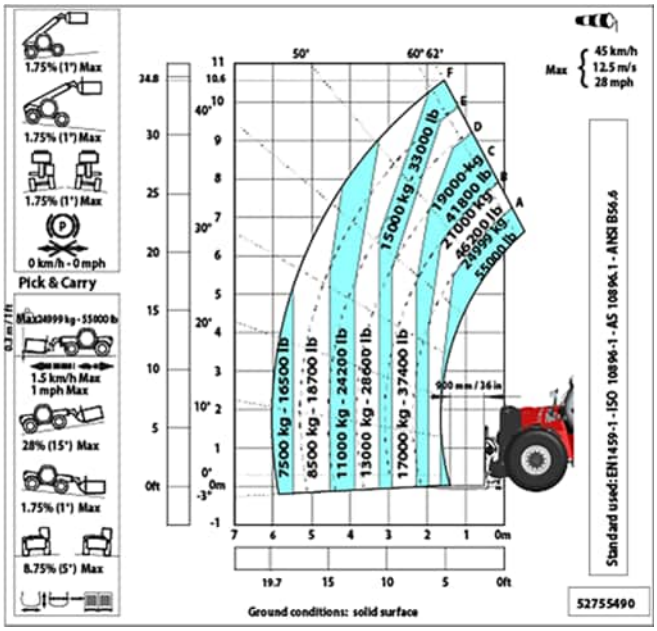

Figure 49:

2.2.11 "CE" DECLARATION OF CONFORMITY

1) **DECLARATION "CE" DE CONFORMITE (originale)**
"EC" DECLARATION OF CONFORMITY (original)

2) La société, *The company* : **MANITOU ITALIA S.r.l.**
3) Adresse, *Address* : **Via Cristoforo Colombo 2, 41013 Cavazzona in Castelfranco Emilia – ITALIA**

4)Dossier technique,*Technical file* : MANITOU ITALIA S.r.l. Via Cristoforo Colombo 2, 41013 Cavazzona in Castelfranco Emilia – ITALIA

5) Constructeur de la machine décrite ci-après, *Manufacturer of the machine described below* :
CHARIOT TELESCOPIQUE, *Rough-terrain variable-reach truck*
MHT 10135 175Y ST5 S1
N°>MAN00000P01234567<

6) Déclare que cette machine, *Declares that this machine* :
❑ 7)- Est conforme aux directives suivantes et à leurs transpositions en droit national, *Complies with the following directives and their transpositions into national law* :

2006/42/CE

8) - Pour les machines annexe IV , *For annex IV ma…*
9) - Numéro d'attestation, *Certificate numbe…*
10) - Organisme notifié, *Notified body* :

2000/14/CE + 2005/88/CE

11) -Proc…re a…liquée, *Applied procedure* : **Annexe VI – 2000 / 14 / CE proc.I**
10) - Orga…e n…tified body : **ECO Certificazioni S.p.A., Via Mengolina, 33 48018 Faenza (RA) – ITA… – Notified Body n. 0714**
1… - N…ve… de puissance acoustique, *Sound power level* :
…) Me…ré, *Measured* : 108 dB (A)
…) Garanti, *Guaranteed* : 108 dB (A)

2014/30/UE

❑ 15)-Normes harmonisées utilisées, *Harmonised standards used* : **EN 13309:2010, EN 1459-1:2017**
❑ 16)-Normes ou dispositions techniques utilisées, *Standards or technical provisions used* : **/**

17) - Fait à, *Done at* : CASTELFRANCO EMILIA 18) - Date, *Date* : 08/02/2022
19) - Nom du signataire, *Name of signatory* : IOTTI MARCO
20) - Fonction, *Function* : DIRECTEUR GENERAL
21) - Signature, *Signature* :

MANITOU ITALIA Srl
A Socio Unico - Sede Legale e Amm.va - Via C. Colombo, 2
Località Cavazzona - 41013 CASTELFRANCO E. (MO)
Tel. 059 959811 - Fax 059 / 959850
Cap. Soc. € 3.000.000 I.V.
Reg. Impr. Dati Modena e CF. 04173970369
P.IVA IT 02591050360 - N. Mecc. MO 033322 R.E.A. 148776

Figure 50: First page of declaration of conformity

bg : 1) удостоверение за « CE » съответствие (оригинална), 2) Фирмата, 3) Адрес, 4) Техническо досие, 5) Фабрикант на описаната по-долу машина: телескопичен манипулатор, 6) Обявява, че тази машина, 7) Отговаря на следните директиви и на тяхното съответствие национално право, 8) За машините към допълнение IV, 9)Номер на удостоверението, 10) Наименувана фирма, 11) Приложена процедура, 12) Ниво на силата на акустиката, 13) Измерено, 14) Гарантирано, 15) хармонизирани стандарти използвани, 16) стандарти или технически правила, използвани, 17) Изработено в, 18) Дата, 19) Име на разписалия се, 20) Функция, 21) Функция

cs : 1) ES prohlášení o shodě (původní), 2) Název společnosti, 3) Adresa, 4) Technická dokumentace, 5) Výrobce níže uvedeného stroje: teleskopický manipulátor, 6) Prohlašuje, že tento stroj, 7) Je v souladu s následujícími směrnicemi a směrnicemi transponovanými do vnitrostátního práva, 8) Pro stroje v příloze IV, 9) Číslo certifikátu, 10) Notifikační orgán, 11) Použitý postup, 12) Hladina akustického výkonu, 13) Naměřená, 14) Zaručená, 15) harmonizované normy použity, 16) Norem a technických pravidel používaných, 17) Místo vydání, 18) Datum vydání, 19) Jméno podepsaného, 20) Funkce, 21) Podpis,

da : 1) EF Overensstemmelseserklæring (original), 2) Firmaet, 3) Adresse, 4) tekniske dossier, 5) Konstruktør af nedenfor beskrevne maskine: teleskopisk håndterer, 6) Erklærer, at denne maskine, 7) Overholder nedennævnte direktiver og disses gennemførelse til national ret, 8) For maskiner under bilag IV, 9) Certifikat nummer, 10) Bemyndigede organ, 11) Anvendt procedure, 12) Lydeffektniveau, 13) Målt, 14) Garanti, 15) harmoniserede standarder, der anvendes, 16) standarder eller tekniske regler, 17) Udfærdiget i, 18) Dato, 19) Underskrivers navn, 20) Funktion, 21) Underskrift,

de : 1) EG-Konformitätserklärung (original), 2) Die Firma, 3) Adresse, 4) Technischen Unterlagen, 5) Hersteller der nachfolgend beschriebenen Maschine: teleskoplader, 6) Erklärt, dass diese Maschine, 7) den folgenden Richtlinien und deren Umsetzung in die nationale Gesetzgebung entspricht, 8) Für die Maschinen laut Anhang IV, 9) Bescheinigungsnummer, 10) Benannte Stelle, 11) Angewandtes Verfahren, 12) Schallleistungspegel, 13) Gemessen, 14) Gewährleistet, 15) angewandten harmonisierten Normen, 16) angewandten sonstigen technischen Normen und Spezifikationen, 17) Ausgestellt in, 18) Datum, 19) Name des Unterzeichners, 20) Funktion, 21) Unterschrift.

el : 1) Δήλωση συμμόρφωσης CE (πρωτότυπο), 2) Η εταιρεία, 3) Διεύθυνση, 4) τεχνικό φάκελο, 5) Κατασκευάστρια του εξής περιγραφόμενου μηχανήματος: τηλεσκοπικό χειριστή, 6) Δηλώνει ότι αυτό το μηχάνημα, 7) Είναι σύμφωνο με τις εξής οδηγίες και τις προσαρμογές τους στο εθνικό δίκαιο, 8) Για τα μηχανήματα παραρτήματος IV, 9) Αριθμός δήλωσης, 10) Κοινοποιημένος φορέας, 11) Εφαρμοζόμενη διαδικασία, 12) Στάθμη ηχητικής ισχύος, 13) Μετρημένη, 14) Εγγυημένη, 15) εναρμονισμένα πρότυπα που χρησιμοποιούνται, 16) Πρότυπα ή τεχνικούς κανόνες που χρησιμοποιούνται, 16) Είναι σύμφωνο με τα εξής πρότυπα και τεχνικές διατάξεις, 17) Εν, 18) Ημερομηνία, 19) Όνομα του υπογράφοντος, 20) Θέση, 21) Υπογραφή,

es : 1)Declaración DE de conformidad (original), 2) La sociedad, 3) Dirección, 4) expediente técnico, 5) Constructor de la máquina descrita a continuación: manipulador telescópico, 6) Declara que esta máquina, 7) Está conforme a las siguientes directivas y a sus transposiciones en derecho nacional, 8) Para las máquinas anexo IV, 9) Número de certificación, 10) Organismo notificado, 11) Procedimiento aplicado, 12) Nivel de potencia acústica, 13) Medido, 14) Garantizado, 15) normas armonizadas utilizadas, 16) Otras normas o especificaciones técnicas utilizadas, 17) Hecho en, 18) Fecha, 19) Nombre del signatario, 20) Función, 21) Firma,

et : 1) EÜ vastavusdeklaratsioon (algupärane), 2) Äriühing, 3) Aadress, 4) Tehniline dokumentatsioon, 5) Seadme tootja: teleskoopkäitleja, 6) Kinnitab, et see toode, 7) On vastavuses järgmiste direktiivide ja nende riigisisesesse õigusesse ülevõtmiseks vastuvõetud õigusaktidega, 8) IV lisas loetletud seadmete puhul, 9) Tunnistu[illegible]umber, 10) Sertifitseerimisasutus, 11) Kohaldatav menetlus, 12) Akustilise võimsuse tase, 13) Mõõdetud, 14) Tagatud, 15) kasutatud ühtlustatud standarditele, 16) Muud standardit[illegible]spetsifikatsioonides kasutatakse, 17) Väljaandmise koht, 18) Väljaandmise aeg, 19) Allkirjastaja nimi, 20) Amet, 21) Allkiri,

fi : 1) EY-vaatimustenmukaisuusvakuutus (alkuperäiset), 2) Yritys, 3) Osoite, 4) teknisen eritelmän, 5) Jäljessä kuvatun koneen valmistaja: [illegible] 6) Vakuuttaa, että tämä kone, 7) Täyttää seuraavien direktiivien sekä niitä vastaavien kansallisten säännösten vaatimukset, 8) Liitteen IV koneiden osalta, 9) To[illegible]uksen nume[illegible] Ilmoitettu laitos, 11) Käytetty menettelytapa, 12) Äänenvoimakkuuden taso, 13) Mitattu, 14) Taattu, 15) yhdenmukaistettuja standardeja käytetään, 16) muita [illegible]dardeja tai [illegible]mät, 1[illegible] Paikka, 18) Aika, 19) Allekirjoittajan nimi, 20) Toimi, 21) Allekirjoitus,

ga : 1) « EC »dearbhú comhréireachta (bunaidh), 2) An comhlacht, 3) Seoladh, 4) comhad teicniúil, 5) Déantói[illegible] inni[illegible]uair[illegible]ar thíos: lái[illegible]eálaí teileascópach, 6) Dearbhaíonn sé go bhfuil an t-inneall, 7) Go gcloíonn sé le na treoracha seo a leanas agus a trasuímh isteach i ndlí náisiúnta, [illegible]agha[illegible]nnill [illegible] 9) Uimhir teastais, 10) Comhlacht a chuireadh i bhfios, 11) Nós imeachta a chuireadh i bhfeidhm, 12) Comhlacht a chuireadh i bhfios, 13) Tomhast[illegible]áthai[illegible]15) [illegible] comhchuibhithe a úsáidtear, 16) caighdeáin eile nó sonraíochtaí teicniúla a úsáidtear, 17) Déanta ag, 18) Dáta, 19) Ainm an tsínitheora, 20) Feidhm, 2[illegible] Síniú.

hu : 1) CE megfelelőségi nyilatkozat (eredeti), 2) A vállalat, 3) Cím, 4) műszaki dokumentáció, 5) [illegible] ge[illegible]nya[illegible]: tele[illegible]pos kezelő, 6) Kijelenti, hogy a gép, 7) Megfelel az alábbi irányelveknek valamint azok honosított előírásainak, 8) A IV. melléklet gépeihez, 9) Bizony[illegible]szám, [illegible]szer[illegible]t, 11) Alkalmazott eljárás, 12) Akusztikus hang szint, 13) Mért, 14) Garantált, 15) felhasznált harmonizált szabványok, 16) egyéb felhasznált műszaki szabvány[illegible]s elő[illegible]ok [illegible]zása[illegible]) Kelt (hely), 18) Dátum, 19) Aláíró neve, 20) Funkció, 21) Aláírás

is : 1) (Samræmisvottorð ESB (upprunalega), 2) Fyrirtækið, 3) Aðsetur, 4) Tæ[illegible] skrá, [illegible]miðu[illegible]kisin[illegible]n lýst er hér á eftir: sjónauka, 6) Staðfestir að tækið, 7) Samræmist eftirfarandi stöðlum og staðfærslu þeirra með hliðsjón af þjóðarrétti, 8) Fyrir tæ[illegible] aukakafla I[illegible] Stað[illegible]ingarnúmer, 10) Tilkynnt til, 11) Aðferð beitt, 12) Hljóðstyrkur, 13) Mældist, 14) Ábyrgður, 15) samhæfða staðla sem notaðir, 16) önnur staðlar eða forskriftir [illegible] 17) Staður, [illegible]Dags[illegible]ng, 19) Nafn undirritaðs, 20) Staða, 21) Undirskrift.

it : 1) Dichiarazione CE di conformità (originale), 2) La società, 3) Indirizzo, 4) [illegible]co, [illegible]ostruttore della macchina descritta di seguito: carrello telescopico, 6) Dichiara che questa macchina, 7) È conforme alle direttive seguenti e alle relativ[illegible]osizioni nel diritto nazio[illegible], 8) Per le macchine Allegato IV, 9) Numero di Attestazione, 10) Organismo notificato, 11) Procedura applicata, 12) Livello di potenza acustica, 13) M[illegible]ato, 14) Garant[illegible], 15) no[illegible]rmonizzate applicate, 16) altre norme e specifiche tecniche applicate, 17) Stabilita a, 18) Data, 19) Nome del firmatario, 20) Funzione, 21) Firma,

lt : 1) CE atitikties deklaracija (originalas), 2) Bendrov[illegible] Adresas, 4) Techninė byla, 5) Žemiau nurodytas įrenginio gamintojas: teleskopinis krautuvas, 6) Pareiškia, kad šis įrenginys, 7) Atitinka toliau nurodytas direktyvas ir į nac[illegible]us teis[illegible]tus perkeltas jų nuostatas, 8) IV priedas dėl mašinų, 9) Sertifikato Nr, 10) Paskelbtoji įstaiga, 11) Taikyta procedūra, 12) Garso stiprumo lygis, 13) Išmatuota, 14) Garantij[illegible]erint[illegible]ndartus[illegible]dojamus, 16) Kiti standartai ir technines specifikacijas, 17) Pasirašyta, 18) Data, 19) Pasirašiusio asmens vardas ir pavardė, 20) Pareigos, 21) Paraša[illegible]

lv : 1) EK atbilstības dekla[illegible](oriģināls[illegible] U[illegible]s, 3) Adrese, 4) tehniskās lietas, 5) Tālāk aprakstītās iekārtas ražotājs: teleskopiskais manipulators, 6) Apliecina, ka šī iekārta, 7) Ir atbilstoša tālāk norādītajām [illegible]ktīvām un to[illegible]ozīc[illegible]acionālajā likumdošanā, 8) Iekārtām IV pielikumā, 9) Apliecības numurs, 10) Reģistrētā organizācija, 11) Piemērotā procedūra, 12) Akustiskā skaļuma līmenis, [illegible]zmē[illegible]14) [illegible]antēts, [illegible]) lietotajiem saskaņotajiem standartiem, 16) lietotajiem tehniskajiem standartiem un specifikācijām, 17) Sastādīts, 18) Datums, 19) Parakstītāja vārds, 20) Amats[illegible]aksts

mt : 1)Dikjarazzjoni ta' Konfo[illegible] KE (oriġ[illegible]li), 2) Il-kumpanija, 3) Indirizz, 4) fajl tekniku, 5) Manifattriċi tal-magna deskritta hawn isfel: maniġer teleskopiku, 6) Tiddikjara li din il-magna, 7) Hija konformi hija konformi mad-[illegible]tivi segwenti u l-liġijiet li jimplimentawhom fil-liġi nazzjonali, 8) Għall-magni fl-Anness IV, 9) Numru taċ-ċertifikat, 10) Entità nnotifikata, 11) Proċedura applikata, 12) Livell ta' qawwa ak[illegible]a, 13) Imkejjel, 14) Garantit, 15) l-istandards armonizzati użati, 16) standards tekniċi u speċifikazzjonijiet oħra użati, 17) Magħmul f', 18) Data, 19) Isem il-firmatarju, 20) Kariga, 21) Firma.

nl : 1) EG-verklaring van overeenstemming (oorspronkelijke), 2) Het bedrijf, 3) Adres, 4) technisch dossier, 5) Constructeur van de hierna genoemde machine: verreiker, 6) Verklaart dat deze machine, 7) In overeenstemming is met de volgende richtlijnen en hun omzettingen in het nationale recht, 8) Voor machines van bijlage IV, 9) Goedkeuringsnummer, 10) Aangezegde instelling, 11) Toegepaste procedure, 12) Geluidsvermogensniveau, 13) Gemeten, 14) Met garantie, 15) gehanteerde geharmoniseerde normen, 16) andere gehanteerde technische normen en specificaties, 17) Opgemaakt te, 18) Datum, 19) Naam van ondergetekende, 20) Functie, 21) Handtekening,

no : 1) CE-samsvarserklæring (original), 2) Selskapet, 3) Adresse, 4) tekniske arkiv, 5) Fabrikant av følgende maskin: teleskopisk håndterer, 6) Erklærer at denne maskinen, 7) Oppfyller kravene i følgende direktiver, med nasjonale gjennomføringsbestemmelser, 8) For maskinene i tillegg IV, 9) Attestnummer, 10) Notifisert organ, 11) Anvendt prosedyre, 12) Akustisk støy, 13) Målt, 14) Garantert, 15) harmoniserte standarder som brukes, 16) Andre standarder og spesifikasjoner brukt, 17) Utstedt i, 18) Dato, 19) Underskriverens navn, 20) Stilling, 21) Underskrift

pl : 1)Deklaracja zgodności CE (oryginalne), 2) Spółka, 3) Adres, 4) dokumentacji technicznej, 5) Wykonawca maszyny opisanej poniżej: ładowarka teleskopowa, 6) Oświadcza, że ta maszyna, 7) Jest zgodna z następującymi dyrektywami i odpowiadającymi przepisami prawa krajowego, 8) Dla maszyn załącznik IV, 9) Numer certyfikatu, 10) Jednostka certyfikująca, 11) Procedura stosowana, 12) Poziom mocy akustycznej, 13) Zmierzony, 14) Gwarantowany, 15) zastosowanych norm zharmonizowanych, 16) innych zastosowanych norm technicznych i specyfikacji, 17) Sporządzono w, 18) Data, 19) Nazwisko podpisującego, 20) Stanowisko, 21) Podpis

pt : 1) Declaração de conformidade CE (original), 2) A empresa, 3) Morada, 4) processo técnico, 5) Fabricante da máquina descrita abaixo: manipulador telescópico, 6) Declara que esta máquina, 7) Está em conformidade às directivas seguintes e às suas transposições para o direito nacional, et à leurs transpositions en droit national. 8) Para as máquinas no anexo IV, 9) Número de certificado, 10) Entidade notificada, 11) Procedimento aplicado, 12) Nível de potência acústica, 13) Medida, 14) Garantida, 15) normas harmonizadas utilizadas, 16) outras normas e especificações técnicas utilizadas, 17) Elaborado em, 18) Data, 19) Nome do signatário, 20) Cargo, 21) Assinatura

ro : 1) Declaraţie de conformitate CE (originală), 2) Societatea, 3) Adresa, 4) cărtii tehnice, 5) Constructor al maşinii descrise mai jos: telescopic, 6) Declară că prezenta maşină, 7) Este conformă cu directivele următoare şi cu transpunerea lor în dreptul naţional, 8) Pentru maşinile din anexa IV, 9) Număr de atestare, 10) Organism notificat, 11) Procedura aplicată, 12) Nivel de putere acustică, 13) Măsurat, 14) Garantat, 15) standardele armonizate utilizate, 16) alte standarde si specificatii tehnice utilizate, 17) Întocmit la, 18) Data, 19) Numele persoanei care semnează, 20) Functia, 21) Semnătura

sk : 1) ES vyhlásenie o zhode (pôvodný), 2) Názov spoločnosti, 3) Adresa, 4) technickej dokumentácie, 5) Výrobca nižšie opísaného stroja, 6) Vyhlasuje, že tento stroj, 7) Je v súlade s nasledujúcimi smernicami a smernicami transponovanými do vnútroštátneho práva, 8) Pre stroje v prílohe IV, 9) Číslo certifikátu, 10) Notifikačný orgán, 11) Použitý postup, 12) Hladina akustického výkonu, 13) Nameraná, 14) Zaručená, 15) použité harmonizované normy, 16) použité iné technické normy a predpisy, 17) Miesto vydania, 18) Dátum vydania, 19) Meno podpisujúceho, 20) Funkcia, 21) Podpis

sl : 1) ES Izjava o ustreznosti (izvirna), 2) Družba. 3) Naslov. 4) tehnične dokumentacije, 5) Proizvajalac tukaj opisanega stroja: teleskopický manipulátor, 6) Izjavlja, da je ta stroj, 7) Ustreza naslednjim direktivam in njihovi transpoziciji v državno pravo, 8) Za stroje priloga IV, 9) Številka potrdila, 10) Obvestilo organu, 11) Uporabljen postopek, 12) Raven akustične moči, 13) Izmerjen, 14) Jamčen, 15) uporabljene harmonizirane standarde, 16) druge uporabljene tehnične standarde in zahteve,17) V, 18) Datum, 19) Ime podpisnika, 20) Funkcija, 21) Podpis.

sv : 1) CE-försäkran om överensstämmelse (original), 2) Företaget., 3) Adress. 4) tekniska dokumentationen, 5) Konstruktör av nedan beskrivna maskin: teleskopisk hanterare, 6) Försäkrar att denna maskin, 7) Överensstämmer med nedanstående direktiv och införlivandet av dem i nationell rätt, 8) För maskinerna i bilaga IV, 9) Nummer för godkännande, 10) Organism som underrättats, 11) Förfarande som tillämpats, 12) Ljudtrycksnivå, 13) Uppmätt, 14) Garanterad 15) Harmoniserade standarder som använts, 16) andra tekniska standarder och specifikationer som använts, 17) Upprättat i, 18) Datum, 19) Namn på den som undertecknat, 20) Befattning, 21) Namnteckni

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Figure 51: Second page of the declaration of conformity

2.3. ENVIRONMENT

2.3.1 EXHAUST GAS AFTER-TREATMENT SYSTEM (DPF + SCR + EGR) AND POLLUTANT GAS EMISSIONS CONTROL

(Excluding -X model machines)

Main components of the after-treatment system

- Diesel Particulate Filter (DPF).
- Catalytic converter (SCR).
- Valve (EGR).
- DEF tank.

Operation of the exhaust gas after-treatment system

This system controls and reduces the harmful emissions of the exhaust gas produced by the engine.

In order to comply with the regulations set by the European Union (EU) and by the Environmental Protection Agency (EPA / ARB), a polluting gas emission control system has been designed that is activated when there are emissions-related warnings.

The following events trigger a warning light:

- Low DEF level.
- Faulty after-treatment system (SCR + EGR + DPF).

If a fault occurs in the after-treatment system or if the fault is not resolved, the system intervenes by automatically and gradually reducing engine performance.

The system is equipped with an emergency command (“override” feature) in order to temporarily disable power reductions caused by the emission control system. The feature is available for a limited time (30 min.) and is designed to allow the operator to move the vehicle to a safe location.

The SCR system is monitored to verify the possible formation and accumulation of DEF crystals (crystallization) inside it or in the circuit. As soon as crystallization is detected, a parked regeneration request (vehicle stopped) is sent, indicated by a flashing regeneration light.

After the warning, parked regeneration must be started by the operator as soon as possible.

If the parked regeneration (vehicle stopped) is not carried out, the polluting gas emission control system activates the specific engine protection features.

The number of regenerations is therefore monitored.

On the display in the cabin, the display and monitoring of the after-treatment system is carried out by means of light indicators.

Table 22. Overview of the indicator lights

	Engine power reduction strategies and control for low level DEF tank. Indicator behavior: • Steady bright = attention step (Level <10%). • Flashing 1Hz = Phase 1* (Level 0%). Strategy: engine weakening • Flashing 1Hz = Phase 2* (Level 0% and DEF pump pressure 0%). Strategy: engine weakening and limited speed.
	Emission-related malfunction of the exhaust gas after-treatment system (SCR / EGR / DPF) or DEF supply. • Steady bright = filter replacement required. • Flashing 1hz = filter replacement required. • Flashing 1hz = filter replacement required Phase 1*. Strategy: engine weakening. • Flashing 1hz = filter replacement required, system reaction active.
	Steady bright: DPF filter regeneration required.
	Steady bright: DPF regeneration approved and activated.
	Steady bright: DPF regeneration disabled by the operator.
	Steady bright: regeneration enabled and high temperature of the exhaust gas.

: Contact your agent or dealer immediately.

Parked regeneration of DPF filter (vehicle stopped)

DPF regeneration is an automated procedure, which is initiated by the operator when the following warning lights are flashing: o + after 50 hours of operation with an engine speed reduction of 25%.

Park the vehicle in a safe and sufficiently ventilated place.

Check the following points:

- Neutral gear selector.
- Parking brake applied.
- No action on the manipulator of the hydraulic controls.
- Boom in transport position.
- Accelerator pedal released.
- Manual accelerator not used.

Check that the fuel level is sufficient.

Start the vehicle and run the engine for a few minutes to bring it to operating temperature (60° C -140° F).

Press the button for more than two seconds to start the DPF regeneration procedure.

The steady lighting of the button (blue or yellow) validates the activation of the procedure.

Follow the steps indicated on the information display.

The DPF regeneration procedure should only be interrupted if necessary.

The procedure stops automatically if the operator:

- Operates the joysticks of the hydraulic movements.
- Operates the forward or reverse direction selector.
- Turns off the heat engine.
- Presses the button.

Alert strategies and engine reduction levels (EU - EPA / ARB)

Different control steps of the exhaust gas after-treatment system and polluting emissions can be identified, which follow one another:

- Normal phase.
- Attention phase.

Once the attention threshold has been exceeded, the polluting gas emissions control system intervenes, in two stages, reducing engine performance and up to shutdown:

1. Reduction phase 1 = Low level alert.
2. Reduction phase 2 = Severe - final alert.

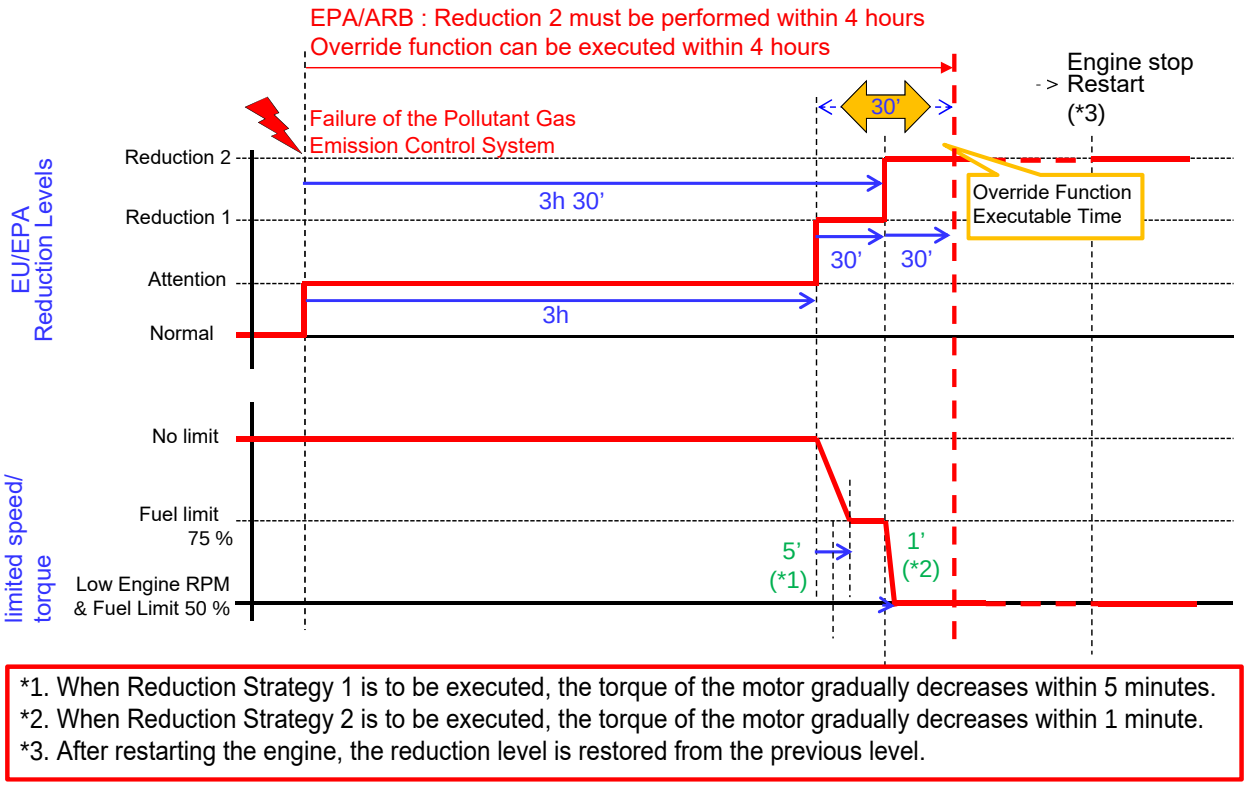


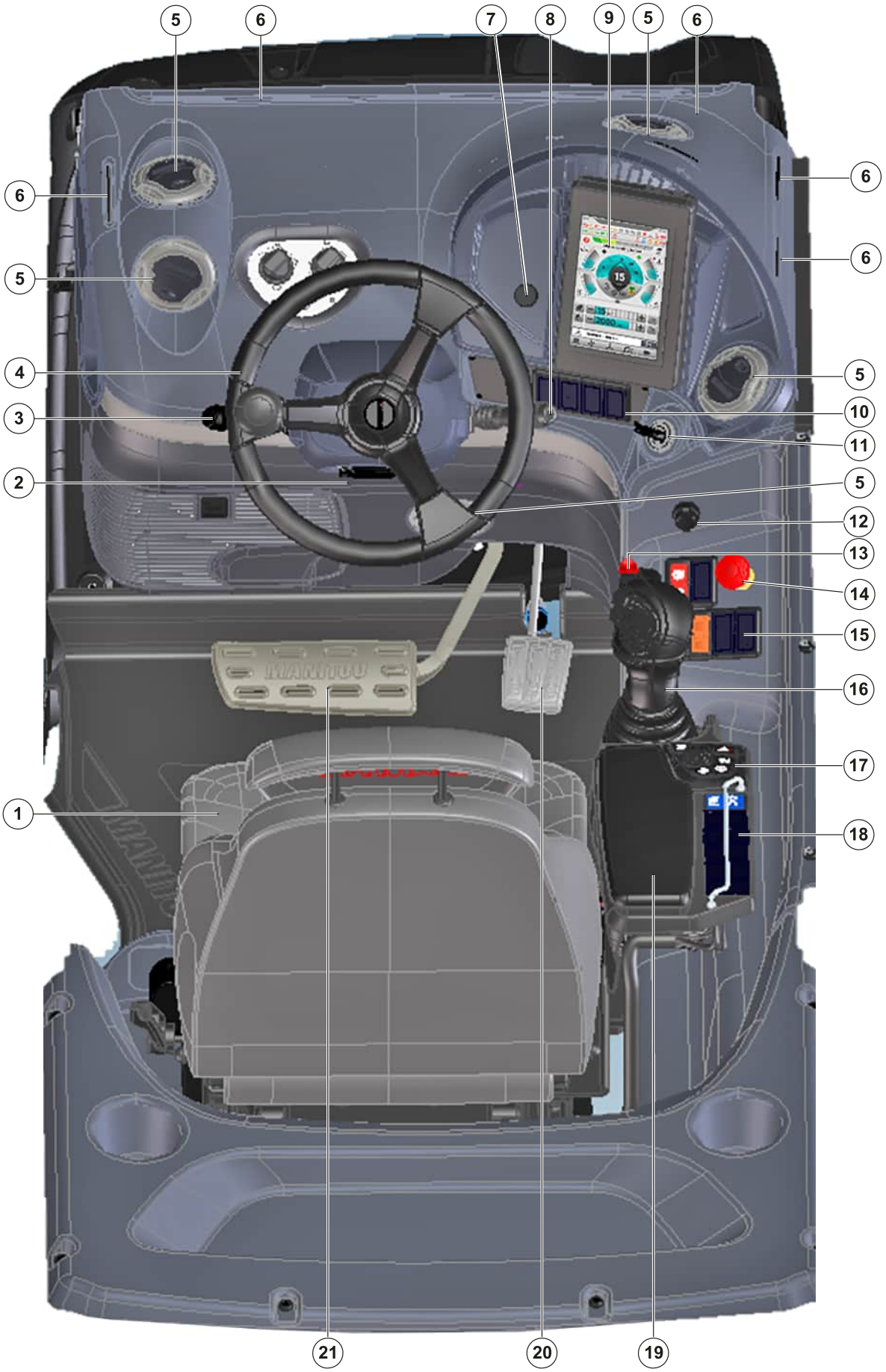
Figure 52: SCR control system chart and EU / EPA strategies

2.4. COMPONENTS

2.4.1 CONTROLS

Driver's cab

Figure 53: Driver's cab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Overview

Ref.	Description
1	Operator's seat
2	Adjustable steering column lever
3	Control lever for lights, horn and indicator lights
4	Steering wheel
5	Heating air vents
6	Demisting diffusers
7	USB Port
8	Front and rear windscreen wiper control lever
9	“HMI” display (man-machine interface)
10	Dashboard switch console
11	Ignition lock
12	USB Port
13	Forward / neutral / reverse direction selector
14	"Emergency stop" button
15	Armrest switches
16	Joystick
17	“HMI” information screen navigator (man-machine interface)
18	Armrest button console
19	Armrest and compartment
20	Accelerator pedal
21	Service brake pedal and inching control

2.4.2 PEDALS

SERVICE BRAKE PEDAL

The pedal (1) acts on the front and rear wheels and allows you to slow down and block the vehicle.
The brake pedal (1) in the first 20 mm of travel works as an Inching pedal allowing for precise and slow movements, in the remaining stroke it produces the braking effect.

ACCELERATOR PEDAL

Pedal (2) that allows you to vary the speed of the vehicle by acting on the number of revolutions made by the heat engine.

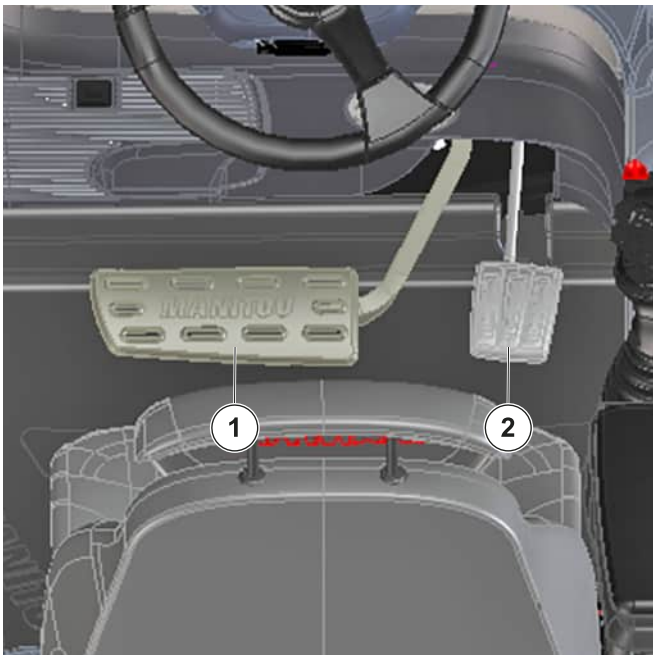


Figure 54: Pedals and diagnosis sockets

2.4.3 ADJUSTABLE STEERING COLUMN LEVER

Adjusting the steering wheel

The lever (1) allows you to adjust the steering wheel to suit the operator.

Push down the lever (1) to loosen the grip of the steering wheel lock:

- Adjust the height.
- Adjust the telescopic adjustment.

Pull the lever (1) up to lock the steering wheel.

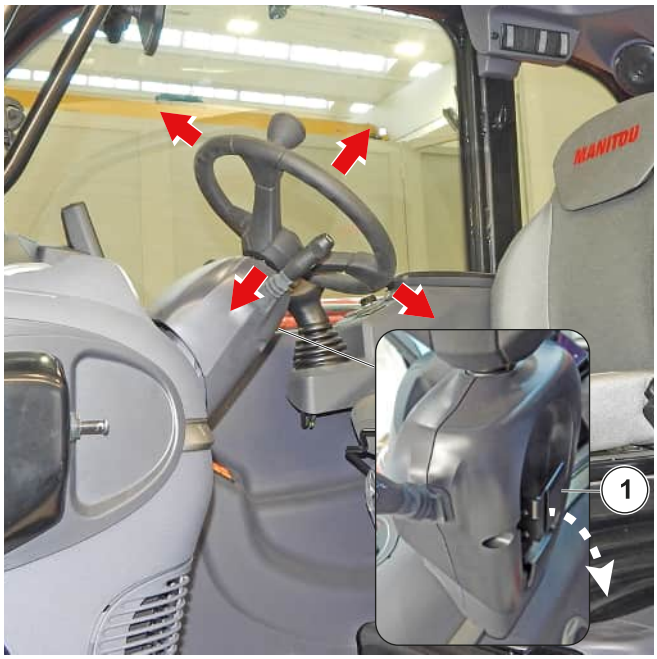


Figure 55: Adjusting the steering wheel

2.4.4 FRONT AND REAR WINDSCREEN WIPER CONTROL LEVER

The switch controls:

- Front windscreen wiper.
- Rear windscreen wiper.

Front windscreen wiper

- Front windscreen wiper stop (2)
- Low speed selection for front windscreen wiper (2).
- High speed selection for front windscreen wiper (2).
- Front windscreen wiper intermittent control (2).
- Front windscreen washer, with pulse drive (2).

Rear windscreen wiper

- Rear windscreen wiper stop (1)
- Rear windscreen wiper selection (1).
- Rear windscreen washer, with pulse drive (2).

To control the features move or press the lever (2) or rotate the selector (1).

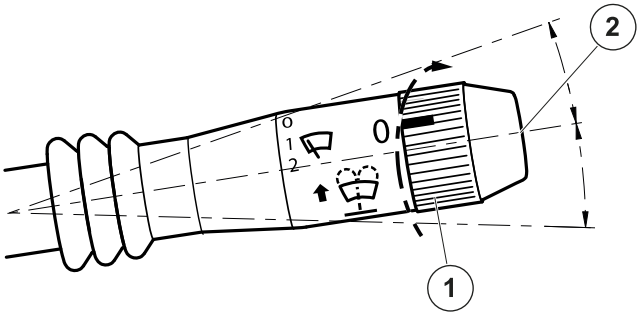


Figure 56: Front and rear windscreen wiper control lever

2.4.5 CONTROL LEVER FOR LIGHTS, HORN AND INDICATOR LIGHTS

The switch controls:

- Turning on the lights (1).
- Direction indicators (1).
- The acoustic signal (2).

To control the features move (1) or press (2)(horn) the lever (1) or rotate the selector (1).

When some features are enabled, warning lights on the display light up.

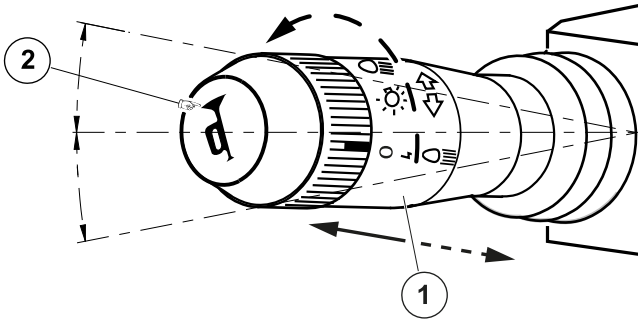


Figure 57: Control lever for lights, horn and indicator lights

2.4.6 USB PORT

The USB port (1) equipped with “Plug and Play” support is a cable connection for communication and power supply between electronic devices.

Figure 58: USB Port

2.4.7 12V SOCKET

For 12 V and 10 A devices maximum.

Figure 59: 12V socket

2.4.8 CUP HOLDER

The following standard accessory (1) is available in the cabin of all machine models:

Figure 60: Cup holder

2.4.9 PHONE HOLDER

The following standard accessory (1) is available in the cabin of all machine models:

Figure 61: Phone holder

2.4.10 CEILING LAMP

CEILING LAMP

The switch (1) is incorporated in the ceiling light (2).

The switch (1) has two positions:

- Continuous lighting.
- Shutdown.

Figure 62: Ceiling lamp

2.4.11 CONTROLS ARMREST ADJUSTMENT CONTROL KNOBS

The knobs (1) and (2) are used to adjust the length and height of the controls armrest.

Height adjustment

Turn and unscrew the knob (1) to release the controls armrest and move it to the desired position. Screw the knob (1) back in to lock the armrest in place.

Reach adjustment

Turn and unscrew the knobs (2) to release the controls armrest and move it to the desired position. Screw the knobs (2) back in to lock the armrest in place.

Figure 63: Controls armrest adjustment

2.4.12 DOOR OPENING LEVER

The lever (1) is found in the cabin. To release the door, press the lever (1) forward.

Figure 64: Door opening lever

2.4.13 DOOR OPENING / CLOSING HANDLE

The handle (1) is found in the cabin and allows the operator to open or close the door after it has been released. Grab the handle (1) to move the door.

Figure 65: Door opening / closing handle

2.4.14 REAR WINDOW OPENING LEVER

The lever (2) opens and closes the rear window (3).

The rear window has 3 positions (a, b, c):

1. Turn the lever (2) clockwise and push it to open the rear window (3).
2. Lock the rear window in place (a, b, c) using the knob (1).
3. Close the rear window using the lever (2) and make sure it returns to the locked position.

Emergency exit

If it is impossible to get out of the cabin door, use the rear window (3) as an emergency exit.

Figure 66: rear window opening lever

2.4.15 DOOR OPENING HANDLE AND BUTTON (OUTSIDE THE CABIN)

The button (1) and handle (2) are found outside the cabin. The button is fitted with the lock (3) which closes the door using the ignition key. If the lock is released, you can grip the handle (2) and press the button (1) to open the door.

Figure 67: Door opening handle and button (outside the cabin)

2.4.16 ARMREST AND COMPARTMENT

Lift the armrest (1) to access the storage compartment (2).

Figure 68: Armrest and compartment

2.4.17 AIR DIFFUSERS

AIR DIFFUSERS FOR DEMISTING SIDE AND FRONT WINDOWS

For optimum efficiency, before turning on the air diffusers (1) for demisting the windows, close the heating air vents (2).

HEATING AIR VENTS

The heating vents (2) allow for distributing ventilated air inside the cabin E on the side window.

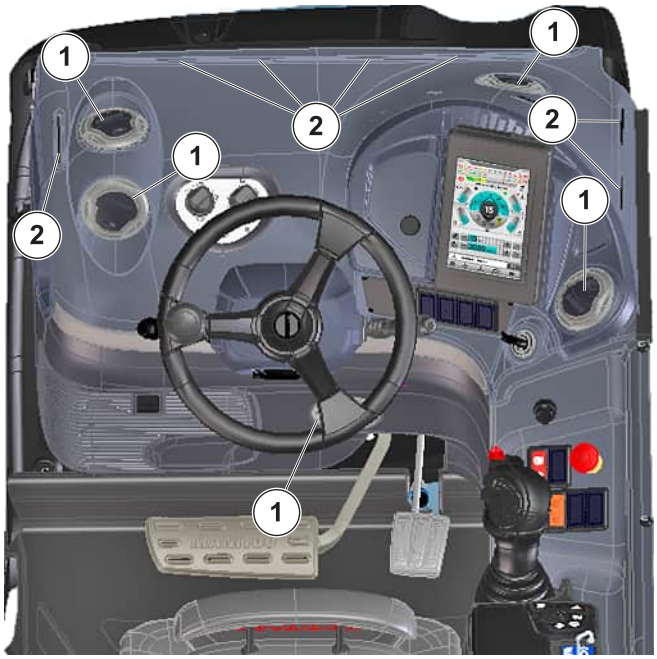


Figure 69: Air diffusers

2.4.18 REGISTRATION PLATE

The vehicle is designed for the posting of the registration plate (1) for road traffic and its lighting (2).

The registration plate must comply with mandatory regulations in the country where the vehicle is registered.

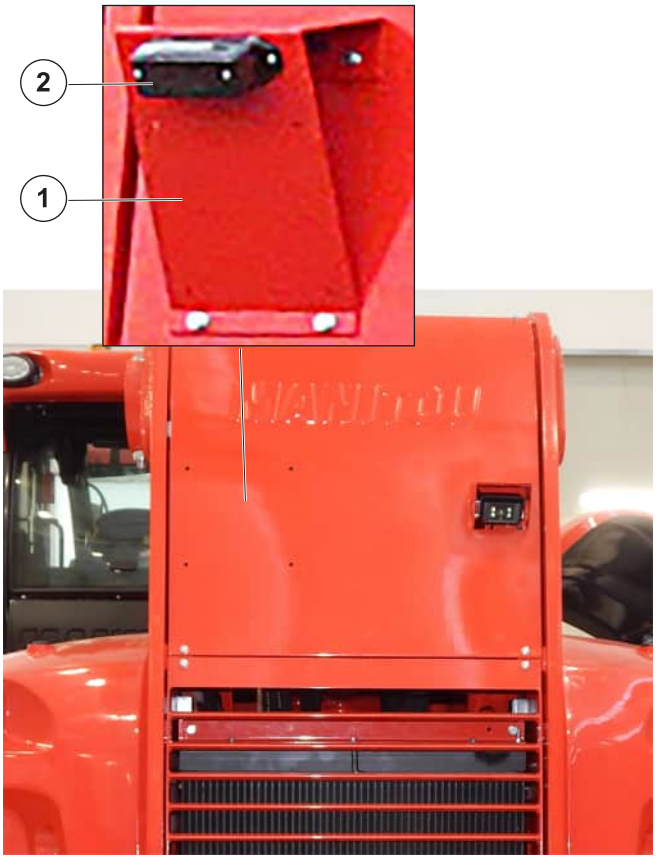


Figure 70: License plate and plate lighting

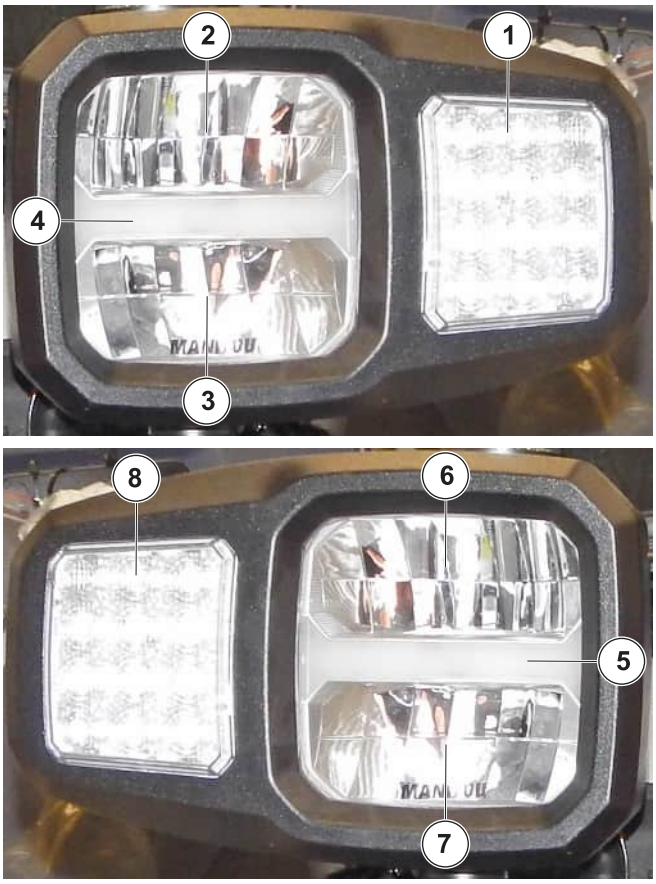


Figure 71: Headlights

2.4.19 HEADLIGHTS

1. Front left indicator light (amber)
2. Front left low beam light (white).
3. Front left high beam light (white).
4. Front left parking light (white) with daylight feature.
5. Front right turn signal light (white).
6. Front right low beam light (white).
7. Front right high beam light (white).
8. Front right parking light (white) with daylight feature.

2.4.20 REAR LIGHTS

1. Rear left turn signal light (amber).
2. Rear left tail light and brake light (red).
3. Reflector (red).
4. Rear fog light (red).
5. Rear reversing light (white).
6. Reflector (red).
7. Rear left tail light and brake light (red).
8. Rear right turn signal light (amber).

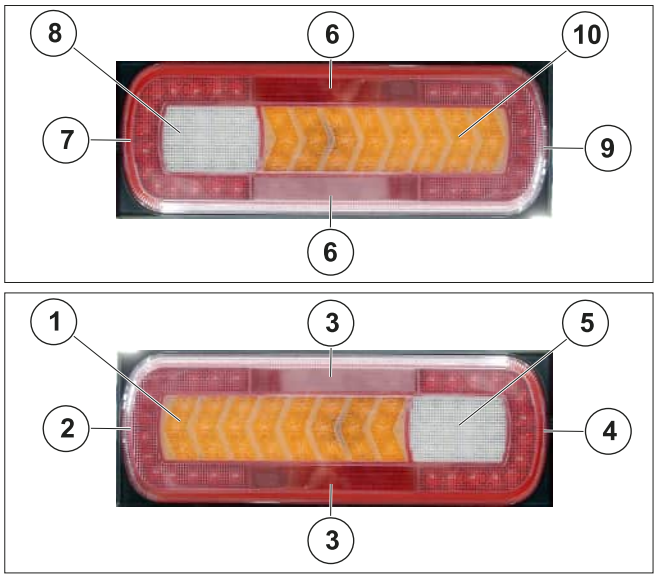


Figure 72: Rear lights

2.4.21 BEACON AND SIGNAL HEADLIGHT

AMBER LED BEACON

The beacon (1) must be turned on every time the vehicle is used to indicate that it is in operation. The beacon (1) is turned on from the cabin by pressing the button on the "HMI" navigator.

FLASHING WHITE LED HEADLIGHT

The headlight (2) on (slow double white flash) warns and indicates that the remote control feature is enabled and that the vehicle is being remotely controlled. The headlight (2) off, indicates that the remote control feature is not active.

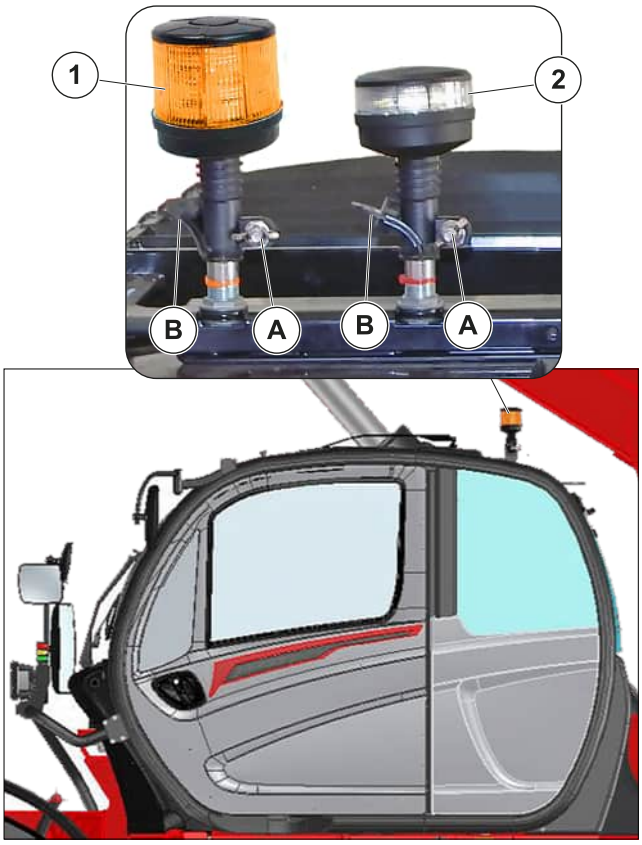


Figure 73: Beacon and signal headlight

The beacon (1) and the headlight (2) can be tilted to reduce, when necessary, the overall space taken up by the vehicle. The beacon (1) and the headlight (2) can also be disassembled to prevent theft:

- Unscrew the nut (A) and remove the beacon or the headlight.
- Protect the base with the cover (B).

2.4.22 INDICATION COLUMNS FOR CHECKING THE LOAD STATUS

External indicator light (1), indicating the percentage of load raised compared to the max. permitted load in these working conditions.

- Green light on: safety zone (2)
- Yellow light on (external horn activated ”3”): alarm zone, load raised higher than 90% of permitted load (4).
- Red light on (external horn activated “3”): stop zone, load raised higher than 100% of permitted load (5).

Figure 74: Indication columns for checking the load status.

2.4.23 GLASS BREAK HAMMER

The glass break hammer (1) with double-sided hammer head and steel tips is used to break the glass in the event of an emergency.

The hammer is found in the cabin near the driver.

⚠ DANGER

In the event of an emergency or danger use the hammer to break the glass and get out of the vehicle.

Figure 75: Emergency glass break hammer

2.4.24 BOX FOR SAFETY KEYS

The safety keys box (1) is fitted with a glass break hammer (2) and a glass window (3).

The safety keys box (1) is found in the cabin near the driver.

In the event of an emergency or danger break the glass and take the keys.

Figure 76: Box for safety keys

2.4.25 BOOM SAFETY WEDGE

Only use the safety wedge (1) supplied with the vehicle.

⚠ DANGER

Risk of crushing

During installation of the safety wedge, do not stand under the telescopic boom.

The vehicle is equipped with a safety wedge (1) which prevents accidental descent of the telescopic boom during maintenance operations of the same or in the areas below it. The boom safety wedge must be installed on the rod of the handler cylinder.

When not in use, the safety wedge (1) is positioned on the vehicle turret through its fixings (1a).

Figure 77: Boom safety wedge

2.5. OPERATOR AREA

2.5.1 GETTING IN AND OUT OF THE VEHICLE

The vehicle is equipped with access steps (1) and handles (2) which are located inside the cabin to facilitate the operator's entry and exit from it.

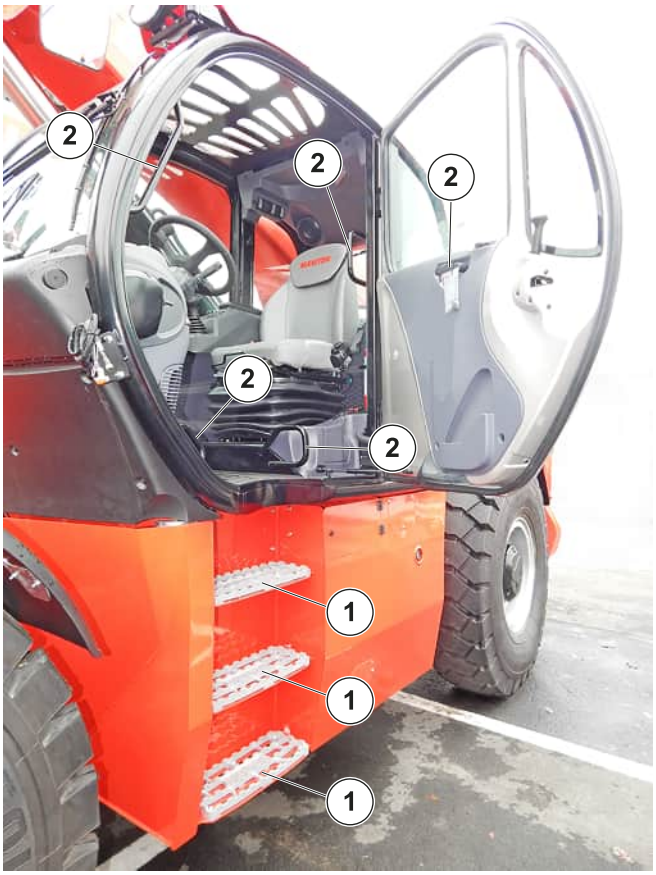


Figure 78: Getting in and out of the vehicle

2.5.2 DRIVER'S SEAT (STANDARD)

Designed for maximum comfort, this seat can be adjusted as follows.

1. Seat height adjustment.
   Sit in the seat properly. Turn the knob (1) until you reach the desired height, clockwise to raise it and counter-clockwise to lower it, making sure the green light (2) is visible. If the light (2) becomes red, readjust the height.

   The seat is designed not to require adjustments for the weight of the driver.

2. Reach adjustment.
   Pull the lockign lever (3) upwards.
   Move the seat to the desired position.
   Release the lever and make sure it returns to the locked position.

3. Tilting seat backrest.
   Supporting the seat backrest, push the lever (4) back and tilt the backrest to the desired position.
   Release the lever and make sure it returns to the blocked position.

   If the backrest is not supported during adjustment, it will tilt all the way forward.

4. Headrest extension.
   The height of the headrest (5) can be adjusted by pulling it upwards (the grooves will snap into the joints) as far as the stop.
   The headrest can be removed by applying enough pressure to free it from the stop.

Figure 79: Driver's seat (standard)

2.5.3 PNEUMATIC / HEATED DRIVER'S SEAT (OPTIONAL)

Designed for maximum comfort, this seat can be adjusted as follows.
Sit in the seat properly. Switch on the electrical contact of the vehicle.

1. Height adjustment of the seat.
   Pull or press the lever (1) until you reach the desired height, making sure the green light (2) is visible.
   If the light (2) becomes red, readjust the height.

   The seat is designed not to require adjustments for the weight of the driver.

2. Reach adjustment.
   Tilt the locking lever (3) upwards.
   Slide the seat to the desired position.
   Release the lever and make sure it returns to the locked position.

3. Horizontal shock absorber.
   In certain conditions (for instance when driving with a trailer), we recommend the use of a horizontal shock absorber.

The driver's seat therefore has a greater capacity to absorb shocks in the direction of travel.
Tilt the lever (3) downwards to lock the horizontal shock absorber.

4. Tilting seat backrest.
   Supporting the seat backrest, push the lever (4) back and tilt the seat to the desired position.
   Release the lever and make sure it returns to the blocked position.

   If the backrest is not supported during adjustment, it will tilt all the way forward.

5. Headrest extension.
   The height of the headrest (5) can be adjusted by pulling it upwards (the grooves will snap into the joints) as far as the stop.
   The headrest can be removed by applying enough pressure to free it from the stop.

6. Lumbar adjustment
   Turn the knob (6) counter-clockwise to select one of the lumbar support settings (5).

7. Seat heating.
   The switch (7) activates the heating of the seat cushion and backrest.

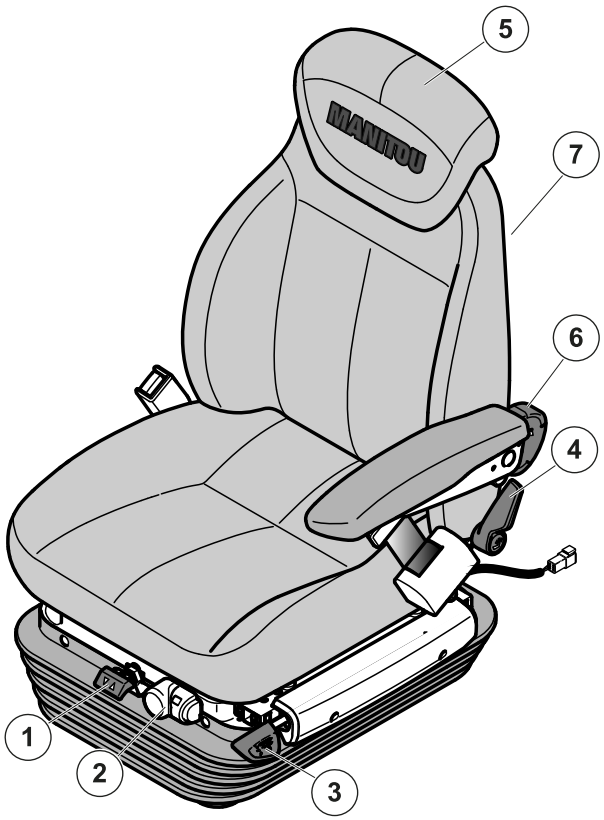


Figure 80: Pneumatic / heated driver's seat (optional)

2.5.4 SEAT BELT

Sit in the seat properly.

- Make sure that the belt (1) is not twisted.
- Wear the belt at the level of the pelvis.
- Fasten the seat belt (1) and check that it is securely locked (2).
- Adjust the belt according to your body size, avoiding compressing the pelvis and without excessive play.

Never use the vehicle with a defective seat belt (fastening, locking, stitching, tearing, etc.). Repair or replace the seat belt immediately.

Figure 81: Safety belt

2.5.5 IGNITION SWITCH

The switch (1) has 4 positions and its features are:

- **0** : STOP heat engine.
- **I** : General electrical contact "+" (also activates the preheating device if installed).
- **II** : Not used.
- **III** : STARTING the heat engine and returning to position "I" after releasing the key (also deactivates the preheating device if installed).

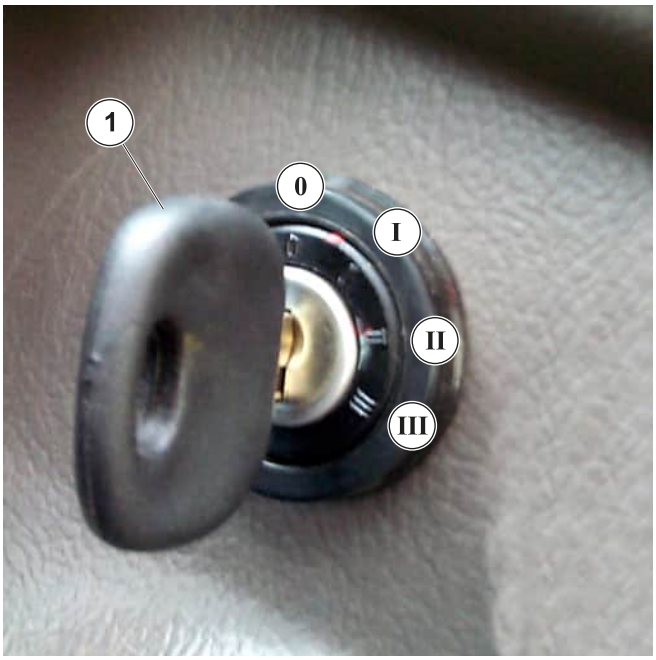


Figure 82: Ignition switch

2.5.6 "EASY MANAGER" ANTI-START SYSTEM (OPTIONAL)

"Easy MANAGER" identification keypad

It requires the creation of identification for the operator from the "EasyMANAGER" portal. For more information contact the dealer.

OPERATION

BY MEANS OF IDENTIFICATION CODE

- Insert the electrical contact on the vehicle, the LED (1) lights up.
- Enter the identification code and confirm it by pressing the (V) key.
- The LED (2) lights up green to confirm operator identification.
- Switch on the vehicle immediately, after this period, the identification is canceled and the LED (2) turns red.

In the event of a typing error, the LED (2) lights up red, press the (X) key and wait 10 seconds before entering the correct identification code.

BY MEANS OF IDENTIFICATION CARD

- Insert the electrical contact on the vehicle, the LED (1) lights up.
- Show the identification card, a beep confirms the reading of the card.
- The LED (2) lights up green to confirm operator identification.
- Switch on the vehicle immediately, after this period, the identification is canceled and the LED (2) turns red.

Figure 83: "Easy MANAGER" anti-start system

2.6. DISPLAY

2.6.1 DISPLAY CONTROL

INFORMATION SCREEN OF HMI NAVIGATOR

(human machine interface)

The contents of the "SETTINGS" and "DIAGNOSTICS" menus vary according to the equipment of the vehicle.

1. ROTARY KNOB WITH CONFIRMATION BUTTON.

   The knob rotates clockwise and counterclockwise.

   Turn the knob to scroll the buttons on the pages and navigate within them (if possible), press the knob to confirm your preferences.

   Turning the knob (1) activates the highlighting and moves it to elements on the page.

   On each page, activation starts from the MENU button (bottom bar, left side).

   By turning the knob (1) clockwise, the highlight will move to the shortcuts and then to the screen above.

By turning the knob (1) counterclockwise, the highlight will move to the top area and then to the bottom screen.

Once activated, section highlighting will start from the first element at the top / left of the selected area.

2. SETTINGS PAGE

   Briefly press the button (2) to display the "SETTINGS" page.

   Turn the knob (1) to navigate on the page and the sub-menus.

   Press the knob (1) to confirm your preference.

3. DIAGNOSTICS PAGE

   Briefly press the button (3) to display the "DIAGNOSTICS" page.

   Turn the knob (1) to navigate the menu and sub-menus.

   Press the knob (1) to confirm your preference.

4. BACK BUTTON

   Briefly press the button (4) to return to the previous screen.

Figure 84: Display control

2.6.2 DISPLAY ICONS

Overview of symbols and features:

Table 23. Indicators

INDICATORS	
	Sidelights
	Dipped beam headlights
	Main beam headlights
	Rear fog lamp
	Indicator lights
	Vehicle door open
	Engine coolant temperature
	Fuel Reserve (Fuel level less than 10% of tank capacity)
	Hydraulic oil temperature (Blue indicator on, the temperature is low: below 20°)
	Front wheel alignment
	Rear wheel alignment
	Front wheel drive (Driving on road)
	Opposite direction forward and backward wheel steer (Small turning radius)
	Front and rear wheel drive in the same direction (lateral movement)
	Centre differential locked (MHT/MHT-X 10200, 11250)
	Low gear engaged

INDICATORS	
	Fast gear engaged
	Restore transmission (MHT/MHT-X 10200, 11250)
	Slow working mode (MHT/MHT– X 790-10135-10160)
	Diesel exhaust fluid (DEF) tank level
	Emission-related malfunction of the exhaust after-treatment system or of the DEF supply
	Approval of regeneration of the DPF filter
	DPF filter regeneration required
	DPF filter regeneration disabled by the operator
	Active regeneration and high temperature of the exhaust gas
	Maximum moving speed adjustment
	Heat engine RPM adjustment
	Continuous optional (Oil flow % setting)
	Radio control (Optional)
	Maintenance interval
	4 braking power levels of the magnetic retarder (Optional)
	
	

INDICATORS	
	

Table 24. Warning lights

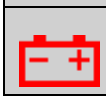
WARNING LIGHTS	
	Serious heat engine failure
	Heat engine malfunction
	Alternator excitation
	Heat engine oil pressure
	Engine air intake filter clogged
	Transmission oil filter clogged
	Hydraulic oil filter clogged
	Parking brake on
	Low brake oil pressure
	Steering malfunction
	Red warning light for disabling the load limiter
	DANGER! Red warning light for disabling the load limiter

Table 25. Icons

ICONS	
	Eco fuel mode (Lit blue or yellow in operation)
	Drive & Handling shift mode (Lit blue or yellow in operation)

ICONS	
	Eco mode Stop heat engine (Lit blue or yellow in operation)
	Eco fuel mode (Lit blue or yellow in operation)
	Drive & Handling shift mode (Lit blue or yellow in operation)

2.6.3 DISPLAY PAGES

The color screen display (1) shows and informs the operator about all the work phases of the vehicle.

Different control modes stored in the display memory (1) can be selected on touchscreen or via the “HMI” navigator (2) on the right armrest (3) in the cabin.

Figure 85: Display control mode

Upon startup, the HMI shows the Manitou startup animation for 10 seconds while waiting for the application to be ready.

The Manitou logo appears 1 second after the dashboard is activated.

Figure 86: HMI start

The fixed features of the HMI areas are:

- The information bar (1).
- The warning lights and indicators (2a), the load status bar (2b).
- Audio playback in progress (3).
- The button bar (4).
- The top (5) and bottom (6) may be different in relation to the activity shown.

Overview:

- Information bar area (1):

  it contains the outdoor temperature, configuration and time.

- Warning lights and indicators area (2a), the load status bar (2b):

  it contains the warning lights or indicators, the errors activated, the load status bar, the status of the selector that disables the anti-tipping system and the type of attachment connected.

- Load status bar (2b) indicates the percentage of load lifted with respect to the maximum load that can be lifted in those working conditions:
  - Green part: Safety Zone.
  - Yellow part: Alarm zone. Lifted load greater than 90% of the permissible load (external horn active).
  - Red part: Blocking zone. Lifted load greater than 100% of the permissible load (external horn active).
- Top (5):

  contains the main view and the bars of the selected page.
- Bottom (6):

  contains touch integration which causes changes at the top.
- Repetition area (3):

  multimedia or radio information.
- Button bar area (4):

  it contains the main menus of the HMI, man-machine interface.

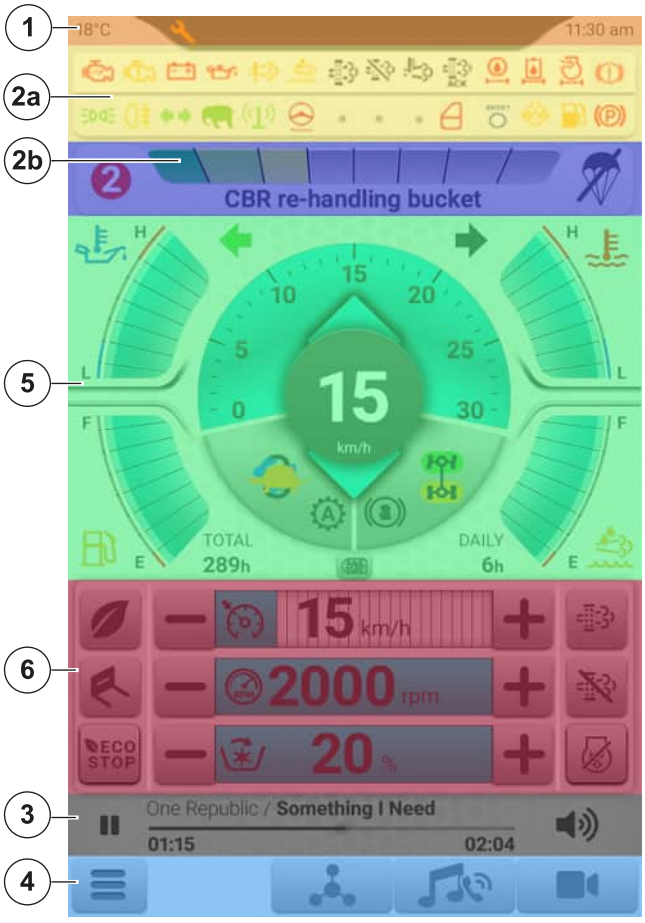


Figure 87: HMI area

2.6.4 BUTTON BAR

- MENU (Main Functions) (A)
- MULTI-FEATURE (B)
- FM RADIO / DAB / USB & PHONE MANAGEMENT (C)
- REAR CAMERA (D)

Briefly press the button to access the content.

Select a button (B, C, D) of the bar (4), the button is highlighted and the content is opened at the bottom of the screen.

Select button (A) to open the drop-down menu on the left side of the screen (see MENU PAGE).

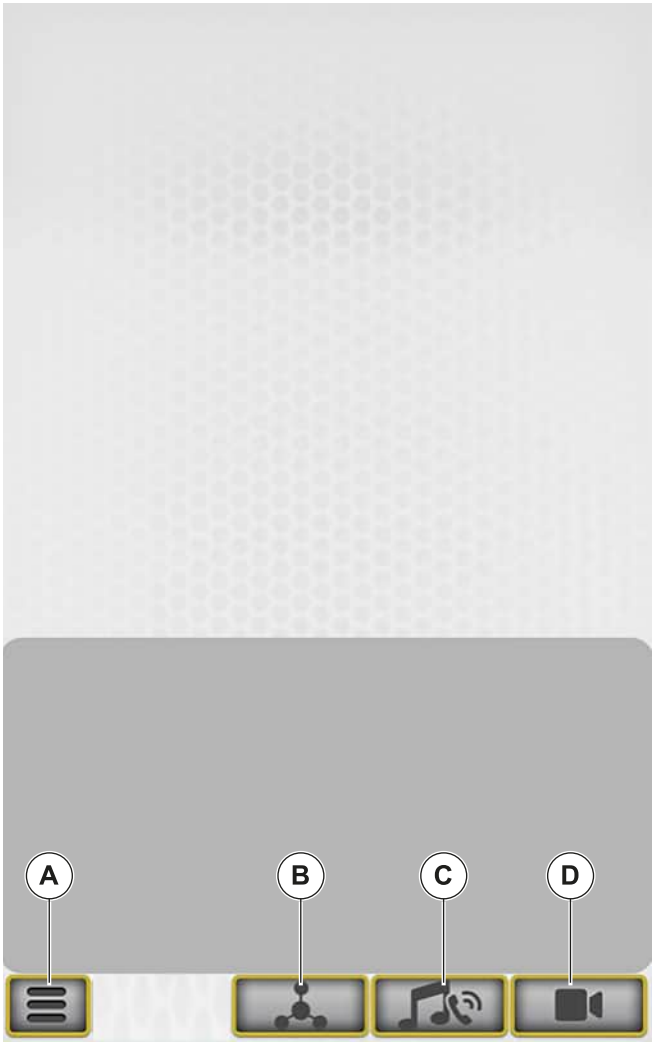


Figure 88: Button bar

B - MULTI-FEATURE BUTTON

(The features may differ depending on the machine model)

Press the button briefly to access some features of the vehicle.

Briefly press the controls to enable or disable the features.

Table 26. Icons overview

Icon	Description
	Easy accessory hydraulic connection
	Exterior rear view mirror heater

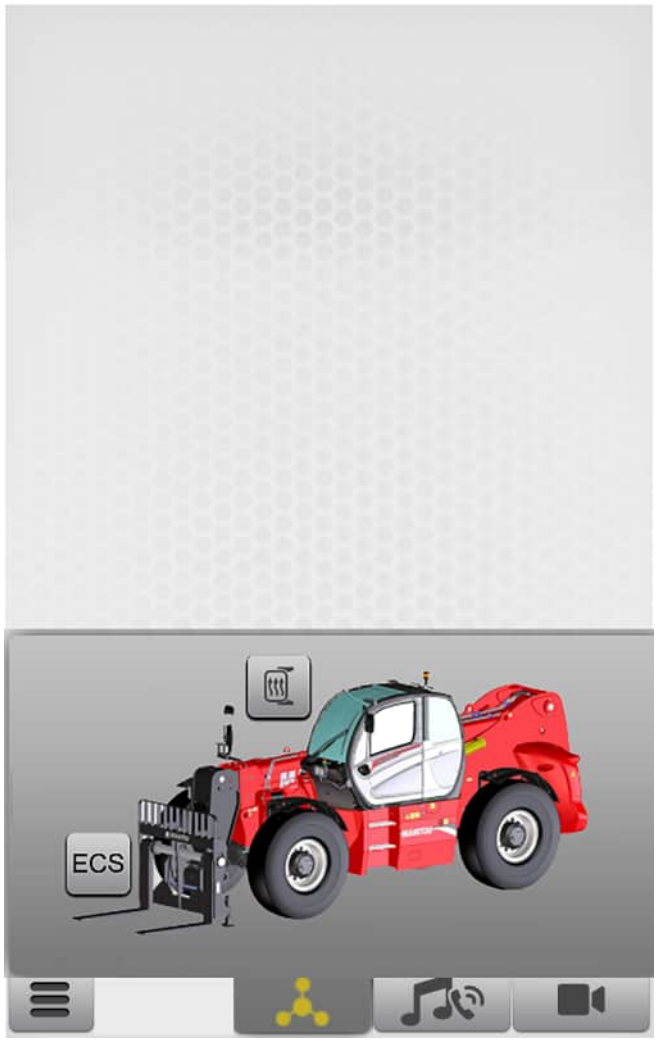


Figure 89: Multi-feature button

C - FM RADIO / DAB / USB & PHONE MANAGEMENT (OPTIONAL)

Briefly press the button to access the management screen of RADIO, USB, BLUETOOTH, TELEPHONE features. The button is highlighted.

Press the buttons briefly to enable the features. Selected buttons or enabled features are highlighted.

Figure 90: Radio management button

D - REAR CAMERA (OPTIONAL)

Briefly press the touch screen button to access the screen. The button is highlighted.

The camera shortcut can be shown at the operator's request or during reverse gear activation.

The camera shows the rear of the vehicle.

Figure 91: Rear camera

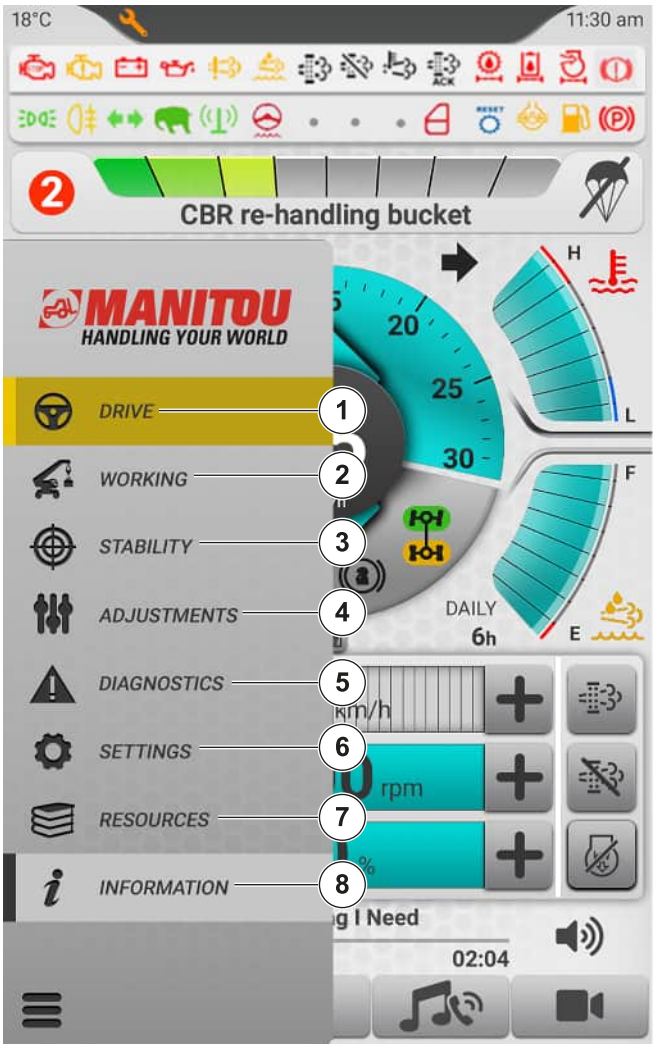


Figure 92: Menu Pages

2.6.5 MENU PAGES

Overview:

1. "DRIVE" PAGE
2. "WORKING" PAGE
3. "STABILITY" PAGE
4. "ADJUSTMENTS" PAGE
5. "DIAGNOSTICS" PAGE
6. "SETTINGS" PAGE
7. "RESOURCES" PAGE
8. "INFORMATION" PAGE

2.6.6 "DRIVE" PAGE

The “DRIVE” page displays the main information related to driving.

The main information in the upper area relates to levels and actual values:

1. Tachometer (x100 rpm) (1).
2. Speedometer (km / h or mph) (2).
3. Engine coolant temperature gauge (3).
4. Diesel exhaust fluid (DEF) level gauge that provides information on the amount of DEF in the tank (4).
5. Fuel level gauge (5).
6. Hydraulic oil temperature gauge (6).
7. Forward - reverse direction indicator (7).
8. Total hours meter (8).
9. Partial hour meters (9).
10. Consumption (10).

The main information in the lower area relates to engine and transmission settings:

11. Setting the maximum speed of the vehicle (11).
12. Engine revs setting (rpm) (12).
13. Continuous adjustment of the oil flow of the attachment line (13).
14. ECO STOP button (14) Enabling this feature allows the engine to stop after a certain time interval. Briefly press the button to enable or disable the feature. Once the button is pressed, it is highlighted.
15. "HANDLING" driving mode (15) This feature allows you to select the "HANDLING" driving mode: for handling loads in the work area. Briefly press the button to enable or disable the feature. Once the button is pressed, it is highlighted to indicate that the feature is active.
16. ECO MODE (16) Enabling this feature allows you to reduce fuel consumption if the driving speed is kept constant. Briefly press the button to enable or disable the feature. Once the button is pressed, it is highlighted.
17. Regeneration request button (17) Keep the button pressed to enable the feature. Once the button is pressed, it is highlighted.
18. Regeneration inhibition button (18) Press the button briefly to enable the feature. Once the button is pressed, it is highlighted.
19. Engine override feature button (19) Press the button briefly to enable the feature. Once the button is pressed, it is highlighted.

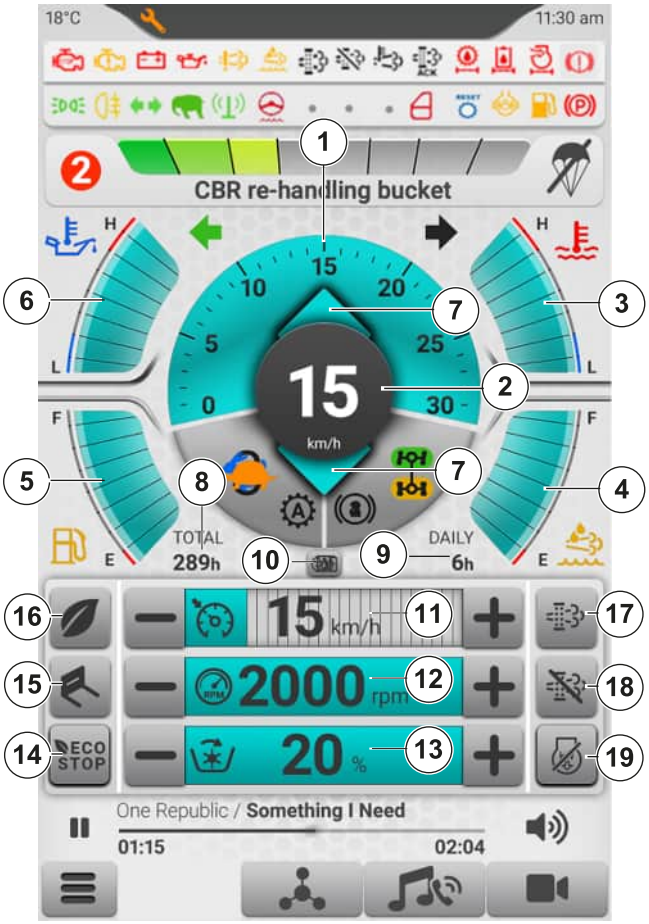


Figure 93: "DRIVE" page

2.6.7 "WORKING" PAGE

The “WORKING” page displays the main information of the vehicle and the reading of the main working data.

Furthermore, on the “WORKING” page, you have the possibility to select three tabs, one at a time, from the tab bar, at the top of the screen.

Always displayed in the central area of the screen is the load chart inherent to the attachment connected to the vehicle which changes automatically according to the working condition of the machine, stabilized or on tires.

Tab overview:

- GEOMETRICAL: Displays the chart and geometric values of the vehicle.
- DIAGRAM INFO (LOAD CHART): displays the complete chart without geometric values.
- SIMULATOR: displays and allows a simulation of maximum load.

"GEOMETRICAL" tab:

- Maximum permissible load.
- Weight of the lifted load.
- Length of the telescopic boom.
- Ground clearance.

- Telescopic boom angle.
- Working radius: measurement of the distance from the center of the machine to the projected point of application of the load.
- Attachment quick coupling tilt angle.
- Vehicle tilt angle.

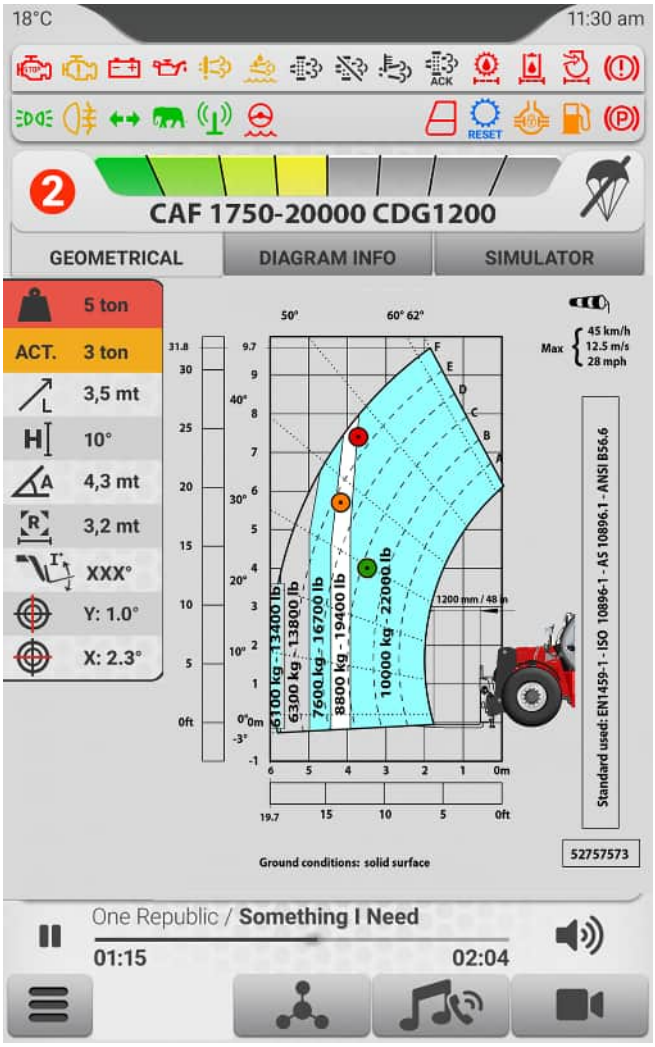


Figure 94: "GEOMETRICAL" tab

"DIAGRAM INFO" tab

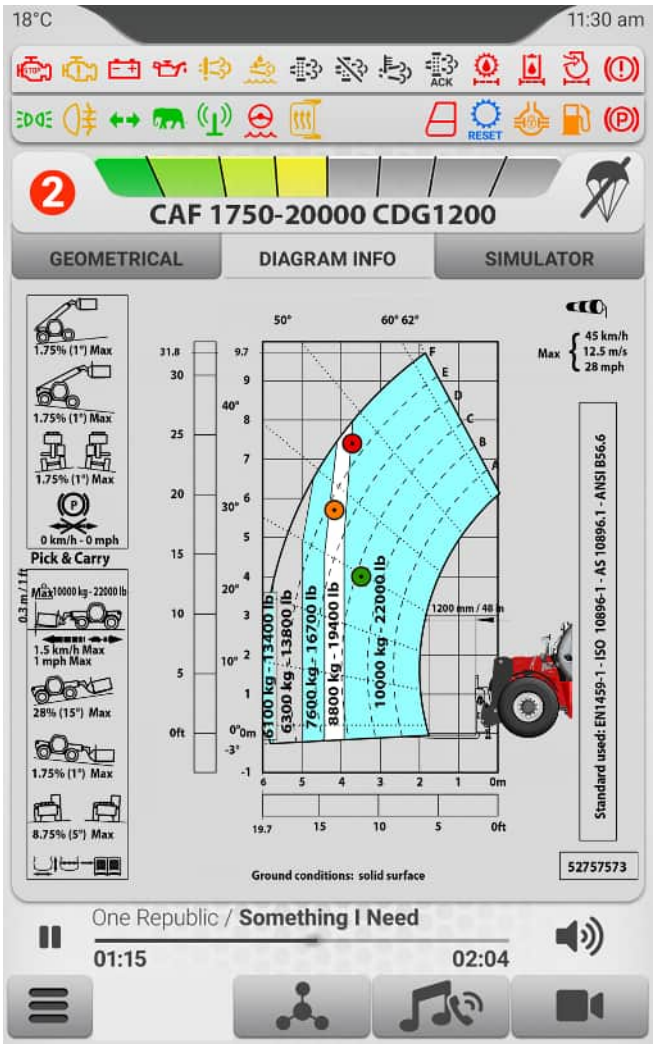


Figure 95: "DIAGRAM INFO" tab

"SIMULATOR" tab

Figure 96: "SIMULATOR" tab.

To obtain the maximum load value from the simulator, the operator must:

- Access the SIMULATOR tab and select the “Press to launch simulation” icon,

Figure 97: Press to launch simulation.

- Select the “Input values” icon (desired geometrical values to determine a specific working condition),

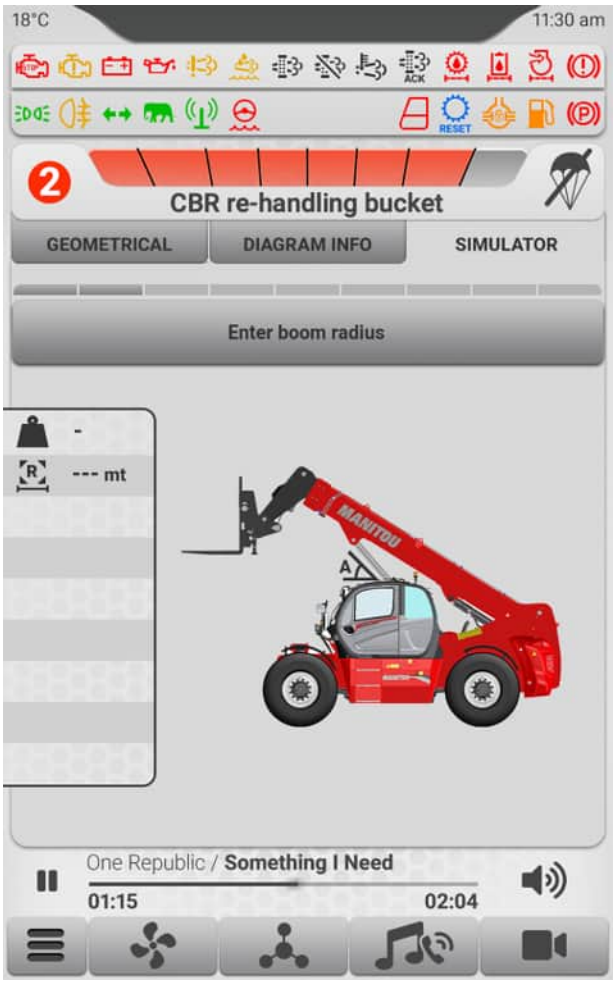


Figure 98: Input values.

Figure 99: Number keypad.

- Select the value(s) on the number keypad shown on the display and confirm it/them with “OK”,
- Once the value(s) has/have been inputted, the “Settings completed” icon appears and the table of geometrical values shows the highlighted “maximum load” value resulting from the simulator calculation.

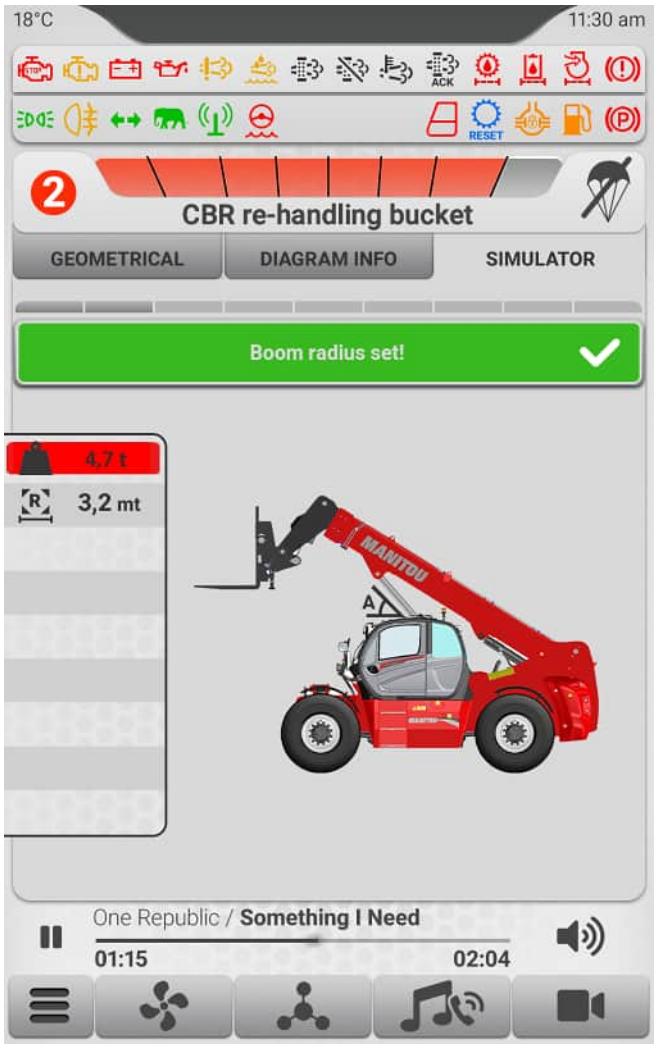


Figure 100: Maximum load resulting from the simulator calculation.

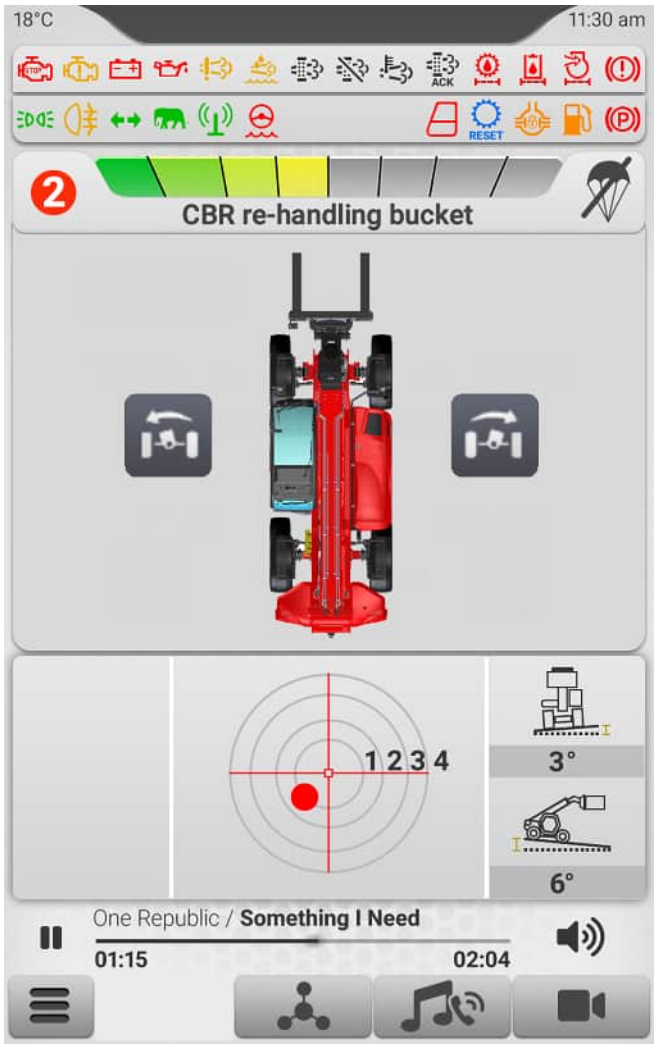


Figure 101: "STABILITY" page

2.6.8 "STABILITY" PAGE

The “STABILITY” page displays the main information of the vehicle and the information concerning the chassis.

The chassis level +/- corrector control can be selected in the center.
This operation is linked to the control buttons on the right armrest of the driver's seat.

The graduated electronic level Indicator is shown at the bottom, along with the information concerning the tilt of the chassis length-wise and laterally.

2.6.9 "ADJUSTMENTS" PAGE

The “ADJUSTMENTS” page displays the main information regarding the geometric limits and the slowed speed of the hydraulic movements and for this it is necessary to select two tabs, one at a time, from the tab bar at the top of the screen.

Tab overview:

- LIMIT (LIMITS): displays and allows for setting geometric limits parameters.
  This feature allows you to set an operational limit in a work area.
- SLOWING DOWN: displays and allows you to set the maximum speed parameters of the hydraulic movements.

"LIMIT" tab:

- "Corridor" workspace.
- “Wall” workspace.
- “Roof” workspace.

The top displays the geometric limit set.

The bottom allows you to modify and enable / disable the feature.

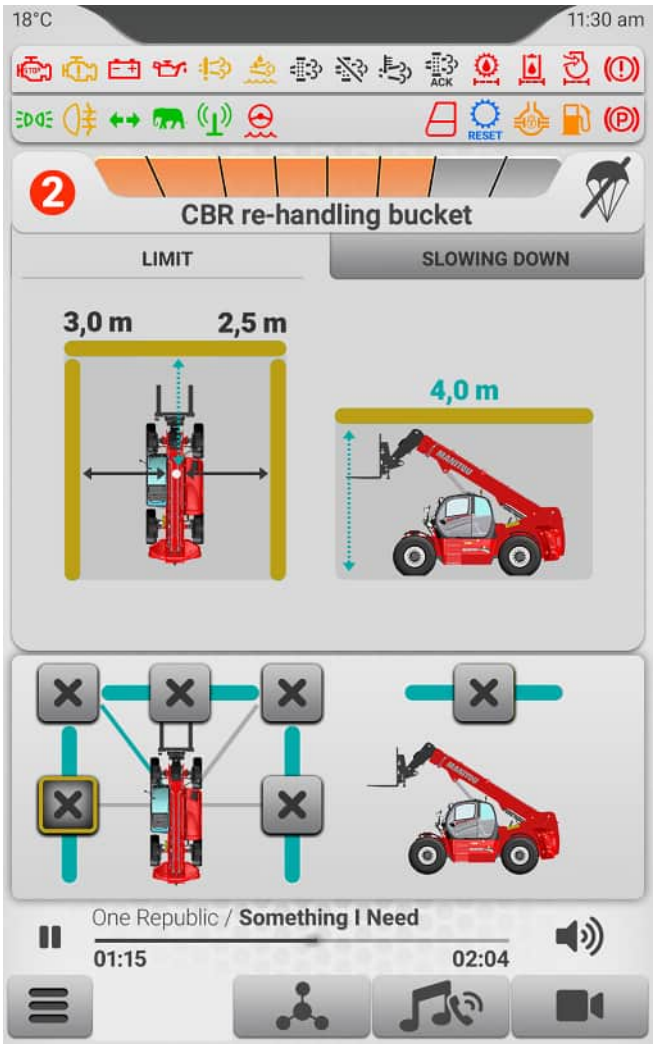


Figure 102: "LIMIT" tab

"SLOWING DOWN" tab:

- Maximum speed of ascent of the telescopic boom.
- Maximum speed of descent of the telescopic boom.
- Maximum extension speed of the telescopic boom.
- Maximum retraction speed of the telescopic boom.
- Maximum tilt-up speed of loads.
- Maximum tilt-down speed of loads.
- Maximum speed of control of the movements of the attachment: up, clockwise rotation, to the right, tilt up (depending on the attachment installed).
- Maximum speed of control of the movements of the attachment: descent, anticlockwise rotation, to the left, tilt down (depending on the attachment installed).

The maximum control speed of the hydraulic movements is expressed as a percentage: from 100% to 0%.

It is possible to set and save two working systems. Furthermore, it is possible to set the maximum control speed of the hydraulic movements by briefly pressing the “MAX” button.

Figure 103: "SLOWING DOWN" tab

2.6.10 "SETTINGS" PAGE

The “SETTINGS” page displays the main information set by the factory or by the operator relating to the “HMI” display.

The “SETTINGS” menu information is visible on the left side of the screen and is highlighted when selected.

The operator can display and change three settings.

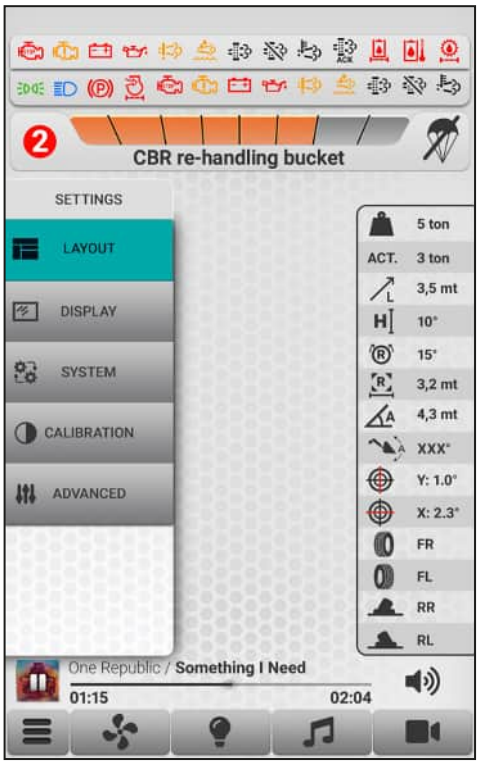


Figure 104: "SETTINGS" page

Table 27. "SETTINGS" menu overview

Menu	*1st submenu*	*2nd submenu*
LAYOUT		
	Graphics	Day / Night / Auto
	Color	Blue / Yellow
	Unit of measure	Metric / Imperial
	Temperature	Celsius / Fahrenheit
DISPLAY		
	Brightness	0-100%
SYSTEM		
	Language	IT, EN, FR, etc.
	Clock	Top right value
	Partial hours reset	
	Attachments list	

Figure 105: Example of "SYSTEM" submenu

Figure 106: Example of "Night" graphic screen

Figure 107: Example of "Yellow" color screen

2.6.11 "DIAGNOSTICS" PAGE

The “DIAGNOSTICS” page displays the main information relating to the active errors of the vehicle, with control unit, DTC code and occurrences.

You need to select three tabs, one at a time, from the tab bar at the top of the screen.

You can press on the error line to view its description, a pop-up window will open.

Tab overview:

- DTC (information about engine errors).
- DATALOGGER (information about the CODE, date and transition.

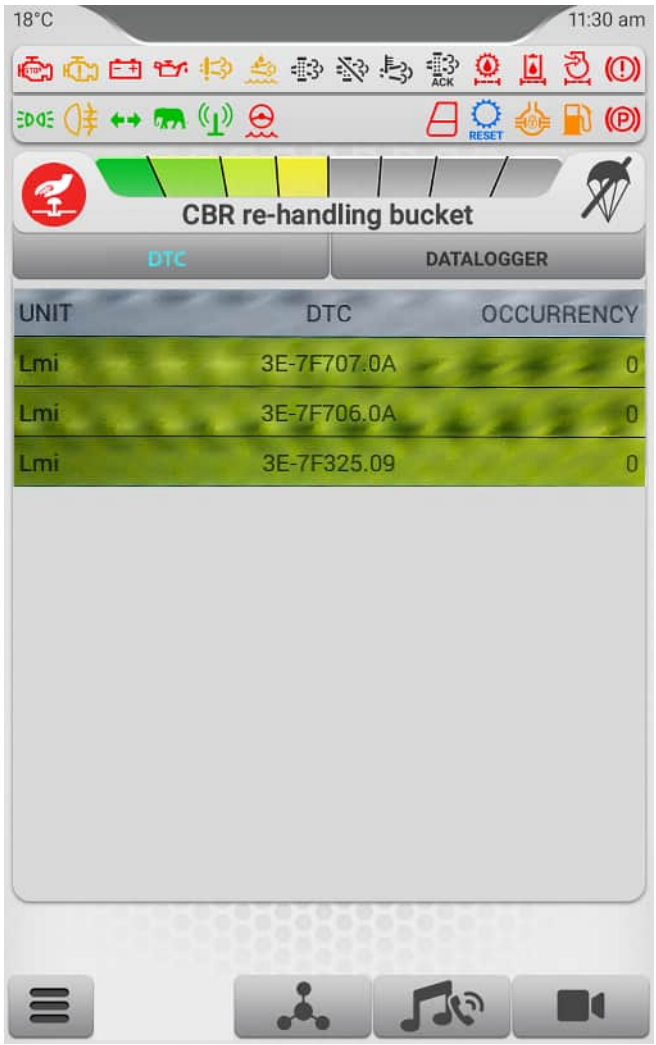


Figure 108: DTC tab

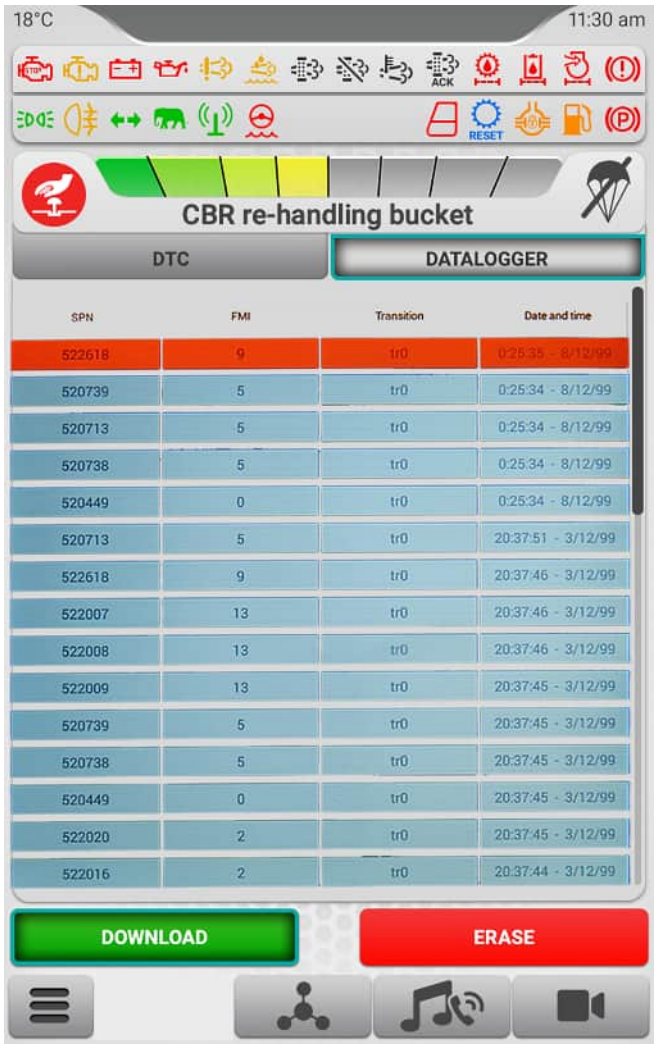


Figure 109: DATALOGGER tab

2.6.12 "RESOURCES" PAGE

The “RESOURCES” page (ADDITIONAL RESOURCES) displays the main information relating to the documentation useful to the operator.

RESOURCES menu overview:

- DISPLAY TUTORIAL
- USER MANUAL

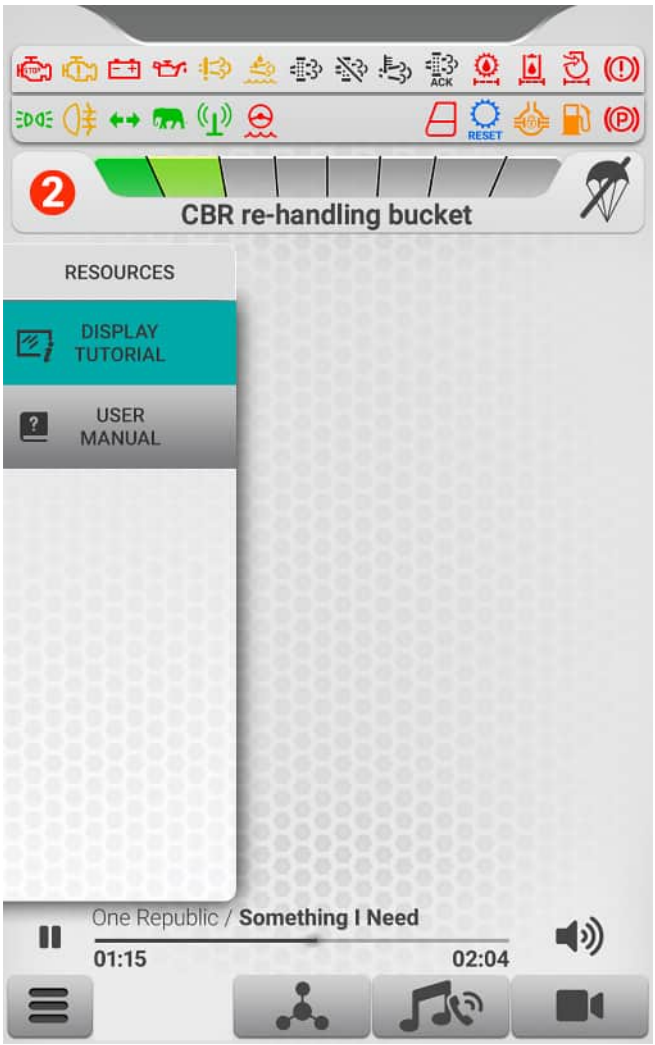


Figure 110: "RESOURCES" page

2.6.13 “INFORMATIONI PAGE

The “INFORMATION” page displays the main information regarding the software version, the version of the load charts and the attachments list.

you need to select two tabs, one at a time, from the tab bar at the top of the screen.

INFORMATION tabs overview:

- VEHICLE INFO
- ATTACHMENTS (ATTACHMENT INFORMATION)

"VEHICLE INFO" tab, displays information about the software version:

- Load charts.
- LMI version.
- Main version.
- HMI version.
- Aux 1 version (Platform).
- Aux 2 version (Optional).
- Manitou SN
- OM Table.
- TCU (Transmission).

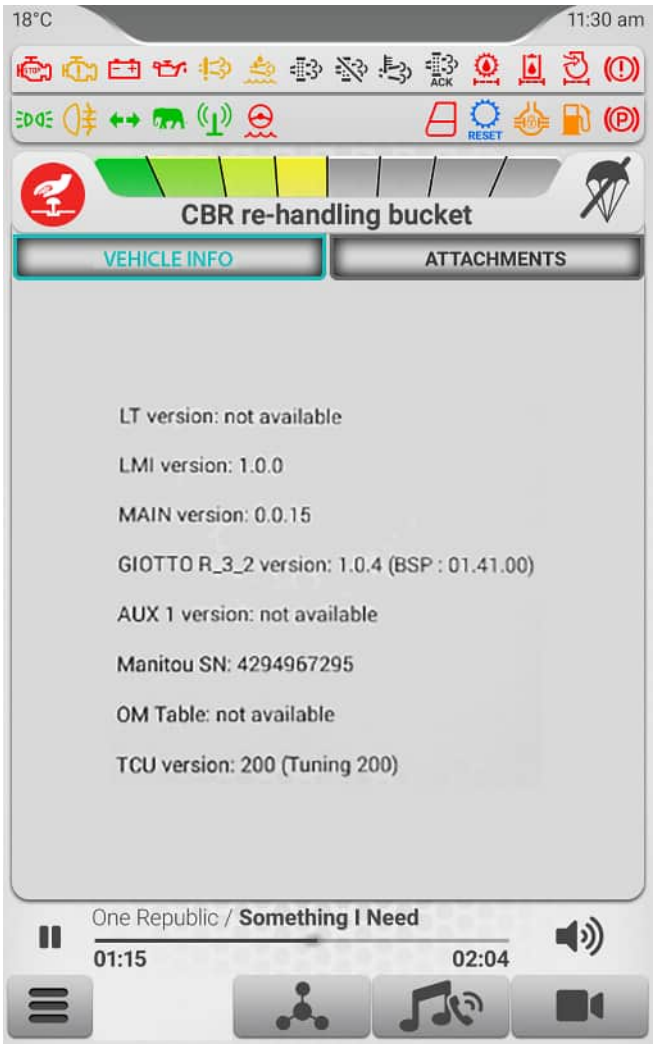


Figure 111: "VEHICLE INFO" tab

"ATTACHMENTS" tab, displays the information relating to the list of attachments available in the flashing load table:

- Index
- Attachment name
- Acronym

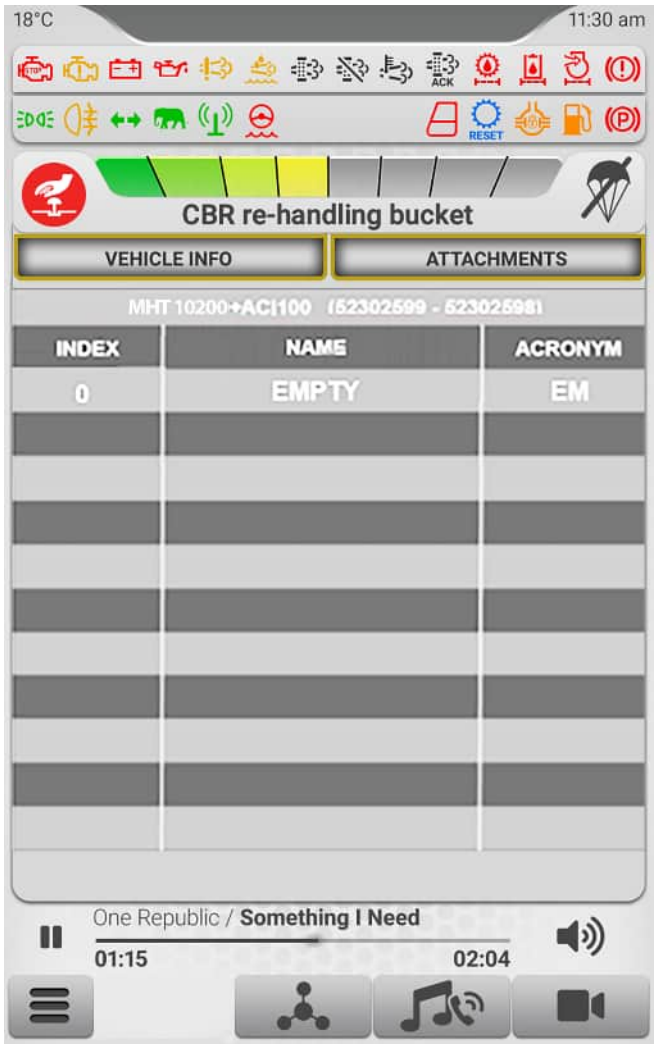


Figure 112: "ATTACHMENTS" tab

2.7. CHECK INDICATORS

2.7.1 JOYSTICK

The joystick (1) is found in the cabin, on the armrest (2).

Authorization to use the hydraulic controls is provided by the driver presence confirmation and confirmed by observing the conditions of use of the hydraulic controls.
To enable and perform movements, hold down the maneuver consent sensor (OK) found on the joystick.

⚠ WARNING

Do not attempt to alter the pressure of the hydraulic system.

If you suspect a fault, contact your dealer. ANY ALTERATION COULD CANCEL AND INVALIDATE THE WARRANTY. To avoid incidents caused by the shaking of the machine, use the hydraulic controls with care and without jolting.

When driving on the road, we recommend you disable all hydraulic movements.

Figure 113: Joystick

GENERAL TELESCOPIC BOOM MOVEMENTS

- LIFTING AND LOWERING THE LOAD.
- TILTING THE LOAD FORWARD OR BACK.
- EXTENDING OR RETRACTING THE BOOM.
- ATTACHMENT

Table 28. Selector overview

	Confirmation of hydraulic movements“OK”.
	Direction selector: Forward / Neutral / Reverse.
	Maximum force and driving torque selector (MHT/MHT- X 790-10135-10160): • + : maximum force and driving torque (reduced moving speed) • - : standard driving torque and speed

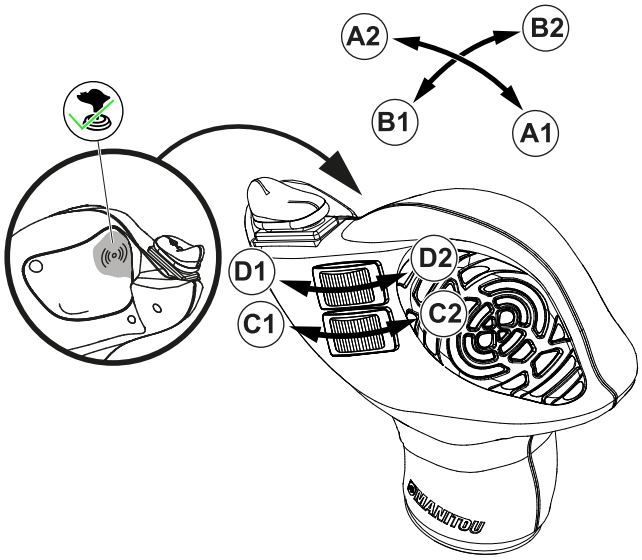


Figure 114: Joystick movements

Joystick controls

LIFTING AND LOWERING THE LOAD

- Pull the joystick back (A1) to lift the load.
- Push the joystick forward (A2) to lower the load.

TILTING THE LOAD FORWARD AND BACK

- Move the joystick towards the left (B1) to tilt the load back.
- Move the joystick towards the right (B2) to tilt the load forward.

EXTENDING AND RETRACTING THE TELESCOPIC BOOM

- Turn the roller (C1) forward to extend the boom.
- Turn the roller (C2) back to retract the boom.

ATTACHMENT

- Turn the roller forward (D1) or back (D2) to control the movements of the attachment.

2.7.2 BUTTONS AND CONTROLS

BUTTON FEATURES

- Red button: safety.
- Orange button: Transmission / engine.
- Blue button: hydraulic system.
- Black button: other.

BUTTON DIAGNOSTICS

- If all buttons are off, there is a power supply problem, contact your dealer.
- If all buttons are flashing simultaneously, there is a connection problem, contact your dealer.

Table 29. BUTTONS OVERVIEW

Right armrest	
	Navigation and confirmation knob
	Preferences menu
	Information menu

Right armrest	
	Back
	Exclusion of hydraulic movements
	Beacon
	Hazard warning lights
	Manual parking brake mode
	Automatic parking brake
	Emergency pump (only with platform)
	"Emergency stop" button
	Opposite direction front and rear wheel drive (small turning radius)
	Front wheel drive (driving on road)
	Front wheel drive and rear wheel drive angle block
	Front and rear wheel drive in the same direction (lateral movement)

Right armrest	
	Left tilt correction
	Right tilt correction
	Forced ventilation inversion
	Automatic ventilation inversion
	Magnetic retarder to increase vehicle speed deceleration force (optional)
	Magnetic retarder to decrease vehicle speed deceleration force (optional)
	Speed selector (fast motion)
	Speed selector (slow motion)
	Restore transmission (MHT/MHT-X 10200–11250)

Right armrest keypad	
	Boom suspension (optional)
	Forced boom suspension (optional)

Right armrest keypad	
	Tilt circuit block. Press the button to exclude the hydraulic movements of the tilt circuit. The light indicates its use.
	Attachment circuit block. Press the button to exclude the hydraulic movements of the attachment circuit. The light indicates its use
	Hydraulic block of the attachment
	Flow limiter of the attachment circuit for continuous hydraulic movement of the attachment
	“Quicklift” smart hydraulic feature (optional)
	Activation of optional attachment 1st hydraulic line. Direct line disabled
	Activation of optional attachment 2nd hydraulic line. Direct line disabled

Lower dashboard (door side)	
	Safety system exclusion key
	Safety system exclusion button
	Radio control activation

Lower dashboard (door side)	
	Cabin or platform controls selector (where platform option is present)
	Red button for recovering the cabin controls from the platform in the event of a stop (where the platform option is present)

Canopy (right side)	
	Cabin roof windscreen wiper and washer switch
	Working light switch on boom (optional)
	Working light switch on back of cabin (optional)
	Working light switch on front of cabin (optional)

Canopy (right side)	
	Rear window demister switch (optional)
	Rear fog light switch

Door	
	Electric window button (electric)

2.7.3 HEATER CONTROLS

FAN CONTROL (1)
This 3-speed control allows the ventilation of air through the air vents.

TEMPERATURE CONTROL (2)
Allows the temperature adjustment in the cabin. The fan conveys cabin air at ambient temperature throughout the cabin (4). The fan conveys hot cabin air (3). The intermediate position allows temperature adjustment.

Figure 115: Heater controls.

2.7.4 SAFETY SYSTEM EXCLUSION SELECTOR

The vehicle is equipped with an electronic safety system (MSS) which controls machine overload during work.

The system intervenes automatically by blocking the movements of the telescopic boom.

⚠ DANGER

Risk of vehicle overturning

With the MSS safety system off, the operator and vehicle are exposed to overload and / or tipping over of the vehicle.

Manually switch off the MSS only in exceptional cases and for safety reasons.

Key switch or button selector

To disable the MSS safety system, the operator must turn a key switch (1) or hold down the button selector (1) in the cabin.

Figure 116: Key switch or button selector.

The key (2) is stored inside a safety box (3) located behind the driver's cabin.

Figure 117: Safety box

The key switch (1) or button selector (1) has two positions:

- Security system enabled  .
- Security system disabled  .

When in service, the safety system exclusion selector is in position  : MSS safety system enabled.

2.8. OPTIONAL

2.8.1 AIR CONDITIONING

The air conditioning only works when the vehicle engine is on.

When the air conditioning is in use, it always works with the cabin closed.

During the winter: ensure correct operation and the effectiveness of the air conditioning system. Activate the compressor once a week, even if for a short time, to ensure the lubrication of the internal seals.

In cold climates: warm up the engine before starting the compressor to allow the liquid refrigerant, accumulated in the lower part of the compressor circuit, to turn into gas thanks to the action of the heat emitted by the engine.

Liquid refrigerant can damage the compressor.

Do not try to repair any faults. If the air conditioner is not working properly, contact an authorized dealer.

FAN CONTROL (1)
This 3-speed control allows the ventilation of air through the air vents.

TEMPERATURE CONTROL (2)
Allows the temperature adjustment in the cabin.

- The fan conveys cold cabin air (4).
- The fan conveys hot cabin air (3). The intermediate position allows temperature adjustment.

AIR CONDITIONER CONTROLS
This control, with a pilot light, allows the air conditioner to be turned on.
Heating mode The controls must be adjusted as follows:

- Control with pilot light off (5).
- At the requested temperature (2).
- At the requested speed: 1, 2 or 3 (1).

Air conditioning mode

The controls must be adjusted as follows:

- Control with pilot light on (5).
- At the requested temperature (2).
- At the requested speed: 1, 2 or 3 (1).

Demisting mode

The controls must be adjusted as follows:

- Control with pilot light on (5).
- At the requested temperature (2).
- At speed: 1, 2 or 3 (2).

For maximum efficiency, close the heater diffusers.

Figure 118: Air conditioning

2.8.2 HYDRAULIC BLOCK OF THE ATTACHMENT

Precautions to be taken if the machine is supplied with “hydraulic block of the attachment” device.

This electrically controlled hydraulic movement device allows you to block or unblock an attachment from the operator's seat.
The device operates two pins (X, Y) which move horizontally on the quick coupling, outwards (blocking the attachment) and inwards (unblocking the attachment).

To block the attachment, the two blocking pins must protrude completely from the quick coupling holes.

Description of controls

To select the “hydraulic attachment block” device, the operator must hold down the button on the keypad (1). On the button (1) the LED lights up (2) to indicate that the feature is active.
The operator can operate the two pins (X, Y) by holding down the button (1) and pressing the optional control rocker button (4) on the joystick (3):

- forward (4a) the two pins come out and block the attachment;
- back (4b) the two pins retract and release the attachment.

Releasing the button (1), the operator deactivates the hydraulic attachment blocking device and restores the standard controls of the option.

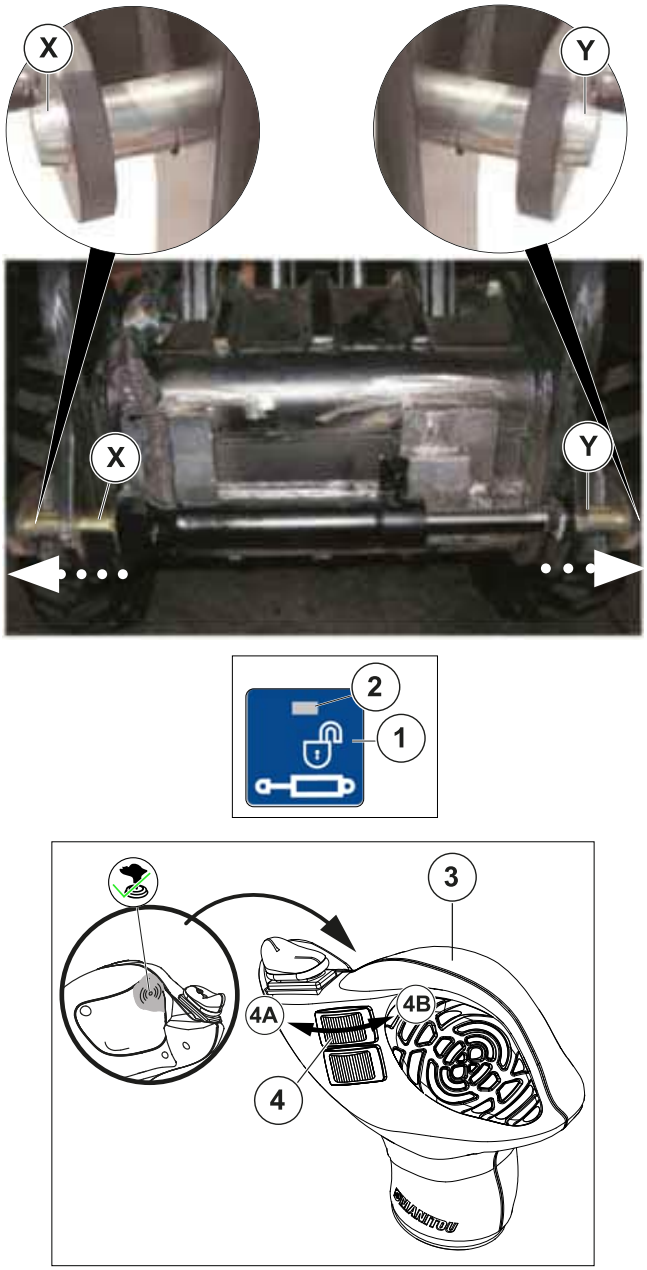


Figure 119: Hydraulic block and description of attachment controls

2.8.3 BOOM SUSPENSION

The boom suspension allows for absorbing the shocks of the vehicle on uneven terrain (example: moving straw in a field).

Activation
There are two types of activation:

1. AUTO key (1), activation above 5 km/h (3.1 mph).
2. FORCED key (2), standard activation requested by the operator.

On keys (1) and (2) a LED lights up (1a) and (2a) to indicate that the feature is enabled.

Operation

- Rest the forks or attachment on the ground and raise the front wheels just a few centimeters.
- Press key (1) or (2), the LED (1a) or (2a) lights up to indicate that the boom suspension is enabled.
- Press key (1) or (2) again, so that the LED (1a) or (2a) switches off to indicate that the boom suspension is disabled.

Deactivation

Boom suspension is not active:

1. AUTO key (1), vehicle movement under 3 km/h (1.8 mph).
2. FORCED key (2), where requested by the operator.
3. FORCED key (2), if the operator operates the telescopic boom lowering control or the load tilt. The feature is reactivated when movement is complete.

Boom suspension is not active:

1. If the telescopic boom is extended and a people carrier attachment is attached.
2. If the boom suspension is temporarily disabled, the LED (1a) or (2a) of the key goes out.
3. If the engine is off.

Figure 120: Boom suspension

2.8.4 "QUICKLIFT" SMART HYDRAULIC FEATURE

The "Quicklift" feature allows the optimization of cycle times by combining the hydraulic lifting/extension movements and lowering/retraction of the telescopic boom.

The load outreach can be adjusted within a horizontal range of ± 500 mm (± 19.6 in) beyond the outreach itself. The "Quicklift" feature is no longer operational. Move back the button (3) to retract the telescopic boom and restore the feature.

- Put the vehicle in transport position.
- Press the button again (1) to activate it. The light (1a) comes on to indicate its use.
- Pull the lever (2) back to lift and extend together.
- Push the lever (2) forward to lower and retract together.

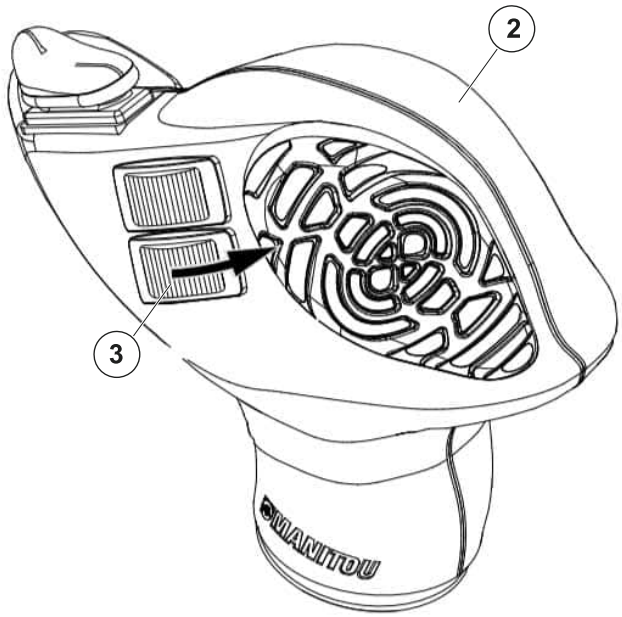


Figure 121: "QUICKLIFT" smart hydraulic feature

2.8.5 FRONT AND SIDE CAMERA SYSTEM

The machine is equipped with a video system which consists of one or two video cameras (1, 2) and a 7" LCD monitor (3) inside the cabin.
The two cameras are installed on the machine on the sides:

1. Front (at the top of the telescopic boom, optional) (1).
2. Side (engine part, near the rear-view mirrors, standard) (2).

The video system is pre-set and connected to the movements and stopping of the machine.

Indeed, when the direction reverser is moved (front-back) (F-N-R):

Standard side camera

- in forward drive "F", the side camera (2) is activated automatically (full screen) (3).
- in neutral "N", the side camera (2) is activated automatically (half-screen) (3).

Optional front camera

in neutral (N), the side camera (2) and front camera (1) of the machine are activated automatically (several screens on the display) (3).

If necessary, the operator can select one of the two cameras by pressing the touch screen to display on full screen (for instance the front view of the camera on the telescopic boom).

Figure 122: Front and side camera system

2.8.6 STANDARD REMOTE CONTROL MHT ST5

1. Transmitter (push button panel) (1).
2. Receiver (2).

2.8.6.1 REMOTE CONTROL FOR ATTACHMENT OPERATION (OPTIONAL)

The radio control consists of:

Figure 123: Radio control

3. Battery charger (3) and battery (3a).
4. Transmitter unit support (4) positioned in the cabin, behind the operator's seat.
   - Release the safety block (4b) to raise the boom (4a) that holds the transmitter unit (1) on the support (4).

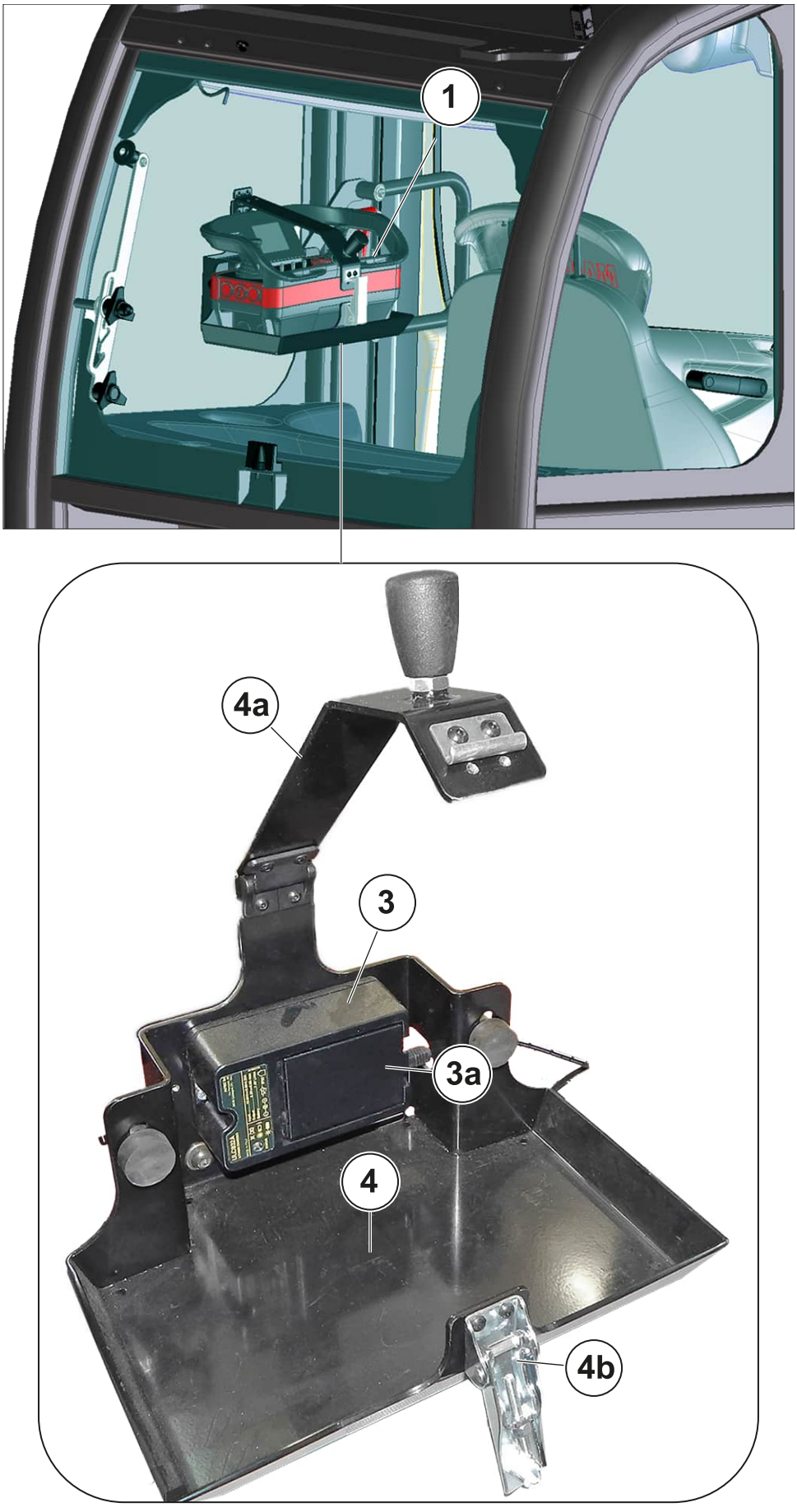


Figure 124: Transmitter unit and support

Radio control identification

The serial number (SN) is the only reference that must be used to uniquely identify the radio control both in case of maintenance interventions and in case of declarations to concerned bodies.

The serial number (SN) and other information relating to the radio control are found on some plates both in the transmitter and in the receiver.

These plates must not be:

- Removed from their position (removal entails the immediate forfeiture of the warranty).
- Altered or damaged (contact MANITOU for replacement).

Transmitter unit plates

There are three plates in the transmitter unit:

1. Identification plate of the radio control.
   Information contained: the serial number of the radio control (SN), a QR code and the year of manufacture.
2. Transmitter unit identification plate.
   Information contained: the year of manufacture, a QR code and the identification number of the transmitter unit (TU ID).
3. Technical data plate.
   Information contained: The Model, the Type and the main technical data of the transmitter unit, the marking and any trademarks of the radio control.

Receiver unit plates

There are two plates on the receiver unit:

1. Receiver unit identification plate.
   Information contained: The serial number (SN) of the radio control, a QR code and the year of manufacture.
2. Technical data plate.
   Information contained: The Model, the Type and the main technical data of the receiver unit, the marking and any trademarks of the radio control.

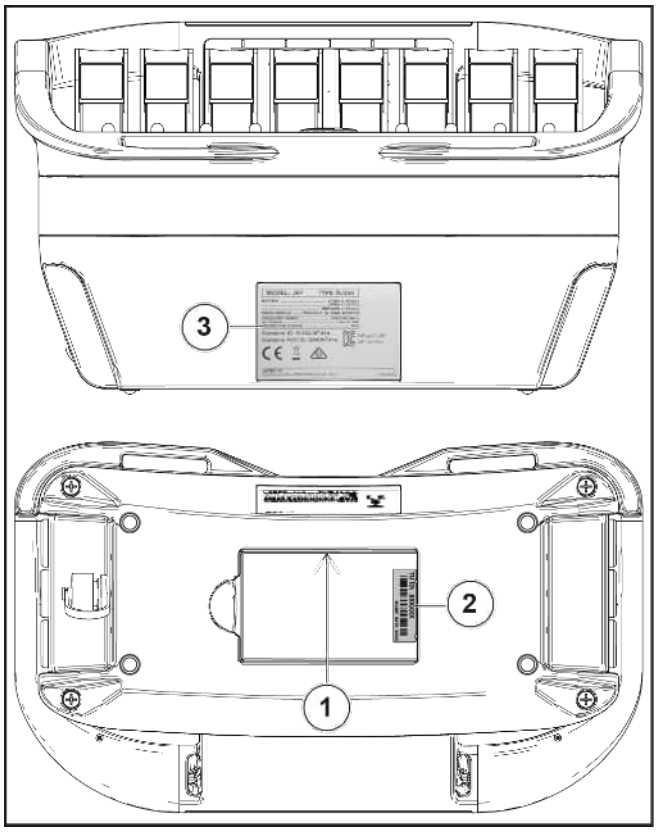


Figure 125: Transmitter unit plates

Receiver unit plates

There are two plates on the receiver unit:

1. Receiver unit identification plate.
   Information contained: The serial number (SN) of the radio control, a QR code and the year of manufacture.
2. Technical data plate.
   Information contained: The Model, the Type and the main technical data of the receiver unit, the marking and any trademarks of the radio control.

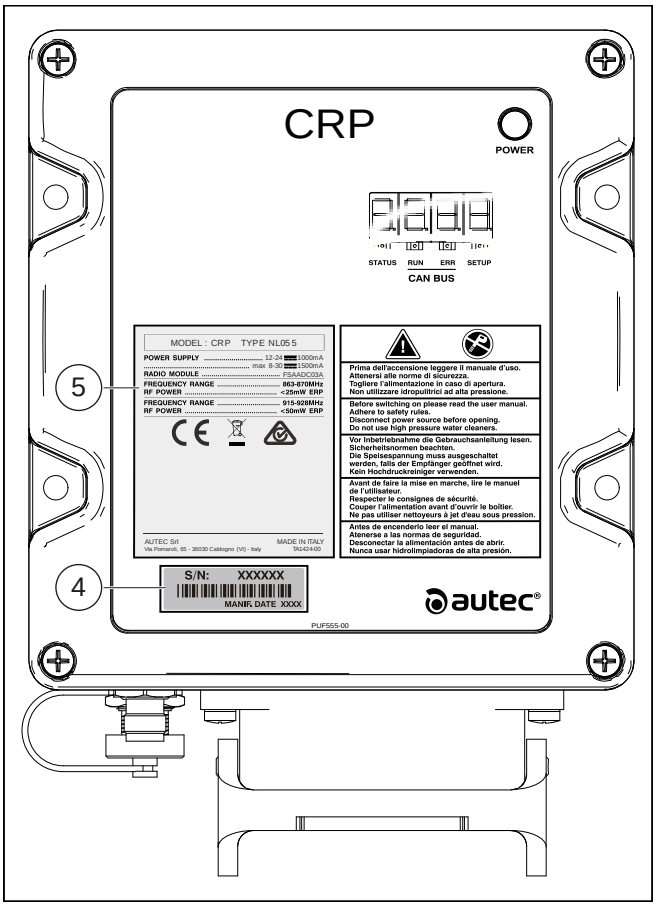


Figure 126: Receiver unit plates

Transmitter unit push-button panel

1. Button to confirm the recognition of the attachment on the display.
2. Engine and horn start consent.
   Sound the horn when the radio control is started.
3. M-KEY: The M-Key allows for powering the transmitter unit.
   Push the M-Key all the way into its housing.
4. Emergency electric pump button for platform rescue:
   - To retract the telescopic boom: keep the button pressed to activate the rescue pump.
   - Perform only the maneuvers strictly necessary to return to the ground.
5. Engine start button:
   - Before switching on, the red EMERGENCY STOP button must be turned off.
   - Press the button (2) then press the button (5) to start the engine.
6. Wired control connector.
   Maneuvering consent from the platform.
7. Button for scrolling the display screens.
8. Button for lighting the display.
9. Not used.
10. Button for turning on the working lights.
11. Button for accessing the attachments screen.
12. 2.8” color display that displays machine work and stability information, engine warnings, attachment in use.
13. Right joystick:
    - Boom lifting / lowering.
    - Forward / back tilting of the load (selected T).
14. Left joystick:
    - Telescopic boom extension / retraction.
    - AUX attachment control.
15. Engine speed management switch (RPM).
16. Speed selector for hydraulic movements.
17. Multiple movements of the attachment: “I / II” and “Hydraulic attachment blocking”.
18. Load tilt or platform leveling consent.
19. "EMERGENCY STOP” red button.
    If pressed, it allows you to stop the heat engine.
    In case of danger, it allows the user to stop hydraulic movements.
    To resume hydraulic movements, turn the red button clockwise.
20. Attachment motion selector.
21. Attachment motion selector.
22. Attachment motion selector.
23. Attachment heavy handling selector consent.

Figure 127: Transmitter unit push-button panel

2.8.6.2 DISPLAY SCREENS

The color screen display built into the transmitter unit shows and informs the operator about the main work phases of the vehicle.

Several control modes in the display memory can be selected using the buttons on the transmitter unit.

List of display screens:

1. Start-up screen
2. Background screen
3. Work screen
4. Joystick screen
5. Engine screen
6. Stability screen
7. Attachments screen
8. Diagnostics screen

“LOGO” screen
Upon startup, the display shows the Manitou startup animation for 4 seconds while waiting for the application to be ready. The Manitou logo appears after activation of the receiver unit.

Figure 128: Start-up screen

Background screen

The fixed characteristics of the display interface are three areas:

- Top (1).
- Center (2).
- Bottom (3).

Overview

- Top: contains the operation indicators and the machine alarm lights.
- Center: contains the main view of the selected screen.
- Bottom: contains the battery level indicator of the transmitter unit and the power indicator of the communication radio signal.

Figure 129: Background screen — area

Overview of symbols and features:

Table 30. Indicators

INDICATORS	
	Transmitter battery level.
	Remote control frequency power.
	Fuel reserve. When the machine reaches the reserve, in addition to the icon lighting up, the machine automatically switches to the Engine Screen for 3 seconds and an alarm sounds for the same amount of time.
	Platform door open.
	Pin not inserted.
	Attachment not recognized.
	Stabilizers not on the ground.

Table 31. Warning lights

WARNING LIGHTS	
STOP	Serious engine failure.
	Engine malfunction.
	Diesel exhaust fluid (DEF) tank level.
	Emission-related malfunction of the exhaust after-treatment system or of the DEF supply.
	Engine oil pressure low.
	Alternator excitation.
	Hydraulic oil temperature high.
	Engine water temperature boiling.
	General alarm.
MAX	Platform overload.

Work screen

The work screen contains information about the machine movements and the icons relating to information.

Figure 130: Work screen

Figure 131: Work screen

Overview of icons and features:

Table 32. Icons

ICONS	
A	Telescopic boom angle.
ACT.	Weight of the lifted load.
	Maximum permissible load. When the attachment used is a platform, the maximum capacity that is displayed on the Work Screen is the same as the nominal capacity of the platform.
R	Working radius: measurement of the distance from the center of the machine to the projected point of application of the load.
H	Ground clearance.
	Attachment quick coupling tilt angle.
FORKS	Attachment in use.

Work screen

The work screen contains information about the machine movements and the icons relating to information.

Overview of icons and features:

Table 33. Icons

ICONS	
A	Telescopic boom angle.
ACT.	Weight of the lifted load.
	Maximum permissible load.
R	Working radius: measurement of the distance from the center of the machine to the projected point of application of the load.
H	Ground clearance.
	Attachment quick coupling tilt angle.
FORKS	Attachment in use.

Joystick screen

The Joystick screen contains information about the Joystick controls and the solenoid valves control to perform a movement.

Figure 132: Joystick screen

Overview of icons and features:

Table 34. Icons and acronyms

ICONS AND ACRONYMS	
RPM	Envine revolution acronym.
	Joystick control.
	Speed of motion (s).
YW	Solenoid valve control.
W	Warning active.
FORKS	Attachment in use.

Engine screen

The Engine screen contains information about the engine.

Figure 133: Engine screen

Overview of icons and features:

Table 35. Icons

ICONS	
	Fuel quantity indication (%).
	Coolant temperature indication (°C / °F).
	DEF additive quantity indication (%).
FORKS	Attachment in use.

Stability screen

The Stability screen contains information about the inclinometer on the vehicle.

Figure 134: Stability screen

Overview of icons and features:

Table 36. Icons

ICONS	
	Lateral tilt indication (°).
	Longitudinal tilt indication (°).
FORKS	Attachment in use.

Attachments screen

The attachments screen contains:

- A picture of the attachment.

- The possible movements that can be carried out.

Several pages concerning the attachments are saved and to select the desired one, press the button above the display: “scroll attachments pages”.

Figure 135: Scroll attachments pages button

The moment a movement is carried out, the display returns to the Work Screen.

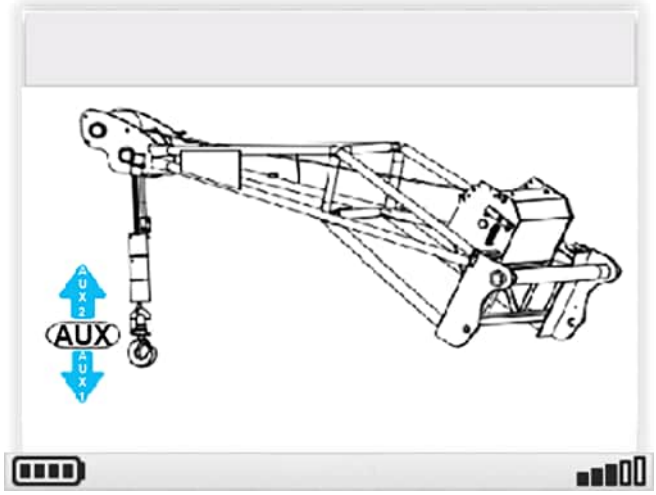


Figure 136: Attachments screen

Diagnostics Screen
The Diagnostics screen contains in 5 different screens the information about the errors or the malfunctions of remote control communication.

To open the diagnostics screens, hold down the button (1) above the display for 3 sec.

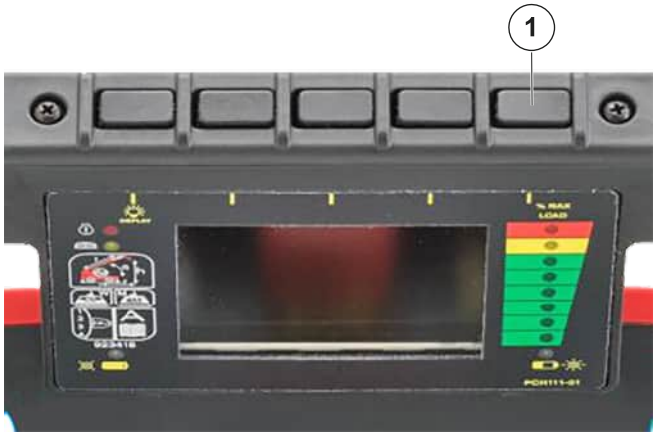


Figure 137: Diagnostics screen selection button

Diagnostics screen 1: contains information about the firmware and application in the remote control.

Figure 138: Screen 1

Diagnostics screen 2: contains information about the active alarms on the remote control, indicating whether an alarm is present via the color of the respective dot.

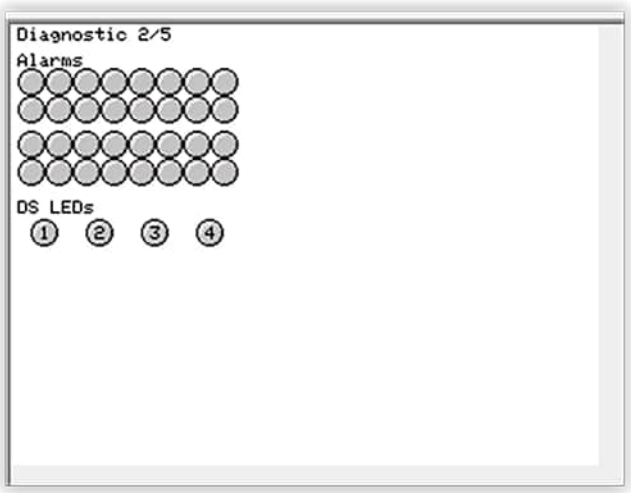


Figure 139: Screen 3

Diagnostics screen 3: contains information about the viewing strings.

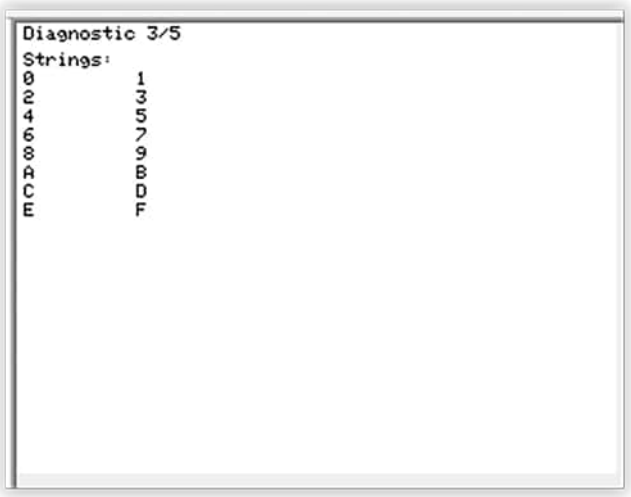


Figure 140: Screen 2

Diagnostics screen 4: contains information about the activation of digital signals generated by the remote control.

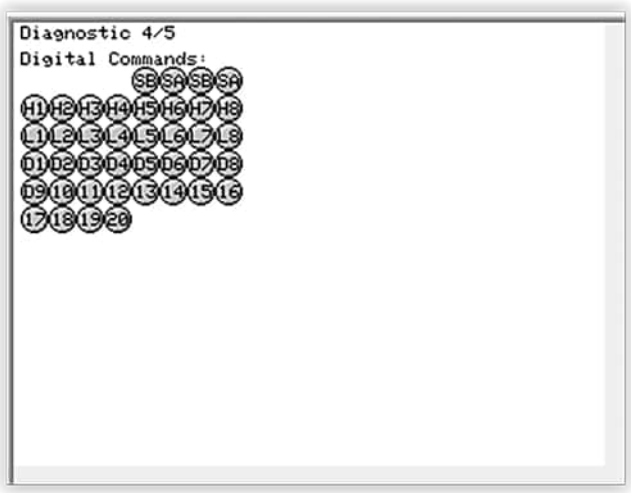


Figure 141: Screen 4

Diagnostics screen 5: contains information about the Joystick controls, in particular the percentage control filling the bar.

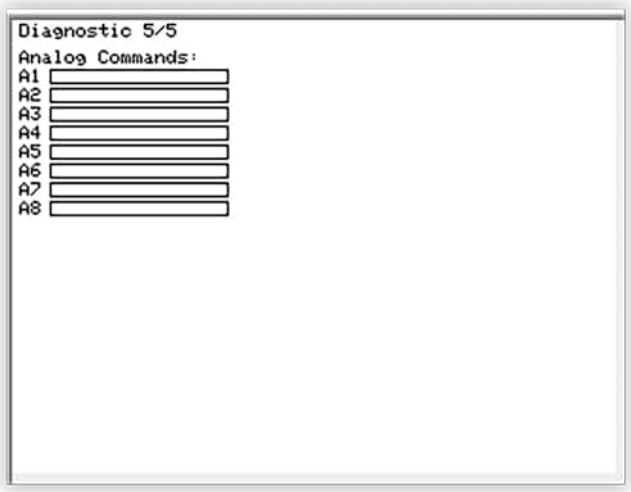


Figure 142: Screen 5

3. USE OF THE MACHINE

3.1. BEFORE USING THE MACHINE

3.1.1 AREA AROUND THE VEHICLE

Carry out a general inspection around the vehicle:

- Leak or stain of liquid on the ground.
- Presence of foreign objects on the vehicle and in the cabin.
- Fixing and locking of the attachment.
- Fixing and adjusting the rear view mirrors.
- Tire condition to identify cuts, bumps, wear, etc.

Observe the instructions for the operator.

Cleaning the vehicle

- Cleaning of the headlights and rear view mirrors.
- Excess dirt or accumulation of material (e.g. straw, flour, sawdust, organic waste, etc.).
- Every day and according to the conditions of use and the environment, the operator must ensure that the vehicle is clean.
- The accumulation of flammable materials (e.g. straw, flour, sawdust, organic waste, etc.) and fuel or lubricant leaks must require special attention, as they greatly increase the risk of fire.
- A regular inspection of the entire vehicle, especially the engine compartment and the central part of the chassis, is necessary to establish the frequency of cleaning, in order to avoid potential accumulation or loss of material.

3.1.2 PRE-USE INSPECTION CHECKLIST

BEFORE STARTING THE VEHICLE

- Carry out daily maintenance.
- Make sure the driver's cab is clean, especially the floor and mat.
- Check that no moving objects disturb the control of the vehicle.
- Check whether the lights, headlights and windshield wipers are working properly and their condition.
- Check if the rear view mirrors are in good condition and adjusted properly.
- Check the effectiveness of the acoustic signal.

CORRECT POSITION IN THE DRIVER'S SEAT

- No matter how much experience he has, the driver should familiarize himself with the position and use of all control and command tools before putting the vehicle into service.
- Wear clothes suitable for driving the vehicle, avoid fluttering clothes.
- Take protective equipment suitable for the work to be done.
- Prolonged exposure to a loud noise can cause hearing loss. To protect yourself from annoying noises, the use of hearing protection is recommended.
- Always get in and out of the vehicle with access to the driver's cab in front of you and use the handles provided. Do not jump off the vehicle to get off.
- Always be careful when using the vehicle, do not listen to the radio or music with earphones or headphones.
- Never drive with wet or greasy hands or shoes.
- For optimal comfort, adjust the seat to your liking and get in the right position in the driver's cab.

⚠ DANGER

Under no circumstances should seat adjustments be made while the vehicle is in motion.

- The driver must always remain in his normal position in the driver’s cab: he is forbidden to stretch his arms, legs and in general any part of his body outside the driver’s cab of the vehicle.
- The use of the seat belt is mandatory and must be adjusted to the height of the operator.
- The control elements must never be used improperly (example: as a support to get on or off the vehicle, as a clothes hanger, etc.).
- If the control elements are equipped with a forced march device (lever block), it is forbidden to leave the driver's cab without positioning the controls on "neutral".
- It is forbidden to carry passengers in the vehicle or in the driver's cab.

VISIBILITY

- The safety of the people in the maneuvering area of the vehicle, of the vehicle itself and of the operator, depend on the operator’s ability to see the working

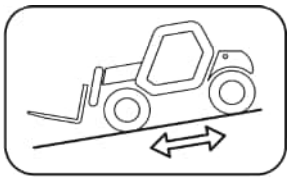
area of the vehicle in any circumstance and constantly.

- This vehicle has been designed to allow the operator to always have good visibility (direct or indirect via rear-view mirrors) of the work area when traveling with the truck unladen and the boom in the transport position.
- If the volume of the load restricts visibility in front, special precautions must be taken:
  - Reverse to destination.
  - Tidy up the site.
  - Help from a someone (positioned outside the vehicle's range of operation) to direct the maneuver, ensuring that you can always clearly see this person.
  - In any case, avoid reversing for too long.
- With some special attachments, it may be necessary to keep the boom in the raised position to move the vehicle. In this case, the visibility from the right side is limited and special precautions must be taken:
  - Tidy up the site.
  - Help from a someone (positioned outside the vehicle's range of action) to direct the maneuver.
  - Replacement of a hanging load with a pallet load.
- In all cases where the visibility of the route is insufficient, get help from someone (positioned outside the vehicle's range of operation) to direct the maneuver, making sure that you can always clearly see this person.
  Keep all elements to improve visibility in perfect working order, correctly adjusted and clean: windshields and windows, windshield wipers and washers, headlights and work lights, rear-view mirrors.

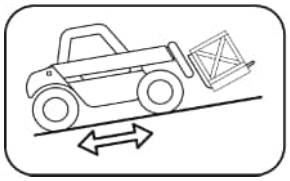
3.1.3 WORK AREA INSPECTION

- Follow the site's safety rules.
- During handling operations, make sure that nothing or no one obstructs the maneuvering of the vehicle and the load.
- Do not authorize anyone to approach the maneuvering area of the vehicle or to pass under the load.

  Driving on a longitudinal slope:
  - Advance and brake smoothly.
  - Movement when unladen: forks or attachment facing downhill.



- Movement with load: forks or attachment facing uphill.



Consider the dimensions of the vehicle and the load before engaging a narrow or low passage.

Never engage a loading gangway without having checked:

- That it is correctly positioned and locked.
- That the element to which it is connected (wagon, truck, etc.) cannot move.
- That it is foreseen for the total weight of the laden vehicle.
- That the gangway is designed for the overall dimensions of the vehicle.
- Never use a gangway, a platform or a freight elevator without being sure that they are correctly foreseen for the weight and dimensions of the laden vehicle, and without having checked that they are in good condition.
- Pay the utmost attention to: loading docks, excavations, scaffolding, unstable ground, wells.
- Check the stability and hardness of the ground under the wheels and/or stabilizers before lifting the load or extending the boom with the load. If necessary, add a suitable wedge under the stabilizers.
- Verify that the scaffolding, loading platform, stack or ground can support the load.
- Never stack loads on uneven ground as they may tip over.

⚠ DANGER

Resting hazard

There is a risk of support if the load or the attachment remains on a structure for a long time due to the descent of the boom when the oil in the jacks cools.

Regularly check the distance between the load or attachment and the structure, readjust if necessary.

If possible, use the vehicle with an oil temperature as close as possible to ambient temperature.

When working near overhead power lines, check that the safety distance between the vehicle's working area and the power line is sufficient.

⚠ DANGER

Electrocution hazard

There is a risk of electrocution or serious accident when working or parking the vehicle too close to electrical wiring.

You need to inquire with your local electricity supply company.

In case of strong wind, do not proceed with handling: risk of compromising the stability of the vehicle and the load, especially if this is exposed to strong wind.

Prevent the risk of fire associated with use in a dusty and flammable atmosphere (e.g. straw, flour, sawdust, organic waste, etc.).

3.1.4 FILLING THE FUEL TANK

- Keep the fuel tank as full as possible to minimize condensation due to atmospheric conditions.

⚠ DANGER

Danger of fire.

Never fill up while the engine is running.

Do not smoke or approach with an open flame during filling operations or when the tank is open.

- If necessary, add diesel fuel.
- Remove the cap (1).
- Fill the tank with clean and filtered diesel fuel through the filling orifice.
- Put the cap back on.
- Look to make sure that there are no leaks on the tank or pipes.

A lockable tank cap is available as an option

Figure 143: Filling the fuel tank

3.1.5 FILLING THE "DEF" TANK

(diesel exhaust fluid (adblue)).

⚠ WARNING

Danger of corrosive substances

The diesel emissions additive is a corrosive product.

Protect the bodywork and wear personal protective equipment (gloves and goggles). The level of the diesel exhaust fluid (adblue) is important, an operation with the tank empty or with little fluid can compromise the performance of the engine.

If necessary, add diesel exhaust fluid (adblue).

- Remove the cap (1).
- Slowly fill the tank to the bottom of the fill chute.
- Always maintain a good level to limit the alteration of the product.
- Put the cap back on.

Figure 144: Filling the "DEF" tank

A lockable tank cap is available as an option

"DEF" (diesel exhaust fluid (adblue)) quality

The quality of the diesel exhaust fluid (adblue) can be measured with the aid of a refractometer; the diesel exhaust fluid (adblue must comply with ISO 22241-1 with 32.5% urea solution.
Refractometer (MANITOU reference: 959709).

"DEF" (diesel exhaust fluid (adblue)) storage

Up to 4 months of non-use of the vehicle: check the quality of the diesel exhaust fluid (adblue) with the aid of a refractometer.

Beyond 4 months: change the diesel exhaust fluid (adblue). Empty and rinse the tank.

3.2. ENTER THE CABIN

3.2.1 GETTING IN AND OUT OF THE VEHICLE

⚠ WARNING

To get in and out of the vehicle, use the access ladder located on the left side of the vehicle (fuel tank area).

The vehicle is equipped with access steps (1) and handles (2) which are located inside the cabin to facilitate the operator's entry and exit from it.

Always get on and off with your face facing the vehicle.

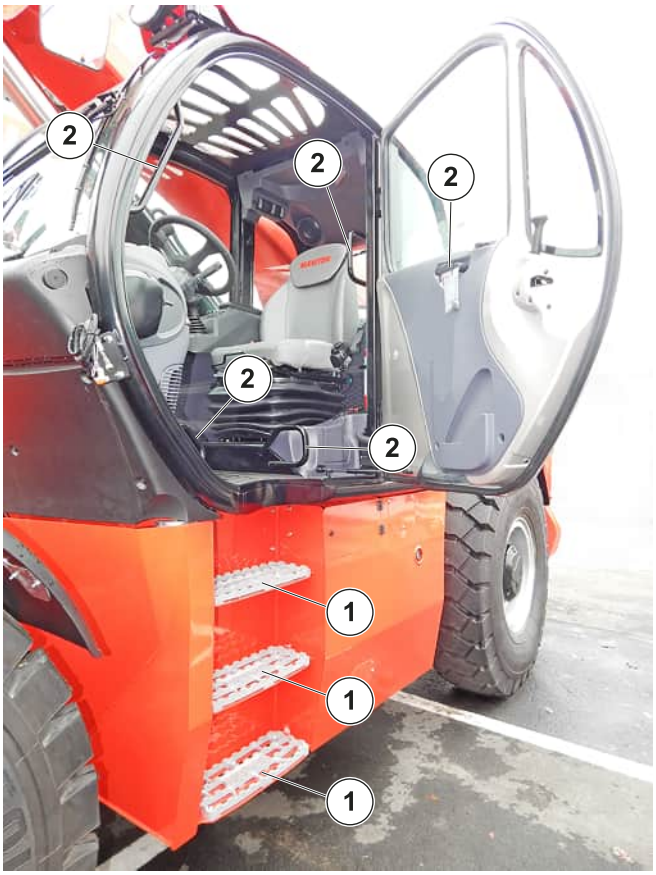


Figure 145: Getting in and out of the vehicle

⚠ WARNING

To climb up it is necessary to use the steps and the specially installed handles.

A bad grip, a badly positioned foot, could involve the risk of falling, therefore: do not cling to the steering wheel or other controls.

3.2.2 GETTING INTO THE VEHICLE

⚠ DANGER

Risk of falling or slipping

Always get on and off with your face facing the vehicle, always maintaining “three-point” contact, i.e. both feet and one hand or both hands and one foot.

Before getting on, remove oil and mud from the soles of the shoes and from the steps.

1. Fully open the cabin door.
2. Keep your hands free (do not hold tools).
3. Use the specially prepared holding points and steps.
4.

⚠ DANGER

Do not cling to the steering wheel or other controls.

Do not use the tire as a step.

Get on with your face facing the vehicle, always maintaining “three-point” contact, i.e. both feet and one hand or both hands and one foot.

3.2.3 GETTING OUT OF THE VEHICLE

⚠ DANGER

Risk of falling or slipping

Always get on and off with your face facing the vehicle, always maintaining “three-point” contact, i.e. both feet and one hand or both hands and one foot.

Before descending, remove oil and mud from the soles of the shoes and from the steps.

1. Fully open the cabin door.
2. Keep your hands free (do not hold tools).
3. Use the specially prepared holding points and steps.
4.

⚠ DANGER

Don't jump from the cabin.

Do not cling to the steering wheel or other controls.

Do not use the tire as a step.

Get off with your face facing the vehicle, always maintaining “three-point” contact, i.e. both feet and one hand or both hands and one foot.

5. At the end of the steps, before placing your foot on the ground, check that the surrounding area provides a stable foothold for the foot and is free from objects or substances that could cause loss of balance and subsequent fall.

3.3. TURNING THE MACHINE ON AND OFF

3.3.1 STARTING THE MACHINE

Starting the vehicle

Safety rules

The vehicle can only be started or maneuvered when the driver is in the driver's seat, with the seat belt fastened and adjusted.

- Do not tow or push the vehicle to start it.

⚠ DANGER

Risk of serious transmission damage

This maneuver could cause serious damage to the transmission.

Put the gear in neutral position if you need to tow the vehicle.

Recommendations

- Verify that the reverse gear lever is in idleoff.
- Turn the ignition key to position I to allow electrical contact.
- Check the fuel level on the gauge.
- Turn the ignition key to position II to allow preheating and wait 15 seconds. (If required by environmental conditions).
- Do not activate the starter for more than 15 seconds, and allow it to preheat for 10 seconds between all attempts.
- Press the accelerator and turn the ignition key fully, the engine should start. Release the ignition key and let the engine run at low speed.
- Before operating in very cold climatic conditions, wait for the heat engine and hydraulic systems to warm up properly.
- Look at all control instruments immediately after starting, with the engine warm, and at regular

intervals during use, in order to quickly identify and resolve any faults.

- If any of the instruments indicates a fault, stop the engine and carry out the necessary operations right away.

3.3.2 TURNING OFF THE MACHINE

Stopping the vehicle

Safety rules

- Before stopping the vehicle after intense work, let the engine idle for a few moments to allow the coolant and oil to lower the engine and transmission temperatures.

This precaution must be strictly observed in the case of frequent stops of the heat engine; otherwise the temperature of some parts would increase considerably.

- Never leave the ignition key in the vehicle without the driver.
- When the vehicle is stationary, place the forks or attachment on the ground, place the shift lever in neutral, apply the parking brake and place the marine gear lever in neutral.
- If the driver has to leave the driver's seat, even temporarily, apply the parking brake and put the gearbox lever in neutral.
- Make sure the vehicle is parked in such a way as not to impede traffic and at least one meter away from the railroad tracks.
- In case of prolonged parking, protect the vehicle from bad weather, particularly in the event of frost (check the antifreeze level), close the rear window, lock the cabin door and the engine cover.

Recommendations for stopping

- Park the vehicle on level ground or with a gradient of less than 15%.
- Place the gear lever in neutral.
- Apply the parking brake.
- Fully retract the boom.
- Rest the forks or attachment flat on the ground.
- Switch off the engine.
- Remove the ignition key.
- Check that the door is locked and that the rear window and engine cover are also closed.

Before leaving the driver's cab, make sure you have carried out all the vehicle stopping operations correctly, to ensure your safety and the safety of others.

3.4. USE OF ATTACHMENTS

3.4.1 SAFETY RECOMMENDATIONS FOR ATTACHMENTS

INTRODUCTION

The manufacturer offers you a wide range of attachments (with warranty) for your vehicle that are perfectly adapted to it.

The attachments are delivered with a load chart for your vehicle. The recommendations booklet and the load chart must remain inside the vehicle. The use of attachments is described in the recommendations contained in this manual.

Some specific uses require the adaptation of an attachment not included in the options on the price list.

There are other solutions. For more information, contact your agent or dealer.

Only approved attachments and “CE” certified attachments by the manufacturer can be used on our vehicles. The manufacturer's liability will not be involved in the event of modification or use of attachments made without its knowledge.

MANITOU has ensured that this vehicle can be used under normal conditions of use as specified in the instruction manual, with a static test coefficient of 1.33 and a dynamic test coefficient of 1, provided for in the harmonized standards EN 1459 for forklift trucks with variable capacity and EN 1726-1 for masted forklift trucks.

The use of interchangeable attachments not originally provided on the machine is prohibited. In the event of subsequent requests for implementation of machine features with other attachments, before commissioning, the user is obliged to ask an authorized MANITOU technician to perform a suitability check, who will verify the correct functioning and update the documentation necessary for use of the new attachment. Only after this check will a new “CE” certificate of conformity of the machine be issued, showing only the new attachments installed.

GENERAL ADVICE REGARDING USE OF THE VEHICLE

⚠ DANGER

Observe the data indicated on the load diagrams. In no case should you try to lift loads heavier than those allowed on the load charts attached to the machine.

⚠ DANGER

Carry the load in a low position and with the telescopic boom fully retracted.

⚠ DANGER

Drive the vehicle at a speed appropriate to the conditions of the terrain.

⚠ DANGER

When the vehicle is unladen, travel with the telescopic boom lowered and fully retracted.

⚠ DANGER

Never go too fast or brake hard with a load.

⚠ DANGER

When the load is lifted, make sure that no one can interfere with operation and do not perform incorrect maneuvers.

⚠ DANGER

Do not attempt to perform operations that exceed the capabilities of the vehicle.

⚠ DANGER

Pay attention to electrical cables.

⚠ DANGER

Never leave the vehicle parked with a raised load.

⚠ DANGER

Do not authorize anyone to approach or pass under the load.

⚠ DANGER

Always think about safety and only carry well-balanced loads.

⚠ DANGER

Do not leave the vehicle loaded on an incline greater than 15% with the parking brake applied.

⚠ DANGER

The following attachments are not intended for systems for lifting or moving people.

⚠ DANGER

Remember to request a check-up every year from the USL in your area (only for Italy).

⚠ DANGER

It is forbidden to lift suspended loads with the fork attachment or other support not provided for this feature. Contact an authorized dealer, see crane attachments list.

⚠ DANGER

Non-conforming calibration of the safety system can be very dangerous. If in any doubt, contact an authorized dealer immediately.

⚠ DANGER

Risk of damage to the vehicle

Some attachments, taking into account their size, and with the boom lowered and retracted, risk interfering with the front tires and causing them to deteriorate if the equipment is tilted down.

To eliminate this risk, extend the telescopic boom long enough for the vehicle and attachment so that no interference occurs.

⚠ DANGER

The maximum loads are defined by the capacity of the vehicle, taking into account the weight and the center of gravity of the attachment. If the attachment has a lower capacity than the vehicle, never exceed this limit.

Before putting any type of attachment on the vehicle into service, make sure that the machine is compatible and that the safety system is calibrated for the attachment used.

3.4.2 COUPLING MANEUVER FOR ATTACHMENTS

Fitting attachment

- Make sure the attachment is in a position that makes it easy to hook the quick coupler. In case it is pointing in the wrong direction, take the necessary precautions to move it in extremely safe conditions.
- Check that the blocking pin is inserted into the holder on the chassis.
- Position the vehicle with the boom lowered, facing front and parallel to the attachment and tilt the quick coupler forward (1).
- Bring the quick coupler under the connecting pipe of the attachment, raise the boom slightly and tilt the coupler backwards to position the attachment (2).
- Take the attachment off the ground to facilitate blocking (3).

If the attachment is equipped with a hydraulic circuit

Carefully clean the quick couplings and protect unused orifices with the plugs provided for this purpose.

- After blocking the attachment (see Manual block or Hydraulic block of the attachment) it is necessary to:
  - Switch off the heat engine and maintain electrical contact on the vehicle.
  - Relieve the pressure of the attachment's hydraulic circuit by pressing the optional control button on the joystick 4 or 5 times.
  - Connect the quick couplings, respecting the logic of the hydraulic movements of the attachment.

REFIT OF THE ATTACHMENT WITH MANUAL BLOCK

Manual blocking

Take the blocking pin (4) on the support and insert it into the hole in the quick coupling (4a) to block the attachment (3).

Do not forget to put in the split pin (5).

Manual release

Proceed in the reverse order to that of MANUAL BLOCKING and make sure you put the blocking pin back into the support on the chassis**.**

Removal (and installation) of the attachment

Proceed in the reverse order to that of FITTING ATTACHMENT, making sure you place it in a safe position on compact and flat ground. If the attachment is equipped with a hydraulic system, connect the quick couplings or, vice versa, disconnect them in case of attachment disassembly after decompressing the circuit.

Keep the quick couplings clean and protect unused orifices with the caps provided.

REFIT OF THE ATTACHMENT WITH HYDRAULIC BLOCK (optional)

Fitting attachment

- Make sure the attachment is in a position that makes it easy to hook the quick coupler. In case it is pointing in the wrong direction, take the necessary precautions to move it in extremely safe conditions.
- Check that the blocking pin is inserted into the holder on the chassis.
- Position the vehicle with the boom lowered, facing front and parallel to the attachment and tilt the quick coupler forward (1).
- Bring the quick coupler under the connecting pipe of the attachment, raise the boom slightly and tilt the coupler backwards to position the attachment (2).
- Take the attachment off the ground to facilitate blocking (3).
- Activate the optional control to block the attachment (see next chapter).

Hydraulic blocking and unblocking (optional)

The blocking and unblocking of any attachment takes place by means of two pins which protrude from the holes of the quick coupling (4).

Removal (and installation) of the attachment

Proceed in the reverse order to that of FITTING ATTACHMENT, making sure you place it in a safe position on compact and flat ground.

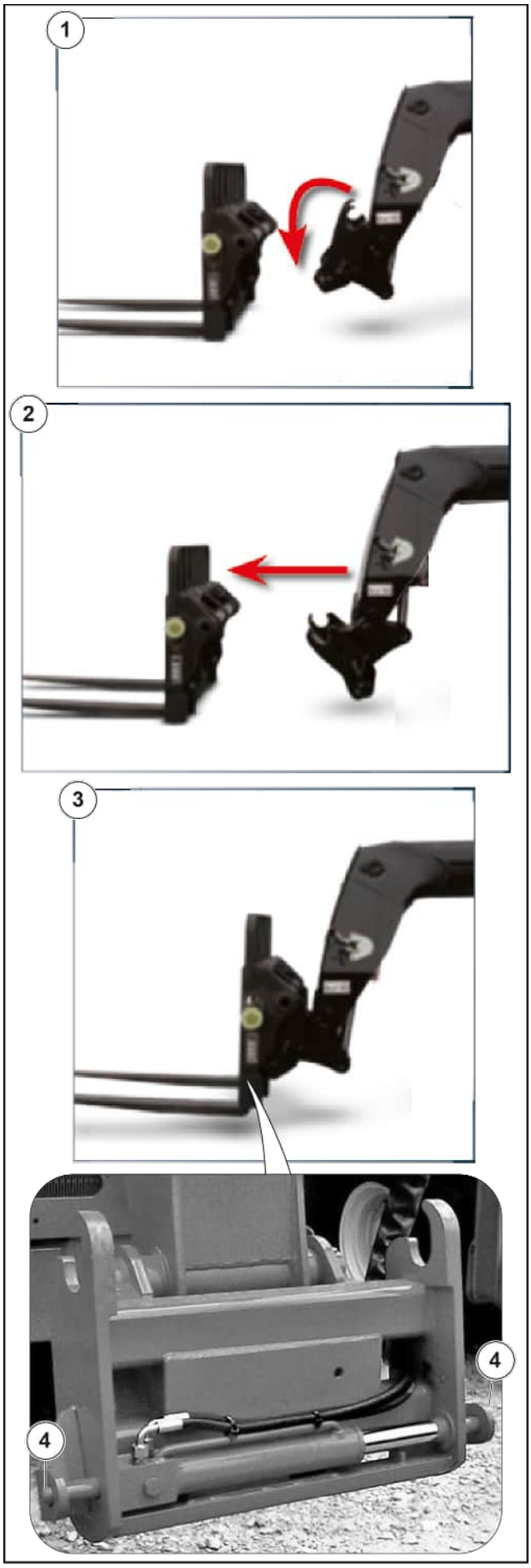


Figure 146: Refit of the attachment with hydraulic block (optional)

3.4.3 FLOW LIMITER OF THE ATTACHMENT CIRCUIT

⚠ DANGER

This option must be used only with an attachment requiring continuous hydraulic movement such as: sweeper, distribution bucket, mixer, sprayer, etc. Therefore it is strictly forbidden during handling and in all other cases (winch, boom, winch boom, hook, etc.).

Continuous hydraulic movement of the attachment

On the display, on the “DRIVE page”, check that the oil flow percentage bar is on 0%.

Move the button (1) that controls the attachment backward and forward (according to the type of attachment), press the key (2) and release the button (1). The flashing light (1a) indicates its use.

On the display, “DRIVE page”, at the bottom, the bar that regulates the oil flow (3) is activated by means of the “+ / -” keys as needed from 0% to 100%.

Stopping the continuous hydraulic movement of the attachment depends on:

- Adjusting the bar that adjusts the oil flow to 0%.
- Moving the button (1) that controls the attachment backward or forward.
- Press the key (2). The warning light (1a) is off.
- Or setting the potentiometer bar to 0%.
- Operator not seated.
- Exclusion of attachment movement control button (1) from key / navigator.
- Enabling and disabling control of 2nd hydraulic line on boom.
- Hydraulic block of the active attachment.
- Vehicle in alarm.

Before starting the vehicle check that the potentiometer bar is at 0%.

If the operator moves away from the driver's cab, continuous hydraulic movement is automatically stopped and must be restarted.

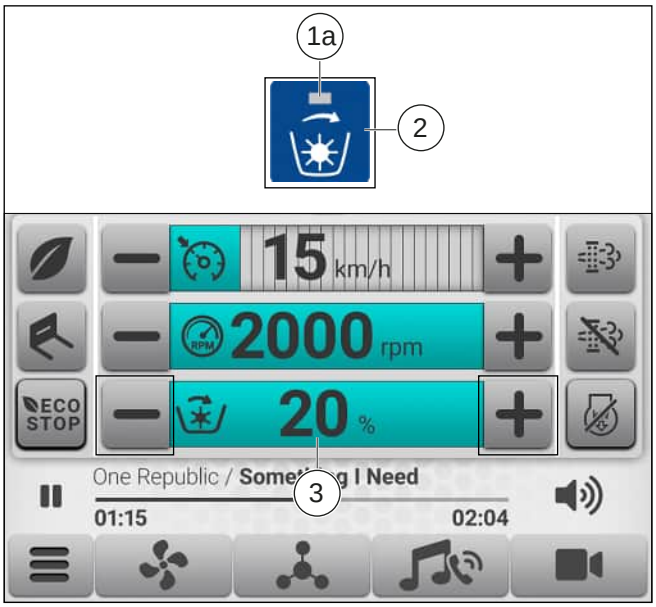


Figure 147: Continuous hydraulic movement of the attachment

3.4.4 AUTOMATIC RECOGNITION OF THE "E-RECO" ATTACHMENT

The machine is equipped with an electronic recognition system that identifies the type of attachment installed at the time of coupling.

This system facilitates and speeds up attachment changing operations.

The system features two devices: one located on the telescopic boom and one on the attachment.

Automatic mode: after identification of the type of attachment and the operator's confirmation, the recognition system sets the machine to operate with the connected attachment.

Manual mode: the machine can operate with an attachment without an identification device and in this case it is the operator's responsibility to identify and confirm the type of attachment connected.

Figure 148: Selection and confirmation of attachment

Automatic mode

Straight after connecting an attachment, the recognition system:

- Identifies the type of attachment (1).
- Asks the Operator to confirm that the recognized attachment is the one actually connected to the machine.
- To confirm the type of attachment, press the knob selector (2).

Manual mode

Straight after connecting an attachment without the identification device, the recognition system:

- Does not recognize the connected attachment.
- The operator must select the type of attachment connected to the machine.

The operator must manually select the type of attachment installed, as follows:

- Press the key (3) to exit the "empty" mode (1) (no attachment connected).
- Turn the knob (2) to select the attachment that is connected.

- To confirm the type of attachment, press the knob selector (2).

In "empty" mode the machine can move the boom but with maximum lifting capacity set at 500 kg (1102 lb).

⚠ WARNING

Risk of injury to people or damage to the vehicle

Not following recommendations could cause malfunctions of your vehicle and property damage and injuries to anyone close to the working area of the machine.

In both modes: it is the operator's responsibility to make sure that the attachment connected and shown on the display is the one identified by the recognition system or selected manually.

Rispettare le procedure sopra descritte.

Figure 149: "E_RECO" attachment recognition

3.5. DRIVING THE MACHINE

3.5.1 USING THE SEMI-AUTOMATIC WHEEL ALIGNMENT

FRONT AND REAR WHEEL ALIGNMENT INDICATOR

	Green indicator on: indicates the alignment of the front wheels with respect to the axis of the vehicle.
	Yellow indicator on: indicates the alignment of the rear wheels with respect to the axis of the vehicle.

Front and rear wheel alignment procedure

1. Select the steering mode “opposite direction front and rear wheel drive (small turning radius)”.
2. Turn the steering wheel so that the yellow rear wheels alignment light comes on.
3. Select the steering mode "Front-wheel drive (driving on road)".
4. Turn the steering wheel so that the green front wheels alignment light comes on.

Once the front and rear wheels are aligned, one of the steering modes can be selected.

With use, the wheels may become uncoordinated, at least every 20 hours of

operation the realignment of the wheels must be carried out.

3.5.2 USING STEERING MODES

The vehicle is equipped with the following steering modes:

- Front wheel drive (driving on road) (1).
- Front and rear wheel drive in the same direction (lateral movement) (2).
- Opposite direction front and rear wheel drive (small turning radius) (3).
- Front wheel drive and rear wheel drive angle block (4).

When the steering mode is enabled, the warning light (5) is steady and the selected driving indicator is shown on the display.

Changing the steering mode is no longer possible when the speed exceeds 11 km / h (6.8 mph).

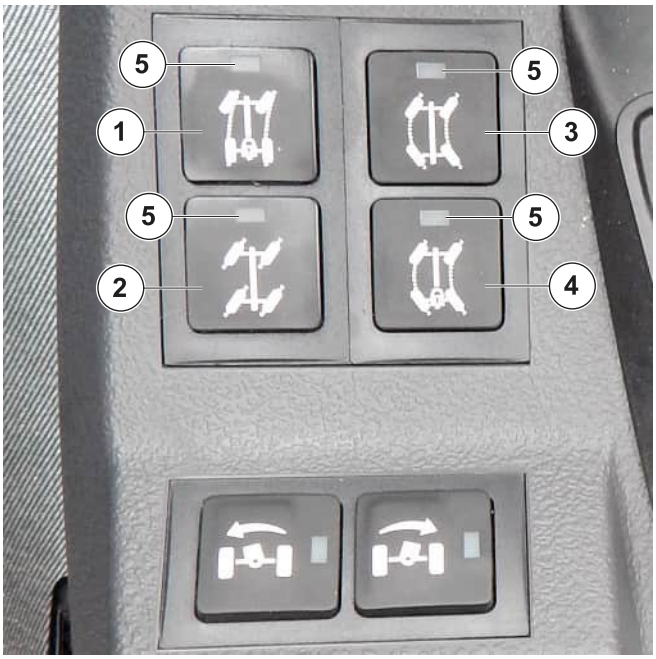


Figure 150: Steering mode

CHANGING STEERING MODE

⚠ DANGER

Check the front and rear wheel alignment each time the vehicle is started.

The wheels must be aligned and the vehicle must be in front-wheel driving mode during use on public roads.

1. Align the front and rear wheels.
2. Press the key (1, 2, 3, 4) to select the desired direction mode, the flashing warning light (5) confirms the request.

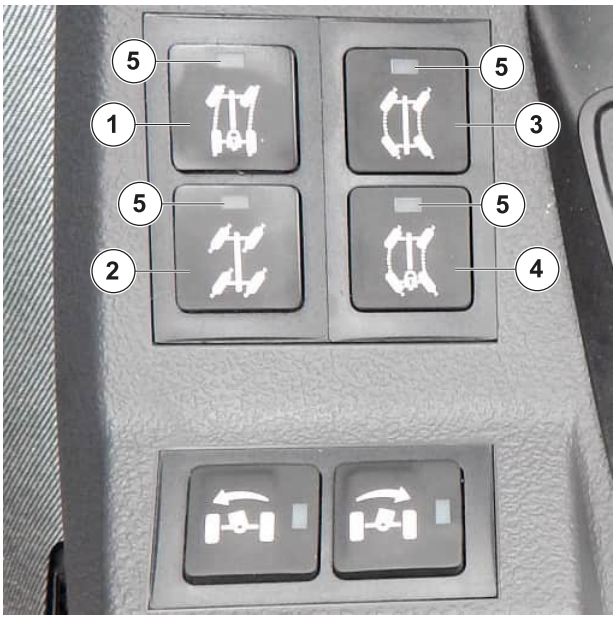


Figure 151: Steering mode

When the steering mode is enabled, the warning light (5) is steady and the selected driving indicator is shown on the display.

3.5.3 USING THE PARKING BRAKE

The vehicle has the option of having automatic or manual application of the parking brake, which can be selected from keys in the cabin.
The parking brake acts on the front and rear axles.

- To activate the manual parking brake, press the key (1). A red warning light is lit on the display.
- To activate the automatic parking brake, press the button (2). A red warning light is lit on the display.

When the parking brake is applied, the brake lights come on for 2 minutes.
To release the parking brake, press key (1) or (2). The red light on the display will go out.
When starting the vehicle, the parking brake is engaged.

For the safety of the machine and the driver, the parking brake is applied automatically under certain conditions.
With the direction selector in the “neutral” position, the parking brake remains applied despite the pressure on the accelerator pedal.
With direction selected and by accelerating, the brake will be released and the vehicle will move.

The conditions for applying the safety brake are:

- The operator is not in the driver’s seat

- The gearbox remains in the neutral position for several seconds.
- The accelerator pedal has been released.
- The traveling speed of the vehicle is less than 3.6 km / h (2.23 mph) or the machine has stopped.

The automatic emergency brake is disabled when the direction selector is enabled and the engine speed is increased by pressing the accelerator pedal.

Figure 152: Using the parking brake

3.5.4 DRIVING MODES

The vehicle equipped with electronically controlled transmission allows the operator to choose from three different driving modes:

1. Drive (for road use).
2. Handling (for work use).
3. Eco (to reduce consumption).

The operator selects the mode based on the driving feeling he wants to achieve with the vehicle and according to the different operating needs.

When the vehicle is switched on, the “Drive” mode is active by default.

1. **"Drive" mode**:
   It allows the operator a dynamic and rapid drive; it is ideal for all uses where speed is crucial. In fact, you have the maximum driving speed.

   Mode can be activated in low and high gear.

2. **"Handling" mode:**

   It allows the operator to have maximum progressivity and torque performance for all heavy handling and loading tasks.

   When the operator makes the vehicle move forward or reverses it and moves the joysticks to control the hydraulic movements, the engine revolutions automatically increase up to maximum speed (if necessary), but the traveling speed does not change and always requires pedal action on the accelerator. While with the vehicle parked "on tires" or on "stabilizers" the operator can increase (+) or decrease (-) the engine revolutions (rpm) on the display (2A). The set value will be the minimum number of engine revolutions below which it is not possible to go. The number of engine revolutions will only increase during hydraulic movements. The maximum moving speed of the vehicle is limited:

   Mode can be activated in low and high gear.

3. **ECO mode:**

   This feature adjusts the transmission to maintain the maximum moving speed of the vehicle at a lower engine RPM, thus saving fuel.

   When the speed is reached (with the accelerator pedal), if maintained for a short period of time, the ECO feature is activated.

   Mode can be activated in low and high gear.

Figure 153: Driving modes

3.5.5 USING THE FORWARD / NEUTRAL / REVERSE DIRECTION SELECTOR (FNR)

To move the vehicle forward or to reverse, press the “F-N-R” selector located on the joystick in the cabin.

FORWARD GEAR (F): push the selector (1) forward.
Press the accelerator pedal to move the vehicle forward.

REVERSE (R): push the selector (1) back.
Press the accelerator pedal to move the vehicle. The reverse lights and an acoustic reverse alarm indicate that the vehicle is reversing.

- The rear video camera will be activated automatically and the pre-defined screen with video recording on the display in the cabin turn on.

IN NEUTRAL (N): to start the vehicle, the selector (1) must be in the neutral position (N). The selected direction is shown on the display on the “DRIVE” page.

Getting the vehicle to go in the opposite direction must be done at low speed and without accelerating.

Getting the vehicle to move forward or to reverse

To allow and enable movement of the machine, the operator must:

- Close the door.
- Be seated in the driver's cab.
- Release the parking brake.
- Check that the machine is positioned on tires (not stabilizers):
- Select the forward or reverse direction selector.

Forward motion or reverse is always permitted at speeds below 20 km/h (12.4 mph).

Whereas above this speed, reverse motion is not permitted and the vehicle behaves as follows:

- The direction set prior to inversion remains selected.
- The direction indication set prior to inversion flashes on the display.
- A “warning” appears on the display (Excessive speed) and an intermittent alarm is triggered.
- Both remain active until transmission is returned to neutral (N) or in the direction (F — R) set prior to inversion.
- Once this condition has been activated, even the vehicle returns below the limit set, the direction inversion is not permitted; in this condition the warning becomes "not in neutral" and to re-establish inversion the selector must be set to neutral (N) and then the desired direction (F — R) selected.

Using the FNR selector

3.5.6 USING THE DIFFERENTIAL BLOCK

The machine is equipped with a centre differential with a block device to prevent the four driving wheels from slipping. During normal use, the differential is not blocked and the four driving wheels turn at different speeds depending on the available grip and traction.

In the case of poor grip, with the vehicle stopped or at minimum speed, the grip-less wheel would slip, removing torque from the gripping wheel which would therefore remain at a standstill.
For this reason, the operator can press the button (1) that enables the differential block which allows the exclusion of the action of the differential itself, distributing torque evenly on both the wheels on the axles.

To activate the differential block:

- Stop the vehicle motion (speed = 0 km/h — 0 mph).
- Keep the engine at minimum revs.
- Check that the automatic brake is engaged.
- Push the brake pedal all th way down.
- Press the control button (1) to activate the differential block.
  The LED on the button comes on to indicate the feature is active (2). On the display, the dedicated yellow light comes on to indicate that the feature is active.
- Release the brake pedal and accelerate gradually to move the vehicle.

To deactivate the differential block:

- Exceed the moving speed of 9 km/h (5.6 mph).
- Press the differential block control button again.

Figure 155: Differential block control button.

3.6. STABILITY OF THE MACHINE

3.7. EMERGENCY PROCEDURE

3.7.1 EMERGENCY PROCEDURE

In case of emergency, if the safety system needs to be disabled, the operator must:

- Take the hammer (1) on the safety box (2).
- Break the protective glass (3) of the safety box (2).
- Take the key (4) and insert it in the key selector (5) or press the button (6).
- Turn the key selector (5) or press the button (6) to position  to disable the safety system.

Hold down and turn the key (4) selector (5) or hold down the button (6) in position  to proceed and continue to operate with the emergency maneuvers, making movements opposite to those that can generate instability and/or overload of the vehicle.

When the safety system is disabled, the following are activated automatically:

- a red light on the display
- an acoustic alarm

to warn the driver or any staff outside the machine of a possible hazardous situation.

When the safety system is deactivated, all the vehicle movements are limited to 15% of their top speed.

Once the emergency procedure is completed, put the key (5) back inside the safety box (2) and replace the protective glass (3).

Figure 156: Emergency procedure.

3.8. USE OF THE TOWING DEVICE

3.8.1 PIN AND TOWING HOOK

Located at the back of the vehicle, this device allows you to hook up a trailer.

For each vehicle, the capacity is limited by the total permitted working weight, the tractive force and the maximum lift capacity on the coupling point.

To use a trailer, consult the regulations in force in your country (maximum travel speed, braking, maximum weight of the trailer, etc.). Check the condition of the trailer before using it (tire condition and pressure, electrical socket, hose).

⚠ DANGER

Risk of damage to the vehicle's steering and braking devices

Using a trailer that is in poor condition could damage the steering and braking devices of the vehicle, and therefore compromise the safety of the machine.

Do not tow a trailer or attachment that is not in perfect working order.

⚠ DANGER

If the trailer coupling or uncoupling operations are carried out by someone else, that person must always be visible to the driver.

Before working on the trailer, wait for the vehicle to stop, the service brake to be applied and the combustion engine to be turned off.

A rear view mirror allows for a more precise approach of the vehicle towards the trailer ring.

3.8.2 COUPLING FORK

Trailer coupling and uncoupling

- To hitch, move the vehicle as close as possible to the trailer ring.
- Apply the parking brake and switch off the engine.
- Remove the split pin 1, raise the tow pin 2, and position or remove the trailer ring.

⚠ DANGER

Risk of pinching or crushing

There is the risk of pinching or crushing during the maneuver.

Don't forget to put the split pin 1 back. When uncoupling, make sure the trailer is standing on its own.

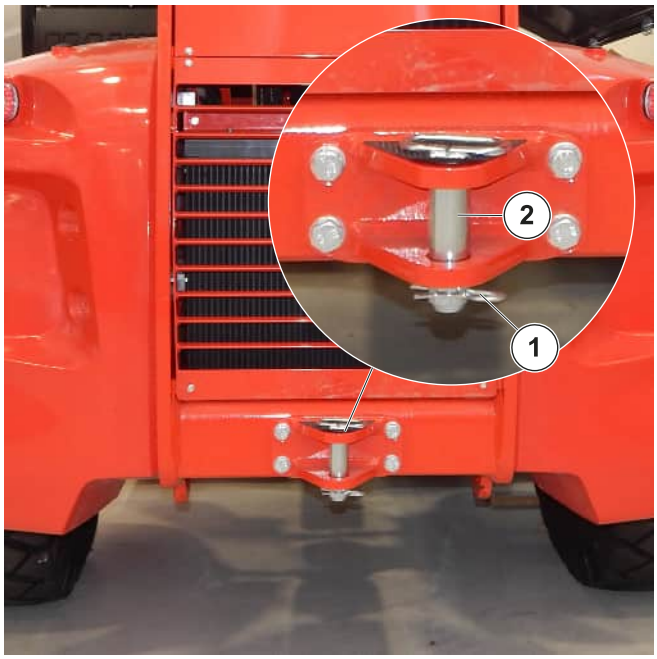


Figure 157: Coupling fork

3.9. TRANSPORT OF THE MACHINE

3.9.1 TRANSPORTING THE VEHICLE ON A TRAILER

Check that the safety recommendations relating to the transport platform have been followed before loading the vehicle, and verify that the driver of the means of transport is informed of the dimensional characteristics and weight of the vehicle.

⚠ DANGER

Risk of overturning

Make sure the platform is large enough and has the load capacity to transport the vehicle. Also check the allowed ground contact pressure for the platform with respect to the vehicle.

Load the vehicle

1. Block the wheels of the transport platform.
2. Fasten the loading ramps to the platform so that the smallest possible angle for lifting the vehicle is achieved.
3. Load the vehicle parallel to the platform.
4. Turn off the engine.

Sling the vehicle

1. Secure wedges in front of and behind each tire (2).
2. Block the vehicle to the platform with sufficiently strong ropes or chains on the front and rear of the vehicle at the anchorage points (1).
3. Tighten the ropes or chains.

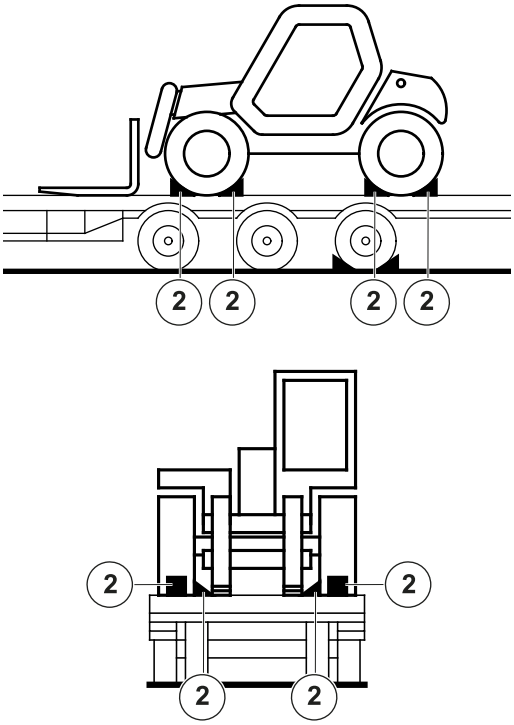


Figure 158: Secure the wedges in place.

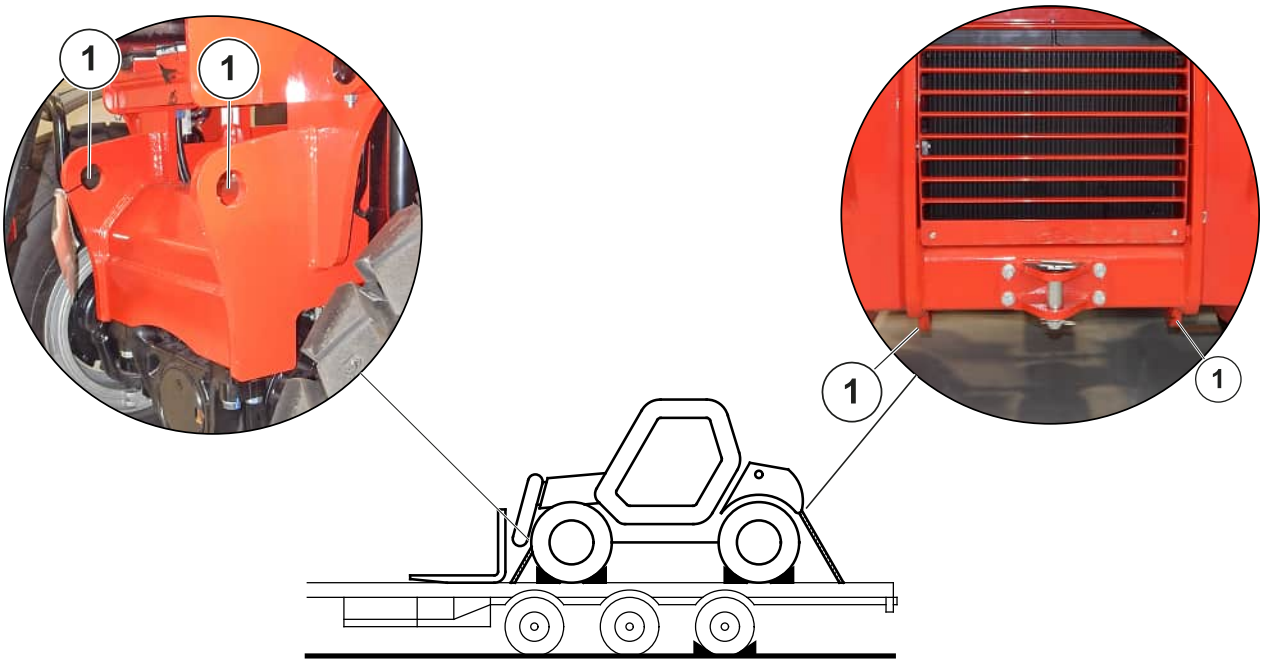


Figure 159: Slinging the vehicle.

3.9.2 PUTTING THE VEHICLE IN A SLING AND LIFTING IT

Take into account the position of the center of gravity of the vehicle for lifting.

- **MHT 10200** A = 2522 mm (99.3 in) B = 1228 mm (48.3 in)
- **MHT-X 10200** A = 2522 mm (99.3 in) B = 1228 mm (48.3 in)
- **MHT 11250** A = XXXX mm (XX in) B = XXXX mm (XX in)
- **MHT-X 11250** A = XXXX mm (XX in) B = XXXX mm (XX in)

Position the bands in the seats (1) provided for this purpose.

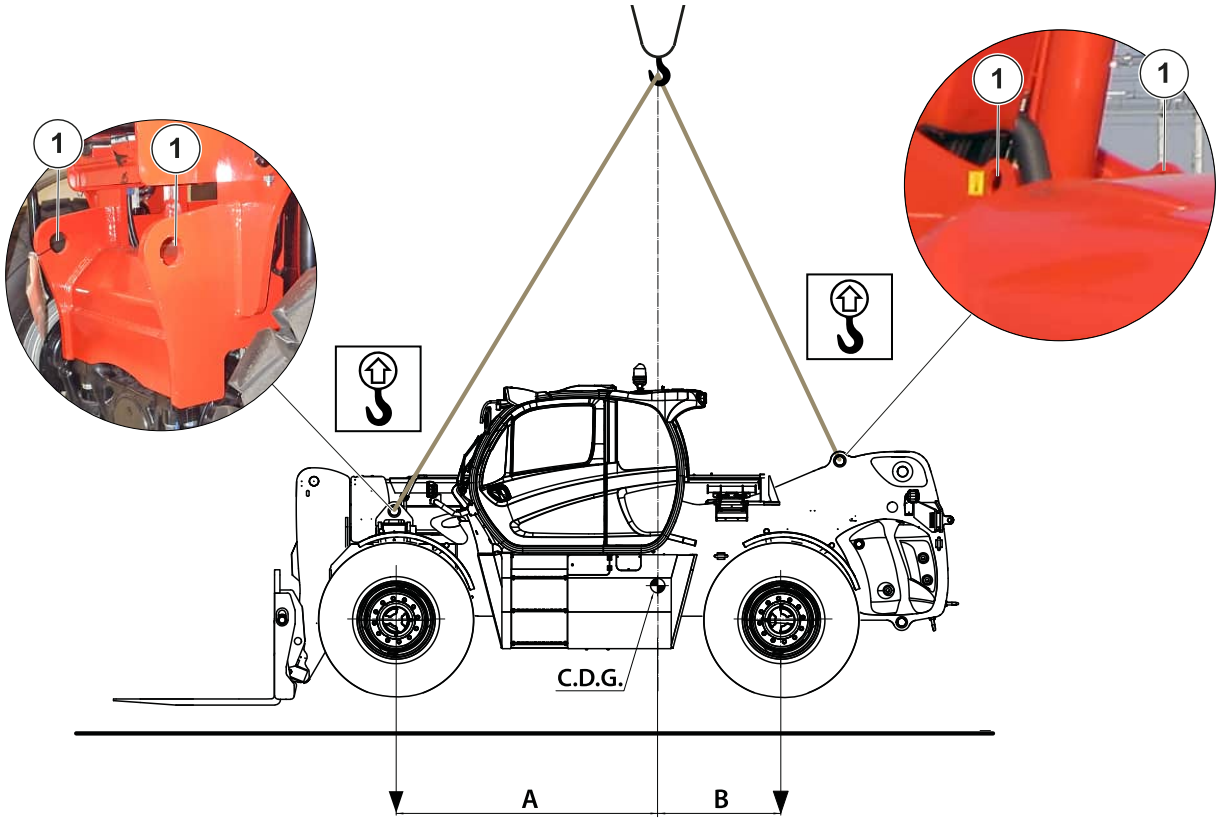


Figure 160: Putting the vehicle in a sling and lifting it

3.9.3 TOWING OR HOOKING THE VEHICLE

MHT 10135, MHT 10160, MHT 10200 e MHT—X 10135, MHT—X 10160, MHT—X 10200

Towing can be done at very low speed and for short distances.

Towing procedure.

1. Arrange the wheel stop wedges under each wheel to lock the vehicle in place.
2. Turn on the hazard lights.
3. Stop the engine if necessary.
4. Press the forward-reverse direction selector in neutral “N”.
5. Set the transmission to the disengage position (bypass mode)[*]
6. Release the service and negative parking brake on the front and rear axles [**].
7. Remove the blocks from the wheels and move the vehicle.

   [*] Set the transmission to the disengage position (bypass mode).
8. Transmission system bypass on the hydrostatic pump:

8.1. Identify the two high pressure relief valves (1) on the hydrostatic pump to disengage the transmission.

8.2. To open the two valves, turn three revolutions counter-clockwise using a hexagon wrench size 30 mm (1.18 in).

⚠ DANGER

Do not turn by more than 3 revolutions, as this would cause leaks.

8.3. Once the towing procedure is complete, turn the two relief valves (1) clockwise to close them. Tightening torque: 110 Nm (81 lbf·ft)

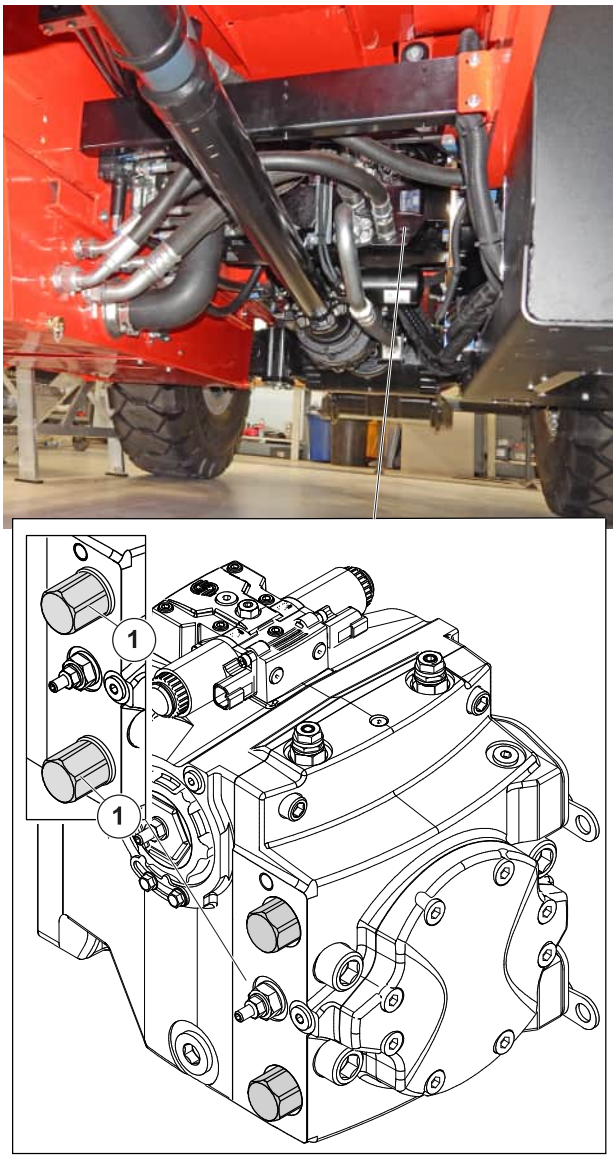


Figure 161: Hydrostatic transmission bypass.

[**] Release of service and negative parking brake on the front and rear axles.

- Loosen the nuts (2) on the screws (1) for the manual mechanical release of the braking groups and retract the nuts by a few mm.
- Screw the screws (1) until they are fully seated on the pressure plate (3).
- Using a wrench, screw the screws (1) alternately by 1/4 of a revolution at a time, to compress the cup springs and release the braking discs.

⚠ WARNING

Screw the screws (1) for a maximum for 1.5 revolutions to release the brakes.

The opposite screws must be tightened by turning them by the same number of revolutions.

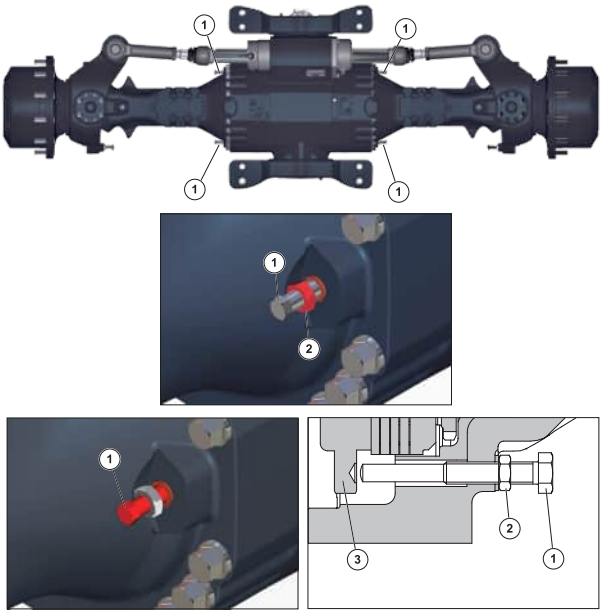


Figure 162: Releasing the negative brake on the axle.

Adjustment after each brake release.

- Remove the screws (1) complete with nuts (2) and gaskets (4).
  Replace the gaskets, lubricate the screws with silicone grease and reassemble everything.
- Adjust the screws (1) until there is a protrusion from the axle block of 34 ± 0.5 mm (1.33 ± 0.5 in).
- Block the position with the nuts (2). Tighten the counter nut (2) o a torque of 15 - 20 N·m (11 - 14.7 lbf·ft).

⚠ WARNING

Retain the position of the screws (1) when the nuts (2) are locked; after locking, check the protrusion of the screws (1) again.

In the absence of hydraulic steering and power brake assistance, act slowly and vigorously on these two controls.
Avoid sudden movements and jerks.

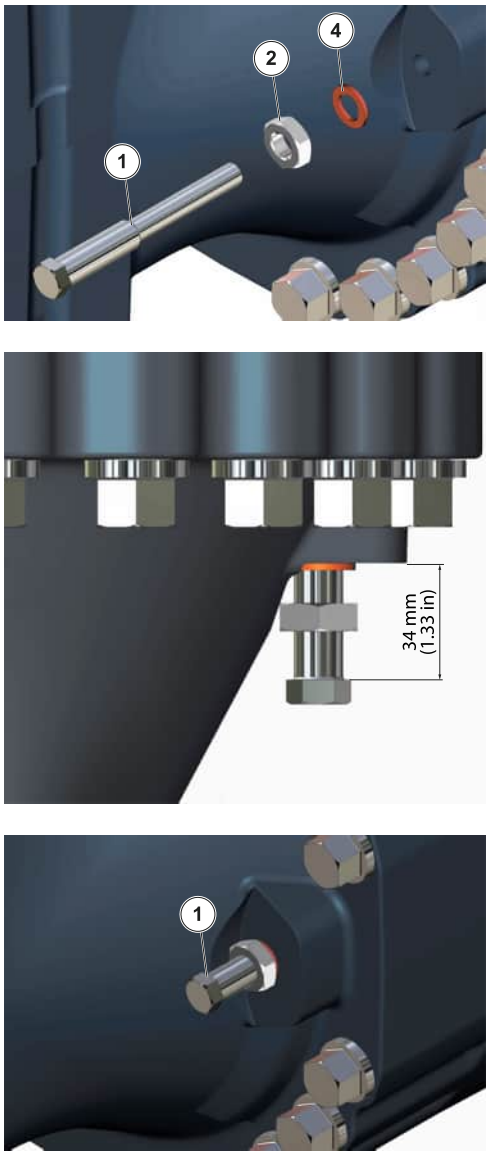


Figure 163: Brake screw adjustments.

3.9.4 TOWING OR HOOKING THE VEHICLE

MHT 11250 e MHT-X 11250

Towing can be done at very low speed and for short distances.

Towing procedure.

1. Arrange the wheel stop wedges under each wheel to lock the vehicle in place.
2. Turn on the hazard lights.
3. Stop the engine if necessary.
4. Press the forward-reverse direction selector in neutral “N”.
5. Set the transmission to the disengage position (bypass mode)[*]
6. Release the service and negative parking brake on the front and rear axles [**].
7. Remove the blocks from the wheels and move the vehicle.

   [*] Set the transmission to the disengage position (bypass mode).
8. Transmission system bypass on the hydrostatic pump:

   8.1. Identify the two high pressure relief valves (1) on the hydrostatic pump to disengage the transmission.

   8.2. To open the two valves, turn three revolutions counter-clockwise using a hexagon wrench size 30 mm (1.18 in).

⚠ DANGER

Do not turn by more than 3 revolutions, as this would cause leaks.

   8.3. Once the towing procedure is complete, turn the two relief valves (1) clockwise to close them. Tightening torque: 110 Nm (81 lbf·ft)

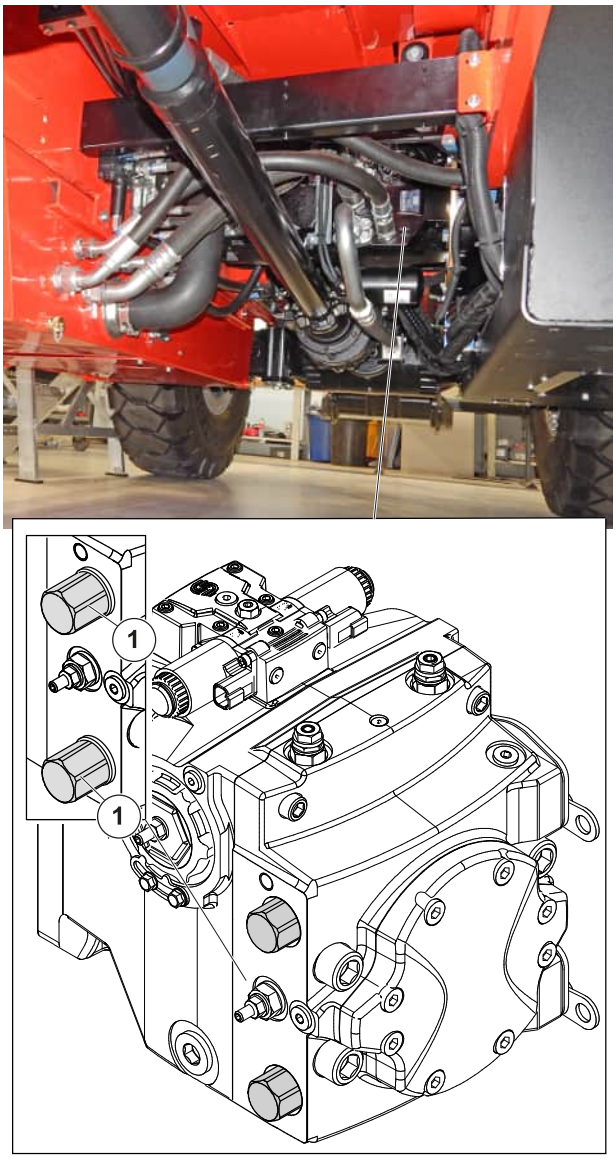


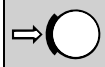
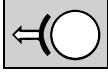
Figure 164: Hydrostatic transmission bypass.

[**] Release of service and negative parking brake on the front and rear axles.

- Place a suitable container under the actuators when removing the plugs (2), as hydraulic oil could leak.
- Unscrew the plug (2) with an Allen key size 17mm (0.66in)
- Remove the fixing spring (4)
- Loosen the counter nut (5) with an Allen key size 17mm (0.66in) or using the special Manitou tool p. n.53013584
- Loosen the regulator (6) of the actuator shaft (7) with a long Allen key size 19mm (0.74 in long type) or using the special Manitou tool p.n.53013584.
- When the actuator shaft regulator (6) turns freely, this means the brake is released.
- Repeat the procedure for each actuator.

In the absence of hydraulic steering and power brake assistance, act slowly and vigorously on these two controls. Avoid sudden movements and jolting when moving the vehicle.

Table 37. Symbols in Figure "Releasing the negative brake".

Sym-bols	Description
	Negative brake engaged (axle braked)
	Negative brake released (axle unbraked)

-

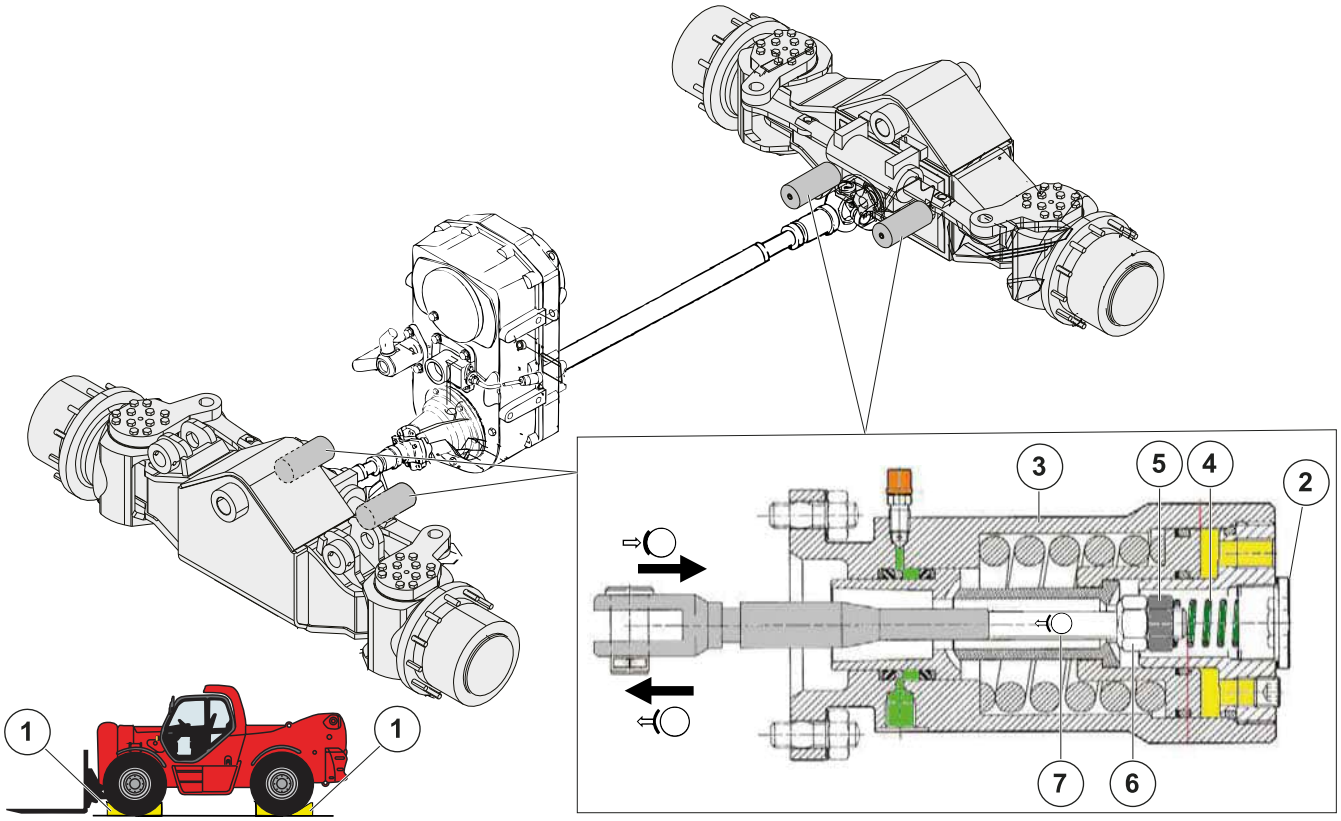


Figure 165: Releasing the negative brake.

Adjustment of negative brakes actuators, after each brake release.

- Place a suitable container under the actuators when removing the plugs (2), as hydraulic oil could leak.
- Unscrew the plugs (5 and 6) of the four actuators (13) with an Allen key size 5 mm (0.19in) and 17mm (0.66in).
- Remove the retainer springs (4) on each actuator (13): (A)-(B)-(C)-(D).
- Loosen the counter nut (5) on the actuator (13-A).

  Using a Vernier caliper (V) measure the depth of the actuator piston (14).
- Adjust the actuator shaft (1) by tightening or loosening the actuator regulator (2) until you get a correct measurement (M1) between "29 - 29.5mm (1.14 - 1.16in)" .
- Tighten the counter nut (5) on the actuator (13-A) and continue the measurement (M1) to check that the depth of the actuator piston (14) meets the measurement requirements.
- Complete phases "1-8" for the remaining actuators (13- B / C / D).
- Refit the retaining springs and tighten all plugs (5 and 6) on the actuators (13) (A / B / C / D).
- Before restarting the vehicle, check the operation of the service brakes and parking brakes.
- Repeat the procedure for each actuator.

Table 38. References of Figure "Adjustment of negative brakes actuators".

Ref.	Description	Ref.	Description
1	Actuator shaft	9	Intermediate plates/ friction plates on left and right side
2	Actuator shaft regulator	10	LHM brake fluid
3	Counter nut	11	Hydraulic oil
4	Spring	12	Cross section of the rear and front axle
5	Inlet plug (regulator measurement)	A	Door A.
6	Inlet plug (piston measurement)	B	Door B.
7	Purge valve (LHM line)	M-1	Actuator inserted setting
8	Left and right side braking mechanisms	M-2	Minimum wear permitted

Table 39. Symbols of Figure "Adjustment of negative brakes actuators".

Sym-bols	Description
	Negative brake engaged (axle braked)

Sym-bols	Description
	Negative brake released (axle unbraked)

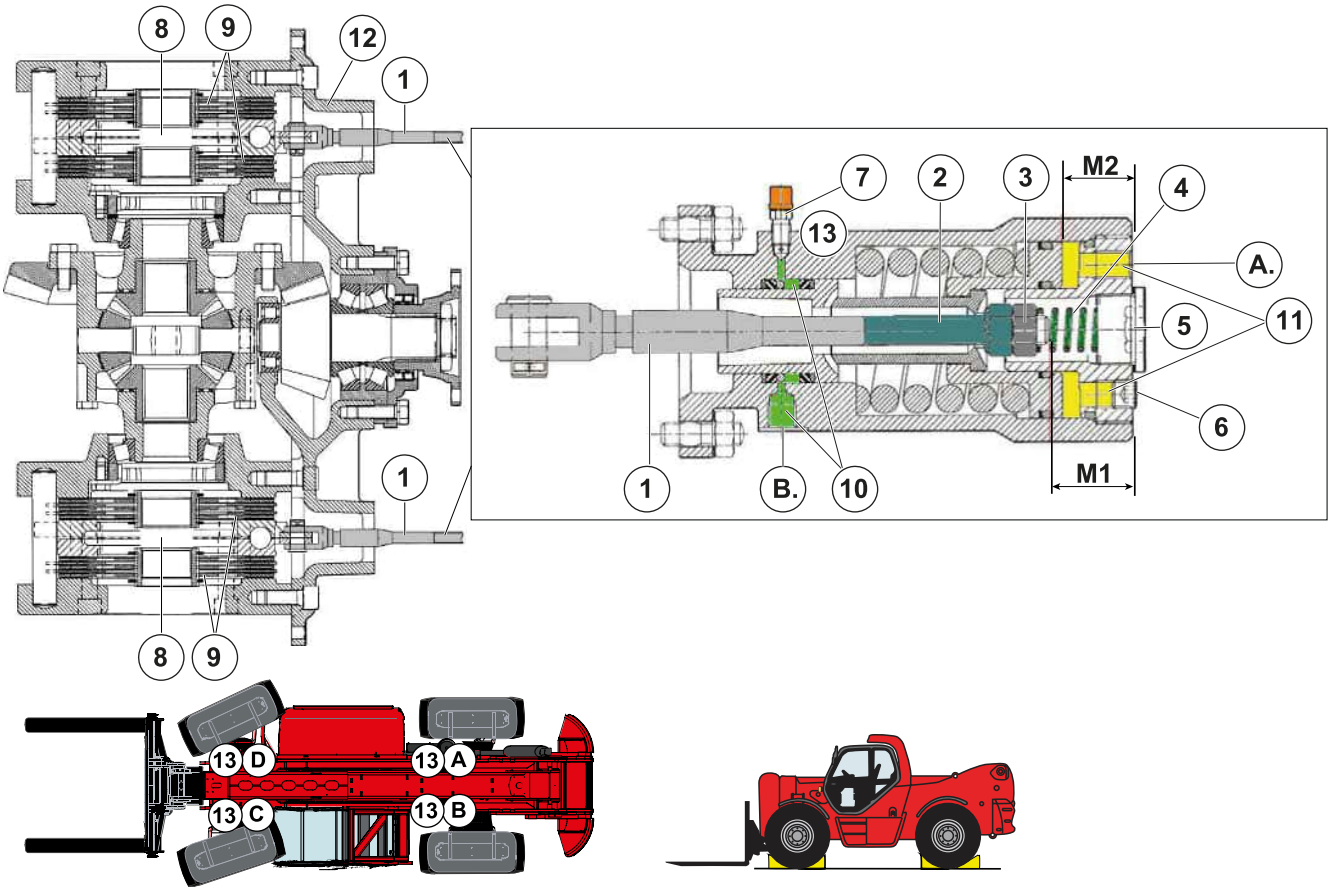


Figure 166: Adjustment of negative brakes actuators.

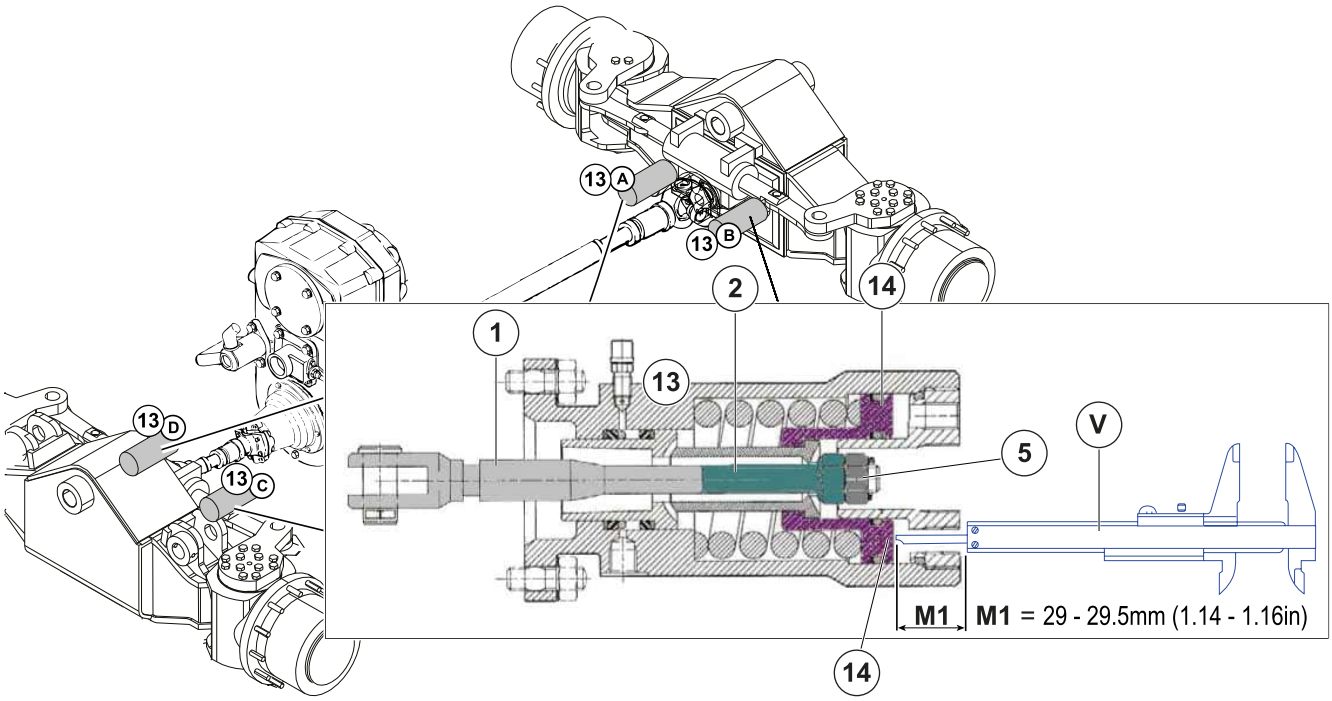


Figure 167: Adjustment of negative brakes actuators.

4. MAINTENANCE

4.1. MAINTENANCE INTERVALS

4.1.1 DAILY AND WEEKLY MAINTENANCE

The operator is authorized to perform this maintenance.

These maintenance interventions allow the operator to keep the vehicle in a clean and safe condition.

4.1.2 1ST MANDATORY SERVICE WITHIN THE FIRST 500 HOURS OR WITHIN 6 MONTHS

This service must be carried out within the first 500 hours of operation or within 6 months from the commissioning of the vehicle (within the first deadline reached).

4.1.3 PERIODIC MAINTENANCE

Periodic maintenance should be performed by an authorized Manitou network professional.

Maintenance intervals calendar

This calendar allows the operator to keep up to date the periodic maintenance work carried out on the vehicle by notifying the total number of hours carried out and the date of the overhaul carried out by the authorized professional of the MANITOU network.

4.1.4 MAINTENANCE AND OCCASIONAL OPERATIONS

The following work and operations must be carried out according to the safety and maintenance requirements of the vehicle.

4.2. SCHEDULED MAINTENANCE

4.2.1 1ST MANDATORY SERVICE WITHIN THE FIRST 500 HOURS OR WITHIN 6 MONTHS

First 500 hours before the initial 6 months.

If the vehicle has reached 500 hours prior to 6 months of service, perform the 1st mandatory service and the 500-hour periodic maintenance.

First 6 months before the initial 500 hours.

If the vehicle has not reached 500 hours of operation within the first 6 months, perform the 1st mandatory service at the dealership.

1st mandatory service

Table 40. 1st mandatory service

Operation	Description	Notes
Check	Oil level in the gearbox	
Check	Tire pressure	
Check	Tightening the wheel nuts	
Check	Differential seal of the front axle	
Check	Differential seal of the rear axle	
Check	Seal of the front wheel reducers	
Check	Seal of the rear wheel reducers	
Check	Tightening the telescopic boom shoes	
Check	Hydraulic and transmission oil level	
Check	Windscreen washer fluid level	
Check	Cabin ventilation filters	
Clean	Radiator grille	
Clean	Condenser grille (Air conditioning OPTION)	
Lubricate	General lubrication	
Check	Wear of the forks	
Check	Safety belt	
Check	Silent Block of the engine	
Check / Adjust	Suction system of the engine	
Check	Hoses and harness of the engine	
Check	Brake circuit pressure	
Check	Wear of the boom shoes	
Check	Condition of harnesses and cables	
Check	Lighting and signaling	
Check	Signalers	
Check	Condition of rear view mirrors	
Check	Cabin structure integrity	
Check	Chassis structure integrity	
Check	Quick coupling of attachments	
Check	Condition of attachments	

4.2.2 DAILY AND WEEKLY MAINTENANCE

10h - Daily maintenance or every 10 hours of operation

Table 41. 10h - Daily maintenance or every 10 hours of operation

Operation	Description	Notes
Check	Engine oil level	
Check	Coolant level	
Check	Telescopic boom sliding shoes	
Verify	"MSS" safety system	
Check	Fuel level	
Check	DEF liquid level	

Operation	Description	Notes
Check	Fuel pre-filter	
Check	Cabin glass for damage	

50h - Weekly maintenance or every 50 hours of operation

Table 42. 50h - Weekly maintenance or every 50 hours of operation

Operation	Description	Notes
Check	Hydraulic oil level	
Check	Tire pressure and wheel nut tightening	
Clean	Water oil cooler grille of intercooler	
Clean and lubricate	Telescopic boom wear shoes	
Lubricate	Telescopic boom	
Lubricate	Tilting corrector	
Lubricate	Cardan joint, steering and axles	
Check	Windscreen washer fluid level	
Check and Clean	Condenser grille (Air Conditioning Optional)	

250h - Every 250 hours of operation

Table 43. 250h - Every 250 hours of operation

Operation	Description	Notes
Check	Front and rear axle differential oil level	
Check	Front and rear wheel reducers oil level	
Check	Gearbox oil level	
Check	Battery	

4.2.3 PERIODIC MAINTENANCE

500h - Periodic maintenance - every 500 hours of operation or 6 months

Table 44. 500h - Periodic maintenance - every 500 hours of operation or 6 months

Operation	Description	Notes
Check	Contamination of hydraulic oil	
Replace	Hydrostatic pump (transmission) oil filter	
Replace	Hydraulic oil filter cartridge (drain)	
Replace	Hydraulic oil breather	
Check	Wear of the forks	Contact your dealer
Check	Cabin ventilation filters	
Replace	Engine oil and filter	

1000h - Periodic maintenance - every 1000 hours of operation or 1 year

Also carry out periodic maintenance of the 500 hours of operation.

Table 45. 1000h - Periodic maintenance - every 1000 hours of operation or 1 year

Operation	Description	Notes
Replace	Front and rear axle differential oil	
Replace	Front and rear wheel reducer oil	
Replace	Gearbox oil	
Replace	Dry air filter cartridge	
Clean	Fuel tank	
Replace	Fuel pre-filter	
Check / Clean	Fuel pump filter	
Replace	Fuel filter	
Replace	Coolant	
Replace	Cabin ventilation filters	
Replace	"DEF" fuel pump filter	
Replace	"DEF" tank breather	
Check	Safety belt	
Check	Silent Block of the engine	Contact your dealer
Check / Adjust	Engine air intake system	Contact your dealer
Check	Engine hoses and pipes	Contact your dealer
Check	Brake circuit pressure	Contact your dealer
Check	Wear of the telescopic boom shoes	Contact your dealer
Check	Condition of harnesses and cables	Contact your dealer
Check	Lighting and signaling	Contact your dealer
Check	Signalers	Contact your dealer
Check	Condition of rear view mirrors	Contact your dealer
Check	Cabin structure integrity	Contact your dealer
Check	Chassis structure integrity	Contact your dealer
Check	Quick coupling of attachments	Contact your dealer
Check	Condition of attachments	Contact your dealer
Check	Service and parking brake	Contact your dealer

2000h - Periodic maintenance - every 2000 hours of operation or 2 years

Also carry out periodic maintenance of the 500 hours and 1000 hours of operation.

Table 46. 2000h - Periodic maintenance - every 2000 hours of operation or 2 years

Operation	Description	Notes
Check	Tire pressure and wheel nut tightening	
Replace	Hydraulic oil	
Clean	Hydraulics intake filter cartridges	
Check	Radiator	Contact your dealer
Check	Transmission pressures	Contact your dealer
Check	Steering	Contact your dealer
Check	Condition of the boom assembly	Contact your dealer
Check	Bearings and articulation rings	Contact your dealer
Check	Conditions of hoses and pipes	Contact your dealer

Operation	Description	Notes
Check	Condition of jacks (leak, rods)	Contact your dealer
Check	Pressures of hydraulic circuits	Contact your dealer
Check	Bearings and articulation rings	Contact your dealer
Clean / Check	Air conditioning (OPTIONAL)	Contact your dealer

3000h - Periodic maintenance - every 3000 hours of operation or 3 years

Also carry out periodic maintenance of the 500 hours and 1000 hours of operation.

Table 47. 3000h - Periodic maintenance - every 3000 hours of operation or 3 years

Operation	Description	Notes
Replace	Air filter safety cartridge	
Replace	Engine service belt	Contact your dealer

4500h - Periodic maintenance - every 4500 hours of operation or 9 years

Also carry out periodic maintenance of the 500 hours of operation.

Table 48. 4500h - Periodic maintenance - every 4500 hours of operation or 9 years

Operation	Description	Notes
Check	Engine crankcase breather	
Replace	Motor breather crankcase filter	
Check	Control unit (ECU), sensors and actuators associated with the engine	Contact your dealer
Check	Engine turbocharger	Contact your dealer
Check / Clean	Valve of the exhaust gas recirculation (EGR) system of the engine	Contact your dealer
Check	Selective Catalytic Reducer (SCR) / Diesel Oxidation Catalyst (DOC) of the engine	Contact your dealer
Check / Clean	Engine injector	Contact your dealer

6000h - Periodic maintenance - every 6000 hours of operation or 12 years

Also carry out periodic maintenance of the 500 hours, 1000 hours, 2000 hours or 3000 hours of operation.

Table 49. 6000h - Periodic maintenance - every 6000 hours of operation or 12 years

Operation	Description	Notes
Check	Diesel Particulate Filter (DPF) of the engine	Contact your dealer

9000h - Periodic maintenance - every 9000 hours of operation or 18 years

Also carry out periodic maintenance of the 500 hours, 1000 hours, 3000 hours or 4500 hours of operation.

Table 50. 9000h - Periodic maintenance - every 9000 hours of operation or 18 years

Operation	Description	Notes
Replace	Diesel Particulate Filter (DPF) of the engine	Contact your dealer
Replace	Selective Catalytic Reducer (SCR) of the engine	Contact your dealer

4.2.4 OCCASIONAL MAINTENANCE

Table 51. Occasional maintenance

Operation	Description	Notes
Install	Telescopic boom safety wedge	
Replace	Wheel	
Regular	Headlights	
Replace	Fuses and relays	
Verify	Radio control	
Check / Clean	Fuel tank filler filter	
Check / Clean	DEF tank filler filter	
Clean	Stationary regeneration of DPF filter “vehicle stopped”	

4.3. EVERY 10 HOURS OF OPERATION

4.3.1 CHECKING THE OIL LEVEL IN THE ENGINE

⚠ DANGER

Risk of damage to the engine or exhaust after-treatment unit

Do not add too much oil. Adding too much oil can cause damage to the engine or the exhaust after-treatment unit.

Drain or suck up excess oil.

Place the vehicle on a level surface with the heat engine off, and let the oil settle in the crankcase.

- Open the engine cover.
- Remove the dipstick (1).
- Clean the dipstick and check that the level is between the two marks.
- If necessary, remove the cap (2) on the cylinder head and add new oil through the filler port (3).
- By means of a visual check, make sure that there are no leaks or sweating.

Figure 168: Engine oil level

4.3.2 CHECKING THE COOLANT LEVEL

⚠ WARNING

Risk of getting a burn

Pressurized system: Hot coolant can cause severe burns.

When opening the filler cap, stop the engine and wait for the cooling system components to cool. Loosen the pressure cap slowly to relieve pressure. Never add cold coolant when the engine is hot.In an emergency, it is possible to use water as a coolant, and then proceed, as quickly as possible, to change the fluid in the cooling circuit.

⚠ DANGER

Risk of introducing an air lock into the cooling system

When performing any maintenance or repair of the engine cooling system, the procedure must be performed with the engine at ground level.

This allows you to accurately check the coolant level and avoid the risk of introducing an air lock into the cooling system.

1. Open the engine cover.
2. Check the correct level in relation to the center of the indicator (1).
3. If necessary, add coolant.
4. Slowly pull the radiator cap (2) up to the safety stop.
5. Let the pressure and steam escape.
6. Press the cap and remove it by turning.
7. Add coolant through the fill orifice (3) up to the center of the indicator (1).
8. Slightly lubricate the fill orifice to make it easier to replace and remove the radiator cap.

9. Look to make sure that there are no leaks on the radiator or pipes.

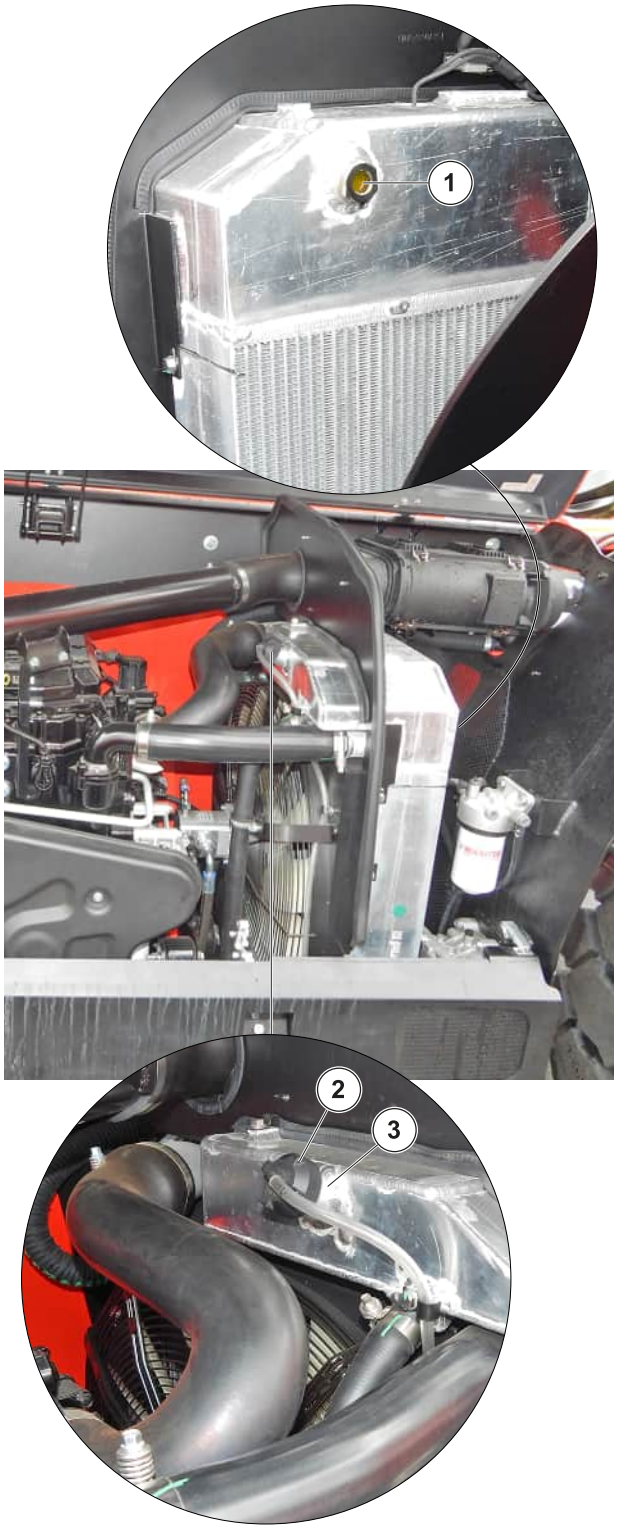


Figure 169: Coolant level

4.3.3 CHECKING THE TELESCOPIC BOOM SLIDING SHOES

To maintain optimum operation, keep the sliding shoes (1) and telescopic boom extensions (1) lubricated.

NOTICE

LUBRICATION OF THE TELESCOPIC BOOM REQUIRED AFTER:

Cleaning the boom, especially with high pressure lances.
Long period of non-use of the vehicle.

1. Fully extend the telescopic boom extensions.
2. Check the condition of the surface of the telescopic extensions: the surface must be clean and without signs of corrosion.
3. Check the condition of the shoes and that they correctly guide the extension and retraction movement of each boom extension.
4. If necessary, lubricate the telescopic boom extensions with specific grease to maintain the correct sliding of the sliding shoes:

   4.1. Extend and retract the boom several times to spread the grease evenly.

5. Remove excess grease.

Figure 170: Telescopic boom sliding shoes

In case of use in an abrasive atmosphere (dust, sand, coal) use a sliding paint (reference MANITOU: 483536). Get advise from your dealer.

4.3.4 CHECKING THE "MSS" SAFETY SYSTEM

Only with the machine equipped with a safety system without a loading cell.

1. With the help of a metric cord and a spirit level check the indications of boom length (L) and angle (A).
2. Make sure the “MSS" safety system is operating correctly:
   2.1. Fully retract the telescopic boom.
   2.2. Attach a fork carrier and lift a considerable load.
   2.3. Check that the load reading on the display (1) is correct (WORKING page, “Geometrical” selection).
3. Extend the telescopic boom with the weight (maintain a height above the ground of about 0.5 m - 1.6 ft).
4. Make sure the “MSS” safety system is triggered when the limit set by the load chart is reached, immediately blocking movements which could compromise the stability and safety of the vehicle.

Figure 171: "MSS" safety system

4.3.5 CHECKING THE FUEL LEVEL

Keep the fuel tank as full as possible to minimize condensation due to atmospheric conditions.

⚠ DANGER

Risk of fire and explosion

Do not smoke or approach with an open flame during filling operations or when the tank is open.

Never fill up while the engine is running.

1. Check the indicator on the display (DRIVE page).

   If necessary, add diesel fuel.
2. Open the flap (1) using the ignition key to see the fuel filler neck (3).
3. Remove the cap (2).
4. Fill the tank with clean and filtered diesel fuel through the filler neck (3).
5. Put the cap (1) back on.

6. Look to make sure that there are no leaks on the tank or pipes.

Figure 172: Fuel level

4.3.6 CHECKING DEF LIQUID LEVEL

⚠ WARNING

Risk of contact with irritants

If the “DEF” tank cap is opened in high temperatures, ammonia vapors may escape. Ammonia vapors have a pungent odor and are particularly irritating to the skin, mucous membranes and eyes.The presence of the vapors can cause a burning sensation in the eyes, nose and oral cavities as well as coughing and watery eyes.

Do not inhale ammonia vapors.

⚠ WARNING

Risk of contact with irritants

If “DEF” comes into contact with eyes or skin, rinse immediately and thoroughly with clean water. If “DEF” is swallowed, rinse your mouth immediately with plenty of clean water and drink plenty of water. Change clothing soiled with “DEF” immediately. In case of allergic reactions, go to a doctor immediately for advice.

Keep “DEF” out of the reach of children."DEF" must not come into contact with the skin, eyes or clothing.

⚠ WARNING

Risk of getting a burn

During operation and after the engine has stopped, “DEF” pipes and all connected components remain under pressure and can be very hot. When opening the system, there is the risk of being burnt by high temperature “DEF” sprays.

Start work on the exhaust gas after treatment system no sooner than at least 5 minutes after the engine has been stopped.Slowly open the piping connections and blocking elements of the system components. When opening, cover the sectioning point with a piece of cloth.Wear protective gloves, clothing and goggles.

⚠ DANGER

Risk of damage to thermostats and temperature sensors

The penetration of “DEF” into the coolant circuit (even a tiny amount) damages the thermostats and temperature sensors.

It is highly recommended to keep “DEF” separated from other consumables.Do not use the same containers and collection trays for "DEF" and other consumables. Do not use consumables containing traces of “DEF”.

⚠ DANGER

Risk of damage to components

The individual components of the DEF system react greatly even in the presence of the slightest trace of impurities in “DEF”.

Use only clean containers and collection trays, suitable for containing "DEF". Do not use “DEF” containing traces of impurities.

⚠ WARNING

Risk of poisoning

Fire-fighting measures:"DEF" is not flammable. In case of fire, NH3 (ammonia) can be released. In this case there is the danger of poisoning. Fire-fighting measures must be suitable for the environmental conditions.

⚠ DANGER

Environmental protection warning Disposal of "DEF":

A small amount of "DEF" accidentally spilled is not a problem. The product is easily biodegradable and can be dispersed without problems in the sewer system using a lot of water.For the disposal of larger quantities of "DEF", always comply with the requirements of the law on environmental protection and recycling / disposal of waste. Packages containing residues of "DEF" must be treated the same way as "DEF". Completely empty the contents of the packages; this way after cleaning the packages can be reused.

1. Check the indicator on the display (DRIVE page).

   If necessary, add “DEF” fluid.
2. Open the flap (1) using the ignition key to see the fuel filler neck (3).
3. Remove the cap (2).
4. Fill the tank with fresh, uncontaminated “DEF” fluid, through the filler neck (3).
5. Refit the cap (2).
6. Look to make sure that there are no leaks on the tank or pipes.

Figure 173: Checking DEF liquid level

4.3.7 FUEL PRE-FILTER CHECK

⚠ DANGER

Fire risk

Smoking or approaching with an open flame is prohibited. The diesel engine must be turned off. Consult maintenance personnel if in doubt about the state of the water separator.

- Open the engine cover and locate the fuel pre-filter (1).
- Check that there is no water in the tank (2) and empty it if necessary.
- Place a container under the water separator to collect water and contaminants.
- Turn the fuel valve (3) to the CLOSED position (4).
- To drain the water, manually loosen the discharge valve (6) located in the lower part of the water separator bowl. If no water comes out, at the top of the filter holder turn the air vent screw (5) counterclockwise 2 to 3 turns to loosen it.
- If water still does not come out, open the fuel tap.

- After draining the water separator bowl, hand tighten the discharge valve (6).
- If the air vent screw (5) has been loosened, be sure to tighten it.
- Open the fuel valve (3) and prime the fuel following the "Priming the Fuel System" procedure. Check for fuel leaks.
- Close the engine cover.

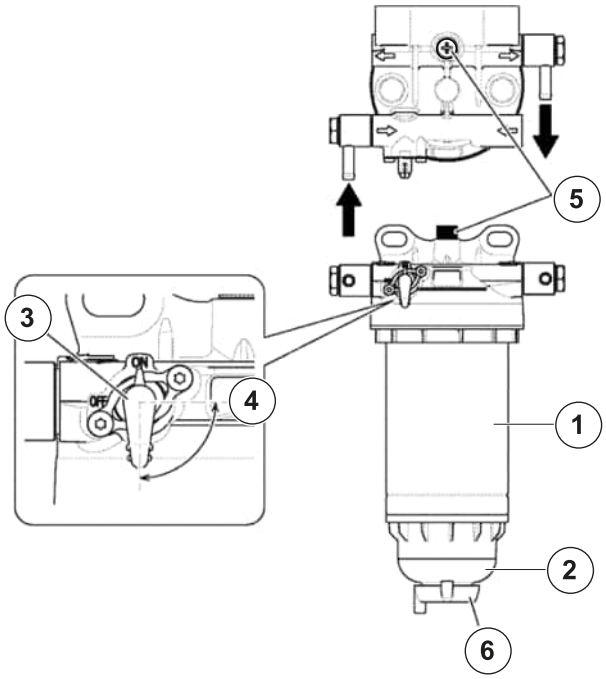


Figure 174: Fuel pre-filter check

4.3.8 CABIN GLASS INTEGRITY CHECK

⚠ DANGER

Structural and/or superficial damage risk

The use of cleaning materials incompatible with the cabin windows can cause structural and/or surface damage.

Do not use abrasive or highly alkaline cleaners on the cabin windows. Do not use aromatic or halogenated solvents such as toluene, benzene, gasoline, acetone or carbon tetrachloride on the cabin windows. If in doubt about the cleaning material, contact your agent or dealer.

⚠ DANGER

Risk of surface degradation and cracking

Contact with aggressive solvents such as methyl ethyl ketone (MEK) or hydrochloric acid can cause surface degradation and possible cracking of the cabin windows.

Do not scrub with brushes, steel wool or other abrasive materials. Do not use spatulas, razor blades or other sharp tools to remove deposits or stains. Do not clean the cabin windows in direct sunlight or high temperatures as this may cause stains.

Cleaning and periodic inspection of the cabin windows, using correct procedures, is recommended for the safety of the operator and to prolong their service life.

- Thoroughly clean all windows in the cabin (windshield, rear window, upper window, side windows).
- Check the integrity of the windows on each side of the cabin.
- Check that there are no scratches, abrasions, cracks etc. In this case it is necessary to replace the glass.
  Contact your agent or dealer immediately.

Here is how to clean the cabin windows in the best way and to keep them in good condition.

CLEANING PROCEDURE WITH CLEANING EQUIPMENT

- Clean the surface using a high pressure cleaner (max. 100 bar or 1,450 psi) and/or a steam cleaner. We suggest testing a small area before cleaning the entire glass.
- Avoid the use of water and/or steam additives.

MANUAL CLEANING PROCEDURE

- Gently wash the cloth with a mild soap and warm water solution, using a soft, non-abrasive cloth or sponge to remove dirt or grime.
- Splashes of grease and soiled glass compounds can be removed easily before drying by wiping lightly with a soft cloth using petroleum ether (BP65), hexane or heptane.
- Minor scratches and abrasions can be minimized by using a mild car polish cleaner. We suggest testing a small area of the glass with the selected cleaner (follow the instructions provided by the cleaner manufacturer).
  Contact your agent or dealer immediately.
- Finally, rinse thoroughly with clean water to remove any detergent residue and dry the surface with a soft cloth to avoid water stains.

Figure 175: Cabin glass integrity check

4.4. EVERY 50 HOURS OF OPERATION

4.4.1 HYDRAULIC OIL LEVEL CHECK

Place the vehicle on a level surface with the engine off and the telescopic boom retracted and lowered as far as possible.

⚠ DANGER

Use a very clean funnel and clean the top of the oil can before filling.

- Remove the protective panel (1) to access the filler cap (4).
- By means of a visual check, make sure that there are no leaks or sweating.
- Refer to the optical indicator (2) on the tank to check the level which is correct when it is between the upper and lower marks.
- If necessary, add new oil from the filler neck (4). Remove the cap (3) from the filler neck (4) and top up with oil.

You must always keep the oil level at maximum.

- Refit the cap (3).
- Refit the protection panel (1).

Figure 176: Hydraulic oil level check

4.4.2 TIRE PRESSURE AND MHT 10200, MHT-X 10200 WHEEL NUT TIGHTENING CHECK

⚠ DANGER

Check that the air tube is properly connected to the tire valve before starting the inflation and keep anyone away during the operations. Follow the recommended inflation pressures.

- Check the condition of the tires for cuts, bumps, wear, etc.
- Check the tightness of the wheel bolts. Failure to observe this warning could cause deterioration and breakage of the wheel pins, as well as deformation of the wheels themselves.
  - Front wheels: 680 Nm – 69 Kgf ± 15%.
  - Rear wheels: 680 Nm – 69 Kgf ± 15%.
- Check and, if necessary, adjust the tire pressure (depending on the tire model equipped).

4.4.3 TIRE PRESSURE AND MHT 11250, MHT-X 11250 WHEEL NUT TIGHTENING CHECK

⚠ DANGER

Check that the air tube is properly connected to the tire valve before starting the inflation and keep anyone away during the operations. Follow the recommended inflation pressures.

- Check the condition of the tires for cuts, bumps, wear, etc.
- Check the tightness of the wheel bolts. Failure to observe this warning could cause deterioration and breakage of the wheel pins, as well as deformation of the wheels themselves.
  - Front wheels: 550 Nm - 56.08 kgf ± 15%.
  - Rear wheels: 550 Nm - 56.08 kgf ± 15%
- Check and, if necessary, adjust the tire pressure (depending on the tire model equipped).

4.4.4 CLEANING THE RADIATOR GRILLE, HYDRAULIC OIL, COOLANT AND INTERCOOLER

⚠ DANGER

Adjust the frequency of cleaning according to the operating environment.

To access the coolant and air intercooler radiator (1), open the engine cover.

To access the hydraulic oil cooling radiator (1), remove the panel on the rear frame (2).

Inspect these radiator elements: damaged fins, corrosion, dirt, grease, insects, leaves, oil and other debris.

Clean the radiator if necessary.

Compressed air is the best method for removing debris.

Direct the air jet in the direction opposite the fan air flow. Hold the nozzle approximately 6 mm (0.25 in) from the radiator fins.

Slowly move the air nozzle parallel to the radiator pipes. Pressurized air removes debris from between the pipes.

⚠ WARNING

Risk of injury

Air pressure can cause personal injury. Failure to comply with safety measures can cause personal injury.

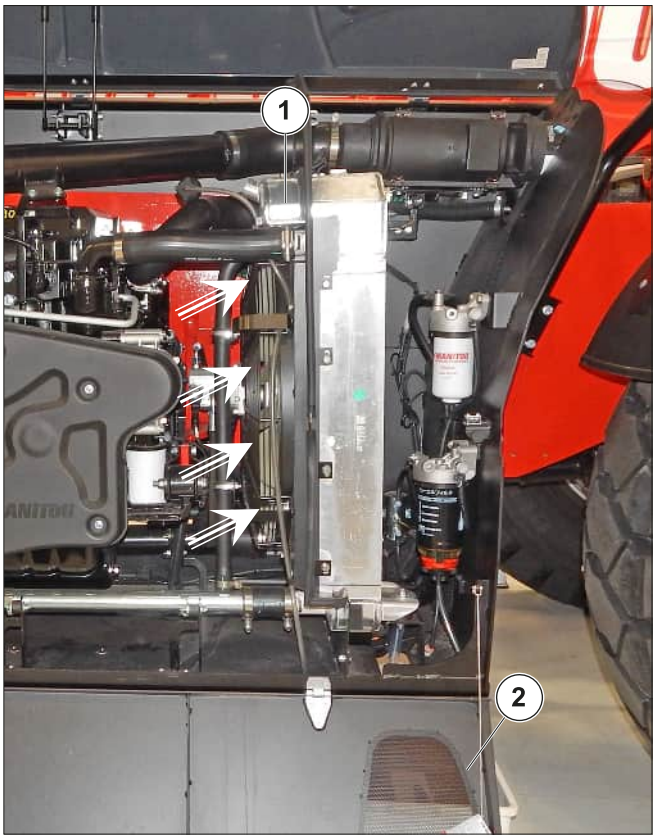
When using compressed air, wear a face shield and protective clothing. The maximum pressure at the compressed air nozzle for cleaning must be less than 21 bar (30psi).

Pressurized water can also be used for cleaning. The maximum water pressure for cleaning must be less than 2.8 bar (40 psi).
Use pressurized water to soften the mud. Clean the core on both sides.

To remove oil and grease, use a degreaser and steam. Clean both sides of the core.
Wash the core with detergent and boiling water.
Rinse thoroughly with clean water.

Once the radiator is cleaned, start the engine.
Warm up the engine at idle speed with no load for 3-5 minutes. Bring the engine to maximum speed. Running at full throttle helps remove debris and dry the core.
Reduce the engine speed to idle and then stop the engine. Use a lamp behind the core to see if it is clean.
Repeat cleaning if necessary.

Check if the fins are damaged.
The folded fins can be opened with a “comb”.
Inspect these items to verify they are in good condition: welds, mounting brackets, air lines, connections, clamps and seals.
Make repairs if necessary.



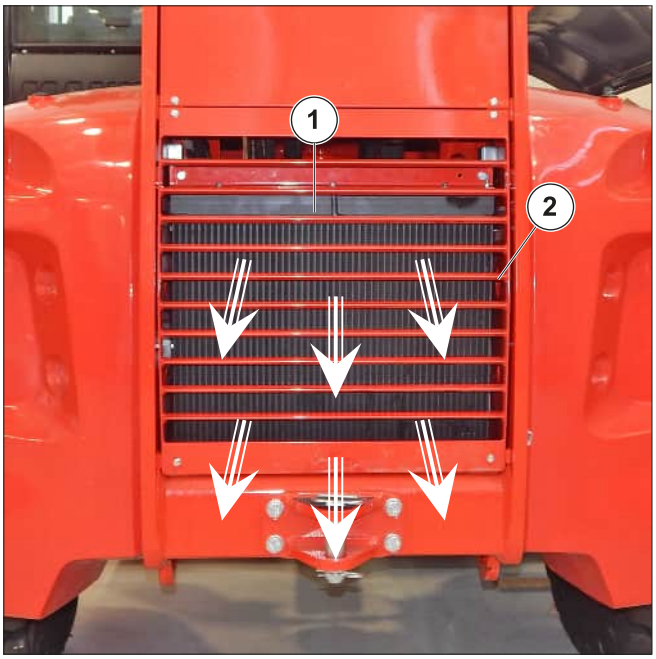


Figure 177: Cleaning the radiator grille, hydraulic oil, coolant and intercooler

4.4.5 WINDSCREEN WASHER FLUID LEVEL CHECK

Open the cover (1) behind the cabing to access the windscreen washer fluid tank (2)

Visually check the tank level.

If necessary, add washer fluid from the filler neck (3).

To access the filler (3), remove the grille (5) on part of the hood behind the cabin.

Remove the filler cap (4).

Add windscreen washer fluid through the filler neck (3).

Replace the filler cap (4).

Refit the grille (5) and close the cover behind the cabin (1).

Figure 178:

4.4.6 CHECKING AND CLEANING THE CONDENSER GRILLE (OPTIONAL AIR CONDITIONER)

⚠ DANGER

Risk of damage to the condenser fins

Do not use a jet of water or high pressure steam, this could damage the condenser fins.

In a polluting atmosphere, clean the radiator grille daily.

- Visually check whether the condenser (1) is clean. Clean if necessary.
- Clean the condenser with a jet of compressed air, directing it in the same direction as the air flow.

To optimize cleaning, carry out this operation with the fans on.

Figure 179: Air conditioning condenser grille

4.4.7 GENERAL LUBRICATION

To be carried out every week if the vehicle has not reached 50 hours of weekly running.

⚠ DANGER

Raise the boom and place the safety wedge on the rod of the lifting cylinder.

In case of intense use in a very dusty or oxidizing atmosphere, reduce this frequency to 10 hours of operation or every day.

Clean, then lubricate the following points with grease and wipe off the excess.

4.4.8 LUBRICATION PROCEDURES

4.4.8.1 CLEANING AND LUBRICATION OF THE TELESCOPIC BOOM WEAR SHOES

- Fully extend the telescopic boom.
- Clean the surface of the extension arms.
- Using a brush, apply a coat of grease to the 4 sides of the telescopic boom.
- Extend and retract the telescopic boom several times to distribute the grease evenly.
- Remove excess grease.

Figure 180: Cleaning and lubricating the telescopic boom wear shoes

4.4.8.2 LUBRICATION OF THE TELESCOPIC BOOM AND TILT CORRECTOR

- Telescopic boom lubricators (1).
- Attachment quick coupling lubricators (2).
- Tilting cylinder foot lubricator (3).
- Tilting cylinder head lubricator (4).
- Lifting cylinder foot lubricator (5).
- Lifting cylinder head lubricator (6).
- Compensating cylinder foot lubricator (7).
- Compensating cylinder head lubricator (8).
- Tilting corrector cylinder foot lubricator (9).
- Tilting corrector cylinder head lubricator (10).

Each lubricator is indicated with a yellow cap.

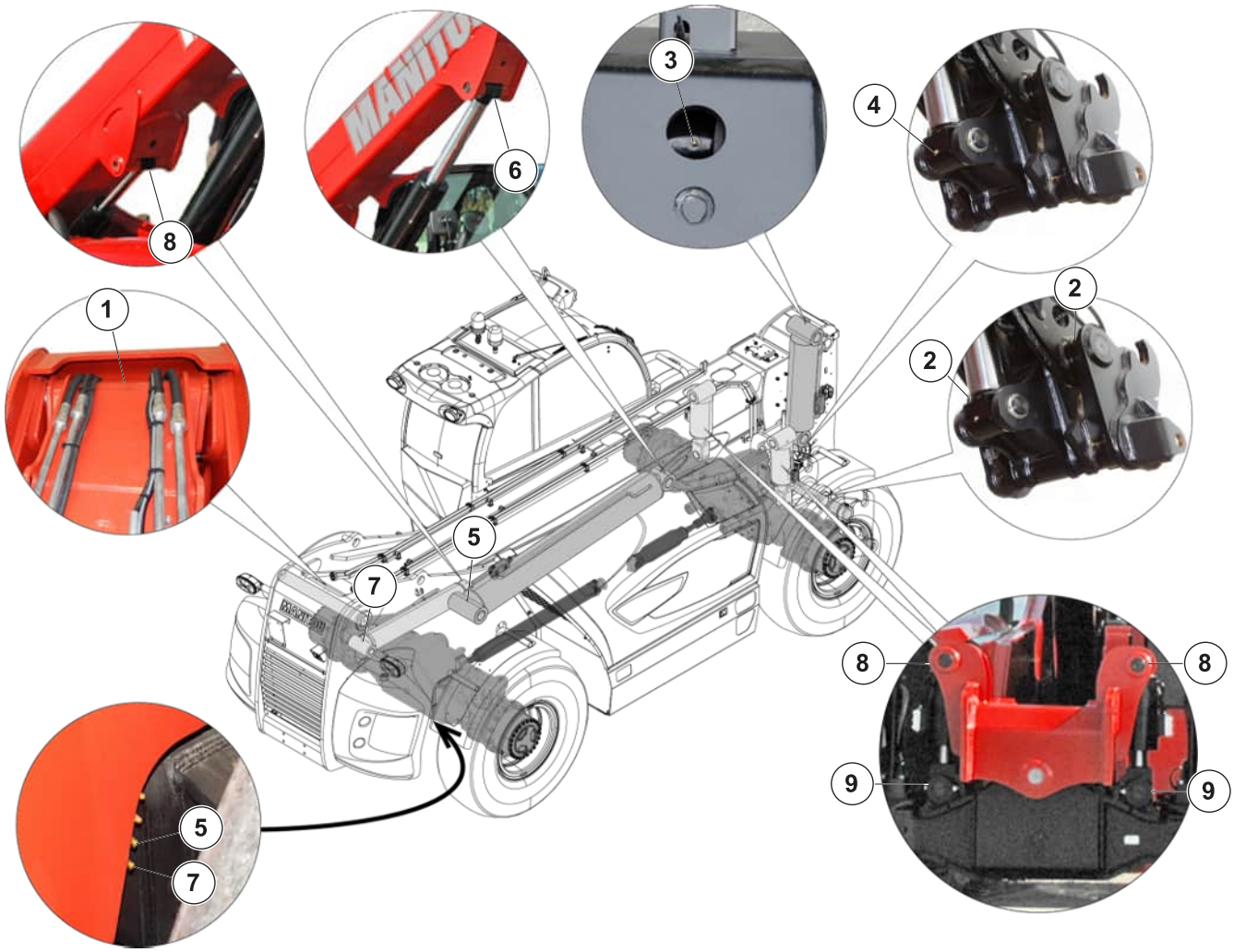


Figure 181: LUBRICATION OF THE TELESCOPIC BOOM AND TILT CORRECTOR

4.4.8.3 LUBRICATION OF THE CARDAN JOINT, STEERING AND AXLES

TRANSMISSION CARDAN JOINT

- Transmission cardan joint lubricators: Transmission/ Front axle (1).
- Transmission cardan joint lubricators: Transmission/ Rear axle (2).

PINS OF FRONT AND REAR WHEEL REDUCERS

- Front and rear wheel reducer lubricators (3).

FRONT AND REAR AXLE STEERING PINS

- Front and rear steering pin lubricators (4).

FRONT AXLE SWING

- Front axle swing lubricators (5).

REAR AXLE SWING

- Front axle swing lubricators (6).

Each lubricator is indicated with a yellow cap.

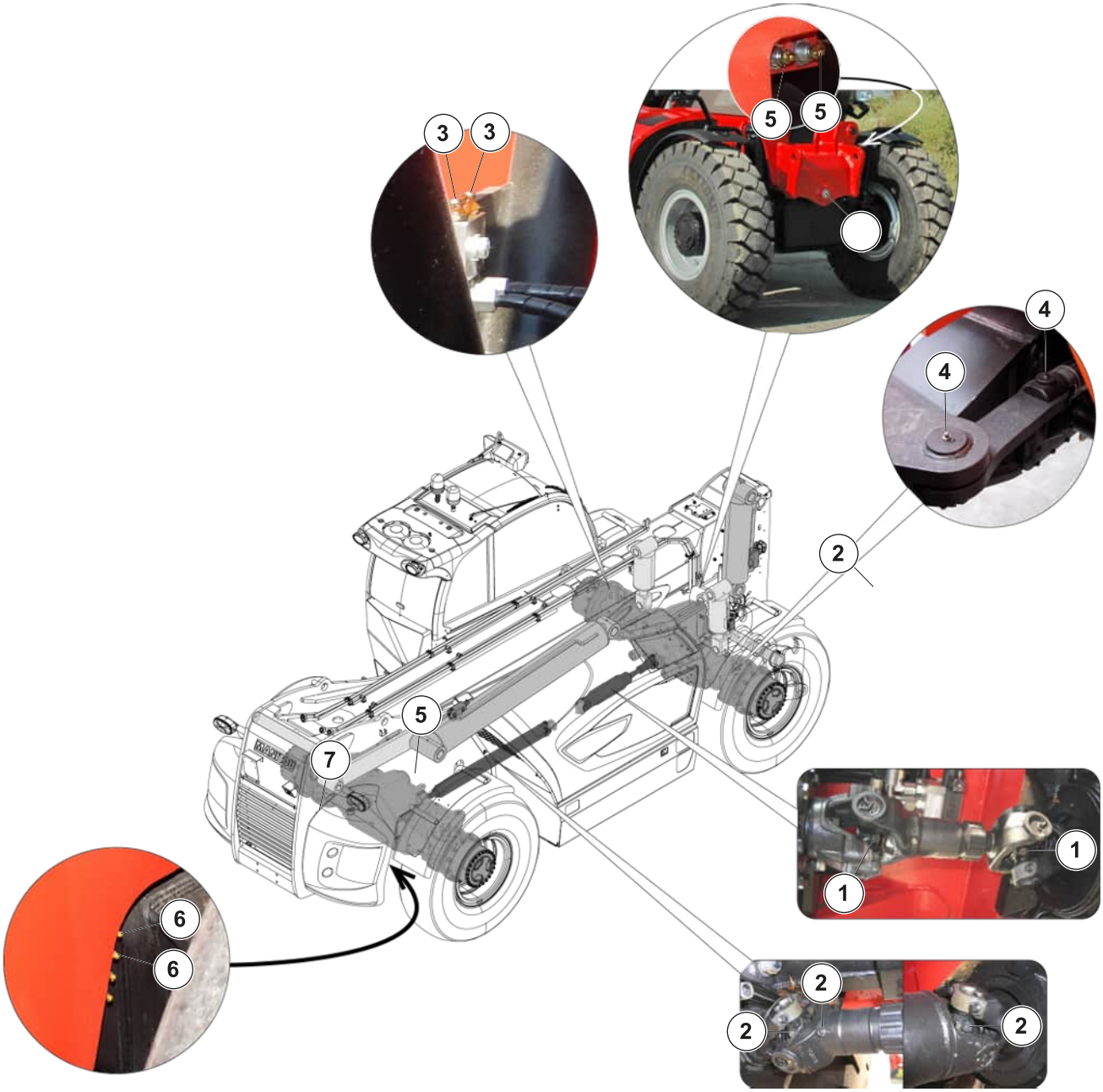


Figure 182: LUBRICATION OF THE CARDAN JOINT, STEERING AND AXLES

4.5. EVERY 250 HOURS OF OPERATION

4.5.1 FRONT AND REAR AXLE DIFFERENTIAL OIL LEVEL CHECK

only for MHT 10200, MHT-X 10200

Place the vehicle on a horizontal surface with the engine stopped.

Check the oil level of the front axle differential.

Remove the level (1) and oil filler plug (2). The level is correct when the oil skims the opening hole.

If necessary, add fresh oil through the hole.

Repeat this for the rear axle differential.

35–50 Nm (25.8-36.8 ft-lb)

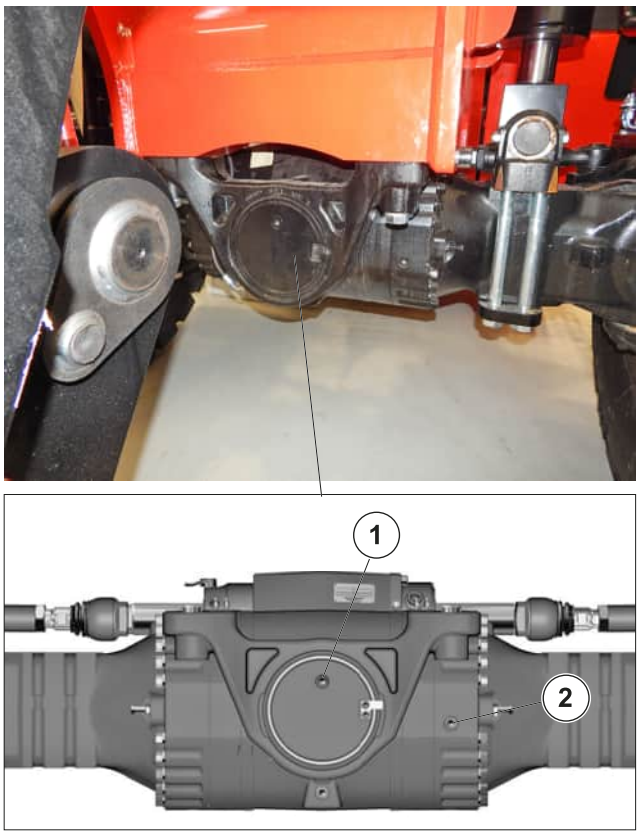


Figure 183: Front and rear axle differential oil level check

4.5.2 FRONT AND REAR AXLE DIFFERENTIAL OIL LEVEL CHECK

only for MHT 11250, MHT-X 11250

Place the vehicle on a horizontal surface with the engine stopped.

Check the oil level of the front axle differential.

Remove the level and filler plug (1). The level is correct when the oil skims the opening hole.

If necessary, add fresh oil through the hole.

Repeat this for the rear axle differential.

Figure 184: Front and rear axle differential oil level check

4.5.3 FRONT AND REAR WHEEL REDUCER OIL LEVEL CHECK

only for MHT 10200, MHT-X 10200

Place the vehicle on a horizontal surface with the engine stopped.

Check the oil level of the front axle differential.

Remove the level plug (1) and top up (2), the oil must surface at the mouth of the hole.

If necessary, add fresh oil through the hole.

Put back and tighten the level and filler plug (1).

Repeat this for the rear axle differential.

35–50 Nm (25.8-36.8 ft-lb)

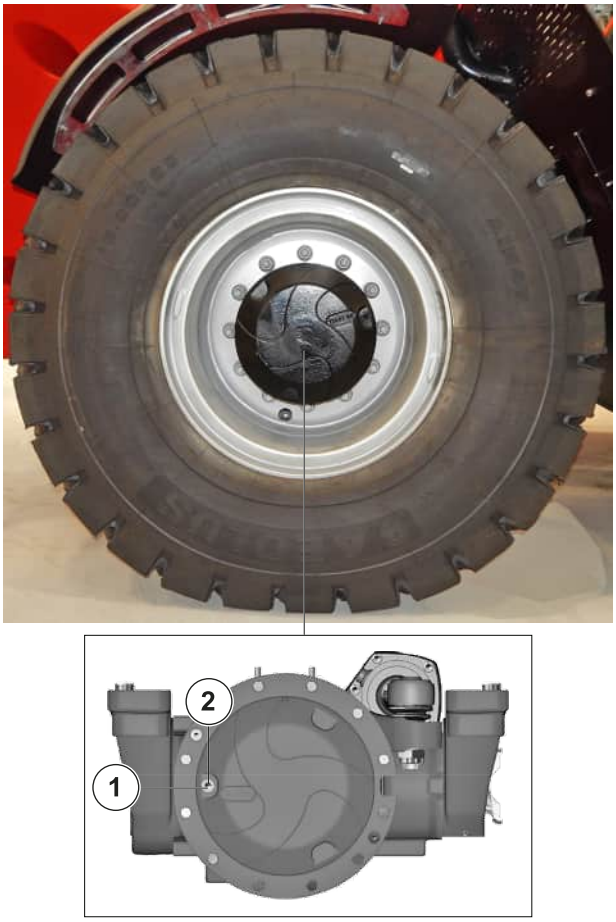


Figure 185: Front and rear wheel reducer oil level check

4.5.4 FRONT AND REAR WHEEL REDUCER OIL LEVEL CHECK

only for MHT 11250, MHT-X 11250

Place the vehicle on a horizontal surface with the engine stopped.

Check the oil level of the front axle differential.

Remove the level plug (1) and top up (2), the oil must surface at the mouth of the hole.

If necessary, add fresh oil through the hole.

Put back and tighten the level and filler plug (1).

Repeat this for the rear axle differential.

Figure 186: Front and rear wheel reducer oil level check

4.5.5 GEARBOX OIL LEVEL CHECK

Place the vehicle on a horizontal surface with the engine stopped and the gearbox oil still warm.

Remove the level and oil filler plug (1). The oil level is correct if it skims the surface of the opening.

Add fresh oil if necessary.

Replace and tighten the level and filler plug (1).

Plug tightening torque 35–50 Nm.

Figure 187: Gearbox oil level check

4.5.6 BATTERY CHECK

⚠ WARNING

Danger of corrosive substances

Operate the battery switch at least 30 seconds after having cut off the electrical contact using the ignition key (1). Handling and maintaining a battery can be dangerous. Take the following precautions:Wear protective goggles. Handle the battery horizontally.Never smoke or work near a flame. Work in a sufficiently ventilated room.If the electrolyte comes into contact with the skin or eyes, rinse thoroughly with cold water for 15 minutes and consult a doctor.

Check the battery electrolyte level every 250 hours.
When necessary, to restore the level add only distilled water. You should never add sulfuric acid.
If frequent topping up of distilled water is required, or if the battery is subject to discharge, the voltage of the regulator must be checked, which must be between 13 V and 14.7 V, with the engine at maximum speed.
Check from time to time that the connection terminals are not oxidized.
If the vehicle is not used for a long time, disconnect the battery.
In case of high ambient temperature, check the level more frequently.

Maintenance:

Open the upper (3) and lower (4) engine cover.
Check the connection clamps (2).
Regularly check the electrolyte level (1) and, if necessary, top up with demineralized or distilled water. Never top up with sulfuric acid.
If the pole voltage of the battery is less than 12.3 V (electrolyte density <1.21), the battery must be recharged.

If the vehicle is not used for a long time, disconnect the battery.

Charging the battery:

- Remove the caps (1).
- The batteries should only be charged with direct current.
- Connect the positive (+) cable of the battery charger to the positive (+) pole of the battery and the negative (-) cable of the battery charger to the negative (-) pole of the battery.
- Recharge with a current equal to 1/10 of the nominal capacity (Ah) of the battery.
- The battery will be fully charged when the acid density is 1.28 (1.23, for tropical countries).
- After charging, turn off the charger before disconnecting the battery.
- Check the electrolyte level.

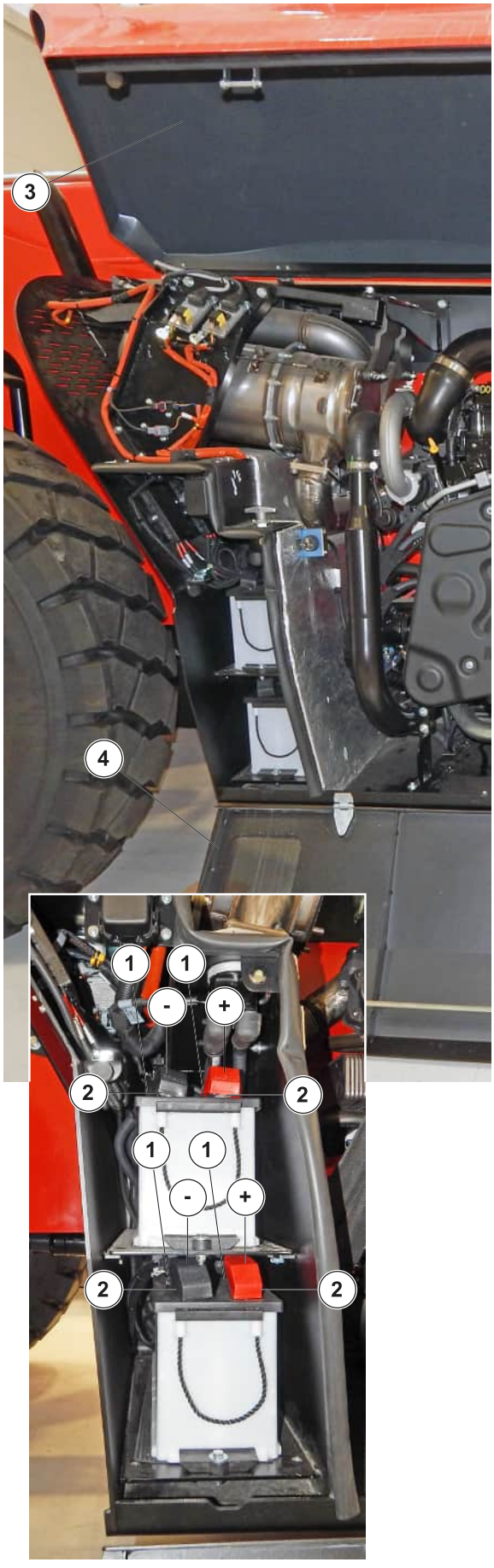


Figure 188: Battery check

4.6. EVERY 500 HOURS OF OPERATION OR 6 MONTHS

4.6.1 HYDRAULIC OIL CONTAMINATION CHECK

MANITOU offers a hydraulic oil analysis kit that can allow you to extend the recommended period of periodic maintenance (2000 hours). In this case it is recommended to perform a hydraulic oil analysis every 500 hours of operation or 1 year.

The oil analysis kit also allows to validate the quality of the oil to reach the 2000 hour expiry in the case of specific uses that generate stress on the hydraulic circuit: extreme environmental conditions, use of attachments that require enormous hydraulic flow (sweeper, mixer).

- Order an oil analysis kit from your dealer.
- Once you have received the kit, take a sample and follow the recommendations indicated inside the kit itself.
- Keep the analysis report or change the hydraulic oil according to the results.

Oil analysis kit (MANITOU reference: 958162).

Figure 189: Hydraulic oil contamination check

4.6.2 REPLACING THE HYDROSTATIC PUMP OIL FILTER (TRANSMISSION)

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

Replace the filter

To replace the filter and filter gasket:

- Place the vehicle on a level surface.
- Stop the engine.
- Hold the filer (1) in position and remove the plug (2) using a wrench size 24 mm (15 / 16 ").
- Remove the filter (3) and discard the gasket (4) and the O-ring (5).
- Insert the new filter cartridge (3) into the filter housing (4).
- Inspect the plug and the sealing surfaces in the filter bracket.
- Replace any damaged components.
- Install a new gasket and a new O-ring (5) on the plug.
- Apply hydraulic fluid to the O-ring (5) and to the gasket (4) for lubrication.
- Insert the plug in the bracket.
- Use a spanner size 24 mm (15 / 16 ") to hold the plug in place and install the spare filter. Manually tighten the filter until it makes contact with the O-ring (5), then tighten a further 1/2 revolution.
- Switch off the engine.
- Operate the pump during normal operation of the vehicle and check for leaks.

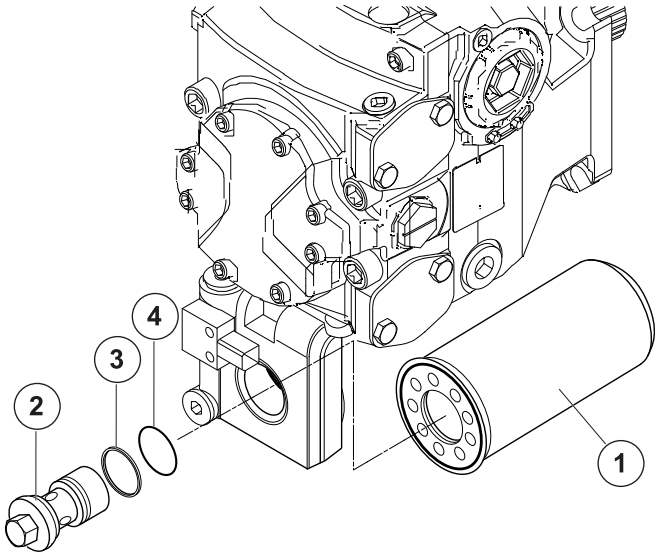


Figure 190: Replacing the hydrostatic pump oil filter (transmission)

4.6.3 REPLACING THE HYDRAULIC OIL FILTER CARTRIDGE (DRAIN)

- Disassemble the panel from the rear of the cabin (1) to access the exhaust hydraulic oil filter cartridge.
- Loosen the 4 fixing screws (2) of the filter cover (3). Remove the used cartridge (4) and replace it with a new one with the same characteristics (4).
- Refit the filter cover (3) and tighten the 4 fixing screws (2).
- Refit the panel (1) behind the cabin.

⚠ DANGER

Before screwing the filter cover (3) back on, check that the cartridge (4) is fitted correctly.

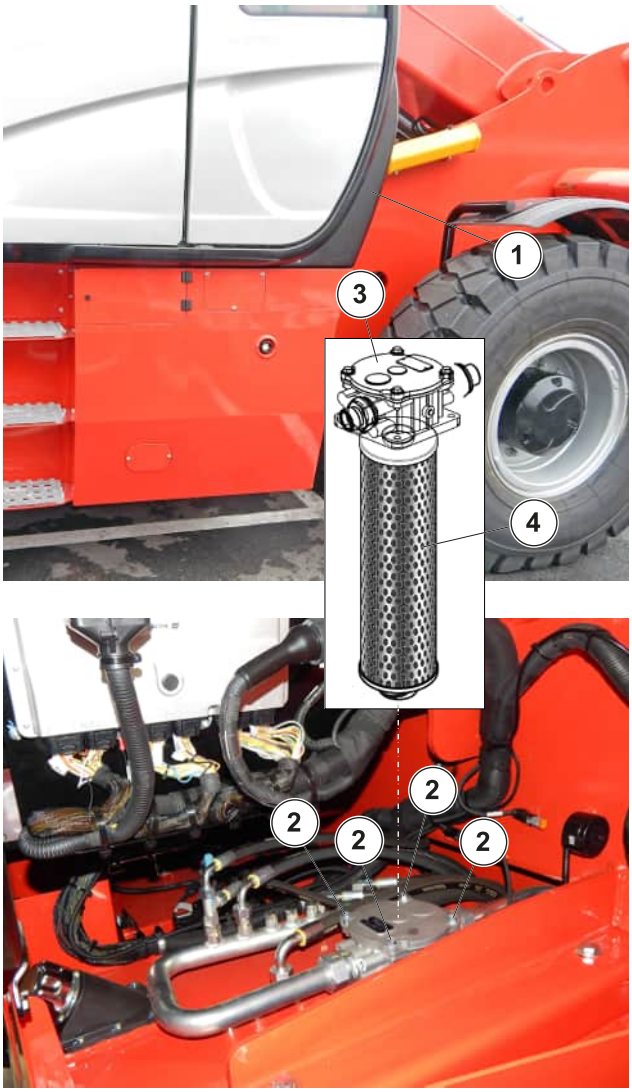


Figure 191: Replacing the hydraulic oil filter cartridge (drain)

4.6.4 REPLACING THE HYDRAULIC OIL BREATHER

⚠ DANGER

Raise the boom and place the safety wedge on the rod of the lifting cylinder.

In case of intense use in a very dusty or oxidizing atmosphere, reduce this frequency to 10 hours of operation or every day.

- Disassemble the breather (1) from the hydraulic oil tank positioned on the chassis, on the cabin side.
- Replace the breather (1) with a new one with the same characteristics.
- Fit the new breather (1) tightening it by hand.

Figure 192: Replacing the hydraulic oil breather

4.6.5 CABIN VENTILATION FILTER REPLACEMENT

VENTILATION FILTER OUTSIDE THE CABIN

- Remove the protection panel (1) from the front of the cabin, using the contact key (1a).
- Disassemble the frame (2a) supporting the filter.
- Remove the cabin ventilation filter (2).
- Replace the filter with a new one with the same characteristics.
- Reposition the frame supporting the filter.
- Refit the protection panel.

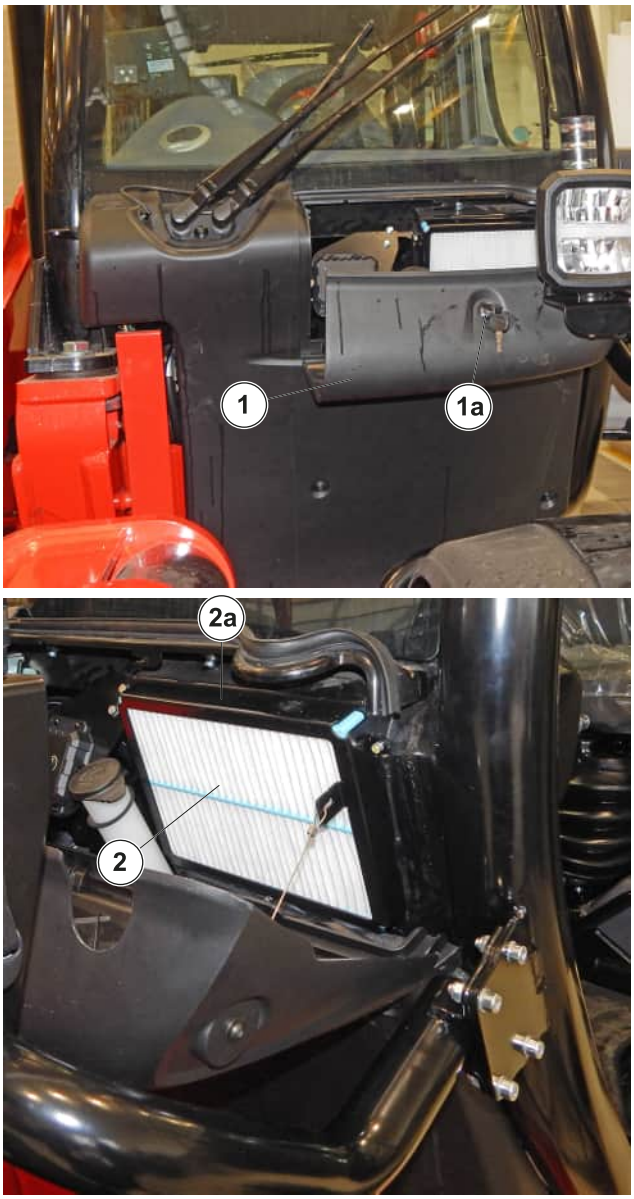


Figure 193: Ventilation filter outside the cabin

VENTILATION FILTER INSIDE THE CABIN

- Remove the protection grille (3).
- Remove the cabin ventilation filter (4).
- Replace the filter with a new one with the same characteristics.
- Re-mount the protection grille.

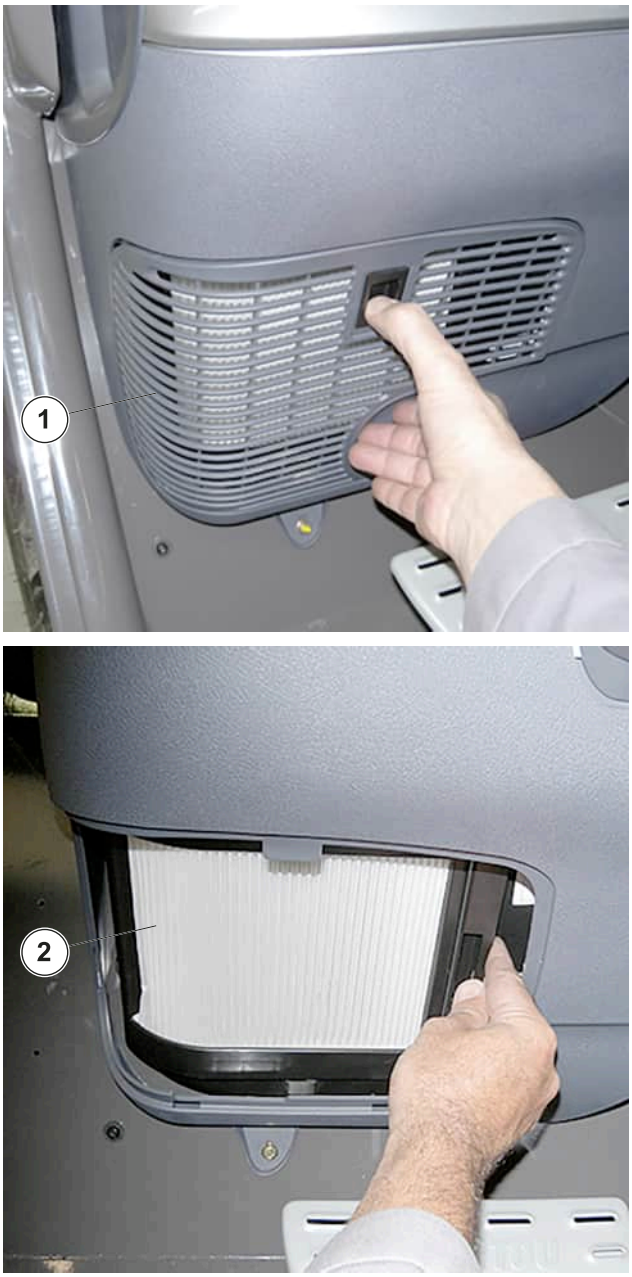


Figure 194: Ventilation filter inside the cabin

4.6.6 FORKS WEAR CHECK

Contact your dealer.

4.7. EVERY 1000 HOURS OF OPERATION OR 1 YEAR

4.7.1 FILTER AND ENGINE OIL CHANGE

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

- Place the vehicle on a level surface.
- Open the lower (1a) and upper (1b) engine cover.
- Remove the lower crankcase (1c) from the engine compartment.
- Remove the filler cap (3) to make it easier to drain the oil.
- Place a suitable collection container under the drain screw (2) on the underside of the oil pan. Carefully unscrew the drain plug (2) and drain the oil from the hole (2a).
- Screw the drain screw (2) back with a new sealing ring and tighten it:
  - Tightening torque: (39.8 - 47.0 ft-lb) (53.9 - 63.7 Nm, 5.5 - 6.5 kgf-m).
- Properly dispose of used oil.

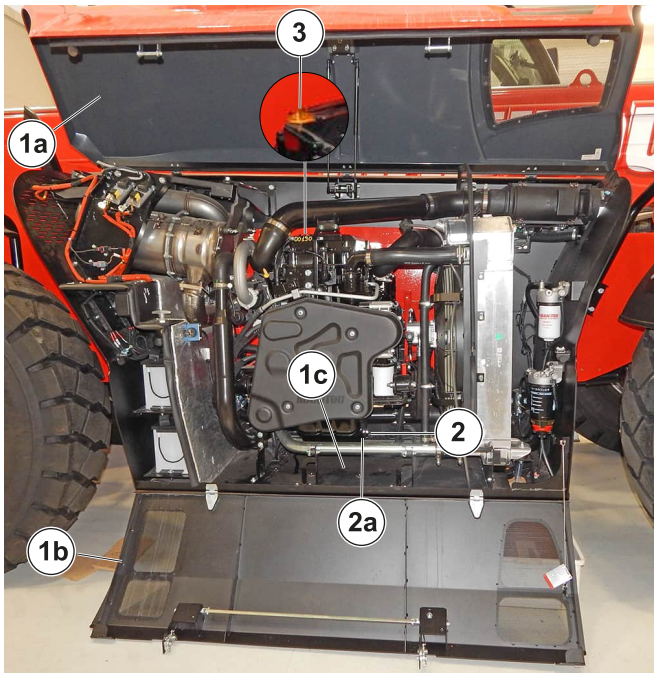


Figure 195: Engine oil drain

REPLACE THE OIL FILTER

After draining the engine oil:

- remove the engine oil filter (1) by turning it counterclockwise (2) using a filter wrench.
- To install the new engine oil filter:
  1. Clean the mounting surface of the bracket (3) of the engine oil filter;
  2. Lightly apply clean engine oil to the gasket surface of the new oil filter.
     Manually install the new engine oil filter (4) by turning it clockwise (5) until it contacts the mounting surface. Tighten to the prescribed torque (21.0 - 25.0 N m) (2.2 - 2.6 kgf-m) or one more turn using the filter wrench.

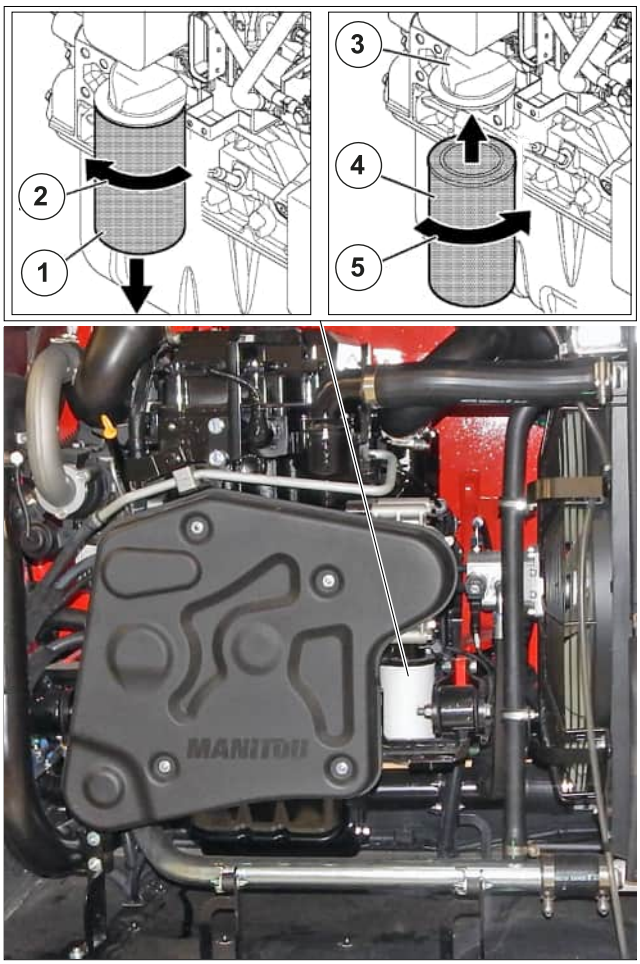


Figure 196: Engine oil filter replacement

LOAD THE OIL

- Remove the engine oil filler cap (1).
- From the filler neck (3), through a funnel (2) add the indicated quantity of lubricating oil. When loading oil into the engine, add it gradually. As a guideline, add no more than 1.2 L[0,26 US gal] of oil at a time, at intervals of 30 seconds or more. If oil is added all at once, the lubricating oil could enter the crankcase and combustion chambers with the risk of consequent engine damage.
- Run the engine for five minutes to warm it up and check for lubricating oil leaks.
- When the engine is warm enough, turn it off and let it sit for ten minutes.
- Check the lubricating oil level (5).
- If necessary, add more engine oil until the level is between the upper and lower lines on the dipstick (5).
- Refit the lower engine compartment cover (4).

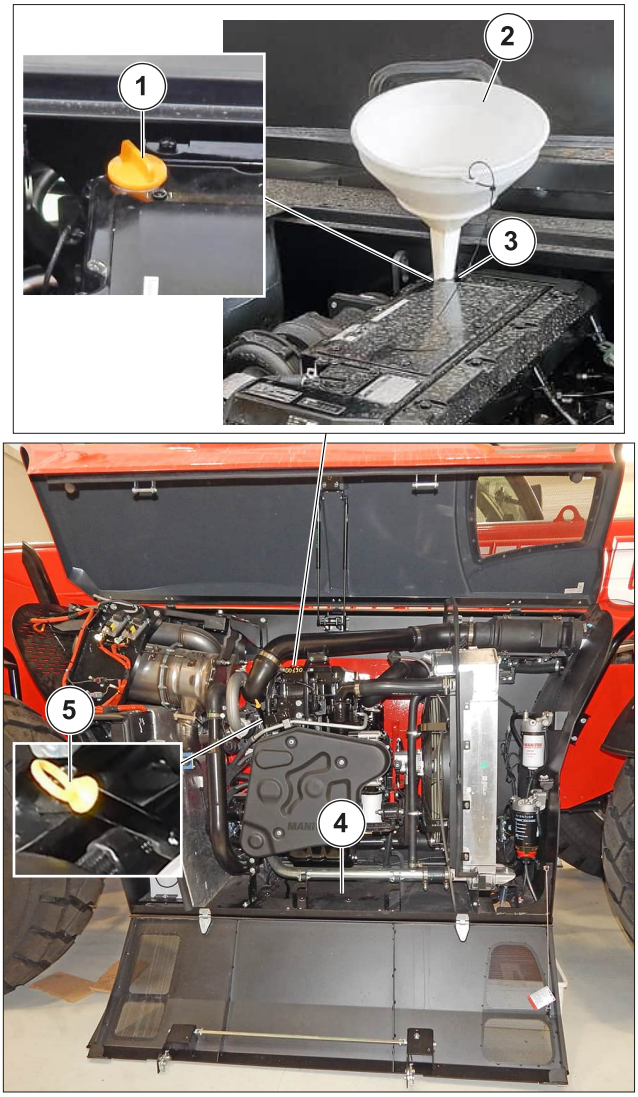


Figure 197: Drain the engine oil

4.7.2 FRONT AND REAR AXLE DIFFERENTIAL OIL CHANGE

only for MHT 10200, MHT—X 10200

⚠ WARNING

High temperature risk

Change the oil only at operating temperature. Oil and boiling components could cause personal injuries. Avoid contact with skin. Wear gloves and protective eyewear.Make sure the fluids are contained during maintenance. Prepare a suitable container for collecting the fluid before draining fluids.Place the vehicle on a level surface.

DRAIN THE OIL

⚠ DANGER

Dispose of the oil and filter in accordance with the legal regulations in force in the place where the engine is used.

- Stop the engine.
- Place a container under the drain plug (1) and let the oil drain out.
- Remove the level and filler plug (2) to ensure complete emptying.
- Fit and tighten the cap (1). Fill the oil through the filling hole (2).
- The level is correct when the oil emerges from the level hole (2).
- Check for leaks from the drain plugs (1).
- Fit and tighten the level and filler plug (2).

Do the same for the front and rear differential.

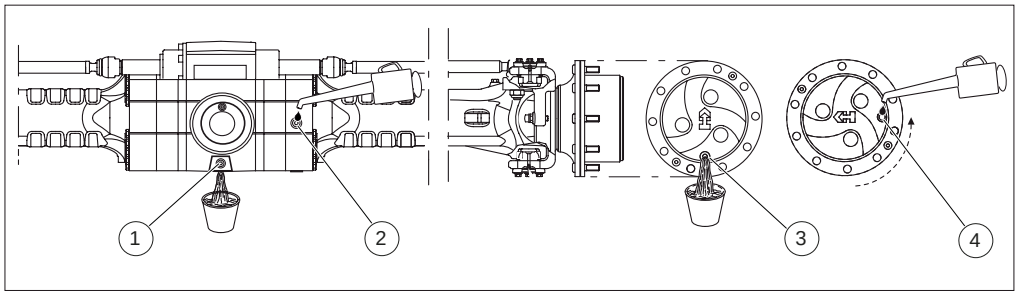


Figure 198: Front and rear axle differential oil change

4.7.3 CHANGE FRONT AND REAR AXLE FINAL REDUCER OIL

only for MHT 10200, MHT—X 10200

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

- Place the vehicle on a level surface.
- Make sure that the drain and level plug (3) of the reducer is oriented downwards to allow the oil to drain better.
- Place a container under the level and drain plug (3) and unscrew it. Let all the oil drain out. Bring the outlet hole to a horizontal position (4) in order to subsequently check the oil level.
- Refill with new oil through the level hole (4). The level is correct when the oil emerges from the hole (4).
- Replace the drain plug 3 and tighten it.

Repeat this for each final drive.

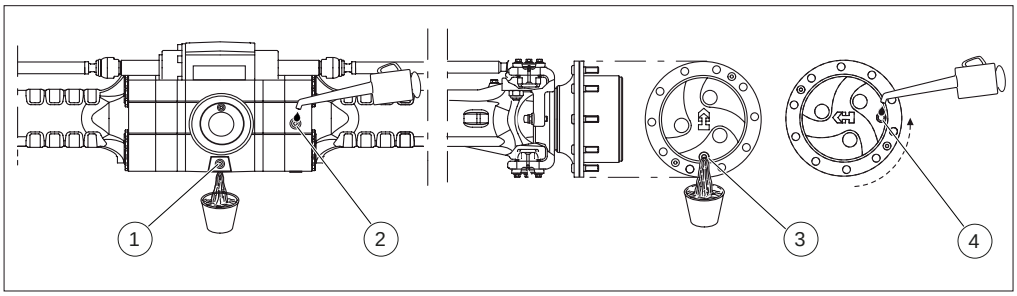


Figure 199: Change front and rear axle final reducer oil

4.7.4 FRONT AND REAR AXLE DIFFERENTIAL OIL CHANGE

only for MHT 11250, MHT—X 11250

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

- Place the vehicle on a level surface.
- Stop the engine.
- Place a container under the drain plug (1) and let the oil drain out.
- Remove the level and filler plug (2) to ensure complete emptying.
- Fit and tighten the cap (1). Fill the oil through the filling hole (2).
- The level is correct when the oil emerges from the level hole (2).
- Check for leaks from the drain plugs (1).
- Fit and tighten the level and filler plug (2).

Do the same for the front and rear differential.

Figure 200: Front and rear axle differential oil change

4.7.5 CHANGE FRONT AND REAR AXLE FINAL REDUCER OIL

only for MHT 11250, MHT—X 11250

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

- Place the vehicle on a level surface.
- Stop the engine.

- Place a container under the drain plug (1) and let the oil drain out.
- Remove the level and filler plug (2) to ensure complete emptying.
- Fit and tighten the cap (1). Fill the oil through the filling hole (2).
- The level is correct when the oil emerges from the level hole (2).
- Check for leaks from the drain plugs (1).
- Fit and tighten the level and filler plug (2).

- Make sure that the drain and level plug (3) of the reducer is oriented downwards to allow the oil to drain better.
- Place a container under the level and drain plug (3) and unscrew it. Let all the oil drain out. Bring the outlet hole to a horizontal position (4) in order to subsequently check the oil level.
- Refill with new oil through the level hole (4). The level is correct when the oil emerges from the hole (4).
- Replace the drain plug 3 and tighten it.

Repeat this for each final drive.

Figure 201: Change front and rear axle final reducer oil

4.7.6 GEARBOX OIL CHANGE

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

- Place the vehicle on a level surface.
- Stop the engine.
- Place a container under the drain plug (2).
- Remove the level and filler plug (1) to ensure complete emptying.
- Remove the drain plug (2) and let the oil drain out.
- Put back and tighten the cap (2).

LOAD THE OIL

- Fill with new oil through the level and filler hole (3). The oil level is correct when it skims the surface of the hole (3).
- Reposition and tighten the level and filler plug (1).

Check for leaks from the drain plug.

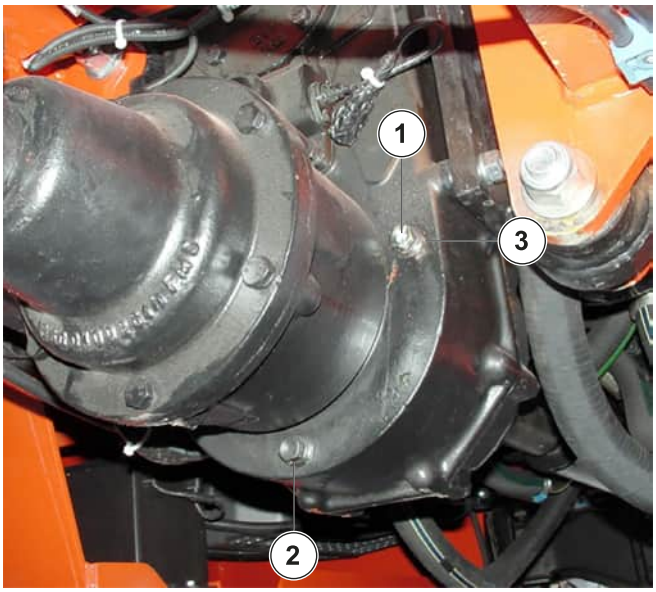


Figure 202: Gearbox oil change

4.7.7 DRY AIR FILTER CARTRIDGE REPLACEMENT

In case of use in a very dusty atmosphere, the cartridge replacement intervals must be reduced (up to 250 hours in a very dusty atmosphere).

⚠ DANGER

Replace the cartridge in a clean environment and with the heat engine off.Never use the vehicle with a disassembled or damaged cartridge. If the air filter service indicator comes on , replace the cartridge as soon as possible (maximum 1 hour).Never use the vehicle without the air filter, or with a damaged air filter.

- To access the engine air filter housing (5), open the engine cover (6), unscrew the knobs (7a) and remove the panel (7) to access the filter cartridge.
- Release the blocks and remove the cover (1).
- Carefully rotate the cartridge (2) forward to minimize dust escaping.
- Remove the cartridge (3).
- Do not remove the safety cartridge.
- Carefully clean the following parts with a damp, clean, lint-free cloth.
- The inside of the filter and lid.
- The inside of the filter inlet pipe.
- The seats of the gaskets in the filter and in the cover.
- Check the condition and fastening of the connecting pipes to the heat engine, and the connection and conditions of the filter clogging indicator.
- Before assembly, check the condition of the new filter cartridge (4).
- Tilt the cartridge about 5° forward, insert it into the filter and position it by pressing on the edge of the cartridge and not in the center.
- Refit the cover and check the correct locking of the clips. The cover must be installed without difficulty, otherwise check the correct positioning of the cartridges in the filter.

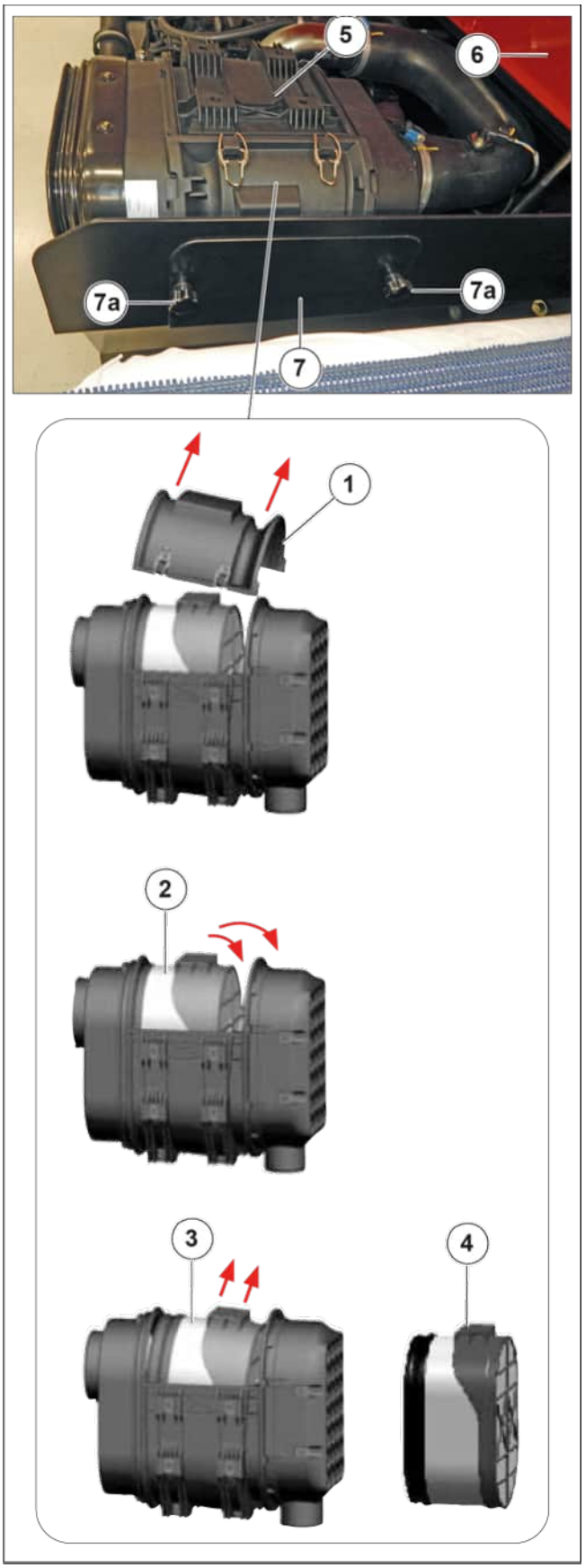


Figure 203: Dry air filter cartridge replacement

4.7.8 CLEANING THE FUEL TANK

⚠ DANGER

Fuels are highly flammable, so the risk of fire is high.During the handling of fuels, it is forbidden to smoke, approach naked flames and unprotected light and carry out interventions that cause the formation of sparks.

- Place the telehandler on a horizontal surface, lower the stabilizers as far as possible to increase the ground clearance of the machine.
- Stop the engine.
- Turn the ignition key to position "**0**".
- Close the water separator fuel valve.
- Unscrew the tank filler cap (2) then place a suitable container under the drain plug (1) and unscrew the cap.
- Let the fuel flow out of the hole (3) and pour 10 liters of clean fuel through the filler neck (4) to eliminate any impurities.
- Refit and tighten the drain plug (1).
- Fill the tank with clean fuel and replace the fill cap (2).

⚠ DANGER

Do not fill the tank completely. As it warms up, the fuel expands. It could overflow from the tank.

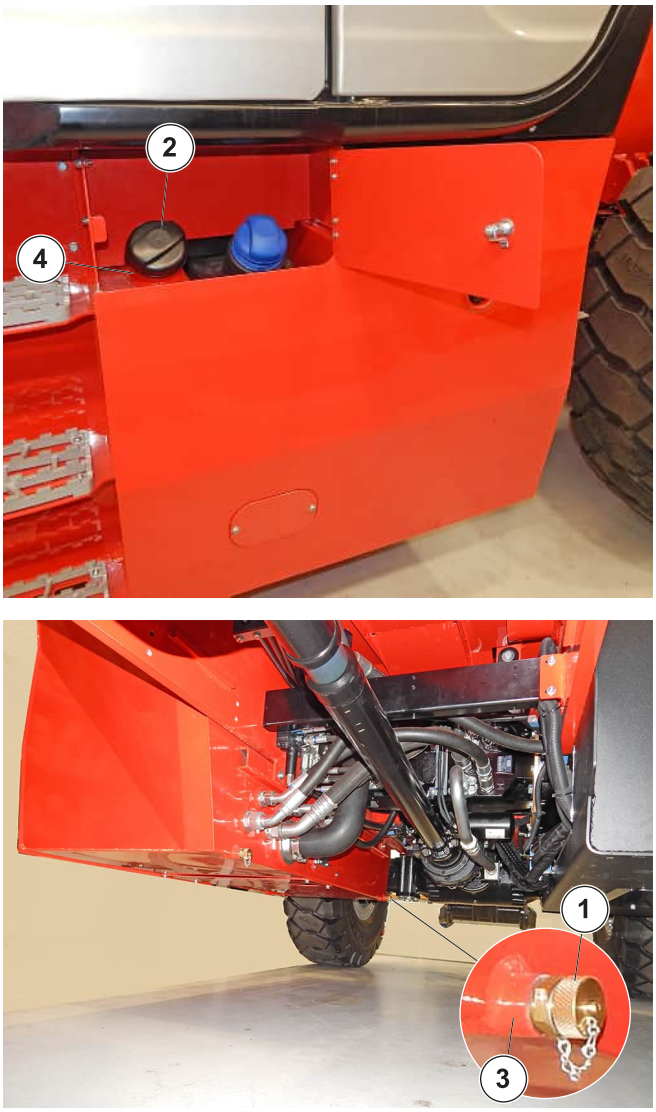


Figure 204: Cleaning the fuel tank

4.7.9 FUEL PRE-FILTER REPLACEMENT

⚠ DANGER

Thoroughly clean the outside of the pre-filter as well as its holder to prevent dust from entering the system. Tighten the fuel pre-filter by hand only and lock it a quarter of a turn.

- Place the vehicle on a horizontal surface and stop the heat engine.
- Turn the ignition key to position "**0**".
- Open the engine cover and locate the fuel pre-filter (14).
- Place a container under the water separator to collect the drained water and contaminants.
- Turn the fuel valve (1) to the (2) CLOSED position.
- Loosen the drain valve (3) to drain the fuel and contaminants.
- Turn the water collection cup (4) counterclockwise (5) and remove the filter element (6). Disconnect the drain pan sensor lead before removing it, being careful not to spill fuel.
- Clean up immediately if fuel is spilled.
- Remove the float (7) from the water collection pan. Pour the contaminants into the container and dispose of properly.
- By hand or using a pliers type filter wrench, turn the filter element counterclockwise (8) to remove it from the bracket (9). When using a filter removal wrench, apply it to the resin part (10) on the filter element.
- Clean the inside of the water pan with new diesel fuel.
- Replace the o-ring of the water collection pan with a new one.
- Clean the mounting surface of the bracket filter element and apply a thin layer of diesel fuel to the gasket surface of the new filter element.
- Install a new filter element onto the bracket and tighten it clockwise (11) hand tight. Do not use any tools.
- Install a new O-Ring (12) on the water collection cup, attach it to the filter element with the float, and tighten it clockwise (13) by hand tightening. Do not use any tools.
- Manually close the drain valve. Reconnect the sensor cable.
- Open the fuel valve.
- Prime the fuel system. See "Priming the Fuel System".

⚠ DANGER

Be sure to prime. If air is mixed with fuel, seizure of the fuel pump and injector may occur.

- Check for fuel leaks.

PRIMING THE FUEL SYSTEM

- Turn the ignition key to position "**I**"(electrical contact) and hold it in that position for 10-15 seconds. This will allow the fuel system's electric pump to prime the fuel.
- Never use the starter to crank the engine to prime the fuel system. This could cause the starter motor to overheat and damage the coils, pinion and/or ring gear.

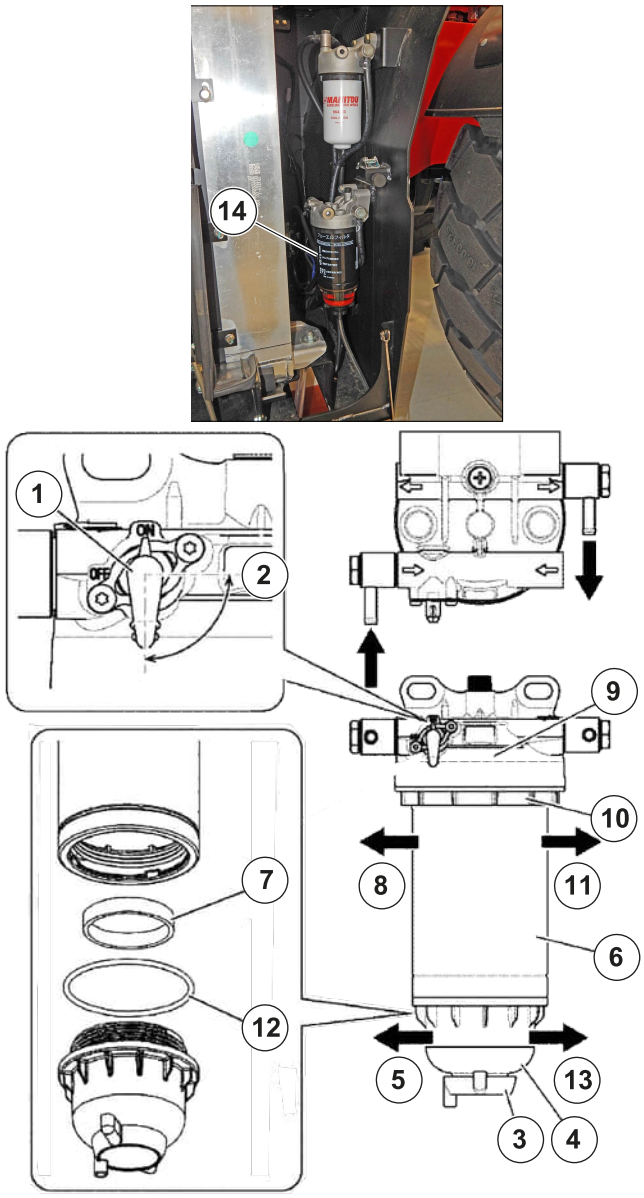


Figure 205: Fuel pre-filter replacement

4.7.10 FUEL FILTER REPLACEMENT

⚠ DANGER

Thoroughly clean the outside of the filter as well as its holder to prevent dust from entering the system.

- Place the vehicle on a horizontal surface, stop the engine and let it cool down.
- Open the engine cover and locate the fuel filter (5).
- Close the water separator fuel valve.
- By hand or using a pliers type filter wrench, turn the fuel filter counterclockwise (1) to remove it.
  When using a filter removal wrench, apply it to the resin part (2) on the filter element.
- Remove the filter, hold it carefully so as not to spill fuel. Wipe up the spilled fuel.
- Clean the filter mounting surface and apply a small amount of diesel to the gasket of the new fuel filter.
- Screw and secure a new fuel filter to the head (3) by manually turning the filter clockwise (4) and tighten it until it hits the head (3).

- Open the water separator fuel valve.
- Prime the fuel system.
- Check for fuel leaks.

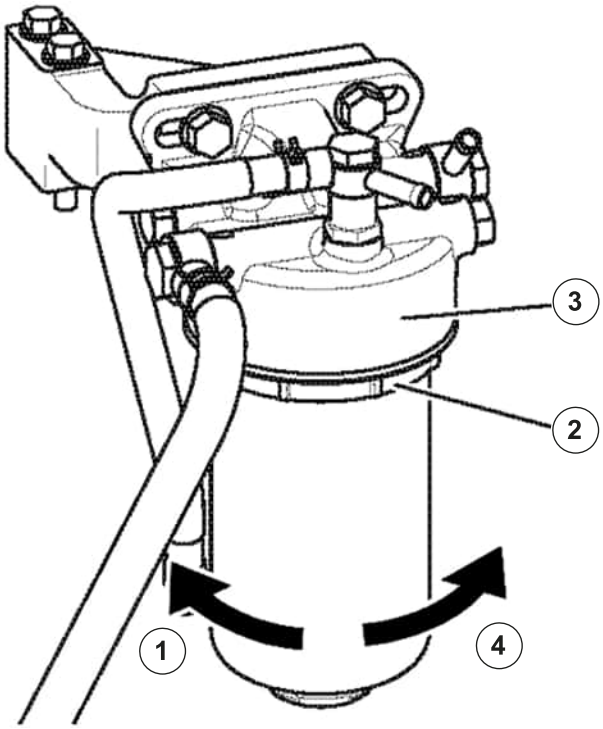


Figure 206: Fuel filter replacement

4.7.11 FUEL PUMP FILTER REPLACEMENT

- Place the vehicle on a horizontal surface, stop the engine and let it cool down.
- Open the engine cover and locate the fuel pump filter (1).
- Close the water separator fuel valve.
- Using a 17mm / 0.66in hex wrench (2) unscrew the fuel pump filter cover (3) and extract the filter cartridge (4).
- Clean the filter cartridge (4) with a jet of air and check that it is not damaged. If necessary, replace it with one of the same characteristics.
- Otherwise reinstall in the fuel pump filter (1).
- Close the lid (3).
- Reopen the water separator fuel valve.

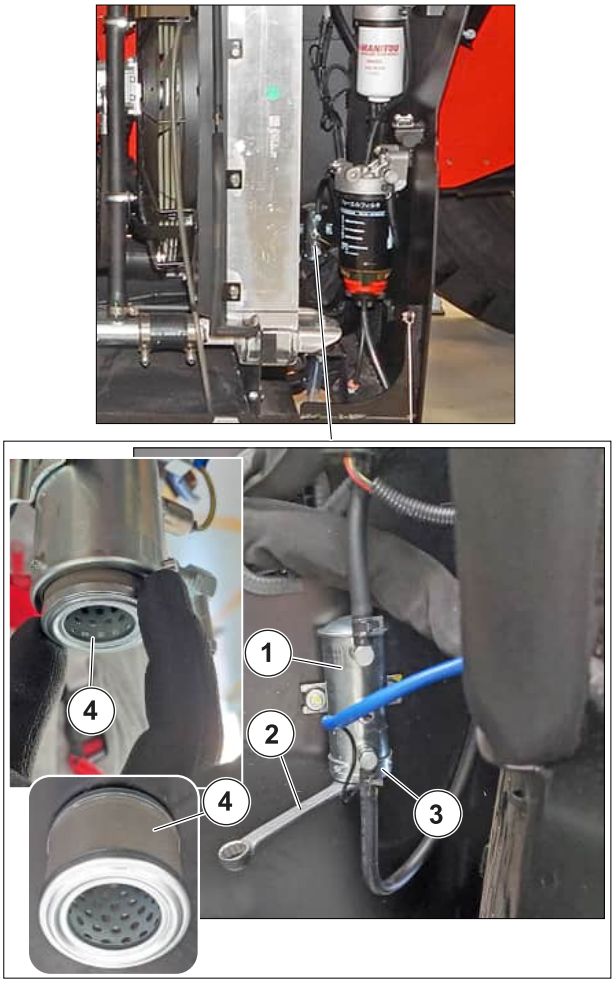


Figure 207: Fuel pump filter replacement

4.7.12 COOLANT REPLACEMENT

This series of operations must be carried out when necessary or at least once every 2 years when winter arrives. Place the vehicle on a level surface, with the heat engine off and cold.

⚠ DANGER

The engine does not contain any anti-corrosive elements and must always be filled with a minimum mixture of 25% ethylene glycol based antifreeze.

Coolant drain

Carry out work on the cooling system only if the coolant temperature is below 50° C.

- Open the engine cover.
- Open the access door (1) under the drain plug (2).

When disassembling the access panel, clean all around and remove any buildup of flammable materials.

- Slowly open the cap (3) of the coolant filler neck (4) on the radiator to relieve the excess pressure, then remove the cap (3).
- Place a container under the radiator drain plug (2) and unscrew it.
- Take the exhaust pipe located in the engine compartment (5).
- Place the end of the drain hose into the container and screw the hose (5) firmly onto the drain fitting (2).
- Allow the cooling circuit to drain completely, checking that the orifices do not clog.
- Check the condition of the rubber hoses and fixing clamps, replace the rubber hoses if necessary.
- Rinse the circuit with clean water and use a cleaning product if necessary.
- Remove, clean and replace the drain hose (5).
- Refit and tighten the radiator drain plug (2).

Refilling the coolant

- Slowly fill the circuit with coolant through the filler neck (4).
- Fill the cooling circuit level up to the center of the indicator (6) through the filler neck (4).
- Screw the radiator filler cap (3) back on.
- Run the engine at low speed for a few minutes.
- Check for any leaks.
- Check the level (6) and top up if necessary.
- Reinstall the access panel (1) and close the engine hood.

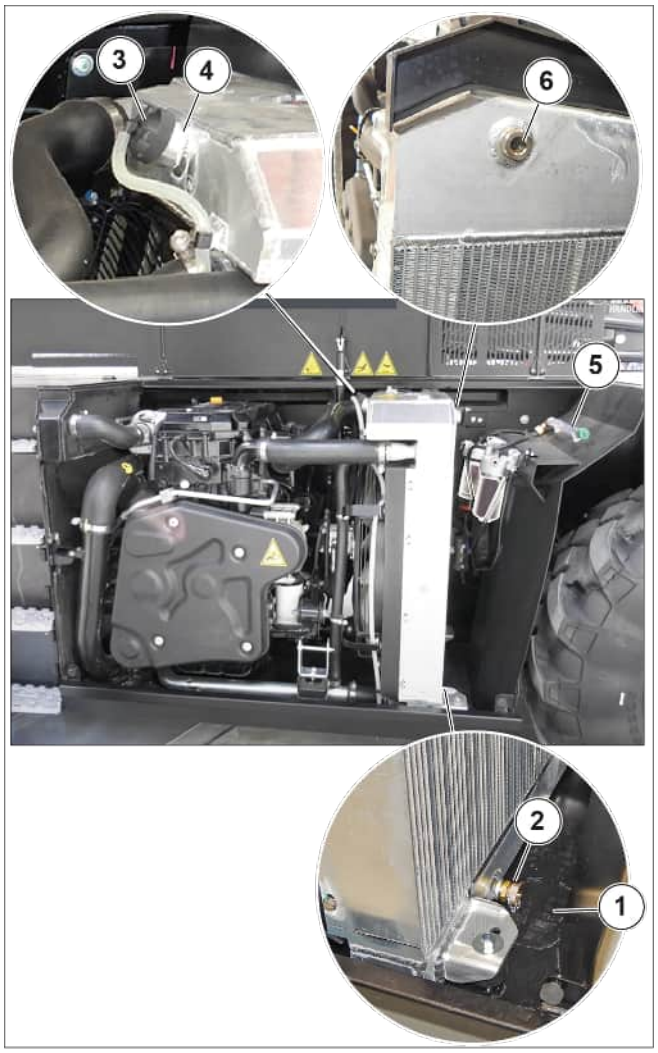


Figure 208: Coolant replacement

4.7.13 CABIN VENTILATION FILTER REPLACEMENT

VENTILATION FILTER OUTSIDE THE CABIN

- Remove the protection panel (1) from the front of the cabin, using the contact key (1a).
- Disassemble the frame (2a) supporting the filter.
- Remove the cabin ventilation filter (2).
- Replace the filter with a new one with the same characteristics.
- Reposition the frame supporting the filter.
- Refit the protection panel.

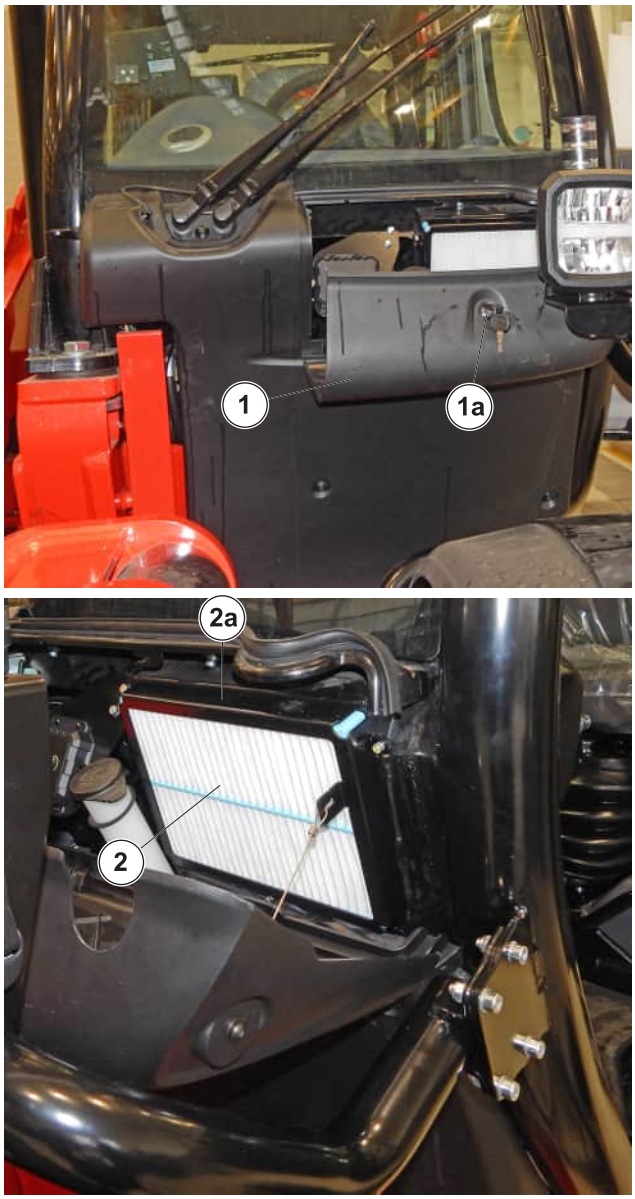


Figure 209: Ventilation filter outside the cabin

VENTILATION FILTER INSIDE THE CABIN

- Remove the protection grille (3).
- Remove the cabin ventilation filter (4).
- Replace the filter with a new one with the same characteristics.
- Re-mount the protection grille.

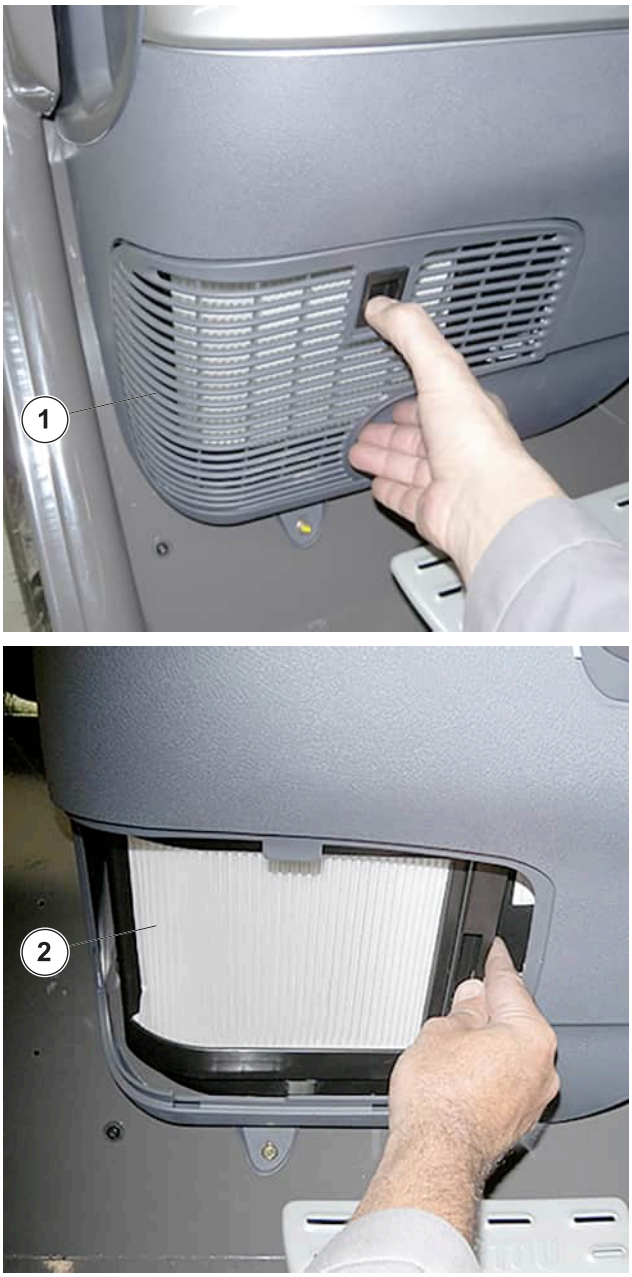


Figure 210: Ventilation filter inside the cabin

4.7.14 REPLACE THE "DEF" TANK BREATHER

Place the vehicle on a level surface.

- Stop the engine.
- Open the hatch to the tank filler necks (1).
- Remove the panel (2) behind the necks to access the “DEF” tank breather (3). Use two hexagon wrenches size 13 mm (0.5 in) to loosen the screws (3a).
- Manually unscrew the breather (4) and replace it with a new one. Tighten by hand all the way to the stop.
- Reposition the panel (2) and close the hatch (1).

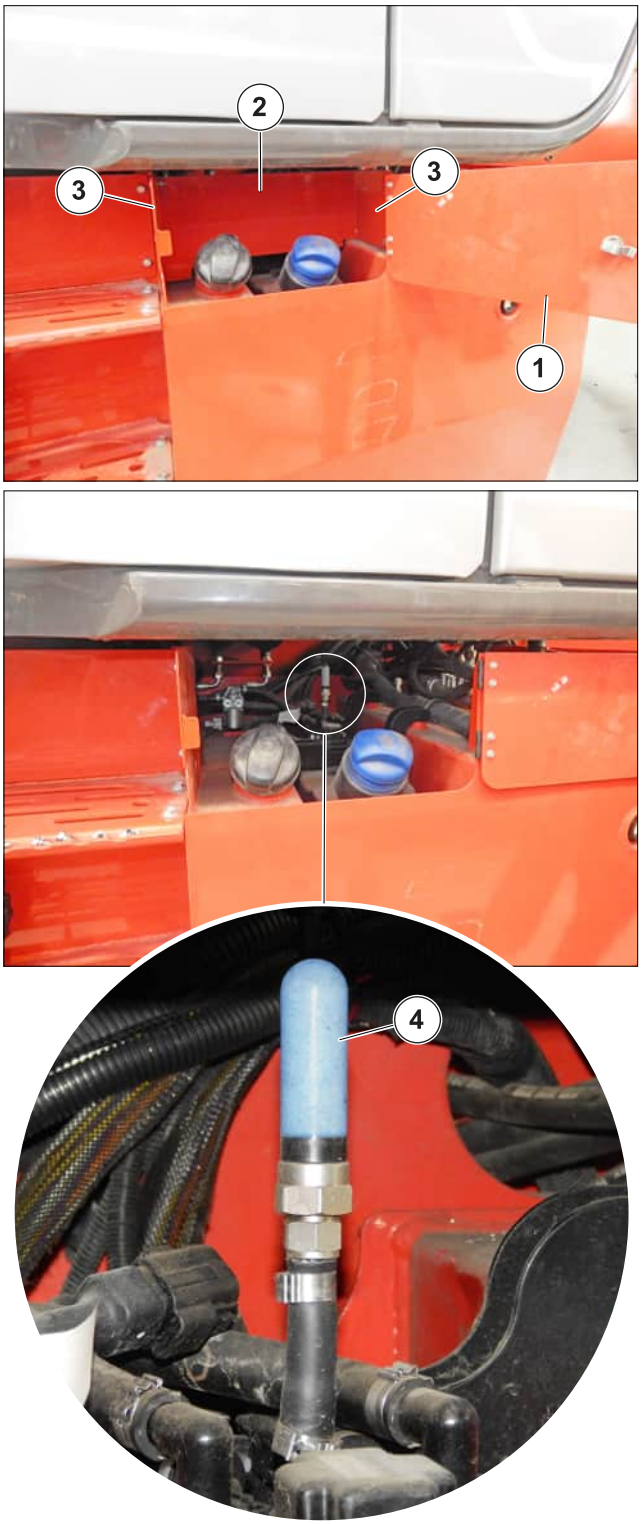


Figure 211: Replace the "DEF" tank breather

4.7.15 SAFETY BELT CHECK

⚠ DANGER

Under no circumstances may the vehicle be used with a defective seat belt (fastening, locking, stitching, tearing, etc.).Repair or replace the seat belt immediately.

TWO-POINT SAFETY BELT

Check the following points:

- The fixing of the anchor points on the seat.
- Cleaning the belt and locking mechanism.
- The click of the locking mechanism.
- The state of the belt (tears, fraying).

AUTOMATIC SEAT BELT WITH TWO ANCHOR POINTS

Check the points listed above and the following:

- The correct running of the belt.
- The status of the reel masks.
- The locking of the reel mechanism by pulling the belt with a sharp jerk.

⚠ DANGER

Following an accident, replace the seat belt.

SILENT BLOCK OF THE ENGINE CHECK

Contact your dealer.

CHECK AND ADJUSTMENT OF THE ENGINE AIR INTAKE SYSTEM

Contact your dealer.

ENGINE HOSES AND PIPES CHECK

Contact your dealer.

BRAKE CIRCUIT PRESSURE CHECK

Contact your dealer.

CHECK FOR WEAR OF THE TELESCOPIC BOOM SHOES

CONDITIONS OF THE HARNESSES AND CABLES CHECK

LIGHTING AND SIGNALING CHECK

SIGNALERS CHECK

CONDITIONS OF THE REAR VIEW MIRRORS CHECK

Contact your dealer.

CABIN STRUCTURE INTEGRITY CHECK

Contact your dealer.

CHASSIS STRUCTURE INTEGRITY CHECK

Contact your dealer.

QUICK COUPLING OF ATTACHMENTS CHECK

Contact your dealer.

CONDITIONS OF THE ATTACHMENTS CHECK

Contact your dealer.

SERVICE AND PARKING BRAKE CHECK

Contact your dealer.

4.8. EVERY 2000 HOURS OF OPERATION OR 2 YEARS

4.8.1 HYDRAULIC OIL REPLACEMENT AND CLEANING THE HYDRAULIC SUCTION FILTERS IN THE TANK

⚠ WARNING

High temperature risk

Fluids and boiling components could cause personal injuries.

Avoid contact with skin. Wear gloves and protective eyewear. Change the fluids if their temperature is between 20-40°C (68-104°F).

DRAIN THE OIL

⚠ DANGER

Collect the fluid in a suitable container of appropriate capacity.

Dispose of the fluid in accordance with the legal regulations in force in the place where the vehicle is used.

Oil drain

- Place the vehicle on a level surface.
- Stop the engine.
- Fully retract and lower the telescopic boom.
- Remove the panel (5) to access the hydraulic oil filler neck (2).
- Place a container under the drain plug (1). Unscrew the plug and let the oil drain out.
- Remove the filler cap (2a) to ensure complete emptying.
- Fit and tighten the cap (1).

Cleaning the hydraulic suction filter

- Disconnect the hose (4a).
- Unscrew the hydraulic suction filter (4), clean it with a jet of compressed air, check its condition and replace it if necessary.
- Reassemble the hydraulic suction filter checking that the gasket is correctly positioned.

Filling the oil

Fill the tank with new oil through the filler neck (2) until the oil level is equidistant between the lower and upper reference marks of the level indicator (3).

Check for leaks from the drain plug (1).

Refit the filler neck plug (2).

De-pollution of the hydraulic circuit

Let the engine run (accelerator pedal halfway) for 5 minutes without any load on the vehicle; afterwards, for another 5 minutes using all the hydraulic movements (except the direction and service brakes).

Bring the engine to maximum speed for 1 minute; then apply the direction and service brakes.

This operation allows the circuit to be cleaned by means of the hydraulic oil filter on the intake.

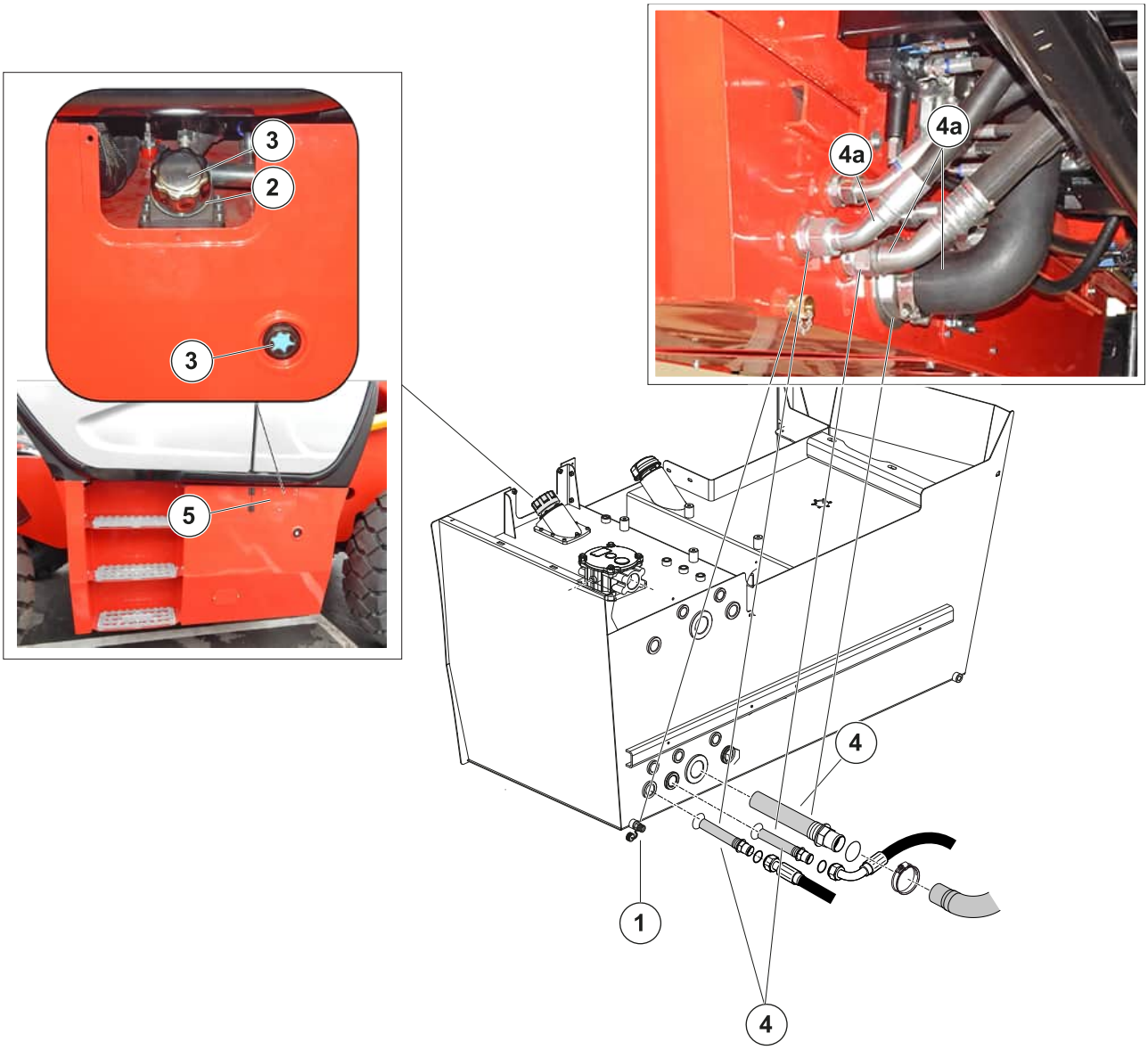


Figure 212: Hydraulic oil filling and draining and cleaning the hydraulic suction filters in the tank

RADIATOR CHECK

Contact your dealer.

TRANSMISSION PRESSURES CHECK

Contact your dealer.

STEERING CHECK

Contact your dealer.

CONDITION OF THE BOOM ASSEMBLY CHECK

Contact your dealer.

ARTICULATION BEARINGS AND RINGS CHECK

Contact your dealer.

CONDITIONS OF HOSES AND PIPES CHECK

Contact your dealer.

CONDITIONS OF THE CYLINDERS (LEAK, RODS)

Contact your dealer.

HYDRAULIC CIRCUIT PRESSURES CHECK

Contact your dealer.

ARTICULATION BEARINGS AND RINGS CHECK

Contact your dealer.

ENGINE VALVE CLEARANCE CHECK

Contact your dealer.

AIR CONDITIONING (OPTIONAL)

Contact your dealer.

CLEANING OF THE COILS OF THE CONDENSER AND EVAPORATOR

CLEANING OF THE CONDENSATE CONTAINER AND THE DISCHARGE VALVE

RECOVERY OF THE COOLANT TO REPLACE THE DRYER FILTER

FILLING WITH COOLANT AND CHECKING THE THERMOSTATIC REGULATION AND PRESSURE SWITCHES

When opening the evaporator unit, do not forget to replace the lid seal.

⚠ WARNING

Risk of corrosive materials

NEVER ATTEMPT TO REPAIR ANY ANOMALIES BY YOURSELF. TO CHARGE A CIRCUIT ALWAYS CONTACT THE DEALER WHO HAS THE SUITABLE SPARE PARTS, THE TECHNICAL NOTIONS AND THE NECESSARY TOOLS. In the following cases, contact a doctor. If inhaled, take the person to an open environment. In case of skin contact, rinse immediately with plenty of running water. In case of frostbite, apply a sterile dressing. In case of contact with eyes, rinse with fresh water for about 15 minutes.

IMPORTANT INFORMATION CONCERNING THE COOLANT USED

- This product contains fluorinated greenhouse gases relevant under the Kyoto protocol.
- Type of coolant: R134A; colorless and odorless and heavier than air. It has a PRG (Global Warming Potential) value of 1430.
- Never let the gas escape into the atmosphere. Never open the circuit as this would cause a loss of coolant.
- The compressor is equipped with an oil level indicator. Never unscrew this indicator: this will drain the circuit. The oil level should only be checked when changing the oil.

4.9. EVERY 3000 HOURS OF OPERATION OR 1 YEARS

4.9.1 AIR FILTER SAFETY CARTRIDGE REPLACEMENT

- Remove/refit the dry air filter cartridge to locate the safety filter of the air filter.
- Carefully pull out the dry air filter safety cartridge (1) to minimize dust escaping.
- Carefully clean the seat of the filter seals with a damp, clean, lint-free cloth.
- Before refitting, check the condition of the new safety cartridge.
- Insert the cartridge into the filter and position it by pressing on the edge of the cartridge and not in the center.

The frequency of replacement of the safety cartridge is given for information only. It must be replaced after every three dry air filter cartridge replacements.

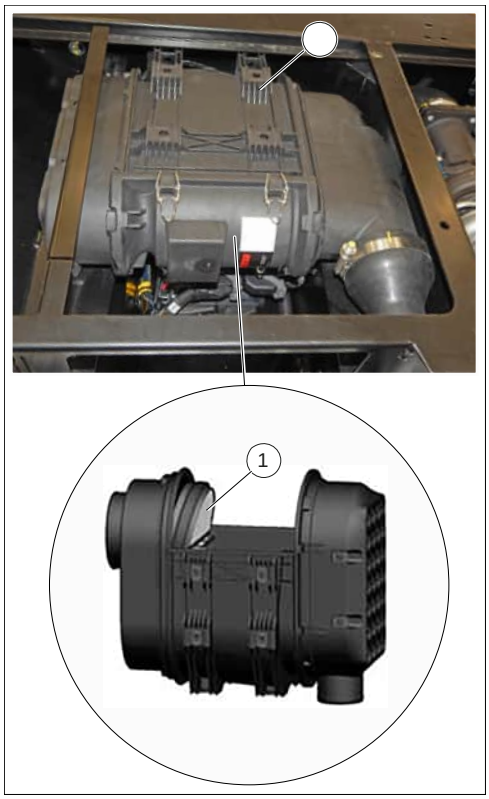


Figure 213: Air filter safety cartridge replacement

4.9.2 REPLACEMENT OF THE ENGINE SERVICE BELT

- Open the engine cover and lower cover.
- Remove the protective casing 1.
- Insert a socket wrench on the square rod of the automatic tensioner 2 to loosen the belt and extract it.
- Release the force and remove the socket wrench.
- Refit a new alternator belt, checking that it is well positioned in the recesses of each pulley and tension the belt using the automatic tensioner 2.

Take advantage of the belt removal to check the correct functioning of the pulleys and bearings (noise, friction, clearance, etc.).

- Refit the protective casing 1.
- Close the lower cover and engine cover.

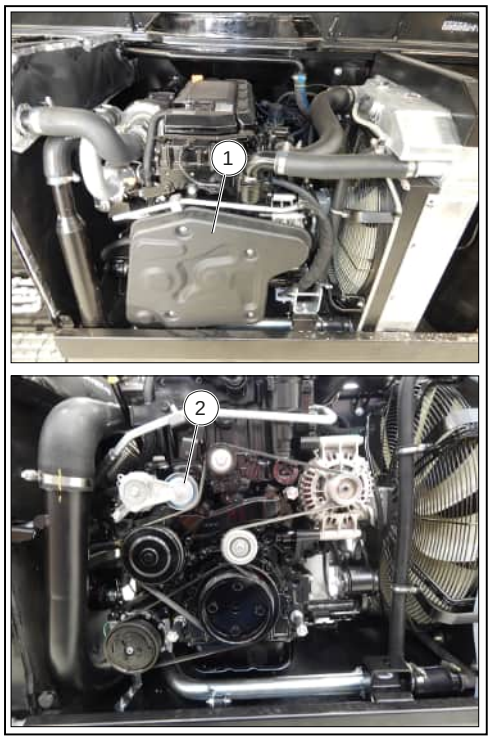


Figure 214: Replacement of the engine service belt

4.10. EVERY 4500 HOURS OF OPERATION OR 9 YEARS

ENGINE CRANKCASE BREATHER CHECK

REPLACEMENT OF THE CRANKCASE FILTER OF THE ENGINE BREATHER

- Open the engine cover.
- Remove the upper cover (1) of the engine.
- Remove the filter (2) and replace it with a new one.
- Refit the upper casing (1).
- Close the engine cover.

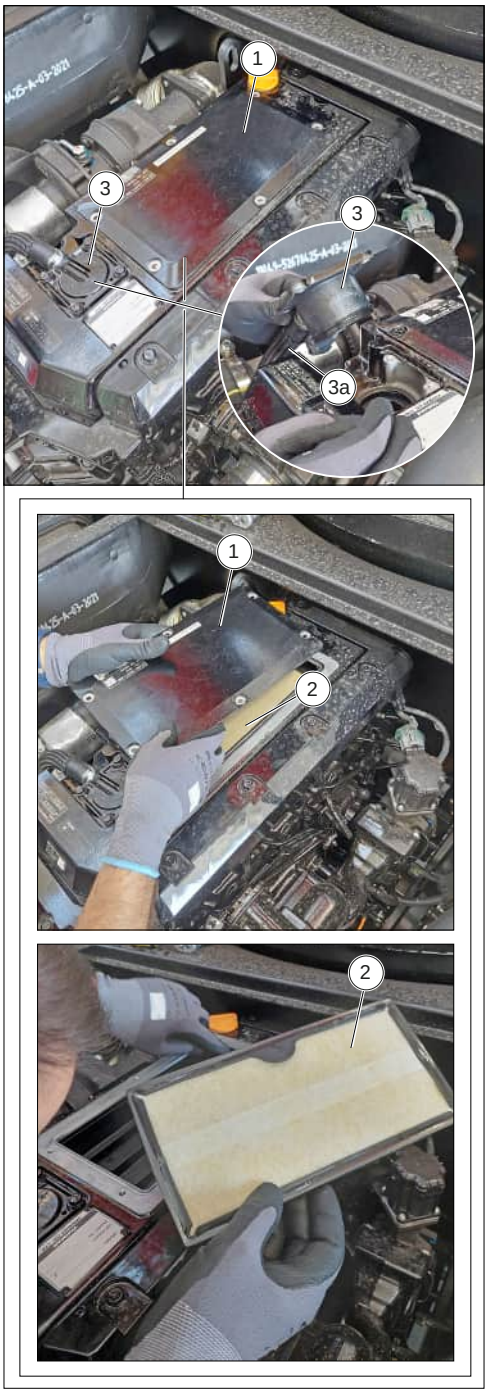


Figure 215: Replacement of the crankcase filter of the engine breather

CONTROL UNIT (ECU), SENSORS AND ACTUATORS ASSOCIATED WITH THE ENGINE

Contact your dealer

ENGINE TURBOCHARGER CHECK

Contact your dealer

CHECKING AND CLEANING THE VALVE OF THE EXHAUST GAS RECIRCULATION SYSTEM (EGR) OF THE ENGINE

Contact your dealer

SELECTIVE CATALYTIC REDUCER (SCR) / ENGINE DIESEL OXIDATION CATALYST (DOC) CHECK

Contact your dealer

CHECKING AND CLEANING THE ENGINE INJECTOR

Contact your dealer

4.11. EVERY 6000 HOURS OF OPERATION OR 12 YEARS

4.11.1 DIESEL PARTICULATE FILTER (DPF) OF THE ENGINE CHECK

Contact your dealer.

4.12. EVERY 9000 HOURS OF OPERATION OR 18 YEARS

REPLACE THE DIESEL PARTICLE FILTER (DPF) OF THE ENGINE

Contact your dealer.

REPLACE THE SELECTIVE CATALYTIC REDUCER (SCR) OF THE ENGINE

Contact your dealer.

4.13. OCCASIONAL MAINTENANCE

4.13.1 INSERTING THE SAFETY WEDGE OF THE TELESCOPIC BOOM

Only use the safety wedge (1) supplied with the vehicle.

⚠ DANGER

Risk of crushing

The safety wedge must be installed by accessing the walkable surface of the undercarriage from the right side staircase.

During installation of the safety wedge, do not stand under the telescopic boom.

The vehicle is equipped with a safety wedge (1) which prevents accidental descent of the telescopic boom during maintenance operations of the same or in the areas below it. The boom safety wedge must be installed on the rod of the handler cylinder.

When not in use, the safety wedge (1) is positioned on the vehicle turret through its fixings (1a).

Figure 216: Telescopic boom safety wedge.

REFITTING THE WEDGE

1. Raise the boom to the maximum.
2. Place the safety wedge 1 on the rod of the lifting cylinder and lock with the shaft 2 and the split pin 3.

3. Lower the boom slowly then stop the hydraulic movements before hitting the wedge.

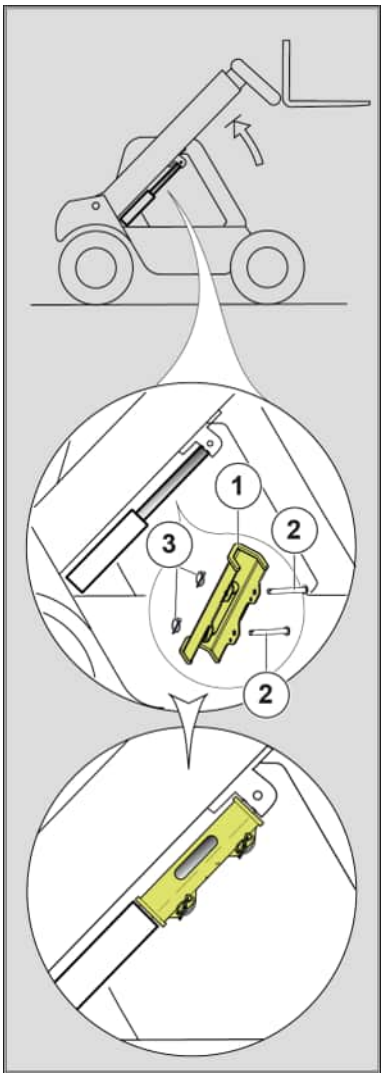


Figure 217: Inserting the safety wedge of the telescopic boom

DISASSEMBLY OF THE WEDGE

1. Raise the boom to the maximum.
2. Remove the split pin and the shaft.
3. Put the safety wedge back into the compartment on the vehicle.

4.13.2 WHEEL REPLACEMENT

⚠ DANGER

Should the wheel replacement be carried out along the road, proceed as follows:

- If possible, stop the vehicle on level ground on firm ground.
- Turn off the engine.
- Activate the parking brake.
- Turn on the hazard lights.
- Apply wedges to immobilize the vehicle in both directions on the axle opposite the wheel to be replaced.
- Loosen the wheel bolts to be replaced
- Place the jack under the axle housing, as close to the wheel as possible and adjust the jack (1).
- Raise the wheel until it comes off the ground and place the safety support under the axle (2).
- To do this, we recommend that you use a hydraulic jack and safety support.
- Completely unscrew the wheel bolts and remove them.
- Pull out the wheel with back and forth movements and turn it to the side.
- Put the new wheel on the hub.
- Manually screw in the bolts, if necessary lubricate them with grease.
- Tighten the wheel bolts securely with a torque wrench.
- Remove the safety support and lower the vehicle with the jack.

Figure 218: Wheel replacement

4.13.3 HEADLIGHTS ADJUSTMENT

Adjustment tips

(In accordance with ECE-76/756 76/761 ECE20 standards).

Adjustment of -2% of the dipped beam headlights with respect to the horizontal axis of the headlight.

Adjustment procedure

- Place the vehicle, empty, in transport position, perpendicular to a white wall, on flat and horizontal ground.
- Check the tire pressure.
- Select the direction reverser in idleoff and apply the parking brake.

Calculation of the height of the dipped beam headlights (h2)

h1 = Height above the ground of dipped beam headlights.

h2 = Height of the adjusted beam.

l = Distance from the white wall and the dipped beam headlights.

h2 = h1- (l x 2/100).

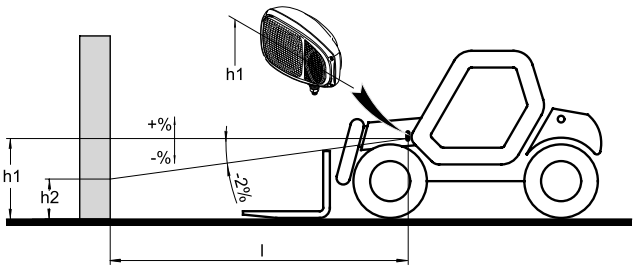


Figure 219: Headlights adjustment

⚠ DANGER

Always replace a faulty fuse with another of equivalent rating. Never use a fuse that has been.

Figure 220: Fuse and relay in cab

4.13.4 FUSE AND RELAY IN CAB

Remove the panel (1) behind the driver seat for access to the fuse box and relays (2).

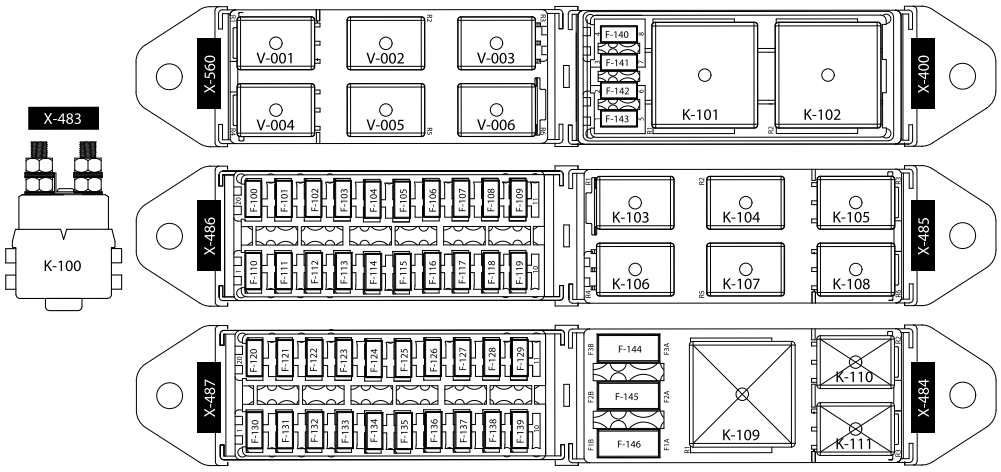


Figure 221: Overview of fuse and relays

Table 52. Specification table of the fuses and relays in cab

		Functions
X-400		
F-140	5 A	+ 30 roof light
F-141	5 A	+ 30 Cluster stand by
F-142	5 A	+15 DSB switch (12V)
F-143	7.5 A	+ 15 Lighter / car radio (12V)
K101		Flasher unit
K-102		Ventilation relay
X-483		
K-100		+15 Main realy
X-484		
F-144	20 A	Cabin blower motor
F-145	25 A	+30 A/C fan roof
F-146	30 A	+30 Main key
K-109	-	not used
K-110		Easy link with keypad (opt)
K-111		Easy link standard (opt)
X-485		
K-103		Electric mirror heated
K-104		Direction light RH
K-105		Beacon light
K-106		ECO STOP
K-107		Direction light LH
K-108	-	not used
X-486		
F-100	15 A	+ 15 floor mat heated supply
F-101	5 A	Door microswitch
F-102	10 A	+ 15 front wiper / washer motor supply
F-103	7.5 A	+15 Emergency pump supply
F-104	-	not used
F-105	7.5 A	Video camera / wather heater
F-106	7.5 A	+ 15 rear wiper / washer motor supply
F-107	10 A	Rear cab work light supply
F-108	3 A	+15 Easy manager
F-109	15 A	Electric mirror management
F-110	15 A	+ 15 Up / down window supply
F-111	-	not used
F-112	10 A	Boom work light supply
F-113	7.5 A	Rear fog light supply
F-114	7.5 A	+15 Predisposition supply
F-115	-	not used
F-116	7.5 A	+ 15 rear wiper / washer motor supply
F-117	10 A	Front cab work light supply
F-118	5 A	+ 15 beacon supply
F-119	15 A	Seat management

		Functions
X-487		
F-120	15 A	+ 15 Boom supply
F-121	5 A	+ 15 Display ignition
F-122	5 A	+ 15 navi encoder
F-123	5 A	+15 OBD diagnostic plug
F-124	5 A	BCU ignition supply
F-125	5 A	Joystick JSM
F-126	5 A	Chassis & boom angle sensor
F-127	5 A	Steering / brake emergency system
F-128	5 A	+15 Remote switch
F-129	10 A	+15 Boom pressure sensor
F-130	10 A	+30 Cab blower supply with water heater
F-131	5 A	+30 OBD diagnostic plug
F-132	10 A	+ 30 hazard and navig. device supply
F-133	2 A	+30 Easy manager supply
F-134	15 A	+ 30 water heater supply
F-135	5 A	+30 Pred supply
F-136	5 A	+15 Foot pedal supply
F-137	7.5 A	+ 15 Safety switch
F-138	5 A	Red button
F-139	-	not used
X-560		
V-001	-	not used
V-002	-	not used
V-003	-	not used
V-004		Diode module
V-005		Diode module
V-006		Diode module

4.13.5 FUSE AND RELAY ON THE CHASSIS

Remove the panel (1) behind the step under the cab for access to the fuse box and relays (2).
Remove the cap to access the fuse and relays.

⚠ DANGER

Always replace a faulty fuse with another of equivalent rating. Never use a fuse that has been.

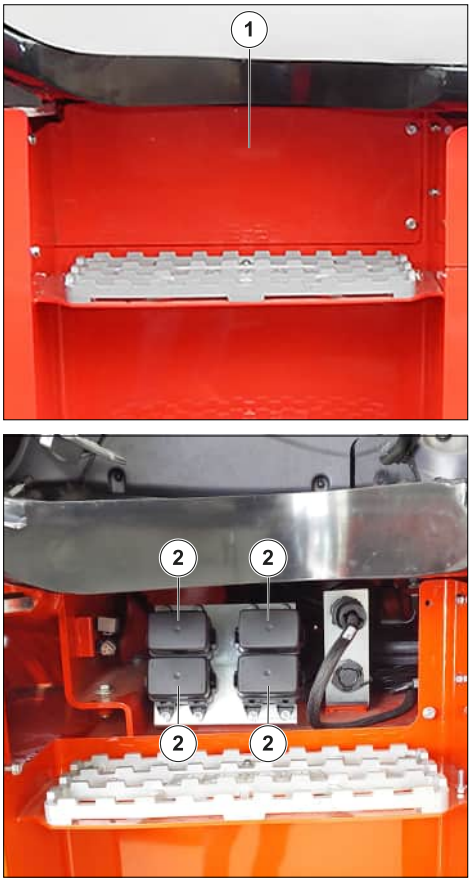


Figure 222: Fuse and relay on the chassis

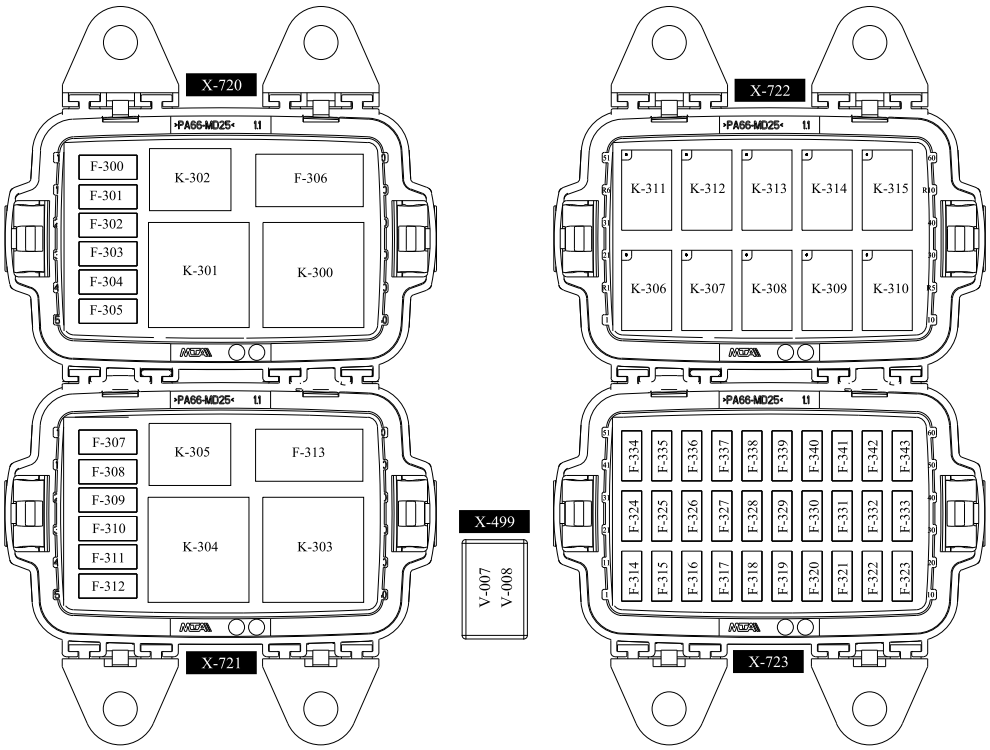


Figure 223: Overview of fuse and relays:

Table 53. Specification table of the fuses and relays on chassis

		Functions
X-499		
V-007		Cranking diode from basket / Remote
V-008		Remote supply from SPU
X-720		
F-300	15 A	+30 cranking relay
F-301	2 A	+ 30 DC/DC converter
F-302	7.5 A	+30 V BAT C auxiliary SPU
F-303	-	not used
F-304	2 A	+ 30 - 12 V Boom supply
F-305	10 A	+ 15 - 12V Boom supply
K-300		Hydraulic oil cooler electric fan
K-301		+15 Vehicle power
K-302	-	not used
K-306		Road light relay
X-721		
F-307	5 A	+30 V BAT P slave SPU
F-308	5 A	+30 V BAT P auxiliary SPU
F-309	5 A	Reverse light
F-310	5 A	Stop light
F-311	10 A	Low beam
F-312	10 A	High beam
F-313	-	not used
K-303		Hydraulic oil cooler electric fan
K-304		Vehicle power ECU
K-303		Hydraulic oil cooler electric fan
K-304		Vehicle power ECU
K-305	-	not used
X-722		
K-306		Road light relay
K-307		High beam relay
K-308		Low beam relay
K-309		Stop light relay
K-310		Reverse light relay
K-311		Cranking relay
K-312	-	not used
K-313	-	not used
K-314	-	not used
K-315		Fog light relay
X-723		
F-314	10 A	+15 V BAT D1 vehicle
F-315	10 A	+15 V BAT D2 vehicle
F-316	10 A	+15 V BAT D3 vehicle
F-317	10 A	+15 V BAT D4 vehicle
F-318	10 A	+15 V BAT D5 vehicle
F-319	10 A	+15 V BAT D6 vehicle

		Functions
F-320	10 A	+15 V BAT D7 vehicle
F-321	10 A	+15 V BAT F1 vehicle
F-322	10 A	+15 V BAT F2 vehicle
F-323	10 A	+15 V BAT F3 vehicle
F-324	10 A	+15 V BAT F4 vehicle
F-325	10 A	+15 Transmission control unit
F-326	5 A	+15 Transmission sensor
F-327	5 A	+15 Distributor feedback sensor
F-328	-	not used
F-329	-	not used
F-330	-	not used
F-331	-	not used
F-332	5 A	Fog light
F-333	5 A	Road light
F-334	15 A	+ 15 Converter
F-335	7.5 A	+15 VP Midac
F-336	5A	+15 Differential lock microswitch
F-337	5 A	+15 Axle allignment sensor
F-338	5 A	+15 Safety / stop switch supply
F-339	7.5 A	+15 V BAT D auxiliary SPU
F-340	7.5 A	+15 V BAT E auxiliary SPU
F-341	-	not used
F-342	5 A	Road light lever supply
F-343	10 A	+15 Automatic greaser

4.13.6 POWER BOX FUSE OF THE TELEHANDLER

Open the engine bonnet (1) to access the fuse box and relays (2).
Remove the cap to access the fuse and relays.

⚠ DANGER

Always replace a faulty fuse with another of equivalent rating. Never use a fuse that has been.

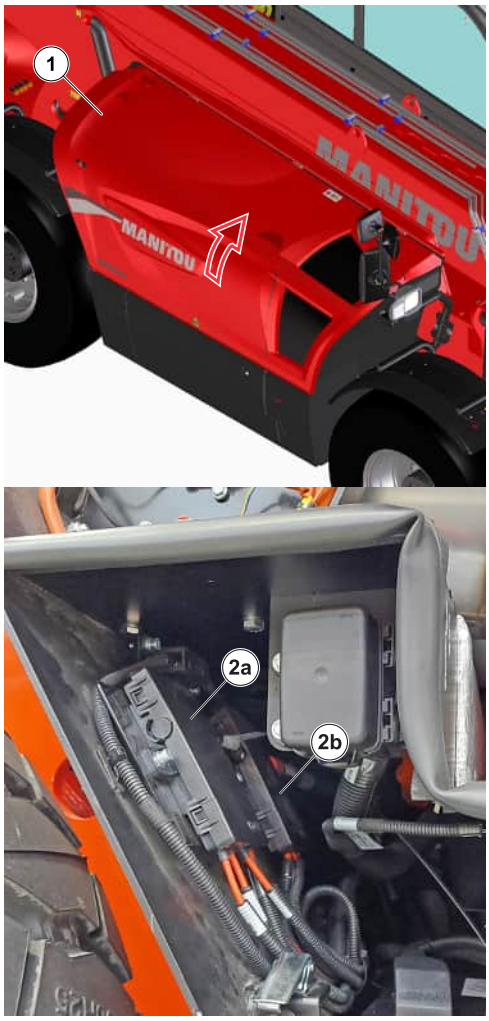


Figure 224: POWER BOX FUSE OF THE TELEHANDLER

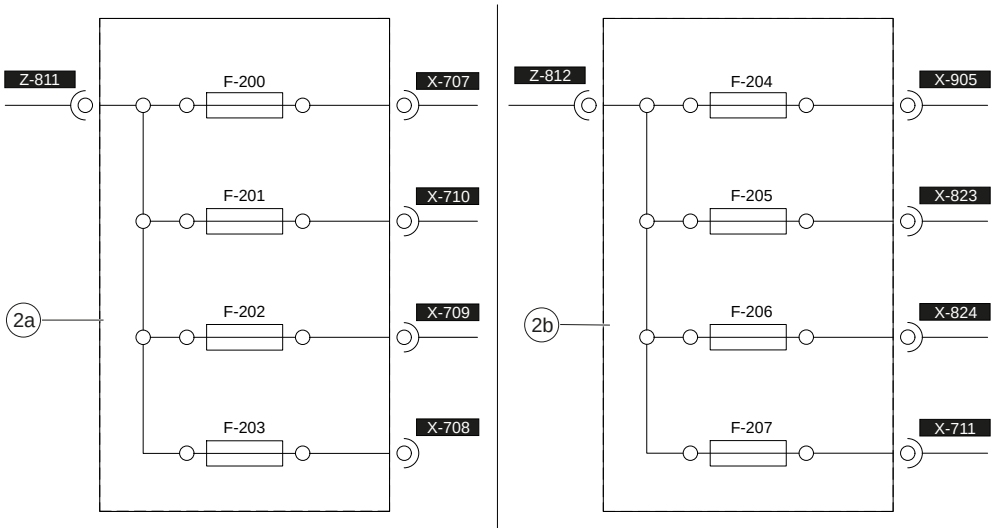


Figure 225: Overview of fuse and relays:

Table 54. Specification table of the fuses and relays on chassis

		Functions
X-707		
F-200	80 A	+30 DCU
X-708		
F-203	30 A	Available
X-709		
F-202	30 A	Glow plug
X-710		
F-201	40 A	+30 Eng. ECU
X-711		
F-207	0 A	Chassis PWR
X-823		
F-205	30 A	Oil cooler fan
X-824		
F-206	30 A	Oil cooler fan
X-905		
F-204	80 A	Cabin PWR

4.13.7 FUSE BOX AND RELAYS ENGINE

Open the engine bonnet (1) to access the fuse box and relays (2).
Remove the cap to access the fuse and relays.

⚠ DANGER

Always replace a faulty fuse with another of equivalent rating. Never use a fuse that has been.

Figure 226: Fuse box and relays engine

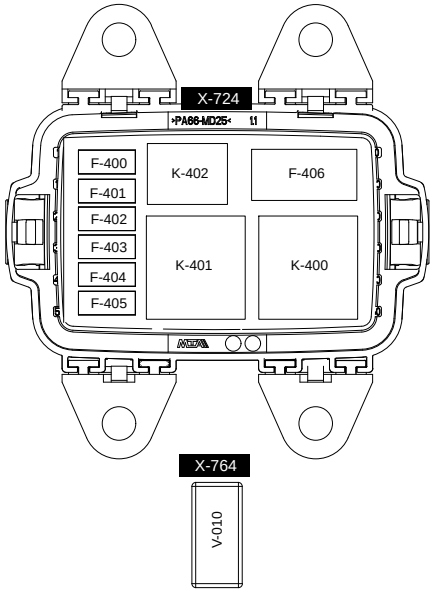


Figure 227: Overview of fuse and relays ST.V / T4 :

Table 55. Specification table of the fuse box and relays engine ST.V / T4

		Functions
X-724		
F-400	5 A	+30 Engine diagnostic plug
F-401	15 A	DEF heater
F-402	10 A	NOX sensor
F-403	5 A	DEF quality sensor
F-404	5 A	+15 Alternator
F-405	7.5 A	EGR valve
F-406	20 A	Fuel feed pump
K-400		Engine ECU main relay
K-401		Glow plug relay
K-402		DEF pipe heater relay
X-764		
V-010		Alternator

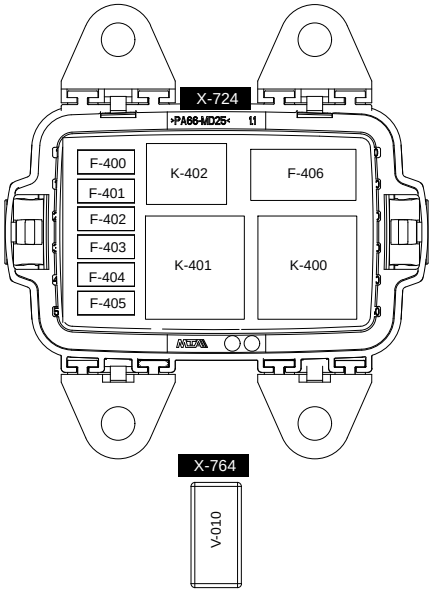


Figure 228: Overview of fuse and relays ST.3A :

Table 56. Specification table of the fuse box and relays engine ST.3A

		Functions
X-724		
F-400	5 A	+30 Engine diagnostic plug
F-401	-	not used
F-402	-	not used
F-403	-	not used
F-404	5 A	+15 Alternator
F-405	7.5 A	EGR valve
F-406	20 A	Fuel feed pump
K-400		Engine ECU main relay
K-401		Glow plug relay
K-402	-	not used
X-764		
V-010		Alternator

4.13.8 REMOTE CONTROL CHECK

Routine daily maintenance

Before starting work:

- Make sure that the housing and battery contacts are always clean.
- Check that the gaskets, bellows and caps of the actuators (joysticks, selectors and buttons) are intact, soft and elastic.
- Check that the symbols on the transmitter unit panel are clearly visible and replace the panel if necessary.
- Check the legibility and integrity of the three nameplates on the transmitter unit.
- Check the correct mechanical operation of the STOP button.

During normal operation:

- Check that the transmitter unit is structurally intact.
- Make sure that no materials (e.g. cement, sand, lime, dust) are deposited on the transmitter unit that could compromise its use and safety.

After using the remote control:

- Clean the transmitter unit: never use solvents or flammable/corrosive products and do not use high pressure cleaners or steam cleaners.
- Store the transmitter unit in a clean and dry environment.

Routine quarterly maintenance

Every 3 months:

- Remove dust or other buildup of material from the receiving unit.
- To clean, never use solvents or flammable/corrosive products and do not use high pressure cleaners or steam cleaners.
- Check that the receiving unit is structurally intact.
- Check the integrity and connection of the receiving unit wiring.
- Check that the symbols on the receiving unit panel are clearly visible and replace the panel if necessary.
- Check the readability and integrity of the plates of the receiving unit.

Extraordinary maintenance

⚠ DANGER

Any faults can only be repaired by authorized personnel. (contact the MANITOU assistance service).

Troubleshooting Guide

When the remote control does not work, it is necessary:

- to move the transmitting unit closer to the receiving unit in order to avoid noise and radio interference.
- to check if the problem affects the remote control or the machine. Therefore, before carrying out any checks, try to control the machine through a control station other than the remote control, if present.

If it persists, the problem affects the machine itself. Otherwise the problem concerns the remote control. In this case, refer to the paragraph “Malfunctions reported by the transmitter unit”.

MALFUNCTIONS REPORTED BY THE TRANSMITTER UNIT (Pushbutton panel)

Red LED and green LED.
The table below indicates the malfunctions that may be encountered when the LEDs present in the transmitter unit come on and the relative solutions.
If the problem persists after having implemented the indicated solution, contact the MANITOU assistance service.

Table 57. Malfunctions reported by the transmitter unit (Pushbutton panel)

Reports	Possible causes	Solutions
The green LED flashes quickly. The red LED flashes for minutes.	The battery is not sufficiently charged or the transmitter unit has been switched on for twenty-four hours.	It is necessary to replace the battery with a charged one or it is necessary to turn off the transmitter unit and restart the radio control.
The green LED repeats one or two flashes and a pause. The red LED flashes for minutes.		

The green LED repeats three flashes and a pause. The red LED flashes for minutes.	The transmitter unit has been on for twenty-four hours.	It is necessary to switch off the transmitter unit and restart the radio control.
The green LED is off. The red LED flashes for a very long time.	The transmitter unit is not working properly.	Contact the MANITOU assistance service.
When the remote control is started, the green LED is off and the red LED flashes for a long time.	The GSS or EMS button is pressed.	Disengage the GSS or EMS button.
When starting the remote control, the green LED is off and the red LED makes two long flashes.	The transmitter unit is not working properly.	Contact the MANITOU assistance service.
When the remote control is started, the green LED is off and the red LED makes three long flashes.	The battery is very low.	You need to replace the battery with a charged one.
When the remote control is started, the green LED is off and the red LED makes four long flashes.	The SAFETY command is active.	Bring the actuators to rest position. If this message persists, contact the MANITOU assistance service.
When the remote control is started, the green LED is on and the red LED flashes for a long time and a few short flashes.	At least one of the actuators related to the digital commands is active.	Bring the actuators to rest position. If this message persists, contact the MANITOU assistance service.
When the remote control is started, the green LED is on and the red LED makes two long flashes and a few short flashes.	At least one of the actuators related to the analog commands is active.	
When the remote control is started, the green LED is on and the red LED flashes three long and a few short flashes.	At least one of the actuators related to the direction commands is active.	
When the remote control is started, the green LED is on and the red LED flashes four long and a few short flashes.	At least one of the actuators related to the direction commands is active.	

MALFUNCTIONS REPORTED BY THE RECEIVING UNIT

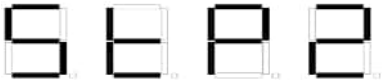
The table below indicates the malfunctions that may be encountered when the LEDs on the receiving unit turn on.

If the problem persists after having implemented the indicated solution, contact the MANITOU assistance service.

Table

Table 58. Malfunctions reported by the receiving unit

Reports	Possible causes	Solutions
The POWER LED is off.	The receiving unit is turned off.	Check the integrity of the power supply protection fuse. Connect the connection plug correctly and power up the receiver unit.
	There is an error on the STP_1 output.	Check the integrity of the STP_1 output protection fuse. Attach the connecting plug correctly. Check the correct wiring of the STP_1 output.

	There is an error on the STP_2 output.	Check the integrity of the STP_2 output protection fuse. Attach the connecting plug correctly. Check the correct wiring of the STP_2 output.
	There is an error on the SAF_1 output.	Check the integrity of the SAF_1 output protection fuse (fuse F6). Attach the connecting plug correctly. Check the correct wiring of the SAF_1 output.
	There is an error on the SAF_2 output.	Check the integrity of the SAF_2 output protection fuse. Attach the connecting plug correctly. Check the correct wiring of the SAF_2 output.
The STATUS LED flashes slowly.	There is an overvoltage in the power supply.	Check that the power supply of the receiving unit is within the voltage limits indicated in the technical data.
The STATUS LED flashes intermittently fast.	The receiving unit loses some of the data sent by the transmitting unit.	Move the transmitting unit closer to the receiving unit. If this message persists, contact Manitou Customer Service.
The RUN LED flashes.	The receiving unit does not send commands to the CAN network.	Contact the MANITOU assistance service.
The ERR LED flashes.	There is a CAN communication error.	
	The receiving unit has activated the automatic stop function (ATS) as it carries out a self-test every twenty-four hours of continuous ignition.	Start the remote control
The SETUP LED flashes twice.	There is a memory card error.	Contact the MANITOU assistance service.

4.13.9 CHECKING AND CLEANING THE FUEL TANK FILLER FILTER

1. Open the access door (1) on the fuel filler cap (2) (3) and unscrew it.
2. Unlock and remove the fuel filter (4) from the filler (3).
3. Clean it with an air jet, check that it is not damaged and if necessary replace it with a new one.
4. Refit the filter (4) and screw the cap (2) back on.
5. Close the access door (1).

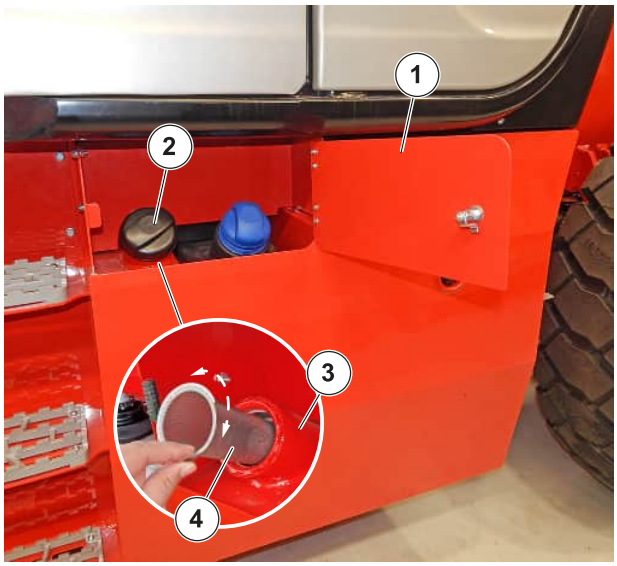


Figure 229: Checking and cleaning the fuel tank filler filter

4.13.10 CHECKING AND CLEANING THE DEF TANK FILLER FILTER

1. Open the access door (1) to the DEF filler cap (2) (3) and unscrew it.
2. Unlock and remove the fuel filter (4) from the filler (3).
3. Clean it with an air jet, check that it is not damaged and if necessary replace it with a new one.
4. Refit the filter (4) and screw the cap (2) back on.
5. Close the access door (1).

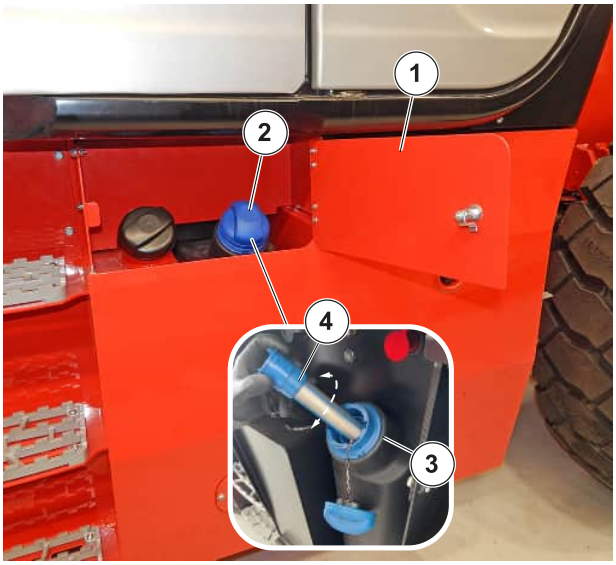


Figure 230: Checking and cleaning the DEF tank filler filter

4.13.11 STATIONARY REGENERATION OF DPF FILTER "VEHICLE STOPPED"

⚠ DANGER

DPF regeneration is an automated procedure, which is initiated by the operator when the following lights flash:

or + after 50 hours of operation with an engine speed reduction of 25%.

Park the vehicle in a safe and sufficiently ventilated place.

To perform the regeneration, the system that controls the devices and actions of the exhaust gas after-treatment of the vehicle will check that the following conditions are met:

- Neutral gear selector.
- Parking brake applied.
- No movement operated (telescopic boom, stabilizers, leveling).
- Telescopic boom in transport position (low and retracted).
- Accelerator pedal released.
- Manual throttle at idle.

Check that the fuel level is sufficient.
Start the vehicle and run the engine for a few minutes to bring it to operating temperature (60° C -140° F).

Press the button for more than two seconds to start the automated DPF regeneration procedure. The button lights up (yellow or blue) to indicate that the automated procedure has been activated. An amber indicator lights up on the display .
Follow the steps indicated on the information display.

⚠ DANGER

The DPF regeneration procedure should only be interrupted if necessary.The procedure stops automatically if the operator:Operate the joysticks of the hydraulic movements. Operate the forward or reverse direction selector. Turns off the engine.Press the button .

5. REFERENCES, OPTIONS AND ACCESSORIES

5.1. REFERENCES

5.1.1 LUBRICANTS AND FUEL

⚠ DANGER

USE RECOMMENDED LUBRICANTS AND FUEL:

For topping up, not all oils are mixable.

For gearboxes, MANITOU oils are perfectly suited.

DIAGNOSTIC ANALYSIS OF OILS

In the event of an inspection or maintenance contract concluded with the dealer, a diagnostic analysis of the engine, transmission and axle oils may be required, depending on the utilization rate.

CHARACTERISTICS OF THE FUEL REQUIRED

Use a quality fuel to obtain the optimum performance of the internal combustion engine.

- Type of diesel fuel EN590 (sulfur rate <10 ppm).
- ASTM D975 diesel fuel type (sulfur rate <15 ppm).

"DEF" SPECIFICATIONS (Diesel Emissions Additive)

- Aqueous solution of urea at 32.5% (ISO22241).
- Solidification at -11° C and expansion of 10%.
- Flammable product.
- Thermal degradation (> 60° C).
- Storage between -5° C and 30° C.

⚠ WARNING

Risk of corrosive substances

Corrosive product for metals; it is necessary to wear personal protective equipment (gloves and protective goggles).

CAPACITIES and RECOMMENDED PRODUCTS

MHT 10200 ST5, MHT 11250 ST5, MHT 10200 ST3A, MHT 11250 ST3A

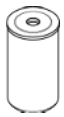
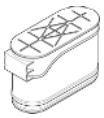
Table 59. Capacities and Recommended Products MHT 10200 ST5, MHT 11250 ST5, MHT 10200 ST3A, MHT 11250 ST3A

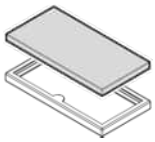
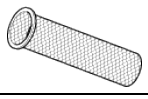
COMPONENTS TO BE LUBRICATED	CAPACITY	RECOMMENDED PRODUCT
ENGINE		
ENGINE	13 L - 3.43 US gal	MANITOU EVOLOGY OIL 10W40 API CJ4

COMPONENTS TO BE LUBRICATED	*CAPACITY*	*RECOMMENDED PRODUCT*
MHT 10200 ST5 - MHT 11250 ST5		
ENGINE **MHT—X 10200 ST3A - MHT—X 11250 ST3A**		MANITOU PREMIUM OIL 15W40 API CI4
COOLING SYSTEM	22 L - 5.8 US gal	COOLING SYSTEM -35° C (Concentrated Product)
FUEL TANK	315 L - 83.21 US gal	DIESEL
DEF TANK **MHT 10200 ST5 - MHT 11250 ST5**	24 L - 6.34 US gal	"DEF" (diesel emissions fluid)
TRANSMISSION		
GEARBOX	4,4 L - 1.16 US gal	SPECIAL MANITOU OIL IMMERSED BRAKES
CARDAN JOINT		BLUE MULTIPURPOSE MANITOU GREASE
TELESCOPIC BOOM		
TELESCOPIC BOOM SHOES		BLACK MULTIPURPOSE MANITOU GREASE
HYDRAULICS		
HYDRAULIC OIL TANK	290 L - 76.60 US gal	MANITOU ISO VG 46 HYDRAULIC OIL
CABIN		
WINDSCREEN WASHER FLUID TANK	5 L - 1 US gal	WINDSCREEN WASHING FLUID
FRONT AXLE MHT 10200 ST5 and MHT—X 10200 ST3A		
CENTRAL DIFFERENTIAL	21 L - 5.54.3 US gal	SPECIAL MANITOU OIL IMMERSED BRAKES
FINAL REDUCTIONS	1.8 L - 0.47 US gal (x2)	SPECIAL MANITOU OIL IMMERSED BRAKES
REAR AXLE MHT 10200 ST5 and MHT—X 10200 ST3A		
CENTRAL DIFFERENTIAL	21 L - 5.54.3 US gal	SPECIAL MANITOU OIL IMMERSED BRAKES
FINAL REDUCTIONS	1.8 L - 0.47 US gal (x2)	SPECIAL MANITOU OIL IMMERSED BRAKES
FRONT AXLE MHT 11250 ST5 and MHT—X 11250 ST3A		
CENTRAL DIFFERENTIAL	35 L - 9.24 US gal	SPECIAL MANITOU OIL IMMERSED BRAKES
FINAL REDUCTIONS	6 L - 1.58 US gal (x2)	SPECIAL MANITOU OIL IMMERSED BRAKES
REAR AXLE MHT 11250 ST5 and MHT—X 11250 ST3A		
CENTRAL DIFFERENTIAL	35 L - 9.24 US gal	SPECIAL MANITOU OIL IMMERSED BRAKES
FINAL REDUCTIONS	6 L - 1.58 US gal (x2)	SPECIAL MANITOU OIL IMMERSED BRAKES
CHASSIS		
TILTING CYLINDER		BLUE MULTIPURPOSE MANITOU GREASE

5.1.2 FILTER ELEMENTS AND BELTS

Table 60. Filter elements and belts

ELEMENT	DESCRIPTION	OPERATION
500H - PERIODIC MAINTENANCE - EVERY 500 HOURS OF OPERATION OR 6 MONTHS		
 	Cabin ventilation filters	Clean / Check
	Hydrostatic pump (transmission) oil filter	Replace
	Hydraulic oil filter cartridge (drain)	Replace
	Hydraulic oil breather	Replace
1000H - PERIODIC MAINTENANCE - EVERY 1000 HOURS OF OPERATION OR 1 YEAR *(Also carry out periodic maintenance of the 500 hours of operation)*		
	Engine oil filter	Replace
	Dry air filter cartridge	Replace
	Fuel pump filter	Check / Clean
	Fuel filter	Replace
 	Cabin ventilation filters	Replace

ELEMENT	DESCRIPTION	OPERATION
	"DEF" fuel pump filter	Replace
	"DEF" tank breather	Replace
2000H - PERIODIC MAINTENANCE - EVERY 2000 HOURS OF OPERATION OR 2 YEARS *(Also perform periodic maintenance of 500 hours and 1000 hours of operation)*		
	Leveling and brakes hydraulics intake filter cartridge	Clean
	Hydrostatic pump hydraulics intake filter cartridge	Clean
	Motion pumps hydraulics intake filter cartridge	Clean
3000H - PERIODIC MAINTENANCE - EVERY 3000 HOURS OF OPERATION OR 3 YEARS *(Also perform periodic maintenance of 500 hours and 1000 hours of operation)*		
	Air filter safety cartridge	Replace
	Engine service belt	Replace
4500H - PERIODIC MAINTENANCE - EVERY 4500 HOURS OF OPERATION OR 9 YEARS *(Also carry out periodic maintenance of the 500 hours of operation)*		
	Motor breather crankcase filter	Replace
OCCASIONAL MAINTENANCE		
	Fuel tank filler filter	Check / Clean
	DEF tank filler filter	Check / Clean

5.2. ATTACHMENTS

5.2.1 INTERCHANGEABLE EQUIPMENT AND MACHINE COMPATIBILITY

Interchangeable equipment

Interchangeable equipment or attachments are devices which, connected to the machine by the operator, modify the original function of the machine or add a new function. In the case of the vehicle, interchangeable equipment or attachments are for example (non-exhaustive list):

- the platform for lifting people or material,
- the jib & crane for handling suspended loads,
- the winch to lift material,
- etc.

Interchangeable equipment, if supplied by Manitou, is certified, i.e. it is equipped with a certificate of conformity that guarantees optimal safety for the operator and the machine.

⚠ WARNING

The use of interchangeable attachments or equipment not originally provided on the machine is prohibited.

In the event of subsequent requests for implementation of the machine functions with other attachments, the user, before commissioning, is obliged to request the suitability for use check by an authorized MANITOU technician, who will check the correct functioning and updating of the documentation necessary for the use of the new attachment. Only after this check will the authorization to use the new attachment be issued.

Interchangeable equipment compatible with the machine

The following tables show the list of interchangeable equipment or attachments compatible with each machine model.

Interchangeable equipment is identified by a code and a description, both reported on the metal plate of the equipment itself.

The compatibility between machine and attachment is certified by Manitou for interchangeable attachments for which the “V” sign appears in the box relating to the machine model.

Compatibility between machine and attachment is NOT guaranteed by Manitou for interchangeable attachments for which the “X” sign appears in the box relating to the machine model. This equipment should not be used on the specified machine model.

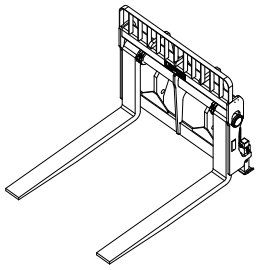
⚠ WARNING

Only attachments approved and certified by MANITOU can be used on telehandlers. The manufacturer's liability will not be involved in the event of modification or use of attachments made without its knowledge.

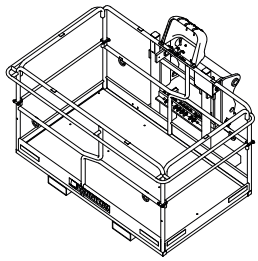
Use original attachments listed in the machine - attachment or equipment compatibility tables.

If in doubt, contact your dealer.

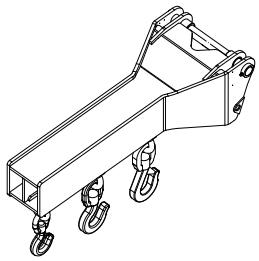
Machine - attachment compatibility table: Forks carriage and Positioners

Image	*Description*	*Code (PN)*	*MHT / MHT-X*			
			10135	*10160*	*10200*	*11250*
	CAF 1750/16000 F1200	52699113	V	V	X	X
	CAF 1750/16000 F1500	52699114	V	V	X	X
	CAF 1750/16000 F1800	52699115	V	V	X	X
	CAF 1750/12500 F2400	52699116	V	V	X	X
	CAF 1750/20000 F1200	52694204	X	X	V	X
	CAF 1750/20000 F1800	52694205	X	X	V	X
	CAF 1750/15000 F2400	52694206	X	X	V	X
	CAF 2500/16000 F1200	52700264	V	V	X	X
	CAF 2500/16000 F1500	52700265	V	V	X	X
	CAF 2500/16000 F1800	52700266	V	V	X	X
	CAF 2500/12500 F2400	52700267	V	V	X	X
	CAF 2500/20000 F1200	52694207	X	X	V	X
	CAF 2500/20000 F1800	52694208	X	X	V	X
	CAF 2500/15000 F2400	52694209	X	X	V	X
	CAF 2500/15000 F3000	52694210	X	X	V	X
	CAF 2000/25000 F1800	52694547	X	X	X	V
	CAF 2000/22000 F2400	52694548	X	X	X	V
	CAF 2500/25000 F1800	52694549	X	X	X	V
	CAF 2500/22000 F2400	52694550	X	X	X	V
	CAF 2500/22000 F3000	52694551	X	X	X	V
	CAT2500/16T+P F200X85X1500	52727768	V	V	X	X
	CAT2500/16T+P F200X85X1800	52727769	V	V	X	X
	CAT2500/12.5T+P F200X85X2400	52727770	V	V	X	X
	CAT2500/16T+P+SS F200X85X1500	52708640	V	V	X	X
	CAT2500/16T+P+SS F200X85X1800	52708641	V	V	X	X
	CAT2500/12.5T+P+SS F200X85X2400	52708642	V	V	X	X
	CAT2500/20T+P F200X80X1200	52727771	X	X	V	X
	CAT2500/20T+P F200X80X1800	52727772	X	X	V	X
	CAT2500/15T+P F200X95X2400	52727773	X	X	V	X
	CAT2500/15T+P F200X95X3000	52727774	X	X	V	X
	CAT2500/20T+P+SS F200X80X1200	52697220	X	X	V	X
	CAT2500/20T+P+SS F200X80X1800	52697225	X	X	V	X
	CAT2500/15T+P+SS F200X95X2400	52697230	X	X	V	X
	CAT2500/15T+P+SS F200X95X3000	52697235	X	X	V	X
	CAT2500/25T+P+SS F250X100X1800	52697150	X	X	X	V
	CAT2500/22T+P+SS F250X100X2400	52697145	X	X	X	V
	CAT2500/22T+P+SS F250X100X3000	52697020	X	X	X	V

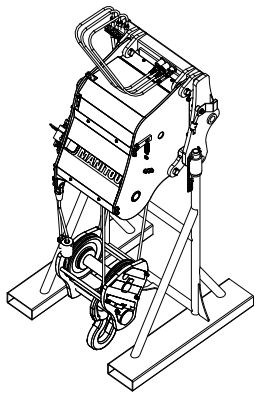
Machine - attachment compatibility table: Lifting platforms

Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	PF 2000/1200D MINING	52727778	V	V	V	V
	PF 2000/365	52727780	V	V	V	V
	PSE 4400/600D+W300/41M	52727781	V	V	V	V
	PSE 4400/ 365	52727782	V	V	V	V
	PSE 4400/ 1000D	52727783	V	V	V	V

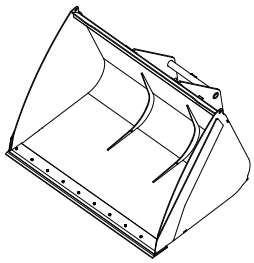
Machine - attachment compatibility table: Arms

Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	JH 13.5T 10T 7.5T	52701740	V	X	X	X
	JH 16T 10T 7.5T	52701741	X	V	X	X
	JH 20T 14T 10T	52701742	X	X	V	X
	P 25T 18T 13T	53010431	X	X	X	V
	JH 16T	52702450	V	V	X	X
	JH 20T	52702460	X	X	V	X
	PC 25T	53008289	X	X	X	V

Machine - attachment compatibility table: Winches

Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	W 13500/13	52702240	V	X	X	X
	W 16000/13	52702241	X	V	X	X
	W 20000/14	52702470	X	X	V	X

Machine - attachment compatibility table: Buckets / Loaders

Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	CBA 2500/4000 LDR MHT GT	52000534	X	X	X	X
	CBR 2500/2000 LDR MHT GT	52000532	X	X	X	X

Machine - attachment compatibility table: Grippers

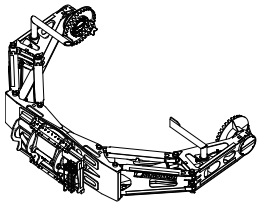
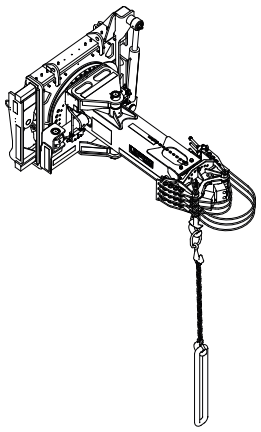
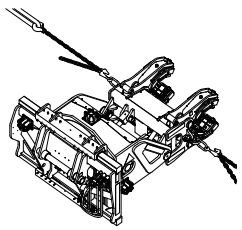
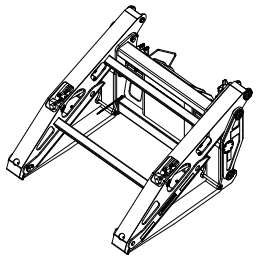
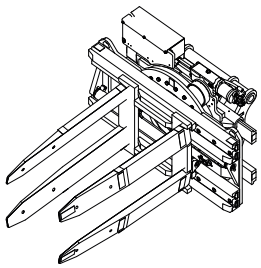
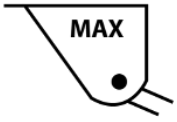
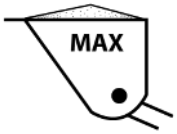
Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	TYRE HANDLER TH51	911969	V	V	X	X
	TYRE HANDLER TH57 S2	939237	V	V	V	V
	TYRE HANDLER TH63 PLUS	939331	X	X	V	V
	CYLINDER HANDLER CH4	911968	V	V	V	V
	CYLINDER HANDLER CH10	939239	V	V	V	V

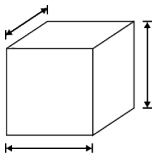
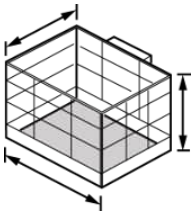
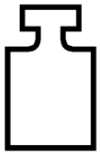
Image	Description	Code (PN)	MHT / MHT-X			
			10135	10160	10200	11250
	PIPE HANDLER PH 2100/8000	939231	V	V	V	X
	PIPE HANDLER PH 2500/14000	939332	X	X	V	V
	TH33/2000S	52721340	V	V	V	V

5.2.2 SYMBOLS AND DESCRIPTION

Below is the key to the symbols used in this chapter:

Table 61. Key to the symbols

Symbol	Description	Unit of measure
	Manitou product code	-
	Maximum capacity of forks carriage	[kg] (lb)
	Maximum capacity of flush-full bucket	[lt] (US gal)
	Nominal maximum capacity of the bucket	[lt] (US gal)
	Maximum capacity of the platform	[kg] (lb)

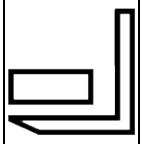
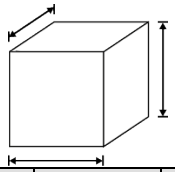
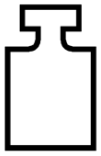
Symbol	Description	Unit of measure
	Maximum capacity of the hook	[kg] (lb)
	Maximum capacity of the gripper	[kg] (lb)
P max	Max Pressure	[bar] (psi)
	Dimensions of the drawing	[mm] (in)
	Dimensions of the platform	[mm] (in)
	Attachment mass	[kg] (lb)

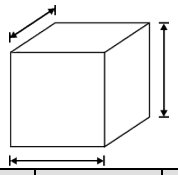
Symbol	Description	Unit of measure
	Side shift to the left	[mm] (in)
	Side shift to the right	[mm] (in)

5.2.3 DIMENSIONALI ACCESSORI

5.2.3.1 FORKS CARRIAGE DIMENSIONS

Table 62. Forks carriage dimensions

	[kg] (lb)	[bar] (psi)	[mm] (in)							[kg] (lb)
		P max								
			A	B	C	D	a	b	c	
52699113	16000 (35274)	-	1900 (74.80)	1900 (59.65)	434 (17.09)	283 (11.14)	180 (7.09)	75 (2.95)	1200 (47.24)	970 (2138)
52699114	16000 (35274)	-	1900 (74.80)	1900 (59.65)	434 (17.09)	335 (13.19)	180 (7.09)	75 (2.95)	1500 (59.06)	-
52699115	16000 (35274)	-	1900 (74.80)	1900 (59.65)	434 (17.09)	409 (16.10)	180 (7.09)	75 (2.95)	1800 (70.87)	1084 (2389)
52699116	12500 (27558)	-	1900 (74.80)	1900 (59.65)	444 (17.48)	597 (23.50)	200 (7.87)	85 (3.35)	2400 (94.49)	1084 (2389)
52694204	20000 (44092)	-	1750 (69.90)	1604 (63.15)	385 (15.16)	312 (12.28)	200 (7.87)	80 (3.15)	1200 (47.24)	1212 (2672)
52694205	20000 (44092)	-	1750 (69.90)	1604 (63.15)	385 (15.16)	433 (17.05)	200 (7.87)	80 (3.15)	1800 (70.87)	1344 (2963)
52694206	15000 (33069)	-	1750 (69.90)	1524 (60)	400 (15.75)	593 (23.35)	200 (7.87)	76 (2.99)	2400 (94.49)	-
52700264	16000 (35274)	-	2500 (98.43)	1530 (60.24)	380 (14.96)	265 (10.43)	180 (7.09)	75 (2.95)	1200 (47.24)	1265 (2788)
52700265	16000 (35274)	-	2500 (98.43)	1530 (60.24)	380 (14.96)	321 (12.64)	180 (7.09)	75 (2.95)	1500 (59.06)	-
52700266	16000 (35274)	-	2500 (98.43)	1530 (60.24)	380 (14.96)	361 (14.21)	180 (7.09)	75 (2.95)	1800 (70.87)	-
52700267	12500 (27558)	-	2500 (98.43)	1529 (60.2)	390 (15.35)	540 (21.26)	200 (7.87)	85 (3.35)	2400 (94.49)	1692 (3730)
52694207	20000 (44092)	-	2500 (98.43)	1604 (63.15)	385 (15.16)	297 (11.69)	200 (7.87)	80 (3.15)	1200 (47.24)	1395 (3075)
52694208	20000 (44092)	-	2500 (98.43)	1605 (63.19)	385 (15.16)	400 (15.75)	190 (7.48)	80 (3.15)	1800 (70.87)	-
52694209	15000 (33069)	-	2500 (98.43)	1605 (63.19)	400 (15.75)	548 (21.57)	200 (7.87)	95 (3.74)	2400 (94.49)	-

	[kg] (lb)	[bar] (psi)	[mm] (in)							[kg] (lb)
		P max								
			A	B	C	D	a	b	c	
52694210	15000 (33069)	-	2500 (98.43)	1605 (63.19)	400 (15.75)	731 (2.78)	200 (7.87)	76 (2.99)	3000 (118.11)	-
52694547	25000 (55115)	-	2140 (84.25)	1624 (63.94)	415 (16.34)	435 (17.13)	220 (8.66)	100 (3.94)	1800 (70.87)	1795 (3957)
52694548	22000 (48501)	-	2140 (84.25)	1624 (63.94)	395 (15.55)	610 (24.02)	250 (9.84)	100 (3.94)	2400 (94.49)	1975 (4354)
52694549	25000 (55115)	-	2530 (99.61)	1624 (63.94)	394 (15.51)	420 (16.54)	220 (8.66)	100 (3.94)	1800 (70.87)	1915 (4221)
52694550	22000 (48501)	-	2530 (99.61)	1624 (63.94)	395 (1.55)	589 (23.19)	250 (9.84)	100 (3.94)	2400 (94.49)	2226 (4907)
52694551	22000 (48501)	-	2530 (99.61)	1624 (63.94)	399 (15.71)	786 (30.94)	250 (9.84)	100 (3.94)	3000 (118.11)	2462 (5427)

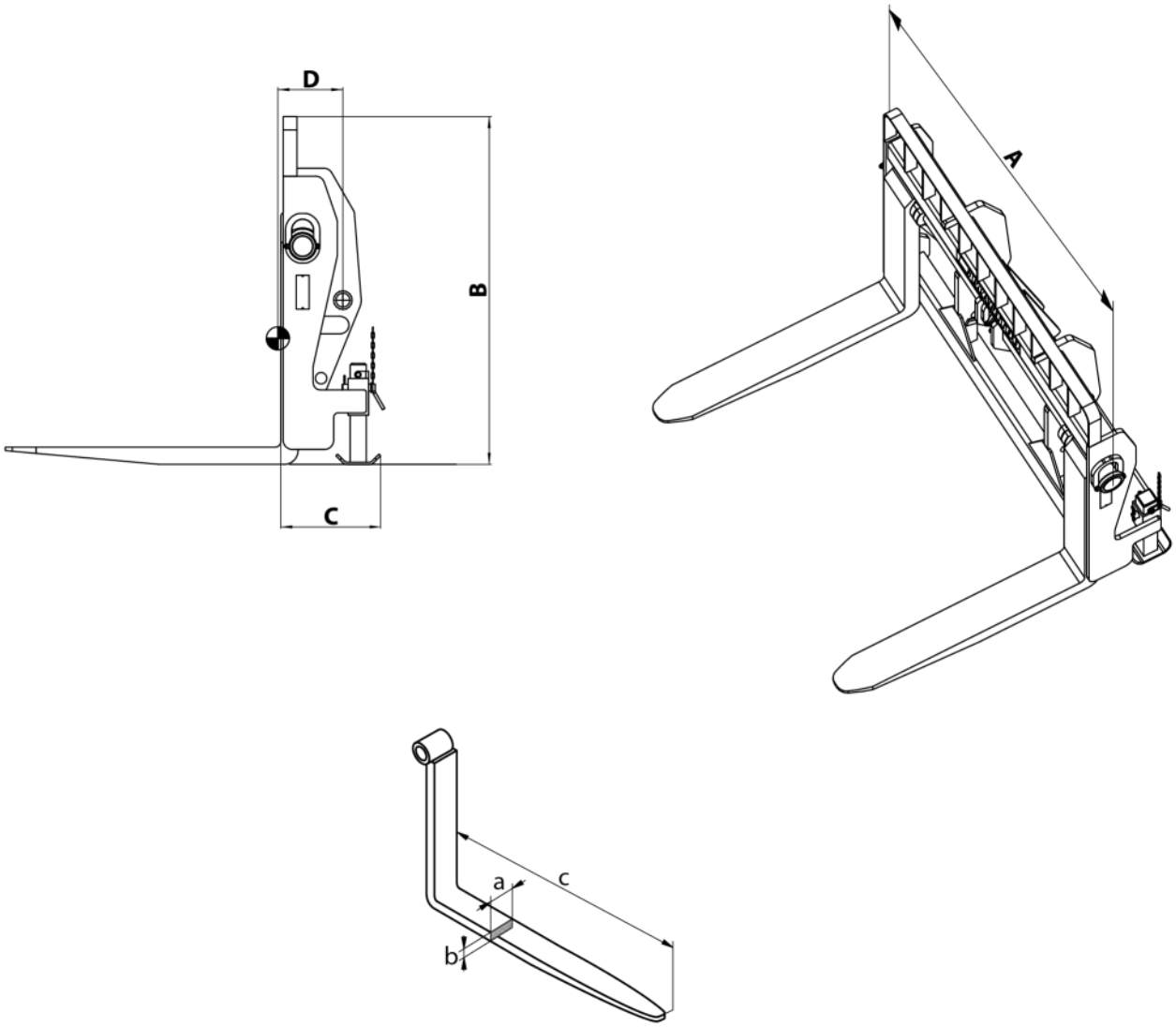
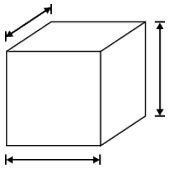
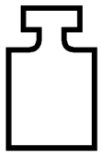


Figure 231: Forks carriage

5.2.3.2 POSITIONING FORKS CARRIAGE DIMENSIONS

Table 63. Positioning forks carriage dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*							*[kg] (lb)*
		*P max*								
			A	***B***	***C***	***D***	***a***	***b***	***c***	
52727768	16000 (35274)	—	2494 (98.19)	1610 (63.39)	485 (19.09)	316 (12.44)	200 (7.87)	80 (3.15)	1505 (59.25)	-
52727769	16000 (35274)	—	2494 (98.19)	1610 (63.39)	485 (19.09)	370 (14.57)	200 (7.87)	80 (3.15)	1800 (70.87)	-
52727770	12500 (27558)	—	2494 (98.19)	1610 (63.39)	490 (19.29)	494 (19.45)	200 (7.87)	85 (3.35)	2400 (94.49)	-
52708640	16000 (35274)	—	2494 (98.19)	1610 (63.39)	485 (19.09)	314 (12.36)	200 (7.87)	80 (3.15)	1500 (59.06)	1520 (3351)
52708641	16000 (35274)	—	2494 (98.19)	1610 (63.39)	485 (19.09)	370 (14.57)	200 (7.87)	80 (3.15)	1800 (70.87)	1750 (3858)
52708642	12500 (27558)	—	2494 (98.19)	1610 (63.39)	490 (19.29)	494 (19.45)	200 (7.87)	85 (3.35)	2400 (94.49)	1750 (3858)
52727771	20000 (44092)	—	2494 (98.19)	1638 (64.49)	486 (19.13)	230 (9.06)	200 (7.87)	80 (3.15)	1200 (47.24)	-
52727772	20000 (44092)	—	2494 (98.19)	1638 (64.49)	486 (19.13)	312 (12.28)	200 (7.87)	80 (3.15)	1800 (70.87)	-
52727773	15000 (33069)	—	2494 (98.19)	1638 (64.49)	501 (19.72)	466 (18.35)	200 (7.87)	95 (3.74)	2400 (94.49)	-
52727774	15000 (33069)	—	2494 (98.19)	1638 (64.49)	501 (19.72)	617 (24.29)	200 (7.87)	95 (3.74)	3000 (118.11)	-
52697220	20000 (44092)	—	2494 (98.19)	1640 (64.57)	485 (19.09)	232 (9.13)	200 (7.87)	80 (3.15)	1200 (47.24)	-
52697225	20000 (44092)	—	2494 (98.19)	1639 (64.53)	485 (19.09)	312 (12.28)	200 (7.87)	80 (3.15)	1800 (70.87)	1980 (4365)
52697230	15000 (33069)	—	2494 (98.19)	1638 (64.49)	501 (19.72)	466 (18.35)	200 (7.87)	95 (3.74)	2400 (94.49)	2203 (4856)
52697235	15000 (33069)	—	2494 (98.19)	1640 (64.57)	500 (19.69)	619 (24.37)	200 (7.87)	95 (3.74)	3000 (118.11)	-
52697150	25000 (55115)	—	2494 (98.19)	1639 (64.53)	505 (19.88)	379 (14.92)	250 (9.84)	100 (3.94)	1800 (70.87)	-
52697145	22000 (48501)	—	2494 (98.19)	1640 (64.57)	505 (19.88)	514 (20.24)	250 (9.84)	100 (3.94)	2400 (94.49)	2485 (5478)
52697020	22000 (48501)	—	2494 (98.19)	1640 (64.57)	505 (19.88)	683 (26.89)	250 (9.84)	100 (3.94)	3000 (118.11)	-

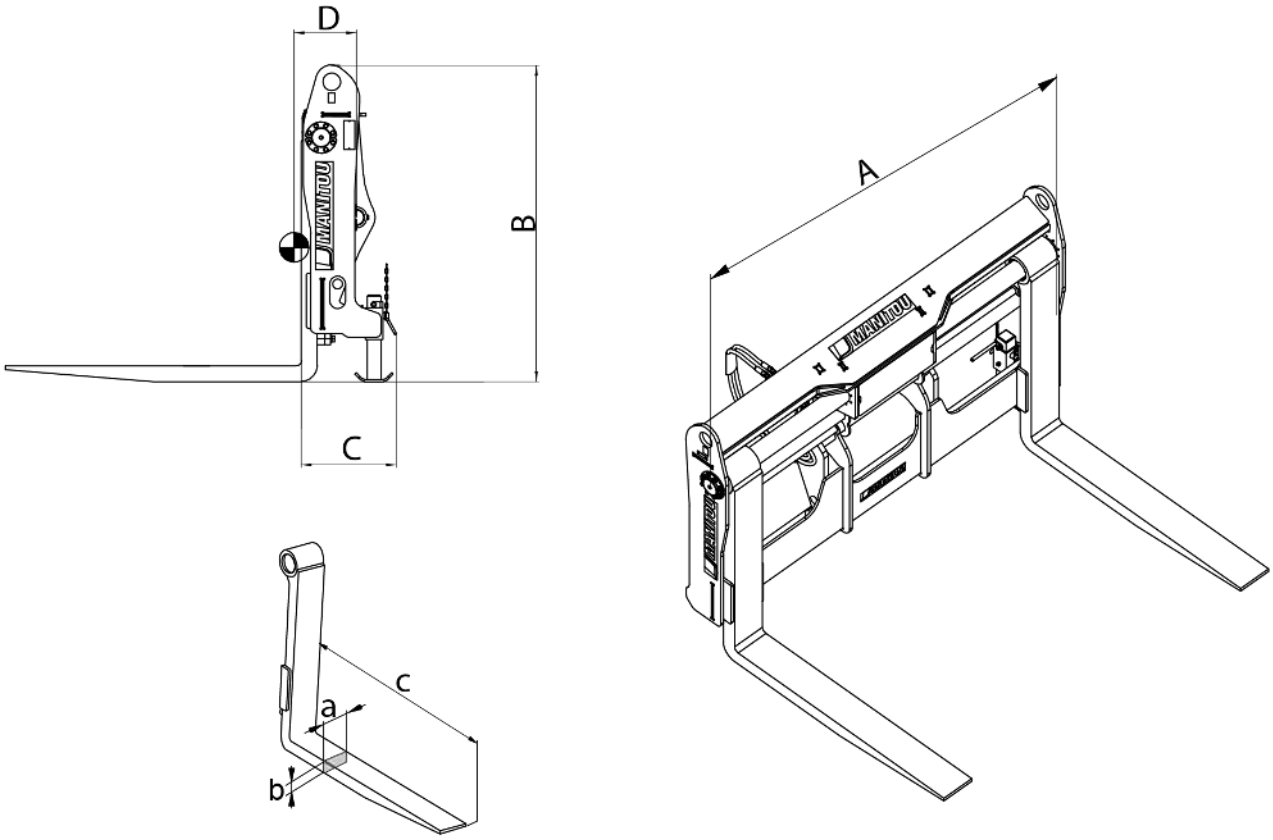


Figure 232: Positioning forks carriage

5.2.3.3 Bucket dimensions

Table 64. Bucket dimensions

	[lt] (US gal)	*[lt] (US gal)*	*[bar] (psi)*	*[mm] (in)*					*[kg] (lb)*
	MAX	MAX	*P max*						
				A	*B*	*C*	*D*	*E*	
52000534	3420 lt (904 gal)	4000 lt (1057 gal)	—	2500 (98.43)	2053 (80.83)	1960 (77.17)	684 (26.93)	710 (27.95)	1440 (3175)

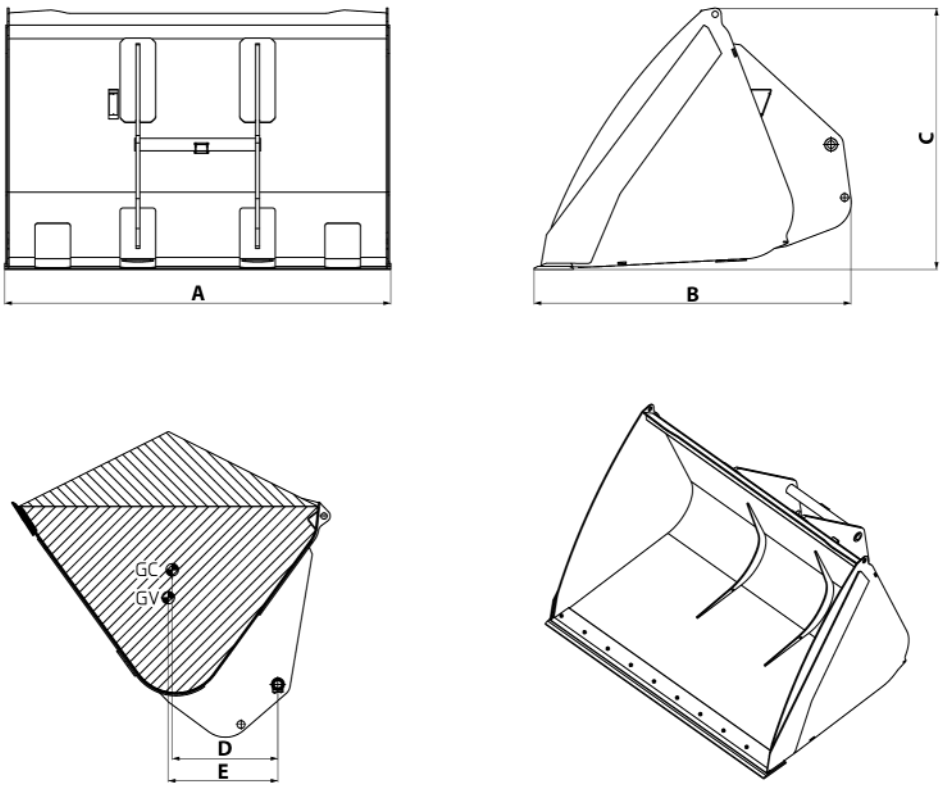


Figure 233: Bucket

Key:

- **GV:** unladen center of gravity.
- **GC:** laden center of gravity.

Table 65. Bucket dimensions

	[lt] (US gal)	*[lt] (US gal)*	*[bar] (psi)*	*[mm] (in)*					*[kg] (lb)*
	MAX	MAX	*P max*						
				A	*B*	*C*	*D*	*E*	
52000532	1810 lt (478 gal)	2000 lt (528 gal)	—	2500 (98.43)	1418 (55.83)	1168 (45.98)	472 (18.58)	486 (19.13)	926 (2041)

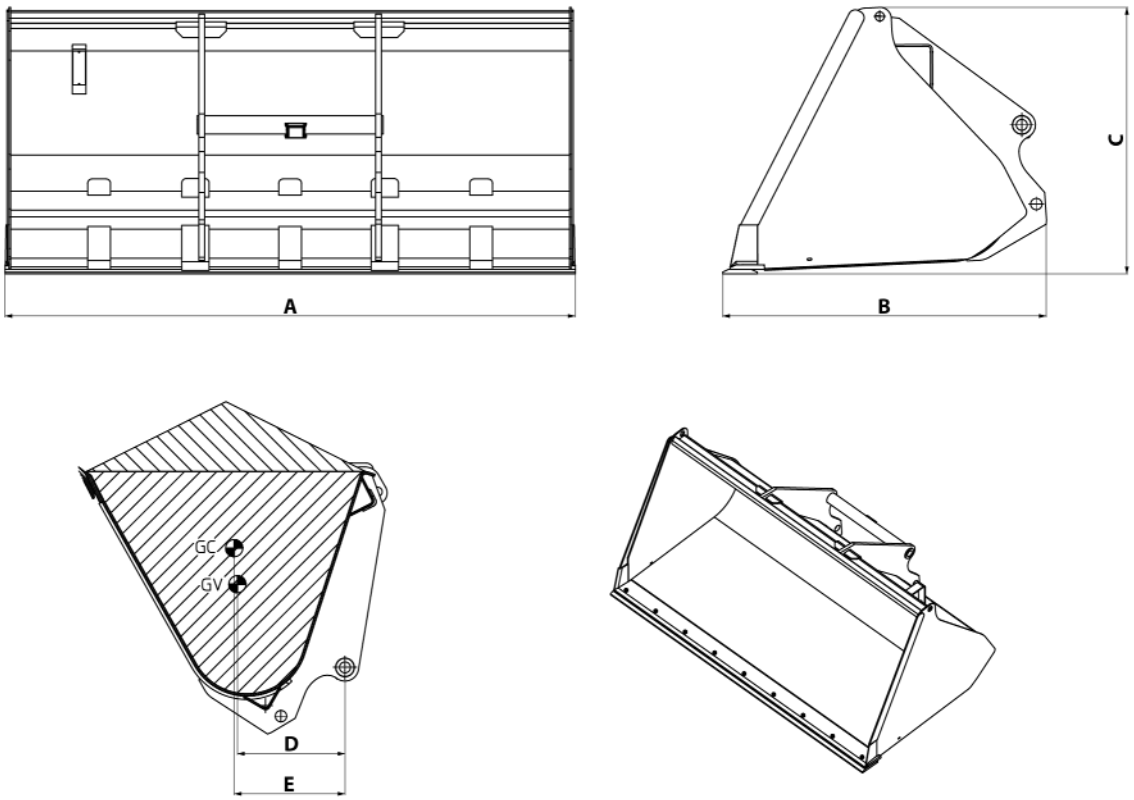


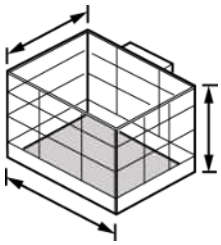
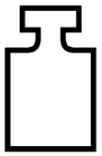
Figure 234: Bucket

Key:

- **GV:** unladen center of gravity.
- **GC:** laden center of gravity.

5.2.3.4 LIFTING PLATFORMS DIMENSIONS

Table 66. Lifting platforms dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*				*[kg] (lb)*
		*P max*					
			A	*B*	*C*	*D*	
52727778	1200 (2649)	—	1922 (75.67)	2118 (83.39)	2246 (88.43)	1035 (40.75)	1150 (2535)
52727780	365 (805)	—	1631 (64.21)	1755 (69.09)	2190 (86.22)	646 (18.87)	409 (902)
52727781	600 (1323)	250 (3626)	—	2723 (107.20)	4387 (172.72)	1221 (48.07)	1360 (2998)
52727782	365 (805)	250 (3626)	1611 (63.43)	2450 (96.46)	4388 (172.76)	1317 (51.85)	675 (1488)
52727783	1000 (2205)	250 (3626)	1609 (63.35)	2389 (94.05)	4387 (172.72)	1187 (46.73)	1040 (2293)

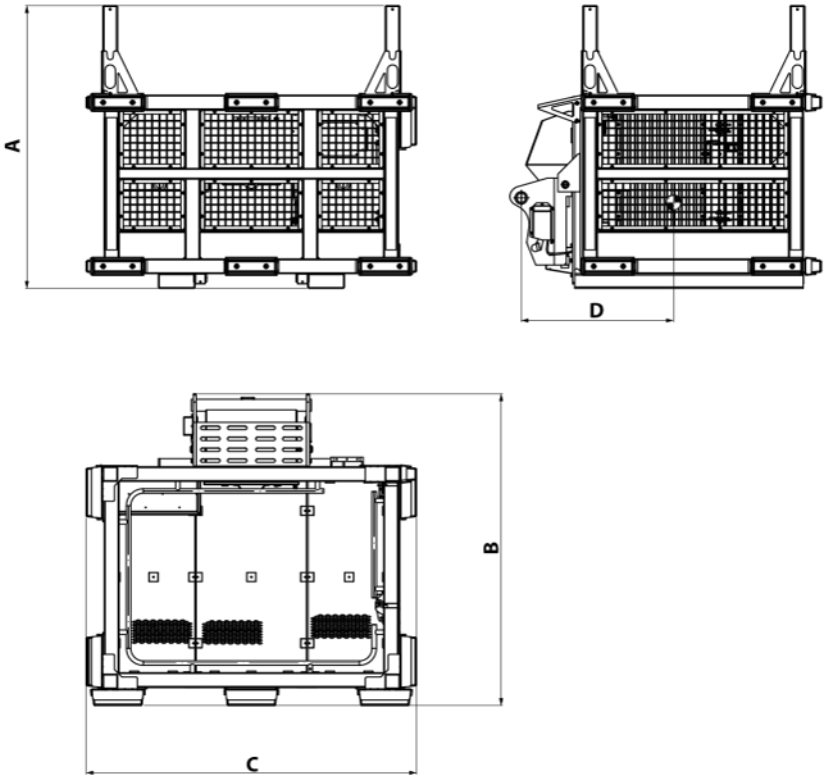
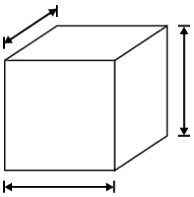
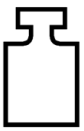


Figure 235: Lifting platforms

5.2.3.5 JIBS & CRANES DIMENSIONS

Table 67. Jibs & cranes with three hooks

	[kg] (lb)		*[bar] (psi)*	*[mm] (in)*								*[kg] (lb)*
			**P max**									
				A	**B**	**C**	**D**	**E**	**a**	**b**	**c**	
5270174-0	**1**	13500 (29762)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1055 (41.54)	821 (32.32)	700 (27.56)	1350 (53.15)	2000 (78.74)	555 (1224)
	2	10000 (22046)										
	3	7500 (16535)										
5270174-1	**1**	16000 (35274)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1055 (41.54)	821 (32.32)	700 (27.56)	1350 (53.15)	2000 (78.74)	555 (1224)
	2	10000 (22046)										
	3	7500 (16535)										
5270174-2	**1**	20000 (44092)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1208 (40.47)	821 (32.32)	700 (27.56)	1350 (53.15)	2000 (78.74)	590 (1301)
	2	14000 (30864)										
	3	10000 (22046)										
5301043-1	**1**	25000 (55115)	—	850 (33.46)	555 (21.85)	2085 (82.09)	1257 (49.49)	901 (35.47)	700 (27.56)	1250 (49.21)	1800 (70.87)	890 (1962)
	2	18000 (39683)										
	3	13000 (28660)										

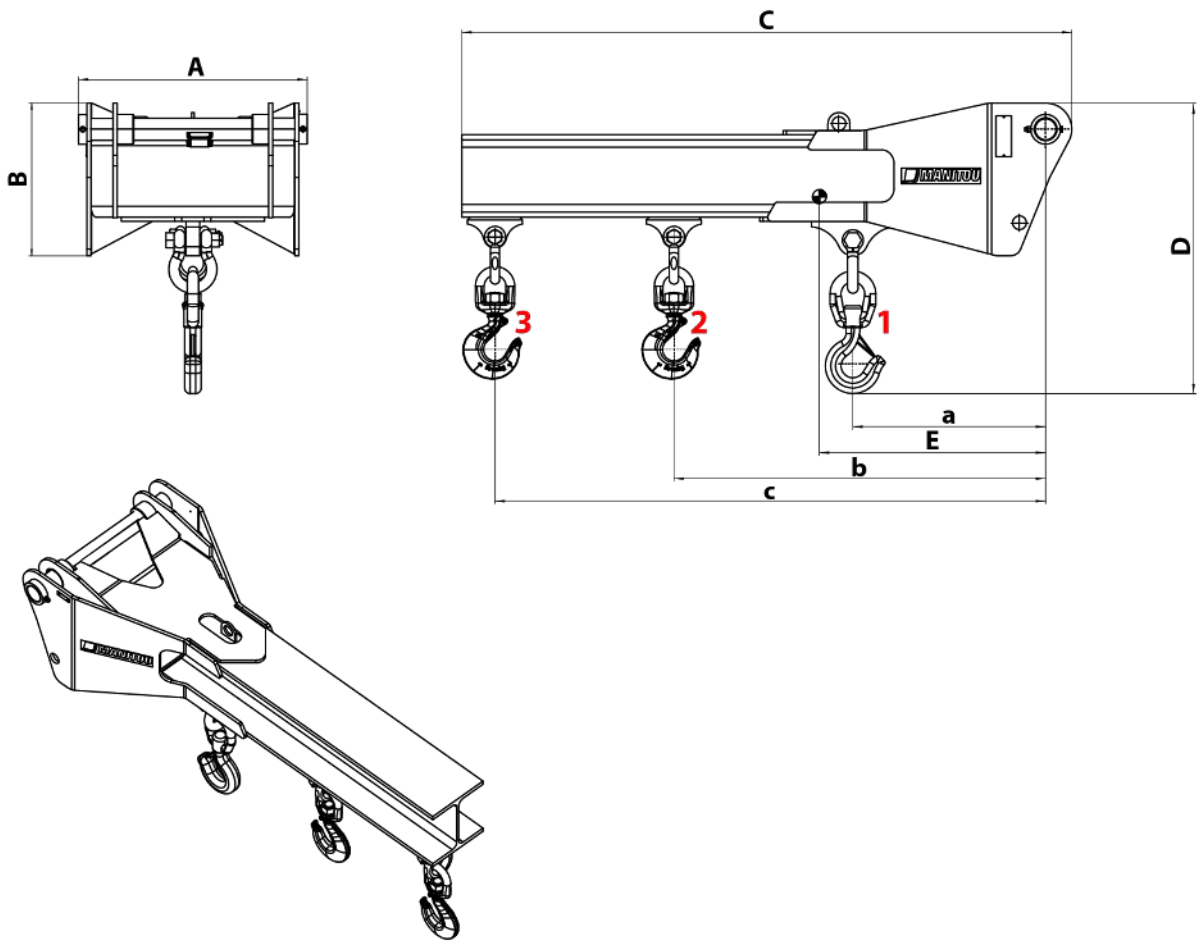


Figure 236: Jibs & cranes with three hooks

Table 68. Arms

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*						*[kg] (lb)*
		P max							
			A	**B**	**C**	**D**	**E**	**F**	
52702450	16000 (35274)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1055 (41.54)	821 (32.32)	700 (27.56)	555 (1224)
52702460	20000 (44092)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1055 (41.54)	821 (32.32)	700 (27.56)	555 (1224)
53008289	25000 (55115)	—	830 (32.68)	555 (21.85)	2215 (87.20)	1208 (40.47)	821 (32.32)	700 (27.56)	590 (1301)

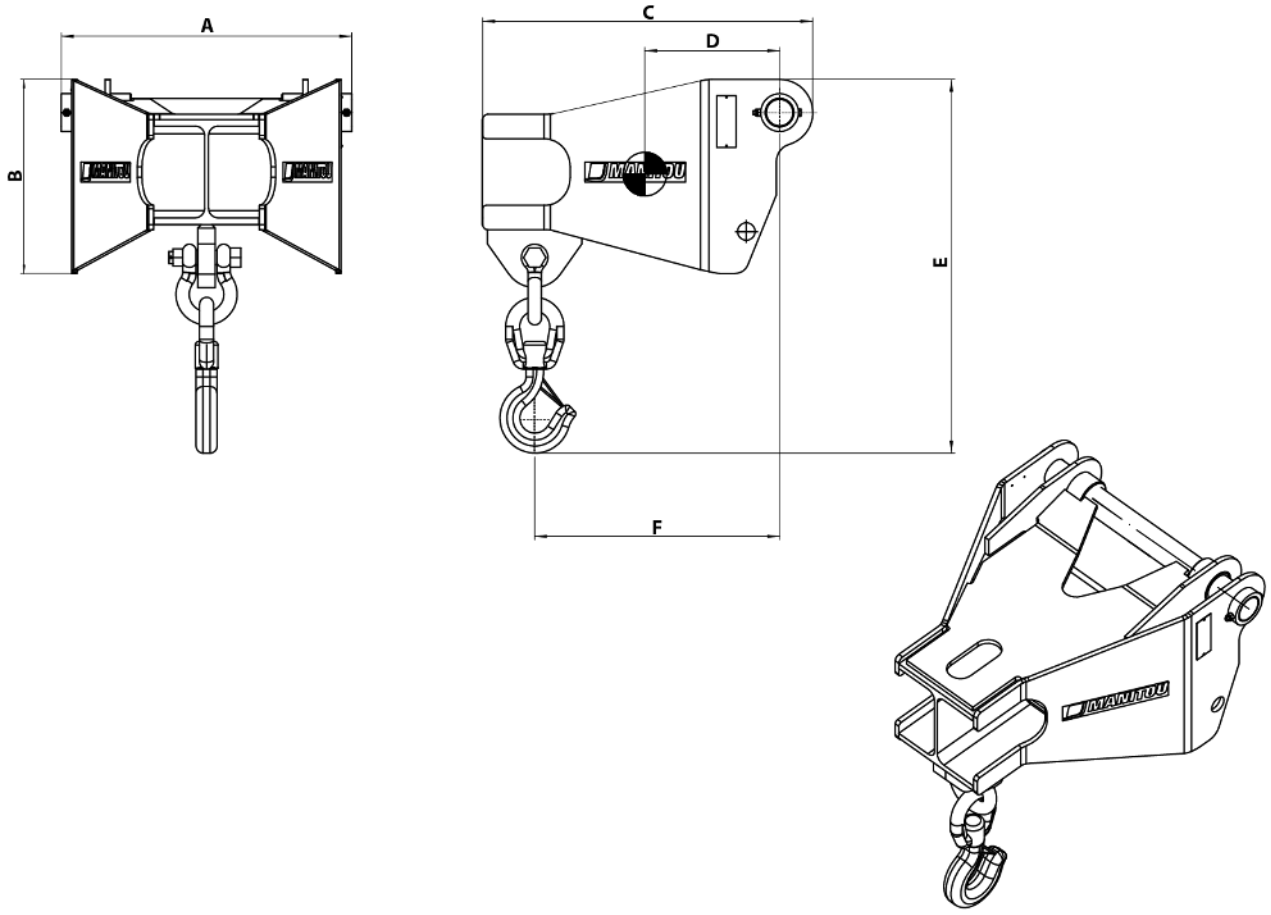


Figure 237: Arms

5.2.3.6 WINCH DIMENSIONS

Table 69. Winch dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*					*[kg] (lb)*
		p max						
			A	*B*	*C*	*D*	*E*	
52702240	13500 (29762)	—	1250 (49.21)	2328 (91.65)	1200 (47.24)	434 (17.09)	682 (26.85)	1185 (2612)
52702241	16000 (35274)	—	1250 (49.21)	2328 (91.65)	1200 (47.24)	434 (17.09)	682 (26.85)	1185 (2612)

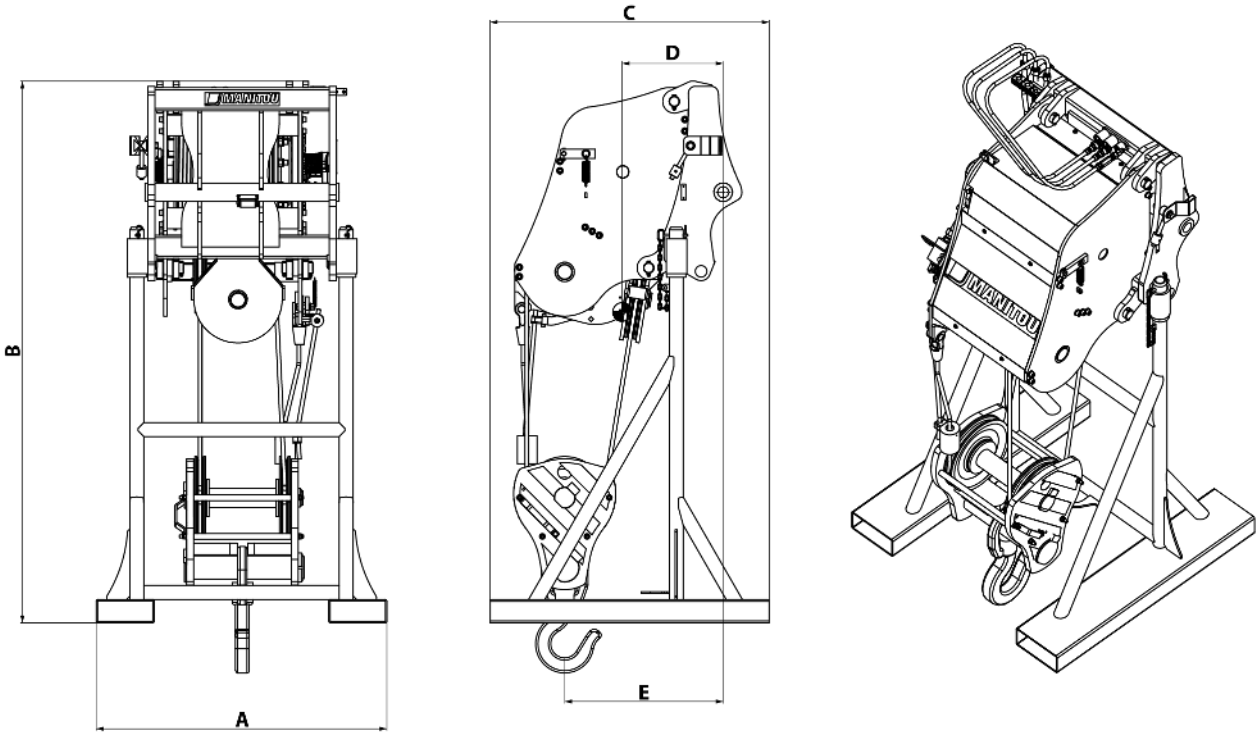


Figure 238: Winches

Table 70. Winch dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*						*[kg] (lb)*
	MAX	*p max*							
			A	*B*	*C*	*D*	*E*	*F*	
52702470	20000 (44092)	350 (5076)	1250 (49.21)	1044 (41.10)	2363 (93.03)	1200 (47.24)	423 (16.65)	722 (28.43)	1550 (3417)
52693990	25000 (55115)	350 (5076)	1250 (49.21)	1044 (41.10)	2363 (93.03)	1200 (47.24)	423 (16.65)	722 (28.43)	1370 (3020)

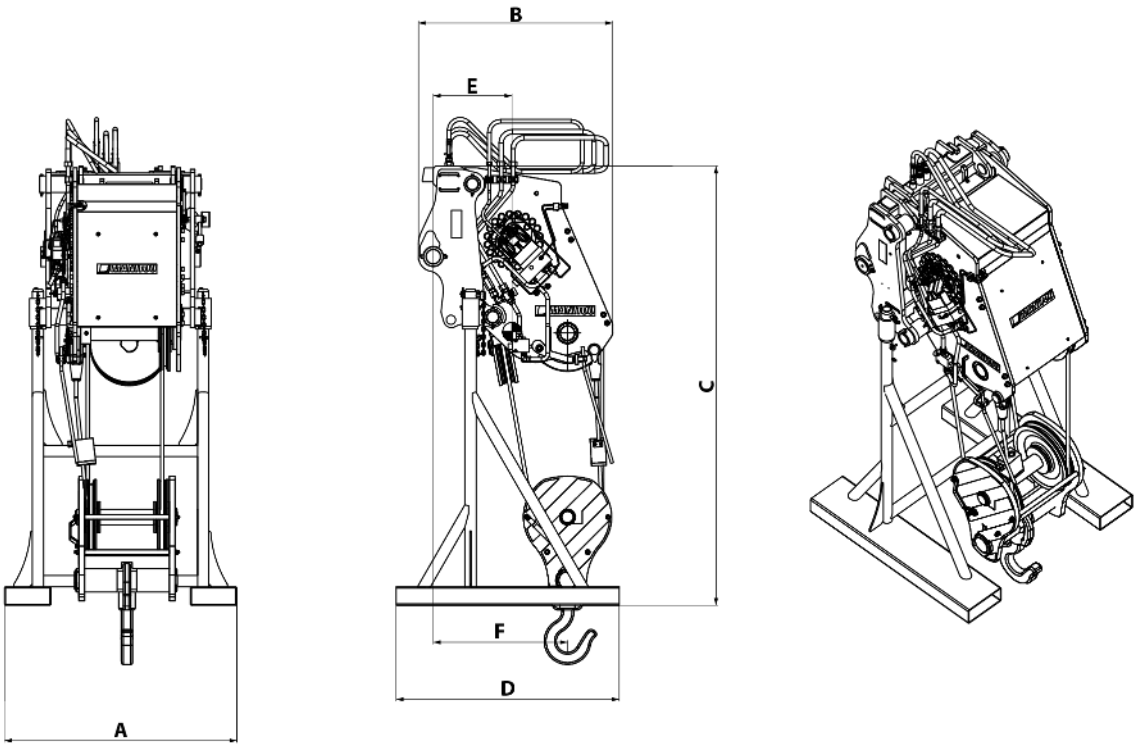


Figure 239: Winches

5.2.3.7 GRIPPER DIMENSIONS

Table 71. Tire gripper dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*										*[kg] (lb)*
	MAX	*P max*	*A*	*B*	*C*	*D*	*E*	*E'*	*F*	*F'*	*G*	*G'*	
911969	3500 (7716)	—	2990 (117.-72)	1229 (48.3-9)	2990 (117.7-2)	1470 (57.87)	4440 (174.-80)	2148 (84.5-7)	3416 (134.4-9)	1128 (44.4-1)	993 (39.0-9)	1135 (44.6-8)	32-00 (70-55)
939237	6000 (13228)	—	3371 (132.-72)	1229 (48.3-9)	3440 (135.4-3)	1770 (69.68)	4883 (192.-24)	2227 (87.6-8)	3831 (150.8-3)	1218 (47.9-5)	1135 (44.6-8)	1350 (53.1-5)	43-00 (94-80)

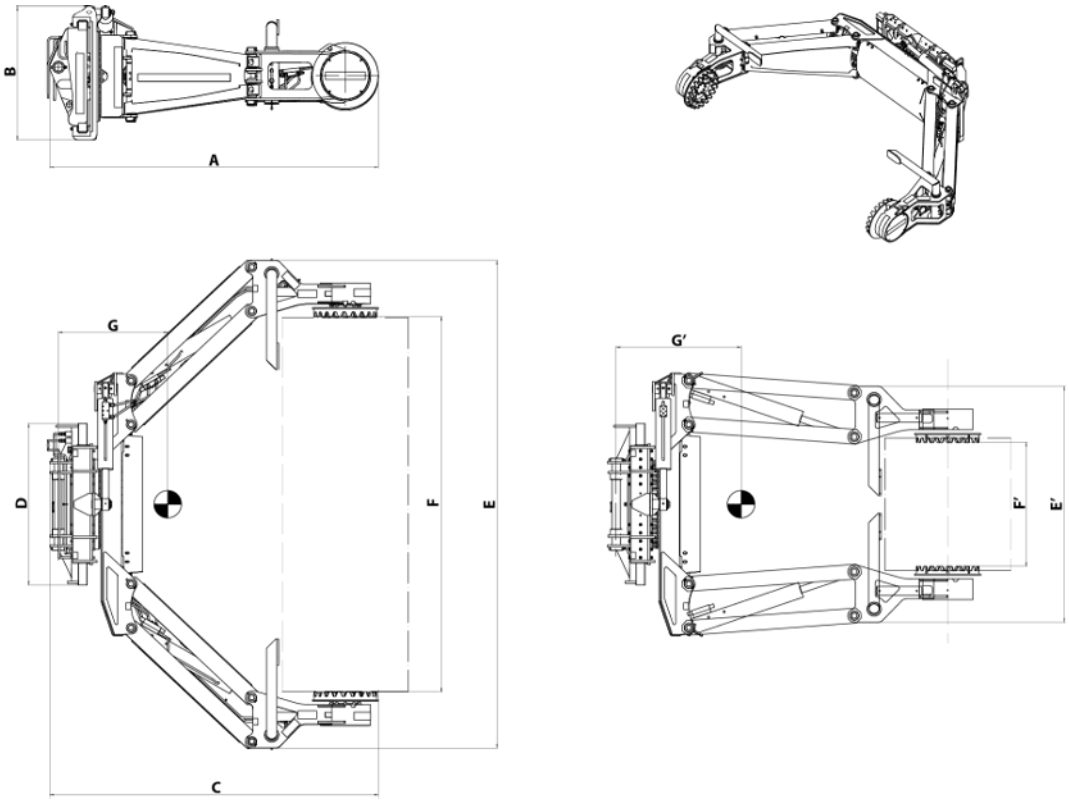


Figure 240: Tire grippers

Table 72. Tire gripper dimensions

	[kg] (lb)	[bar] (psi)	[mm] (in)											[kg] (lb)
	MAX	P max												
			A	B	C	D	E	E'	F	F'	G	G'	H	
939331	12000 (2645-5)	350 (507-6)	3837 (151-.06)	1229 (48.3-9)	1770 (69.6-8)	3752 (145.-72)	5296 (208.-50)	1559 (61.-38)	4286 (168.-74)	549 (21.-61)	1225 (48.2-3)	1335 (52.5-6)	3224 (126.-93)	5260 (115-96)

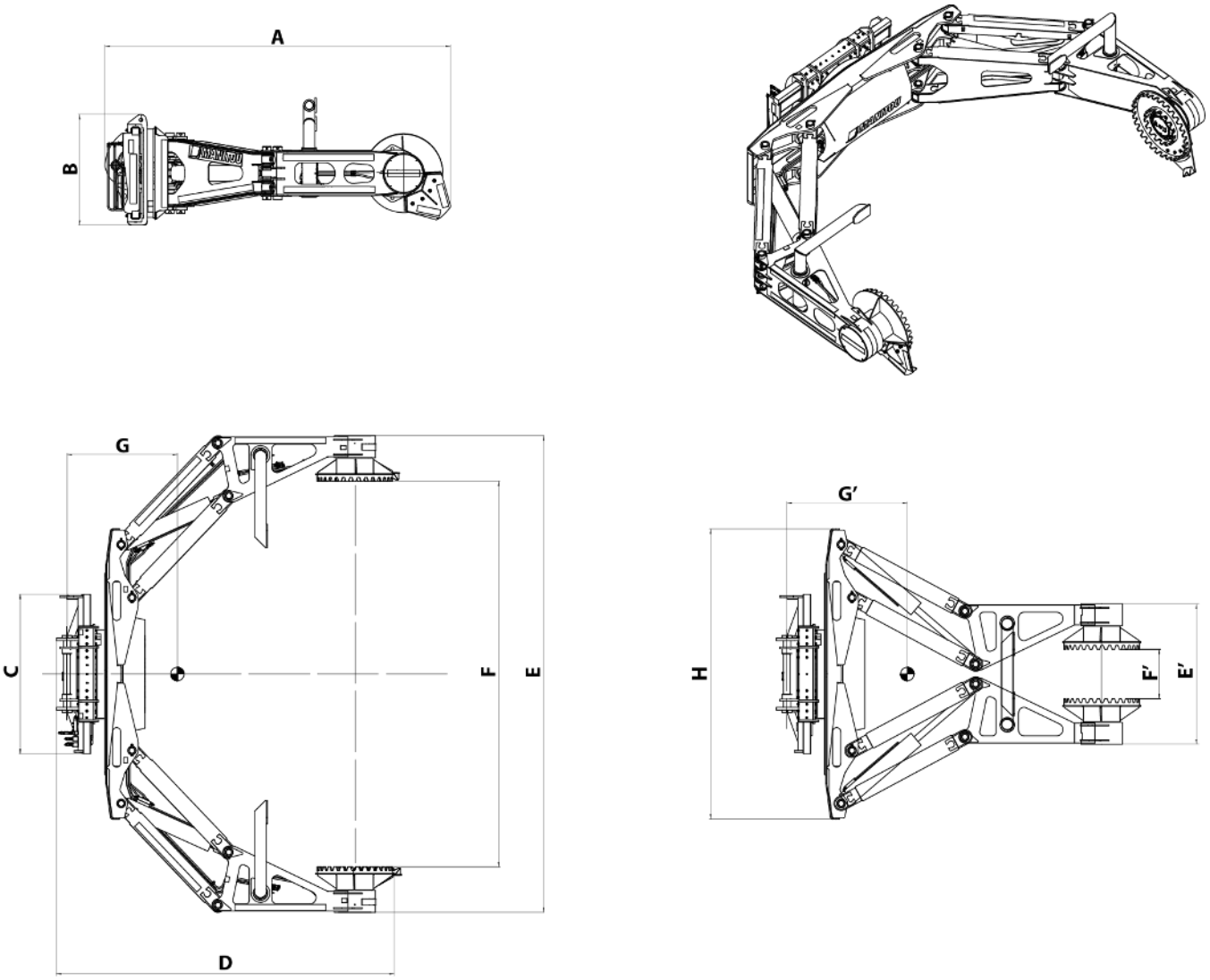


Figure 241: Tire grippers

Table 73. Cylinder gripper dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*								*[kg] (lb)*
		P max									
			A	*B*	*C*	*D*	*D'*	*E*	*F*	*F'*	
911968	**OPEN: 2000 kg (4409 lb) CLOSED: 4000 kg (8818 lb)**	270 (3916)	2249 (88.5-4)	1360 (53.54)	1470 (57.87)	2221 (87.4-4)	3106 (122.2-8)	687 (27.0-5)	1619 (63.74)	2504 (98.58)	1850 (4079)

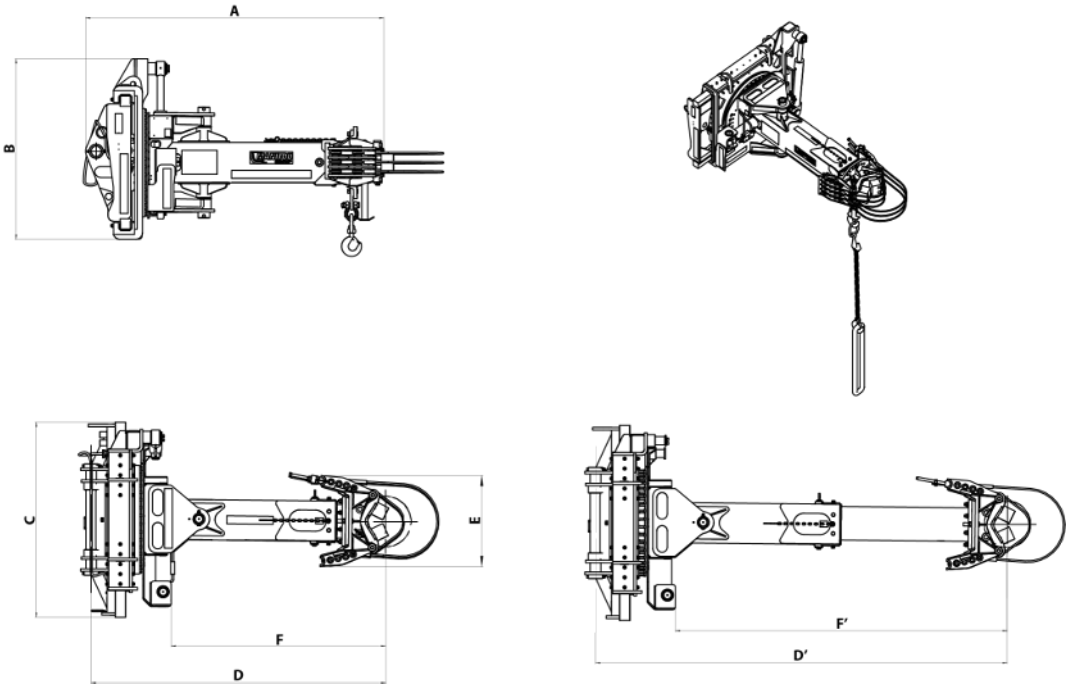


Figure 242: Cylinder grippers

Table 74. Cylinder gripper dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*						*[kg] (lb)*
		P max							
			A	*B*	*C*	*D*	*E*	*E'*	
939239	10000 (22046)	350 (5076)	1195 (47.05)	2525 (99.41)	1255 (49.41)	1780 (78.08)	665 (26.18)	477 (18.78)	3400 (7496)

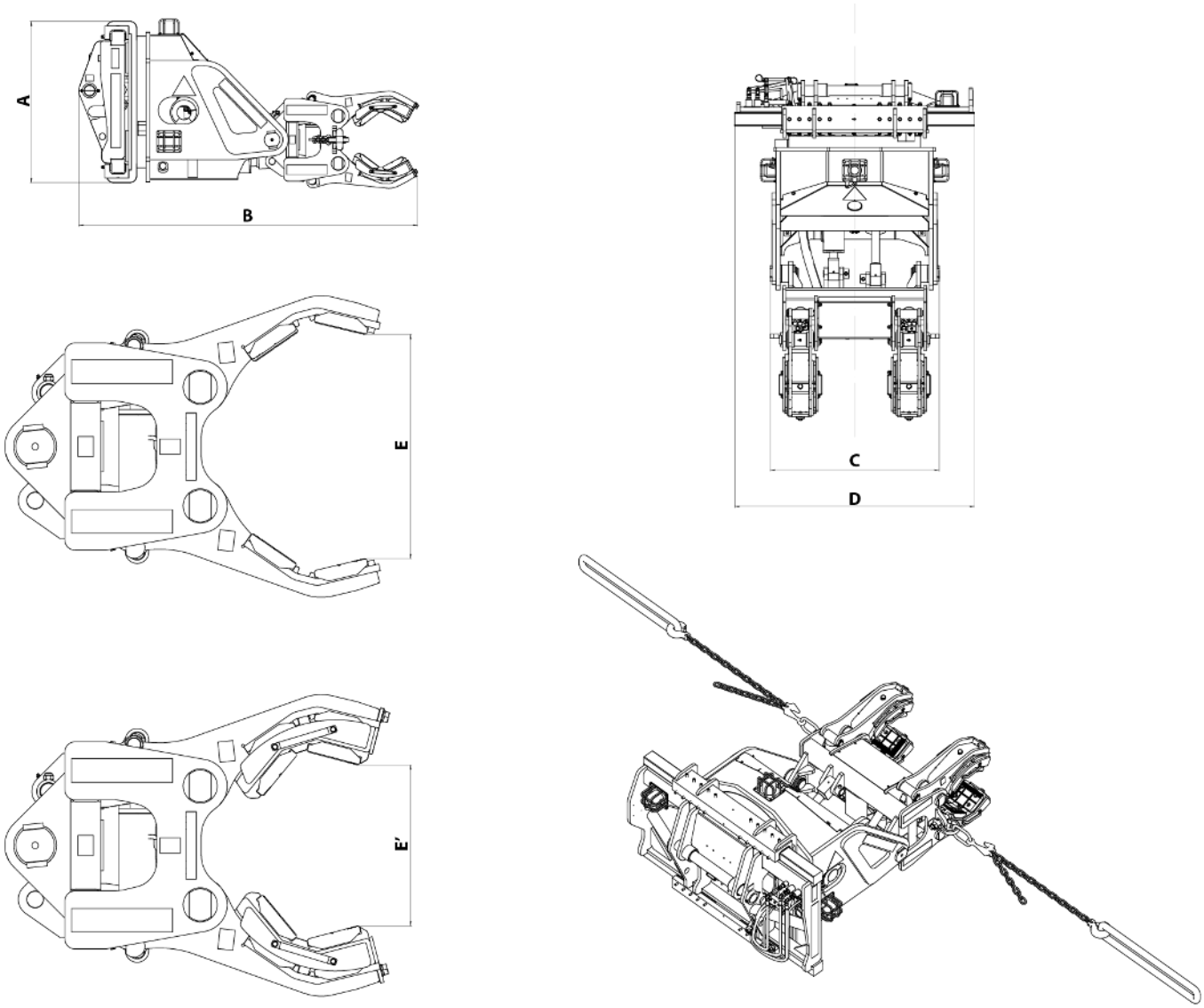


Figure 243: Cylinder grippers

Table 75. Hose gripper dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*						*[kg] (lb)*
		P max							
			A	*B*	*C*	*D*	*E*	*F*	
939231	8000 (17673)	350 (5076)	2143 (84.37)	1387 (54.61)	586 (23.07)	748 (29.45)	2115 (83.27)	3286 (129.37)	2200 (4850)

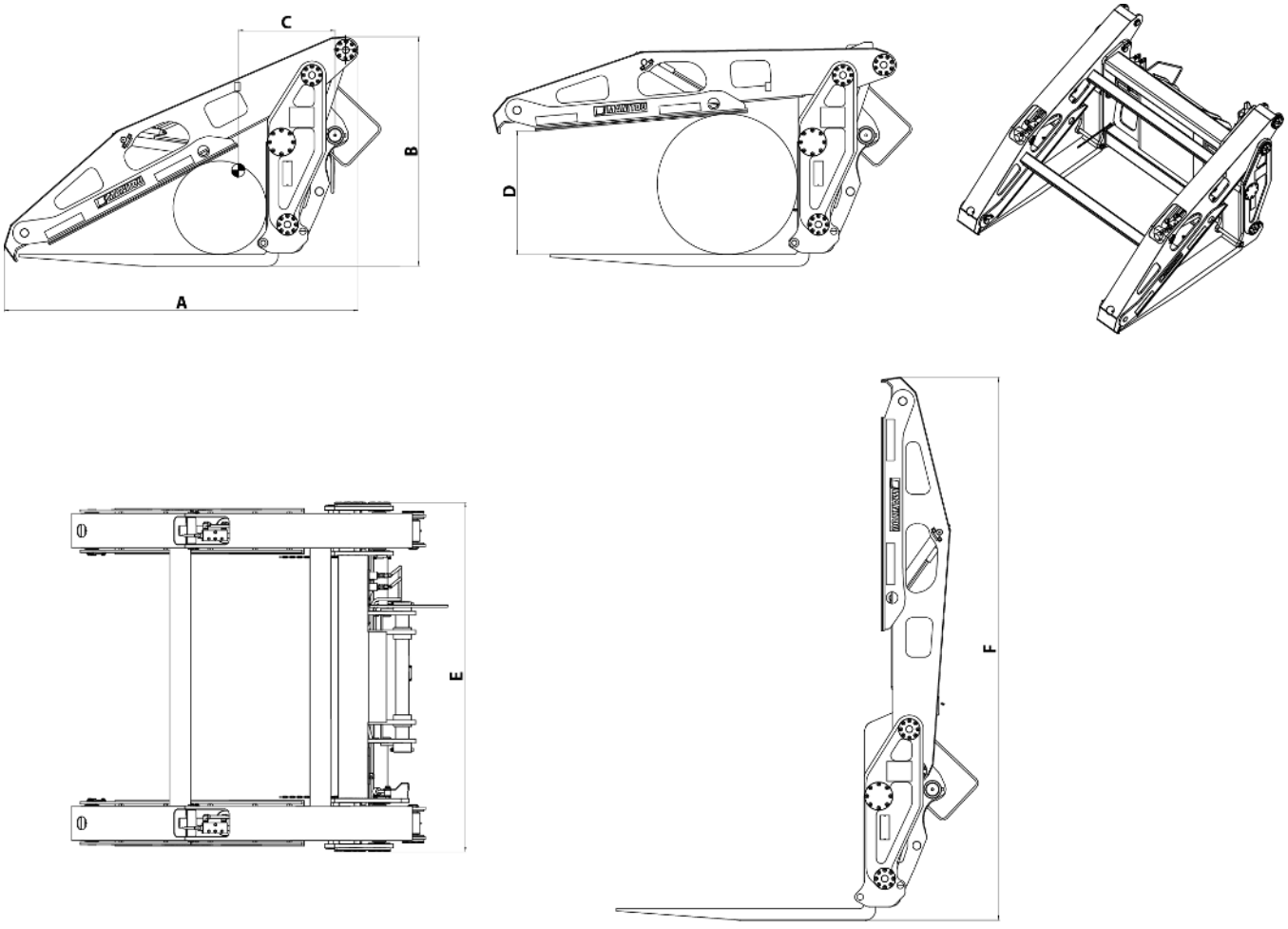


Figure 244: Hose grippers

Table 76. Hose gripper dimensions

	[kg] (lb)	*[bar] (psi)*	*[mm] (in)*					*[kg] (lb)*
		P max						
			A	*B*	*C*	*D*	*E*	
939332	14000 (30864)	160 (2320)	1950 (76.77)	3104 (122.20)	891 (35.08)	2444 (96.22)	4699 (185.00)	3800 (8377)

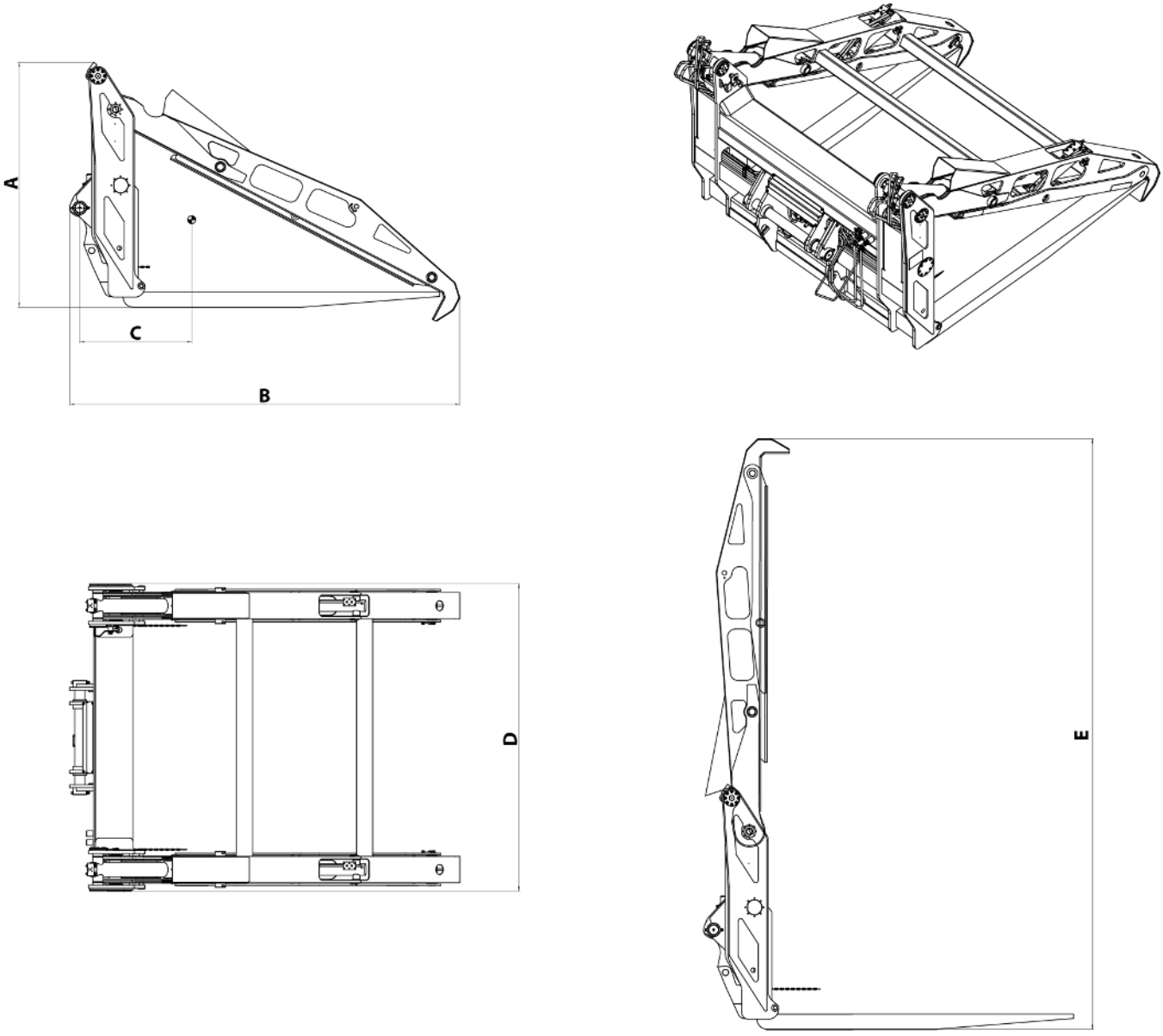


Figure 245: Hose grippers

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