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For Parts Orders contact your Manitou North America Dealer or call:
Manitou North America Parts Dept. (800) 425-3727 or (254) 799-0232.
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Website:www.manitou.com/www.mnadealers.com

MHT 10210 L
E3
M SERIES

OPERATOR/SERVICE MANUAL

THIS OPERATOR'S MANUAL MUST BE KEPT IN THE LIFT TRUCK AND MUST BE READ AND UNDERSTOOD BY OPERATORS.

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MHT 10210 L
MSeries
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INTRODUCTION

Our telescopic lift trucks have been designed to ensure simple manoeuvres and easy maintenance.
Before operating the truck for the first time, the driver should read and become fully familiar with the various chapters in this manual.
These instructions have been prepared to provide all the information required for proper servicing and truck operation. By complying with these instructions, the truck driver will be able to get the best performances from his vehicle.
The terms “right” and “left”, “front” and “rear” used in this manual refer to positions viewed by the driver seated normally in the driving seat.
Always state the following information when ordering spare parts or requesting technical information:

Manufacturer's data plate (FIG.A)

-Model_____

-Series_____

- Serial N°_____

- Chassis N°_____

- Year of manufacture_____

FIG.A

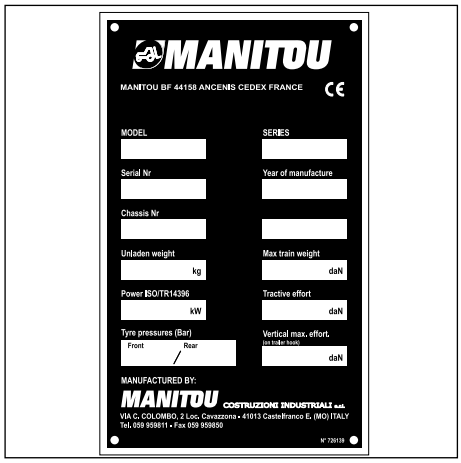
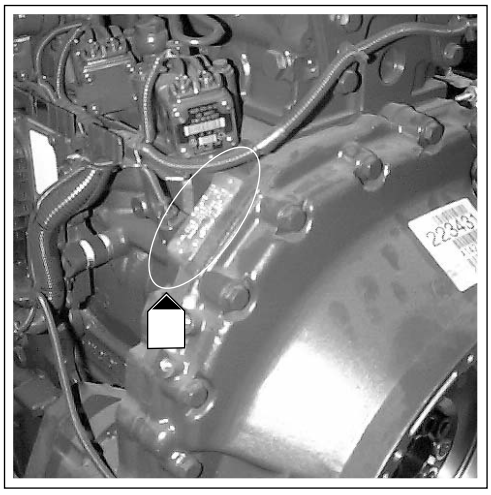


FIG.B

On internal combustion engine (FIG.B)

- Engine No_____



On hydrostatic drive (FIG.C)

FIG.C

- MANITOU referenceN° _____

- Serial N° _____

On front and rear axle (FIG.D)

- Axle type and model_____

_____

- Serial N° of front axle_____

_____

- Serial N° of rear axle_____

_____

① - Axle type and model
② - Serial N°

FIG.D

On cab (FIG.E)

FIG.E

Cab N°_____

Write all these numbers in the empty spaces. Since the MANITOU policy is to constantly improve our products, our range of telescopic lift trucks may be subject to modifications without our being obliged to give advance warning to our customers.

1 - INSTRUCTIONS

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ORIGINAL REPLACEMENT PARTS AND ATTACHMENTS

All maintenance on our lift trucks must be carried out using original parts.

By allowing non-original parts to be used, you run the risk:

- Legally, of being liable in the event of an accident.
- Technically, of causing breakdowns to occur or of reducing your lift truck's service life.

Using counterfeit parts or components not approved by the manufacturer may put an end to contract warranty terms and lead the maker to withdraw the lift truck's certificate of compliance.

By using original parts during maintenance operations, you are legally covering yourself.

- Any user who procures parts from another quarter does so at his own risk.
- Any user who modifies his lift truck or has it modified by a service company, must consider that a new item of equipment has been brought onto themarket and therefore takes liability for it.
- Any user who copies original parts or has them copied is taking a risk from the legal viewpoint.
- The certificate of compliance only bindsthe maker for parts chosen or produced under the maker's control.
- The practicalities of maintenance terms are set out by the maker. The maker is in no way liable in the event of the user not complying with such terms.

The manufacturer brings to the user:

- His know-how and skill.
- Guaranteed quality work.
- Original replacement parts.
- Help with preventive maintenance.
- Effective help with diagnosing faults.
- Enhancements gained from feedback.
- Training for operating staff.
- Only the manufacturer knows thedetails of the lift truck design and therefore has the best technological capability to carry out maintenance.

Original replacement parts are distributed exclusively by MANITOU and its dealer network.
You can obtain the list of dealers by phoning the spare parts department on :
TEL : 0033240091011

DRIVER'S OPERATING INSTRUCTION

Caution

Whenever you see this symbol it means :

Warning! Be careful! Your safety or the safety of the lift truck is at risk.

- Most accidents connected with the use, maintenance and repair of the lift truck are due to non application of the basic safety instructions. By being aware of the risks to which you are exposed and by taking the necessary preventive measures, you should be able to avoid accidents occurring.
- Any operation or manoeuvre not described in the instructions is prohibited, however, any person who does use another method must first ensure that he is not putting himself, another person or the lift truck in danger.
- The manufacturer is not able to anticipate all possible risk situations. Therefore the safety instructions and notices given in the user manual and on the lift truck are not exhaustive.

Any bending of the rules in safety notices or the user, maintenance or repair instructions for your lift truck may result in serious, or even fatal, accidents.

We would remind users of the risks in driving at excessive speed with regard to traffic conditions, particularly:

- Risk of loss of control on a poor-quality track.
- Increased stopping distance.

The user must remain in full control of his lift truck and should :

- Adapt his speed to each situation in order to be maintain his own safety, that of others and of his equipment.
- Always be aware of his stopping distance.

On the basis of experience, there are a number of possible situations in which operating the lift truck is contra-indicated. Such foreseeable abnormal uses, the main ones being listed below, are strictly forbidden.

- The foreseeable abnormal behaviour resulting from ordinary neglect, but 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 lift truck.
- Behaviour resulting from application of the "principle of least action" when performing a task.
- For certain machines, the foreseeablebehaviour of such persons as : apprentices, teenagers, handicapped persons and trainees tempted to drive a lift truck

Truck drivers tempted to operate a truck to win a bet, in competition or for their own personal experience.

The person in charge of the equipment must take these criteria into account when assessing whether or not a person will make a suitable driver.

- Get to know the telescopic fork lift truck on the terrain where it is to be used.
- Transport the load with the boom lowered and fully retracted
- Position the forks at right-angles to theload to be lifted.
- Drive the truck at a speed appropriate to conditions and the state of the ground.
- Never go too fast or brake sharply with a load.
- When picking up a load, check that the ground is as even as possible.
- Never attempt to carry out operations which exceed the lift truck's capabilities.
- Never raise a load in excess of the lift truck's capacity and never increase the size of the ballast.
- Drive around obstacles.
- Take care over electrical wires, trenches and recently-excavated or filled ground.
- Never leave the engine running unattended.
- Use the parking brake when depositing difficult loads or on sloping ground.
- Never leave the truck parked with a raised load.
- Never authorise anyone to approach or pass below a load.
- Always think of safety and only transportwell balanced loads.
- Never lift a load using one fork only.
- Drive with care and with reflexes alert.
- When the lift truck is not in use, lower the forks to the ground and engage the parking brake.
- Never leave the ignition key in the truck unattended.
- Never leave the truck loaded on a gradient of over 15% even with the parking brake engaged.
- When lifting a load, take care that nothing and no-one interferes with the movement and adopt proper handling procedures only.
- Comply with the data provided in the load diagrams.
- Never transport another person on the lift truck.

Whenever an implement is changed, to prevent damage to the hydraulic unions always proceed as follows:

- Stop the engine
- turn key to position I
- release pressure from the circuit using the joystick

Always check these pipe unions to ensure they are clean.

GENERAL INSTRUCTIONS

A - Driver's operating instructions.

- Read the operator's manual carefully, making sure you understand it.
- The operator's manual must always be kept in the lift truck, in the place provided and in the language understood by the operator.
- Respect the safety notices and instructions given on the lift truck.
- It is compulsory to replace all plates or stickers which are no longer legible or which have become worn or damaged.

B - Authorisation to operate (Or refer to the legislation for each particular country).

- Only qualified personnel may use the lift truck. Its use is subject to authorisation to operate being given by the appropriate manager in the user establishment.
- The user should always carry this authorisation to operate with him while he is using the lift truck.
- The driver is not competent to authorise the driving of the lift truck by another person.
- In addition, the vehicle should be used in accordance with good practice for the profession.

C - Maintenance

- The user must immediately advise his superior if his lift truck 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 lift truck properly cleaned if this is among his responsibilities.
- Carry out daily maintenance (See chapter : A - DAILY OR EVERY 10 HOURS SERVICE in paragraph : 3 - MAINTENANCE).
- Ensure tyres are adapted to the nature of the ground (See area of the contact surface of the tyres in the chapter : CHARACTERISTICS in paragraph : 2 - DESCRIPTION).

THERE ARE:
• SAND tyres.
• LAND tyres.
• Snow chains.
There are optional solutions, consult your agent or dealer.

Do not use a worn or damaged tyre.

The fitting of foam inflated tyres is prohibited and is not guaranteed by the manufacturer, excepting prior authorisation.

- For your own and other people's safety, it is forbidden to modify the structure and settings of the various components of your lift truck yourself (Hydraulic pressure, relief valve calibration, I.C. engine running speed, addition of extra equipment etc.). The same holds with regard to any suppression or modification of the safety systems, in which case the maker would no longer be liable.

Regular inspection of your lift truck is mandatory if it is to be kept in conforming condition. The frequency of such checks are defined by the current legislation of the country in which the lift truck is being operated.
Maintenance or repairs other than those detailed in part : 3 - (MAINTENANCE) must be carried out by qualified personnel (Consult your agent or dealer) and under the necessary safety conditions to maintain the health of the operator and any third party.

D - Environment.
- A lift truck operating in an area without fire extinguishing equipment must be equipped with an individual extinguisher. There are optional solutions, consult your agent or dealer.
- Take into account climatic and atmospheric conditions of the site of utilisation.

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. It is the same for the cooling liquid.

- Protection against frost (See chapter : LUBRICANTS AND FUEL in paragraph : 3 - MAINTENANCE).
- Adaptation of lubricants (Ask your dealer for information).
- Engine filtration.
- Lighting (Working headlight).

Optional solutions exist, consult your dealer.

Use of a lift truck is prohibited in protected areas (e.g. refinery, explosive atmosphere). For use in these areas,specific equipment is available as an option. Consult your dealer.

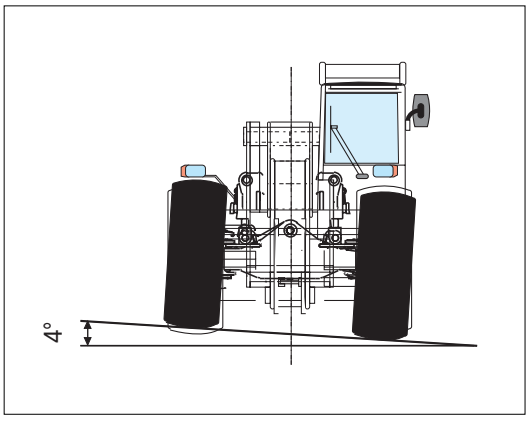
If necessary, consult your dealer.

RECOMMENDATIONS FOR USING THE TRUCK

LEVELLING DEVICE :

The machine MHT 10210 L have a device to level the chassis in relation to the ground, to raise the boom in safety conditions.

This device allows the level to be corrected 4° to the right and to the left 4°.



IMPORTANT

HOW TO USE THIS DEVICE

Use the bubble gauge to level the machine before lifting and telescoping the boom out.
The levelling operation cannot be carried out when the boom has been raised more than 30° from the ground. If the machine is not on level, lower the boom again and repeat the leveling operation.

BEFORE ANY HANDLING WORK, CHECK THAT THE LIFT TRUCK IS COMPLETELY HORIZONTAL.

Never move the vehicle with the boom raised, with or without load, as it can overturn; place the load from a height, with the machine stopped

OPERATING INSTRUCTIONS

A - Driver's operating instructions.

- Wear clothes suited for driving the lift truck, avoid loose clothes.
- Never operate the vehicle when hands or feet are wet or soiled with greasy substances.
- For increased comfort, adjust the driver's seat to your requirements and adopt the correct position in the driver's cab.
- 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 lift truck.
- Always remember to fasten your seat belt and adjust it to your requirements.
- 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 lift truck, 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.
- Never allow a passenger to travel on the lift truck in the driver's cab.

B - Before starting the lift truck.

- If the lift truck is new, refer to chapter : BEFORE STARTING UP A NEW LIFT TRUCK in paragraph : 1 - OPERATING AND SAFETY INSTRUCTIONS.
- Check the condition of the tyres and the tyre pressures (See chapter : CHARACTERISTICS in paragraph : 2 - DESCRIPTION).
- Before starting the lift truck, check the different levels :

• Engine oil.
• Hydraulic reservoir oil.
• Transmission oil.
• Cooling liquid.
• Brakes fluid.

- Also check for possible leakage of oil, fuel or liquid from the lift truck.
- Check the closing and locking of the hood.
- Whatever his experience as a truck driver is, the operator is advised to familiarize himself with the position and operation of all the controls and instruments before operating the lift truck.

C - Starting the lift truck.

Safety notice.

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

- Never try to start the lift truck by pushing or towing it.

Such operation may cause severe damage to the transmission. If necessary, to tow the lift truck in an emergency, the gear-box must be placed in the neutral position (See chapter : G2 - OCCASIONAL MAINTENANCE in paragraph : 3 - MAINTENANCE).

Instructions

- Make sure that the forward/reverse lever is in neutral.
- Turn the ignition key to the position I to activate the electrical system.
- Check the level on the fuel level gauge.
- Turn the ignition key to position II to preheat for 15 seconds. (If the environmental conditions require it).

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

- Press the accelerator pedal and turn the ignition key fully : the I.C. engine should then start. Release the ignition key and let the I.C. engine run at idle.
- Before operating in very cold environment wait for the I.C. engine and hydraulic systems to heat up adequately.
- Check all control instruments immediately after starting up, when the I.C. 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 I.C. engine and immediately carry out the necessary operations.

D - Driving the lift truck

Safety notice

- Always drive the lift truck with the forks or attachment at approximately 300 mm from the ground, i.e. In the transport position.
- Familiarise yourself with the lift truck on the terrain where it will be used.
- Ensure that the service brakes and the sound alarm are working properly.
- Drive according to, and at an appropriate speed for, the conditions and state of the terrain.
- Slow down before executing a turn.
- 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 lift truck's forward/reverse lever from a stationary position and never do so abruptly.
- Always remember that hydraulic type steering is extremely sensitive to movement of the steering wheel, so turn it gently and not jerkily.
- Never leave the I.C. engine on when the lift truck is unattended.
- Look in the direction you are travelling and always keep clear visibility of the road. Use the left and right rear view mirrors frequently and ensure that they are kept in good condition, are clean and correctly adjusted.
- Never use the truck in places poorly lighted.
- When working at night, ensure that your lift truck is fitted with full beam lights. There are optional solutions, consult your agent or dealer.
- Drive round obstacles.
- Never move onto a loading platform without having first checked :
  - That it is suitably positioned and madefast.
  - 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 lift truck to be loaded.
  - That this platform is prescribed for the width of the lift truck.
- Never move onto a foot bridge, floor or freight lift, without being certain that they are prescribed for the weight and size of the lift truck to be loaded and without having checked that they are in sound working order.

Take extreme care with loading platforms, trenches, scaffolding, recently dug and/or backfilled ground.

- The loaded lift truck must not travel at speeds in excess of 10 km/h.

Movement instructions.

- Check the transmission oil level.
- Raise the forks or attachment to the transport position approximately 300 mm from the ground.
- Engage the gear selected (See chapter: CONTROL AND COMMAND INSTRUMENTS in part: 2 - DESCRIPTION).
- Select the required steering mode.
- Shift the forward/reverse lever to the selected direction of travel.
- Release the parking brake and accelerate gradually until the lift truck moves off.

E - Stopping the lift truck.

Safety notice.

- Before stopping the lift truck after a long working period, leave the I.C. engine idling for a few moments, to allow the coolant liquid and oil to lower the temperature of the I.C. engine and transmission.

Ensure you comply wiyh this safety notice as stopping the engine without allowing it to cool could cause damage to components damaging such parts.

- Never leave the ignition key in the lift truck when the lift truck is unattended.
- When the lift truck is stationary, place the forks or attachment on the ground, place the gear lever in neutral, apply the parking brake and put the forward / reverse lever in neutral.
- If the driver has to leave his cab, even for a moment, it is essential to place the gear lever in neutral, apply the parking brake and put the forward/reverse lever in neutral.
- Make sure that the lift truck is not stopped in any position that will interfere with the traffic flow and at less than one metre from the track of a railway.
- In the event of prolonged parking on a site, protect the lift truck from bad weather, particularly from frost (Check the level of antifreeze), close the rear window, lock the cab door and ensure that the hood is properly secured.

Stop instructions.

- Park the lift truck on flat ground or on an incline lower than 15 %.
- Place the forward/reverse lever in neutral.
- Apply the parking brake.
- Completely retract the boom.
- Lower the forks or attachment to rest on the ground.
- Stop the I.C. engine
- Remove the ignition key.
- Check the closing and locking of door, rear window and hood.

Before leaving your driver's cabin, ensure that you have carried out all operations for stopping the lift truck, for your safety and the safety of others.

F - Driving the lift truck on the public highway.

Safety instructions.

- Lift truck drivers, driving on the public highway, must abide by the general provisions relative to highway traffic.
- The lift truck must conform to the provisions of the Highway Code. If necessary, optional solutions exist, consult your dealer.

Transport of loads on the public highway is forbidden and attachments mounted on the lift truck must be fitted with equipment in accordance with regulations or else dismounted.

Instructions for driving on roads

- Ensure that the flashing light is installed and is in perfect working order.
- Dipped headlights working also during hours and on roads where it is not obligatory to use visual and lighting indicator devices.
- Check the headlights, turn indicators and windscreen wipers to ensure they are clean and in perfect working condi tion.
- Check the position of the rear-view mirrors.
- Check wheel alignment and press the steering selector ***in the operating position with only front wheel steering.***
- Position the rear axle steering mechanical block.
- Ensure that the fuel level is sufficient.
- Ensure that the truck is fitted with all the accessories required for traveling on roads (depending on the model and country).
- Keep the boom retracted and the attachment about 300 mm above ground level.
- Level the machine with the chassis parallel to the ground, using the inclination corrector.
- Cut out the operating system control by means of the ***red button***.
- The vehicle can only circulate without load.
- The vehicle must not be used for transporting the company personnel.

While on the road, do not put the reverse gear in neutral to maintain lift truck exhaust brake.

G - Driving the lift truck with trailer on roads.

- To use a trailer, observe the regulations applicable in the country of use (maximum permitted speed, braking system, maximum trailer weight, etc.).
- Remember to connect the electrical system of the lift truck to that of the trailer.
- Do not use a trailer if the unit weight of the load is greater than that specified by Highway Code.
- Do not use a braked trailer if the lift truck does not have a trailer braking system.
- Remember to connect the lift truck braking system to that of the trailer.
- The total permitted weight for transport must not exceed the maximum permitted by the manufacturer (See the lift truck manufacturer'sidentification plate).

H - Operating the lift truck with a front-end attachment on a public highway.

- For driving with an attachment, check the regulations currently applicable in your country.
- The attachment must not exceed the overall width of the lift truck.
- Do not mask the lighting range of the front headlamps.
- Set the attachments shields in place.
- If necessary, fit the block spacer on the lifting and slewing cylinder.
- Front dimensions of equipment indicated on all three sides with 10 cm wide alternate white and red reflecting stripes, slanting 45° (Follow the specific instructions for each type of equipment).

If necessary, consult your dealer.

HANDLING INSTRUCTIONS

A - General.

- Check conformity of the accessories to the vehicle safety system calibration
- Ensure the correct functioning of your lift truck's attachments.
- Do not carry out operations which exceed the capacity of the lift truck or the accessory.
- It is prohibited to increase thecounterweight value in any way.
- It is strictly prohibited to carry or to lift up persons using the lift truck, unless the vehicle is specially equipped for this purpose and has the corresponding certificate of conformance for lifting people.
- Avoid travelling for a long distance in reverse.
- When lifting or lowering the boom ensure the control lever is moved slowly and smoothly (whether operating with or without a load).

B - Attachments.

- Ensure that the attachment is correctly fitted and locked to its frame.
- Conform to the limits on the load chart for the attachment.
- Position the forks perpendicular to the load to be lifted, taking account of the load's centre of gravity.
- Never lift a load with a single fork.
- Never lift a sling load with a single fork or with the carriage. Optional solutions exist, consult your dealer.
- If not utilise, place the attachment in horizontal on the ground (For unstable attachments, ensure they are secured using wedges).
- Place the attachments in the closed position, flat on level ground (for unstable attac ments secure using wedges).
- Ensure that rapid hydraulic connections on the attachment system are clean and protected.

Carry out the following procedure before changing hydraulic attachments to prevent damage to the quick release couplings :

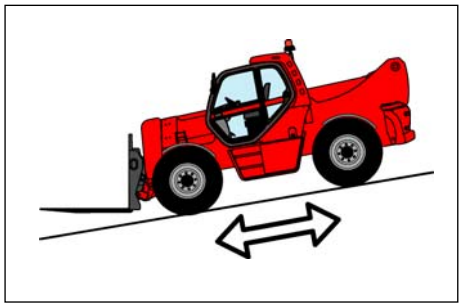
- Switch off the engine.
- turn key to position I
- release pressure from the circuit using the joystick

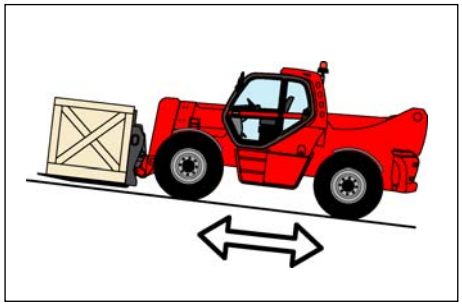
C - Environment.

- Verify that the lighting in suitable
- Ensure that no person or objet is in the vicinity before raising the load. Don't make any incorrect manoeuvres.
- In the case of work near aerial lines, ensure that the safety distance is sufficient between the working area of the lift truck and the aerial line.

You must consult your local electrical agency.

You could be electrocuted or seriously injured if you operate or park the lift truck too close to power cables. You are strongly advised to ensure that the safety rules on the site conform to the local regulations in force regarding all types of work carried out close to power cables.





- Do not allow anybody to come near the working area of the lift truck or pass beneath an elevated load.
- When using the lift truck on a slope, before raising the jib, ensure that the ground is horizontal. However, fork lift trucks provided with level correctors and/or stabilizers can operate on transverse slopes, provided this slope is corrected (See paragraph: G - LIFT TRUCK HORIZONTALITY in the Chapter: HANDLING A LOAD).
- 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.
- Ensure that scaffolding, loading platform or pile are capable of bearing the weight.
- Ensure the stability and solidity of the ground before depositing a load.

D - Handling

- Always consider safety and only transport balanced and correctly secured loads to avoid any risk of tipping.
- Fully engage forks under the load and move it in the transport position (The forks 300 mm from the ground, the jib retracted to the maximum and the carriage sloping backwards).
- For obvious reasons regarding the lift truck's stability and clear visibility of the surrounding environment, only move the lift truck when the jib is in the transport position.
- Do not manoeuvre the lift truck with the jib 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 and get another person to guide you along if necessary.
- Never shift the position of the load while the lift truck is in motion.
- Never drive too fast or brake abruptly when carrying a load.
- During handling, drive at low speed.
- Check the load, particularly when turning corners and especially if it is very bulky.
- Secure unstable loads.
- Handle loads with caution, at slow speed, without sudden jerks when moving them at significant heights and jib extention.

In the event of high winds or storms, do not carry out handling work that jeopardizes the stability of the lift truck and its load,

- Do not change direction sharply and at high speed.

In the event of the lift truck overturning, do not try to leave the cab.
DO NOT TRY TO JUMP CLEAR STAY IN THE CAB WITH YOUR SEAT BELT FASTENED.

- Apply the parking brake when lifting or depositing a difficult load or when on an incline.
- Do not stop the lift truck with the load in an elevated position.
- Do not leave a laden lift truck with the parking brake applied on an incline which exceeds 15 %.

E - Visibility.

- Constantly keep clear visibility of the road, either direct view (looking backwards when reversing) or indirect view using the panoramic rear view mirrors to check for people, animals, holes, obstacles, change of slope, etc.
- Since visibility can be reduced on the right side when the jib is raised, ensure clear visibility of the road before raising the jib and before undertaking any manoeuvres.
- If the visibility in forward motion is not sufficient because of the bulkiness of the load, drive in reverse motion. This manoeuvre must remain exceptional and for short distances.
- Ensure you have good visibility (Clean windows, adequate lighting, correctly adjusted rear view mirror, etc.).
- Signalling and lighting on the lift truck must take account of the conditions of use. The standard lighting system may not be sufficient for certain applications or night time road use.
  Optional accessories are available.

If necessary, consult your dealer.

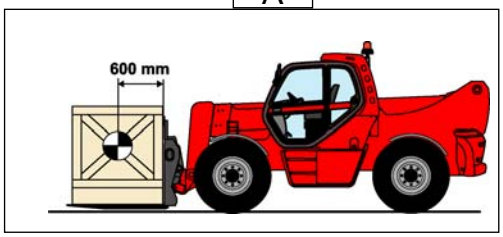
LOAD HANDLING

A - Weight of load and centre of gravity.

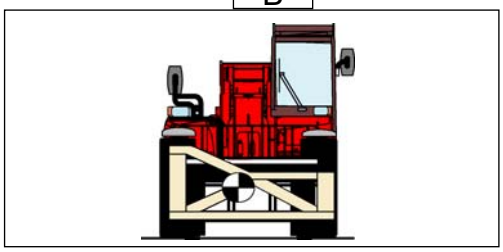
Carrying a load greater than the rated capacity for the lift truck or for the attachment is prohibited.

- Before taking up a load, you must know its weight and its centre of gravity.
- The load chart relating to your lift truck is valid for a weight with its centre of gravity 1200 mm from the heel of the forks (Fig. A). For a load with a higher centre of gravity, consult your agent or dealer.
- For irregular loads, determine the centre of gravity in the transverse direction before handling (Fig. B).

A



B

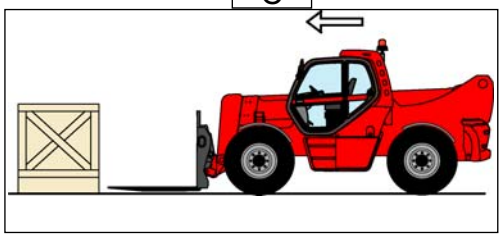


For loads with a moving centre of gravity (e.g. liquids), take account of the variations in the centre of gravity in order to determine the load to be handled (Consult your agent or dealer) and be vigilant and take extra care to limit these variations as far as possible.

B - Taking up a load on the ground.

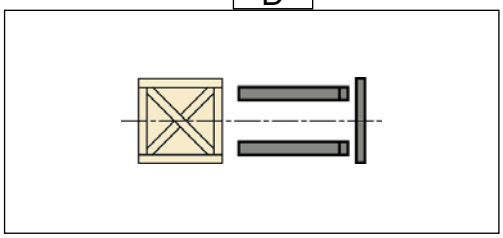
- Position the lift truck perpendicular to the load, with the jib retracted and the forks in a horizontal position (Fig. C).
- Adjust the fork spread and centering in connection with the load (Fig. D) (Optional solutions exist, consult your dealer).

C



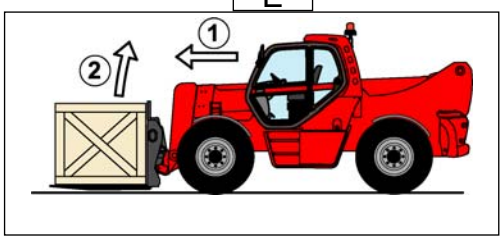
Beware of the risks of trapping or squashing limbs when manually adjusting the forks. Always maintain an equal distance between the forks and the centre of the carriage in order to keep the load completely stable.

D



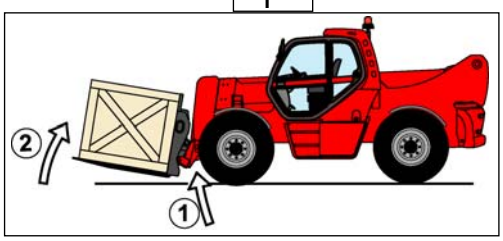
- Slowly move the life truck forward (1) and stop with the forks in front of the load (Fig. E), if necessary, slightly lift the jib (2) while taking up the load.
- Apply the parking brake and place the forward/reverse lever in neutral.
- Slightly lift the load (1), tilt the carriage backwards (2) in the transport position (Fig. F).

E



Inclinare sufficientemente il carico all'indietro per assicurarne la stabilità (perdita del carico durante la frenata) facendo però attenzione a non modificarne l'equilibrio.

F

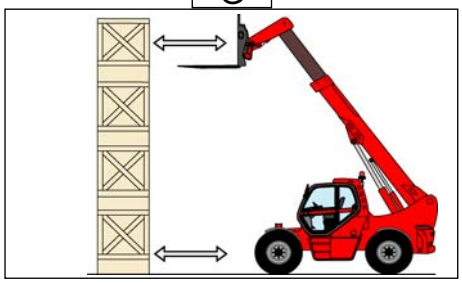


C - Taking up a high load.

A load MUST NOT be picked up unless the lift truck is on a level surface (See paragraph: G - LIFT TRUCK HORIZONTALITY in the Chapter: HANDLING A LOAD).

- Ensure that the forks will easily pass under the load.
- Position the lift truck perpendicular to the load with the forks in a horizontal position (Fig. G) manoeuvring gently and carefully (See paragraph : E - VISIBILITY in the chapter : HANDLING INSTRUCTIONS for visibility of the road).

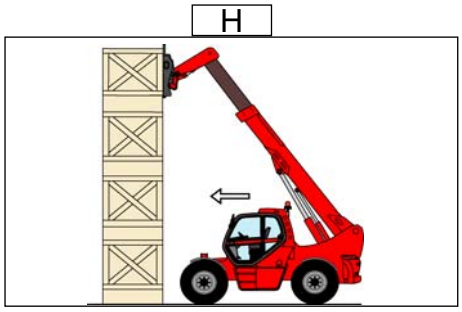
G



Always think about keeping the distance necessary to fit the forks under the load, between the pile and the lift truck (Fig. G) and use the shortest possible length of jib.

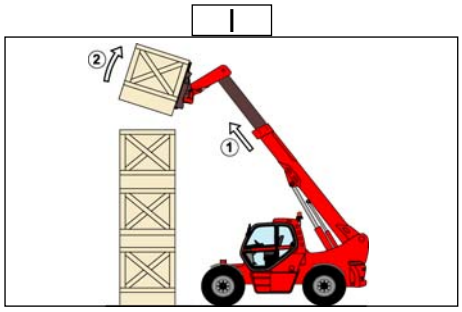
- Stop with the forks in front of the load (Fig. H). Action the parking brake and place the forward/reverse lever in neutral.

H



- Slightly lift the load (1) and incline the forks carriage (2) backwards to stabilize the load (Fig. I).

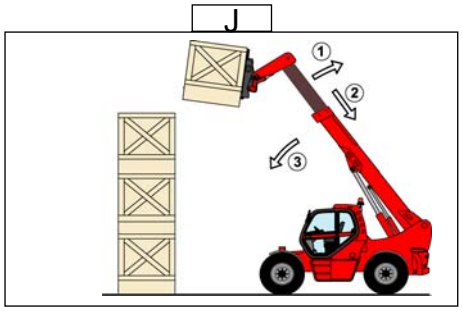
I



Tilt the load sufficiently backwards to ensure its stability (loss of load on braking) without upsetting the balance of the load in so doing.

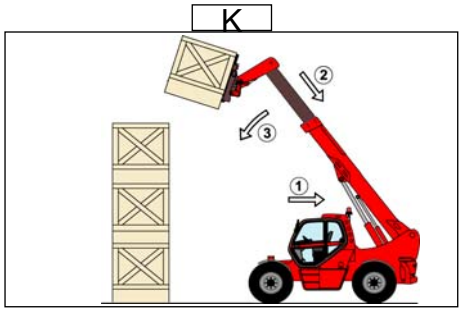
- If possible (Fig. J), lower the load without shifting the lift truck. Lift the jib (1) to release the load, retract (2) and lower the jib (3) to bring the load into the transport position (Fig. J).

J



- If this is not possible, back the lift truck up (Fig. K). Manoeuvring very gently and carefully (See paragraph : E - VISIBILITY in the chapter : HANDLING INSTRUCTIONS for visibility of the road), back up the lift truck (1) to release the load, retract (2) and lower the jib (3) to bring the load into the transport position (Fig. K).

K

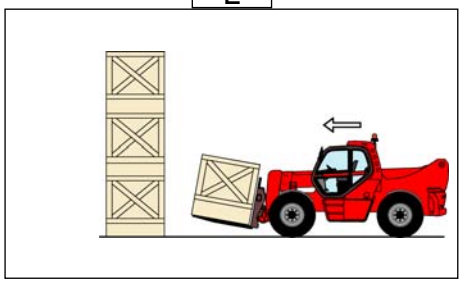


D - Laying a high load.

Under no circumstances should you lay down a load if the lift truck is not a horizontal position. (See paragraph : G - HORIZONTAL POSITION OF THE LIFT TRUCK in the chapter : LOAD HANDLING).

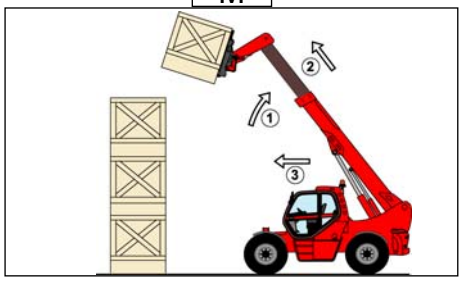
- Approach the load in the transportposition in front of the pile (Fig. L).

L



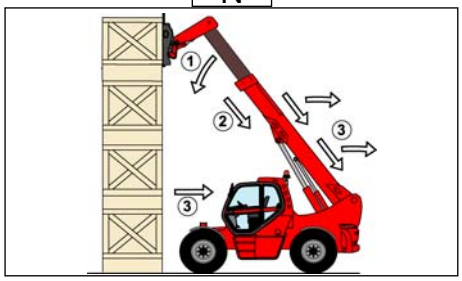
- Lift and extend the jib (1) (2) until the load is above the pile, if necessary move the lift truck forward (3) (Fig. M) manoeuvring very gently and carefully (See paragraph : E - VISIBILITY in the chapter : HANDLING INSTRUCTIONS for visibility of the road). Apply the parking brake and place the forward/reverse lever in neutral.

M



- 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 (Fig. N).
- Free the forks by alternately retracting and lifting the jib (3) (Fig. N) or, if possible, by reversing the lift truck (3) (See paragraph : E - VISIBILITY in the chapter : HANDLING INSTRUCTIONS for visibility of the road). Then bring the jib into the transport position.

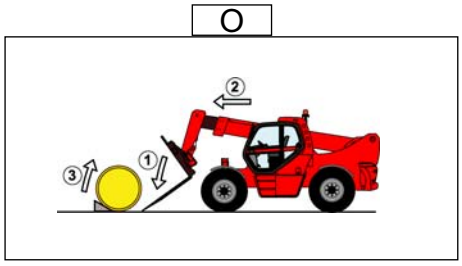
N



E - Taking up a load without pallet

- Tilt the carriage (1) forwards and extend the jib (2) while simultaneously crowding the carriage backwards to slip the forks under the load (Fig. O).
  If necessary, wedge the load.

O

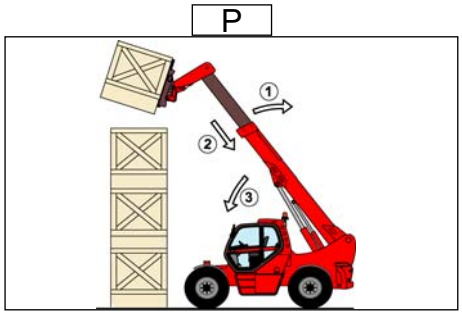


F - Load status indicator.

- Always watch the load status indicator while handling a load.

If the load status indicator alarm is actived, do not carry out:
A - Extend the jib.
B - Lower the jib.

P



- If the load status indicator alarm is actived, carry out in all security movements in the following order (Fig. P) :

1 - Fully retract the jib.
2 - If it's necessary lift the jib.
3 - Lower the jib in order to lay the load.

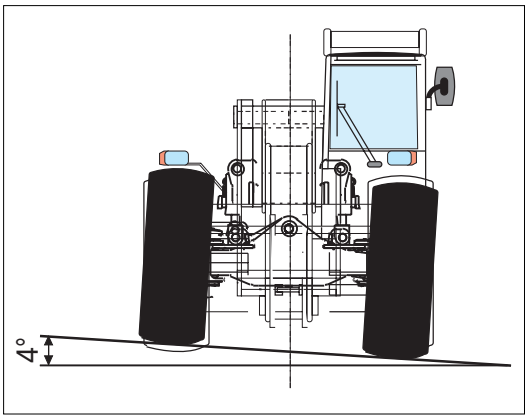
The device reading may be false if the steering is turned to the maximum or if the rear axle is swung to the maximum. Before lifting a load, always make sure the steering is not turned all the way and that the rear axle is not swung completely.

Lift truck with level corrector.

- Correct the slope using the hydraulic control and check the horizontal position on the level before lifting the boom(See chapter : INSTRUMENTS AND CONTROLS in paragraph : 2 - DESCRIPTION).

Apart from the transverse slope of the ground, several parameters can upset the horizontal position of the lift truck.

• The tyre pressures.
• The stability of the ground.
• The balance of the load.
• Strong wind or stormy conditions.



Before any handling work, check the points above and ensure that the lift truck is ***completely horizontal****.*
(See bubble level)

MAINTENANCE INSTRUCTIONS OF THE LIFT TRUCK

A - General.

- Read the operator's manual carefully and ensure you understand it.
- Stop the I.C. engine, when an intervention is necessary.
- Wear clothes suitable for the maintenance of the lift truck, avoid wearing jewellery and loose clothes. Tie and protect your hair, if necessary.
- Ensure the area is sufficiently ventilated before starting the lift truck.

Make sure that the disposal of process materials and of spare parts is carried out in total safetyand in a ecological way.

- Carry out all repairs immediately, even if the repairs concerned are minor.
- Repair all leaks immediately, even if the leak concerned is minor.
- Do not attempt to loosen unions, hoses or any hydraulic component with the circuit under pressure.

The handling and removal of the balancing valves or safety valves which may be fitted to the cylinders of your lift truck can be dangerous. A balancing valve must only be removed when the cylinder concerned is at rest and the hydraulic circuit is depressurised.

This operation can only be carried out by authorised staff.

- Do not smoke or approach the lift truck with a flame, when the fuel tank is open or is being filled.
- Take care not to burn yourself (Exhaust, radiator, I.C. engine, etc.).
- Disconnect the negative cable terminal (-) from the top of the battery before working on the electrical circuit or on the lift truck (e.g. : Welding).
- Do not drop metallic items on the battery.
- When carrying out electric welding work on the lift truck, connect the negative cable from the equipment directly to the part being welded, so as to avoid high tension current passing through the alternator.

B - Maintenance.

- The maintenance and the keeping in compliance of the lift truck are compulsory.
- Carry out daily maintenance (See chapter : A - DAILY OR EVERY 10 HOURS SERVICE in paragraph : 3 - MAINTENANCE).
- Do not run the I.C. engine without air filter, or with oil, water or fuel leaks.

Wait for the I. C engine to cool before removing the radiator cap.

- Change the filter cartridges (See servicing schedules in chapter : FILTERS CARTRIDGES AND BELTS in paragraph : 3 - MAINTENANCE).

C - Levels.

- Use the recommended lubricants (Never use contaminated lubricants).
- Do not fill the fuel tank when the I.C. engine is running.
- Only fill up the fuel tank in areas specified for this purpose.

D - Washing.

- Clean the lift truck or at least the area concerned before any intervention.
- Remember to close the door and the rear window of the cab.
- 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 lift truck of any fuel, oil or grease trace.

For any intervention other than regular maintenance, consult your dealer.

BEFORE STARTING UP A NEW LIFT TRUCK

Introduction.

- Our lift trucks have been designed for easy handling by the operator and maximum ease of maintenance for the mechanic.
- However, before commencing to operate the lift truck, the user should carefully read and understand the various chapters of this manual which has been provided to solve driving and maintenance problems. By following these instructions the user will be able to take full advantage of the versatility of this lift truck.
- The operator must familiarize himself with the positions and functions of all the controls and instruments before operating the lift truck.

Do not attempt to start a new lift truck before the following checks have been carried out:

Lubrication.

- Check that all the correct grades of oils and greases that are required are available ; see chapter : SERVICING SCHEDULE in paragraph : 3 - MAINTENANCE and top up if necessary.

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. It is the same for the cooling liquid (Contact your dealer for information, if necessary).

Dry air filter.

- Ensure that the air filter is undamaged and not blocked.
- Tighten the fastening devices if necessary.

Never run the I.C. engine with the air filter removed or damaged.

Cooling circuit.

- Always check the cooling liquid level before starting up the lift truck.

Hydraulic circuit

- Visually check for oil leakage or sweating on the couplings, hose pipes, pipes and unions. Tighten or check the defective connections, if necessary.
- Also check the oil level in the tank.

Braking system.

- Check by a visual examination that there are no leaks or oil oozing in the hoses, connections and unions. If necessary, tighten or repair the defective connections.
- Also check the oil level in the tank.

Use only the recommended brand of oil to avoid risk of damage to the brakes circuit (see Chapter LUBRICANTS in part: 3 - MAINTENANCE).

Tyres.

- Make sure that the wheel nuts are correctly tightened (See chapter : A - DAILY OR EVERY 10 HOURS SERVICE in paragraph : 3 - MAINTENANCE) and that the tyre pressures are correct (See chapter : CHARACTERISTICS in paragraph : 2 - DESCRIPTION).

Fuel system.

- Check that all fuel lines are secured.
- If necessary drain the fuel filter and bleed the fuel system of air.

Electrical circuit.

- Check the level and the density of the electrolyte in the battery (See chapter : B - EVERY 50 HOURS SERVICE in paragraph : 3 - MAINTENANCE).
- Check the components of the electrical system, the connections and fastening devices.

If necessary, consult your dealer.

2 - DESCRIPTION

Index

SPECIFICATIONS

Engine (E3)

- Type	MERCEDES-BENZ (OM 904 LA)
- Cylinders number	4
- Number of strokes	4
- Injection system	direct
- Firing order	1.3.4.2.
- Displacement	4250 cm^3
- Bore	102 mm
- Stroke	130 mm
- Volumetric ratio	18 : 1
- Nominal rpm	2200 rpm
- Idling rpm	800 rpm
- Power	175 CV / 129 Kw
- Maximum torque	675 Nm from 1200 to 1600 rpm

Cooling system:

- Type	Water cooled
- Intake fan	1750 rpm
Number of blades	7
- Diameter	550 mm
Thermostat	
- Complete open	95° C

Electrical circuit :

- Ground	Negative
- Battery	12 v - 120 Ah
- Alternator	14 v - 90 ÷ 150 A
- Voltage regulator	incorporated in the alternator
- Starting	12 v

Brake :

- Type	Disc brakes in oil bath
- Service brake	Foot pedal actuated on front and rear axles
- Parking brake	Lever actuated on front and rear axle negative type

Transmission

- Type	Hydrostatic
- Type	Pump and motor with variable displacement
- Gear box	hydraulically operated
- N° of forward speeds	2
- N° of reverse speeds	2
- Reverser	Electrohydraulic

Hydraulic circuit

- Lifting, tilting of telescopic boom and device	
- Type of pump	Piston type-load sensing
- Delivery	165 l/min
- Pressure	350 bar

Steering circuit

- Type of pump	Load sensing
- Delivery	165 l/min
- Pressure	205 bar

Leveling circuit

- Type of pump	Gear pump
- Delivery	25 l/min
- Pressure	205 bar

Cooling circuits

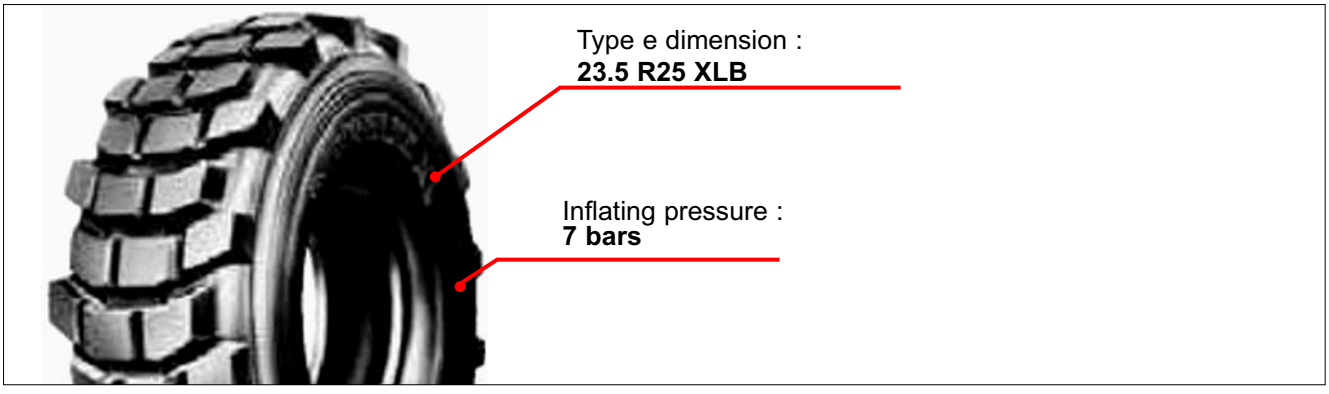
Water and intercooler by hydraulic motor

- Type of pump	Gear pump
- Delivery	25 l/min
- Pressure	175 bar

Hydraulic oil

- Electrical fan	Number 4

Front and rear tyre:



Specifications

- Maximum speed	
- Forward : unloaded	25 Km/h
: Loaded	10 Km/h
- Reverse : unloaded	25 Km/h
: Loaded	10 km/h

The maximum speed *may be reduced depending on the laws which regulate road travel in different countries.*

Gradeability best slip condition	
Unloaded	80 %
Loaded	38 %
Standard lifting height	9700 mm
Max rated capacity with std equipment	21000 Kg
Truck weights with std carriage and forks	28350 kg
Axle ground weights with std equipment	
- Front unloaded	9320 kg
- Rear unloaded	19030 kg
Drawbar pull	15000 daN
Forks	
- dimensions (lenght x width x thickness)	1800 x 200 x 100 mm
- external fork spread	2000 mm
- Distance from center of gravity	900 mm

Tank capacities

Hydraulic oil	200 l.
Fuel	200 l.

Vibrations

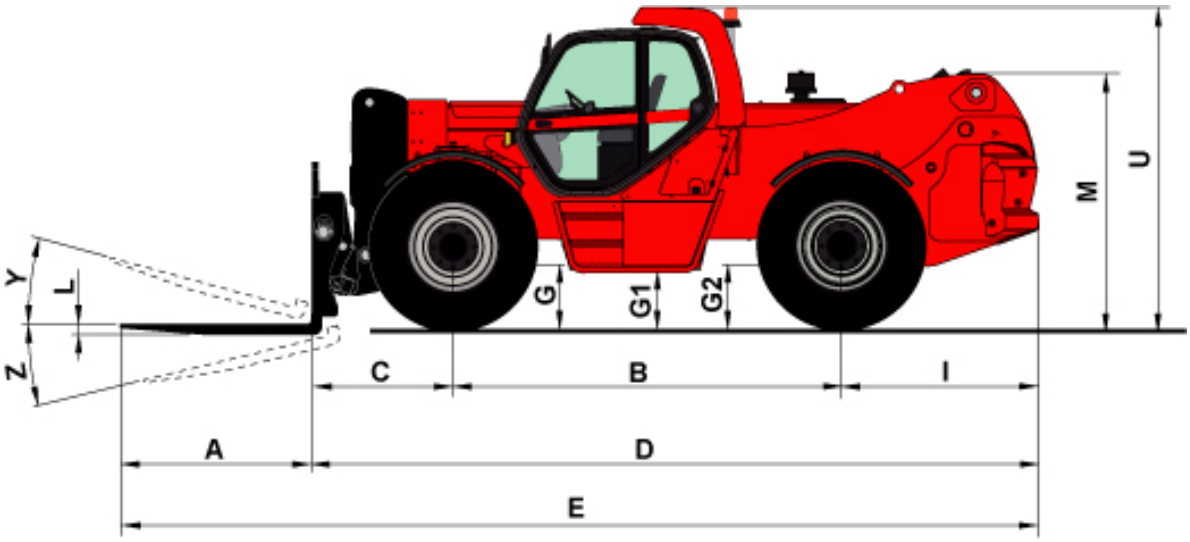
Acceleration of upper limbs	$\leq 2.5\ m/s^2$
Acceleration of body (feet or seated part)	$\leq 0.5\ m/s^2$

Noise

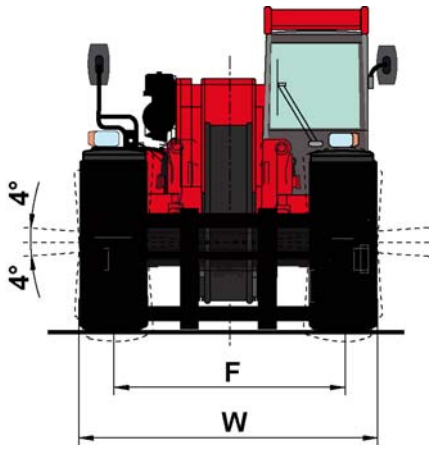
The noise level guaranteed	LwA 108 dB

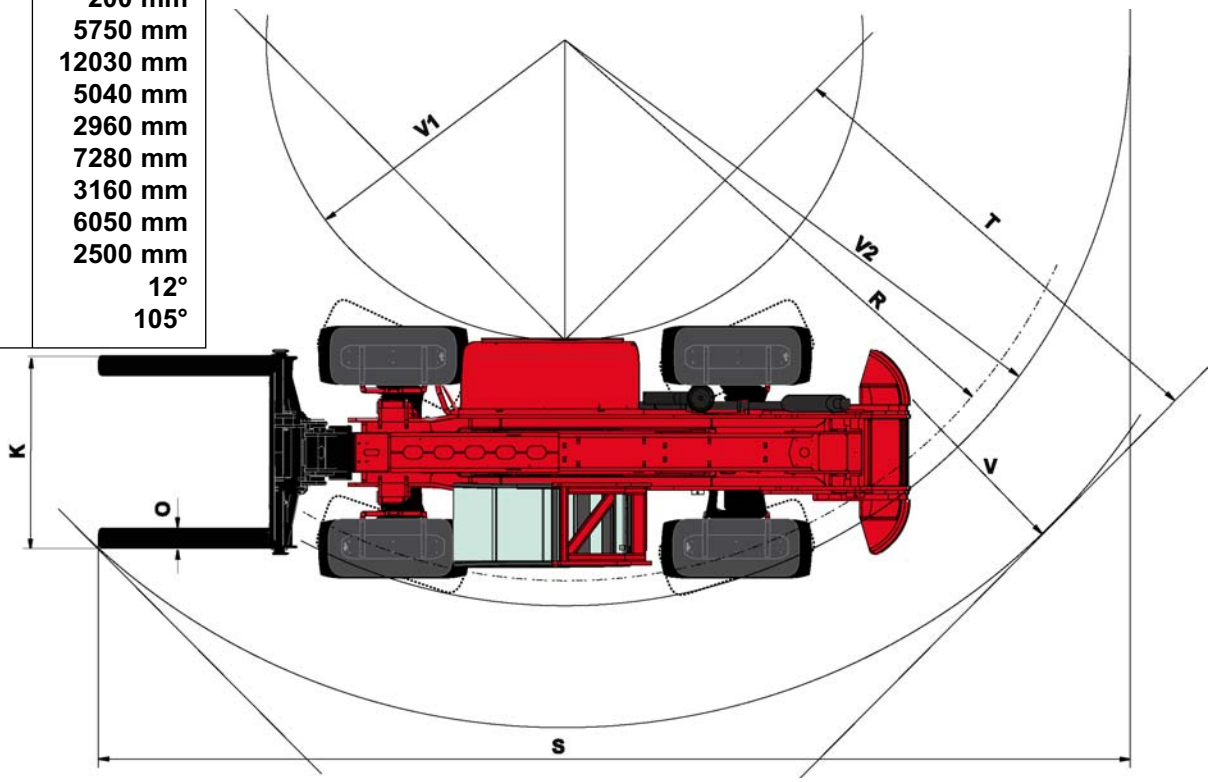
(in accordance with Directive EN 2000/14CE modified by Directive 2005/88/CE)

DIMENSIONS

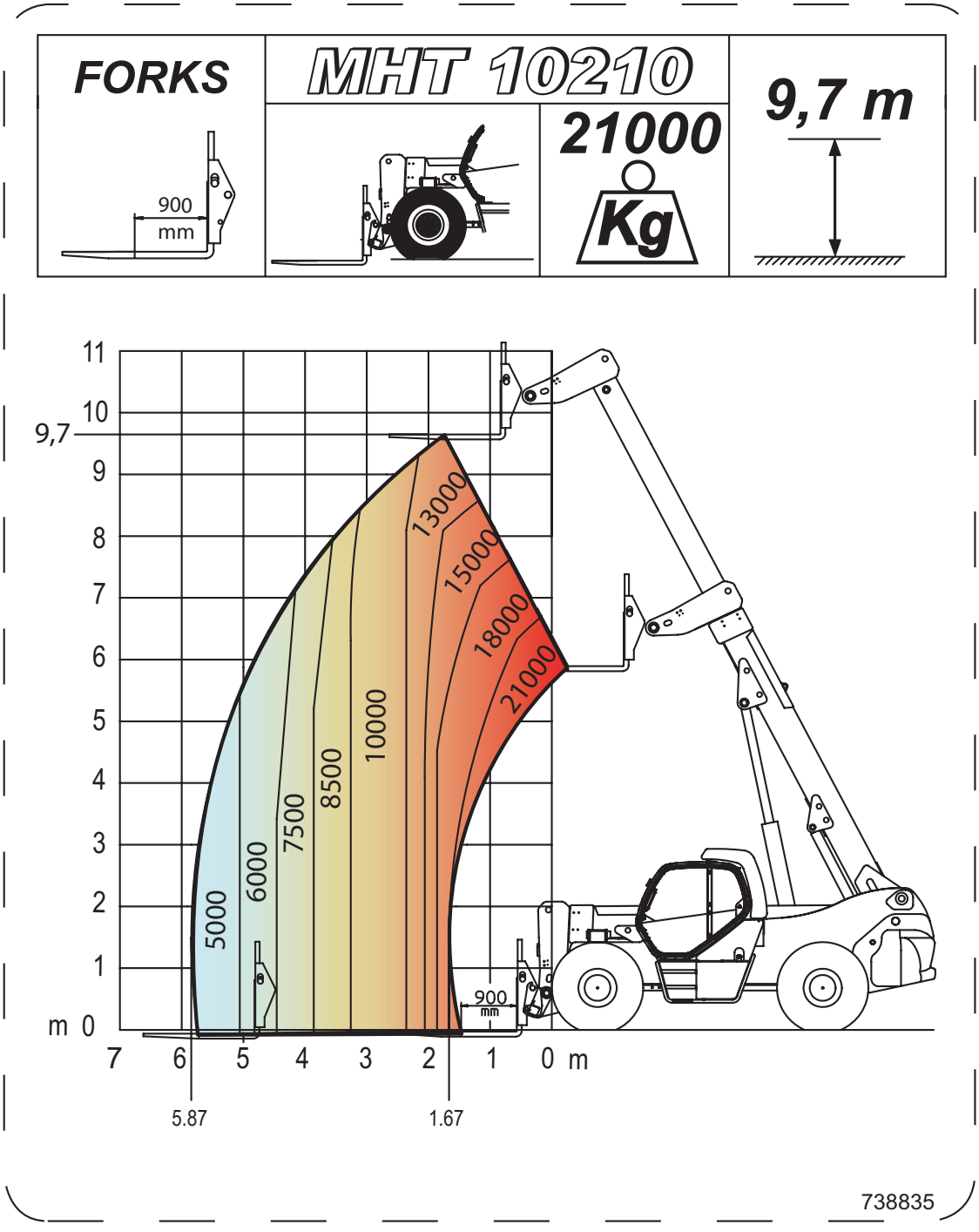


A	1800 mm
B	3650 mm
C	1350 mm
D	6860 mm
E	8660 mm
F	2000 mm
G	510 mm
G1	470 mm
G2	510 mm
I	1860 mm
K	2000 mm
L	100 mm
M	2325 mm
O	200 mm
R	5750 mm
S	12030 mm
T	5040 mm
U	2960 mm
V	7280 mm
V1	3160 mm
V2	6050 mm
W	2500 mm
Y	12°
Z	105°

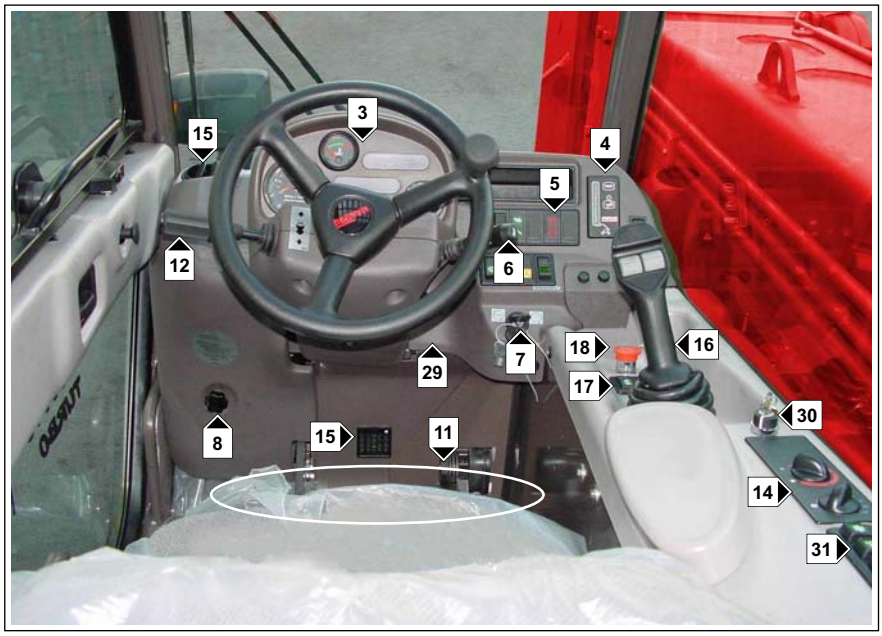


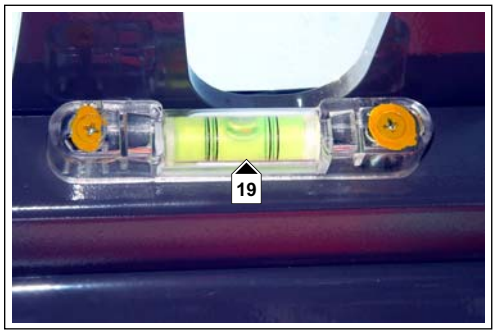


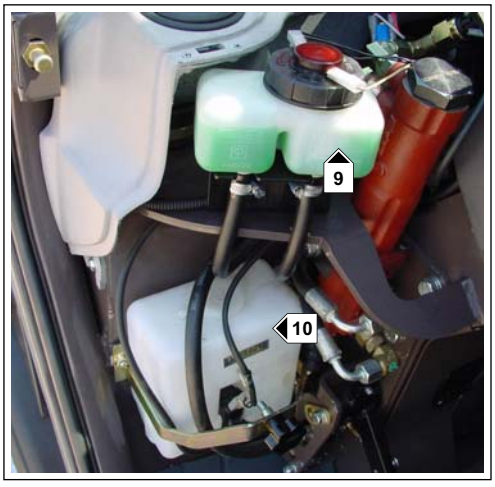
LOAD CAPACITY CHART



INSTRUMENTS AND CONTROLS







DESCRIPTION

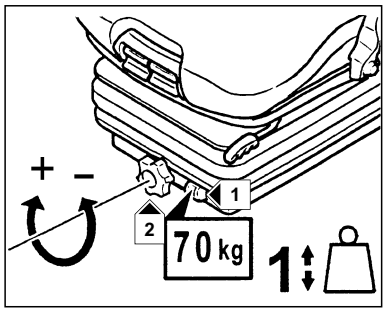
1 - Driver's seat
2 - Seat belt
3 - Monitoring instrument and indicator light panel
4 - Load status control and safety device
5 - Switch console
6 - Light, horn and direction indicator lever
7 - Key-switch
8 - Casing giving access to brake fluid tank and windscreen-washing liquid
9 - Brake fluid tank
10 - Windscreen-washing liquid tank
11 - Accelerator pedal, service brake and inching pedal
12 - Direction reverser lever
13 - Parking brake lever
14 - Heating controls
15 - Ventilation outlets
16 - Hydraulic movement controls
17 - Optional exclusion switch
18 - Red emergency button
19 - Bubble level
20 - Levelling device
21 - Ceiling light
22 - Door lock
23 - Rear window opening lever
24 - Upper half door lock
25 - Towbar
26 - Front lights
27 - Rear lights
28 - Revolving flashing light
29 - Steering wheel adjuster lever
30 - Key to switch off the safety device
31 - Air conditioning (optional)

USEFUL ADVICE

Regardless of the operator's experience in this sector, he must learn the position and function of all instruments and controls on board before putting the fork-lift truck into operation.
When the ignition key is turned without starting the engine, a test is automatically performed on the instrumentation: all the lights come on and a beeper sounds. All this stops once the engine has started.
A check must be made on all the truck's instruments immediately after start-up once the engine has warmed up and at regular intervals during use, so that any malfunctions can be noted at once and put right without delay. If the instrument is not giving a correct reading, stop the engine and take the necessary measures to restore correct operation immediately.

Using the fork-lift truck without following these recommendations may have dangerous consequences.

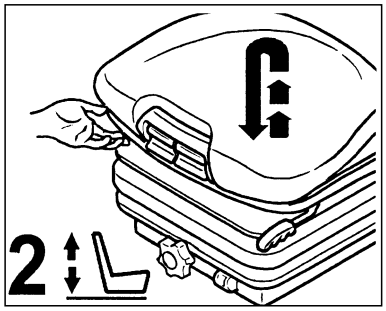
1 - DRIVER'S SEAT (STANDARD)



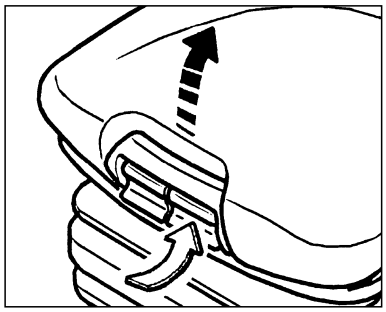
FOR ENHANCED COMFORT, THIS SEAT ALLOWS VARIOUS ADJUSTMENTS.

WEIGHT ADJUSTMENT
The seat should be adjusted to the driver's weight with no-one sitting on it.
- Take the seat notch 1 as reference.
- Turn the knob 2 as appropriate to the driver's weight.

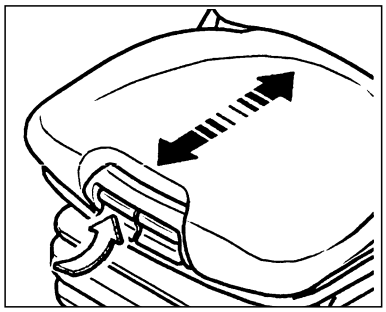
N.B. : To avoid health problems, the weight setting should be checked and adjusted before the truck is put into operation.



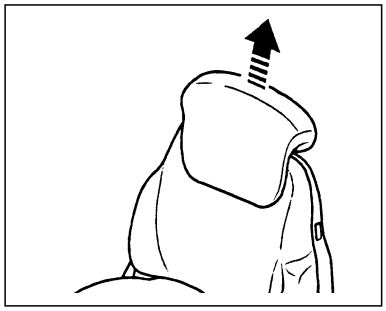
ADJUSTING THE SEAT HEIGHT
Bring the seat to the desired position, until the catch is heard to engage. If the seat is raised above the last catch, it will return to the lowest position.



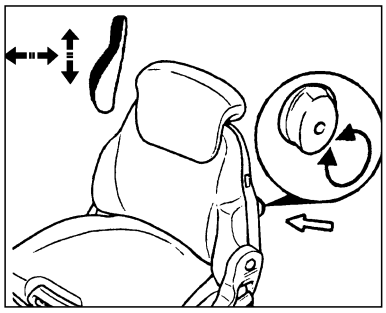
ADJUSTING THE SEAT ANGLE
The seat angle can be regulated individually.
- Press the button on the left and at the same time push or release the seat to obtain the position desired.



ADJUSTING THE SEAT POSITION
The seat position can be regulated individually.
- Press the button on the right and move the seat forward or back to obtain the position desired.

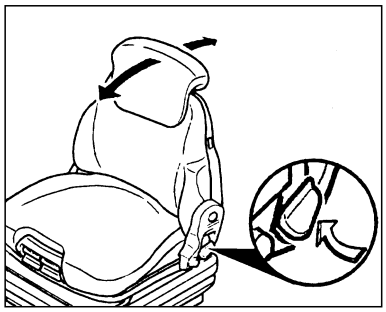


SEAT BACK EXTENSION
- The height of the seat back extension can be adjusted (the catches can be heard) until the stop is reached.
- The seat back extension can be removed by pulling until it moves beyond the last stop.



BACK SUPPORT
This allows adjustment of both the seat conform level and the driver's freedom of movement.
- Turn the knob to the right or left to adjust the height and depth of the back support.

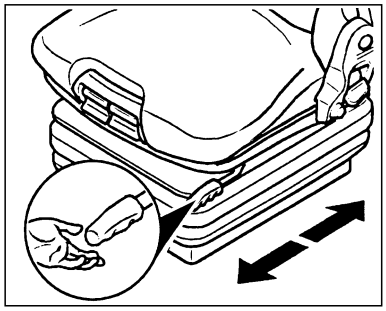
ADJUSTING THE SEAT BACK ANGLE



- Lean against the back, pull the lever and move the seat back into the position desired

If the back is not held in place when adjusted, it will tip completely forward.

LONGITUDINAL ADJUSTMENT

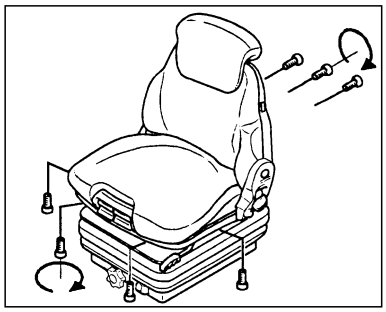


- Engage the locking lever in the position desired. Once locked in place, the seat cannot be adjusted further.

CLEANING

Dirt may prevent the seat from functioning correctly; it must therefore always be kept clean.

- To clean or replace the cushions, simply extract them from the frame of the seat.



Risk of accident are increased when the seat tips up!

Take care not to wet the cushions' fabric when cleaning them. First check the fabric's resistance to the normal detergents for fabrics and plastics, on a concealed surface.

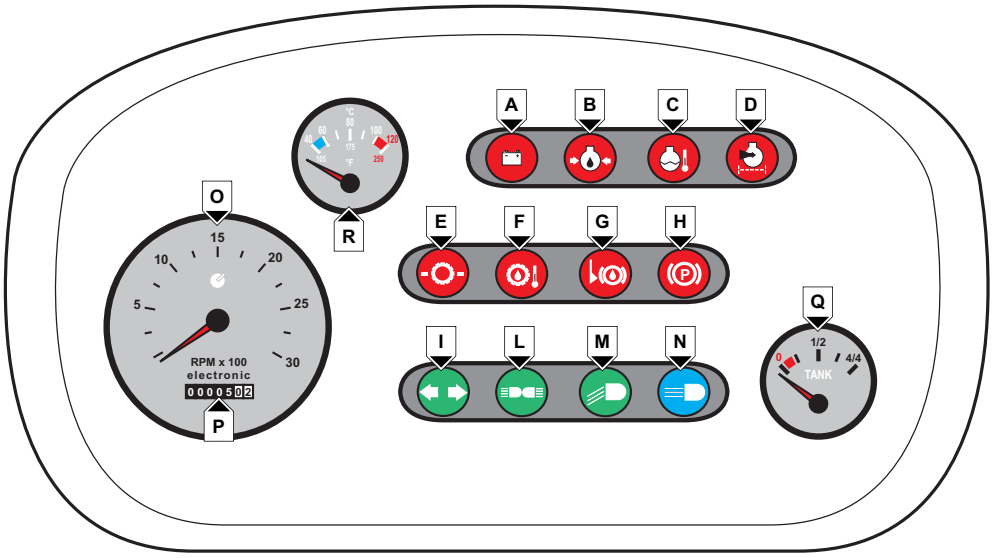
2 ▫ SEAT BELTS

- Sit on the seat correctly.
- Check that the seat belt is not twisted.
- Place the belt over your pelvis, not over your stomach.
- Fasten the seat belt and check that it is firmly engaged.
- Adjust the belt to your physique, so that it does not apply excess pressure to your pelvic region.

The fork-lift truck may never be used if the seat belt is faulty (mounts, fastening, seams, tears, etc.). Repair or replace the seat belt immediately.

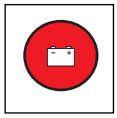
3 - MONITORING INSTRUMENT AND INDICATOR LIGHT PANEL

A - Red alternator excitation light.
B - Red engine oil pressure light.
C - Red engine water temperature light.
D - Red air filter fouling indicator light.
E - Red Mercedes engine alarm light.
F - Red engine oil level light.
G - Red brake fluid level light.
H - Red parking brake light.
I - Green direction indicator light.
L - Green dipped headlight light.
M - Green side-light light.
N - Blue full-beam headlight light.
O - Rpm-counter.
P - Hour-counter.
Q - Fuel level gauge.
R - Engine water temperature.



A – RED ALTERNATOR EXCITATION LIGHT

If lights **A-B-C-D-F-G** and the buzzer are activated during operation of the fork-lift truck, stop the engine immediately and check the electrical system and the fan-belt.



B – RED ENGINE OIL PRESSURE LIGHT

If the light and buzzer are activated during operation of the fork-lift truck, stop the engine immediately and look for the origin of the fault. (See oil level in engine pump).

C – RED WATER TEMPERATURE INDICATOR LIGHT

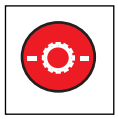
If the light and buzzer are activated during operation of the fork-lift truck, stop the engine immediately and look for the origin of the fault in the cooling circuit.

D – RED AIR FILTER FOULING LIGHT

The light and buzzer are activated when the air filter cartridge is fouled.
Switch off the truck and make the necessary repairs (see frequency of cleaning and replacement procedures).

E – RED MERCEDES ENGINE ALARM LIGHT

The light idicates the failure of the Mercedes engine, contact your agent or dealer.



F – RED ENGINE OIL LEVEL LIGHT

If the light is activated during operation of the fork-lift truck, stop the engine immediately and check the engine oil level. If the level is relatively low, fill with the proper oil.

G – RED BRAKE FLUID LEVEL LIGHT

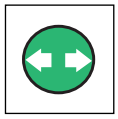
If the light and buzzer are activated during operation of the fork-lift truck, stop the engine immediately and check the brake fluid level. If the level is relatively low, contact your agent or dealer.

H – RED LIGHT PARKING BRAKE

The light indicates that the parking brake has been pulled on.

I – GREEN DIRECTION INDICATOR LIGHT

This light comes on at the same time as the direction indicators and shows that they are operating correctly.



L – GREEN LIGHT – SIDE-LIGHTS

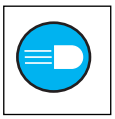
This light illuminates when the side-lights are in operation.

M – GREEN DIPPED HEADLIGHT LIGHT

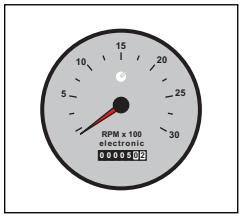
This light illuminates when the dipped headlights are switched on.

N – BLUE FULL BEAM HEADLIGHT LIGHT

This light illuminates when the full beam headlights are in operation.

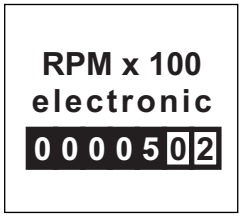


O – RPM-COUNTER



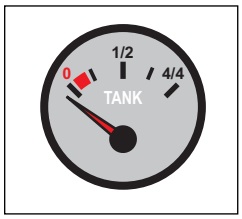
P – HOUR-COUNTER

Indicates the number of hours the truck has worked.
The hours are shown on the dial up to multiples of one thousand

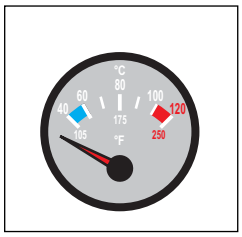


Q – FUEL LEVEL GAUGE

The red zone indicates that the fuel level is low and the truck can only be used for a limited time



R – MAX. WATER TEMPERATURE INDICATOR



N. B. : - When each red light switches on, a buzzer also starts to sound (except the light "H").
- When the ignition key is turned to the first catch (with the engine off), a check is performed. All the lights illuminated and a buzzer starts to operation; everything returns to normal once the engine starts.

4 - LOAD STATUS CONTROL AND SAFETY DEVICE

The load status control and safety device allows the user to check the condition of the fork-lift truck in relation to the maximum permitted load at any moment.

OPERATION
When the truck electrical contact is made, an automatic check is carried out.
- Correct operation: All LEDs and the buzzer operate continuously for 2 seconds.
- Faulty operation: All LEDs and the buzzer operate in intermittent mode
(Switch off the truck and contact your agent or dealer; never make repairs yourself).

A - LED (VISUAL ALARM) (Fig. 1/1 - Fig. 1/2)
A1- 4 green LEDs: The fork-lift truck is operating in complete safety.
A2- 2 yellow LEDs: The fork-lift truck is approaching the maximum permitted load.
A3- 1st red LED: The fork-lift truck has reached the maximum permitted load limit.
The buzzer is activated simultaneously, in slow intermitted mode.
A4- 2nd red LED: The fork-lift truck is overloaded. The buzzer is activated simultaneously, in rapid intermittent mode. Carry out the hydraulic movements needed to reduce the loadin the following order: boom retraction and then boom lowering.

When A4- 2nd red LED is switched on, the hydraulic controls are automatically blocked. Only boom retraction and inclination of the forks are authorized. DO NOT turn key "30" (Page 23) for exclusion of automatic blocking of movements to be used only when operating with shovel.

B - BUZZER SWITCH (Fig. 1/1 - Fig. 1/2)
Enables or disables use of the alarm buzzer. If not in use, the red light B1 indicates that the buzzer is disabled and only the warning lights are operational.

C - TEST INDICATOR (Fig. 1/1)
Press the switch to check that the load status indicator device is operating correctly at any moment.
- Correct operation: All LEDs and the buzzer operate continuously.
- Faulty operation: All LEDs and the buzzer operate in intermittent mode
(Switch off the truck and contact your agent or dealer; never make repairs yourself).

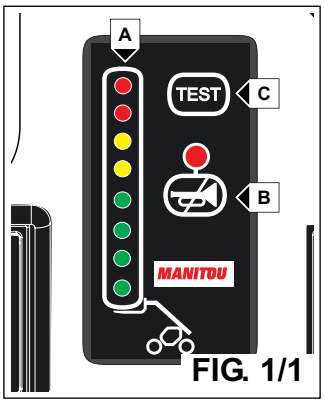


FIG. 1/1

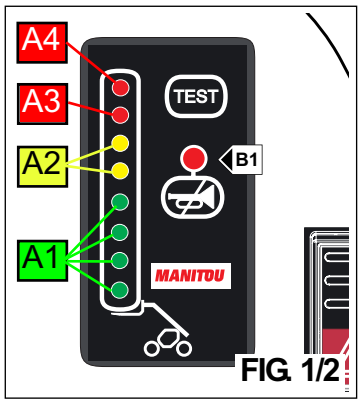
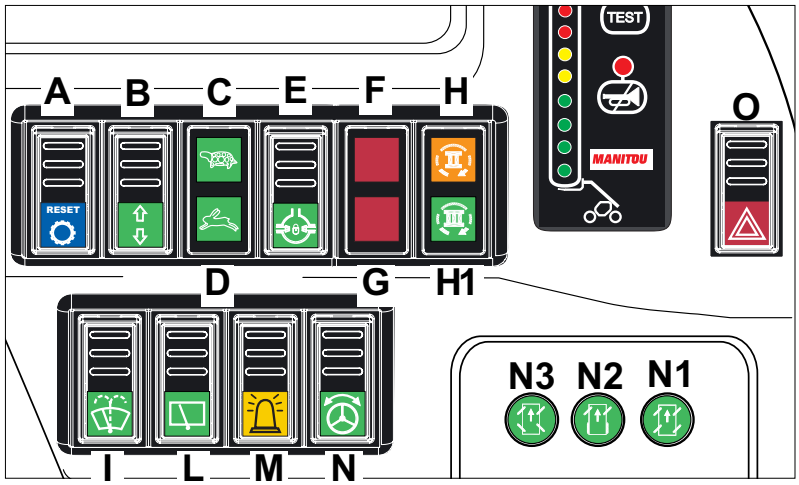


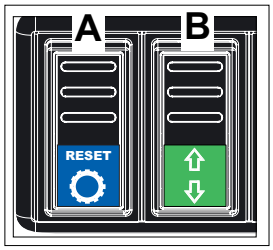
FIG. 1/2

5 - SWITCH CONSOLE

A - RESET TRANSMISION
B - RUNNING SELECTOR (SLOW-FAST)
C - SLOW SPEED GREEN LIGHT
D - FAST SPEED GREEN LIGHT
E - CENTRAL DIFFERENTIAL BLOCK PUSH BUTTON
F - TELESCOPE FAULT RED LIGHT
G - OPTIONAL FAULT RED LIGHT
H - 2nd OPTIONAL CONTROL ORANGE LED (IF EQUIPPED)
H1 - 3rd OPTIONAL CONTROL GREEN LED (IF EQUIPPED)
I - WINDSCREEN WIPER-WASHER SWITCH
L - REAR WINDOW WIPER SWITCH
M - FLASHING LIGHT SWITCH
N - STEERING SELECTION
O - EMERGENCY WARNING LIGHTS SWITCH



A - RESET TRANSMISION.
In normal operating conditions, the button is illuminated.
For more detailed information on use, see point “B”.



B - RUNNING SELECTOR (SLOW-FAST) .
The machine has two speeds:
- Slow (work site speed)
- Fast (for road travel)

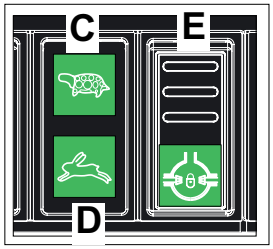
To change the speed follow the instructions given below:
- stop vehicle movement completely
- keep the I.C. engine running at minimum speed
- set the reverse gear in idle (see point 12 on page 17)
- push the brake pedal down all the way and press the fast-slow “B” button till the respective light “C” or “D” switches on.

If the forward or reverse speed is not engaged, follow the instructions given below :
- set the reversal lever in the required position (Forwards - Backwards)
- discharge pressure from the brake pedal
- press the “RESET TRANSMISSION” button “A” to engage in the required direction.
- If the vehicle does not move, accelerate the I.C. engine slowly and gradually till the truck starts moving.

These instructions must be followed for proper working of the transmission.

C - SLOW SPEED GREEN LIGHT
When the green light is ON it indicates selection of slow speed.

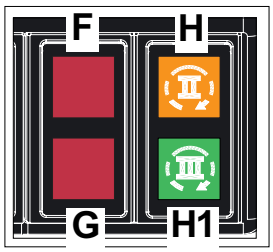
D - FAST SPEED GREEN LIGHT
When the green light is ON it indicates selection of fast speed.



E - CENTRAL DIFFERENTIAL BLOCK PUSHBUTTON
Differential block pushbutton is used when the machine does not have optimum road grip.
On selecting the button the central differential of the truck is blocked and torque is transmitted to both the front and rear axles.

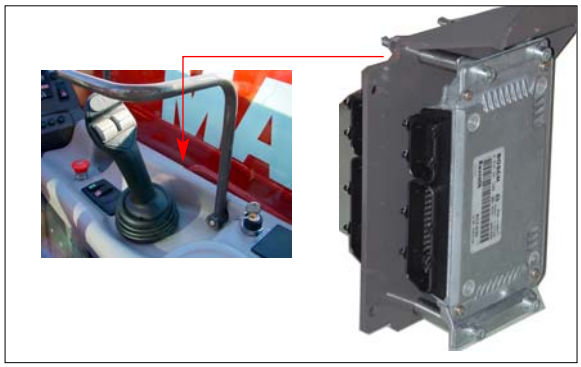
To block the central differential, carry out the following operations :
- stop carriage movement completely
- keep the I.C. engine running at minimum speed
- push the brake pedal all the way and press the differential block pushbutton “E”
- keeping the differential block pushbutton “E” pressed, gradually accelerate the I.C. engine to obtain the required movement.

F - TELESCOPE FAULT RED LIGHT.
When the light is on the telescope has a fault, please check the signal into the electrical box “XX” and consult your agent or dealer.



G - OPTIONAL FAULT RED LIGHT.
When the light flashes the optional has a fault or is manually disanabled through the optional exclusion switch (red light off - See point 17 page 20).
If the light flashes also if the optional switch is pressed (red light on - See point 17 page 20), please check the signal into the electrical box “XX” and consult your agent or dealer.

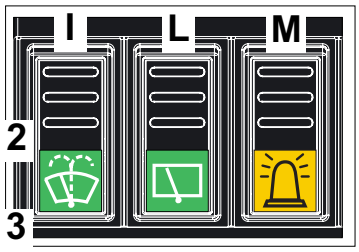
Fig.XX



H - 2nd OPTIONAL CONTROL ORANGE LED (IF EQUIPPED)
The orange LED lights up to indicate that the 2nd optional control has been selected (See point 16 page 19)

H1 - 3rd OPTIONAL CONTROL GREEN LED (IF EQUIPPED)
The green LED lights up to indicate that the 3rd optional control has been selected (See point 16 page 19).

I - WINDSCREEN WIPER-WASHER SWITCH
Switch with 3 positions: for wiper (2) and for washer (3).
To stop the washer, simply release the switch.

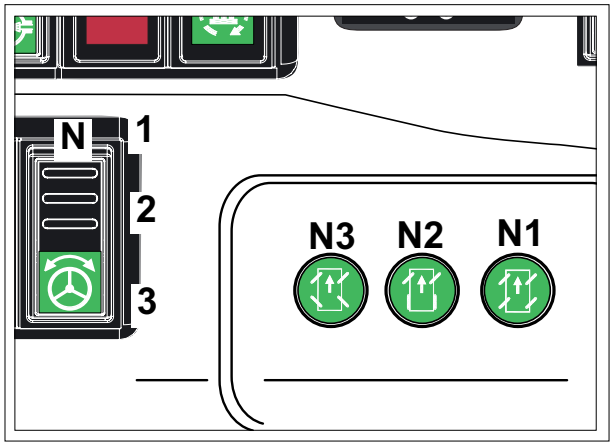


L - REAR WINDOW WIPER SWITCH
On-off switch for rear window wiper.

M - FLASHING LIGHT SWITCH
On-off switch for the rotating flashing light.

N - STEERING SELECTION
Before selecting one of the three steering options, align the 4 wheels with the axis of the truck.

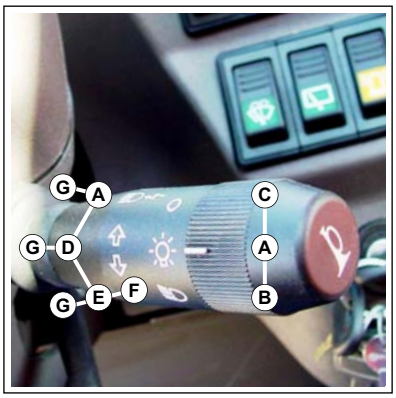
1 - Front and rear wheel steering in opposite directions (short or concentric steering).
2 - Front wheel steering (use on public highways).
3 - Front and rear wheel steering in the same direction (sideways or crab movement).



N1 - GREEN LIGHT SHORT STEERING
The green light on indicates the short steering selection.
N2 - GREEN LIGHT USED ON PUBLIC HIGHWAYS
The green light on indicates the steering selection for use on public highways.
N3 - GREEN LIGHT SIDEWAYS OR CRAB MOVEMENT
The green light on indicates the steering selection for sideways or crab movement.

O - EMERGENCY WARNING LIGHTS SWITCH
Press this switch to activate all turn signals at the same time.
Depress the switch a second time to deactivate.

6 - LIGHT, HORN AND DIRECTION INDICATOR CONTROL LEVER



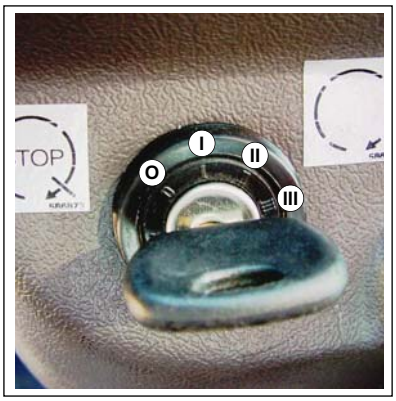
The lever controls the lights and horn.

- A – Lights off, direction indicator lights not working.
- B – Direction indicator lights signalling right.
- C – Direction indicator lights signalling left.
- D – Side-lights on.
- E – Dipped headlights and side-lights on.
- F – Full beam headlights and side-lights on.
- G – Lights flashing.

Press the tip of the lever to sound the horn.

N.B.: Position D - E - F - G can be activated without the ignition contact made.

7 - IGNITION SWITCH



The switch has four positions:

- O - Internal combustion engine.
- I - Electrical contact.
- II - Warming-up.
- III - Start-up and return to position “I” after the key has been released.

BEFORE THE “START-UP” POSITION WAIT AT LEAST 5 SECOND

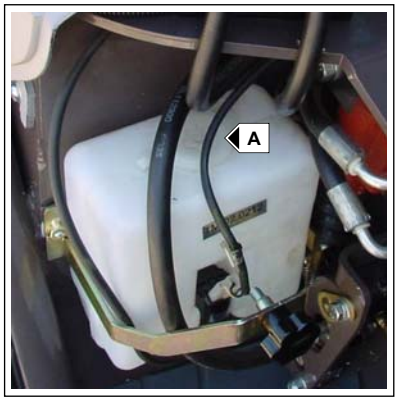
8 - CASING GIVING ACCESS TO BRAKE FLUID AND WINDSCREEN-WASHING LIQUID

Undo the screw “H” and remove the casing for access to the brake fluid and screen washing liquid tanks.

9 - BRAKE FLUID TANK

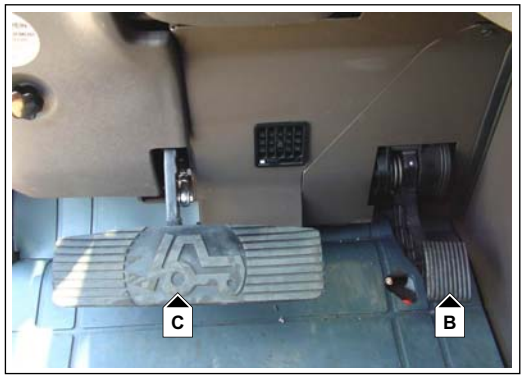
10 - WINDSCREEN-WASHING LIQUID TANK

On the operator's left. Remove the cap "A"; make sure that the tank is always full.
Liquid to be used: water + window-cleaning detergent (use an anti-freeze in winter).



11 - ACCELERATOR PEDAL, SERVICE BRAKE AND INCHING PEDAL

Pedal "B" can be used to vary the speed of the fork-lift truck by adjusting the engine rpm.
Pedal "C" acts on the front brakes and can be used to slow down and stop the truck. During the first 20 mm of its stroke, the brake pedal acts as an inching pedal, allowing precise, slow movements; in the rest of its stroke, it produces the braking effect.

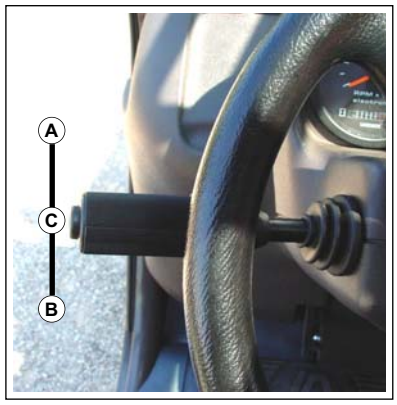


12 - DIRECTION REVERSER LEVER

The truck's travel direction must be reversed at low speed and without accelerating.

FORWARD TRAVEL: Raise the lever slightly and push it forward (Position A).
REVERSE: Raise the lever slightly and pull it back (Position B).
NEUTRAL : When the truck is started, the lever must be in neutral (Position C).

N.B.: The reverse travel lights indicate that the truck is travelling in reverse. There is also a reverse warning beeper.



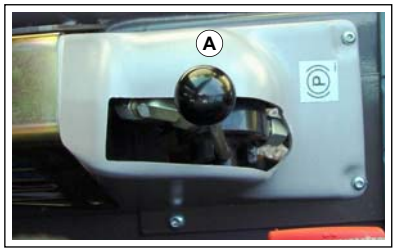
If the gear does not engage forwards or backwards, see point "5B" on page 14.

These instructions must be complied with to allow the transmission to operate correctly.

13 - PARKING BRAKE LEVER

To prevent any accidental release, the lever has a safety locking system.

- To engage the parking brake, pull the lever back (Position A).
- To disengage the parking brake, release the lever and push it forward (Position B).



Con il freno di stazionamento attivato (leva in posizione “A”) insieme all’accensione della spia sul cruscotto, viene anche inibito il comando della traslazione del carrello elevatore.

14 - HEATING CONTROLS

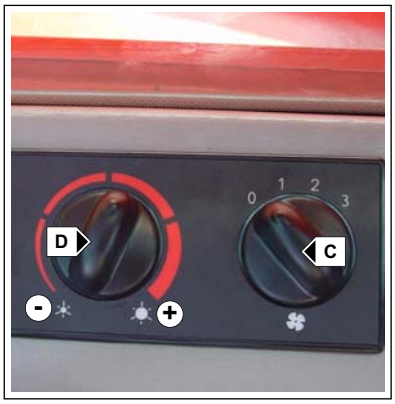
C) Fan knob
This 3-speed knob allows distribution of warm or cold air from the outlets.

D)Temperature regulator knob.
This knob allows regulation of the temperature inside the cab.

“-” - Valve closed, fan delivering cold air.

“+” - Valve completely open, fan delivering warm air.

The intermediate positions allow regulation of the temperature.



15 - VENTILATION OUTLETS

These allow direction of the ventilation jets inside the cab; they are placed in the top of the cab “E” and near the driver’s feet “F”.

16 - HYDRAULIC MOVEMENT CONTROLS

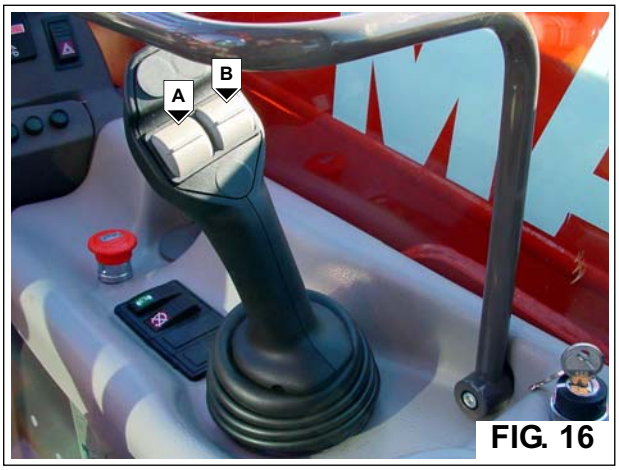


FIG. 16

The truck is equipped with a one lever manipulator with proportional electro-hydraulic servo control placed on the operator's right and composed of two proportional button "**A**" and "**B**" (Fig.16).

- To lift the load, pull the control lever back (Fig.16/1).
- To lower the load, pull the control lever forward (Fig.16/1).
- To tilt the forks down pull the control lever to the right (Fig.16/1).
- To raise the fork back into position, pull the control lever to the left (Fig.16/1).
- To extend the telescopic arm, pull the "A" proportional button up (Fig.16/2).
- To retract the telescopic arm, pull the "A" proportional button down (Fig.16/2).
- To operate the optional function, pull the "B" proportional button up or down (Fig.16/2).
- to activate the 2nd or 3rd optional at the top of the boom or the movements of an accessory (if equipped) press button "C" and use roller "B" to carry out the required movements (Fig.16/2).

N. B. button "C" activates the two optional outputs at the top of the boom alternately.
Button "D" selects the main optional.

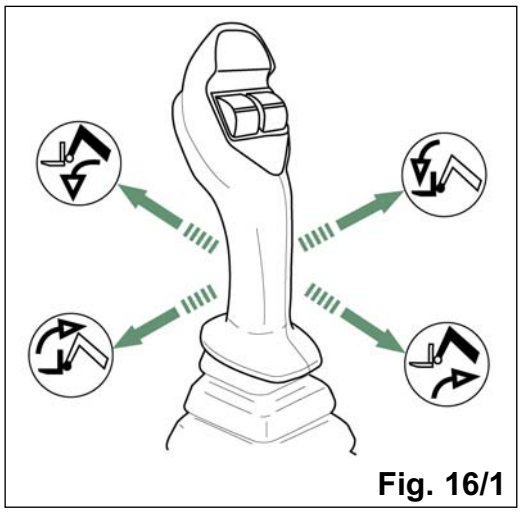


Fig. 16/1

Never attempt to modify the hydraulic pressure of the system. In case of malfunction, contract your agent or dealer.

ANY MODIFICATION WILL CASE THE WARRANTY TO BECOME NULL AND VOID.

16/A - OPTIONAL CIRCUIT DECOMPRESSION

This operation must be carried out each time it is necessary to connect or disconnect a supplemental accessory to the fork-lift truck.

1) Turn off the engine and place the ignition key 7 in position "I".
2) Rotate roller "B" forwards and backwards (pushbutton "17" pressed and red LED On see page 20), and press button "C" to activate the 2nd/3rd optional at the top of the boom and act on roller "B".

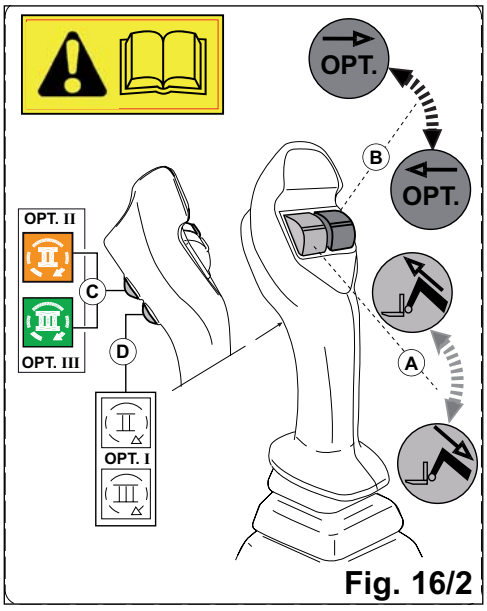


Fig. 16/2

When the operation has been completed, the optional circuit has been depressurised; therefore, it will be easier to connect and disconnect the rapid fittings on the top of the arm.

N. B. The operation should be performed immediately after turning off the engine, and for no more than 3 seconds for each button.

17 - OPTIONAL EXCLUSION SWITCH (accessories hydraulic block)

The switch “A” has two differents positions, enabled or disabled the optional command.
With the switch pressed “B” (red indicator light ON) the Optional/ accessories hydraulic block function is activated.
With the switch pressed “C” (red indicator light OFF) the Optional/ accessories hydraulic block function is inhibited.

18 - RED EMERGENCY BUTTON

It deactivates all the movements for the charge lifting.

N.B. IT IS COMPULSORY TO INHIBIT HYDRAULIC MOVEMENTS USING EMERGENCY PUSHBUTTON "D" WHILE TRAVELLING ON ROADS

To deactivate the movements, press the red pushbutton “D”.
To restore movements turn the red pushbutton “D” clockwise.

19 - BUBBLE LEVEL

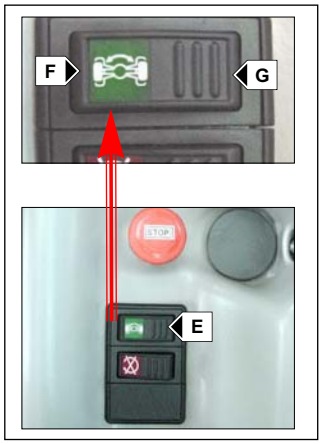
It is on the upper part of the cab, in front of the operator.
It is used to control the horizontality of t he machine, in case of need use the levelling device (see point 20 Levelling device).

20 - LEVELLING DEVICE

The lever “E” has two positions, controls lift truck levelling towards the right or left.
- pushing “F” the truck inclinates to the left
- pushing “G” the truck inclinates to the right

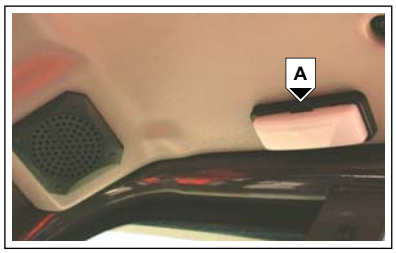
To ensure the truck is level check the bubble level.

N. B. : The levelling operation cannot be carried out when :
- the telescopic boom has been raised more than about 30° from the ground.



21 - CEILING LIGHT

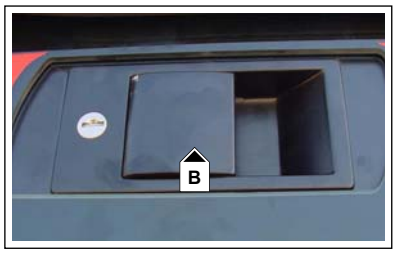
The switch “A” is incorporated in the light unit.
It has two positions: constant lighting and off.



22 - DOOR LOCK

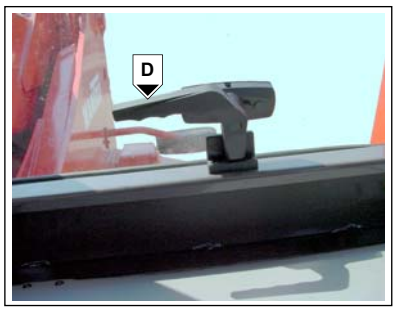
Outside lock “B” : To open the door, take hold of the handle and pull it outward.
Two keys for locking the cab are supplied with the truck.

Inside lock “C” : To open the door, take hold of the handle and pull it inward.



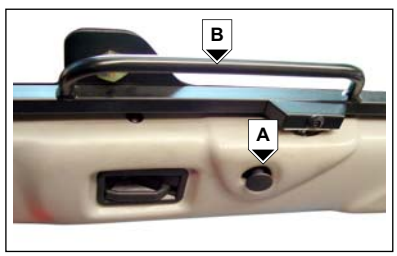
23 - REAR WINDOW OPENING LEVER

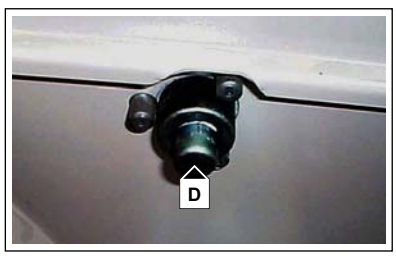
To open the rear window, pull the lever "D" clockwise to the right and push on the window.

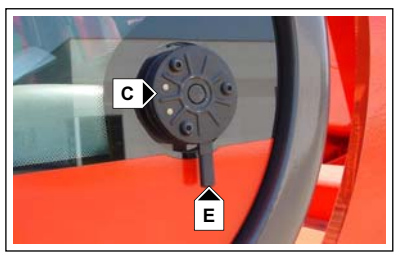


24 - UPPER HALF DOOR LOCK

Closed position: To open, push the lock “A” down.
To close, simply pull the handle “B” inward.
Open position : Push the door towards the cab to engage in the bolt “C” .
To release press the knob “D” or use the lever “E”.







25 - TOWBAR

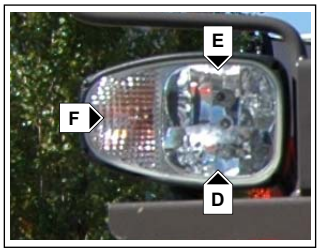
On the rear of the truck, the towbar allows towing of a trailer. For each truck, the towing capacity is limited by the total authorised weight for travel on the public highway, the traction force and the maximum vertical stress on the towing pin. These data are shown on the manufacturer's data plate applied to each truck.

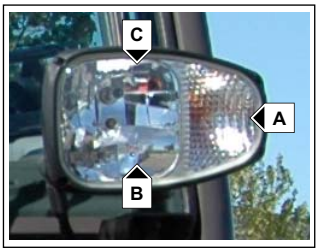
N.B. : Other optional solutions are available for towing trailers; for further information, contact your agent or dealer.

- Only trucks registered as agricultural tractors are allowed to tow trailers on the public highway.
- Check the trailer's braking and light systems and connect them to the truck.
- Reduce the speed of the truck.
- Follow your country's highway code.

Make sure that the split-pin is properly positioned on the towbar

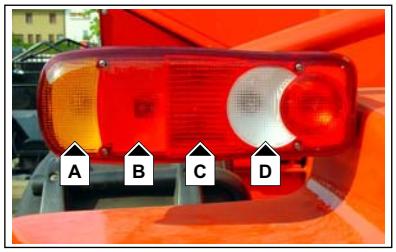
26 - FRONT LIGHTS

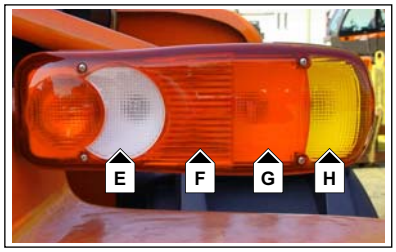




A - Front left direction indicator light.
B - Front left side-light.
C - Front left dipped headlight and full beam headlight.
D - Front right side-light.
E - Front right dipped headlight and full beam headlight.
F - Front right direction indicator light.

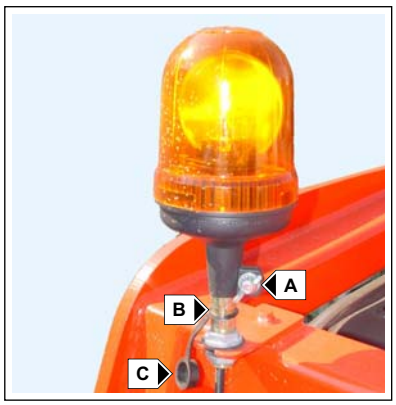
27 - REAR LIGHTS





A - Rear left direction indicator light.
B - Rear left brake light.
C - Rear left side-light.
D - Rear left reversing light.
E - Rear right reversing light
F - Rear right side-light.
G - Rear right brake light.
H - Rear right direction indicator light.

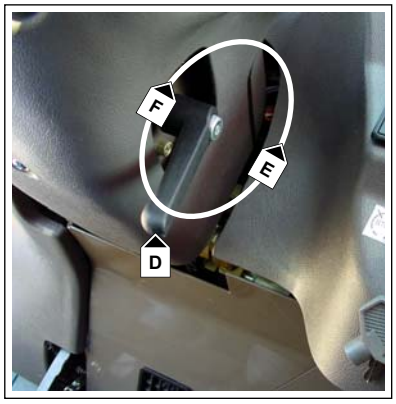
28 - REVOLVING FLASHING LIGHT



The revolving flashing light can be removed, for example to reduce the dimensions of the truck or to prevent its theft.

- Unscrew the nut “A” and remove the revolving flashing light.
- Protect the support “B” with the cover “C”.

29 - STEERING WHEEL ADJUSTER LEVER



This lever allows adjustment of the height and angle of the steering wheel.

- Turn the lever “D” anti-clockwise “E” to loosen and adjust the steering wheel.

- Turn the lever “D” clockwise “F” to lock the steering wheel in the chosen position.

30 - KEY TO SWITCH OFF THE SAFETY DEVICE

There are two key positions (0-1) “G”.
With normal conditions of work the safety device is always activated (position 1).
To disengage the safety device keep the key is position “0” and a red light “H” on the dashboard lights on.

It’s possible to disable the safety system turning the key “G”, only in working conditions with bucket.
ATTENTION : With the safety system nothing prevents overloading and/or tipping of the vehicle.

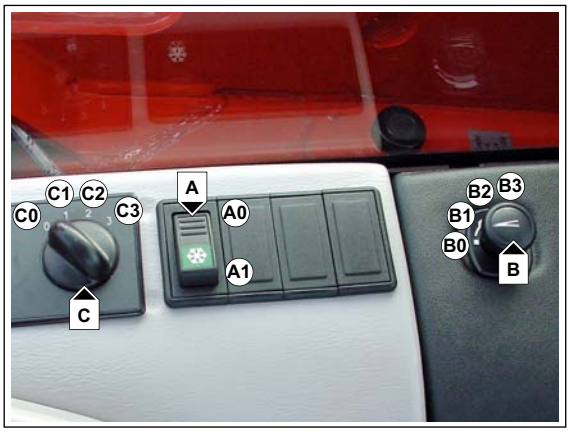
31 - AIR CONDITIONING (OPTIONAL)

A) COMPRESSOR SWITCH

This switch has two positions :

A0 - Off (indicator light Off)
A1 - On (compressor switched on, indicator light On)

N.B. The indicator light On indicates the compressor is switched on.



ATTENTION : The compressor switches on only with the fan knob turned to C1-C2-C3.
If the fan knob is on C0, the compressor is not switched on.

B) Knob

Regulates the air flow in the supplementary inlets located behind the operator seat.
B0 - Off
B1 - 1st speed
B2 - 2nd speed
B3 - 3rd speed

Adjust the direction of the inlets located behind the operator seat.

C) Front fan knob

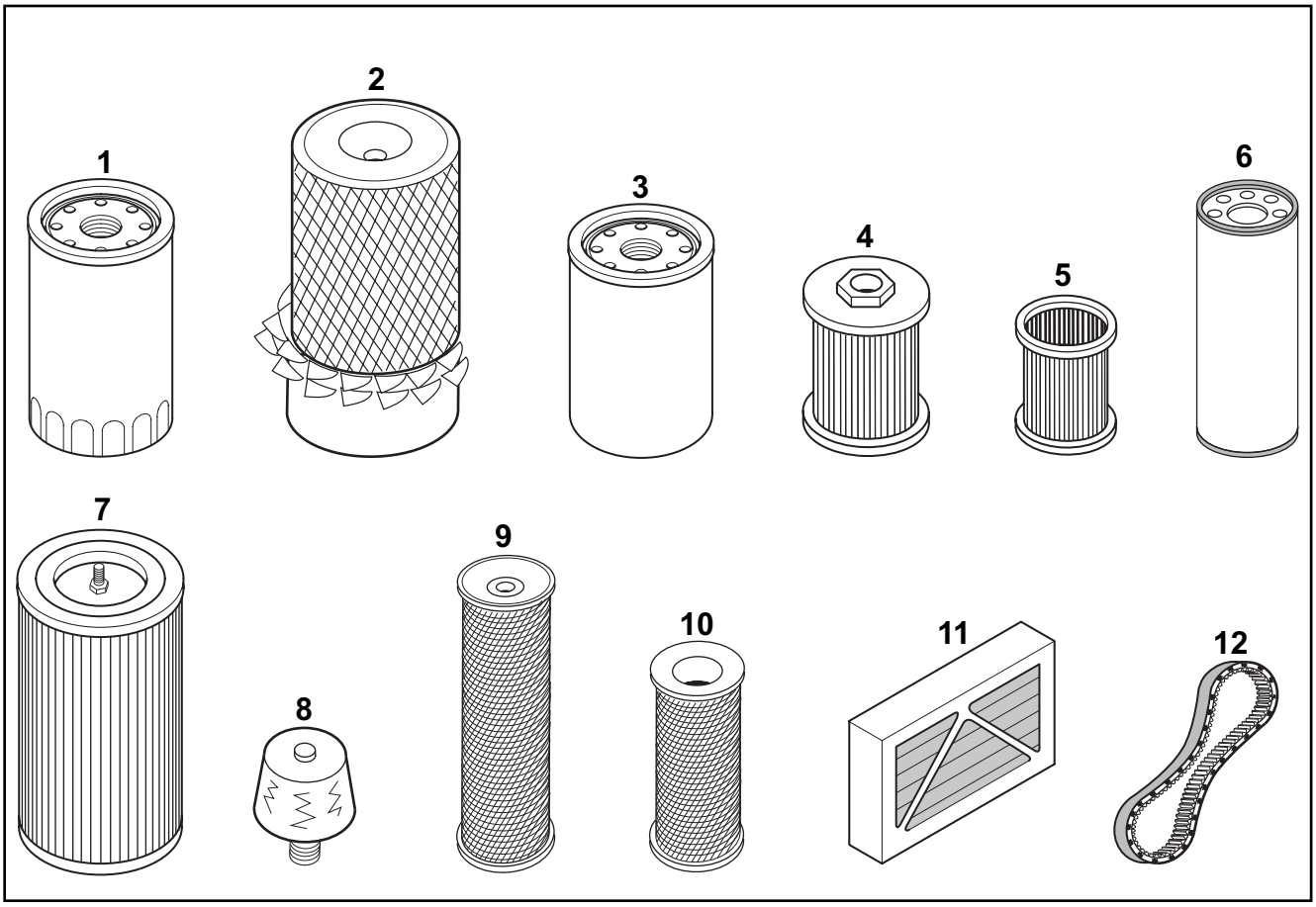
C0 - Off
C1 - 1st speed
C2 - 2nd speed
C3 - 3rd speed

3 - MAINTENANCE

Index

ROUTINE MAINTENANCE

FILTERING ELEMENTS AND BELTS.



	DESCRIPTION	MANITOU REFERENCE	50 ÷ 100 H (WITHIN 3 MONTHS) (COUPON)	REPLACEMENT SCHEDULE
1	Engine oil filter❋	**709 666**	/	Every 500 H
2	Air filter cartridge ▲	**723 755**	CLEAN	Every 500 H
3	Transmission oil filter	**485 695**	REPLACE	Every 500 H
4	Fuel filter cartridge❋	**709 664**	/	Every 1500 H
5	Fuel prefilter cartridge❋	**709 667**	CLEAN	/
6	Fuel prefilter cartridge with water separator❋	**709 663**	CHECK	Every 1500 H
7	Hydraulic oil filter cartridge (exhaust)	**724 670**	REPLACE	Every 500 H
8	Breather filter	**448 269**	CLEAN	Every 500 H
9	Hydraulic oil filter cartridge (intake)	**513 752**	CHECK	Every 1000 H
10	Air filter safety cartridge ▲	**723 754**	CHECK	Every 1000 H
11	Air filter cartridge for cab	**225 052**	CLEAN	Every 500 H
12	Engine belt❋	**739 731**	CHECK	Every 500 H

▲ : Reduce the periodicity and advance the replacement in a dusty atmosphere.
❋ : Parts that can be supplied only if the engine serial number is indicated.

FIRST COUPON OBLIGATORY (50 ÷ 100 H WITHIN 3 MONTHS)

LISTS OF THE OPERATION TO BE CARRIED OUT FOR THE FIRST COUPON:

ENGINE
- Check fuel filter
- Clean air filter
- Tightness check : injection power supply
- Check cooling circuit
- Check belt(s) tension

HYDROSTATIC TRANSMISSION
- Change suction filter
- Clean Return filter (as for assembly)
- Check oil level
- Check transmission inching control adjustment

AXLES / TRANSFER BOX
- Change differential / brake housing
- Change oil of reduction gears
- Lubrification of pivots, hinges and controls
- Oscilation lubrification
- Change transfer box oil

HYDRAULIC CIRCUIT
- Change return filter(s)
- Check oil level
- Check tightness

BREAKING CIRCUIT
- Check service brake operation
- Check brake fluid level (as for assembly)

BOOM UNIT
- Lubrification of telescope(s)
- Lubrification of all pivot pins
- Wear pads adjustment + tightness

SAFETY SYSTEM MANISCOPIC
- Check operation and adjustment

ACCESSORIES / OPTIONS
- Check operation

CAB
- Check control panel and all instruments check and control, heating and air conditioning

ELECTRIC CIRCUIT
- Battery level checking
- Lighting operation

WHEELS
- Wheel nut tightness
- Tyre pressures

GENERAL LUBRICATION OF MACHINE

TEST OF MACHINE
- Hydraulic test with nominal load
- Driving test : steering and breaking

FREQUENCY OF OPERATIONS

MAINTENANCE AND LUBRICATION TABLE

CHAPTER	FREQUENCY	OPERATION N°	COMPONENTS	CHECK	CLEAN	GREASE	REPLACE	ADJUST	DRAIN
A	Daily and every 10 hours service	A1	- Engine oil level	X					
		A2	- Cooling liquid level	X					
		A3	- Fuel level	X					
		A4	- Tyre pressure and wheel nut tightness	X					
		A5	- Telescopic boom slide rails	X					
B	Every 50 hours service	B1	- Air filter cartridge ▲		X				
		B2	- Hydraulic oil level	X					
		B3	- Oil/water radiator grille		X				
		B4	- Telescopic boom shoes ■		X	X			
		B5	- Brake circuit fluid level	X					
		B6	- Battery	X					
		B7	- Fuel prefilter cartridge with water separator (if necessary)						X
		B8	- Articulation pin of the telescopic boom ◆		X	X			
		B9	- Telescopic boom upper shoes ◆		X	X			
		B10	- Articulation pin of the snap coupling ◆		X	X			
		B11	- Pins of the base plate and of the rod of the snap coupling cylinder ◆		X	X			
		B12	- Pins of the base plate and of the rod of the lifting coupling cylinder ◆		X	X			
		B13	- Pins of the base plate and of the rod of the compensation coupling cylinder ◆		X	X			
		B14	- Cab door ◆		X	X			
		B15	- Front and rear wheel pivot pins ◆		X	X			
		B16	- Steering pins of the front and rear axle ◆		X	X			
		B17	- Front and rear axle shaft cross journals ◆		X	X			
		B18	- Pins of the base plate and of the rod of the levelling coupling cylinder ◆		X	X			
		B19	- Grease the tilting bushes of the front and rear axle ◆		X	X			
		B20	- Front and rear axle drive shaft and cross journals ◆		X	X			
C	Every 250 hours service	C1	- Front and rear axle differential oil level	X					
		C2	- Front and rear wheel final drive oil level	X					
		C3	- Oil of front reduction gear on axle	X					
		C4	- V-belt tension	X					
D	Every 500 Engine oil hours service or once a year if the lift truck has not reached the 500 hours service in the year.	D1	- Transmission oil filter				X		
		D2	- Hydraulic oil exhaust filter cartridge				X		
		D3	- Breather filter				X		
		D4	- Front and rear wheel final drive oil				X		X
		D5	- Air filter cartridge ▲				X		
		D6	- Cab ventilation filter	X	X		X		
		D7	- V-belt	X			X		
		D8	- Valves clearance ❋ (*)	X				X	
		D9	- Engine oil and filter				X		

CHAPTER	FREQUENCY	OPERATION N°	COMPONENTS	CHECK	CLEAN	GREASE	REPLACE	ADJUST	DRAIN
E	Every 1000 hours service or once a year if the lift truck has not reached the 1000 hours service in the year.	E1	- Air filter safety cartridge ▲				X		
		E2	- Hydraulic oil and hydraulic oil exhaust filter cartridge				X		X
		E3	- Front and rear axle differential oil				X		X
		E4	- Transmission reduction gear box oil				X		X
		E5	- Fuel tank		X				
		E6	- Wear of the jib pads (*)	X					
F	Every 1500 hours service	F1	- Fuel prefilter cartridge		X		X		
		F2	- Fuel prefilter cartridge with water separator				X		
		F3	- Fuel filter cartridge				X		
		F4	- Cooling liquid of cooling system				X		
G	Occasional maintenance	G1	- Change a wheel						
		G2	- Tow the lift truck						
		G3	- Check the brake cylinder						
		G4	- Sling the lift truck						
		G5	- Transport the lift truck on a platform						
		G6	- Adjust the front headlamps						
		G7	- Air condition						

N.B. : To be carried out annually if the truck has not reached these operating times.

▲ : In a very dusty atmosphere reduce the interval and replace earlier.

■ : Every 10 hours up to the first 50 hours and periodically every 250 hours service.

◆ : In the event of prolonged use in an extremely dusty or oxidising atmosphere, reduce this interval to 10 working hours or every day.

✱ : Operation to be carried out the first time after 500 hours of service, periodically every 1500 hours of service.

(*) : (Consult your dealer).

OILS - GREASES - FLUIDS- FUEL - FILTERS

COMPONENTS FOR LUBRICATION	CAPACITY	RECOMMENDED PRODUCT
- I.C. ENGINE + FILTER	15 + 0,8 L	MANITOU 500 Engine oil (API CH4)
- FRONT WHEEL FINAL DRIVE - REAR WHEEL FINAL DRIVE	6 L 6 L	Special MANITOU oil for immersed brakes
- FRONT AXLE DIFFERENTIAL - GEARBOX - REAR AXLE DIFFERENTIAL	35 L 4,4 L 35 L	Special MANITOU oil for immersed brakes
- HYDRAULIC FLUID TANK	200 L	Oil MANITOU ISO 46
- BRAKING CIRCUIT	0,8 L	Oil SHELL LHM-S
- GENERAL GREASING		Grease HD NLGI 2
- TELESCOPIC BOOM GREASING		Grease HD NLGI 2
- COOLING CIRCUIT	16 L	MANITOU ANTIFREEZE (-25°) MANITOU ANTIFREEZE (-30°)
- FUEL TANK	200 L	Diesel *

*FEATURES OF FUEL

Use good quality fuel to obtain the best performance out of the I.C. engine.
FEATURES OF THE RECOMMENDED FUEL :

- *DERV in accordance with EN590*
- *BS2869 Class A2*
- *ASTM D975 - 91 Class 2D*
- *JIS K2204 (1992) Degrees 1, 2, 3 and Special Degree 3.*

N.B. : HYDROSTATIC TRANSMISSION FILTER, HYDRAULIC FILTER AND ENGINE OIL AND FILTER MUST BE CHANGED AFTER THE FIRST 50 WORKING HOURS TO GUARANTEE SAFETY.

A - EVERY DAY EVERY 10 WORKING HOURS

A1 - CHECK THE ENGINE OIL LEVEL

Before checking the oil level, make sure that the engine is stopped and that the truck is on a flat, horizontal surface.
To obtain accurate information, wait for a few minutes after the engine stops so that the oil flows into the engine sump.

Remove the dipstick “1” (fig. A1), clean it and check the oil level. Top up if necessary by removing the filler cap “2” (fig. A1).

FIG. A1

A2 - CHECK THE COOLING LIQUID LEVEL

This is done on the cooling liquid tank in the engine compartment. There are two notches on the tank to indicate a minimum and a maximum; check to make sure the liquid level is always between these values.

ATTENTION: Open the cap to top up the cooling system only if the temperature of the liquid is less than 90°C/194°F.
In any case, it is obligatory to use protective gloves and clothing as well as safety goggles.

FIG. A2

If topping up is required, operate carefully, as follows:
- Turn cap “1” (fig. A2) anticlockwise gradually to the safety stop position.
- Release the pressure and the steam.
- Press the cap and remove it by rotating it.

If necessary, add water and antifreeze liquid.
Occasionally grease the radiator cap “1” (fig. A2) to facilitate its removal.

ATTENTION: Before topping up, wait for the cooling liquid temperature to drop below 50° C/122° F.

A3 - CHECK THE FUEL LEVEL

Place the truck on a horizontal surface with the engine stopped.

To minimise the condensation due to weather conditions, the fuel tank should be kept full as far as possible.

- Remove the cap “1” (Fig. A3).
- Through the filler intake, fill the tank with clean Diesel fuel, filtered by a rose pipe or a clean cloth which does not leave residues.
- Replace the cap “1” (Fig. A3).

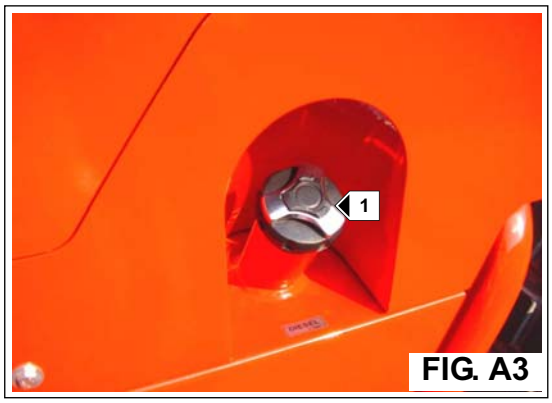


FIG. A3

Never smoke or approach with naked lights during filling or when the tank is open.
Never fill up with the engine running.

A4 - TYRE PRESSURE AND WHEEL NUT TIGHTNESS

Check the tyre pressure and adjust if necessary (see “Characteristics” section).
Check the tyres for any cuts, bulges, signs of wear, etc.
Check the tightness of the wheel nuts (see Fig. A4).

A4

WHEEL NUT TORQUE LOADING	
FRONT WHEEL	500Nm
REAR WHEEL	500Nm

Failure to follow these instructions may cause damage and breakage of the wheel fixing nuts, leading to accidents.

A5 - CHECK THE TELESCOPIC BOOM SLIDE RAILS

Extend the telescopic boom completely.
Check to ensure the telescopic boom slide rails are greased properly.
If necessary, clean and grease the telescopic boom slide rails (see B4).

B - EVERY 50 WORKING HOURS

B1 - CLEANING THE AIR FILTER CARTRIDGE

Slacken nut 1(Fig. B1/1) and remove cover 2 (Fig. B1/1).
Slacken nut 3 (Fig. B1/2) which fixes cartridge 4 (Fig. B1/2).
Clean the filter cartridge using a jet of compressed air directed from inside outwards.
Clean the inside of the filter housing using a clean, damp cloth that does not leave residue, protecting the inlet tube to the I.C. engine. Check the condition of the cartridge.
Cartridges that are no longer efficient must be replaced immediately.
Refit cartridge 4 (Fig. B1/2) inside the filter and fix it by means of nut 3 (Fig. B1/2).
Refit cover 2 (Fig. B1/1) with the valve facing downwards and lock it by means of nut 1 (Fig. B1/1).

Never wash an air filter cartridge.

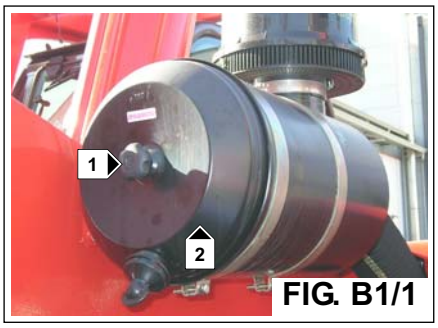


FIG. B1/1

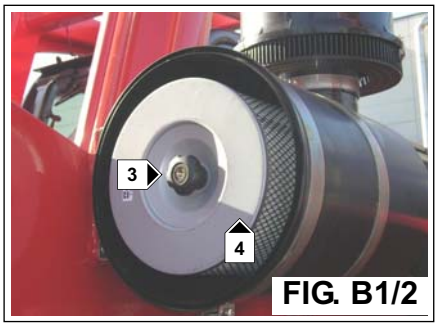


FIG. B1/2

B2 - CHECK THE HYDRAULIC OIL LEVEL.

Place the truck on a flat surface with the engine off and the telescopic boom retracted and as low as possible.
Refer to the gauge “1” (fig. B2/1).
The oil level is correct when it is 10 mm under the maximum the upper and lower marks.
If necessary, top up with oil (see “OILS - GREASES - FLUIDS - FUEL - FILTERS” table) through the filler hole “1” (fig. B2/2).
The oil must always be kept topped up to the maximum level, since cooling improves as the oil passes through the tank.

FIG. B2/1

B3 - CLEAN THE OIL/WATER RADIATOR GRILLE

To prevent the radiator from clogging (water radiator fig. B3/1 ; oil radiator fig. B3/2), it must be cleaned with a jet of compressed air from the inside towards the outside.
This is the only way to clean off the debris.

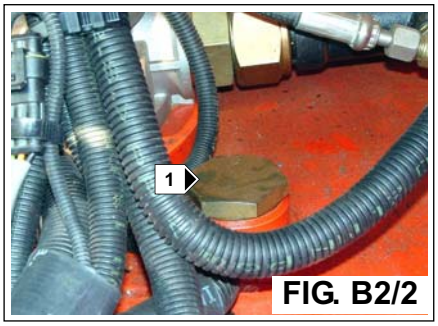


FIG. B2/2

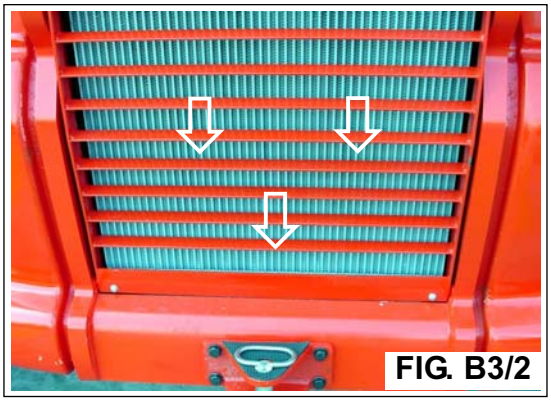


FIG. B3/2

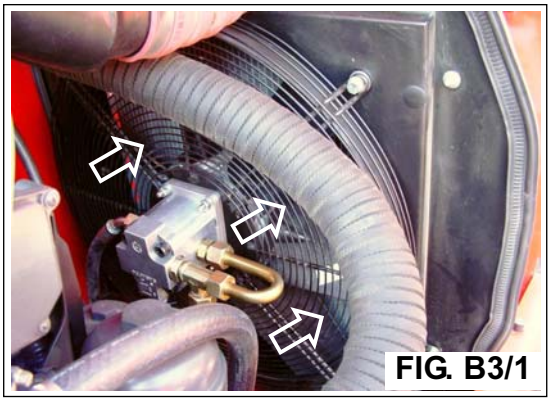


FIG. B3/1

B4 - CLEAN AND GREASE THE TELESCOPIC BOOM SHOES

Every 10 hours up to the first 50 hours and periodically every 250 hours service

- Completely extend the telescopic boom.
- Use a brush to apply a layer of grease (see “OILS - GREASES - FLUIDS - FUEL - FILTERS” table) to the 4 sides of the telescopic boom (fig. B4).
- Operate the telescopic boom several times to distribute the grease evenly.
- Remove the excess grease.

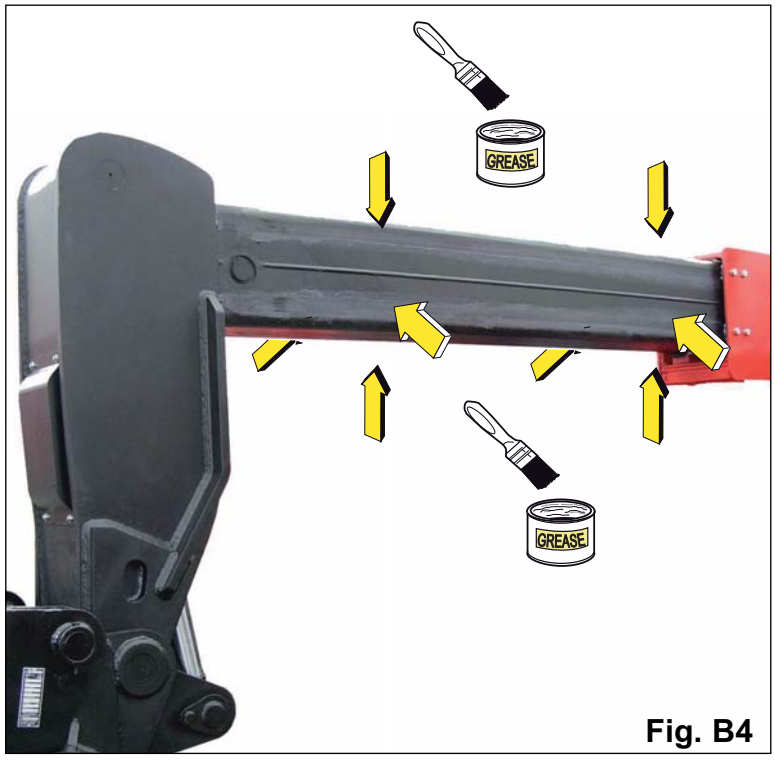


Fig. B4

B5 - CHECK THE BRAKE CIRCUIT FLUID LEVEL

Place the truck on a flat surface with the engine off.

- Remove the casing giving access to the braking fluid tank.
- The fluid must be at the tank 10 mm under the maximum level.
- If necessary, add oil through the filler orifice “1” (Fig. B5) (see “OILS - GREASES - FLUIDS - FUEL - FILTERS” table).

In case of an abnormal drop in the level, consult your agent or dealer.

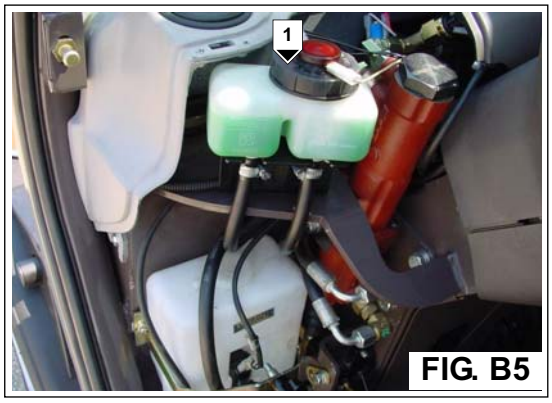


FIG. B5

B6 - CHECK THE LEVEL OF THE BATTERY ELECTROLYTE

Check the level of the electrolyte in each battery cell “1” (fig. B6/1).
If necessary, add only distilled water to restore the level.

Never add sulphuric acid.
If frequent topping up with distilled water becomes necessary, or if the battery is subject to getting discharged, check the regulator voltage, which must be between 13 V and 14,7 V, with the engine running at maximum speed.
Once in a while, check the connecting terminals to make sure they are not rusted.
If the vehicle is to remain unused for a long time, disconnect the battery.

When the ambient temperature is high, the level should be checked more frequently than once every 50 hours.

FIG. B6/1

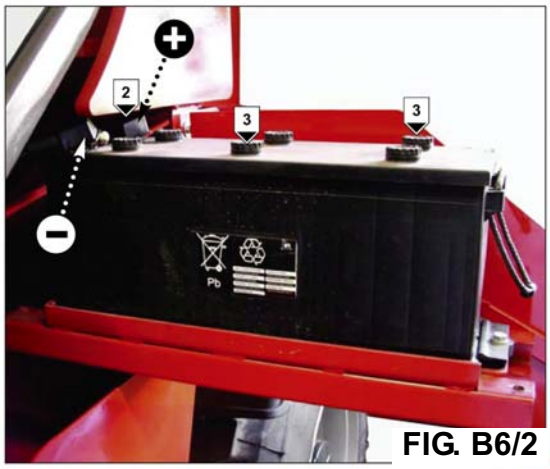


FIG. B6/2

Maintenance **:**
- Check connections “2” (fig. B6/2).
- Check eleclrolyte levels regularly “3” (fig. B6/2).
  Add distilled or demineralised water if necessary.
- Never add acid.
- Battery needs to be recharged if voltage drops below 12.3 V (specific gravity of 1.21).
- If vehicle is not being used for a long period, disconnect the battery.

F. Charging (off the vehicle) **:**
- Remove vents “3” (fig. B6/2).
- Only use direct current (DC).
- Connecl “**+**” wìth “**+**”, “**-**” wìth “**-**”.
- Charge at recommended bench rate i.e. 10% of battery capacity.
- The battery is fully charged when specific gravìty has reached 1.28 (1.23 under tropical climate).
- When charge has completed.
- Switch off charger then disconnect.
- Check electrolyte level.

B7 - CLEAN THE FUEL PRE-FILTER WITH WATER SEPARATOR (if necessary)

Position the truck on a level surface with the engine switched off. Open the engine hood. Check for liquid in the tank (B7/1) and top up if necessary. Place a container under the drain plug (B7/2) and unscrew it. Let the gas oil flow out until it is free of impurities. Screw the plug back on while the gas oil is flowing out.

GREASE POINTS

*To be carried **out weekly**, if the lift truck has been operated for less than 50 hours during the week.*

***In the event of prolonged use** in an extremely dusty or oxidising atmosphere, **reduce** this interval **to 10 working hours or every day**.*

B8 - Grease the articulation pin of the telescopic boom “1” (fig. B8).
B9 - Grease the telescopic boom upper shoes “1” (fig. B9).
B10 - Grease the articulation pin of the snap coupling “1” (fig. B10).
B11 - Grease the pins of the base plate “1” (fig. B11/1) and of the rod “2” (fig. B11/2) of the snap coupling cylinder.
B12 - Grease the pins of the base plate “1” (fig. B12/1) and of the rod “2” (fig. B12/2) of the lifting cylinder.
B13 - Grease the pins of the base plate “3” (fig. B13/1) and of the rod “4” (fig. B13/2) of the compensation cylinder.
B14 - Grease the cab door “1” (fig. B14).
B15 - Grease the pivots of the front and rear wheels “1” (fig. B15/1 - B15/2).
B16 - Grease the steering pins the front and rear axle “1” (fig. B16).
B17 - Grease the front and rear axle shaft cross journals “1” (fig. B17).

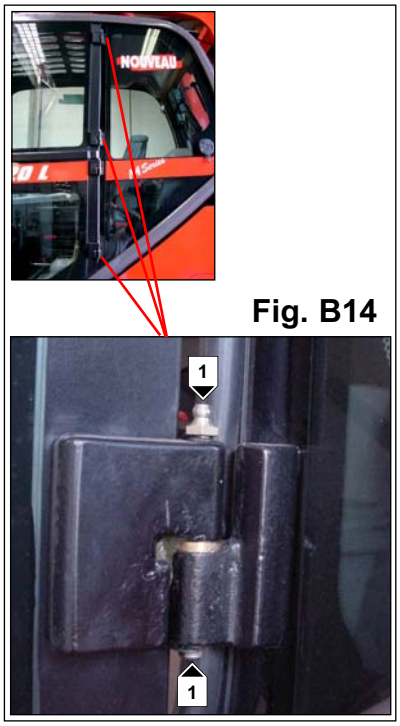


Fig. B14

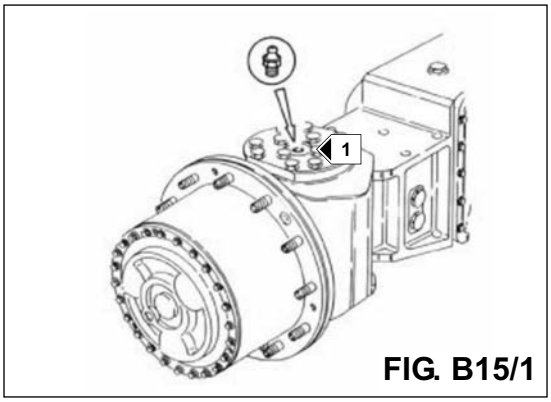


FIG. B15/1

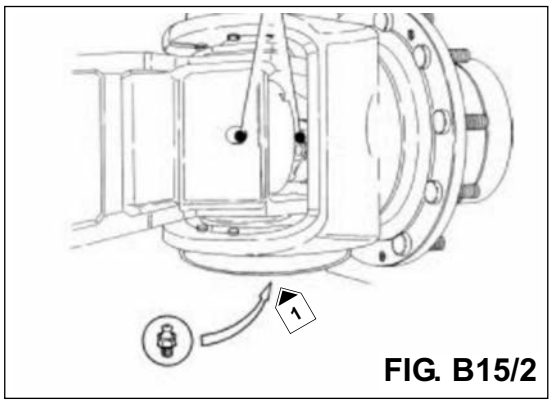


FIG. B15/2

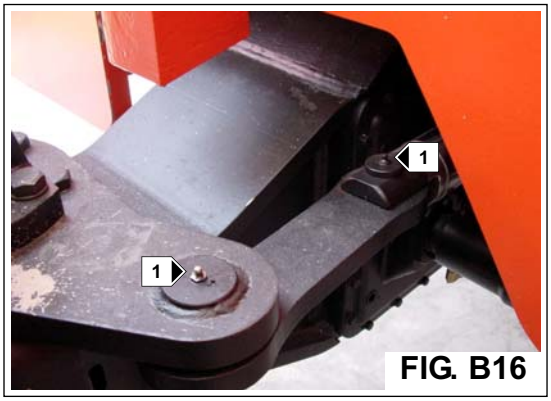


FIG. B16

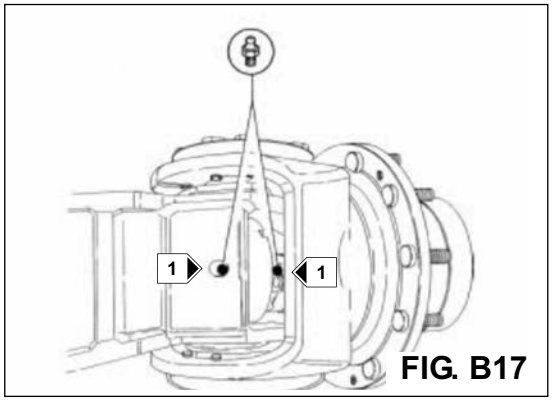


FIG. B17

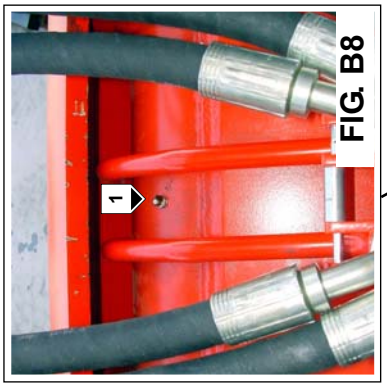


FIG. B8
1

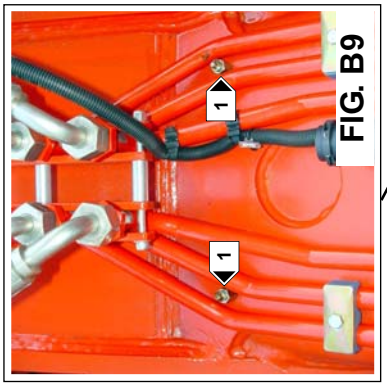


FIG. B9
1
1


FIG. B13/2
2

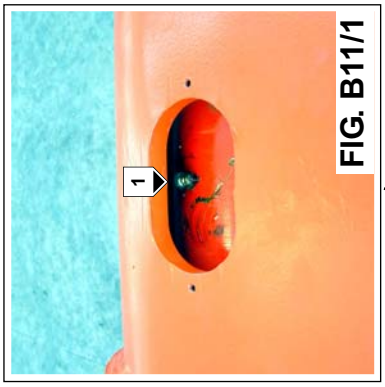


FIG. B11/1
1

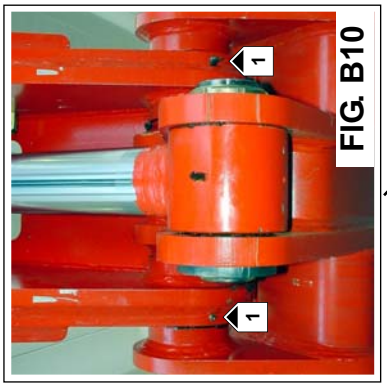


FIG. B10
1
1

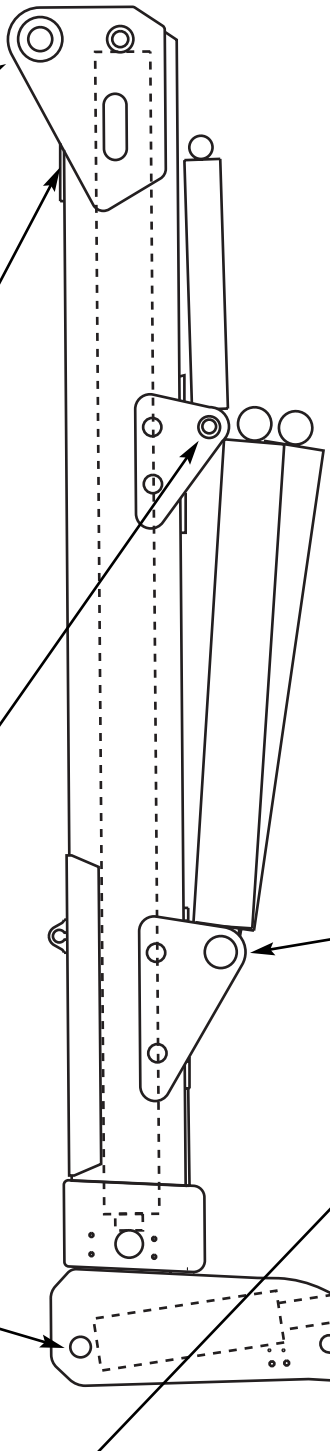



FIG. B13/1
1


FIG. B12/1
1
1

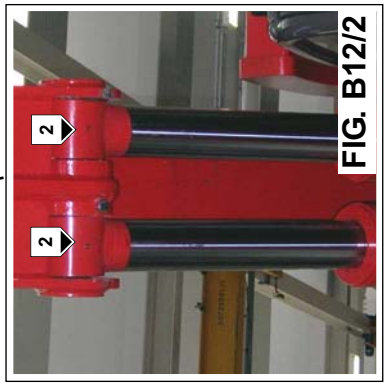


FIG. B12/2
2
2


FIG. B11/2
2

B18 - Grease the pins of the rod “1” (fig. B18) and of the base plate “2” (fig. B18) of the levelling coupling cylinder.

B19 - Grease tilting bushes of front axle “1-2” (Fig. B19/1).
Grease tilting bushes of rear axle “3-4” (Fig. B19/2).

B20 - Grease the axle drive shaft and cross journals on the rear side “1” (fig. B20/1) and front side “1” (fig. B20/2-fig. B20/3).

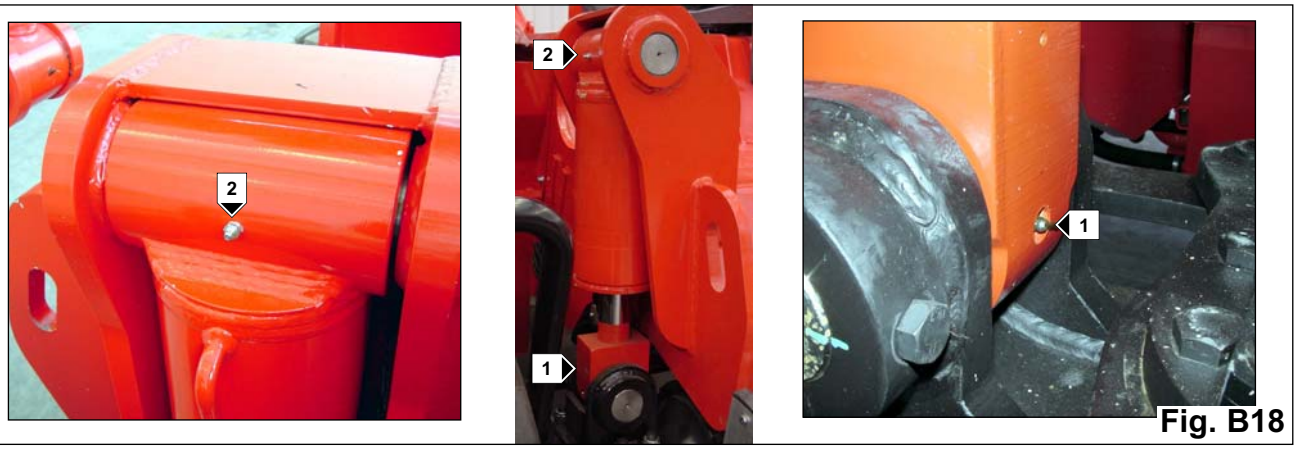


Fig. B18

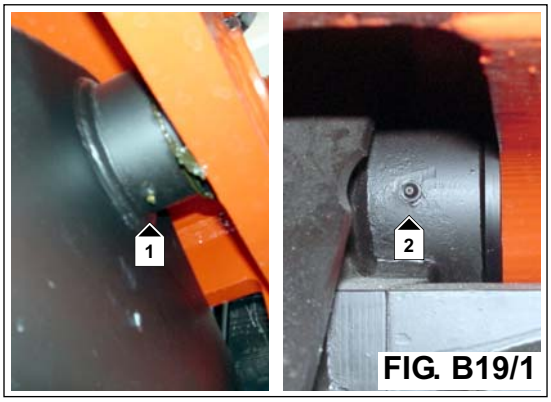


FIG. B19/1

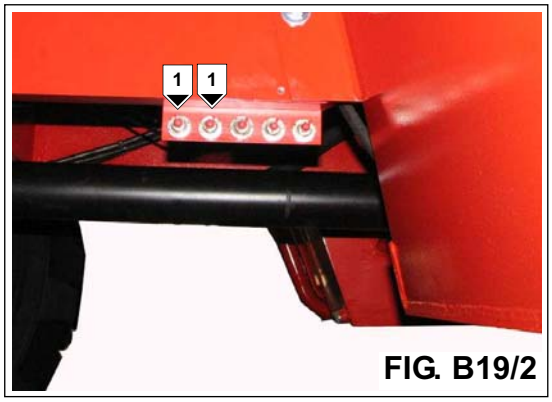


FIG. B19/2

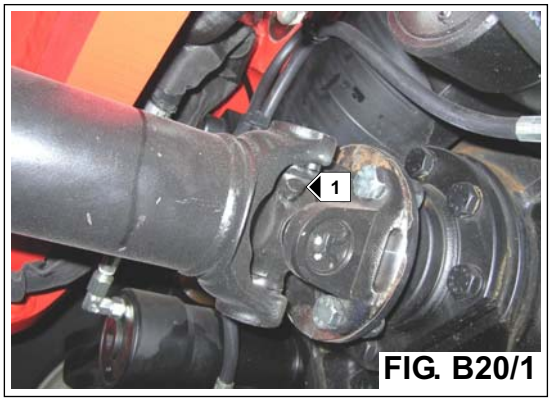


FIG. B20/1

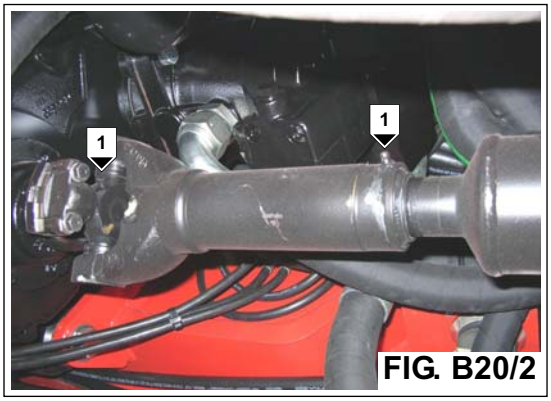


FIG. B20/2

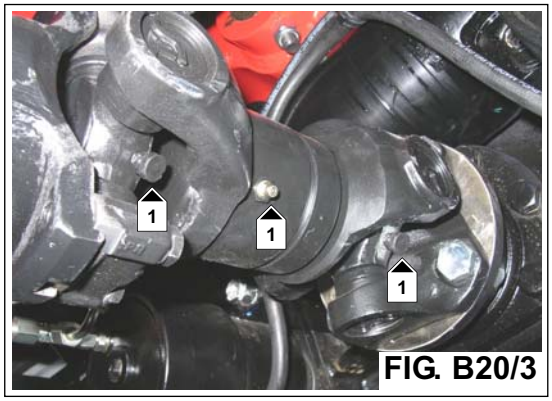


FIG. B20/3

C - EVERY 250 WORKING HOURS

C1 - CHECK THE OIL LEVEL OF THE FRONT AND REAR AXLE DIFFERENTIAL.

Place the truck on a horizontal surface with the engine stopped.
Check the oil level of the front axle differential.
Remove the cap “1” (fig. C1/1).
The level is correct when the oil is just up to the level indicator cap “1” (fig. C1/1).
If necessary, top up with oil through the filler inlet “1” (fig. C1/1). (see “OILS - GREASES - FLUIDS - FUEL - FILTERS” table).
Repeat this operation for the rear axle differential using the filler inlet “1” (fig. C1/2).

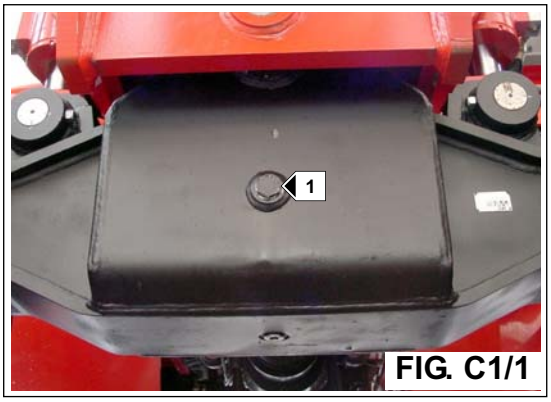


FIG. C1/1

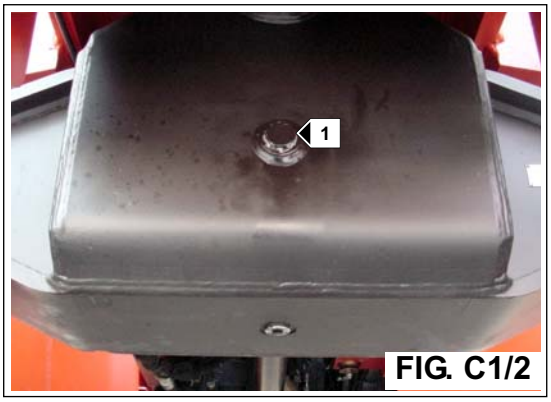


FIG. C1/2

C2 - CHECK THE OIL LEVEL OF THE FRONT AND REAR WHEEL FINAL DRIVES.

Place the truck on a horizontal surface with the engine stopped.
Check the level on the final drive of each front wheel.
Set the level cap “1” (fig. C2) horizontal.
Remove the cap: the oil must be up to the surface of the hole.
Top up with oil if necessary (see “OILS - GREASES - FLUIDS - FUEL - FILTERS” table).
Carry out the same operation on the final drive of each rear wheel.

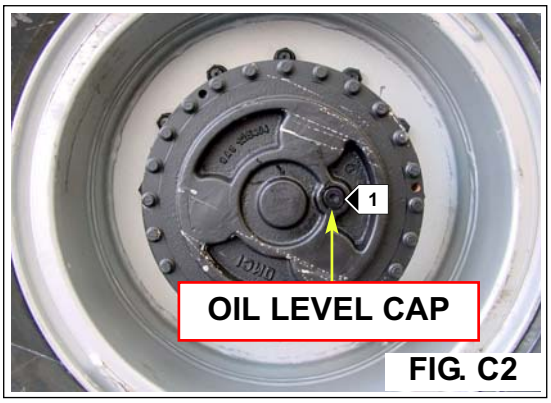


FIG. C2

C3 - CHECK THE OIL OF FRONT REDUCTION GEAR ON AXLE

Place the truck on a horizontal surface with the engine stopped.

- Remove the level cap “1” (Fig. C3), the oil must come up to the orifice.
- If necessary, top up with oil through the same orifice. (See “OILS - GREASES - FLUIDS - FUEL - FILTERS” table).
- Replace and re-tighten the level cap “1” (Fig. C3).

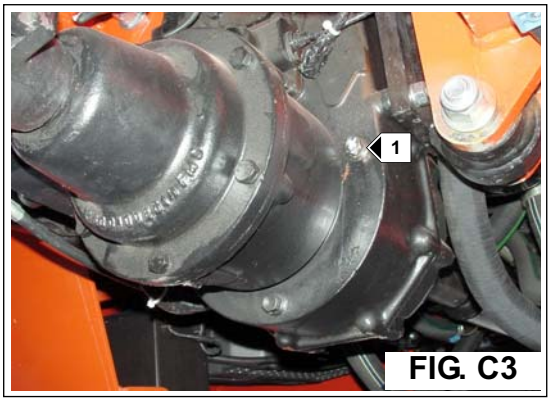


FIG. C3

C4 - CHECKING THE POLY-V RIBBED BELT TENSION

Open the engine hood and remove crank case 1 C4/1.
Check for the presence of damage on ribbed belt 2 C4/2 moving one section at a time; to carry out this check:
- Make a mark with chalk on the ribbed belt;
- Make the engine run in bursts or move the ribbed belt by means of a rotation device up to the chalk mark;
- Replace ribbed belt 2 C4/2 if one of the following types of damage mentioned are present (C4/3).

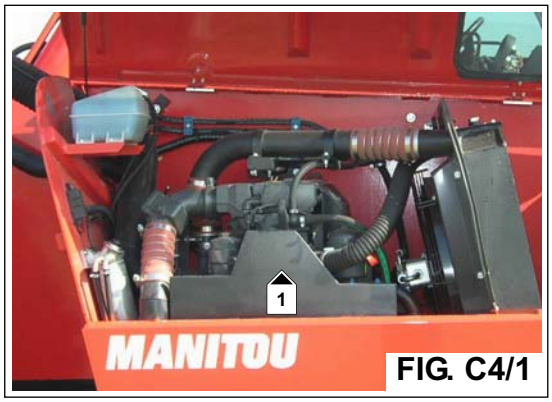


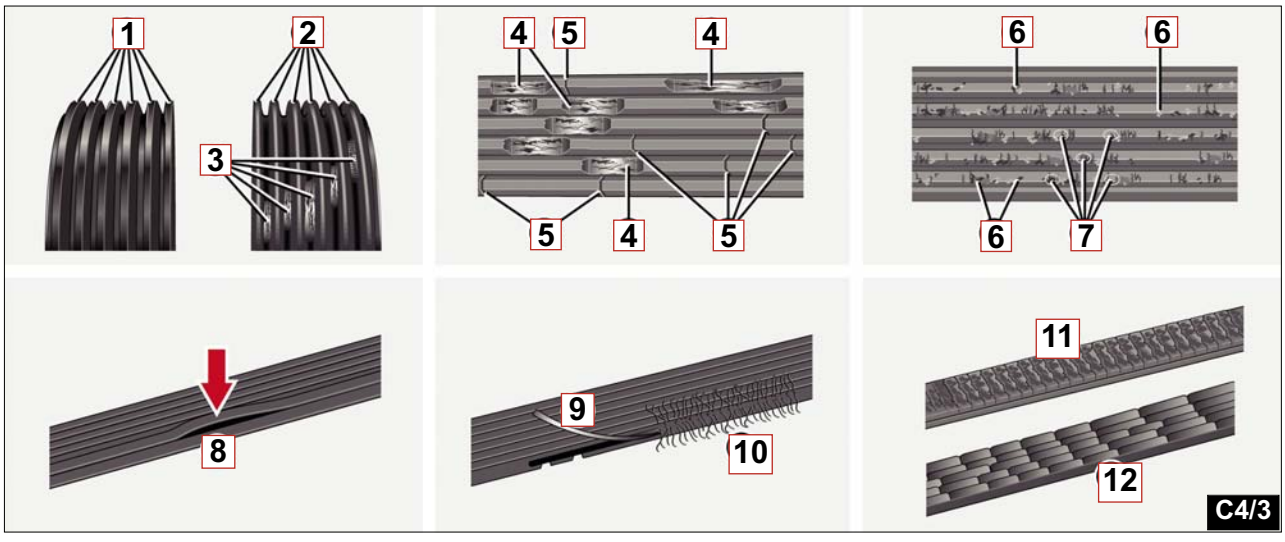
FIG. C4/1

The damage

1 – New belt (comparison; ribbing)
2 – Wear on the sides: wedge-shaped ribbing
3 – Frame visible at the bottom of the ribbing
4 – Ribbing broken
5 – Transverse cracks in different ribs
6 – Rubber nodules at the bottom of the belt
7 – Dirt or rubble deposits
8 – Ribbing detached from the bottom of the belt
9 – Wires of the frame torn on the sides
10 – Outer wires of the frame frayed
11 – Transverse cracks on the back
12 – Transverse cracks in different ribs

FIG. C4/2

For assembling and disassembling the ribbed belt, see point D7.



D - EVERY 500 WORKING HOURS

D1 - CHANGING THE TRANSMISSION OIL FILTER

Use a collar wrench to remove the transmission oil filter “1” (fig. D1/1) and throw it away together with the gasket.
Clean the filter support with a clean cloth which does not leave threads.
Fit the new filter of the same characteristics, see table (“FILTER ELEMENTS AND BELTS”) using your hands only, taking care that the gasket (lubricated before fitting) is properly positioned.
Start the truck and check that there are no leaks.

To check the efficency of the filter see the indicator “2” (fig. D1/2).
If the indicator reach the “red” zone before 500 working hours change immediately the filter.

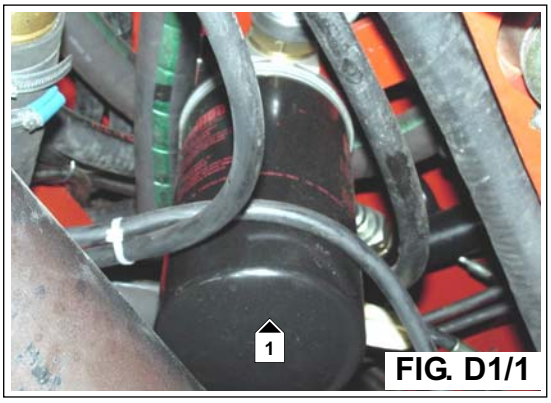


FIG. D1/1

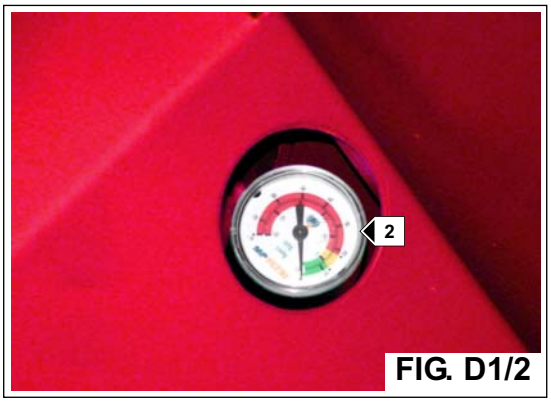


FIG. D1/2

D2 - CHANGING THE HYDRAULIC OIL EXHAUST FILTER CARTRIDGE

Slacken the 4 screws that fix the cover of filter “1” (fig. D2), remove the old cartridge.
Fit the new filter of the same characteristics, see table (“FILTER ELEMENTS AND BELTS”), taking care that the gasket (lubricated before fitting) is properly positioned.
Start the truck and check that there are no leaks.

Before fitting the cover of filter “1” (Fig. D2), check that the cartridge has been correctly installed.

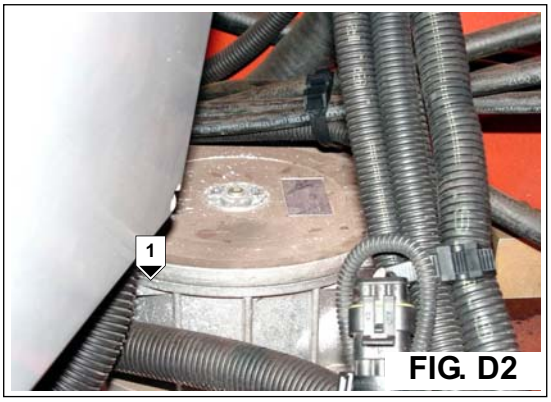


FIG. D2

D3 - REPLACING THE BREATHER FILTER

Unscrew the filter “1” (fig. D3) in the back of the cab and replace it with a new one of the same characteristics, see table (“FILTER ELEMENTS AND BELTS”).
Fit the new filter, tightening it by hand.

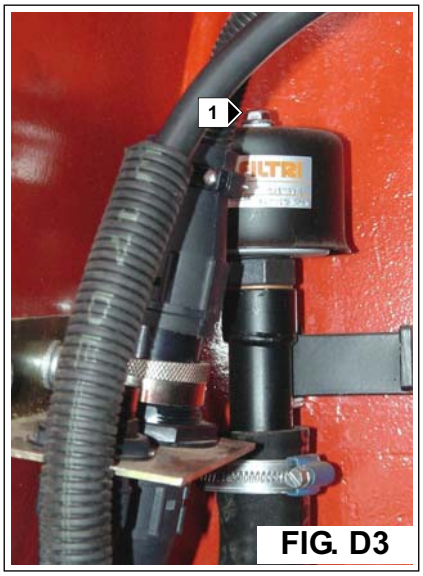


FIG. D3

D4 - CHANGE THE OIL IN THE FRONT AND REAR AXLE DIFFERENTIAL

Place the truck on a horizontal surface with the engine stopped and the differential oil still hot.

Drain the oil from the front axle differential.
Place a container under the drainage cap “1” (fig. E4/1) and allow the oil to flow out.
Remove the filler cap “2” (fig. E4/1) to ensure complete drainage.
Replace and tighten the cap “1” (fig. E4/1).
Fill up with oil, see table (“OILS - GREASES - FLUIDS - FUEL - FILTERS”) through the filler inlet “2” (fig. E4/1).
The level is correct when the oil is just up to the level indicator cap “2” (fig. E4/1).
Check for any leaks from the drainage cap.
Replace and tighten the filler cap “2” (Fig. E4/1).
Carry out the same operation for the rear axle differential using the drainage cap “3” (fig. E4/2) and the filler inlet “4” (fig. E4/2).

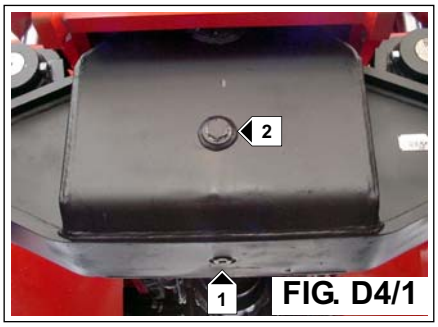


FIG. D4/1

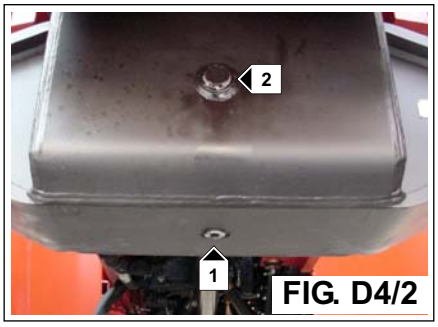


FIG. D4/2

D5 - REPLACE THE AIR FILTER CARTRIDGE

The air taken in by the engine is filtered by a dry air filter; the truck must not be used without the air filter or with a damaged filter.
Slacken nut 1(fig. D5/1) and remove cover 2 (Fig. D5/1).
Then unscrew nut 3 (Fig. D5/2) which fixes filter cartridge 4 (Fig. D5/2) and remove it.
Wipe the inside of the filter with a clean, damp cloth that does not leave residue.

Never wash an air filter cartridge.

Fit a new cartridge having the same features (“FILTER ELEMENTS AND BELTS TABLE”) in place of the one removed, fix it by means of butterfly nut 3 (Fig. D5/2).
Refit cover 2 (Fig. D5/1) with the valve facing downwards and lock it by means of nut 1 (Fig. D5/1).

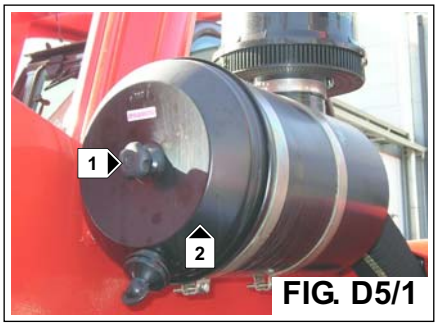


FIG. D5/1

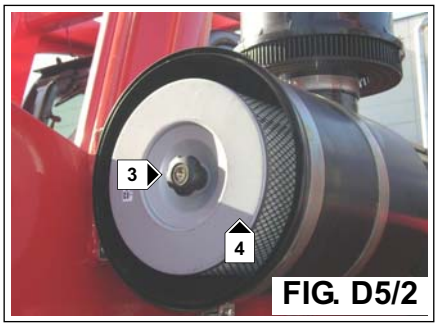


FIG. D5/2

D6 - CLEAN THE CAB VENTILATION FILTER

Lift up protective casing “1” (Fig. D6).
Lift out cabin ventilation filter “2” (Fig. D6).
Clean the filter with a compressed air jet.
Check its condition and change if necessary with another of the same characteristics, see table (“FILTER ELEMENTS AND BELTS”).
Refit the filter and protective casing.

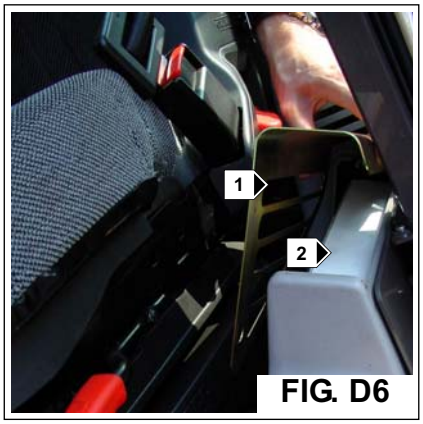


FIG. D6

D7 - REPLACE THE POLY-V RIBBED BELT

Replace the ribbed V-belt if one of the following types of damage illustrated is present (C4/3)

Take great care while disassembling and assembling the ribbed V-belt, keeping the fingers well out of the area between the pulley and the belt.

Insert release lever “2” (fig. D7) using a 17 mm wrench on the hex head screw of the belt tightener roller “1” (Fig. D7) .

Tip the belt-tightener roller upwards and remove the ribbed V-belt.
Reposition the belt-tightener device.

Check to make sure the belt-tightener device and the pulleys are in perfect condition (for example, that there are no damaged bearings on the belt-tightener device, the belt-tightener roller and the return rollers and that the pulley profile is not worn); replace the components if necessary.

Apply the ribbed V-belt (new) on all the pulleys, except on the belt-tightener roller (observe Fig. D7 which shows the route of the ribbed V-belt).

Rise the belt-tightener roller by means of a lever, apply the ribbed V-belt and then bring the belt-tightener roller backwards.

Remove the release lever and check to ensure the ribbed V-belt is lodged correctly on the pulleys.

Route of the ribbed V-belt (Fig. D7):
3 Alternator
4 Belt-tightener roller
5 Cooling liquid pump
6 Engine shaft

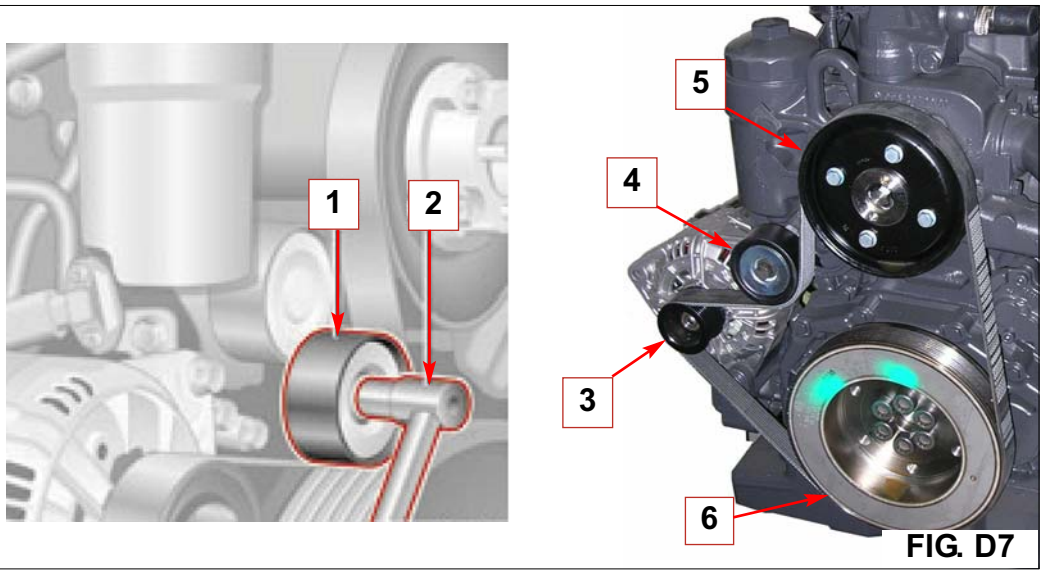


FIG. D7

D8 - CHECKING/ADJUSTING THE VALVE CLEARANCE

Operation to be performed the first time on reaching 500 hours of service, **periodically every 1500 hours of service.**

Adjust the valve clearance with the engine cold.

Disassembling/assembling the cover of the head end "1" (Fig. D8).

If the head covers are excessively smeared, wipe and then remove them.

Disassembly:

Remove the engine vent tube "6" (fig. D8/1) from the cover of the cylinders head "2" (Fig. D8/1).
Unscrew and remove the hollow, hex head screw "3" (fig. D8/1) from the cover of the cylinders head together with sealing ring "4" (Fig. D8/1).
Remove the head cover "2" (Fig. D8/1).

Assembly:

Clean the sealing surfaces of the cylinder heads and relative cover "2" (Fig. D8/1).
Always replace gasket "5" (fig. D8/1) between the cover of the cylinder head and the head.
Fit the cylinders head cover "2" (Fig. D8/1).
Insert the hollow, hex head screw "3" (Fig. D8/1) with new sealing rings "4" (Fig. D8/1) and tighten: tightening torque: 30 Nm.

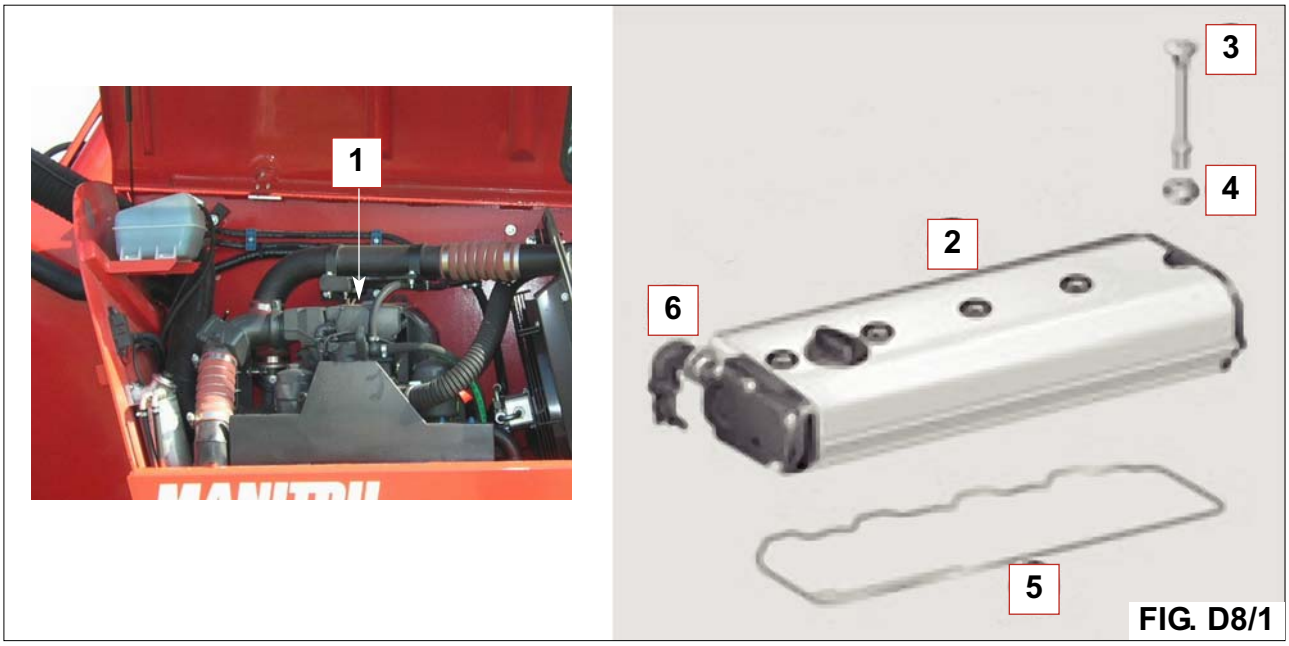


FIG. D8/1

Layout of cylinders and valves (Fig. D8/2)

⇨ = suction valve

⬅ = discharge valve

X = handwheel side

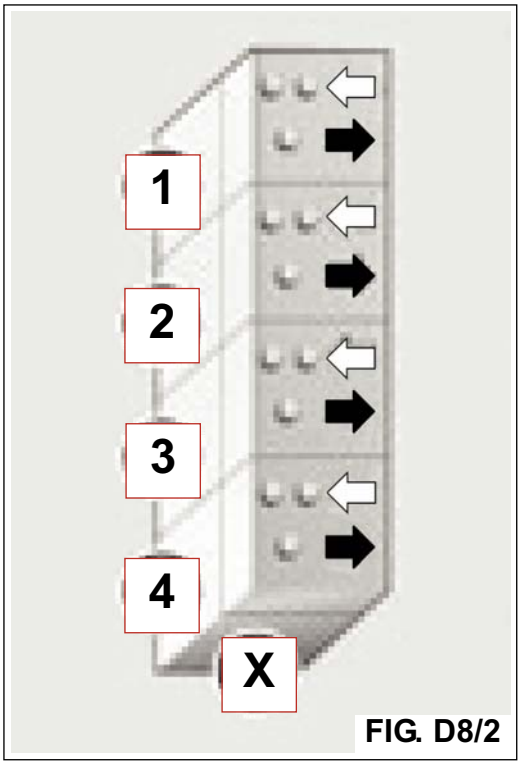


FIG. D8/2

Checking/adjusting the clearance of the valves

Measure the valve clearance between the rocker arm and the valve stem (discharge valve) or the valves bridge (suction valve) using a thickness gauge (arrow).

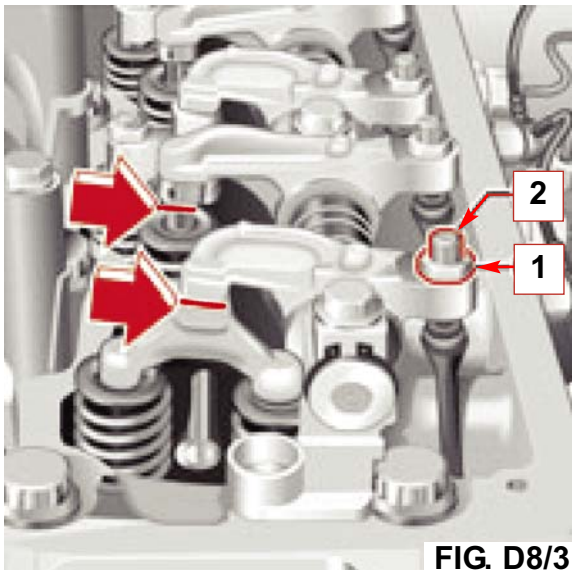


FIG. D8/3

The thickness gauge must be able to pass through with slight resistance.

Valve clearance:

suction valve	=	0.40 mm
discharge valve	=	0.60 mm

To adjust the valve clearance, slacken lock nut “1” (fig. D8/3).

Adjust the valve clearance by turning adjuster screw “2” (Fig. D8/3).

Retighten the lock nut. Tightening torque: 25 Nm.

Check the valve clearance again and correct it if necessary.

D9 - CHANGE THE OIL AND THE ENGINE FILTER

Change the oil only with the engine at operating temperature.

Engine oil filter

Unscrew the threaded oil filter cap using a 36mm pipe wrench Drain the oil out of the filter casing.

Remove threaded cap “1” (fig. D9/1) together with oil filter cartridge “3” (Fig. D9/1) and release cartridge “3” (Fig. D9/1) by pressing on the sides of the lower edge.

Make sure no foreign bodies enter the filter casing. The filter casing must not be wiped with cloth or anything similar.

Change sealing ring “2” (Fig. D9/1) present on threaded cap “1” (Fig. D9/1).
Grease sealing ring “2” slightly (Fig. D9/1).

Introduce the new cartidge “3” (fig. D9/1) in threaded cap “1” (Fig. D9/1) and press to fit it in place.

Screw the threaded cap on the oil filter casing and lock it tight.
Tightening torque: 40 Nm.

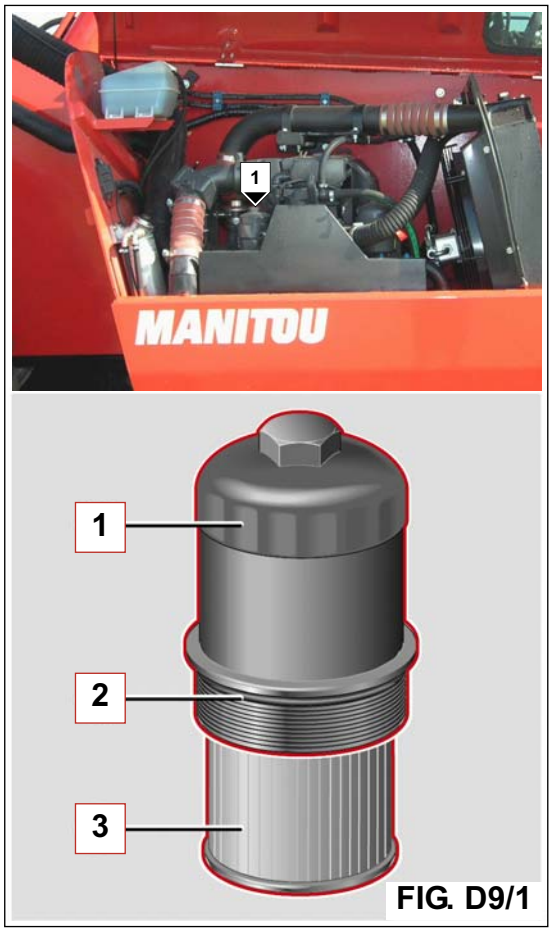


FIG. D9/1

Drain the engine oil

Place a suitable container under the oil drainage screw “4” (fig. D9/2) present on the lower part of the oil cup.
Unscrew the drainage screw carefully and allow the oil to flow out.

The engine oil and the filter must be disposed off in compliance with the legal prescriptions applicable in the place where the engine is used.

Refit the drainage screw with a new sealing ring and tighten it.
Tightening torque:
M20 x 1.5 – 60 Nm
M26 x 1.5 – 85 Nm

FIG. D9/2

Change the engine oil

Pour fresh oil into the engine through filler plug “5” (fig. D9/3), until the level reaches the max. notch on level rod “6” (Fig. D9/3).

Start up the engine at minimum speed and observe the oil low pressure indicator.

Keep the engine running at minimum speed until the low pressure indicator switches off.
Switch off the engine immediately if the low pressure indicator does not switch off after about 10 seconds and check for the cause of the oil pressure failure in the engine.

Check the oil filter seal and the discharge screw seal.

About 5 minutes after switching off the engine, check the oil level and, if necessary, top up with oil up to the max. notch on level rod “6” (Fig. D9/3).

FIG. D9/3

E - EVERY 1000 WORKING HOURS

E1 - REPLACING THE AIR FILTER SAFETY CARTRIDGE

Dismantle the air filter cartridge (see Chapter: D5).
Remove the air filter safety cartridge “1” (Fig. E1) and replace it with a new one.
Then unscrew nut 1 (Fig. E1) which fixes filter cartridge 2 (Fig. E1) and remove it.
Fit a new cartridge having the same features (“FILTER ELEMENTS AND BELTS TABLE”) in place of the one removed, fix it by means of butterfly nut 1 (Fig. E1).
Refit the air filter cartridge (see Chapter: D5).

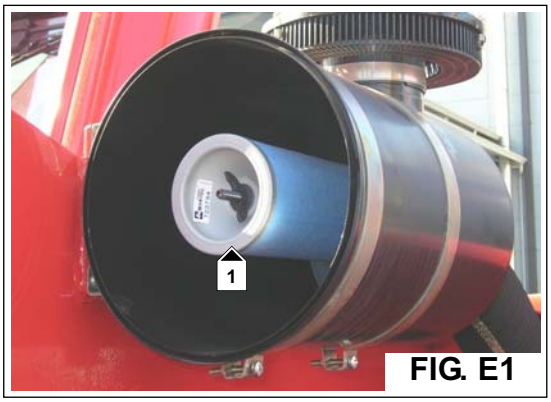


FIG. E1

E2 - CHANGING THE HYDRAULIC OIL AND HYDRAULIC OIL EXHAUST FILTER CARTRIDGE.

Before carrying out these procedures, make sure that the truck is on a horizontal surface, the engine is off and the boom raised.
Place a container under the drain cap “1” (fig. E2/1).
Remove the cap and allow the oil to fluid to flow out.
To speed up the emptying process, allow air to enter by removing the filler cap “1” (fig. E2/2).

Filling the tank.
Replace and tighten the drain cap “1” (fig.E2/1).
Fill the tank with oil, see table (“OILS - GREASES - FLUIDS - FUEL - FILTERS”) through the filler hole “1” (fig. E2/2) until the oil level reaches the mark on the gauge “1” (fig. E2/3).
Check for any leaks from the drainage hole.
Fit the cap to close the tank “1” (fig. E2/2).

Use only filtered, uncontaminated oil.

It may sometimes be necessary to bleed the pump intake circuit, if an al bubble has formed on drainage.
In this case, consult your agent or dealer.

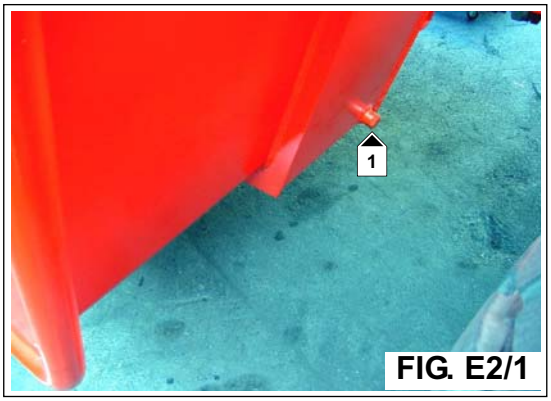


FIG. E2/1

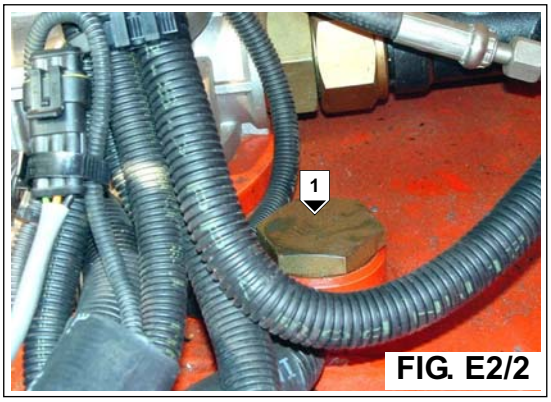


FIG. E2/2

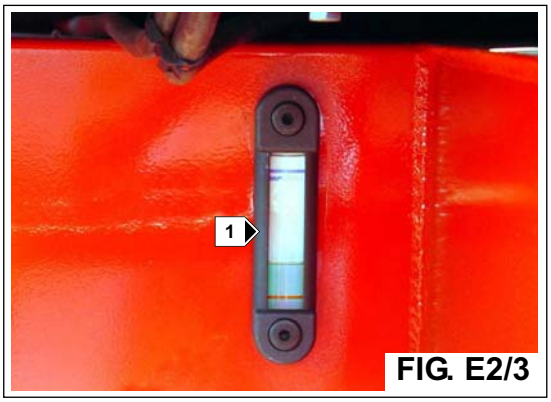


FIG. E2/3

E3 - CHANGING OIL IN FRONT AND REAR WHEEL FINAL DRIVES

Place the truck on a horizontal surface with the engine stopped and the final drive oil still hot.
Empty each front wheel final drive.
Place the cap “1” (fig. E3) in horizontal position, place a container under the drainage screws “2” (fig. E3) and unscrew them.
Take off the cap “1” (fig. E3) and allow all the oil to flow out.
Tighten the screws “2” (fig. E3) with a torque wrench of 130 Nm using loctite 270 for the thread and downcorning silicone type 7091 for the head of the screw.
Fill up with oil, see table (“OILS - GREASES - FLUIDS - FUEL - FILTERS”) through the filler hole “1” (fig. F3).
The level is correct when the oil is just up to the hole “1” (fig. E3).
Replace the cap “1” (fig.E3) and tighten it.
Repeat this operation for each rear wheel final drive.

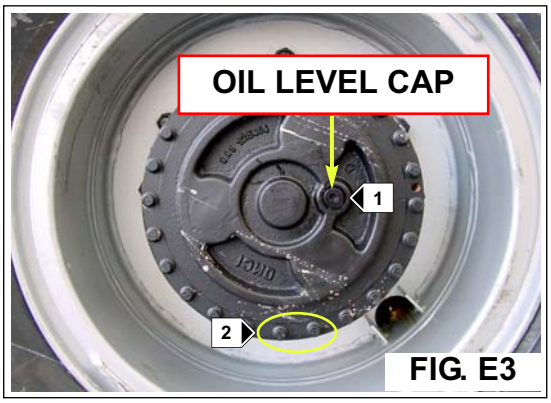


FIG. E3

E4 - CHANGE THE OIL IN THE FRONT AXLE REDUCTION GEAR

Set the truck on a horizontal surface with the engine off and the oil in the reduction gear still hot. Place a receptacle under drain plug “1” (fig. E4).
Remove plug 1 and allow the oil to drain out.
Remove fill and level plug “2” (fig. E4) to ensure that all oil has drained out.
Refit and tighten plug “1” (fig. E4).
Fill with oil (see “LUBRICANT” chart) through fill and level plug “2” (fig. E4).
The level is correct when flush with the top of the hole.
Refit and tighten the fill and level plug “2” (fig. E4).
Check for any leaks from the drain plug.

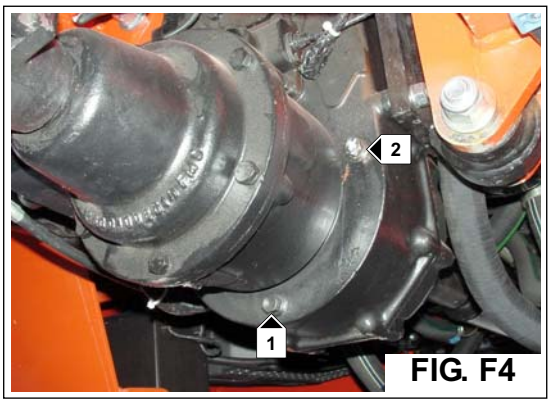


FIG. F4

E5 - EMPTYING AND CLEANING THE FUEL TANK.

During this operation, do not smoke and do not approach with naked lights

Place the truck on a horizontal surface; the engine must be stopped.
- Make a visual and manual check on the parts on the fuel circuit and in the tank which may leak.
- **In case of leaks, contact your agent or dealer.**

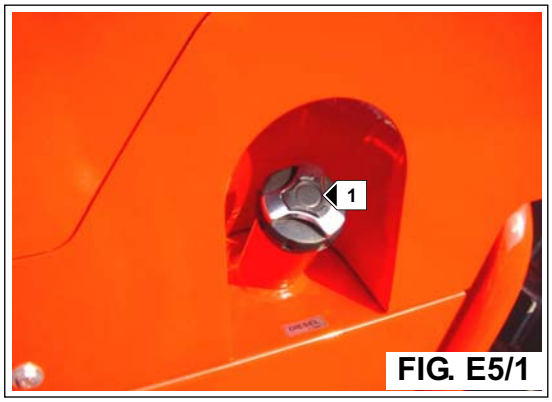


FIG. E5/1

Never attempt to make a weld or perform any other operation on your own: this might cause an explosion or a fire.

- Place a container under the drainage cap “1” (Fig. E5/2) and unscrew it.
- Remove the cap “1” (Fig. E5/1).
- Allow all the fuel to drain out and rinse with 10 litres of clean fuel, poured into the filler orifice.
- Replace and tighten the drainage cap “1” (Fig. E5/2).
- Start the thermic motor and let it run to the minimum for a few minutes, before using the truck at maximum speed.

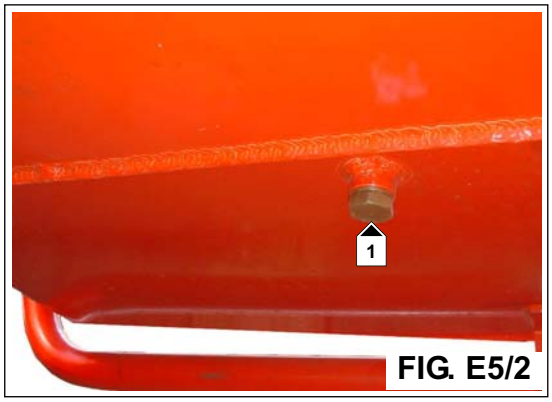


FIG. E5/2

E6 - CHECK THE WEAR OF THE JIB PADS

For this oparations, consult your agent or dealer.

F - EVERY 1500 WORKING HOURS

F1 -CLEAN THE FUEL PREFILTER CARTRIDGE

- Open the tank cap to discharge the excess pressure inside the system.
- Clean the outside of the fuel prefilter, after taking care to cover the ducts, hoses and cables which may be present under the prefilter.
- Unscrew the threaded cap “1” (fig. F1) and remove it from the filter casing together with filter cartridge “2” (Fig. F1).
- Clean the threaded cap “1” (Fig. F1) and filter cartridge “2” (Fig. F1).
- Replace the filter cartridge if it is excessively dirty or damaged.
- Check sealing ring “3” (Fig. F1) for the threaded cap and replace it, if necessary.
- Grease sealing ring “3” slightly (Fig. F1).
- Insert the filter cartridge in the threaded cap and screw the latter in the filter casing.
  Tightening torque: 25 Nm.

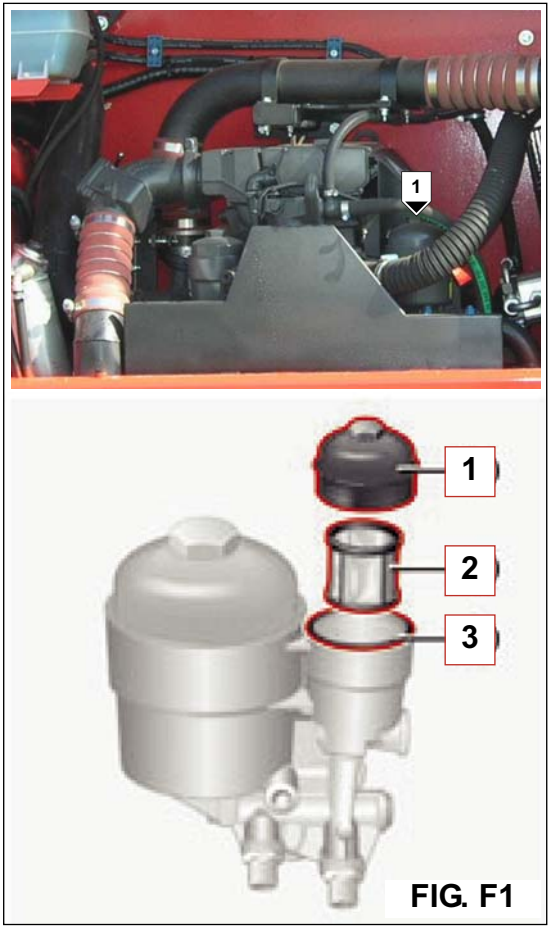


FIG. F1

F2 - REPLACE THE FUEL PREFILTER CARTRIDGE WITH WATER SEPARATOR

- Turn knob “1” (Fig. F2/1) clockwise to close the fuel flow during cartridge replacement.
- Open drainage valve “2” (Fig. F2/2) and bleed screw “3” (Fig. F2/1) and collect the water-fuel mixture flowing out of the filter element in a container.
- Unscrew and remove filter cartridge “4” (Fig. F2/2).
- Unscrew and remove the separator container “5” (fig. F2/2) from the filter cartridge and clean or replace it, as required.
- Reassemble by following the procedure described in reverse order, tightening elements “4” and “5” (fig. F2/2) manually on the filter body.
  In the assembly phase, use new lubricated sealing rings.
- Close drainage valve “2” (Fig. F2/2).
- Turn knob “1” (Fig. F2/1) anticlockwise to open the fuel flow.
- Press the small hand pump “6” (Fig. F2/1 - F2/2) repeatedly until the fuel flows out through the vent hole “3” (Fig. F2/1).
- Then close venting screw “3” (Fig. F2/1).
- Start up the engine and keep it running at minimum for about one minute to let out the air bubbles automatically from the supply system.
- Check for fuel leaks from the prefilter.

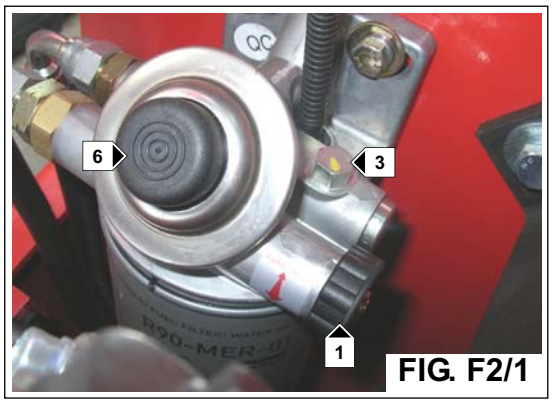


FIG. F2/1

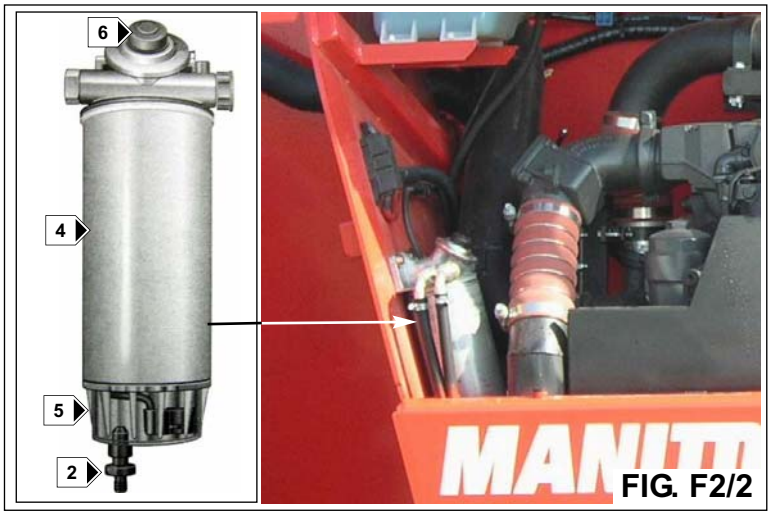


FIG. F2/2

F3 - REPLACE THE FUEL FILTER CARTRIDGE

Open the tank cap to prevent overpressure from building up inside.
Unscrew threaded cap “1” (Fig. F3) of the fuel filter using a pipe wrench.
Remove threaded cap “1” (Fig. F3) together with cartridge “3” (Fig. F3) of the filter from filter casing “5” (Fig. F3).
Drain out the fuel.

Remove the threaded cap “1” (Fig. F3) with filter cartridge “3” (Fig. F3).
Release filter cartridge “3” (Fig. F3) from the retainer by pressing on the sides of the lower edge.
Remove the cup containing the impurities “4” (fig. F3) from filter casing “5” (fig. F3) holding it by the tabs.
The filter casing must never contain water or impurities.

Clean the threaded cap “1” (Fig. F3) and cup for collecting impurities “4” (Fig. F3).
Replace sealing ring “2” (Fig. F3).
Fit the new filter cartridge “3” (Fig. F3) back in place in threaded cap “1” (Fig. F3).

Grease sealing ring “2” (Fig. F3) and the filter cartridge gaskets slightly.
Insert the cup containing the impurities “4” (fig. F3) in filter casing “5” (Fig. F3) ensuring it is fitted in the correct position.
Screw and tighten the threaded cap with the filter cartridge.
Tightening torque: 25 Nm.

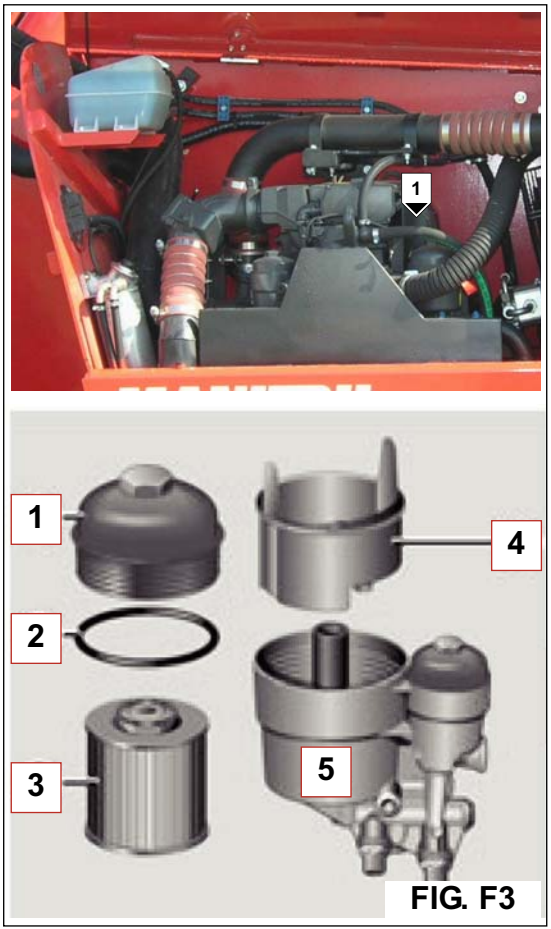


FIG. F3

Start up the engine and run it for about one minute to bleed the supply system.

With the engine switched on, check the fuel filter seal.

F4 - CHANGE THE COOLING LIQUID IN THE COOLING SYSTEM

ATTENTION: Open the cap for filling the cooling system only if the temperature of the liquid is less than 90°C/194°F.
In any case, it is obligatory to use protective gloves and clothing as well as safety goggles.

Before changing the cooling liquid, check the seals and conditions of the cab cooling and heating system.

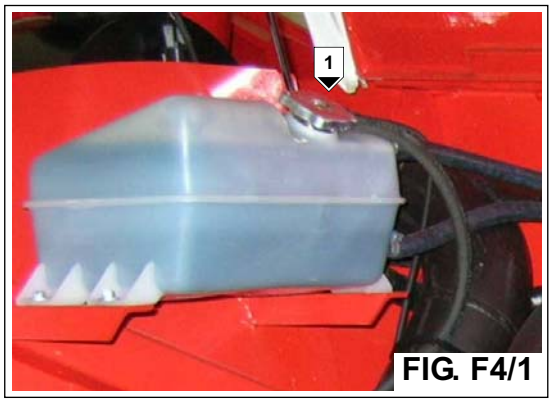


FIG. F4/1

Drain the cooling liquid

Before draining the liquid, cover the cables, piping etc, present under the drainage screw.
Place a container under the drainage screw large enough to hold the quantity of liquid to be collected.

Gradually open the cap on the tank “1” (Fig. F4/1), discharge the excess pressure, then remove the cap.
Turn the temperature regulator knob “2” (Fig. F4/2) present in the cabin completely.

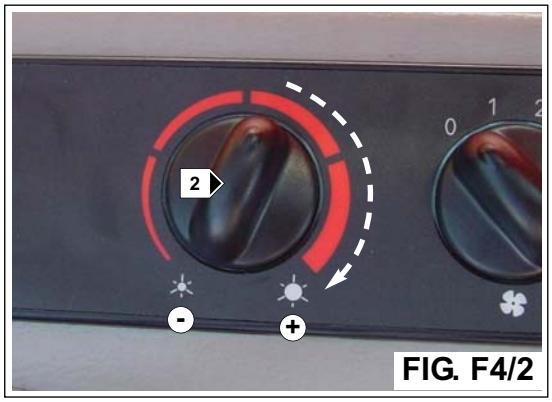


FIG. F4/2

Insert a tube (recommended length 1m) on drainage screw “3” (Fig. F4/3) present on the engine.
Unscrew drainage screw “3” (Fig. F4/3) (1 - 2 turns) and let the cooling liquid flow out from the engine block.

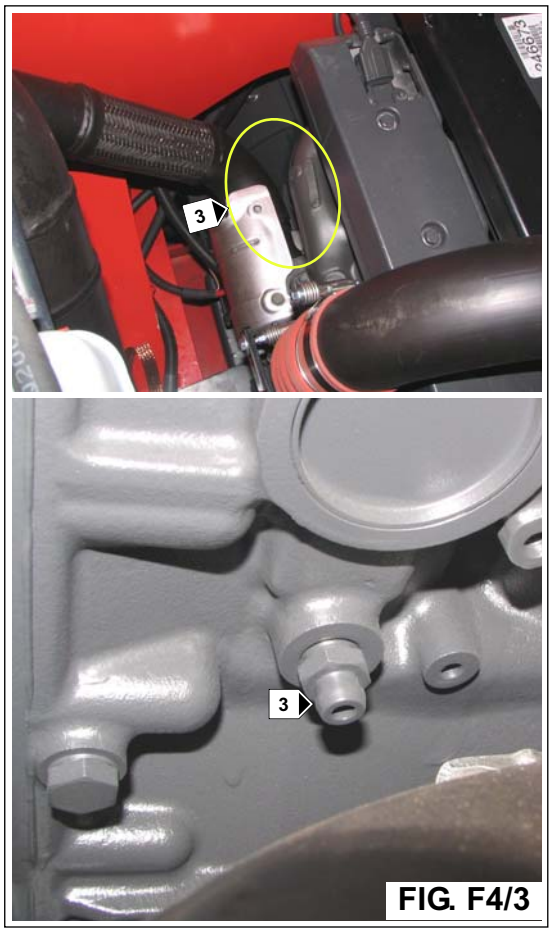


FIG. F4/3

Place a container large enough for the quantity of liquid to be collected, under the radiator drainage screw “4” (Fig. F4/4).
Unscrew the radiator drainage screw “4” (fig. F4/4) (in the lower part of the radiator) and drain out the cooling liquid.

Clear the drainage opening of obstruction, if present.

Tighten the cooling liquid drainage screws present on engine “3” (Fig. F4/3) and on radiator “4” (Fig. F4/4).

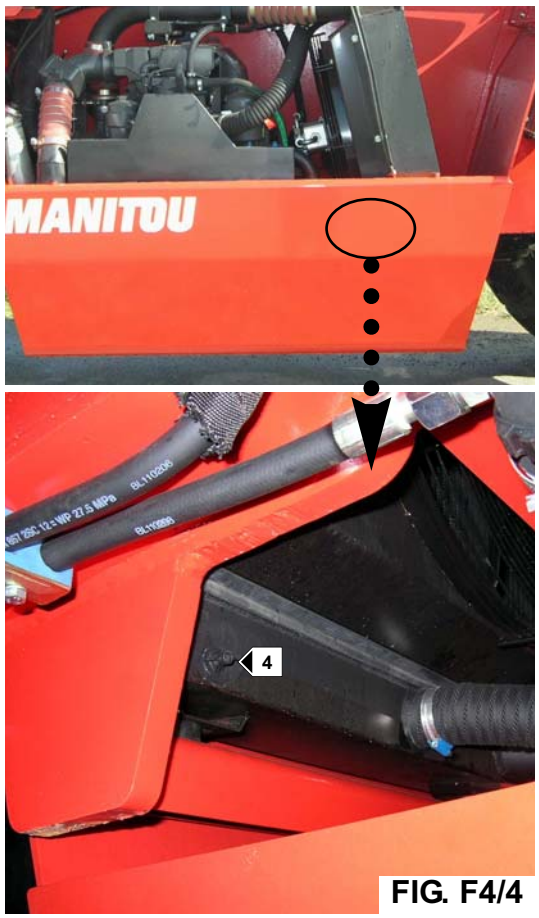


FIG. F4/4

Filling the cooling system

Before filling the cooling system, prepare the liquid to be filled according to the water and cooling liquid percentages indicated in the Table (F4/5).

TABLE (F4/5)
FREEZING POINT DEPENDING ON THE % VOLUME OF ANTIFREEZE AND WATER

Antifreeze SHELL ANTIFREEZE	***Water (distilled recommended)***	***Temperature freezing***	
25%	75%	-12 °C	
35%	**65%**	**-21 °C**	**filling by Manufacturer**
40%	60%	-26 °C	
50%	50%	-38 °C	

Pour the cooling liquid through the opening in tank “5” (Fig. F4/6) up to the MAX. mark.

Refit cap “5” to close the tank (Fig. F4/6).

Start up the engine and run it for about one minute, changing the speed to release air bubble from the cab cooling and heating system.

Switch the engine off and top up with cooling liquid to the MAX level in the tank.

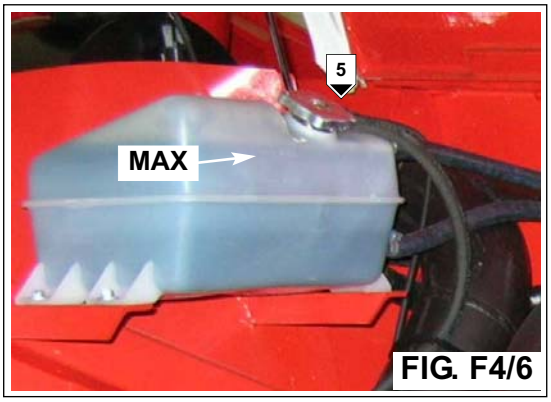


FIG. F4/6

G - OCCASIONAL MAINTENANCE

G1 - CHANGE A WHEEL

In the event of a wheel being changed on the public highway, make sure of the following points :

- Stop the lift truck, if possible on even and hard ground.
- To pass on stop of lift truck (See chapter : DRIVING INSTRUCTIONS in paragraph : 1 - OPERATING AND SAFETY INSTRUCTIONS).
- Action the parking brake
- Put the warning lights on.
- Immobilise the lift truck in both directions on the axle opposite to the wheel to be changed.
- Unlock the nuts of the wheel to be changed.
- Place the jack under the flared axle tube (F-R), as near as possible to the wheel and adjust the jack (Fig. G1).
- Lift the wheel until it comes off the ground and put in place the safety support under the axle (Fig. G1).

For this operation, we advise you to use the hydraulic jack and the safety support (S).

- Completely unscrew the wheel nuts and remove them.
- Free the wheel by reciprocating movements and roll it to the side.
- Slip the new wheel on the wheel hub.
- Refit the nuts by hand, if necessary grease them.
- Tighten the wheel nuts with a torque wrench (See chapter : A - DAILY OR EVERY 10 HOURS SERVICE in paragraph : 3 - MAINTENANCE for tightening torque).
- Remove the safety support and lower the lift truck with the jack.

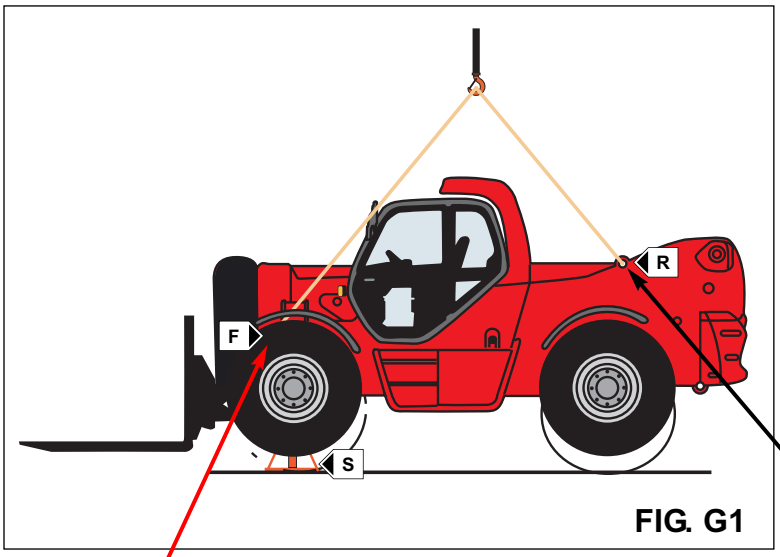


FIG. G1

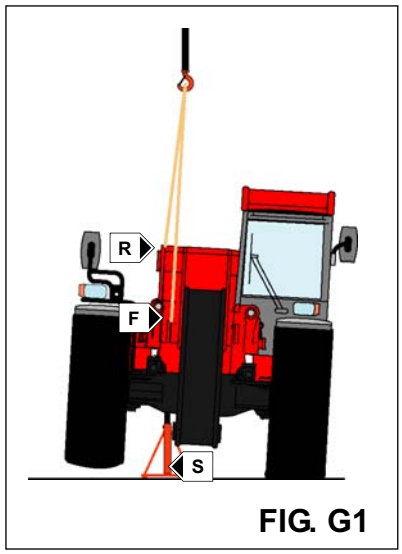
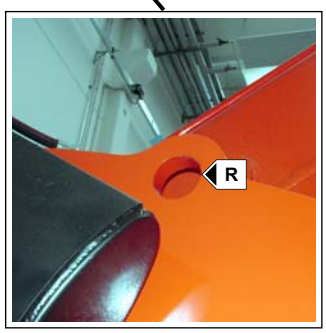


FIG. G1



G2 - TOW THE LIFT TRUCK

The lift truck can be towed through a rigid bar hooked to the frame ears, front or rear and for short distance with slow speed.

- Block all four wheels to prevent accidental movement of the lift truck
- Shut down engine
- Put the forward/reverse lever in neutral position
- Release the parking brake
- Put the emergency lights
- put the gear selector in neutral position:

a) Disconnect and close the hydraulic “X” (Fig.G2/1) of the cylinder of the gear selector.
b) Put the rod “Y” (Fig.G2/1) in neutral position (this is on half stroke between two “détente”)
c) Deactivate the negative brake (fig.G2/2):
- unscrew the caps “4” and “5”
- take off the spring “7”
- with a key of 19 mm and external diameter not higher than 26 mm, unscrew the counter nut “9”,unscrew the nut “1” untill at the position “8”

The brake is deactivated.

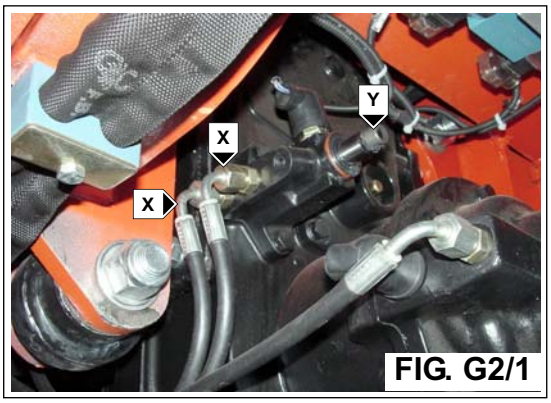


FIG. G2/1

Note: If the engine is not running there will be no steering or braking assistance.
Operate the steering and pedal slowly avoiding sudden jerky movements.

Reactivating negative brake

Brake cylinder regulation (fig.G2/2)
- unscrew the caps “4” and “5”
- take off the spring “7”
- with a key of 19 mm and external diameter not higher than 26 mm, screw the nut “1” till the piston is at a maximum depht of 39,7-40,2 mm (dimension “A”). The nut is “1” has a pitch of 1,75 mm so it’s possible to calculate how screw the nut, for example: if the dimension “A” is of 36,2 mm it’s necessary to screw it of 2 turns (3,5 mm).
  Check again the mesure as described and, if not right again, repeat the operations till now described.
- screw the counter nut “9” untill the nut “1”.
- mount again the spring “7” and the caps “4” and “5”.

Note: exceeding the mesure of 40,2 mm the complete unlock of the brake it’s not possible, so the brake could overheat and damage it self quickly.

A bad regulation could cause big damages to the brakes and also a quickly destruction.
*If the nut “1” is unscrewed too far the machine **doesn’t brake!** Dangerous to your life!*

Pay attention to the dimension “B” : if it’s lower than 24,5 mm you must change the brake disk.
FOR THESE OPERATION, CONSULT YOUR AGENT OR DEALER

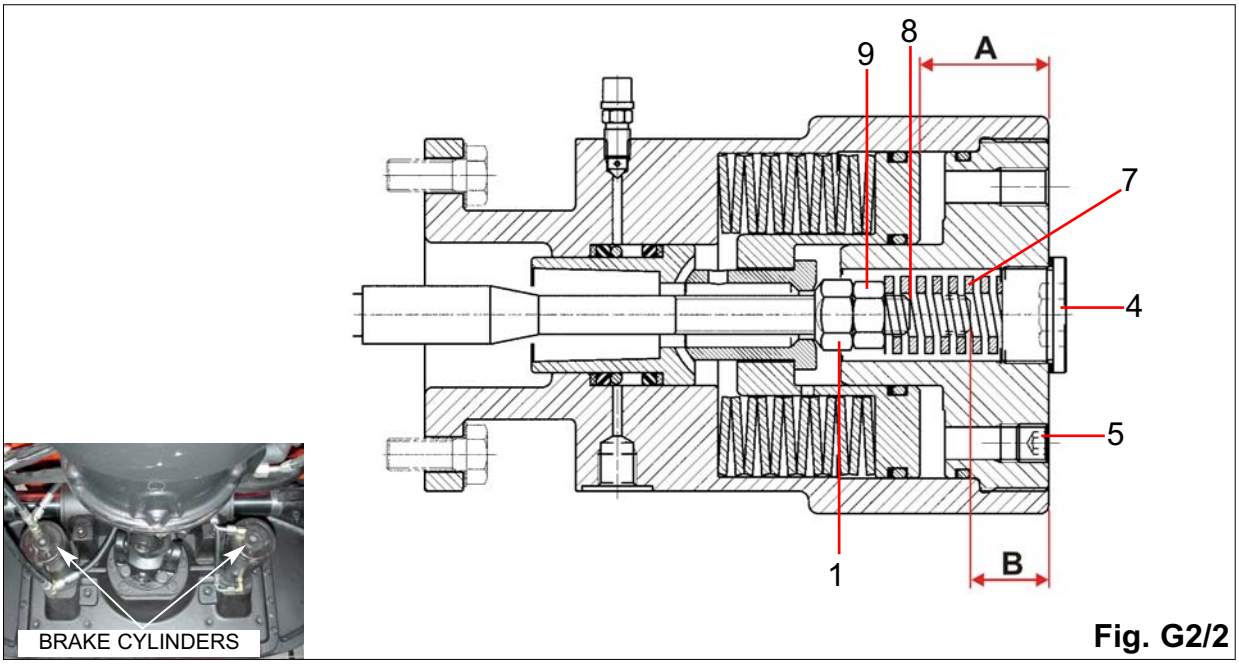


Fig. G2/2

G3 - CHECK THE BRAKE CYLINDER

Brake cylinder (fig.G3)
- unscrew the caps “5”
- check that the dimension “A” is 39,7-40,2 mm if necessary screw the nut “1” until the piston reach that depht.
- unscrew the caps “4”
- take off the spring “7”
- with a key of 19 mm and external diameter not higher than 26 mm, unscrew the counter nut “9” and screw the nut “1” till the piston is at a maximum depht of 39,7-40,2 mm (dimension “A”). The nut is “1” has a pitch of 1,75 mm so it’s possible to calculate how screw the nut, for example: if the dimension “A” is of 36,2 mm it’s necessary to screw it of 2 turns (3,5 mm).
  Check again the mesure as described and, if not right again, repeat the operations till now described.
- screw the counter nut “9” untill the nut “1”
- mount again the spring “7” and the caps “4” and “5”.

Note: exceeding the mesure of 40,2 mm the complete unlock of the brake it’s not possible, so the brake could overheat and damage it self quickly.

A bad regulation could cause big damages to the brakes and also a quickly destruction.
If the nut “1” is unscrewed too far the machine ***doesn’t brake!*** *Dangerous to your life!*

Pay attention to the dimension “B” : if it’s lower than 24,5 mm you must change the brake disk.
FOR THESE OPERATION, CONSULT YOUR AGENT OR DEALER

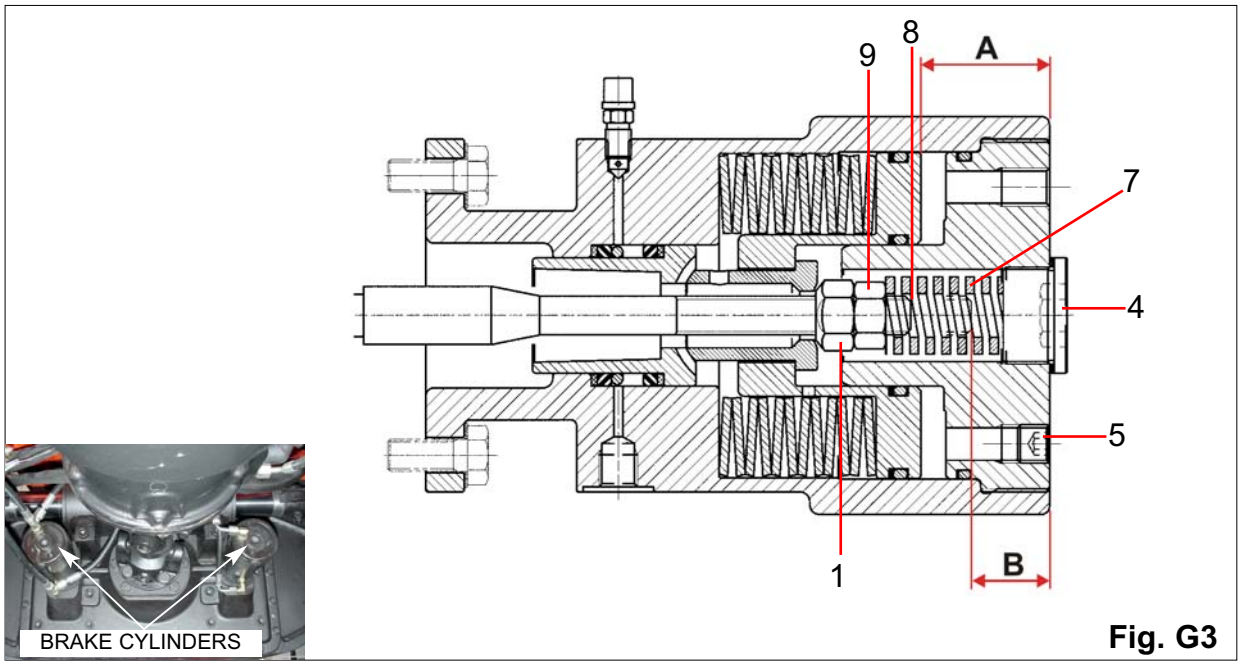


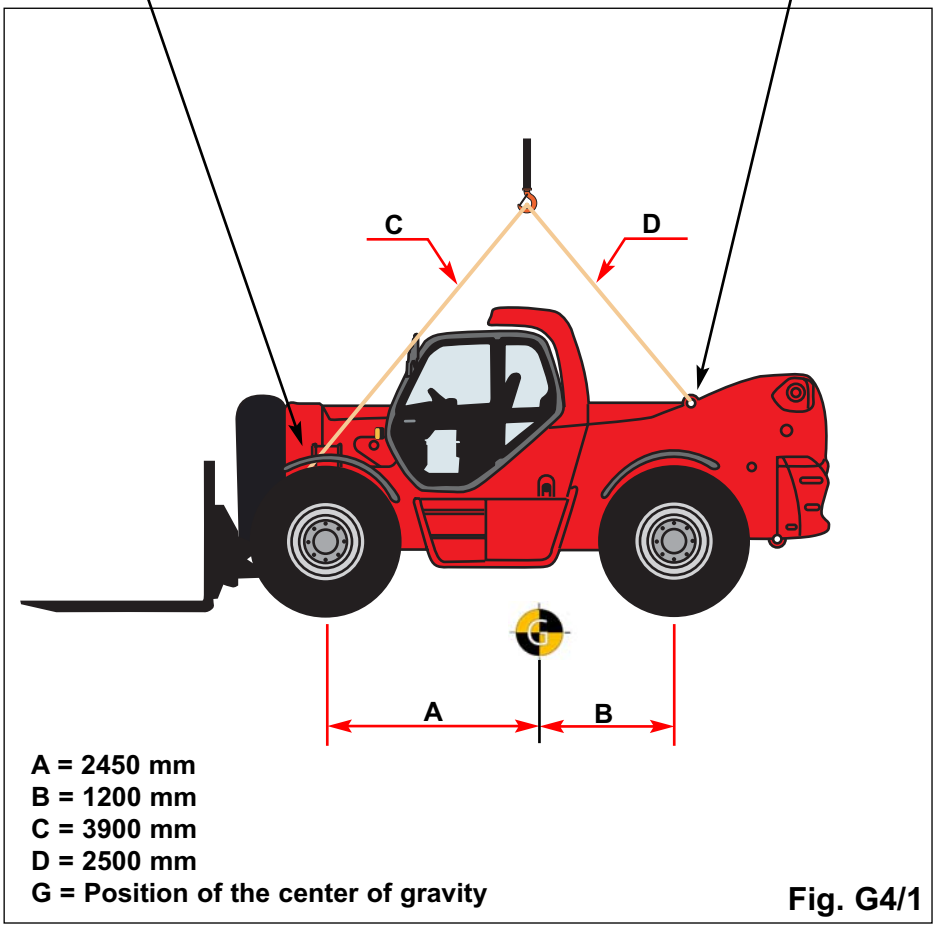
Fig. G3

G4 - SLING THE LIFT TRUCK

- Take into account the position of the lift truck gravity center for lifting (Fig. G4/1).
- Place the hooks in the fastening points provided (Fig. G4/2 and G4/3).

FIG. G4/2

FIG. G4/3



A = 2450 mm
B = 1200 mm
C = 3900 mm
D = 2500 mm
G = Position of the center of gravity

Fig. G4/1

G5 - TRANSPORT THE LIFT TRUCK ON A PLATFORM

To carry the machine respect the circulation laws.

Ensure that the safety instructions connected to the platform are respected before the loading of the lift truck and that the driver of the means of transport is informed about the dimensions and the weight of the lift truck (See chapter : CHARACTERISTICS in paragraph : 2 - DESCRIPTION).

Ensure that the platform has got dimensions and a load capacity sufficient for transporting the lift truck. Check also the pressure on the contact surface allowable for the platform in connection with the lift truck.

Load the lift truck

- Block the wheels of the platform.
- Fix the loading ramps so that you obtain an angle as little as possible to lift the lift truck.
- Load the lift truck parallel to the platform.
- Stop the lift truck (See chapter : DRIVING INSTRUCTIONS in paragraph : 1 - OPERATING AND SAFETY INSTRUCTIONS).

Sling the lift truck

- Fix the chocks to the platform at the front and at the back of each tyre “1” (Fig. G5/1) and (Fig. G5/2).
- Stow the lift truck on the platform with enough resisting ropes, at the front of the lift truck, on the fastening point “2” (Fig. G5/3) and at the front of the lift truck, on the fastening point “3” (Fig. G5/3).
- Tighten the ropes.

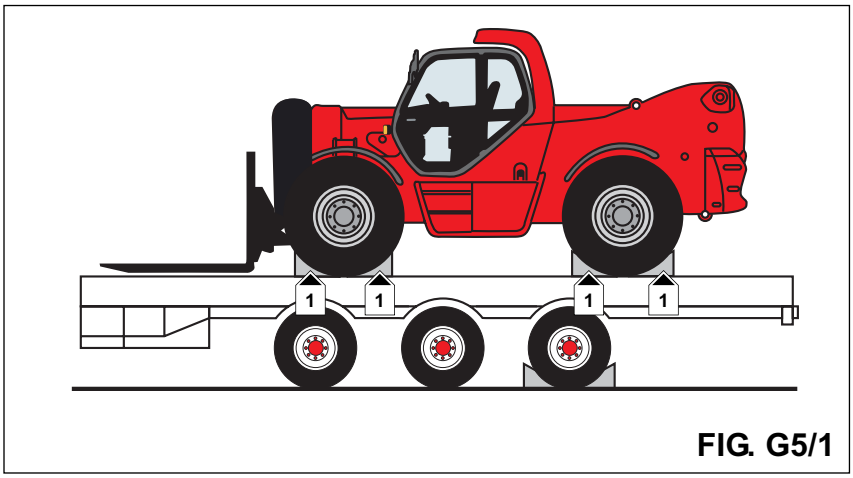


FIG. G5/1

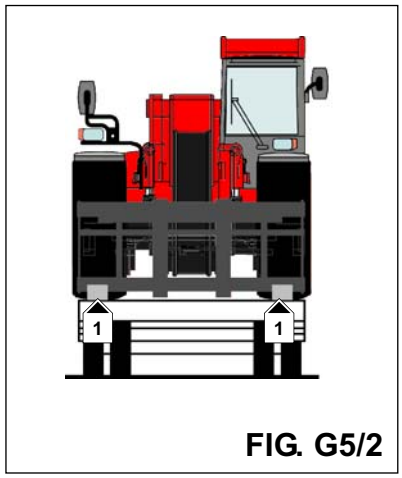
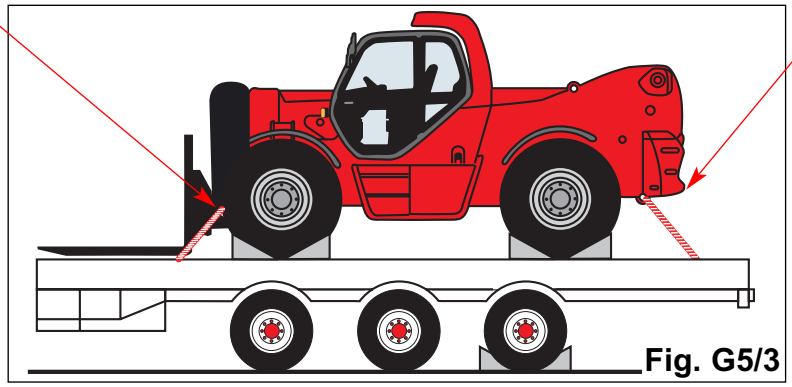


FIG. G5/2



G6 - ADJUST THE FRONT HEADLAMPS

Recommended setting*(As per standard ECE-76/756 76/761 ECE20)*
Set to - 2% of the dipped beam in relation to the horizontal line of the headlamp.

Adjusting procedure

- Place the lift truck unloaded and in the transport position and perpendicular to a white wall on flat, level ground (Fig. G6).
- Check the tyre pressures (See chapter : A4 - CHECK THE TYRE PRESSURES AND THE WHEEL NUTS TORQUE in paragraph : 3 - MAINTENANCE).
- Put the gear reverser lever in neutral and action the parking brake.

Calculating the height of the dipped beam (h2) (FIG. G6)

h1 = Height of the dipped beam in relation to the ground.
h2 = Height of the adjusted beam.
l = Distance between the dipped beam and the white wall.
h2 = h1- (l x 2/100)

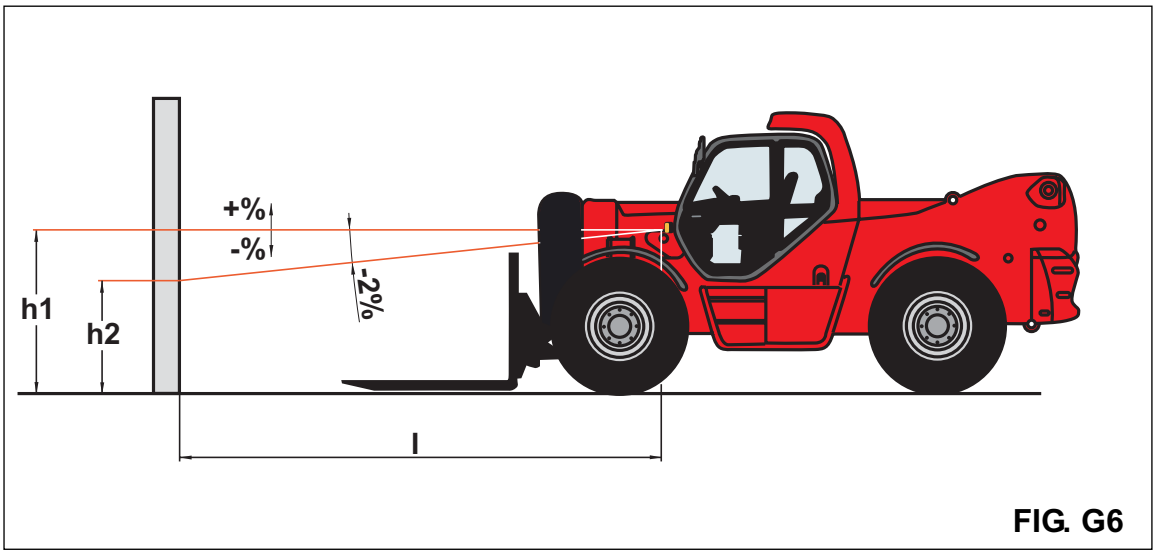


FIG. G6

G7 - AIR CONDITION

Change the gas if the air is not as cold as desired :

- use “134 FREON” 1 Kg.
- in case of failure or part’s substitution change the oil using 60 gr of specific oil for Air Condition compressor.

4 - SYSTEMS

Index

ELECTRICAL SYSTEM

Starter motor.

The starter motor is installed on the left of the engine and no maintenance is required except cleaning and tightening of the terminals. If the starter motor does not work properly, consult your agent or dealer.

Alternator.

The alternator is installed on the left of the motor. The alternator and regulator are designed to operate in a system polarised in one direction only, so the following precautions must be taken when working on the battery charging circuit; otherwise, serious damage may be caused to the electrical equipment:

Never operate the alternator with the circuit open; ensure that all terminals are firmly tightened.
It is important not to remove the terminals on the back of the alternator while the engine is running, as this may damage the alternator itself.
When fitting a battery, check that the connections are correctly polarised. It is essential for the cable marked (+) to be connected to the positive terminal (+) of the battery and the cable marked (-) to be connected to the negative terminal (-) on the battery, and that there is a ground connection.

If a second battery is used to start the engine, always connect terminals of the same polarity (Fig. A). Fit a battery with the same voltage as that installed on the truck.
If an external charger is used, always connect the (+) wire of the charger to the (+) terminal of the battery and the (-) wire of the charger to the (-) terminal of the battery and ground connection.
Never short-circuit the alternator terminals or connect them to ground.

Never reverse the alternator connection on the battery.
Never remove or replace an electrical connection while the engine is running.
If electric-arc welding is carried out on the truck, directly connect the welder negative wire to the piece to be welded, to ensure that the high voltage current cannot pass through the alternator, and then disconnect the battery.

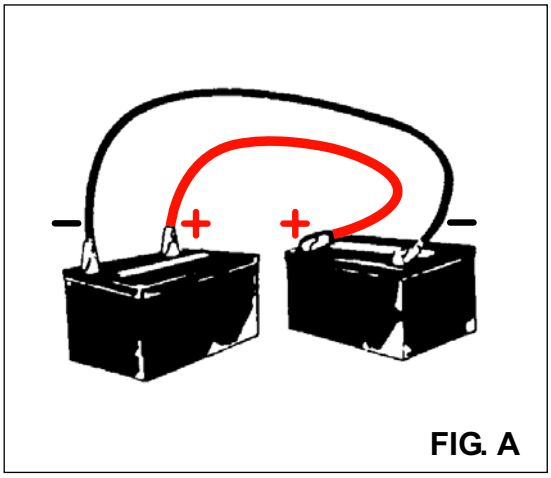
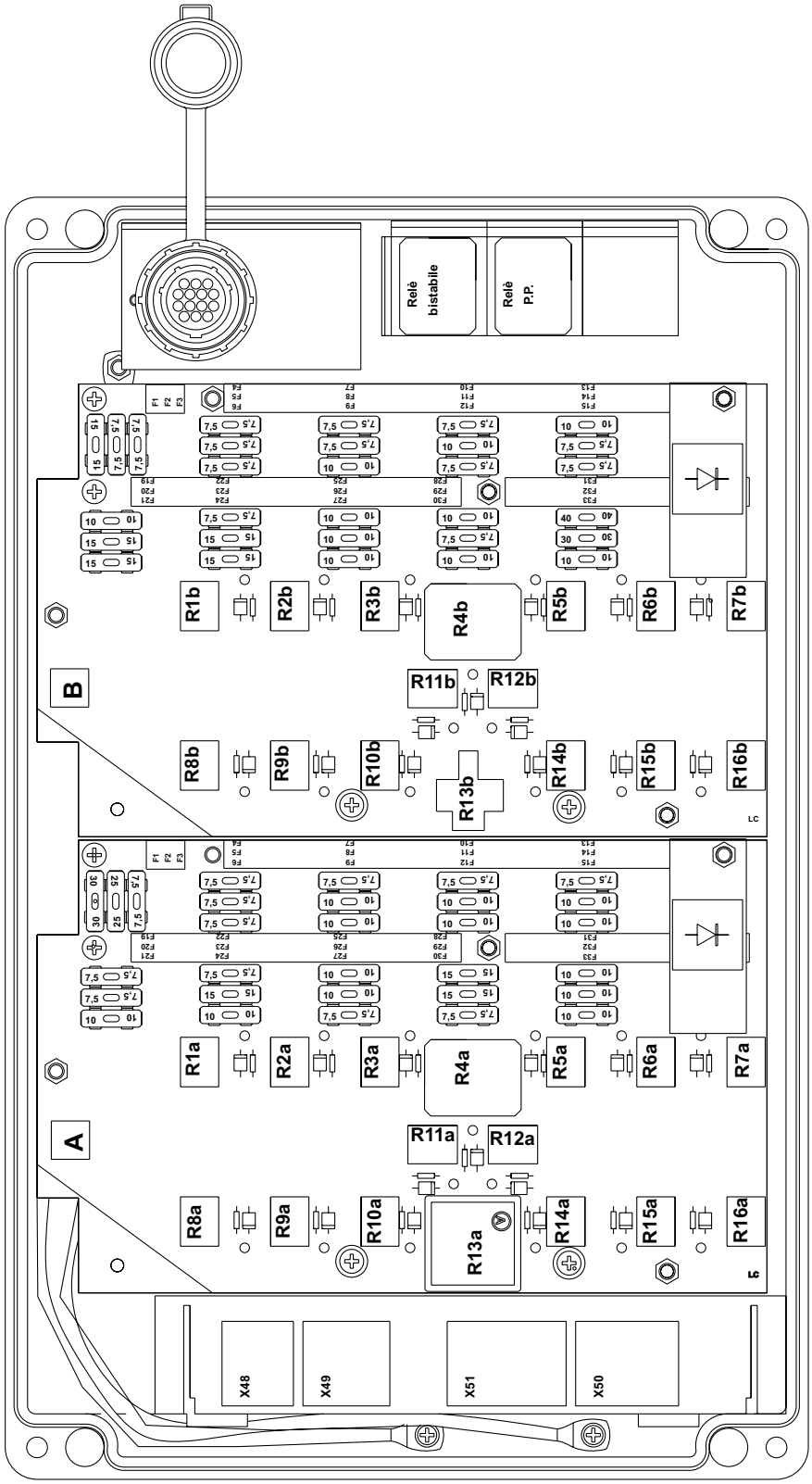


FIG. A

FUSE AND RELAY BOX

The electric circuit is protected by fuses mounted in the fuse box.
To change a fuse, remove it and replace it with a new one with the same quality and calibration values.
If a power failure occurs, check all the fuses and verify if a short-circuit has occurred.
DO NOT TRY TO REPAIR A BURNED FUSE.



LIGHTING

A blown bulb must be changed immediately. Do not handle a new bulb with bare or dirty fingers.
Any traces of grease, oil or sweat will evaporate when the bulb is hot and stain the reflector.
Never touch or attempt to polish the reflector. Just open the headlamp to change the bulb.

BATTERY

Battery efficiency becomes progressively lower as the ambient temperature drops, until it practically ceases to function at -40°C.
Never attempt to use the starter motor if the battery has been exposed to temperatures of around -29°C.
In these cases, heat the battery by immersing it in lukewarm water to 5 cm below the cell caps.
If the temperatures are very low, remove the battery from the truck and store it in a warm place until it is required.

MHT ELECTRIC SYSTEM USERS' LEGEND

Code	Page	Function
A1	5	Reverse engaged buzzer
A2	5	Horn
B1	4	12 V battery
DIAG1	17	Diagnostics connector 1
DIAG2	18	Diagnostics connector 2
DL	6	Lights switch
DM	8	Run switch
F1b	21	Basket fuse “15”
F2a	21	Air heater fuse
F4a	8	Gear reset fuse
F4b	9	Slow-fast movement fuse
F5a	8	Forward/reverse movement fuse
F5b	5	Differential block fuse
F6a	7	Position lights fuse
F6b	15	Steering power supply fuse
F7a	7	Position lights fuse
F7b	8	Fuse for start up from motor
F8a	7	Low beam lights fuse
F8b	17	Rexroth outputs fuse
F9a	7	High beam lights fuse
F9b	17	Manoeuvre manipulator fuse
F10a	5	Brake lights fuse
F10b	17	Rexroth control unit fuse
F11a	6	Emergency “15” fuse
F11b	20	Antitheft “15” fuse
F12a	6	Emergency “30” fuse
F12b	10	Levelling fuse
F13a	5	Horn fuse
F13b	5	Military lights selector fuse
F14a	11	Optical indicators fuse
F14b	21	Mixer bucker + emergency pump fuse
F15a	16	Diagnostics power supply fuse
F15b	20	Radio “15” fuse
F16a	13	1st rear fan speed diode
F16b	8	Forward gear engaged diode
F17a	13	2nd rear fan speed diode
F17b	8	Reverse gear engaged diode
F18a	13	3rd rear fan speed diode
F18b	5	Reverse relay diode
F19a	20	1200 rpm solenoid valve fuse
F19b	20	“30” antitheft fuse
F20a	9	Anti-tilting fuse
F20b	14	Hydraulic oil fan fuse
F21a	6	Intermittence fuse
F21b	14	Hydraulic oil fan
F22a	15	Front wiper fuse
F22b	20	“30” car radio fuse
F23a	15	Rear wiper fuse
F23b	14	Hydraulic oil fan fuse
F24a	19	Cab front work lights fuse
F24b	14	Hydraulic oil fan fuse
F25a	19	Cab rear work lights fuse
F26a	19	Boom work lights fuse
F26b	20	Mercedes adm control unit fuse
F27a	10	Rotary light fuse
F28a	13	Conditioner auxiliary unit fan power supply fuse
F28b	21	Basket power supply fuse
F29a	13	Heating fuse
F29b	13	Air conditioner fuse
F30a	14	Timer fuse
F30b	21	Pneumatic seat fuse
F31a	16	Diagnostics connector fuse
F31b	4	“15” basket fuse
F32a	16	Mercedes mr control unit power supply fuse
F32b	9	Provision for load cell e
F33a	16	Adm control unit direct power supply fuse
F33b	17	Manoeuvre manipulator fuse
F34a	13	Cab aeration fan third speed diode
F34b	5	Differential block fuse
F35a	13	Cab aeration fan second speed diode
F35b	5	Differential block by brake diode
F36a	13	Cab aeration fan first speed diode
F36b	8	Reverse relay diode
FADX	7	RH front headlight
FASX	7	LH front headlight
FG	4	Main Fuse
FLA1	19	Front work lights
FLA2	19	Front work lights
FLB1	19	Boom top work light
FLB2	19	Boom top work light
FLP1	19	Rear work lights
FLP2	19	Rear work lights
FODX	7	Provision for military lights
FOSX	7	Provision for military lights
FPDX	7	RH rear headlight
FPSX	7	LH rear headlight
FPODX	5	Provision for military lights
FPOSX	5	Provision for military lights
G1	4	Alternator
GF	10	Rotary light
KEY	11	Start up panel
I1	6	Emergency switch
I2	5	Differential block pushbutton
I3	15	Steering selector
I4	9	Slow-fast switch
I5	8	Gear reset switch
I6	9	Anti-tilting exclusion key
I7	10	Rotary lamp switch
I8	15	Rear wiper switch
I9	15	Front wiper switch
I10	5	Military lights provision connector
I11	21	Mixer bucket switch
I13	18	Optional exclusion switch
I15	13	Air conditioner switch
I16	19	Front work lights switch
I17	19	Rear work lights switch
I18	19	Boom top work lights switch
I19	13	Front aeration selector
I20	13	Rear aeration selector
I21	5	Stop pressure switch
I22	8	Gear microswitch
I23	8	Parking brake pressure switch
I24	9	Emergency stop pushbutton
I25	10	Boom below 2m Proximity switch
I26	11	Brakes oil level gauge
I27	17	Air conditioner pressure switch
I28	13	Air conditioner thermostat
I29	13	Air conditioner thermostat

SCHEMA ELETTRICO

MTU.557-01

KIT CARRO MTU.559-02 (VS.710086)
KIT CABINA MTU.558-01 (VS.710087)

MHT SERIE 990 - 7140 - 10160 - 10210
DISTRIBUTORE REXROTH

MANITOU

Denominazione
Name:

TITOLO
TITLE

TAVOLA
TABLE
1

LISTA FOGLI \ INDEX

Note :

MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name:

LEGENDA FOLGLI TABLE NOTE

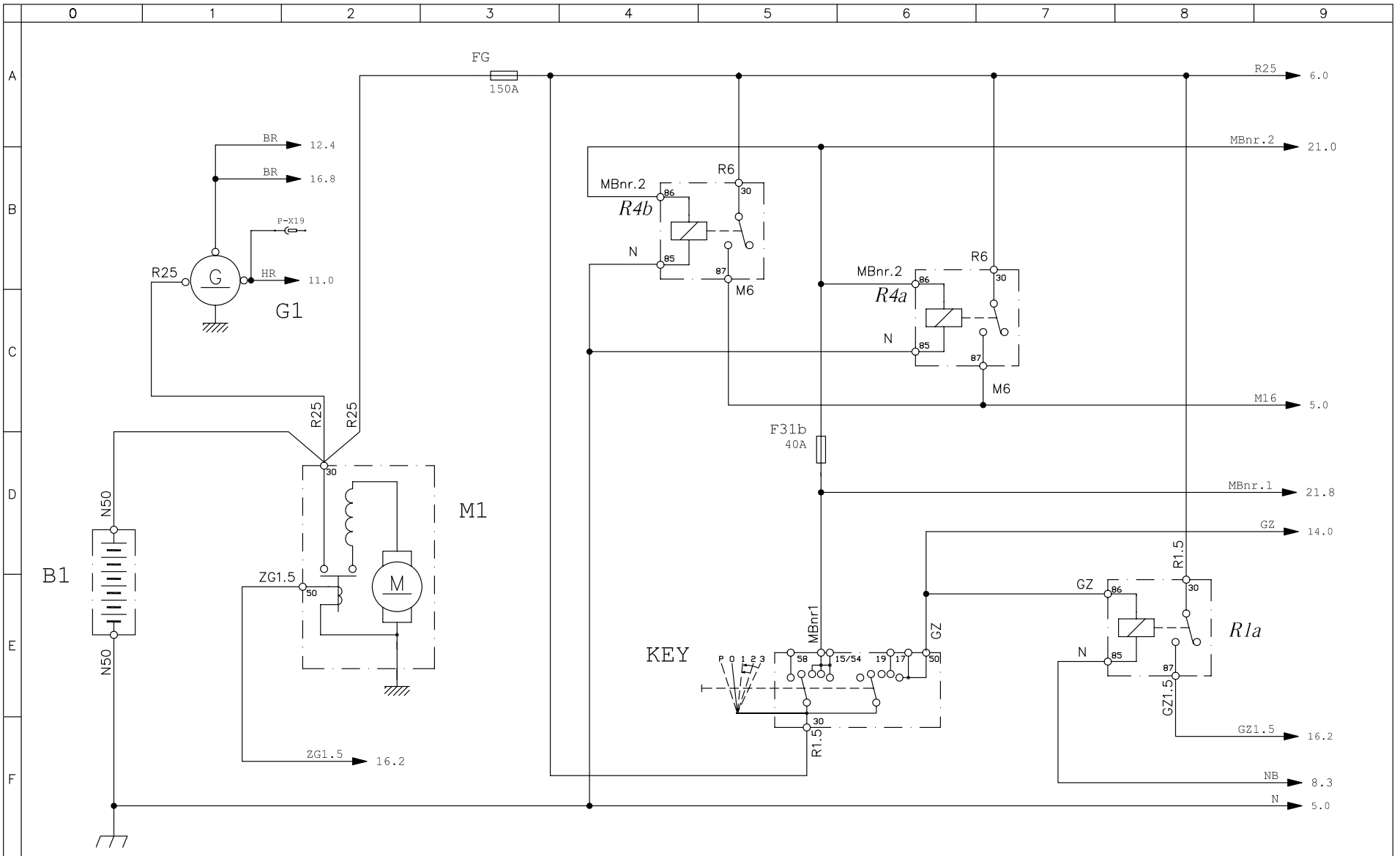
TAVOLA TABLE 2

LEGENDA / DESCRIPTION

R1.5 ► 2.5 SEGNALE ROSSO sez 1.5 mm DIRETTO A PAG 2 COLONNA 5
RED SIGNAL sect. 1.5 mm LEADING TO PAGE 2 COLUMN 5

1.7 ► R1.5 SEGNALE ROSSO sez 1.5 mm PROVENIENTE DA PAG 1 COLONNA 7
RED SIGNAL sect. 1.5 mm COMING FROM PAGE.1 COLUMN 7

	Colori	Colors
A	Azzurro	Light blue
B	Bianco	White
C	Arancio	Orange
G	Giallo	Yellow
H	Grigio	Grey
L	Blu	Blue
M	Marrone	Brown
N	Nero	Black
R	Rosso	Red
S	Rosa	Pink
V	Verde	Green
Z	Viola	Violet



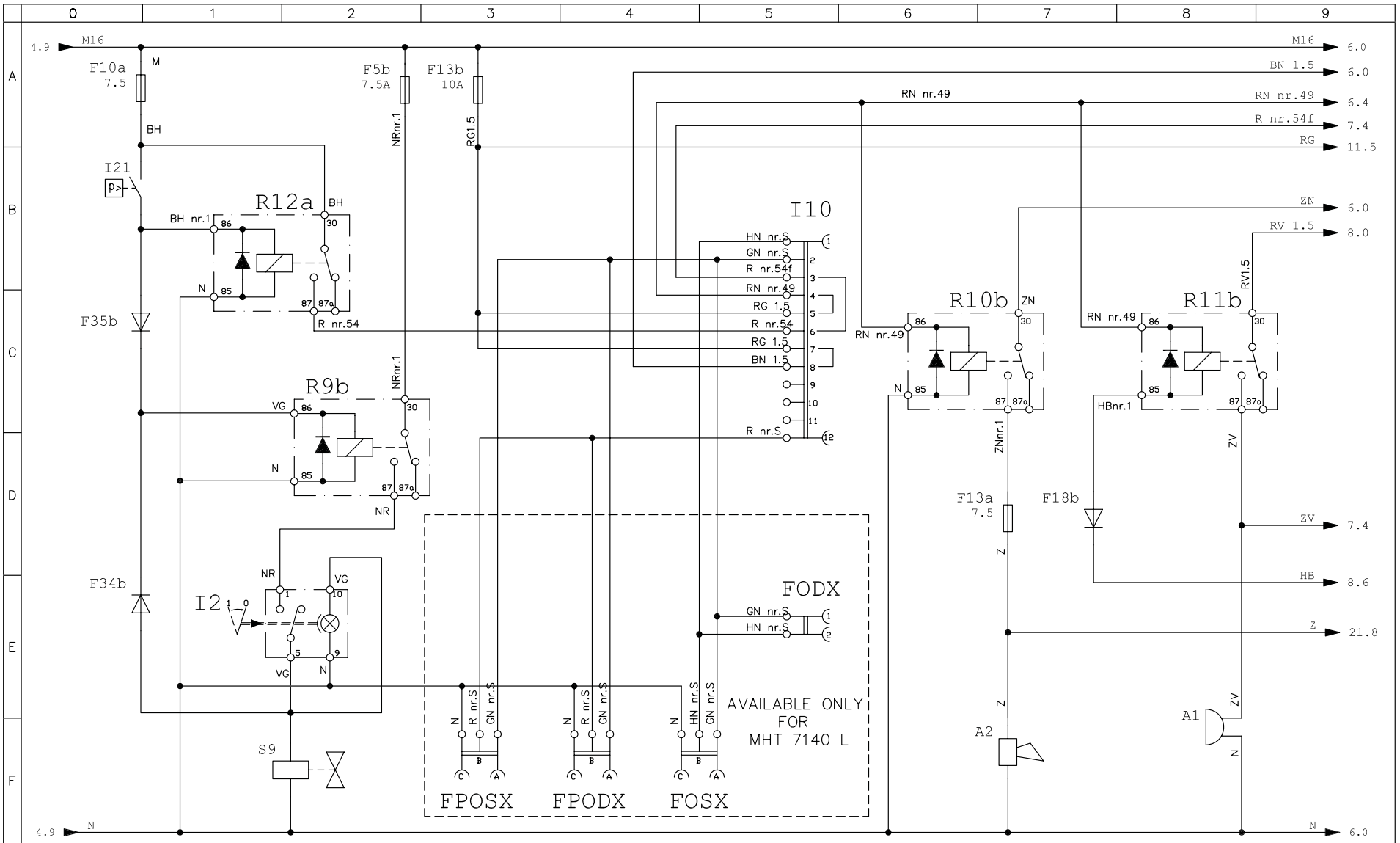
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione
Name:

QUADRO AVVIAMENTO
STARTING ENGINE

TAVOLA
TABLE
4



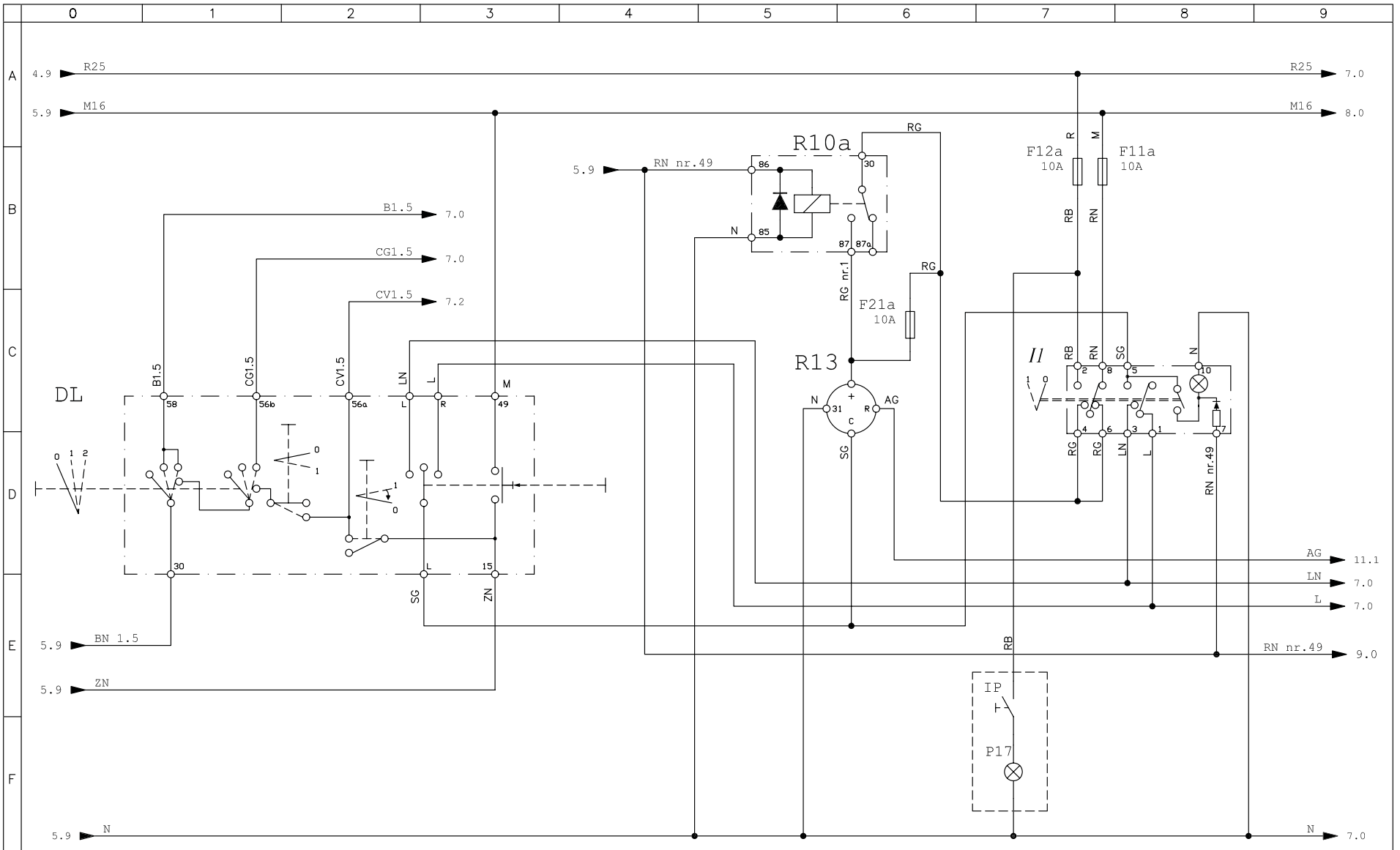
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

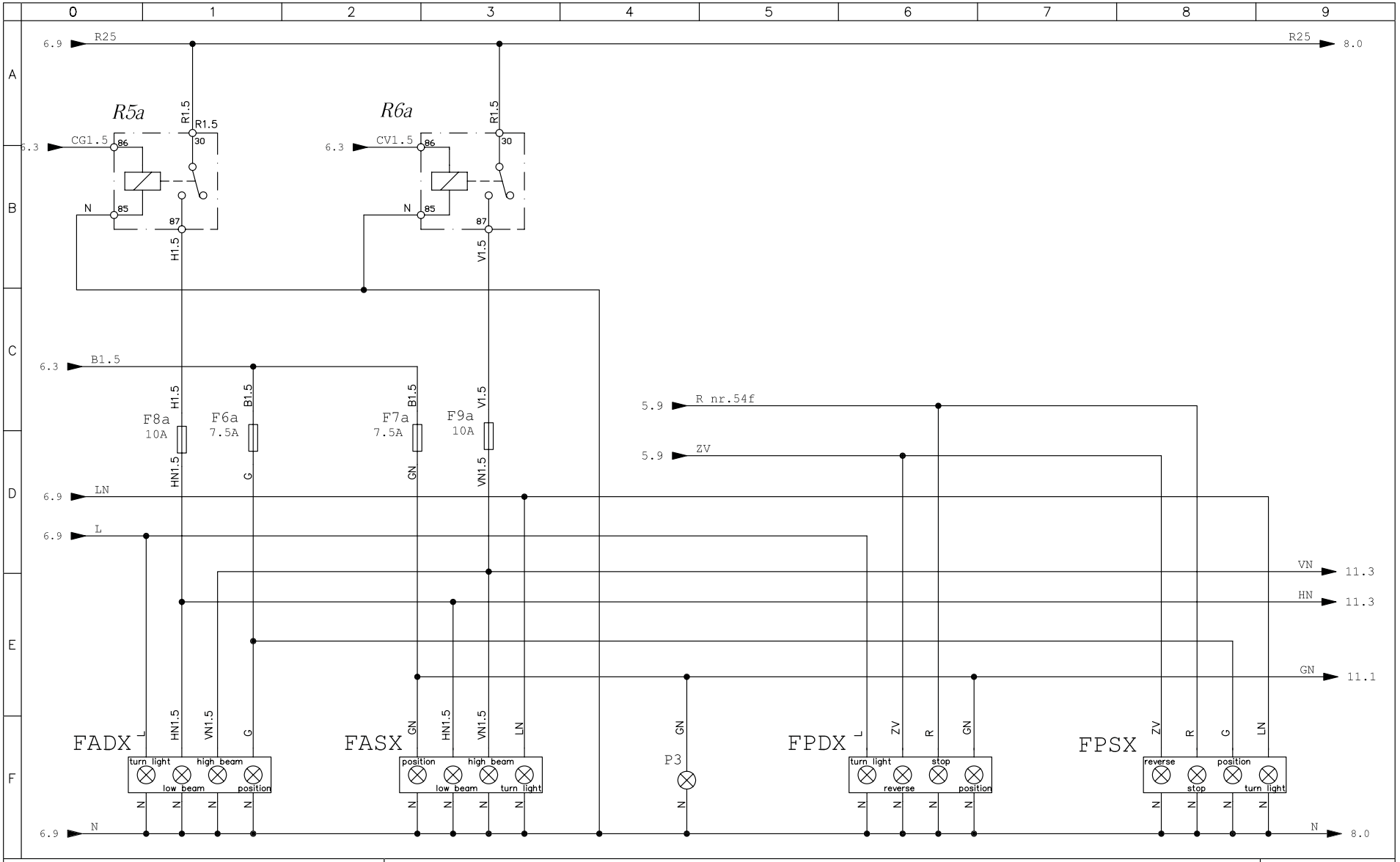
Denominazione Name:

SELETTORE LUCI MILITARE / LUCI SCRUPOLARE WAR LIGHT'S SELECTOR

TAVOLA TABLE 5



MANITOU	MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)	TAVOLA TABLE 6
	Denominazione Name: **DEVIO LUCI, EMERGENZA ED INTERMITTENZA LIGHT'S SELECTOR, HAZARD**	



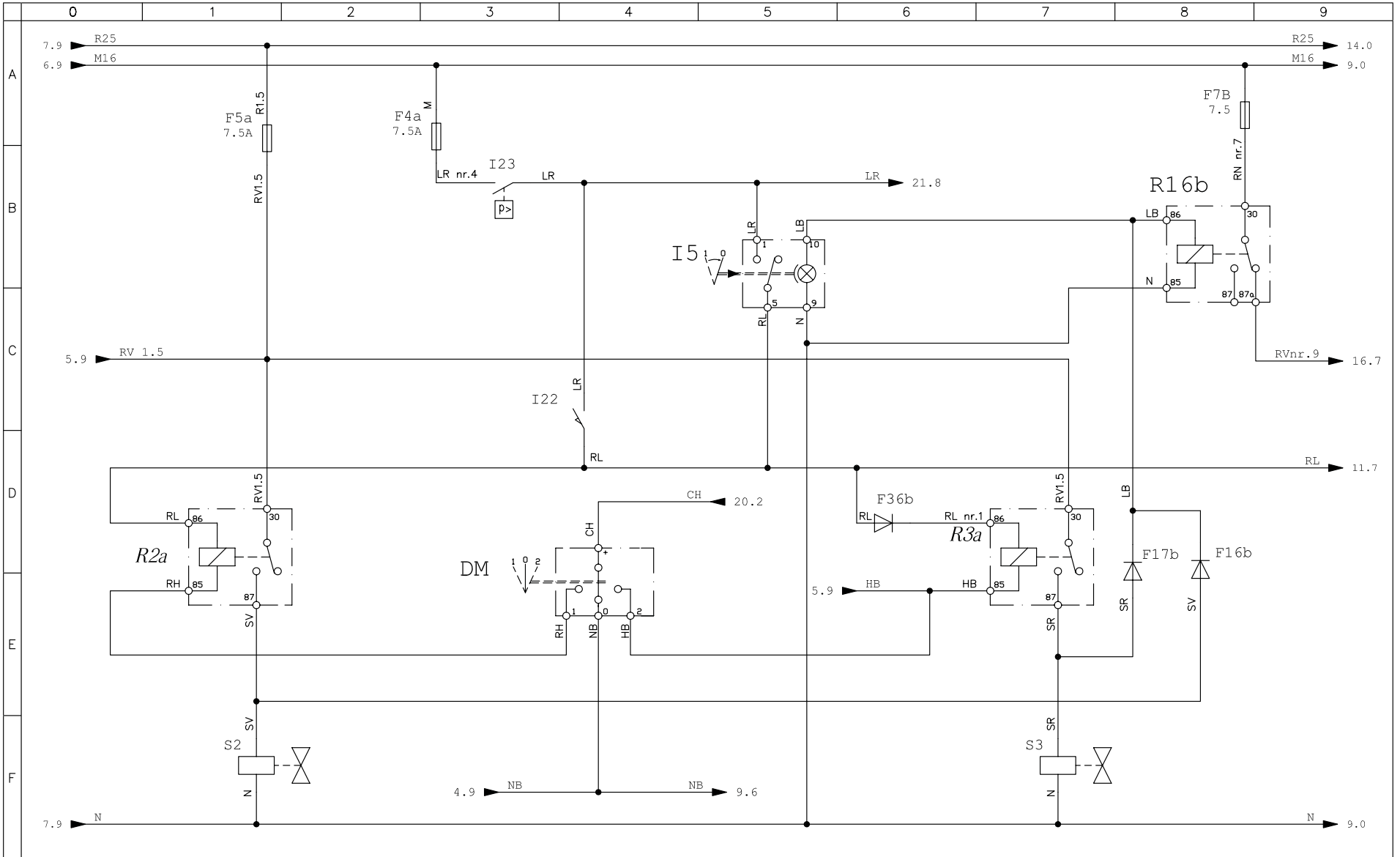
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

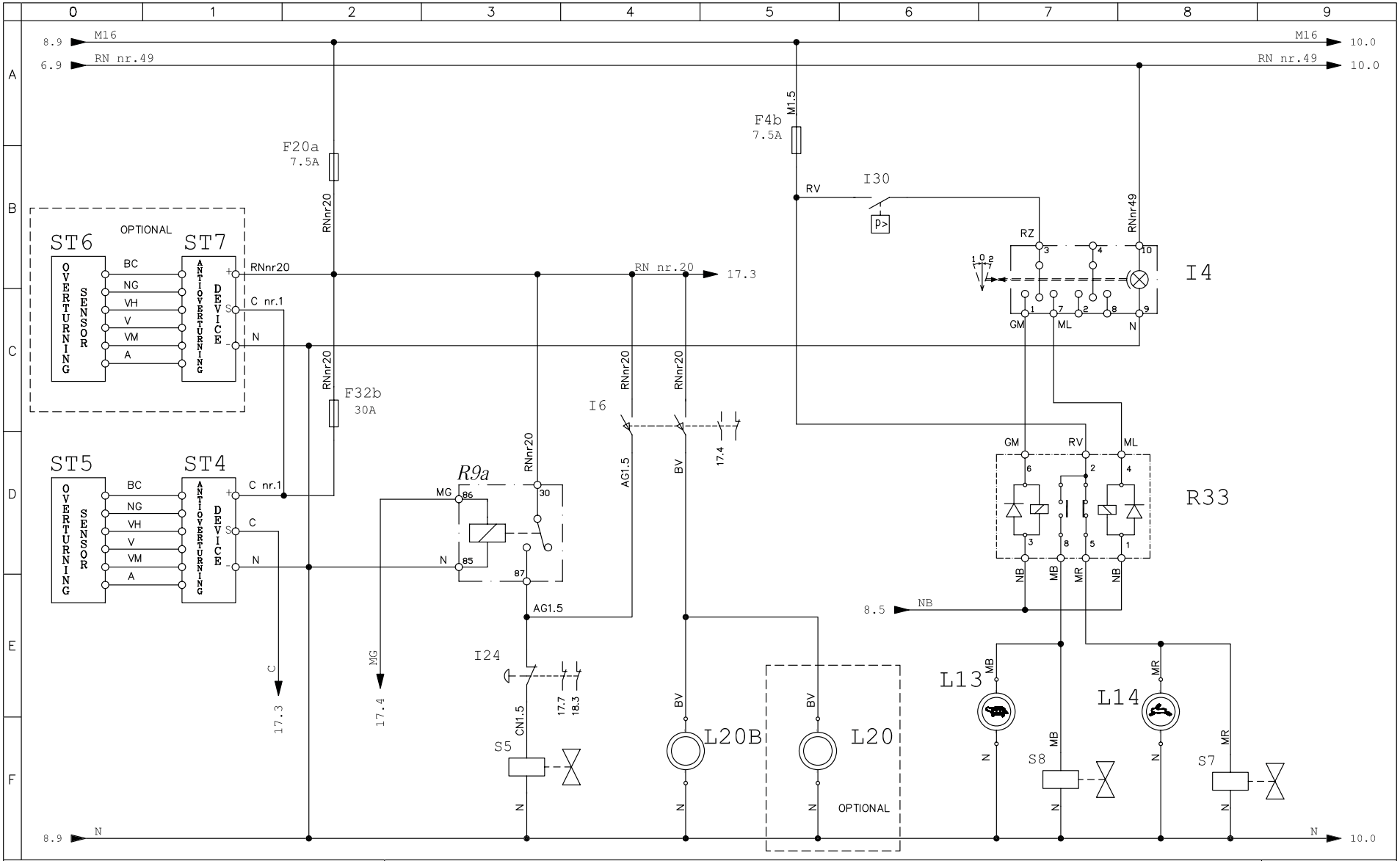
Denominazione
Name:

FANALERIA
LIGHTS

TAVOLA
TABLE
7



MANITOU	MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)	TAVOLA TABLE 8
	Denominazione Name: DEVIO MARCE FOWARD AND REVERSE GEAR	

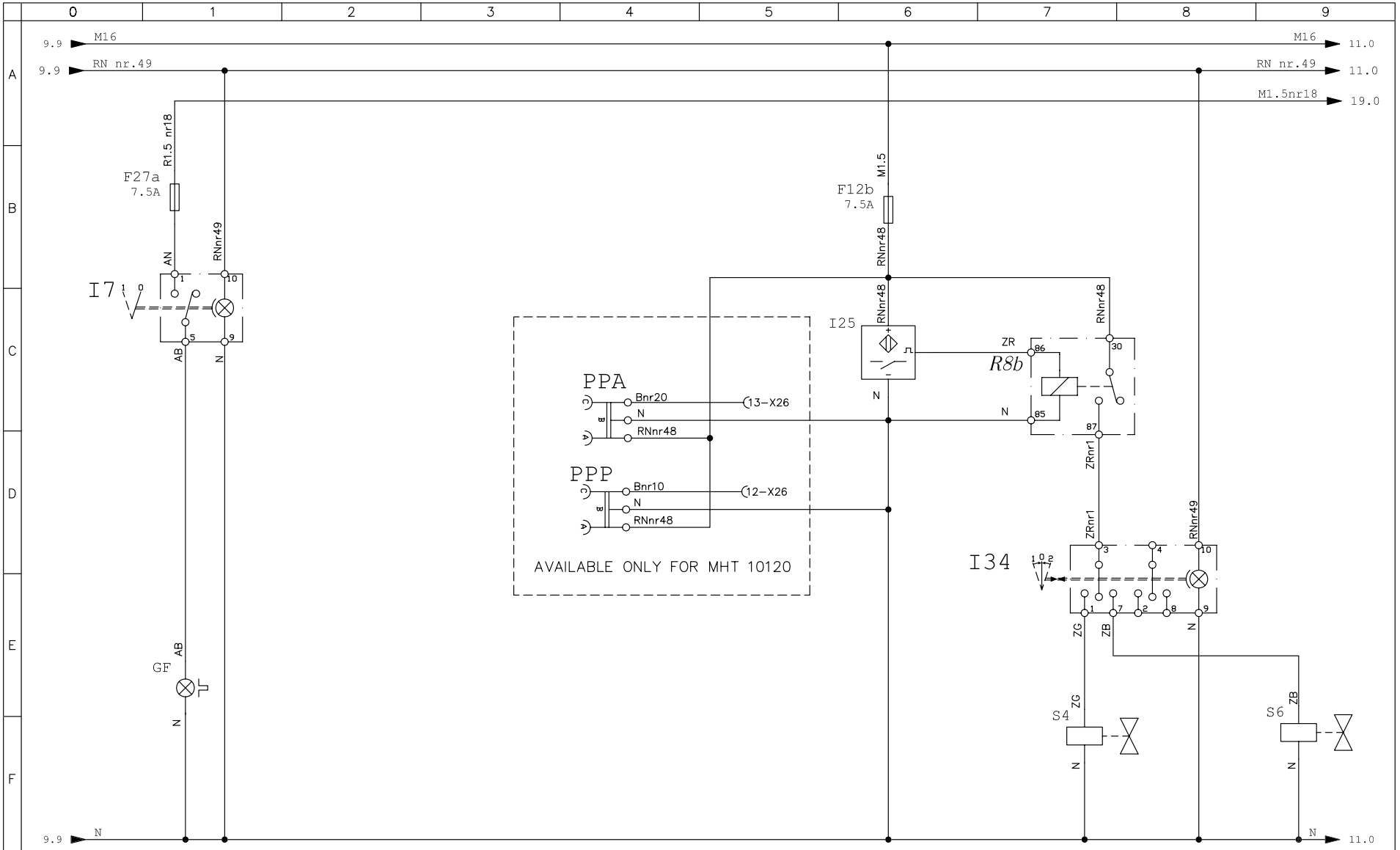


MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name: ***ANTI-RIBALTAMENTO E TERGI ANTI-OVERTURNING; WINDSCREEN***

TAVOLA TABLE 9

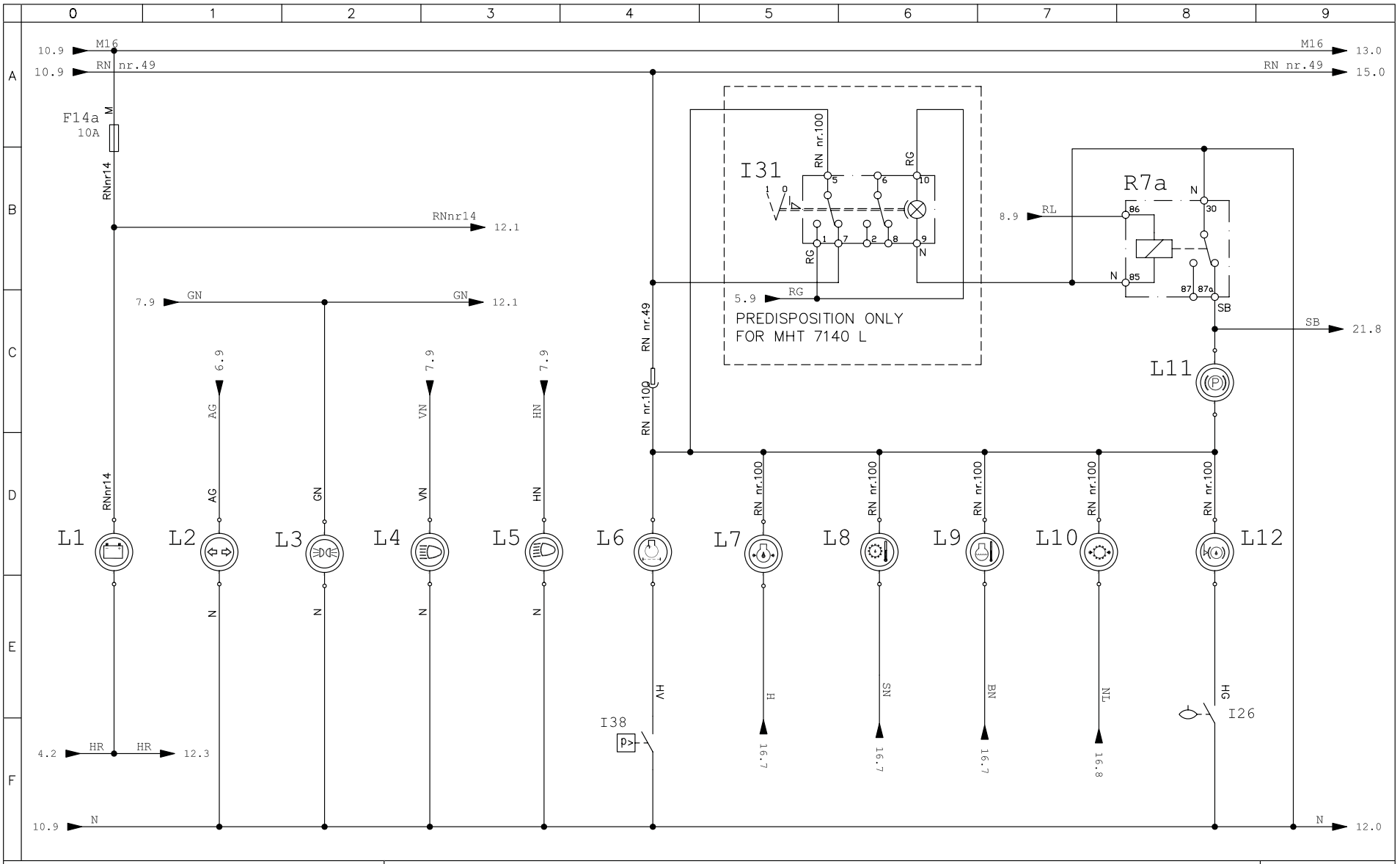


MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name: ***MANIP. LIVELLAMENTO E LAMPADA ROTANTE LEVELLING AND WORKING LAMP***

TAVOLA TABLE 10



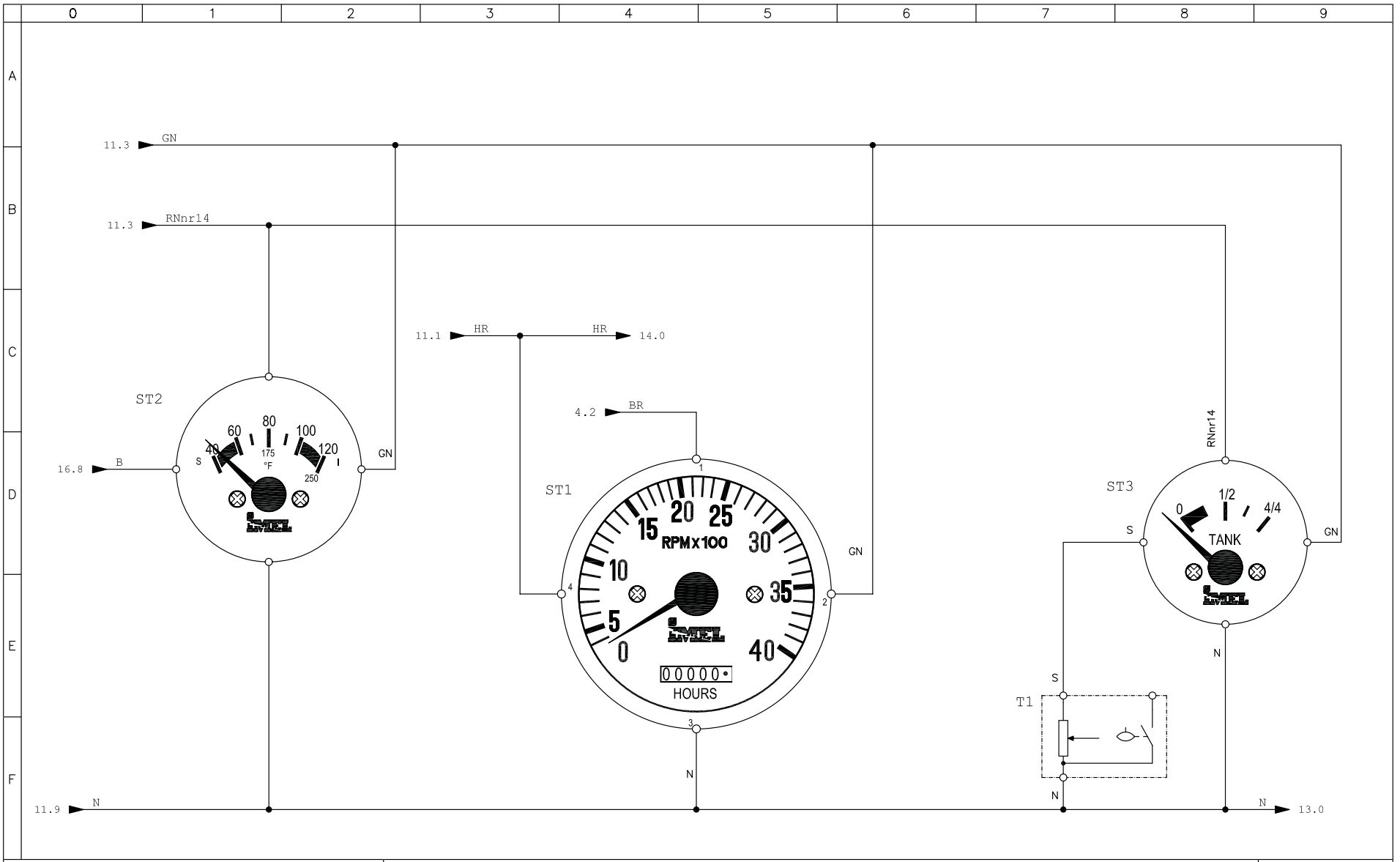
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione
Name:

CHECK E INDICATORI OTTICI
CHECK AND WARNING LIGHTS

TAVOLA
TABLE
11



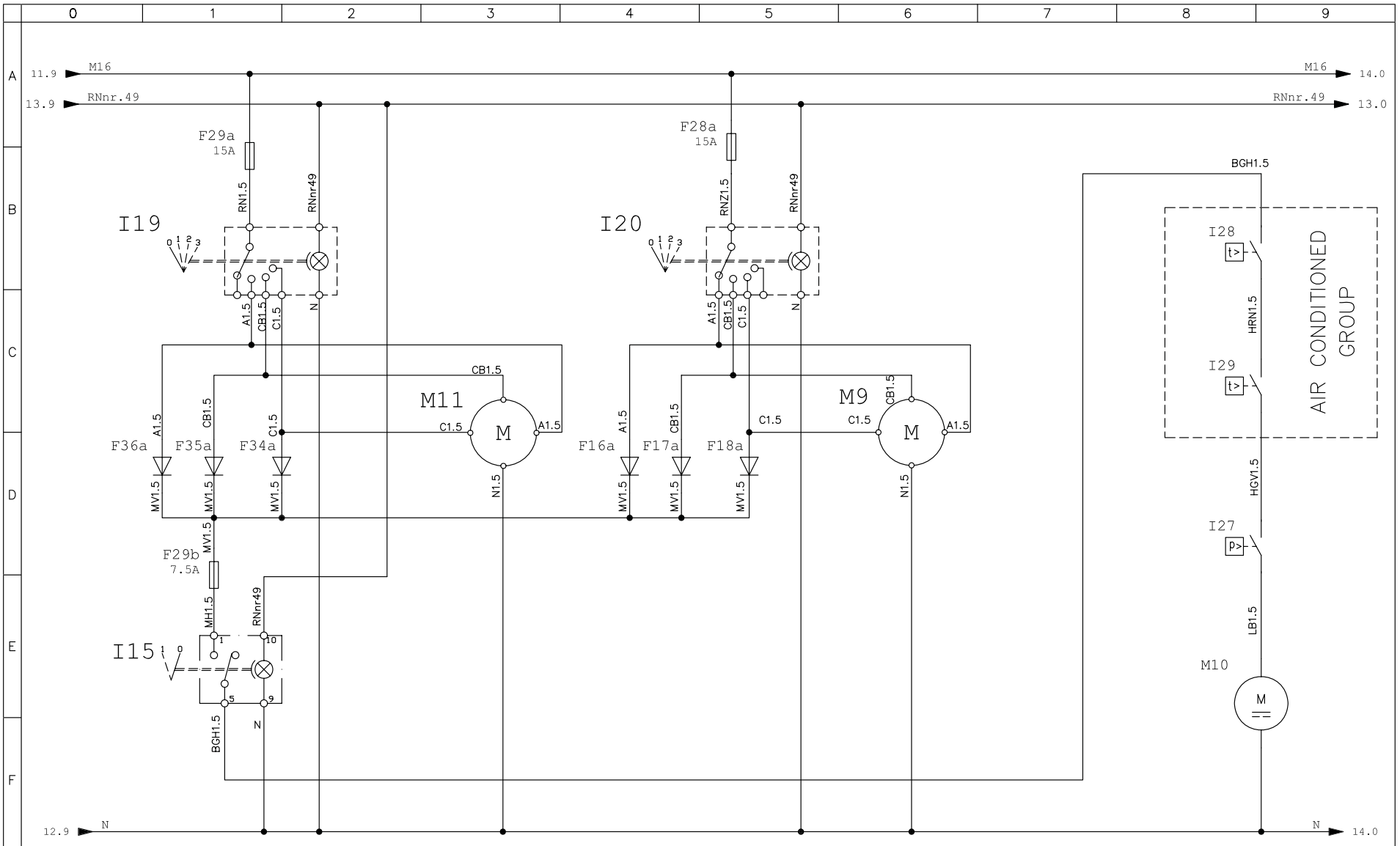
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione
Name:

STRUMENTAZIONE
INSTRUMENTATION

TAVOLA
TABLE
12



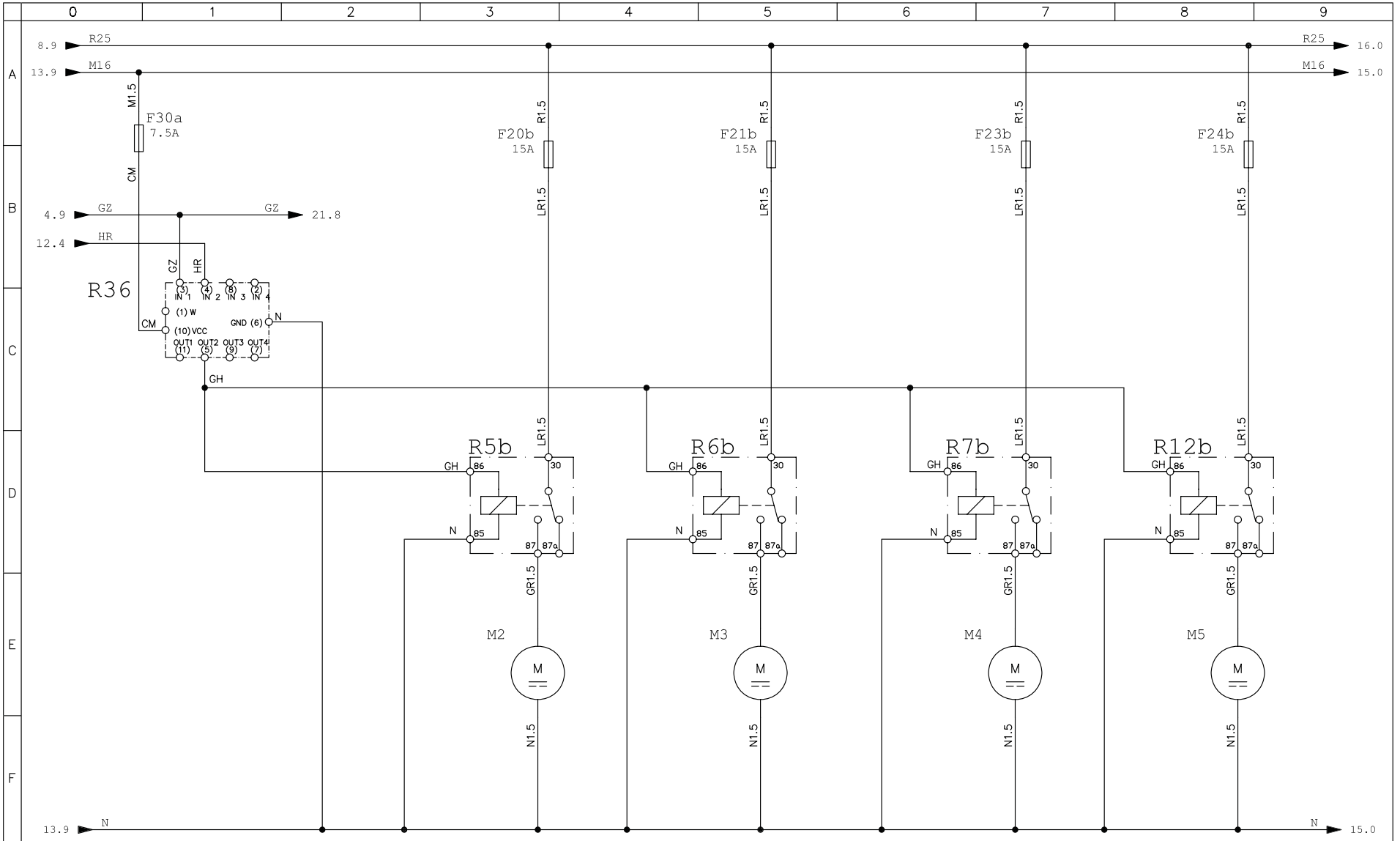
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name:

CONDIZIONATORE CABINA CONDITIONER

TAVOLA TABLE 13

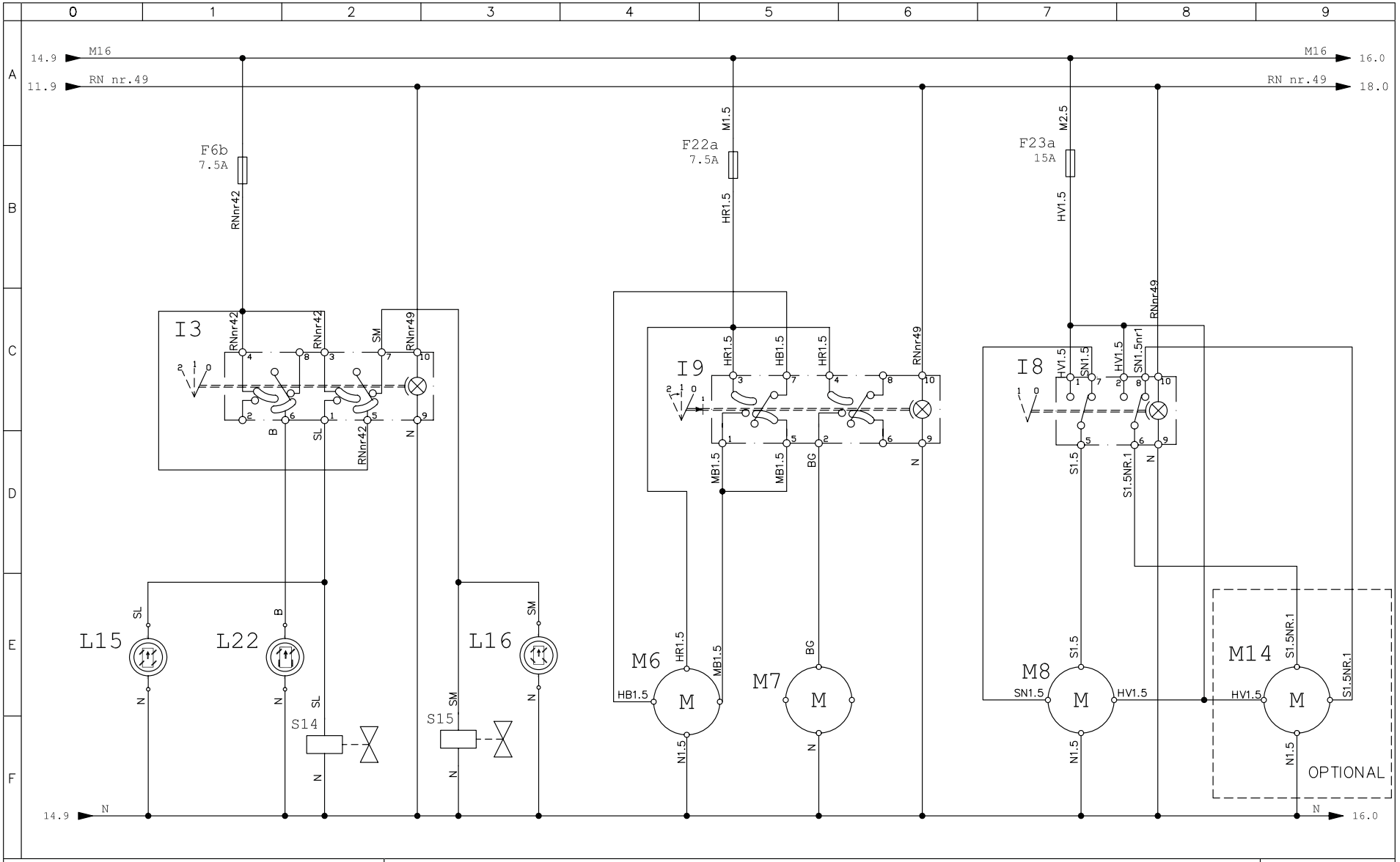


MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name: ***SISTEMA RAFFREDDAMENTO OLIO OIL COOLING SYSTEM***

TAVOLA TABLE 14

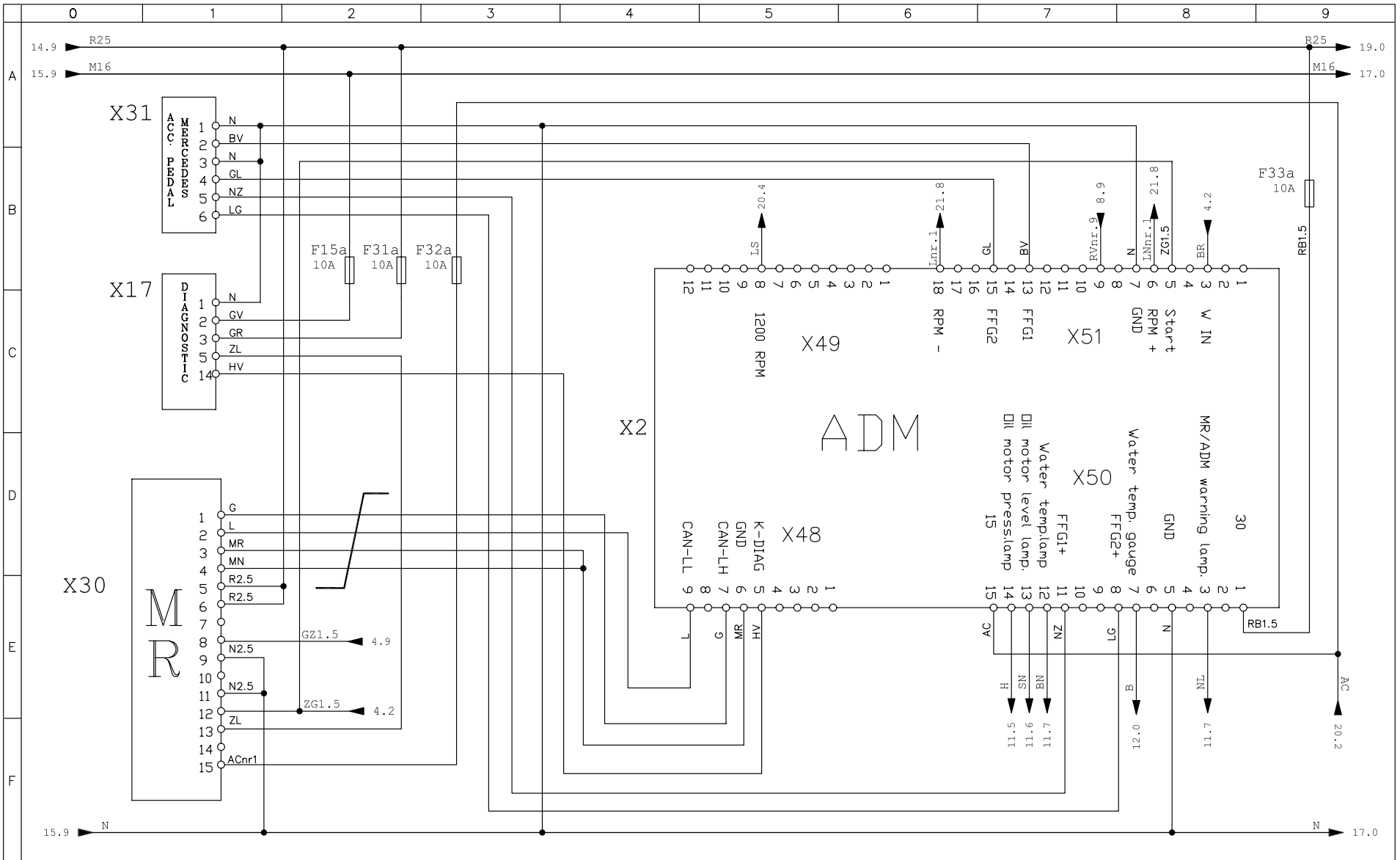


MANITOU

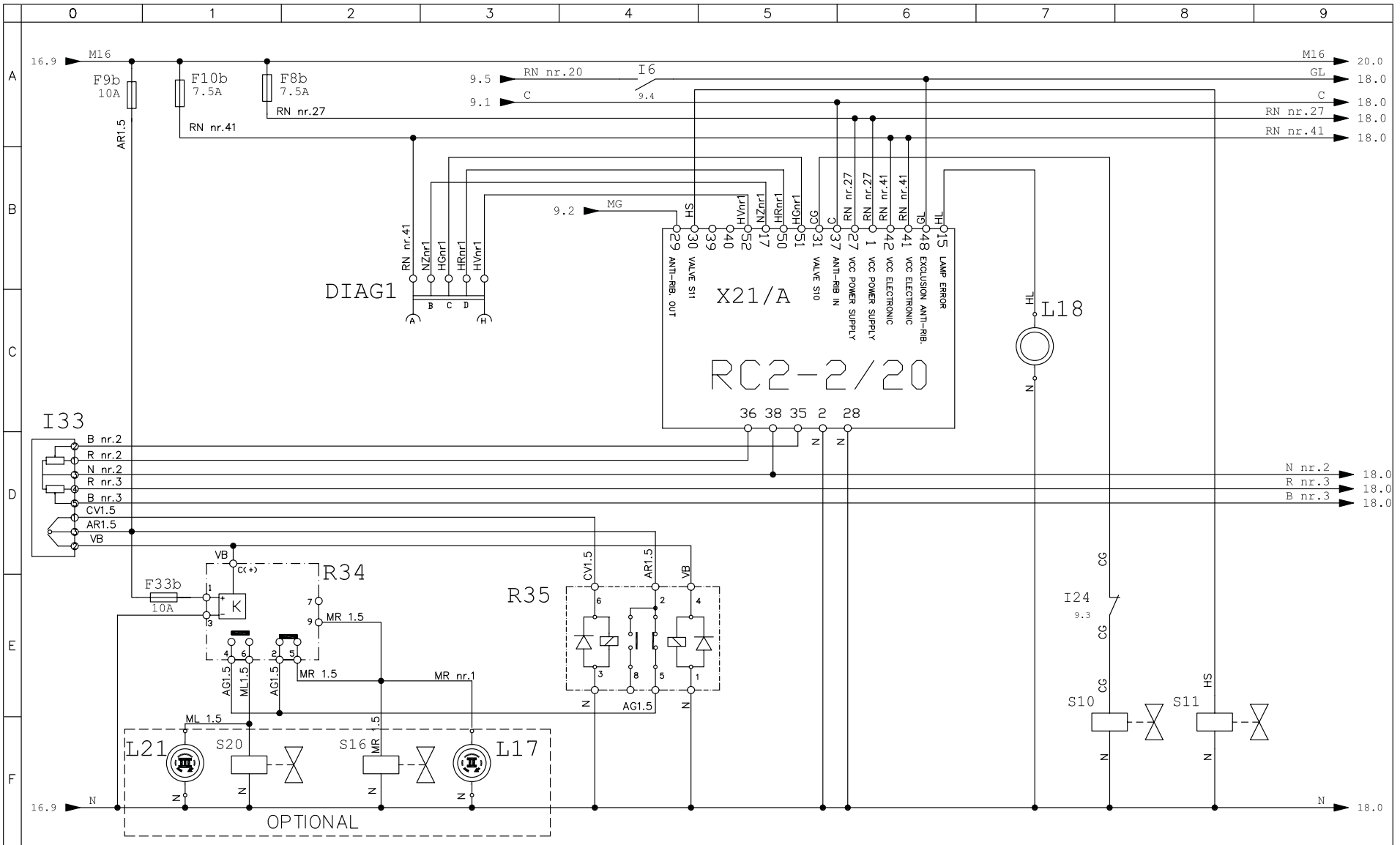
MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name: ***STERZATE E ALLINEAMENTO PONTI STEERING CYRCUIT***

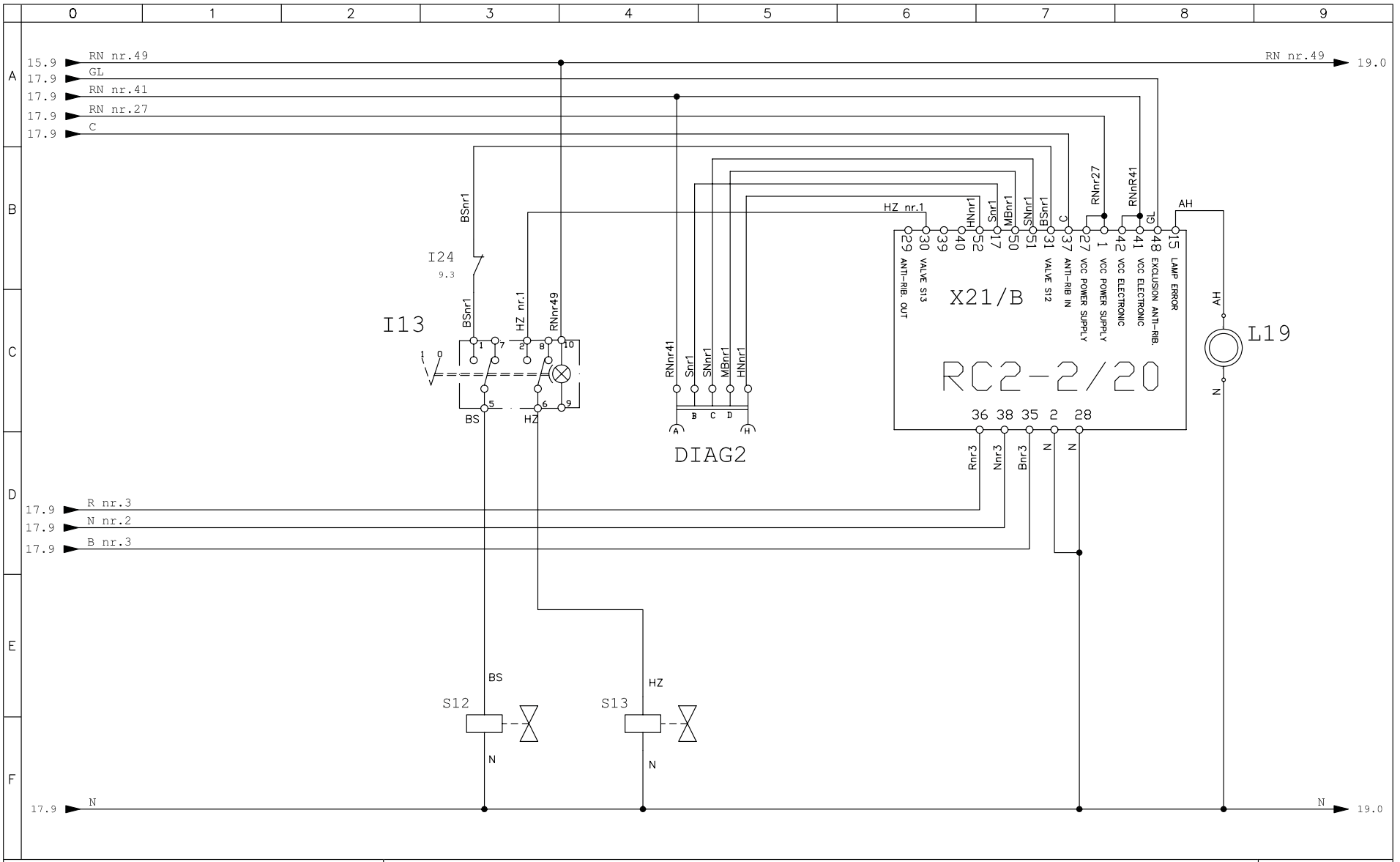
TAVOLA TABLE 15



MANITOU	MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)	TAVOLA TABLE 16
	Denominazione Name: CENTRALINA MERCEDES MERCEDES ELECTRONIC DEVICE	



MANITOU	MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)	TAVOLA TABLE 17
	Denominazione Name: **MANIPOLATORE 4 POS. E 2a-3a USCITA BRACCIO MANIPULATOR AND 2ND-3RD BOOM'S EXIT**	



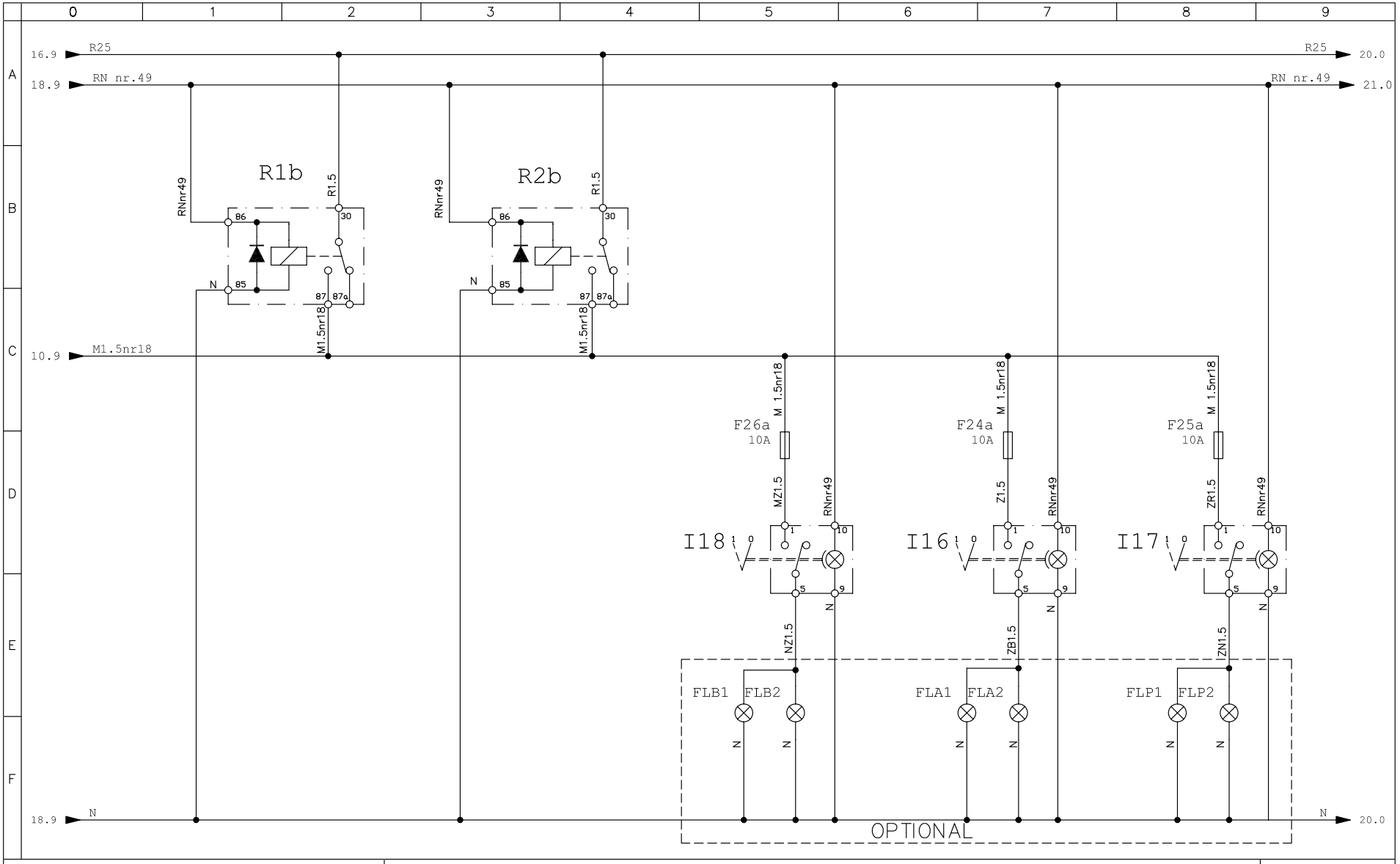
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name:

SET-RESET MANOVRE IDRAULICHE HYDRAULIC MOVEMENT SET-RESET

TAVOLA TABLE 18



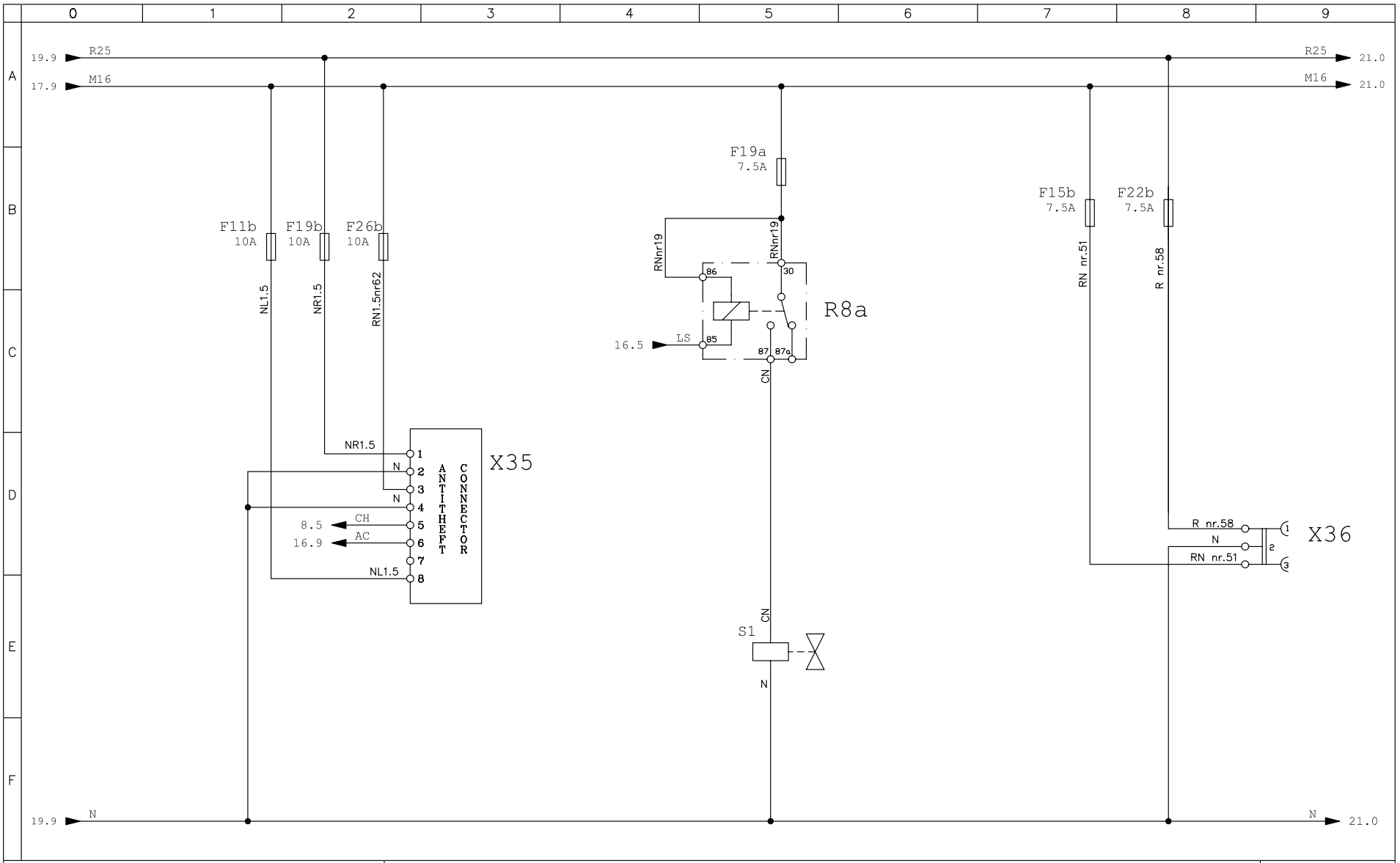
MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

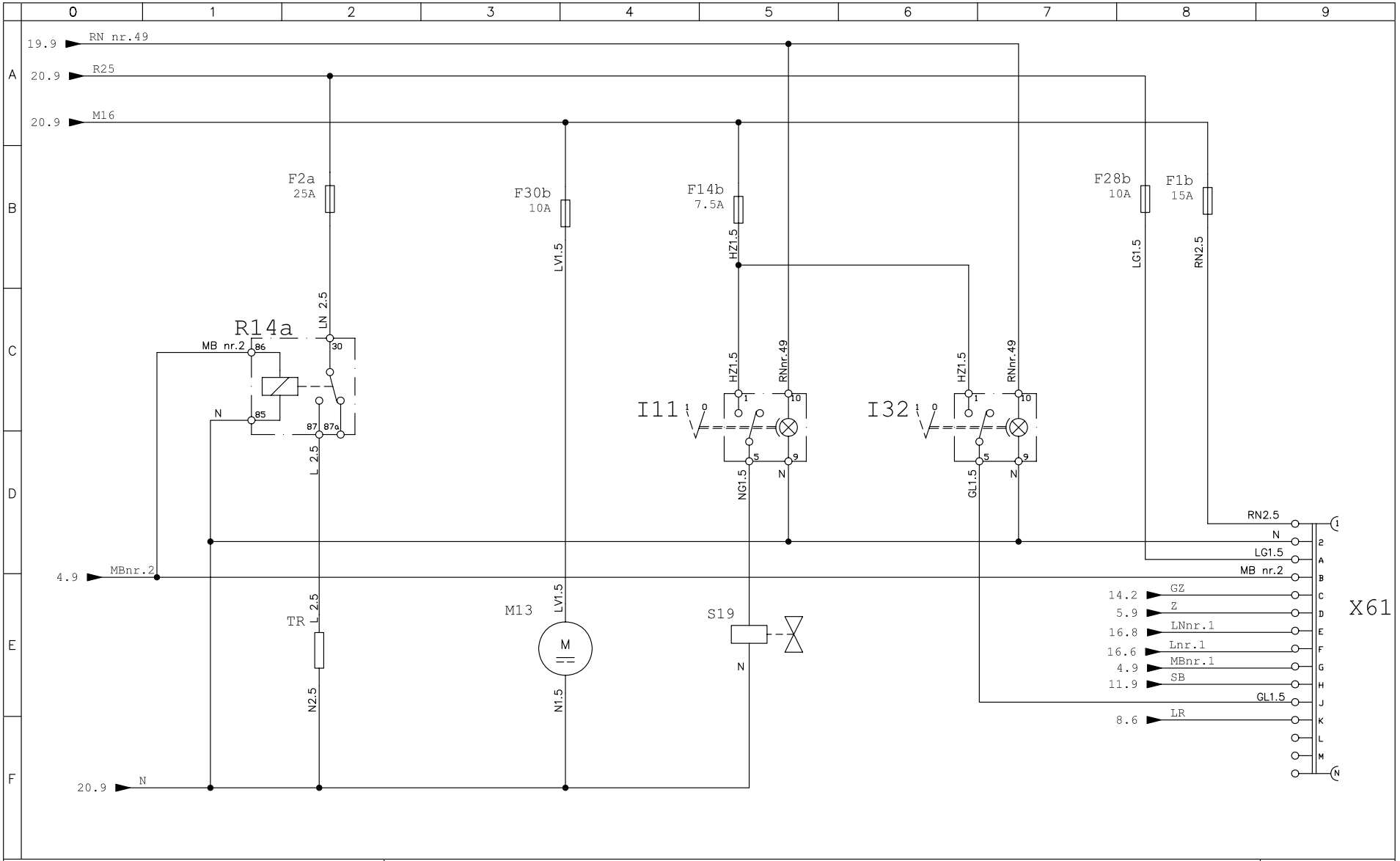
Denominazione Name:

ANTIFURTO, AUTORADIO E FARI DI LAVORO ANTI-THIEFT, RADIO WORKING LIGHTS

TAVOLA TABLE 19



MANITOU	MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)	TAVOLA TABLE 20
	Denominazione Name: ANTIFURTO, AUTORADIO ANTI-THIEFT, RADIO	



MANITOU

MHT 990-7140-10160 M SERIES DISTRIBUTORE REXROTH (09-2003) / MHT 990-7140-10160 M SERIES DISTRIBUTOR REXROTH (09-2003)

Denominazione Name:

CESTELLO + BENNA MIX BASKET + MIXING BUCKET

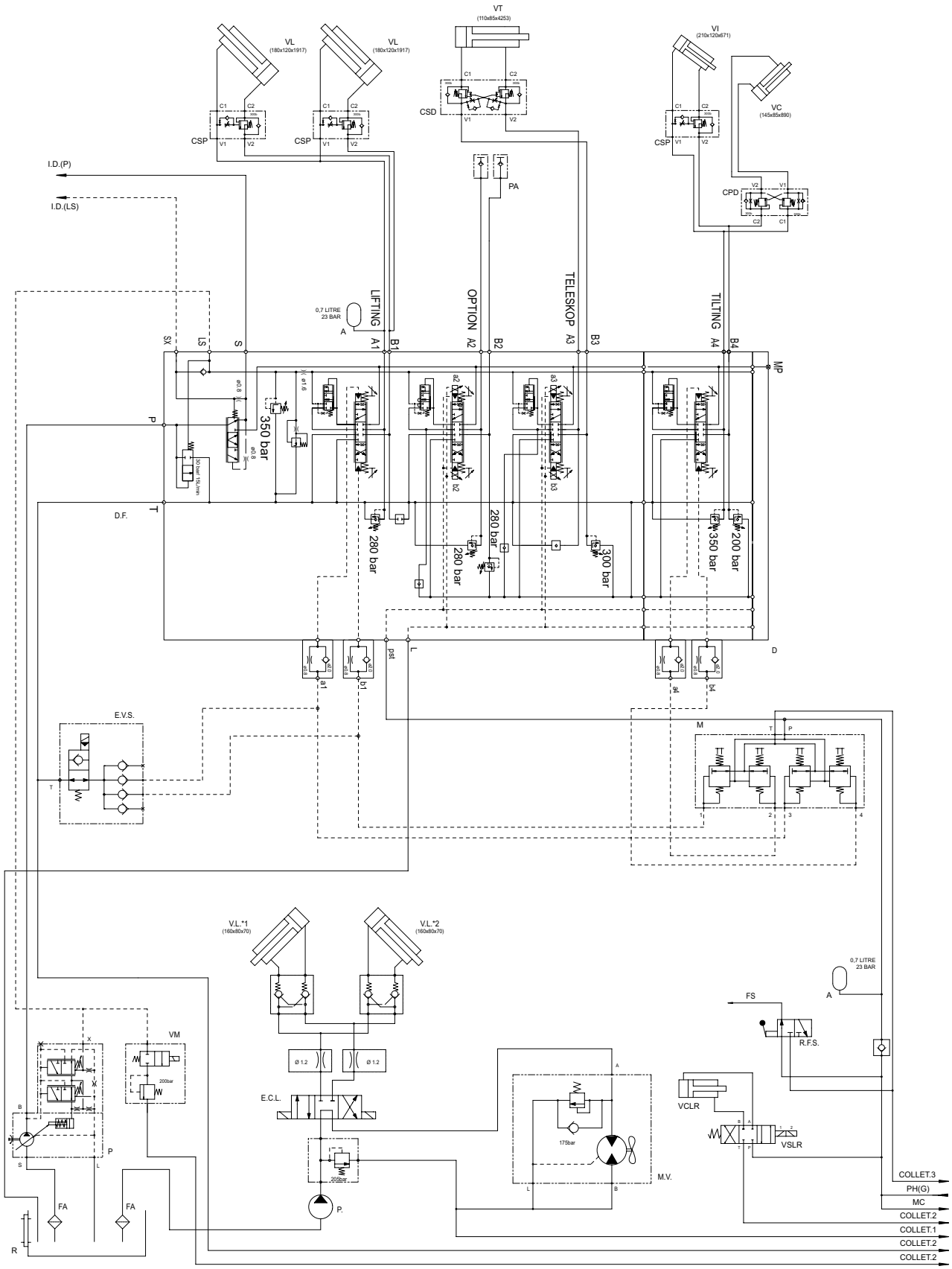
TAVOLA TABLE 21

HYDRAULIC SYSTEM

KEY TO MOVEMENT HYDRAULIC SYSTEM DIAGRAM

A	=	Pressure booster
COLLET	=	Manifold
CPD	=	Locking and balancing valve
CSD	=	Double piloted relief valve
CSP	=	Piloted relief valve
D.	=	Directional control valve
D.F.	=	Flow divider
ECL	=	Levelling control solenoid valve
EVS	=	Anti-tipping solenoid valve
F.A.	=	Intake filter
FS	=	Parking brake control cylinder
I.D.(P)	=	P connection of power steering unit
I.D.(LS)	=	LS connection of power steering unit
M	=	Control lever
MC	=	Brake pump
M.V.	=	Fan Motor
P.	=	Pump
P.A.	=	Optional attachment
PH (G)	=	G connection of hydrostatic pump
R.	=	Hydraulic fluid tank
RFS	=	Parking brake control lever
V.C.	=	Compensation cylinder
VCLR	=	Slow-fast control cylinder
V.I.	=	Tilting cylinder
V.L.	=	Lifting cylinder
V.L*1	=	First levelling cylinder
V.L*2	=	Second levelling cylinder
V.T.	=	Boom extension cylinder
VM	=	Solenoid and relief valve
VSLR	=	Slow-fast selector valve

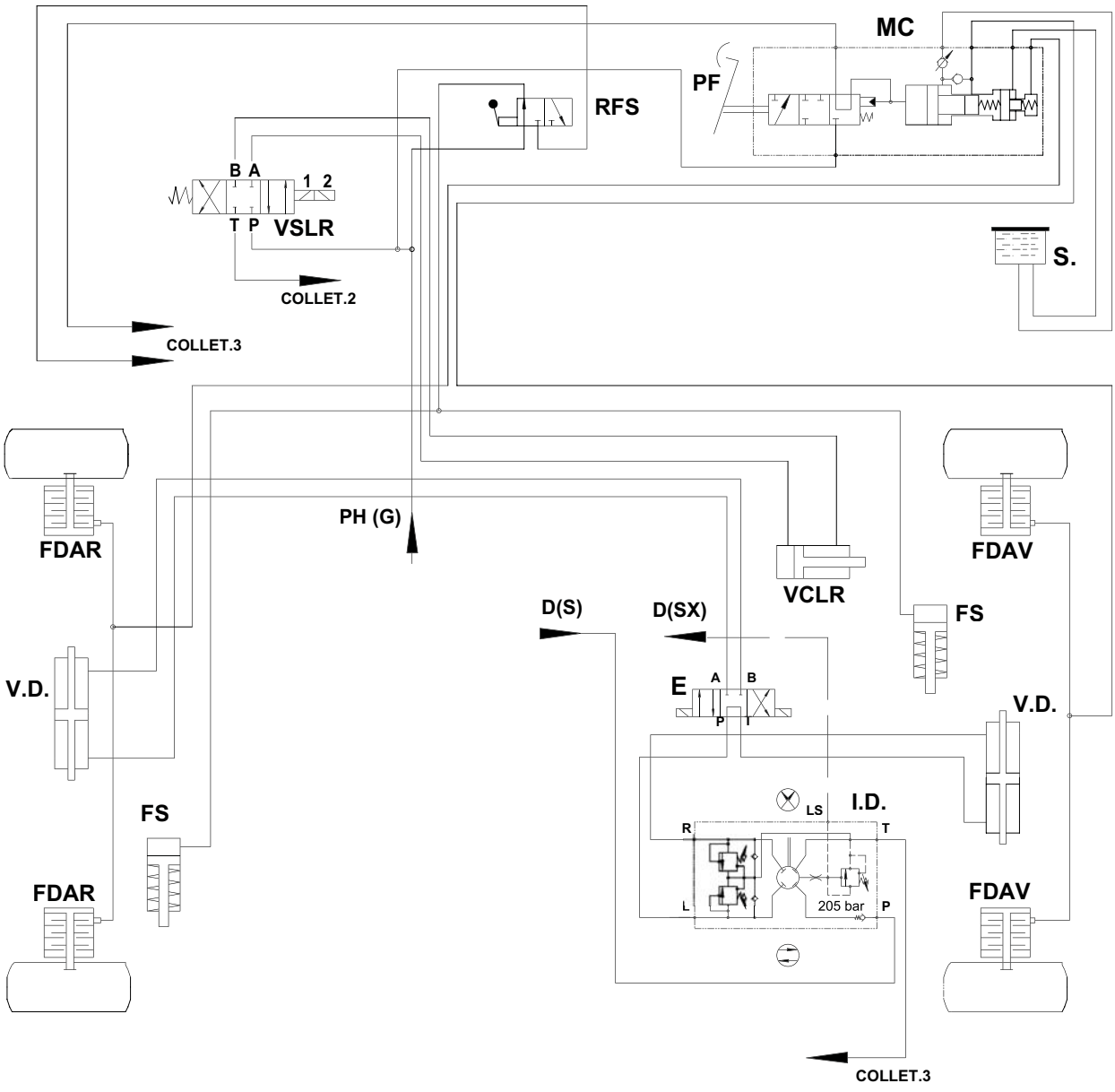
MOVEMENT HYDRAULIC SYSTEM DIAGRAM



KEY TO BRAKE/STEERING SYSTEM DIAGRAM

COLLET = Manifold
D. (S) = S connection of directional control valve
D. (SX) = SX connection of directional control valve
E = Solenoid valve
F.S. = Parking brake control cylinder
FDAR = Rear axle disk brake
FDAV = Front axle disk brake
I.D. = Power steering unit
M.C. = Brake pump
P.F. = Brake pedal
PH (G) = G connection of hydrostatic pump
RFS = Parking brake control lever
S = Brake oil tank
V.D. = Steering Cylinder
VCLR = Slow-fast control cylinder
VSLR = Slow-fast selector valve

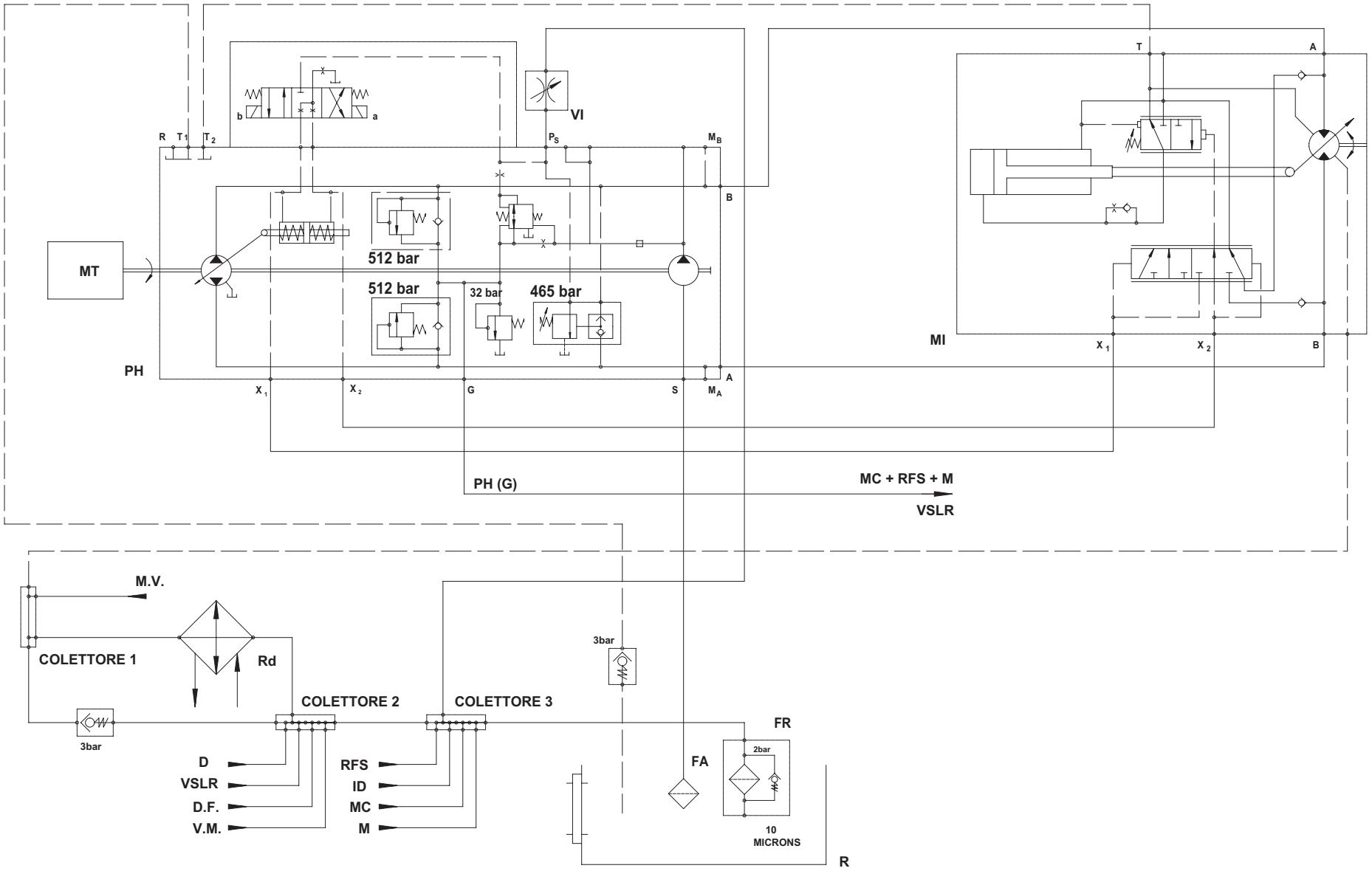
BRAKE/STEERING SYSTEM DIAGRAM



KEY TO TRANSMISSION HYDRAULIC SYSTEM DIAGRAM

COLLETTORE = Manifold
D. = Directional control valve
DF = Flow divider
F.A. = Intake filter
F.R. = Drain filter
I.D. = Power steering unit
M = Control lever
MC = Brake pump
M.I. = Hydrostatic motor
M.T. = Engine
M.V. = Fan Motor
P.H. = Hydrostatic pump
P.H. (G) = G connection of hydrostatic pump
R. = Hydraulic fluid tank
Rd = Oil radiator
RFS = Parking brake control lever
V.I. = Inching valve
VM = Solenoid and relief valve
VSLR = Slow-fast selector valve

TRANSMISSION HYDRAULIC SYSTEM DIAGRAM



5 - OPTIONAL ACCESSORIES ENVISAGED

Index

INTRODUCTION

- The manufacturer makes available (with warranty) a vast range of accessories perfectly suited to your lift-truck.

- The accessories are supplied complete with a load diagram relating to your truck. The user manual and the load diagram must be kept on the truck. The use of the possible accessories is subject to the instructions in this manual.

Some specific uses require adaptation of the accessory, not included in the optionals in the catalogue.
Other solutions are possible; contact your agent or dealer for further information.

Only accessories approved and "CE" certificates by the manufacturer can be used on our lift-trucks.
The manufacturer will have no liability in case of modifications or use of accessories without his knowledge.

Manitou assures oneself about the employement's capacity of this machine in normal conditions of working foreseen in the user's manual, with a static test coefficient of 1.33 and a dynamic test coefficient of 1, foreseen in the harmonized rules EN 1459 for the truck with variable capacity and EN 1726-1 for the forklift.

Do not use interchangeable accessories not originally included in the machine supply.

For subsequent requests for implementation of machine functions using other accessories, before starting up the machine, the user must request inspection for suitability for use by an authorized MANITOU technician, who will check the correct working and updating of the documentation necessary for using the new accessory. It is only after this inspection that a new "CE" conformity certificate will be issued for the machine indicating only the new accessories installed.

GENERAL RECOMMENDATIONS FOR USE OF A LIFT-TRUCK

WHEN YOU SEE THIS SYMBOL :

CAUTION ! TAKE CARE ! YOUR SAFETY OR THAT OF THE TRUCK IS AT STAKE.

- Follow the data provided in the load diagram. Never attempt to raise loads greater than those permitted in the load diagrams supplied with the machine.
- Transport the load in low position with the telescopic boom fully retracted.
- Drive the truck at a speed suitable to the conditions and the state of the ground.
- When the truck is empty, travel with the telescopic boom lowered and fully retracted.
- Never go too fast or brake sharply with a load.
- When the load is lifted, check that no-one can get in the way of the operation and take care not to carry out incorrect procedures.
- Never attempt operations which exceed the lift-truck's capacity.
- Take care over electrical cables.
- Never leave the truck parked with a raised load.
- Never authorise anyone to approach or pass under the load.
- Always think of safety and only transport well balanced loads.
- Never leave the truck loaded with the parking brake engaged on gradients exceeding 15%.
- With the winch or equipment with a load hanging from the hook, always adopt the following precautions :
  - *Position the winch perpendicular to the load to be lifted.*
  - *The empty hook must be lowered slowly (gently) since if it is operated too quickly the cable wound round the drum may become slack, causing serious problems for the cable, the limit stop device, etc.*
  - *If the cable tends to become twisted around the block, release the fixed end hook, pull the cable in the opposite direction until the twisting is eliminated, then re-connect the end unit.*
  - *Operate the control lever gently to prevent jerking of the load and possible problems in the winding of the cable onto the drum.*
  - *Raise the load vertically, avoiding swaying and slanting lifting.*
  - *Check the cable daily; if it is worn or damaged or has even one broken strand (see ISO 4309), replace it immediately (contact your dealer).*
  - *Check that the hydraulic hook raising and lowering limit stop is in good working order and that the brake holds with load applied.*
  - *Oil the revolving part of the hook periodically.*
  - *Check periodically that the cable is winding onto the drum correctly.*
- The following accessories are not intended for systems for lifting or moving people.
- Before putting the winch or any other equipment in which the load hangs from a hook into service, report it to the relative authority (ISPEL) in your zone for checking (for Italy only).
- Every year, remember to request your local health authority (USL) for a visit of inspection (Italy only).

It is forbidden to lift hanging loads using fork accessories or other supports not meant for this function (Contact your agent or dealer, see crane accessories list).

Using the machine outfitted with hoist

When all the green, yellow and red LEDs (Fig. A-Ref. 1) on the truck stabilization control instrument light up, the hydraulic commands are automatically blocked. ***Only the boom retraction, fork inclination and hoist rope descent commands are authorized.*** *Do not turn key "30" (page 23 - paragraph 2) for excluding automatic blocking of movements as this must be done only for operation with shovel.*

FIG. A

Before putting the winch into operation on the lift-truck check that the machine is compatible and that its safety system is set appropriately for the type of winch required.

CAUTION

Incorrect setting of the safety system may put your safety at serious risk; if in doubt, do not hesitate to contact your dealer immediately.

In view of their size, when the boom is lowered and retracted some accessories may interfere with the front tyres and damage them if the board is tilted downward.

TO ELIMINATE THIS RISK, EXTEND THE TELESCOPIC SYSTEM FAR ENOUGH TO ELIMINATE THE INTERFERENCE (THE DISTANCE WILL DEPEND ON THE TRUCK AND THE ACCESSORY.

The maximum loads are defined by the lift-truck's capacity, bearing in mind the weight and centre of gravity of the accessory. If the capacity of the accessory is below that of the lift-truck, never exceed this limit.

Before putting any type of accessory into operation on the fork-lift truck check the machine's compatibility and the calibration of the safety system with regard to the accessory used.

ACCESSORY WITHOUT HYDRAULIC SYSTEM AND MANUAL LOCKING

ENGAGING THE ACCESSORY

- Check that the accessory is in a position which simplifies connection of the snap coupling. If it is badly positioned, take the necessary precautions to move it in the conditions of maximum safety.
- Check that the locking pin is engaged in the support provided on the frame.
- Position the lift-truck with the boom lowered squarely in front of and parallel to the accessory and tilt the snap coupling forward (Fig.A).
- Bring the snap coupling into position below the accessory's connection pipe, raise the boom slightly and tilt the connection back to position the accessory (Fig.B).
- Raise the accessory off the ground for easier engagement.

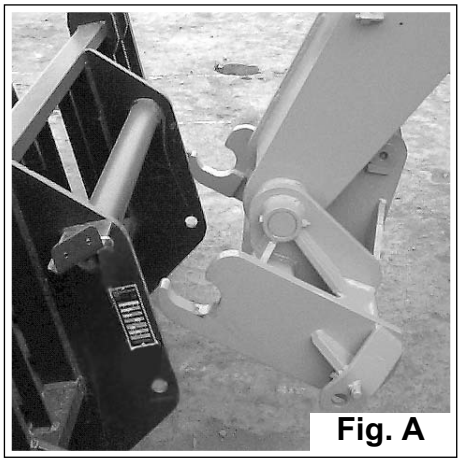


Fig. A

MANUAL LOCKING

- Take the locking pin on the support and fix the accessory (Fig.C). Do not forget to fit the split-pin.

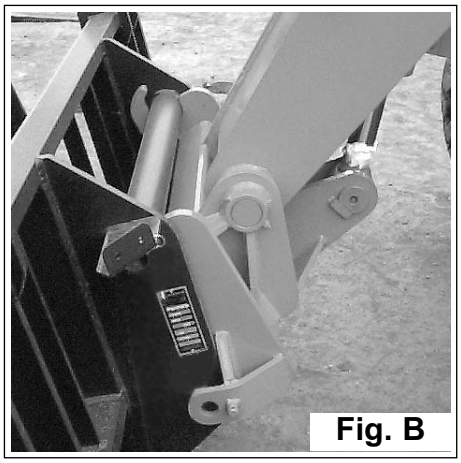


Fig. B

MANUAL RELEASE

- Proceed in reverse direction to the MANUAL LOCKING procedure, taking care to replace the locking pin in the support on the frame.

REMOVING (AND PUTTING DOWN) THE ACCESSORY

- Proceed in reverse direction to the ENGAGING THE ACCESSORY procedure, taking care to place it in a safe position on firm, flat ground.

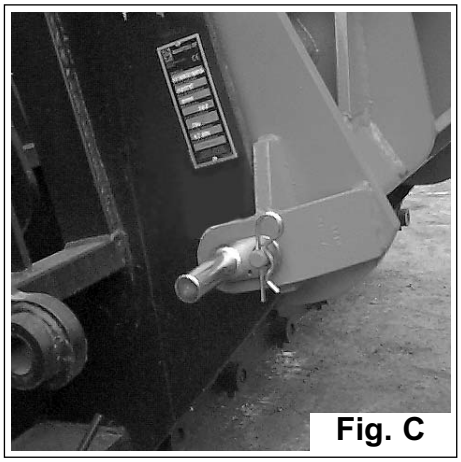


Fig. C

ACCESSORY WITHOUT HYDRAULIC SYSTEM AND HYDRAULIC LOCKING (OPTIONAL)

ENGAGING THE ACCESSORY

- Check that the accessory is in a position which simplifies connection of the snap coupling. If it is badly positioned, take the necessary precautions to move it in the conditions of maximum safety.
- Check that the rods of the locking cylinder are retracted.
- Position the lift-truck with the boom lowered squarely in front of and parallel to the accessory and tilt the snap coupling forward (Fig. A).
- Bring the snap coupling into position below the accessory's connection pipe, raise the boom slightly and tilt the connection back to position the accessory (Fig. B).
- Raise the accessory off the ground for easier engagement.

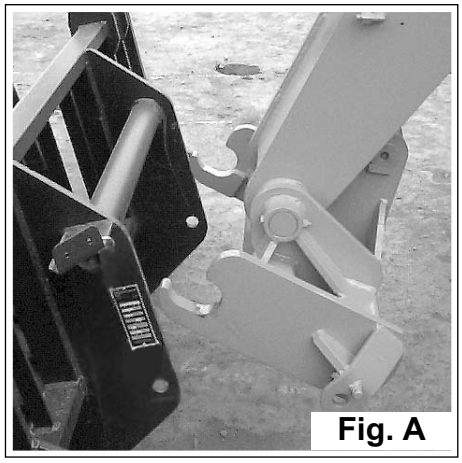


Fig. A

HYDRAULIC LOCKING AND RELEASE (OPTIONAL)

- The accessory (if any) is locked and released using the optional control (which may be operated by a push-button or using the control lever itself, depending on the type of truck). For further information, refer to the use and maintenance manual provided with the truck.

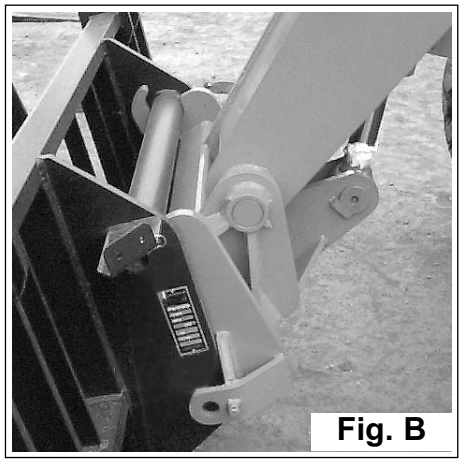


Fig. B

REMOVING (AND PUTTING DOWN) THE ACCESSORY

- Proceed in reverse direction to the ENGAGING THE ACCESSORY procedure, taking care to place it in a safe position on firm, flat ground.

ACCESSORY WITH HYDRAULIC SYSTEM AND MANUAL LOCKING (OPTIONAL)

ENGAGING THE ACCESSORY

- Check that the accessory is in a position which simplifies connection of the snap coupling. If it is badly positioned, take the necessary precautions to move it in the conditions of maximum safety.
- Check that the locking pin is engaged in the support provided on the frame.
- Position the lift-truck with the boom lowered squarely in front of and parallel to the accessory and tilt the snap coupling forward (Fig. A).
- Bring the snap coupling into position below the accessory's connection pipe, raise the boom slightly and tilt the connection back to position the accessory (Fig. B).
- Raise the accessory off the ground for easier engagement.

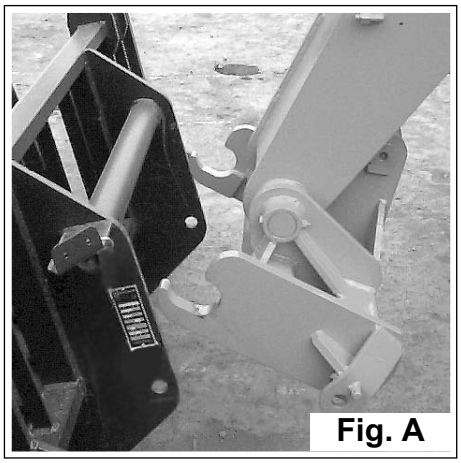


Fig. A

MANUAL LOCKING AND CONNECTION OF THE ACCESSORY

- Take the locking pin on the support and fix the accessory (Fig. C). Do not forget to fit the split-pin.
- Switch off the engine.
- Eliminate the accessory hydraulic circuit pressure using the optional control (refer to the "controls" pages of the use and maintenance manual).
- Connect the snap couplings, following the description of the hydraulic movements of the accessory.

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

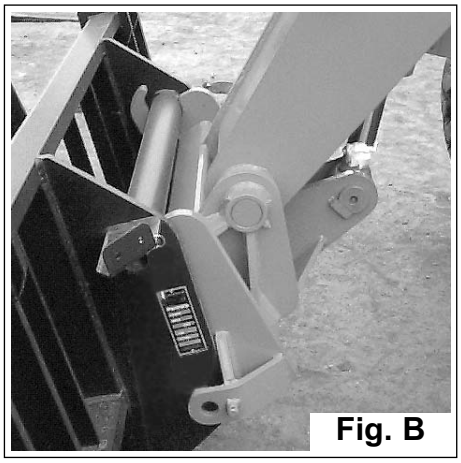


Fig. B

REMOVING (AND PUTTING DOWN) THE ACCESSORY

- Proceed in reverse direction to the ENGAGING THE ACCESSORY procedure, taking care to place it in a safe position on firm, flat ground.

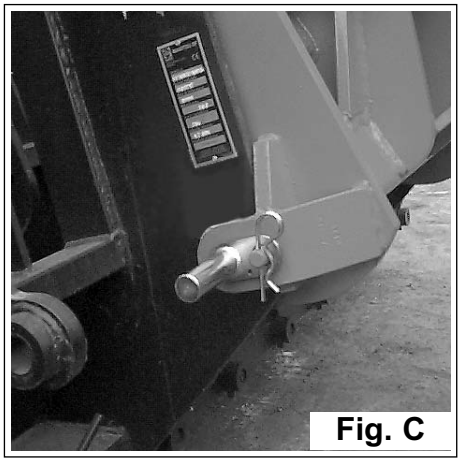


Fig. C

ACCESSORY WITH HYDRAULIC SYSTEM AND HYDRAULIC LOCKING (OPTIONAL)

ENGAGING THE ACCESSORY

- Check that the accessory is in a position which simplifies connection of the snap coupling. If it is badly positioned, take the necessary precautions to move it in the conditions of maximum safety.
- Check that the rods of the locking cylinder are retracted.
- Position the lift-truck with the boom lowered squarely in front of and parallel to the accessory and tilt the snap coupling forward (Fig. A).
- Bring the snap coupling into position below the accessory's connection pipe, raise the boom slightly and tilt the connection back to position the accessory (Fig. B).
- Raise the accessory off the ground for easier engagement.

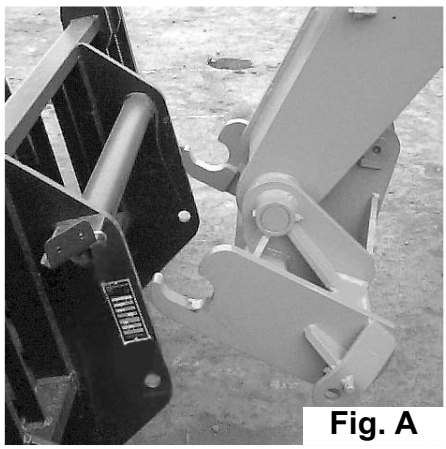


Fig. A

HYDRAULIC LOCKING AND RELEASE (OPTIONAL)

- The accessory (if any) is locked and released using the optional control (which may be operated by a push-button or using the control lever itself, depending on the type of truck). For further information, refer to the use and maintenance manual provided with the truck.

Remember to decompress the optional circuit whenever an extra accessory is to be connected to or disconnected from the lift-truck; this will simplify the engagement and disengagement of the snap couplings on the end of the boom.

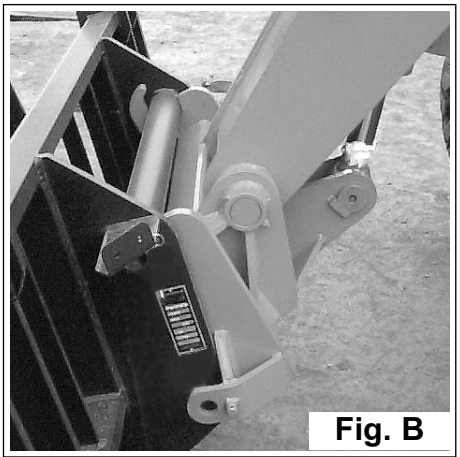


Fig. B

REMOVING (AND PUTTING DOWN) THE ACCESSORY

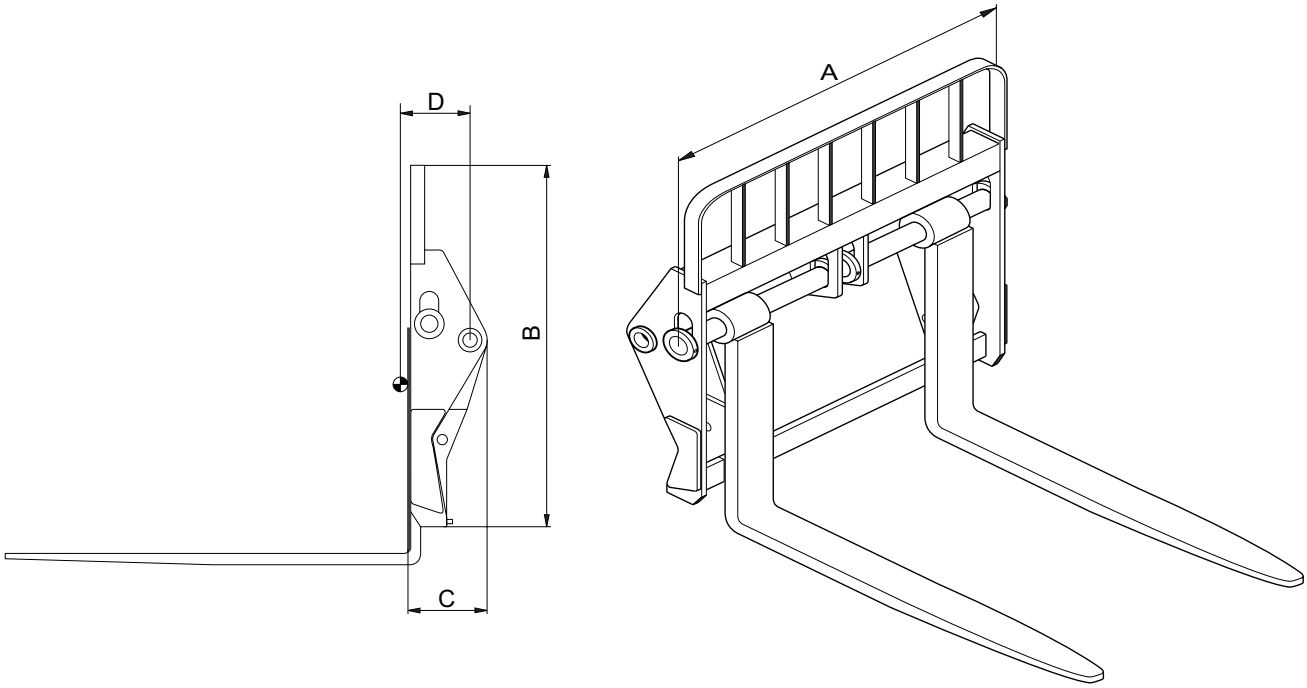
- Proceed in reverse direction to the ENGAGING THE ACCESSORY procedure, taking care to place it in a safe position on firm, flat ground.

TECHNICAL FEATURES OF ACCESSORIES

Index

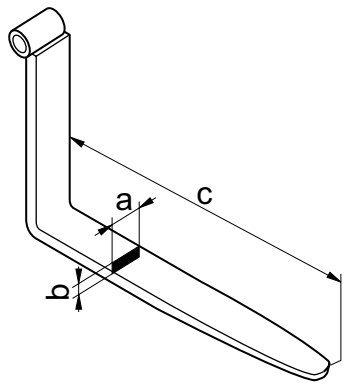
FLOATING FORK-HOLDER

FEATURES



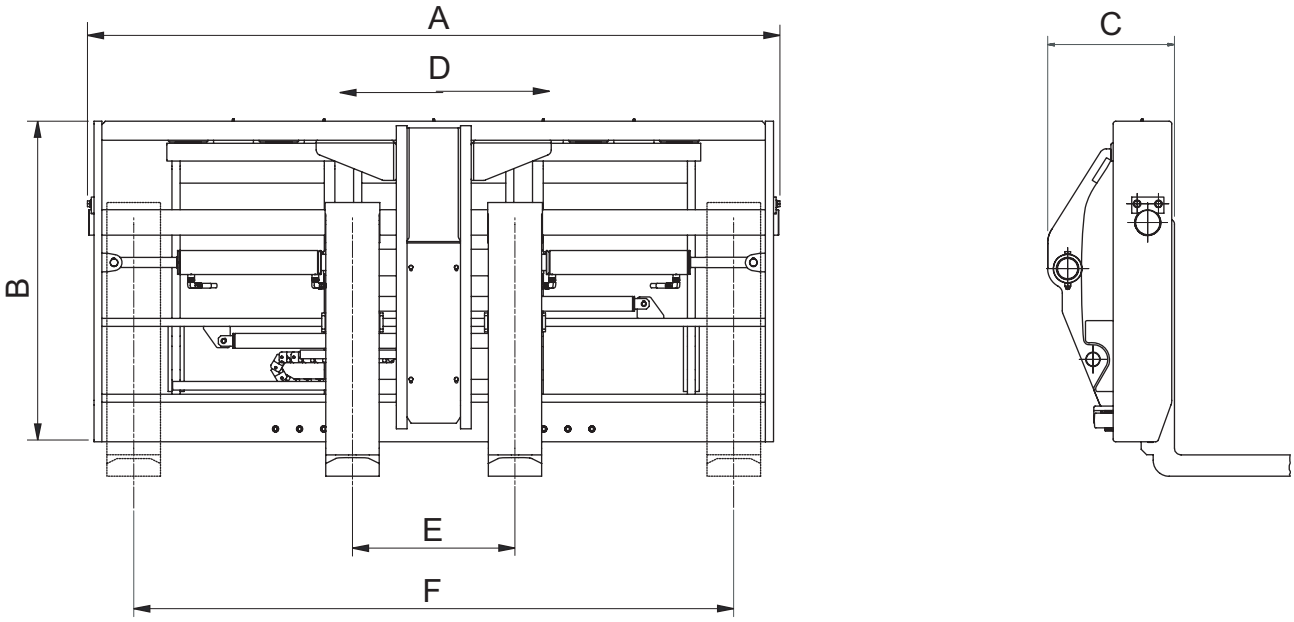
FEATURES						
DESCRIPTION	CAPACITY	DIMENSIONS (mm)			ACCESSORY	WEIGHT
		A	B	C	D	
PF FLOTT / L 2000	21000 Kg	2090	1450	770	800 mm	795 Kg

FORKS FEATURES					
DESCRIPTION	CAPACITY	DIMENSIONS (mm)			WEIGHT
		A	B	C	
F FLOTT /L1800	2 X 10500 Kg	200	100	1800	390 Kg



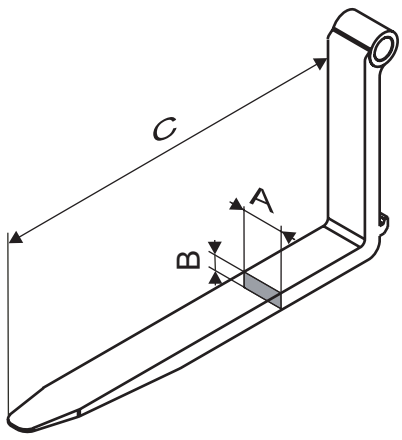
SIDE SHIFT FORK POSITIONER

FEATURES

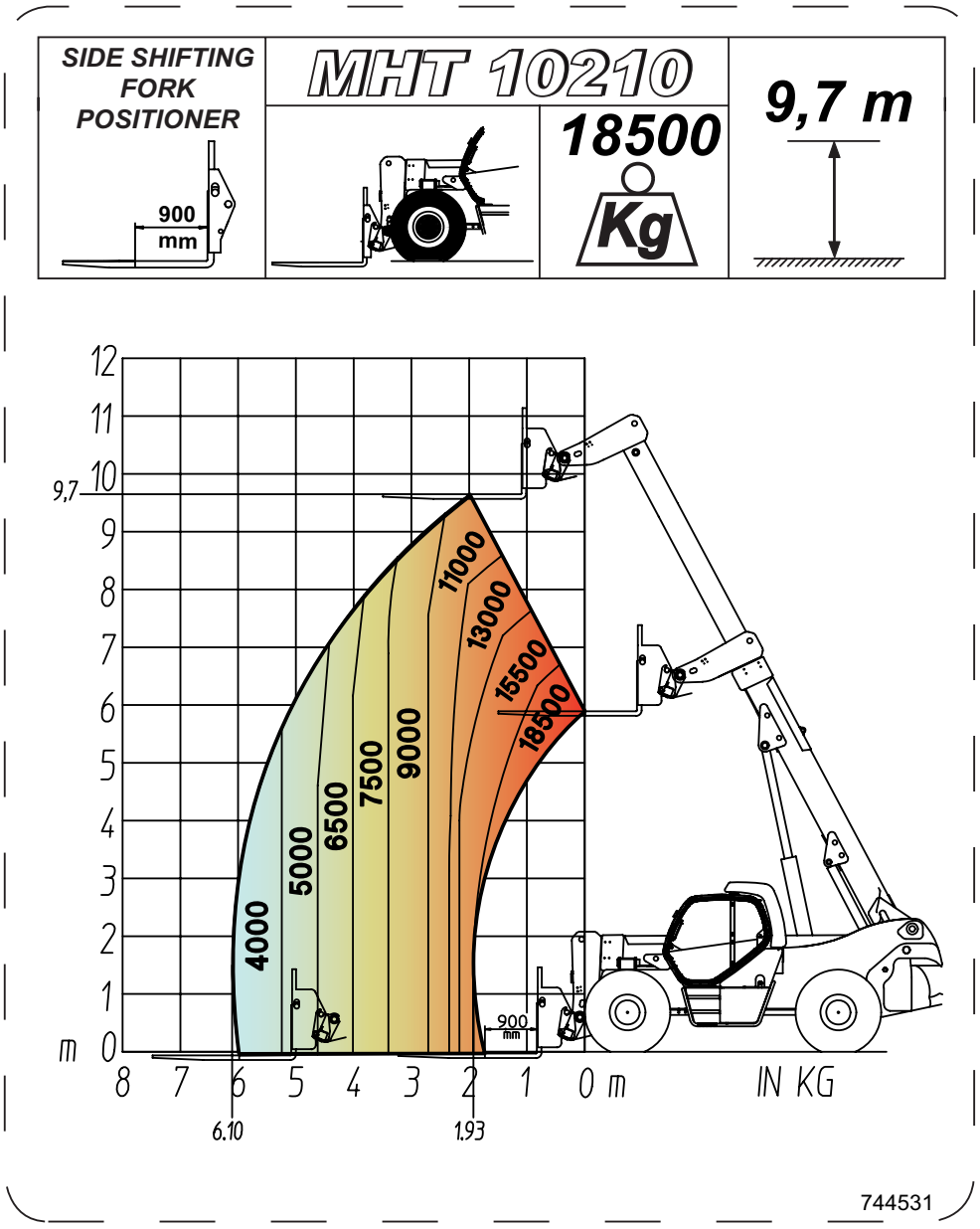


FEATURES								
DESCRIPTION	CAPACITY	DIMENSIONS (mm)						WEIGHT
		A	B	C	D	E	F	
TDL FL / 550-2250	8000 Kg	2600	1200	470	±200	550	2250	1310 Kg
TDL FL / 600-2200	10000 Kg	2600	1200	470	±200	550	2250	1310 Kg

FORKS FEATURES					
DESCRIPTION	CAPACITY	DIMENSIONS (mm)			WEIGHT
		A	B	C	
F FLOTT /L1500	2 X 8000 Kg	200	80	1500	270 Kg
F FLOTT /L1830	2 X 8000 Kg	200	80	1830	330 Kg
F FLOTT /L2000	2 X 8000 Kg	200	80	2000	350 Kg
F FLOTT /L2400	2 X 8000 Kg	200	80	2400	400 Kg

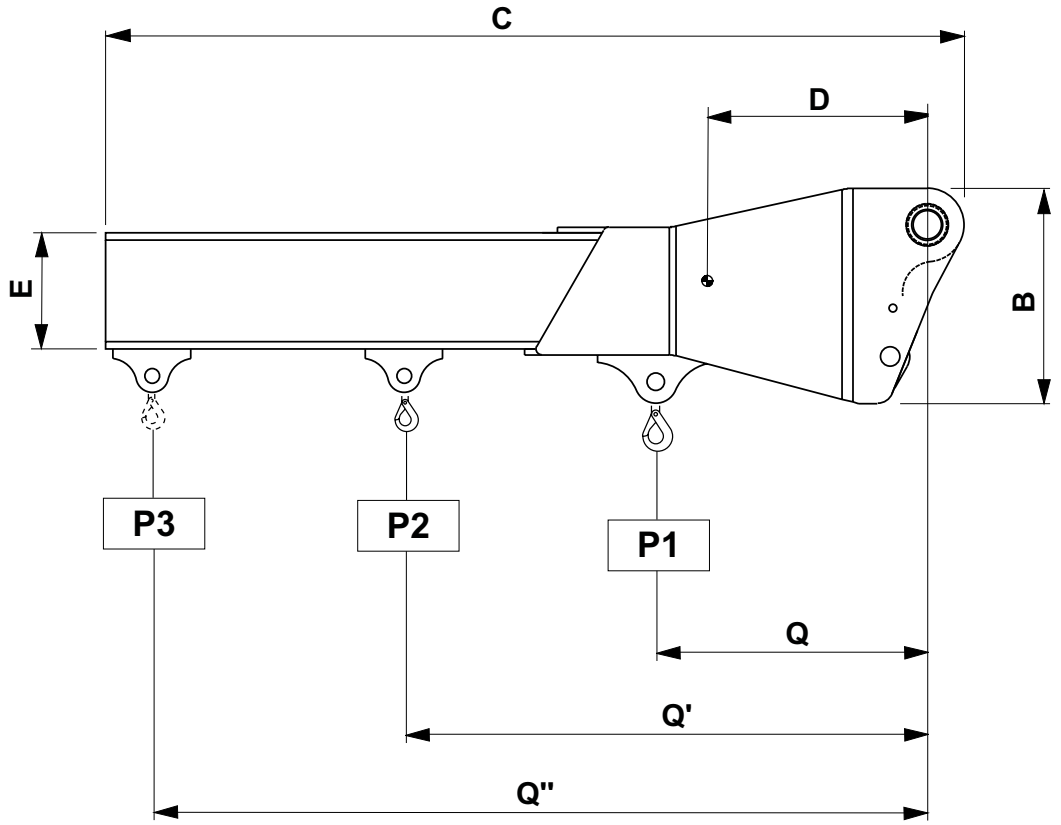


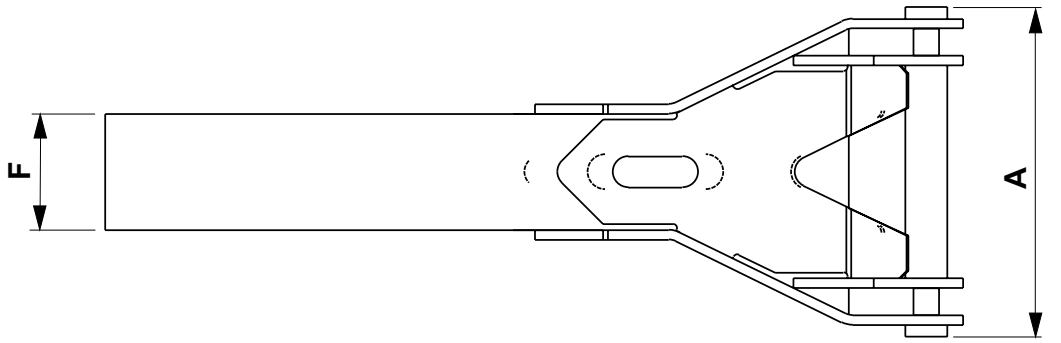
LOAD CAPACITY CHART



ARM WITH HOOK

FEATURES

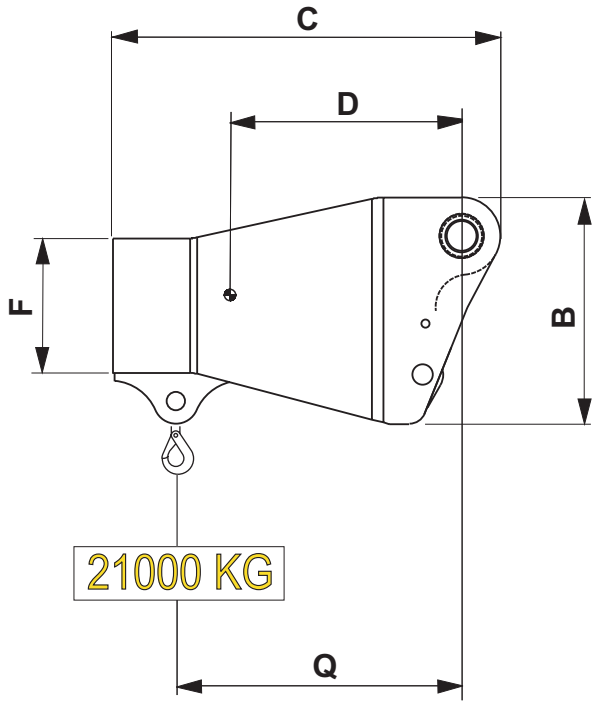


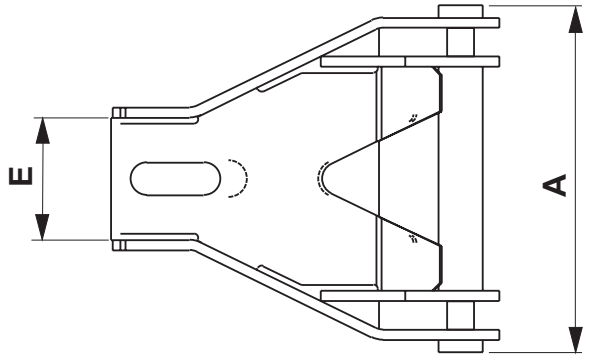


FEATURES													
DESCRIPTION	CAPACITY			DIMENSIONS (mm)					ACCESSORY	HOOK DISTANCE (mm)			WEIGHT
	P1	P2	P3	A	B	C	E	F	D	Q	Q'	Q''	
PC 160	16000 Kg	10000 Kg	7500 Kg	850	555	2290	300	300	550 mm	700	1350	2000	650 Kg

ARM WITH HOOK

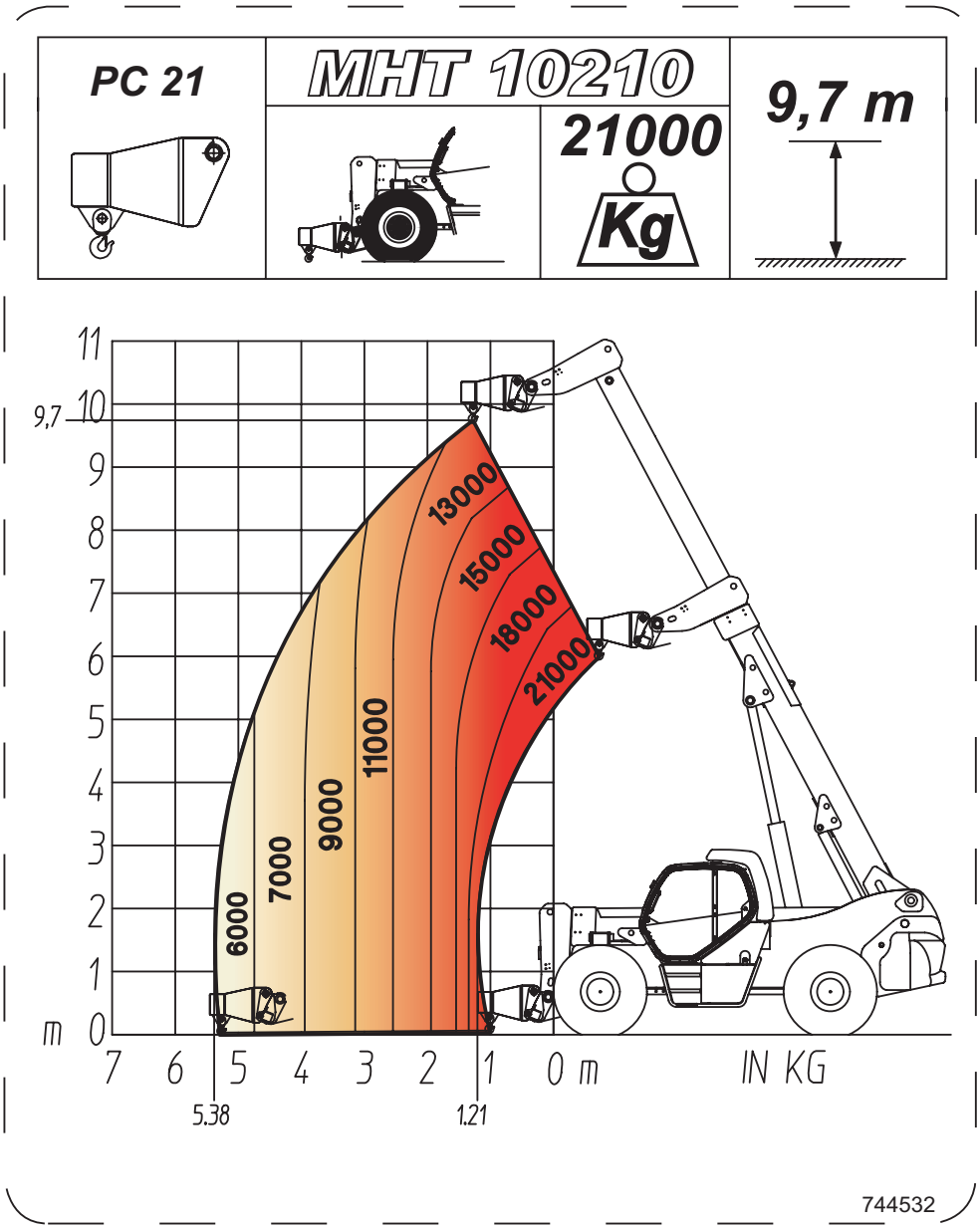
FEATURES





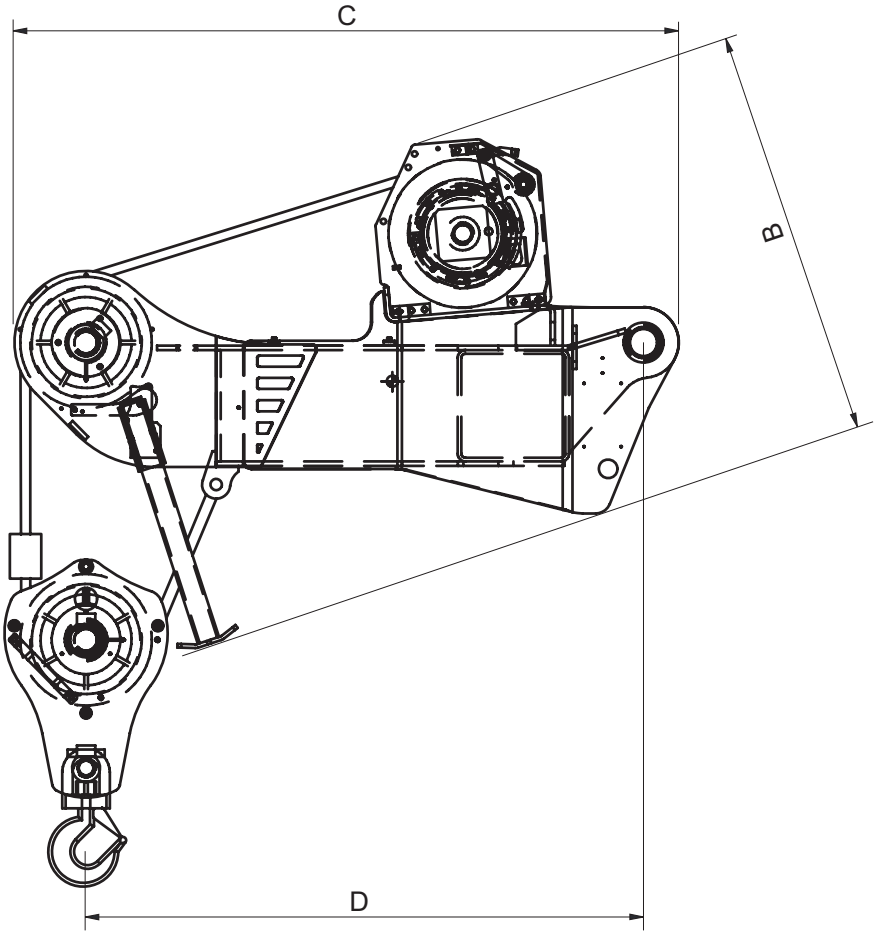
FEATURES									
DESCRIPTION	CAPACITY	DIMENSIONS (mm)					ACCESSORY	HOOK DISTANCE (mm)	WEIGHT
		A	B	C	E	F	D	Q	
PC 21	21000 Kg	850	555	945	300	300	340 mm	700	430 Kg

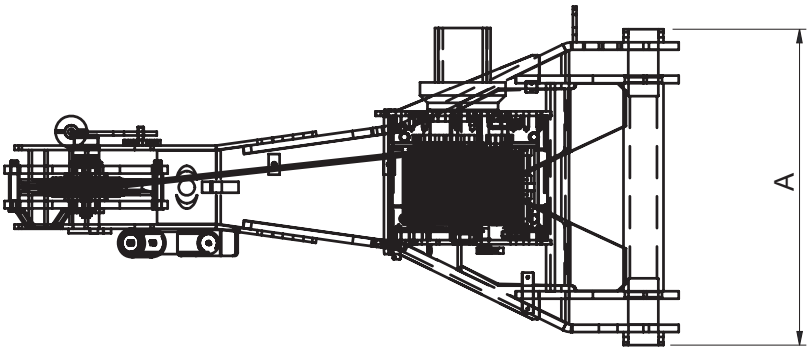
LOAD CAPACITY CHART



ARM + WINCH 7 TON

FEATURES

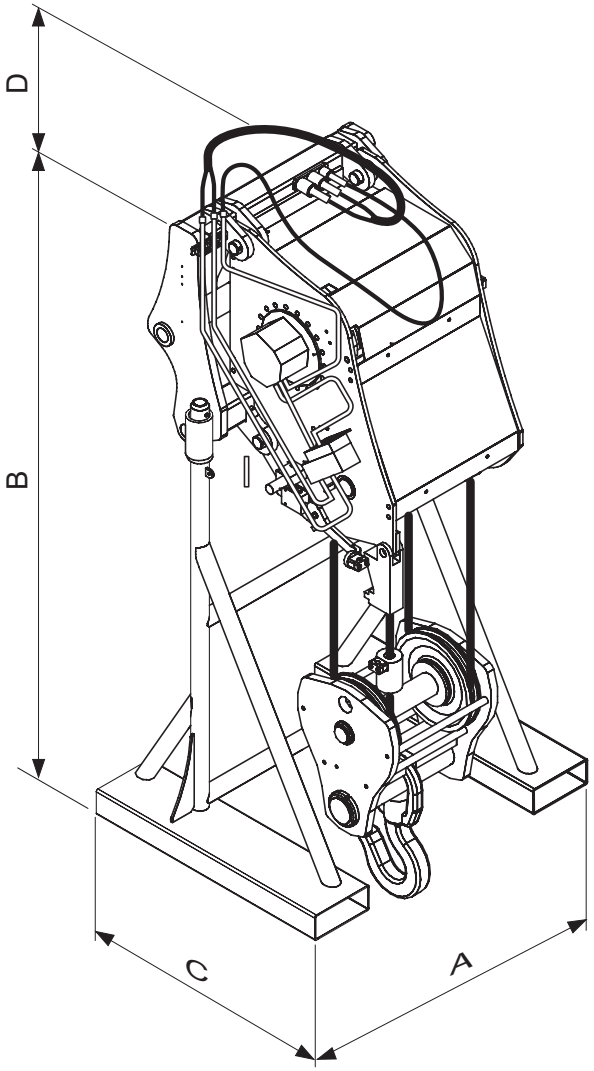




FEATURES						
DESCRIPTION	CAPACITY	DIMENSIONS (mm)			HOOK DISTANCE (mm)	WEIGHT
		A	B	C	Q	
PT 7000	7000 Kg	850	1200	1750	1500	726 Kg

WINCH 16 TON

FEATURES



LUBRICATION				
DESCRIPTION	RECOMMENDED PRODUCT	QUANTITY	FIRST COUPON	FREQUENCY
ROPE	GREASE SHELL RETINAX HDX 2	/	/	30 HOURS
BLOCK	GREASE SHELL ALVANIA GREASE EP2 (LF)	/	/	30 HOURS
WINCH RED.	OIL SHELL SPIRAX HD 80W-90	1,5 L	150 HOURS	1000 HOURS
HOOK ROTATION	OIL AT 40	/	/	30 HOURS

FEATURES											
DESCRIPTION	CAPACITY		ROPE	"CE" HOOK	HOOK SPEED	LIMIT STOP	ACCESSORY (mm)				WEIGHT
							A	B	C	D	
WINCH 16 T	16000 Kg WITH 4 ROPES	4000 Kg DIRECT TYPE	16 mm 25100 daN x 60 m	22 T	// m/min	HYDRAULIC	1205	2340	1000	250	1185 Kg

LOAD CAPACITY CHART