

Use and Maintenance Manual HTH 16.10

engine: Mercedes

General information



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DECLARACION DE CONFORMIDAD "CE"

MAGNI
TELESCOPIC HANDLERS

El abajo firmante Sr. Riccardo Magni, en calidad de Representante Legal de la Empresa
MAGNI TELESCOPIC HANDLERS S.r.l.
41013 Castelfranco Emilia (MO) Italy
como persona facultada para fabricar y almacenar el expediente técnico,
DECLARA
bajo su exclusiva responsabilidad que la in aqua:
Manipulador Telescopico

HTH 16.10

MODELO:
NUMERO DE SERIE:
AÑO DE PRODUCCION:

0000****
2014

cumple con los requisitos de las directivas siguientes:

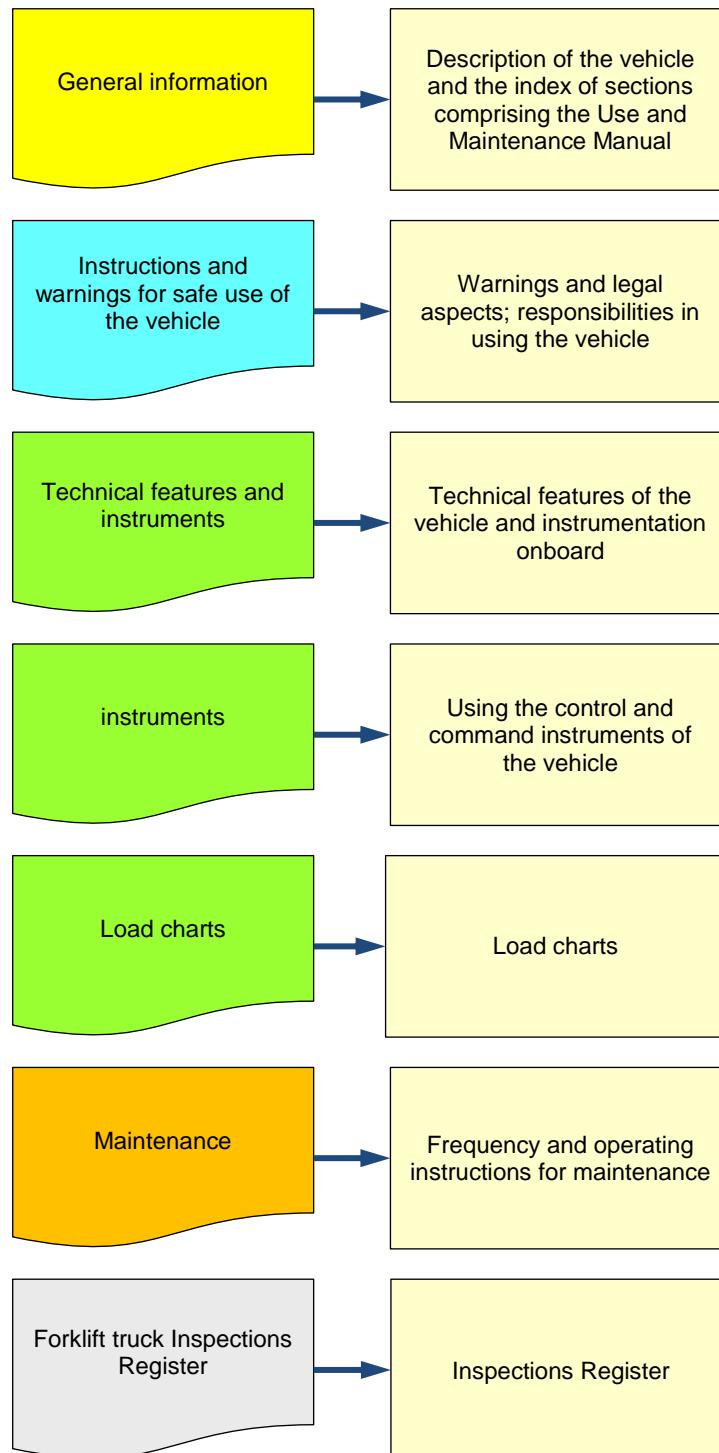
2006/42/CE as per Annex II, Part 1; Letter A

DPR 262/2002
2005/88/CE
2000/14/CE
El procedimiento aplicará de conformidad con el anexo VI
organismo notificado: n° 0714
Potencia neta instalada 110 (kW)
Nivel de potencia de sonido medida L_{WA} 105 dB(A)
Nivel de potencia de sonido garantizado L_{WA} 107 dB(A)

2004/108/CE
• También se ajusta a las siguientes normas armonizadas
EN ISO 12895:2002 Carretillas Industriales Compatibilidad Electromagnética;

MAGNI TELESCOPIC HANDLERS S.r.l.
Sr. Riccardo Magni
Representante Legal
Castelfranco Emilia (MO) Italy

Structure of the machine documentation



General information

1.1. Scope of the Manual

This Manual has been drafted by the Manufacturer to provide the information necessary to the operators for using, driving, handling, transporting, lifting and routine maintenance of the vehicle in complete safety.

All the information necessary for the user is contained in this Manual.

The operators must use the forklift truck for the purposes envisaged and indicated in this Manual.

The information must be read carefully and strictly applied.

Failure to comply with this information can lead to risk for the health and safety of persons and result in damage to objects.



The documentation must be kept safe in good condition by the forklift user, in a suitable place, inside the vehicle cab, so that it is always readily available for consultation.

If lost or damaged, contact the Manufacturer directly for replacement documentation, mentioning the code of this Manual.

The Manual reflects the state-of-the-art at the time of release of the product on the market.

The Manufacturer reserves the right to make changes, additions or improvements to the Manual, without however resulting in this publication being considered as inadequate. All the modifications to the documentation are made in a controlled manner, and the different revisions ensure the traceability for association of the Manual to different serial numbers of the vehicles released on the market.

Some parts of the text that are considerably important or certain important specifications have been highlighted with the use of certain symbols, the meanings of which are described below.

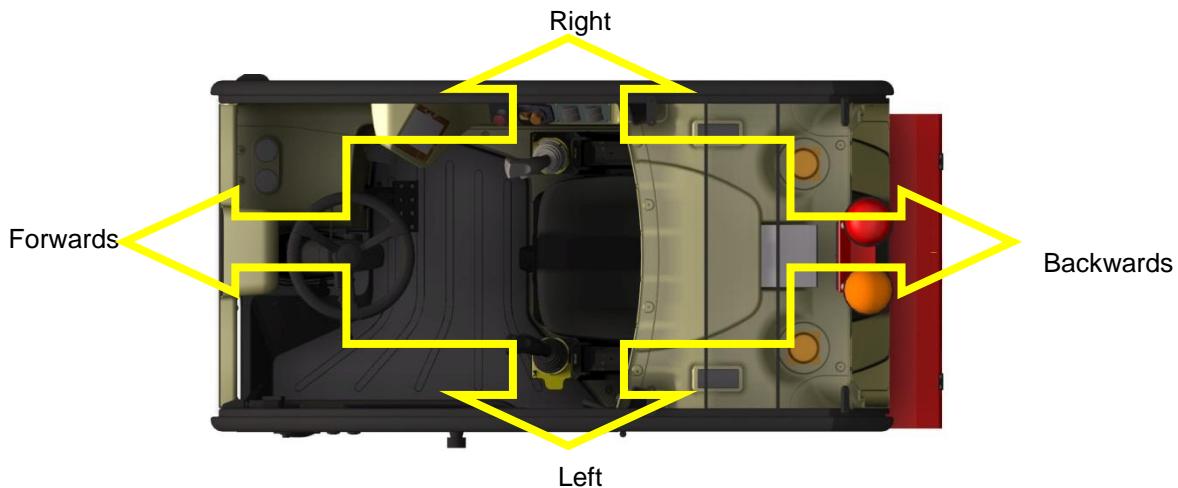
	DANGER: the signal indicates situations of serious danger which, if ignored, can be a serious risk to the safety of persons.
	CAUTION: the signal indicates that suitable precautions must be adopted to prevent putting the safety of persons at risk and avoid causing damage to objects.
	IMPORTANT: the signal indicates specially important technical information that must not be ignored.

1.2. Introduction:

Our telescopic forklift trucks are designed to provide the customers with a high level of simplicity of handling, use and maintenance. However, before starting up the forklift truck for the first time, the operator must carefully read and become familiar with the methods of use and conduction and all the aspects regarding safe use as described in this Use and Maintenance Manual.

With the help of these instructions, the operator will be able to make the best possible use of the telescopic forklift truck.

All references to the "RH" and "LH", "Forwards" and "Backwards" mean the person is in the conductor's seat and is looking in front.



For ordering spare parts or for all technical information, the customer must always indicate the data regarding the vehicle shown on the different plates present on the forklift truck.

List of identification plates present on the forklift truck and their position on the vehicle:

Manufacturer's identification plate				
inside the cab to the RH at the driver's feet (Ref. 0)				
ref. 1 – truck model	ref. 2 – Homologation No.	ref. 3 – Serial No.	ref. 4 – year of manufacture	ref. 5 – engine power
ref. 6 – weight standard accessory load	ref. 7 – ant. axle weight		ref. 8 – rear axle max. weight	ref. 9 – weight without accessory

1. Model / Model / Modèle / Typ / Modelo / Model
Magelano 22 - 41013 Castelfranco Emilia (Italy)

2. Model / Model / Modèle / Typ / Modelo / Model
Magelano 22 - 41013 Castelfranco Emilia (Italy)

3. Homologation / Homologation No. / N° d'homologation / Zulassung-Nr. / N° de aprobación / N° de aprovacão / Godteigeringnummer
Homologation / Homologation No. / N° d'homologation / Zulassung-Nr. / N° de aprobación / N° de aprovacão / Godteigeringnummer

4. Matricula N° Serial number / Número de serie / Serie nummer
Matricula N° Serial number / Número de serie / Serie nummer

5. Anno di fabbr. / Year of manufacture / Année fabrication / Ano de fabricação / Anno di fabbricazione / Bouwjaar
Anno di fabbr. / Year of manufacture / Année fabrication / Ano de fabricação / Anno di fabbricazione / Bouwjaar

6. Potenza motore / Engine power / Puissance moteur / Potencia del motor / Potência do motor / Motorvermogen
Potenza motore / Engine power / Puissance moteur / Potencia del motor / Potência do motor / Motorvermogen

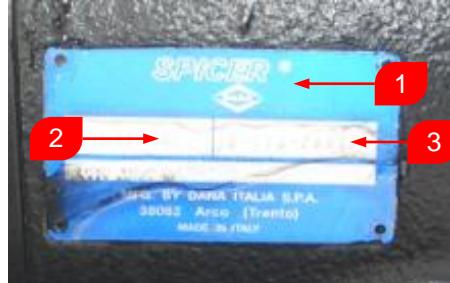
7. Massa a vuoto / Utoden weeg / Masse à vide / Peso secco / Peso seco / Massa em vazio / Eigen gewicht
Massa a vuoto / Utoden weeg / Masse à vide / Peso secco / Peso seco / Massa em vazio / Eigen gewicht

8. Massa massima assiale anteriore / Maximum front axle mass / Masse maximum essieu avant / Maximum ummassa van de vooras / massa máxim del eje delantero / massa máxima do eixo frontal / Máximo de las masas
Massa massima assiale posteriore / Maximum rear axle mass / Masse maximum essieu arrière / Maximum achtermassa / massa máxima del eje trasero / Massa máxima do eixo traseiro / Máximo de las masas

9. Tare / Tare / Tare / Tara / Tara / Tara/Tare
Tare / Tare / Tare / Tara / Tara / Tara/Tare

I.C. engine identification plate	
inside engine compartment on the RH of the truck (ref. 0)	
ref. 1 - Manufacturer	ref. 2 – Serial No.

Front axle identification plate		
To the top LH of the axle (ref. 0)		
ref. 1 - Manufacturer	ref. 2 - serial number	ref. 3 – Homologation No.

Rear axle identification plate To the top RH of the axle (ref. 0)		
ref. 1 - Manufacturer	ref. 2 - serial number	ref. 3 – Homologation No.
		

1.3. Legibility of the identification plate

The identification plates must be preserved in such a way that they are always legible over time as regards all the data they contain, by means of periodic maintenance activities consisting of cleaning and washing.

If the plates are damaged and/or no longer legible, even as regards just one of the information elements therein, contact the Manufacturer for a replacement, indicating the vehicle identification data and proceed with replacement.

1.4. Requesting assistance

For all requests for assistance, the customer must contact our Technical Assistance Service or our dealers network directly, indicating the data given on the forklift truck identification plate, the number of hours the vehicle has been used and the type of problem encountered.

1.5. Manufacturer's responsibilities

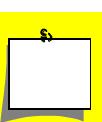
The Manufacturer declines all responsibilities in the following cases:

- ✓ if the product is not used correctly and in compliance with the national legislation and/or regulations regarding workplace safety
- ✓ incorrect maintenance, lack of maintenance or failure to comply with the instructions provided in this Manual;
- ✓ modifications or tampering;
- ✓ use or conduction of the vehicle by untrained unskilled personnel.



The safety of the forklift truck depends on strict compliance with the prescriptions in this Manual, especially:

- ✓ always work within the limits of use of the product (see rating plate);
- ✓ always carry out careful maintenance of the vehicle according to the schedule defined by the manufacturer
- ✓ contact qualified and authorized service centres for carrying out inspections and maintenance;
- ✓ use only genuine spare parts.



1.6. Information regarding safety

- ✓ Carefully read the information given in this Manual and those applied directly on the forklift truck, if any.
- ✓ Personnel involved in such activities must have the technical skills and must be equipped with the professional work tools used in suitable environments.
- ✓ Those operating on the product must be provided with suitable personal protection equipment, in accordance with the legislation of the country concerned.
- ✓ Use the forklift truck only for the purposes envisaged by the Manufacturer. Improper use can be a source of risk for the health and safety of persons and can cause damage to objects.
- ✓ **The Manufacturer has designed and constructed the forklift truck for industrial and professional uses.**
- ✓ For carrying out maintenance in areas that are not easily accessible or are potentially hazardous, provide adequate safety conditions for self and others, in compliance with the legislation in the country concerned, on matters of safety.
- ✓ Maintenance, inspection and repairs must be carried out solely by a qualified maintenance technician who is aware of the hazard conditions. It is therefore necessary to provide for operating procedures regarding the complete machine in order to deal with hazard situations that may occur



and the relative methods for preventing these. The skilled maintenance technician must always work with utmost care and strict compliance with the safety standards.

- ✓ When using the forklift truck, the operator must wear professional clothing and/or personal protection equipment, if necessary, indicated in the operating instructions provided by the Manufacturer and those envisaged by the legislation in force in the country concerned on matters of occupational safety.
- ✓ Replace worn components with genuine spare parts.
- ✓ Do not dump polluting material in the environment and proceed with disposal in compliance with the legislations on the matter in force in the country concerned.

1.7. Spare parts

- ✓ For spare parts, the customer can contact our Technical Assistance Service directly, indicating the forklift truck model and its Serial No., and order the components or parts required.

Use and Maintenance Manual HTH 16.10

engine: Mercedes

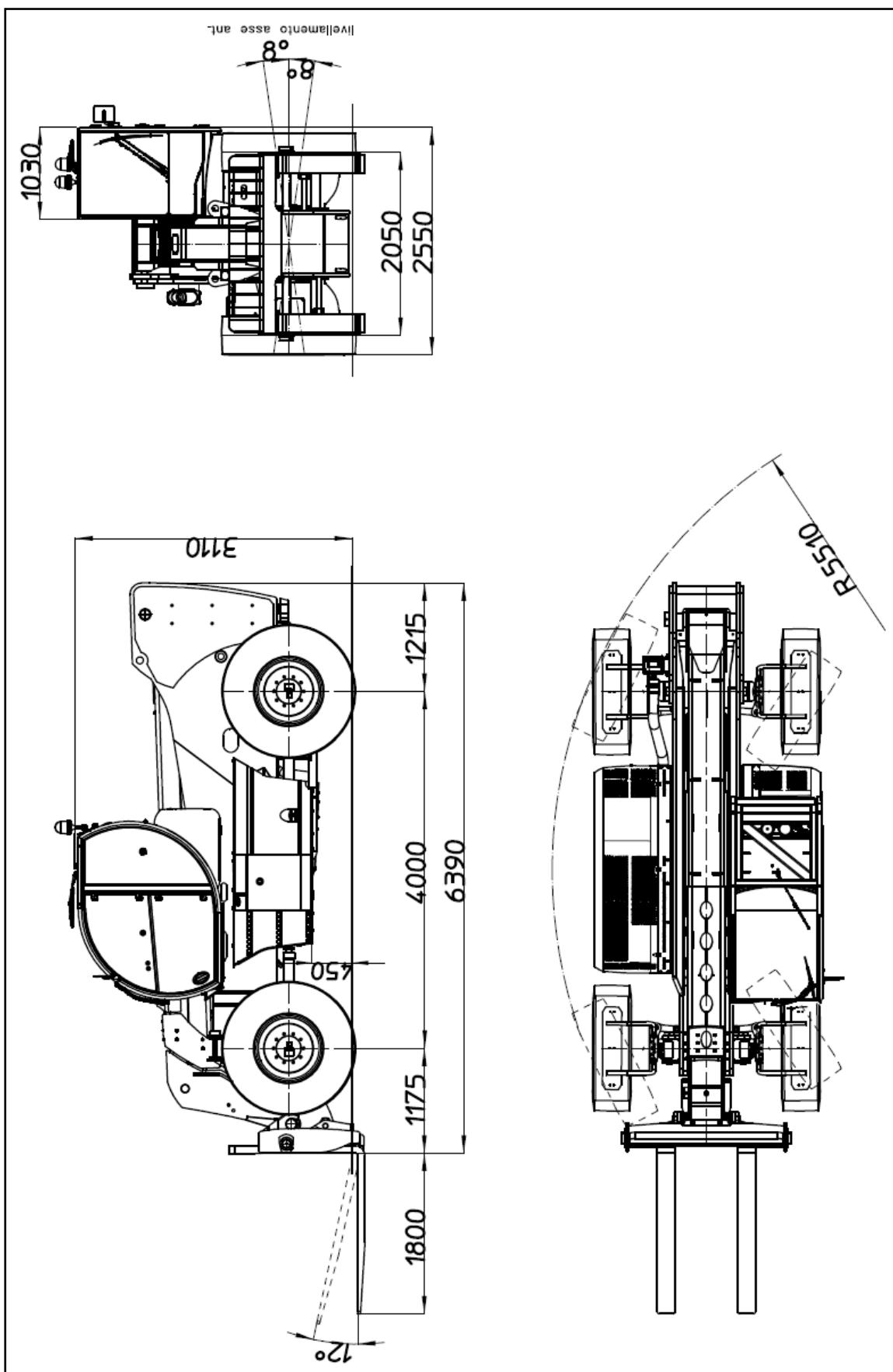
***Instructions and warnings for safe use
of the vehicle***



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Dimensions

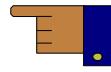


1. Spare parts and tooling

Maintenance on our forklift trucks must be carried out solely using original components.

If original components are not used, the customer alone will be held responsible for harm to persons and damage to objects caused by potential malfunctioning of the vehicle.

The Manufacturer **shall not accept** responsibility if the use of non original components leads to reduction of the reliability over time of the forklift truck equipment.



No request for guarantee can be accepted in the above-listed cases, but assistance can be provided by our network of technical assistance on payment.

Using original components for carrying out maintenance will ensure legal protection since:

- ✓ the Customer who purchases non original components from unauthorized dealers must be aware of the risks this entails;
- ✓ the Customer who modifies or has third parties make modifications to the forklift truck must be aware of the legal responsibilities of such an action and, in case of accident caused by yielding of non original components, cannot avail of any legal cover;
- ✓ the Customer who copies or has copies made of the original component is exposed to legal risks;
- ✓ the Certificate of Conformity of the truck implies responsibility for the Manufacturer only if the maintenance schedules and methods defined in the *Use and Maintenance Manual* are complied with;
- ✓ the Customer who does not comply with the maintenance schedules and frequency established in this *Use and Maintenance Manual* must be aware that the warranty conditions on the vehicle will lapse.

We are capable of ensuring the customer:

- ✓ skill and understanding of the vehicle and its working;
- ✓ availability of original components and spare parts distributed exclusively by us and our network of dealers;
- ✓ skill of qualified personnel capable of operating correctly and ethically on vehicles produced by us;
- ✓ guarantee of the work done at the authorized centres;
- ✓ innovation of the machinery over time, thanks to ongoing research and development on the original components and spare parts;
- ✓ assistance for preventive maintenance;
- ✓ personnel qualified and trained for working on vehicles;
- ✓ improvement of the product over time by exchanging experience and technical skills;
- ✓ assistance for vehicle diagnostics;
- ✓ detailed knowledge of all aspects concerning the peculiarities of use and technical solutions of the vehicle;
- ✓ continuity of our engineering;
- ✓ reliability of equipment over time in the worst conditions of use, thanks to experience gained in the sector, in all modes of use;
- ✓ adequacy and knowledge of the vehicle by our network of authorized workshops and dealers capable of working with determination pursuing the quality of the repairs in the best possible action times.

2. Operating instructions for the conductor

Attention: in this section the following symbols may be used:

	DANGER: the signal indicates situations of serious danger which, if ignored, can be a serious risk to the safety of persons.
	CAUTION: the signal indicates that suitable precautions must be adopted to prevent putting the safety of persons at risk and avoid causing damage to objects.
	IMPORTANT: the signal indicates specially important technical information that must not be ignored.

2.1. Introduction

Most of the accidents linked to use, maintenance and repair of the forklift truck are due to failure to apply and follow the elementary safety standards. By identifying the risks to which you will be exposed and by taking the necessary precautions, it will be possible to avoid these accidents. Specifically, the conductor must strictly follow the indications given below:

- ✓ All the operations or movements not described in the Use and Maintenance Manual must be avoided and, in any case, the person using the vehicle for purposes other than those recommended, must first ensure his own safety, the safety of others and correct control of the vehicle;
- ✓ The Manufacturer has designed the vehicle and accessories accurately, with the help of appropriate tools and technologies to ensure safety of the vehicle; however, it is difficult to assess all the work situations the forklift truck may be subject to in different operating conditions. Consequently, the vehicle conductor is responsible not only for following the indications given in this Use and Maintenance Manual, but also for adopting forklift truck driving and conduction measures, taking into account the provisions and legislation in force in the country in which the vehicle is used, regarding occupational safety, associated with responsible conduction of the vehicle, foreseeing and preventing potential danger situations generated by special logistic, climatic, visibility and health conditions of the conductor.
- ✓ **Failure to observe the safety regulations listed in the Use and Maintenance Manual for the conduction and maintenance and repair of the forklift truck and its accessories can result in serious accident, sometimes even mortal.**

2.2. List of main risks deriving from conduction of the forklift truck

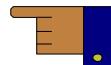
In the conduction of the forklift truck by the operator, the potential risks may be listed as follows:

risks	precautions
✓ risk of loss of control of the vehicle because of uneven road;	<ul style="list-style-type: none"> ● adapt the vehicle speed according to the state and conditions of the ground or road to ensure your own safety, the safety of persons working in the adjacent areas or near the vehicle, and the safety of the vehicle and objects.
✓ increased vehicle braking space because of the conditions of the ground on the road as well as at the work site	

risks	precautions
<ul style="list-style-type: none"> ✓ abnormal behaviour due to negligence of the conductor, like distraction or carrying out other activities or additional activities while driving the forklift truck (using a phone, etc...) 	<ul style="list-style-type: none"> • behaviour and concentrations adequate to the level of responsibility assumed with driving the vehicle on the basis of the conditional aspects such as spaces, ground conditions, logistic aspects, light conditions, climatic factors;
<ul style="list-style-type: none"> ✓ lack of concentration when driving and using the forklift truck for operating activities; 	<ul style="list-style-type: none"> • number of operating hours adequate for the climatic conditions at the work place;
<ul style="list-style-type: none"> ✓ lack of control of the vehicle and incompetency for becoming the Conductor qualified for driving the forklift truck. 	<ul style="list-style-type: none"> • inhibiting apprentices, adolescents, disabled persons, trainee personnel from driving.
<ul style="list-style-type: none"> ✓ using the vehicle for betting and/or competitions. 	<ul style="list-style-type: none"> • surveillance by the vehicle owner Company to ensure it is only driven by qualified personnel in compliance with all the limitations and legislative provisions in force in the country in which the vehicle is used;
<ul style="list-style-type: none"> ✓ lack of control and understanding of the vehicle; 	<ul style="list-style-type: none"> • gaining confidence in the conduction of the vehicle, also by expert personnel, in the surrounding area and free of potential hazards, before starting operations in the work areas and sites

2.3. Precautions to be taken in the conduction of the forklift truck

- ✓ Transport the load with the forks lowered to ensure the position of the centre of gravity of the load is kept as close to the ground as possible;
- ✓ Position the forks perpendicular to the load to be lifted;
- ✓ Always proceed at a speed suitable for the ground conditions;
- ✓ Do not exceed the speed, also in consideration of the state of the ground, and do not brake suddenly when moving with load or without load;
- ✓ When picking up the load using the forks, always check the stability and solidity of the ground;
- ✓ Do not carry out operations which exceed the capacity declared by the forklift truck manufacturer;
- ✓ **Do not lift loads exceeding those declared by the Manufacturer and do not increase the dimensions of the counterweight;**
- ✓ Avoid all obstacles present on the ground and at heights by driving around the obstacles at suitable safety distances;
- ✓ Always check the work area ground to ensure absence of: electric cables, downhill slopes, lack of solidity of the ground because of inadequate settling in, treading ground with capacity not suitable for the weight of the vehicle and the loads lifted and transported;

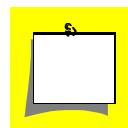


- ✓ Transport only correctly balanced loads;
- ✓ Never lift loads using a single fork;
- ✓ Drive only in conditions that reflect promptness of reflexes;
- ✓ Do not drive the truck after taking medicines, alcoholic drinks or drugs;
- ✓ Do not smoke while driving the truck;
- ✓ Do not use telephones or other electronic equipment when driving the truck;
- ✓ **In case of conductors fitted with medical and electro-medical equipment, use utmost caution and comply with the standards to be applied in environments with risk of electromagnetic interference (environments where it is difficult to ensure complete protection from interference from sensitive electronic devices such as, certain medical equipment and electronic apparatus onboard the forklift trucks);**
- ✓ Check the adequacy of the operating spaces around the vehicle and the relative inhibition of the passage of persons and identification of work areas in compliance with the legislation and regulations in force in the country of use;
- ✓ In the lifting, handling and transfer phase, foresee and evaluate obstacles and obstructions which can interfere with the vehicle and the load;
- ✓ Never use the forklift truck to transport persons;
- ✓ Never leave the vehicle engine running when the driver is absent;
- ✓ Always use the parking brake in the load lifting and deposit phase on sloping ground;
- ✓ Never leave the vehicle parked with the load lifted;
- ✓ Never allow persons to pass under the load when it is lifted;
- ✓ When the vehicle is not in use, always keep the forks lowered to the ground and apply the parking brake;
- ✓ Always remove the ignition key from the vehicle control panel;
- ✓ Never leave the vehicle with the load on a slope exceeding 15%;
- ✓ **Abide by the data shown on the load diagrams for lifting and operating heights.**



3. General instructions

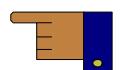
3.1. Use and Maintenance Manual



- ✓ The forklift truck operator must always take the driving seat only after having read and clearly understood the recommendations and instructions contained in the Use and Maintenance Manual;
- ✓ The Use and Maintenance Manual must be stored correctly onboard the vehicle in a position identified and easily accessible in conditions to ensure perfect consultation;
- ✓ The Use and Maintenance Manual must be available in the language of the country in which the vehicle is used;
- ✓ Carefully read the instructions contained in this Manual and those applied directly on the forklift truck (data and warning plates), especially those regarding safety;
- ✓ Maintenance personnel must have the technical skills and must be equipped with the professional work tools used in industrial working environments.
- ✓ Those operating on the product must be provided with suitable personal protection equipment, in accordance with the legislation and regulations of the country concerned;
- ✓ **Use the forklift truck only for the purposes envisaged by the Manufacturer. Improper use can be source of risk for the health and safety of persons and can cause damage to objects.**



The Manufacturer has designed and constructed the vehicle for industrial and professional purposes;



- ✓ Keep the forklift truck in perfect working condition condition by carrying out the scheduled maintenance operations;
- ✓ For carrying out maintenance in areas that are not easily accessible or are potentially hazardous, provide adequate safety conditions for self and others, in compliance with the legislation in the country concerned, on matters of safety;
- ✓ **Maintenance, inspection and repairs must be carried out solely by skilled maintenance technicians who are aware of the hazard conditions. It is therefore necessary to provide for operating procedures for carrying out the activities, aimed at preventing hazard situations that may occur and the relative methods to prevent these. The skilled**

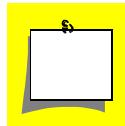


maintenance technician must always work with utmost care and in strict compliance with the safety standards.

- ✓ Replace worn components with genuine spare parts.
- ✓ Do not dump polluting material in the environment and proceed with disposal in compliance with the legislations on the matter in force in the country concerned.

3.2. Permission for driving

- ✓ It is the forklift driver's responsibility to abide by the laws in force in the country of use on the matter of authorization for driving the vehicle;
- ✓ The forklift truck can be driven and used only by qualified persons authorised by the contact persons/those responsible in the Company to which the vehicle belongs;
- ✓ The driver cannot authorize others to drive the vehicle;
- ✓ The methods for driving the vehicle must be conformant and must be in compliance with the rules-of-the-art and the profession.

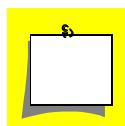


3.3. Routine maintenance

Routine maintenance includes all activities which can be carried out by personnel trained for carrying out the activities, without any effect on the safety of the vehicle and reduced complexity of execution.

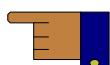
The personnel responsible for conduction of the forklift truck must respect the following rules:

- ✓ the conductor who detects abnormal working or faults which could affect the original features must immediately inform the person responsible for taking the decisions in the case;
- ✓ the conductor is not authorized to act on the vehicle except for carrying out authorized routine maintenance;
- ✓ carry out the scheduled routine maintenance operations defined in detail in Section 03 of this Use and Maintenance Manual;
- ✓ check to make sure the tyres are suitable for the type of ground; refer to section 02 of this Use and Maintenance Manual;
- ✓ assess whether the type of environmental and ground conditions require the use of special tyres for: sand, agricultural land, snow chains. For more information, the vehicle owner or the conductor must contact specialist workshops for assessing the suitability of the tyres;
- ✓ check the tyres for wear daily;
- ✓ do not use worn or damaged tyres;
- ✓ **it is strictly forbidden to fill tyres with PU rubber;**
- ✓ **do not modify the elements which may change the pressure and the settings of the equipment, resulting in irreparable and lethal consequences for maintaining the safety level of the forklift truck (for example; hydraulic pressure, calibration of limiters, motor speed, assembling supplementary equipment);**
- ✓ **modification, adjustment or deactivation on the forklift truck will automatically cause the warranty to lapse, and the responsibility will be entirely that of the vehicle owner.**



In order to keep the forklift truck in perfect working order and safety, it is compulsory to:

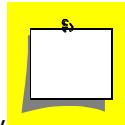
- ✓ carry out the periodic inspections established by this Use and Maintenance Manual;
- ✓ strictly follow the maintenance intervals;
- ✓ have maintenance and repairs carried out by qualified personnel and use original components, by contacting authorized workshops that are capable of working correctly for repairing the vehicle and in compliance with the legislative regulations in force in the country in which the vehicle is used.



3.4. Environmental conditions of use

The forklift truck coming out of our factory is outfitted, calibrated and tested for all adjustments for use in normal working conditions such as:

- ✓ Operating temperature: **min -15°C; max +45°C**; for other temperature conditions it is necessary to provide for replacement of the lubricants and coolants of the different machine equipment (in this regard, see Section 03 of this Use and Maintenance Manual);
- ✓ **It is forbidden to use the forklift truck in potentially explosive atmospheres or where the use of explosion-proof machinery and components is prescribed (for example: refineries, oil ducts, or work areas with ATEX limitations);**
- ✓ **Always assess the need for using an extinguisher onboard depending on the use of the vehicle in areas with potential risk of fire or limited by the legislation or regulations in force in the countries in which the vehicle is used (for example: variant available as accessory);**
- ✓ The customer must assess the need for using the vehicle in heat or climatic conditions different from those specified above, and contact our Technical Assistance Service for information or advice regarding all types of lubricants recommended for the different types of use.

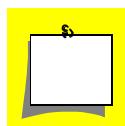


4. Driving instructions

4.1. Driving seat set-up

The conductor who drives the forklift truck must take the following precautions:

- ✓ wear professional clothing suitable for driving the forklift truck;
- ✓ use protective footwear;
- ✓ never drive with damp hands or footwear or smeared with grease or mud;
- ✓ adjust the seat according to the driver's height and weight, in order to ensure correct posture from the point of view of health and safety for driving the vehicle and from the point of view of visibility outside the vehicle during road travel and working;
- ✓ do not put the arms or legs or any other part of the body outside the forklift truck driving seat;
- ✓ always wear and adjust the safety belt;
- ✓ **never use the control organs for purposes other than those for which they are meant;**
- ✓ **never allow passengers to climb on the forklift truck or sit in the driver's seat.**



4.2. Precautions before starting up the forklift truck

Before starting up the forklift truck, the conductor or workshop or the Company which provides the vehicle for operation in the work area must:

- a. check the condition and pressure of the tyres;
- b. check the levels of:
 - ✓ I.C. engine oil
 - ✓ Hydraulic tank oil
 - ✓ Gear oil
 - ✓ Coolant
 - ✓ Fuel
- c. ensure that the engine hood is closed and locked properly;
- d. be familiar with the position and use of the control and command instruments before starting work with the forklift truck.

4.3. Starting up the forklift truck

4.3.1. Safety standards

The forklift truck must be started up or moved only when the conductor is in the driver's seat, with the safety belt on and adjusted.



Do not pull or push the forklift truck to start it.

This movement can cause serious damage to the gear.

4.3.2.Instructions

- a. check to make sure the reverse gear is in neutral;
- b. turn the ignition key to position I to allow the electric contact;
- c. check the fuel level on the indicator on the instruments panel;
- d. press the accelerator and turn the ignition key all the way to start up the engine;
- e. release the ignition key and let the engine run at low speed;
- f. before operating in specially rigid climatic conditions, allow enough time for the I.C. engine and the various machine control circuits to warm up;
- g. check all the instruments onboard immediately after the I.C. engine is started up and at regular intervals during the use of the vehicle, to check for faults, if any;
- h. if one or more control instruments show abnormal values, switch off the engine and immediately proceed with:
 - ✓ routine maintenance: for example: restore the levels of machine liquids
 - ✓ extraordinary maintenance: call an authorized service centre.

4.4. Driving the forklift truck

4.4.1.Safety standards

- a. move the forklift truck always with the forks or accessory at a distance of about 150 mm from the ground or in the transport position;
- b. practice driving the forklift truck on the ground on which work is to be carried out;
- c. make sure the service brakes and warning siren and warning lights are in perfect working order;
- d. drive the truck properly at the speed suitable for the conditions and type of the working ground;
- e. slow down before changing direction;
- f. in all circumstances or working conditions, keep control over the vehicle and the load conditions;
- g. proceed slowly on damp, slippery or uneven ground;
- h. brake gradually, avoiding sudden speed variations;
- i. always remember that the hydraulic steering is very sensitive to movements of the steering wheel; therefore steer gradually, not in jerks;
- j. never leave the engine running if the conductor is absent;
- k. always look in the direction of movement and maintain good visibility of the path;
- l. use the rear view mirrors on the sides frequently, check their condition and keep these correctly adjusted and clean;
- m. do not use the truck in environments where there is insufficient lighting;
- N. when working at night, check to make sure the forklift truck is equipped with work lights; the forklift truck may be provided with a number of optional solutions. For more information, contact our Technical Assistance Service or your Agent or Dealer.
- o. drive around obstacles;
- p. do not enter a loading deck without ensuring:
 - ✓ that the vehicle is positioned and fixed correctly;
 - ✓ that the vehicle on which the machine is positioned (wagon, truck, half-trailer, etc.) lies within the dimensions permitted by national legislation and regulations in terms of road travel rules and for the movement of loads by road or by rail;
 - ✓ that the capacity of the vehicle or the deck is suitable for the weight of the vehicle;
 - ✓ do not enter a gangway, or a platform or a lift, without having checked to make sure these are suitable for the capacity and dimensions of the truck and its efficiency;
 - ✓ take special care with wharfs and trenches, scaffolding, recently dug and/or filled grounds.
- ✓ **the speed of the forklift truck with load must never exceed 10 km/h.**



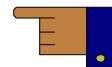
4.4.2.Instructions for movement

- a. check the gear oil level;
- b. position the forks or accessory for transport, i.e. approx. 150mm off the ground;
- c. move the reverse gear lever in the required position;
- d. deactivate the parking brake and accelerate gently to allow the forklift truck to move.

4.5. Stopping the forklift truck

4.5.1.Safety standards

- ✓ Before stopping the forklift truck, after intense activity, leave the I.C. engine running at minimum speed for a few seconds, to allow the coolant and the oil to lower the engine and transmission temperature. This precaution must be strictly followed in case of frequent stops of the I.C. engine, otherwise the temperature of some equipment may increase considerably.
- ✓ Never leave the ignition key in the forklift truck with the conductor absent;
- ✓ when the forklift truck is stopped, place the forks or the accessory on the ground, set the gear lever in neutral, apply the parking brake and set the reverse gear in neutral;
- ✓ if the conductor leaves the driving seat even for a moment, the parking brake must be applied and the reversing lever must be in neutral;
- ✓ make sure the forklift truck is parked in such a manner as not to obstruct circulation and at least 2 metres from railway lines present in the parking area;
- ✓ if parking for a long time, protect the forklift truck from unfavourable weather conditions, especially frost (check to ensure the level and suitability of the anti-freeze liquid at minimum temperatures that can be reached in the parking area).
- ✓ lock the control cab using a key;
- ✓ close the engine hood.



4.5.2.Instructions for stopping

- ✓ park the forklift truck on level ground or on ground with slope not exceeding 15%;
- ✓ position the reversing gear lever in the neutral position;
- ✓ apply the parking brake;
- ✓ retract the telescopic boom completely;
- ✓ rest the forks or the accessory on the ground;
- ✓ switch off the I.C. engine;
- ✓ remove the ignition key;
- ✓ check to make sure the control cab door is locked using a key; close the rear window and the engine hood;
- ✓ before leaving the driving seat, ensure all the forklift stop operations (listed above) are carried out correctly in order to ensure your safety and the safety of others.



4.6. Driving the forklift truck on the road

4.6.1.Safety standards

- a. the forklift truck drivers driving on roads must observe the laws and regulations on the matter of road travel relative to the country concerned. Moreover, the forklift truck must conform to the provisions of the road travel code applicable in the country of use. If necessary, the Customer must contact our Technical Assistance Service to evaluate the various optional solutions for making the vehicle conformant to these regulations and provisions;
- b. it is forbidden to transport loads by road;
- c. the accessories fitted on the forklift truck must be removed from the vehicle during road travel;
- d. the forklift truck can travel on roads only if fitted with accessories homologated for road travel.



4.6.2.Instructions for road travel

- a. check to make sure the flashing light is installed and in working order;
- b. activate the dim lights also during the hours and on roads where it is not obligatory to use visual indicators and lights;
- c. check to ensure that the headlights, direction lights and windscreens wipers are clean and in perfect working order;
- d. check the position of the rearview mirrors;
- e. check the alignment of the wheels and activate the steering selector in ***the position for movement with front steering wheels only;***
- f. ***position the mechanical block of the rear axle steering;***
- g. make sure the quantity of fuel present in the tank is enough for the planned route;
- h. fit all the accessories required for road travel (according to the model and country);
- i. retract the telescopic boom;
- j. level the vehicle with the chassis parallel to the ground, using the inclination corrector;
- k. ***the vehicle must travel on roads only without load;***
- l. it is forbidden to transport persons on the vehicle and inside the control cab;
- m. on the road, do not set the reverse gear in neutral in order to always have the forklift truck engine brake available.



4.7. Driving the forklift truck on roads with front accessory mounted

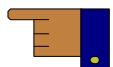
The only accessory that must be fitted on the forklift truck for road travel are the forks provided they are positioned as described below.



Positioning limitation for forks for road travel:

- turn the forks through 180° so that they are facing the direction opposite the direction of movement;
- secure the forks stably to the equipment structure in such a way that it is integral with the structure by means of a device consisting of a U-bolt with pins and the relative R-clips inserted in the holes at the ends of the pins;
- identify the end part by means of a regular reflecting board indicating projecting loads approved by the Ministry of Public Works (class 2), 50 x 50 cm, or in conformity with the regulations in force regarding road travel in force in the country in which the vehicle is used.

For operating details explaining the assembly of the individual accessories, see the Use and Maintenance Manual specific for the truck model in question.



The forklift conductor must abide by the provisions and regulations in force concerning road travel of vehicles.

In all the cases, the accessory fitted on the telescopic boom of the truck:

- a. must not exceed the dimensions limits of the truck;
- b. must not obscure the area lighted by the headlights;
- c. must be equipped with the original protections;
- d. must be accompanied by the blocking spacer on the lift and slewing cylinder in conformity with what is defined by the vehicle registration document and the laws and regulations in force in the country in which the forklift truck is used.
- e. must be delimited by using reflector plates in compliance with the provisions and regulations in force concerning road travel.

4.7.1.Instructions for handling operations

4.7.1.1. General information

- ✓ check the conformity of the accessories to the calibration of the machine's safety system;
- ✓ check to ensure the forklift truck accessories are working correctly;
- ✓ do not carry out operations which generate working conditions exceeding the vehicle plate data;
- ✓ it is forbidden to increase the dimensions and weight of the counterweight ballast whatever the device, method and purpose of the solution adopted;**
- ✓ it is strictly forbidden to transport or lift persons using the forklift truck, unless the forklift truck is equipped for the purpose and supplied with a Certificate of Conformity which qualifies it for this use.
- ✓ avoid travelling long routes in reverse;
- ✓ carry out slow progressive movements for ascent and descent of the telescopic boom (also without load).



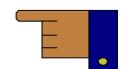
4.7.1.2. Accessory

- ✓ check to make sure the accessory is installed and locked properly on its support;
- ✓ respect the accessory's load diagrams limit;**
- ✓ check to make sure the pallets, crates or the lifted elements are in good condition and suitable and correctly sized in relation to the load to be lifted;
- ✓ position the forks perpendicular to the load to be lifted, taking into account the position of the centre of gravity of the load;
- ✓ never lift the load using a single fork; for replacement or optional accessories, contact our Technical Assistance Service or your agent or dealer;
- ✓ if not in use, always position the accessory horizontally on the ground, propping up the unstable accessories, if any, correctly;
- ✓ check to make sure the quick-release hydraulic couplings of the accessory circuit are clean and protected; before every hydraulically-operated accessory change, in order to avoid deterioration of the quick-release hydraulic couplings;**
- ✓ switch off the I.C. engine;**
- ✓ wait for about one minute to reduce the pressure in the hydraulic circuit;**



4.7.1.3. Accessory self recognition

The forklift truck is provided with an automatic system for recognition of the accessory mounted on the vehicle.



In the forklift truck start-up phase, the message appearing on the machine control display informs the operator of the type of accessory mounted; to proceed with the screen pages, the operator must confirm the code and relative description of the accessory fitted (in this regard, see Sect.02.1 paragraph 2).

The automatic accessory recognition system reads the type of accessory fitted and communicates the relative parameters to the machine control system for correct and safe control and management of the parameters in the telescopic boom lifting and extension phase.

For operating details explaining the assembly of the individual accessories, see the Use and Maintenance Manual specific for the truck model in question.

4.7.1.4. Environmental conditions of use

- ✓ when lifting a load, check to ensure that the environment is suitably illuminated;
- ✓ make sure that there is no one near the vehicle or within the range of action of the vehicle;
- ✓ that there are no obstacles which could interfere with the vehicle;
- ✓ that there are no overhead electrical lines in the work area and within the operating capacity of the machine;**
- ✓ that there are no electric cables deposited on the ground and/or on the work surfaces of the machine;**
- ✓ prevent access by outsiders to the work areas by means of warning signs and barriers in compliance with the regulations, provisions and laws on the**



matter of workplace safety established in the different countries in which the machine is used;

- ✓ prevent the possibility of persons passing under hanging loads;

4.7.1.5. Movement on longitudinal slopes

- ✓ more forwards and brake gently;
- ✓ check to ensure that the limits regarding the areas and passages allow movement and are capable of withstanding the load;
- ✓ ensure the stability and compactness of the ground before placing the load.

4.7.2. Movement

- a. Always observe the safety regulations, always transport balanced and correctly positioned loads to avoid all risk of tilting over;
- b. insert the forks all the way under the load and shift the transport position with the forks **150 mm** off the ground, the boom completely retracted and lowered and the tips of the forks raised in relation to the base);
- c. for obvious conditions affecting the stability and visibility of the front area, move the forklift truck only when the boom is in the transport position;
- d. operate the forklift truck with the boom lifted only in exceptional cases, operating with utmost care at very low speed and brake gently.
- e. always ensure visibility conditions of the area surrounding the vehicle, with the help of indications from an operator on the ground, if necessary;
- f. keep the load stable when the forklift truck is in motion;
- g. never proceed very fast or brake suddenly when handling a load;
- h. during handling operations, travel at low speed;
- i. supervise the load, especially bulky loads, on bends;
- j. harness unstable loads;
- k. **handle the load with caution, at slow speed, without jerks, especially for capacities and heights and with considerable overhand; in case of strong wind or storm, do not make movements potentially dangerous for the stability of the forklift truck and the load**
- l. **do not change direction suddenly and/or at high speed; if the forklift truck tilts over, do not try to leave the cab during the accident, but wait for rescue operations;**
- m. **always wear the safety belt while driving;**
- n. **keep the safety belt on when inside the cab as this is the best safety condition;**
- o. use the parking brake to deposit or lift a difficult load or on sloping ground;
- p. never leave the forklift truck parked with a raised load;
- q. never leave the forklift truck with or without load on a slope exceeding 15 degrees even with the parking brake applied, but always bring it to a position with a lesser inclination.



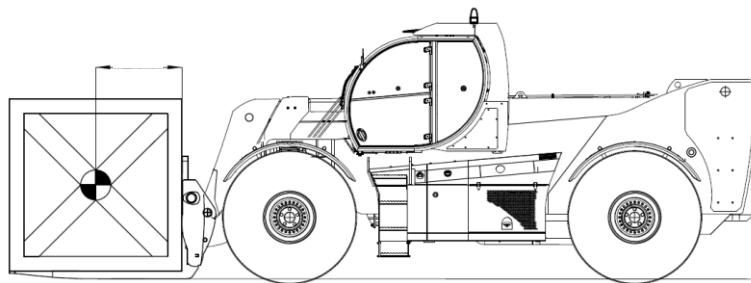
4.7.3. Visibility

- a. always ensure good visibility of the path, for direct and indirect vision by means of panoramic rear view mirrors, to check for the presence of persons, animals, ground conditions, obstacles, variations in the slope;
- b. visibility may be reduced on the RH side of the vehicle with the boom raised, therefore ensure good visibility of the work area before raising the boom and before operating it;
- C. if the visibility for forward movement is not sufficient because of the load dimensions, proceed in reverse. This is an exceptional movement and can only be carried out for short distances;
- d. ensure that the windows and rear view mirrors are clean;
- E. standard illumination of the vehicle is not sufficient for use in environments with low lighting or for nocturnal use. There are various options, in addition to the standard equipment fitted on the forklift truck. For more information, contact our Technical Assistance Service or your Agent or Dealer.

4.7.4. Handling a load

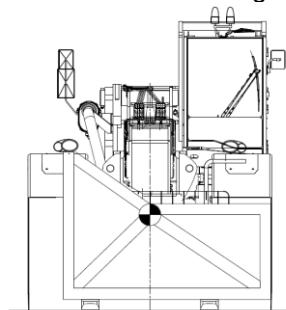
4.7.4.1. Weight of the load and its centre of gravity

- ✓ **it is forbidden to lift and transport weights greater than the capacity declared for the vehicle;**
- ✓ before proceeding with lifting a load, it is necessary to know the weight and the position of the centre of gravity;
- ✓ the load diagram, which is visible on the machine display, relative to your forklift truck, is valid for a load with the centre of gravity 600 mm from the forks heel (Figure A);



A

- ✓ for a load with centre of gravity greater than this value, contact our Technical Assistance Service or your Agent or Dealer;
- ✓ in case of irregular loads, determine the centre of gravity in the transverse direction to the vehicle before making any movement (Figure B);



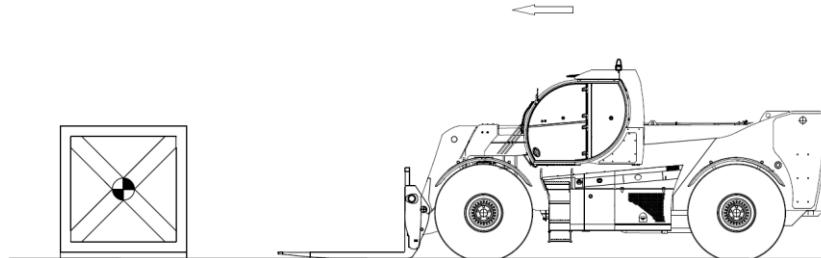
B

for loads with movable centre of gravity (for example: liquids), take into account the changes of this variable and proceed with utmost caution; for more information, contact our Technical Assistance Service or your Agent or Dealer.



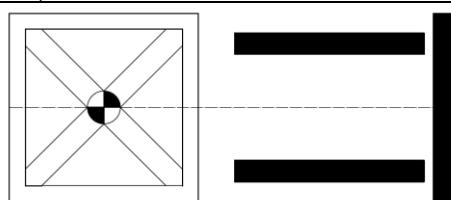
4.7.4.2. Picking up a load from the ground

- ✓ bring the forklift truck perpendicular to the load, with the boom retracted and the forks horizontal (**Figure C**);



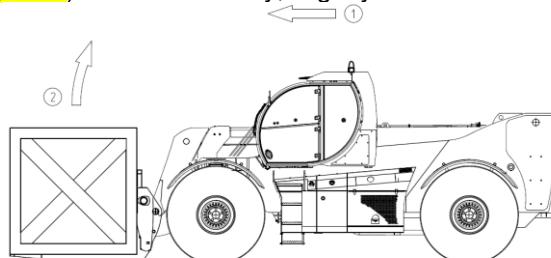
C

- ✓ adjust the centering of the forks with respect to the load (**Figure D**); for more information, contact our Technical Assistance Service or your Agent or Dealer;



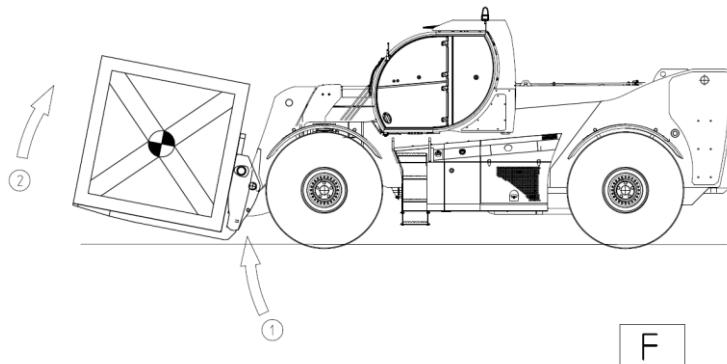
D

- ✓ attention to risks of pinching or crushing of the limbs while adjusting the forks manually;
- ✓ always maintain the distance between the forks and axis of the table in order to ensure the perfect stability of the load;
- ✓ move the forklift truck (**1**) slowly forwards and bring the forks against the load (**Figure E**) and if necessary slightly raise the boom (**2**) while picking up the load;
- ✓ apply the parking brake and set the reverse gear lever in the neutral position;
- ✓ lift load (**1**) slightly, incline the forks-holder (**2**) backward in the transport position (**Figure F**);
- ✓ incline the load backwards sufficiently to ensure stability and prevent loss of the load while braking, taking care to avoid modifying the balance;
- ✓
- ✓ move the forklift truck (**1**) slowly forwards and bring the forks against the load (**Figure E**) and if necessary, slightly raise the boom (**2**) while picking up the load;



E

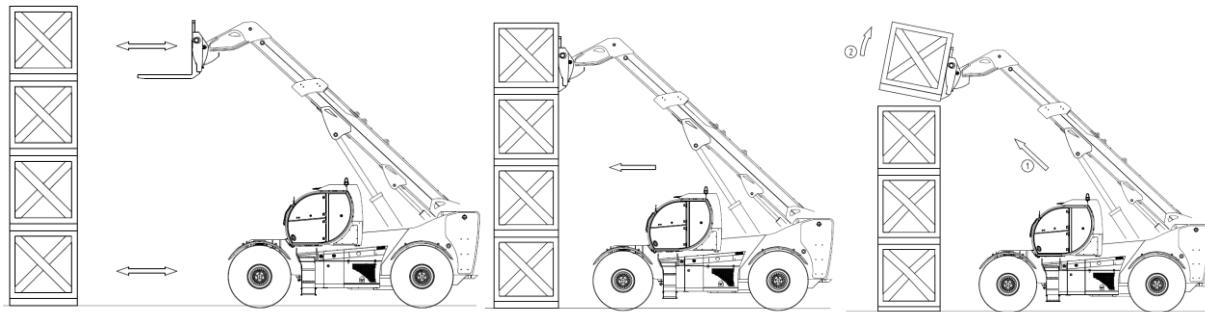
- ✓ apply the service brake and set the reverse gear lever in the neutral position;
- ✓ lift load (**1**) slightly, incline the forks-holder (**2**) backward in the transport position (**Figure F**);



F

4.7.4.3. Picking up a load in the raised position with the truck on tyres

- ✓ **DO NOT pick up a load if the forklift truck is not level;**
- ✓ check to make sure the forks pass easily under the load;
- ✓ bring the forklift truck perpendicular to the load, with the forks horizontal (**Figure G**), moving gently and carefully;
- ✓ always keep the distance necessary to insert the forks under the load, between the stack and the forklift truck (**Figure G**), using the minimum possible length of the boom;
- ✓ Bring the forks against the load (**Figure H**). Apply the parking brake and set the reverse gear lever in the neutral position;
- ✓ Lift the load (**1**) slightly and incline the forks-holder (**2**) backwards to stabilize the load (**Figure I**);



G

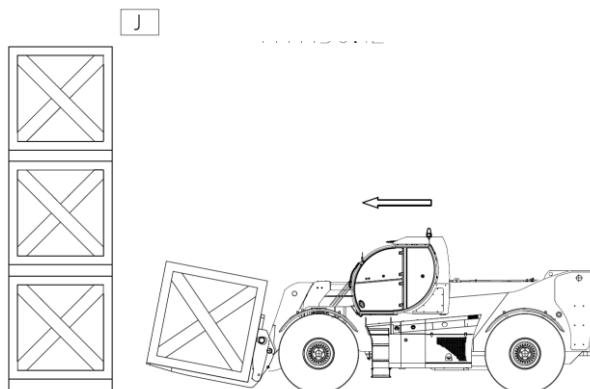
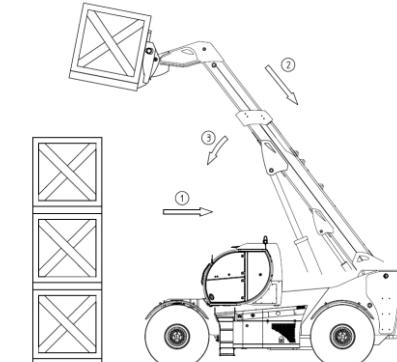
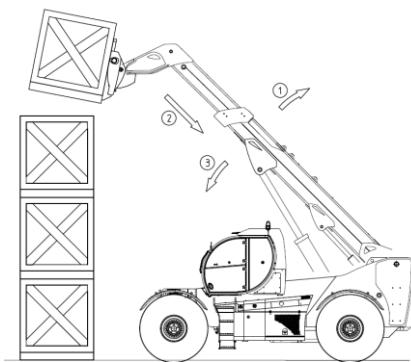
H

I

- ✓ incline the load backwards sufficiently to ensure stability and prevent loss of the load while braking, taking care to avoid modifying the balance;
- ✓ if possible (**Figure J**), lower the load without moving the forklift truck;
- ✓ raise the boom (**1**) to move the load away, retract (**2**) and lower the boom (**3**) to bring the load to the transport position (**Figure L**);
- ✓ if this is not possible, retract the forklift truck (**Figure K**), moving very gently and cautiously;
- ✓ move backwards with the forklift truck (**1**) to move the load away, retract (**2**) and lower the boom (**3**) to bring the load to the transport position (**Figure L**);

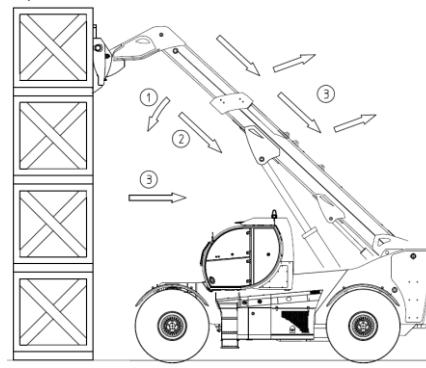
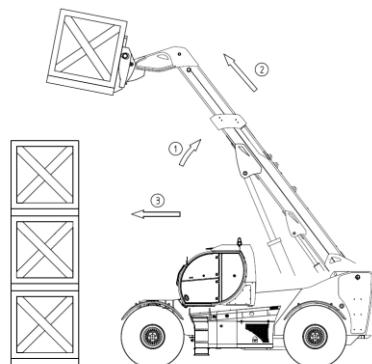
4.7.4.4. Placing a load at a height on tyres

- ✓ DO NOT pick up a load if the forklift truck is not level;



L

- ✓ bring the load to the transport position in front of the stack (Figure L);
- ✓ lift and extend the boom (1) (2) until the load is above the stack; move the forklift truck forwards if necessary (3) (Figure M) gently and cautiously;
- ✓ apply the parking brake and set the reverse gear lever in the neutral position;
- ✓ position the load horizontally and place it on the stack, lowering and retracting the boom (1) (2) to position the load correctly (Figure N);
- ✓ free the forks, retracting and raising the boom alternately (3) (Figure N), or if possible, move backwards with the forklift truck;
- ✓ bring the boom to the transport position;

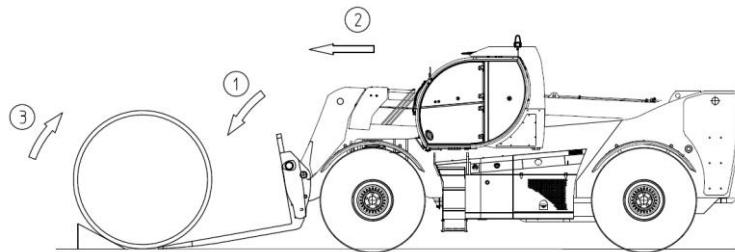


M

N

4.7.4.5. Picking up a load without pallet

- ✓ Incline the forks (1) forwards and extend the boom (2) while at the same time inclining the forks (3) backwards to insert the forks under the load (Figure O); if necessary, insert wedges to prevent the load from rolling.



O

4.7.4.6. Load status indicator device

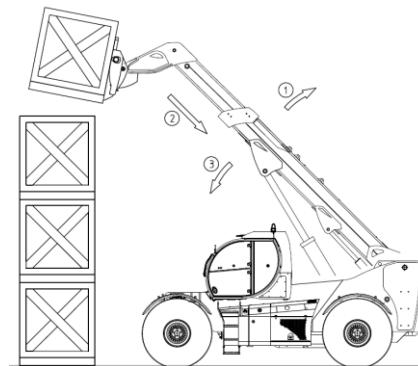
- ✓ Always observe the load status indicator on the machine control display during handling operations;

- ✓ When the load status indicator is in alarm, do not:

- a. extend the boom;
- b. lower the boom;

- ✓ If the load status indicator is in alarm, make the unloading movements in the following order (Figure P):

- a. retract the boom to the maximum possible extent;
- b. raise the boom if necessary;
- c. lower the boom to deposit the load.



P

4.7.4.7. Forklift truck with inclination corrector

- ✓ Act on the inclination corrector by acting on the hydraulic control and check the machine set up in the horizontal position by means of the spirit level positioned on the machine display, before lifting the load;
- ✓ In addition to the transverse slope of the ground, other parameters may affect the correct horizontal positioning of the forklift truck, such as:
 - a. state and pressure of the tyres;
 - b. stability of the ground;
 - c. balance of the load;
 - d. strong wind or storm;
- ✓ Before making any movement, check the afore-mentioned conditions and ensure that the forklift truck is perfectly horizontal. (Check the levelling and degree of imbalance of the forklift truck on the machine control display).



4.7.5.Instructions for maintenance of the forklift truck

4.7.5.1. General instructions

- ✓ Read all the Sections of this Use and Maintenance Manual carefully;
- ✓ Switch off the I.C. engine before acting on the forklift truck;
- ✓ Use suitable personal clothing and protection equipment for carrying out forklift truck maintenance operations, in accordance with the laws in force in each country, on the matter of workplace safety;
- ✓ Make sure the room is properly ventilated before starting up the forklift truck;
- ✓ Pay special attention to the disposal of consumables and used parts, ensuring this is done in the utmost eco-friendly and safe manner;**
- ✓ Make the necessary repairs;
- ✓ Consider and repair all leaks, even the minimum ones, immediately;
- ✓ Do not try to slacken the unions, hose pipes or hydraulic components with the circuit pressurised;
- ✓ The modification of the adjustment and/or disassembly of the balancing valves which are sometimes fitted in the forklift truck cylinders, may turn out to be dangerous; a balancing valve can be dismantled only with the cylinder concerned in the rest position and the hydraulic circuit depressurized. This operation can only be performed by authorized personnel;**
- ✓ Do not smoke or approach the forklift truck with naked flames when the fuel tank is open or is being filled;
- ✓ Attention to risk of burns (discharge apparatus, radiator, I.C. engine, etc.);
- ✓ Disconnect the negative cable terminal (-) from the battery before working on the electrical system or on the forklift truck to carry out repairs by welding;
- ✓ To carry out electrical welding in parts of the forklift truck, apply the pliers of the negative pole of the welding machine directly on the part to be welded, in order to prevent the current from passing through the alternator;
- ✓ Do not place metallic parts on the battery.



4.7.5.2. Maintenance

- ✓ Maintenance and maintaining the conformity of the forklift truck are binding for the operator's safety while driving and carrying out operations; the Manufacturer does not assume any responsibility in case of damage to persons or objects because of incorrect maintenance of the parts and apparatus which comprise the forklift truck;**
- ✓ Carry out daily maintenance;
- ✓ Do not allow the working of the I.C. engine without the air filter and with leakage of oil, water or fuel;
- ✓ Wait for the I.C. engine to cool down before removing the radiator cap;**
- ✓ Replace the filter cartridges in compliance with the times and frequencies established by this *Use and Maintenance Manual*.

4.7.5.3. Levels

- ✓ Use the recommended lubricants (Never use used lubricants);
- ✓ Do not fill fuel in the tank with the I.C. engine running;
- ✓ Carry out refuelling operations only in the areas meant for the purpose.

4.7.5.4. Washing

- ✓ Clean the forklift truck or the parts concerned before each operation, taking all the precautions necessary to avoid liquid entering the control cab;
- ✓ During the washing, avoid wetting the connectors, the electrical components;
- ✓ If necessary, protect the components from risk of damage from water, vapour or detergent product, especially the electrical components and connectors and the injection pump;**
- ✓ Clean the forklift truck to remove all traces of fuel, oil and grease.
- ✓ For every action not included in routine maintenance, contact your agent or dealer.**

4.7.6.Precautions to be adopted for starting up a new forklift truck

4.7.6.1. Introduction

Our forklift trucks are designed to give the driver utmost simplicity of operation associated with easy maintenance.

However, before starting up the forklift truck for the first time, the User **must** read and understand this Use and Maintenance Manual, which has been prepared to answer all problems regarding driving and maintenance of the vehicle.

By following these instructions, the user will be able to get the best performance out of the forklift truck.

Before using the forklift truck, the user must be familiar with the functions and methods of use of the various control, command and emergency instruments.

- ✓ **Never start up the new forklift truck before carrying out the following checks.**

4.7.6.2. Greasing

- ✓ Check the various greasing points and the various levels;
- ✓ **Lubricants and coolants are filled in the factory, using products suitable for the average climatic conditions of use, i.e. -15°C to + 45°C. For use in extreme conditions, before start up, these lubricants and coolants must be replaced with those suitable for the type and environment in which the vehicle is to be used. For more information, contact our Technical Assistance Service or your Agent or Dealer.**

4.7.6.3. Dry air filter

- ✓ Make sure the air filter is in good condition and is not clogged;
- ✓ Tighten if necessary;
- ✓ Never use the forklift truck without the air filter or with a damaged air filter.

4.7.6.4. Cooling circuit

- ✓ Never start up the forklift truck without first checking the coolant liquid level.

4.7.6.5. Brakes circuit

- ✓ Check to make sure there is no leakage or oozing of oil on the pipes, hose pipes and connectors. Repair the seals, if necessary.
- ✓ Check the oil level in the tank.

4.7.6.6. Tyres

- ✓ Make sure the nuts of the wheels fixing standoffs are tightened correctly at a suitable torque;
- ✓ Check the pressure of the tyres regularly.

4.7.6.7. Fuel supply circuit

- ✓ Check to ensure the piping is sealed tight;
- ✓ If necessary, clean or replace the fuel filter and the supply system.

4.7.6.8. Electrical system

- ✓ Check the level and density of the electrolyte in the battery;
- ✓ Check the various components of the electrical system, their connections and contacts;
- ✓ **For more information regarding the inspection and maintenance of the forklift truck, contact our Technical Assistance Service or your agent or dealer.**

Use and Maintenance

Manual HTH 16.10

engine: Mercedes

Technical features



Via Magellano, 22
41013, Castelfranco Emilia (MO), Italia
Tel +39 059 8630811 Fax +39 059 8638012
www.magnith.com commerciale@magnith.com



Technical features

Engine	Manufacturer	Mercedes	
	Type	OM 924 LA Stage 3A	OM 924 LA Stage 3B
	No. of cylinders	4	
	Displacement	4800 cc	
	Injection system	diretta	
	Bore	102	106
	Stroke	130	136
	Volumetric ratio	18:1	17,4:1
	Rated speed	2.200 rpm	
	Minimum speed	600 rpm	
	Power ISO/TR 14396	110 kW	115 kW
	Maximum torque	580 Nm - 1400 rpm	610 Nm – 1400 rpm
Cooling circuit	Type	water-cooled	
Electrical system	Weight	negative	
	Battery	2 BATTERIES 12 V 150 A	
	Alternator	24 V 35/80 A	
	Start-up	24 V	
Transmission	Type	hydrostatic with electronic control Rexroth	
	No. of forward gears	2	
	No. of backward gears	2	
	Gear reversal	electro-hydraulic	
Service brakes	Type	in oil bath-servo-assisted with pedal on front and rear wheels	
Parking brake	Type	hydraulic negative action on front and rear axle	
Front and rear axle	Type	steering - tilting	
	Wheels hub reduction gear	Planetary	
Front and rear standard tyres	Size	16.00 – R25	
	Pressure	7 bar	
Front and rear optional tyres	Size	16.00 – R25	
	Pressure	10 bar	
Movements hydraulic system	Type of pump	variable capacity pistons pump – load sensing	
	Capacity at 2300 rpm	132 l/min	
	Pressure	350 bar	
	Displacement	60 cm ³	
Steering circuit	Type	load sensing	
	Pressure	280 bar	
Performance	Max. speed	25 km/h	
	Lifting height	9.70 m	
Maximum rated capacity with equipment	STD: Forks	16,000 kg	
	Distance from centre of gravity	600 mm	
	Truck weight with std. equipment	15000 kg	
Load distribution on axles without forks	Front axle	10505 kg	
	Rear axle	11600 kg	
Std. forks dimensions	Length	1500 mm	
	Width	200 mm	
	Thickness	80 mm	
Slope that can be covered	Vehicle load-less	58 %	

Noise level	Guaranteed acoustic pressure level in the environment in accordance with Directive 2000/14/CE modified by Directive 2005/88/CE	L _{wa} 108 Db(A)
	Acoustic pressure level in driver's seat in accordance with standard EN 12053	L _{wa} 79.5 Db(A)
Vibrations	Acceleration of upper limbs	≤ 2.5 m/s ²
	Acceleration of body (feet or seated part)	≤ 0.5 m/s ²
Crash test for protection structure	ROPS Test for ISO 3471:2008	conforms
	FOPS Test conforming to ISO 3449:2005	conforms

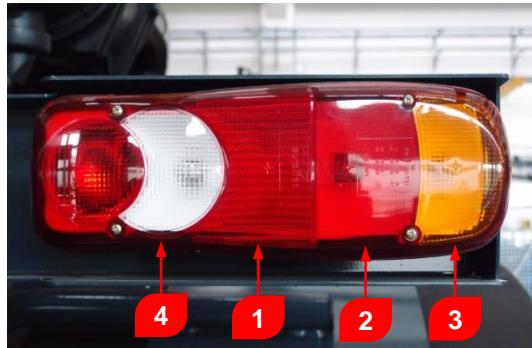
1. Front Headlamps

1	position lights
✓	always on the commissioning of the electrical voltage
2	low beams and high beams
✓	low beam always on together with the engine running;
✓	beam actuated by a lever right under the steering wheel;
3	direction lights
✓	can be activated by means of RH lever under steering wheel



2. Rear headlamps

1	position lights and reflector
✓	light always on the commissioning of the electrical voltage;
2	stop lights
✓	can be activated in case of activation of vehicle brake pedal;
3	direction lights
✓	can be activated by means of RH lever under steering wheel
4	reversing lights
✓	can be activated automatically when reversing is activated



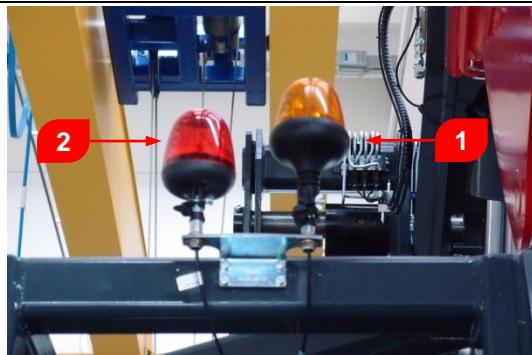
3. License plate light

1	license plate lights
✓	always on the commissioning of the electrical voltage



4. Work light and emergency light

1	orange work light
✓	activated by button on the touch screen;
2	red emergency light
✓	automatically turned on with emergency button pressed or the achievement of operational limitations;



5. Adjusting steering column for climbing in and getting down from cab

The possibility of rotation of the steering column makes it easier for the driver to get in and out of the cab.

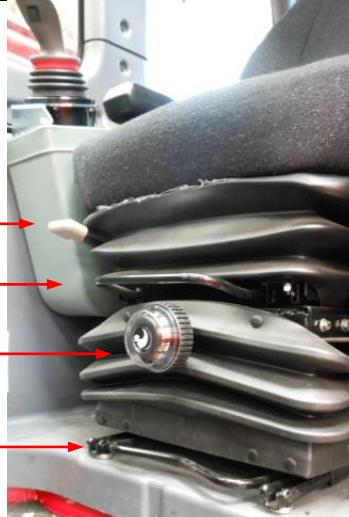
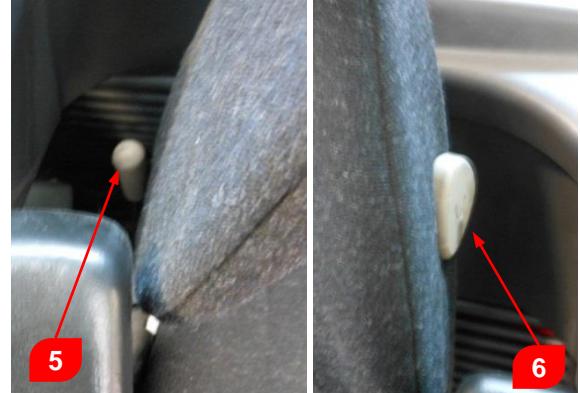
The operator can use the pedal provided on the LH of the steering column to rotate the column to make it easy to get in and out of the cab.

A series of levers can be used for adjusting the column for ergonomic use according to the driver's height and posture.

1	column release pedal	<ul style="list-style-type: none"> ✓ by activating pedal 1 with the LH foot the driver can raise or bend the column by applying a traction or repulsion force by acting on the steering wheel; ✓ the driver must always set the column in the position most convenient for driving the truck. 	
2	steering wheel inclination adjustment release button	<ul style="list-style-type: none"> ✓ push button 2, present on the LH of the steering column, upwards to adjust the inclination of the steering wheel; ✓ the driver must push button 2 upwards with the LH hand and adjust the steering wheel inclination using the RH hand; 	
3	steering wheel height adjustment release lever	<ul style="list-style-type: none"> ✓ pull the lever upwards to release the steering column so that the height can be adjusted; ✓ the driver must pull the lever upwards with the RH hand, while at the same time raising or lowering the steering wheel with the LH hand; 	

6. Operator seat

Before starting up the forklift truck, the driver must check the driver's seat to make sure it is correct so that the driving posture is according to his height and weight, in order to take up a position suitable for easy access to the instruments onboard, to the control levers, steering wheel and pedals and the outside view.

1	adjusting seat forwards/backwards in relation to the armrest	
✓	pull the lever upwards; move the seat forwards or backwards to the position required;	
✓	release the lever and make sure it is back in the locked position;	
2	adjusting the seat forwards/backwards	
✓	pull the lever upwards; position the seat as required;	
✓	release the lever and make sure it is back in the locked position;	
3	adjusting the seat height	
✓	pull or push the lever upwards or downwards and position the seat at the required height;	
4	adjusting the seat suspension according to weight	
✓	turn the knob so that the white arrow points at the operator weight value;	
5	adjusting the backrest	
✓	push the lever on the back on the RH side of the seat to adjust the backrest inclination;	
6	lumbar adjustment of backrest	
✓	turn the handwheel on the LH of the backrest to the optimum position;	
Precaution: if there is no operator in the driving seat, the vehicle must not be started up.		

7. Reversing lever

Reversing the forklift truck must be done at low speed, without accelerating:

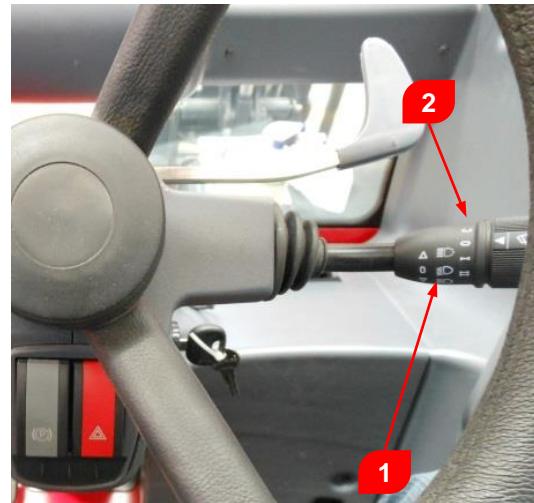
- ✓ Forward: push the lever forwards (position 1);
- ✓ Backwards: pull the lever backwards (position 2);
- ✓ Neutral: for starting up the forklift truck, the lever must be in neutral. (position 0).

1	forwards:	
✓	lift and push the lever forwards;	
0	neutral	
✓	position the lever in the centre;	
2	backwards	
✓	lift and push the lever backwards;	

8. Lights switch

The switch consisting of the RH lever under the steering wheel controls the lights, the direction indicators and the warning sound.

1a	position lights
✓	always switched on when truck engine starts up with the lever in the central position;
1b	high beams
✓	turn the lever downwards;
1c	signalling with high beams
✓	turn the lever upwards;
2a	direction lights
✓	lever in central position, direction lights Off;
2b	RH direction lights
✓	pull direction lever back
2c	LH direction lights
✓	push direction lever forwards
3a	squeegee on position "0"
✓	squeegee not moving;
3b	squeegee on position "I"
✓	weak rain position;
3c	squeegee on position "II"
✓	heavy rain position;
4	squeegee sprayer
✓	press the end of the lever to activate the squeegee spray;
5	warning sound;
✓	press the button at the end of the lever;



9. Engine On/Off switch

The switch has three positions with the following functions:

- ✓ **0** : I.C. engine **STOP**;
- ✓ **1** : Main electric contact;
- ✓ **2** : I.C. engine **START** and return to position “**1**” after key is released.

P	not used	
0	I.C. engine stop	
I	main electric contact	
II	not used	
III	electric motor start-up	

9.1. I.C. engine switching on procedure

- Turn the engine ignition key clockwise from 0 to 3 in sequence;

9.2. I.C. engine switching off procedure

- Turn the engine ignition key anticlockwise from 3 to 0 in sequence;

10. Service brake and accelerator

This pedal is used to change the forklift truck speed by acting on the I.C. engine rpm.

The pedal acts on the front and rear wheels and makes it possible to slow down or block the forklift truck. The brake pedal acts as the inching pedal in the first 20 minutes of travel allowing slow accurate movements, after which it has the braking effect.

1	service brake pedal	
✓	press the pedal using the RH foot to apply the forklift truck service brake;	
✓	In the first 20mm of travel, the brake pedal acts as inching pedal, thereby allowing slow and accurate movements.	
2	accelerator pedal	
✓	press the pedal with the RH foot to change the I.C. rpm and thereby change the vehicle speed.	

11. Emergency lights and parking brake

1	emergency lights button	
1	parking brake button	

12. Method for exclusion of the safety systems

12.1. Key selector for exclusion of the overload control safety system

The forklift truck is provided with an electronic safety system which controls the machine overload in the work phase, inhibiting all movements that are not allowed.

The system is activated automatically when the boom movements are blocked.

The system can be deactivated manually in case of emergency or for reasons of safety. With the control system deactivated, the operator and the forklift truck are exposed to risk since there is no control system for monitoring the overload or overturning of the vehicle.



The operator uses the selector below the machine control panel display to disable the safety system.

The key must be kept safe inside a safety box placed behind the driver's seat.

The key selector has two positions "1" and "0" :

- position "1" the safety system is activated;
- position "0" the safety system is deactivated;

For normal operation, the key selector is usually turned to position "1", safety system activated.

In position "0" the selector must be kept in this position by the operator, when the key is released the selector returns to the normal position "1".

1	red box containing emergency key on the RH column of the cab	
✓	pick up the small hammer placed at the top of the red box containing the emergency keys (1);	

- ✓** break the front glass (2.);
- ✓** Take the key that is easily identifiable as it is completely metallic (3);

2	key selector	
	<ul style="list-style-type: none"> ✓ change the key selector from position 1 to position 0 to exclude the safety system; ✓ when released, the button returns to position 1, and the safety system is again activated; 	 !
In case of emergency, to deactivate the safety system, the operator must:		
<ul style="list-style-type: none"> ✓ take the hammer placed on the side of the safety box; ✓ break the protective glass on the safety box; ✓ take the key and insert it in the key selector; ✓ turn the key selector to position "0" and hold it in this position as long as necessary to be able to carry out the emergency manoeuvres, aware of the risks to the operator when working in this mode. 		
<ul style="list-style-type: none"> ✓ When the operator disables the safety system the acoustic alarm and steady red warning light on the top of the cab are activated automatically to warn of the potentially hazardous situation for those working in the area near the forklift truck 		
<ul style="list-style-type: none"> ✓ When the emergency procedure is complete, the operator must put the key back in the safety box and restore the glass cover. 		

12.2. Procedure for excluding the emergency system on the platform

If the forklift truck is combined with a work platform, the system has the possibility of operating all the commands relative to the boom by using only the radio-control positioned on the platform. The operator using the radio-control can operate the emergency button (red mushroom-shaped), thereby inhibiting all the movements of the forklift truck boom.

In this condition, it may be necessary to bypass the block activated by the operator carrying the radio-control by activating the procedure described below.

Obviously, this procedure can only be activated in an extreme emergency where an operator present on the vehicle considers it necessary to lower the platform even if the operator present on the platform has activated the emergency button.



This condition may occur if the operator present on the platform activates the emergency button and then finds himself in a position where he is unable to control the descent because he feels unwell.

In this case, the operator on the vehicle can activate the emergency procedure and lower the platform to the ground.

Procedure for excluding the emergency system on the platform:



1	red box containing emergency key on the RH column of the cab	
	<ul style="list-style-type: none"> ✓ pick up the small hammer placed at the top of the red box containing the emergency keys (1); ✓ break the front glass (2.); ✓ take the key identified by means of the black plastic surround (3); 	
2	key selector	
	<ul style="list-style-type: none"> ✓ insert the key as shown in the photo alongside indicator 4; ✓ press and turn the key clockwise, holding it in position; 	
3	key selector + red emergency button	
	<ul style="list-style-type: none"> ✓ hold the in position (turned clockwise) and with the same hand press the red emergency button as shown in the photo alongside indicator 5; 	
	<ul style="list-style-type: none"> ✓ The block command activated by the operator present onboard the platform is thus by-passed and another operator from the cab can restore the platform to the ground. ✓ When the emergency procedure is complete, the operator must put the key back in the safety box and restore the glass cover. 	

13. Emergency stop mushroom-shaped selector

If the driver is in an actual or potential emergency situation, he can use a button provided on the side LH of the direction of movement outside the arm-rest area which, if pressed, will stop the vehicle's I.C. engine and all the relative movements.

To restore the engine and vehicle movements, the driver must turn the red button clockwise.

1	mushroom-shaped emergency button	
<ul style="list-style-type: none"> ✓ press the button to stop the I.C. engine and all the movements of the vehicle; ✓ turn the button clockwise to restore the functions of the engine and machine movements; 		

14. Levelling the vehicle on tyres

The forklift truck is provided with a manual levelling device that can be operated by means of a button present on the dashboard to the driver's RH to laterally recover differences in level of the ground, if any. The operator can recover level differences up to a maximum inclination of $\pm 8^\circ$.

1	button for levelling on tyres	
<ul style="list-style-type: none"> ✓ press the button at the RH end to activate the levelling of the vehicle transversely; ✓ press the button 1 at the end and the vehicle will be inclined to the RH side; ✓ press the button at the end 2 and the vehicle will be inclined to the LH side; 		

Limitations: The command can be activated only in the following conditions:

- ✓ maximum height of the load less than 3 m;
- ✓ telescopic boom completely retracted

15. Hydraulic circuit emergency command

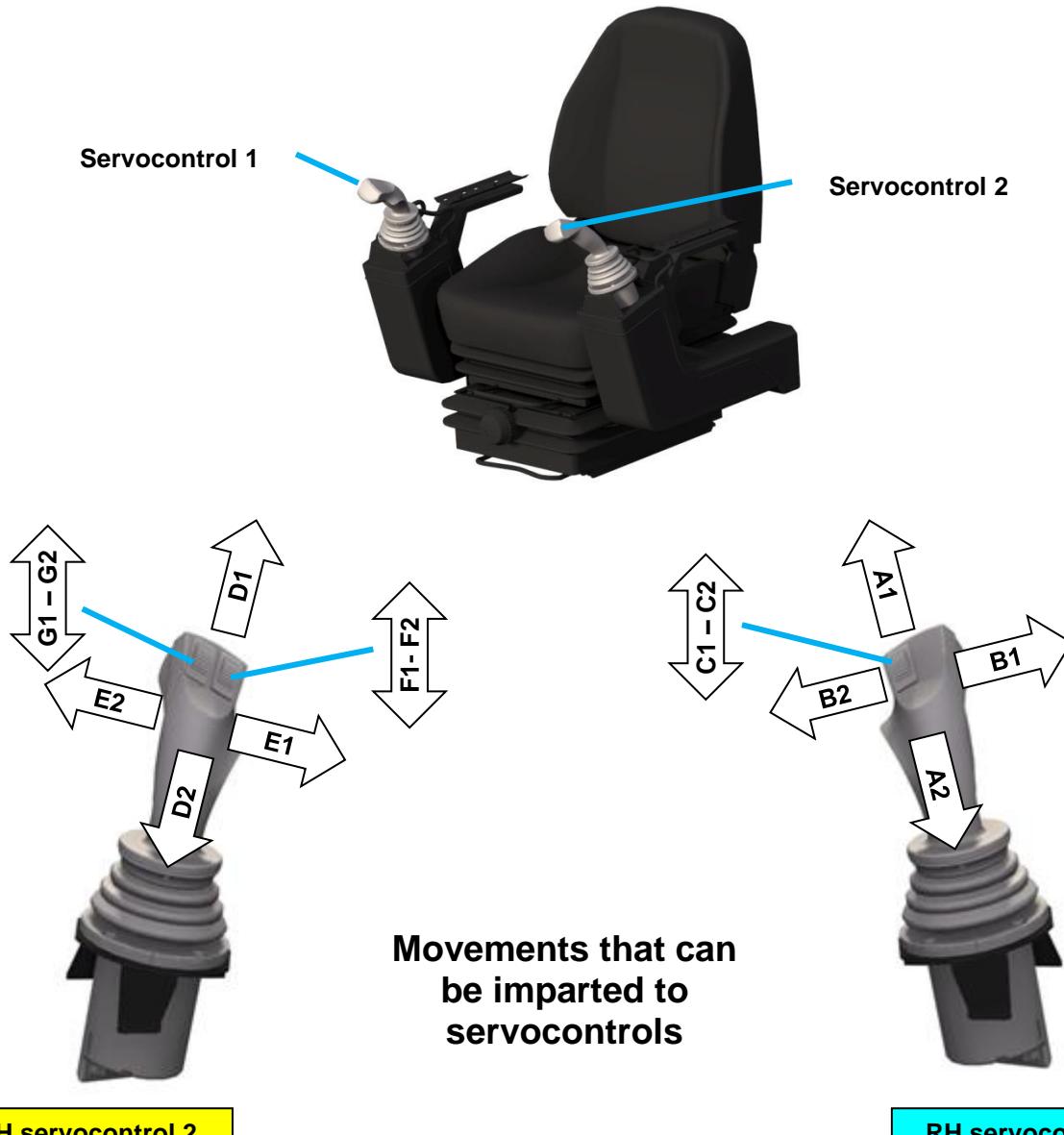
The command activates the hydraulic circuit by means of an electric motor powered by the vehicle batteries to solve any emergency that may be caused by a fault in the main hydraulic pump. With reactivation of the hydraulic system, this system can operate the organs like the telescopic boom for ensuring safe conditions for the operating personnel. Such a situation may occur with the forklift truck in operation, with the work platform raised with the operator onboard; in this case, the button must be used to restore the working of the machine's hydraulic system, for a limited period of 3 minutes, so that the telescopic boom can be lowered and the operator can then be brought to safety.

1	hydraulic circuit emergency command button	
<ul style="list-style-type: none"> ✓ press the button to activate the emergency command of the hydraulic circuit; 		

✓ Limitations: The command has a maximum duration of 3 minutes.

16. Proportional electro-hydraulic servocontrols

The forklift truck is provided with two electro-hydraulic servocontrols positioned on the RH (1) and LH (2) of the driver's seat at the two arm-rests, in order to be able to ensure an ergonomic operating position for the forklift truck driver.



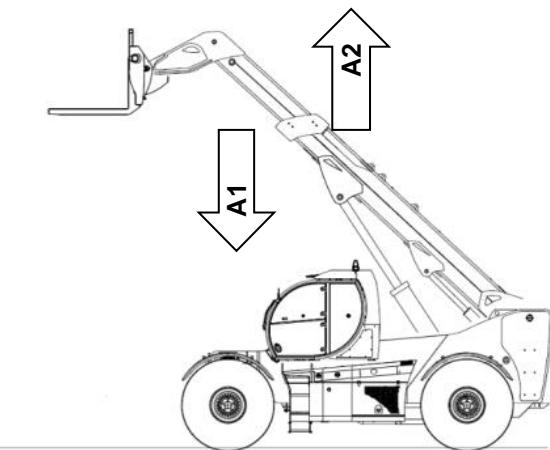
Before starting to use the two levers, it must be noted that inside the grip, for each lever, there is a "movement enable" button for enabling the commands imparted by pressing them during the movement of the servocontrol on which they are present.



command enable button on servocontrol

16.1. RH servocontrol 1

1) Type A movements



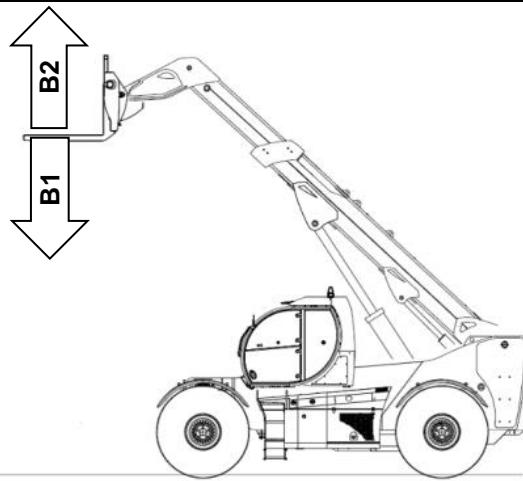
A1 Movement:

moving the lever forward lowers the boom;

A2 Movement:

moving the lever back raises the boom;

2) Type B movements



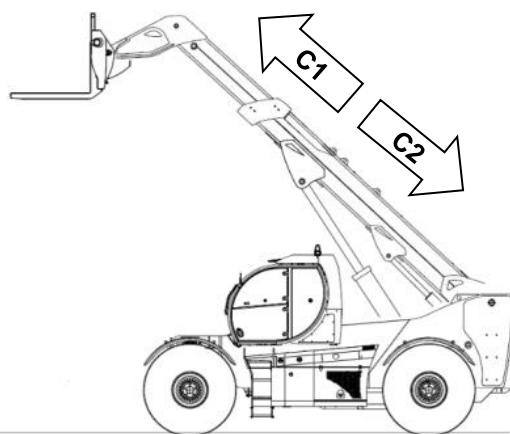
B1 Movement:

moving the lever to the right to turn down the installed accessory;

B2 Movement:

moving the lever to the left will turn up the installed accessory;

3) Type C movements



C1 Movement:

Rotate the roller forwards to extend the boom.

C2 Movement:

Rotate the roller backwards to shorten the boom.

16.2. LH servocontrol 2

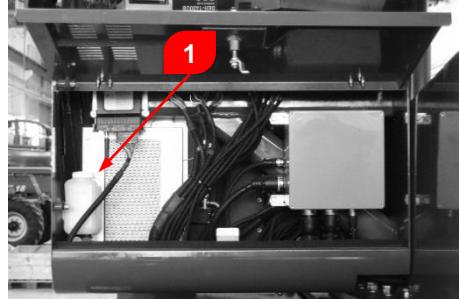
Movements of type D - E - F - G

The movements [D and E] given by the movement of the joystick left in the two aces and two roller [F and G] present in the head, imparting only the optional features installed.

For operation refer to the specific Owner's Manual specific accessory.

17. Window washing liquid tank

This is positioned in the hood at the back of the cab to the LH of the operator. Unscrew the cap to pour in the window washing liquid, making sure the tank is always full.

1	window washing liquid tank	
<p>✓ open the tank cap; ✓ pour in window washing liquid with water;</p>		

Precautions for extreme climates:

at temperatures below 5 °C ensure suitable liquid concentrations, recommended by the producer, to prevent the liquid from freezing inside the distribution system.

18. Ceiling lights in the cab

Ceiling lights are provided in the cab on the two sides of the driver's seat, for lighting up the passenger compartment. The switch is provided on the side of the ceiling light to switch it on.

1	internal ceiling light	
<p>✓ press switch 1 on the front of the two ceiling lights provided on the RH and LH sides in the cab;</p>		

19. Vehicle radio

The vehicle radio is present at the back of the cab. To use the radio, follow the instructions accompanying the vehicle Use and Maintenance Manual.

1	vehicle radio	
<p>✓ consult the use and maintenance Manual for using the vehicle radio;</p>		

20. Cab rear window

The cab has a rear fanlight which can be opened by means of a gas spring. A lever is provided at the bottom of the window for opening and closing it.

1	opening the rear window	
2	closing the rear window	

Precaution:

danger of crushing when closing the rear window.

21. Cab door

The driver's cab can be entered through a cab door consisting of two sections made of glass: lower window and upper window.

The two sections can be opened separately.

1	opening the cab door from the outside	
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Precautions:

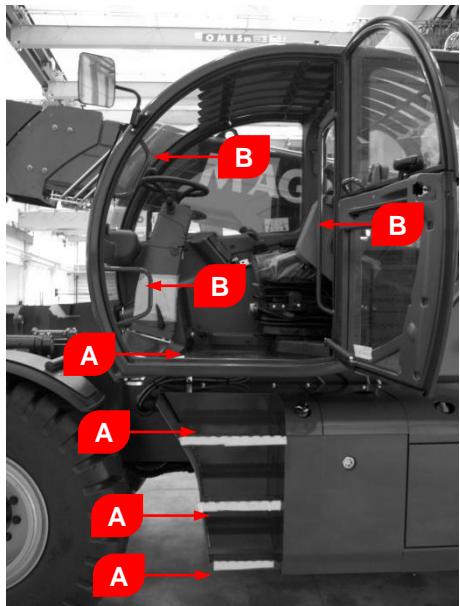
the vehicle must not be started up with the lower cab door window open.

2	closing the cab door from the outside	
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Precautions:

danger of crushing when closing the door.

3	opening the cab door from inside	
Precautions: make sure no persons or objects are present in the range of opening of the spring outside the vehicle.		
4	closing the cab door from inside	
Precautions: danger of crushing when closing the door.		
5	opening cab door upper window	
Precautions: make sure no persons or objects are present outside the vehicle within the range of opening of the window .		
5.1	opening cab door upper window	
Precautions: The vehicle cannot be started up if the locking pin 1 is not inserted properly in seat 2.		

<p>6 closing cab door upper window</p> <ul style="list-style-type: none"> ✓ to close the upper window of the cab door, use the unlocking lever 1 present inside the door rear fixed window and turn it anticlockwise; ✓ the window will open partially and get detached from the locator; 	
<p>Precautions: make sure no persons or objects are present in the range of closure of the window outside the vehicle.</p>	
<p>6.1 closing cab door upper window</p> <ul style="list-style-type: none"> ✓ pull the window by means of the handle provided and bring it in contact with the door compartment; ✓ after rotating the window, turn the closure lever clockwise to ensure correct closure; 	
<p>Precautions: danger of crushing when closing the window.</p>	
<p>22. Procedure for getting into and out of the cab</p> <p>The forklift truck is designed taking into account the ergonomic needs of the user; therefore a procedure is defined which the operator must follow for getting into and out of the cab safely and functionally.</p>	
<ul style="list-style-type: none"> ✓ To get on and off the machine, always use the steps A and B. handles ✓ Before you go up or down thoroughly clean all the steps and handholds. In the case of steps or damaged handles, promptly see to their repair. ✓ Do not go up or down from the car with his back to it. ✓ During the phases of ascent and descent always maintain three points of gripping. Keep three points gripping means two hands on the handles and a foot on a step or two feet and one hand on the steps of a handle. ✓ Do not climb out of a moving car. Do not climb down from a moving car. Do not jump down by a car. ✓ Do not climb or descend from the car carrying tools or other objects. Load the gear you want before you get on the machine. Do not use any control device of the machine as a handle for the ascent or descent. 	
<p>Precautions: only operators wearing suitable protective footwear and other PPE as required by specific regulations and laws in force in the country in which the vehicle is used must be allowed to climb onboard the forklift truck.</p>	

23. Emergency exit

In case of emergency, the operator must break one of the side glass windows or the rear glass window using the hammer meant for the purpose placed on the RH column inside the cab, and leave the cab.

1	emergency exit	<ul style="list-style-type: none"> ✓ take the small hammer on the RH column of the cab for breaking the glass; ✓ break one of the side glass windows or the rear window glass; ✓ After use, put the hammer for breaking the glass back in its support. 		
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Precautions:

The windshield is made of laminated glass, and can therefore be broken with the mallet, but not shattered.

24. Safety belt

The truck is fitted with a safety belt in the driver's seat.

The driver must use the safety belt when driving the forklift truck.



1	locking the safety belt	<ul style="list-style-type: none"> ✓ take the end of the belt present on the RH side of the driver's seat and insert it in the housing on the LH side of the seat; 		
2	unlocking the safety belt	<ul style="list-style-type: none"> ✓ press the red button 1 in the belt body on the LH side of the driver's seat to release the locking pin; 		

Precautions:

check to make sure the belt is not wound around itself and that it is inserted correctly in place.

25. Method for towing the vehicle in case of emergency

The carriage is provided with special hooking eyelets for towing the vehicle in case of emergency.

The operators must use **only** these eyelets present on the outer front and rear beams of the forklift truck and apply on these the towing force necessary for moving the vehicle in case of an emergency.



1 eyelets for towing the vehicle	<p>✓ use only the eyelets provided on the front and back beams of the vehicle;</p>	 
<p>Precautions:</p> <ul style="list-style-type: none"> • carry out the machine towing operations with utmost care; • make sure no one is standing in the areas of action of the vehicle drive chains and the emergency vehicles; • check to ensure that the chains used for towing the forklift truck are sized correctly for the truck and for the force that may be necessary, and carry out the operations for setting the machine in safety in emergency situations; • the towing chains must be fixed only in the eyelets provided for the purpose. • To be able to tow the vehicle, the front and rear axles must be unlocked and the traction must be set in neutral; for these procedures, refer to Section 03, paragraph S2. 		

Use and Maintenance

Manual HTH 16.10

engine: Mercedes

Control and command instruments



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Machine command display

0. Introduction

The **HTH 16.10** forklift truck has an innovative machine control and command system consisting of a digital display with **touch screen** technology which makes it possible for the user to interact with a display with graphic interface using the fingers for activating the commands and display of all the machine controls instruments.

The simplicity of use and activation of the display and interface instrument supports and facilitates the machine control and management by the operator and allows continuous control of all the parameters. The touch screen is at the same time an output device i.e. for display of the indications and alarms, if any, and an input device for activation of the commands.

The advantage of the *touch screen* consists in not having any hindrance or needing space for pushbuttons distributed on the normally ample spaces for housing all the pushbuttons and control and command indicators, but having all these buttons and indicators in a limited space available to the operator and thereby ensure direct interactivity between the user and the device with a faster interaction/keying in speed and fewer possibilities of error.

Usability is defined by the ISO (International Organisation for Standardisation) as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction. In other words, it defines the degree of ease and satisfaction with which interaction takes place between Man and an instrument (control panel, gear lever, graphic interface, etc.), our mission was to provide the forklift truck operator with a highly ergonomic system capable of facilitating the interface by means of instinctive interaction with a panel with digital commands and captivating and chromatically pleasant graphics.

Our aim is to provide the operator with:

a particularly usable instrument.

The problem of *usability* arises when the design engineers' model (i.e. the their ideas regarding the working of the product, which is transferred to the product design) does not coincide with the model of the final user (i.e. the idea the user has of the product and its working).

The degree of usability increases proportionally to the similarity of the two models (design engineer's model and user's model).

Our aim is to provide the operator with:

a model for the user.

The instrumentation includes:

- ✓ **Joystick**: on the RH side of the operator; can be operated with the RH hand for confirmation, selection or exclusion of the machine commands;
- ✓ **Touch screen Display**: placed on the front on the RH side of the visual radius of the operator.



1. Joystick functions and keys

The joystick consists of the central activation command "mushroom" and 5 buttons; 3 upper and 2 lower. The "mushroom" has the following movements:

- ✓ pressed,
- ✓ shifted (forwards-backwards);
- ✓ rotated clockwise and counter-clockwise.

The 3 upper keys from LH to RH are assigned for the selection of the three different main pages:

- ✓ **Main Page;**
- ✓ **Legs Stabilizer;**
- ✓ **Load Page.**

The LH lower button marked "**Esc**" has the function of deselecting and exiting the selected page and returning to the **Main Page**.

The bottom RH key has the function of accessing the **Main Page**.

Press the joystick to activate the selection/confirmation function (**enter**) and consequently the movement.

Move forwards-backwards to scroll through the various sections of the individual pages.

Rotate the joystick to scroll through the various functions or sections in each screen page.

1	Machine indicators screen page opening button	
2	Button not active for HTH 15.10	
3	Load and stability control screen page opening button	
4	Button for exiting the screen page or function	
5	Information and diagnostics screen pages button	
6	Press joystick button	
7	Moving the joystick forwards and backwards	
8	Rotazione joystick	

Moving forwards or backwards on the longitudinal axis commands activation of the various areas of the individual pages; the area selected, i.e. active, appears with the sides lit up in blue.

8 | Rotazione joystick

Rotate the joystick in both directions (clockwise and counter-clockwise), to scroll through the commands of the various sections activated.

2. Display and relative functions screen page

<i>Indications present on home page</i>	
<ol style="list-style-type: none"> 1. Description of accessory detected; 2. Accessory code; 3. Accessory confirmation button; 4. Accessory not confirmed/not present button. 5. Hours of service remaining until the next scheduled maintenance action. 	

Every time the vehicle is switched on the operator is required to confirm the correctness of the accessory detected by the vehicle.
In this manner the control unit can calibrate the control of the forklift truck uploading the correct load charts

<i>Screen page activation: main operations</i>		
<i>control by joystick</i>	<i>control by display</i>	<i>display</i>
The screen page is divided into three sub sections containing buttons or indicators; each section can be activated by rotating the joystick or activating the command from the monitor by using the scroll arrows present at the two bottom corners of the display.		
<i>identification of active section of display</i>		The operator sees the active section is active by means of the blue coloured outline lighting up

Indicators present in the main operations screen pages (P1)

Page heading (C0P1)

	current time	
	total hours of machine operation	
	tachymeter (vehicle speed in km/h)	
	emergency lights On	
	button for passing on to diagnostics menu	
	speed selected (fast/slow)	
it is possible to change from slow to fast speed by activating the button identified above, which will change from "tortoise" to "hare"		
in particularly difficult conditions for switching from one speed to the other, it may be necessary to use the "reset" button for facilitate the activation and consequent change in machine speed		

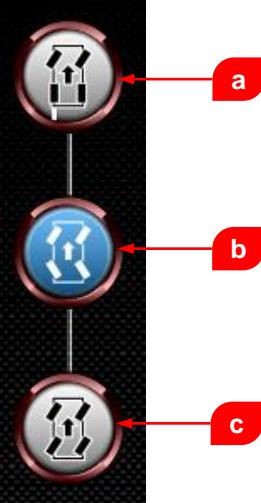
page top section		
	engine oil pressure indicator (bar)	
	engine RPM	
	engine coolant temperature (°C)	
	fuel level indicator	
	description and code of accessory mounted on forklift truck boom	Tool: FORK 26

List of alarm indicators

- A. engine oil temperature alarm indicator;
- B. hydraulic system filter clogged alarm indicator;
- C. hydraulic system oil temperature alarm indicator;
- D. parking brake applied indicator;
- E. braking system oil level alarm indicator;
- F. battery charge status alarm indicator;
- G. air filter clogged alarm indicator;
- H. tank fuel level alarm indicator;
- I. engine general alarm indicator;
- J. electrical system general alarm indicator;
- K. telescopic boom extension chains breakage alarm indicator;
- L. hydraulic system general alarm indicator;
- M. transmission system general alarm indicator;
- N. coolant system liquid temperature alarm indicator;

Page bottom section

steering type command button



- a. button for enabling only front wheels steering;
- b. button for enabling front and rear wheels steering with convergent axis;
- c. button for enabling front and rear wheels steering with parallel axis;

The procedure for enabling different types of wheel steering is only possible after realignment of all the wheels.

The backlit button indicates that the type of enabling for steering is selected and is therefore in operation.



front wheels alignment indicator; when the indicator light is Off, it means the wheels axis is not aligned with the vehicle axis



rear wheels alignment indicator; when the indicator light is Off, it means the wheels axis is not aligned with the vehicle axis; the green indicator lights up to indicate that the wheels are aligned with the vehicle axis.



	<p>vehicle stability conditions</p>	
<p>The indicator shows the state of the vehicle regarding imbalance, if any, detected by the control system.</p>		
	<p>Button not active for fixed telescopic lift</p>	
<p>Page bottom section</p>		
	<p>rear axle block activation indicator</p>	
<p>The indicator shows the block status of the blocking rear axle oscillation.</p>		
<p>foot of the page</p>		
	<p>buttons for scrolling through the previous or successive screen pages</p>	

Stabilization load control screen page activation

control by joystick	control by display	display
Indicators present on stabilization load control screen page		
	extension of telescopic boom (extension length)	
	telescopic boom height	
	angle between telescopic boom and horizontal axis	
	telescopic boom rotation radius	
	summary of symbols used in the screen pages relative to orientation of the boom	

	maximum capacity of accessory in relation to boom position
--	--

	load present on accessory
--	---------------------------

<i>Page bottom section</i>	
	Vehicle load chart

The display can show the five load diagrams in three different configurations: ✓ forklift truck on wheels with front boom ($\pm 5^\circ$ deviation from longitudinal axis); ✓ forklift truck on wheels with boom rotated; ✓ forklift truck on stabilizers in maximum extended position (100%); ✓ forklift truck on stabilizers in medium extended position (50%); ✓ forklift truck on stabilizers in no extension position (0%);
--

<i>image indicating the configuration of the forklift truck relative to the load chart displayed</i>	
	image indicating that the diagram displayed concerns the forklift truck on wheels with boom in front

	indicator of position of centre of gravity of load inside the diagram	
--	---	--

<i>foot of the page</i>	
	identification of active page

COMMAND PAGE activation		
control by joystick	control by display	display
→		
<i>Indicators present on COMMAND PAGE</i>		
<i>page heading</i>		Screen page activation sector Diagnostics and Alarm Page
<i>page top section</i>		
	air conditioning activation	
	demister air inside cab in recirculation mode	
	regulation of air temperature inside cab, the numeric indicator shows the regulation value on a scale between 0 and 100	
	regulation of ventilation speed inside cab, the numeric indicator shows the regulation value on a scale between 0 and 3	

page central section		
	power light flashing beacon and work lights	
Page bottom section		
	remote radio control activation by radio control	

The button activates the connection between the radio control panel and receiver control unit to allow management of the controls by means of an external panel that can be used by the operator

Use and Maintenance Manual HTH 16.10

engine: Mercedes

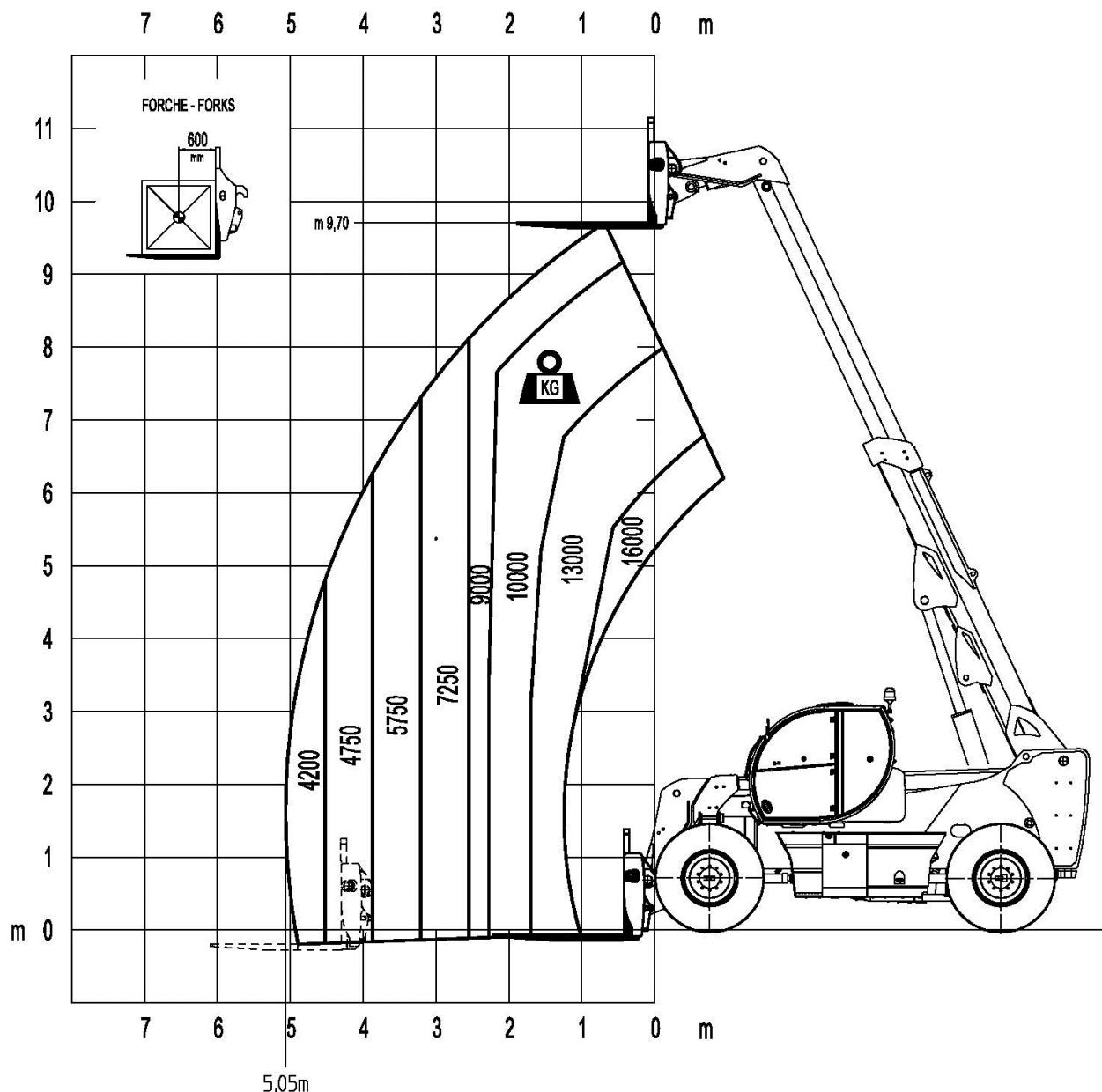
Load Charts



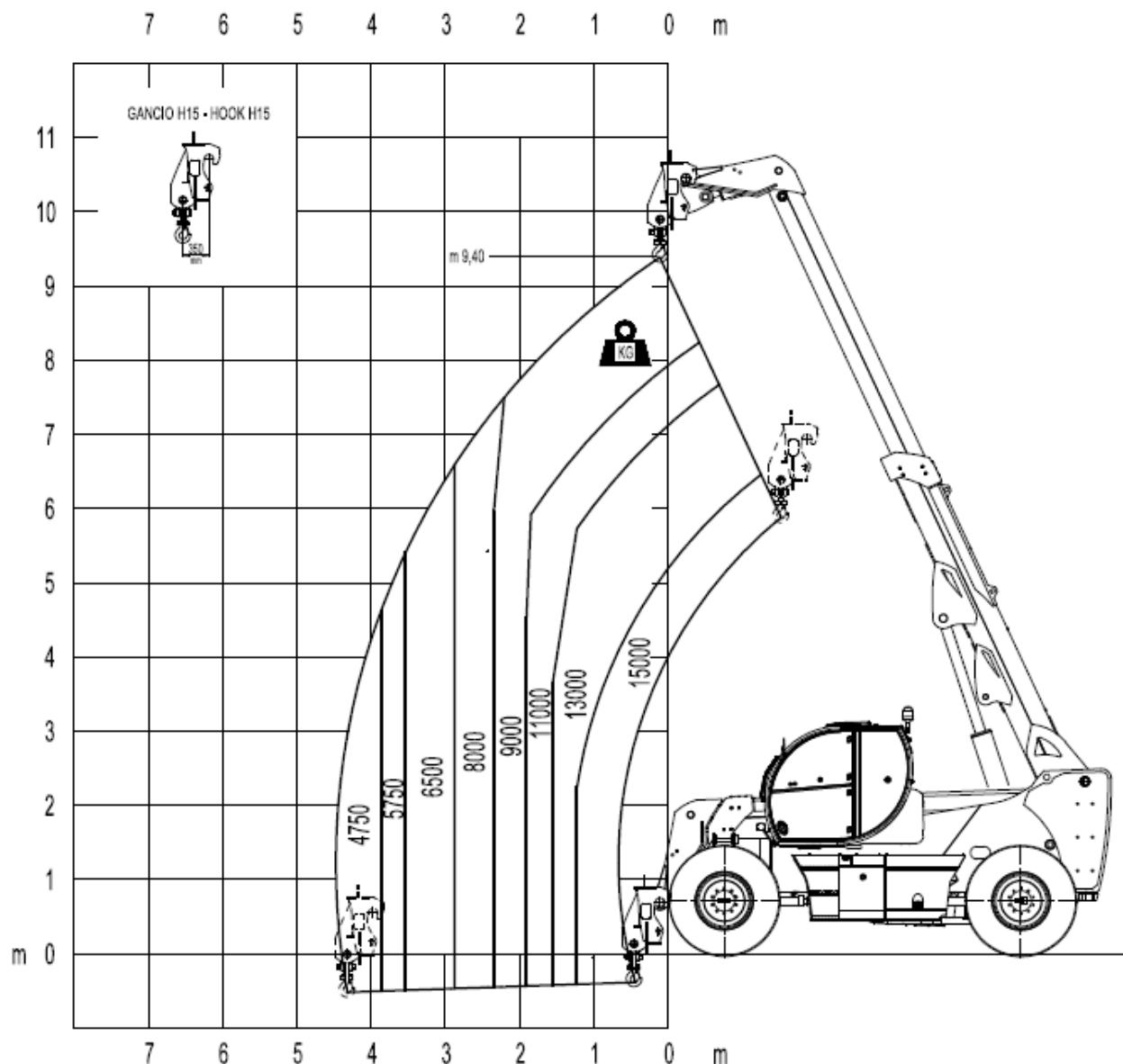
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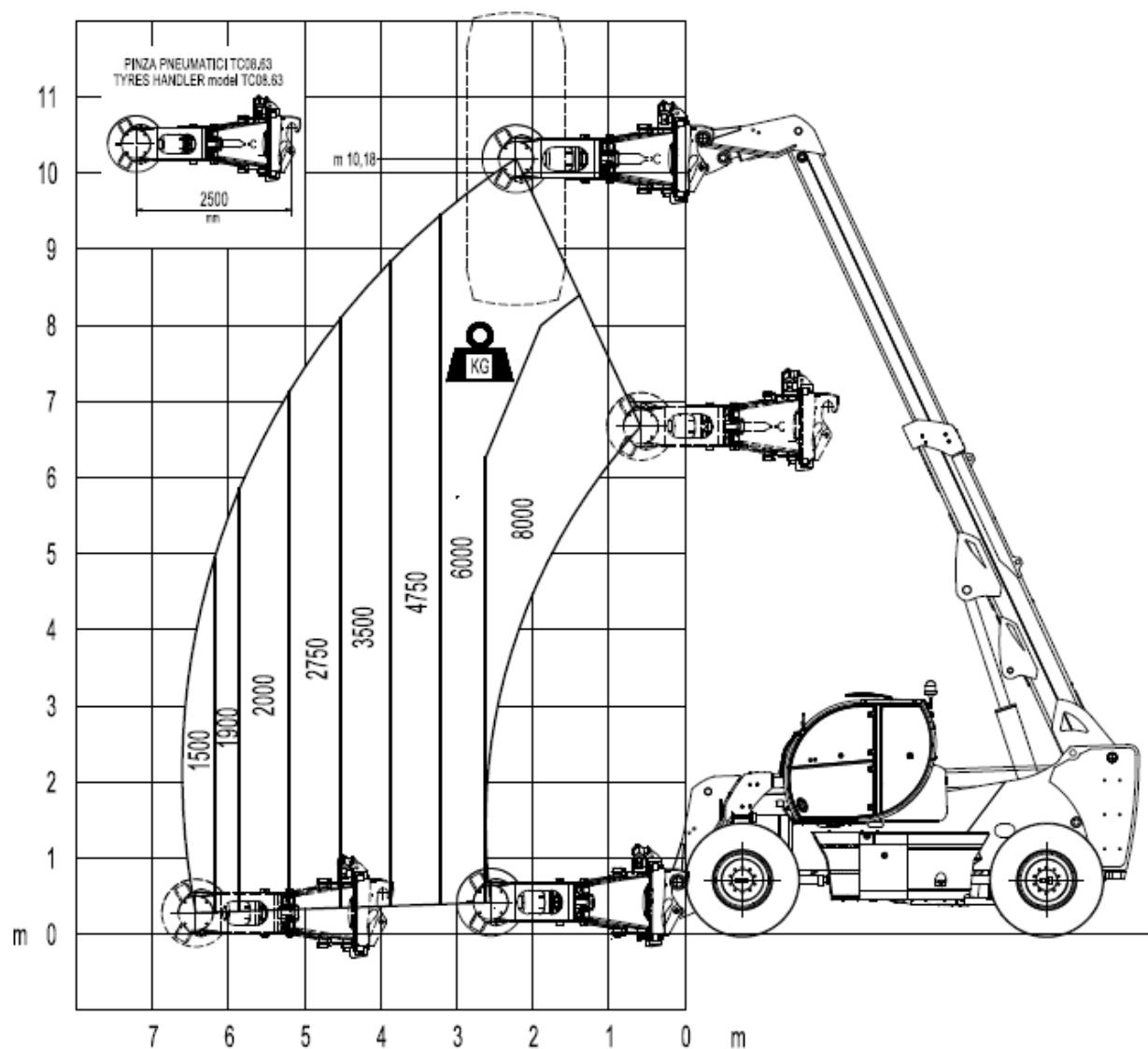
Load chart with fork carriage



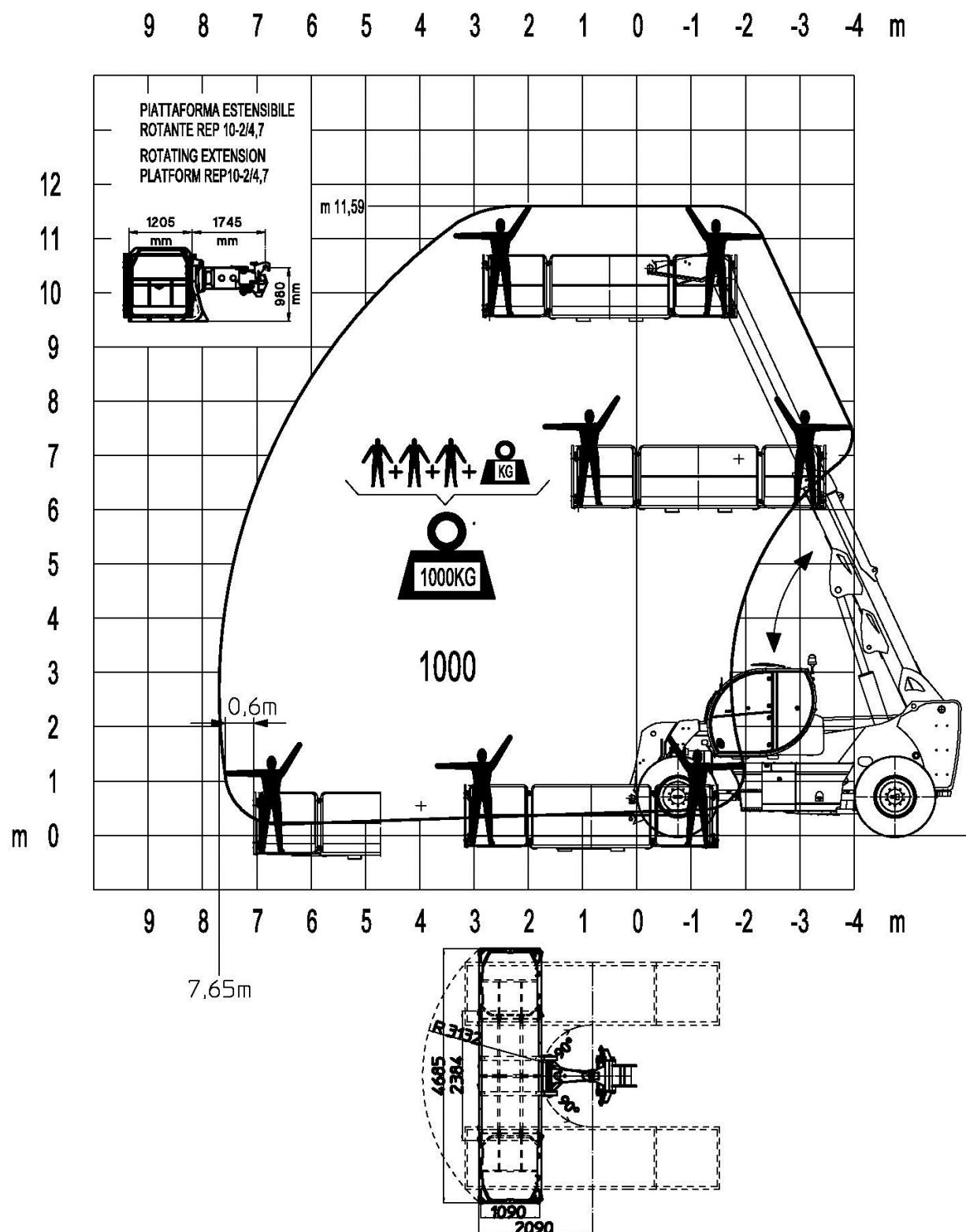
Load chart with hook 15 ton



Load chart with tyre clamp 8ton



Load chart with platform



Use and Maintenance

Manual HTH 16.10

engine: Mercedes

Maintenance



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Filter elements

description		code	1 st service	periodic maintenance
1	Engine oil filter	12961	change	every 500 hours
2	Fuel filter on engine	12952	change	every 1000 hours
3	Fuel filter	12802	change	every 1000 hours
4	Primary air filter cartridge	12683	change	every 500 hours
5	Safety air filter cartridge	12684	clean	every 500 hours
6	Hydraulic oil filter cartridge (exhaust)	09689	change	every 500 hours
7	Hydraulic oil filter cartridge (suction)	09688	check	every 1000 hours
8	Air filter cartridge for cab	09371	check	every 1000 hours
9	Engine belt	15586	check	every 1000 hours
10	Hydraulic oil tank venting	12734	check	every 500 hours

1. Lubricants to be used on forklift truck

parts to be lubricated	recommended product	quantity
I.C. engine	SHELL Rimula Ultra Special 228,5	16 litres
Transmission hydraulic oil tank	SHELL Tellus S2 V 46	210 litres
Front axle gear	SHELL Donax TD 5W-30	2.8 litres
Front axle	SHELL Donax TD 5W-30	11 litres
Rear axle	SHELL Donax TD 5W-30	11 litres
Front – rear wheel hub reduction gear	SHELL Donax TD 5W-30	1.6 litres
Slewing ring bearing pinion rotation reduction gear	SHELL Omala S2 G 150	2 litres
Main greasing points	Shell Retinax HD2	q.s.
Telescopic boom friction points	Grease L Moly EP 2	q.s.
Cooling circuit	Carix Premium HD G 05	20 litres
Fuel tank	-	200 litres

2. I.C. engine fuel

It is advisable to use gas oil fuel conforming to the following standards:

- ✓ DIN E 590 DERV (class A-F and 0-4)
- ✓ BS2869 Class A2 (Off highway, gas oil, red diesel)
- ✓ ASTM D975-91 Class 1-1DA and Class 2-2DA
- ✓ JIS K2204 (1997) Grades 1, 2, 3 and special grade 3
- ✓ Diesel fuel mix with 5 vol% RME in accordance with proposal 51606 JIS J2203



2.1. Refuelling I.C. engine

- ✓ **Do not smoke or go near the engine with a flame during this operation.**
- ✓ Switch off the vehicle's I.C. engine;
- ✓ Unlock the cap by means of the key provided for the purpose;
- ✓ Unscrew the tank filler cap;
- ✓ Fill fuel in the tank;
- ✓ Refit and lock the filler cap;



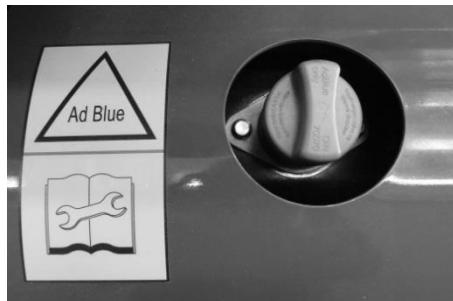
3. NOx reducing agent for Diesel engines provided with SCR catalyst

Use of a NOx reducing agent for Diesel engines is recommended

- ✓ AdBlue® conforming to requisites of ISO 22241-1:2006 and DIN 70070.

3.1. Refuelling AdBlue®

- ✓ Switch off the vehicle's I.C. engine;
- ✓ Unscrew the tank filler cap;
- ✓ Fill the tank with AdBlue®;
- ✓ Refit and lock the filler cap;



4. Checks during 1° service

part	checks
Engine	Change oil
	Replace oil filter
	Replace fuel pre-filter
	Replace fuel filter
	Checking the seals: Power supply injection
	Check cooling circuit
	Check belt for wear
	Replace engine oil filter
	Replace fuel filter
Hydrostatic transmission	Replace hydraulic oil filter cartridge (suction)
	Replace transmission pump inlet oil filter
	Check hydraulic oil level and top up if necessary
	Check transmission control registration
Axles and gearbox	Change differential oil
	Change reduction gears oil
	Grease pins, joints and controls
	Change gearbox oil
	Grease oscillation
Hydraulic circuit	Change return filter
	Check oil level
	Check hydraulic system hose pipes and connection seals
Service and parking brakes circuit	Check service brakes
	Check parking brake
	Check brakes fluid level
Telescopic boom	Grease the extensions
	Grease all the joining axes
	Check locking of sliding blocks
Accessories	Check to ensure the correct working of the accessories
Diagnostics	Instrumental check of machine diagnostic control system
	Check the working of the controls onboard
	Check the working to ensure it responds to the controls onboard
Cab air conditioning system	Check the working of the air conditioner
	Check the air conditioning system gas circuit pressure
	Check the working of the heating system
Electrics and lighting	Check the working of the electrical system
	Check the working of the headlights and direction indicators
	Check the working of the emergency lights
Wheels	Check the tread depth on wheel tyres
	Check the tyre pressure
	Check the wheels fixing nuts tightening torque
Hydraulic system	Check the working of the hydraulic system with rated load
	Check the sealing of the joints and condition of the hose pipes
Steering and braking system	Check working on the road and compliance of the systems
Mechanics	Check the mechanical parts and the chassis to make sure it is intact
	Check the welds and joints
	Visual inspection of the machine to make sure the configuration corresponds
	Check the jointed heads and that the tie-rods are intact
	Check for worn and rusted parts on the chassis and bodywork
	Check the working of the cab door and engine compartment doors
	Function test of telescopic boom
	Functional test of stabilizers
	Check the rear view mirrors to make sure they are intact
	Check the wheels fixing nuts tightening torque

5. Vehicle maintenance frequency

Par.	frequency
A	Every 10 hours of operation
A1	Check the I.C. engine oil level
A2	Check or clean the fuel pre-filter
A3	Engine cooling system: check and restore the level of liquid and anti-corrosion and anti-freeze protection
A4	Check the greasing of the telescopic boom sliding blocks
A5	Check the safety system
B	Every 50 hours of operation
B1	Check the hydraulic and transmission oil level
B2	Check the tyres pressure and tightening of the wheel nuts
B3	Clean the radiator grille of the I.C. engine cooling system
B4	Clean and grease the telescopic boom wear sliding blocks
B5	Clean and grease the telescopic boom rotation fulcrum pin
B6	Clean and grease the pins of the forks inclination cylinder on the rod side and bottom plate
B7	Clean and grease the pins of the lift cylinder on the bottom plate and rod side
B8	Clean and grease the compensation cylinder pins on the bottom plate and rod side
B9	Clean and grease the front axle oscillation bushings
B10	Clean and grease the rear axle oscillation bushings
B11	Clean and grease the cross journals and universal joint of the transmission shaft on the front and rear side
B12	Check the seals of the connections and the condition of the hose pipes of the hydraulic system
C	Every 250 hours of operation
C1	Check the ribbed belt for wear
C2	Type of damage or deterioration which may appear on the ribbed V-belt over time
C3	Disassembling/assembling ribbed belt
C4	Check the front and rear axle differential oil level
C5	Check the front and rear wheels reduction gears oil level
C6	Check the oil in the 2-speed reduction gear on the front axle
C7	Check the battery electrolyte level
C8	Recharge the battery
C9	Lubrication of front levelling cylinders pins
C10	Lubricate the front and rear pivot upper and lower joint
D	Every 500 hours of operation
D1	Replace the engine suction air filter primary cartridge
D2	Replace the cab air filter
D3	Replace the fuel filter cartridge (fitted in the engine compartment)
D4	Replace transmission pump inlet oil filter
D5	Replace hydraulic oil filter cartridge
D6	Clean hydraulic and transmission oil breezer
D7	Change oil engine
D8	Replace engine filter
D9	Clean air conditioning system evaporator radiator
D10	Replace the fuel filter cartridge
D11	Fill engine lubricant oil
D12	Check the nuts and fixing screws of slewing ring bearing and turret
D13	Check, clean and lubricate chains
E	Every 1,000 hours of operation
E1	Drain and replace hydraulic and transmission oil
E2	Drain and replace front and rear axle differential oil
E3	Drain and replace front and rear wheels reduction gears oil
E4	Drain and replace the oil in the 2-speed reduction gear on the front axle
E5	Clean fuel tank
E6	Check the telescopic boom sliding blocks for wear
F	Every 1500 hours of operation
F1	Replace the engine suction air filter safety cartridge
H	Every 2000 hours of operation
H1	Check engine valve

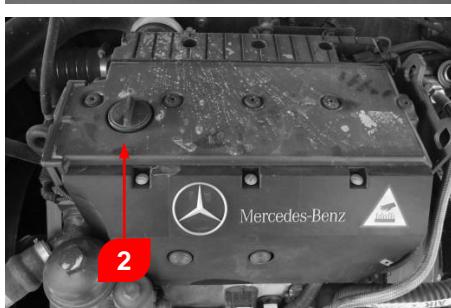
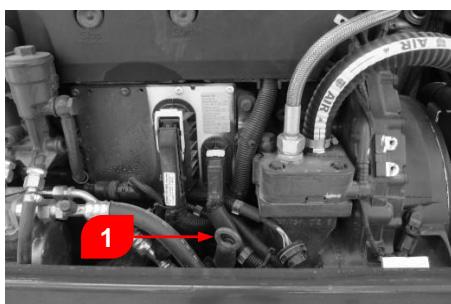
H2	Check injectors
H3	Check alternator and starter motor
H4	Check turbo compressor
H5	Change coolant
S	Occasional maintenance and actions
S1	Changing a wheel
S2	Towing the forklift truck
S3	Loading the forklift truck on a vehicle
S4	Transporting the forklift truck on a trailer
S5	Loading the forklift truck on a trailer
S6	Adjusting the front lights
S7	Bleeding the rear service brakes system
S8	Bleeding the front service brakes and parking brakes system

A	Every 10 hours of operation
A1	Check the I.C. engine oil level

The engine is generally filled with oil when it is delivered from the factory.

These excellent quality engine oils facilitate running in and make it possible to change the oil the first time at the maintenance intervals prescribed for normal operation. It therefore becomes superfluous to use special oils for initial working and consequently a supplementary oil change is not required. Moreover, it is only by using engine oils conforming to the indications in this Use and Maintenance Manual that longer maintenance intervals can be obtained.

- ✓ Before checking the engine oil level, make sure the I.C. engine is switched off and that the truck is on a horizontal surface;
- ✓ For precise indications, wait a few minutes for the engine to stop so that the oil flows into the engine casing;
- ✓ Remove the level indicator **1** and check the oil level after cleaning;
- ✓ Check the oil level and, if necessary, pour engine oil through the filler opening **2** up to the max. notch on the oil level indicator rod.



A2	Check or clean the fuel pre-filter
-----------	------------------------------------

- ✓ Open the tank cap and discharge the overpressure;
- ✓ Clean the outside of the fuel prefilter **1** and cover the hose pipe/s that may be present under the prefilter;
- ✓ Unscrew the screw cap and remove it from the filter body together with the cartridge;
- ✓ Clean the screw cap and the filter cartridge;
- ✓ Check the sealing ring of the screw cap and replace it if necessary;
- ✓ Insert the filter cartridge in the screw cap and screw the cap on the filter body. Tightening torque: 25 Nm.
- ✓ **There is high risk of fire when handling fuels as these are highly inflammable products;**
- ✓ **It is forbidden to smoke, use naked flames or carry out operations that cause generation of sparks, when handling fuels;**
- ✓ **Dispose of the used filter cartridges, gaskets and fuel residues in conformity with the regulations in force in the place of use;**
- ✓ Change the filter cartridge **3** in case of persistent smears or damage.



A3	Engine cooling system: check and restore the level of liquid and anti-corrosion and anti-freeze protection
----	--

The cooling liquid consists of a mixture of water and anticorrosion/antifreeze liquid. For adequate anti-corrosion protection and to increase the boiling point, the coolant must remain in the cooling system throughout the year.

The anti-corrosion protection of the coolant gets reduced over time.

Therefore, the coolant must be changed every 3-5 years, depending on the type of anti-corrosion liquid and anti-freeze approved by Mercedes-Benz.

Water free of additives cannot be used as coolant even if anti-freeze characteristics are not required. The water used for the coolant must satisfy certain specific requirements which are not always found in potable water. Water having suitable quality features must be subjected to treatment.

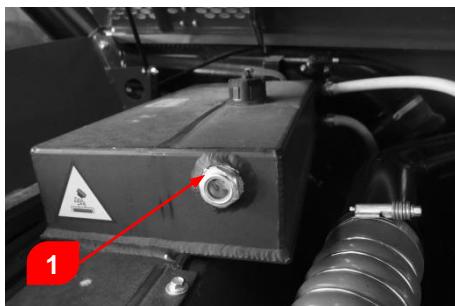
To avoid damage to the cooling system

- ✓ Use only anti-corrosion and anti-freeze liquids approved by Mercedes-Benz.

✓

The cooling system is pressurized. When the cooling system is opened, boiling coolant spray can come out of it, leading to risk of burns to the skin and eyes.

- ✓ **Open the cooling system only if the coolant temperature is less than 90 °C;**
- ✓ Turn the cap gently to discharge the pressure before opening;
- ✓ Use suitable protective gloves and glasses when working on the cooling system;
- ✓ Check the liquid level of the engine cooling system by checking the level indicator **1** present on the radiator tank. The level must be between the upper and lower limits of the indicator;
- ✓ If the level is below the lower limit, top up with coolant using the same type of liquid as that present in the radiator;
- ✓ Gently turn the radiator cap (Figure A3.2) counter-clockwise;
- ✓ **Never add cold coolant to the hot engine;**
- ✓ These series of operations must be performed when required or at least once a year before winter;
- ✓ **There is danger of poisoning if coolant is swallowed.**
- ✓ **Do not swallow coolant for any reason whatsoever.**
- ✓ **Do not pour the coolant in containers for drinking water or beverages.**
- ✓ **Keep the coolant out of the reach of children.**



A4	Check the greasing of the telescopic boom sliding blocks
----	--

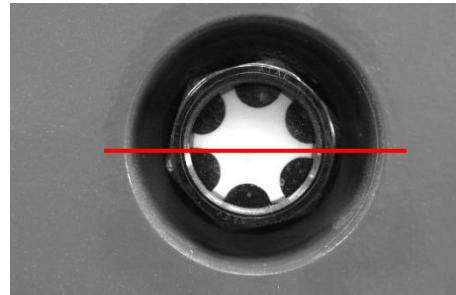
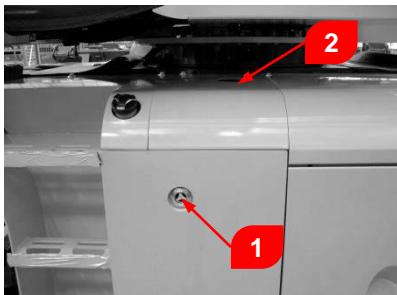
- ✓ Extend the telescopic boom completely and check to ensure the sliding blocks of the boom are greased correctly (in case of lack of lubrication see point **B5**).

A5	Check the safety system
----	-------------------------

- ✓ **Using a measuring tape and a level, check the boom length (L) and angle (A);**
- ✓ **Then check the working of the safety system by lifting a known weight, with forks with the boom closed, and check the load reading on the system to see if it correct;**
- ✓ **Extend the load (keeping it approx. 0.5m off the ground) and check to see that it reaches the limit predefined in the diagram and that the vehicle blocks the movements beyond the safety system limits.**



B	Every 50 hours of operation
B1	Check the hydraulic and transmission oil level
✓	Position the forklift truck to a level surface with the engine switched off, the telescopic boom retracted and lowered to the maximum possible extent and all the vehicle extensions retracted so that oil is not used by any part of the hydraulic system and the relative equipments that use oil;
✓	Check the oil level on the indicator 1 present on the side of the oil tank;
✓	The oil level is correct when it is above the red line;
✓	If necessary, add oil (see Lubricants Table) through the hydraulic oil filler opening 2 after unscrewing the filler cap.


B2 Check the tyres pressure and tightening torque of the wheel nuts

- ✓ Check the pressure of the tyres and adjust, if necessary.
- ✓ Check the tyres for cuts, protuberances, signs of wear, etc.
- ✓ Check to ensure that the wheel fixing nuts are tightened correctly **using a torque wrench**;
- ✓ If these instructions are not followed, there may be damage and breakage of the stud bolts fixing the wheels, resulting in dire consequences.
- ✓ Front and rear wheels tightening torque: **550 Nm**;
- ✓ Tighten the wheel nuts in the cross-wise sequence.


B3 Clean the radiator grille of the I.C. engine cooling system

- ✓ To prevent obstruction of the radiator by sand or mud deposits from reducing its radiation capacity, it must be cleaned to remove the material that may get deposited on the finned grille of the RH rear wheel arch or on the radiating mass of the radiator in the operating phase;
- ✓ The grille on the wheel arch and the radiator can be cleaned to remove mud, if any, using a compressed air jet or a high pressure water jet, depending on the type of deposit.

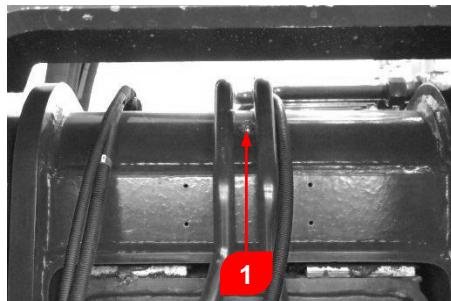


B4 Clean and grease the telescopic boom wear sliding blocks

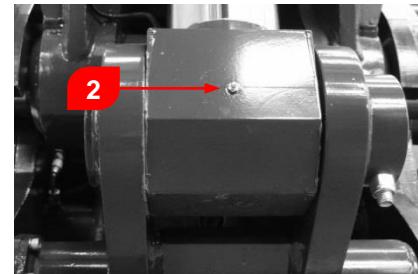
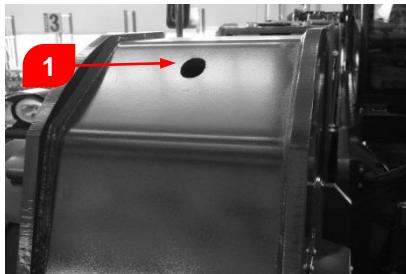
- ✓ Extend the telescopic boom completely;
- ✓ Clean the surfaces of the extension arms;
- ✓ Apply a layer of grease using a brush (see recommended lubricants Table) on the four sides of the telescopic boom on all the contact surfaces of the boom with the plastic sliding blocks which guide the booms;
- ✓ Operate the telescopic boom a number of times to distribute the grease uniformly;
- ✓ Wipe off excess grease;
- ✓ This operation must be carried out every week if the forklift truck has not yet reached 50 hours of weekly operation.**
- ✓ In case of operation in very dusty and oxidising atmosphere, reduce this frequency to 10 hours of operation or every day.


B5 Clean and grease the telescopic boom rotation fulcrum pin

- ✓ Clean the rotation fulcrum pin of the telescopic boom and lubricate in the two greasing points **1**.

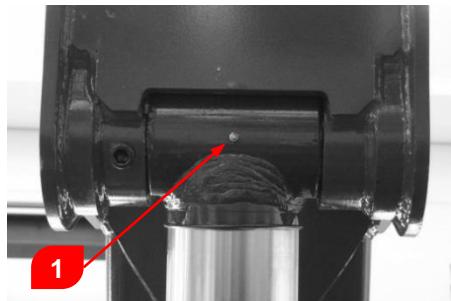

B6 Clean and grease the pins of the forks inclination cylinder on the rod side and bottom plate

- ✓ Grease the pins of the forks inclination cylinder present inside the top of the carriage rod, bottom plate side **1** and rod side **2**;

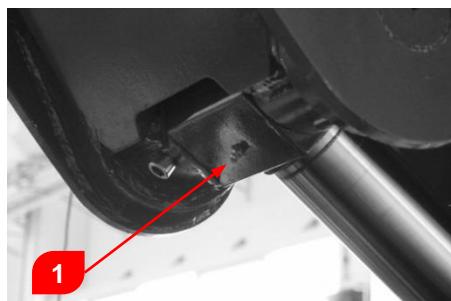


B7 Clean and grease the pins of the boom lift cylinder on the bottom plate and rod side

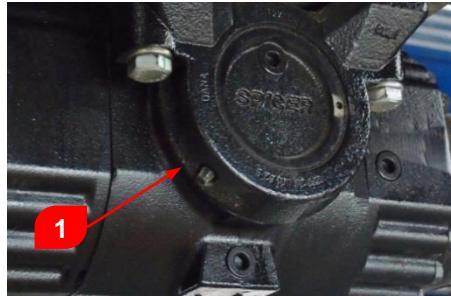
- ✓ Grease the pins of the rod side and bottom lift cylinder by means of grease nipples 1.


B8 Clean and grease the compensation cylinder pins on the bottom plate and rod side

- ✓ Grease the pins of the rod side and bottom compensation cylinder by means of grease nipples 1.


B9 Clean and grease the front axle oscillation bushings

- ✓ Lubricate the front axle oscillation bushes 1 by means of the grease nipples provided on both sides (front and rear side) of the axle oscillation hub.


B10 Clean and grease the rear axle oscillation bushings

- ✓ Lubricate the rear axle oscillation bushes by means of the grease nipples provided on both sides (front and rear side) of the axle oscillation hub;

B11 Clean and grease the cross journals and universal joints of the transmission shaft

- ✓ Use the grease nipples present, and repeat for all the joints.



B12 Check the seals of the connections and the condition of the hose pipes of the hydraulic system

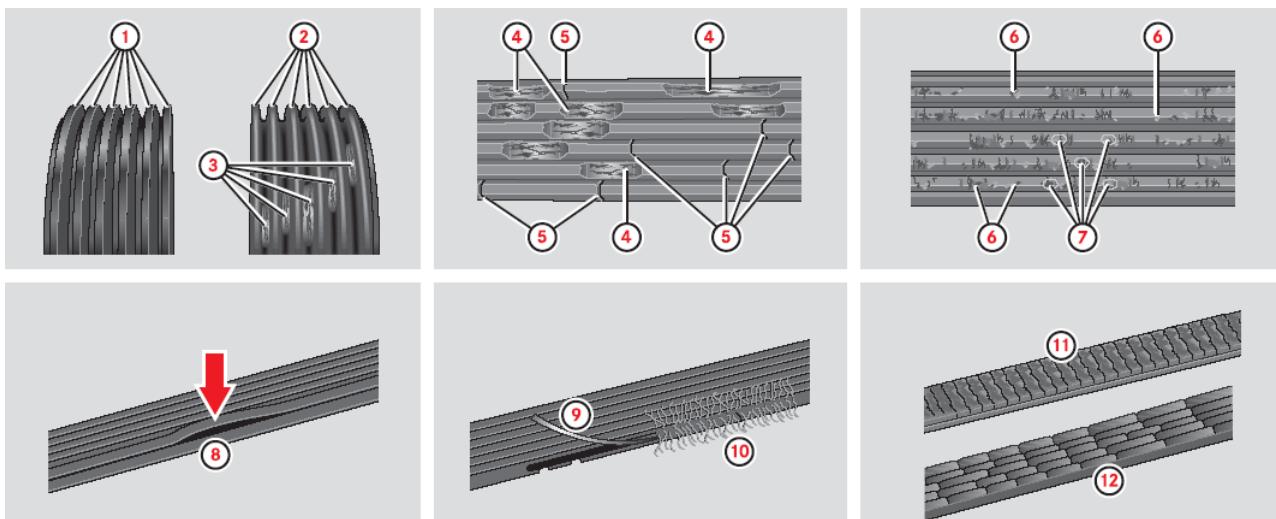
- ✓ All the connections of the hydraulic pipes and hoses must be inspected visually for hydraulic leaks.
- ✓ All the hydraulic hoses must be inspected visually for abrasions or deterioration which could affect the working.
- ✓ In case of leaks from the connections or deterioration of piping, contact your Dealer or the nearest Assistance Workshop for replacement.

C	Every 250 hours of operation
C1	Check the wear on the ribbed V-belt of the radiator and alternator fan

- ✓ The tension of the radiator and alternator fan belt is adjusted and maintained by an idle pulley adjusted by a tension spring. Consequently the belt tension does not require adjustments; however the belt condition must be inspected visually.



C2	Type of damage or deterioration which may appear on the ribbed V-belt over time
-----------	---



- 01) New belt (in comparison; V-ribbing);
 02) Wear on sides: wedge-shaped ribbing;
 03) Structure visible at the bottom of the ribbing;
 04) Breakage of ribbing;
 05) Transverse cracks in various ribs;
 06) Rubber modules at the bottom of the belt;

- 07) Dirt or gravel deposits;
 08) Ribbing detached from the bottom of the belt
 09) Torn threads on the side of the structure;
 10) Outer threads of structure frayed;
 11) Transverse cracks on the back;
 12) Transverse cracks in various ribs

C3	Disassembling/assembling the ribbed belt
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The belt tensioner device is provided with a spring tensioning system;

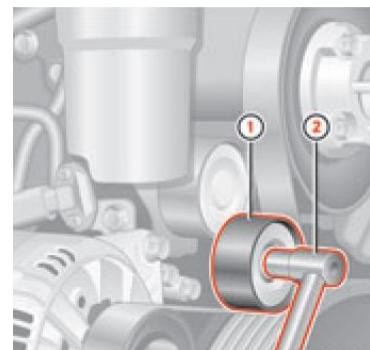
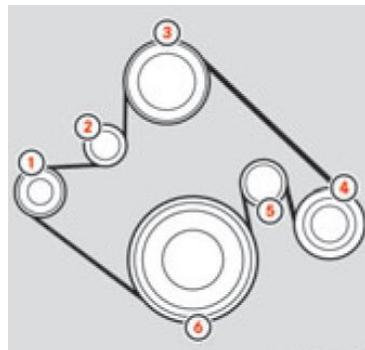
When the device is released or put under tension, there is danger of injuries if the hands or the fingers remain crushed or trapped between the elements in the pre-load state;

- ✓ Therefore, it is advisable to act on the belt tensioner device with utmost caution;
- ✓ Take utmost care to use the accessory correctly.
- ✓ Engage the release lever with the extension and the 15m pipe wrench of the belt tensioner device.
- ✓ Tilt the belt-tensioner roller upwards and remove the ribbed V-belt.
- ✓ Reposition the belt-tensioner device;
- ✓ Check to make sure the belt tensioner device and the pulleys are in perfect condition (for example, that there are no worn bearings of the belt tensioner device, of the belt tensioner roller and of the return rollers and that the profile of the pulleys is not worn); if necessary, replace the components;



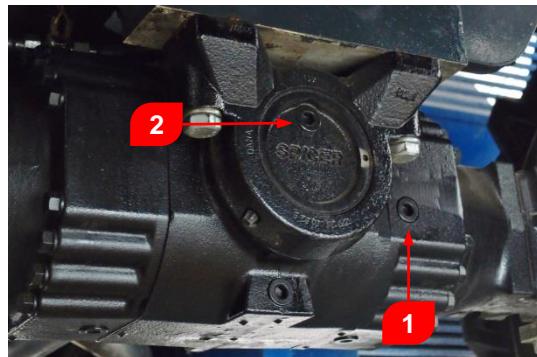
- ✓ Position the ribbed V-belt (new) on all the pulleys, with the exception of the belt tensioner roller (observe the Figures which show the route of the ribbed V-belt);
- ✓ Lift the belt tensioner roller by means of a lever, apply the ribbed V-belt on the belt tensioner roller, then move the roller back;
- ✓ Remove the release lever and check to ensure the ribbed V-belt is housed properly on the pulleys.

- 1) Alternator
- 2) Belt tensioner roller
- 3) Coolant pump
- 4) Refrigerator compressor
- 5) Return roller and drive roller
- 6) Motor shaft



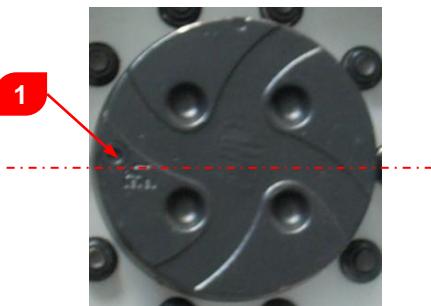
C4 Check the front and rear axle differential oil level

- ✓ Position the truck on a horizontal surface with the engine stopped;
- ✓ Check the oil level of the differential of the front axle;
- ✓ Remove cap 1;
- ✓ The oil must flow out through the opening;
- ✓ If this does not happen, top up with oil through the filler hole 2;
- ✓ Repeat this operation for both differentials.



C5 Check the front and rear wheels reduction gears oil level

- ✓ Position the truck on a horizontal surface with the I.C. engine switched off;
- ✓ Place cap 1 in the horizontal position and cap 2 at the top as shown in the Figure;
- ✓ Remove the cap 1 and check to make sure the oil level is at the lower limit of the threaded hole diameter;
- ✓ Add oil through cap 2, if necessary (see Lubricants Table for the type of oil);
- ✓ Close caps 1 and 2;
- ✓ Repeat this operation on the reduction gear of each wheel.



C6 Check the oil in the 2-speed reduction gear on the front axle

- ✓ Position the forklift truck on a horizontal surface with the engine stopped and the oil in the reduction gear still hot;
- ✓ Remove cap 1 and check to see if the oil flows out through the hole;
- ✓ Add oil if necessary;
- ✓ Screw on cap 1.

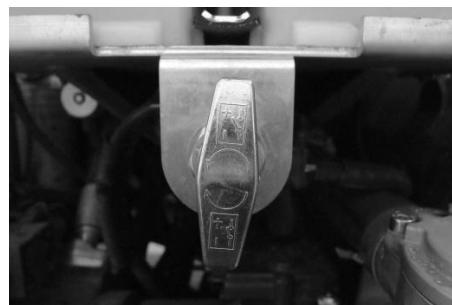
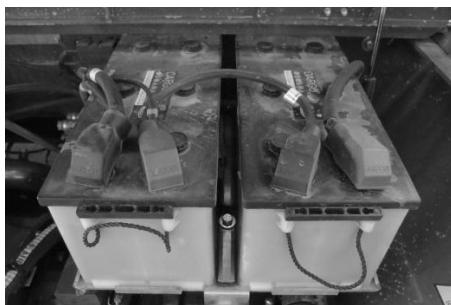

C7 Check the battery electrolyte level

- ✓ Check the level of electrolyte in the battery every 250 hours;
- ✓ In case of high ambient temperature, check the level more frequently.
- ✓ Check the connecting terminals and ensure they are tightened properly;

The acid contained in the batteries causes burns due to corrosion in case of contact with the skin and eyes.



- ✓ **Avoid contact with the skin, eyes or clothing.**
- ✓ **Wear protective gloves and glasses as well as suitable protective clothing since the battery acid can pass through normal clothing.**
- ✓ **Immediately rinse acid sprays with clean water and, if necessary, see a doctor.**
- ✓ Check the electrolyte level regularly and, if necessary, top up with demineralised or distilled water.
- ✓ Never top up with sulphuric acid;
- ✓ If the voltage at the battery poles is less than 12.3 V, the battery must be charged;
- ✓ In case of prolonged shutdown of the vehicle, disconnect the battery by activating the lever concerned. Turn it counter-clockwise for detachment, and clockwise for connection.


C8 Recharge the battery

During winter the batteries must be subjected to maintenance and recharged more frequently.

The acid contained in the batteries causes burns due to corrosion in case of contact with the skin and eyes.



- ✓ **Avoid contact with the skin, eyes or clothing.**
- ✓ **Wear protective gloves and glasses as well as suitable protective clothing since the battery acid can pass through normal clothing.**
- ✓ **Immediately rinse acid sprays with clean water and, if necessary, see a doctor.**

The gas generated by the batteries can explode causing injuries to persons. Therefore:

- ✓ **Do not smoke, do not use naked flames and unprotected light and avoid operations which result in the formation of sparks near the batteries.**
- ✓ The maximum charging level can be obtained only by carrying out accurate maintenance and limiting current consumption. At low temperatures the start-up capacity is reduced to a considerable extent; at 10 °C, for example, it is not more than approx. 60% of the normal capacity;
- ✓ If the engine remains idle for a long period, it is advisable to store the batteries in a heated room;
- ✓ **While recharging, make sure the room is well ventilated.**

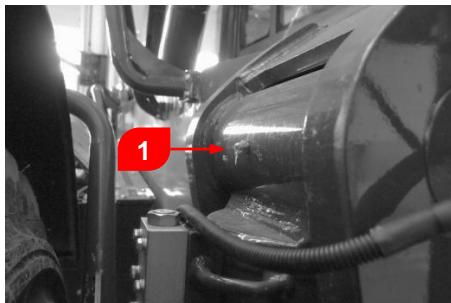


Recharge as follows:

- ✓ Remove the caps;
- ✓ The battery must be recharged only with continuous current;
- ✓ Connect the positive wire (+) of the battery charger to the positive pole (+) of the battery and the negative wire (-) of the battery charger to the negative pole (-) of the battery;
- ✓ Recharge with a current 1/10 of the rated capacity (Ah) of the battery;
- ✓ The battery will be charged completely when the density of the acid is 1.28 (1.23 for tropical countries);
- ✓ After recharging, switch off the battery charger before disconnecting the battery.
- ✓ Check the electrolyte level.

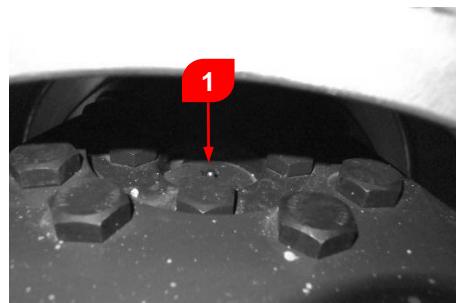
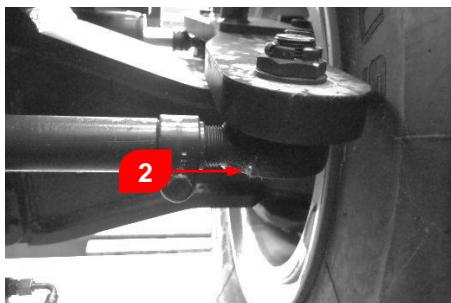
C9 Lubrication of front levelling cylinders pins

- ✓ Position the truck on a horizontal surface with the wheels aligned in relation to the longitudinal axis of the vehicle and the engine switched off;
- ✓ Lubricate the pins of the front levelling cylinders by means of grease nipples 1 provided on the side of the bottom plate and grease nipples 2 on the side of the rod;



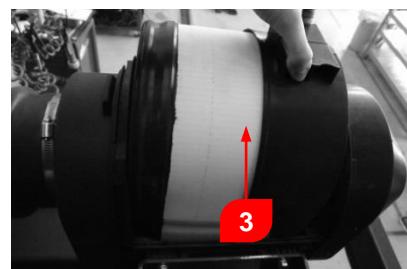
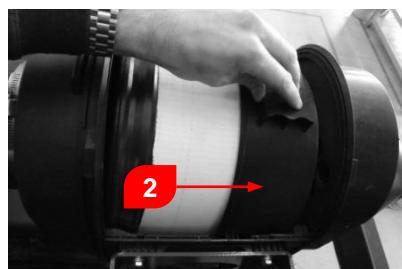
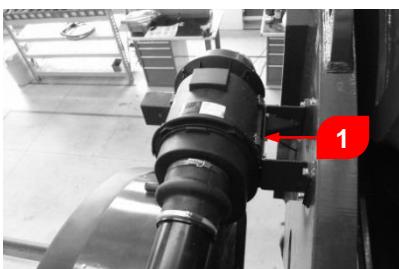
C10 Lubricate the front and rear pivot upper and lower joint

- ✓ Position the forklift truck on a horizontal surface with the engine stopped and the telescopic boom completely raised;
- ✓ Access the inner part of the wheels and lubricate the grease nipples 1 present on the upper and lower part of the wheel hub.
- ✓ Lubricate the pins of the guide rod of the steering by means of the grease nipples 2.



D	Every 500 hours of operation
D1	Replace the engine suction air filter primary cartridge

- ✓ The filter consists of two elements; the primary filter which must be replaced every 500 hours of operation and the safety filter which must be replaced every 1500 hours of operation (every three replacements of the primary filter).
- ✓ Open the filter casing by releasing the four catches **1** present on the sides of the cover;
- ✓ Pull the filter in the direction of the arrow **2** to remove it from its seat;
- ✓ Remove the filter in the direction of the arrow **3** to remove it from the filter casing;
- ✓ Replace the filter with one of the same type and having the same code (check code in spare parts list);
- ✓ Repeat the operations described above in reverse sequence for the assembly;
- ✓ The forklift truck must never be started up unless the filter is fitted in its place;**
- ✓ Never wash paper filters; simply replace the filter during periodic maintenance or if the machine display indicates a clogged filter;**



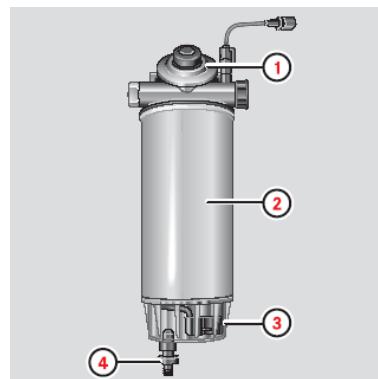
D2	Replace the cab air filter
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- ✓ The air let into the cab is first filtered at the inlet by an anti-pollen anti-dust filter present in the rear hood of the driver's cab;
- ✓ Unscrew the four fixing screws on the frame around the filter;
- ✓ Remove the filter from its seat;
- ✓ Replace with a new filter of the same type, checking to ensure it is fitted in the correct direction;
- ✓ Refit the surrounding frame and tighten the four fixing screws.



D3	Replace the fuel filter cartridge
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- ✓ Open the water drainage valve **4** and collect the water+fuel mixture coming out of the filter cartridge in a container;
- ✓ Unscrew the filter casing **2**;
- ✓ Unscrew the water separator **3** from the filter casing and clean it; replace it when necessary;
- ✓ Open the water drainage valve **4** and the bleed screw and collect the water+fuel mixture coming out of the filter cartridge in a container;
- ✓ Screw the filter body **2** manually back on the filter cup;
- ✓ Close the drainage valve and refill the pre-filter by means of a manual fuel pump **1**. Then close the bleed screw;
- ✓ Start up the engine and proceed with bleeding the supply system.



- ⌚ 1 Manual fuel pump
- ⌚ 2 Filter body
- ⌚ 3 Water trap
- ⌚ 4 Water drainage valve

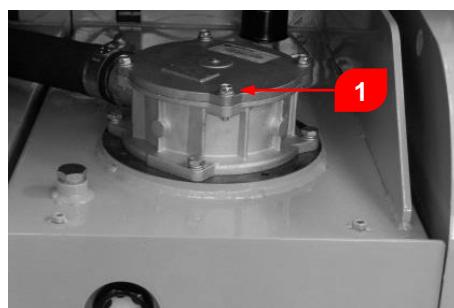
D4 Replace transmission pump inlet oil filter

- ✓ The transmission pump inlet oil filter is positioned on the RH side of the engine hood;
- ✓ Stabilize the vehicle, lift and extend the boom completely to lower the oil level in the tank; then switch off the engine;
- ✓ Slacken and remove the four fixing screws 1;
- ✓ Clean the filter cover thoroughly ensuring there is no residue or detritus to prevent possible internal contamination of the hydraulic circuit;
- ✓ Replace the oil filter with one of the same type (see code in Spare Parts);
- ✓ Close the lid repositioning it correctly and fitting the four fixing screws;
- ✓ Start up the truck and check for leaks.



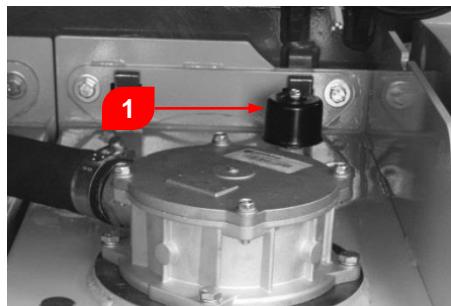
D5 Replace hydraulic oil filter cartridge (exhaust)

- ✓ Slacken the 4 screws for fixing the cover on the filter;
- ✓ Remove the cover and replace the used cartridge with a new one having similar features (see Table: Filter elements and belts);
- ✓ Before refitting the filter cover using the screws, check to ensure the cartridge is fitted correctly.

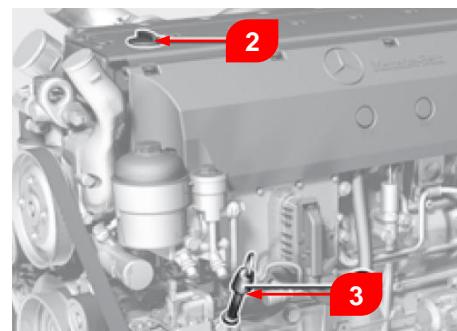
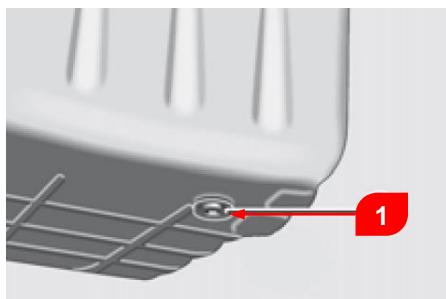


D6 Clean hydraulic and transmission oil blow-off

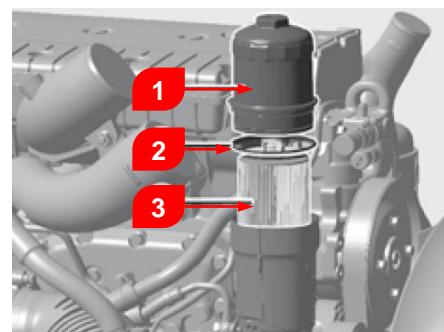
- ✓ Unscrew the bleed screw positioned on the oil tank and replace it with one having similar features (see Filter elements Table);
- ✓ Fit the new bleed screw manually.

**D7 Change engine oil**

- ✓ Carry out the following operations with the engine hot to allow the oil to flow out;
- ✓ Position the vehicle on a flat surface with the engine switched off;
- ✓ Open the engine compartment hood;
- ✓ Place a suitable container under the engine below the drainage cap to avoid spilling the spent lubricant;
- ✓ Unscrew the drainage cap **1** at the centre of the oil cup, in the lower part of the engine;
- ✓ Let the oil flow out completely from the engine and avoid dumping it in the environment;**
- ✓ Check to make sure the O-Ring of the drainage cap is not damaged; replace it if necessary;
- ✓ Fit the oil drainage cap **1** and tighten it using a 60 Nm torque;
- ✓ Fill oil in the engine through the filler cap **2** checking the level a number of times on the rod **3**;
- ✓ Dispose of the used oil in accordance with the regulations in force in the country in which the vehicle is used.

**D8 Replace engine oil filter**

- ✓ Carry out the following operations only with the engine at normal operating temperature;
- ✓ Unscrew screw cap **1**;
- ✓ Remove the screw cap together with the filter cartridge **3** and release the cartridge by pressing gently from the side on the lower edge.
- ✓ Replace the sealing ring **2** present on the screw cap. Grease the sealing ring slightly;
- ✓ Insert the new cartridge in the screw cap and press gently so that it clicks into place;
- ✓ Fit the screw cap together with the filter cartridge. Tightening torque: 40 Nm.
- ✓ Dispose of the used filter in accordance with the regulations in force in the country in which the vehicle is used;



D9 Clean air conditioning system evaporator radiator.

- ✓ Clean the evaporator present in the front compartment of the cab on the RH side by blowing compressed air on the radiant mass;
- ✓ Evaluate the type of dirt present on the radiator to see if it is necessary to wash it using a high pressure water jet;
- ✓ The air and water flow must enter from the radiator side and come out on the fan side.

**D10** Replace fuel filter

- ✓ Open the tank cap and discharge the overpressure;
- ✓ Clean the outside of the fuel filter and cover the hose pipe/s that may be present under the filter;
- ✓ Unscrew the screw cap 1 and remove it from the filter body together with the cartridge;
- ✓ Clean the screw cap and the filter cartridge;
- ✓ Check the sealing ring 2 and replace it if necessary;
- ✓ Replace the filter cartridge 3;
- ✓ Insert the filter cartridge in the screw cap and screw the cap on the filter body. Tightening torque: 25 Nm.
- ✓ There is high risk of fire when handling fuels as these are highly inflammable products;**
- ✓ It is forbidden to smoke, use naked flames and light or carry out operations that cause generation of sparks, when handling fuels;**
- ✓ Dispose of the used filter cartridges, gaskets and fuel residues in conformity with the regulation in force in the place of use;**

**D11** Fill engine lubricant oil

- ✓ Remove cap 1 present on the motor cover;
- ✓ Remove the oil level rod 2;
- ✓ Fill the engine with fresh oil through the filler opening 1 until the level reaches the max. notch on the oil level rod 2;
- ✓ Keep the engine running at minimum speed until the oil pressure appears on the display. Switch the engine off if the oil pressure is not displayed after about 10 seconds. Check for the cause of the display failure;
- ✓ Check the oil filter seal and drainage screw seal;
- ✓ Run the engine at minimum speed (nominal value transducer in minimum position) and observe the oil pressure indicator;
- ✓ Switch the engine off; after about 5 minutes, check the oil level and, if necessary, top up to the max. level notch on the oil level rod 2.



D12 Check the nuts and the fixing screws of the slewing ring bearing and turret

- ✓ Position the forklift truck on a flat surface with the I.C. engine switched off, without load and stresses due to external forces.

Nuts for fixing the turret on the slewing ring bearing:

- ✓ Carry out a visual inspection to make sure there are no problems with the nuts fixing the turret to the slewing ring bearing and use a torque wrench to check the fixing nuts;
- ✓ In case of problems:
 - Slacken the lock nuts **1** and check using a torque wrench that the nuts **2** are fixed by applying a **570 Nm** tightening torque;
 - at the same time, another operator must hold the head of the sunken cylindrical hex screws on the which the aforementioned nuts are screwed firm, accessing the lower part of the chassis to reach the head of the screws through the hole provided for the purpose;



Screws fixing the slewing ring bearing on the chassis:

- ✓ Carry out a visual inspection to make sure there are no problems with the screws fixing the slewing ring bearing to the chassis and use a torque wrench to check the sunken cylindrical hex head screws;
- ✓ In case of problems:
 - Check the torque for tightening the sunken hex screws by inserting the torque wrench in the hole provided **1** (tightening torque value: **570 Nm**).

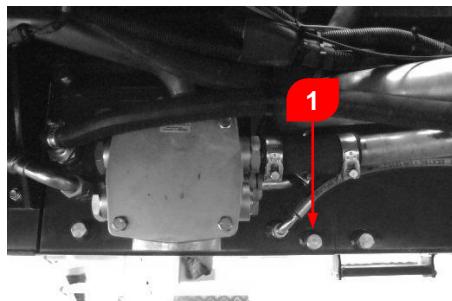


D13 Check, clean and lubricate chains

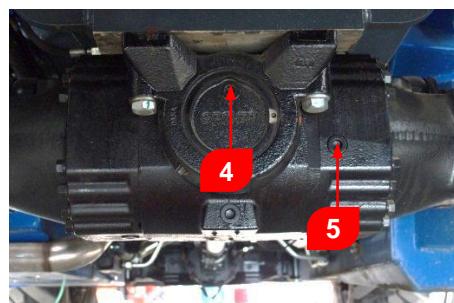
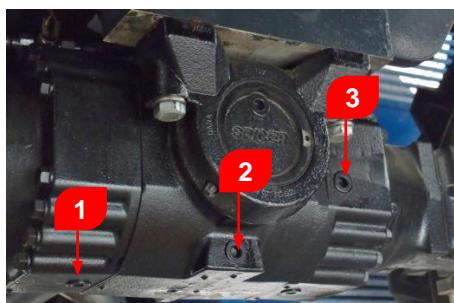
- ✓ Extend the telescopic boom completely;
- ✓ Clean the chain thoroughly to remove dirt that may have been deposited over time using a nylon brush and detergent (such as: fuel oil) in order to proceed with a visual inspection of the chains and check for possible deterioration that may have been caused by rubbing or other causes;
- ✓ Blow with compressed air on the chains to remove dust or residues trapped between the links;
- ✓ Lubricate the chains carefully with grease (see recommended greases in the Lubricants Table).

E Every 1000 hours of operation
E1 Drain and replace transmission hydraulic oil

- ✓ Before proceeding with these operations, make sure the truck is on a level surface and that the I.C. engine is switched off;
- ✓ Place a container under the drainage cap 1;
- ✓ Remove cap 1 and drain out the oil;
- ✓ When the tank is empty, remove the hydraulic oil filter as defined in paragraph D4;
- ✓ Fill the tank with oil to the level corresponding to the upper limit of the oil level indicator present on the outer wall of the tank;
- ✓ Dispose of the used oil in compliance with the regulations and legislation in force in the country concerned as regards management of industrial wastes, in compliance with the environment.

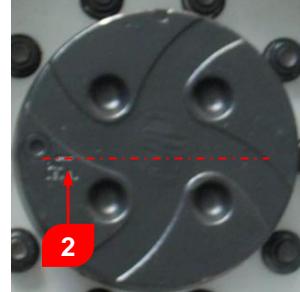
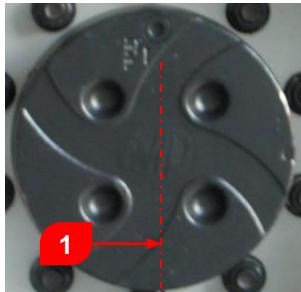

E2 Drain and replace front and rear axle differential oil

- ✓ Position the forklift truck on a horizontal surface with the engine stopped and the oil in the differential still hot;
- ✓ Place suitable containers under the 3 drainage caps 1, 2 and 3, and drain the oil out of the differential box;
- ✓ Remove the level and filler cap 4 and filler plug 5 to ensure complete drainage;
- ✓ Screw on the drainage caps 1, 2 and 3 at the end of the operation;
- ✓ Fill oil (see Lubricants Table) through the filler hole 5;
- ✓ The differential box is filled correctly the moment the oil starts flowing out through level hole 4;
- ✓ Check to make sure there is no leak from the drainage caps;
- ✓ Screw and tighten level cap 4;
- ✓ Repeat the operation for both differentials (front and rear);
- ✓ Dispose of the used oil in compliance with the regulations and legislation in force in the country concerned as regards management of industrial wastes, in compliance with the environment;


E3 Drain and replace front and rear wheels reduction gears oil

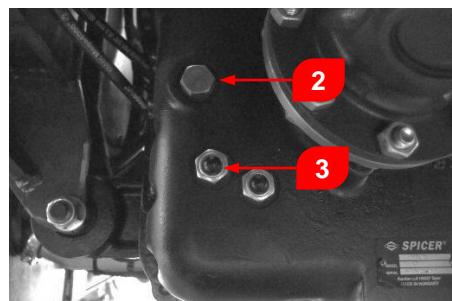
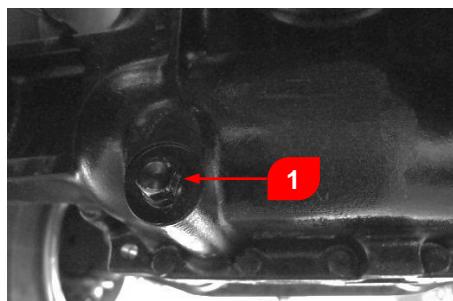
- ✓ Position the forklift truck on a flat surface with the engine stopped and the oil in the reduction gears still hot;
- ✓ Make sure the drainage cap is positioned below as indicated by arrow 1;
- ✓ Place a container under the drainage cap;

- ✓ Unscrew the cap and drain out the oil from the reduction gear;
- ✓ Turn the cap to the horizontal position as indicated by arrow 2;
- ✓ Fill oil in the reduction gear through the hole (for the type of oil, see Oils Lubricants Table). The level is correct when the oil flows out through the filler hole.
- ✓ Refit the screw cap and tighten it.
- ✓ Repeat this operation for each reduction gear.



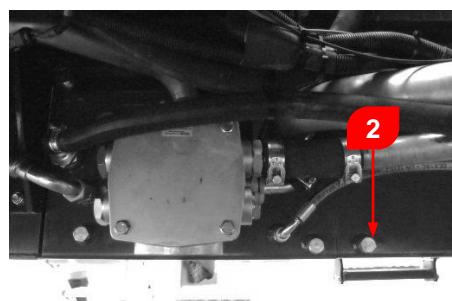
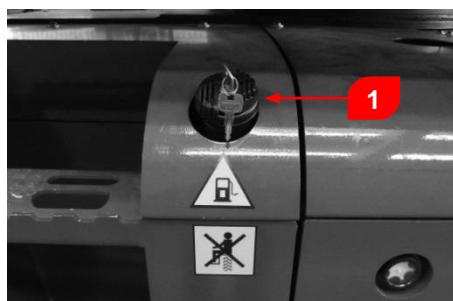
E4 Drain and replace the oil in the 2-speed reduction gear on the front axle

- ✓ Position the forklift truck on a horizontal surface with the engine stopped and the oil in the reduction gear still hot;
- ✓ Place a container under the drainage cap 1;
- ✓ Remove cap 1 and drain out the oil;
- ✓ Remove the filler cap 2 to ensure the gear is drained completely;
- ✓ Screw and tighten cap 1;
- ✓ Fill the reduction gear with oil (see Lubricants Table) through hole 2. The level is correct when the oil is visible through inspection window 3;
- ✓ Screw and tighten cap 2;
- ✓ Check for leaks from the drainage cap;
- ✓ Dispose of the used oil in compliance with the regulations and legislation in force in the country concerned as regards management of industrial wastes, in compliance with the environment.



E5 Clean fuel tank

- ✓ Do not smoke or do not go near the tank with a flame during this operation.**
- ✓ Position the truck on a horizontal surface with the engine stopped;
- ✓ Unscrew the tank filler cap 1 and place a suitable container under the drainage cap 2 and unscrew the cap;
- ✓ Allow the fuel to flow out and fill 10 litres of clean fuel through the filler opening to remove impurities, if any;
- ✓ Refit and lock the drainage cap 2;
- ✓ Fill the tank with clean fuel and close.

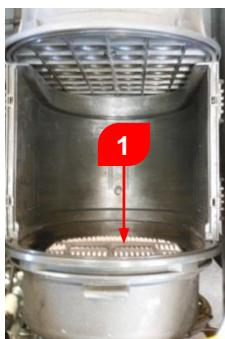


E6 Check the telescopic boom sliding blocks for wear

- ✓ For these operations, contact your Agent or Dealer.

F	Every 1500 hours of operation
F1	Replace the engine suction air filter safety cartridge

- ✓ Carry out all the operations described in paragraph D1 for removing the primary filter;
- ✓ Remove safety filter 1;
- ✓ Replace the safety filter 1 with a new one of the same type and code;
- ✓ Lubricate the safety filter perimeter with neutral silicon grease to make it easier to insert the filter in its seat;
- ✓ Reposition the safety filter taking care to ensure the protuberance 2 is in the seat present on the filter casing;
- ✓ Push the safety filter into its seat;
- ✓ The forklift truck must never be started up unless the filter is fitted in place;**
- ✓ Never wash the safety filter; always replace the filter during periodic maintenance;**



H	Every 2000 hours of operation
H1	Check the engine valves play
H2	Check injectors
H3	Check alternator and starter motor
H4	Check turbo compressor

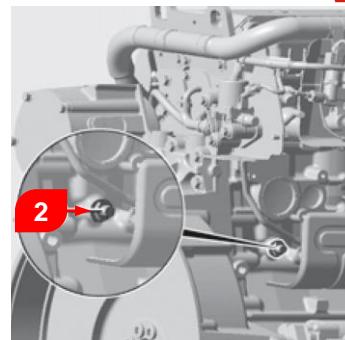
- ✓ For these operations, contact your Agent or Dealer.

H5 Change coolant

The cooling system is pressurized. When the cooling system is opened, boiling coolant spray can come out of it, leading to risk of burns to the skin and eyes.

- ✓ Open the cooling system only if the coolant temperature is less than 50 °C;
- ✓ First cover the ducts, etc. under the discharge screws and place a container suitably sized for the quantity of coolant;
- ✓ Turn the cap gently to discharge the pressure before opening;
- ✓ Use suitable protective gloves and glasses when working on the cooling system;**
- ✓ Collect the used coolant, detergent solutions as well as the rinse water, and dispose of in compliance with the environmental safety regulations in force in the country in which the engine is used.**
- ✓ This series of operations must be carried out as required or at least once a year before winter;
- ✓ Position the truck on a horizontal surface with the I.C. engine switched off and cold.
- ✓ Open the cap 1 gently to discharge pressure from the cooling system;
- ✓ With heating systems: open the heating temperature selectors (regulator valves);
- ✓ Protect the cables and piping near the bleed cap 2;
- ✓ Place a suitable sized container under the engine to collect the coolant;
- ✓ Connect a suitable sized tube to the drainage plug 2;
- ✓ Unscrew drainage cap 2 and pour the coolant in the container;
- ✓ After all the liquid is drained out, change the gasket of the drainage cap 2 and tighten the cap using a **60 Nm** torque;





H6 Fill the cooling system

- ✓ Prepare the coolant on the basis of the operating ambient temperature of the forklift truck, mixing water and glycol as defined by the Manufacturer's specifications;
- ✓ Fill the coolant system until the level is visible through the indicator provided at the top of the radiator;
- ✓ Start up the engine and let it run for about one minute at varying speed;
- ✓ Switch off the engine and if required, add coolant to the half way level of the indicator provided at the top of the radiator.

Dilution in volume	Freezing point obtained
25 %	- 10 °C
30 %	- 26 °C
40 %	- 17 °C
50 %	- 38 °C

S Occasional maintenance and actions

S1 Changing a wheel

The operations for changing a wheel involve special tools and highly qualified personnel. Therefore, contact your Dealer to receive assistance.

S2 Towing the forklift truck

- ✓ **The truck can be towed at very low speed for very short distances;**
- ✓ Set the reverse gear lever in the neutral position;
- ✓ Disengage the parking brake;
- ✓ Switch on the emergency lights;

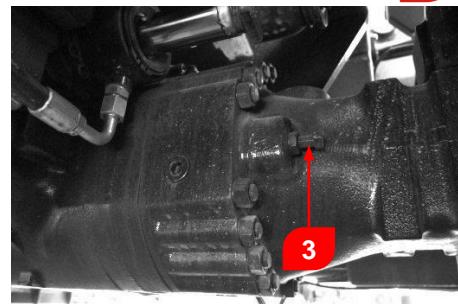
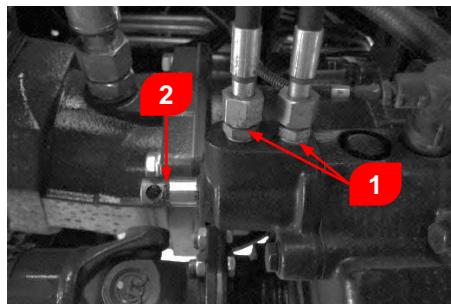


Position the gear manually in neutral:

- ➔ disconnect the hydraulic tubes 1 from the cylinder of the slow gear/fast gear change box and fit two screw caps in them;
- ➔ act on rod 2 of the gear box to bring it out to the neutral position (intermediate position between the two previous and next "clicks");

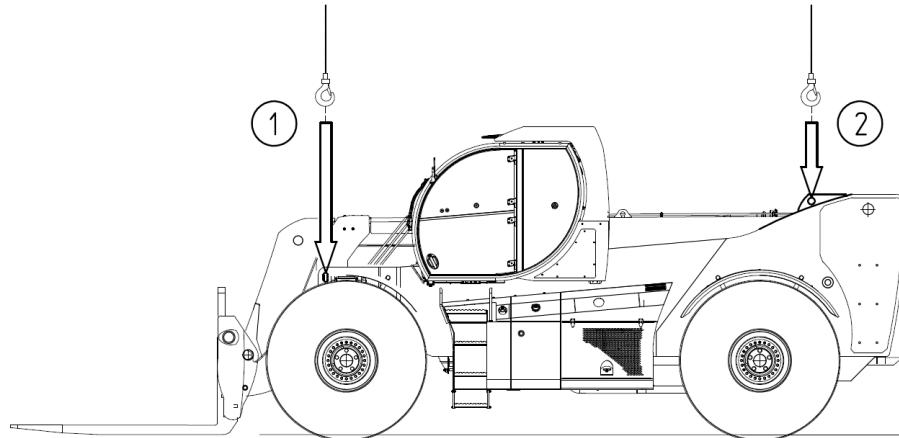
Disengage the negative brake:

- ➔ tighten the screws with lock nut 3 on the two sides of the front axle housing until they come to rest against the piston;
- ➔ rotate through one turn.
- ✓ If there is no hydraulic servo assistance of direction and at the brakes, act gently and strongly on these two commands;
- ✓ Avoid sudden jerky movements;
- ✓ The screws on the opposite sides must be tightened to the same extent.



S3 Loading the forklift truck on a vehicle

- ✓ Take into account the position of the centre of gravity of the forklift truck for lifting;
- ✓ Position the straps in the fixing seats meant for the purpose **1** and **2**.

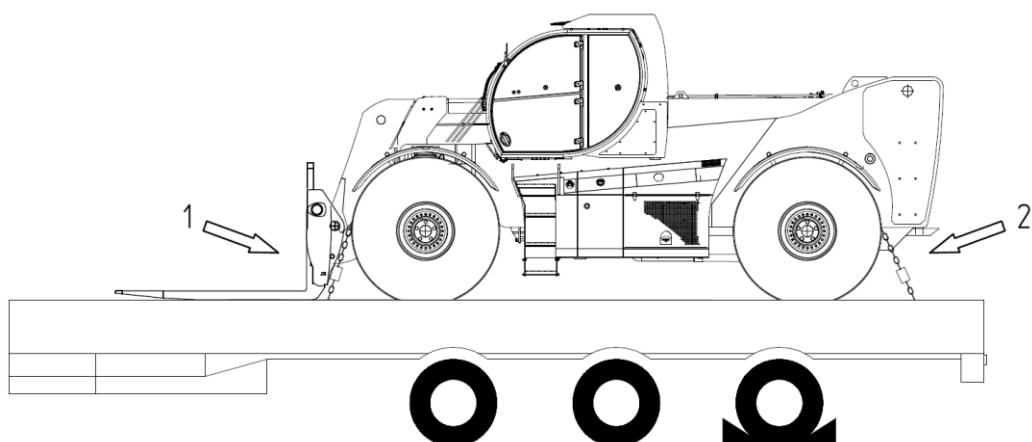


S4 Transporting the forklift truck on a trailer

- ✓ Check to ensure correct application of the safety instructions regarding the transport platform before loading the forklift truck, and ensure that the vehicle driver is aware of the dimensions and weight of the forklift truck;
- ✓ Make sure the dimensions and capacity of the platform are adequate for transporting the forklift truck;
- ✓ Check the permitted contact pressure with the ground regarding the platform in relation to the forklift truck;

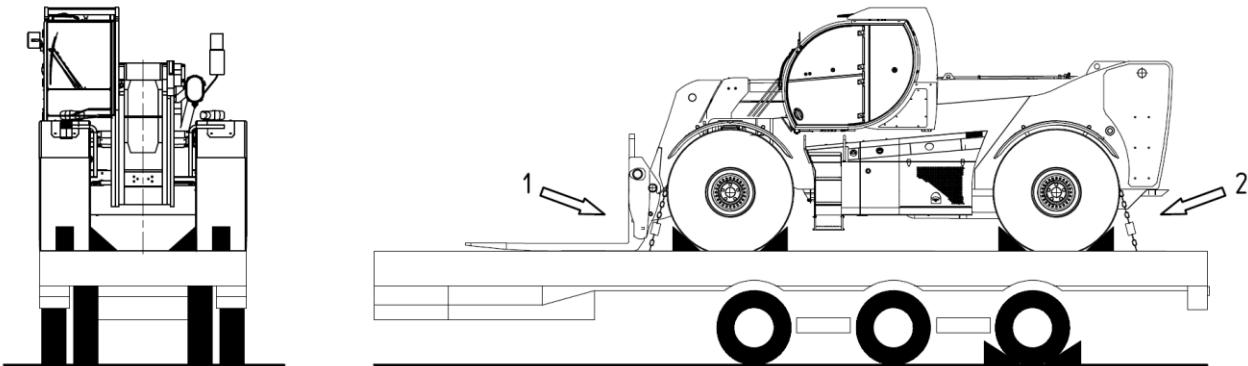
Loading the forklift truck

- ✓ Block the wheels of the transport platform;
- ✓ Fix the loading ramps to the platform in such a way as to obtain the lowest possible angle for the forklift truck to climb;
- ✓ Position the forklift truck parallel to the trailer platform;
- ✓ Switch off the forklift truck.



S5 Loading the forklift truck on a trailer

- ✓ Place wedges in front and behind each tyre of both axles;
- ✓ Secure the forklift truck on the platform by means of sufficiently resistant ropes, on the front of the forklift truck at the fixing points 1 and 2;
- ✓ Tighten the ropes.


S6 Adjusting the front lights

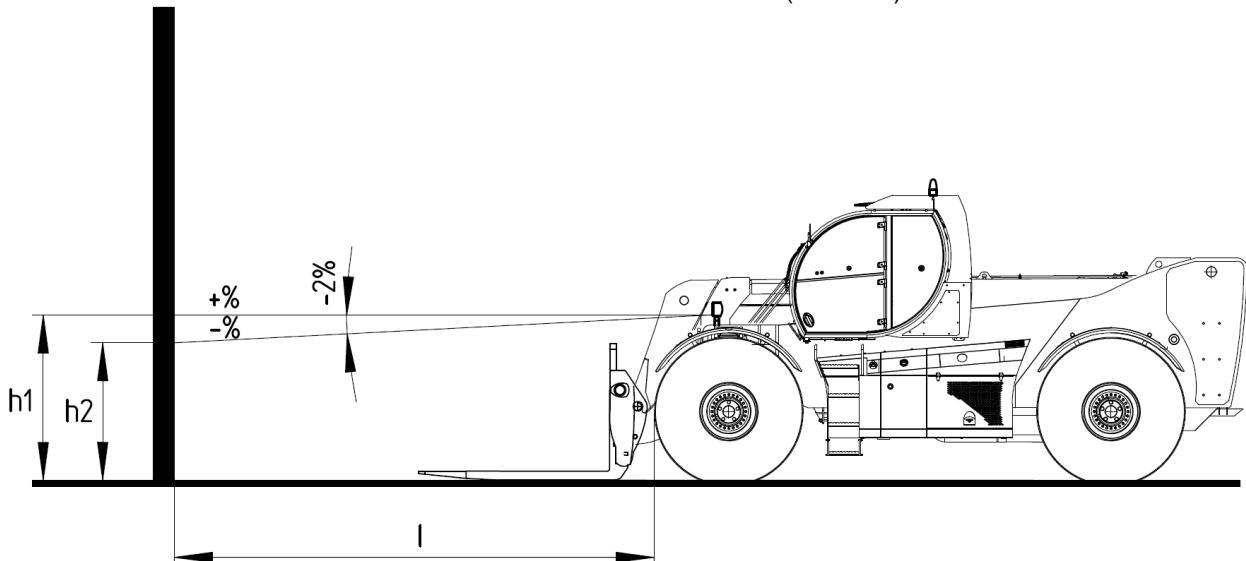
- ✓ Recommendations for adjustment (In accordance with standards ECE 75/756 76/761 ECE20).
- ✓ Adjusting the low beams by -2% with respect to the horizontal axis of the projector.

Adjustment procedure

- ✓ Position the forklift truck with load in the transport position, with the longitudinal axis perpendicular to a blank wall, on a flat horizontal floor;
- ✓ Check the pressure of the tyres and bring to correct operating pressure if necessary;
- ✓ Move the reverse gear lever to the neutral position and apply the parking brake;

Calculating the height of the low beams (h2) Fig. S6.1:

- ➔ h_1 = height of low beams with respect to the ground;
- ➔ h_2 = height of adjusted beam;
- ➔ I = Distance between the low beams and blank wall $h_2 = h_1 (I \times 2/100)$.

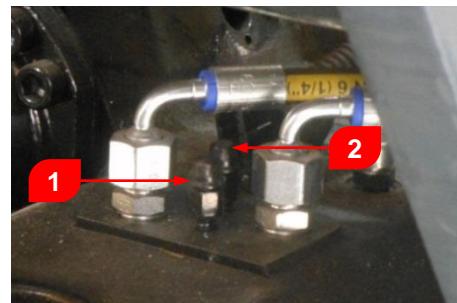


S7 | Bleeding the rear service brakes system

- ✓ To bleed the rear service brakes system, stand on the two sides of the rear axle;
- ✓ Remove the protective cap on the bleed connector **1**;
- ✓ Insert a transparent, suitable sized tube on the connector to drain the oil;
- ✓ Slacken the bleed connector and at the same time operate the brake pedal a number of times to bleed the system;
- ✓ Once the oil starts flowing out without air bubbles, close the connector and remove the tube used for drainage;
- ✓ Collect the drained oil after bleeding and dispose of in compliance with the environmental safety regulations in force in the place where the vehicle is used.


S8 | Bleeding the front service brakes and parking brakes system

- ✓ To bleed the front service and parking brakes system, stand on the two sides of the front axle;
- ✓ Two connectors are provided for bleeding: the outer **1** concerns the service brake, while the inner one **2** concerns the parking brake;
- ✓ Remove the protective cap on the bleed connectors **1** and **2**;
- ✓ Insert a transparent, suitable sized tube on the connector **1** to bleed the service brake circuit;
- ✓ Slacken connector **1** and at the same time operate the brake pedal a number of times;
- ✓ Once the oil starts flowing out without air bubbles, close the connector **1** and remove the tube used for drainage;
- ✓ Insert a transparent, suitable sized tube on the connector **2** to bleed the parking brake circuit;
- ✓ Slacken connector **2** and at the same time operate the parking brake a number of times;
- ✓ Once the oil starts flowing out without air bubbles, close the connector **2** and remove the tube used for drainage;
- ✓ Collect the drained oil after bleeding and dispose of in compliance with the environmental safety regulations in force in the place where the vehicle is used.



	U Trouble-shooting
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Problem	Cause	Solution
The pinion of the starter engine does not turn or turns very slowly	Battery charge insufficient	➔ Charge the battery
	The cable for connection with the starter engine is disconnected or slackened	➔ Tighten the cable completely on the terminal, weld a new terminal if necessary
	Problem with the electromagnetic circuit-breaker of the starter motor or starter motor failure	➔ Have it checked in a qualified workshop
The engine does not start up or stops immediately after it starts up	Fuel tank is empty	➔ Refuel
	Fuel filter clogged	➔ Replace the filter cartridge
	Water trap, prefilter or fuel filter clogged	➔ Clean/Replace
	Supply system or filter without seal	➔ Replace the gaskets
	Resistance features of fuel to cold insufficient	➔ Clean the prefilter ➔ Replace the fuel filter ➔ Use a winter fuel
The engine does not start up or stops immediately after it starts up	Engine oil viscosity not adequate	➔ Upgrade the viscosity of the engine oil to the conditions of use
The engine does not start up correctly	Fault in the working of the MR unit	➔ Read the MR unit memory; have it checked by a qualified workshop
	Sealing defect or insufficient pressure in low pressure circuit of the fuel	➔ Check the seal (inspection test); ➔ Have the pressure checked in a qualified workshop
The engine switches off without the stop being activated	MR control unit fault (total failure)	➔ Have it checked in a qualified workshop
	MR/ADM units power supply cut off or short-circuit in wiring	➔ Have it checked in a qualified workshop
	Sealing defect or insufficient pressure in low pressure circuit of the fuel or feed pump command failure	➔ Check the seal (inspection test); ➔ Have the pressure checked in a qualified workshop
The engine switches to operation in emergency mode	Interruption of MR/ADM control units data flow	➔ Read the faulty memory of the control unit ➔ Have it checked in a qualified workshop
The engine works "in jerks", vibrates or runs irregularly	Motor shaft position transducer or cams shaft fault or no signal	➔ Contact a qualified workshop
	Problem with the working of the feed system	➔ Read the faulty codes; ➔ Have it checked in a qualified workshop (no power)

Problem	Cause	Solution
Engine performance not optimum	Air filter dirty or clogged	→ Replace the air filter cartridge
	Supercharger air temperature excessive because of impurities present in supercharger air radiator or in coolant radiator	→ Clean the outside of the supercharger air radiator and the coolant radiator
	Coolant temperature too high	→ Check the temperature transducer and, if necessary, replace it; check the fan rpm; contact a qualified workshop
	Fault in supply system (obstructed, lack of sealing)	→ Inspection test for leaks; contact a qualified workshop
Engine performance not optimum (no power)	Lack of sealing in supercharger system, supercharger air hose pipe clamp slackened or defective	→ Have the seal checked in a qualified workshop
	Fault in supercharger pressure transducer	→ Test using a diagnosis instrument; if necessary, replace; contact a qualified workshop
	*Engine brake valve faulty or jammed	→ Inspection or operating test
Traction interrupted	Significant voltage drop to MR/ADM control unit (loose contact)	→ Check to see that the battery terminals and the connector on the MR/ADM unit are connected firmly and have no traces of corrosion
Engine braking power insufficient	Fault in the working of the engine brake valve or fault in activation system	→ Check the working, inspection test; contact a qualified workshop
Excessive fuel consumption	No sealing in connection points (single injection pump – duct and injectors)	→ Have the seal checked in a qualified workshop
	Irregular combustion	→ Have the engine checked in a qualified workshop
Limitation of rpm too much in advance (impossible to reach max. rpm)	FR or ADM unit fault or incorrect parameter settings	→ Contact a qualified workshop

Problem	Cause	Solution
The engine reaches very high temperatures (on the basis of the coolant temperature indicator)	Coolant in cooling system insufficient	→ Top up and vent
	Coolant temperature indicator or transducer fault	→ Replace the transducer or indicator
	Ribbed V-belt damaged	→ See Replacement of Ribbed V-belt (page 85)
	The fan does not work properly	→ Contact a qualified workshop
	Impurities or limescale inside the coolant radiator, smears on the outside of the coolant radiator	→ Remove the dirt or lime scale
	Thermostat fault	→ Test; if necessary, replace; contact a qualified workshop
The charging current control indicator does not light up with the engine switched off	Lamp fault or power supply line cut off	→ Replace the lamp remove the interruption
The charging current control indicator lights up with the engine running	Ribbed V-belt not taut enough	→ Check the working of the belt tensioners
	Ribbed V-belt torn	→ Replace Ribbed V-belt (page 85)
	Alternator or regulator fault	→ Check; contact a qualified workshop
Exhaust gases are black	Air filter dirty or clogged	→ Replace the air filter cartridge
	Engine brake defective	→ Contact a qualified workshop
	Exhaust gas turbocompressor fault	→ Test; contact a qualified workshop
	Problems in combustion phase, injector fault	→ Contact a qualified workshop
Exhaust gases are blue	Oil level in engine excessive, base venting system fault, engine oil penetrates combustion chamber	→ Correct the oil level, check the vent of the engine base in a qualified workshop
Exhaust gases are white	The coolant penetrates the combustion chamber	→ Identify the damaged cylinder by checking pressure drop; contact a qualified workshop
Knocking in the engine	Irregular combustion	→ Contact a qualified workshop
	Damage to bearings	→ Contact a qualified workshop
Unusual noises	Sealing defect in suction duct and exhaust duct causes a hissing noise	→ Remove the sealing defect; if necessary, replace the gaskets
	Rubbing of the turbine rotor or compressor on a foreign body; foreign bodies in compressor or in turbine; seizure of bearings of rotating components	→ Have the exhaust gas turbocompressor checked in a qualified workshop
	valves play excessive	→ Check the valves play; adjust, if necessary

Use and Maintenance Manual

HTH 16.10

engine: Mercedes

***Register of preventive maintenance and
periodic inspections of the lifting equipment,
in compliance with the EHSR 4.4.2 of Annex I of
Directive 2006/42/EC***



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www.magnith.com commerciale@magnith.com



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Features of the vehicle	page 03
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Registration of change of ownership	page 04
Periodic inspections	page 07
Quarterly inspections of ropes and chains	page 08
Register for replacement of safety components and management of modifications	page 10

2. Scope

This inspection register is prepared pursuant to paragraph 4.4.2, letter b) of Annex 1 to Machinery Directive 2006/42/EC with the scope of recording the "history" of the vehicle, from the moment it is put into service up to its final dismantling.

2.1. This document must be considered as an integral part of the vehicle and must accompany it throughout its working life.

2.2. It must be kept safe together with the Use and Maintenance Manual.

It contains the main technical specifications of the vehicle including: dimensions, diagrams, load diagrams, instructions and warnings, instructions for using the vehicle; furthermore, the warnings and the diagrams are available in the driver's cab and the vehicle control display by using the appropriate search windows;

2.3. It is the vehicle owner's responsibility to record all the significant events concerning the working life of the vehicle, specifically:

2.3.1. change of equipment;

2.3.2. replacement of mechanisms, structural elements, safety devices, etc.;

2.3.3. serious faults and relative repairs, not included among routine or extraordinary maintenance;

2.3.4. periodic inspections of ropes and chains;

2.3.5. compulsory periodic inspections;

2.3.6. change of ownership.

If not sufficient, it is the owner's responsibility to reproduce parts of this Inspection Register in order to copy parts or pages that may be necessary.

In any case, the customer must complete this Inspection Register with parts or sections as envisaged by the regulations or national legislative constraints in the various countries where the vehicle is used.

The Manufacturer declines all civil and criminal responsibility if the above recommendations are not followed.

3. Features of the vehicle

3.1. Description of the vehicle:

3.1.1. The essential parts of the forklift truck consist of:

- ✓ Chassis made up of two side members made of appropriately ribbed and shaped steel sheet;
- ✓ Base carriage;
- ✓ Tilting front axle;
- ✓ Rigid suspensions;
- ✓ Tilting rear axle;
- ✓ Four drive wheels and steering wheels;
- ✓ Driving and operating seat with cab on the LH side of the turret between the axles;
- ✓ Boom with elements consisting of composite boxed sections, pivoted at the top of the turret, inclinable and extensible by means of double-action cylinders (and chains in models where envisaged); at the end of the last boom element a supporting element is hinged for the equipment for lifting loads (called the "quick-release coupling") which can be moved by means of a cylinder.

3.2. Safety devices:

- ✓ System for controlling the limit stop (block/hook ascent and descent) stresses (electronic torque and overload limiter) and safety valves (maximum pressure and block) on all the hydraulic actuators (motors and cylinders).

3.3. Reference standards:

- ✓ DIN 15018-1 and 15019-2 Lifting hanging loads.

Delivering the forklift truck to the customer

machine type	HTH 16.10
Serial No.	
Year of manufacture	

for which the Inspection Register is being handed over by

Magni Telescopic Handlers S.r.l.
Via Magellano, 22
41013 Castelfranco Emilia (MO) Italy
Tel +39-059-8630811 Fax +39-059-8638012

by Mr.

to	represented by Mr.
----	--------------------

Dealer's Company Name:

Street

Postcode - City

Province

according to the conditions defined in the contract, with the technical, dimensional and functional features specified in the attached Use and Maintenance Manual.

Date

The Dealer

for the Customer/Buyer

Registration of change of ownership 1

on

The ownership of the vehicle identified in this Register was transferred to:

Company represented by Mr.
Street/No.
Postcode/City prov.

It is hereby declared that, at the time of preparation of this document, the technical, dimensional and functional features of the vehicle described in this Register conform to those indicated at the beginning by the Manufacturer and that changes, if any, have been recorded.

Furthermore, we declare that the transfer has been reported to the relevant Bodies (local INAIL).

The Dealer

The Buyer

Registration of change of ownership 2

on

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Street/No.
Postcode/City prov.

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The Dealer

The Buyer

Registration of change of ownership 3

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The Dealer

The Buyer

Registration of change of ownership 4

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The Dealer

The Buyer

Registration of change of ownership 5

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The Dealer

The Buyer

Registration of change of ownership 6

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The Dealer

The Buyer

Registration of change of ownership 7

on

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The Dealer

The Buyer

Registration of change of ownership 8

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The Dealer

The Buyer

Registration of change of ownership 9

on

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Furthermore, we declare that the transfer has been reported to the relevant Bodies (local INAIL).

The Dealer

The Buyer

Periodic inspections

The Manufacturer declares that dynamic and static tests have been conducted on all the forklift trucks produced, equipped with all the accessories for lifting loads or persons (for example: forks, jib with hook, winch, platform, etc.). A functional test was also performed, adjusting all the electric and hydraulic equipment and mechanisms and the safety devices and the torque and overload limiter devices; the performance of the assembly for each forklift truck is also checked before shipment to the customer.

The Customer must comply with the maintenance and monitoring program defined in the Use and Maintenance Manual.

It is important and advisable to carry out a daily check, without the obligation to record in the register, the state and the working of all the safety devices of the vehicle, specifically the safety system and the roll-over protection system; in case of doubt regarding their working or any malfunctioning, do not use the vehicle and contact the area dealer immediately.

Every 2500 years of service or every year, send the vehicle for a general check by your dealer.

After 20 years of service, it is necessary to have your dealer carry out a general check/overhaul of the vehicle, on forklift trucks equipped with platform for lifting persons or equipment for lifting suspended loads (such as jib with hook, hoist, etc.) (Obligation required at point 3.2.3 of M.D. 111 of 11/04/2011).

Quarterly inspections of ropes and chains

After the inspections, the accredited body must diligently prepare the register below, identifying the wear of the ropes and chains by means of the following decisions regarding the degree of deterioration/wear as defined in the Table below:

<i>degree of deterioration</i>	<i>definition</i>	<i>action</i>
slight	in this case the operator found a slight degree of wear, but proportional to the working life of the ropes and chains	none
medium	in this case, the operator found a clearly visible and identifiable degree of wear; this state presupposes potential replacement of the rope or the chain during the course of the next quarterly inspection	none
serious	in this case the operator found a marked degree of wear	stop the vehicle and replace the rope or chain
very serious	in this case, the operator found a degree of wear that impairs the safety of the vehicle	stop the vehicle and replace the rope or chain immediately
replacement	the rope or chain was replaced	record the replacement

Register of replacement of safety components 1

identification of modifications-changes made to the vehicle

Register of replacement of safety components 2

identification of modifications-changes made to the vehicle

Register of replacement of safety components 3

identification of modifications-changes made to the vehicle