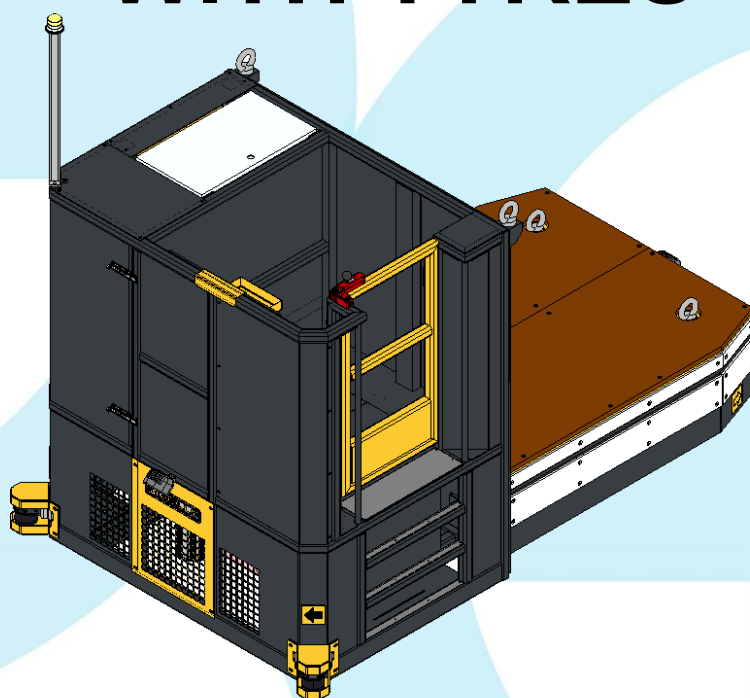


TRANSLATION OF
“ISTRUZIONI ORIGINALI”



SELF-PROPELLED ELECTRONIC TROLLEY WITH TYRES



MANUAL USER AND MAINTENANCE

Model:	SGAE-E $\pm 90^\circ$ P 38/3 - TRANSPALLET	Revision:	00
Serial number:	2750 / 1 and 2750 / 2	Working load limit (WLL):	38 t
Version:	GROUND OPERATOR	Construction year:	2026

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REVISION

REVISION				
MODEL	LANGUAGE	DATE	VERSION	NOTES
SGAE-E $\pm 90^\circ$ P 38/3 TRANSPALLET	English	05/2026	00	First issue

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In case of doubts or difficulties in understanding or interpretation of the manual, the original/official version referred to as "ISTRUZIONI ORIGINALI" on the cover, must be considered as the valid version.

Some of the images included in this manual should be considered as examples only, as some details may have changed over time.

ADDITIONAL INFORMATION



The **self-propelled electronic trolley with tyres**, described, hereinafter will be called "**machine**".

HANDBOOK STRUCTURE

The manual is divided into 9 chapters.

CHAPTER 1 – GENERAL INFORMATION

This chapter contains general information about the machine and the Manufacturer's data.

CHAPTER 2 – SAFETY

This chapter contains a description regarding the standards, the type of certification applied, working environment conditions, accident prevention devices used, residual risks, warning plates applied to the machine.

CHAPTER 3 – GENERAL DESCRIPTION

This chapter contains the description of the machine functioning principles and of the controls available for the operator, the general technical data and the description of the groups that constitute the same.

CHAPTER 4 – TRANSPORT AND STORAGE

This chapter contains instructions on how to use the proper packing, handling, transport and unloading at the user's plant.

CHAPTER 5 – INSTALLATION

This chapter contains the instructions to carry out any assembly, checking, inspection and adjustment operations to be performed before start-up.

CHAPTER 6 – USE

This chapter contains the instructions for machine start-up, use, with description of the more important operating sequences and use of the diagnostics system.

CHAPTER 7 – MAINTENANCE

This chapter contains the machine maintenance schedule. It contains the warnings, precautions and instructions to correctly carry out the maintenance operations on the machine.

CHAPTER 8 – DISMANTLING

This chapter contains information and warnings to properly decommission and dismantle the machine at end-of life.

CHAPTER 9 – ATTACHMENTS

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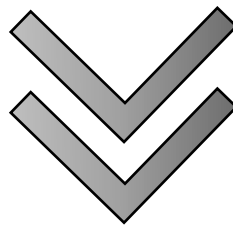
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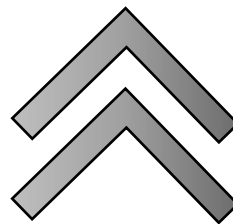
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GENERAL INFORMATION



**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



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1. GENERAL INFORMATION

1.1 INTRODUCTION

ADDITIONAL INFORMATION



MORELLO S.r.l. the machine manufacturing company, is indicated in the handbook with the name: **Manufacturer**.

ADDITIONAL INFORMATION



The Company purchasing the machine is indicated in the handbook with the name: **Customer**.

The manufacturer recommends a training course for personnel responsible for operating and maintaining the machine to increase familiarity and know-how of the various procedures.

This manual contains the features, performances, instructions for use and the references to the preventive and remedial operations of the machine.

The manufacturer compels the personnel in charge of operating and maintaining the machine, as well as the personnel in charge of transport and possible assembly operations, to read this document.

This document is the Use and Maintenance handbook for the:

**ELECTRONIC SELF-PROPELLED INDUSTRIAL TROLLEY WITH TYRES MODEL SGAE-E $\pm 90^\circ$ P 38/3
TRANSPALLET SERIAL NUMBERS 2750/1 E 2570/2**

and has been drawn up in compliance with machines directive 2006/42/CE.

The Use and Maintenance Manual is to be considered an integral part of the machine and must be kept until final disposal or transfer of ownership, at which time the manual must be handed over to the new owner. It must be kept by the person in charge who is entrusted with the machine.

1.2 SERVICE DEPARTMENT

For technical assistance, contact the manufacturer:

Morello S.r.l.

Head Office and Factory:

Lungo Dora Colletta 85/A

10153 – Torino (Italy)

TEL. 011.248.05.69

TEL. / FAX. 011.85.00.85

E-mail: info@morellogiovanni.it

Website: www.morello.eu.com

1.3 GLOSSARY

Emergency stop – to stop in an emergency; the purpose of this function is:

- to avoid or reduce hazards that exist for persons, damage to the machinery or to the work in progress and
- to be initiated by a single human action.

Machinery Directive: the DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the approximation of the laws of the Member States relating to machinery.

Command device: device inserted in a command circuit for use of the machine.

Supplier: entity (Manufacturer, installer, system integrator) that provides equipment or services associated with the machine (the user can also act as a manufacturer for himself).

Safety function: machine function, the failure of which could cause an immediate increase of risks.

Failure: terms of the capacity of an element to perform a required function.

Machine:

- an assembly equipped or to be equipped with a drive system different from direct human or animal force, composed of parts or components, at least one of which is mobile, integrally connected together for a well determined application;
- an assembly as per the first section, lacks only the elements of connection to the site of use or connection to the sources of energy and movement;
- an assembly as per the first and second sections, ready for installation and that can only function after assembly on a means of transport or installed in a building or in a construction;
- a group of machines, as per the first, the second and the third section, or partly completed machines, that to attain the same result are arranged and controlled in a manner to have an integral functioning;
- a group of parts or components, one of which is mobile, integrally connected together for the lifting of weights, and having direct human forces as the only source of energy;

Malfunctioning: inability of a machine to perform the foreseen function.

Marking: symbol and wording for the identification of the machine, which is affixed by the Manufacturer.

Safety measure: means that eliminate or reduce a hazard.

Operator: person in charge of running the machine.

Hazard: Potential source of harm.

Qualified technician or skilled maintenance technician: the persons who have attended specialisation courses, vocational training, etc. and have experience regarding installation, putting into service and maintenance operations, repairs, transport, and handling of the machine.

PLC: Programmable Logic Controller can manage and control all movements of the machine. It's equipped with electronic cards designed to control the various devices and to receive the associated control signals.

Protection: measure using means to prevent hazards that cannot be reasonably eliminated or risks that cannot be sufficiently reduced by design-integrated protective measures.

Safety protection: Shelter or protective device used as a safety measure for the protection of persons from a present or latent danger.

Guard: physical barrier, designed as part of the machine, to provide protection.

Fixed guard: fixed protection (for example: by screws, nuts, welding) so that it can only be opened or removed using tools or by removal of the means of anchorage.

Risk: combination of the probability of occurrence of harm and the severity of that damage.

Residual risk: risk that remains after the protective measures have been applied.

Transport: a set of operations designed to transfer equipment from the manufacturer to the final work position at the Customer's.

Foreseen use: use of the machine in conformity with the information provided in the instructions for use.

User: entity using the machine and the associated electrical equipment.

Danger zone: all spaces, area within or near the machine in which the presence of an exposed person constitutes a risk to his health and / or safety.

1.4 SYMBOLS

The manual uses a number of symbols that are meant to draw the reader's attention and highlight some aspects that are particularly important.

An explanation of each indication is given below.

DANGER



Indicates a situation where there is an immediate danger which, if not avoided, will result in serious injury or death to the operator.

Identifies absolutely forbidden operations and procedures that must be adopted in order to avoid serious injury or death to the operator.

WARNING



Indicates a situation where a potential hazard is present which, if not avoided, could result in serious injury or death to the operator.

Describes operations that require special attention in order to avoid serious injury or death to the operator.

CAUTION



Indicates a situation where a non-immediate or potential hazard is present which, if not avoided, could result in medium or low-level injury or health damage to the operator.

Describes operations that require special attention in order to avoid injury to the operator.

NOTE



Indicates important information and/or describes those procedures, the non-observance or partial observance of which may result in damage to the machine or equipment connected to it.

ADDITIONAL INFORMATION



It provides useful information and/or indicates references to other supplementary documentation, such as accompanying instruction manuals, technical documents or other sections of this manual.

1.5 MANUFACTURER'S ADDRESS

For any kind of information or clarifications regarding the use, maintenance, etc., the Technical Office of the Manufacturer is always available to the customer requirements.

It is appropriate that the latter puts the questions in clear, with references to this manual, always indicating the data shown on the identification plate of the machine in question.

Any request for assistance, service at the Customer, or clarification regarding the technical aspects of this document should be addressed to:



MORELLO S.r.l.

Lungo Dora Colletta 85/A 10153 – TORINO (TO) – ITALIA

TEL. 011.248.05.69 – TEL./FAX 011.85.00.85

E-mail: info@morellogiovanni.it

Website: www.morello.eu.com

1.6 SAFETY STANDARDS

Prescriptions, instructions, regulations and related safety notes described in the various chapters of the manual are intended to define a set of behaviours and rules to be observed when performing the various activities that constitute the mode of intended use of the machine in order to operate in conditions of safety for personnel, for the equipment and the surrounding environment.

The safety instructions are addressed to all authorized personnel, trained and authorized to perform the various activities and operations:

- Transport.
- Installation.
- Use.
- Management.
- Maintenance.
- Cleaning.
- Decommissioning and dismantling.

1.7 RESPONSIBILITY OF THE MANUFACTURER

The manufacturer declines any liability arising from the incorrect use or misuse of the machine in question and from damage caused by the use of non-original and non-prescribed spare parts, by maintenance not carried out properly and by tampering with circuits, components, and system software.

The responsibility for the application of the safety requirements, as set out below, lies with the technical personnel of the Customer responsible for the planned activities on the machine.

They must ensure that the operators authorised to carry out the required activities are qualified, comply with and are aware of the requirements contained in this document and the general safety regulations applied to the machine itself.

Failure to follow the safety instructions can cause injury to persons and damage to equipment.

1.8 MANAGEMENT OF THE MACHINE

The machine control is allowed only to authorized and properly trained persons, or at least with adequate technical expertise.

Operators responsible for running and maintenance operations should be aware that the knowledge and application of safety standards is an integral part of their work.

Operators not authorised to work on the machine are not to have access to the pushbuttons.

Before starting the machine, do the following:

- Read this manual carefully.
- Know what protections and emergency stop devices are present on the machine, where they are located and how they work.

Do not remove, even partially, the protections, safety devices and/or warning signs applied to the machine. In the event of malfunction or failure of such devices, they should be immediately repaired or replaced.

1.9 WARRANTY

The manufacturer guarantees that its machines are free of manufacturing flaws for the period specified in the relevant terms of the contract.

The buyer is only entitled to the replacement of parts acknowledged to be defective, excluding parts subject to wear and tear (such as gaskets, seals and electrical and electronic components). The costs of packaging and transport, as well as any installation, shall be borne by him. In such cases, the Buyer shall specify in writing:

- Date and number of the purchase document.
- Machine model.
- Serial number.
- Defective part, if known.

Will not be recognized claims for damages for loss of production caused by any periods of inactivity of the machine.

Damages are excluded caused by improper use to the contents of this "Use Manual and Maintenance" which is an integral part of the machine, including the maintenance, if not conforming to the instructions provided.

The warranty will not be recognized for the machines on which were performed unauthorized modifications. Modifications or tampering of safety devices are in every way strictly prohibited.

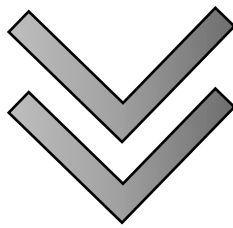
If damages occur during warranty period, the warranty is valid only using original spare parts.

Repair work may only be performed by skilled operators, who are familiar with the machine.

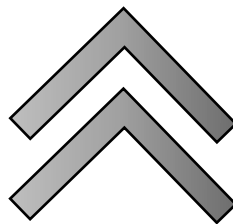
**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



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SAFETY



**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



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2. SAFETY

2.1 GENERAL INFORMATION

The Customer must provide instructions for the operators about the risks of injury, safety devices installed on the machine and the general rules regarding accident prevention as specified by the Community directives and the law of the country where the machine is used.

The operators must know the location and operation of all the controls of the machine and its characteristics.

Tampering, or unauthorized replacement of one or more components of the machine, the adoption of accessories and the use of particular parts different from the originals may cause injury risks.

WARNING



It is absolutely forbidden to exclude/tamper with the safety devices on the machine.
The Manufacturer declines all responsibility for the safety of the machine in case of failure to comply with this prohibition.

CAUTION



It is the responsibility of the operator who uses the machine to check that during movement there are no objects or persons in the area.

2.1.1 Certification of the machine

The Machine is provided with the EC declaration of conformity to the essential safety requirements in accordance with Directive 2006/42/EC (annex II A) and EMC Directive 2014/30/UE.

ADDITIONAL INFORMATION

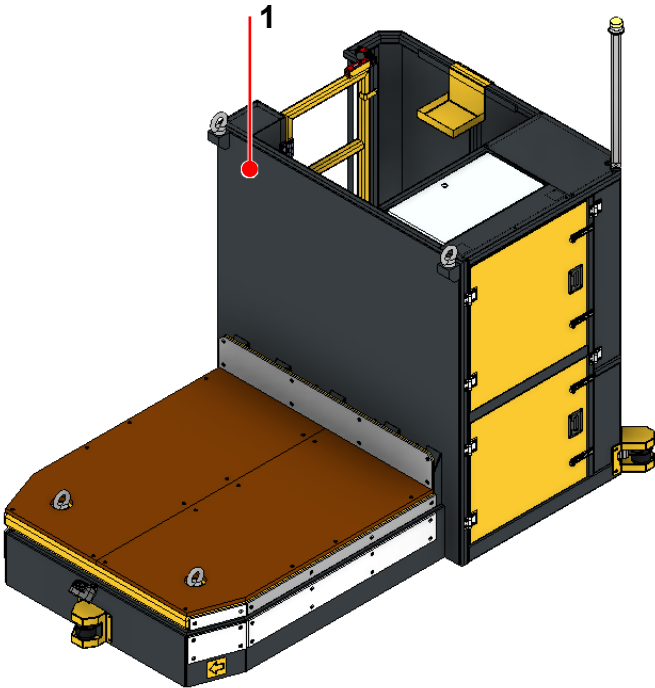


Any changes made to the machine immediately invalidate the EC certification issued by the manufacturer.

ADDITIONAL INFORMATION



The picture shown below is for the sole purpose of indicating the position of the EC (1) with the main machine identification data.



1		1	
Lungo Dora Colletta, 85 / A 10153 TORINO - ITALY		Lungo Dora Colletta, 85 / A 10153 TORINO - ITALY	
MODEL	SGAE-E ±90° P 38/3	MODEL	SGAE-E ±90° P 38/3
DEAD LOAD	Kg 3.800	DEAD LOAD	Kg 3.800
PAYLOAD	Kg 38.000	PAYLOAD	Kg 38.000
SERIAL NUMBER	2750_1	SERIAL NUMBER	2750_2
YEAR OF CONSTRUCTION	2026	YEAR OF CONSTRUCTION	2026

2.1.2 Foreseen and unforeseen uses

The machine has been designed and manufactured to lift and handle heavy loads, in accordance with the technical specifications set out in this manual. The load must be placed on a suitable pallet (not supplied). It can be used both indoors on a concrete floor (flat, smooth and level).

The machine is not to be used on roads (road traffic).

Use is not possible of the machine for purposes other than those planned.

DANGER



The use of the machine for processing purposes not described in this manual is **IMPROPER USE**. In that case the Manufacturer declines all responsibility for any damage caused to property and/or persons and considers annulled every kind of guarantee of the machinery. The manufacturer declines all responsibility in the event of tampering with the machine, unauthorised modifications or maintenance operations carried out by unskilled operators.

CAUTION



The use of the machine is allowed only to the experienced and qualified operator, who has taken full vision and awareness of this document.

CAUTION



Never transport persons on the machine.

CAUTION



Only one operator is required to manage the machine, who is to position as indicated in the paragraph "Operator workstation" and to follow the instructions as described in the chapter "Use".

NOTE



In the event of abnormal behaviour of the machine, or lack of power, it is forbidden to carry out any movement because specific competence of maintenance personnel.

2.2 OPERATING ENVIRONMENTAL CONDITIONS

The machine is to be placed in an environment equipped with all safety requirements specified by the laws in the user country, and with adequate ventilation.

Operating environment conditions:

- Environment temperature ranging between 0°C and + 30°C.
- Humidity: <80% (with no condensation).

2.2.1 Installation of fire protection

The machine is not equipped with its own sprinkler system.

2.2.2 Explosive atmosphere

The machine has not been designed and built to operate in zones with explosive atmosphere or partially explosive atmosphere.

2.2.3 Lighting

The machine does not have its own lighting system.

NOTE



It is the task of the Customer to provide correct lighting in the working area.

2.2.4 Vibrations

The machine does not produce hazardous vibration to the health of the operators who work there.

NOTE



The operator's workstation is, however, fitted with a non-slip, vibration-damping mat.

NOTE



Excessive vibration can only be caused by a mechanical failure, that is to be immediately reported and eliminated.

2.2.5 Noise

Noise measurement has been carried out in conformity with the specifications of acoustic standards. The typical sound data are filed by the manufacturer.

The machine operating features are such that, with no load, the overall noise generated is less than 75 dB (A), measured in the workstation of the relevant operators.

NOTE



The sound pressure level in the actual working conditions depends on the characteristics and the capacity of the load.

NOTE



The measurement of exposure to noise levels of workers should be carried out by the user, in compliance with the legislation in force in your country.

2.2.6 Electromagnetic emissions

The machine contains electronic components subject to the directive on Electromagnetic Compatibility, affected by radiated and conducted emissions.

Emission values are in accordance with regulations thanks to the use of EMC compatible components, suitable connections and installation of filters where necessary.

NOTE



Any maintenance on electrical equipment made in a non-compliant manner, or wrong replacement of components, can impair the effectiveness of the equipment.

2.3 DISPOSAL OF EXHAUSTED MATERIALS

The machine produces exhausted materials (reducers oil, hydraulic power unit oil and filters).

In every country there are specific regulations for disposal to safeguard the environment.

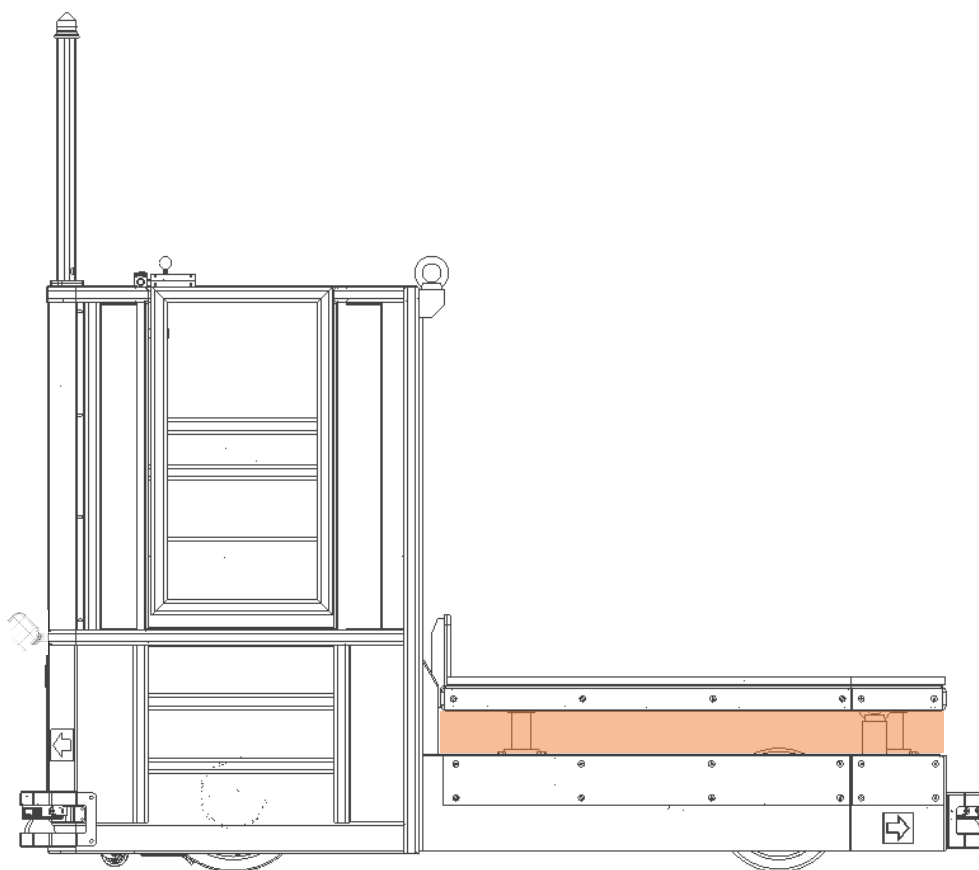
The customer must be aware of these standards and work in such a manner to respect them.

In particular, see chapter 8 for disposal of the materials that the machine is composed of.

2.4 DANGEROUS ZONES

The machine's hazardous areas are demarcated by fixed or movable guards and protected by laser scanners (with the exception of the loading platform handling area). Access to these areas, subject only to maintenance operations, must be carried out as indicated in this manual.

The following image shows the danger zone of the machine.



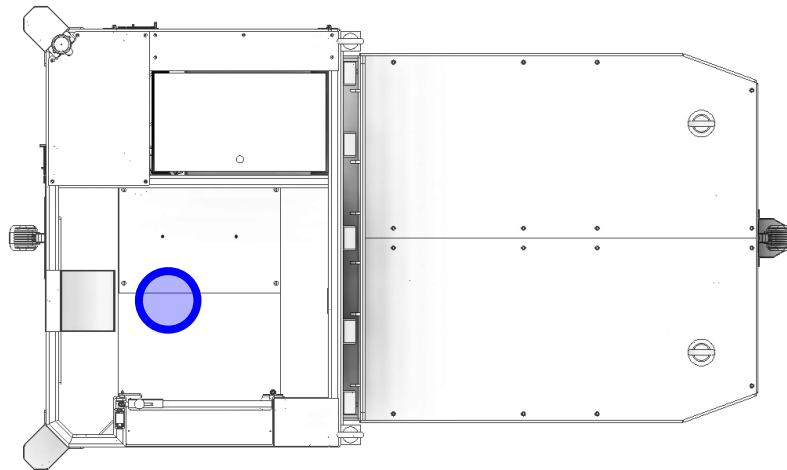
Dangerous zone

2.5 OPERATOR WORKSTATION

The machine is designed to be operated by a single operator, who must stand at the designated operating position on the machine.



Operator workstation



2.6 SAFETY DEVICES

The machine is equipped with the following safety devices:

DEVICE TYPE	FUNCTION
Power-on key selector switch	To prevent machine movement.
Emergency button/s	Emergency stop of the machine.
Retained action movement system	Stops machine movements if the control is released.
Fixed and movable guards	Demarcation of hazardous areas of the machine.
Visual and acoustic signalling systems	It indicates when the machine is in motion.
Laser scanner	Slowing down and stopping the machine in the event of an interception of the intervention areas.
Parapets	Prevent the operator from falling from the driver's seat.
Safety switch	Prevent the machine from moving whilst the gate is open.
Pilot-operated shut-off valves	Prevent the loading platform from descending in the event of a fault or emergency.
Safety circuits	Cuts-out the electric power supply in the case of overload or short circuit.

2.6.1 Power-on key selector switch

Function: To prevent machine movement.

Characteristics and methods: The machine electric power is disconnected by turning the “power-on key selector”, on the electric panel to position (0), and removing the key.

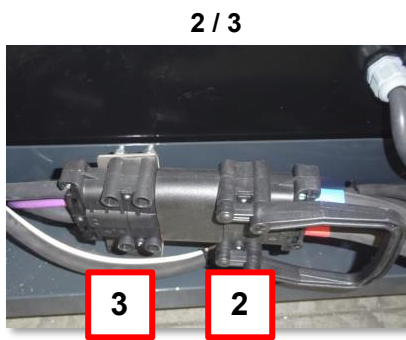
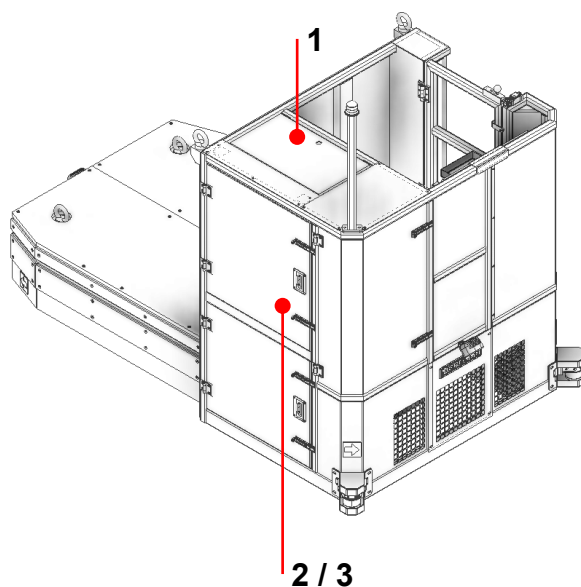
Subsequently disconnect the machine plug from the battery socket to cut out the power supply.

WARNING



For maintenance, disconnect the battery, removing the machine power supply plug from the battery socket.

1. Power-on key selector switch
2. Machine power plug
3. Battery socket



Example images for only illustrative purposes

2.6.2 Emergency button/s

Function: Immediate machine stoppage.

Characteristics and methods: Press this button in a hazardous situation to safeguard the operators and/or the machine.

Pressing this button **(1)** causes the power supply to the motors, and the hydraulic power unit, to be cut off, thus stopping the machine's movements. The locking valves hold the loading platform in its current position.

If pressed, the emergency button remains in low position. To reset, turn it clockwise.

The emergency button is located on the control panel.

CAUTION



The emergency button requires regular checks to ensure its correct operation.

NOTE



In case of maintenance is not enough to intervene on emergency buttons for cutting energy of the machine.



Wired control panel / Radio-control

2.6.3 Retained action movement system

Function: Machine movement, with presence of operator.

Characteristics and methods: To carry out all movements, there are momentary-action controls **(1)** on the wired control panel and on the remote control.

If the control is released, the movement currently in progress is stopped.

CAUTION



For correct use of the radio-control / wired control panel the operator is to remain in position as indicated in paragraph "Operator workstation".



Wired control panel / Radio-control

2.6.4 Fixed and movable guards

Function: Demarcation of hazardous areas of the machine.

Characteristics and methods: Fixed guards

The fixed guards (casings) are firmly secured to the structure by screws that require a specific tool for removal. They are not monitored, and their removal is permitted only as part of maintenance work, with the machine's power supply switched off.

Movables guards

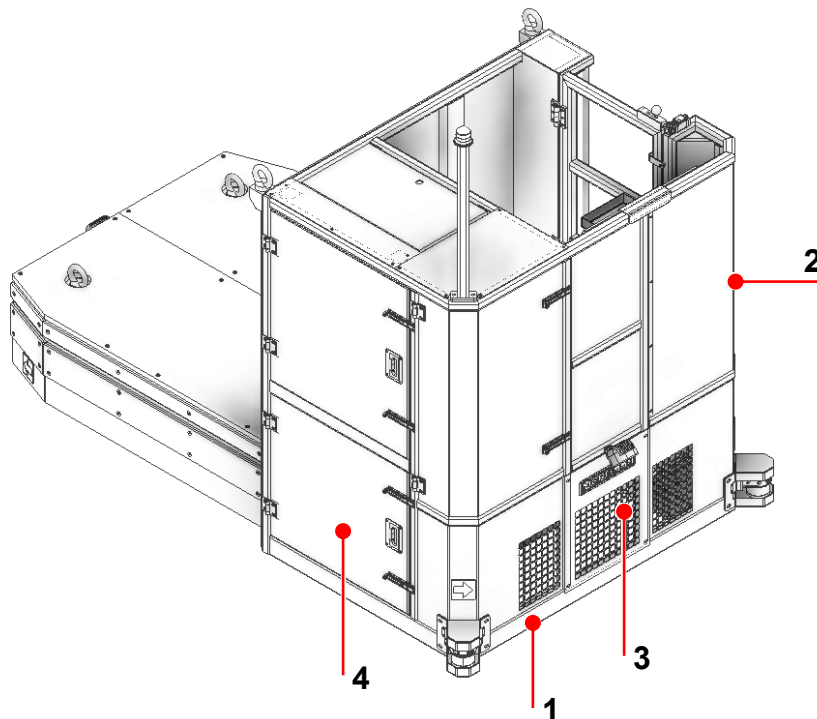
There are three uncontrolled movable guards at the front of the machine (battery compartment, hydraulic control unit compartment and electrical control panel compartment). These may only be opened for maintenance purposes, with the machine's power supply switched off.

WARNING



The manufacturer accepts no liability should the machine be operated without safety guards or with the movable guards open.

1. Machine frame
2. Protective cover made from smooth sheet steel (example)
3. Protective grating cover (example)
4. Mobile guard made of smooth sheet steel (example)

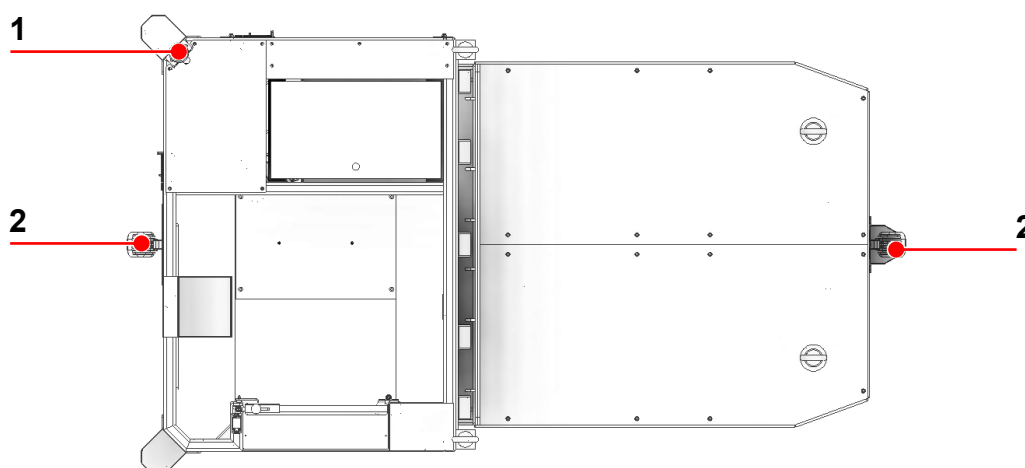


2.6.5 Visual and acoustic signalling systems

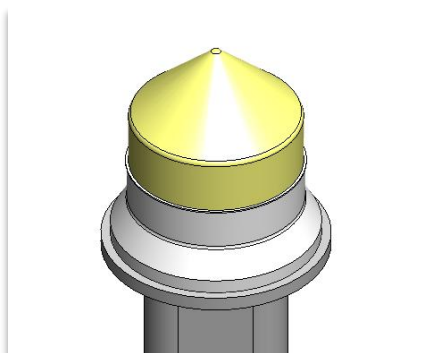
Function: Visual and acoustic signalling of moving machine.

Characteristics and methods: The machine is fitted with a buzzer and an indicator light **(1)**. These devices are activated when the machine is in motion.

There are also two BLUESPOT spotlights **(2)** which project a blue beam of light onto the ground in the direction of travel.



1



2



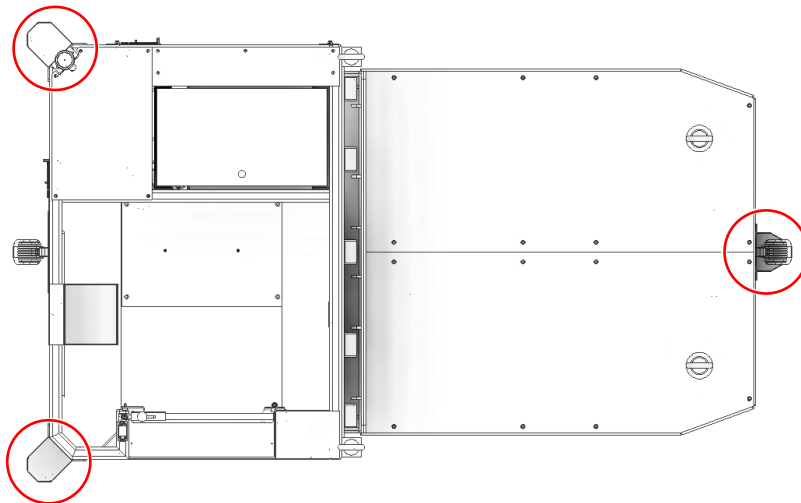
2.6.6 Laser scanner

Function: Slowing down and stopping the machine in the event of an interception of the intervention areas.

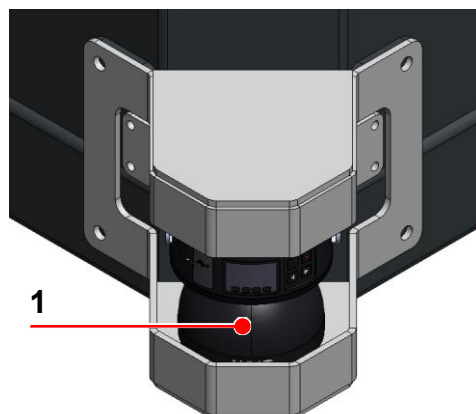
Characteristics and methods: Three laser scanners (1) are fitted to the machine, each fitted with impact protection. Each of these devices is programmed with two intervention areas:

- Slowdown area (GREEN): the machine slows down.
- Stop area (RED): the machine stops immediately.

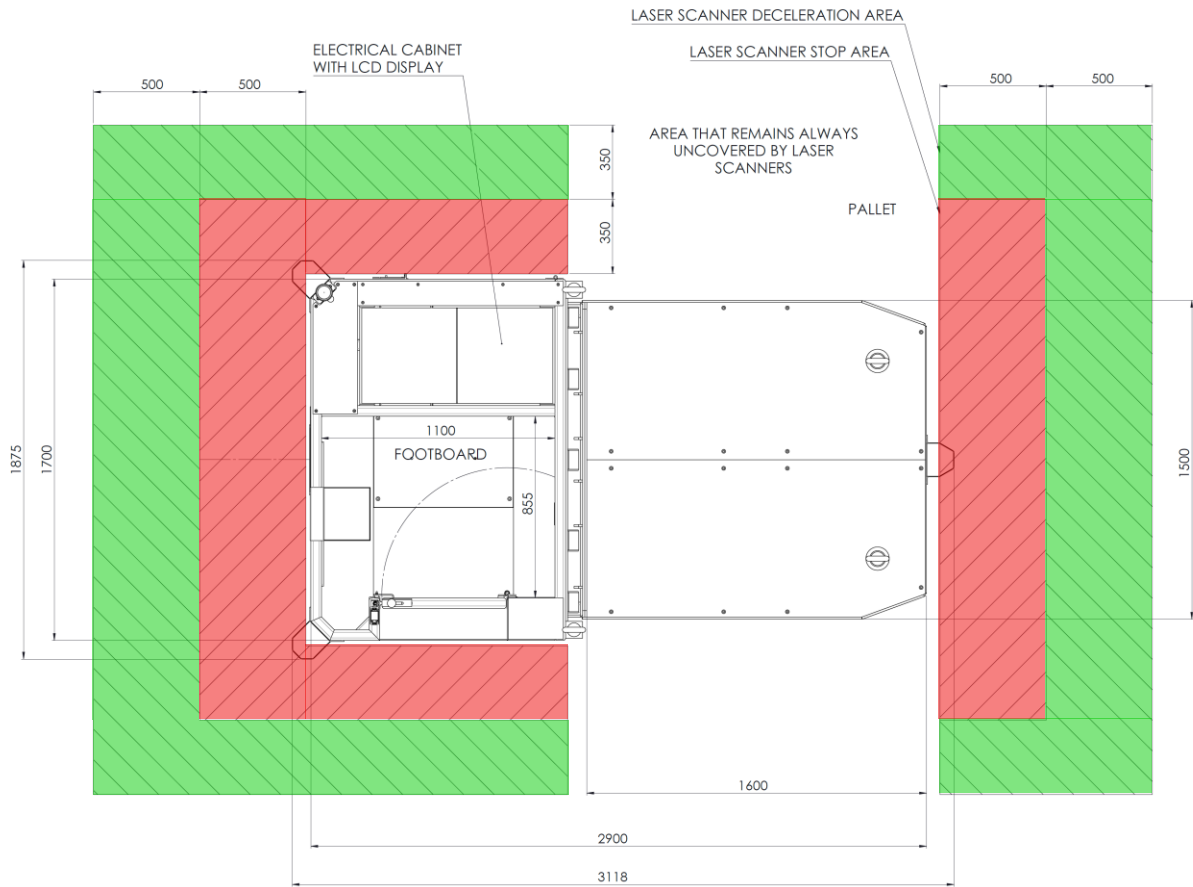
Only the areas in the direction of travel are active.



Position of the laser scanners



The following image shows the scanning areas of the laser scanners (dimensions in mm).



CAUTION



The beam interceptor must not be used to lock the machine for maintenance. Any tampering with the devices poses a possible risk.

CAUTION



Setting the selector switch to SAFETY OFF (and keeping it in that position) disables the laser scanners. In this state (with the safety function disabled), it is the operator's responsibility to ensure that the area is clear of objects and people during operation.

CAUTION



It is possible to disable the laser scanners until the machine is switched off, using the RFID reader located on the control panel, which is fitted with a numeric keypad for entering the PIN.

In this state (with the safety function disabled), it is the operator's responsibility to ensure that the area is clear of objects and people during operation.

NOTE



The protection of personnel operating and maintaining the machine is not guaranteed if laser scanners are not used in accordance with the relevant manual.

NOTE



Direct sunlight on the laser scanner lens causes a false positive (i.e. the presence of an obstacle) to be detected.

ADDITIONAL INFORMATION



For more information, please refer to the attached laser scanners manual.

2.6.7 Parapets

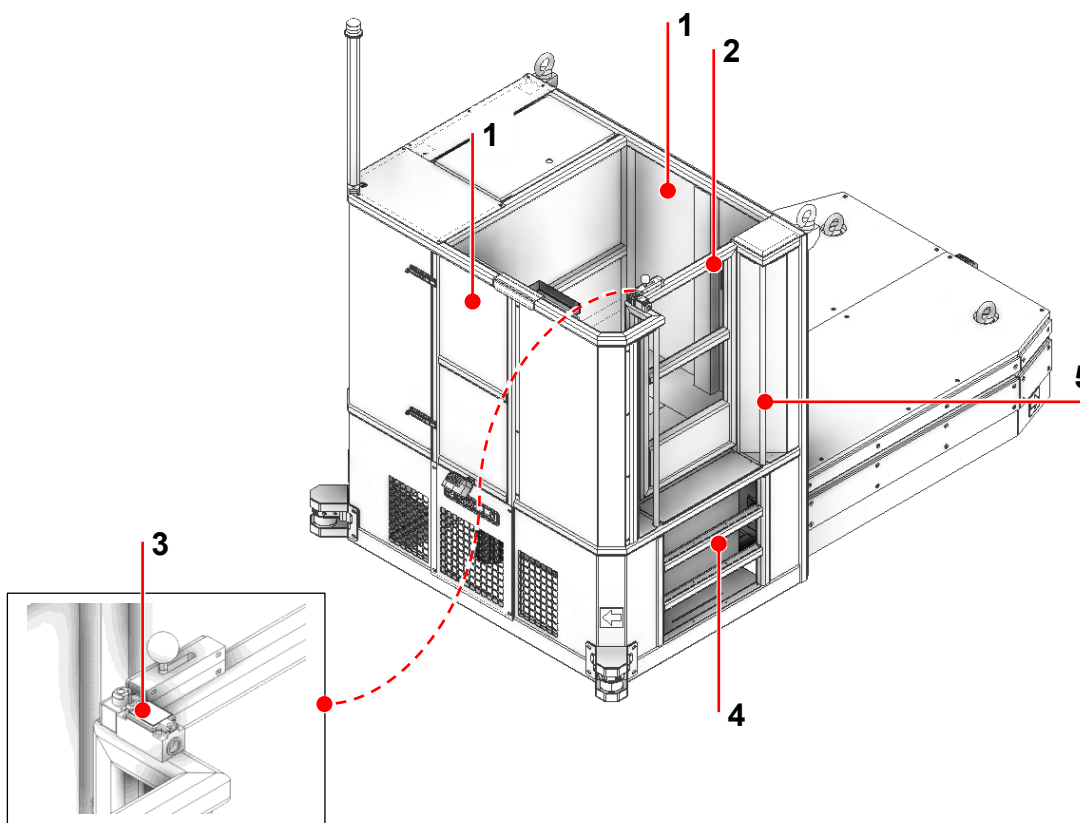
Function: Prevent the operator from falling from the driver's seat.

Characteristics and methods: The perimeter of the operator's station is enclosed by guardrails **(1)** 1,100 mm high.

Access to the driver's station is via a gate **(2)**, fitted with a footrest and a crossbar, operated by a switch **(3)**.

This safety system helps to prevent accidental falls.

There is a ladder **(4)** and handrails **(5)** on either side of the gate.



2.6.8 Safety switch

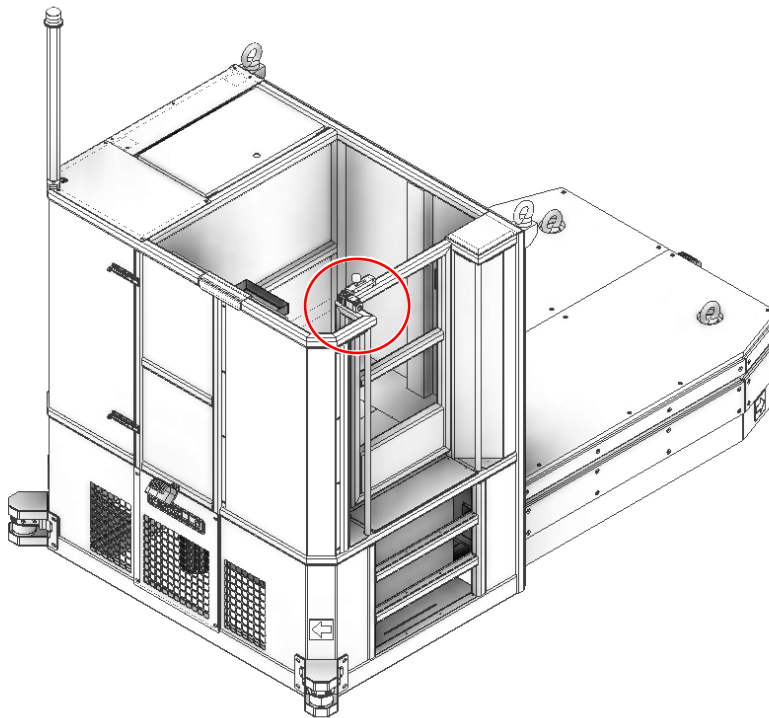
Function: Prevent the machine from moving whilst the gate is open.

Characteristics and methods: The access gate to the operator's station is controlled by a safety switch.
After closing the gate, you must manually engage the actuator **(1)** in the switch **(2)** by operating the knobbed lever **(3)** to enable the machine to move.

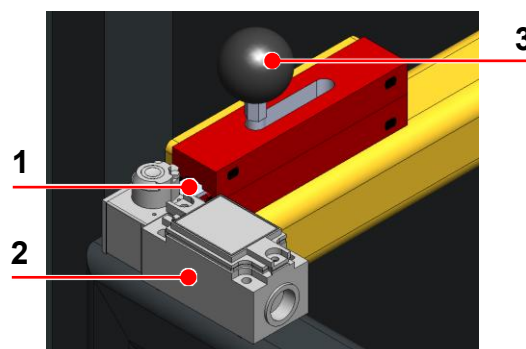
CAUTION



The switch requires regular checks to ensure it is working properly.



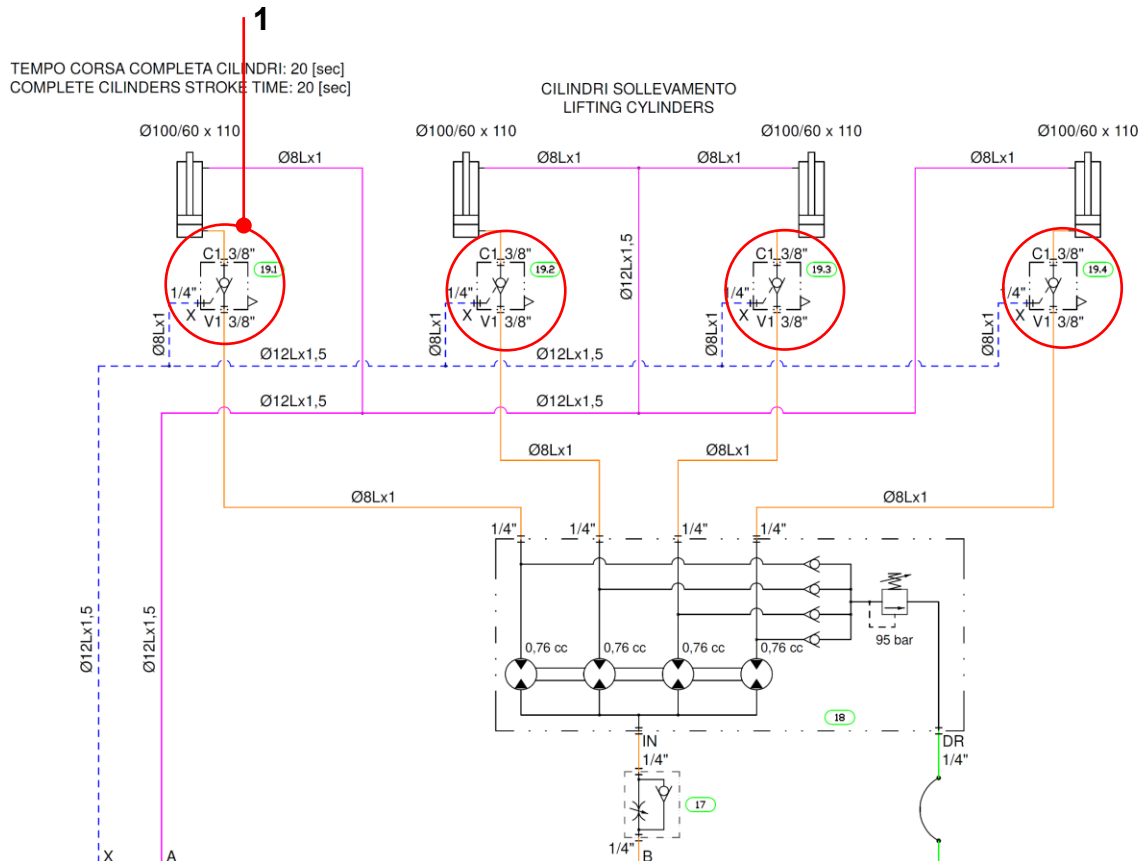
Switch position



2.6.9 Pilot-operated shut-off valves

Function: Prevent the loading platform from descending in the event of a fault or emergency.

Characteristics and methods: On the discharge line of the lower chamber of each lifting cylinder, there is a shut-off valve (1) designed to prevent the platform from descending in the event of an emergency.



Extract from the hydraulic diagram

2.6.10 Safety circuits

Function: To control electric circuits and interrupt electric supply before hazardous overloads/short circuits are generated.

Characteristics and methods: If an overload or short circuit occurs, the fuses installed inside the electric panel cut out the power supply to the circuits and immediately stop the machine.

ADDITIONAL INFORMATION



For information on the location of the fuses refer to the electrical diagram with its bill.

2.7 PERSONAL PROTECTIVE EQUIPMENT

The machine operator is to use the personal protection devices to reduce the possibility of risks to a minimum.

CAUTION



The clothing of those who work or perform maintenance on the system must comply with the essential safety requirements set by EU Directives and laws in the country where the machine is used.

NOTE



During the operations of management and maintenance, personnel should wear appropriate work clothing so as to prevent the occurrence of accidents.

To avoid mechanical risks, such as dragging, entrapment, etc, keep hair gathered up and do not wear bracelets, wrist-watches, rings or chains.

2.8 RESIDUAL RISKS

2.8.1 General information

In the design phase have been assessed all zones or high-risk parts and were taken as a result all necessary precautions to avoid risks to persons and damage to machine components.

WARNING



Periodically check the operation of all safety devices.

Do not dismantle the guards on the machine.

Do not insert foreign objects in the machine movement area.

2.8.2 Residual risks

After carefully examining all possible machine risks, all the necessary solutions have been applied to eliminate the risks and limit hazards for exposed persons.

Despite the necessary precautions taken, some risks remain on the machine that cannot be eliminated. For these, appropriate monitoring plates have been provided in the area concerned.

- **Risk of crushing of the lower/upper limbs**

This hazard is present beneath the loading platform during the lowering phase. It is the operator's responsibility to ensure that no one is present whilst the platform is being lowered.

2.8.3 Plates on the machine

The manufacturer has affixed to the machine a set of monitoring plates defined in accordance with the European regulations on the graphic symbols to be used. These plates are located in a highly visible position.

The maintenance service is required to immediately replace all the plates which, due to wear, they should become illegible.

CAUTION



It is absolutely forbidden to remove the warning notices on the machine.

The manufacturer declines all responsibility for the safety of the machine in case of failure to comply with this prohibition.

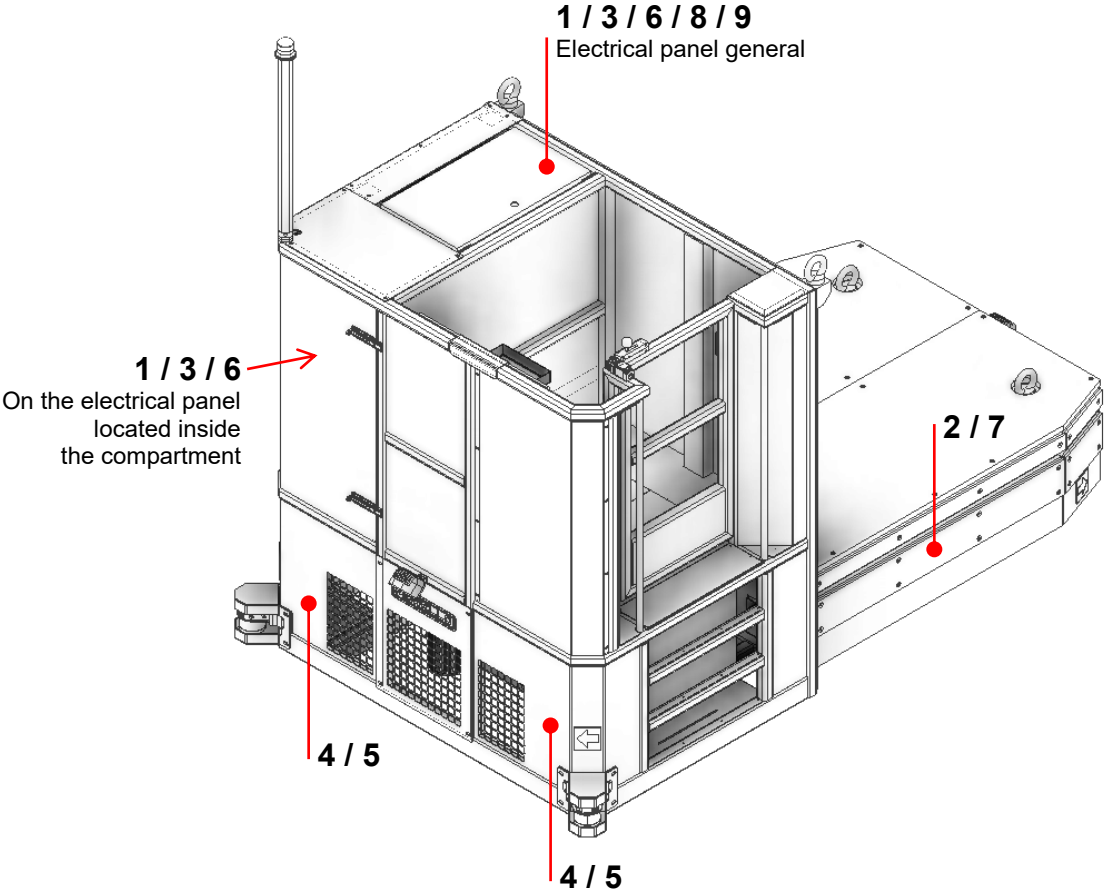
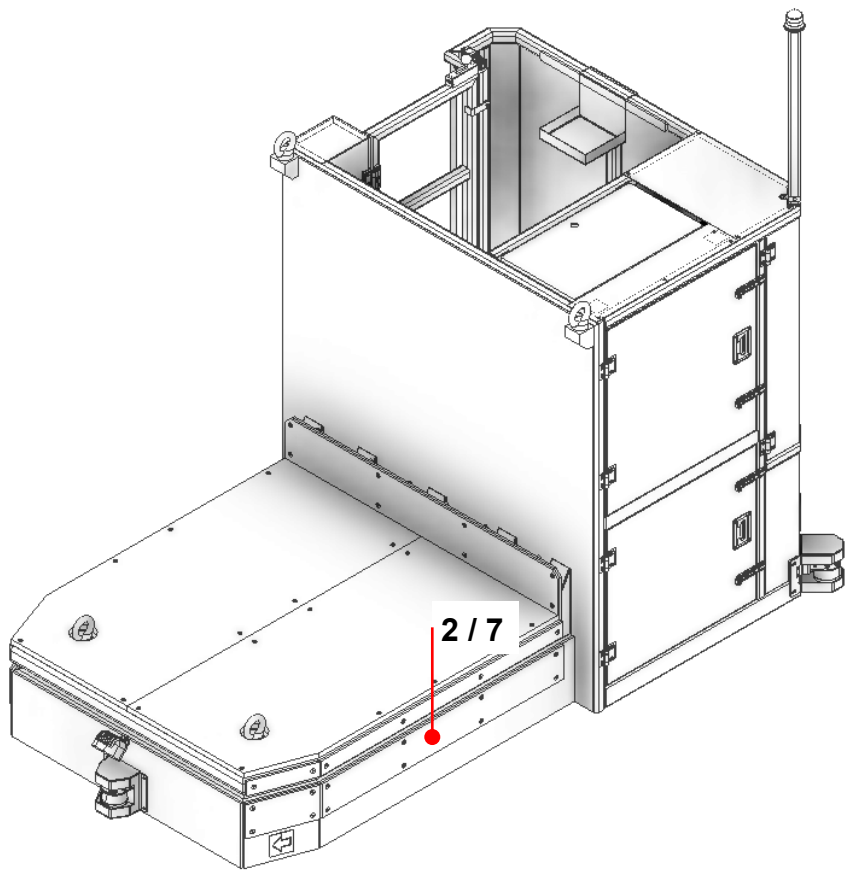
ADDITIONAL INFORMATION

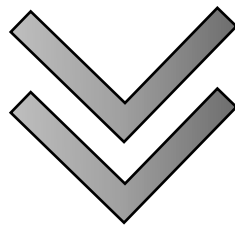


For information on the warning plates installed on the incorporated parts of the machine, consult the specific manuals.

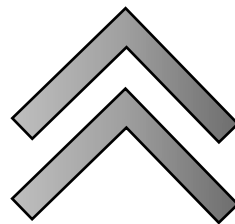
PLATES ON THE MACHINE		
Plate 1		Hazardous electric voltage.
Plate 2		<u>Danger</u> of crushing lower and upper limbs.
Plate 3		<u>Do not</u> carry out maintenance with equipment powered.
Plate 4		<u>Do not</u> clean, oil, grease, repair or adjust moving parts by hand.
Plate 5		<u>Do not</u> remove safety devices.
Plate 6		<u>Do not</u> extinguish fires with water.
Plate 7		Do not climb on the machine.
Plate 8		<u>It is compulsory</u> to wear protective gloves.
Plate 9		<u>Obligation</u> to read the user and maintenance manual.

**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2





GENERAL DESCRIPTION



**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



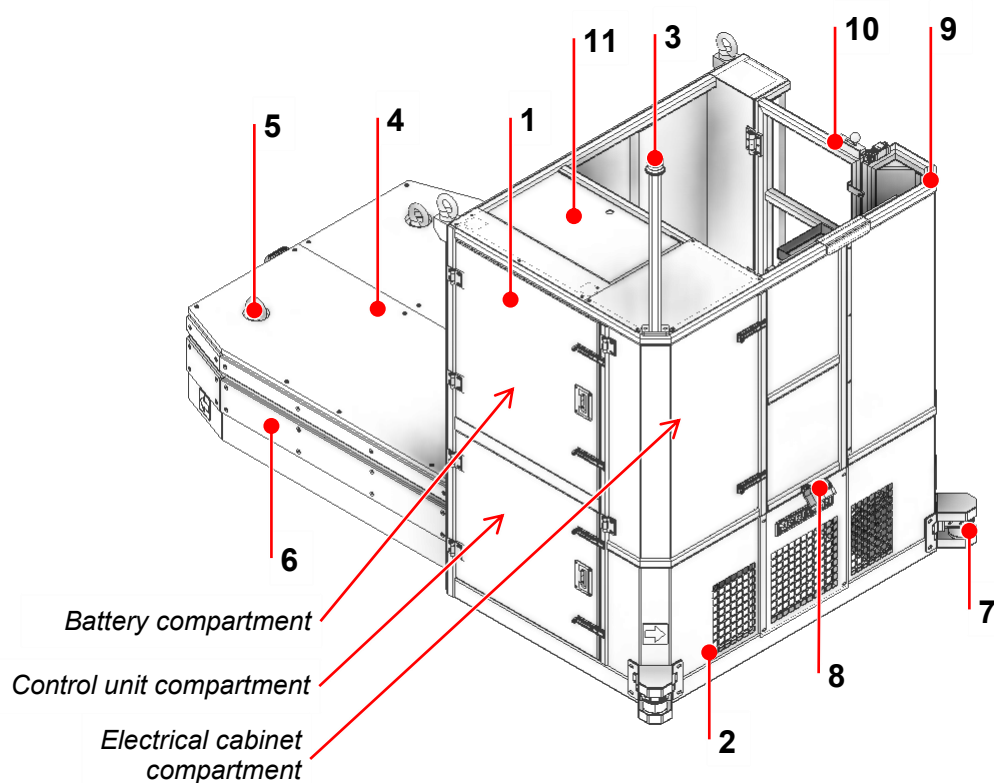
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3. GENERAL DESCRIPTION

The machine has been designed and manufactured to lift and handle heavy loads, in accordance with the technical specifications set out in this manual. The load must be placed on a suitable pallet (not supplied). It can be used both indoors on a concrete floor (flat, smooth and level). The working area must be clear and large enough for machine movement.

3.1 LAYOUT

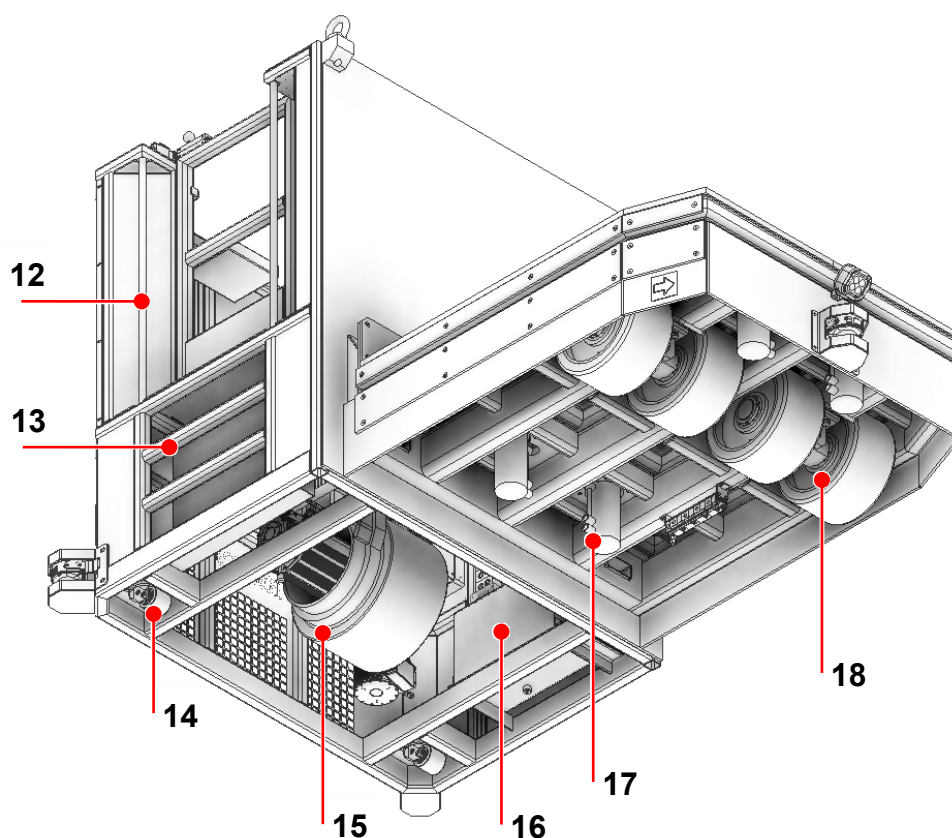
N.	DESCRIPTION
1	Movable guard
2	Fixe guard
3	Signal lamp
4	Loading surface
5	Lifting point on the machine
6	Scratch-resistant side protection
7	Laser scanner
8	Spotlight BLUEPOINT
9	Parapet
10	Gate with a switch
11	Electrical switchboard with HMI panel



**SELF-PROPELLED ELECTRONIC
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N.	DESCRIPTION
12	Handrail
13	Ladder
14	Stability wheel
15	Front motorbike
16	Hydraulic unit
17	Hydraulic lifting cylinder
18	Idler wheel
19	Wired control panel / Radio-control



3.2 TECHNICAL DATA

The following table contains the main machine data.

MACHINE	
Weight	Approx. 3.800 kg
Maximum working load (WLL)	38 t evenly distributed, with the centre of gravity aligned with the Client's pallet
Loading surface dimensions	Approx. 1.500 mm x 1.600 mm
Height loading surface	Approx. 520 mm from the ground $\pm$ 110 mm (lifting stroke)
Movement indicators	Acoustic and luminous
Machine lifting points	4
Fixed guard	Steel
Frame	Steel
Loading surface	Smooth steel sheet + non-slip coating
Transmission	Electro-mechanical
Translation	Adjustable electronics
Steering	Electrical
Type of steering	Simple front flip
Steering angle	$\pm 90^\circ$
Motorised steering wheels	1 (front)
Idler wheels	4 (rear)
Stability wheels	2
Type of wheels	Polyurethane coating
Dimensions of the motorised wheel	$\varnothing$ 500 x 300 mm
Idler wheel dimensions	$\varnothing$ 400 x 200 mm
Maximum slope that can be overcome	0,5 %
Traction motor	1 electric motor 80 V 12 kW
Steering motor	1 electric motor 80 V 3 kW
Travel speed	Quick mode: 0 ÷ 45 m / min Slow mode: 0 ÷ 25 m / min
Service brake	Electric negative
Parking brakes	Electromagnetic negatives

**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



MACHINE	
Control device	Wired control panel / Radio-control
Lifting cylinders	4
Hydraulic power unit motor	1 electric motor 80 V 2,2 kW
Oil tank capacity	30 litres

POWER SUPPLY	
Power supply voltage	80 V
Type of power supply	LITHIUM battery
Nominal capacity	220 Ah
Battery weight	Approx. 170 kg
Autonomy	Approx. 3 h
Recharging method	Rectifier
Rectifier supply voltage	480 V 60 Hz
Recharging time (full)	Approx. 2 h

ADDITIONAL INFORMATION



The data contained in the tables above may vary, therefore, for more precision or verifications of the machine data, see the attached diagrams.

3.3 GROUPS DESCRIPTION

ADDITIONAL INFORMATION



For more information on the commercial components that make up the groups, please refer to the accompanying documentation.

3.3.1 Machine structure

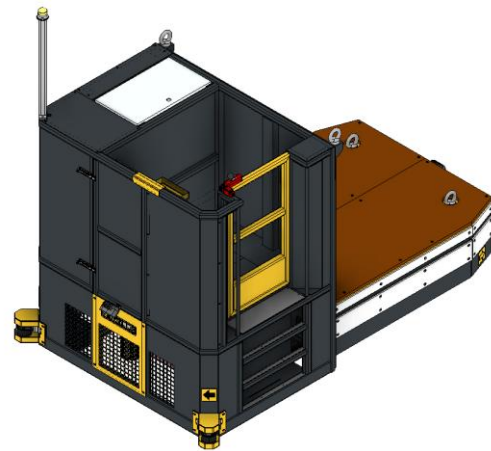
The machine is constructed with a frame **(1)** made of sheet and profile steel and a protection casing made of smooth **(2)** and grated sheet steel **(3)**.

At the front of the machine there are three hatches **(4)** providing access to the battery, the electrical panel and the hydraulic control unit (for maintenance work).

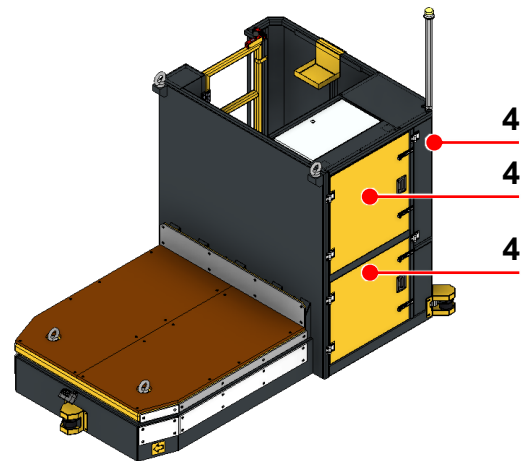
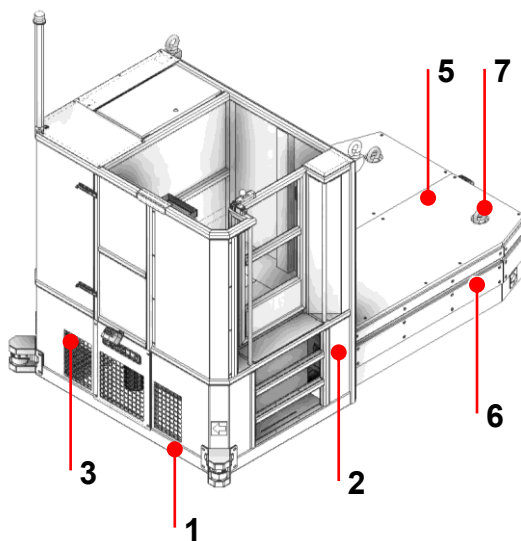
The machine is fitted with a lifting platform **(5)** on which the load is placed. The perimeter of the loading platform is lined with polyethylene protective panels **(6)**, whilst the top is lined with wooden panels.

The paintwork is finished in anthracite grey (RAL 7016) and yellow (RAL 1018).

There are four threaded holes for fitting four eye bolts **(7)** for lifting the machine.



Front



Rear

**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
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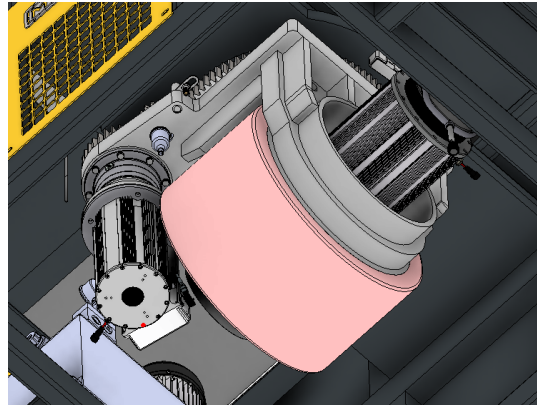


3.3.2 Wheels group

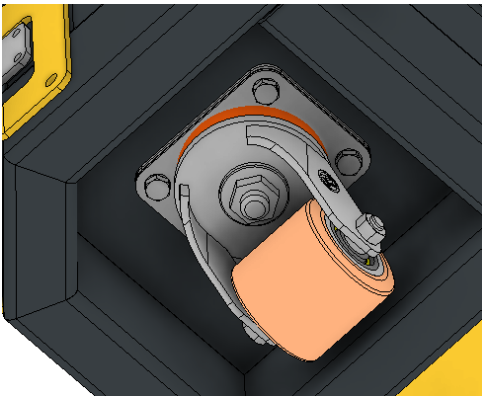
The machine is manoeuvred by five wheels, comprising one motorised front wheel (1) and four non-driven rear wheels (2). The non-driven wheels are mounted in pairs on rockers (3).

Two pivoting non-driven wheels (4) are fitted at the front to ensure stability.

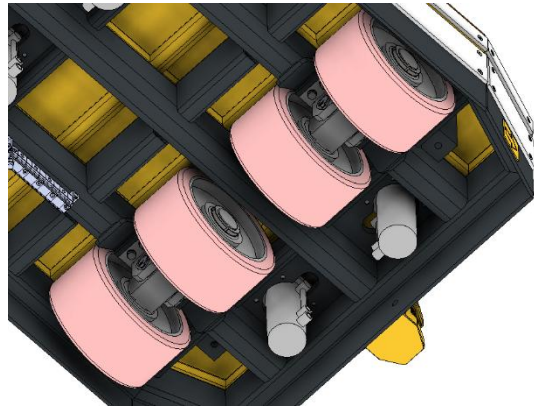
Each wheel is constructed with a steel core and a polyurethane coating.



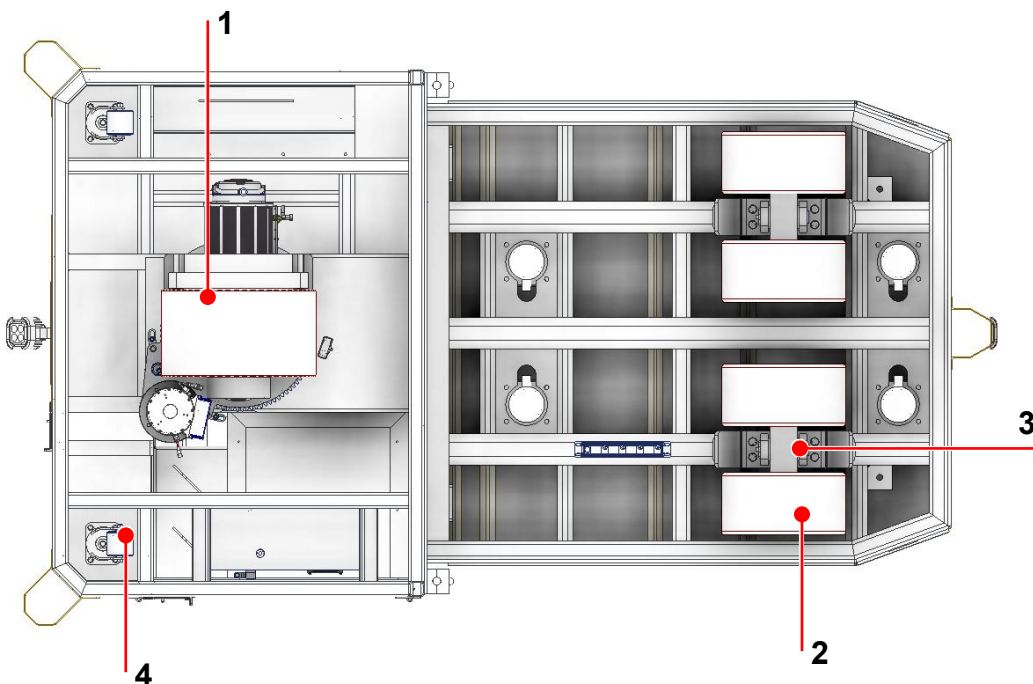
Motorised front wheel (1)



Front stabiliser wheel (4)



Idler rear wheels (2) on the rocker arm (3)

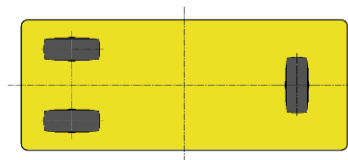


3.3.3 Steering

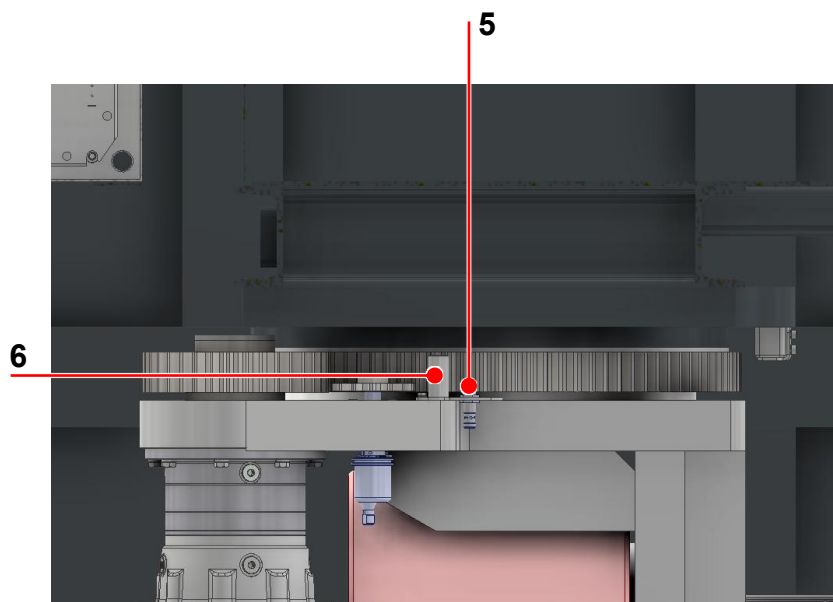
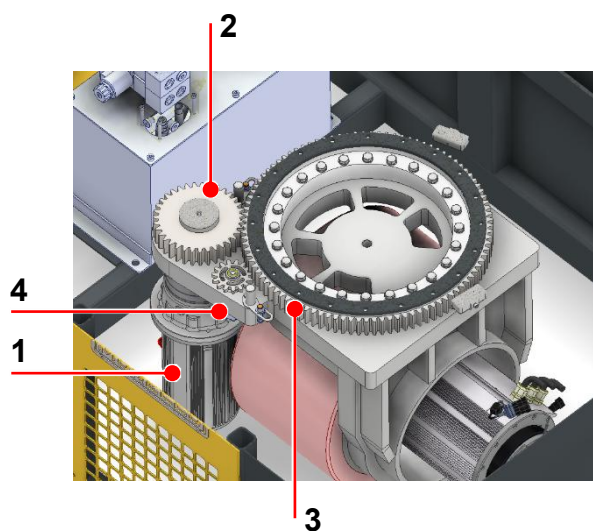
Steering is controlled by an electric gear motor **(1)**, which transmits motion via a pinion **(2)** to the rack **(3)** of the front motorised wheel. It can steer through $\pm 90^\circ$.

The steering angle is read from an encoder **(4)**.

In order to guarantee machine safety, in the event of an encoder failure, there are two types of limit switches (the first electrical type **(5)** and the second mechanical type **(6)**).



Front single-curve steering



**SELF-PROPELLED ELECTRONIC
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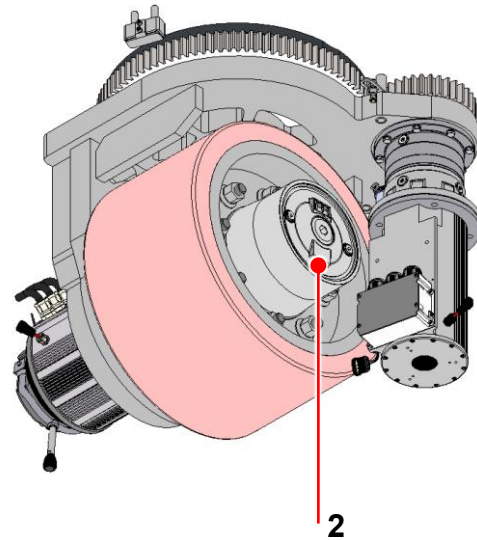
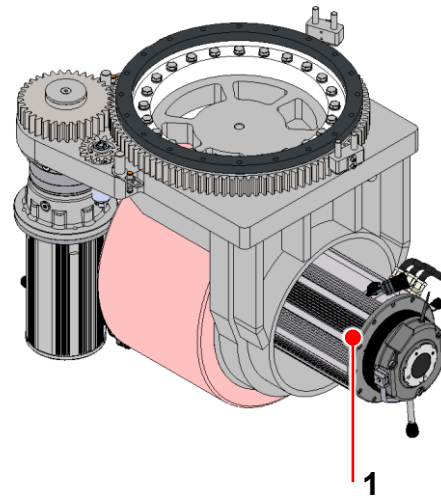
3.3.4 Traction and braking

Power is transmitted to the front motor wheel via an electric motor **(1)**. The power is transmitted via a gearbox **(2)**.

The translation, which is electronic, allows gradual acceleration and deceleration ramps, millimetre shifts and uniform speed variations.

Operating braking is achieved by negative torque on the traction motor.

Parking braking is achieved via negative electromagnetic brakes mounted on the motors.

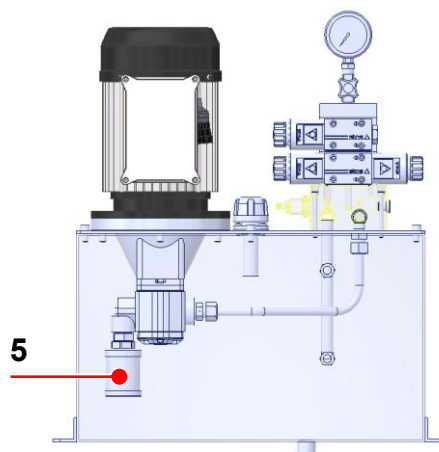
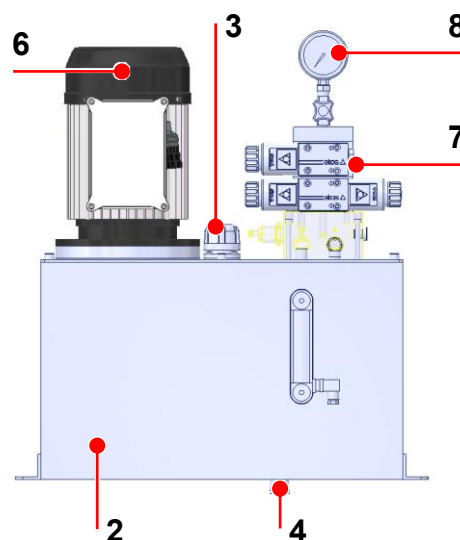
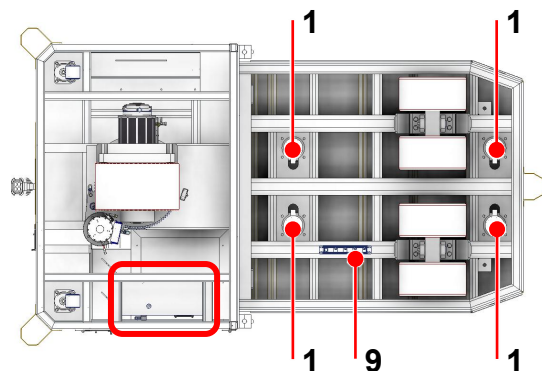


3.3.5 Hydraulic unit

The unit enables the loading platform to be raised by means of four hydraulic cylinders (1).

It consists mainly of:

- Oil tank (2) with level indicator.
- Tank top-up point (3).
- Tank drain point (4).
- Filter (5).
- Pump (6) with electric motor.
- Solenoid valves (7).
- Pressure gauge (8) with excluder
- Shut-off valves.
- Pressure relief valve.
- Flow divider (9).



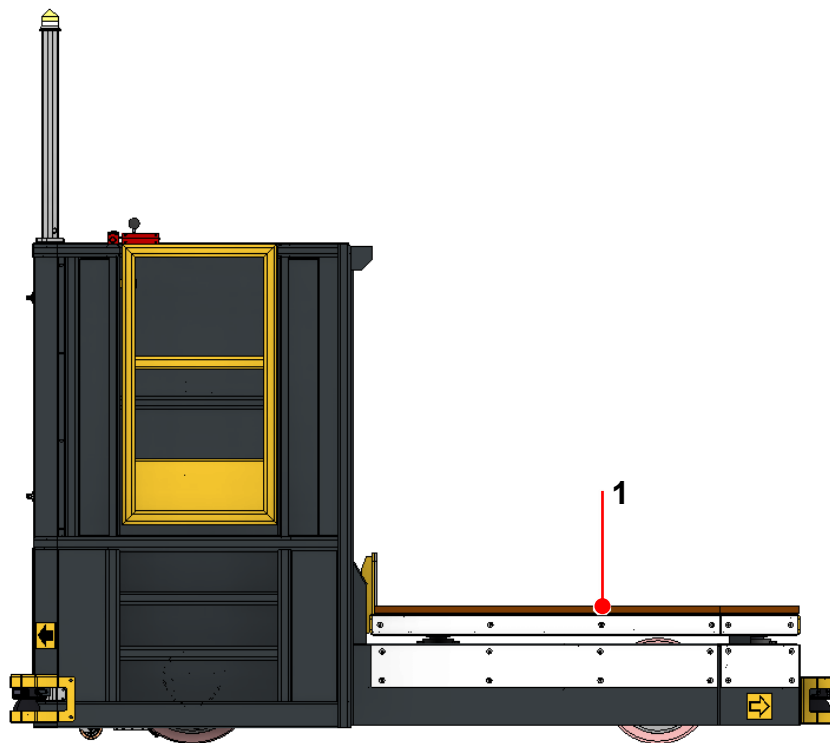
ADDITIONAL INFORMATION



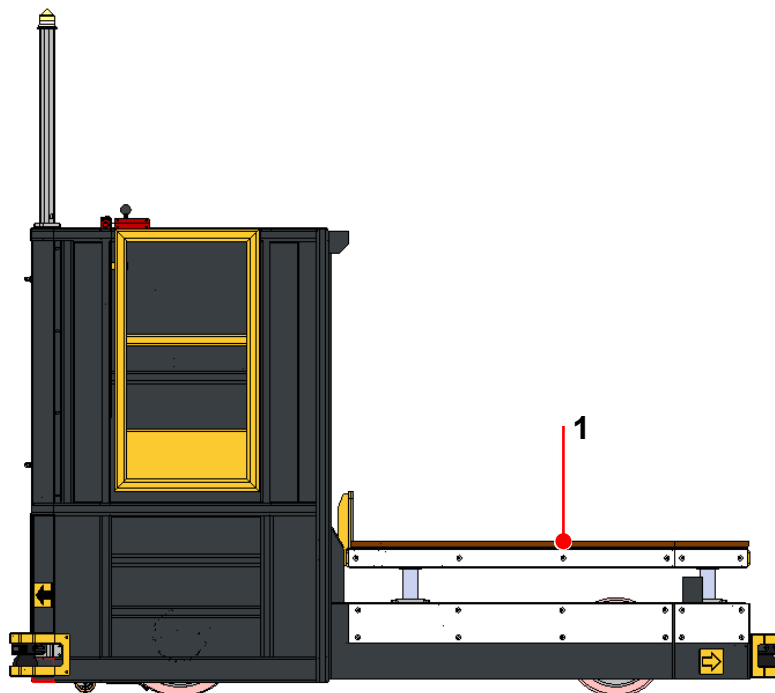
For further information on the hydraulic system, please refer to the relevant diagram and the hydraulic control unit manual provided in the appendix.

3.3.6 Lifiable loading platform

The loading platform (1), consisting of a sub-frame supported by four hydraulic cylinders, can be raised evenly over a stroke of 110 mm.



Low-level floor



Upper level floor

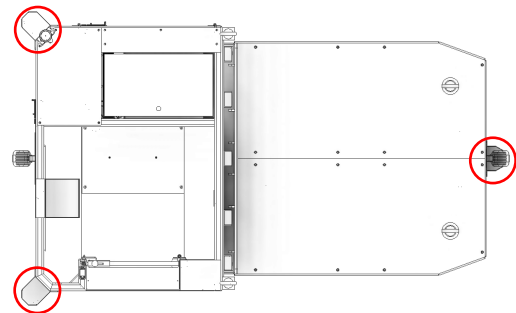
3.3.7 Laser scanner

Three laser scanners **(1)** are fitted around the perimeter of the machine to slow it down and bring it to a halt in the event of obstacles.

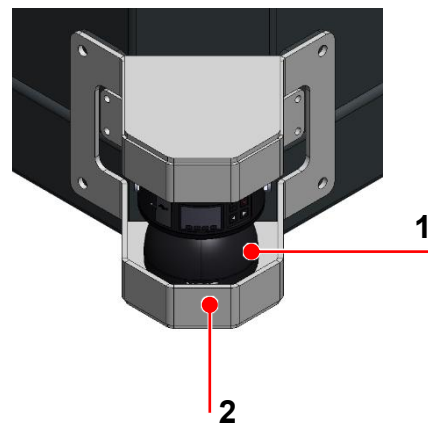
The devices are protected by steel sheet guards **(2)**.

There are two areas of operation:

- Slowdown: if an obstacle is intercepted in this area, there is a slowdown of the machine.
- Stop: if an obstacle is intercepted in this area, the machine stops immediately.



Laser scanner 1 position



3.3.8 Control devices

Machine movements are controlled via the control panel (radio-control or wired control panel).

The operator can execute all commands via a single connected device.

There is a socket on the machine for connecting the control panel.



Wired control panel



Radio-control

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3.3.9 Driver's seat

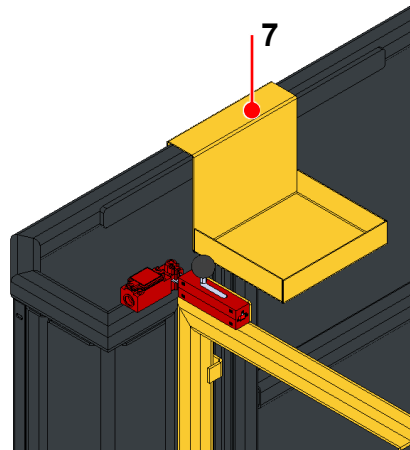
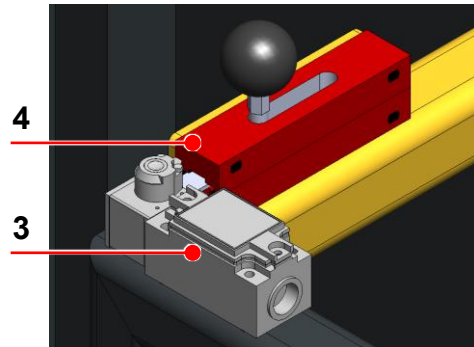
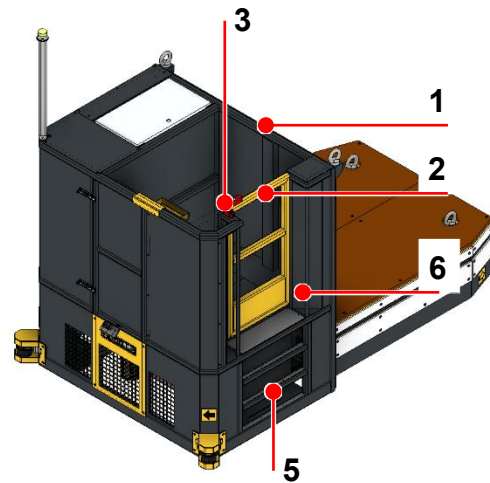
The machine is fitted with an on-board operator's station for operating it.

The perimeter of the operator's station is enclosed by guardrails (1) 1,100 mm high. Access is via a gate (2), fitted with a footrest and an intermediate rail, controlled by a switch (3). After closing the gate, the actuator (4) must be manually inserted into the switch (3) by operating the knobbed lever to enable the machine's movements.

This safety system helps to prevent accidental falls.

There is a small ladder (5) at the gate, with handrails (6) on either side.

The station is fitted with a non-slip, vibration-damping mat and a movable stand (7) on which to place the control panel.

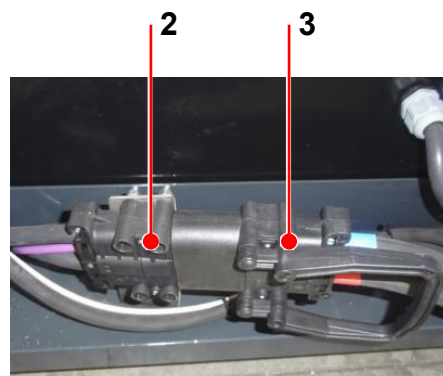


3.3.10 Power supply

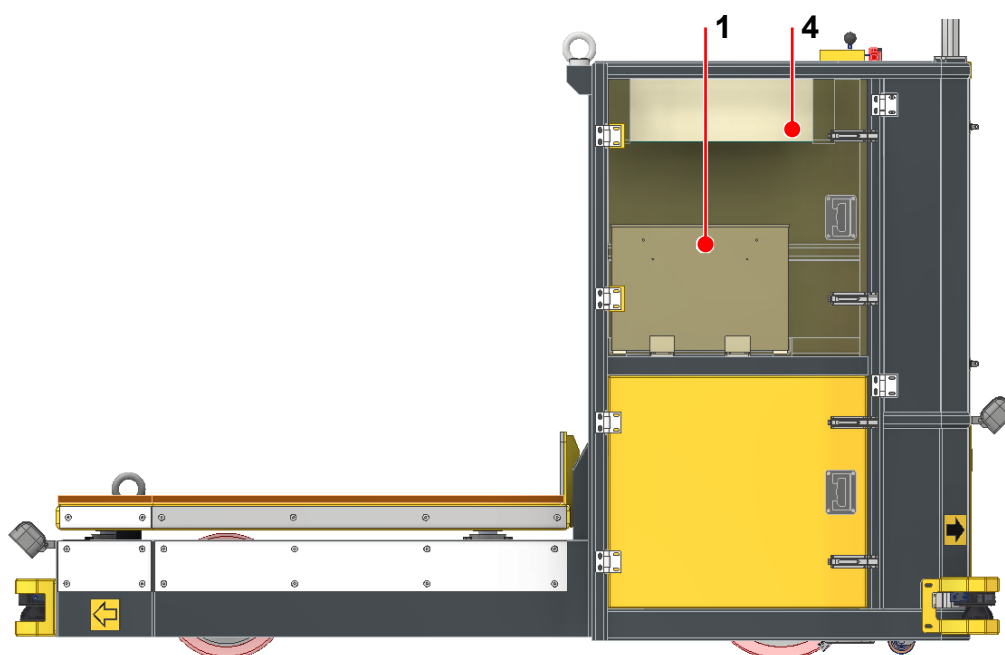
The machine is powered by a lithium battery (1) inserted in a special compartment.

The battery socket (2), located near the battery, can be connected to the machine's plug to supply power, or to the rectifier's plug (3) for recharging.

The connectors and the battery are accessible via the movable cover (4).



Example image



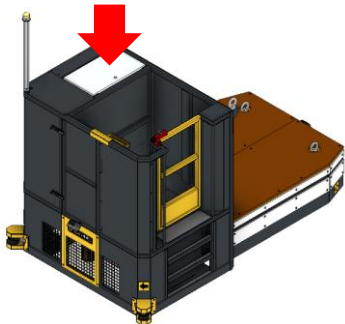
3.3.11 Accessories

The Manufacturer in addition to the delivery of the machine provides:

- N.1 Rectifier for battery recharging of the machine.
- N.1 Radio-control battery charger.

3.4 PUSHBUTTONS

3.4.1 Pushbutton on electric panel



Position



Image of the pushbutton panel

IMAGE	DESCRITPION
	Power-on key selector switch Turn to position (1) to switch on the machine. Turn to position (0) to switch off the machine
	Insertion services white luminous button Press to insert the auxiliary services.
	Voltage inserted on white led When alight, it indicates the machine is powered.
	Yellow illuminated button for additional time This switches on to indicate that the battery has reached approx. 30% autonomy. Pressing restores power to the machine for another 15 minutes, to be able to reach the recharging station.

IMAGE	DESCRIPTION
	Red luminous generic fault button When alight it indicates there is a fault/emergency. Check the cause of the fault/emergency on the display.
	Red light on intercepted scanners When this light comes on, it indicates that the laser scanner's stop area has been detected.
	CAN network programming port connector.
	Orange lamp: SCANNER BY-PASSED If lit, this indicates that the timed bypass for the laser scanners has been activated, which deactivates the devices until the machine is switched off.
	Battery display This tool allows you to view information about the battery (remaining charge, voltage, current, etc.). For further information, please refer to the battery manual, which is attached.

3.4.2 RFID reader with numeric keypad



An RFID card reader with a numeric keypad for entering the PIN code is fitted to the machine's control panel.

This device allows the laser scanners to be deactivated until the machine is switched off. When this happens, the flashing orange 'SCANNERS BYPASSED' indicator light on the control panel comes on.

To activate the bypass, you must:

1. Hold the card close to the RFID reader.
2. Enter the relevant PIN.

To reactivate the laser scanners, you need to switch the machine off and on again.

NOTE



RFID cards (and their corresponding PINs) must be kept in a secure place by the person in charge of the machine.

CAUTION



When the bypass is active (i.e. the safety function is disabled), it is the operator's responsibility to ensure that the area is clear of people and objects during operation.

3.4.3 Control panel (wired control panel / radio-control)



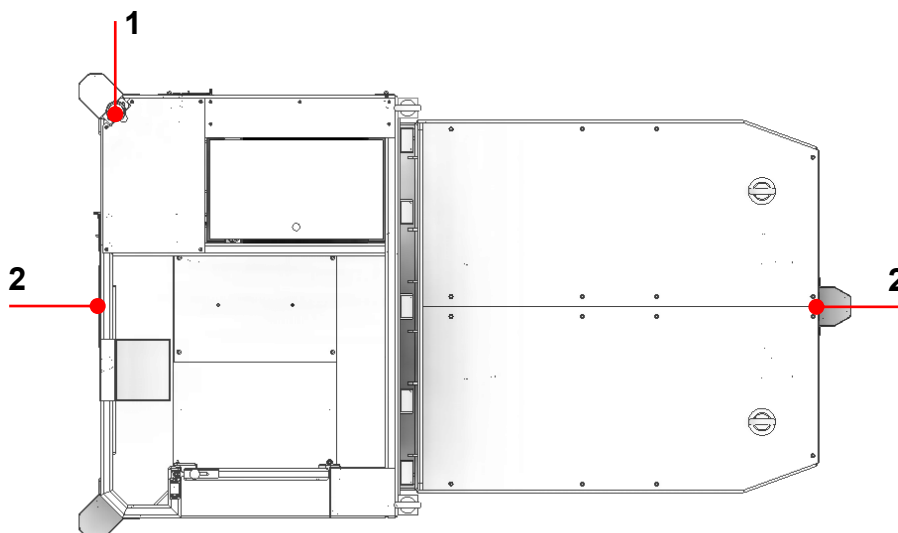
IMAGE	DESCRIPTION
	Key switch for the control panel (SIDE) Turn the switch to the (I) position to switch the pushbutton panel on. Turn the switch to the (O) position to switch the pushbutton panel off.
	Green button START / HORN (SIDE) Press to activate the wired control panel / connect the remote control after switching it on. Press to operate the horn while the car is in use.
	Button 0° (SIDE) Press to straighten the steering wheel.
	Green ON indicator light When lit, this indicates that the pushbutton panel is switched on.
	RESET / SAFETY OFF lever Push the lever to RESET to activate the auxiliary circuits. If you move the lever to SAFETY OFF (and hold it in this position), the laser scanners are disabled. If you hold it down for more than 60 seconds, an alarm is triggered.

IMAGE	DESCRIPTION
	Lever for selecting the maximum travel speed Push on "HARE" to set maximum speed of 45 m/min. Push on "SNAIL" to set maximum speed of 25 m/min.
	Lever for raising and lowering the loading platform Move the lever to raise or lower the loading platform. The lever is a hold-to-operate type.
	Emergency button Press in the event of danger to bring the machine to an immediate stop. To reset it, turn it clockwise.
	Steering lever LEFT / RIGHT Operate the lever to steer to the left or right. The lever is maintained action.
	Movement lever FORWARD / REVERSE Act on the lever to move the machine forwards or backwards. The lever has a maintained action. The travel speed is proportional to the pressure exerted.
	Pushbutton panel cable connector.

3.5 VISUAL AND ACOUSTIC INDICATIONS

The following visual and acoustic indication devices are installed on the machine:

- Lamp (1)
- Buzzer
- Spotlight BLUEPOINT (2)



SIGNALLING	DESCRIPTION
YELLOW FLASHING LIGHT + BUZZER	They are activated during machine movement and deactivated when the machine is completely stationary.
BLUE LIGHT (2)	A beam of blue light on the road surface in the direction of travel.

ADDITIONAL INFORMATION

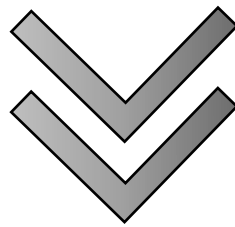


There is a horn that the operator can use to warn of the passage of the machine.

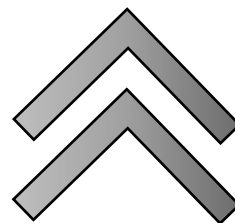
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TRANSPORT AND STORAGE



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4. TRANSPORT AND STORAGE

4.1 STORAGE

The machine is shipped by the Manufacturer already assembled and with the battery charged inside it.

The packaging does not protect the machine against external weather conditions, such as rain, snow, hail, etc even if it is transported in wooden cases. Therefore, if it remains exposed to weather conditions it is indispensable that it remains in the closed container until the final storage.

The storage site is to be appropriate for use as a machine warehouse: closed, protected against weather conditions, clean and ventilated. The floor is to be able to sustain the weight of the machine. Environment temperature is to be between 0 ° C and + 30 ° C.

The Manufacturer shall not be held liable for damage caused by long periods of storage or under conditions that differ from those indicated.

4.1.1 Storage of battery/batteries

When not used, the battery is to be kept in a covered area that is protected against weather conditions, dry, free of dust and protected against frost. Inspect and recharge at regular intervals on a weekly basis. Run complete recharging cycles before periods of long inactivity.

ADDITIONAL INFORMATION



For any other information regarding the battery, see the relevant manual attached.

4.2 TRANSPORT

The machine may be shipped, according to the destination, in the following ways:

- BY SEA → the machine is enclosed in a caisson with a flat bottom and anchored with tie rods. The caisson is lined with tar paper and contains bags with drying salts against moisture and salt.
- BY AIR → the machine is enclosed in a flat-bottomed box and anchored with tie rods.
- BY LAND → land transport can be divided into two categories:

- LONG-DISTANCE TRANSPORT the machine is covered with protective tarpaulins, enclosed in a wooden cage with a flat bottom and anchored with tie rods on the loading surface of the articulated truck.

The instructions printed on the outside of the packaging must be strictly adhered to when lifting the container. Packages may be recovered for eventual re-use; it is good practice to try to keep them in a protected place to avoid damaging them and making them unreliable. If, on the other hand, they are disposed of, it is the Customer's responsibility to dispose of them in accordance with the regulations in force in their own country.

- MEDIUM AND SHORT-DISTANCE TRANSPORT the machine is secured to a flatbed and covered with protective sheets.

The anchorage points for lifting are indicated on the shipped packages.

Furthermore, externally on the packages there are all the indications to identify the contents and for the safe handling:

- Address of the receiver and the sender.
- Dimensions (length, width, height).
- Gross, net weight and tare.
- Centre of gravity.
- Notes and symbols (e.g. fragile, this way up, etc.).
- Packing list holder label (to be contained inside each package).

4.3 LIFTING

Before any handling and/or lifting operations, it is important to know the weight.

NOTE



All handling and lifting operations are to be carried out by qualified operators, who know the standards regarding lifting and handling of loads, so that it can act in full respect of them.

NOTE



Use suitable lifting equipment, appropriate for the weight and overall dimensions of the load to be handled.

NOTE



Always check the correct balancing of the load. If it is unbalanced, immediately rest it on the ground and rearrange the slings appropriately.

CAUTION



When the load is lifted by more than 50 cm from the ground, the operators are to remain at a safe distance of more than 2 m from the perimeter.

Breakage of a chain or an uncontrolled movement of the load is, in fact, a serious hazard for the safety of the operators.

4.3.1 Weight/s

DESCRIPTION	WEIGHT
Machine	Approx. 3.800 kg

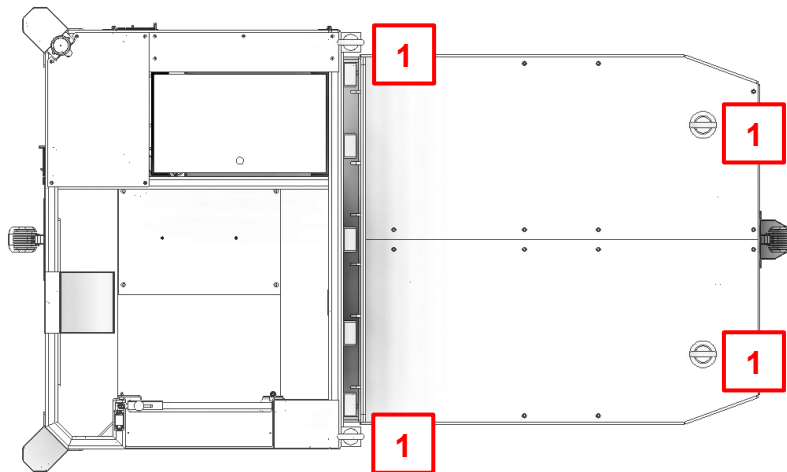
4.3.2 Complementary to the machine

The manufacturer, in addition to the delivery of the machine, provides n.4 fixed M30 eyebolts for lifting the machine.

4.3.3 Machine lifting

To lift the machine, proceed as follows:

- Make sure there is nothing on the loading platform.
- Make sure the loading platform is fully lowered.
- Insert a fixed M30 eyebolt into each of the four points **(1)** provided on the machine.



NOTE

Before using the eyebolt, check the integrity and cleanliness of the thread.

To orientate the eyebolts correctly, insert suitable washers.



Images for illustrative purposes

- Insert appropriate hooks with chains in the four eyebolts.
- Secure the chains to the hooks of an appropriate lifting.
- Slowly lift the machine taking care to balance it correctly.
- Transport it avoiding abrupt movements and keeping it as close to the ground as possible.
- Upon arrival at destination, slowly and gradually rest it on the ground.
- Only release the chains after the machine is resting perfectly on the ground.
- Remove the eyebolts.

LIFTING DIAGRAM

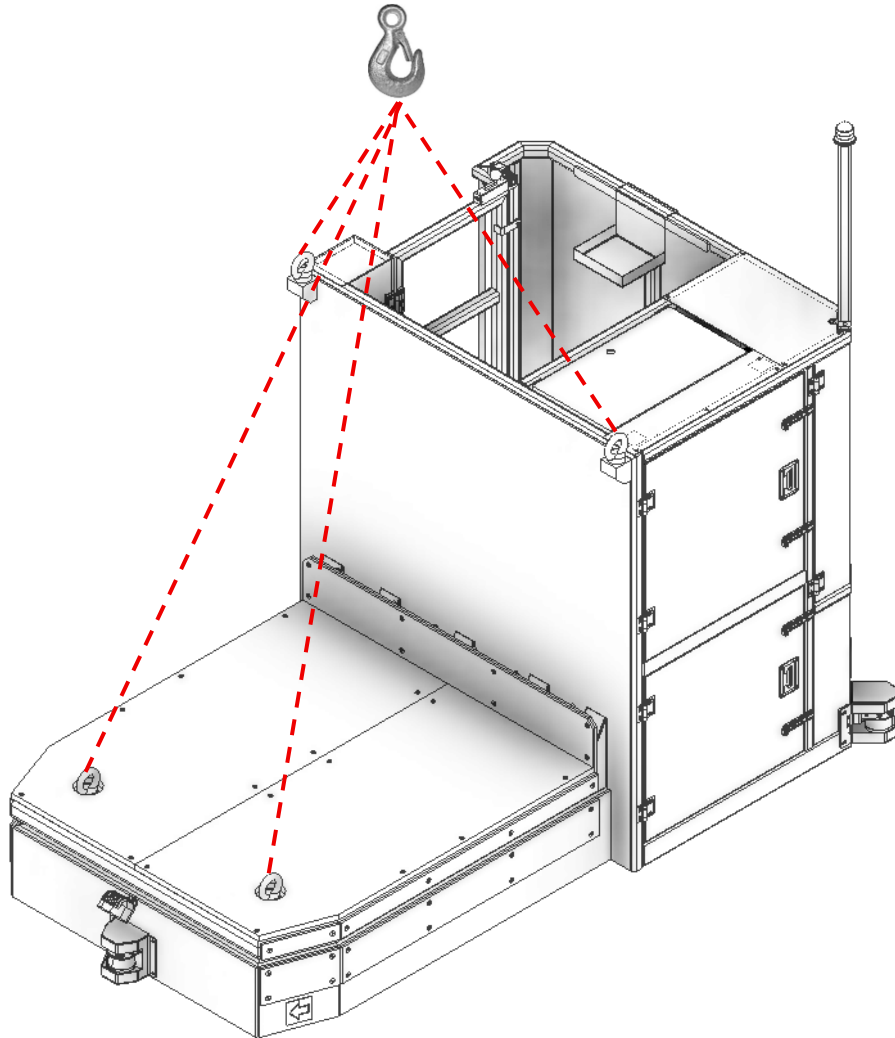
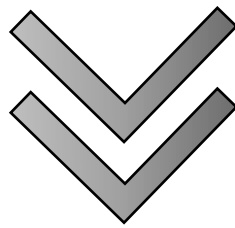


Image for illustrative purposes

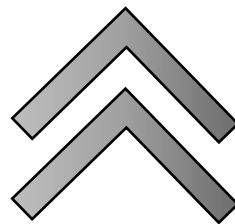
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INSTALLATION



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5. INSTALLATION

Before using the machine, the following have to be removed:

- Any fastening restraints used for transport.
- Protective packaging.

5.1 INTACTNESS CHECK

The machine has to be checked to ensure that no damage has occurred during transport. Therefore, in the case of accidents or if visible damage is seen (signs or traces of impact), please notify in this manner:

- With a written notification on the Shipping Document.
- Informing the carrier and the Manufacturer of the damage found by means of registered letter (or PEC) attaching photos of the damage, within 48 hours of the machine delivery.

5.2 INSTALLATION OF THE MACHINE

NOTE



The machine is shipped from the manufacturer already assembled and with a charged battery inside.

5.2.1 General safety precautions

The operations described in this chapter must be performed by authorized personnel.

NOTE



Personnel in charge of all operations described in this chapter must be trained, to avoid incorrect operations that could damage the machine.

CAUTION



Make sure there is nothing around the machine that can cause interference or danger to operators.

ADDITIONAL INFORMATION



Refer to specific manuals for information regarding embedded devices.

5.2.2 Choice of place of use and check on requirements

The Customer **MUST** provide:

- A sufficiently large environment, free of obstacles, equipped according to the safety standards in force in the user country.
- Correct ventilation and lighting.
- Appropriate lifting devices.
- Operational spaces.
- Passageways.
- Escape routes.
- A flat, level and smooth surface capable of supporting the weight of the machine and its load.
- A power supply that meets the required specifications and tolerances.
- Pallets of a suitable size.

5.3 FILLING THE TANK

The machine is supplied with the hydraulic unit tank empty.

Upon installation, it is necessary to first fill with oil using a special filter to avoid contamination.

NOTE



It is recommended never to mix oils of different types and/or manufacturer. Used oil, as special waste, is subject to disposal through authorized consortia.

NOTE



Using a type of oil that is not equivalent to that specified will void the warranty in case of failure and/or breakage.

ADDITIONAL INFORMATION



The machine is supplied with the control unit already connected.

5.3.1 Hydraulic power unit tank filling

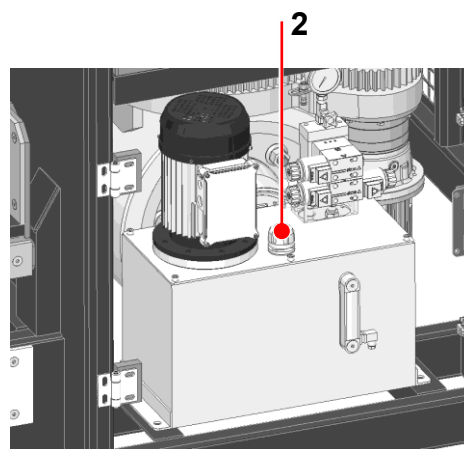
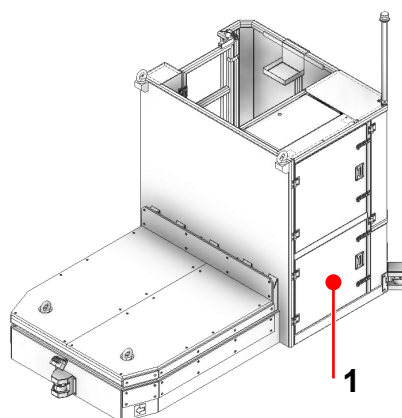
WARNING



This operation must be carried out whilst the machine is at a standstill and the power supply is switched off and disconnected.

For filling, proceed as follows:

- Access the tank by opening the flap **(1)**.
- Check that all the pipe connections to the tank are securely tightened.
- Turn and remove the tank cap **(2)** to fill the tank.
- Fill the reservoir with IP HYDRUS 46 oil or an equivalent product until the level reaches the midpoint between the minimum and maximum marks on the reservoir's gauge.
- Securely close the cap **(2)**.
- Close the door **(1)**.



NOTE



The fluid level decreases when the system is put into operation as the fluid fills the pipes and actuators, which is why the fluid level must be checked regularly.

ADDITIONAL INFORMATION



For more information on the hydraulic unit, please refer to the accompanying manual and hydraulic diagram.

5.4 CHECKS AND INSPECTIONS

Before starting the machine, some general controls and checks have to be carried out to avoid risks or problems during machine operation.

CAUTION



These checks and preparation for the first start-up are to be carried out by a specialised technician of the Manufacturer or by a specialised technician who has been specifically trained.

NOTE



Before starting any movement, make sure there are no anomalies to avoid damage to the machine. Before deleting any fault, check the cause and remove it.

ADDITIONAL INFORMATION



The checks and inspections that follow are to be considered as routine maintenance operations.

ADDITIONAL INFORMATION



Refer to specific manuals for information on built-in devices.

5.4.1 Overall checks on mechanical units

WARNING



This operation must be carried out with the machine at standstill and with the power source switched off and disconnected. Ensure the working area is clear and free of obstructions.

- Visually check the wheel groups, checking there are no mechanical faults (ovalizing, crushing, warping due to loads and/or foreign objects).
- Perform a general visual inspection of the various groups that make up the machine, verifying that there are no particular mechanical anomalies or foreign bodies.
- Check that all the guards are mounted correctly.
- Check that moving parts are correctly lubricated.
- Check for correct tightness of all nuts and bolts.

ADDITIONAL INFORMATION



To check the tightness, see the tables in the paragraph "Tightening torques" in the chapter "Maintenance".

NOTE



If problems arise, contact the Manufacturer immediately.

5.4.2 Electrical system check

Proceed with a general check on the electrical system and in particular check that all the junction boxes are closed and all the conductors are connected.

Main switch

- Rotate the voltage input selector on (1) and verify the presence of voltage, by turning on the appropriate lamp.

Motor/s

- Check correct connection of the motor/s.

Pushbutton panels

- Check correct functioning of the buttons and selectors with consequent switching on of the luminous indicators.
- Check that the machine movement corresponds to the relevant control.

Indicators and sensors

- Check correct connection and functioning of the buzzer and the horn.
- Check that the lamp and spotlights are correctly connected and working properly.
- Check the correct connection and function of the limit switches and encoder.
- Check the correct connection and function of the laser scanner.

ADDITIONAL INFORMATION



For further information and details, see the wiring diagram.

5.4.3 Checks on safety devices

Check that the guards and the safety devices are correctly assembled and functioning.

WARNING



Machine safety cannot be ensured if safety devices are removed or tampered with.

CAUTION



Carry out the functional, tightness and positioning checks of the safety systems as indicated in chapter 2.

NOTE



These control procedures are to be applied as normal maintenance procedures.

5.4.4 Hydraulic system checks

Carry out a general check of the hydraulic system, and in particular:

- Check the oil level in the tank via the gauge on the tank.
- Check that the pressure matches that shown in the relevant diagram.
- Check that there are no hydraulic leaks from pipes or cylinders.
- Check the correct tightening of pipe connections.
- Check the hoses for tight bends, crushing or abrasion.

ADDITIONAL INFORMATION



For further information and clarification, please refer to the hydraulic diagram and the hydraulic control unit manual.

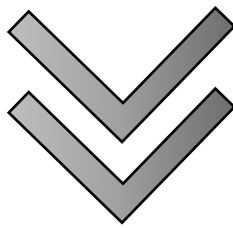
5.5 UNIVERSAL INTERNATIONAL RECYCLING CODES

Symbol	Code	Description
Plastics		
	#1 PET o PETE	Polyethylene terephthalate or arnite: water bottles, soft drink bottles, shampoo bottles
	#2 HDPE	High-density polyethylene: containers of yogurt, detergent bottles
	#3 PVC o V	Polyvinyl chloride: food containers
	#4 LDPE	Low Density Polyethylene: frozen food bags, squeezable bottles
	#5 PP	Polypropylene or MOPLen: bottles
	#6 PS	Polystyrene or Styrofoam: disposable glasses
	#7-#19 O	Any other plastics
Paper		
	#20 PAP	Corrugated Cardboard: boxes of furniture to assemble
	#21 PAP	Paperboard, not corrugated: packaging of sandwiches in fast-food
	#22 PAP	Paper: pack of fries in fast-food, newsprint, paper bags
	#23-#39	Other types of paper
Metals		
	#40 FE	Steel
	#41 ALU	Aluminium: cans
	#42-#49	Other types of metal
Wooden materials		
	#50 FOR	Wood

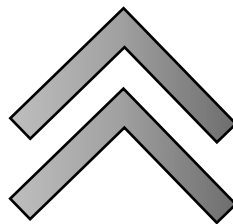
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Symbol	Code	Description
	#51 FOR	Cork
	#52-#59	Other types
Textiles		
	#60 TEX	Cotton
	#61 TEX	Jute
	#60-69	Other textile materials.
Glass		
	#70	Transparent / colourless glass: water bottles
	#71	Green glass: wine bottles
	#72	Brown glass: bottles of beer
	#73-79	Other materials in glass and cans
Composite materials		
	#80	Paper and cardboard / various metals
	#81	Paper and cardboard / plastic
	#82	Paper and cardboard / aluminium: bag of packed biscuits
	#83	Paper and cardboard / tin
	#84	Paper and cardboard / plastic / aluminium
	#85	Paper and cardboard / plastic / aluminium / tin
	#86-#89	Other composed materials
	#90	Plastic / aluminium
	#91	Plastic / tin
	#92	Plastic / various metals
	#93-#94	Other composed materials
	#95	Glass / plastic
	#96	Glass / aluminium
	#97	Glass / tin
	#98	Glass / various metals
	#99	Other composed materials



USE



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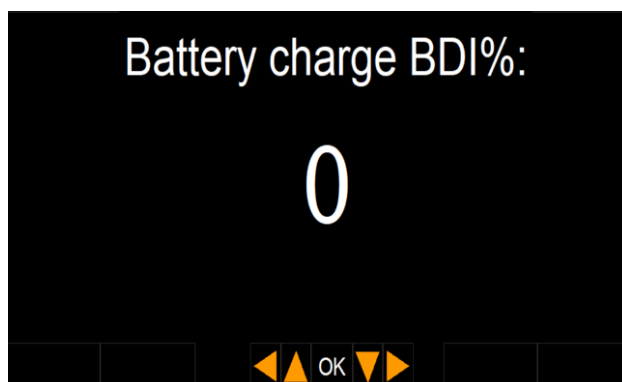
6. USE

6.1 VIDEO PAGES

There is an LCD display on the electrical panel that allows you to view information about the machine.

The screens that can be displayed on the screen are shown below. You can scroll through the screens using the arrows.

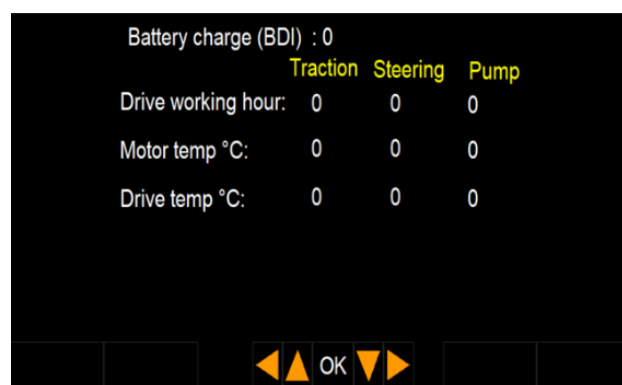
6.1.1 Screen 1: battery remaining charge



This page indicates:

- Battery remaining charge level.
- Any faults / emergency present.

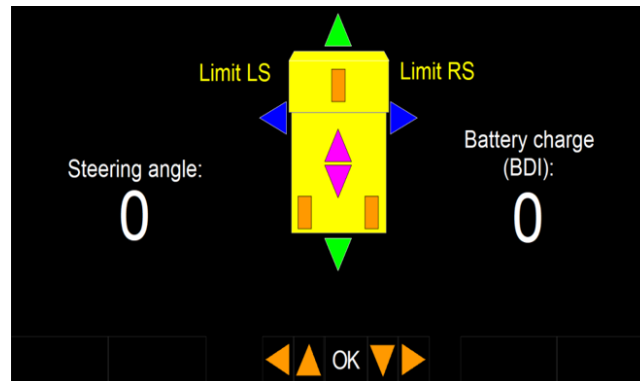
6.1.2 Screen 2: trolley data



This page displays the data regarding:

- Battery remaining charge level.
- Working hours of motor drives.
- Motors temperature in degrees Celsius (°C).
- Temperature of motor drives in degrees Celsius (°C).
- Any faults / emergency present.

6.1.3 Screen 3: movements



This page displays the data regarding:

- Battery remaining charge level.
- Position of the steering wheel.
- Steering angle of the wheel.
- Steering direction (blue arrow).
- Direction of travel (green arrow).
- Upward or downward movement of the load platform (purple arrow).
- Indicator showing that the maximum steering angle has been reached.

NOTE



In the event of an overtravel limit switch tripping, the red general fault lamp on the electrical panel lights up.

- Any faults / emergency present.

6.1.4 Screen 4 and 5: alarms

The following screen allows you to view the active alarms. You can scroll through the list / pages using the arrows.

1	Fault PLC in STOP
2	
3	
4	
5	
6	
7	
8	
9	





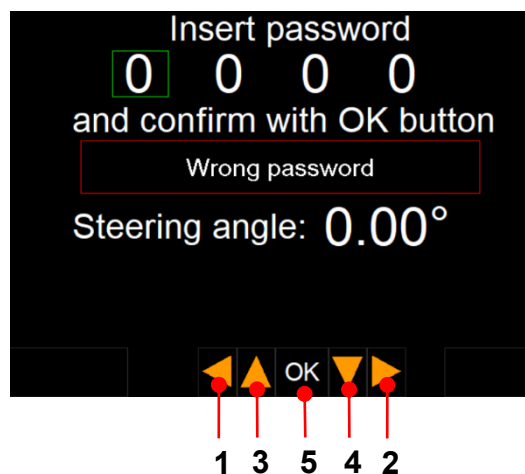

On the following screen it is possible to view a history of the alarms in chronological order. Red highlighted lines show active alarms, while grey lines show reset alarms.

1	Fault PLC in STOP
2	
3	
4	
5	
6	
7	
8	
9	






6.1.5 Screen 6: reset encoder



Using this screen, the steering encoder can be reset after entering the access password.

NOTE



Please contact the manufacturer for the password.

Use the physical buttons below the indicators **(1)** / **(2)** to move between the four digits and the physical buttons below the indicators **(3)** / **(4)** to select the digit. Press the OK button **(5)** to confirm.

To perform the reset, once you have positioned the steering wheel correctly, press the button below the indicator **(3)** and hold it down for 5 seconds.

6.2 ALARMS

A list follows of possible alarms that may be shown on the display.

NOTE



All the operations to be carried out to reset the fault are to be carried out by a specialised technician.

NOTE



For further information and details regarding how to solve faults that could occur, contact the Manufacturer.

ALARM DISPLAYED	CAUSE	ACTION
Emergency not OK	Emergency circuit has activated.	Remove the cause of the error or the hazard and reset the emergency. SPECIALISED TECHNICIAN: Check electrical continuity of the emergency circuit and correct functioning of the emergency devices.
Steering motor drive alarm: cod.[xxxx] Traction motor drive alarm: cod.[xxxx] Pump motor drive alarm: cod. xx	Inverter fault.	SPECIALISED TECHNICIAN: Make sure the battery is charged. Check that the inverter protection fuses are intact. Check that the relevant motor is not blocked or impeded. Check that there is voltage on the auxiliary circuits (24 Vdc). Check drive alarms through the control desk or the configuration software.
Steering motor or drive temp. alarm: cod.[xxxx] Traction motor or drive temp. alarm: cod.[xxxx]	Motor overload, motor blocked, battery flat, interruption of a phase or temperature sensor failure.	SPECIALISED TECHNICIAN: Make sure the battery is charged. Check that the motor is not impeded or blocked. Check continuity of the drive and the motor power circuits. Check continuity of the temperature sensor.
Battery low	Battery flat.	Recharge the battery.

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ALARM DISPLAYED	CAUSE	ACTION
Right steering overrun LS Left steering overrun LS	Position does not correct by software, of the steering wheel due to possible encoder failure or encoder slippage.	SPECIALISED TECHNICIAN: Reset the steering encoder if it is not aligned with the mechanical zero position. After the reset, move the wheel several times and check there is no discrepancy between the mechanical zero position and the zero shown on the display. Check that the encoder is secured correctly with no mechanical slipping. Check cables and wiring of the encoder. Check that the encoder functions correctly, watching the position on the display during the steering. If necessary, replace.
	Overrun limit switch fault.	SPECIALIST TECHNICIAN: If the wheel has not reached the overtravel limit switch, check that the limit switch is working correctly, as well as the limit switch power cable and the wiring.
Encoder not OK: frozen data	Encoder fault.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.
CAN Cumulative Fault	CAN communication with errors.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.
CAN Encoder Fault	No CAN communication between encoder and PLC.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.
CAN Remote control Fault	No CAN communication between control pushbutton panel and PLC.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.
CAN Steering motor Driver Fault CAN Traction motor Driver Fault CAN Pump motor Driver Fault	No CAN communication between motor control driver and PLC.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.
CAN Lithium Battery Fault	No CAN communication between battery and PLC.	SPECIALISED TECHNICIAN: Check the electrical connection. If connected correctly, contact the Manufacturer.

ALARM DISPLAYED	CAUSE	ACTION
Steering offset is ZERO	No ZERO offset setting.	Contact the Manufacturer.
Fault PLC in STOP	PLC hardware or power supply fault.	SPECIALISED TECHNICIAN: Check the status of the PLC via the diagnostic LED. Check the electrical connection. Contact the Manufacturer for more information.
Lithium battery: voltage or current too high Lithium battery: cell temperature out of range Lithium battery: out current too high Lithium battery: cell voltage too low: recharge Lithium battery: battery voltage too low: recharge Lithium battery: generic fault: see battery display	Lithium battery fault.	See the battery manual.
Front laser area switching: feedback missing Rear laser area switching: feedback missing	Faulty relay or disconnected wire.	Contact the Manufacturer.
Laser scanner intercepted	The laser scanner's stop area has been detected.	Clear the area by removing the obstacle and reset the alarm.
Laser scanner Safety Off active	The SAFETY OFF function is active and the laser scanners are disabled.	Take care when moving the machine. Release the control to reactivate the laser scanners.
Safety Off time limit exceeded	The time limit for the activated function has been reached.	Release the SAFETY OFF control.
Laser scanner bypass activated	The laser scanner bypass has been activated (the laser scanners are disabled until the machine is switched off).	Take care when moving the machine. Switch the machine off and on again to reactivate the laser scanners.

ALARM DISPLAYED	CAUSE	ACTION
Lifting timeout: Check load position	Lifting timeout.	Check the position of the load, as its centre of gravity may not be centred. SPECIALISED TECHNICIAN: Check that the hydraulic pump and proportional valves are working properly.
Gate Open	The gate is open.	Close the gate and plug the motor into the switch.

6.3 PRELIMINARY PROCEDURES FOR MACHINE MOVEMENT

Before starting to move the machine, the operator shall:

- Check that there are no foreign objects attached to the wheels and that they are not deformed.
- Check the correct operation and positioning of the safety devices present.
- Check that the machine is not in a maintenance/cleaning state.
- Verify that all guards are properly mounted.
- Verify the correct operation of the limit switches.
- Verify the correct operation of the control devices.
- Check the correct insertion of the machine's power plug into the battery socket.
- Check the correct insertion of the wired hand control plug into the socket on the machine (if used).
- Check that the battery of the radio-control is charged (if used).
- Check that the battery charge level of the machine is sufficient.
- Check that there are no fault signals.
- Check that the electrical panel doors are properly closed and locked and that there are no damaged or loose components on the control panels.
- Check that the movable guards are closed.
- Check that there is sufficient oil in the tank.

6.4 MACHINE OPERATION

The machine can only be operated using one of the radio-control supplied.

WARNING



Before carrying out handling operations, ensure that no obstacles or persons are in the vicinity of the machine.

CAUTION



It is forbidden to have the machine operated by unqualified and authorised personnel.

NOTE



Before switching on the machine, make sure that there are no leaks from the hydraulic circuit.

6.4.1 Battery connection

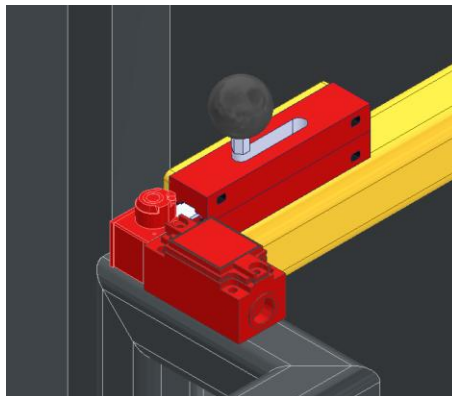
Before starting the machine:

- Open the battery compartment door.
- Plug the machine's power plug (coming from the electrical panel) into the battery socket.
- Close the panel.

6.4.2 Machine start-up with wired control panel

To start-up the machine, proceed as follows:

- Go to the control panel and close the gate. Plug the actuator into the gate switch.



- Place the control panel in the designated holder.
- Connect the wired hand control connector to the socket on the machine.

NOTE



The wired control panel is enabled by connecting the connector to the socket on the machine. Inserting the connector disables the radio-control, so only one device can be used at a time.

- **Electrical panel:**
 - Insert the key in the power-on selector and turn it to position (1).
 - The voltage inserted led switches on.
- **Wired control panel:**
 - Switch on the control panel by inserting the appropriate key and turning the selector to position (I).
 - The ON indicator light comes on.
 - If pressed, release the emergency button.
 - Press the green START button
- **Electrical panel:**
 - Press the illuminated white service button (Alternatively, press the RESET button on the wall-mounted control panel.)
 - The internal LED of the service button lights up.

You are ready to move the machine.

NOTE

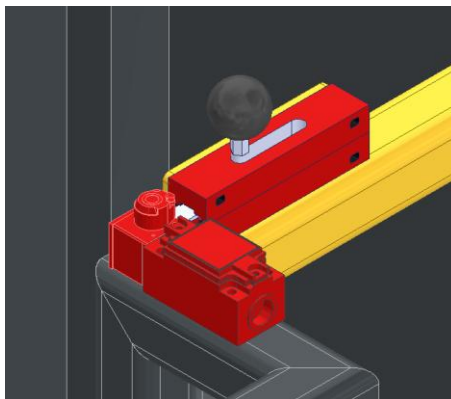


Do not disconnect or connect the shoulder strap pushbutton panel before the voltage to the machine has been switched off (voltage selector in position 0).

6.4.3 Machine start-up with radio-control

To start the machine, proceed as follows:

- Go to the control panel and close the gate. Plug the actuator into the gate switch.



- Place the remote control in the designated holder.
- **Radio-control:**
 - Switch on the remote control by inserting the key and turning the selector switch to position (I).
 - The ON indicator light comes on.
 - If pressed, release the emergency button.
- **Electrical panel:**
 - Insert the key into the voltage on selector switch and turn it to position (1).
 - The voltage on LED lights up.
- **Radio-control:** Press the green START button.
- **Electrical panel:**
 - Press the illuminated white service button (Alternatively, press the RESET button on the remote control.)
 - The internal LED of the service button lights up.

You are ready to move the machine.

NOTE



Before changing the control panel (from wired control panel to radio-control panel and vice versa), switch off the control panel and the machine using the appropriate selectors.

6.4.4 Machine movement (translation and steering)

To move the machine, after start-up, proceed as follows:

Via the control panel in use (radio control or wired control panel):

- Set the maximum travel speed by means of the travel speed selector switch.
- Exert pressure on the FORWARD / BACKWARD movement lever to move the machine. The travel speed is proportional to the pressure exerted. Release the lever to stop the machine.
- In order for the machine to perform the required wheel angle change, exert pressure on the steering lever LEFT/RIGHT. The maximum steering angle of the wheel is $\pm 90^\circ$. Releasing the lever stops the steering movement.

CAUTION



It is the responsibility of the operator who uses the machine to check that during movement there are no objects or persons in the area.

CAUTION



Only one operator is required to manage the machine, who is to position as indicated in the paragraph "Operator workstation".

NOTE



During movement, pay attention, and if necessary, signal the passage of the machine with the horn.

NOTE



Before starting any movement, make sure there are no anomalies to avoid damage to the machine. Before deleting any fault, check the cause and remove it.

Pay attention to the lighting up of the general fault indication lamp and the indications shown on the display.

6.4.5 Direction indicators

On the machine there are visual indications regarding the directions.

PLATE	DESCRIPTION
	FORWARD
	BACKWARD
	LEFT
	RIGHT

6.4.6 Raising / lowering the loading platform

The machine can raise the loading platform to a level position, thanks to four hydraulic cylinders operated by an electro-hydraulic power unit.

Using the control panel:

- Push the lever  /  upwards to raise the top. Keep pressing until it reaches the end of its travel.
- Push the lever  /  down to lower the table. Keep pressing until it reaches the end of its travel.

NOTE



Lower the loading platform before switching off the machine to prevent damage.

6.4.7 Start-up after an emergency stop

If the movement is interrupted by an EMERGENCY STOP, proceed as follows:

- Remove cause of the error or the hazard.
- Reset by turning the EMERGENCY STOP button clockwise, if pressed.
- Wired control panel / radio-control: press the START button.
- Electrical panel: press the white luminous service button and check that the internal LED lights up.

The machine is ready to move.

6.4.8 Laser scanner operation

If there is an obstacle in the stop zone, the machine comes to a halt. On the control panel, the 'scanners detected' LED lights up steadily and the 'services enabled' LED flashes.

To reset the laser scanners, you must:

- Remove the obstacle.

CAUTION



If it is not possible to remove the obstruction, use the "SAFETY OFF" button on the control panel to deactivate the laser scanners, and move the machine until the work areas are clear.

It is the responsibility of the operator using the machine to ensure that the area is clear of objects and people during operation

- Press the service reset button on the electrical panel to reset the safety functions (or, alternatively, operate the RESET lever on the control panel).

6.4.9 Parking brakes

The machine is equipped with electromagnetic parking brakes that disengage when the movement command is given and engage when the machine stops.

NOTE



It is not possible to tow the machine because the negative brakes of the electric motors prevent wheel movement. If it is necessary to release the motor brakes, contact the Manufacturer.

6.4.10 Shutting down the machine

NOTE



Do not leave the load on the machine. Set the loading platform to the 'fully lowered' position before switching off the machine, to prevent damage.

To shut down the machine, proceed as follows:

- Stop the machine on a flat floor.
- Switch off the control pushbutton panel (wired control panel or radio-control).

NOTE



Do not disconnect the shoulder strap pushbutton panel if no tension has been removed to the machine before (voltage selector switch in '0' position).

- Switch off the machine, turning the power-on selector on the electric panel to (0) and take out the key.
- If used, disconnect the wired shoulder strap pushbutton panel from the machine.

NOTE



In the case of long periods of disuse, or for maintenance operations, disconnect the machine plug from the battery socket to cut out the electrical supply.

6.5 LOAD POSITIONING

NOTE



The machine is capable of lifting and transporting a pallet of suitable dimensions, which is not supplied by the manufacturer.

The load to be transported must be placed on the pallet's loading surface, taking care to distribute it evenly. The load's centre of gravity must be at the centre of the pallet.

NOTE



It is the operator's responsibility to position the load correctly on the pallet and to comply with the machine's maximum load capacity specifications.

WARNING



It is the operator's responsibility to secure the load to the pallet using suitable slinging systems appropriate to the dimensions of the load.

The machine can slide under the pallet (with the platform in the 'fully lowered' position) and lift it for handling (with the platform in the 'fully raised' position).

It is recommended that the pallet be lifted slowly, without any jolts that might cause additional stress within the load-bearing structure and the machine's mechanical components.

CAUTION

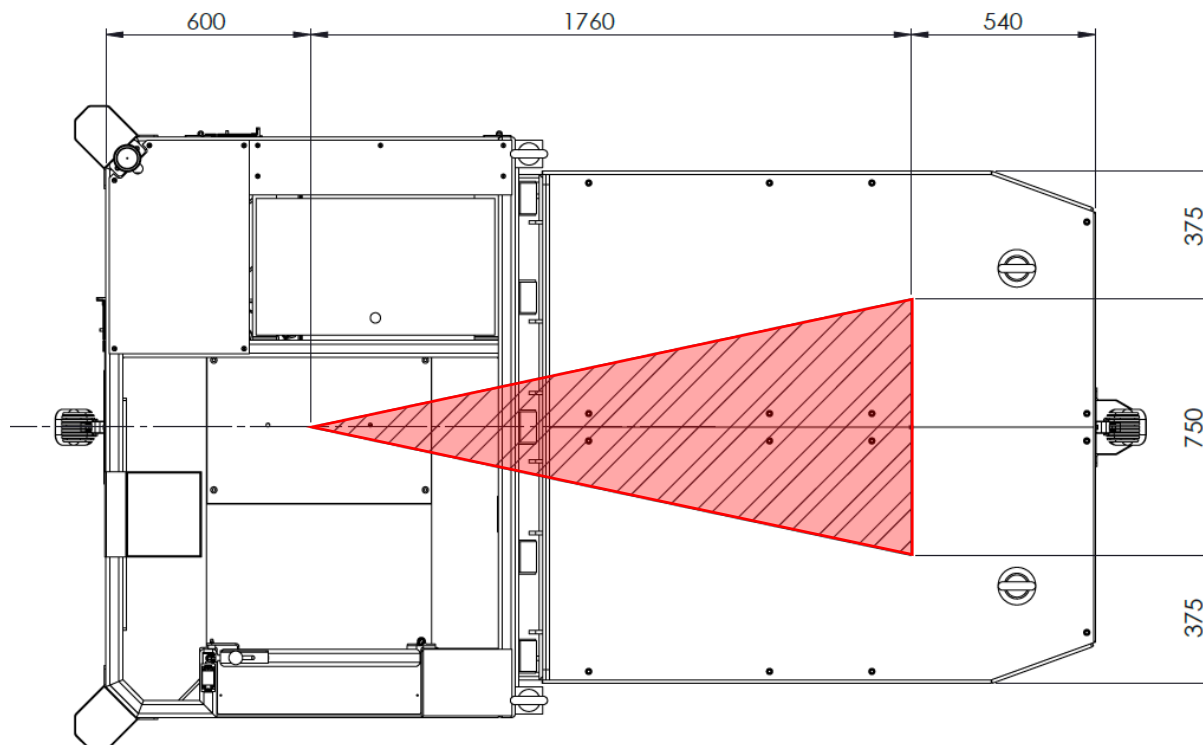


It is the operator's responsibility to align the machine correctly with the pallet (it is strictly forbidden to lift or move the pallet if this requirement is not met) and to lift it with care.

Whilst picking up and setting down the pallet, the operator must ensure that the area is clear of objects and people.

6.5.1 Stability area

There are three points that allow the frame to discharge the weight of the load to the ground, as shown in the following image. There is therefore 'an area of stability' given by the junction of these points.



Stability zone highlighted in red

WARNING



To avoid tipping hazards, the centre of gravity of the load must always be positioned within the above area.

6.6 BATTERY

For the first use of the machine nothing is required, since the battery inside is already charged 100%.

6.6.1 Flat battery and extra time

The autonomy of the battery at 100 % charge, indicated in the table of technical characteristics, is calculated on the basis of actual flat use (50 % full load and 50 % empty).

When a residual charge of about 30 per cent is reached, the machine stops and the yellow extra time button on the electrical panel lights up. To move the machine again, this button must be pressed. This gives an autonomy of about 15 minutes to reach the charging station.

Once the extra time has elapsed, it is mandatory to recharge the battery.

NOTE



It is not possible to tow the machine as the negative brakes of the electric motors prevent wheel movement. Therefore, the only way to move it is to recharge/replace the battery or lift it. For possible release of the brakes contact the Manufacturer.

6.6.2 Maintaining the Lithium Battery

ADDITIONAL INFORMATION



For all information regarding the battery (charging frequency, operating and storage conditions and temperatures, maintenance, etc.), please refer to the battery manual provided in the appendix.

For the battery maintenance, it is recommended:

- Do not go below 20% residual charge.

NOTE



Drastic discharge can irreparably damage the lithium cells. The warranty does not cover replacement of cells that are totally discharged.

- When not in use, store the fully charged battery in a dry place where it will not be exposed to frost.

NOTE

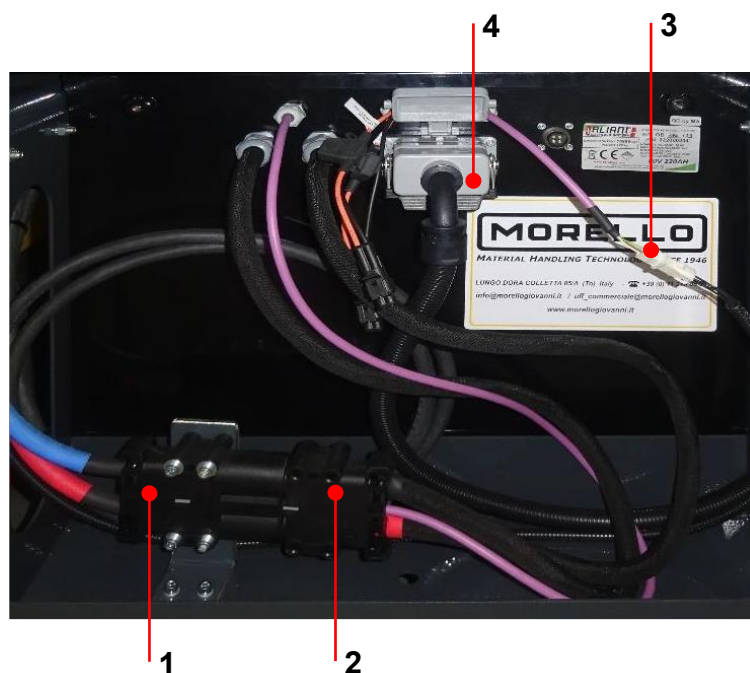


The battery charge level decreases even if not used. Therefore, also in the case of no use, recharge the battery periodically (at least once a week), to avoid slowly dropping under the indicated threshold.

6.6.3 Battery removal

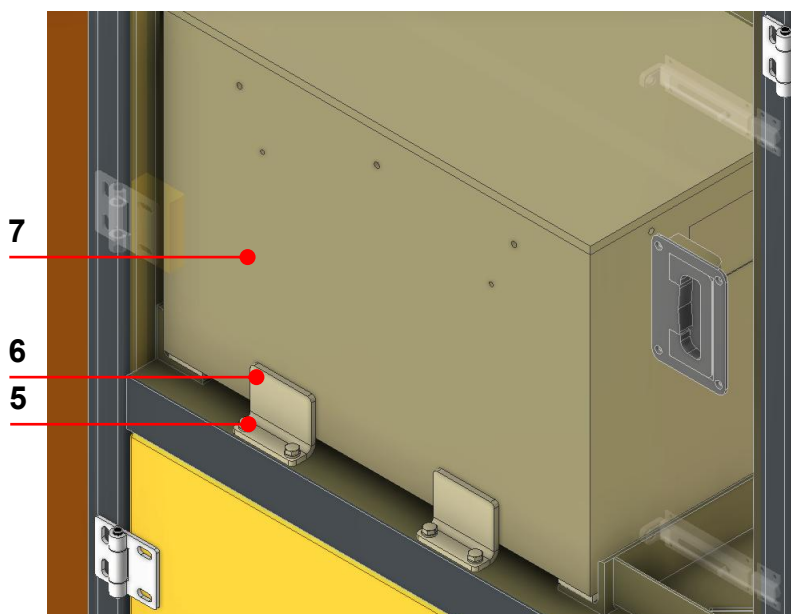
To remove the battery, proceed as follows:

- Interrupt the power supply to the machine by turning the voltage cut-off key switch, located on the control panel, to position (0). Remove the key.
- Open the battery compartment access door.
- Disconnect the machine's power plug **(1)** from the battery socket **(2)**.
- Disconnect the battery display cable **(3)** and the PLC connector **(4)** (connected to the battery).



Exampe image for only illustrative purposes

- Unscrew the four screws **(5)** with washers and remove the two clips **(6)**.
- Position the forks of a suitable lifting device at the height of the battery **(7)**.



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- Manually remove the battery **(7)** by moving it onto the lifting equipment. The battery is fitted with sliding runners on the underside.
- Slowly lower the forks and transport the battery **(7)**, taking care to avoid any sudden movements.

To reposition the battery, proceed in reverse order.

ADDITIONAL INFORMATION



For further information on battery handling, please refer to the accompanying manual.

6.6.4 Recharge of the battery

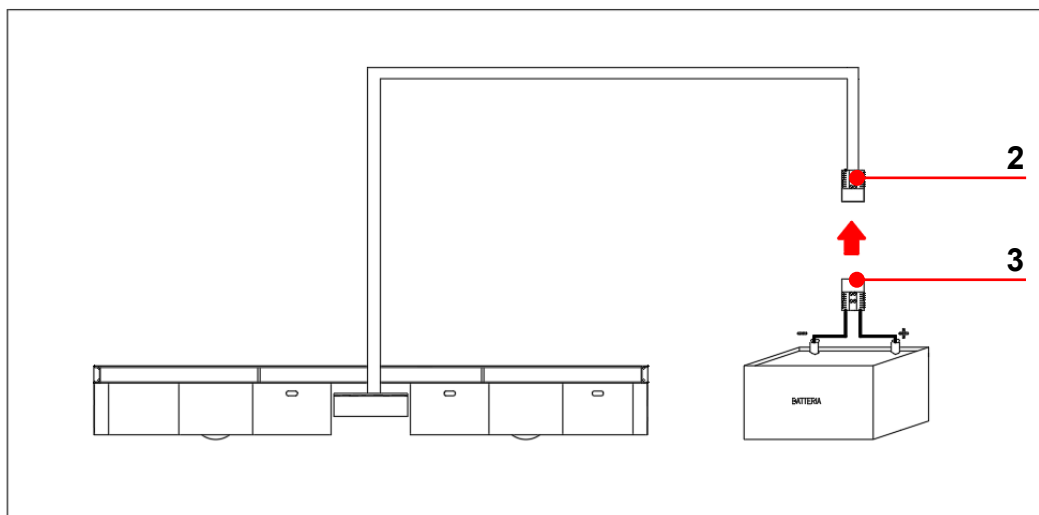
To recharge the battery, proceed as follows:

- Bring the machine to the charging area, observing the appropriate safety distances.
- Switch off the power supply to the machine by turning the key switch **(1)**, located on the electrical panel, to position (0). Remove the key.

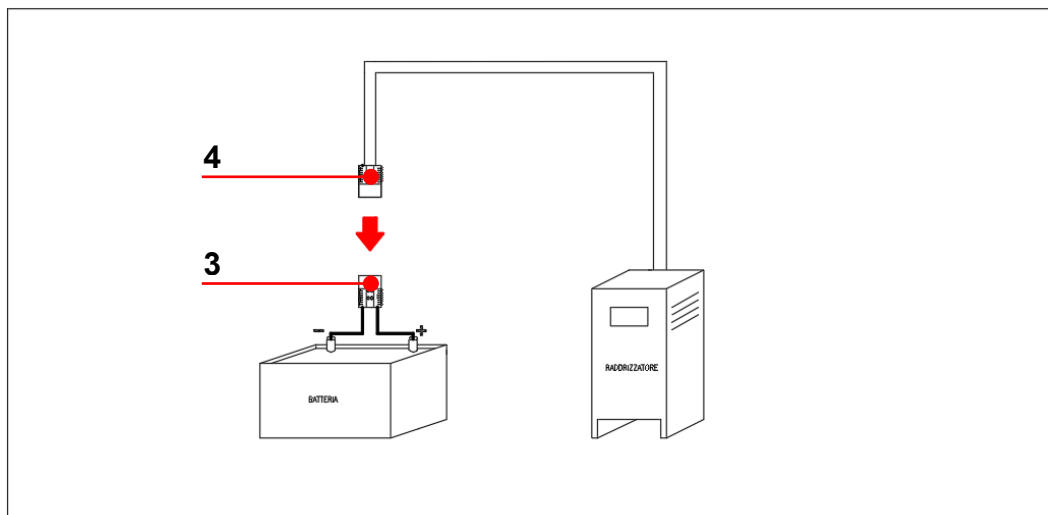


Key selector switch (1)

- Disconnect the power plug **(2)** of the machine from the socket **(3)** of the battery.



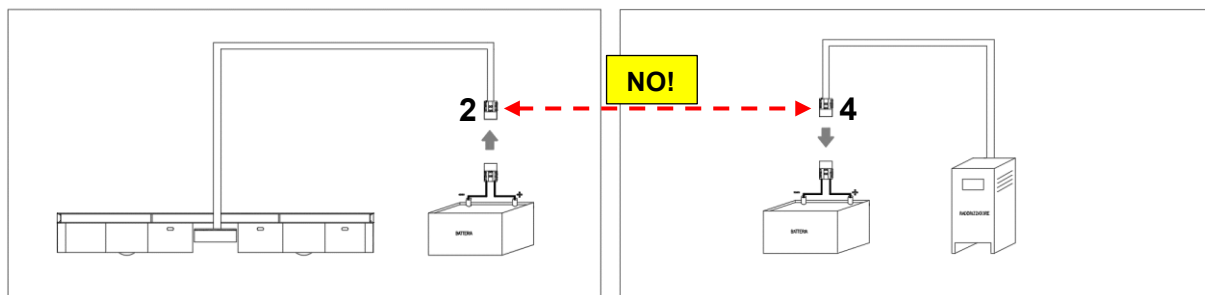
- Connect the plug **(4)** of the rectifier to the socket **(3)** of the battery.



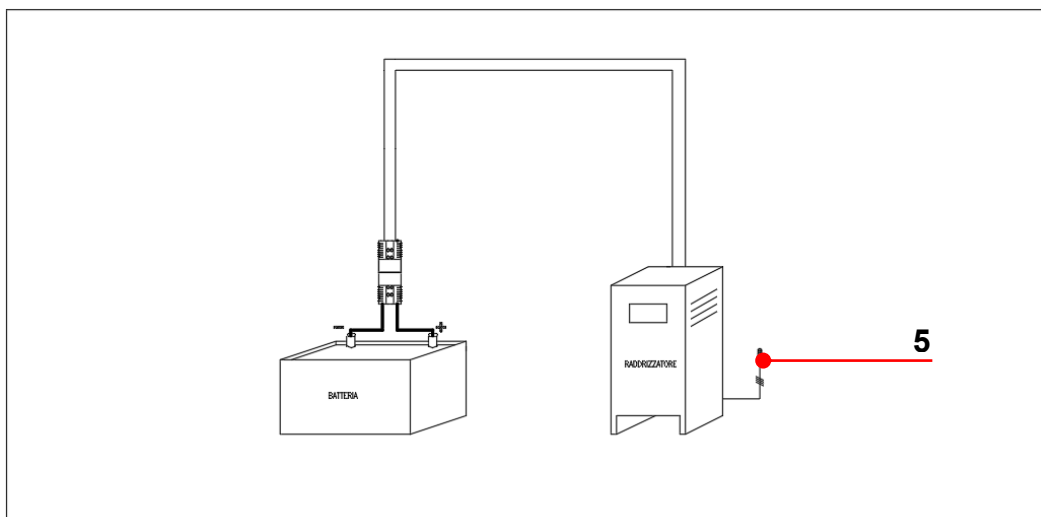
NOTE



It is forbidden to connect the plug **(4)** of the rectifier to the plug **(2)** of the machine's power supply (coming out of the on-board electrical panel).



- Connect the plug **(5)** of the rectifier to the electric mains.



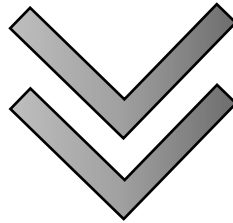
- Operate the battery charging rectifier by turning the switch to ON.
- Wait for the battery to recharge.

When recharging is complete, proceed backwards.

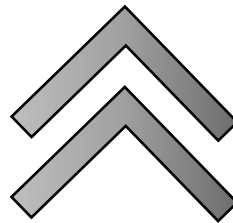
ADDITIONAL INFORMATION



For more information on recharging the battery through the rectifier, please refer to the accompanying manual.



MAINTENANCE



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7. MAINTENANCE

7.1 GENERAL SAFETY PRECAUTIONS

Maintenance, troubleshooting and repairs are only to be carried out by the authorised technicians.

The persons assigned to use and maintenance of the machine are to be well trained and have in-depth knowledge of accident-prevention standards. Unauthorized personnel must remain outside of the work area during operations.

The safety precautions contained in this paragraph shall always be strictly observed, during the conduct and maintenance of the machine, in order to avoid damage to personnel and equipment.

At the end of each maintenance operation is required to restore the protections, verifying the correct functioning.

7.1.1 General hazards

- High voltages can cause death upon contact. Always operate with extreme caution and following the accident-prevention standards in force in the country.
- When the machine is functioning there are moving parts that can cause serious harm to persons. Therefore, the cleaning and specialised maintenance operations regarding disassembly or replacement of components on the machine and on the control unit, are to be carried out with the system off.
- Place specific warning notices ("MACHINE BEING SERVICED – DO NOT POWER-ON") near the electric panel/s.
- Do not use inflammable or harmful solvents.
- Always wear protective goggles and gloves when carrying out maintenance on the equipment.
- Make sure that the tools to be used are in perfect condition and have insulated grips, where required.
- Check that the isolation of cables and conductors of testing equipment has no signs of breakage or damage.
- Lack of equipment connection to ground can cause serious harm to persons. Always make sure the ground is connected and that it complies to the standards.
- Long overloads or failures can cause overheating of electric motors and electrical equipment developing harmful fumes; immediately cut-out the power supply for safety and do not approach the equipment before dispersing the fumes by means of appropriate ventilation. Do not inhale residual fumes inside the equipment during the repair operations.
- In the event of fire, never spray water on the equipment; cut-out all power supplies and use CO₂ extinguishers.
- Avoid prolonged, excessive or repeated contact of the skin with lubrication products and change clothes immediately if they become impregnated, because lubricants are very hazardous for the skin.
- Do not handle lubricants (such as oils, greases, etc) where there are electric sparks and/or naked flames.

WARNING



Lubricants are inflammable products; follow the indications on the containers

- Before making connections, carefully inspect all fittings and ensure that there is no dirt or defects on the threads.
- Before pressurizing systems following repair work, check that fittings and joints are tightened correctly.
- Always make sure, before setting the machine in operation, that no tools or materials have been left near the equipment.
- Do not wear items that could become entangled in the equipment, or act as conductors (chains, bracelets, etc.).
- Maintenance, repair and troubleshooting operations are to terminate with verification of correct machine functioning and restoration of all safety devices.

7.1.2 General warnings

- Machine maximum reliability and minimum maintenance costs are the result of planned maintenance and inspection schedules, scrupulously followed during the entire machine life. Scrupulously observe the set maintenance time intervals and program the operations according to the specific requirements.
- It is advised, should major operations be necessary, to contact the Manufacturer for any explanations regarding the project or for technical assistance.
- Before starting to check and maintenance operations, remove any dirt from the machine.
- Always use perfectly dry air for cleaning and with a pressure not over 0.2 Mpa.
- Always use tools in perfect condition and that are specifically for the operation to be performed; use of inappropriate and/or inefficient equipment can cause serious damage.
- During disassembly, mark the separate parts with an identity tag to ensure the correct reassembly.
- After every maintenance operation that requires disconnection of cables and/or fixed and mobile parts, check that the number/tag on the fixed and on the mobile part coincide.
- Before resetting the equipment in operation after a failure, it is to be carefully inspected and checked to highlight any damage.
- Never act, unless following a failure, on adjustments and position of limit switch microswitches, where installed: tampering with them can cause serious damage.
- Always take utmost care when checking lubrication on machine components, because insufficient or defective greasing can jeopardise correct functioning.
- For lubrication, use only the recommended lubricants, or those with equivalent properties and of a known and proven quality.
- The lubricants used are to have a good emulsion stability and be unalterable with age.
- It is absolutely necessary to continue to use the same lubricants as used for the first filling.
- Upon completion of the normal maintenance activities, the maintenance technicians are to carry out, when foreseen, also predictive instrumental maintenance operations consisting in analysis and specialistic controls to predict, over time, breakdowns that can occur in certain machine components.

7.2 QUALIFICATION OF MAINTENANCE TECHNICIANS

CAUTION



The Security Officer will ensure that all persons operating on the machine have received all their instructions contained in this manual.

7.2.1 General skills

To be up to the ever-increasing qualifications needed in the field of maintenance, the maintenance technicians must have the following requisites:

- be aware of the standards in force regarding prevention of accidents, and be able to apply them,
- have read and understood the “Safety” chapter,
- know the basic structure and functions of the machine,
- know how to use and refer to the manufacturing papers and machine documentation,
- assume the responsibility to make autonomous decisions regarding interventions on the machine,
- be willing to adapt to technological changes on the machine,
- note irregularities and, where appropriate, take the necessary measures.

7.3 PROCEDURE TO STOP MACHINE

WARNING



Maintenance work must be carried out with the load removed and the platform in the fully lowered position.

Before starting maintenance operations, the operator is to stop the machine and set it in maintenance state following this procedure:

- Cut-out the machine power supply sources, if required by the maintenance operation to be carried out. Otherwise, this is not necessary.

NOTE



To deactivate and cut-out the electrical supply:

- Switch off the machine following the indications contained in the paragraph “Shutting-down the machine”.
 - Disconnect the machine power supply plug from the battery socket.
- Place the notice “DO NOT EXECUTE MOVEMENTS – MACHINE BEING SERVICED” on the electric panel near the power-on selector.



After the maintenance operations, restore the previously deactivated electrical supply.

Before resuming normal machine functioning, check the entire system again following the start-up procedure indicated in this manual.

NOTE



After every maintenance operation check correct machine functioning.

7.4 MACHINE PROCEDURE FOR MAINTENANCE POSITIONING

The following paragraph provides indications for the positioning of the machine on appropriate resting supports (maintenance-aid devices) for the maintenance operations where they are required.

Before lifting the machine, the Customer is to procure two suitable maintenance-aid devices, to place the machine.

WARNING



The Manufacturer shall not be held in any way liable if unsuitable devices are used.

The main purpose of the maintenance-aid devices is to stabilize the suspended trolley; therefore, the lifting device and the chains are to remain tensioned.

To position the machine on the devices, three operators are necessary:

- One operator in charge of the lifting device;
- One operator in charge of the maintenance-aid devices;
- One operator to ensure correct positioning of the machine on the maintenance-aid devices.

WARNING



Before lifting the machine, place the two maintenance-aid devices in an appropriate and segregated area, to which unauthorized persons are not permitted access.

NOTE



Before starting the lifting, operations check that the lifting devices have an adequate grip and that all the operators are equipped with personal protection devices (DPI).

To prepare the machine for maintenance proceed as follows:

- Stop the machine and cut-out the power supply, following the procedure indicated in **paragraph 7.3** "Procedure to stop machine".
- If necessary, remove the protective perimeter casing using the specific wrench.
- Lift the machine, following the procedure indicated in **paragraph 4.3.3** "Machine lifting".

NOTE



Always check correct machine balancing. If it is unbalanced, rest it on the ground immediately and correctly reposition the chains.

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- Transfer it, avoiding abrupt movements.
- Visually check that the machine resting points are aligned with the maintenance-aid devices.
- If necessary, correct the position of the devices.
- Rest the machine on these devices, avoiding abrupt movements, and check they are perfectly in contact with the frame.

CAUTION

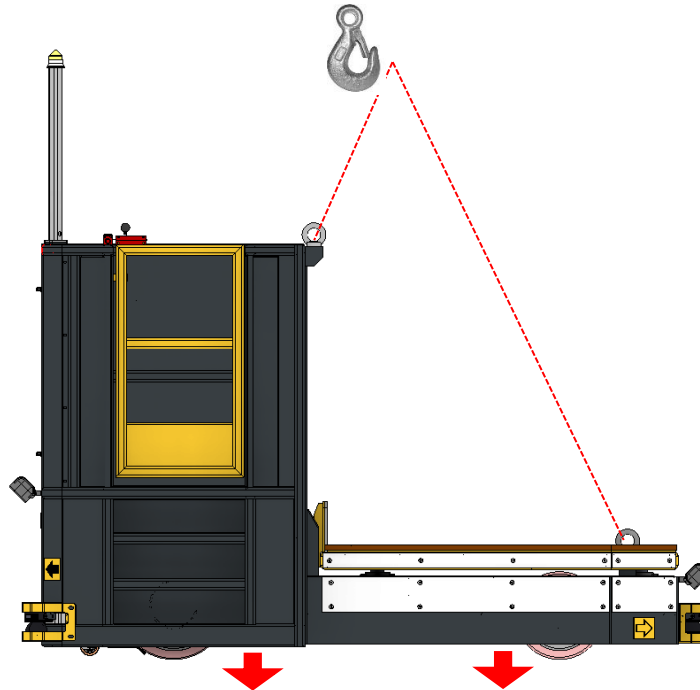


The lifting equipment operator is to pay careful attention to avoid collisions against the devices when positioning the machine.

- Keep the lifting chains tensioned during the entire maintenance operations.

After the maintenance has been completed, slowly lift the machine, place it on the ground (following the indications contained in the paragraph regarding lifting) and refit any casings that were previously removed.

POSITIONING OF THE MACHINE ON SERVICE DEVICES



*Example image of an
assistive device*

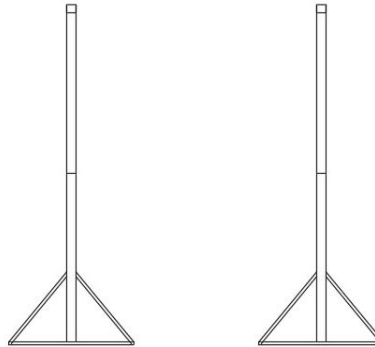


Image for illustration purposes only

7.5 CONTROL PLAN ON SAFETY

WARNING



It is strictly forbidden to electrically or mechanically bridge the safety switches of the safety circuits or tamper with them in any way.

CAUTION



Periodically check the efficiency of security systems on the machine. This procedure must be repeated as normal maintenance practices.

7.5.1 Checks and functional tests on safety devices

The maintenance technicians have the obligation to periodically check the functioning of the safety devices.

The operation is to be carried out by skilled technicians who have specific knowledge regarding the uses of the safety devices.

CAUTION



Carry out the functional, tightness and positioning checks of the safety systems as indicated in chapter 2.

7.6 MAINTENANCE FREQUENCY

To ensure machine reliability, regular and efficient maintenance is necessary and a constant control of the indicator instrument parameters. Maintenance, troubleshooting and repairs are only to be carried out by the authorised technicians.

FREQUENCY	DESCRIPTION
Every week	Full battery charge cycle.
Every week	Check that the horn, the warning buzzer, the indicator light and the spotlights are working properly.
Every week	Check the correct functioning of the hold-to-run levers.
Every week	Visually check that there are no hydraulic leaks from the pipes or cylinders.
Every week	Check that the laser scanners are correctly connected, securely fastened and functioning properly. Clean the laser scanner sensor with a suitable cloth. For further information, please refer to the relevant manual.
Every month	Clean the wheels, the load floor, the spotlights and the lamp.
Every month	Clean the pushbutton panel on the electrical panel, the radio-control and the wired control panel.
Every month	Check that the encoder, limit switches, spotlights and lamp are correctly connected and tightened.
Every month	Check the correct functioning of the limit switches.
Every month	Check that the turntable moves smoothly. In the event of anomalies, contact the manufacturer.
Every month	Check that the discharge chain is correctly attached to the ground.
Every month	Check that the pressure in the hydraulic circuit corresponds to that shown in the relevant diagram.
Every three months	Check that the hydraulic fittings are properly tightened. Check that the hoses do not have any excessively tight bends, kinks or abrasions.
Every three months	Check that the cylinders are securely fastened and undamaged.
Every three months	Check that there are no signs of wear or damage to the polyethylene and wooden protective covers.
Every six months	Perform a general visual check of the various groups that make up the machine, verifying that there are no mechanical anomalies.

FREQUENCY	DESCRIPTION
Annual	Check tightness of all nuts and bolts.
Annual	Check there are no signs of wear, damage or mechanical faults on the wheels. If necessary, contact the Manufacturer for the replacement.

ADDITIONAL INFORMATION



For information regarding maintenance of commercial devices incorporated, see the relevant manuals.

ADDITIONAL INFORMATION



For information on maintaining the filters in the hydraulic power unit, please refer to the relevant manual.

NOTE



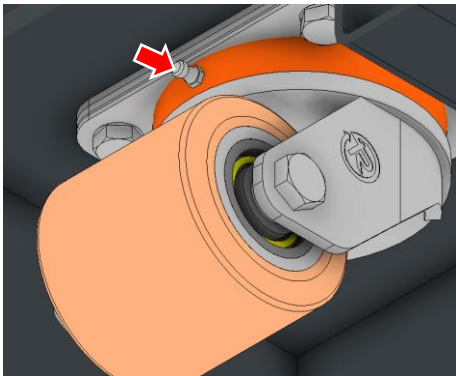
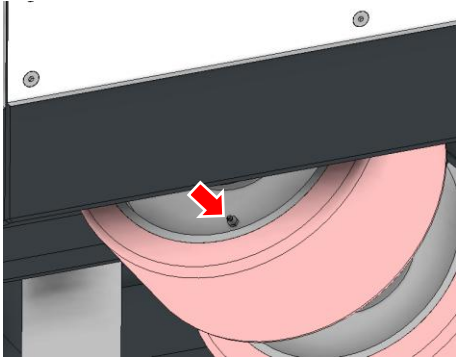
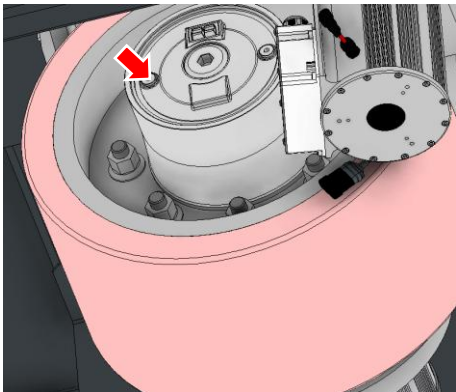
For information regarding replacement procedures, contact the Manufacturer.

7.7 LUBRICATION

Before carrying out lubrication operations, stop the machine, cut-out the power supply and prepare it for maintenance as indicated in **paragraph 7.3** "Procedure to stop the machine". If necessary, remove the outer casings (and reassemble them at the end of operations).

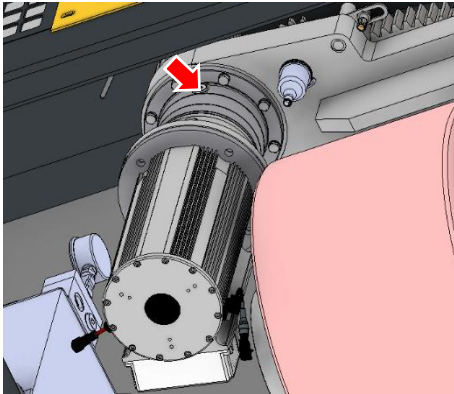
Where necessary, prepare the machine for maintenance as described in **paragraph 7.4** "Machine procedure for maintenance positioning".

The following table indicates the machine points to be lubricated.

FREQUENCY	COMPONENT	IMAGE	METHOD
Every three months for the first year, then every six months	Pivoting idler wheel bearings		Insert grease into the nozzles with a grease gun. Use TRIBOL GR 4020/220-2 PD grease or equivalent
Every three months for the first year, then every six months	Idler wheel bearings		Insert grease into the nozzles with a grease gun. Use TRIBOL GR 4020/220-2 PD grease or equivalent
-	Drive reduction gearbox		For information on lubrication of the gearbox, refer to the accompanying manual and the nameplate affixed to the gearbox. Use the oil specified in the relevant manual.

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FREQUENCY	COMPONENT	IMAGE	METHOD
-	Steering gearbox		For information on lubrication of the gearbox, refer to the accompanying manual and the nameplate affixed to the gearbox. Use the oil specified in the relevant manual.

NOTE



Never mix oils/greases of different types and/or brands.

Waste oil is a special waste and has to be disposed of by authorised consortiums.

NOTE



Use of a type of oil/grease that is not equivalent to that indicated annuls the warranty in the case of failures and/or breakdowns.

7.8 TIGHTNESS CHECK

The following table indicates the tightening torques for each screw dimension. Table A relates to the tightening of wheel nuts, whilst Table B applies to the remaining screws on the machine.

ADDITIONAL INFORMATION



To tighten, use a torque wrench.

NOTE



Carry out a check after the first month of machine use and annually thereafter.

NOTE



When tightening the wheel nuts, work diagonally.

Table A

Ø Screw	Fine-grained mm	Cross-section mm ²	Coefficient of friction	Classes of fine-pitch fasteners											
				4.8		5.8		6.8		8.8		10.9		12.9	
				preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque
				N	Nm	N	Nm	N	Nm	N	Nm	N	Nm	N	Nm
M8	1	39,2	0,10	9758,1	10,87	12247,6	13,59	14697,1	16,31	19596,1	21,75	27557,1	30,58	33068,5	36,70
			0,14	9079,5	13,53	11349,4	16,91	13619,3	20,29	18159,1	27,05	25536,2	38,04	30643,4	45,65
M10	1,25	61,2	0,10	15296,9	21,13	19121,1	26,41	22945,3	31,69	30593,8	42,25	43022,5	59,42	31627,0	71,30
			0,14	14175,0	25,27	17718,8	32,84	21262,6	39,41	28350,1	52,55	39867,3	73,89	47840,8	88,67
M10	1	64,5	0,10	16383,6	22,12	20479,5	27,66	24575,4	33,19	32767,2	44,25	46078,8	62,23	55294,6	74,67
			0,14	15221,6	27,80	19027,0	34,75	22832,5	41,70	30443,3	55,61	42810,8	78,20	51373,0	93,84
M12	1,50	88,1	0,10	22020,7	35,83	27525,9	44,79	33031,0	53,75	44041,4	74,51	65626,1	104,78	78751,3	125,74
			0,14	20405,8	44,53	25507,2	55,66	30608,7	68,79	40811,6	93,41	60944,6	131,36	73133,5	157,63
M12	1,25	92,1	0,10	23333,7	37,26	29167,1	55,88	35000,6	74,51	78751,3	104,78	78751,3	104,78	78751,3	125,74
			0,14	21669,2	45,70	27086,5	70,06	32503,8	93,41	73133,5	131,36	73133,5	121,36	73133,5	157,83
M14	1,50	125	0,10	31610,0	59,04	39512,5	73,80	47415,0	88,57	63220,0	118,09	88903,1	166,06	106683,7	199,27
			0,14	29345,9	73,92	36682,4	92,40	44018,9	110,89	58691,9	147,85	82535,4	207,91	99042,5	249,49
M16	1,50	167	0,10	42581,3	89,78	53226,6	112,33	63871,9	134,67	85162,5	179,56	119759,8	252,51	143711,8	303,02
			0,14	39587,8	113,06	49484,7	141,32	59381,6	169,59	79175,5	226,12	111340,6	317,98	133608,7	381,57
M18	2	204	0,10	51457,2	124,03	64321,5	155,03	77185,8	186,04	102914,4	248,06	144723,3	343,83	173568,0	418,59
			0,14	47751,7	155,02	59689,6	193,78	71627,5	232,53	95503,3	310,05	134301,6	436,00	161161,9	523,20
M18	1,50	216	0,10	55415,1	130,17	69268,9	162,72	83122,7	195,26	110830,3	260,35	155855,1	366,12	187026,1	439,34
			0,14	51577,6	164,67	64472,0	205,84	77356,4	247,01	103155,2	329,35	145062,1	463,15	174074,5	555,77
M20	2	258	0,10	65534,1	173,72	81917,7	217,16	98301,2	260,59	131068,3	347,45	184314,8	488,60	221177,8	586,32
			0,14	60886,2	218,17	76107,8	272,71	91329,3	327,26	121772,4	436,34	171242,5	613,61	205491,0	736,33
M20	1,50	272	0,10	70114,7	181,58	87643,3	226,97	105172,0	272,36	140229,3	363,15	197197,5	510,68	236637,0	612,82
			0,14	65319,1	230,55	81648,4	288,19	97978,6	345,82	130638,1	461,10	183709,9	648,42	220451,9	778,10
M22	2	318	0,10	81220,8	236,88	101526,0	296,10	121831,2	355,32	162441,5	473,76	228433,4	666,23	274120,1	799,48
			0,14	75533,9	298,75	94417,4	373,43	113300,9	448,12	151067,8	597,49	212439,1	880,22	254927,0	1001,27
M22	1,50	333	0,10	86164,2	246,02	107705,3	307,53	129246,4	359,04	172328,5	492,05	242337,0	691,94	290804,3	830,33
			0,14	80331,8	313,41	100414,7	391,76	120497,7	470,11	160663,6	626,82	225933,2	881,46	271119,8	1057,75
M24	2	384	0,10	98515,6	308,56	123144,5	385,70	147773,4	462,84	197031,1	617,12	277075,0	867,83	332490,0	1041,40
			0,14	91693,3	390,33	114616,6	487,92	137539,9	585,50	183386,5	780,67	257887,3	1097,82	309464,8	1371,38
M24	1,50	401	0,10	104079,4	316,62	130099,2	399,52	156119,0	479,43	208158,7	639,23	292723,2	898,92	351267,9	1078,71
			0,14	97096,0	408,12	121370,1	510,15	145644,1	612,18	194192,1	816,24	273082,6	1147,84	327699,1	1377,41
M27	2	496	0,10	127922,3	448,43	159902,9	560,54	191883,5	672,65	255844,7	896,37	359781,6	1251,22	431737,9	1513,46
			0,14	119185,0	569,67	148981,3	712,09	178777,5	854,51	238370,1	1139,34	335207,9	1602,20	402249,5	1922,64
M30	2	621	0,10	160817,5	623,80	201021,8	779,75	241226,2	935,70	321635,0	1247,60	452299,2	1754,43	572759,0	2105,32
			0,14	149957,0	795,14	187445,3	993,03	224935,5	1192,72	299914,0	1590,29	421754,2	2236,34	506105,0	2683,61
M33	2	761	0,10	197716,9	835,81	247145,1	1044,76	296575,4	1253,72	395433,8	1671,62	556078,8	2350,72	667294,5	2820,57
			0,14	184490,1	1058,24	230512,6	1335,30	226735,1	1602,36	368980,2	2135,49	518878,4	3004,43	622654,0	3505,32
M36	3	865	0,10	221916,8	1048,15	277395,0	1310,18	332875,1	1572,22	443833,5	2096,29	624140,9	2947,91	748969,0	3537,49
			0,14	206548,9	1326,13	258186,2	1657,66	309823,4	1989,19	413097,9	2652,26	580918,9	3729,74	697102,7	4475,68

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Ø Screw	Fine-grained mm	Cross-section mm ²	Coefficient of friction	Classes of fine-pitch fasteners											
				4.8		5.8		6.8		8.8		10.9		12.9	
				preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque	preload	Tightening torque
				N	Nm	N	Nm	N	Nm	N	Nm	N	Nm	N	Nm
M39	3	1030	0,10 0,14	265219,6 247027,0	1351,70 1715,15	331524,5 308783,8	1689,63 2143,94	397829,5 370540,5	2027,56 2572,72	530439,3 494051,1	2703,41 3430,30	745930,2 694763,5	3801,67 4823,86	895116,2 833716,1	4562,00 5783,63
M42	3	1210	0,10 0,14	312529,3 291268,7	1709,52 2174,59	390561,6 364085,9	2136,90 2718,24	468793,9 436903,1	2564,28 3251,89	625058,5 582537,4	3418,04 4349,18	878988,6 819193,3	4808,02 6116,04	1054786,0 983031,9	5769,62 7339,24
M45	3	1400	0,10 0,14	36551,7 338057,8	2118,52 2700,72	453189,7 422584,7	2648,14 3375,90	543827,6 507101,7	3177,77 4051,08	725103,5 676135,5	4237,03 5401,43	1019677,0 950815,6	5958,33 7595,77	1223612,0 1140979,0	7149,99 9114,92
M48	3	1600	0,10 0,14	415279,0 387415,3	2581,68 3297,46	519098,7 484269,2	3227,11 4121,83	622918,5 581123,0	3872,53 4946,20	830558,0 774830,6	5163,37 6594,93	1167972,0 1089606,0	7260,99 9274,12	1401567,0 1307527,0	8713,18 11128,94
M52	3	1900	0,10 0,14	494405,2 461482,7	3299,14 4222,62	618005,5 576853,3	4123,92 5278,28	741607,8 692224,0	4948,71 6333,94	988810,4 922965,3	6598,28 8445,25	1390515,5 1297920,0	9278,83 11876,13	1668618,0 1557504,0	11134,60 14251,36
M56	4	2140	0,10 0,14	552738,4 515137,2	4008,26 5097,95	690923,0 643921,5	5010,32 6372,43	829107,5 772705,8	6012,39 7646,92	1105477,0 1030274,0	8016,51 10195,89	1554577,0 1448823,0	11273,22 14337,98	1865492,0 1738588,0	13527,87 17205,57
M60	4	2480	0,10 0,14	642235,1 598863,8	4950,24 6309,01	802793,9 748579,8	6187,80 7886,27	863352,7 898295,7	7425,36 9463,52	1284470,0 1197728,0	9800,49 12618,02	1806286,0 1684304,0	13922,56 17744,10	2167544,0 2021165,0	16707,07 21292,92
M64	4	2850	0,10 0,14	739716,3 690084,3	6039,07 7710,76	924545,4 862605,3	7548,84 9638,45	1109574,0 1035126,0	9058,60 11566,14	1479433,0 1380169,0	12078,14 15421,52	2080452,0 1940852,0	16934,88 21686,51	2496543,0 2329034,0	20381,86 25023,81
M68	4	3240	0,10 0,14	842588,5 786380,1	7253,31 9288,98	1063236,0 982975,1	9079,14 11611,23	1263883,0 1179570,0	10894,97 13933,47	1685177,0 1572760,0	14526,52 18577,96	2369780,0 2211694,0	20428,06 26125,26	2843735,0 2654033,0	24513,58 21350,31

Table B

Ø Screw	Screw pitch	Pre-tightening torque [kgm]	Tightening torque [kgm]
M6	1	0,75	1
M8	1,25	1,8	2,4
M10	1,5	3,6	4,8
M12	1,75	6,5	8,5
M14	2	10	13
M16	2	15	20,5
M18	2,5	22	29
M20	2,5	30	40
M22	2,5	42	56
M24	3	50	70
M27	3	80	105
M30	3,5	95	130

7.9 HYDRAULIC UNIT

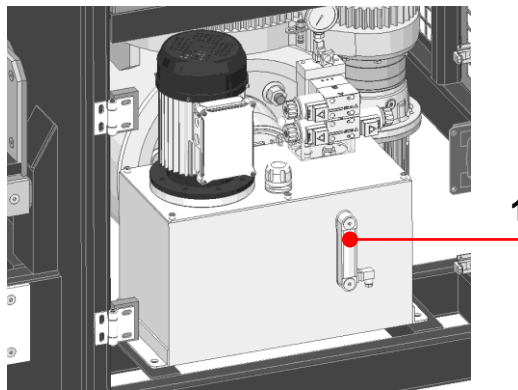
WARNING



Before performing maintenance operations, stop the machine and cut off the power supply, as described in **paragraph 7.3** "Procedure to stop the machine".

If necessary, prepare the machine for maintenance as described in **paragraph 7.4** "Preparing the machine for maintenance".

Check the oil level regularly via the oil level gauge (1) on the tank. For the procedure for topping up the oil, see section "Filling the hydraulic pump tank".



NOTE



Do not start the machine if the oil is below the minimum level.

ADDITIONAL INFORMATION

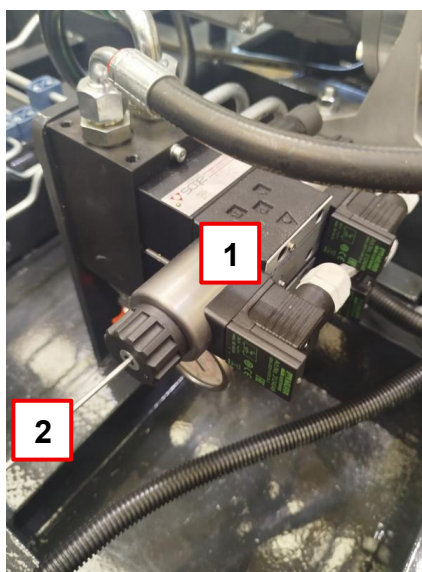


For further information on hydraulic system maintenance, please refer to the hydraulic control unit manual attached.

7.9.1 Oil cleaning procedure

If necessary, change the hydraulic oil as follows:

- Stop the machine and switch off the power supply.
- Access the oil reservoir.
- Remove the fuel tank filler cap and its filter.
- Connect a suitable transfer pump (fitted with filters) to the tank, at the point where the cap has been removed, to allow the oil to be drawn out of the circuit.
- Connect the pump to an oil collection drum.
- Start drawing oil from the machine's hydraulic circuit.
- Run the cycle in reverse to refill the machine's circuit.
- Circulate the oil for about two hours.
- Move the steering cylinder periodically to change the oil in the pipes. To move the cylinder, you need to mechanically actuate the relevant solenoid valve **(1)** by moving the spool with a screwdriver **(2)**.



Example image

When you have finished, disconnect the pump and replace the cap with the filter.

NOTE



If the problem persists, you should clean any dirt build-up from the solenoid valve housing that controls the steering cylinder.

7.9.2 Oil change procedure

To change the hydraulic oil, proceed as follows:

- Stop the machine and switch off the power supply.
- Access the oil reservoir.
- Remove the fuel tank filler cap and its filter.
- Connect a suitable transfer pump to the tank, at the point where the cap has been removed, to allow the oil to be drawn out of the circuit.
- Connect the pump to an oil collection drum.
- Connect the pump to an oil collection drum.
- Move the steering cylinder periodically to drain the pipes. To move the cylinder, you must mechanically actuate the relevant solenoid valve **(1)** by moving the spool with a screwdriver **(2)**.

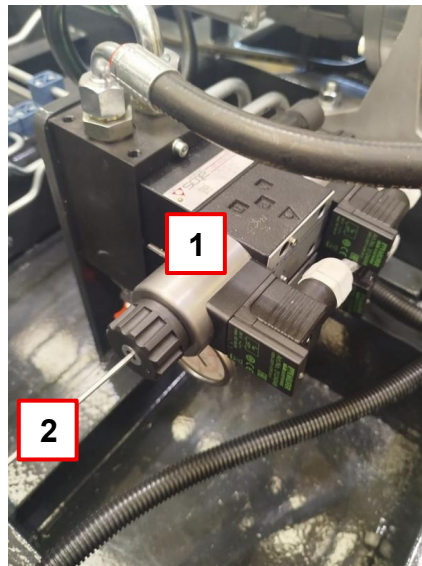


Image example

- After draining the system, connect the pump to the drum containing the new oil and to the tank, and proceed with the transfer.

When you have finished, disconnect the pump and replace the cap with the filter.



7.10 MAINTENANCE SHEET

Record all the maintenance operations in a specific logbook, for which an example follows.

DATE	OPERATOR	DESCRIPTION OF OPERATION

7.11 SPARE PARTS

A spare parts list follows. The letter “U” indicates parts subject to wear that it is recommended to keep in stock, whereas the letter “R” indicates those which could break (for which it is necessary to contact the Manufacturer).

NOTE



Use only original spare parts. Replacement with parts that are not originals could jeopardise machine functioning.

NOTE



The spare parts are to be kept clean, lubricated and stored in appropriate containers to preserve the integrity over time.

7.11.1 Mechanical spare parts

U / R	Description	Manufacturer	Quantity installed	Quantity recommended
U	Motorised polyurethane wheel Ø 500 x 280 mm code M_RTE_PLM_0043	MORELLO	1	1
U	Idler wheel made of polyurethane Ø 400 x 200 mm code M_RTE_PLF_0033	MORELLO	4	1
U	Polyurethane swivel castor Ø 85 x 80 mm code TPAC 85.80 P4	OMG	2	1
R	Ring nut KM16	SKF	4	-
R	Washer MB16	SKF	4	-
R	Dust cover 80x125x3	MORELLO	8	-
R	Steering gear motor AC 80V 3.000W 2.800rpm code AGX135.150.004	CFR	1	-
R	Traction motor AC 80V 12.000W 1.600rpm code AMX200.190.022	CFR	1	-
R	Reduction unit (traction) code RRWDB800D/53,00 LC-KC (DG-3731-C)	REGGIANA	1	-
R	Shaft for engine coupling (AMX200.190.022) code 90.X0142	CFR	1	-
R	Fifth wheel code M_CSC_RLM_0114	MORELLO	1	-
R	Pinion m=5 Z=35 code M_MTR_PRT_0346	MORELLO	1	-
R	Toothed wheel encoder m=5 Z=15 km=0,5	MORELLO	1	-

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U / R	Description	Manufacturer	Quantity installed	Quantity recommended
R	Internal clamping device code TLK350 10X20	TOLLOK	1	-
U	Rigid ball bearing code 6201-2RSL (12x32x10)	SKF	2	1
U	Taper roller bearing 32016X code (80x125x29)	SKF	8	2
U	Bushing DU 45x50x40 type GLY.PG 455040 F	FEDERAL MOGUL	4	1
U	Bushing DU 45x50x50 type GLY.PG 455050 F	FEDERAL MOGUL	4	1
U	Polizene panel code 2750_A2A_GN002	MORELLO	2	1
U	Polizene panel code 2750_A2A_GN004	MORELLO	2	1
U	Polizene panel code 2750_A2A_GN005	MORELLO	1	1
U	Polizene panel code 2750_A1A_GN019	MORELLO	2	1
U	Polizene panel code 2750_A1A_GN016	MORELLO	2	1
U	Polizene panel code 2750_A1A_GN009	MORELLO	2	1
U	Wooden panel CARPLY code 2750_A2A_GN006	MORELLO	1	1
U	Wooden panel CARPLY code 2750_A2A_GN007	MORELLO	1	1
R	Double-acting cylinder – BORE 100 mm STEM Ø 60 mm STROKE 110 mm code M_CIL_IDR_0232	MORELLO	4	-

7.11.2 Electrical spare parts

U / R	Description	Manufacturer	Quantity installed	Quantity recommended
R	LITHIUM battery 80 V 220 Ah	ALIAN T	1	-
R	Rectifier code CB80100 G6 UL	ALIAN T	1	-
R	Inductive sensor code IFS340	IFM	2	-
R	Hollow-shaft multi-turn absolute encoder code RM8004	IFM	1	-
R	Laser scanner I/O field 4m code MICS3-AAAZ40AZ1P01	SICK	3	-
R	Flashing yellow code CTL600	SIRENA	1	-

U / R	Description	Manufacturer	Quantity installed	Quantity recommended
R	Actuator code XCSZ05	SCHNEIDER ELECTRIC	1	-
R	Safety switch code XCSB702	SCHNEIDER ELECTRIC	1	-
R	Traction motor controller 1236SE-6521 48-80V 450A	CURTIS	1	-
R	Steering motor controller 1232E-6221 48-80V 175A	CURTIS	1	-
R	Pump motor controller 1232E-6221 48-80V 175A	CURTIS	1	-

7.11.3 Hydraulic spare parts

ADDITIONAL INFORMATION

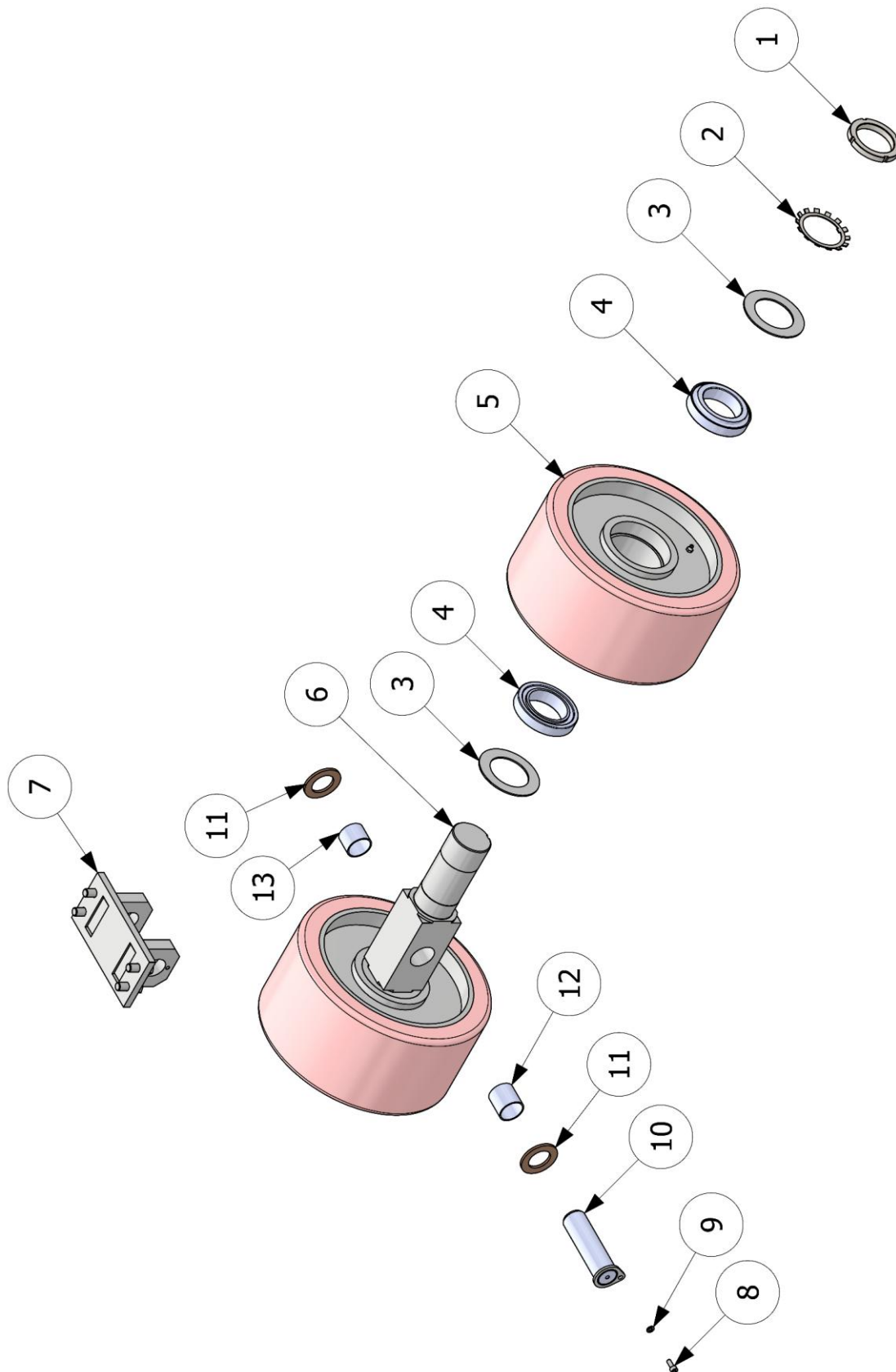


For a list of hydraulic spare parts, please refer to the enclosed group manual.

7.12 EXPLODED DRAWINGS

7.12.1 Idler wheel assembly

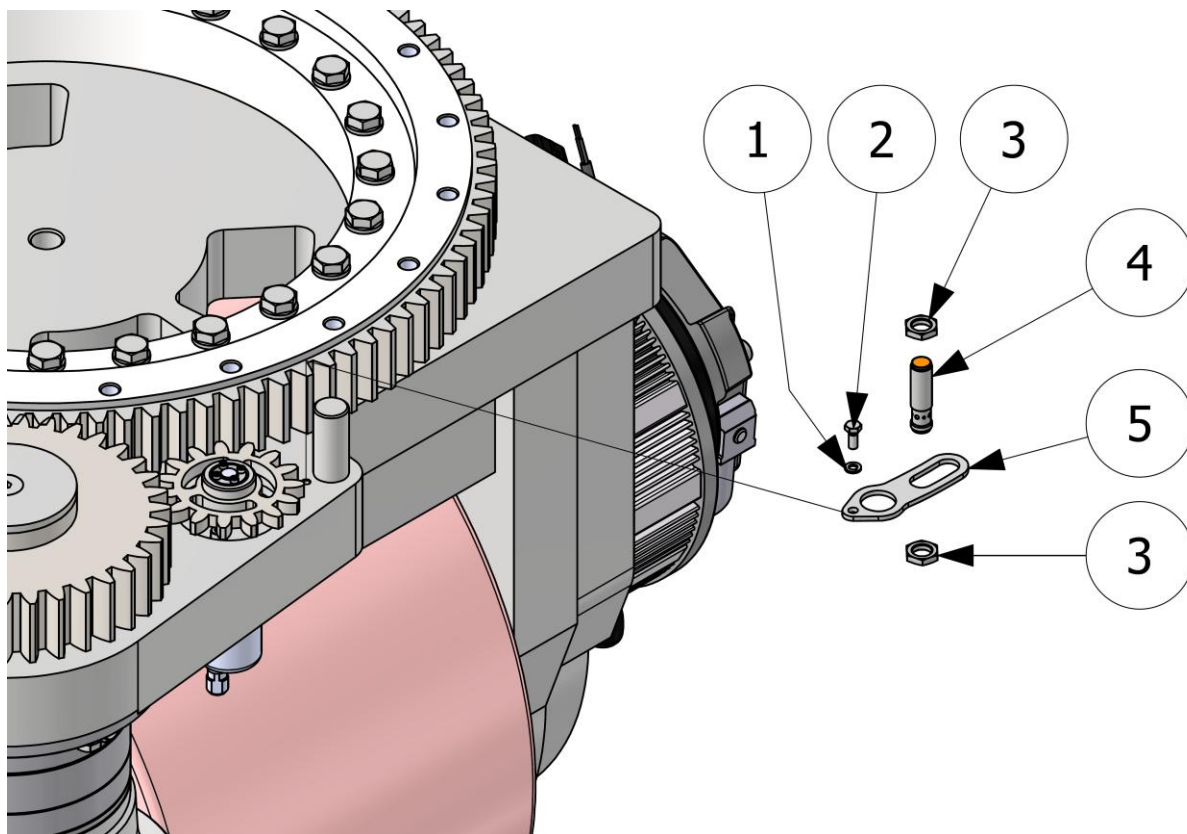
Pos.	Description	Quantity
1	Ring nut KM16	2
2	Washer MB16	2
3	Dust cover 80x125x3	4
4	Taper roller bearing 32016X code (80x125x29)	4
5	Idler wheel made of polyurethane Ø 400 x 200 mm code M_RTE_PLF_0033	2
6	Axle	1
7	Axle-end mounting bracket	1
8	Cylinder head screws M8x20	2
9	Open spring washer M8	2
10	Pin	2
11	Shim 45 75 5	4
12	Bushing DU 45x50x50 type GLY.PG 455050 F	2
13	Bushing DU 45x50x40 type GLY.PG 455040 F	2



7.12.2 Motor wheel assembly

LIMIT SWITCH

Pos.	Description	Quantity
1	Open spring washer M5	2
2	Hex head screw M5x12	2
3	Nut M12	4
4	Inductive sensor code IFS340	2
5	Fastening plate	2

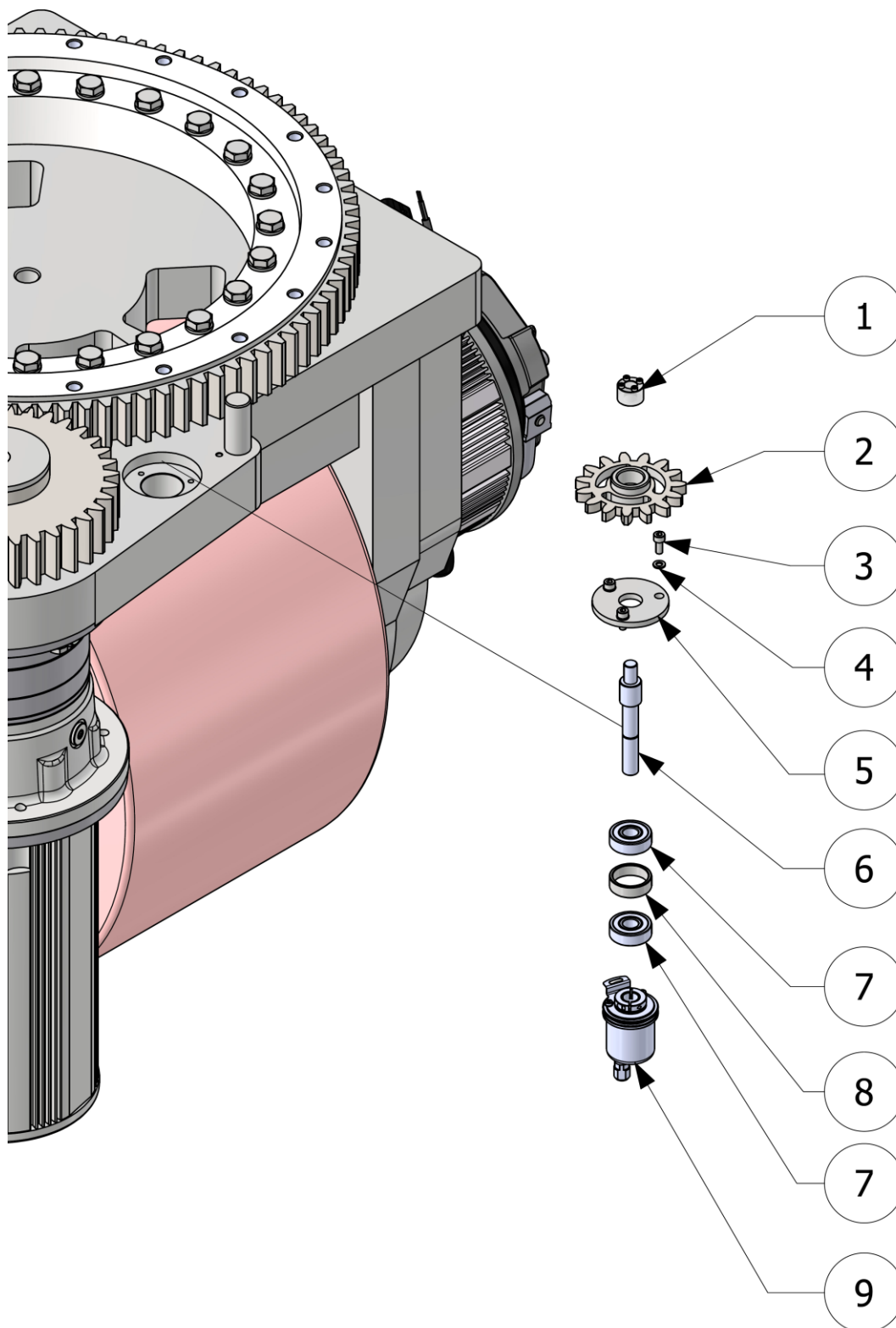


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ENCODER

Pos.	Description	Quantity
1	Internal clamping device code TLK350 10X20	1
2	Toothed wheel encoder m=5 Z=15 km=0,5	1
3	Cylinder head screws M5x12	3
4	Open spring washer M5	3
5	Plate	1
6	Shaft	1
7	Rigid ball bearing code 6201-2RSL (12x32x10)	2
8	Spacer	1
9	Multi-turn absolute encoder RM8004	1

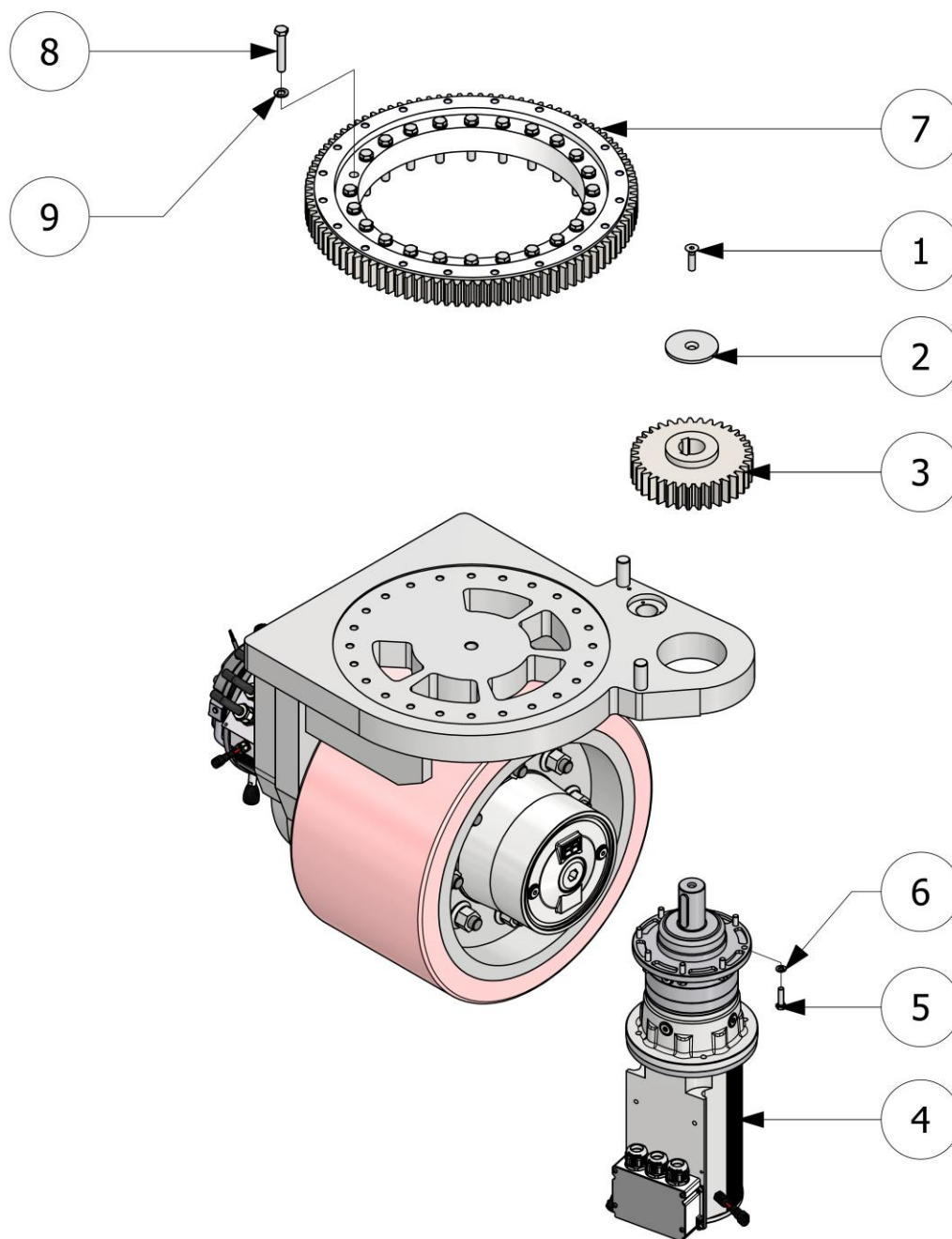


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STEERING GEAR MOTOR

Pos.	Description	Quantity
1	Countersunk screw M10x40	1
2	Cap	1
3	Pinion m=5 Z=35 code M_MTR_PRT_0346	1
4	Steering gear motor AC 80V 3.000W 2.800rpm code AGX135.150.004	1
5	Hex head screw M8x30	8
6	Open spring washer M8	8
7	Fifth wheel code M_CSC_RLM_0114	1
8	Hex head screw M12x70	24
9	Open spring washer M12	24

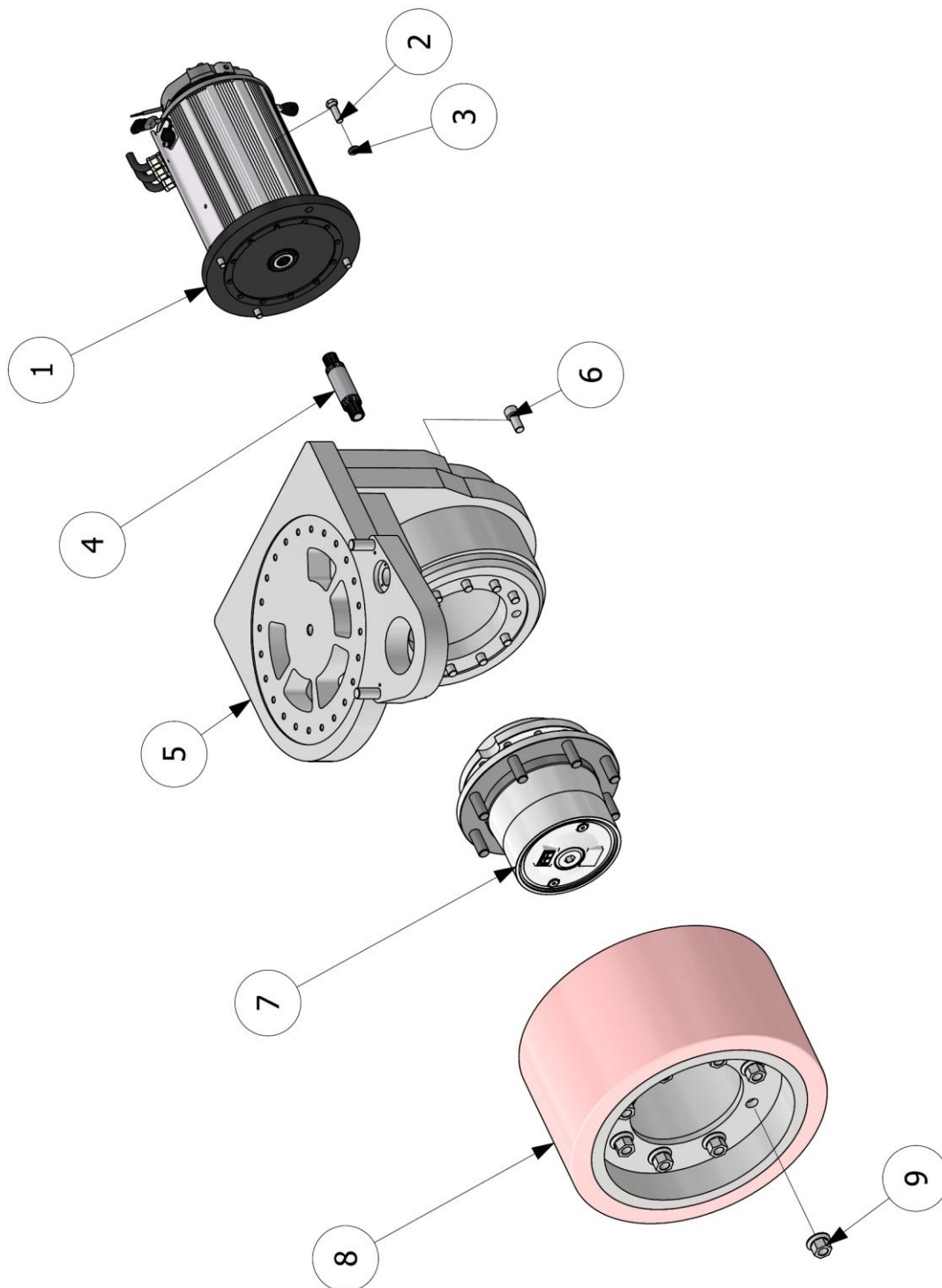


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TRACTION GEAR MOTOR

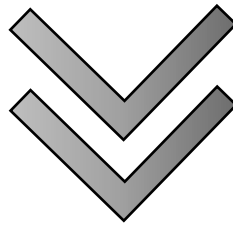
Pos.	Description	Quantity
1	Traction motor AC 80V 12.000W 1.600rpm code AMX200.190.022	1
2	Hex head screw M12x40	4
3	Open spring washer M12	4
4	Shaft for engine coupling (AMX200.190.022) code 90.X0142	1
5	Wheel frame	1
6	Cylinder head screws M16x35	12
7	Reduction unit (traction) code RRWDB800D/53,00 LC-KC (DG-3731-C)	1
8	Motorised polyurethane wheel Ø 500 x 280 mm code M RTE PLM 0043	1
9	Nut with washer M20x1,5	8



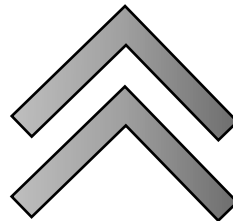
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DISPOSAL



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8. DISPOSAL

The following paragraph contains some suggestions and indications to correctly carry out the operations for putting out of service, dismantling and removal of the machine at the end of its operating life.

CAUTION



The following operations are the responsibility of authorized personnel.

- Make sure that, around the machine, there is sufficient space to enable staff to perform all the necessary movements without risk.
- Disconnect the electrical energy devices.
- Disconnect and remove the battery.

ADDITIONAL INFORMATION



For disposal of the battery, see the relevant manual attached.

- Unload, disconnect and remove the oil tank from the machine.
- Remove the lubricants.
- Disassemble the machine by taking, for each group.

WARNING



Pay close attention to possible falling machine parts or components during removal. This could cause serious danger to operators.

- Remove the moving parts and separate, as far as possible, the various components for the type of materials (plastic, metal, etc.), in order to be able to be disposed of through a separate collection.
- Remove and move the machine parts from the work area by taking all the necessary precautions.
- Before lifting components of considerable size/weight, check the correct attachment of lifting devices and only use appropriate slings and equipment.

ADDITIONAL INFORMATION



Disposal operations must be carried out in accordance with the provisions of the regulations in force in the country where the machine is used.

NOTE



In case of difficulty in dismantling, demolition of the machine, or for added security, please contact the Manufacturer and indicate cause of the removal and serial number of the machine.

- The machine is built with various materials, recyclable and not. For this reason, its removal involves adequate separation of the materials: steel, aluminium, copper, bronze, special alloys, plastic, etc.
- The manufacturer assumes no liability for any damage caused by any use of the individual components other than the one prescribed.

NOTE



Demolition is to be carried out in compliance with the laws in force.

8.1 RECYCLING

Part of the dismantled materials can be recycled. For the relevant indications, see the table in Chapter 5 "INTERNATIONAL RECYCLING CODES".

8.2 DISPOSAL

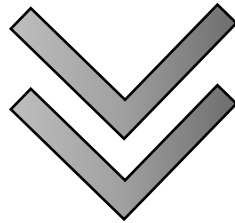
During the machine working life, waste materials are produced (lubricants, hydraulic oil and filters).

To dispose of some of these materials, specific standards are in place to safeguard the environment.

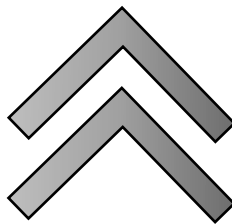
For the disposal of waste lubricants/oils, it is necessary to observe the following environment protection regulations:

- The lubricants/oils risk contaminating water and the soil, therefore never pour the products on the ground, in the water, or the sewage drain. Each breach of these rules can be prosecuted by law. When using lubricants, keep a container for oil within hand's reach.
- Carefully recover all lubricants/oils, by separating the mineral based products with those with a synthetic base. On disposal, comply with the regulations in force on disposal of exhausted oil.

It is compulsory for the client to know the legislation in force in his country and work to ensure this legislation is enforced.



ATTACHED DOCUMENTATION



**SELF-PROPELLED ELECTRONIC
TROLLEY WITH TYRES**
Serial numbers 2750/1 - 2750/2



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9. ATTACHED DOCUMENTATION

The documents below will be inserted at the end of this manual.

DESCRIPTION	
1	Machine layout
2	Wiring diagram
3	Hydraulic diagram
4	Hydraulic control unit manual
5	Battery manual
6	Rectifier manual
7	Motors manual
8	Gearboxes manual
9	Inverter manual
10	Laser scanner manual

**SELF-PROPELLED ELECTRONIC
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Serial numbers 2750/1 - 2750/2



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