Haulotte GROUP

CE

OPERATING AND MAINTENANCE INSTRUCTION

Self-propelled platform
STAR 8 & 10

242 032 7160 - E 02.06 Ind. A AUST

Registered Quality System ISO 9001 V2000 Haulotte GROUP CERTIFIED COMPANY

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REVIEW JOURNAL

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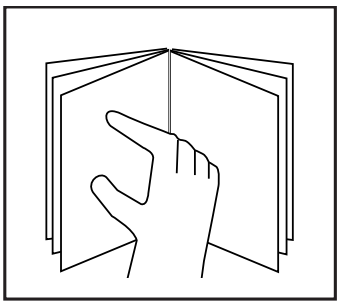
FOREWORD



You have just taken delivery of your mobile elevating work platform.

The purpose of this manual is to help the owners, the operators, the lessors to get to know HAULOTTE self-propelled lifts so as to use them efficiently and SAFELY. It cannot, however, replace the basic training necessary for any user of site plant.

The owners, the lessors have an obligation to ensure that operators know the instructions in the instruction manual. The head of establishment is also responsible for the implementation of the "user regulations" in force in the country of use.

This machine will give you complete satisfaction if you follow the operating and maintenance instructions exactly.

The purpose of this instruction manual is to help you in this, hence, it must be kept in the machine at all times. Additional copies can be supplied by the manufacturer on request.

We stress the importance:

- of complying with the safety instructions relating to the machine itself, its use and its environment,
- of using it within the limits of its performances,
- of proper maintenance upon which its service life depends.

This manual is supplied with the machine and is included on the delivery note.

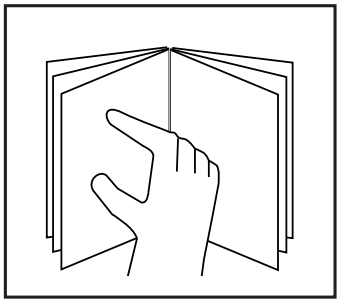
Caution!

THE TECHNICAL DATA CONTAINED IN THIS MANUAL CANNOT INVOLVE OUR RESPONSIBILITY AND WE RESERVE THE RIGHT TO PROCEED WITH IMPROVEMENTS OR MODIFICATIONS WITHOUT AMENDING THIS MANUAL.

CONTENTS

1 - SAFETY INSTRUCTIONS

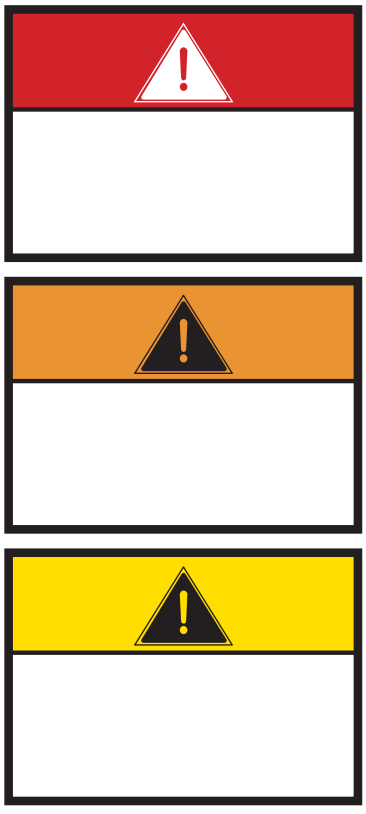
1.1 - GENERAL WARNING



The owner, lessor, user or operator of the machine must not use this machine before having read and understood this manual under any circumstances.

Prohibit any working mode liable to jeopardise safety. Any use not compliant with the instructions could lead to risks and injury to people and damage to property, and even a mortal danger.

Caution !
To attract the reader's attention instructions are signalled by this sign.



Potential dangers and machine instructions are indicated on labels and plates. All instructions on such plates must be read.

All labels conform to the following colour code:

- Red indicates a potentially fatal danger.
- Orange indicates a danger of causing serious injury.
- Yellow indicates a danger that may cause material damage or slight injury.

The owner, lesser, user or operator must ensure that these labels are in good condition and remain legible. Additional copies can be supplied by the manufacturer on request.

This manual must be kept by the user throughout the machine's service life, including in the case of loan, lease and resale.

Ensure that all plates or labels relative to safety and hazards are complete and legible.

1.2 - BEFORE USE

IT IS THE USER'S RESPONSIBILITY TO STOP USING THE MACHINE IN THE CASE OF OPERATING FAULTS OR SAFETY PROBLEMS OF THE MACHINE ITSELF OR IN THE AREA AROUND THE MACHINE.

1.2.1 - Training and operator knowledge

Only authorised and qualified operators can use Haulotte self-propelled platforms.

He/she must be the holder of an operation or 'driving' licence issued by their employer after undergoing a medical check and a practical test that prove they are apt to operate the machine.

- He/she must read and understand the present manual before using the machine. He/she must also read and understand all the plaques or stickers on the machine.
- He/she must know all the employer rules and official regulations applicable in the country of operation;
- He/she must operate the machine for the/those purpose(s) for which it is destined only.
- All the operating personnel must be familiar with the safety controls and the operating of the machine in the case of an emergency.
  There must always be at least two operators present, so that one can always:
  - Take fast action if necessary.
  - Take over the controls in case of accident or malfunction.
  - Monitor and prevent movement of vehicles and people near the platform.
  - Guide the platform operator if required.
- Operators are strongly recommended to wear an officially approved helmet when operating the machine.
- The operator training must be dispensed by a qualified person, in an area which is free from any obstacles, until such time as the student is capable of manoeuvring and operating the machine in complete safety.

Caution !
Operating the machine is strictly forbidden for anyone under the influence of alcohol, drugs or suffering from vertigo (dizziness) or who has problems controlling the machine, etc ...

1.2.2 - Environment

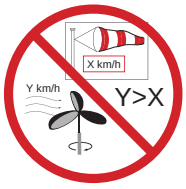
IT IS STRICTLY FORBIDDEN TO USE THE MACHINE:

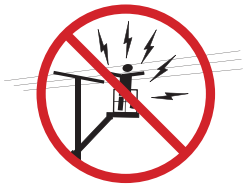
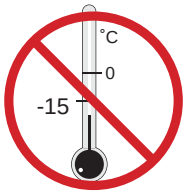
- neither on lorries, trailers, trains, sea vessels, nor any other vehicles or equipment unless this is authorized by HAULOTTE in writing.
- On ground that is soft, unstable, congested.
- On a ground that has a slope greater than permissible limit.
- In winds greater than the permissible limit. If used outside, use an anemometer to ensure that the wind speed does not exceed the permissible limit.
- Near power lines (check minimum safe approach distances according to voltage carried). Take into account the movements of the machine and the oscillation of electrical lines.
- In temperatures less than -15°C (especially in refrigerated chambers). Consult us if it is necessary to work below -15°C.
- In explosive atmospheres.
- During storms (risk of lightning).
- In the dark, unless the optional floodlight is fitted.
- In the presence of intense electromagnetic fields (radar, moving and high currents).

DRIVING ON PUBLIC ROADS IS PROHIBITED.







1.3 - USING THE MACHINE

- Never operate a faulty machine. It must be serviced and repaired in accordance with the instructions contained in the maintenance and repair manuals.
- Never use the machine for any purpose other than taking people together with their tools and materials to a particular place.
- Never operate the controls of the machine abruptly.
- When several operators are on board the platform, only one shall have the responsibility for operating the controls of the machine.
- It is important to ensure that in normal use, that is lift operation, the lift post selection key remains in the lift position so as to be able to control the lift from the platform. In the event of a problem on the platform, a person present and trained in emergency/standby manoeuvres can assist by putting the key in the ground control position.
- Never place the machine against a structure in order to maintain that structure.
- Never use the platform as a crane, hoist or lift.
- Never use the machine to pull or tow
- Do not use the machine with:
  - A load greater than the nominal load.
  - More people than the authorized number.
  - A lift lateral force greater than the permissible value.
  - A wind greater than the permissible speed.

NOTE : Never tow the lift (it has not been designed for that and must be transported on a trailer).

1.4 - DANGER OF ELECTROCUTION

Caution !

If the machine has a 220 V 16A max. plug, the extension must be connected to a mains socket protected by a 30 mA differential circuit breaker.

Our machines are not insulated, the electrical risks are considerable in the following situations:

- hitting a power line, also consider the movements performed by the machine and the oscillation of electrical lines.
- use in stormy weather.
- use of the machine as a welding ground.

CHECK THAT A SERVICEABLE FIRE EXTINGUISHER IS CLOSE TO HAND.

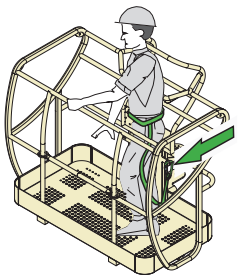
1.5 - MINIMUM SAFETY DISTANCES

Our machines are not insulated, hence, it is important to maintain a safety distance from the electrical power cables and devices according to applicable government regulations and the following diagram :

Voltage	Minimum safety distance in meters
Up to 300V	avoid contact
from 300 V to 30 kV	2.5 m
from 30 kV to 45 kV	2.6 m
from 45 kV to 63 kV	2.8 m
from 63 kV to 90 kV	3 m
from 90 kV to 150 kV	3.4 m
from 150 kV to 225 kV	4 m
from 225 kV to 400 kV	5.3 m
from 400 kV to 750 kV	7.9 m

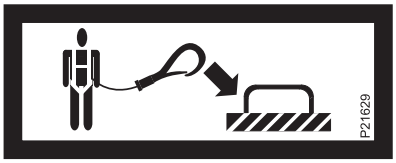
All electrical components and cables are active. Never operate the machine in a prohibited area (failure to comply with safety distance), unless you have made sure beforehand that their power supply has been interrupted.

1.6 - DANGER OF FALLS



When the operators are on board the machine, they must observe the following rules:

- Wear personal protective equipment suited to working conditions and conform to local regulations, particularly when working in hazardous areas.
- Make sure that the tip-up middle rail of the platform is down.
- Hold the guardrail firmly when lifting or driving the platform.
- Remove any traces of oil or grease from the platform steps, floor or guardrails.
- Wear personal protective equipment suited to working conditions and conform to local regulations, particularly when working in hazardous areas.
- Avoid contact with stationary or moving obstacles.
- To enter the platform or to get off the platform:
  - make sure that the machine is entirely folded,
  - always use the access door, facing it and always keeping 3 points of body contact with it.



All our machines are equipped with authorised fixing points, with only one harness per fixing point. These fixing points are indicated by the sticker opposite.

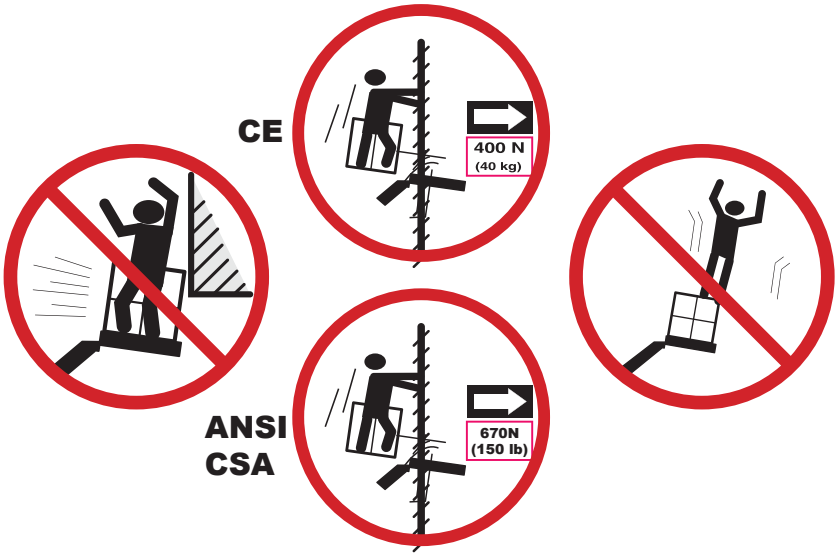
If current local and national government regulations in the countries of operation stipulate the wearing of a safety harness, we recommend that it should be attached to these authorised fixing points.

Caution !

When an operator working on the raised platform must leave the platform to get on to a stable and safe structure, this change-over must only be performed according to the following recommendations:- The operator must wear a safety harness, using two straps. One strap must be attached to the platform, the other one to the relevant structure. The operator must leave the platform through the access door only. - The operator must not undo the strap which is fixed to the platform while the change-over has not been completed or it still presents a danger.

It is strictly forbidden:

- to disable the limit switches of the safety devices.
- to increase the platform operating height by means of ladders or other accessories.
- to use the guardrails to climb into or out of the platform (use the steps provided).
- to get on the guard-rails like on horse-back when the platform is being raised.
- to drive the machine at high speed in narrow or congested areas.
- to operate the machine unless the guard-rails are properly installed and the tip-up middle rail is down.
- to get on the covers.



1.7 - RISKS OF JERKY MOVEMENTS AND TIPPING OVER

Caution !
Never use the platform as a crane, hoist or lift.
Never use the machine to pull or tow.

When the operators are on board the machine, they must observe the following rules:

- Do not neutralise the limit switches on the safety devices.
- Avoid operating the control levers for one direction in the opposite direction without stopping in the " 0 " position (in order to stop during travelling, move the manipulator's lever gradually, by keeping the deadman activated (if the control station has one).
- Comply with the maximum load as well as the number of people authorized on the lift.
- Distribute the loads and place them if possible in the centre of the lift.
- Verify that the ground can take the pressure and load per wheel.
- Avoid hitting fixed or moving obstacles.
- Do not drive the lift at high speed in areas which are narrow or not cleared.
- Control speed when going round bends.
- Carry out the daily checks and monitor proper operation during periods of use.
- Protect the machine from any unsupervised intervention when it is not in service.
- Be highly attentive when driving on platforms, pavements, etc ... (inversion of driving direction).

IF THE MACHINE IS IN AN UNSTABLE POSITION OR ONE OR SEVERAL WHEELS DO NOT HAVE GROUND CONTACT, THE PERSONNEL ON BOARD THE PLATFORM OR IN THE IMMEDIATE VICINITY OF THE MACHINE MUST BE EVACUATED BEFORE TRYING TO PUT IT IN A STABLE POSITION.

Caution !
Allow sufficient stopping distances
3 meters at high speed,
1 meter at low speed.

It is strictly forbidden:

- to drive the lift in reverse (lack of visibility).
- to go down ramps at high speed.
- to use the machine with a cluttered lift.
- to use the machine with equipment or objects suspended from the guard rails.
- to increase the ground surface of the machine by using floor extensions or accessories that have not been authorized by HAULOTTE.
- to use the machine with elements which could increase the wind load (e.g.: panels).
- to carry out machine maintenance operations when it is raised without having put in place the necessary safety devices (travelling crane, crane).

1.8 - DANGER OF SQUASHING AND COLLISION

Caution !

Wearing a safety helmet is compulsory for any operator working on the platform or in the close vicinity of the machine

When the operators are on board the machine, they must observe the following rules:

- When the platform is being lifted, lowered or shifted sideways, check that very person and every obstacle is out of the way and that there are no holes or any frames or structures.
- Make sure that there is no one in the immediate vicinity of the machine before carrying out a movement or travelling. Any non-operating personnel must keep a distance of at least 2 m from the machine during operation.
- Adapt the travel speed to suit the conditions of the ground, traffic and slope, the position of people and any other factor which could cause a collision.
- Do not operate a machine where a crane or other machine is operating high up, except if the crane's controls have been locked and/or precautions have been taken to avoid any collision.
- When going down the ramp of a lorry, allow for an adequate distance between the lower end of the ramp and any obstacle.

It is strictly forbidden:

- to drive the lift in reverse (lack of visibility).
- to go down ramps at high speed.
- to put your feet towards the pothole safety systems, so as to avoid risks of crushing.

1.9 - OTHER DANGERS

- Never use the machine as a welding ground.
- Keep batteries clear of sparks, flames and burning. The batteries emit an explosive gas.
- Batteries contain acid. Always wear protective clothing and goggles when working on the batteries.
- Avoid spilling or touching the battery acid. Spilled battery acid can be neutralised with sodium bicarbonate and water.
- Do not expose the batteries or charger to water or rain.
- The battery tray must remain open throughout the charge cycle.
- Do not touch the battery poles with tools that may produce sparks.

1.10 - INSPECTIONS

Caution !

Compliance with the national regulations in force in the country of machine use.

For FRANCE: Order dated March 1st 2004 + circular DRT 2005/2004 dated 24 March 2005 which specify:

According to French regulations introduced on 2 March 2004 (for the company manager of the user) the keeping of a maintenace logbook for any lifting device is now compulsory.

1.10.1 -Periodic inspections

The machine must be inspected every 6 months in order to detect any defects liable to cause an accident.

These inspections are performed by an organisation or personnel specially designated by the site manager and under his responsibility (whether or not they belong to the company) Articles R 233-5 and R 233-11 of the French Labour Code.

The results of these inspections are recorded in a safety register kept by the site manager and constantly available to the labour inspector and the site safety committee (if one exists) and the list of specially designated personnel (Article R 233-5 of the French Labour Code).

NOTE : This register can be obtained from trade organisations, and in some cases from the OPPBTP or private prevention agencies.

The designated persons must be experienced in risk prevention (Articles R 233-11 or order n° 93-41).

No member of personnel is allowed to perform any check whatsoever during machine operation (Article R 233-11 of the French Labour Code).

1.10.2 -Examination of machine suitability

The manager of the site where the machine is operated must ensure the machine is suitable, i.e. capable of performing the work in complete safety, and in compliance with the operating manual. Furthermore, the French order of March 1st 2004 addresses problems relative to leasing, examination of the state of conservation, checking upon operation after repairs, and test conditions (static test coefficient 1.25; dynamic test coefficient 1.1). All users must consult this order's requirements and comply with them.

1.10.3 -State of conservation

Detect any deterioration liable to cause hazardous situations (concerning safety devices, load limiters, tilt sensor, cylinder leaks, deformation, welds, bolt tightness, hoses, electrical connections, tyre state, excessive mechanical gaps).

NOTE : If the machine is rented/leased, the user responsible for the machine must examine its state of conservation and suitability. He must obtain assurance from the leaser that general periodic inspections and pre-operation inspections have been performed.

1.11 - REPAIRS AND ADJUSTMENTS

These cover major repairs, and work on or adjustments to safety systems or devices (of a mechanical, hydraulic or electrical nature).

These must be performed by personnel from or working for PINGUELY-HAULOTTE who will use only original parts.

Any modification not controlled by PINGUELY-HAULOTTE is unauthorised.

The manufacturer cannot be held responsible if non-original parts are used or if the work specified above is not performed by PINGUELY-HAULOTTE-approved personnel.

1.12 - VERIFICATIONS WHEN RETURNING TO SERVICE

Caution !
These tests must be performed by a competent person.

To be performed after:

- extensive disassembly-reassembly operation,
- repair affecting the essential components of the machine,
- any accident caused by the failure of an essential component.

It is necessary to perform a suitability examination, a state of conservation examination, a static test, a dynamic test.

1.13 - BEAUFORT SCALE

The Beaufort Scale of wind force is accepted internationally and is used when communicating weather conditions. It consists of number 0 - 17, each representing a certain strength or velocity of wind at 10m (33 ft) above ground level in the open.

Description of Wind		Specifications for use on land	MPH	m/s
0	Calm	Calm; smoke rises vertically.	0-1	0-0.2
1	Light Air	Direction of wind shown by smoke.	1-5	0.3-1.5
2	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.	6-11	1.6-3.3
3	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.	12-19	3.4-5.4
4	Moderate Breeze	Raises dust and loose paper; small Branches are moved.	20-28	5.5-7.9
5	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waterways.	29-38	8.0-10.7
6	Strong Breeze	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty.	39-49	10.8-13.8
7	Near Gale	Whole trees in motion; inconvenience felt when walking against wind.	50-61	13.9-17.1
8	Gale	Breaks twigs off trees; generally impedes progress.	62-74	17.2-20.7
9	Strong Gale	Slight structural damage occurs (chimney pots and slates removed).	75-88	20.8-24.4

2 - PRESENTATION

Self-propelled platforms, STAR 8 & STAR 10 models, are designed for all elevated work within the limits of their characteristics (Chap. 8, page 39) and conform to all the safety recommendations specific to the equipment and places of use.

The main control station is in the plaform.

The machine is equipped with two extra control stations located on the turntable.

- one emergency rescue station (station to be operated with key only).
- one repair station (access once the protective covers of the turntable have been opened).

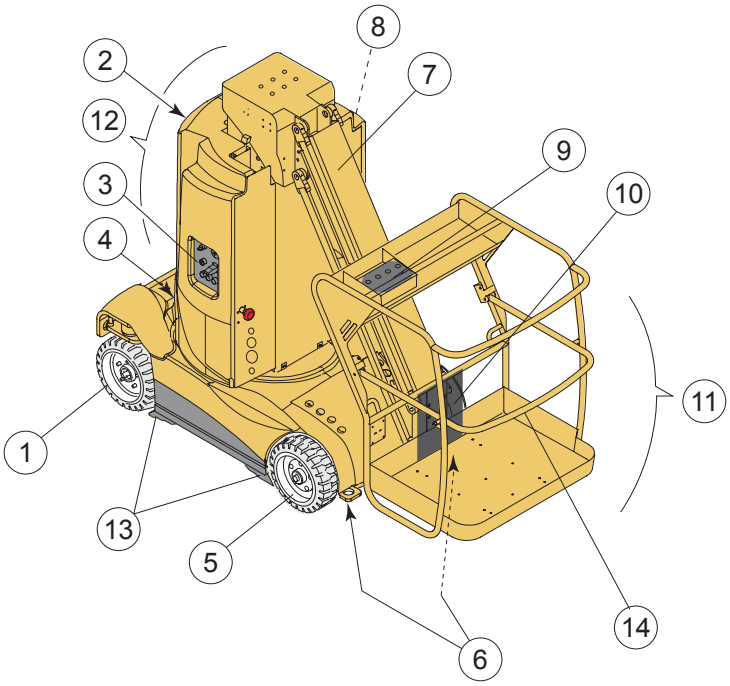
2.1 - IDENTIFICATION

A plate, fixed on rear of the lift, bears all the information (engraved) necessary to identify the machine.

REMINDER: When requesting information, intervention or spare parts, please specify the type and serial number.

2.2 - MAIN COMPONENTS

Fig. 1 - Main components



1 - steering wheels	8 - winder
2 - battery box	9 - top control panel
3 - bottom control panel	10 - document holder
4 - counterweight	11 - platform
5 - drive wheels	12 - turntable
6 - anchoring lugs	13 - potholes
7 - jib	14 - tip-up middle rail

2.3 - SAFETY EQUIPMENT

Caution !
Do not put your feet towards the pothole safety systems, so as to avoid risks of crushing.

2.3.1 - Pothole safety system

The machine has fixed potholes situated underneath the base-frame, which helps to prevent it from swaying.

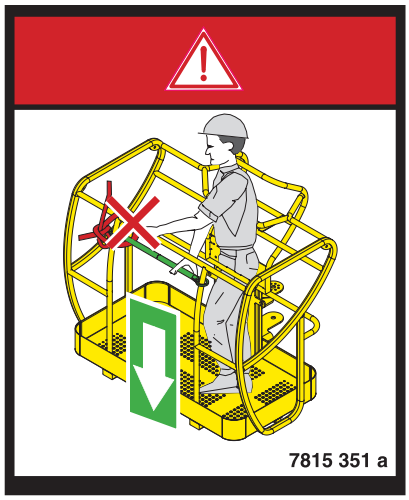
See (Figure: Main components, page 11) ref.13.

Caution !
Before operating the machine, and once the operator is on the lifting-platform, he must make sure that the middle rail is in low position.

2.3.2 - Safety devices of the lifting-platform

The lifting-platform is made up of guard-rails and a tip-up middle rail (Fig. 1 - Main components, page 11) facilitating access to the operator on the lifting-platform.

Sticker tip-up middle raill



Caution !
The tip-up middle rail must not be attached to the guard-rail.

2.4 - DESCRIPTION OF CONTROL STATIONS

All the movements are controlled from a control box situated on the platform.

This is the main driving post ; it must not be moved to another place on the platform otherwise the " FORWARD " and " REVERSE " controls may be inverted.

The gearbox situated on the turntable is an emergency station.

Repair stations are accessible at the bottom of the turntable. See Chap. 6, page 33.

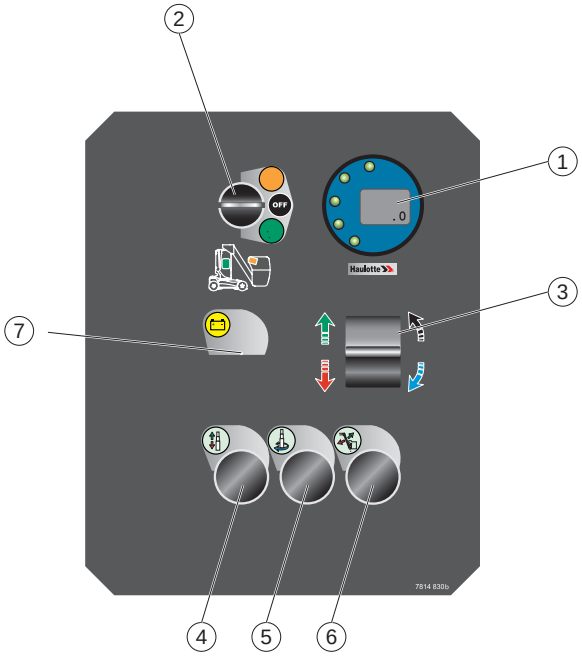
You must be familiar with the machine's characteristics and operation as certain interruptions may cause you think a breakdown has occurred, whereas the safety systems are simply coming into operation.

See Chapter 4, page 19 and Chapter 8, page 39.

NOTE : Do not execute any manoeuvres before having assimilated the instructions in Chapter 5.2, page 28.

2.4.1 - "Turntable" control station

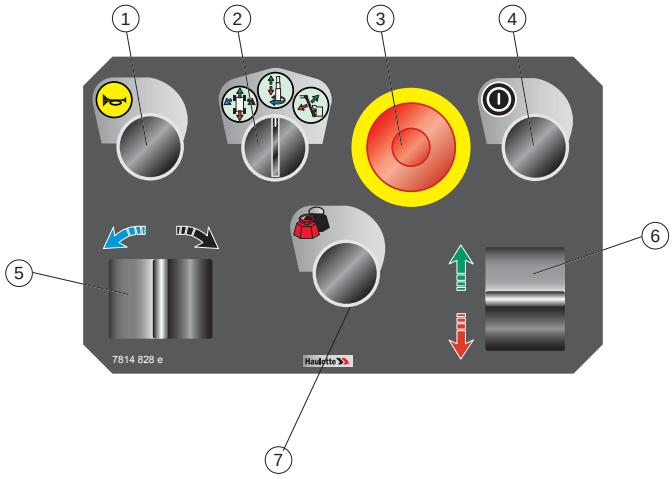
Fig. 2 - : "Turntable" control station



1 - Timer with charge level	5 - Turntable orientation control
2 - Control panel selection switch: turntable / platform	6 - Jib raising control
3 - Movement control manipulator	7 - Charge indicator
4 - Mast telescoping control	

2.4.2 - "Platform" control station

Fig. 3 - : Platform control panel



1 - Horn	5 - Movement control: left / right
2 - Travel / movement selector switch	6 - Movement control:For/back; Up/down
3 - Emergency stop	7 - Weighing light indicator
4 - Control unlocking	

3 - CHECKS PRIOR TO MACHINE OPERATION

3.1 - GENERAL INSTRUCTIONS

During its manufacture, each lift is the subject of continuous quality controls.

Transport can cause damage. You must report any damage to the carrier before the machine is put into service for the first time. See Chapter 7, page 37.

Each day and at the beginning of a new work period, the machine will undergo a visual inspection and an operating test. Any repair, if any, should be carried out before starting the machine. This is vital for its smooth functioning.

3.2 - VISUAL CHECKS

3.2.1 - General mechanical appearance of the machine

- Visual inspection of all of the machine : chipped paint, missing or loose parts or battery acid leaks must attract your attention.
- Check that there are no bolts, nuts, connectors and hoses undone, no hydraulic oil leaks, no electric conductors cut or disconnected.
- Check the wheels : no nuts loose or missing.
- Check the tyres : no cuts or wear.
- Check for cracks and welded parts that might be broken.
- Check that the control panel supply cable is in good condition.
- Verify that the limit switches are free from any foreign body.
- Check that there are no leaks, indication of wear, impact marks, scratches, rust or foreign matter on the cylinder rods.
- Check that the reducers are not disconnected.
- Check that the guard-rails and the tip-up middle-rail for access are in good condition.
- Check that there is a manufacturer's rating plate, warning labels and user's manual.

Photo 1 : Hydraulic assembly

3.2.2 - Hydraulic system

- Check the hydraulic circuit: no leaks, components properly fixed.
- Check the hydraulic oil level.

Caution !

TO FILL UP, ONLY USE THE PRODUCTS RECOMMENDED IN THE CONSUMABLES CHAPTER.

Photo 2: Battery tray

3.2.3 - Batteries

- Check the cleanness and tightness of the battery's terminals regularly (loose terminals or corrosion cause loss of power).
- Check the battery electrolyte level: the level must be about 10 mm above the plates; top up if necessary with distilled water.
- Verify the sliding operation of the battery trays.

REMINDER: Respect safety instructions given by the battery manufacturer.

3.2.4 - The machine's environment

Caution !
Do not use the machine if the wind speed exceeds 28 mph / 45 km/h.

3.2.4.1 -Outdoors

For use outdoors, it is important to comply with the operating instructions as well as the recommendations so as to avoid any risk of an accident.

The factors to be complied with for use outdoors are in particular:

- The maximum load not to be exceeded: 440 lb / 200 Kg (1 pers. max.)
- The maximum wind speed: 28 mph / 45 km/h
- The lateral manual force: 44 lb / 20 kg
- The ground must not have any holes or any major unevenness.

3.2.4.2 -Indoors

For use indoors, it is important to comply with the operating instructions as well as the recommendations so as to avoid any risk of an accident.

The factors to be complied with for use indoors are in particular:

- The maximum load not to be exceeded: 440 lb / 200 Kg (2 pers. max.)
- The lateral manual force: 88 lb / 40 Kg.
- The ground must not have any holes or any major unevenness.

3.3 - OPERATING TESTS

3.3.1 - Safety devices

3.3.1.1 -Emergency stop switches

- Verify the operation of the top and bottom emergency stop switches:
- when pressed ('OFF'), all the controls of the machine will be brought to a standstill.
- each emergency stop button needs to be reset (position 'ON') in order to put the machine back into operation. See (Figure: 1- Bottom panel emergency stop, page 17) and (Figure: 2 - Top panel emergency stop, page 17).

Caution !
Risk of overturning when the buzzer sounds.

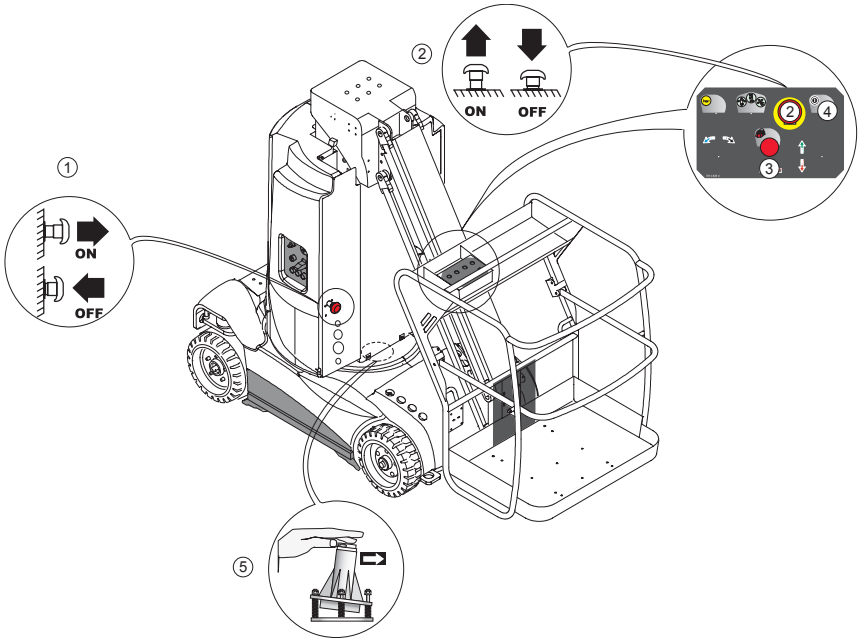
3.3.1.2 -Tilt detector

- From the platform in raised position, check that the tilt detector (photo 5) works properly by tilting the support plate, raised mast or jib.
- Beyond 3°, it should emit a sound and disable dangerous movements. (Figure: 5 - Tilt detector, page 17)

3.3.1.3 -Weighing

- Verify the visual and audible alarms, in the case of an overload of the platform:
  - From the turntable station:
    -Load the platform with a weight of more than 200 kg.
    -The sound signal will send a warning signal to the operator; all movements will be brought to a standstill.
  - From the platform station:
    -Load the platform with a weight of more than 200 kg.
    -The overload light indicator on the platform panel and the buzzer alert the operator; all movements as well as travelling will be brought to a standstill.
    The load needs to be removed, so that all the controls can become operational again.

Fig. 4 - Safety systems



1- Bottom panel emergency stop	2 - Top panel emergency stop	3 - Overload light indicator	4 - Validation	5 - Tilt detector

3.3.1.4 -Validating movements

- When testing the movements of the machine, Chap. 3.3.2, page 17, check the correct functioning of the validation button of the control station at the platform:
  - Control a movement, press validation button (Figure: 4 - Validation, page 17), operate the master controller. If no movement is performed after 5 seconds from validation, the master controller will become inoperational. You will then have to perform a new validation in order to get the movement you want.

Caution !

DANGER ! Never stand under the platform when it is descending. Risks of crushing!

3.3.2 - Movement tests

See Chap. 5.2.1, page 28 et Chap. 5.2.2, page 29

From the turntable station, control:

- the raising / lowering of the mast
- the raising / lowering of the pendular
- turrntable rotation.

From the platform, test:

- the raising / lowering of the mast
- the raising / lowering of the pendular
- turrntable rotation.
- travelling and traversing.

REMINDER: You have 5 seconds to operate the master controller once you have selected and validated a movement. After these 5 seconds, you will have to perform a new validation.

NOTE : It is essential to control the safety systems' operation every day during checks before putting into service.

4 - OPERATING PRINCIPLE

4.1 - HYDRAULIC CIRCUIT

All machine movements, apart from travel, are powered by the hydraulic energy supplied by an electropump whose operating speed is controlled by an electronic chopper.

A filter mounted on the hydraulic return line protects the machine from pollution.

In the case of a fault, manual rescue measures allow the emergency operator to obtain the movements of the mast, the movements of the jib as well as the movements of the turntable.

Caution !
The lifting and rotational movements are brought to a standstill when the batteries are 80% empty.

4.1.1 - Turntable rotation

This is achieved by a "wheel and pinion" ring and reducer assembly, drive by a hydraulic motor. Operating pressure is limited to 50 bar for this movement.

Caution !
IT IS FORBIDDEN TO REMOVE THE LEAD OR ADJUST THE MACHINE's PRESSURE LIMITERS.

4.1.2 - Steering movement

This is controlled by a 4-channel electrovalve.

On/off output from the same electropump.

No travelling movement is possible when lifting the platform.

Only one movement can be performed at the same time.

See “Hydraulic diagram”, page 53

4.2 - ELECTRIC CIRCUIT

Caution !

These machines are not insulated and must not be put into service near power lines

The electrical power used for the controls and the starting of the machine is supplied by a unit of two traction battery blocks of 24 V - 250 Ah. A built-in charger enables these batteries to be recharged overnight by connecting it to a domestic 16A socket.

Caution !

If the machine has a 220 volt power point/plug, it is essential for the extension cable to be connected to a mains socket protected by a 30 mA quick-trip circuit-breaker.

4.2.1 - Electronic speed chopper

This device is central to platform operation. Its role is to control movement and travel speed by adapting the rotation regime of the various electric motors to a given command.

The chopper receives the signal from the control manipulator, as well as information on the type of movement to be made and state of the safety systems.

All electric motors are controlled by the chopper and therefore depend on its internal operating safety systems.

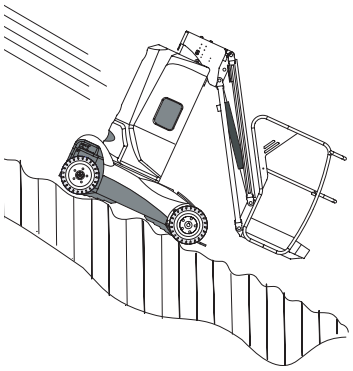
4.2.2 - Direct electric travel

Two direct current motors, whose inductors are connected in parallel, power the drive wheels via epicycloidal reducing gears.

A field control device on the induced circuit and the inductors prevents acceleration due to runaway and triggers counteractive braking if necessary.

4.2.3 - Braking

Fig. 5 - a damaged ramp



The platform is equipped with an electrical brake which is automatically operated through reduced power: braking performance can be reduced in the case of:

- a descent down a damaged ramp,
- ‘wear-and-tear’ of tyres.
- wet or greasy ground.

4.2.4 - Battery charge monitor / Hour counter

This combines in a single unit the following functions :

- State of charge of the batteries
- Hour counter
- Resetting.

4.2.4.1 -State of charge of the batteries

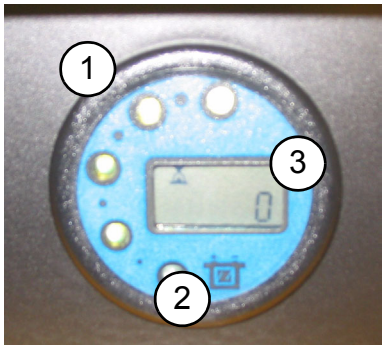


Photo 3

The state of charge of the battery is indicated by 5 LEDs:

- When the battery is correctly charged, four green LEDs are on. (item 1 Photo 3, page 21)
- When the battery discharges itself, the LEDs go out one by one.
- When the battery is discharged, the red LED (item 2, Photo 3, page 21) comes on, raising is cut but travel remains possible.
- It is compulsory to recharge the batteries otherwise they would be excessively discharged and damaged.

4.2.4.2 -Hour counter

The hours are counted on the screen (item 3, (Photo 3 , page 21)) when the machine is moving. At that time the " timer " flashes.

4.2.4.3 -Resetting

This takes place when the battery is correctly recharged

4.2.4.4 -Alarm : Problem on the machine

When there is a problem on the machine

- the operator on the platform is warned by flashes.
- the operator on the ground is warned by a numerical indication. The problem can be identified from the number displayed on the hour counter's screen (see table below).

ALARM CODE (MDI)	MESSAGE ON CONSOLE	PROBABLE CAUSES	REMEDIES
01	**POWER FAILURE**	• Short-circuit on an on/off valve: proportional electrovalve, coil main contactor SB1 or electrobrake.	
02	**EEPROM KO**	• Failure in the memory area in which the configured parameters are stored. If the failure remains when the ignition key has been turned on and then off, change the EEPROM and the µP. If the alarm stops, the stored parameters may have been cancelled and replaced by default parameters.	• Replace the speed chopper.
03	**WEIGHING CARD KO**	Problem on the weighing card	• Leave at least 2 seconds before resetting the emergency stop or changing station with the key selector. See Chap. 5.2.1, page 28.
03	**INCORRECT START**	• Forward/reverse gear / jib lowering or lifting / platform lifting or lowering / left/right / steering/ traction authorization is/are ON when the ignition key is turned off or traction is required before traction authorization occurs.	• Machine problem, contact After-Sales service.

ALARM CODE (MDI)	MESSAGE ON CONSOLE	PROBABLE CAUSES	REMEDIES
04	**CAPACITOR CHARGE**	• The test is executed during the initial diagnosis. The alarm switches on if, 500 m after the ignition key has been turned off, condensers have not started to load. A probable reason for that is a default in the power unit.	• Replace the chopper.
05	**R VMN NOT OK**	• The test is executed at rest, main switch off, and during operation. If the VMN is inferior to the battery voltage, and the machine is at rest, then the chopper switches to an alarm state. While working, the alarm switches ON if the VMN does not follow the duty-cycle of the chopper. • Possible reasons: - Incorrect motor connection - Current leakage to the ground - Default in the power unit.	• Check the right travel motor and its wiring (sock). • If they are correct, replace the chopper.
06	**L VMN NOT OK**	• The test is executed at rest, main switch off, and during operation. If the VMN is inferior to the battery voltage, and the machine is at rest, then the chopper switches to an alarm state. While working, the alarm switches ON if the VMN does not follow the duty-cycle of the chopper. • Possible reasons: - Incorrect motor connection - Current leakage to the ground - Default in the power unit.	• Check the left travel motor and its wiring (sock). • If they are correct, replace the chopper.
07	**VACC NOT OK**	• The alarm shows that the traction accelerator voltage received by the serial card is more than 1V at rest, without any operation request. • Possible reasons (to look for in the serial card): - One of the potentiometer's wires is cut. - The potentiometer is improperly connected. - The potentiometer is defective. - Incorrect serial card programming.	• The code checks the potentiometer voltage value at rest. • Replace the serial card or the joystick.
08	**VFIELD NOT OK**	• The test is executed at rest. In this condition, the voltage on the 2 connections of the field should be about half of the batteries'. The alarm is given if voltage is different from this value. • Possible reasons for voltage differences: - Motor current leakage to the ground. - The field of the motor is not connected to the chopper. - Default in the section of the power unit related to the field.	• Check the travel motor's inductors and check the F1 and F2 outputs' resistance compared to positive and negative outputs.
09	**STEER SENSOR KO**	• The µP maintains that the signal of the steering potentiometer is not out of the programmed range. • Possible reasons for failure: - Incorrect programming - Steering potentiometer needs readjusting.	• Check the potentiometer, wiring, chopper data (steer sensor adjusting).

ALARM CODE (MDI)	MESSAGE ON CONSOLE	PROBABLE CAUSES	REMEDIES
10	**RIGHT STBY I HIGH** **LEFT STBY I HIGH**	• The test is executed during the initial diagnosis, at rest. It maintains that the current is superior to a minimum threshold. In the opposite case, the chopper switches the alarm ON while blocking the machine. • Possible reasons for failure: - Sensor is out of order. - Fault in the measure circuit, the logic circuit, or in the power.	• Induction current problem detected on ignition. • Replace the chopper.
11	**RIGHT I = 0 EVER** **LEFT I = 0 EVER**	• The test is executed while working. It checks that the current is superior to a threshold value. In the opposite case, the chopper switches the alarm ON while blocking the machine. • Possible reasons: see STBY HIGH.	• Induction current problem detected during operation. • Replace the chopper.
12	**HIGH FIELD CURRENT**	• Malfunction in the field current. The field current at rest is not nil. • Possible reasons for failure to indicate nil field current: - Malfunction in the current detector - Fault in the power unit of the field.	• Inductor current problem detected on ignition. • Replace the chopper.
13	**NO FIELD CURRENT**	• Malfunction in the field current. While working the field current is nil • Possible reasons: - Malfunction in the current detector - Fault in the power unit.	• Inductor current problem detected on ignition. • Replace the chopper.
14	**DRIVER SHORTED**	• The test is executed with the main switch (SB1) open. Check that the main switch driver is not in short-circuit. • Possible reasons for failure: - Driver in short-circuit. - Malfunction in the measure circuit of the contactor coil voltage. - Incorrect wiring. - Faulty hardware circuit protection (Nota Bene: This alarm is normally overridden by alarm #1 POWER FAILURE).	• Main switch alarm usually overridden by the POWER FAILURE alarm. • Machine related problem ; contact After Sales Service.
15	**CONTACTOR DRIVER**	• The test is executed while the main switch is closed. It checks that the driver is not open. • Possible reasons for failure: - Short-circuit in the driver. - Malfunction in the circuit of the contactor coil voltage.	• Alarm given on SB1 driver (main switch in short-circuit). • Replace the chopper.
16	**CONTACTOR CLOSED**	• The test is executed each time before the main switch is closed. It checks that the switch is actually open. • Possible reasons for failure: - The switch contacts are stuck. - A malfunction in the power unit.	• Alarm given due to a problem on the SB1 power contact. • Replace the power sensor or the chopper. • Check F1 and F2 on the chopper.

ALARM CODE (MDI)	MESSAGE ON CONSOLE	PROBABLE CAUSES	REMEDIES
17	**FORW + BACK**	• The test is performed non stop. The alarm is on if two requests for different operations are simultaneously activated. • Possible reasons: - Mistake in wiring. - Working microswitch stuck. - Wrong operation by the user.	• Replace the serial card or joystick.
18	**BATTERY LOW**	• Stepping down of the traction current and blocking of the pump functions. The battery alarm switches on when there is 10% of residual load left. • If the alarm is on with unloaded batteries, control the battery value read in the TESTER menu of the console. If incorrect, adjust it in the menu CONFIG MENU/ADJUSTMENT.	• Fix the problem selecting the BATT ADJUSTMENT function. It is essential to test the travel movements BEFORE replacing the chopper.
19	**BRAKE DRIVER KO**	• This alarm is on when there is a problem on the electrobrake driver. • Possible reasons: - Short-circuit in the driver - Defect in the driver unable to command the electrobrake. - The measure circuit on the voltage on the electro-brake coil is defective.	• Internal problem related to the chopper QH20 driver. • Replace the chopper.
20	**CONTACTOR OPEN**	• The control microprocessor is broken or has identified a dangerous situation that has not been detected by the main microprocessor.	• Replace the chopper.
21	**MICRO CONTROL KO**	• The µP of the logic control is broken or several connections have been damaged.	• Replace the chopper.
22	**CHECK UP NEEDED**	• Servicing request programmed ; interval of the last maintenance operation >300h. This alarm does not stop the machine but signals the problem. Select the option "CHECK UP DONE" ON to erase the message.	• Cancel the servicing request, reset or service the machine if needed.
23	**NO ISOLATION**	• Maintains that the chassis is not on short circuit with the +BATT or connected to the ground.	• Check the circuit and the chopper's outputs insulation. • Repair the damaged circuit.
24	**PRESSURE NOT OK**	• The pressure switch can be damaged or disconnected or the emergency stop could have been damaged (it cuts the positive charge at the pressure switch but not at the logic).	• Check the shunt on the serial card and that the voltage on the chopper input is positive.
25	**CHOPPER NOT CONFIGURATED**	• A valid model for the chopper has not been configured. (See the model selection board).	• Check the parameters (shunt on the downside of the serial card).
26	**EVP NOT OK**	• The proportional electrovalve is open at rest. While working, the electrovalve is too open or too closed compared to the PVM applied.	• Check that the controller has been correctly configured with absent EVP.
27	**SERIAL ERROR #1**	• Incomplete or lack of reception by the selected serial card.	• Check the serial card selection by SA1.

ALARM CODE (MDI)	MESSAGE ON CONSOLE	PROBABLE CAUSES	REMEDIES
28	**THERMAL PROTECTION**	• Heat alarm > 75°C/167°F ; the maximum current on inductors is linearly stepped down to 0 at 90°C/ 194°F. The alarm stops if T<70°C/167°F.	• Check the chopper's temperature using the console or replace the chopper.

4.3 - SAFETY SYSTEMS

Caution !
Do not raise the platform unless the machine is on a hard, firm and level surface.

4.3.1 - Tilt control up to 3°

The tilt detector emits an audible signal when the maximum allowed tilt is reached.

If the situation continues, after a time delay of 1 or 2 seconds, the mast extension telescoping and jib lifting movements are disabled, and as long as the machine is extended, travel is also disabled.

To restore the travel movement, all elevation elements must first be retracted.

NOTA : *NOTA : As long as the slope will be above the permissible limit, it will not be possible for the operator to extend the machine.*

4.3.2 - High travel speed

Caution !
DO NOT GO TRAVEL DOWN STEEP SLOPES AT HIGH SPEED

- High travel speed is only authorised while the platform is in the low position.
- While the mast is extended, or the jib goes beyond the horizontal, only low speed is available.

4.3.3 - Validation of movements

A validation button allows the decision of a joystick operation for 5 seconds. Beyond these 5 seconds, the joystick will stop functioning.

4.3.4 - Platform load control

If an overload is detected on the platform, no movement can be performed from the upper control station. The overload light indicator on the platform panel and the buzzer alert the operator. Load needs to be removed from the platform, so that all the controls can become operational again.

4.3.5 - Contact switches' function

4.3.5.1 - SQ1 - Tilt control

See "Tilt control up to 3°", page 25

4.3.5.2 -SQ4 - Low position limit switch

- When being raised:
  - micro - gear activated
  - tilt activated
- when being lowered:
  - high speed activated
  - interruption of the tilt detector disactivated
  - the sound signal linked to the tilt detector remains activated.

4.3.5.3 -SQ10 - Top position limit switch

When this sensor is activated, the raising of the mast will be brought to a standstill.

4.3.5.4 - SQ12 - Limit switch - jib

Indicates the jib's position compared to a horizontal plane.

- when being raised:
  - micro-gear activated,
  - tilt activated.
- when being lowered:
  - micro-gear disactivated,
  - tilt disactivated.

4.3.5.5 -P1 - Steering potentiometer

- Detects the deviation of the steer-wheels in order to adjust the speed of the electrical motors for the travelling movement of the platform.

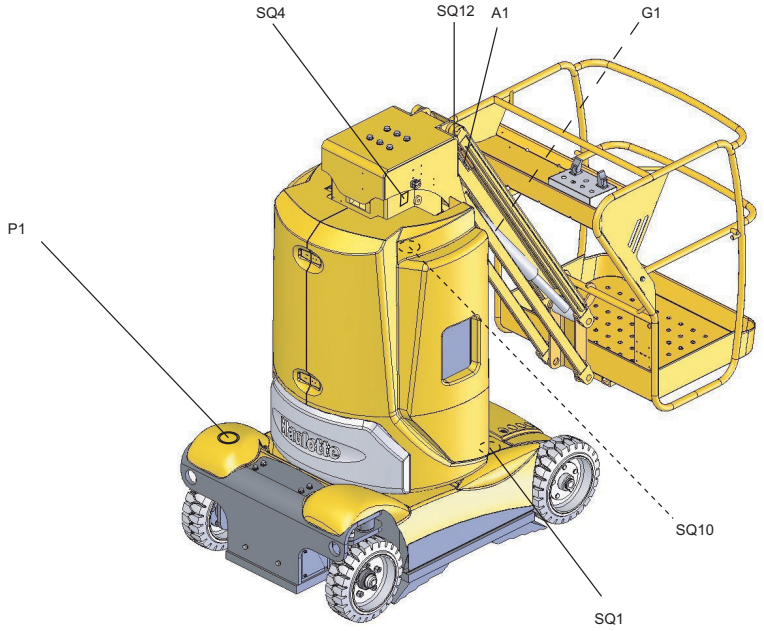
4.3.5.6 -A1 - Angle sensor

- signals the degree of the pendular tilt.

4.3.5.7 -G1 - Pressure sensor

- signals the load on the platform.

Contact switches' position



See "Wiring diagrams", page 55.

5 - USE

5.1 - RECOMMENDATIONS

5.1.1 - Reminders

Do not use the machine :

- without reading the recommendations dealing with machine operation,
  - See “Before use”, page 2.
  - See “Using the machine”, page 4.
- with various hazards,
  - See “Danger of electrocution”, page 5.
  - See “Minimum safety distances”, page 5.
  - See “Danger of falls”, page 6.
  - See “Risks of jerky movements and tipping over”, page 7.
  - See “Danger of squashing and collision”, page 8.
  - See “Other dangers”, page 8.
- without having thoroughly assimilated :
  - See “CHECKS PRIOR TO MACHINE OPERATION”, page 15
  - See “Safety systems”, page 25
  - See “TECHNICAL DATA”, page 39

These machines are not insulated and must not be put into service near power lines.

Do not use the machine if the wind speed exceeds 28 mph (45 km/h).

It is forbidden to exceed the machine’s nominal load (See “TECHNICAL DATA”, page 39.)

Caution !
DO NOT GO TRAVEL DOWN STEEP SLOPES AT HIGH SPEED

5.1.2 - Movement (control from the "platform" station)

To enable the machine to be moved to access the place of work, unload or load on slopes of less than 23%, you must ensure that:

- the mast is fully retracted.
- the jib is lowered.

Caution !
High travel speed is only possible if the mast is fully retracted and the jib is lowered.

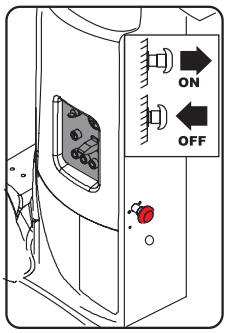
5.1.3 - Battery discharge

If the battery is more than 80% discharged:

- telescope and jib raising is impossible
- rotation is neutralised.

5.2 - OPERATION

Fig. 6 - : Bottom panel emergency stop



The main control panel is in the platform.

- In normal operation, the "turntable" operation station is an emergency station only used if necessary.
- The platform/turntable selector key must be removed and kept on the ground by a person present and trained in emergency/rescue operations.

Caution !

For any movement the cut-out must be turned on. “: Bottom panel emergency stop”, page 28

- Ensure that there are no obstacles that may interfere with movements before starting operation.

5.2.1 - Operation from the ground

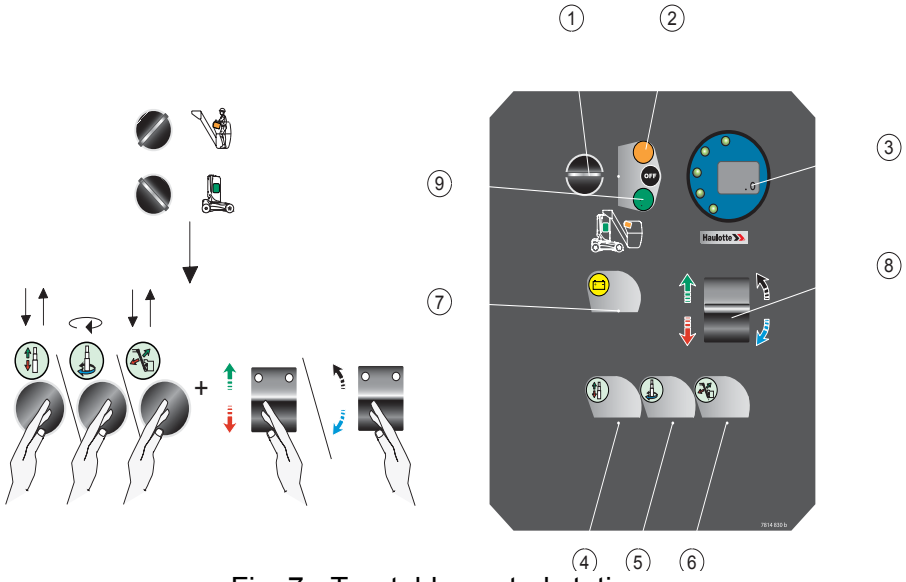


Fig. 7 - Turntable control station

Only one movement can be performed at the same time.

Caution !

To avoid tripping alarm 03, take the following precautions:
When changing the control station from chassis to platform and vice versa, leave at least 2 seconds in the neutral position.
After an emergency stop, before resetting leave at least 2 seconds.

5.2.1.1 -Mast lifting / jib lifting

- Ensure that the emergency stop button is armed.(Fig. 7 - Turntable control station)
- Turn key no. 1 in turntable position no. 2.
- The multi-function indicator indicates the battery charge with flashing lights (no.7).
- Press the change-over switch (no. 4.) or (no. 6) while operating the master controller from bottom to top (no. 8).
- To stop the movement, release either the change-over switch (no. 4) or (no 6) or the master controller.

Caution !

DANGER ! Never stand under the platform when it is descending. Risks of crushing!

5.2.1.2 -Mast lowering / jib lowering

- Ensure that the emergency stop button is armed.
- Turn key no. 1 in turntable position no. 2.
- Press the change-over switch (no. 4.) or (no. 6) while operating the master controller from top to bottom (no. 8).
- To stop the movement, release either the change-over switch (no. 4) or (no 6) or the master controller .

5.2.1.3 -Turntable rotation

- Ensure that the emergency stop button is armed.
- Turn key no. 1 in turntable position no. 2.
- Press the change-over switch (no. 5) while operating the master controller in the desired direction (no. 8).
- To stop the movement, release either the change-over switch (no. 5) or the master controller (n.8) .

5.2.1.4 -Switching to the "platform" control

- Put the key selector (ref: 2) (Figure: Turntable control station, page 28) in the "platform" position .
- Climb into the basket, respecting maximum load recommendations and distributing load evenly, if necessary, all over the floor.

PLATFORM MODEL

STAR 8: 200 kg. (2 persons) (indoor); 200 kg.(1 pers.) (outdoor).
STAR 10: 200 kg. (2 persons) (indoor); 200 kg.(1 pers.) (outdoor).

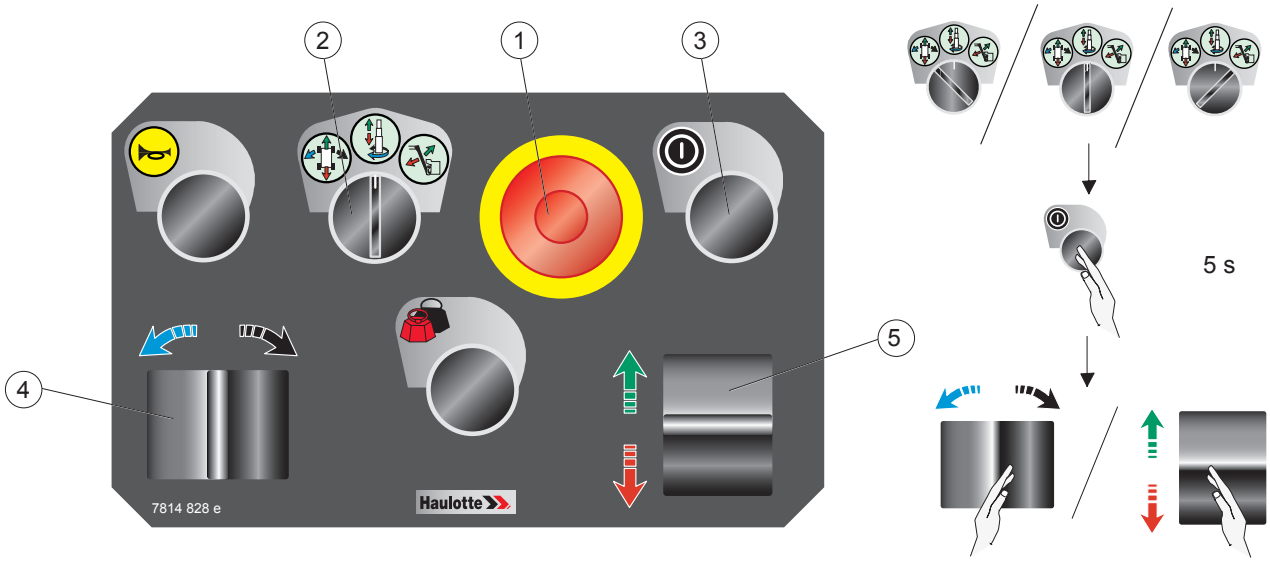
- Pull the emergency stop (Figure: Platform control station, page 30) ref.1

5.2.2 - Operations from the platform

See (Figure: Platform control station, page 30)

- Ensure that the emergency stop button (ref.1) is fitted.
- If a movement does not respond to its command, press the emergency stop button and reset.
- Place the selector on the pictogram (no..2) corresponding the desired movement:
  - - travelling / steering
  - - Raising of mast / rotation of turntable
  - - Raising of jib / rotation of turntable
- Press the validation button. You have then 5 seconds to activate one of the manipulators:
- - Steering / rotation of turntable (no. 4)
- - Travelling / raising (no. 5)
- To change direction you do not need to press the validation button (no. 3) if no more than 5 seconds have lapsed between the different movements.
- It is possible to simultaneously operate the master controllers (no. 4) and (no. 5) when performing travelling movements only. For the other movements, operate the master controllers one after the other.
- It is not possible to simultaneously perform a lifting movement and a turntable rotation.

Fig. 8 - Platform control station



5.2.2.1 - Mast or jib lifting

- Place the selector switch on the pictogram (ref.2).
- Press the validation button (ref. 3).
- Operate the master controller (rep.5) from bottom to top .
- To interrupt the raising movement, release the master controller.

5.2.2.2 - Mast or jib descent

- Place the selector switch on the pictogram (ref.2).
- Press the validation button (ref. 3) if necessary.
- Operate the master controller (rep.5) from top to bottom .
- To interrupt the lowering movement, release the master controller.

5.2.2.3 - Turntable rotation

- Place the selector switch on the pictogram (ref.2).
- Press the validation button (ref. 3) if necessary.
- Operate the master controller (rep.4)
  - Right and left for orientational movements.
- To stop the movement, release the master controller.

Caution !

High speed is only possible if the mast is fully retracted and the jib lowered.

5.2.2.4 -Travelling and steering

- Place the selector switch on the pictogram (ref.2) corresponding to the travel/steer functions.
- Operate the master controller
  - -back and/or forth (no. 5) to obtain a travelling movement.
  - -right and/or left (no. 4) to obtain a steering movement.
- To stop the movement, release the master controller.

Work may now begin.

5.3 - USING THE BUILT-IN CHARGER

CHARIS HF 24V - 30A STD type.

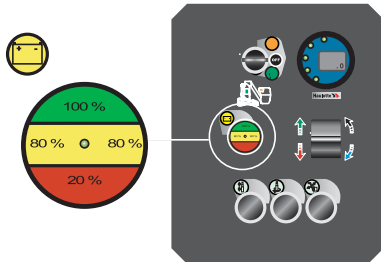
Caution !
Set the chassis emergency stop on the 'OFF' position before recharging.

5.3.1 - Characteristics

- Power supply: 220V single phase 50 Hz
- Voltage supplied: 24 V
- Charging time for 250 Ah battery: approximately 8 hours for batteries discharged by 80%.
- Charge curve entirely controlled by micro-controller.
- Protection against battery polarity inversion by 2 output fuses, of the 25 A/h car type.

5.3.2 - Light indicators

Fig. 9 - : Light indicator



The charger is equipped with a light indicator (led).

See table below:

State	Description
RED on	Machine charging
YELLON on	80% charged
GREEN on	Machine charging complete

5.3.3 - Starting the charge

Charging is started automatically when connected to the mains.

Charge time for a battery discharged by 80%: 8 hours

5.3.4 - Maintenance charge

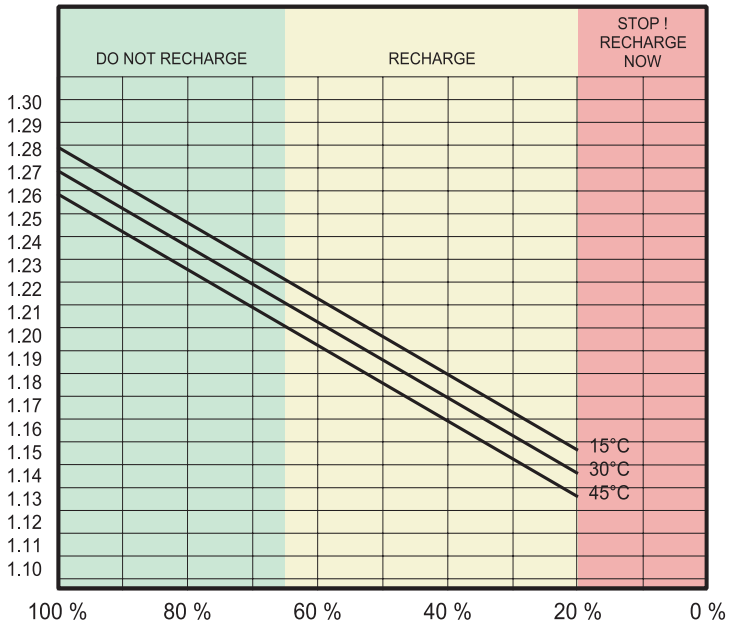
If the charger remains connected to the mains for more than 24 hours, it starts a new charge cycle after termination of the previous charge to compensate for self-discharge.

5.3.5 - Charge interruption

If it is necessary to move the machine during a charge cycle, the charger must be disconnected.

After moving the machine, reconnect the charger. If the interruption is longer than 13 minutes, a full charge cycle is initialised.

STATE OF BATTERY CHARGE ACCORDING TO DENSITY AND TEMPERATURE



6 - RESCUE AND REPAIR OPERATIONS

Caution !

Only a skilled and authorised operator may perform standby or emergency movements.

6.1 - RESCUE LOWERING

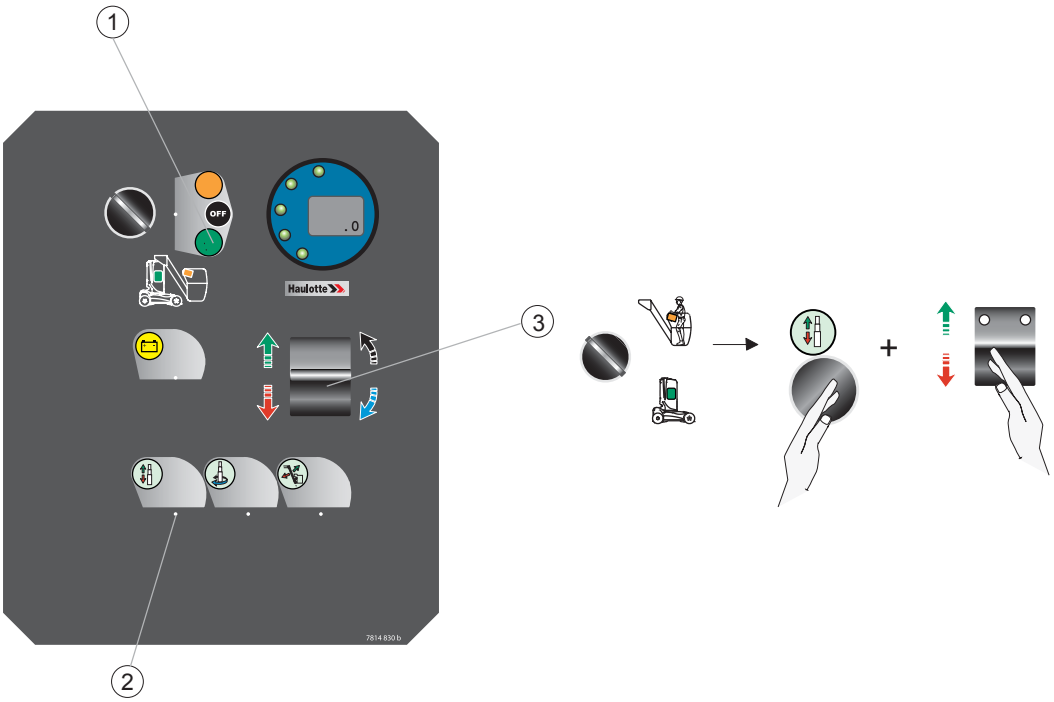
This is the case in which the operator on the platform is no longer able to control the movements, even though the machine is functioning as normal. A competent operator on the ground may operate the control station at the base-frame with the main power supply to bring the operator on the platform back down.

Rescue procedure

- Place the key selector from selection of control station to position "ground control" (no. 1). In this position the controls of the control station at the platform will be cancelled.
- Press the button corresponding to the mast movements (no. 2) whilst operating the master controller (no. 3) in lowering direction to bring the operator back to the ground.

REMINDER: When carrying out rescue operations from the ground, it is absolutely vital that you make sure that all obstacles have been removed from under the platform (wall, structures or frames, electrical wiring etc.)..

Fig. 10 - Rescue procedure



6.2 - MANUAL REPAIR

Caution !

It is prohibited to lower overloads using emergency lowering at the risk of overturning the lift.

If an operating fault prevents the operator on the platform from coming back down, a competent operator may bring the platform back down from the control station at the base-frame.

Procedure of manual lowering of mast (Photo 4):

- Pull the control of the solenoid valve for lowering the mast to get the platform down;
- Release to stop the platform when being lowered.

Procedure of manual lowering of jib (Photo 5):

- Press the central part of the solenoid valve for lowering the jib to get the jib down.

NOTA : It is necessary to bring the mast down completely before proceeding to lower the jib.

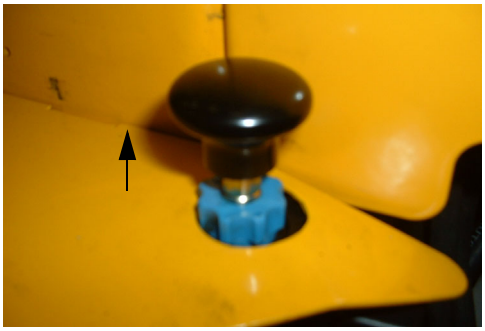


Photo 4 - Manual lowering of the mast

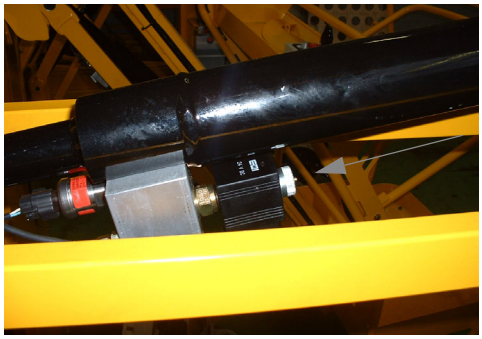


Photo 5 - Manual lowering of jib

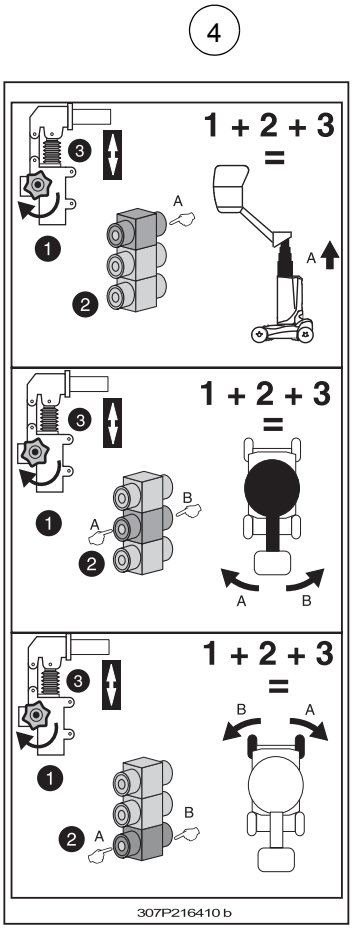
6.3 - MANUAL PUMP EMERGENCY OPERATION

Movements may be controlled from the ground if the main power source fails.

There is a hand pump (ref.1) next to the hydraulic distirbuting valves on the turntable.

In association with manual control of the electrodistributing valves, this pump enables mast lifting, turntable orientation and steering orientation (if the machine is towed).

- Insert the lever (ref.2) into the pump.
- Check that the pump's decompression valve (ref.3) is closed.



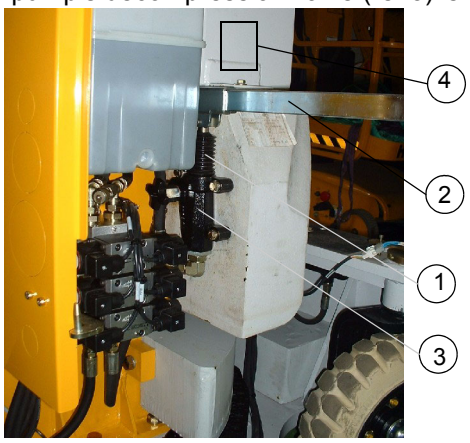


Photo 6: Manual pump

- Move the lever up and down, keeping the manual control corresponding to the required movement's electrodistributing valve pressed down.
- Follow the instructions on the label near the distributing valve (ref.4).

REMINDER: Mast and jib lowering movements are obtained by acting on the electrovalves corresponding to these movements. (See "Manual repair", page 34.)

Caution !

Use of the emergency pump is exclusively reserved for rescuing personnel if the main hydraulic supply fails. Any other use may cause damage.

7 - UNLOADING - LOADING - MOVING

MPORTANT: Before any unloading operation, check the machine's overall condition to make sure that it has not been damaged during transport. Otherwise, please file the necessary reservations with the carrier within 48 hours in writing.

Never use the machine before checking, first of all, that there are no dangers on the surface of the work area, such as holes, unevenness, dents or scraps.

Before any loading of the machine, please make sure that:

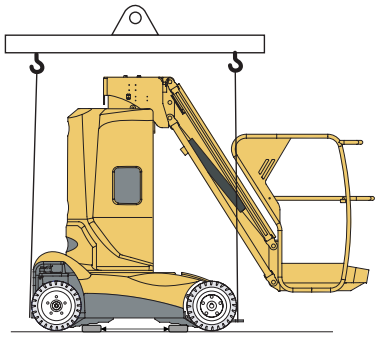
- no load is in the basket.
- that the machine is in transport mode: retracted mast.

Unload on a stable surface that is sufficiently resistant (see pressure on the ground - Chap. 8, page 39), flat and clear of any obstables.

7.1 - LOADING / UNLOADING BY LIFTING

Caution !

Never stand underneath the machine or come too close to the machine when it is in operation in order to avoid serious physical and material injuries.



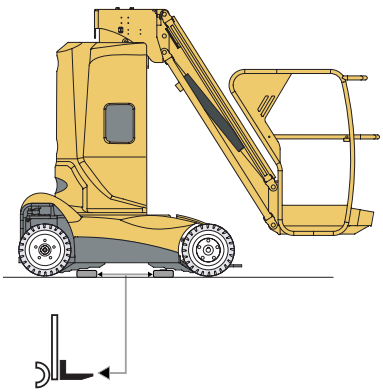
- Use a yoke plate and 4 slings.
- Precautions:

Ensure that:

- the lifting accessories are in good working order and of sufficient capacity.
- the slinging accessories can bear the load and are not abnormally worn.
- the slinging lugs are clean and in good condition.
- the personnel controlling movement is authorised to use lifting equipment.

- Unloading:
  - attach the 4 slings to the 4 slinging lugs.
  - slowly lift, making sure that the load is evenly distributed and slowly set the machine down.

7.2 - LOADING / UNLOADING IN A LIFTING TRUCK



- Safety precautions:
  - Make sure that the control switches of the machine are 'off';
  - Use a lifting truck of sufficient capacity;
  - Move forks apart.
  - Place the forks in the spaces indicated on the chassis.
  - Put the forks far enough under the machine to optimise its stability and in order to avoid any risk of skidding.
- Unloading:
  - lift slowly, making sure that the load is evenly distributed and slowly set the machine down.

7.3 - LOADING / UNLOADING WITH RAMPS

IMPORTANT: When going on a ramp, whether ascending or descending, we recommend that the axle at the back engine should be oriented towards the lower end of the slope.

Caution !
DO NOT GO DOWN THE RAMPS AT HIGH SPEED.

- Precautions:
  - Ensure that the ramps can bear the load and that adhesion is sufficient to avoid all risk of slipping during movement and that the ramps are properly fixed.
  - Ensure that no-one or no obstacle is in the machine's path before starting ascending or descending.
- Allow for a stopping distance of approximately 3 meters.
  - Preferably use a continuous ramp compatible with the width of the machine and its performance.

IMPORTANT: This method requires the machine to be started, see (Chap. 5.2, page 28) to avoid all risk of incorrect movement. Select the low travel speed.

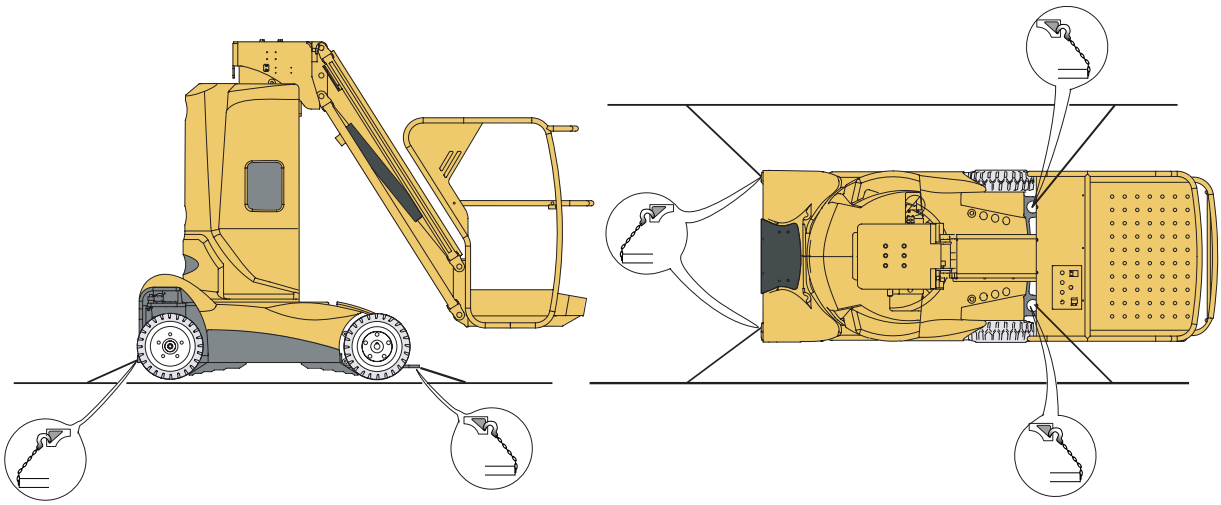
NOTE : The slope of the ramp is almost always greater than the maximum working slope (3°), therefore the mast and jib must be lowered to enable the travel movement. In this case, the buzzer sounds but travel is still possible.

If the slope is greater than the maximum slope allowed in travel (Chap. 8, page 39): use a hoist in addition to traction means.

7.4 - PRECAUTIONS FOR TRANSPORTATION

The machine should be wedged according to the diagram below.

Fig. 11 - Wedging



7.4.1 - Moving

- Carefully follow the regulations and instructions on transportation that are applicable on the development sites;
- Check the route out first before starting any work above the ground.
- Make sure that there are no holes, dents, unevennesses or scraps.
- Always drive sufficiently far from unstable edges (steps, platforms).
- Ensure that there is no-one in the immediate proximity of the machine before moving the machine.
- Allow for a 3 meter distance for the machine to stop.

REMINDER: It is forbidden to drive on public highways.

8 - TECHNICAL DATA

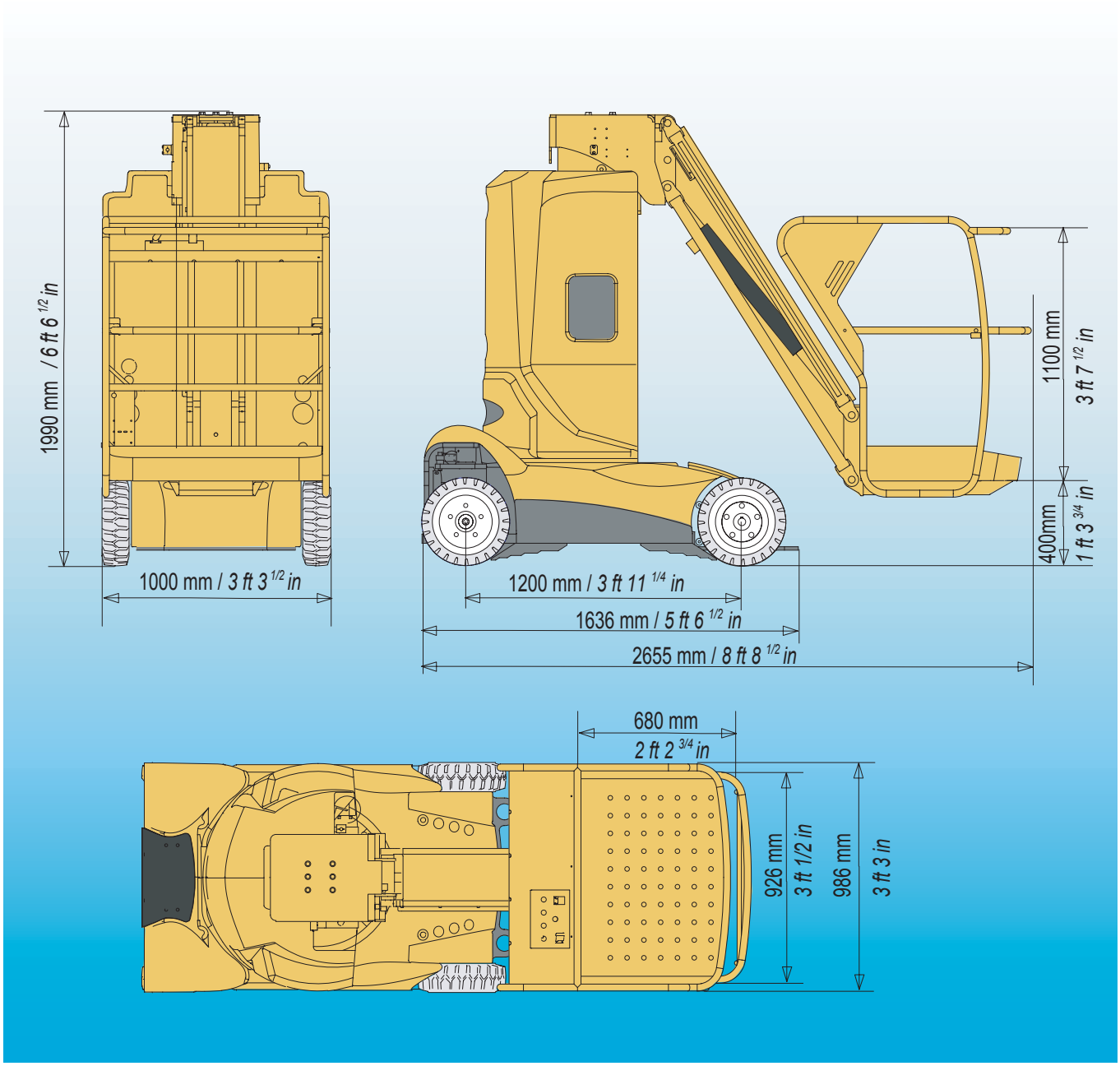
8.1 - STAR 8 &10 TECHNICAL DATA

	STAR 8	STAR 10
Useful load (outdoor / indoor)	200 kg (2 persons) / 200 kg (1 person)	
Maximum side force (outdoor / indoor)	40 kg / 20 Kg	
Working height	8.8 m	10 m
Floor height	6.8 m	8 m
Maximum reach	3,1 m	
Turntable rotation	345°	
Maximum slope and tilt during operation	3° (~5.2%)	
Platform floor dimensions	680 x 926 mm	
Maximum slope during travel	23 %	
Micro travel speed	0.7 km/h	
High travel speed	4.5 km/h	
Traction batteries	24V	
Floor clearance (under potholes)	100 mm max - 25 mm)	
Tyres	Solid tyres	
Turning radius: * Internal * External	 440 mm 1875 mm	
Mast telescoping stroke	3750 mm	4950 mm
Max. wind speed in operation (outdoor / indoor)	0 km/h - 45 km/h	
Max. pressure on the ground useful load: concrete	15 daN/cm²	18.2 daN/cm²
Max. force on one wheel	1169daN	1737 daN
Movement time with one person: * Turntable rotation (345°) * Mast telescoping: extend * Mast telescoping: retract *Jib lifting: up *Jib lifting: down	 60 s (approx.) 26 s (approx.) 30 s (approx.) 26 s (approx.) 26 s (approx.)	 60 s (approx.) 30 s (approx.) 30 s (approx.) 26 s (approx.) 26 s (approx.)
Motor * Voltage * Power * Consumption	Separate energising 24V 1.2 kW 63A	
Hydraulic pump in operation: volume	3.2 cm3	
Noise level:	< 75 db	
Vibration level (feet)	< 0.5 m / s2	
Vibration leval (hands)	>0.5 m / s2	
Hydraulic oil tank capacity	7 l	
Hydraulic operating pressure*: * max steering pressure * max orientation pressure * max mast extension telescoping pressure * max jib lifting pressure	 130 bars 50 bars 130 bars 130 bars	
Tightening torque of the 5 steering wheels' nuts	210 Nm	
Tightening torque of the drive wheels' central nut	80 Nm	
Weight	2700 kg	2760 kg
Size	See Chap. 8.2, page 40	

- All pressures can be checked by means of a tap.
  - Jib movement, lifting, telescoping, orientation: hydraulic electropump and speed control by chopper.
  - Steering by electro-distributing valve.
- 2 drive wheels with braked reducing gears and electric motors controlled by choppers.

8.2 - DIMENSIONS OF STAR 8 AND STAR 10 MASTS

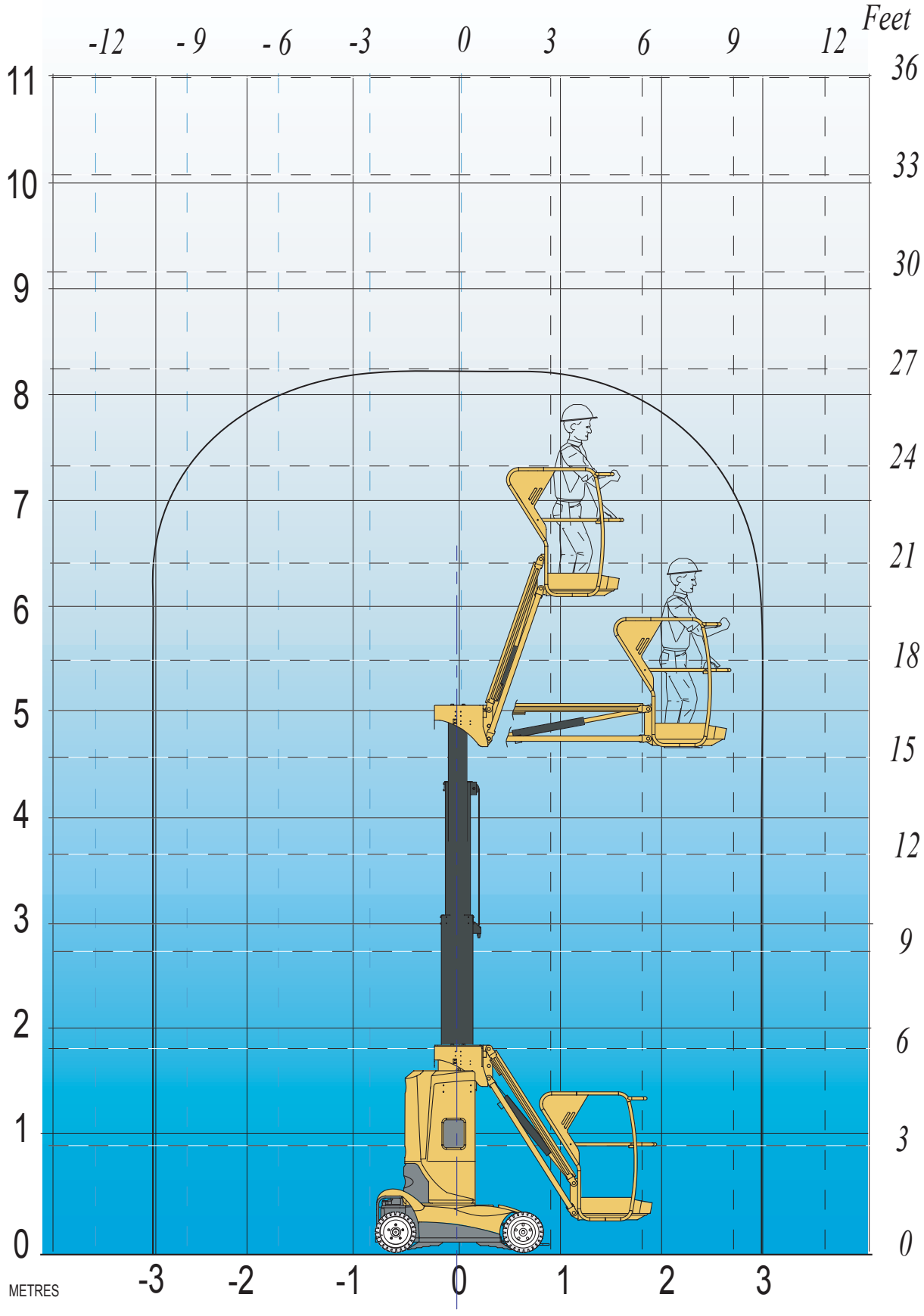
Fig. 12 - Dimensions



8.3 - WORKING AREA

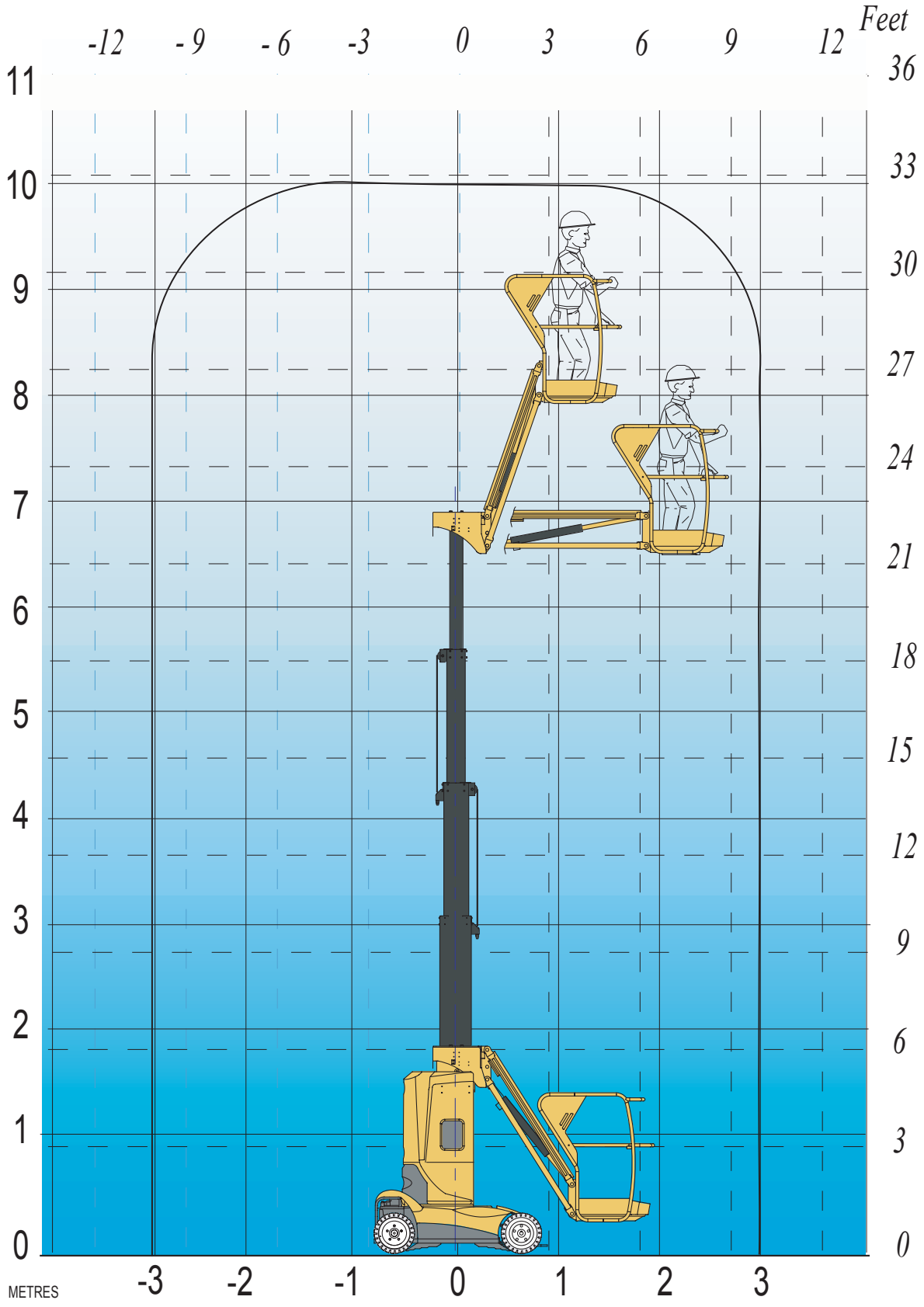
8.3.1 - Working area for the STAR 8 mast

Fig. 13 - STAR 8 working area



8.3.2 - Working area for the STAR 10 mast

Fig. 14 - STAR10 working area



9 - MAINTENANCE

9.1 - GENERAL RECOMMENDATIONS

The servicing operations indicated in this manual are given for normal operating conditions.

In difficult conditions: extreme temperature, high hygrometry, polluted atmosphere, high altitude, etc. certain operations must be performed more often and specific precautions should be taken: contact HAULOTTE After-sales service for information.

Only authorised and skilled personnel may intervene on the machine and must respect the safety instructions concerning protection of personnel and the environment.

Check safety system operation regularly.

Caution !
Do not use the machine as a welding ground-
Do not start other vehicles with the batteries connected.

IMPORTANT: REMOVE ALL PROTECTIVE COVERS BEFORE OPERATING ON THE TURNTABLE COMPONENTS

9.2 - MAINTENANCE PLAN

The plan on the following page gives the frequency, servicing operations (device) and consumables to be used.

- The reference in the symbol indicates the servicing point according to frequency.
- The symbol represents the consumable to be used.

9.2.1 - Consumable

INGREDIENT	SPECIFICATION	SYMBOL	Lubricants used by HAULOTTE	ELF	TOTAL
Hydraulic oil	AFNOR 48 602ISO V G 46	◇	BP SHF ZS 46	HYDRELF DS 46	EQUIVIS ZS 46
ORGANIC hydraulic oil(OPTION)	BIO ISO 46	◇	SHELL NATURELLE HF-E		
Extreme cold hydraulic oil (OPTION)	ISO 6743-4	◇	SHELL TELLUS T-32		
Lithium grease		◌	SHELL ALVANIA EP (LF) 2		
High-pressure lubricant		◌	BARDAHL Super TEFLUBE + PTFE		
Exchange or specific operation		⬡			

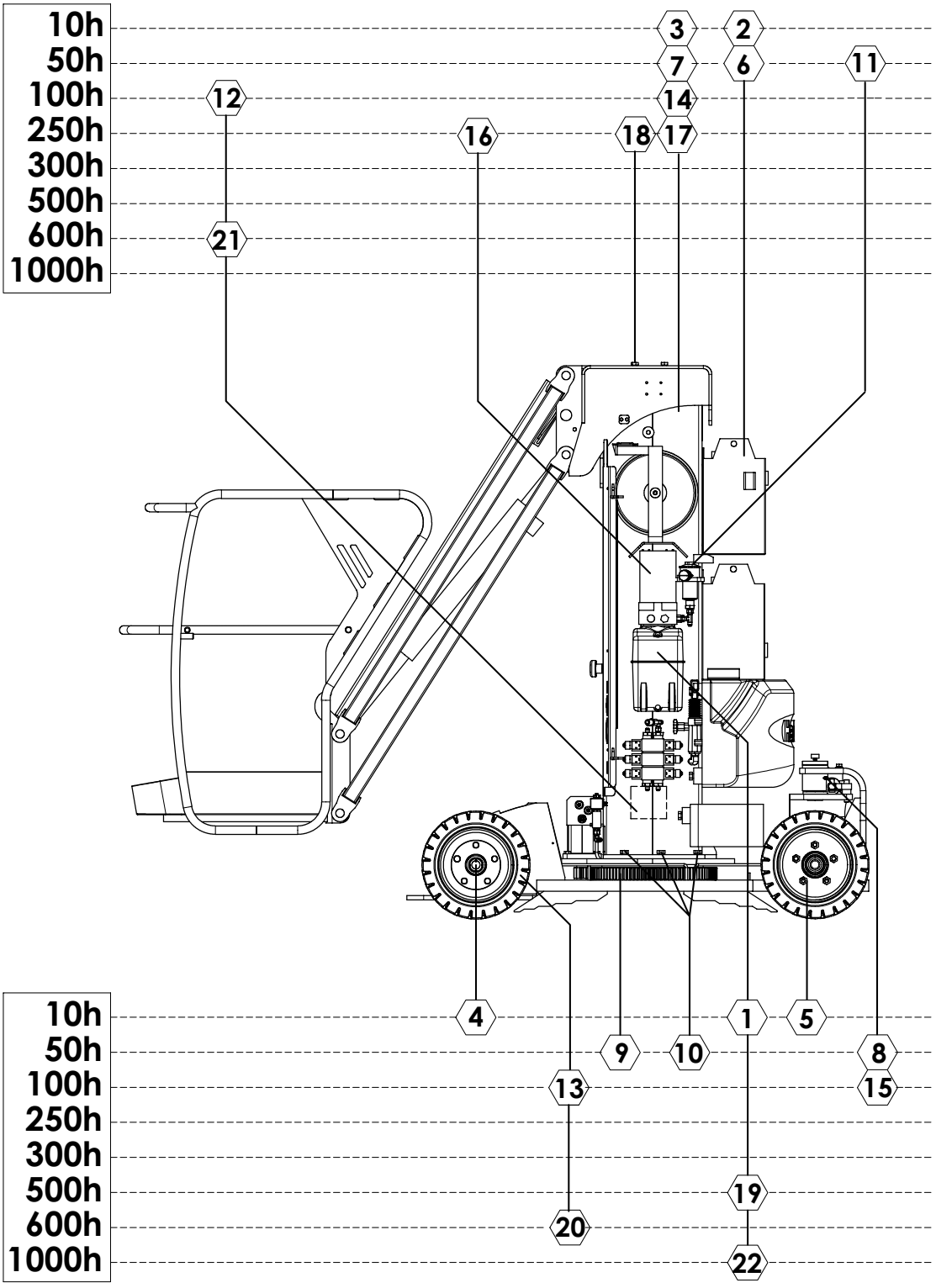
9.2.1.1 -'Intense cold' hydraulic oil conditions of use

This oil is meant for working at low temperature.

Caution !

The ambient temperature must not exceed 15°C. In the opposite case, use a standard or organic hydraulic oil.

9.2.2 - Maintenance plan



IMPORTANT: If "ORGANIC" OR "EXTREME COLD" OIL IS USED, FREQUENCIES IN THE TABLE BELOW ARE REDUCED BY HALF

FREQUENCY	OPERATION	REFERENCE
Every day or before each start of operation	• Check: - hydraulic tank level. - electrolyte level in the batteries. See Chap. 9.3.2, page 46. • Check - that there is no oil leakage (splashes of oil on the ground are visible under the machine when parked) - the cleanliness of the mast's slide paths. - the condition of the safety devices.	1 2 3
Every 10 hours	• Check: - the wheels' tightening torque. See Chap. 8, page 39 - the hydraulic fittings and the nuts' and bolts' tightening torque.	4-5
Every 50 hours	• Check: - the batteries' level. Top up with distilled or demineralised water if necessary. - the state of cleanliness of the batteries' terminals. - the chain 'wear and tear' and tension. See Chap. 9.3.3, page 46 - the tension and 'wear and tear' of the bracing ropes See Chap. 9.3.4, page 46 - Check that there are pins on all the chain guards. • If necessary, clean and/or grease the masts. • Grease: - wheel pivot axles. - slew ring: bearing. - slew ring: teeth. **CAUTION: after the first 50 hours:** • Check tightness of slew ring screws (135 Nm) • Check tightness of the screws fixing the mast foot on the slew ring. (195 Nm) • Change the hydraulic filter cartridge. See Chap. 9.3.1, page 46	6 6 7 7 7 7 8 9 9 9 10 11
Every 100 hours	• Check: - the electric wiring and power wires (batteries, chopper, relays) - the safety of the brakes by placing the machine on a ramp at 23% ; the machine should come to a standstill. - air gap of the brake - lubricate the mast's chains - lubricate hubs and pivots of steer-wheels	12 13 13 14 15
Every 250 hours	• Check: - the brushes and the state of the hydraulic group's motor's commutator. • Grease the friction parts of the mast, check pad wear. ***Caution: It is essential to use the lubricant mentioned in Chap. 9.2.1, page 43 as dust sticks to standard grease.*** • Check tightness of the upper cover screws.(100 Nm	16 17 18
Every 300 h	• Have the masts entirely checked and/or contact Pinguely-Haulotte or one of their agents.	
Every 500 hours	• If using organic oil, emply the hydraulic oil tank.	19
Every 600 hours	• Check: - the condition of the travel motor's collector - the conditions of the contacts of the 3 speed chopper's relays	20 21
Every 1000 hours	• Empty the tank and the whole hydraulic oil circuit.	22

9.3 - OPERATIONS

- For filling and lubrication operations, only use the greases and lubricants recommended in the table in Chap. 9.2.1, page 43.
- Use a container for collecting used oil so as to prevent environment contamination.

9.3.1 - Hydraulic oil filter

- Filter without clogging indicator.
- Unscrew the cap (ref.1)
- Remove the cartridge (ref.2).
- Fit a new cartridge.
- Screw up the cap.

9.3.2 - Electric batteries

To have access to the lower tray (ref.3), pivot the upper tray (ref.4).

Photo 7: Electric batteries

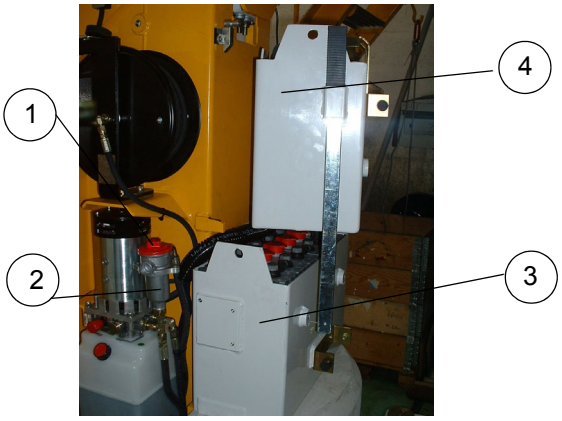
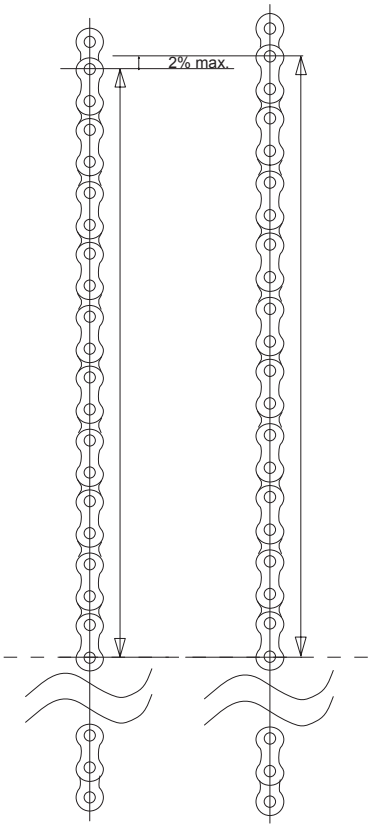


Fig. 15 - Chains' 'wear and tear'



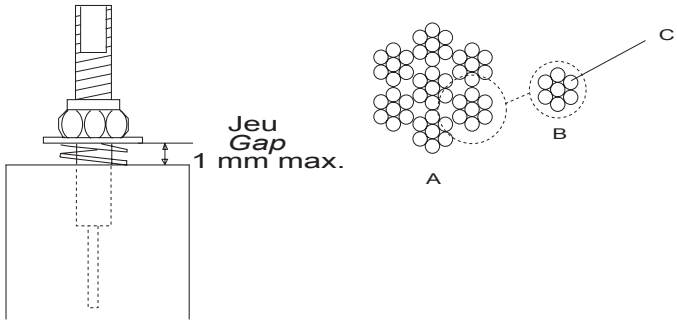
9.3.3 - Checking 'wear and tear' of chains

- Check that the deviation between the initial value and the current value is not more than 2%, using a measuring instrument
- In the opposite case, exchange the chains.

Type	value (10 chain links)	Max. elongation (2%)
LL08-44	127 mm	+ 2.54 mm
LH10-44	158.75 mm	+ 3.175 mm
LH10-66	158.75 mm	+ 3.175 mm

9.3.4 - Checking the tension of the bracing ropes

- Exchange in the case of:
  - breakage of a wire (no. c) or a strand (no. b).
  - defective cable.
  - 'wear and tear' of fixing points.
  - abnormal elongation of the cable, making the adjustment of the 1mm play at the threaded end impossible.



9.3.5 - Cleaning the machine

Opening the machine's covers during high-pressure cleaning is strictly forbidden as this may seriously damage the electrical system and its components and would result in warranty cancellation.

9.4 - LOAD TESTING

The tests below are to be performed after

- a major strip down operation,
- an accident resulting from a critical component failure.

Caution !
The following tests must be carried out by a competent persons under controlled conditions with the test result being fully documented.

9.4.1 - Overload test

The structural overload test is 125% of the rated safe working load. See §1.12.3 of AS 1418.10-1996 for details of the test.

Machine	Overload test is
STAR8	250 kg
HM10P (STAR10)	287,5 kg

The machine is to show no signs of permanent deformation.

9.4.2 - Functional test

These tests are to demonstrate that :

- The machine can operate smoothly through all motions whilst carrying the rated safe working load.
- All safety devices are working correctly.
- The maximum permitted operating speeds are not exceeded.

9.4.3 - Stability test

Stability test is performed in order to demonstrate that the machine is stable in the least favorable position. The worst case overturning moment applied represents the least favorable loads and forces combined.

Overturning moment applied is simulated by a load of W kg applied at distance L from tipping line, with the elevating work platform on a 3,5° side slope.

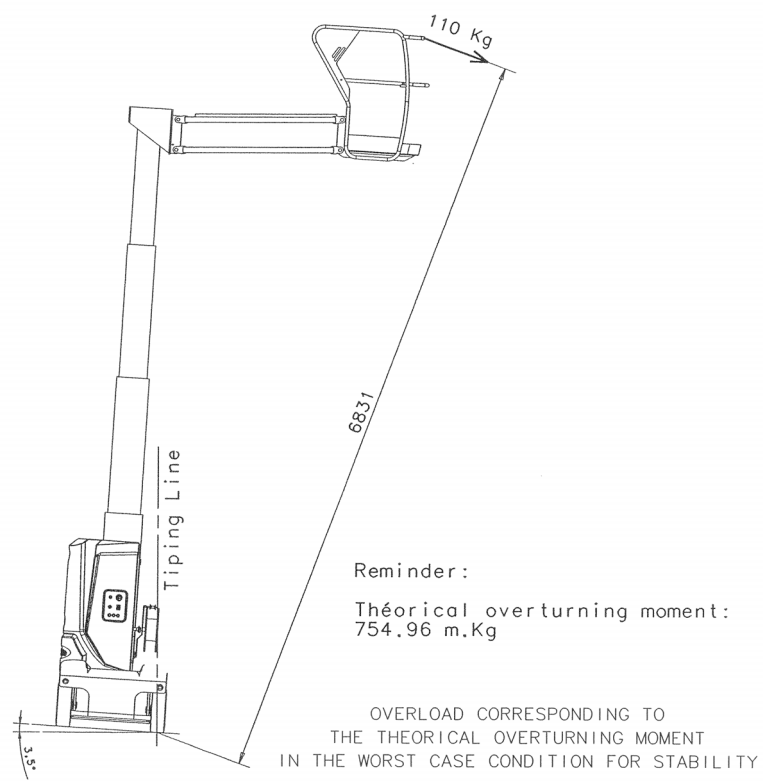
- Overturning moment in transversal position

Machine	Side slope (°)	W (kg)	L (m)	Overturning moment (mN)
STAR 8	3,5	110	6,831	754,96
HM10P (STAR 10)	3,5	111	8,003	890,66

See § 1.12.2 of AS 1418.10-1996 for additional testing details. The elevating work platform must come to a stationary conditions without overturning.

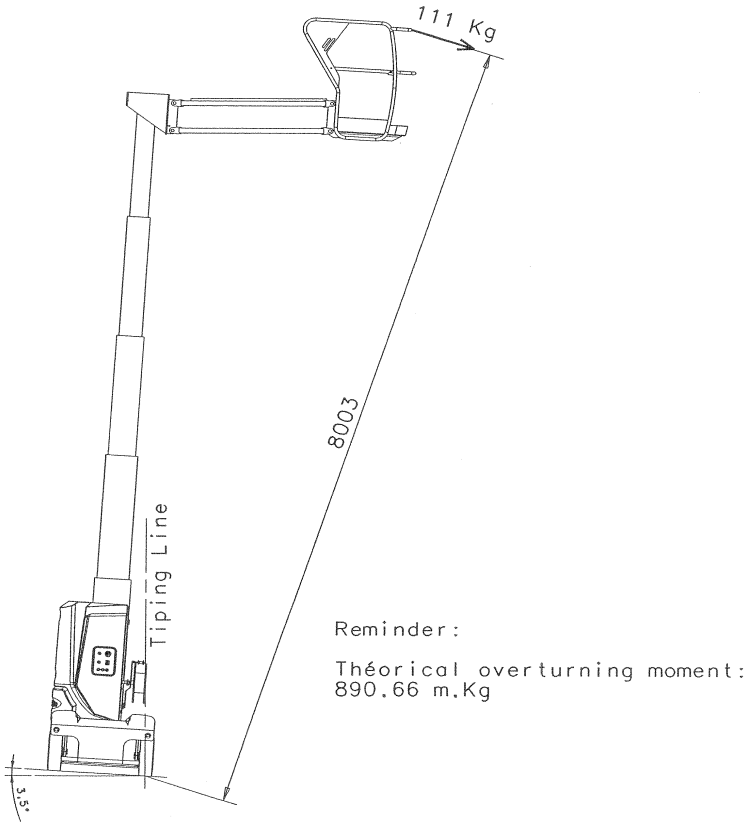
Caution !
In order to safeguard the elevating platform against tipping during the stability test, it is imperative that a restraining device such as an anchor block and chain be used to restrain the unit during the stability test. The chain shall not assist in stabilising the platform prior to it reaching a point of tipping should it occur for any reason i.e. uncontrolled application of test load.

9.4.3.1 -STAR8



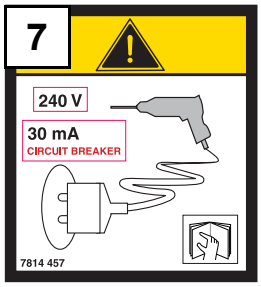
9.4.3.2 -HM10P - STAR10

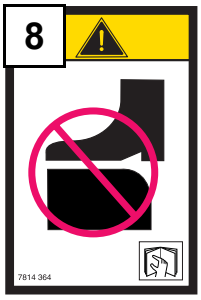
OVERLOAD CORRESPONDING TO
THE THEORICAL OVERTURNING MOMENT
IN THE WORST CASE CONDITION FOR STABILITY

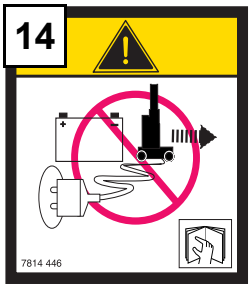


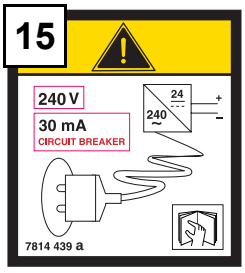
10 - LABELS

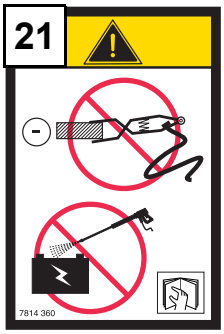
10.1 - YELLOW LABELS

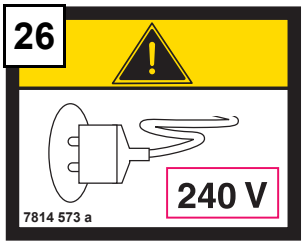


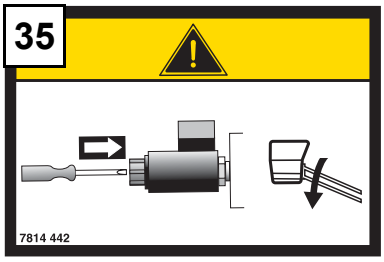


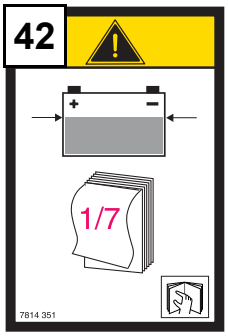




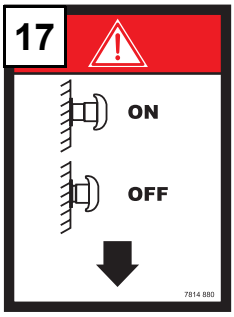


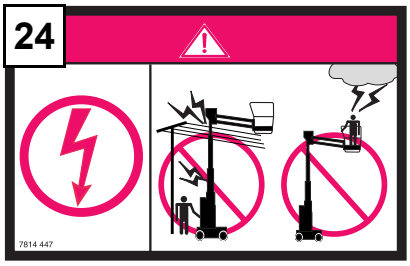


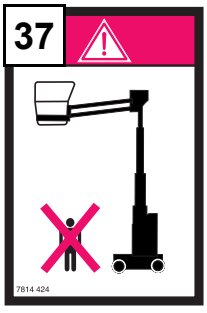




10.2 - RED LABELS

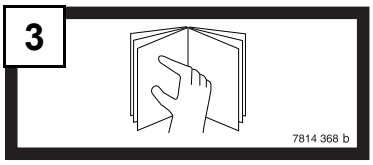






10.3 - MISCELLANEOUS LABELS

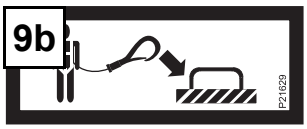
3



5

9a

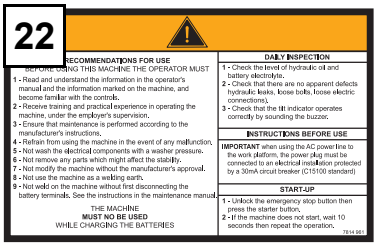
9b



10

11

22



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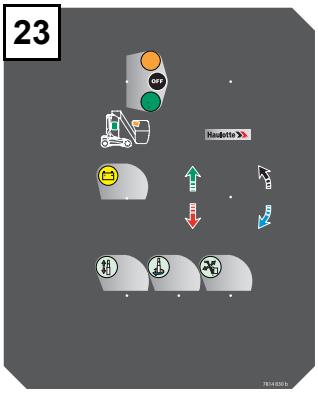
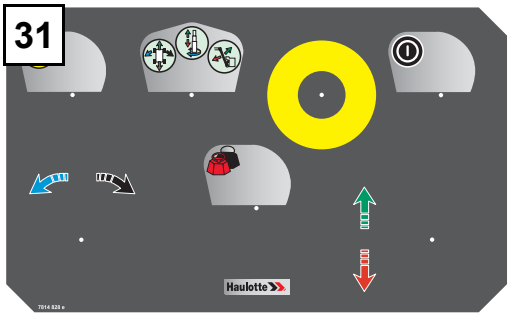


31



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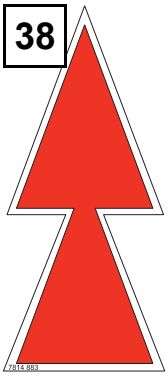

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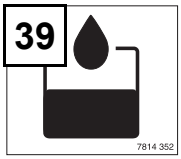

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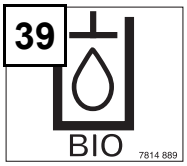

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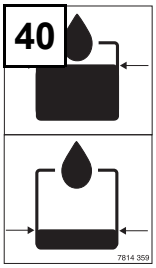
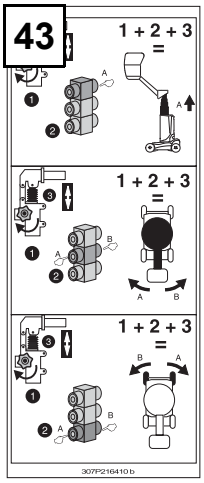
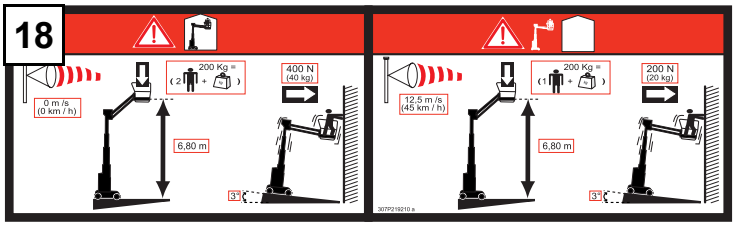


43



10.4 - LABELS SPECIFIC TO MODELS

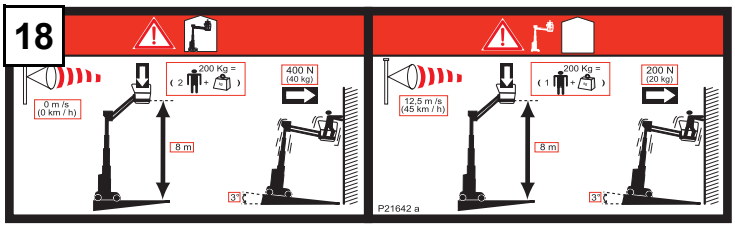
18



49

STAR 8

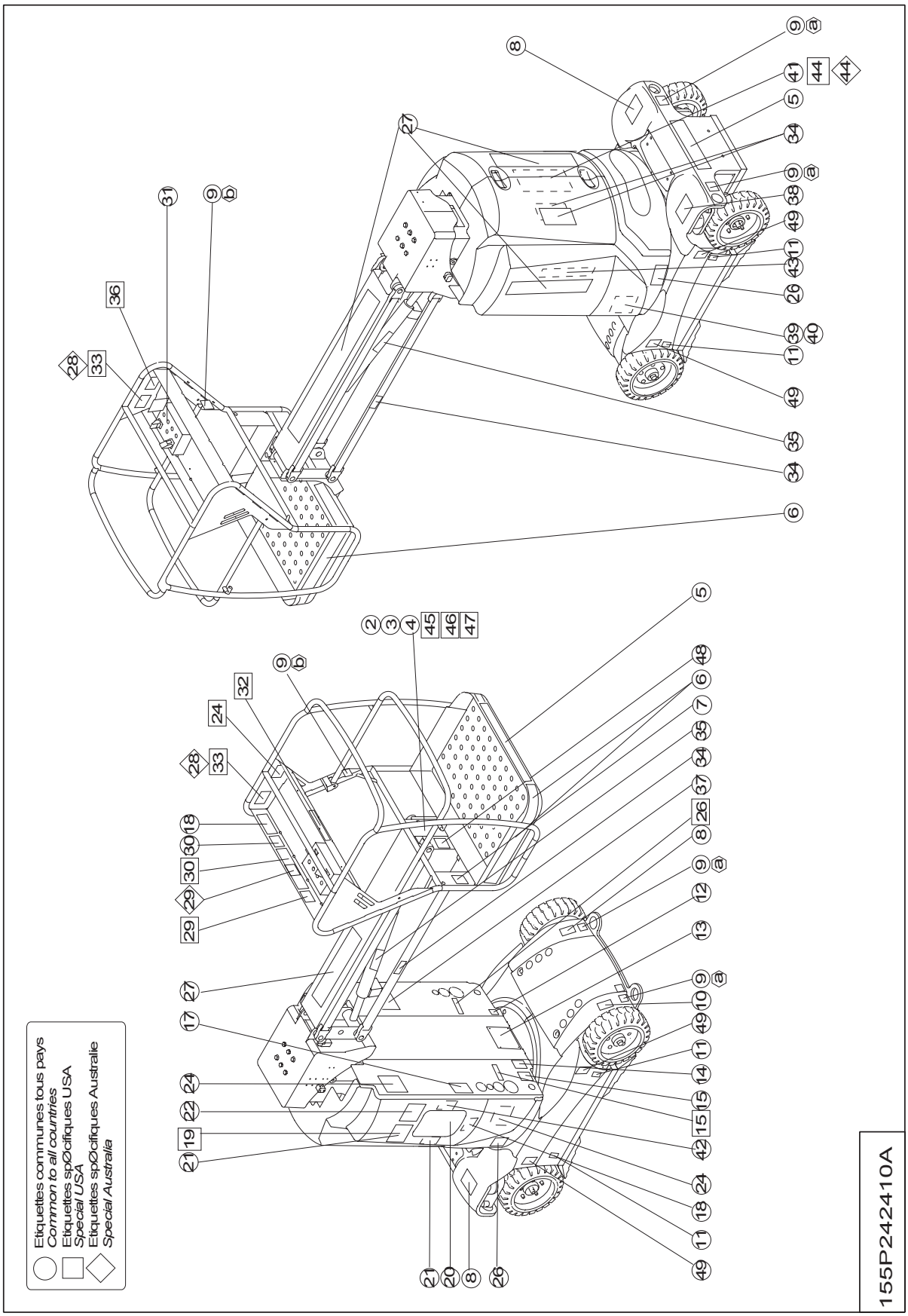
18



49

STAR 10

10.5 - LABEL POSITIONING



10.6 - REFERENCES OF THE MACHINE'S LABELS

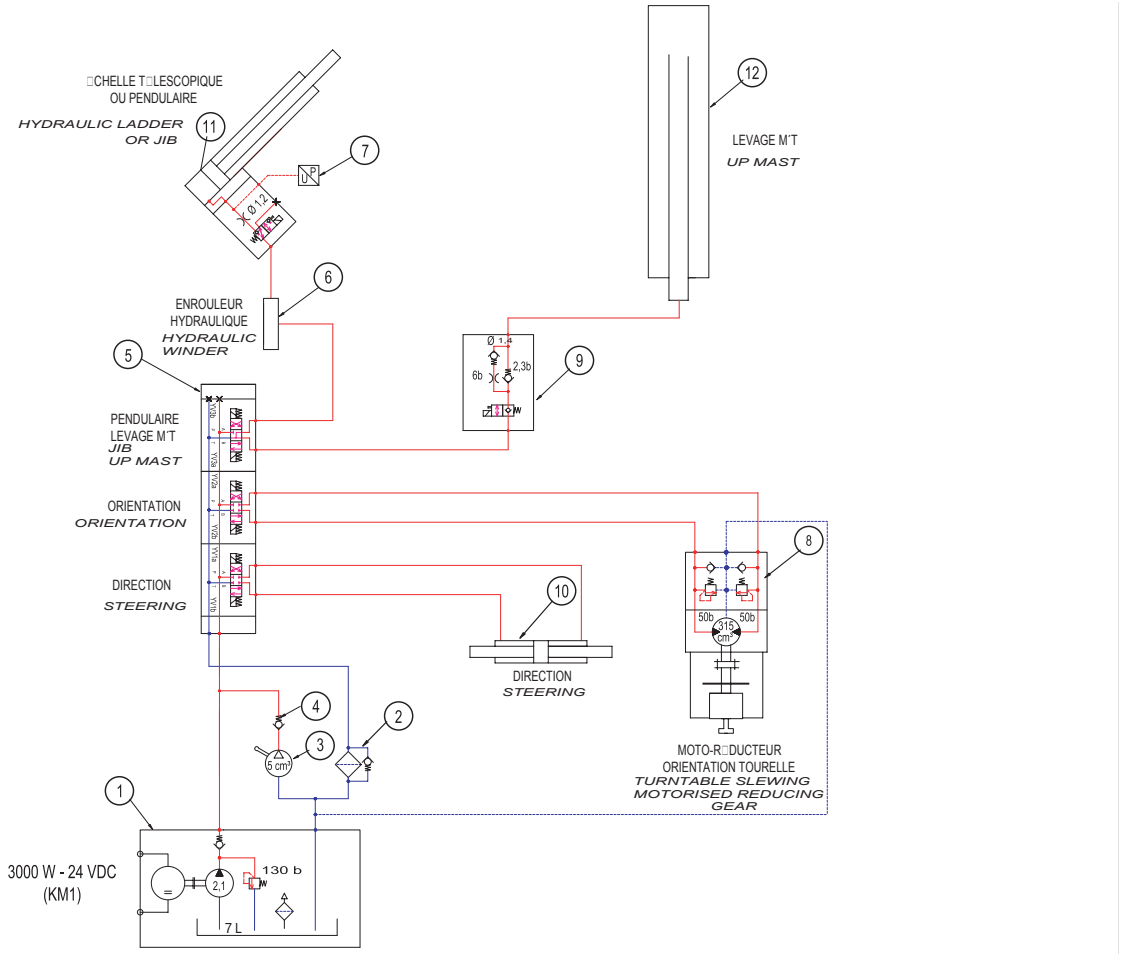
Ref	Code	Qty	Description
	2420505950	1	Warranty activation
	2420803570	4	GESIPA rivets 3x10
2	2420328930	1	STAR 8 Spare parts manual
2	2420327100	1	Star 10 Spare parts manual
2	2420327160	1	Operator’s manual
3	3078143680	1	Read CE Operating Instruction manual
4	2420313920	1	Maintenance log
6	2421808660	1	Black and yellow adhesive marking
5	307P217410	2	"HAULOTTE" logo
7	3078144570	1	Connect socket to 240V network
8	3078143640	2	Do not stand on the cover
9a	3078145110	4	Anchoring hooks location
9b	307P216290	2	Fixing points of safety harnesses
10	3078148820	1	Green arrow
11	3078143830	4	"Fork lift truck position" label
12	307P218900	1	"Mast emergency lowering" label
13	307P219020	1	Manufacturer’s plate (English)
14	3078144460	1	The machine must not be used during charging
15	3078144390	1	"240V charger connection" label
16	3078149010	2	Hand crush risk
17	3078148800	1	ON / OFF
18	3078144490	1	Anchoring hooks’ minimum load capacity
18	307P219210	2	Floor height and load STAR 8
18	307P216420	2	Floor height and load STAR 10
20	3078148300	1	Turntable control panel
21	3078143600	1	Caution, do not use as a welding ground
22	3078149610	1	Operating instructions (English)
24	3078144470	1	Machine not insulated
25	3078144440	2	Vertical "Body crush risk" label
26	3078145730	1	240V plug
27	307P217430	3	STAR 8 logo
27	307P217400	3	STAR 10 logo
28	3078144520	1	Harness must be worn
29	3078144360	1	Do not travel down steep slopes at high speed
30	3078148790	1	Travel direction danger
31	3078148280	1	Platform control panel
34	3078143630	2	Lateral body crush risk
35	3078144420	1	Jib emergency lowering label
37	3078144240	1	Do not stand in the working area
38	3078148830	1	Red arrow
39	3078143520	1	Hydraulic oil
39	3078148890	1	Organic oil option label
40	3078143590	1	Hydraulic oil high and low
41	3078143610	1	Protective clothing must be worn
42	3078143510	1	Battery check plate
43	307P216410	1	Hand pump
44	3078145200	1	Pressurised liquid
48	3078153510	1	Tip-up middle rail
49	307P219220	4	Load on one wheel STAR 8
49	307P216430	4	Load on one wheel STAR 10

11 - HYDRAULIC DIAGRAM

11.1 - HYDRAULIC COMPONENT'S LIST (DIAGRAM P23343D)

• Reference	Component
• 1	Motorpump group
• 2	Hydraulic filter
• 3	Emergency pump
• 4	One way valve 0.5 bar
• 5	ON / OFF movements block
• 6	Hydraulic winder
• 7	Pressure sensor
• 8	Orientation hydraulic motor
• 9	Mast lifting / Lowering block
• 10	Steering cylinder
• 11	Jib lifting cylinder
• 12	Mast lifting cylinder

11.2 - HYDRAULIC DIAGRAM

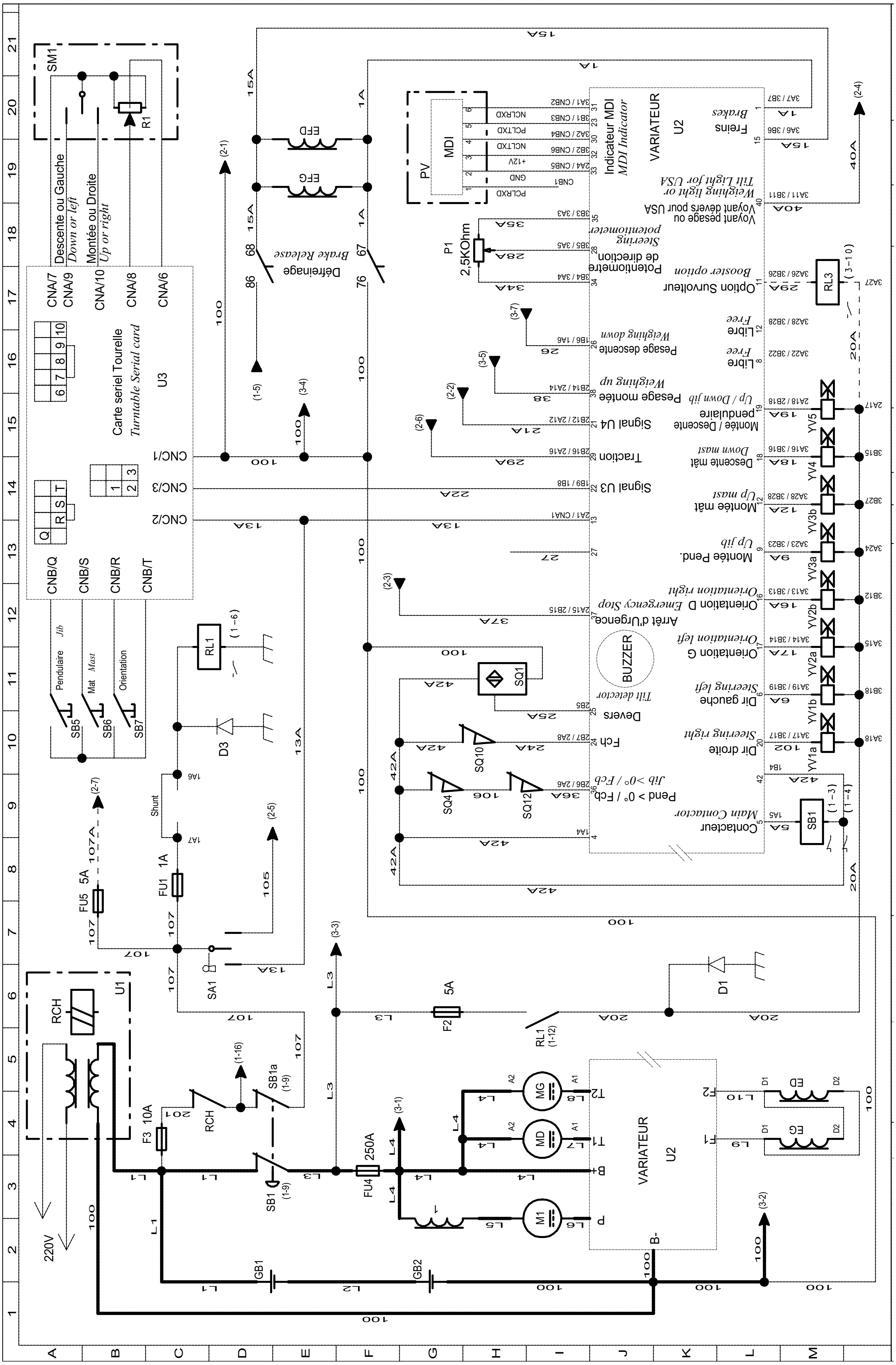


12 - WIRING DIAGRAMS

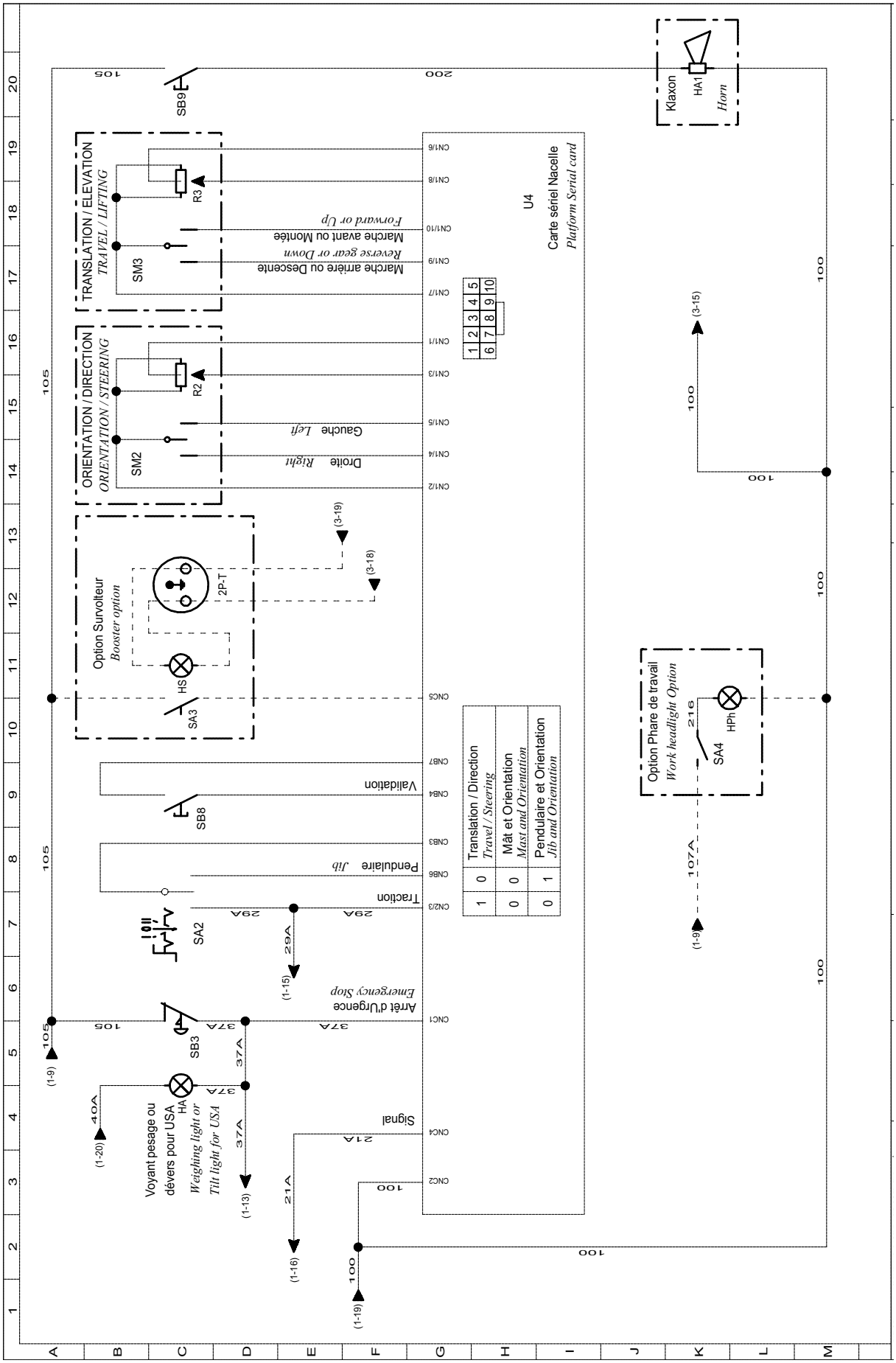
12.1 - ELECTRIC COMPONENTS' LIST (E621C DIAGRAMS)

• Component	• Description
• A1	• Angle sensor
• FU1 1A	• Overload protection
• FU2 5A	• Electrovalve protection
• FU3 10A	• Command protection
• FU4 250A	• Power fuse
• FU5 5A	• Work headlight protection (option)
• G1	• Pressure sensor
• GB1	• Battery kit 1
• GB2	• Battery kit 2
• HA	• Weighing light indicator
• HA1	• Horn
• P1	• Steering potentiometer
• PV	• Timer / battery indicator
• RL1	• Power supply relay
• RL2	• Insulation relay (inactive)
• RL3	• Booster option relay
• SA1	• Station selector (turntable panel)
• SA2	• Movement selector switch (platform panel)
• SB1	• Emergency stop; line contactor
• SB3	• Emergency stop; platform
• SB5	• Jib control
• SB6	• Mast control
• SB7	• Turntable rotation
• SB8	• Movement validation
• SB9	• Horn control
• SM1	• Turntable up/down, orientation manipulator
• SM2	• Platform orientation, steering manipulator
• SM3	• Platform travel manipulator
• SQ1	• Tilt
• SQ4	• Tilt reset / Bottom end of travel safety sensor (mast)
• SQ10	• Top end of travel safety sensor (mast)
• SQ12	• Tilt reset / Jib safety system > 0°
• U1	• Charger
• U2	• Chopper
• U3	• Turntable serial card
• U4	• Platform serial card
• U5	• Weighing card
• YV1a	• Right steer
• YV1b	• Left steer
• YV2a	• Left orientation
• YV2b	• Right orientation
• YV3a	• Jib up
• YV3b	• Mast up
• YV4	• Mast down
• YV5	• Jib down / Jib up

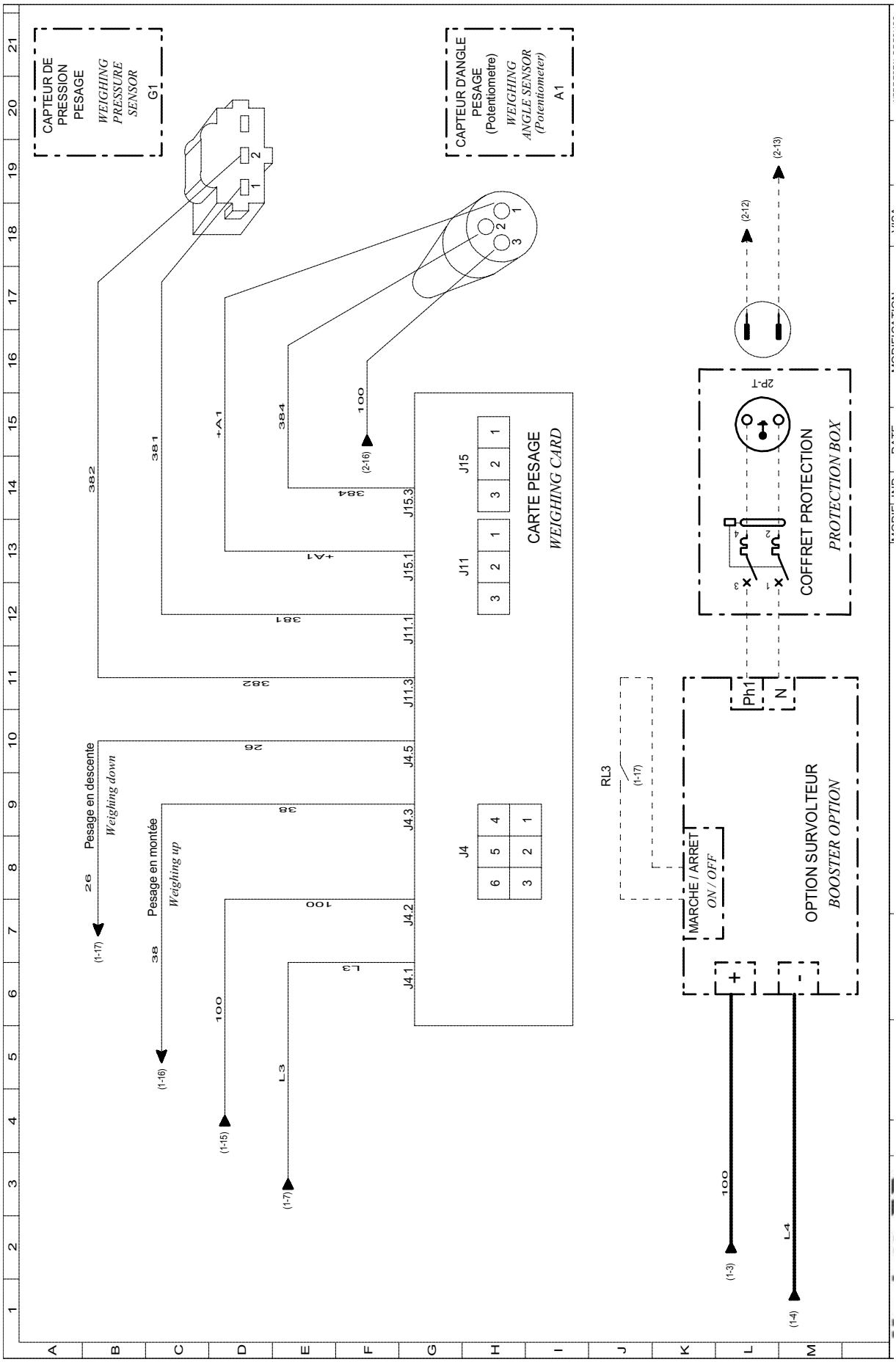
12.2 - FOLIO 1


SM1
Descente ou Gauche
Down or left
Montée ou Droite
Up or right
R1
Carte seriel Tourelle
Turntable Serial card
U3
CNA/7
CNA/9
CNA/10
CNA/8
CNA/6
CNC/1
CNC/3
CNC/2
CNB/Q
CNB/S
CNB/R
CNB/T
Pendulaire
Jib
Mat
Mast
Orientation
SB5
SB6
SB7
FU5 5A
FU1 1A
Shunt
RL1
D3
SA1
RCH
U1
220V
F3 10A
SB1a
SB1
FU4 250A
GB1
GB2
F2 5A
RL1 (1-12)
D1
Défreinage
Brake Release
EFD
EFG
PV
MDI
P1
2,5KOhm
SQ1
SQ4
SQ12
SQ10
BUZZER
Indicateur MDI
MDI Indicator
VARIATEUR
U2
Freins
Brakes
Voyant pesage ou Voyant dévers pour USA
Weighing light or Tilt Light for USA
Potentiometre de direction
Steering potentiometer
Option Survolteur
Booster option
Libre
Free
Pesage descente
Weighing down
Pesage montée
Weighing up
Signal U4
Montée / Descente pendulaire
Up / Down jib
Traction
Descente mât
Down mast
Signal U3
Montée mât
Up mast
Montée Pend.
Up jib
Arrêt d'Urgence
Emergency Stop
Orientation D
Orientation right
Orientation G
Orientation left
Devers
Tilt detector
Dir gauche
Steering left
Fch
Dir droite
Steering right
Pend > 0° / Fcb
Jib >0° / Fcb
Contacteur
Main Contactor
RL3
YV5
YV4
YV3b
YV3a
YV2b
YV2a
YV1b
YV1a
SB1
MG
MD
M1
ED
EG
VARIATEUR
U2

12.3 - FOLIO 2


Klaxon
HA1
Horn
SB9
TRANSLATION / ELEVATION
TRAVEL / LIFTING
SM3
R3
Marche arrière ou Descente
Reverse gear or Down
Marche avant ou Montée
Forward or Up
ORIENTATION / DIRECTION
ORIENTATION / STEERING
SM2
R2
Gauche Left
Droite Right
U4
Carte sériel Nacelle
Platform Serial card
Option Survolteur
Booster option
2P-T
HS
SA3
Option Phare de travail
Work headlight Option
SA4
HPh
Validation
SB8
Pendulaire Jib
Traction
SA2
Arrêt d'Urgence
Emergency Stop
SB3
Signal
Voyant pesage ou dévers pour USA
Weighing light or Tilt light for USA
HA
Translation / Direction
Travel / Steering
Mât et Orientation
Mast and Orientation
Pendulaire et Orientation
Jib and Orientation

12.4 - FOLIO 3


CAPTEUR DE PRESSION PESAGE
WEIGHING PRESSURE SENSOR
G1
CAPTEUR D'ANGLE PESAGE (Potentiomètre)
WEIGHING ANGLE SENSOR (Potentiometer)
A1
CARTE PESAGE
WEIGHING CARD
J15
J11
J4
J15.3
J15.1
J11.1
J11.3
J4.5
J4.3
J4.2
J4.1
382
381
+A1
384
100
26
38
100
L3
Pesage en descente
Weighing down
Pesage en montée
Weighing up
(1-17)
(1-16)
(1-15)
(1-7)
(2-16)
RL3
(1-17)
MARCHE / ARRET
ON / OFF
OPTION SURVOLTEUR
BOOSTER OPTION
Ph1
N
+
-
100
L4
(1-3)
(1-4)
COFFRET PROTECTION
PROTECTION BOX
2P-T
(2-12)
(2-13)