Haulotte

HA18PX

Maintenance Book

# HA18PX

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# A-Preface - Foreword

**You have just purchased a HAULOTTE® product and we would like to thank you for your business.**

The Aerial Work Platform is a mechanical device primarily designed and manufactured with the intent to position people with the necessary tools and material to overhead elevated temporary workplaces. All other uses or alterations/modifications to the aerial work platform must be approved by HAULOTTE®.

This manual shall be considered a permanent component of the machine and shall be kept with the aerial work platform in the designated Manual Holder, at all times.

Safe operation of this product can only be assured if you follow the operating instructions contained in this manual are followed. To ensure proper and safe use of this equipment, it is strongly recommended that only trained and authorized personnel operate and maintain the aerial work platform.

**We would particularly like to draw your attention to 2 essential points :**

- Compliance with safety instruction (machine, use, environment).
- Use of the equipment within the performance limits.

With regard to the designation of our equipment, we stress that this is purely for commercial purposes and not to be confused with the technical specifications. Only the specifications in this manual should be used to study the suitability of the equipment for the intended use.

This maintenance and repairs book is specific to the HAULOTTE® products listed on the cover page of this manual. The maintenance book is intended for the on-site maintenance technician.

It is the on-site maintenance technician's duty to carry out the regular maintenance work recommended by HAULOTTE Services®.

This maintenance work is essential for correct machine operation.

**If regular maintenance is not carried out, this may :**

- Void the warranty.
- Cause machine malfunction.
- Reduce machine reliability and shorten its service life.
- Jeopardize operator safety.

**To ensure that the regular maintenance requirements are fully satisfied, contact HAULOTTE Services®.**

**HAULOTTE Services® technicians are specially trained to carry out extensive repairs, interventions or adjustments on the safety systems or elements of HAULOTTE® machines. They carry genuine HAULOTTE spare parts and tools as required, and also provide fully documented reports on all work completed.**

# 1 - Symbols and colors

Symbols and colors are used to alert the operator of safety precautions and/or to highlight important safety information.

The following safety symbols are used throughout this manual to indicate specific hazards and the hazard severity level when operating or maintaining the Aerial Work Platform.

**Symbol**

| Symbol | Description |
|---|---|
|  | Danger : Risk of injury or death |
|  | Caution : Risk of material damage |
|  | Prohibition relating to work safety and quality |
|  | Reminder to use good practice or follow pre-operation checks |
|  | Cross-reference to another part of the manual |
|  | Cross-reference to another manual |
|  | Cross-reference to repair (contact HAULOTTE Services®) |
|  | Maintenance sheet |
|  | Recommended tools |
|  | Recommended part |
|  | Safety |
| N.B. : | Additional technical information |

# A-Preface - Foreword

**Decals**

| Color | Title | Description |
|---|---|---|
|  |  | Danger : Indicates a hazardous situation which if not avoided, WILL result in death or serious injury. |
|  |  | Warning : Indicates a hazardous situation which if not avoided, COULD result in death or serious injury. |
|  |  | Caution : Failure to comply could result in minor or moderate injury. |
|  |  | Notice : Indicates practices not related to personal injury. |
|  |  | Procedure : Indicates a maintenance operation. |

***N.B.-:-THE FOLLOWING SAFETY ADVISORIES ARE USED THROUGHOUT THIS MANUAL TO INDICATE SPECIFIC HAZARDS WHEN OPERATING OR MAINTAINING THE TELEHANDLER.***

# Notes

# 1 - General safety rules

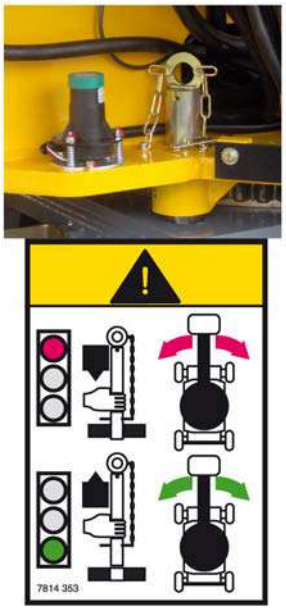
## 1.1 - MAINTENANCE IMPLEMENTATION

Your safety and the safety of the people around are essential.

Make sure the work area is clean in order to not to pollute the system of the machine.

Before performing any maintenance interventions, place the machine in maintenance configuration.

1. Place the machine on firm, level ground.
2. Stow the machine completely.
3. Push the E-stop button to cut off the electricity supply.
4. Insert the turntable rotation locking pin.




Never leave the hydraulic cylinders fully extended before switching off the machine, or when stationary for an extended period of time. Keep the elements of the machine in configuration of maintenance thanks to mechanics devices.

Report that the machine is under maintenance by tagging the platform and ground control boxes.

**Note :**

- Using the machine during maintenance is strictly forbidden.
- Do not climb onto the covers.
- The handling of parts must be carried out using appropriate equipment (Chains, Lifting slings, Lifting anchors).
- Plug the end of any hoses removed, and cap any open ports to prevent contamination during maintenance.

## 1.2 - UNCONTROLLED MOVEMENT HAZARD

Be aware of uncontrolled movement and always respect the following :

- Maintain clearance from high voltage lines.
- Maintain clearance from generators, radar, electromagnetic fields.
- Never expose the batteries or electrical components to water (high pressure washer, rain).
- Never tow the machine over extended distances.
- In case of a machine breakdown, it is possible to tow short distance to load it onto a trailer.
- Never leave the hydraulic cylinders fully extended before switching off the machine, or when stationary for an extended period of time.
- Retract and lower the boom to the stowed position rotate the turntable so that the boom is between the non-steering wheels.
- Select a safe parking location, on a firm level surface, clear of obstruction and traffic.
- Ensure all compartments are closed and secured.
- Chock the wheels.

## 1.3 - ELECTROCUTION HAZARDS

The machine is not electrically insulated and does not provide protection from contact or proximity to electrically charged conductors.

Always position the lift at a safe distance from electrically charged conductors to ensure that no part of the machine is within an unsafe area.

Respect the local rules and the minimum safety distance from power lines.

**Minimum safe approach distances**

| Electric voltage | Minimum safety distance | |
|---|---|---|
| | Mètre | Feet |
| 0 - 300 V | Avoid contact | |
| 300 V - 50 kV | 3 | 10 |
| 50 - 200 kV | 5 | 15 |
| 200 - 350 kV | 6 | 20 |
| 350 - 500 kV | 8 | 25 |
| 500 - 750 kV | 11 | 35 |
| 750 - 1000 kV | 14 | 45 |

***N.B.-:-THIS TABLE IS APPLICABLE, EXCEPT WHEN THE LOCAL REGULATIONS ARE MORE STRICT.***

**Do not operate the machine :**

- Do not operate the machine when close to live power lines, consider the movement of the machine and the sway of the electric power lines particularly in windy conditions.
- Do not operate the machine during lightning, thunderstorms, snow/ice or any weather condition that could compromise operator safety.
- Do not operate the machine during lightning or storms.
- Do not use the machine as a welding earth.
- Do not wash electrical components with a high pressure washer.
- Do not weld on the machine without first disconnecting the battery terminals.
- The machine must not be used while charging the batteries.
- When using the platform AC power line, ensure it is protected with a circuit breaker.




Keep away from the machine if it contacts energized power lines. Personnel on the ground or in the platform must not touch or operate the machine until energized power lines are shut off.

In the event of accidental contact with a high voltage line, wait for the power to the line be de-energized before attempting to operate the machine.

## 1.4 - EXPLOSION / FIRE HAZARDS

Always wear protective clothing and eye wear when working with batteries and power sources/systems.

***N.B.-:-ACID IS NEUTRALIZED WITH SODIUM BICARBONATE AND WATER.***

- Do not start the engine if you smell or detect liquid propane gas (LPG), gasoline, diesel fuel or other explosive substances.
- Do not work in an explosive or flammable atmosphere / environment.
- Do not touch hot components.
- Do not bridge the battery terminals with metallic objects.
- Do not service the battery in proximity of spark, open flame, lit cigarettes.
- Do not fill up the fuel tank, when the engine is running and/or near a flame.

# 2 - Maintenance and repair training

## 2.1 - OWNER'S RESPONSABILITY

The owner (or hirer) has the obligation to inform technician of the instructions contained in the Operator Manual and Maintenance Book.

The owner (or hirer) has the obligation to renew all manuals or decals that are either missing or in bad condition.

Additional copies can be ordered from HAULOTTE Services®.

The owner (or hirer) is responsible for applying the local regulations regarding maintenance of the machine.

## 2.2 - TECHNICIAN'S RESPONSABILITY

The technician must read and understand the contents of this manual, operators manuals and the decals affixed on the machine.

The technician must inform the owner (or hirer) if the manual or any decals are missing or in poor condition, and of any malfunction of the machine.

**Only authorized and qualified operators may operate HAULOTTE® machines.**

## 2.3 - HAULOTTE SERVICES®

The HAULOTTE® is at your service in all 5 continents of the world via an extensive network of its own factory trained technicians, who are ready to respond to your every need.

## 2.4 - TRAINING

Whether you want to just service your equipment or carry out a complete overhaul, HAULOTTE® can provide you with a structured training program or we can tailor a program to suit your specific requirements or circumstances. Training can cover the general operation of the equipment, breakdowns, engine maintenance and repairs and electrical/hydraulic/mechanical repairs and trouble shooting.

## 2.5 - PRODUCT MODIFICATION

In a constant effort to improve the quality of machines, HAULOTTE continually monitors technical improvements that enable to develop products with improved safety and greater reliability. The target being that HAULOTTE® always work to build confidence in the relationships with our customers.

These improvements will be shared via the following documents :

- OI : Obligatory Intervention, Safety information requiring immediate action (take into account by HAULOTTE®).
- NI : Technical improvement requiring immediate action (take into account by HAULOTTE®).
- RI : Improvement proposed to customers to take into account during maintenance operation.
- PI : Product information for knowledge.

## 2.6 - AFTER SALES SERVICE

Our HAULOTTE Services® After Sales Service is at your disposal throughout your machine's service life to ensure the optimum use of your HAULOTTE product :

- When contacting our After Sales Service, ensure that you provide the machine model and serial number.
- When ordering any consumables or spare parts, please use this manual and the HAULOTTE® Essential catalogue to receive your genuine HAULOTTE® spare parts, your only guarantee of parts interchangeability and correct machine operation.
- If there is an equipment malfunction involving a HAULOTTE® product, then contact HAULOTTE Services® immediately even if the malfunction does not involve material and/or bodily damage.

## 2.7 - PRODUCT INFORMATION

Without the written permission from Haulotte, modifying a HAULOTTE® product is a Safety concern. Any modification may violate Haulotte design parameters, government regulations and industry standards.

If you desire a modification to the product, submit a request in writing to HAULOTTE.

With the utmost care to ensure enhanced reliability and greater safety of the HAULOTTE® products, it is pertinent that when a "Service or Safety Bulletin" is issued, action is taken immediately. Once the bulletin has been addressed, make sure that the completed form is submitted to HAULOTTE Services®.

Do not hesitate to contact HAULOTTE Services® , should you have any questions relating to the issued bulletin(s) or with questions on the policy itself.

# 3 - Manufacturer's warranty

## 3.1 - WARRANTY ACCEPTANCE

On reception of his machine, the owner or rental company must check the machine's condition and fill out the machine reception slip provided.

## 3.2 - WARRANTY PERIOD

The present warranty is valid for a period of 12 months or up to a maximum of 1000 operating hours for personnel lifting machines and 12 months or up to a maximum of 1500 operating hours for the other machines, including MJX or the Telescopic Handlers, starting from delivery and terminating when the first limit is reached.

Spare parts are covered by a 6 month warranty.

## 3.3 - CONDITIONS OF WARRANTY

HAULOTTE® guarantees its products against defects, faults or manufacturing defects when the owner or rental company has informed HAULOTTE® of the defect.

The warranty does not cover the consequences of normal wear, nor any defects, failure or damage resulting from poor maintenance or abnormal usage, in particular overloading, impact by an external source, faulty installation or any modification made to products marketed by HAULOTTE® and performed by the owner or rental company.

In the event of operation or use which does not comply with the instructions or recommendations in the maintenance book, warranty claims will not be accepted.

The machine utilisation period must be recorded by reading the engine hour meter whenever an intervention is made. The engine hour meter must be maintained in good working order to guarantee maximum working life and to justify maintenance at the recommended time.

Warranty obligations for the time period stated above will cease immediately in situations where the defect is due to the following reasons :

- Use of spare parts that are not HAULOTTE® originals.
- If elements or products other than those recommended by the manufacturer are used.
- If the HAULOTTE® name, serial numbers or identification marks are removed or altered.
- After an unreasonably long delay before reporting a manufacturing problem.
- If the owner or rental company continues to use the machine despite problems.
- If damage is caused by modifications that do not comply with HAULOTTE® specifications.
- If lubricants, hydraulic oils or fuels that do not comply with HAULOTTE® recommendations are used.
- If the machine is incorrectly repaired or used by the customer.

If no particular agreement has been made, any claims made after the previously established warranty period has expired will be refused.

The present warranty does not cover damage that may result directly or indirectly from any flaws or defects covered by the latter :

- Consumables : No claims will be accepted for objects or parts replaced in the context of normal machine usage.
- Settings : Adjustments of all sorts may become necessary at any time. Therefore adjustments are considered a part of normal machine usage conditions and are not covered by the warranty.
- Hydraulic and fuel circuit contamination : Every possible precaution is taken to ensure that fuel and hydraulic liquid delivered is clean. On the other hand, in certain cases it is possible to contaminate fuel and hydraulic circuits, especially when fuel and lubricants are stored on the work site. Moreover, irregular or poor cleaning of the decanting device may also cause fuel/hydraulic circuit contamination and therefore damage the parts in direct contact with these liquids. HAULOTTE® will not accept any claims concerning cleaning of the fuel circuit, filter, injection pump or any other equipment in direct contact with fuel or lubricants.
- Wearing parts (pads, bearings, tires/tyres, connections, etc.) : These parts are, by definition, subject to deterioration during the period of operation. Wearing parts will therefore not be covered by the warranty agreement.

### 3.4 - WARRANTY CONDITIONS

To benefit from the warranty, the owner or rental company must inform the nearest HAULOTTE® subsidiary or the subsidiary that delivered the machine (the only dealer authorised to carry out an intervention under the manufacturer's warranty agreement) of the defect in writing as quickly as possible.

The subsidiary will decide whether to repair or replace the part that proves to be faulty.

The owner or rental company must present the duly completed maintenance book supplied with the machine as proof that the maintenance operations recommended by the manufacturer have been carried out.

The owner or rental company must ensure that the defect covered by the HAULOTTE® warranty is reported to and acknowledged by the HAULOTTE® subsidiary the only dealer authorised to carry out work covered by the warranty) as rapidly as possible or must report the defect in writing.

Work carried out under the HAULOTTE® warranty will be performed by the subsidiary which delivered the machine, wherever possible.

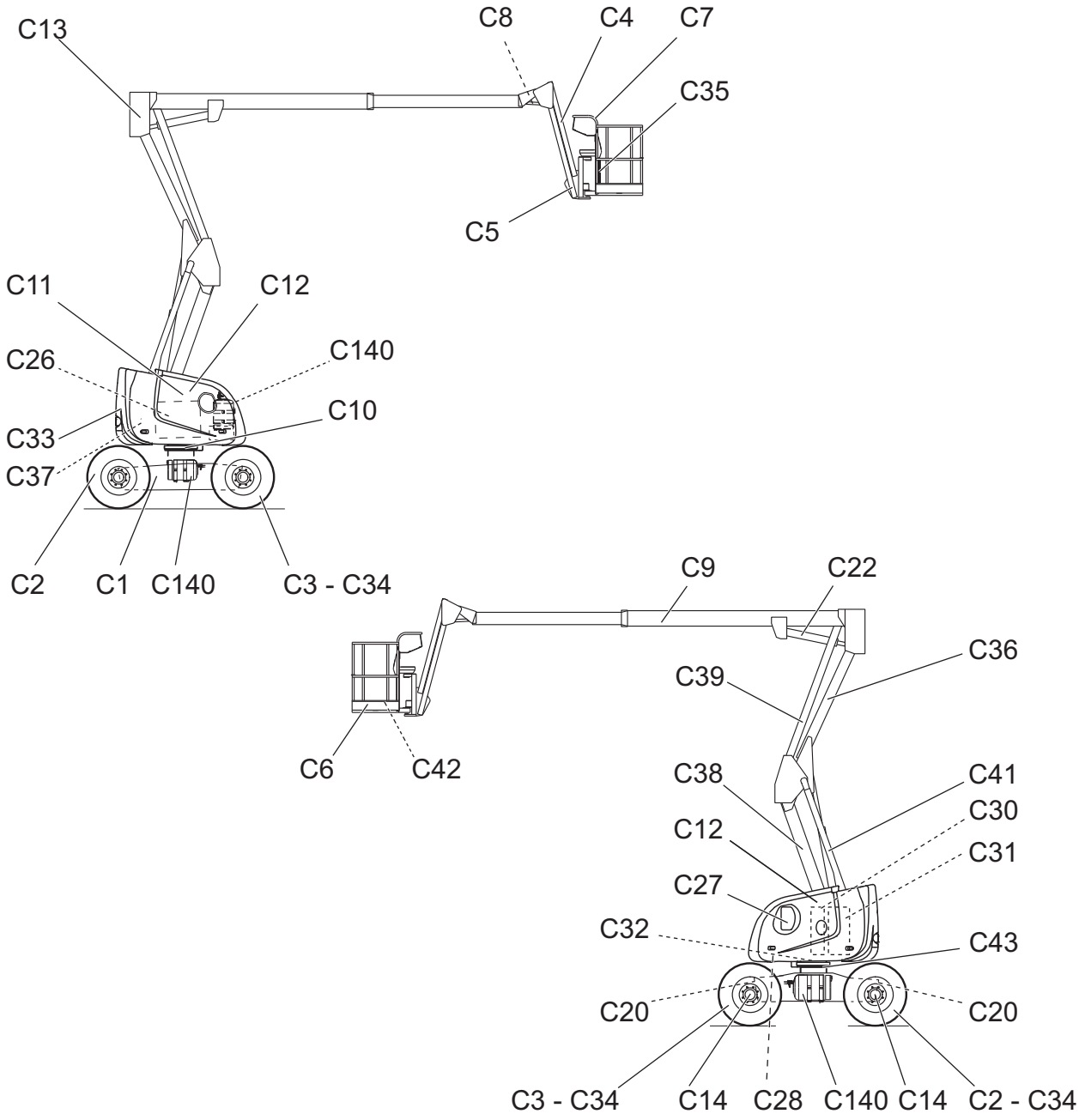
# Notes

# Notes

# 1 - Primary machine components

## 1.1 - LAYOUT

**HA18PX - HA51JRT**



# C-Familiarization

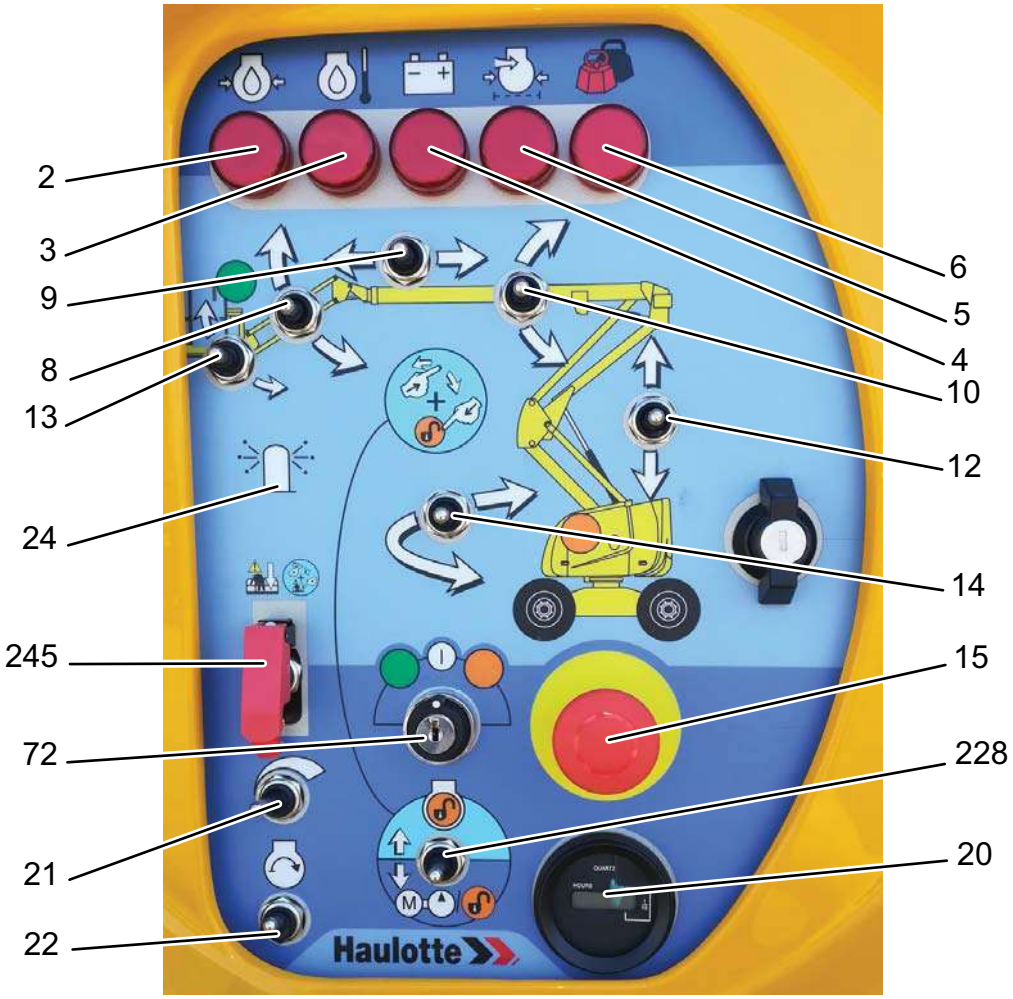
| Marking | Description | Marking | Description |
|---|---|---|---|
| C1 | Chassis | C27 | Ground control box + Universal plug |
| C2 | Front driven steering axle | C28 | Tilt sensor |
| C3 | Rear drive and/or steer wheel | C30 | Hydraulic oil tank |
| C4 | Jib | C31 | Fuel tank |
| C5 | Platform support with load limiter | C32 | Turntable rotation gearbox |
| C6 | Platform | C33 | Counterweight |
| C7 | Platform control box | C34 | Drive wheels |
| C8 | Input jib leveling cylinder | C35 | Document holder |
| C9 | Upper boom (or boom tube) | C36 | Top arm |
| C10 | Slew ring | C37 | Operating batteries |
| C11 | Turntable assembly | C38 | Bottom arm |
| C12 | Side cover | C39 | Top tie rod |
| C13 | Arm/Boom link piece | C41 | Bottom tie rod |
| C14 | Hydraulic drive motor and reducer | C42 | Foot Switch |
| C20 | Tie-down (and/or lifting) points | C43 | Turntable rotation lock pin |
| C22 | Boom lift cylinder | C140 | Propane bottles - (For ANSI / CSA standard only) |
| C26 | Engine and hydraulic pump | C154 | For Russia and the Ukraine only : Temperature probe relays |

**Universal plug**

## 1.2 - GROUND CONTROL BOX

### 1.2.1 - Layout

**General view**



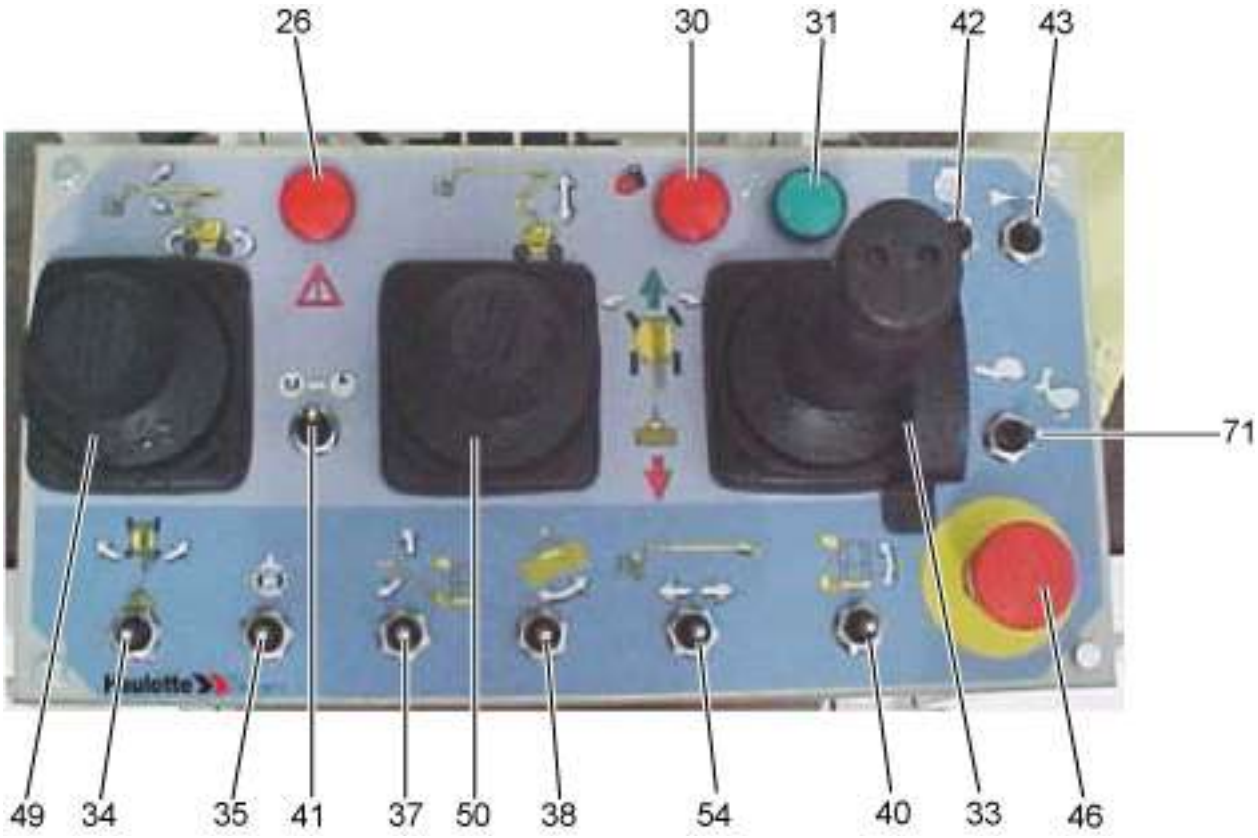
## Controls and indicators

| Marking | Description | Function |
|---|---|---|
| 2 | Engine oil pressure light | Low engine oil pressure |
| 3 | Engine temperature indicator | High engine oil temperature |
| 4 | Battery charging indicator | Low battery charge |
| 5 | Air filter clogging indicator | Clogged air filter |
| 6 | Platform overload indicator | Platform overload |
| 8 | Jib lifting / lowering switch | Move upwards : Jib lifting |
| | | Move downwards : Jib lowering |
| 9 | Boom telescoping switch | Move to the left : To extend the boom out |
| | | Move to the right : To retract the boom in |
| 10 | Boom raising switch | Move upwards : Boom raising |
| | | Move downwards : Boom lowering |
| 12 | Arm lifting selector | Move upwards : Arm raises |
| | | Move downwards : Arm lowers |
| 13 | Platform levelling | Move to the right : Platform leveling lowered or placed in transport position |
| | | Move to the left : Platform leveling raised or placed in operating position |
| 14 | Turntable rotation switch | Move to the left : Counter clockwise (CCW) rotation |
| | | Move to the right : Clockwise (CW) rotation |
| 15 | E-stop button | Pulled out : Ground control box energized |
| | | Pushed in : De-energizes control system |
| 20 | Hour meter | Total machine running hours |
| 21 | Engine revs selector | Move to the right : Engine speed increases |
| | | Move to the left : Engine idle speed |
| 22 | Engine start-up selector | Starting the engine |
| 24 | Beacon light on/off | Move to the right : Beacon light on |
| | | Move to the left : Beacon light off |
| 72 | Control box activation key switch | Left : Platform control box energized |
| | | Center : De-energizes control system |
| | | Right : Ground control box energized |
| 228 | Enable Switch / Back-up unit selector | Move upwards : Engine start |
| | | Move downwards : Enable switch. If the engine is switched off, the emergency electropump is engaged automatically. |
| 245 | "Overriding system" switch under cover | Emergency lowering system enabled when the cover is lifted. This must be used ONLY when normal operation from the ground box is unavailable - use in emergencies ONLY. |

## 1.3 - PLATFORM CONTROL BOX

### 1.3.1 - Layout

**General view**




**Controls and indicators**

| Marking | Description | Function |
|---|---|---|
| 26 | Fault indicator | Operation malfunction |
| | | Machine on excessive slope |
| 30 | Platform overload indicator | Platform overload |
| 31 | Power ON indicator | On : Machine switched on |
| | | Off : Machine switched off |
| 33 | Drive joystick | Move forward : Forward drive |
| | | Move backwards : Reverse drive |
| | Front axle steering selector | Press right side of button : Right-hand steering |
| | | Press left side of button : Left-hand steering |
| 34 | Rear axle steering selector | Move to the right : Right-hand steering |
| | | Move to the left : Left-hand steering |
| 35 | Differential lock selector | Toggle and hold (activated) : Maximum drive torque (on difficult or sloping ground) |
| | | Release (deactivated) : Standard torque |
| 37 | Jib lifting / lowering switch | Move forward : Jib lifting |
| | | Move backwards : Jib lowering |
| 38 | Platform rotation switch | Move to the right : Counter clockwise (CCW) rotation |
| | | Move to the left : Clockwise (CW) rotation |

# C-Familiarization

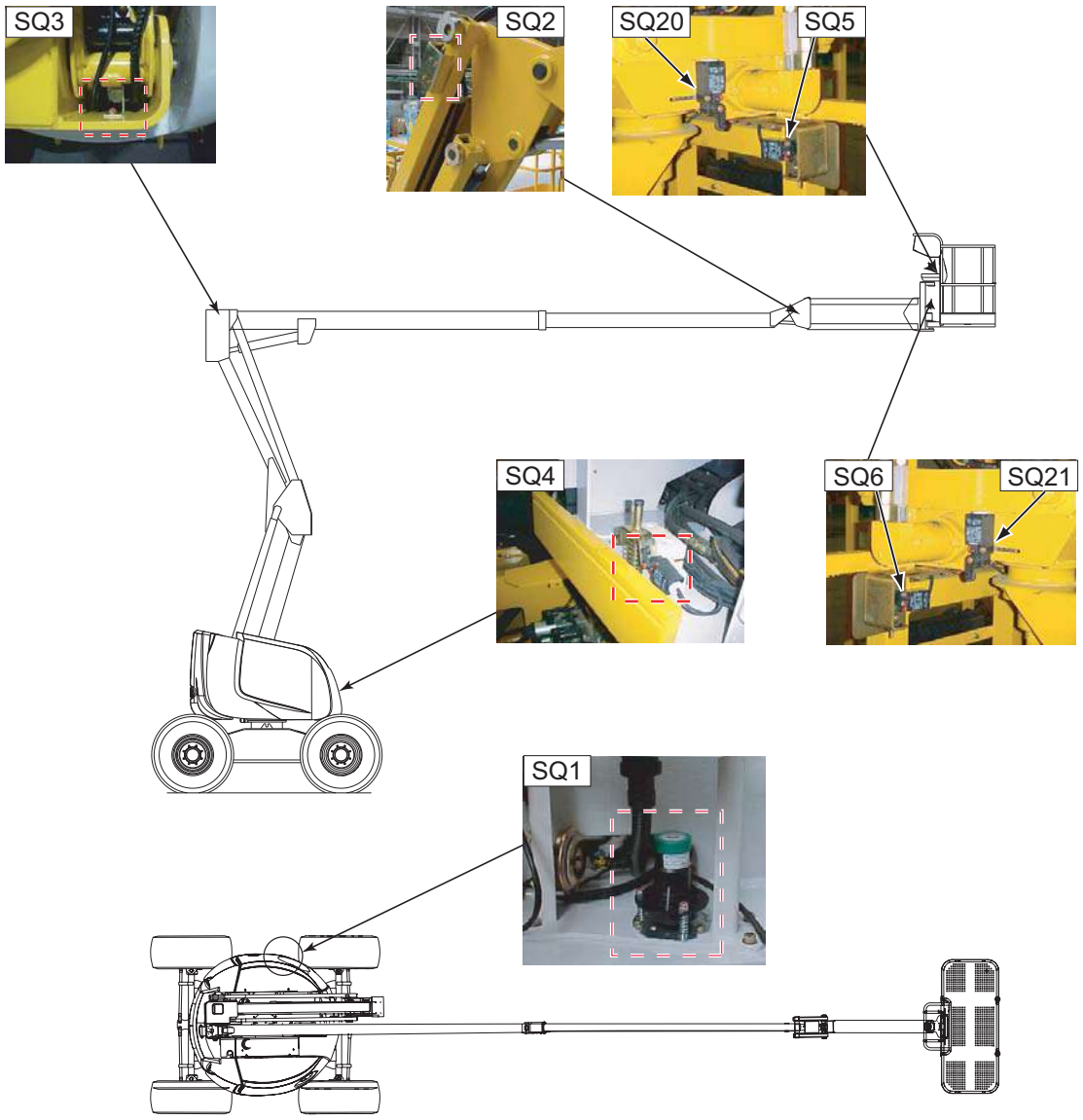
| Marking | Description | Function |
|---|---|---|
| 40 | Platform leveling switch | Move forward : Raise platform |
| | | Move backwards : Platform lowers |
| 41 | Back-up unit selector | Toggle and hold : Back-up unit activated |
| | | Release : Back-up unit deactivated |
| 42 | Engine start-up selector | Starting the engine |
| 43 | Horn button | Horn |
| 44 | Petrol/Liquid propane gas selector[1] | LPG : Propane Gas supply |
| | | G : Petrol/Liquid propane gas or diesel supply |
| 46 | E-stop button | Pulled out : Ground control box energized |
| | | Pushed in : De-energizes control system |
| 49 | Turntable rotation joystick | Move to the right : Counter clockwise (CCW) rotation |
| | | Move to the left : Clockwise (CW) rotation |
| | Boom lift joystick | Move forward : Boom raising |
| | | Move backwards : Boom lowering |
| 50 | Arm raising/lowering joystick | Move forward : Arm raises |
| | | Move backwards : Arm lowers |
| 51 | Electric pre-heating indicator | On : Engine in pre-heating mode |
| | | Off : Engine pre-heated, starting possible |
| 54 | Boom telescoping switch | Move to the right : To retract the boom in |
| | | Move to the left : To extend the boom out |
| 71 | Drive speed selector |  High-speed drive |
| | |  Medium-speed drive (difficult ground, slope) |
| | |  Low-speed drive |

1. For machines fitted with

# 2 - List of actuators and sensors

## 2.1 - Sensors and actuators

**Sensors and actuators**




| Marking | Description |
|---|---|
| SQ1 | Tilt sensor |
| SQ2 | Jib movements cut-off |
| SQ3 | Boom movements cut-off |
| SQ4 | Arm movements cut-off |
| SQ5 - SQ6 | Overloaded platform position sensor |
| SQ20 | Right-hand rotation cut-off |
| SQ21 | Left-hand rotation cut-off |

# 3 - Power source - Engine specifications

## 3.1 - General safety and specific interventions on motor

The technician should take all steps to protect themselves or others against all risks of injury inherent in his intervention.

The technician should ensure that suitable PPE (personal protective equipment) for the job is used, and check the particular conditions of environment in which the material can be found (see safety information specific to the operation site).

- Turn off the ignition, remove the key, open the battery switch before working on the engine.
- Accidental engine starting can cause injury or death to personnel working on the equipment. To avoid accidental engine starting, disconnect the battery cable from the negative (-) battery terminal. Completely tape all metal surfaces of the disconnected battery cable end in order to prevent contact with other metal surfaces which could activate the engine electrical system. Place a do not operate tag at the start/stop switch location to inform personnel that the equipment is being worked on.
- The hot engine parts can cause injury and burns. Before performing maintenance on the engine, cool the engine and parts.
- By touching a functioning engine, there is a risk of burns from contact with hot parts, and injuries by the rotating parts.
- To avoid any risk of accident, using compressed air (example : blowing air filter), always wear a headband and goggles.
- The hot coolant, steam and alkalis can cause injury. At the operating temperature, the engine coolant is hot and under pressure. Do not open the cap of the expansion chamber before letting the circuit cool.
- The radiator and all the pipes going to the heaters or engine contain hot coolant or steam. Contact can cause severe burns.

**The engine exhaust gases contain harmful combustion products. Always start and run the engine in a well ventilated area. In an enclosed area, evacuate the exhaust outside.**

## 3.2 - General Specifications

***N.B.-:-Using unsuitable fuel may cause diminished performance, difficulties starting, excessive pollution and prematurate wear. To established the type of the fuel suitable for the engine fitted on your HAULOTTE®, please refer to the engine manufacturer's manual. The engine may not be covered by the warranty in case of damage caused by using unsuitable fuel.***

### 3.3 - CONSUMABLES

**List of consumables**

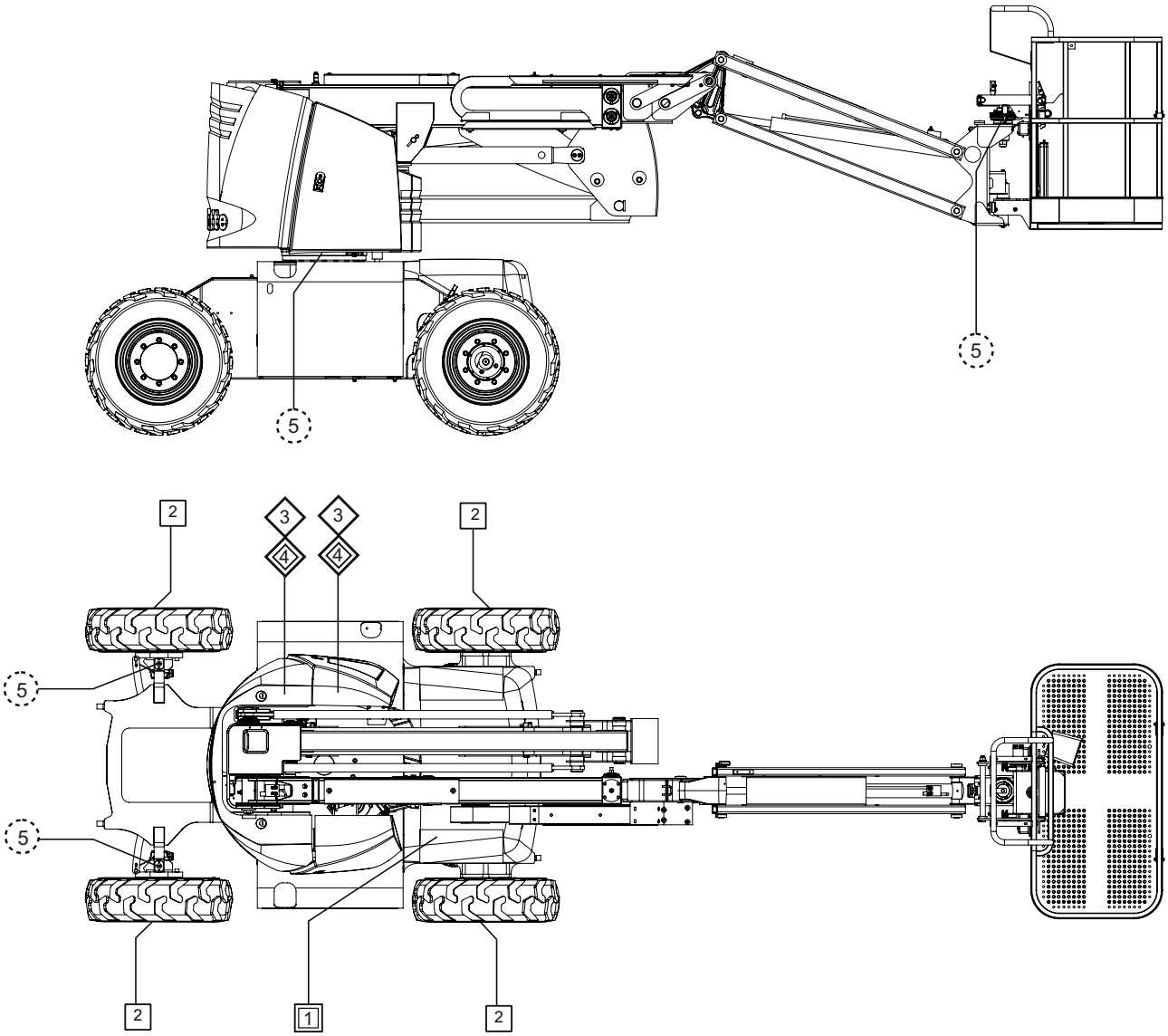
| Consumable | HAULOTTE® code |
|---|---|
| Hydraulic filter cartridge | 2427002910 |
| Air filter (system) | 2427003170 |
| Diesel pre-filter | 2324000620 |
| Diesel filter | 2427003150 |
| Engine oil filter | 2324000610 |

### 3.4 - INGREDIENT

| Ingredient | HAULOTTE® code |
|---|---|
| Coolant | 2326013640 |
| Engine oil | 2820305720 |
| Hydraulic oil - Standard | 2505003800 |
| Hydraulic oil for hot countries (Option) | 2505003820 |
| Hydraulic oil - Driving reducer | 2505004030 |

# Notes

## 4 - Lubrication diagram



# C-Familiarization

**List of ingredients**

| Marking | Ingredient | Symbol | HAULOTTE® code |
|---|---|---|---|
| 1 | Engine oil - Barrel 209 l(55,2 gal US) |  | 2820305720 |
| 2 | Gear box oil - Barrel 209 l(55,2 gal US) |  | 2505004030 |
| 3 | Hydraulic oil (Standard) - Barrel 209 l(55,2 gal US) |  | 2505003800 |
| | Hydraulic oil for hot countries (Option) |  | 2505003820 |
| 4 | Biological hydraulic oil - Barrel 209 l(55,2 gal US) |  | 2505003830 |
| 5 | Extreme-pressure lithium grease |  | 4000049970 |

# 5 - Consumables (Oils - Fuels - Engine oil - Coolant level...)

## 5.1 - FUEL

***N.B.-:-THESE FUELS CAN BE USED ON ANY TYPE OF MECHANICAL INJECTION ENGINE. PLEASE SEE MACHINE CONFIGURATION.***

**Table of technically permitted fuels**

| Engines | Fuels | | | |
|---|---|---|---|---|
| Hydraulic filter cartridge | European gas oil according to EN590 | European fuel oil according to BS2869 class 2 | American gas oil according to ASTMD975-07b | Japanese gas oil according to NATO F54 |
| HATZ 41C | ✓ | ✓ | ✓ | ✓ |
| DEUTZ 2011/2012 | ✓ | ✓ | ✓ | ✓ |
| PERKINS 403/804/ 1104 | ✓ | ✓ | ✓ | ✓ |
| LOMBARDINI LDW 1404 | ✓ | ✗ | ✗ | ✓ |
| KUBOTA D1105-W1 | ✓ | ✗ | ✓ | ✗ |
| KUBOTA V2403 | ✓ | ✓ | ✓ | ✓ |
| KUBOTA V2703 | ✓ | ✓ | ✓ | ✓ |

**Compliant**

✓

**Not compliant**

✗

### 5.1.1 - Other fuels

- Biofuels : According to EN14214 (EU) and ASTM D6751-07a (USA) biofuels are allowed on some engines and under certain conditions. For more information, please contact HAULOTTE Services®.
- Jet engine fuels (kerosene) : F34 and F35 types under OTAN designation are possible on some engines and under certain conditions. For more information, please contact HAULOTTE Services®.
- The use of vegetable oils is forbidden.

## 5.2 - ENGINE OIL

The correct SAE viscosity grade of oil is determined by the minimum ambient temperature during cold engine start-up, and the maximum ambient temperature during engine operation.

Refer to Table "Engine Oil Viscosity" (minimum temperature) in order to determine the required oil viscosity for starting a cold engine.

Refer to Table "Engine oil Viscosity" (maximum temperature) in order to select the oil viscosity for engine operation at the highest ambient temperature that is anticipated.

Generally, use the highest viscosity oil that is available to meet the requirement for the temperature at start-up.

### Engine oil viscosity

| EMA LGR-1 / API CH-4 Viscosity grade | Ambient temperature | |
|---|---|---|
| | Minimum | Maximum |
| SAE 0W20 | -40°C (-40°F) | 10°C (50°F) |
| SAE 0W30 | -40°C (-40°F) | 30°C (86°F) |
| SAE 0W40 | -40°C (-40°F) | 40°C (104°F) |
| SAE 5W30 | -30°C (-22°F) | 30°C (86°F) |
| SAE 5W40 | -30°C (-22°F) | 40°C (104°F) |
| SAE 10W30 | -20°C (-4°F) | 40°C (104°F) |
| SAE 15W40 | -10°C (14°F) | 50°C (122°F) |

### Engine sump

| Engine Refill Capacities | |
|---|---|
| Compartment or System | Liters |
| Engine only | 9,5 L (2,51 Imp. gal) |

(1) The external system includes a radiator or an expension tank with the following components : heat exchanger and piping. Refer to the QEM specifications. Enter the value for the capacity of the external system in this row.

### Classification API

| | |
|---|---|
| Fuel type | Engine oil classification |
| | Engines with non EGR<br>Engines with internal EGR |
| High sulfur fuel ≤ [0.05% (500 ppm)]<br>Sulfur content < 0.50% (5000 ppm) | CF<br>(If the engine oil is used with a high sulfur level, change the engine oil at shorter intervals, approximately half) |
| EGR : Exhaust Gas Re-circulation | |

## 5.3 - HYDRAULIC OIL

Hydraulic oils must comply with the following requirements :

- Oil filterability must be compatible with absolute filters
- Have properties such as :
  - Antifoam and deaeration
  - Anti-wear, anti-shear and antioxydant
  - Rust and corrosion inhibitors (copper)

The recommended viscosity grades depending on the environmental conditions are as follows :

| Environmental conditions | ISO Viscosity grade |
|---|---|
| Ambient temperature between - 15° C (- 9° F) and + 40° C (+ 104° F) | HV 46 |
| Ambient temperature between - 35° C (- 31° F) and + 35° C (+ 95° F) | HV 32 |
| Ambient temperature between 0° C (32° F) and + 45° C (+ 113° F) | HV 68 |

Biodegradable oils may be used if they comply with the following requirements :

- Ambient operating temperature between - 15° C (- 9° F) and + 40° C (+ 104° F)
- HEES type biodegradable oil only according to standards ISO 15380 and VDMA 24568
- Necessary characteristics :

| Viscosity grade | ISO Viscosity grade |
|---|---|
| Viscosity at + 40° C (+ 104° F) | 46 +/- 3 mm² / s |
| Viscosity at + 100° C (+ 260° F) | > 8 mm² / s |
| Viscosity index | > 160 |
| Flashpoint | > 220° C (> 572° F) |
| Pour point | < - 40° C (> - 104° F) |

# 6 - Machine specifications

## 6.1 - MOVEMENT SPEED

To allow checking operation, refer to the following table about originally time per movement. If the values measured by test are not equal to the following :

- Do not use the machine.
- Setting updating is needed.

Always check speed movement from the ground control box.

| | HA18PX - HA51JRT |
|---|---|
| Time for arm lifting | 35s ± 3s |
| Time for descent arm | 23s ± 3s |
| Time for raising boom | 30s ± 3s |
| Time for descent boom | 33s ± 3s |
| Time for continue turntable rotation | 75s ± 1.5s (per 1/2 rotation) |
| Time for telescopic boom extension | 20s ± 3s |
| Time for telescopic boom retraction | 16s ± 3s |
| Time for jib lifting | 34s ± 2s |
| Time for jib descent | 35s ± 2s |
| Time for raising compensation | 27s ± 5s |
| Time for lowering compensation | 35s ± 5s |

# D-Inspection and maintenance schedule

## 1 - Inspection program

The machine must be inspected at regular intervals in accordance with the requirements set out in the country of use and at least once a year. The purpose of the inspection is to detect any defect which could lead to an accident during routine use of the machine.

Inspections and maintenance must be carried out by a qualified company or person chosen by the owner of the machine.

The results of these visits must be recorded in a safety register created by the owner. This register as well as the list of competent repair persons must made available to the work inspector, government inspector and company safety committee at any time.

| Frequency | Person-in-charge | Stakeholder | Type | Documentation |
|---|---|---|---|---|
| Before each hire | Owner | On-site technician | Daily inspection | Operator's manual |
| Before each use or each change of user | Operator | Operator | Daily inspection | Operator's manual |
| At intervals recommended by HAULOTTE® | Owner | On-site technician, qualified HAULOTTE Services® technician | Preventive maintenance | Maintenance Book |
| Before sale | Owner | On-site technician, qualified HAULOTTE Services® technician | Periodic inspection | Maintenance Book |
| Annually ( 1 year) (*) | Owner | On-site technician, qualified HAULOTTE Services® technician | Periodic inspection | Maintenance Book |
| After 10 years then every 5 years | Owner | Qualified technician HAULOTTE Services® | Major inspection | Maintenance Book |

(*) Or according to local regulations.

## 2 - Daily inspection

The daily inspection must be performed every day, before the start of a new work shift and at every change of user.

This inspection is performed by and under the responsibility of the user and includes the visual and functional inspection of the machine as well as the testing of its safety systems.

A description of the daily inspection can be found in the machine's user manual.

We recommend these forms to be completed daily and stored to assist with your maintenance schedule.

## 3 - Preventive maintenance

Maintenance operations must be carried out by a qualified technician chosen by the owner and ensure that the machine operates correctly.

Severity of operating conditions may require a reduction in time between maintenance periods.

Maintenance operations performed must be recorded in a register / log book of the machine.

**The information contained in our manual is to be complemented by the information found in the engine manufacturer's maintenance manual, which can be found on the link in the associated maintenance sheet MS0238.**

| | | | | | |
|---|---|---|---|---|---|
|  | Oil change |  | Lubrication-Lubrication |  | Tightening |
|  | Levelling |  | Systematic replacement |  | Functional adjustments / Checks / Cleaning |
|  | Visual inspection |  | To check by test | | |

**Preventive Maintenance Level 1 - First 50H**

| First 50H | Page or associated procedure | First 50H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Tighten the wheel nuts | |  | | | | |
| **Hydraulic : oils, filters and hoses** | | | | | | |
| Replace the hydraulic filter | |  | | | | |

# D-Inspection and maintenance schedule

## Preventive Maintenance Level 1 - Every 200H

| Every 200H | Page or associated procedure | Every 200H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Grease the steering system | |  | | | | |
| Grease the bushings and pins | |  | | | | |
| Drain the wheel reducer** | |  | | | | |
| **Slew ring** | | | | | | |
| Grease the turntable slew ring | |  | | | | |
| Drain the movement reducer** | |  | | | | |
| **DEUTZ 2011 engine** | | | | | | |
| Clean the air filter | |  | | | | |
| **Arm, boom** | | | | | | |
| Grease the pads | |  | | | | |

** Only in the first 200H

# D-Inspection and maintenance schedule

**Preventive Maintenance Level 1 - Every 6 months or 500H**

| Every 6 months or 500H | Page or associated procedure | Every 6 months or 500H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Tighten the wheel nuts | |  | | | | |
| Check the wheel reducer level | |  | | | | |
| Tighten the steering system | |  | | | | |
| **Slew ring** | | | | | | |
| Tighten the slew ring | |  | | | | |
| Check the movement reducer level | |  | | | | |
| **DEUTZ 2011 engine** | | | | | | |
| Drain the engine oil* | |  | | | | |
| Replace the oil filter* | |  | | | | |
| **Hydraulic : oils, filters and hoses** | | | | | | |
| Check the hydraulic oil level | |  | | | | |
| **Jib** | | | | | | |
| Tighten the rotary cylinder | |  | | | | |
| Tighten the load cell | |  | | | | |
| **Platform** | | | | | | |
| Tighten the mounting on the platform support, the platform floor and the platform access | |  | | | | |

* Do not take into account the deadline of 6 months, only 500H.

# D-Inspection and maintenance schedule

**Preventive Maintenance Level 2 - Every 1 year or 1000H**

| Every 1 year or 1000H | Page or associated procedure | Every 1 year or 1000H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Drain the wheel reducer | |  | | | | |
| **Slew ring** | | | | | | |
| Drain the movement reducer | |  | | | | |
| **DEUTZ 2011 engine** | | | | | | |
| Replace the fuel filter | |  | | | | |
| Replace the air filter | |  | | | | |
| Check tension and status of the distribution belt | |  | | | | |
| Replace alternator belt | |  | | | | |
| **Hydraulic : oils, filters and hoses** | | | | | | |
| Replace the hydraulic filter | |  | | | | |
| **Arm, boom** | | | | | | |
| Check the pads-Replacement is necessary | |  | | | | |

# D-Inspection and maintenance schedule

## Preventive Maintenance Level 2 - Every 2 years or 2000H

| Every 2 years or 2000H | Page or associated procedure | 2 year(s) or 2000H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Check the bushings and pins-Replacement is necessary | |  | | | | |
| **Slew ring** | | | | | | |
| Check the slew ring clearance | |  | | | | |
| **DEUTZ 2011 engine** | | | | | | |
| Drain the oil tank | |  | | | | |
| Drain the cooling circuit | |  | | | | |
| **Hydraulic : oils, filters and hoses** | | | | | | |
| Drain the hydraulic oil | |  | | | | |

## Preventive Maintenance Level 2 - Every 5 years or 5000H

| Every 5 years or 5000H | Page or associated procedure | Every 5 years or 5000H | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Replace distribution belt | |  | | | | |

## 4 - Periodic inspection

The Periodic inspection is a thorough inspection of the operation and safety features of the machine. This must take place prior to the sale or resale of the machine and every 1 year. Local regulations may have specific requirements on frequency, and content of inspections.

This intervention must take place after :

- Extensive dismantling and reassembly
- Repairs involving the machine's essential components
- Any accident causing stress to the machine

This inspection is the responsibility of the owner, and must be conducted by a qualified technician.

Under no circumstances may this inspection replace the control required by local regulations.

Use the detailed program below.

| Periodic | Page or associated procedure | Periodic | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **Chassis assembly : Wheel, reducer, steering, wheel pivot** | | | | | | |
| Check state of tires/tyres and inflations | |  | | | | |
| **Motor** | | | | | | |
| Check that there are no leaks from the engine's components (engine, hose, radiator) | |  | | | | |
| Check the condition of the battery | |  | | | | |
| Check for visible damage and broken welds on the exhaust system | |  | | | | |
| Check the operation of the lock on the engine casing | |  | | | | |
| **Turntable** | | | | | | |
| Test the operation of the turntable locking system | |  | | | | |
| **Hydraulic : oils, filters and hoses** | | | | | | |
| Check the hoses, blocks and pumps, fittings, cylinders and the tank for the absence of leaks, deformations and damage | |  | | | | |
| **Platform** | | | | | | |
| Test the automatic closure and locking of access basket | |  | | | | |
| Check that the harness anchor points are not cracked or damaged | |  | | | | |

# D-Inspection and maintenance schedule

| Periodic | Page or associated procedure | Periodic | OK | NOK | Corrected | Comments |
|---|---|---|---|---|---|---|
| **General** | | | | | | |
| Check for the presence, cleanliness and readability of the manufacturer's plates, security labels, user manual and maintenance manual | |  | | | | |
| Check the cleanliness and readability of the control box | |  | | | | |
| Test the opening and closure of covers (chassis, turntable, upper control box) | |  | | | | |
| Check the condition of electrical harnesses, cables and connectors | |  | | | | |
| Check for the absence of abnormal noise and jerky movements | |  | | | | |
| Check for the absence of visible deterioration and damage | |  | | | | |
| Check for the absence of cracks, broken welds and chipped paintwork on the structure | |  | | | | |
| Check for the absence of missing or loose screws and bolts | |  | | | | |
| Check for the absence of deformation, cracking and breakage of axis stops, bushing and axes | |  | | | | |
| Check for the absence of foreign bodies in joints and sliding parts | |  | | | | |
| **Safety devices** | | | | | | |
| Test the operation of the upper and lower control boxes: manipulators, switches, buttons, horn, emergency stops, screens and lights | |  | | | | |
| Check for the absence of visual and audible alarms | |  | | | | |
| Test the operation of the tilt system | |  | | | | |
| Test the operation of the emergency lowering system | |  | | | | |
| Test the operation of the axle locking system | |  | | | | |
| Test the operation of the loading control system (visual alarm on the control box) | |  | | | | |
| Test the operation of the Activ Shield Bar (If equipped) | |  | | | | |
| Test the operation of the drive speed limiter systems | |  | | | | |
| Test the speed and behavior of movements | |  | | | | |
| Check the operation of the load control system- Calibrate if necessary | |  | | | | |

## 5 - Major inspection

The inspection is a thorough inspection of the machine to ensure that it is fully functional. It must be carried out after 10 years then every 5 years.

This inspection is the responsibility of the owner and must be carried out by a technician HAULOTTE Services® or an authorized and qualified person.

In order to carry it out, contact the subsidiary HAULOTTE® or the authorized distributor.

***N.B.-:-The list of Maintenance Sheets is not exhaustive. Other Sheets may be sent upon request. Contact HAULOTTE Services®.***

# Notes

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

Exclusively use tools and auxiliary average adapted. Always wear necessary safety clothing.
For safety reasons, imperatively respect the following stages during the tests :
- To set up e beaconing of safety around the test area.
- To put the machine in position transport (horizontal jib accepted)
- Use safety straps.

# 2 - Preliminary operation

The operations of disassembling if they exist should be carried out only on the installations completely disconnected and must be entrusted only to people having the necessary technical training.

Respect, in addition to the instructions appearing in the present instructions, the legal tendencies generally applicable for safety accident prevention.

All the precautions must be done in work before intervening on and near the machine.

After completion of work, all the covers and safety devices must be positioned back completely and operational.

# 3 - Control and maintenance

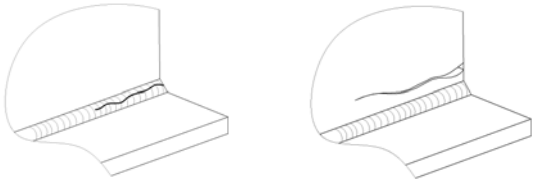
To guarantee the integrity of the machine, it is necessary to carry out periodical controls on the mechanical structure such as defines hereafter.

## 3.1 - DAILY INSPECTION

All the accessible structural part without disassembling must be subjected to a fast visual inspection.

If anomalies are noted, according to the list below, a reinforced control will have to be carried out to judge conformity of the part :

- Absence of foreign body to the articulations and slides.
- Absence of deformation and visible damage.
- Absence of crack, broken welding, oxidation, glare of painting.
- Absence of excessive gap to the articulations and slides.
- Check that locking device are not damaged and are functional.
- No screws or missing part loosened or unscrew.
- Anchorage points firmly fixed and not damaged.



The list of part to check are define Section Familiarization.

### 3.2 - MAJOR INSPECTION

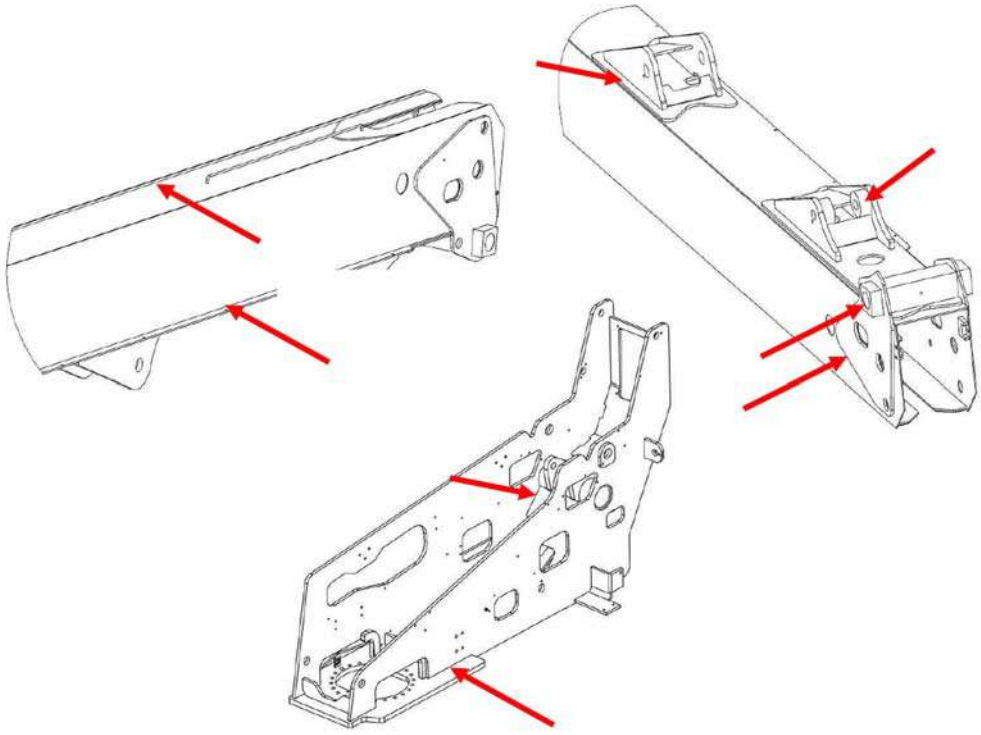
All structural part listed Section Familiarization must be disassembled and all weldsmust be review using non-destructive checks Section D Inspection and maintenance schedule.

The criteria quoted above are applicable.

The main items to be inspected are :

- Boss welds on chassis, turret, arms, booms and jib.
- Booms and arms welds.

**Example**



In the event of suspicion of crack, a cleaning and a sweating are to be carried out to guarantee the integrity of the part before reassembly.

Check presence and torque of each bolts and screw used to assembly part listed in Section Familiarization. Refer to spare part catalog for additional information if needed.

**Some screws are not reusable and must be systematically changed (ex: screws from the gear ring).**

### 3.3 - FUNCTIONAL TESTS

The following tests must be performed periodically Section D Inspection and maintenance schedule :

- An important technical intervention.
- An accident resulting from a failure of a major component.

The following tests must be realized by a qualified staff under secure conditions.

The results of the tests must be entirely documented.

To avoid the swing of the machine during the test, it is imperative that a device of reserve (chain, not of anchoring) is used during the test.

### 3.4 - DYNAMIC TESTS

The machine must be place on level and firm ground.

With 100% of the maximum allowed load, operate from ground control box (or emergency control box) all the movements ; the platform floor must reach a height of about 1 above the ground.

The functional tests must show the following facts :

- The machine carried out all the movements without jolts while supporting the load.
- All the security device function correctly.
- Authorized maximum speeds of operation are not exceeded.

Refer to the user manual for the description of the safety device and technical characteristics to be reached.

### 3.5 - STRUCTURAL TEST (OVERLOAD)

The following test shows that the structure of the machine is in conformity with the safety requirements.

The machine must be place on level and firm ground.

With 100% of the maximum allowed load, operate from ground control box (or emergency control box) all the movements ; the platform floor must reach a height of about 1 above the ground :

- Measure the distance between the ground and the basket (or of the platform).
- Leave the machine in static during 15 mnn.
- Measure the distance between the ground and the basket (or of the platform).

If the difference between two measurements does not exceed 4 cm (1.575 in) : the test is validated.

If the difference between two measurements exceeds 4 cm (1.575 in), to contact HAULOTTE Services® or to carry out the additional tests described below. MS0003 - § 3.2 Cylinder inspection.

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves
- Oil collection pan

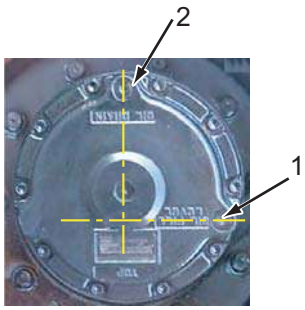
- Place barriers around the perimeter of the work area

# 2 - Preliminary procedure

1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

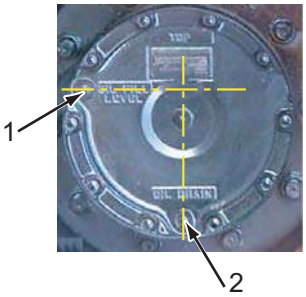
# 3 - Control

1. Turn the wheel to obtain the following configuration :
   - Plug ( 1 ) is on a horizontal line.
   - Plug ( 2 ) is on a vertical line.
2. Loosen and remove plug ( 1 ).
3. Check the oil level.
4. Top up the oil level to the hole, if necessary.
5. Refit and tighten plug ( 1 ).




# 4 - Oil change

1. Turn the wheel until plug ( 2 ) is directed downwards.
2. Loosen and remove plugs ( 1 ) and ( 2 ).
3. Let the oil drain out.
4. Refit and tighten plug ( 2 ).
5. Turn the wheel again to the level control position.
6. Fill the wheel reducer with oil up to hole ( 1 )
7. Refit and tighten plug ( 1 ).




**Use an oil collection pan to avoid polluting the environment.**

# 5 - Additional operation

1. Place the machine in its operating configuration. 3.3.2-Placing in operating configuration

# Notes

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

Exclusively use tools and auxiliary average adapted. Always wear necessary safety clothing.

# 2 - Preliminary operation

The operations of disassembling if they exist should be carried out only on the installations completely disconnected and must be entrusted only to people having the necessary technical training.

Respect, in addition to the instructions appearing in the present instructions, the legal tendencies generally applicable for safety accident prevention.

All the precautions must be done in work before intervening on and near the machine.

After completion of work, all the covers and safety devices must be positioned back completely and operational.

# 3 - Control and maintenance

Inspection of the pins, stop pins, bushings and bearings must be carried out according to the recommendations Section D Inspection and maintenance schedule :

- Fast visual inspection without disassembling Section D Inspection and maintenance schedule :
  - Check the presence of the pins and visible stops pins without disassembling.
  - Check the presence of the screws.
  - Check absence of deformations, cracks or breakage of pins and/or stops pins.
  - Check absence of heavy abrasion, wear or oxidation of the pins, stops pins.
- Reinforced visual inspection with disassembling of certain elements to reach the bushes or bearing Section D Inspection and maintenance schedule : In addition to the above cited criteria, verify the following :
  - Check the presence and the position of the bushes and bearings.
  - Check the absence of shaving in periphery of the pins.
  - Check the absence of heavy abrasion, wear or oxidation of the bushes and bearing.
  - Check the absence of deformations, cracks or breakage of the bushes and bearing.
  - Check the absence of radial gap > 0,5 mm (19690 µ in) on the pins.
- Complete disassembling of the pins, bushes and bearing Section D Inspection and maintenance schedule : In complement of the inspections above cited, it is necessary to check :
  - For the stages :
- Check the presence of material of friction.
  - For the bearings :
- After disassembling, protect the bearing from pollution and shocks.
- Clean the bearing with a suitable solvent.
- Check the absence of shaving in the housing of the bearing and/or the bearing.
- Check the absence of heavy abrasion, wear, oxidation, deformations of the balls (or rollers) and the ball races.

The periodicity can evolve under the following conditions Section D Inspection and maintenance schedule :

- Abnormal noise during movements of the structure.
- Prolonged storage of the machine ( 6 months).
- Specific storage and use Environment (strong moisture and salinity of the air).

# 4 - Criteria of replacement

The pins, stop pins, bushes and bearing must be replaced as soon as one of the anomalies quoted above is noted. Bearing and bushes must be imperatively changed at the end of 10 years of use.

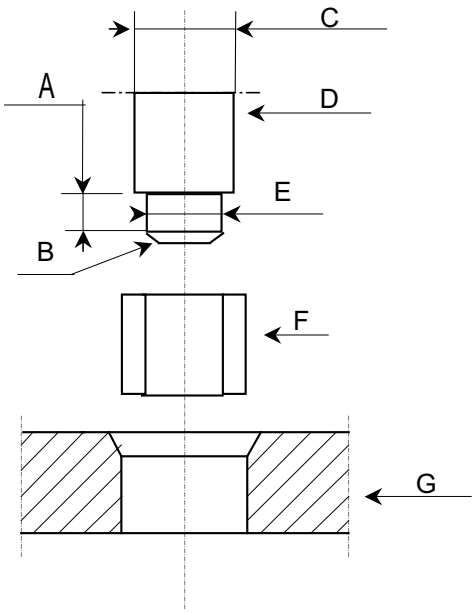
# 5 - Procedure of reassembly

## 5.1 - PINS AND BUSHES

When reassembling bearings and pins ensure that :

- Lightly lubricate the housing into which the bearing is to be installed.
- Insert the bearing using a bearing drift, preferably out of mild steel.
- The bearing, the bearing drift and the bearing housing must be correctly aligned during the assembly process.
- The recommended values for the bearing drift are given on the diagram below :

**Recommended Values**




| Marking | Description |
|---|---|
| A | At least 0,5 times the nominal diameter |
| B | Make a chamfer |
| C | Nominal diameter of the bearing - 0,2 / - 0,3 mm (-7874 µ in / -11810 µ in) |
| D | Bearing drift |
| E | Diameter of the bearing guide - 0,20 / - 0,25 mm (-7874 µ in / -9843 µ in) |
| F | Bearing |
| G | Housing |

- After inserting the bearing, lubricate and fit the pin.

## 5.2 - BEARINGS

For the reassembly of bearings, respect the following stages :

- Clean boring and/or the pins to remove all the foreign bodies.
- Slightly lubricate boring and/or pins.
- Lubricate the ring of the bearing slightly.
- To fit bearing in a boring: take support on the external ring of the bearing.
- To fit bearing on an axis: take support on the interior ring of the bearing.

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

Exclusively use tools and auxiliary average adapted. Always wear necessary safety clothing.
For safety reasons, imperatively respect the following stages during the tests :
- To set up a beaconing of safety around the test area.
- Put the machine in stowed position.
- Use safety straps.

# 2 - Preliminary operation

The operations of disassembling if they exist should be carried out only on the installations completely disconnected and must be entrusted only to people having the necessary technical training.

Respect, in addition to the instructions appearing in the present instructions, the legal tendencies generally applicable for safety accident prevention.

All the precautions must be done in work before intervening on and near the machine.

After completion of work, all the covers and safety devices must be positioned back completely and operational.

# 3 - Control and maintenance

## 3.1 - VISUAL INSPECTIONS

The hydraulic actuating cylinders must be subjected to visual inspections periodic all the 250 hours or 6 months such as defined below :

- Absence of leakage.
- Absence of deformations, visible damage , cracks on the body and fixing of the cylinder.
- Absence of rust and shock on the rod.
- Absence of foreign objects on all surfaces.
- Absence of missing or loosened part (bolt, nut, connection, flexible device, etc).

## 3.2 - FUNCTIONAL TESTS

To guarantee an optimal level of performance and safety, functional tests must be realized all the 250 hours or 6 months.

The periodicity can evolve under the following conditions :

- Anomaly noted during visual inspection.
- Abnormal noise during movements of the structure.
- Prolonged storage of the machine ( 6 months).
- Specific storage and use Environment (strong moisture and salinity of the air).

Generic Control :

- Position a load equal to the rated capacity on the cage (or platform).
- Raise the cage (or the platform) using the ground control box. To activate the cylinder to be tested, proceed as follows :
  - Lift Arm hydraulic cylinder : Lift the arm to approximately half full height. The telescopic boom should be fully extended and in the horizontal position. (For machines fitted with).
  - Boom lifting cylinder or Jib cylinder : Lift the concerned equipment (boom or jib) of approximately half way. Extend the telescope to its maximum.
  - Telescoping cylinder : Lift the boom to its maximum angle and telescope approximately 50 cm (19.69 in).
- Measure the distance between the floor of the cage (or of the platform) and the ground.
- Leave the machine in this condition for 15 mn (minutes).
- Measure the distance between the floor of the cage (or of the platform) and the ground.
  - If the difference between two measurements does not exceed 4 cm (1.575 in) : the test validates correct operation.
  - If the difference between two measurements exceeds 4 cm (1.575 in), contact HAULOTTE Services® or carry out the additional tests described below.

Control cylinder by cylinder :

- Position a load equal to the rated capacity on the cage (or platform).
- Perform the movement of the concern cylinder to half of its stroke.
- Fix the cylinder with a comparator :
  - Attach the body of the comparator on the cylinder rod.
  - The needle of the comparator must be in contact with the end of the casing of the cylinder.
  - The target is to measure the creep of the cylinder rod.

- If the creep of the cylinder rod is higher than the values indicated in the table below, replace the cylinder.

| Type of cylinders | Maximum drift authorised due to an internal leak of the cylinder | |
|---|---|---|
| Lift cylinder arm or boom (Machine with working heights > 26 m(85 ft4 in)) | After 10 mn, creep < 0,2 mm (7874 µ in) | After 60 mn, creep < 1 mm (0.039 in) |
| Outriggers cylinder, Oscillating axle locking, Lift cylinder arm or boom (Machine with range-limiting system) | After 10 mn, creep < 0,5 mm (0.01196 in) | After 60 mn, creep < 2,5 mm (0.098 in) |
| Lift cylinder arm or boom, Telescoping, Compensation, ... | After 10 mn, creep < 1 mm (0.039 in) | After 60 mn, creep < 6 mm (0.236 in) |
| Steering cylinder | After 10 mn, creep < 1,5 mm (0.059 in) | After 60 mn, creep < 9 mm (0.354 in) |

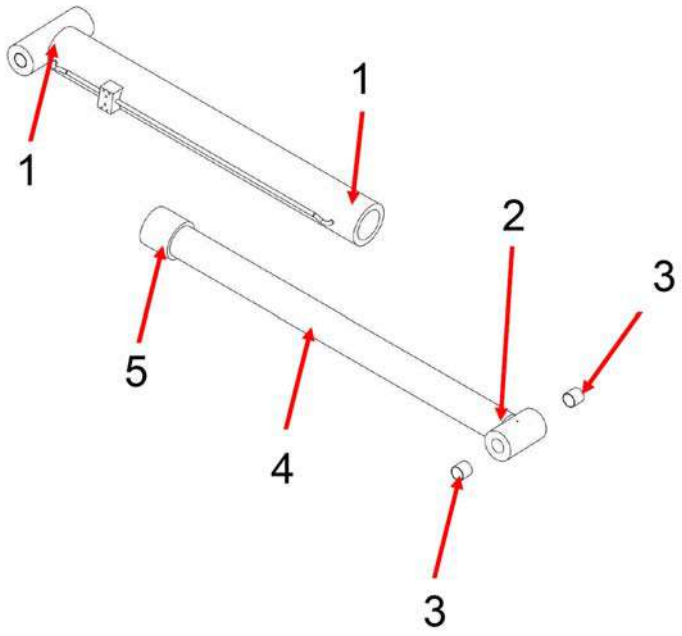
**These tests must be made in conditions of equivalent temperatures.**

## 3.3 - MAJOR INSPECTION

A thorough inspection of the structural parts must be realized all the 5000 h or 10 years with disassembling of the element to check the entirety of the welding. Each Cylinder must be disassembled and must be review using non-destructive checks.

The criteria quoted above are applicable :

- Absence of deformation and visible damage.
- Absence of crack, broken welding, oxidation, glare of painting.




**Check :**

1. Pipe weld connection.
2. Rod weld connection.
3. Ring.
4. Rod.
5. Piston.

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

# 2 - Preliminary procedure

1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

# 3 - Filling-up

**Touch the exterior of the filling hole with the pump spout before starting pouring to avoid any risk of static electricity causing sparks.**

**Make sure you are standing up-wind to avoid being splashed by the fuel.**

**Do not smoke.**

- Loosen and remove the tank cap .
- Fill up the tank.
- Refit and tighten the tank cap .
- Clean up any fuel that may have escaped from the tank.

# 4 - Additional operation

1. Place the machine in its operating configuration. 3.3.2-Placing in operating configuration

# Notes

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

Exclusively use tools and auxiliary average adapted. Always wear necessary safety clothing.
For safety reasons, imperatively respect the following stages during the tests :
- Set up a beaconing of safety around the test area.
- Put the machine in position transport (Pendular horizontal accepted).
- Use safety straps.

# 2 - Preliminary operation

The operations of disassembling if they exist should be carried out only on the installations completely disconnected and must be entrusted only to people having the necessary technical training.

Respect, in addition to the instructions appearing in the present instructions, the legal tendencies generally applicable for safety accident prevention.

All the precautions must be done in work before intervening on and near the machine.

After completion of work, all the covers and safety devices must be positioned back completely and operational.

# 3 - Test procedure

The brake system is a significant component of the safety of the machine. The following tests must be performed periodically  Section D Inspection and maintenance schedule.

High speed :
- On a flat ground or slightly inclined (always lower than the authorized slope: see plate manufacturer).
- Trace on the ground, a line being used as reference mark of stop.
- Roll moving front until reaching maximum speed :
- Between 3 km/h (1.9 mph) and 6,5 km/h (4,039 mph) according to the machines.
- Release the manipulator as soon as the wheels axles are on the level of the traced reference mark.
- Stopped machine, measure the distance between the wheel axles and traced reference mark on the ground :
- If the distance lies between 0.2 m (0ft 8in) and 2,7 m (8 ft 11 in), the test is validated.
- If not, Contact HAULOTTE Services® to repair the system.

# Notes

# 1 - You will need

- Standard tool kit
- Steel shims
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

# 2 - Preliminary procedure

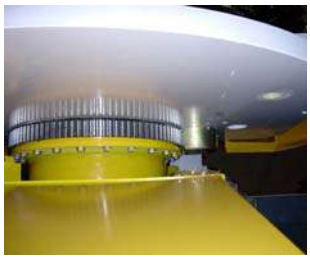
1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

# 3 - Lubrication

**The illustrations in this paragraph do not necessarily correspond to the range of products designated in the manual.**

The maintenance of the slew ring is essential for the safety of the machine and to guarantee its service life. Whatever the type of system installed on the machine, interior or external teeth, follow the recommendations of greasing as indicated in the program.

1. Check for the presence of all the locating bolts.
2. Check that the accessible screws are not loosened. If necessary, tighten the screws(Refer to the "tightening torque" table).
3. Visually check the presence of the teeth and gear (if possible).
4. Check the appearance of the teeth.
5. Grease the (internal and external) crown gear teeth.
6. Grease the raceways (access to greasers via the holes situated on the turntable, until the oil escapes from the crown lip seal).



## 4 - Tightening

| Machine type | Metric | Imperial |
|---|---|---|
| HA16PE | 21,5 daN.m | (158 lbf.ft) |
| HA12IP - HA33JE | 9 daN.m | (66 lbf.ft) |
| HA15IP - HA43JE | 9 daN.m | (66 lbf.ft) |
| HA12CJ - HA32CJ | 9 daN.m | (66 lbf.ft) |
| HA12CJ+ - HA32CJ+ | 9 daN.m | (66 lbf.ft) |
| HA120PX (N/A) | 9 daN.m | (66 lbf.ft) |
| HA16X (N/A) | 21,5 daN.m | (158 lbf.ft) |
| HA16SPX - HA46SJRT | 21,5 daN.m | (158 lbf.ft) |
| HA16PX - HA46JRT | 21,5 daN.m | (158 lbf.ft) |
| HA18SPX - HA51SJRT | 21,5 daN.m | (158 lbf.ft) |
| HA18PX - HA51JRT | 21,5 daN.m | (158 lbf.ft) |
| HA20PX - HA61JRT | 21,5 daN.m | (158 lbf.ft) |
| HA260PX - HA80JRT | 21,5 daN.m | (158 lbf.ft) |
| HA32RTJ PRO - HA100RTJ PRO | 21,5 daN.m | (158 lbf.ft) |
| HA41RTJ PRO - HA130RTJ PRO | 21,5 daN.m | (158 lbf.ft) |
| H14TX - HB40 | 8,7 daN.m | (64 lbf.ft) |
| H16TPX - HB44J | 8,7 daN.m | (64 lbf.ft) |
| H21TX - HB62 | 21,5 daN.m | (158 lbf.ft) |
| H23TPX - HB68J | 32 daN.m | (236 lbf.ft) |
| H25TPX - HB76J | 21,5 daN.m | (158 lbf.ft) |
| H28TJ+ - HB86TJ+ | 21,5 daN.m | (158 lbf.ft) |
| HT43RTJ PRO - HT132RTJ PRO | 21,5 daN.m | (158 lbf.ft) |
| STAR 8 - STAR 22J - Ring on plate | 13.5 daN.m | (100 lbf.ft) |
| STAR 8 - STAR 22J - Plate on mast foot | 19.5 daN.m | (144 lbf.ft) |
| STAR 8 - STAR 22J - Ring on chassis | 13.5 daN.m | (100 lbf.ft) |
| STAR 10 - STAR 26J - Ring on plate | 13.5 daN.m | (100 lbf.ft) |
| STAR 10 - STAR 26J - Plate on mast foot | 19.5 daN.m | (144 lbf.ft) |
| STAR 10 - STAR 26J - Ring on chassis | 13.5 daN.m | (100 lbf.ft) |

# 5 - Criteria of replacement

Check the slewing system every 500 h or each major intervention done on the machine.

Step 1 : Visual and sound check :

Replace slew ring in the following cases :

- Abnormal noise during the turret rotation.
- Movement jolts during the rotation of the turret.
- Gear teeth missing or damaged.
- Presence of metal particles in the grease.
- Wear on gear teeth.

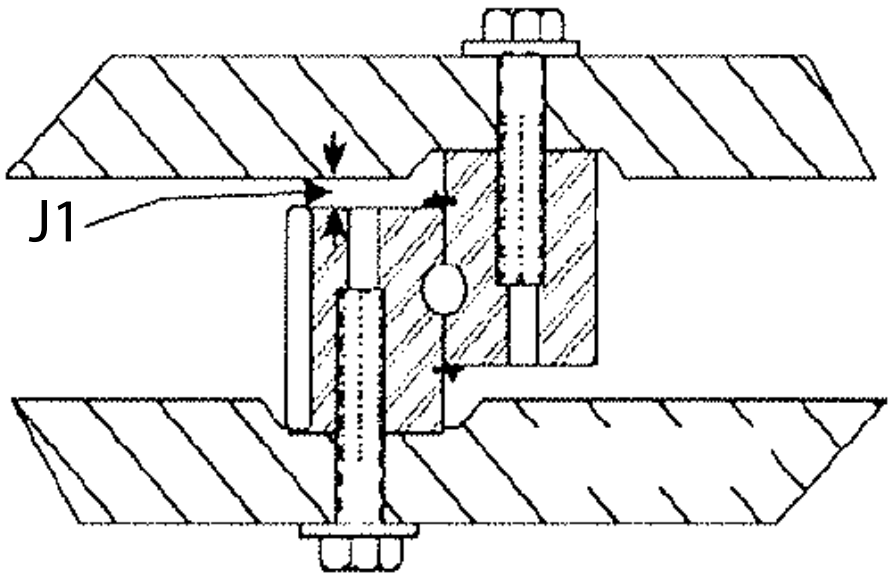
Step 2 : Measurement of the clearance :

Place the machine in the following conditions :

- On flat ground, Set up barriers to define the test area.
- No load in the platform.
- From the ground control box, align the turret at 90 ° to the chassis.
- Lift the boom approximatively 30 ° from the ground.
- Completely retract the boom.
- Jib in horizontal position(if fitted).

From the magnetic comparator, note the clearance ( J1) between chassis (or turret) and the slew ring.

**Clearance between chassis (or turret) and slew ring**



After having carried out the measurement :

- Lower the boom at horizontal position.
- Lift the arm (if exists) as its maximum position. Don't extend the telescopic boom.
- The telescopic boom should be fully extended and in the horizontal position..
- Jib in horizontal position(if fitted).

In its new configuration, note the clearance ( J1) between chassis (or turret) and the slew ring as previously.

- If the difference between two measurements does not exceed 2 mm : the test validates correct operation.
- Otherwise, contact HAULOTTE Services® to repair the system.

## 6 - Clearance check

**Consult the After-Sales Service HAULOTTE Services®.**

## 7 - Additional operation

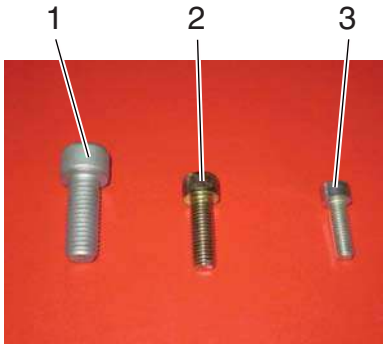
1. Place the machine in its operating configuration. 3.3.2-Placing in operating configuration
2. Rotate the slew ring by one complete turn.

**A tight spot or grinding sound during rotation or the presence of metal particles escaping from the lip seal are signs of abnormal wear in the raceway (Contact HAULOTTE Services®).**

# 1 - Metric torque chart

For screws HAULOTTE®, use columns ( A ), ( B ) and ( C ) :

- Screw ( 1 ) grey dull dry, use colums ( A )
- Screw ( 1 ) grey dull greasy, use column ( B )
- Screw ( 2 ) yellow dry, use column ( C )
- Screw ( 2 ) yellow greasy, use column ( B )
- Screw ( 3 ) grey bright dry, use column C
- Screw ( 3 ) grey bright greasy, use column ( B )




**Metric fastener torque chart**
**This charts is to be used as a guide only unless noted elsewhere in this manual**

| Size (mm) | Class 4.6 | | | | | | Class 8.8 | | | | | | | | | | | | Class 12.9 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dull dry (A) | | Lubed (B) | | Yellow dry (C) | | Dull dry (A) | | Lubed (B) | | Yellow dry (C) | | Dull dry (A) | | Lubed (B) | | Yellow dry (C) | | Dull dry | | Lubed | | Yellow dry | |
| | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm |
| 5 | 17.7 | 2 | 16 | 1.8 | 21 | 2.4 | 44 | 5 | 41 | 4.63 | 54 | 6.18 | 68 | 7.7 | 58 | 6.63 | 78 | 8.84 | 79 | 9 | 68 | 7.75 | 91 | 10.3 |
| 6 | 30 | 3.4 | 19 | 3.05 | 36 | 4.07 | 80 | 9.1 | 69 | 7.87 | 93 | 10.5 | 118 | 13.4 | 100 | 11.3 | 132 | 15 | 139 | 15.7 | 116 | 13.2 | 155 | 17.6 |
| Size (mm) | Dull dry | | Lubed | | Yellow dry | | Dull dry | | Lubed | | Dry | | Dull dry | | Lubed | | Dry | | Dull dry | | Lubed | | Dry | |
| | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm |
| 8 | 5.9 | 8 | 5.4 | 7.41 | 7.2 | 9.88 | 16.2 | 22 | 14 | 19.1 | 18.8 | 25.5 | 23.6 | 32 | 20.1 | 27.3 | 26.9 | 36.5 | 28 | 38 | 23.6 | 32 | 31.4 | 42.6 |
| 10 | 12.17 | 16.5 | 10.8 | 14.7 | 14.4 | 19.6 | 32.45 | 44 | 27.9 | 37.8 | 37.2 | 50.5 | 47.2 | 64 | 39.9 | 54.1 | 53.2 | 72.2 | 55 | 75 | 46.7 | 63.3 | 62.3 | 84.4 |
| 12 | 20.65 | 28 | 19.8 | 25.6 | 25.1 | 34.1 | 56 | 76 | 48.6 | 66 | 64.9 | 88 | 81.8 | 111 | 69.7 | 94.5 | 92.2 | 125 | 95.9 | 130 | 81 | 110 | 108 | 147 |
| 14 | 33.19 | 45 | 30.1 | 40.8 | 40 | 54.3 | 89.24 | 121 | 77.4 | 105 | 103 | 140 | 131.28 | 178 | 110 | 150 | 147 | 200 | 154.15 | 209 | 129 | 175 | 172 | 234 |
| 16 | 52.37 | 71 | 46.9 | 63.6 | 62.5 | 84.8 | 139.4 | 189 | 125 | 170 | 166 | 226 | 205.04 | 278 | 173 | 235 | 230 | 313 | 239.7 | 325 | 202 | 274 | 269 | 365 |
| 18 | 72.28 | 98 | 64.5 | 87.5 | 86.2 | 117 | 192.5 | 261 | 171 | 233 | 229 | 311 | 283.2 | 384 | 238 | 323 | 317 | 430 | 331 | 449 | 278 | 377 | 371 | 503 |
| 20 | 102.5 | 139 | 91 | 124 | 121 | 165 | 272.9 | 370 | 243 | 330 | 325 | 441 | 401.2 | 544 | 337 | 458 | 450 | 610 | 469.8 | 637 | 394 | 535 | 525 | 713 |
| 22 | 140.87 | 191 | 124 | 169 | 166 | 225 | 345.4 | 509 | 331 | 450 | 442 | 600 | 551.7 | 748 | 458 | 622 | 612 | 830 | 645.3 | 875 | 536 | 727 | 715 | 970 |
| 24 | 176.27 | 239 | 157 | 214 | 210 | 285 | 469.8 | 637 | 420 | 570 | 562 | 762 | 690.3 | 936 | 583 | 791 | 778 | 1055 | 807.6 | 1095 | 682 | 925 | 909 | 1233 |

# 2 - SAE fastener torque chart

**SAE fastener torque chart**
**This charts is to be used as a guide only unless noted elsewhere in this manual**

| Size | Thread | Grade 5 | | | | Grade 8 | | | | A574 High strength black oxide bolts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lubed | | Dry | | Lubed | | Dry | | Lubed | |
| | | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm |
| 1/4 | 20 | 80 | 9 | 100 | 11.3 | 110 | 12.4 | 140 | 15.8 | 130 | 14.7 |
| | 28 | 90 | 10.1 | 120 | 13.5 | 120 | 13.5 | 160 | 18 | 140 | 15.8 |
| | | Lubed | | Dry | | Lubed | | Dry | | Lubed | |
| | | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm | ft-lbs | Nm |
| 5/16 | 18 | 13 | 17.6 | 17 | 23 | 18 | 24 | 25 | 33.9 | 21 | 28.4 |
| | 24 | 14 | 19 | 19 | 25.7 | 20 | 27.1 | 27 | 36.6 | 24 | 32.5 |
| 3/8 | 16 | 23 | 31.2 | 31 | 42 | 33 | 44.7 | 44 | 59.6 | 38 | 51.5 |
| | 24 | 26 | 35.2 | 35 | 47.4 | 37 | 50.1 | 49 | 66.4 | 43 | 58.3 |
| 7/16 | 14 | 37 | 50.1 | 49 | 66.4 | 50 | 67.8 | 70 | 94.7 | 61 | 62.7 |
| | 20 | 41 | 55.5 | 55 | 74.5 | 60 | 81.3 | 80 | 108.4 | 68 | 92.1 |
| 1/2 | 13 | 57 | 77.3 | 75 | 101.6 | 80 | 108.4 | 110 | 149 | 93 | 126 |
| | 20 | 64 | 86.7 | 85 | 115 | 90 | 122 | 120 | 162 | 105 | 142 |
| 9/16 | 12 | 80 | 108.4 | 110 | 149 | 120 | 162 | 150 | 203 | 130 | 176 |
| | 18 | 90 | 122 | 120 | 162 | 130 | 176 | 170 | 230 | 140 | 189 |
| 5/8 | 11 | 110 | 149 | 150 | 203 | 160 | 217 | 210 | 284 | 180 | 244 |
| | 18 | 130 | 176 | 170 | 230 | 180 | 244 | 240 | 325 | 200 | 271 |
| 3/4 | 10 | 200 | 271 | 270 | 366 | 280 | 379 | 380 | 515 | 320 | 433 |
| | 16 | 220 | 298 | 300 | 406 | 310 | 420 | 420 | 569 | 350 | 474 |
| 7/8 | 9 | 320 | 433 | 490 | 583 | 450 | 610 | 610 | 827 | 510 | 691 |
| | 14 | 350 | 474 | 470 | 637 | 500 | 678 | 670 | 908 | 560 | 759 |
| 1 | 8 | 480 | 650 | 640 | 867 | 680 | 922 | 910 | 1233 | 770 | 1044 |
| | 12 | 530 | 718 | 710 | 962 | 750 | 1016 | 990 | 1342 | 840 | 1139 |
| 1 1/8 | 7 | 590 | 800 | 790 | 1071 | 970 | 1315 | 1290 | 1749 | 1090 | 1477 |
| | 12 | 670 | 908 | 890 | 1206 | 1080 | 1464 | 1440 | 1952 | 1220 | 1654 |
| 1 1/4 | 7 | 840 | 1138 | 1120 | 1518 | 1360 | 1844 | 1820 | 2467 | 1530 | 2074 |
| | 12 | 930 | 1260 | 1240 | 1681 | 1510 | 2047 | 2010 | 2725 | 1700 | 2304 |
| 1 1/2 | 6 | 1460 | 1979 | 1950 | 2643 | 2370 | 3213 | 3160 | 4284 | 2670 | 3620 |
| | 12 | 1640 | 2223 | 2190 | 2969 | 2670 | 3620 | 3560 | 4826 | 3000 | 4067 |

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves
- Jack
- Hoist
- Torque spanner

- Place barriers around the perimeter of the work area

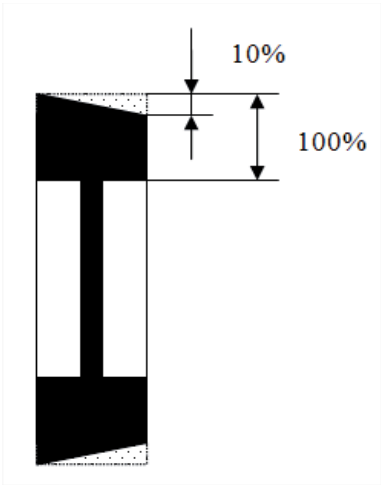
# 2 - Preliminary procedure

1. Place the machine in maintenance configuration. 3.3.1 -Placing the machine in maintenance configuration

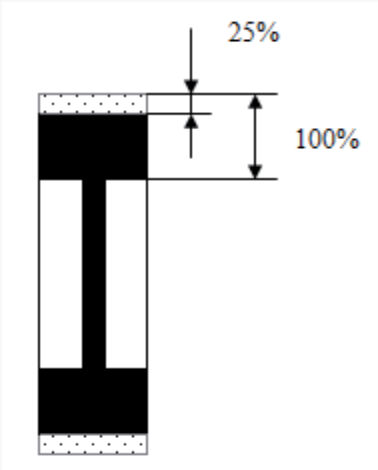
# 3 - Criteria of replacement

Replace the wheels and the tires if any of the following conditions exist :

- Presence of cracks, damage, deformation or other faults on the hub
- Damage to the tire :
  - Cut or hole > 3 cm (2 in) in the rubber side wall.
  - Blister or pronounced lump on the external and lateral wall.
  - Damaged wheel stud.
  - Damage or wear on the side wall to the extent that the reinforcing wire is visible.
- Nonlinear wear of the ground contact surface greater than 10 %.



- Consistent wear of the ground contact surface greater than 25 %.




**For safety reasons, always use original HAULOTTE® spare parts that are specific to this machine. Refer to the spare parts catalog.**

## 4 - Replacement

1. Loosen the wheel nuts on the wheel to be removed.
2. Raise the machine using a jack or a hoist.
3. Remove the wheel nuts.
4. Remove the wheel.
5. Install the new wheel.
6. Lower the machine to the ground.
7. Tighten the wheel nuts to the recommended torque



# 5 - Torque

| Machine type | Wheel type | Torque in N.m - lbf.ft |
|---|---|---|
| HA12CJ - HA32CJ | Drive wheel | 210-155 |
| | Steer wheel | 210-155 |
| HA12CJ+ - HA32CJ+ | Drive wheel | 210-155 |
| | Steer wheel | 210-155 |
| HA120PX (N/A) | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA16X | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA16SPX - HA46SJRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA16PX - HA46JRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA18SPX - HA51SJRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA18PX - HA51JRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA20PX - HA61JRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA260PX - HA80JRT | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| HA32RTJ PRO - HA100RTJ PRO | Drive wheel | 650-479 |
| | Steer wheel | 650-479 |
| HA41RTJ PRO - HA130RTJ PRO | Drive wheel | 570-420 |
| | Steer wheel | 570-420 |
| H12 SX - HS3388 RT H12 SXL - HS3388 RT XL - H15 SX - HS4388 RT - H15 SXL - H18 SX - HS5388 RT - H18 SXL | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H14TX - HB40 | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H16TPX - HB44J | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H21TX - HB62 | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H23TPX - HB68J | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H25TPX - HB76J | Drive wheel | 320-236 |
| | Steer wheel | 320-236 |
| H28TJ+ - HB86TJ+ | Drive wheel | 650-479 |
| | Steer wheel | 650-479 |
| HT43RTJ PRO - HT132RTJ PRO | Drive wheel | 570-420 |
| | Steer wheel | 570-420 |
| STAR 6 - STAR 13 - STAR 6 P | Drive wheel | 127-94 |
| | Steer wheel | 127-94 |

| Machine type | Wheel type | Torque in N.m - lbf.ft |
|---|---|---|
| STAR 8 - STAR 22J | Drive wheel | 80-59 |
| | Steer wheel | 115-85 |
| STAR 10 - STAR 26J | Drive wheel | 80-59 |
| | Steer wheel | 115-85 |
| COMPACT 10DX - COMPACT 12DX - COMPACT 2668RT - COMPACT 3368RT | Drive wheel | 190-140 |
| | Steer wheel | 190-140 |

## 6 - Additional operation

1. Place the machine in its operating configuration. 3.3.2 -Placing in operating configuration

## 1 - Torque (coarse thread)

| Nominal diameter | Torque in N.m - lbf.ft | | |
|---|---|---|---|
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M6x1 | 9 - 11-6,64 - 8,11 | 13 - 14-9,59 - 10,33 | 15 - 17-11,06 - 12,54 |
| M7x1 | 15 - 19-11,06 - 14,01 | 21 - 24-15,49 - 17,7 | 26 - 28-19,18 - 20,65 |
| M8x1.25 | 22 - 27-16,23 - 19,91 | 31 - 34-22,86 - 25,08 | 37 - 41-27,29 - 30,24 |
| M10x1.5 | 43 - 45-31,72 - 33,19 | 61 - 67-44,99 - 49,42 | 73 - 81-53,84 - 59,74 |
| M12x1.75 | 75 - 94-55,32 - 69,33 | 110 - 120-81,13 - 88,51 | 130 - 140-95,88 - 103,26 |
| M14x2 | 120 - 150-88,51 - 110,63 | 170 - 190-125,39 - 140,14 | 200 - 220-147,51 - 162,26 |
| M16x2 | 190 - 230-140,14 - 169,64 | 260 - 290-191,77 - 213,89 | 320 - 350-236,02 - 258,15 |
| M18x2.5 | 260 - 320-191,77 - 236,02 | 360 - 400-265,52 - 295,02 | 440 - 480-324,53 - 354,03 |
| M20x2.5 | 370 - 450-272,9 - 331,9 | 520 - 570-383,53 - 420,41 | 620 - 680-457,29 - 501,54 |
| M22x2.5 | 500 - 620-368,78 - 457,29 | 700 - 770-516,29 - 567,92 | 840 - 930-619,55 - 685,93 |
| M24.3x3 | 630 - 790-464,66 - 582,67 | 890 - 990-656,43 - 730,19 | 1070 - 1180-789,19 - 870,32 |
| M27x3 | 930 - 1150-685,93 - 848,2 | 1300 - 1400-958,83 - 1032,59 | 1560 - 1730-1150,6 - 1275,98 |
| M30x3.5 | 1260 - 1570-929,33 - 1157,97 | 1770 - 1960-1305,49 - 1445,62 | 2200 - 2350-1622,64 - 1733,27 |

## 2 - Torque (fine thread)

| Nominal diameter | Torque in N.m - lbf.ft | | |
|---|---|---|---|
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M8x1 | 24 - 29-17,7 - 21,39 | 33 - 37-24,34 - 27,29 | 40 - 44-29,5 - 32,45 |
| M10x1.25 | 46 - 57-33,93 - 42,04 | 64 - 71-47,2 - 52,37 | 77 - 85-56,79 - 62,69 |
| M12x1.25 | 83 - 100-61,22 - 73,76 | 120 - 130-88,51 - 95,88 | 140 - 150-103,26 - 110,63 |
| M14x1.5 | 130 - 160-95,88 - 118,01 | 180 - 200-132,76 - 147,51 | 220 - 240-162,26 - 177,01 |
| M16x1.5 | 200 - 250-147,51 - 184,39 | 280 - 310-206,52 - 228,64 | 340 - 370-250,77 - 272,9 |
| M18x1.5 | 290 - 360-213,89 - 265,52 | 410 - 450-302,4 - 331,9 | 490 - 540-361,41 - 398,28 |
| M20x1.5 | 410 - 510-302,4 - 376,16 | 570 - 630-420,41 - 464,66 | 690 - 760-508,92 - 560,55 |
| M22x1.5 | 550 - 680-405,66 - 501,54 | 780 - 870-575,3 - 641,68 | 920 - 1000-678,56 - 737,56 |
| M24x1.5 | 690 - 860-508,92 - 634,3 | 970 - 1070-715,44 - 789,19 | 1160 - 1290-855,57 - 951,46 |
| M27x2 | 1000 - 1300-737,56 - 958,83 | 1400 - 1560-1032,59 - 1150,6 | 1690 - 1880-1246,48 - 1386,62 |
| M30x2 | 1400 - 1700-737,56 - 958,83 | 1960 - 2180-1032,59 - 1150,6 | 2350 - 2610-1246,48 - 1386,62 |

# Notes

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

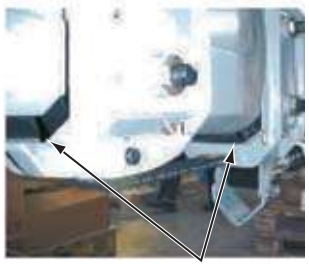
- Place barriers around the perimeter of the work area

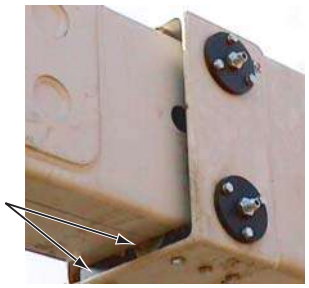
# 2 - Preliminary procedure

1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

# 3 - Control

Check the telescoping friction pad wear indicators. Change the pad if the indicator is not visible.





***N.B.-:-PACKERS OF DIFFERENT THICKNESSES CAN BE USED FOR ADJUSTMENT***

# 4 - Replacement

Replace the friction pads.

# 5 - Additional operation

1. Place the machine in its operating configuration. 3.3.2-Placing in operating configuration

# Notes

## 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

## 2 - Preliminary procedure

**The battery manufacturer's safety instructions must be followed.**

1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

## 3 - Control

Loosen the caps located on the top of the battery.

The level of electrolyte in the battery must be approx. 0,01 m(0 ft39 in) above the plates.

## 4 - Filling-up

Loosen the caps located on the top of the battery.

If the level of electrolyte is below the level of the plates :

1. Top up with distilled water.
2. Refit and tighten the battery caps.

# 5 - Battery charge

Battery discharged :

- Never discharge the batteries to more than 80 % of their capacity in 5 h (hours).
- Never leave the batteries discharged.
- Do not put off recharging the batteries in cold weather as the electrolyte may freeze.

Battery to be charged :

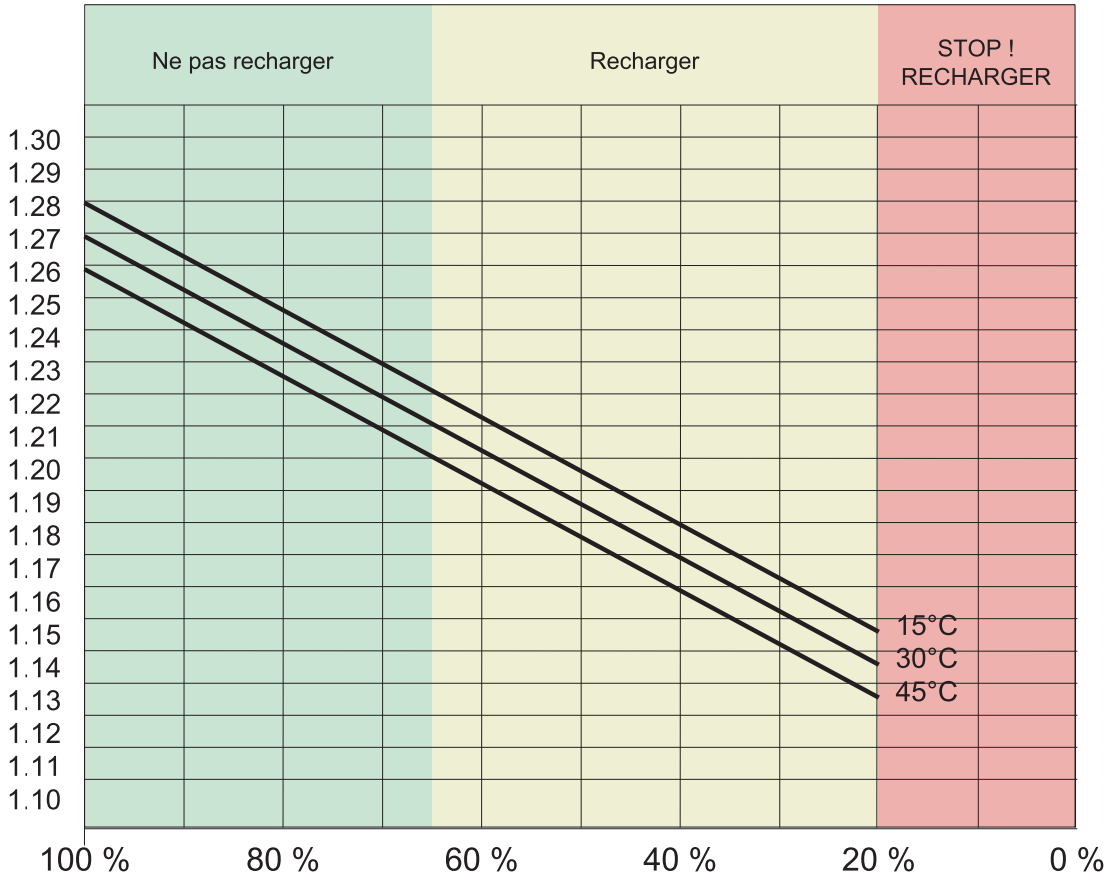
- When should the batteries be charged ?
- When the batteries are discharged to between 35 % and 80 % of their nominal capacity.
- After a long period of non-use.
- How to charge the batteries ?
- Ensure that the mains supply is compatible to the charger's consumption.
- Top up the batteries with distilled water to the minimum electrolyte level if any of the elements are below this minimum level.
- Work in a clean and well-ventilated area away from naked flames.
- Open the bay.
- Use the machine's on-board charger. The charger has a charge rate compatible to the battery capacity.
- During charging :
- The machine's electric system is automatically deactivated while the external power supply is connected to the machine.
- Ensure that the battery are at a temperature not exceeding 45 °C(113 °F) (be careful in summer or in places with a high ambient temperature).
- Do not remove or open the caps on the elements.
- After charging :
- Top up the electrolyte level, if necessary.
- Avoid overflowing.
- Wash the top of the batteries without removing the caps.
- Dry with compressed air or clean cloths.
- Oil the terminals.

# 6 - Additional operation

Place the machine in its operating configuration. 3.3.2-Placing in operating configuration

To keep your batteries in good condition, test the density of each element once a month using a batttery hydrometer, according to the temperature indicated in the curves below :

**Battery charge status according to density and temperature**



# Notes

# 1 - You will need

- Standard tool kit
- Protective goggles
- Gloves

- Place barriers around the perimeter of the work area

Exclusively use tools and auxiliary average adapted. Always wear necessary safety clothing.

All hydraulic components (pump, tanks….) except cylinders must be subjected to periodic visual inspections such as defined below.

For all the visible components without disassembling a fast visual inspection must be realized every day before use :

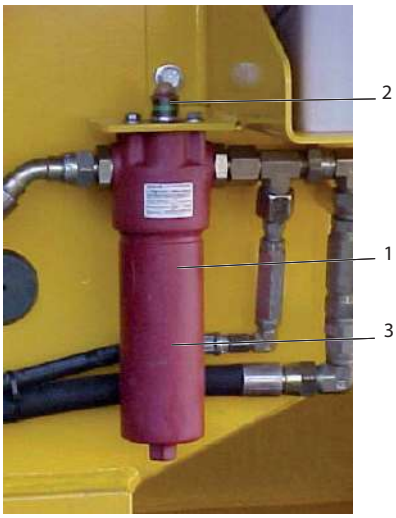
- Absence of leakage (pump, tanks, hydraulic block, connections…).
- Absence of rust on the hydraulic blocks.
- Absence of deformations, damage, crack on tanks, pump and block hydraulics.
- Absence of foreign objects on all surfaces.
- Absence of missing or loosened part (bolt, nut, connection, flexible device, etc).
- Hydraulic oil level (to supplement if necessary, machine in folded up position).
- Presence and good state of the hydraulic oil filter (absence of filling).

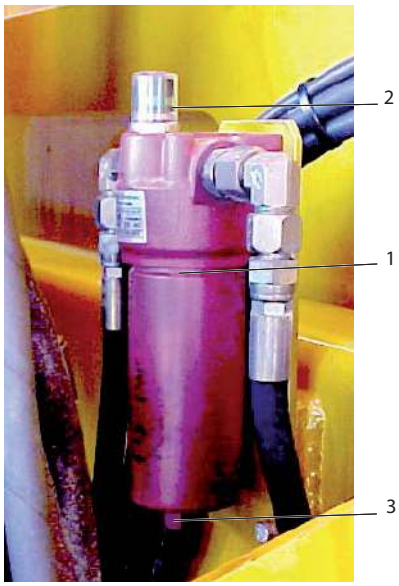
For all the non visible components without disassembling a reinforced visual inspection must be realized all the 250 hours or 1 year with the same criteria as quoted above.

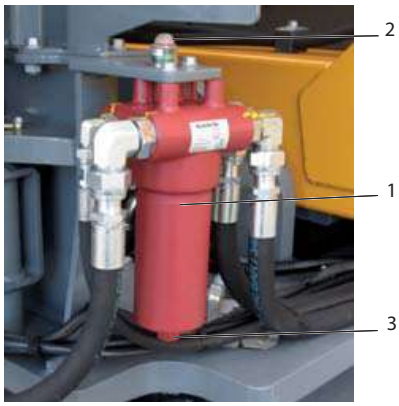
# 2 - Hydraulic filter cartridge Replacement

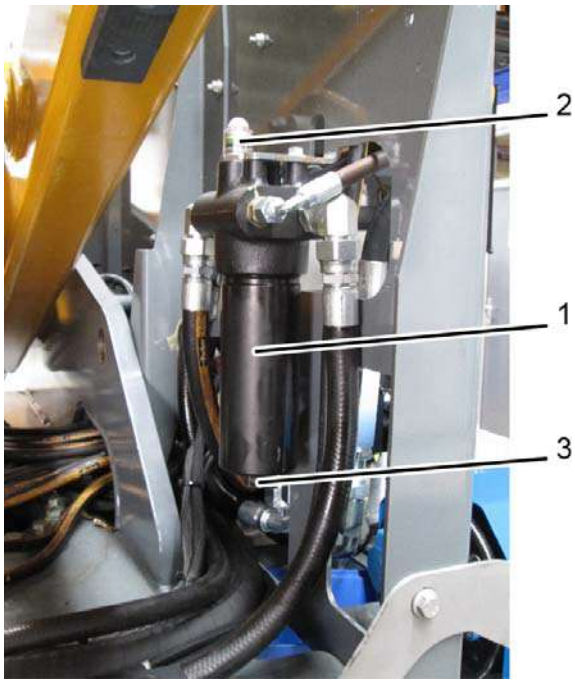
**Clogging must be checked when hot. When cold, oil viscosity may simulate filter clogging.**

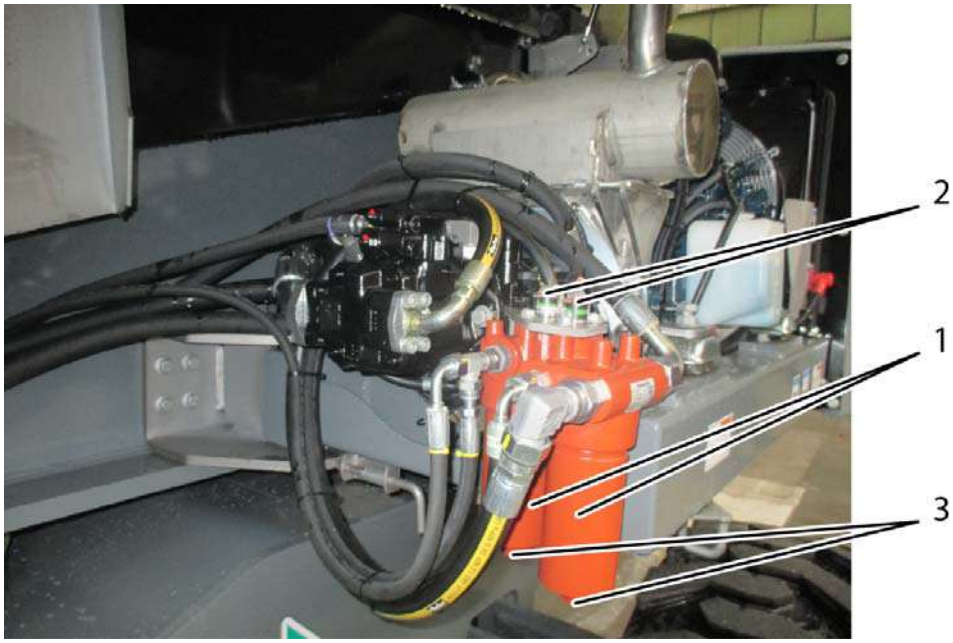
**Do not touch the hot parts of the hydraulic power source (engine, filters, etc.).**






1. When the clogging indicator ( 2 ) comes on, replace the cartridge ( 1 ) (Cold oil).
2. Loosen and remove the base nut ( 3 ).
3. Loosen and remove the cartridge ( 1 ).
4. Screw in a new cartridge.
5. Refit and tighten the base nut ( 3 ).
6. Reset the clogging indicator ( 2 ) by pressing it until it becomes green again.

# Notes

# 1 - You will need

- Standard tool kit
- Gloves
- Spanner 1"

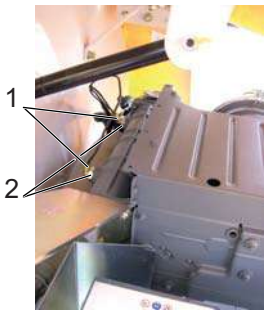
- Place barriers around the perimeter of the work area

# 2 - Preliminary procedure

1. Place the machine in maintenance configuration. 3.3.1-Placing the machine in maintenance configuration

# 3 - Replacement

1. Remove the power supply lugs from the plugs (1).
2. Unscrew the plugs (2) using a spanner 1".
3. Change the plugs.




# 4 - Torque

- Plug torque : 55 Nm.
- Power supply lug torque : 5 Nm.

# 5 - Additional operation

1. Place the machine in its operating configuration. 3.3.2-Placing in operating configuration

# Notes

# 1 - You will need

- The tracker with its cable.
- A clamp to strip the wires.
- A clamp to crimp the wires.

1

- Place barriers around the perimeter of the work area

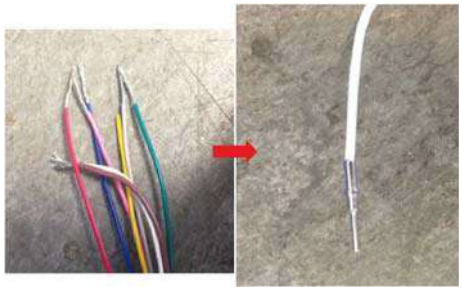
# 2 - Procedure

**Step 1 :**

- Disconnect the plug 2.
- Remove the caps on the plug.

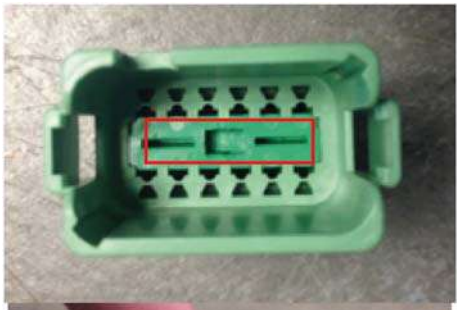
**Step 2 :**

- Pick up the pins in the plastic bag.
- Strip the wires of the tracker.
- Crimp the wires with the pins with a crimping clamp.



**Step 3 :**

- Take the wedgelock off the plug.
- Thread the wires in the positions regarding the information.



| C1 | Universal connector |
|---|---|
| Pin 1 | + permanent battery |
| Pin 2 | GND (0 V) |
| Pin 3 | + battery voltage |
| Pin 4 | • Machine with engine : Engine ON information.<br>• Electrical machine : Movement and driving information. |
| Pin 5 | Power ON information |
| Pin 6 | |
| Pin 7 | Movement information (Flashing light option activation) |
| Pin 8 | Driving information |
| Pin 9 | CAN 1 H |
| Pin 10 | CAN 1 L |
| Pin 11 | CAN 2 H |
| Pin 12 | CAN 2 L |

***N.B.-:-Refer to the instructions provided with the tracker for the wires correspondence. Depending of the type of unit, a resistance (200 Ohms, 1 W) must be integrated between signal and ground.***

**Step 4 :**

- Put the wedgelock back on the plug to fix the pins.

**Step 5 :**

- Reconnect the plugs.
- Mount the tracker.
- The tracking device is operational.

# 1 - Trouble shooting

## 1.1 - RECOMMENDATIONS

If a malfunction occurs, check the following points :

- There is sufficient fuel.
- Sufficient engine oil.
- Sufficient hydraulic oil in the tank.
- Batteries are charging.
- Control box E-stop push-buttons are pulled out.
- The control box selector key is set to platform or ground control box.
- Control box relays are engaged.
- Fuse status.
- Ground control box solenoid valve status.

If the malfunction persists, consult the troubleshooting table to identify the problem.

IF you cannot identify the problem, contact HAULOTTE Services®.

## 1.2 - DESCRIPTION

The FAILURES function describes the requirements relative to failures : monitoring, information recording, information reading.

## 2 - Troubleshooting

**Diagnosis**

| Problem | Probable cause | Solution |
|---|---|---|
| Engine cannot be started or stopped | Empty fuel tank | Fill the tank |
| | Batteries discharged | Recharge the battery or batteries |
| | Faulty printed circuit fuses (ground control box) | Replace the fuse(s) |
| | E-stop push-buttons are pushed in | Pull the E-stop buttons |
| | Engine in restricted mode (oil pressure indicators, overheating indicator, alternator charging indicator and clogged air filter indicator on) | See engine manufacturer's manual or contact HAULOTTE Services® |
| | Charge indicator bulb burnt out | Replace the bulb |
| | Clogged air filter indicator on | Replace the air filter cartridge |
| | Faulty engine safety relay | Replace the relay(s) |
| | Poor cable/battery terminal contact | Loosen and clean the terminals |
| | Faulty fuel preheating system (winter weather option) | Check and replace the plugs<br>Check and replace the preheating relays |
| Low hydraulic pump pressure or power | Clogged air filter | Replace the filter |
| | Engine speed too low | Contact HAULOTTE Services® |
| | Oil leak on couplings, hoses or components | |
| | Clogged oil filter | Replace the oil filter cartridge<br>See maintenance sheet E003 |
| Platform controls do not respond | Ground control box selector key is set to ground control box position | Turn the ground control box selector key to platform control box position |
| | Platform overload indicator | Remove some weight<br>Do not exceed the authorised limit<br>Section G 1-Main characteristics |
| | Enable Switch is not enabled | Enable the device and keep pressed down during movement |
| | Faulty joystick | Replace the joystick<br>Contact HAULOTTE Services® |
| | Faulty solenoid valve for the selected movement | Replace the solenoid valve or the solenoid valve coil<br>Contact HAULOTTE Services® |
| | Not enough hydraulic oil | Top up the oil level |
| | Tilt or slope exceeding the authorised limit | Lower the arm and boom<br>Do not exceed the authorised limit<br>Section G 1-Main characteristics |
| No high speed | Platform extended | Fold the arm and boom |
| No steering | Not enough hydraulic oil | Top up the oil level |
| | Enable Switch is not enabled | Enable the device and keep pressed down during movement |
| No driving, telescope extension, boom lifting or arm lift/lower and the buzzer is on | Tilt or slope exceeding the authorised limit | Lower the arm and boom<br>Do not exceed the authorised limit<br>Section G 1-Main characteristics |
| No turntable rotation | Turntable rotation locking pin is inserted in the chassis | Remove the pin |
| Hydraulic pump is making an abnormal noise | Not enough hydraulic oil | Top up the oil level |
| A drive wheel does not hold the road | Insufficient load on one wheel | Press the differential locking selector |

# E-Trouble shooting and diagram

| Problem | Probable cause | Solution |
|---|---|---|
| Buzzer in operation | Tilt or slope exceeding the authorised limit | Lower the arm and boom<br>Do not exceed the authorised limit<br>Section G 1-Main characteristics |
| | Platform overload indicator | Remove some weight<br>Do not exceed the authorised limit<br>Section G 1-Main characteristics |
| | Hydraulic oil temperature too high | Allow to cool down |
| Pump not working | E-stop buttons are pulled out | Push in the buttons |
| | Faulty fuse(s) | Replace the fuse(s) |
| | Batteries discharged or faulty | Recharge or replace the batteries |
| | Poor contact on the battery cables | Clean and tighten the terminals |

# 3 - Legend

## 3.1 - ELECTRIC CIRCUIT

Refer to Section E 3 - Wiring diagram

### 3.1.1 - Main components

**Nomenclature**

| Marking | Description |
|---|---|
| B1 | Engine air filter clogging pressure switch |
| B2 | Engine oil temperature |
| B3 | Engine oil pressure switch |
| B4 | Hydraulic oil overheating pressure switch |
| B15 | Hydraulic oil overheating temperature switch for cooler option |
| D+ | Alternator |
| FU1 | 10 A<br>Engine power supply circuit fuse |
| FU2 | 40 A<br>Timing box power supply circuit fuse |
| FU4 | 30 A<br>Turntable / platform box power supply circuit fuse |
| FU5 | 3 A<br>Turntable movement control circuit fuse |
| FU6 | 3 A<br>Platform movement control circuit fuse |
| FU7 | 20 A<br>Solenoid valve power supply circuit fuse |
| FU8 | 5 A<br>Permanent power supply circuit fuse |
| FU9 | 20 A<br>Accessory power supply circuit fuse |
| FU10 | 3 A<br>LS valve circuit fuse |
| FU11 | 250 A<br>Emergency pump circuit fuse |
| FU12 | 10 A<br>12 V Plug power supply circuit fuse |
| FU13 | Cooler option circuit fuse |
| FU30 | 50 A<br>Preheating fuse (Winter option) |
| FU31 | 50 A<br>Preheating fuse (Winter option) |
| FU32 | 15 A<br>Encoded boot power supply circuit fuse |
| G2 | Alternator |
| GB1 | Operating batteries |
| HA1 | Buzzer |
| HA2 | Buzzer — Platform control box :<br>• Overload |

# E-Trouble shooting and diagram

| Marking | Description |
|---|---|
| HA4 | Buzzer — Ground control box :<br>• Tilt sensor<br>• Overload<br>• Temperature<br>• Driving buzzer option<br>• Movement buzzer option |
| HL1 | Battery charging indicator |
| HL2 | Air filter clogging indicator |
| HL3 | Engine overheating indicator |
| HL4 | Engine oil pressure light |
| HL5 | Beacon light option |
| HL6 | Spotlight option |
| HL7 | Power ON indicator |
| HL8 | On movement flashing light LED |
| HL9 | Fault indicator |
| HL13 | Overload indicator |
| HL30 | Preheating indicator (Winter option) |
| HM1 | Enable Switch |
| K1 | Preheating module (Winter option) |
| KA2 | Engine start-up relay |
| KA43 | Alternator output relay |
| KM2 | Spark plug pre-heating relay |
| KM3 | Spark plug pre-heating relay |
| KM4 | Emergency pump relay |
| KM30 | Preheating relay (Winter option) |
| KMG | General power supply relay |
| KP1 | Engine power supply relay |
| KT2 | Accelerator relay |
| M3 | Starter |
| M4 | Emergency pump |
| P1 | Hour meter |
| SA1 | Control box selection key selector |
| SA2 | Engine speed |
| SA3 | Differential lock |
| SA4 | Platform rotation :<br>• SA4a : Left<br>• SA4b : Right |
| SA5 | Platform leveling(Platform control box) :<br>• SA5a : Lifting<br>• SA5b : Lowering |
| SA6 | Turntable jib (Ground control box) :<br>• SA6a : Lowering<br>• SA6b : Lifting |
| SA7 | Platform jib :<br>• SA7a : Lifting<br>• SA7b : Lowering |
| SA8 | Turntable telescope (Ground control box) :<br>• SA8a : Retraction<br>• SA8b : Extension |
| SA9 | Platform box (or platform) telescope(Platform control box) :<br>• SA9a : Retraction<br>• SA9b : Extension |
| SA11 | Speed selection |

# E-Trouble shooting and diagram

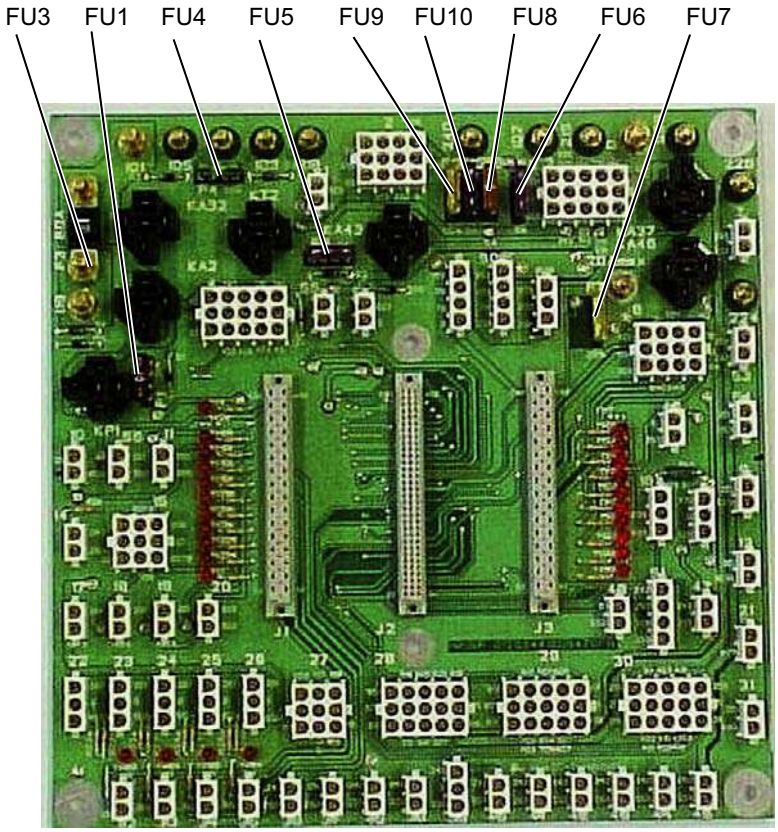
| Marking | Description |
|---|---|
| SA12 | Rear-axle steering :<br>• SA12a : Right<br>• SA12b : Left |
| SA13 | Boom raising (Ground control box) :<br>• SA13a : Lifting<br>• SA13b : Lowering |
| SA14 | Arm raises (Ground control box) :<br>• SA14a : Lifting<br>• SA14b : Lowering |
| SA15 | Turntable rotation (Ground control box) :<br>• SA15a : Right<br>• SA15b : Left |
| SA16 | Beacon light |
| SA17 | Platform leveling (Ground control box) :<br>• SA17a : Lifting<br>• SA17b : Lowering |
| SA19 | Emergency pump (Platform control box) |
| SA20 | Emergency pump (Ground control box) |
| SB1 | E-stop button (turntable) |
| SB2 | E-stop button (cage) |
| SB3 | Start-up switch (ground control box) |
| SB4 | Platform start-up switch |
| SB5 | Horn switch |
| SB6 | Foot Switch |
| SB7 | Horn switch (Ground control box) |
| SB8 | Manual pre-heating |
| SM2 | Arm raising/lowering joystick |
| SM4 | Drive joystick :<br>• SM4d : Right<br>• SM4g : Left<br>• SM4ab : Drive setpoint |
| SM31 | Boom lifting and turntable rotation joystick |
| SQ1 | Tilt sensor |
| SQ2 | Jib movements cut-off |
| SQ3 | Boom movements cut-off |
| SQ4 | Arm movements cut-off |
| SQ5 - SQ6 | Overloaded platform position sensor |
| SQ20 | Right-hand rotation cut-off |
| SQ21 | Left-hand rotation cut-off |
| U | HEAD electronic module |
| W | Frequency |
| YA1 | Engine power supply on |
| YA2 | Engine speed |
| YA3 | Damper valve |
| YV1 | LS control solenoid valve |
| YV2 | Boom telescoping PVG :<br>• YV2a : Extension<br>• YV2b : Retraction |
| YV3 | Boom lifting PVG |
| YV4 | Arm lifting PVG |
| YV5 | Proportional solenoid valve for turntable rotation |
| YV6 | Driving PVG |
| YV8 | High-speed drive control solenoid valve |

# E-Trouble shooting and diagram

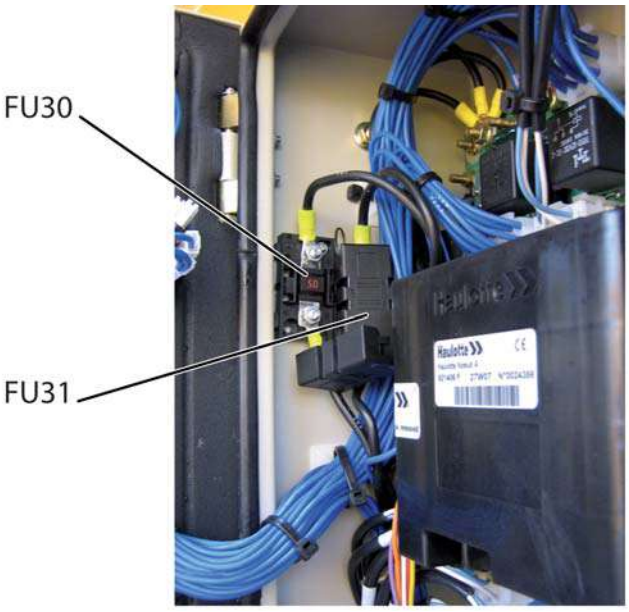
| Marking | Description |
|---|---|
| YV9 | Differential locking control solenoid valve (Front axle) |
| YV10 - YV12 - YV17 YV23 | Medium and high-speed drive control solenoid valve |
| YV11 | Brake release control solenoid valve |
| YV13 | High-speed drive control solenoid valve |
| YV14A | Turntable rotation right solenoid valve |
| YV14B | Turntable rotation left solenoid valve |
| YV15A | Compensation elevation control solenoid valve - Platform |
| YV15B | Compensation lowering control solenoid valve - Platform |
| YV18A | Jib lowering control solenoid valve |
| YV18B | Jib elevation control solenoid valve |
| YV19A | Platform rotation control solenoid valve (Left) |
| YV19B | Platform rotation control solenoid valve (Right) |
| YV21A | Reverse left-hand steering control solenoid valve |
| YV21B | Reverse right-hand steering control solenoid valve |
| YV22A | Front left-hand steering control solenoid valve |
| YV22B | Front right-hand steering control solenoid valve |

### 3.1.2 - Fuses

**Locations**




**Locations**



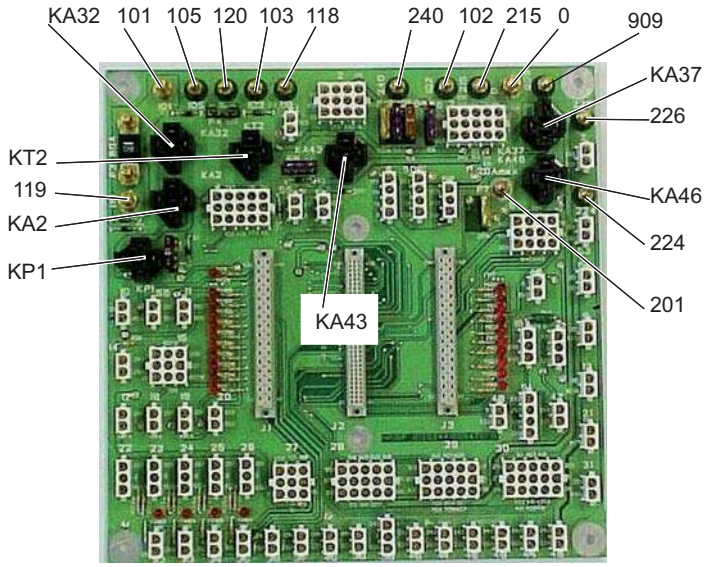
# E-Trouble shooting and diagram

## Description of the components

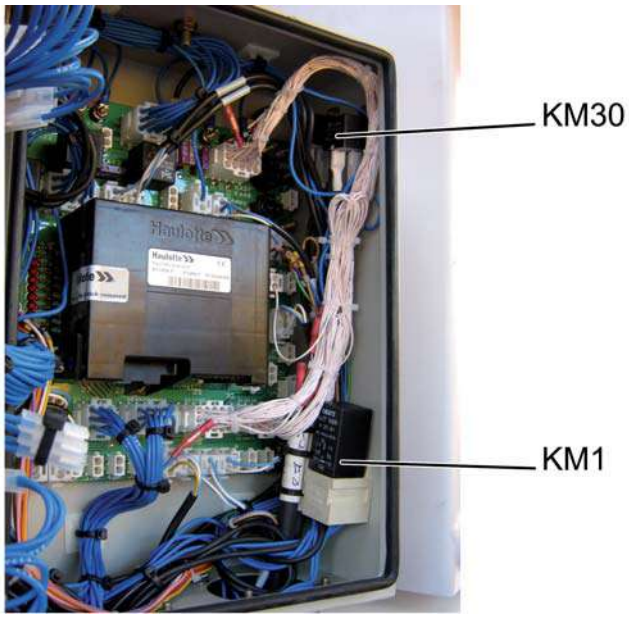
| Marking | Description |
|---|---|
| FU1 | 10 A<br>Engine power supply circuit fuse |
| FU2 | 40 A<br>Timing box power supply circuit fuse |
| FU3 | 80 A<br>Accelerator circuit fuse |
| FU4 | 30 A<br>Turntable / platform box power supply circuit fuse |
| FU5 | 30 A<br>Turntable movement control circuit fuse |
| FU6 | 3 A<br>Platform movement control circuit fuse |
| FU7 | 20 A<br>Solenoid valve power supply circuit fuse |
| FU8 | 5 A<br>Permanent power supply circuit fuse |
| FU9 | 20 A<br>Accessory power supply circuit fuse |
| FU10 | 3 A<br>LS valve circuit fuse |
| FU11 | 250 A<br>Emergency pump circuit fuse |
| FU12 | 10 A<br>12 V Plug power supply circuit fuse |
| FU13 | Cooler option circuit fuse |
| FU14 | Thermostat power supply circuit fuse |
| FU30 | 50 A<br>Preheating fuse (Winter option) |
| FU31 | 50 A<br>Preheating fuse (Winter option) |
| FU32 | 15 A<br>Encoded boot power supply circuit fuse |

### 3.1.3 - Relays and terminals

**Locations**




**Locations**



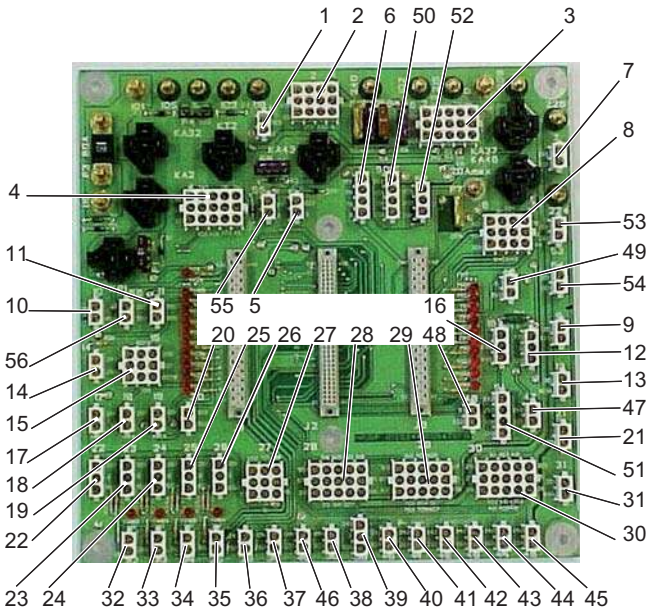
# E-Trouble shooting and diagram

## Description of the components

| Marking | Description |
|---|---|
| K1 | Preheating module (Winter option) |
| KA2 | Engine start-up relay |
| KA43 | Back-up unit cut-off relay |
| KM4 | Electric pump relay |
| KM30 | Preheating relay (Winter option) |
| KMG | General power supply relay |
| KP1 | Engine power supply relay |
| KT2 | Accelerator relay |
| 0 | -Battery |
| 101 | +Battery |
| 102 | Emergency stop circuit |
| 103 | Starter |
| 118 | Engine speed |
| 119 | +Engine pre-heating |
| 120 | +General |
| 240 | General power supply after contactor |

### 3.1.4 - Connectors

**Locations**




**Description of the components**

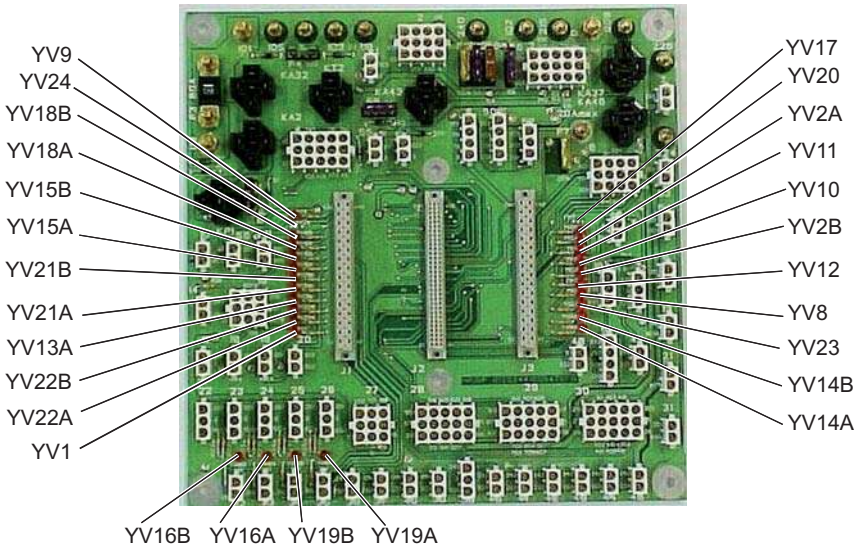
| Marking | Description |
|---|---|
| 3 | • High jib sensor SQ2<br>• Start-up switch SB4 |
| 4 | • Turret jib switch SA6<br>• Turntable telescoping switch SA8<br>• Start-up switch (ground control box) SB3<br>• Air filter clogging indicator HL2<br>• Engine overheating indicator HL3<br>• Engine oil pressure light HL4 |
| 8 | • Medium and high-speed drive control solenoid valve YV12 / YV17 ; YV10 / YV23<br>• Brake release control solenoid valve YV11<br>• High-speed drive control solenoid valve YV8 |
| 10 | Jib raising / lowering control solenoid valve YV18B |
| 12 | • Telescoping indicator HL10<br>• Lifting indicator HL11 |
| 14 | Turntable buzzer HA4 |
| 15 | Chassis solenoid valves :<br>• YV22A, YV22B (Forwards drive solenoid valve)<br>• YV21A, YV21B (Reverse drive solenoid valve)<br>• YV13 (High-speed drive control solenoid valve)<br>• YV9 (Differential locking control solenoid valve) |
| 17 | Jib raising / lowering control solenoid valve YV18A |
| 18 | Compensation control solenoid valve YV15A |
| 19 | Compensation control solenoid valve YV15B |
| 20 | LS control solenoid valve YV1 |
| 21 | Turntable rotation left solenoid valve YV14B |
| 22 | Boom lifting PVG |
| 23 | Arm lifting PVG YV4 |
| 24 | Proportional solenoid valve "On/Off" YV5 |
| 26 | Driving solenoid valve YV6 |

# E-Trouble shooting and diagram

| Marking | Description |
|---|---|
| 27 | • Engine air filter clogging pressure switch B1<br>• Engine overheating pressure switch B2<br>• Engine oil pressure switch B3<br>• D+ and W |
| 28 | • Overload indicator HL13<br>• Buzzer HA2 |
| 29 | Horn switch SB5 |
| 30 | • Platform rotation switch SA4<br>• Platform leveling switch SA5 ; Turntable compensation selector SA17<br>• Platform jib switch SA7<br>• Platform box telescope switch SA9<br>• Platform overload SQ5 - SQ6 |
| 31 | Turntable rotation right solenoid valve YV14A |
| 34 | Left platform rotation control solenoid valve YV19B |
| 35 | Right platform rotation control solenoid valve YV19A |
| 39 | 5 ° tilt sensor SQ1 |
| 40 | Hydraulic tank temperature probe B4 |
| 41 | Retracted boom telescope sensor-Tilt reset contactor SQ3 |
| 42 | Arm telescope retracted sensor-Tilt reset contactor SQ4 |
| 49 | Fault indicator HL9 |
| 52 | Horn HA1 |

### 3.1.5 - Diagnosis assistance indicators

**Locations**




**Description of the components**

| Marking | Description |
|---|---|
| YV1 | LS control solenoid valve |
| YV2 | Boom telescoping PVG :<br>• YV2a : Extension<br>• YV2b : Retraction |
| YV3 | Boom lifting PVG |
| YV4 | Arm lifting PVG |
| YV5 | Proportional solenoid valve for turntable rotation |
| YV6 | Driving PVG |
| YV8 | High-speed drive control solenoid valve |
| YV9 | Differential locking control solenoid valve (Front axle) |
| YV10 - YV12 - YV17<br>YV23 | Medium and high-speed drive control solenoid valve |
| YV11 | Brake release control solenoid valve |
| YV13 | High-speed drive control solenoid valve |
| YV14A | Turntable rotation right solenoid valve |
| YV14B | Turntable rotation left solenoid valve |
| YV15A | Compensation elevation control solenoid valve |
| YV15B | Compensation lowering control solenoid valve |
| YV18A | Jib lowering control solenoid valve |
| YV18B | Jib elevation control solenoid valve |
| YV19A | Left platform rotation control solenoid valve |
| YV19B | Right platform rotation control solenoid valve |
| YV21A | Reverse left-hand steering control solenoid valve |
| YV21B | Reverse right-hand steering control solenoid valve |
| YV22A | Front left-hand steering control solenoid valve |
| YV22B | Front right-hand steering control solenoid valve |

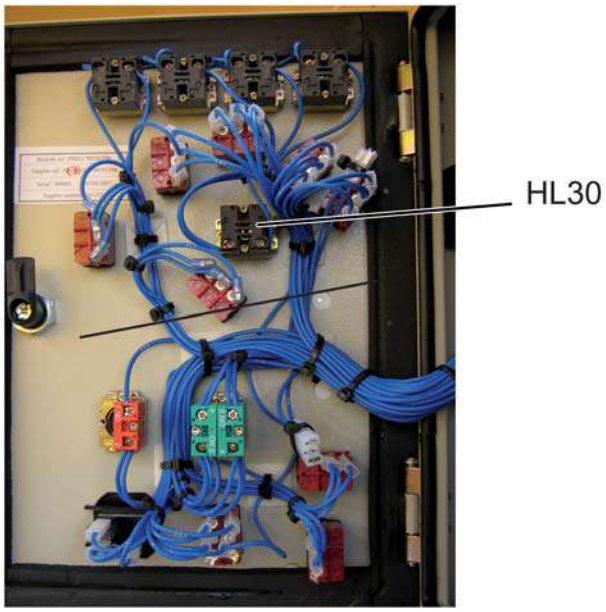
### 3.1.6 - Buzzers

**Description of the components**

| Marking | Description |
|---|---|
| HA1 | Buzzer |
| HA2 | Buzzer Platform control box :<br>• Overload |
| HA4 | Buzzer Ground control box :<br>• Tilt sensor<br>• Overload<br>• Temperature<br>• Driving buzzer option<br>• Movement buzzer option |

### 3.1.7 - Indicators

**Locations**




**Description of the components**

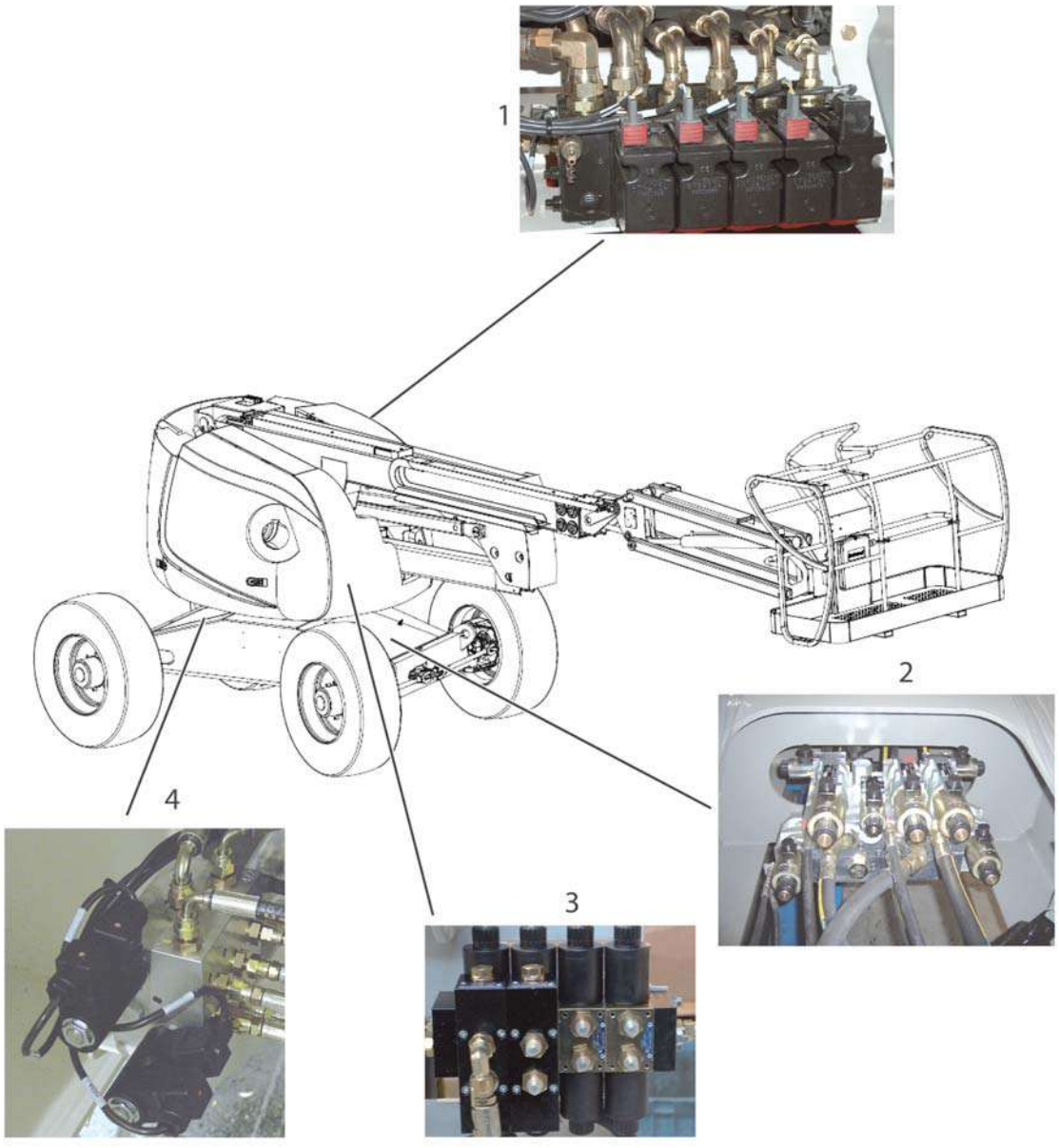
| Marking | Description |
|---|---|
| HL1 | Battery charging indicator |
| HL2 | Air filter clogging indicator |
| HL3 | Engine overheating indicator |
| HL4 | Engine oil pressure light |
| HL5 | Beacon light option |
| HL6 | Spotlight option |
| HL7 | Power ON indicator |
| HL8 | On movement flashing light LED |
| HL9 | Fault indicator |
| HL13 | Overload indicator |
| HL30 | Preheating indicator (Winter option) |

## 3.2 - HYDRAULIC CIRCUIT

Refer to Section E 4 - Hydraulic diagram

### 3.2.1 - Solenoid valves

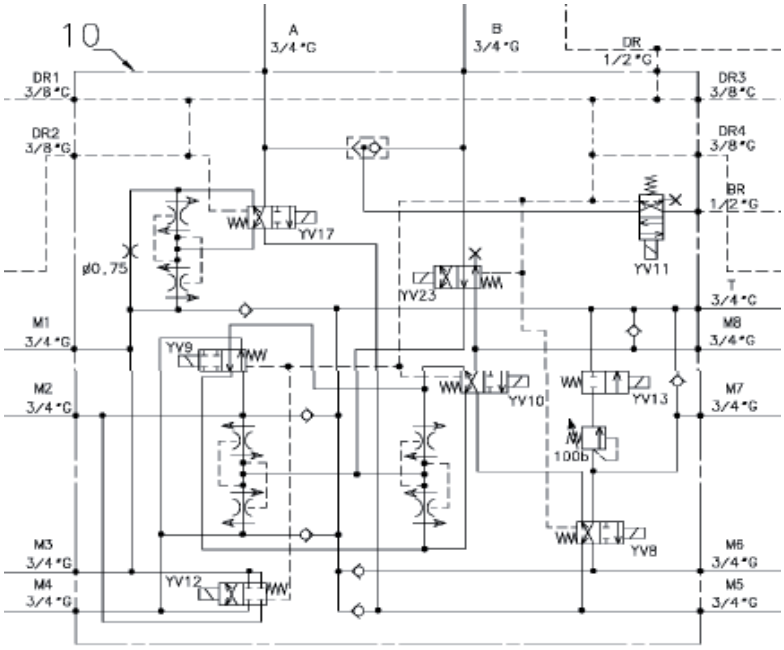
**Locations**

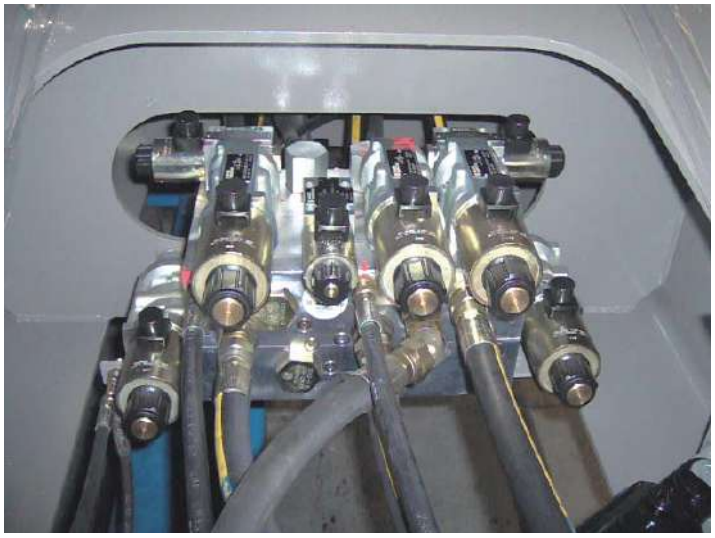



| Marking | Description |
|---|---|
| 1 | Proportional unit |
| 2 | Drive unit |
| 3 | Unit TOR |
| 4 | Steering unit |

### *3.2.1.1 - Drive unit*

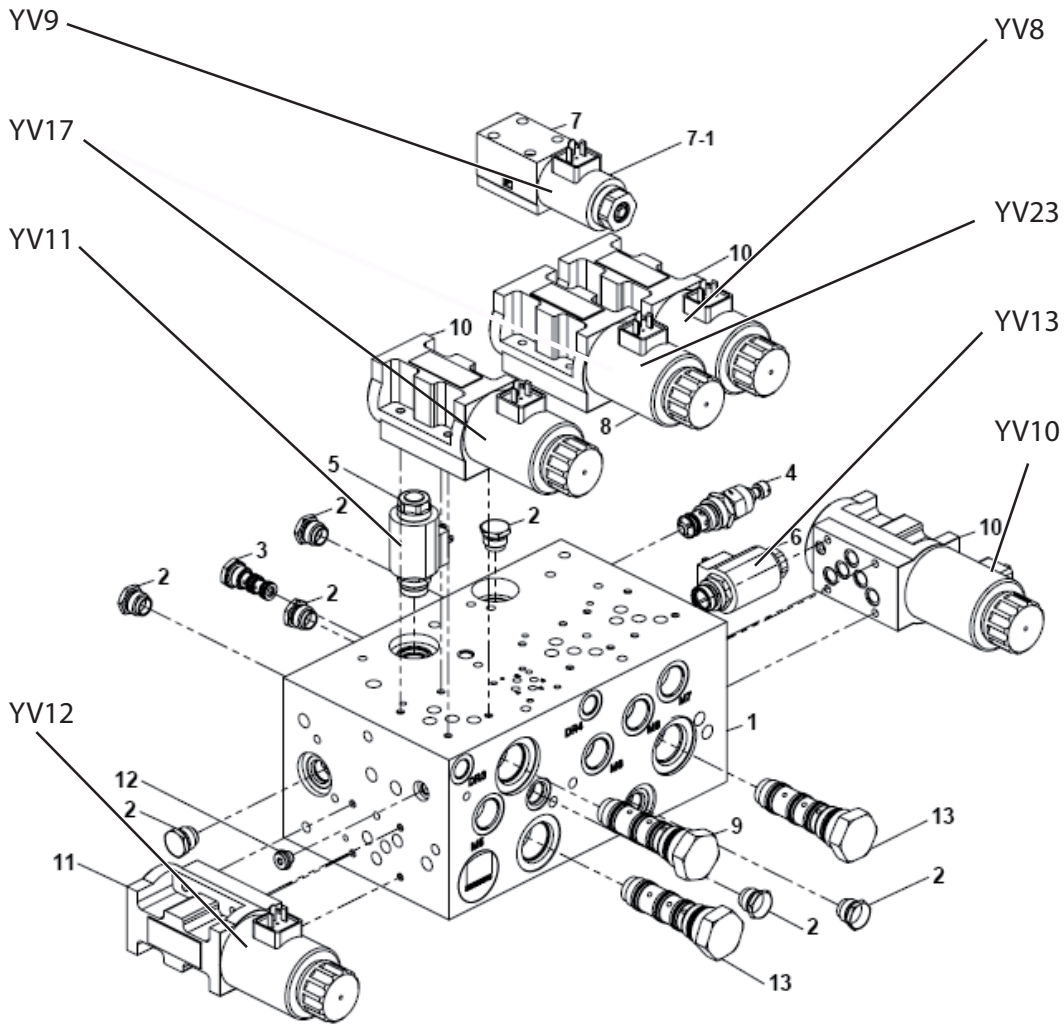
**Diagram extract**



# E-Trouble shooting and diagram

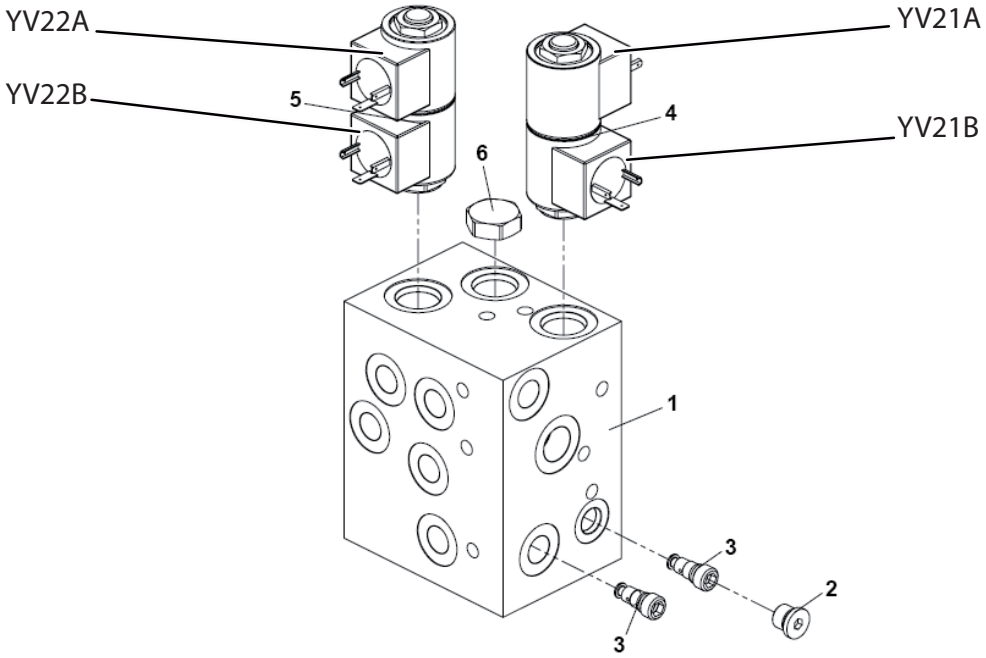
**Drive manifold details**




| Marking | Description |
|---|---|
| 1 | Unit |
| 2 | Valve |
| 3 | Shuttle valve |
| 4 | Pressure relief valve |
| 9 | Flow divider |
| 12 | Plug |
| 13 | Flow divider |
| YV8 | Switching to high-speed |
| YV9 | Differential release |
| YV10 | Medium and high-speed selector switch |
| YV11 | Brake release |
| YV12 | Medium and high-speed selector switch |
| YV13 | Switching to high-speed |
| YV17 | Medium and high-speed selector switch |
| YV23 | Medium and high-speed selector switch |

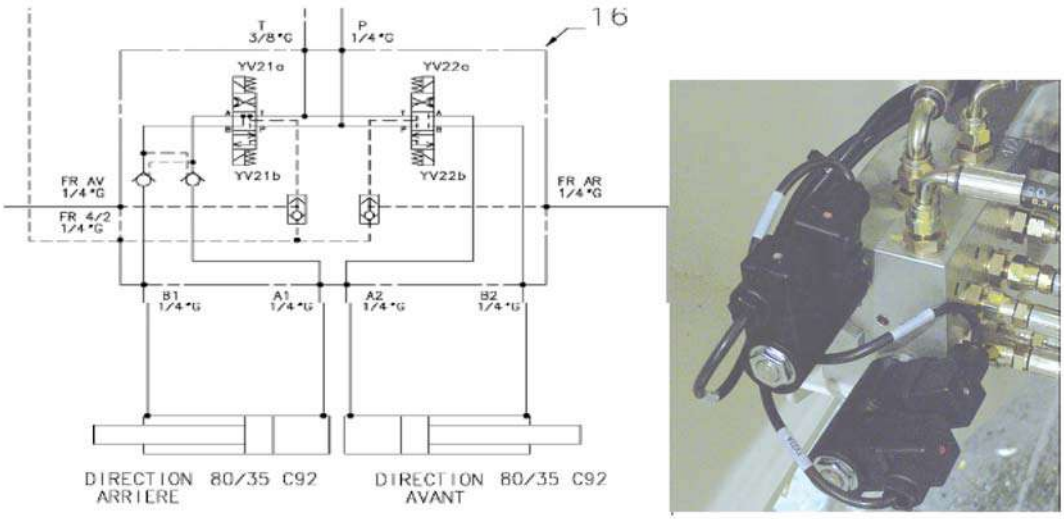
### *3.2.1.2 - Steering unit*

**Steering unit detail**




| Marking | Description |
|---|---|
| 1 | Unit |
| 2 | Plug |
| 3 | Shuttle valve |
| YV21 | Solenoid valve |
| YV21A - YV21B | Coil |
| YV22 | Solenoid valve |
| YV22A - YV22B | Coil |
| 6 | Valve |

**Diagram extract**



### *3.2.1.3 - Unit TOR*

**TOR block details**

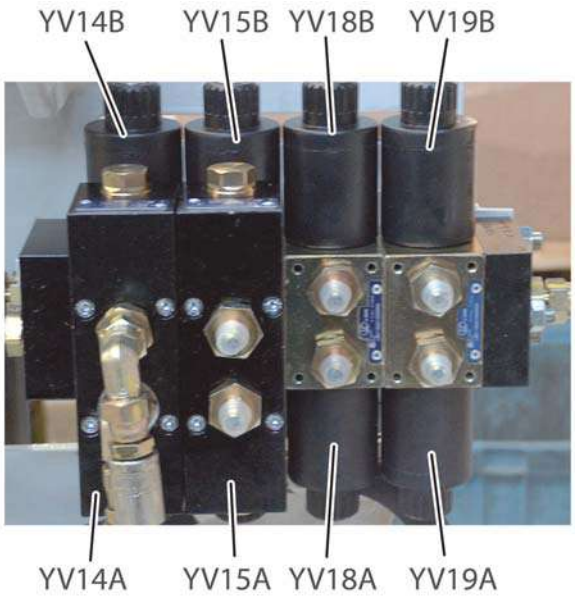
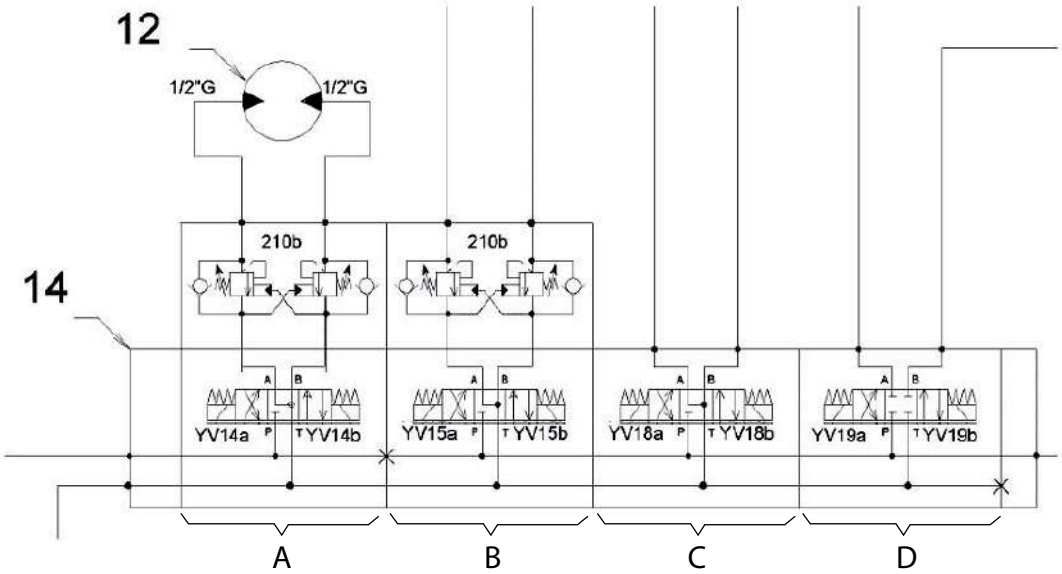


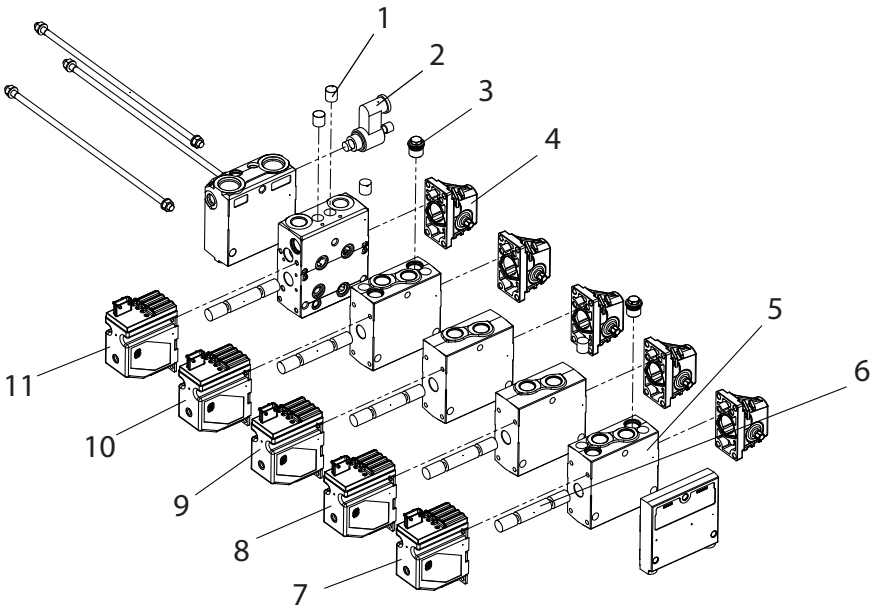

**Diagram extract**




| Marking | Description |
|---|---|
| A | Turntable rotation |
| B | Compensation |
| C | Jib arm |
| D | Platform rotation |

### *3.2.1.4 - Proportional unit*

**Proportional unit detail**




| Marking | Description |
|---|---|
| 1 | Anti-impact relief valve |
| 2 | YV1 - LS control solenoid valve |
| 3 | Valve |
| 4 | Manual control |
| 5 | Distribution range |
| 6 | Slide |
| 7 | YV2 - Boom telescoping PVG :<br>• YV2a : Extension<br>• YV2b : Retraction |
| 8 | YV3 - Boom lifting PVG |
| 9 | YV4 - Arm lifting PVG |
| 10 | YV5 - Proportional solenoid valve for turntable rotation |
| 11 | : Driving<br>YV6 - Driving PVG |

**Proportional unit**

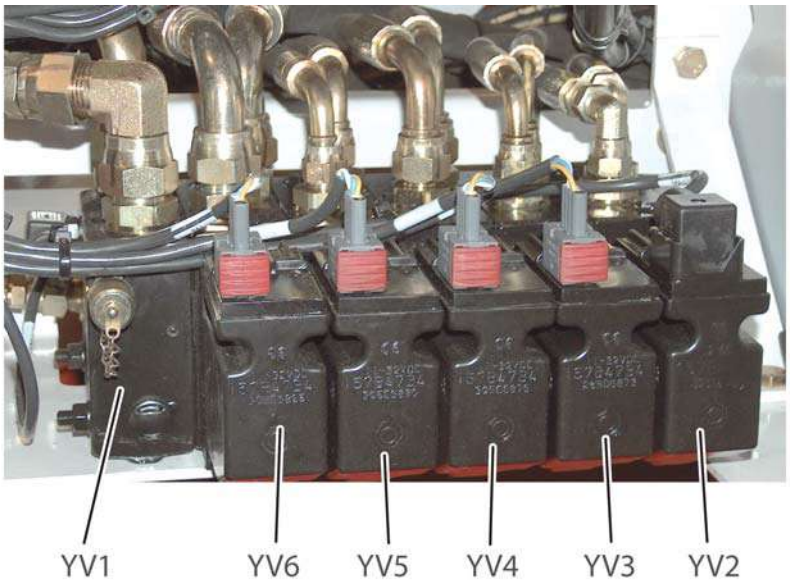
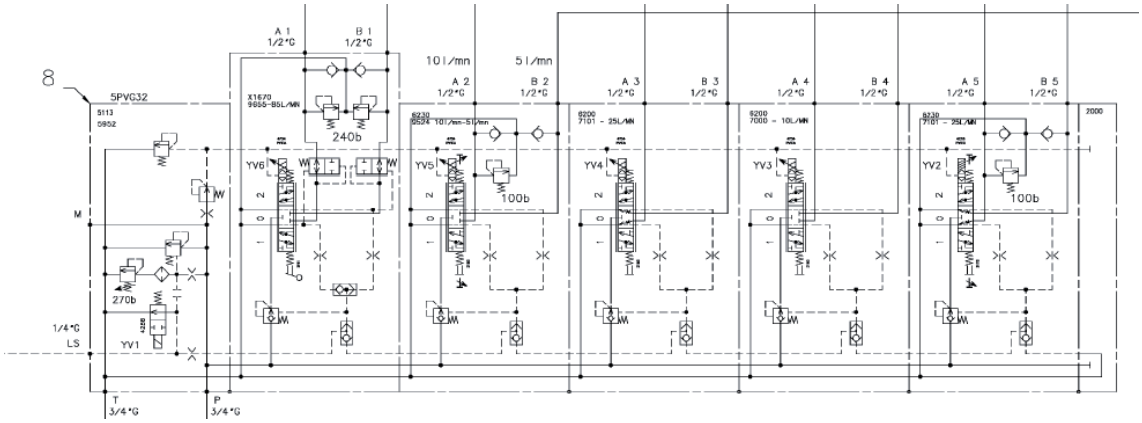



**Diagram extract**



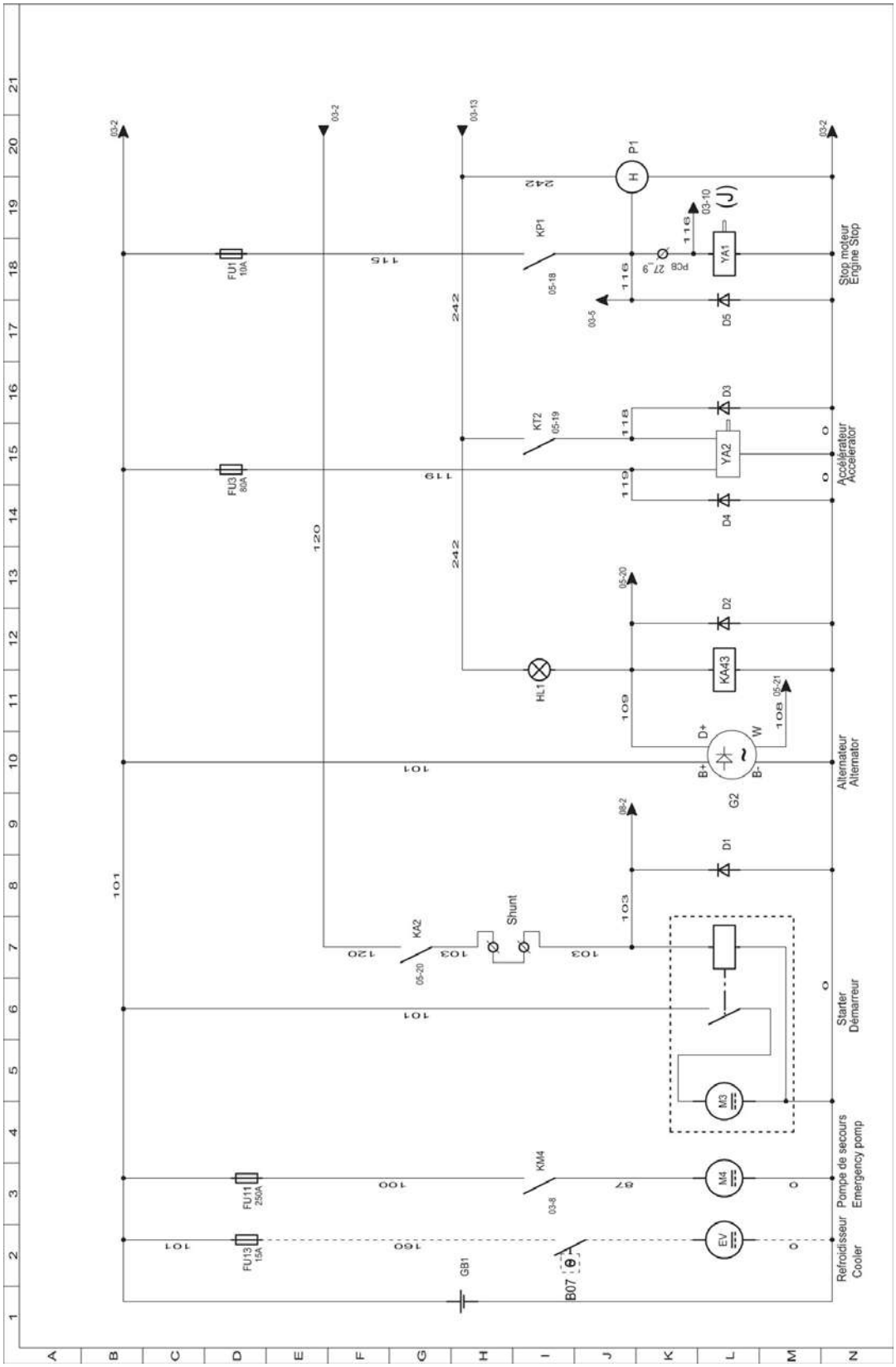
# E-Trouble shooting and diagram

## Description of the components

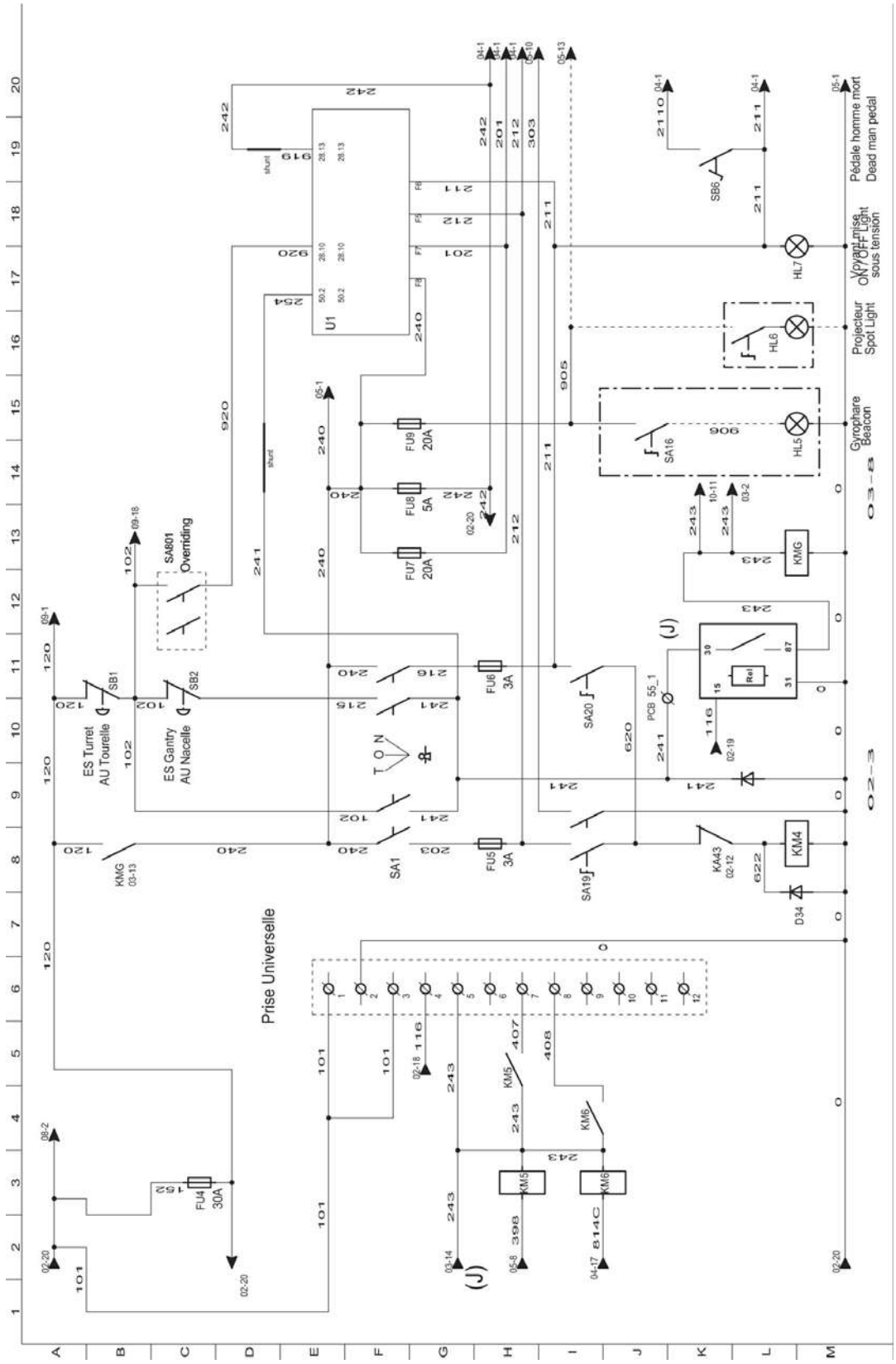
| Marking | Description |
|---|---|
| YV8 | High-speed drive control solenoid valve |
| YV9 | Differential locking control solenoid valve (Front axle) |
| YV10 - YV12 - YV17 YV23 | Medium and high-speed drive control solenoid valve |
| YV11 | Brake release control solenoid valve |
| YV13 | High-speed drive control solenoid valve |
| YV14A | Turntable rotation right solenoid valve |
| YV14B | Turntable rotation left solenoid valve |
| YV15A | Compensation elevation control solenoid valve |
| YV15B | Compensation lowering control solenoid valve |
| YV18A | Jib lowering control solenoid valve |
| YV18B | Jib elevation control solenoid valve |
| YV19A | Left platform rotation control solenoid valve |
| YV19B | Right platform rotation control solenoid valve |
| YV21A | Reverse left-hand steering control solenoid valve |
| YV21B | Reverse right-hand steering control solenoid valve |
| YV22A | Front left-hand steering control solenoid valve |
| YV22B | Front right-hand steering control solenoid valve |

## 4 - Electric diagram

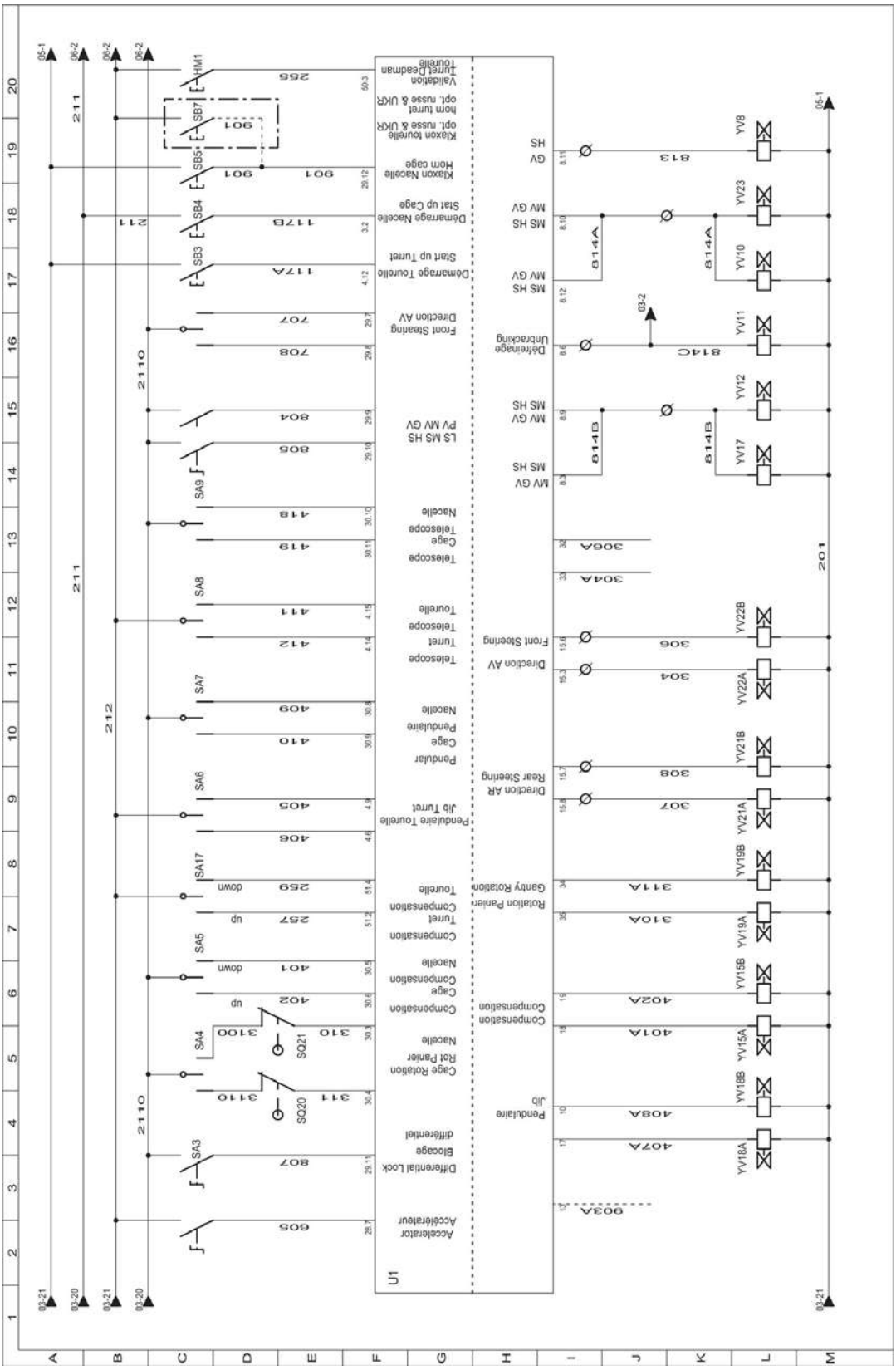
**Power - HA18PX - HA51JRT - E598J - folio 2**



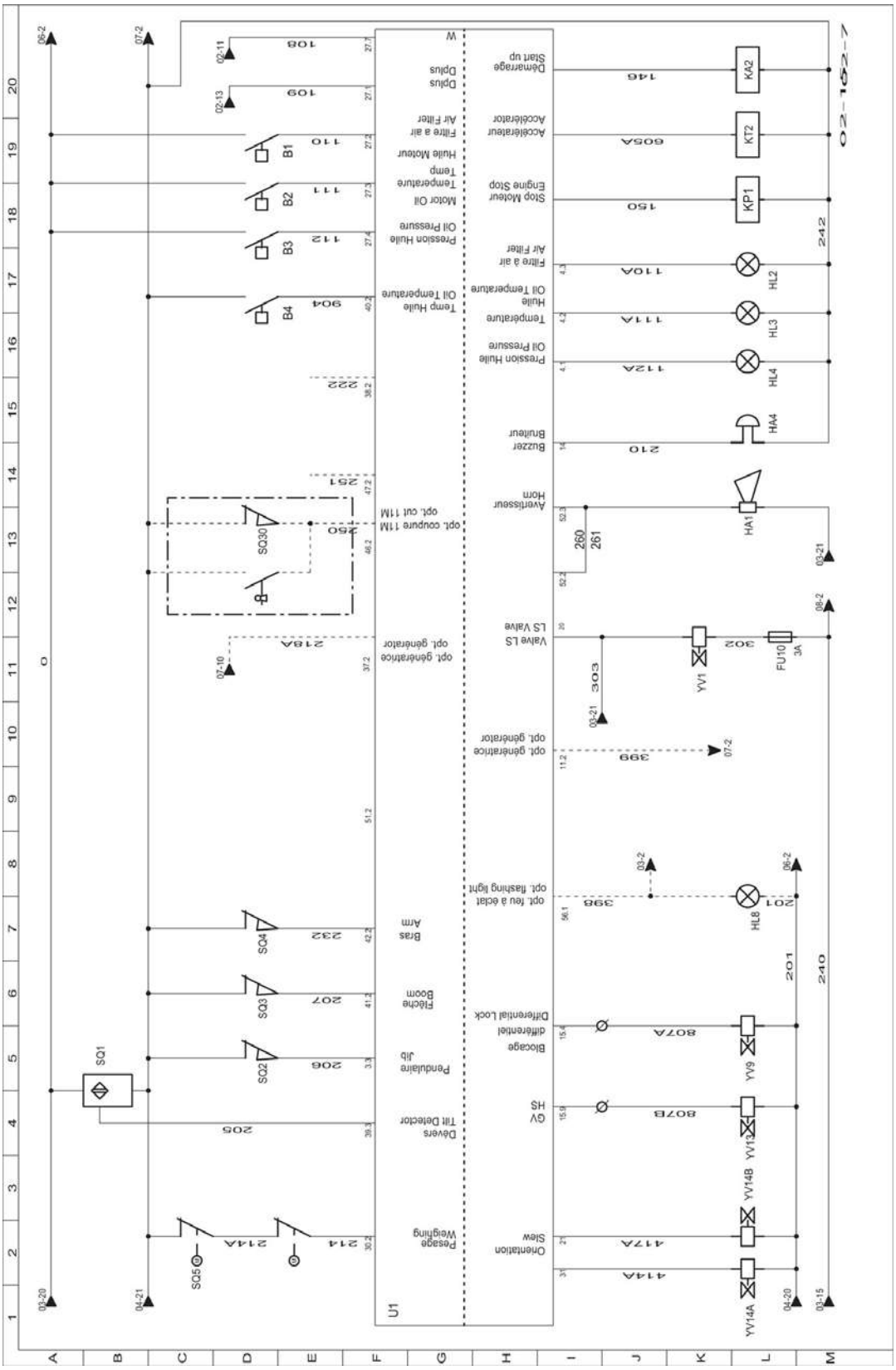
**Station selection - HA18PX - HA51JRT - E598J - folio 3**



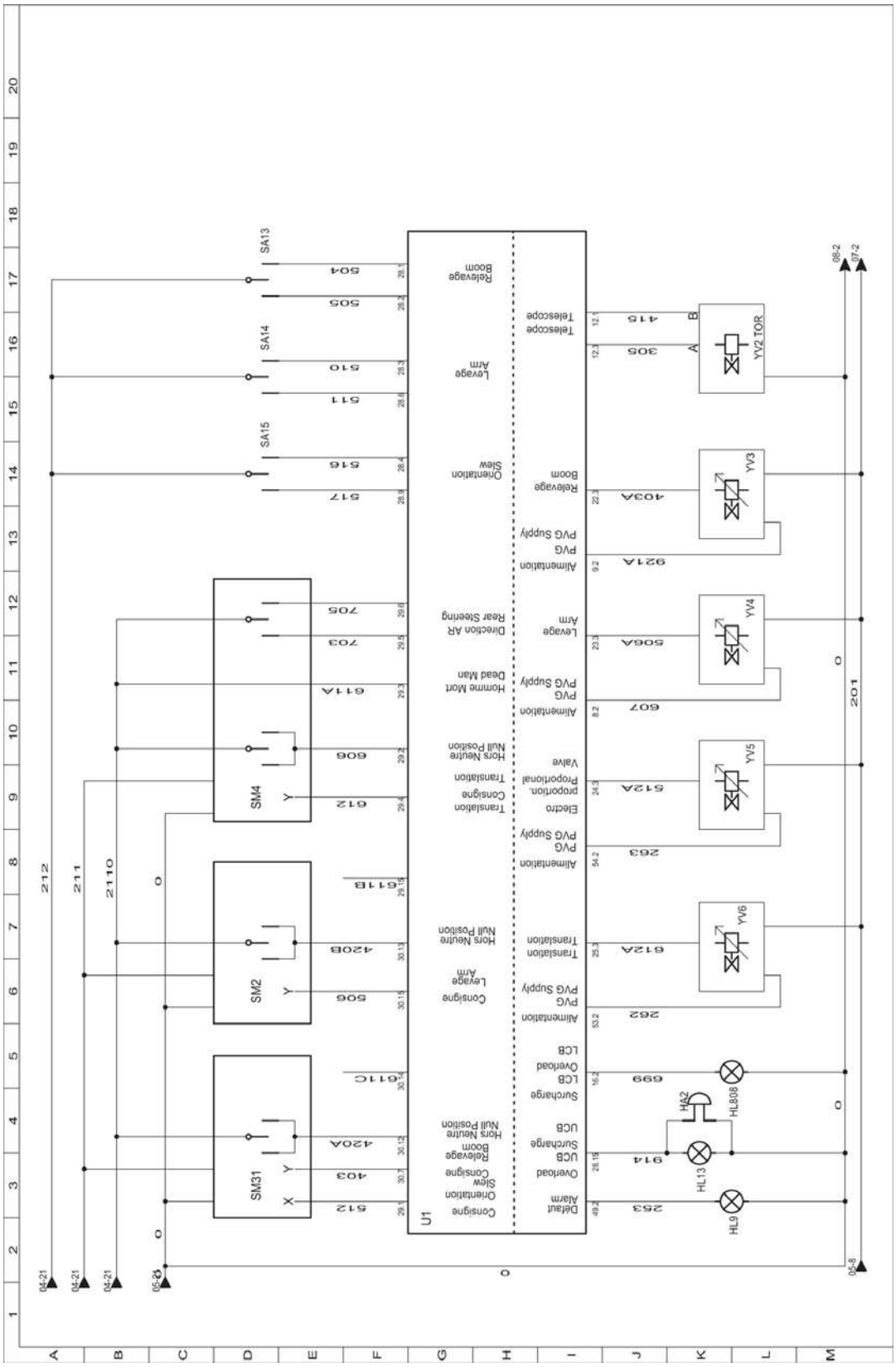
**ECU - 1/2 - HA18PX - HA51JRT - E598J - folio 4**



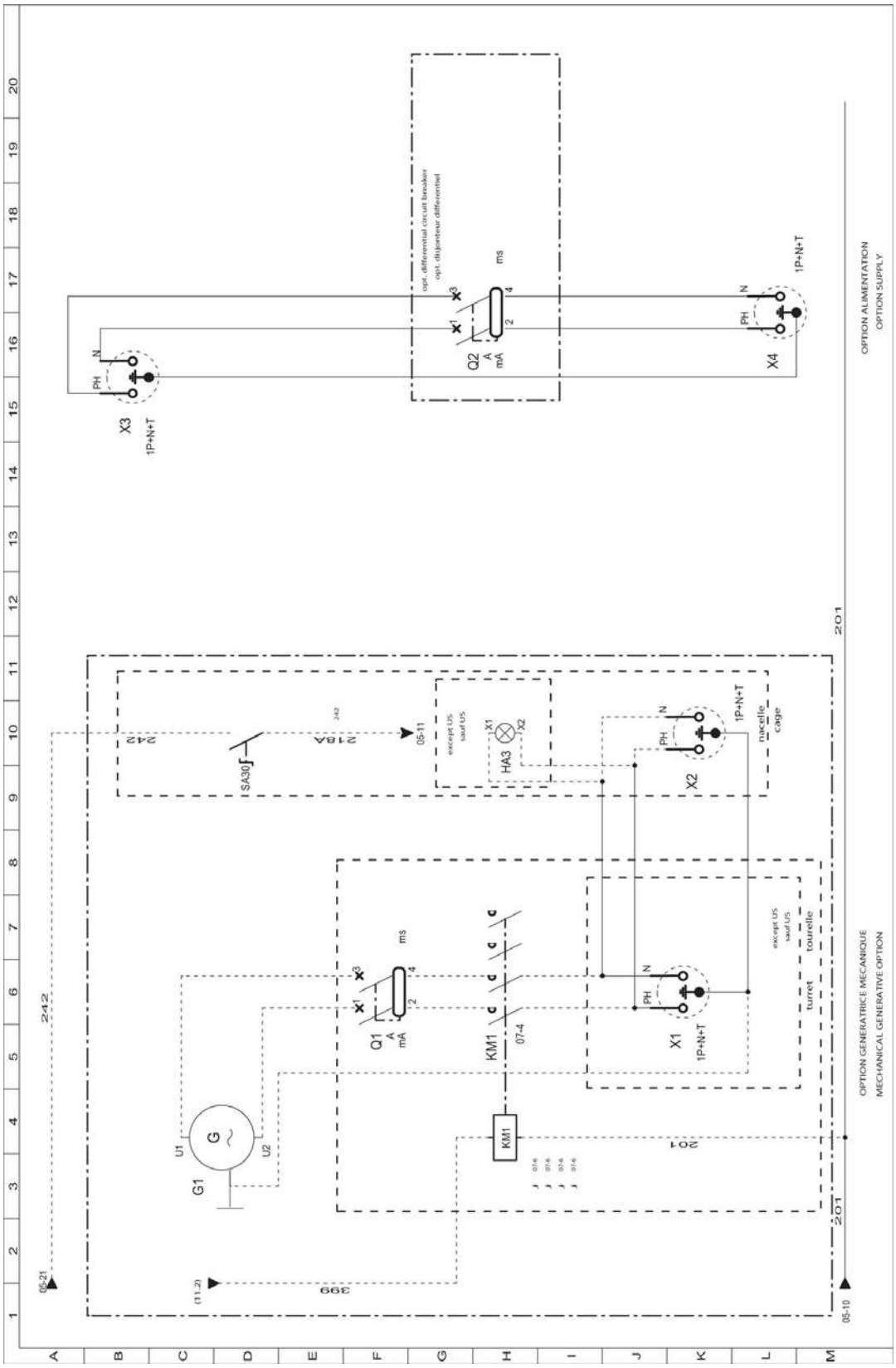
**ECU - 2/2 - HA18PX - HA51JRT - E598J - folio 5**



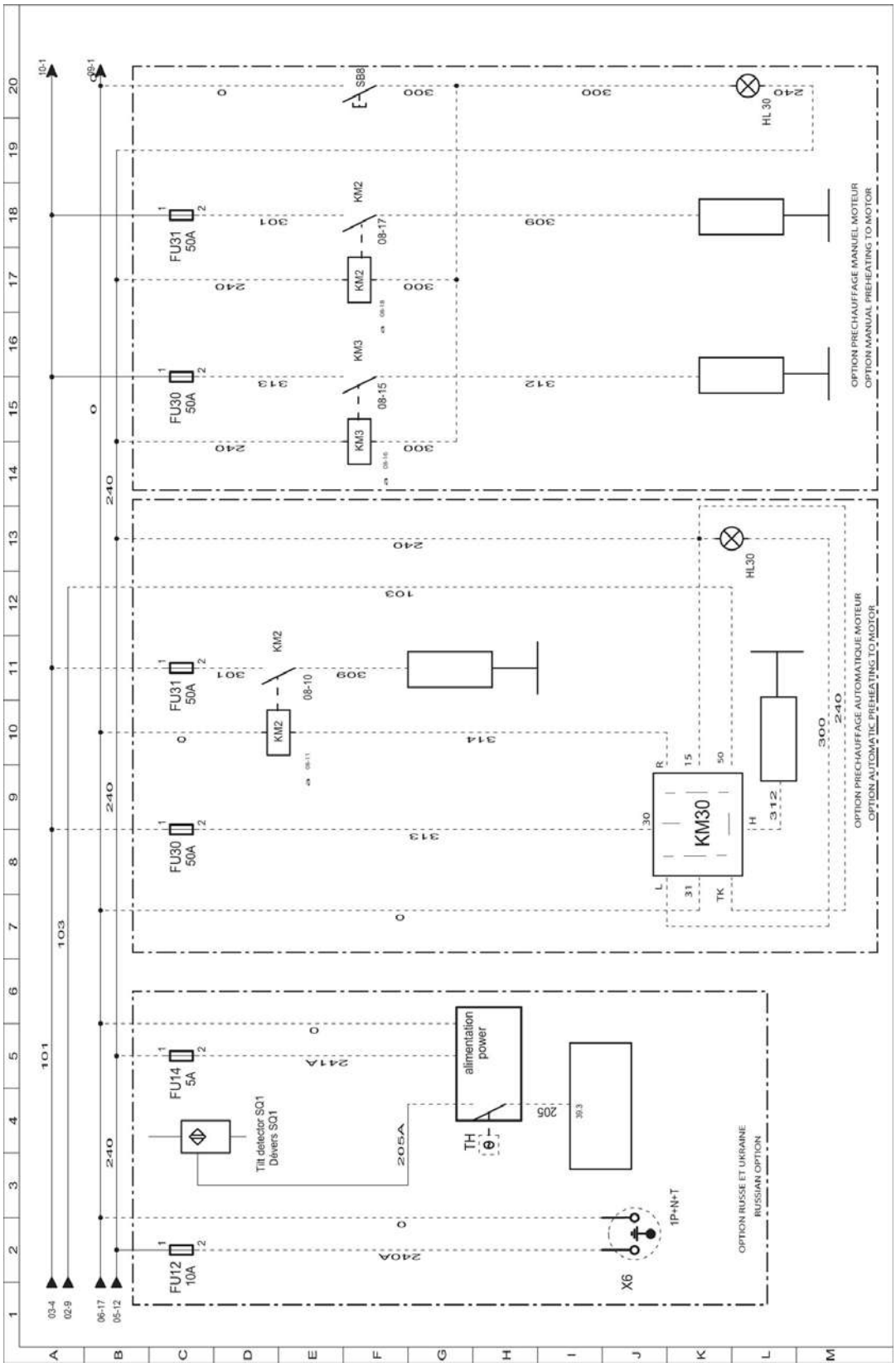
**Joysticks - HA18PX - HA51JRT - E598J - folio 6**



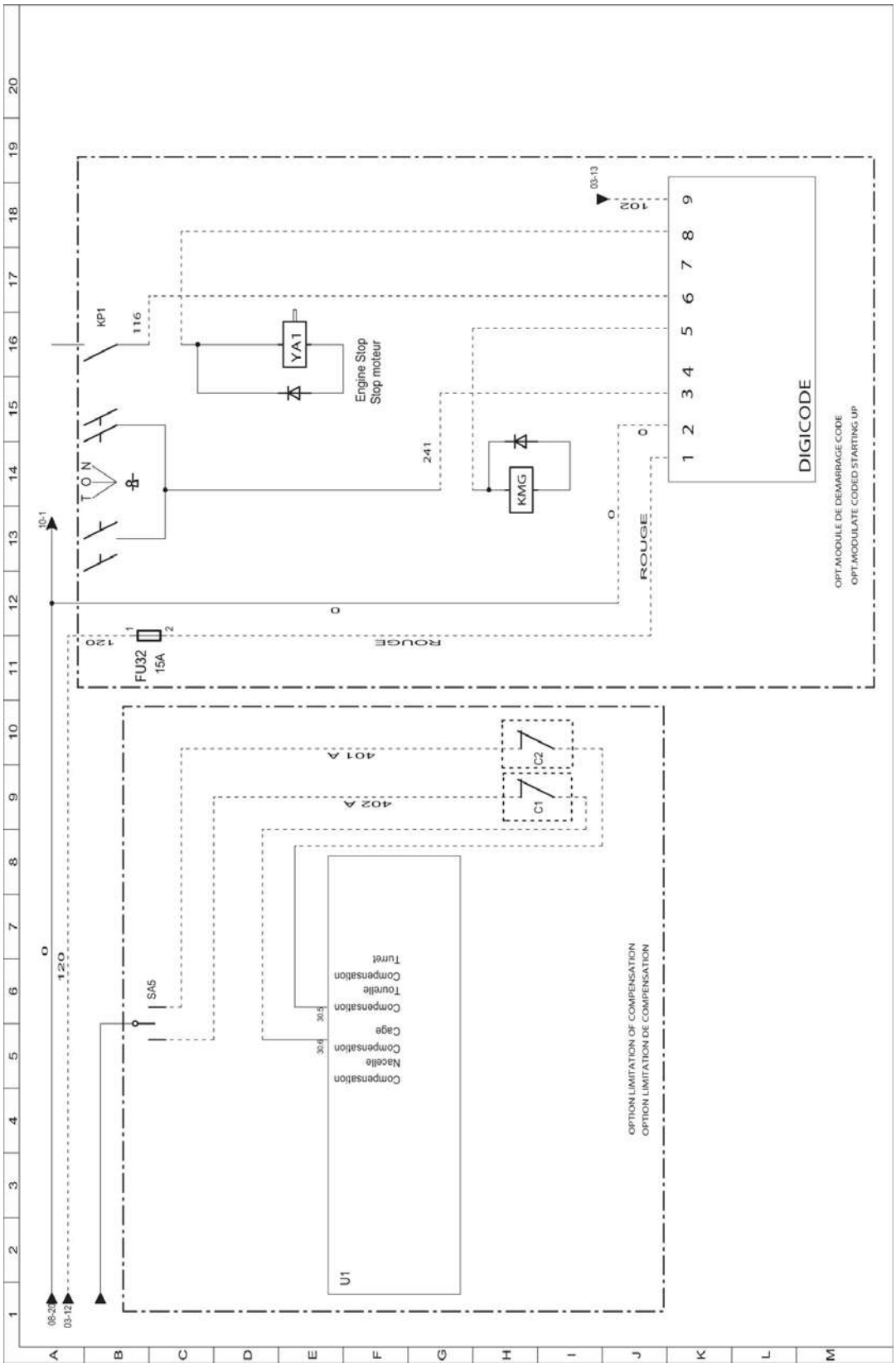
**Options - 1/4 - HA18PX - HA51JRT - E598J - folio 07**



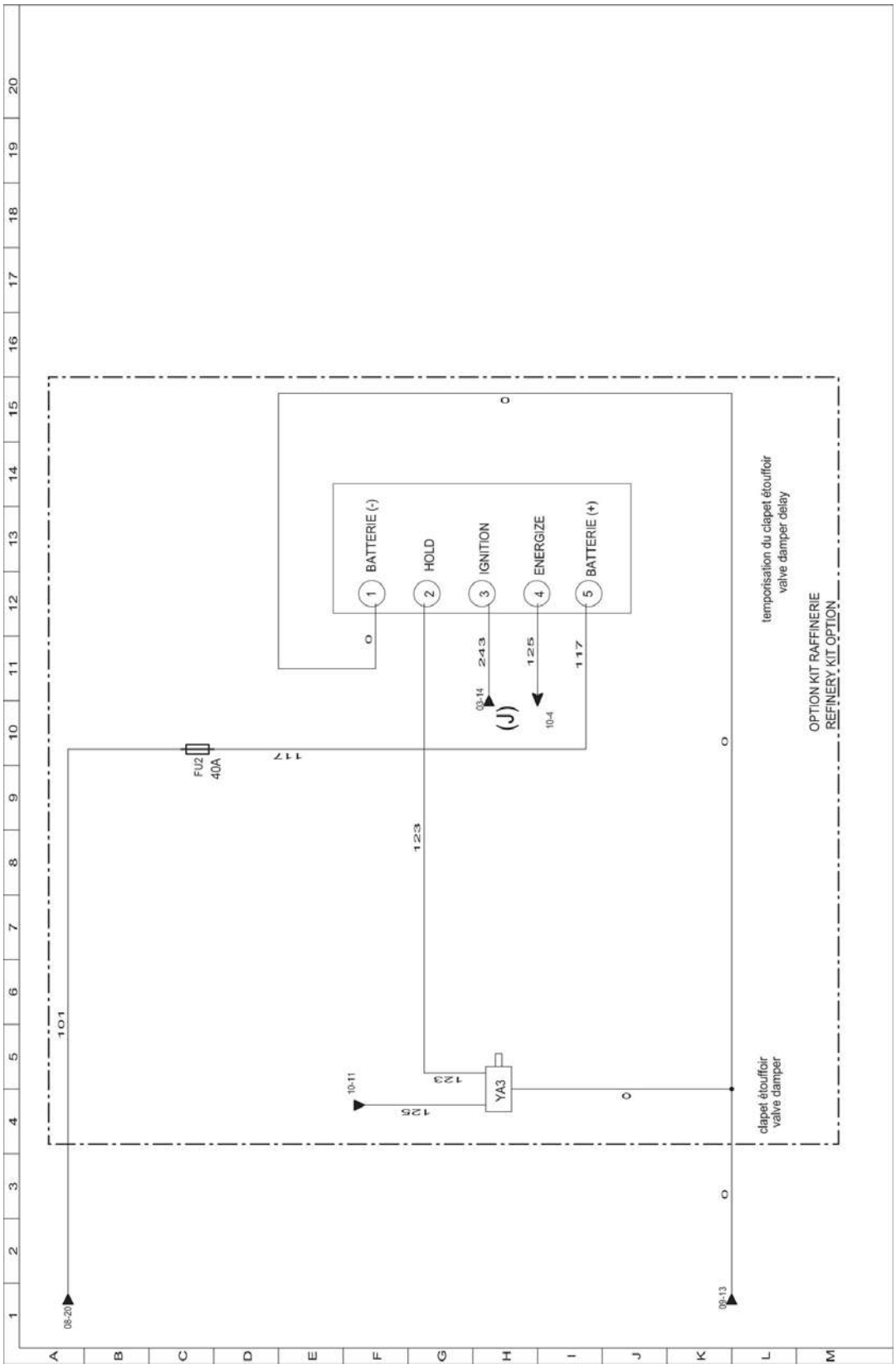
**Options - 2/4 - HA18PX - HA51JRT - E598J - folio 08**



**Options - 3/4 - HA18PX - HA51JRT - E598J - folio 09**



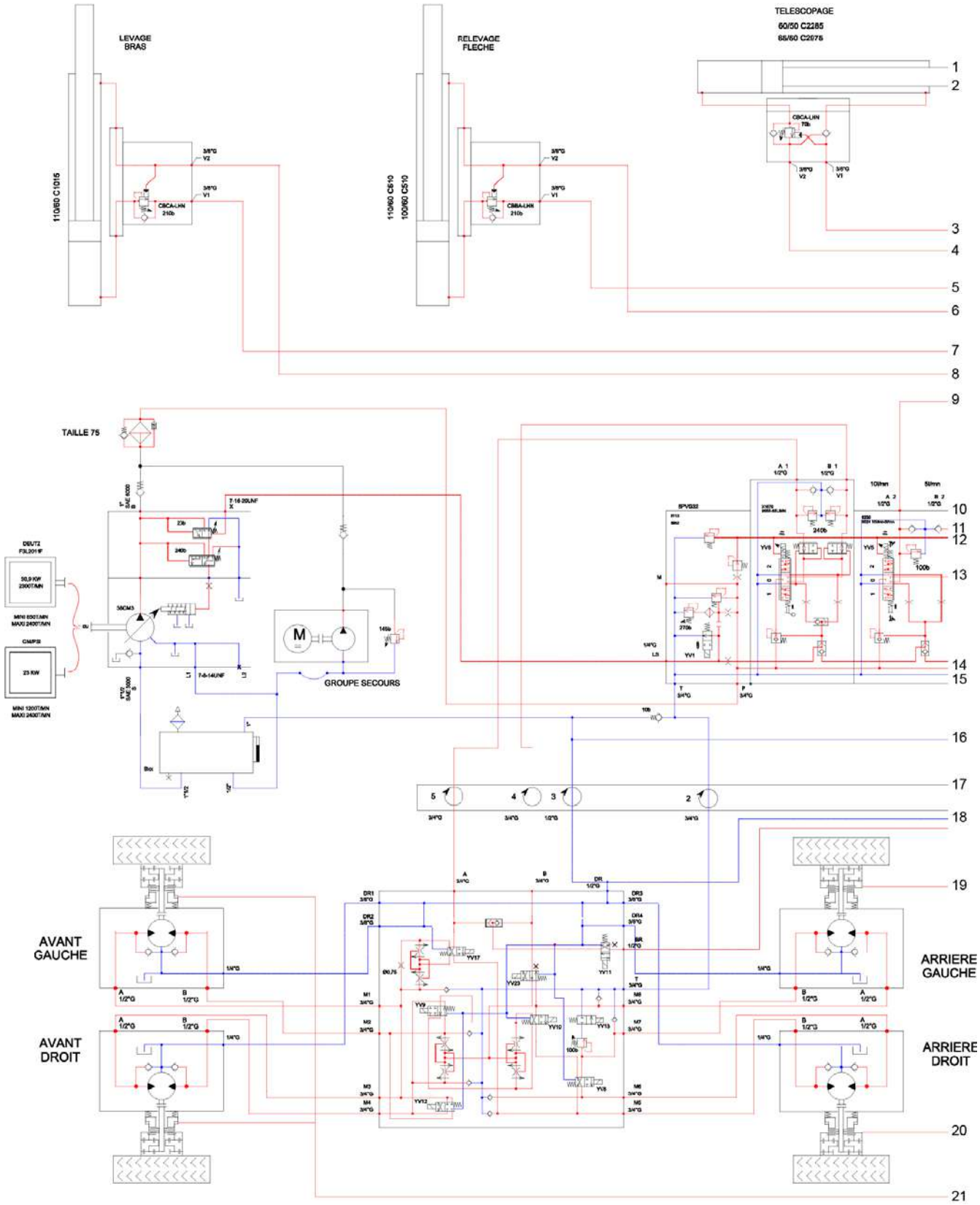
**Options - 4/4 - HA18PX - HA51JRT - E598J - folio 10**



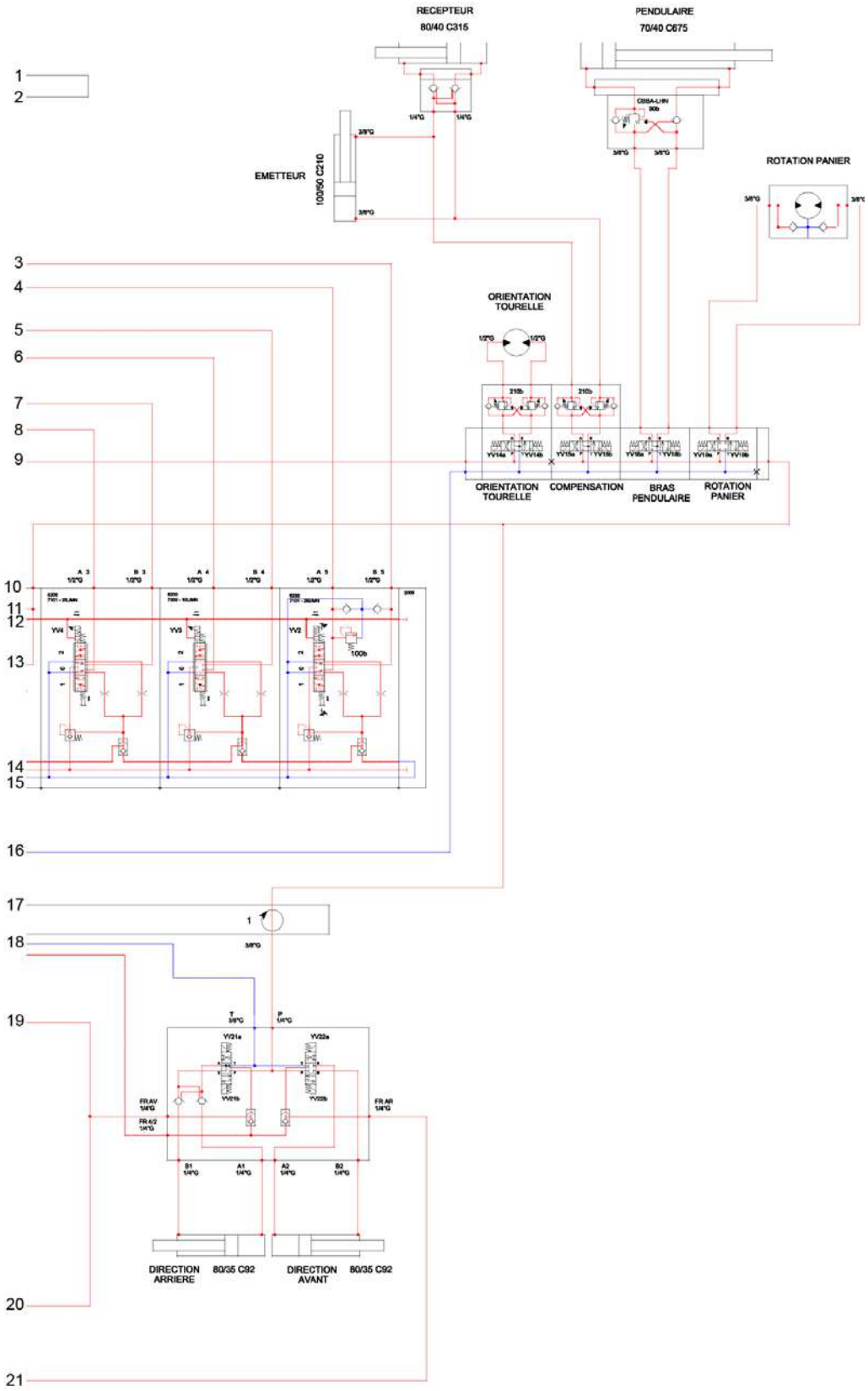
# Notes

## 5 - Hydraulic diagram

**HA18PX - HA51JRT - 1/2**



## HA18PX - HA51JRT - 2/2



# Notes

## 1 - Intervention register

The intervention register keeps a record of maintenance and repair work carried out inside or outside the maintenance programme.

***N.B.-:-In the case of a HAULOTTE Services® intervention, the qualified technician must indicate the HAULOTTE Services® intervention number.***

| Date | Type of intervention | Number of hours | Intervenor | HAULOTTE Services® intervention number |
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