Genie®
A TEREX COMPANY

# Service Manual

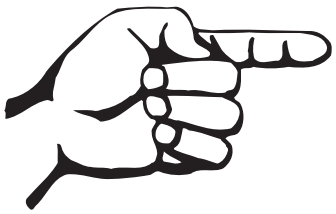
Serial number range

## GTH-4013 sx
From serial n.: 19275

## GTH-4017 sx
From serial n.: 19300

Part. No. 57.4403.4200

May 2008



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# Introduction

**IMPORTANT**
Read, understand and obey the safety rules and operating instructions in the **GTH-4013 SX and GTH-4017 SX Operator's manual** (cod. 57.0009.0300) before attempting any maintenance or repair procedure.
This manual provides the machine owner and user with detailed information on the scheduled maintenance. It also provided qualified service technicians with infromation on troubleshooting and repair procedures.
Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, as well as specific tools and equipment.
In these instances, we strongly recommend letting service and repair the machine at an authorized TEREXLIFT service center.

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IDENTIFICAZIONE MACCHINA

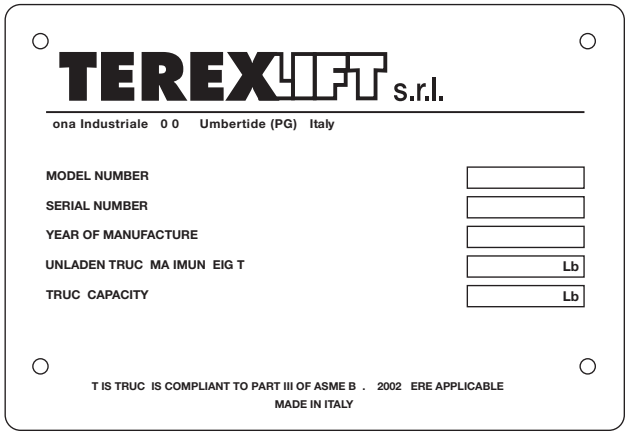
# Machine Identification

## ■ CHASSIS SERIAL NUMBER

The chassis serial number is punched on the front left part of the chassis side member.

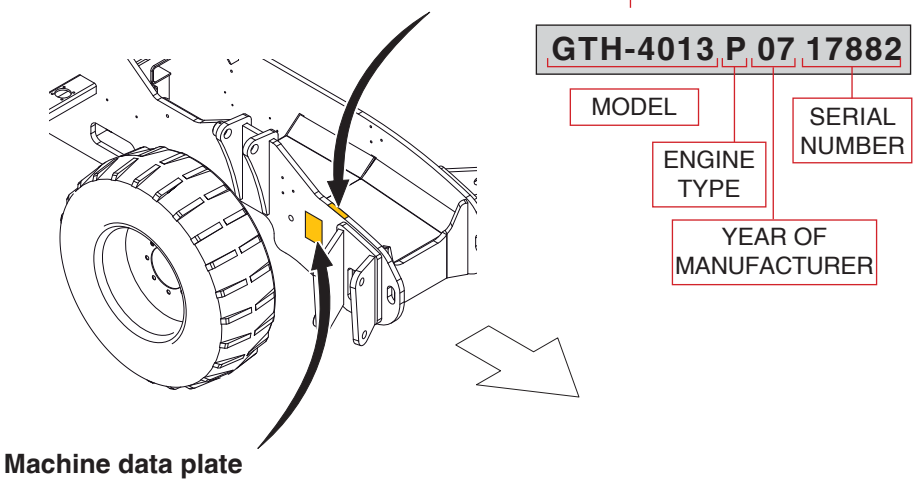
## ■ IDENTIFICATION PLATES OF THE MAIN PARTS

The plates of the main components, not directly manufactured by **TEREXLIFT srl** (for instance, engines, pumps, etc.), are located where originally applied by the manufacturers.




*MACHINE DATA PLATE*

## HOW TO READ YOUR SERIAL NUMBER



# Description

## DESCRIPTION OF THE MACHINE OPERATION

The mechanical energy source of these machines is a **(1) Perkins diesel engine** model 1104/d-44T, which supplies a 74,5 kW at 2300 rev/min with a max torque of 392 Nm at 1400 rev/min.
On the flywheel side of the engine, and connected to the same by a Technodrive coupler complete with elastic joint and with a 1-to-1 ratio, there is Sauer danfoss closedloop pump for hydrostatic drives, model H1P078 **(2)**. max displacement of this swashplate pump is 78 $cm^3$/rev, and the max calibration pressure is 450 bar. This pump is used to supply hydraulic power under form of pressure and flow rate which is then used for moving the machine. On the through-shaft of such drive pump there is a Casappa open-loop gear pump (with fixed displacement) **(3)** with priority valve integrated in the housing. The displacement of this pump is 43 $cm^3$/rev. Its function is to provide hydraulic power, under form of pressure and flow rate, to the steering circuit of the machine (primary branch of the priority valve) and to the circuit for the telescopic boom movements (secondary branch of the priority valve). The assembly of the two pumps involves they have a rotation velocity equal to the speed of the diesel engine. A third Casappa open-loop gear pump (with fixed displacement) **(4)** with a displacement of 20 $cm^3$/rev., is installed on the PTO of the engine located to the distribution side. This pump feeds the servo-assisted braking system **(25)**. The suction lines of the open-loop pumps **(3)** and **(4)** are protected by an immersed filter **(8)**, placed inside the hydraulic fluid tank **(10)** whose capacity is 130 litres. Just upstream of the connection with the three suction lines mentioned above, there is a gate valve with ball valve **(9)** which lets you cut out the hydraulic oil tank in order to perform maintenance interventions on the machine's hydraulic system. The drive pump **(2)** is protected by a special filter **(34)**, placed on the pump drain line **(3)**. This filter purifies the oil coming from the main openloop circuit of the machine (telescopic boom operating circuit) and, when needed, supplies oil at a minimum pressure of 0.5 bar to the transmission suction line. This construction feature of the filter guarantees important advantages in terms of absence of cavitation in the transmission suction line, especially when the machine is started from cold.
The one-way valve **(11)** set at 2.5 bar protects the pump housing against high pressures and guarantees a certain circulation of the drain oil to the hydrostatic motor reducing, in this way, the temperature. From port “M3” of the drive pump **(2)** low-pressure oil is taken (25-30 bar) and used for the anti-cavitation circuit of the automatic fork levelling system. The hydraulic energy produced by the drive pump **(2)** is converted into mechanical power by a closed-loop hydrostatic motor, model Sauer danfoos 51D110 **(5)**. The max displacement of this bent-axis motor is 80 $cm^3$/rev.
The motor is directly flanged to the Dana single-speed reduction gear **(26)**, which is fixed with brackets to the central zone of the chassis. The mechanical torque at the gearbox output is transmitted to the front axle **(6)** and the rear axle **(27)**, both model 212 manufactured by Dana, through Cardan shafts. The hydraulic drive **(12)** of “load sensing” type with a displacement of 315 $cm^3$/rev., receives oil from the priority line of the pump **(3)** in relation to the “load sensing” signal sent by the hydraulic drive and connected to such pump with function of pilot signal. In this way, the input flow to the hydraulic drive is exactly the one needed for the instantaneous steering functions; any excess flow of the pump is available for the functions of the telescopic boom. The steering circuit is protected against input overpressures by a pressure reducing valve set at 140 bar. On the two delivery lines to the steering cylinders there are other two pressure reducing valves with anti-shock function set at 200 bar. These two valves are intended to limit possible shocks on the steering wheel due to overstress on the steering cylinders. The three pressure reducing valves are installed in the hydraulic drive **(12)** and cannot be regulated from the outside. The steering circuit is completed by the front steering cylinder **(14)**, the rear steering cylinder **(15)** (these cylinders being integral part of the front axle **(6)** and the rear axle **(27)** respectively) and by a 4-way/3-position solenoid valve **(13)** for the selection of the three different steer modes (rear wheels straight, co-ordinate front/rear steering and independent front/rear steering). When the solenoid valve **(13)** is not energised, the front steering cylinder is fed by the hydraulic drive and the rear cylinder is blocked.
When one magnet or the other of the solenoid valve **(13)** is energised, the chambers of the cylinders are connected in a different manner thus causing the desired effect on the steering mode. The Walvoil 6-section valve block of mechanical type **(16)** receives oil from the secondary line of the pump **(3)** and feeds all the movements of the telescopic boom, as well as the outriggers and the chassis sway function. This monoblock valve is the 6-way type, with oil which flows through the main valve

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when the controls are not activated, and then to the tank. When the mechanical lever controls are activated, the movement of the main valve sliders chokes the oil flow, thus producing the necessary pressure for the control of the activated function. Each of the 6 sections of the main valve control a specific function of the machine (lifting/lowering, attachment holding plate rotation, boom extension/ retraction, attachment locking/unlocking, outriggers and chassis sway function).
In the head there is a pressure relief valve set at 270 bar also serving as a safety valve of the circuit which directly acts on the main line of the hydraulic oil. Again in the input head of the main valve there is a solenoid valve discharging the main flow which activates the movements of the main valve only when its solenoid is energised. When such solenoid is not energised all the flow from the pump is discharged. In this specific version of the machine, this solenoid valve is mainly used to stop some movements of the machine when the stability limits are reached, and also to completely deactivate such functions when the relevant selector in the driving place is turned to the "road" position.
By moving the main lever in the driving place to one side, section 1 of the main valve directly delivers oil to the oil-dynamic block **(37)** consisting of a 6-way/2 position electrical switch block and 3 pressure relief valves. Two of these valves, calibrated at 295 bar, are mounted on the lines controlling the rotation of the attachment holding frame; the third one, set at 200 bar, is installed on the extension line of the telescopic boom lifting cylinder.
When the coil of the electrical switch block is not energised, the oil coming from section 1 of the main valve is sent to the extension cylinders **(21)** and (**22** only for GTH-4013 SX) of the telescopic boom, connected in series with each other. Cylinder **(21)**, which activates the second telescope of the boom, is equipped with a double-acting compensation valve serving also as a safety valve, while cylinder **(22)**, which activates the third telescope of the boom, is equipped with a singleacting compensation valve again serving also as a safety valve. This pressure relief valve set at 200 bar and fitted to the oil-dynamic block **(37)**, reduces the maximum load during the boom extension phase in those work areas where the electronic moment limiting system cannot detect overload conditions with respect to the admissible load chart of the machine.

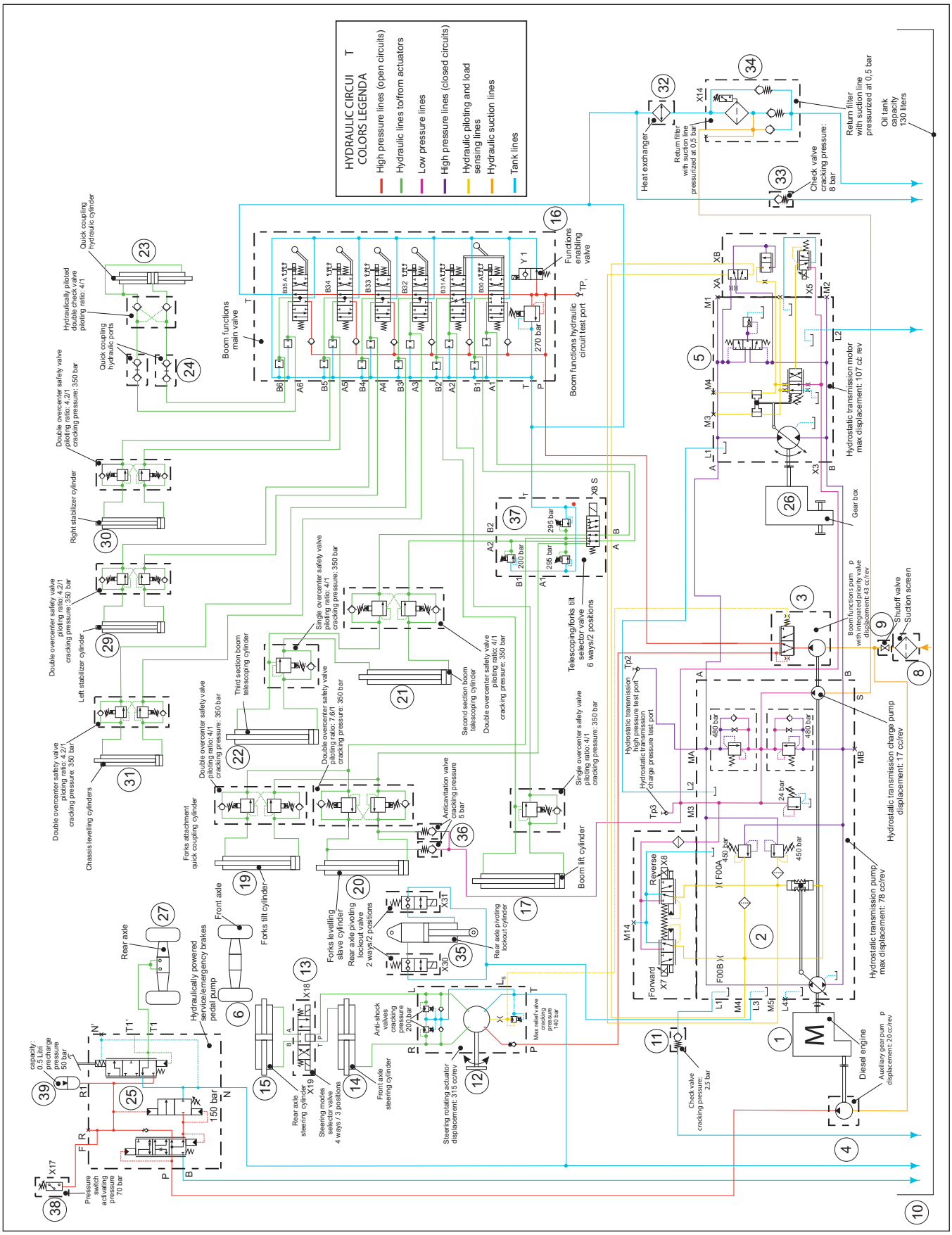
When the coil of the electrical switch block is energised by the activation of the pushbutton placed at the top of the main lever in the cab, oil is sent to the attachment holding frame cylinder **(19)** of the telescopic boom. This cylinder is equipped with a double-acting compensation valve serving also as a safety valve.
Parallel to this cylinder, there is the fork levelling compensation cylinder (20) (also called balancing cylinder) which is equipped with a special double-acting compensation valve. Inside this valve, the one-way valves are mounted in reversed manner with respect to the normal position to avoid the pressurisation of the cylinder when the rotation control of the attachment holding frame is activated. Again inside this valve, there are other two one-way valves **(36)**, set at 5 bar, serving as anti-cavitation check valves. These valves deliver oil, taken from the low-pressure line of the transmission pump **(2)**, to the fork levelling compensation circuit when needed.
The two pressure relief valves set at 295 bar and mounted in the oil-dynamic block **(37)**, protect the automatic fork levelling circuit during the boom lifting/lowering phases and in all cases of overload on the attachment holding frame (for instance, in the case of use of the bucket).
Section 2 of the main valve **(16)** controls the telescopic boom lifting cylinder **(17)** through the longitudinal displacement of the main lever placed in the driving cab. This cylinder has one single-acting compensation valve with safety function.
Section 3 of the main valve controls the chassis sway cylinder **(31)** mounted on the right side of the machine and equipped with a double-acting compensation valve serving also as a safety valve, through the lateral displacement of the special lever installed in the driving place.
Section 4 of the main valve controls the left outrigger cylinder **(29)** equipped with double-acting compensation valve serving also as a safety valve, through the longitudinal displacement of the special lever placed in the driving cab.
Section 5 of the main valve controls the right outrigger cylinder **(30)** equipped with double-acting compensation valve serving also as a safety valve, through the longitudinal displacement of the special lever placed in the driving cab.
Section 6 of the control valve controls the attachment locking cylinder **(23)** through the lateral displacement of the special lever placed in the driving place. This cylinder has a double one-way valve with hydraulic release and safety function.
On the feeding lines of this cylinder, there are two quickfit connectors **(24)** for the connection of the hydraulic lines to those optional attachments necessitating hydraulic power for their operation (ex. hydraulic winch and maintenance jib, mixing bucket, etc.). In the model dealt with in this manual, this function is optional. All the sections of the main valve **(16)** are equipped with a micro-switch which senses and transmits a special ON/ OFF signal when the relevant slider is activated. Such signals are used by the operating logic of the system protecting the machine in case of loss of stability (LMI).
The SAFIM S6 servo-assisted braking system with pedal **(25)** receives oil from pump **(4)** and uses this oil to pressurise a hydraulic accumulator **(39)** connected to

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the same system. The oil at pressure contained in this accumulator is then used to operate the service brake placed inside the rear axle **(27)**. The braking effect produced by the braking axle is then transferred to the front axle through Cardan shafts connecting the axles to reduction gear **(26)**.
The fill valve inside the braking system takes the flow from the feeding line so the pressure on the accumulator line reaches the calibration value of the cutout valve set at 150 bar. When this pressure is reached, the valve gradually releases all the flow to line B for other uses.
The brake pedal located in the driving cab, which is an integral part of the braking system S6, is connected to a slider of proportional type which controls the line of the service brake. In relation to the stroke of this slider, a gradual communication between the feeding line, connected to an accumulator **(39)** with 0.5 lt. capacity and a fill pressure of 50 bar, connected, at its turn, to port R1, and the service brake line is established so the flow is distributed to such line and the discharge line increasing, in this way, the pressure (and as a result the braking force) on the line of the service brake.
When the slider is in the rest position, the line of the service brake is connected to the discharge.
The pressure switch set at 70 bar **(38)** and connected to port F, sends an electrical warning signal when the pressure inside the feeding circuit of the brake line is too low to guarantee the minimum braking efficiency.
The oil coming from the drain line of the main valve **(16)** is cooled down by heat exchanger **(32)** which is divided in two sectors, i.e. one absorbing heat from the cooling circuit of the diesel engine and the other absorbing heat from the hydraulic circuit of the machine.
The oil cooled down by the heat exchanger is sent back to the special filter **(34)** which is also used to deliver fluid at pressure to the transmission booster pump, and finally drained into tank **(10)**.
A one-way valve calibrated at 8 bar **(33)**, is installed parallel to the input line of the heat exchanger and used as safety valve. Its function is to avoid overpressure conditions of the heat exchanger (as is the case of a machine starting at low temperatures) by directly draining any excess oil into the tank. The oscillation of the rear axle of the machine is controlled by a block cylinder **(35)** whose two chambers are equipped with sealed 2-way/2-position solenoid valves.
When the two solenoid valves are de-energised, the circular and annular chambers of the cylinder are closed toward the outside and the cylinder behaves like a strut/tie-rod blocking in this way the rear axle.
This happens when the inclination of the telescopic boom exceeds a certain pre-set value of 50° and the side stability of the machine must be improved.
When, on the contrary, the boom inclination is below such pre-set value, the two solenoids of the solenoid valves are energised thus letting the oil circulating freely from/to the two chambers of the cylinder. In this way, the axle can oscillate, thus making the machine drive more comfortable even in case of rough terrains.
The chambers of the cylinder are always kept filled with oil by a single hydraulic line connected to the housing of the drive pump **(2)**.
This allows to have a minimum pressure capable of keeping the circuit of the rear axle block cylinder full of oil but incapable of producing overloads on the same axle.

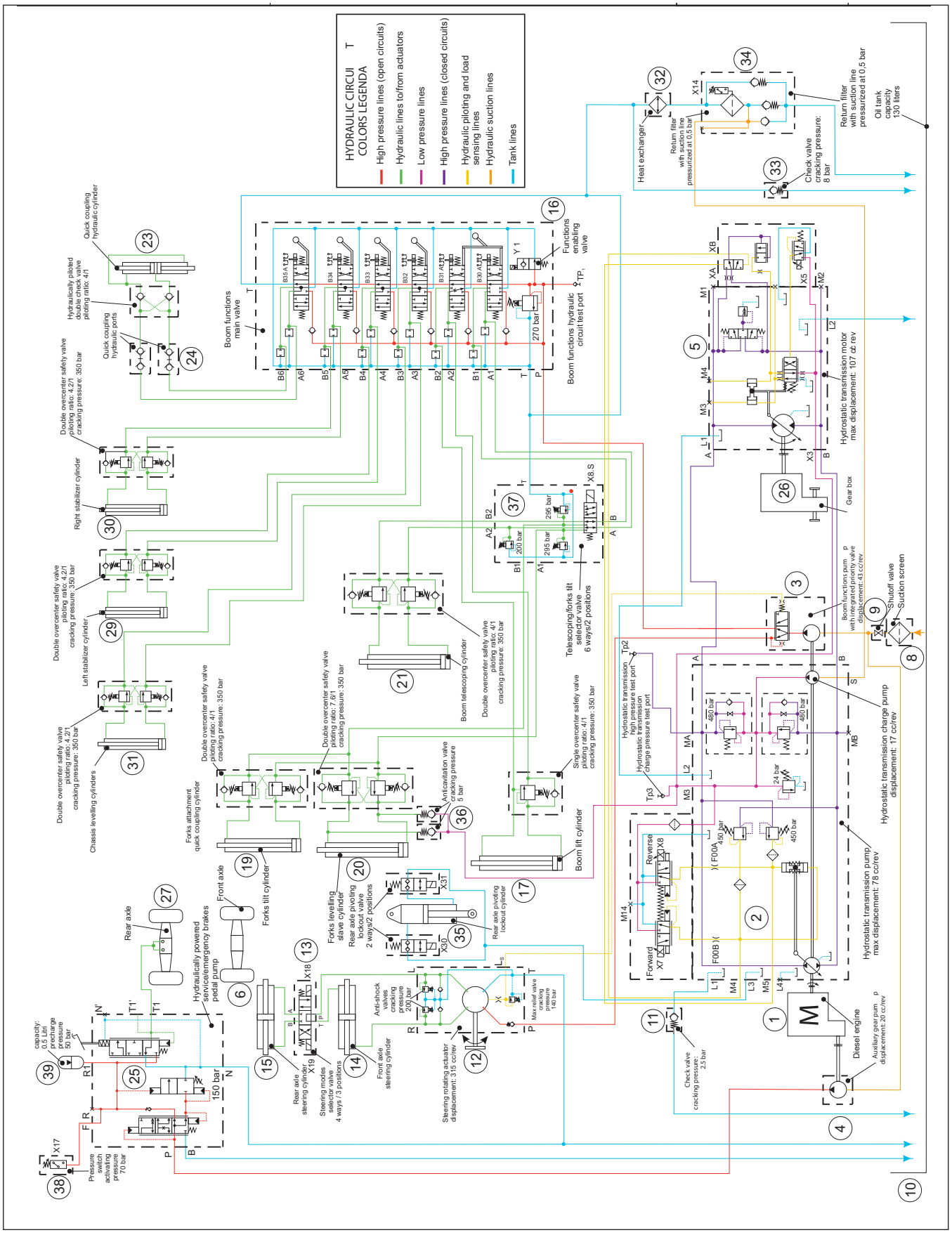
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## GTH 4013 SX hydraulic schematic



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## GTH 4017 SX hydraulic schematic





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# Safety Rules



## Danger

Failure to obey the instructions and safety rules in this manual and the appropriate Operator's Manual on your machine will result in death or serious injury.

Many of the hazards identified in the Operator's Manual are also safety hazards when maintenace and repair procedures are performed..

## Do Not Perform Maintenace Unless:

☑ You are trained and qualified to perform maintenace on this machine.

☑ You read, understand and obey:
- manufacturer's instructions and safety rules
- employer's safety rules and worksite regulations
- applicable governmental regulations

☑ You have the appropriate tools, lifting equipment and a suitable workshop.

SAFETY RULES

## 1.1 SAFETY RULES

### 1.1-1 PERSONAL SAFETY

In this manual, any important information is preceded by a **SPECIAL SYMBOL**.
All operators who work or service the machine must know the exact meaning of these safety symbols.

There are six special (or safety) symbols in this manual, always combined with keywords that class the situations according to their danger degree.
The symbols are always followed by a text explaining the situation taken into account, the attention to be paid to such situation, the method and the behaviour to be adopted. When necessary, it stresses prohibitions or supplies instructions to prevent dangers.
Sometimes, it can be followed by illustrations.

We list below the special (or safety) symbols according to the relative seriousness of the hazard situation:

***Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.***

**DANGER**

***Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.***

**WARNING**

***Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury or to situations that involve the machine efficiency.***

**CAUTION**

***Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury or to situations that involve the machine efficiency.***

**NOTICE**

***Draws the attention to important technical information or practical advice that allows for a safer and more efficient use of the machine.***

**PROTECT THE ENVIRONMENT**

***Draws the attention to important environment-related information.***



Be sure to wear protective eye wear and other protective clothing if the situation warrants it.



Be aware of potential crushing hazards such as moving parts, free swinging or unsecured components when lifting or placing loads. Always wear approved steel-toed shoes.

## 1.1-2 WORKPLACE SAFETY



Be sure to keep sparks, flames and lighted tobacco away from flammable and combustible materials like battery gases and engine fuels. Always have an approved fire extinguisher within easy reach.



Be sure that all tools and working areas are properly maintained and ready for use. Keep work surfaces clean and free of debris that could get into machine components and cause damage.



Be sure that your workshop or work area is properly ventilated and well lit.



Be sure any forklift, overhead crane or other lifting or supporting device is fully capable of supporting and stabilizing the weight to be lifted. Use only chains or straps that are in good condition and of ample capacity.



Be sure that fasteners intended for one time use (i.e., cotter pins and self-locking nuts) are not reused. These components may fail if they are used a second time.



Be sure to properly dispose of old oil or other fluids. Use an approved container. Please be environmentally safe.

SAFETY RULES

## 1.2 GENERAL REMARKS

Most accidents occurring while working, servicing or maintaining operation machines, are caused by not complying with the basic safety precautions. Therefore, it is necessary to pay steady attention to the potential hazards and the effects that may come of operations carried out on the machine

**CAUTION**

***If you recognise hazardous situations, you can prevent accidents!***

For instance, this handbook makes use of special **safety symbols** to highlight potentially hazardous situations.

**NOTICE**

***The instructions given in this handbook are the ones established by GENIE. They do not exclude other safe and most convenient ways for the machine commissioning, operation and maintenance that take into account the available spaces and means.***

If you decide to follow instructions other than those given in this manual, you must:

- be sure that the operations you are going to carry out are not explicitly forbidden;
- be sure that the methods are safe and in compliance with the indications given in this section;
- be sure that the methods cannot damage the machine directly or indirectly or make it unsafe;
- contact GENIE Assistance Service for any suggestion and the necessary written permission.

**CAUTION**

***Do not hesitate to pose questions if you are in doubt! Contact GENIE: the assistance service is at your disposal. Addresses, phone and fax numbers are given in the cover and in the title-page of this manual.***

## 1.3 SERVICEMEN'S REQUISITES

The operators who use the machine regularly or occasionally (e.g. for maintenance or transport) shall have the following requisites:

**health:**
before and during any operation, operators shall never take alcoholic beverages, medicines or other substances that may alter their psycho-physical conditions and, consequently, their working abilities.

**physical:**
good eyesight, acute hearing, good co-ordination and ability to carry out all required operations in a safe way, according to the instructions of this manual.

**mental:**
ability to understand and apply the rules, regulations and safety precautions. They shall be careful and sensible for their own as well as for the others' safety and shall desire to carry out the work correctly and in a responsible way.

**emotional:**
they shall keep calm and always be able to evaluate their own physical and mental conditions.

**training:**
they shall read and familiarise with this handbook, its enclosed graphs and diagrams, the identification and hazard warning plates. They shall be skilled and trained about the machine use.

**CAUTION**

***It is recommended to take part in at least one technical training course organised by GENIE Assistance Office.***

**CAUTION**

***Ordinary and extraordinary maintenance of the machineare quite complex from a technical point of view and should be performed by an authoirsed service centre.***

### 1.3-1 PERSONAL PROTECTIVE EQUIPMENT

During work, but especially when maintaining or repairing the machine, operators must wear suitable protective clothing and equipment:

- Overalls or any other comfortable garments. Operators should wear neither clothes with large sleeves nor objects that can get stuck in moving parts of the machine
- Protective helmet when working under or in the vicinity of suspended load
- Protective gloves
- Working shoes
- Breathing set (or dust mask)
- Ear-protectors or equivalent equipment
- Goggles or facial screen.

**CAUTION**

***Use only type-approved protective equipment in good condition.***

## 1.4 GENERAL SAFETY PRECAUTIONS

**DANGER**

***Read and understand the following safety instructions before servicing the machine.***
***The following list contains safety rules which must absolutely be obeyed to prevent accidents and injuries.***

### 1.4-1 WORKING AREA

- Make sure the area all around the machine is safe. Always be aware of potential risks.
- During work, keep the working area in order. Never leave objects scattered: they could hinder the machine movements and represent a danger for personnel.

### 1.4-2 PRECAUTIONS DURING WORK

- Do not walk or stop under raised loads or machine parts supported by hydraulic cylinders or ropes only.
- Keep the machine handholds and access steps always clean from oil, grease or dirt to prevent falls or slips.
- When entering/leaving the cab or other raised parts, always face the machine; never turn the back.
- When carrying out operations at hazardous heights (***over 3 meters from the ground***), always use typeapproved safety belts or fall preventing devices.
- Do not enter/leave the machine when it is running.
- Before servicing the engine, let its parts cool down.
- Do not leave the driving place when the machine is running.
- Neither stop nor carry out interventions under or between the machine wheels when engine is running. When maintenance in this area is needed, stop the engine, engage the parking brake and chock the wheels to prevent accidental movements.
- Do not carry out maintenance or repair works without a sufficient lighting.
- When using the machine lights, the beam should be oriented in order not to blind the personnel at work.
- Before applying voltage to electric cables or components, ensure they are properly connected and efficient.
- Do not carry out interventions on electric components with voltage over 48V.

SAFETY RULES

- Do not connect wet plugs or sockets.
- Signs and stickers shall never be removed, hidden or become unreadable.
- Except for maintenance purposes, do not remove safety devices, covers, guards,. Should their removal be necessary, stop the engine, remove them with the greatest care and always remember to refit them before starting the engine and using the machine again.
- Always stop the engine and disconnect the batteries before maintenance or service.
- Do not lubricate, clean or adjust moving parts.
- Do not carry out operations manually when specific tools are provided for this purpose.
- Absolutely avoid to use tools in bad conditions or in an improper way.
- Before carrying out operations on hydraulic lines under pressure (hydraulic oil, compressed air) and/or before disconnecting hydraulic components, ensure the relevant line has been previously depressurised and does not contain any hot fluid.

## DANGER

***Any intervention on the hydraulic or pneumatic circuit must be carried out by authorised personnel.***
***Before any operation on lines under pressure, release any residual pressure from the circuit.***
***Do not use your fingers to check for pressure leaks. Fine jets of air, oil or fuel can injure you.***

- Neither smoke nor use open flames if there is a risk of fire or close to fuel, oil or batteries.
- Do not leave fuel cans or bottles in unsuitable places.
- Do not empty catalytic mufflers or other vessels containing burning materials without taking the necessary precautions.
- Carefully handle all flammable or dangerous substances.
- After any maintenance or repair work, make sure that no tool, cloth or other object has been left within compartments with moving parts or in which suction and cooling air circulates.
- Never give orders to several people at a time. Instructions and signs must be given by one person only.
- Always pay the due attention to the instructions given by the foreman.
- Never distract the operator during working phases or crucial manoeuvres.
- Do not call an operator suddenly, if unnecessary.
- Do not frighten an operator or throw objects by no means.
- After work, never leave the machine under potentially dangerous conditions.

## PROTECT THE ENVIRONMENT

***Treatment and disposal of used oils is subject to federal, national and local laws and regulations. Collect and deliver these wastes to authorised centres.***

- Use the assistance of a second person to handle loads weighing 30 to 50 kg.
- For loads over 50 kg, the use of special hoisting equipment in good condition and equipped as per enforced regulations is mandatory.

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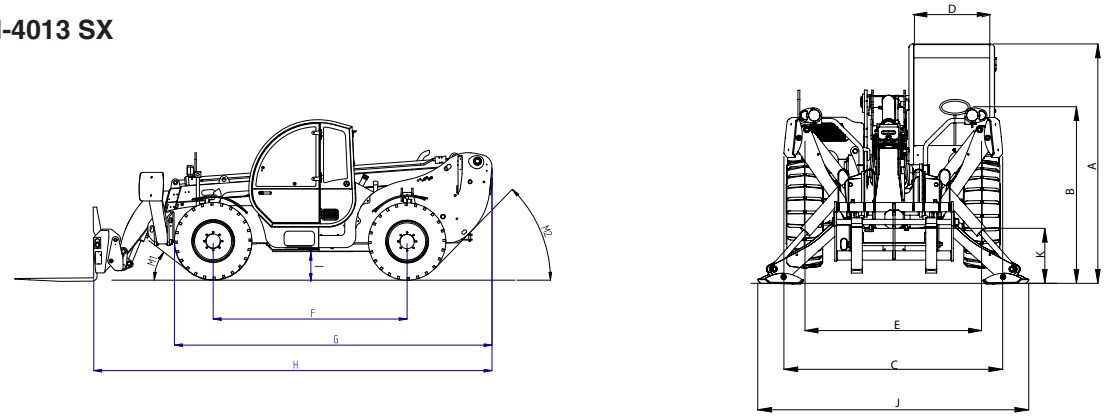
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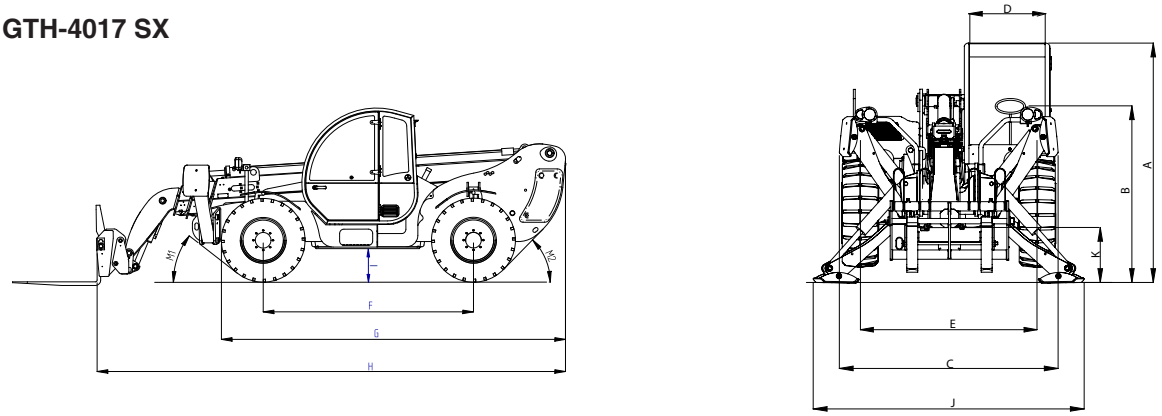
# Technical Specification

## 2.1 MAIN DIMENSIONS

**GTH-4013 SX**




**GTH-4017 SX**




| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| **A** | Height | mm | 2400 | 2440 |
| **B** | Height at steering whell | mm | 1600 | 1600 |
| **C** | Width | mm | 2320 | 2320 |
| **D** | Inside cab width | mm | 780 | 780 |
| **E** | Track | mm | 1920 | 1920 |
| **F** | Wheelbase | mm | 2950 | 2950 |
| **G** | Lenght to the front tyres | mm | 4790 | 4830 |
| **H** | Lenght to the attachment holding plate | mm | 6060 | 6570 |
| **I** | Ground clerance, center | mm | 390 | 430 |
| **J** | Max width with ext. outriggers | mm | 2890 | 2890 |
| **K** | Ground clerance, axle | mm | 441 | 491 |
| • | Inside turning radius | mm | 2425 | 2425 |
| • | Outside turning radius | mm | 4650 | 4650 |

TECHNICAL SPECIFICATION

## 2.2 TYRES

| | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|
| - Dimension | | 405/70-20 | 405/70-24 |
| - Load index | | 14 pr | 14 pr |
| - Rim | | 13x20 | 13x24 |
| - Wheel disc | | 8 holes DIN 70631 | 8 holes DIN 70631 |
| - Pressure | bar/Psi | 5.5/80 | 4.5/65 |

## 2.3 LIMIT OF USE

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| **M1** | Obstruction angle | ° | 40 | 40 |
| **M2** | Departure angle | ° | 46 | 46 |
| • | Min/max ambient temperature | °C | -20°/+40° | -20°/+40° |

## 2.4 WEIGHT

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Weight with fork | Kg | 9850 | 11600 |

## 2.5 SPEED

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Max speed*/** | Km/h | 5/28 | 5/28 |
| • | Max slope uphill*/** | ° | 13/23 | 13/23 |
| • | Towing capacity at dinamometer (max load) | kg | 3590 | 3590 |
| • | Towing capacity at dinamometer (with fork) | kg | 4105 | 4105 |
| • | Break-out force | Kg | 6000 (shovel 800lt SAE J732/80) | 6000 (shovel 800lt SAE J732/80) |
| • | Chassis levelling | ° | +/- 6 | +/- 6 |

## 2.6 PAYLOAD AND REACH

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Lifting height (max) with/without outriggers | mm | 13000/12810 | 17190/16720 |
| • | Forward reach (max) | mm | 9080 | 13330 |
| • | Reach at maximum height | mm | 1900 | 3560 |
| • | Fork-holder plate rotation | ° | 138 | 138 |
| • | Lifting capacity (max) | kg | 4000 | 4000 |
| • | Lift capacity at maximum height | kg | 3000 | 2000 |
| • | Lift capacity at maximum reach | kg | 1250 | 700 |
| • | Floor loading* with/without outriggers | kPa | 469/479 | 397/522 |

## 2.7 FORKS (FLOATING TYPE)

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Dimension | mm | 1200x120x50 | 1200x120x50 |
| • | Weight | Kg | 70 | 70 |

## 2.8 DIESEL ENGINE

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Make | | PERKINS | PERKINS |
| • | Model/Type | | 1104 / D-44T | 1104 / D-44T |
| • | Total displacement | $cm^3$ | 4,4 | 4,4 |
| • | Cylinder arrangement | | vertical in-line | vertical in-line |
| • | Combustion system | | direct injection | direct injection |
| • | Max power output (@ 2200 rpm) | kW | 74,5 | 74,5 |
| • | Max torque output (@ 1400 rpm) | Nm | 392 | 392 |
| • | Aspiration | | turbocharged | turbocharged |
| • | Cylinder's number | | 4 | 4 |
| • | Bore x Stroke | mm | 105x127 | 105x127 |

** Max Load; **With Fork*

## 2.9 HYDRAULIC SYSTEM

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Make | | PERKINS | PERKINS |
| • | Hydraulic output | L/min | 95 | 95 |
| • | Pressure | bar | 270 | 270 |

## 2.10 ELECTRICAL SYSTEM

| | | | GTH-4013 SX GTH-4017 SX |
|---|---|---|---|
| • | Voltage | V | 12 |
| • | Tension | Ah | 120 |

TECHNICAL SPECIFICATION

## 2.11 MACHINE SOUNDS LEVEL

- Not applicable

## 2.12 VIBRATION LEVEL

| | | | GTH-4013 SX GTH-4017 SX |
|---|---|---|---|
| • | Vibrations (at seat level) | $m/s^2$ | 0,23 |

Values calculated in accordance with standard prEN13059

**CAUTION**

***This is a Class A device. In a residential environment, such device can cause radio disturbance. In such cases, the operator is required to take suitable measures.***

## 2.13 REFUELLING

| | | | GTH-4013 SX | GTH-4017 SX |
|---|---|---|---|---|
| • | Make | | PERKINS | PERKINS |
| • | Diesel engine | l | 7 | 7 |
| • | Fuel tank | l | 135 | 135 |
| • | Hydraulic system tank | l | 150 | 150 |
| • | Front differential gear with reduction gear | l | 8,7 | 8,7 |
| • | Rear differential gear | l | 8,7 | 8,7 |
| • | Front wheel reduction gears | l | 0,75 | 0,75 |
| • | Rear wheel reduction gears | l | 0,75 | 0,75 |
| • | Engine coolant | l | 15 | 15 |

**Products**:

Engine Oil: **SHELL RIMULA SAE 15W-40 (API CH-4/CG-4/CF-4/CF; ACEA E3; MB228.3)**

Power divider-Differential gears- Reduction gears: **TRACTORENAULT THFI 208 LF SAE 80W; API GL4 / FORD M2C 86B; MASSEY FERGUSON M 1135**

Hydraulic system and brakes: **SHELL TELLUS T 46; DENISON HF-1, DIN 51524 part.2 e 3**

## 2.14 TIGHTENING TORQUES

| Thread diameter | Pitch | Wrench measure mm | | | | Tightening torques Material class | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S | S | | | 8.8 | | 10.9 | | 12.9 | |
| | | | UNI | UNI | UNI | Normali | Zincate | Normali | Zincate | Normali | Zincate |
| mm | mm | | 5931/32 | 5933÷36 | 5923÷30 | Nm | Nm | Nm | Nm | Nm | Nm |
| 4 | 0,7 | 7 | 3 | 2,5 | 2 | 3,2 | 2,8 | 4,4 | 3,9 | 5,3 | 4,8 |
| 5 | 0,8 | 8 | 4 | 3 | 2,5 | 6,1 | 5,5 | 8,7 | 7,8 | 10,3 | 9,3 |
| 6 | 1 | 10 | 5 | 4 | 3 | 10,6 | 9,5 | 14,8 | 13,3 | 17,8 | 16,0 |
| 8 | 1,25 | 13 | 6 | 5 | 4 | 25,1 | 22,5 | 35,4 | 31,8 | 42,5 | 30,2 |
| | 1 | 13 | 6 | 5 | 4 | 26,5 | 23,8 | 37,3 | 33,5 | 44,7 | 40,3 |
| 10 | 1,5 | 17 | 8 | 6 | 5 | 51,1 | 46,0 | 71,9 | 64,7 | 86,3 | 77,6 |
| | 1,25 | 17 | 8 | 6 | 5 | 53,4 | 48,1 | 75,1 | 67,5 | 90,2 | 81,1 |
| 12 | 1,75 | 19 | 10 | 8 | 6 | 86,5 | 77,8 | 121,4 | 109,2 | 145,9 | 131,3 |
| | 1,25 | 19 | 10 | 8 | 6 | 92,4 | 83,2 | 129,5 | 116,6 | 156,1 | 140,5 |
| 14 | 2 | 22 | 12 | 10 | 6 | 137,7 | 123,9 | 193,8 | 174,4 | 232,6 | 209,3 |
| | 1,5 | 22 | 12 | 10 | 6 | 145,9 | 131,3 | 206,1 | 185,5 | 246,9 | 222,0 |
| 16 | 2 | 24 | 14 | 10 | 8 | 209,1 | 188,2 | 293,8 | 264,4 | 353,0 | 317,7 |
| | 1,5 | 24 | 14 | 10 | 8 | 218,3 | 196,5 | 308,1 | 277,3 | 369,3 | 332,4 |
| 18 | 2,5 | 27 | 14 | 12 | 8 | 288,7 | 259,8 | 406,1 | 365,5 | 487,7 | 436,9 |
| | 1,5 | 27 | 14 | 12 | 8 | 314,2 | 282,8 | 442,8 | 398,5 | 530,6 | 477,5 |
| 20 | 2,5 | 30 | 17 | 12 | 10 | 408,1 | 367,3 | 573,4 | 516,1 | 687,7 | 618,9 |
| | 1,5 | 30 | 17 | 12 | 10 | 439,7 | 395,8 | 619,3 | 557,4 | 742,8 | 662,5 |
| 22 | 2,5 | 32 | 17 | - | 12 | 542,3 | 488,5 | 763,2 | 686,9 | 915,3 | 823,7 |
| | 1,5 | 32 | 17 | - | 12 | 582,6 | 524,3 | 819,3 | 737,4 | 983,6 | 885,3 |
| 24 | 3 | 36 | 19 | - | 12 | 705,1 | 634,5 | 990,8 | 891,7 | 1193,3 | 1074,4 |
| | 2 | 36 | 19 | - | 12 | 745,3 | 671,3 | 1051,0 | 945,9 | 1255,1 | 1129,5 |
| 27 | 3 | 41 | 19 | - | - | 1036,0 | 927,5 | 1448,9 | 1304,0 | 1734,6 | 1561,2 |
| | 2 | 41 | 19 | - | - | 1091,8 | 982,6 | 1530,6 | 1377,5 | 1836,7 | 1653,0 |
| 30 | 3,5 | 46 | 22 | - | - | 1307,9 | 1258,1 | 1989,3 | 1772,4 | 2357,1 | 2121,4 |
| | 2 | 46 | 22 | - | - | 1510,2 | 1359,1 | 2122,4 | 1910,2 | 2540,8 | 2286,7 |
| 33 | 3,5 | 50 | 24 | - | - | 2000,0 | 1800,0 | 2800,0 | 2520,0 | 3400,0 | 3060,0 |
| | 2 | 50 | 24 | - | - | 1610,0 | 1450,0 | 2300,0 | 2070,0 | 2690,0 | 2420,0 |
| 36 | 4 | 55 | 27 | - | - | 2600,0 | 2340,0 | 3700,0 | 3330,0 | 4300,0 | 3870,0 |
| | 3 | 55 | 27 | - | - | 2800,0 | 2520,0 | 3900,0 | 3510,0 | 4600,0 | 4140,0 |
| 39 | 4 | 60 | 27 | - | - | 3400,0 | 3060,0 | 4800,0 | 4320,0 | 5600,0 | 5040,0 |
| | 3 | 60 | 27 | - | - | 3600,0 | 3240,0 | 5100,0 | 4590,0 | 5900,0 | 5310,0 |

TECHNICAL SPECIFICATION

| Thread diameter | Pitch | Standard nuts | | Low nuts | |
|---|---|---|---|---|---|
| | | 5S | 8G | 5S | 8G |
| | | Nm | Nm | Nm | Nm |
| 4 | 0,7 | 5,5 | | 3,5 | |
| 5 | 0,8 | 5,5 | | 3,5 | |
| 6 | 1 | 9,5 | 13,0 | 6,0 | 8,0 |
| 8 | 1,25 | 23,0 | 32,0 | 14,0 | 20,0 |
| | 1 | 25,0 | 35,0 | 16,0 | 22,0 |
| 10 | 1,5 | 46,0 | 64,0 | 29,0 | 40,0 |
| | 1,25 | 49,0 | 68,0 | 31,0 | 42,0 |
| 12 | 1,75 | 80,0 | 110,0 | 50,0 | 69,0 |
| | 1,25 | 88,0 | 125,0 | 55,0 | 78,0 |
| 14 | 2 | 125,0 | 180,0 | 78,0 | 110,0 |
| | 1,5 | 140,0 | 195,0 | 88,0 | 120,0 |
| 16 | 2 | 195,0 | 275,0 | 120,0 | 170,0 |
| | 1,5 | 210,0 | 295,0 | 130,0 | 185,0 |
| 18 | 2,5 | 270,0 | 390,0 | 170,0 | 245,0 |
| | 1,5 | 305,0 | 425,0 | 190,0 | 265,0 |
| 20 | 2,5 | 305,0 | 540,0 | 190,0 | 340,0 |
| | 1,5 | 425,0 | 600,0 | 260,0 | 375,0 |
| 22 | 2,5 | 510,0 | 720,0 | 320,0 | 450,0 |
| | 1,5 | 570,0 | 800,0 | 360,0 | 500,0 |
| 24 | 3 | 660,0 | 930,0 | 410,0 | 580,0 |
| | 2 | 720,0 | 1000,0 | 450,0 | 630,0 |
| 27 | 3 | 980,0 | 1400,0 | 610,0 | 880,0 |
| | 2 | 1050,0 | 1500,0 | 660,0 | 940,0 |
| 30 | 3,5 | 1350,0 | 1850,0 | 850,0 | 1160,0 |
| | 2 | 1450,0 | 2050,0 | 910,0 | 1280,0 |
| 33 | 3,5 | 1650,0 | 2310,0 | 1050,0 | 1470,0 |
| | 2 | 1980,0 | 2770,0 | 1270,0 | 1780,0 |
| 36 | 4 | 2120,0 | 2970,0 | 1360,0 | 1900,0 |
| | 3 | 2550,0 | 3570,0 | 1630,0 | 2280,0 |
| 39 | 4 | 2730,0 | 3820,0 | 1750,0 | 2450,0 |
| | 3 | 3250,0 | 4550,0 | 2080,0 | 2910,0 |

## 2.15 DRILL DIAMETERS FOR THREADS

| *Thread x pitch* | *DRILL DIAMETER LIMITS* | | *DRILL BIT DIAMETER* |
|---|---|---|---|
| | *max* | *min* | |
| M 4 x 0,7 | 3,42 | 3,24 | 3,30 |
| x 0,5 | 3,60 | 3,46 | 3,50 |
| M 5 x 0,8 | 4,33 | 4,13 | 4,20 |
| x 0,5 | 4,60 | 4,46 | 4,50 |
| M 6 x 1 | 5,15 | 4,92 | 5,00 |
| x 0,75 | 5,38 | 5,19 | 5,20 |
| M 8 x 1,25 | 6,91 | 6,65 | 6,80 |
| x 1 | 7,15 | 6,92 | 7,00 |
| M 10 x 1,5 | 8,87 | 8,38 | 8,50 |
| x 1,25 | 9,38 | 9,19 | 9,20 |
| M 12 x 1,75 | 10,44 | 10,10 | 10,20 |
| x 1,5 | 10,68 | 10,38 | 10,50 |
| M 14 x 2 | 12,21 | 11,83 | 12,00 |
| x 1,5 | 12,68 | 12,38 | 12,50 |
| M 16 x 2 | 14,21 | 13,84 | 14,00 |
| x 1,5 | 14,68 | 14,38 | 14,50 |
| M 18 x 2,5 | 15,74 | 15,29 | 15,50 |
| x 1,5 | 16,68 | 16,38 | 16,50 |
| M 20 x 2,5 | 17,74 | 17,29 | 17,50 |
| x 1,5 | 18,68 | 18,38 | 18,50 |
| M 22 x 2,5 | 19,74 | 19,29 | 19,50 |
| x 1,5 | 20,68 | 20,38 | 20,50 |
| M 24 x 3 | 21,25 | 20,75 | 21,00 |
| x 2 | 22,21 | 21,83 | 22,00 |
| M 27 x 3 | 24,25 | 23,75 | 24,00 |
| x 2 | 25,21 | 24,83 | 25,00 |
| M 30 x 3,5 | 26,77 | 26,21 | 26,50 |
| x 3 | 27,25 | 26,75 | 27,00 |
| M 33 x 3,5 | 27,77 | 29,21 | 29,50 |
| x 2 | 31,21 | 30,83 | 31,00 |
| M 36 x 4 | 32,27 | 31,65 | 32,00 |
| x 3 | 33,25 | 32,75 | 33,00 |
| M 39 x 4 | 35,27 | 34,67 | 35,00 |
| x 3 | 36,25 | 35,75 | 36,00 |

TECHNICAL SPECIFICATION

## 2.16 STANDARD TIGHTENING TORQUES FOR FITTING SEALS

### ▫ 60° CONICAL SEALS

| *Thread diameter* | | *TIGHTENING TORQUES (0+10%)* |
|---|---|---|
| *inc.* | *mm* | *60° CONICAL SEALS Nm* |
| G 1/8" | | 15 |
| G 1/4" | M 10 x 1 | 20 |
| 9/16"-18 | | 25 |
| 11/16"-16 | | 40 |
| 13/16"-16 | | 55 |
| 3/4"-16 | | 62 |
| 1"-14 | | 80 |
| 7/8"-14 | | 80 |
| 1.1/16"-12 | | 110 |
| 1.3/16"-12 | | 115 |
| 1.5/16"-12 | | 160 |
| 1.7/16"-12 | | 130 |
| 1.11/16"-12 | | 190 |
| 1.5/8"-12 | | 225 |
| 1.7/8"-12 | | 270 |
| 2"-12 | | 245 |
| 2.1/4"-12 | | 360 |

### ▫ FRONT O-LOK (Parker) SEALS

| *Thread diameter* | | *TIGHTENING TORQUES (0+10%)* |
|---|---|---|
| *inc.* | *mm* | *FRONT O-LOK (PARKER) SEALS Nm* |
| 9/16"-18 | | 25 |
| 11/16"-16 | | 40 |
| 13/16"-16 | | 55 |
| 1"-14 | | 80 |
| 1.3/16"-12 | | 115 |
| 1.7/16"-12 | | 130 |
| 1.11/16"-12 | | 190 |
| 2"-12 | | 245 |

### ▫ 37° COUNTER-SUNK CONICAL SEALS (JIC)

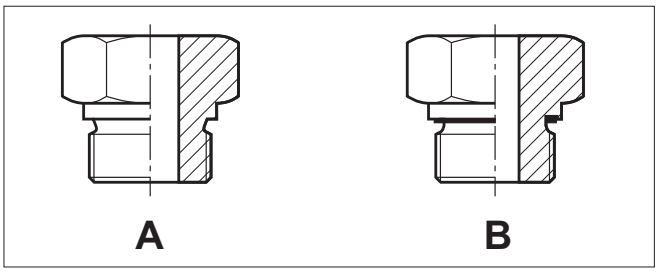
| *Thread diameter* | | *TIGHTENING TORQUES (0+10%)* |
|---|---|---|
| *inc.* | *mm* | *37° CONICAL SEALS (JIC) Nm* |
| 7/16"-20 | M10x1 | 15 |
| 1/2"-20 | M12x1.5 | 20 |
| 9/16"-18 | M14x1.5 | 28 |
| | M16x1.5 | 62 |
| 3/4"-16 | M18x1.5 | 62 |
| 7/8"-14 | M22x1.5 | 80 |
| 1.1/16"-12 | M27x2 | 110 |
| 1.3/16"-12 | | 141 |
| 1.5/16"-12 | M33x2 | 160 |
| 1.5/8"-12 | M42x2 | 225 |
| 1.7/8"-12 | M48x2 | 270 |
| 2.1/4"-12 | M10x1 | 360 |

## SEALS WITH GRIP-RING

| Thread diameter inc. | Thread diameter mm | Fitting Series | Pipe ø mm | TIGHTENING TORQUE (0+10%) SEALS WITH GRIP-RING Nm |
|---|---|---|---|---|
| G 1/8" | M10x1 | LL | 4 | 10 |
| G 1/8" | M10x1 | LL | 6 | 10 |
| G 1/8" | M10x1 | L | 6 | 25 |
| G 1/4" | M12x1.5 | L | 8 | 50 |
| G 1/4" | M14x1.5 | L | 10 | 50 |
| G 1/8" | M20x1.5 | L | 12 | 130 |
| G 1/8" | M20x1.5 | L | 15 | 190 |
| G 1/8" | M20x1.5 | L | 18 | 245 |
| G 1/8" | M20x1.5 | L | 22 | 130 |
| G 1/8" | M20x1.5 | L | 28 | 190 |
| G 1/8" | M20x1.5 | L | 35 | 245 |
| G 1/8" | M20x1.5 | L | 42 | 245 |
| G 1/4" | M12x1.5 | S | 6 | 50 |
| G 1/4" | M14x1.5 | S | 8 | 50 |
| G 3/8" | M16x1.5 | S | 10 | 80 |
| G 3/8" | M18x1.5 | S | 12 | 80 |
| G 1/2" | M22x1.5 | S | 16 | 105 |
| G 3/4" | M27x2 | S | 20 | 220 |
| G 1" | M33x2 | S | 25 | 370 |
| G 1.1/4" | M42x2 | S | 30 | 500 |
| G 1.1/2" | M48x2 | S | 38 | 600 |

## FITTING ASSEMBLY

| Thread diameter inc. | Thread diameter mm | TIGHTENING TORQUE (0+10%) JOINTS A Nm | TIGHTENING TORQUE (0+10%) JOINTS B Nm |
|---|---|---|---|
| G 1/8" | M10x1 | 25 | 12 |
| | M12x1.5 | 30 | 18 |
| G 1/4" | | 40 | 18 |
| | M14x1.5 | 50 | 20 |
| | M16x1.5 | 60 | 35 |
| | M18x1.5 | 80 | 50 |
| G 3/8" | | 95 | 40 |
| | M20x1.5 | 140 | 60 |
| G 1/2" | M22x1.5 | 140 | 75 |
| | M26x1.5 | 220 | 85 |
| G 3/4" | | 250 | 110 |
| | M27x2 | 250 | 100 |
| G 1" | | 400 | 190 |
| | M33x2 | 400 | 150 |
| G 1.1/4" | | 600 | 240 |
| | M42x2 | 600 | 260 |
| G 1.1/2" | | 800 | 300 |
| | M48x2 | 800 | 350 |




**A** Male face
Mechanical seal or copper washer

**B** Male face
Soft seal with O-ring

TECHNICAL SPECIFICATION

## 2.17 LOCKING MATERIAL

### THREAD LOCKERS

| *Product* | *APPLICATION* | *Characteristics* *Temp. °C* | *Thread* | *Locking speed* | *Resistance* |
|---|---|---|---|---|---|
| Loctite 290 | Thread locking | to 150° | M 12 | Rapid | Medium |
| Loctite 222 | Thread locking | to 150° | M 20 | Moderate | Low |
| Loctite 243 | Thread locking | to 150° | M 20 | Rapid | Medium |
| Loctite 262 | Thread locking | to 150° | M 20 | Moderate | High |
| Loctite 270 | Thread locking | to 150° | M 20 | Moderate | Very high |
| Loctite 277 | Thread locking | to 150° | M 36 | Slow | High |
| Loctite 272 | Thread locking | to 200° | M 36 | Slow | High |

**THREAD SEALANT** For hermetic sealing. Not suitable for thermoplastic materials

| *Product* | *APPLICATION* | *Characteristics* *max °C* | *Thread max* | *type* | *Locking speed* | *Disassembly difficulty* |
|---|---|---|---|---|---|---|
| Loctite 511 | Fitting sealant | 150° | M80 | Con./Cyl. | Rapid | Low |
| Loctite 542 | Fitting sealant | 150° | M36 | Con./Cyl. | Rapid | Moderate |
| Loctite 545 | Fitting sealant | 150° | M36 | Con./Con. | Moderate | Low |
| Loctite 565 | Fitting sealant | 150° | M80 | Con./Cyl. | Instantaneous | Low |
| Loctite 572 | Fitting sealant | 150° | M80 | Con./Cyl. | Moderate | Low |
| Loctite 577 | Fitting sealant | 150° | M80 | Con./Cyl. | Rapid | Moderate |

**GASKETS** Total sealing in 24-72 hours

| *Product* | *APPLICATION* | *Characteristics* *max °C* | *Play max mm* | *Formation time* | *Resistance to fluids* |
|---|---|---|---|---|---|
| Loctite 518 | Formed-in-place gasket | 150° | 0,5 | Moderate | Excellent |
| Loctite 509 | Formed-in-place gasket | 150° | 0,2 | Moderate | Excellent |
| Loctite 573 | Formed-in-place gasket | 150° | 0,2 | Slow | Excellent |
| Loctite 574 | Formed-in-place gasket | 150° | 0,5 | Rapid | Excellent |
| Loctite 510 | Formed-in-place gasket | 200° | 0,2 | Moderate | Excellent |
| Loctite 5699 | Formed-in-place gasket | 200° | 6,0 | Rapid | Excellent |
| Loctite 5999 | Formed-in-place gasket | 200° | 6,0 | Instantaneous | Excellent |
| Loctite 5910 | Formed-in-place gasket | 200° | 6,0 | Rapid | Excellent |
| Loctite 5900 | Formed-in-place gasket | 200° | 6,0 | Instantaneous | Excellent |
| Loctite 5920 | Formed-in-place gasket | 250° | M 36 | Slow | Good |

## 2.18 HOISTING INSTRUCTIONS

**DANGER**

***All parts weighing more than 25 kg MUST COMPULSORILY be handled with suitable hoisting means. In the Disassembly and Assembly section there is a clear indication of the weight of the part to handle, while chapter A.12 contains a summary table with the weight of the single components.***

Before removing parts of the machine, make sure that:

- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

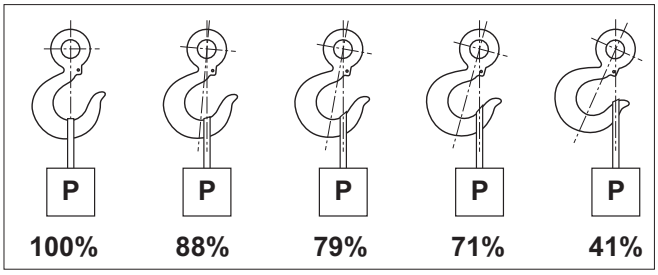
**STRANDED ROPES**

- Use ropes or other hoisting accessories suitable to the weight of the part to be handled. For ropes, refer to the following table:

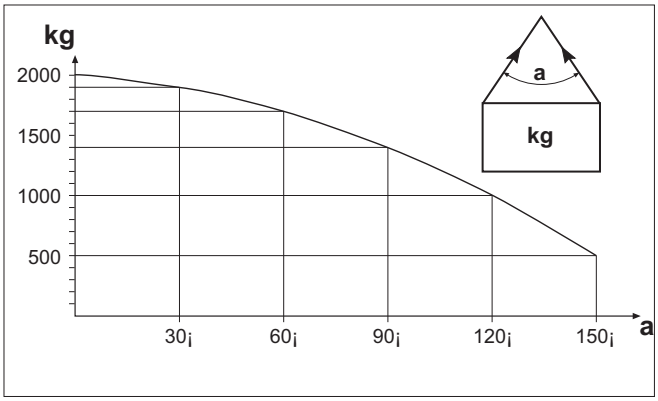
| STRANDED ROPES | |
|---|---|
| Rope diameter mm | Max admissible load kg |
| 10 | 1000 |
| 11.2 | 1400 |
| 12.5 | 1600 |
| 14 | 2200 |
| 16 | 2800 |
| 18 | 3600 |
| 20 | 4400 |
| 22.4 | 5600 |
| 30 | 10000 |
| 40 | 18000 |
| 50 | 28000 |
| 60 | 40000 |

The value of the admissible load has been considered as equal to 1/6 the rope breaking load.

- Attach the load to the natural seat of the hook. Attaching a load to an end can cause the load to fall down during raising and result in serious injury.




- Do not attach a heavy load to ropes forming a wide suspension angle. The total capacity of the ropes reduces proportionally to the angle as shown in the following chart.



TECHNICAL SPECIFICATION

## 2.19 ADVICE TO RENEW FLEXIBLE HOSES

**PROTECT THE ENVIRONMENT**

***Before disconnecting a hydraulic pipe, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

***Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.***

**DANGER**

***Before disconnecting the hydraulic pipe, check that there is no residual pressure. In case, eliminate the pressure operating the control levers with the engine stopped. In any case, disconnect the hydraulic pipe with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc. Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.***

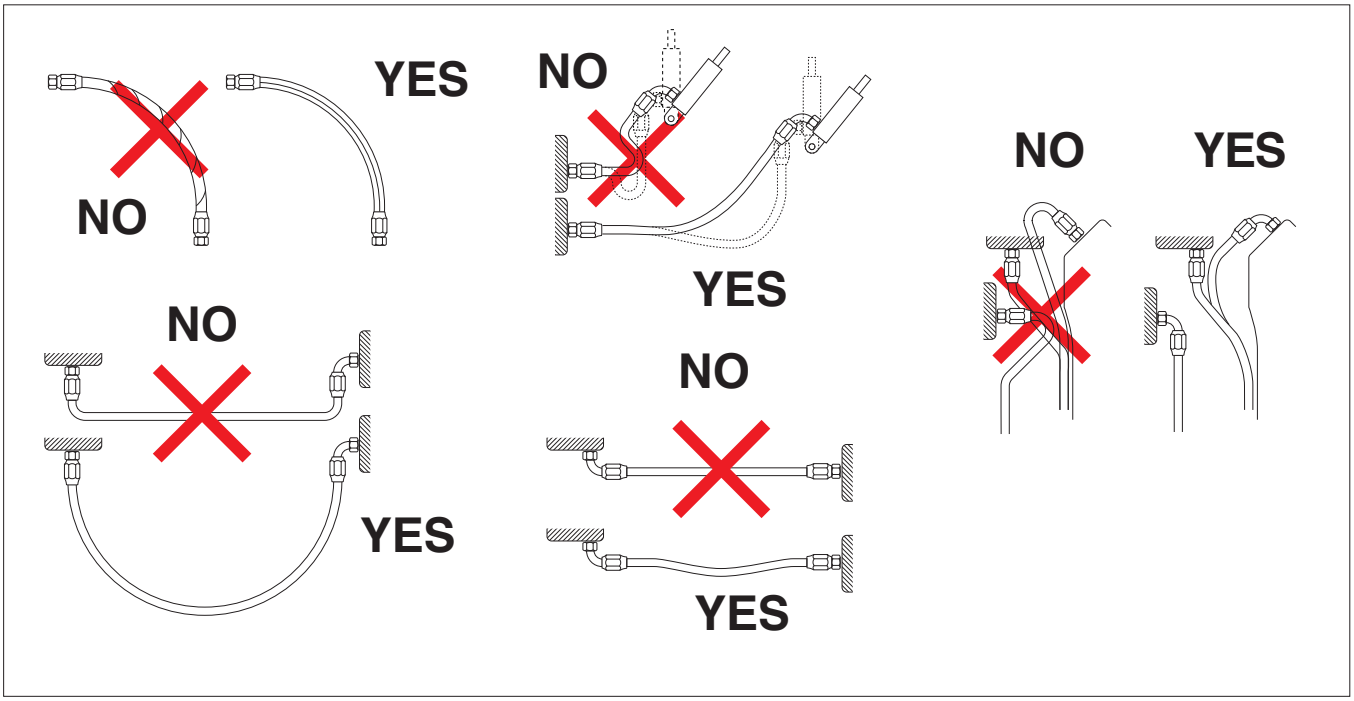
1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.

2 Blow some compressed air to remove any impurity.

3 For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:

- disconnect the hose to be replaced from both sides
- tie a cord to one end of the hose
- remove the hose pulling the cord until it comes out completely
- untie the cord and tie it to the new hose, make sure the hose has a cork to avoid dust and impurity in the circuit
- pull the cord from the other side to refit the hose until reaching the connecting point to the line.

**Useful advice for mounting flexible hoses:**



## 2.20 LIST OF RECOMMENDED SPARE PARTS GTH-4013 SX/GTH-4017 SX

| Cod. | Description | Q.ty |
|---|---|---|
| 07.4501.0085 | diesel filter | 1 |
| 07.4501.0084 | air filter | 1 |
| 07.4501.0057 | safety air filter | 1 |
| 638243 | engine air filter | 1 |
| 07.0700.0023 | hydraulic oil filter | 1 |
| 07.0704.0075 | solenoid | 1 |
| 09.4661.0014 | connector | 1 |
| 07.4529.0108 | levelling cylinder kit | 1 |
| 07.0709.0118 | nut | 1 |
| 640270 | kit | 1 |
| 09.4670.0004 | antivibrant element | 4 |
| 07.0712.0094 | plug | 1 |
| 09.0803.0360 | cover | 1 |
| 56.0013.0001 | diesel level | 1 |
| 07.4529.0106 | gasket kit | 1 |
| 04.4240.0025 | solenoid | 1 |
| 09.0805.0018 | hose | 1 |
| 09.0805.0005 | manifold | 1 |
| 53.3001.6000 | evaqueted smoke flexible hose | 1 |
| 09.4645.0000 | throttle cable | 1 |
| 640101 | gasket kit | 1 |
| 640102 | gasket kit | 1 |
| 04.0605.0505 | twin hose | 1 |
| 56.0009.0002 | horn | 1 |
| 09.4604.0045 | vacuometer | 1 |
| 07.0740.0050 | handle | 1 |
| 07.0740.0041 | glass | 1 |
| 07.0703.0494 | switch | 1 |
| 07.0703.0417 | speed switch | 1 |
| 07.0703.0418 | lights switch | 1 |
| 07.0704.0133 | handle | 1 |
| 07.0741.0011 | pushbutton | 1 |
| 07.0703.0029 | starter switch | 1 |
| 07.0703.0433 | switch | 1 |
| 07.0703.0125 | key | 1 |
| 56.0016.0022 | overload panel | 1 |
| 09.0802.0018 | load cell | 1 |
| 54.0702.0000 | pad | 4 |
| 54.0702.0001 | pad | 4 |
| 51.0804.9000 | pad shim | 4 |
| 07.4529.0110 | gasket kit | 1 |
| 07.4529.0109 | gasket kit | 1 |
| 04.4229.0024 | hose | 1 |
| 06.0401.0219 | o-ring | 2 |
| 637650 | fuse | 2 |
| 634972 | fuse | 2 |
| 634973 | fuse | 2 |
| 07.0703.0485 | relay | 2 |
| 07.0703.0487 | relay | 2 |
| 07.0703.0486 | relay | 2 |
| 56.0021.0073 | gear card | 1 |
| 56.0021.0057 | card | 1 |
| 56.0013.0036 | termistore | 1 |

TECHNICAL SPECIFICATION

| Cod. | Description | Q.ty |
|---|---|---|
| 07.0703.0192 | relay | 2 |
| 07.0703.0060 | fuse | 2 |
| 05.4329.0001 | pressure switch | 1 |
| 56.0012.0017 | sensore | 1 |
| 56.0010.0035 | light | 1 |
| 56.0010.0034 | light | 1 |
| 07.0703.0535 | relay | 1 |
| 56.0021.0071 | control unit | 1 |
| 07.0703.0640 | diode | 1 |
| 634975 | fuse | 1 |
| 56.0010.0005 | flashing beacon | 1 |
| 07.0703.0384 | bulb | 1 |

## 2.21 MACHINE PAINT COLOUR

### GENIE machine

**BLU GENIE**

**GREY GENIE**

**BLACK** RAL 9500

**RED**
RAL 3002
RAL 2002
RAL 3020

**YELLOW**
RAL 1003
RAL 1018
RAL 1007
RAL 1021
RAL 1016
RAL 1028

**ORANGE**
RAL 2009
RAL 2011
RAL 2004

**GREEN**
RAL 6029

**SUNBELT GREEN**

**WHITE**
RAL 9002
RAL 9010
RAL 9016
RAL 1013 TEREX

**GREY**
RAL 7039
RAL 7038
RAL 7032 TEREX

**BLU**
RAL 5002
RAL 5003
RAL 5010

## 2.22 CHECKING THE CYLINDER MOVEMENT TIMES

**CAUTION**

***The check of the movement times of the cylinders shall be done with the hydraulic oil at a temperature of 60° and with max engine speed.***

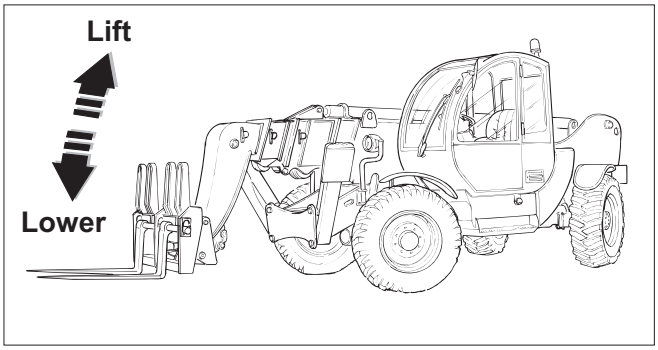
**CAUTION**

***To check the engine speed, the area easy to reach is the shaft of the CASAPPA pump.***
***Min engine speed = 950 rpm***
***Max engine speed = 2600 rpm***

### LIFT/LOWERING SPEED with fork

| GTH-4013 SX | Time (s) | |
|---|---|---|
| | Up | Down |
| **Regime motore max.** | **11"** | **8"** |

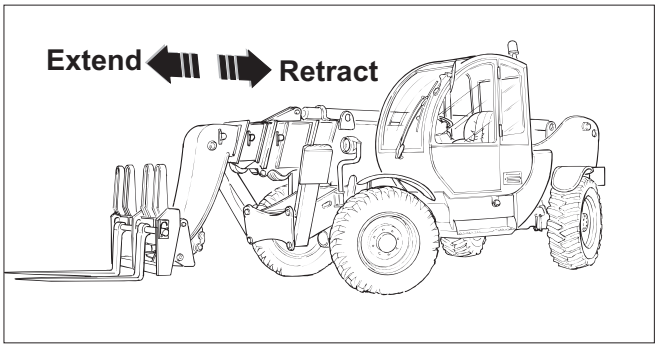
| GTH-4017 SX | Time (s) | |
|---|---|---|
| | Up | Dow |
| **Max eingine speed** | 11" | 8" |




### BOOM EXTENSION/RETRACTION with fork

| GTH-4013 SX | Time (s) | |
|---|---|---|
| | Out | In |
| **Regime motore max.** | **17"** | **16"** |

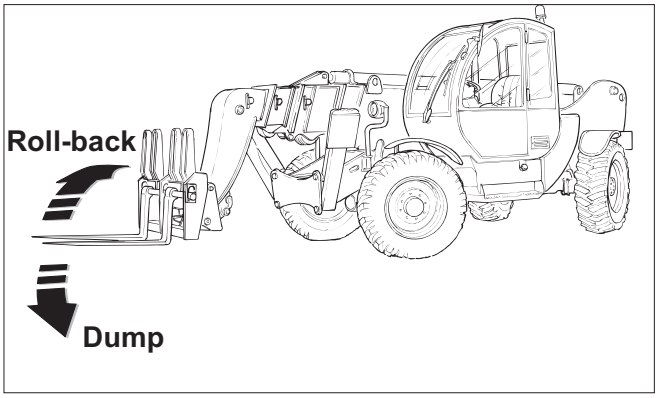
| GTH-4017 SX | Time (s) | |
|---|---|---|
| | Out | In |
| **Max eingine speed** | 26" | 18" |




### ATTACHMENT DUMPING with fork

| GTH-4013 SX | Time (s) | |
|---|---|---|
| | Roll-back | Dump |
| **Regime motore max.** | **4"** | **3"** |

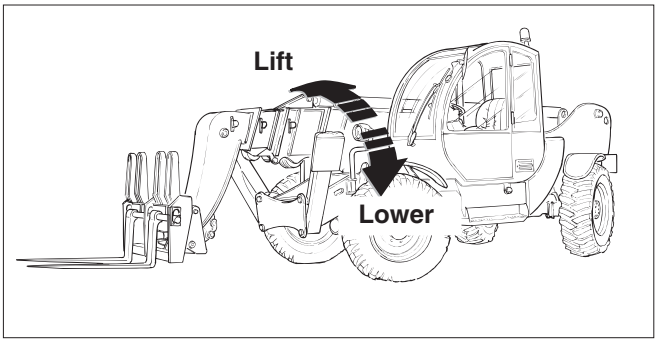
| GTH-4017 SX | Time (s) | |
|---|---|---|
| | Roll-back | Dump |
| **Max eingine speed** | 3" | 4" |



TECHNICAL SPECIFICATION

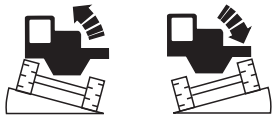
## OUTRIGGERS CONTROL

| GTH 4013 SX | Time (s) | |
|---|---|---|
| | Up | Down |
| **Max engine speed** | 6” | 7” |
| **Min engine speed** | 14” | 19” |




## MACHINE SWAY

| GTH 4013 SX | Time (s) | |
|---|---|---|
| | from right to left | - from left to right |
| **Max engine speed** | 13” | 12” |
| **Min engine speed** | 17” | 17” |



## 2.23 HYDRAULIC SETTINGS

### 1. PRELIMINARY OPERATIONS

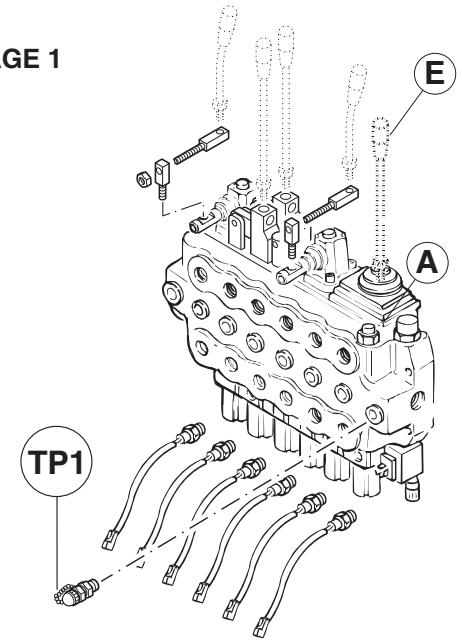
**Check that the engine idle is set at 950 rpm and that the engine maximum speed is set at 2350 rpm.**

Warm up the hydraulic oil to 60°C by keeping one of the elements of the boom main valve to full stroke under pressure.
To reach this temperature in a faster way, cover the oil core of the radiator with a carton in the case of a wateroil combined cooler, or the oil radiator if the machine is equipped with a separate oil radiator.

### 2. CALIBRATING THE BOOM MAIN VALVE

Lift the boom and put the ring on the lift cylinder rod. Disassemble the side cab carter, find the mini-socket **TP1** (see **image 1**) and fit a 0-400 bar manometer.

IMAGE 1




### 2.1 CALIBRATING THE MAIN VALVE PRESSURE CONTROL VALVE

Using a 13mm wrench, loosen the locknut of the pressure relief valve **A** of the main valve (see **image 1**). Using joystick **E**, with the engine running at max speed, lift completely the boom and set the valve A to 280 bar.

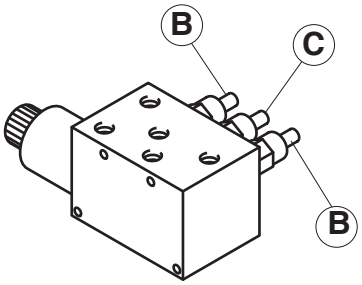
To check the safety valves **B** proceed as follows:

- Increase the pressure of valve **A** of the main valve to 310 bar moving the lifting cylinder to end of stroke.
- With the engine running at maximum speed, tilt the forks to one direction by means of the joystick and act on one of the two valves **B** (see **image 2**) until reaching a pressure of 295 bar. Adjust the second valve **B** by pitching the forks back.
- When both fork inclination valves have been calibrated, reset the pressure control valve to 280 bar by adjusting the adjustment screw **A**.
- With the engine at max speed, extend completely the 2nd boom section to the end of stroke. Check the pressure on mini-socket **TP1** is 230 bar, otherwise set it by valve **C** (see **image 2**).

**CAUTION**

***For safety reasons, do not hold the cylinder to end of stroke and do not let the engine run at max speed for more than 5 seconds.***

IMAGE 2



TECHNICAL SPECIFICATION

## 3. CHECK CALIBRATING HYDROSTATIC TRANSMISSION (IMAGE 3 AND ANNEX 1)

Do the calibration of the hydrostatic transmission with the hydraulic oil at 60°C.

- Connect a 0-60 bar manometer to the mini-socket **TP3** to read the boost pressure (see **image 3**).
- Connect a 0-60 bar manometer to the mini-socket **TP2** to read high pressure (see **image 3**).

**WARNING**

***During this operation, the operator has to be on the side of the machine.***

- Hold the selector to neutral position and make sure the maximum speed of the engine does not exceed 2350 giri/min. The engine must run at a idle speed of 950 rpm. Otherwise, adjust the minimum speed.
- Read the boost pressure on manometer **TP3** and ensure it is about 24 bar with the engine running at idle speed.
  The boost pressure has not a fixed value but varies from pump to pump. (from 20 to 29 bar)
- Hold the machine blocked using the brake pedal, disconnecting the incing electrical connection located on the service brake under the cab.
- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at maximum speed.
- Check the high-pressure value on the manometer **TP2** is 425 bar. (**annex 1**)

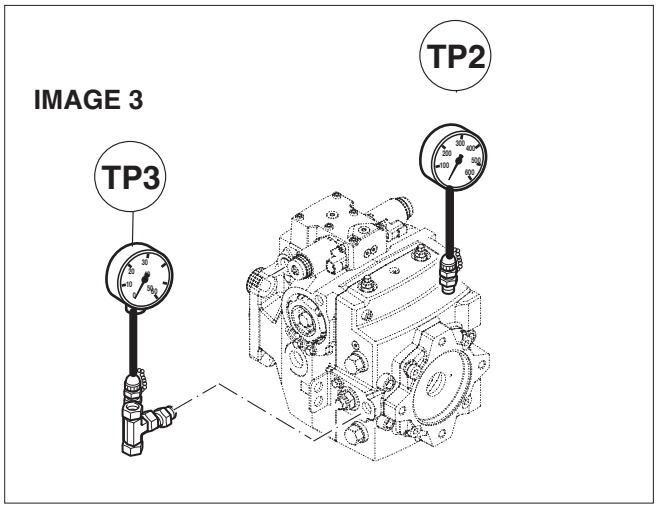



**IMAGE 3**

## 3.1 HYDROSTATIC TRANSMISSION PUMP (ANNEX 2)

Pump check points.

- A. high pression manometric socket MB.
- B. low pression manometric socket M3
- C. pressure cut-off valves (max 450 bar).
- D. high pression safety valves (480 bar)
- E. boost pressure valve.
- F. forward/revers speed solenoids

**Max. pressure of the valves C is 450 bar**

## 3.2 CHECK TRANSMISSION PILOTING (ANNEX 4)

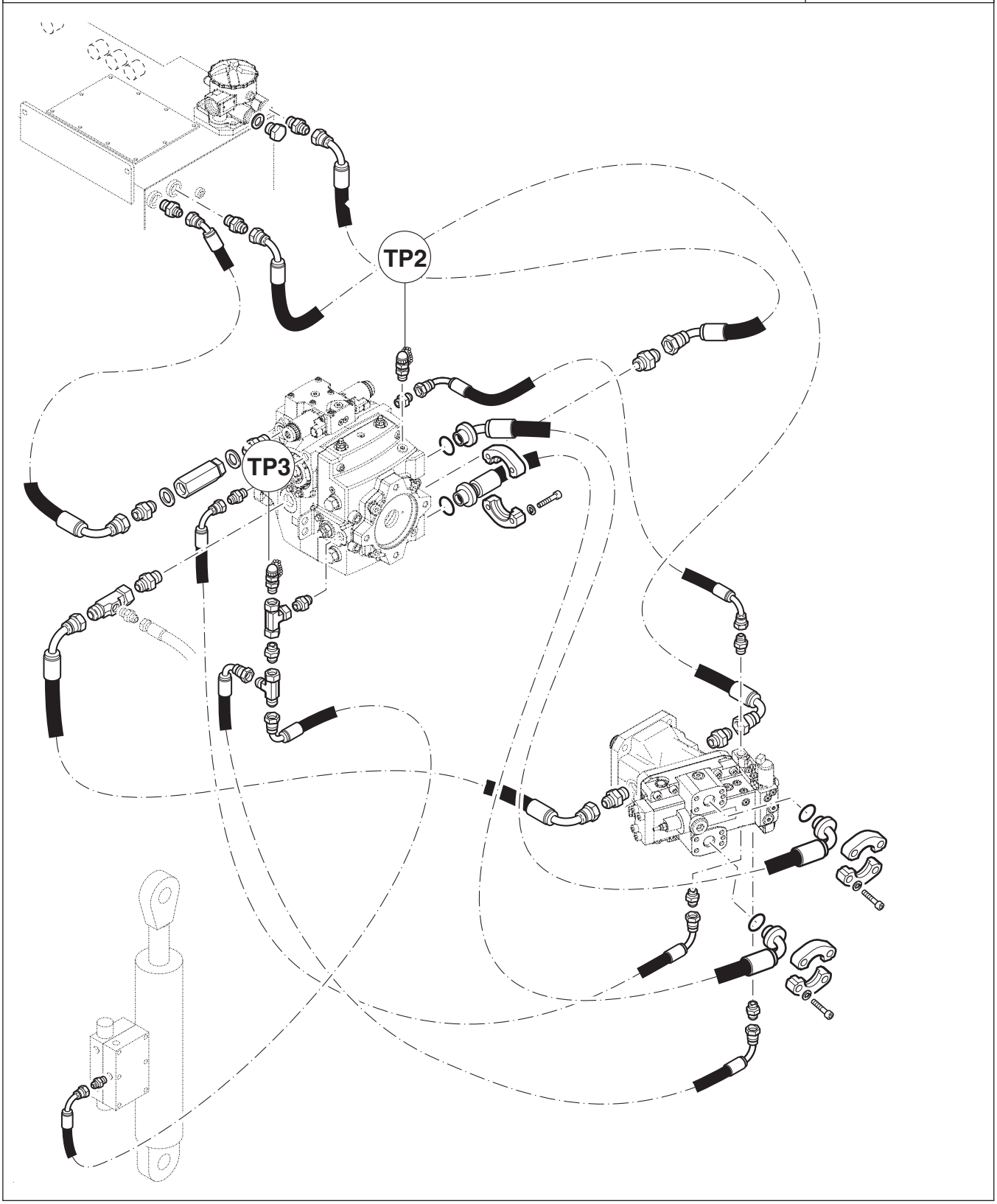
- Fit a 0-600 bar manometer to the transmission in M4
- Disconnect the incing electrical connection located on the service brake under the cab.
- Press down on the service brake by left foot.
- Set the forward or reverse speed.
- Run the engine at maximum speed.
- With engine at minimum rpm on M4, the value of manometer is equal to the value of boost pressure. Running the engine at maximum speed, the value of manometer rises and the piloting hoses are well connected: the M4 pump to the XB engine, the M5 pump to the XA engine.

## 4. CALIBRATING THE POWER STEERING

- Fit a coupling complete with mini-socket **Z** in the position shown in **annex 2**.
- Fit a 0-250 bar manometer to the mini-socket **Z**.
- Select the front axle steering mode.
- Move the steering cylinder to stroke end and make sure the value of the power steering **A** is 170 bar. If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

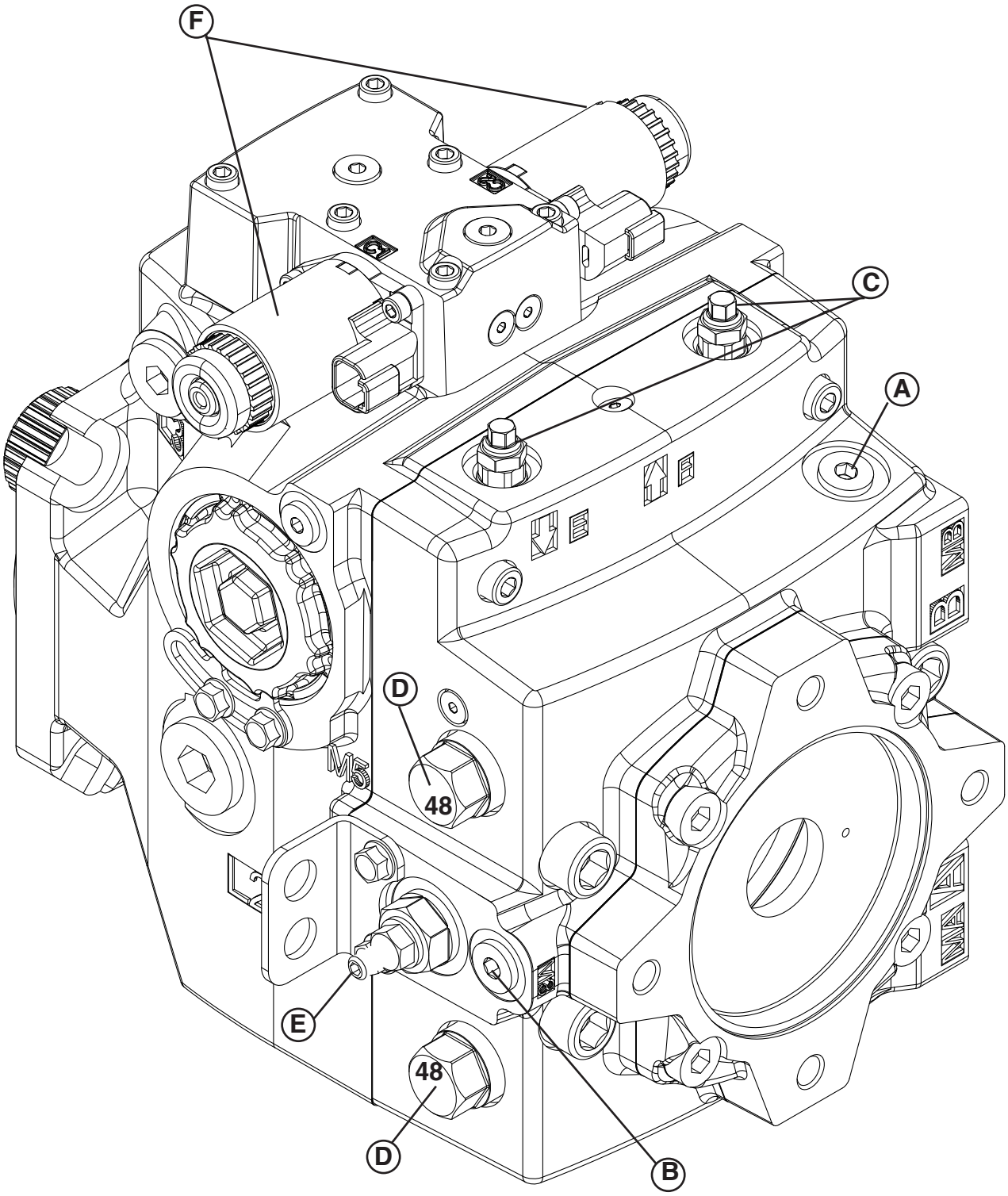
  **N.B.:** To gain access to valve **X**, remove the protection cap (**annex 3**).

| TRANSMISSION | annex 1 |
|---|---|

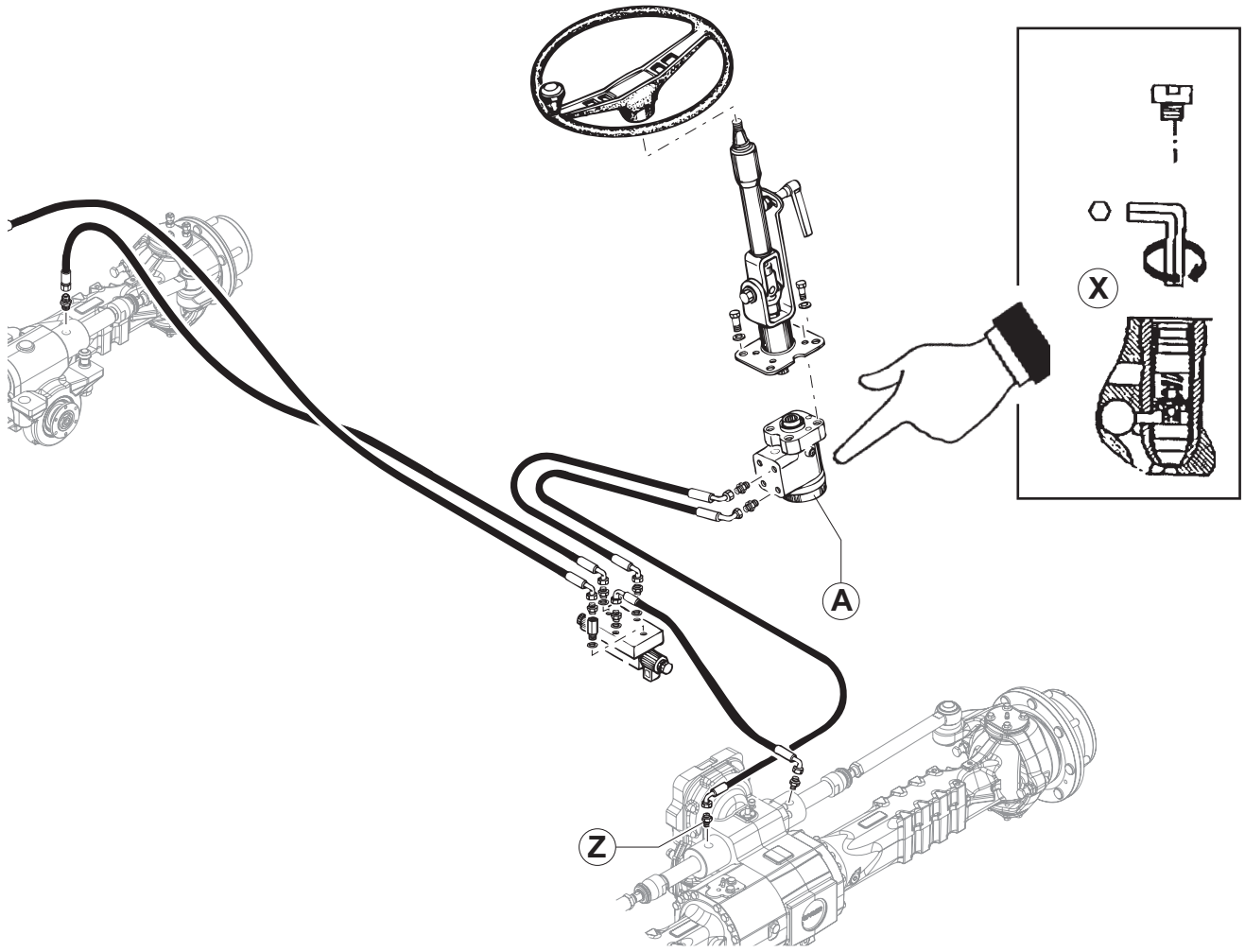


TECHNICAL SPECIFICATION

| TRANSMISSION PUMP | annex 2 |
|---|---|

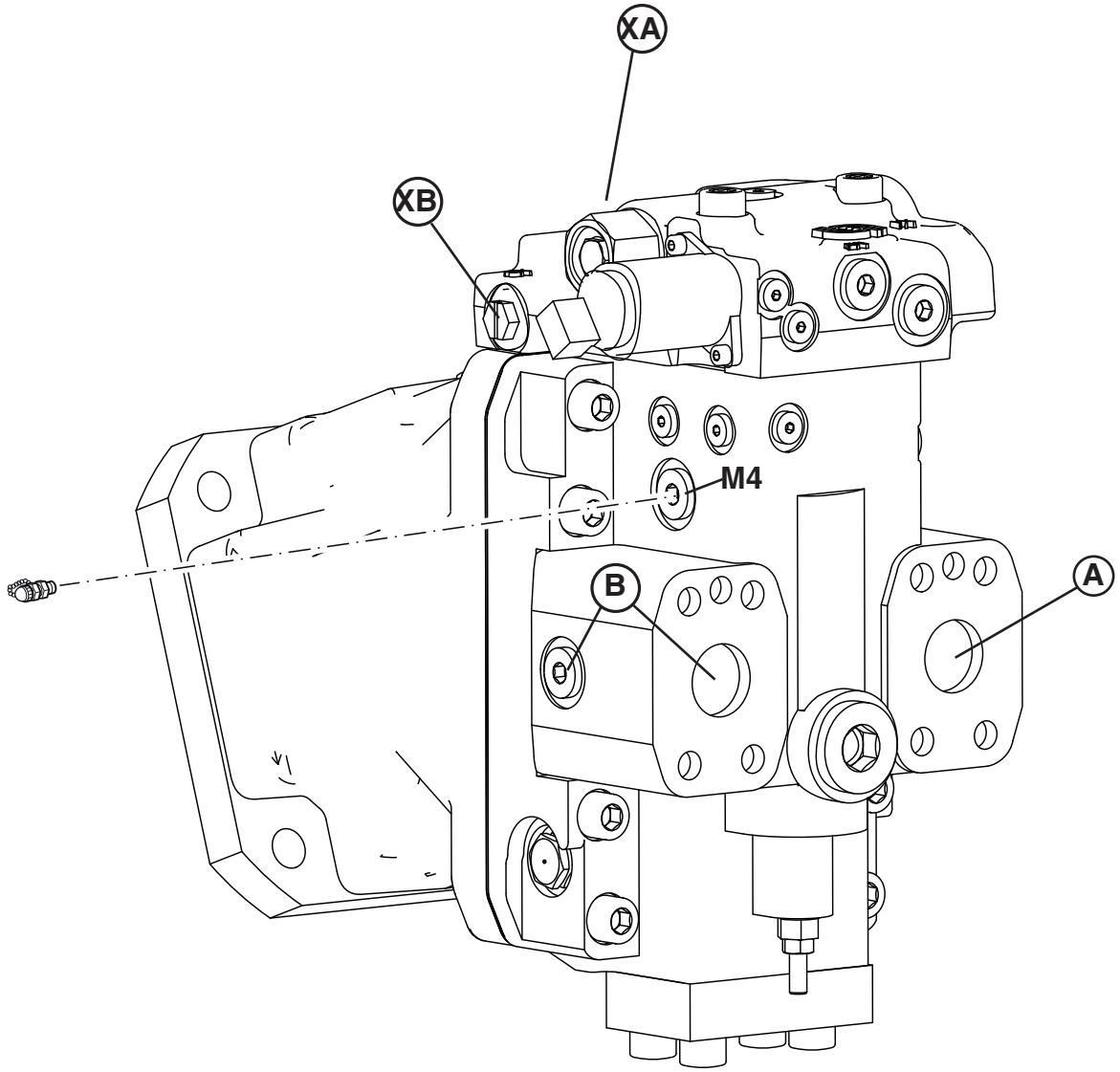


| POWER STEERING SYSTEM | annex 3 |
|---|---|



TECHNICAL SPECIFICATION

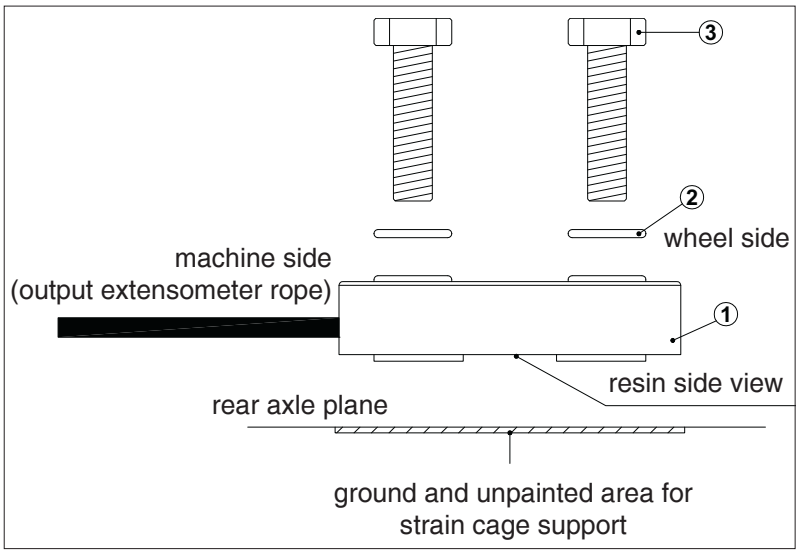
| TRANSMISSION ENGINE | annex 4 |
|---|---|



## 2.24 DLE SYSTEM

### INSTALLATION OF THE EXTENSIMETRIC CELL

**1** = strain cage
**2** = washer ø 10
**3** = fixing screw M10x40 cl. 10.9



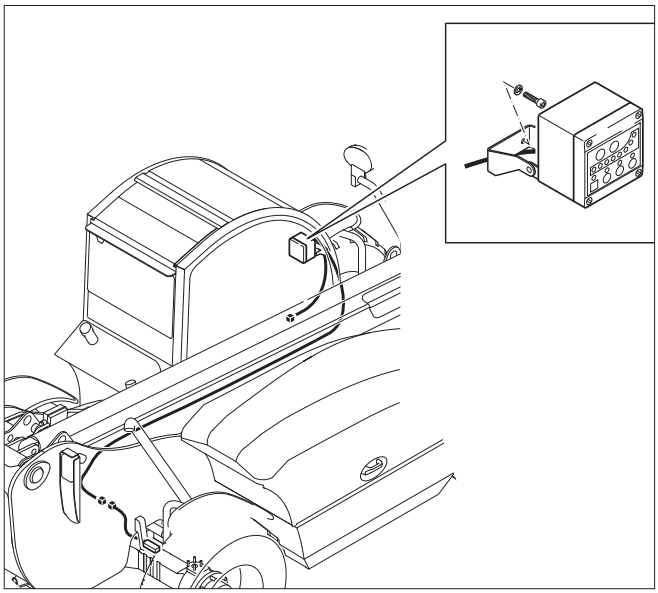

*To avoid damaging strain cage and to get maximum results, proceed as follows:*

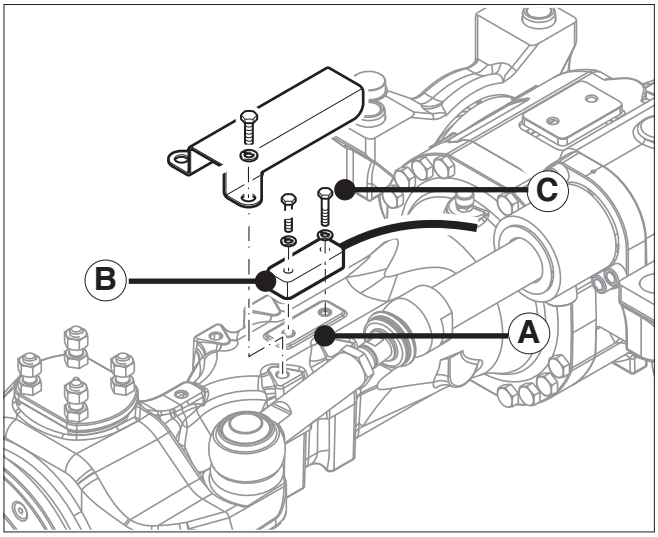
**1 - PREPARATION:**

- Thoroughly clean whole tightening system, especially the ground and unpainted area **A** of rear axle.

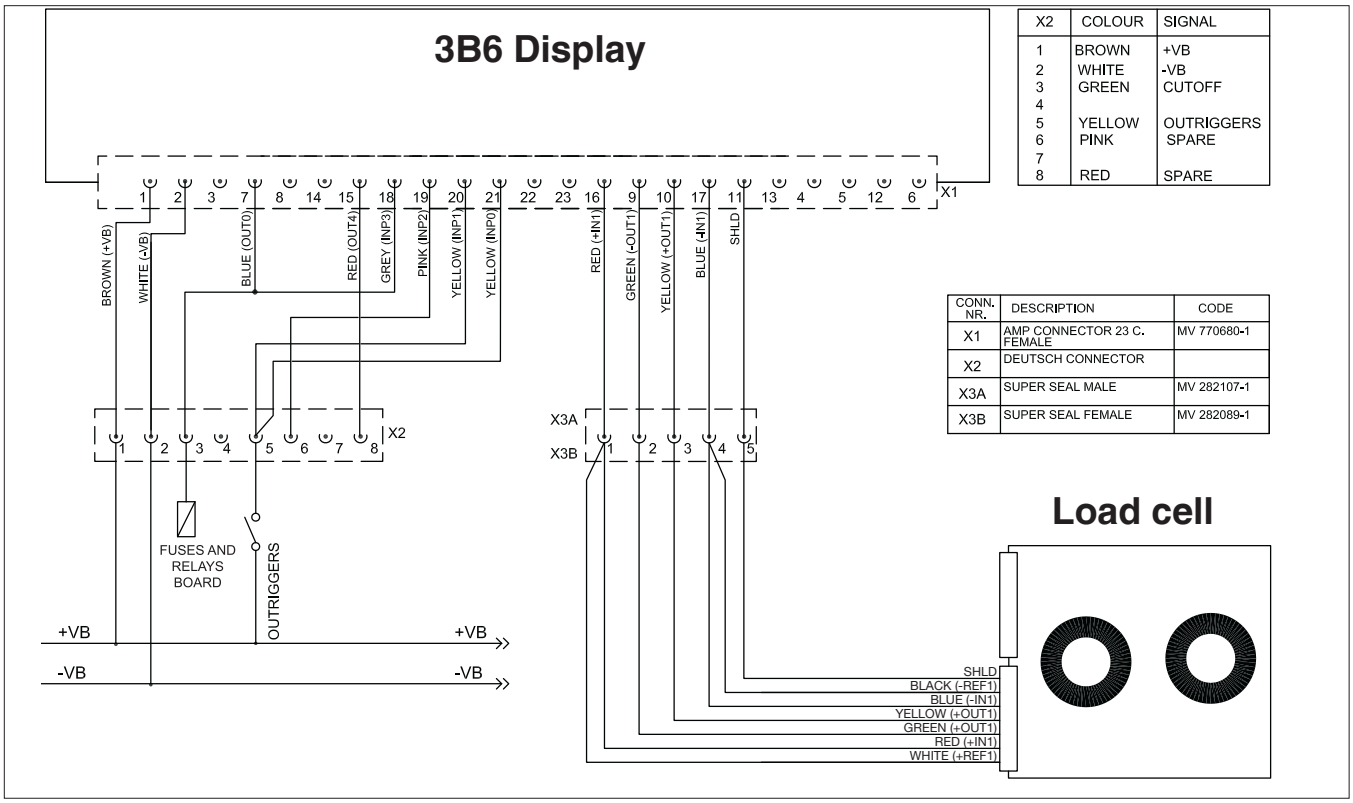
**2 - ASSEMBLY:**

- Apply the strain cage **B** with its resinated side facing the axle and holding the cable(s) toward the machine.
- Tighten the two screws **C** with a torque wrench at **70 Nm**.
- Mark the position of the screws with paint in order to make possible loosening visible to the eye.





TECHNICAL SPECIFICATION




| X2 | COLOUR | SIGNAL |
|---|---|---|
| 1 | BROWN | +VB |
| 2 | WHITE | -VB |
| 3 | GREEN | CUTOFF |
| 4 | | |
| 5 | YELLOW | OUTRIGGERS |
| 6 | PINK | SPARE |
| 7 | | |
| 8 | RED | SPARE |

| CONN. NR. | DESCRIPTION | CODE |
|---|---|---|
| X1 | AMP CONNECTOR 23 C. FEMALE | MV 770680-1 |
| X2 | DEUTSCH CONNECTOR | |
| X3A | SUPER SEAL MALE | MV 282107-1 |
| X3B | SUPER SEAL FEMALE | MV 282089-1 |

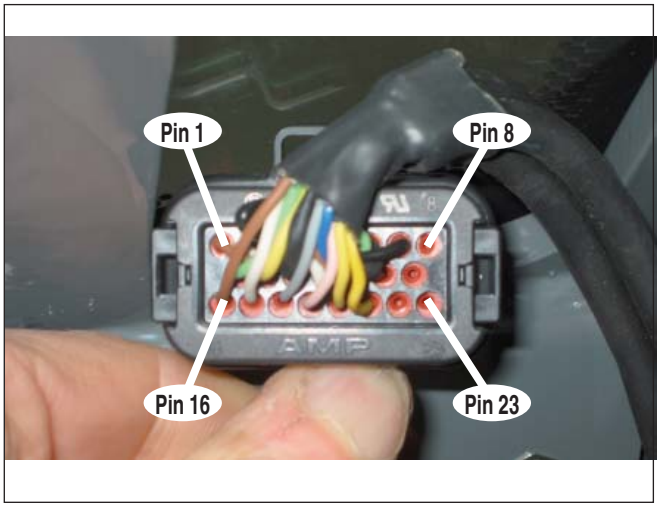
Pin 18 + GND = 12V in work condition
0V in overload condition

Pin 7 + GND = feedback ok (12V)

Pin 9 positive
Pin10 = boom retracted with forks in horizontal position, without load: 1,1÷1,4 mV
= boom extended with forks in horizontal position, without load: 0,1÷0,4 mV

Pin 20 + GND = 12V with outriggers down

Pin 21 + GND = 12V with outriggers down




**CONNECTOR X1 FOR CHECKS WITH TESTER**

**Electrical power to control unit (DLE)**
Pin 1: 12 V
Pin 2: GND

**Overload signal (12V generated by the DLE)**
Pin 18: 12 V normal conditions, 0 Valarm overload
Pin 7: re-reading overload signal

**Electrical power to load cell equal to 5 V**
Channel 1: Pin 16:positive Pin 17: negative

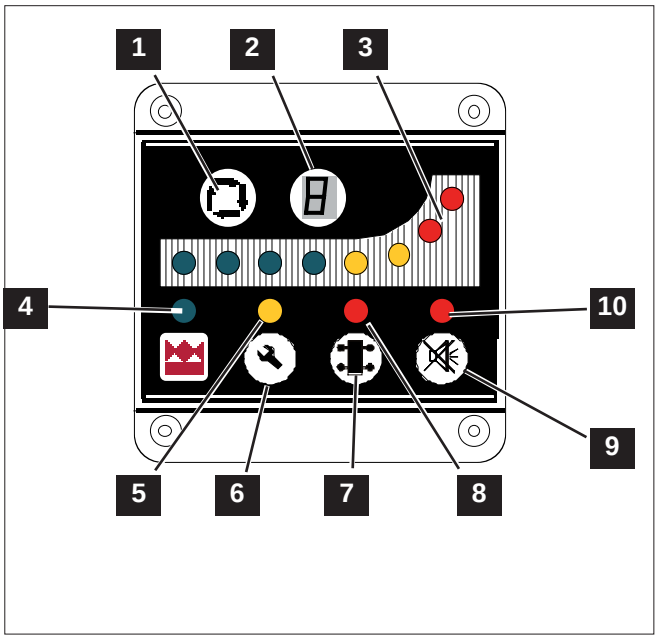
**Load cell signal in range 0,1 - 2,5 mV**
Channel 1: Pin 10: positive Pin 9: negative

**Machine without load on the forks, without outriggers, with boom horizontal and not extended**
Pin 9 and 10: 1,1 - 1,2 - 1,3 - 1,4 mV

**Machine without load on the forks, without outriggers, with boom horizontal and not extended**
Pin 9 and 10: 0,1 - 0,2 - 0,3 - 0,4 mV

**Outriggers down signal**
Pin 20: 12 V
Pin 21: 12 V

## CALIBRATING THE DLE SYSTEM




**- Description of the controls:**

**1** Calibration selection button
**2** Display
**3** Stability indicator with LED-bar
**4** Green light - power OK
**5** Yellow light - calibration mode
**6** Calibration confirmation button
**7** Not used
**8** Red light - outrigger position
**9** Buzzer ON/OFF pushbutton
**10** Red light - overload pre-alarm/alarm

The digit on display **2** shows the selected attachment. The user can choose among:

**0: Generic**

The system recognises the attachment fitted to the machine automatically.

After calibrating, using different weights, check the correspondece with the load charts (lenghts from the front tyres to the center of the weight on the fork).

# NOTICE

- ***During the calibration mode the limiter device doesn't block any manoeuvres so the calibration can be done.***
- ***With outriggers, calibrate the DLE system without load and with load and outriggers fully at ground.***
- ***The calibration of the machine should be done after a few minutes of use, in other words with the machine "warm".***

**- Enter the calibration mode:**

Within 5 seconds from when the instrument is activated (even if the display is still off) you should press the keys on the front panel in the right sequence.
Belowe, the push buttons and their mean:

Press to enter number 0
Press to enter number1
Press to confirm the sequence entered.

The access code currently used is 1001. Therefore you should enter the following sequence:

**1 0 0 1** CONFIRM

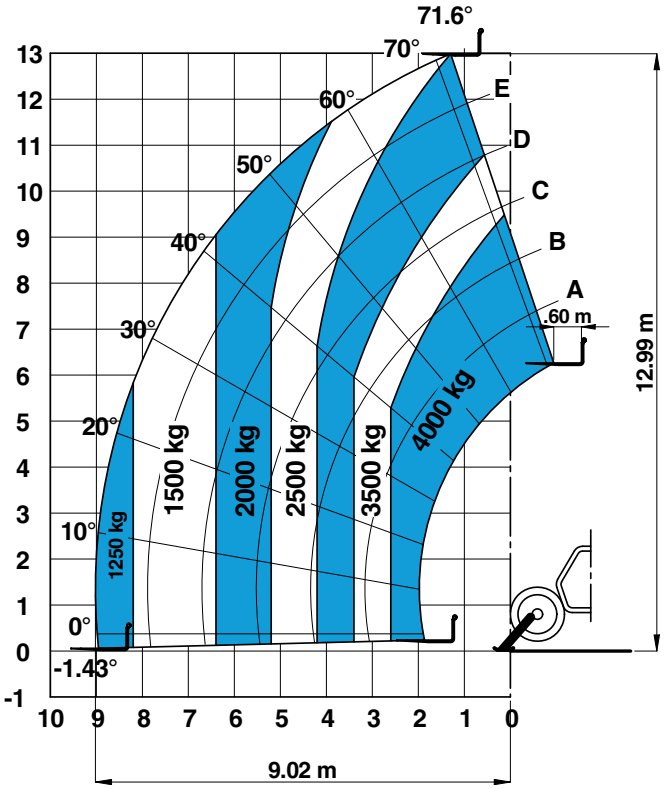
If the sequence is correct the confirmation of the instrument functioning in the calibration mode is given by the LED near lighting with a fixed light.

The display shows a number that ISN'T blinking, starting from "0".

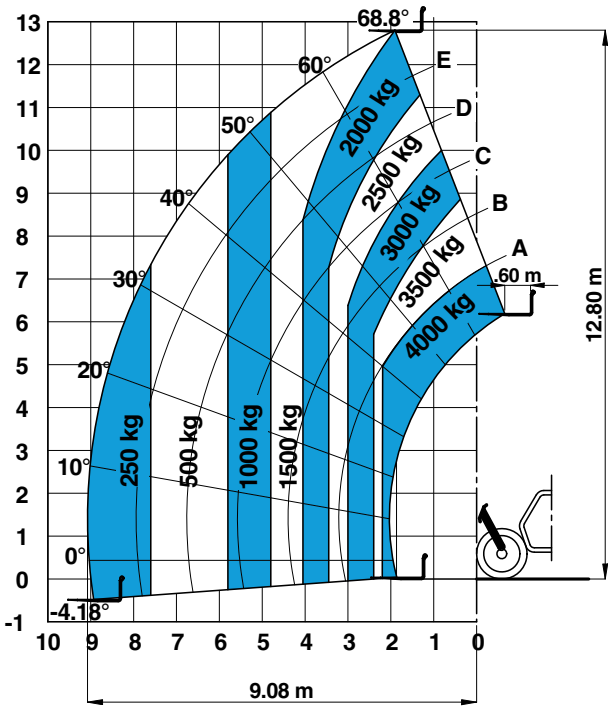
TECHNICAL SPECIFICATION

| DISPLAY | FUNCTION |
|---|---|
| **0** | The LED bar indicates the type of machine in use:<br>1 LED on -GTH 4013 SX - GTH 4017 SX<br>To select the machine to be calibrated press to increase the number of LED's lit or press to reduce the number of LED's lit.<br>If you are doing the first calibration, press to reset the system and load the default parameters of the selected machine.<br>**If you are re-calibrating the instrument, directly jump to point 1.**<br>Press to proceed to the next point (1). |
| 1 | Lower the outriggers to the ground, fully retract the boom holding it slightly above the horizontal with respect to the ground. **DON'T** lift loads.<br>Press to confirm the **EMPTY** calibration of the machine. The audible alarm will sound to confirm the command has been executed.<br>Press to proceed to the next point (2). |
| 2 | With outriggers down, place a load on the forks with a known weight, extend the boom while holding it horizontal till reaching the overturning moment. The overturning distance is from the front part of the wheels to the center of the load. (see the diagram inside the cab).<br>Press to confirm the **LOADED** calibration of the machine and check that the alarm triggers. The audible alarm will sound to confirm the command has been executed. Move the boom fully in while holding the same in the horizontal position.<br>Press to proceed to the next point (3). |
| 3 | With outriggers down, place a load on the forks with a known weight, extend the boom while holding it horizontal till reaching the overturning moment. The overturning distance is from the front part of the wheels to the center of the load. (see the diagram inside the cab).<br>Press some times to switch off the LED's of the load and press to switch on them; at the end, all LED's are on from left to right, except the red last one.<br>The procedure is saved automatically<br>Press some times to arrive to the point (F). |
| F | Press to exit calibration and to **SAVE** the changes made (the audible alarm sounds and the LED's come on to confirm that data have been saved).<br>The limiter is no longer in the calibration mode. The LED is not lit fixed any more. You should turn the machine off and then on again to eliminate any alarm messages.<br>Starting to work. |

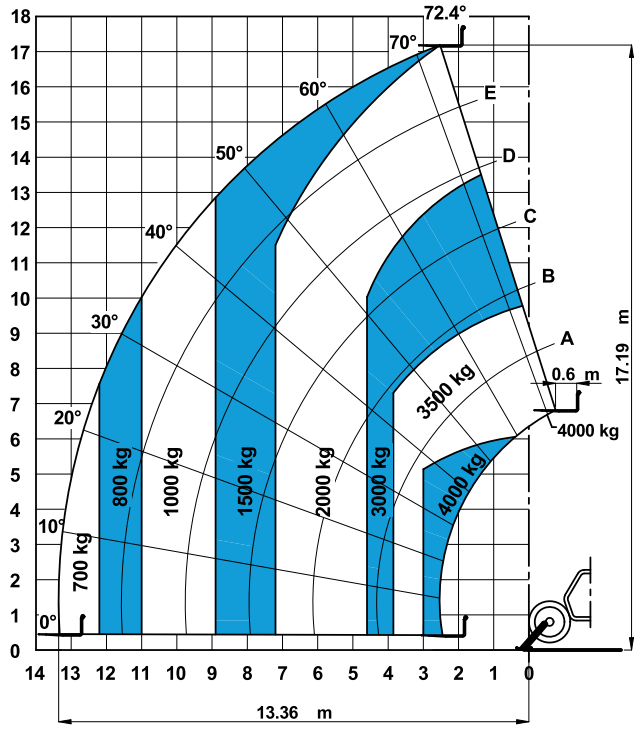
## LOAD DIAGRAM
## GTH-4013 SX - ON OUTRIGGERS



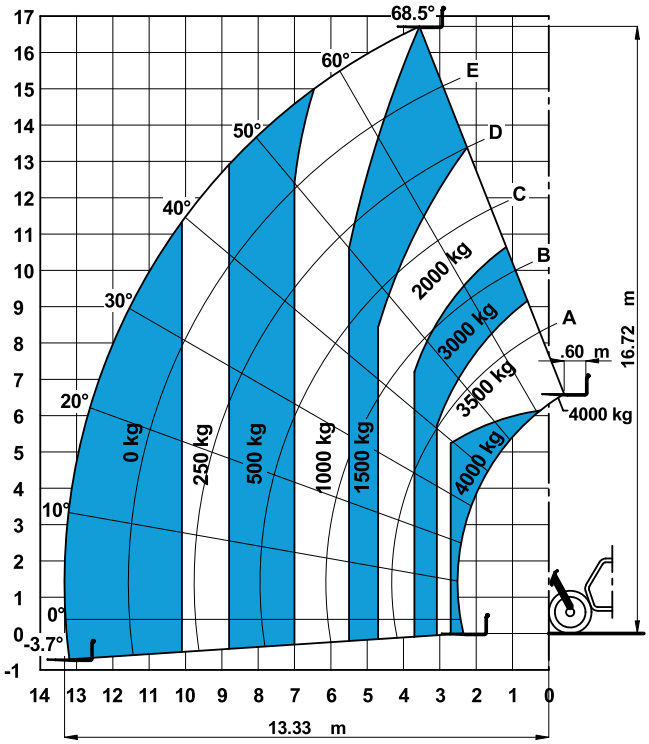

## LOAD DIAGRAM
## GTH-4013 SX - ON TYRES




## LOAD DIAGRAM
## GTH-4017 SX - ON OUTRIGGERS




## LOAD DIAGRAM
## GTH-4017 SX - ON TYRES



TECHNICAL SPECIFICATION

## DIAGNOSTIC FUNCTION IN CALIBRATION MODE

| FUNZIONE | DISPLAY |
|---|---|
| **A-B** | Display of the value read by the ADC converter-cell channel 1 (**A**).<br>This diagnosis function allows you to check proper reading of the load cell.<br>As you move the boom, you can see the LEDs of the load bar progressively go on/off (valid if calibration has already been done).<br>Position the machine for a calibration without load.<br>If the function **A** is setted, by a progressive boom extension the LEDs of the load bar progressively have to go off.<br>If function **A** is activated and the LED is completely ON or OFF, there could be a problem with the connection or in the cell thereof; if it is partly lit but there is no movement in the boom, make sure the cell is fixed. |
| **C** | Digital Inputs display: this function allows you to see if the following signals are properly delivered to the DLE device according to the lighted LEDs of the load bar:<br>LED3: lit when the load limiter disconnect key is turned.<br>LED4: ON if the interlock relay is active (machine safe without alarms). |
| **D** | Software version existing in the DLE unit: this function allows you to see the software version included in the DLE unit according to the lighted LEDs of the load bar:<br>No LED: software 0<br>One LED: software 1 ……<br>Four LED: software 4 |
| **E** | No function. |
| **F** | Press to escape from the calibration and **SAVE** all changes<br>(the buzzer and the LED activate to confirm storage).<br>The limiter has now escaped from the calibration mode. The LED is no longer ON stedily.<br>It is necessary to turn off and turn on the machine to eliminate all alarm messages (display flashing). |

## ALARM CODES

| | |
|---|---|
| **Alarm code**<br>**Description**<br>**Action** | **1**<br>**E2PROM Error.** Internal comparison of data read from E2PROM failed.<br>Switch off and switch on the machine. If the alarm continues, recalibrate the machine, otherwise replace DLE |
| **Alarm code**<br>**Description**<br>**Action** | **2**<br>**CELL 1 reading out of range.**<br>Check if the load cell is fixed well.<br>Check the connection between DLE and sensor for short circuits or signal interruptions due to a broken cable.<br>Check the DLE connector for signs of oxidation, short circuits or absence of electrical contact in some pins.<br>If the alarm persists, check if the cell is intact. |

| | |
|---|---|
| **Alarm code** | **4** |
| **Description** | **Block Relay check error during work.** Check through.re-reading of the block output of the congruence with the current state of the limiter.<br>***The alarm triggers even in the absence of malfunctions if the load limiter cutout key is used.*** |
| **Action** | The relay or the cable can be shorted; check.<br>The limiter's outputs do not deactivate. Switch off and on the machine and run a complete test of the outputs.<br>If the alarm persists, replace the DLE. |
| **Alarm code** | **5-8** |
| **Description** | **Block Relay check error at start.** When the instrument is started, the re-reading of the block output is always OFF except when the two outputs of the DLE are connected in series.<br>**5** - DLE output 0V or low voltage - 12V re-reading<br>**8** - DLE output 12V - ow voltage or 0V re-reading<br>***The alarm triggers even in the absence of malfunctions if the load limiter cutout key is used when the instrument is started.*** |
| **Action** | The relay or the cable can be shorted; check.<br>The limiter's outputs do not deactivate. Switch off and on the machine and run a complete test of the outputs.<br>If the alarm persists, replace the DLE. |
| **Alarm code** | **A** |
| **Description** | **RAM data error.** Checks that the parameters load in the RAM at start-up remain unaltered. |
| **Action** | Switch off and on the limiter. |
| **Alarm code** | **B** |
| **Description** | **Outriggers congruence.** |
| **Action** | Check that the signal of stabilised machine is congruent between the two inputs used for reading during operation.<br>Display: until the system is turned off.<br>Operations: check wiring, power cable, DLE connector. If the alarm persists, change the DLE (digital input reading malfunction). |
| **Alarm code** | **C** |
| **Description** | **A.D.C. reading control error.** If the analog/digital converter works fine after special rereading of the DLE board**.** |
| **Action** | Switch off and on the limiter.<br>If the alarm continues, replace DLE. |

## CHECK THE SYSTEM USING WINSCOPE

Connect the PC to the LMI display (limit moment indicator) using the serial port and the power cord (cod. 07.0736.0014), switch on the board and start the Winscope application.
Below, the list of the parameters and of the variables visualizable on the PC. In bold, the values interesting for the GTH-4013 SX and GTH-4017 SX.

TECHNICAL SPECIFICATION

## LIST OF THE DLE PARAMETERS

| N° | Winscope Name | Description |
|---|---|---|
| **00** | **C1cellaVuoto** | **Value saved in analog channel 1 - calibration with unloaded machine (best setting around 700).** |
| **01** | **C1cellaCarico** | **Value saved in analog channel 1 - calibration with loaded machine (best setting around 300).** |
| **02** | **C1cellaMin** | **Min admissible value for analog channel 1 reading (if actual value is below: alarm 2) (value set at 10 roughly).** |
| **03** | **C1cellaMax** | **Max admissible value for analog channel 1 reading (if actual value is above: alarm 2) (value set at 1010).** |
| 04 | C2cellaVuoto | Value save in analog channel 2 - calibration with unloaded machine (best setting around 300). |
| 05 | C2cellaCarico | Value save in analog channel 2 - calibration with loaded machine (best setting around 700). |
| 06 | C2cellaMin | Min admissible value for analog channel 2 reading (if actual value is above: alarm 3)(value set at about10). |
| 07 | C2cellaMax | Max admissible value for analog channel 2 reading (if actual value is above: alarm 3) (value set at about 1010). |
| 08 | Filter | Number of filter samples, with mobile mean. Load cell reading. Max 5. |
| 09 | paCellaUnica | Sets to 1 automatically (during the machine selection) when the DLE is used in single channel mode. |
| 10 | Celle_MaxDelta | Max admissible delta between readings of analog channels 1 and 2, expressed as a %, default 10 (current 20). |
| **11** | **SpanForche** | **Limiter intervention percentage in case of work with stabilised machine and forks. Default: 100 (as per calibration).** |
| 12 | SpanNavicella | Limiter intervention percentage in case of work with stabilised machine and platform (changed by the relevant procedure during calibration). When the platform is selected, the limiter uses this % (default 110% - load increase of 10%) instead of the SpanForche datum (current value 125). |
| 13 | DeltaSpanGomme | Limiter intervention percentage in case of work with non-stabilised machine (changed by the relevant procedure during calibration). % value that adds to the calibration with forks and outriggers (SpanForche). |
| **14** | **OffSet0** | **Command given to the digital potentiometer for cell 1 (value from 0 to 255) to set the reading scale during calibration with unloaded machine to a certain pre-set value (about 900 bit ADC - C1cellaVuoto) (about 700).** |
| 15 | OffSet1 | Command given to the digital potentiometer for cell 2 (value from 0 to 255) to set the reading scale during calibration with unloaded machine to a certain pre-set value (about 200 bit ADC - C2cellaVuoto) (about 300). |
| **16** | **palsteresiSblocco** | **Load % for the reset of the movements once the block condition has been rectified. (default 5% = 95%).** |
| **17** | **paRitardoSblocco** | **Value expressed in tenths of second corresponding to the time that must elapse between the block condition and the movement reset (default 10 = 1 second).** |

| | | |
|---|---|---|
| 20 | C1NavicellaVuoto | Parameters 20, 21, 22 and 23 are usually equivalent to parameters 0, 1, 4 and 5. They shall be used for a new calibration of the platform not depending on the proportional % calibration done with the forks. These parameters only apply to the platform. Value saved in analog channel 1 during calibration with empty machine. |
| 21 | C1NavicellaCarico | Value saved in analog channel 1 during calibration with loaded machine. |
| 22 | C2NavicellaVuoto | Value saved in analog channel 2 during calibration with empty machine. |
| 23 | C2NavicellaCarico | Value saved in analog channel 2 during calibration with loaded machine. |
| 24 | CurMacchina | Machine selected on point “0” of the calibration. |
| **28** | **VersioneSW** | **Software version.** |
| 29 | WPsum | Parameters CHECKSUM used by the safety functions. |

**LIST OF THE DLE VARIABLES**

| N° | Winscope Name | Default | Description |
|---|---|---|---|
| **05** | **PCorder** | **0** | **You can save changes effected to the parameters by setting this variable to “1”. The variable will return to 0 once the value has been saved.** |
| **10** | **C1swl** | | **Load percentage of cell 1 (0% = calibration without load; 100% = calibration under load).** |
| **13** | **C1adcFiltro** | | **Current value of cell 1 (analog, converted into bits 0 - 1023).** |

TECHNICAL SPECIFICATION

## 2.25 HYDROSTATIC TRANSMISSION CONTROL UNIT CHECK SYSTEM

An electronic control unit gives power to the SAUER hydrostatic transmission; the software PLUS+1 lets to control the transmission.

- Connect the computer to the cable CAN/USB (cod. 55.0602.0331)
- Joint the cable (cod. 55.0602.0491) to the "DIAGNOSI SAUER" connector of the electric line.
- Start the software "PLUS+1"
- Turn ON the ignition key or start the engine
- Click on "+" and open the windows of system (image 1)

Proceed as follows:

- Click FILE
- Click OPEN
- Choose the diagnostic file (image 1)
- Select and click INVIO
- Click on "+" to open the dialog windows (image 2)

Check the installed SOFTWARE is right (image 3):

- Select SYSTEM
- Select SYSTEM INFORMATION.

Check the customer specific is **401702**, (for GTH 4013SX and for GTH 4017SX)

Open the first control system page:

- Select SYSTEM
- Select ELECTRICAL

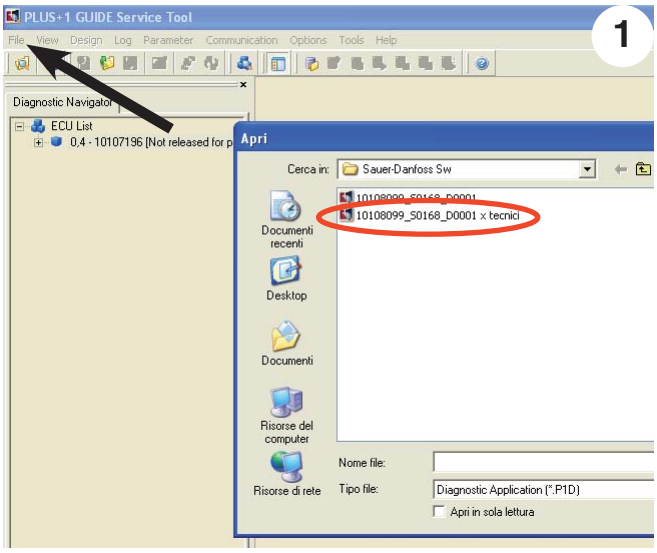
The window (image 4) shows the electric input/output of the system.

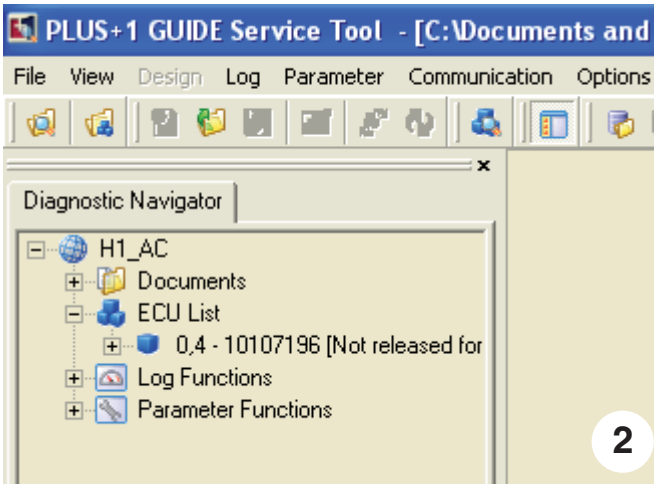
EXEMPLE:C1P06- input forward speed, C1P07- input rear speed,

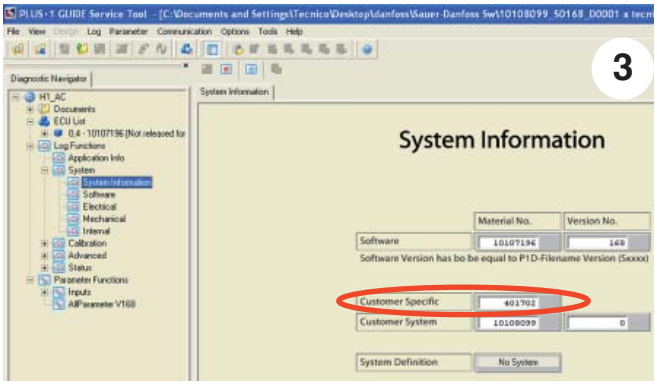
the electric input/output are colored refer to speed (images 5 - 6)

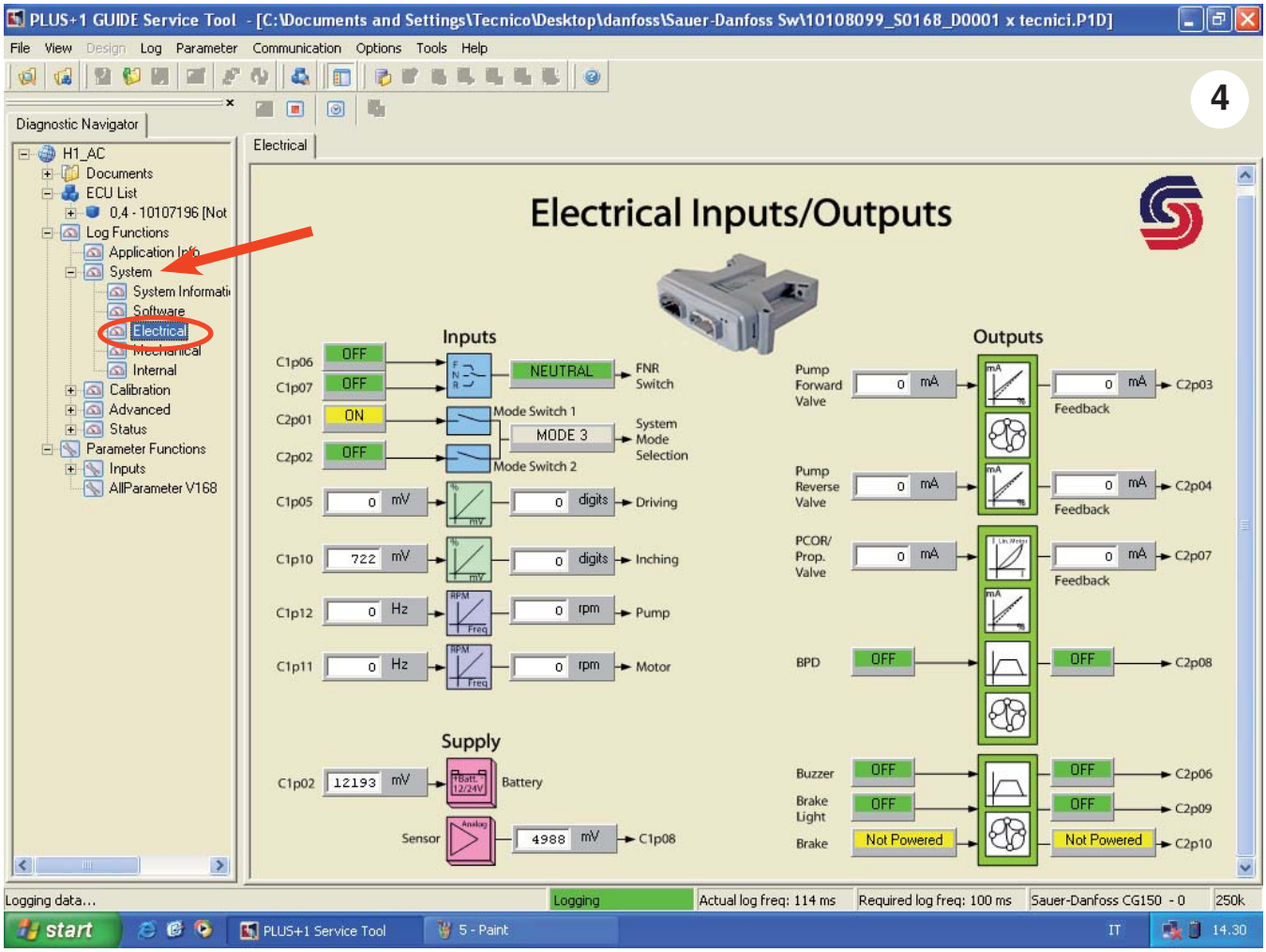
It is possible to check the ROAD/JOB-SITE signal.

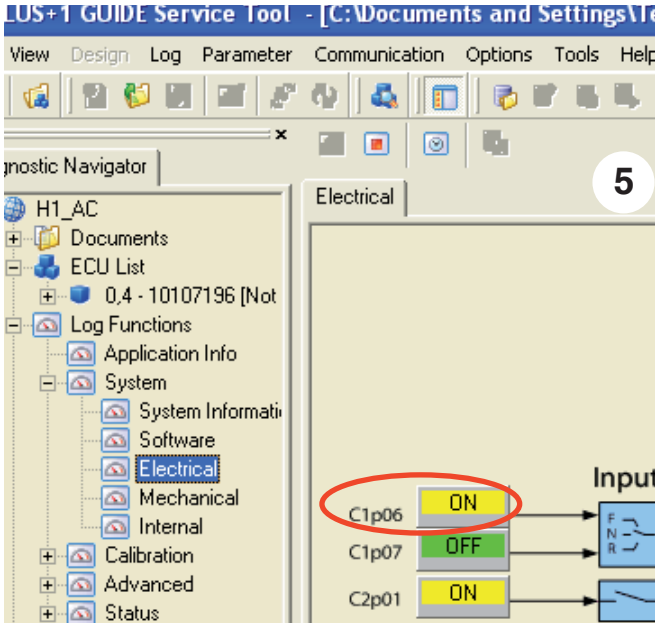
It is possible to check the windows are ON when the ROAD/JOB-SITE push button on the dashboard is pressed (C2P01 - C2P02)

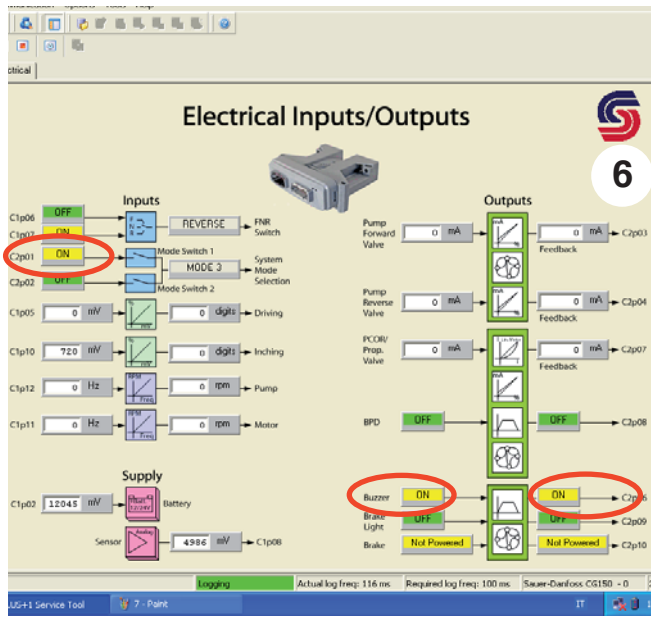



PLUS+1 GUIDE Service Tool - [C:\Documents and Settings\Tecnico\Desktop\danfoss\Sauer-Danfoss Sw\10108099_S0168_D0001 x tecnici.P1D]
File View Design Log Parameter Communication Options Tools Help
4
Diagnostic Navigator
H1_AC
Documents
ECU List
0,4 - 10107196 [Not
Log Functions
Application Info
System
System Informati
Software
Electrical
Mechanical
Internal
Calibration
Advanced
Status
Parameter Functions
Inputs
AllParameter V168
Electrical
Electrical Inputs/Outputs
Inputs
C1p06 OFF
C1p07 OFF
C2p01 ON
C2p02 OFF
NEUTRAL
FNR Switch
Mode Switch 1
MODE 3
Mode Switch 2
System Mode Selection
C1p05 0 mV
0 digits
Driving
C1p10 722 mV
0 digits
Inching
C1p12 0 Hz
0 rpm
Pump
C1p11 0 Hz
0 rpm
Motor
Supply
C1p02 12193 mV
Batt. 12/24V
Battery
Sensor
4988 mV
C1p08
Outputs
Pump Forward Valve
Feedback
C2p03
Pump Reverse Valve
C2p04
PCOR/ Prop. Valve
C2p07
BPD
OFF
C2p08
Buzzer
Brake Light
Brake
Not Powered
C2p06
C2p09
C2p10
Logging data...
Logging
Actual log freq: 114 ms
Required log freq: 100 ms
Sauer-Danfoss CG150 - 0
250k
start
PLUS+1 Service Tool
5 - Paint
IT
14.30


View Design Log Parameter Communication Options Tools
5
Electrical
H1_AC
Documents
ECU List
Log Functions
Application Info
System
Software
Electrical
Mechanical
Internal
Calibration
Advanced
Status
C1p06 ON
C1p07 OFF
C2p01 ON

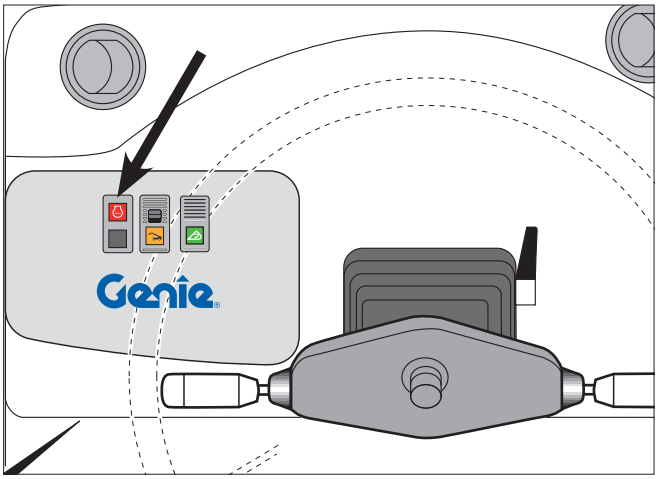

Electrical Inputs/Outputs
6
Inputs
Outputs
REVERSE
MODE 3
Supply
Battery
Buzzer
Brake Light
Brake
Not Powered

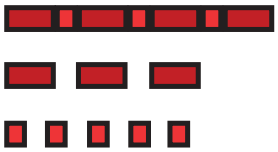
TECHNICAL SPECIFICATION

Click on

- STATUS
- ELECTRICAL

to open the ELECTRICAL STATUS window and to find some possible mistakes on the system (image 7). The signal of ERROR is present on the instrument panel too.



**Short shimmering**

**Long blinks: tens (3)**

**Short blinks: units (5)**

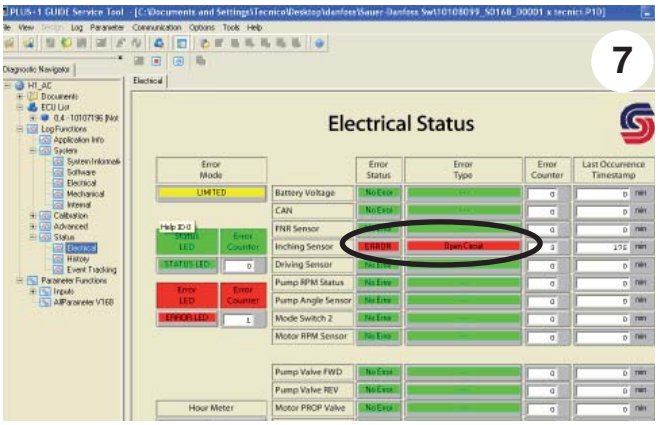
**ERROR CODE 35**

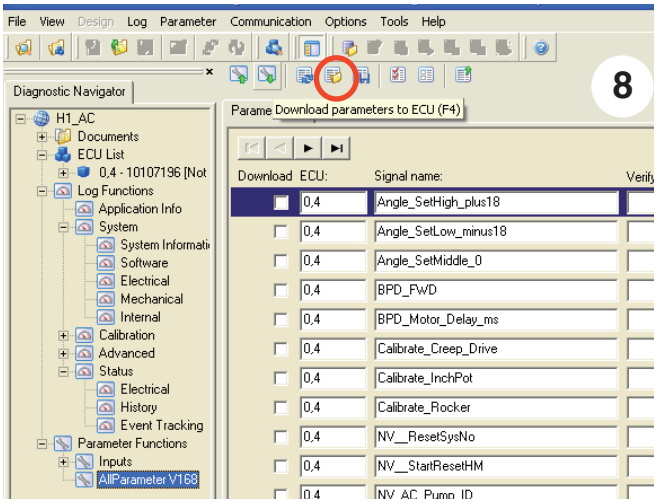
See the list of errors at page 38 in the "FAULT TABLE A".

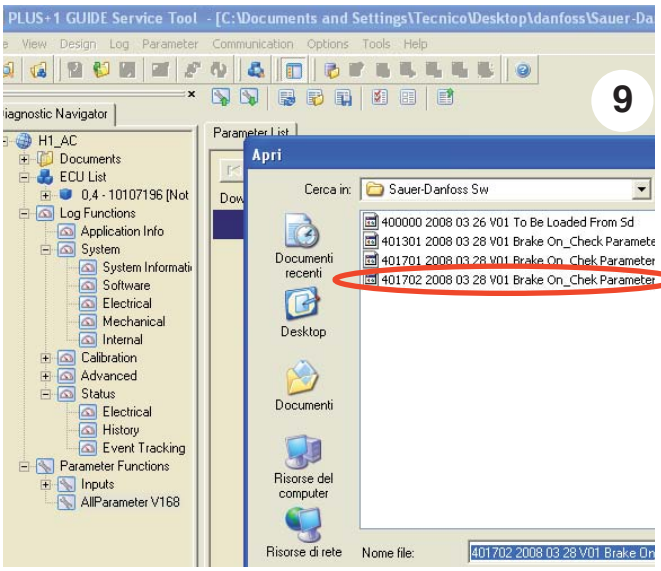
Select PARAMETERS FUNCTIONS to check the parameters.

Proceed as follows:

- Select ALLPARAMETERS V168 (8)
- Press F2 to ensure the present parameters are up-loaded on the control unit
- Click on "import values from a parameter data filer"
- Select the right FILE (401702.....)
- Press F4 to up-load the parameters on the control unit
- The control unit can work
- Perform the pedal inching calibration (see next chapter)

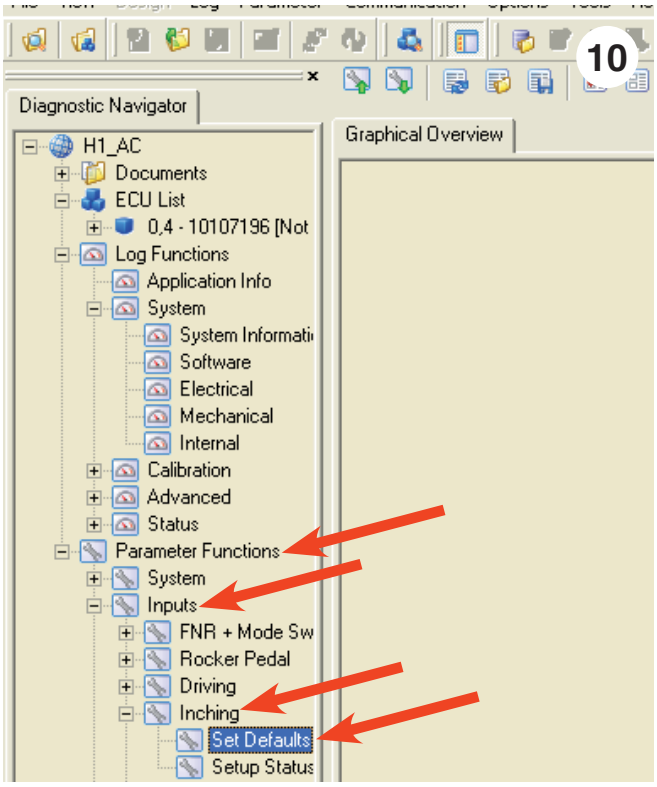


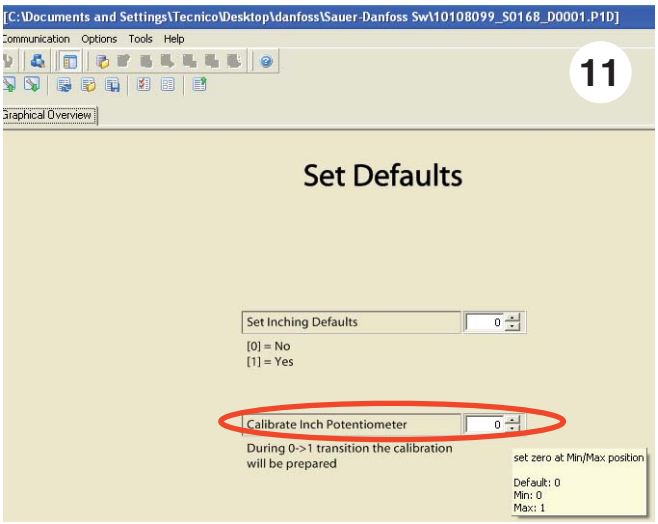



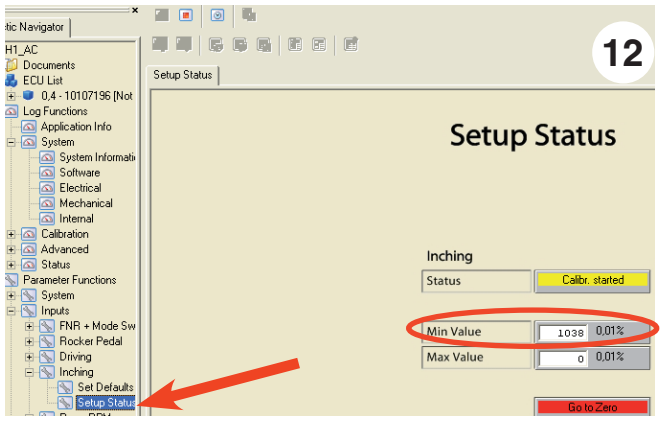



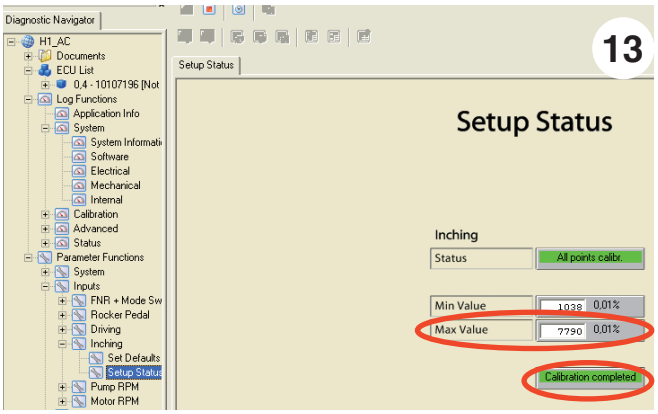
To get acces to the INCHING from PARAMETERS FUNCTIONS select:

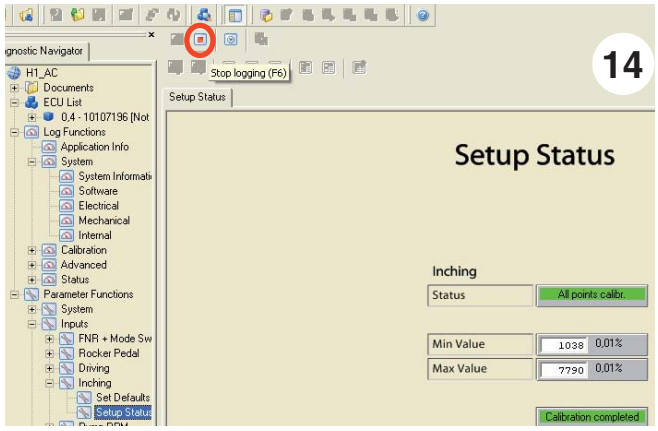
- Parameter Functions (10)
- Inputs
- Inching
- Set Defaults
- Inside the window "calibrate inch Potentiometer" select the value 1 (see image 11)
- PRESS F4
- Inside the window "calibrate inch Potentiometer" select the value 0 (see image 11)
- PRESS F 4
- select the Setup Status menu (see image 12)
- The system recognizes the calibration minimum value automatically (for example, Min Value 1038- image 12)
- Step down the brake pedal until "calibration complited" appears (see image 13), with the maximum calibrate inching value - Max Value 7790
- To finish the calibration procedure, press "Stop logging" or F6 (see image 14)
- The machine can work.



TECHNICAL SPECIFICATION

**FAULT TABLE "A"**

| Error code | Error description | Machine state |
|---|---|---|
| **15** | Battery Voltage or Sensor Voltage Error | SAFE-Mode |
| **19** | Pump Current Forward EV | SAFE-Mode |
| **23** | Pump Current Reverse EV | SAFE-Mode |
| **27** | Motor Current EV | SAFE-Mode |
| **31** | Engine Speed RPM | SAFE-Mode |
| **35** | FNR Shortcut | LIMITED-Mode |
| **39** | Inching | SAFE-Mode |
| **70** | CAN line | LIMITED-Mode |

***SAFE-Mode:*** the machine stops and restarts only when the panel is switched off and on again, after eliminating the detected problem.
***LIMITED-Mode:*** the machine moves adjusting the pump but without controlling the engine; therefore, it moves at limited speed.

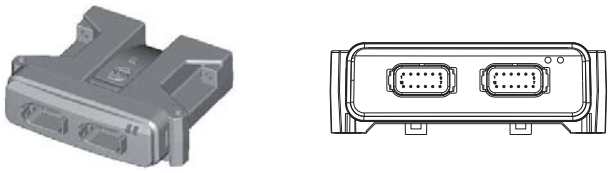


Image 15: connections of the check transmission control unit

Image 16: functional scheme of the transmission

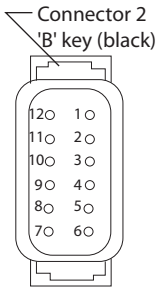
The following elements are not used in the present system:

- Creeper drive
- Creeper drive switch.
- PPU motor
- Brake pressure defeat
- Parking brake

*Connector 2*

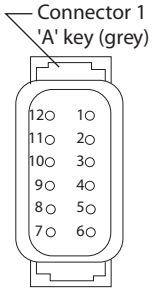
**15**

| Pin | Controller Function |
|---|---|
| C2-P1 | Mode switch |
| C2-P2 | DIN/AIN/FreqIN |
| C2-P3 | Forward solenoid valve hydrostatic pump |
| C2-P4 | Reverse solenoid valve hydrostatic pump |
| C2-P5 | warning error lamp |
| C2-P6 | Reverse gear buzzer and lamp |
| C2-P7 | Hydrostatic motor displacement |
| C2-P8 | - |
| C2-P9 | Brake light |
| C2-P10 | - |
| C2-P11 | Power supply + 12 volts |
| C2-P12 | Power supply + 12 volts |

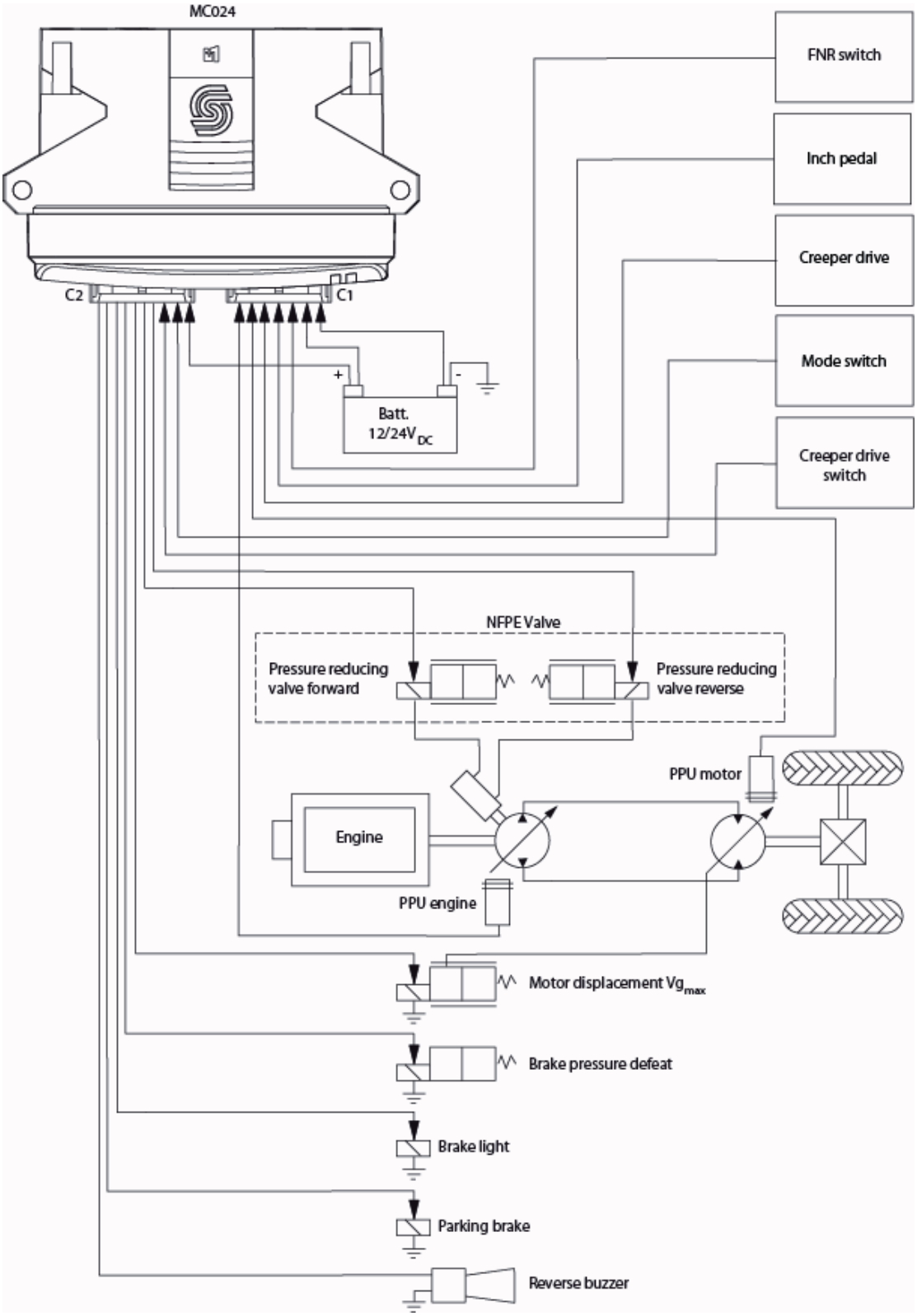



*Connector 1*

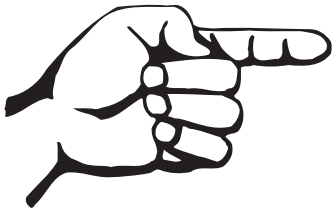
| Pin | Controller Function |
|---|---|
| C1-P1 | Power ground - |
| C1-P2 | Power supply + 12 volts |
| C1-P3 | CAN + (H) |
| C1-P4 | CAN - (L) |
| C1-P5 | AIN/CAN shield |
| C1-P6 | Forward |
| C1-P7 | Reverse |
| C1-P8 | Power +5 Volts inch. pedal |
| C1-P9 | Ground - inch. pedal |
| C1-P10 | Inch. pedal segnal |
| C1-P11 | - |
| C1-P12 | Engine rpm |



16


MC024
C2
C1
+
-
Batt.
12/24V DC
FNR switch
Inch pedal
Creeper drive
Mode switch
Creeper drive switch
NFPE Valve
Pressure reducing valve forward
Pressure reducing valve reverse
PPU motor
Engine
PPU engine
Motor displacement Vg max
Brake pressure defeat
Brake light
Parking brake
Reverse buzzer

TECHNICAL SPECIFICATION



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# Maintenance Inspections

## 3.1 INTRODUCTION

- ***Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.***
- ***Scheduled maintenance must be carried out at the intervals indicated in the MAINTENANCE REPORT.***

**WARNING**

***Failure to properly complete each inspection when required may cause death, serious injury or substantial machine damage***

- ***Immediately tag and remove from service a damaged or malfunctioning machine.***
- ***Repair any machine damage or malfunction before operating machine.***

MAINTENANCE INSPECTIONS

## 3.2 ABOUT THIS SECTION

***Intervention times***

Maintenance interventions have been divided into 7 different groups in relation to the time at which they must be carried out, say daily, weekly, monthly, every 2 months, every 6 months, yearly and every 5 years (afterwards every 2 years).

For ease of use, the service intervals have been grouped in different tables, as explained below:

| Inspection | Table |
|---|---|
| Daily | A |
| Weekly | A+B |
| Monthly | A+B+C |
| Every 2 months | A+B+C+D |
| Every 6 months | A+B+C+D+E |
| Yearly | A+B+C+D+E+F |
| Every 5 years (afterwards every 2 years) | G |

***Maintenance table***

The maintenance table contains general information on the type of intervention to be carried out at a certain interval.

For the explanation of the maintenance jobs to be done, please refer to chapter 4 “Maintenance Procedures”.

***Maintenance inspection report***

The maintenance report summarises all of the interventions to be carried at a given interval and lets the maintenance technician note the result of the check or intervention carried out.

This card can be photocopied to be used at the different service intervals and to keep a trace of all interventions carried out.

## 3.3 MAINTENANCE TABLE

### TABLE A

***During the first 10 working hours*:**

| | |
|---|---|
| **A-1** | Check the oil level within reduction gears, power divider and differential gears. |
| **A-2** | Check the tightening of the wheel bolt. |
| **A-3** | Check the tightening of all bolts and nuts. |
| **A-4** | Check the couplings for oil leaks. |

***Every 10 working hours or daily*:**

| | |
|---|---|
| **A-5** | Check the Operator's Manual inside the machine. |
| **A-6** | Check the labels and plates are well visible. |
| **A-7** | Check the engine oil level. |
| **A-8** | Check and clean the air suction filter. |
| **A-9** | Check and clean the radiator. |
| **A-10** | Check the hydraulic oil level in the tank. |
| **A-11** | Check the greasing of the boom section pads. |
| **A-12** | Grease the forks. |
| **A-13** | Grease all joints of the boom, the rear axle shaft joint, the transmission shafts, the front and rear axles and any equipment of the machine. |
| **A-14** | Check the efficiency of the lighting electric system. |
| **A-15** | Check the efficiency of braking system and parking brake. |
| **A-16** | Check the efficiency of the steering selection system. |
| **A-17** | Check the efficiency of the fork balancing system. |
| **A-18** | Make sure the safety devices installed are in efficient working order. |
| **A-19** | Check the engine coolant level. |
| **A-20** | Check the efficiency of the overload system. |
| **A-21** | Check the re-sequence of the boom extenxion of the GTH 4013 SX. |

MAINTENANCE INSPECTIONS

## TABLE B

***Within the first 50 working hours:***

| | |
|---|---|
| **B-1** | Check the general efficency of the machine. |

***Every 50 working hours or weekly:***

| | |
|---|---|
| **B-2** | Check the tension of the alternator belt. |
| **B-3** | Check the tyre inflation. |
| **B-4** | Check the tightening of the wheel nuts. |
| **B-5** | Check the tightening of the cardan shaft screws. |
| **B-6** | Clean the fins of radiator. |

## TABLE C

***Every 250 working hours or monthly:***

| | |
|---|---|
| **C-1** | Change the oil in the differential gears, in the four wheel reduction gears and in the power divider. |
| **C-2** | Change the engine oil and relevant filter |
| **C-3** | Check the oil level in the front and rear differential gears. |
| **C-4** | Check the oil level in the four wheel reduction gears. |
| **C-5** | Check the main filtering element of the engine air filter. Replace, if necessary. |
| **C-6** | Check the clamping of the cableheads to the battery terminals. |
| **C-7** | Check the air suction hose between engine and filter. Replace, if necessary. |
| **C-8** | Check the cylinder chromium-plated rods. |
| **C-9** | Check the hydraulic lines are not worn because of rubbing against the frame or other mechanical components. |
| **C-10** | Check the electric cables do not rub against the frame or other mechanical components. |
| **C-11** | Check the wear of the sliding pads of the boom sections. |
| **C-12** | Adjust the play of the sliding pads of the boom sections. |
| **C-13** | Remove any grease from the boom, then re-grease the sliding parts of the boom sections. |
| **C-14** | Check the level of the battery electrolyte. |
| **C-15** | Check the efficiency of the block valves. (every 250 working hours or every 3 working months). |

## TABLE D

***Every 500 working hours or every two months*:**

| | |
|---|---|
| **D-1** | Visually check the smoke quantity evacuated from the engine exhaust. |
| **D-2** | Check the tightening of the engine fixing screws. |
| **D-3** | Check the tightening of the cab fixing screws. |
| **D-4** | Check the backlash between pins and bushings in all joints. |
| **D-5** | Change the hydraulic oil filter cartridge on the return line to the tank. |
| **D-6** | Have the hydraulic system checked by a skilled technician. |
| **D-7** | Change the main cartridge of the engine air filter. |
| **D-8** | Change the engine oil filter and fuel filter (every 500 working hours or once an year) |
| **D-9** | Clean the air filter in the cab. |
| **D-10** | Change the oil in the differential gears. |
| **D-11** | Boom chain tensioning (GTH 4017 SX) |

## TABLE E

***Every 1000 working hours or every six months*:**

| | |
|---|---|
| **E-1** | Change the safety element of engine air filter. |
| **E-2** | Change the oil in the power divider gearbox. |
| **E-3** | Change the oil in the four wheel reduction gears. |
| **E-4** | Change the hydraulic oil and inner hydraulic oil filter. |

## TABLE F

***Every 2000 working hours or every year*:**

| | |
|---|---|
| **F-1** | Change the engine coolant. |

## TABLE G

***At 6000 hours or 5 years and, subsequently, every 2 years*:**

| | |
|---|---|
| **G-1** | Check that the structure is intact paying a special attention to the welded supporting joints and the boom pins. |

MAINTENANCE INSPECTIONS

## 3.4 MAINTENANCE INSPECTION REPORT

***Model***

***Serial number***

***Date***

***Hour meter***

***Machine owner***

***Inspected by***

***Inspector signature***

***Inspector title***

***Inspector company***

***Instructions:***

- *Make copies of this page to use for each inspection.*
- *Select the appropriate checklist(s) for the type of inspection to be performed.*

| | |
|---|---|
| | ***Every 10 hours: A*** |
| | ***Every 50 hours: A+B*** |
| | ***Every 250 hours: A+B+C*** |
| | ***Every 500 hours: A+B+C+D*** |
| | ***Every 1000 hours: A+B+C+D+E*** |
| | ***Every 2000 hours: A+B+C+D+E+F*** |
| | ***At 6000 hours: G*** |

- *Place a check in the appropriate box after each inspection procedure is completed.*
- *Use the maintenance tables in this section and the step-by-step procedures in section 4 to learn how to perform these inspection.*
- *If any inspection receives an "N", tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.*

***Legend:***

*Y = yes, acceptable*

*N = no, remove from service*

*R = repaired.*

| Table A | | Y | N | R |
|---|---|---|---|---|
| ***Within the first 10 working hours:*** | | | | |
| **A-1** | Oil level within reduction gears, power divider and differential gears. | | | |
| **A-2** | Tightening of the wheel bolts. | | | |
| **A-3** | Tightening of all bolts and nuts. | | | |
| **A-4** | Check the couplings for oil leaks. | | | |
| ***Every 10 working hours:*** | | | | |
| **A-5** | Operator Manual. | | | |
| **A-6** | Labels and plates. | | | |
| **A-7** | Engine oil livel. | | | |
| **A-8** | Air suction filter. | | | |
| **A-9** | Radiator. | | | |
| **A-10** | Hydraulic oil level in the tank. | | | |
| **A-11** | Check the greasing of the boom section pads. | | | |
| **A-12** | Grase the forks. | | | |
| **A-13** | Grease all joints of the boom, the rear axle shaft joint, the transmission shafts, the front and rear axles and any equipment of the machine. | | | |
| **A-14** | Lighting electric system. | | | |
| **A-15** | Efficiency of braking system and parking brake. | | | |
| **A-16** | Steering selection system. | | | |
| **A-17** | Fork balancing system. | | | |
| **A-18** | Safety devices. | | | |
| **A-19** | Engine coolant level. | | | |
| **A-20** | Overload warning system | | | |
| **A-21** | Re-sequence boom extension (GTH 4013 SX) | | | |

| Table B | | Y | N | R |
|---|---|---|---|---|
| ***Within the first 50 working hours:*** | | | | |
| **B-1** | Efficency of machine. | | | |
| ***Every 50 working hours:*** | | | | |
| **B-2** | Alternator belt. | | | |
| **B-3** | Tyre inflation. | | | |
| **B-4** | Tightening of the wheel nuts. | | | |
| **B-5** | Tightening of the cardan shaft screws. | | | |
| **B-6** | Fins of the radiator | | | |

| Table C | | Y | N | R |
|---|---|---|---|---|
| ***Every 250 working hours:*** | | | | |
| **C-1** | Oil level in the differential gears, reduction gears and divider. | | | |
| **C-2** | Engine oil and relevant filter. | | | |
| **C-3** | Differential gears oil level. | | | |
| **C-4** | Four wheel reduction gears oil level. | | | |
| **C-5** | Cartridge of the engine air filter. | | | |
| **C-6** | Clamping of the cableheads to the battery terminals. | | | |
| **C-7** | Air suction hose between engine and filter. | | | |
| **C-8** | Cylinder chromium-plated rods. | | | |
| **C-9** | Check the hydraulic lines. | | | |
| **C-10** | Check the electric cables. | | | |
| **C-11** | Wear of the sliding pads of the boom sections. | | | |
| **C-12** | Play of the sliding pads of the boom sections. | | | |
| **C-13** | Re-grease sliding parts of the boom sections. | | | |
| **C-14** | Level of the battery electrolyte. | | | |
| **C-15** | Efficiency of the block valves. | | | |

| Table D | | Y | N | R |
|---|---|---|---|---|
| ***Every 500 working hours:*** | | | | |
| **D-1** | Smoke from engine exhaust. | | | |
| **D-2** | Tightening of the engine fixing screws. | | | |
| **D-3** | Tightening of the cab fixing screws. | | | |
| **D-4** | Backlash between pins and bushings in all joints. | | | |
| **D-5** | Hydraulic oil filter cartridge on the return line to the tank | | | |
| **D-6** | Efficiency of hydraulic system | | | |
| **D-7** | Cartridge of the engine air filter. | | | |
| **D-8** | Cartridge engine oil filter and cartridge fuel filter | | | |
| **D-9** | Air filter in the cab. | | | |
| **D-10** | Oil in the differential gears. | | | |
| **D-11** | Boom chains tensioning (GTH 4017 SX) | | | |

***Model***

***Serial number***

***Date***

***Hour meter***

***Machine owner***

***Inspected by***

***Inspector signature***

***Inspector title***

***Inspector company***

***Instructions:***

- *Make copies of this page to use for each inspection.*
- *Select the appropriate checklist(s) for the type of inspection to be performed.*

☐ ***Every 10 hours:: A***

☐ ***Every 50 hours:: A+B***

☐ ***Every 250 hours:: A+B+C***

☐ ***Every 500 hours:: A+B+C+D***

☐ ***Every 1000 hours:: A+B+C+D+E***

☐ ***Every 2000 hours:: A+B+C+D+E+F***

☐ ***At 6000 hours: G***

- *Place a check in the appropriate box after each inspection procedure is completed.*
- *Use the maintenance tables in this section and the step-by-step procedures in section 4 to learn how to perform these inspection.*
- *If any inspection receives an "N", tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.*

***Legend:***

*Y = yes, acceptable*

*N = no, remove from service*

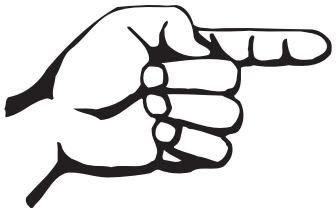
*R = repaired.*

| Table E | | Y | N | R |
|---|---|---|---|---|
| ***Every 1000 working hours:*** | | | | |
| **E-1** | Safety element of engine air filter | | | |
| **E-2** | Power divider gearbox oil | | | |
| **E-3** | Four wheel reduction gears oil | | | |
| **E-4** | Hydraulic oil and hydraulic oil filter | | | |

| Table F | | Y | N | R |
|---|---|---|---|---|
| ***Every 2000 working hours:*** | | | | |
| **F-1** | Change the engine coolant | | | |

| Table G | | Y | N | R |
|---|---|---|---|---|
| ***At 6000 working hours:*** | | | | |
| **G-1** | Checking the state of the structure | | | |

MAINTENANCE INSPECTIONS



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# Maintenance Procedures

## 4.1 INTRODUCTION

- ***Maintenance inspections shall be completed by a trained and qualified person on the maintenance of this machine.***
- ***Scheduled maintenance must be carried out at the intervals indicated in the MAINTENANCE REPORT.***

**WARNING**

***Failure to properly complete each inspection when required may cause death, serious injury or substantial machine damage.***

- ***Immediately tag and remove from service a damaged or malfunctioning machine.***
- ***Immediately tag and remove from service a damaged or malfunctioning machine.***
- ***Unless otherwise specified, perform each procedure with the machine in the following configuration:***
  - ***machine parked on a flat level surface;***
  - ***boom in the stowed position;***
  - ***key switch in the OFF position with the key removed.***

MAINTENANCE PROCEDURES

## 4.2 ABOUT THIS SECTION

This section describes the maintenance interventions to be carried out on the machine according to the indications of the maintenance inspection report (see chapter 3)..

**Safety symbols:**



***Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.***




***Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.***




***Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury or to situations that involve the machine efficiency.***




***Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury or to situations that involve the machine efficiency.***




***Draws the attention to important technical information or practical advice that allows for a safer and more efficient use of the machine.***




***Draws the attention to important information on environment protection.***

## 4.3 TABLE A PROCEDURES

### A-1 CHECK THE OIL LEVEL WITHIN REDUCTION GEARS, DIFFERENTIAL GEARS AND POWER DIVIDER REDUCTION GEAR

To check the oil level within the wheel **reduction gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged and plug **A** finds on the horizontal axis.
- Clean the plug all around, then remove it using a 12 mm Allen wrench, and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

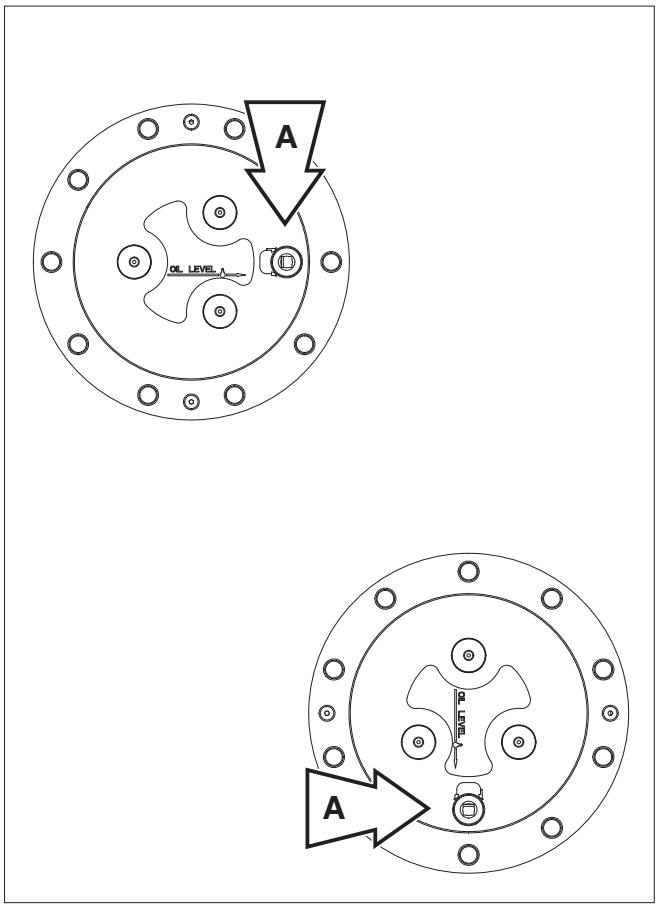
***Place a container of suitable size under the plug for oil leaks.***

To check the oil level in the front and rear **differential gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged.
- Remove the plug **A** using a 12 mm Allen wrench and check if oil is level with the hole.
- If necessary, remove the plug **B** using a 12 mm Allen wrench and top-up through hole **B** until oil comes out from hole **A**.
- Refit the plugs **A** and **B**.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***



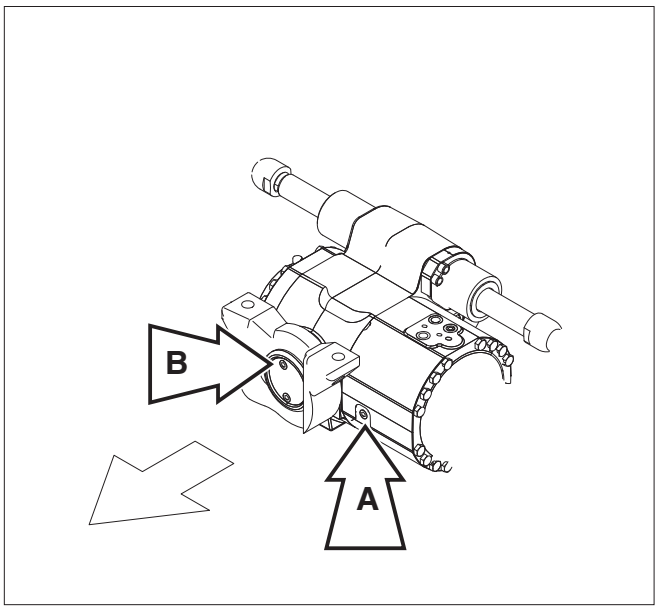



TABLE A

To check the oil level in the **power divider reduction gear**:

- Stop the machine on a level ground and ensure the parking brake is engaged.
- Clean the plug **A** all around, then remove it using a 12 Allen wrench, and check if oil is level with the hole.
- If necessary, top-up through hole **A** until oil comes out.
- Refit the plug.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

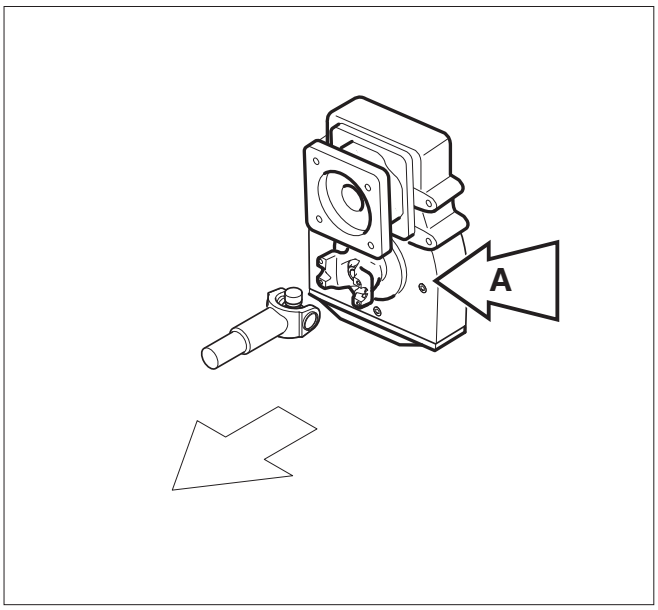


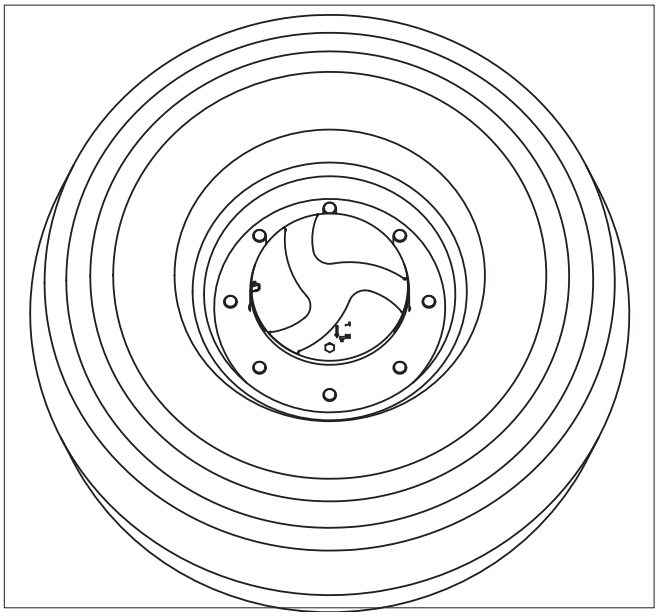
TABLE A

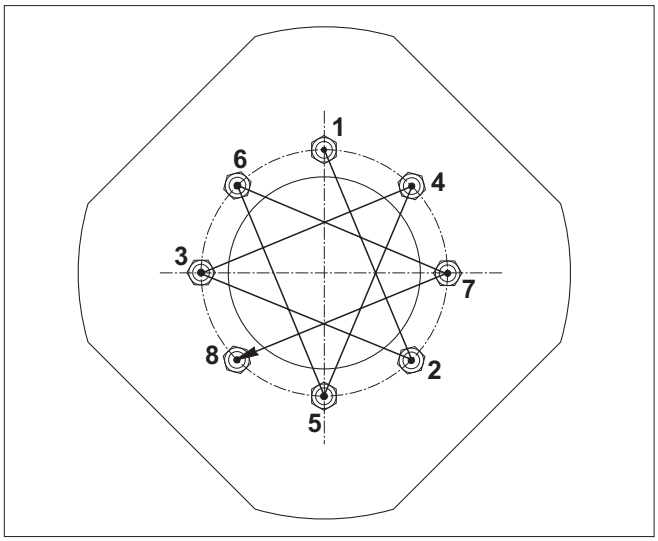
## A-2 CHECK THE TIGHTENING OF THE WHEEL BOLTS

If you have to check the tightening of the wheel bolts or replace a wheel, proceed as follows:

- Raise the machine using a hydraulic jack.
- Screw the bolts and remove the wheel rolling it on the ground.
- Line up the wheel with the axle and fit the 8 nuts.
- Tighten the nuts following the alternate sequence shown in the picture with a pneumatic screwdriving machine.
- Lower the machine to the ground.

***Re-tighten all nuts to a torque 440 Nm.***






**WARNING**

***Check the tightening of wheels one hour after the job. They might get loose until they do not stay correct.***

**WARNING**

***On new machines, and when a wheel has been disassembled or replaced, check the nut torque of the wheels every 2 hours until they stay correct.***

**WARNING**

***Always use tyres having the dimensions indicated in the vehicle registration card.***

| | GTH 4013 SX<br>Standard - Optional | GTH 4017 SX |
|---|---|---|
| **Dimensions** (front and rear.) | 405/70 R20 - 400/70 R24 | 405/70 R24 |
| **Load index** | 14 pr - 14 pr | 14 pr |
| **Rim** | 13x20 - 13X24 | 13x24 |
| **Wheel disc** | 8 fori DIN 70361 - 8 fori DIN 70361 | 8 fori DIN 70361 |
| **Pressure** bar/Psi | 5.5/80 - 4.6/65 | 4.5/65 |

TABLE A

## A-3 CHECK THE TIGHTENING OF ALL BOLTS AND NUTS

Before starting your daily work, proceed with a random check of the bolts.

For the correct tightening torques, please refer to par. 2.13 in section 2 “Technical Specifications”.

## A-4 CHECK THE COUPLINGS FOR OIL LEAKS

Before starting your work, do a walk-around inspection and check for oil leaks.

If you find them, rectify before starting using the machine.

TABLE A

## A-5 INSPECT THE OPERATOR'S MANUAL

Maintaining the operator manual in good condition is essential to consult it if necessary..

Manual are included with each machine and should be stored in the cab. An illegible or missing manual will not provide safety and operational information necessary for a safe operating condition.

In particular:

- check to be sure the storage container is in good condition.
- check to make sure that the operator manual are present, complete and in the storage container in the cab.
- examine the pages of each manual to be sure that they are legible and in good condition.
- always return the manual to the storage container after use.

NOTICE

***Contact TEREXLIFT Service Centre if replacement manuals are needed.***

## A-6 INSPECT THE DECALS AND PLATES

Maintaining all of safety and instructional decals and placards in good condition is mandatory for safe machine operation. Decals alert operators and personnel to the many possible hazards associated with using this machine.

An illegible decal will fair to alert personnel of a procedure or hazard and could result in unsafe operating conditions.

- refer to the "labels and warning plates applied on the machine" section in the Operator Manual and use the decal list and illustrations to determine that all decals and placards are in place.
- inspect all decals for legibility and damage. Replace any damaged or illegible decal immediately.

NOTICE

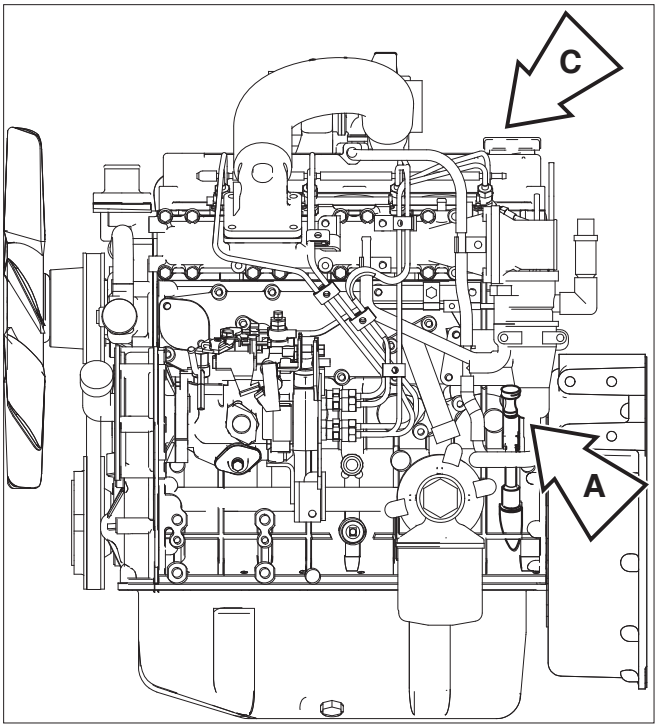
***Contact TEREXLIFT Service Centre if replacement decals are needed.***

TABLE A

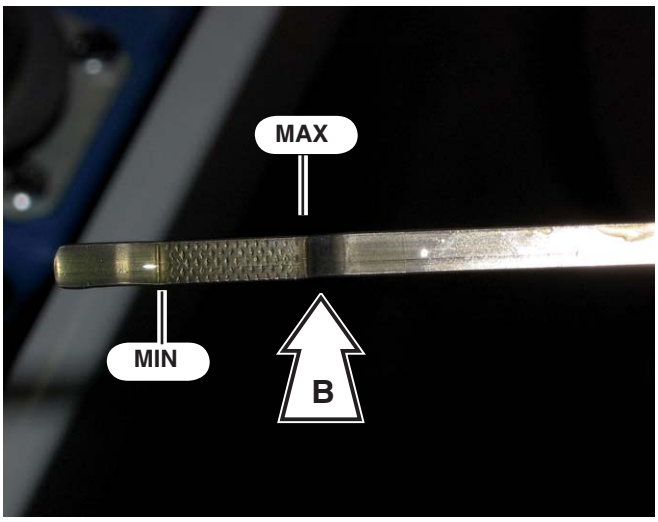
## A-7 CHECK THE ENGINE OIL LEVEL

To check the engine oil leve, proceed as follows:

- Stop the machine on a level ground, stop the engine and ensure the parking brake is engaged.
- Pull out the rod of the level **A** and ensure the oil comes to the maximum height **B.**




- If the oil is below this level, remove the pluh **C** and add new oil in the engine using a gradueted cup.



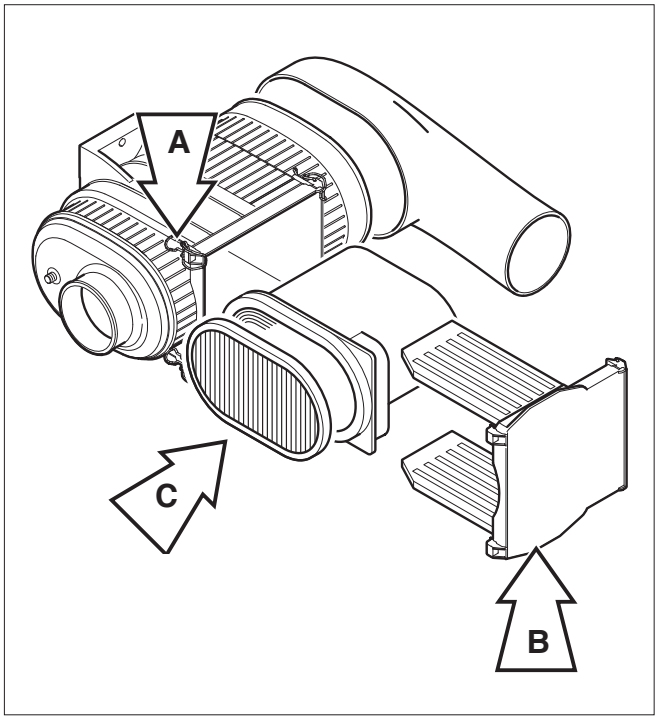

- Pull out the rod **A** again and ensure the oil comes to the maximum level **B**.
- Refit the rod **A** and the plug **C**.

TABLE A

## A-8 CLEAN THE AIR SUCTION FILTER

Clean the engine air filter every 10 working hours:

- Stop the engine and engage the parking brake.
- Lift the engine carter.
- Unlock the four clamps **A**.
- Remove the cap **B**.
- Extract the external filtering cartridge **C**.
- Clean the inside of the filter.
- Knock out the filtering cartridge using a wooden board to eliminate the dust.
- Dry clean the cartridge (max. pressure 6 bar).
- Check for cracks in the filtering element.
- Refit the clean cartridge, or a new one, correctly, appling some grease on the gaskets.
- Refit the plug **B**.




**WARNING**

***As soon as the warning lamp on the cab dashboard switches on, replace the filtering element.***

**WARNING**

***Do not wash the cartridge using water or other kind of solvents.***

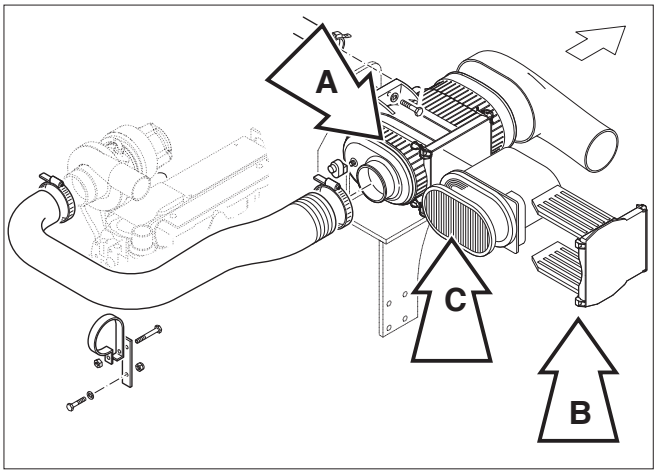


TABLE A

## A-9 CHECK AND CLEAN THE RADIATOR

**DANGER**

***When using a steam-washer, always wear protective clothes. Hot steam may cause serious injury.***

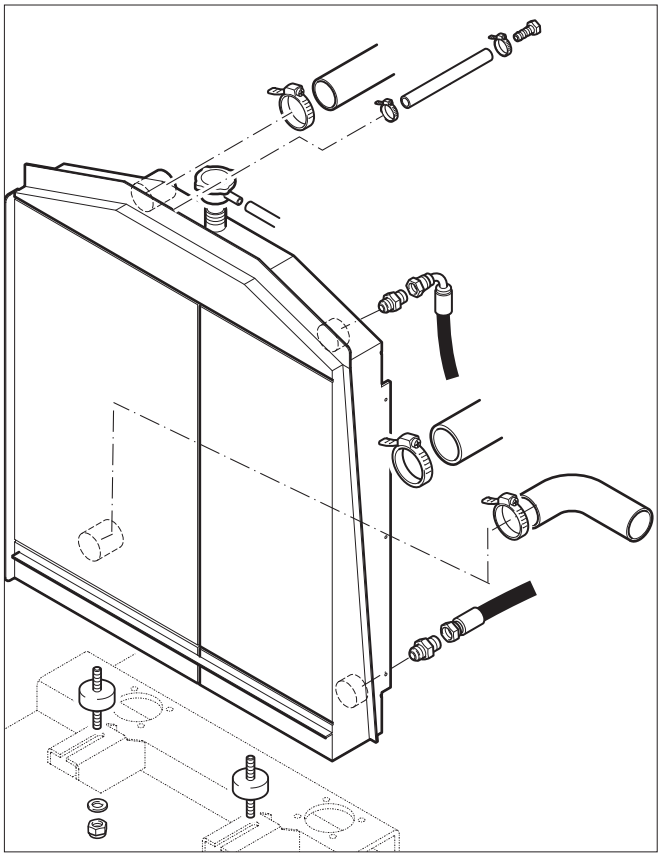
- Open the engine carter to check the radiator.
- Check the fins of the radiator for sediments.
- If necessary, prepare a compressed air nozzle (max. 2 bar) or a nozzle distributing water under pressure or steam.

**Cleaning using compressed air**

- Direct a jet of compressed air toward radiator, paying attention not to damage its fins.
- Remove any loose particles of dirt with some water.

**Cleaning using water under pressure or steam**

- Spray radiator with a cold commercial detergent and wait for at least 10 minutes to allow the detergent to react.
- Wash radiator **C** using a jet of water or steam.



**NOTICE**

***The core fouling depends on the dust of the outside environment and the presence of oil and fuel leaks in the motor area. It is therefore advisable to remove oil and fuel leaks immediately in case of very dusty environments.***

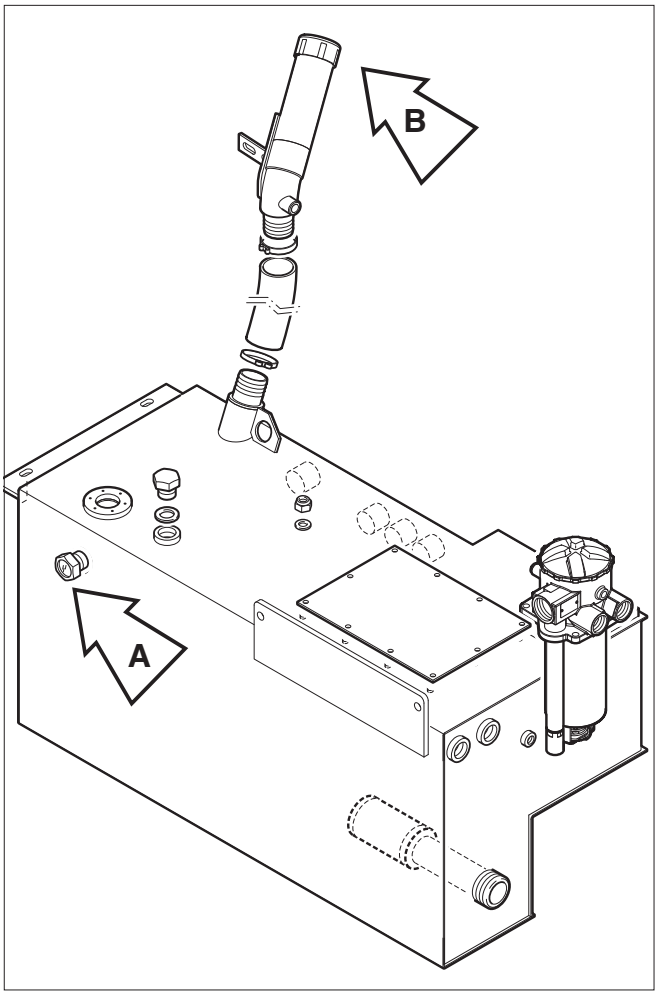
TABLE A

## A-10 CHECK THE HYDRAULIC OIL LEVEL IN THE TANK

**DANGER**

***Fine jets of hydraulic oil under pressure can penetrate the skin. Do not use your fingers, but a piece of cardboard to detect oil leaks.***

Check visually the hydraulic oil level through level **A** on the tank, visible through a hole on the right side of the chassis.
If necessary, add oil through plug **B**.




**WARNING**

***Check the oil level with the machine in the travel position, tha is boom lowered and telescopes fully in.***

**PROTECT THE ENVIRONMENT**

***The handling and disposing of used oils can be ruled by local or national regulations. Address to authorised centres.***

TABLE A

**A-11 CHECK THE GREASING OF THE BOOM SECTION PADS**

**4013 SX**

Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

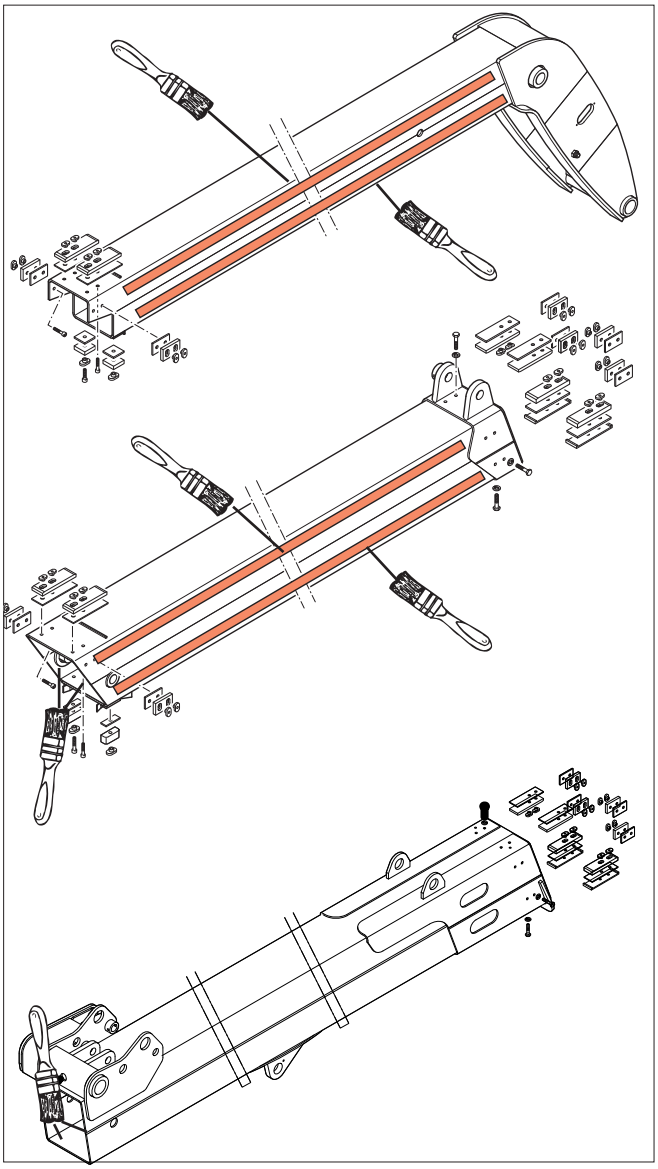
At regular intervals, check that the telescopes are well greased in correspondence of the sliding pads.

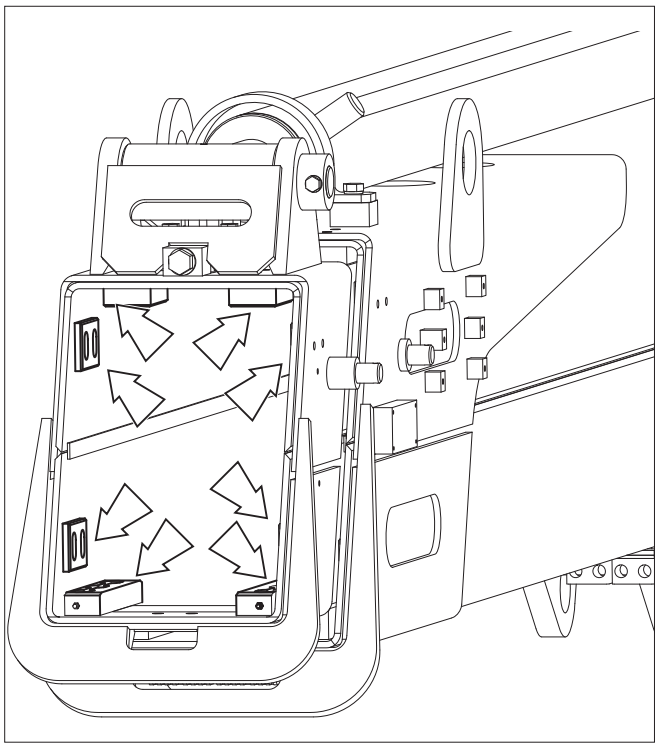
If necessary, scrape off the old grease and brush new grease. We recommend using:

- **Grasso PTFE INTERFLON FIN GREASE LS 2**

**CAUTION**

***Avoid mixing greases of different type or features and do not use greases of lower quality.***





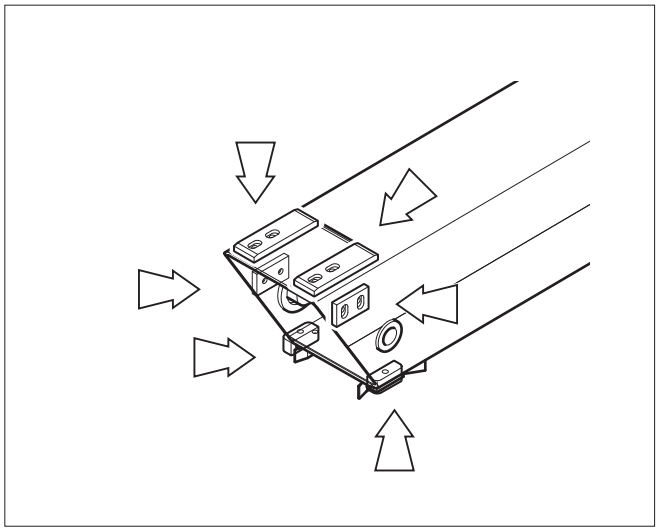
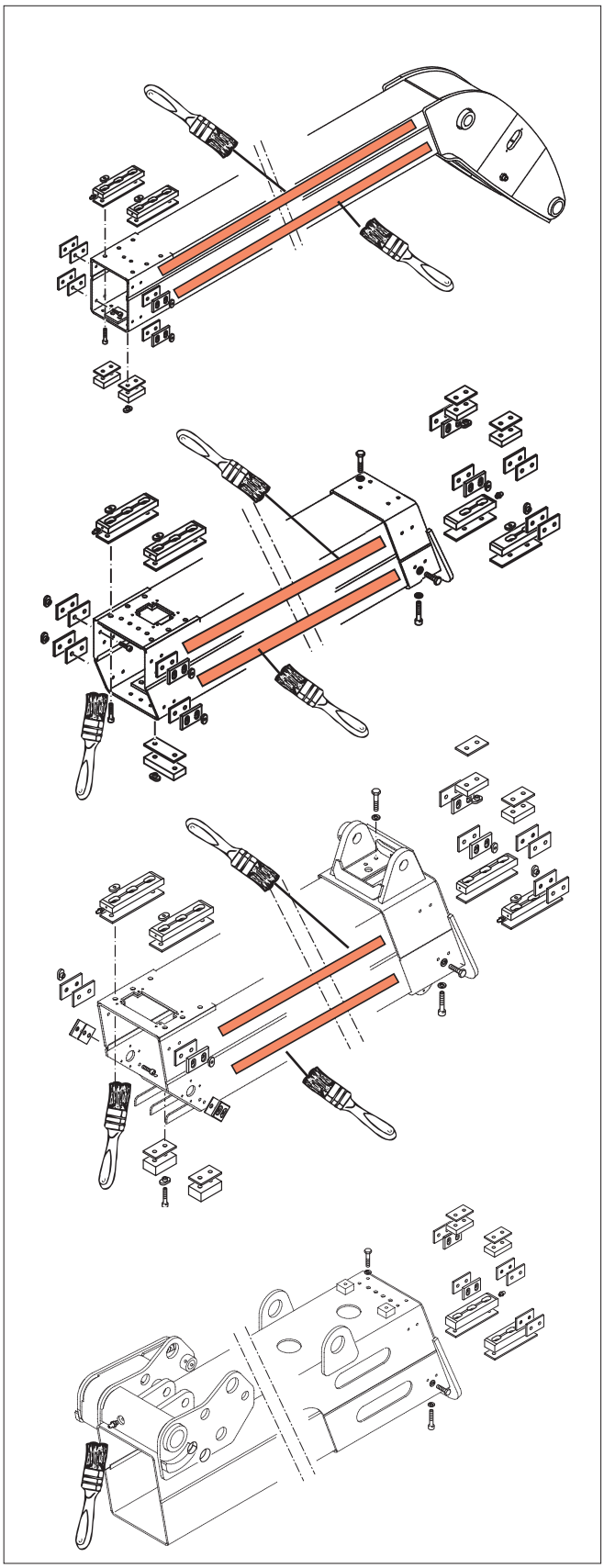
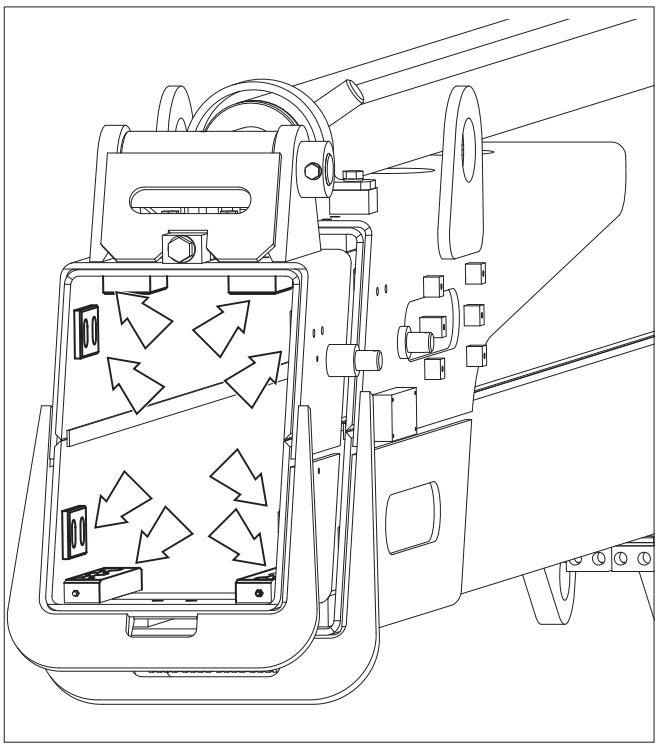


TABLE A

**4017 SX**





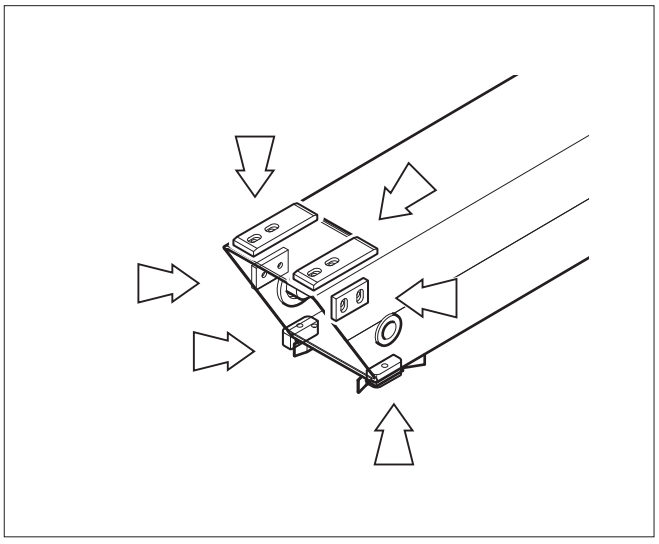


TABLE A

**A-12 GREASE THE FORKS**

**CAUTION**

***Before use grease, thoroughly clean the intervention zone to avoid that mud, dust or other matters can mix with the lubricant and reduce or annihilate the lubrication effect.***
***Remove any old grease with a degreaser from the telescopes before smearing them with new grease.***

Smear pin **A** with grease to help the forks slide on it.

Recommended grease:

- **AGIP graphitized grease type GR NG 3**

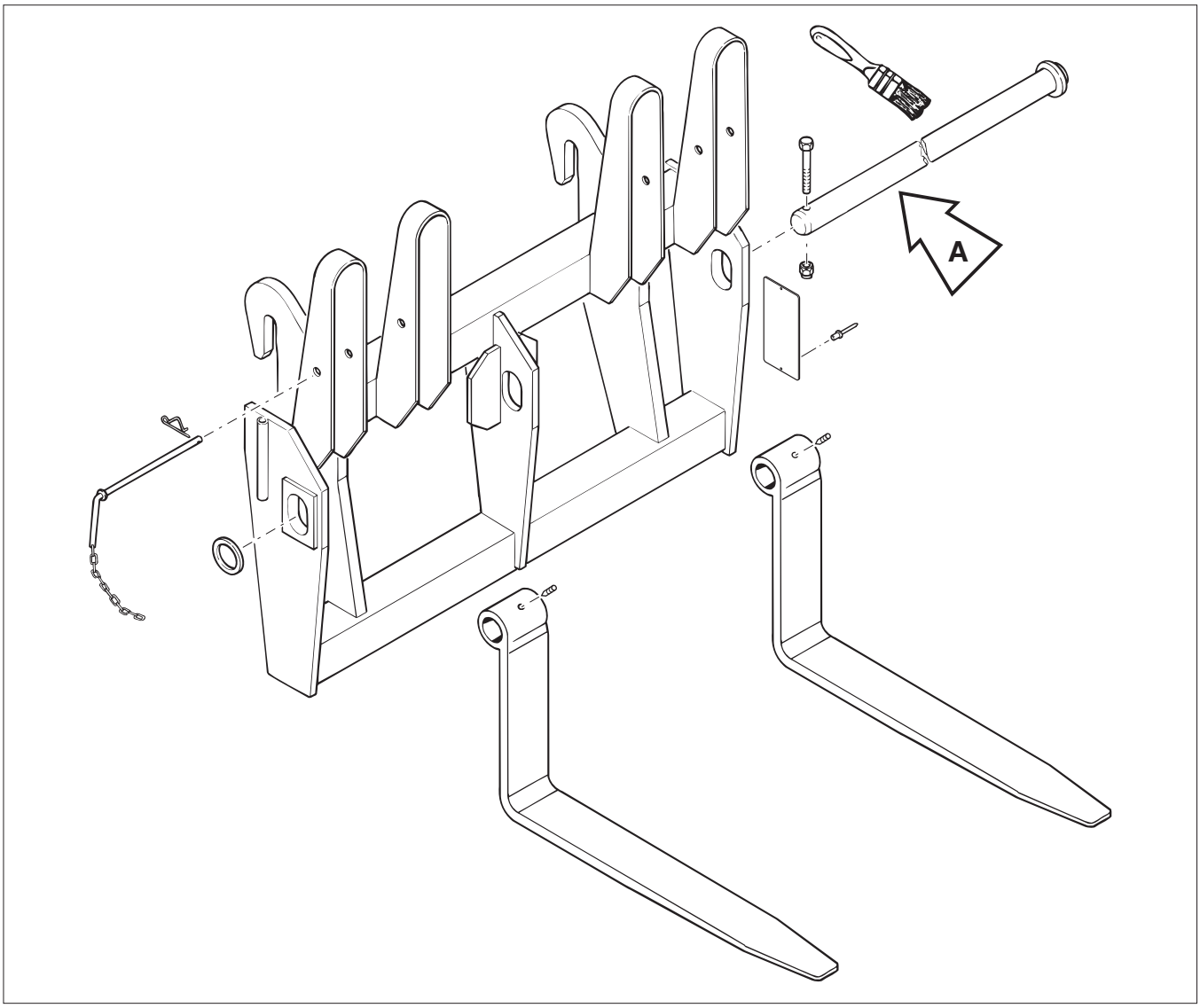
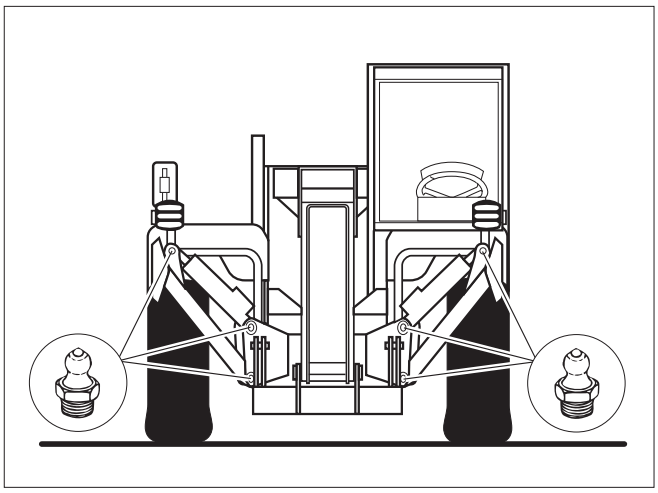


TABLE A

## A-13 GREASE ALL JOINTS OF THE BOOM, THE REAR AXLE SHAFT JOINT, THE TRANSMISSION SHAFTS, THE FRONT AND REAR AXLES AND ANY EQUIPMENT OF THE MACHINE

**CAUTION**

***Before injecting grease into the greasers, thoroughly clean them to avoid that mud, dust or other matters can mix with the lubricant and reduce or annihilate the lubrication effect.***
***Remove any old grease with a degreaser from the telescopes before smearing them with new grease.***



Regularly grease the machine to grant it efficient conditions and a long life.

By means of a pump, inject grease into the special greasers.

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

- the symbol  represents the points to be greased by a pump
- the symbol  represents the points to be greased by a brush.

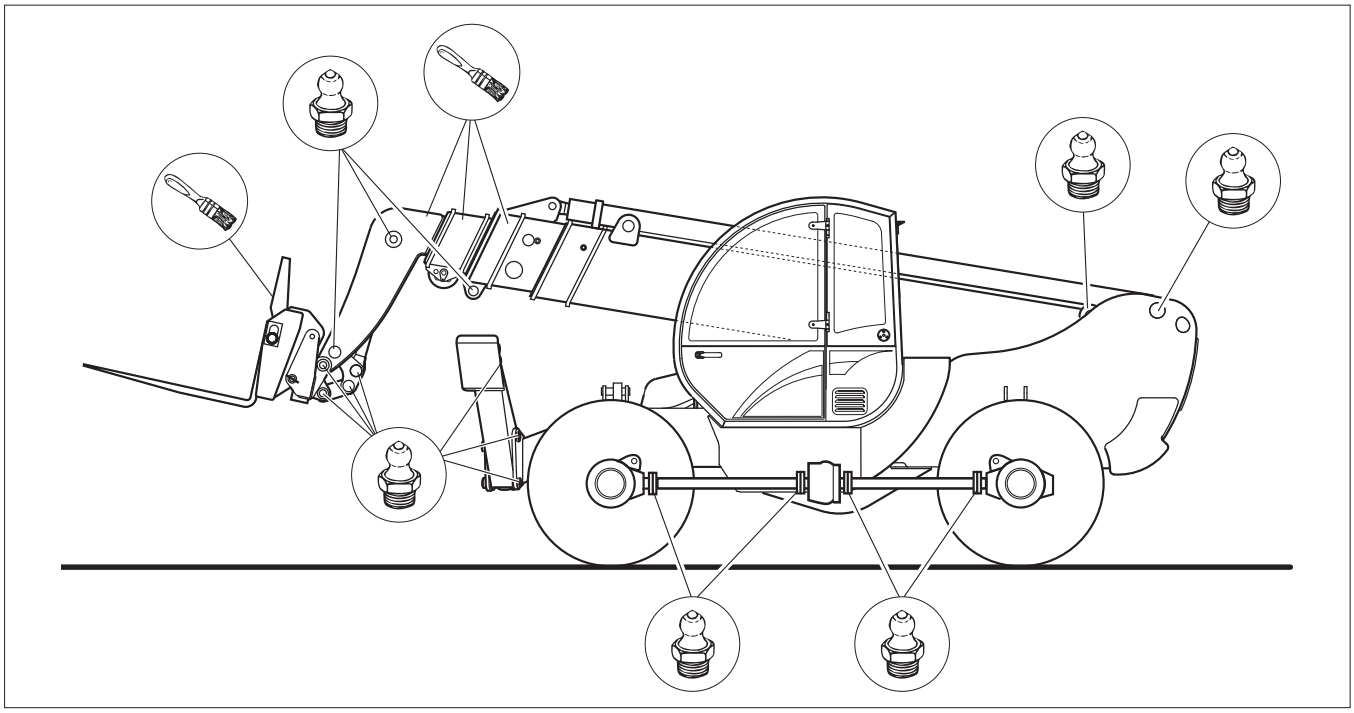


TABLE A

## A-14 CHECK THE EFFICENCY OF THE LIGHTING ELECTRIC SYSTEM

Check every day that the electrical system powering the lights of the machine is in efficient working order.

Use the assistance of a second technician to check that the front lights (position lights, low and high beams and turn signals) and the rear lights (position lights, stop/tail lights and turn signals) are in excellent state of repair.

Also check beacon located on the cab roof.

If one lamp or more must be replaced, use the table below as a reference.

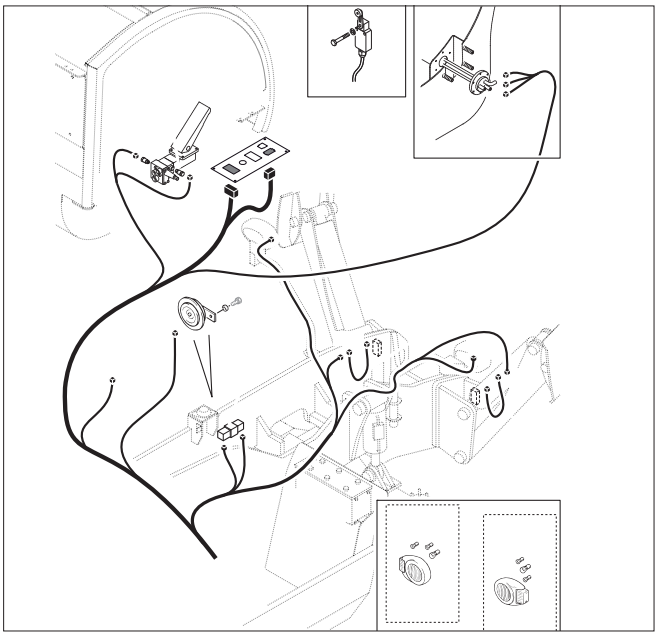
**WARNING**

***When switched on, lamps get hot. Before touching a lamp with your fingers, let it cool down.***

**CAUTION**

***Never touch the bulb of halogen lamps with your fingers: this may damage the lamp (use of a clean cloth or a paper tissue). If you touch it accidentally, thoroughly clean with a paper tissue and some ethyl alcohol.***

| Use | Voltage | Mount type | Power |
|---|---|---|---|
| • Front low/high beam | 12 V | P45t | 45/40 W |
| • Front position lights | 12 V | BA 9s | 3 W |
| • Side/tail turn signals | 12 V | BA 15s | 21 W |
| • Stop lights and rear position lights | 12 V | BAY 15d | 21/5 W |
| • Beacon - Work lights (OPTIONAL) | 12 V | H3 | 55 W |
| • Dashboard indicators and cab lighting | 12 V | W 2x4,6d | 1,2 W |
| • Interior lamp | 12 V | SV 8,5-8 | 5 W |
| • License plate lights | 12 V | BA 15s | 5 W |
| • Back-up lamps | 12 V | BA 15s | 21W |



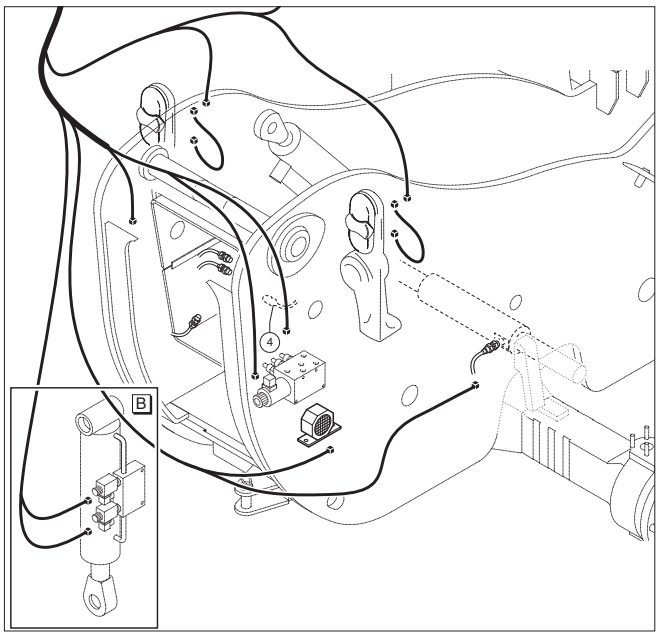


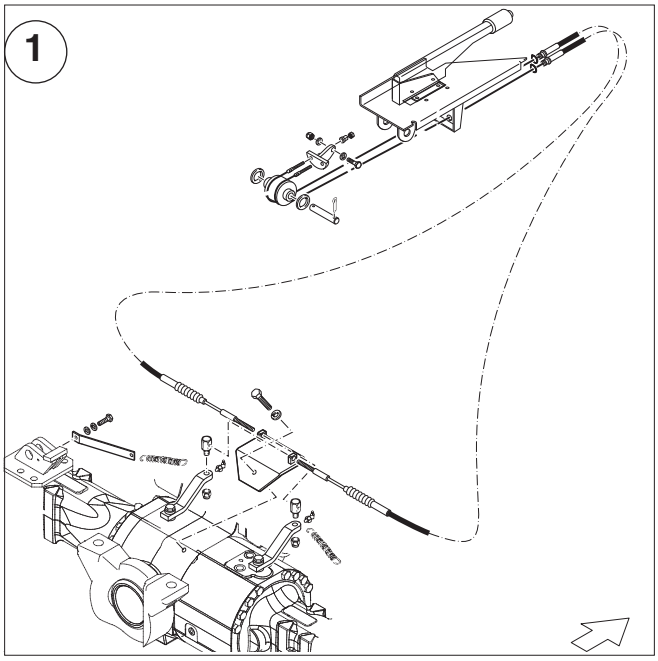
TABLE A

## A-15 CHECK THE EFFICENCY OF BRAKING SYSTEM (STANDARD ISO 6292)

### 1 CHECK PARKING BRAKE:

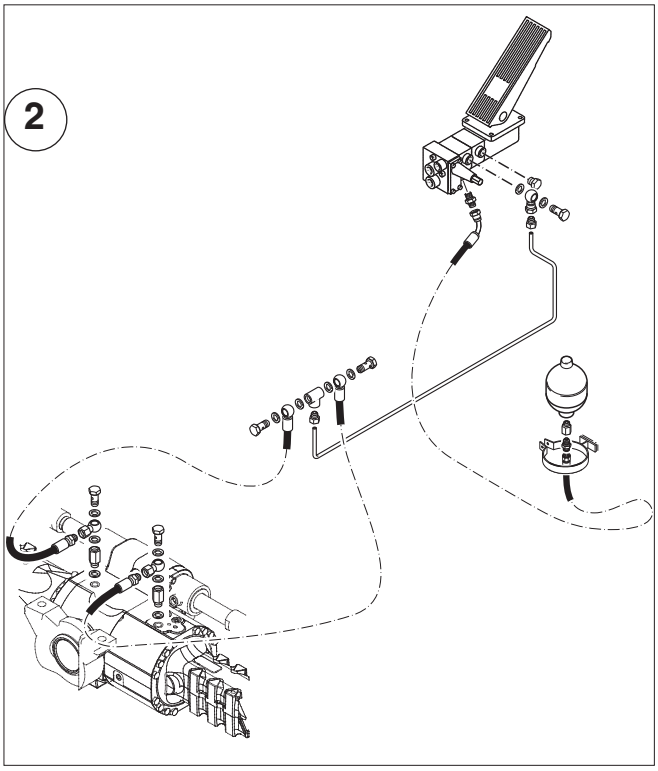
- Load the maximum payload onto the forks (4000 Kg).
- Retract boom and forks fully.
- Lift the forks at about 50 cm on the ground.
- Stop the machine on a sloped surface of about 15% (8.5°). If possible, use a oscillating axle.
- Engage the parking brake.

Check the parking brake with the forward or reverse gear put and ensure the machine is stopped.




### 2 CHECK SERVICE BRAKE

- Load the maximum payload onto the forks (4000 Kg).
- Retract boom and forks fully..
- Lift the forks at about 50 cm on the ground.
- Ensure the space is enough to stop the machine.
- Start the machine at maximum speed.
- Brake using the service brake until the machine is completely stopped.
- Measure the space between the beginning and the end of the raking.
- Maximum value: meter 12,4 for GTH 4013 SX; meter 12,4 for GTH 4017 SX (see TEST REPORT cod. 57.1400.8105)[1].




[1] With fork

TABLE A

## A-16 CHECK THE EFFICENCY OF THE STEERING SELECTION SYSTEM

During operation, the alignment of the front and rear axles of the machine can be subject to variations. This can depend on an oil blow-by from the steering control circuit, or on a steering of both axles when front and rear wheels are not perfectly aligned.

To fix this problem, rather than checking the alignment visually, follow the procedure below:

1 Move the machine to a solid and level ground.

2 Set the steering selection switch **A** to “four-wheel steer” (pos. **2**).

3 Rotate the steering up to its stop (either to the right or to the left).

4 Set the steering selection switch to “two-wheel steer” (pos. **0**).

5 Rotate the steering up to its stop (turn in the same direction as above).

6 Reset the steering selection switch to “four-wheel steer” (pos. **2**).

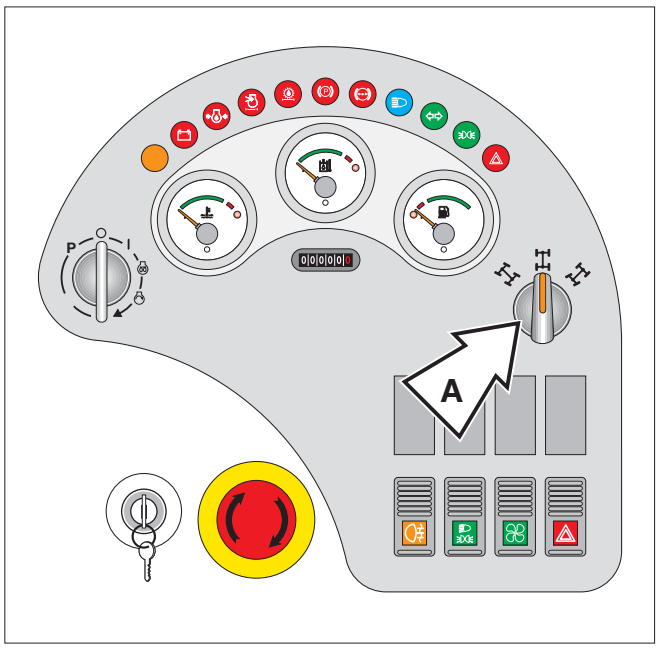
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop.

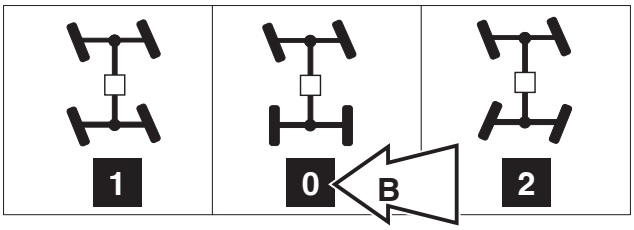
8 Reset the steering selection switch to “two-wheel steer” (pos. **0**).

9 Rotate the steering (to the same side as in point **7**) so that the front axle reaches its stop.

10 Reset the steering selection switch to “four-wheel steer” (pos. **2**).

Now the wheels should be re-aligned.




If the **rear wheel alignment indicator light** (OPTIONAL) is on the machine, the indicator light **A** comes on when wheels are aligned (see rear wheels on position **B**). The sensor **C** on the steering cylinder of the rear axle gives the aligned wheels.

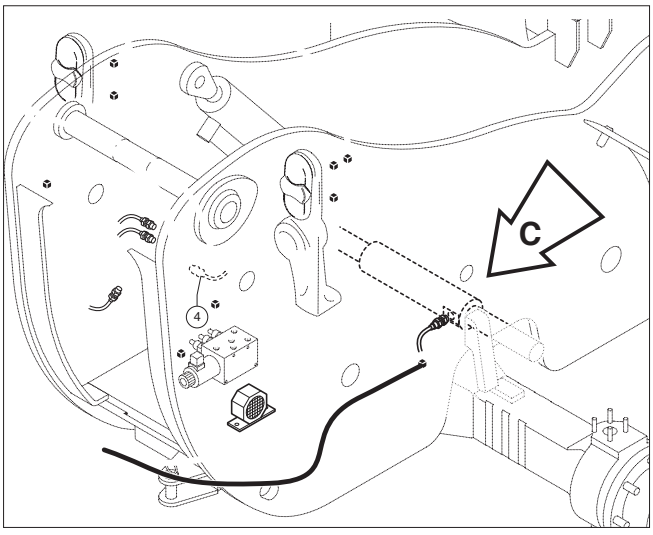


TABLE A

## A-17 CHECK THE EFFICENCY OF THE FORK BALANCING SYSTEM

**WARNING**

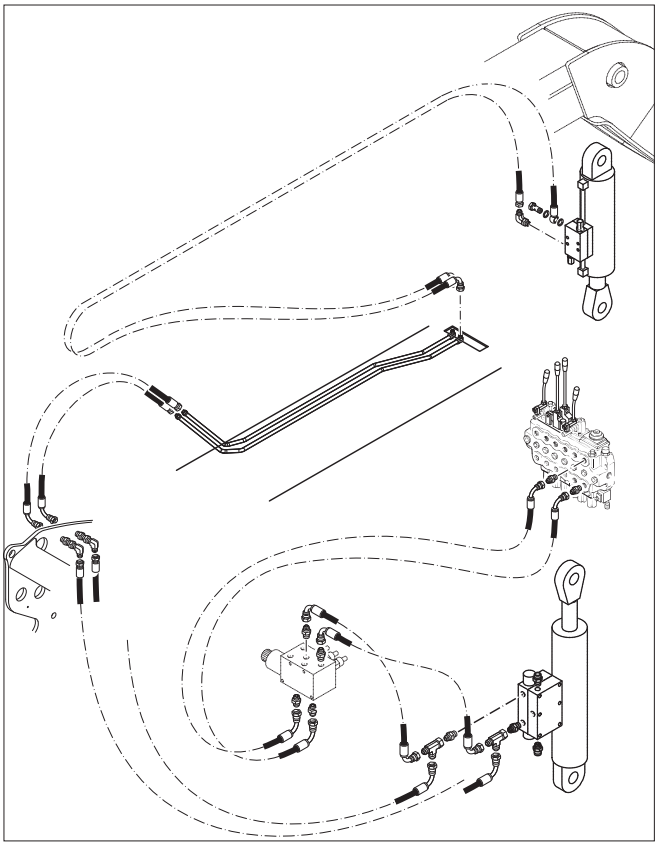
***Test the system without any load on the machine's forks.***

To check the efficiency of the fork balancing system, obey the instructions below:

- Drive the machine to a flat, smooth ground.
- Move the retracted boom fully down and align the forks with the ground.
- Start lifting the boom and check that the forks remain parallel to the ground.

**NOTICE**

***If the forks do not remain parallel to the ground, consult section 5 "Problems - Causes - Solutions".***



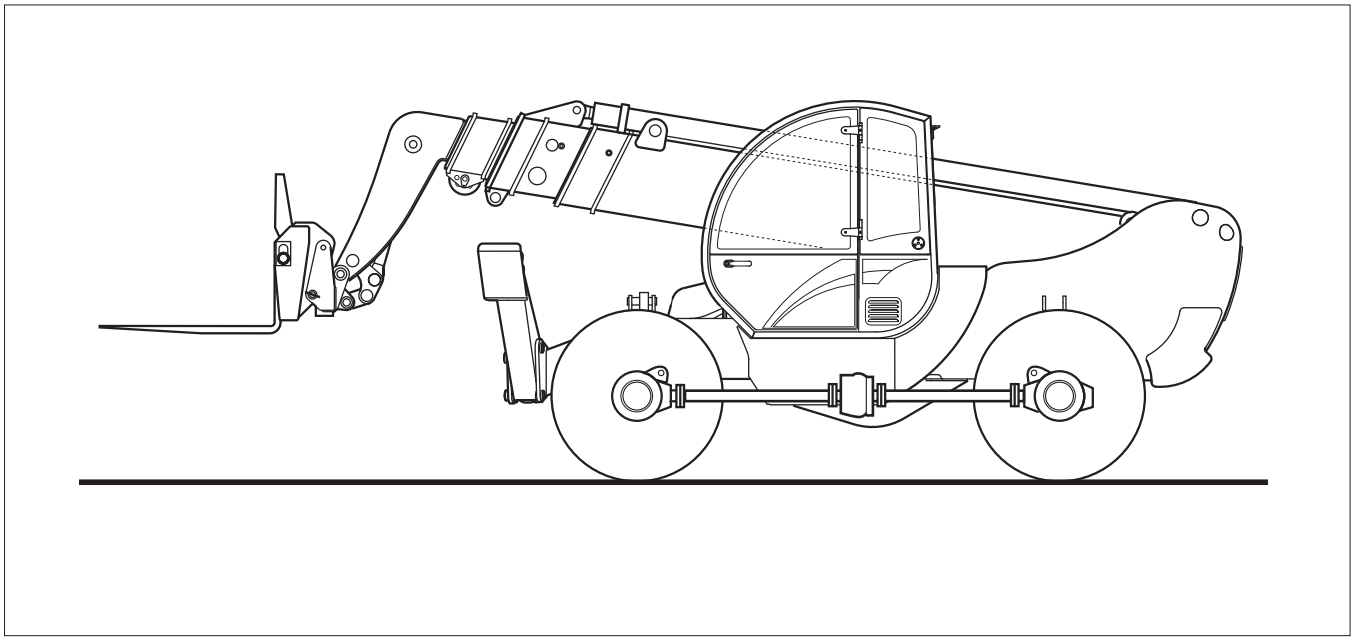
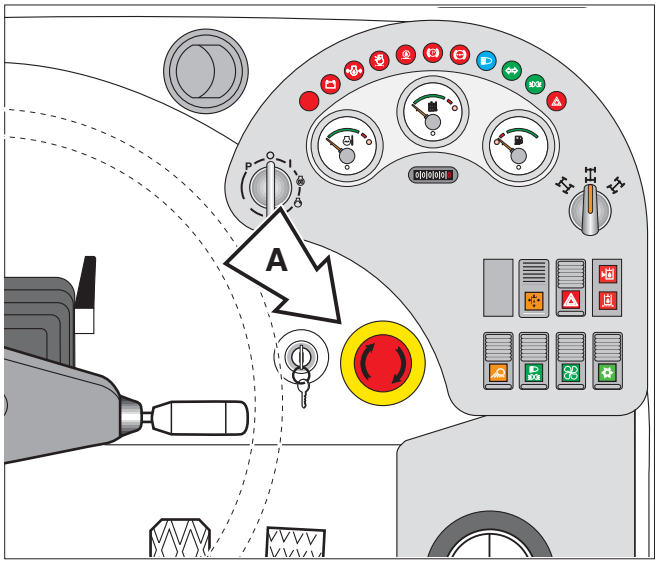


TABLE A

## A-18 CHECK THE EFFICIENT WORKING ORDER OF THE SAFETY DEVICES

### Check the emergency stop pushbutton
(at every use)

To check the efficency of the emergency stop pushbutton **A**, push it during one of movement operations of the machine: the operation and the machine engine has to stop.




### Check of the machine ignition control
(at every use)

Start diesel engin using lever **B** to forward/revers.
The diesel engine has not start.

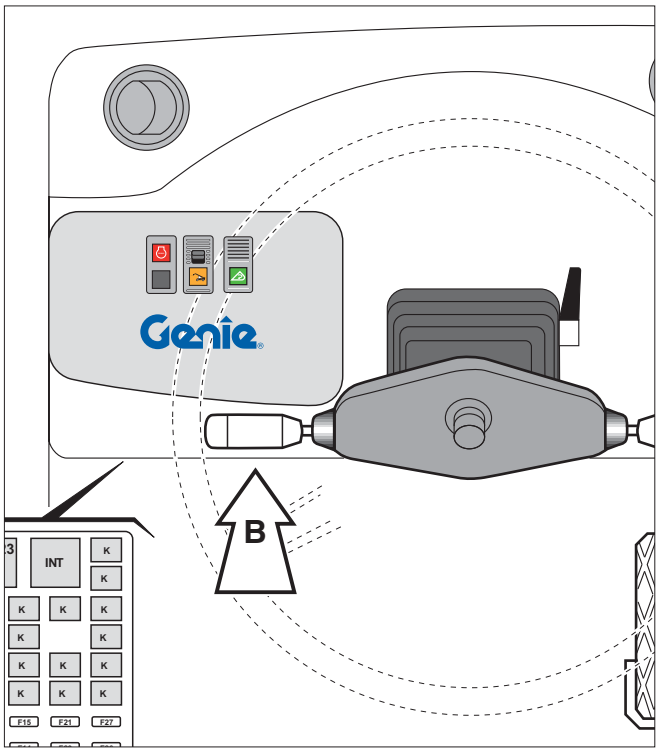


TABLE A

### Check of the limit switches on the outriggers
(at every use)

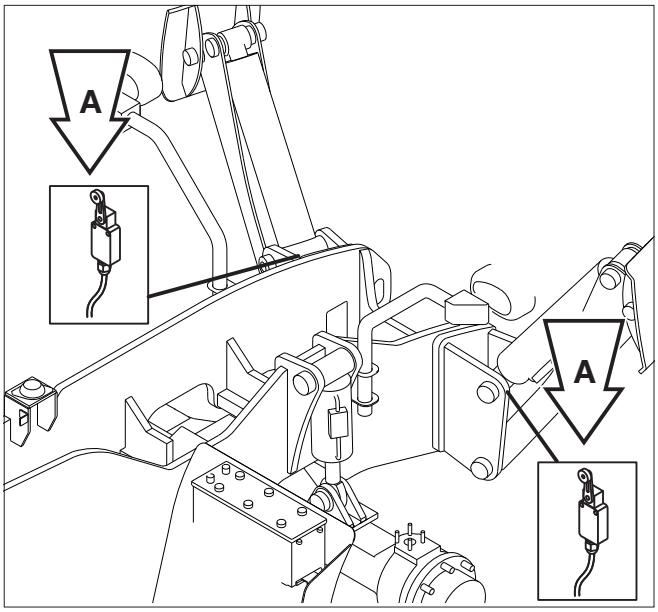
To check the limit switches (**A**) on the outriggers:
- Lower the outriggers to the ground and attempt to engage a gear.
  Accelering the machine has to be stopped.

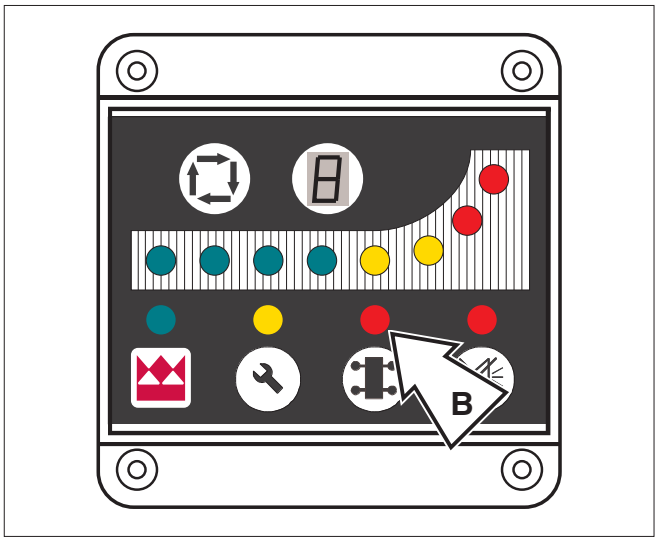
Proceed on one outrigger at a time.

- With the outriggers up, light (**B**) on the load limiter panel must be off; with the outriggers down to the ground, the same light must be on.




***If a limit switch is faulty or a lever is deformed, immediately replace the part.***




### Check of the limit switches
(at every use)

**Limit switches C on boom**
- Lift the boom over the zero position until a maximum angle of 20° and check if machine sway function and outriggers' controls can be activated.

**Limit switches D on boom**
- Lift the boom with a tilt angle over 50° (GTH 4013SX e il GTH 4017SX) and check that the rear axle is stopped.

**Limit switche E (GTH 4013SX only)**
- The limit switche E shoes the boom is fully retract.

**Limit switches E-D on boom (GTH 4013SX only)**
- Lift the boom with a tilt angle until 50° (sensor **D**), retrac it fully and check the outriggers and the right/left sway. Check the outriggers and the right/left sway are stopped with a tilt angle over 50°.

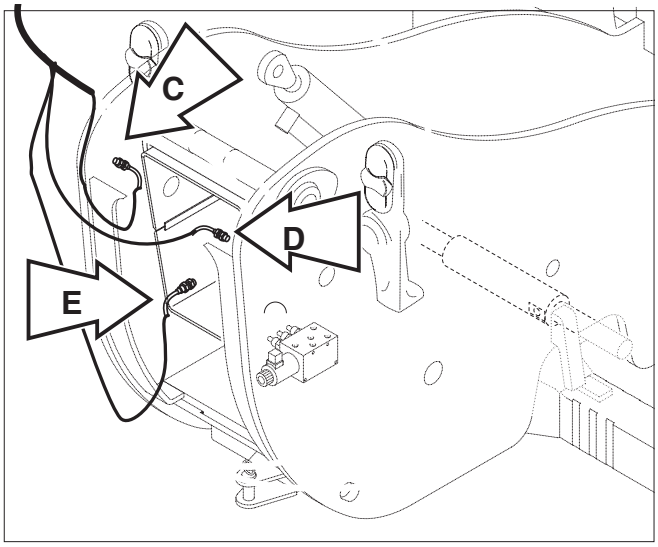


TABLE A

**Limit switches F on the parking brake**
(at every use)

To check the efficency of the limit switches on the parking brake, follow the procedure below:

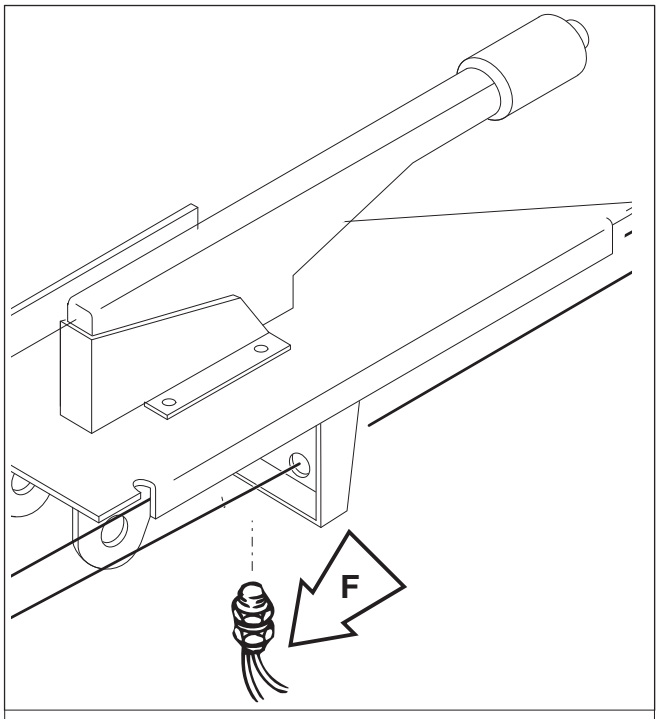
- Sit in the driving seat, engage the parking brake and make sure the machine does not move.
  If the machine moves, replace or adjust the distance of the micro-switch on the parking brake.

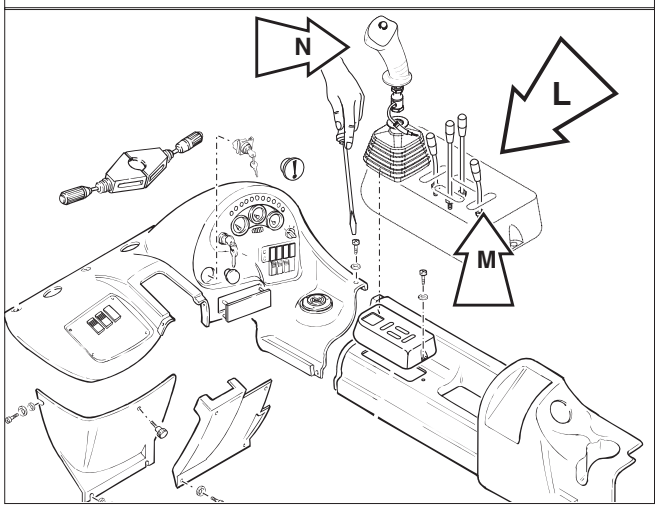
**Check the limit switches on the main valve levers (GTH 4013SX only).**

To check the efficency of the three main valve levers, follow the procedure below:

- Sit in the driving seat, engage the parking brake and move the lever to forward in neutral position.
- Using a screwdriver, remove the locking screws of the carter, open it until seeing the sensor **G**, **H**, **I**.
- Turn the ignition key to the position **1**.
- Move the lever **M,** lock/unlock attachment, to right (unlock attachment) and check the light of sensor **I** switchs on.
- Move the lever N, extend/retract boom, to left (retract boom) and check the light of sensor **G** switchs on.
- Move the lever N, lift/low boom, to revers (lift boom) and check the light of sensor **H** switchs on.

In case of defects, adjust the sensors.



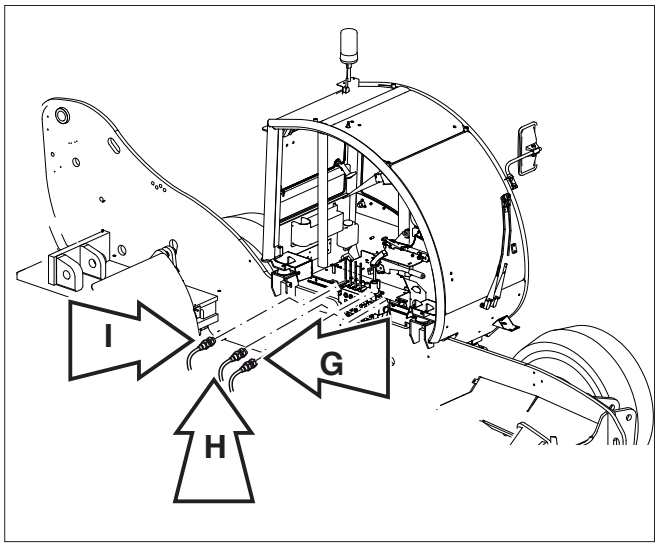



TABLE A

## A-19 CHECK THE ENGINE COOLANT LEVEL

**DANGER**

***When the coolant is hot, the cooling system is under pressure. With warm engine, loosen the radiator plug slowly and carefully, without removing it, to drain the pressure. Use protection gloves and keep your face at a safe distance.***

- Every week, before starting working (with the coolant cold), check the coolant level through the glass cap of plug **B**.
- When necessary, add clean water or an antifreeze mixture through plug **A**.

On delivery, the machine is filled with a cooling mixture consisting of 50% water and 50% anti-freeze.

| **TEREX PRO COOL** Protection against boiling / freezing | | |
|---|---|---|
| Product % | Freezing point | Boiling point |
| 33 | -17 °C | 123 °C |
| 40 | -24 °C | 126 °C |
| 50 | -36 °C | 128 °C |
| 70 | -67 °C | 135 °C |

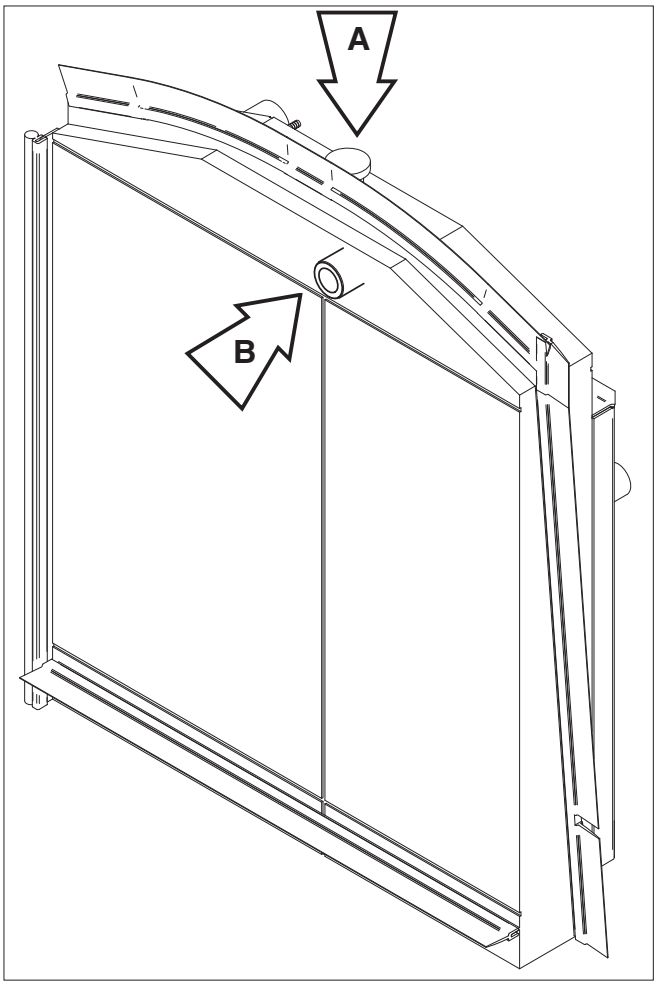
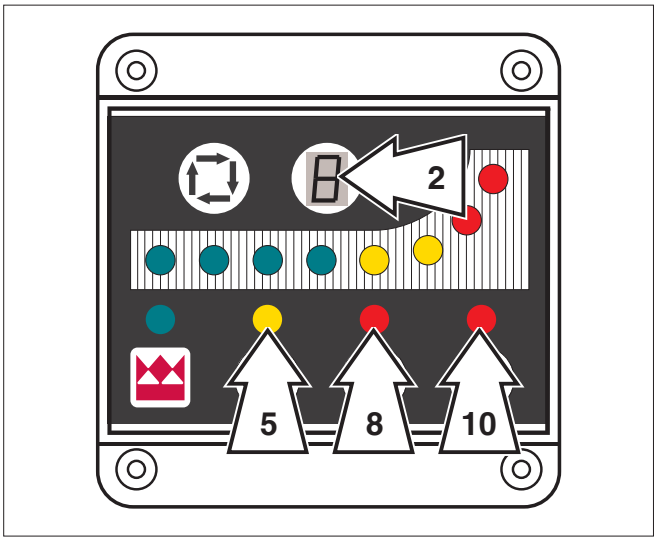
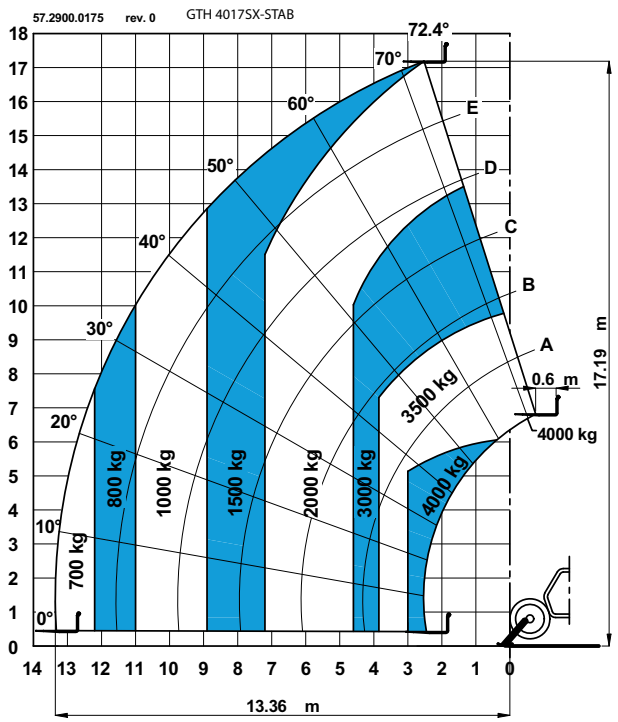


TABLE A

## A-20 CHECK THE EFFICENCY OF THE OVERLOAD WARNING SYSTEM

When the machine starts, the DLE system executes a check.
When power is turned on, the DLE load limiting system runs a self-test. In the case of troubles, LED's **5**, **8** and **10** start flashing, the buzzer sounds, an error code is shown on the display **2** and the machine enters the alarm mode and cannot be operated.
The meaning of the error messages is shown in Section **2**.
To do a manual check, it will be enough to load a known weight on the forks and extend the boom fully in zero position until the DLE system enters in alarm. Then, using a measure check the distance is in the area indicated in the load chart inside the cab (see below)
In case of defects, make a diagnosis and adjust the system.



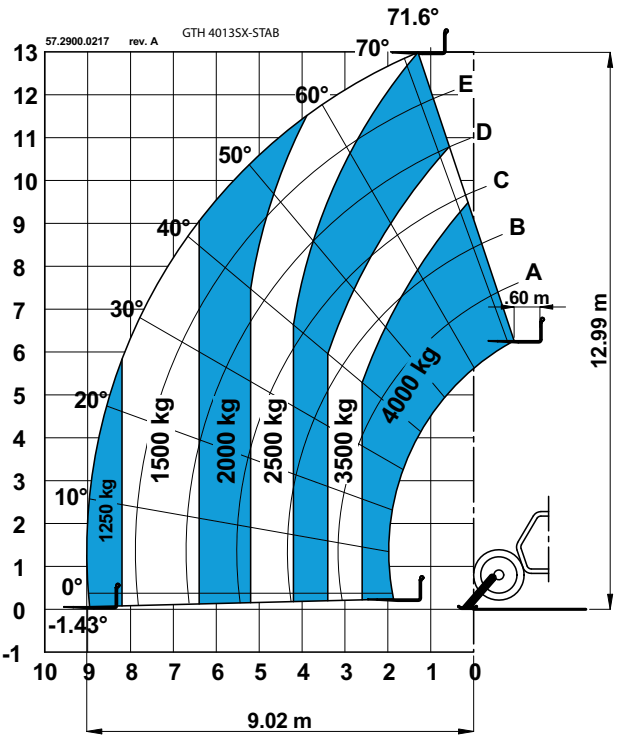



TABLE A

## A-21 CHECK THE RE-SEQUENCE OF THE BOOM TELESCOPE (GTH 4013SX)

If, during normal operation, a change in the boom extended lengths of 150 mm or more is noticed when the boom is retracted, proceed as follows:

1 With the thermal motor started, retract the boom fully using the joystick, hold the system over relief (approx. 15 seconds); the three boom sections should retract fully. Then, hold the system over relief for approx. 20-40 seconds, to change the hydraulic oil inside the system.

If after performing this procedure the boom still remains out of sequence, proceed with the steps below:

2 Move the boom to the zero position, fully retract the boom and hold the retract system over relief for approx. 20-40 seconds.

3 Extend the boom fully, retract it and hold it over relief for approx. 60 seconds. Repeat this operation for maximum three times.

If, despite these procedures, the boom does not return in sequence, check the cylinders and their re-sequence valves **A**. Before this procedure, disassemble the cylinders.

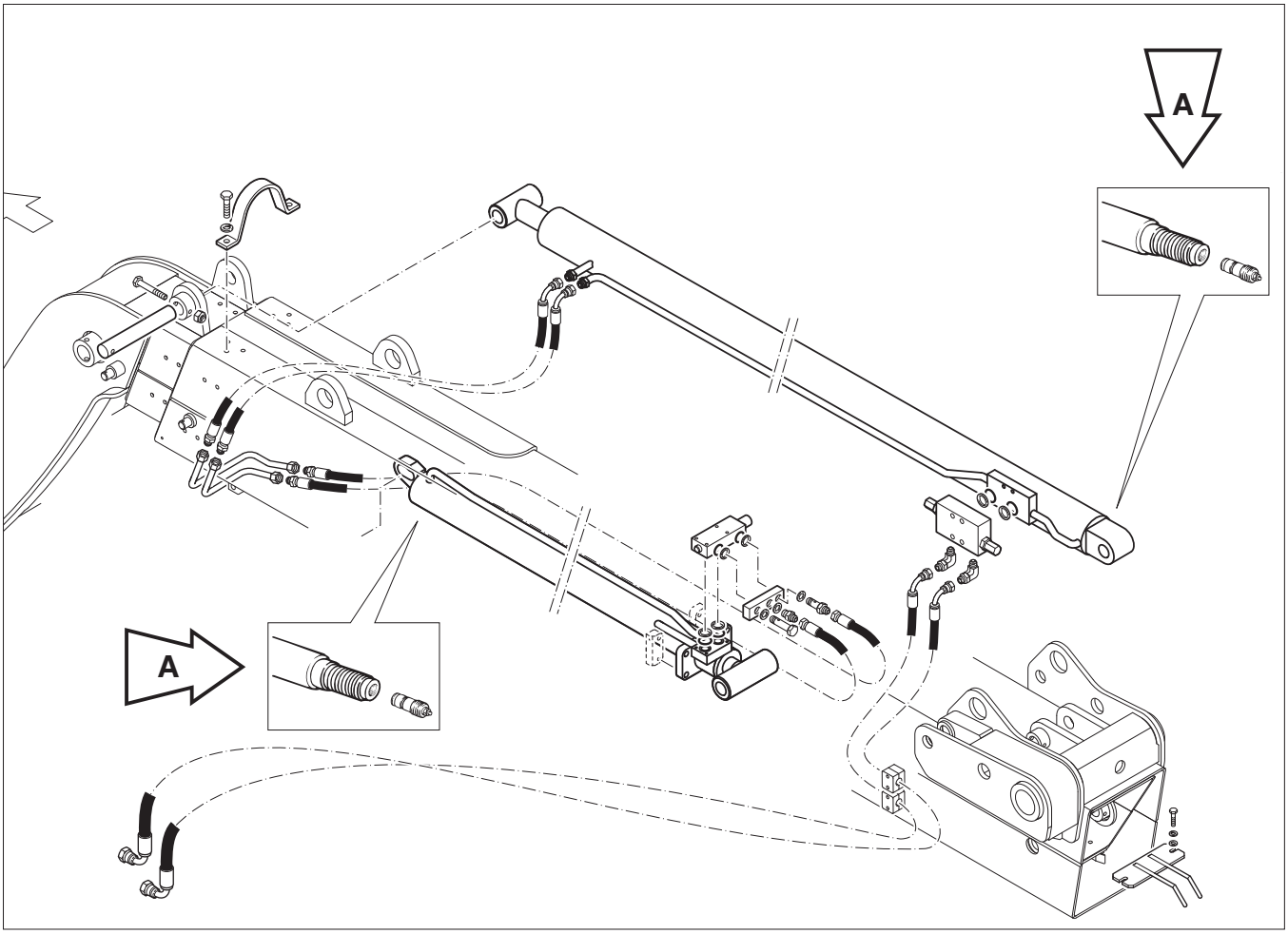


TABLE B

## 4.4 TABLE B PROCEDURES

### B-1 CHECK THE EFFICENCY OF THE MACHINE

- Check visually the the machine is in efficient working order.
- Make sure that all hydraulic and electrical components are in efficient working order.

**NOTICE**

***For the engine maintenance, please refer to the specific Operator's manual supplied with the machine.***

### B-2 CHECK THE TENSION OF THE ALTERNATOR BELT

- Open the carter with engine cold and stopped.
- Visually check belt **A** for damages or cracks (this belt doesn't need to be tensioned as the system is equipped with an automatic tensioning device).
- In necessary, change the belt **A**.

**NOTICE**

***For the engine maintenance, please refer to the specific Operator's manual supplied with the machine.***

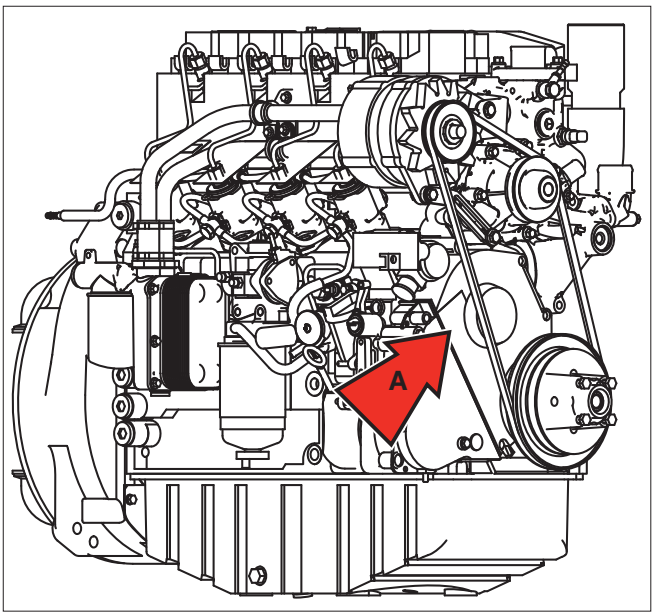
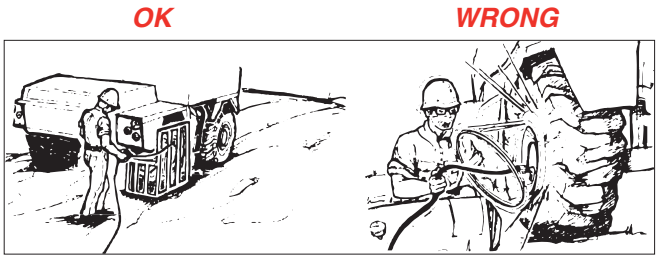


TABLE B

## B-3 CHECK THE TYRE INFLATION

**DANGER**

***Over-inflated or overheated tyres can burst. Do not flame-cut or weld the wheel rims. For any repair work, call in a qualified technician.***




For the tyre inflation or substitution, please refer to the table below:

| | GTH 4013 SX<br>Standard - Optional | GTH 4017 SX |
|---|---|---|
| **Dimensions** (front and rear.) | 405/70 R20 - 400/70 R24 | 405/70 R24 |
| **Load index** | 14 pr - 14 pr | 14 pr |
| **Rim** | 13x20 - 13X24 | 13x24 |
| **Wheel disc** | 8 fori DIN 70361 - 8 fori DIN 70361 | 8 fori DIN 70361 |
| **Pressure** bar/Psi | 5.5/80 - 4.6/65 | 4.5/65 |

On new machines, and when a wheel has been disasembled or replaced, check the nut torque of the wheels every 2 hours until they stay correct.

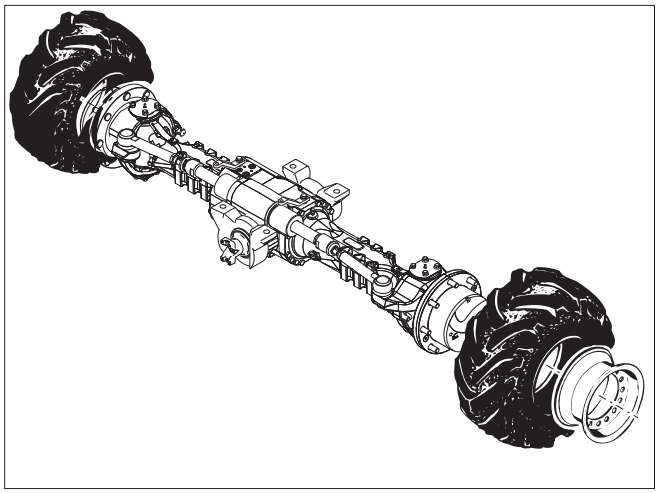
**Torque 400 N/m.**

**WARNING**

***Always use tyres having the dimensions indicated in the vehicle registration card.***

TABLE B

## B-4 CHECK THE TIGHTENING OF THE WHEEL NUTS



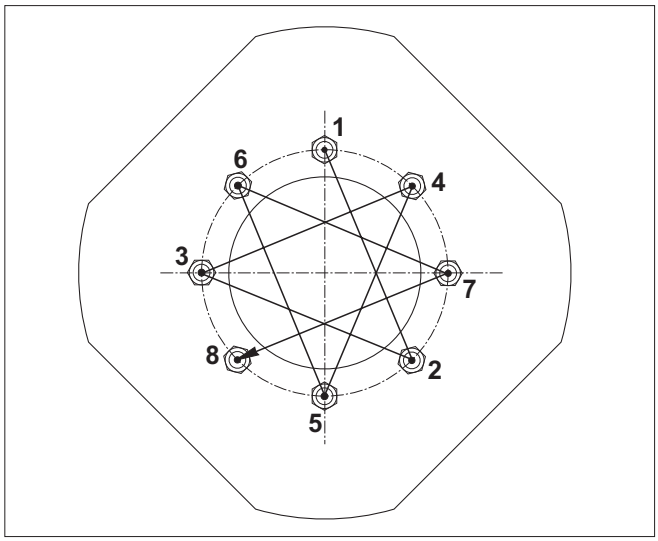
If you have to check the tightening of the wheel bolts or replace a wheel, proceed as follows:

- Raise the machine using a hydraulic jack
- Remove the wheel rolling it on the ground.
- Line up the wheel with the axle and fit the 8 nuts.
- Tighten the nuts following the alternate sequence shown in the picture using a pneumatic screwdriving machine.
- Lower the machine to the ground.

***Re-tighten all nuts to a torque 400 Nm.***

**WARNING**

***Check the tightening of wheels one hour after the job. They might get loose until they do not stay correct.***




**WARNING**

***On new machines, and when a wheel has been disassembled or replaced, check the nut torque of the wheels every 2 hours until they stay correct.***

**WARNING**

***Always use tyres having the dimensions indicated in the vehicle registration card.***

| | GTH 4013 SX<br>Standard - Optional | GTH 4017 SX |
|---|---|---|
| **Dimensions** (front and rear.) | 405/70 R20 - 400/70 R24 | 405/70 R24 |
| **Load index** | 14 pr - 14 pr | 14 pr |
| **Rim** | 13x20 - 13X24 | 13x24 |
| **Wheel disc** | 8 fori DIN 70361 - 8 fori DIN 70361 | 8 fori DIN 70361 |
| **Pressure** bar/Psi | 5.5/80 - 4.6/65 | 4.5/65 |

TABLE B

## B-5 CHECK THE TIGHTENING OF THE CARDAN SHAFT SCREWS

Check every week that the screws of the Cardan shaft **A-B** are tight.

For the correct tightening torques, please refer to par. 2.13 in section 2 “Technical Specifications”.

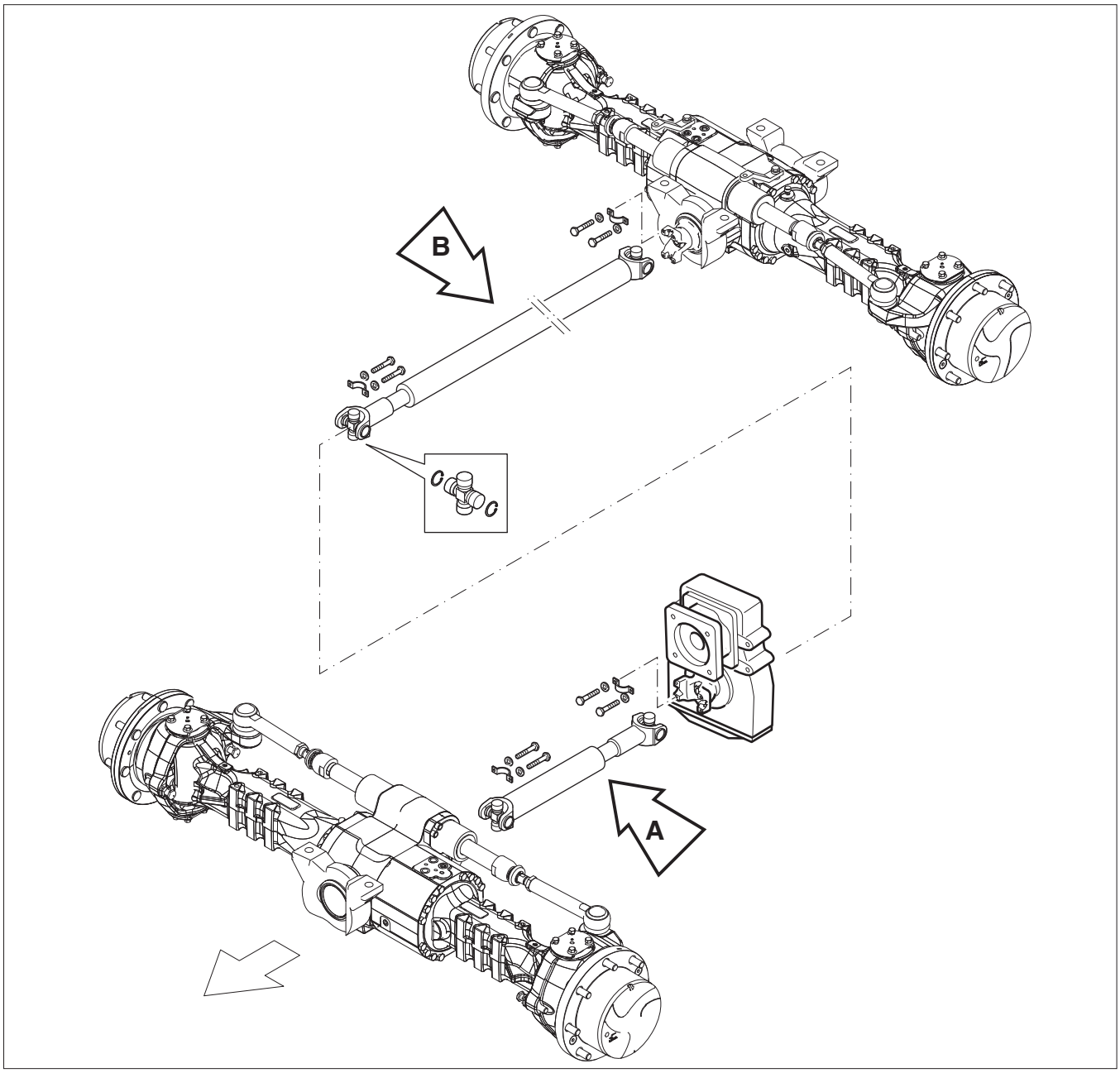


TABLE B

## B-6 CLEAN THE RADIATOR FINS

**DANGER**

***When using a steam-washer, always wear protective clothes. Hot steam may cause serious injury.***

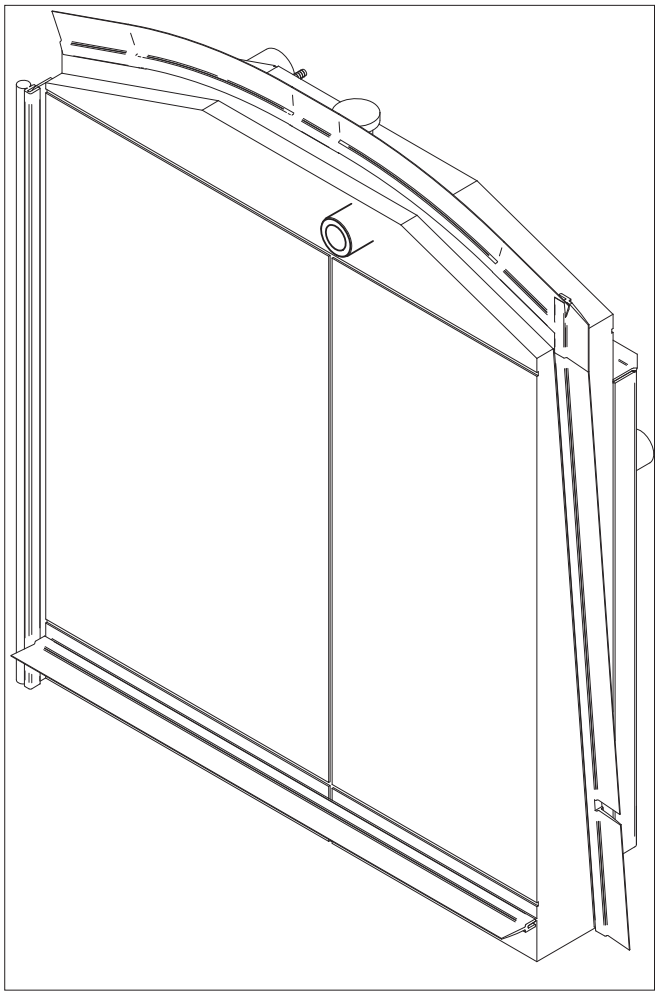
- Open the engine carter to check the radiator.
- Check the fins of the radiator for sediments.
- If necessary, prepare a compressed air nozzle (max. 2 bar) or a nozzle distributing water under pressure or steam.

**Pulizia a mezzo aria compressa**

- Direct a jet of compressed air toward radiator, paying attention not to damage its fins.
- Remove any loose particles of dirt with some water.

**Cleaning using water under pressure or steam**

- Spray radiator with a cold commercial detergent and wait for at least 10 minutes to allow the detergent to react.
- Wash radiator **B** using a jet of water or steam.



**NOTICE**

***The core fouling depends on the dust of the outside environment and the presence of oil and fuel leaks in the motor area. It is therefore advisable to remove oil and fuel leaks immediately in case of very dusty environments.***

## 4.5 TABLE C PROCEDURES

### C-1 CHANGE THE OIL IN THE REDUCTION GEARS, DIFFERENTIAL GEARS AND POWER DIVIDER REDUCTION GEAR

To change the oil in the **reduction gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged and plug **A** finds on the vertical axis.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plug **A** and allow the oil to flow from the reduction entirely.
- Rotate the wheel by 90° until the plug is on the horizontal axis.
- Add the oil through hole **A**.
- Refit the plug **A**.

Recommended oil:

- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**

To change the oil in thefront and rear **differential gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged.

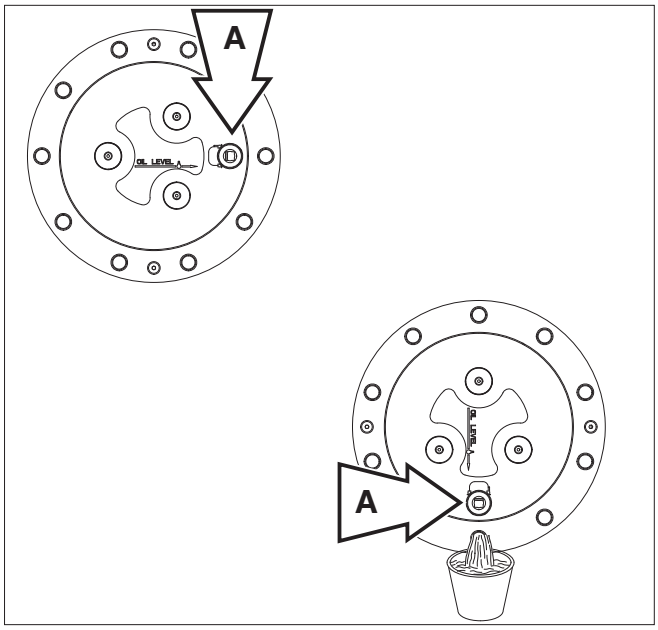
PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plugs **C**, **A** and **B**, and allow the oil to flow entirely.
- Refit the plug **C**.
- Add the oil through hole **B** until it is level with hole **A**.
- Refit the plugs **A-B**.

Recommended oil:

- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**



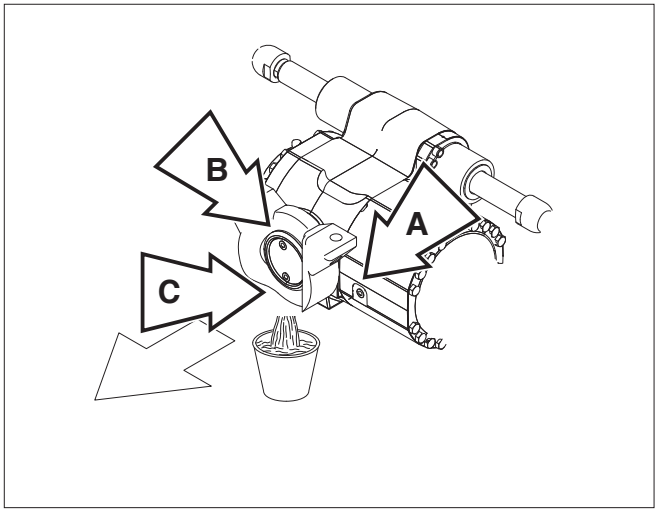



TABLE A

To change the oil in the **power divider reduction gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged.

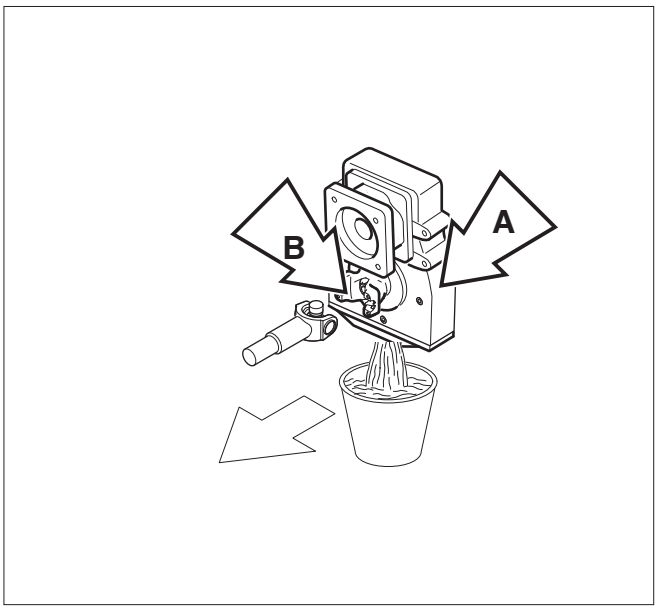
PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plug **A**.
- Remove the plug **B** and allow the oil to flow entirely.
- Refit the plug **B**.
- Add the oil through the plug **A** until it is level with hole.
- Refit the plug **A**.

Recommended oil:

- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**




**C-2 CHANGE THE ENGINE OIL AND RELEVANT FILTER**

- Stop the machine on a level ground and ensure the parking brake is engaged.

NOTICE

***For the engine maintenance, please refer to the specific Operator's manual supplied with the machine.***

- Remove the plug **A**.
- Remove the plug **B** and allow the oil to flow entirely.
- Refit the plug **B**.
- Unscrew the filter **D** and change it with a **new one**.
- Add new oil through the plug **A**.
- Using the rod C, check the right engine oil level.

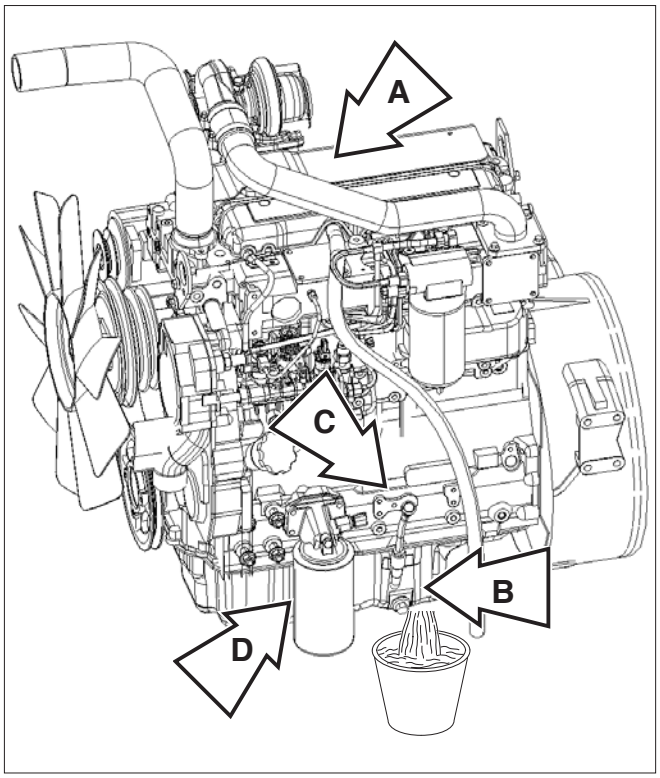


TABLE C

## C-3 CHECK THE OIL LEVEL IN THE FRONT AND REAR DIFFERENTIAL GEARS

To check the oil level in the front and rear **differential gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged.
- Remove the plug **A** and check the oil is level with hole.
- If necessary, top-up the oil through the hole **B** until oil comes out from the hole **A**.
- Refit the plugs **A** e **B**.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

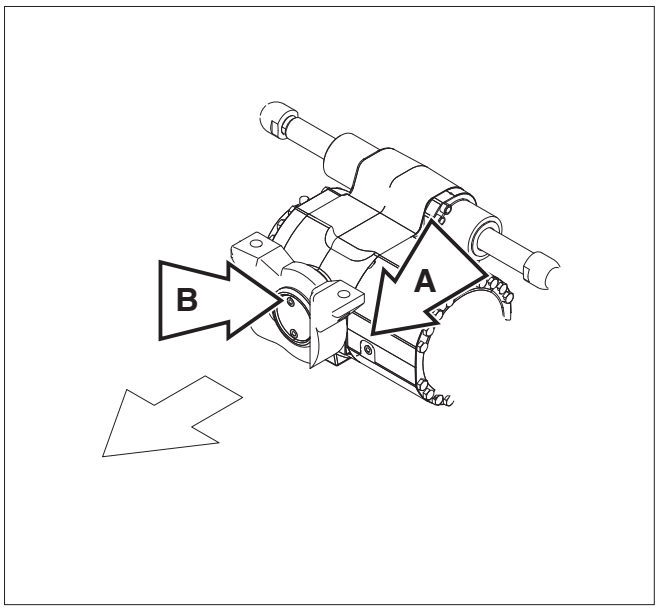
## C-4 CHECK THE OIL LEVEL IN THE FOUR WHEEL REDUCTION GEARS

To check the oil level in the **four wheel reduction gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged and plug **A** finds on the horizontal axis.
- Clean the plug all around, then remove it and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***



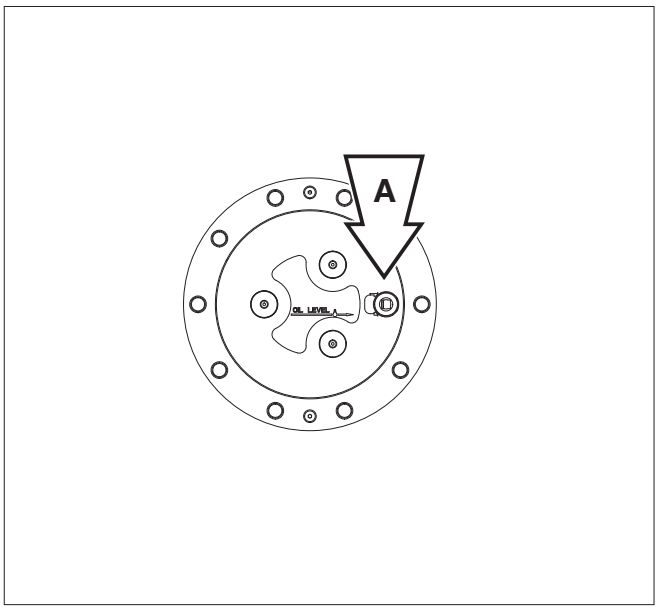
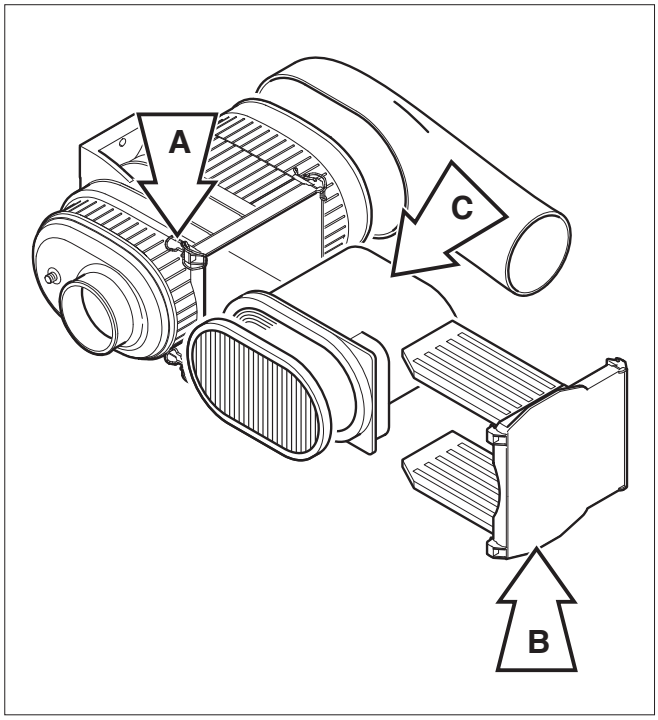



TABLE C

## C-5 CHECK AND CLEAN THE ENGINE AIR FILTER

To check and clean the engine air filter:

- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove the cover **B**.
- Pull out the filter cartridge **C**.
- Clean the filter bowl.
- Knock the cartridge using a wooden table to eliminate the dust.
- Dry clean the cartridge (at max. 6 bar pressure).
- Check the filter element for cracks.
- Refit the clean cartridge, or a new one, using some grease on the seal and make sure it is properly positioned.
- Close the cover **B**.




**WARNING**

***As soon as the warning lamp on the cab dashboard switches on, replace the outer element.***

**WARNING**

***Do not wash the cartridge using water or other kind of solvents.***

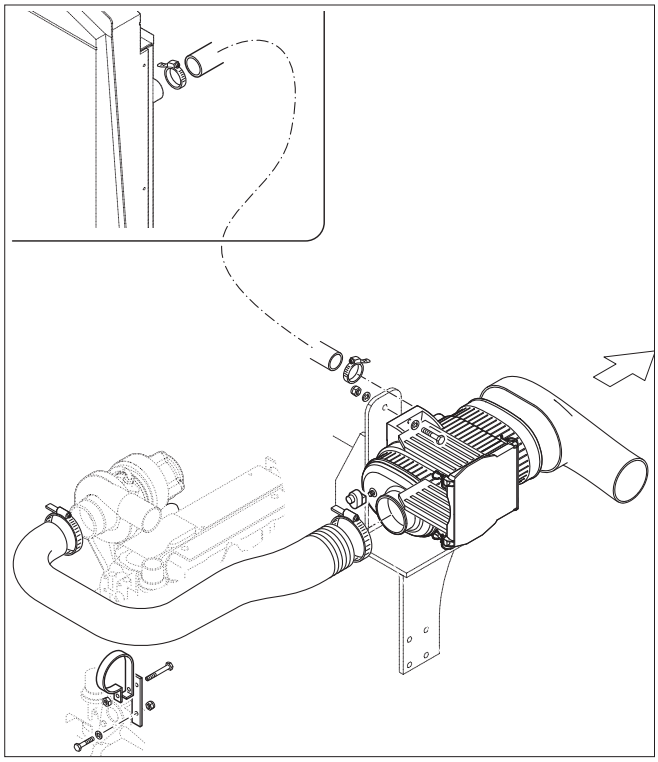


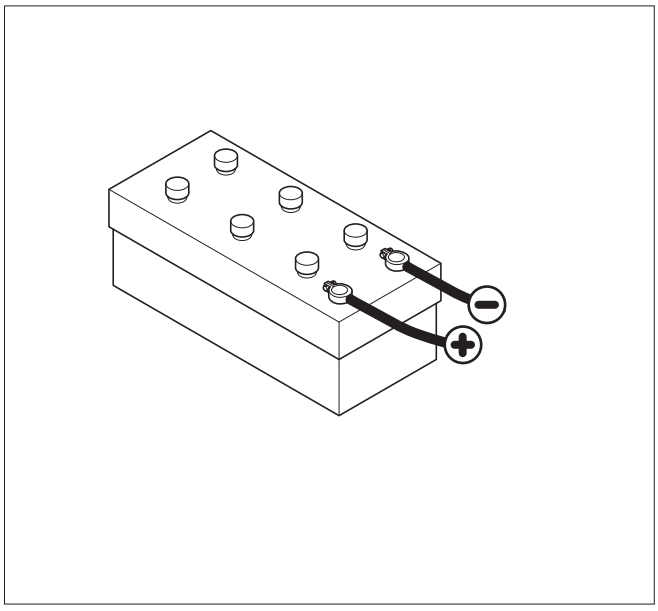
TABLE C

## C-6 CHECK THE CLAMPING OF THE CABLE HEADS TO THE BATTERY TERMINALS

Check the cable clips are well secured to the battery terminals. To tighten the clips, always use a box wrench, never pliers.

**DANGER**

- ***Keep out of items which can produce sparks, of naked flames or lit cigarettes.***
- ***Do not rest metal objects onto the battery. This can result in a dangerous short especially during a recharge.***



## C-7 CHECK THE AIR SUCTION HOSE BETWEEN ENGINE AND FILTER

Check the state of all the rubber sleeves **A** of the air suction line between engine and filter every month.

**CAUTION**

***If you use the machine continuously for several days, check these sleeves, as well as the hose clamps more frequently.***

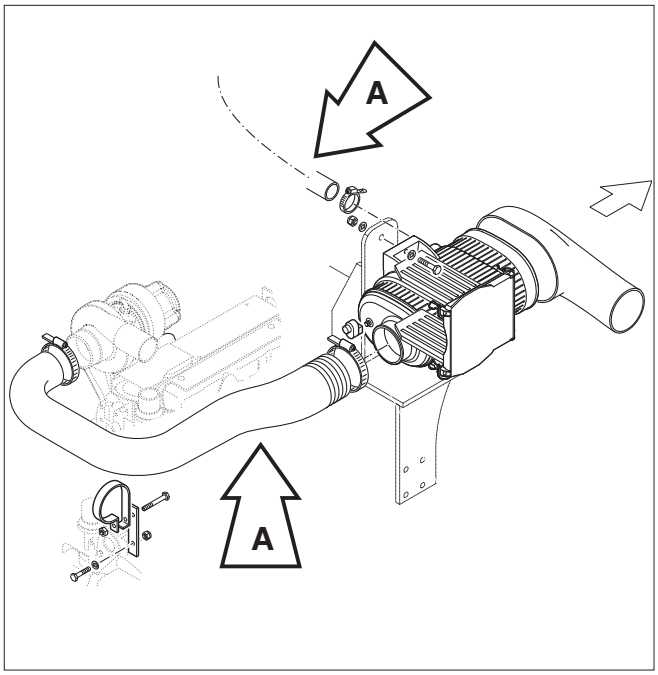
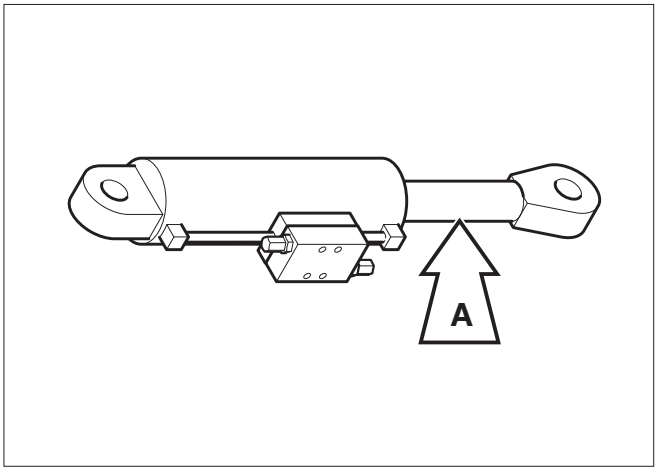


TABLE C

## C-8 CHECK THE CYLINDER CHROMIUM-PLATED RODS

Visually check the cylinder rods **A** for scoring every month.

For this operation, fully extend all of the cylinders and check that their rods are intact.




## C-9 CHECK THE HYDRAULIC LINES

Every month, do a random check of the oil-dynamic hoses to be sure they are not worn. In particular, we recommend checking the hoses located near moving mechanical parts as they could rub against such parts and get damaged.

**CAUTION**

***Replace any worn hoses immediately before using the machine again.***

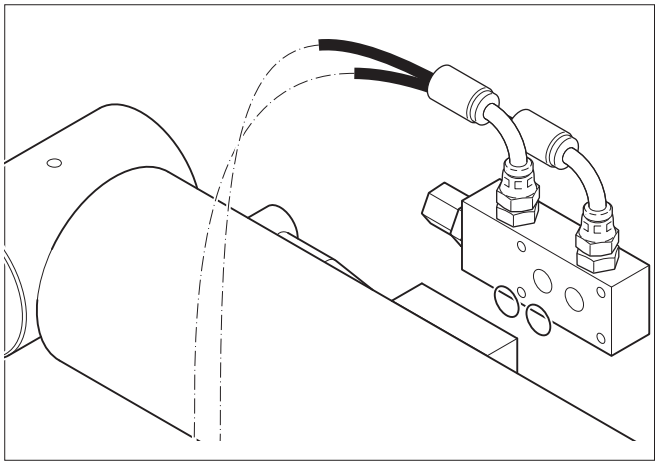


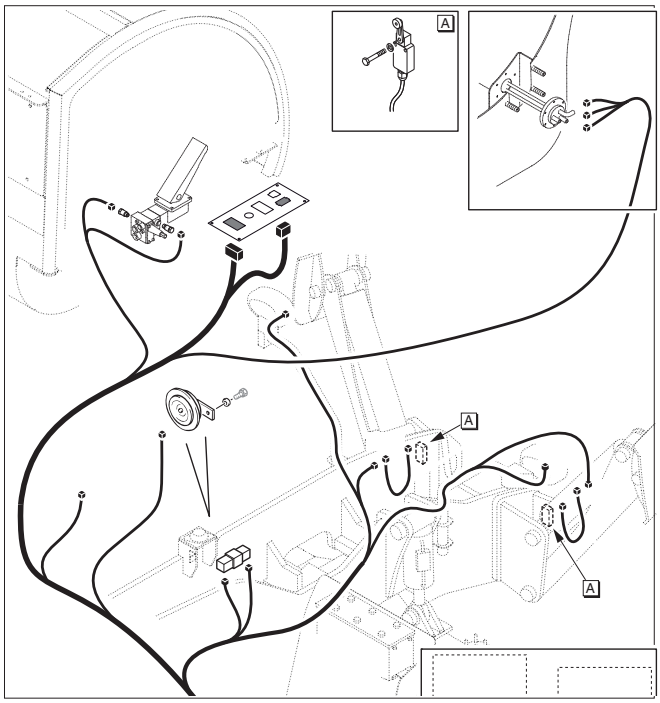
TABLE C

## C-10 CHECK THE ELECTRIC CABLES

Every month, do a random check of the electrical cables to be sure they are not damaged. In particular, we recommend checking the cables located near moving mechanical parts as they could rub against such parts and get damaged.

**CAUTION**

***Replace any worn cables immediately before using the machine again.***



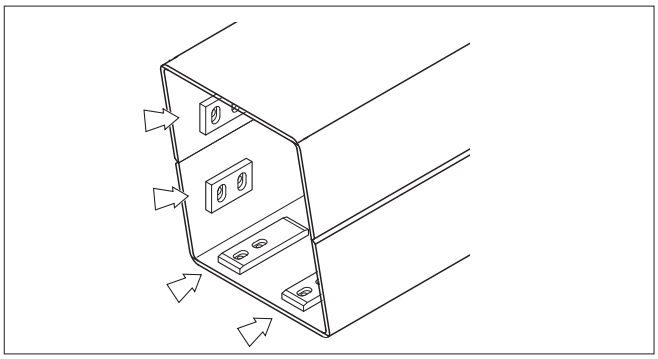

## C-11 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

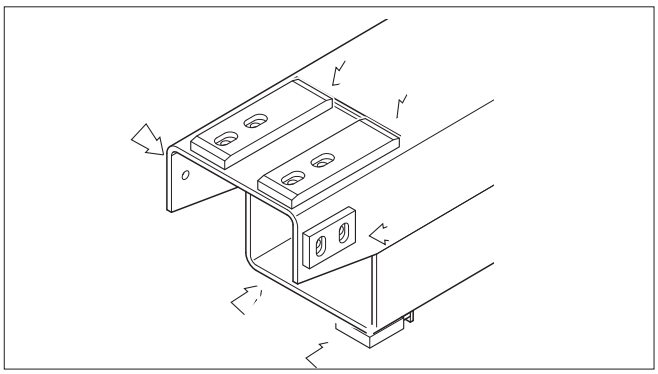
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

All pads can be adjusted by the special shims **not** supplied by GENIE.

**CAUTION**

***Pads must compulsorily be replaced if the residual thickness of the plastic layer with respect to the iron bush fixing the block is equal or inferior to 1 mm.***





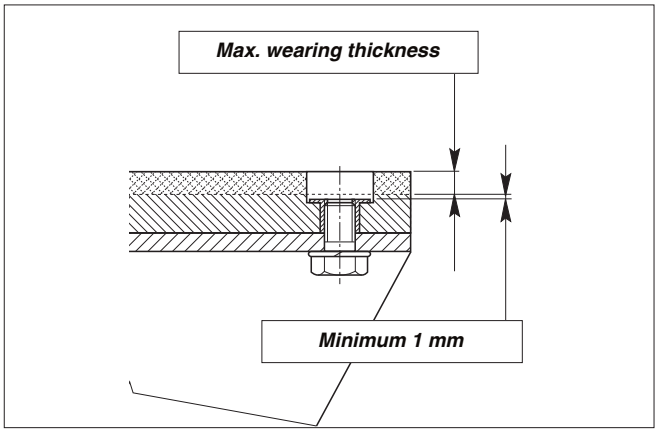


TABLE C

## C-12 ADJUST THE PLAY OF THE SLIDING PADS OF THE BOOM SECTIONS

Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

All pads can be adjusted by the special shims.

***Adjusting the pads*:**

- Remove or loosen the screws fixing the pads in relation to type of shims used (with or without slots).
- Fit the necessary amount of shims.
- If the residual thickness of the pad is insufficient or near the maximum wearing limit, renew the pad.
- Tighten the screws fixing the pads at the recommended torque (see below). Use a dynamometric wrench.

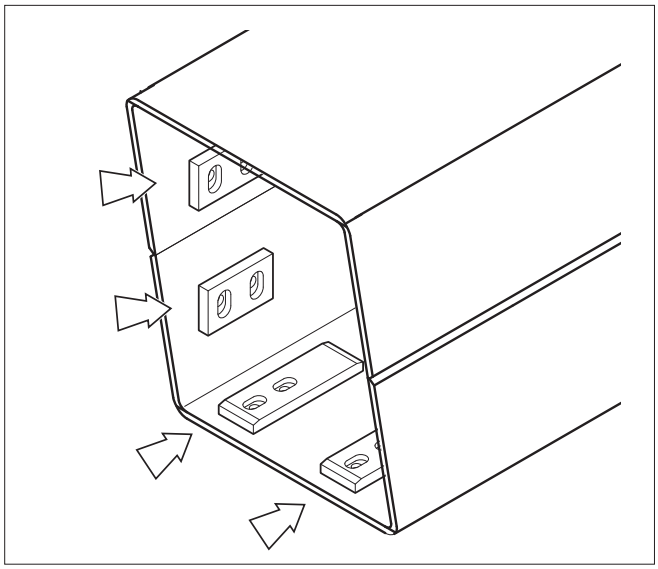
**Tightening torques of the pad screws in relation to the screw diameter**

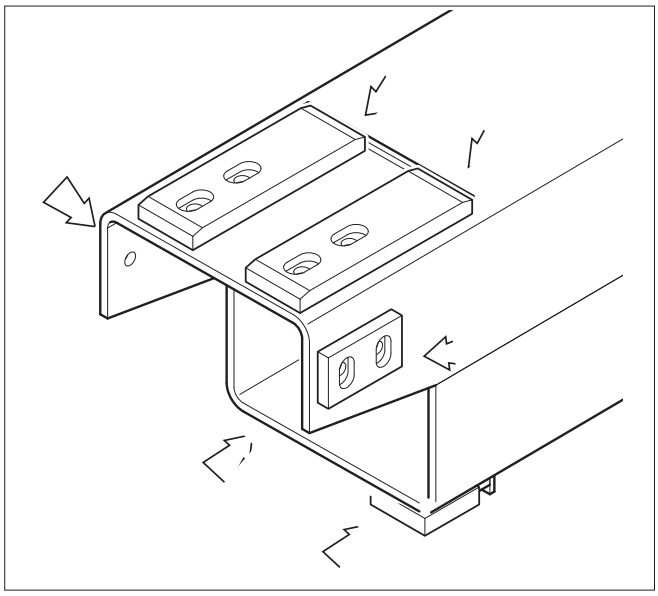
| | |
|---|---|
| Screws M10 | Nm 30 |
| Screws M14 | Nm 50 |

**Tightening torques higher than those recommended can cause the break of the pad or of the locking threaded bush.**

**CAUTION**

***Pads must compulsorily be replaced if the residual thickness of the plastic layer with respect to the iron bush fixing the block is equal or inferior to 1 mm.***





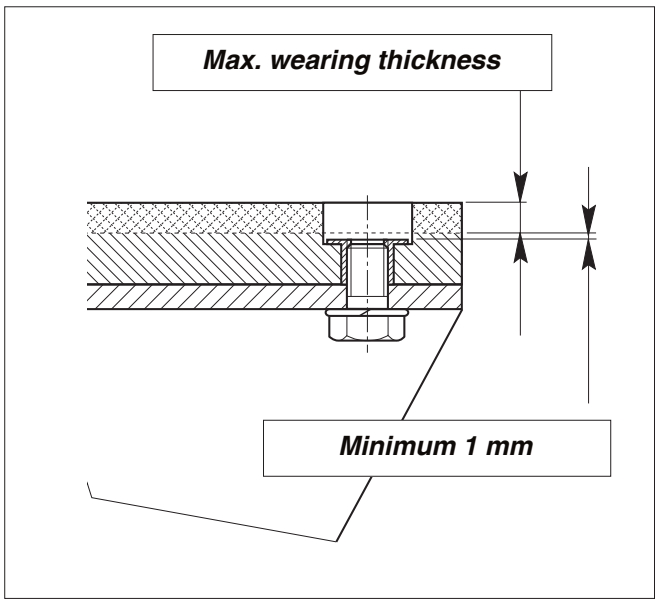


TABLE C

## C-13 GREASE THE SLIDING PARTS OF THE BOOM SECTIONS

Check every month that the telescopes are well greased in correspondence of the sliding pads.

If necessary, scrape off the old grease and apply a thin film of new grease.

Use only:

- **Grasso INTERFLON FIN GREASE LS 2 cod. 640772**

**CAUTION**

***Avoid mixing greases of different type or features and do not use greases of lower quality.***

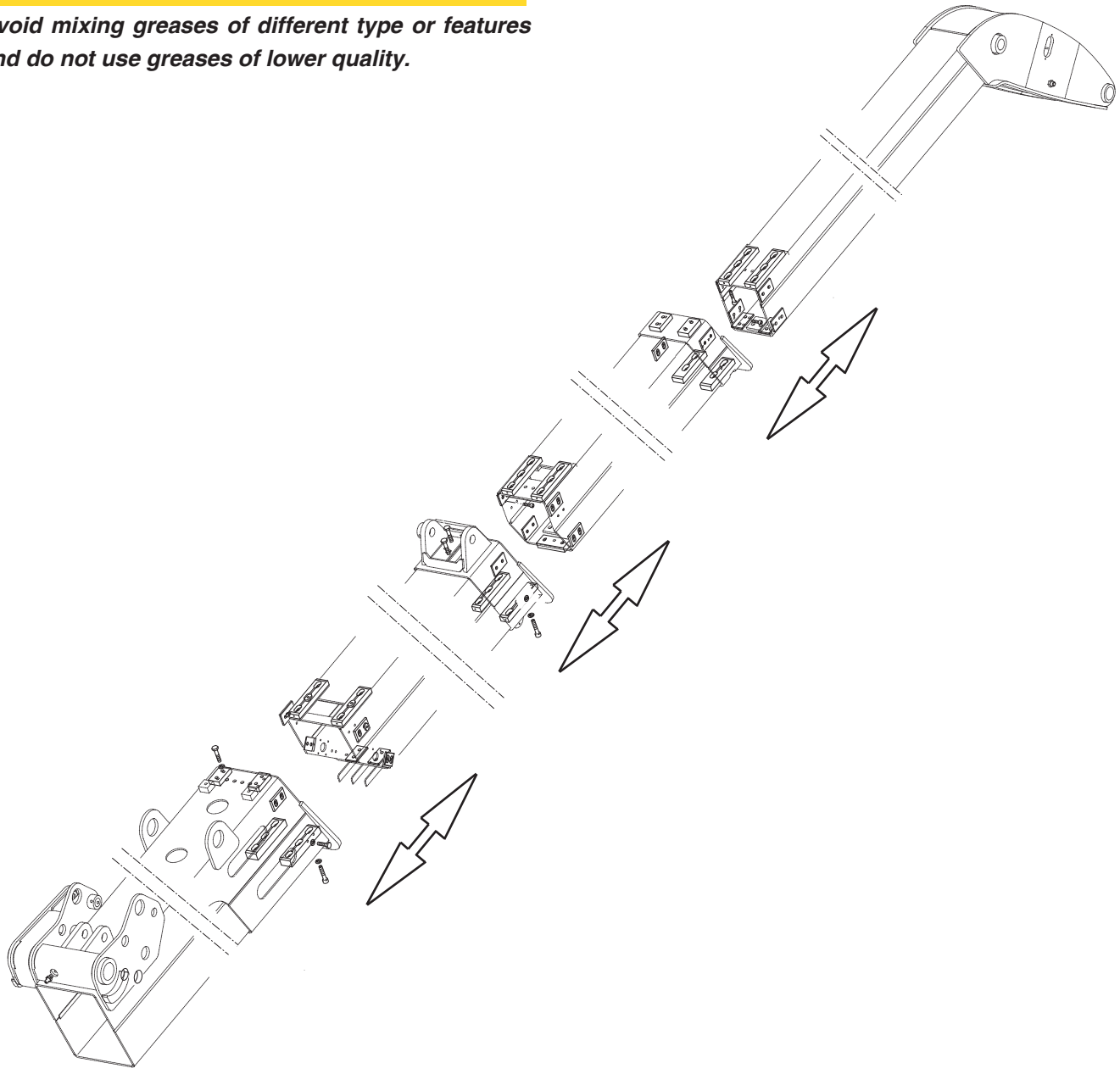


TABLE C

## C-14 CHECK THE LEVEL OF THE BATTERY ELECTROLYTE

- Check the electrolyte level every 250 working hours; if necessary, add distilled water.
- Ensure the fluid is 5÷6 mm above the plates and the cell levels are correct.
- Protect the terminals smearing them with pure vaseline.
- Remove the battery and store it in a dry place, when the machine is not used for a long time.

**DANGER**

***Battery electrolyte contains sulphuric acid. It can burn you if it touches your skin and eyes. Always wear goggles and protective gloves, and handle the battery with caution to prevent spillage. Keep metal objects (watch straps, rings, necklaces) clear of the battery leads, since they can short the terminals and burn you.***

**DANGER**

- ***Before disconnecting the battery, set all switches within the cab to OFF.***
- ***To disconnect the battery, disconnect the negative (-) lead from the frame earth first.***
- ***To connect the battery, connect the positive (+) lead first.***
- ***Recharge the battery far from the machine, in a well-ventilated place.***
- ***Keep out of items which can produce sparks, of naked flames or lit cigarettes.***
- ***Do not rest metal objects onto the battery. This can result in a dangerous short especially during a recharge.***
- ***Because the electrolyte is highly corrosive, it must never come in contact with the frame of the handler or electric/electronic parts. If the electrolyte comes in contact with these parts, contact the nearest authorised assistance centre.***

**DANGER**

***Risk of explosion or shorts. During the recharge, an explosive mixture with release of hydrogen gas forms.***

**DANGER**

***Do not add sulphuric acid; add only distilled water.***

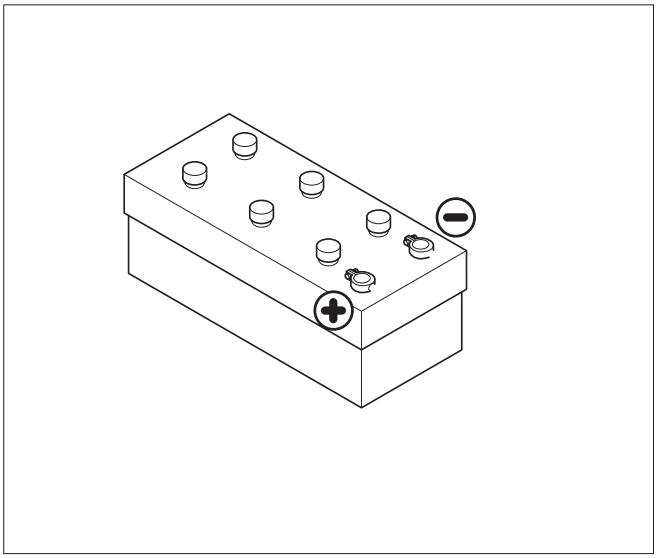


TABLE C

## C-15 CHECK THE EFFICENCY OF THE BLOCK VALVES

The piloted blocking valves allow to held the load in position in case of burst of a flexible hose.

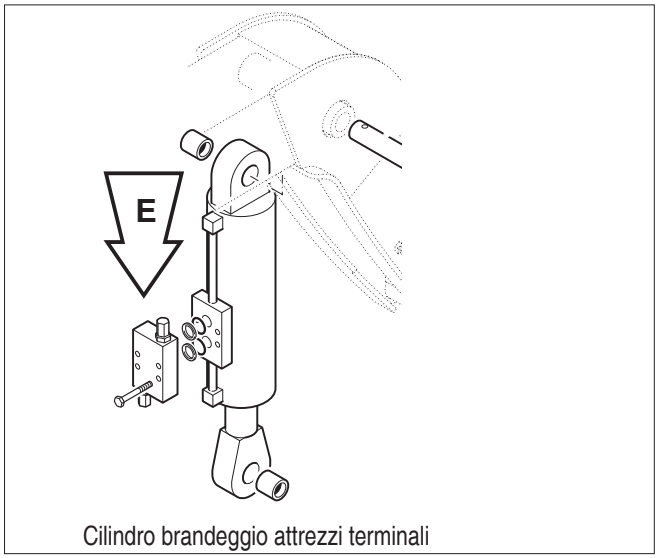
To check the efficiency of a valve, proceed as follows:

- Load a weight near the maximum payload onto the boom (4000 kg).
- Raise the load some centimetres above the ground (max 10 cm). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which you are checking the valve with caution.
- To check the efficent working order of the block valves on the outriggers, lower the outriggers to ground and unload the wheel weight without lifting them from the ground. To check the efficency of the valve, loosen the hoses.

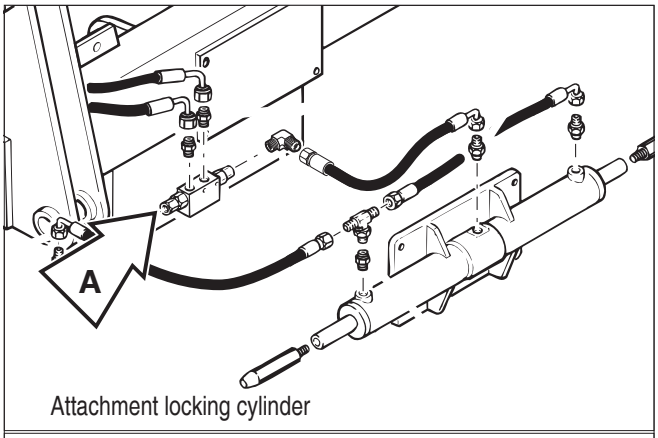
During the check, the load shall remain blocked in position.
Should that not be the case, the valve must be replaced.

PROTECT THE ENVIRONMENT

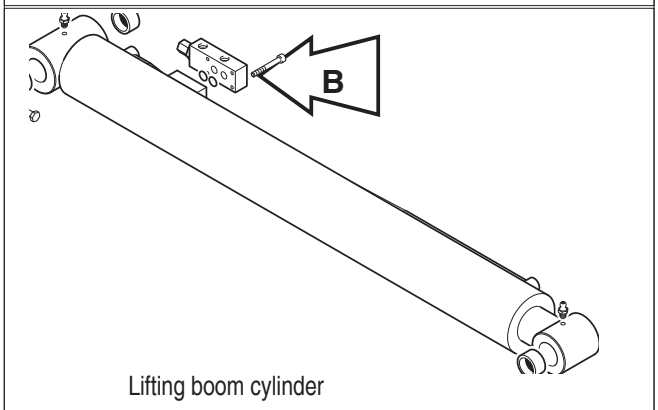
***Place a container of suitable size under the plug for oil leaks.***



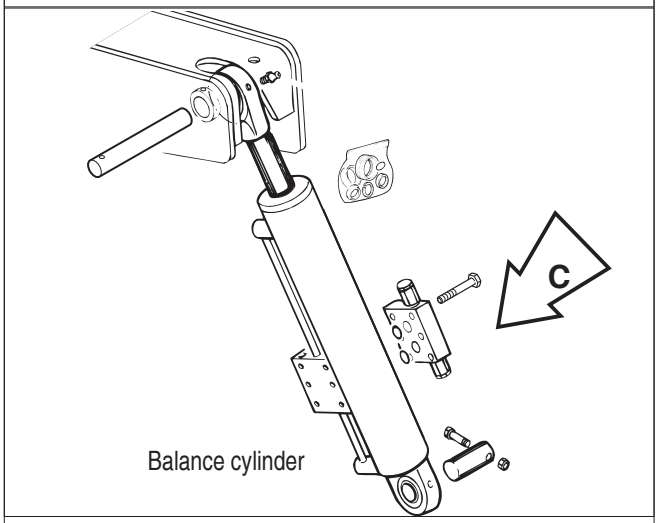
Cilindro brandeggio attrezzi terminali



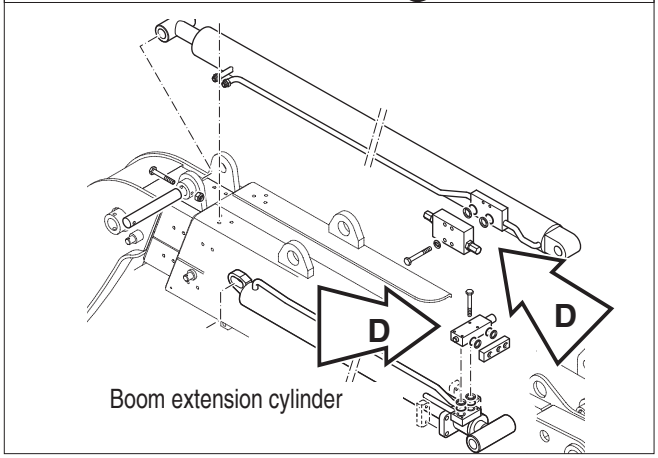
Attachment locking cylinder



Lifting boom cylinder



Balance cylinder



Boom extension cylinder

TABLE C

**DANGER**

***Do the check of the valves taking all the possible precautionary measures:***

***- Wear safety glasses***

***- Wear safety gloves***

***- Wear safety shoes***

***- Wear suitable working clothes***

***- Use guards against leaks of oil at high pressure***

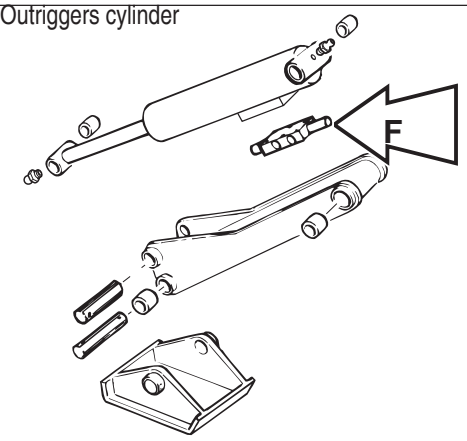
***- Do the check in a free space with barriers all around to keep non-authorised people away***

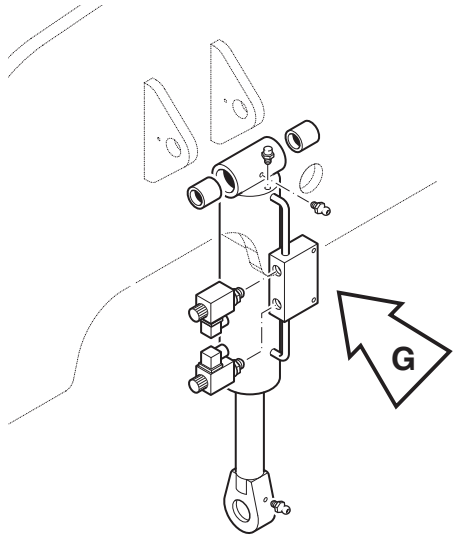
***- Ensure that the part to be checked is in safe condition and that the action generated does not result in an uncontrolled movement of the machine.***

***TO REMOVE THE BLOCK VALVES OR THE CYLINDERS***

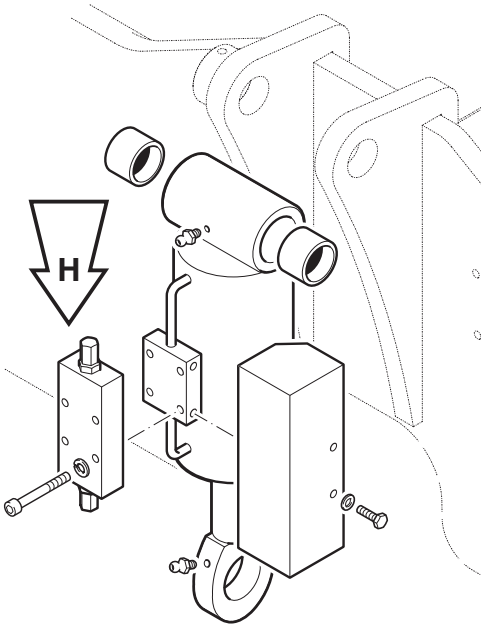
- ***Lower the boom to the ground in a firm way since the removal of the block valve or the cylinder can cause an uncontrolled down-movement.***
- ***After refitting the valve or the cylinder, replenish the circuit and eliminate any air before starting working. To eliminate the air from the circuit, move the involved cylinders to end-of-stroke in the two directions (opening/closing. To eliminate the air from the fork balance cylinder, move the boom up and down and tilt the fork plate forwards/back.***

Outriggers cylinder




Rear axle locking cylinder




Machine compensation cylinder

## 4.6 TABLE D PROCEDURES

### D-1 VISUALLY CHECK THE SMOKE QUANTITY EVACUATED FROM THE ENGINE EXHAUST

To check the quantity of smoke evacuated from the engine exhaust, proceed as follows:

- Start the engine of the machine.
- Wait for a few minutes so the engine can warm up correctly.
- Visually check that the amount of smoke coming out of the exhaust is normal; repeat the check while accelerating the engine.

**CAUTION**

***Do this check outdoors or use an adequate smoke extraction system.***

**NOTICE**

***In case of excess smoke, strictly obey the instructions provided in the relevant Use and maintenance manual enclosed with the technical literature of the machine.***

### D-2 CHECK THE TIGHTENING OF THE ENGINE FIXING SCREWS

Every 6 months, check that the screws fixing the engine to the machine chassis are tight.

For this operation, use a torque wrench and tighten the screws to a torque of **146 Nm**.

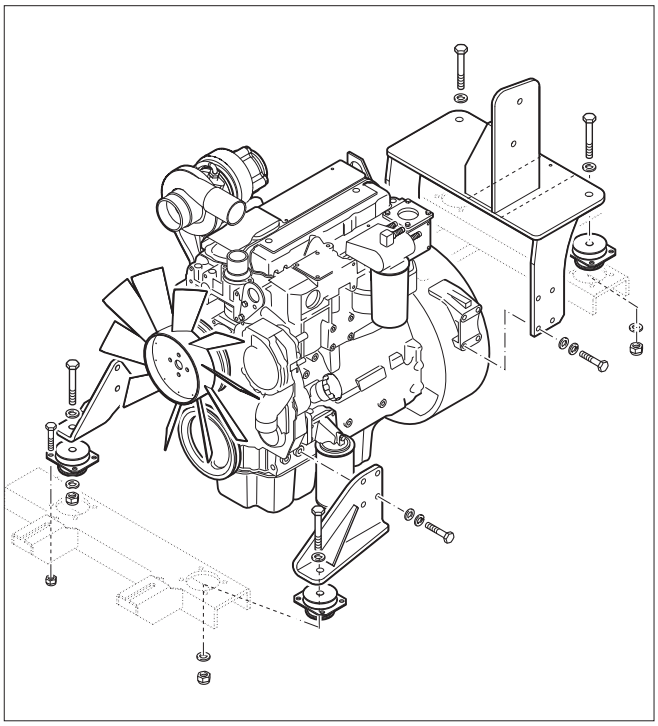


TABLE D

## D-3 CHECK THE TIGHTENING OF THE CAB FIXING SCREWS

Every 6 months, check that the screws fixing the cab to the machine chassis are tight.

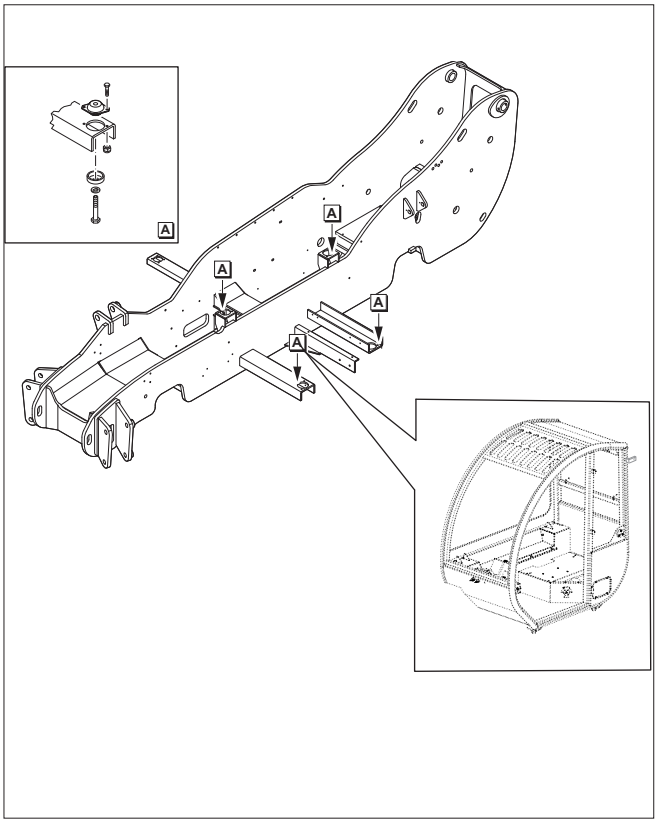
For this operation, use a torque wrench and tighten the screws to a torque of **188 Nm**.

## D-4 CHECK THE BLACKLASH BETWEEN PINS AND BUSHINGS IN ALL JOINTS

Every 6 months, check the machine randomly to be sure the backlash between pins and relevant bushings on the joints is not too high.

**CAUTION**

***If you have to change some parts, please refer to the spare parts catalogue enclosed with the technical literature of the machine.***



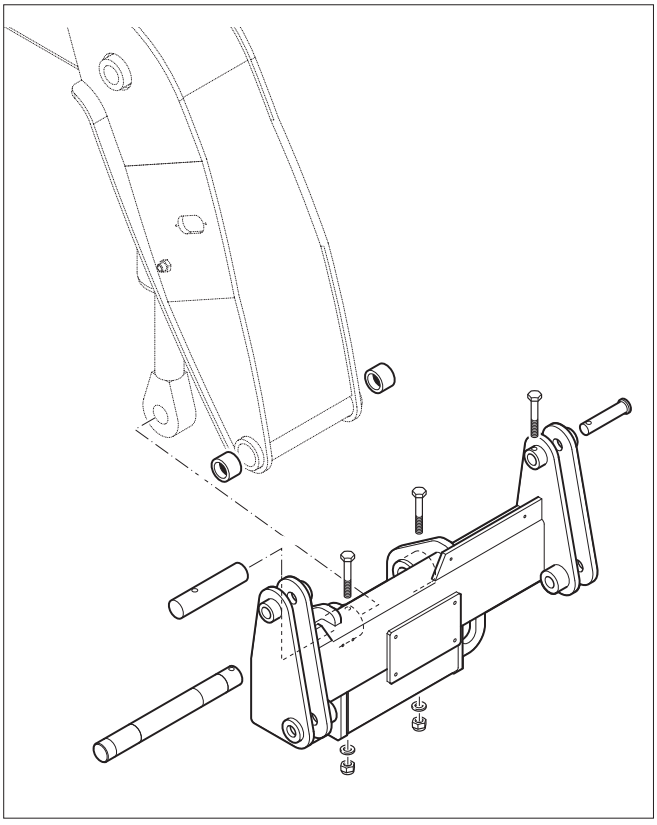
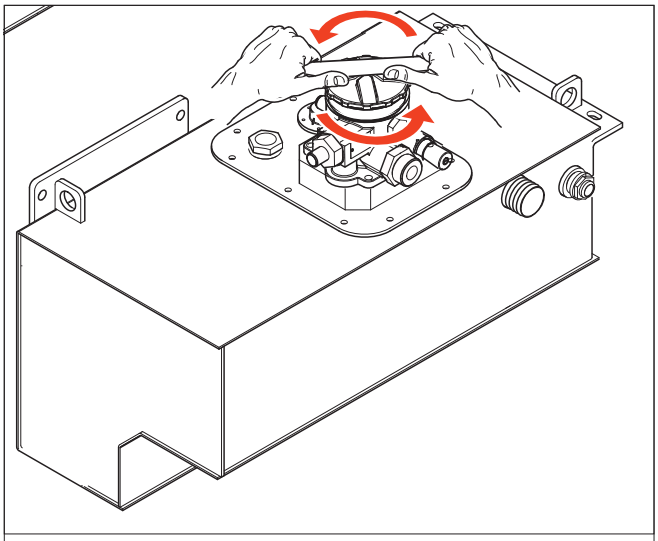



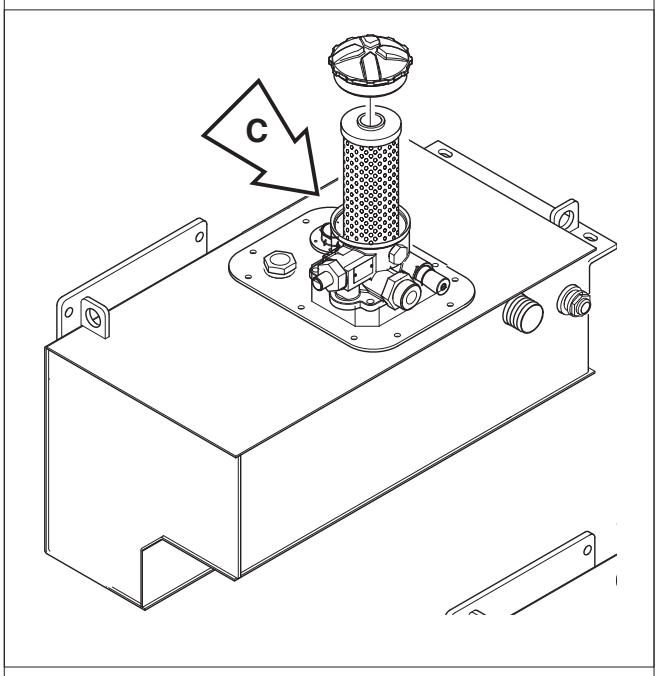
TABLE D

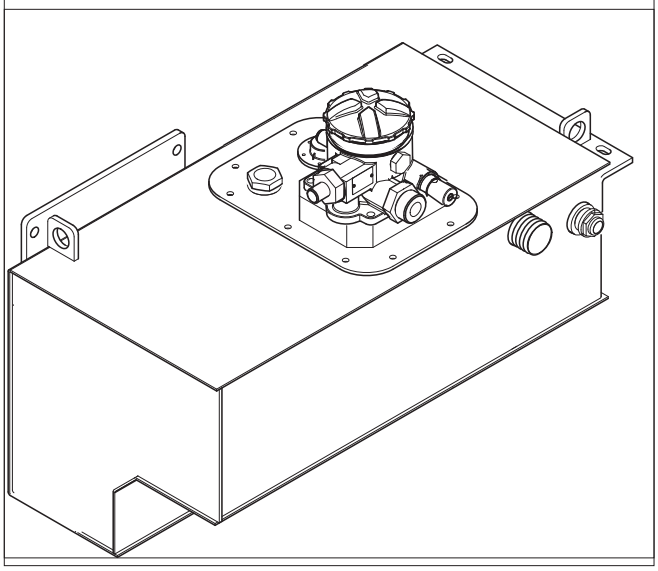
## D-5 CHANGE THE HYDRAULIC OIL FILTER CARTRIDGE

To change the hydraulic oil filter element, proceed as follows:

- Stop the machine on a level ground and engage the parking brake.
- Place a container of suitable size under the filter to collect any oil leaks.
- Remove the filter cover **B**
- Change the filter element **C**, then, before fitting a new one, thoroughly clean and grease both seat and gasket.
- Refit and tighten the filter cover.





**PROTECT THE ENVIRONMENT**

***Handling and disposing of used oils may be ruled by local or national regulations. Address to authorised waste centres.***

**NOTICE**

***Hydraulic oil filter canisters cannot be cleaned or washed and refitted.***
***They must be replaced with new ones of the type recommended by the manufacturer:***

***Flow rate l/1' = 150***

***Filtering = 10 π***

***Attachment = 1" 1/4 BSP***

**NOTICE**

***When changing the oil, drain it when it is still hot and the polluting substances are in suspension.***

TABLE D

## D-6 HAVE THE HYDRAULIC SYSTEM CHECKED BY A SKILLED TECHNICIAN

Every six months we recommend having the system checked by a skilled technician, to be sure it is in efficient working order.

**CAUTION**

***In case of need, please contact the GENIE Service Centre.***

## D-7 CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER

Changing the main cartridge air filter:

- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove cover **B**.
- Pull out the external cartridge **C**.
- Clean the filter bowl.
- Refit the clean cartridge, or a new one, using some grease on the seal and make sure it is properly positioned.
- Close the cover **B**.

**WARNING**

***As soon as the warning lamp on the cab dashboard switches on, replace the outer element.***

**WARNING**

***Do not wash the cartridge using water or other kind of solvents.***

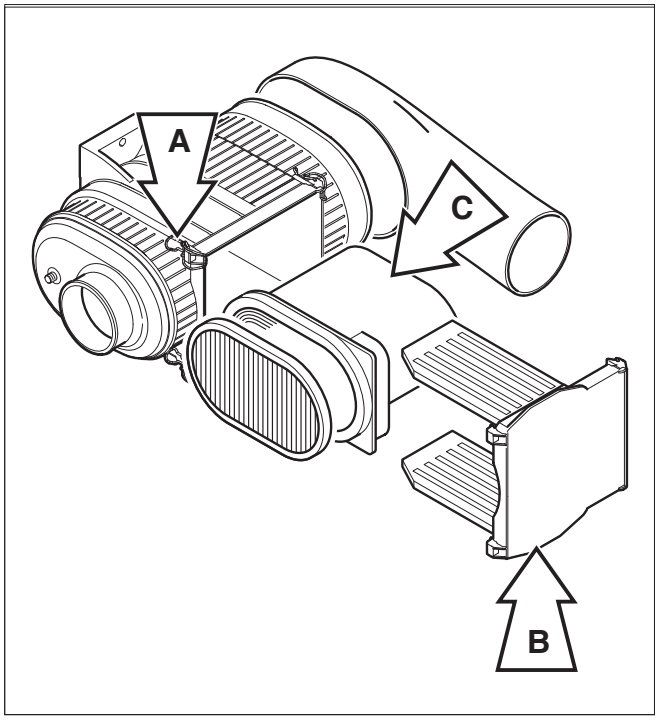


TABLE D

## D-8 CHANGE THE ENGINE OIL FILTER AND THE FUEL FILTER

- Stop the machine on a level ground and engage the parking brake.

**CAUTION**

***For the engine maintenance, please refer to the specific Operator's manual supplied with the machine.***

- Remove the plug **A**.
- Remove the plug **B** and allow the oil to flow entirely
- Refit and tighten the plug **B**.
- Unscrew the filter **D** and change it with a **new one**.
- Add new oil through the plug **A**.
- Using the rod C, check the right engine oil level.
- Remove the fuel filter E and change it with a new one.

## D-9 CLEAN THE CAB AIR FILTER

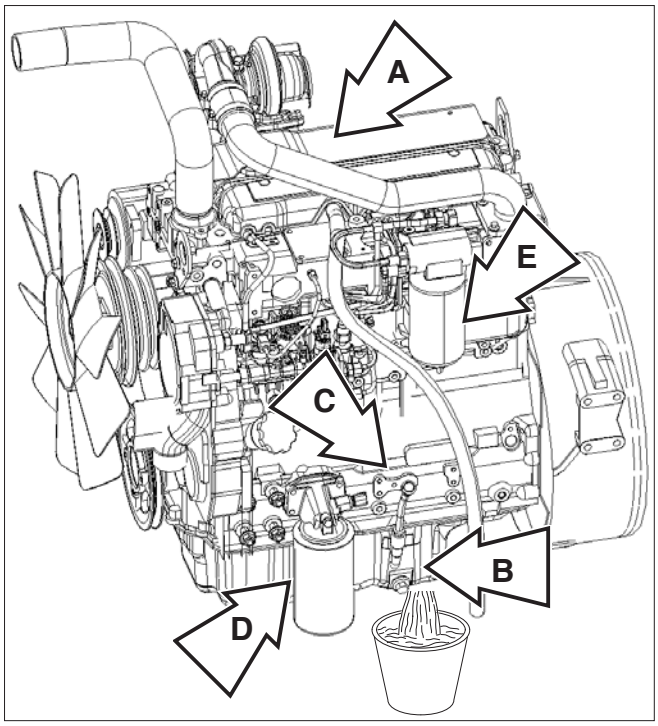
Clean the air filter in the cab every six months. Replace the cartridge if the filtering cloth is damaged.

Cleaning and changing the cartridge:

- Shut the engine down and engage the parking brake.
- From the external of the cab, pull out the filter **A** located in a special cab.
- Clean the filter bowl.
- Clean and cartridge knock out the filtering cartridge using a wooden board and replace in case of damage.

**CAUTION**

***Paper filters must never be cleaned using compressed air or washed with water and/or solvents.***



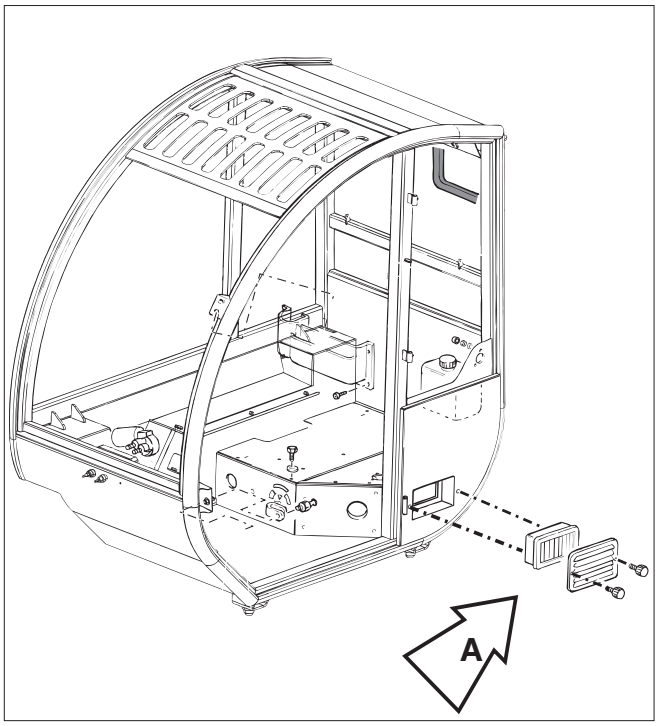



TABLE D

## D-10 CHANGE THE OIL OF THE FRONT AND REAR DIFFERENTIAL GEARS

To change the oil of the front and rear **differential gears**:

- Stop the machine on a level ground and engage the parking brake.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plugs **C**, **A** and **B**, then allow the oil to flow entirely.
- Refit and tighten the plug **C**.
- Top-up the oil through the hole **B** until it is at level **A**.
- Refit and tighten the plugs **A-B**.

Recommended oil:

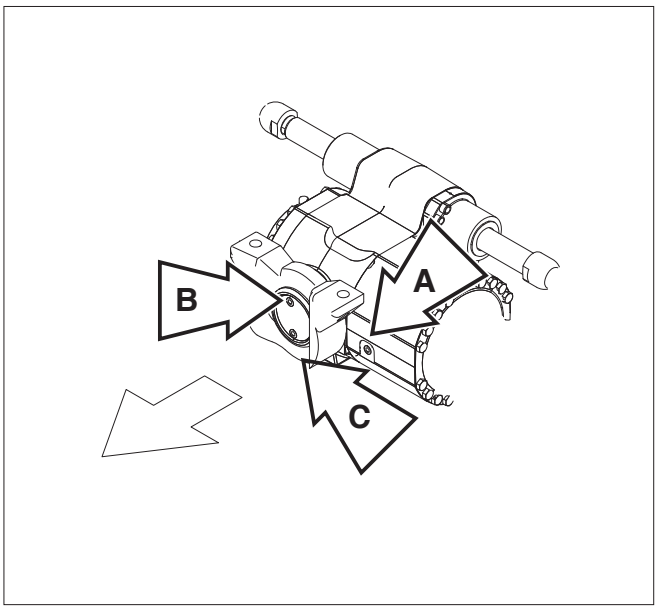
- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**

## D-11 BOOM CHAIN TENSIONING (GTH 4017SX ONLY)

To tighten the boom chains, follow the instructions below:

- Fully extend the boom and retract it by some 20/30 cm.
- For tensioning the four chains under the first section boom, remove the four locknuts (**D**) and loosen the four nuts (**E**) using a 27 mm wrench.
- Using a 27mm dynamometric wrench, tensioning the chain until a maximum 40Nm value operating on the nuts (**F**). (Tighten the nuts make sure the four chains are tensioned at the same time).
- Check that all chains have been equally tensioned; on the contrary, repeat the procedure.
- Lock the chain tensioners by means of a counternut and locknut.

Change the chains if during the procedure described above all threaded part of the screws have been used; in this case, please contact the GENIE Service Centre.



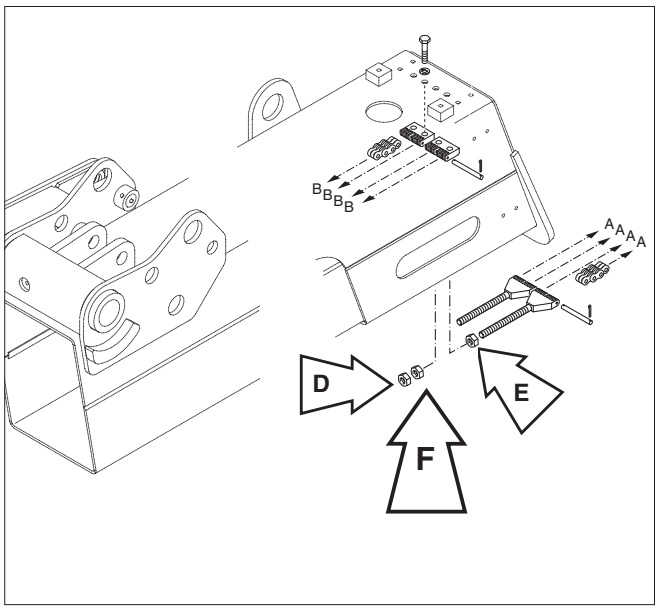



TABLE D

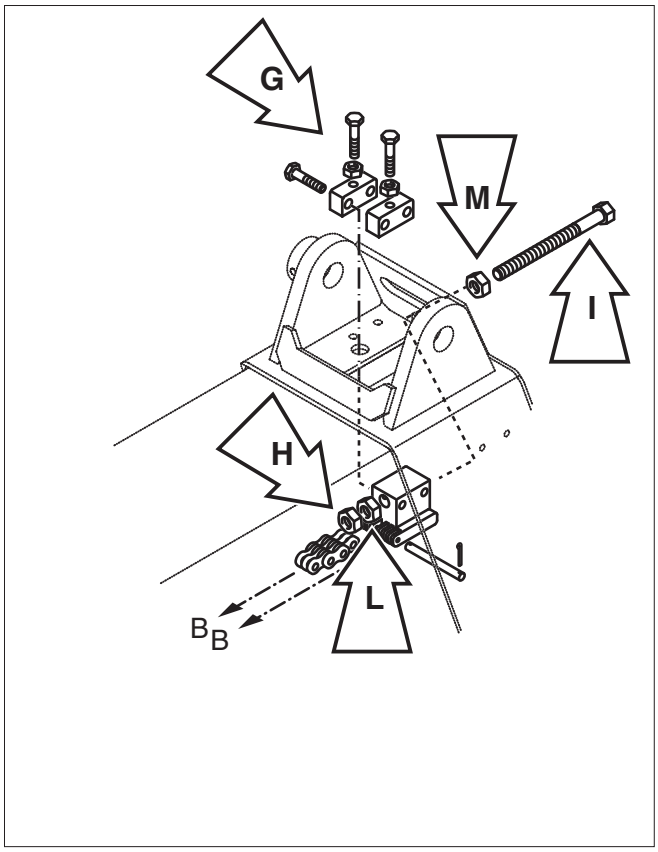
- For tensioning the two chains above the second section boom, loosen the locknuts and the screws (**G**) using a 19 mm combination wrench, and loosen the locknuts (**H**) and (**M**) using a 27 mm wrench.

- Tensioning the chain until a maximum 40Nm value operating on the screw (**I**) using a 27mm dynamometric wrench and on the nut (**L**) using a 27mm combinatione wrench.

- Lock the chain tensioners with locknut using two 27mm wrench.

- Tighten the screws (**G**) using a 19mm wrench.

Change the chains if during the procedure described above all threaded part of the screws have been used; in this case, please contact the GENIE Service Centre.




## 4.7 TABLE E PROCEDURES

### E-1 CHANGE THE SAFETY ELEMENT OF ENGINE AIR FILTER

To change the safety element:

- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove cover **B**.
- Pull out the outer filter cartridge **C**.
- Pull out the inner filter cartridge **D**.
- Clean the filter bowl.
- Refit the clean cartridge **D**, or a new one, using some grease on the seal and make sure it is properly positioned.
- Refit the element **C** and the cover **B**.

**WARNING**

***The inner element should be replaced every second time the outer element is replaced.***

**WARNING**

***Do not wash the cartridge using water or other kind of solvents.***

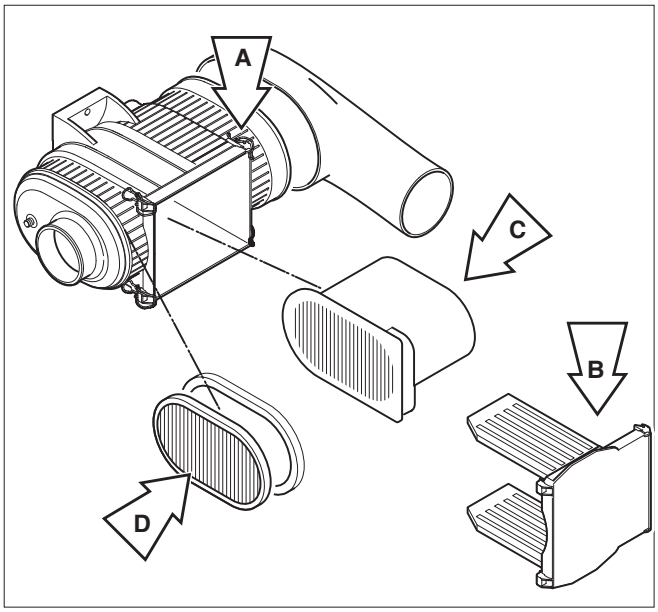


TABLE D

## E-2 CHANGE THE OIL IN THE POWER DIVIDER GEARS

To change the oil in the **power divider gears**:

- Stop the machine on a level ground and engage the parking brake.

PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plug **A**.
- Remove the plug **B** and allow the oil to flow entirely.
- Refit and tighten the plug **B**.
- Add new oil through the hole **A** until it is level with hole
- Refit and tighten **A**.

Recommended oil:

- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**

## E-3 CHANGE THE OIL IN THE FOUR WHEEL REDUCTION GEARS

To change the oil in the **four wheel reduction gears**:

- Stop the machine on a level ground and ensure the parking brake is engaged and plug **A** is oriented along the vertical axis.

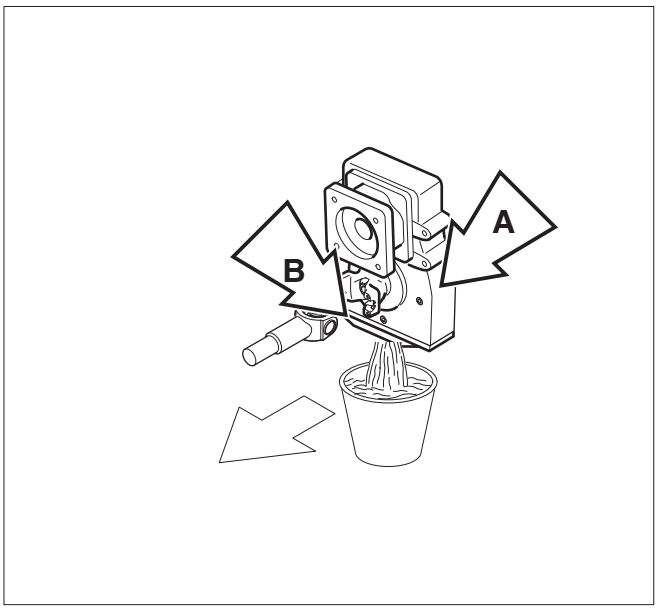
PROTECT THE ENVIRONMENT

***Place a container of suitable size under the plug for oil leaks.***

- Remove the plug **A** and allow the oil to flow entirely from the reduction.
- Rotate the wheel by 90° until the plug is oriented along the horizontal axis.
- Add new oil through hole **A**.
- Refit and tighten **A**.

Recommended oil:

- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**



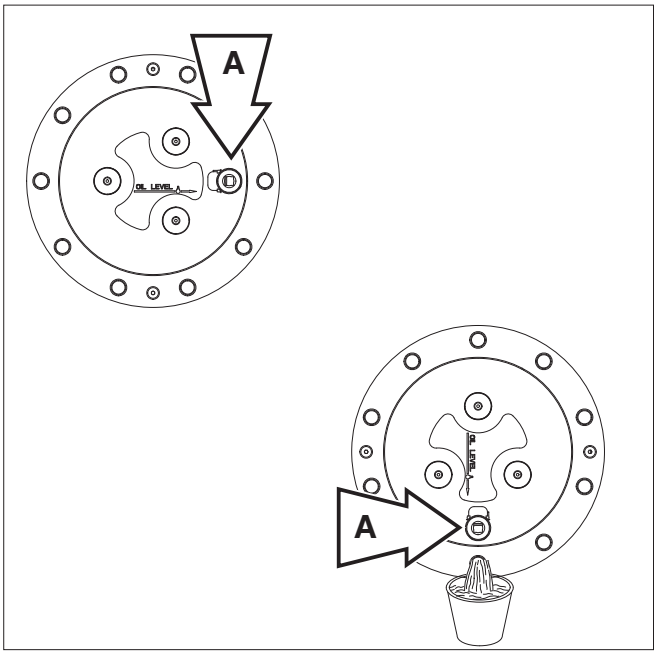
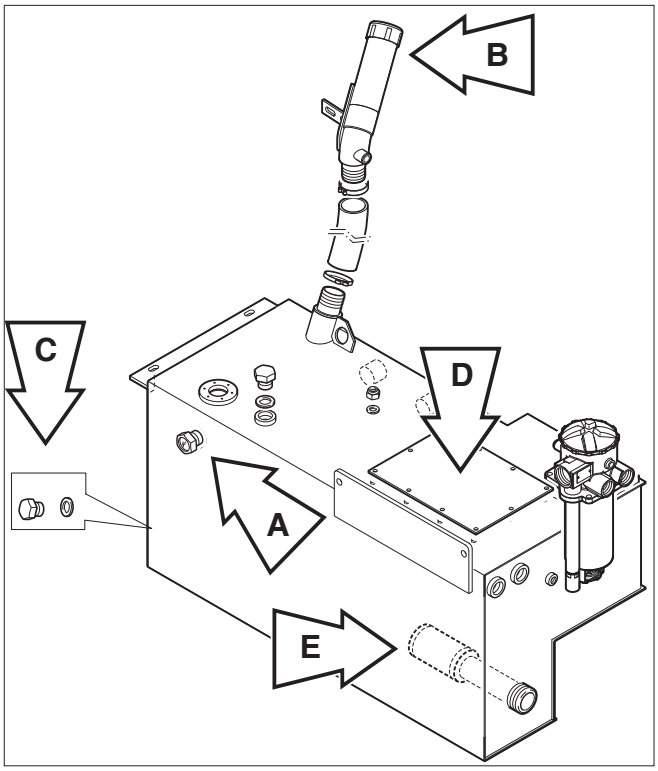



TABLE D

## E-4 CHANGE THE HYDRAULIC OIL AND THE INNER HYDRAULIC OIL FILTER




To change the hydraulic oil:

- Stop the machine on a level ground and make sure the parking brake is engaged.
- Release the pressure from the hydraulic circuit.
- Place a container of suitable size under the drain plug **C**, placed in the lower part of the reservoir, and collect any oil leaks.
- Using a 27 mm combination wrench, remove the plug **C** and allow the oil to flow in the container.
- Using a 13 mm combination wrench, remove the screws of the inspection cover **D**, and then remove it.
- Carefully wash the tank with Diesel oil and blow a jet of compressed air.
- Change the inner cartridge **E**.
- Refit the drain plug **C** and the inspection cover **D**.
- Add new oil through hole **B**, by making sure that it matches the recommended type indicated, until it is level with **A**.

Recommended oil:

- **SHELL TELLUS T22 (temperatures below -10° C)**
- **SHELL TELLUS T46 (temperatures from -15° C to +45° C)**
- **SHELL TELLUS T68 (temperatures above +30° C)**

PROTECT THE ENVIRONMENT

***Handling and disposing of used oils might be ruled by local or national regulations. Address to authorised waste centres.***

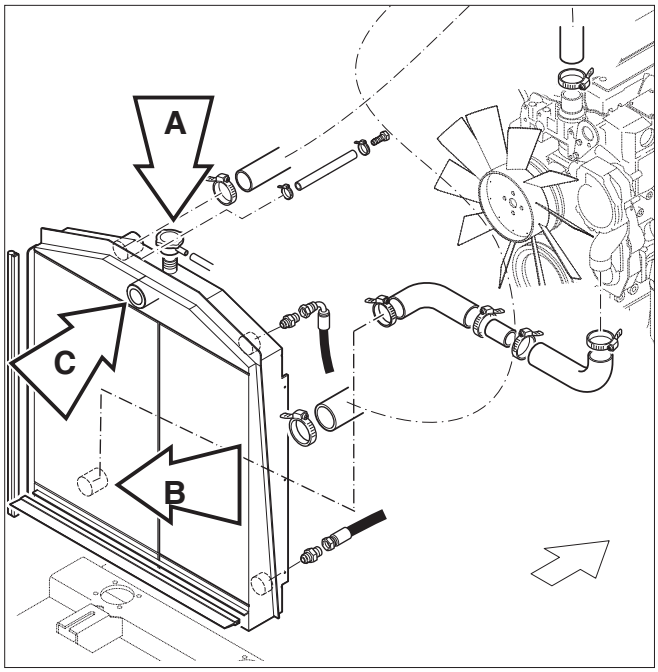
TABLE F

## 4.8 TABLE F PROCEDURES

### F-1 CHANGE THE ENGINE COOLANT

**DANGER**

***When the coolant is hot, the cooling system is under pressure. With warm engine, loosen the radiator plug slowly and carefully, without removing it, to drain the pressure. Use protection gloves and keep your face at a safe distance.***




To drain the antifreeze:

- Let the engine cool down and remove the plug **A**.
- Using a screwdriver, loosen the clamp and remove the rubber hose **B**. Allow the coolant to flow out into a special container.
- Refit the hose and pour new antifreeze (50% water-antifreeze) in the plug **A**. This proportion will provide protection up to -38°C.
- Refit the plug **A** and start the Diesel engine. After few minutes, check the level by the hole **C**. If necessary, add new coolant until it is level.

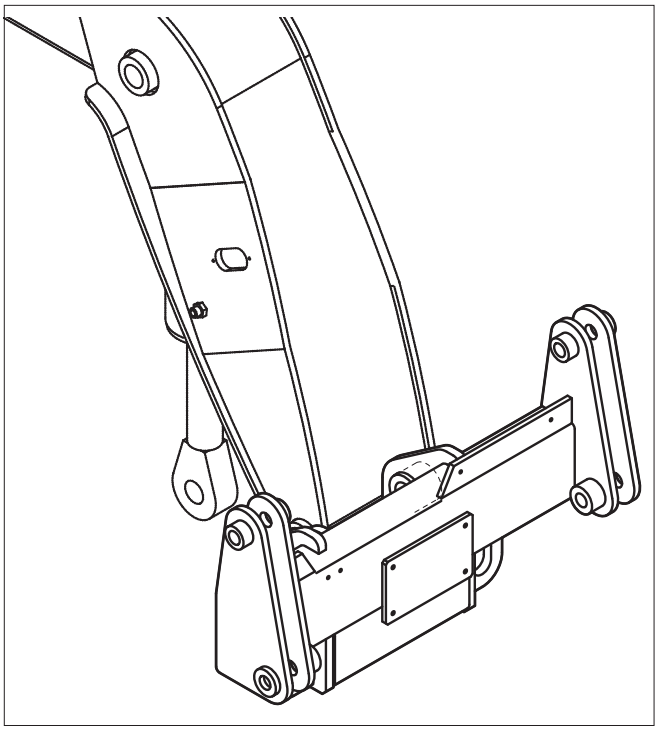
On delivery, the machine is filled with a cooling mixture consisting of 50% water and 50% anti-freeze.

| **TEREX PRO COOL**<br>Protection against boiling/freezing | | |
|---|---|---|
| Product % | Freezing point | Boiling point |
| 33 | -17 °C | 123 °C |
| 40 | -24 °C | 126 °C |
| 50 | -36 °C | 128 °C |
| 70 | -67 °C | 135 °C |

TABLE G

## 4.9 PROCEDURE TABELLA G

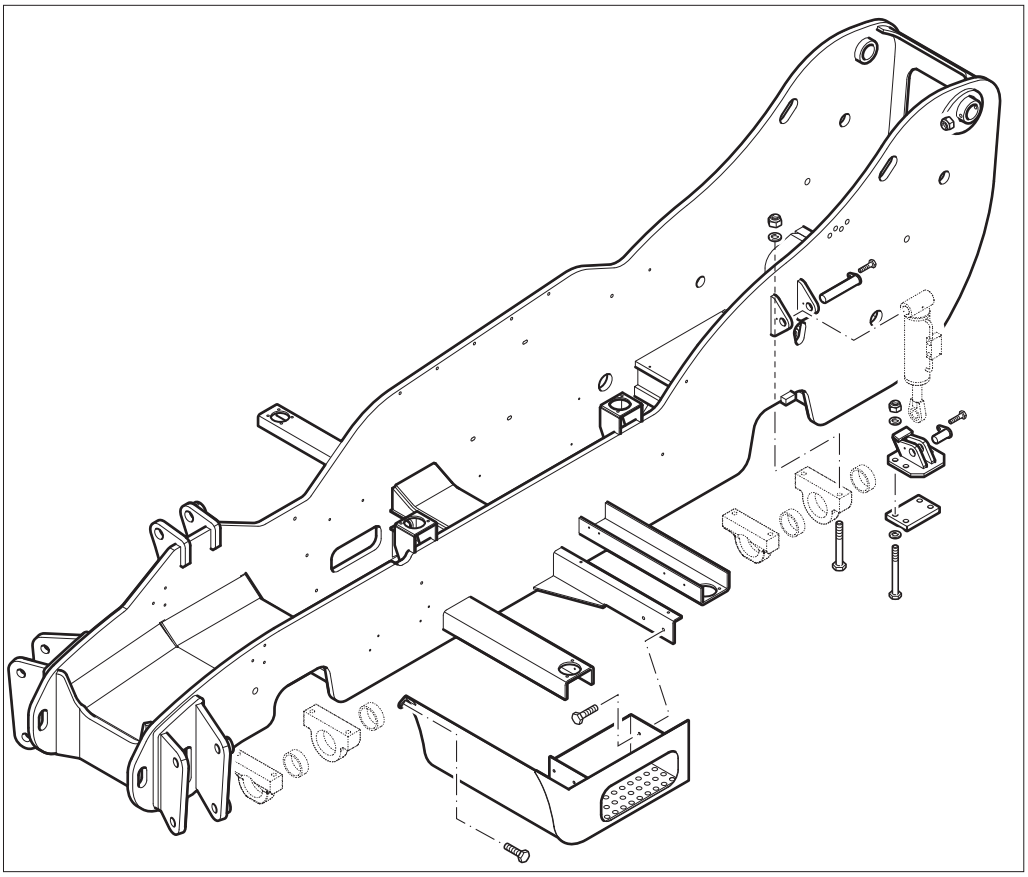
### G-1 CHECK THE MACHINE STRUCTURE

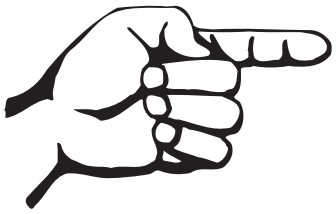


Five years after the first placing into operation of the machine or after 6000 hours (whichever occurs first), check the state of the structure paying attention to the welded supporting joints, the boom pins, the platform and all attachment (if installed).

**DANGER**

***After the first 5 years, repeat this check every 2 years.***





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# Problems-Causes-Solutions

## 5.1 INTRODUCTION

- *Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.*
- *Immediately tag and remove from service a damaged or malfunctioning machine.*
- *Repair any damage or malfunction before operating machine.*
- *Unless otherwise specified, perform each procedure with the machine in the following configuration:*
  - *machine parked on a flat level surface;*
  - *boom in the stowed position;*
  - *key switch in the OFF position with the key removed.*

*Before troubleshooting:*

- *Read, understand and obey the safety rules and operating instructions printed in the Operator Manual of the machine.*
- *Be sure that all necessary tools are available and ready for use.*
- *Read each appropriate flow chart thoroughly.*
- *Pay special attention to the following warnings:*

**DANGER**

*Crushing hazard. When testing or replacing any hydraulic component, always support the structure and secure it from movement.*

**WARNING**

*Electrocution hazard. Contact with electrically charged circuits may result in death or serious injry. Remove all rings, watches and other jewerly.*

**WARNING**

*Spraying hydraulic oil can penetrate and burn skin; loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.*

**CAUTION**

*Perform all troubleshooting on a firm level surface.*

**CAUTION**

*Two person will be required to safely perform some troubleshooting procedures.*

PROBLEMS-CAUSES-SOLUTIONS

## 5.2 ABOUT THIS SECTION

The tables on the following pages should be used to find and rectify problems that can occur when using the machine.

Prepare adequate tools, and especially a voltmeter and a pressure gauge to carry out the checks explained on next pages.

The initials of the electrical and hydraulic parts indicated in the following tables are given to help you find such parts on the schemes and diagrams in chapter 6.

The tables should be read as follows:

- once you have identified the problem, search this problem in the "**problems**" column;
- analyse the possible causes explained in the "**causes**" column;
- proceed with the check or replacement according to the instructions provided in the "**solutions**" column;
- check that the machine runs well;
- if the problem cannot be eliminated, check again all indications in the "**causes**" column and proceed accordingly.

**CAUTION**

***For any further information, contact the GENIE Service Centre.***

## 5.3 ELECTRICAL FAULTS

| Problems | Causes | Solutions |
|---|---|---|
| **When key is turned to 1, the dashboard is not powered** | Battery discharged. | Check the battery, replace if necessary. |
| | Battery disconnect switch. | Check that the disconnect switch is in the correct position and works fine. Replace if damaged. |
| | Ground. | Check that the ground braid between chassis and engine is correctly connected and intact. |
| | 60A fuse blown. | Check the fuse in the box inside the engine compartment; replace if necessary. |
| | Ignition key block. | Check that contact **30** of the ignition key is powered; if you have not 12V on contact **15/54**, change the key. |
| | Problem of the wiring line. | Check the wiring up to the input of the fuses and relays board for continuity. |
| **The machine cannot be started** | Ignition key. | Check that contact **50** of the key supplies 12V when the key is in the start position (turned right). |
| | Emergency stop button activated or damaged | Check if the button has been pressed accidentally; check the efficiency of the contacts. |
| | Relay **K11** damaged. | Check the relay; replace if necessary. |
| | 70A relay **K01** damaged. | Check the relay in the box inside the engine compartment; replace if necessary. |
| | Problem of the wiring line from relay **K11** to relay **K01**. | Check the wiring for continuity. |
| | Speed selector not in neutral position. | Check if the speed is engaged or change the speed selector. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| | 30A fuse **F1G** feeding the start relay and the emergency button blown. | Check the fuse and the emergency button; replace if necessary. |
| | Problem of the wiring line from dashboard to 70A relays in the engine box. | Check the wiring for continuity. |
| | Starting motor relay **M1** damaged. | Check the starting motor coil is powered. If the coil is powered and the motor doesn't work, change the motor. |
| | Starting motor damaged. | Check and replace if necessary. |
| | Efficiency of the grounding system. | Check and, if necessary, reconnect the grounding system to the chassis. |
| **The starting motor runs but the engine doesn't start** | No fuel. | Refuel. |
| | Injection pump of engine damaged. | Check the pump; replace if necessary, according to the instructions provided in the Cummins manual. |
| | Air in the tank suction system. | Check the suction line and bleed the system. |
| | Engine stop solenoid **Y00** damaged. | Check and replace if necessary. |
| **The battery gets discharged too fast** | Internal elements broken. | Change the battery. |
| | The alternator doesn't recharge. | Check the efficiency of the alternator and replace if necessary. |
| | Excessive absorption of the system. | Check and rectify. |
| **The machine doesn't move** | 10A fuse **F14** blown. | Check the fuse; replace if necessary. |
| | Parking brake micro-switch **S6b** damaged. | Check the micro-switch and replace, if necessary; with the parking brake released, you must have 12V on the pink-yellow wire. |
| | Speed selector damaged. | Check and replace the speed selector if necessary. |

| Problems | Causes | Solutions |
|---|---|---|
| | Outrigger limit switches **S29-S29** damaged. | Check the mechanical operation of the limit switches; replace if necessary. |
| | 10A fuse **F18** blown. | Check the fuse; replace if necessary. |
| | The solenoid valves of the forward and reverse speeds are damaged. | Check you have 12V on solenoid, when the forward gear is put, and, 12V on solenoid when the reverse gear is put. If necessary, change the coils of the solenoid valves. |
| | Relays **K7** and **K8** damaged. | Check the relays and replace if necessary. |
| | Relays **K9** and **K10** damaged. | Check the relays and replace if necessary. |
| | Relays board damaged. | Check the board and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The boom doesn't move** | Road/Jobsite selector turned to a wrong position. | Check the ROAD/JOBSITE selector is on JOBSITE position. |
| | Road/Jobsite selector damaged. | Check the contacts and replace, if necessary. |
| | Main valve electrovalve | Check the efficency; replace if necessary |
| **The rear steering axle of the machine remains locked** | "High boom" micro-switch damaged. | Check the micro-switch and replace if necessary. |
| | Problem of the wiring line to the "high boom" micro-switch. | Check the wiring for continuity. |
| | Machine control board damaged | Check the board inputs and outputs; replace the board if necessary. |
| | Rear axle cylinder solenoid valves Y30 and Y31 damaged. | Check the solenoid valves and replace if necessary. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| **The 3B6 moment limiter doesn't change scale when passing from the "machine on wheels" condition to the "stabilised machine" condition** | 10A fuse **F26** blown. | Check the fuse; replace if necessary. |
| | Outrigger micro-switches damaged. | Check the micro-switches and replace if necessary. |
| | Problem of the DLE wiring line to the outrigger micro-switches. | Check the wiring for continuity. |
| | Socket **X25** on DLE defective. | Check the socket and replace if necessary. |
| | DLE display damaged. | Change the DLE. |
| **The steer mode selection of the machine doesn't work** | 10A fuse **F25** blown. | Check the fuse; replace if necessary. |
| | Steering solenoid valves damaged. | Check the spools and replace if necessary. |
| | Road/Jobsite key-selector damaged. | Check that the selector is in the “Jobsite” position; if damaged, change the selector. |
| | Steering selector damaged. | Check the selector and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| | Solenoids **Y20** and **Y21** damaged. | Check the solenoids and replace if necessary. |
| **The horn doesn't work** | 10A fuse **F5** blown. | Check the fuse and replace if necessary. |
| | 15A fuse **F21** blown. | Check the fuse and replace if necessary. |
| | Relay **K3 damaged.** | Check the relay and replace if necessary. |
| | Horn button damaged. | Check and replace the speed selector if necessary. |
| | Horn **H20** damaged. | Check you have 12V between the two wires connected to the horn; if there is power, change the horn. |
| | Problem of the wiring line. | Check the wiring for continuity. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| **The flashing beacon doesn't work** | 7,5A fuse **F10** blown. | Check the fuse and replace if necessary. |
| | Flashing beacon damaged. | Check the flashing beacon and replace if necessary. |
| | Flashing beacon lamp damaged. | Check the lamp and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The heating fan doesn't work** | 10A fuse **F11** blown. | Check the fuse and replace if necessary. |
| | Fan control switch damaged. | Check the switch and replace if necessary. |
| | Heating fan motor damaged. | Check the fan motor and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The limit switch sensing when the boom is in the low position doesn't work** | A15 fuse **F2** blown. | Check the fuse and replace if necessary. |
| | Limit switch damaged. | Check the limit switch and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The limit switch sensing when the boom is in the high position doesn't work** | Control unit **I/O** mode damaged. | Check the efficency and replace if necessary. |
| | Limit switch damaged. | Check the limit switch and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The air filter restriction warning light doesn't work** | Dashboard indicator light. | Check the indicator light and replace the lights group if necessary. |
| | Filter restriction sensor **B15** damaged. | Check the sensor and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| **The light warning of a low engine oil pressure doesn't work** | Pressure switch for low engine oil pressure **B11** damaged. | Check the pressure switch and replace if necessary. |
| | Dashboard indicator light. | Check the indicator light and replace the lights group if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The engine cooling water temperature indicator light doesn't work** | Temperature sensing bulb **B13** damaged. | Check the efficiency of the bulb and replace, if necessary. |
| | Dashboard indicator light. | Check the indicator light and replace the lights group if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The engine water thermometer doesn't work** | Engine oil thermometer on dashboard damaged. | Check the thermometer and replace if necessary. |
| | Engine oil temperature transducer **B14** damaged. | Check the transducer and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The hydraulic oil thermometer doesn't work** | Hydraulic oil thermometer on dashboard damaged. | Check the thermometer and replace if necessary. |
| | Hydraulic oil temperature transducer **B16** damaged. | Check the transducer and replace if necessary. |
| | 3A fuse **F8** blown. | Check the fuse and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The fuel gauge doesn't work** | 3A fuse **F8** blown. | Check the fuse and replace if necessary. |
| | Dashboard fuel gauge damaged. | Check the fuel gauge and replace if necessary. |
| | Fuel detector **B12** damaged. | Check the fuel detector and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |

| Problems | Causes | Solutions |
|---|---|---|
| **The hour-meter doesn't work** | Hour-meter **P4** damaged. | Check the hour-meter and replace if necessary. |
| | Alternator **A1** damaged. | Check the alternator and replace if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The display of the overload warning system cannot be turned on** | 10A fuse **F25** blown. | Check the fuse and replace if necessary. |
| | DLE display damaged. | Change the DLE. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The back-up horn doesn't work** | Back-up horn **H25** damaged. | Check the efficiency of the back-up horn and replace, if necessary. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| **The hydraulic oil filter restriction indicator light doesn't work** | Bulb **B17** damaged. | Check the efficiency of the bulb and replace, if necessary. |
| | Indicator light **H113**. | Check the indicator light. |
| | Problem of the wiring line. | Check the wiring for continuity. |
| | | |

PROBLEMS-CAUSES-SOLUTIONS

## 5.4 HYDRAULIC FAULTS

| Problems | Causes | Solutions |
|---|---|---|
| **The machine does not move** | Drive pump not well calibrated. | Re-calibrate the pump (see par. 2 - section “Technical Specifications”) |
| | Valves damaged. | Check and replace the valves if necessary. |
| | Hydraulic oil filter clogged. | Check and replace the cartridge if necessary. |
| **Poor boost pressure** | Boost pump damaged. | Change the pump. |
| | Hydraulic engine damaged. | Change the engine. |
| | Boost valve not well calibrated. | Re-calibrate the valve (see par. 2 - section “Technical Specifications”) |
| **The machine drive is low** | Hydraulic oil filter clogged. | Check and replace the cartridge if necessary. |
| | Low hydraulic oil level. | Replenish the tank up to the recommended level. |
| | Hydraulic oil contaminated. | Drain the oil, clean tank and pipes, empty the pumps and add new oil. |
| | Boost pump not well calibrated. | Re-calibrate the pump (see par. 2 - section “Technical Specifications”) |
| **No steer selection** | Steer selection electrovalve damaged. | Check the coil and the the movement of the inner electrovalve pin. |
| **Poor action of the parking brake** | Loose cables. | Tension the cables and check the relevant clamps. |
| | Brake control lever in the cab damaged. | Check the control lever and replace if necessary. |
| **The right - left sway function doesn't work** | Sway cyilinders damaged. | Check or replace the internal seals, if necessary. |
| | Block valves damaged. | Check the sliders and the coils of the electrovalves. |

| Problems | Causes | Solutions |
|---|---|---|
| | The electrovalves don't work. | Check the sliders and the efficiency of the electrovalves. |
| **The outriggers do not work** | Outrigger cylinders damaged. | Check the efficiency and the internal seals of the cylinder. |
| | Outrigger cylinders' block valves damaged. | Check the efficiency of the valves and that the internal pistons slide correctly. |
| | Main valve damaged. | Check the efficiency of the internal sliders of the Walvoil main valve. |
| **The machine doesn't steer** | Main pump damaged. | Check the operation of main gear pump. |
| | Load-sensing priority valve damaged. | The priority valve doesn't deliver hydraulic oil to the hydraulic drive; change the valve unit. |
| | Hydraulic drive damaged. | Check the efficiency of the hydraulic drive and if the pilot activates the priority valve. |
| | Steering cylinders damaged. | Check the efficiency and the internal seals of the cylinders. |
| **The boom doesn't move** | Main gear pump damaged. | The pump doesn't deliver oil. Check the max output pressure of the pump. Replace if damaged. |
| | Load-sensing priority valve damaged. | Valve restricted or damaged; remove and check the seals and the efficiency of the slider. |
| | Tecnord control block damaged. | Check the efficiency of the control block (see par. 2 - sect. "Technical Specifications"). Remove the pressure relief valve and eliminate any dirt. |
| | Pressure relief valve of main valve damaged. | Check the efficiency of the valve and the proper sliding of the internal piston. |
| **When the brake pedal is stepped down, the machine doesn't brake** | Auxiliary gear pump damaged. | Check the pump thoroughly. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| | Brake pump damaged. | Check the pump thoroughly (see section 2 "Technical specifications" for calibration). |
| | Brakes damaged or worn out. | Check the efficiency of the disks; replace, if necessary. |
| **The attachment locking cylinder doesn't work (if any)** | Attachment locking cylinder damaged. | Check the efficiency of the cylinder; replace the internal seals , if necessary. |
| | Quick couplings damaged. | Check and replace, if necessary. |
| | The hydraulic line between control block and quick couplings is defective. | Check and replace any damaged or clogged hose. |
| **The forks cannot be pitched perfectly** | Fork cylinder damaged. | Change the seals and check the tightness of the cylinder. |
| | Fork cylinder block valve damaged. | Remove and clean the valve; check its seals and replace if necessary. |
| | The hydraulic line between control block and block valve is defective. | Check and replace any damaged or clogged hose. |
| | Safety valves not well calibrated or damaged. | Check the efficiency of the safety valves fitted after the DFE 20 switch module; re-calibrate or replace. |
| **The boom extension system doesn't work** | Extension cylinder inside the boom damaged (third telescope extension), only GTH 4013 SX. | Check the seals of cylinder, rod and re-sequencing valve (located at the top of the rod); replace any defective parts. |
| | Cilindro sfilo esterno del braccio rovinato (sfilo secondo tronco). | Check the seals of cylinder, rod and re-sequencing valve (located at the top of the rod); replace any defective parts. |
| | Valvola di blocco cilindro sfilo interno braccio danneggiata. (only GTH 4013 SX) | Check the valve, clean or replace if necessary. |
| | Block valve of the boom external extension cylinder damaged. | Check the valve, clean or replace if necessary. |

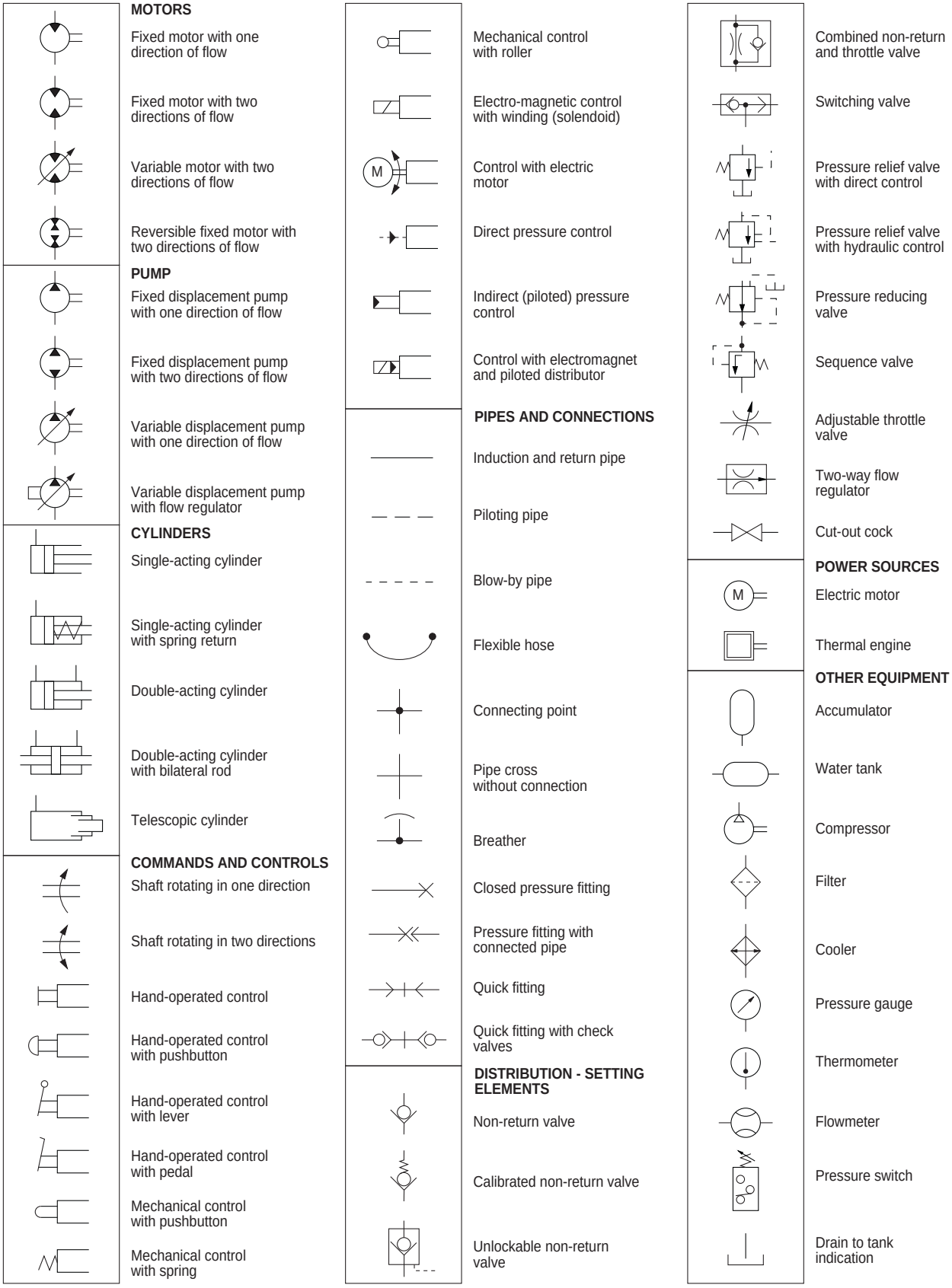
| Problems | Causes | Solutions |
|---|---|---|
| | 6-way/2-position electrical switch block damaged. | Check the efficiency of the valve and the proper sliding of the internal piston. |
| | Main valve not well calibrated. | Check if the main valve reaches the max working pressure (see par. 2 - section “Technical Specifications”). Check the efficiency of the internal sliders of the Walvoil main valve. |
| | Mechanical jamming. | Check the boom. In case of mechanical jamming, rectify. |
| | The line feeding the cylinders is defective or damaged. | Check and replace any defective parts which stop the flow of the hydraulic oil to the cylinders. |
| **The boom cannot be moved up** | Lifting cylinder damaged. | Change the seals and check the tightness of the cylinder. |
| | Block valve damaged. | Remove and clean the valve; check its seals and replace if necessary. |
| | Main valve not well calibrated. | Check if the main valve reaches the max working pressure (see par. 2 - section “Technical Specifications”). Check the efficiency of the internal sliders of the Walvoil main valve. |
| **The boom jerks when moved down** | Block valve damaged. | Remove and clean the valve; check its seals and replace if necessary. |
| **The boom telescopes are frequently out of sequence** | Seals of the extension cylinder damaged. | Change the seals and check the tightness of the cylinder. |
| | Re-sequencing valves damaged. | Remove and clean the valves; check their seals and replace if necessary. |
| | Air in the circuit. | Bleed (see Operator's manual). |
| **When the boom is moved up or down, the forks cannot be levelled** | Balancing cylinder damaged. | Check the cylinder efficiency and the state of the internal seals. |

PROBLEMS-CAUSES-SOLUTIONS

| Problems | Causes | Solutions |
|---|---|---|
| | Safety valves of the 6-way/2-position electrical switch block damaged. | Check the efficiency of the safety valves fitted to ports A and B of the module; re-calibrate or replace. |
| | One-way valves dirty or damaged. | Remove and clean the valve; check its seal and replace if necessary. |
| | Block valves damaged. | Remove and clean the valve; check its seal and replace if necessary. |
| | Hydraulic line defective. | Check and replace any damaged or restricted hose. |
| **The booms swings when moved out** | Pads worn. | Check the pads for wear and replace if necessary. |
| | Poor lubrication of the boom. | Smear the sliding zone of the pad with the grease recommended by Terex. |
| | Paint or abrasion on the pad sliding rail. | Grind out amy signs of abrasion on the boom and polish the sliding area of the pad, then smear with grease. |
| **The boom moves hardly in when fully extended and horizontal** | Pads worn. | Carefully check all of the front and rear pads of the boom; lubricate with the grease recommended by Terex. |
| **The rear axle unlocking device doesn't work** | Cylinder damaged. | Change the seals and check the tightness of the cylinder. |
| | Block valve damaged. | Remove and clean the valve; check its seal and replace if necessary. |

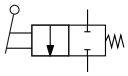
# Schemes

## 6.1 HYDRAULIC SYMBOLS

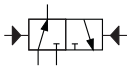


SCHEMES

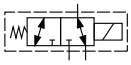
**DISTRIBUTION - SETTING ELEMENTS**



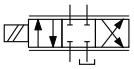
Two-position and two-way distributor, with manual lever control and spring return



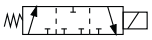
Three-way and two-position distributor, with hydraulic control



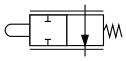
Two-position, three-way distributor, with electro-magnetic control and spring return



Distributor with mechanical control and span proportional to the action of the same control



Two-position, three-way distributor, with representation of transient connection during passage phase

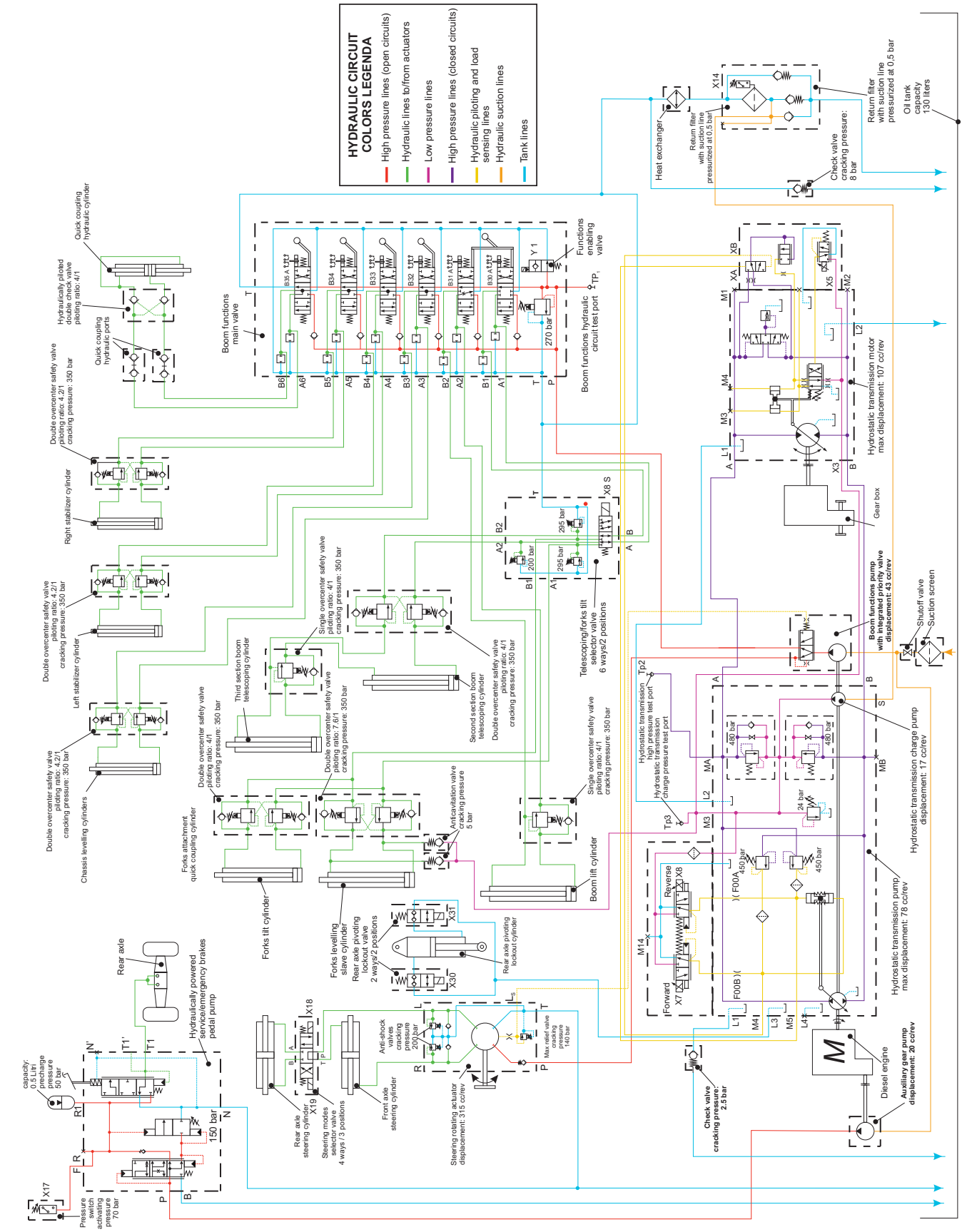


Electro-hydraulic single-acting servo valve

SCHEMES

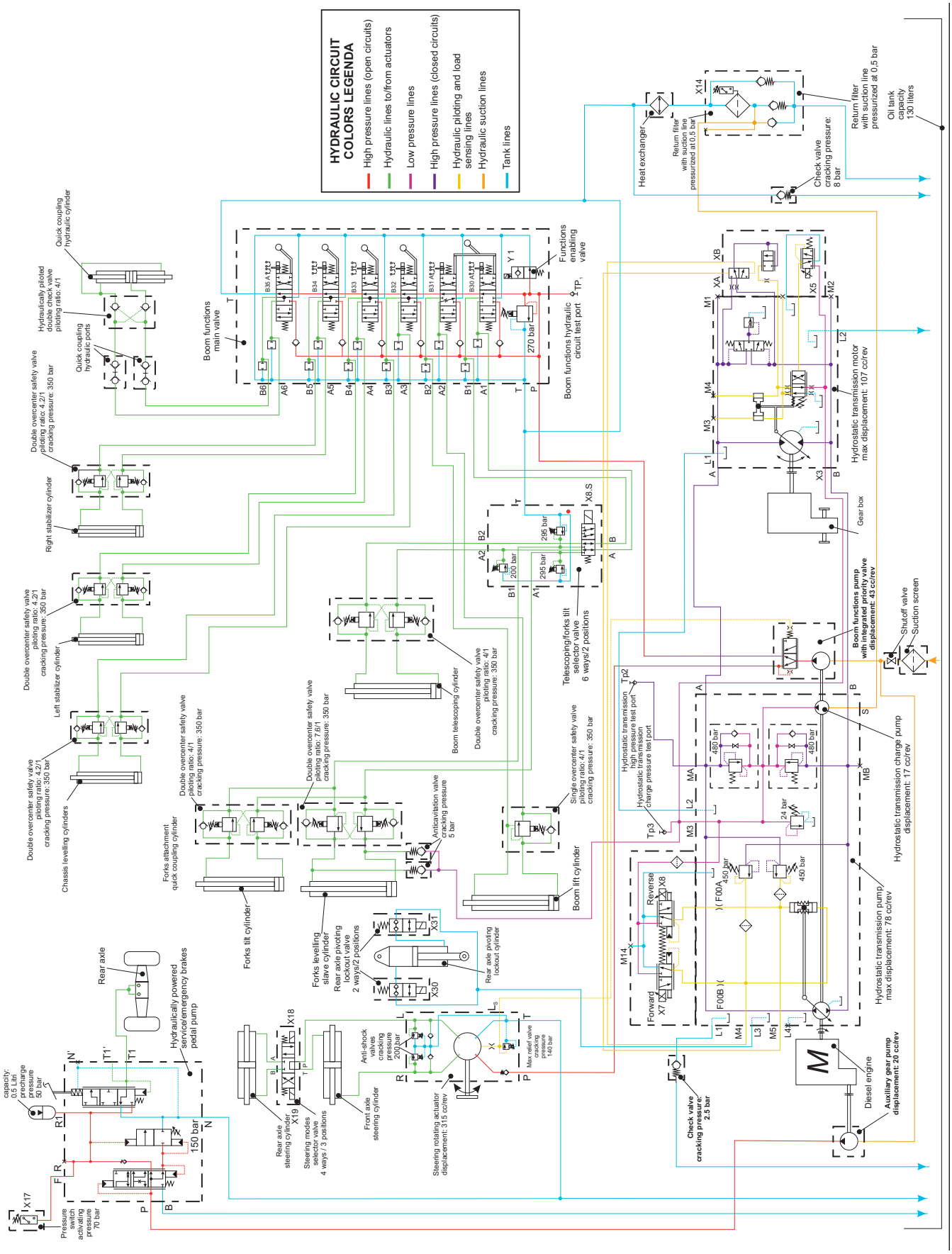
## 6.2 HYDRAULIC SCHEMES

### 6.2.1 GTH-4013 SX



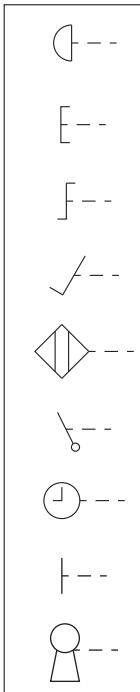
SCHEMES

## 6.2.2 GTH-4017 SX



## 6.3 ELECTRICAL SYMBOLS

**ACTUATORS**



Emergency controls

Pushbutton control

Rotary control

Pedal control

Proximity control

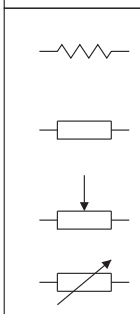
Lever control

Timed control

Mechanical/manual control

Key control

**RESISTANCES**



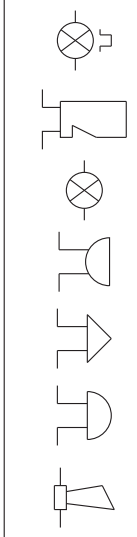
Resistance

Resistor

Potentiometer

Variable resistance

**SIGNALS**



Intermittent lamp

Whistle

Lamp

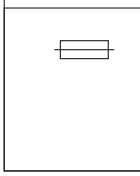
Buzzer

Siren

Bell

Horn

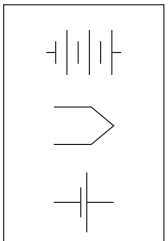
**FUSES AND RELAYS**



Horizontal fuse

Relay

**ACCUMULATORS**

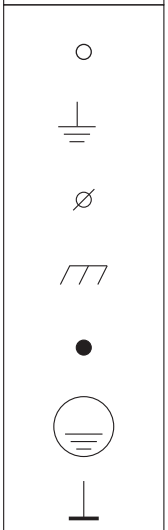


Battery

Thermocouple

Element

**TERMINALS AND GROUNDS**



Ring

Ground

Terminal

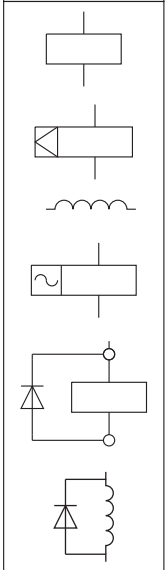
Ground to frame

Knot

Protection ground

Frame ground 2

**COILS**



Coil

Mechanical coupling coil

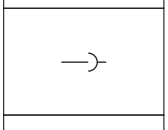
Winding

A/C coil

Coil with diode

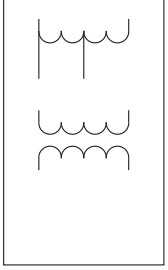
Winding with diode

**CONNECTORS**



Connector

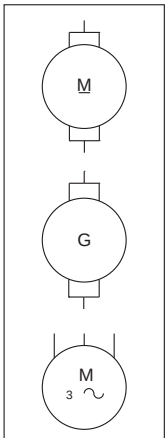
**STATIC APPLICATIONS**



Auto-transformer

Transformer

**DYNAMIC APPLICATIONS**

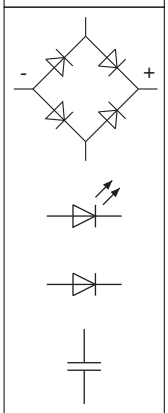



Motor

Generator

As_3p_motor

**ELECTRONIC PARTS**



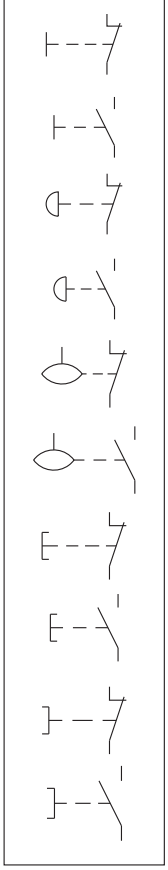

Rectifier

Light-emitting diode

Diode

Condenser

**PUSHBUTTONS**



Manual NC contact

Manual NO contact

NC mushroom-head pushbutton

NO mushroom-head pushbutton

NC level

NO level

Pushbutton with NC return

Pushbutton with NO return

NC tie-rod

NO tie-rod

SCHEMES

**CONTACTS**


Thermal


Normally open (NO)


Normally closed (NC)


NO limit switch


NC limit switch


Contactor

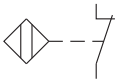

Magneto-thermal closure


Magneto-thermal opening

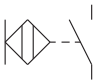

Thermal closure

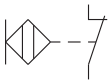

Thermal opening


Exchange


NC proximity


NO proximity


NO mechanical

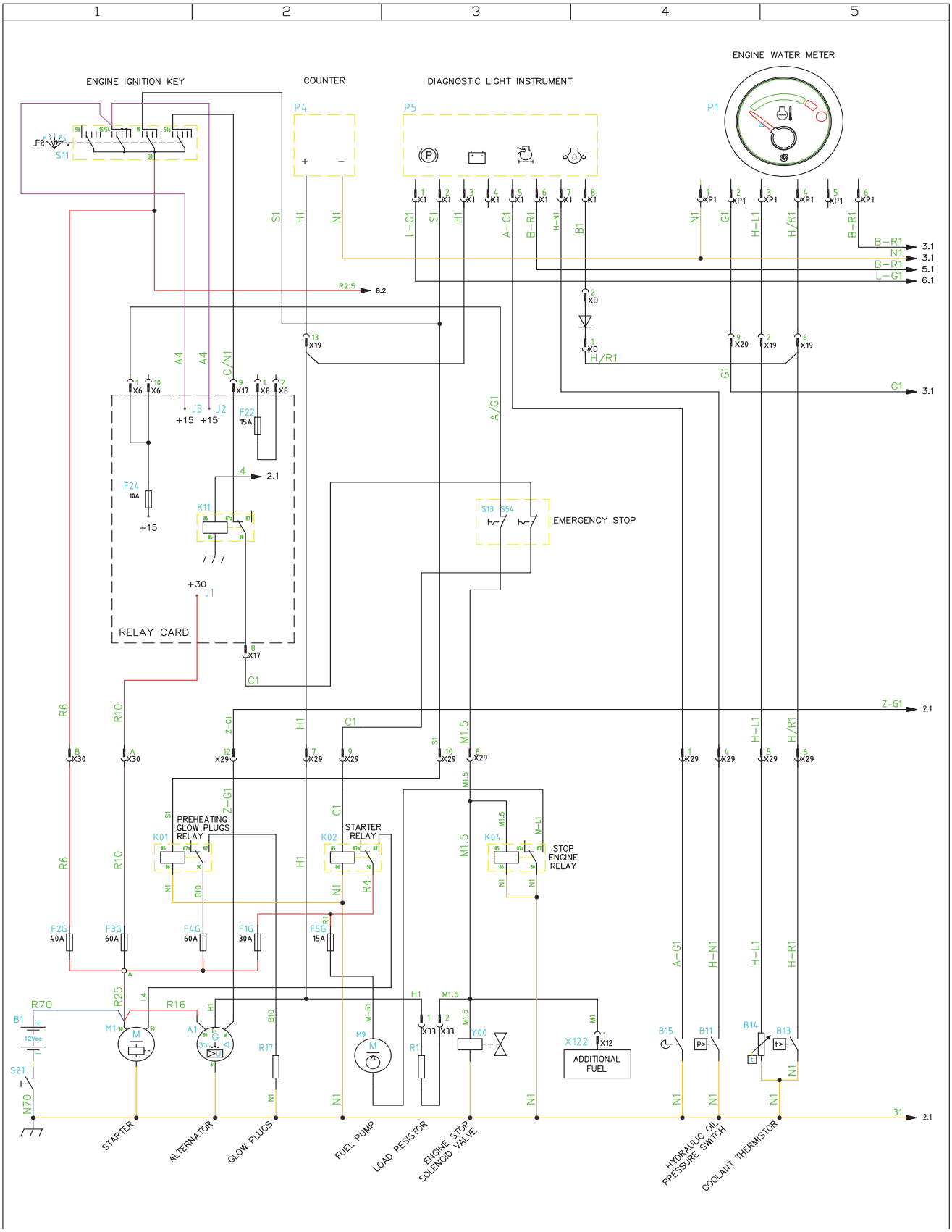

NC mechanical


Selector


Selector2

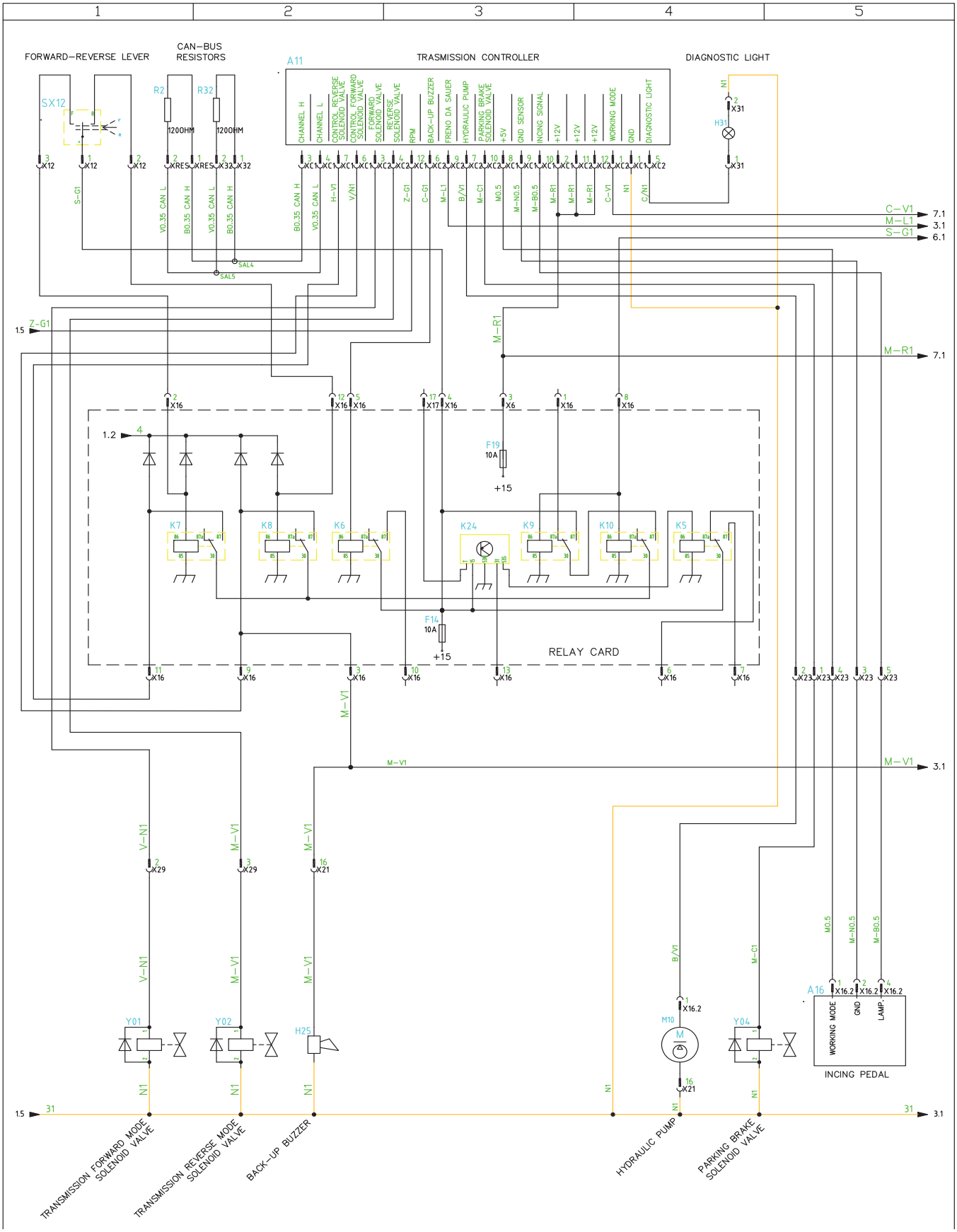
## 6.4 ELECTRICAL SCHEMES
### 6.4.1 GTH-4013 SX GTH-4017 SX

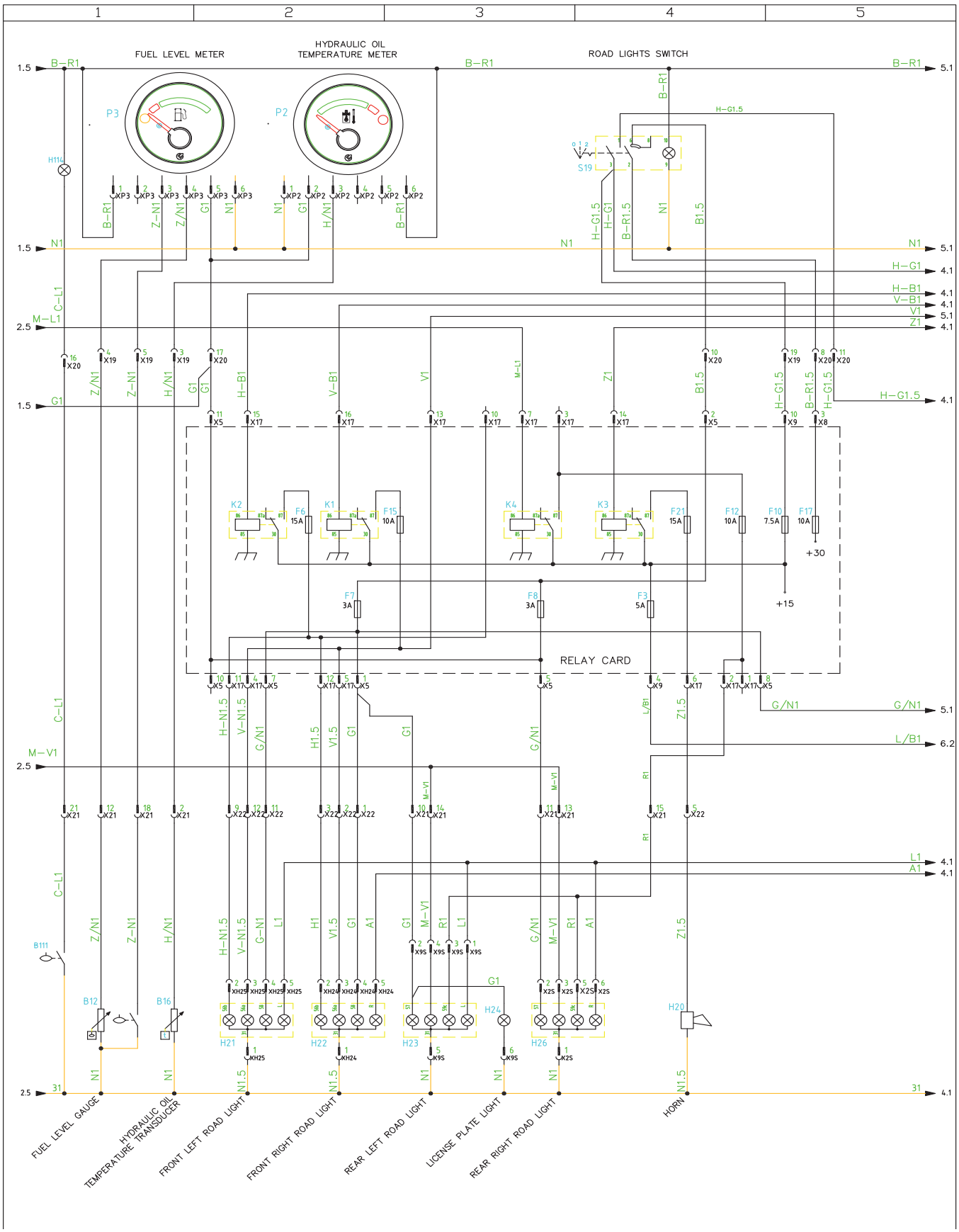




SCHEMES

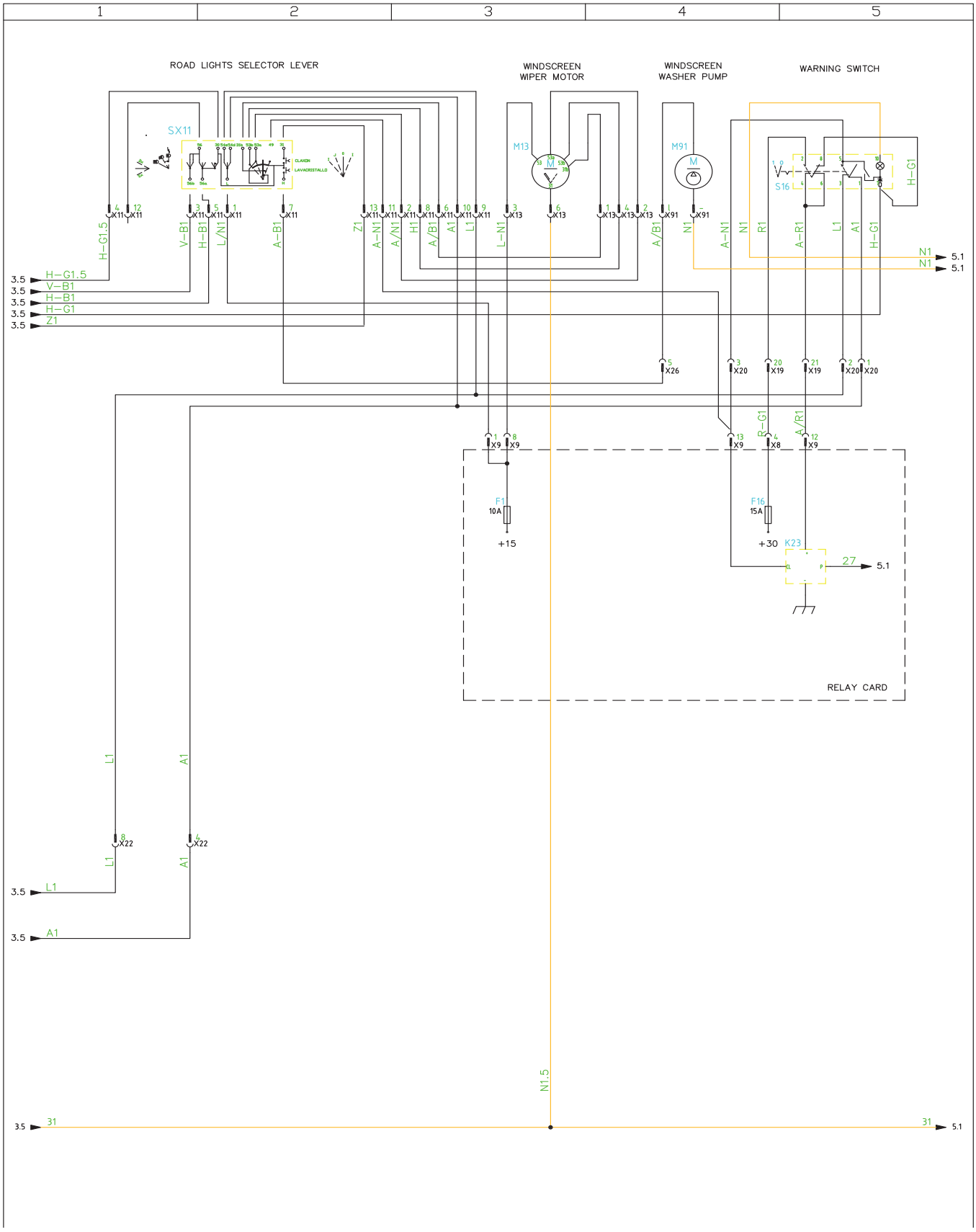
2/10

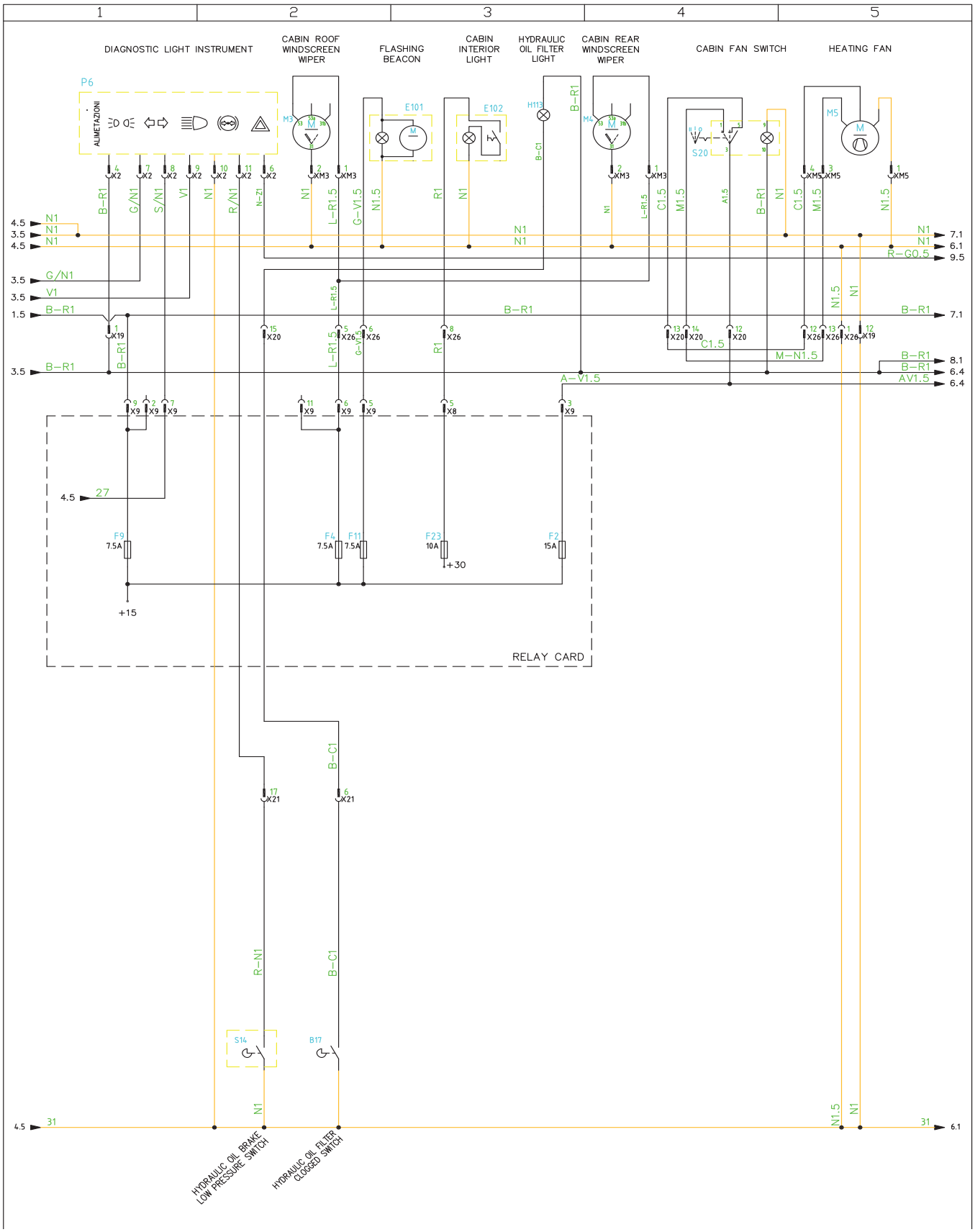

1
2
3
4
5
FORWARD–REVERSE LEVER
CAN–BUS RESISTORS
TRASMISSION CONTROLLER
DIAGNOSTIC LIGHT
A11
SX12
R2
R32
1200HM
CHANNEL H
CHANNEL L
CONTROL REVERSE SOLENOID VALVE
CONTROL FORWARD SOLENOID VALVE
FORWARD SOLENOID VALVE
REVERSE SOLENOID VALVE
RPM
BACK–UP BUZZER
FRENO DA SAUER
HYDRAULIC PUMP
PARKING BRAKE SOLENOID VALVE
+5V
GND SENSOR
INCING SIGNAL
+12V
WORKING MODE
GND
DIAGNOSTIC LIGHT
H31
C–V1
M–L1
S–G1
Z–G1
M–R1
M–V1
V–N1
F19
F14
10A
+15
K7
K8
K6
K24
K9
K10
K5
RELAY CARD
A16
WORKING MODE
GND
LAMP.
INCING PEDAL
Y01
Y02
H25
M10
Y04
TRANSMISSION FORWARD MODE SOLENOID VALVE
TRANSMISSION REVERSE MODE SOLENOID VALVE
BACK–UP BUZZER
HYDRAULIC PUMP
PARKING BRAKE SOLENOID VALVE


1
2
3
4
5
FUEL LEVEL METER
HYDRAULIC OIL TEMPERATURE METER
ROAD LIGHTS SWITCH
RELAY CARD
+30
+15
FUEL LEVEL GAUGE
HYDRAULIC OIL TEMPERATURE TRANSDUCER
FRONT LEFT ROAD LIGHT
FRONT RIGHT ROAD LIGHT
REAR LEFT ROAD LIGHT
LICENSE PLATE LIGHT
REAR RIGHT ROAD LIGHT
HORN

SCHEMES

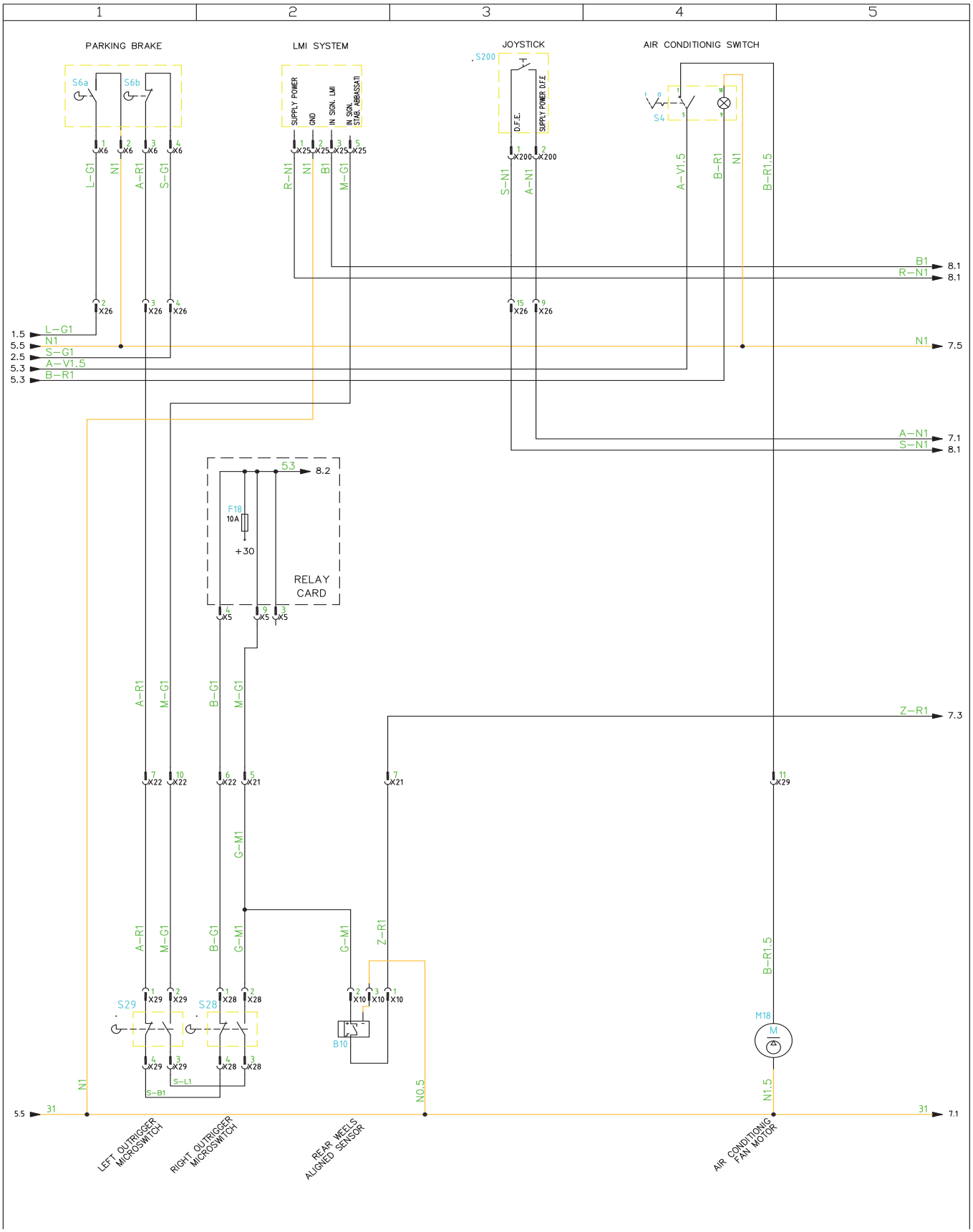
4/10

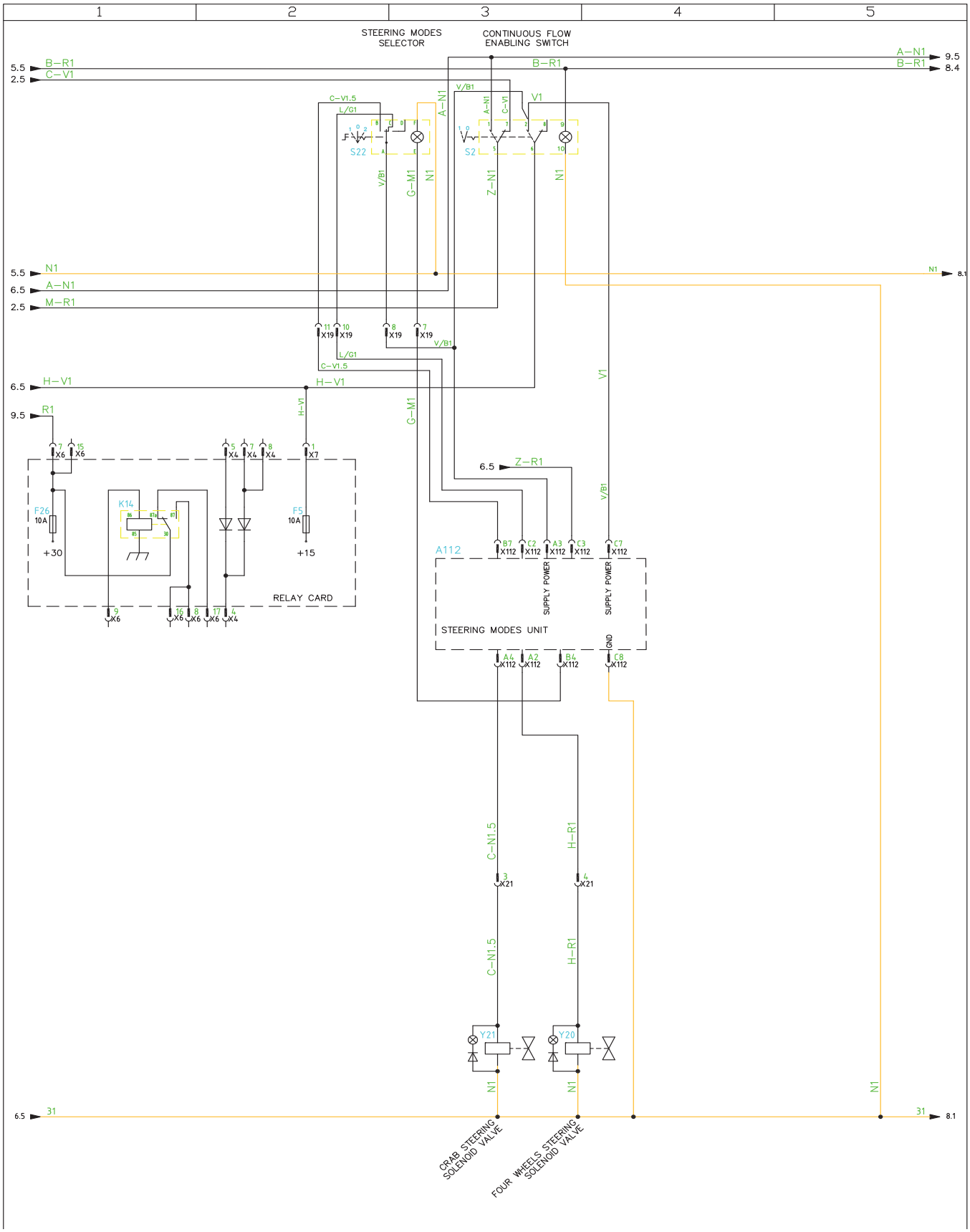

1
2
3
4
5
ROAD LIGHTS SELECTOR LEVER
WINDSCREEN WIPER MOTOR
WINDSCREEN WASHER PUMP
WARNING SWITCH
SX11
M13
M91
S16
H-G1.5
V-B1
H-B1
L/N1
A-B1
Z1
A-N1
A/N1
H1
A/B1
A1
L1
L-N1
N1
R1
A-R1
H-G1
A/R1
R-G1
3.5 H-G1.5
3.5 V-B1
3.5 H-B1
3.5 H-G1
3.5 Z1
N1 5.1
N1 5.1
F1 10A
+15
F16 15A
+30
K23
27
5.1
RELAY CARD
3.5 L1
3.5 A1
N1.5
3.5 31
31 5.1


1
2
3
4
5
DIAGNOSTIC LIGHT INSTRUMENT
CABIN ROOF WINDSCREEN WIPER
FLASHING BEACON
CABIN INTERIOR LIGHT
HYDRAULIC OIL FILTER LIGHT
CABIN REAR WINDSCREEN WIPER
CABIN FAN SWITCH
HEATING FAN
P6
ALIMETAZIONI
M3
E101
E102
H113
M4
S20
M5
RELAY CARD
F9 7.5A
F4 7.5A
F11 7.5A
F23 10A
F2 15A
+15
+30
S14
B17
HYDRAULIC OIL BRAKE LOW PRESSURE SWITCH
HYDRAULIC OIL FILTER CLOGGED SWITCH

SCHEMES

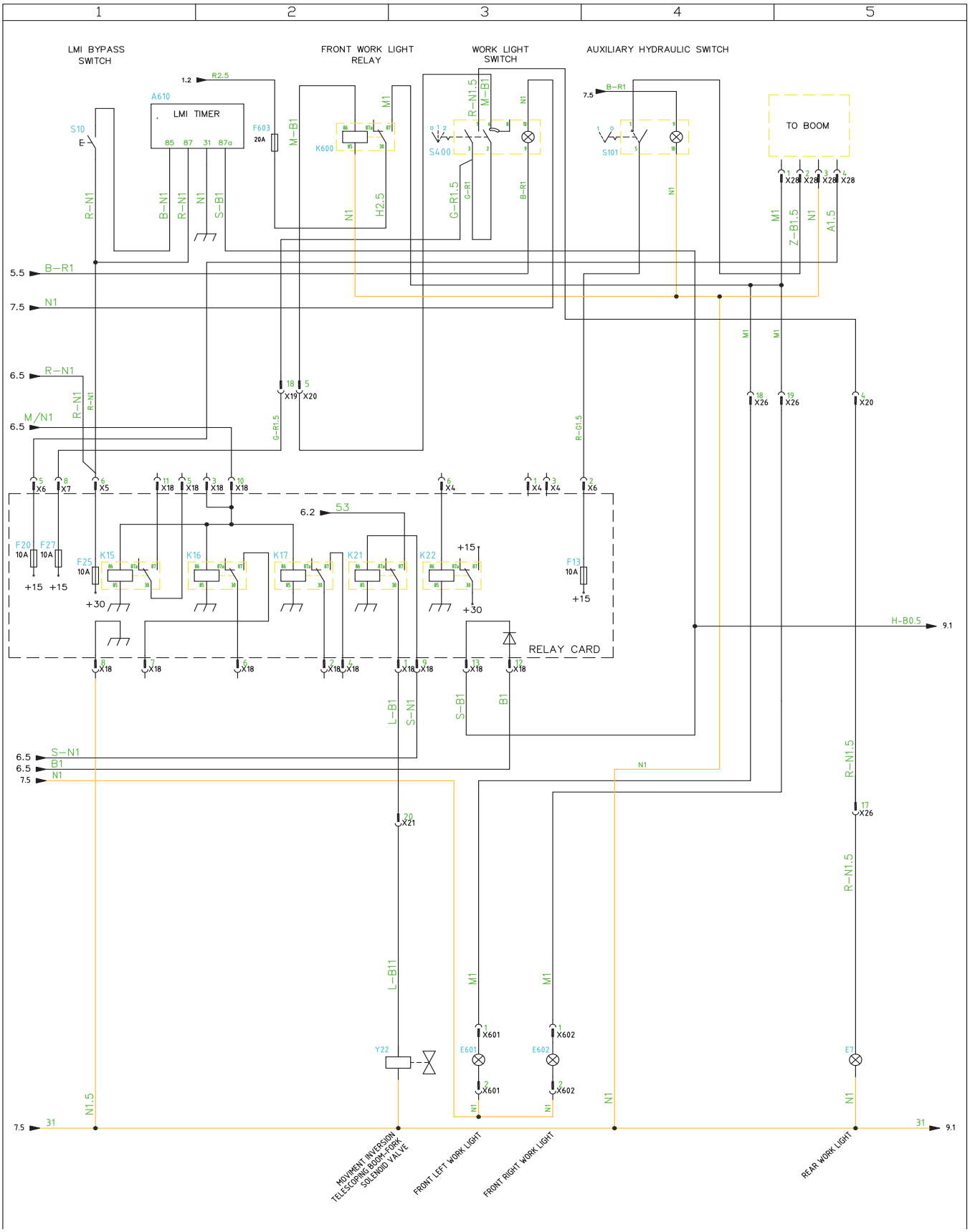
6/10

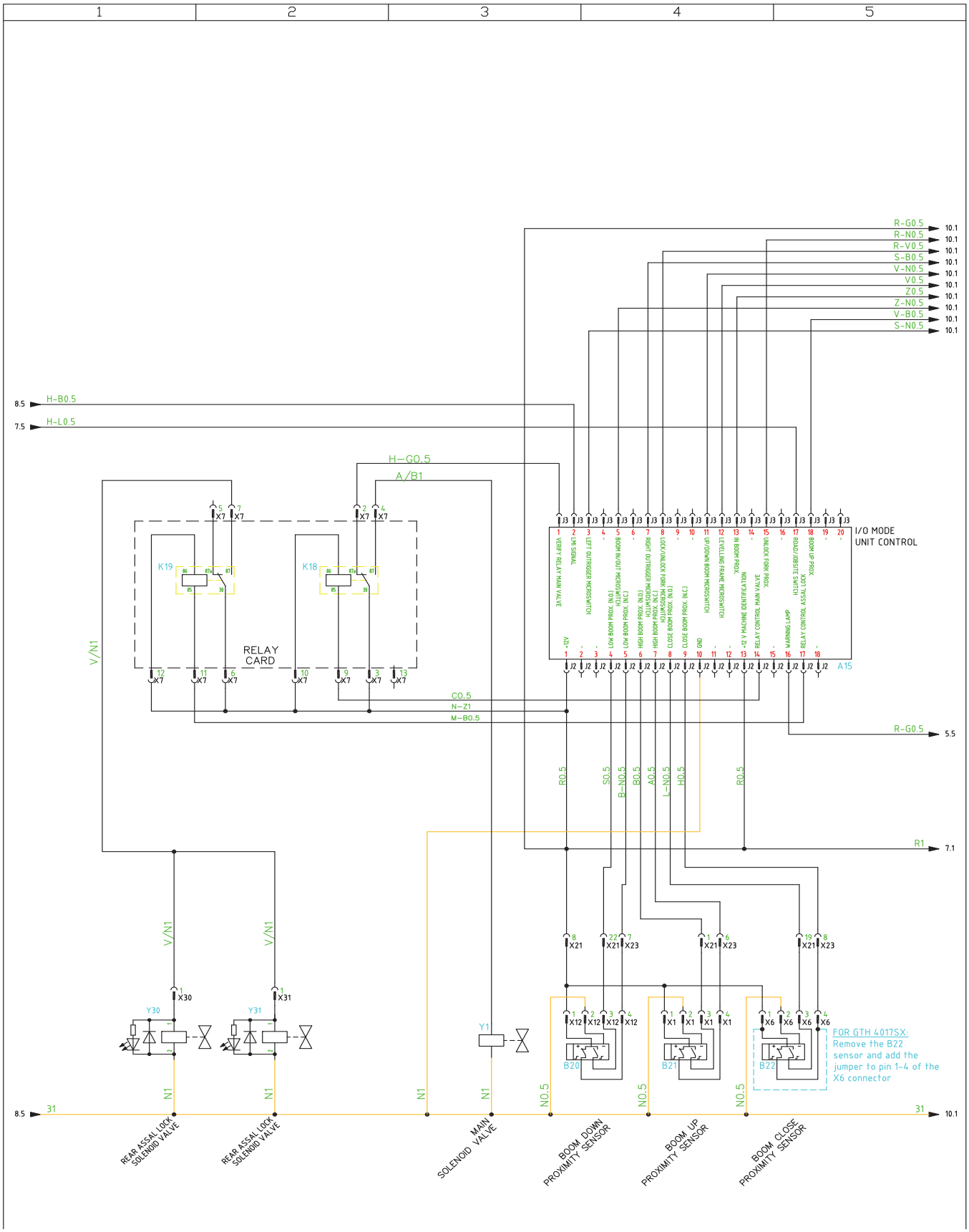

1
2
3
4
5
PARKING BRAKE
LMI SYSTEM
JOYSTICK
AIR CONDITIONIG SWITCH
S6a
S6b
SUPPLY POWER
GND
IN SIGN. LMI
IN SIGN. STAB. ABBASSATI
S200
D.F.E.
SUPPLY POWER D.F.E
S4
L–G1
N1
A–R1
S–G1
R–N1
B1
M–G1
S–N1
A–N1
A–V1.5
B–R1
B–R1.5
B1 8.1
R–N1 8.1
1.5 L–G1
5.5 N1
2.5 S–G1
5.3 A–V1.5
5.3 B–R1
N1 7.5
A–N1 7.1
S–N1 8.1
S3 8.2
F18
10A
+30
RELAY CARD
Z–R1 7.3
G–M1
S29
S28
B10
M18
M
S–L1
S–B1
N0.5
N1.5
5.5 31
31 7.1
LEFT OUTRIGGER MICROSWITCH
RIGHT OUTRIGGER MICROSWITCH
REAR WEELS ALIGNED SENSOR
AIR CONDITIONIG FAN MOTOR


1
2
3
4
5
STEERING MODES SELECTOR
CONTINUOUS FLOW ENABLING SWITCH
B–R1
C–V1
A–N1
N1
M–R1
H–V1
R1
Z–R1
V/B1
L/G1
C–V1.5
G–M1
Z–N1
V1
S22
S2
F26
10A
+30
K14
F5
10A
+15
RELAY CARD
A112
SUPPLY POWER
SUPPLY POWER
GND
STEERING MODES UNIT
C–N1.5
H–R1
Y21
Y20
CRAB STEERING SOLENOID VALVE
FOUR WHEELS STEERING SOLENOID VALVE
31

SCHEMES

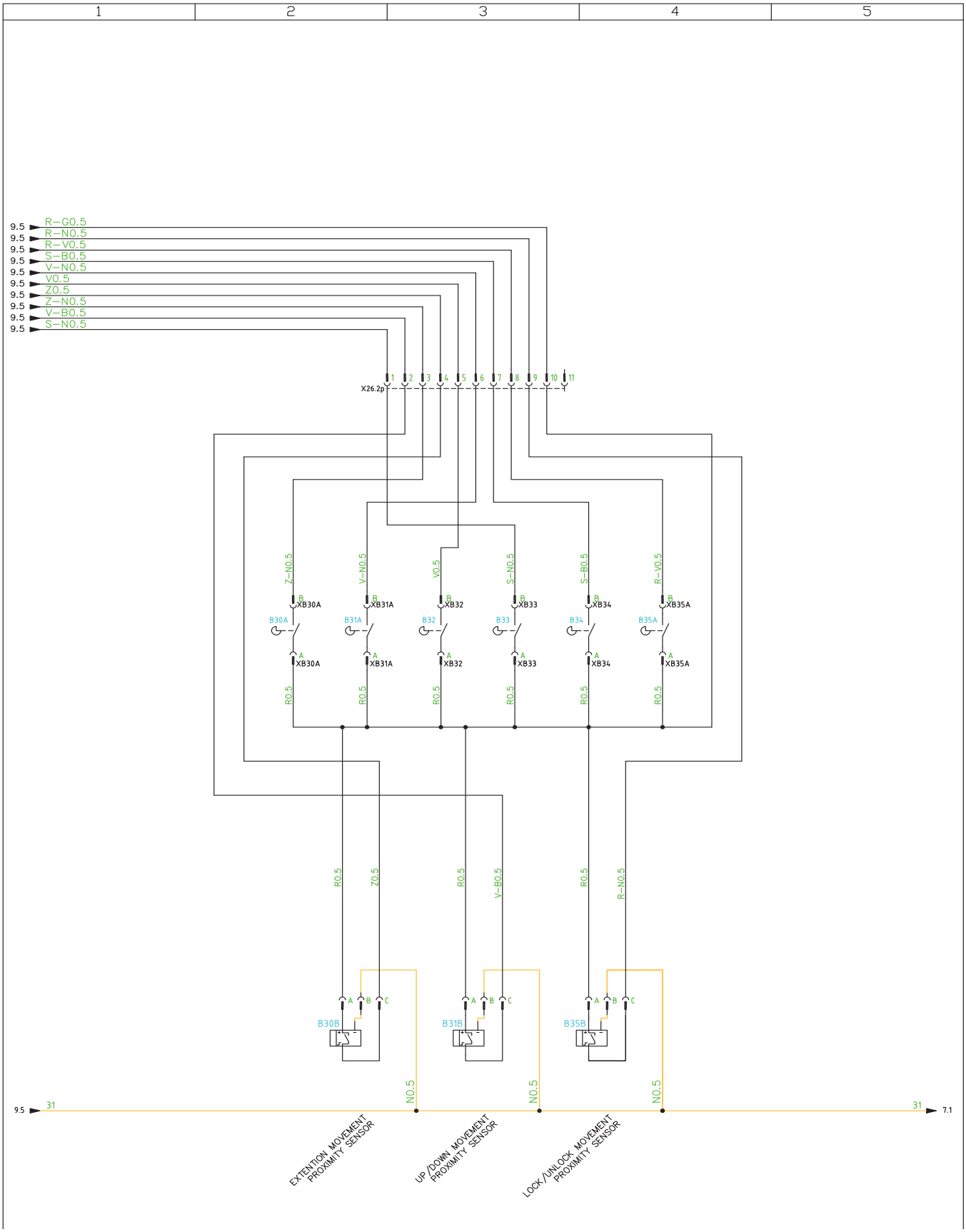
8/10


1
2
3
4
5
LMI BYPASS SWITCH
FRONT WORK LIGHT RELAY
WORK LIGHT SWITCH
AUXILIARY HYDRAULIC SWITCH
LMI TIMER
A610
TO BOOM
RELAY CARD
MOVIMENT INVERSION TELESCOPING BOOM-FORK SOLENOID VALVE
FRONT LEFT WORK LIGHT
FRONT RIGHT WORK LIGHT
REAR WORK LIGHT


1
2
3
4
5
R-G0.5
R-N0.5
R-V0.5
S-B0.5
V-N0.5
V0.5
Z0.5
Z-N0.5
V-B0.5
S-N0.5
10.1
8.5 H-B0.5
7.5 H-L0.5
H-G0.5
A/B1
V/N1
K19
K18
RELAY CARD
I/O MODE
UNIT CONTROL
A15
C0.5
N-Z1
M-B0.5
R-G0.5
5.5
R0.5
S0.5
B-N0.5
B0.5
A0.5
L-N0.5
H0.5
R0.5
R1
7.1
Y30
Y31
Y1
B20
B21
B22
FOR GTH 4017SX:
Remove the B22
sensor and add the
jumper to pin 1-4 of the
X6 connector
N1
N0.5
8.5 31
31 10.1
REAR ASSAL LOCK
SOLENOID VALVE
REAR ASSAL LOCK
SOLENOID VALVE
MAIN
SOLENOID VALVE
BOOM DOWN
PROXIMITY SENSOR
BOOM UP
PROXIMITY SENSOR
BOOM CLOSE
PROXIMITY SENSOR

SCHEMES

10/10



## 6.4.2.1 GENERAL WIRING DIAGRAM GTH 4013-SX GTH-4017 SX

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

| Item | Description | Sh |
|---|---|---|
| A1 | Alternator | 1.2 |
| A15 | Input/Output mode unit control | 9.4–9.5 |
| A11 | Trasmission controller | 2.3 |
| A16 | Incing pedal | 2.5 |
| A112 | Steering modes unit | 7.4 |
| A610 | LMI timer | 8.2 |
| B1 | Battery | 1.1 |
| B10 | Rear weels aligned sensor | 6.2 |
| B100 | Low boom sensor | 6.2 |
| B101 | High boom sensor | 6.4 |
| B11 | Hydraulic oil pressure switch | 1.5 |
| B12 | Fuel level gauge | 3.1 |
| B13 | Coolant thermistor | 1.5 |
| B14 | Coolant thermistor | 1.5 |
| B15 | Air filter clogged switch | 1.4 |
| B16 | Hydraulic oil temperature transducer | 3.1 |
| B17 | Hydraulic oil filter clogged switch | 5.2 |
| B20 | Boom down proximity sensor | 9.3 |
| B21 | Boom up proximity sensor | 9.4 |
| B22 | Boom close proximity sensor | 9.5 |
| B30B | Extention boom movement proximity sensor | 10.2 |
| B31B | Up/down boom movement proximity sensor | 10.3 |
| B35B | Lock/unlock boom movement proximity sensor | 10.4 |
| B30A | Boom extension main valve microswitch | 10.2 |
| B31A | Boom lowering main valve microswitch | 10.2 |
| B32 | Chassis levelling main valve microswitch | 10.3 |
| B33 | Outrigger left main valve microswitch | 10.3 |
| B34 | Outrigger right main valve microswitch | 10.4 |
| B35A | Lock/Unlock fork microswitch | 10.4 |
| B6 | Close boom sensor | 6.4 |
| B101 | High boom sensor | 6.4 |
| B111 | Hydraulic oil minimun level | 3.1 |
| B12a | Fuel reserve level | 3.1 |
| E7 | Rear work light | 8.5 |
| EV20 | Moviment inversion telescoping boom–fork solenoid valve | 8.3 |
| E601 | Front left work light | 8.3 |
| E602 | Front right work light | 8.3 |
| F1 | Fuse front windscreen wipers 10A | 4.3 |
| F2 | Fuse heating 15A | 5.3 |
| F3 | Fuse stop light microswitch 5A | 3.4 |
| F4 | Fuse rear–roof windscreen wiper 7.5A | 5.2 |
| F5 | Fuse continuous flow enablig relay, outrigger relay 10A | 7.2 |
| F6 | Fuse low beam light 15A | 3.2 |
| F7 | Fuse left position light 3A | 3.2 |
| F8 | Fuse control instruments lighting 3A | 3.3 |
| F9 | Fuse power supply ceck light 7.5A | 5.1 |
| F10 | Fuse road light switch 7.5A | 3.5 |
| F11 | Fuse flashing beacon 7.5A | 5.2 |
| F12 | Fuse stop light 10A | 3.4 |
| F13 | Fuse auxiliary hydraulic switch 10A | 8.3 |
| F14 | Fuse forward/reverse lever 10A | 2.3 |
| F15 | Fuse high beam light 10A | 3.3 |
| F16 | Fuse hazard warning light 15A | 4.4 |
| F17 | Fuse road light 10A | 3.5 |
| F18 | Fuse outriggers 10A | 6.2 |
| F19 | Fuse trasmission controller 10A | 2.3 |
| F20 | Fuse boom attachments 10A | 8.1 |
| F21 | Fuse horn 15A | 3.4 |
| F22 | Fuse optional | 1.2 |
| F23 | Fuse interior cabin light 10A | 5.3 |
| F24 | Fuse emergency stop switch 10A | 1.1 |
| F25 | Fuse LMI unit 10A | 8.1 |
| F26 | Fuse continuous flow enabling switch 10A | 7.1 |
| F27 | Fuse rear work ligths 10A | 8.1 |
| F5G | Fuse fuel pump 15A | 1.2 |
| F1G | Fuse relay starter engine 30A | 1.2 |
| F4G | Fuse glow plugs 60A | 1.1 |
| F3G | Fuse cabin relay card 60A | 1.1 |
| F2G | Fuse engine ignition key 40A | 1.1 |
| F603 | Fuse front work light 20A | 8.2 |
| H31 | Diagnostic light | 2.4 |
| H20 | Horn | 3.4 |
| H21 | Front left road light | 3.2 |
| H22 | Front right road light | 3.2 |
| H23 | Rear left road light | 3.3 |
| H24 | License plate light | 3.3 |
| H25 | Back–up buzzer | 2.2 |
| H26 | Rear right road light | 3.3 |
| H113 | Hydraulic oil filter light | 5.3 |
| H114 | Hydraulic oil low level light | 3.1 |
| K1 | Relay high beam | 3.2 |
| K2 | Relay low beam | 3.2 |
| K3 | Reley claxon | 3.4 |
| K4 | Relay power supply gear switch | 3.3 |
| K5 | Relay optional | 2.4 |
| K6 | Relay optional | 2.2 |
| K7 | Relay transmission forward mode | 2.1 |
| K8 | Relay transmission reverse mode | 2.2 |
| K9 | Relay stop transmission | 2.3 |
| K01 | Relay preheating glow plugs | 1.2 |
| K02 | Relay start engine | 1.2 |
| K04 | Relay stop engine | 1.3 |
| K10 | Relay stop transmission | 2.4 |
| K11 | Relay start abilitation | 1.2 |
| K12 | Relay optional | |
| K13 | Relay optional | |
| K14 | Relay outrigger | 7.1 |
| K15 | Relay optional | 8.1 |

| Item | Description | Sh |
|---|---|---|
| K16 | Relay optional | 8.2 |
| K17 | Relay optional | 8.2 |
| K18 | Relay outrigger | 9.2 |
| K19 | Relay LMI | 9.1 |
| K20 | Relay hig boom | 8.3 |
| K21 | Relay Tilt/Ext. exchange movement | 8.2 |
| K22 | Relay optional | 8.3 |
| K23 | Relay timer | 4.5 |
| K24 | Relay timer | 2.3 |
| K600 | Front work light relay | 8.2 |
| K611 | Relay boom | 6.3 |
| M1 | Starter engine | 1.1 |
| M3 | Cabin roof windscreen wiper | 5.2 |
| M4 | Cabin rear windscreen wiper | 5.4 |
| M5 | Heating fan | 5.5 |
| M13 | Windscreen wiper motor | 4.3 |
| M18 | Air conditioning fan motor | 6.5 |
| M9 | Fuel pump | 1.3 |
| M10 | Hydraulic pump | 2.4 |
| M91 | Windscreen washer pump | 4.4 |
| P1 | Engine water meter | 1.5 |
| P2 | Hydraulic oil temperature meter | 3.2 |
| P3 | Fuel level meter | 3.1 |
| P4 | Counter | 1.2 |
| P5 | Diagnostic light panel | 1.3 |
| P6 | Diagnostic light panel | 5.1 |
| R1 | Load resistor | 1.2 |
| R2 | CAN–BUS resistor 1200 OHM | 2.1 |
| R32 | CAN–BUS resistor 1200 OHM | 2.2 |
| R17 | Glow plugs | 1.2 |
| S2 | Continuous flow enabling switch | 7.3 |
| S4 | Air conditionig switch | 6.4 |
| S10 | LMI bypass switch | 8.1 |
| S11 | Engine ignition key | 1.1 |
| SX11 | Road lights selector lever | 4.2 |
| SX12 | Forward–reverse lever | 2.1 |
| S29 | Left outrigger microswitch | 6.1 |
| S28 | Right outrigger microswitch | 6.2 |
| S101 | Auxiliary hydraulic switch | 8.4 |
| S13 | Emergency stop | 1.3 |
| S14 | Hydraulic oil brake low pressuse switch | 5.2 |
| S16 | Warning switch | 4.5 |
| S19 | Road lights switch | 3.4 |
| S20 | Cabin fan switch | 5.4 |
| S21 | Remouving battery | 1.1 |
| S22 | Steering modes selector | 7.2 |
| S54 | Emergency stop | 1.3 |
| S6a | Parking brake microswitch | 6.1 |
| S6b | Parking brake microswitch | 6.1 |
| S200 | Joystick | 6.3 |
| S400 | Work light switch | 8.4 |
| E101 | Flashin beacon | 5.2 |
| E102 | Cabin Interior light | 5.3 |
| Y00 | Engine stop solenoid valve | 1.3 |
| Y01 | Transmission forward mode solenoid valve | 2.1 |
| Y02 | Transmission reverse mode solenoid valve | 2.2 |
| Y04 | Parking brake solenoid valve | 2.5 |
| Y10 | Dead man solenoid valve | 7.5 |
| Y20 | Four wheels steering solenoid valve | 7.3 |
| Y21 | Crab steering solenoid valve | 7.3 |
| Y22 | Moviment inversion telescoping boom–fork solenoid valve | 8.3 |
| Y30 | Rear assal lock solenoid valve | 9.1 |
| Y31 | Rear assal lock solenoid valve | 9.2 |
| X122 | Additional fuel | 1.3 |

| COLOR WIRE LEGEND | |
|---|---|
| A | LIGHT BLUE |
| B | WHITE |
| C | ORANGE |
| D | YELLOW |
| H | GREY |
| L | BLUE |
| M | BROWN |
| N | BLACK |
| R | RED |
| S | PINK |
| V | GREEN |
| Z | PURPLE |

REMARK: Two colorwires are indicated through a combination of the aforesaid initials as follows:
G/V= YELLOW/GREEN (crosswise colouring)
G-V= YELLOW-GREEN (lengthswise colouring)

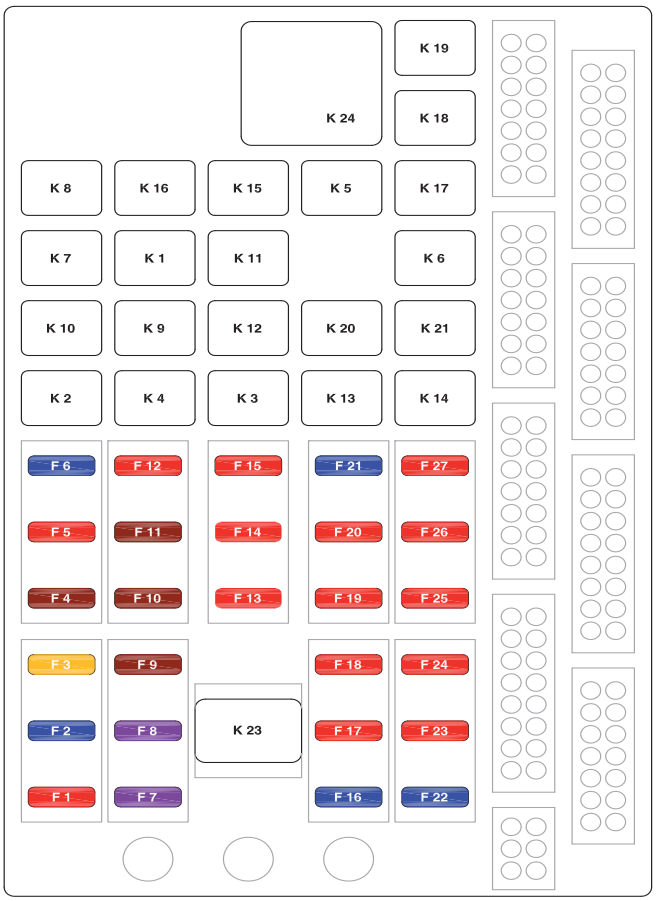
| CONNECTORS | |
|---|---|
| X1 | Plug–in Conn. Light |
| X11 | Plug–in Conn. 13 Way Mark |
| X12 | Plug–in Conn. 5 Way Mark |
| X13 | Plug–in Conn. 6 Way |
| X16 | Plug–in Conn. 13 Way Mark |
| X17 | Plug–in Conn. 17 Way Mark |
| X18 | Plug–in Conn. 13 Way Mark |
| X19 | Plug–in Conn. 21 Way Mark |
| X2 | Plug–in Conn. Light |
| X20 | Plug–in Conn. 17 Way Mark |
| X21 | Plug–in Conn. 40 Way Tipe B Deutsch |
| X22 | Plug–in Conn. 12 Way Deutsch |
| X25 | Plug–in Conn. 8 Way |
| X26 | Plug–in Conn. 17 Way Mark |
| X26.2p | Plug–in Conn. 11 Way Mark |
| X28 | Plug–in Conn. 4 Way Deutsch |
| X29 | Plug–in Conn. 24 Way Deutsch |
| X30 | Plug–in Conn. 2 Way |
| X31 | Plug–in Conn. 2 Way |
| X34 | Plug–in Conn. 2 Way 90° |
| X4 | Plug–in Conn. 9 Way Mark |
| X5 | Plug–in Conn. 11 Way Mark |
| X29 | Plug–in Conn. 4 Way Deutsch |
| X28 | Plug–in Conn. 4 Way Deutsch |
| X53 | Plug–in Conn. 3 Way Deutsch |
| X6 | Plug–in Conn. 17 Way Mark |
| X7 | Plug–in Conn. 9 Way Mark |
| X8 | Plug–in Conn. 5 Way Mark |
| X9 | Plug–in Conn. 13 Way Mark |
| X91 | Plug–in Conn. 2 Way 90° |
| XH25 | Plug–in Conn. 6 Way Deutsch |
| XH24 | Plug–in Conn. 6 Way Deutsch |
| XH9S | Plug–in Conn. 6 Way Deutsch |
| XH28 | Plug–in Conn. 6 Way Deutsch |
| XM3 | Plug–in Conn. 2 Way |
| XM5 | Plug–in Conn. 4 Way |
| XP1 | Plug–in Conn. 6 Way |
| XP2 | Plug–in Conn. 6 Way |
| XP3 | Plug–in Conn. 6 Way |
| XV1 | Plug–in Conn. 3 Way |
| XB30 | Plug–in Conn. 2 Way Deutsch |
| XB31 | Plug–in Conn. 2 Way Deutsch |
| XB32 | Plug–in Conn. 2 Way Deutsch |
| XB33 | Plug–in Conn. 2 Way Deutsch |
| XB34 | Plug–in Conn. 2 Way Deutsch |
| X33 | Plug–in Conn. 2 Way |
| X32 | Plug–in Conn. 2 Way |
| XRES | Plug–in Conn. 2 Way |
| XC1 | Plug–in Conn. 12 Way |
| XC2 | Plug–in Conn. 12 Way |
| X15 | Plug–in Conn. 18 Way |

SCHEMES

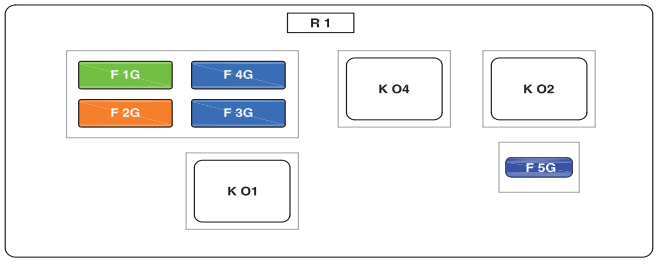
## 6.4.2.2 FUSES AND RELAYS GTH-4013 SX GTH-4017 SX

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

FUSES AND RELAYS CABIN CARD

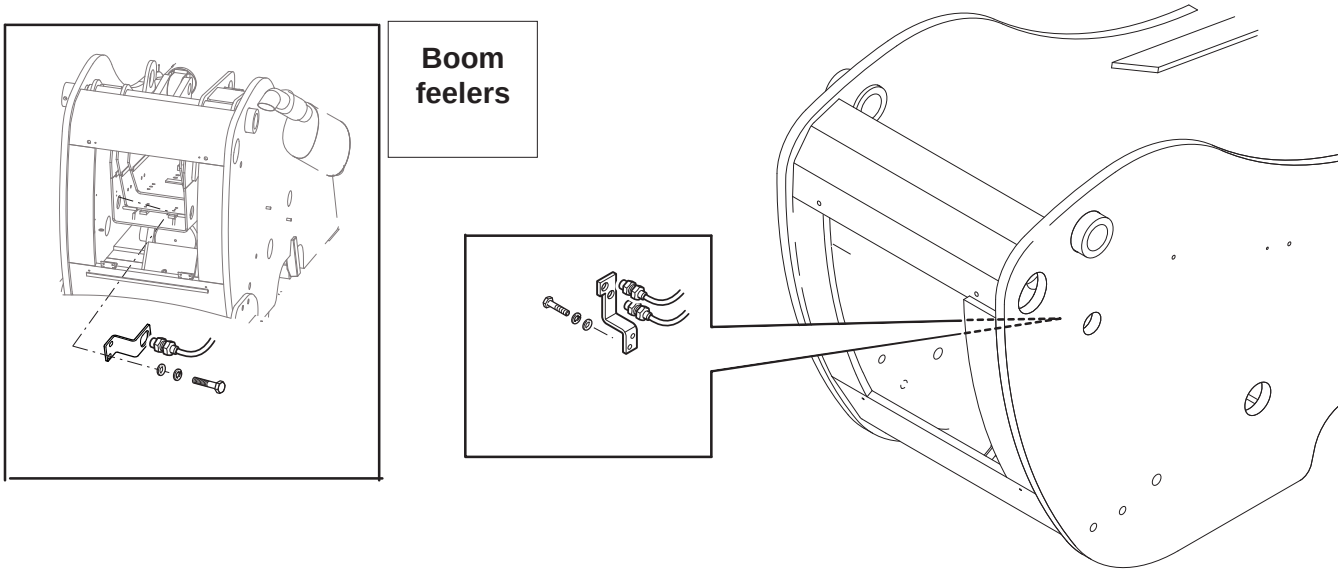


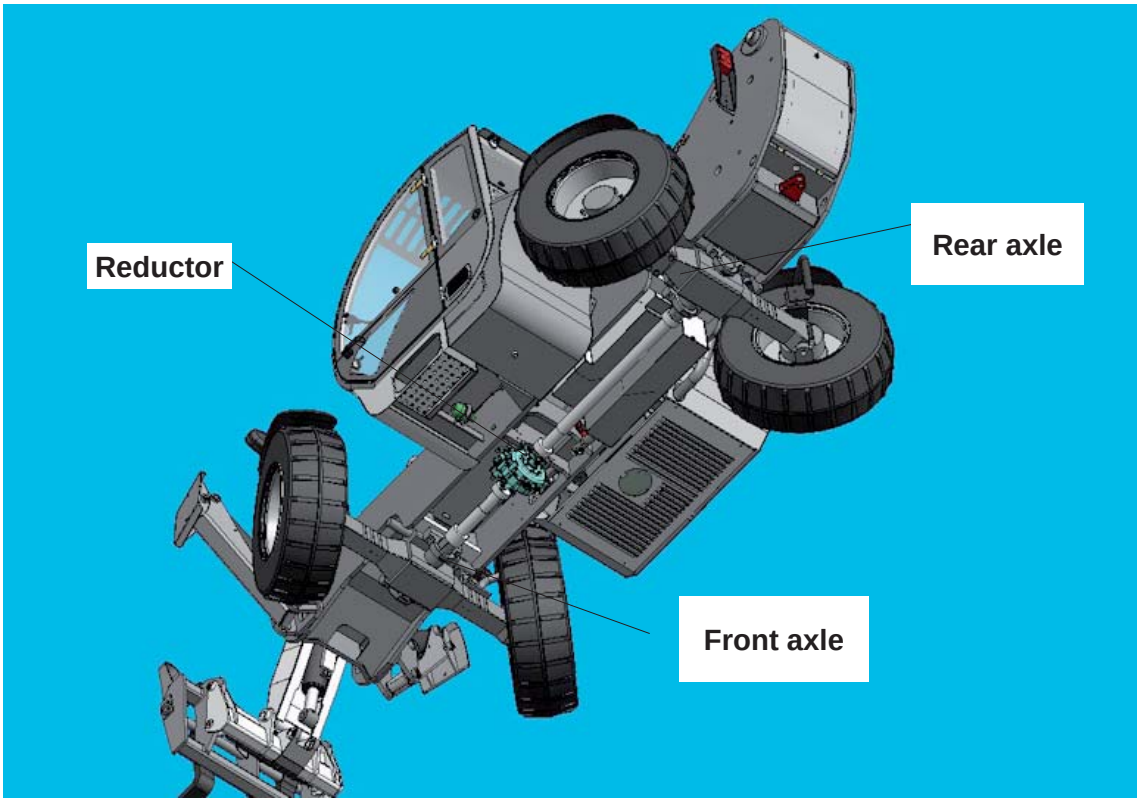

FUSES AND RELAYS MOTOR CARD



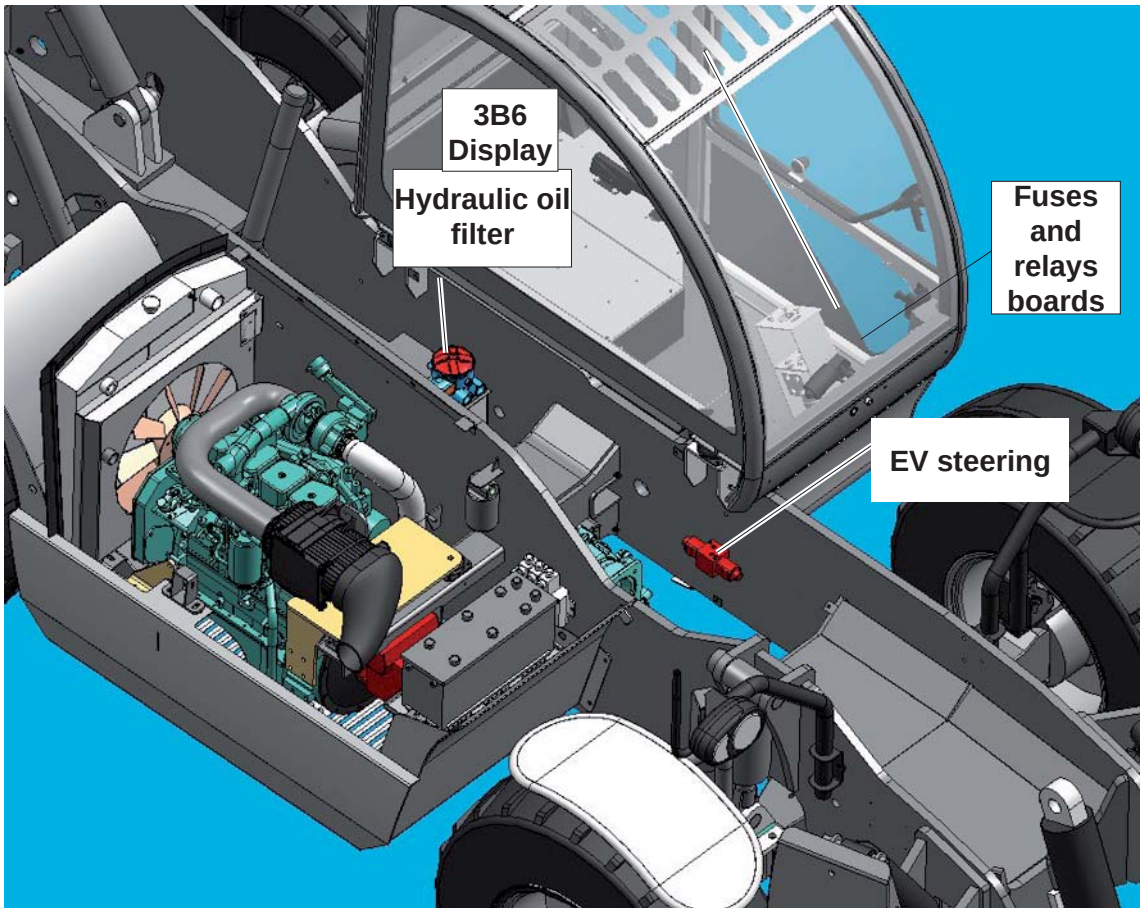

PARTS LEGEND

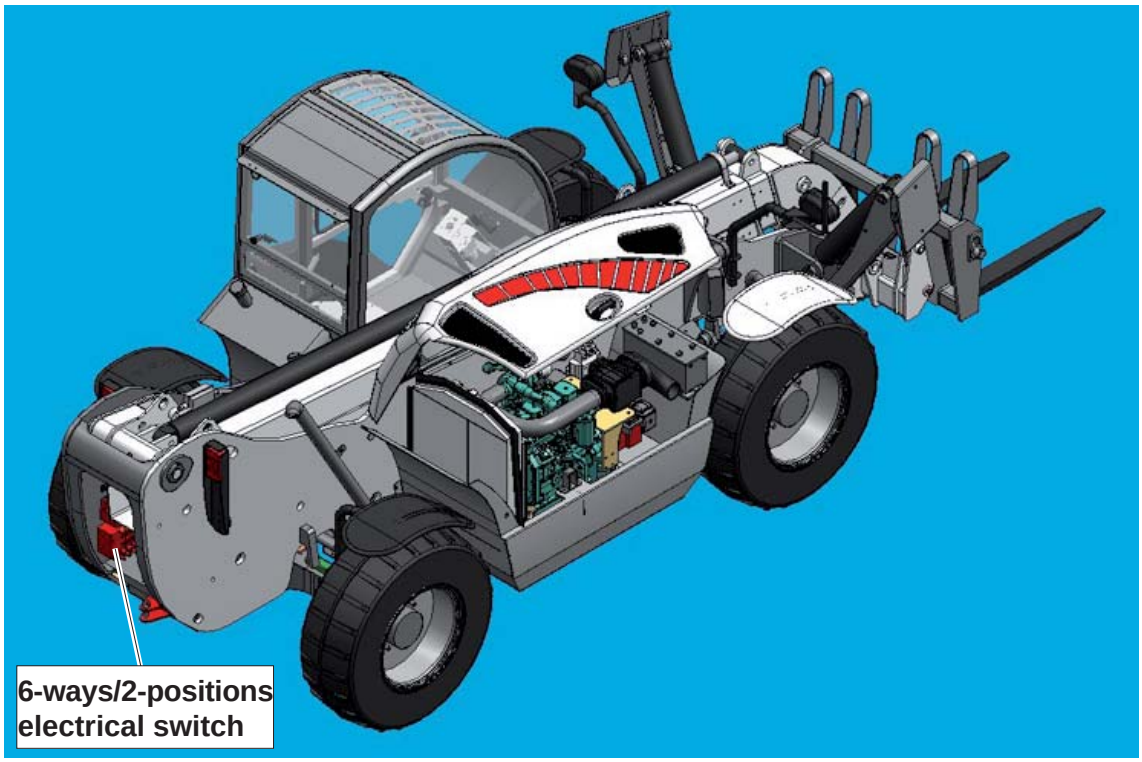
| Ref. | DESCRIPTION | AMP. |
|---|---|---|
| F1 | FRONT WINDSCREEN WIPERS | 10A |
| F2 | HEATING | 15A |
| F3 | STOP LIGHT MICROSWITCH | 5A |
| F4 | REAR WINDSCREEN WIPER<br>ROOF WINDSCREEN WIPER | 7.5A |
| F5 | CONTINUOUS FLOW ENABLIG SWITCH RELAY<br>OUTRIGGER RELAY | 10A |
| F6 | LOW BEAM LIGHT | 15A |
| F7 | POSITION LIGHT | 3A |
| F8 | CONTROL INSTRUMENTS LIGHTING | 3A |
| F9 | POWER SUPPLY CECK LIGHT | 7.5A |
| F10 | ROAD LIGHT SWITCH | 7.5A |
| F11 | FLASHING BEACON | 7.5A |
| F12 | STOP LIGHT | 10A |
| F13 | AUXILIARY HYDRAULIC SWITCH | 10A |
| F14 | FORWARD/REVERSE LEVER | 10A |
| F15 | HIGH BEAM LIGHT | 10A |
| F16 | HAZARD WARNING LIGHT | 15A |
| F17 | ROAD LIGHT | 10A |
| F18 | OUTRIGGERS | 10A |
| F19 | TRASMISSION CONTROLLER | 10A |
| F20 | +12V ON THE BOOM | 10A |
| F21 | HORN | 15A |
| F22 | OPTIONAL | 15A |
| F23 | CABIN INTERIOR LIGHT | 10A |
| F24 | EMERGENCY STOP SWITCH | 10A |
| F25 | LMI UNIT | 10A |
| F26 | CONTINUOUS FLOW ENABLING SWITCH | 10A |
| F27 | WORK LIGHTS | 15A |
| F5G | FUEL PUMP | 15A |
| F1G | RELAY STARTER ENGINE | 30A |
| F4G | GLOW PLUGS | 60A |
| F3G | CABIN FUSE–RELAY CARD | 60A |
| F2G | ENGINE IGNITION KEY | 40A |
| K01 | PREHEATING GLOW PLUGS | |
| K02 | START ENGINE | |
| K04 | STOP ENGINE | |
| K1 | HIGH BEAM LIGHT | |
| K2 | LOW BEAM LIGHT | |
| K3 | HORN | |
| K4 | POWER SUPPLY FORWARD/REVERSE LEVERE | |
| K5 | OPTIONAL | |
| K6 | OPTIONAL | |
| K7 | TRANSMISSION FORWARD MODE | |
| K8 | TRANSMISSION REVERSE MODE | |
| K9 | STOP TRANSMISSION | |
| K10 | STOP TRANSMISSION | |
| K11 | START ABILITATION | |
| K12 | OPTIONAL | |
| K13 | OPTIONAL | |
| K14 | OUTRIGGERS | |
| K15 | OPTIONAL | |
| K16 | – | |
| K17 | OPTIONAL | |
| K18 | OUTRIGGERS | |
| K19 | LMI | |
| K20 | HIGH BOOM | |
| K21 | TILT/EXT. EXCHANGE MOVIMENT | |
| K22 | OPTIONAL | |
| K23 | TIMER | |
| K24 | TIMER | |
| R1 | LOAD RESISTOR | |

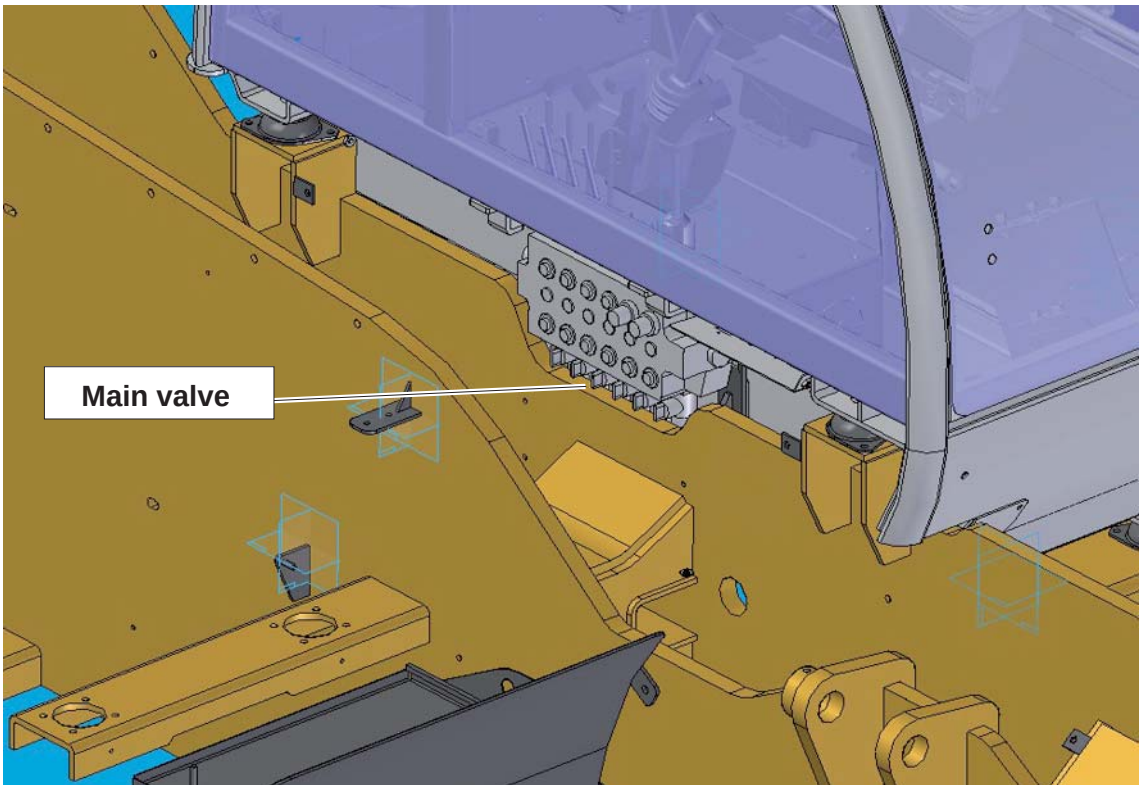

Boom
feelers

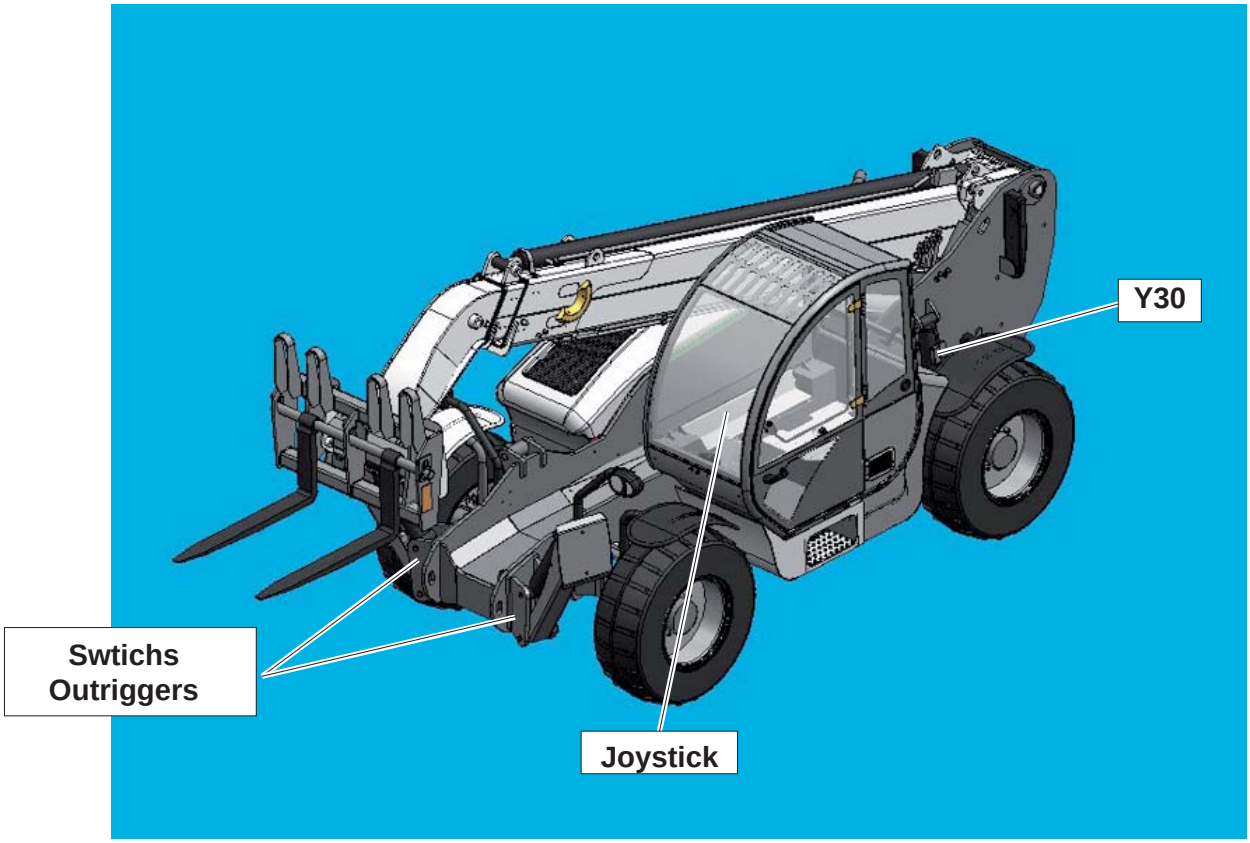

Reductor
Rear axle
Front axle

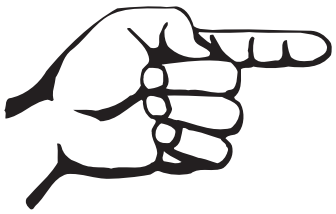
SCHEMES


3B6
Display
Hydraulic oil
filter
Fuses
and
relays
boards
EV steering


6-ways/2-positions
electrical switch


Main valve


Y30
Swtichs
Outriggers
Joystick



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# Repair Procedures

## 7.1 TIME SCHEDULE

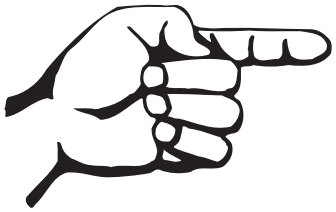
| Job | Operators needed | Expected time (h) |
|---|---|---|
| change the ignition key | 1 | 1,30 |
| change the speed selector | 1 | 1,00 |
| change the lights and horn selector | 1 | 1,00 |
| change the overload warning system display | 1 | 1,00 |
| re-calibrate the 3B6 system | 1 | 1,00 |
| change the load cell | 1 | 2,00 |
| change the overload warning system display and calibrate | 1 | 1,00 |
| change the joystick levers | 1 | 1,00 |
| change the joystick movement switch pushbutton | 1 | 1,00 |
| change the brake pump | 1 | 1,30 |
| change the low boom micro-switch | 1 | 0,30 |
| change the high boom micro-switch | 1 | 0,30 |
| change the boom lifting cylinder | 2 | 2,15 cad. |
| change the boom lifting cylinder kit (complete overhaul) | 1 | 2,00 |
| change the block valve of the boom lifting cylinder | 1 | 1,00 |
| change the cylinder inside the boom | 2 | 2,50 cad. |
| change the extension cylinder kit inside the boom | 1 | 2,30 |
| change the block valve of the extension cylinder inside the boom | 1 | 1,00 |
| change the extension cylinder on the boom | 2 | 1,00 cad. |
| change the extension cylinder kit on the boom | 1 | 1,30 |
| change the valve of the extension cylinder on the boom | 1 | 0,30 |
| change the re-sequencing valve of the extension cylinder inside the boom | 1 | 2,30 |
| change the re-sequencing valve of the extension cylinder on the boom | 1 | 2,30 |
| change the fork pitching cylinder | 1 | 1,30 |
| change the fork pitching cylinder kit | 1 | 1,30 |
| change the valve of the fork pitching cylinder | 1 | 0,30 |
| change locking fork cylinder | 1 | 1,00 |
| change locking fork cylinder kit | 1 | 1,30 |
| change block valve of the attachment locking cylinder | 1 | 1,00 |
| change the outrigger up/down movement cylinder | 1 | 1,30 |
| change the outrigger up/down movement cylinder kit | 1 | 1,30 |

REPAIR PROCEDURES

| Job | Operators needed | Expected time (h) |
|---|---|---|
| change the valve of the outrigger up/down movement cylinder | 1 | 1,00 |
| change fork levelling control cylinder | 1 | 3,00 |
| change fork levelling control cylinder kit | 1 | 1,30 |
| change fork levelling control cylinder valve | 1 | 1,00 |
| check the one-way valves of the fork levelling control cylinder | 1 | 1,00 |
| change the right/left machine levelling cylinder | 1 | 2,00 |
| change the right/left machine levelling cylinder kit | 1 | 2,00 |
| change the right/left machine levelling cylinder valve | 1 | 1,00 |
| change the boom internal line for the boom extension | 1 | 1,30 |
| change the boom internal line for the fork pitching | 1 | 2,30 |
| change the boom internal line for the fork locking | 1 | 2,30 |
| change the boom pads | 1 | 3,00 |
| check the transmission pump pressure | 2 | 1,00 cad. |
| check the main valve pressure of the boom movement control | 2 | 1,00 cad. |
| check the brake pump pressure and the hydraulic drive | 1 | 1,00 |
| check the safety valves | 1 | 1,00 |
| change the drive pump | 1 | 3,00 |
| change the drive motor | 1 | 3,00 |
| change transmission motor, transmission pump, transmission hoses and test | 1 | 6,00 |
| change main valve control pump | 1 | 1,30 |
| change main valve and calibration test | 1 | 2,00 |
| change the pump on the engine distribution | 1 | 1,00 |
| change boom movement switch | 1 | 1,00 |
| change fuses and relays | 1 | 0,15 cad. |
| change the wiper motor | 1 | 1,00 |
| change the solenodi valves | 1 | 1,00 |
| change the throttle pedal with rope | 1 | 1,00 |
| change the manual throttle complete with cord | 1 | 1,00 |
| change the front axle shaft | 1 | 3,00 |
| change the rear axle shaft | 1 | 3,00 |
| change 1 cardan joint | 1 | 1,00 |
| change the cardan joints | 1 | 2,00 |
| change the axle shaft hub | 1 | 1,30 |
| change the boom assy | 2 | 5,00 cad. |

| Job | Operators needed | Expected time (h) |
|---|---|---|
| change the boom anchoring pin | 2 | 1,00 cad. |
| change the attachment locking cylinder pins | 1 | 1,00 |
| change the outrigger cylinder pin | 1 | 1,00 |
| change a cab pushbutton | 1 | 1,00 |
| change and test the actuator pressure relief valve or the sliders | 1 | 1,00 |
| change and test the actuator safety valve | 1 | 1,00 |
| change one-way valve | 1 | 1,00 |
| change the maxi-fuses and search for troubles | 1 | 1,00 |
| bleed the braking system | 2 | 1,00 cad. |
| change the return filter of the hydraulic oil tank | 1 | 1,00 |
| change the hydrostatic steering unit | 1 | 2,00 |
| change the flashing beacon | 1 | 0,30 |
| change the battery | 1 | 1,00 |
| change the exhaust pipe | 1 | 1,00 |
| change the mud-guard supports | 1 | 1,00 |
| change the mud-guard | 1 | 1,00 |
| change the parking brake cord | 1 | 1,00 |
| change the steering wheel | 1 | 1,00 |
| dismantle the hydraulic oil tank | 2 | 2,30 cad. |
| dismantle the fuel tank | 2 | 2,00 cad. |
| change a wheel (n° 1) | 1 | 1,00 |
| change the rear axle locking cylinder | 1 | 1,00 |
| change the outriggers | 1 | 1,00 |
| change flexible hoses | 1 | 0,30 |
| change the parking brake lever | 1 | 1,00 |

REPAIR PROCEDURES



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TABLE 001

| Procedure: **Cylinder disassembly**<br>**Boom raising cylinder** | Table: ***001***<br>**GTH-4013 SX**<br>**GTH-4017 SX** | kg | 76 |
|---|---|---|---|
| | | | Hours / Min. |
| **Bridge crane, payload 5000 kg**<br>**Textile bridles or chains with hooks** | Standard tools<br>Adjustable stands | | 2 / 30 |
| | | | 1 |

**Operation:**

**1** Release the attachment

**2** Anchor the attachment holding frame to the hooks of the slinging chain




**3** Raise the boom to max. height (the hinging pin of the cylinder rod must be over the driving cabin) operating alternately the bridge crane and the hydraulic boom raising control of the machine

**4** Stop raising when the slinging chains are slightly under tension

**5** Place a container of suitable size under the hydraulic piping before disconnecting

PROTECT THE ENVIRONMENT

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

**6** With a 24 mm wrench, disconnect two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.

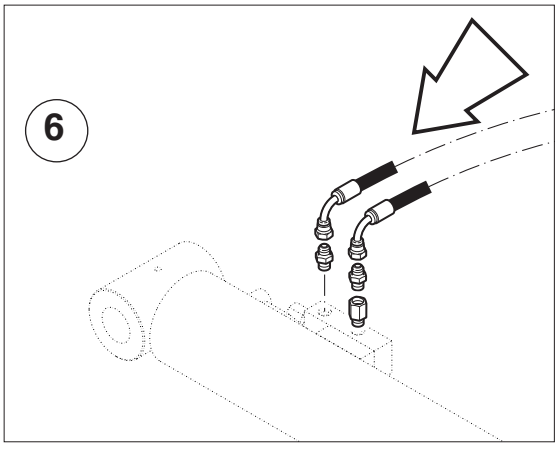


TABLE 001

| Procedure: | Table: 001 |
|---|---|
| **Cylinder disassembly**<br>**Boom raising cylinder** | **GTH-4013 SX**<br>**GTH-4017 SX** |

**7** To move the boom using the up/down controls of the bridge crane, previously disconnect the rod of the fork balance cylinder

**8** Remove the screw fixing the pitching cylinder pin with two 13 mm wrenches

**9** Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

**10** Fix the balance cylinder to the cabin with a sling and ensure it does not hinder the movement of the boom

**11** Secure the raising cylinder to the boom with a sling

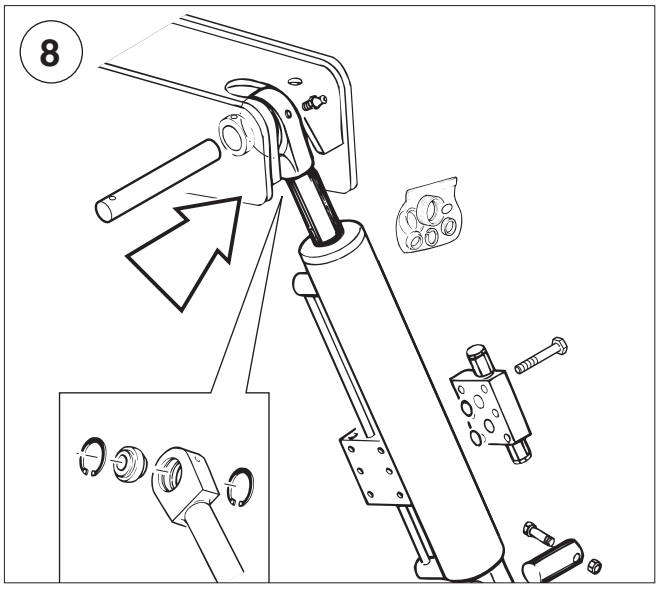






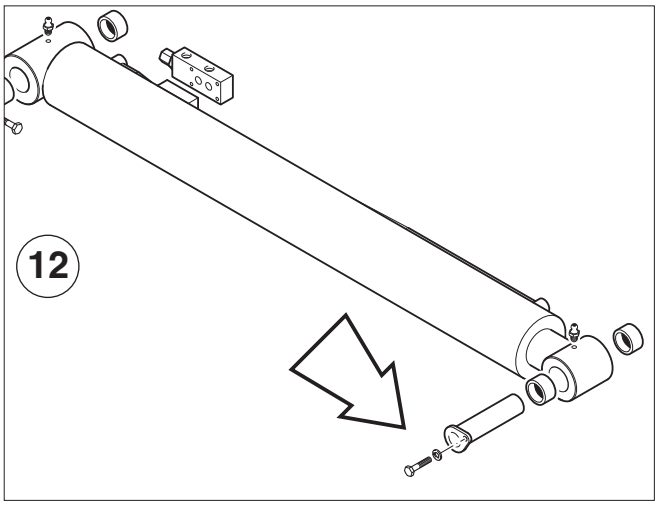





TABLE 001

| Procedure: | Table: |
|---|---|
| **Cylinder disassembly**<br>**Boom raising cylinder** | ***001***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |

**12** Remove the screw which fixes the rod pin to the boom using two 19 mm wrenches




**13** Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

**14** Put two wooden plugs, each 100mm high, on the oil tank to support the raising cylinder

**15** Lower the boom until the cylinder rests on the supporting plugs previously positioned

**16** Untie the sling fixing the cylinder to the boom, then raise the boom with the bridge crane to go on working




**17** Remove the screw which fixes the bottom-side pin of the cylinder using two 19 mm wrenches

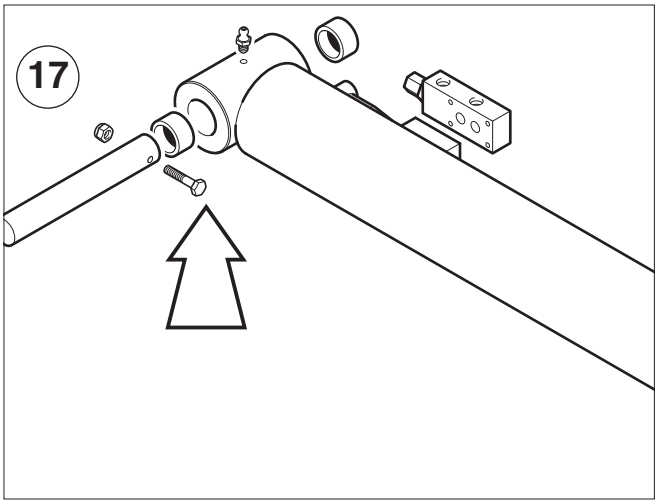


TABLE 001

| Procedure: | Table: 001 |
|---|---|
| **Cylinder disassembly**<br>**Boom raising cylinder** | **GTH-4013 SX**<br>**GTH-4017 SX** |

**18** Knock out the pin using a plug of soft material (aluminium, copper, wood, etc.) and extract it through the hole on the frame

**19** Lower the boom onto the adjustable stand to remove the slinging chains

**20** Sling the cylinder with a textile bridle and remove it from the machine using the bridge crane




**CAUTION**

***To reassemble the cylinder, repeat the steps above in reversed order.***
***Remember to set the circuit under pressure before releasing the bridge crane.***

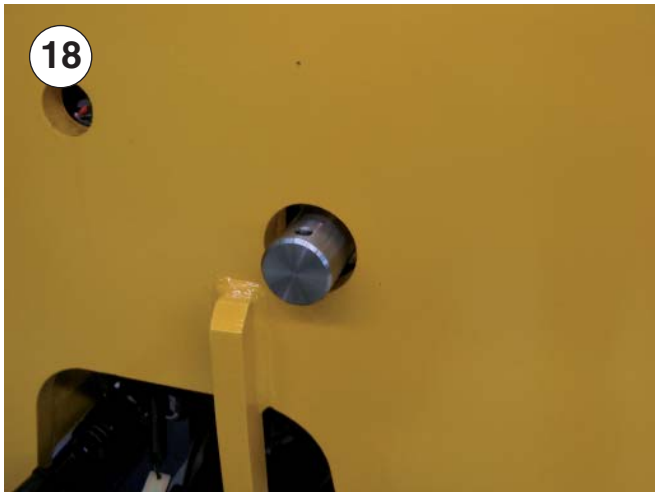


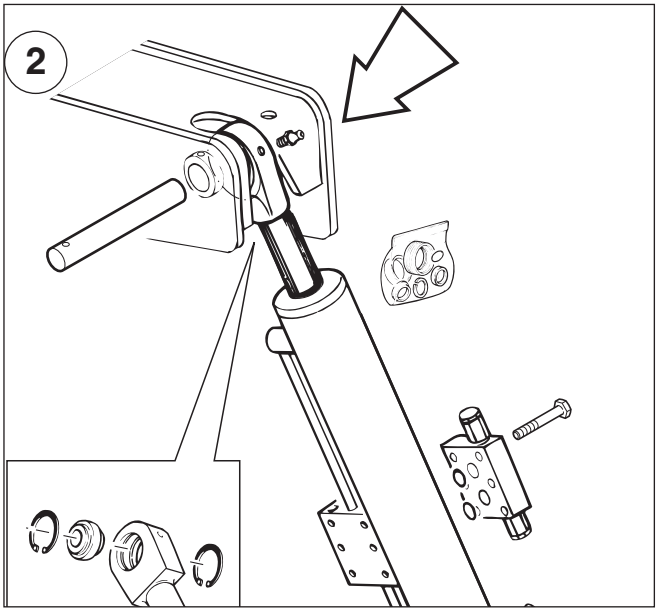
TABLE 002

| Procedure: **Cylinder disassembly Fork balance cylinder** | Table: **002** GTH-4013 SX GTH-4017 SX | kg | 26 |
|---|---|---|---|
| | | | Hours / Min. |
| Bridge crane, payload 500 kg<br>Textile bridles or chains with hooks | Standard tools<br>Adjustable stands | | 2 / - |
| | | | 1 |

**Operation:**

**1** Release the attachment

**2** Remove the screw fixing the rod pin with two 13 mm wrenches




**3** Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)



TABLE 002

| Procedure: | Cylinder disassembly<br>Fork balance cylinder | Table: 002<br>GTH-4013 SX<br>GTH-4017 SX |
|---|---|---|

**4** Fix the cylinder with a textile bridle connected to the bridge crane to support its weight

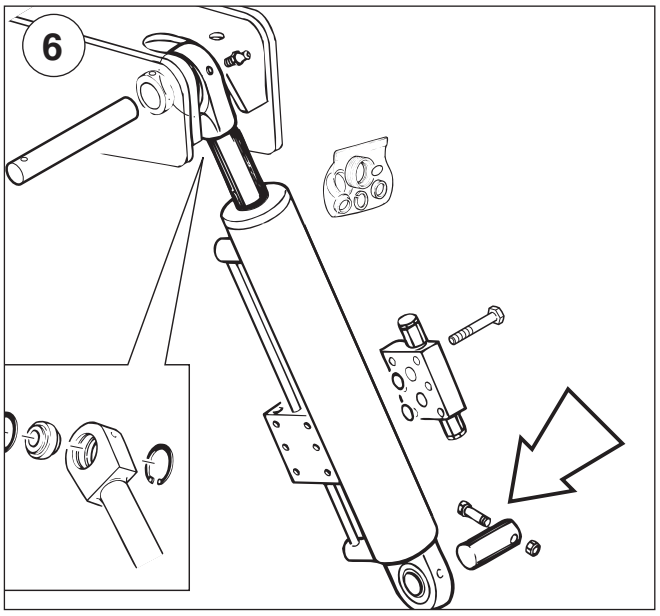



**5** Place a container of suitable size under the hydraulic piping before disconnecting

PROTECT THE ENVIRONMENT

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

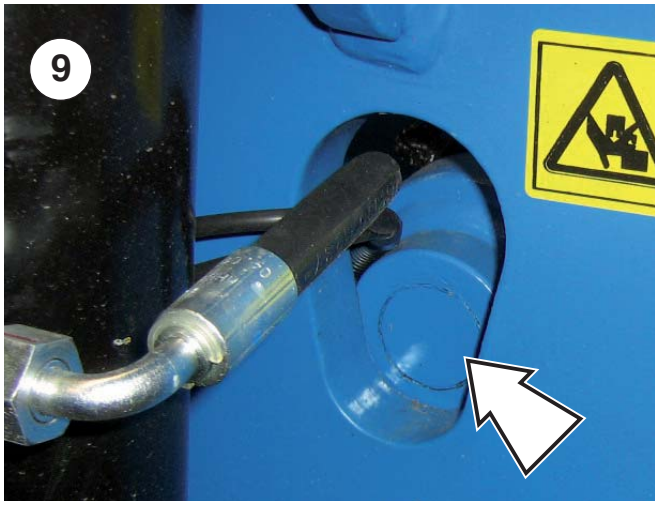
**6** Using a 24 mm and a 19 mm wrenches, disconnect three hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit




**7** Drive out the lower pin

**8** Unscrew and extract the screw fixing the pin with two 17 mm wrenches

**9** Knock out the pin using a plug of soft material (aluminium, copper, wood, etc.) and extract it through the hole on the frame




**10** Remove the cylinder from the machine using the bridge crane

TABLE 003

| Procedure: **Removing the engine from the machine** | Table: **003** GTH-4013 SX GTH-4017 SX | kg | 340 |
|---|---|---|---|
| | | Hours | Min. |
| **Bridge crane, payload 500 kg** **Textile bridles or chains with hooks** | Standard tools | 2 | 30 |
| | | | 2 |

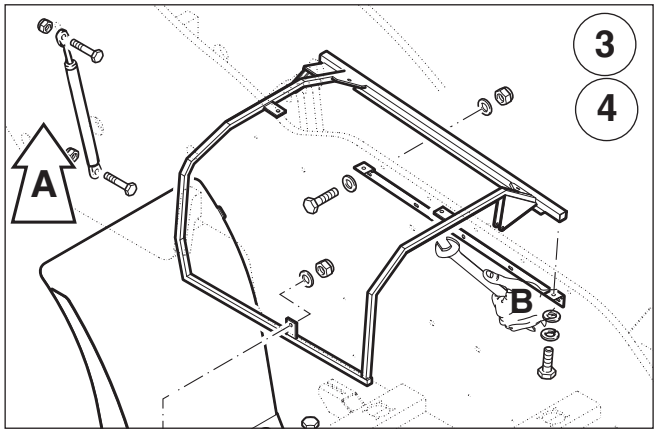
**Operation:**

**1** Open the engine cover.

**2** Secure the engine cover to a bridge crain using a textile bridle

**3** Using two 13mm wrenches, remove the two screws of the spring (A).

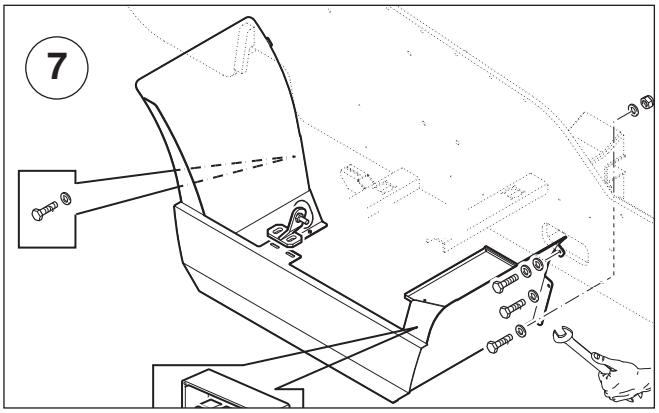
**4** Again with two 13mm wrenches, loosen the five screws (B) that secure the cover to the frame of the machine.




**5** Remove the upper cover.

**6** Disconnect the two battery leads and remove the battery using a 13mm wrench and a 4mm Allen wrench; remove the two screws of engine fuse box using a 10mm combination wrench.

**7** Using two 17mm wrenches, remove the six screws fixing the lower cover of the engine




**8** Remove the lower cover using a stacker.

**9** With a screwdriver, disconnect the fuel feeding and return piping held in position by the special hose-clamps

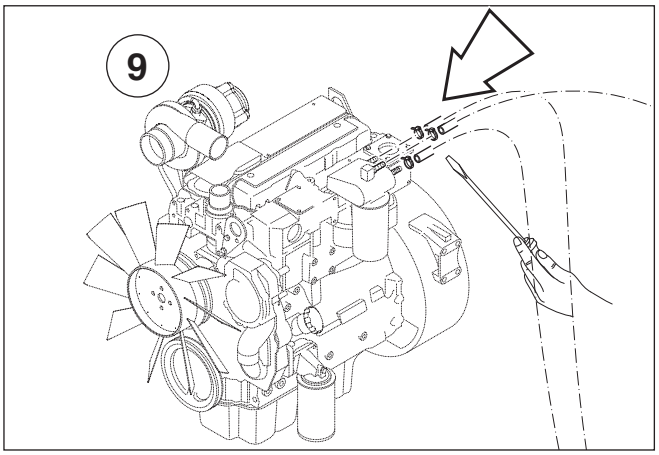
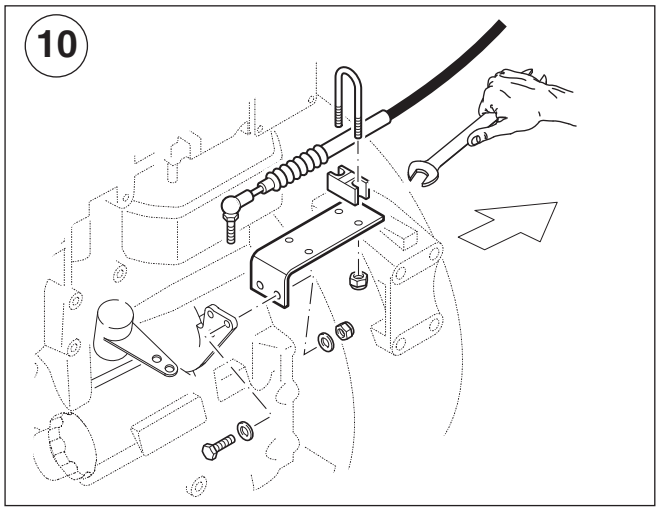


TABLE 003

| Procedure: **Removing the engine from the machine** | Table: ***003*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

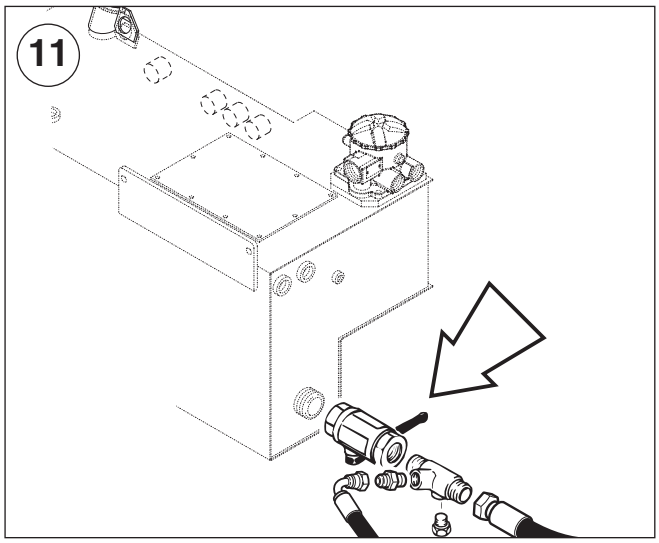
**10** Disconnect the throttle control cable removing the locking clip; remove the screws fixing the rope sheath to the engine using a 10mm combination wrench.




**11** Close the oil tank cocks

**12** Disconnect the flexible hose of the silencer removing the three nuts fixing the manifold to the thermal engine using a 13mm wrench.

**13** Remove the manifold.




**14** Disconnect all the electrical wires connected to the engine, and namely:

- oil pressure bulb,
- electrical stop,
- water temperature bulb,
- the three alternator connections,
- starter motor,
- ground between chassis and engine,
- the two coils of the transmission pump solenoid valve.

**15** Disconnect the radiator:

- tremove the clamps fixing the sleeves to the radiator
- disconnect the radiator hyraulic hoses using a 41mm combination wrench.

**16** Remove the screw (C) of the bracket fixing the radiator to the chassis, using two 13mm combination wrench. Remove the screws of the fan guard using a 13mm wrench, and remove the nuts (D) of the vibration-damping brackets using a 22mm wrench. Extract the radiator using a bridle and a bridge crane, make sure do not damnage the parts.

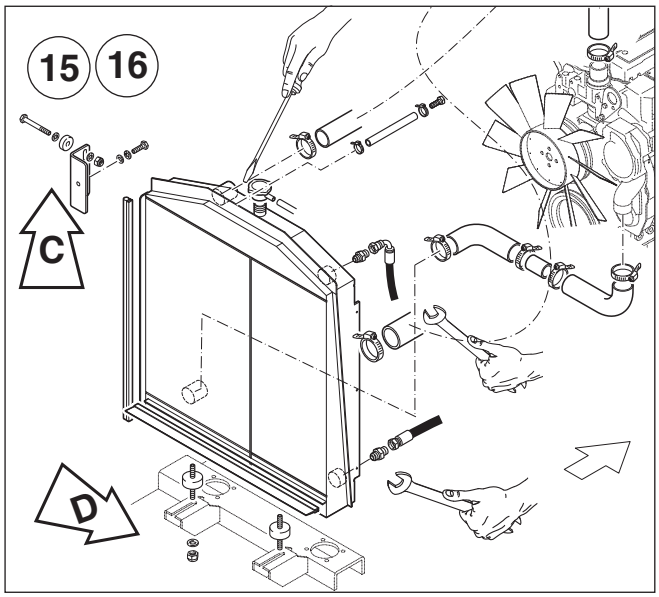


TABLE 003

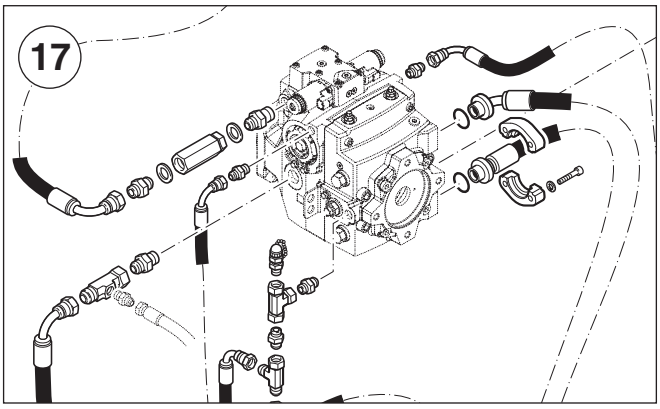
| Procedure: **Removing the engine from the machine** | Table: ***003*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

## PROTECT THE ENVIRONMENT

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

## CAUTION

***Plug all disconnected parts to prevent dust and impurities from entering the circuit. They can cause serious damage.***




**17** Disconnect the pump pipes:

- disconnect the two drain lines of the hydraulic pump with a 36mm wrench,
- disconnect the suction line of the hydraulic pump with a 50mm wrench,
- disconnect the “low pressure line” duct with a 19mm wrench,
- disconnect the four flanges which connect the drive pump to the drive motor with a 10mm Allen wrench,
- disconnect the two pilot circuits using a 17mm combination wrench,
- disconnect the suction line of the service pump using a 50mm combination wrench **(A)**,
- disconnect the delivery line ducts of the hydraulic drive and the main valve using a 36mm wrench and a 24mm wrench.
- disconnect the load sensing signal line from the hydraulic drive using a 17mm wrench.
- disconnect the two holes of the hydraulic pump (B) using a 24mm combination wrench and a 36mm combination wrench.

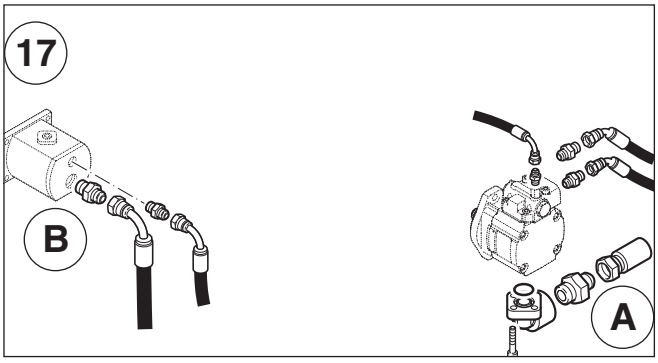
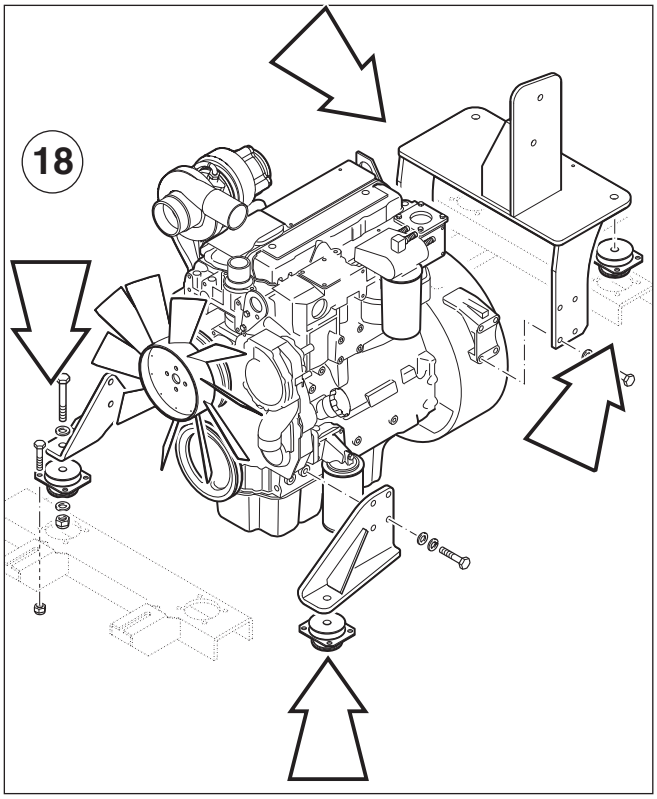


TABLE 003

| Procedure: **Removing the engine from the machine** | Table: ***003*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

**WARNING**

***Once all operations have been performed make sure that all the electrical wires and the hydraulic lines are disconnected from the motor.***



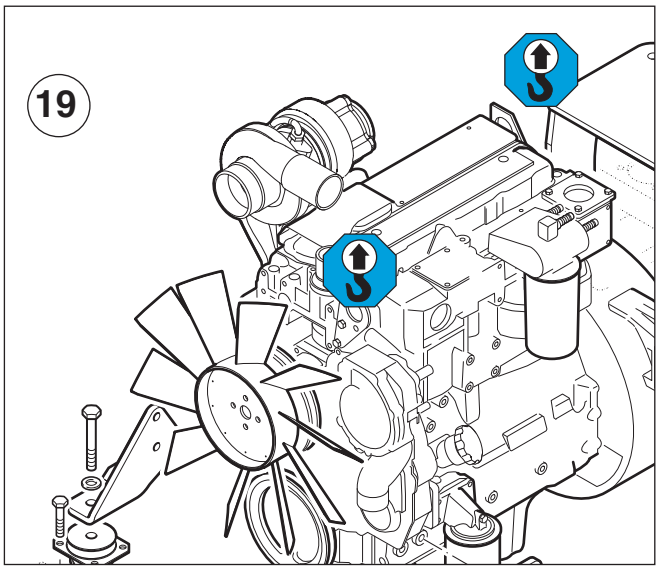

**18** Remove the four screws (two on the front and two at the back) of the vibration-damping brackets with a 22 mm wrench

**19** Sling the engine using a two-leg chain with hook to be coupled to the two top lugs.

**20** Raise the engine with caution and ensure no parts are still connected

**21** Remove the engine from the machine, rest it on a wooden pallet and hold it in position with some plugs

**Reassembling the engine:**




**CAUTION**

***To reassemble the engine, repeat the steps above in reversed order considering the precautions below.***

***Handle the engine with extreme caution to prevent it from crashing against the machine***

TABLE 004

| Procedure: **Hydraulic pumps disassembly** | Table: **004** GTH-4013 SX GTH-4017 SX | 40 kg |
|---|---|---|
| Bridge crane or swing hoist, payload 500 kg | Standard tools | Hours 2 Min. 30 |
| | | 1 |

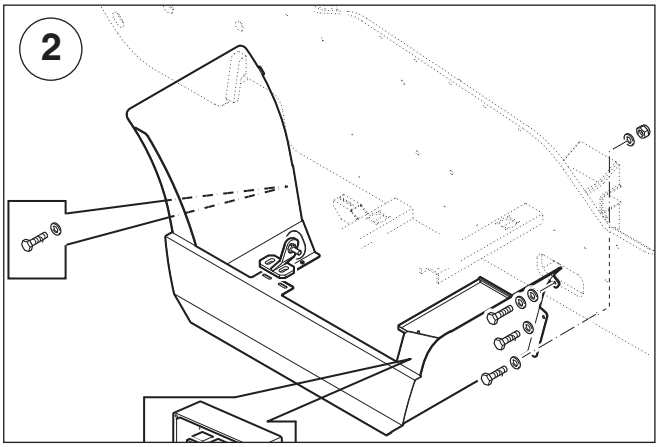
**Operation:**

**PROTECT THE ENVIRONMENT**

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

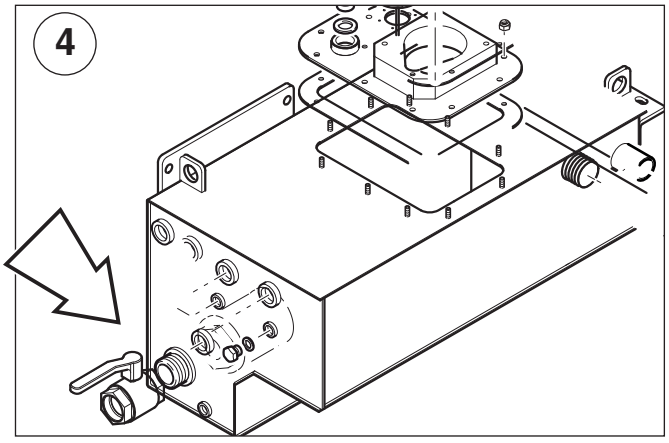
***Carefully clean the area around the piping to be disconnected, plug all disconnected parts with caps, rags or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.***




**1** Open the carter engine and disconnect the battery using a 13mm wrench.

**2** Using two 17mm wrenches, remove the six screws that fix the engine lower cover

**3** Remove the lower cover using a stacker

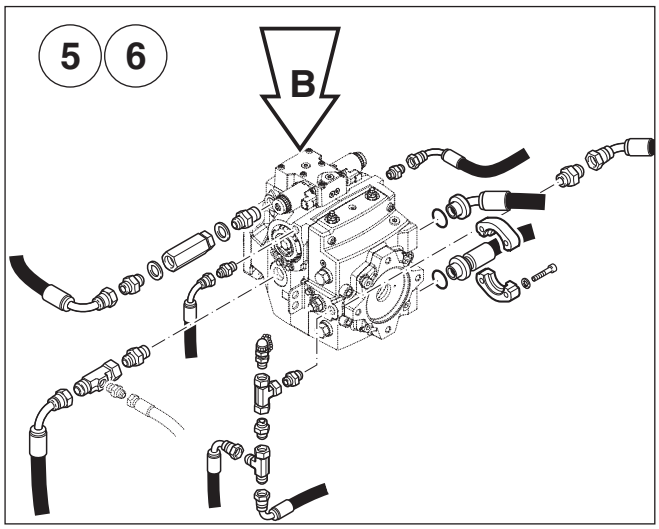



**4** Close the oil tank cock

TABLE 004

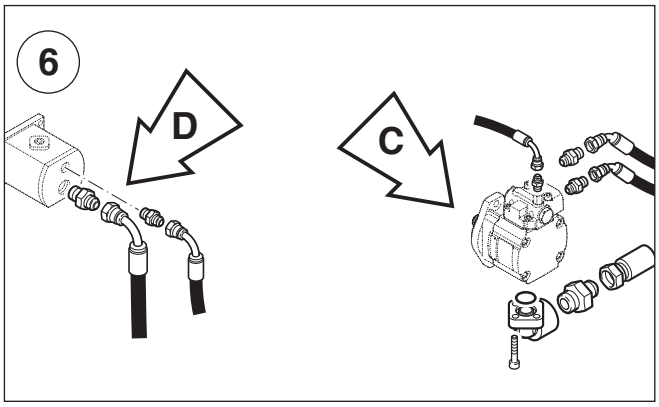
| Procedure: **Haydraulic pumps disassembly** | Table: ***004*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

**5** Remove the two electrical connections (**B**) of the electrovalve which controls the machine forward/ reverse movements




**6** Disconnect the hydraulic piping:

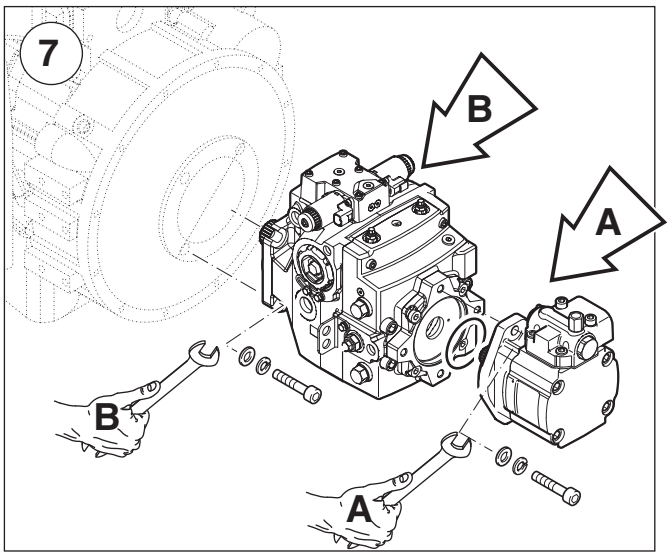
- disconnect the two drain lines of the hydraulic pump using a 36mm wrench,
- disconnect the suction line of the hydraulic pump with a 50mm wrench,
- disconnect the “low pressure line” duct with a 19mm wrench,
- disconnect the “transmission engine pilot circuit” hoses using a 17mm wrench,
- disconnect the four flanges which connect the drive pump to the drive motor with a 10mm Allen wrench,
- disconnect the suction line of the service pump using a 50mm combination wrench,
- disconnect the delivery line ducts of the hydraulic drive (**C**) and the main valve with a 36mm wrench and a 24mm wrench.
- disconnect the load sensing signal line from the hydraulic drive with a 17mm wrench,
- disconnect the hydraulic pump hoses using a 24mm combination wrench and a 36mm combination wrench.




**WARNING**

***Once all operations have been performed, make sure that all electrical wires and hydraulic lines are disconnected from the motor.***

**7** Disconnect the service pump from the drive pump by driving out bolts **A** with a 19mm combination wrench. Place the pump on to a bench and plug all the outlets




**8** Remove the fixing screws **B** of the drive pump using a 22mm combination wrench, then secure the pump to the bridge crane with a textile sling and pull it out of the motor. Place the pump on

TABLE 004

| Procedure: **Haydraulic pumps disassembly** | Table: ***004*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

to a bench and plug all the outlets.

**9** Disconnect the second service pump removing the four nuts (**G**) using a 13mm wrench, and remove the screw (**F**) using a 10mm wrench. Pull out the pump and place it on to a bench and plug all the outlets.

**10** Proceed in reverse order to re-assemble the hydraulic pumps.

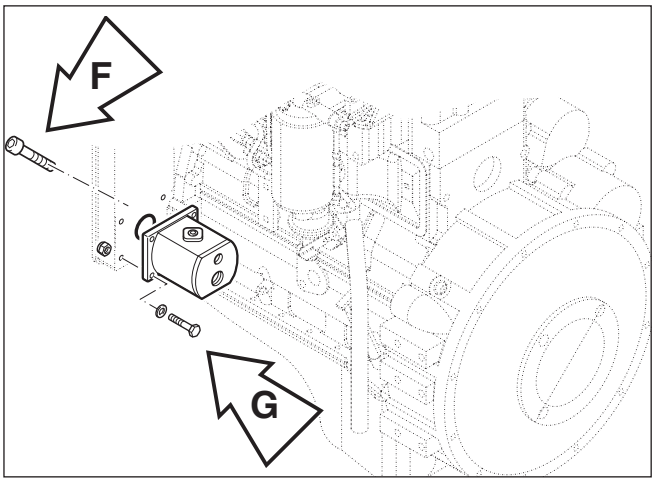
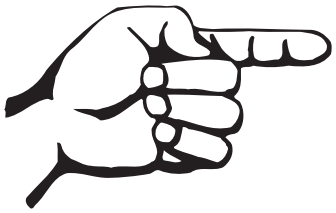


TABLE 004

| Procedure: | Table: ***004***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |
|---|---|



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TABLE 005

| Procedure: **Disassembling the hydraulic motor** | Table: **005** GTH-4013 SX GTH-4017 SX | kg | 44 |
|---|---|---|---|
| | | | Hours Min. |
| Bridge crane or swing hoist, payload 500 kg | **Standard tools** | | 2 - |
| | | | 1 |

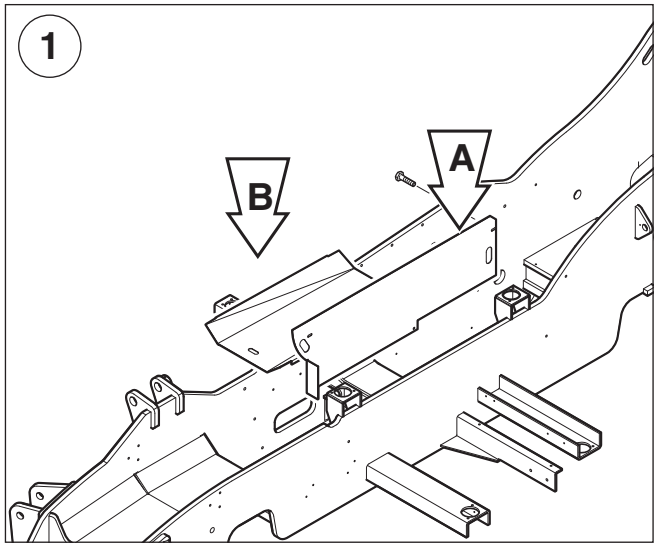
**Operation:**

**PROTECT THE ENVIRONMENT**

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

***Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.***




**1** Remove the central covers A-B of the machine by driving out the seven screws using a 13mm wrenche

**2** Disconnect the electric link of the electrovalve.

**3** Disconnect the drainage hydraulic tubes using a 36 mm wrench and a 24 mm wrench.

**4** Disconnect the two hoses using a 16 mm wrench.

**5** Disconnect the pilots using a 17mm combination wrench.

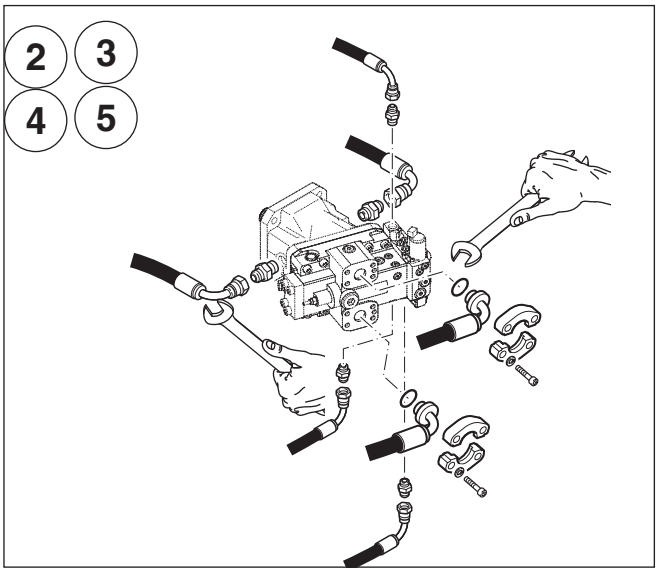


TABLE 005

| Procedure: **Disassembling the hydraulic motor** | Table: ***005*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

**6** Remove the four locking screws of the hydraulic motor using a 14mm Allen wrench.

**7** Pull out the motor from the power divider using a textile sling and a bridge crane.

**8** Protect the engine compartment to prevent the entrance of impurities.

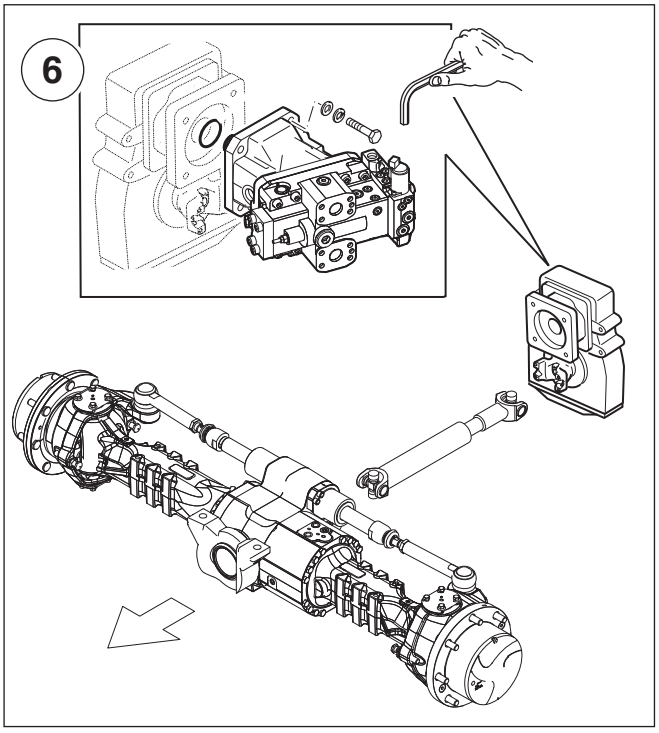


TABLE 006

| Procedure: **Cylinder disassembly**<br>**Boom extension cylinder GTH 4017 SX** | Table: **006**<br>**GTH-4013 SX**<br>**GTH-4017 SX** | kg | 92 |
|---|---|---|---|
| | | | Hours Min. |
| **Bridge crane, payload 500 kg**<br>**Textile bridles or chains with hooks** | Standard tools | | 2 30 |
| | | | 1 |

**Operation:**

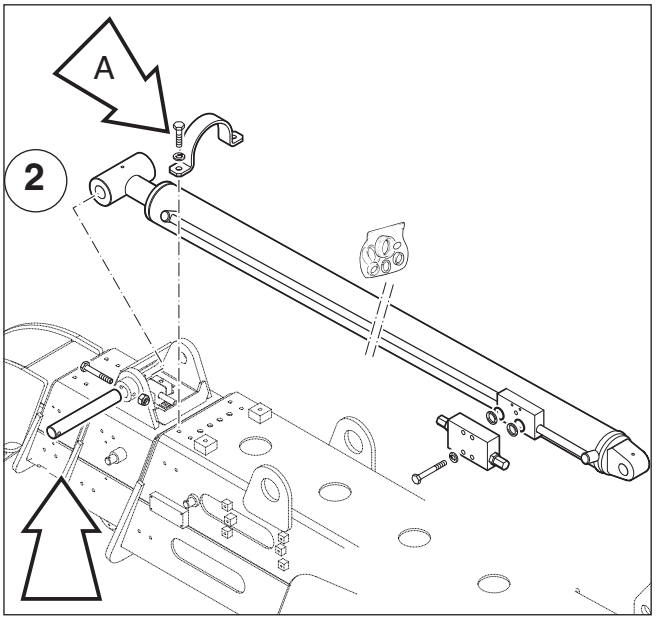
**1** Set the boom to horizontal position with the telescope slightly extended to work on the cylinder connecting pin (rod side)

**2** Remove the screw fixing the pin to the boom section using two 17mm wrench.

**3** Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.)

**4** Remove the two screws of the bracket **A** using a 22mm wrench.

**5** Place a container of suitable size under the hydraulic piping before disconnecting




PROTECT THE ENVIRONMENT

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

**6** With a 24 mm wrench, disconnect the two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.

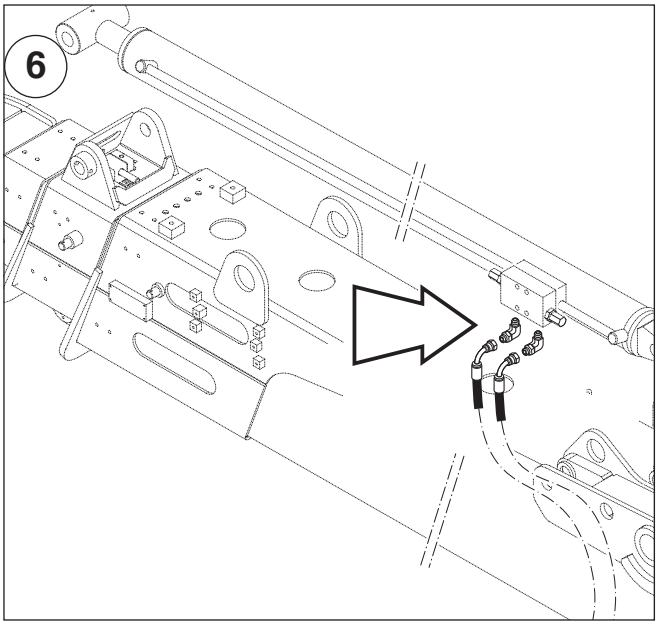
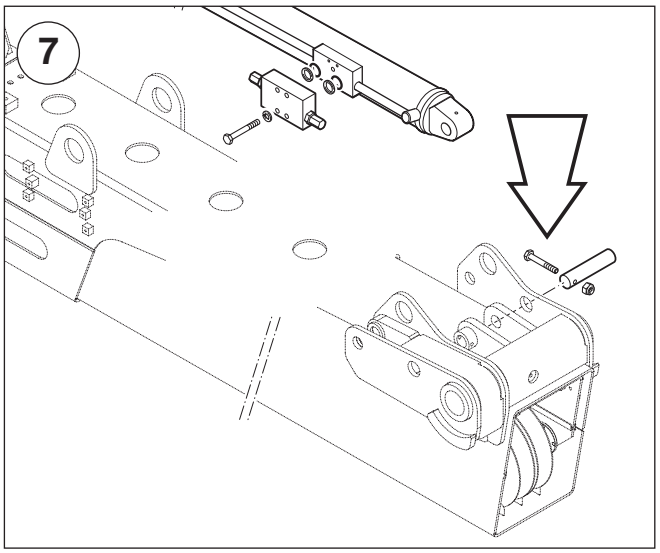


TABLE 006

| Procedure: **Cylinder disassembly**<br>**Boom extension cylinder GTH 4017 SX** | Table: ***006***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |
|---|---|

**7** Loosen and remove the screw fixing the cylinder pin (bottom side) using two 17 mm wrenches.




**8** Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.)

**9** Pull out the cylinder from the boom section and sling it with the textile bridles connected to the bridge crane

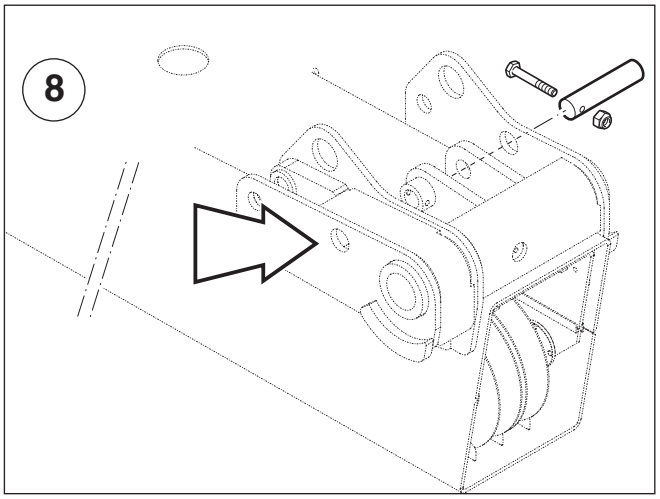


TABLE 007

| Procedure: **Cylinder disassembly**<br>**Boom extension external cylinder**<br>**GTH 4013 SX** | Table: ***007***<br>**GTH-4013 SX**<br>**GTH-4017 SX** | kg | **92** |
|---|---|---|---|
| | | | **Hours** / **Min.** |
| **Bridge crane, payload 500 kg**<br>**Textile bridles or chains with hooks** | Standard tools | | **2** / **30** |
| | | | **1** |

**Operation:**

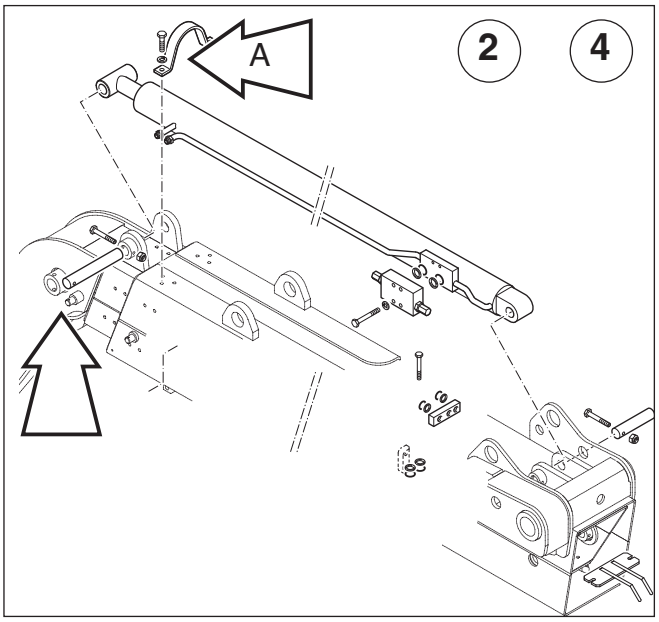
**1** Set the boom to horizontal position with the telescope slightly extended to work on the cylinder connecting pin (rod side)

**2** Remove the screw fixing the pin to the boom section using two 17mm wrench.

**3** Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.)

**4** Remove the two screws of the bracket **A** using a 22mm wrench.

**5** Place a container of suitable size under the hydraulic piping before disconnecting




PROTECT THE ENVIRONMENT

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

**6** Using a 24 mm wrench, disconnect the two hydraulic hoses (B) and the two hoses (C) , then plug the disconnected connectors to prevent dust and impurities from entering the circuit.

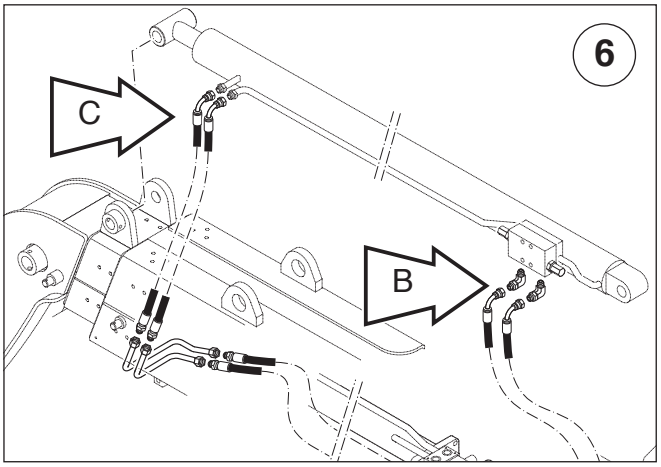
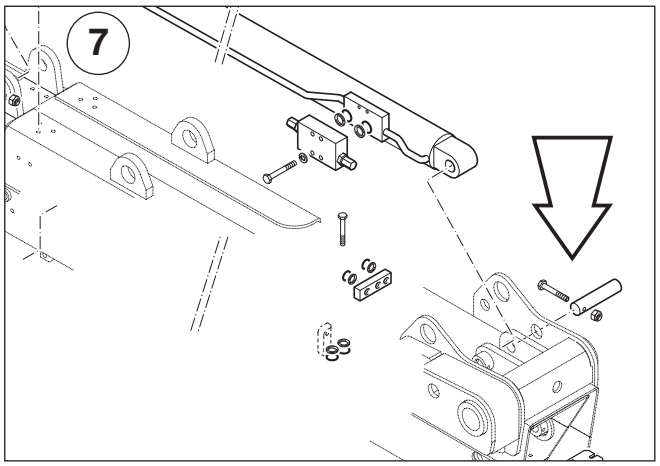


TABLE 007

| Procedure: **Cylinder disassembly**<br>**Boom extension external cylinder GTH 4013 SX** | Table: ***007***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |
|---|---|

**7** Loosen and remove the screw fixing the cylinder pin (bottom side) using two 17 mm wrenches.




**8** Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.).

**9** Pull out the cylinder from the boom section and sling it with the textile bridles connected to the bridge crane.

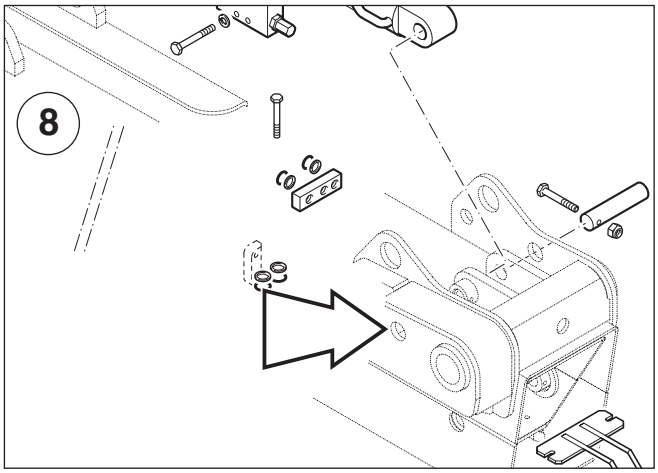


TABLE 008

| Procedure: **Cylinder disassembly**<br>**Boom extension internal cylinder**<br>**GTH 4013 SX** | Table: ***008***<br>**GTH-4013 SX**<br>**GTH-4017 SX** | kg | 92 |
|---|---|---|---|
| | | | Hours / Min. |
| **Bridge crane, payload 500 kg**<br>**Textile bridles or chains with hooks** | Standard tools | | 2 / 30 |
| | | | 1 |

**Operation:**

**1** Set the boom to horizontal position and extend it until the pin A is on the 3rd boom section.

**2** Remove the screw fixing the pin to the 3rd boom section using a 5mm Allen wrench.

**3** Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.). If necessary, lift the cylinder using a jack under the boom, corrisponding to the hole inside the 3rd boom section.

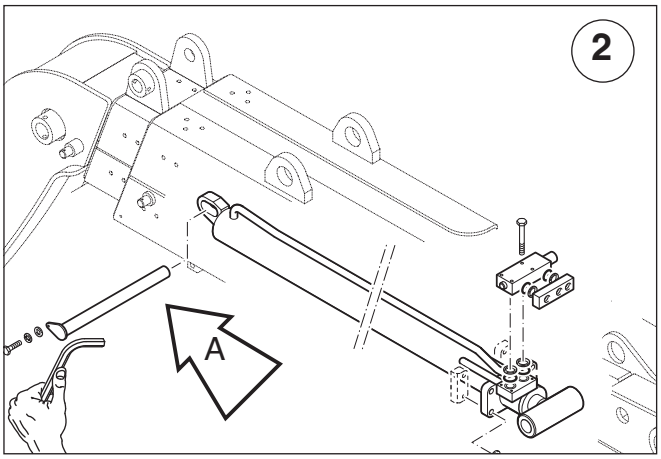
**4** Retract the boom entirely, remove the screw that locks the pin (B), using two 13mm wrench. Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.).

**5** Place a container of suitable size under the hydraulic piping before disconnecting.

PROTECT THE ENVIRONMENT

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

**6** With a 24 mm wrench, disconnect the two hydraulic hoses (C) from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.



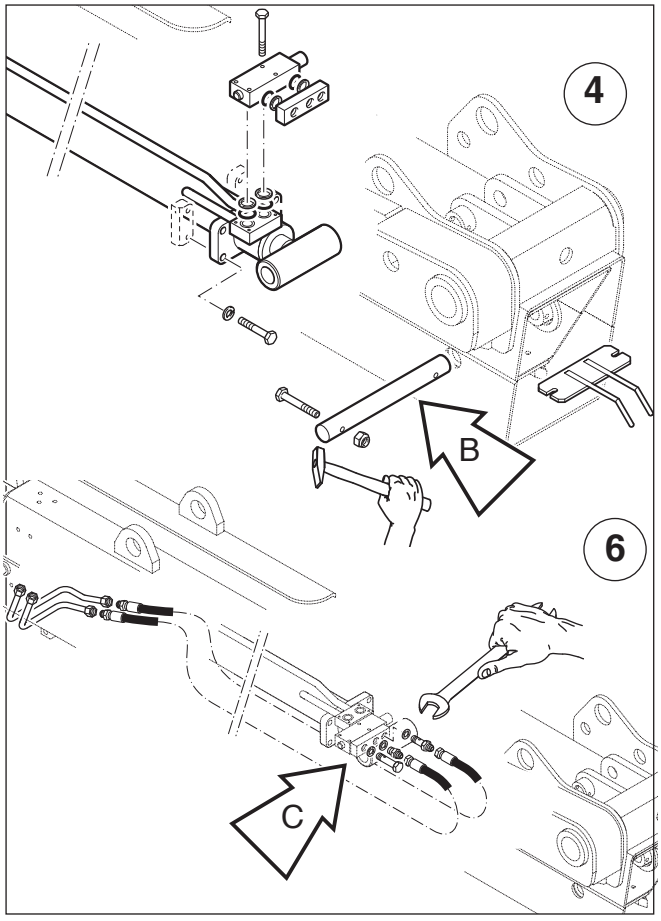
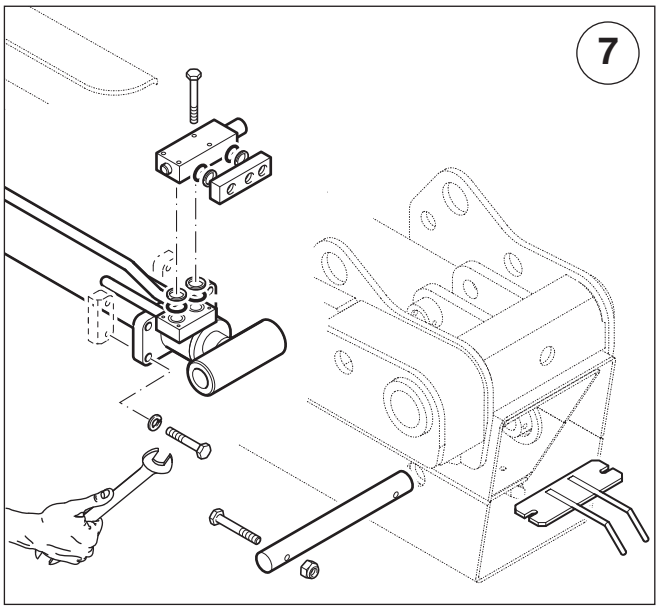



TABLE 008

| Procedure: **Cylinder disassembly**<br>**Boom extension internal cylinder GTH 4013 SX** | Table: ***008***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |
|---|---|

**7** Remove the four screws fixing the cylinder to the 3dr section boom using a 22mm ratchet socket.




**8** Pull out the cylinder from the boom section and sling it with the textile bridles connected to the bridge crane. When half cylinder is out, sling it in the center so it can be in horizontal position.

**9** Extract the cylinder from the boom entirely and place it on to a bench.

**10** Lock the cylinder to avoid damnage for people and things.

TABLE 009

| Procedure: **Water-oil cooler disassembly** | Table: **009** GTH-4013 SX GTH-4017 SX | kg | 24 |
|---|---|---|---|
| | | Hours | Min. |
| **Standard tools** | | 2 | - |
| | | | 1 |

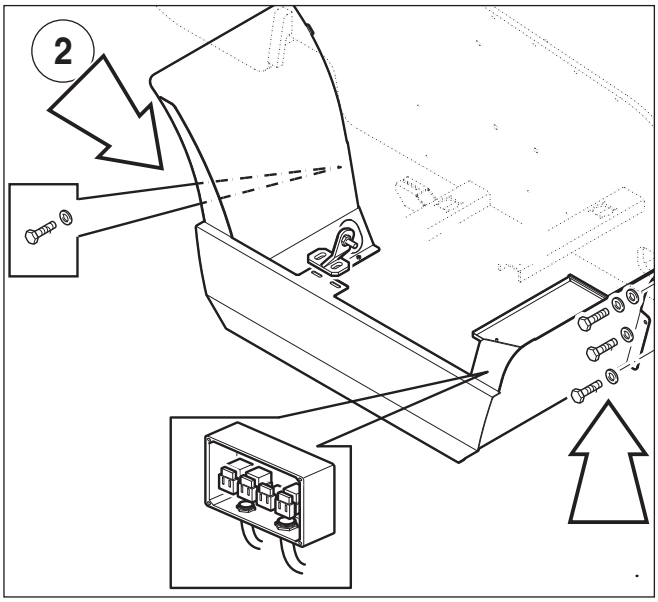
**Operation:**

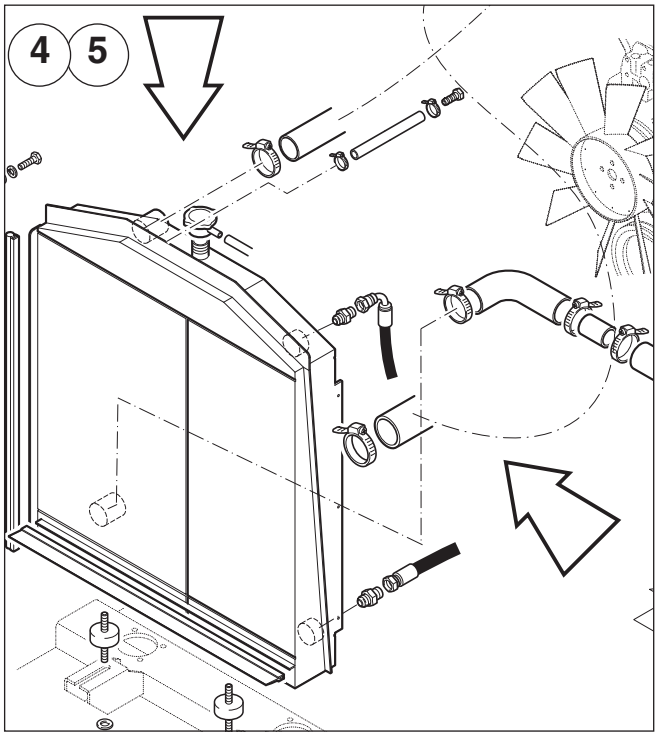
**PROTECT THE ENVIRONMENT**

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

***Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.***




**1** Open the carter and disconnect the two battery terminals using a 13mm wrench; then, remove the screws fixing the fuse box to carter using a 4mm Allen wrenc and a 10mm combination wrench.

**2** Install a handler under the carter and remove the six screws fixing the lower carter to the chassis using two 10mm wrenches; then remove the lower carter.

**3** Empty the cooler opening the special cocks.

**4** Disconnect the two hydraulic oil hoses from the cooler using a 41mm wrench.

**5** Disconnect the water and air pipes from/to the thermal motor loosening the hose-clamps with a screwdriver.

TABLE 009

| Procedure: **Water-oil cooler disassembly** | Table: ***009*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

**6** Remove the screws fixing the fan guard using a 13mm wrench.

**7** Remove the two screws of the vibration-damping bracket using a 22 mm wrench.

**8** Remove the two screws which fix the radiator to the chassis wall using two 13mm wrenchs.

**9** Secure the cooler with a textile bridle connected to the rising hoist.

**10** Rise with caution by tilting the cooler forward to prevent damage to the fixed fan of the engine.

**11** Place it on to a bench and lock it to avoid damnage for people and things.

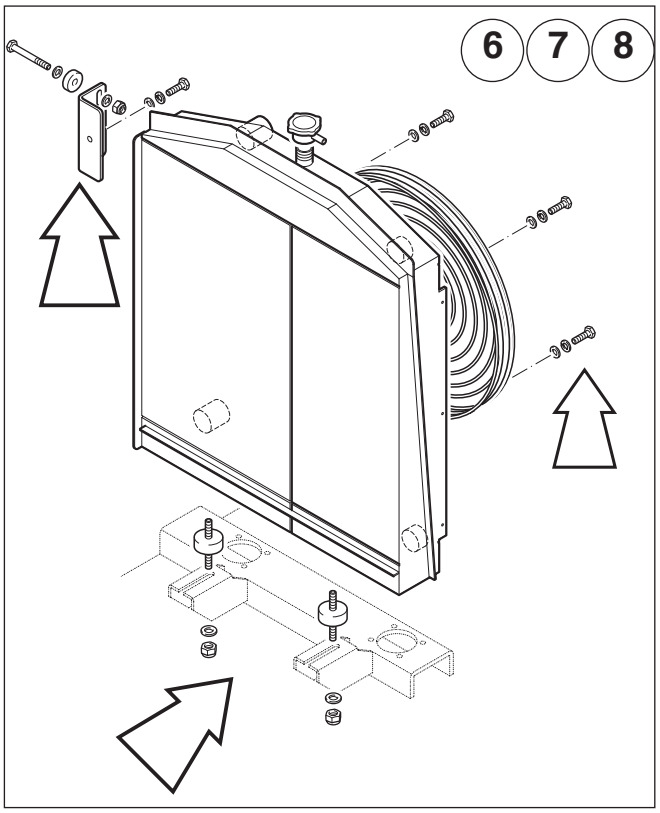


TABLE 010

| Procedure: **Main valve disassembly** | Table: **010** GTH-4013 SX GTH-4017 SX | kg | 27 |
|---|---|---|---|
| | | | Hours Min. |
| Standard tools | | | 2 30 |
| | | | 1 |

**PROTECT THE ENVIRONMENT**

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

***Carefully clean the area around the piping to be disconnected, plug all disconnected parts with connectors, clothes or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.***

**DANGER**

***Before disconnecting the hydraulic piping, ensure the line is not under pressure. Release the pressure if necessary by operating the control levers with the engine stopped. In any case, disconnect the hydraulic piping with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc.***
***Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.***

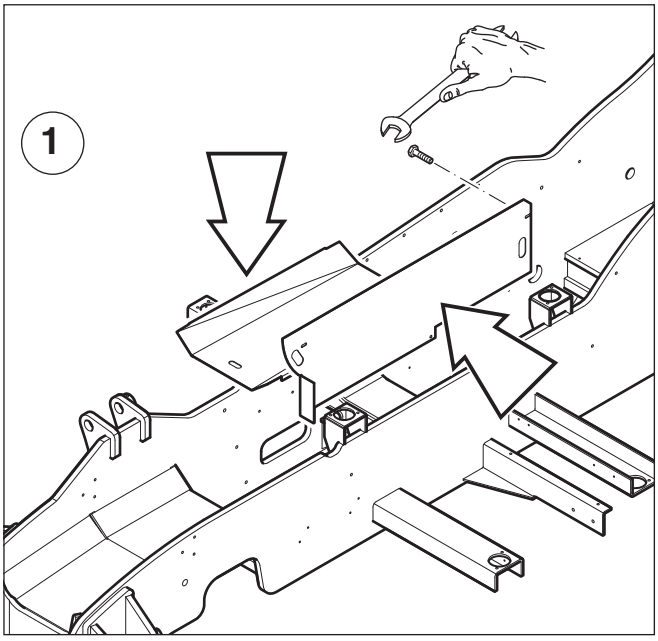


TABLE 010

| Procedure: **Main valve disassembly** | Table: ***010*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

**Operation:**

**1** Remove the central and side cover of the machine using a 13mm combination wrench.

**CAUTION**

***Before disconnecting any flexible hoses, label them for an easier reassembly.***

**2** Disconnect all pipes of the main valve using the following combination wrenchs: 17 mm, 22 mm, 24 mm. 36 mm, 41 mm

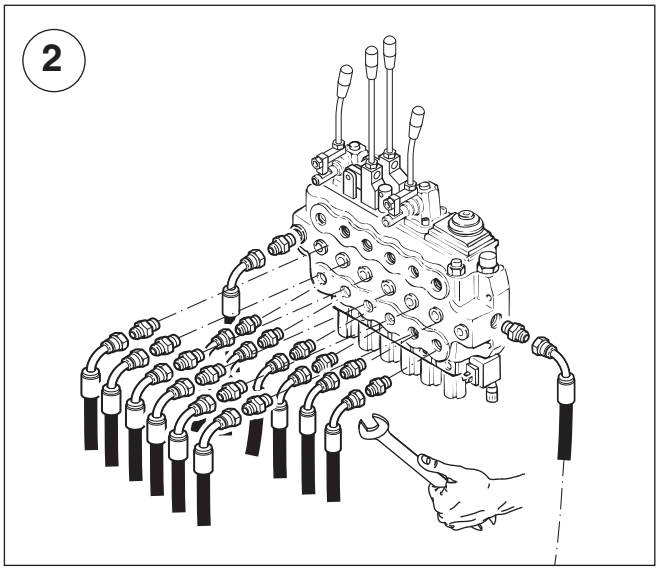
**3** Disconnect all wires.

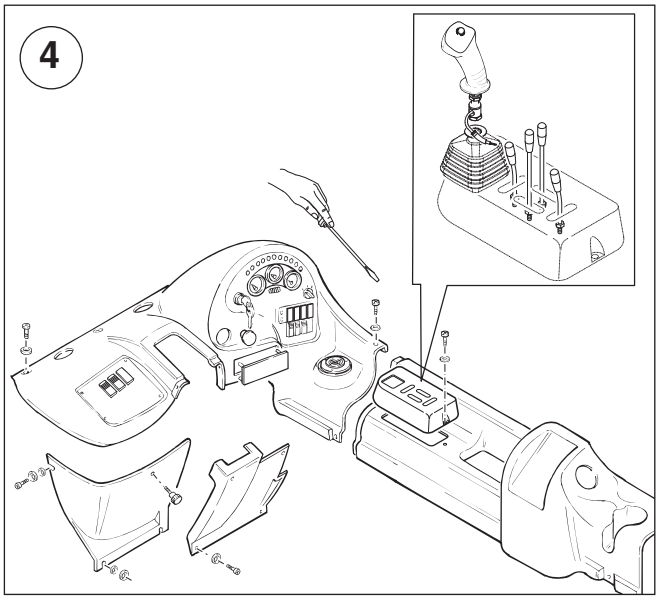
**4** Remove the screws fixing the inside cab protection carter of the main valve.

**5** Loosen the locknuts fixing the main valve levers using a 17mm combination wrench and a 19mm combination wrench.

**6** Remove the three screws fixing the main valve to the chassis using a 13mm wrench.

**7** Remove the main valve from the machine and place it on to a bench.



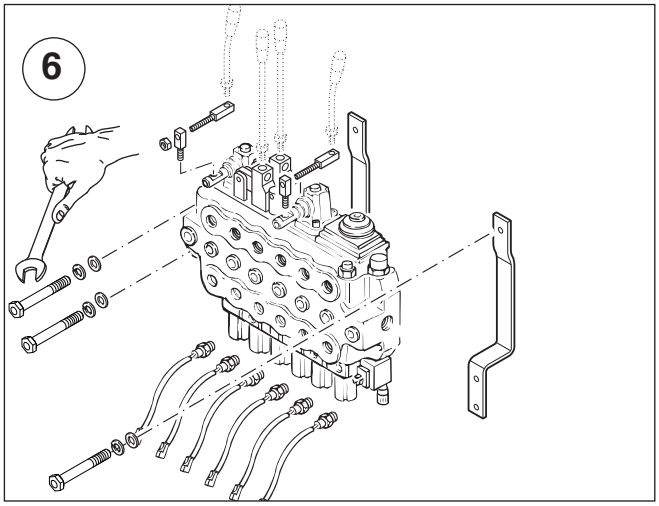



TABLE 011

| Procedure: **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***011*** **GTH-4013 SX GTH-4017 SX** | kg | - |
|---|---|---|---|
| | | Hours | Min. |
| **Standard tools** | | 1 | 30 |
| | | | 1 |

### *ADJUSTING THE PLAY WITH SHIMS*

If the play between the boom sections is too great (2 mm or more), proceed in shimming the guide pads of the boom sections.

Usually, the guide pads subject to premature wear are:

- front bottom pads of the first and second boom section
- rear top pads of the second and third boom section

Proceed as follows:

**1** Lower the boom to the ground and ensure the telescope is fully retracted

**2** With a thickness gauge, check the play of all pads.
After adjustment, the minimum play in the narrowest point must be: **0,5÷1 mm**

**3** Measure the thickness of the slide pads. The value of the bottom pads of the fixed section and of the top pads of the telescope must be at least 13 mm. For the remaining pads, the minimum thickness must never be less than 9 mm

**4** If the thickness reaches the minimum value, renew the pads before adjusting the residual play with some shims

**5** Remove the fixing screws from the pads and position as many shims as necessary to reach the normal thickness value

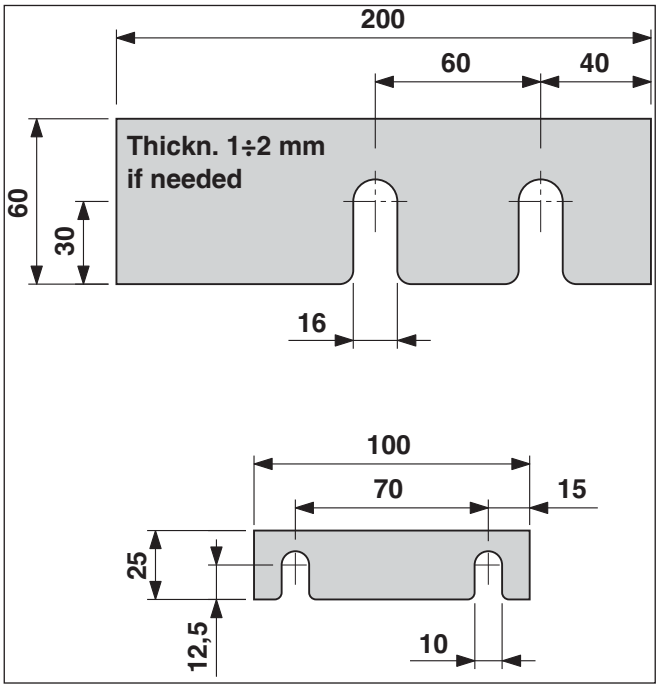
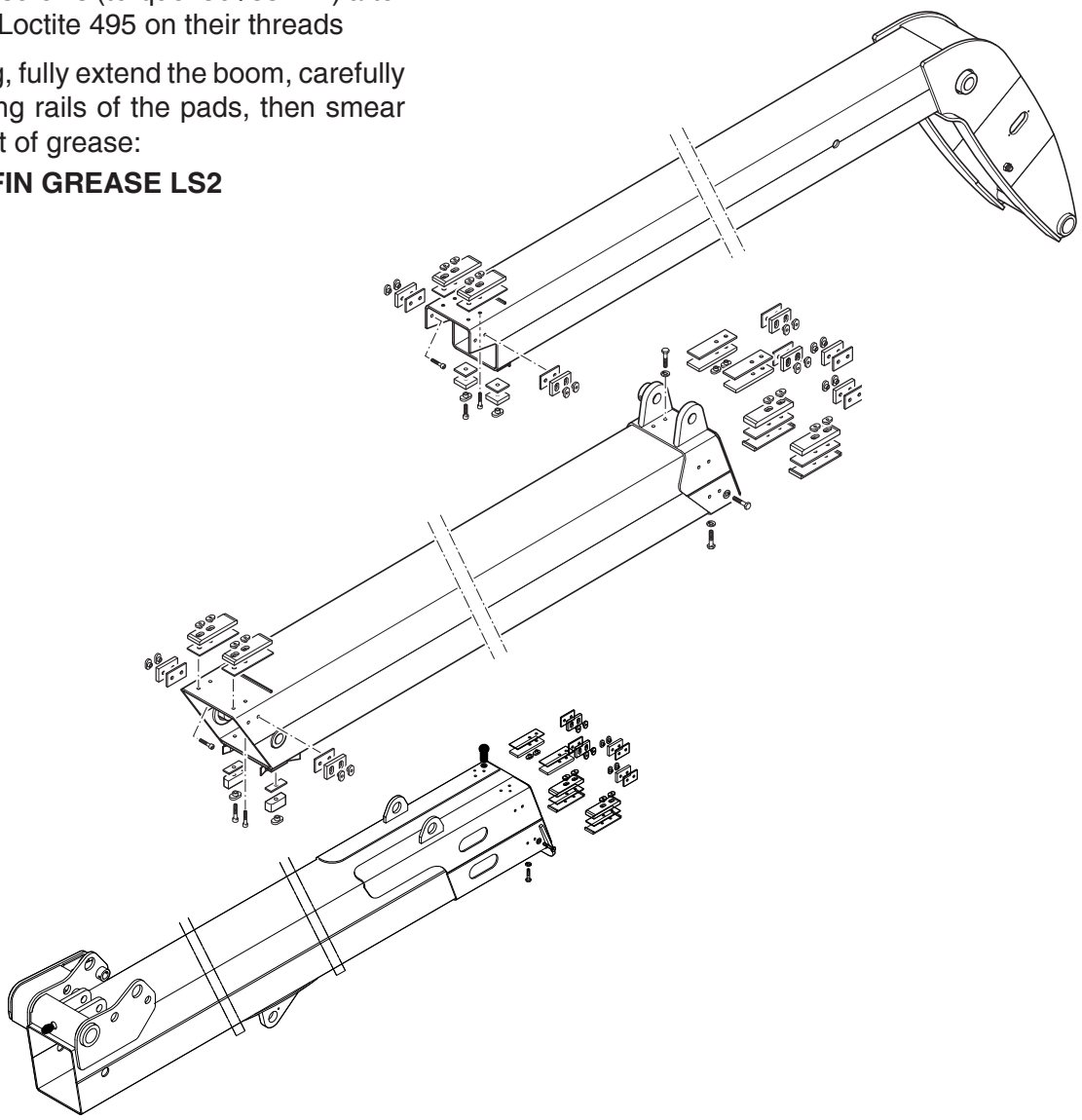


TABLE 011

| Procedure: | **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***011*** **GTH-4013 SX GTH-4017 SX** |
|---|---|---|

**6** Refit the fixing screws (torque: 30÷35 Nm) after pouring some Loctite 495 on their threads

**7** After shimming, fully extend the boom, carefully clean the sliding rails of the pads, then smear with a thin coat of grease:
**INTERFLON FIN GREASE LS2**



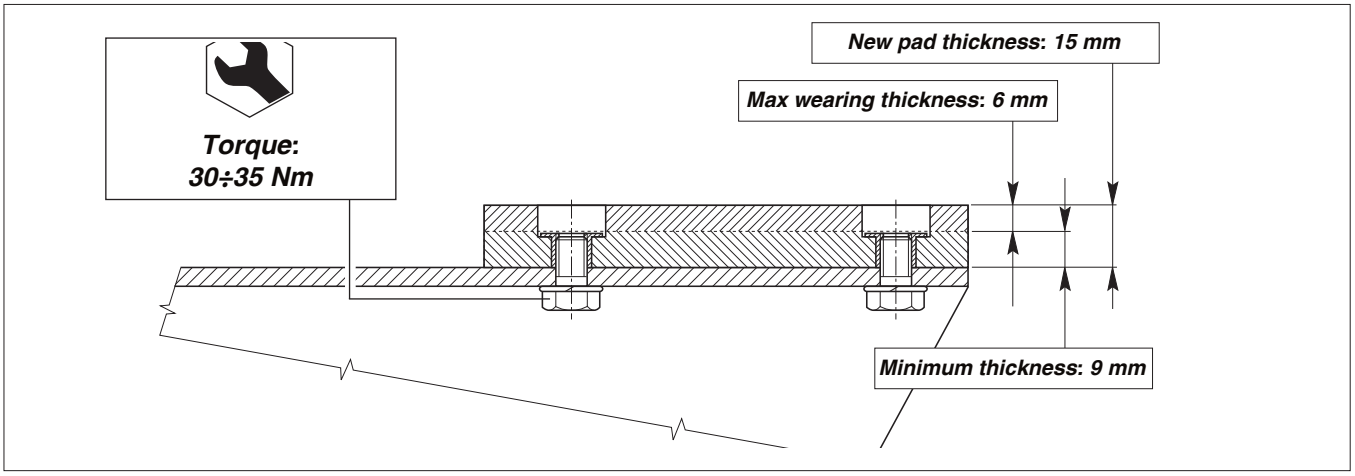


TABLE 011

| Procedure: **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***011*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

### *RENEWING THE REAR PADS (A)*

To renew the rear pads of the **section**, retract the boom entirely and proceed as follows:

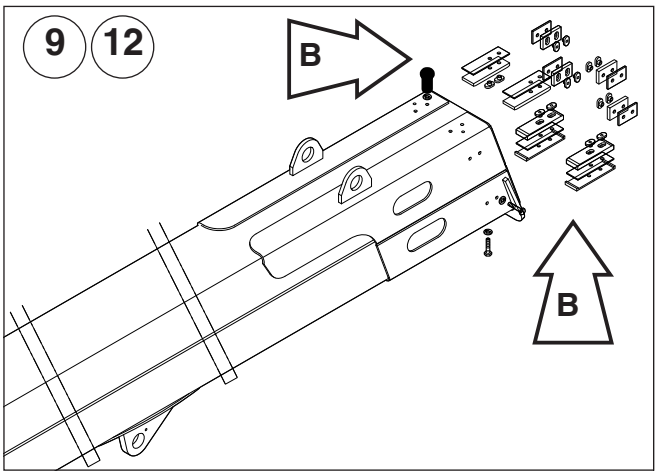
**8** Stop the machine, lower the nose to the ground for an easier removal of the top pads. Hold it in horizontal position for removing the bottom pads.

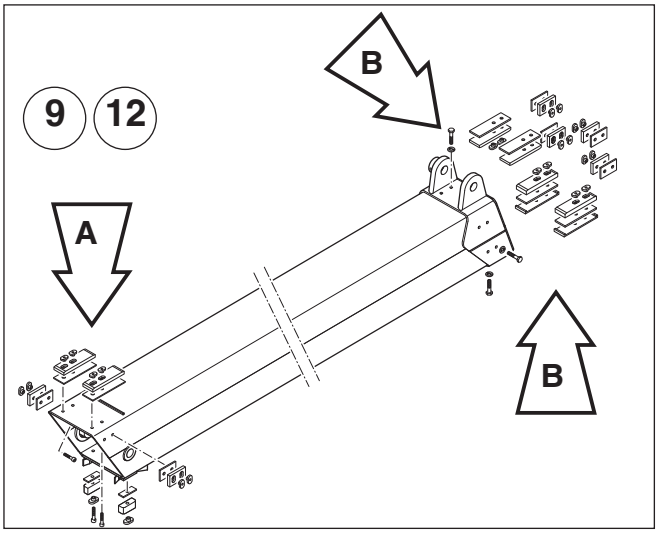
**9** Using a 17mm hex wrench or a 6mm Allen wrench, remove the pad fixing screws.

**10** Using a screwdriver, pry off the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads.

**CAUTION**

***Tighten the pad fixing screws to 30÷35 Nm.***




### *RENEWING THE FRONT PADS (B)*

To renew the front pads of the **section**, extend the boom of about 1 meter, and proceed as follows:

**11** Stop the machine, lower the nose to the ground for an easier removal of the bottom pads. Hold it in horizontal position for removing the top pads.

**CAUTION**

***Tighten the pad fixing screws to 30÷35 Nm.***

**12** Using a 17mm hex wrench or a 6mm Allen wrench, remove the pad fixing screws. Using a screwdriver, pry off the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads.

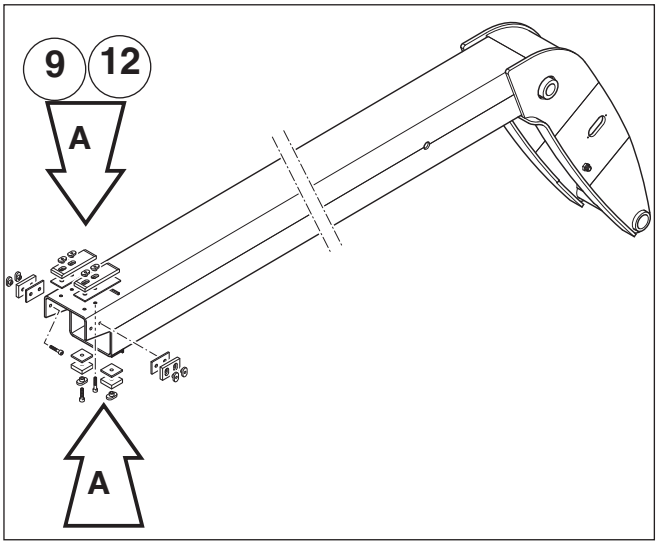


TABLE 011

| Procedure: | **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***011*** **GTH-4013 SX GTH-4017 SX** |
|---|---|---|

**13** Clean and grease the internal and external walls of the boom sections in the sliding points of the pads. To this end, use **INTERFLON FIN GREASE LS2**

**14** With a thickness gauge, ensure the play between the boom sections is correct in both positions -i.e. with the boom fully extended and fully retracted.

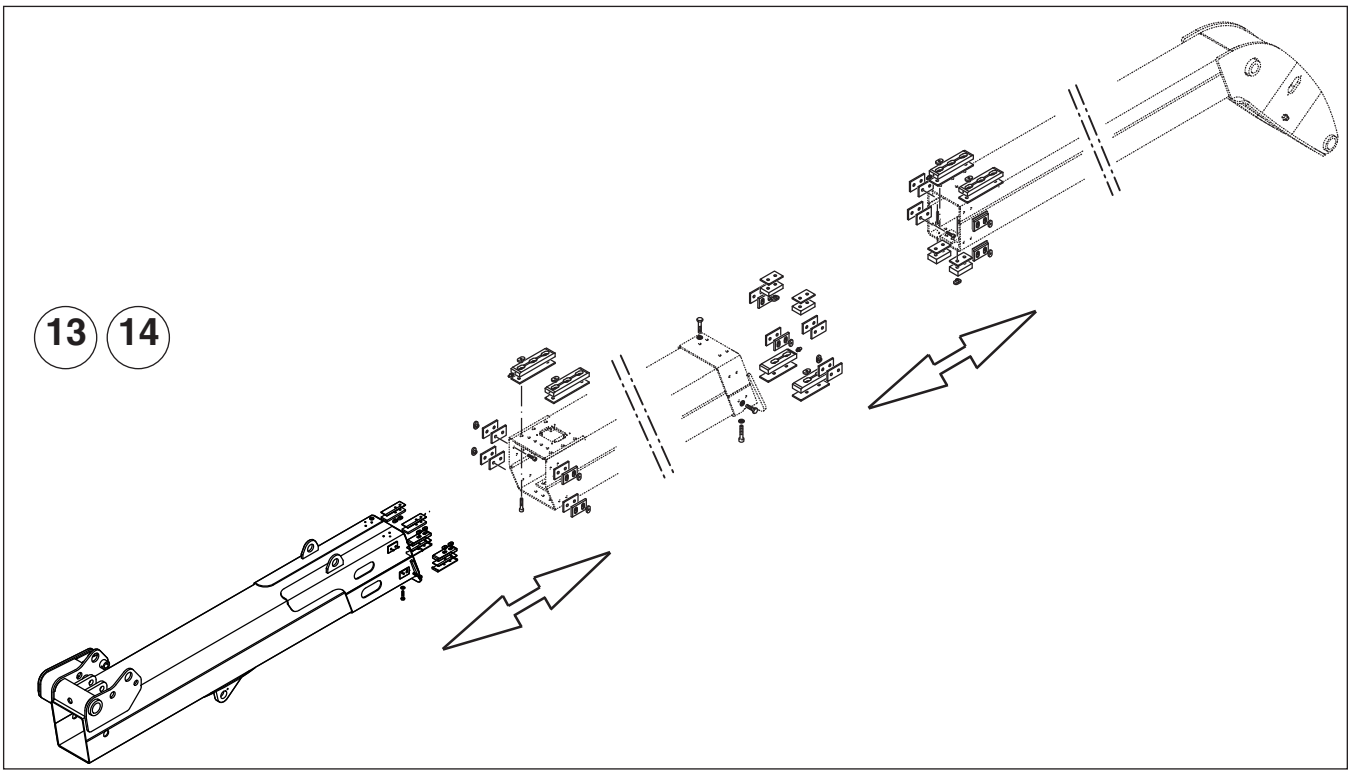


TABLE 012

| Procedure: **Renewing the slide pads of the telescopic boom GTH 4017 SX** | Table: ***012*** **GTH-4013 SX GTH-4017 SX** | kg | - |
|---|---|---|---|
| | | Hours / Min. | 1 / 30 |
| **Standard tools** | | | 1 |

### *ADJUSTING THE PLAY WITH SHIMS*

If the play between the boom sections is too great (2 mm or more), proceed in shimming the guide pads of the boom sections.

Usually, the guide pads subject to premature wear are:

- front bottom pads of the first, second and third section
- rear top pads of the second, third and fourth section

Proceed as follows:

**1** Lower the boom to the ground and ensure the telescope is fully retracted

**2** With a thickness gauge, check the play of all pads.
After adjustment, the minimum play in the narrowest point must be: **0,5÷1 mm**

**3** Measure the thickness of the slide pads. The value of the bottom pads of the fixed section and of the top pads of the telescope must be at least 13 mm. For the remaining pads, the minimum thickness must never be less than 9 mm

**4** If the thickness reaches the minimum value, renew the pads before adjusting the residual play with some shims

**5** Remove the fixing screws from the pads and position as many shims as necessary to reach the normal thickness value

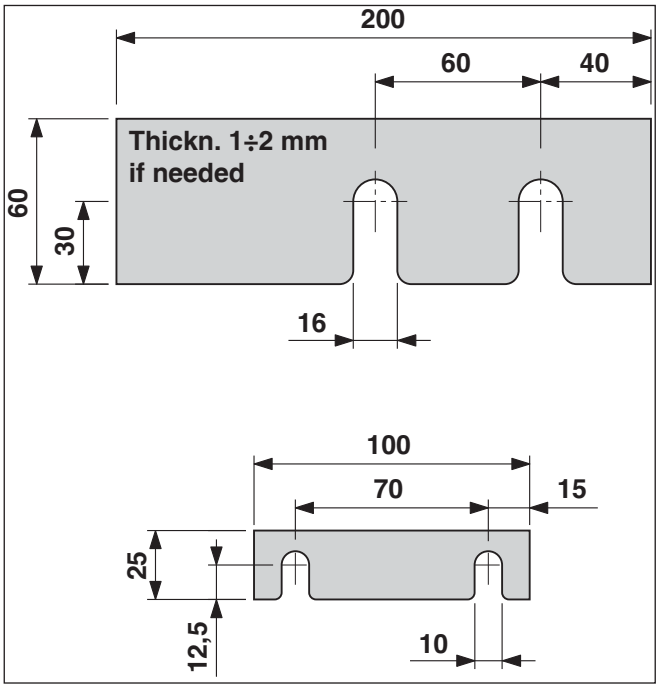
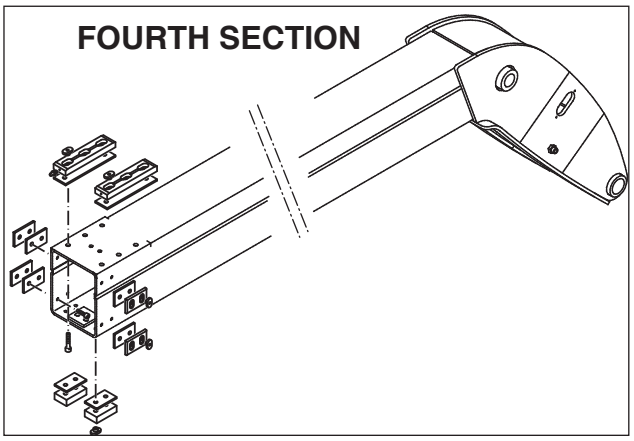


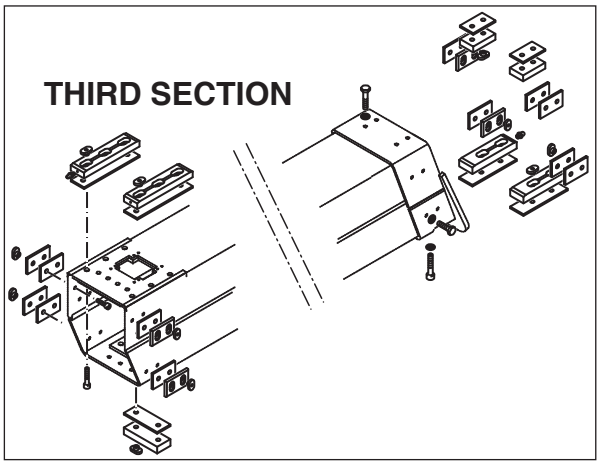
TABLE 012

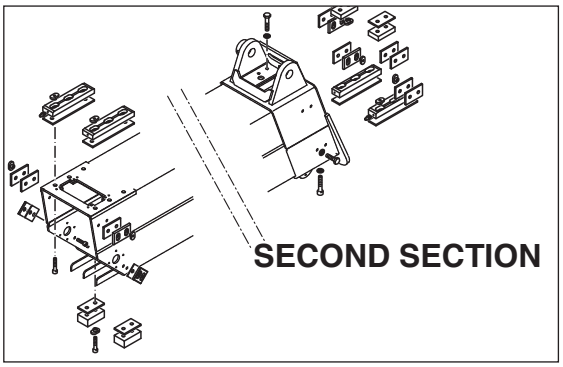
| Procedure: | **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***012*** **GTH-4013 SX GTH-4017 SX** |
|---|---|---|

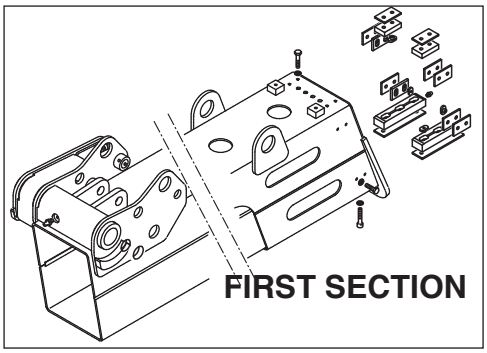
**6** Refit the fixing screws (torque: 30÷35 Nm) after pouring some Loctite 495 on their threads

**7** After shimming, fully extend the boom, carefully clean the sliding rails of the pads, then smear with a thin coat of grease:
**INTERFLON FIN GREASE LS2**



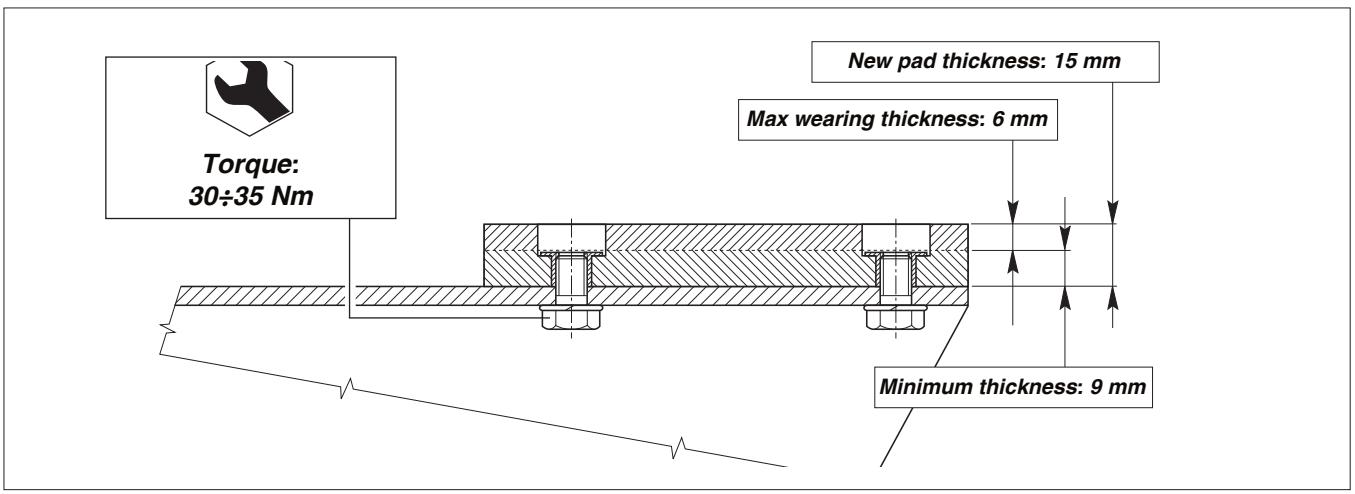



TABLE 012

| Procedure: **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***012*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

### *RENEWING THE REAR PADS (A)*

To renew the rear pads of the **section**, retract the boom entirely and proceed as follows:

**8** Stop the machine, lower the nose to the ground for an easier removal of the top pads. Hold it in horizontal position for removing the bottom pads.

**9** Using a 17mm hex wrench or a 6mm Allen wrench, remove the pad fixing screws.

**10** Using a screwdriver, pry off the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads.

**CAUTION**

***Tighten the pad fixing screws to 30÷35 Nm.***

### *RENEWING THE FRONT PADS (B)*

To renew the front pads of the **section**, extend the boom of about 1 meter, and proceed as follows:

**11** Stop the machine, lower the nose to the ground for an easier removal of the bottom pads. Hold it in horizontal position for removing the top pads.

**CAUTION**

***Tighten the pad fixing screws to 30÷35 Nm.***

**12** Using a 17mm hex wrench or a 6mm Allen wrench, remove the pad fixing screws. Using a screwdriver, pry off the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads.

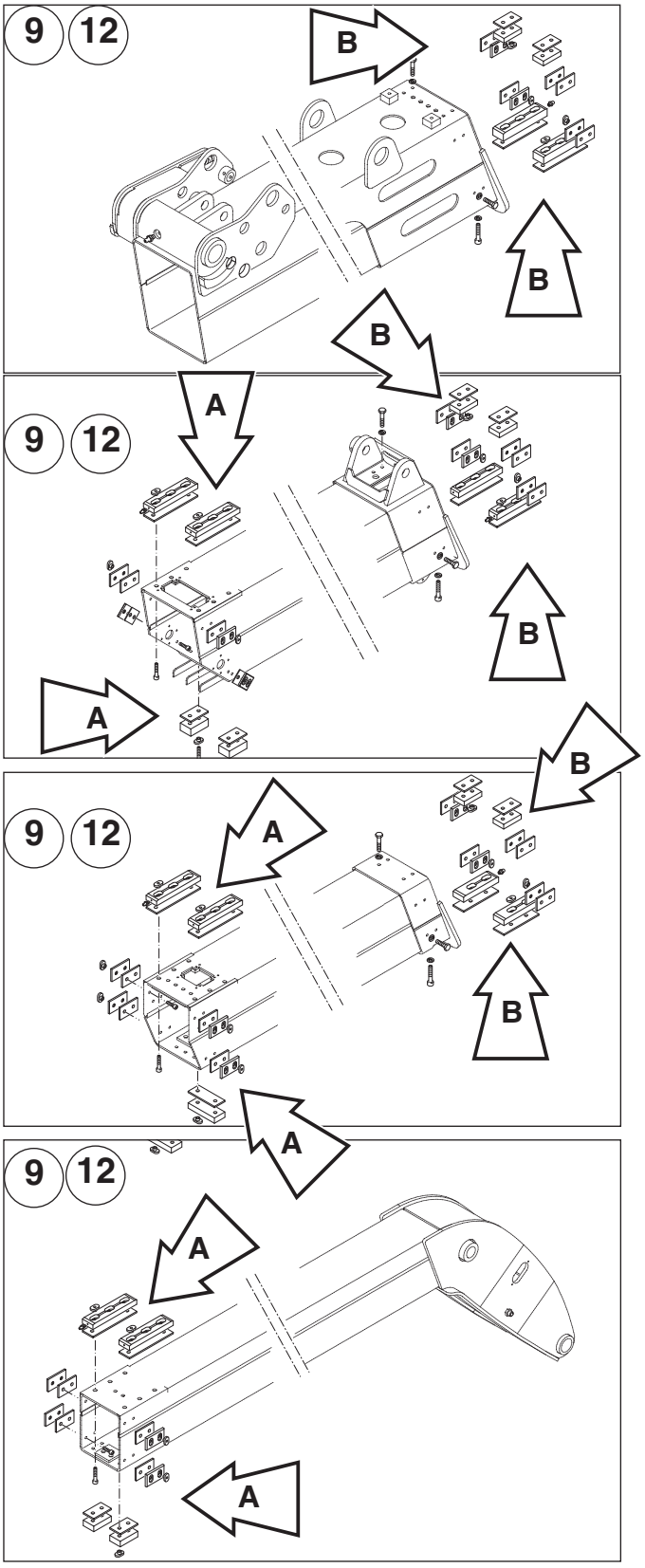


TABLE 012

| Procedure: | **Renewing the slide pads of the telescopic boom GTH 4013 SX** | Table: ***012*** **GTH-4013 SX GTH-4017 SX** |
|---|---|---|

**13** Clean and grease the internal and external walls of the boom sections in the sliding points of the pads. To this end, use **INTERFLON FIN GREASE LS2**

**14** With a thickness gauge, ensure the play between the boom sections is correct in both positions -i.e. with the boom fully extended and fully retracted.

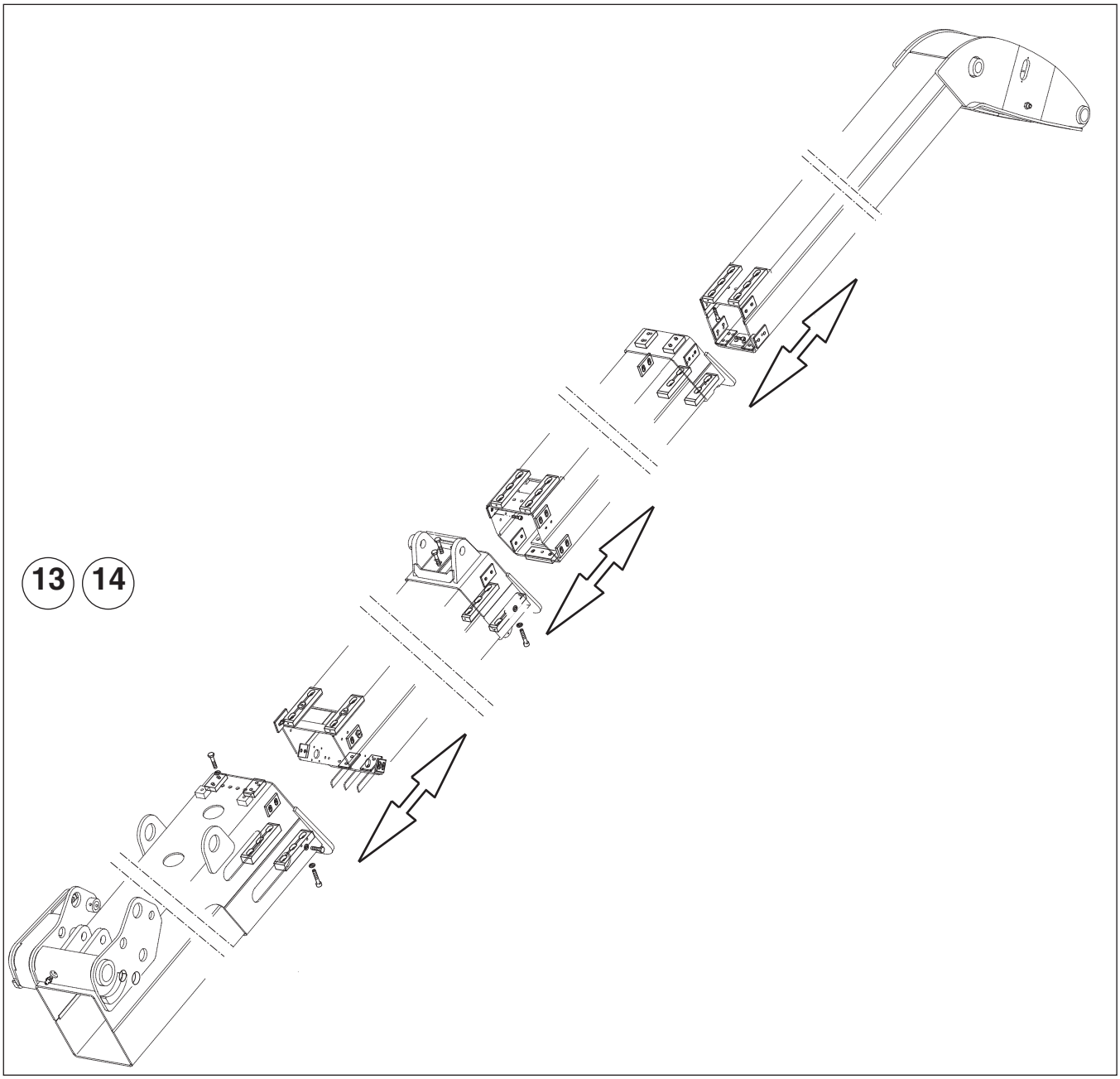


TABLE 013

| Procedure: **Renewing the flexible hoses inside the boom GTH 4013 SX** | Table: **013** GTH-4013 SX GTH-4017 SX | kg | - |
|---|---|---|---|
| | | | Hours Min. |
| **Standard tools** | | | 2 - |
| | | | 2 |

**How to renew flexible hoses:**

PROTECT THE ENVIRONMENT

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

CAUTION

***Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.***

DANGER

***Before disconnecting the hydraulic piping, ensure there is no pressure in the line. In case, release the pressure by operating the control levers with the engine stopped.***
***In any case, disconnect the hydraulic piping with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc.***
***Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.***

1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.
2 Blow some compressed air to remove any impurity.
3 For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:
- disconnect the hose to be replaced from both sides
- attach a cord to the side of the hose which reaches the boom tip (B)
- disconnect the hose from the rear side of the boom (C)
- remove the hose frome the hole iunder the first section boom until it comes out completely (D)
- disconnect the cord and reconnect the same to the end of the new flexible hose making sure the hose has been previously plugged to prevent dirt from entering the circuit
- proceed in reverse order and re-assemble the hose.

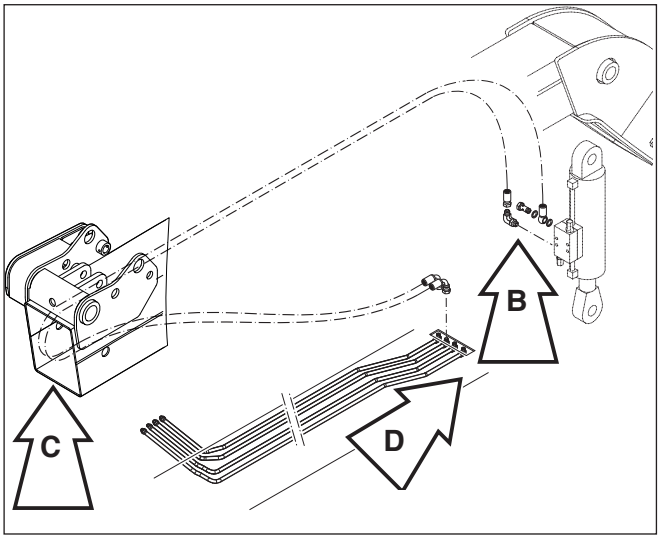


TABLE 013

| Procedure: **Renewing the flexible hoses inside the boom GTH 4013 SX** | Table: ***013*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

## Useful advice for mounting flexible hoses:

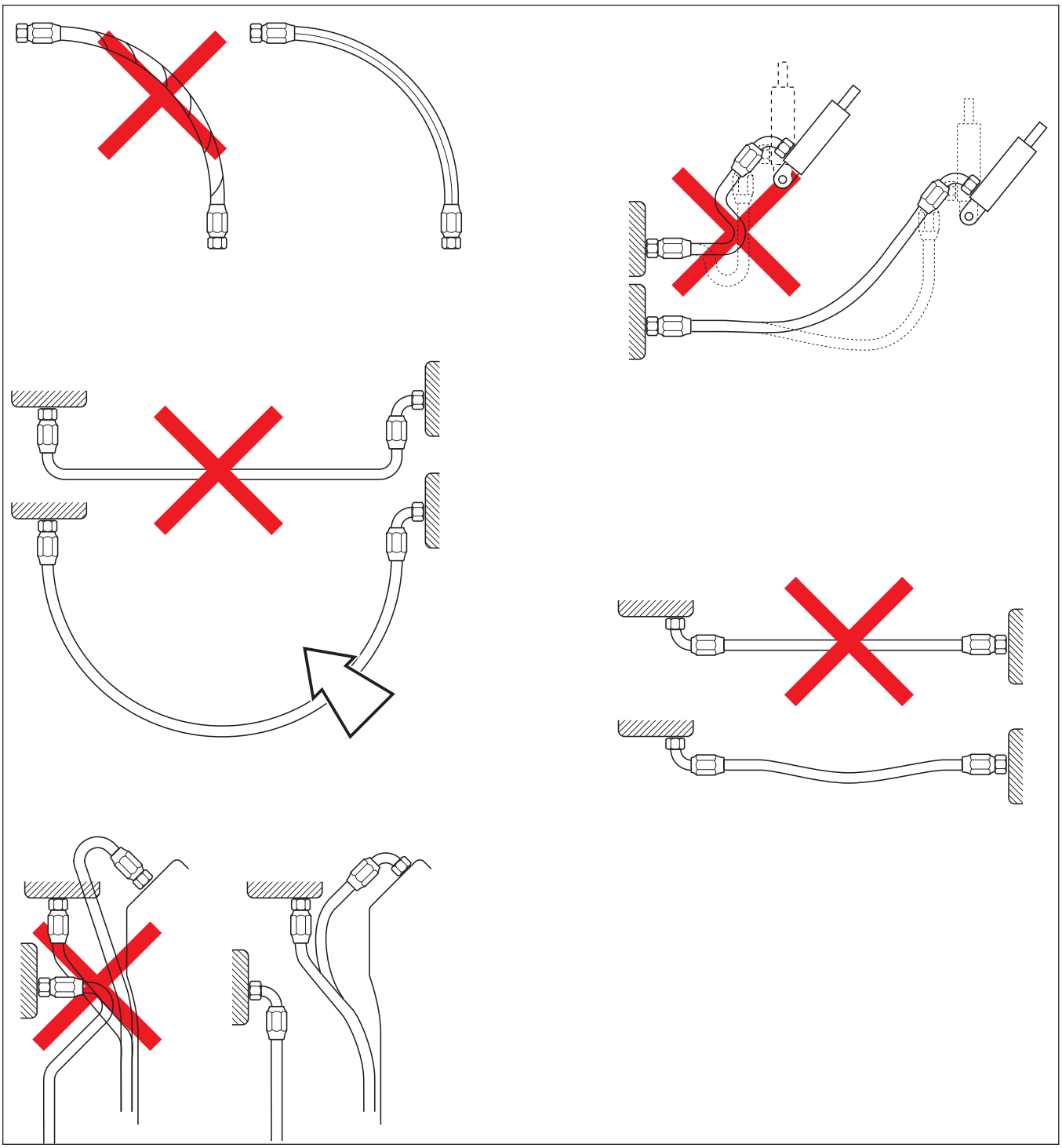


TABLE 014

| Procedure: **Renewing the flexible hoses inside the boom GTH 4017 SX** | Table: ***014*** **GTH-4013 SX GTH-4017 SX** | kg | - |
|---|---|---|---|
| | | Hours | Min. |
| **Standard tools** | | 2 | - |
| | | 2 | |

**How to renew flexible hoses:**

**PROTECT THE ENVIRONMENT**

***Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.***

**CAUTION**

***Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.***

**DANGER**

***Before disconnecting the hydraulic piping, ensure there is no pressure in the line. In case, release the pressure by operating the control levers with the engine stopped.***
***In any case, disconnect the hydraulic piping with extreme caution and always wear suitable personal protection equipment -e.g. goggles, gloves, facial screen, etc.***
***Wrap up the end of the pipe to be disconnected with some rags and slowly loosen the pipe connector so that air comes out as slow as possible.***

1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.
2 Blow some compressed air to remove any impurity.
3 For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:
- retract the boom completely and keep it in horizontal position
- disconnect the side ot the hose to replace using a 24mm combination wrench (**A)**
- attach a cord to the side of the disconnected hose
- disconnect the other side of the hose using a 24mm wrench(**B**)
- remove the hose pulling the cord until it comes out completely **(B)**
- disconnect the cord and reconnect the same to the end of the new flexible hose making sure the hose has been previously plugged to prevent dirt from entering the circuit
- proceed in reverse order and re-assemble the hose.

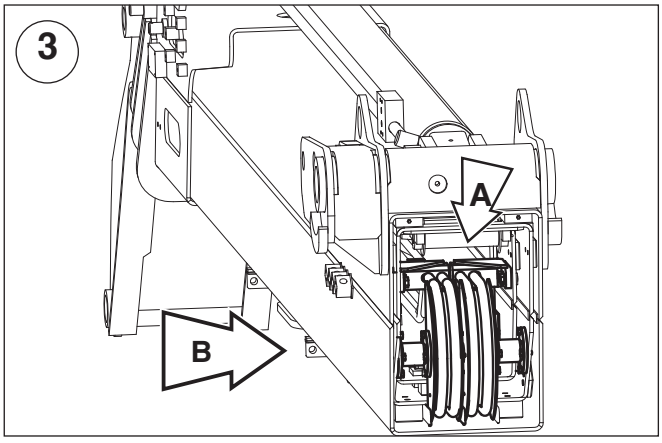
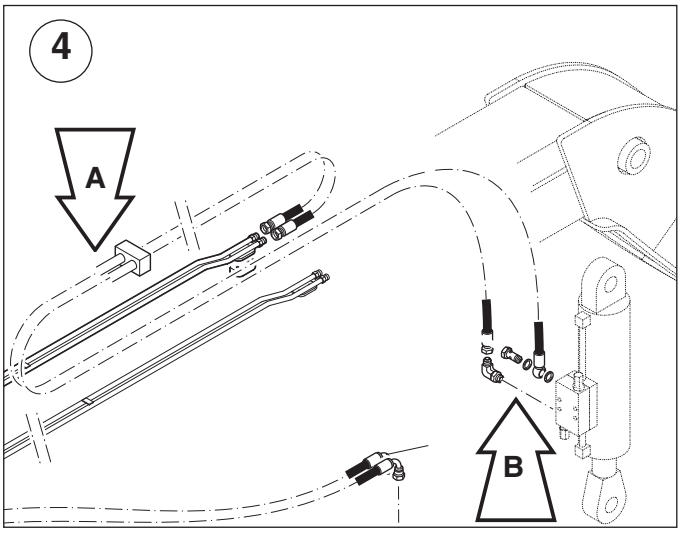


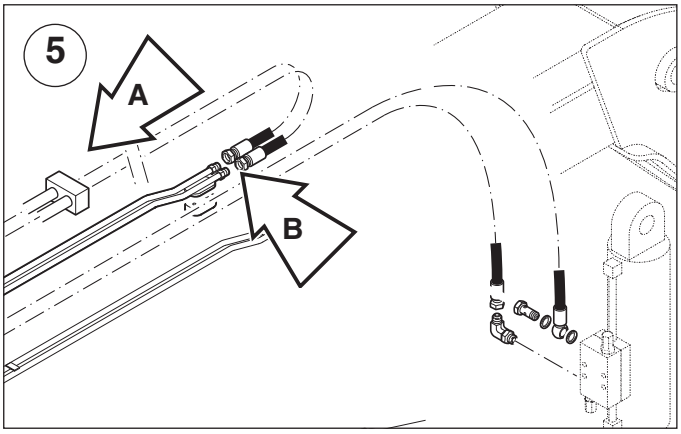
TABLE 014

| Procedure: | **Renewing the flexible hoses inside the boom GTH 4017 SX** | Table: ***014*** **GTH-4013 SX GTH-4017 SX** |
|---|---|---|

**4** How to renew the flexible hoses inside the boom:
- extend the boom until the holes inside the fourth section are visible
- disconnect the hose using a 24mm wrench (**A**)
- plug the hole to avoid dusty or impurities come inside
- attach a cord to the end of hose
- disconnect the hose on the external side of the boom, using a 24mm wrench and a 27mm wrench (**B**).
- remove the hole pulling it from the external side of the boom, position (**B**).
- proceed in reverse order and re-assemble the new hose.




**5** How to renew the flexible hoses inside the boom:
- extend the boom until the holes inside the fourth section are visible
- disconnect the hose using a 24mm wrench (**A**)
- plug the hole to avoid dusty or impurities come inside
- read and execute the instructions in the following paragraph (**6**); once the iron pipes are removed renew the holes disconnecting them in the position (**B**)
- proceed in reverse order to re-assemble.




**6** How to renew the stiff hoses inside the boom:
- extend the boom until the holes inside the fourth section are visible
- disconnect the hose using a 24mm wrench (**A**)
- plug the hole to avoid dusty or impurities come inside
- retract the boom completely
- remove the lock screws of the two half pulleys (**B**) using a 13mm combination wrench

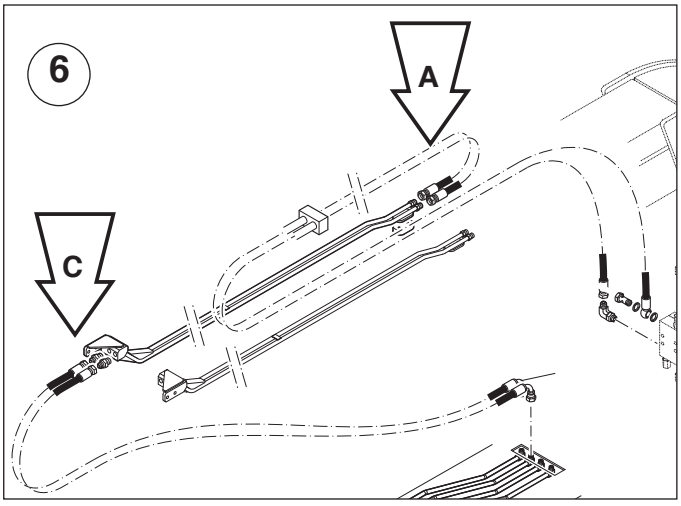
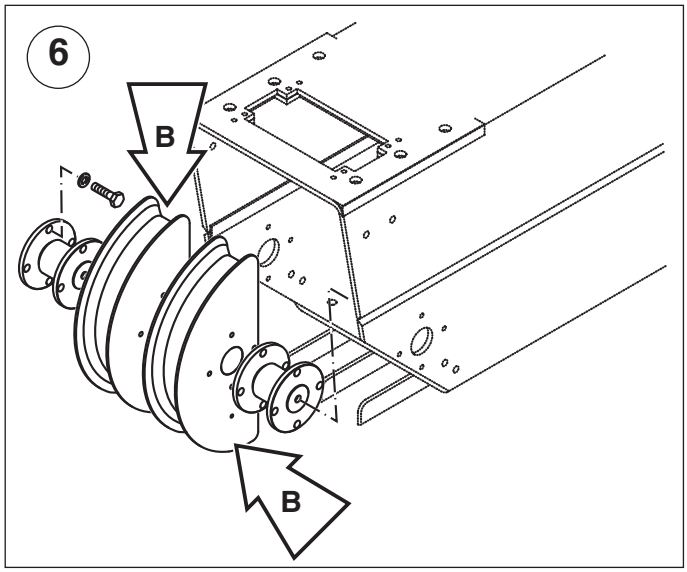


TABLE 014

| Procedure: **Renewing the flexible hoses inside the boom GTH 4017 SX** | Table: ***014*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

- disconnect the holes (**C**) using a 24mm combination wrench, then plug them to avoid dusty or impurities come inside
- remove the lock screws of the metal holes (**D**) using a 17mm combination wrench
- pull out the metal holes by hand
- proceed in reverse order to re-assemble.



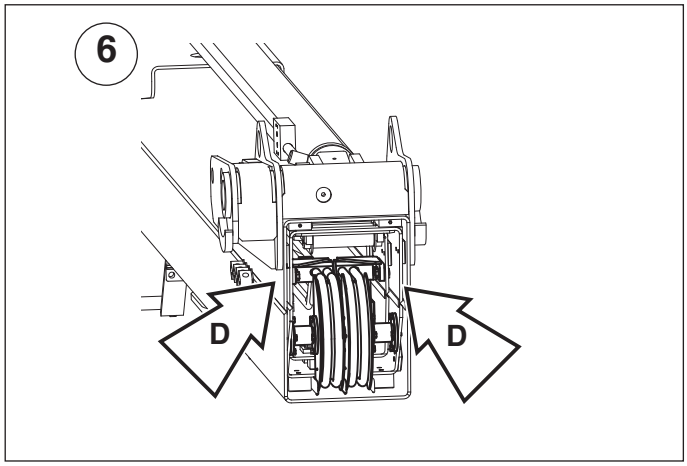



TABLE 014

| Procedure: **Renewing the flexible hoses inside the boom GTH 4017 SX** | Table: ***014*** **GTH-4013 SX GTH-4017 SX** |
|---|---|

## Useful advice for mounting flexible hoses:

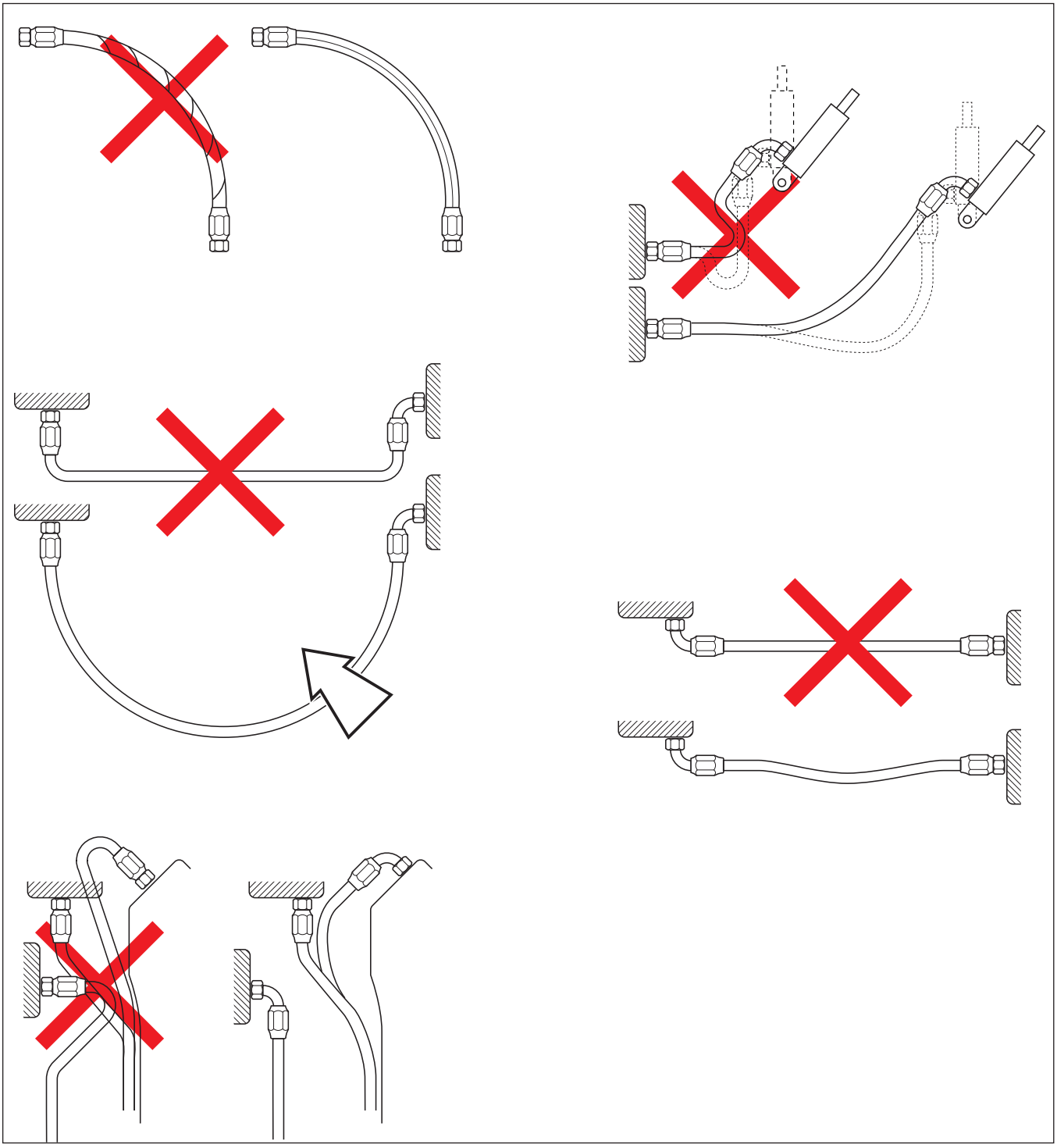


TABLE 015

| Procedure: **Cylinder disassembly Attachment rotation cylinder** | Table: ***015*** **GTH-4013 SX GTH-4017 SX** | kg: 36 |
|---|---|---|
| **Bridge crane, payload 500 kg** **Textile bridles or chains with hooks** | Standard tools Adjustable stands | Hours: 2 Min.: 00 |
| | | 1 |

**Operation:**

**1** Remove the attachment

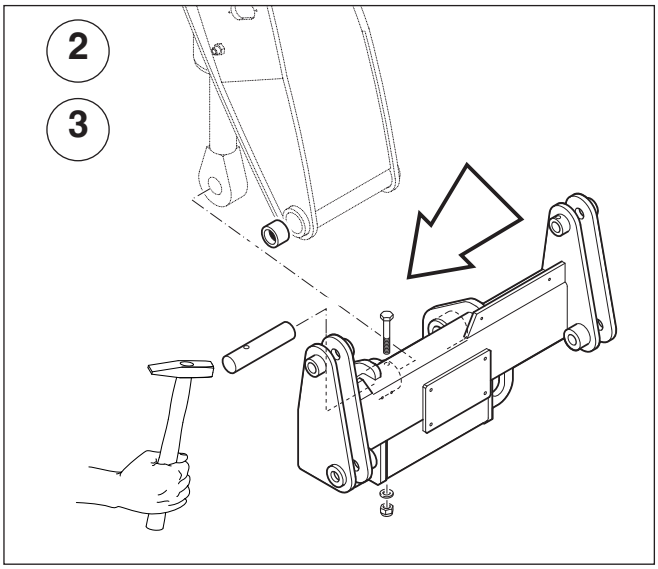
**2** Remove the screw fixing the pin (rod side) with two 17 mm wrenches

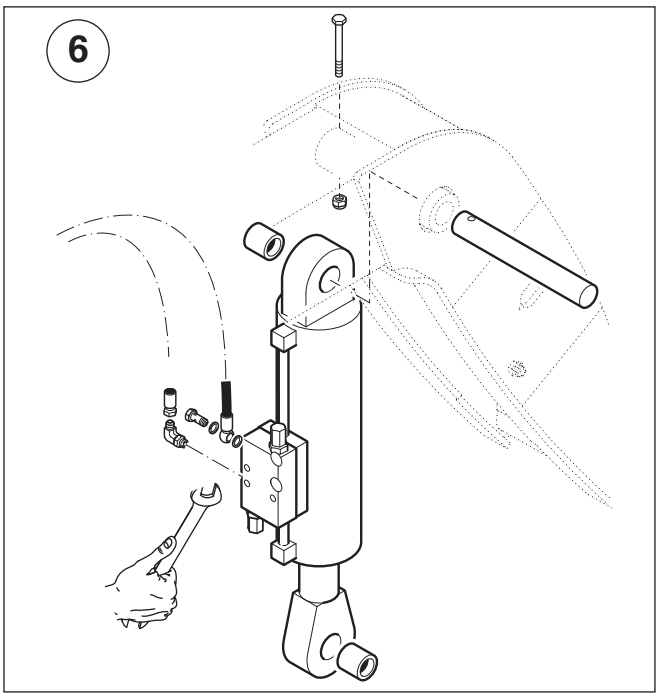
**3** Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

**4** Open entirely the cylinder by the hydraulic drive and then stop the machine

**5** Place a container of suitable size under the hydraulic piping before disconnecting the same

**6** Using a 24mm wrench and a 27mm wrenchm disconnect the two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.



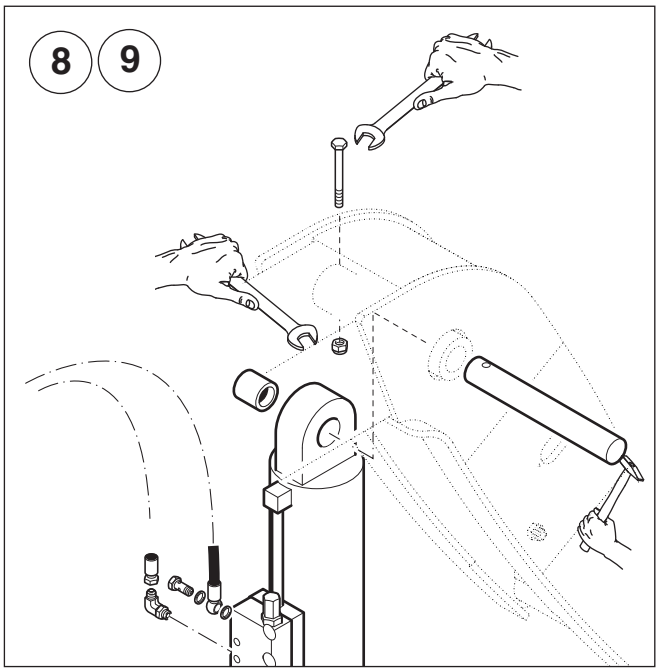

**PROTECT THE ENVIRONMENT**

***Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.***

**7** Place a wooden plug under the cylinder rod, then lower the boom using the hydraulic controls as far as the rod rests on the wooden plug

TABLE 015

| Procedure: **Cylinder disassembly**<br>**Attachment rotation cylinder** | Table: ***015***<br>**GTH-4013 SX**<br>**GTH-4017 SX** |
|---|---|




**8** Remove the screw fixing the cylinder pin (bottom side) using two 17 mm wrenches

**9** Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

**10** Secure the cylinder to the bridge crane with a textile bridle, then slightly raise the boom to set the cylinder free

**11** Remove the cylinder using the bridge crane