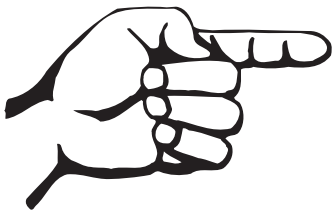
Genie®
A TEREX COMPANY

Service Manual

	Serial number range
GTH-4017 EX	From serial n.: 19296
GTH-4514 EX	From serial n.: 19286
GTH-4013 EX	From serial n.: 19266

Part. No. 57.0009.0427

November 2008



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Introduction

IMPORTANT
Read, understand and obey the safety rules and operating instructions in the **GTH-4013EX - GTH-4514EX - GTH-4017EX Operator's manual** (cod. 57.0009.0454) 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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IDENTIFICATION MACHINE

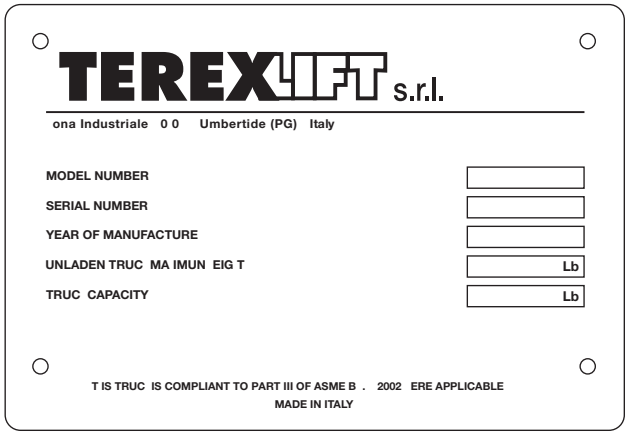
Machine Identification

■ CHASSIS SERIAL NUMBER

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

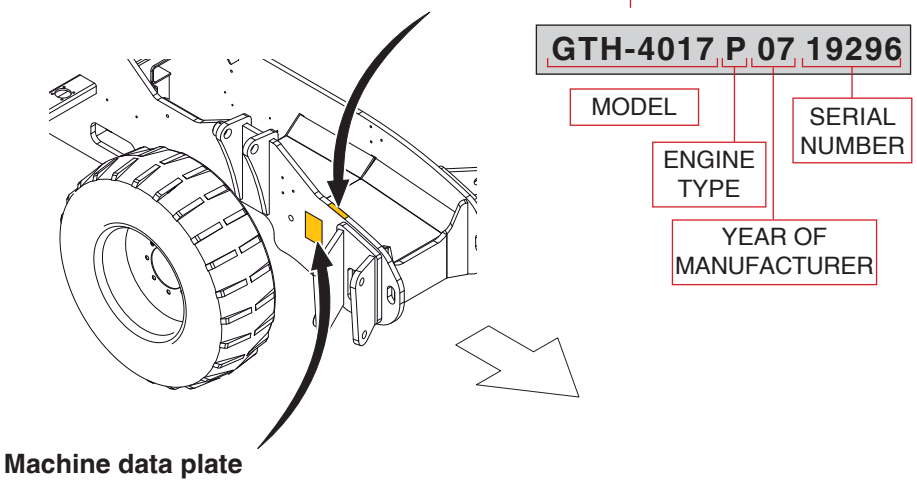
■ IDENTIFICATION PLATES OF THE MAIN PARTS

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 GTH-4017 EX - GTH-4514 EX

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 side) and to the circuit for the telescopic boom movements (secondary side). 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 150 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 external side of the tank and protected by a gate **(40)**.

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, Sauer danfoos 51D110 model **(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 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 hydraulic drive supplies power to the front steering cylinder; the rear steering cylinder is locked. 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 4-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.

This valve consists of an input head with 3-way pressure compensator used as a flow regulator for the user which works at max load (load sensing), and as a discharge valve when the pump flow is not used for the boom movements, and of 4 modules each one of them controlling a specific function of the telescopic boom, that is lifting/lowering, attachment holding plate

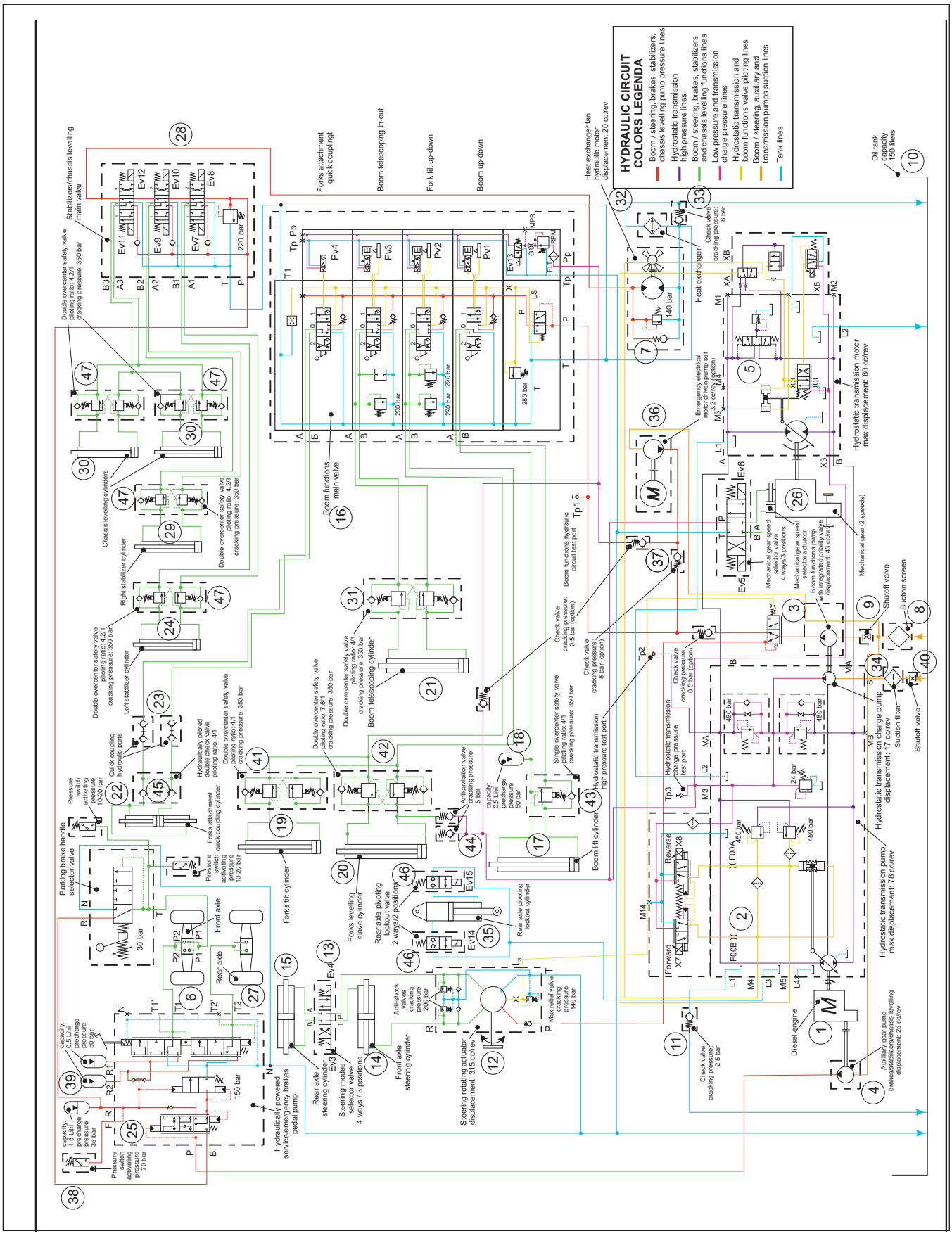
DESCRIPTION

rotation, boom extension/ retraction, attachment locking/ unlocking).
In the head there is a pressure relief valve set at 280 bar which, acting on the line of the “load sensing” signal, limits the maximum pressure at the inlet of the main valve through such 3-way compensator. On the main inlet head of the main valve, there is also the pilot line head which includes an inlet safety filter, a pressure relief valve acting on the pilot line, and a safety solenoid valve. The pilot head delivers oil at pressure to the 4 control modules of the main valves, such modules operating the relevant main sliders in relation to the command signal they receive from such joystick via the control unit.
Module 1 of the main valve controls the telescopic boom lifting cylinder **(17)**. This cylinder has one single-acting compensation valve **(43)** with safety function. The control module of the second main valve element is the electro-proportional type with electrical feed-back and integrated electronics. The 0.5-lt. accumulator prefilled at 50 bar **(18)** and located on the line of the differential chamber of the lifting cylinder **(17)**, allows for damping the boom swings when the same boom is moved down.
Module 2 of the main valve **(16)** controls the cylinder operating the attachment holding plate of the telescopic boom **(19)**. This cylinder is equipped with a double-acting compensation valve **(41)** with safety function. Paralleled to this cylinder we find the fork levelling cylinder **(20)** (or balancing cylinder) equipped with a special double-acting compensation valve **(42)**. Inside this valve, the one-way valves are installed in a reverse manner with respect to the normal position to avoid the pressurisation of the cylinder when the rotation command of the attachment holding plate is operated. Again inside this valve, there are other two one-way valves **(44)** set at 5 bar with anti-cavitation function. These are used to deliver oil, sucked from the low pressure line coming from the drive pump **(2)**, to the compensation circuit of the fork levelling function, when such circuit cannot do it alone. The control module of the second main valve element is the electro-proportional type with electrical feed-back and integrated electronics. On the two control lines of the cylinder **(19)**, and integral to module 2, there are two pressure relief valves set at 290 bar which protect the automatic levelling system of the forks when the boom is moved up and down and in case of overload on the attachment holding plate (ex. use of the bucket).
Module 3 of the main valve controls the boom telescope extension cylinder **(21)**. This cylinder is equipped with a double-acting compensation valve **(31)** with safety function. The control module main valve element is the electro-proportional type with electrical feed-back and integrated electronics.
On the control line of the circular chamber of the cylinder **(21)** there is a pressure relief valve set at 200 bar which limits the load when the boom is extended in those working zones where the electronic overturning control system cannot detect overload conditions with respect to the load chart of the machine.
Module 4 of the main valve controls the attachment locking cylinder **(22)**. This cylinder has a double one-way valve **(45)** with hydraulic release and safety function. The control module of this main valve element is the ON/OFF electrical type with integrated electronics. On the feeding lines of this cylinder, there are two quick-fit connectors **(23)** for the connection of the hydraulic lines to the optional attachments which need hydraulic power for their operation (ex. hydraulic winch and maintenance jib, mixing bucket, etc.). The SAFIM S6 servo-assisted braking system with pedal **(25)** receives oil from the pump **(4)** and uses this oil to pressurise 3 hydraulic accumulators **(39)** connected to the same system. The oil at pressure contained in these accumulators is then used to operate the service brake of the two axles **(6)** and **(27)**, and to unlock the parking brake in the front axle **(27)**.
The fill valve inside the braking system takes the flow from the feeding line so the pressure on the line of the accumulators 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 oil feeds the ON/OFF type modular main valve **(28)**; the not used oil feeds the engine of the radiator fan for cooling the hydraulic oil and the thermal engine liquid.
The brake pedal located in the driving cab, which is an integral part of the braking system S6, is connected to a proportional slider which controls the two lines of the service brake, one for each axle.
In relation to the stroke of this slider, a gradual communication between the feeding line, connected to two accumulators **(39)** which, at their turn, are connected to ports R1 and R2 (the accumulators have 0.5-lt. capacity and 50bar fill pressure), and the service brake lines is established so the flow is distributed to such lines and the discharge line increasing, in this way, the pressure (and as a result the braking force) on the lines of the service brakes. When the sliders are in the rest position, the lines of the service brakes are connected to the discharge.
The pressure switch set at 70 bar and connected to port F, sends an electrical warning signal when the pressure inside the feeding circuit of the brake lines is too low to guarantee the minimum braking efficiency.
The oil coming from the drain lines of the main control valve of the telescopic boom **(16)** is cooled downb 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 drained into the 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 **(46)** 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 about 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.
The ON/OFF type modular main valve **(28)** controls the outriggers using the cylinders **(24) (29)** and controls the levelling of the frame **(30)**. In the input head of the main valve there is a pressure relief valve set at 220 bar. The oil flow that the main valve doesn't use, goes to the 20 cm gears hydraulic engine **(7)**. The engine housing is equipped with an anti-cavitation valve and a pressure reducing valve set at 140 bar with by-pass function.
The outriggers and levelling cylinders are equipped with a double-acting balancing valve **(47)** with safety function.
When the machine is equipped with man-platform, a battery-powered emergency pump **(36)** is installed to be used in an emergency when the main circuit of the telescopic boom is faulty.
To work correctly, this circuit uses one-way valves **(37)** with different opening pressures.

DESCRIPTION

GTH-14017EX - GTH-4514EX hydraulic schematic



Description

DESCRIPTION OF THE MACHINE OPERATION GTH-4013EX

The mechanical energy source of these machines is a **(1) Perkins diesel engine** model 1104/d-44T, which supplies a 74,5 kW at 2200 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 side) and to the circuit for the telescopic boom movements (secondary side). 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 150 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 drine lines of the pumps **(3) (4)**. This filter cleans the oil. The drive pump sucks the oil from the head filter set at 0,5bar.

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, Sauer danfoos 51D080 model **(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 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 hydraulic drive feeds the front steering cylinder 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 4-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.

This valve consists of an input head with 3-way pressure compensator used as a flow regulator for the user which works at max load (load sensing), and as a discharge valve when the pump flow is not used for the boom movements, and of 4 modules each one of them controlling a specific function of the telescopic boom, that is lifting/lowering, attachment holding plate rotation, boom extension/ retraction, attachment locking/ unlocking).

In the head there is a pressure relief valve set at 280 bar which, acting on the line of the “load sensing” signal, limits the maximum pressure at the inlet of the main valve through such 3-way compensator. On the main inlet head of the main valve, there is also the pilot line head which includes an inlet safety filter, a pressure relief valve acting on the pilot line, and a safety solenoid valve. The pilot head delivers oil at pressure to the 4 control modules of the main valves, such modules operating the relevant main sliders in relation to the command signal they receive from such joystick via the control unit.

Module 1 of the main valve controls the telescopic boom lifting cylinder **(17)**. This cylinder has one single-acting compensation valve **(43)** with safety function. The control module of the second main valve element is the electro-proportional type with electrical feed-back and integrated electronics. The 0.5-lt. accumulator prefilled at 50 bar **(18)** and located on the line of the differential chamber of the lifting cylinder **(17)**, allows for damping the boom swings when the same boom is moved down.

Module 2 of the main valve **(16)** controls the cylinder operating the attachment holding plate of the telescopic boom **(19)**. This cylinder is equipped with a double-acting compensation valve **(41)** with safety function. Paralleled to this cylinder we find the fork levelling cylinder **(20)** (or balancing cylinder) equipped with a special double-acting compensation valve **(42)**. Inside this valve, the one-way valves are installed in a reverse manner with respect to the normal position to avoid the pressurisation of the cylinder when the rotation command of the attachment holding plate is operated. Again inside this valve, there are other two one-way valves **(44)** set at 5 bar with anti-cavitation function. These are used to deliver oil, sucked from the low pressure line coming from the drive pump **(2)**, to the compensation circuit of the fork levelling function, when such circuit cannot do it alone. The control module of the second main valve element is the electro-proportional type with electrical feed-back and integrated electronics. On the two control lines of the cylinder **(19)**, and integral to module 2, there are two pressure relief valves set at 290 bar which protect the automatic levelling system of the forks when the boom is moved up and down and in case of overload on the attachment holding plate (ex. use of the bucket).

Module 3 of the main valve controls the boom telescope extension cylinder **(21)**. This cylinder is equipped with a double-acting compensation valve **(31)** with safety function; the module 3 controls the third section boom extension cylinder **(40)** too. This cylinder is equipped with a single-acting balancing valve **(48)** with safety function.

The control module main valve element is the electro-proportional type with electrical feed-back and integrated electronics.

On the control line of the circular chamber of the cylinders **(21)** and **(40)** there is a pressure relief valve set at 230 bar which limits the load when the boom is extended in those working zones where the electronic overturning control system cannot detect overload conditions with respect to the load chart of the machine.

Module 4 of the main valve controls the attachment locking cylinder **(22)**. This cylinder has a double one-way valve **(45)** with hydraulic release and safety function. The control module of this main valve element is the ON/OFF electrical type with integrated electronics. On the feeding lines of this cylinder, there are two quick-fit connectors **(23)** for the connection of the hydraulic lines to the optional attachments which need hydraulic power for their operation (ex. hydraulic winch and maintenance jib, mixing bucket, etc.). The SAFIM S6 servo-assisted braking system with pedal **(25)** receives oil from the pump **(4)** and uses this oil to pressurise 2 hydraulic accumulators **(39)** connected to the same system. The oil at pressure contained in these accumulators is then used to operate the service brake of the two axles **(6)** and **(27)**.

The fill valve inside the braking system takes the flow from the feeding line so the pressure on the line of the accumulators 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 oil feeds the ON/OFF type modular main valve **(28)**.

The brake pedal located in the driving cab, which is an integral part of the braking system S6, is connected to a proportional slider which controls the two lines of the service brake, one for each axle.

In relation to the stroke of this slider, a gradual communication between the feeding line, connected to two accumulators **(39)** which, at their turn, are connected to ports R1 and R2 (the accumulators have 0.5-lt. capacity and 50bar fill pressure), and the service brake lines is established so the flow is distributed to such lines and the discharge line increasing, in this way, the pressure (and as a result the braking force) on the lines of the service brakes. When the sliders are in the rest position, the lines of the service brakes are connected to the discharge.

The pressure switch **(38)** set at 70 bar and connected to port F, sends an electrical warning signal when the pressure inside the feeding circuit of the brake lines is too low to guarantee the minimum braking efficiency.

The oil coming from the drain lines of the main control valve **(16)** of the telescopic boom 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 drained into the tank **(10)**.

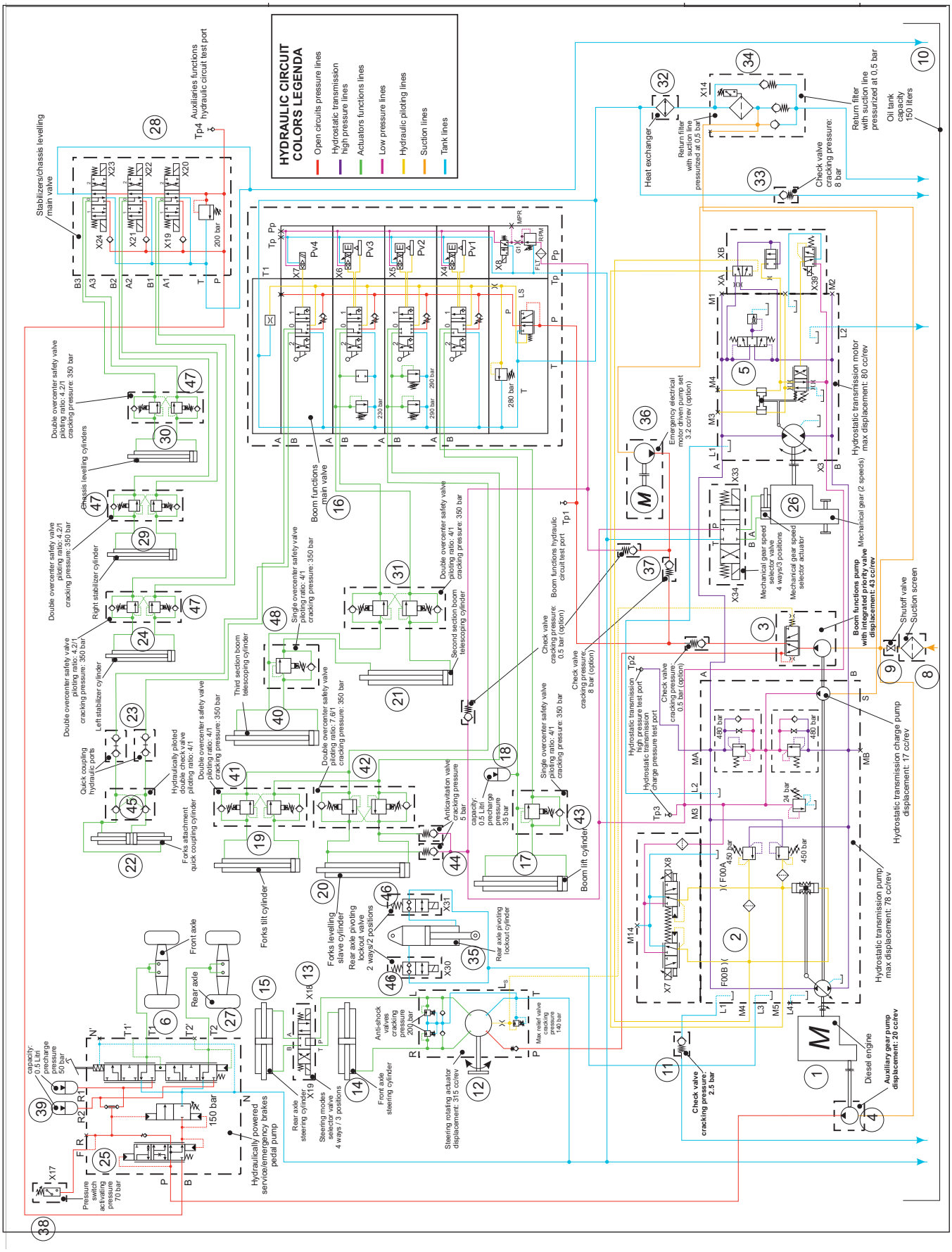
A one-way valve calibrated at 8 bar **(33)**, is installed

DESCRIPTION

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 **(46)** 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 about 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.
The ON/OFF type modular main valve **(28)** controls the outriggers using the cylinders **(24) (29)** and controls the levelling of the frame **(30)**. In the input head of the main valve there is a pressure relief valve set at 220 bar.
The outriggers and levelling cylinders are equipped with a double-acting balancing valve **(47)** with safety function.
When the machine is equipped with man-platform, a battery-powered emergency pump **(36)** is installed to be used in an emergency when the main circuit of the telescopic boom is faulty.
To work correctly, this circuit uses one-way valves **(37)** with different opening pressures.

DESCRIPTION

GTH-4013EX hydraulic schematic



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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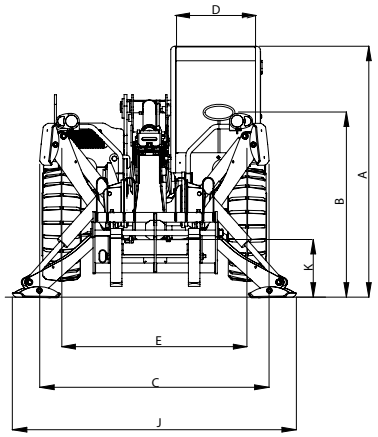
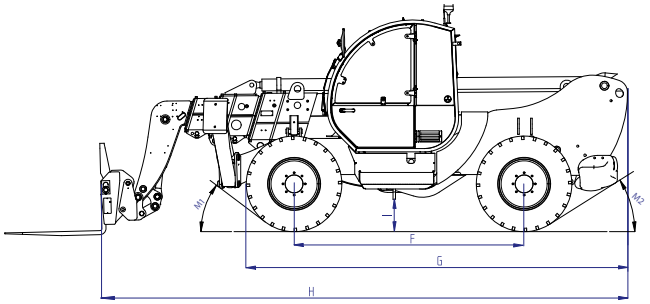
Technical Specification

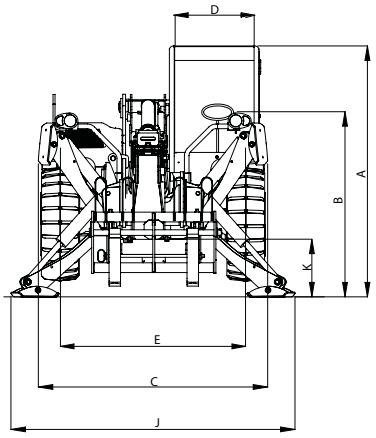
2.1 MAIN DIMENSIONS

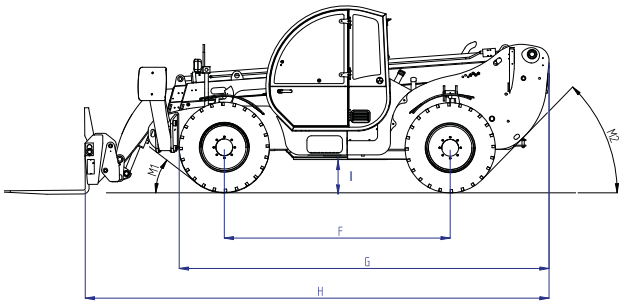
GTH-4017 EX GTH-4514 EX





GTH-4017 EX GTH-4514 EX





			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
A	Height	mm	2610	2560	2400
B	Height at steering whell	mm	1650	1600	1600
C	Width	mm	2450	2450	2320
D	Inside cab width	mm	780	780	780
E	Track	mm	1980	1980	1920
F	Wheelbase	mm	2850	2850	2950
G	Lenght to the front tyres	mm	4700	4650	4790
H	Lenght to the attachment holding plate	mm	6490	6100	6060
I	Ground clerance, center	mm	425	375	390
J	Max width with ext. outriggers	mm	2950	2950	2890
K	Ground clerance, axle	mm	450	400	441
•	Inside turning radius	mm	2150	2150	2425
•	Outside turning radius	mm	4500	4500	4650

TECHNICAL SPECIFICATION

2.2 TYRES

		GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
- Dimension		405/70-24	405/70-20	405/70-20
- Load index		14 pr	14 pr	14 pr
- Rim		13x24	13x20	13x20
- Wheel disc		8 holes DIN 70631	8 holes DIN 70631	8 holes DIN 70631
- Pressure	bar/Psi	4.5/65	5.5/80	5.5/80

2.3 LIMIT OF USE

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
M1	Obstruction angle	°	37	33	40
M2	Departure angle	°	32	29	46
•	Min/max ambient temperature	°C	-20°/+40°	-20°/+40°	-20°/+40°

2.4 WEIGHT

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Weight with fork	Kg	11850	10600	10100

2.5 SPEED

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Max speed*/**	Km/h	5/35	5/35	55/35
•	Max slope uphill*/**	°	29/36	31/41	30/34
•	Towing capacity at dinam. (max load)	kg	8200	8200	7500
•	Towing capacity at dinam. (with fork)	kg	7250	7250	5835
•	Break-out force	Kg	7900 (shovel 800lt SAE J732/80)	7900 (shovel 800lt SAE J732/80)	6000 (shovel 800lt SAE J732/80)
•	Chassis levelling	°	+/- 8	+/- 8	+/-6

2.6 PAYLOAD AND REACH

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Lifting height (max) with/without outriggers	mm	16720/16590	13710/13560	13000/12810
•	Forward reach (max)	mm	12550	9610	9080
•	Reach at maximum height	mm	590	560	1900
•	Fork-holder plate rotation	°	145	145	138
•	Lifting capacity (max)	kg	4000	4500	4000
•	Lift capacity at maximum height	kg	2500	3500	3000
•	Lift capacity at maximum reach	kg	600	1250	1250
•	Floor loading* with/without outriggers	kPa	581/581	619/527	469/479

2.7 FORKS (FLOATING TYPE)

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Dimension	mm	1200x120x50	1200x120x50	1200x120x50
•	Weight	Kg	70	70	70

2.8 DIESEL ENGINE

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Make		PERKINS	PERKINS	PERKINS
•	Model/Type		1104 / D-44T	1104 / D-44T	1104 / D-44T
•	Total displacement	cm^3	4.400	4.400	4.400
•	Cylinder arrangement		vertical in-line	vertical in-line	vertical in-line
•	Combustion system		direct injection	direct injection	direct injection
•	Max power output (@ 2200 rpm)	kW	74,5	74,5	74,5
•	Max torque output (@ 1400 rpm)	Nm	392	392	392
•	Aspiration		turbocharged	turbocharged	turbocharged
•	Cylinder's number		4	4	4
•	Bore x Stroke	mm	105x127	105x127	105x127

** Max Load; **With Fork*

2.9 HYDRAULIC SYSTEM

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Make		PERKINS	PERKINS	PERKINS
•	Hydraulic output	L/min	95	95	95
•	Pressure	bar	270	270	270

2.10 ELECTRICAL SYSTEM

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Voltage	V	12	12	12
•	Tension	Ah	120	120	120

TECHNICAL SPECIFICATION

2.11 MACHINE SOUNDS LEVEL

- Not applicable

2.12 VIBRATION LEVEL

			GTH-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Vibrations (at seat level)	m/s^2	0,23	0,23	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-4017 EX	GTH-4514 EX	GTH-4013 EX
•	Make		PERKINS	PERKINS	PERKINS
•	Diesel engine	l	7	7	7
•	Fuel tank	l	135	135	135
•	Hydraulic system tank	l	150	150	150
•	Front differential gear with reduction gear	l	8,7	8,7	8,7
•	Rear differential gear	l	8,7	8,7	8,7
•	Front wheel reduction gears	l	0,75	0,75	0,75
•	Rear wheel reduction gears	l	0,75	0,75	0,75
•	Engine coolant	l	15	15	15
•	Gearbox	l	0,5	0,5	0,5

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 FASTENER TORQUE

SAE FASTENER TORQUE CHART

• This chart is to be used as a guide only unless noted elsewhere in this manual •

SIZE	THREAD	Grade 5				Grade 8				A574 High Strength Black Oxide Bolts	
		LUBED		DRY		LUBED		DRY		LUBED	
		in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
1/4	20	80	9	100	11.3	110	12.4	140	15.8	130	14.7
	28	90	10.1	120	13.5	120	13.5	160	18	140	15.8
		LUBED		DRY		LUBED		DRY		LUBED	
		ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
5/16	18	13	17.6	17	23	18	24	25	33.9	21	28.4
	24	14	19	19	25.7	20	27.1	27	36.6	24	32.5
3/8	16	23	31.2	31	42	33	44.7	44	59.6	38	51.5
	24	26	35.2	35	47.4	37	50.1	49	66.4	43	58.3
7/16	14	37	50.1	49	66.4	50	67.8	70	94.7	61	82.7
	20	41	55.5	55	74.5	60	81.3	80	108.4	68	92.1
1/2	13	57	77.3	75	101.6	80	108.4	110	149	93	126
	20	64	86.7	85	115	90	122	120	162	105	142
9/16	12	80	108.4	110	149	120	162	150	203	130	176
	18	90	122	120	162	130	176	170	230	140	189
5/8	11	110	149	150	203	160	217	210	284	180	244
	18	130	176	170	230	180	244	240	325	200	271
3/4	10	200	271	270	366	280	379	380	515	320	433
	16	220	298	300	406	310	420	420	569	350	474
7/8	9	320	433	430	583	450	610	610	827	510	691
	14	350	474	470	637	500	678	670	908	560	759
1	8	480	650	640	867	680	922	910	1233	770	1044
	12	530	718	710	962	750	1016	990	1342	840	1139
1 1/8	7	590	800	790	1071	970	1315	1290	1749	1090	1477
	12	670	908	890	1206	1080	1464	1440	1952	1220	1654
1 1/4	7	840	1138	1120	1518	1360	1844	1820	2467	1530	2074
	12	930	1260	1240	1681	1510	2047	2010	2725	1700	2304
1 1/2	6	1460	1979	1950	2643	2370	3213	3160	4284	2670	3620
	12	1640	2223	2190	2969	2670	3620	3560	4826	3000	4067

METRIC FASTENER TORQUE CHART

• This chart is to be used as a guide only unless noted elsewhere in this manual •

Size	Class 4.6				Class 8.8				Class 10.9				Class 12.9			
(mm)	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
5	16	1.8	21	2.4	41	4.63	54	6.18	58	6.63	78	8.84	68	7.75	91	10.3
6	19	3.05	36	4.07	69	7.87	93	10.5	100	11.3	132	15	116	13.2	155	17.6
7	45	5.12	60	6.83	116	13.2	155	17.6	167	18.9	223	25.2	1.95	22.1	260	29.4
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
8	5.4	7.41	7.2	9.88	14	19.1	18.8	25.5	20.1	27.3	26.9	36.5	23.6	32	31.4	42.6
10	10.8	14.7	14.4	19.6	27.9	37.8	37.2	50.5	39.9	54.1	53.2	72.2	46.7	63.3	62.3	84.4
12	18.9	25.6	25.1	34.1	48.6	66	64.9	88	69.7	94.5	92.2	125	81	110	108	147
14	30.1	40.8	40	54.3	77.4	105	103	140	110	150	147	200	129	175	172	234
16	46.9	63.6	62.5	84.8	125	170	166	226	173	235	230	313	202	274	269	365
18	64.5	87.5	86.2	117	171	233	229	311	238	323	317	430	278	377	371	503
20	91	124	121	165	243	330	325	441	337	458	450	610	394	535	525	713
22	124	169	166	225	331	450	442	600	458	622	612	830	536	727	715	970
24	157	214	210	285	420	570	562	762	583	791	778	1055	682	925	909	1233

TECHNICAL SPECIFICATION

2.15 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

2.16 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.

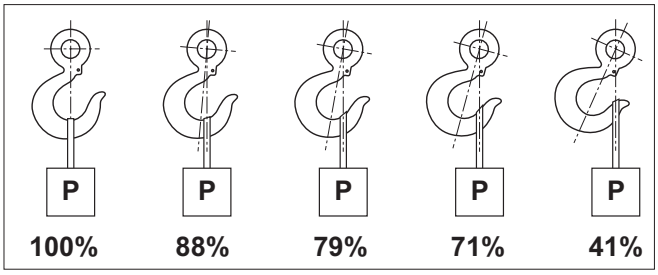
STRANDED ROPES

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

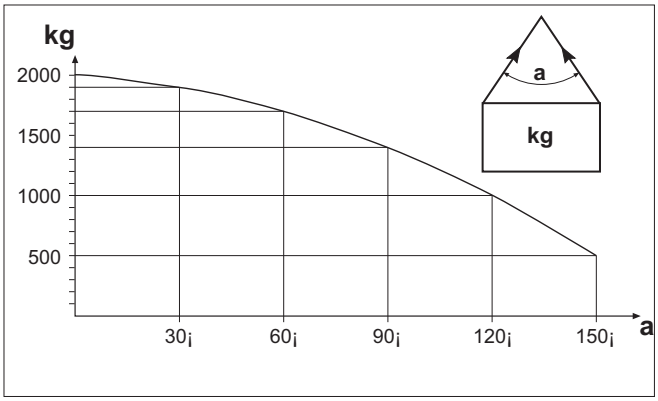
STRANDED ROPES	
Rope diameter mm	Max admissible load kg
10	1000
11.2	1400
12.5	1600
14	2200
16	2800
18	3600
20	4400
22.4	5600
30	10000
40	18000
50	28000
60	40000

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

2.17 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.

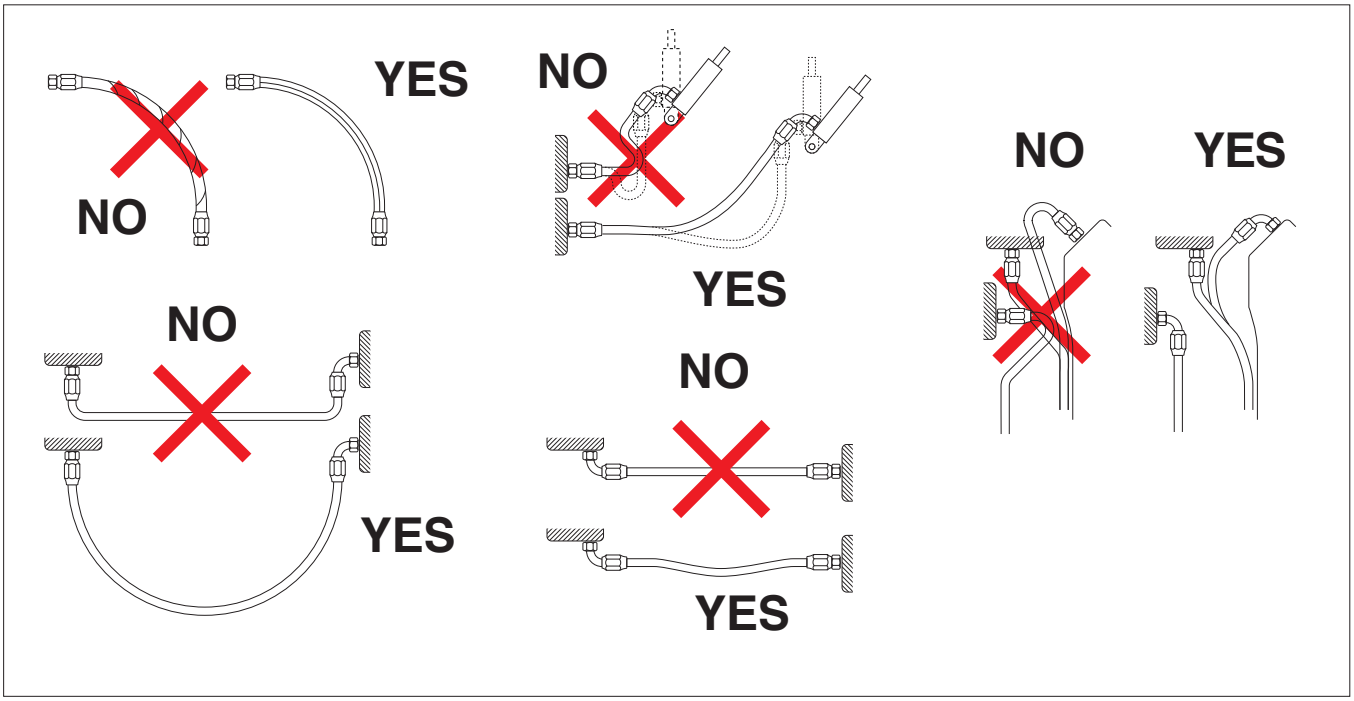
1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.

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:



2.18 LIST OF RECOMMENDED SPARE PARTS GTH-4013EX

Cod.	Description	Q.ty
07.0741.0015	Outrigger main valve gaskets kit	1
07.4529.0108	Levelling chassis cylinder gaskets kit	1
07.4529.0093	Rear axle levelling cylinder gaskets kit	1
04.4240.0025	Rear axle levelling cylinder solenoid valve	1
07.4529.0106	Outrigger cylinder gaskets kit	1
07.4529.0110	Lifting boom cylinder gaskets kit	1
54.0702.0000	Pad	2
54.0200.0001	Pad	2
54.0702.0001	Pad	2
54.0702.0003	Pad	2
54.0200.0000	Pad	2
54.0702.0004	Pad	2
04.0605.0505	Flexible hose	1
640536	Dumping fork cylinder gaskets kit	1
640101	Second section boom extending cylinder gaskets kit	1
640102	Third section boom extending cylinder gaskets kit	1
04.0605.0504	Flexible hose	1
640594	Valve	1
04.4210.0008	Female quick coupling	1
04.4210.0007	Male quick coupling	1
54.0001.0058	Lock attachment cylinder pin	1
07.4529.0107	Lock attachment cylinder gaskets kit	1
54.0001.0059	Lock attachment cylinder pin	1
04.0605.0506	Flexible hose	1
07.0740.0066	Cabin air filter	1
07.0740.0088	Front windscreen wiper boom	1
07.0740.0089	Front windscreen wiper brush	1
07.0740.0104	Lock door switch	1
07.0740.0202	Left mirror	1
07.0740.0050	External door handle	1
07.0740.0051	Inside door lock	1
07.0740.0029	Inside upper door handle	1
07.0740.0279	Inside door handle	1
07.0740.0230	Door upper glass seal	1
07.0703.0125	Cab door key	1
07.0703.0417	Forward lever	1
07.0703.0418	Turn signal lever	1
96008	S/C/N selector	1
07.0741.0012	Enabling function push button	1
56.0016.0032	Joystick	1
07.0703.0532	Switch	1
07.0741.0009	Switch	1
07.0703.0533	Road/job-site oush button switch	1
09.4670.0004	Vibration-damping brackets	2
07.0712.0094	Radiator Cap	1
53.3001.6000	Engine smoke manifold	1
09.4645.0000	Throttle cable	1
07.4501.0057	Diesel filter	1

TECHNICAL SPECIFICATION

Cod.	Description	Q.ty
638243	Engine oil filter	1
07.4501.0084	Engine air filter cartridge	1
07.4501.0085	Engine air filter safety cartridge	1
53.3001.6700	Engine air filter pipe	1
07.0728.0007	Changing speed solenoid valve	1
04.4240.0052	Steering mode solenoid valve	1
07.0741.0004	Boom main valve module	2
07.0741.0005	Boom main valve on-off module	1
07.0741.0016	Boom main valve gaskets kit	1
07.0741.0006	Boom main valve enabling function swicth solenoid valve	1
09.4661.0014	Diesel tank cap	1
07.0700.0028	Hydraulic oil tank filter pressure switch	1
56.0013.0000	Hydraulic oil temperature sensor	1
07.0701.0180	Transmission pump gaskets kit	1
07.0701.0203	Transmission engine gaskets kit	1
56.0017.0003	Light switch	1
07.0703.0434	Position light switch cover	1
07.0703.0431	Fog light switch	1
07.0703.0435	Air conditioning switch	1
07.0703.0572	Emergency light switch	1
07.0703.0029	Starter switch	1
07.0703.0494	Emergency pump switch	1
07.0703.0430	Mechanical gearbox switch	1
07.0703.0429	Steering mode switch cap	1
638226	Steering mode switch	1
07.0703.0125	Starter key	1
09.0803.0178	Rear left mudguard	1
09.4661.0014	Hydraulic oil tank cap	1
56.0013.0001	Fuel level gauge	1
09.0803.0177	Rear right mudguard	1
07.0740.0050	Carter handle	1
09.4610.0002	Right mirror	1
56.0016.0021	Overload warning system display	1
09.0802.0017	Load cell	1
07.4529.0109	Levelling cylinder gaskets kit	1
09.4635.0014	Cardan shaft screw kit	1
09.4645.0022	Parking brake cable	1
07.0740.0267	Parking brake sensor	1
07.0709.0059	Clutch disk	1
07.0709.0117	Wheel stud pipe fitting	4
07.0709.0118	Wheel pipe fitting nut	4
639674	Brake disk	6
640270	Gaskets kit	1
637650	3A fuse	2
634972	7,5A fuse	2
634973	15A fuse	2
07.0703.0485	relay	2
07.0703.0487	relay	1
56.0021.0073	Control unit	1
56.0021.0073	Control unit	1

Cod.	Description	Q.ty
56.0013.0036	Cooler temperature sensor	1
07.0703.0192	Therma engine box relay	1
56.0005.0001	50A fuse	1
07.0703.0061	70A fuse	1
56.0012.0020	Engine speed meter	1
56.0012.0017	Outrigger micro-switch	1
56.0013.0028	Hydraulic oil level gauge	1
07.0703.0535	Relay	1
56.0021.0059	Boom, outrigger and chassis movement control unit	1
56.0021.0071	Allignment rear wheels control unit	1
56.0021.0078	Relay	1
56.0010.0005	Flashing beacon	1
07.0703.0384	Flashing beacon bulb	1
07.0703.0656	1A fuse	1

LIST OF RECOMMENDED SPARE PARTS GTH-4017EX - GTH-4514EX

Cod.	Description	Q.ty
07.0740.0066	Cabin air filter	1
07.0740.0089	Front windscreen wiper brush	1
07.0740.0104	Lock door switch	1
07.0740.0202	Mirror	1
07.0740.0248	Rear windscreen wiper brush	1
07.0740.0054	Stop belt	1
07.0740.0050	External door handle	1
07.0740.0051	Inside door lock	1
07.0740.0029	Inside upper door handle	1
07.0703.0417	Forward lever	1
07.0703.0418	Turn signal lever	1
07.0741.0010	Withe lock/unlock fork push button cap	1
07.0741.0011	Withe lock/unlock fork push button	1
07.0741.0023	Extension boom joystick switch	1
96008	S/C/N selector	1
56.0016.0021	Overload warning system display	1
09.0802.0017	Load cell	1
09.4661.0014	Diesel tank cap	1
56.0013.0001	Fuel level gauge	1
09.4610.0002	Right mirror	1
637452	Front axle levelling cylinder gaskets kit	1
07.4529.0093	Rear axle levelling cylinder gaskets kit	1
04.4240.0025	Rear axle levelling cylinder solenoid valve	1
640537	Outrigger cylinder gaskets kit	1
07.0741.0000	Outrigger main valve solenoid	1
56.0012.0017	Outrigger micro-switch	1
07.0741.0015	Outrigger main valve gaskets kit	1
02.0117.0101	Grease nipple	1
54.0702.0037	Pad	1
54.0702.0024	Pad	1
695962	Pad bushing	1

TECHNICAL SPECIFICATION

Cod.	Description	Q.ty
695970	Pad	1
54.0702.0040	Pad	1
695959	Pad	1
54.0702.0021	Pad	1
54.0702.0038	Pad	1
54.0200.0000	Pad bushing	1
07.4529.0065	Extension boom cylinder gaskets kit	1
07.0741.0006	Boom main valve enabling function swicth solenoid valve	1
56.0021.0091	Main valve module	1
56.0021.0090	Main valve module	1
56.0021.0089	Main valve module	1
56.0021.0089	Main valve module	1
07.0741.0028	Boom main valve gaskets kit	1
56.0021.0088	Main valve module	1
56.0021.0087	Main valve module	1
640536	Dumping fork cylinder gaskets kit	1
07.4529.0073	O-ring	2
07.4529.0071	O-ring	2
54.0001.0058	Lock attachment cylinder pin	1
54.0001.0059	Lock attachment cylinder pin	1
07.4529.0107	Lock attachment cylinder gaskets kit	1
09.4605.0012	Plug	1
53.3000.8100	Engine smoke manifold	1
09.0803.0259	Guard	0,65 m
07.0712.0012	Insulator	1
07.4529.0031	Gaskets kit	1
07.0700.0000	Hydraulic oil filter cartridge	1
09.4604.0000	Hydraulic oil filter	1
638243	Engine oil filter	1
07.4501.0057	Diesel filter	1
09.4645.0000	Throttle cable	1
56.0013.0030	Thermal engine sensor	1
56.0013.0031	Engine oil pressure sensor	1
639399	Internal air filter cartridge	1
639400	External air filter cartridge	1
06.0401.0219	O-ring	1
09.4635.0014	Cardan shaft screw kit	1
56.0012.0021	Sensor	1
07.0728.0007	Steering solenoid valve	1
07.0728.0006	Steering solenoid valve gaskets kit	1
638004	Brake pump gaskets kit	1
05.4329.0001	Service brake pressure switch	1
05.4329.0002	Service brake pressure switch	1
05.4329.0016	Parking brake pressure switch	1
07.0709.0117	Parking brake pressure switch	1
07.0709.0118	Wheel pipe fitting nut	4
07.0709.0419	Steering cylinder gaskets kit	1
07.0703.0029	Starter switch	1
07.0703.0430	Mechanical gearbox switch	1
07.0703.0433	Road lights switch	1
07.0703.0192	Relay	1

2.19 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

TECHNICAL SPECIFICATION

2.20 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

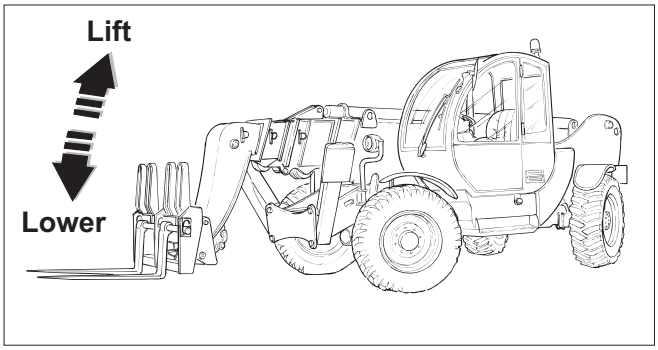
To check the engine speed, the area easy to reach is the shaft of the CASAPPA pump.
Min engine speed = 950 rpm
Max engine speed = 2600 rpm

LIFT/LOWERING SPEED with fork

GTH-4017 EX	Time (s)	
	Up	Down
Max engine speed	14"	10"

GTH-4514 EX	Time (s)	
	Up	Down
Max engine speed	15"	11"

GTH-4013 EX	Time (s)	
	Up	Down
Max engine speed	11"	9"

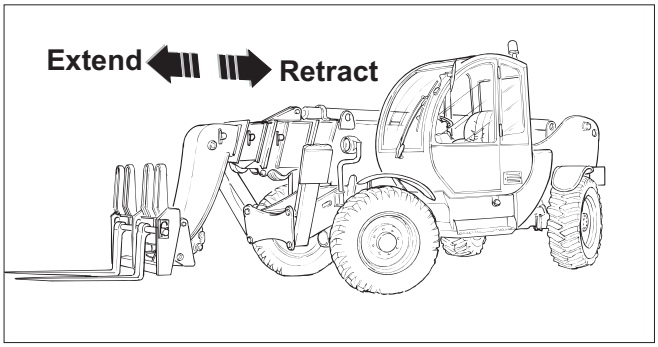


BOOM EXTENSION/RETRACTION with fork

GTH-4017 EX	Time (s)	
	Out	In
Max engine speed	26"	16"

GTH-4515 EX	Time (s)	
	Up	Down
Max engine speed	22"	15"

GTH-4013 EX	Time (s)	
	Up	Down
Max engine speed	17"	13"

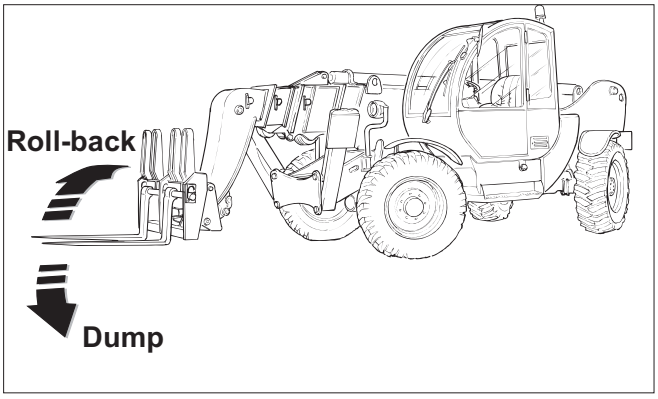


ATTACHMENT DUMPING with fork

GTH-4017 EX	Time (s)	
	Roll-back	Dump
Max engine speed	4"	3"

GTH-4514 EX	Time (s)	
	Roll-back	Dump
Max engine speed	4"	3"

GTH-4013 EX	Time (s)	
	Roll-back	Dump
Max engine speed	3"	3"

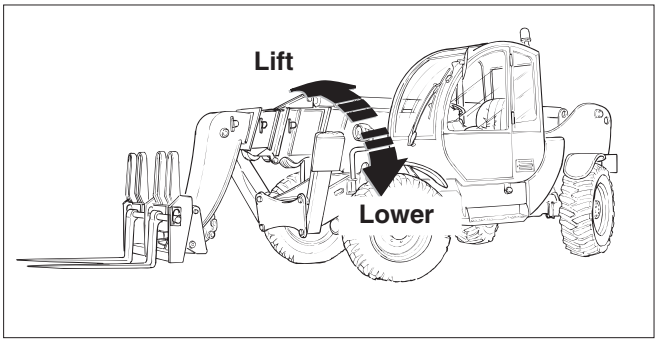


OUTRIGGERS CONTROL

GTH-4017 EX	Time (s)	
	Up	Down
Max engine speed	5"	6"

GTH-4514 EX	Time (s)	
	Up	Down
Max engine speed	5"	6"

GTH-4013 EX	Time (s)	
	Up	Down
Max engine speed	6"	8"

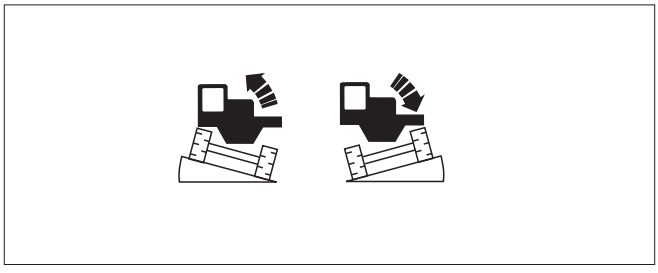


MACHINE SWAY

GTH-4017 EX	Time (s)	
	right to left	left to right
Max engine speed	8"	9"

GTH-4514 EX	Time (s)	
	right to left	left to right
Max engine speed	8"	9"

GTH-4013 EX	Time (s)	
	right to left	left to right
Max engine speed	11"	13"



TECHNICAL SPECIFICATION

2.21 HYDRAULIC SETTINGS

1. PRELIMINARY OPERATIONS

Check that the engine idle is set at 950 rpm and that the engine maximum speed is set at 2300 rpm for GTH 4017 EX and at 2200 rpm for GTH 4514EX, GTH 4013EX.

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.

2. CALIBRATING THE BOOM MAIN VALVE

Lift the boom and put the ring on the lift cylinder rod. Open the rear carter and locate the main valve. Find the mini-socket **2** (see **annex 1**) and fit a 0-400 bar manometer. Using the joystick, with the engine running at maximum speed, keep the lifting boom cylinder to full stroke and set the valve **A** at **280 bar**.
To check the safety valves **B** (see **annex 1**) proceed as follows:

- Increase the pressure of valve **A** of the main valve to **300 bar** moving the one of the cylinders 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** until reaching a pressure of **290 bar**. Adjust the second valve **B** by pitching the forks back.
- When both fork inclination valves have been calibrated, reset the pressure control valve **A** to **280 bar** by adjusting the adjustment screw.

To check the set of the extension boom safety valve (see annex 1), proceed as follow:

- With the engine running at maximum speed, extend the boom to end of stroke maintaining the position.
- Set the valve **T** at **200 bar** for GTH 4514EX - GTH 4017EX.
- Set the valve **T** at **230 bar** for GTH 4013EX.

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.

3. CHECK CALIBRATING HYDROSTATIC TRANSMISSION (ANNEX 3)

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

3.1 HYDROSTATIC TRANSMISSION PUMP (ANNEX 4)

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 6)

- 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

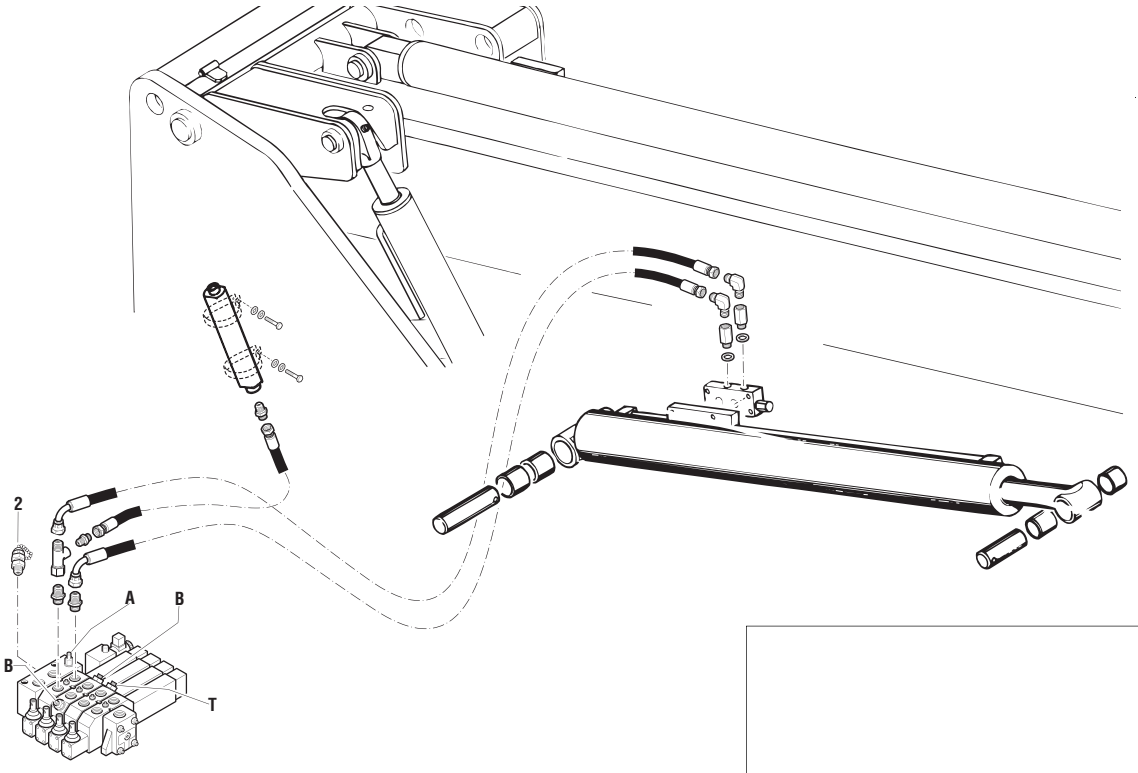
- Fit a coupling complete with mini-socket **Z** in the position shown in **annex 5**.
- Fit a 0-250 bar manometer to the mini-socket **Z**.
- Select the front axle steering mode.
- Move the steering cylinder to stroke end and make sure the value of the power steering **A** is 170 bar. If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

  To gain access to valve **X**, remove the protection cap (see **annex 5**).

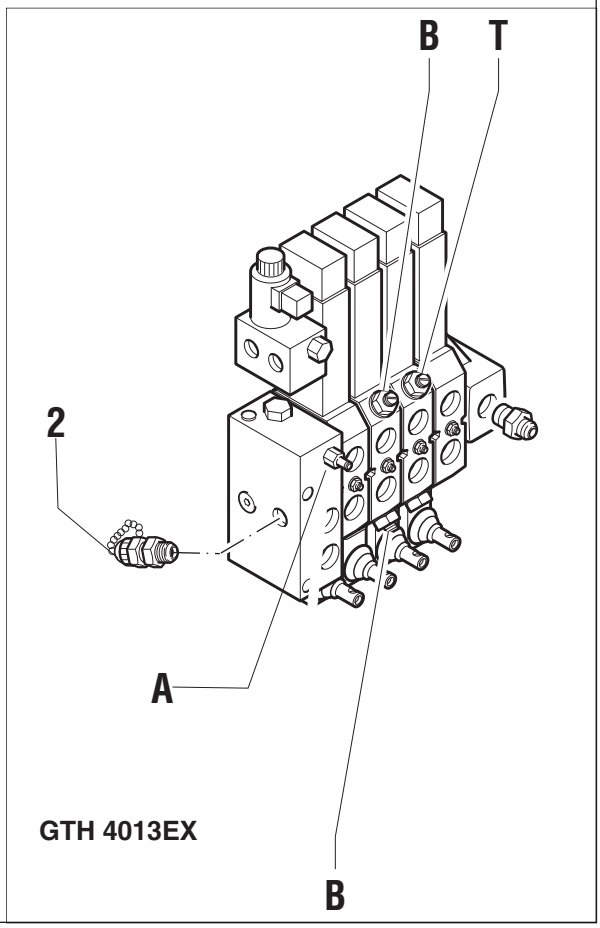
TECHNICAL SPECIFICATION

HYDRAULIC SYSTEM - CONTROL MAIN VALVE

annex 1



GTH 4514EX-GTH 4017EX

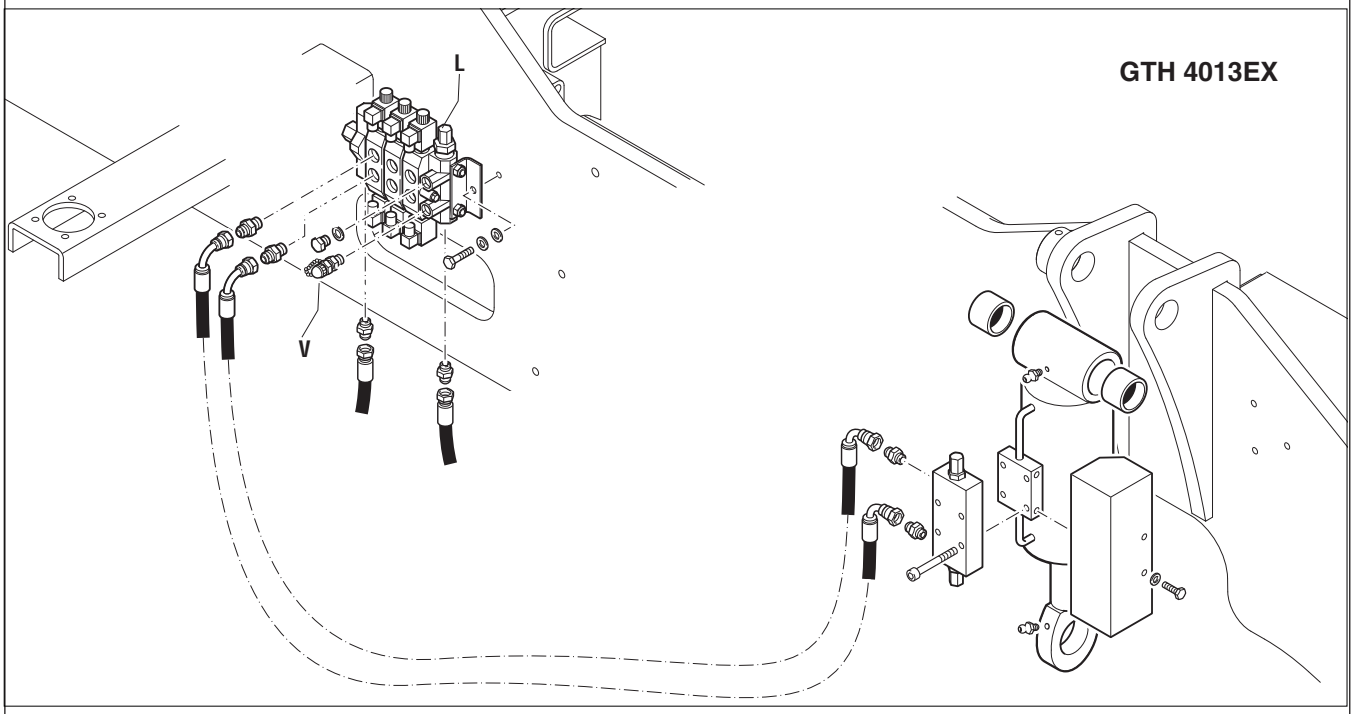


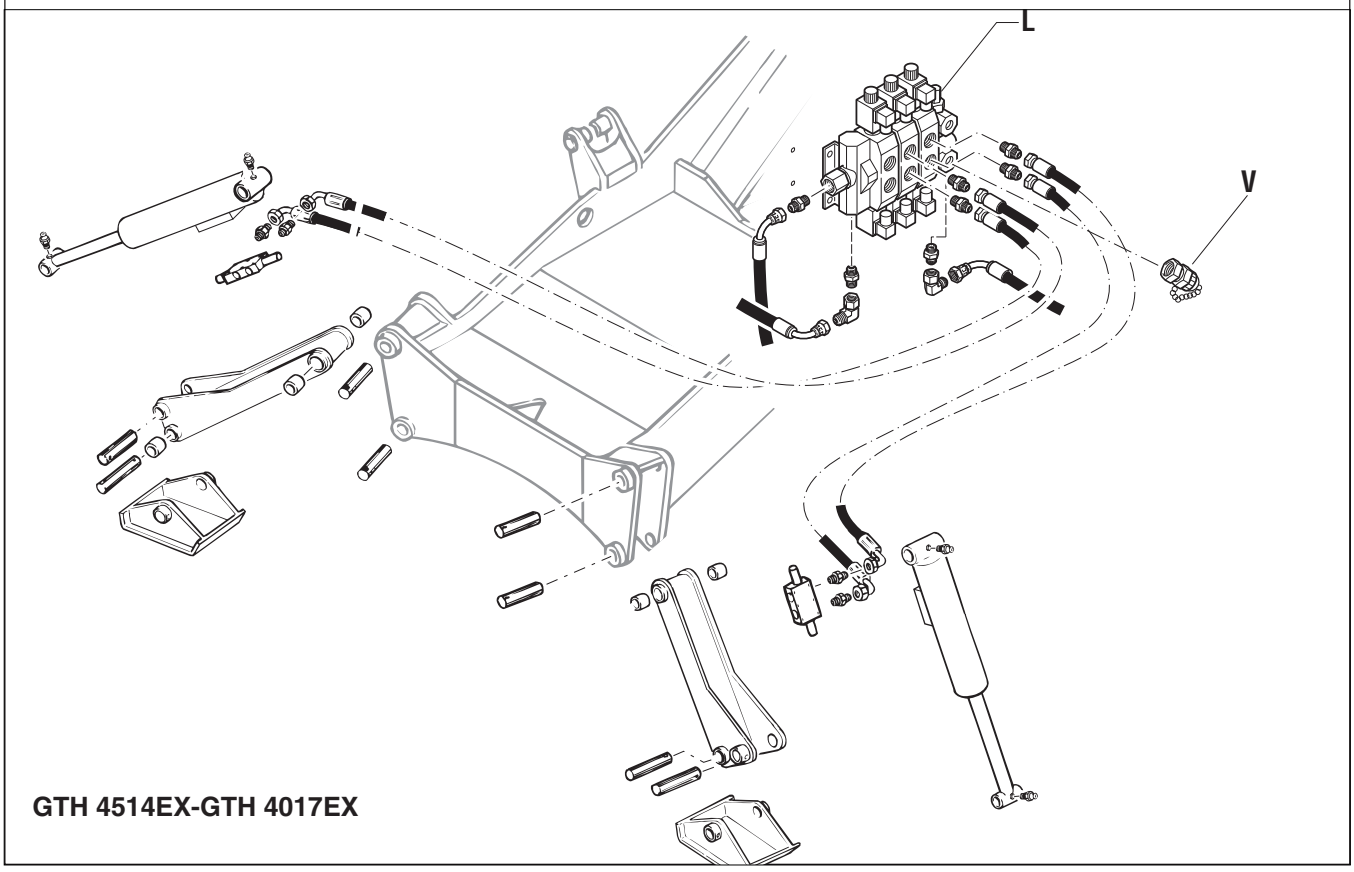
GTH 4013EX

HYDRAULIC SYSTEM - OUTRIGGERS

annex 2

GTH 4013EX

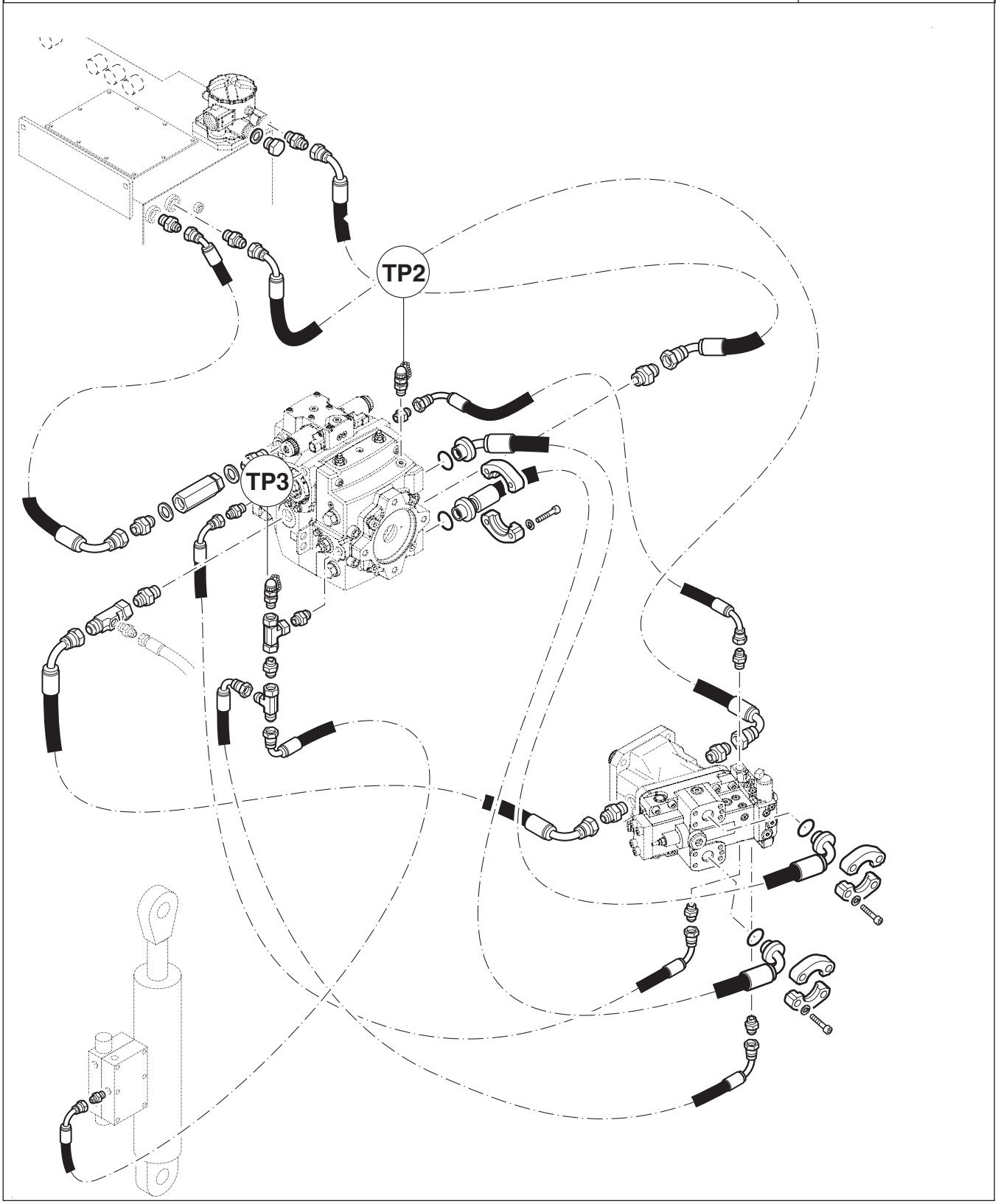




GTH 4514EX-GTH 4017EX

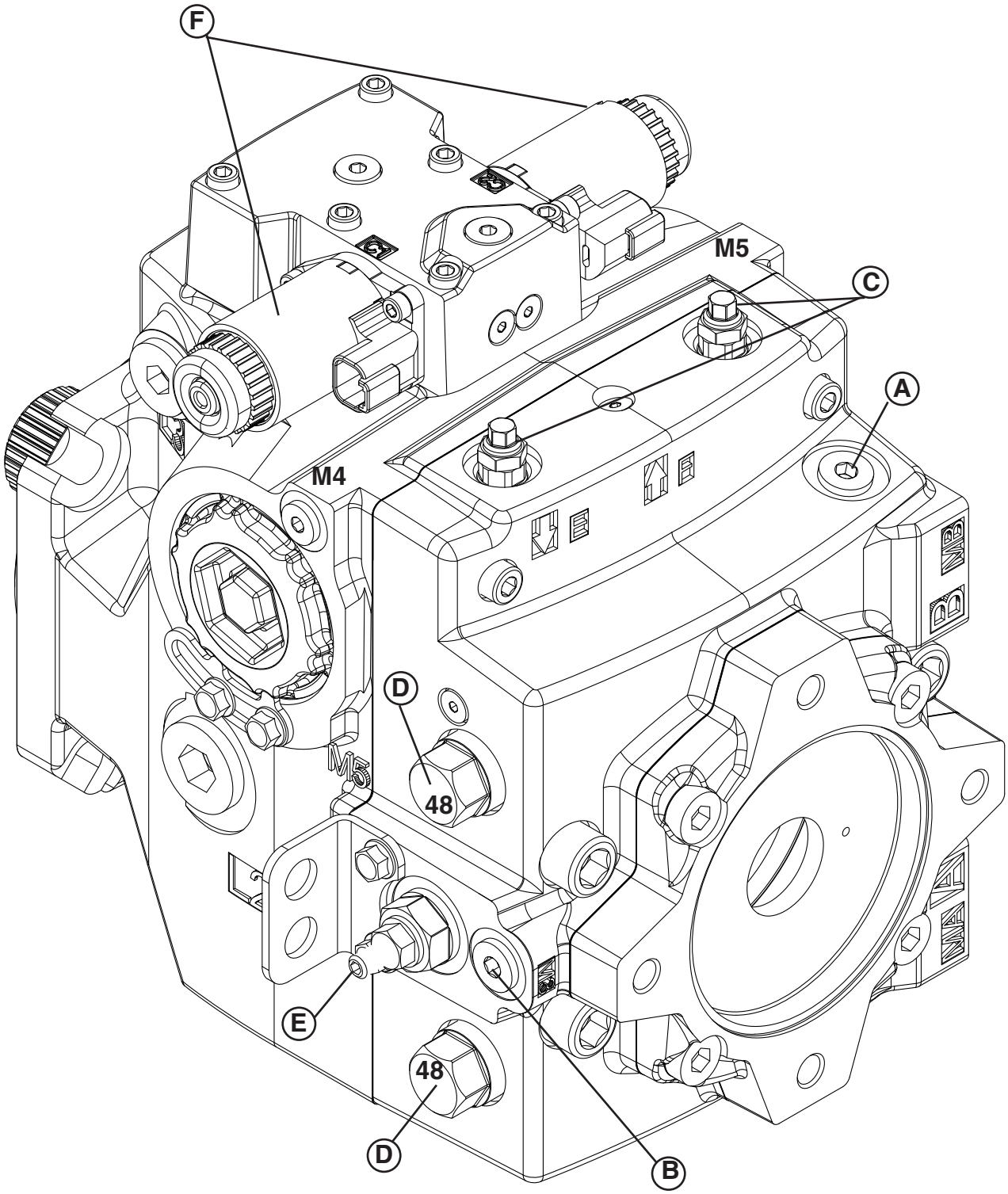
TECHNICAL SPECIFICATION

HYDRAULIC SYSTEM - TRANSMISSION PUMP	annex 3



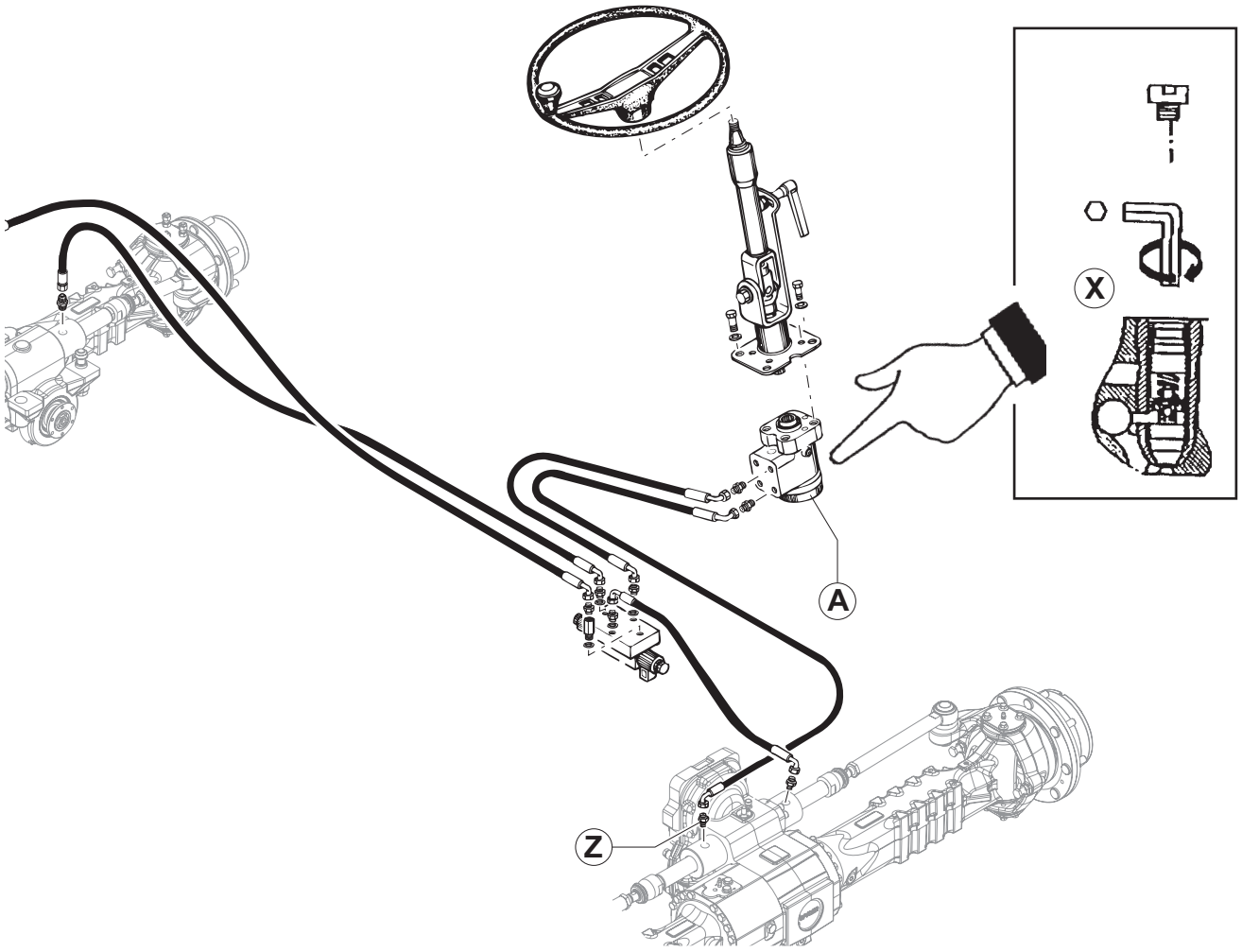
TECHNICAL SPECIFICATION

HYDRAULIC SYSTEM - TRANSMISSION PUMP	annex 4

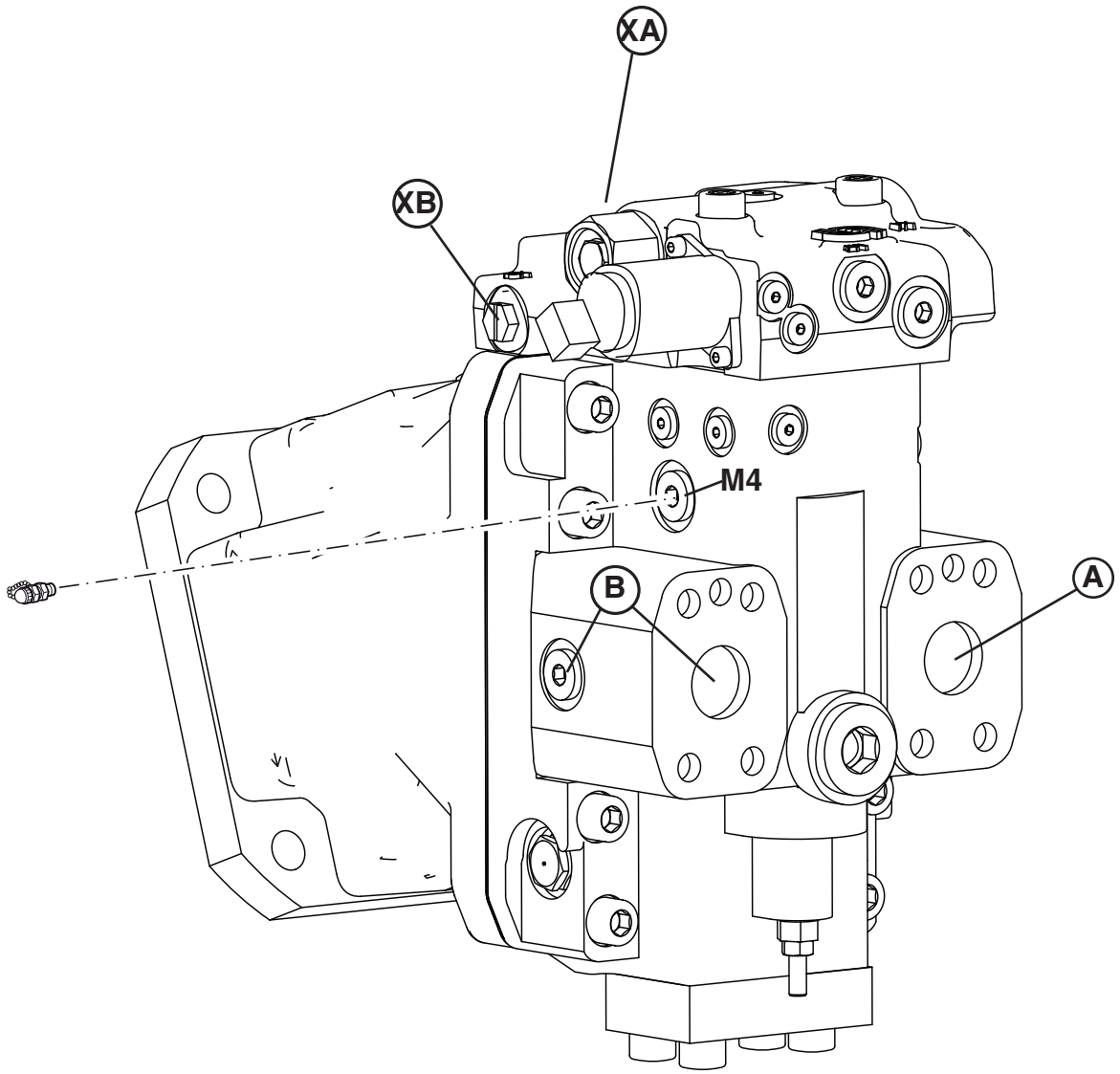


TECHNICAL SPECIFICATION

HYDRAULIC SYSTEM - POWER STEERING	annex 5



HYDRAULIC SYSTEM - TRANSMISSION ENGINE	annex 6

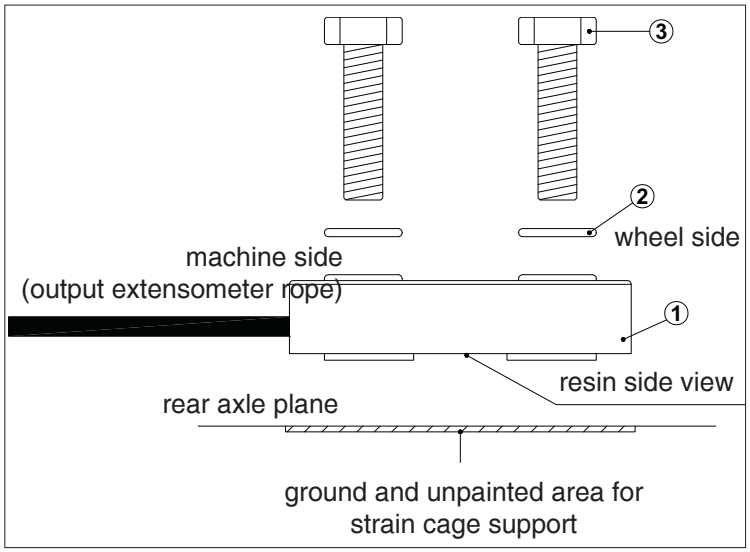


TECHNICAL SPECIFICATION

2.22 DLE SYSTEM

INSTALLATION OF THE EXTENSIMETRIC CELL

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



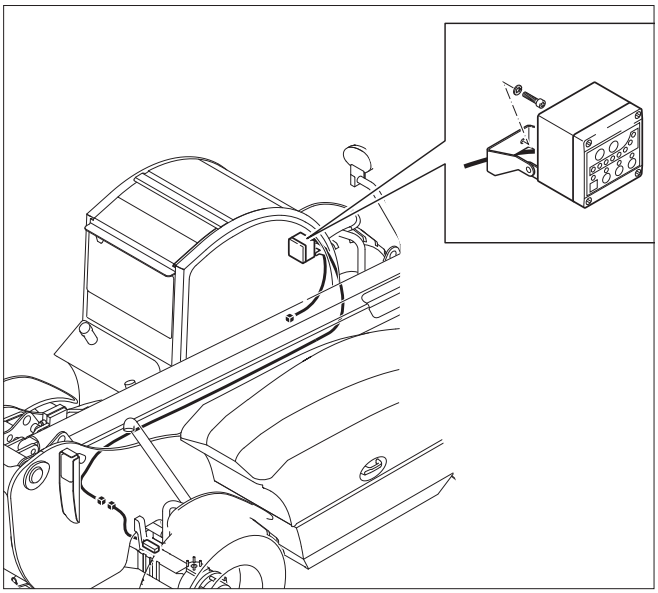
To avoid damaging strain cage and to get maximum results, proceed as follows:

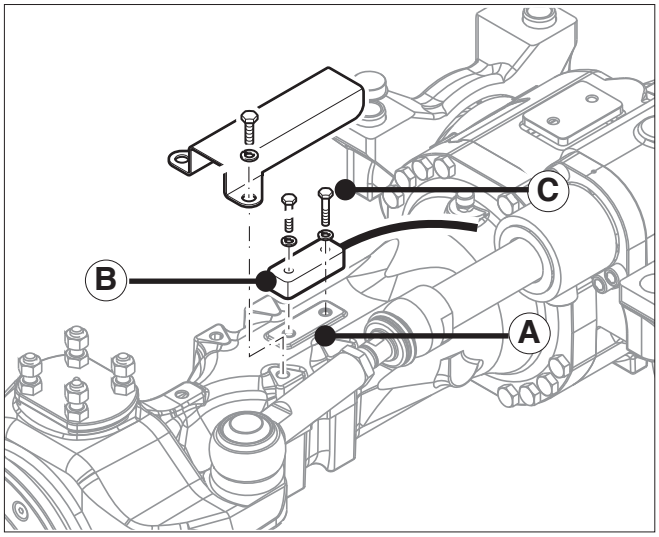
1 - PREPARATION:

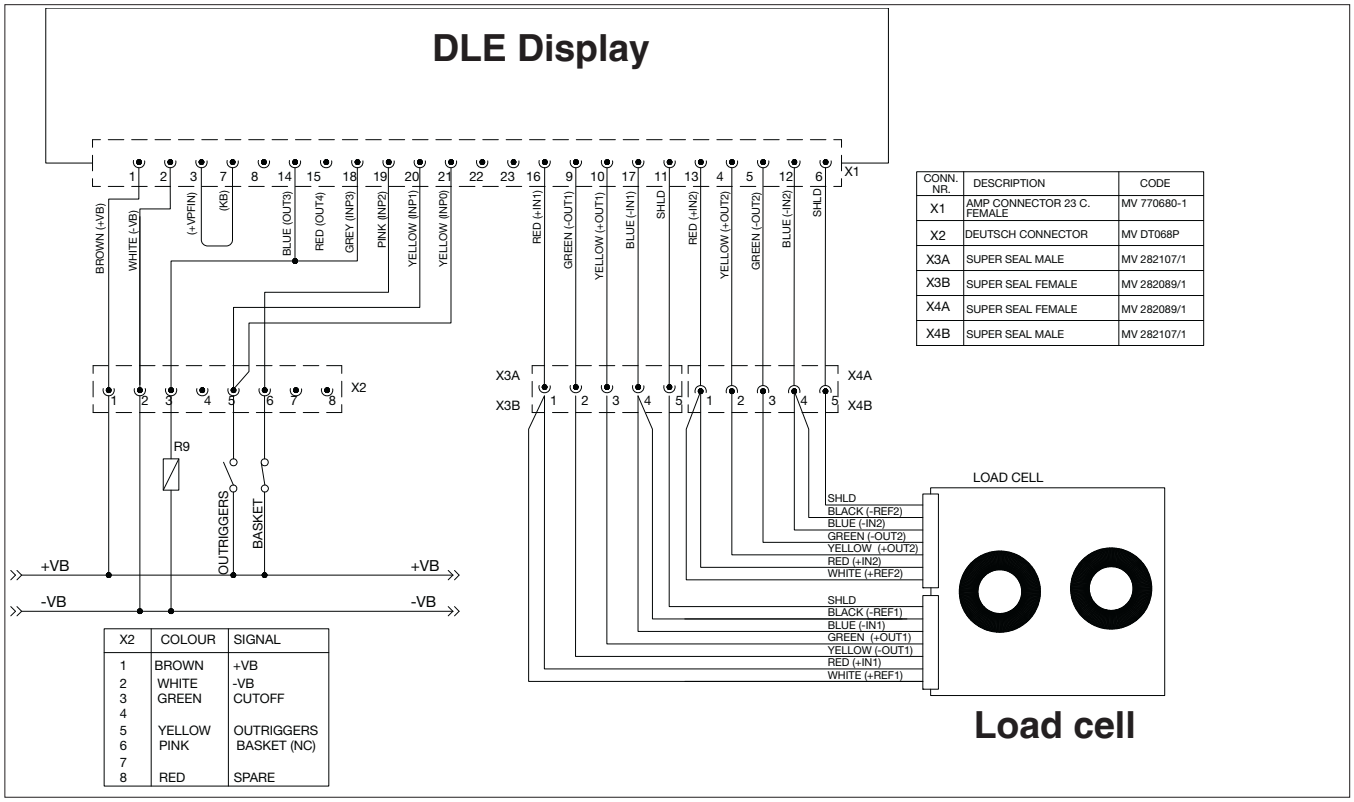
- Thoroughly clean whole tightening system, especially the ground and unpainted area **A** of rear axle.

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.

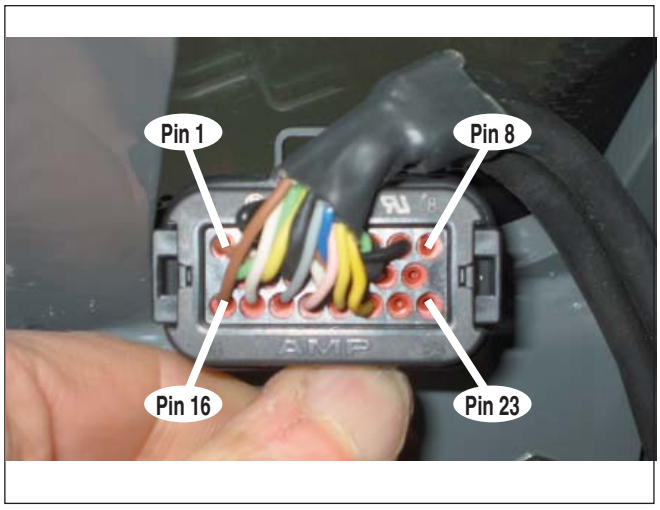






CONN. NR.	DESCRIPTION	CODE
X1	AMP CONNECTOR 23 C. FEMALE	MV 770680-1
X2	DEUTSCH CONNECTOR	MV DT068P
X3A	SUPER SEAL MALE	MV 282107/1
X3B	SUPER SEAL FEMALE	MV 282089/1
X4A	SUPER SEAL FEMALE	MV 282089/1
X4B	SUPER SEAL MALE	MV 282107/1

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



CONNECTOR X1 FOR CHECKS WITH TESTER

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

Overload signal
Pin 14: 12 V normal job conditions, 0 V alarm overload
Pin 18: re-reading overload signal

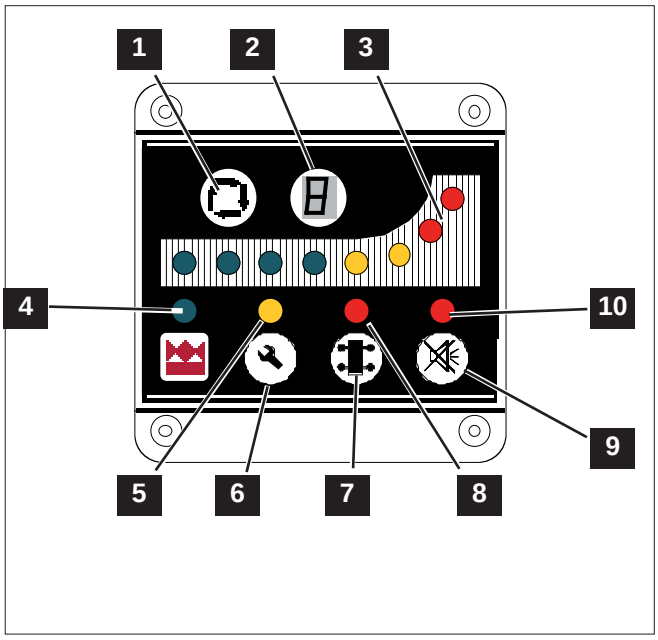
Cab/platform swotch signal
Pin 19: 0 V if switch is on “platform”,
12 V if switch is on “cab”

Outriggers down signal
Pin 20/21: 12 V if the machine is on stabilizers,
0 V if it is on wheels

Electrical power to load cell equal to 5 V
Channel 1: Pin 16: positive Pin 17: negative
Channel 2: Pin 13: positive Pin 12: negative

Load cell signal in range 0,1 - 2,5 mV
Channel 1: Pin 10: positive Pin 9: negative
Channel 2: Pin 4: positive Pin 5: negative

TECHNICAL SPECIFICATION



- 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
1: Platform

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).

CALIBRATING THE DLE SYSTEM

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

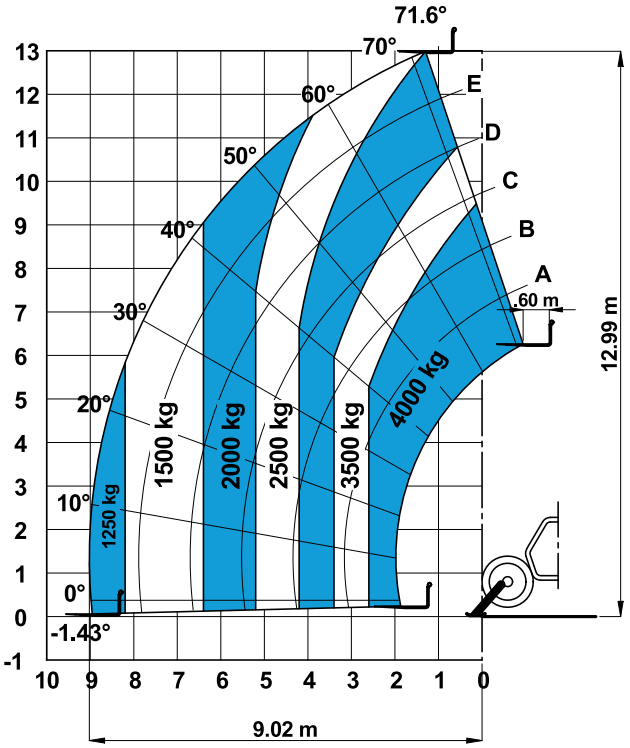
If the sequence is correct the confirmation of the instrument functioning in the calibration mode is given by the LED near lighting with a fixed light.

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

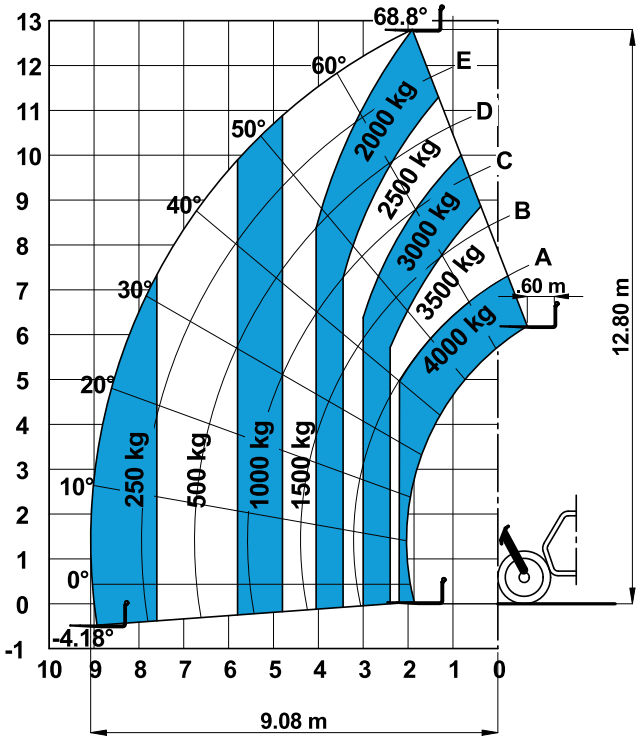
DISPLAY	FUNCTION
0	The LED bar indicates the type of machine in use: 1 LED on -GTH 4013EX - GTH 4017EX - GTH 4017EX To select the machine to be calibrated press to increase the number of LED's lit or press to reduce the number of LED's lit. If you are doing the first calibration, press to reset the system and load the default parameters of the selected machine. **If you are re-calibrating the instrument, directly jump to point 1.** 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. Press to confirm the **EMPTY** calibration of the machine. The audible alarm will sound to confirm the command has been executed. 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). 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. Press to proceed to the next point (3).
3	With outriggers up, 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). 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. To do this, we recommend starting with the LED's bar on the green area and then press to increase the number of LED's lit. The procedure is saved automatically 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). 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. Starting to work.

TECHNICAL SPECIFICATION

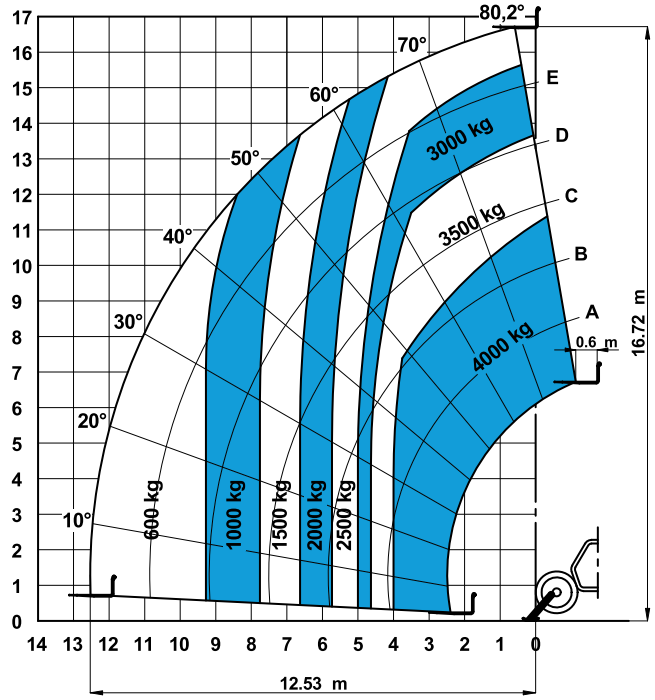
LOAD DIAGRAM
GTH-4013 EX - ON OUTRIGGERS



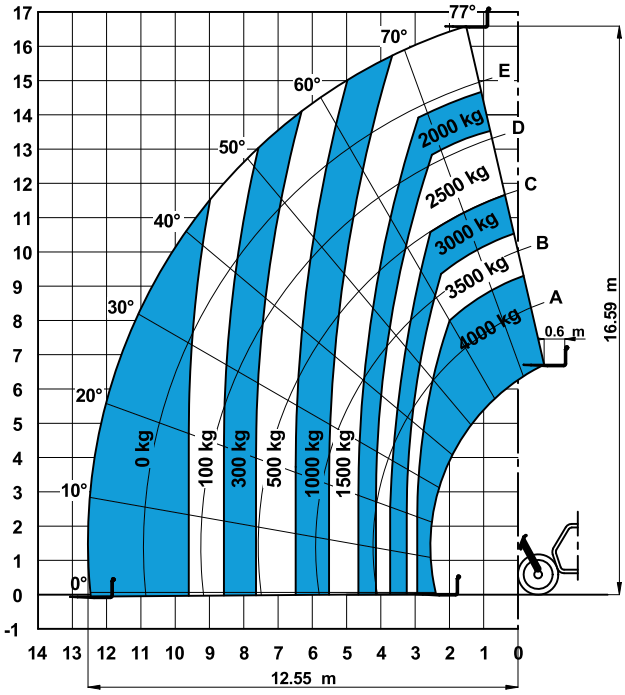
LOAD DIAGRAM
GTH-4013 EX - ON TYRES



LOAD DIAGRAM
GTH-4017 EX - ON OUTRIGGERS

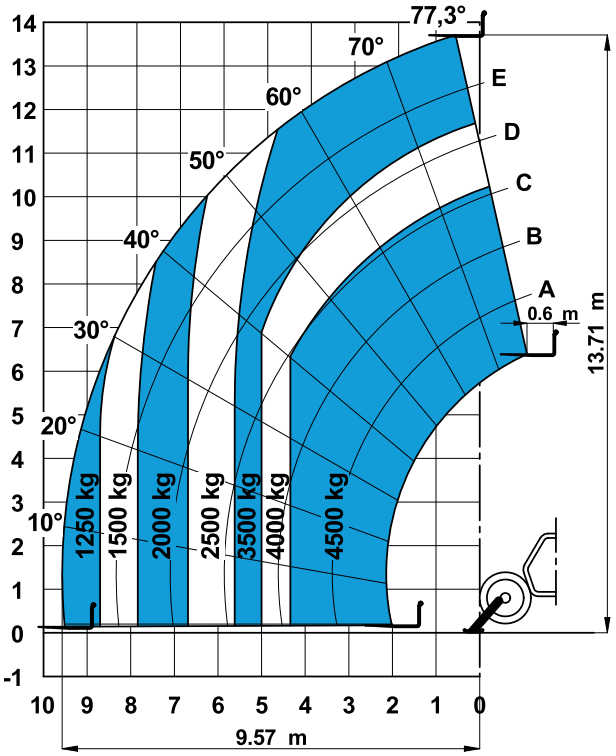


LOAD DIAGRAM
GTH-4017 EX - ON TYRES



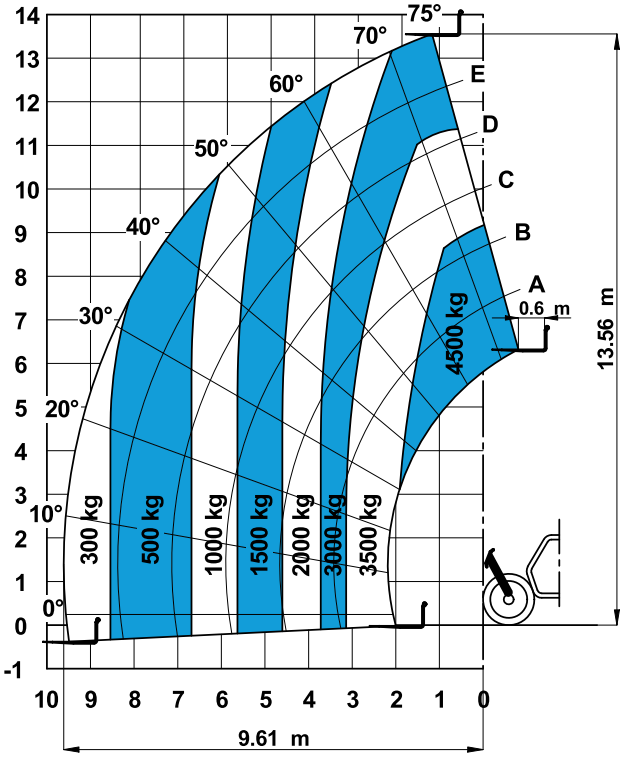
LOAD DIAGRAM

GTH-4514 EX - ON OUTRIGGERS



LOAD DIAGRAM

GTH-4514 EX - ON TYRES



TECHNICAL SPECIFICATION

DIAGNOSTIC FUNCTION IN CALIBRATION MODE

FUNCTION	DISPLAY
A-B	Display of the value read by the ADC converter-cell channel 1 (**A**) and cell channel 2 (**B**). This diagnosis function allows you to check proper reading of the load cell. 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). Lay the machine for a calibration without load. If the function **A** is setted, the LEDs of the load bar progressively have to go off, moving out the boom; while in the function **B** the same LEDs progressively have to go on. If it 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: LED1 and LED2: ON when the machine is stabilized. LED3: the 4013 will be active if the nacelle is not installed. 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: No LED: software 0 One LED: software 1 …… Four LED: software 4
E	No function.
F	Press to escape from the calibration and **SAVE** all changes (the buzzer and the LED activate to confirm storage). The limiter has now escaped from the calibration mode. The LED is no longer ON steadily. It is necessary to turn off and turn on the machine to eliminate all alarm messages (display flashing).

ALARM CODES

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

Alarm code	**3**
Description	**CELL 2 reading out of range.**
Action	Similar to alarm 2, but referred to the second analog channel (Cell 2).
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. ***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. The limiter's outputs do not deactivate. Switch off and on the machine and run a complete test of the outputs. If the alarm persists, replace the DLE.
Alarm code	**5-6-7-8**
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. **5** - output 1 off and output 2 off **6** - output 1 off and output 2 on **7** - output 1 on and output 2 off **8** - output 1 on and output 2 on ***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. The limiter's outputs do not deactivate. Switch off and on the machine and run a complete test of the outputs. If the alarm persists, replace the DLE.
Alarm code	**9**
Description	**CELL1 and CELL2 reading correspondence**. From the continuous comparison of the value read from analog channel 1 and analog channel 2, an alarm is triggered if the difference exceeds the preset threshold.
Action	Check the integrity and fastening of the load sensor and the relevant connections. If the alarm persists, attempt to re-calibrate or replace the load sensor.
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.** During operation, the signal of stabilised machine is congruent between the two inputs used for reading.
Action	Check connections and DLE connector. If the alarm continues, replace DLE.
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. 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 machines.

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 about 10).
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).**

CALIBRATING THE PLATFORM SYSTEM

1. With the machine properly stabilised, the boom lowered, the ignition key turned to the left (pos. P), the platform controls enabled (key of the Road-Jobsite-Platform selector turned to "Platform" and the green light next to the selector on), load the max authorised load on the platform. Operate the boom extension and using the load charts in the driving cab as a reference, check the system stops the boom at the correct distance. If the systems works properly, proceed with your work. If the system doesn't stop the boom extension at the correct distance, re-adjust the DLE system according to the following instructions.
2. Switch the controls to the Platform.
3. Start the engine of the machine operating the platform controls and have a second operator in the driving cab enter the calibration mode of the DLE system.

   The second operator shall turn on the instrument (no matter if the display is still off) and within five seconds press the keys on the front panel in the given sequence. The keys to be used and their meaning are the following:

   Press to input digit 0

   Press to input digit 1

   Press to confirm the input sequence.

   The access code actually used is **1001**. Therefore, you shall input the following sequence:

   1 0 0 1 CONFIRM

   If the sequence is correct, the LED next to comes on with a solid light to confirm the proper operation of the instrument in the calibration mode.

   The display shows a FIXED digit starting from “0”.

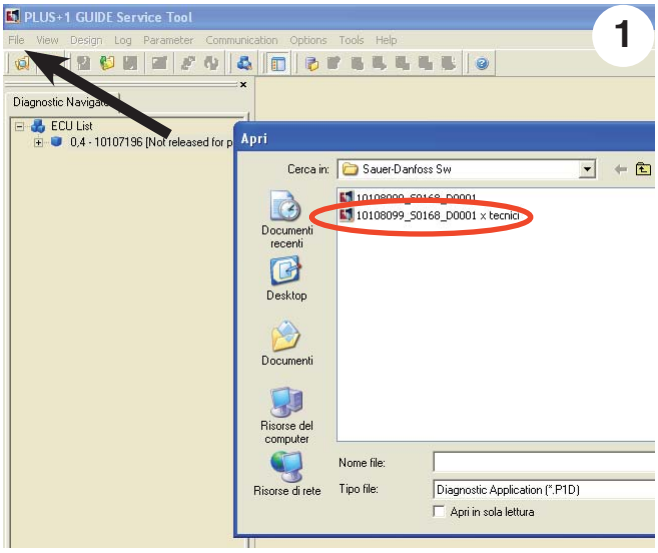
4. Press key to go to the point 4.

   Calibration of the machine for operation with the MAN-PLATFORM. With the stabilisers lowered to the ground, move to a limit point of the load chart and **load the max authorised load on the platform.** Press key some times to switch off the LED's of the load percent bar; or press key to switch these LED's on;by the end of the operation, all LED's from the left to the right must be lit, but for the last red LED. To do this, we recommend starting with the LED's bar on the green area and then press to increase the number of LED's lit.
5. Press key several times to go to the next point. The systems enters point A automatically. If no problems have been found during calibration, press till reaching point F.
6. Press to quit the calibration mode and **SAVE** the changes done (the "zero" flashes).
7. Stop the engine.
8. Restart the engine (the DLE system shows the work mode automatically).
9. Re-attempt to extend the boom as explained in point 1 and check that the system enters the alarm mode when the max authorised value shown in the load chart is exceeded.

2.23 HYDROSTATIC TRANSMISSION CONTROL UNIT CHECK SYSTEM

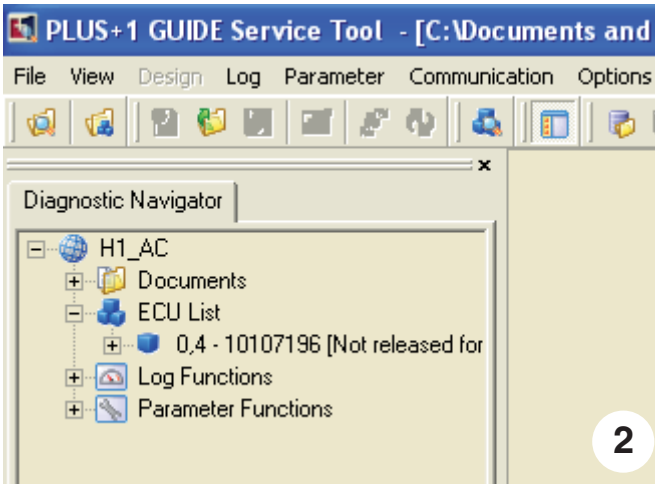
An electronic control unit gives power to the SAUER hydrostatic transmission; the software PLUS+1 lets to control the transmission.

- 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:

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



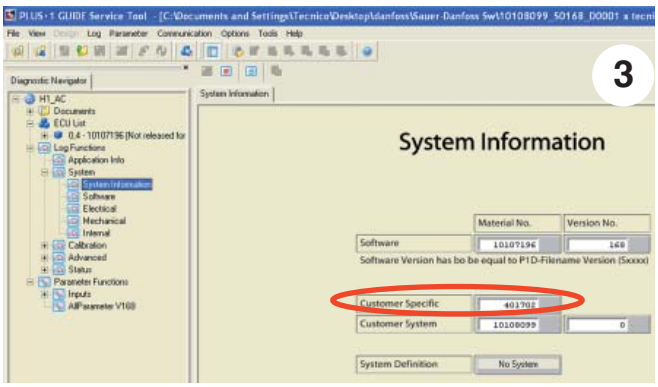
Check the installed SOFTWARE is right (image 3)::

- Select SYSTEM
- Select SYSTEM INFORMATION.

Check the customer specific is **401701** for **GTH 4514EX** and for **GTH 4017EX; 401301** for **GTH 4013EX**.

Open the first control system page:

- Select SYSTEM.
- Select ELECTRICAL.



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

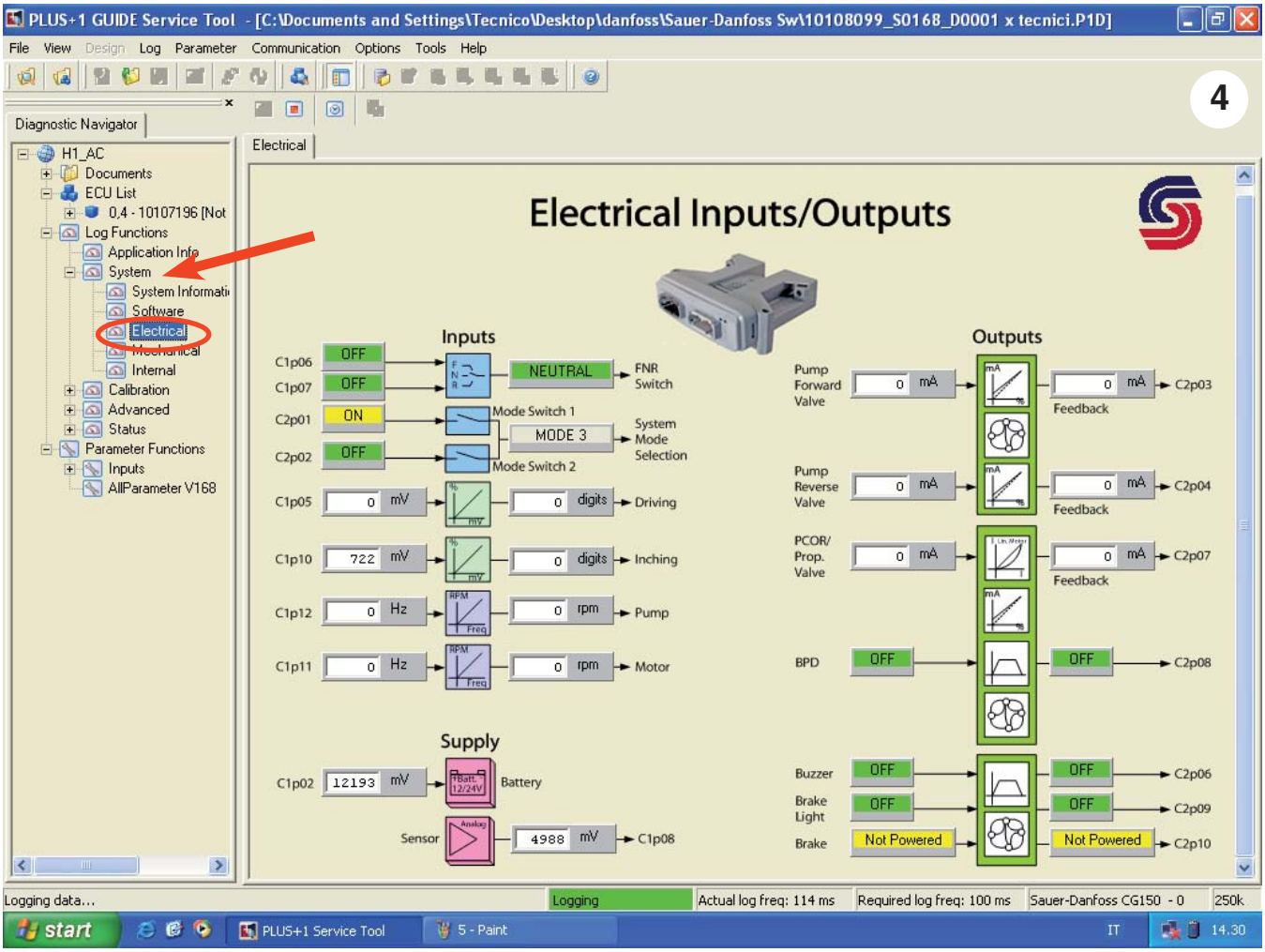
EXEMPLE:C1P06- input forward speed, C1P07- input rear speed,

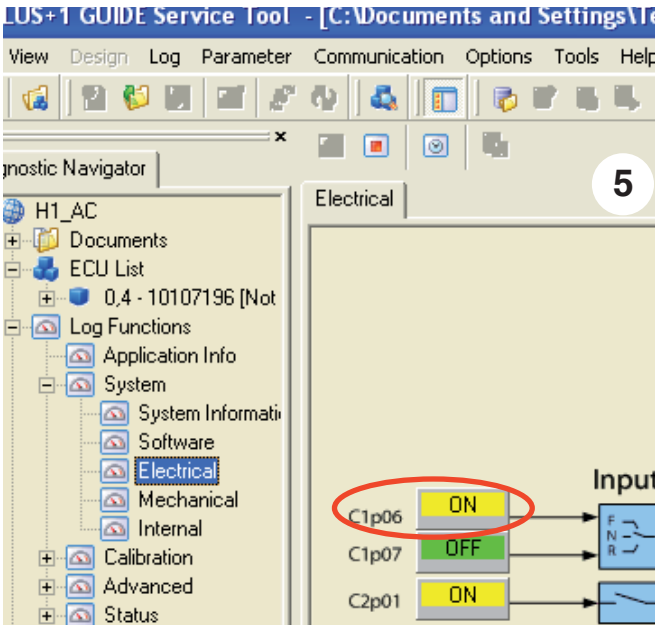
the electric input/output are colored refer to speed (images 5 - 6).

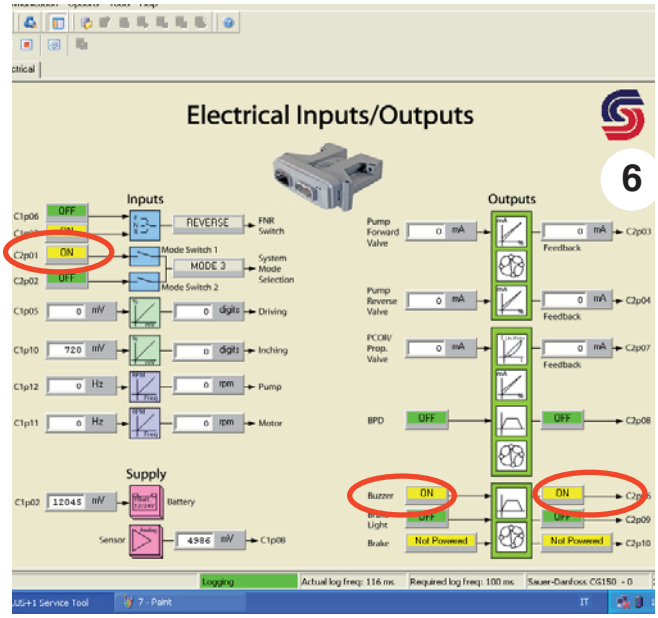
It is possible to check the ROAD/JOB-SITE signal.

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

TECHNICAL SPECIFICATION



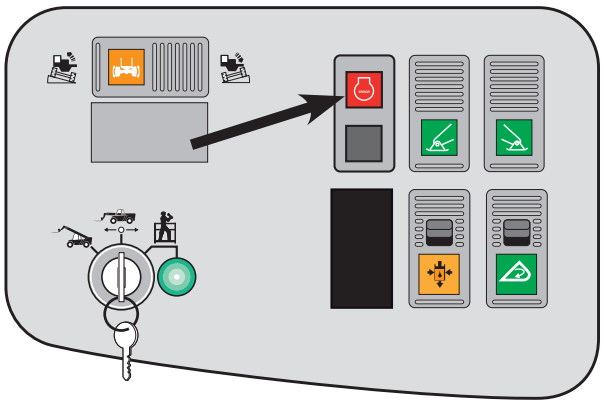


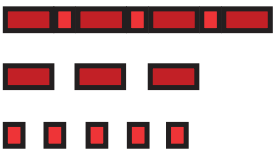


Click on

- 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)

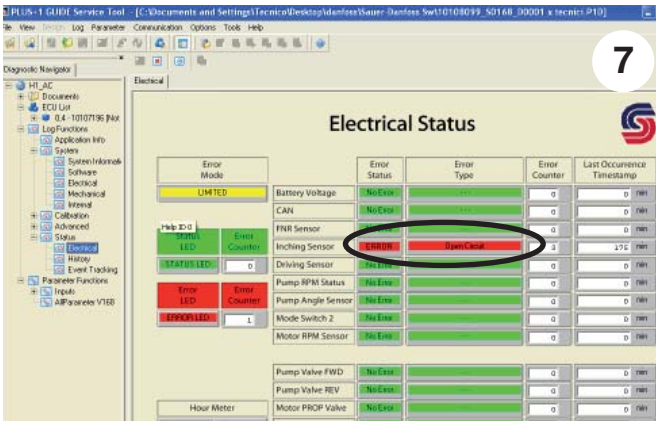
ERROR CODE 35

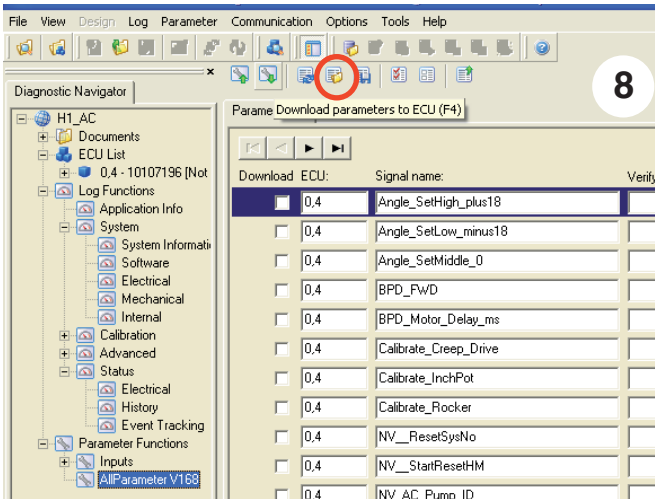
See the list of errors at page 39 in the "FAULT TABLE A".

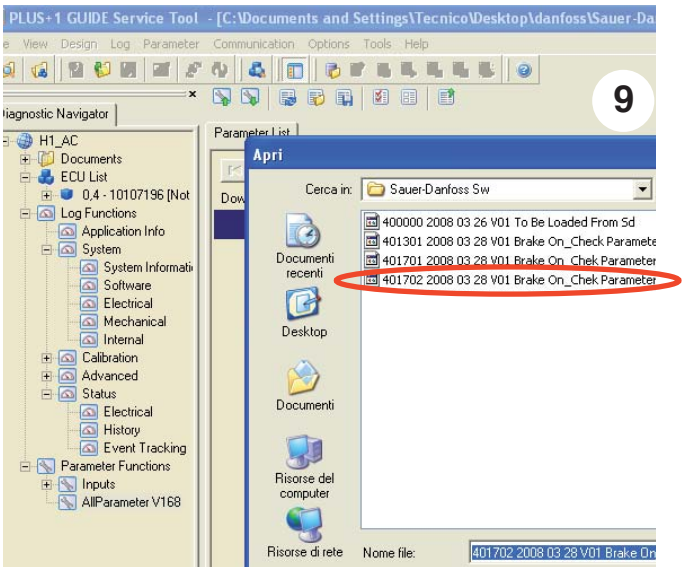
Select PARAMETERS FUNCTIONS to check the parameters.

Select

- Allparameters V168 (8).
- Press F2 to ensure the present parameters are uploaded on the control unit.
- Click on "import values from a parameter data filer".
- Select the right FILE (401701 o 401301)
- Press F4 to up-load the parameters on the control unit.
- The control unit can work.
- Perform the pedal inching calibration (see next chapter).



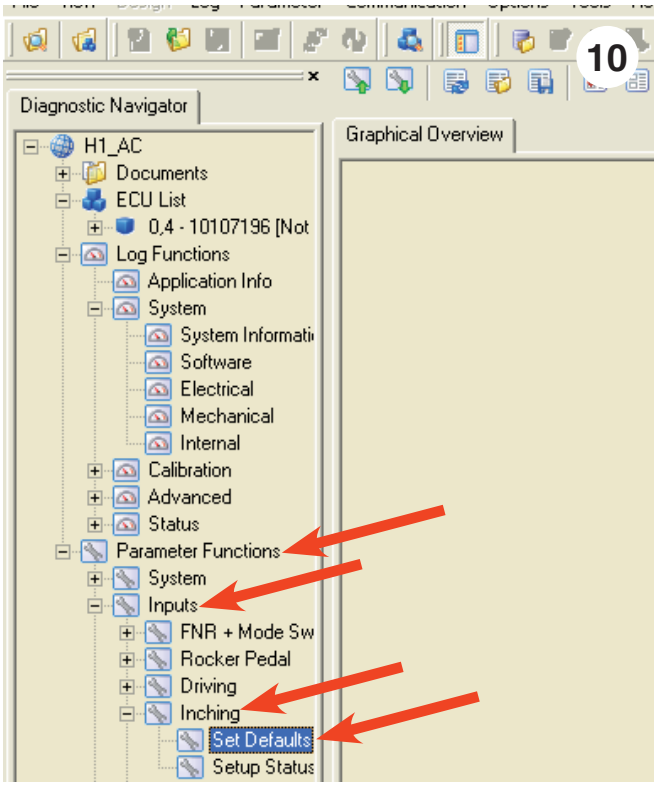


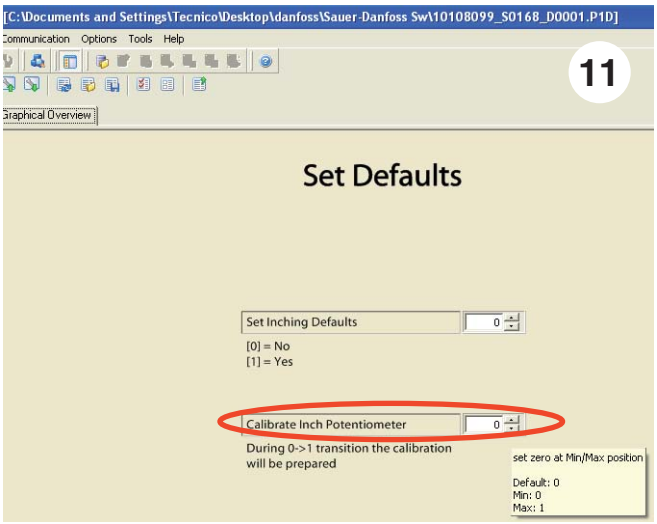


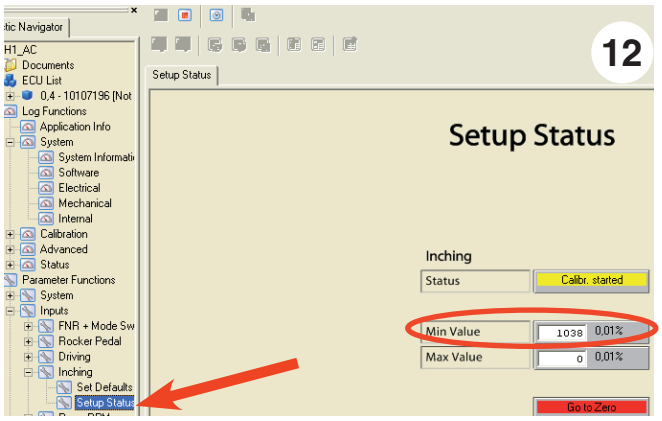
TECHNICAL SPECIFICATION

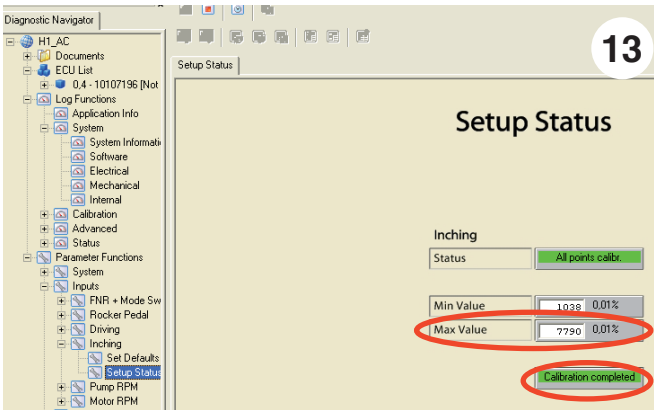
To get acces to the INCHING from PARAMETERS FUNCTIONS select:

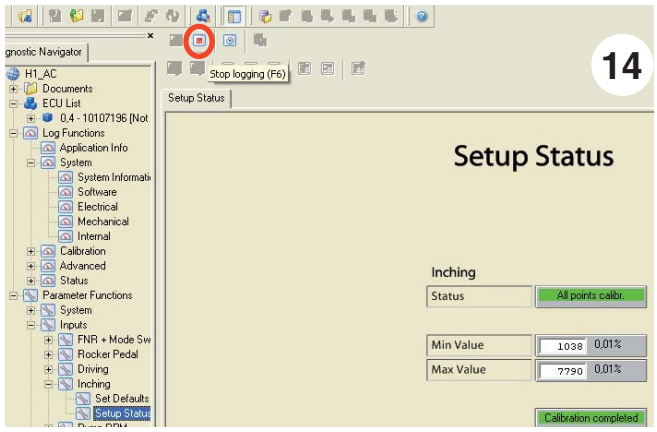
- Parameter Functions (10).
- Inputs.
- Inching.
- Set Defaults.
- Inside the window "calibrate inch Potentiometer" select the value 1 (see image 11).
- PRESS F4.
- Inside the window "calibrate inch Potentiometer" select the value 0 (see image 11).
- PRESS F4.
- select the Setup Status menu (see image 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.







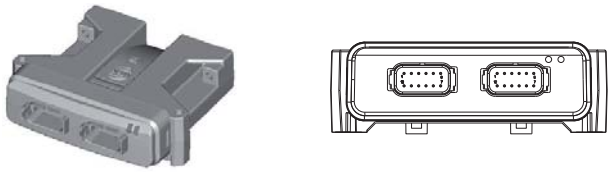




FAULT TABLE "A"

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	Diesel Engine Speed RPM	SAFE Mode
35	FNR Shortcut Neutral-Reverse	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.



15

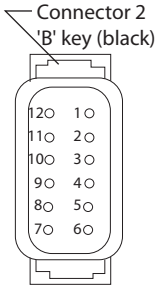
Image 15: connections of the check transmission control unit.

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

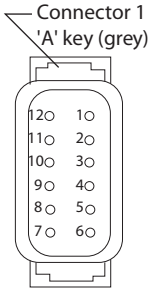
Connector 2

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



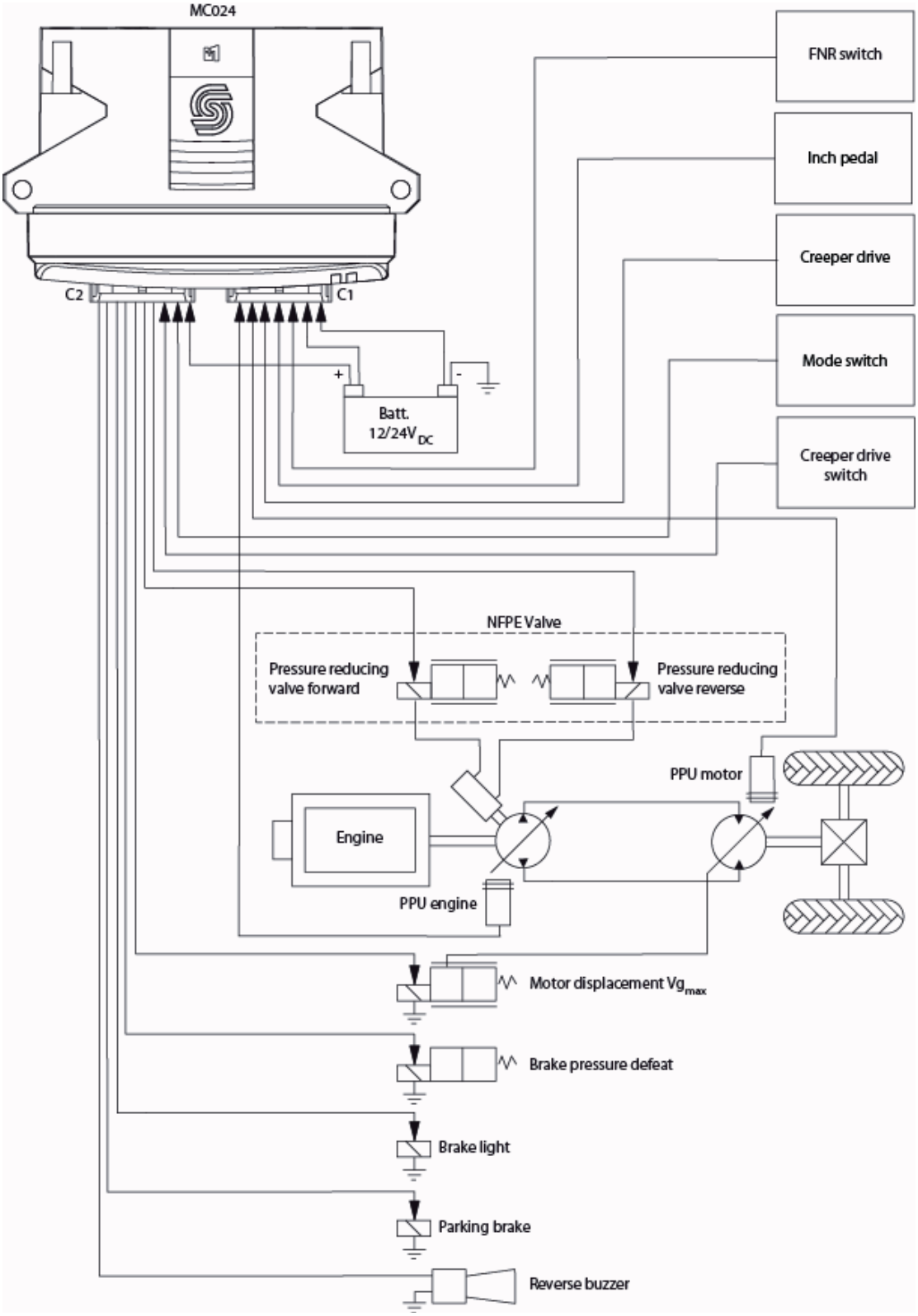
Connector 1

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



TECHNICAL SPECIFICATION

16



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..

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

Within the first 100 working hours

C-1	Change the oil in the differential gears, in the four wheel reduction gears and in the power divider.

Every 250 working hours or monthly:

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.

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 4017EX, GTH 4514EX)

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 working 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			

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			

		Y	N	R
Within the first 10 working hours:				
C-1	Oil level in the differential gears, reduction gears and divider.			
Every 250 working hours:				
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.)			

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

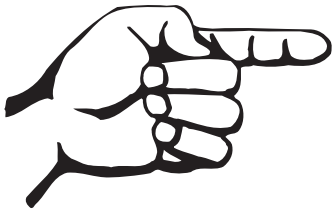
R = repaired.

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 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

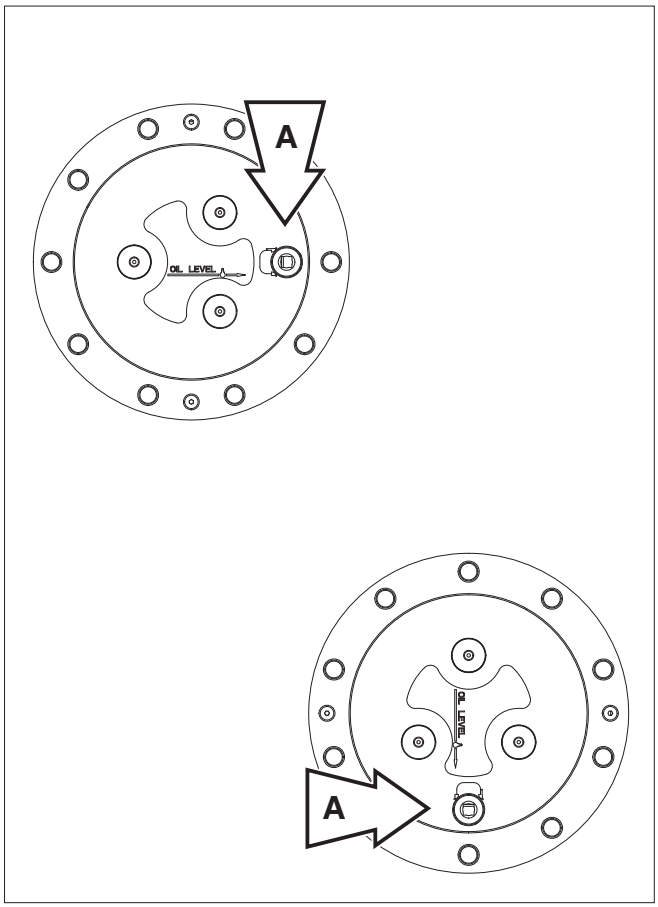
Place a container of suitable size under the plug for oil leaks.

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** and check if oil is level with the hole.
- If necessary, 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.



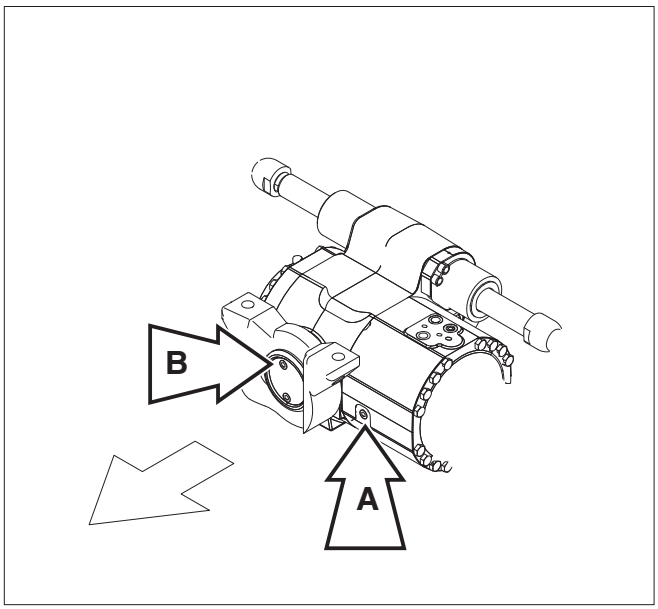


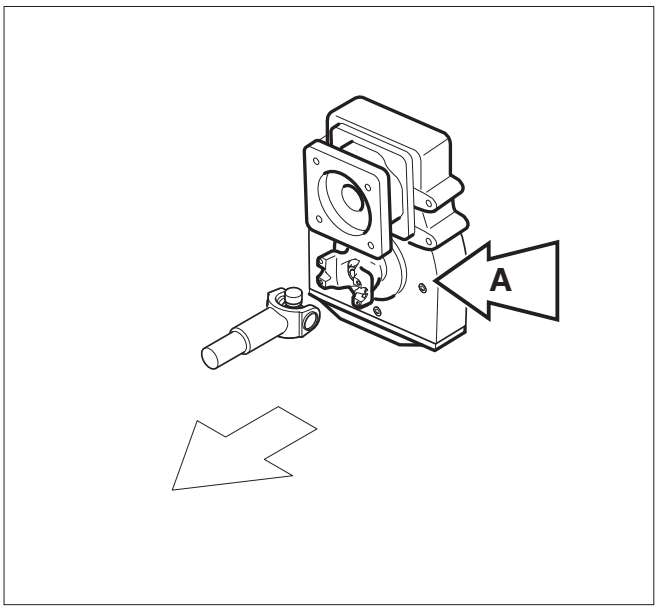
TABLE A

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 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.



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.

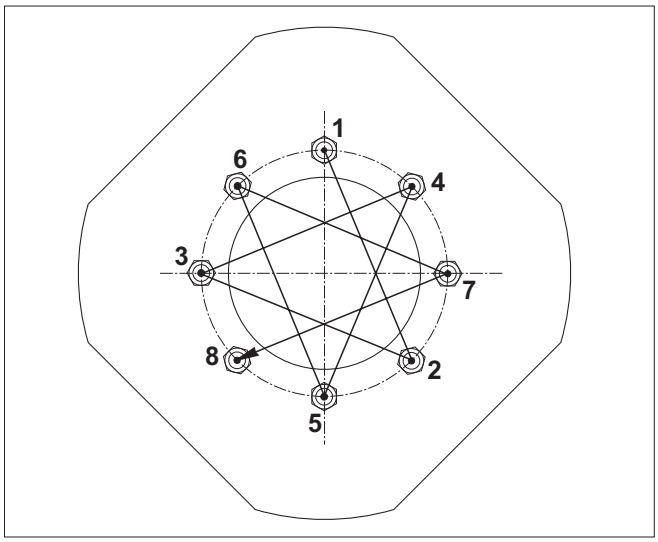
WARNING

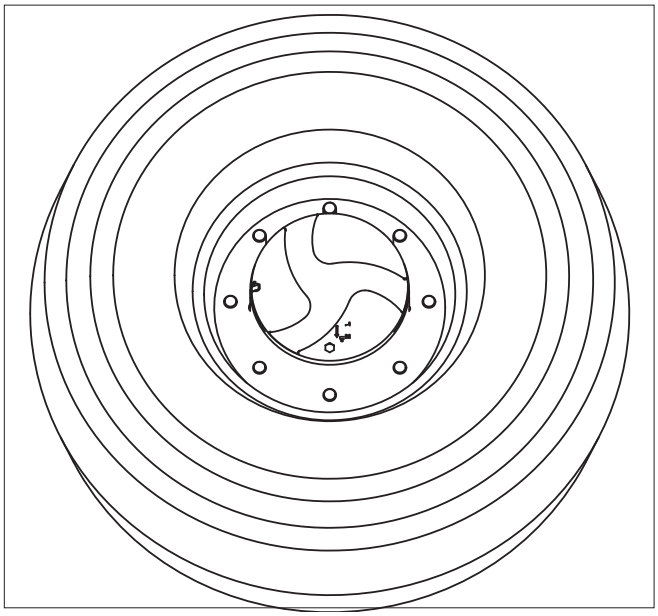
On new machines, and when a wheel has been disassembled or replaced, check the nut torque of the wheels every 2 hours until they stay correct.

WARNING

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

TABLE A





	GTH 4013 EX Standard - Optional	GTH 4514 EX Standard - Optional
Dimensions (front, rear)	405/70 R20 - 405/70 R24	405/70 R20 - 405/70 R24
Load Index	14 pr - 14 pr	14 pr - 14 pr
Rim	13x20 - 13X24	13x20 - 13X24
Wheel disc	8 holes DIN 70361 - 8 fori DIN 70361	8 holes DIN 70361 - 8 fori DIN 70361
Pressure bar/Psi	5.5/80 - 4.6/65	5.5/80 - 4.6/65

	GTH 4017 EX	
Dimensions (front, rear)	400/70 R24	
Load Index	14 pr	
Rim	13X24	
Wheel disc	8 holes DIN 70361	
Pressure bar/Psi	4.6/65	

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 GENIE 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

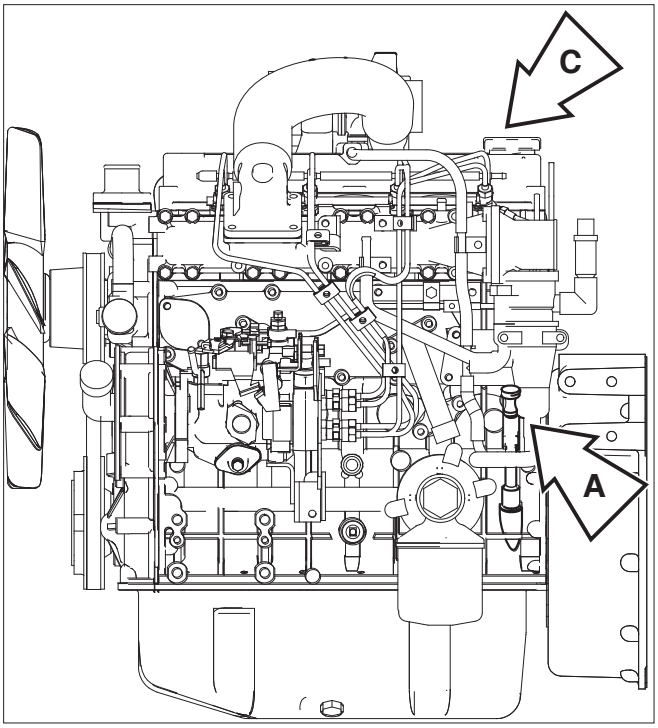
Contact GENIE Service Centre if replacement decals are needed.

TABLE A

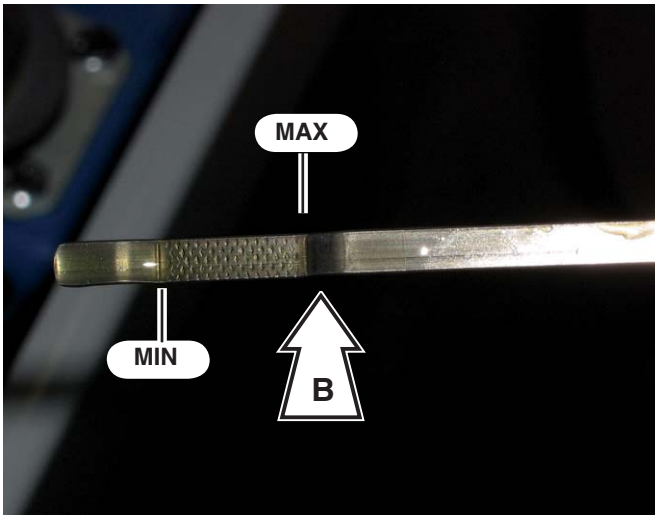
A-7 CHECK THE ENGINE OIL LEVEL

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.



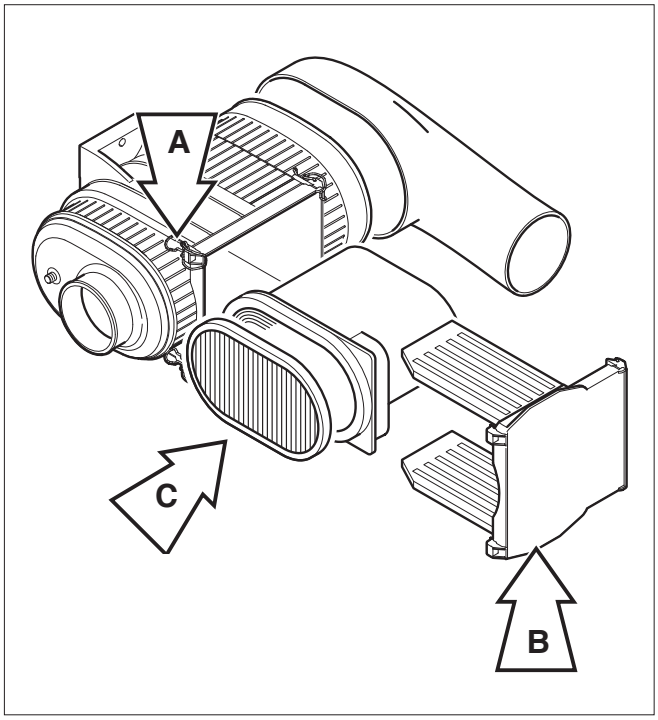
- Pull out the rod **A** again and ensure the oil comes to the maximum level **B**.
- Refit the rod **A** and the plug **C**.

TABLE A

A-8 CLEAN THE AIR SUCTION FILTER (GTH-4013EX)

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.

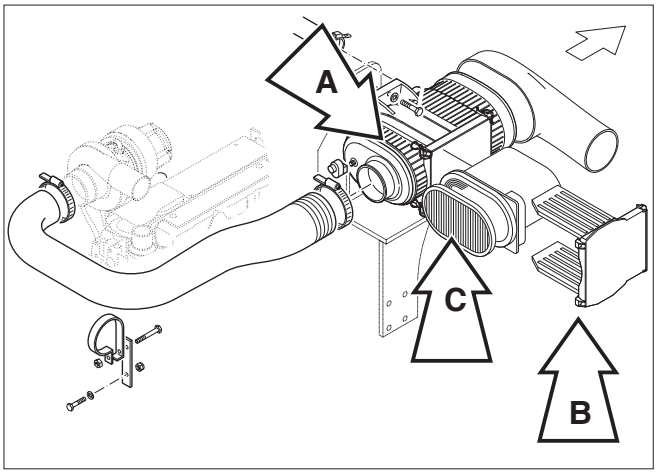
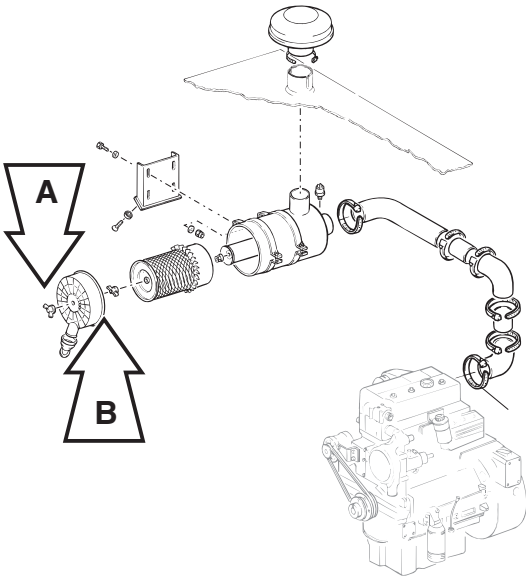


TABLE A

CLEAN THE AIR SUCTION FILTER (GTH-4017EX - GTH-4514EX)

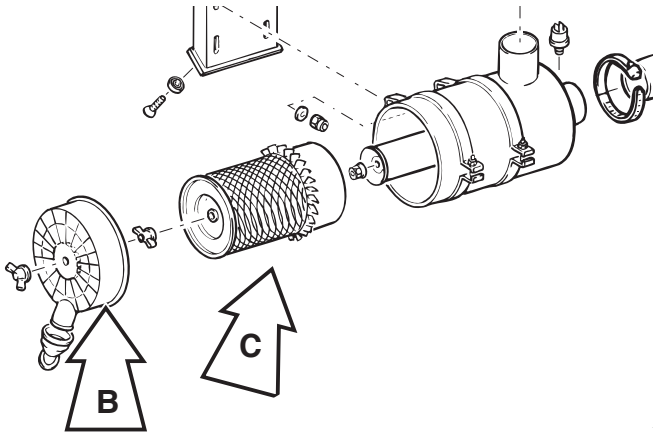
Clean the engine air filter every 10 working hours:

- Stop the engine and engage the parking brake.
- Lift the engine carter.
- Remove the screw **A** locking the filter cap.
- 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.
- Check the inside cartridge **D**, remove and clean it.
- 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.

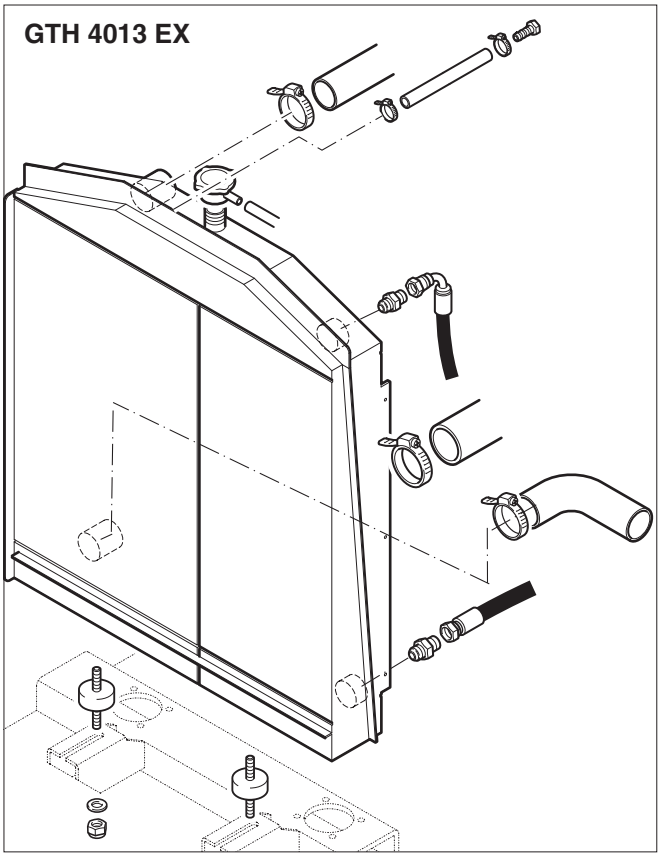
Cleaning using water under pressure or steam

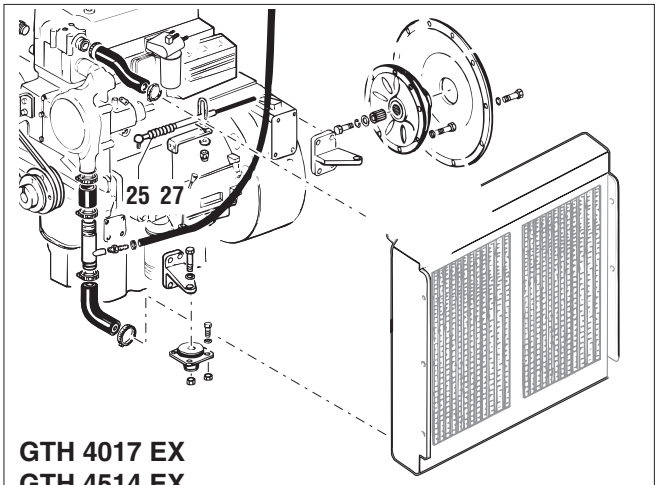
- Spray radiator with a cold commercial detergent and wait for at least 10 minutes to allow the detergent to react.
- Wash radiator using a jet of water or steam.

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.

GTH 4013 EX





GTH 4017 EX
GTH 4514 EX

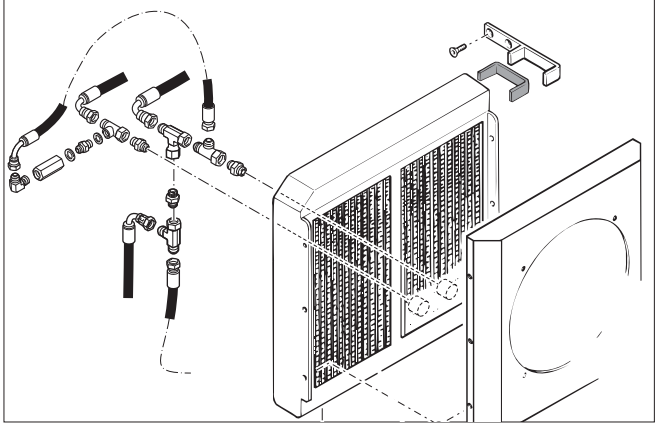


TABLE A

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**.

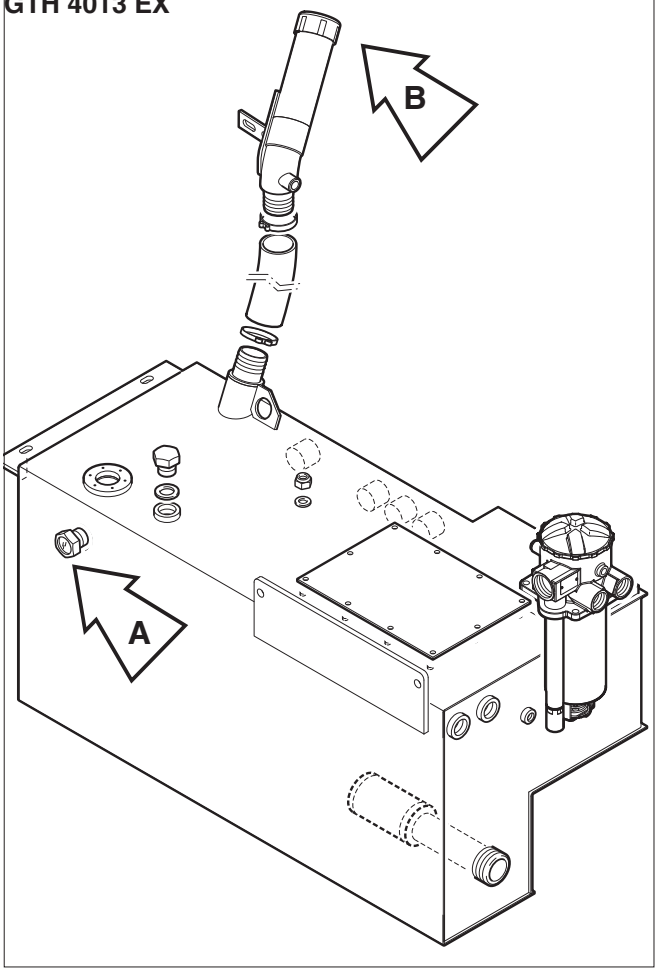
WARNING

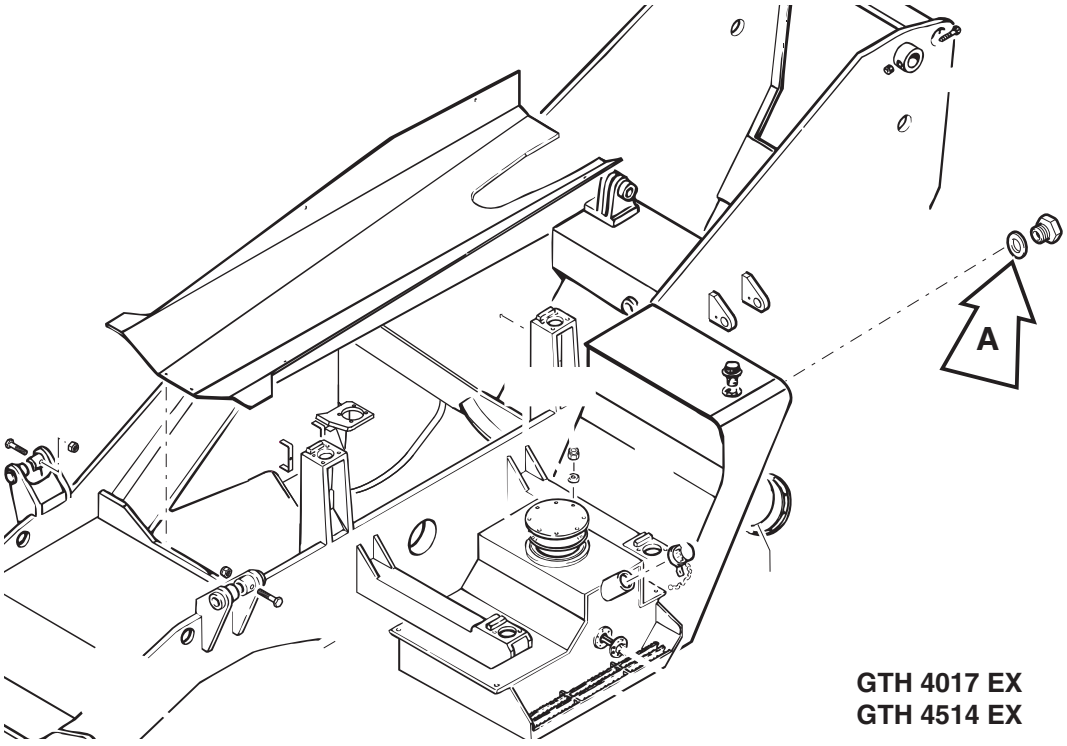
Check the oil level with the machine in the travel position, tha is boom lowered and telescopes fully in.

PROTECT THE ENVIRONMENT

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

GTH 4013 EX





GTH 4017 EX
GTH 4514 EX

TABLE A

A-11 CHECK THE GREASING OF THE BOOM SECTION PADS (GTH-4013EX - GTH-4514EX)

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.

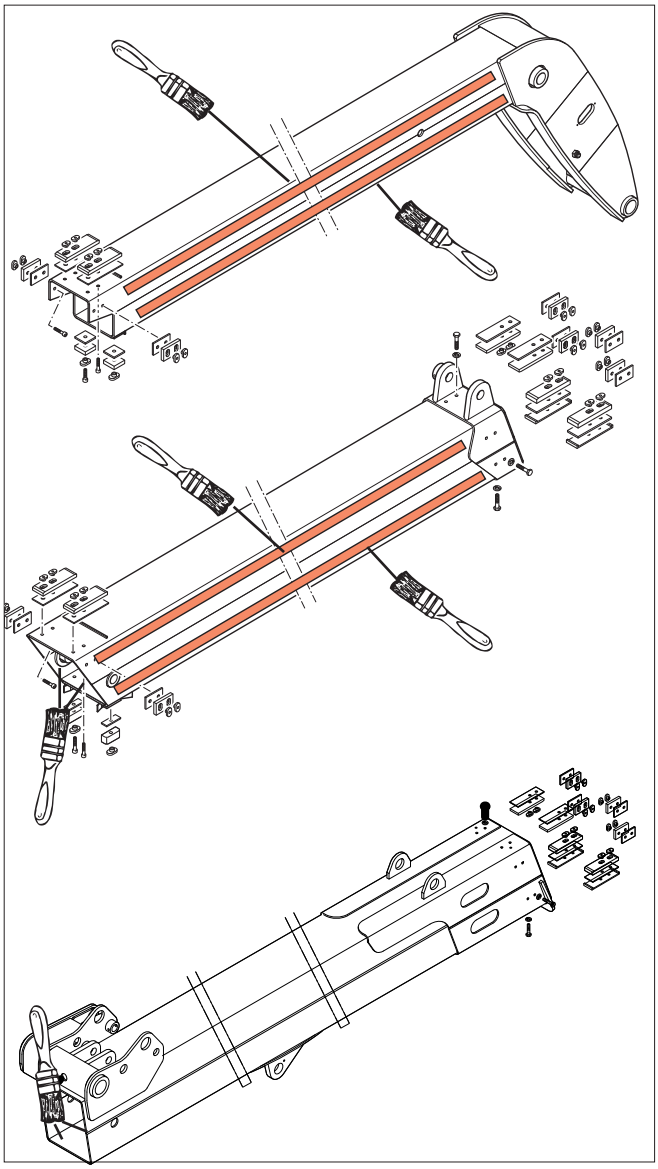
At regular intervals, check that the telescopes are well greased in correspondence of the sliding pads.

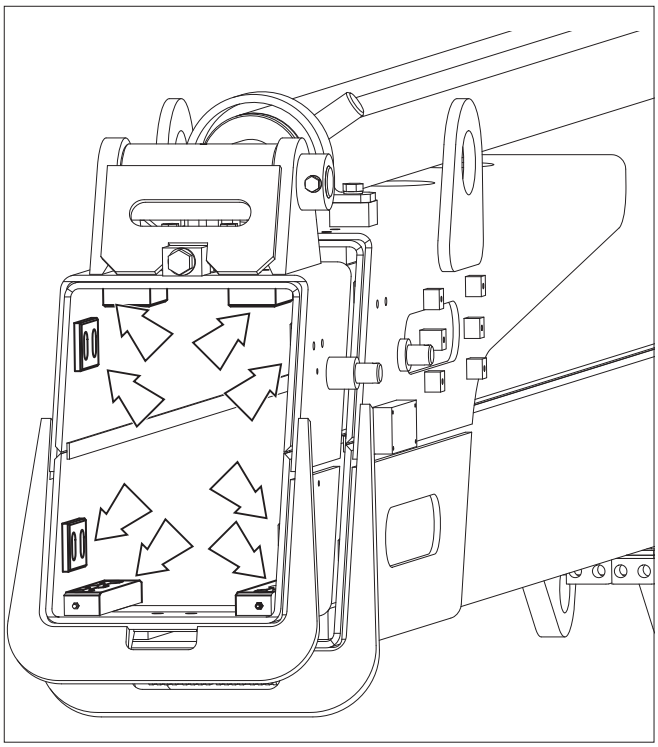
If necessary, scrape off the old grease and brush new grease. We recommend using:

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

CAUTION

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





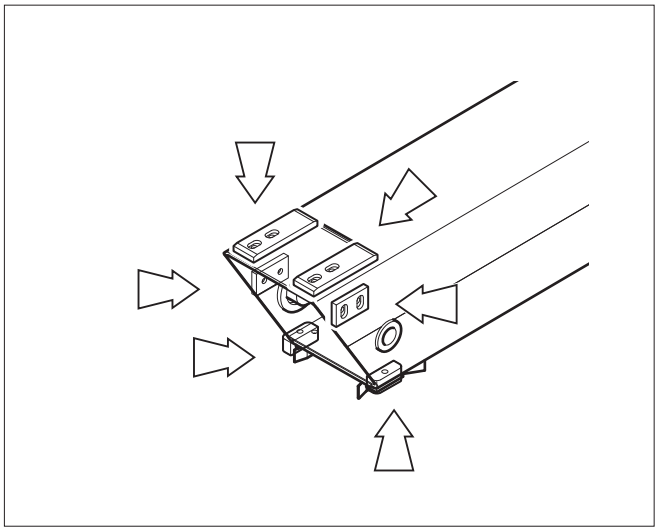
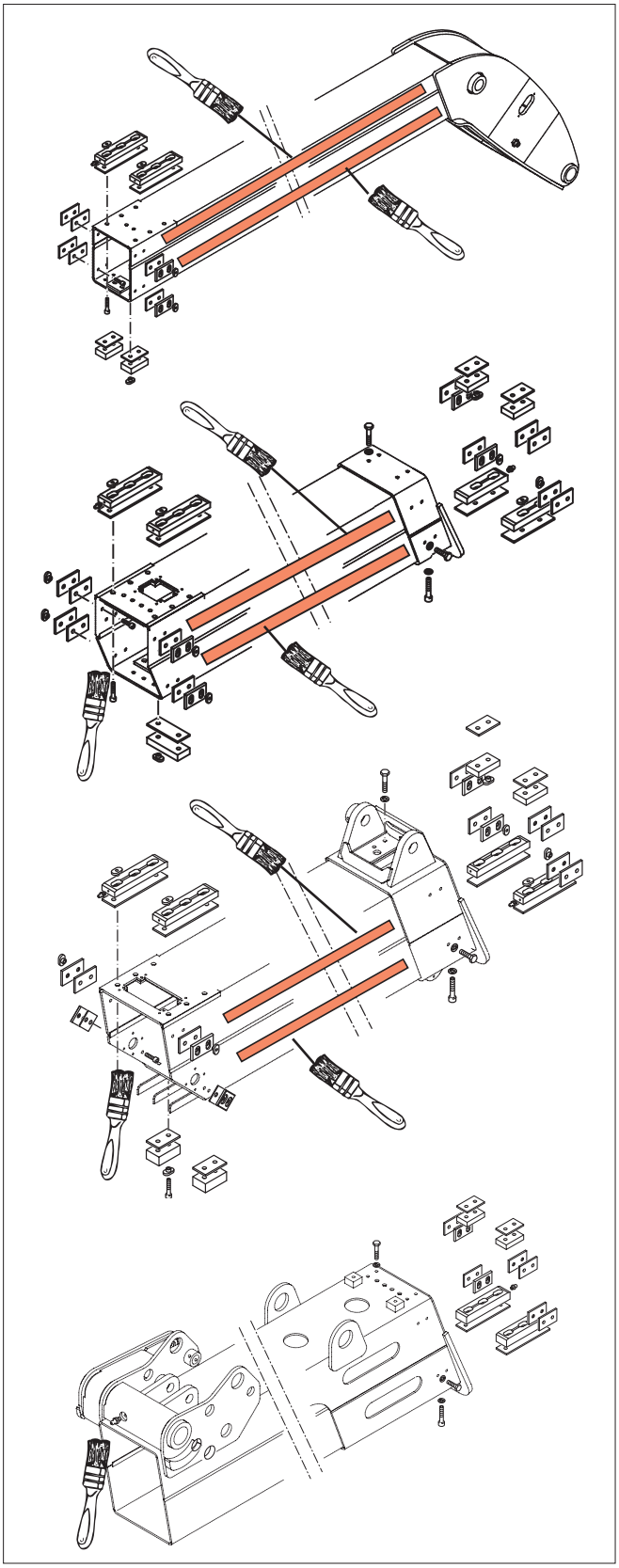
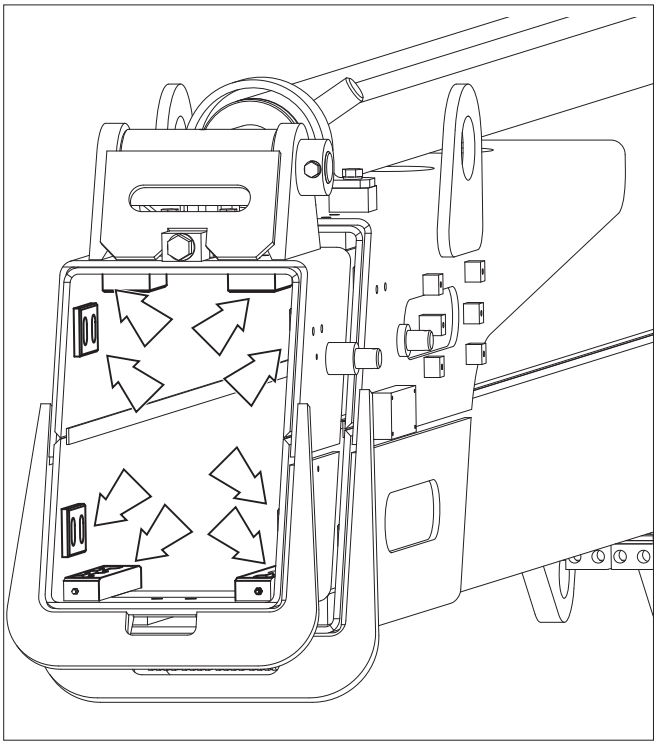


TABLE A

CHECK THE GREASING OF THE BOOM SECTION PADS (GTH 4017 EX)





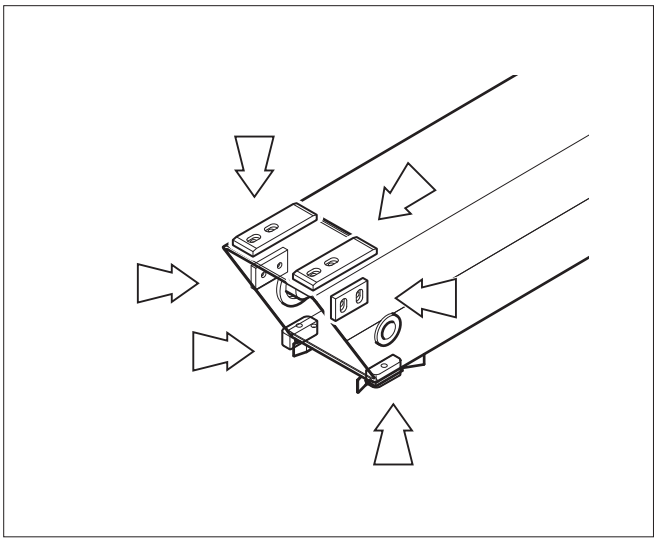


TABLE A

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**

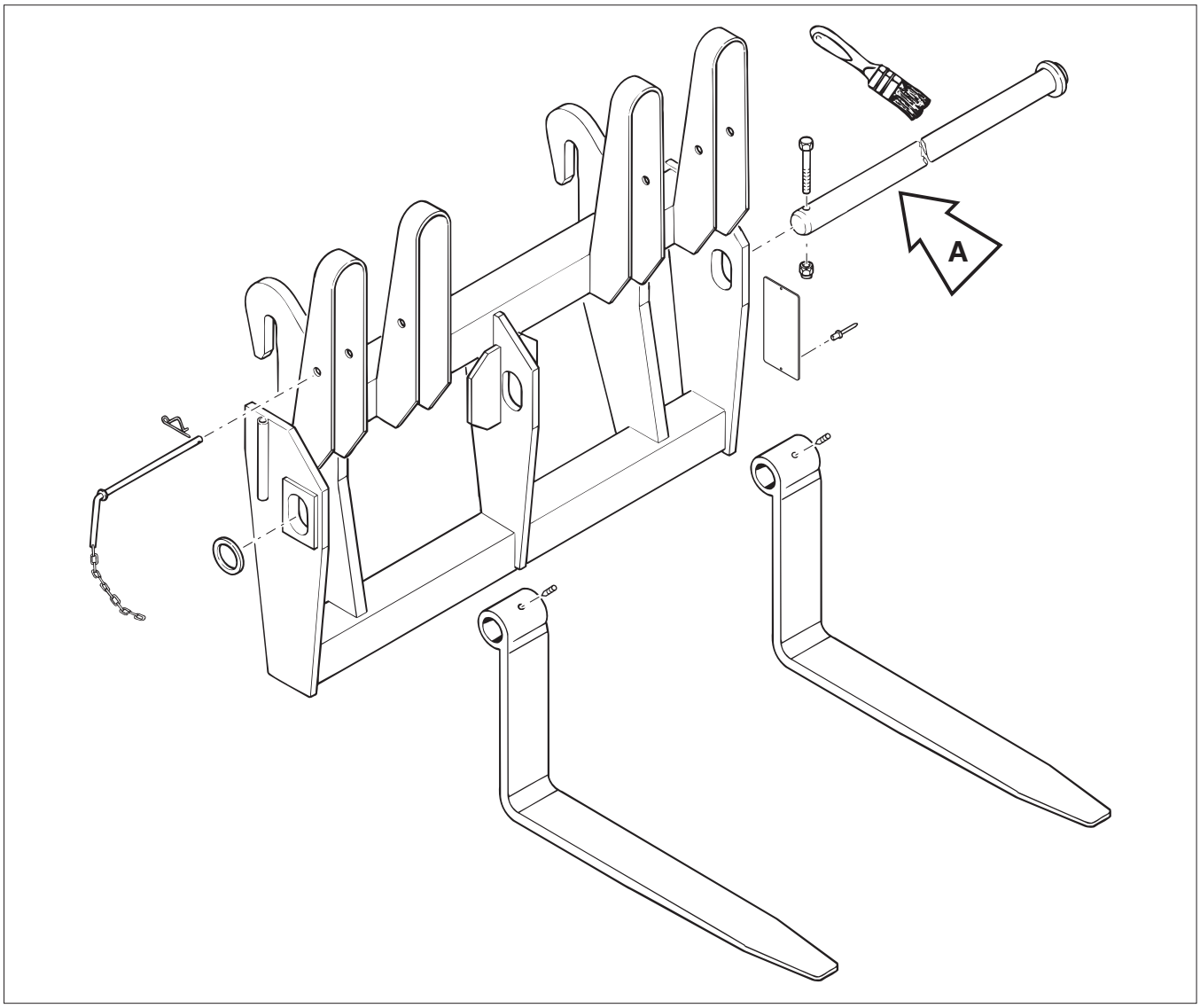
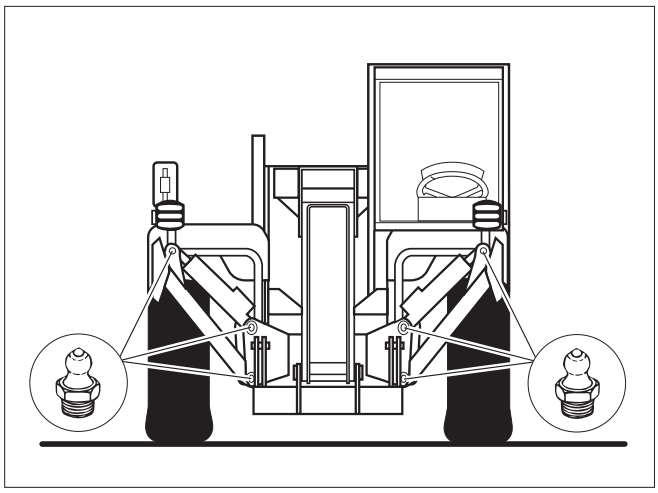


TABLE A

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.

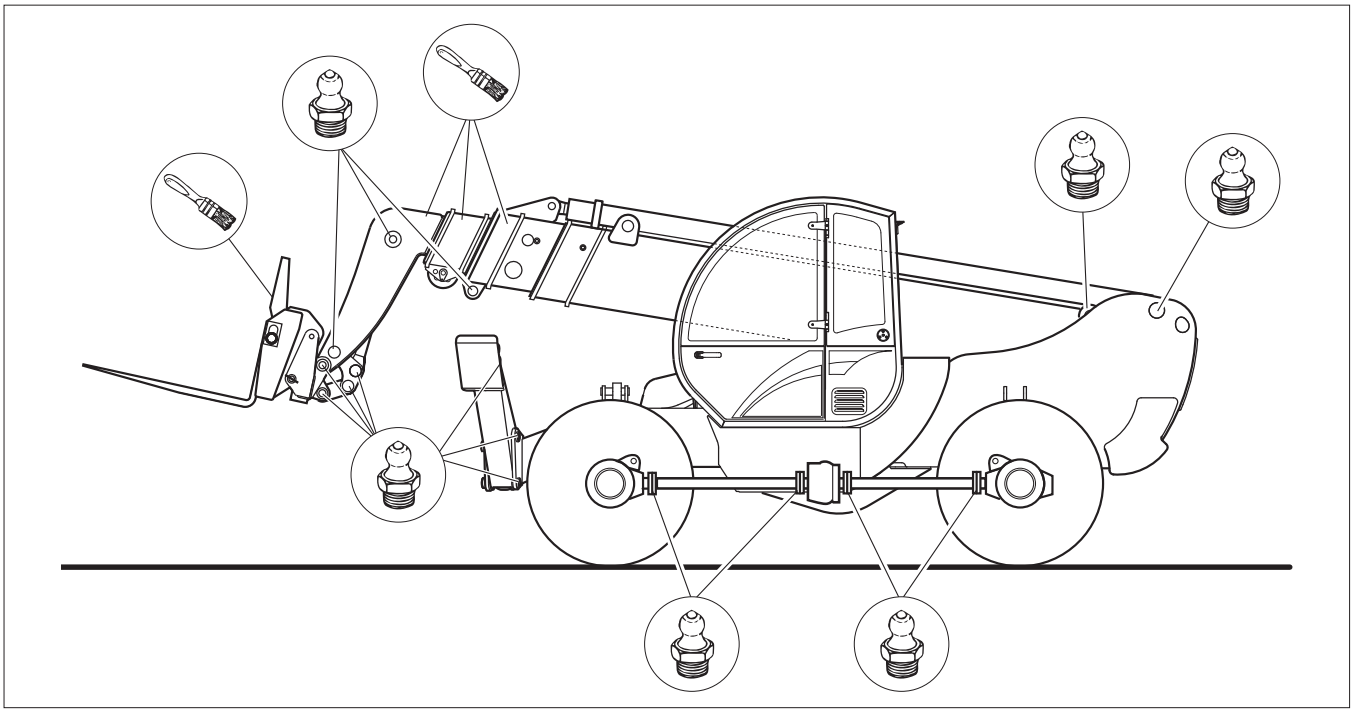


TABLE A

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.

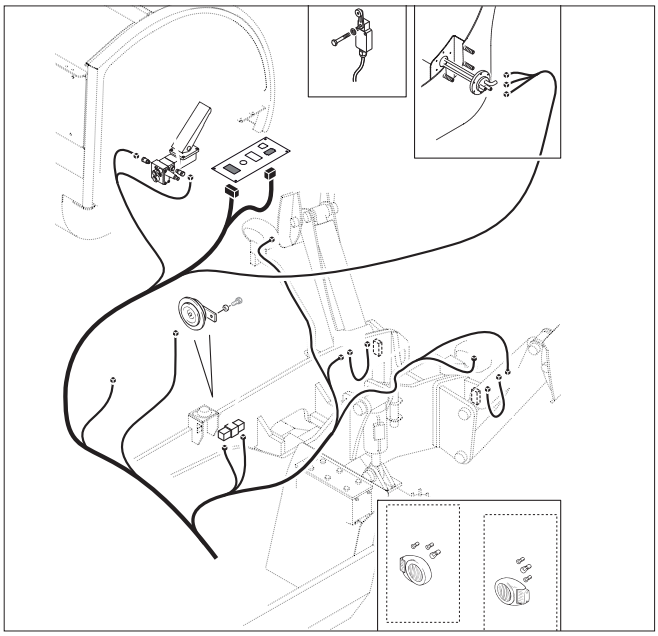
WARNING

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



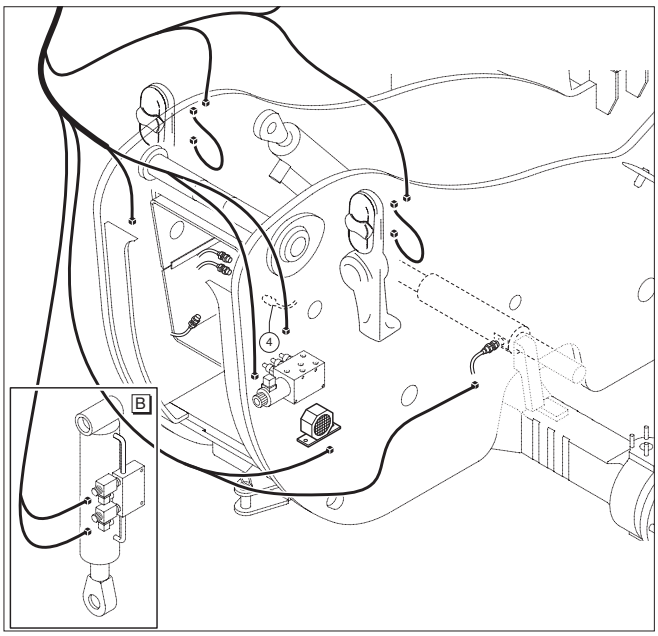


TABLE A

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

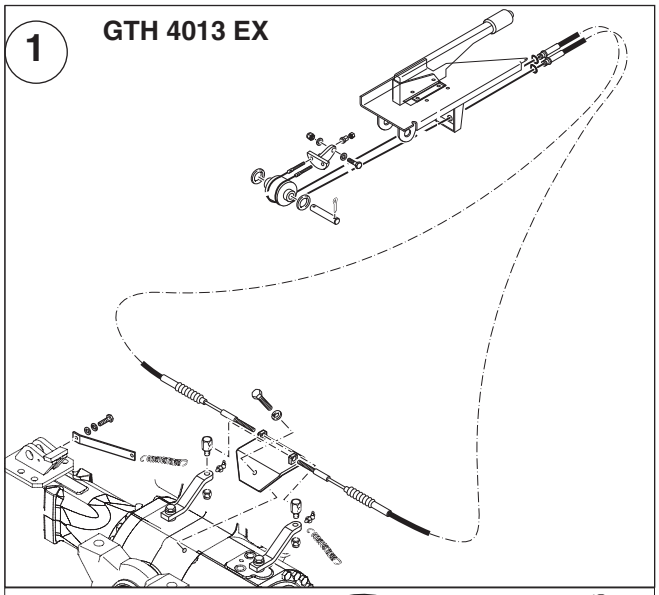
1 CHECK PARKING BRAKE:

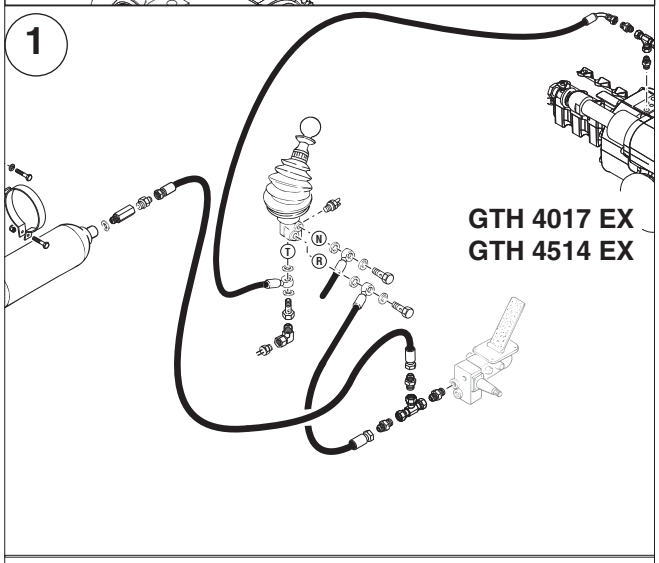
- Load the maximum payload onto the forks (4000 Kg for GTH 4013 EX - GTH 4017 EX; 4500 Kg for GTH 4514 EX).
- Retract boom and forks fully.
- Lift the forks at about 50 cm on the ground.
- Stop the machine on a sloped surface of about 15% (8.5°). If possible, use a oscillating axle.
- Engage the parking brake.

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

2 CHECK SERVICE BRAKE

- 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 19,23 (see TEST REPORT cod. 57.1400.8105).





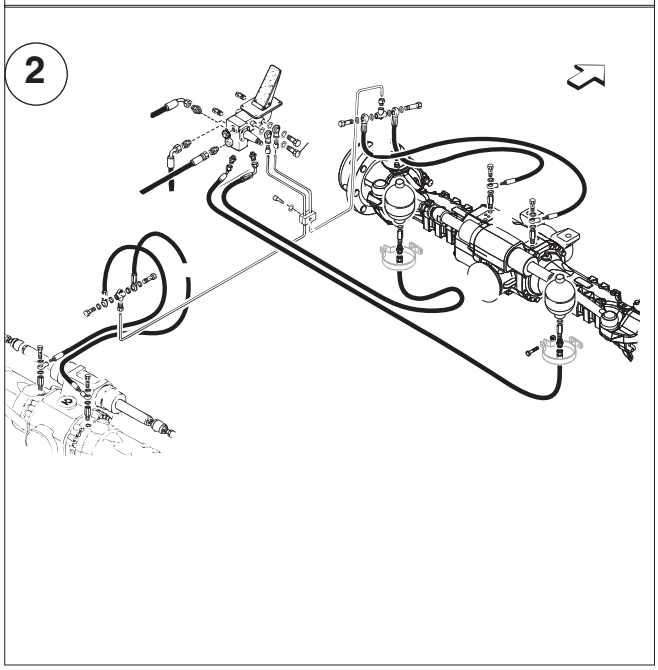


TABLE A

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**).

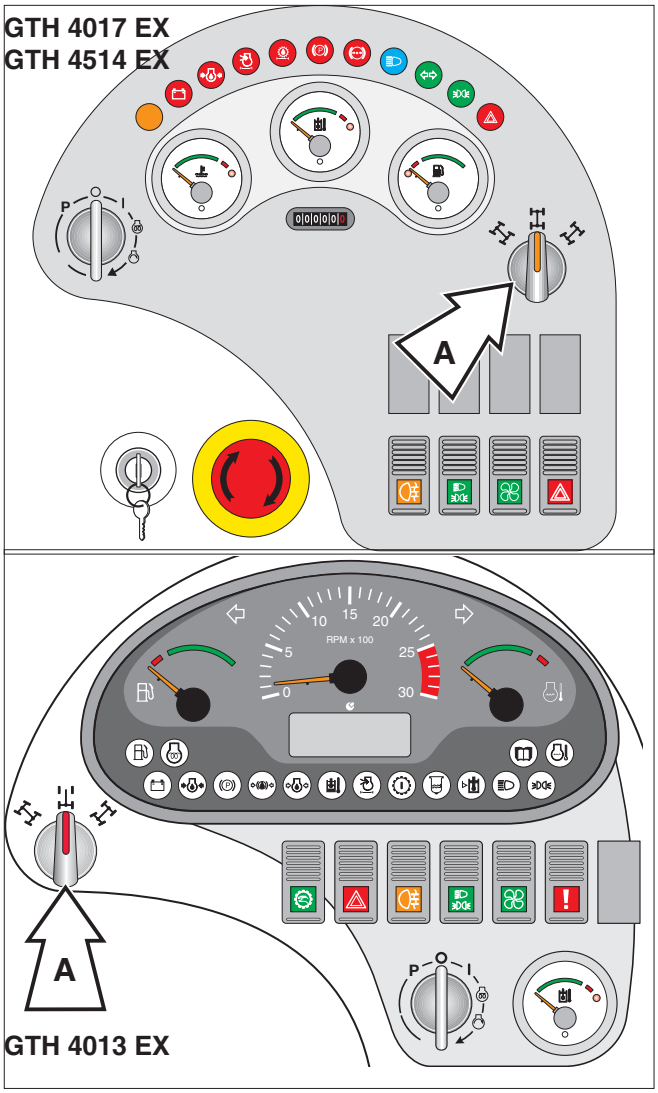
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop.

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

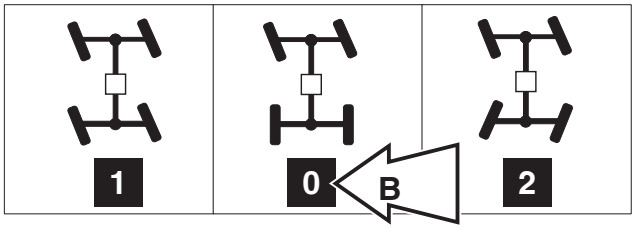
9 Rotate the steering (to the same side as in point **7**) so that the front axle reaches its stop.

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.



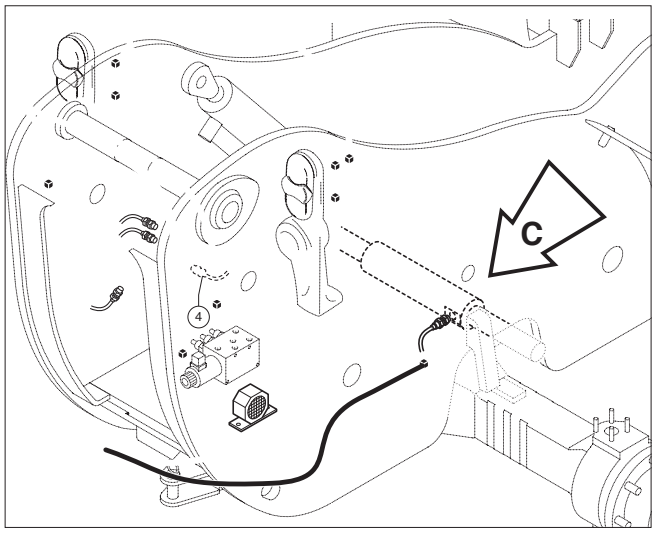


TABLE A

A-17 CHECK THE EFFICENCY OF THE FORK BALANCING SYSTEM

WARNING

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

NOTICE

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

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.

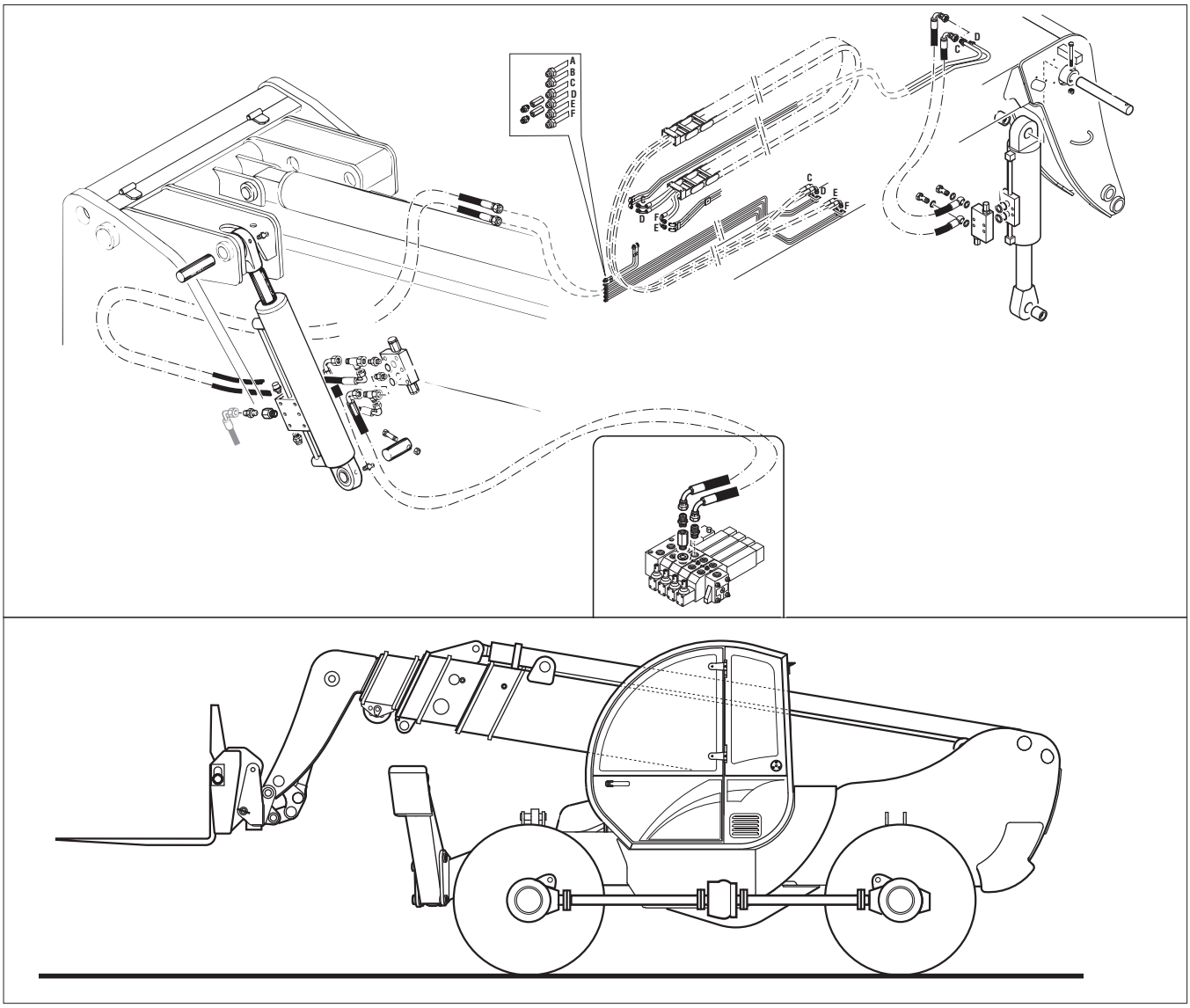
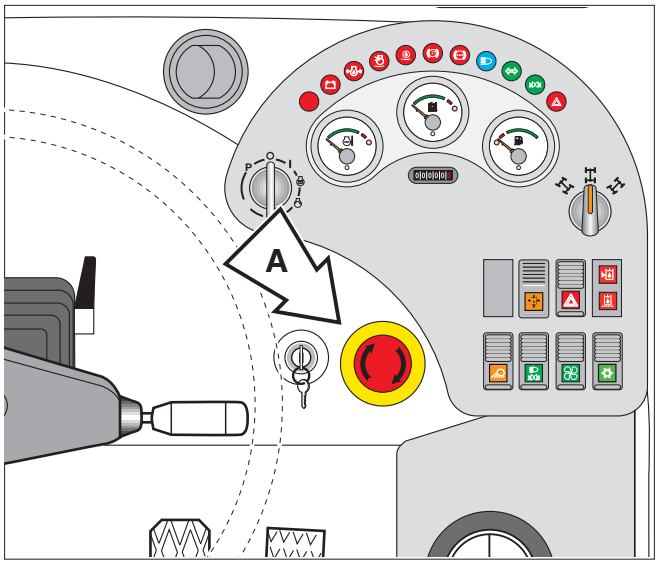


TABLE A

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.

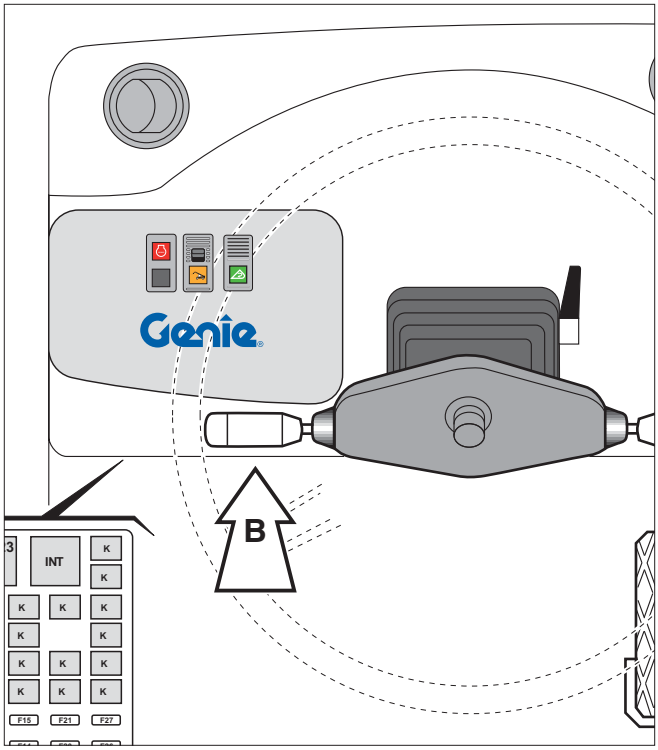


TABLE A

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

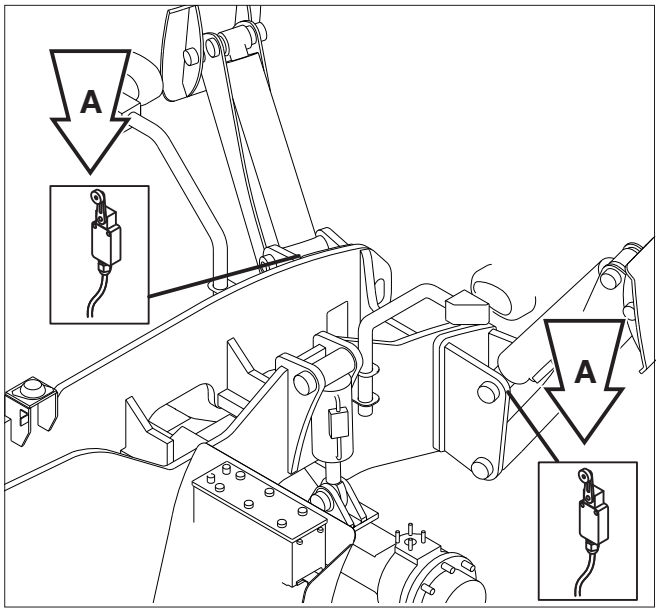
To check the limit switches (**A**) on the outriggers:
- Lower the outriggers to the ground and attempt to engage a gear.
  Accelering the machine has to be stopped.

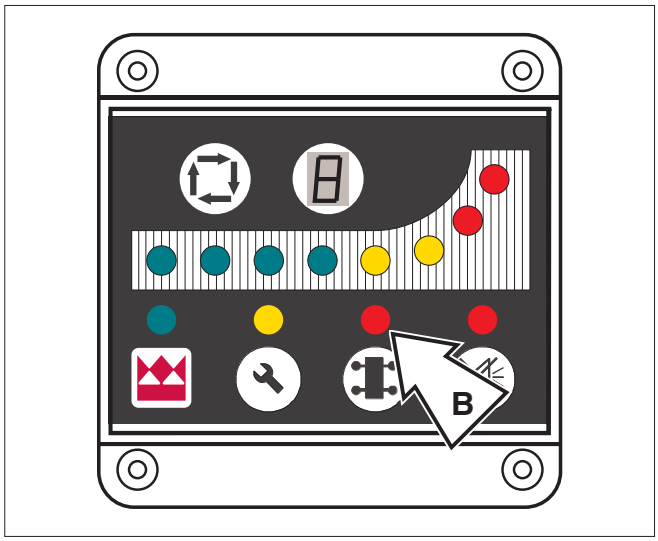
Proceed on one outrigger at a time.

- 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.

DANGER

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° and check that the rear axle is stopped.

Limit switche E
- The limit switche E shoes the boom is fully retract.

Limit switches E-D on boom
- Lift the boom with a tilt angle until 50° (sensor **D**), retrac it fully (sensor **E**) 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°.

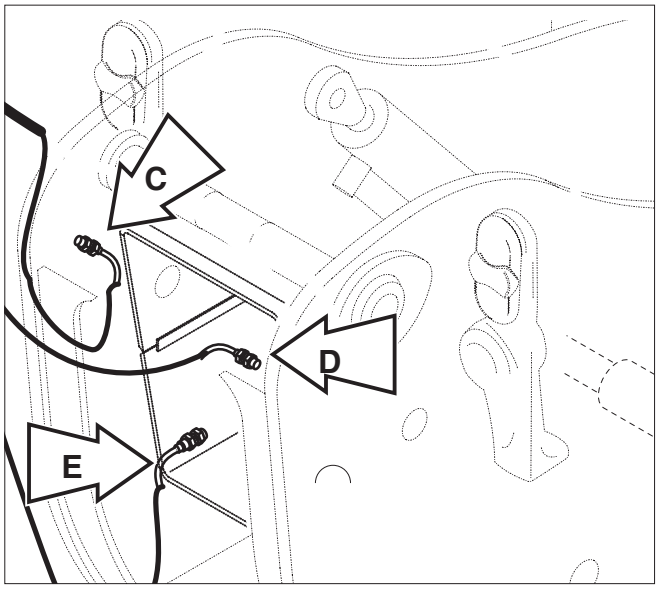


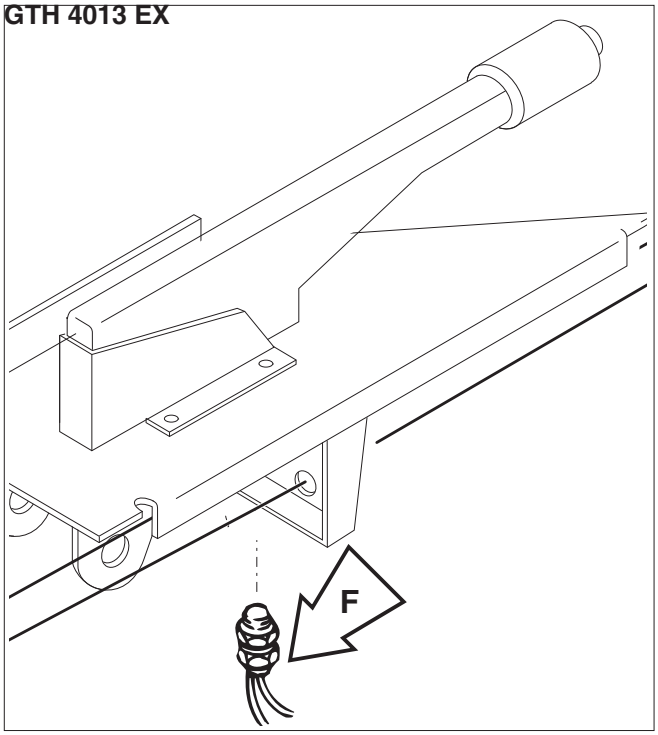
TABLE A

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.

GTH 4013 EX



GTH 4017 EX
GTH 4514 EX

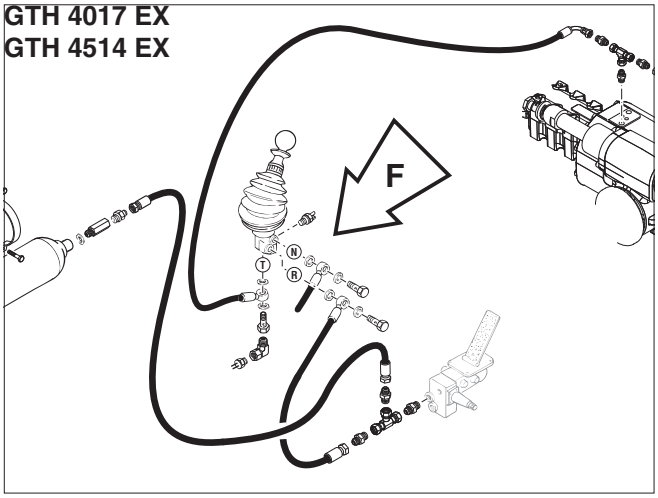


TABLE A

A-19 CHECK THE ENGINE COOLANT LEVEL

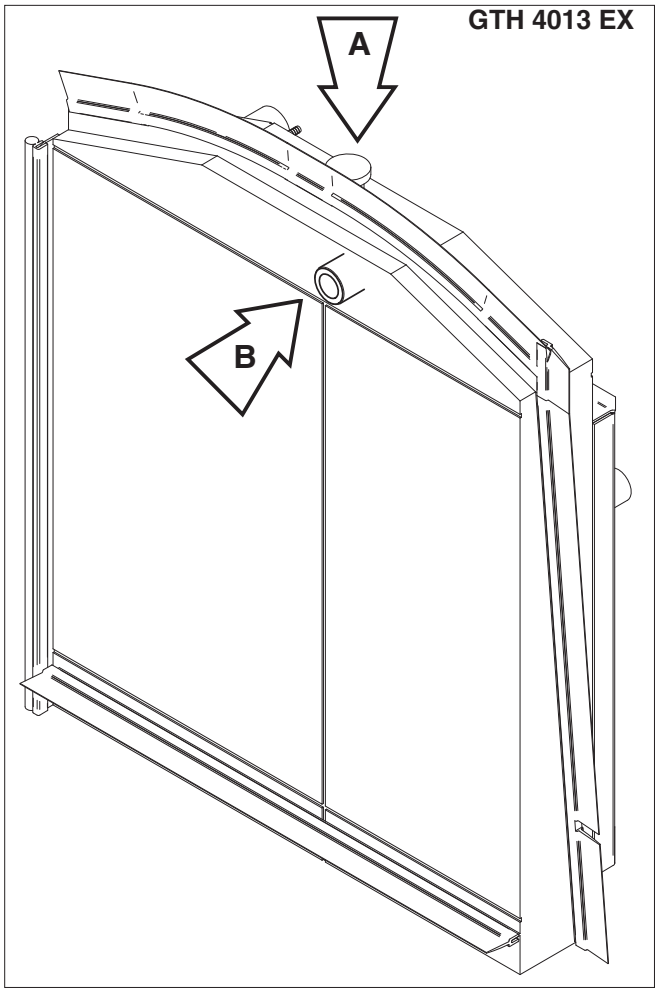
DANGER

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



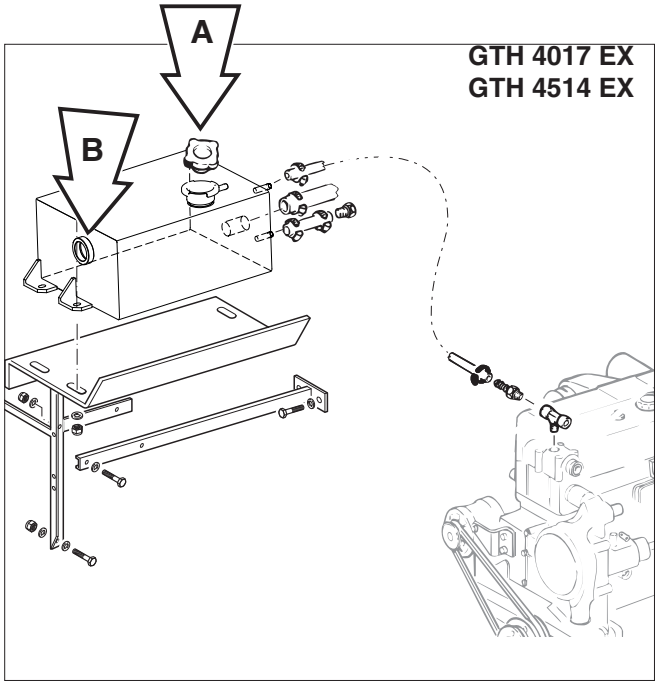
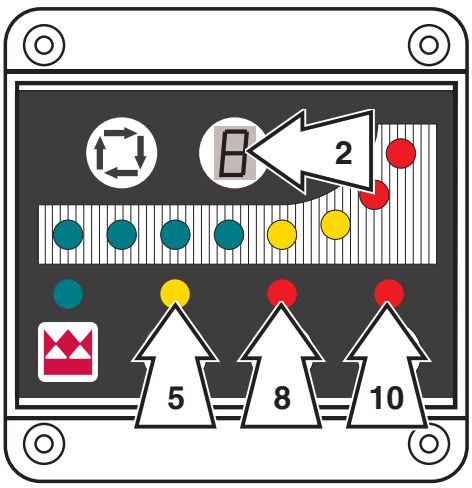
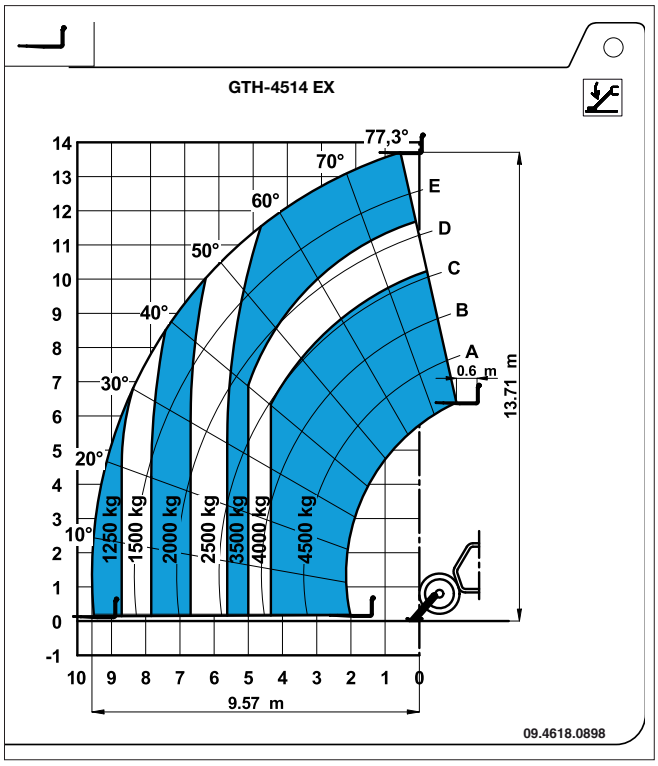


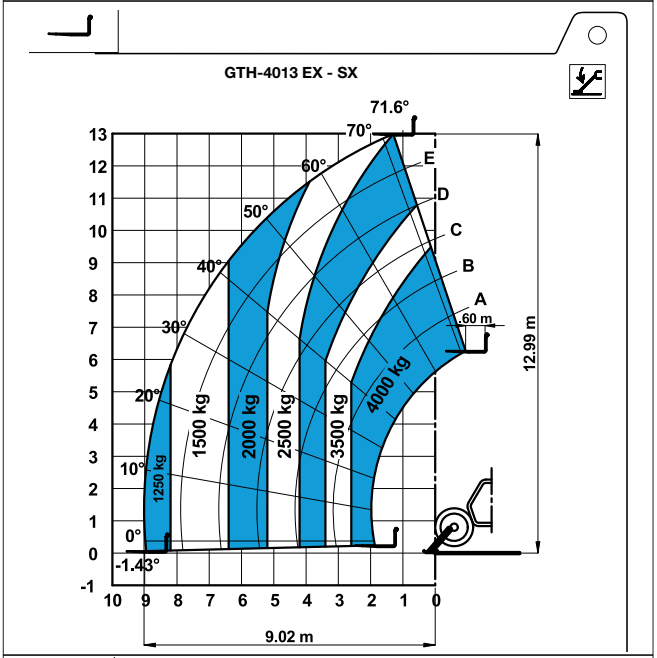
TABLE A

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.







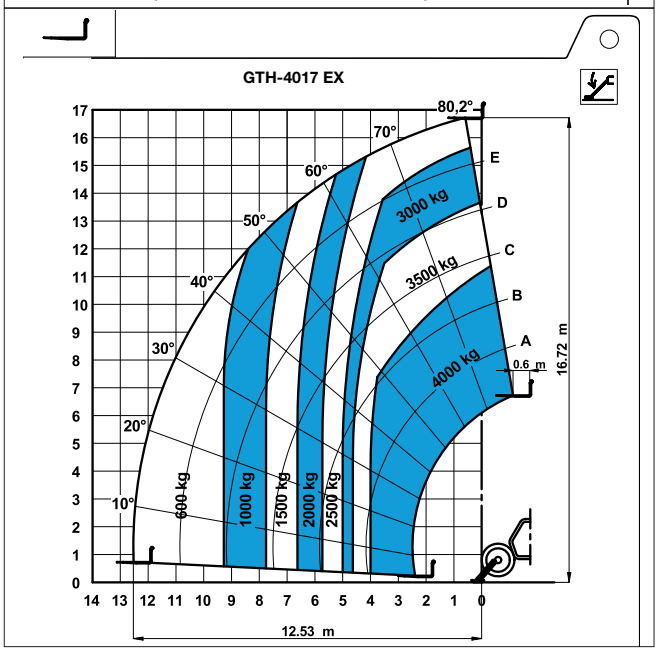


TABLE A

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

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:

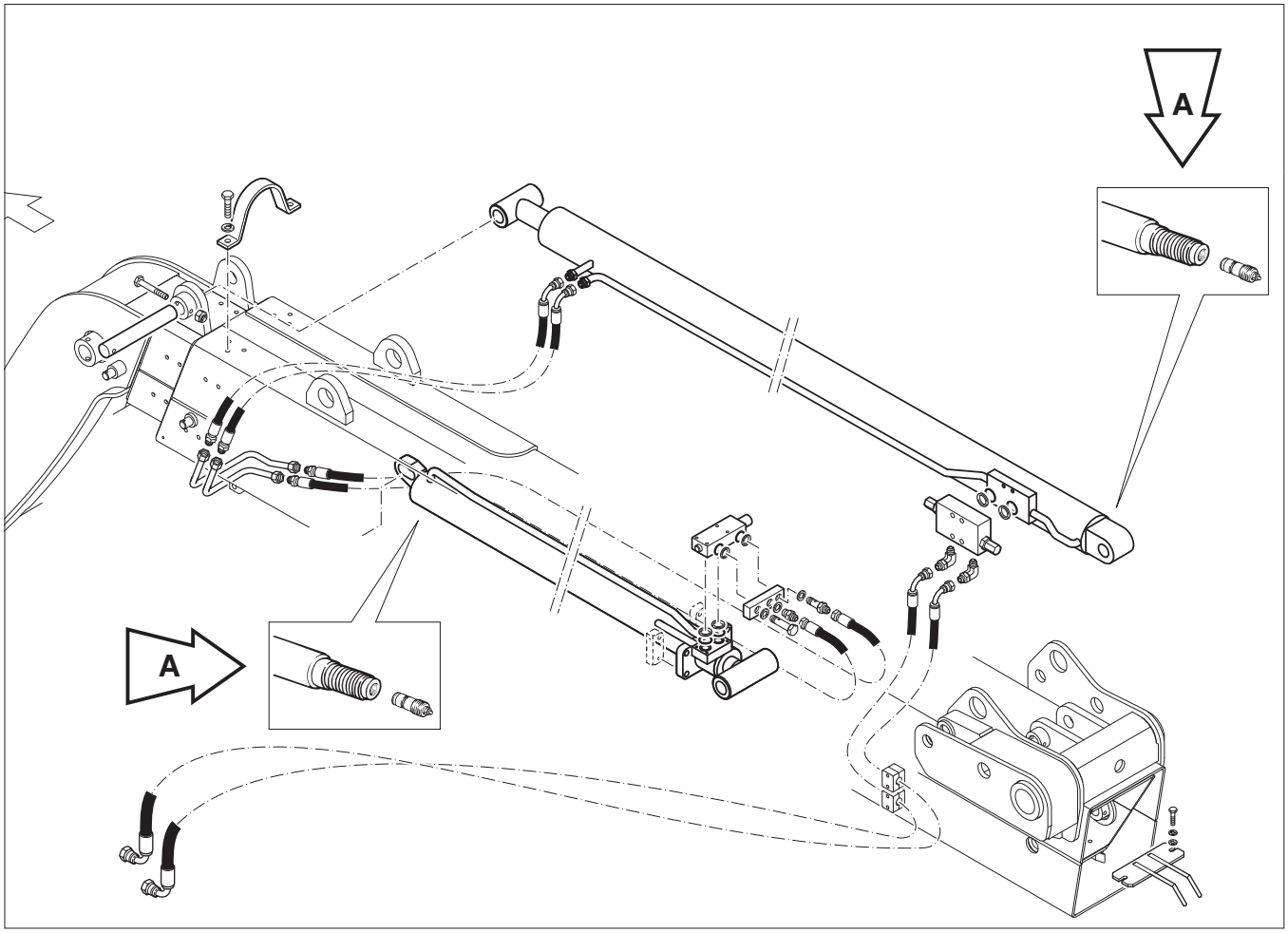
1 With the thermal motor started, retract the boom fully using the joystick, hold the system over relief (approx. 15 seconds); the three boom sections should retract fully. Then, hold the system over relief for approx. 20-40 seconds, to change the hydraulic oil inside the system.

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.



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.

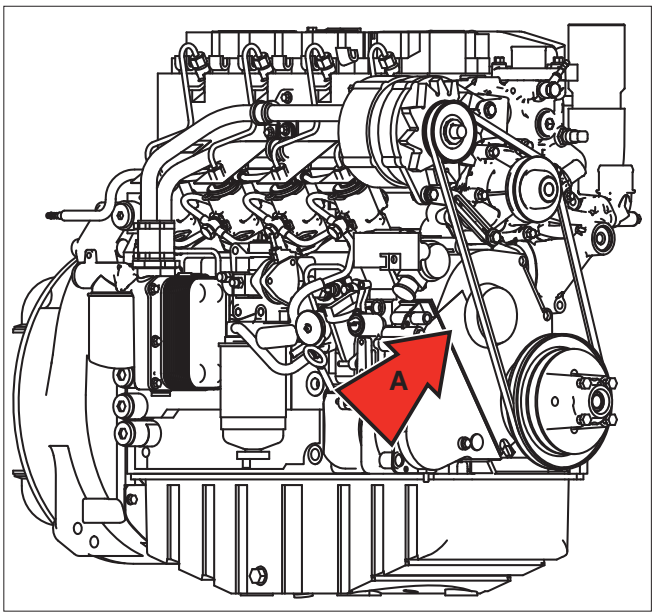


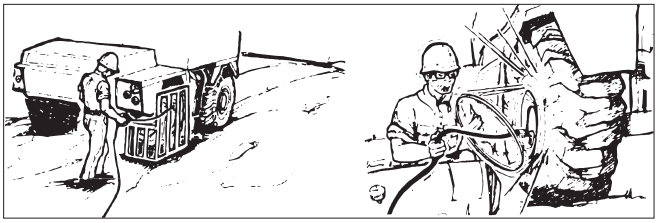
TABLE B

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.

OK ***WRONG***



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

	GTH 4013 EX-GTH 4514 EX Standard - Optional	GTH 4017 EX
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 holes DIN 70361 - 8 fori DIN 70361	8 holes DIN 70361
Pressure bar/Psi	5.5/80 - 4.6/65	4.6/65

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

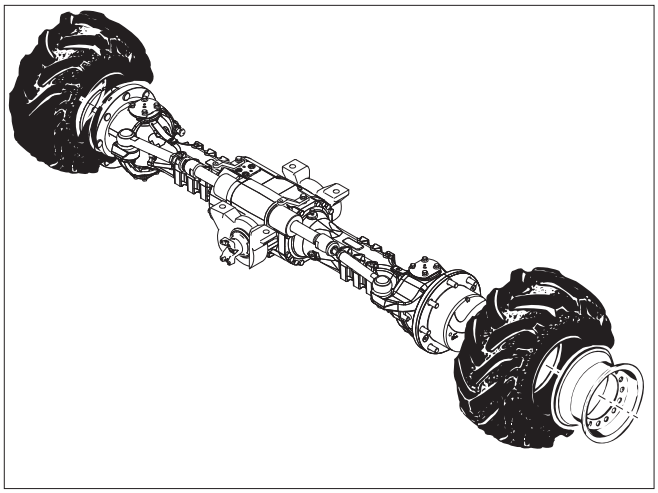
Always use tyres having the dimensions indicated in the vehicle registration card.

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.

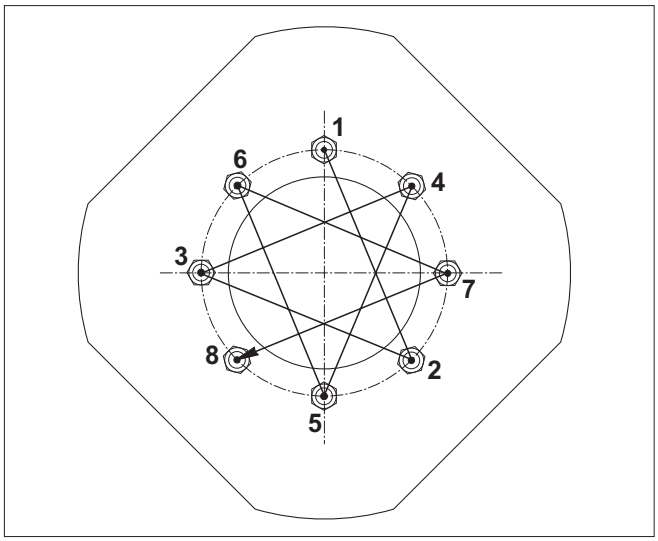


TABLE B

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”.

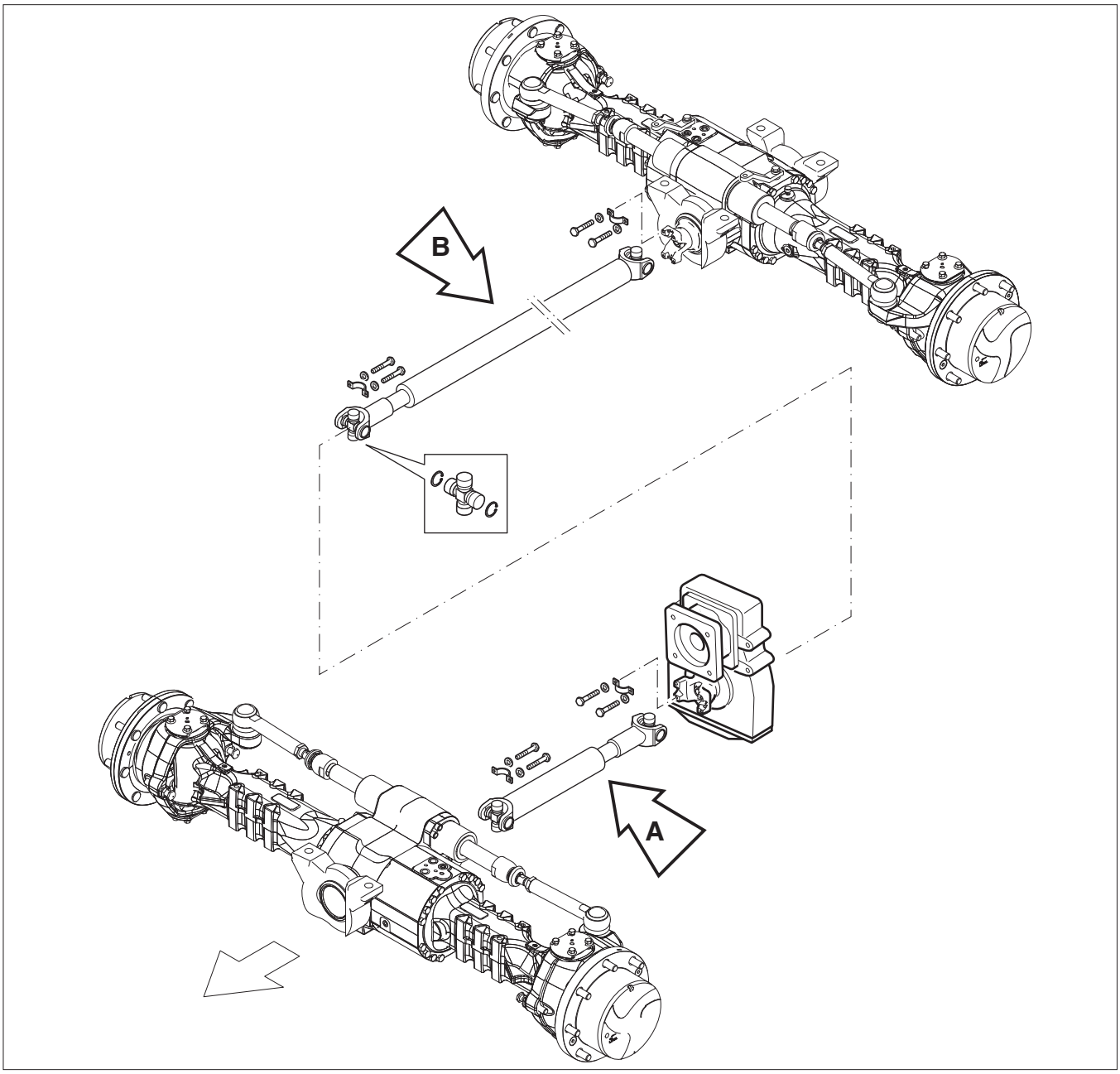


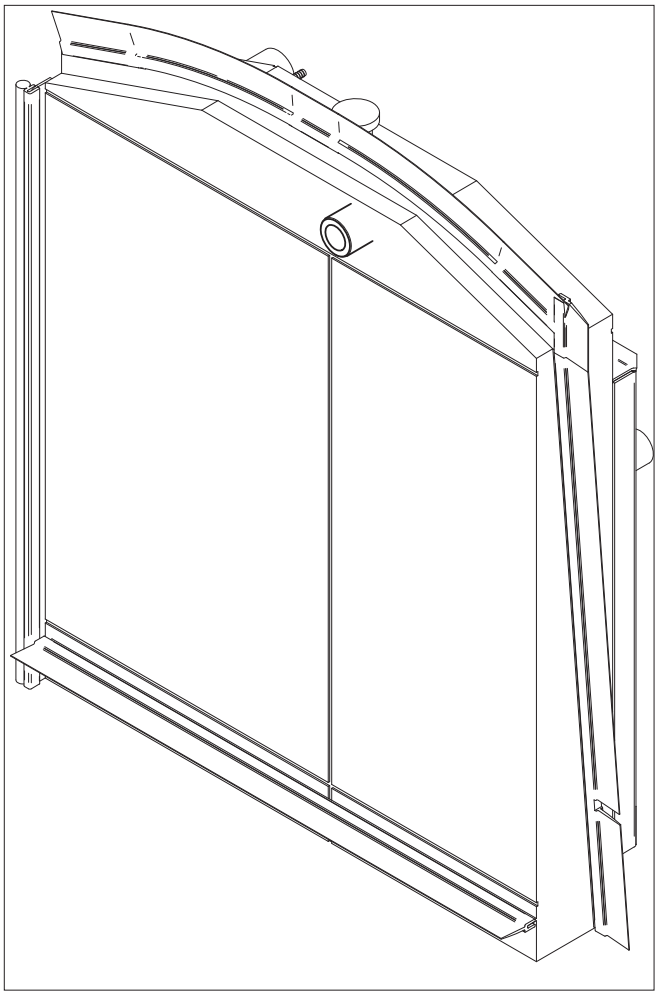
TABLE B

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.



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 **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.

TABLE C

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 the front and rear **differential gears**:

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

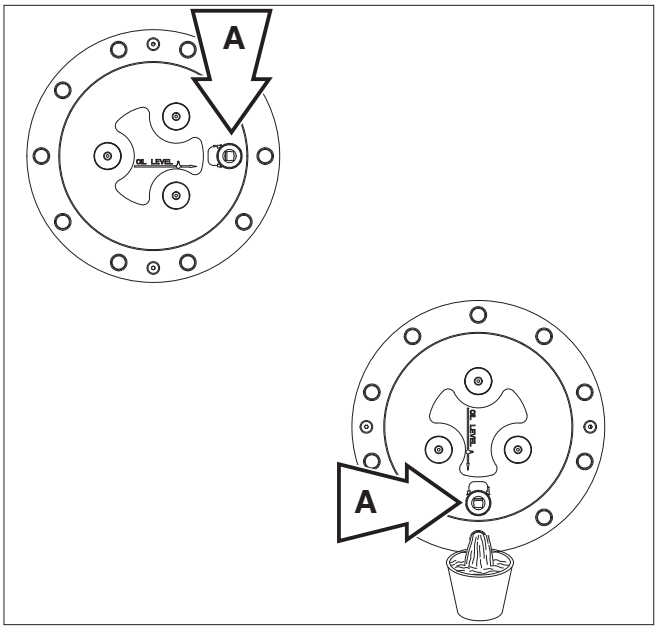
PROTECT THE ENVIRONMENT

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**



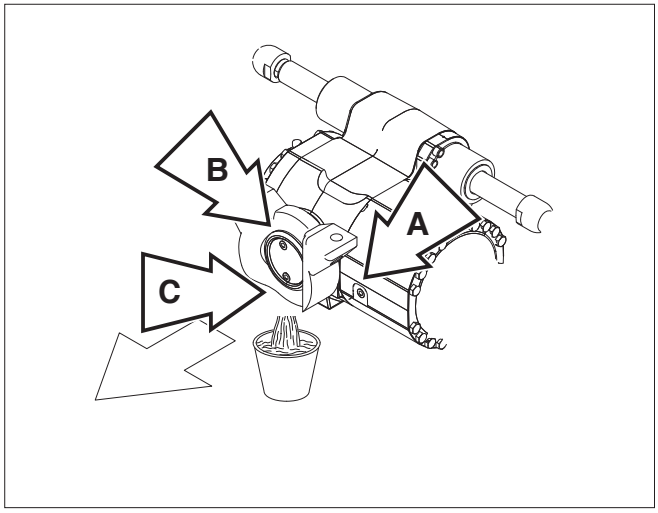


TABLE A

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

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

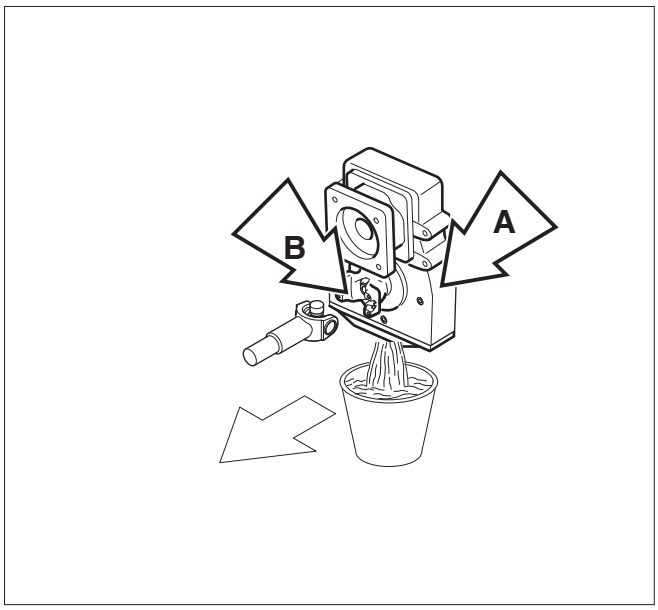
PROTECT THE ENVIRONMENT

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.

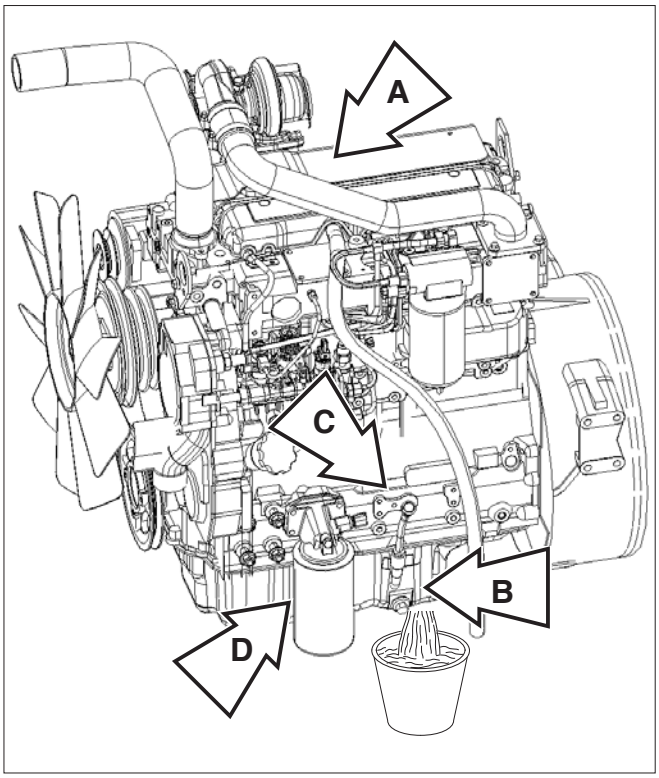


TABLE C

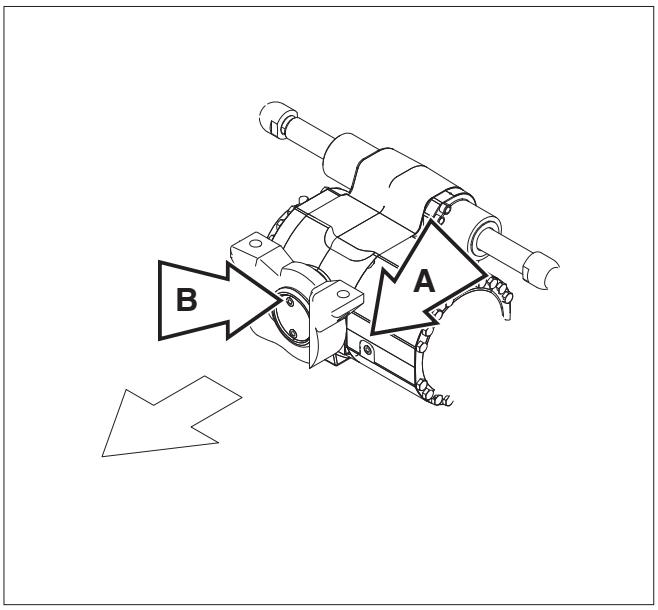
C-3 CHECK THE OIL LEVEL IN THE FRONT AND REAR DIFFERENTIAL GEARS

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.

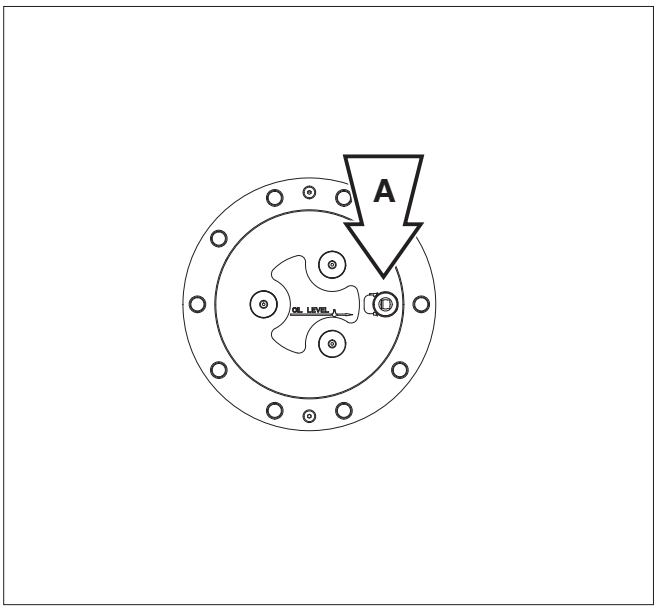
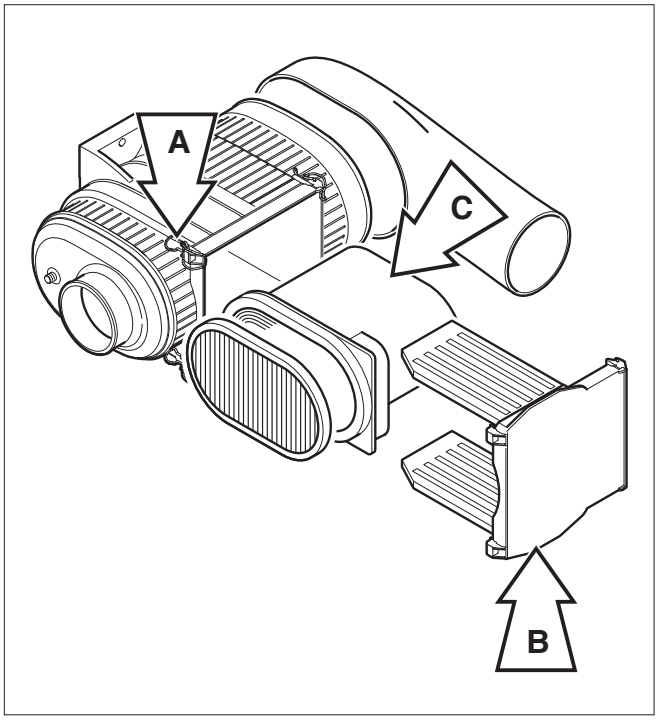


TABLE C

C-5 CHECK AND CLEAN THE ENGINE AIR FILTER (GTH-4013EX)

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.

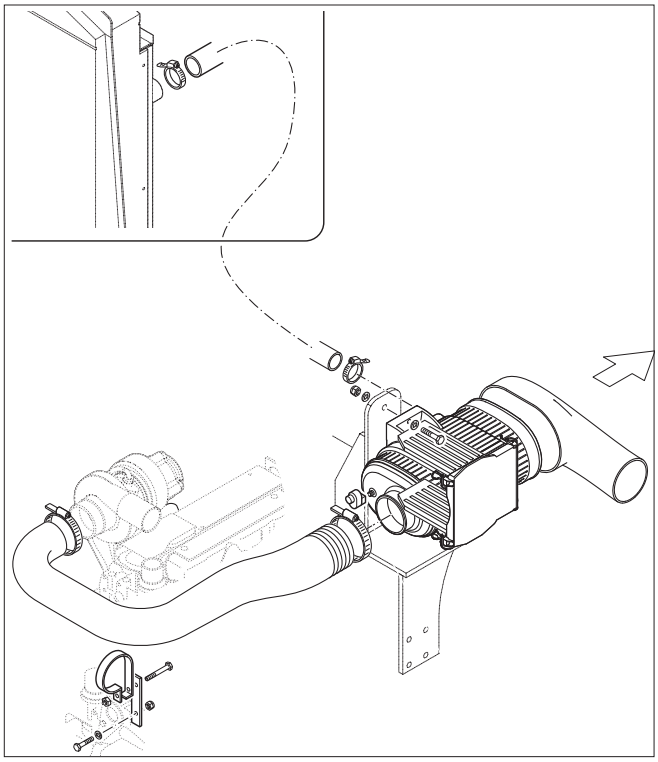


TABLE C

CHECK AND CLEAN THE ENGINE AIR FILTER (GTH-4017EX - GTH-4514EX)

To check and clean the engine air filter:

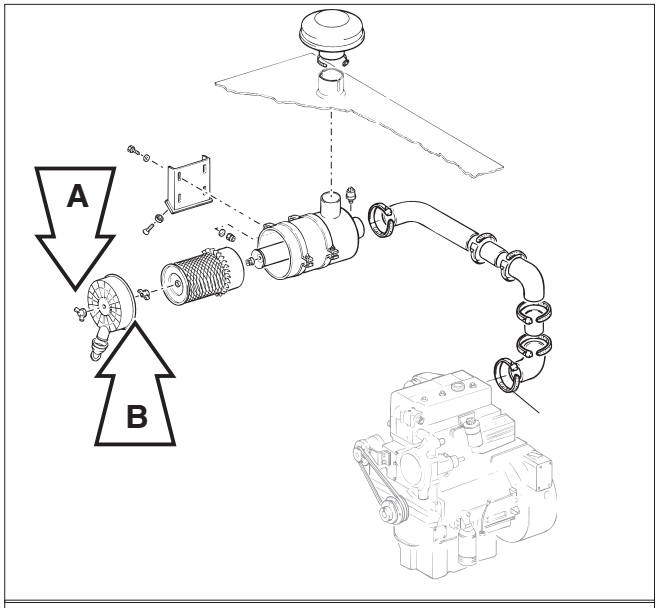
- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove the cover **B**.
- Pull out the filter cartridge **C**.
- Clean the filter bowl.
- Knock the cartridge using a wooden table to eliminate the dust.
- Dry clean the cartridge (at max. 6 bar pressure).
- Check the 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.



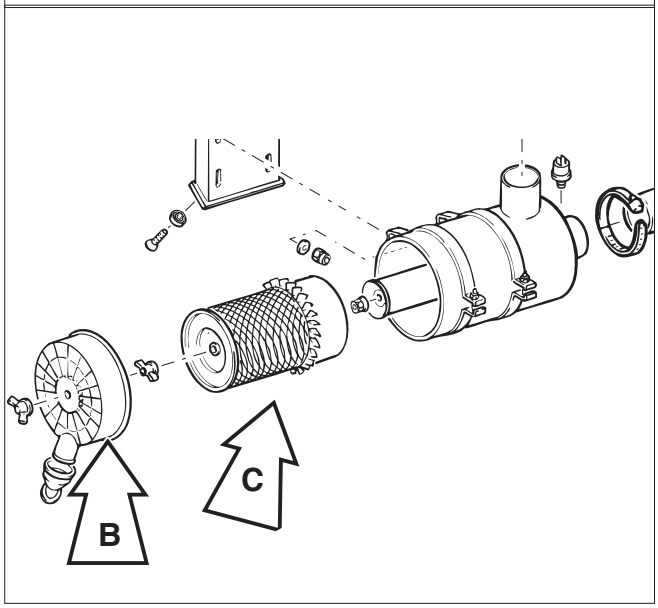


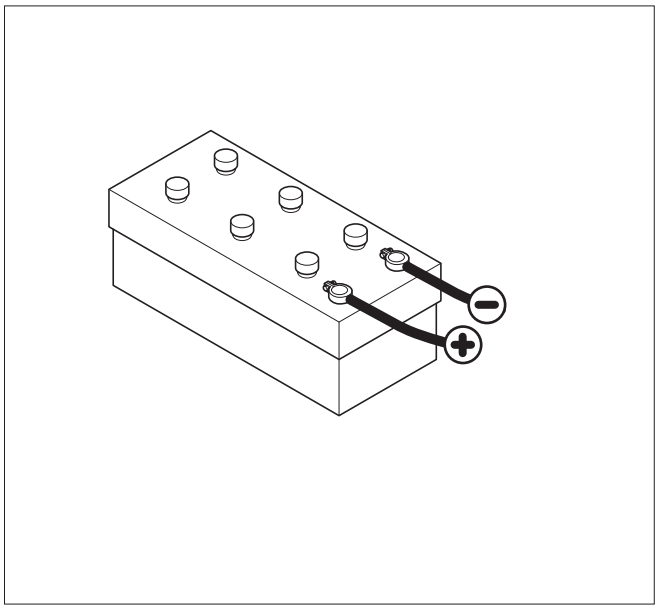
TABLE C

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.***



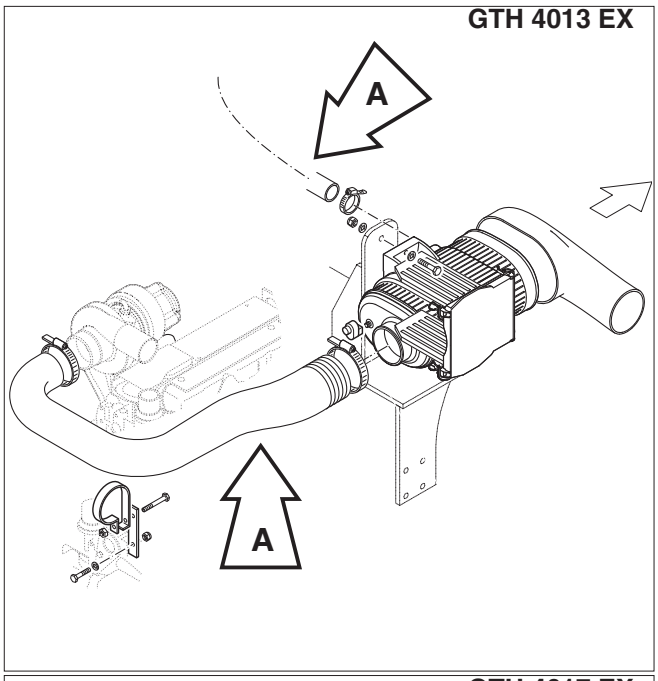
C-7 CHECK THE AIR SUCTION HOSE BETWEEN ENGINE AND FILTER

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.

GTH 4013 EX



GTH 4017 EX
GTH 4514 EX

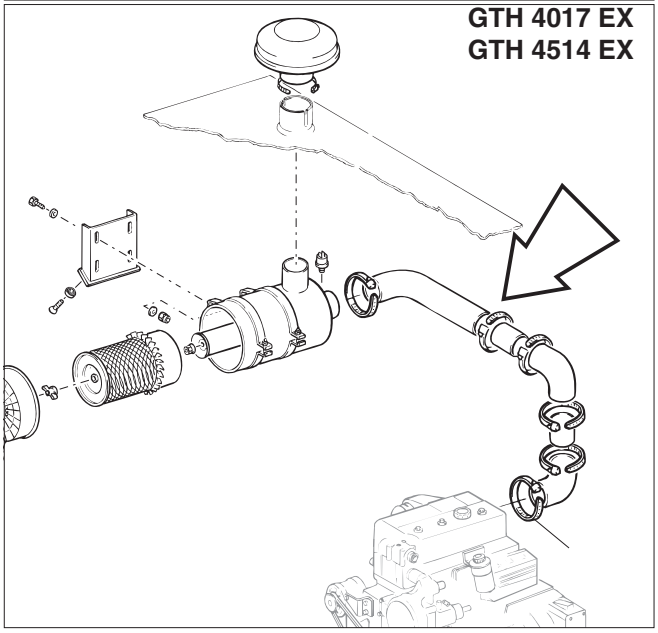
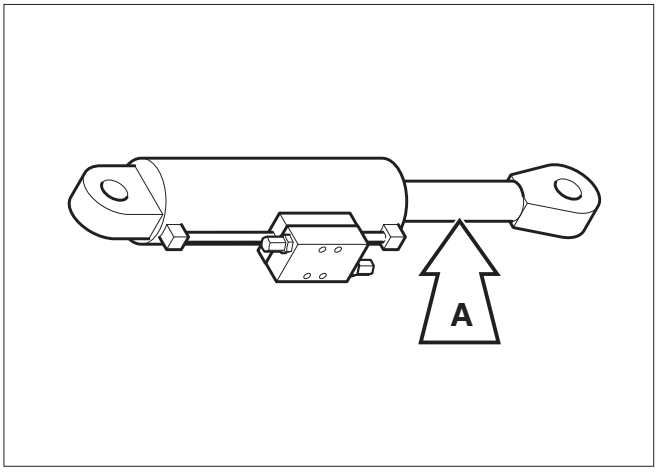


TABLE C

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.

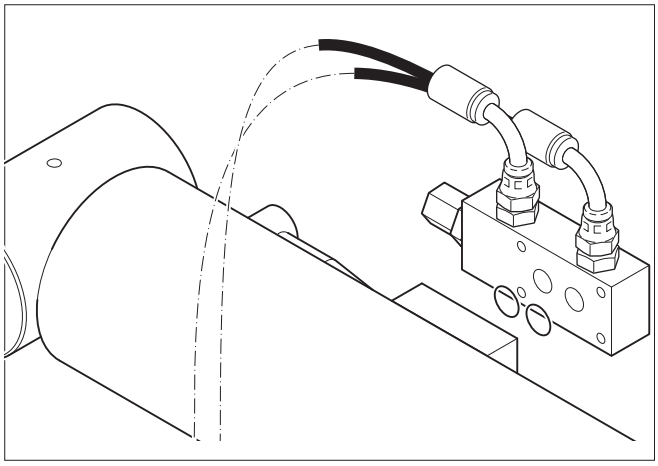


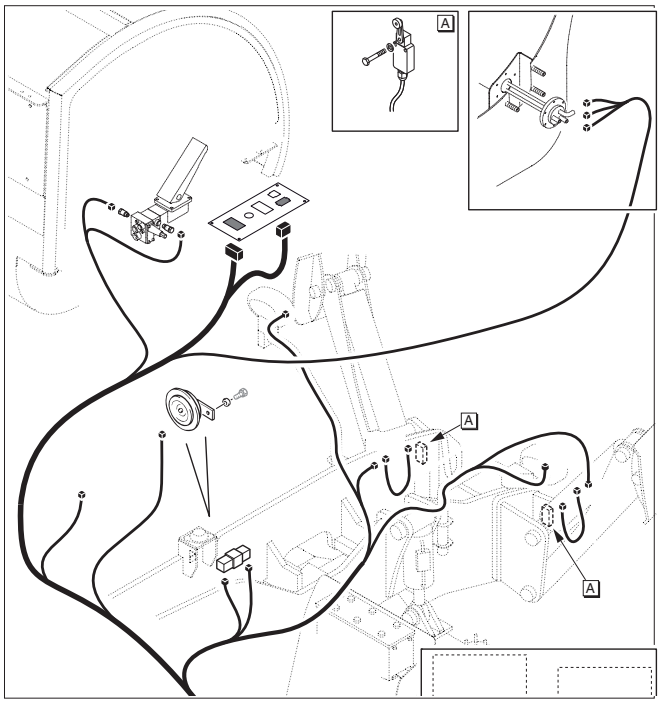
TABLE C

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.



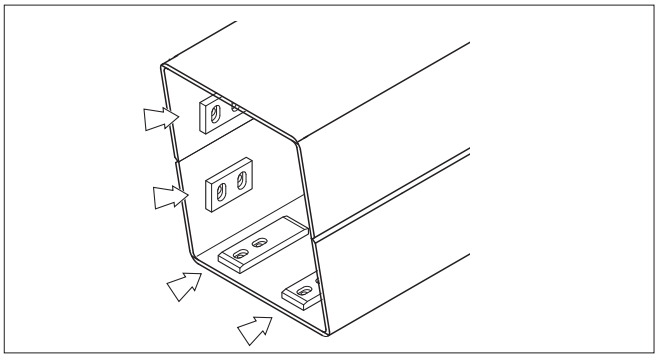
C-11 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

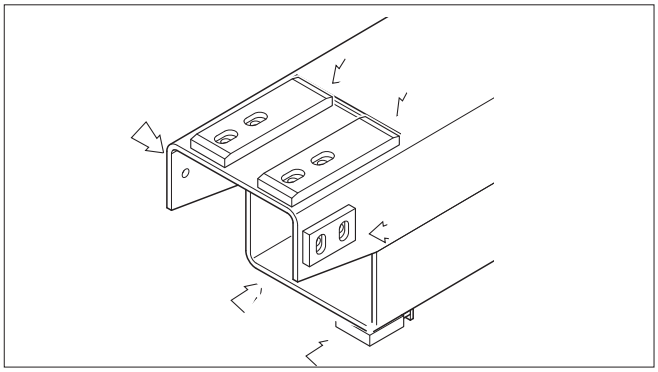
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

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.





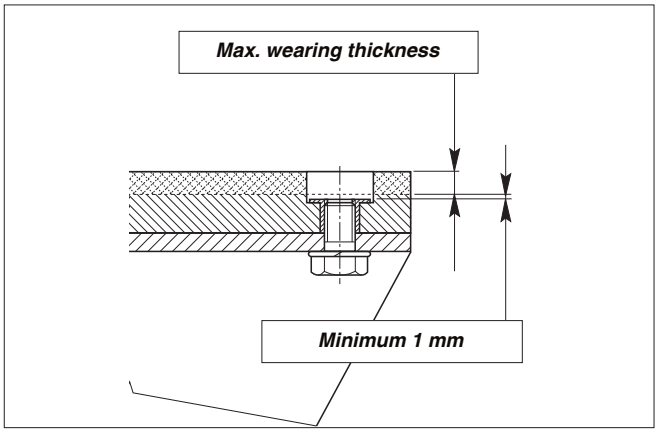


TABLE C

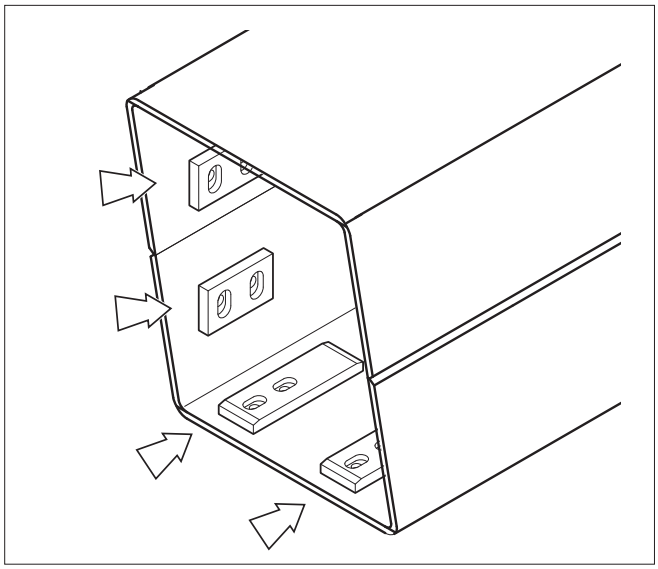
C-12 ADJUST THE PLAY OF THE SLIDING PADS OF THE BOOM SECTIONS

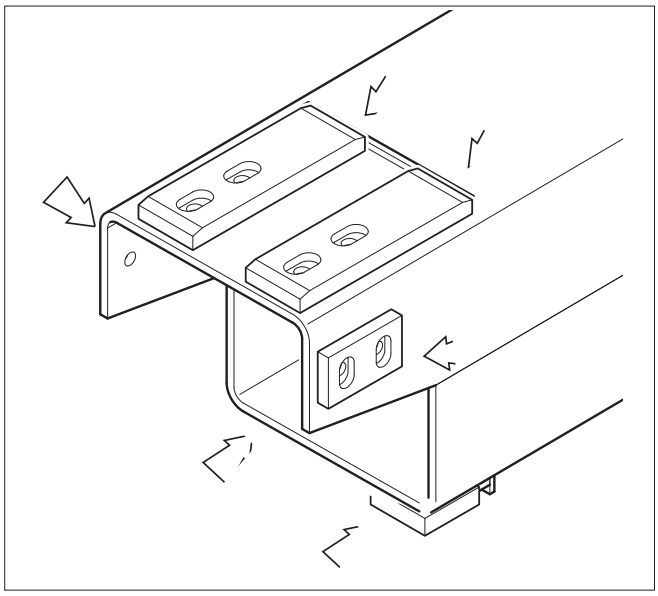
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

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.

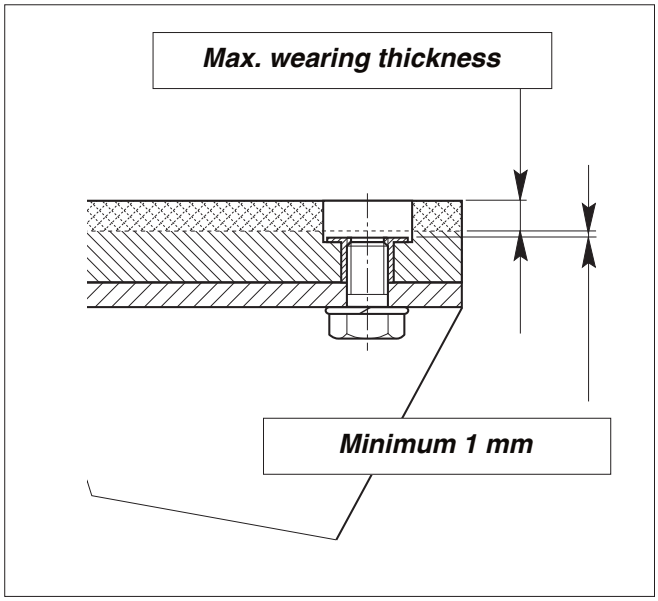


TABLE C

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.

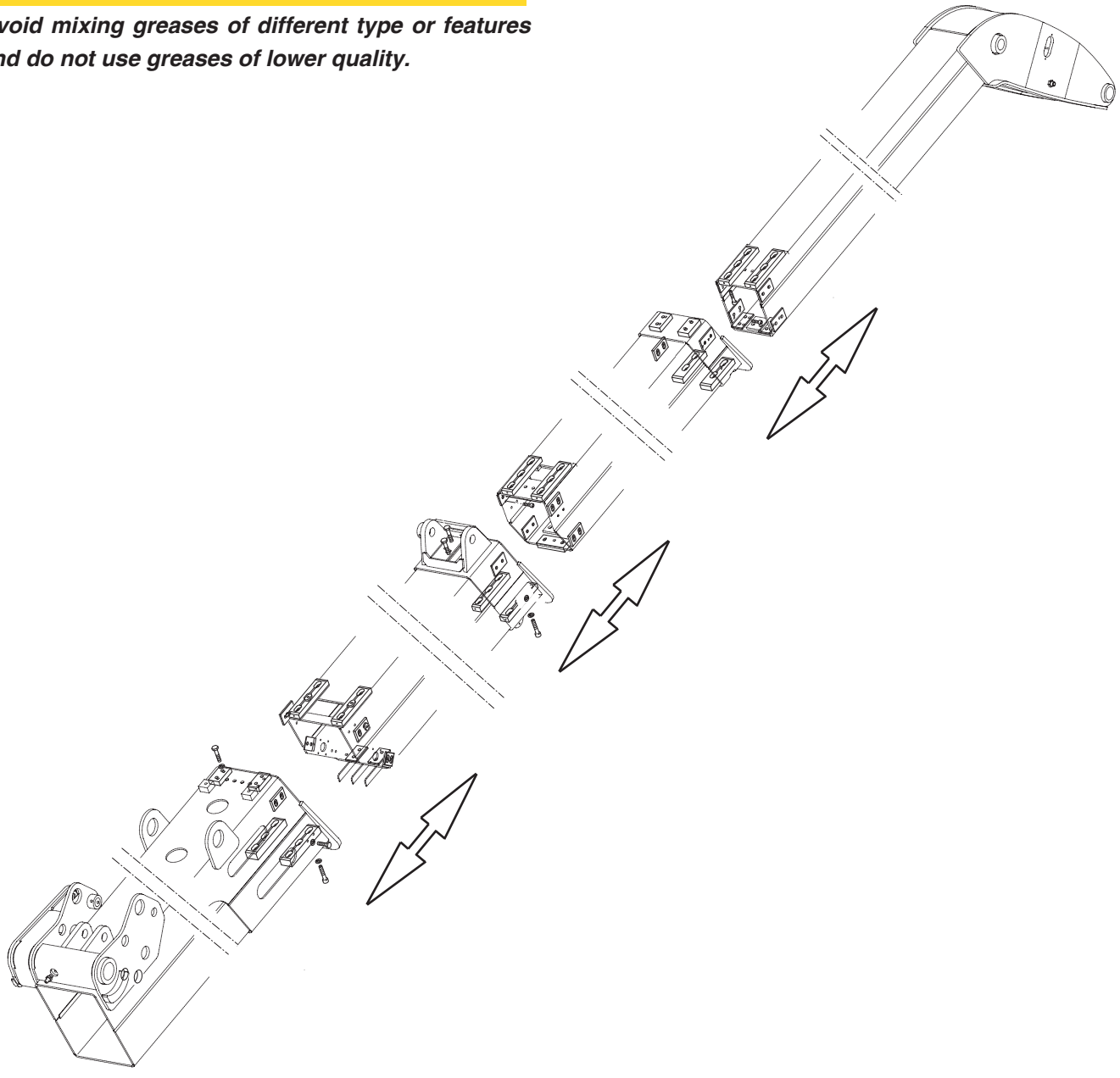


TABLE C

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.

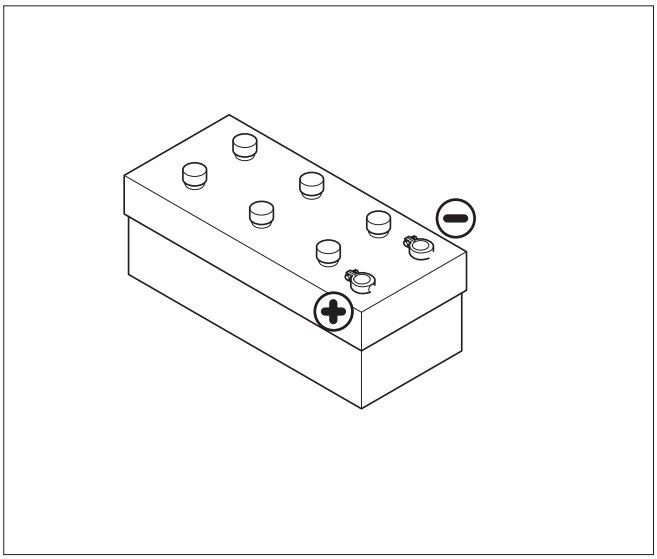


TABLE C

C-15 CHECK THE EFFICENCY OF THE BLOCK VALVES

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

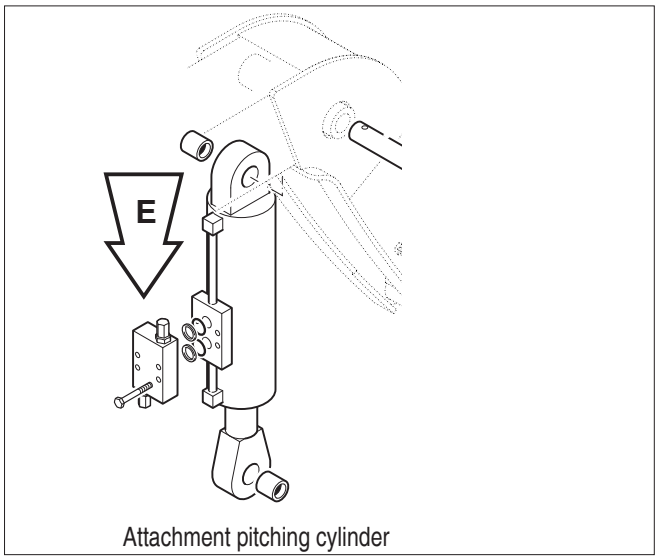
To check the efficiency of a valve, proceed as follows:

- Load a weight near the maximum payload onto the boom (4000 kg for GTH 4017 EX and GTH 4013 EX). (4500 kg for GTH 4514 EX).
- 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.

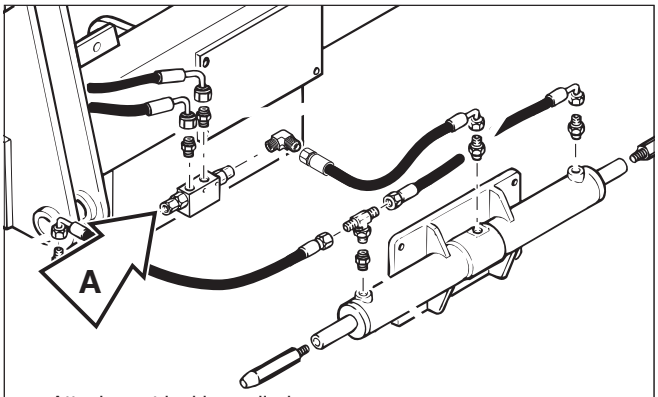
During the check, the load shall remain blocked in position.
Should that not be the case, the valve must be replaced.

PROTECT THE ENVIRONMENT

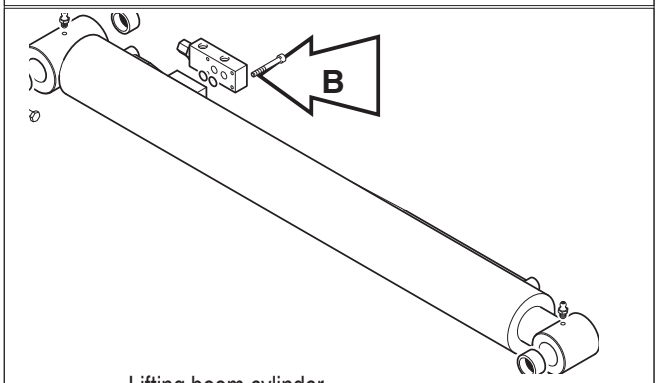
Place a container of suitable size under the plug for oil leaks.



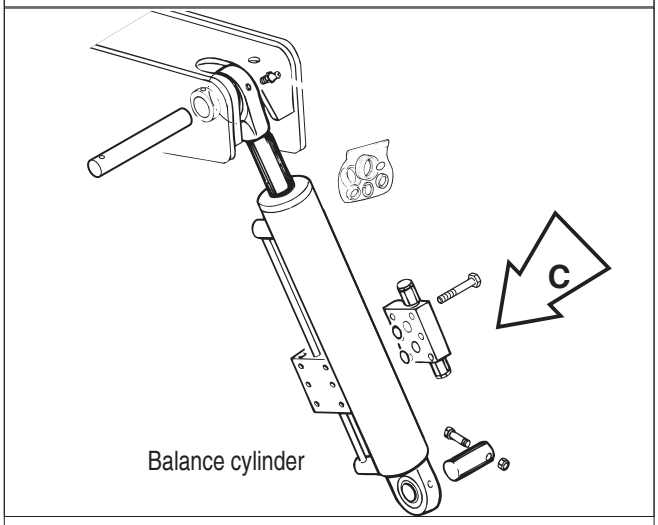
Attachment pitching cylinder



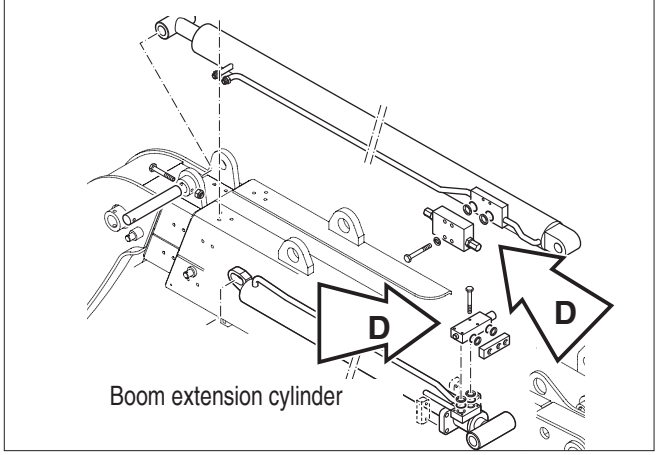
Attachment locking cylinder



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

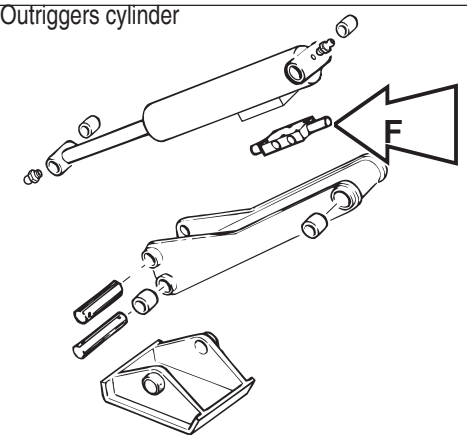
- Do the check in a free space with barriers all around to keep non-authorised people away

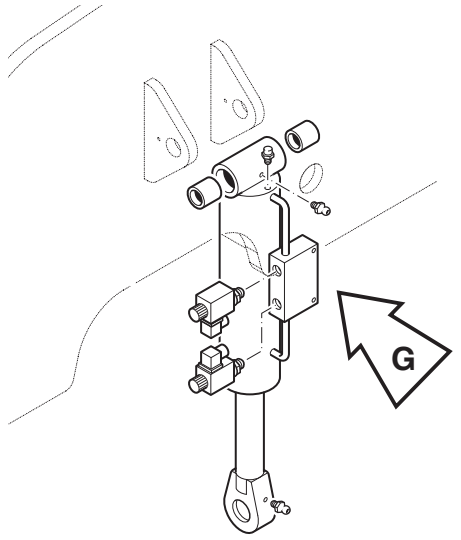
- Ensure that the part to be checked is in safe condition and that the action generated does not result in an uncontrolled movement of the machine.

TO REMOVE THE BLOCK VALVES OR THE CYLINDERS

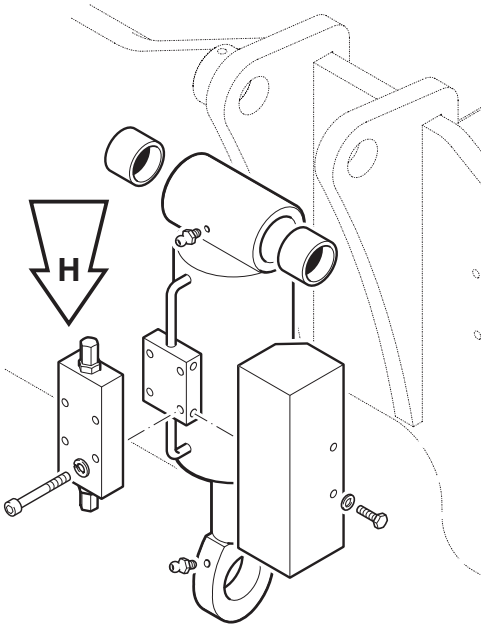
- ***Lower the boom to the ground in a firm way since the removal of the block valve or the cylinder can cause an uncontrolled down-movement.***
- ***After refitting the valve or the cylinder, replenish the circuit and eliminate any air before starting working. To eliminate the air from the circuit, 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

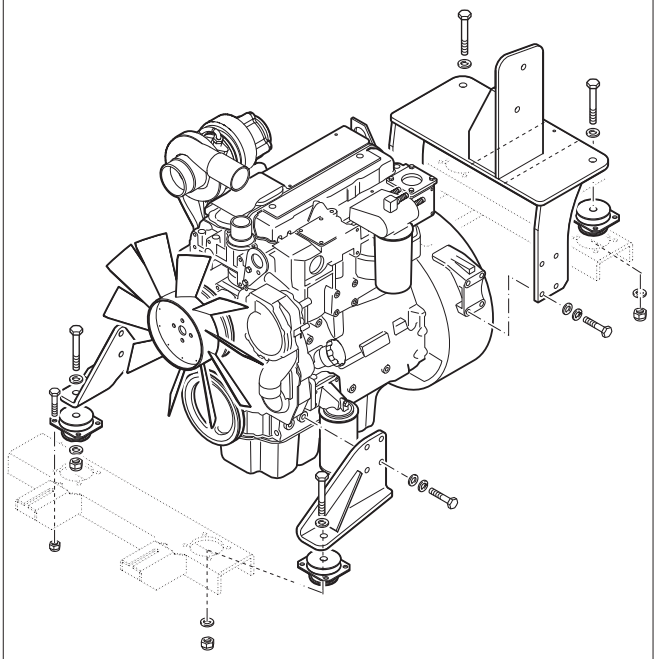
In case of excess smoke, strictly obey the instructions provided in the relevant Use and maintenance manual enclosed with the technical literature of the machine.

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**.

GTH 4013 EX



GTH 4017 EX
GTH 4514 EX

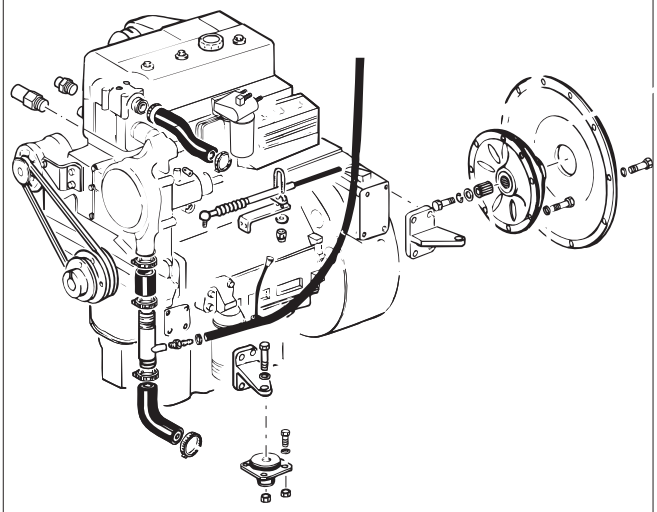


TABLE D

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.

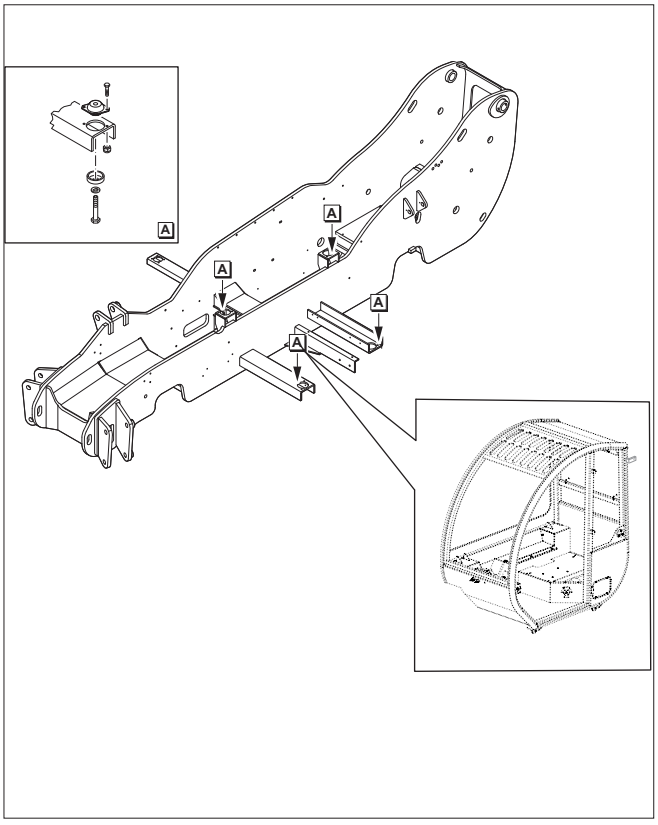
For this operation, use a torque wrench and tighten the screws to a torque of **288 Nm**.

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.



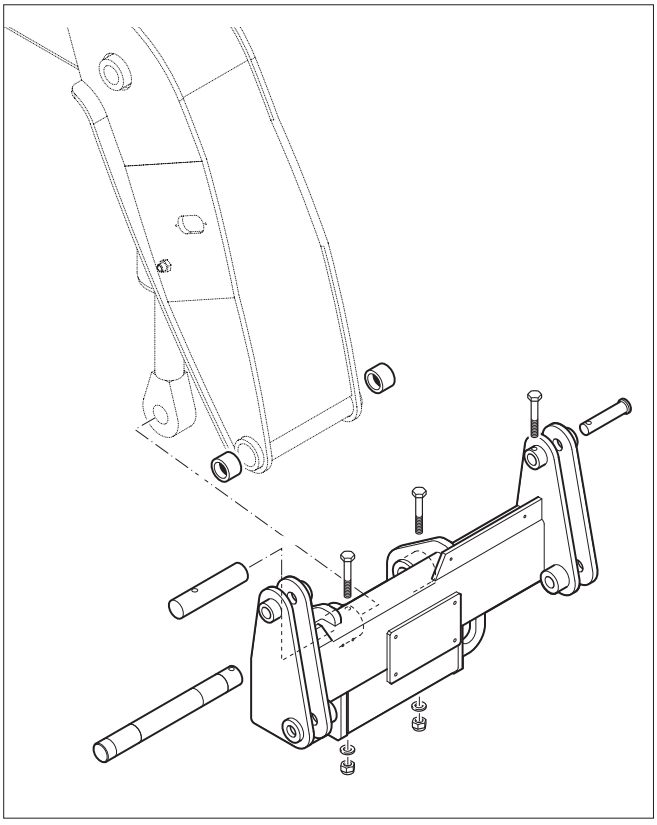
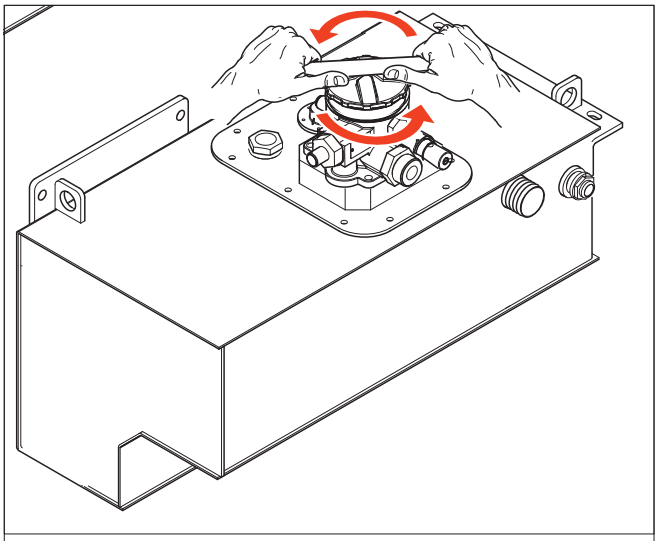


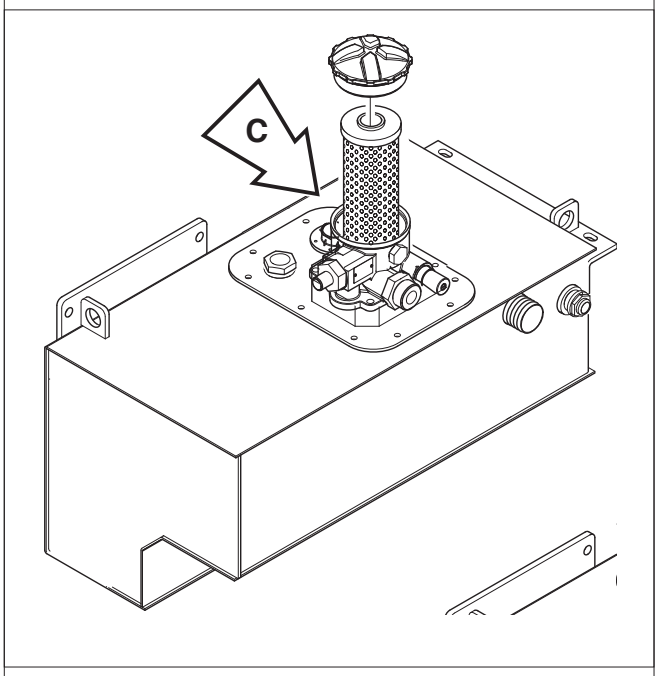
TABLE D

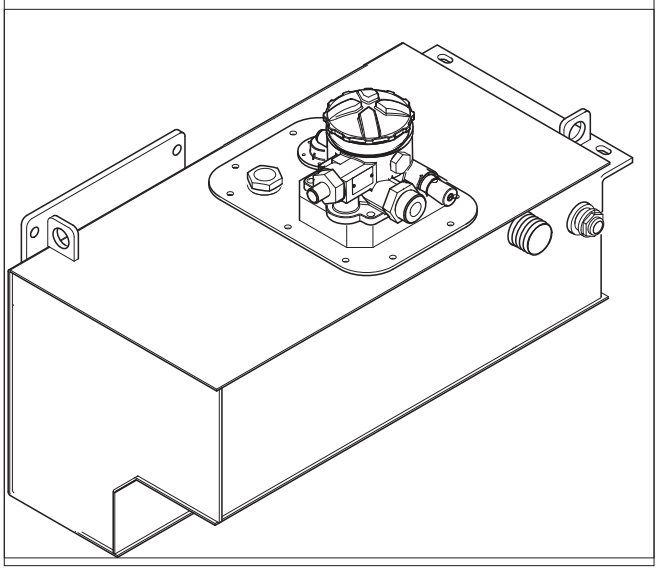
D-5 CHANGE THE HYDRAULIC OIL FILTER CARTRIDGE (GTH-4013EX)

To change the hydraulic oil filter element, proceed as follows (GTH-4013EX):

- 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** to check the cartridge **C**.
- 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

CHANGE THE HYDRAULIC OIL FILTER CARTRIDGE (GTH-4017EX - GTH-4514EX)

To change the hydraulic oil filter element, proceed as follows (GTH-4017EX - GTH-4514EX):

- 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.
- Close the gate **A**.
- Remove the filter cover **B.**
- Change the filter element, then, before fitting a new one, thoroughly clean and grease both seat and gasket.
- Refit the filter and open the gate **A**.

PROTECT THE ENVIRONMENT

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

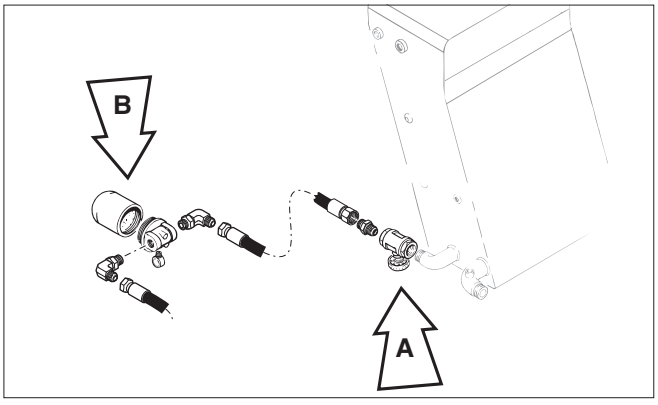
NOTICE

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.



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.

TABLE D

D-7 CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER (GTH-4013EX)

Changing the main cartridge air filter:

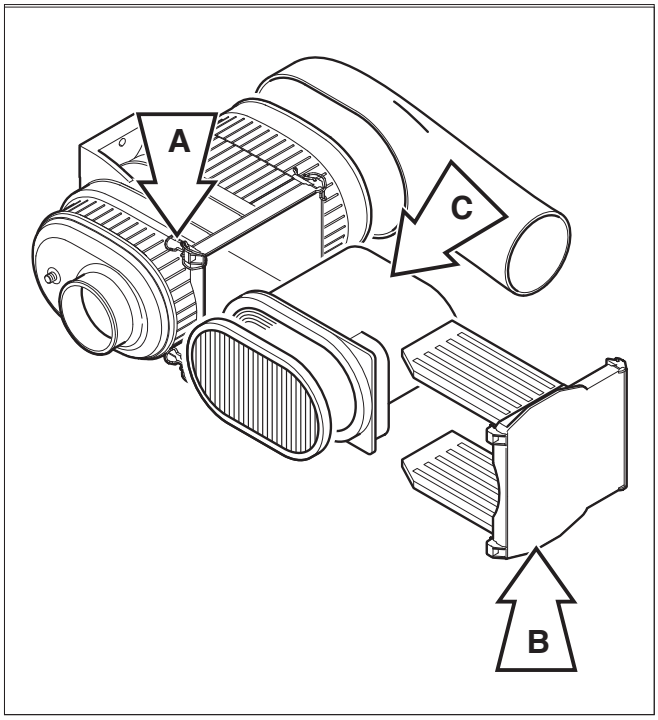
- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove cover **B**.
- Pull out the external cartridge **C**.
- Clean the filter bowl.
- Refit the clean cartridge, or a new one, using some grease on the seal and make sure it is properly positioned.
- Close the cover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



CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER (GTH-4017EX - GTH-4514EX)

Changing the main cartridge air filter:

- Stop the engine and engage the parking brake.
- Unscrew the screw of the cover **B**.
- 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.

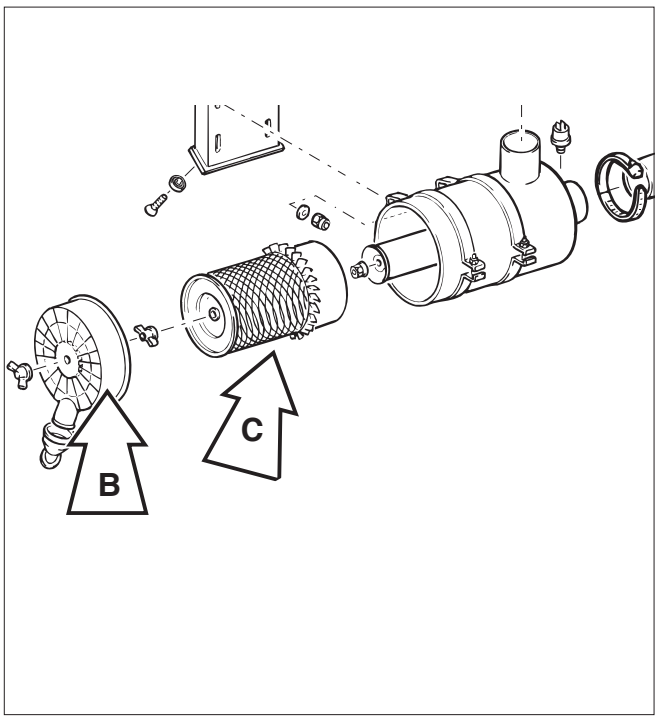


TABLE D

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

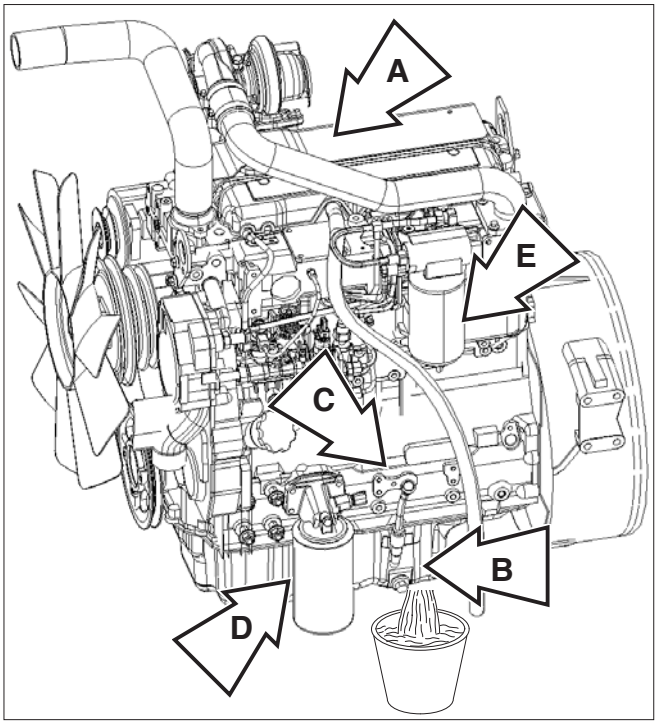
Clean the air filter in the cab every six months. Replace the cartridge if the filtering cloth is damaged.

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.



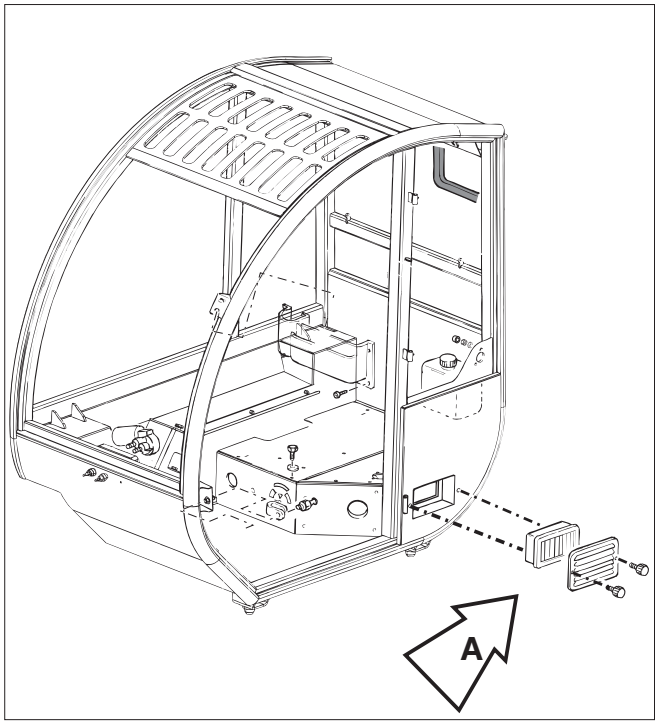


TABLE D

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:

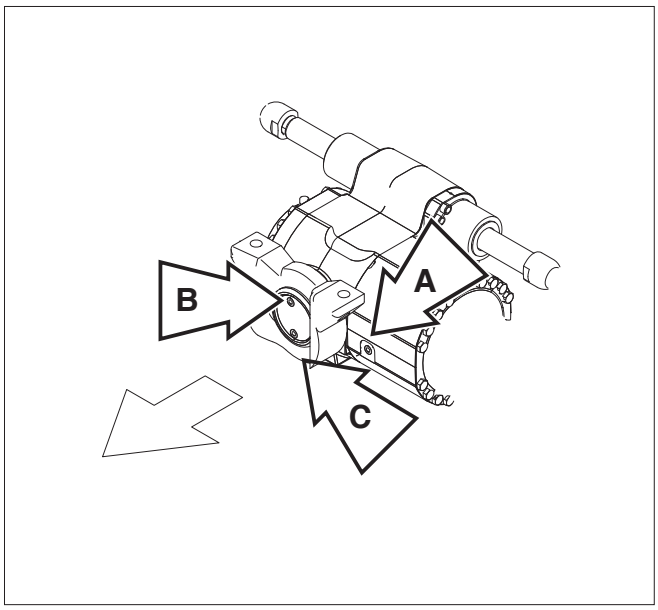
- **TRACTORENAULT THFI 208 LF SAE 80W API GL-4 / FORD M2C 86 B / Massey Ferguson M 1135**

D-11 BOOM CHAIN TENSIONING (GTH-4017EX - GTH-4514EX)

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 50Nm 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.



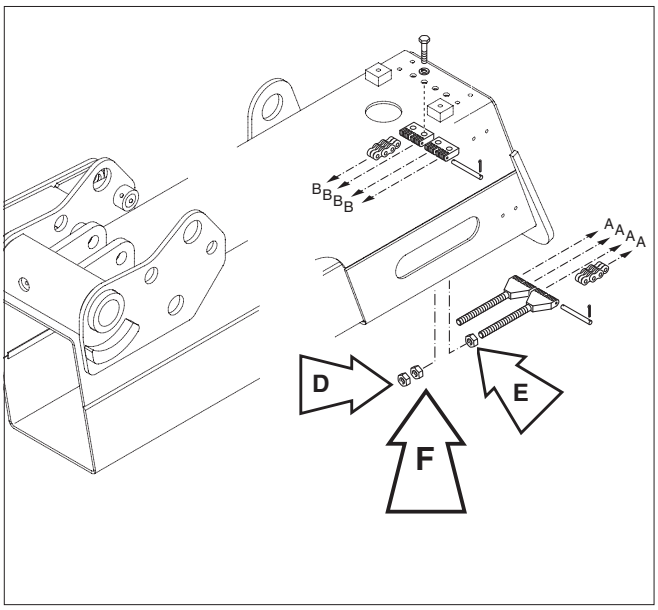


TABLE D

4.7 TABLE E PROCEDURES

E-1 CHANGE THE SAFETY ELEMENT AIR FILTER (GTH 4013EX)

To change the safety element:

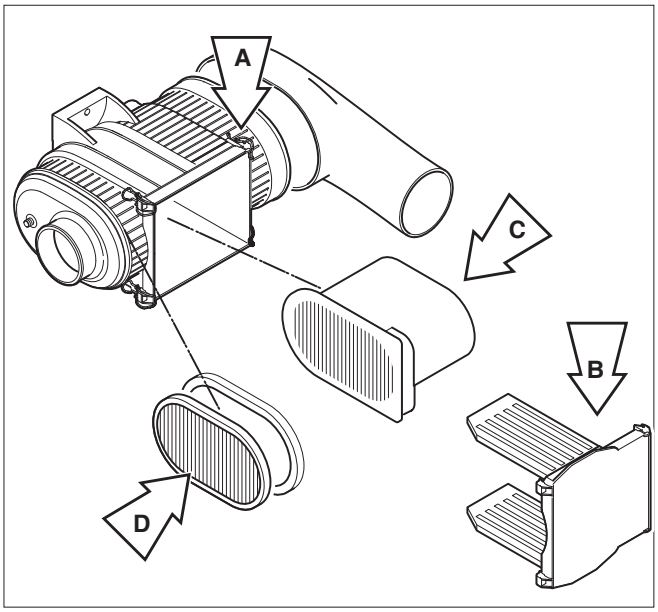
- Stop the engine and engage the parking brake.
- Unlatch the four fasteners **A**.
- Remove cover **B**.
- Pull out the outer filter cartridge **C**.
- Pull out the inner filter cartridge **D**.
- Clean the filter bowl.
- Refit the clean cartridge **D**, or a new one, using some grease on the seal and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



CHANGE THE SAFETY ELEMENT AIR FILTER (GTH 4017EX - GTH 4514EX)

To change the safety element:

- Stop the engine and engage the parking brake.
- Unscrew the four fixing scerws of the cover.
- 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.

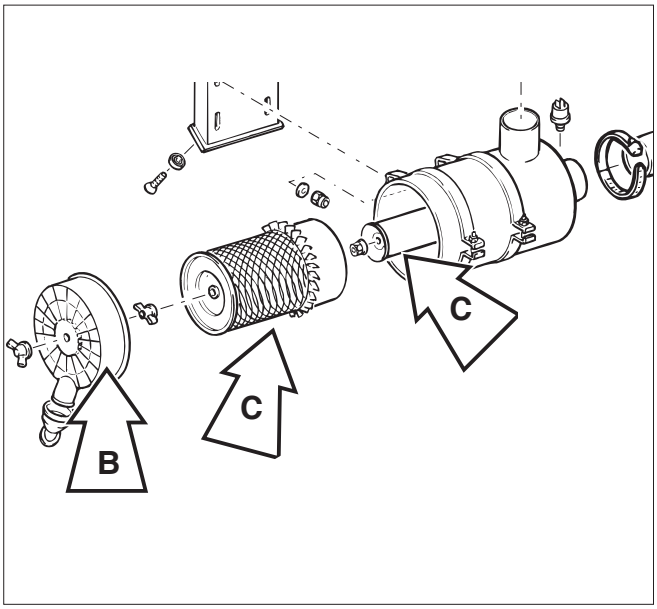


TABLE D

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.

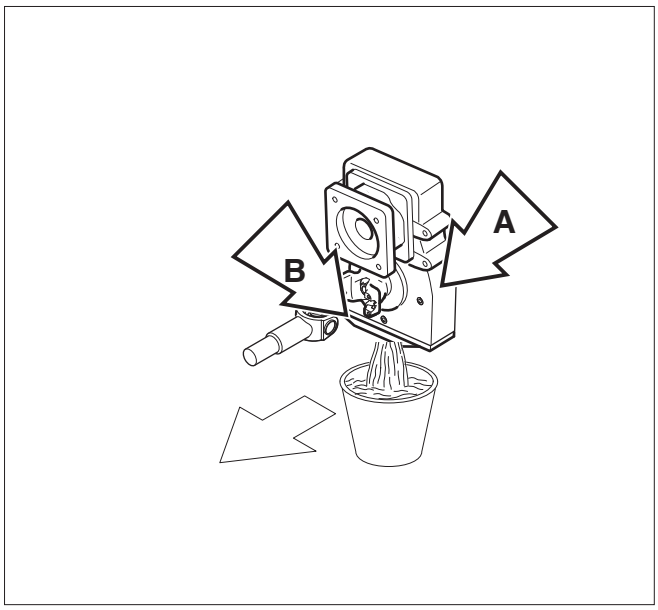
PROTECT THE ENVIRONMENT

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**

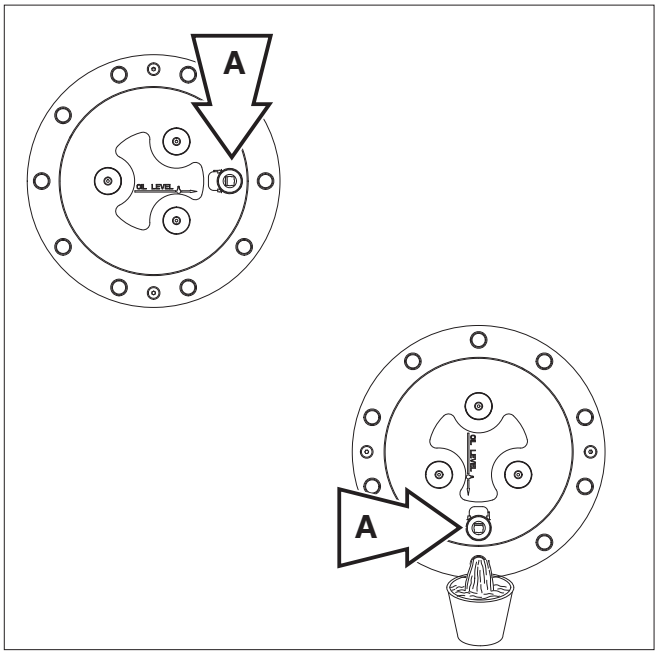


TABLE D

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**.

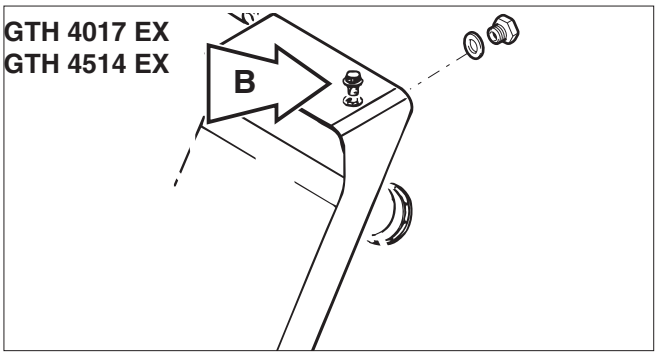
Recommended oil:

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

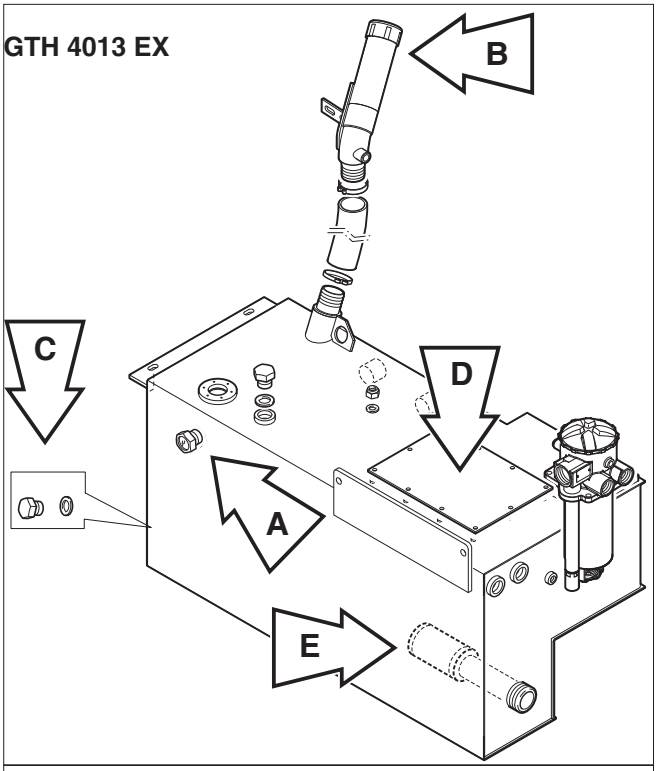
PROTECT THE ENVIRONMENT

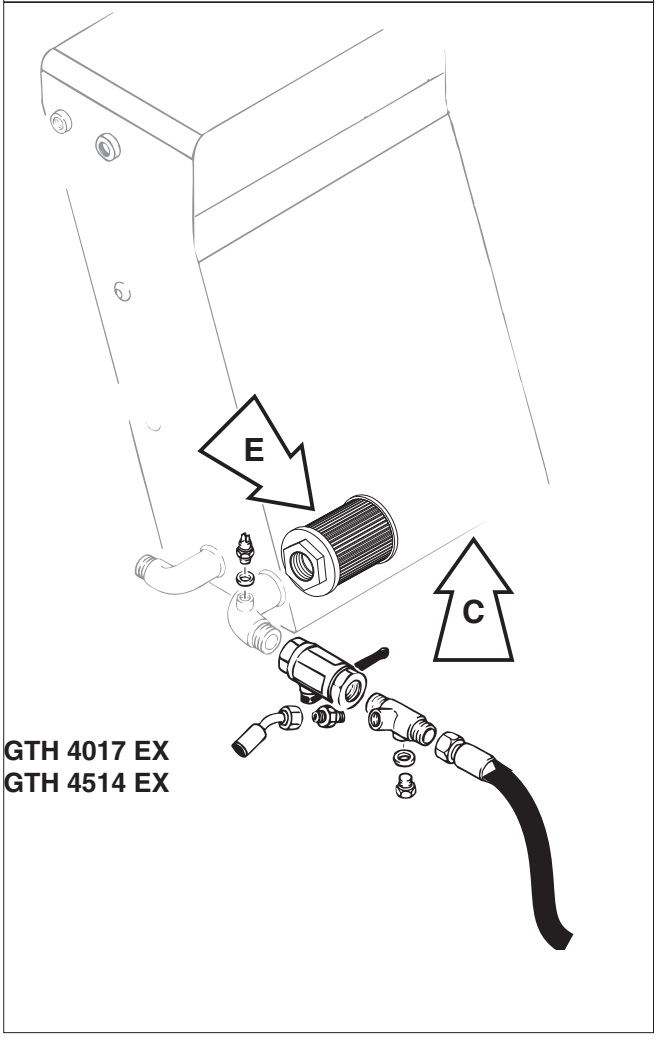
Handling and disposing of used oils might be ruled by local or national regulations. Address to authorised waste centres.

GTH 4017 EX
GTH 4514 EX



GTH 4013 EX





GTH 4017 EX
GTH 4514 EX

4.8 TABLE F PROCEDURES

F-1 CHANGE THE ENGINE COOLANT

DANGER

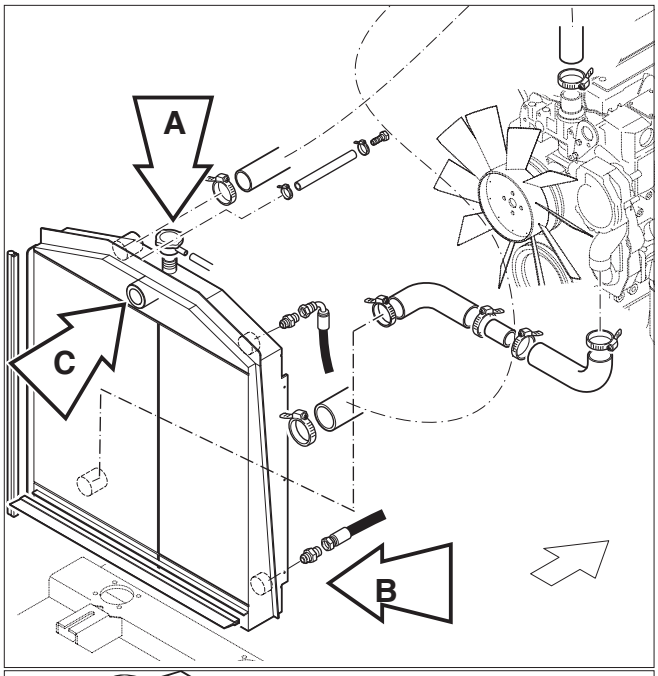
When the coolant is hot, the cooling system is under pressure. With warm engine, loosen the radiator plug slowly and carefully, without removing it, to drain the pressure. Use protection gloves and keep your face at a safe distance.

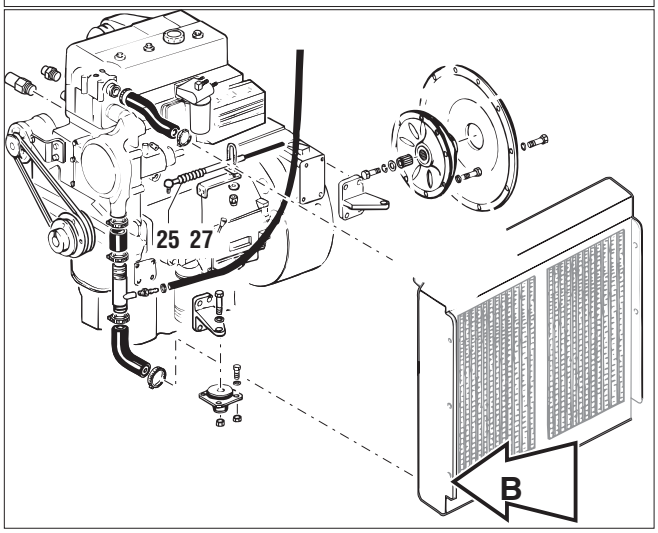
To drain the antifreeze:

- 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 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





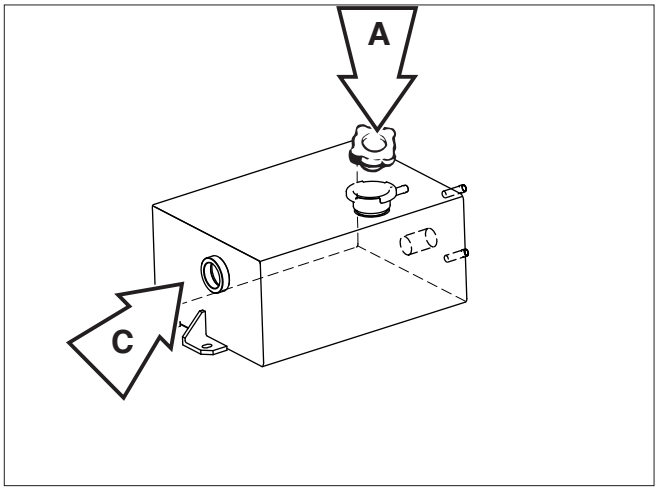
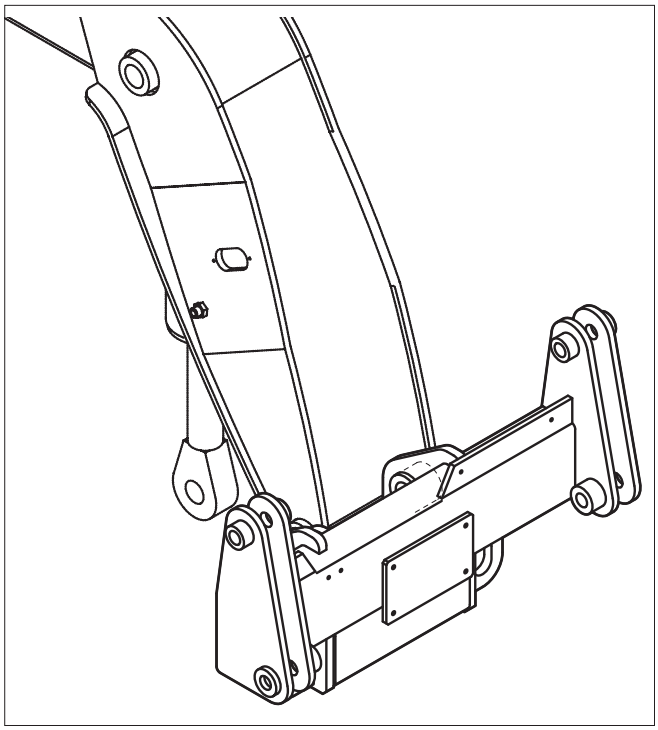


TABLE G

4.9 PROCEDURE TABELLA G

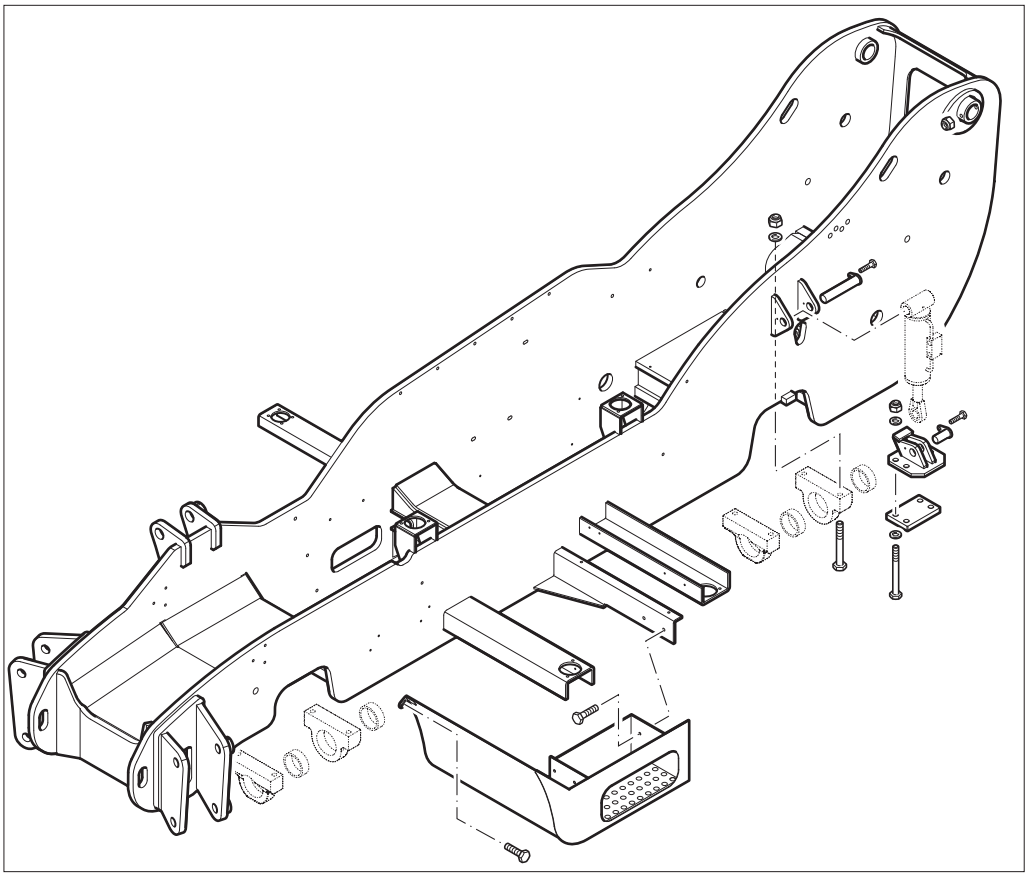
G-1 CHECK THE MACHINE STRUCTURE

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.



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.
	40A F2G 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 **K01** or **RL2** relay 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** - **RL2**.	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
	Emergency button **10A F20** feeding fuse blown.	Check the fuse and 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 (**Y10-GTH 4013EX)(Y0-GTH 4514EX, GTH 4017EX)** damaged.	Check and replace if necessary.
The battery gets discharged too fast.	Internal elements broken.	Change the battery.
	The alternator (**A1**) 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

Problems	Causes	Solutions
	Outrigger limit switches (**S51-S52 GTH 4017EX - GTH 4514EX)** damaged.	Check the mechanical operation of the limit switches; replace if necessary.
	10A F18 fuse 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.
	Control drive unit damaged.	Check the unit (see par. 2 - sect. “Technical Specifications”).
	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.
	Y10 solenoid damaged.	Check the solenoid and replace if necessary.
	10A F24 fuse blown.	Check the fuse and 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.
	A10 F18 fuse damaged.	Check the fuse 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.	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.
	10A F13 fuse damaged.	Check the fuse; replace if necessary.
The steer mode selection of the machine doesn't work.	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 **Y18 - Y19(GTH 4013EX) Y14 - Y15(GTH 4917EX - GTH 4514EX)** damaged.	Check the solenoids and replace if necessary.
	15A F21 fuse damaged.	Check the fuse; replace if necessary.
The horn doesn't work.	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.
	7,5A fuse **F11** blown.	Check the fuse; replace if necessary.

PROBLEMS-CAUSES-SOLUTIONS

Problems	Causes	Solutions
The flashing beacon doesn't work	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.
	15A F2 fuse blown.	Check the fuse and replace if necessary.
The heating fan doesn't work.	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.
	A5 F3 fuse blown.	Check the fuse and replace if necessary.
The limit switch sensing doesn't work when the boom is in the low position.	Limit switch damaged.	Check the limit switch and replace if necessary.
	Problem of the wiring line.	Check the wiring for continuity.
	A5 F3 fuse blown.	Check the fuse and replace if necessary.
The limit switch sensing doesn't work when the boom is in the high position.	Limit switch damaged.	Check the limit switch and replace if necessary.
	Problem of the wiring line.	Check the wiring for continuity.
	X1 dashboard indicator light.	Check the indicator light and replace the lights group if necessary.
The air filter restriction warning light doesn't work.	Filter restriction sensors **B6 (GTH 4013EX) B15 (GTH 4017EX - GTH 4514EX)** 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 damaged.	Check the pressure switch and replace if necessary.
	X1 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 bulbs **B13 (GTH 4013EX) B14 (GTH 4017EX - GTH 4514EX)** damaged.	Check the efficiency of the bulb and replace, if necessary.
	X1 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 transducers **B5 (GTH 4013EX) B13 (GTH 4017EX - GTH 4514EX)** damaged.	Check the transducers 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 damaged.	Check the transducer and replace if necessary.
	Fuse damaged.	Check the fuse and replace if necessary.
	Problem of the wiring line.	Check the wiring for continuity.
The fuel gauge doesn't work.	Fuse blown.	Check the fuse and replace if necessary.
	Dashboard fuel gauge damaged.	Check the fuel gauge and replace if necessary.
	Fuel detectors **B12/B12a (GTH 4017EX - GTH 4514EX) B15/B15A (GTH 4013EX)** damaged.	Check the fuel detector and replace if necessary.
	Problem of the wiring line.	Check the wiring for continuity.

PROBLEMS-CAUSES-SOLUTIONS

Problems	Causes	Solutions
The hour-meter doesn't work.	Hour-meter 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 F25** fuse 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 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 damaged.	Check the efficiency of the bulb and replace, if necessary.
	Indicator light on dashboard.	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 movement of the inner electrovalve pin.
Poor action of the parking brake	Loose cables (GTH 4013EX).	Tension the cables and check the relevant clamps.
	Brake control lever in the cab damaged (GTH 4017EX GTH 4514EX).	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.
	Main valve damaged.	Check the efficiency of the main valve (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.
	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 on the main valve; re-calibrate or replace.
The boom extension system doesn't work	Extension cylinder inside the boom damaged (third telescope extension), only GTH 4013 EX.	Check the seals of cylinder, rod and re-sequencing valve (located at the top of the rod); replace any defective parts.
	External extention boom cylinder damaged (second telescope extension)	Check the seals of cylinder, rod and re-sequencing valve (located at the top of the rod); replace any defective parts.
	Block valve of the boom internal extension cylinder damaged (only GTH 4013 EX).	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.

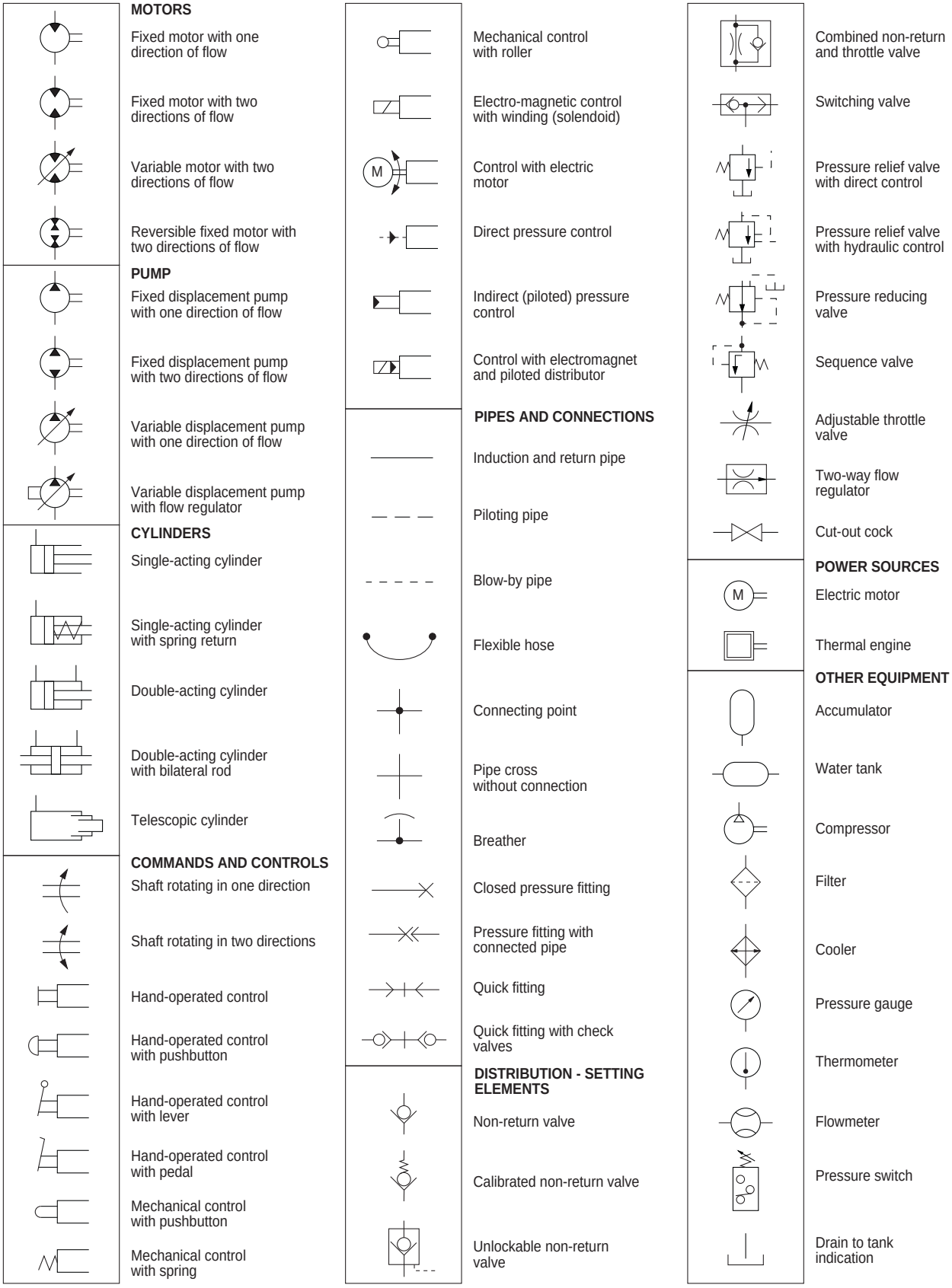
Problems	Causes	Solutions
	Main valve not well calibrated.	Check if the main valve reaches the max working pressure (see par. 2 - section "Technical Specifications"). Check the efficiency of the internal sliders of the main valve.
	Mechanical jamming.	Check the boom. In case of mechanical jamming, rectify.
	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 main valve damaged or dirty.	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 any 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.

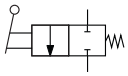
Schemes

6.1 HYDRAULIC SYMBOLS

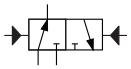


SCHEMES

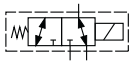
DISTRIBUTION - SETTING ELEMENTS



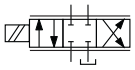
Two-position and two-way distributor, with manual lever control and spring return



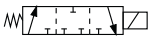
Three-way and two-position distributor, with hydraulic control



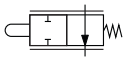
Two-position, three-way distributor, with electro-magnetic control and spring return



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

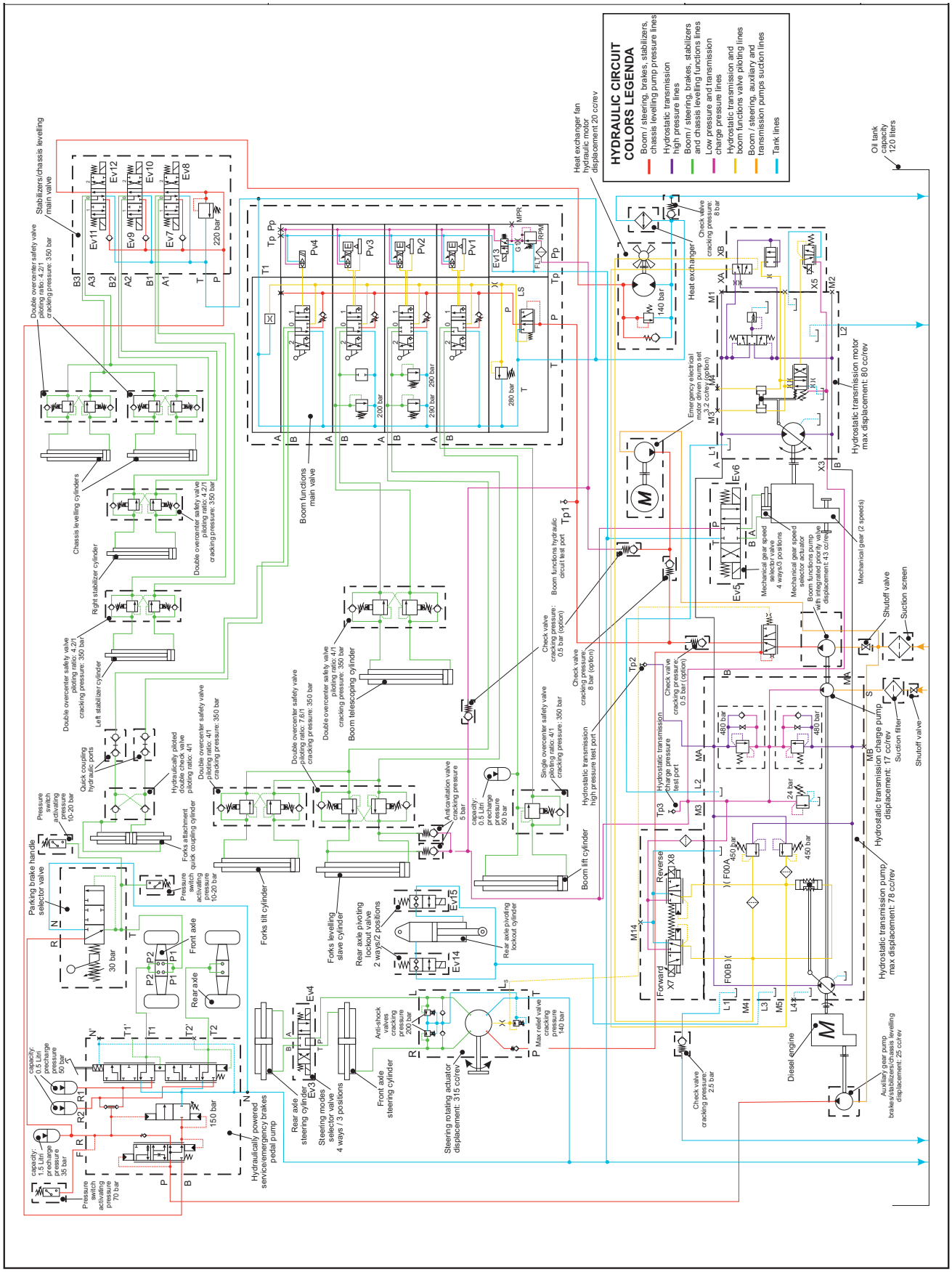


Electro-hydraulic single-acting servo valve

SCHEMES

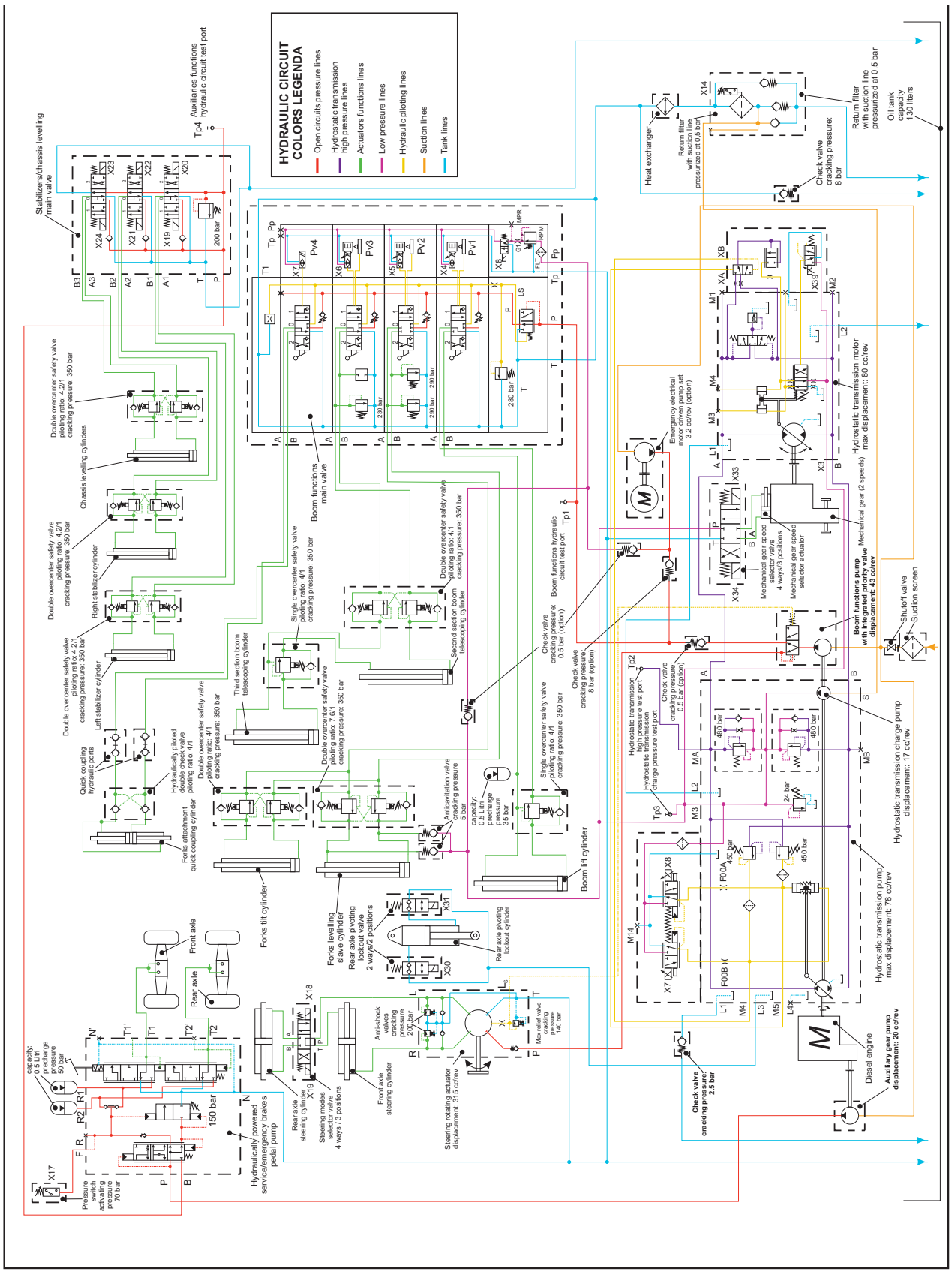
6.2 HYDRAULIC SCHEME

6.2.1 GTH-4017EX GTH-4514EX



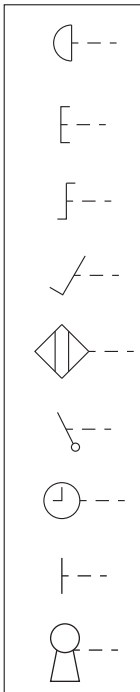
SCHEMES

6.2.2 GTH-4013EX



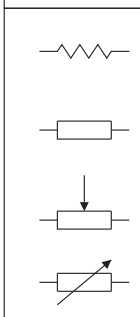
6.3 ELECTRICAL SYMBOLS

ACTUATORS



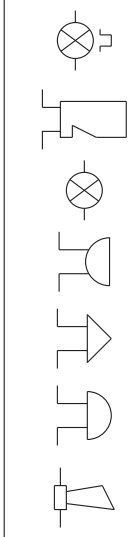
Emergency controls
Pushbutton control
Rotary control
Pedal control
Proximity control
Lever control
Timed control
Mechanical/manual control
Key control

RESISTANCES



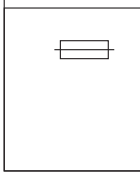
Resistance
Resistor
Potentiometer
Variable resistance

SIGNALS



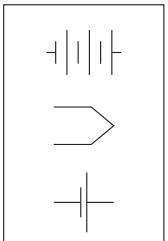
Intermittent lamp
Whistle
Lamp
Buzzer
Siren
Bell
Horn

FUSES AND RELAYS



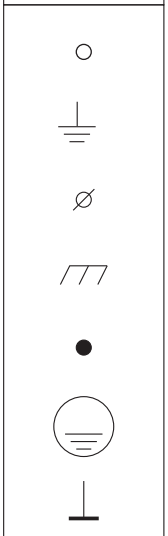
Horizontal fuse
Relay

ACCUMULATORS



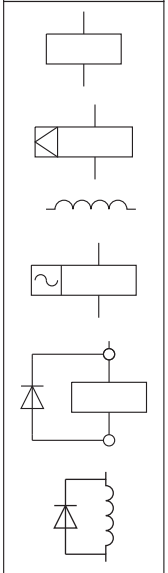
Battery
Thermocouple
Element

TERMINALS AND GROUNDS



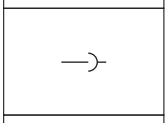
Ring
Ground
Terminal
Ground to frame
Knot
Protection ground
Frame ground 2

COILS



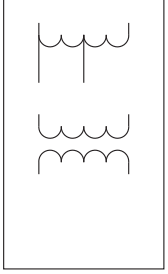
Coil
Mechanical coupling coil
Winding
A/C coil
Coil with diode
Winding with diode

CONNECTORS



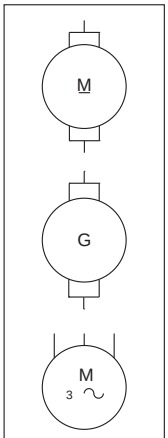
Connector

STATIC APPLICATIONS



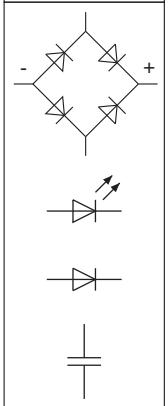
Auto-transformer
Transformer

DYNAMIC APPLICATIONS



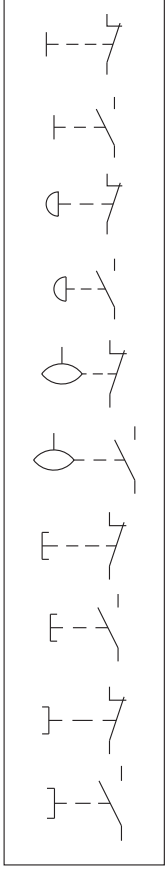
Motor
Generator
As_3p_motor

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

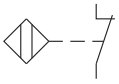

Magneto-thermal closure


Magneto-thermal opening

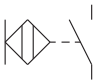

Thermal closure

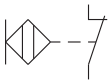

Thermal opening


Exchange


NC proximity


NO proximity

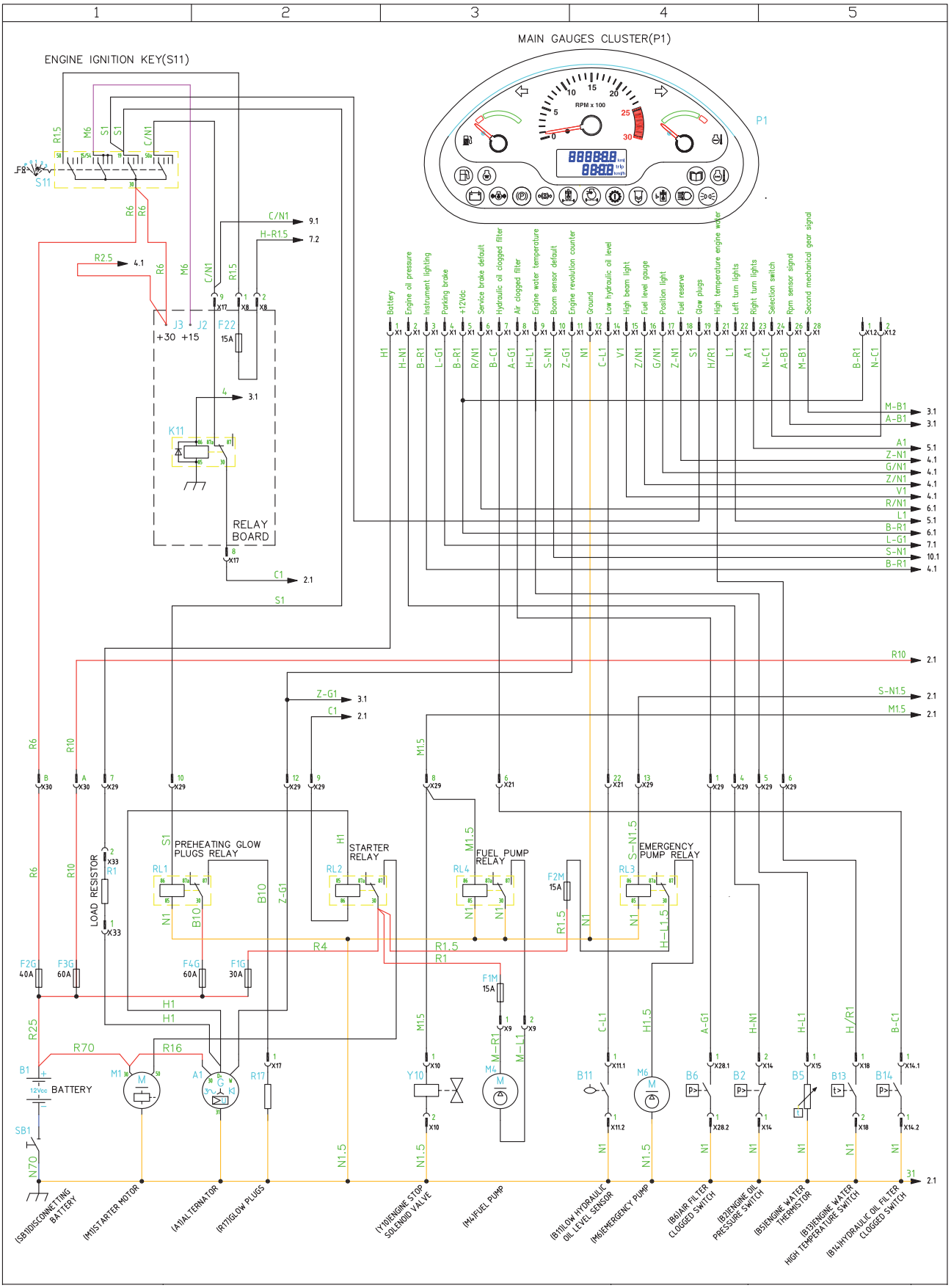

NO mechanical


NC mechanical


Selector

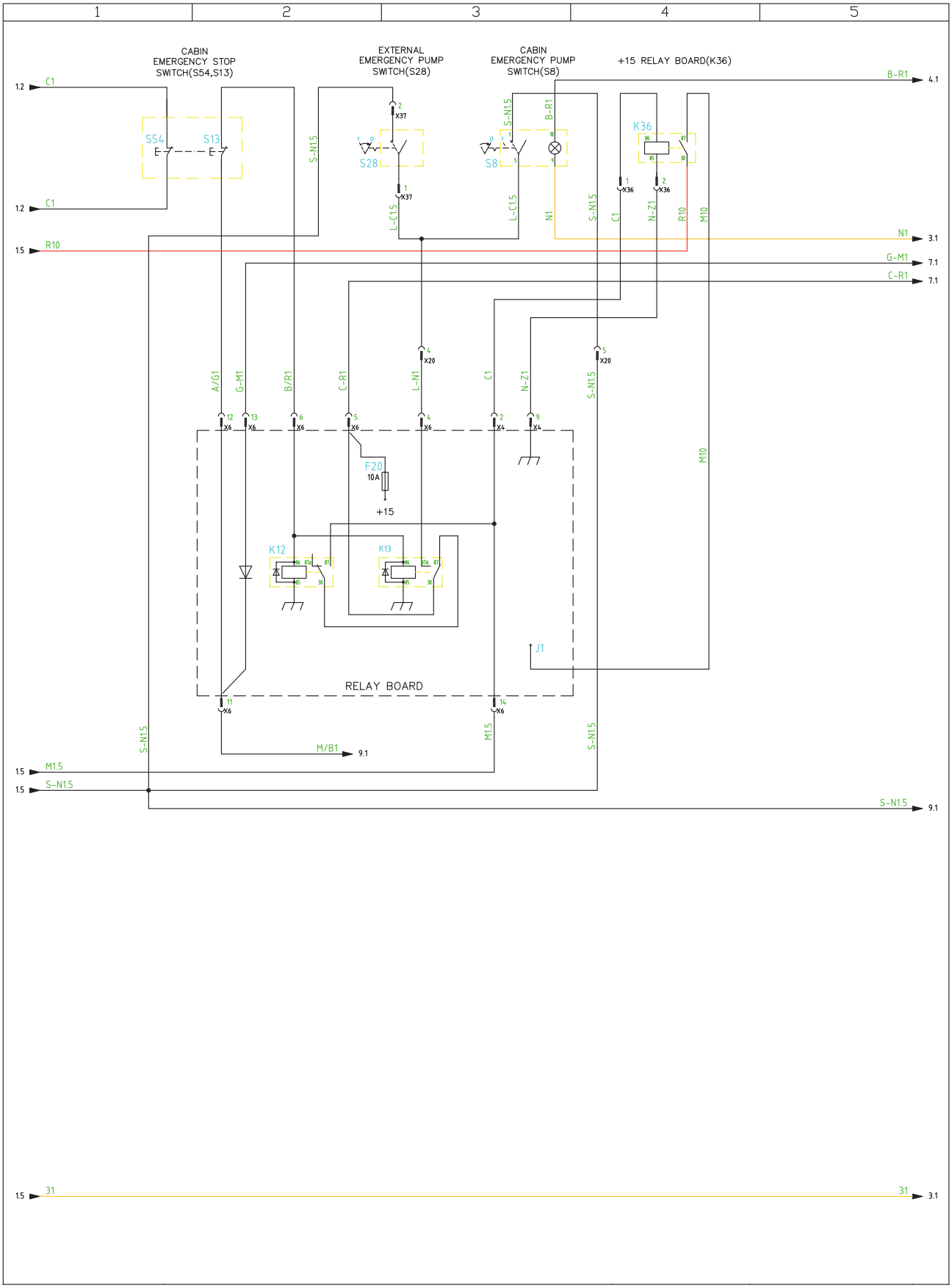

Selector2

6.4 ELECTRICAL SCHEMES
6.4.1 GTH-4013EX



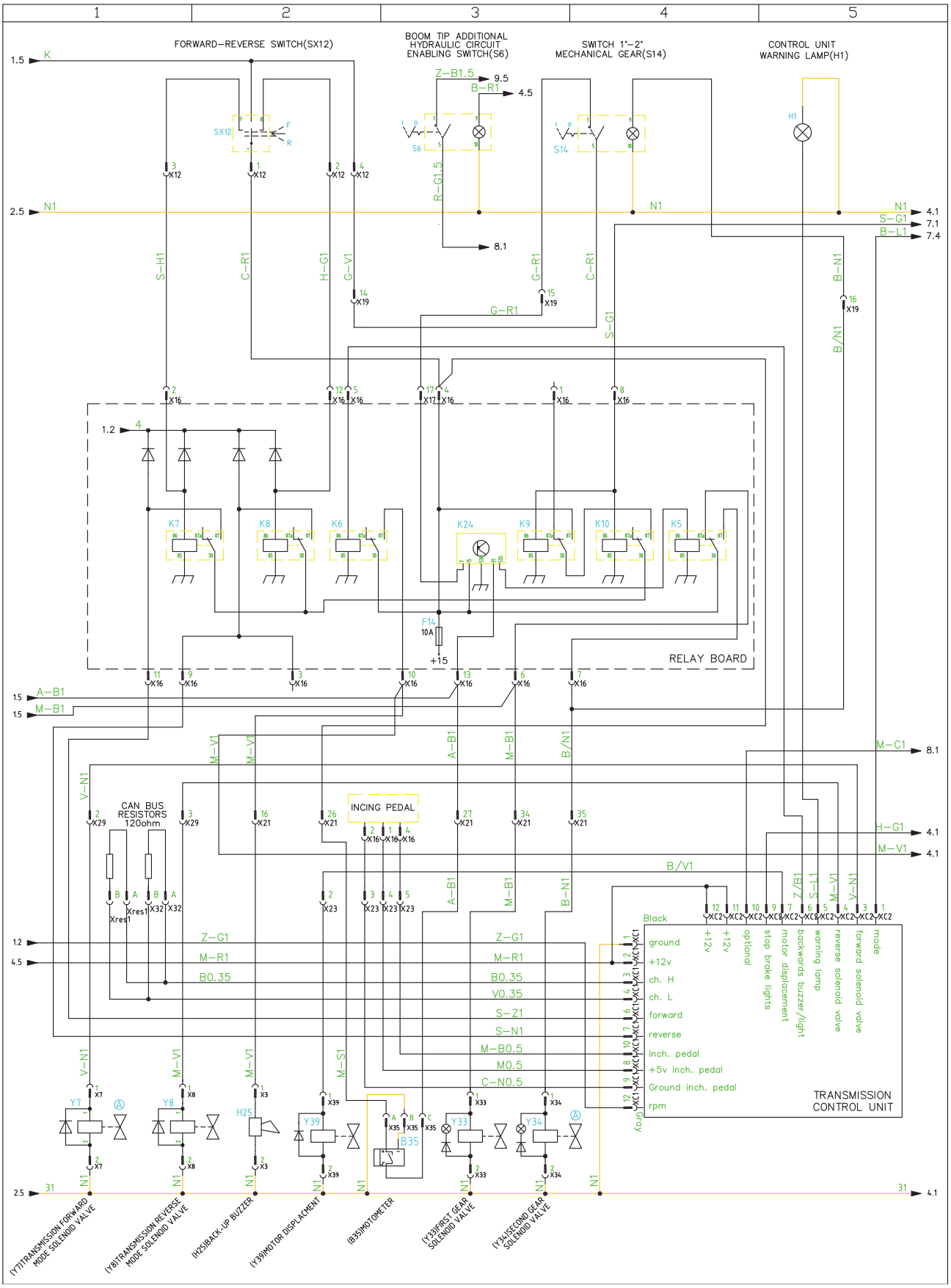
SCHEMES

2/11


1
2
3
4
5
CABIN EMERGENCY STOP SWITCH(S54,S13)
EXTERNAL EMERGENCY PUMP SWITCH(S28)
CABIN EMERGENCY PUMP SWITCH(S8)
+15 RELAY BOARD(K36)
S54
S13
S28
S8
K36
K12
K13
F20
10A
+15
J1
RELAY BOARD
C1
R10
B-R1
N1
G-M1
C-R1
S-N15
L-C15
L-N1
N-Z1
M10
M1.5
M/B1
31

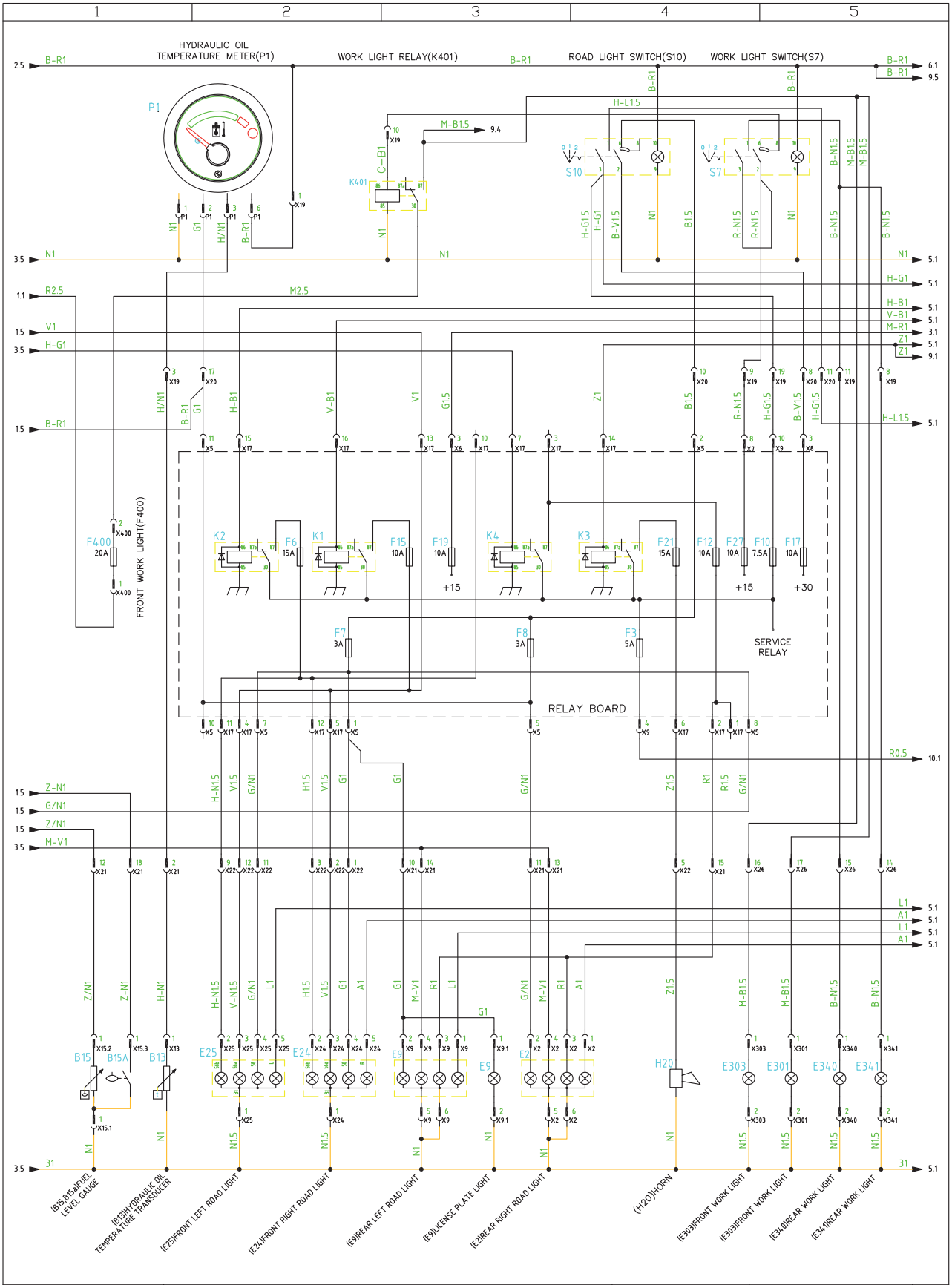
SCHEMES

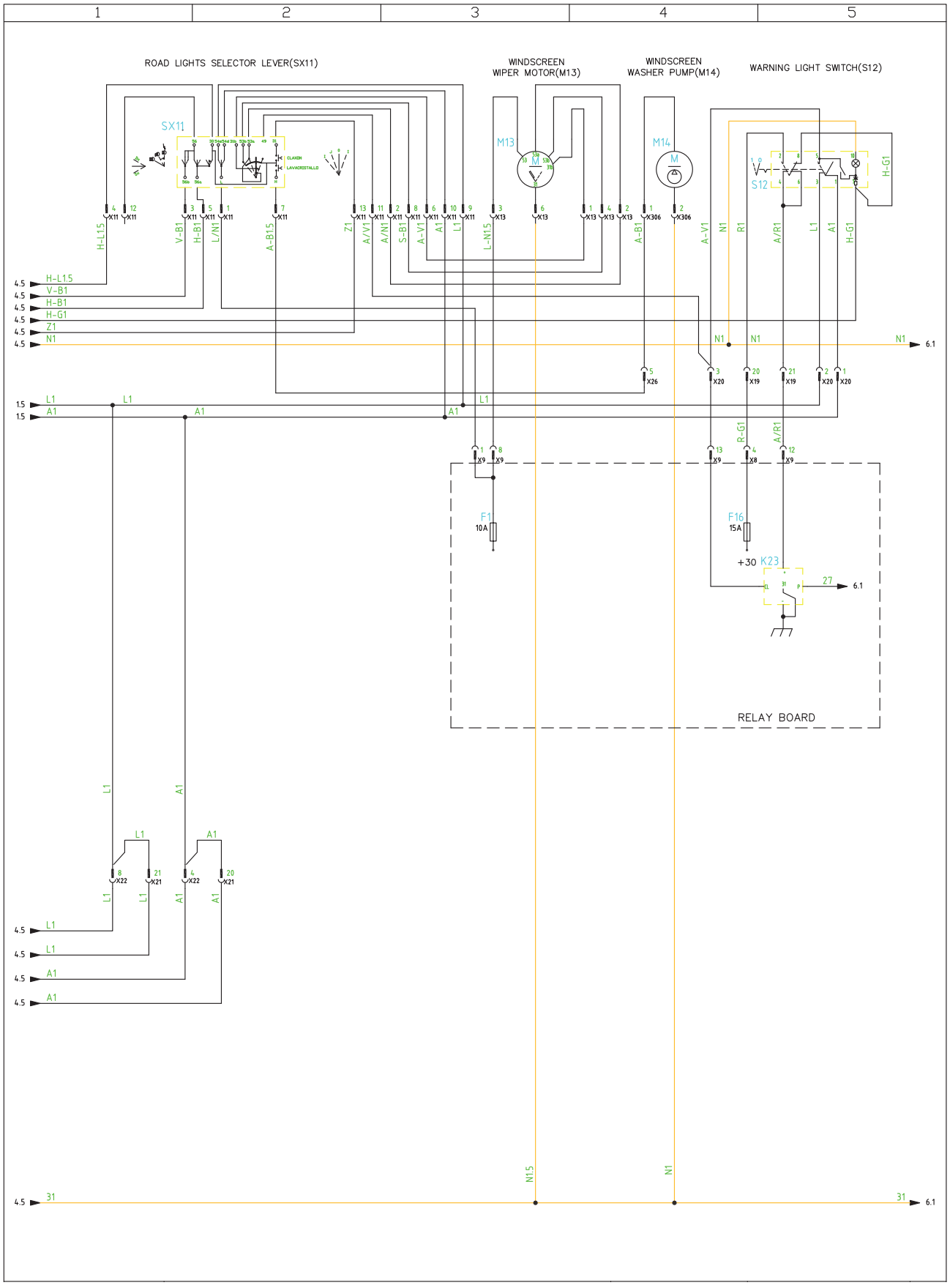
3/11


1
2
3
4
5
FORWARD-REVERSE SWITCH(SX12)
BOOM TIP ADDITIONAL HYDRAULIC CIRCUIT ENABLING SWITCH(S6)
SWITCH 1°-2° MECHANICAL GEAR(S14)
CONTROL UNIT WARNING LAMP(H1)
RELAY BOARD
CAN BUS RESISTORS 120ohm
INCING PEDAL
TRANSMISSION CONTROL UNIT
ground
+12v
ch. H
ch. L
forward
reverse
inch. pedal
+5v inch. pedal
Ground inch. pedal
rpm
optional
stop brake lights
motor displacement
backwards buzzer/light
warning lamp
reverse solenoid valve
forward solenoid valve
mode
(Y7)TRANSMISSION FORWARD MODE SOLENOID VALVE
(Y8)TRANSMISSION REVERSE MODE SOLENOID VALVE
(H25)BACK-UP BUZZER
(Y39)MOTOR DISPLACEMENT
(B35)MOTOMETER
(Y33)FIRST GEAR SOLENOID VALVE
(Y34)SECOND GEAR SOLENOID VALVE

SCHEMES

4/11


1
2
3
4
5
HYDRAULIC OIL TEMPERATURE METER(P1)
WORK LIGHT RELAY(K401)
ROAD LIGHT SWITCH(S10)
WORK LIGHT SWITCH(S7)
P1
S10
S7
K401
K2
K1
K4
K3
F400 20A
FRONT WORK LIGHT(F400)
F6 15A
F15 10A
F19 10A
F21 15A
F12 10A
F27 10A
F10 7.5A
F17 10A
F7 3A
F8 3A
F3 5A
+15
+15
+30
SERVICE RELAY
RELAY BOARD
B15
B15A
B13
E25
E24
E9
E2
H20
E303
E301
E340
E341
(B15,B15A)FUEL LEVEL GAUGE
(B13)HYDRAULIC OIL TEMPERATURE TRANSDUCER
(E25)FRONT LEFT ROAD LIGHT
(E24)FRONT RIGHT ROAD LIGHT
(E9)REAR LEFT ROAD LIGHT
(E9)LICENSE PLATE LIGHT
(E2)REAR RIGHT ROAD LIGHT
(H2O)HORN
(E303)FRONT WORK LIGHT
(E301)FRONT WORK LIGHT
(E340)REAR WORK LIGHT
(E341)REAR WORK LIGHT


1
2
3
4
5
ROAD LIGHTS SELECTOR LEVER(SX11)
WINDSCREEN WIPER MOTOR(M13)
WINDSCREEN WASHER PUMP(M14)
WARNING LIGHT SWITCH(S12)
SX11
M13
M14
S12
H-L1.5
V-B1
H-B1
L/N1
A-B1.5
Z1
A/V1
A/N1
S-B1
A-V1
A1
L1
L-N1.5
A-B1
A-V1
N1
R1
A/R1
L1
A1
H-G1
F1
10A
F16
15A
+30 K23
RELAY BOARD
N1.5
N1
31

SCHEMES

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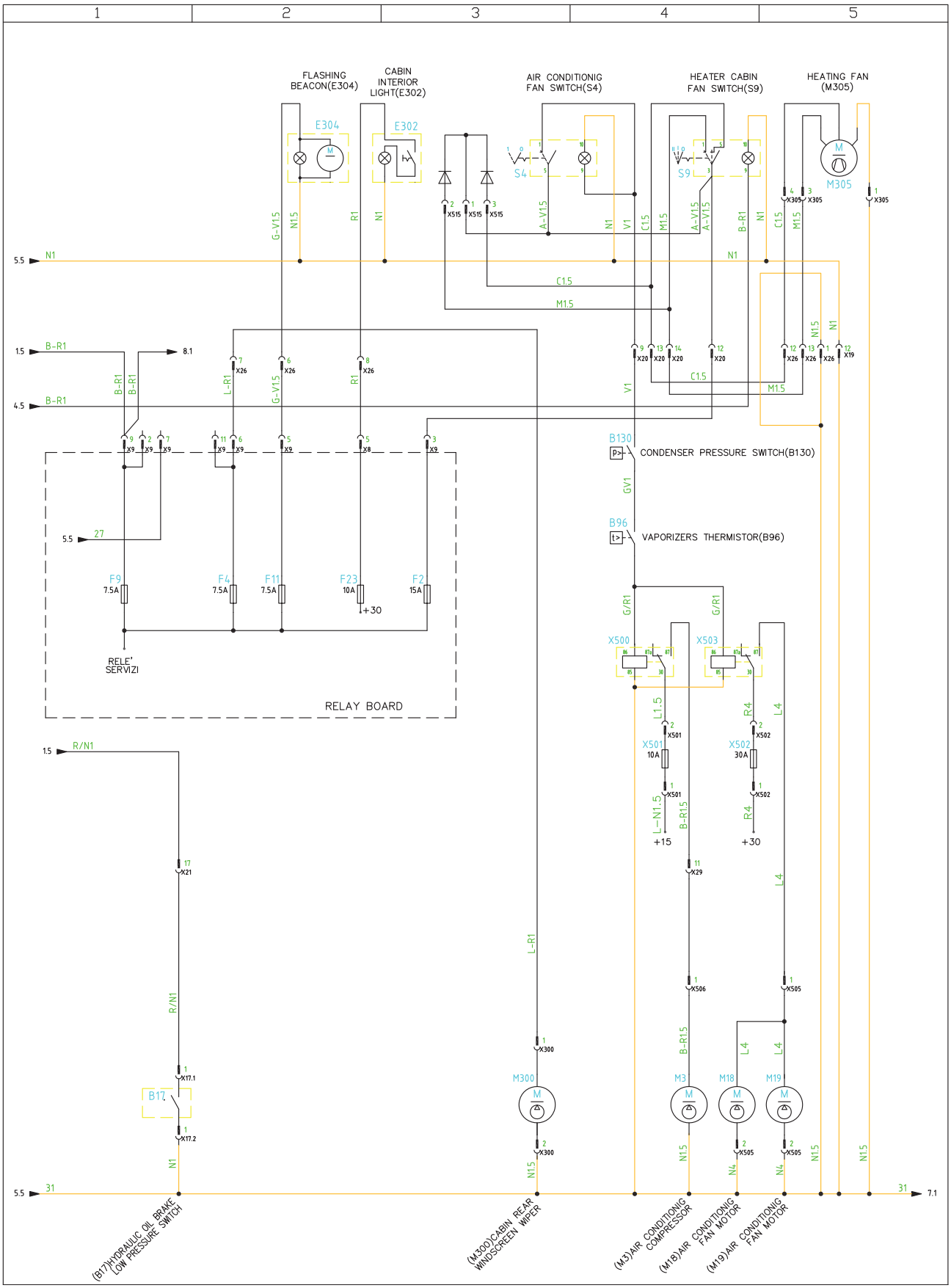
1
2
3
4
5
FLASHING BEACON(E304)
CABIN INTERIOR LIGHT(E302)
AIR CONDITIONIG FAN SWITCH(S4)
HEATER CABIN FAN SWITCH(S9)
HEATING FAN (M305)
E304
E302
S4
S9
M305
N1
B-R1
C1.5
M1.5
G-V1.5
N1.5
R1
L-R1
A-V1.5
V1
B-R1
B130
CONDENSER PRESSURE SWITCH(B130)
GV1
B96
VAPORIZERS THERMISTOR(B96)
G/R1
X500
X503
L1.5
R4
L4
X501
X502
10A
30A
L-N1.5
B-R1.5
+15
+30
RELE' SERVIZI
RELAY BOARD
F9
F4
F11
F23
F2
7.5A
7.5A
7.5A
10A
15A
+30
R/N1
B17
M300
M3
M18
M19
N1.5
N4
(B17)HYDRAULIC OIL BRAKE LOW PRESSURE SWITCH
(M300)CABIN REAR WINDSCREEN WIPER
(M3)AIR CONDITIONIG COMPRESSOR
(M18)AIR CONDITIONIG FAN MOTOR
(M19)AIR CONDITIONIG FAN MOTOR

SCHEMES

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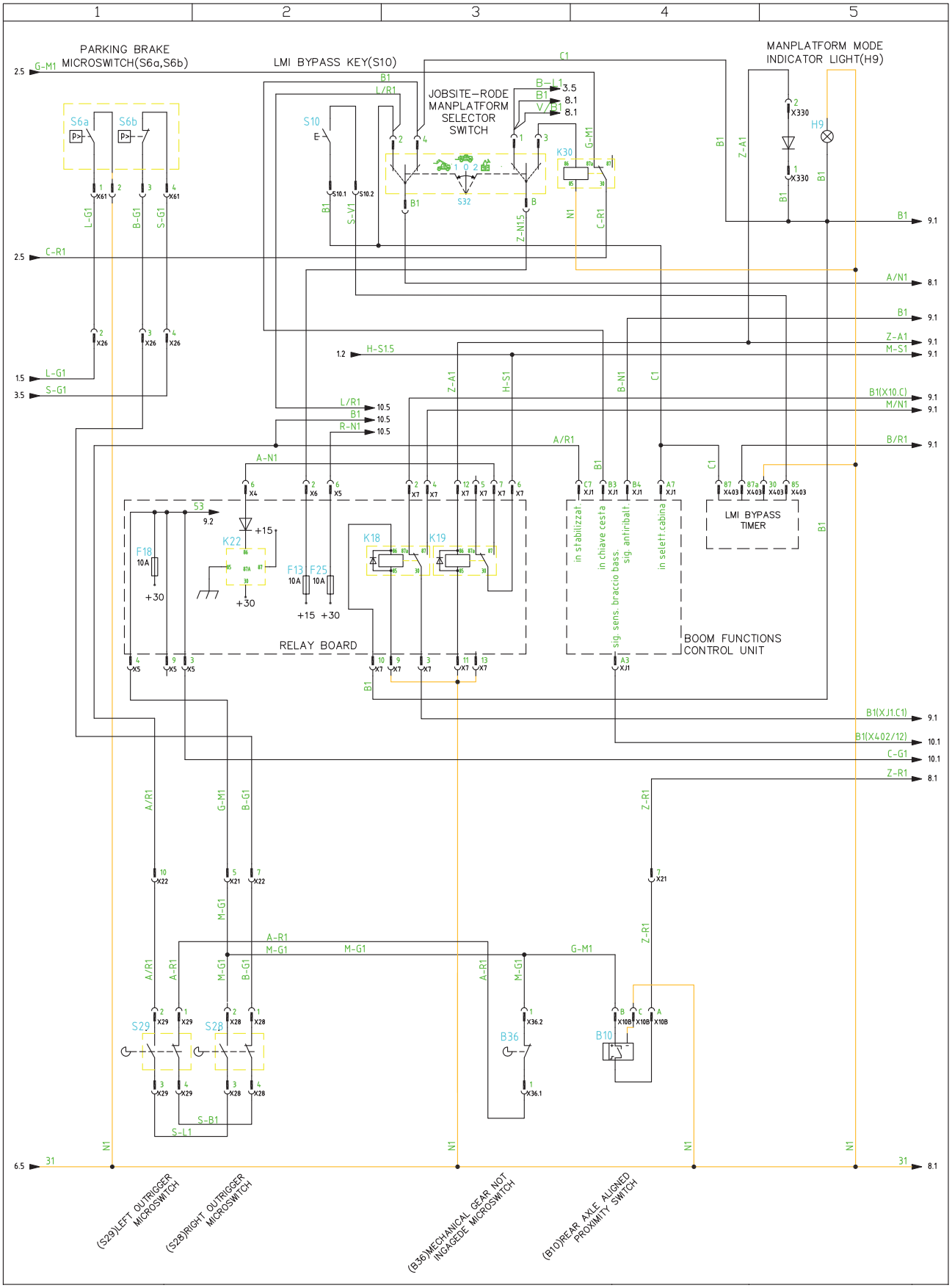
1
2
3
4
5
PARKING BRAKE MICROSWITCH(S6a,S6b)
LMI BYPASS KEY(S10)
JOBSITE-RODE MANPLATFORM SELECTOR SWITCH
MANPLATFORM MODE INDICATOR LIGHT(H9)
RELAY BOARD
BOOM FUNCTIONS CONTROL UNIT
LMI BYPASS TIMER
(S29)LEFT OUTRIGGER MICROSWITCH
(S28)RIGHT OUTRIGGER MICROSWITCH
(B36)MECHANICAL GEAR NOT INGAGEDE MICROSWITCH
(B10)REAR AXLE ALIGNED PROXIMITY SWITCH

SCHEMES

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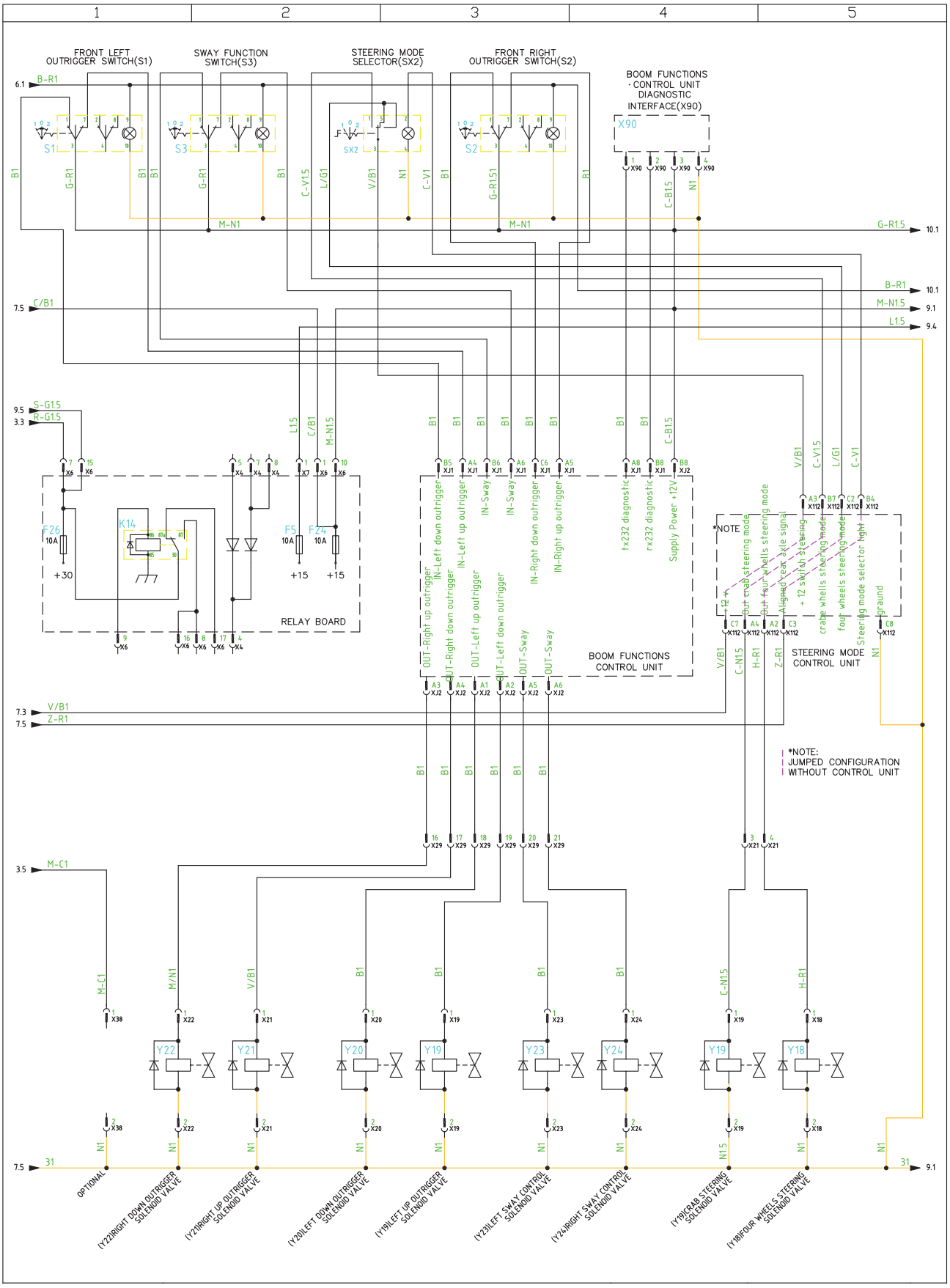
1
2
3
4
5
FRONT LEFT OUTRIGGER SWITCH(S1)
SWAY FUNCTION SWITCH(S3)
STEERING MODE SELECTOR(SX2)
FRONT RIGHT OUTRIGGER SWITCH(S2)
BOOM FUNCTIONS CONTROL UNIT DIAGNOSTIC INTERFACE(X90)
RELAY BOARD
BOOM FUNCTIONS CONTROL UNIT
STEERING MODE CONTROL UNIT
*NOTE
*NOTE:
JUMPED CONFIGURATION
WITHOUT CONTROL UNIT
OPTIONAL
(Y22)RIGHT DOWN OUTRIGGER SOLENOID VALVE
(Y21)RIGHT UP OUTRIGGER SOLENOID VALVE
(Y20)LEFT DOWN OUTRIGGER SOLENOID VALVE
(Y19)LEFT UP OUTRIGGER SOLENOID VALVE
(Y23)LEFT SWAY CONTROL SOLENOID VALVE
(Y24)RIGHT SWAY CONTROL SOLENOID VALVE
(Y19)CRAB STEERING SOLENOID VALVE
(Y18)FOUR WHEELS STEERING SOLENOID VALVE

SCHEMES

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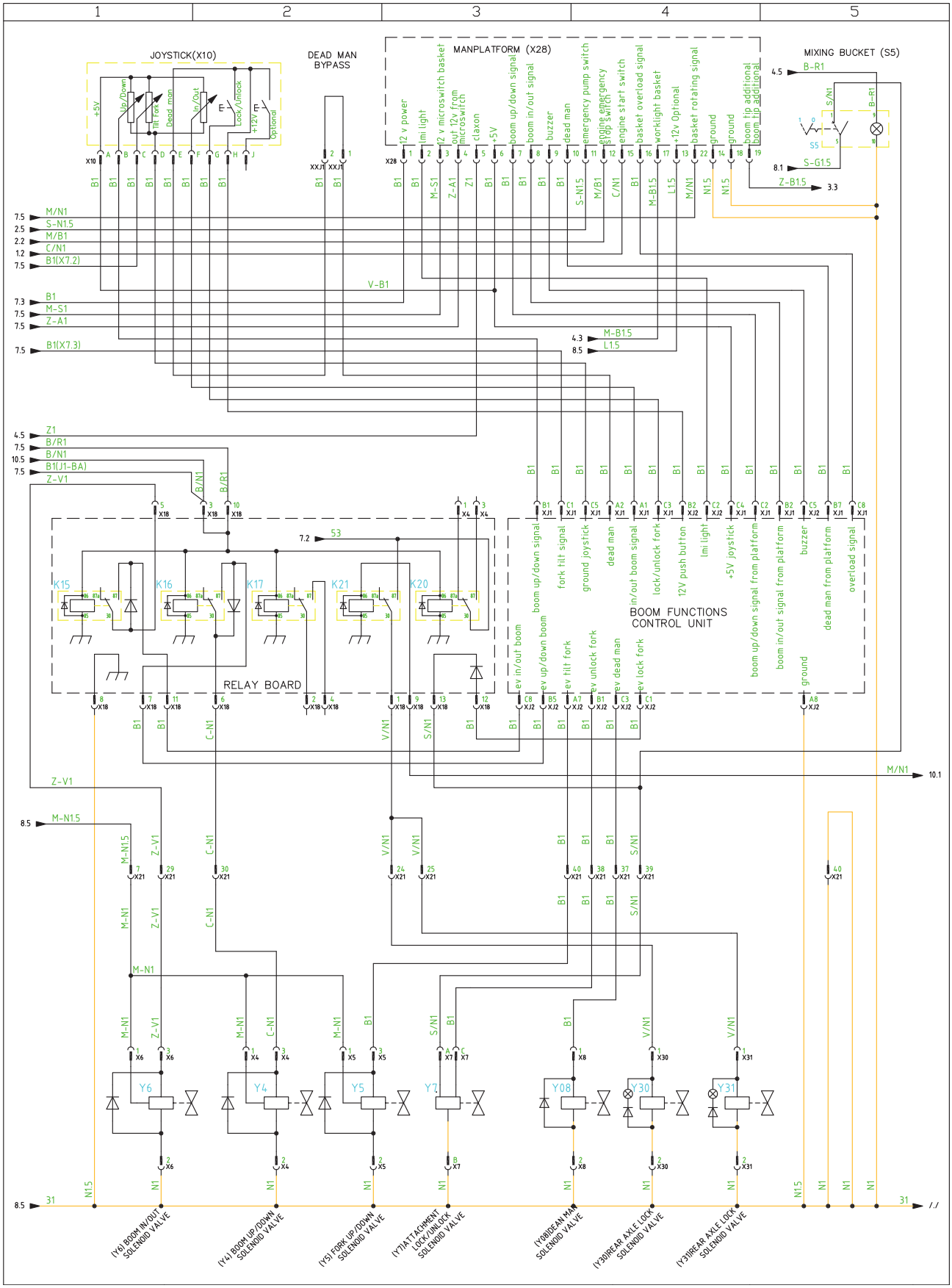
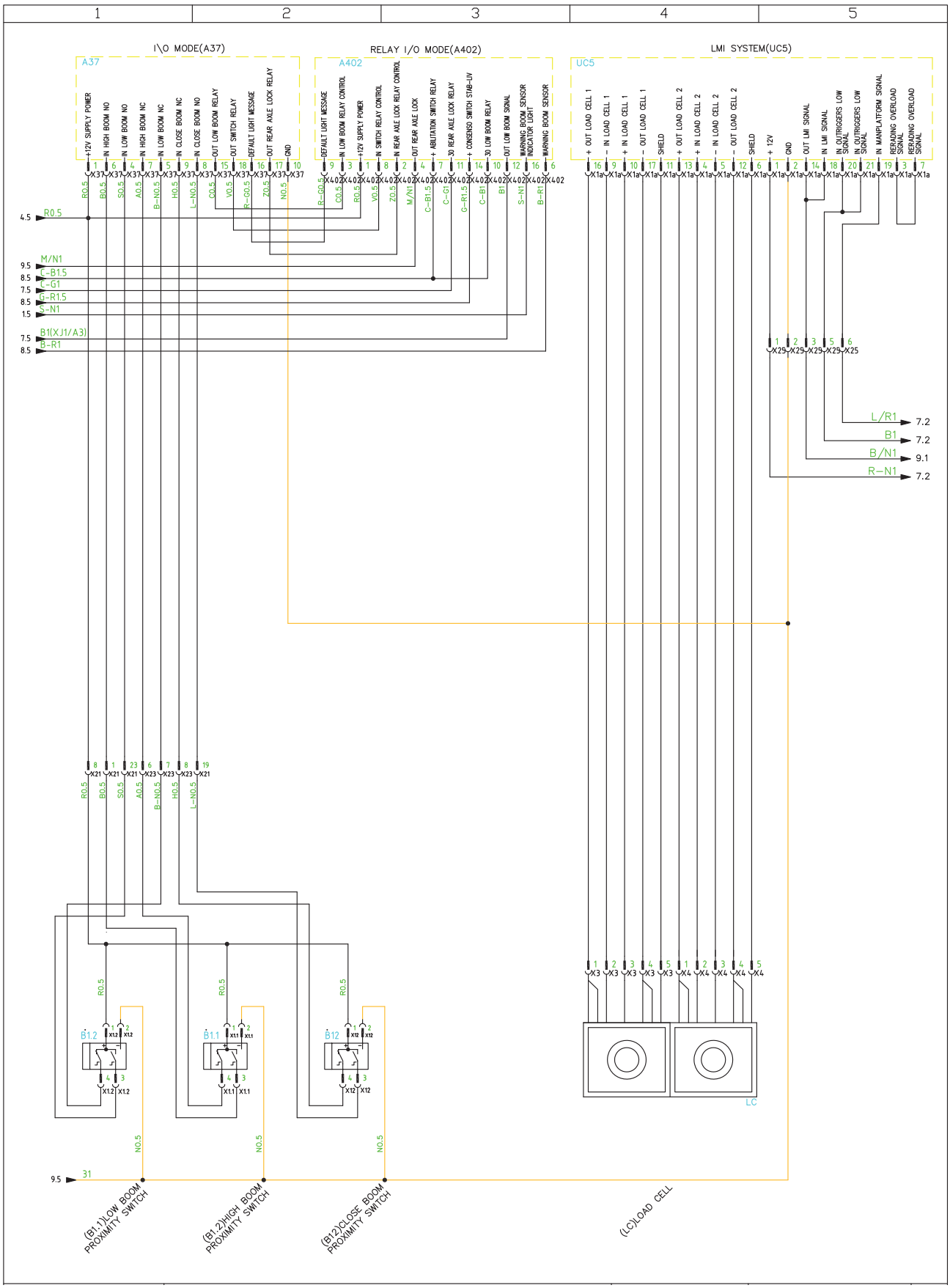

1
2
3
4
5
JOYSTICK(X10)
DEAD MAN BYPASS
MANPLATFORM (X28)
MIXING BUCKET (S5)
BOOM FUNCTIONS CONTROL UNIT
RELAY BOARD
K15
K16
K17
K21
K20
Y6
Y4
Y5
Y7
Y08
Y30
Y31
(Y6) BOOM IN/OUT SOLENOID VALVE
(Y4) BOOM UP/DOWN SOLENOID VALVE
(Y5) FORK UP/DOWN SOLENOID VALVE
(Y7)ATTACHMENT LOCK/UNLOCK SOLENOID VALVE
(Y08)DEAN MAN SOLENOID VALVE
(Y30)REAR AXLE LOCK SOLENOID VALVE
(Y31)REAR AXLE LOCK SOLENOID VALVE

SCHEMES

10/11



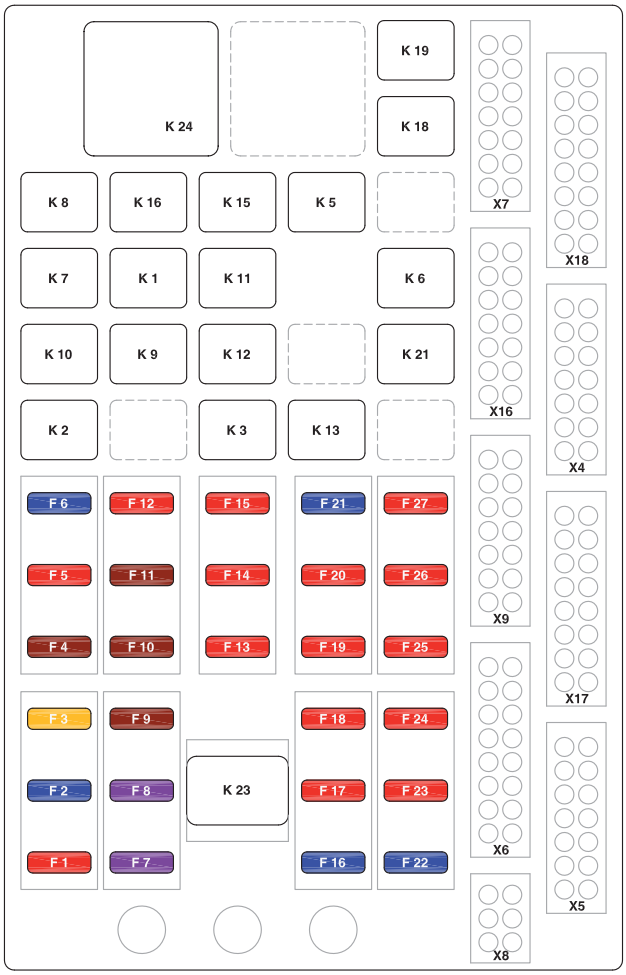
SCHEMES

6.4.1.1 FUSES AND RELAYS GTH-4013EX

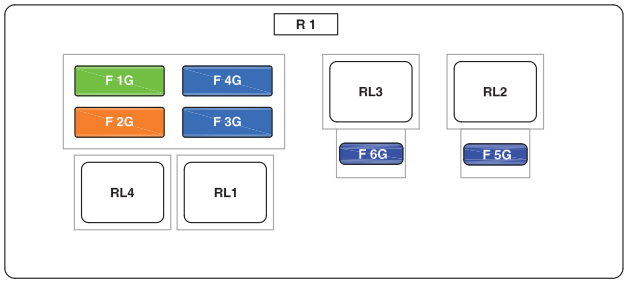
11/11

1	2	3	4	5

FUSES AND RELAYS CABIN BOARD



FUSES AND RELAYS ENGINE BOARD



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

COLOR WIRE LEGEND

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)

PARTS LEGEND

Ref.	DESCRIPTION	AMP.
F1	FRONT WINDSCREEN WIPER	10A
F2	AIR CONDITIONING HEATING	15A
F3	I/O CONTROL UNIT	5A
F4	REAR WINDSCREEN WIPER ROOF WINDSCREEN WIPER	7.5A
F5	OPTIONAL	10A
F6	LOW BEAM LIGHT	15A
F7	POSITION LIGHT	3A
F8	MAIN GAUGES CLUSTER LIGHTING	3A
F9	MAIN GAUGES CLUSTER SUPPLY POWER	7.5A
F10	ROAD LIGHT SWITCH	7.5A
F11	FLASHING BEACON	7.5A
F12	STOP LIGHT	10A
F13	STEERING MODE SELECTOR	10A
F14	BACKWARDS BUZZER	10A
F15	HIGH BEAM LIGHT	10A
F16	HAZARD WARNING LIGHT	15A
F17	POSITION LIGHT SWITCH	10A
F18	OUTRIGGERS	10A
F19	TRANSMISSION UNIT CONTROL	10A
F20	EMERGENCY STOP SWITCH	10A
F21	HORN	15A
F22	MANPLATFORM SUPPLY POWER	15A
F23	CABIN INTERIOR LIGHT	10A
F24	JOBSITE MODE SUPPLY POWER	10A
F25	LMI CONTROL UNIT	10A
F26	BOOM TIP ADDITIONAL HYDRAULIC CIRCUIT	10A
F27	WORK LIGHTS	15A
F1G	ENGINE START	30A
F2G	ENGINE IGNITION KEY	40A
F3G	CABIN FUSE–RELAY BOARD	60A
F4G	GLOW PLUGS	60A
F1M	FUEL PUMP	15A
F2M	EMERGENCY PUMP	15A
RL1	GLOW PLUGS PREHATING	
RL2	STARTER	
RL3	EMERGENCY PUMP	
RL4	FUEL PUMP	
K1	HIGH BEAM LIGHT	
K2	LOW BEAM LIGHT	
K3	HORN	
K4	STOP LIGHT	
K5	SHIFT FIRST/SECOND MECHANICAL SPEED	
K6	BACKWARDS BUZZER	
K7	FORWARD MODE SOLENOID VALVE	
K8	REVERSE MODE SOLENOID VALVE	
K9	SECURITY FORWARD/REVERSE MODE	
K10	SECURITY FORWARD/REVERSE MODE	
K11	START ABILITATION	
K12	ENABLING EMERGENCY PUMP	
K13	EMERGENCY PUMP	
K14	–	
K15	ENABLING BOOM OUT (OVERLOAD LMI)	
K16	ENABLING BOOM DOWN (OVERLOAD LMI)	
K17	–	
K18	MANPLATFORM ABILITATION ROTATING COMMAND	
K19	MANPLATFORM ABILITATION	
K20	–	
K21	REAR AXLE LOCK	
K22	TIMER	
K23	TIMER	
K24	TIMER	
R1	LOAD RESISTOR 100Ω 10W	

SCHEMES

6.4.2 GTH-4017EX GTH-4514EX

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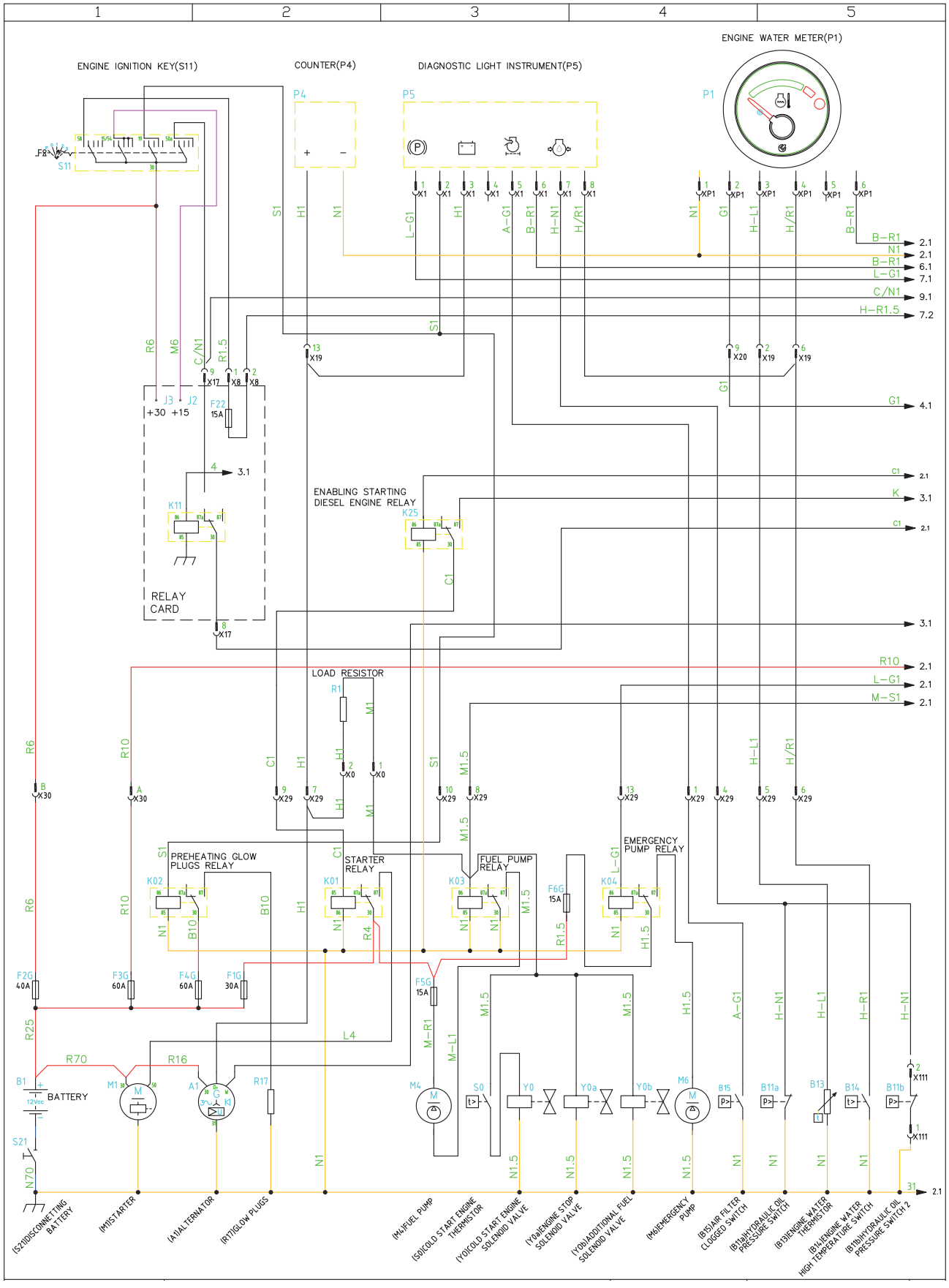

SCHEMES

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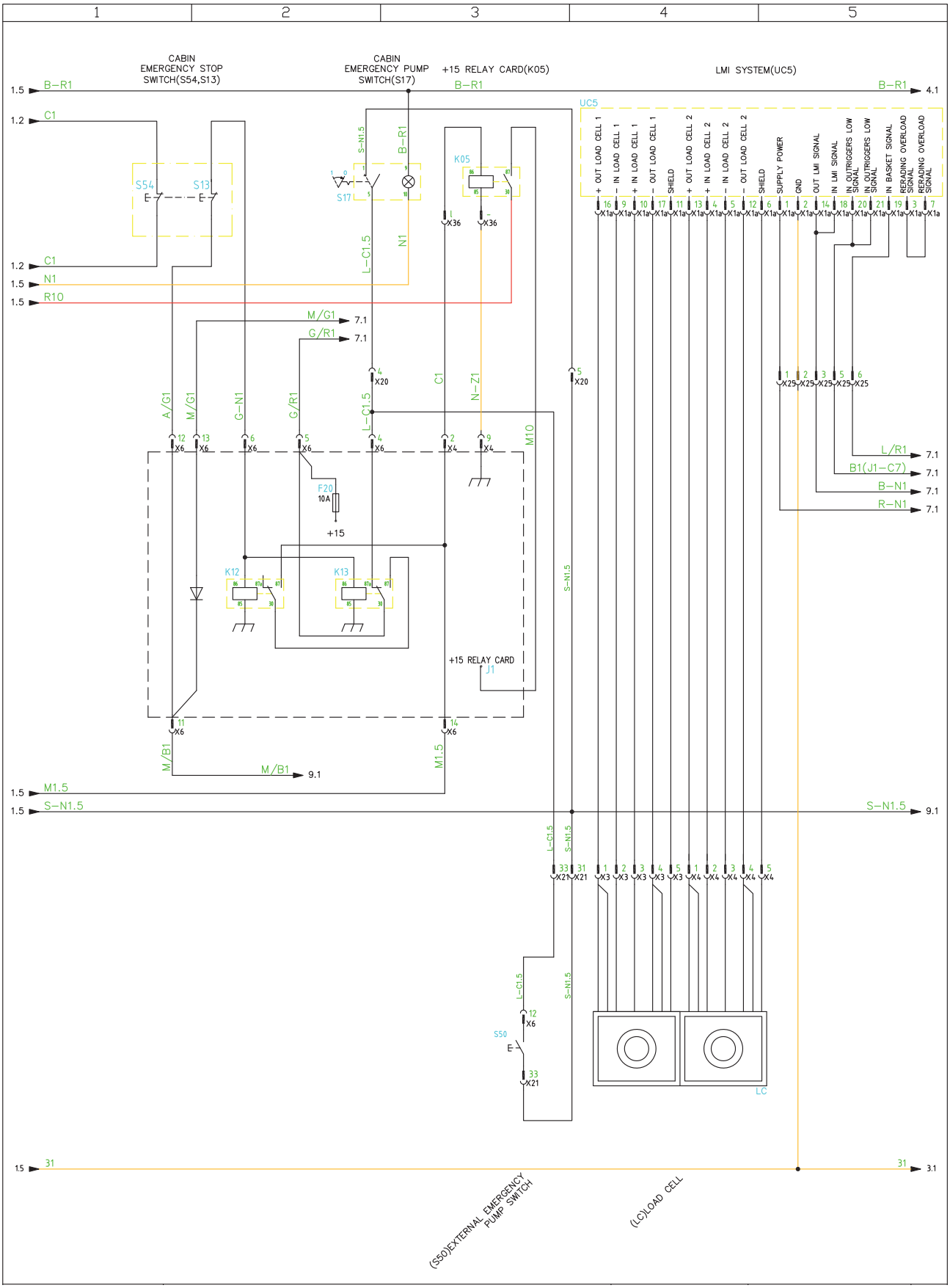
1
2
3
4
5
CABIN EMERGENCY STOP SWITCH(S54,S13)
CABIN EMERGENCY PUMP SWITCH(S17)
+15 RELAY CARD(K05)
LMI SYSTEM(UC5)
B-R1
C1
N1
R10
M/G1
G/R1
A/G1
G-N1
L-C1.5
N-Z1
M10
S-N1.5
M/B1
M1.5
L/R1
B1(J1-C7)
B-N1
R-N1
31
S54
S13
S17
K05
K12
K13
F20
10A
+15
+15 RELAY CARD
J1
UC5
OUT LOAD CELL 1 +
IN LOAD CELL 1 -
OUT LOAD CELL 1 +
OUT LOAD CELL 1 -
SHIELD
OUT LOAD CELL 2 +
IN LOAD CELL 2 -
OUT LOAD CELL 2 -
SHIELD
SUPPLY POWER
GND
OUT LMI SIGNAL
IN LMI SIGNAL
IN OUTRIGGERS LOW SIGNAL
OUTRIGGERS LOW SIGNAL
IN BASKET SIGNAL
REREADING OVERLOAD SIGNAL
REREADING OVERLOAD SIGNAL
S50
LC
(S50)EXTERNAL EMERGENCY PUMP SWITCH
(LC)LOAD CELL

SCHEMES

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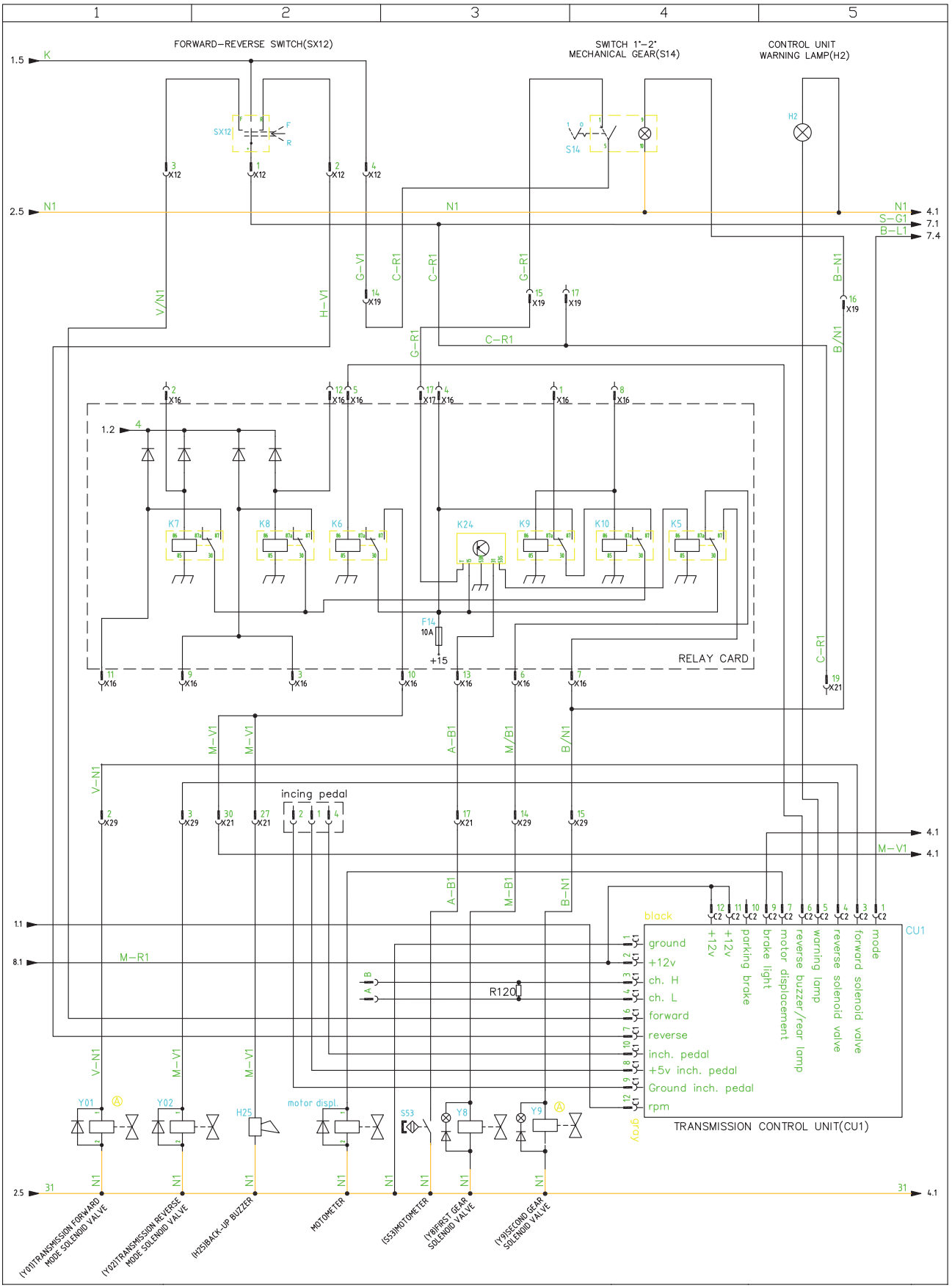
1
2
3
4
5
FORWARD–REVERSE SWITCH(SX12)
SWITCH 1"–2" MECHANICAL GEAR(S14)
CONTROL UNIT WARNING LAMP(H2)
RELAY CARD
incing pedal
TRANSMISSION CONTROL UNIT(CU1)
ground
+12v
ch. H
ch. L
forward
reverse
inch. pedal
+5v inch. pedal
Ground inch. pedal
rpm
mode
forward solenoid valve
reverse solenoid valve
warning lamp
reverse buzzer/rear lamp
motor displacement
brake light
parking brake
+12v
+12v
(Y01)TRANSMISSION FORWARD MODE SOLENOID VALVE
(Y02)TRANSMISSION REVERSE MODE SOLENOID VALVE
(H25)BACK-UP BUZZER
MOTOMETER
(S53)MOTOMETER
(Y8)FIRST GEAR SOLENOID VALVE
(Y9)SECOND GEAR SOLENOID VALVE

SCHEMES

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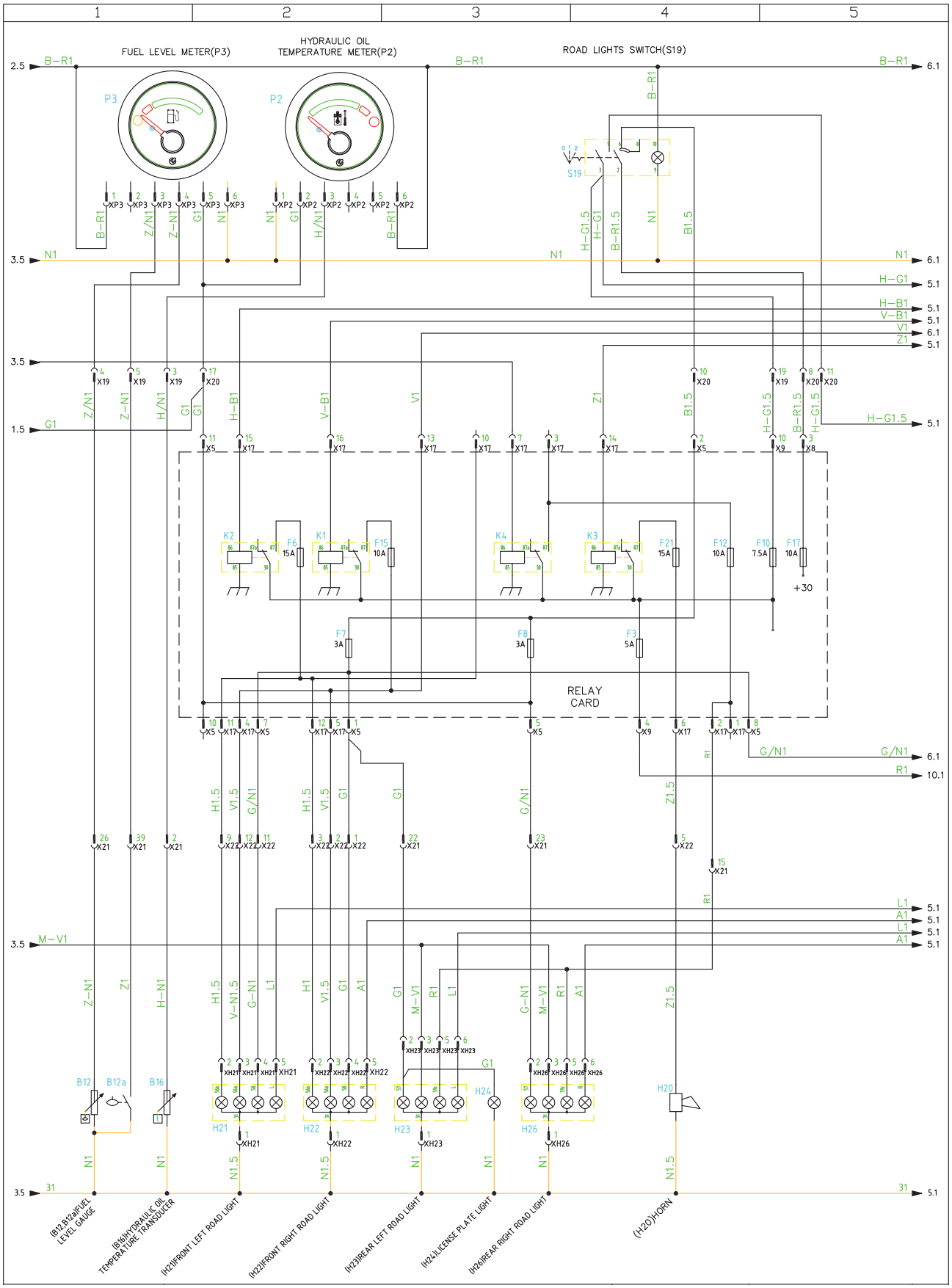
1
2
3
4
5
FUEL LEVEL METER(P3)
HYDRAULIC OIL TEMPERATURE METER(P2)
ROAD LIGHTS SWITCH(S19)
P3
P2
S19
RELAY CARD
K2
K1
K4
K3
F6 15A
F15 10A
F21 15A
F12 10A
F10 7.5A
F17 10A
F7 3A
F8 3A
F3 5A
+30
B12
B12a
B16
H21
H22
H23
H24
H26
H20
(B12,B12a)FUEL LEVEL GAUGE
(B16)HYDRAULIC OIL TEMPERATURE TRANSDUCER
(H21)FRONT LEFT ROAD LIGHT
(H22)FRONT RIGHT ROAD LIGHT
(H23)REAR LEFT ROAD LIGHT
(H24)LICENSE PLATE LIGHT
(H26)REAR RIGHT ROAD LIGHT
(H20)HORN

SCHEMES

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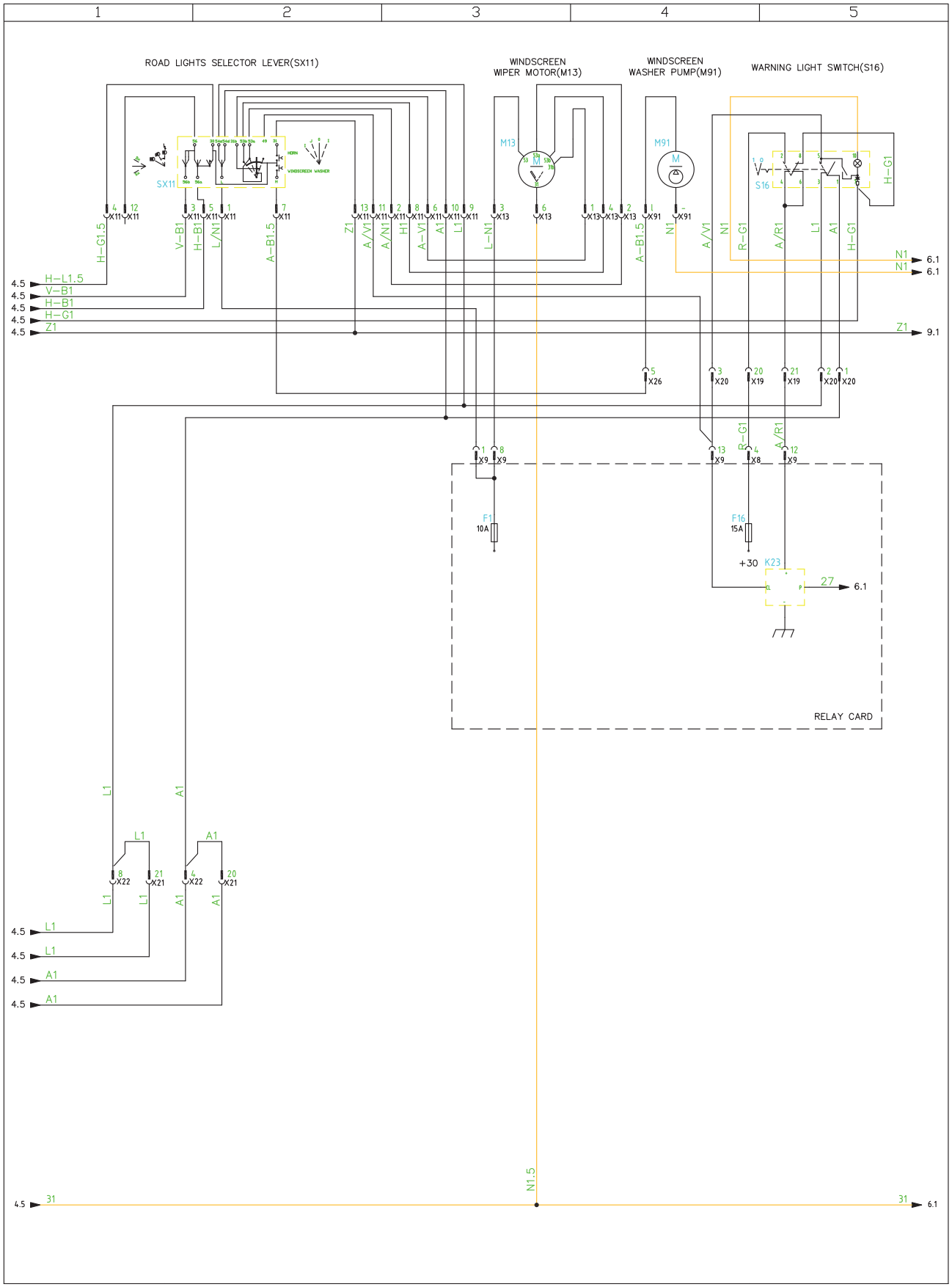
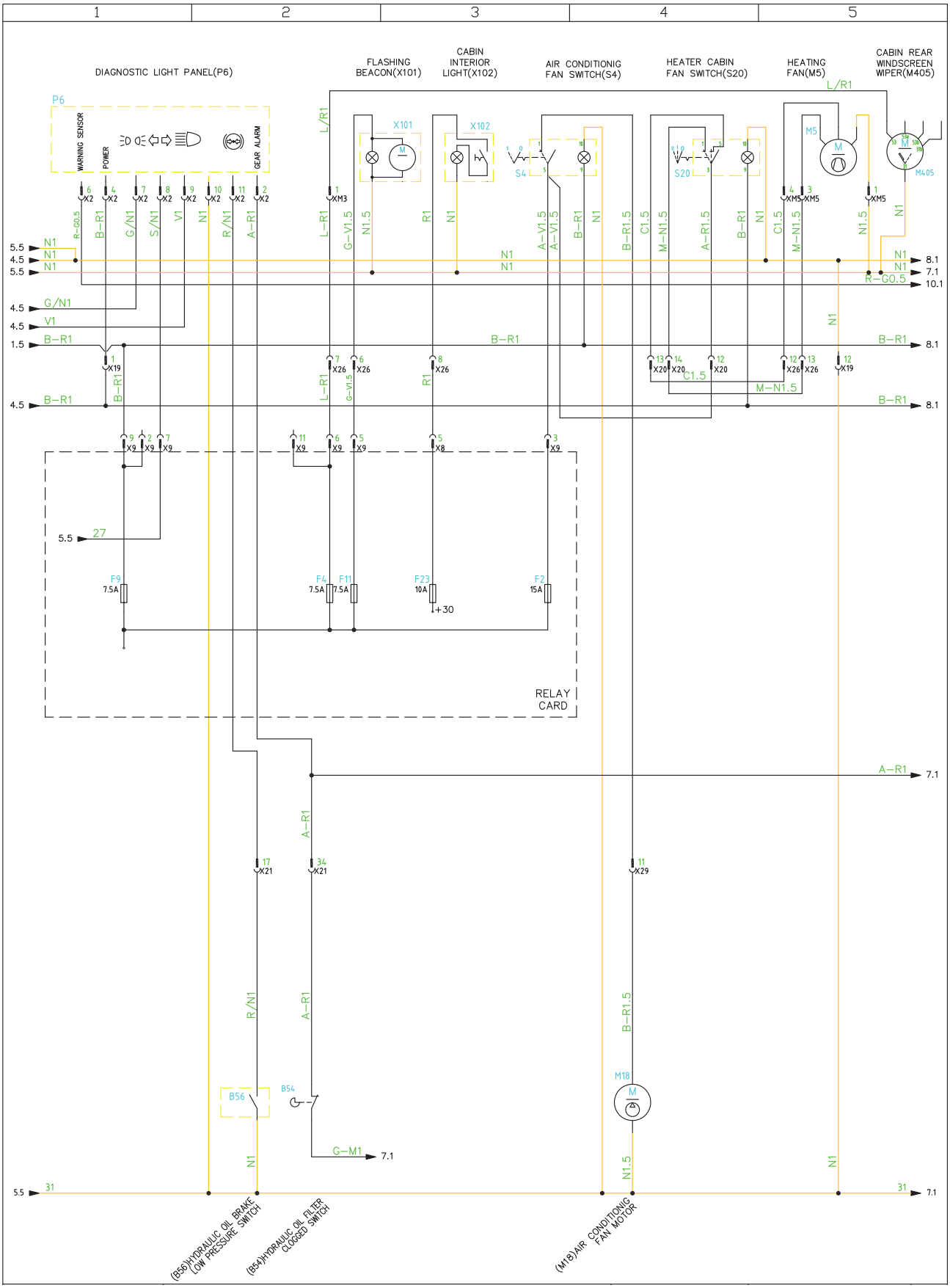

1
2
3
4
5
ROAD LIGHTS SELECTOR LEVER(SX11)
WINDSCREEN WIPER MOTOR(M13)
WINDSCREEN WASHER PUMP(M91)
WARNING LIGHT SWITCH(S16)
SX11
M13
M91
S16
RELAY CARD
F1 10A
F16 15A
K23
+30
H-G1.5
V-B1
H-B1
L/N1
A-B1.5
Z1
A/V1
A/N1
H1
A-V1
A1
L1
L-N1
A-B1.5
N1
A/V1
N1
R-G1
A/R1
L1
A1
H-G1
H-L1.5
V-B1
H-B1
H-G1
Z1
N1
N1
Z1
L1
A1
L1
A1
L1
L1
A1
A1
L1
L1
A1
A1
N1.5
31
31

SCHEMES

6/11


1
2
3
4
5
DIAGNOSTIC LIGHT PANEL(P6)
FLASHING BEACON(X101)
CABIN INTERIOR LIGHT(X102)
AIR CONDITIONIG FAN SWITCH(S4)
HEATER CABIN FAN SWITCH(S20)
HEATING FAN(M5)
CABIN REAR WINDSCREEN WIPER(M405)
P6
WARNING SENSOR
POWER
GEAR ALARM
X101
X102
S4
S20
M5
M405
L/R1
R-G0.5
B-R1
G/N1
S/N1
V1
N1
R/N1
A-R1
L-R1
G-V1.5
N1.5
R1
A-V1.5
B-R1.5
C1.5
M-N1.5
A-R1.5
RELAY CARD
F9 7.5A
F4 7.5A
F11 7.5A
F23 10A
F2 15A
+30
27
B56
B54
G-M1
M18
(B56)HYDRAULIC OIL BRAKE LOW PRESSURE SWITCH
(B54)HYDRAULIC OIL FILTER CLOGGED SWITCH
(M18)AIR CONDITIONIG FAN MOTOR

SCHEMES

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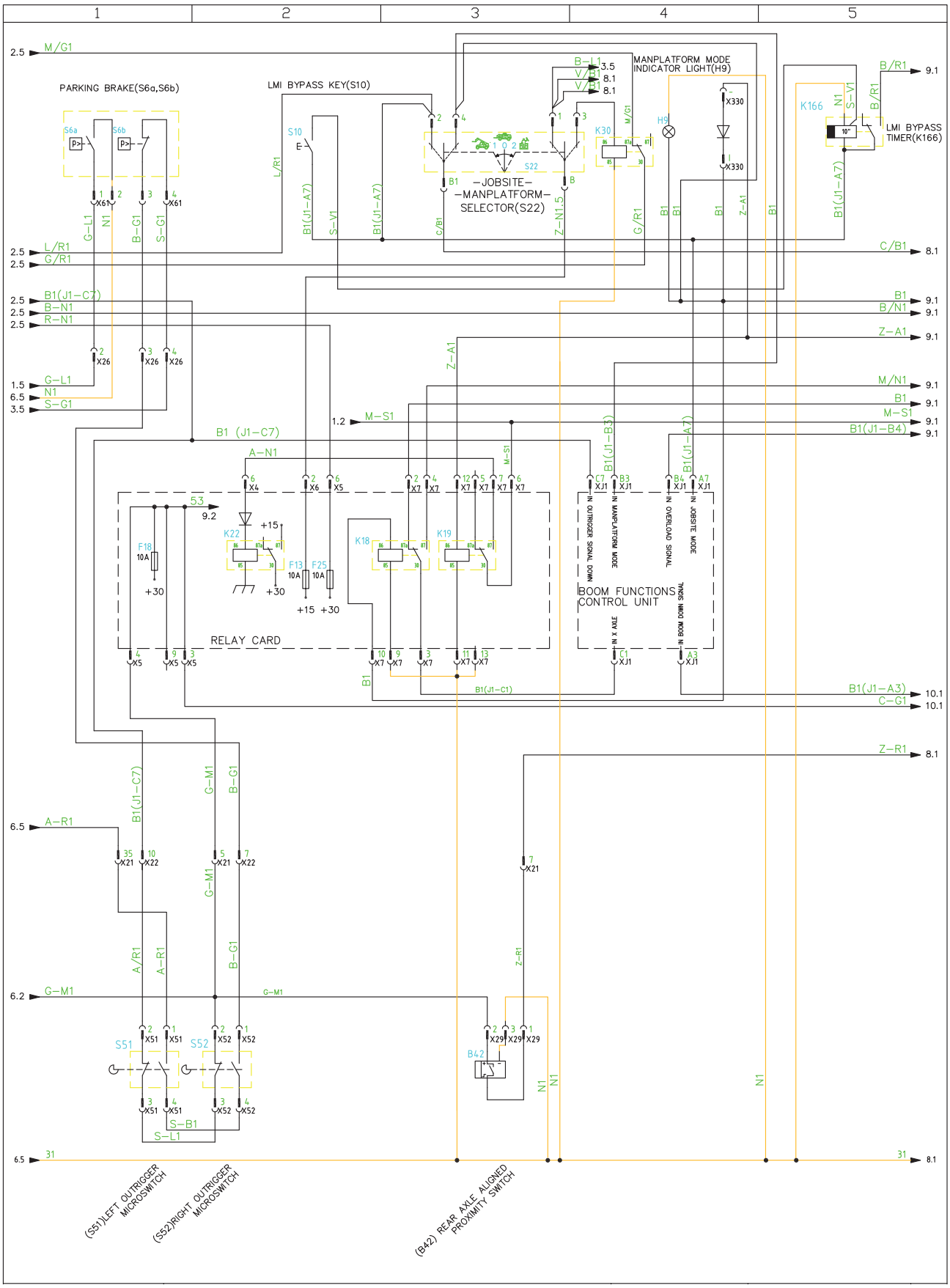
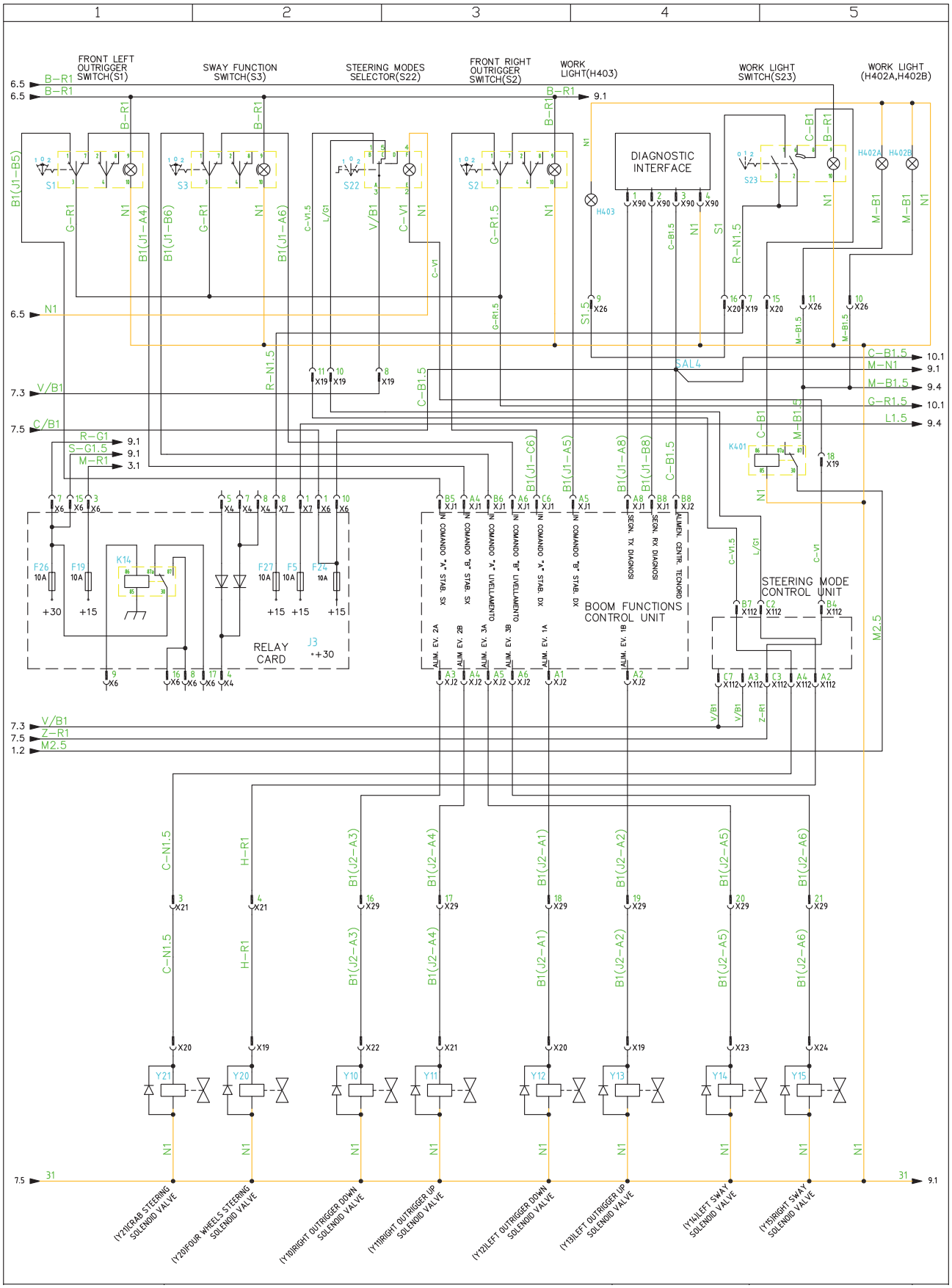

1
2
3
4
5
PARKING BRAKE(S6a,S6b)
LMI BYPASS KEY(S10)
MANPLATFORM MODE INDICATOR LIGHT(H9)
LMI BYPASS TIMER(K166)
-JOBSITE-
-MANPLATFORM-
SELECTOR(S22)
RELAY CARD
BOOM FUNCTIONS CONTROL UNIT
(S51)LEFT OUTRIGGER MICROSWITCH
(S52)RIGHT OUTRIGGER MICROSWITCH
(B42) REAR AXLE ALIGNED PROXIMITY SWITCH

SCHEMES

8/11


1
2
3
4
5
FRONT LEFT OUTRIGGER SWITCH(S1)
SWAY FUNCTION SWITCH(S3)
STEERING MODES SELECTOR(S22)
FRONT RIGHT OUTRIGGER SWITCH(S2)
WORK LIGHT(H403)
WORK LIGHT SWITCH(S23)
WORK LIGHT (H402A,H402B)
DIAGNOSTIC INTERFACE
RELAY CARD
BOOM FUNCTIONS CONTROL UNIT
STEERING MODE CONTROL UNIT
(Y21)CRAB STEERING SOLENOID VALVE
(Y20)FOUR WHEELS STEERING SOLENOID VALVE
(Y10)RIGHT OUTRIGGER DOWN SOLENOID VALVE
(Y11)RIGHT OUTRIGGER UP SOLENOID VALVE
(Y12)LEFT OUTRIGGER DOWN SOLENOID VALVE
(Y13)LEFT OUTRIGGER UP SOLENOID VALVE
(Y14)LEFT SWAY SOLENOID VALVE
(Y15)RIGHT SWAY SOLENOID VALVE

SCHEMES

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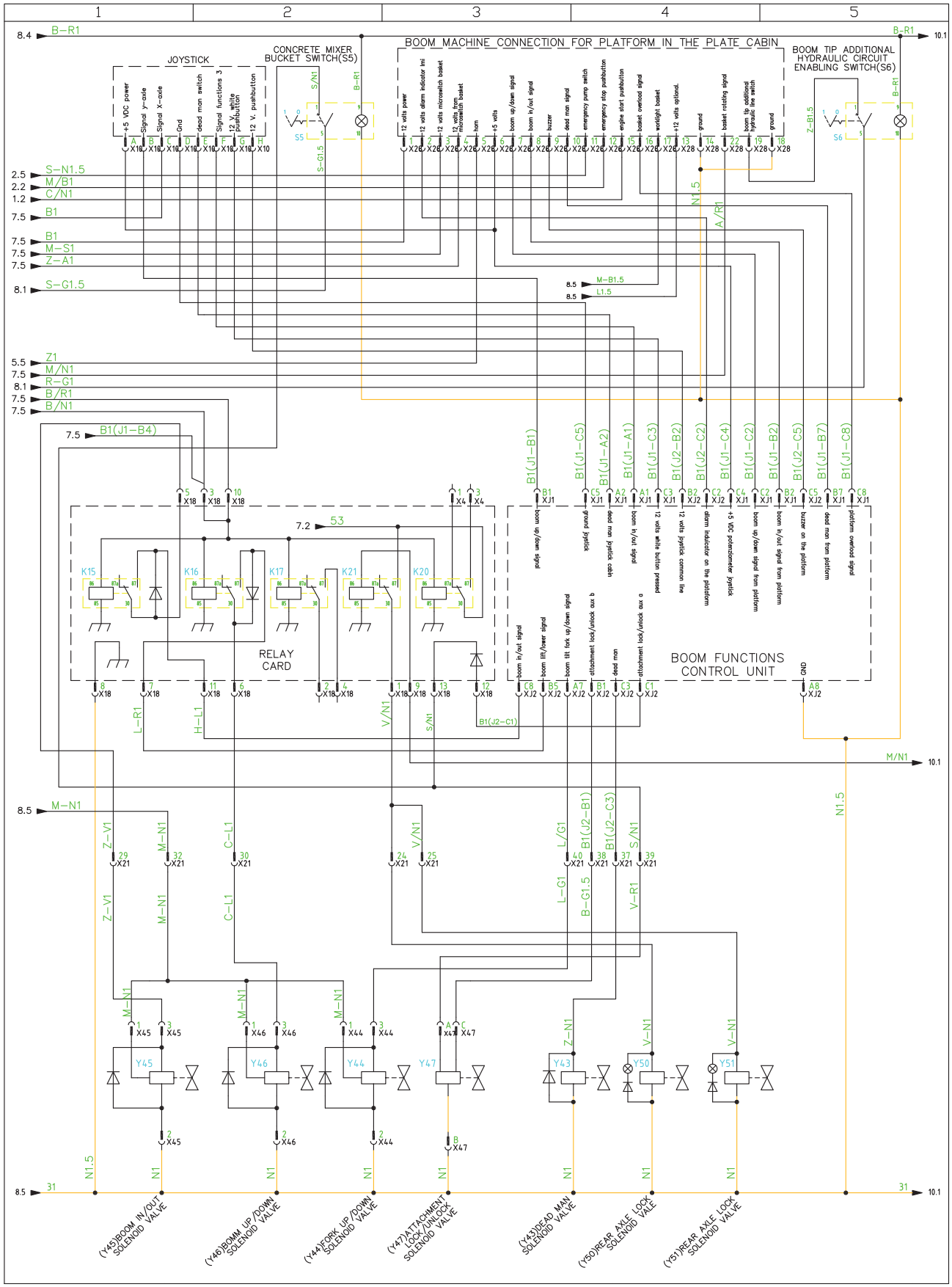
BOOM MACHINE CONNECTION FOR PLATFORM IN THE PLATE CABIN
JOYSTICK
CONCRETE MIXER BUCKET SWITCH(S5)
BOOM TIP ADDITIONAL HYDRAULIC CIRCUIT ENABLING SWITCH(S6)
RELAY CARD
BOOM FUNCTIONS CONTROL UNIT
(Y45)BOOM IN/OUT SOLENOID VALVE
(Y46)BOMM UP/DOWN SOLENOID VALVE
(Y44)FORK UP/DOWN SOLENOID VALVE
(Y47)ATTACHMENT LOCK/UNLOCK SOLENOID VALVE
(Y43)DEAD MAN SOLENOID VALVE
(Y50)REAR AXLE LOCK SOLENOID VALE
(Y51)REAR AXLE LOCK SOLENOID VALVE

SCHEMES

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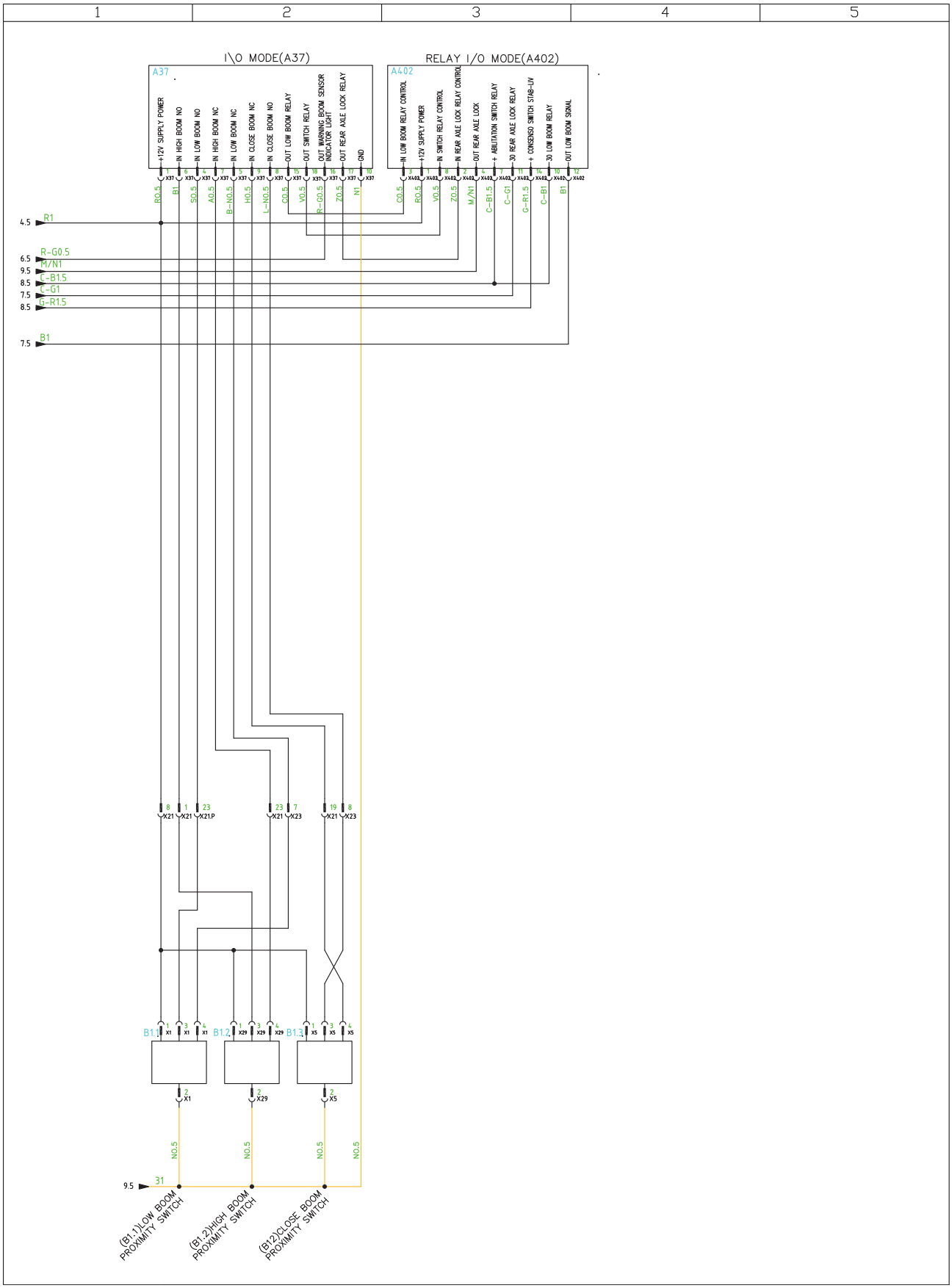

SCHEMES

6.4.2.2 FUSES AND RELAYS GTH-4017 EX GTH-4514 EX

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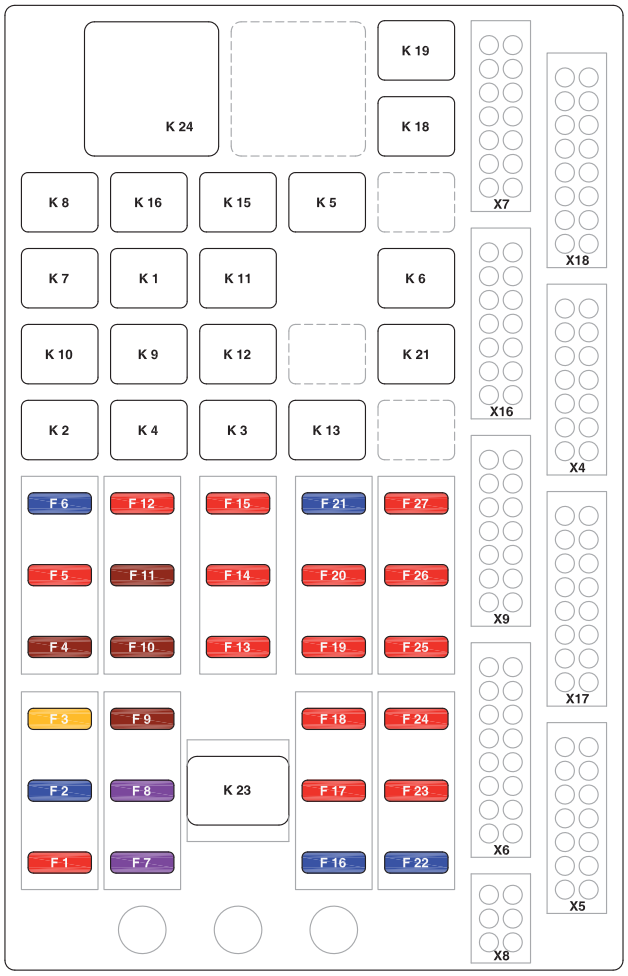
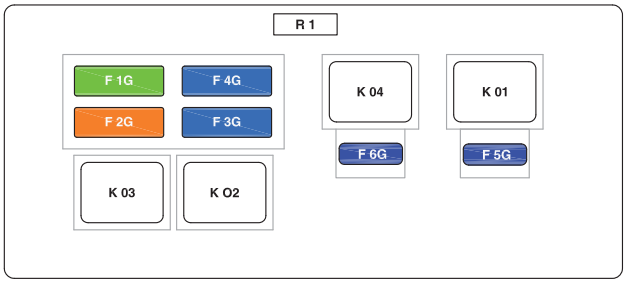
1	2	3	4	5

FUSES AND RELAYS CABIN BOARD



FUSES AND RELAYS ENGINE BOARD



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

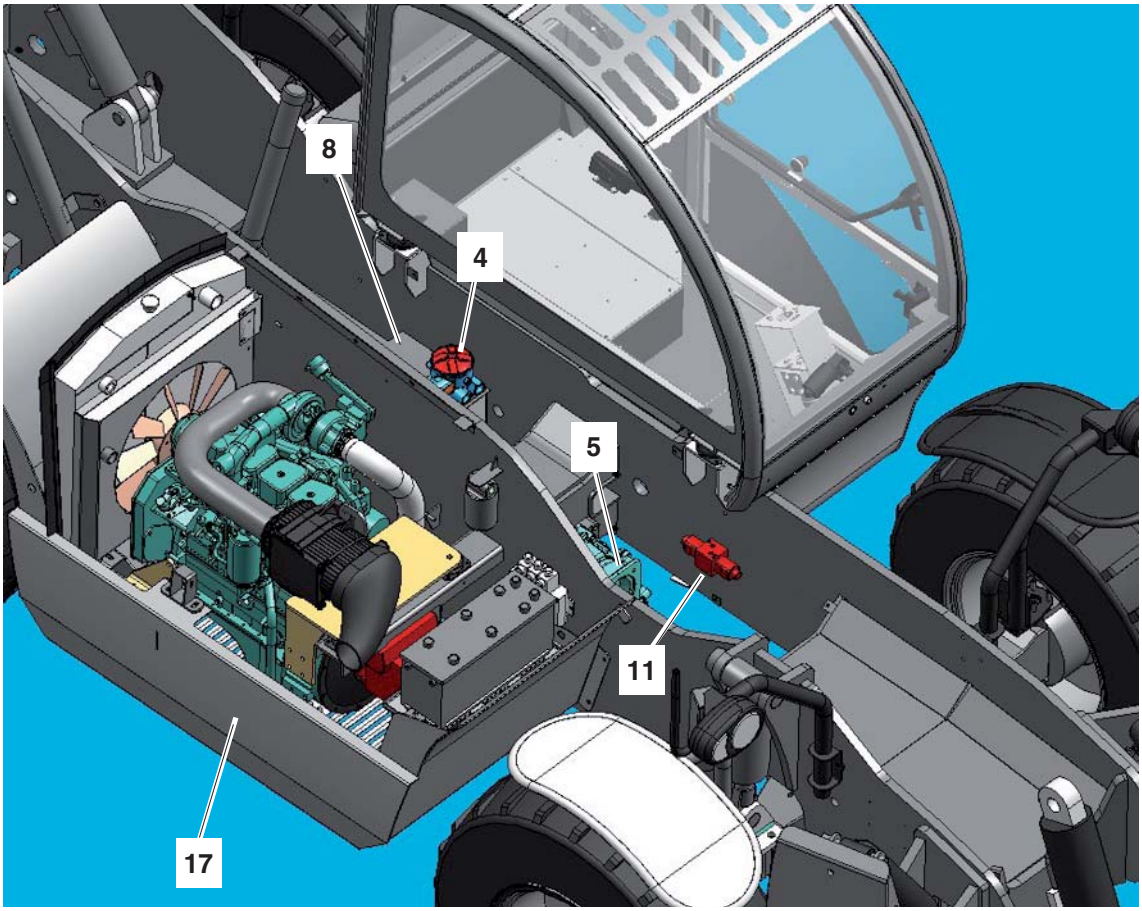
PARTS LEGEND

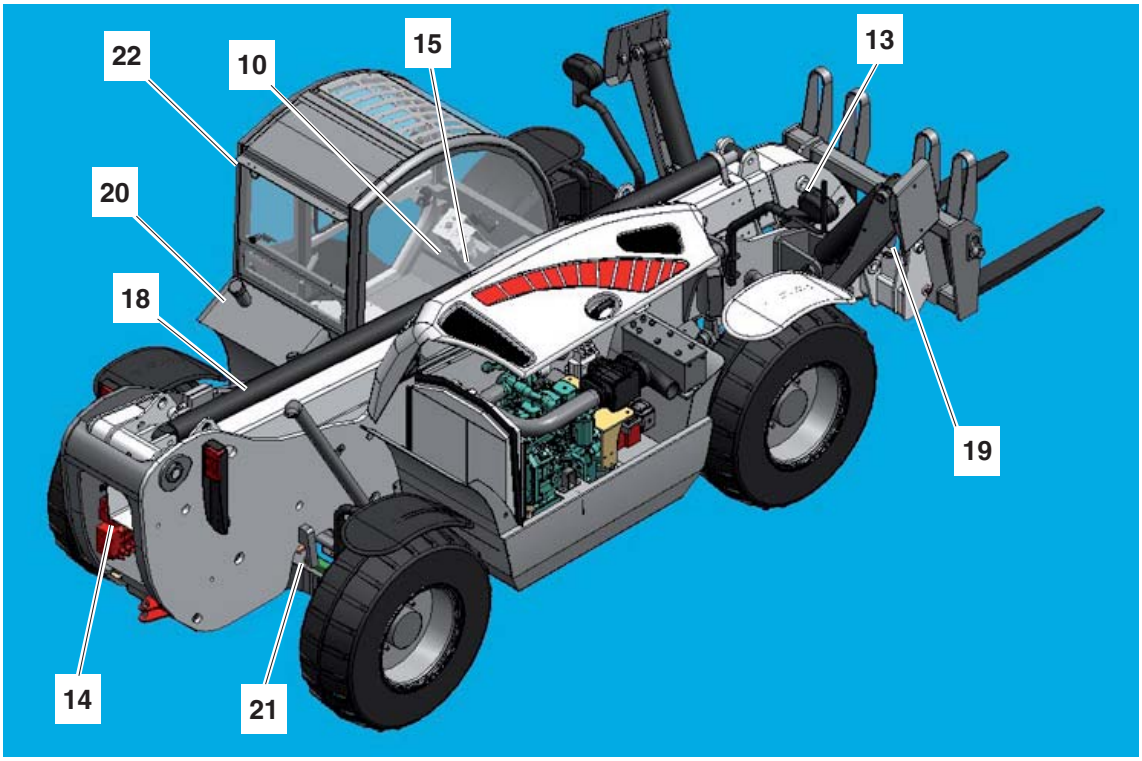
Ref.	DESCRIPTION	AMP.
F1	FRONT WINDSCREEN WIPER	10A
F2	AIR CONDITIONING HEATING	15A
F3	STOP LIGHT MICROSWITCH	5A
F4	REAR WINDSCREEN WIPER ROOF WINDSCREEN WIPER	7.5A
F5	OPTIONAL	10A
F6	LOW BEAM LIGHT	15A
F7	POSITION LIGHT	3A
F8	CONTROL INSTRUMENTS LIGHTING	3A
F9	POWER SUPPLY CHECK LIGHT	7.5A
F10	ROAD LIGHT SWITCH	7.5A
F11	FLASHING BEACON	7.5A
F12	STOP LIGHT	10A
F13	MANPLATFORM MODE	10A
F14	BACKWARDS BUZZER	10A
F15	HIGH BEAM LIGHT	10A
F16	HAZARD WARNING LIGHT	15A
F17	ROAD LIGHT	10A
F18	OUTRIGGERS	10A
F19	TRANSMISSION UNIT CONTROL	10A
F20	+12V ON THE BOOM	10A
F21	HORN	15A
F22	MANPLATFORM SUPPLY POWER	15A
F23	CABIN INTERIOR LIGHT	10A
F24	JOBSITE MODE	10A
F25	LMI CONTROL UNIT	10A
F26	BOOM TIP ADDITIONAL HYDRAULIC CIRCUIT	10A
F27	WORK LIGHTS	15A
F1G	ENGINE START	30A
F2G	ENGINE IGNITION KEY	40A
F3G	CABIN FUSE–RELAY BOARD	60A
F4G	GLOW PLUGS	60A
F5G	FUEL PUMP	15A
F6G	EMERGENCY PUMP	15A
K01	ENGINE START	
K02	GLOW PLUGS PREHATING	
K03	FUEL PUMP	
K04	EMERGENCY PUMP	
K1	HIGH BEAM LIGHT	
K2	LOW BEAM LIGHT	
K3	HORN	
K4	LIGHT POWER SUPPLY	
K5	SHIFT FIRST/SECOND MECHANICAL SPEED	
K6	BACKWARDS BUZZER	
K7	–	
K8	–	
K9	–	
K10	–	
K11	START ABILITATION	
K12	ENABLING EMERGENCY PUMP	
K13	EMERGENCY PUMP	
K14	–	
K15	ENABLING BOOM OUT (OVERLOAD LMI)	
K16	ENABLING BOOM DOWN (OVERLOAD LMI)	
K17	–	
K18	OUTRIGGERS	
K19	LMI CONTROL	
K20	–	
K21	REAR AXLE LOCK	
K22	OPTIONAL	
K23	TIMER	
K24	TIMER	
R1	LOAD RESISTOR 100Ω 10W	

6.5 POSITION OF THE COMPONENTS ON THE MACHINE

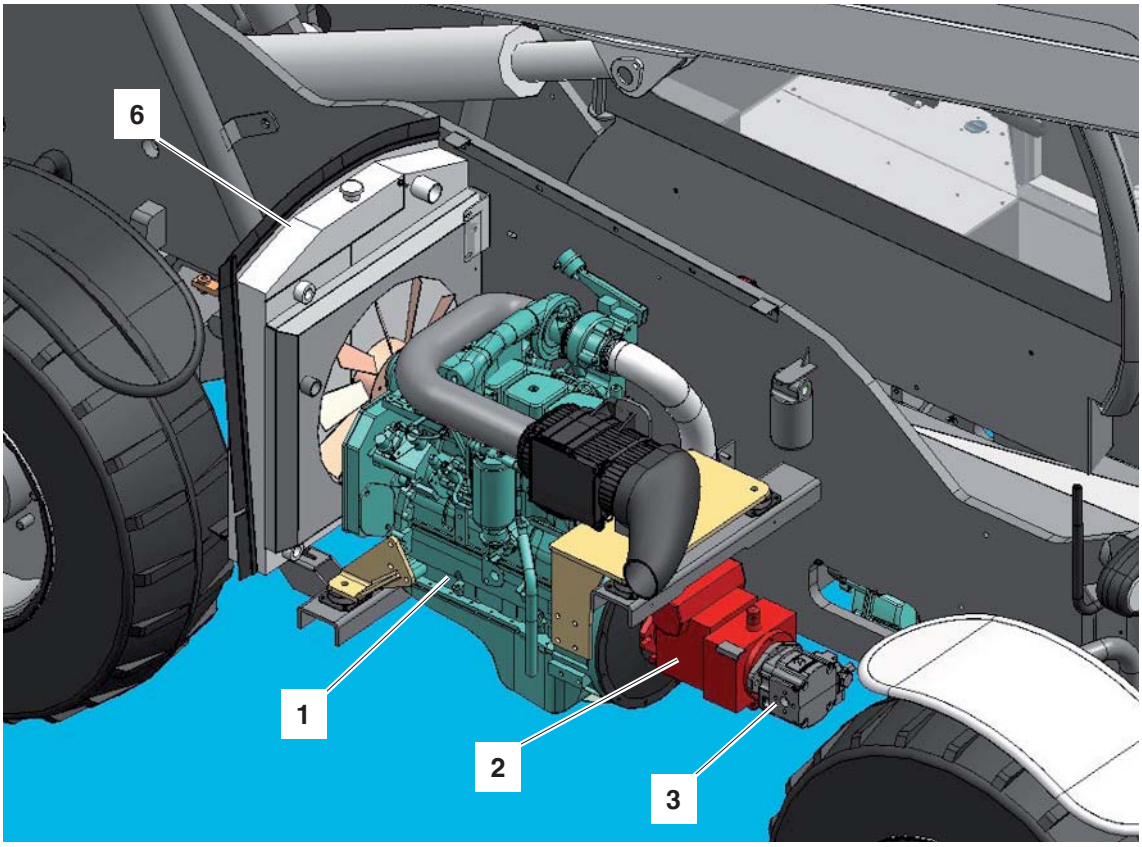
Pos.	Descrizione
1	Diesel engine
2	Drive pump
3	Service pump
4	Hydraulic oil return filter
5	Drive motor
6	Combined engine fluid/hydraulic oil radiator
7	Front axle
8	Hydraulic oil tank
9	Rear axle
10	Hydraulic steering
11	Steering selection solenoid valve
12	Brake pump
13	Quick-fit couplings for attachment lock/ unlock control
14	Main valve
15	Joystick
16	Fork tilting cylinder
17	Carter
18	Boom extension/retraction cylinder
19	Attachment locking cylinder
20	Fuel tank
21	Load cell
22	Cab

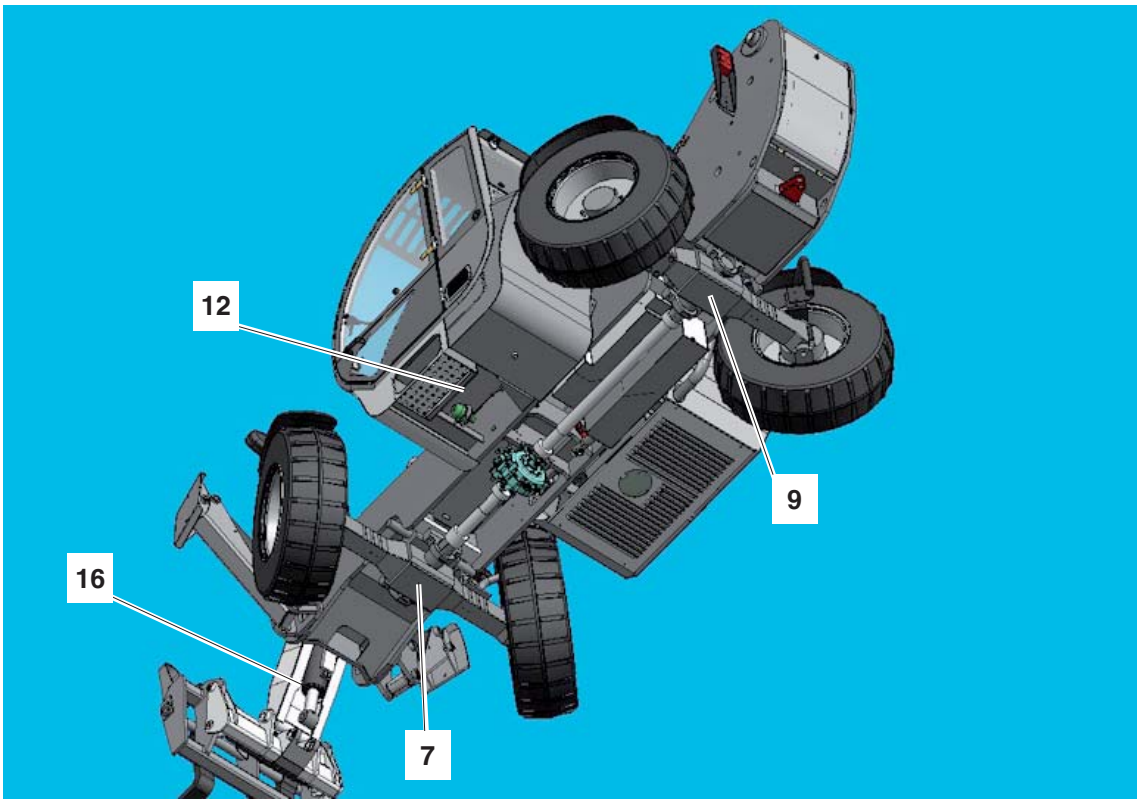
SCHEMES





SCHEMES





SCHEMES

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Repair Procedures

7.1 TIME SCHEDULE

Job	Operators needed	Expected time (h)
change the ignition key	1	1,00
change the speed selector	1	0,30
change the lights and horn selector	1	0,30
change the overload warning system display	1	0,15
re-calibrate the overload system	1	1,00
change the load cell	1	2,00
change the overload warning system display and calibrate	1	1,00
change joystick	1	1,30
change joystick push button	1	1,00
change brake pump	1	2,00
change the low boom micro-switch	1	0,30
change the high boom micro-switch	1	0,30
change the boom lifting cylinder	2	3,00 cad.
change the boom lifting cylinder kit (complete overhaul)	1	2.00
change the block valve of the boom lifting cylinder	1	0,30
change the cylinder inside the boom (**GTH-4013EX**)	2	2,50 cad.
change the cylinder inside the boom kit (**GTH-4013EX**)	1	1,30
change the block valve of the extension cylinder inside the boom (**GTH-4013EX**)	1	1,30
change the extension cylinder on the boom	2	1,00 cad.
change the extension cylinder on the boom kit	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 (**GTH-4013EX**)	1	2,30
change the re-sequencing valve of the extension cylinder on the boom (**GTH-4013EX**)	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	0,30
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	2,00
change fork levelling control cylinder kit	1	1,30
change fork levelling control cylinder valve	1	1,30
check the one-way valves of the fork levelling control cylinder	1	1,00
change the right/left machine levelling cylinder	1	1,30
change the right/left machine levelling cylinder kit	1	1,30
change the right/left machine levelling cylinder valve	1	1,00
change the boom internal line for the boom extension	1	2,30
change the boom internal line for the fork pitching	1	3,00
change the boom internal line for the fork locking	1	3,00
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	0,30
check the safety valves	1	0,30
change the drive pump	1	3,00
change the drive engine	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	0,30
change fuses and relays	1	0,15 cad.
change the wiper motor	1	1,00
change the solenodi valves	1	0,30
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	0,30
change the outrigger cylinder pin	1	0,30
change a cab pushbutton	1	0,30
change and test the actuator pressure relief valve or the sliders	1	2,00
change and test the actuator safety valve	1	1,00
change one-way valve	1	0,30
change the maxi-fuses and search for troubles	1	0,30
bleed the braking system	2	0,30 cad.
change the return filter of the hydraulic oil tank	1	0,30
change the hydrostatic steering unit	1	1,30
change the flashing beacon	1	0,20
change the battery	1	0,30
change the exhaust pipe	1	0,30
change the mud-guard brackets	1	0,30
change the mud-guard	1	0,30
change the parking brake cord	1	0,30
change the steering wheel	1	0,30
dismantle the hydraulic oil tank	2	2,00 cad.
dismantle the fuel tank	2	2,00 cad.
change a wheel (n° 1)	1	0,30
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	0,30

REPAIR PROCEDURES

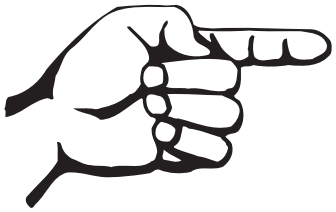

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TABLE 001

Procedure: **Cylinder disassembly Boom raising cylinder**	Table: **001** GTH-4017EX GTH-4514EX GTH-4013EX	kg	76
			Hours: 2 Min.: 30
Bridge crane, payload 5000 kg **Textile bridles or chains with hooks**	Standard tools Adjustable stands		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.

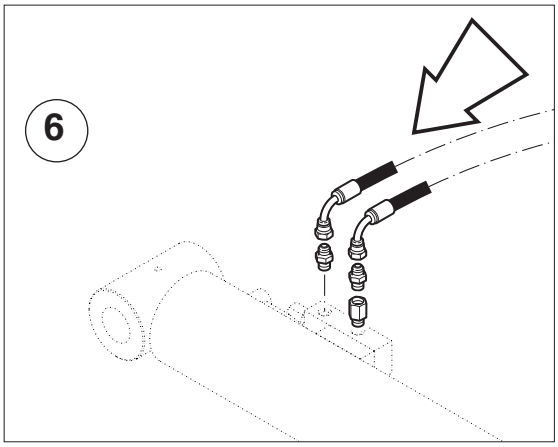


TABLE 001

Procedure:	Table:
Cylinder disassembly **Boom raising cylinder**	***001*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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.

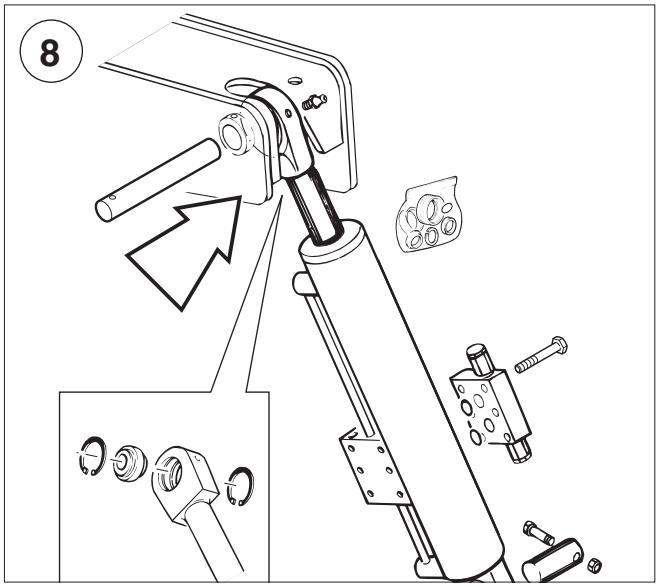
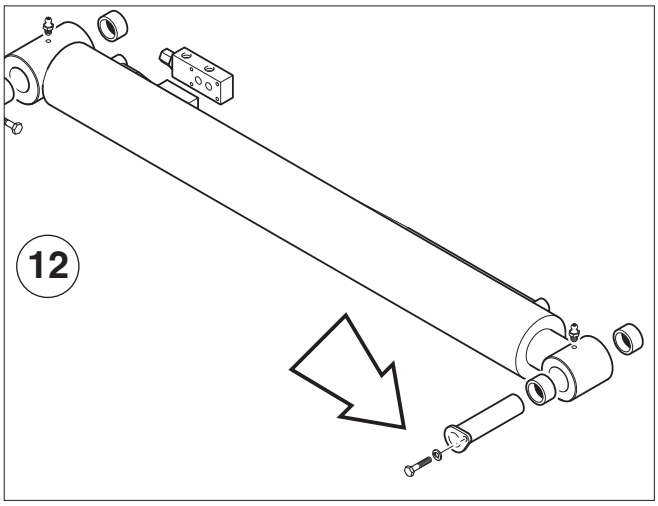


TABLE 001

Procedure:	Table: 001
Cylinder disassembly **Boom raising cylinder**	**GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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.

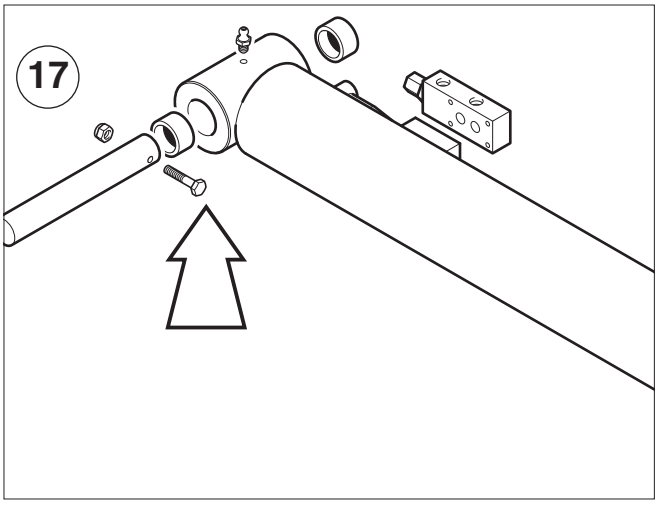


TABLE 001

Procedure:	Table:
Cylinder disassembly **Boom raising cylinder**	***001*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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.

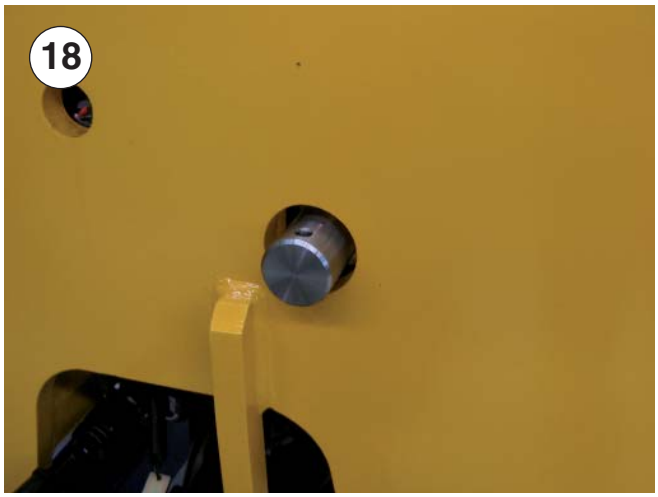


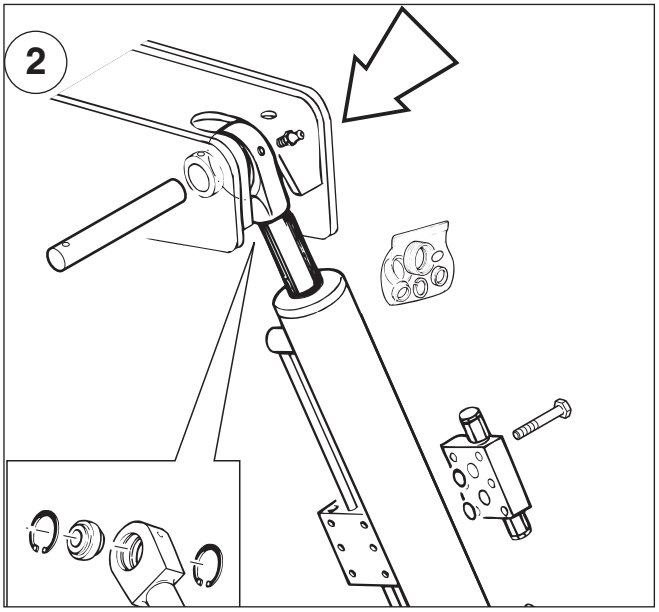
TABLE 002

Procedure: **Cylinder disassembly Fork balance cylinder**	Table: **002** GTH-4017EX GTH-4514EX GTH-4013EX	kg	26
			Hours: 2 Min.: -
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools Adjustable stands		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:	Table: 002
Cylinder disassembly **Fork balance cylinder**	**GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

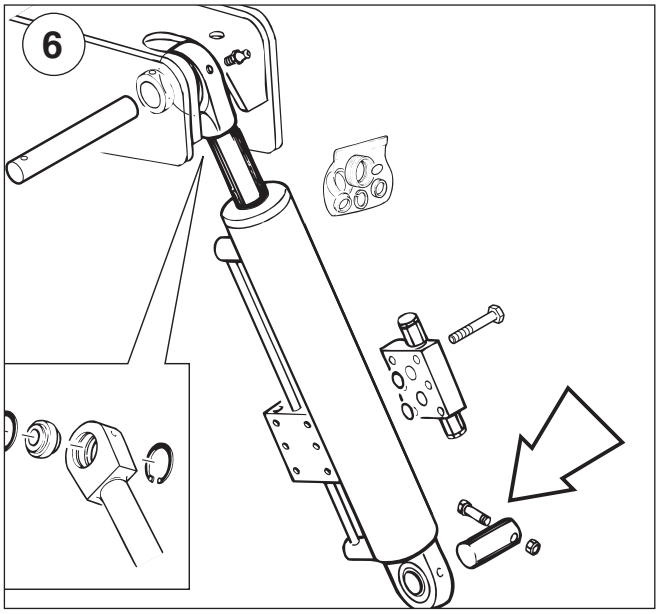
4 Fix the cylinder with a textile bridle connected to the bridge crane to support its weight.

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.

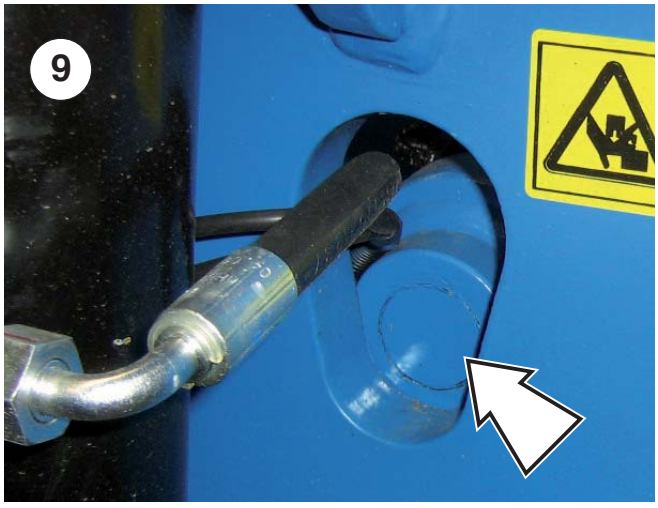
6 Using a 24 mm and a 19 mm wrenches, disconnect three hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.



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-4017EX GTH-4514EX GTH-4013EX**	kg	340
			Hours / Min.
Bridge crane, payload 500 kg **Textile bridles or chains with hooks**	Standard tools		2 / 30
			2

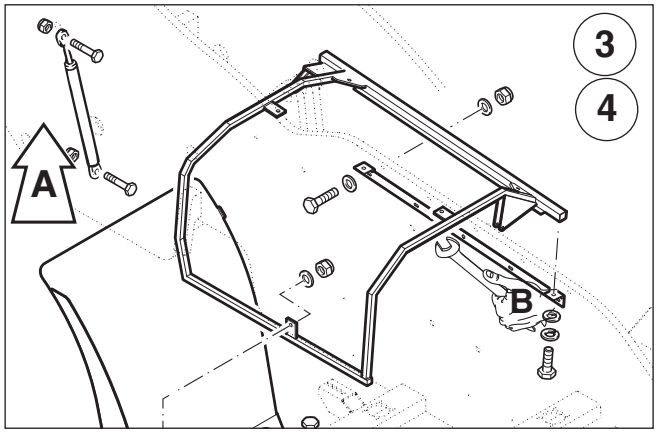
Operation:

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).

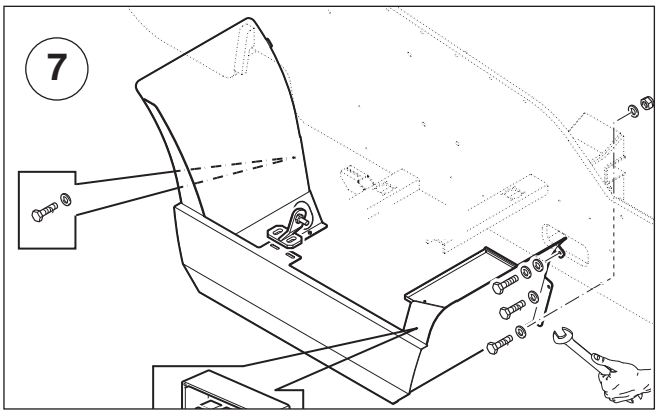
4 Again with two 13mm wrenches, loosen the five screws (B) that secure the cover to the frame of the machine.



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.

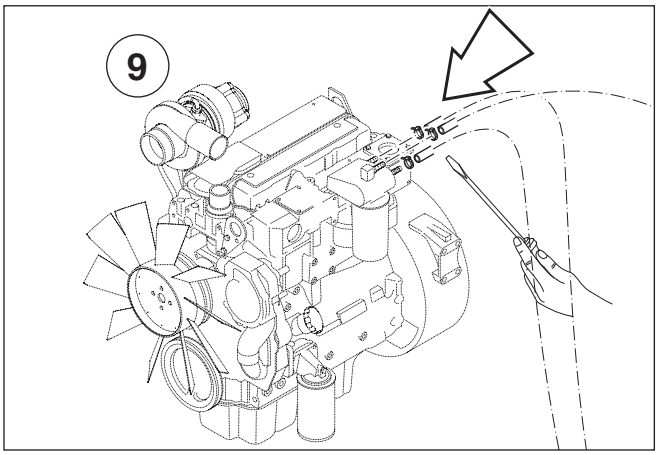
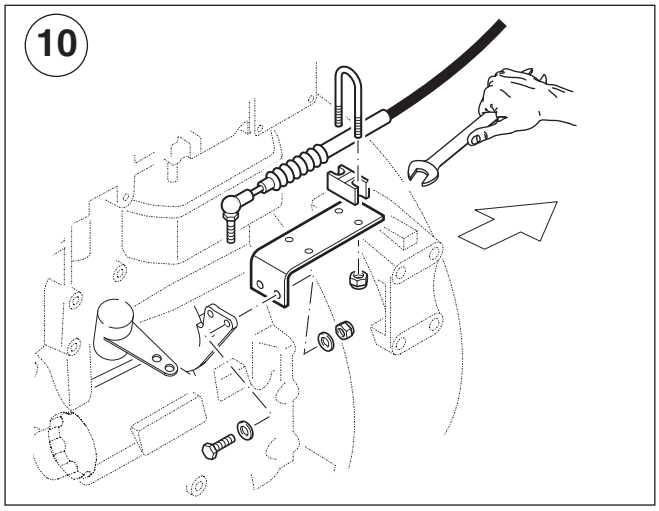


TABLE 003

Procedure: **Removing the engine from the machine**	Table: ***003*** **GTH-4017EX GTH-4514EX GTH-4013EX**

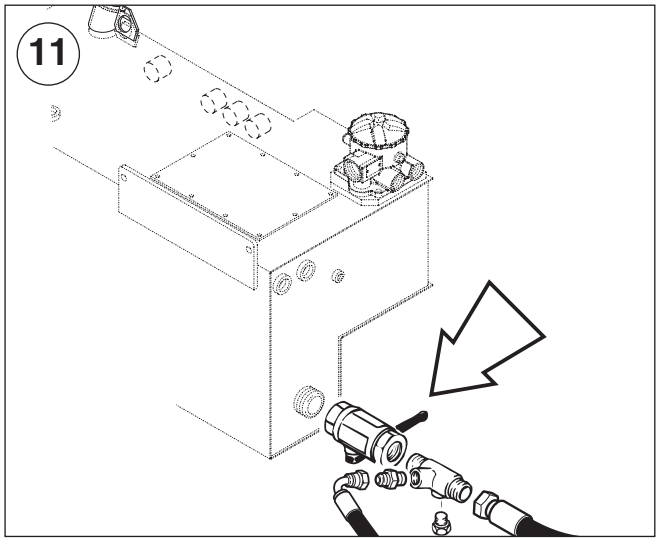
10 Disconnect the throttle control cable removing the locking clip; remove the screws fixing the rope sheath to the engine using a 10mm combination wrench.



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.

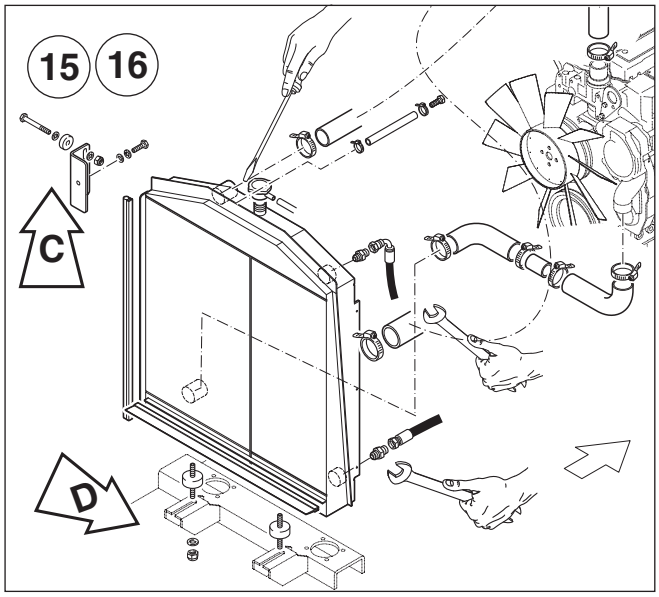


TABLE 003

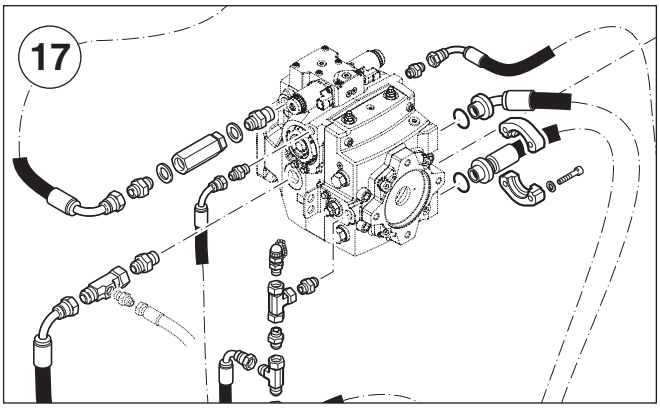
Procedure: **Removing the engine from the machine**	Table: ***003*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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.

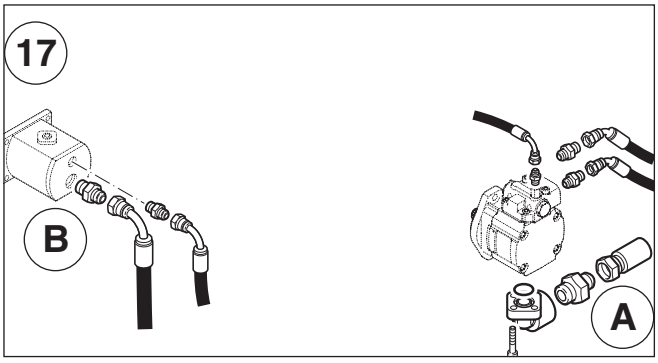


TABLE 003

Procedure: **Removing the engine from the machine**	Table: ***003*** **GTH-4017EX GTH-4514EX GTH-4013EX**

WARNING

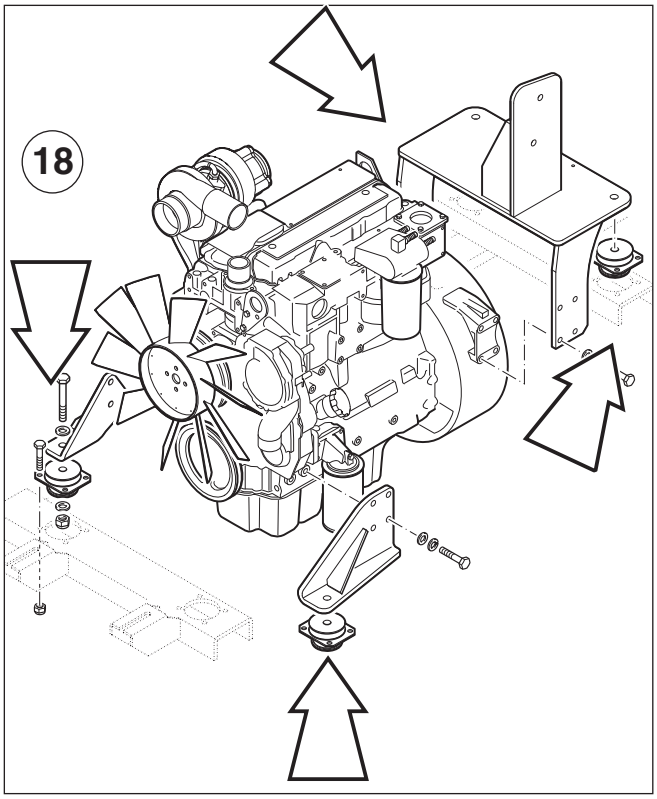
Once all operations have been performed make sure that all the electrical wires and the hydraulic lines are disconnected from the motor.

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

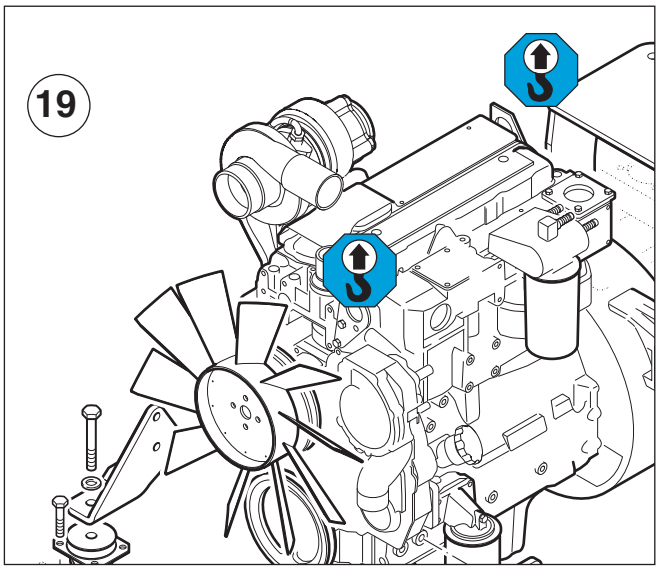


TABLE 004

Procedure: **Hydraulic pumps disassembly**	Table: **004** GTH-4017EX GTH-4514EX GTH-4013EX	kg	40
			Hours: 2 Min.: 30
Bridge crane or swing hoist, payload 500 kg	Standard tools		1

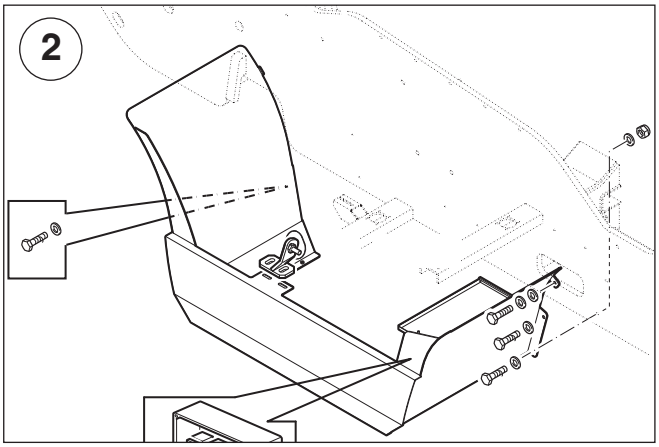
Operation:

PROTECT THE ENVIRONMENT

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

CAUTION

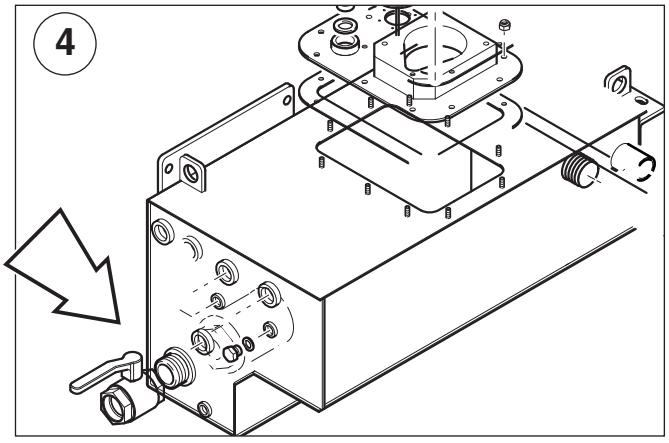
Carefully clean the area around the piping to be disconnected, plug all disconnected parts with caps, rags or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.



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.

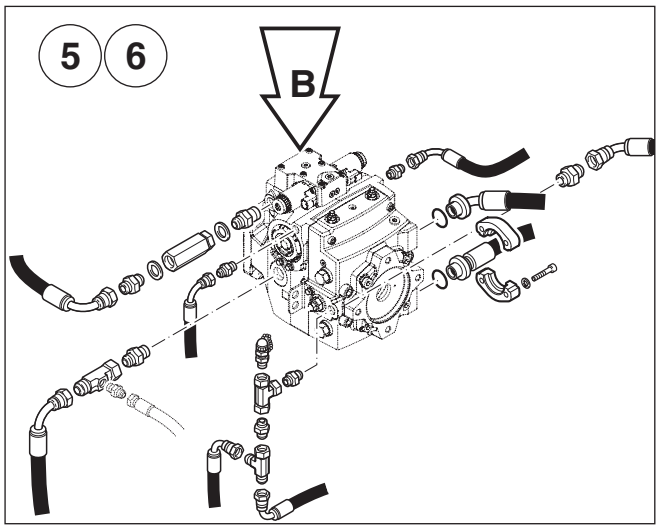


4 Close the oil tank cock.

TABLE 004

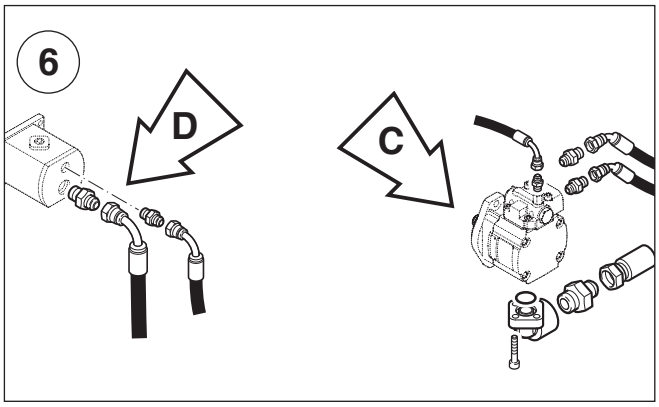
Procedure: **Haydraulic pumps disassembly**	Table: ***004*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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

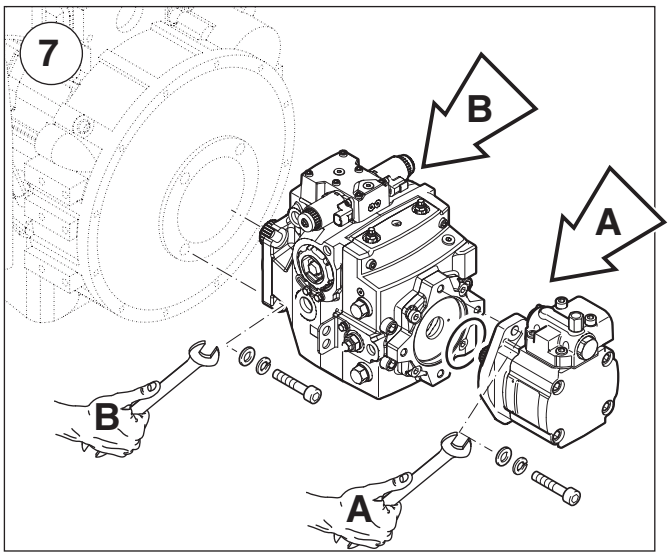


TABLE 004

Procedure: **Haydraulic pumps disassembly**	Table: ***004*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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 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.

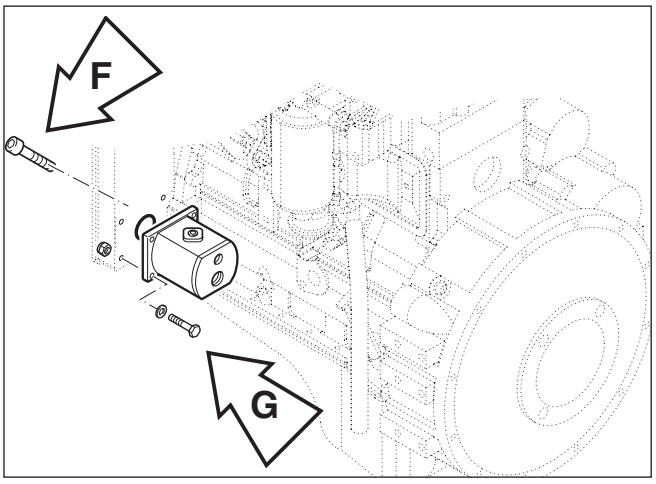


TABLE 004

Procedure:	Table: ***004*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

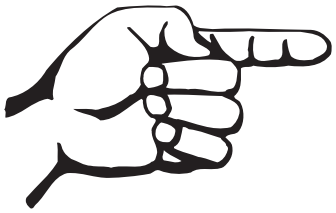


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TABLE 005

Procedure: **Disassembling the hydraulic motor**	Table: **005** GTH-4017EX GTH-4514EX GTH-4013EX	kg	44
			Hours / Min.
Bridge crane or swing hoist, payload 500 kg	**Standard tools**		2 / -
			1

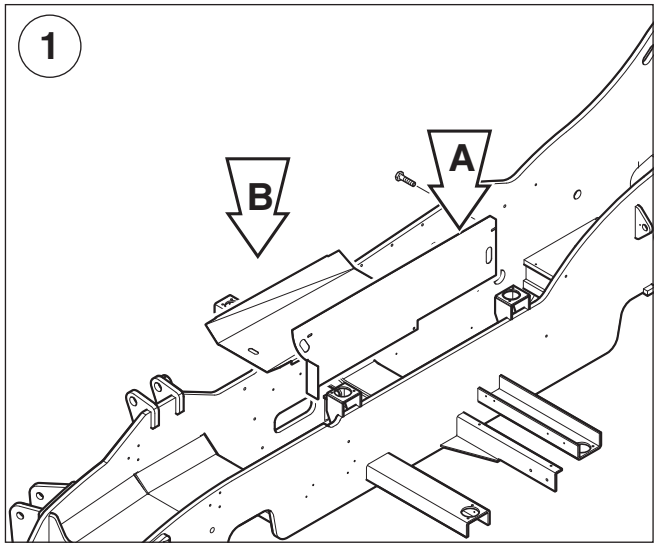
Operation:

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 wrench.

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.

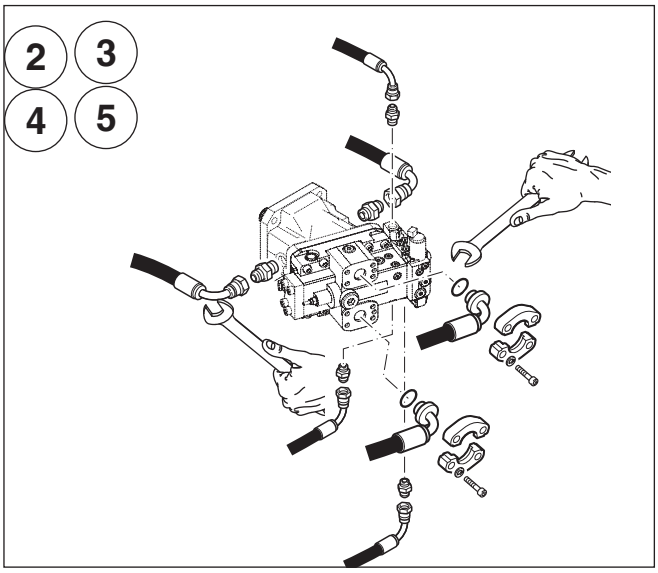


TABLE 005

Procedure: **Disassembling the hydraulic motor**	Table: ***005*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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.

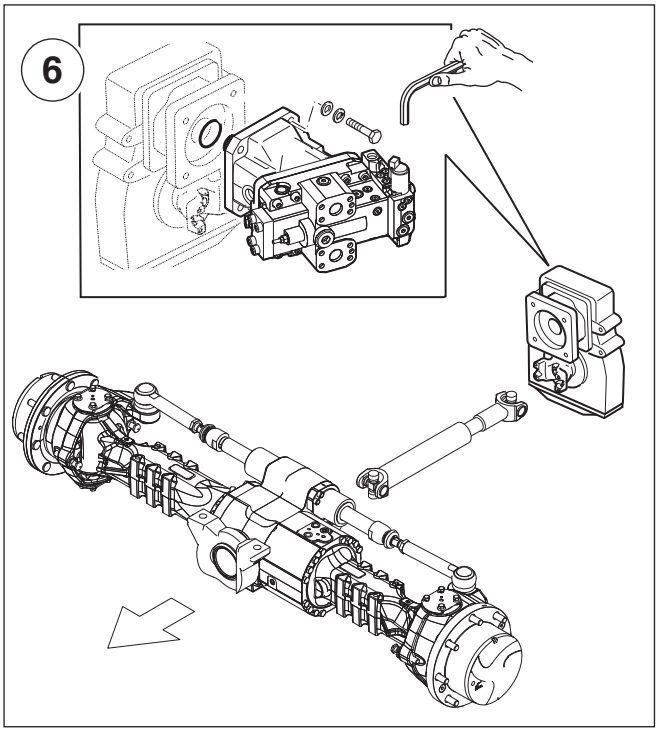


TABLE 006S

Procedure: **Cylinder disassembly Boom extension cylinder GTH-401 EX - GTH-451 EX**	Table: **006** GTH-4017EX GTH-4514EX GTH-4013EX	kg	92
			Hours / Min.
Bridge crane, payload 500 kg Textile bridles or chains with hooks	Standard tools		2 / 30
			1

Operation:

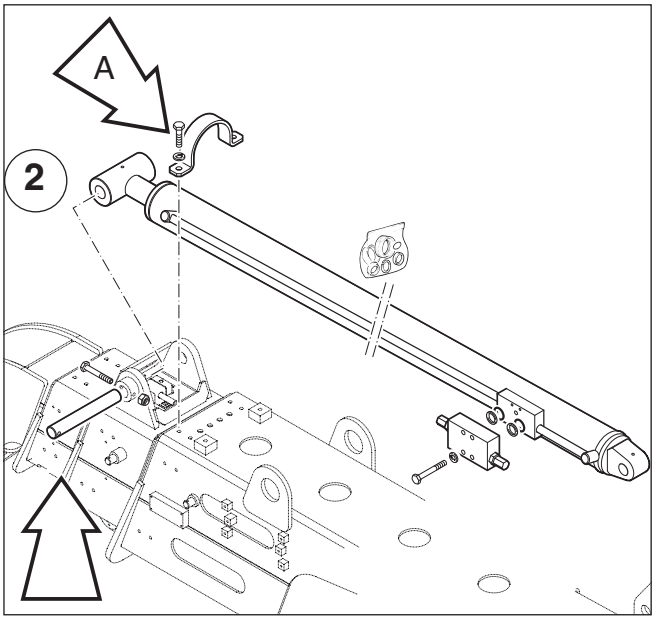
1 Set the boom to horizontal position with the telescope slightly extended to work on the cylinder connecting pin (rod side).

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.

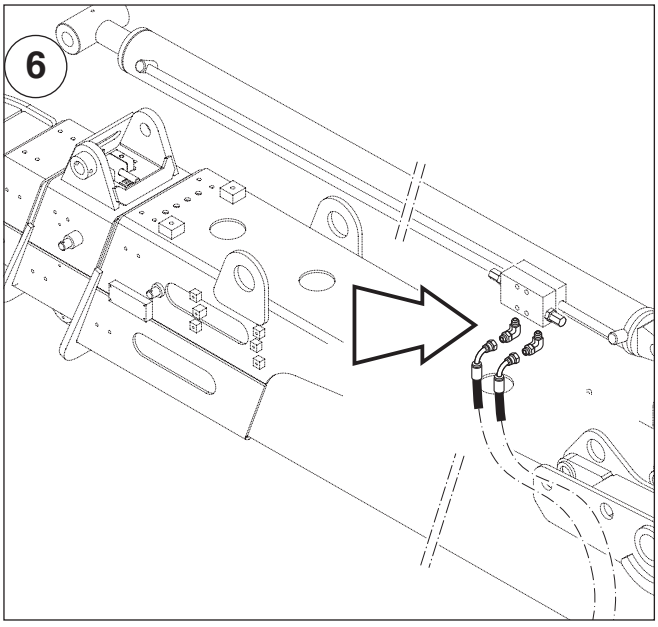
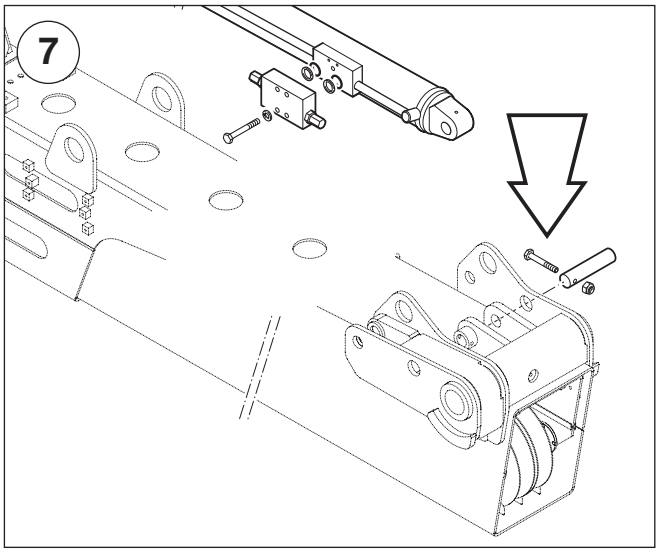


TABLE 006

Procedure: **Cylinder disassembly** **Boom extension cylinder GTH-401 EX - GTH-451 EX**	Table: ***006*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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

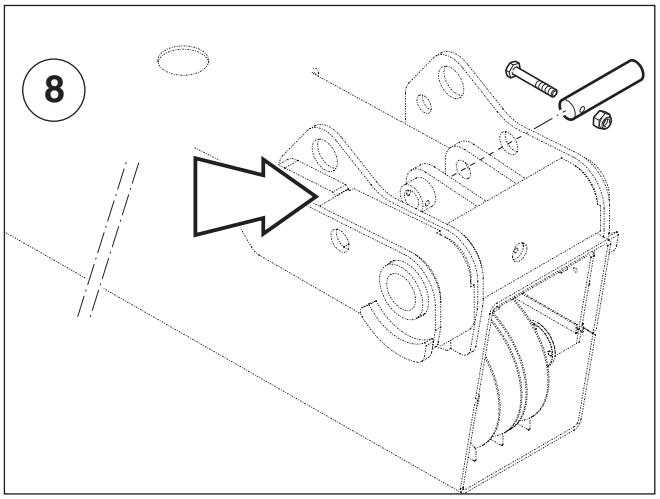


TABLE 007

Procedure: **Cylinder disassembly** **Boom extension external cylinder** **GTH-4013EX**	Table: ***007*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**	kg	92
			Hours: 2 Min.: 30
Bridge crane, payload 500 kg **Textile bridles or chains with hooks**	Standard tools		1

Operation:

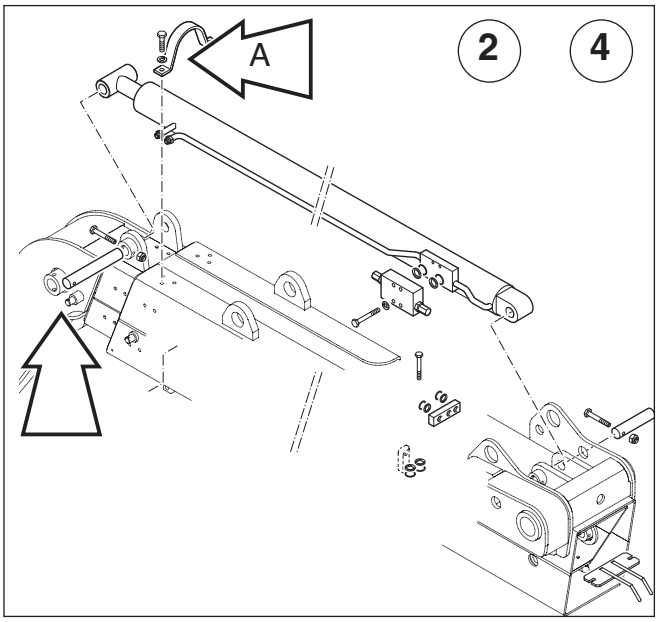
1 Set the boom to horizontal position with the telescope slightly extended to work on the cylinder connecting pin (rod side).

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.

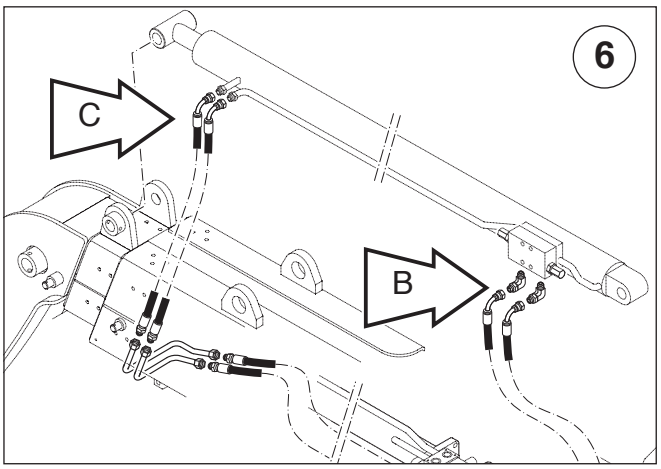
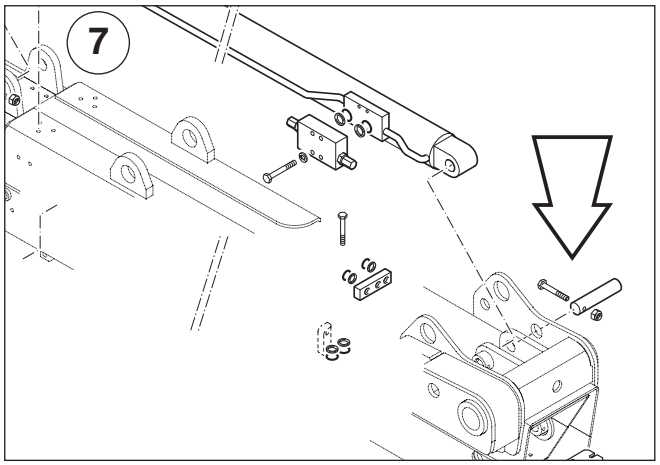


TABLE 007

Procedure: **Cylinder disassembly** **Boom extension external cylinder GTH-4013EX**	Table: ***007*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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.

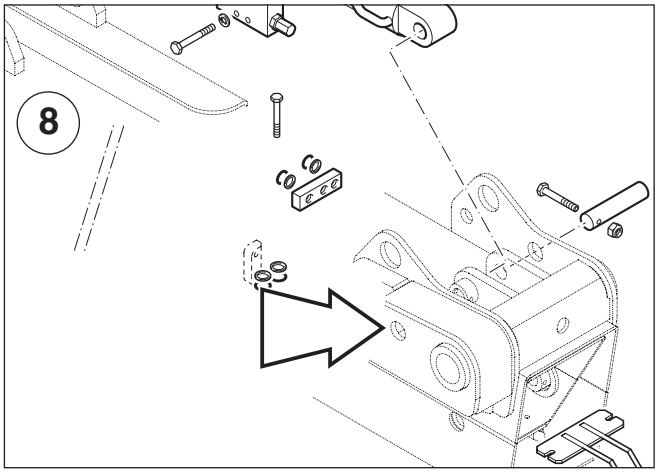


TABLE 008

Procedure: **Cylinder disassembly** **Boom extension internal cylinder** **GTH-4013EX**	Table: ***008*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**	kg	92
			Hours / Min.
Bridge crane, payload 500 kg **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.

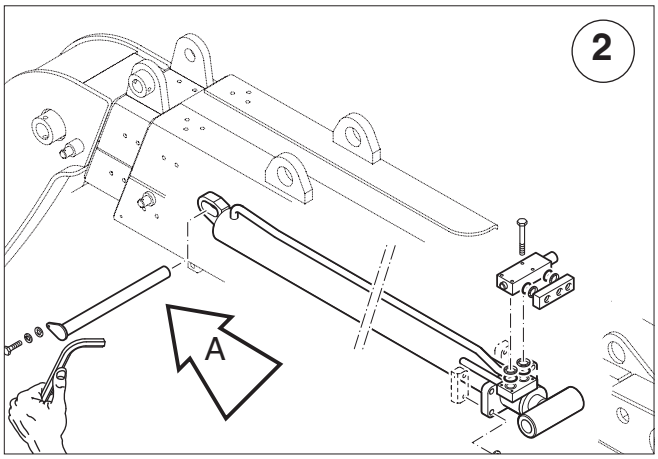
4 Retract the boom entirely, remove the screw that locks the pin (B), using two 13mm wrench. Extract out and knock the pin using a plug of soft material (aluminium, copper, wood, etc.).

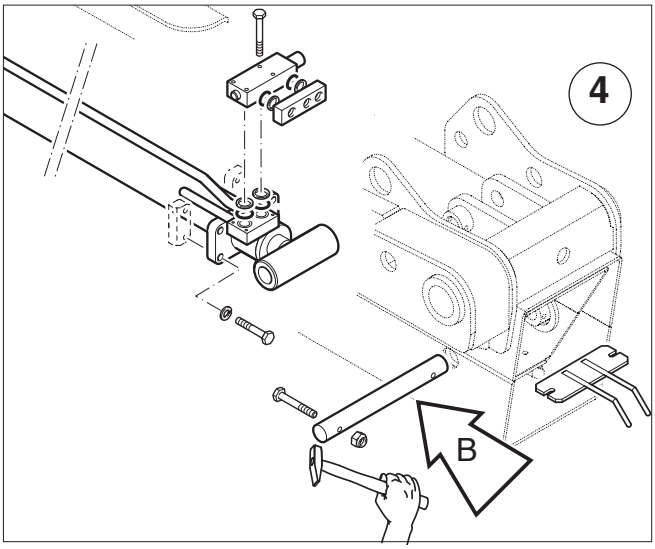
5 Place a container of suitable size under the hydraulic piping before disconnecting.

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.





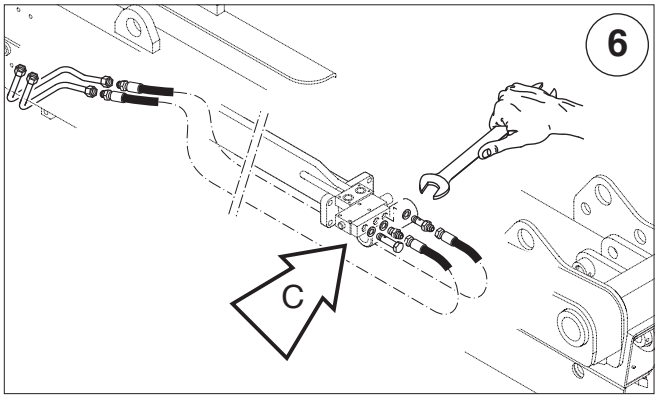
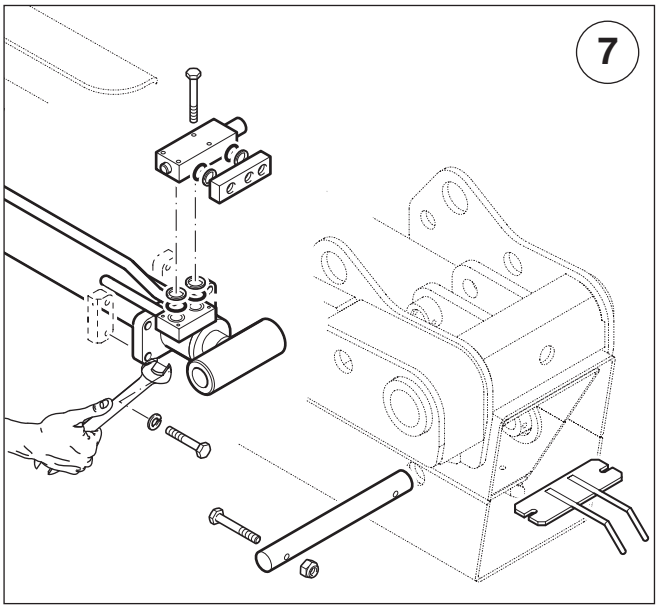


TABLE 008

Procedure: **Cylinder disassembly** **Boom extension internal cylinder GTH-4013EX**	Table: ***008*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

7 Remove the four screws fixing the cylinder to the 3^{dr} 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-4017EX GTH-4514EX GTH-4013EX	kg	24
			Hours / Min.
Standard tools			2 / -
			1

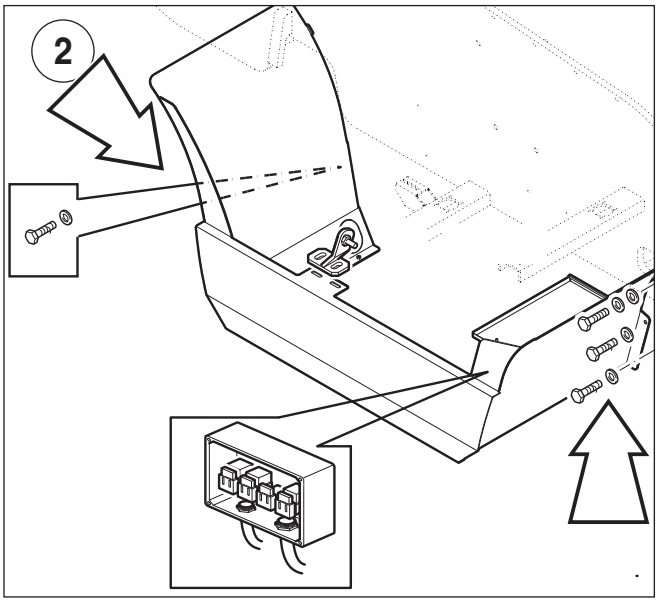
Operation:

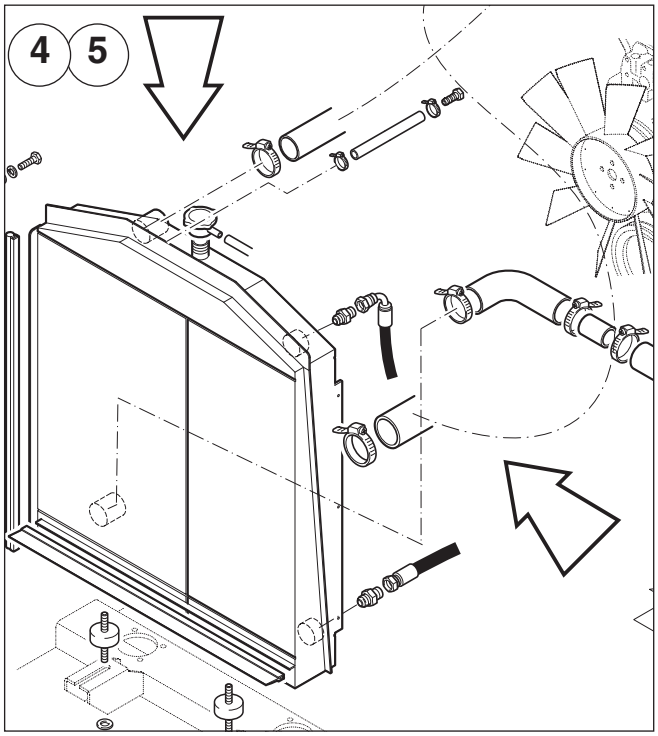
PROTECT THE ENVIRONMENT

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 wrench 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 17mm 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-4017EX GTH-4514EX GTH-4013EX**

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.

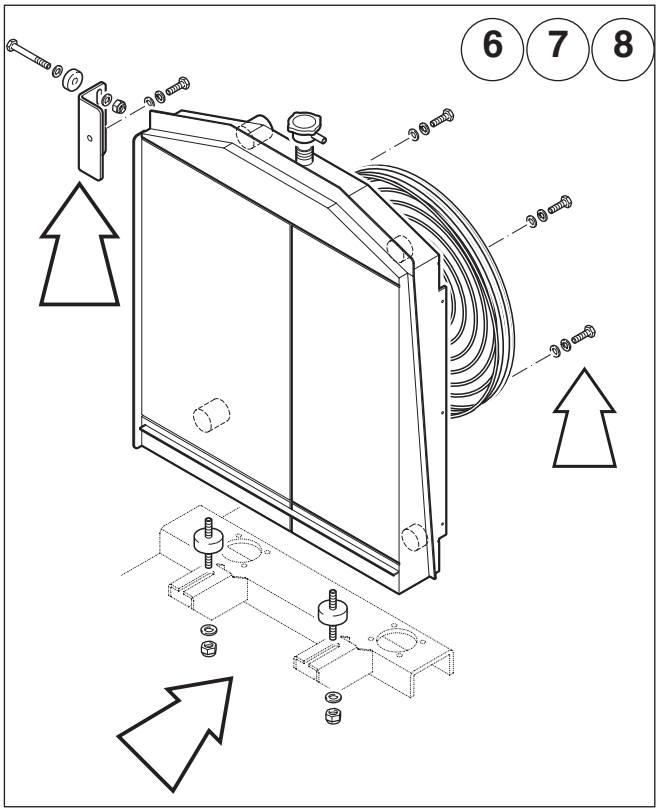


TABLE 010

Procedure: **Main valve disassembly Boom main valve**	Table: ***010*** **GTH-4017EX GTH-4514EX GTH-4013EX**	kg	27
			Hours: 2 Min.: 30
Standard tools			1

PROTECT THE ENVIRONMENT

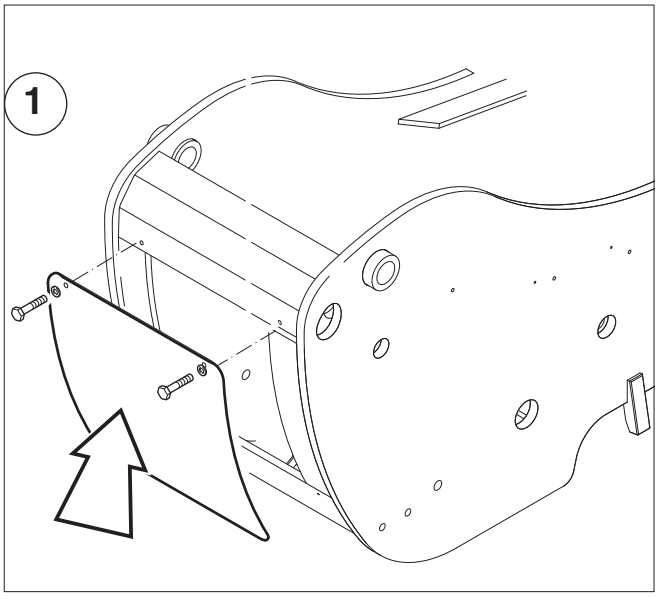
Before disconnecting the hydraulic piping, place containers of suitable size underneath to prevent oil spillage.

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.



Operation:

1 Remove the rear carter of the machine using a 4mm Allen wrench for GTH 4514 EX - GTH 4017 EX, or using the handle for GTH 4013 EX.

TABLE 010

Procedure:	Table: 010
Main valve disassembly **Boom main valve**	**GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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, 19 mm, 24 mm. 36 mm, 41 mm

3 Disconnect all wires.

4 Remove the screws fixing the chassis using a 13 mm wrench and a 6 mm Allen wrench.

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

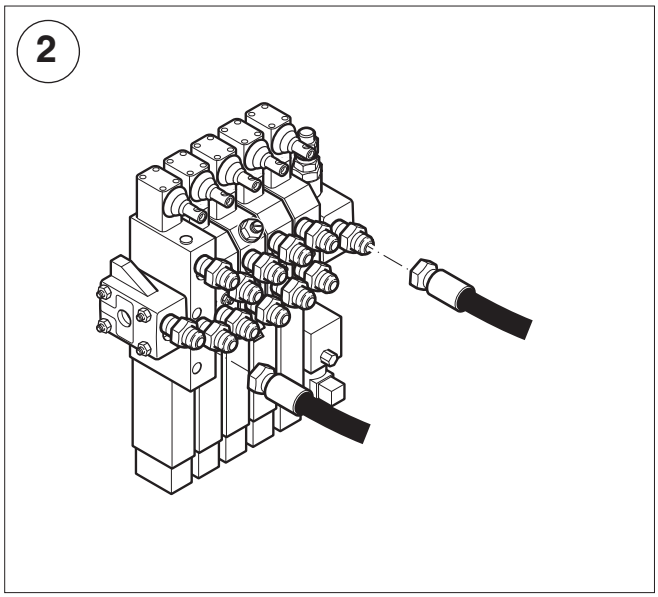


TABLE 010

Procedure: **Main valve disassembly** **Outriggers main valve**	Table: ***010*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

Operation:

1 Remove the central carter (A) of the machine using a 4 mm Allen wrench (GTH 4514 EX - GTH 4017 EX) or open the engine carter using the handle (GTH 4013 EX).

ATTENZIONE

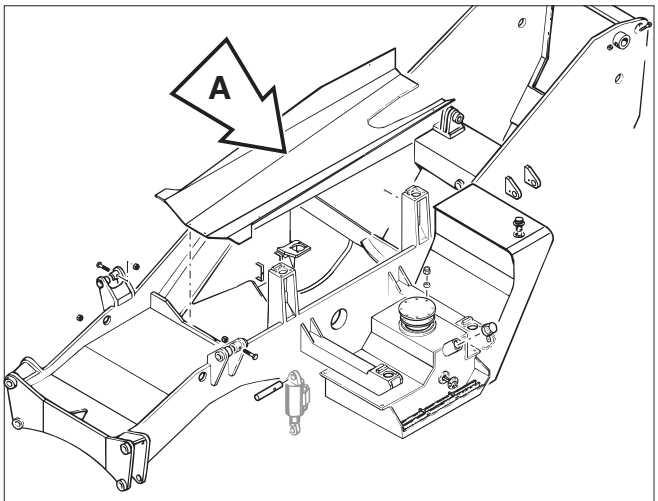
Before disconnecting any flexible hoses, label them for an easier reassembly.

2 Disconnect all pipes of the main valve using the following combination wrenchs: 19 mm, 22 mm. 24 mm.

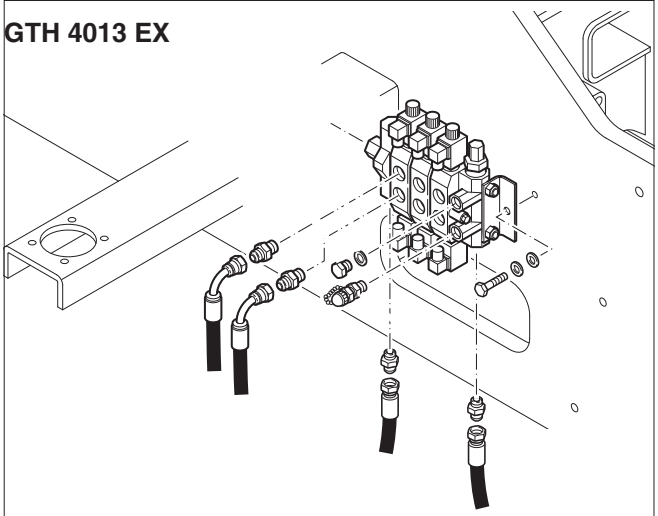
3 Disconnect all wires.

4 Remove the 3 screws fixing the chassis using a 13 mm wrench for GTH 4514 EX - GTH 4017 EX, and two 13 mm wrench for GTH 4013 EX.

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



GTH 4013 EX



GTH 4017 EX
GTH 4514 EX

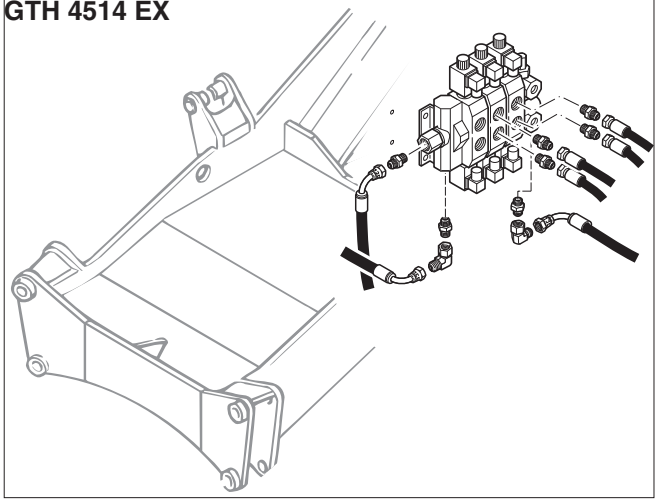


TABLE 010

Procedure:	Table: ***010*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

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TABLE 011

Procedure: **Renewing the slide pads of the telescopic boom GTH-4013EX**	Table: ***011*** **GTH-4017EX GTH-4514EX GTH-4013EX**	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.

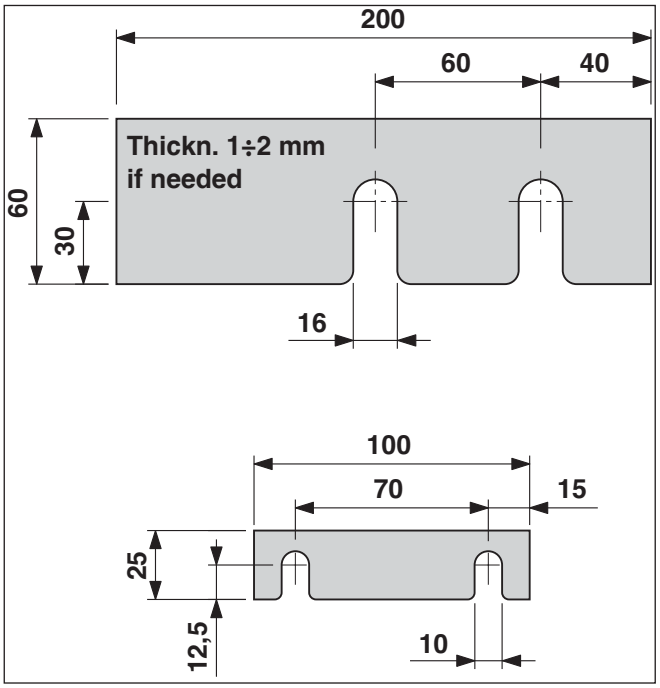
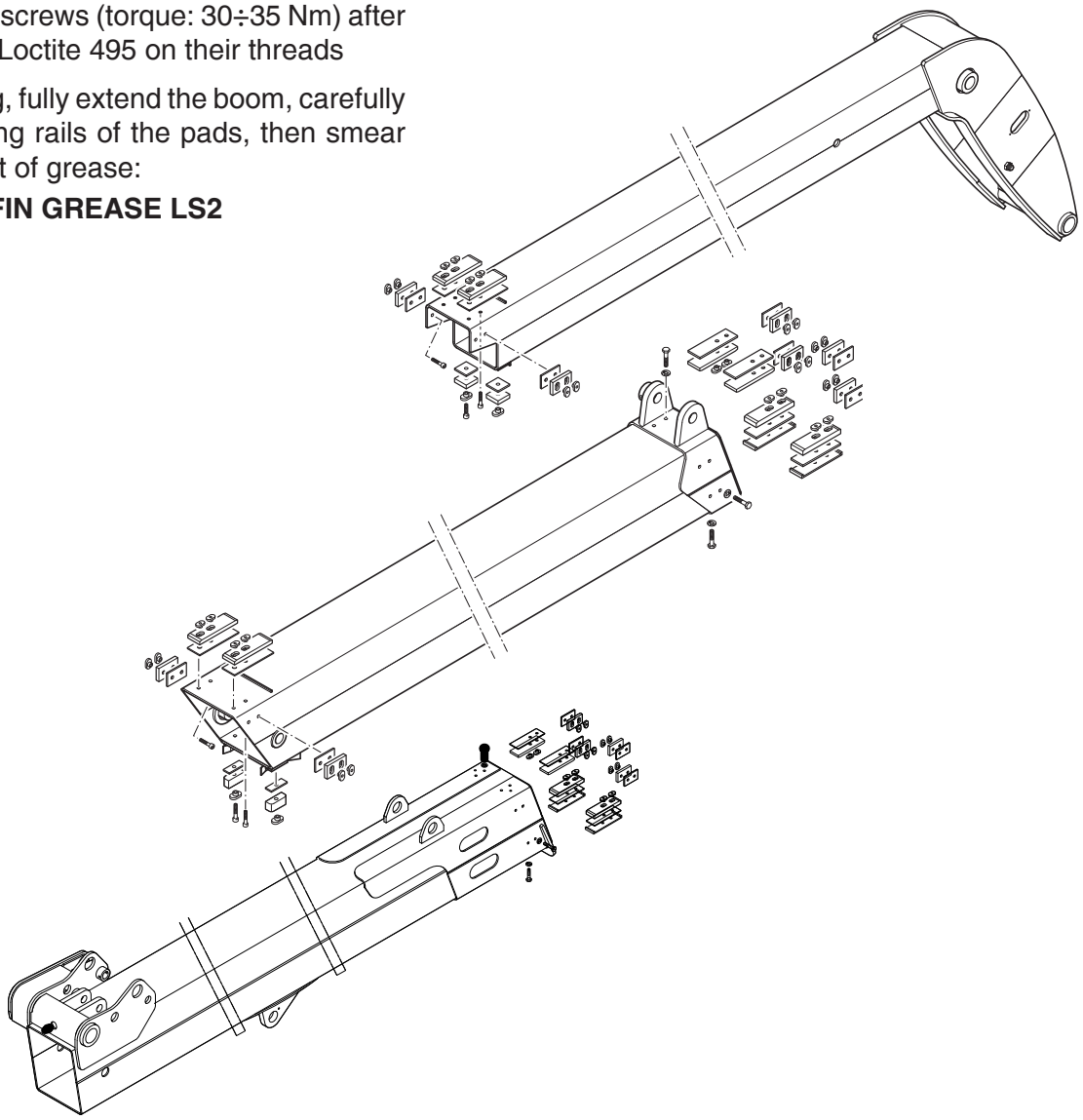


TABLE 011

Procedure:	**Renewing the slide pads of the telescopic boom GTH-4013EX**	Table: ***011*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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



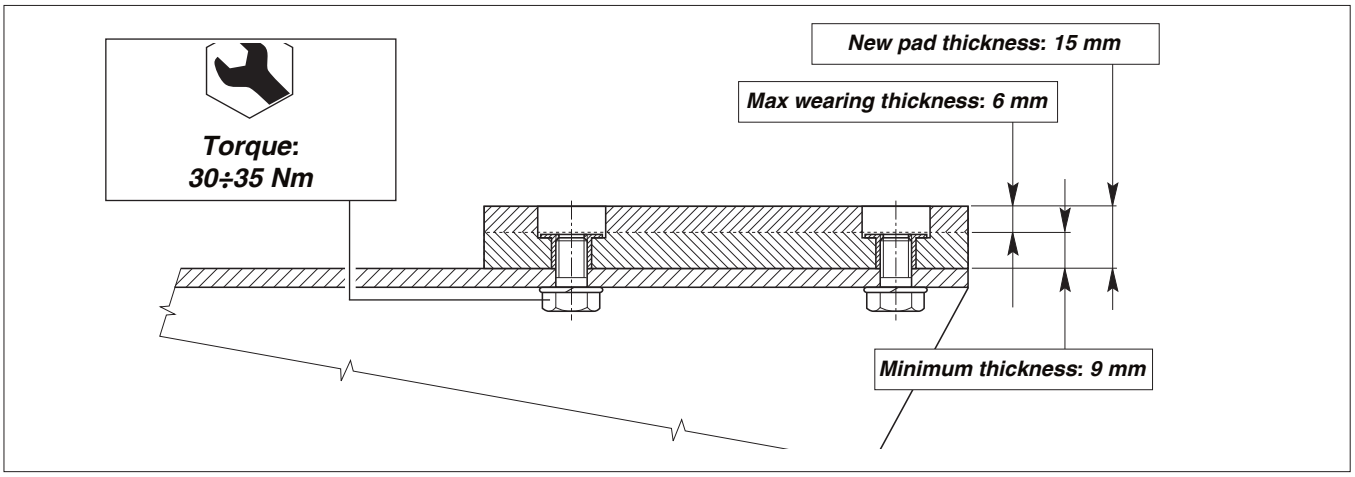


TABLE 011

Procedure: **Renewing the slide pads of the telescopic boom GTH-4013EX**	Table: ***011*** **GTH-4017EX GTH-4514EX GTH-4013EX**

RENEWING THE REAR PADS (A)

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

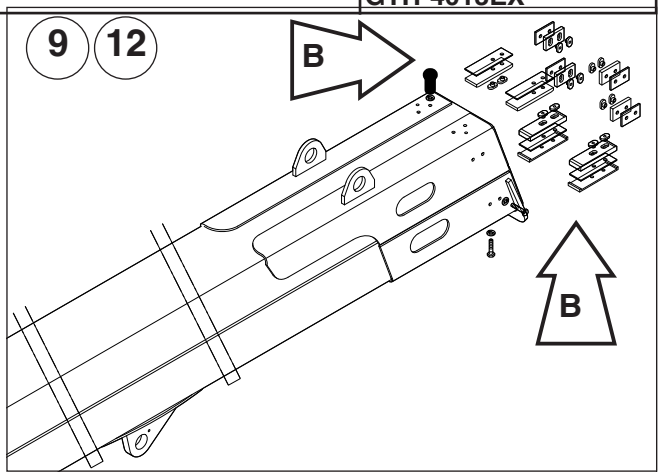
8 Stop the machine, lower the nose to the ground for an easier removal of the top pads. Hold it in horizontal position for removing the bottom pads.

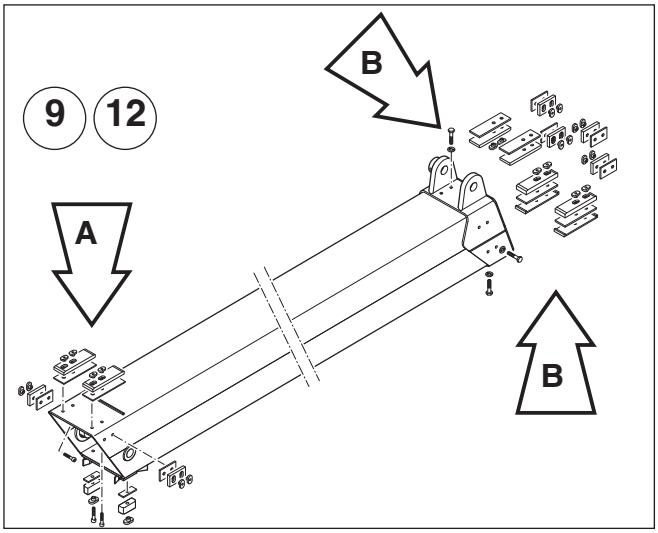
9 Using a 17mm hex wrench or a 6mm Allen wrench, remove the pad fixing screws.

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.

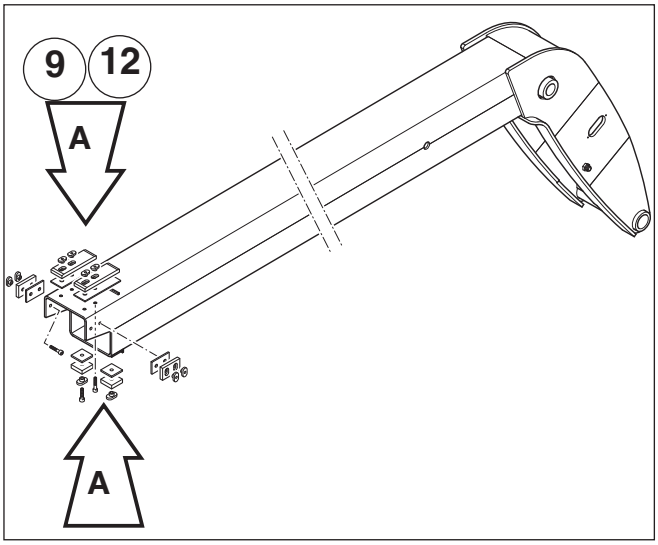


TABLE 011

Procedure:	**Renewing the slide pads of the telescopic boom GTH-4013EX**	Table: ***011*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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.

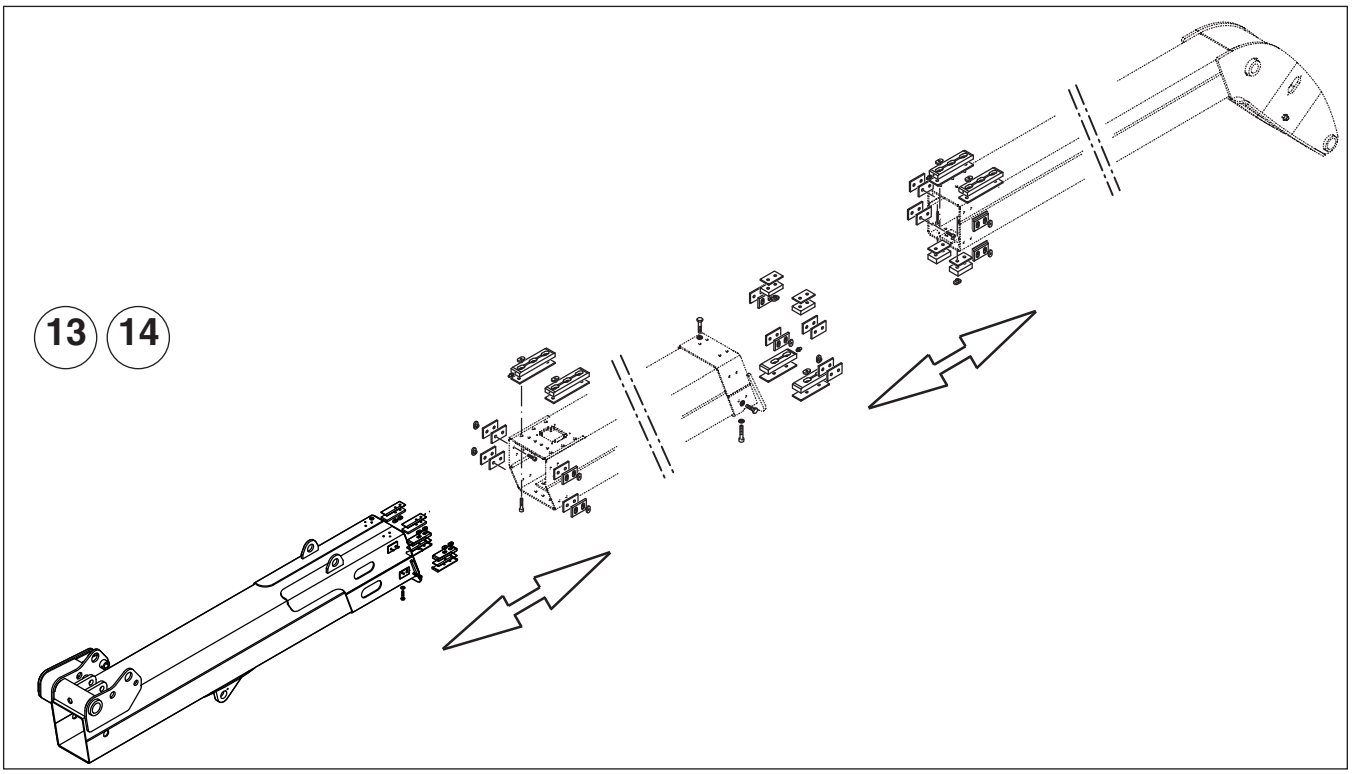


TABLE 012

Procedure: **Renewing the slide pads of the telescopic boom GTH-4017EX GTH-4514EX**	Table: ***012*** **GTH-4017EX GTH-4514EX GTH-4013EX**	kg	-
			Hours: 1 Min.: 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.

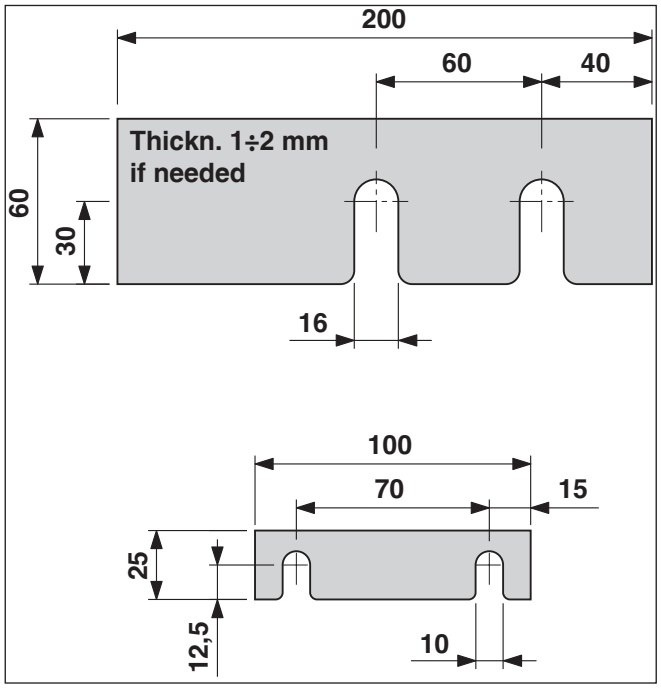
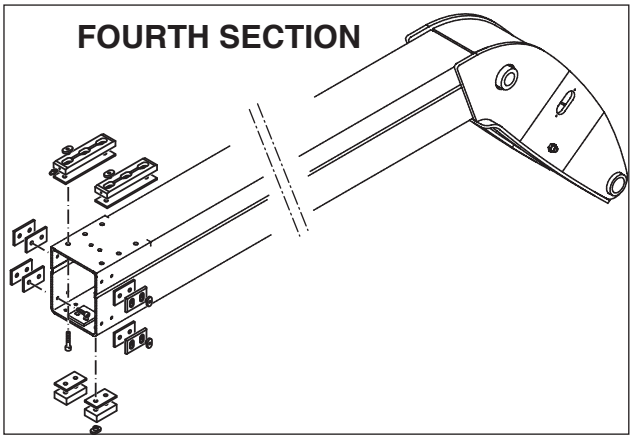


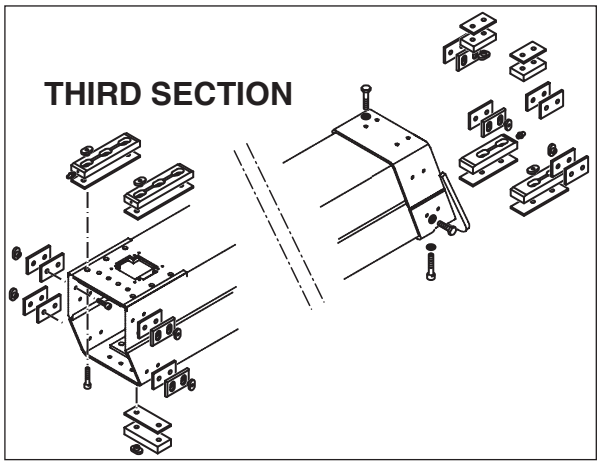
TABLE 012

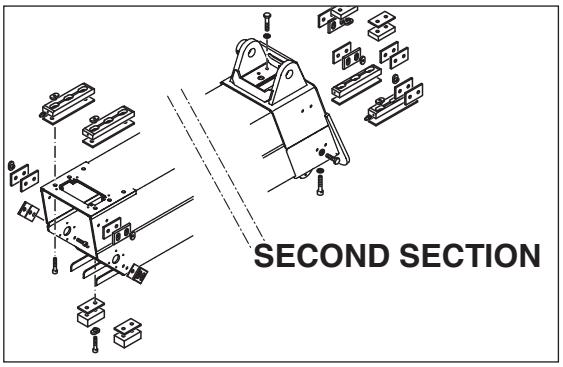
Procedure:	**Renewing the slide pads of the telescopic boom GTH-4017EX GTH-4514EX**	Table: ***012*** **GTH-4017EX GTH-4514EX GTH-4013EX**

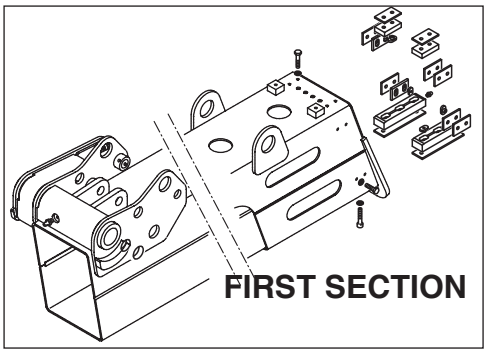
6 Refit the fixing screws (torque: 30÷35 Nm) after pouring some Loctite 495 on their threads.

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









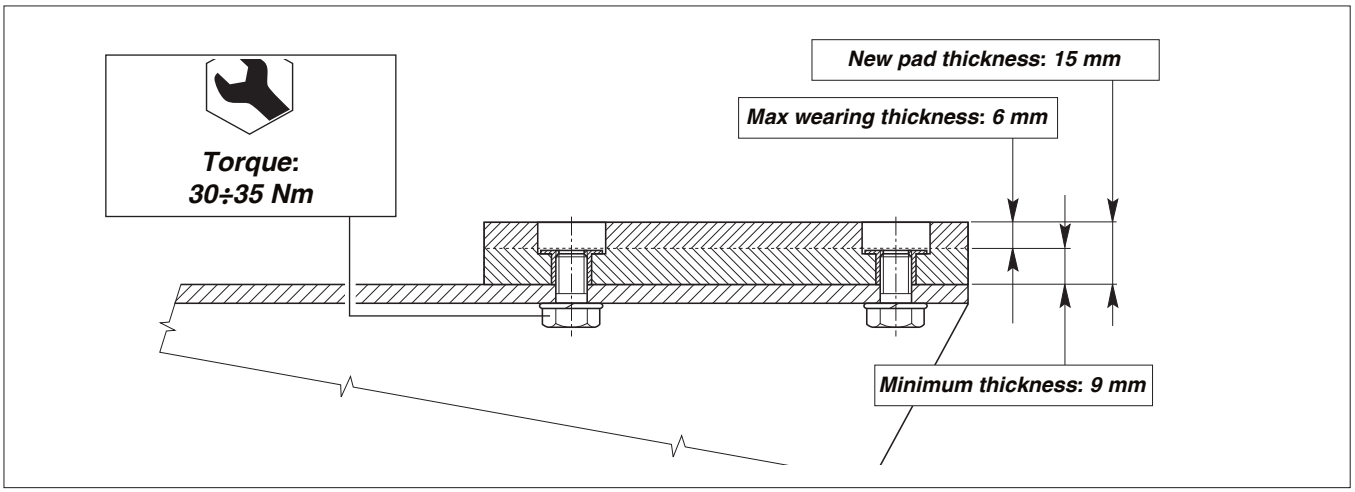


TABLE 012

Procedure: **Renewing the slide pads of the telescopic boom GTH-4017EX GTH-4514EX**	Table: ***012*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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 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 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.

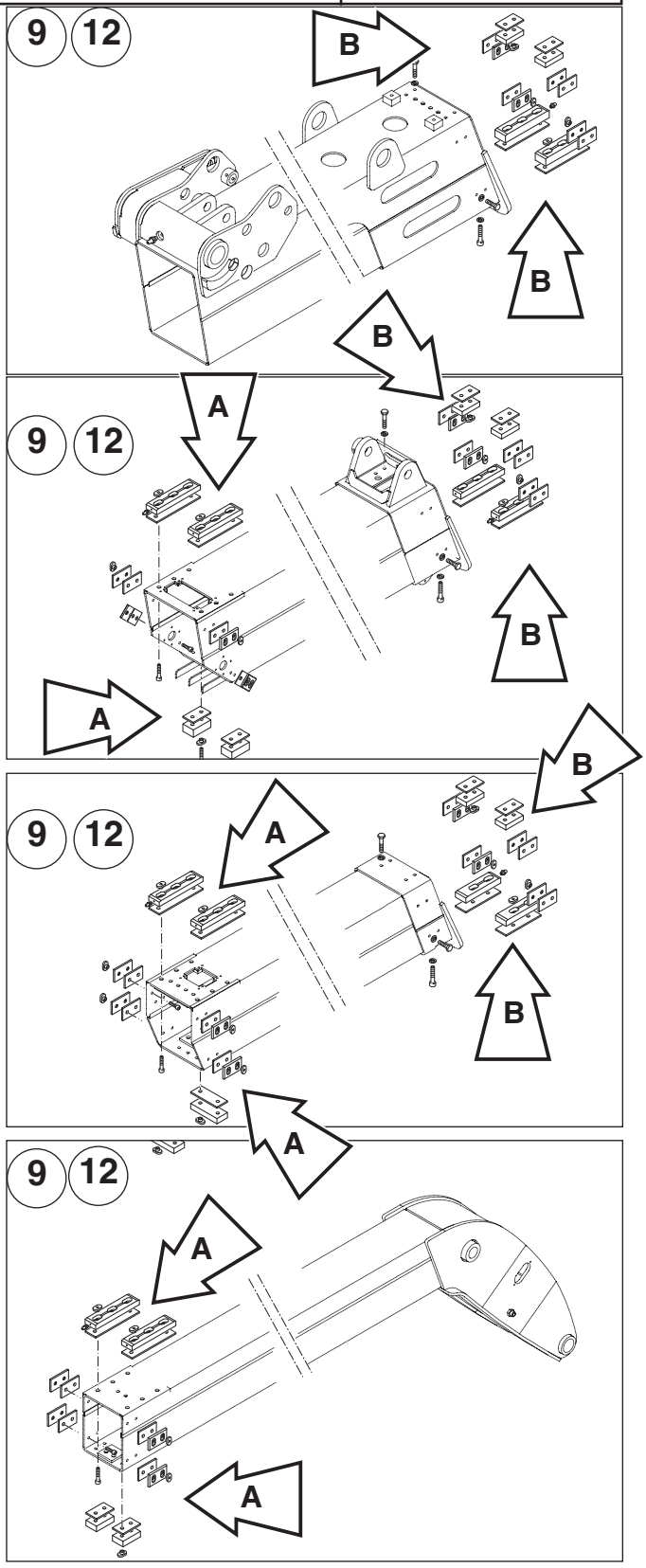


TABLE 012

Procedure:	**Renewing the slide pads of the telescopic boom GTH-4017EX GTH-4514EX**	Table: ***012*** **GTH-4017EX GTH-4514EX GTH-4013EX**

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.

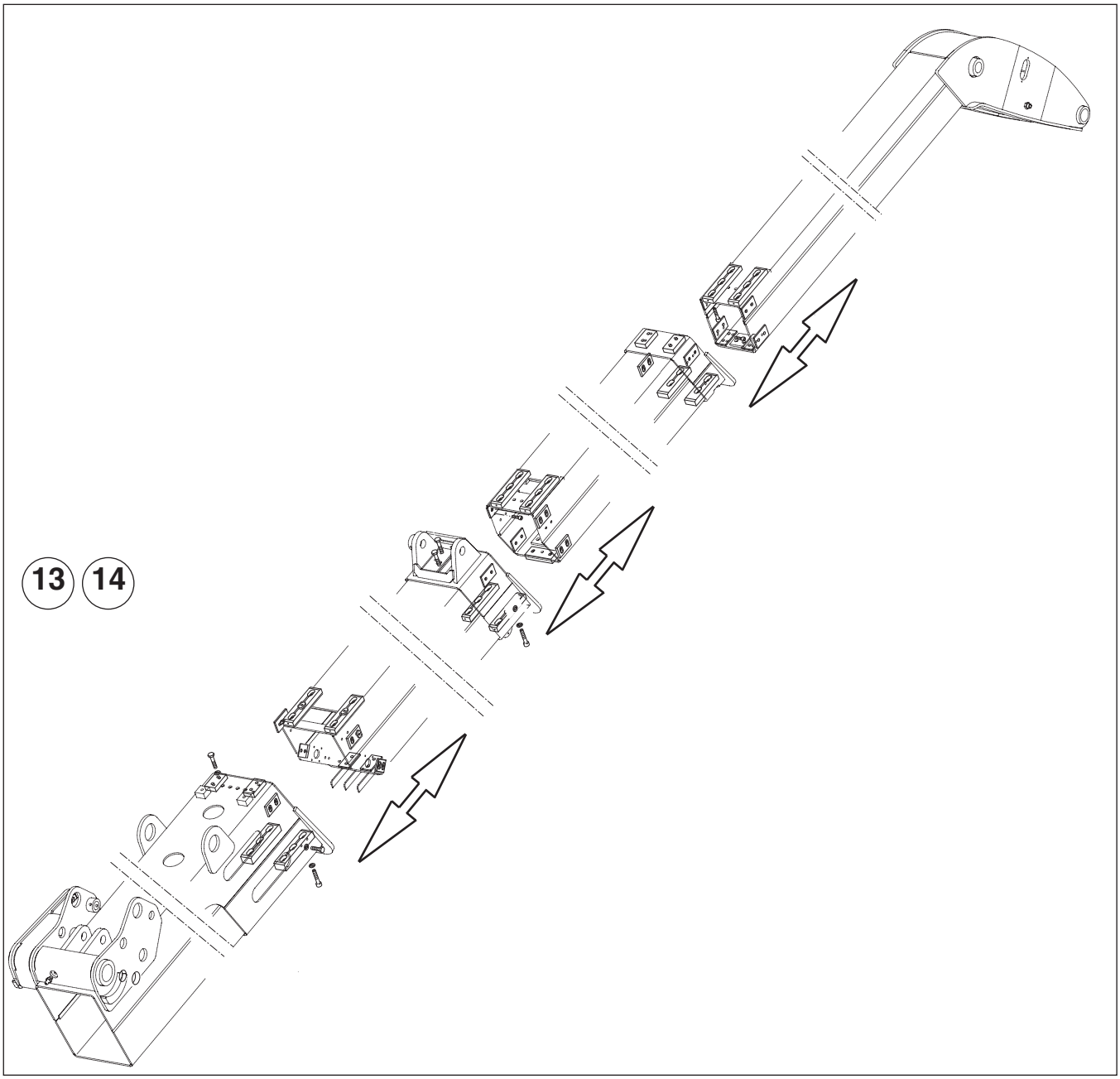


TABLE 013

Procedure: **Renewing the flexible hoses inside the boom GTH-4013EX GTH-4514EX**	Table: **013** GTH-4017EX GTH-4514EX GTH-4013EX	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 under 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.

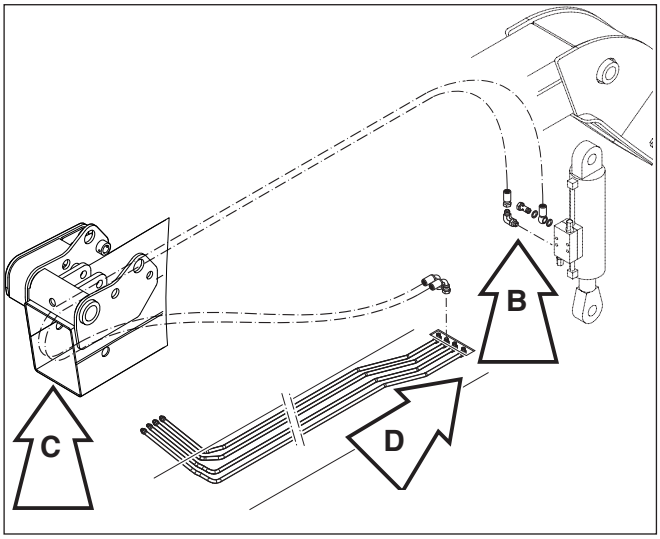


TABLE 013

Procedure:	Table: 013
Renewing the flexible hoses inside the boom **GTH-4013EX GTH-4514EX**	**GTH-4017EX** **GTH-4514EX** **GTH-4013EX**

Useful advice for mounting flexible hoses:

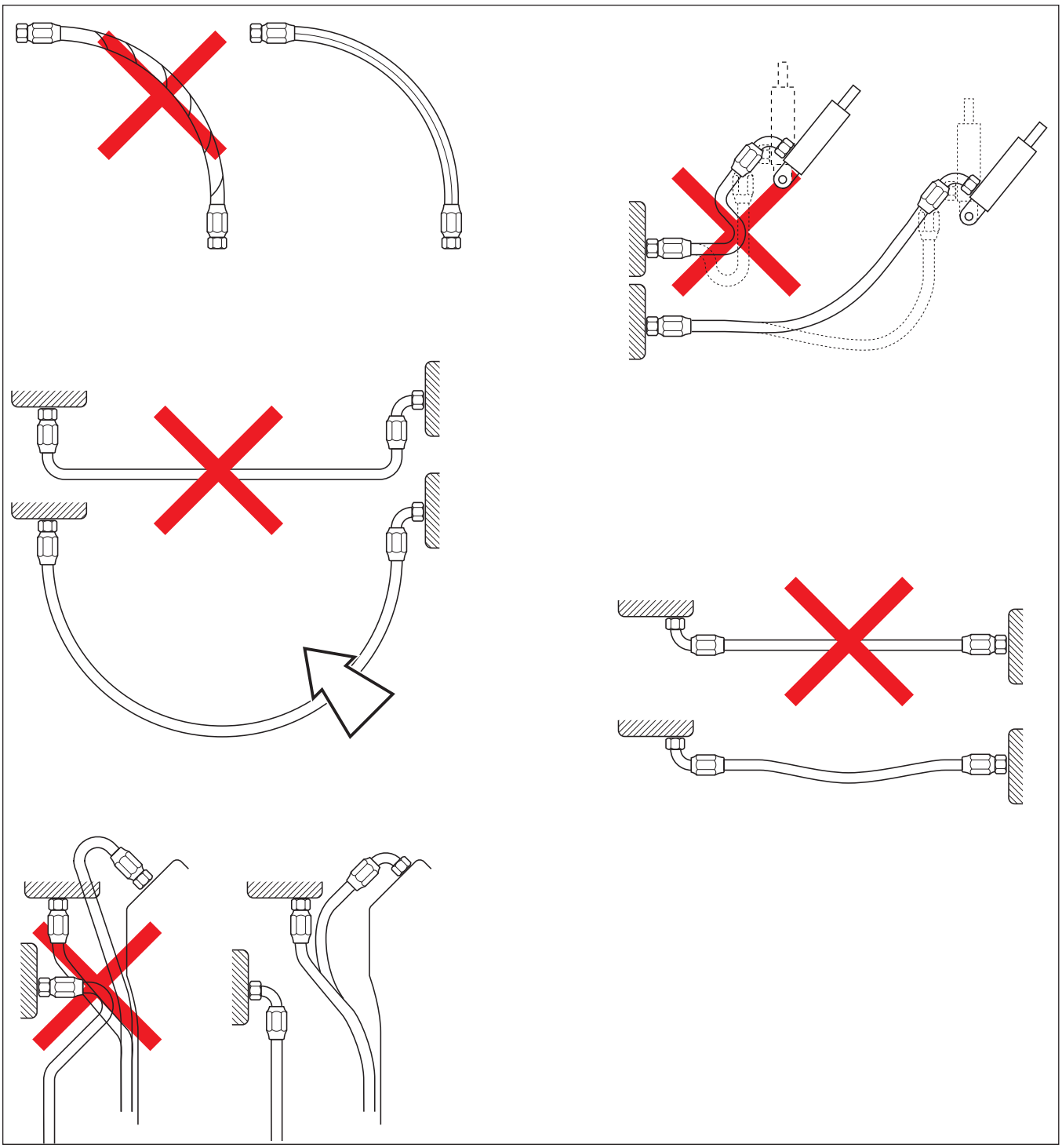


TABLE 014

Procedure: **Renewing the flexible hoses inside the boom GTH-4017EX**	Table: ***014*** **GTH-4017EX GTH-4514EX GTH-4013EX**	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 about 45°-50°
- install on the lifting cylinder the clamp to stop the boom
- disconnect the hoses **(A)** under the boom, using a 27 mma combination wrench
- install a 1/2 plug on the iron hoses
- start the machine, extend the boom until the two holes of the firts section are free
- insert the pipe fittings of the hoses **(A)** inside the first section boom, and extract them from the rear part of the boom.

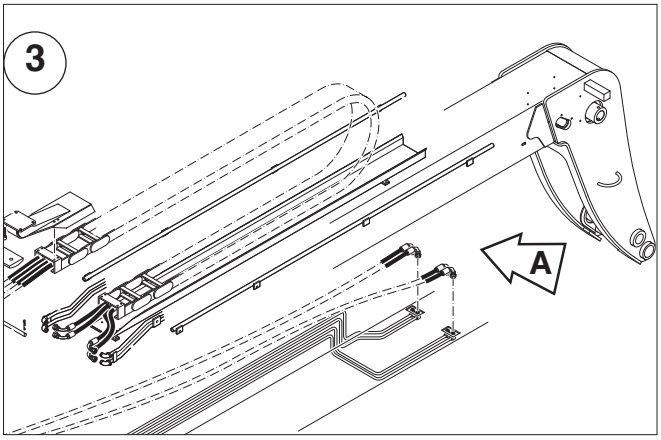


TABLE 014

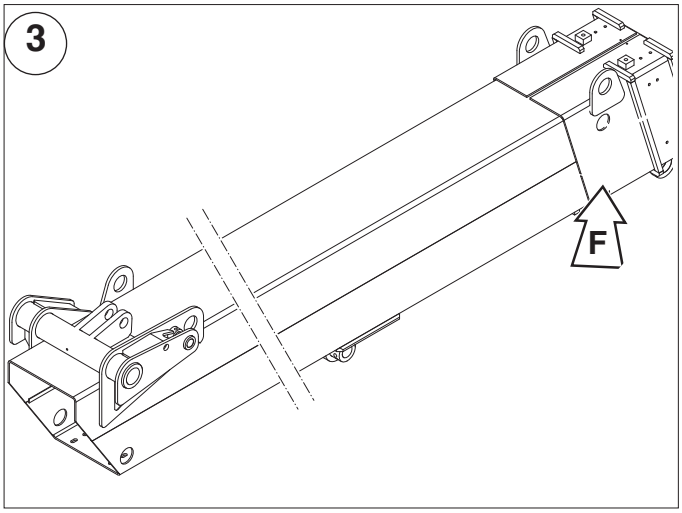
Procedure: **Renewing the flexible hoses inside the boom GTH-4017EX**	Table: ***014*** **GTH-4017EX GTH-4514EX GTH-4013EX**

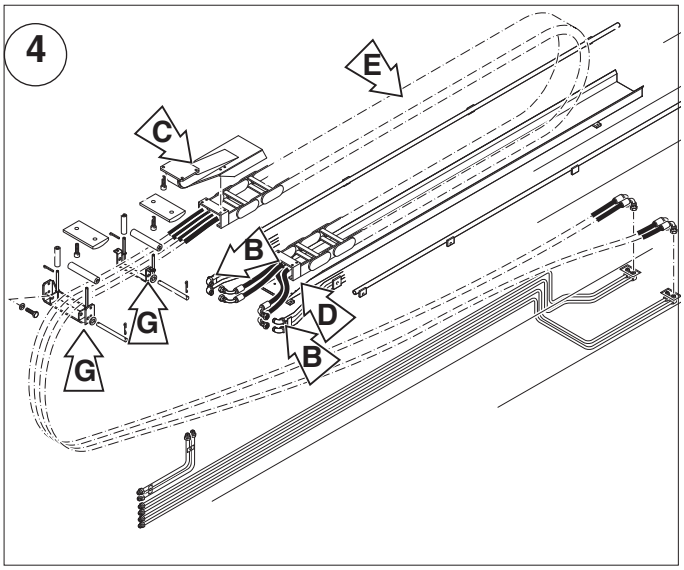
4 To renew the flexible hoses inside the boom remove the chain and proceed as follows:

- remove the safety clamp on the rod of the lifting cylinder
- start the thermal engine and hold the boom in horizonthal position and fully retracted
- remove the two bracket **(G)** using a 13 mm wrench
- make a list of the positions of the hoses
- disconnect the pipe fitting **(B)** from the hoses in the rear part of the boom, usong a 27 mm wrench
- remove the screws fixing the top bracket **(C)** using a 17 mm open-end wrench
- remove the screws fixing the bottom bracket **(D)** using a 5 mm hex wrench
- insert tha chain inside the boom until passing the bracket that stop the same chain to the boom
- using a bridge crane, extract the chain **(E)** from the boom and lay it on a plane area or on two stands.

5 To renew the flexible hoses inside the chain proceed as follows:

- make a list of the positions of the hoses
- remove the hoses from the chain, ensure to extract the side with 90° pipe fittings
- proceed in reverse order to re-assemble the hoses inside the chian and inside the boom.





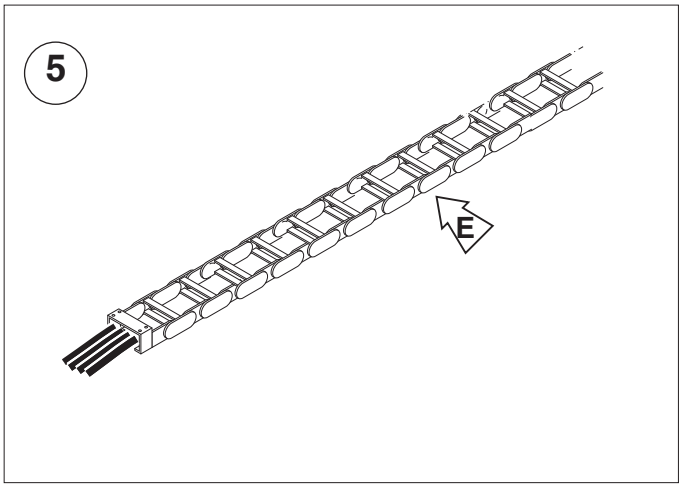


TABLE 015

Procedure: **Cylinder disassembly Attachment rotation cylinder**	Table: **015** GTH-4017EX GTH-4514EX GTH-4013EX	kg	36
			Hours: 2 Min.: 00
Bridge crane, payload 500 kg **Textile bridles or chains with hooks**	Standard tools Adjustable stands		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.)

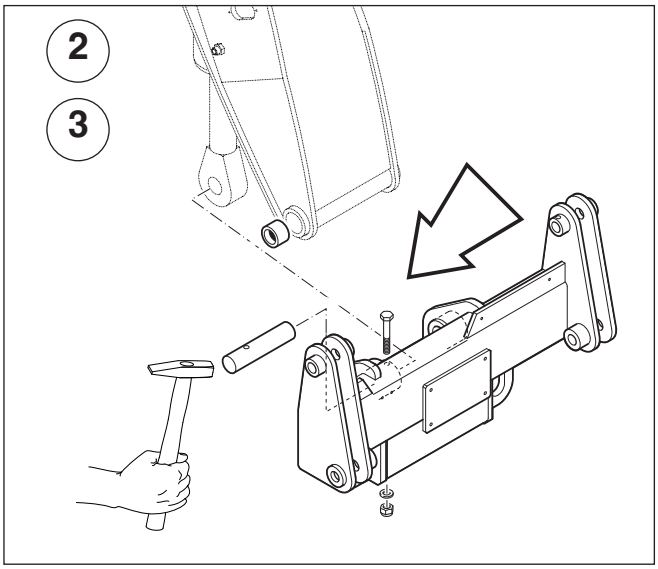
4 Open entirely the cylinder by the hydraulic drive and then stop the machine

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.

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



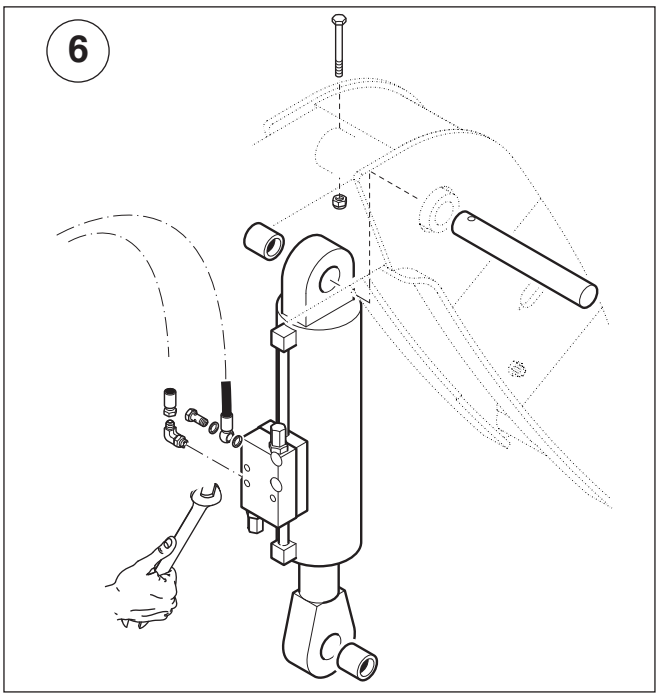
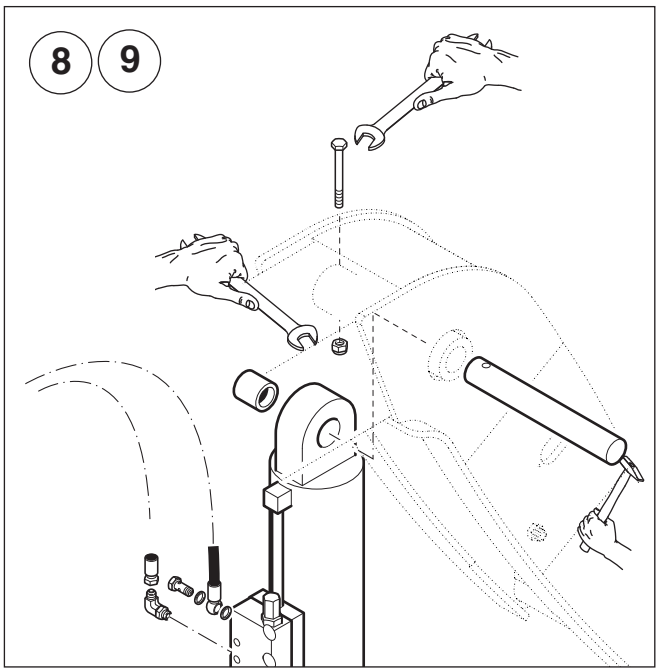


TABLE 015

Procedure: **Cylinder disassembly** **Attachment rotation cylinder**	Table: ***015*** **GTH-4017EX** **GTH-4514EX** **GTH-4013EX**



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.