A TEREX COMPANY

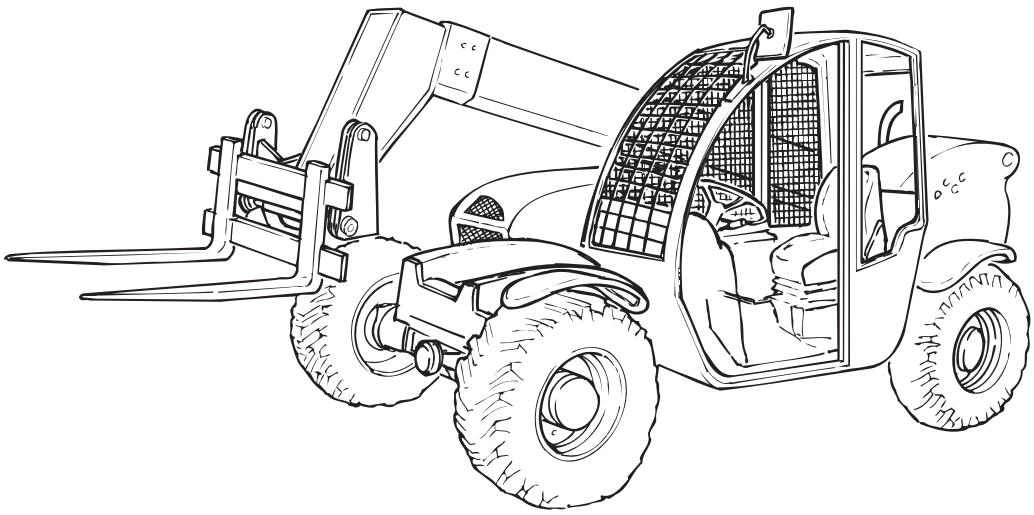
SERVICE MANUAL

Code 57.4403.3200 - 2nd Edition 01/2008

Handler with telescopic boom

GTH 55-19

(from serial n. 17548 to serial n. 17565)
(from serial n. 17822 to serial n. 17825)
(from serial n. 18154 to serial n. 18168)
(from serial n. 18556 to serial n. 18586)



English
Edition

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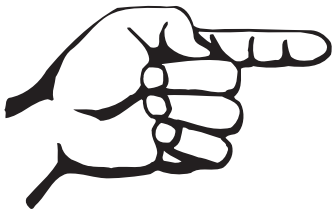

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SERVICE MANUAL

Code 57.4403.3200 - 2nd Edition 01/2008

Number: .....

Consigned to: .....

DECLARATION

I, the undersigned.....

declare that I have received the ***Service manual for GENIE lifts series GTH 55-19.***

Copies consigned: n° ..... on paper

n° ..... on CD-Rom

The undersigned is obliged to use the manual in their workshop, without disclosing the information in the same in any way, to unauthorised workshops and third parties in general, and not to photocopy or reproduce this manual or parts of the same in any way without the prior written authorisation of GENIE to do so.

If business relations between the undersigned and GENIE should come to an end, the undersigned is obliged to return the copies received without charges for GENIE.

Yours sincerely

Date .....

For acceptance

The consignee	Company stamp and signature of the Legal representative
.....	.....

Copy to return stamped and signed for acceptance by the Legal representative of the company receiving the copies of the manual.

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....

LIST OF REVISED PAGES

Revision		Revised pages	Notes	Issued by
No.	Date			
1	06-2007		Publication	
2	01-2008	Section 2, 5, 6	Revision	
3				
4				
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MANUAL CONTENTS

Machine denomination	Literature valid up to serial number
GTH 55-19	from 17548 to 17565, from 17822 to 17825, from 18154 to 18168, from 18556 to 18586

INTRODUCTION

Important
Read, understand and obey the safety rules and operating instructions in the **GTH 55-19 Operator's Handbook** 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.

Technical Publications

In pursuing a policy of constant quality improvement, TEREXLIFT srl reserves the right to make changes at any time and without undertaking to give prior notice; therefore, also this publication may be subject to modifications.

Contact Us
http://www.terexlift.com
e-mail: info@terexlift.it
http://www.genielift.com

DESCRIPTION OF THE MACHINE OPERATION

The mechanical energy source of this machine is a Perkins diesel engine **(1)**, model 804C-33 Tier 2, which supplies 47.1 kW at 2600 rev/min (63 HP) with a max torque of 198 Nm (146 lb-ft) at 1600 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 Bosch-Rexroth closed-loop pump for hydrostatic drives, model A4VG56 **(2)** with adjustment valve of DA type. The max displacement of this swashplate pump is 56 cm^3/rev. and the max calibration pressure is 430 bar (6235 psi). 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 27 cm^3/rev. Its function is to provide hydraulic power, under form of pressure and flow rate, to the steering circuit of the machine (primary branch of the priority valve) and to the circuit for the telescopic boom movements (secondary branch of the priority valve).The assembly of the two pumps involves they have a rotation velocity equal to the speed of the diesel engine.
The suction line of the open-loop pump **(3)** is protected by an immersed filter **(8)**, placed inside the hydraulic fluid tank **(10)** whose capacity is 75 litres (20 gallons). Just upstream of the connection with the suction line, 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 without having to drain oil off the tank built in the same circuit. The filter **(34)**, placed in the line returning to pump **(3)**, purifies most oil coming from the hydraulic circuit operating the telescopic boom before this oil returns to the tank. In addition to purify the oil coming from the main open-loop circuit of the machine (telescopic boom operating circuit), this filter can deliver oil at a minimum pressure of 0.5 bar to the suction line of the drive pump (**2**).This construction feature of the filter guarantees important advantages in terms of absence of cavitation in the transmission suction line, especially when the machine is started from cold.
The one-way valve **(11)** set at 2.5 bar (36 psi) 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 “G” of the drive pump **(2)** low-pressure oil is taken (25-30 bar) to feed the anti-cavitation circuit of the automatic fork levelling system, the pilot circuit of the main valve of the telescopic boom **(16)** and the parking brake unlock circuit. The hydraulic energy produced by the drive pump **(2)** is converted into mechanical power by a closed-loop hydrostatic motor, model Bosch-Rexroth A6VM107 **(5)** equipped with adjustment valve of DA1 type and with flush valve **(36)** for reducing the max temperatures inside

the drive circuit. The max displacement of this bent-axis motor is 107 cm^3/rev.
The motor is directly flanged to the front steering axle **(26)**. The mechanical torque produced by the drive motor is transmitted to the rear axle **(27)** through a Cardan shaft. The hydraulic drive **(12)** of "load sensing" type with a displacement of 125 cm^3/rev., receives oil from the priority line of 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 operating the different movements of the telescopic boom. The steering circuit is protected against input overpressures by a pressure reducing valve set at 170 bar (2465 psi). On the two delivery lines to the steering cylinders there are other two pressure reducing valves with anti-shock function set at 225 bar (3262 psi). These two valves are intended to limit possible shocks on the steering wheel due to overstress caused by the wheels on the steering cylinders. These pressure reducing valves are installed in the hydrostatic 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 **(26)** and the rear axle **(27)** respectively) and by a 4-way/3-position solenoid valve **(13)** for the selection of the three different steer modes (rear wheels straight, co-ordinate front/rear steering and independent front/rear steering).When the solenoid valve **(13)** is not energised, the front steering cylinder is fed by the hydraulic drive and the rear cylinder is blocked. When one magnet or the other of the solenoid valve **(13)** is energised, the chambers of the cylinders are connected in a different manner thus causing the desired effect on the steering mode. The Walvoil hydraulic 4-section main valve **(16)** receives oil from the secondary line of pump **(3)** and feeds all the movements of the telescopic boom. Each of the 4 sections of the main valve controls a specific function of the machine (lifting/lowering, attachment holding plate rotation, boom extension/retraction, attachment locking/unlocking). In the head there is a pressure relief valve set at 270 bar (3915 psi) which reduces the max pressure at the main valve inlet and drains the excess oil. The joystick **(18)** is used to reduce the pressures of the main valve section pilot lines and to move the main sliders of the main valve in a proportional manner with respect to their neutral position. Slider 1 of the main valve controls the lifting cylinder **(17)** of the telescopic boom. This cylinder has one single-acting compensation valve with safety function. Slider 2 of the main valve controls the attachment holding frame cylinder **(19)** of the telescopic boom. This cylinder is equipped with a double-acting compensation valve serving also as a safety valve. Parallel to this cylinder, there is the fork levelling compensation cylinder **(20)** (also called balancing cylinder) which is equipped

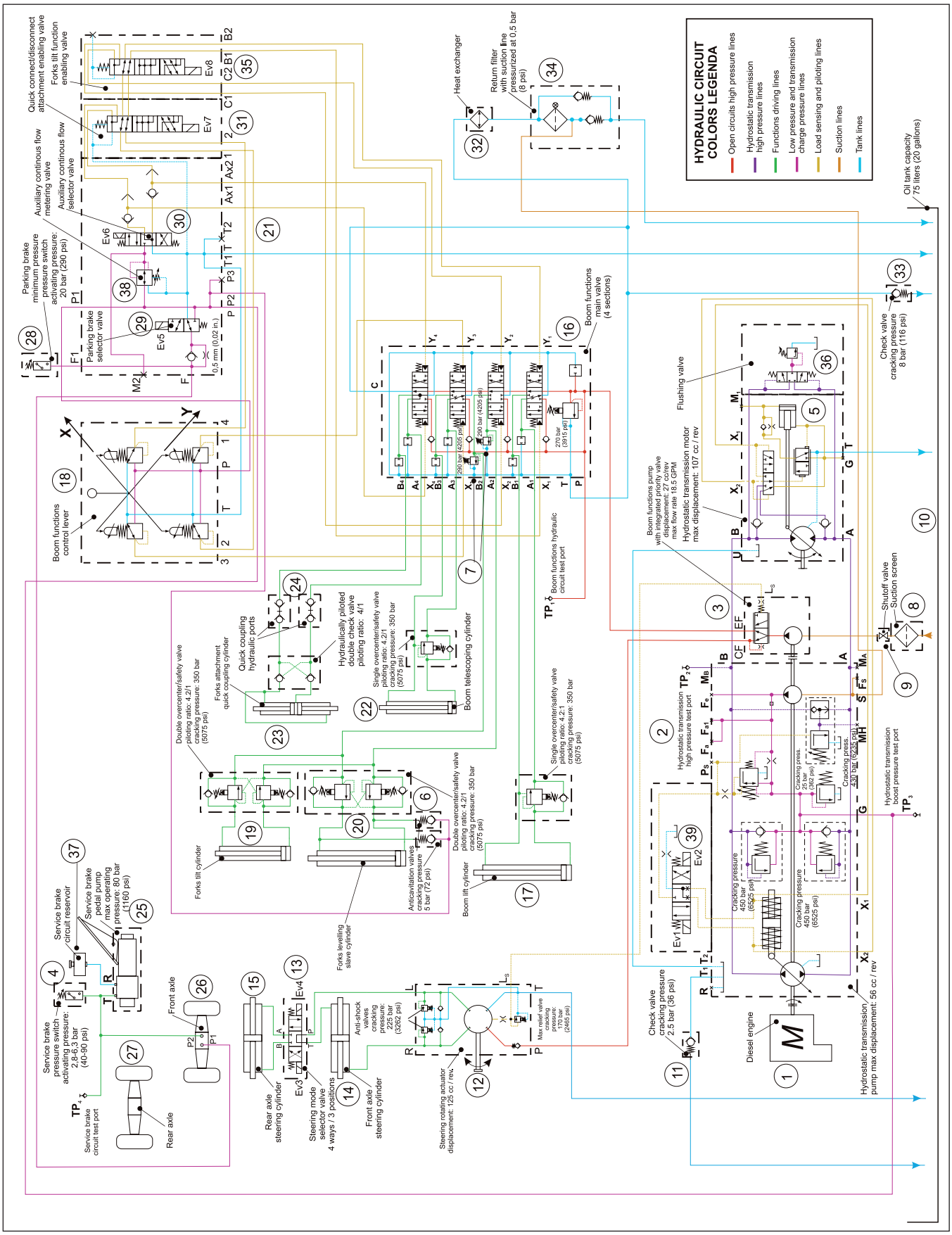
with a special double-acting compensation valve. Inside this valve, the one-way valves are mounted in reversed manner with respect to the normal position to avoid the pressurisation of the cylinder when the rotation control of the attachment holding frame is activated. Again inside this valve, there are other two one-way valves, set at 5 bar (72 psi), serving as anti-cavitation check valves **(6)**. These valves deliver oil, taken from the low-pressure line of the transmission pump **(2)**, to the fork levelling compensation circuit when needed. The two pressure relief valves **(7)** set at 290 bar (4205 psi) which protect the automatic fork levelling circuit during the boom lifting/lowering phases and in case of overload on the attachment holding frame (for instance, in the case of use of the bucket) are installed in the two control lines of cylinder (**19**) and they are integral to module 2. Slider 3 of the main valve controls the extension cylinder **(22)** of the telescopic boom which operates the movement of the second boom telescope and is equipped with a single-acting compensation valve used as well as safety valve.
Slider 4 of the main valve controls the attachment locking cylinder **(23)**. This cylinder has a double one-way valve with hydraulic release and safety function. On the feeding lines of this cylinder, there are two quick-fit connectors **(24)** for the connection of the hydraulic lines to those optional attachments necessitating hydraulic power for their operation (ex. hydraulic winch and maintenance jib, mixing bucket, etc.).

The special hydraulic block **(21)** has been designed to group, in a single element, some valves of the low-pressure circuit fed through port "G" of pump **(2)**, which, in the previous versions of the machine, were installed separately. In particular, this block houses the selection solenoid valve **(29)** operating the parking brake and the relevant valve controlling the flow rate of the calibrated throttle with 0.5mm diameter; the selection solenoid valves **(31)** and **(35)** used to switch the pilot lines coming from joystick **(18)** and relevant to the longitudinal axis of this joystick (forward/backward) which, depending on the operation of the two pushbuttons installed on the control lever in the driving place, activate one of the three sections of the main valve **(16)**, and namely the lift/lower movement, the attachment holding plate rotation movement and the attachment lock/unlock movement. The selection solenoid valve **(30)**, again built in block **(21)**, activates the attachment lock/unlock line (also used as auxiliary line for the operation of optional attachments) without any need to move the joystick (continuous flow). The pressure reducing valve with screw adjustment **(38)**, when operated together with solenoid valve **(30)**, allows to adjust the oil flow rate of the attachment lock/unlock line (auxiliary line) through the adjustment of the pilot pressure on the line of the fourth element of the main valve **(16)**. Finally, one of the hydraulic ports of the block connected to the feeding line of the parking brake is used for the connection of the safety

pressure switch **(28)**. This pressure switch prevents the machine from moving when the pressure of the parking brake line is too low to guarantee the complete release of this brake.

The circuit of the service brake is operated by a SAFIM 27-20 pump **(25)** which takes hydraulic oil from tank **(37)** to operate the service brake, located inside the front axle **(26)**. The brake pump can provide a maximum pressure of 80 bar (1160 psi), thus depending on the pressure exerted on the brake pedal placed inside the driving place.
The pressure switch **(4)** set at 2.8-6.3 bar (40 - 90 psi), placed on the pump head, sends an electrical signal when the service brake is engaged. The oil coming from the drain line of the main valve operating the telescopic boom **(16)** is cooled down by the heat exchanger **(32**). This exchanger is divided in two sectors, the former absorbs heat from the cooling circuit of the diesel engine and the latter absorbs heat from the hydraulic circuit of the machine. The oil cooled down by the heat exchanger is sent back to the special filter **(34)** and finally drained into tank **(10)**. A one-way valve **(33)** calibrated at 8 bar (116 psi), 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.

GTH 55-19 hydraulic schematic



Section 1
SAFETY INFORMATION

SECTION INDEX

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.

CAUTION

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

NOTICE

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.

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.

⚠CAUTION

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 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 type-approved 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.

- 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.
- Aleays 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 ime. 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.

NOTICE

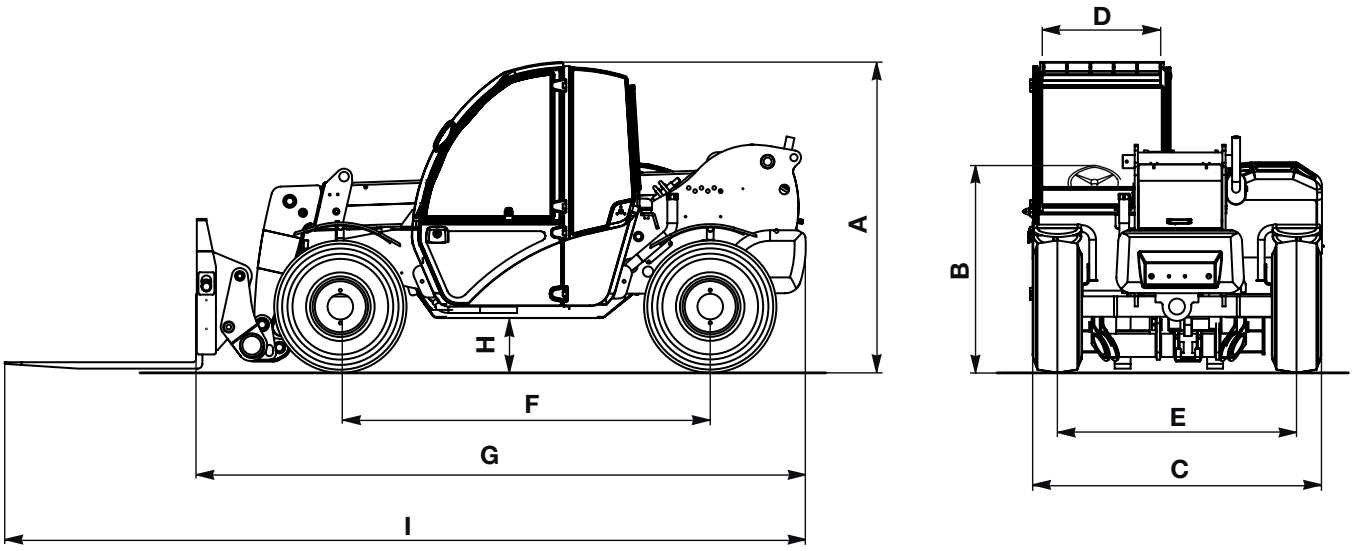
Treatment and disposal of used oils is subject to federal, national and local laws and regulations. Collect and deliver these wastes to authorised centres.

- 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.

Section 2
TECHNICAL SPECIFICATIONS

SECTION INDEX

2.1 MAIN DIMENSIONS



			GTH 55-19
A	Height	ft	6' - 4"
B	Height at steering whell	ft	4' - 1"
C	Width	ft	5' - 11"
D	Inside cab width	ft	2' - 6"
E	Track	ft	4' - 11"
F	Wheelbase	ft	7' - 7"
G	Length at fork-holder plate	ft	12' - 7"
H	Ground clearance	ft	1' - 1"
I	Overall length	ft	6' - 7"
•	Internal steering radius	ft	5' - 9"
•	External steering radius	ft	11'
•	Chassis levelling on both axles	°	2,3

2.2 TYRES

		GTH 55-19
		Standard
- Dimensions		12-16.5
- Load index		10 pr
- Rim		9.75 x 16.5
- Wheel disc		8 holes DIN 70361
- Pressure	bar	4.5
- Pressure	Psi	65

2.3 LIMIT OF USE

			GTH 55-19
•	Angle of approach (machine front side)	°	90
•	Departure angle (machine rear side)	°	60
•	Ambient temperature	°C	-

2.4 WEIGHT

			GTH 55-19
•	Weight with fork	lb	9810

2.5 SPEED

			GTH 55-19
•	Travel speed (max)	mph	15
•	Max. slope with full load	%	70
•	Traction to the dynamometer (max load)	lb	9325
•	Traction to the dynamometer (no load)	lb	6835

2.6 PAYLOAD AND REACH

			GTH 55-19
•	Max lifting height	ft	19'
•	Max forward reach	ft	11'
•	Reach at maximum height	ft	2'
•	Fork-holder plate rotation	°	130
•	Max lifting capacity	lb	5500
•	Lift capacity at maximum height	lb	4400
•	Lift capacity at maximum reach	lb	1900
•	Break-out force (with 500lt shovel SAE J732/80)	lb	8157

2.7 FORKS (floating type)

			GTH 55-19
•	Dimensions	in	47.2" x 3,9" x 1,6"
•	Weight	lb	9270

2.8 DIESEL ENGINE

			GTH 55-19
•	Make		PERKINS
•	Model/Type		804C-33
•	Displacement	in^3	203
•	Cylinder arrangement		Vertical in-line
•	Combustion System		In-direct injection
•	Max Power Output (@ 2600rpm)	hp	63,0
•	Max Torque Output (@ 1600rpm)	lb-ft	140
•	Rated Power (@ 2600rpm)		116 ft-lb / 58 hp
•	Aspiration		Aspirated
•	Cylinder's number		4

2.9 ELECTRICAL SYSTEM

			GTH 55-19
•	Voltage	V	12
•	Battery	Ah	100

2.10 MACHINE SOUND LEVELS

- Not applicable

2.11 VIBRATION LEVELS

			GTH 55-19
•	Mean assessed vibration level transmitted to arms	m/s^2	< 2.5
•	Mean assessed vibration level transmitted to body	m/s^2	< 0.5

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.

2.12 REFUELLING

			GTH 55-19
•	Diesel engine	l	11 + 3.5
•	Fuel tank	l	60
•	Hydraulic oil tank	l	62
•	Front differential gear with reduction gear	l	6
•	Rear differential gear	l	5
•	Front wheel reduction gears	l	1.5 + 1.5
•	Rear wheel reduction gears	l	0.7 + 0.7
•	Brake oil tank	l	0.1

Products:
Engine oil: **SHELL RIMULA SAE 15W-40 (API CH-4/ CG-4/ CF-4/CF, ACEA E3, MB 228.3)**
Power divider-Differential gears-Reduction gears: **FUCHS TITAN GEAR LS 85 W-90 (API GL-5 LS / GL-5)**
Hydraulic system and brakes: **SHELL TELLUS T 46 (DENISON HF-1 DIN 51524 part. 2 e 3)**

2.13 TIGHTENING TORQUES

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

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

2.14 DRILL DIAMETERS FOR THREADS

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

2.15 STANDARD TIGHTENING TORQUES FOR FITTING SEALS

■ 60° CONICAL SEALS

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

■ FRONT O-LOK (Parker) SEALS

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

■ 37° COUNTER-SUNK CONICAL SEALS (JIC)

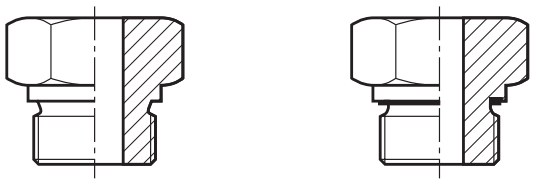
Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	37° CONICAL SEALS (JIC) Nm
7/16"-20	M10x1	15
1/2"-20	M12x1.5	20
9/16"-18	M14x1.5	28
	M16x1.5	62
3/4"-16	M18x1.5	62
7/8"-14	M22x1.5	80
1.1/16"-12	M27x2	110
1.3/16"-12		141
1.5/16"-12	M33x2	160
1.5/8"-12	M42x2	225
1.7/8"-12	M48x2	270
2.1/4"-12	M10x1	360

■ SEALS WITH GRIP-RING

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

■ FITTING ASSEMBLY

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



A B

A Male face
Mechanical seal or copper washer

B Male face
Soft seal with O-ring

2.16 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

2.17 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.

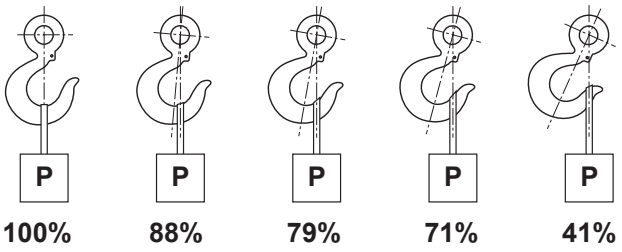
Before removing parts of the machine, make sure that:
- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

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:

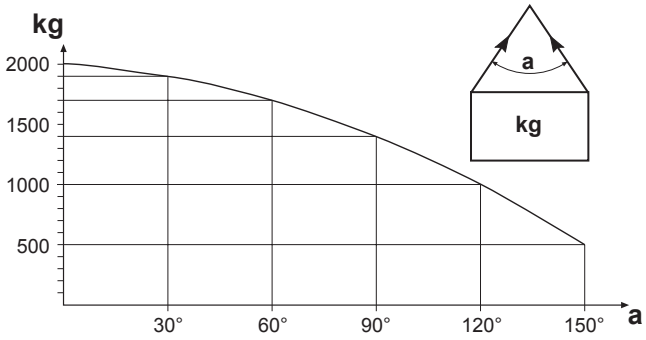
STRANDED ROPES	
Rope diameter mm	Max admissible load kg
10	1000
11.2	1400
12.5	1600
14	2200
16	2800
18	3600
20	4400
22.4	5600
30	10000
40	18000
50	28000
60	40000

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.



2.18 ADVICE TO RENEW FLEXIBLE HOSES

NOTICE

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

CAUTION

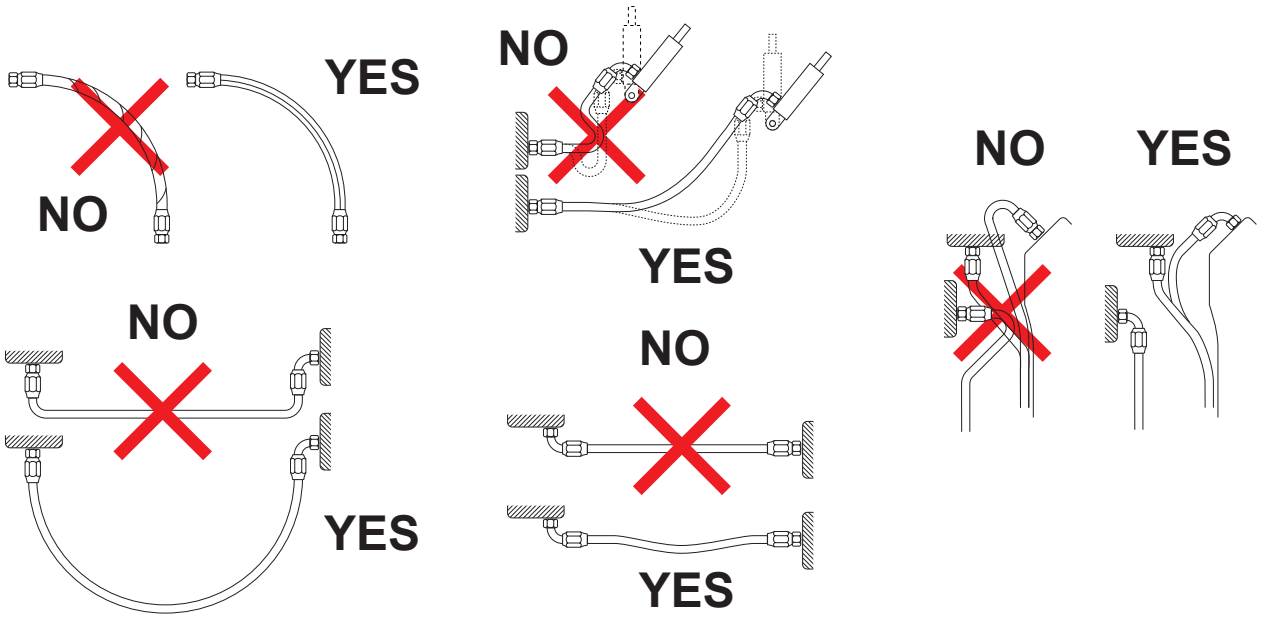
Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

⚠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
- 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:



2.19 LISTS OF RECOMMENDED SPARE PARTS

Code	Description	Q.ty
07.0700.0023	Oil filter cartridge (inside the tank)	1
09.4604.0004	Hydraulic oil filter	1
07.0700.0037	Primary engine air filter element	1
07.0700.0036	Safety engine air filter element	1
07.0723.0149	Cab air filter	1
07.4501.0139	Fuel filter	1
07.4501.0138	Engine oil filter	1
07.0705.0093	Solenoid	1
07.0705.0096	Solenoid	1
07.0705.0099	Solenoid	1
07.0728.0007	Solenoid	2
07.0709.0417	Seals kit	2
07.0701.0200	Seals kit	1
07.4529.0112	Seals kit	1
07.0701.0210	Seals kit	1
07.4529.0027	Seals kit	1
639395	Seals kit	1
07.0705.0081	Seals kit	1
640096	Seals kit	1
639993	Seals kit	1
635965	Seals kit	1
07.0705.0085	Seals kit	1
639992	Seals kit	1
07.0705.0082	Seals kit	1
07.0700.0028	Restriction indicator	1
07.0738.0003	Star wheel	1
53.3001.5400	Manifold	1
53.3001.5500	Manifold	1
07.0701.0007	Coil	2
07.0701.0209	Solenoid valve	2
07.0703.0479	Speed switch	1
07.0703.0472	Ignition switch	1
07.0704.0118	Red cap	2
07.0704.0117	Pushbutton	2
07.0704.0119	Yellow cap	2
04.4239.0004	Valve on balance cylinder	1
07.0703.0081	2A fuse	2
07.0703.0080	5A fuse	2
634972	7.5A fuse	2
07.0703.0148	10A fuse	2
634973	15A fuse	2
634975	20A fuse	2
07.0703.0060	50A fuse	1
07.4501.0059	Relay	1
57.0008.6100	Operator's manual (ITA)	1
57.0008.6200	Operator's manual (GB)	1
57.0409.9000	Spare parts catalogue (ITA)	1
57.0410.0000	Spare parts catalogue (GB)	1

Code	Description	Q.ty
09.4618.0644	Sticker: GTH-5519 32x5 (white)	1
97664	Sticker: Risk of crushing-English	1
09.4618.0641	Sticker: Genie 50x14 (white)	1
09.4618.0061	Sticker: Tyre inflation pressure (4.5 Bar)	1
09.4618.0010	Sticker: Prohibition to open with the engine running	1
97673	Sticker: Prohibition to lift people-English	2
09.4618.0782	Sticker: Connect./disconnect. quick coupling	1
09.4618.0643	Sticker: Genie GTH-5519 130x15 (white)	1
09.4618.0777	Sticker: Testing ports Tp2, Tp3	1
97675	Sticker: Risk of explosion-English	1
97671	Sticker: Risk of explosion-English	1
97665	Sticker: Safety belts-English	1
97668	Sticker: Risk of overturning-English	1
97676	Sticker: Electrical hazard-English	1
97670	Sticker: Risk of crushing-English	1
97672	Sticker: Risk of crushing-English	1
97666	Sticker: Read the user's manual-English	1
97669	Sticker: Risk due to falling objects-English	1
09.4618.0205	Sticker: Boom tilting degree	1
97674	Sticker: Risk of crushing-English	1
97688	Sticker: Emergency exit handle-English	1
82558	Sticker: Fluid at pressure-English	1
09.4618.0776	Sticker: Upper door unlock system	1
09.4616.0051	Decal: Hydraulic oil	1
09.4618.0783	Decal: Load chart	1
09.4618.0389	Decal: Control lever controls	1
09.4618.0780	Decal: Continuous flow knob	1
09.4618.0781	Decal: Flow reversal button	1
09.4618.0109	Sticker with various warnings	1
09.4616.0101	Machine data plate	1
09.4618.0778	Sticker: Testing ports Tp1	1
09.4618.0779	Sticker: Testing ports Tp4	1
56.0013.0001	Fuel gauge	1
07.0723.0042	Mirror	1
09.0803.0228	Left mud-guard	1
09.0803.0229	Right mud-guard	1
09.4645.0030	Cable	1
09.4670.0004	Vibration-proof support	1
07.0723.0446	Wiper blade	1
07.0723.0037	Wiper blade	1
07.0723.0024	Mirror	1
07.0703.0088	Switch	1
07.0703.0476	Switch	1
641065	Switch	1
54.0702.0013	Sliding guide	2
54.0702.0000	Sliding guide	4
54.0702.0001	Sliding guide	2
54.0702.0002	Sliding guide	2
54.0702.0005	Sliding guide	2
51.0809.3900	Boom shim	2

Code	Description	Q.ty
51.0804.9000	Boom shim	4
04.4210.0019	Quick coupling: F 1/2” Faster Art. 2FFI12GASF	2
04.4210.0018	Quick coupling: M 1/2” Faster Art. FFI12GASM	2
04.4239.0005	Block valve	1
04.4239.0005	Block valve	1
04.4239.0052	Block valve	1
04.4240.0052	Solenoid valve	1
56.0006.0002	Relay: 12v 20/30A	2
04.0605.0612	Flex hose	1
04.0605.0615	Flex hose	1
04.0605.0613	Flex hose	1
04.0605.0614	Flex hose	1
52.1100.7500	Carter	1
09.4604.0047	Hydraulic oil filter	1
09.4604.0052	Air filter complete	1
05.4309.0001	Brake pump	1
07.0704.0133	Joystick	1
07.0704.0042	Valve	1
04.4239.0002	Block valve	1
07.0722.0023	Valve	1
04.4237.0010	Complete servo-control	1
04.4239.0051	Block valve	1

2.20 MACHINE PAINT COLOUR

GENIE machines

BLU GENIE

GRIGIO GENIE

NERO RAL 9500

2.21 CHECKING THE CYLINDER MOVEMENT TIMES

CAUTION

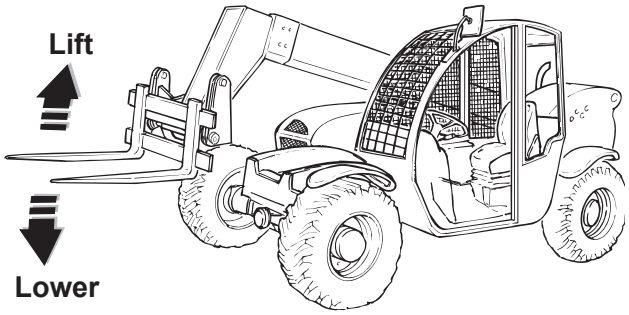
The check of the movement times of the cylinders shall be done with the hydraulic oil at a temperature of 60°.

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

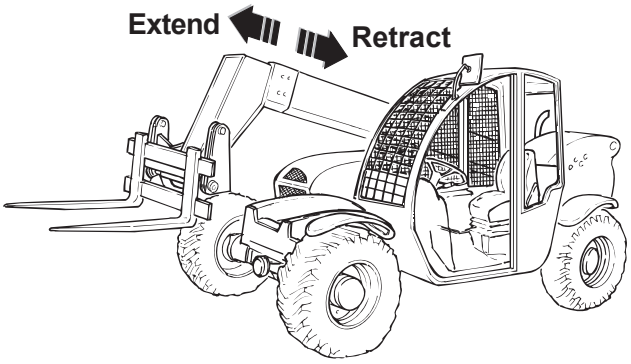
BOOM LIFTING/LOWERING

GTH 55-19	Time (s)	
	up	down
Max engine speed	7”	4”
Min. engine speed	18”	11”



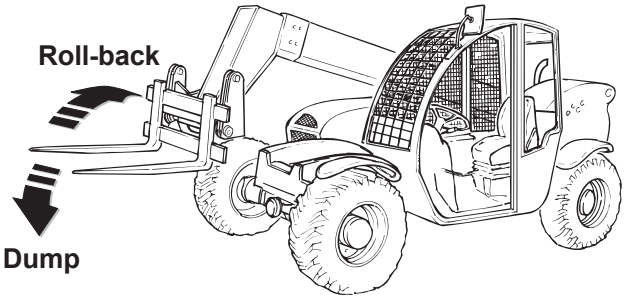
BOOM EXTENSION/RETRACTION

GTH 55-19	Time (s)	
	out	in
Max engine speed	7”	4”
Min. engine speed	19”	11”



ATTACHMENT DUMPING

GTH 55-19	Time (s)	
	dumping	roll-back
Max engine speed	3”	4”
Min. engine speed	7”	10”



2.22 HYDRAULIC SETTINGS

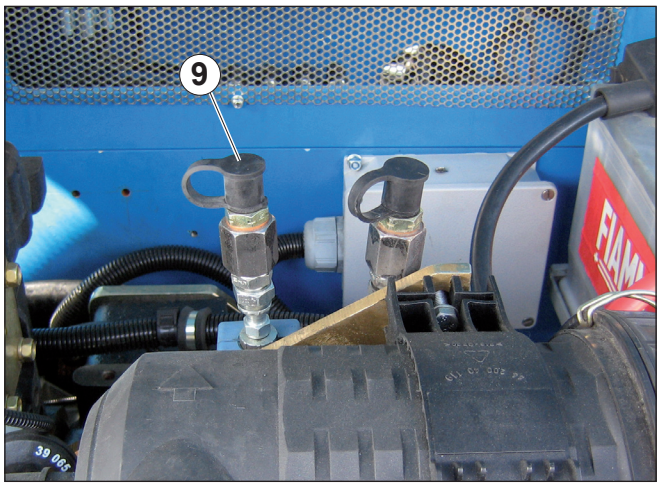
1. PRELIMINARY OPERATIONS

Check that the engine idle is set at 950 rpm and that the engine maximum speed is set at 2600 rpm.

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

2. CALIBRATING THE BOOM MAIN VALVE

Open the engine bonnet, find the mini-socket **ref. 9** (see **picture below**) and fit a 0-400 bar pressure gauge (0-5972 psi) to this socket.



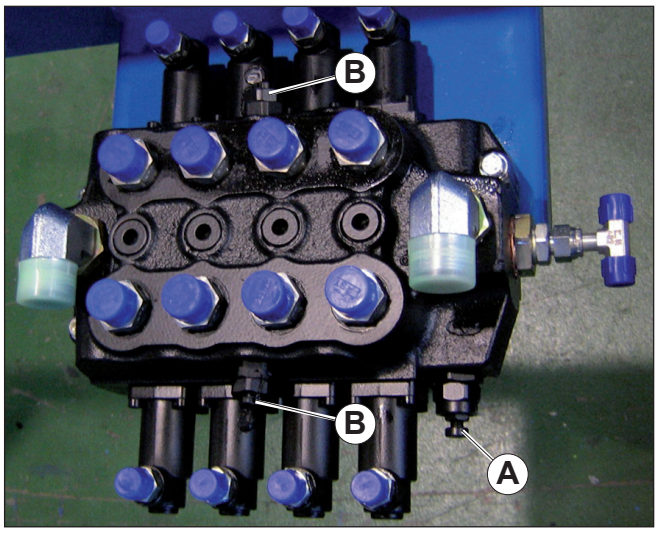
2.1 CALIBRATING THE MAIN VALVE PRESSURE CONTROL VALVE

Remove the central protective cover of the machine and, with a 13mm wrench, loosen the locknut of the pressure relief valve **A** of the main valve (see **annex 1**).
With the engine running at max speed, move the boom fully up and to end of stroke by operating joystick **1**, and set valve **A** to 270 bar (3915 psi).
For the inspection of the safety valves **B**, proceed as follows:

- Connect a 0-400 bar (0-5972 psi) manometer to the mini-socket **ref. 9**.
- Increase the pressure of valve **A** of the main valve to 300 bar moving the lifting cylinder to end of stroke (fully out).
- 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 to 270 bar (3915 psi) by adjusting the adjustment screw **A**.

CAUTION

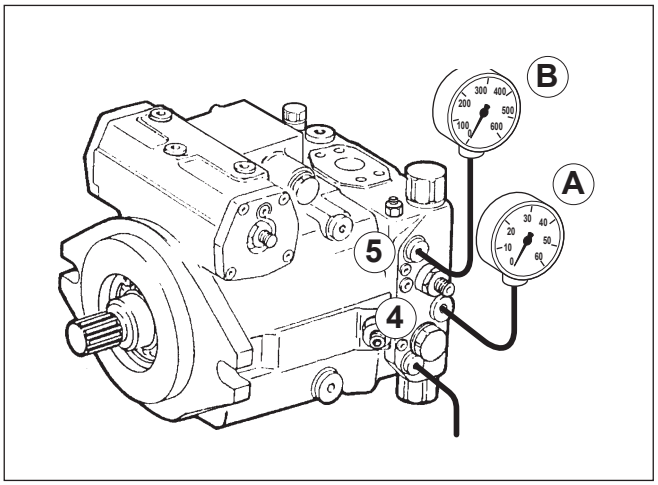
For safety reasons, do not hold the cylinder to end of stroke and do not let the engine run at max speed for more than 5 seconds.



3. SETTING THE HYDROMATIK PUMP HYDROSTATIC TRANSMISSION

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

- Connect a 0-60 bar (868 psi) manometer **A** to the mini-socket **ref. 4** to read the boost pressure value (see **annex 1**).
- Connect a 0-600 bar (0-8688 psi) manometer **B** to the mini-socket **ref. 5** to read the high-pressure value.



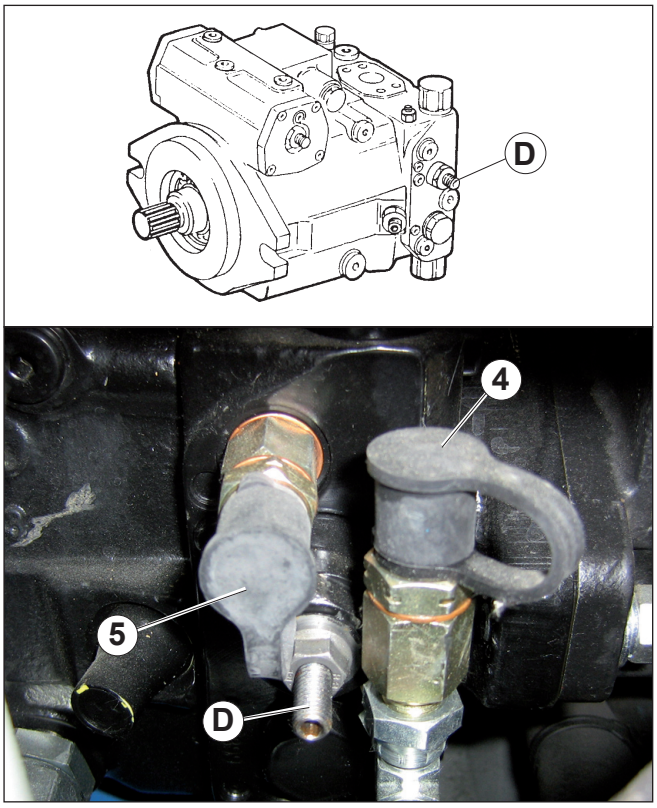
WARNING

Do not fit the manometer to the application point corresponding to the reverse speed. This operation is extremely dangerous for the serviceman who is calibrating the transmission.

- Hold the selector to neutral position and make sure the maximum speed of the engine does not exceed 2600 rpm. The engine must run at a idle speed of 950 rpm. Otherwise, adjust the minimum speed.
- Read the boost pressure on manometer **A** and ensure it is about 30 bar with the engine running at idle speed.
  The boost pressure has not a fixed value but varies from pump to pump.
- Hold the machine blocked by disconnecting the power plug of the solenoid valve controlling the parking brake.

STARTING THE CALIBRATION

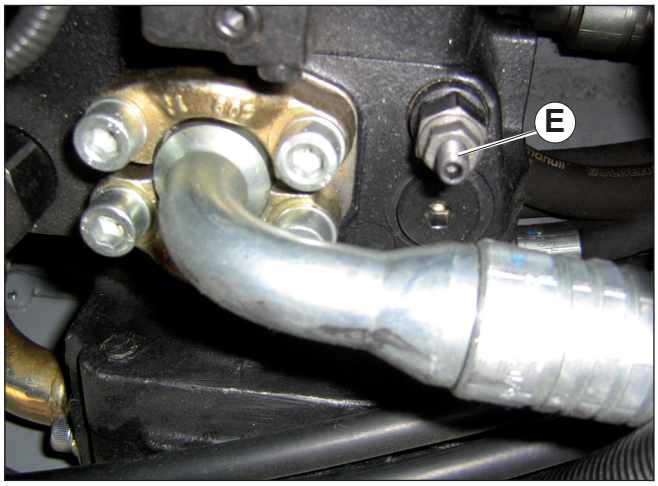
- Set the forward-neutral-reverse selector to the forward or reverse position.
- Run the engine at 1200 rpm. Check the value on the tachometer.
- Adjust shutter **D** by means of the register until reading a value of 50 bar (724 psi) on the high-pressure manometer **B**.

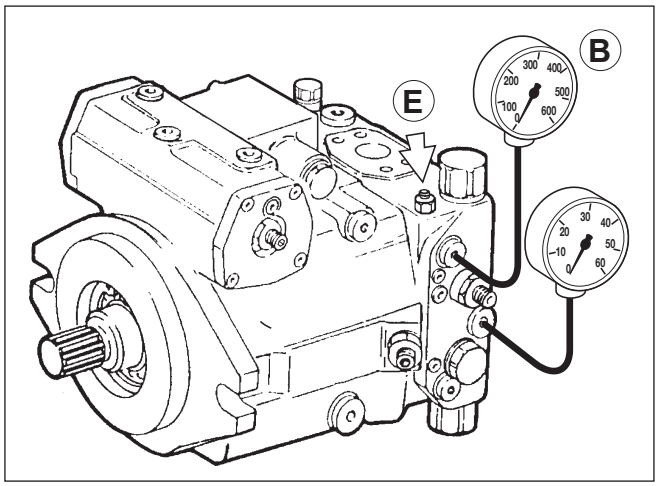


3.1 CALIBRATION OF THE MAXIMUM PRESSURE

Do this operation with extreme caution. The proper functioning of pump and transmission depends on this calibration.

- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at maximum speed and check the high-pressure value on the manometer **B**. If this value is less than 430 bar (6235 psi), increase the pressure to 430 bar (6235 psi) by means of the pressure cut-off valve **E**.
- Remove the manometers and do an attempt.





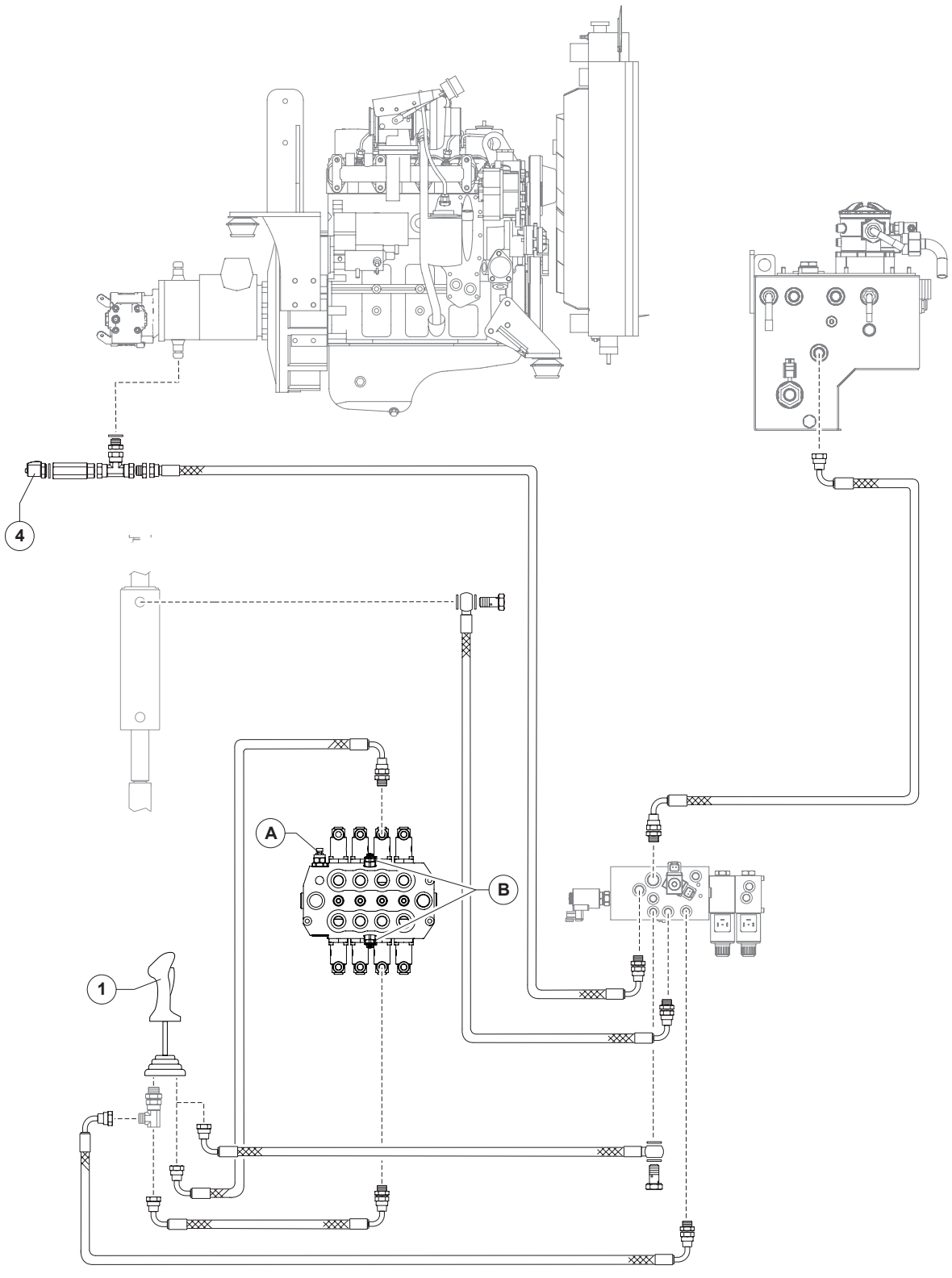
4. CALIBRATING THE POWER STEERING

- Fit a coupling complete with mini-socket **Z** in the position shown in **annex 2**.
- Fit a 0-250 bar pressure gauge (0-3620 psi) 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 (2465 psi). If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

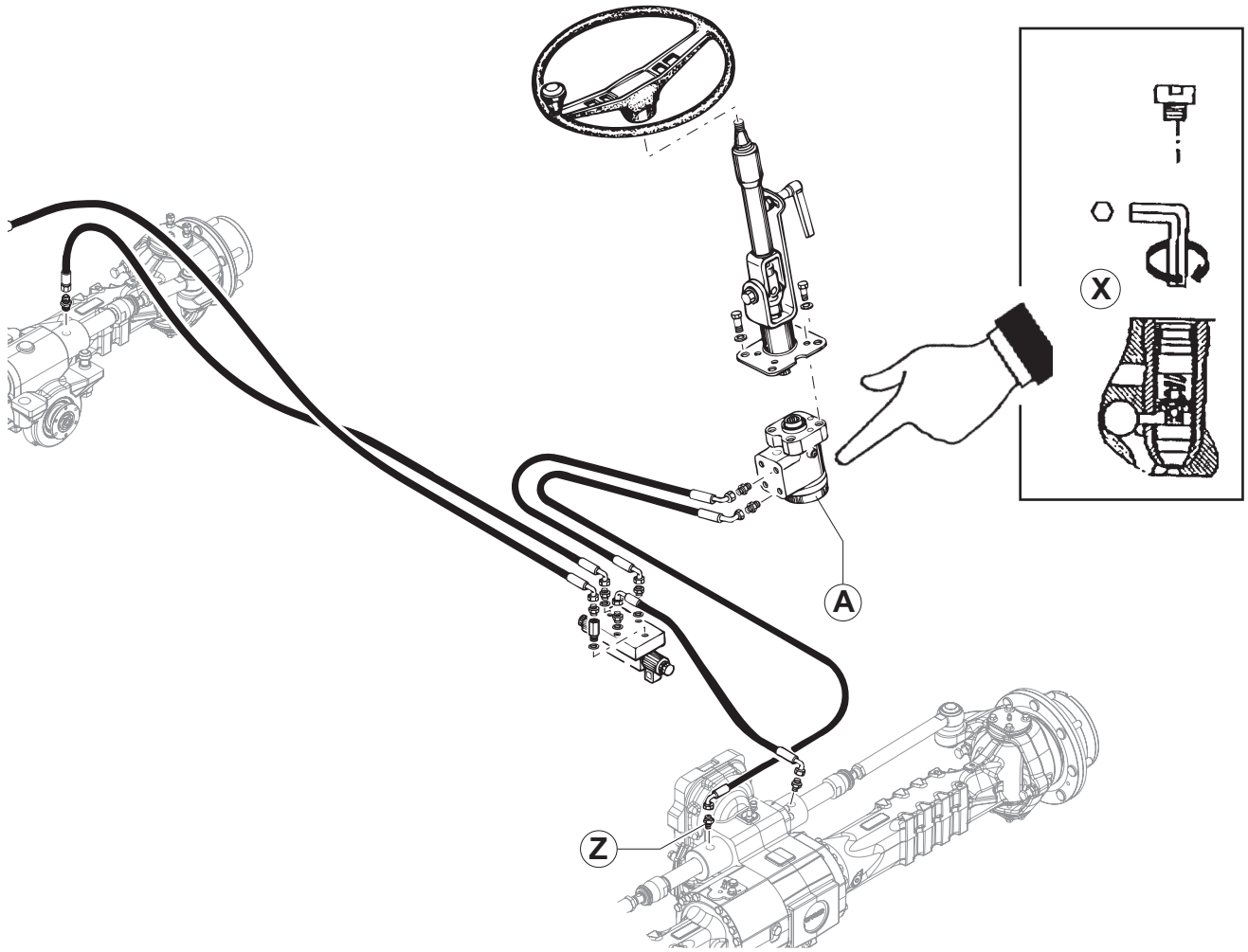
  Note: To gain access to valve **X**, remove the protection cap (see **annex 2**).

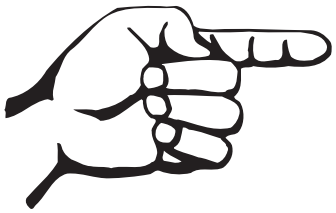
HYDRAULIC SYSTEM - MAIN VALVE

annex 1



POWER STEERING SYSTEM	annex 2





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Section 3
SCHEDULED MAINTENANCE INSPECTIONS

SECTION INDEX

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.***

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 6 months, yearly, every 2 years and at 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
Six month	A+B+C+D
Yearly	A+B+C+D+E
Every 2 years	A+B+C+D+E+F
At 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 bolts.
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	Inspect the Operator Manual.
A-6	Inspect the decals and placards.
A-7	Check the engine oil level
A-8	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.

TABLE B

Within the first 50 working hours:

B-1	Change the engine oil.

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.

TABLE C

Every 250 working hours or monthly:

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

TABLE D

Every 500 working hours or every six 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 cartridge of the hydraulic oil filter.
D-6	Change the cartridge of the hydraulic oil filter in the tank.
D-7	Have the hydraulic system checked by a skilled technician.
D-8	Change the cartridge of the engine air filter.
D-9	Clean or replace, if nececessary, the air filter in the cab.

TABLE E

Every 1000 working hours or yearly:

E-1	Change the inner element of engine air filter.
E-2	Change the oil in the front and rear differential units and in the power divider.
E-3	Change the oil in the four wheel reduction gears.
E-4	Change the hydraulic oil.

TABLE F

Every 2000 working hours or every 2 years:

F-1	Change the engine coolant.

TABLE F

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

G-1	Checking the state of the structure.

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
During 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 Decals and placards.			
A-7 Engine oil level.			
A-8 Air suction filter.			
A-9 Radiator.			
A-10 Hydraulic oil level in the tank.			
A-11 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 Efficiency of the lighting electric system.			
A-15 Efficiency of braking system and parking brake.			
A-16 Efficiency of the steering selection system.			
A-17 Efficiency of the fork balancing system.			
A-18 Safety devices.			

Table B	Y	N	R
Within the first 50 working hours:			
B-1 Change the engine oil.			
Every 50 working hours:			
B-2 Tension of the alternator belt.			
B-3 Check the tyre inflation.			
B-4 Tightening of the wheel nuts.			
B-5 Tightening of the cardan shaft screws.			

Table C	Y	N	R
Every 250 working hours:			
C-1 Engine oil and relevant filter.			
C-2 Oil level in the differential gears and reducer.			
C-3 Oil level in the four reduction gears.			
C-4 Cartridge of the engine air filter.			
C-5 Clamping of the cableheads to the battery terminals.			
C-6 Air suction hose between engine and filter.			
C-7 Cylinder chromium-plated rods.			
C-8 Check the hydraulic lines.			
C-9 Check the electric cables.			
C-10 Wear of the sliding pads of the boom sections.			
C-11 Play of the sliding pads of the boom sections.			
C-12 Sliding parts of the boom sections.			
C-13 Level of the battery electrolyte.			
C-14 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 of the transmission.			
D-6 Hydraulic oil filter in the tank.			
D-7 Efficiency of hydraulic system.			
D-8 Cartridge of the engine air filter.			
D-9 Air filter in the cab.			

Table E	Y	N	R
Every 1000 working hours:			
E-1 Oil of the differential casing and the power divider.			
E-2 Oil in the four wheel reduction gears.			
E-3 Change the hydraulic oil.			

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 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			

Section 4
SCHEDULED MAINTENANCE PROCEDURES

SECTION INDEX

4.1 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.***
- ***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.***

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.

⚠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.

CAUTION

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

NOTICE

Draws the attention to important environment-related information.

4.3 TABLE A PROCEDURES

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

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.

NOTICE

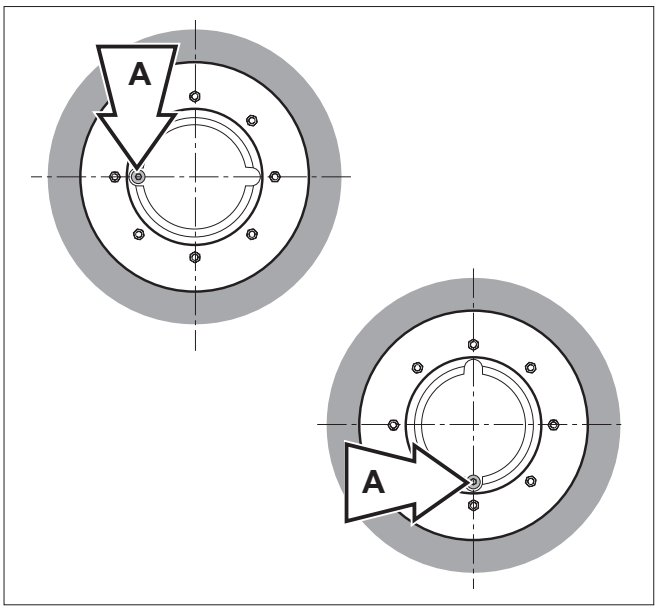
Place a container of suitable size under the plug.

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

- Stop the machine on a level ground and engage the parking brake.
- Loosen level plug **A** and check if oil is level with the hole.
- If necessary, add new oil through the hole of the level plug until it comes out.
- Refit and tighten plug **A**.

NOTICE

Place a container of suitable size under the plug.

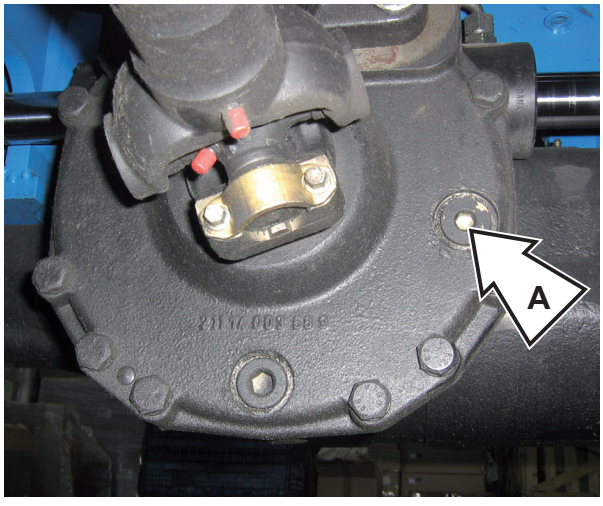


To check the oil level in the **power divider**:

- Stop the machine on a level ground and engage the parking brake.
- Clean the plug **A** 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.

NOTICE

Place a container of suitable size under the plug.

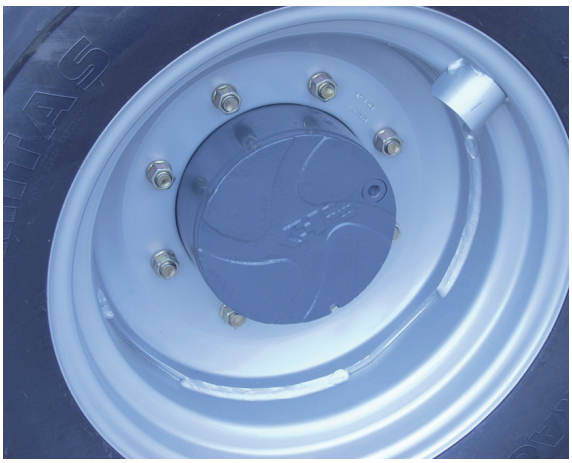


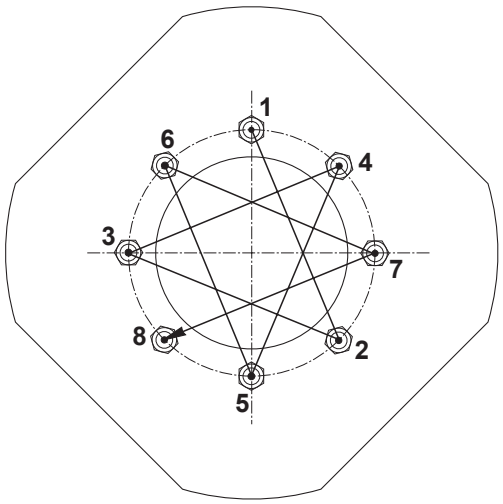
A-2 CHECK THE TIGHTENING OF THE WHEEL BOLTS

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.
- 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 300 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.

	STANDARD GTH 55-19
Dimensions (front and rear)	12-16.5
Load index	10 pr
Rim	9.75x16.5
Wheel disc	8 holes DIN 70361
Pressure bar/Psi	4.5/65

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.

A-5 INSPECT THE OPERATOR MANUAL

Maintaining the operator manual in good condition is essential to safe machine operation.

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.

CAUTION

Contact GENIE Service Centre if replacement manuals are needed.

A-6 INSPECT THE DECALS AND PLACARDS

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.

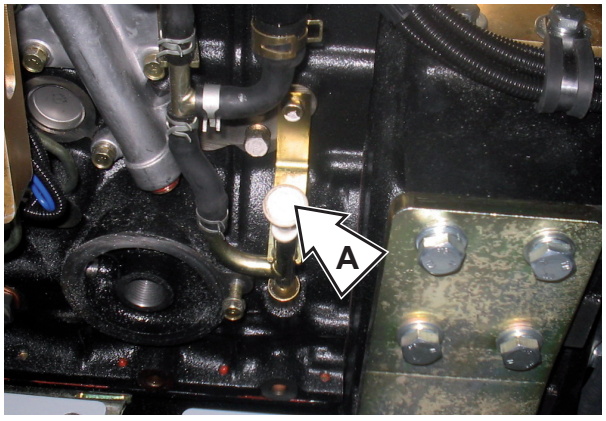
CAUTION

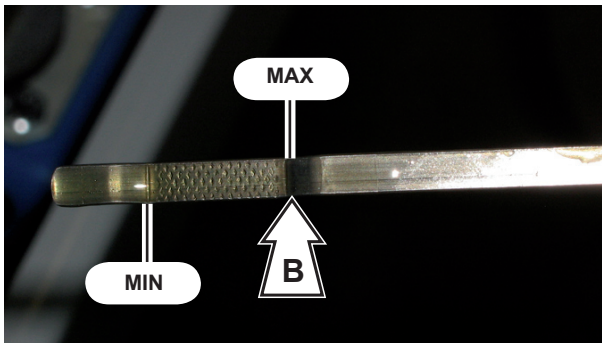
Contact GENIE Service Centre if replacement decals are needed.

A-7 CHECK THE ENGINE OIL LEVEL

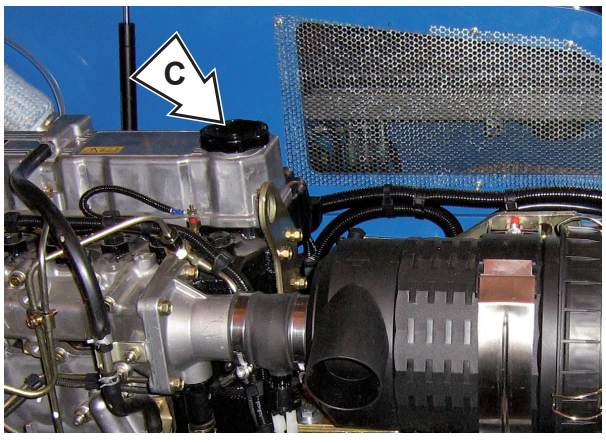
To check the engine oil level:

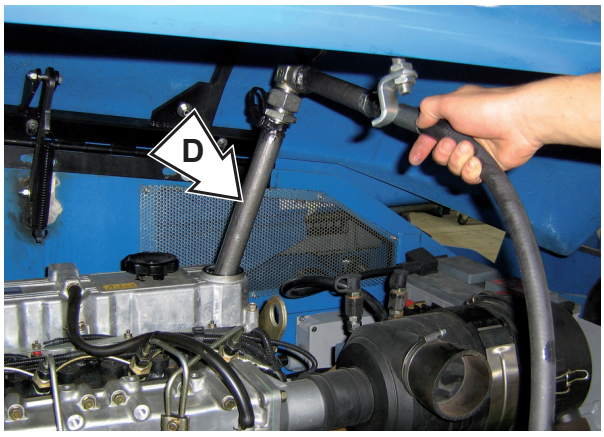
- Park the machine on a flat ground, stop the engine and check the parking brake is engaged.
- Remove dipstick **A** and check if oil reaches the max mark **B**.





- If oil is below this mark, remove plug **C** and pour new oil into the engine using the special appliance **D**.



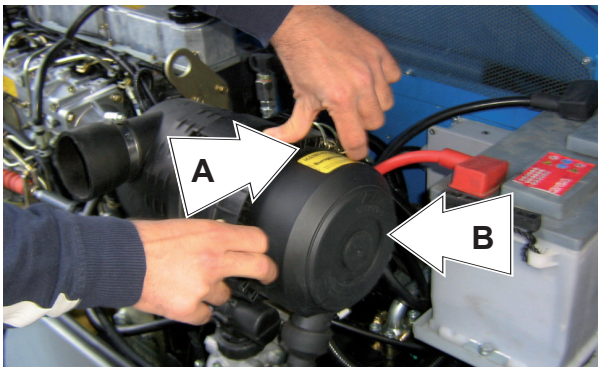


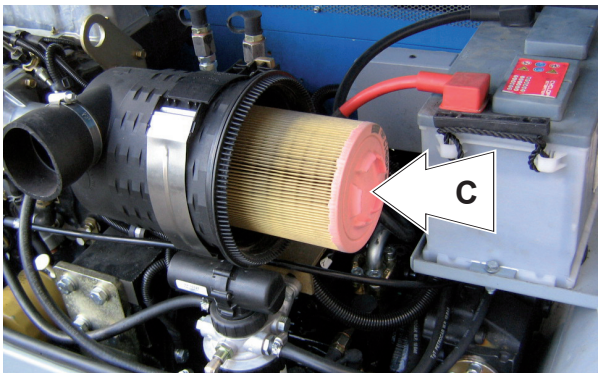
- Remove dipstick **A** once again and check if oil reaches the max mark **B**.
- Refit the plug.

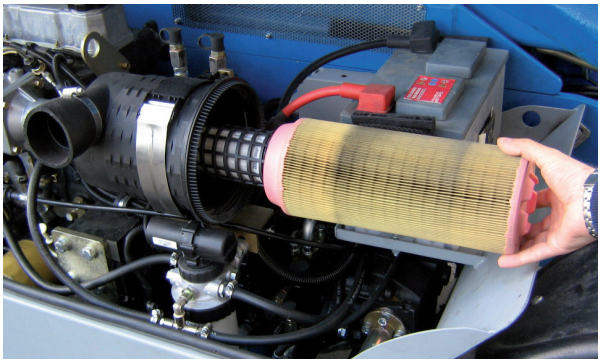
A-8 CLEAN THE AIR SUCTION FILTER

Clean the engine air filter every 10 hours:

- Stop the engine and engage the parking brake.
- Unlatch the fasteners **A** and remove cover **B**.
- Pull out the filter cartridge **C**.
- Clean the filter bowl.
- Dry clean the cartridge (at max. 6 bar pressure) and direct the air jet from inside to outside.
- Check the filter element for cracks by introducing a lamp inside.
- Refit the cartridge and make sure it is properly positioned.
- Close cover **B** and lock in place with fasteners **A**.







WARNING

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

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 radiator panel.
- Check the fins of 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.

CAUTION

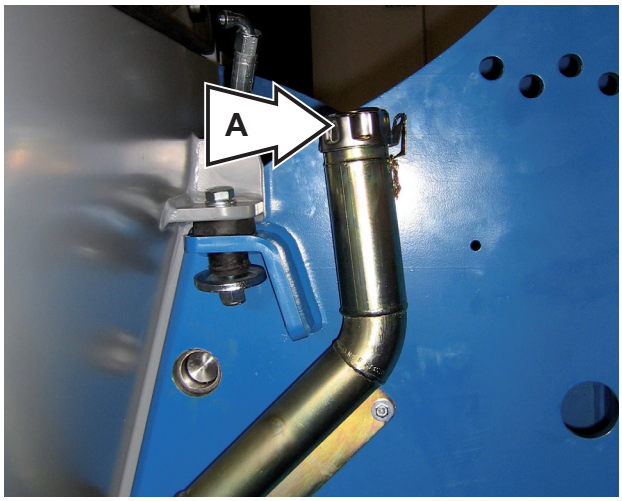
The core fouling depends on the dust of the outside environment and the presence of oil and fuel leaks in the motor area. It is therefore advisable to remove oil and fuel leaks immediately in case of very dusty environments.

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 the hydraulic oil level (visually) through the special level **B** fitted into the tank.
When necessary, add new oil through filler **A**.

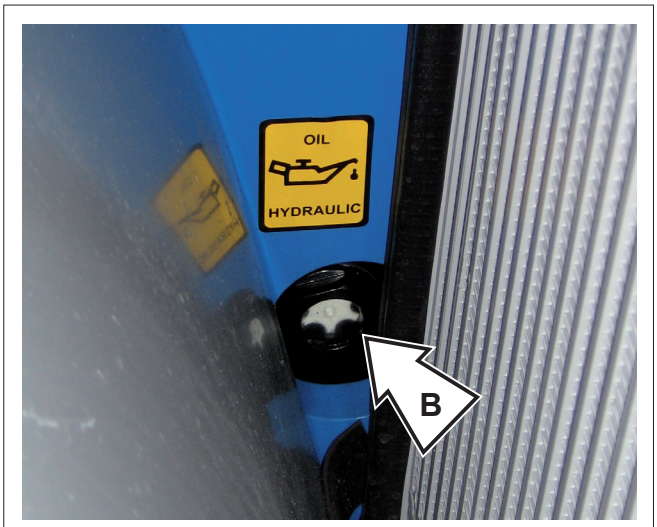


WARNING

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

NOTICE

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



A-11 CHECK THE GREASING OF THE BOOM SECTION PADS

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.

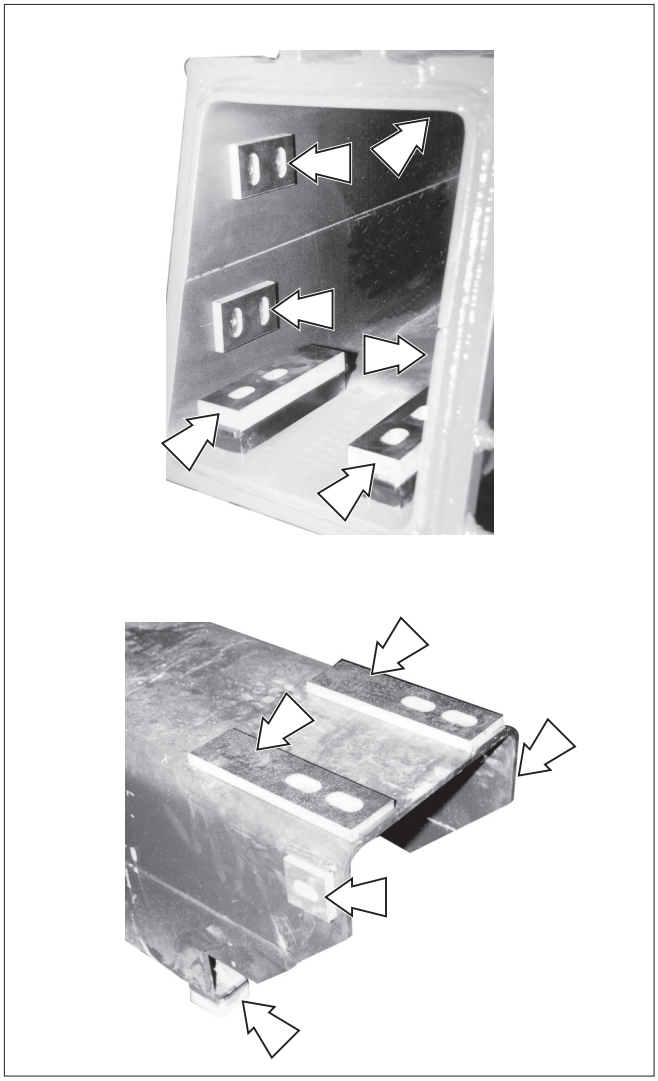
At regular intervals, check that the telescopes are well greased in correspondence of the sliding pads.

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

- **INTERFLON grease** **FIN GREASE LS 2**

CAUTION

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



A-12 GREASE THE FORKS

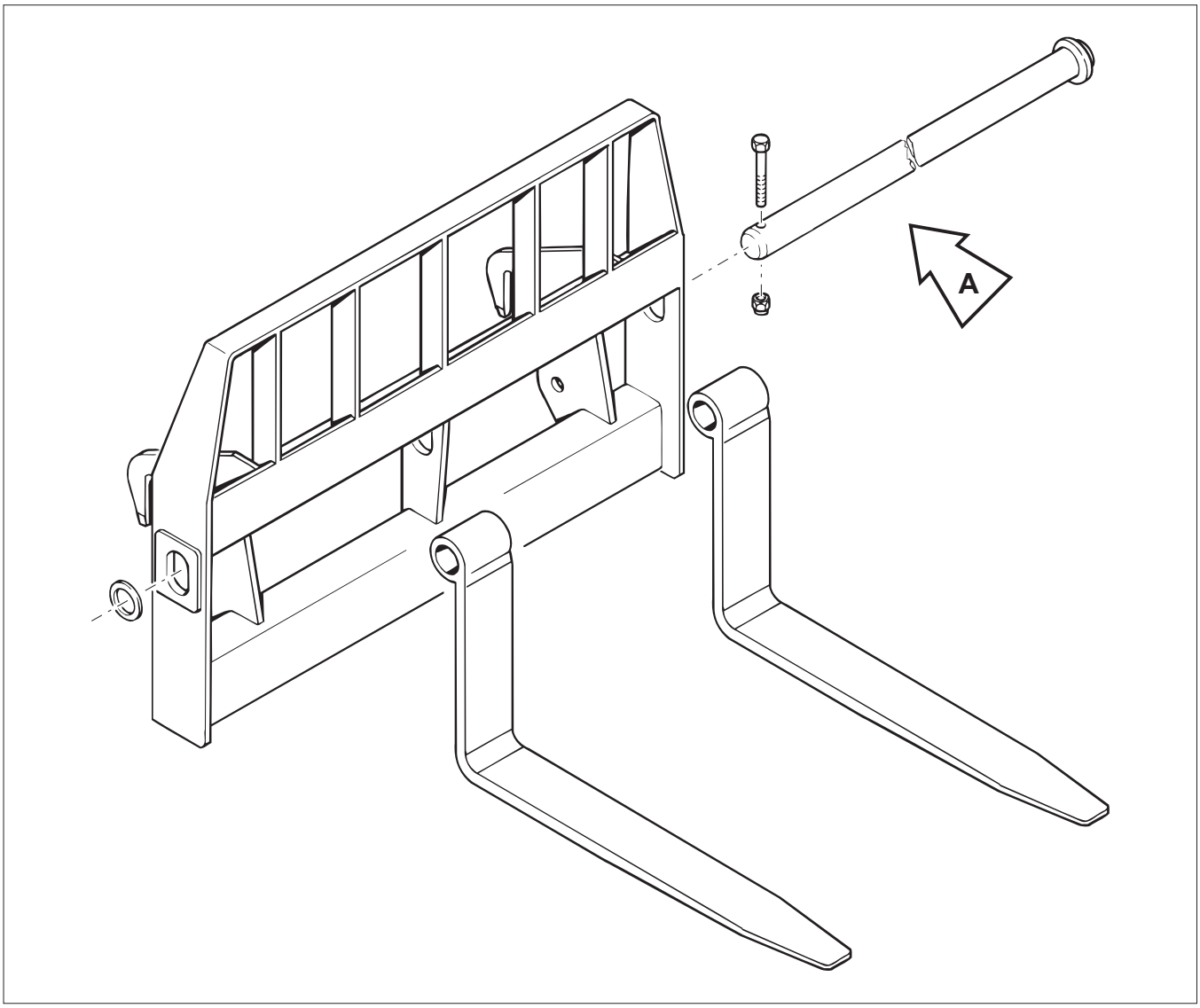
CAUTION

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.

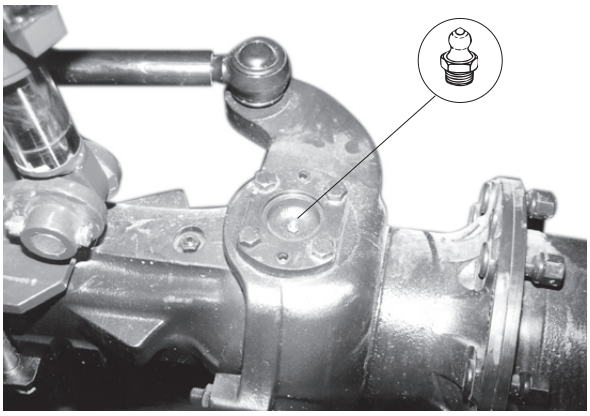
Smear pin **A** with grease to help the forks slide on it.

Recommended grease:

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



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.

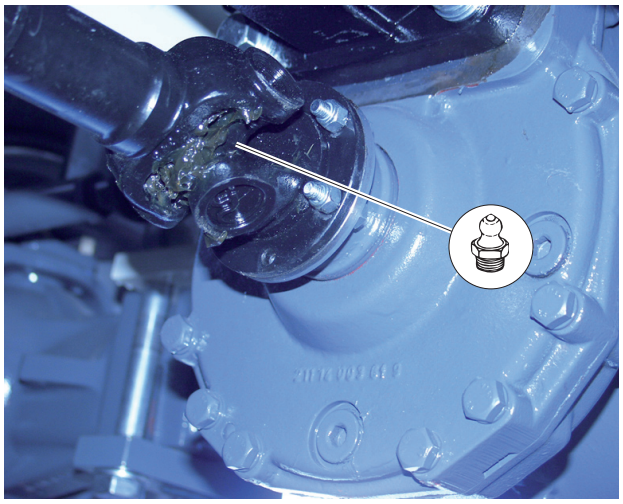
Regularly grease the machine to grant it efficient conditions and a long life.

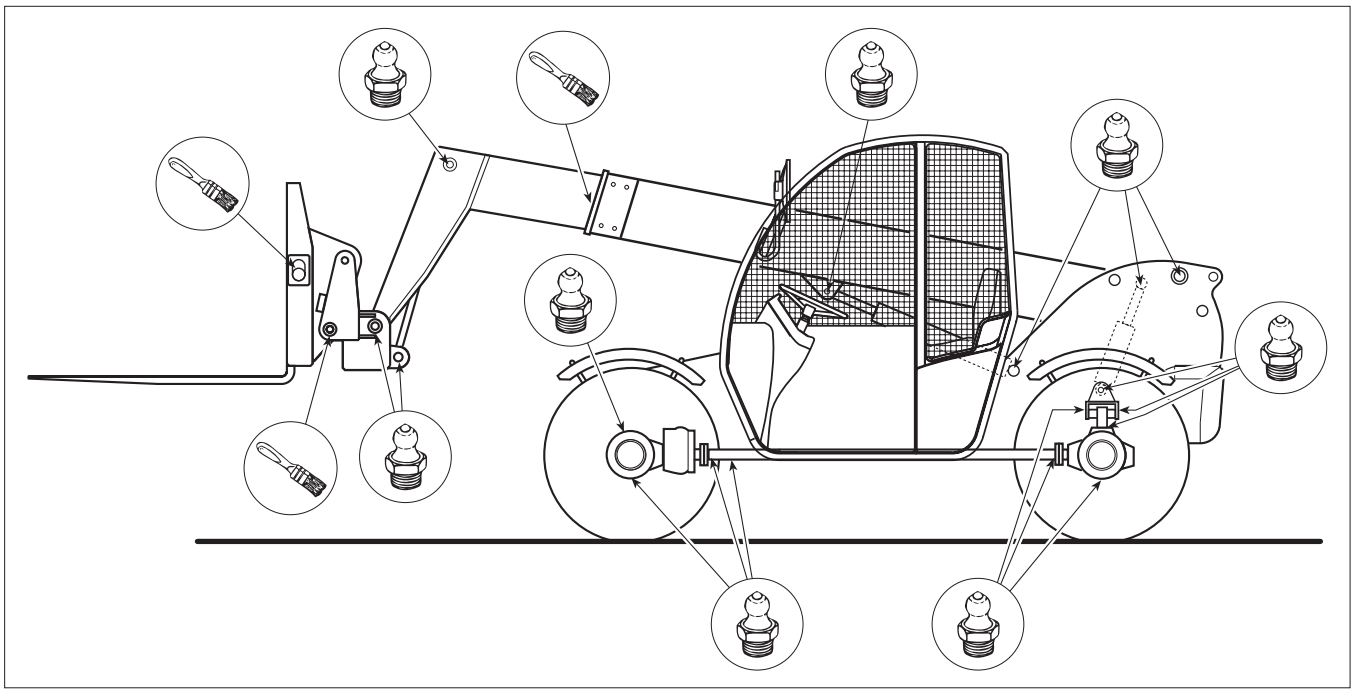
By means of a pump, inject grease into the special greasers.

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





A-14 CHECK THE EFFICIENCY OF THE LIGHTING ELECTRIC SYSTEM

If the LIGHTS KIT is installed, 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

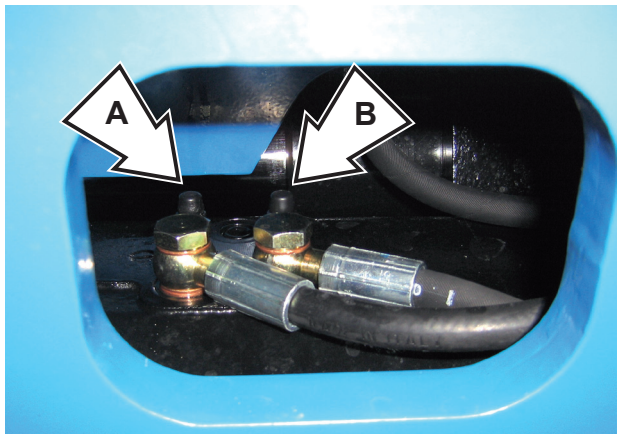
Never touch the bulb of halogen lamps (mount type H3) with your fingers: this may damage the lamp (use of a clean cloth or a paper tissue). If you touch it accidentally, thoroughly clean with a paper tissue and some ethyl alcohol.

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

A-15 CHECK THE EFFICIENCY OF BRAKING SYSTEM AND PARKING BRAKE

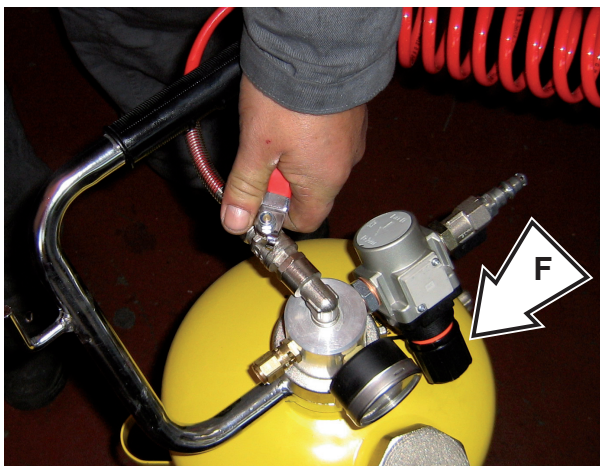
For any intervention on the braking system (adjustment and/or substitution of the brake discs) address to the GENIE Technical Service Centre or the nearest GENIE authorised workshop.

The malfunctioning of the braking system may depend on the presence of air in the hydraulic circuit.
The braking system is equipped with two purge valves **A** and **B** to eliminate any air from the circuit. The first valve is used to purge the service brake circuit (**B**); the second valve is used to purge the negative parking brake circuit (**A**). Both valves can be easily reached through the slot located on the front part of the chassis.

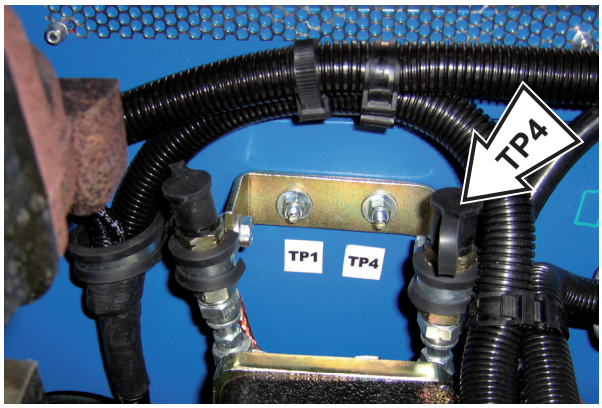


TO BLEED THE CIRCUIT OF THE SERVICE BRAKE, DO THE FOLLOWING:

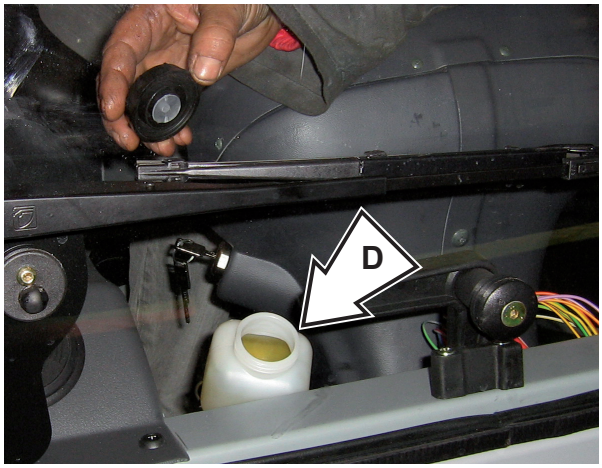
- Make sure that compressor **F** contains a sufficient quantity of oil so you can proceed with the circuit bleeding.



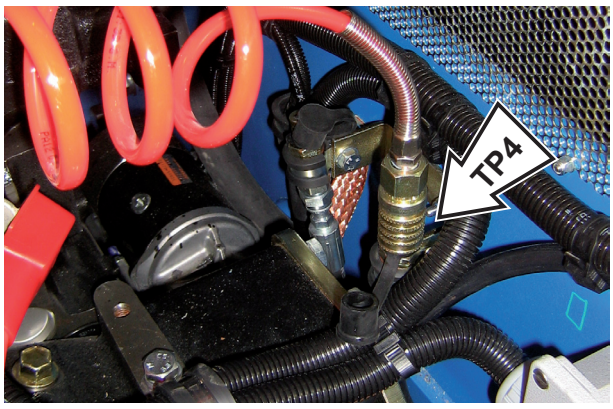
- Connect the flexible hose of the compressor to the mini-socket **TP4** placed inside the engine compartment.



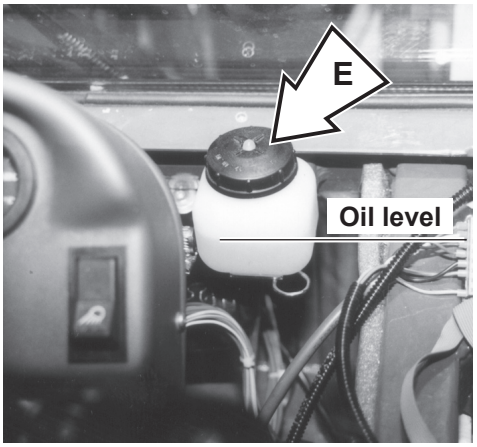
- Connect the compressor to an air source and pressurise the system.
- Unscrew valve **B** to help air flow out of the braking circuit.
- Open the cap of the feeding tank **D**.



- Open the tap of the compressor **F** which has been previously connected to mini-socket **TP4**.



- Check that air flows out of valve **B**. As soon as oil without air bubbles starts flowing out of this valve, close the same.
- Check that the fluid in tank **E** reaches the recommended level.



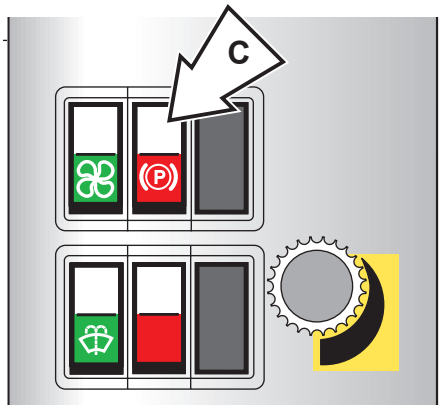
- Close the tap of the compressor.
- Disconnect the hose from mini-socket **TP4**.
- Test the efficiency of the braking system.

In order to bleed the service brake circuit WITHOUT A COMPRESSOR (for this operation, two service technicians are needed – one in the driving place and the other near the drain valve **B**):

1 Fill tank **D** with oil.
2 With the machine stopped, step down on the brake pedal 5-6 times.
3 Hold the pedal pressed down and slowly unscrew valve **B**. Close the valve as soon as oil mixed with air starts flowing out.
4 Ease up the brake pedal.
5 Repeat steps **2**, **3** and **4** until oil without air bubbles starts flowing out of the valve.
6 Test the efficiency of the braking system.

TO BLEED THE CIRCUIT OF THE PARKING BRAKE, DO THE FOLLOWING:

- Start the diesel engine.
- Press pushbutton **C** to unlock the parking brake.
- Slowly unscrew valve **A** and close the same as soon as oil mixed with air starts flowing out.
- Repeat until oil without air bubbles starts flowing out of the valve.
- Test the efficiency of the braking system.

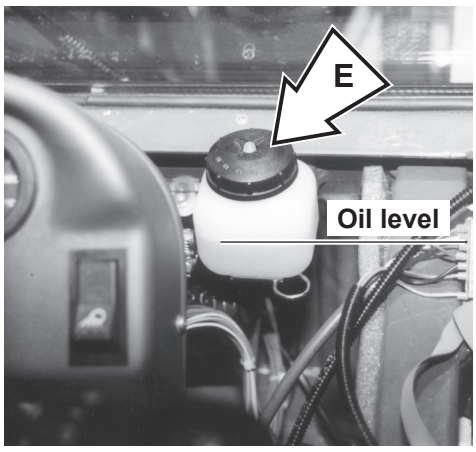


⚠WARNING

Once the circuit has been bled, make sure the brake circuit is in efficient working order.

CHECKING THE BRAKE OIL LEVEL

The oil within the braking circuit must be at about 2 cm from the tank plug **E**.



A-16 CHECK THE EFFICIENCY 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 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**).

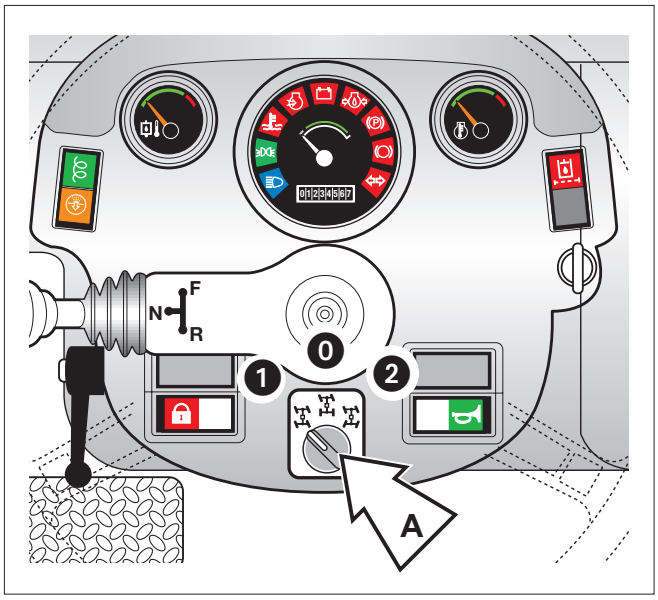
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop

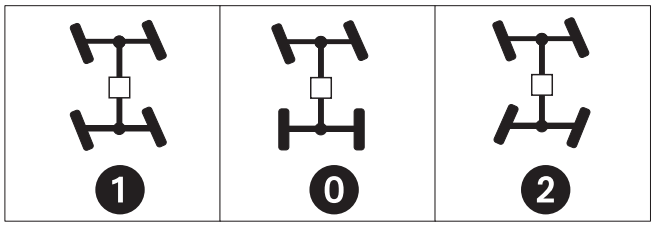
8 Reset the steering selection switch to “two-wheel steer” (pos. **0**)

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.





A-17 CHECK THE EFFICIENCY OF THE FORK BALANCING SYSTEM

WARNING

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

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

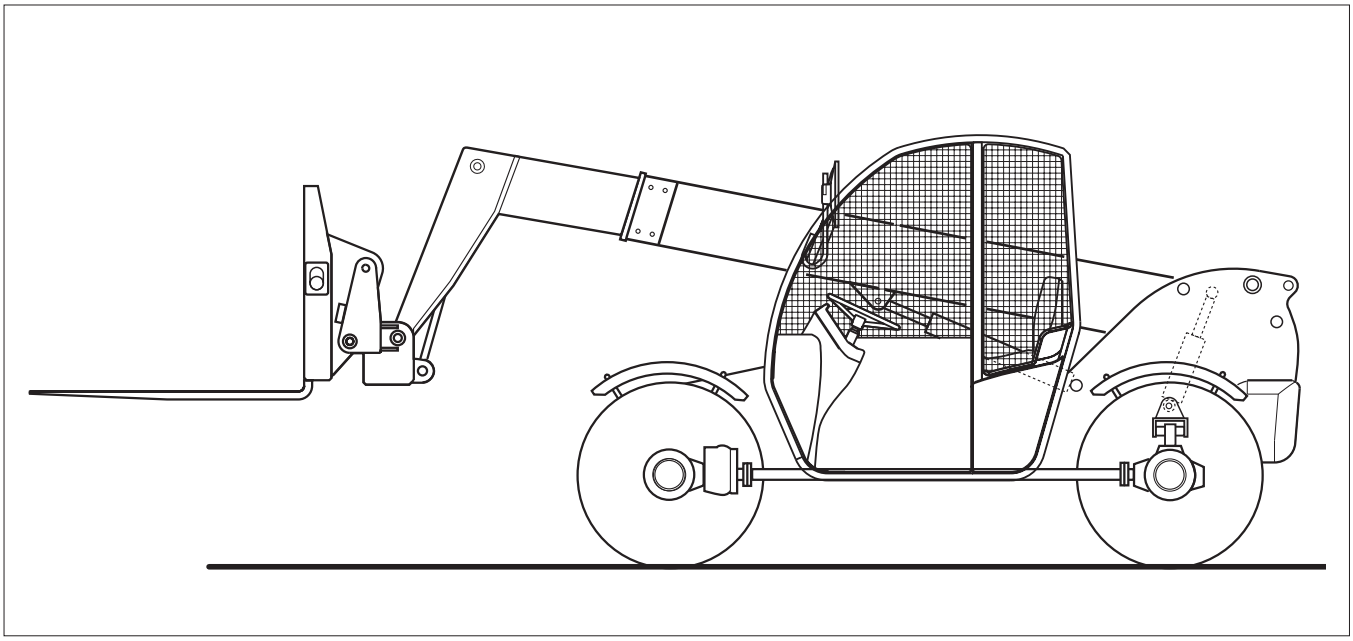
- Drive the machine to a flat, smooth ground.
- Move the retracted boom fully down and align the forks with the ground.
- Start lifting the boom and check that the forks remain parallel to the ground.

CAUTION

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

A-18 MAKE SURE THE SAFETY DEVICES INSTALLED ARE IN EFFICIENT WORKING ORDER

Attempt to start the engine with the forward or reverse gear put.
The engine must not start. If the engine starts, contact the GENIE Technical Service.
Repeat the operation putting first one gear, then the other.



A-19 CHECK THE ENGINE COOLANT LEVEL

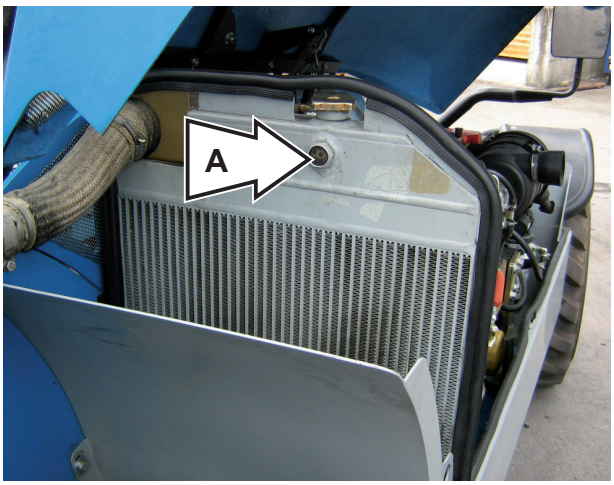
⚠DANGER

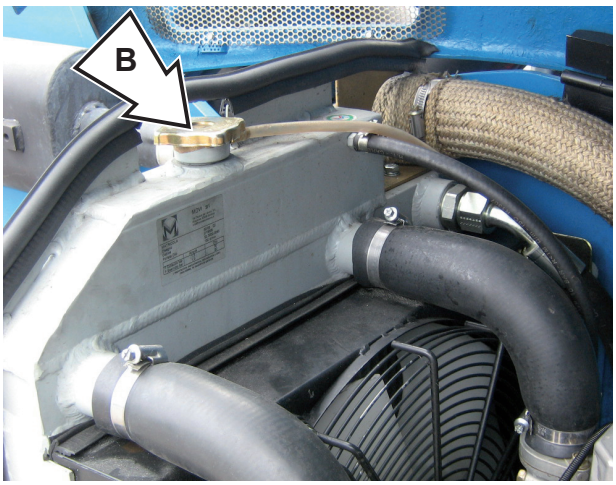
When the coolant is hot, the cooling system is under pressure. With warm engine, loosen the radiator plug slowly and carefully, without removing it, to drain the pressure. Use protection gloves and keep your face at a safe distance.

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

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





4.4 TABLE B PROCEDURES

B-1 CHANGE THE ENGINE OIL AND RENEW THE FUEL FILTER

B-2 CHECKTHETENSIONOFTHEALTERNATOR BELT

CAUTION

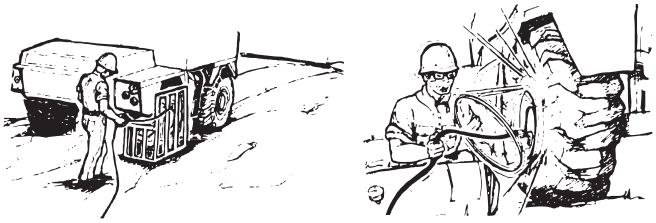
For the engine maintenance, please refer to the specific Operator handbook (code SLBU 7853-00) supplied with the machine.

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.

OKAY *WRONG*



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

	STANDARD GTH 55-19
Dimensions (front and rear)	12-16.5
Load index	10 pr
Rim	9.75x16.5
Wheel disc	8 holes DIN 70361
Pressure bar/Psi	4.5/65

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

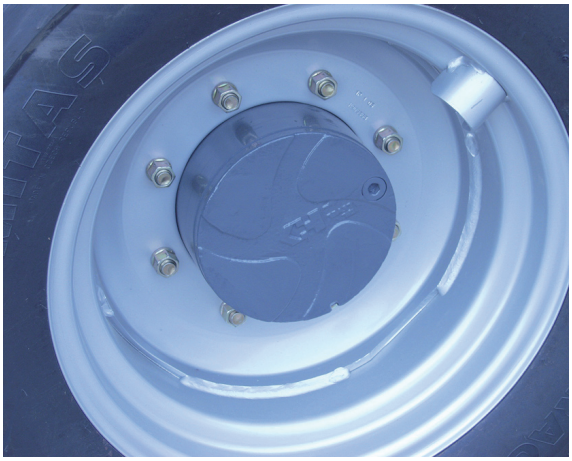
Always use tyres having the dimensions indicated in the vehicle registration card.

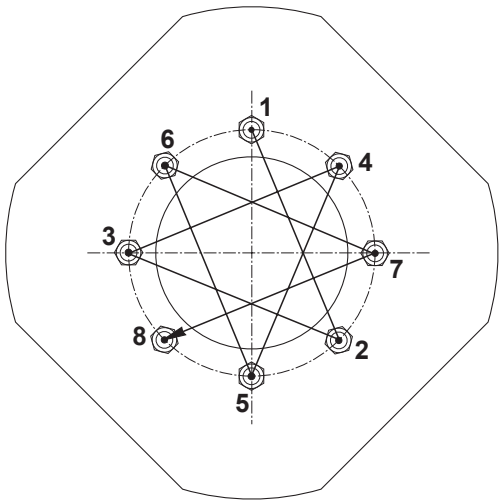
B-4 CHECK THE TIGHTENING OF THE WHEEL NUTS

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 with a pneumatic screwdriving machine.
- Lower the machine to the ground.

Re-tighten all nuts to a torque 300 Nm.





AWARNING

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

AWARNING

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.

AWARNING

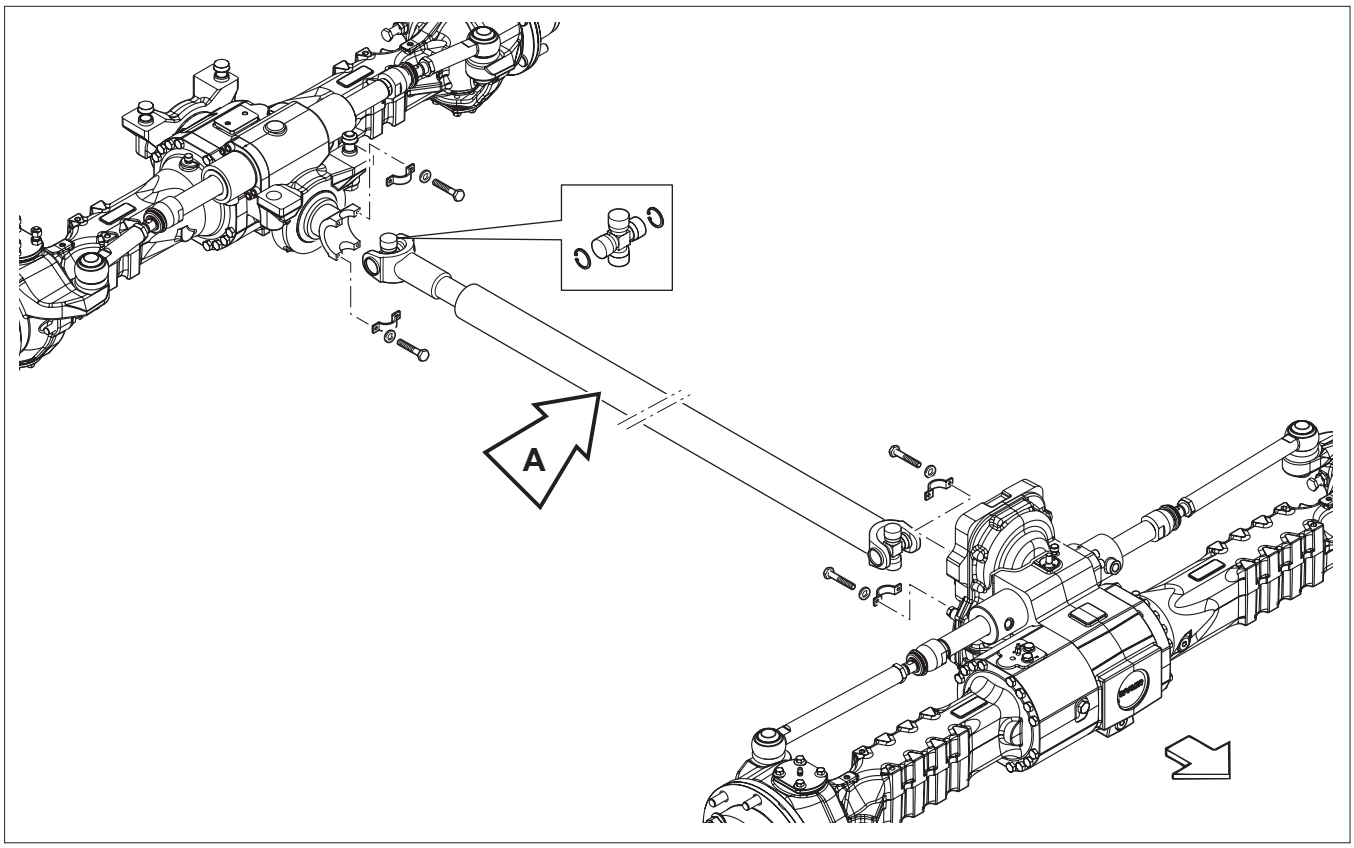
Always use tyres having the dimensions indicated in the vehicle registration card.

	STANDARD GTH 55-19
Dimensions (front and rear)	12-16.5
Load index	10 pr
Rim	9.75x16.5
Wheel disc	8 holes DIN 70361
Pressure bar/Psi	4.5/65

B-5 CHECK THE TIGHTENING OF THE CARDAN SHAFT SCREWS

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

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



4.5 TABLE C PROCEDURES

C-1 CHANGE THE ENGINE OIL AND RELEVANT FILTER

CAUTION

For the engine maintenance, please refer to the specific Operator handbook (code SLBU 7853-00) supplied with the machine.

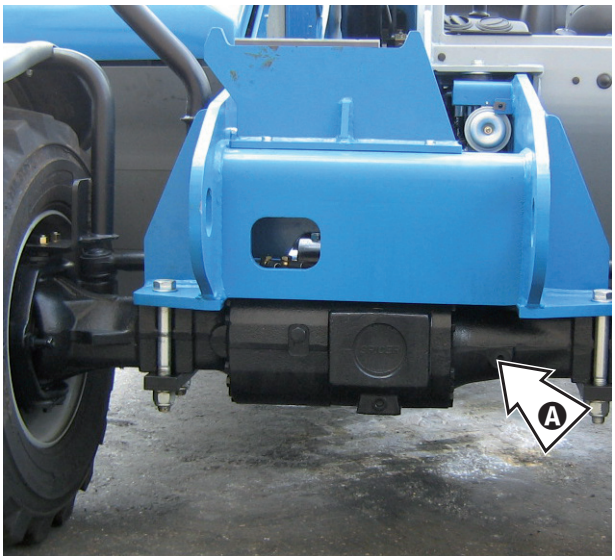
C-2 CHECK THE OIL LEVEL IN THE DIFFERENTIAL GEARS AND POWER DIVIDER

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

- Stop the machine on a level ground and engage the parking brake.
- Loosen level plug **A** and check if oil is level with the hole.
- If necessary, add new oil through the hole of the level plug until it comes out.
- Refit and tighten plug **A**.

NOTICE

Place a container of suitable size under the plug.

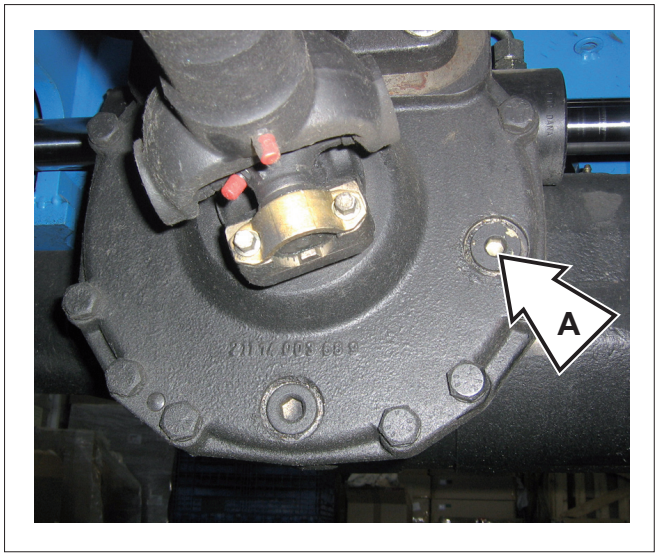


To check the oil level in the **power divider**:

- Stop the machine on a level ground and engage the parking brake.
- Clean the plug **A** 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.

NOTICE

Place a container of suitable size under the plug.



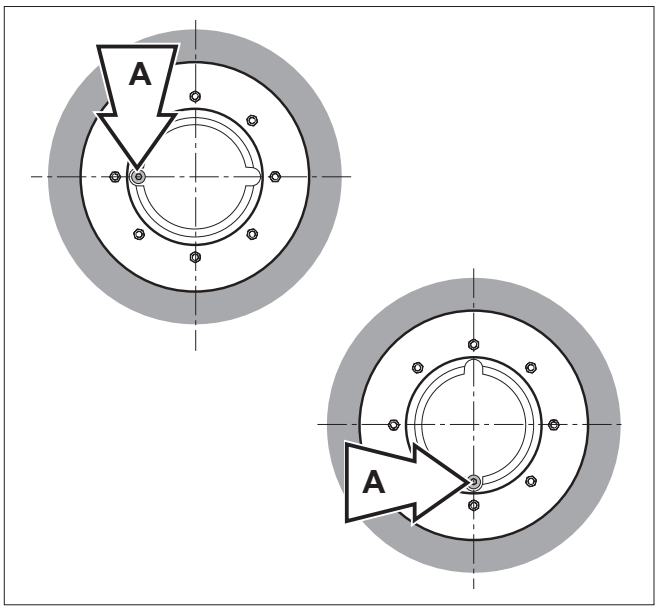
C-3 CHECK THE OIL LEVEL IN THE FOUR WHEEL REDUCTION GEARS

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.

NOTICE

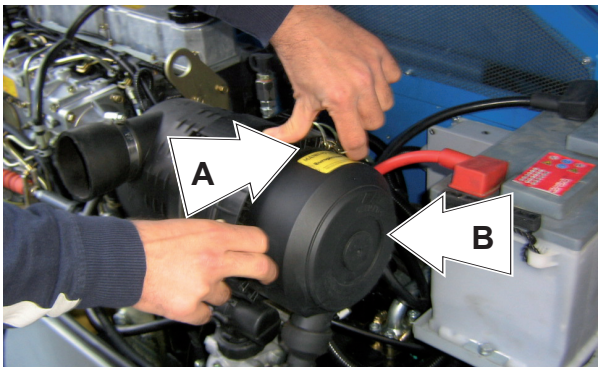
Place a container of suitable size under the plug.

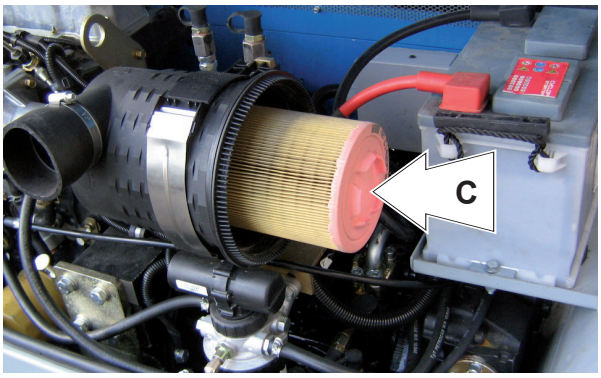


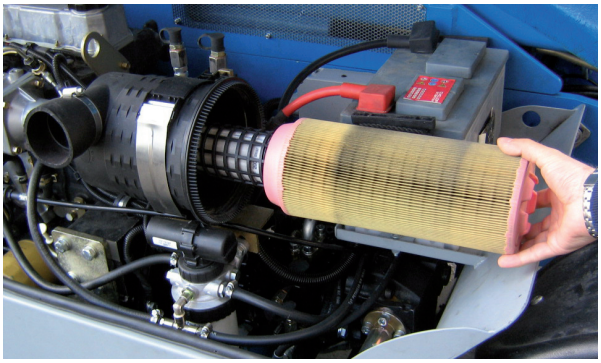
C-4 CHECK AND CLEAN THE ENGINE AIR FILTER

To clean the engine air filter :

- Stop the engine and engage the parking brake.
- Unlatch the fasteners **A** and remove cover **B**.
- Pull out the filter cartridge **C**.
- Clean the filter bowl.
- Dry clean the cartridge (at max. 6 bar pressure) and direct the air jet from inside to outside.
- Check the filter element for cracks by introducing a lamp inside.
- Refit the cartridge and make sure it is properly positioned.
- Close cover **B** and lock in place with fasteners **A**.





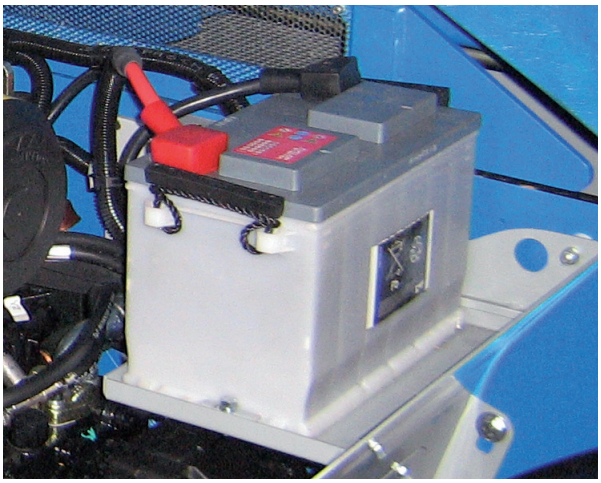


WARNING

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

C-5 CHECK THE CLAMPING OF THE CABLEHEADS 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

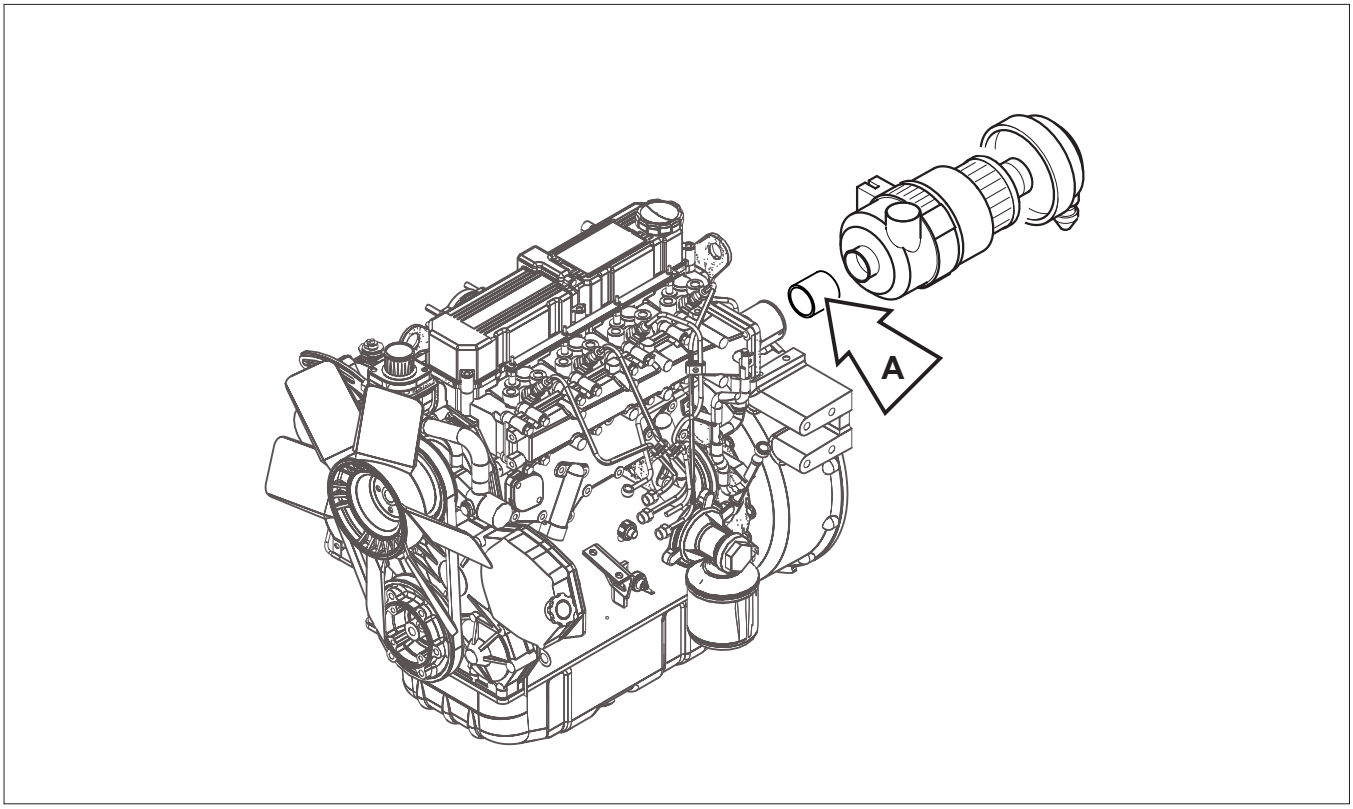
- ***Keep out of items which can produce sparks, of naked flames or lit cigarettes.***
- ***Do not rest metal objects onto the battery. This can result in a dangerous short especially during a recharge.***

C-6 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

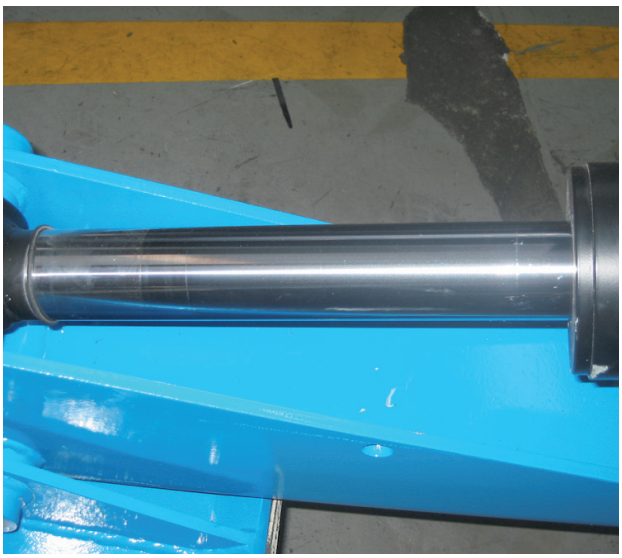
If you use the machine continuously for several days, check these sleeves, as well as the hose clamps more frequently.



C-7 CHECK THE CYLINDER CHROMIUM-PLATED RODS

Visually check the cylinder rods for scoring every month.

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

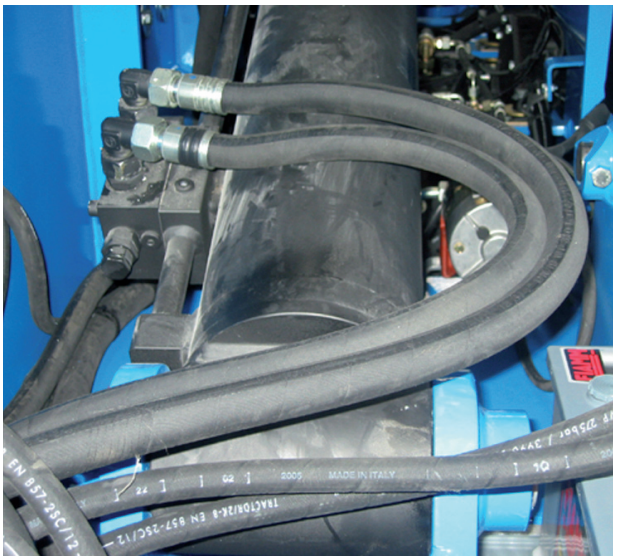


C-8 CHECK THE HYDRAULIC LINES

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.

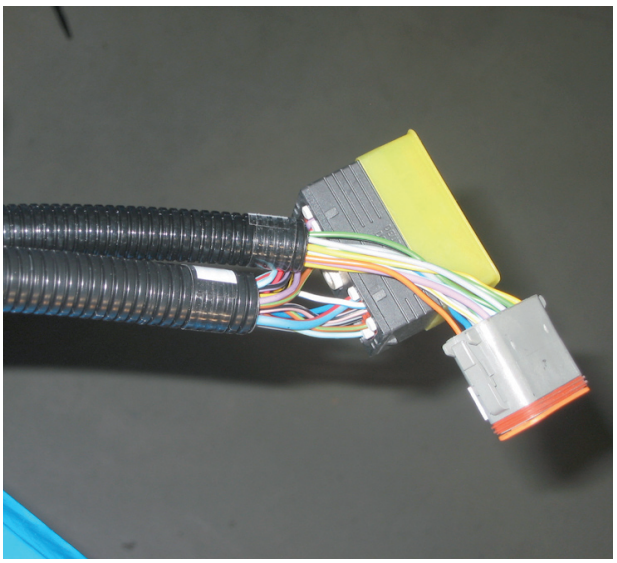


C-9 CHECK THE ELECTRIC CABLES

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.



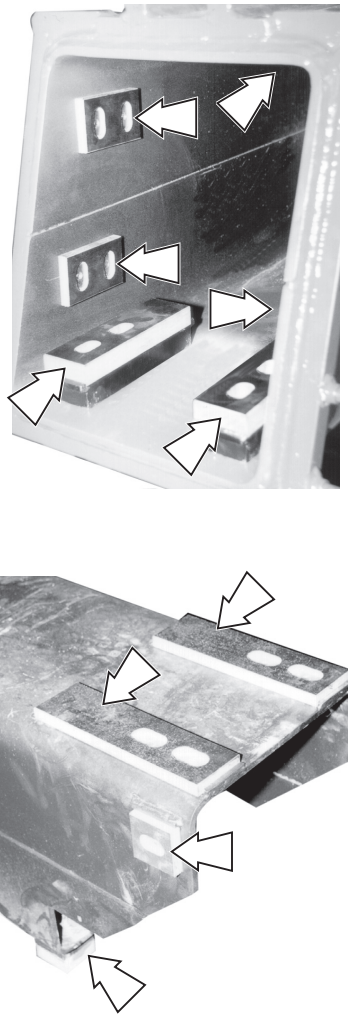
C-10 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

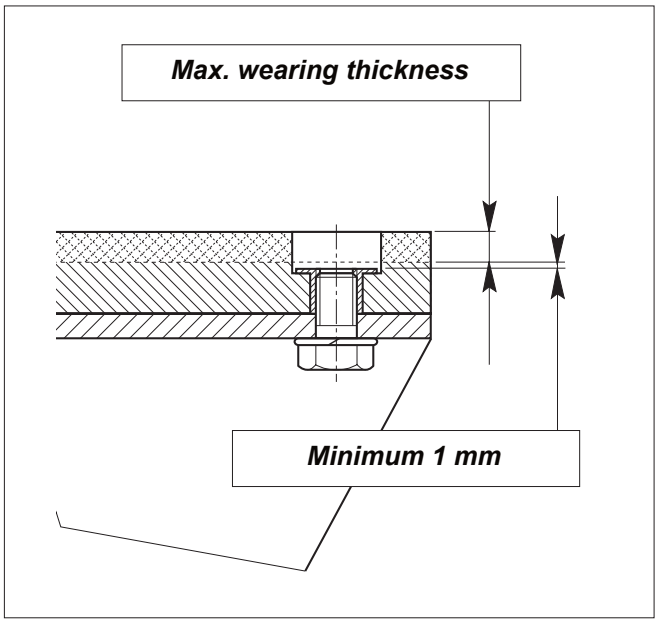
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

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.





C-11 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.

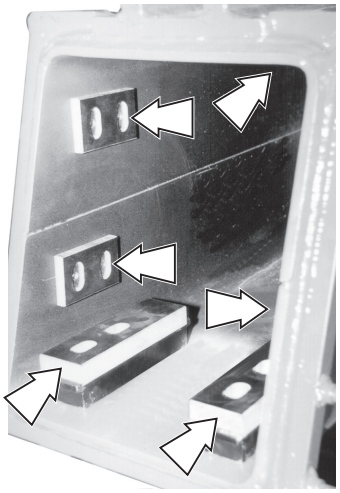
Tightening torques of the pad screws in relation to the screw diameter

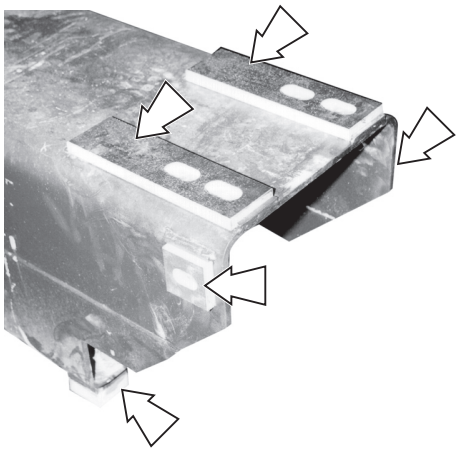
Screws M10	Nm 30
Screws M14	Nm 50

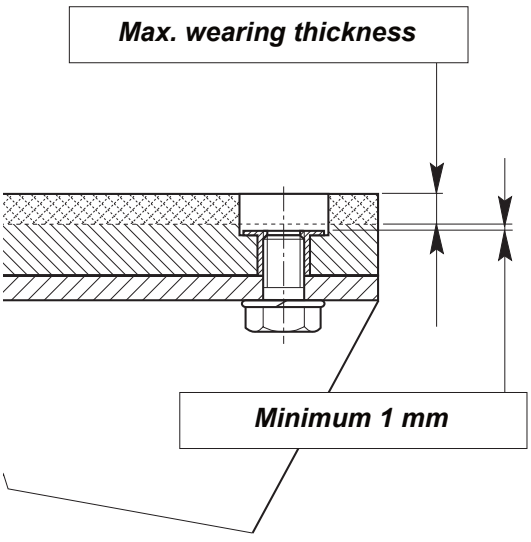
Tightening torques higher than those recommended can cause the break of the pad or of the locking threaded bush.

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.







C-12 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 brush new grease. We recommend using:

- **INTERFLON grease code 640772** **FIN GREASE LS 2**

CAUTION

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

C-13 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.

C-14 CHECK THE EFFICIENCY OF THE BLOCK VALVES

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

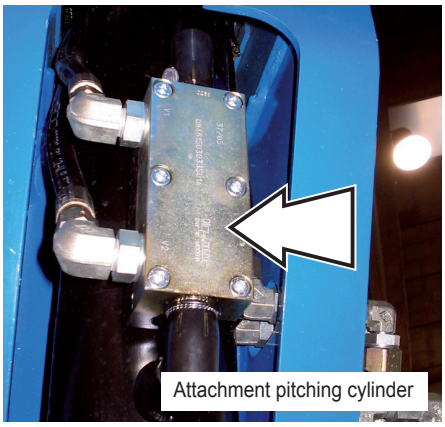
To check the efficiency of a valve, proceed as follows:

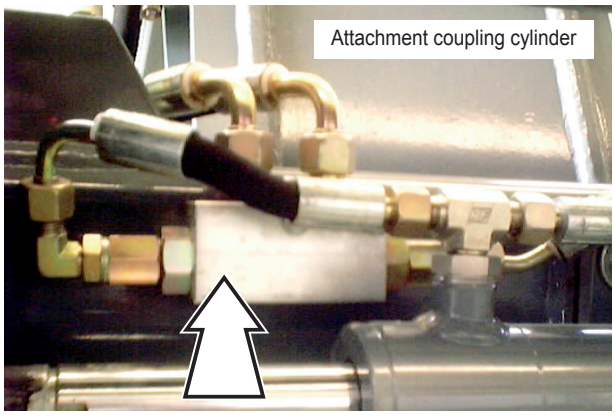
- Load a weight near the maximum payload (3500 kg roughly) onto the boom.
- Raise the load some centimetres above the ground (max 10 cm). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which you are checking the valve with caution.
- To check the efficiency of the block valves of the outriggers, lower them to the ground and unload the weight on the tyres. Loosen the cylinder hoses to check the efficiency of the valve.

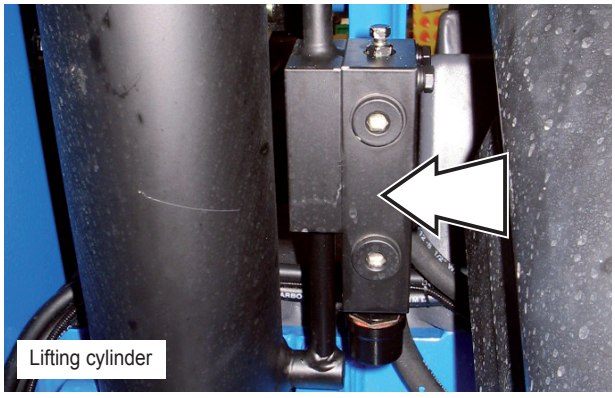
During the check, the load shall remain blocked in position.
Should that not be the case, the valve must be replaced. Contact GENIE Technical Service.

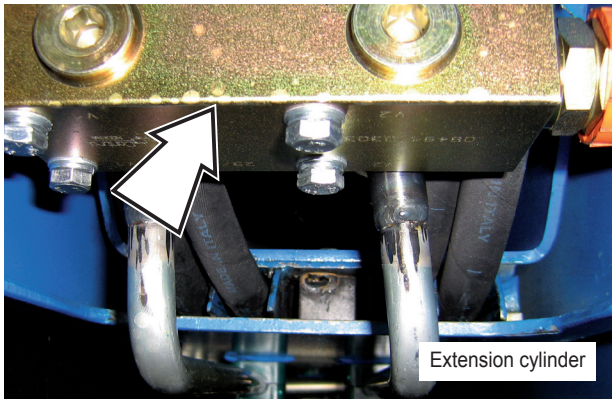
NOTICE

Place a container of suitable size under the plug.









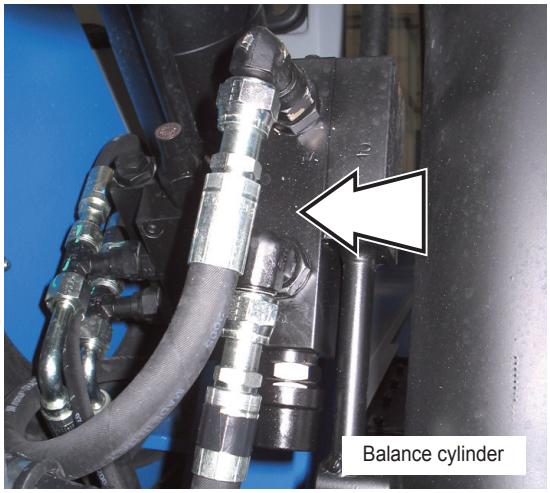
DANGER

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.***


Balance 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.

CAUTION

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 **124 Nm**.

D-3 CHECK THE TIGHTENING OF THE CAB FIXING SCREWS

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

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

D-4 CHECK THE BACKLASH 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.

D-5 CHANGE THE HYDRAULIC OIL FILTER

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

1 Stop the machine on a level ground and engage the parking brake.
2 Place a container of suitable size under the filter to collect any oil leaks.
3 Remove the filter cover **B** per accedere alla cartuccia **A**.
4 Change the filter element, then, before fitting a new one, thoroughly clean and grease both seat and gasket.
5 Refit and tighten the filter cover.

NOTICE

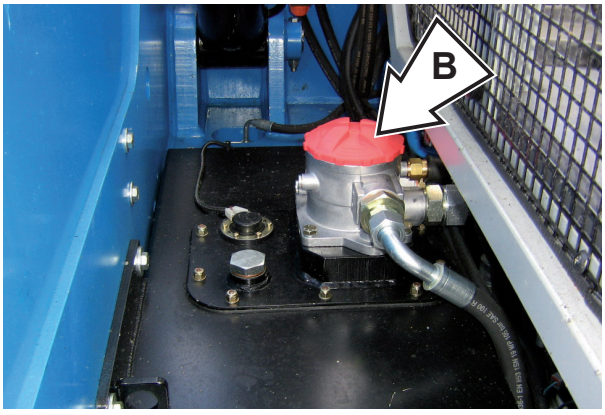
The handling and disposing of used oils may be ruled by local or national regulations. Address to authorised centres.

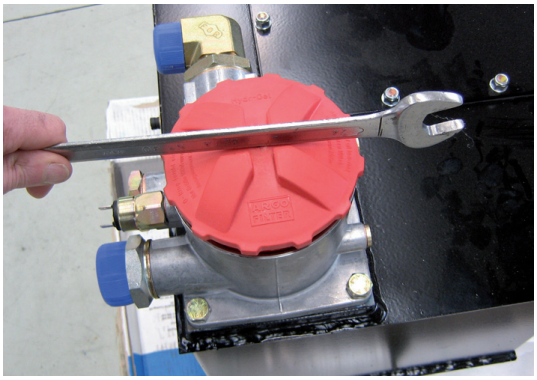
CAUTION

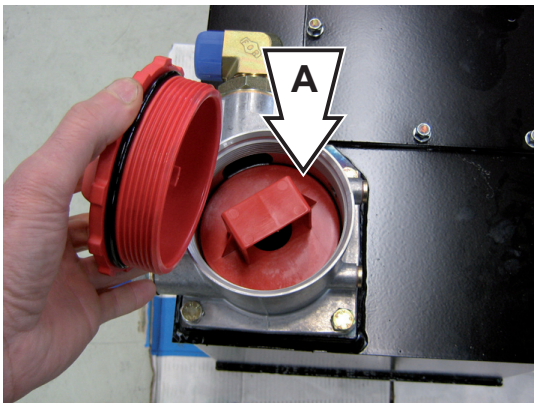
Hydraulic oil filter canisters cannot be cleaned or washed and refitted.
They must be replaced with new ones of the type recommended by the manufacturer:
Flow rate l/1' = MPS 150
Filtering = 10 µ
code = 09.4604.0001

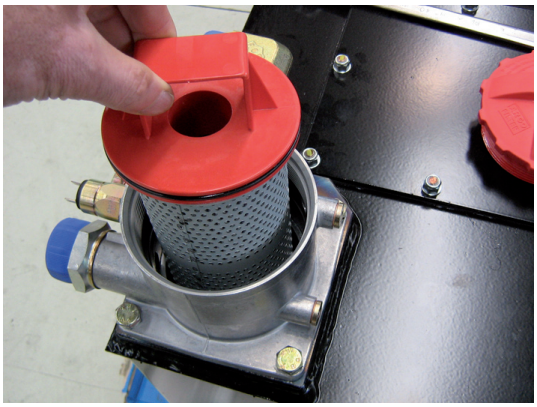
CAUTION

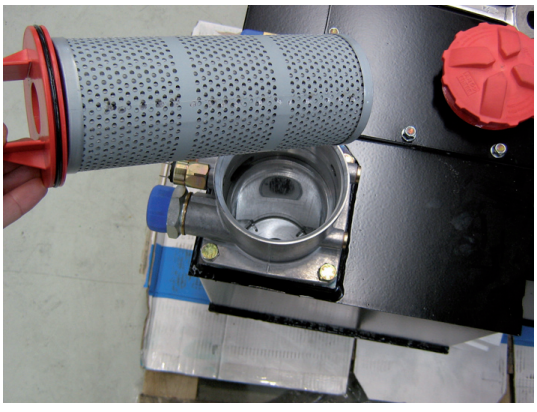
When changing the oil, drain it when it is still hot and the polluting substances are in suspension.







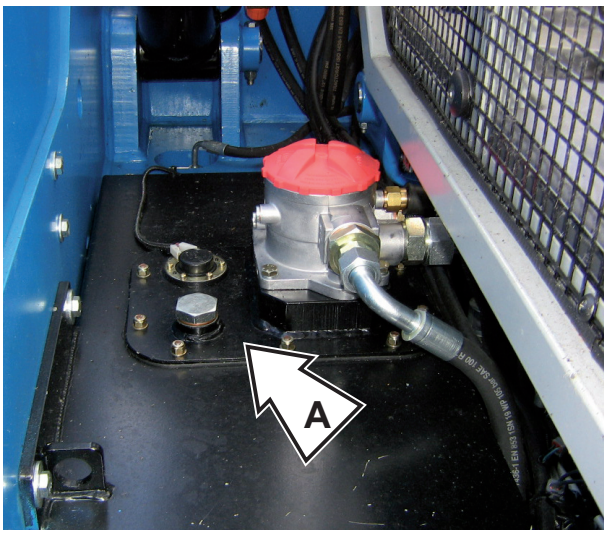




D-6 CHANGE THE HYDRAULIC OIL FILTER IN THE TANK

To change the hydraulic oil filter cartridge of the service circuits, proceed as follows:

- Stop the machine on a level ground and engage the parking brake.
- Remove the inspection hatch **A** and unscrew the oil filter fitted inside the tank.
- Check the tank is clean, then fit a new filtering element and refit the inspection hatch.
- Check the oil level within the tank. Add new oil, if necessary.



CAUTION

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' = STR 100/1
Filtering = 60 µ
code = 09.4604.0004

NOTICE

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

CAUTION

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

D-7 HAVE THE HYDRAULIC SYSTEM CHECKED BY A SKILLED TECHNICIAN

Every 6 months, we recommend have the efficiency of the hydraulic system checked by a skilled technician.

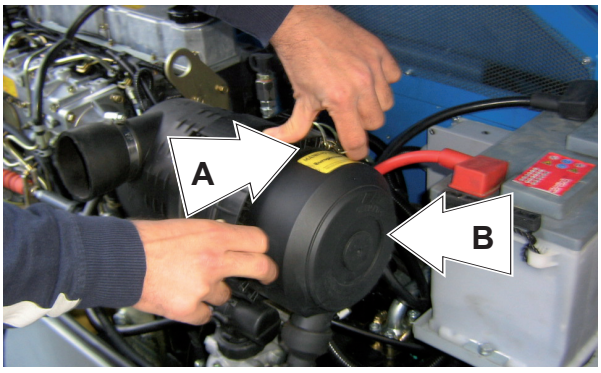
CAUTION

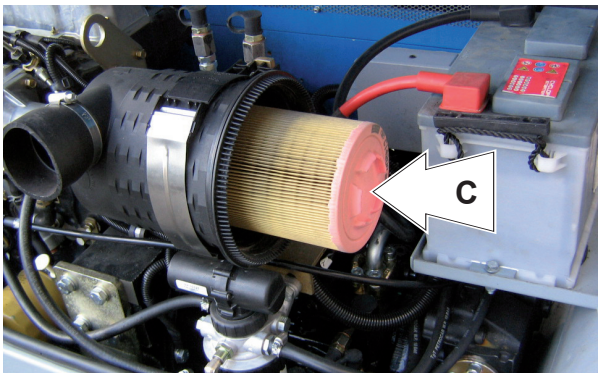
In case of need, please contact the GENIE Service Centre.

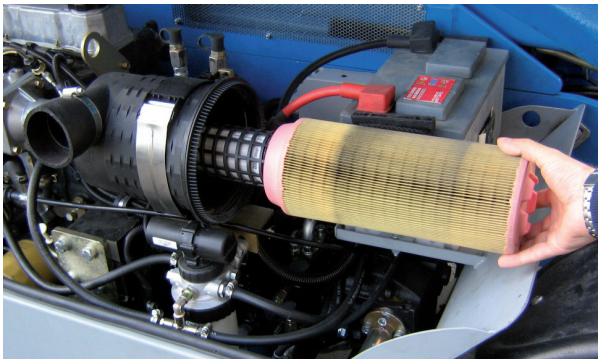
D-8 CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER

Changing the external element:

- Stop the engine and engage the parking brake.
- Unlatch the fasteners **A** and remove cover **B**.
- Pull out the filter cartridge **C**.
- Clean the filter bowl.
- Mount the new cartridge **D** and make sure it is correctly positioned.
- Close cover **B** and lock in place with fasteners **A**.





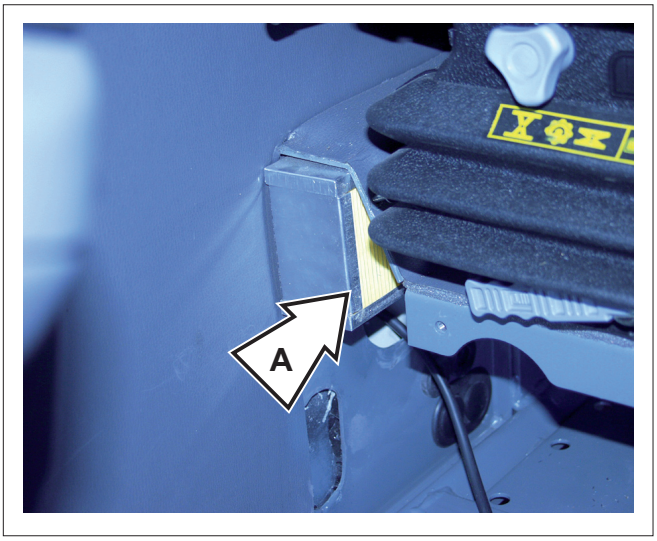


⚠WARNING

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

D-9 CLEAN THE CAB AIR FILTER

If the machine comes with a closed cab, 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.
- Pull out the filter **A** located to the left of the driving place.
- Clean the filter bowl.
- Clean the filter cartridge and replace in case of damage.

CAUTION

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

4.7 TABLE E PROCEDURES

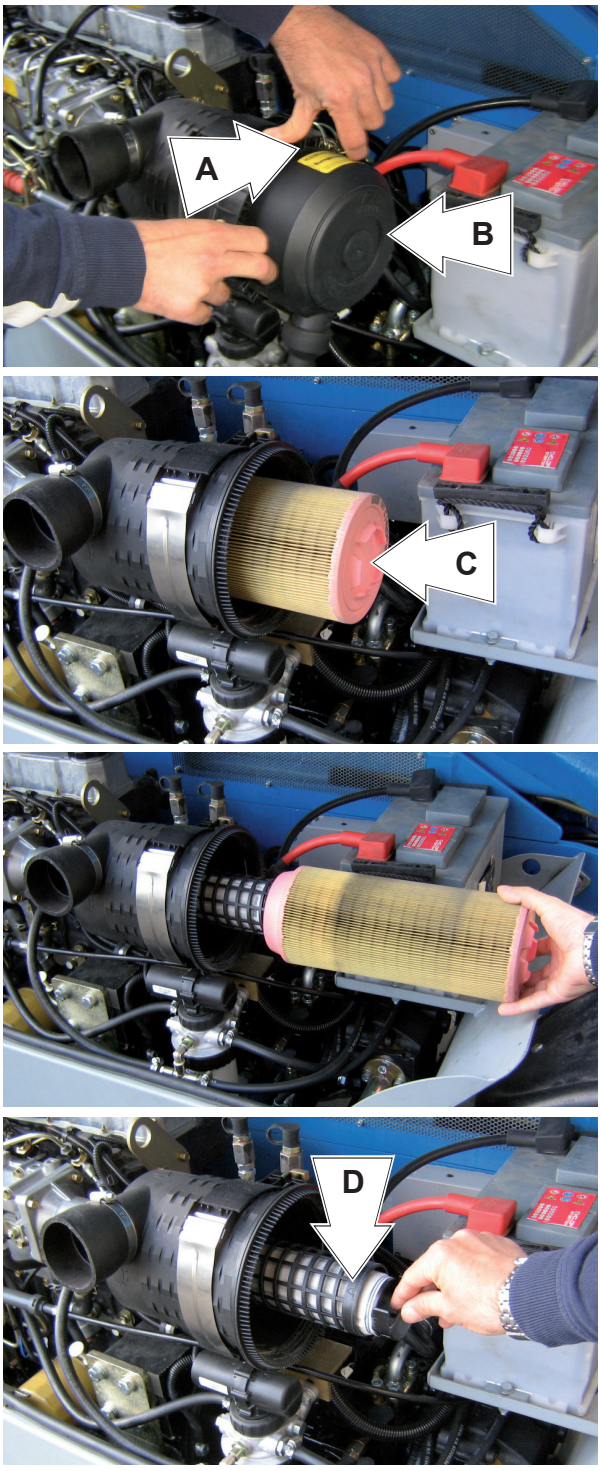
E-1 CHANGE THE SAFETY ELEMENT OF ENGINE AIR FILTER

To change the safety element:

- Stop the engine and engage the parking brake.
- Unlatch the fasteners **A** and remove cover **B**.
- Pull out the filter cartridge **C**.
- Loosen wing nut and remove the inner element **D**.
- Clean the filter bowl.
- Mount the new safety element and make sure it is correctly positioned.
- Tighten wingnut.
- Refit the outer element **C**.
- Close cover **B** and lock in place with fasteners **A**.

⚠WARNING

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



E-2 CHANGE THE OIL WITHIN POWER DIVIDER AND DIFFERENTIAL GEARS

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

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

NOTICE

Place a container of suitable size under the plug.

- Remove the level plug **A** and the filler.
- Remove the drain plug **B** and allow oil to flow out from the power divider.
- Refit and tighten the drain plug **B** .
- Add new oil through the filler until it is level with hole **A**.
- Refit and tighten filler/level plug.

Recommended oil:

- **FUCHS TITAN GEAR LS 85 W-90 API GL-5 LS / GL-5**

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

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

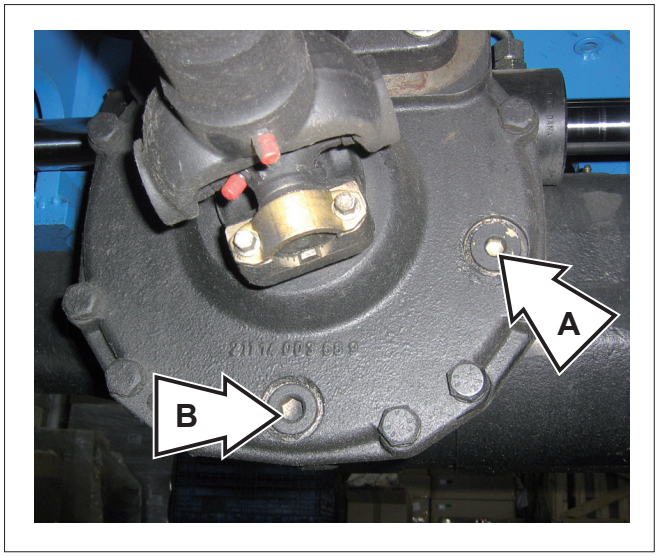
NOTICE

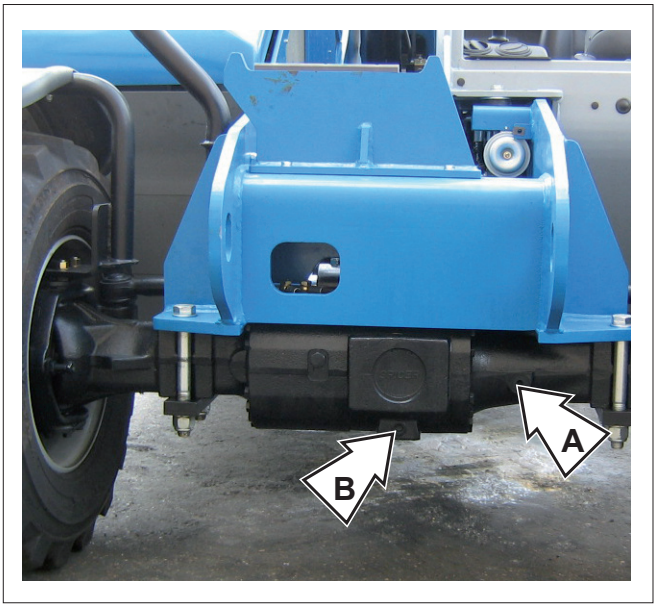
Place a container of suitable size under the plug.

- Loosen the drain plug **B** and the level plug **A** and allow oil to flow out from the differential gears.
- Refit and tighten drain plug **B**.
- Add new oil through plug **A** until it is level with the hole.
- Refit and tighten plug **A**.

Recommended oil:

- **FUCHS TITAN GEAR LS 85 W-90 API GL-5 LS / GL-5**





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

To change the oil in the **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.

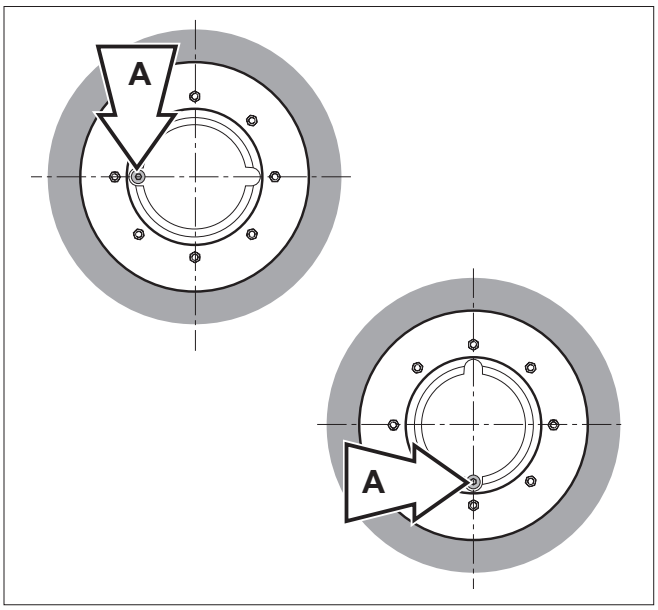
NOTICE

Place a container of suitable size under the plug.

- Unscrew plug **A** and drain any oil from the reduction gear.
- Rotate the wheel by 90° until the plug finds again on the horizontal axis.
- Add new oil through hole **A**.
- Refit and tighten plug **A**.

Recommended oil:

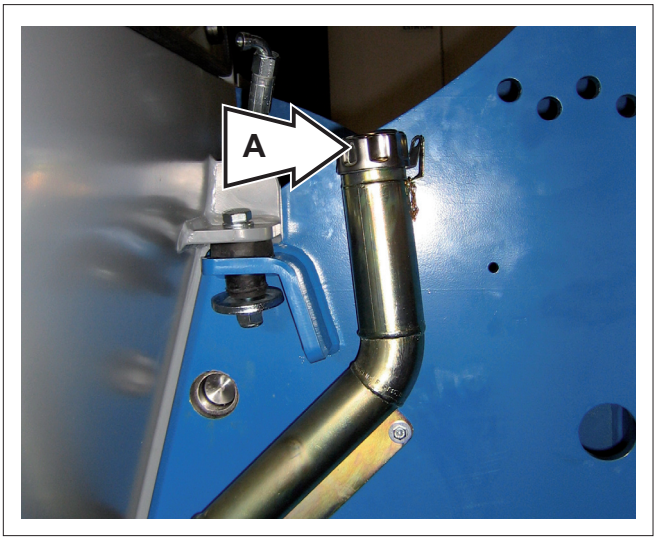
- **FUCHS TITAN GEAR LS 85 W-90 API GL-5 LS / GL-5**

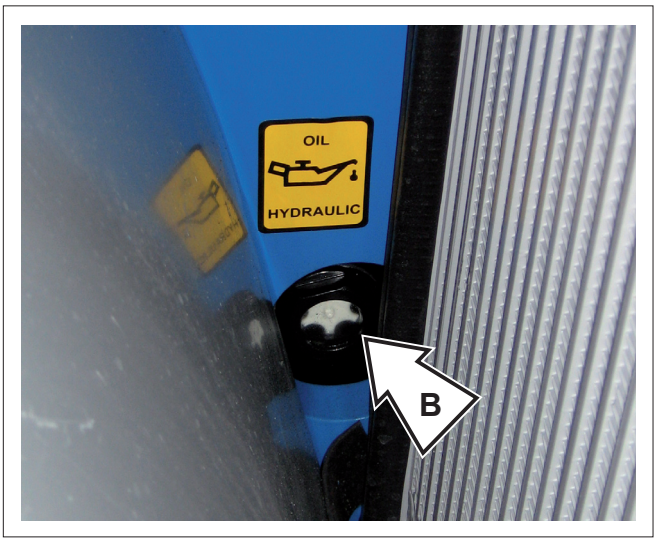


E-4 CHANGE THE HYDRAULIC OIL

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, placed in the lower part of the reservoir, and collect any oil leaks.
- Remove the drain plug and allow oil to flow out into the container.
- Remove the inspection cover **C** of tank.
- Carefully wash the tank with Diesel oil and blow a jet of compressed air.
- Refit the drain plug and the inspection cover **C**.
- Add new oil through hole **B**, by making sure that it matches the recommended type indicated until it is level with **A**.



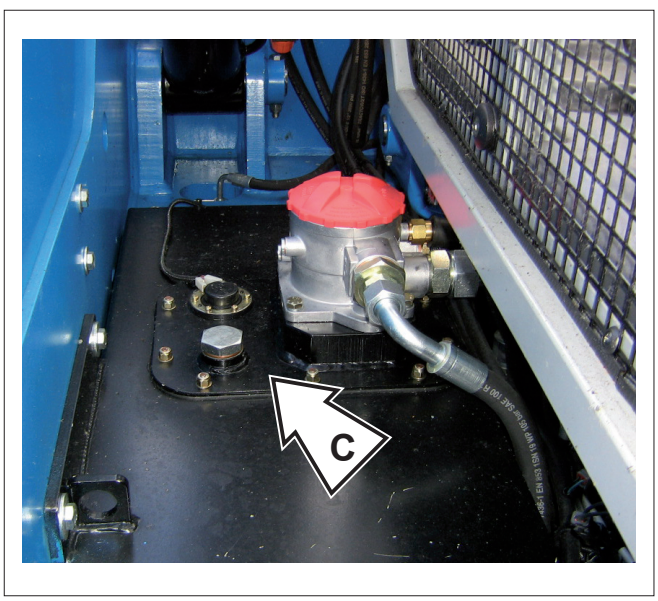


Recommended oil:

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

NOTICE

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

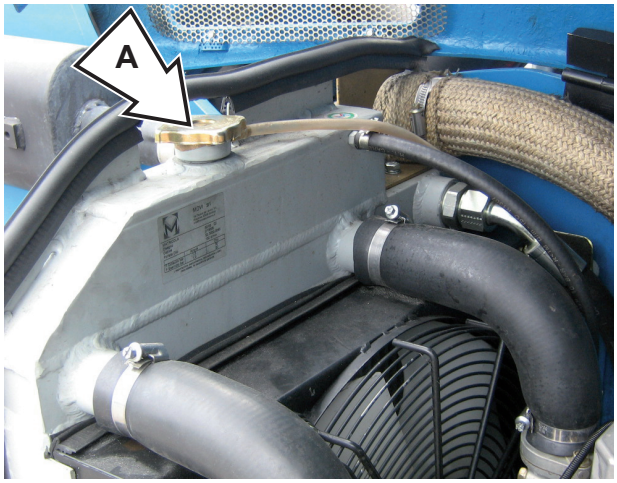


4.8 TABLE F PROCEDURES

F-1 CHANGE THE ENGINE COOLANT

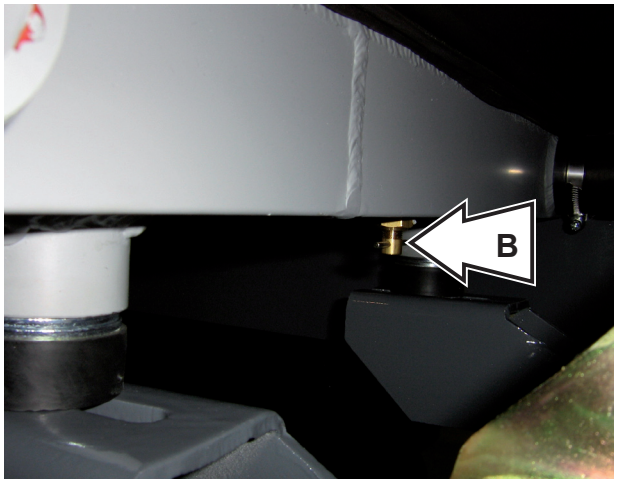
⚠ DANGER

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.
- Unscrew the plug **B** at the bottom of the radiator or disconnect the rubber hose, if no plug is present. Allow the coolant to flow out into a special container.
- Refit the plug or the hose and pour new antifreeze (50% water-antifreeze) through cap **A**. This proportion will provide protection up to -38°C.



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

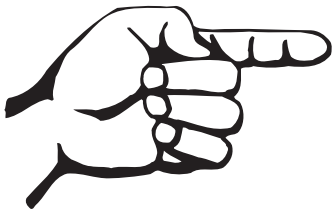
4.9 TABLE G PROCEDURES

G-1 CHECKING THE STATE OF THE 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 and the boom pins.

⚠DANGER

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



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Section 5
TROUBLESHOOTING

SECTION INDEX

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.

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 "**problem**" 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 PROBLEMS-CAUSES-SOLUTIONS

5.3.1 Hydraulic faults

Problem	Cause	Solution
The machine does not move neither forwards nor in reverse	Low pressure of the drive pump	Re-calibrate the pump (see sec. 2)
	DA valve damaged	Check the operation and replace the valve if necessary
	Hydraulic oil filter restricted	Change the oil filter
The boom does not move	Low pressure	Set the max pressure of the main valve to 270 bar
	Hydraulic pump damaged	Replace the pump
	Load sensing valve defective	Check the efficiency of the valve; replace if necessary
	The valve of the main valve leaks	Dismantle the valve, check and eliminate any foreign matters
	Joystick damaged	Check the efficiency of the joystick; replace if necessary
Wrong wheel shafting	Leakage in the steering cylinders	Check and replace the seals if necessary
	Leakage in the steer selection solenoid valve	Check the efficiency of the solenoid valve
The steering wheel is hard (low force in the cylinders)	Low pressure	Check the pressure; in case, reset (170 bar)
	Priority valve damaged	Check the efficiency of the valve; replace if necessary
Low booster supply	Pump damaged	Change the pump
	Motor damaged	Change the motor
The machine drive is not enough	Hydraulic oil filter restricted	Clean the oil filter
	Low hydraulic oil level	Replenish the tank up to the recommended level

Problem	Cause	Solution
	The oil in the tank is contaminated	Drain the oil, clean tank and pipes, empty the pumps and add new oil
By stepping down on the pedal, the machine does not brake	Brake pump damaged	Check the pump operation and bleed the system if necessary
	Front axle brakes defective	Check the operation of the brake disks of the front axle
When the engine is stopped, the lifting cylinder does not support the boom	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the engine is stopped, the cylinder does not support the forks	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the engine is stopped and the boom is high, the extension cylinder moves in	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the load is lifted, the fork cannot be levelled	Seals of the levelling cylinder worn out	Dismantle the cylinder and replace the seals
	Shockproof valves of the main valve dirty or maladjusted	Remove the valves, dry-clean or replace if damaged, and re-calibrate
	One-way valves of the levelling cylinder dirty or damaged	Remove the valves, dry-clean or replace if damaged, and replace in their seats

Problem	Cause	Solution
When the max load is applied, forks move down	Seals, rod and liner of the fork tilting cylinder worn out	Dismantle the cylinder and check and replace any defective parts
	Leakage in the cylinder block valve	Check the leakage; remove the valve and rectify or replace
	Low pressure in the hydraulic circuit	Re-calibrate the main valve
The fork tilting is not efficient	The seals of the fork levelling cylinder are damaged	Fit a new kit of seals and check the tightness of the cylinder
	Leakage in the cylinder block valve	Check the valve operation; if necessary, clean or change the valve
	Line from main valve to block valve defective	Check the hydraulic line carefully and replace any defective pipelines
	Safety valves of the main valve maladjusted or damaged	Check the efficiency of the safety valve fitted to the ports of the main valve. If necessary, proceed with the clibration or replacement
The boom extension is not efficient	The seals of the internal boom extension cylinder are damaged	Fit a new kit of seals and check the tightness of the cylinder
	Cylinder rod damaged	Check the rod condition
	Leakage in the cylinder block valve	Check the valve operation; if necessary, clean or replace the valve
	Hydraulic line defective	Check the hydraulic line carefully and replace any defective pipelines
	Main valve damaged	Check the efficiency of the main valve and replace if necessary

Problem	Cause	Solution
The boom lifting is not not efficient	The seals of the lifting cylinder are damaged	Fit a new kit of seals and check the tightness of the cylinder
	Cylinder rod damaged	Check the rod condition
	Leakage in the cylinder block valve	Check the valve operation; if necessary, clean or replace the valve
During the down-movement, the boom jerks	Leakage in the cylinder block valve	Check the valve operation; if necessary, clean or replace the valve
Operating the joystick no function is activated	Joystick damaged	Check the joystick efficiency; replace if necessary
	Valve of the main valve damaged	Check the efficiency of the valve; replace if necessary
The steering wheel is slow and noisy	Couplings damaged	Replace the couplings
	Hydraulic drive damaged	Replace the hydraulic drive
Differential noisy and high temperature on the body	No oil	Check the oil level and refill. If trouble cannot be rectified, dismantle the unit
	Bearings damaged	Replace the bearings
The boom is hard to move in when it is fully extended in the horizontal position	Sliding blocks worn out	Check all the front bottom pads and the rear top pads for wear; clean the sliding guides of the boom thoroughly and lubricate with the special “INTERFLON FIN GREASE LS 2” grease
When moving out the second telescope, the boom tends to move right and left	Sliding blocks worn out	Check the play and replace any worn parts or place shims
When moving out the second telescope, the boom tends to jump	Grease is insufficient or inadequate	Check that the grease smeared on the boom is INTERFLON FIN GREASE LS2; smear the boom againwith grease

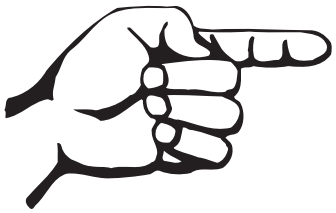
Problem	Cause	Solution
	Foreign matters on the sliding blocks and the relevant surfaces of the boom	Check and eliminate any foreign matters
Low traction	Drive pump defective	Check the pressure values of the drive pump and re-calibrate if necessary. If the overfeeding pressure drops down, replace the pump and clean the pump-motor couplings

5.3.2 Electrical faults

Problem	Cause	Solution
No power to dashboard	Battery switch off	Turn on the switch
	Battery down	Check the battery efficiency; replace if necessary
	50A fuse blown	Change the fuse
	Dashboard damaged	Check the dashboard and replace if necessary
	Broken or damaged wiring	Reconnect or replace the wiring
Engine does not start, starter does not run	50A fuse blown	Change the fuse
	Dashboard damaged	Check the dashboard and replace if necessary
	K01 relay damaged	Change the relay
	Speed switch ruined	Check or replace the speed switch
	70A engine start relay damaged (K11)	Change the relay
	Starter defective	Change the starter
Engine does not start - starter runs but engine does not start	No fuel	Refuel
	Fuel filter clogged	Clean or replace the filter
	Fuel ducts empty	Eliminate any air
	Start aid solenoid damaged	Check the efficiency and replace if necessary
	Engine stop solenoid damaged	Check the efficiency and replace if necessary
	Broken or damaged wiring	Reconnect or replace the wiring
The machine does not move forward/back	Speed switch damaged	Check the efficiency or replace the switch if necessary
	Fuse F23 broken	Change the fuse
	Relays K02-K03-K05 damaged	Change the relays

Problem	Cause	Solution
	Forward/reverse speed solenoid valves damaged	Check the efficiency or replace
	Service brake micro-switch damaged	Check the efficiency or replace
	Parking brake switch	Check the efficiency or replace
	Broken or damaged wiring	Reconnect or replace the wiring
	Negative brake pressure switch	Check the efficiency or replace
No steer selection	Fuse F20 blown	Change the fuse
	Steer selector damaged	Check the efficiency or replace the switch if necessary
	Coils of the steer selection solenoid valve damaged	Check the coils; replace if necessary
	Broken or damaged wiring	Reconnect or replace the wiring
Hydraulic oil thermometer defective	Indicator damaged	Change the part
	Temperature sensor defective	Check or replace the sensor
	Broken or damaged wiring	Reconnect or replace the wiring
The parking brake lamp does not come on	Dashboard instrument damaged	Change
	Broken or damaged wiring	Reconnect or replace the wiring
The fuel gauge does not work	Dashboard instrument damaged	Change
	Fuel sensor defective	Check and replace the sensor if necessary
	Broken or damaged wiring	Reconnect or replace the wiring

Problem	Cause	Solution
The engine coolant thermometer does not work	Indicator defective	Change the part
	Temperature sensor defective	Check and replace the sensor if necessary
	Broken or damaged wiring	Reconnect or replace the wiring
High hydraulic oil temperature	Hydraulic oil bulb damaged	Check or replace the bulb if necessary
	Indicator defective	Change the part
	Radiador clogged	Check the radiator and eliminate any impurities from the fins
The joystick does not operate the boom extension/retraction	Fuse F20 blown	Change the fuse
	Road-jobsite-platform selector damaged	Check and replace the selector if necessary
	Yellow button on control lever	Check the efficiency of the yellow pushbutton
	Main valve selection valve	Check the efficiency of the solenoids and replace if they are damaged
	Broken or damaged wiring	Reconnect or replace the wiring
The joystick does not operate the attachment locking/unlocking	Fuse F20 blown	Change the fuse
	Red button on control lever	Check the efficiency of the red pushbutton
	Main valve selection valve	Check the efficiency of the electrical coils and replace if they are damaged
	Mouvement selection button	Check the efficiency or replace



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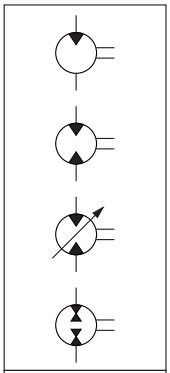
Section 6
SCHEMES

SECTION INDEX

6.1 HYDRAULIC SYMBOLS

MOTORS



Fixed motor with one direction of flow

Fixed motor with two directions of flow

Variable motor with two directions of flow

Reversible fixed motor with two directions of flow

PUMP

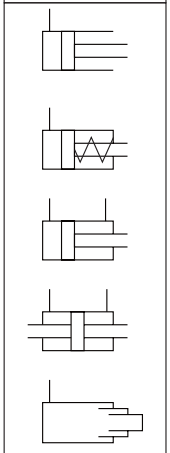
Fixed displacement pump with one direction of flow

Fixed displacement pump with two directions of flow

Variable displacement pump with one direction of flow

Variable displacement pump with flow regulator

CYLINDERS



Single-acting cylinder

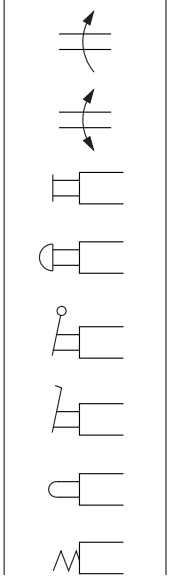
Single-acting cylinder with spring return

Double-acting cylinder

Double-acting cylinder with bilateral rod

Telescopic cylinder

COMMANDS AND CONTROLS



Shaft rotating in one direction

Shaft rotating in two directions

Hand-operated control

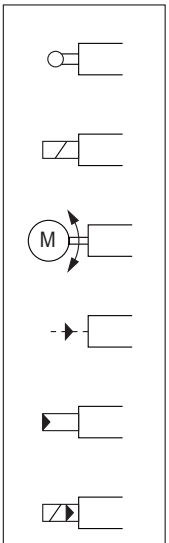
Hand-operated control with pushbutton

Hand-operated control with lever

Hand-operated control with pedal

Mechanical control with pushbutton

Mechanical control with spring



Mechanical control with roller

Electro-magnetic control with winding (solendoid)

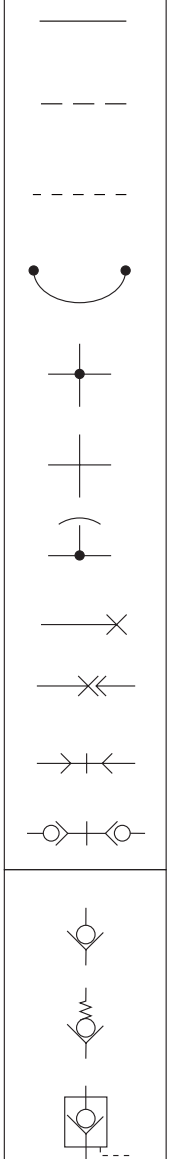
Control with electric motor

Direct pressure control

Indirect (piloted) pressure control

Control with electromagnet and piloted distributor

PIPES AND CONNECTIONS



Induction and return pipe

Piloting pipe

Blow-by pipe

Flexible hose

Connecting point

Pipe cross without connection

Breather

Closed pressure fitting

Pressure fitting with connected pipe

Quick fitting

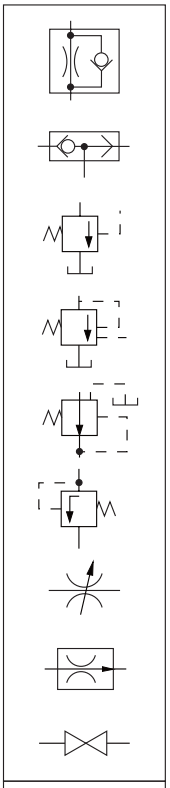
Quick fitting with check valves

DISTRIBUTION - SETTING ELEMENTS

Non-return valve

Calibrated non-return valve

Unlockable non-return valve



Combined non-return and throttle valve

Switching valve

Pressure relief valve with direct control

Pressure relief valve with hydraulic control

Pressure reducing valve

Sequence valve

Adjustable throttle valve

Two-way flow regulator

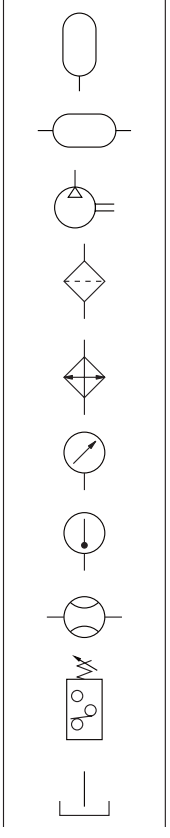
Cut-out cock

POWER SOURCES

Electric motor

Thermal engine

OTHER EQUIPMENT



Accumulator

Water tank

Compressor

Filter

Cooler

Pressure gauge

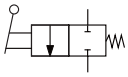
Thermometer

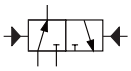
Flowmeter

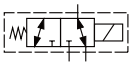
Pressure switch

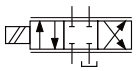
Drain to tank indication

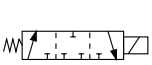
DISTRIBUTION - SETTING ELEMENTS

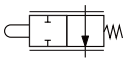

Two-position and two-way distributor, with manual lever control and spring return

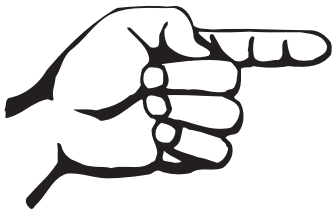

Three-way and two-position distributor, with hydraulic control


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



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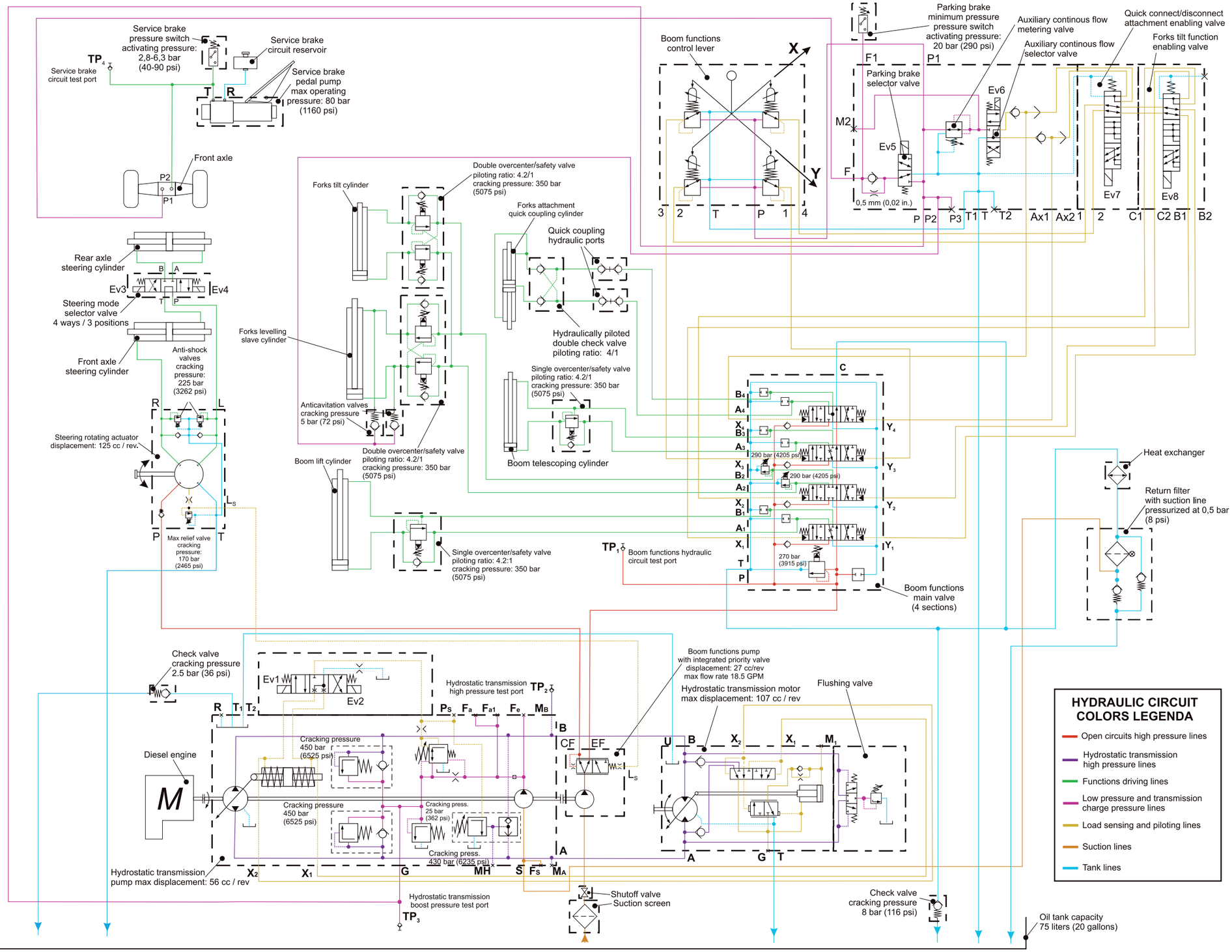
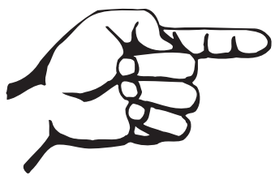
6.2 HYDRAULIC SCHEME

6.2.1 GTH 55-19





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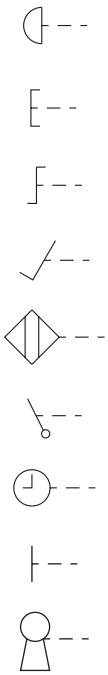
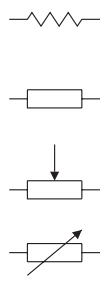
6.3 ELECTRICAL SYMBOLS

ACTUATORS



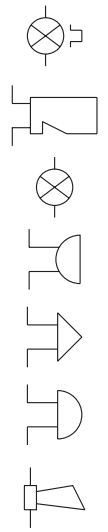
Emergency controls
Pushbutton control
Rotary control
Pedal control
Proximity control
Lever control
Timed control
Mechanical/manual control
Key control

RESISTANCES



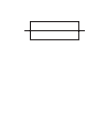
Resistance
Resistor
Potentiometer
Variable resistance

SIGNALS



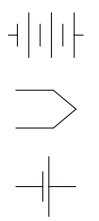
Intermittent lamp
Whistle
Lamp
Buzzer
Siren
Bell
Horn

FUSES AND RELAYS



Horizontal fuse
Relay

ACCUMULATORS

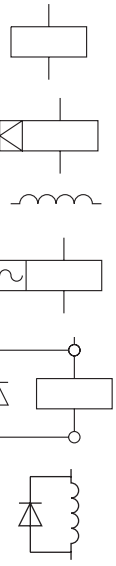


Battery
Thermocouple
Element

TERMINALS AND GROUNDS

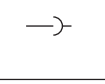
Ring
Ground
Terminal
Ground to frame
Knot
Protection ground
Frame ground 2

COILS



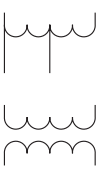
Coil
Mechanical coupling coil
Winding
A/C coil
Coil with diode
Winding with diode

CONNECTORS



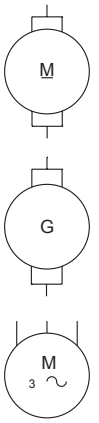
Connector

STATIC APPLICATIONS



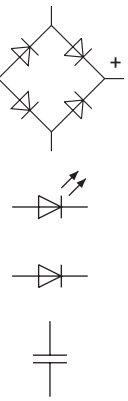
Auto-transformer
Transformer

DYNAMIC APPLICATIONS



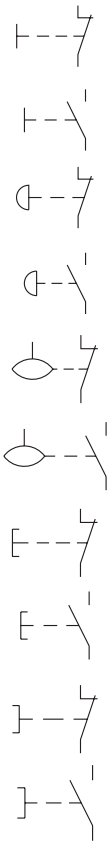
Motor
Generator
As_3p_motor

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

CONTACTS


Thermal


Normally open (NO)


Normally closed (NC)


NO limit switch


NC limit switch


Contactor

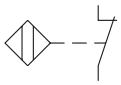

Magneto-thermal closure


Magneto-thermal opening

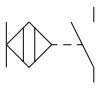

Thermal closure

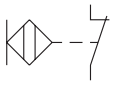

Thermal opening


Exchange


NC proximity


NO proximity

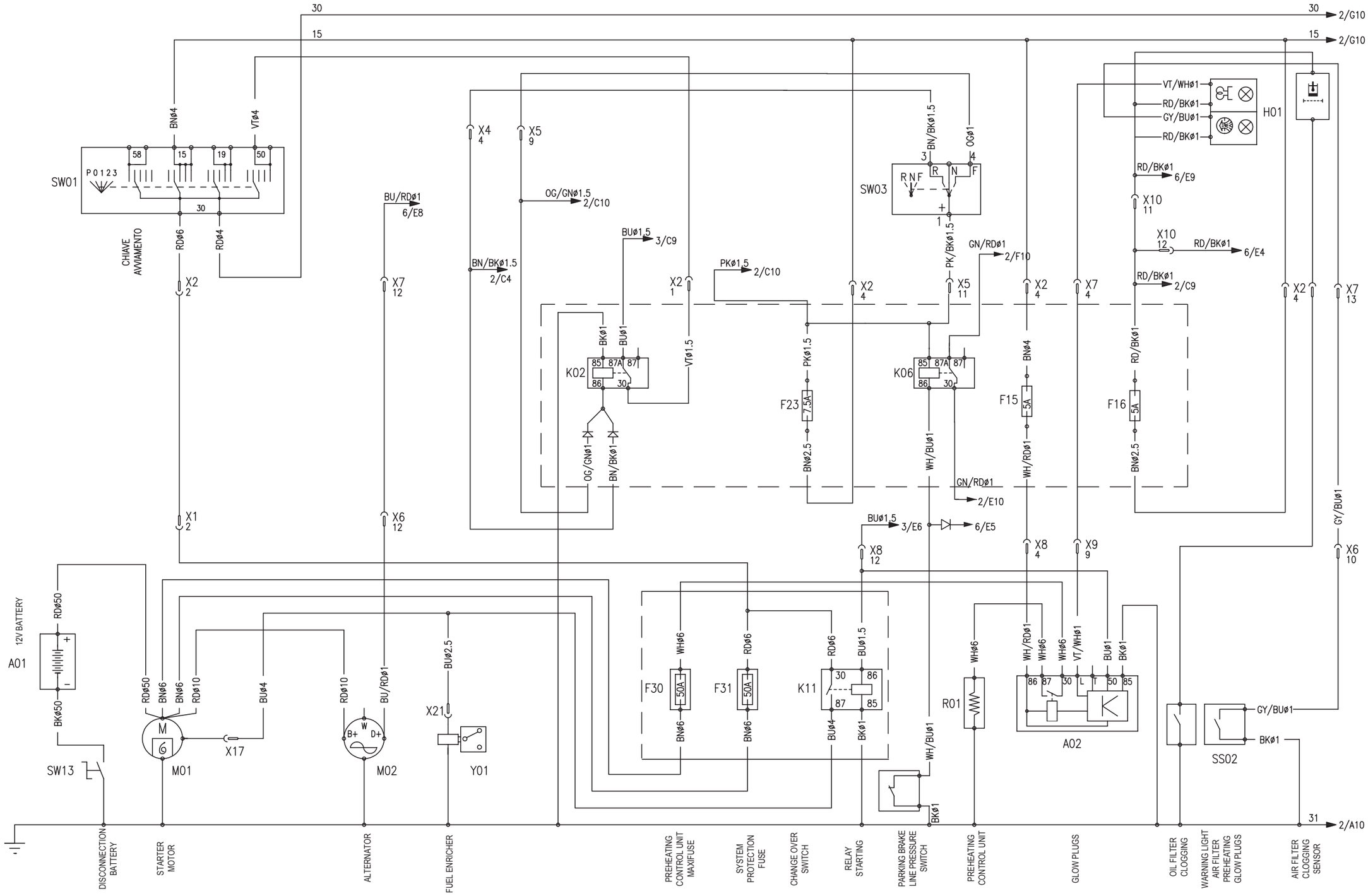

NO mechanical

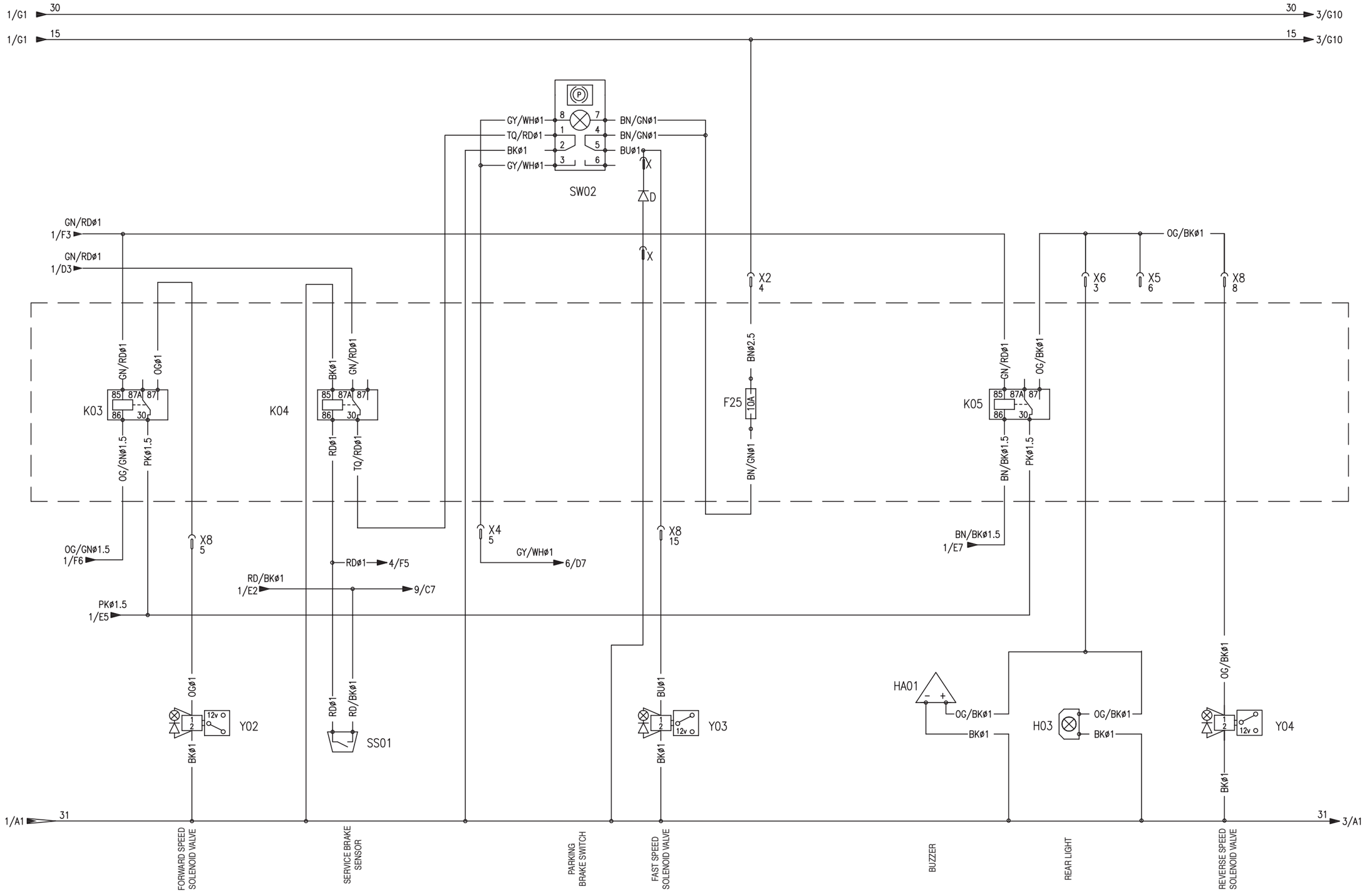

NC mechanical

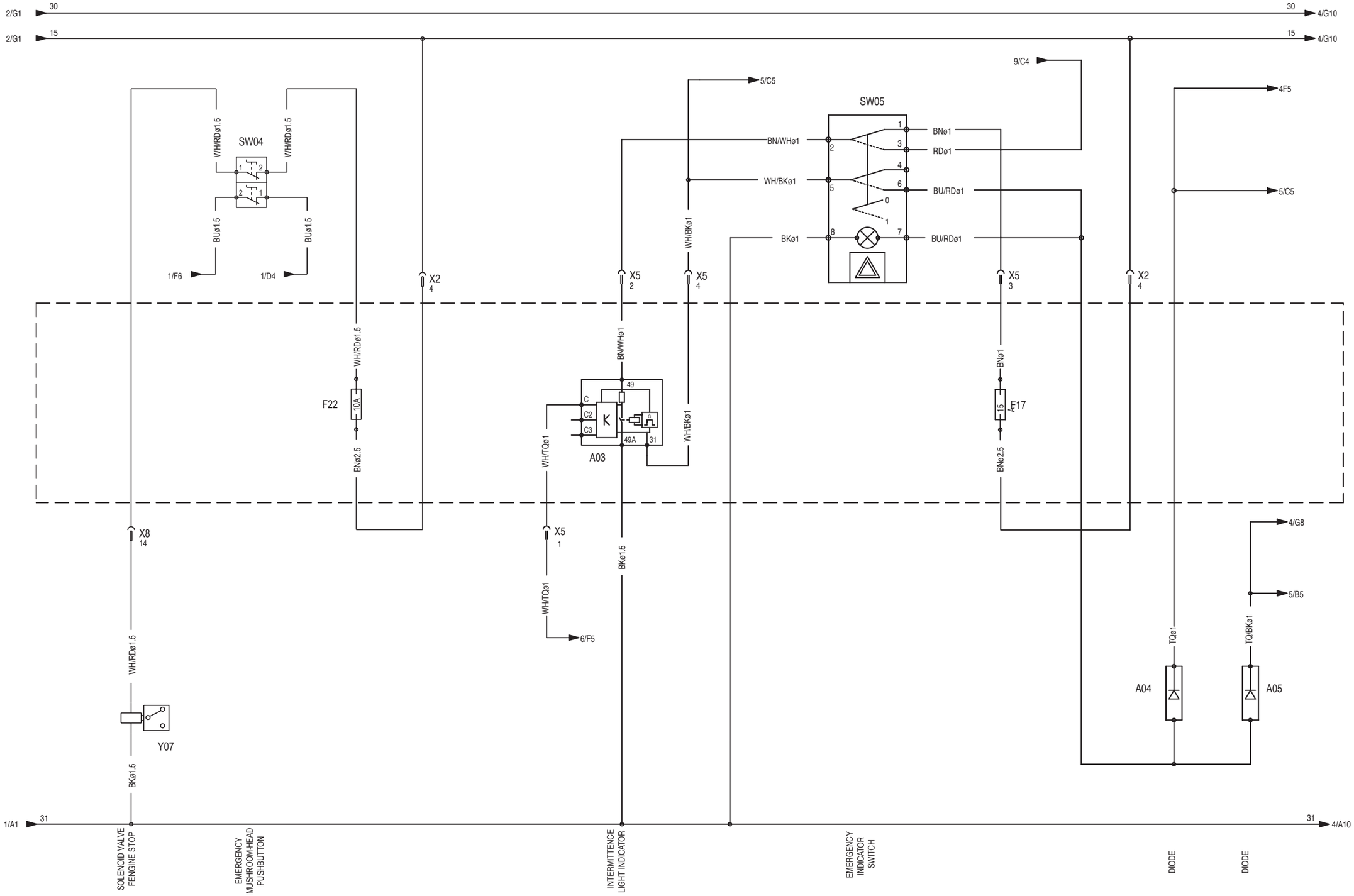

Selector

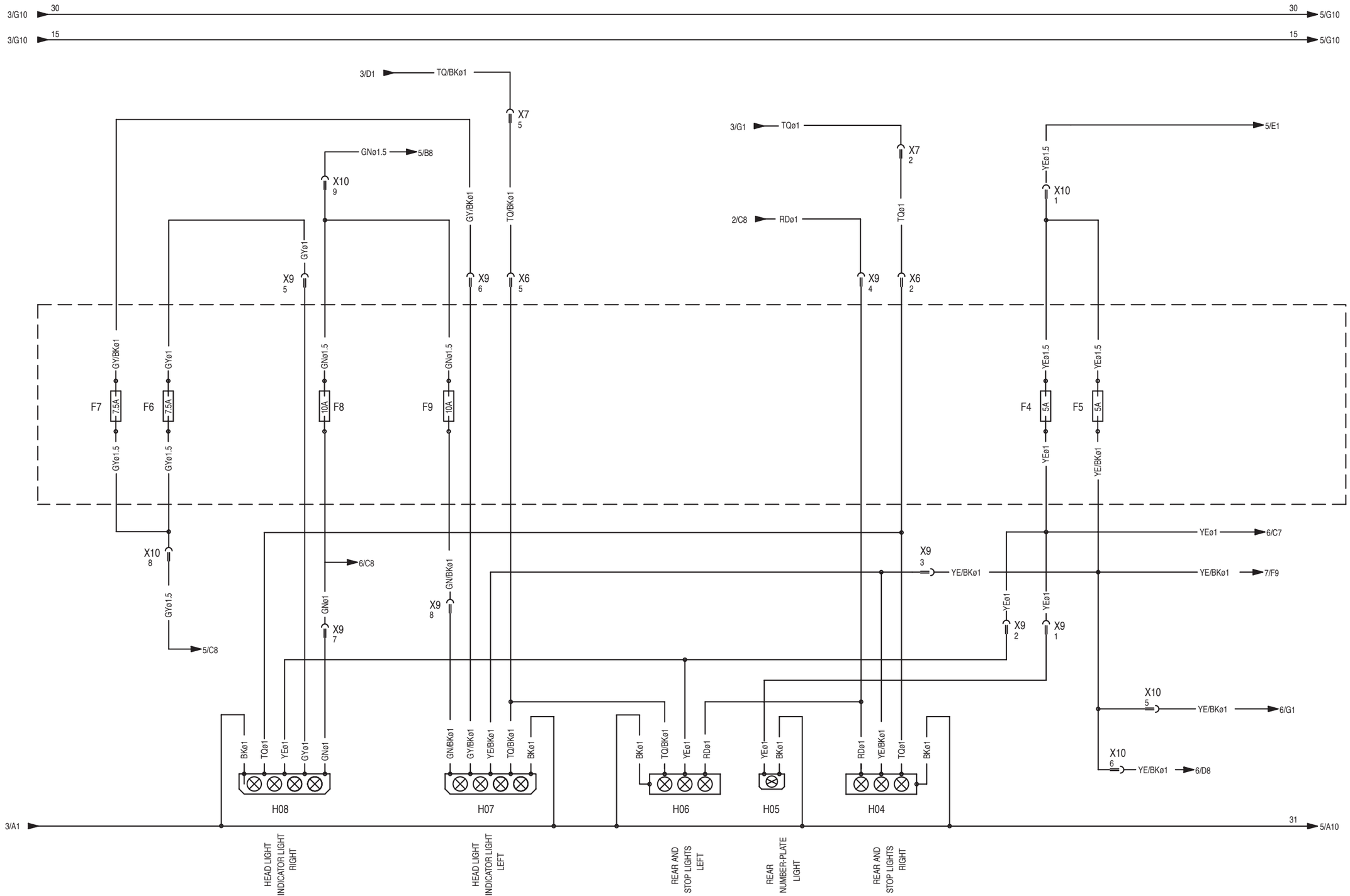

Selector2

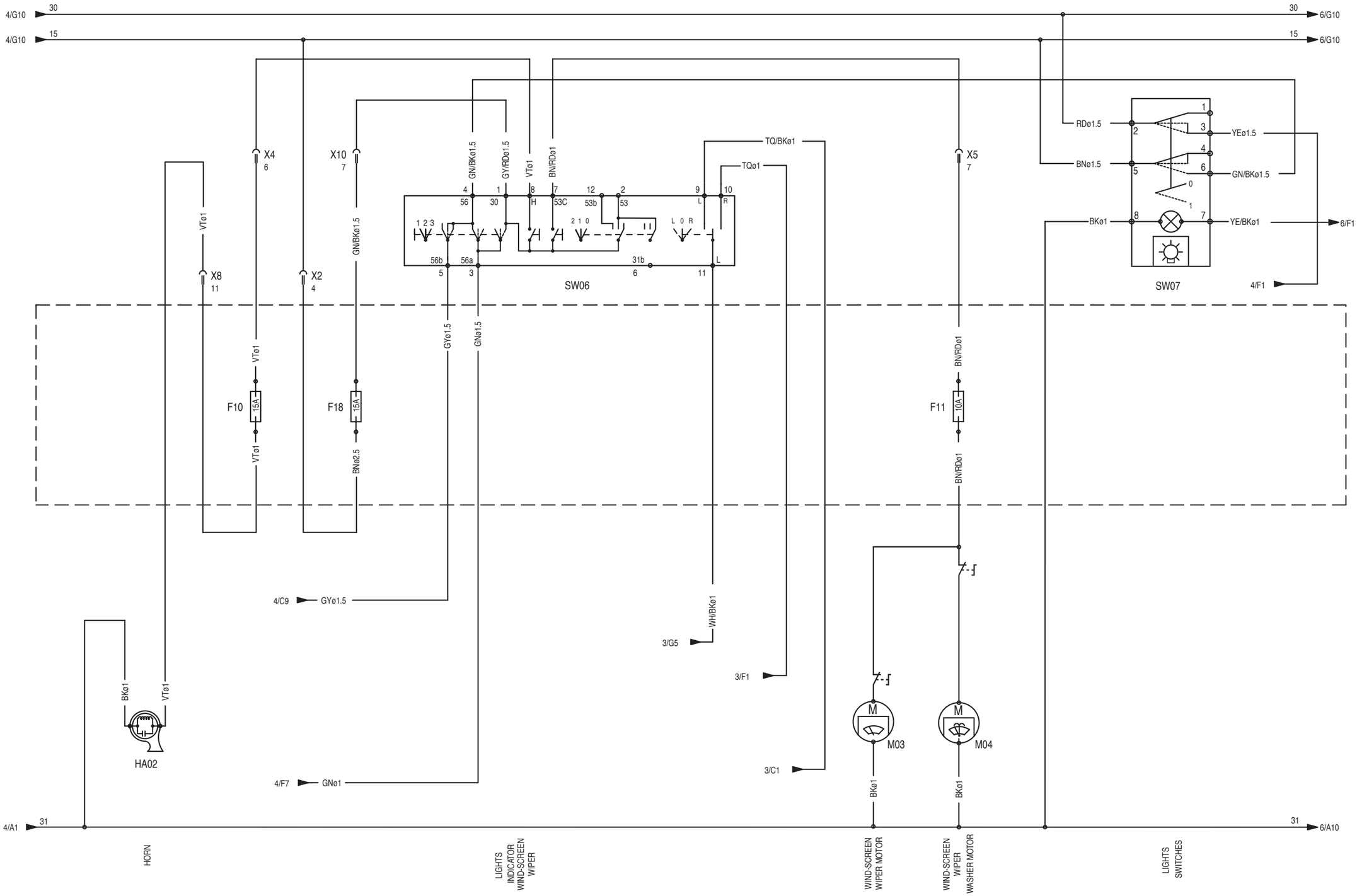
6.4 WIRING DIAGRAMS

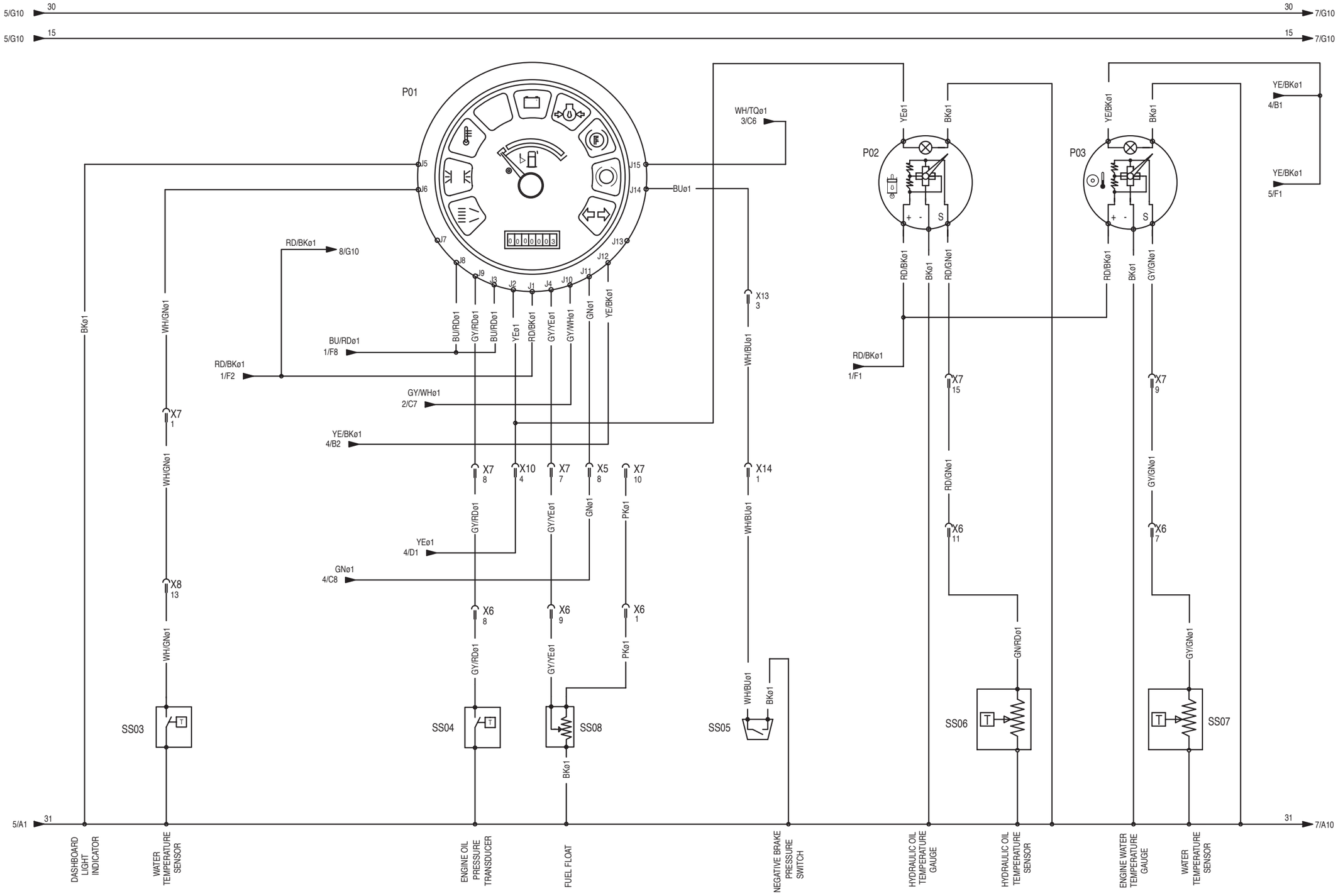


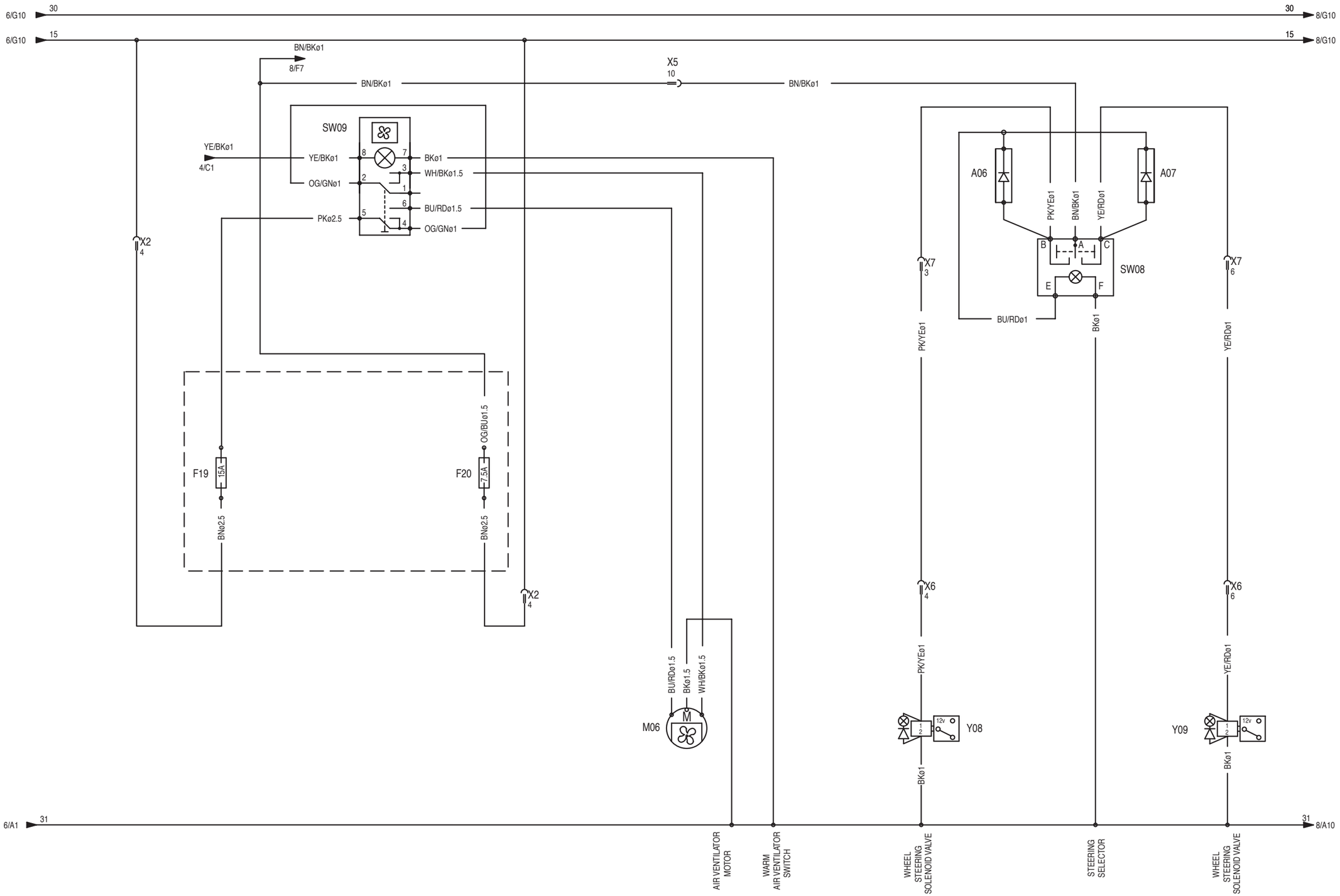

1/G1 30
1/G1 15
30 3/G10
15 3/G10
SW02
GY/WHØ1
TQ/RDØ1
BKØ1
GY/WHØ1
BN/GNØ1
BN/GNØ1
BUØ1
D
GN/RDØ1
1/F3
GN/RDØ1
1/D3
OG/BKØ1
X2 4
X6 3
X5 6
X8 8
K03
K04
K05
F25 10A
BN/GNØ1
BN/GNØ2.5
GN/RDØ1
OG/BKØ1
OG/GNØ1.5
PKØ1.5
BN/BKØ1.5
PKØ1.5
OG/GNØ1.5
1/F6
X8 5
RDØ1
TQ/RDØ1
RDØ1 4/F5
RD/BKØ1
1/E2
9/C7
X4 5
GY/WHØ1 6/D7
X8 15
BN/BKØ1.5
1/E7
PKØ1.5
1/E5
OGØ1
BKØ1
Y02
RDØ1
RD/BKØ1
SS01
BUØ1
BKØ1
Y03
HA01
OG/BKØ1
BKØ1
H03
OG/BKØ1
BKØ1
OG/BKØ1
BKØ1
Y04
1/A1 31
31 3/A1
FORWARD SPEED SOLENOID VALVE
SERVICE BRAKE SENSOR
PARKING BRAKE SWITCH
FAST SPEED SOLENOID VALVE
BUZZER
REAR LIGHT
REVERSE SPEED SOLENOID VALVE

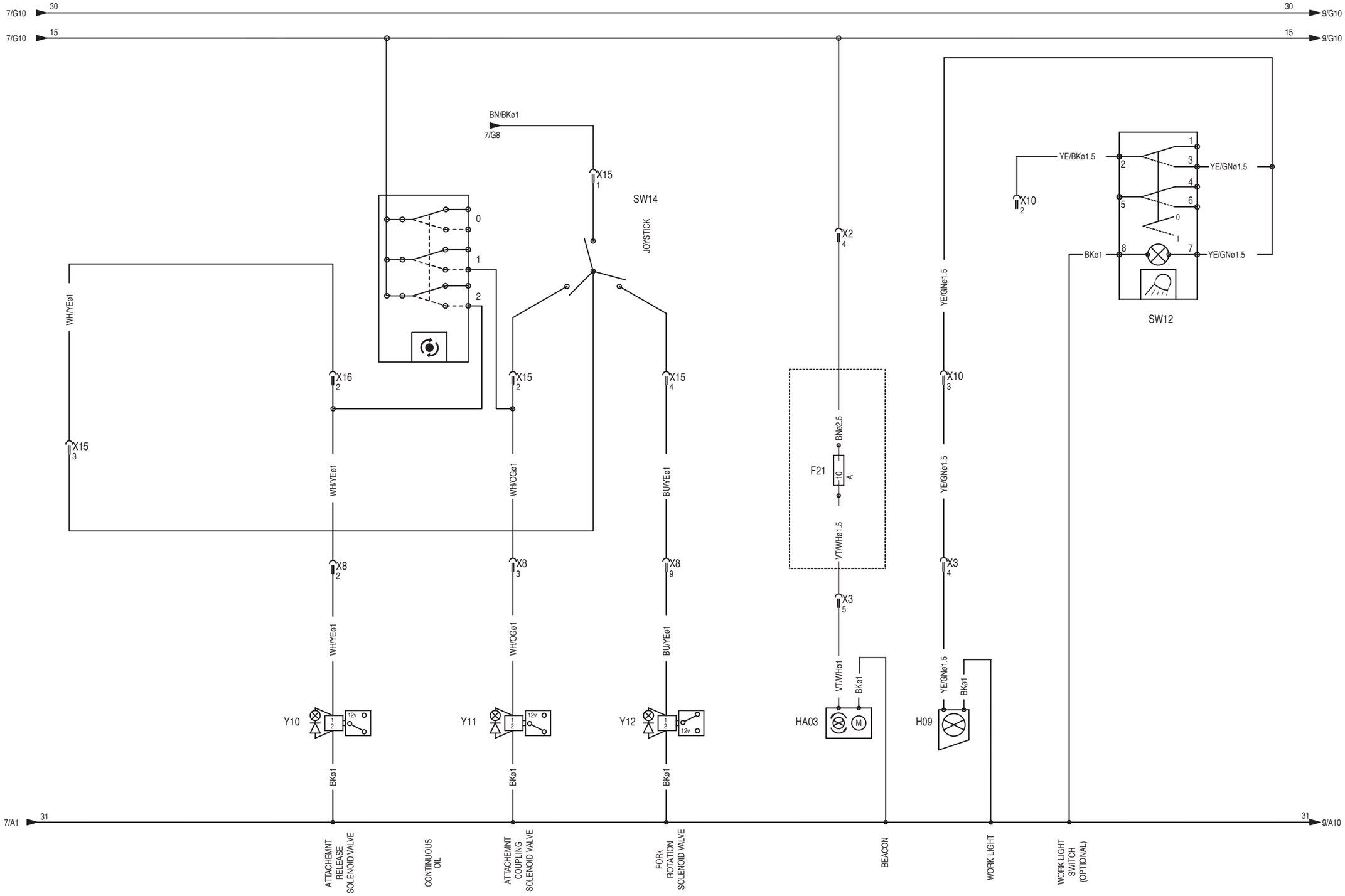

2/G1 30
2/G1 15
30 4/G10
15 4/G10
SW04
WH/RDø1.5
WH/RDø1.5
BUø1.5
BUø1.5
1/F6
1/D4
X2 4
F22 10A
WH/RDø1.5
BNø2.5
5/C5
SW05
BN/WHø1
WH/BKø1
BKø1
BNø1
RDø1
BU/RDø1
BU/RDø1
9/C4
4F5
5/C5
X5 2
X5 4
X5 3
X2 4
WH/BKø1
BNWHø1
WH/TQø1
WH/BKø1
A03
BNø1
F17 15A
BNø2.5
X8 14
X5 1
WH/TQø1
6/F5
BKø1.5
4/G8
5/B5
TQø1
TQ/BKø1
A04
A05
WH/RDø1.5
Y07
BKø1.5
1/A1 31
31 4/A10
SOLENOID VALVE FENGINE STOP
EMERGENCY MUSHROOM-HEAD PUSHBUTTON
INTERMITTENCE LIGHT INDICATOR
EMERGENCY INDICATOR SWITCH
DIODE
DIODE


3/G10 30
30 5/G10
3/G10 15
15 5/G10
3/D1 TQ/BKø1
X7 5
GNø1.5 5/B8
X10 9
GY/BKø1
TQ/BKø1
GYø1
X9 5
X9 6
X6 5
3/G1 TQø1
X7 2
2/C8 RDø1
TQø1
X9 4
X6 2
5/E1
YEø1.5
X10 1
F7 7.5A
F6 7.5A
F8 10A
F9 10A
F4 5A
F5 5A
GY/BKø1
GYø1
GNø1.5
YEø1.5
YE/BKø1
GYø1.5
X10 8
6/C8
GNø1
X9 7
GN/BKø1
X9 8
X9 3
YE/BKø1
YEø1
X9 2
X9 1
YEø1 6/C7
YE/BKø1 7/F9
X10 5
YE/BKø1 6/G1
X10 6
YE/BKø1 6/D8
5/C8
BKø1 TQø1 YEø1 GYø1 GNø1
GN/BKø1 GY/BKø1 YE/BKø1 TQ/BKø1 BKø1
BKø1 TQ/BKø1 YEø1 RDø1
YEø1 BKø1
RDø1 YE/BKø1 TQø1 BKø1
H08
H07
H06
H05
H04
3/A1
31 5/A10
HEAD LIGHT INDICATOR LIGHT RIGHT
HEAD LIGHT INDICATOR LIGHT LEFT
REAR AND STOP LIGHTS LEFT
REAR NUMBER-PLATE LIGHT
REAR AND STOP LIGHTS RIGHT


4/G10 30
4/G10 15
30 6/G10
15 6/G10
X4 6
X10 7
X5 7
X8 11
X2 4
VTø1
GN/BKø1.5
GY/RDø1.5
VTø1
BN/RDø1
TQ/BKø1
TQø1
RDø1.5
BNø1.5
YEø1.5
GN/BKø1.5
BKø1
YE/BKø1
6/F1
4/F1
SW06
SW07
F10 15A
F18 15A
F11 10A
VTø1
BNø2.5
BN/RDø1
GYø1.5
GNø1.5
4/C9 GYø1.5
4/F7 GNø1
3/G5 WH/BKø1
3/F1
3/C1
M03
M04
BKø1
HA02
4/A1 31
31 6/A10
HORN
LIGHTS INDICATOR WIND-SCREEN WIPER
WIND-SCREEN WIPER MOTOR
WIND-SCREEN WIPER WASHER MOTOR
LIGHTS SWITCHES


5/G10 30
5/G10 15
30 7/G10
15 7/G10
P01
P02
P03
J5
J6
J7
J8
J9
J3
J2
J1
J4
J10
J11
J12
J13
J14
J15
WH/TQø1 3/C6
BUø1
RD/BKø1 8/G10
BU/RDø1 1/F8
RD/BKø1 1/F2
GY/WHø1 2/C7
YE/BKø1 4/B2
YEø1 4/D1
GNø1 4/C8
BKø1
WH/GNø1
BU/RDø1
GY/RDø1
YEø1
RD/BKø1
GY/YEø1
GY/WHø1
GNø1
YE/BKø1
PKø1
WH/BUø1
X13 3
X14 1
X7 1
X8 13
X7 8
X10 4
X7 7
X5 8
X7 10
X6 8
X6 9
X6 1
SS03
SS04
SS08
SS05
YEø1
BKø1
RD/BKø1
RD/GNø1
GY/GNø1
GN/RDø1
X7 15
X7 9
X6 11
X6 7
SS06
SS07
YE/BKø1 4/B1
YE/BKø1 5/F1
RD/BKø1 1/F1
5/A1 31
31 7/A10
DASHBOARD LIGHT INDICATOR
WATER TEMPERATURE SENSOR
ENGINE OIL PRESSURE TRANSDUCER
FUEL FLOAT
NEGATIVE BRAKE PRESSURE SWITCH
HYDRAULIC OIL TEMPERATURE GAUGE
HYDRAULIC OIL TEMPERATURE SENSOR
ENGINE WATER TEMPERATURE GAUGE
WATER TEMPERATURE SENSOR


6/G10 30
6/G10 15
30 8/G10
15 8/G10
BN/BKø1
8/F7
BN/BKø1
X5
10
BN/BKø1
SW09
YE/BKø1
4/C1
YE/BKø1
OG/GNø1
PKø2.5
BKø1
WH/BKø1.5
BU/RDø1.5
OG/GNø1
X2
4
F19 15A
F20 7.5A
BNø2.5
BNø2.5
OG/BUø1.5
X2
4
A06
A07
PK/YEø1
BN/BKø1
YE/RDø1
B
A
C
E
F
SW08
BU/RDø1
BKø1
X7
3
X7
6
PK/YEø1
YE/RDø1
BU/RDø1.5
BKø1.5
WH/BKø1.5
M06
M
X6
4
X6
6
PK/YEø1
YE/RDø1
12v
Y08
Y09
BKø1
BKø1
6/A1 31
31 8/A10
AIR VENTILATOR MOTOR
WARM AIR VENTILATOR SWITCH
WHEEL STEERING SOLENOID VALVE
STEERING SELECTOR
WHEEL STEERING SOLENOID VALVE


7/G10 30
7/G10 15
9/G10 30
9/G10 15
BN/BKø1
7/G8
X15 1
SW14
JOYSTICK
0
1
2
X16 2
X15 2
X15 4
X15 3
X2 4
F21
10 A
BN/Bø2.5
VT/WHø1.5
X3 5
X10 3
YE/GNø1.5
X3 4
YE/BKø1.5
X10 2
1
2
3
4
5
6
0
1
8
7
BKø1
YE/GNø1.5
SW12
WH/YEø1
WH/OGø1
BU/YEø1
X8 2
X8 3
X8 9
Y10
Y11
Y12
HA03
H09
12v
VT/WHø1
BKø1
YE/GNø1.5
BKø1
7/A1 31
9/A10 31
ATTACHEMNT RELEASE SOLENOID VALVE
CONTINUOUS OIL
ATTACHEMNT COUPLING SOLENOID VALVE
FORk ROTATION SOLENOID VALVE
BEACON
WORK LIGHT
WORK LIGHT SWITCH (OPTIONAL)

6.4.1 Wiring diagram - Component description

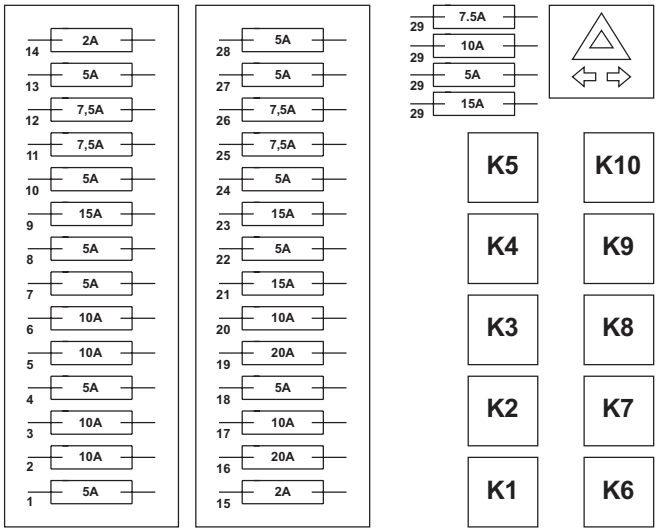
Ref.	Description	Sheet
F1	5 A FUSE	
F2	10 A FUSE	
F3	10 A FUSE	
F4	5 A FUSE	
F5	10 A FUSE	
F6	10 A FUSE	
F7	5 A FUSE	
F8	5 A FUSE	
F9	15 A FUSE	
F10	5 A FUSE	
F11	7,5 A FUSE	
F12	7,5 A FUSE	
F13	5 A FUSE	
F14	2 A FUSE	
F15	2 A FUSE	
F16	20 A FUSE	
F17	10 A FUSE	
F18	5 A FUSE	
F19	20 A FUSE	
F20	10 A FUSE	
F21	15 A FUSE	
F22	5 A FUSE	
F23	15 A FUSE	
F24	5 A FUSE	
F25	7,5 A FUSE	
F26	7,5 A FUSE	
F27	5 A FUSE	
F28	5 A FUSE	
F29	SPARE FUSES (15A - 10A - 7,5A - 5A)	
F30	PREHEATING CONTROL UNIT MAXIFUSE	
F31	SYSTEM PROTECTION FUSE	
H01	WARNING LIGHTS: AIR FILTER SOILED, PREHEATING GLOW PLUGS WARNING LIGHT	1
H03	BACK-UP LAMPS	2
H04	REAR RIGHT-HAND LIGHT	4
H05	LICENSE PLATE LAMP	4
H06	REAR LEFT-HAND LIGHT	4
H07	FRONT LIGHT LAMP - LEFT TURN SIGNAL	4
H08	FRONT LIGHT LAMP - RIGHT TURN SIGNAL	4
H09	WORK LIGHT	8
HA01	BACK-UP HORN	2
HA02	HORN	5
HA03	BEACON	8
K01	OPTIONAL WORK LIGHT	
K02	STARTING ENABLING COMMAND	1
K03	FORWARD SPEED ENABLING COMMAND	2
K04	INHIBITION WITH SERVICE BRAKE ENGAGED	2
K05	REVERSE SPEED ENABLING COMMAND	2
K06	GEAR ENGAGEMENT FROM PARKING BRAKE LINE LOW PRESSURE BULB	1
K11	START RELAY	1
M01	STARTER MOTOR	1
M02	ALTERNATOR	1
M03	WINDSCREEN WIPER MOTOR	5
M04	WINDSCREEN WIPER/WASHER MOTOR	5
M06	FAN MOTOR	7
P01	WARNING LIGHTS - FUEL GAUGE INSTRUMENT	5
P02	ENGINE OIL TEMPERATURE INDICATOR	5
P03	ENGINE OIL COOLING TEMPERATURE INDICATOR	5
R01	GLOW PLUGS	1
SW01	IGNITION KEY	1
SW02	PARKING BRAKE SWITCH	2
SW03	CHANGE OVER SWITCH	1
SW04	MUSHROOM-HEAD BUTTON	3
SW05	HAZARD WARNING LIGHT / TURN SIGNALS SWITCH	3
SW06	LIGHT SWITCH-TURN SIGNALS-WINDSCREEN WIPER/WASHER	5
SW07	LIGHTS SELECTION SWITCH	5
SW08	STEERING SELECTOR	7
SW09	HEATING FAN SWITCH	7
SW11	CONTINUOUS OIL SWITCH	8
SW12	OPTIONAL WORK LIGHT SWITCH	8
SW13	BATTERY CUTOFF	1
SW14	JOYSTICK	8
SS01	SERVICE BRAKE SENSOR	2
SS02	AIR FILTER CLOGGING SENSOR	1
SS03	WATER TEMPERATURRE SENSOR	6
SS04	ENGINE OIL PRESSURE SENSOR	6
SS05	NEGATIVE BRAKE PRESSURE SWITCH	6
SS06	HYDRAULIC OIL TEMPERATURE SENSOR	6
SS07	WATER TEMPERATURE SENSOR	6
SS08	FUEL FLOAT	6
Y01	FUEL ENRICHER SOLENOID	1
Y02	SOLENOID VALVE - FWD SPEED	2
Y03	SOLENOID VALVE - PARKING BRAKE	2
Y04	SOLENOID VALVE - REVERSE SPEED	2
Y07	ENGINE STOP SOLENOID	3
Y08	WHEEL STEERING SOLENOID VALVE	7
Y09	WHEEL STEERING SOLENOID VALVE	7
Y10	SOLENOID VALVE - ATTACHMENT RELEASE	8
Y11	SOLENOID VALVE - ATTACHMENT COUPLING	8
Y12	SOLENOID VALVE - FORK ROTATION	8

Ref.	Description	Sheet
A01	12V BATTERY	1
A02	PREHEATING CONTROL UNIT	1
A03	TURN SIGNALS FLASHING	3
A04	DIODE	3
A05	DIODE	3
A06	DIODE	7
A07	DIODE	7
X01	4-WAY CONNECTOR - ENGINE FUSES LINE	
X02	4-WAY CONNECTOR - STEERING COLUMN	
X03	6-WAY CONNECTOR - CAB	
X04	6-WAY CONNECTOR - STEERING COLUMN	
X05	12-WAY CONNECTOR - STEERING COLUMN	
X06	12-WAY CONNECTOR - ENGINE	
X07	15-WAY CONNECTOR - STEERING COLUMN	
X08	15-WAY CONNECTOR - ENGINE	
X09	9-WAY CONNECTOR - ENGINE	
X10	12-WAY CONNECTOR - STEERING COLUMN	
X15	4-WAY CONNECTOR - JOYSTICK	
X16	2-WAY CONNECTOR - STEERING COLUMN	

6.4.2 Fuses and relays

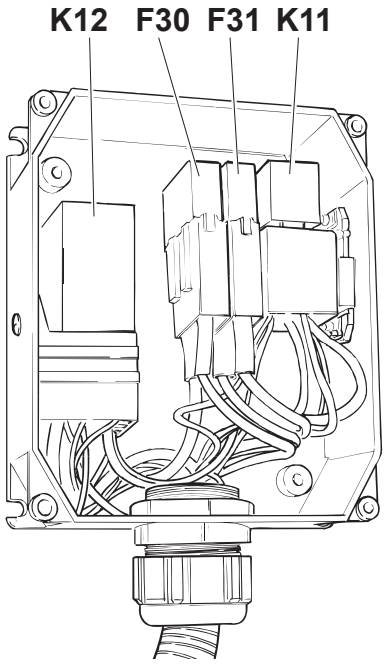
FUSES

Ref.	Circuit	Amp.
F1	FUSE	5
F2	FUSE	10
F3	FUSE	10
F4	FUSE	5
F5	FUSE	10
F6	FUSE	10
F7	FUSE	5
F8	FUSE	5
F9	FUSE	15
F10	FUSE	5
F11	FUSE	7,5
F12	FUSE	7,5
F13	FUSE	5
F14	FUSE	2
F15	FUSE	2
F16	FUSE	20
F17	FUSE	10
F18	FUSE	5
F19	FUSE	20
F20	FUSE	10
F21	FUSE	15
F22	FUSE	5
F23	FUSE	15
F24	FUSE	5
F25	FUSE	7,5
F26	FUSE	7,5
F27	FUSE	5
F28	FUSE	5
F29	SPARE FUSES	
F30	PREHEATING CONTROL UNIT MAXIFUSE	
F31	SYSTEM PROTECTION FUSE	



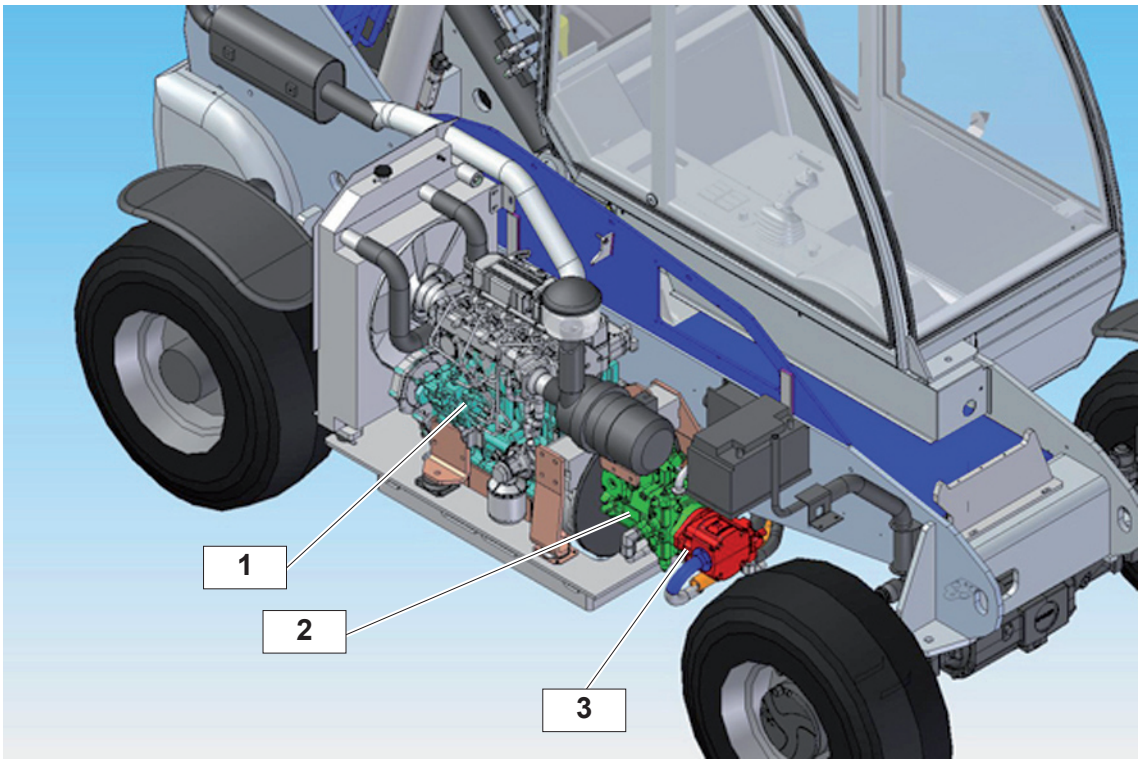
RELAYS

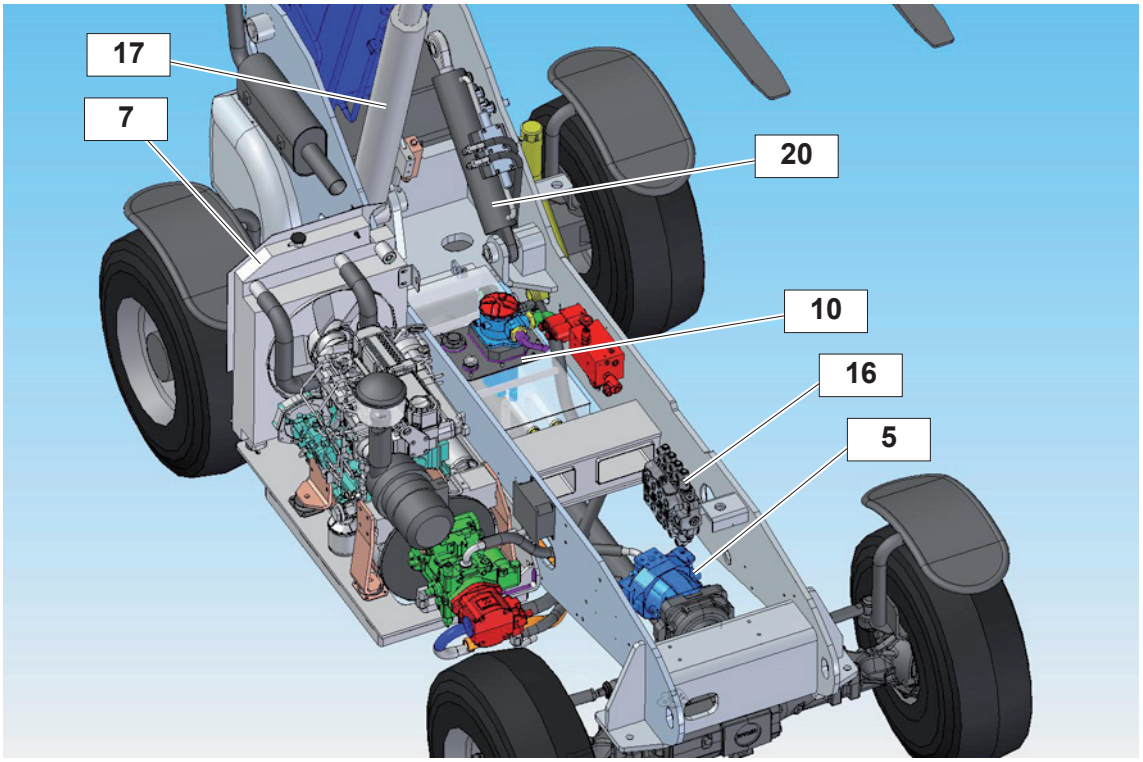
Ref.	Circuit
K01	OPTIONAL WORK LIGHT
K02	STARTING ENABLING COMMAND
K03	FORWARD SPEED ENABLING COMMAND
K04	INHIBITION WITH SERVICE BRAKE ENGAGED
K05	REVERSE SPEED ENABLING COMMAND
K06	GEAR ENGAGEMENT FROM PARKING BRAKE LINE LOW PRESSURE BULB
K11	START RELAY
K12	PRE-HEATING RELAY

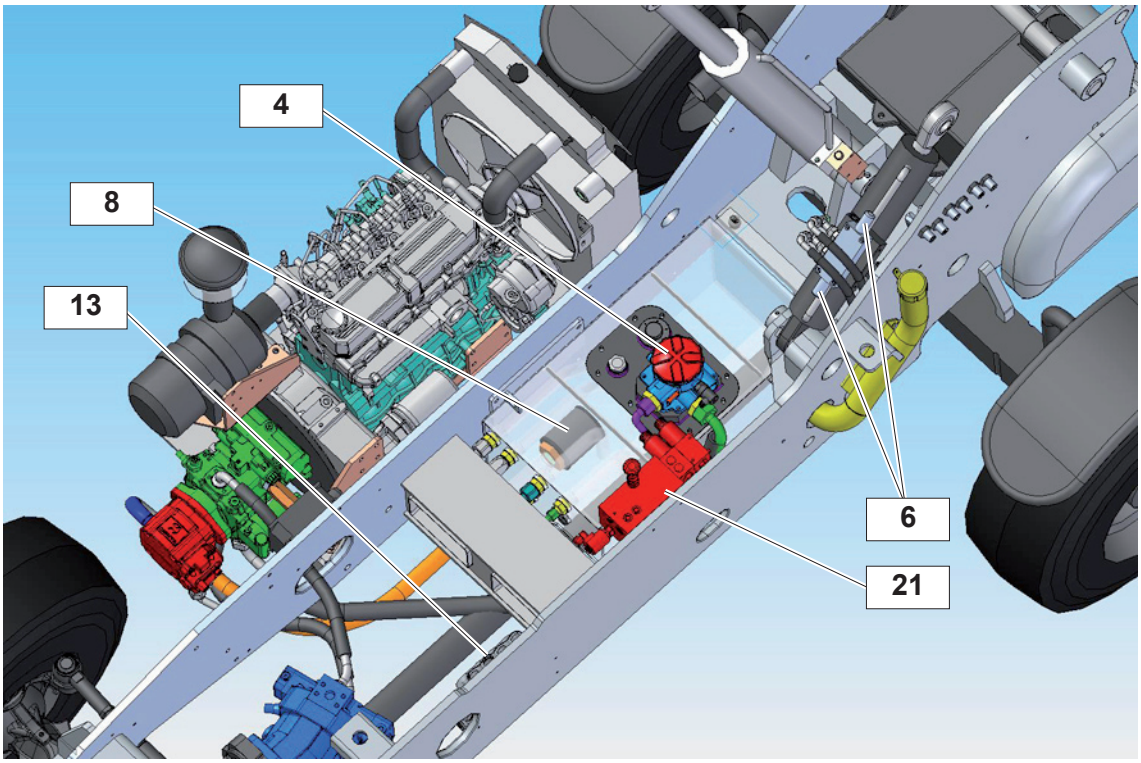


6.5 POSITION OF THE ELECTRICAL AND HYDRAULICAL COMPONENTS ON THE MACHINE

6.5.1 Hydraulical components



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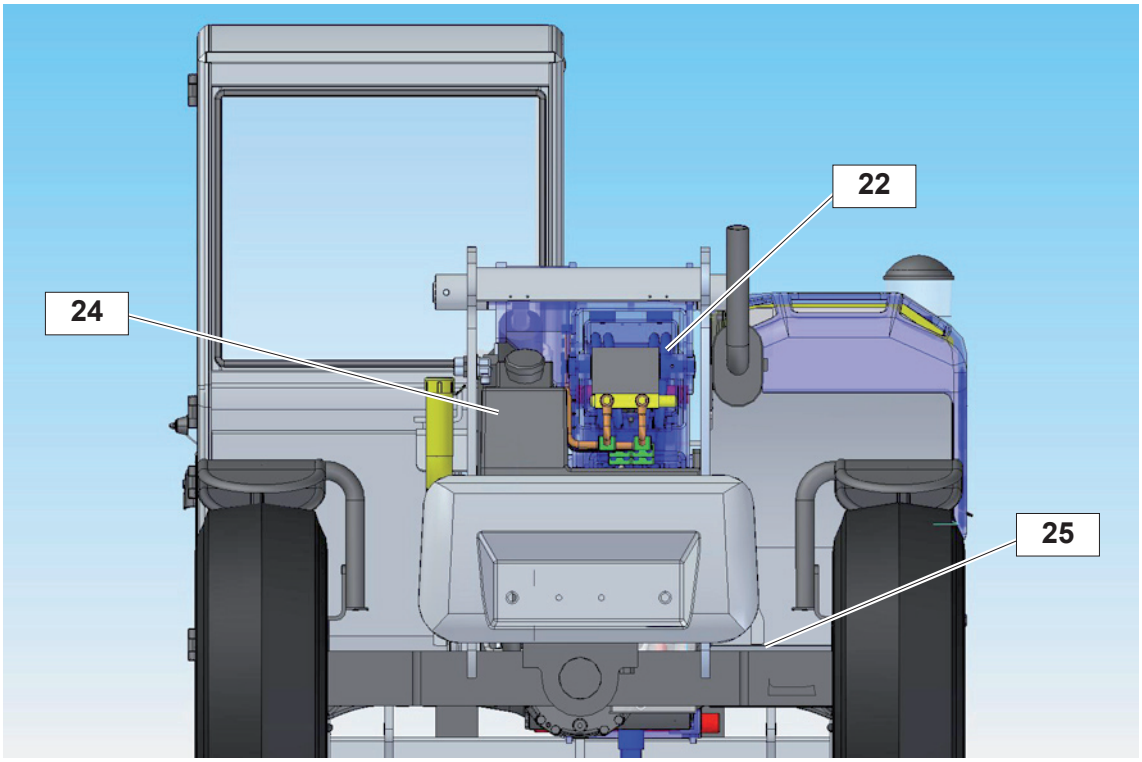
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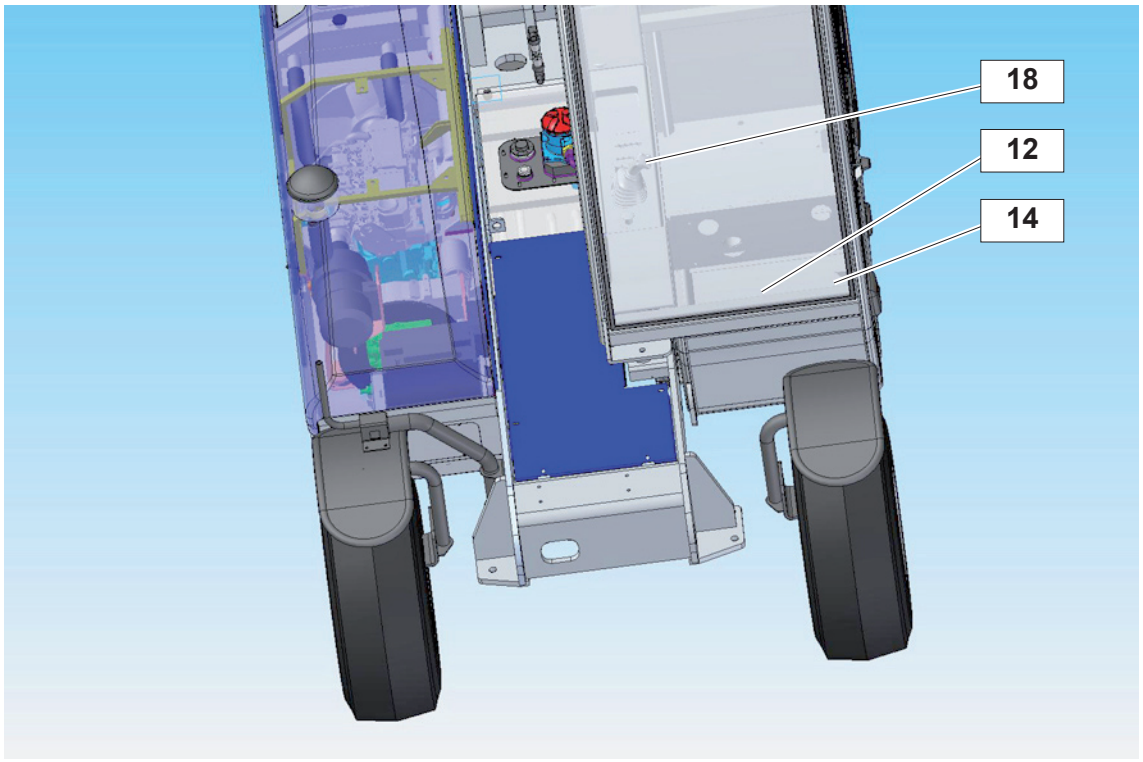
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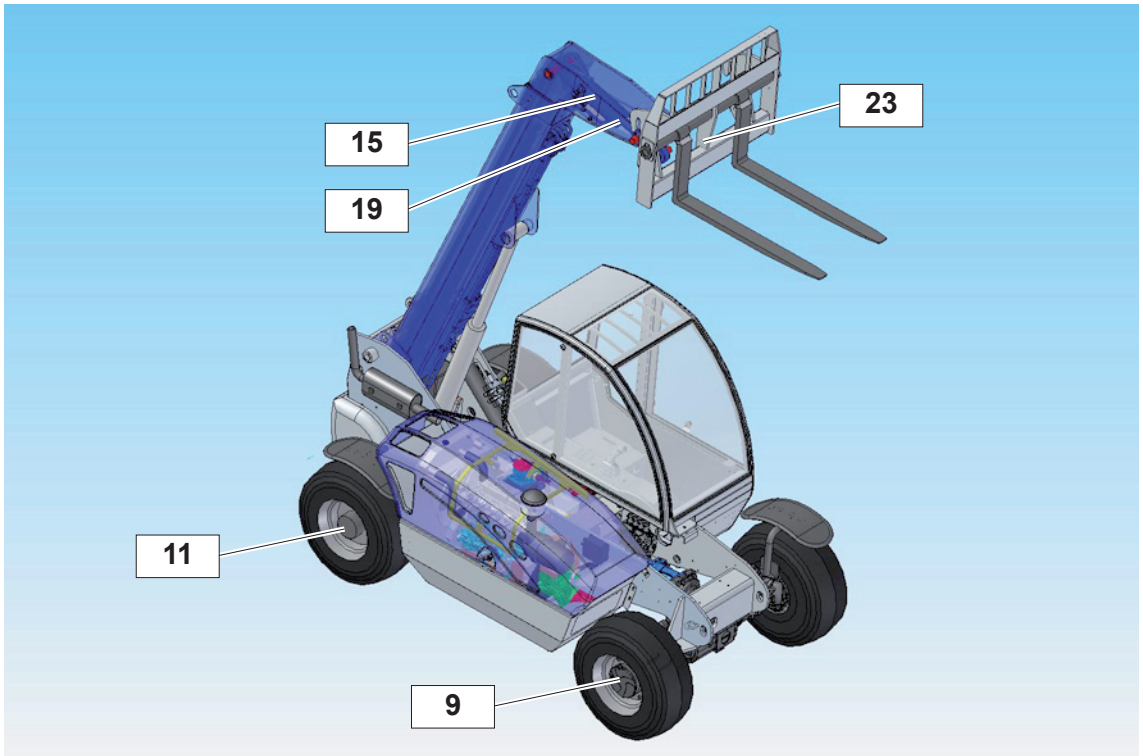
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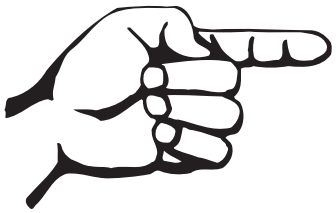
Legend of the hydraulic components

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



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Section 7
REPAIR PROCEDURES

SECTION INDEX

7.1 TIME SCHEDULE

Job	Operators needed	Expected time (h)
change the ignition key	1	1,00
change the gear switch lever	1	0,15
change the speed switch	1	0,15
change the joystick	1	1,00
change the fork locking/releasing pushbutton	1	0,20
change the fork locking/releasing red pushbuttons	1	0,20
change the brake pump	1	0,30
change the boom lifting cylinder	1	2,15
change the boom lifting cylinder kit (complete overhaul)	1	1,30
change the block valve of the boom lifting cylinder	1	0,30
change the cylinder inside the boom	1	2,30
change the extension cylinder kit inside the boom	1	1,30
change the block valve of the extension cylinder inside the boom	1	0,30
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 the attachment locking cylinder	1	1,00
change the attachment locking cylinder kit	1	1,15
change the block valve of the attachment locking cylinder	1	0,30
change the fork compensation cylinder	1	2,00
change the fork compensation cylinder kit	1	1,30
change the valve of the fork compensation cylinder	1	0,45
check the one-way valves of the fork compensation cylinder	1	0,20
change the boom internal line for the boom extension	1	1,30
change the boom internal line for the fork pitching	2	2,00
change the boom internal line for the fork locking	2	2,00
change the boom slide pads	1	2,30
check the transmission pump pressures	2	0,30 each
check the pressure of the main actuator operating the boom movements	2	0,30 each
check the pressure of brake pump and hydrostatic steering unit	1	0,30
check the pressure of pressure relief valves and safety valves	1	1,30
change the drive pump	1	2,00

Job	Operators needed	Expected time (h)
change the drive motor	1	2,00
change motor, pump, transmission piping + tests	1	5,00
change the actuator control pump	1	2,00
change and calibrate the actuator	1	2,30
change the DFE valve	1	0,30
change relays and fuses	1	0,10
change the windscreen wiper motor (closed cab version)	1	1,00
change a solenoid valve	1	0,30
change the gas pedal complete with cord	1	1,00
change the manual throttle complete with cord	1	0,30
change the front axle shaft	1	2,30
change the rear axle shaft	1	2,00
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	4,00 each
change the boom anchoring pin	2	1,00 each
change the attachment locking cylinder pins	1	0,30
change a cab pushbutton	1	0,30
change and test the actuator pressure relief valve or the sliders	1	0,30
change and test the actuator safety valve	1	0,30
change the one-way valve	1	0,20
change the maxi-fuses and search for troubles	1	1,00
bleed the brake circuit	2	0,15 each
disassemble and reassemble a wheel	1	1,00
disassemble the Deutz engine	2	2,30
dismantle the hydraulic oil tank	1	3,00
dismantle the fuel tank	1	2,00
change the oil-water cooler	1	2,00
change the fork pivot pin support	1	2,00
change the engine bonnet	1	1,00
change the canister of the air filter	1	0,10
check the seals of the steering cylinder	2	1,00
change the return filter of the hydraulic oil tank	1	0,30
change the hydrostatic steering unit	1	2,00
change the battery	1	0,20
change the exhaust pipe	1	0,30
change the mud-guard supports	1	0,30

Job	Operators needed	Expected time (h)
change the mud-guards	1	0,20
change the steering wheel	1	0,20
replace the complete solenoid valve block	1	2,00

Operation:	Table:		
Cylinder disassembly **Boom raising cylinder**	**GTH5519-001**	kg	76
		Hrs. / Min.	2 / 15
			1

Bridge crane, payload 5000 kg (20000 lb)
Textile bridles or chains with hooks

Standard tools
Adjustable stands

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

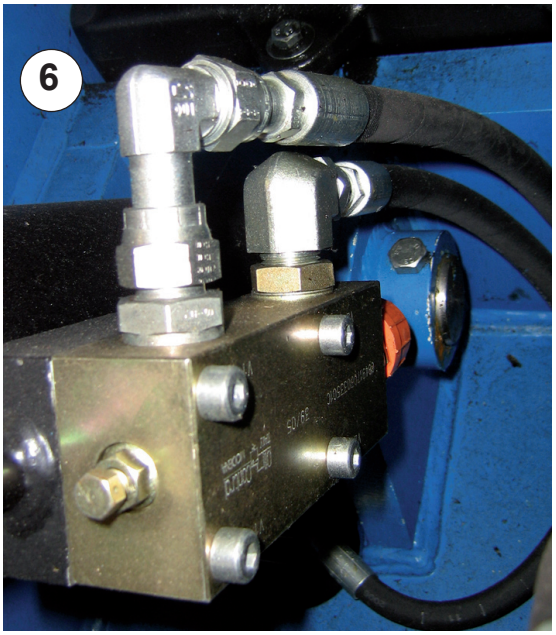
4 Stop raising when the slinging chains are slightly under tension

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

NOTICE

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

6 With a 27 mm wrench, disconnect two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit



Operation:	Table:
Cylinder disassembly **Boom raising cylinder**	**GTH5519-001**

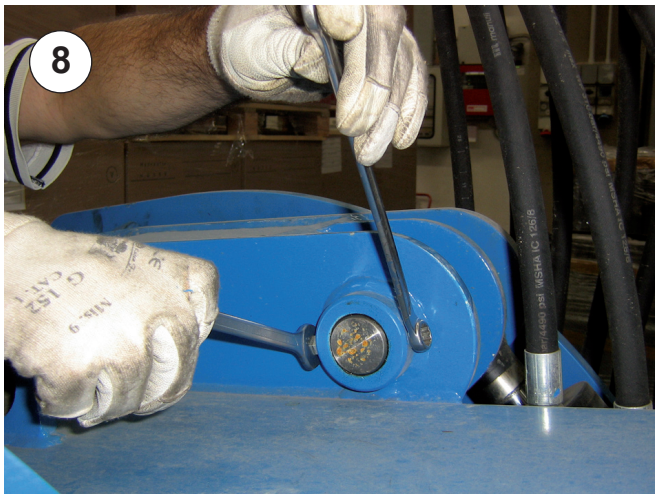
7 To move the boom using the up/down controls of the bridge crane, previously disconnect the rod of the fork balance cylinder

8 Remove the screw fixing the pin with two 17 mm wrenches

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

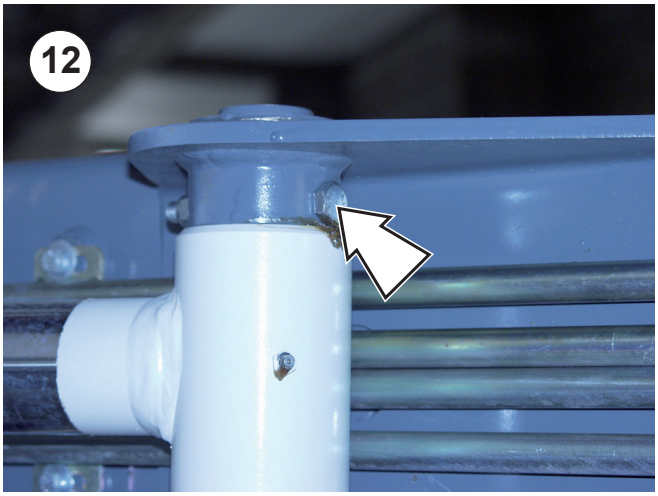
10 Fix the balance cylinder to the cabin with a sling and esnure it does not hinder the movement of the boom

11 Secure the raising cylinder to the cabin with a sling



Operation:	Table:
Cylinder disassembly **Boom raising cylinder**	**GTH5519-001**

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



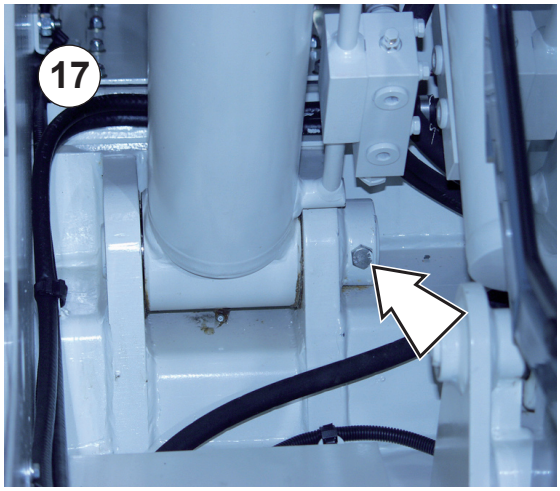
13 Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

14 Put two wooden plugs, each 100mm high, on the oil cylinder 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



Operation:	Table:
Cylinder disassembly **Boom raising cylinder**	**GTH5519-001**

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.

Operation:	Table:		
Cylinder disassembly **Fork balance cylinder**	**GTH5519-002**	kg	26
		Hrs. / Min.	2 / -
			1

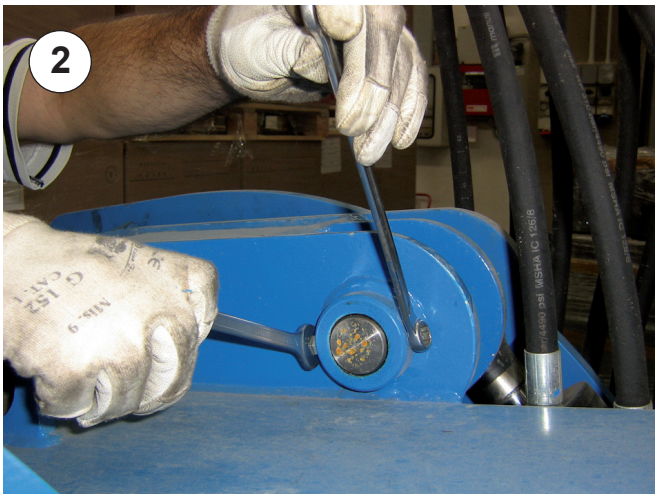
Bridge crane, payload 500 kg (2000 lb)
Textile bridles or chains with hooks

Standard tools
Adjustable stands

Operation:

1 Release the attachment

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

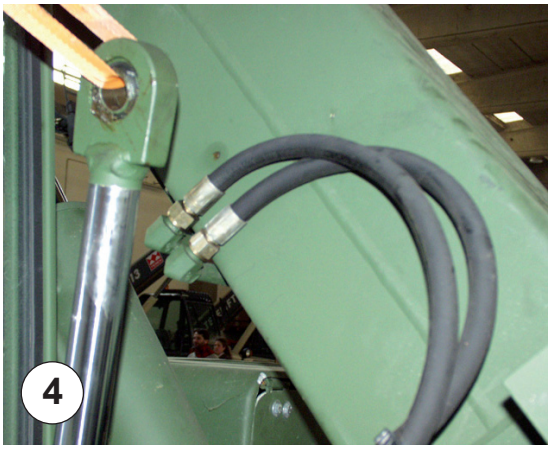


3 Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)

Operation:	Table:
Cylinder disassembly **Fork balance cylinder**	**GTH5519-002**

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



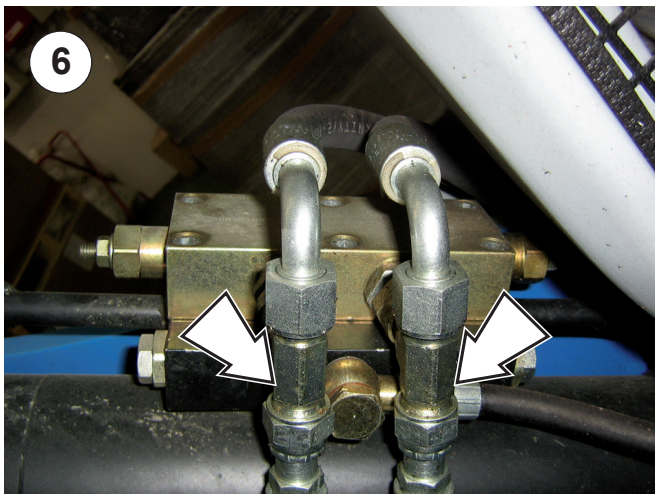
NOTICE

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

6 With a 27 mm wrench, disconnect two 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 13 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

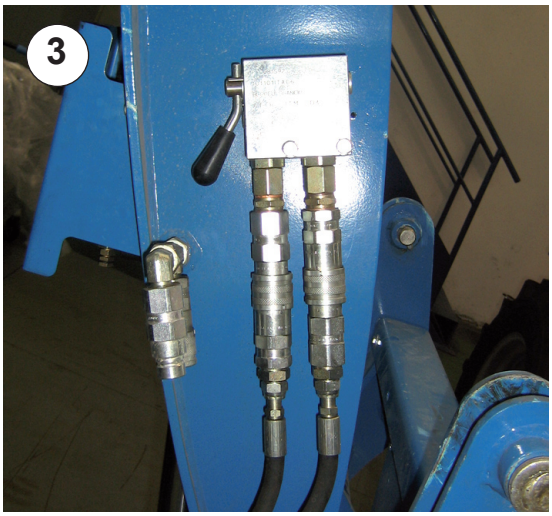
Operation: **Cylinder disassembly** **Attachment locking cylinder + DFE valve** **(if any)**	Table: **GTH5519-003**	kg	12
			Hrs. / Min.
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools		1 / -
			1

Operation:

1 Release the attachment

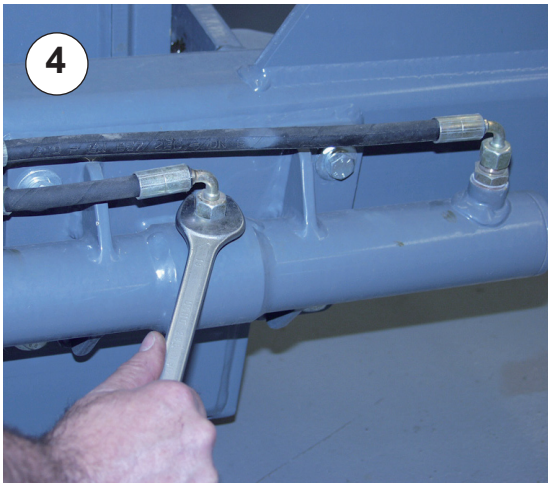
2 With a 13mm wrench, remove the protective cover of the attachment lock/unlock cylinder

3 Disconnect the flexible hoses connected to the DFE valve (if present; usually it is used when the attachment needs an additional hydraulic line) from the quick connectors on the telescopic section of the boom

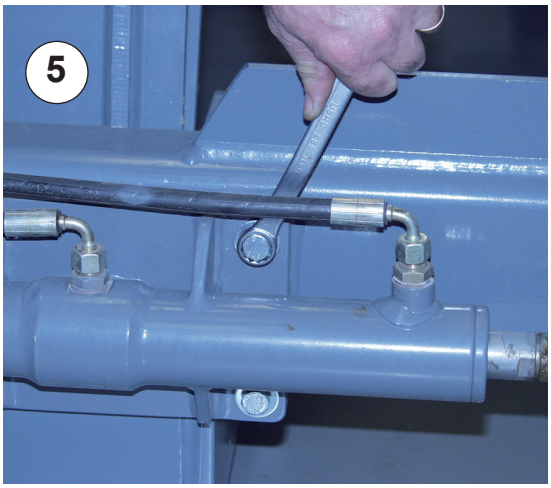


Operation:	Table:
Cylinder disassembly **Attachment locking cylinder**	**GTH5519-003**

4 With a 17 mm wrench, disconnect the flexible hoses from the attachment locking cylinder

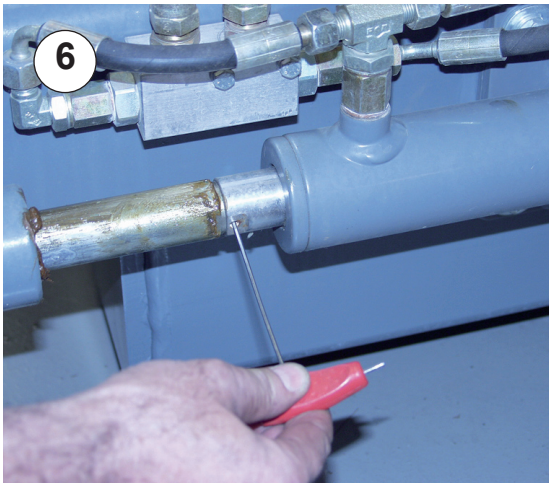


5 With a 17 mm wrench, loosen the four screws fixing the cylinder without removing them



Operation:	Table:
Cylinder disassembly **Attachment locking cylinder**	**GTH5519-003**

6 With a 2.5 mm hexagonal wrench, remove the grub-screw fixing the terminal pin on both sides of the cylinder (if present)



7 With two 27 mm wrenches, loosen and pull out the terminal pins from their housings

8 Remove the four screws, previously loosened, to set the cylinder free

9 Seize and remove the cylinder

10 If necessary, position the cylinder on the bench and disconnect the pipes

Operation: Cylinder reassembly Attachment locking cylinder	Table: GTH5519-003

Reassembling the cylinder:

CAUTION

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

1 Block the terminal pins on the cylinder rods after smearing the threads with Loctite 245. Clean and use the amount indicated in the bottle

2 Lock the four fixing screws of the cylinder to the holding frame with the terminal pins completely driven into their housing but free to rotate (correct alignment of the pins with the holes)

3 Block the grub-screws of the terminal pins with Loctite 245

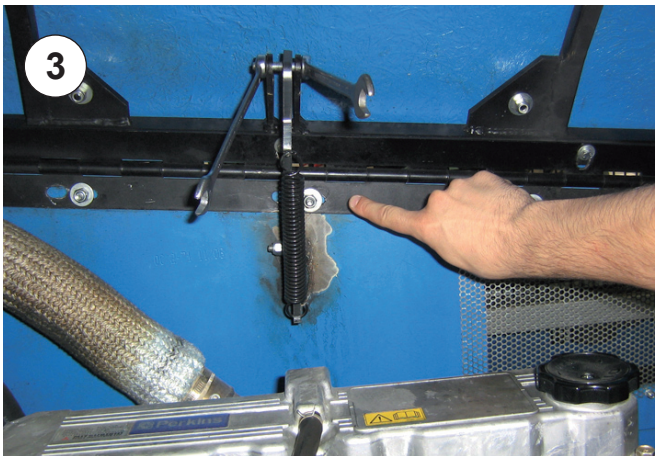
Operation: **Removing the engine from the machine**	Table: **GTH5519-004**	kg: 340
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools	Hrs.: 2 — Min.: 30
		2

Operation:

1 Open the engine cover

2 Secure the cover with a belt or hold it raised by hand so it cannot move

3 Using two 13mm wrenches, remove the two screws of the spring

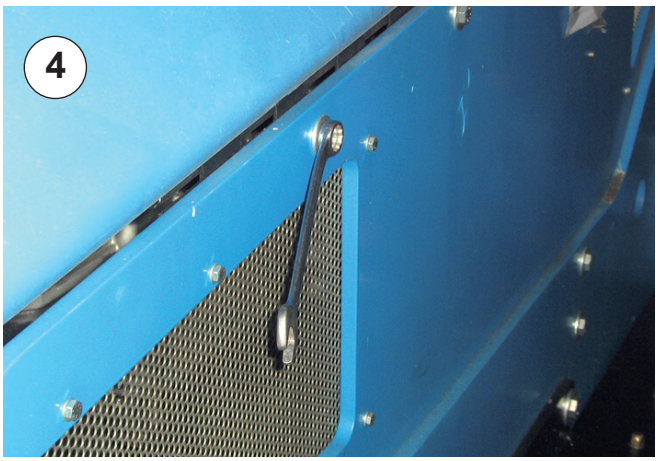


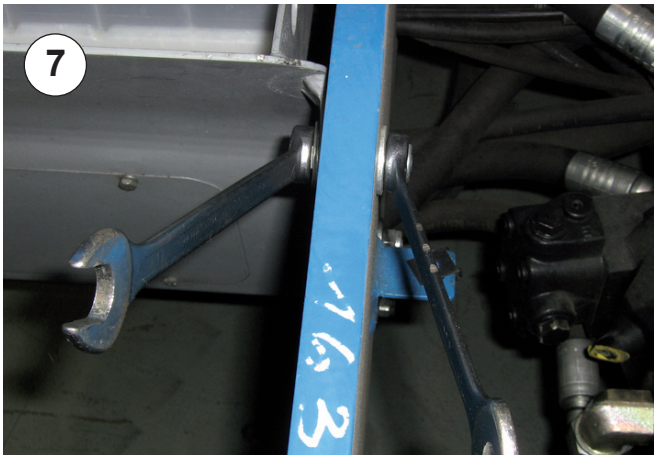
4 Again with two 13mm wrenches, loosen the three screws that secure the cover to the frame

5 Remove the upper cover

6 Disconnect the two battery leads and remove the battery

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

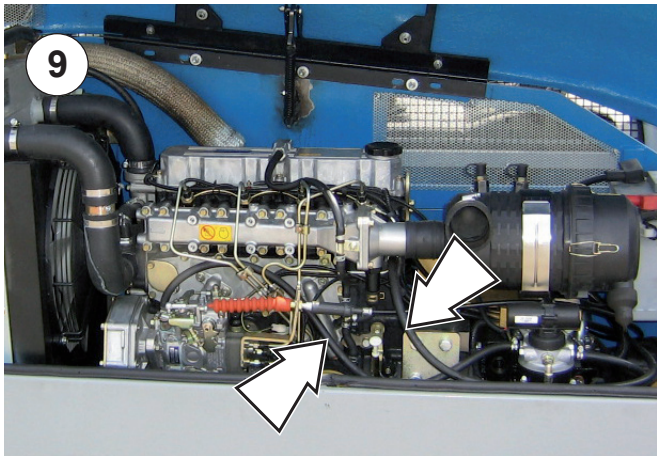




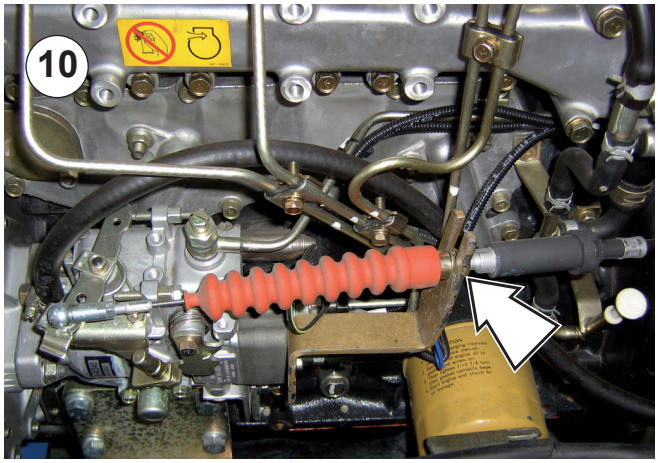
Operation: **Removing the engine from the machine**	Table: **GTH5519-004**

8 Remove the lower cover

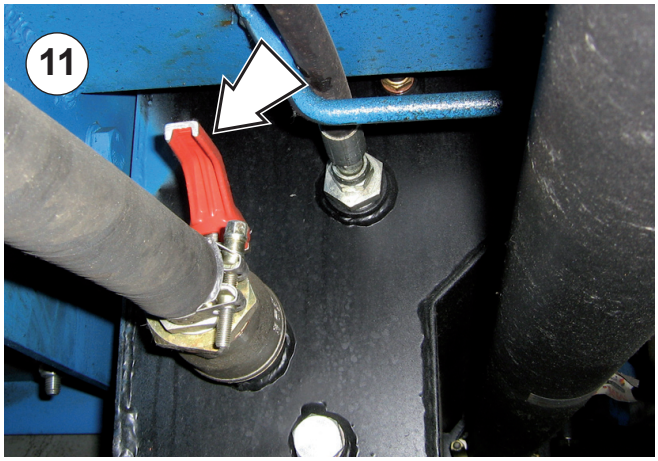
9 With a screwdriver, disconnect the fuel feeding and return piping held in position by the special hose-clamps



10 Disconnect the throttle control cable removing the locking clip; loosen the cable register with a 17 mm wrench to pull out the cable



11 Close the oil tank cocks



Operation: **Removing the engine from the machine**	Table: **GTH5519-004**

12 Disconnect the flexible hose of the silencer loosening the clamps with a 13 mm wrench

13 Remove the manifold with a 17 mm wrench

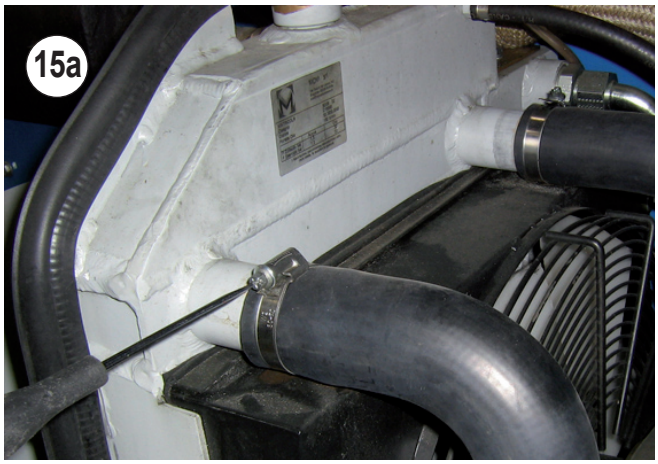
14 Disconnect all the electrical wires connected to the engine, and namely:

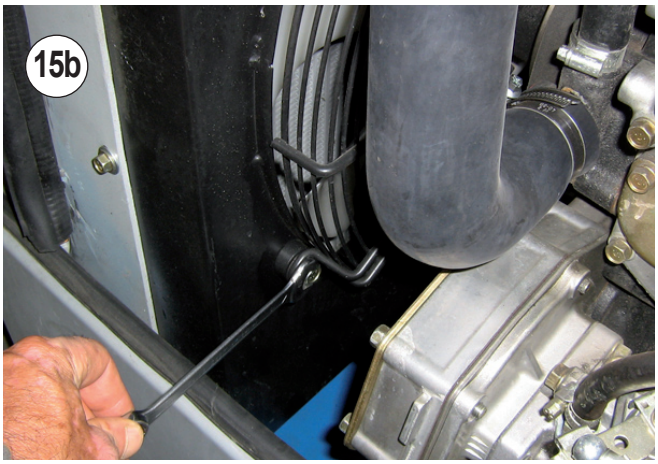
- ❑ oil pressure bulb,
- ❑ electrical stop,
- ❑ water temperature bulb,
- ❑ the three alternator connections,
- ❑ starter motor,
- ❑ ground between chassis and engine,
- ❑ the two coils of the transmission pump solenoid valve.

15 Disconnect the radiator:

a) remove the clamps fixing the sleeves to the radiator

b) remove the three screws that hold the fan protective grille in place





Operation: Removing the engine from the machine	Table: GTH5519-004

16 Disconnect the hydraulic piping:

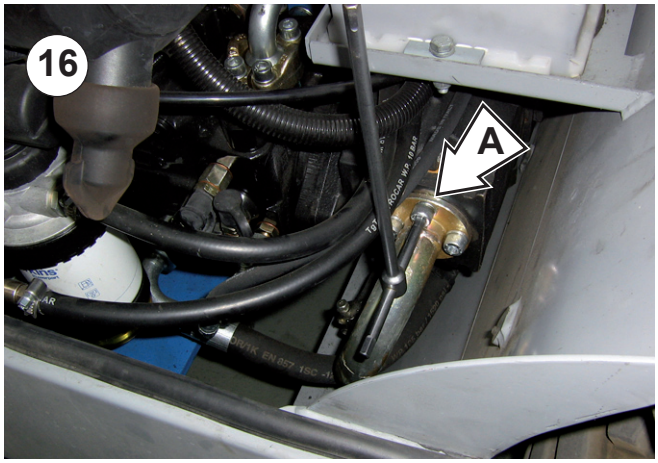
NOTICE

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.

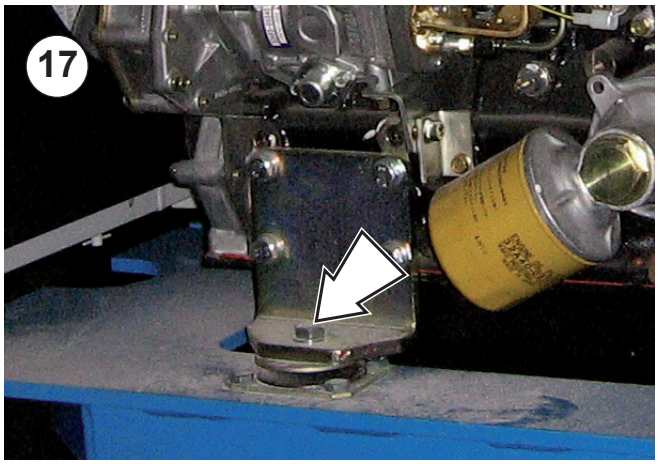
- ❑ disconnect the two drain lines of the hydraulic pump with a 36mm wrench
- ❑ disconnect the suction line of the hydraulic pump with a 50mm wrench
- ❑ disconnect the “low pressure line” duct with a 19mm wrench
- ❑ disconnect the four flanges which connect the drive pump to the drive motor with a 8mm Allen wrench
- ❑ disconnect the suction line of the service pump with a 8mm Allen wrench (**ref. A**),
- ❑ disconnect the delivery line ducts of the hydraulic drive 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.



WARNING

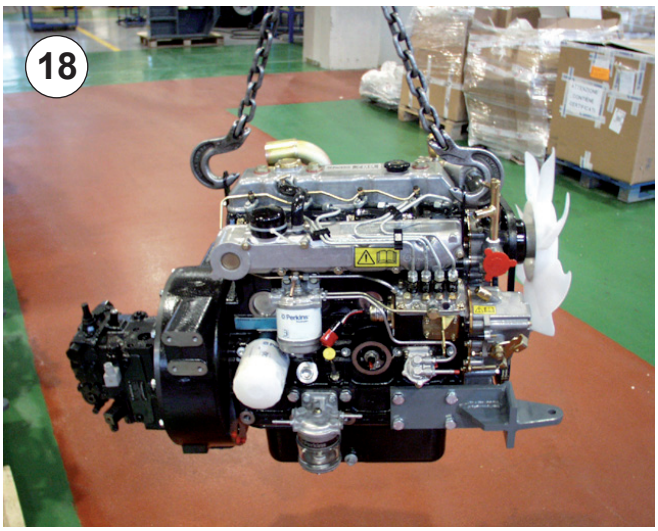
Once all operations have been performed make sure that all the electrical wires and the hydraulic lines are disconnected from the motor.

17 Remove the four screws (two on the front and two at the back) of the vibration supports with a 22 mm wrench



Operation:	Table:
Removing the engine from the machine **Reassembling the engine on the machine**	**GTH5519-004**

18 Sling the engine using a two-leg chain with hook to be coupled to the front lug and the rear supporting bracket of the battery



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

20 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.

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

Operation: Reassembling the engine on the machine	Table: GTH5519-004

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Operation: Hydrostatic pump disassembly	Table: GTH5519-005	kg: 40
Bridge crane or swing hoist, payload 500 kg (2000 lb)	Standard tools	Hrs.: 2 — Min.: -
		1

Operation:

NOTICE

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

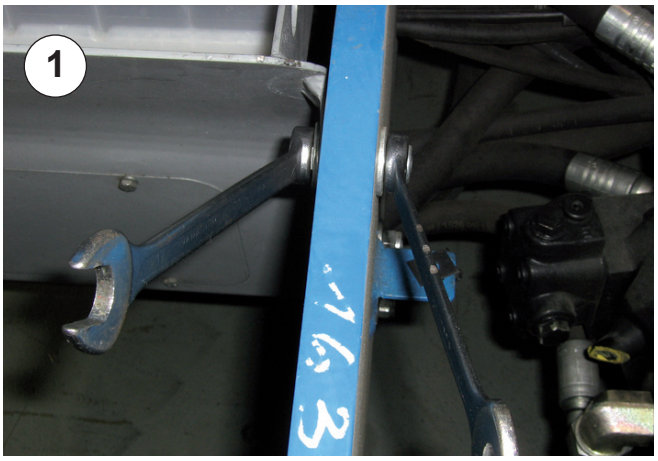
CAUTION

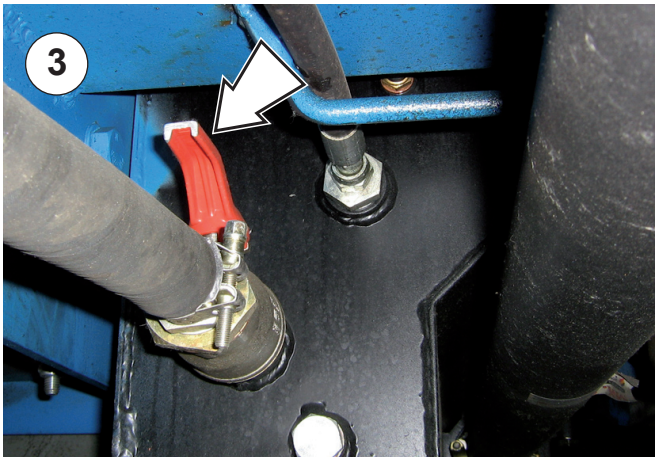
Carefully clean the area around the piping to be disconnected, plug all disconnected parts with caps, rags or adhesive tape to prevent dust or impurities from entering the circuit. They can cause serious damage.

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

2 Remove the lower cover

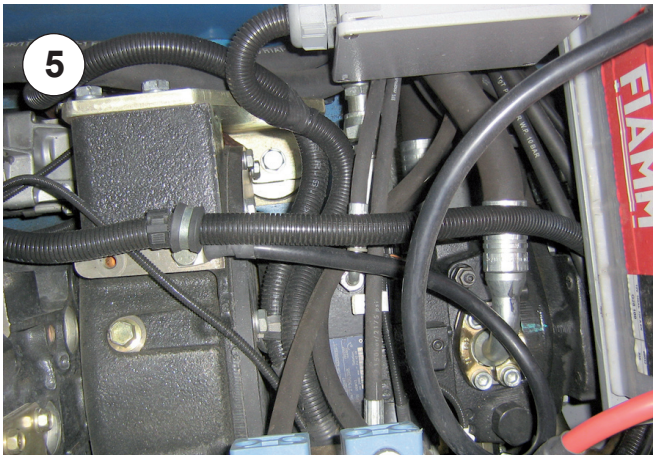
3 Close the oil tank cocks





Operation: **Hydrostatic pump disassembly**	Table: **GTH5519-005**

4 With a screwdriver, remove the two electrical connections of the solenoid valve which controls the machine forward/reverse movements



5 Disconnect the hydraulic piping:

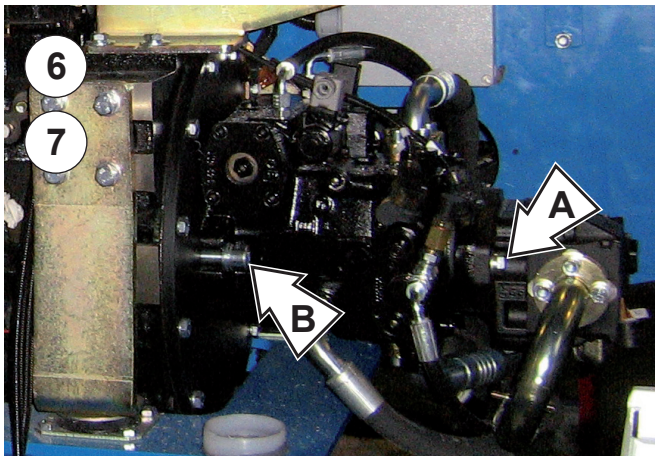
- ❑ disconnect the two drain lines of the hydraulic pump with a 36mm wrench
- ❑ disconnect the suction line of the hydraulic pump with a 50mm wrench
- ❑ disconnect the “low pressure line” duct with a 19mm wrench
- ❑ disconnect the four flanges which connect the drive pump to the drive motor with a 8mm Allen wrench
- ❑ disconnect the suction line of the service pump with a 8mm Allen wrench
- ❑ disconnect the delivery line ducts of the hydraulic drive 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.

⚠WARNING

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

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

7 Remove the fixing screws **B** of the drive pump with a 14mm hex-head wrench and 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.



Operation: **Disassembling the hydraulic motor**	Table: **GTH5519-006**	kg: 44
Bridge crane or swing hoist, payload 500 kg (2000 lb)	Standard tools	Hrs.: 2 — Min.: -
		1

Operation:

NOTICE

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

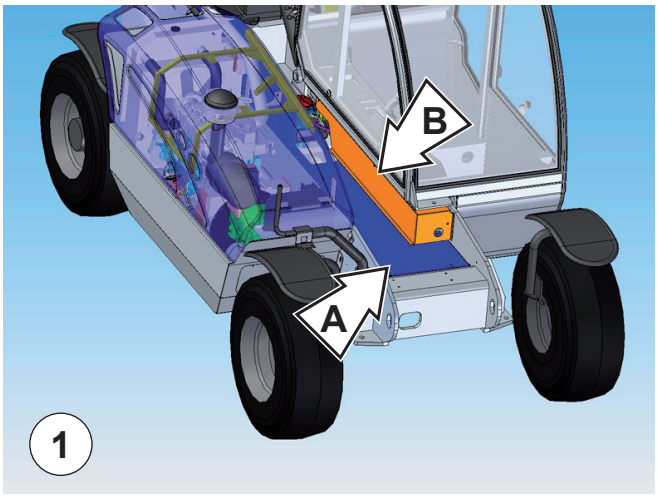
CAUTION

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 all the bolts with two 13mm wrenches

2 Using a 36mm wrench and a 17mm wrench, disconnect the hoses

3 Disconnect the two delivery hoses with a 19 mm wrench

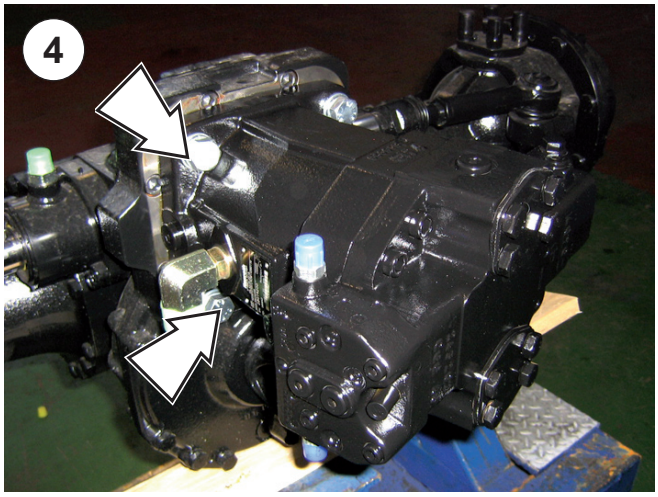


Operation: **Disassembling the hydraulic motor**	Table: **GTH5519-006**

4 Remove the four locking screws of the motor with a 24mm wrench

5 Pull out the motor from the power divider fitted to the front axle

6 Protect the engine compartment to prevent the entrance of impurities



Operation: **Cylinder disassembly** **Boom extension cylinder**	Table: **GTH5519-007**	kg: 92
		Hrs. 2 / Min. -
Bridge crane, payload 500 kg (2000 lb) 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 With a 13 mm wrench, remove the screw fixing the pin drop-shaped head

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

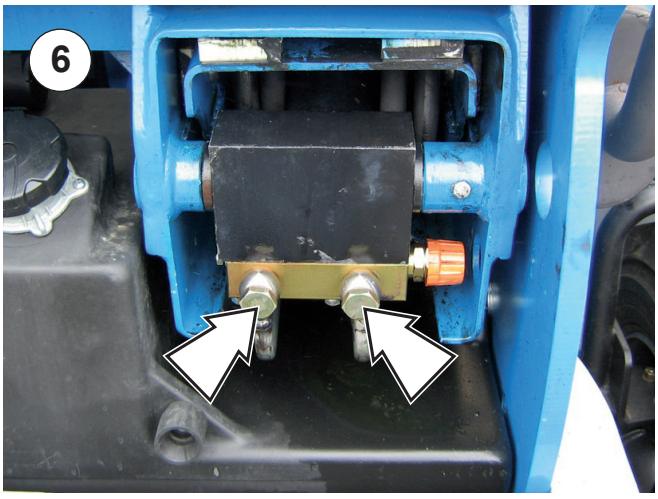
4 Remove the rear guard to gain access to the rear part of the boom

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

NOTICE

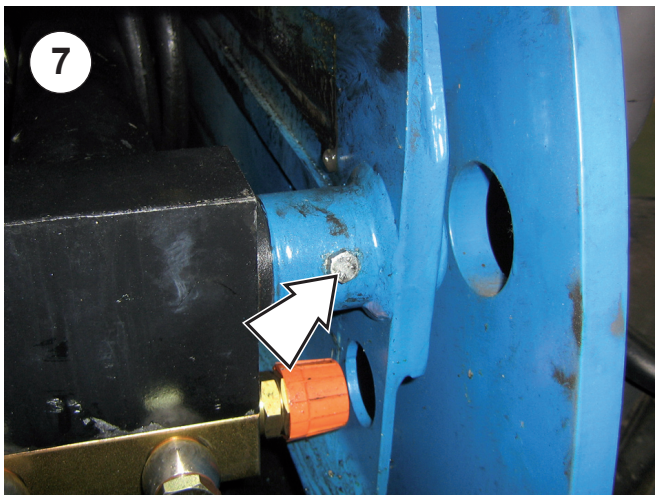
Used oils must be handled and disposed of according to local regulations. Address to legally authorised centres.

6 With a 27 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.



Operation:	Table:
Cylinder disassembly **Boom extension cylinder**	**GTH5519-007**

7 Loosen and remove the screw fixing the cylinder pin (bottom side) with two 13 mm wrenches



8 Knock out and extract 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

Operation: Water-oil cooler disassembly	Table: GTH5519-008	kg	24
		Hrs.	Min.
Standard tools		2	-
			1

Operation:

NOTICE

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

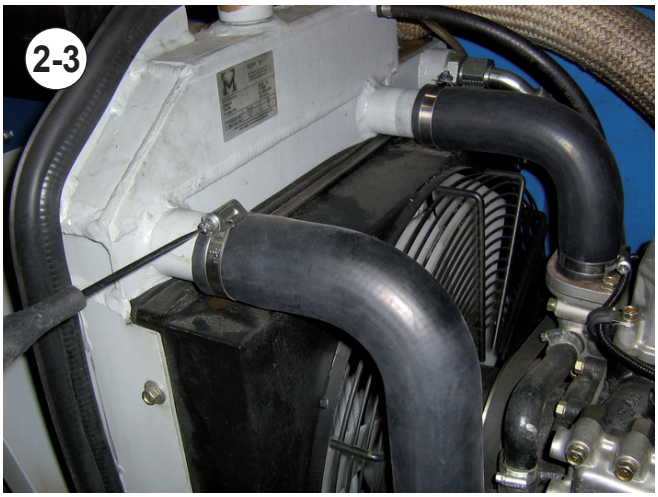
CAUTION

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 Empty the cooler opening the special cock

2 Disconnect the two inlet and outlet hoses from the cooler with a 36 mm wrench

3 Disconnect the water pipes from/to the engine loosening the hose-clamps with a screwdriver



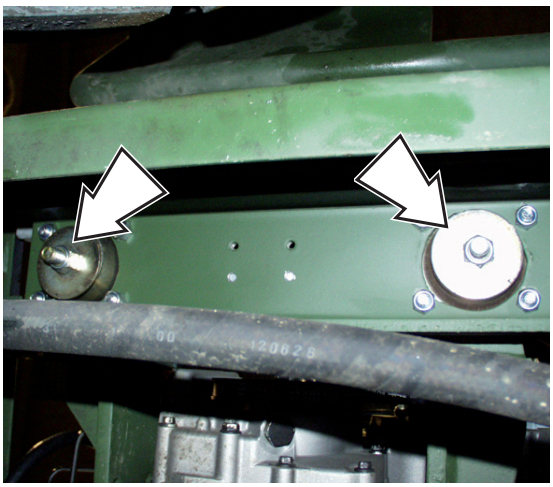
Operation: **Water-oil cooler disassembly**	Table: **GTH5519-008**

4 Remove the two screws of the vibration supports with a 22 mm wrench

5 Secure the cooler with a textile bridle connected to the swing hoist

6 Hoist with caution by tilting the cooler forward to prevent damage to the fixed fan of the engine

(4)



VIEW OF THE MACHINE FROM THE BOTTOM

Operation: Main valve disassembly	Table: GTH5519-009	kg: 27
		Hrs. 2 / Min. 30
Standard tools		1

NOTICE

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.

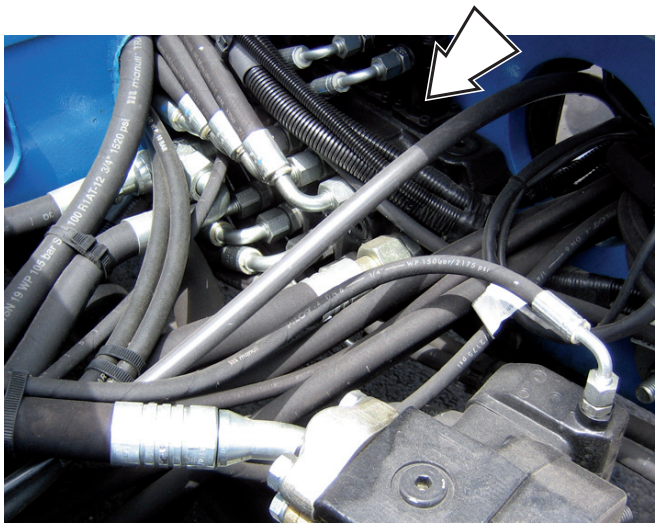
⚠DANGER

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: Main valve disassembly	Table: GTH5519-009

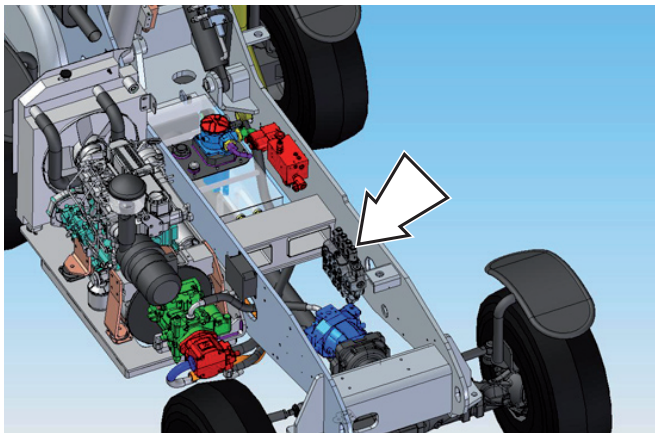
CAUTION

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



Operation:

1. Disconnect the delivery and return pipes with a 32 mm wrench
2. Disconnect all users with a 27 mm wrench
3. Disconnect all pilot systems with a 19 mm wrench
4. Remove the 3 fixing screws with two 13 mm wrenches (screw + lock nut)



Operation:	Table:		
Renewing the slide pads of the telescopic boom	**GTH5519-010**	kg	-
		Hrs. / Min.	1 / 30
Standard tools			1

ADJUSTING THE PLAY WITH SHIMS

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

Usually, the guide pads subject to premature wear are:

- bottom pads of the fixed section
- top pads of the telescope

Proceed as follows:

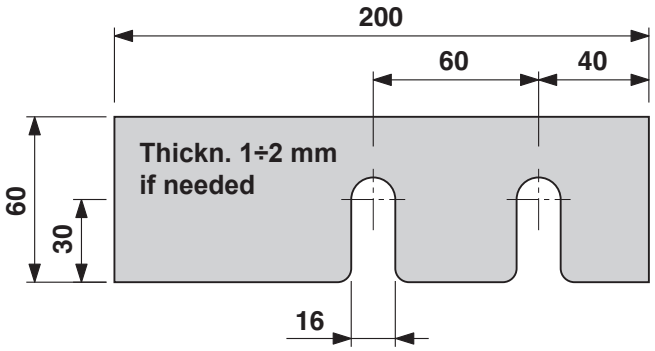
1 Lower the boom to the ground and ensure the telescope is fully retracted

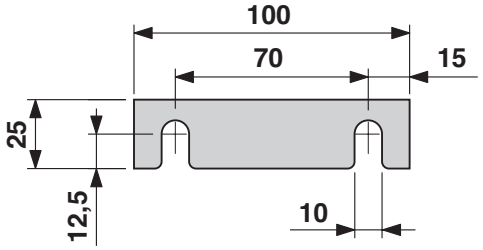
2 With a thickness gauge, check the play of all pads.
After adjustment, the minimum play in the narrowest point must be: **0,5÷1 mm**

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



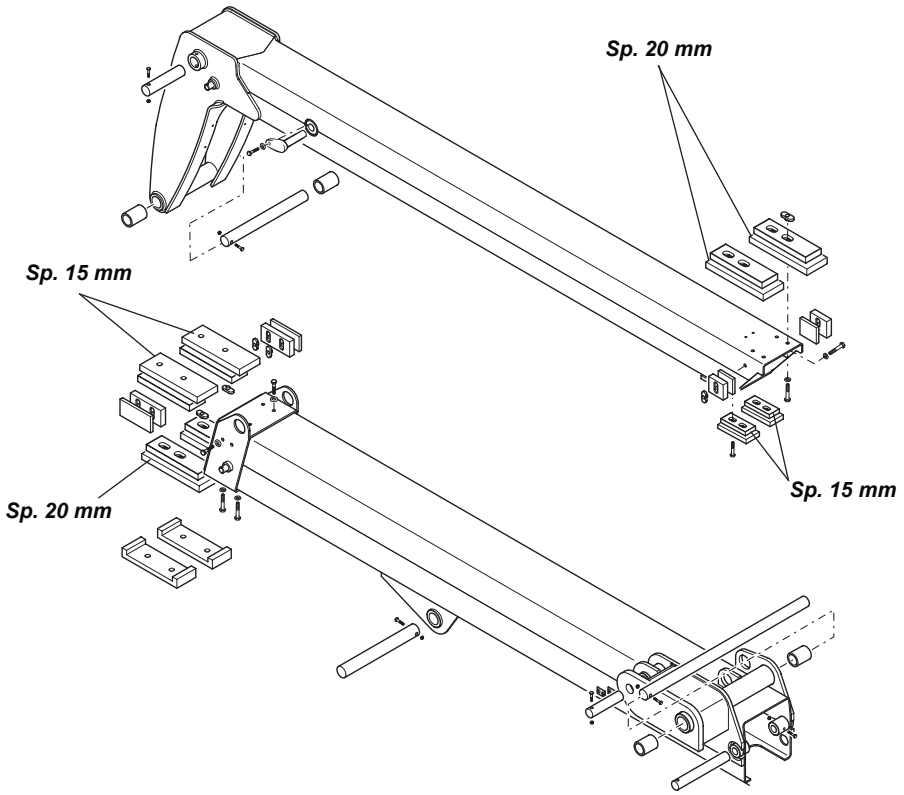


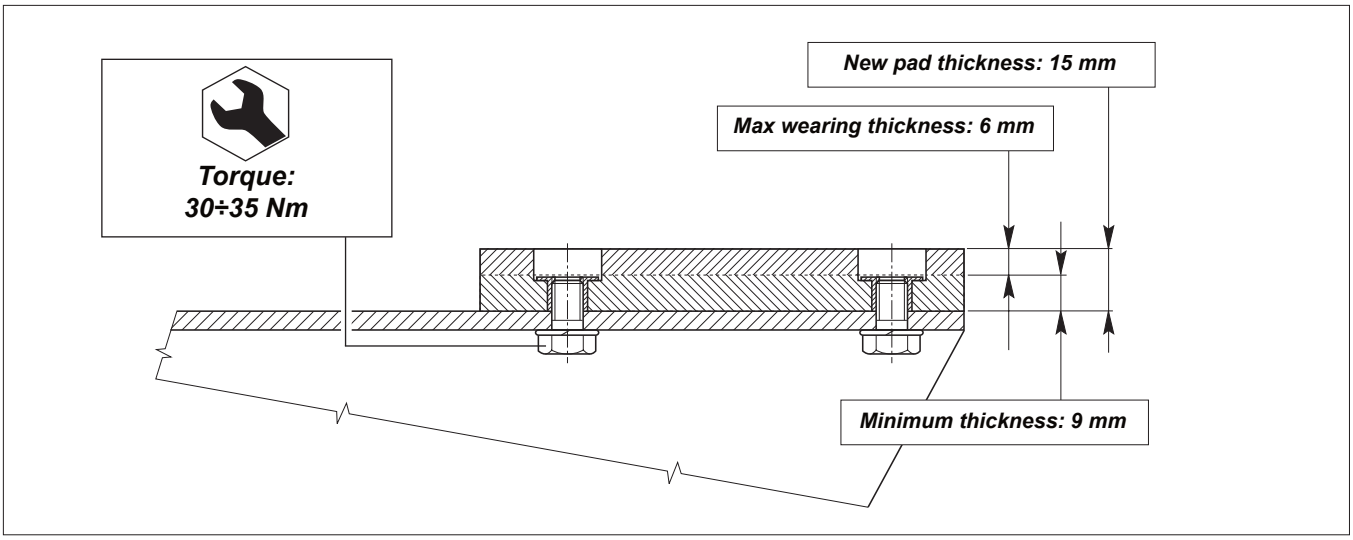
Operation: **Renewing the slide pads of the telescopic boom**	Table: **GTH5519-010**

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





Operation:	Renewing the slide pads of the telescopic boom	Table: GTH5519-010

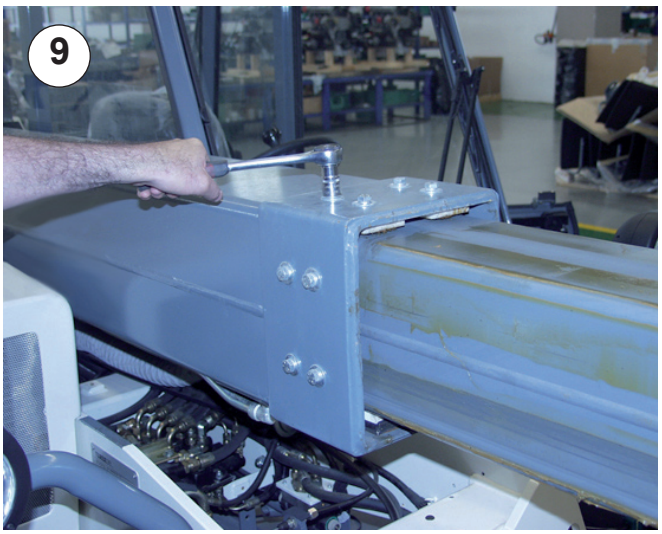
RENEWING THE PADS

To renew the pads of the **fixed section**, proceed as follows:

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

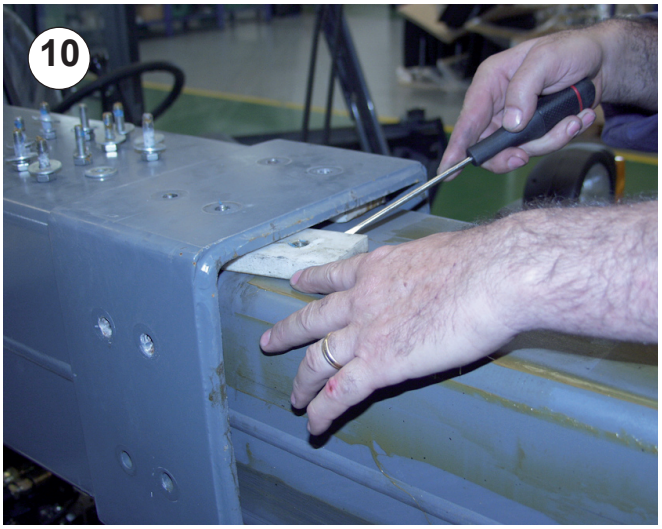
9 With a 17mm hexagonal wrench, remove the pad fixing screws

10 With 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.



To renew the pads of the **telescope**, proceed as follows:

11 Remove all pads from the fixed section to extend the telescope - see instructions above

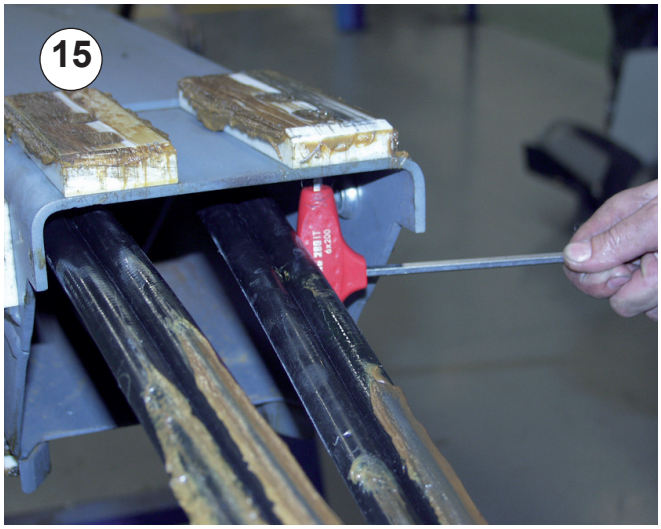
12 Fully extend the boom, then lower the nose to the ground and place a stand underneath the telescope near the fixed section

13 Remove the pin from the extension cylinder (rod side) - see table GTH5519-013.
Move back with the machine slowly to extend about 20 cm of the telescope out of the fixed section

Operation:	Renewing the slide pads of the telescopic boom	Table: GTH5519-010

14 Check the internal measure of the fixed section and the external measure of the telescope to verify if some shims are necessary considering that the final tolerance must range from **+ 1,0 mm** to **+ 1,5 mm**

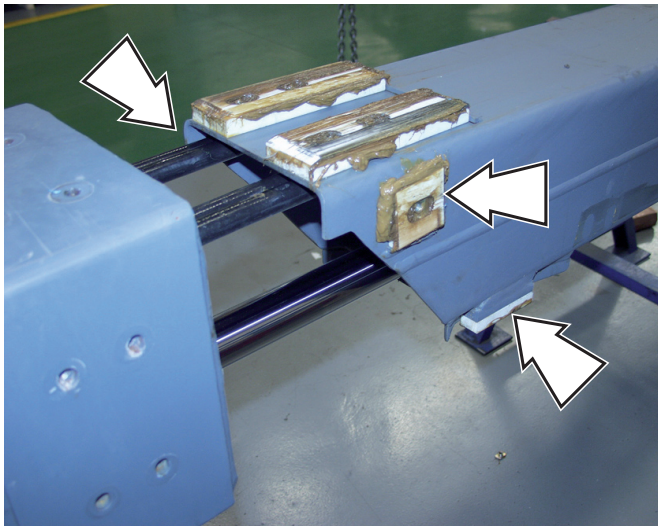
15 With a 6 mm hexagonal wrench, remove the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads



CAUTION

Tighten the pad fixing screws to 30÷35 Nm.

15 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**



16 Retract the telescope into the fixed section and refit the pin of the extension cylinder

17 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.

Operation: Renewing the flexible hoses inside the boom	Table: GTH5519-011	kg: -
	Standard tools	Hrs.: 2 / Min.: -
		2

How to renew flexible hoses:

NOTICE

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.

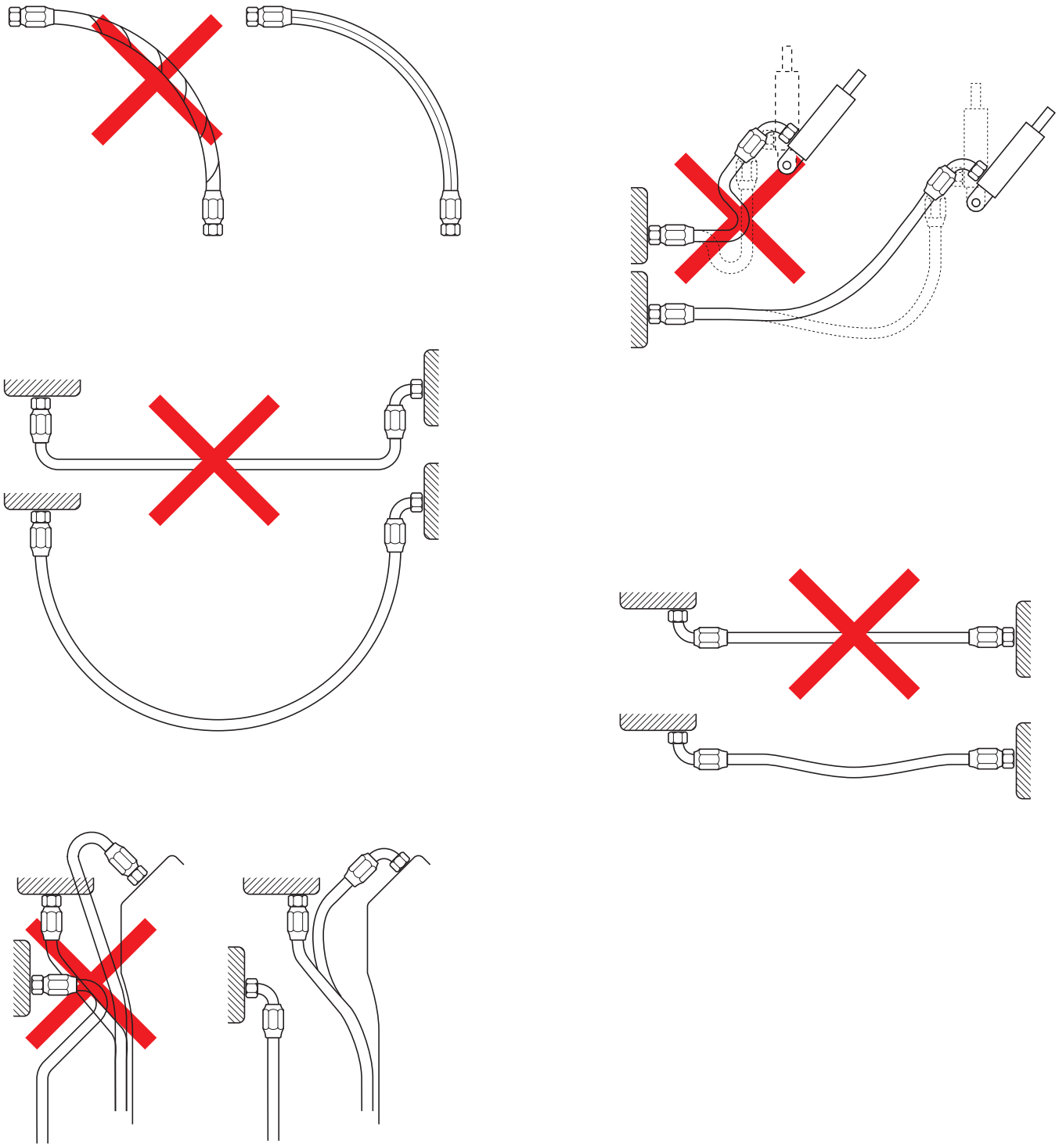
⚠DANGER

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
- 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
- pull the cord from the other side to refit the hose until reaching the connecting point to the line.

Operation: Renewing the flexible hoses inside the boom	Table: GTH5519-011

Useful advice for mounting flexible hoses:

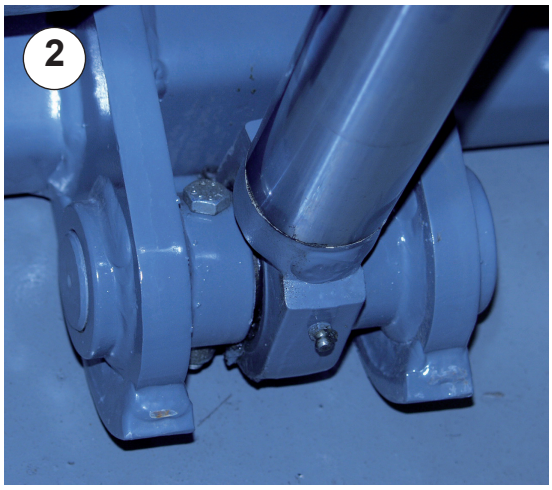


Operation: **Cylinder disassembly** **Attachment rotation cylinder**	Table: **GTH5519-012**	kg: 36
		Hrs. 1 / Min. 30
Bridge crane, payload 500 kg (2000 lb) Textile bridles or chains with hooks	Standard tools Adjustable stands	1

Operation:

1 Remove the attachment

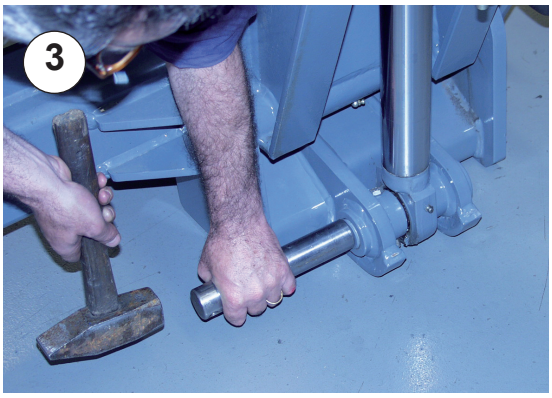
2 Remove the screw fixing the pin (rod side) with two 17 mm wrenches



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

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

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



6 Using a 13mm wrench, remove the protection cover from the valve of the attachment rotation cylinder

NOTICE

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

Operation:	Table:
Cylinder disassembly **Attachment rotation cylinder**	**GTH5519-012**

7 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.

8 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

9 Remove the screw fixing the cylinder pin (bottom side) with two 17 mm wrenches

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

11 Secure the cylinder to the bridge crane with a textile bridle, then slightly raise the boom to set the cylinder free

12 Remove the cylinder using the bridge crane