TEREX®

Service Manual

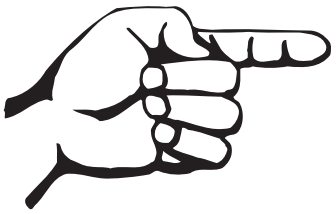
Serial number range

TH 19-55

From serial n.: 19925

Part No. 57.4400.9201

October 2008



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Introduction

Important

Read, understand and obey the safety rules and operating instructions in the **TH 19-55 Operator's Manual** (part n. 57.0100.5605) before attempting any maintenance or repair procedure.
This manual provides the machine owner and user with detailed information on the scheduled maintenance. It also provided qualified service technicians with infromation on troubleshooting and repair procedures.
Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, as well as specific tools and equipment.
In these instances, we strongly recommend letting service and repair the machine at an authorized TEREXLIFT service center.

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MACHINE IDENTIFICATION

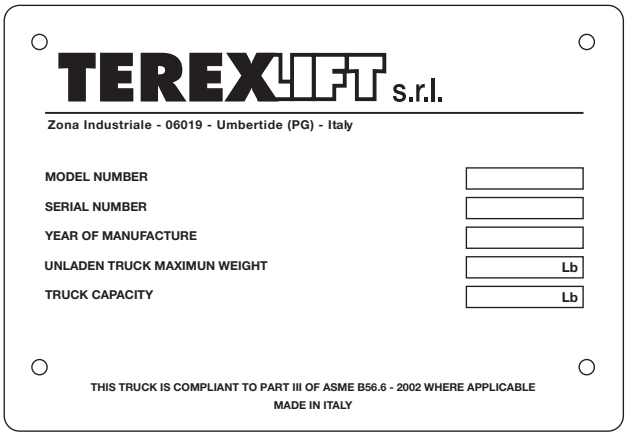
Machine Identification

■ CHASSIS SERIAL NUMBER

The chassis serial number is punched at the front of the chassis on the right side.

■ IDENTIFICATION PLATES OF THE MAIN PARTS

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

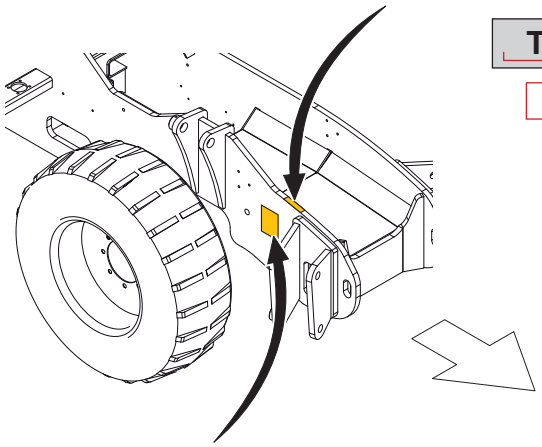


MACHINE DATA PLATE

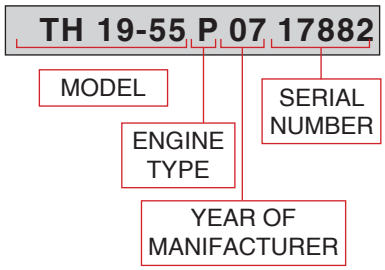
HOW TO READ THE MACHINE SERIAL NUMBER

Chassis serial number

(The chassis serial number is punched at the front of the chassis on the right side)



Machine data plate



Description

DESCRIPTION OF THE MACHINE OPERATION

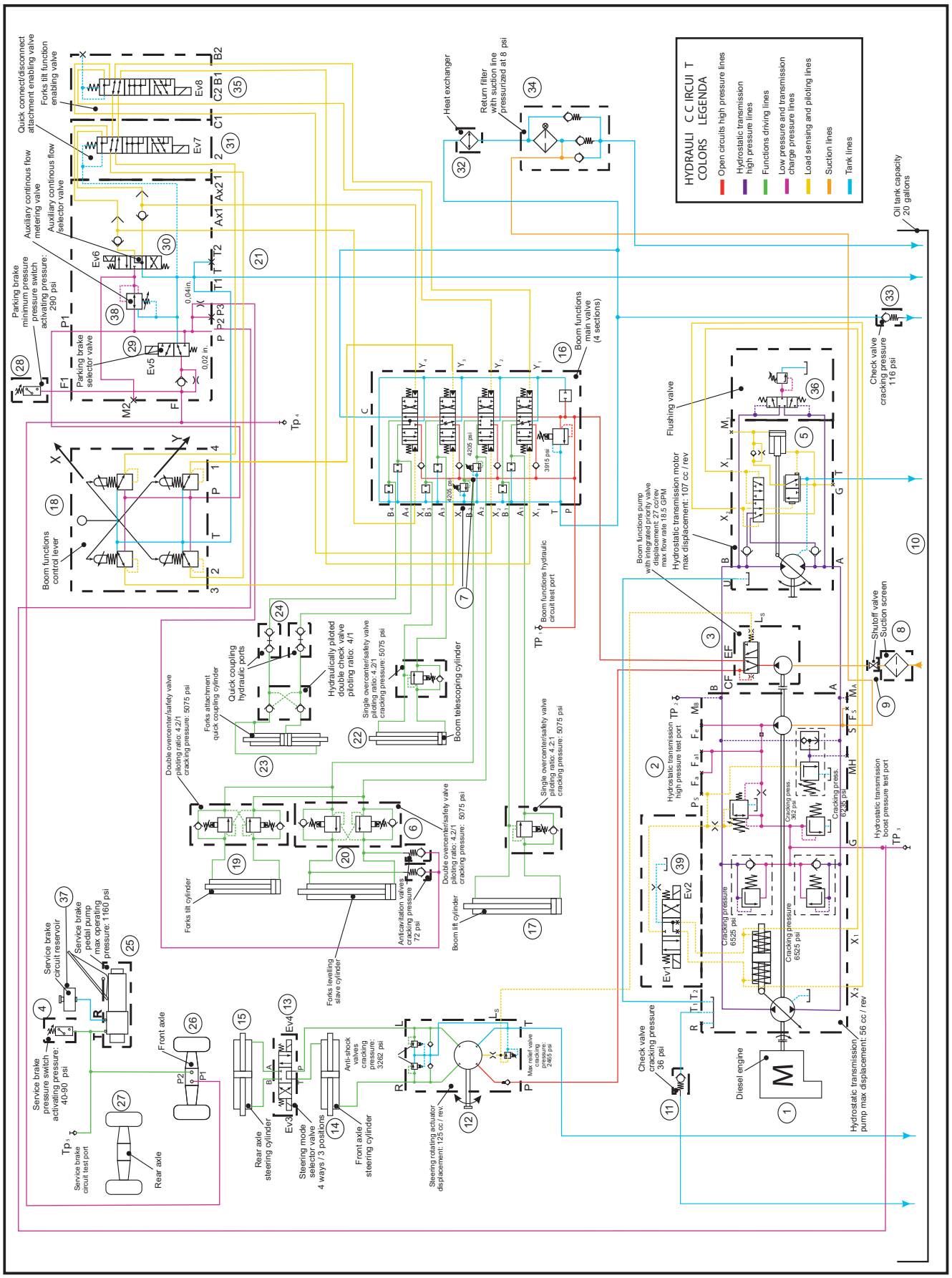
The mechanical energy source of this machine is a diesel engine **(1) Perkins**, model 804D-33 Tier 3 with a power of 47.1 kW at 2500 rev/min (63 HP) and a maximum torque of 147 lb-ft at 1600 rev/min. On the flywheel side of the engine, and connected to the same by a Technodrive coupler complete with 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 0.0000732 yd^3/rev. and the max calibration pressure is 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 0.0000353 yd^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 7,25 psi 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 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 (362-345 psi) 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 0.00014 yd^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 0.0001635 yd^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 2465 psi. On the two delivery lines to the steering cylinders there are other two pressure reducing valves with anti-shock function set at 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 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

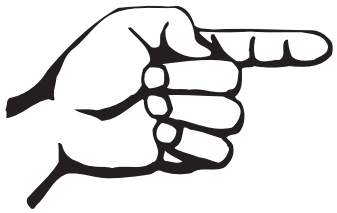
neutral position. Slider 1 of the main valve controls the lifting cylinder **(17)** of the telescopic boom. This cylinder has one single-acting compensation valve with safety function. Slider 2 of the main valve controls the attachment holding frame cylinder **(19)** of the telescopic boom. This cylinder 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 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 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 0.02in 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 1160, thus depending on the pressure exerted on the brake pedal placed inside the driving place.
The pressure switch **(4)** set at 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 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.

TH 19-55 hydraulic schematic





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SAFETY RULES

Safety Rules



Danger

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

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

Do Not Perform Maintenace Unless:

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

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

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

SAFETY RULES

1.1 SAFETY RULES

1.1-1 Personal Safety

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

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

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

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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

PROTECT THE ENVIRONMENT

Draws the attention to important environment-related information.



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



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

1.1-2 Workplace Safety



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



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



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



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



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



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

SAFETY RULES

1.2 GENERAL REMARKS

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

⚠ CAUTION

If you recognise hazardous situations, you can prevent accidents!

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

NOTICE

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

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

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

⚠ CAUTION

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

1.3 SERVICEMEN'S REQUISITES

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

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

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

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

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

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

⚠ CAUTION

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

⚠ CAUTION

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

1.3-1 PERSONAL PROTECTIVE EQUIPMENT

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

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

CAUTION

Use only type-approved protective equipment in good condition.

1.4 GENERAL SAFETY PRECAUTIONS

DANGER

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

1.4-1 WORKING AREA

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

1.4-2 PRECAUTIONS DURING WORK

- Do not walk or stop under raised loads or machine parts supported by hydraulic cylinders or ropes only.
- Keep the machine handholds and access steps always clean from oil, grease or dirt to prevent falls or slips.
- When entering/leaving the cab or other raised parts, always face the machine; never turn the back.
- When carrying out operations at hazardous heights (***over 3 meters from the ground***), always use 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.

SAFETY RULES

- Do not connect wet plugs or sockets.
- Signs and stickers shall never be removed, hidden or become unreadable.
- Except for maintenance purposes, do not remove safety devices, covers, guards,. Should their removal be necessary, stop the engine, remove them with the greatest care and always remember to refit them before starting the engine and using the machine again.
- 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.

PROTECT THE ENVIRONMENT

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

- Use the assistance of a second person to handle loads weighing 66 to 110 lb.
- For loads over 110 lb, the use of special hoisting equipment in good condition and equipped as per enforced regulations is mandatory.

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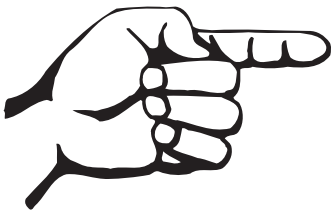
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002 - Cylinder disassembly, Fork balance cylinder 9
003 - Removing the engine from the machine 11
004 - Hydrostatic pump disassembly 17
005 - Disassembling the hydraulic motor 19
006 - Cylinder disassembly, Boom extension cylinder 21
007 - Water-oil cooler disassembly 23
008 - Main valve disassembly 25
009 - Renewing the slide pads of the telescopic boom 27
010 - Renewing the flexible hoses inside the boom 31
011 - Cylinder disassembly, Attachment rotation cylinder 33

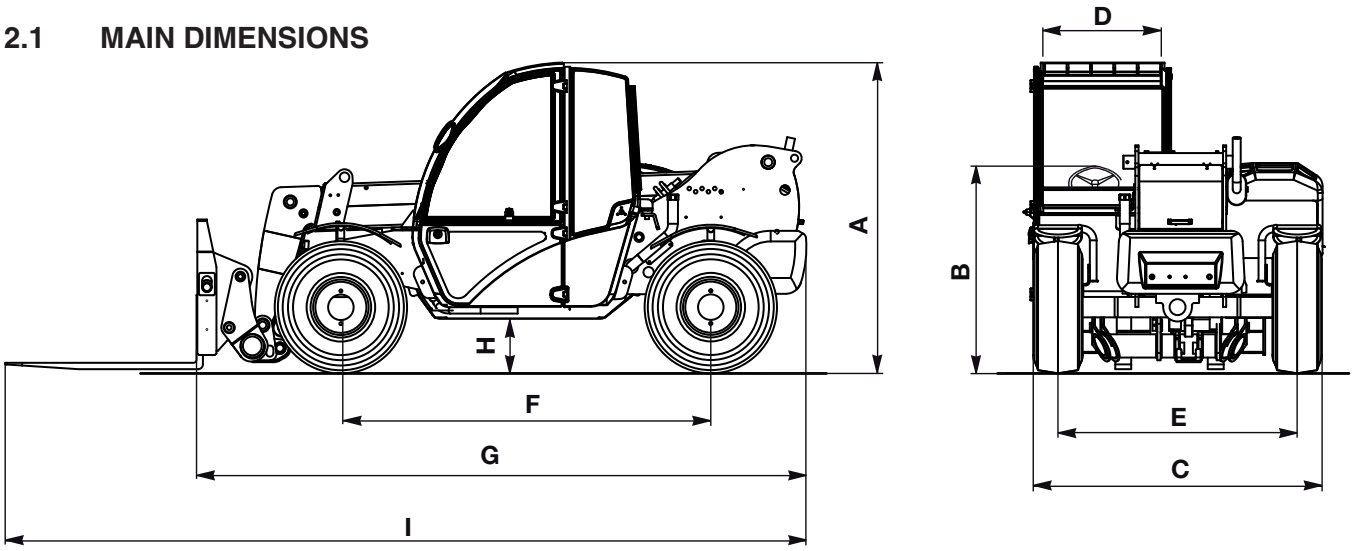


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TECHNICAL SPECIFICATION

Technical Specification

2.1 MAIN DIMENSIONS



			TH 19-55
A	Height	ft - in	6' - 4"
B	Height at steering whell	ft - in	4' - 1"
C	Width	ft - in	5' - 11"
D	Inside cab width	ft - in	2' - 6"
E	Track	ft - in	4' - 11"
F	Wheelbase	ft - in	7' - 7"
G	Length at fork-holder plate	ft - in	12' - 7"
H	Ground clearance	ft - in	1' - 1"
I	Overall length	ft - in	16' - 7"
•	Internal steering radius	ft - in	5' - 9"
•	External steering radius	ft - in	9' - 10"
•	Chassis levelling on both axles	°	2,3

2.2 TYRES

		TH 19-55
		Standard
- Dimensions		12-16.5
- Load index		10 pr
- Rim		9.75 x 16.5
- Wheel disc		8 holes DIN 70631
- Pressure	psi	65

TECHNICAL SPECIFICATION

2.3 LIMIT OF USE

			TH 19-55
•	Angle of approach (machine front side)	°	90
•	Departure angle (machine rear side)	°	60
•	Ambient temperature	°F	114.8

2.4 WEIGHT

			TH 19-55
•	Weight with fork	lbs	9810

2.5 SPEED

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

2.6 PAYLOAD AND REACH

			TH 19-55
•	Max lifting height	ft	19'
•	Max forward reach	ft	11'
•	Reach at maximum height	ft	2'
•	Fork-holder plate rotation	°	130
•	Max lifting capacity	lbs	5500
•	Lift capacity at maximum height	lbs	4400
•	Lift capacity at maximum reach	lbs	1900
•	Weight***	lbs	9810

2.7 FORKS (floating type)

			TH 19-55
•	Dimensions	in	47.2" x 3,9" x 1,6"
•	Weight	lbs	551

2.8 DIESEL ENGINE

			TH 19-55
•	Make		*PERKINS*
•	Model/Type		804D-33
•	Displacement	in^3	210
•	Cylinder arrangement		Vertical in-line
•	Combustion System		Direct injection
•	Max Power Output	hp; rpm	63,0; 2500
•	Max Torque Output	lbs-ft; rpm	147; 1600
•	Rated Power	ft-lbs; hp; rpm	132; 63; 2500
•	Aspiration		Aspirated
•	Cylinder's number		4

** Max Load; ** No Load; ***With Fork*

2.9 HYDRAULIC SYSTEM

				GTH 5519 GTH 5519-S
•	Make		*DEUTZ*	*PERKINS*
•	Hydraulic output	USgal/min	21	21
•	Pressure	psi	3916	3916

2.10 ELECTRICAL SYSTEM

			GTH 5519 GTH 5519-S
•	Voltage	V	12
•	Battery	Ah	100

TECHNICAL SPECIFICATION

2.11 MACHINE SOUND LEVELS

- Not applicable

2.12 VIBRATION LEVELS

			TH 19-55
•	Mean assessed vibration level transmitted to arms	ft/s^2	< 8.2
•	Mean assessed vibration level transmitted to body	ft/s^2	< 1.6

Values calculated in accordance with standard prEN13059

CAUTION

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

2.13 REFILLING

			TH 19-55
•	Make		PERKINS
•	Diesel engine	USgal	2
•	Fuel tank	USgal	15.6
•	Hydraulic oil tank	USgal	17
•	Front differential gear with reduction gear	USgal	1 + 0.2
•	Rear differential gear	USgal	1
•	Front wheel reduction gears	USgal	0.4
•	Rear wheel reduction gears	USgal	0.4
•	Brake oil tank	USgal	0.1
•	Engine coolant	USgal	3.4

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)**

2.14 TIGHTENING TORQUES

SAE FASTENER TORQUE CHART

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

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

METRIC FASTENER TORQUE CHART

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

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

TECHNICAL SPECIFICATION

2.15 HOISTING INSTRUCTIONS

DANGER

All parts weighing more than 55 lbs 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.

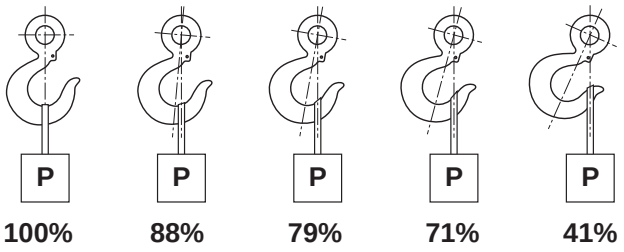
Before removing parts of the machine, make sure that:
- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

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:

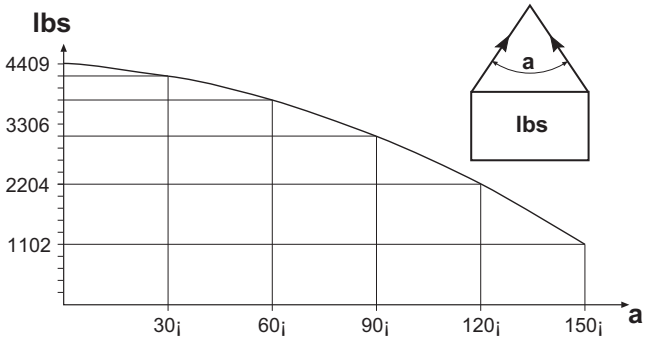
STRANDED ROPES	
Rope diameter mm	Max admissible load lbs
10	2204
11.2	3086
12.5	3527
14	4850
16	6172
18	7936
20	9700
22.4	12345
30	22046
40	39683
50	61729
60	88184

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

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



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



TECHNICAL SPECIFICATION

2.17 ADVICE TO RENEW FLEXIBLE HOSES

PROTECT THE ENVIRONMENT

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

CAUTION

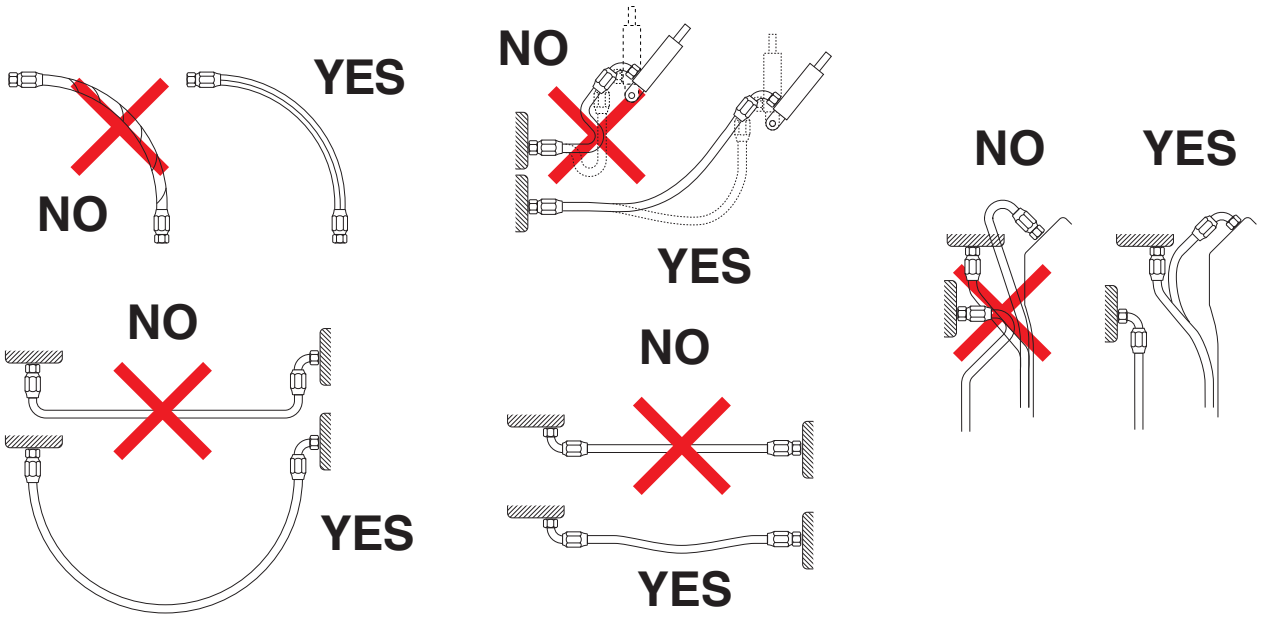
Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

DANGER

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

1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.
2 Blow some compressed air to remove any impurity.
3 For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:
- disconnect the hose to be replaced from both sides
- tie a cord to one end of the hose
- remove the hose pulling the cord until it comes out completely
- untie the cord and tie it to the new hose
- 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:



TECHNICAL SPECIFICATION

2.17 LISTS OF RECOMMENDED SPARE PARTS

Code	Description	Q.ty
07.0700.0023	Hydraulic oil filter inside the tank	1
09.4604.0004	Hydraulic oil filter	1
07.0700.0037	Engine air primary filter	1
07.0700.0036	Engine air secondary filter	1
07.4501.0139	Fuel filter (Perkins)	1
07.4501.0138	Engine oil filte (Pekins)	1
07.0705.0093	Negative brake electrovalve solenoid	1
07.0705.0096	Lock/unlock attachment - fork dumping electrovalve solenoid	1
07.0705.0099	Boom hydraulic line continous oil electrovalve solenoid	1
07.0728.0007	Steering electrovalve solenoids	2
07.0709.0417	Axals cylinders seals kit	2
07.0701.0200	Transmission pump seals kit	1
07.4529.0112	Service pump seals kit	1
07.4529.0027	Break pedal seals kit	1
635965	Fork movement cylinder seals kit	1
07.0705.0081	Lifting cylinder valve seals kit	1
640096	Lifting cylinder seals kit	1
639993	Extension cylinder seals kit	1
639992	Fork balance cylinder seals kit	1
07.0705.0085	Fork movement cylinder valve seals kit	1
07.0705.0082	Fork balance cylinder valve seals kit	1
07.0700.0028	Hydraulic oil return filter restriction indicator	1
07.0738.0003	Cardan spider	1
53.3001.5400	Perkins engine cooler collector	1
53.3001.5500	Perkins engine cooler collector	1
53.3001.6200	Deutz engine cooler collector	1
53.3001.6300	Deutz engine cooler collector	1
07.0701.0007	Transmission pump electrovalve coil	2
07.0701.0209	Transmission pump electrovalve	2
56.0016.0090	Speed switch	1
56.0016.0089	Diesel engine ignition switch	1
07.0704.0118	Red cap	2
07.0704.0117	Push button S + cap	2
07.0704.0119	Yellow cap	2
07.0703.0080	5A fuse	2
07.0703.0148	10A fuse	2
634973	15A fuse	2
07.0703.0071	25A fuse	2
07.0703.0060	50A big fuse	1
56.0021.0078	Timer relay	1
07.0723.0042	Mirror	1
09.0803.0400	Left mud guard	1
09.0803.0401	Right mud guard	1
07.0723.0486	Accelerator cable	1
09.4670.0004	Thermal engine antivibrant element	1
07.0723.0446	Cab roof wiper blade	1
07.0723.0037	Frontal window wiper blade	1
56.0017.0037	"Lights" "cab fan" switch	1

Code	Description	Q.ty
56.0017.0044	"Brake" "road-jobsite" "work light" switch	1
56.0017.0048	"Air conditioning" "continous oil" switch	1
56.0017.0035	Switch	1
56.0017.0049	3 steering ways switch	1
54.0702.0013	Pad	2
54.0702.0000	Pad	4
54.0702.0001	Pad	2
54.0702.0002	Pad	2
54.0702.0005	Pad	2
04.4210.0019	Quick coupling female 1/2” Faster Art. 2FFI12GASF	2
04.4210.0018	Quick coupling male 1/2” Faster Art. FFI12GASM	2
07.0704.0133	Handle joystick	1
07.0704.0042	Distributor pressure control valve	1
07.0703.0319	Rear stop and position lights	1
07.0703.0175	Rear turn signal lamp	1
07.0703.0305	3 W front lamp	1
07.0703.0304	40.50 W front lamp	1
07.0703.0306	21 W front lamp	1

2.18 MACHINE PAINT COLOUR

TEREX machines

WHITE RAL 1013

GREY RAL 7012

BLACK RAL 9500

TECHNICAL SPECIFICATION

2.19 CHECKING THE CYLINDER MOVEMENT TIMES

CAUTION

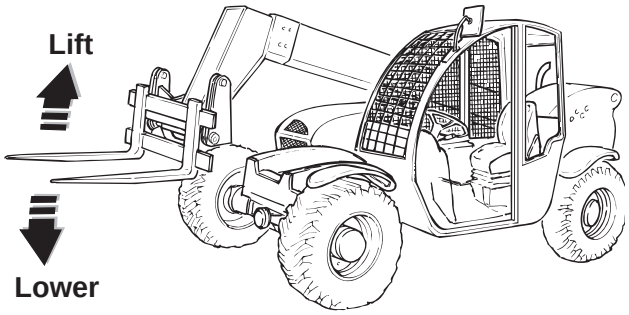
The check of the movement times of the cylinders shall be done with the hydraulic oil at a temperature of 60°.

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

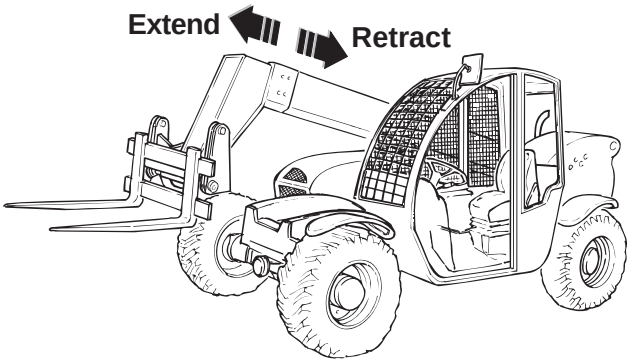
BOOM LIFTING/LOWERING

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



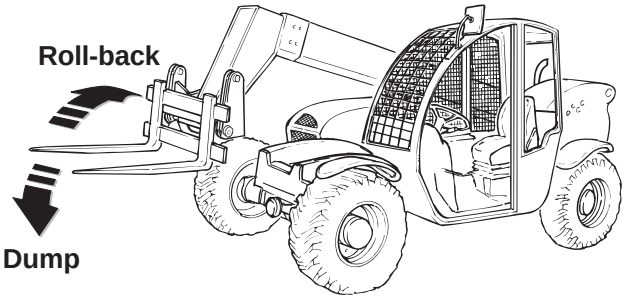
BOOM EXTENSION/RETRACTION

TH 19-55	Time (s)	
	out	in
Max engine speed	7”	4”
Min. engine speed	16”	8”



ATTACHMENT DUMPING

TH 19-55	Time (s)	
	dumping	roll-back
Max engine speed	4”	3”
Min. engine speed	8”	6”



2.20 HYDRAULIC SETTINGS

1. PRELIMINARY OPERATIONS

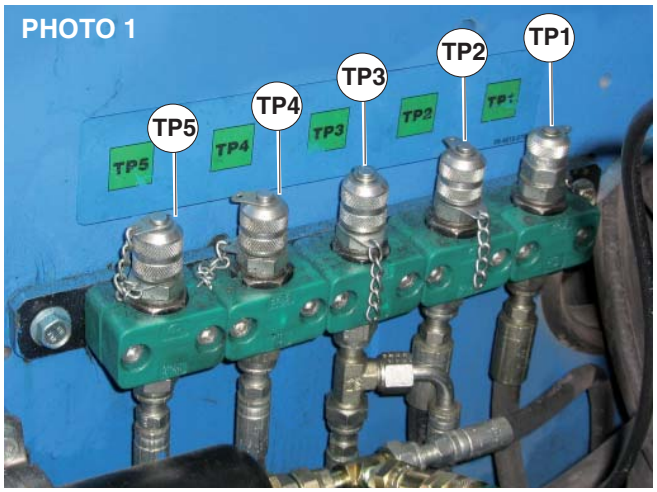
Check that the engine idle is set at 950 rpm and that the engine maximum speed is set at 2600 rpm.

Warm up the hydraulic oil to 140°F 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

Go to the front of the machine, find the mini-socket **TP1** (see **photo 1**) which is located on the internal wall of the chassis on the left and fit the 0-5972 psi pressure gauge.

PHOTO 1



2.1 CALIBRATING THE MAIN VALVE PRESSURE CONTROL VALVE

Remove the central protective covers of the machine and, using a 0,51inc wrench, loosen the locknut of the pressure relief valve **A** of the main valve (see **photo 2**).
With the engine running at max speed, move the boom fully up and to end of stroke by operating joystick, and set valve **A** to 3915 psi.
For the inspection of the safety valves **B**, proceed as follows:

- Increase the pressure of valve **A** of the main valve to 4351 psi moving the lifting cylinder to end of stroke.
- With the engine running at maximum speed, tilt the forks to one direction by means of the joystick and act on one of the two valves **B** until reaching a pressure of 4206 psi. Adjust the second valve **B** by pitching the forks back.
- When both fork inclination valves have been calibrated, reset the pressure control valve to 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.

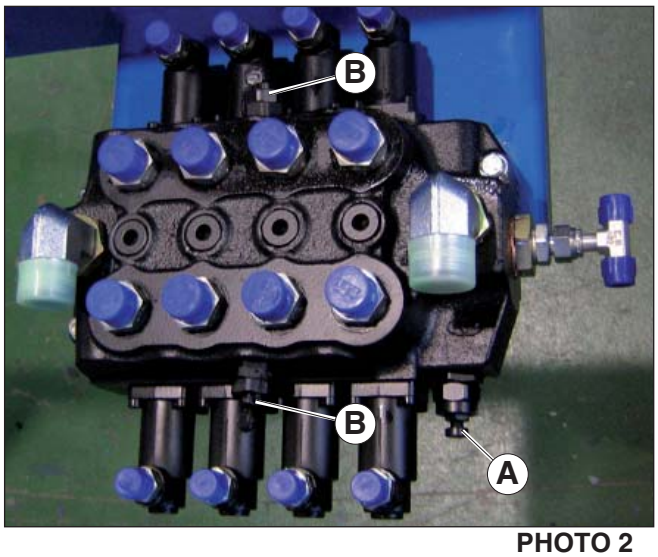


PHOTO 2

TECHNICAL SPECIFICATION

3. SETTING THE HYDROMATIK PUMP HYDROSTATIC TRANSMISSION

Do the calibration of the hydrostatic transmission with the hydraulic oil at 140°F.

- Connect a 0-868 psi manometer to the mini-socket **TP3** to read the boost pressure value (see **photo 1**).
- Connect a 0-8688 psi manometer to the mini-socket **TP2** to read the high-pressure value (see **photo 1**).

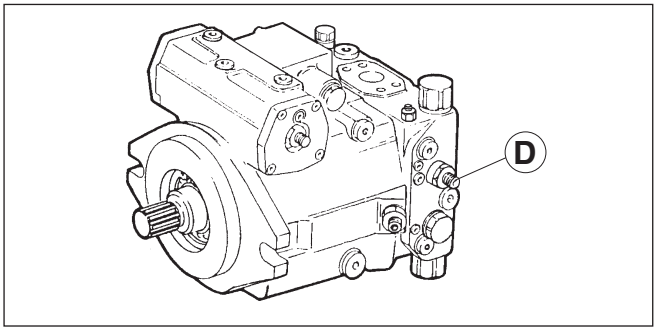
⚠ PERICOLO

Keep to one side of the machine during this operation.

- Hold the selector to neutral position and make sure the maximum speed of the engine does not exceed 2500 rpm (Perkins engine). The engine must run at a idle speed of 950 rpm. Otherwise, adjust the minimum speed.
- Read the boost pressure on manometer **TP3** and ensure it is about 362-435 psi 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

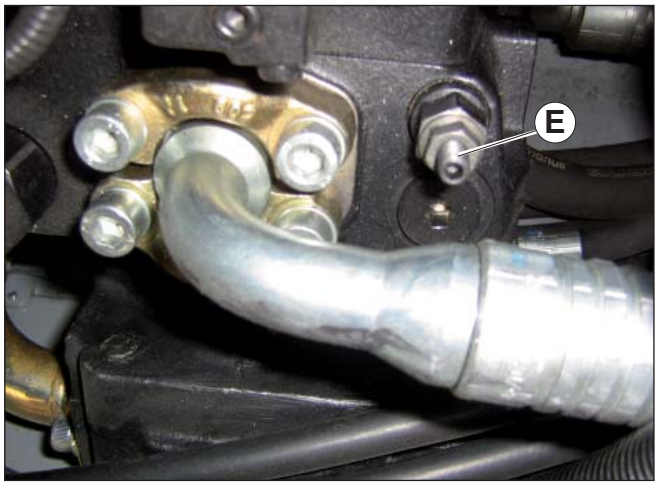
- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at 1200 rpm. Check the value on the tachometer.
- Adjust shutter **D** by means of the register until reading a value of 724 psi on the high-pressure manometer **TP2**.

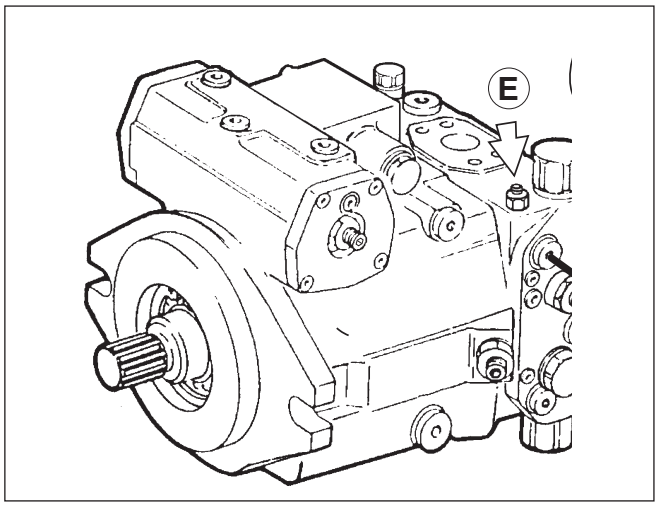


3.1 CALIBRATION OF THE MAXIMUM PRESSURE

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 **TP2**. If this value is less than 6235 psi, increase the pressure to 6235 psi by means of the pressure cut-off valve **E**.
- Remove the manometers and test the machine.





4. CALIBRATING THE POWER STEERING

- Fit a coupling complete with mini-socket **Z** in the position shown in **annex 1**.
- Fit a 0-3620 psi pressure gauge 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 2465 psi. If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

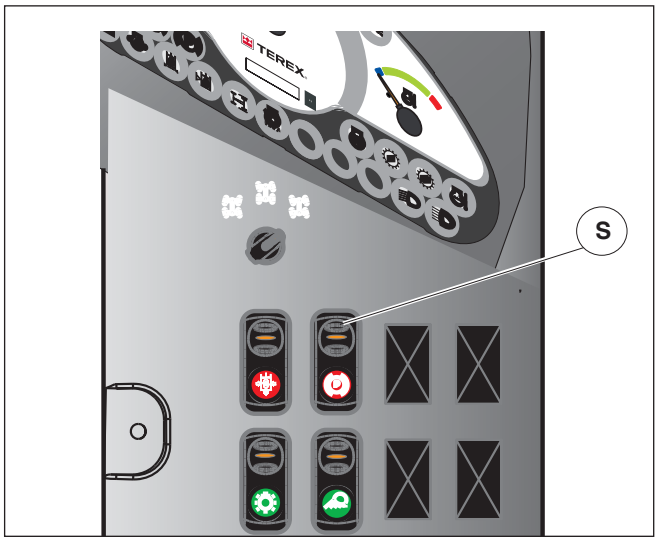
  Note: To gain access to valve **X**, remove the protection cap (see **annex 1**).

5. NEGATIVE BRAKE PRESSURE

- Connect a 0-868 psi manometer to the mini-socket **TP4**.
- Start the engine and unlock the brake by operating the relevant button **S** in the driving place.
- The pressure gauge shall display a value of 362 psi approx. given by the supercharge of the drive pump.

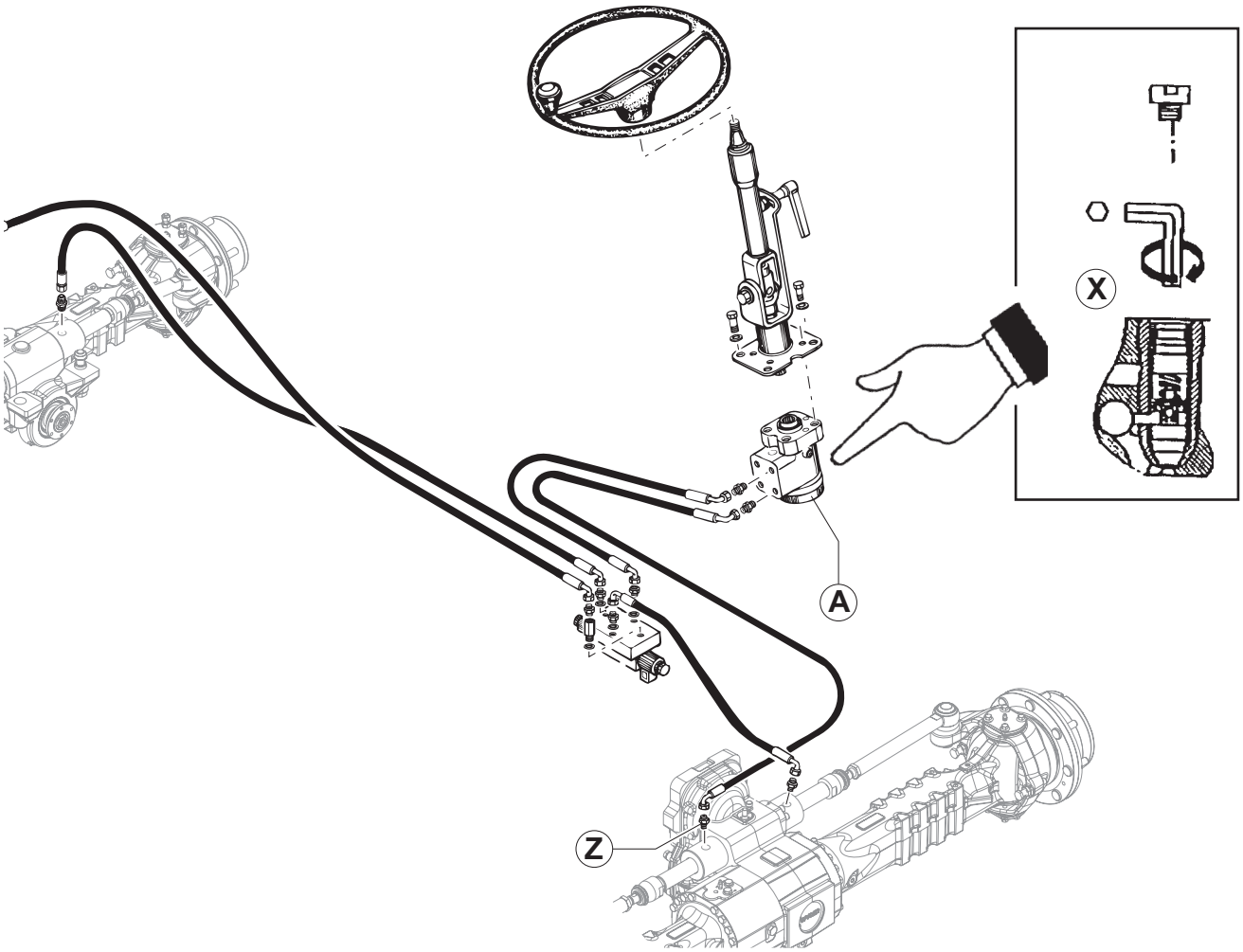
6. SERVICE BRAKE PRESSURE

- Connect a 3626 psi manometer to the mini-socket **TP5**.
- Step down on the brake pump pedal.
- The working pressure is about 1160 psi and is given by the force exerted on the pedal.



TECHNICAL SPECIFICATION

POWER STEERING SYSTEM	annex 1



MAINTENANCE INSPECTIONS

Maintenance Inspections

3.1 INTRODUCTION



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



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

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

MAINTENANCE INSPECTIONS

3.2 ABOUT THIS SECTION

Intervention times

Maintenance interventions have been divided into 7 different groups in relation to the time at which they must be carried out, say daily, weekly, monthly, every 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	Make sure the Operator's Manual is inside the machine.
A-6	Check that all safety decals and plates on the machine are in seat and legible.
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.

MAINTENANCE INSPECTIONS

TABLE B

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

B-1	Check the machine is in efficient working order

***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 replace the oil filter after the first 250 working hours.
C-2	Check the oil level in front and rear differential gears and 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. Replace, if necessary.
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.

MAINTENANCE INSPECTIONS

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	Replace the hydraulic oil filter cartridge of the drive pump return/suction line.
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.
D-10	Change the engine oil and replace oil filter and fuel filter (every 500 hours or one year).

TABLE E

***Every 1000 working hours or yearly*:**

E-1	Change the internal element of engine air filter.
E-2	Change the oil in front and rear differential boxes and 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 G

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

G-1	Checking the state of the structure.

MAINTENANCE INSPECTIONS

3.4 MAINTENANCE INSPECTION REPORT

Model

Serial number

Date

Hour meter

Machine owner

Inspected by

Inspector signature

Inspector title

Inspector company

Instructions:

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

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

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

Legend:

Y = yes, acceptable

N = no, remove from service

R = repaired.

Table A	Y	N	R
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.			
A-19 Engine coolant level.			

Table B	Y	N	R
Within the first 50 working hours:			
B-1 Machine efficiency			
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 Drive pump hydraulic oil filter (tank return)			
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.			
D-10 Engine oil, oil filter and fuel filter			

Table E	Y	N	R
Every 1000 working hours:			
E-1 Inner element of engine air filter.			
E-2 Oil of the differential casing and the power divider.			
E-3 Oil in the four wheel reduction gears.			
E-4 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:

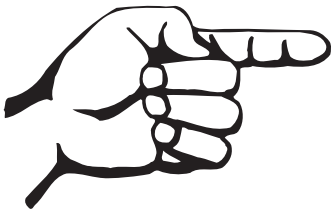
Y = yes, acceptable

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.			



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Maintenance Procedures

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.***

MAINTENANCE PROCEDURES

4.2 ABOUT THIS SECTION

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

Safety symbols:



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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

PROTECT THE ENVIRONMENT

Draws the attention to important environment-related information.

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 with a 0,47inc hex-head wrench and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

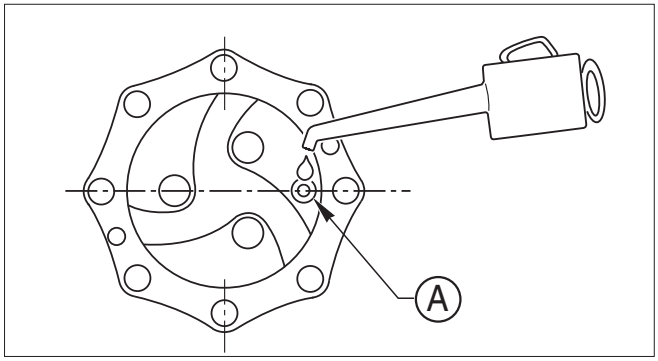
Place a container of suitable size under the plug.

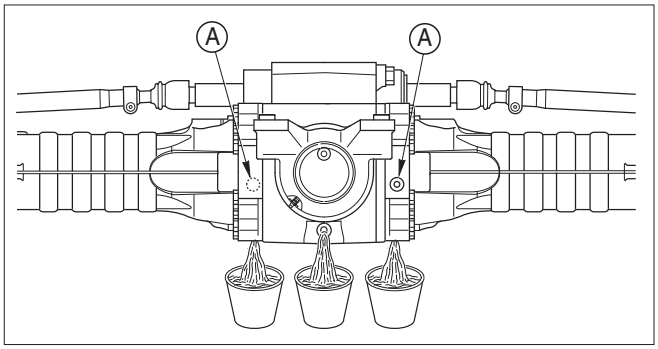
To check the oil level in the **front and rear differential gears**:

- Stop the machine on a level ground and engage the parking brake.
- Loosen level plug **A** with a 0,39inc hex-head wrench 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**.

PROTECT THE ENVIRONMENT

Place a container of suitable size under the plug.







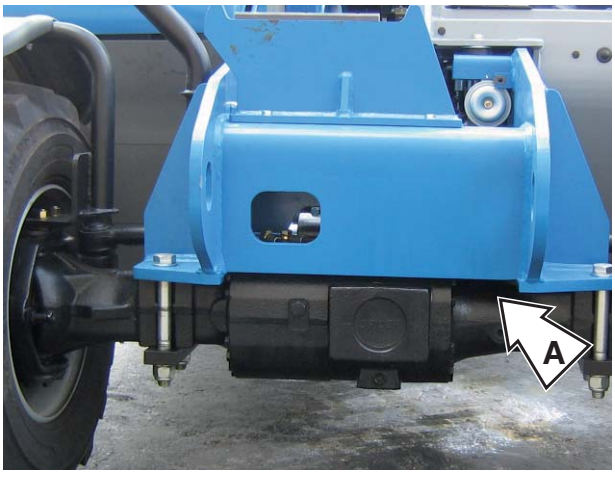


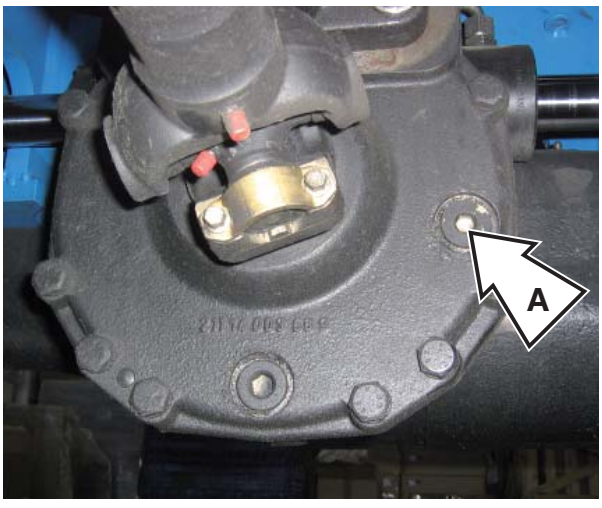
TABLE A

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

- Stop the machine on a level ground and engage the parking brake.
- Clean plug **A** all around, then remove it with a 0,47inc hex-head wrench and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

Place a container of suitable size under the plug.



A-2 CHECK THE TIGHTENING OF THE WHEEL BOLTS AND THE TYRE PRESSURE

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 221 lbf•ft.

WARNING

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

WARNING

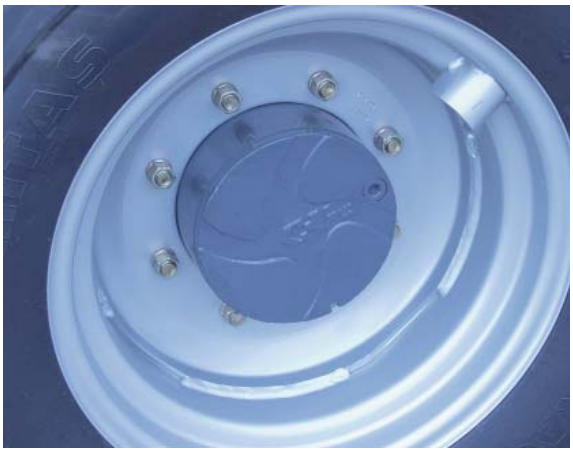
On new machines, and when a wheel has been disassembled or replaced, check the nut torque of the wheels every 2 hours until they stay correct.

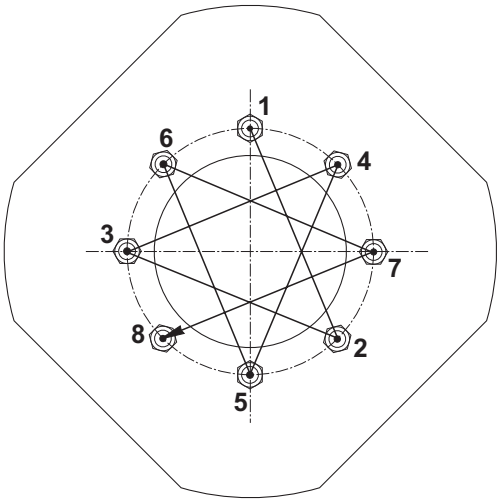
WARNING

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

TABLE A

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





- Remove nut **A** from the tyre.
- Connect the hose of the pressure gauge.
- Read the pressure on the pressure gauge.
- If the pressure is not the one recommended, adjust to the value indicated on the table to the side.



TABLE A

A-3 CHECK THE TIGHTENING OF ALL BOLTS AND NUTS

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

For the correct tightening torques, please refer to par. 2.14 in section 2 “Technical Specifications”.

A-4 CHECK THE COUPLINGS FOR OIL LEAKS

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

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

TABLE A

A-5 INSPECT THE OPERATOR'S MANUAL

Maintaining the operator's 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 TEREX Service Centre if replacement manuals are needed.

A-6 INSPECT THE DECALS AND PLATES

Maintaining all of safety and instructional decals and plates 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

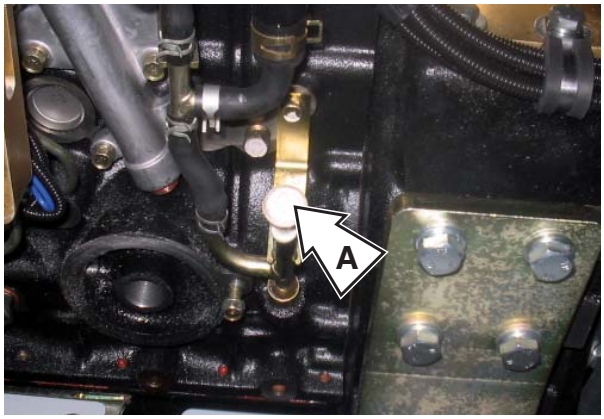
Contact TEREX Service Centre if replacement decals are needed.

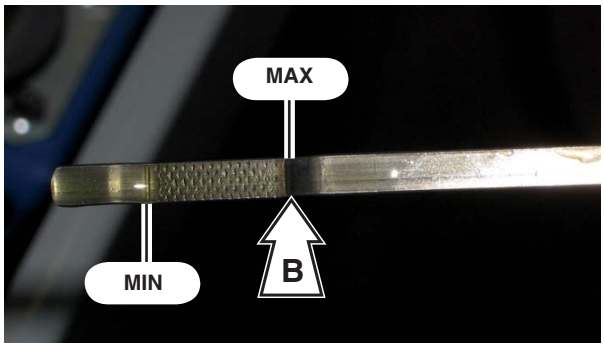
TABLE A

A-7 CHECK THE ENGINE OIL LEVEL

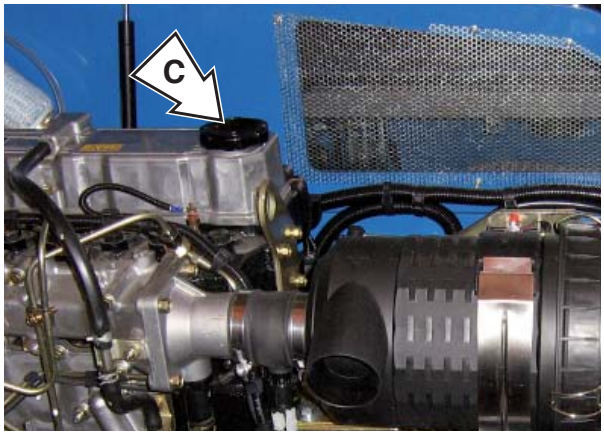
To check the engine oil level:

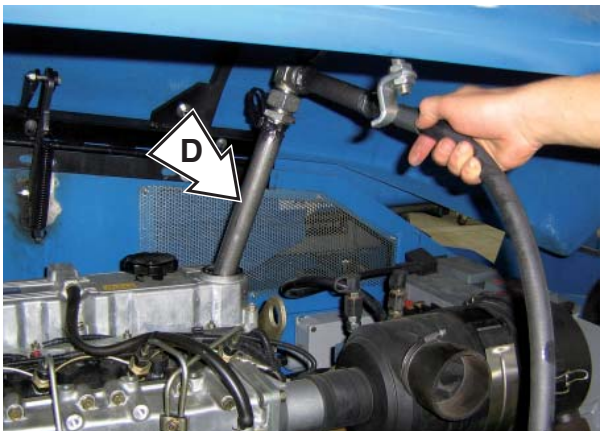
- Park the machine on a flat ground, stop the engine and check the parking brake is engaged.
- Remove dipstick **A** and check if oil reaches the max mark **B**.





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





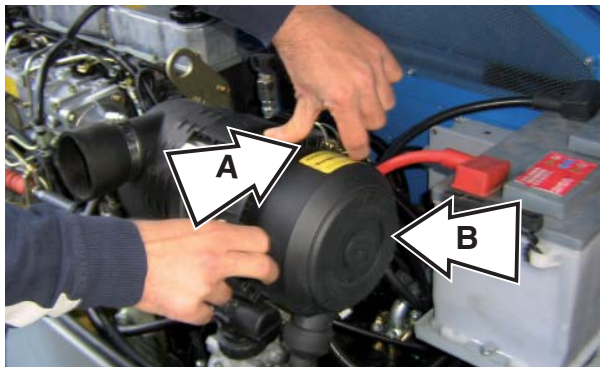
- Remove dipstick **A** once again and check if oil reaches the max mark **B**.
- Refit the plug.

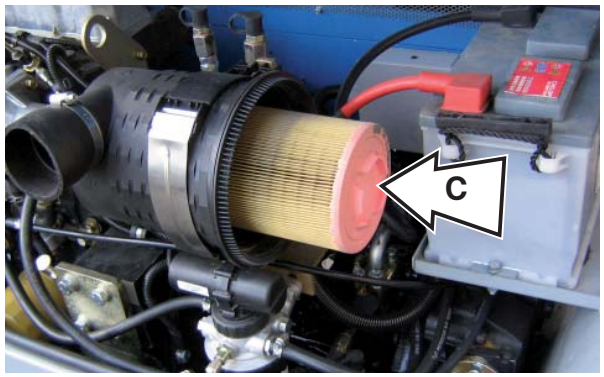
TABLE A

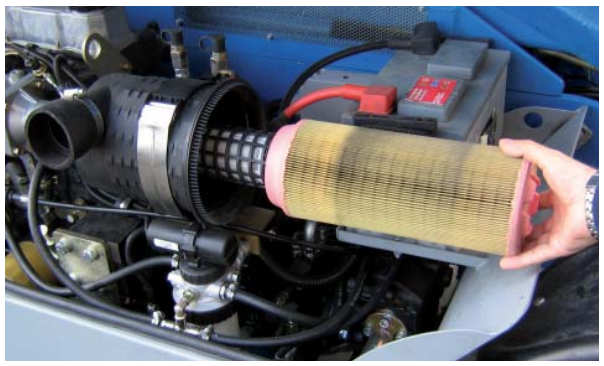
A-8 CLEAN THE AIR SUCTION FILTER

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. 87 psi 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

If the warning light (air filter restriction) in the driving place comes on, replace the two filter elements C and D.

- Stop the engine and engage the parking brake.
- Unlatch the fasteners **A** and remove cover **B**.
- Pull out the filter elements **C** and **D**.
- Check the filter element for cracks by introducing a lamp inside.
- Install the new filter elements **C** and **D**.
- Close cover **B** and lock in place with fasteners **A**.

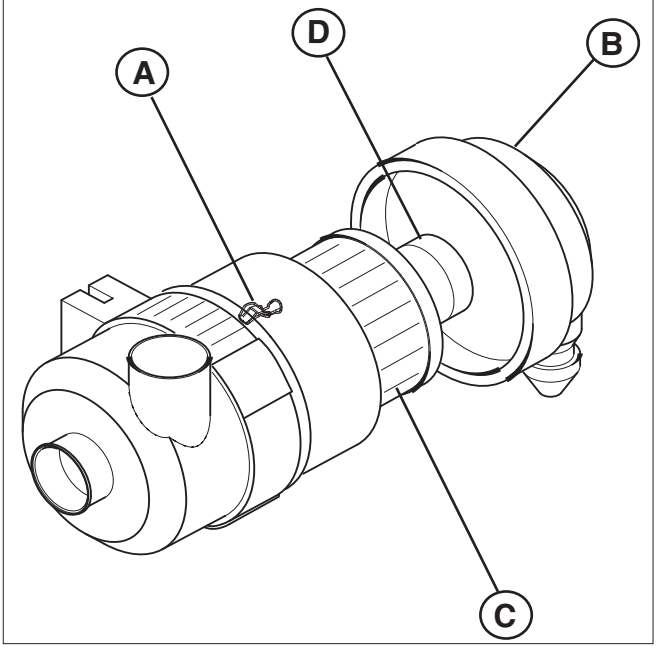


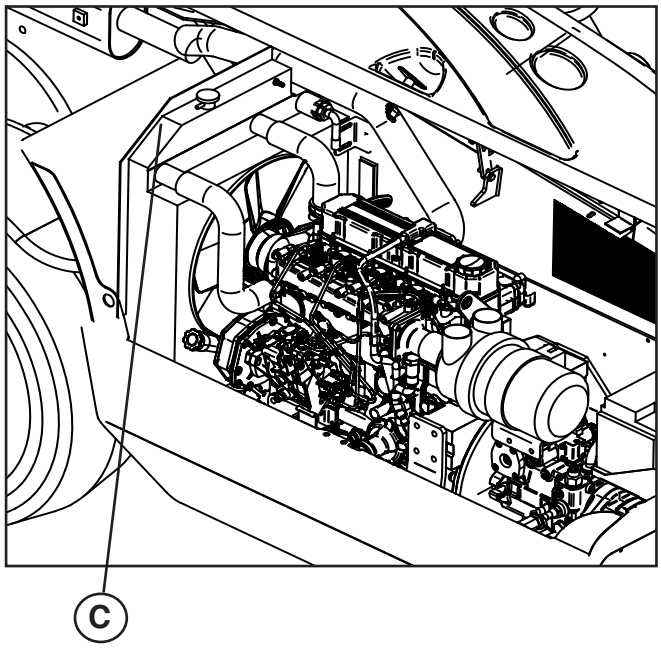
TABLE A

A-9 CHECK AND CLEAN THE RADIATOR

DANGER

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

- Stop the engine and engage the parking brake.
- To reach radiator **C** open the engine cover.
- Check the fins of radiator **C** for sediments.
- If necessary, prepare a compressed air nozzle (max. 29 psi) or a nozzle distributing water under pressure or steam.



Cleaning using compressed air

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

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.

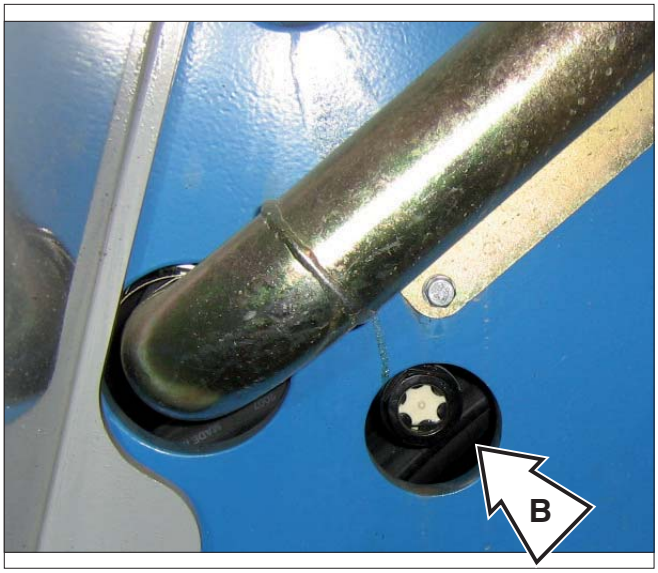
TABLE A

A-10 CHECK THE HYDRAULIC OIL LEVEL IN THE TANK

DANGER

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

- Stop the machine on a level ground and make sure the parking brake is engaged.
- Make sure the boom of the machine is fully retracted and lowered.
- 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.

PROTECT THE ENVIRONMENT

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

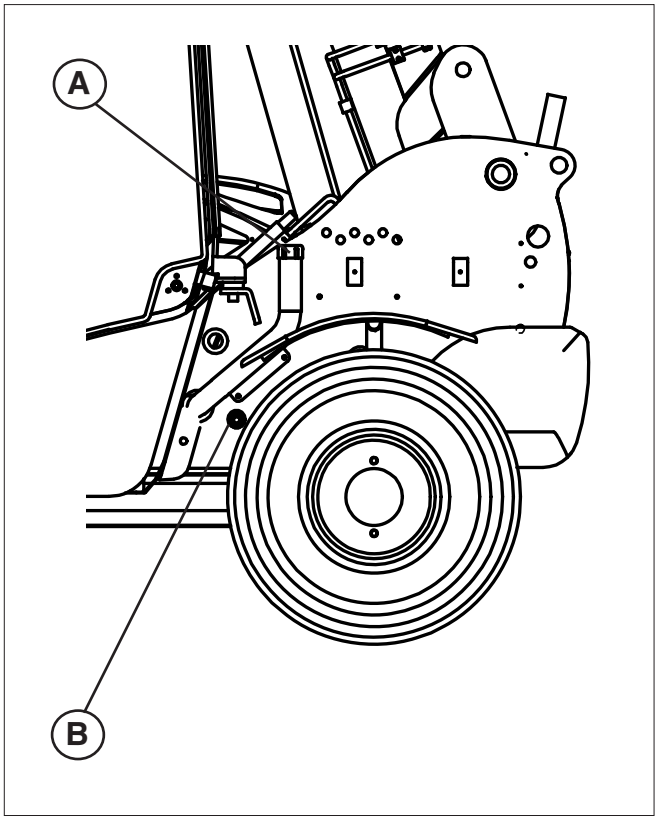


TABLE A

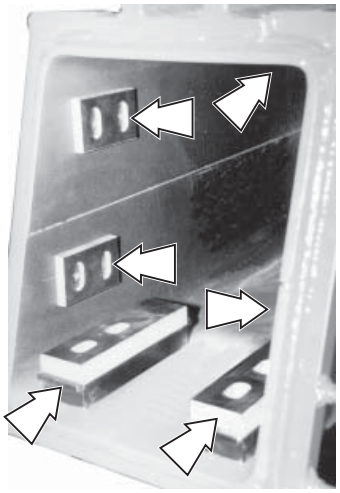
A-11 CHECK THE GREASING OF THE BOOM SECTION PADS

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 sliding pads of the telescopes are well greased (red strip on the picture).

Using a brush, apply a thin coat of fresh grease. If necessary, scrape off the old grease and smear the telescope with fresh grease.

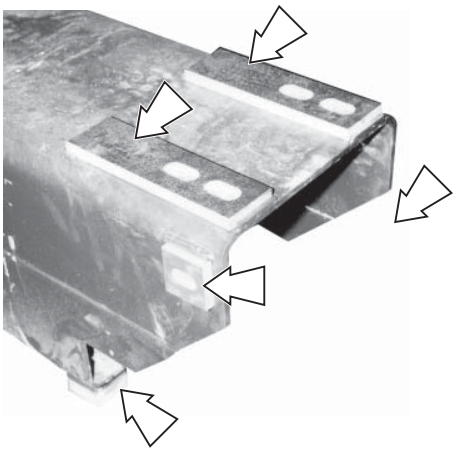
- **INTERFLON grease FIN GREASE LS 2**



CAUTION

Use only greases of the recommend type, avoid mixing greases with different characteristics and never use greases of a lower quality.

Before injecting fresh grease into the greasing nipples, 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.



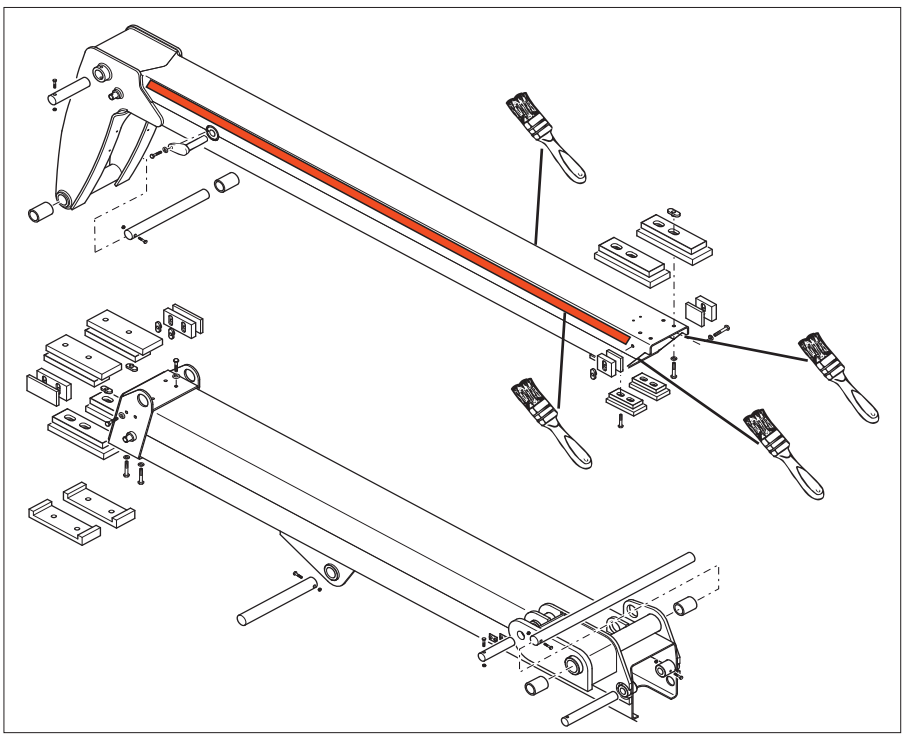


TABLE A

A-12 GREASE THE FORKS

CAUTION

Before injecting fresh 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.

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

Recommended grease:

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

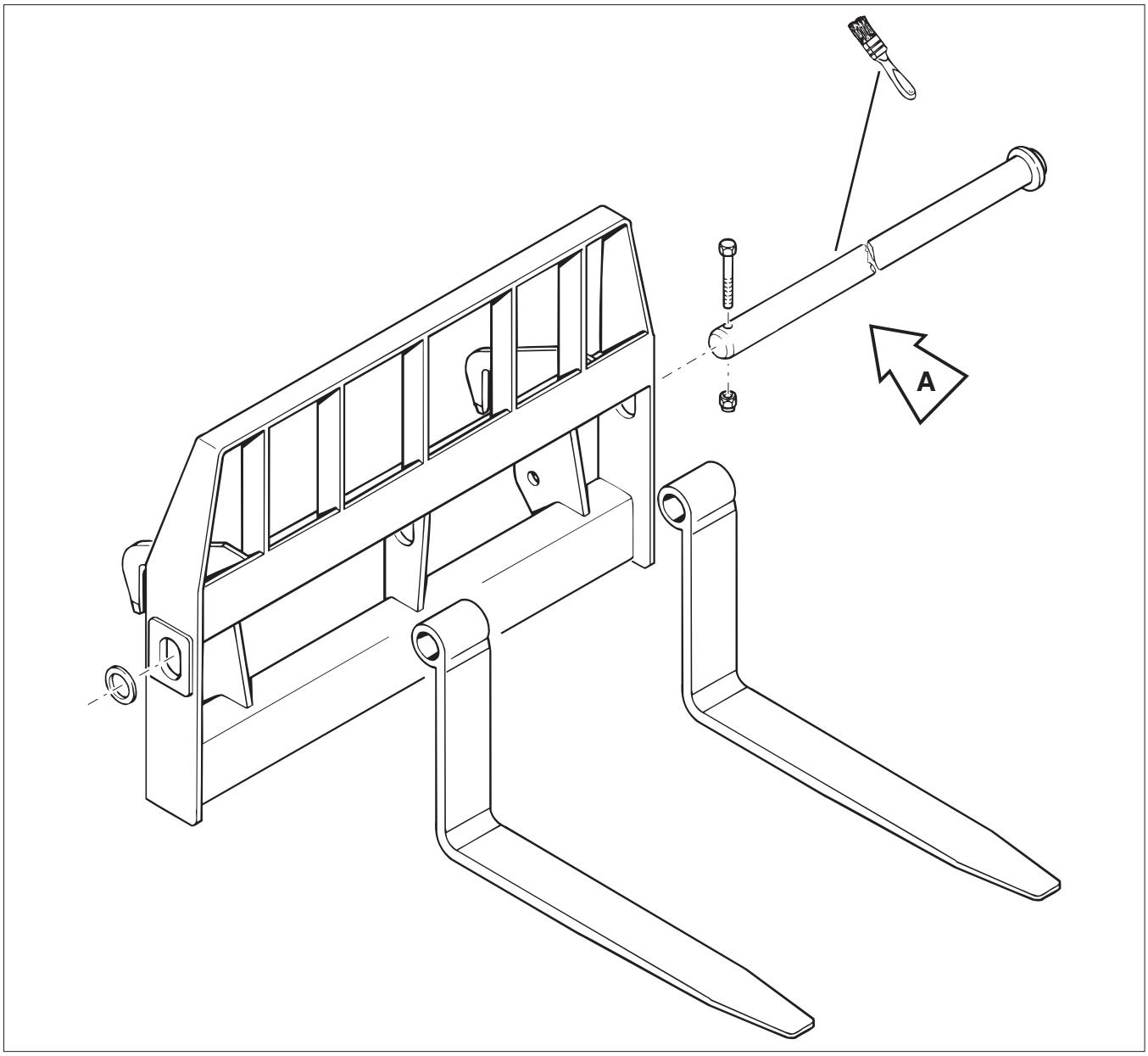
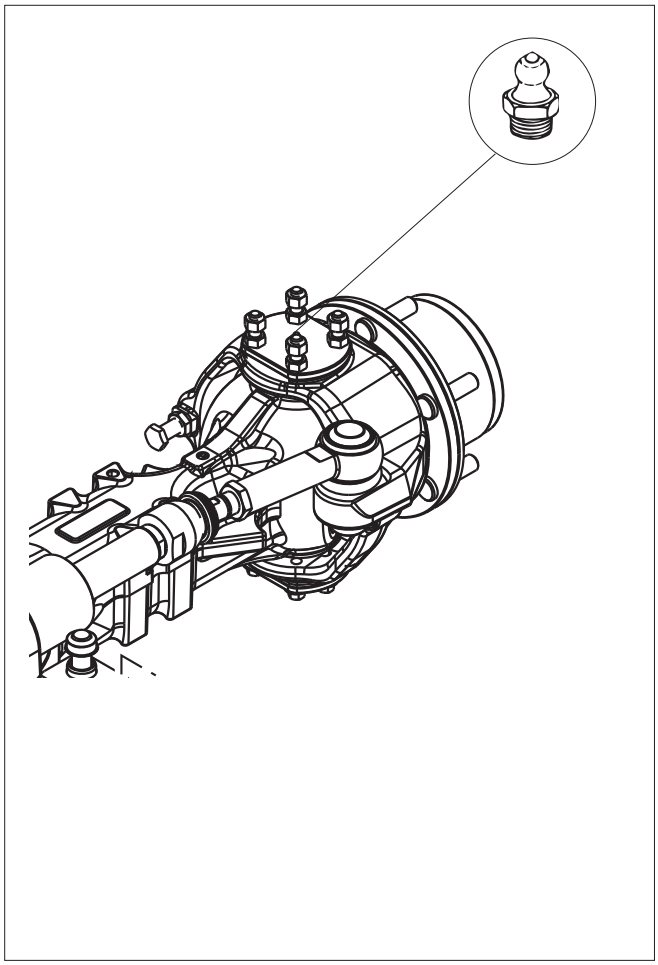


TABLE A

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



CAUTION

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

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

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

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

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

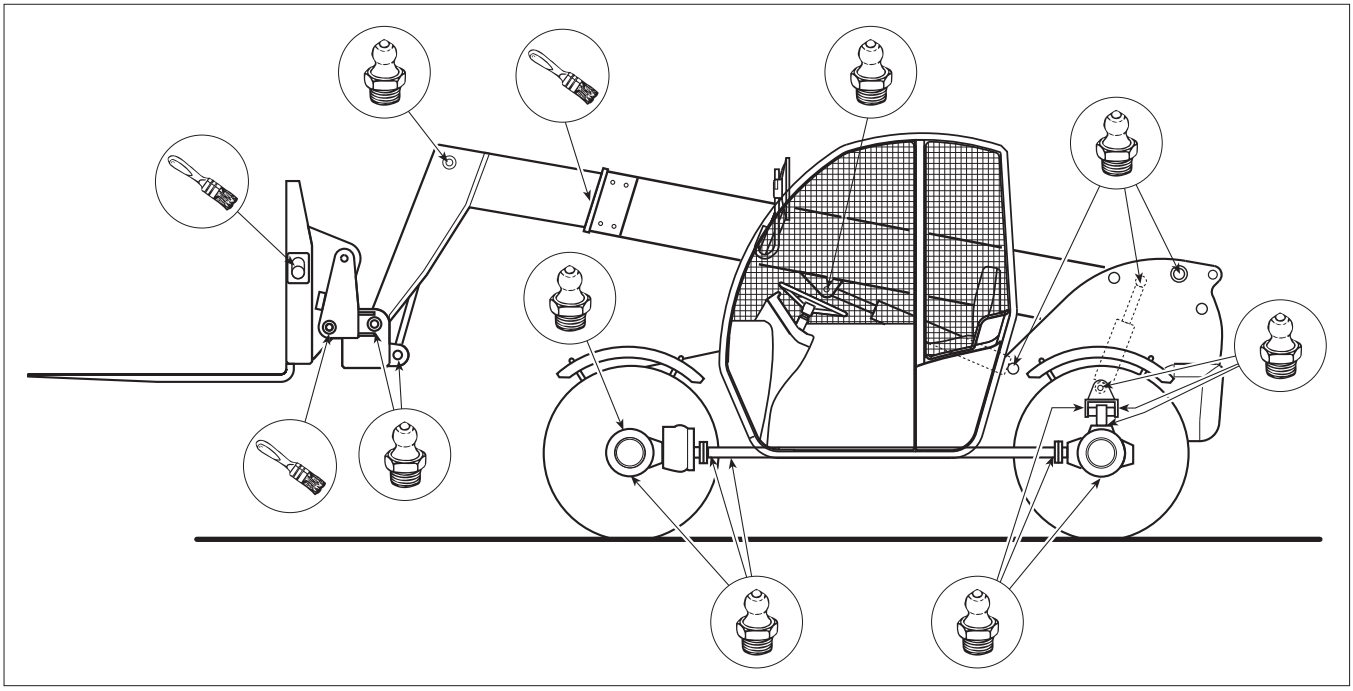


TABLE A

A-14 CHECK THE 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.

NOTICE

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

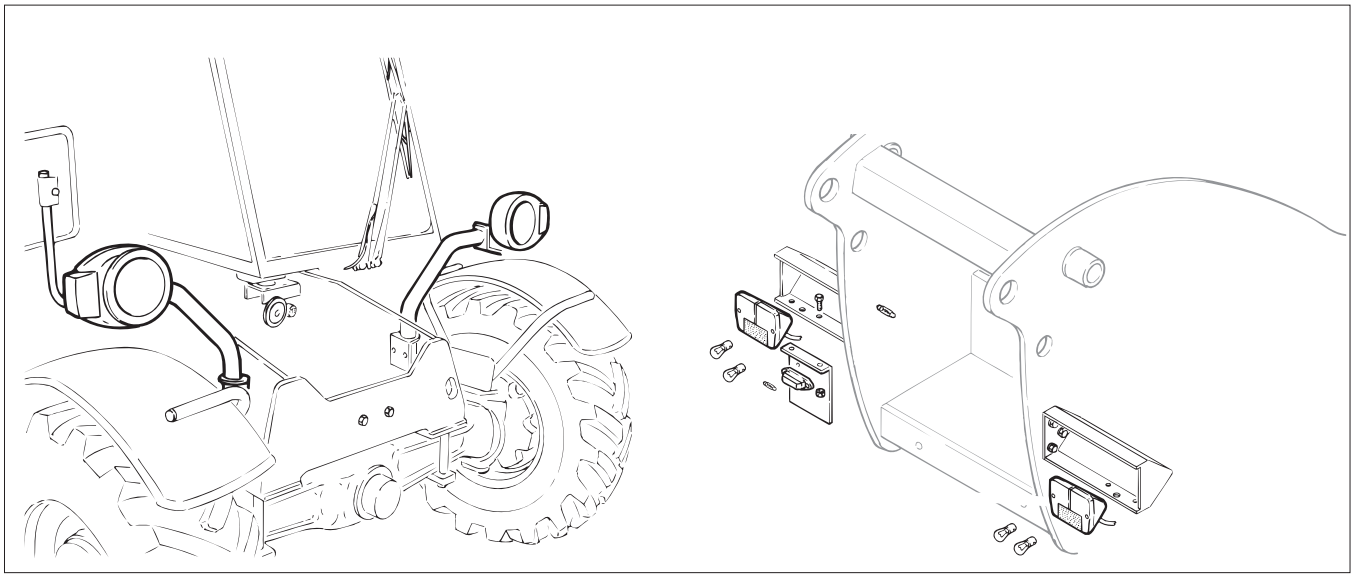
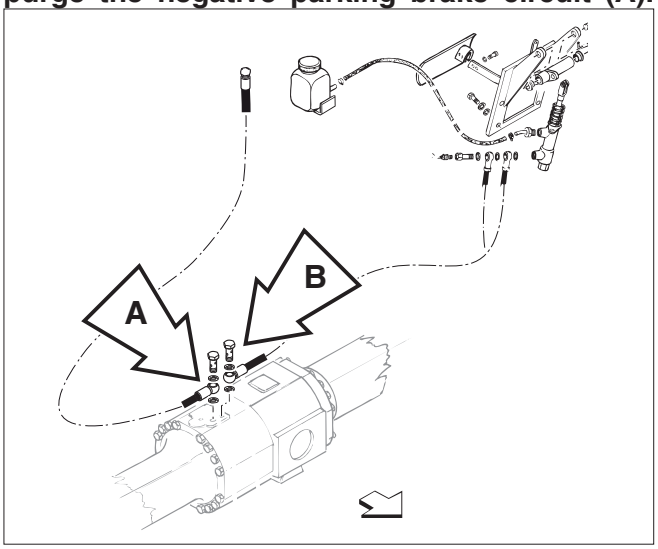


TABLE A

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 TEREX Technical Service Centre or the nearest TEREX 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).

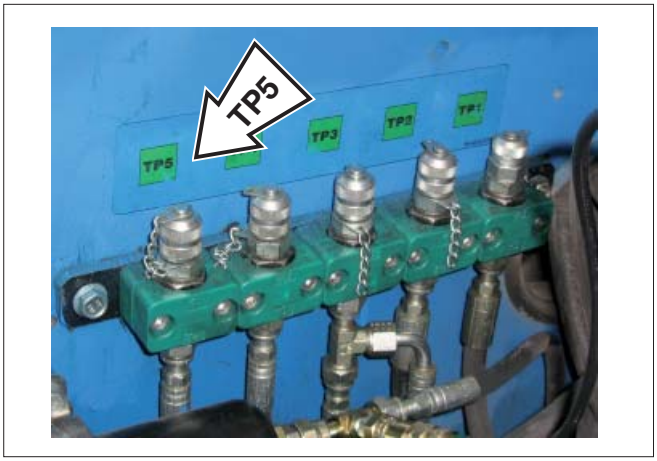


Both valves can be easily reached through the slot located on the front part of the chassis.

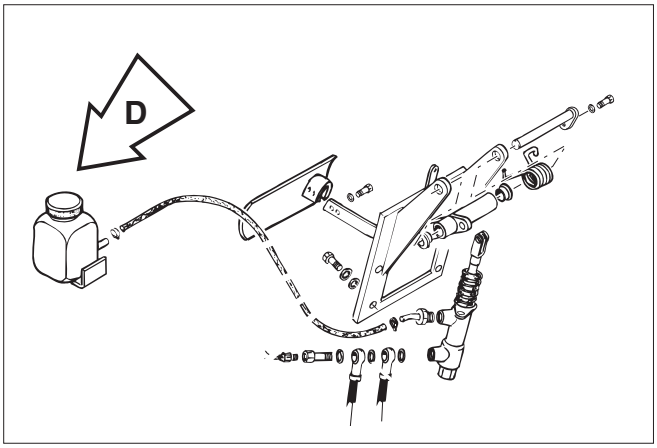
TO BLEED THE CIRCUIT OF THE SERVICE BRAKE, DO THE FOLLOWING:



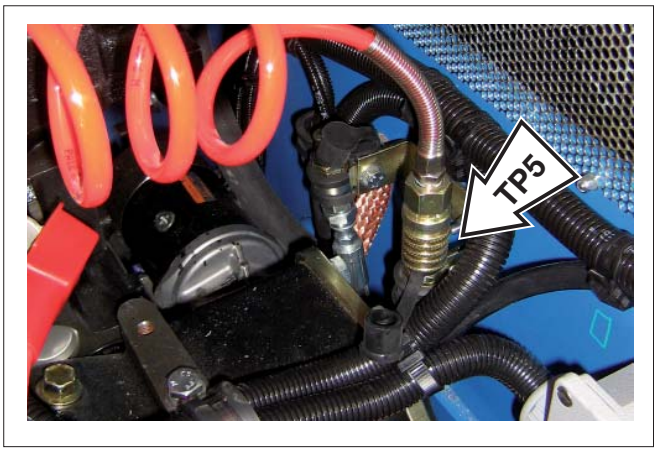
- Make sure that compressor **F** contains a sufficient quantity of oil so you can proceed with the circuit bleeding.



- Connect the flexible hose of the compressor to the mini-socket **TP5** 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 **TP5**.
- 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 **TP5**.
- 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.

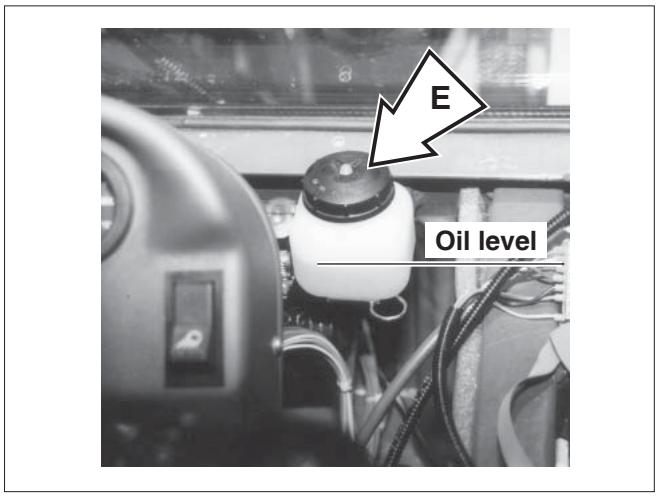
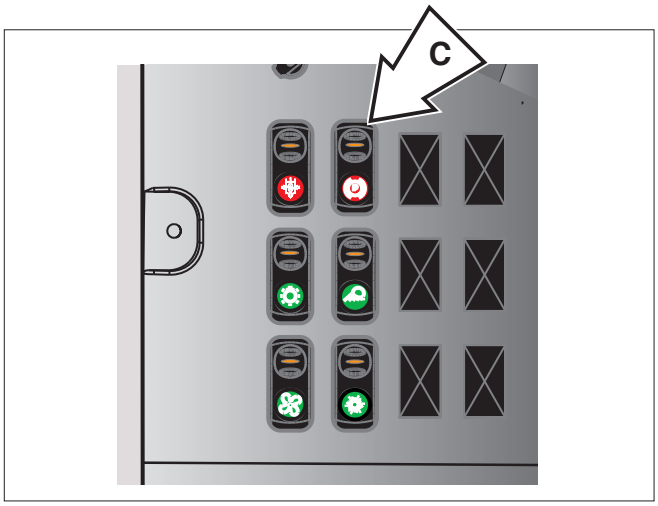


TABLE A

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 0.0218723 yd from the tank plug **E**.

TABLE A

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**).

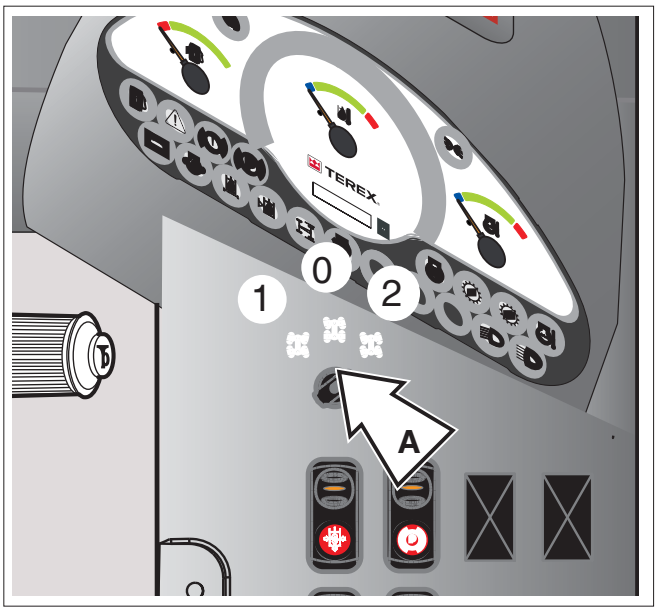
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop

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.



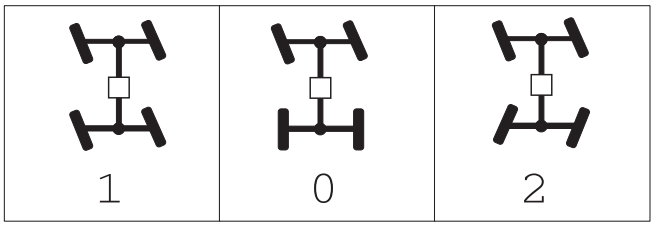


TABLE A

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 TEREX Technical Service.
Repeat the operation putting first one gear, then the other.

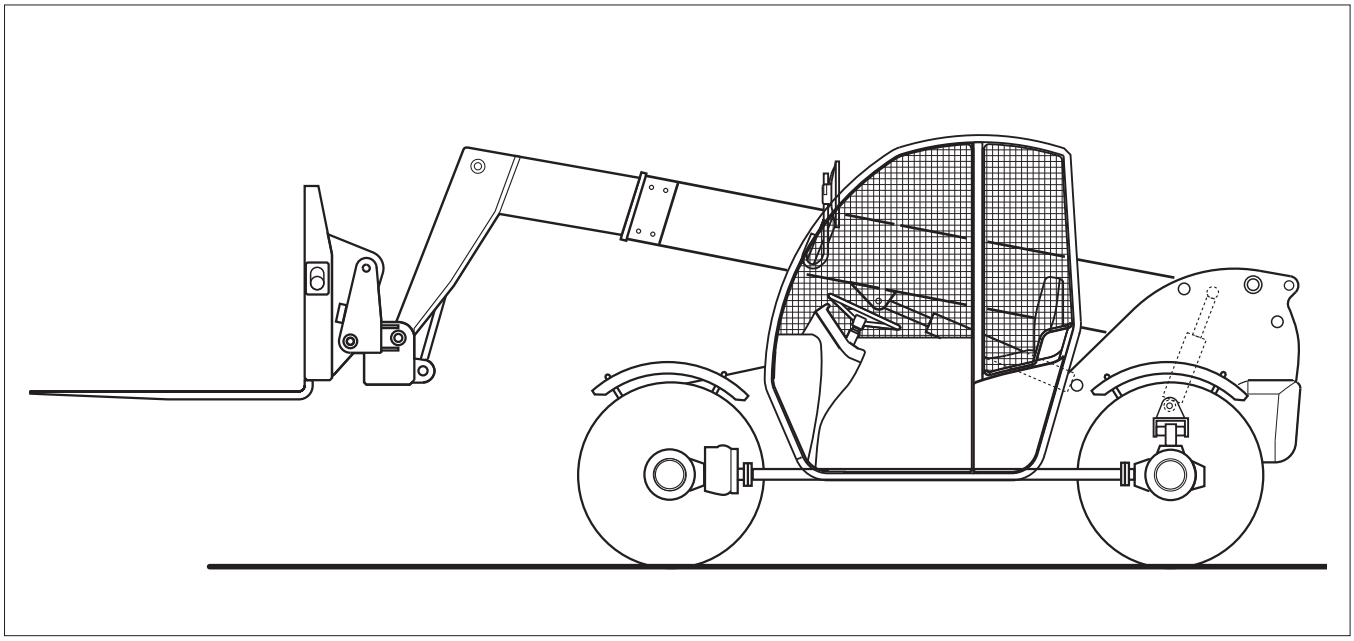


TABLE A

A-19 CHECK THE ENGINE COOLANT LEVEL

DANGER

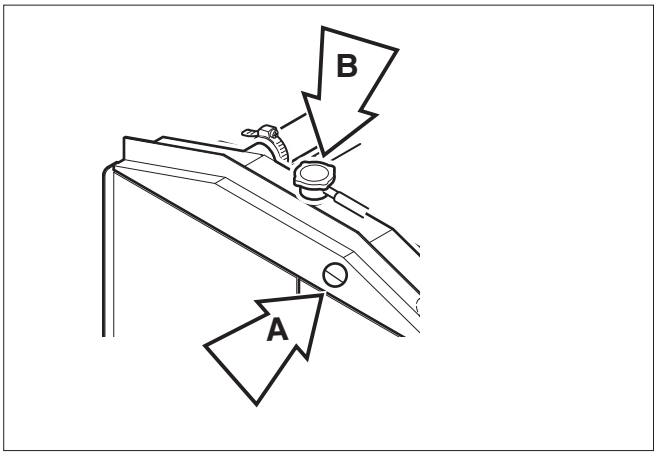
When the coolant is hot, the cooling system is under pressure. With warm engine, loosen the radiator plug slowly and carefully, without removing it, to drain the pressure. Use protection gloves and keep your face at a safe distance.

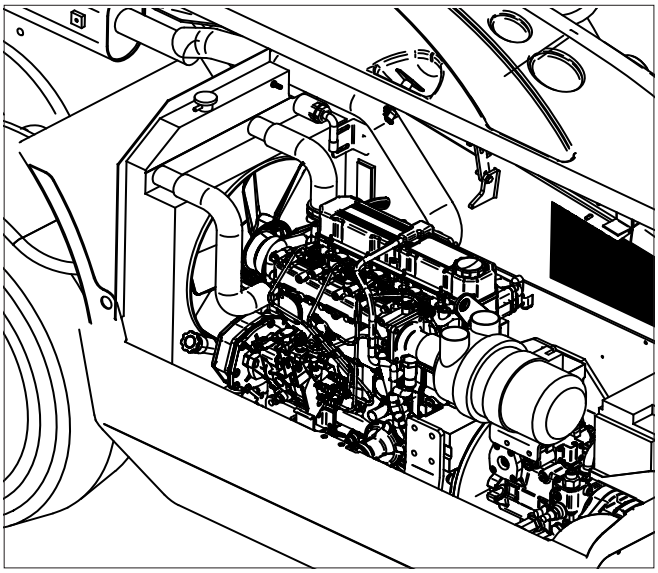
- Every week, before starting working (with the coolant cold), check the coolant level through the glass cap of plug **A**.
- When necessary, add clean water or an antifreeze mixture through cap **B**.

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	1.4 °F	253.4 °F
40	-11.2 °F	258.8 °F
50	***-32.8 °F***	***262.4 °F***
70	-88.6 °F	275 °F

PERKINS ENGINE





4.4 TABLE B PROCEDURES

B-1 CHECK THE MACHINE IS IN EFFICIENT WORKING ORDER

- Do a walk-around inspection and check the machine is in efficient working order.
- Check for fluid leaks.
- Make sure that all hydraulic and electrical components are in efficient working order.

CAUTION

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

B-2 CHECKTHETENSIONOFTHEALTERNATOR BELT

- Visually check belt **A** for damages or cracks (this belt doesn't need to be tensioned as the system is equipped with an automatic tensioning device).

CAUTION

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

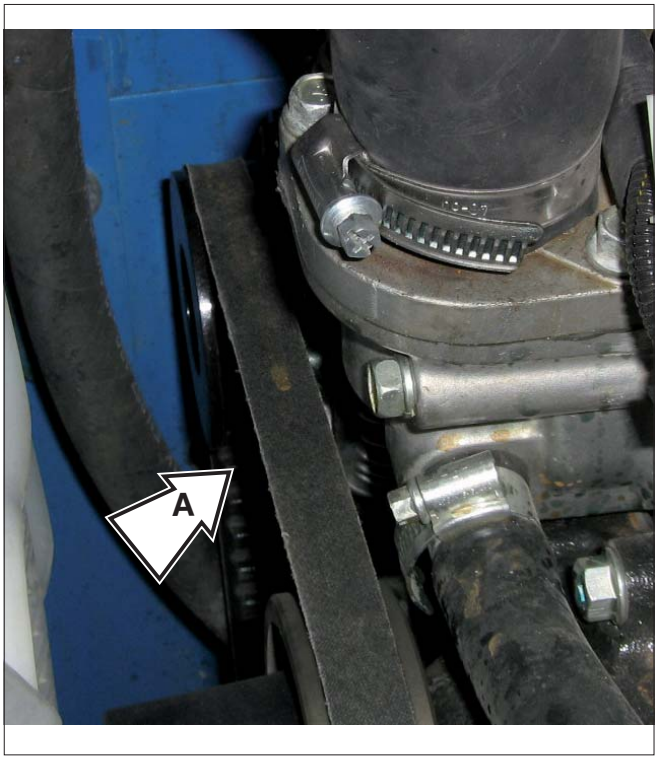


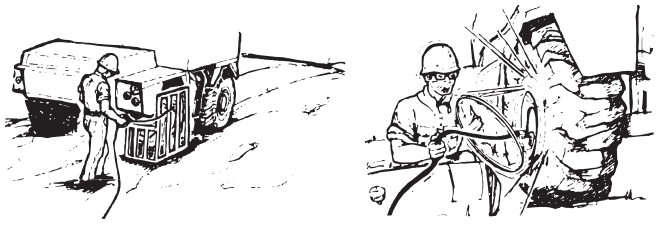
TABLE B

B-3 CHECK THE TYRE INFLATION

DANGER

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

OKAY *WRONG*



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

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

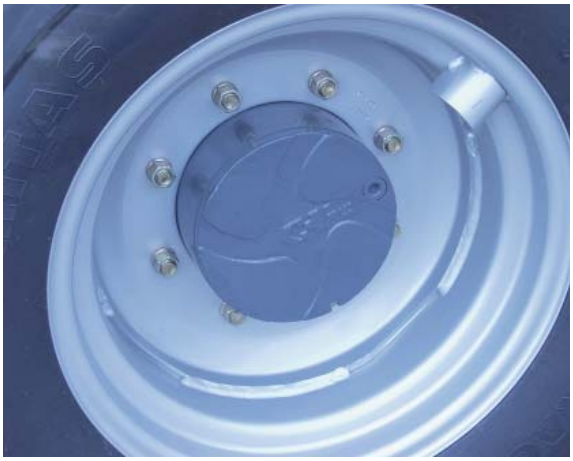
TABLE B

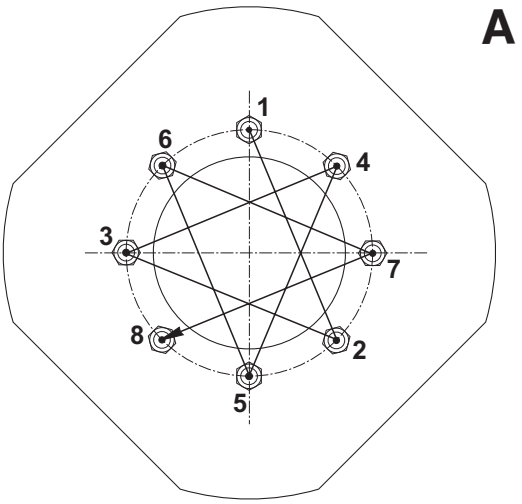
B-4 CHECK THE TIGHTENING OF THE WHEEL NUTS

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

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

Re-tighten all nuts to a torque 221 lbf•ft.





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.

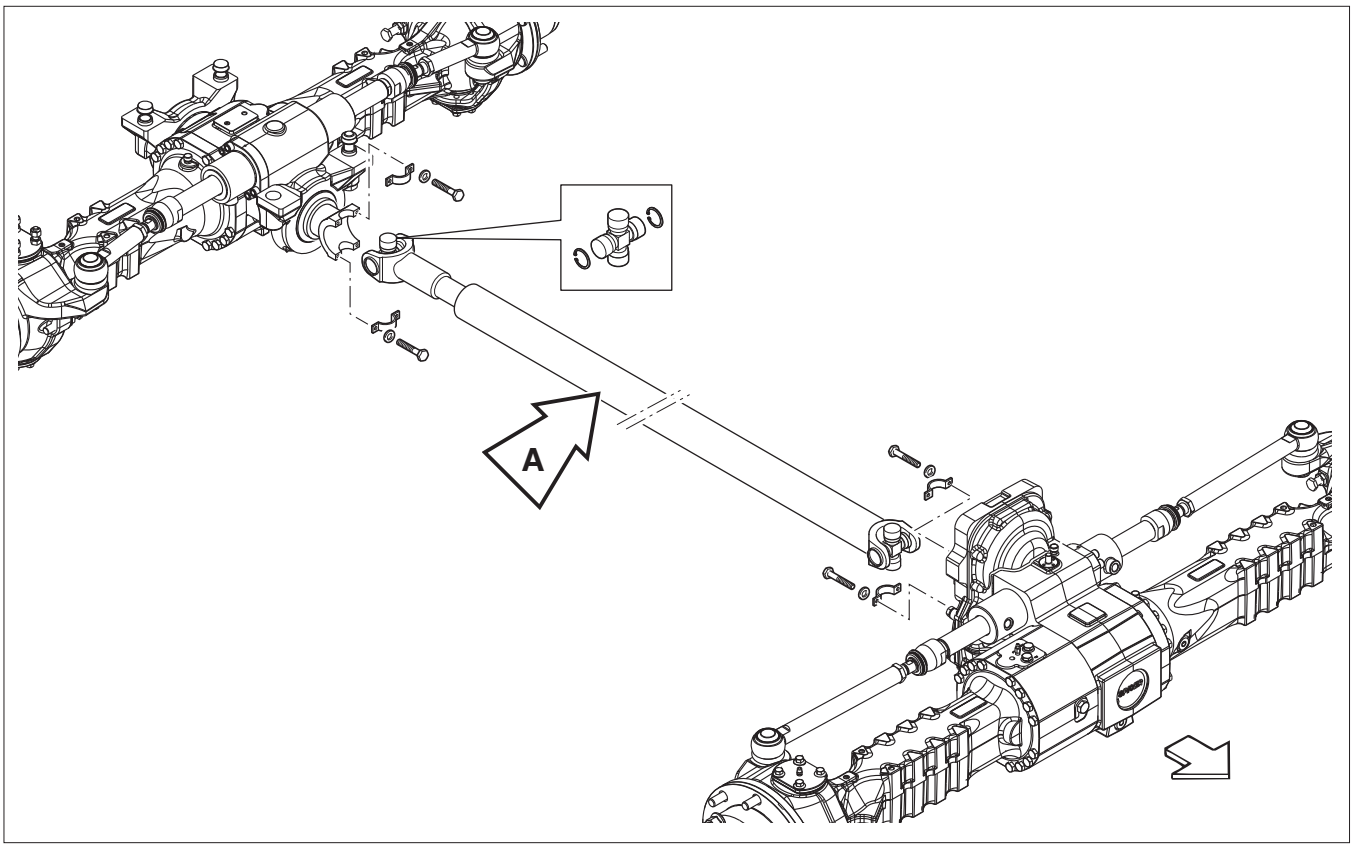
	STANDARD TH 19-55
Dimensions (front and rear)	12-16.5
Load index	10 pr
Rim	9.75x16.5
Wheel disc	8 holes DIN 70361
Pressure Psi	65

TABLE B

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

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

- Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase and cannot be drained through hole **A**.
- Park the machine on a level surface.
- Unscrew plug **B** (engine filling plug).
- Place a collecting tray under plug **A** and, with an appropriate wrench, unscrew this plug and allow the oil to drain into the tray.
- If the engine has two drain plugs, allow the oil to drain off from both.
- Once oil has been drained, clean plug **A** with care and refit it.
- If necessary, replace the plug gasket.
- Unscrew filter **C** with an appropriate tool.
- Remove it from its seat.
- Check the filter surface and the filter housing base are clean.
- Apply a thin film of clean engine oil to the seal of the filter.
- Install the filter by hand.
- Remove dipstick **D** (engine level check).
- Fill the engine through the hole of plug **B** (see “technical specifications”, table 2.13).
- Check the oil is level with the hole.
- Operate the starting motor and let the engine run for a few seconds.
- Start the engine and let it run AT IDLE and LOADLESS for some 2 minutes.
- Stop the engine, wait for a few minutes and then check that oil level reaches the MAX mark on the dipstick **D**.

CAUTION

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

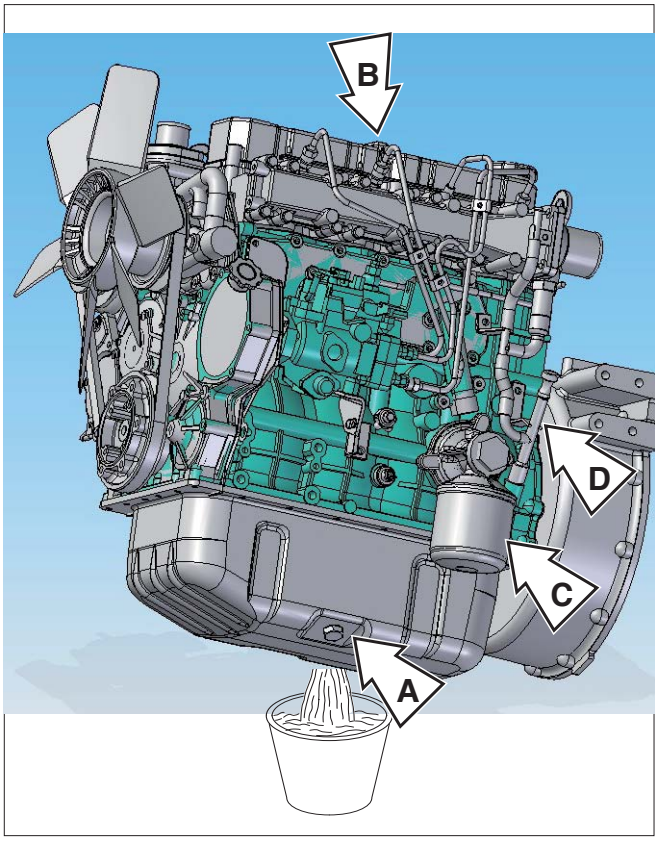


TABLE C

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

To check the oil level in the **wheel flow dividers**:

- 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 with a 0,47inc hex-head wrench and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

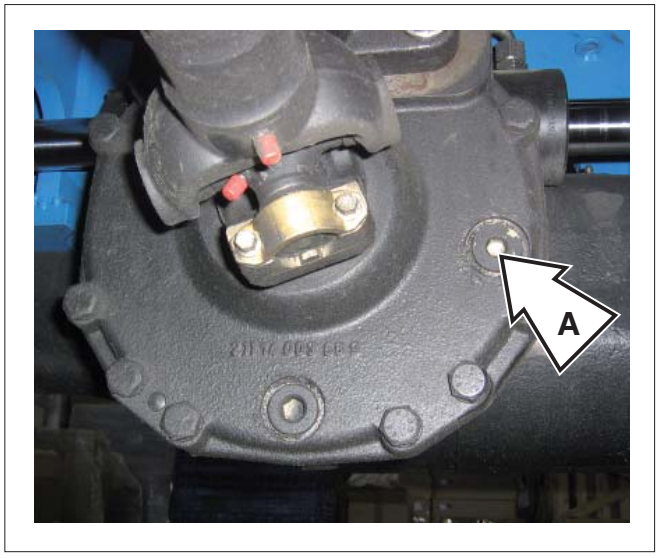
Place a container of suitable size under the plug.

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

- Stop the machine on a level ground and engage the parking brake.
- Using a 0,39inc hex-head wrench unscrew 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**.

PROTECT THE ENVIRONMENT

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.
- Using a 0,39inc hex-head wrench unscrew plug **A** and check if oil is level with the hole.
- If necessary, add new oil through hole **A** until it is level.
- Refit the plug.

PROTECT THE ENVIRONMENT

Place a container of suitable size under the plug.



TABLE C

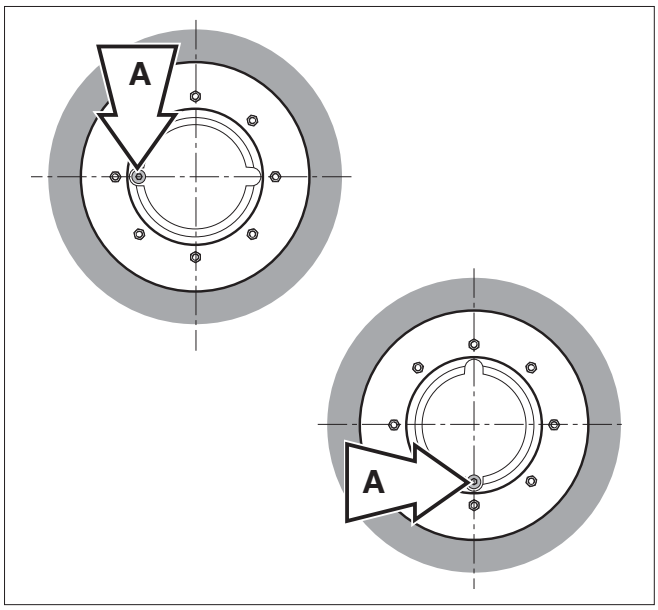
C-3 CHECK THE OIL LEVEL IN THE FOUR WHEEL REDUCTION GEARS

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

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

PROTECT THE ENVIRONMENT

Place a container of suitable size under the plug.



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. 87 psi 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.

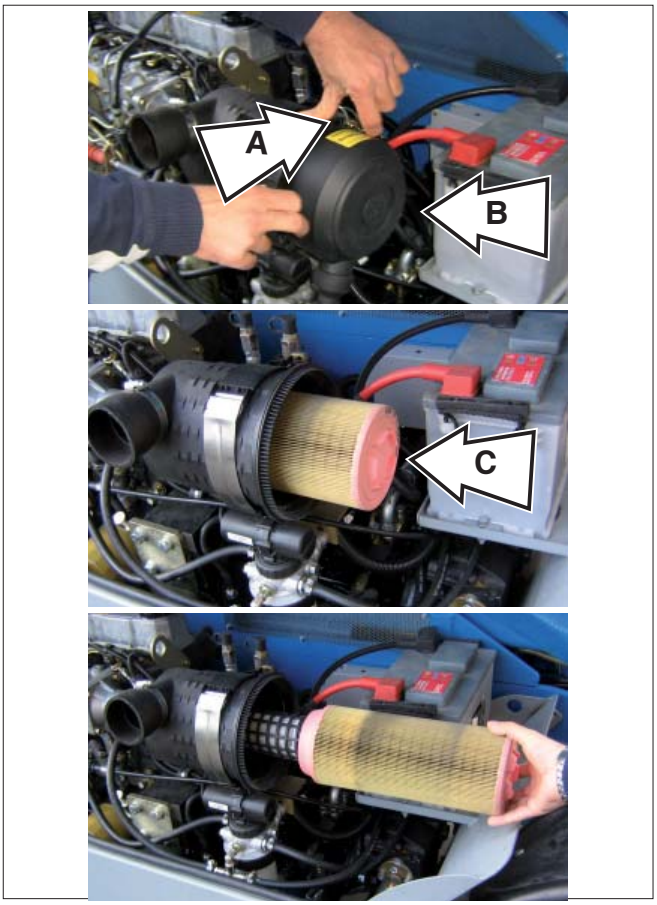


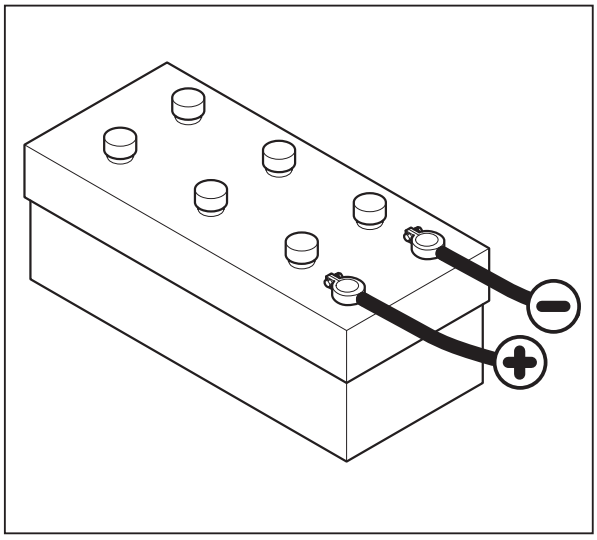
TABLE C

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.

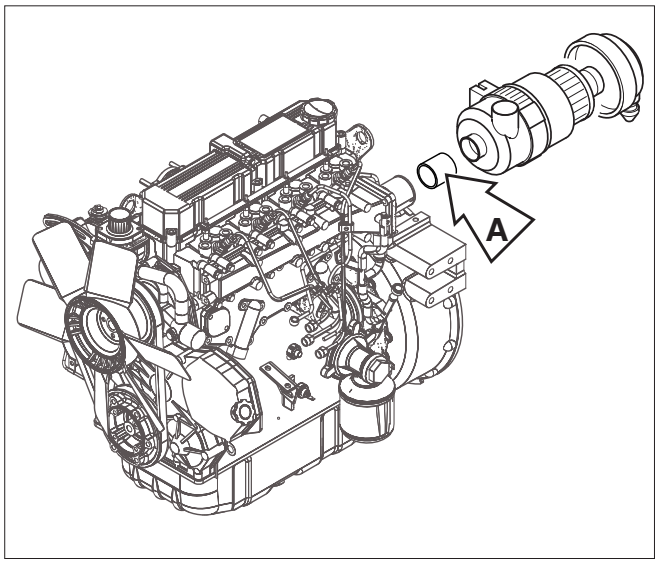


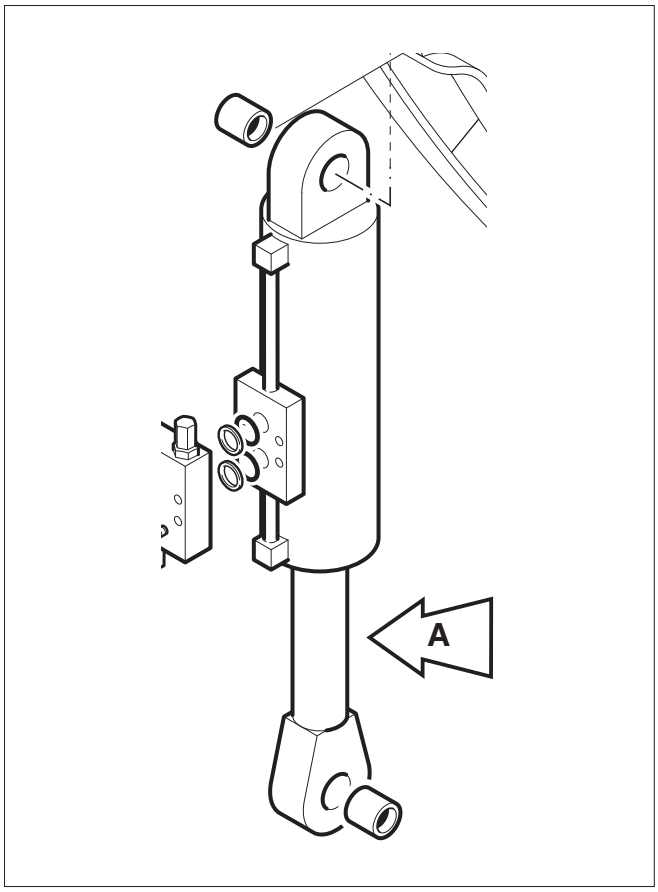
TABLE C

C-7 CHECK THE CYLINDER CHROMIUM-PLATED RODS

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

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

In case of problems, replace the cylinder.



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.

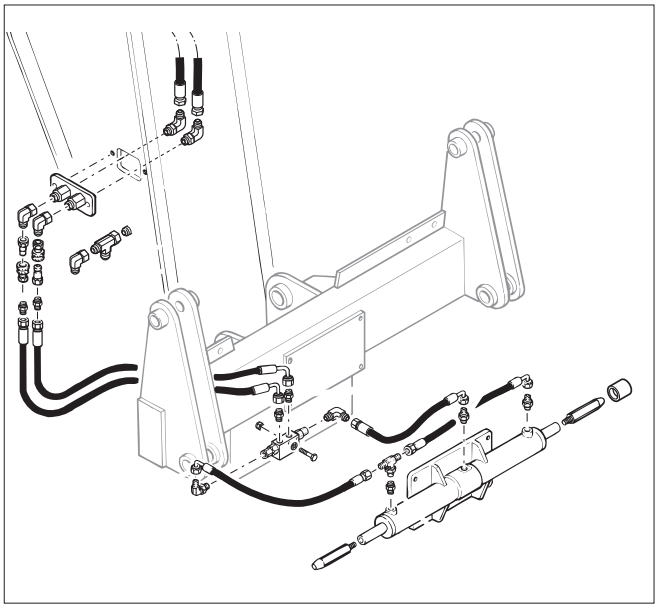
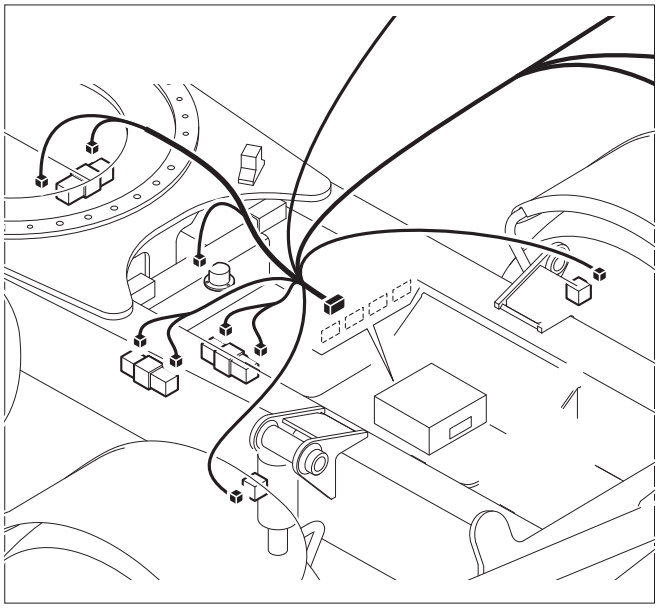


TABLE C

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.

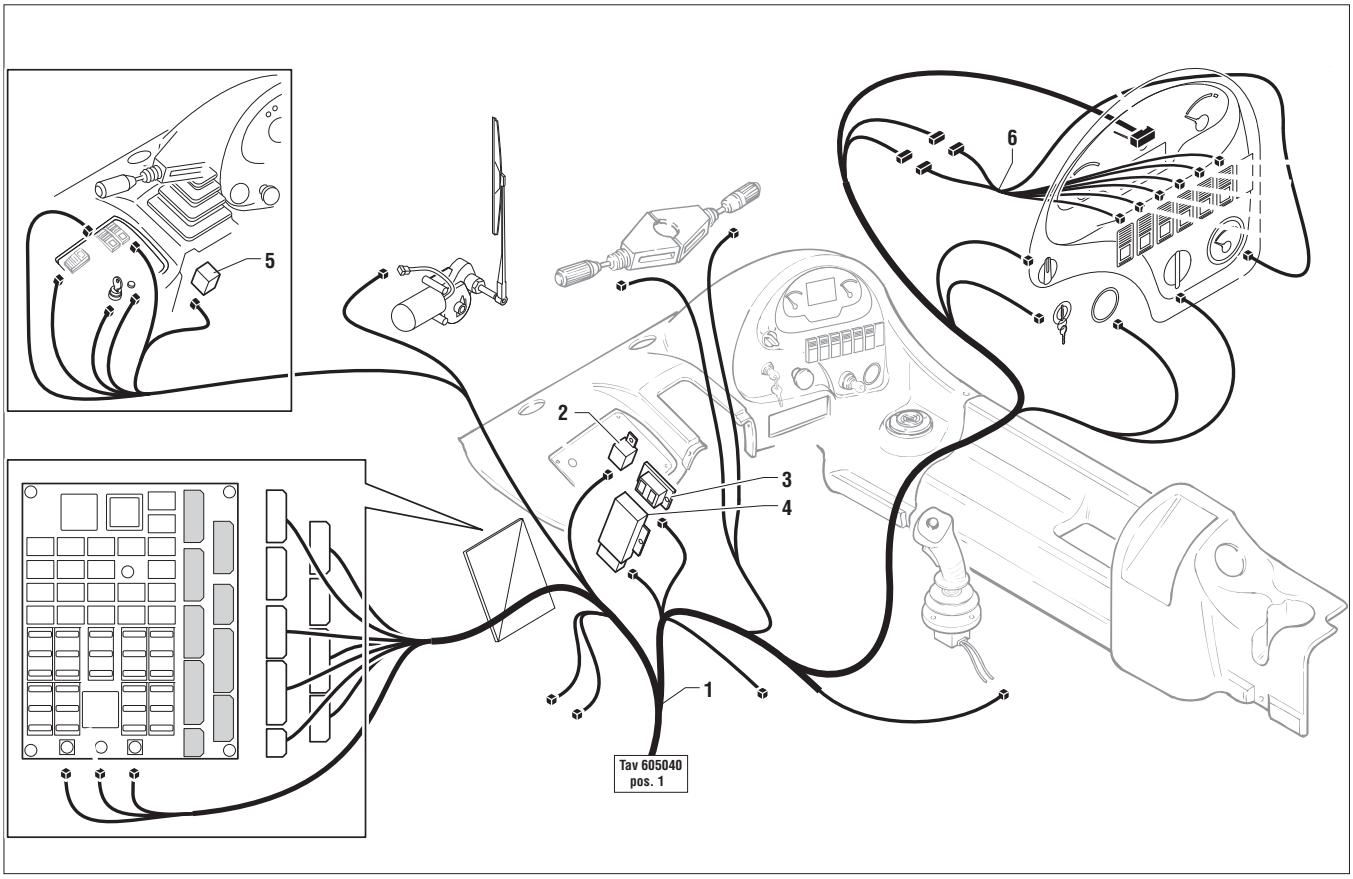


TABLE C

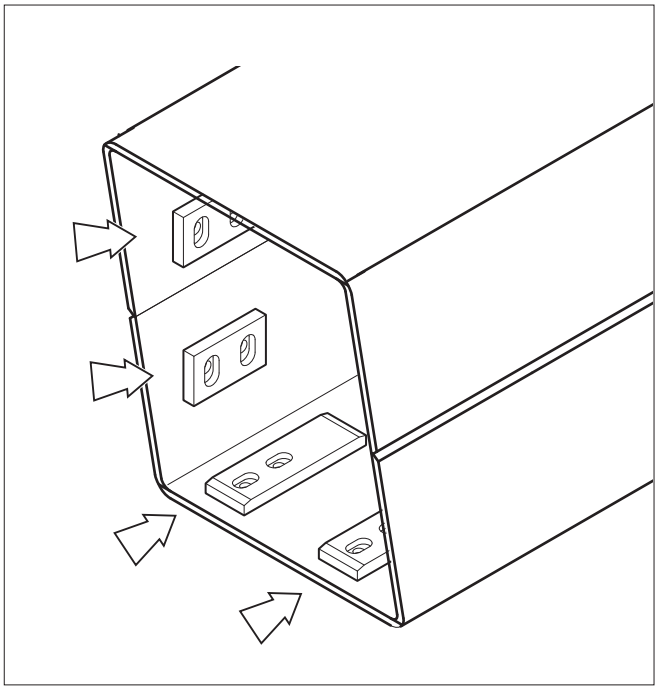
C-10 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

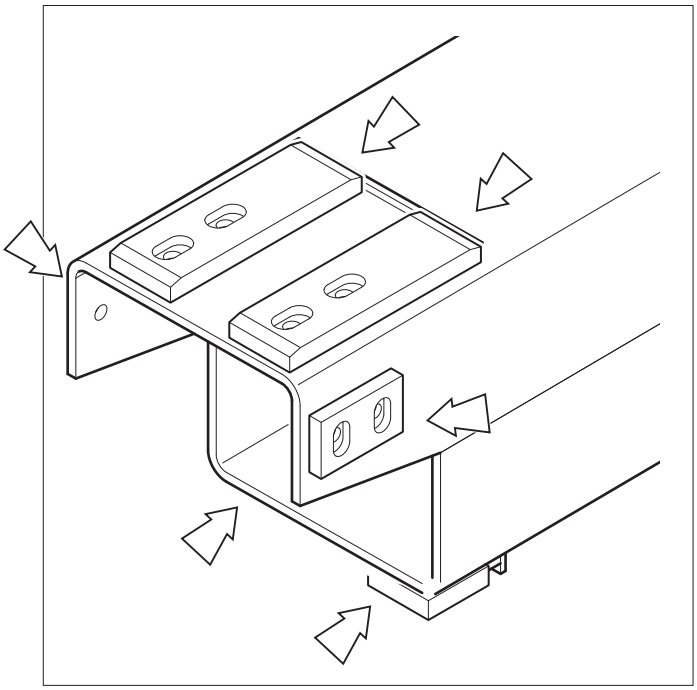
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

All pads can be adjusted by the special shims.

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 0,039 inc.





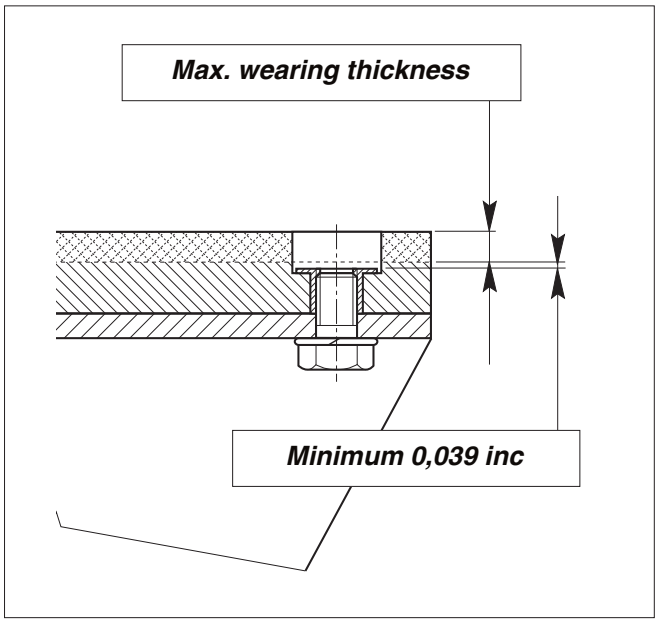


TABLE C

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.

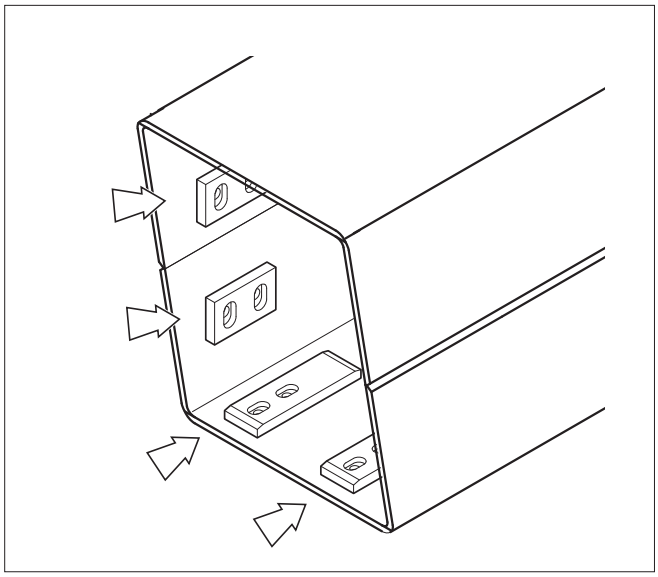
Tightening torques of the pad screws in relation to the screw diameter

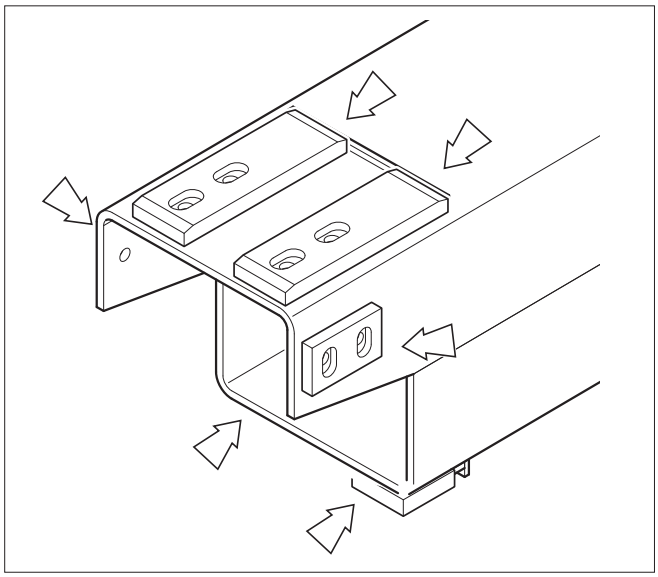
Screws M10	lbf•ft 22
Screws M14	lbf•ft 36

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 0,039 inc.





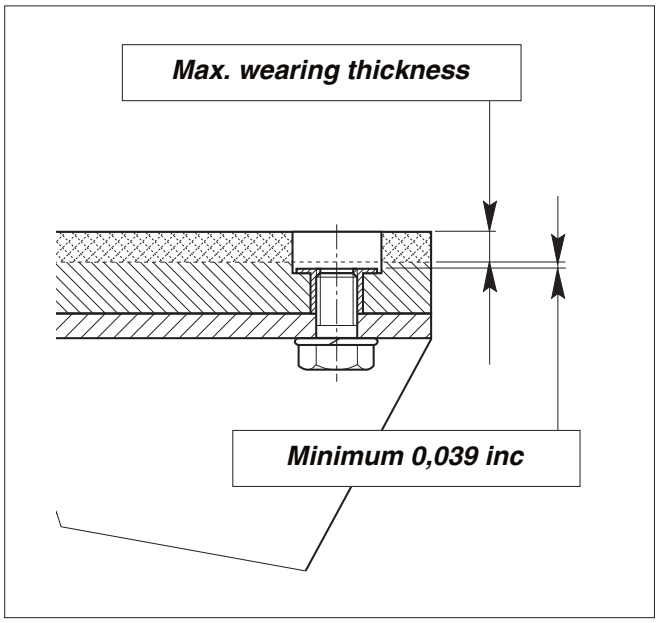


TABLE C

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 apply a thin film of new grease.

Use only:

- **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.

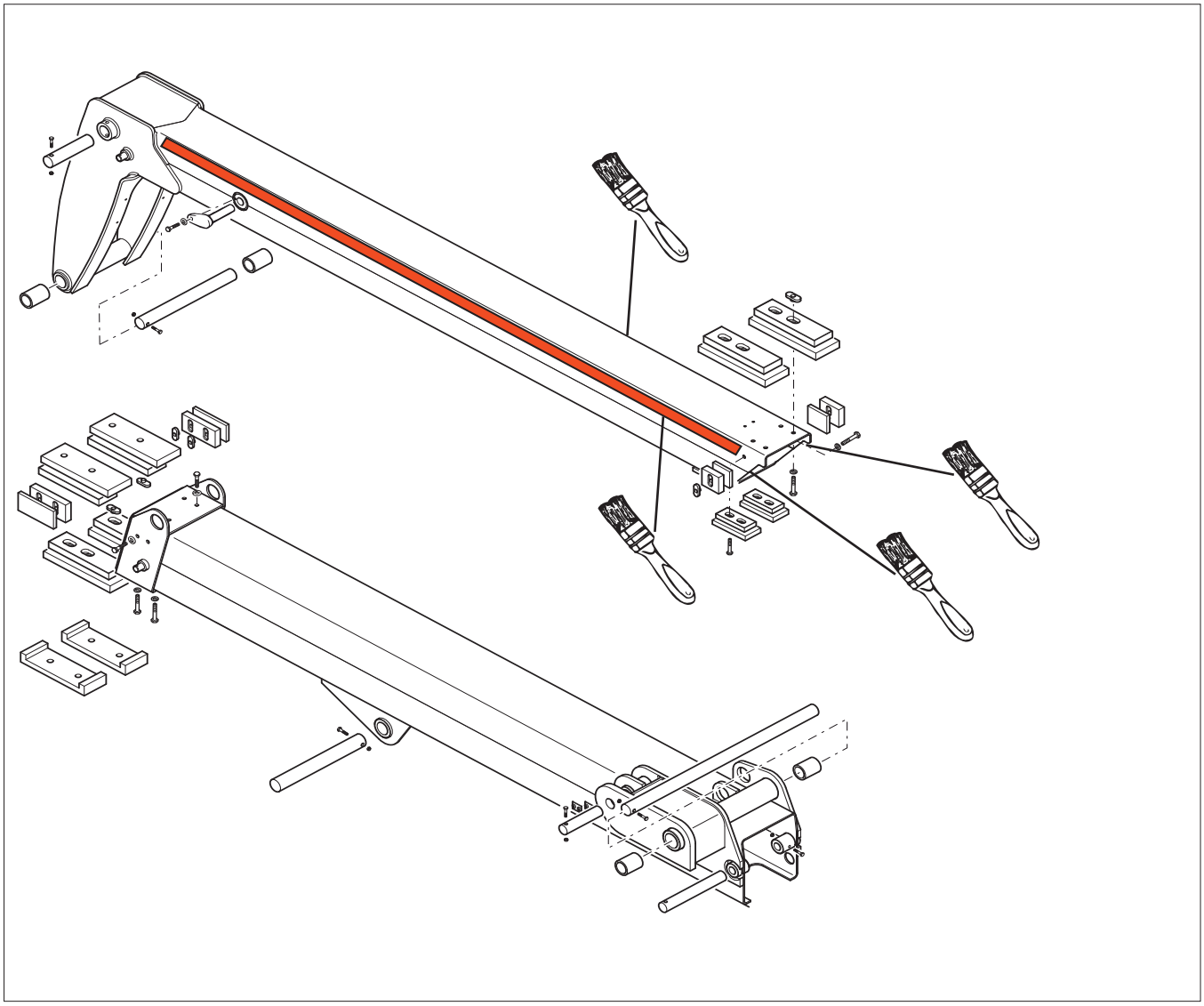


TABLE C

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 0,19÷0,23 inc above the plates and the cell levels are correct.
- Protect the terminals smearing them with pure vaseline.
- Remove the battery and store it in a dry place, when the machine is not used for a long time.

DANGER

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

DANGER

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

DANGER

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

DANGER

Do not add sulphuric acid; add only distilled water.

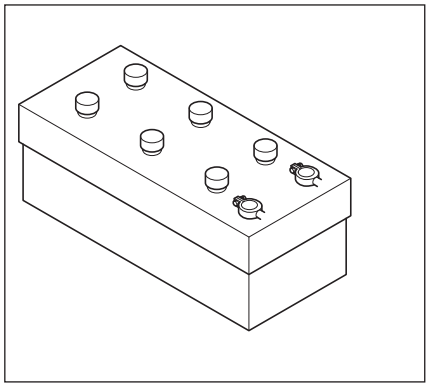


TABLE C

C-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.

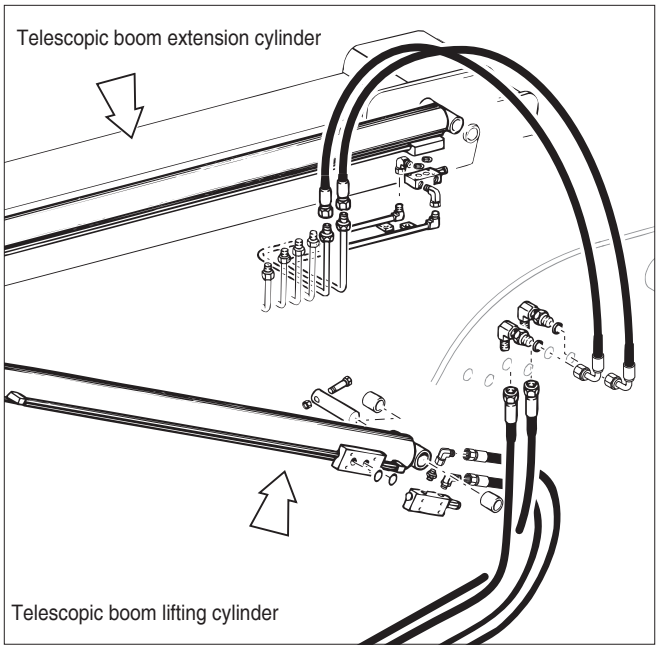
To check the efficiency of a valve, proceed as follows:

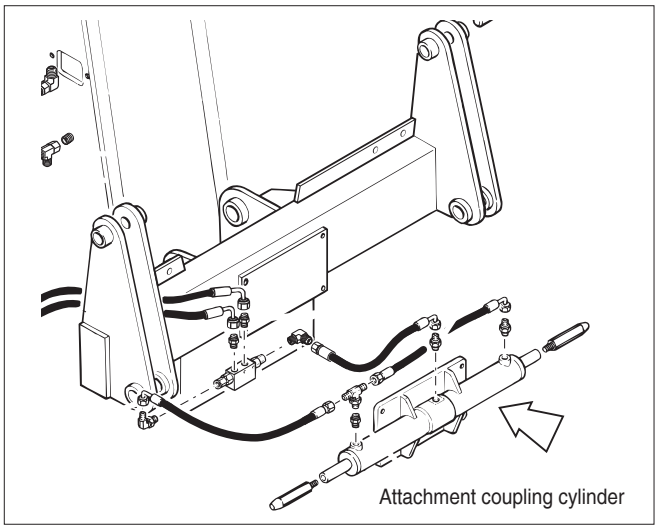
- Load a weight near the maximum payload onto the boom.
- Raise the load some centimetres above the ground (max 0.1093613 yd). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which you are checking the valve with caution.

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.

PROTECT THE ENVIRONMENT

Place a container of suitable size under the plug.





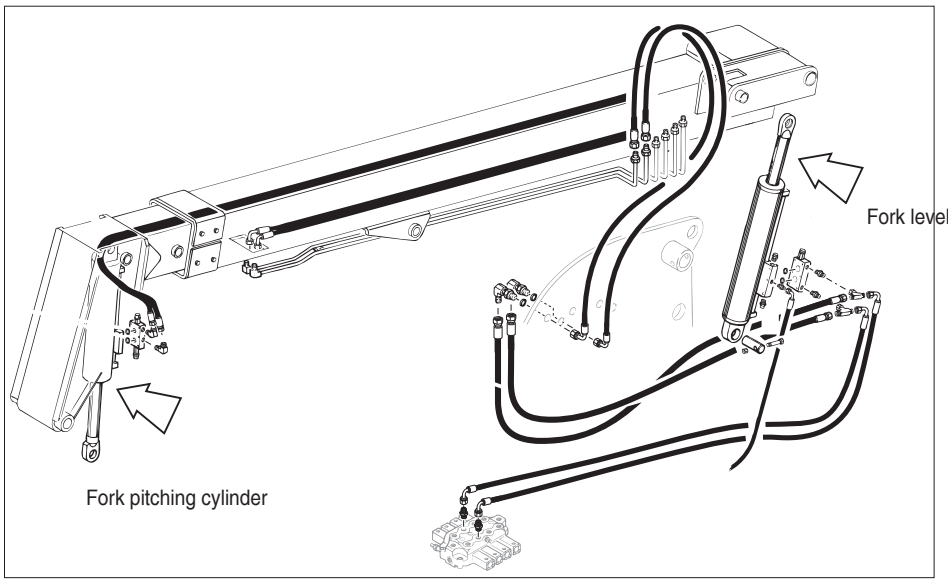


TABLE C

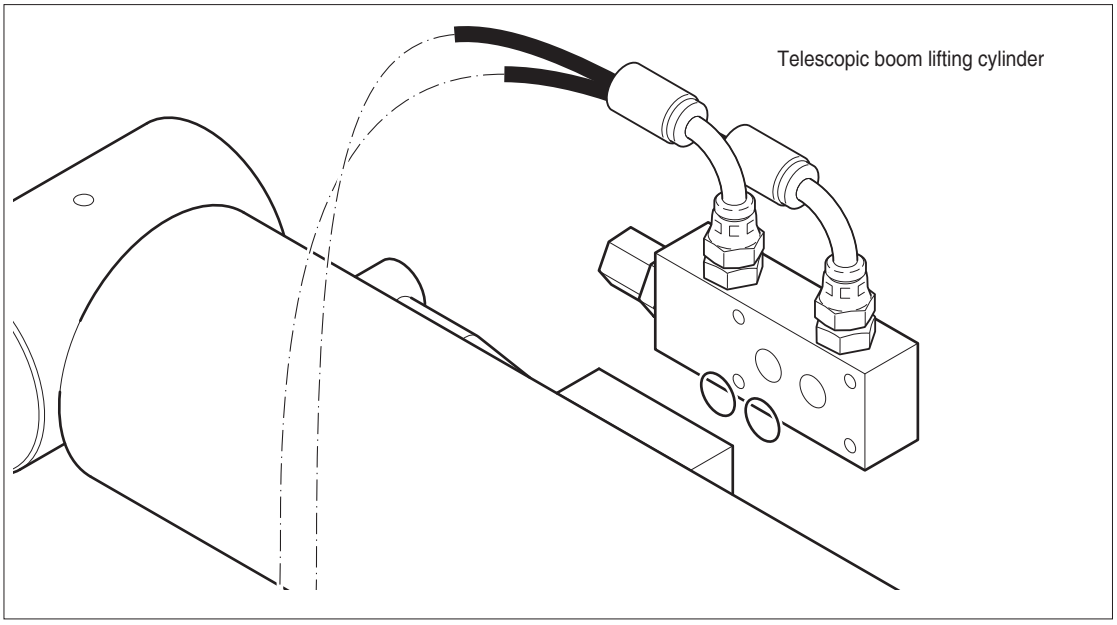
DANGER

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

- ***Wear safety glasses***
- ***Wear safety gloves***
- ***Wear safety shoes***
- ***Wear suitable working clothes***
- ***Use guards against leaks of oil at high pressure***
- ***Do the check in a free space with barriers all around to keep non-authorised people away***
- ***Ensure that the part to be checked is in safe condition and that the action generated does not result in an uncontrolled movement of the machine.***

TO REMOVE THE BLOCK VALVES OR THE CYLINDERS

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



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.

NOTICE

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 **91** lbf·ft.

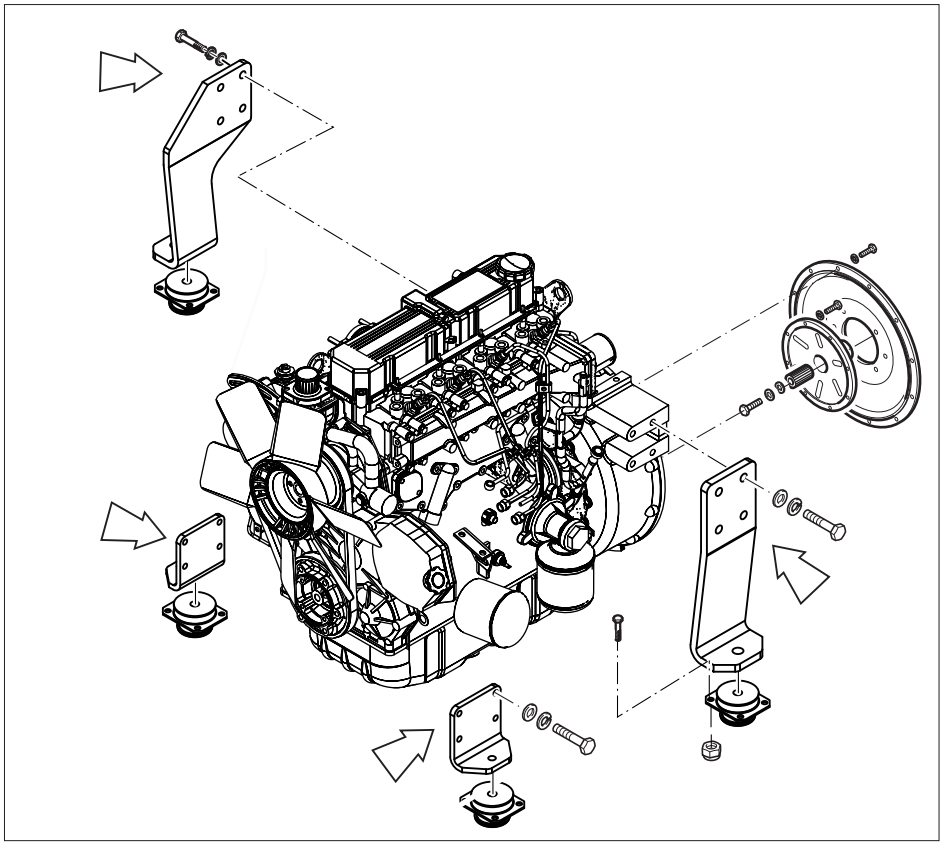


TABLE D

D-3 CHECK THE TIGHTENING OF THE CAB FIXING SCREWS

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

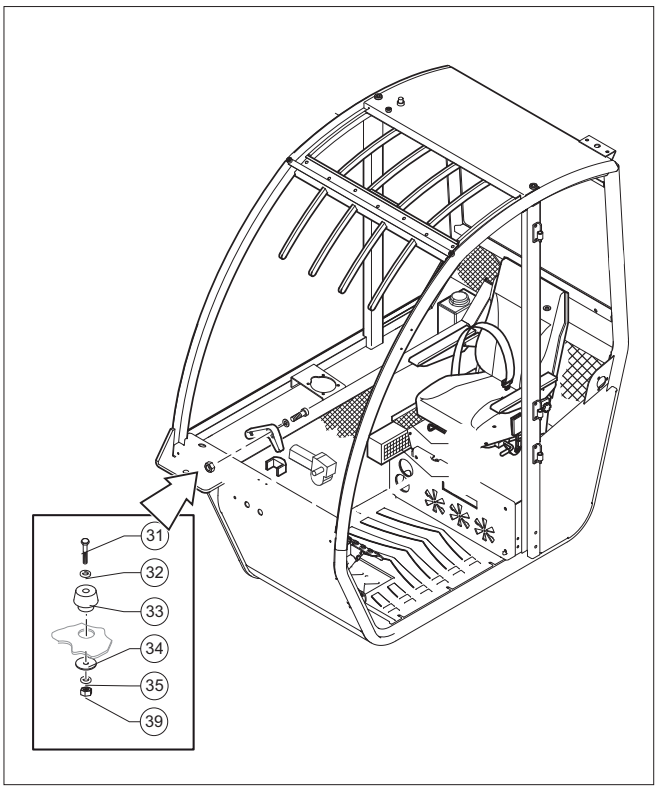
For this operation, use a torque wrench and tighten the screws to a torque of **138 lbf·ft**.

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.



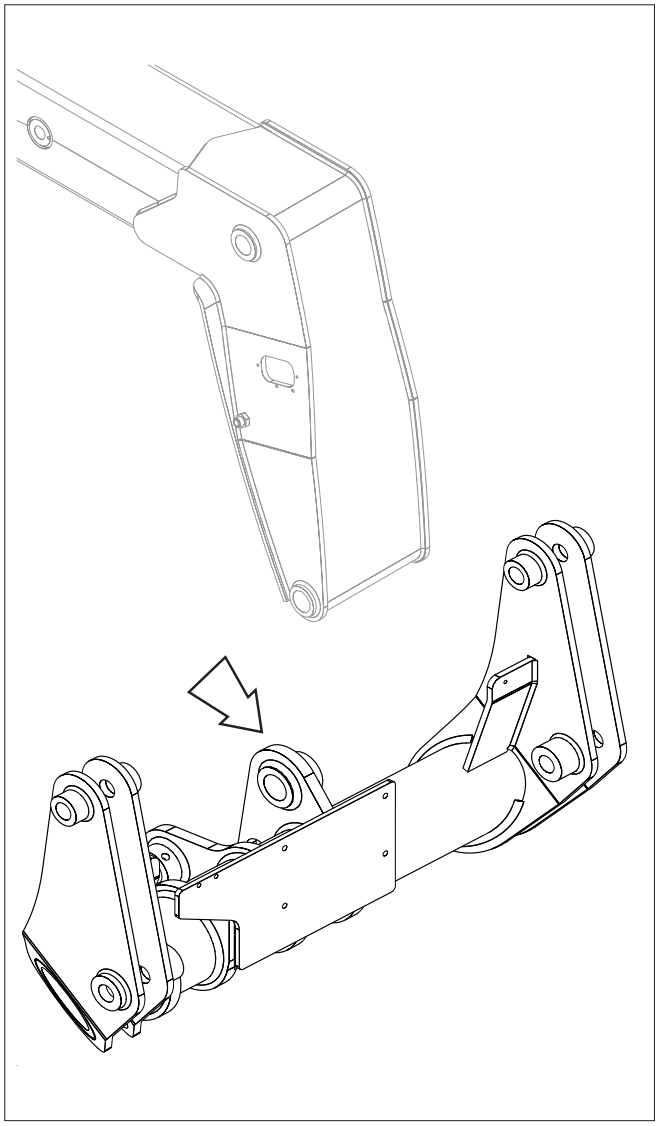


TABLE D

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.

PROTECT THE ENVIRONMENT

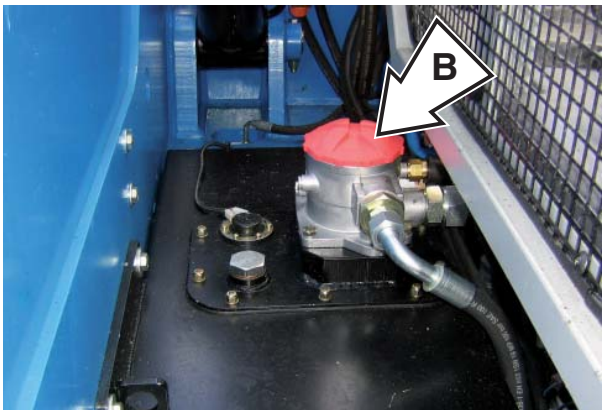
Handling and disposing of used oils may be ruled by local or national regulations. Address to authorised waste centres.

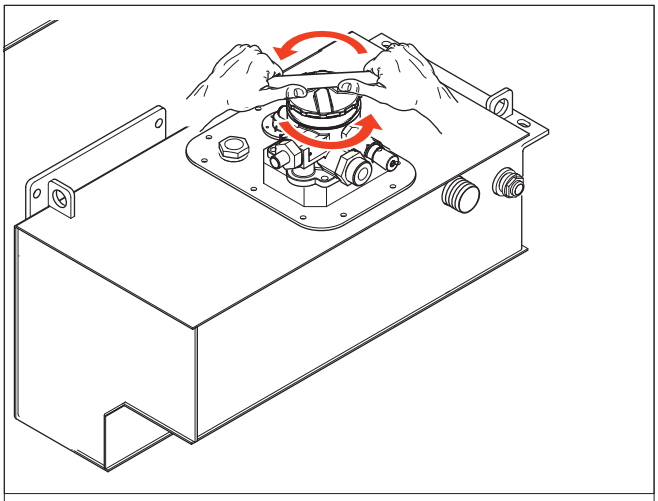
⚠ CAUTION

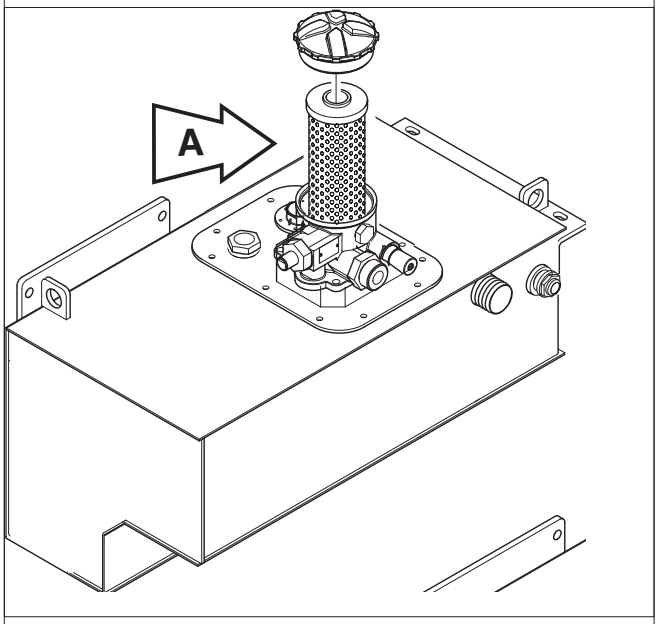
Hydraulic oil filter canisters cannot be cleaned or washed and refitted.
They must be replaced with new ones of the type recommended by the manufacturer:
Flow rate l/1' = MPS 150
Filtering = 10 µ
code = 09.4604.0001

⚠ CAUTION

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







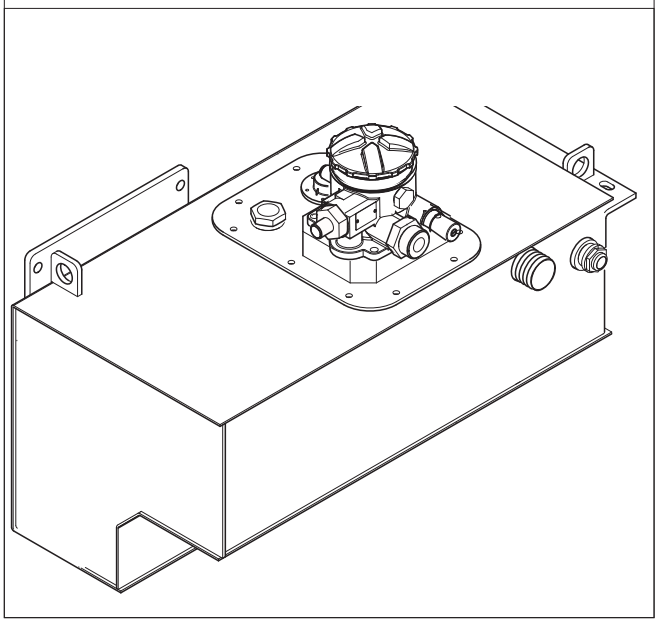
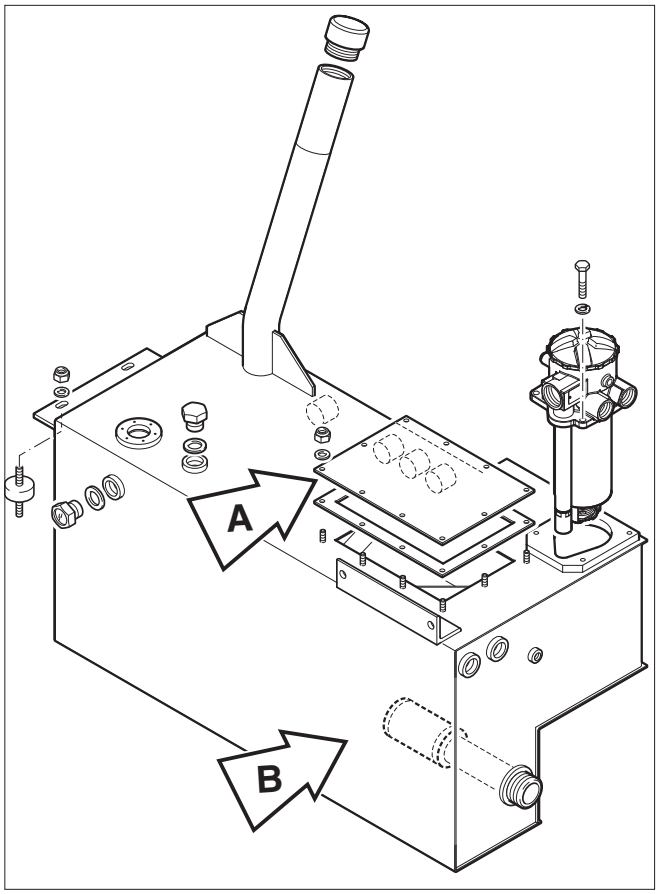


TABLE D

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 **B** 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

PROTECT THE ENVIRONMENT

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

CAUTION

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

TABLE D

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

Every six months we recommend having the system checked to be sure it is in efficient working order. In particular, we recommend:

- checking the max pressure of the main valve
- checking the pressure of the drive pump
- checking the pressure of the hydraulic drive unit
- checking the pressure of the braking system
- checking all hydraulic components and their movements.

⚠ CAUTION

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

TABLE D

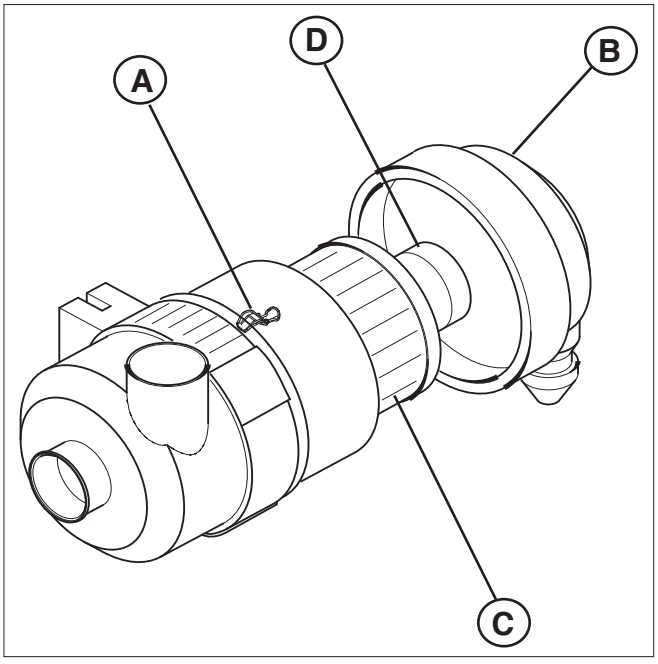
D-8 CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER

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.



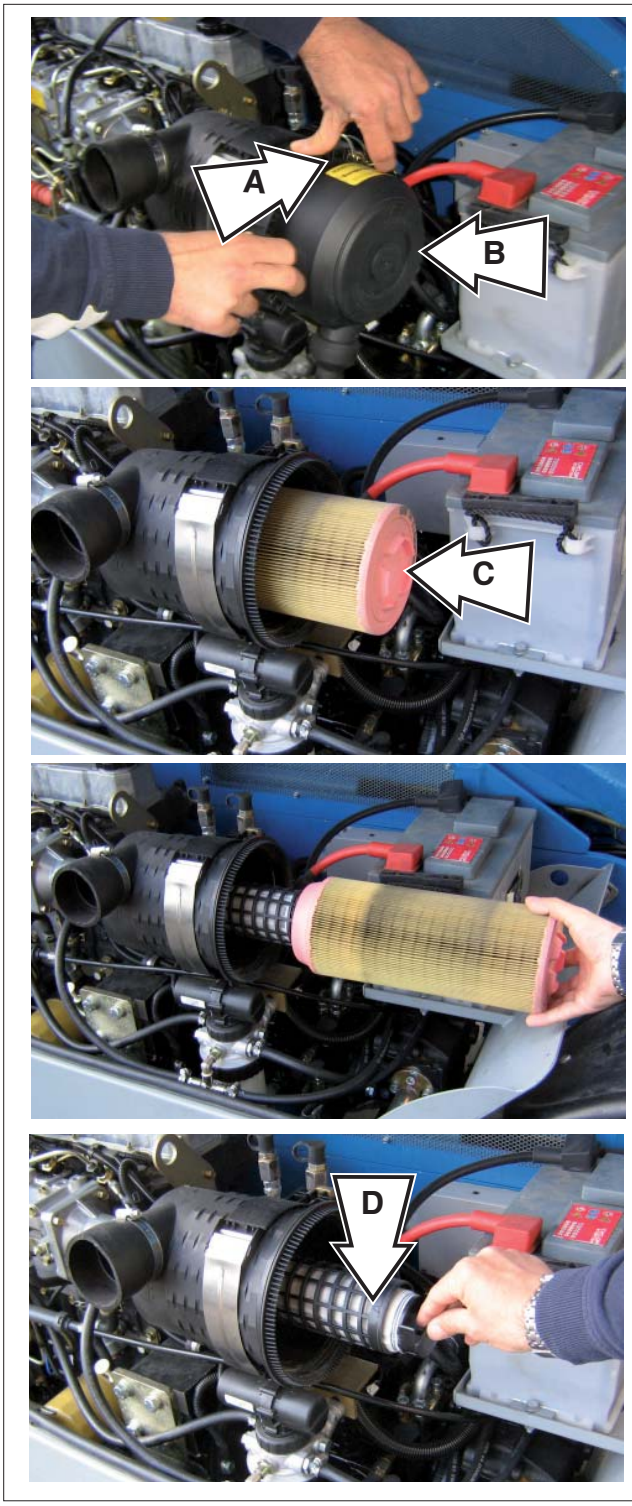


TABLE D

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 right 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.

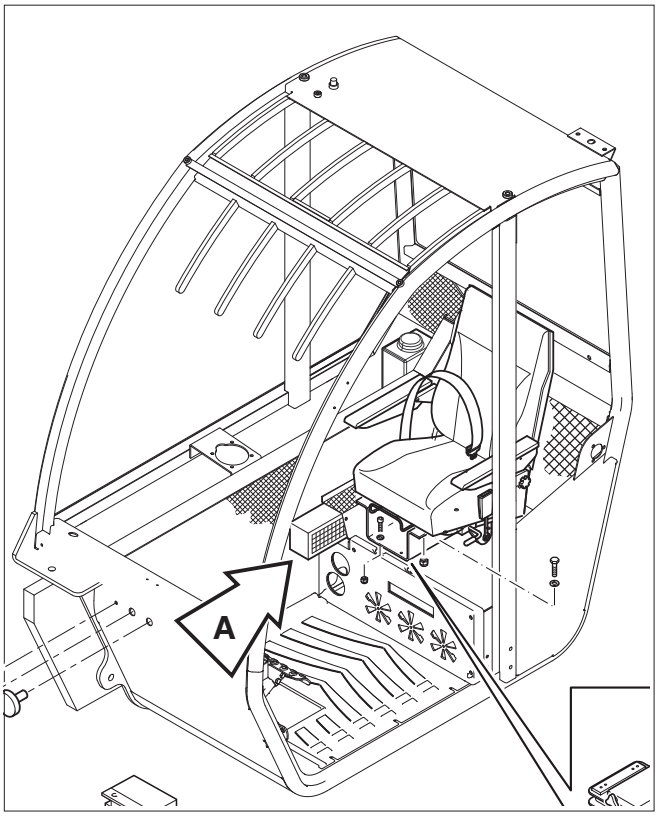


TABLE D

D-10 CHANGE ENGINE OIL, OIL FILTER AND FUEL FILTER (EVERY 500 HOURS OR EVERY YEAR WHICHEVER OCCURS FIRST)

CAUTION

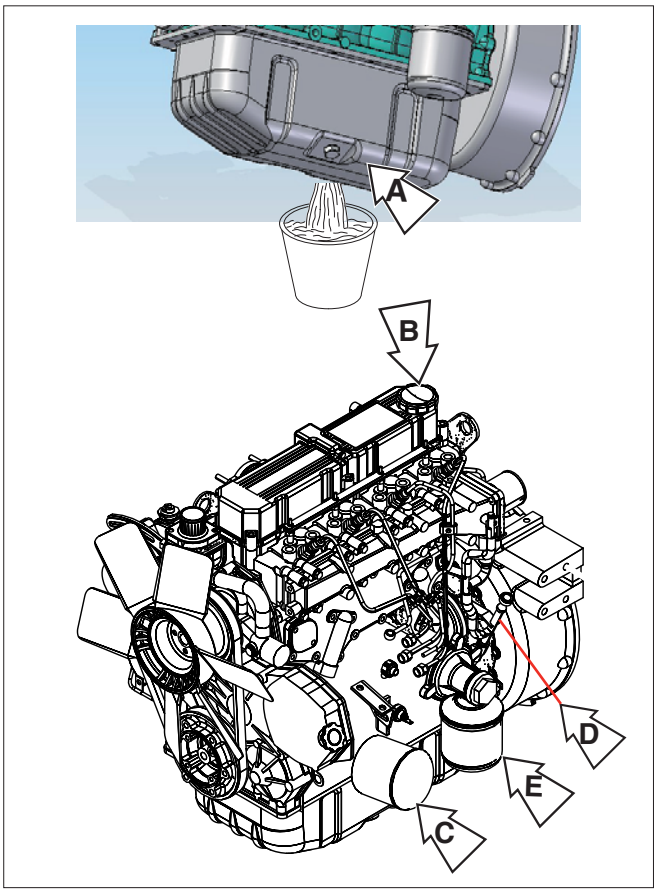
Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.

- Drain the crankcase while the oil is warm. This allows waste particles that are suspended in the oil to drain. As the oil cools, the waste particles will settle to the bottom of the crankcase and cannot be drained through hole **A**.
- Park the machine on a level surface.
- Unscrew plug **B** (engine filling plug).
- Place a collecting tray under plug **A** and, with an appropriate wrench, unscrew this plug and allow the oil to drain into the tray.
- If the engine has two drain plugs, allow the oil to drain off from both.
- Once oil has been drained, clean plug **A** with care and refit it.
- If necessary, replace the plug gasket.
- Unscrew filter **C** with an appropriate tool.
- Remove it from its seat.
- Check the filter surface and the filter housing base are clean.
- Apply a thin film of clean engine oil to the seal of the filter.
- Install the filter by hand.
- Remove dipstick **D** (engine level check).
- Fill the engine through the hole of plug **B** (see “technical specifications”, table 2.13).
- Check the oil is level with the hole.
- Operate the starting motor and let the engine run for a few seconds.
- Start the engine and let it run AT IDLE and LOADLESS for some 2 minutes.
- Stop the engine, wait for a few minutes and then check that oil level reaches the MAX mark on the dipstick **D**.

CAUTION

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

- Park the machine on a level surface and stop the engine.
- Place a collecting tray underneath to catch any escaping fuel.
- Clean the fuel filter outside.
- Open the drain valve **E** and allow the fuel to drain into the collecting tray.
- Remove the filter bowl from the mounting base.
- Free the filter element and clean all its parts thoroughly.
- Install a new filter element by hand.
- Bleed the fuel system.
- Start the engine and let it run at idle for a few minutes.



4.7 TABLE E PROCEDURES

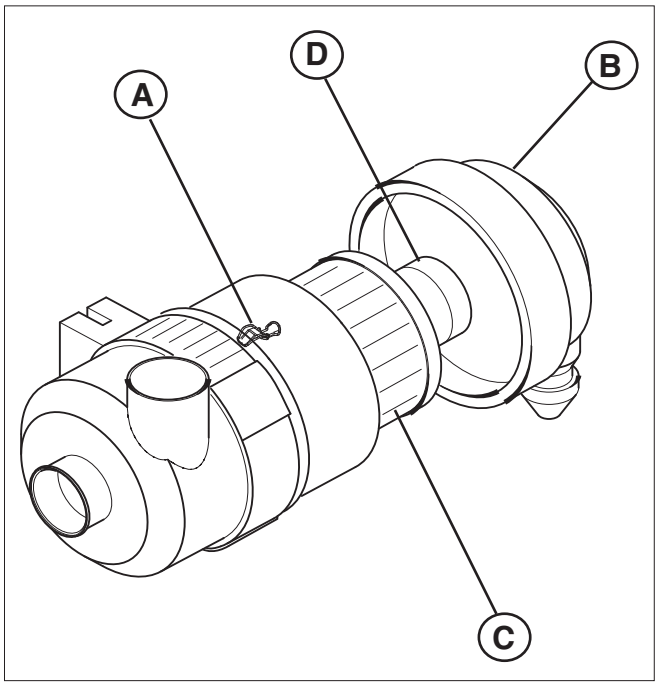
E-1 CHANGE THE SAFETY ELEMENT OF ENGINE AIR FILTER

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.



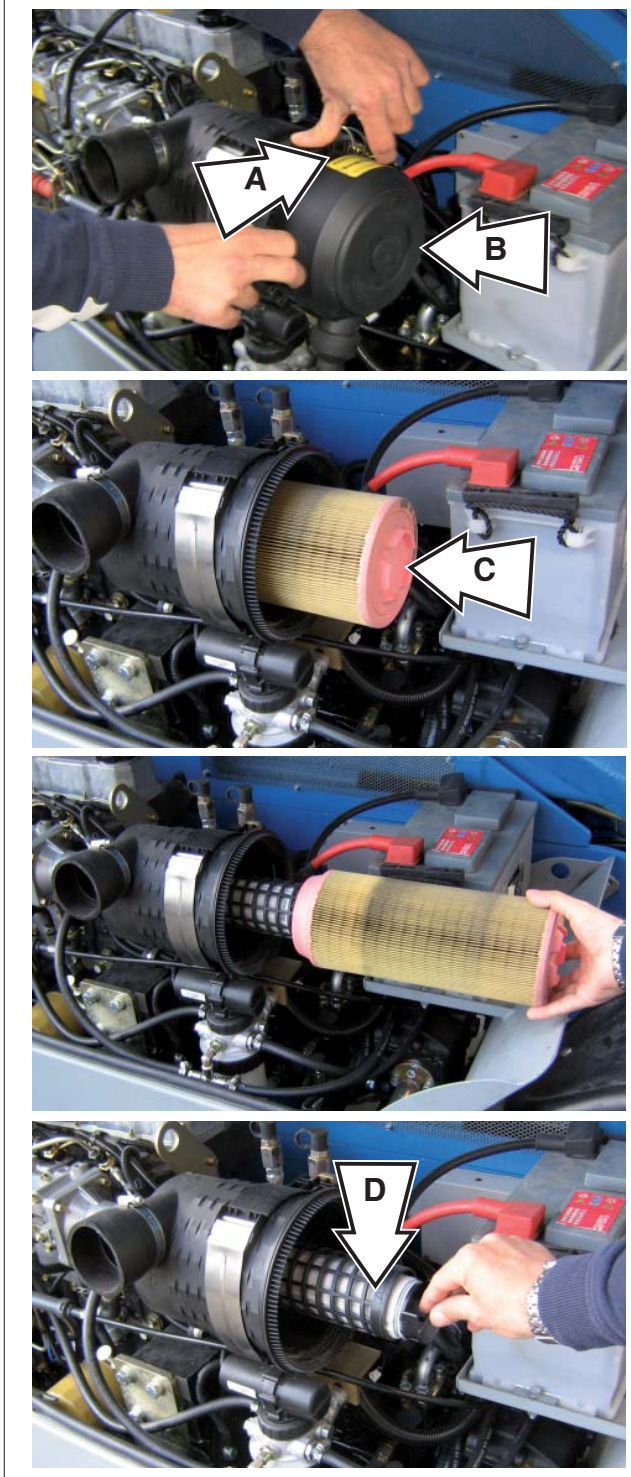


TABLE E

E-2 CHANGE THE OIL IN 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.

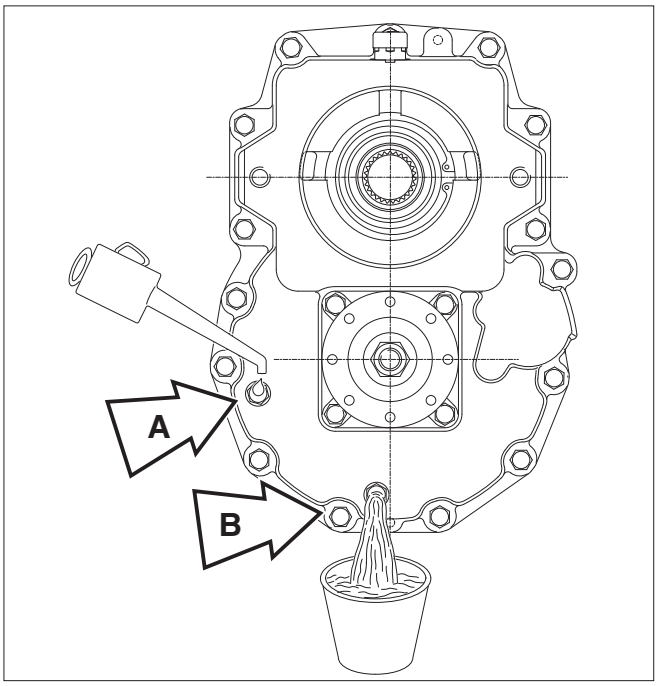
PROTECT THE ENVIRONMENT

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.

PROTECT THE ENVIRONMENT

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**

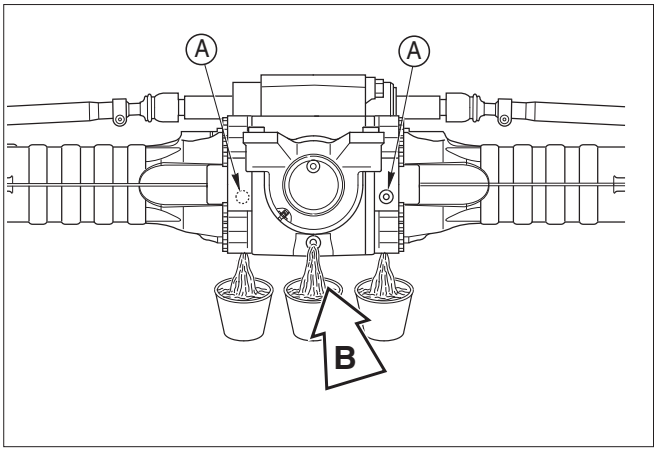


TABLE E

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.

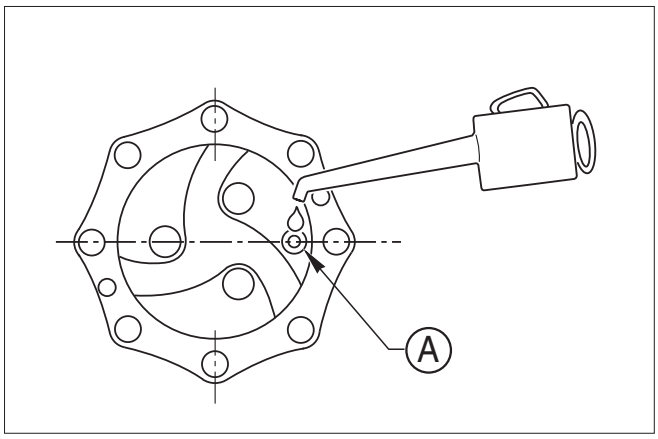
PROTECT THE ENVIRONMENT

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**



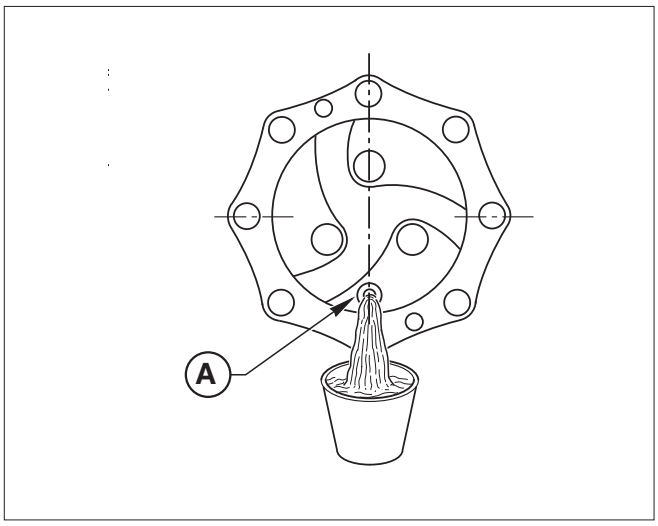


TABLE E

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 **D** 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**.

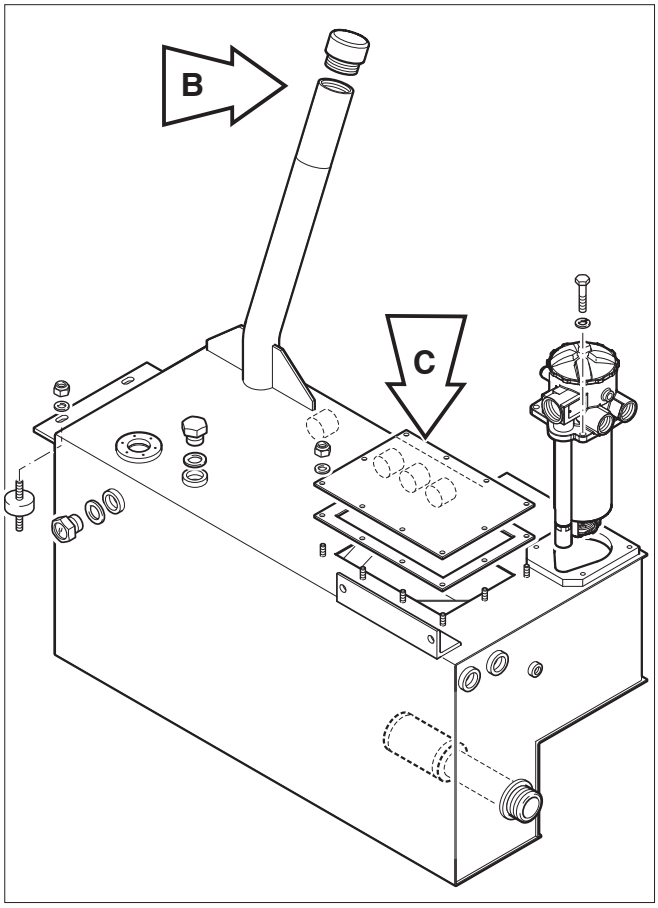
Recommended oil:

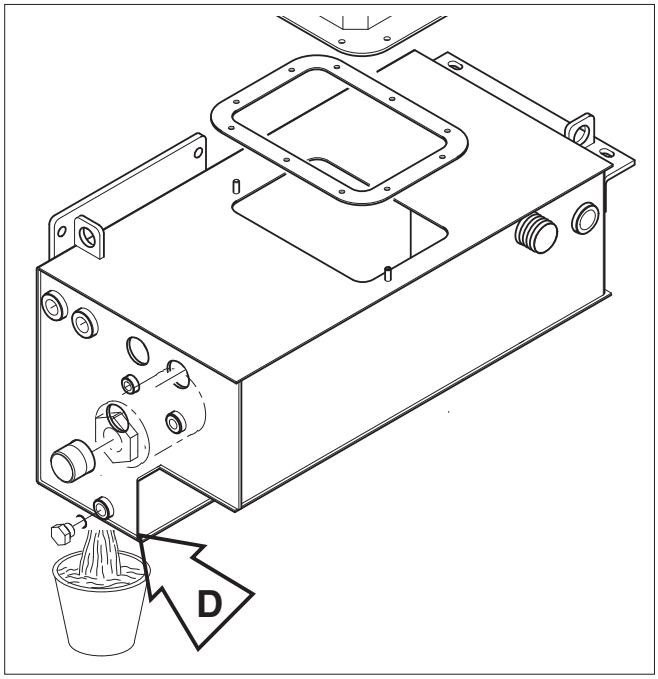
- **SHELL TELLUS T22 (Temperatures below 14° F)**
- **SHELL TELLUS T46 (Temperatures from 5° F to +1 13° F)**
- **SHELL TELLUS T68 (Temperatures above +86° F)**

PROTECT THE ENVIRONMENT

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





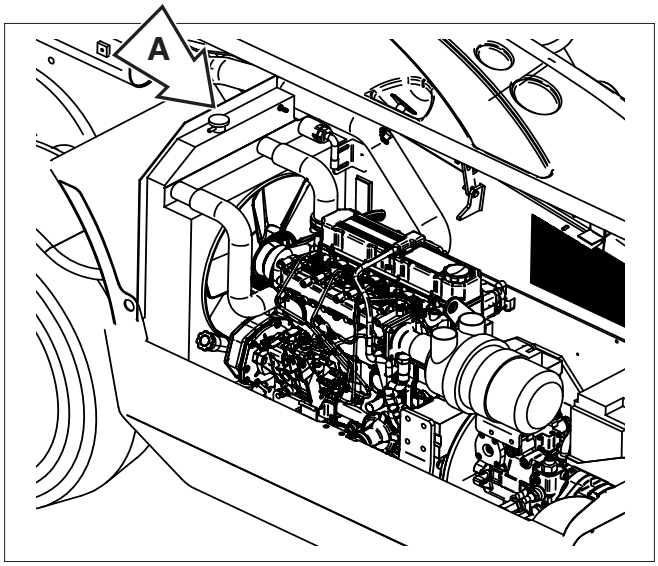


4.8 TABLE F PROCEDURES

F-1 CHANGE THE ENGINE COOLANT

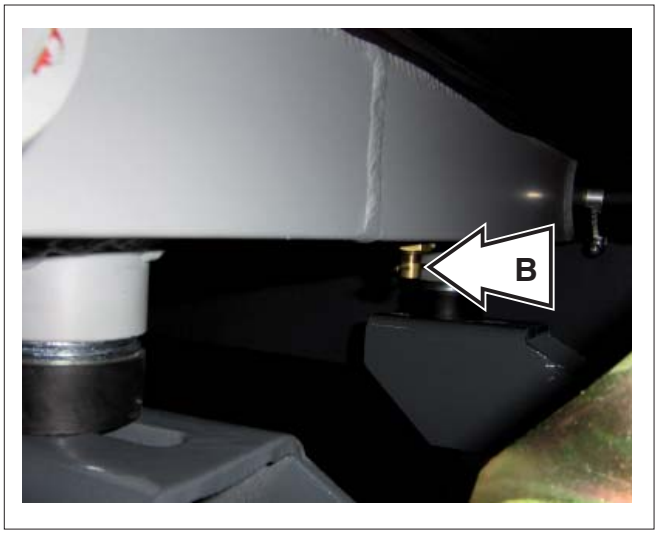
DANGER

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.
- Relieve the internal pressure from the circuit by loosening plug **A**.
- Remove plug **A**.
- Place a collecting tray under the drain tap or under plug **B**.
- Open the drain tap or remove the drain plug **B** located at the bottom of the radiator and allow the fluid to drain into the container.
- Once the fluid has been drained, close the drain tap or refit plug **B** 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	1.4 °F	253.4 °F
40	-11.2 °F	258.8 °F
50	***-32.8 °F***	***262.4 °F***
70	-88.6 °F	275 °F

TABLE G

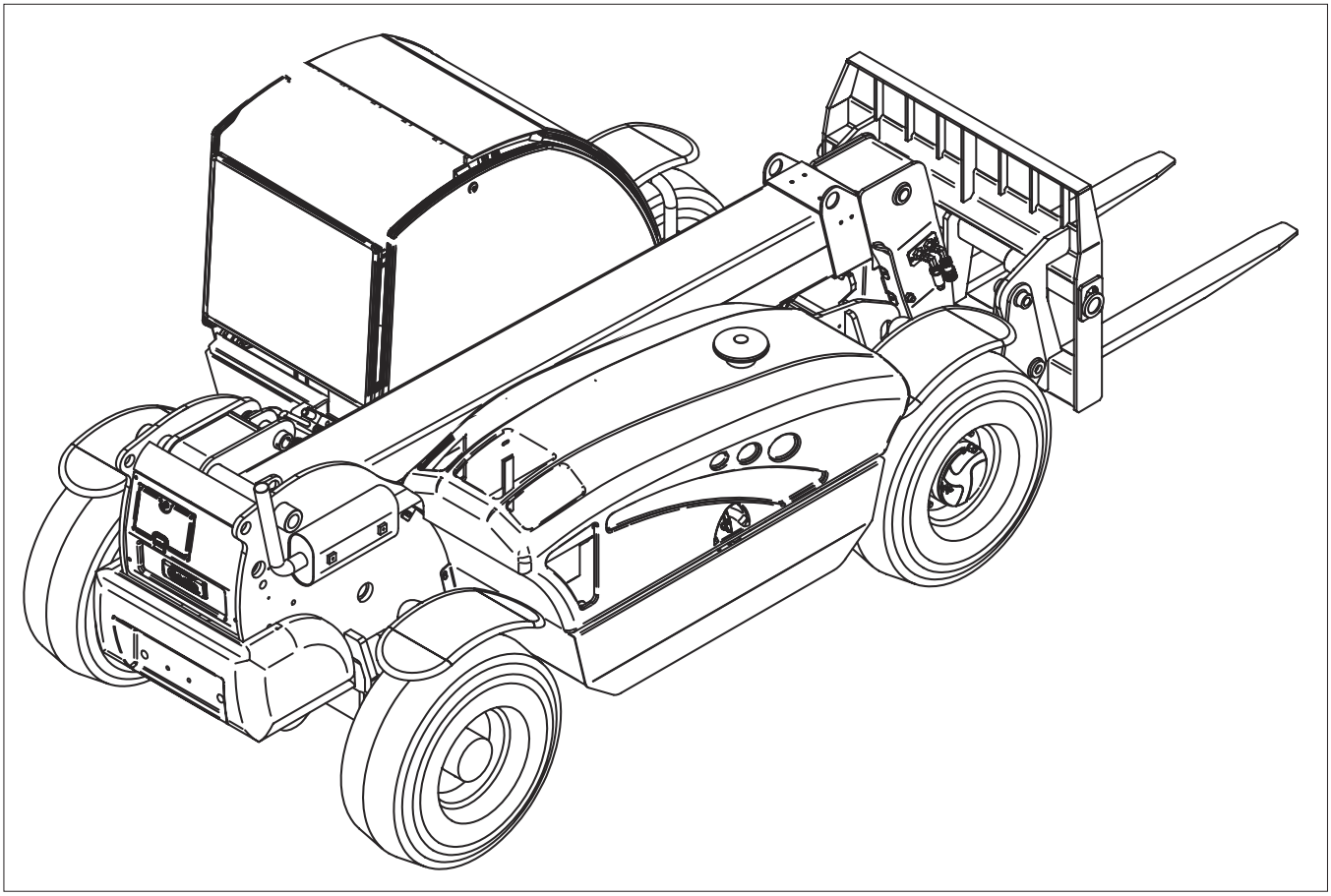
4.9 TABLE G PROCEDURES

G-1 CHECK THE MACHINE STRUCTURE

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

DANGER

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



Problems-Causes-Solutions

5.1 INTRODUCTION



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



Before troubleshooting:

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



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



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



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.



Perform all troubleshooting on a firm level surface.



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

PROBLEMS-CAUSES-SOLUTIONS

5.2 ABOUT THIS SECTION

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

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

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

The tables should be read as follows:

- once you have identified the problem, search this problem in the "**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 TEREX 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 3915 psi
	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 (2465 psi)
	Priority valve damaged	Check the efficiency of the valve; replace if necessary
Low drive pump supercharge	**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

PROBLEMS-CAUSES-SOLUTIONS

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

PROBLEMS-CAUSES-SOLUTIONS

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
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

PROBLEMS-CAUSES-SOLUTIONS

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
	Low pilot pressure	Check the supercharge pressure of the drive pump
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

PROBLEMS-CAUSES-SOLUTIONS

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

PROBLEMS-CAUSES-SOLUTIONS

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 (F61)	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
	K02 relay damaged	Change the relay
	Speed switch ruined	Check or replace the speed switch
	K8 engine start relay damaged	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 F12 broken	Change the fuse
	Relays K05-K07-K08 damaged	Change the relays

PROBLEMS-CAUSES-SOLUTIONS

Problem	Cause	Solution
	Forward/reverse speed solenoid valves damaged	Check the efficiency or replace
	Service brake micro-switch damaged	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 F9 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

PROBLEMS-CAUSES-SOLUTIONS

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 F5 blown**	Change the fuse
	Road-jobsite-platform selector damaged	Check and replace the selector if necessary
	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

Schemes

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

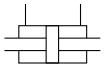

Variable displacement pump with flow regulator

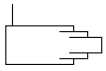
CYLINDERS


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

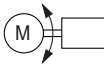

Hand-operated control with pedal


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

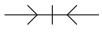

Connecting point

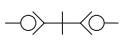

Pipe cross without connection


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

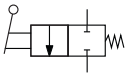
Flowmeter

Pressure switch

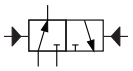
Drain to tank indication

SCHEMES

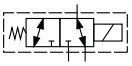
DISTRIBUTION - SETTING ELEMENTS



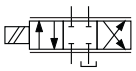
Two-position and two-way distributor, with manual lever control and spring return



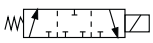
Three-way and two-position distributor, with hydraulic control



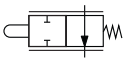
Two-position, three-way distributor, with electro-magnetic control and spring return



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



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

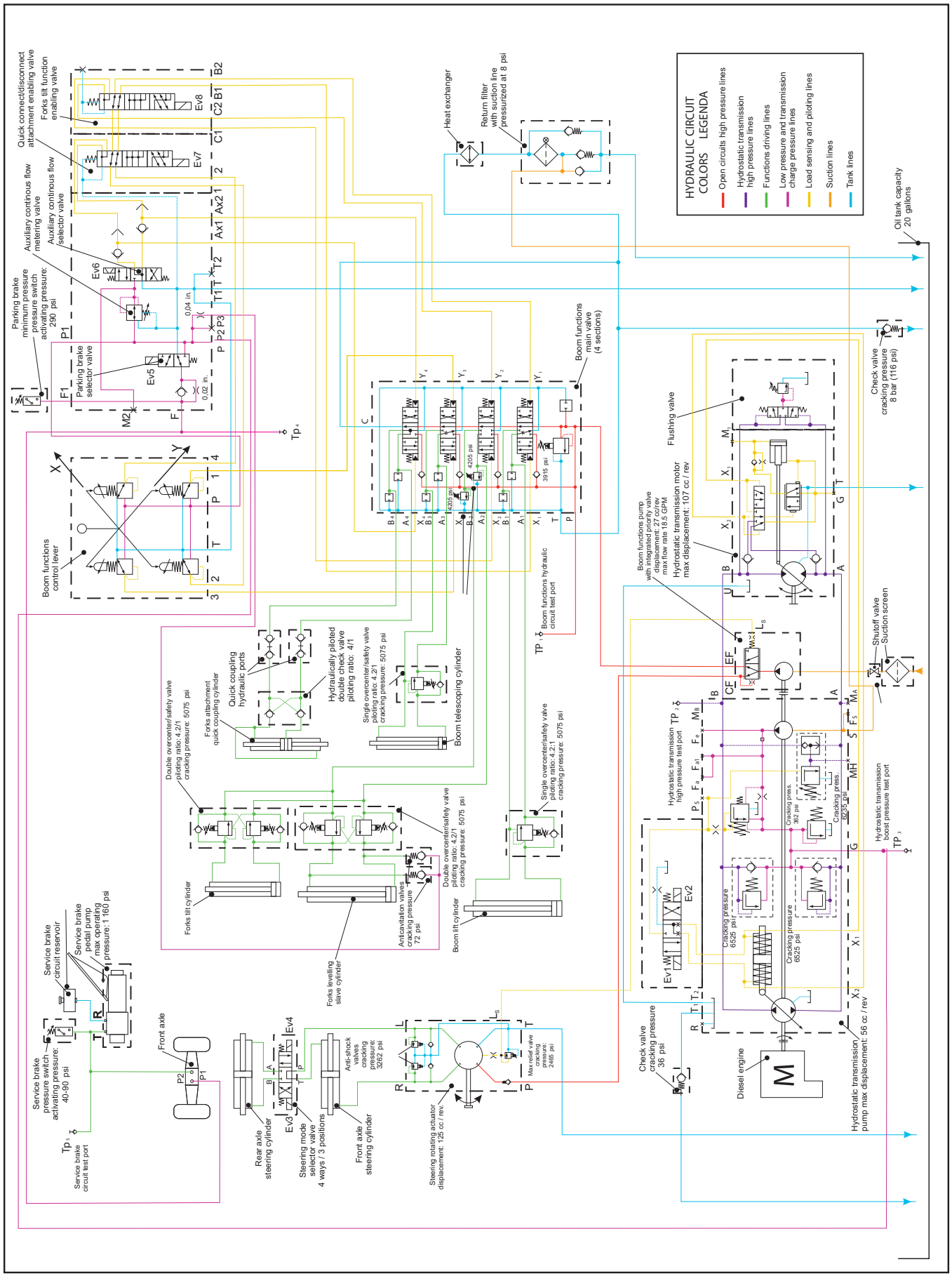


Electro-hydraulic single-acting servo valve

SCHEMES

6.2 HYDRAULIC SCHEMES

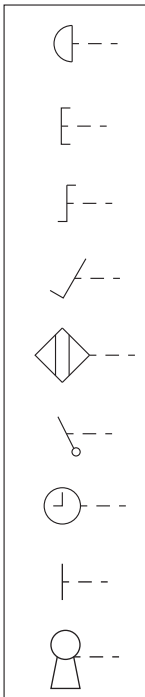
6.2.1 TH 19-55



SCHEMES

6.3 ELECTRICAL SYMBOLS

ACTUATORS



Emergency controls

Pushbutton control

Rotary control

Pedal control

Proximity control

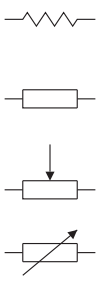
Lever control

Timed control

Mechanical/manual control

Key control

RESISTANCES



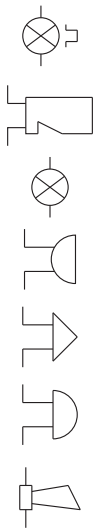
Resistance

Resistor

Potentiometer

Variable resistance

SIGNALS



Intermittent lamp

Whistle

Lamp

Buzzer

Siren

Bell

Horn

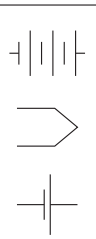
FUSES AND RELAYS



Horizontal fuse

Relay

ACCUMULATORS



Battery

Thermocouple

Element

TERMINALS AND GROUNDS



Ring

Ground

Terminal

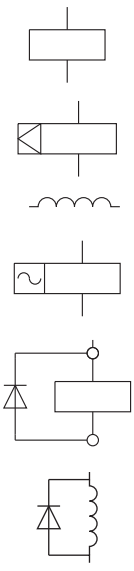
Ground to frame

Knot

Protection ground

Frame ground 2

COILS



Coil

Mechanical coupling coil

Winding

A/C coil

Coil with diode

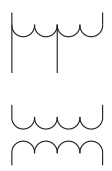
Winding with diode

CONNECTORS



Connector

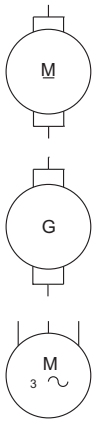
STATIC APPLICATIONS



Auto-transformer

Transformer

DYNAMIC APPLICATIONS

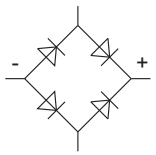


Motor

Generator

As_3p_motor

ELECTRONIC PARTS



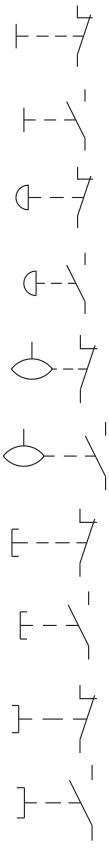
Rectifier

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

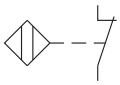

Magneto-thermal closure


Magneto-thermal opening


Thermal closure

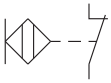

Thermal opening


Exchange


NC proximity


NO proximity


NO mechanical


NC mechanical

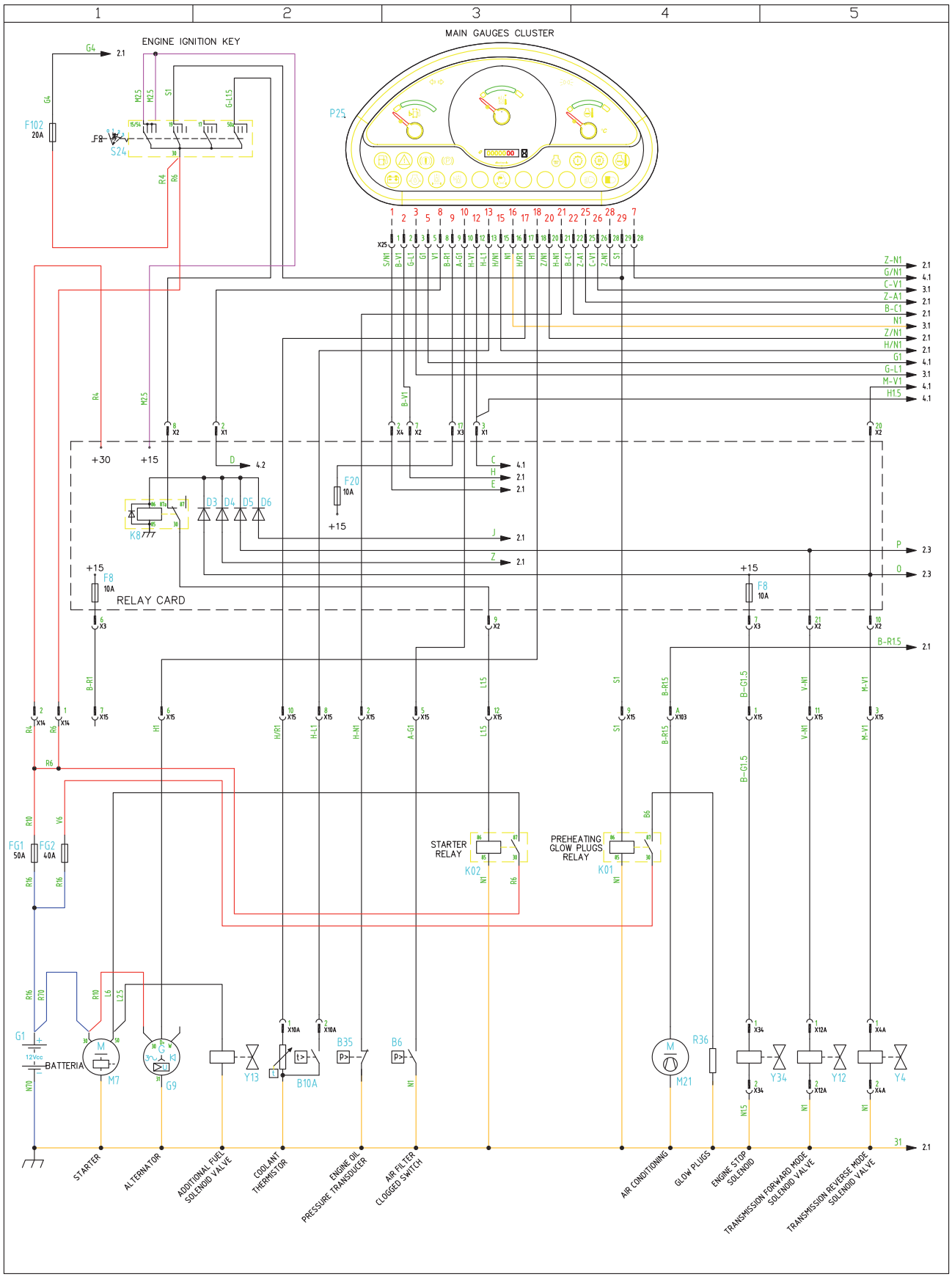

Selector


Selector2

SCHEMES

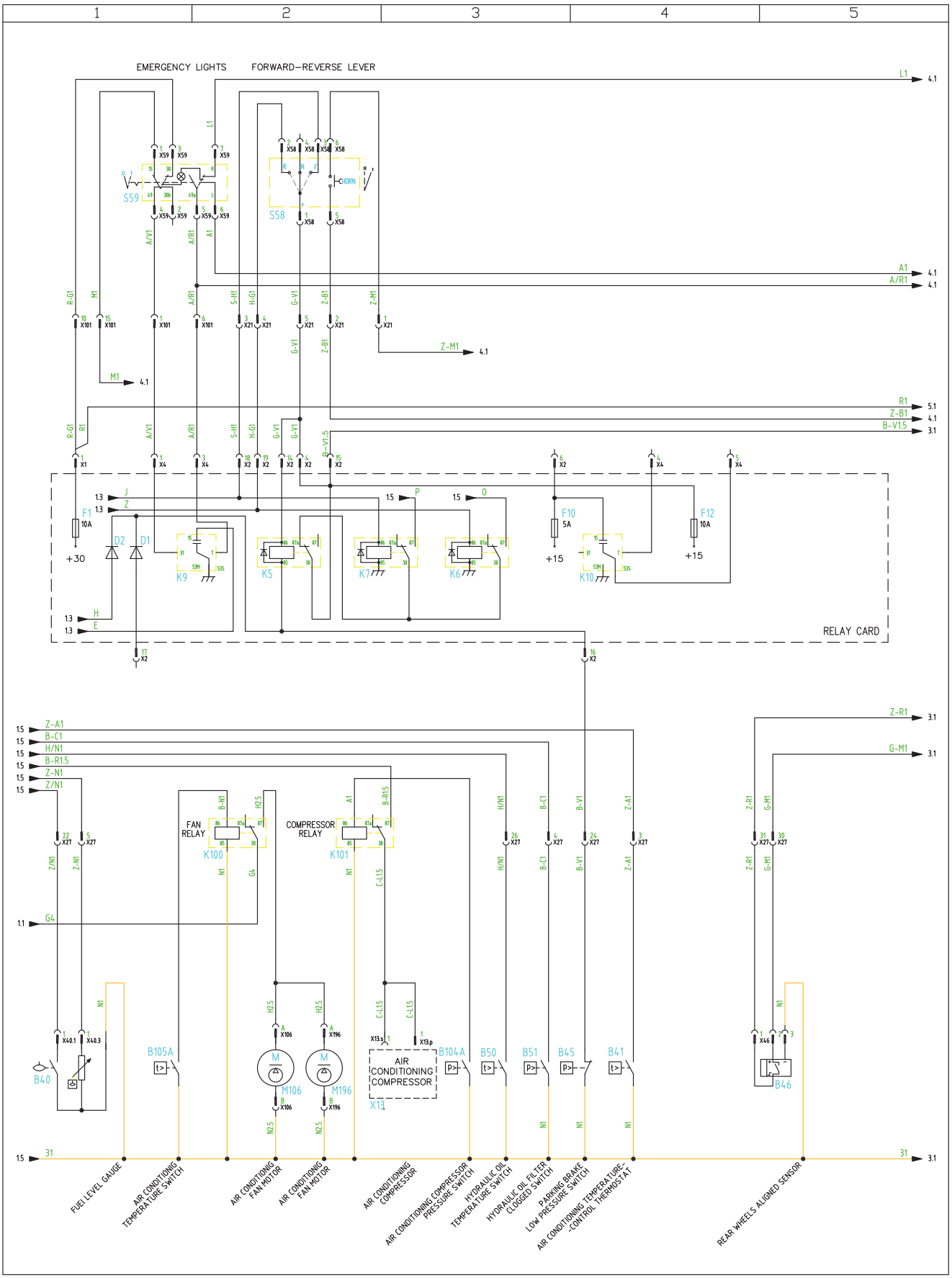
6.4 WIRING DIAGRAMS

Page 1/5



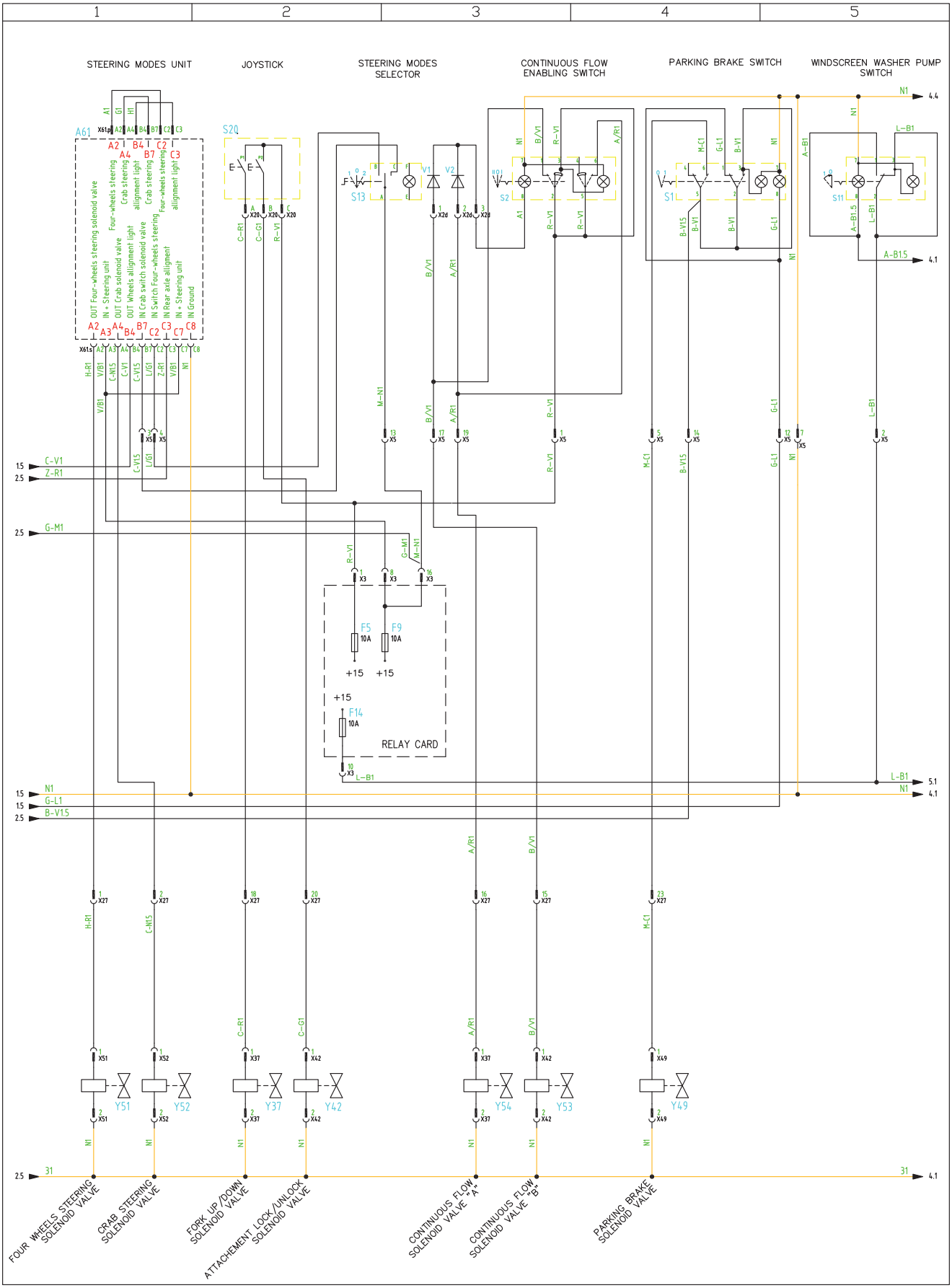
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SCHEMES



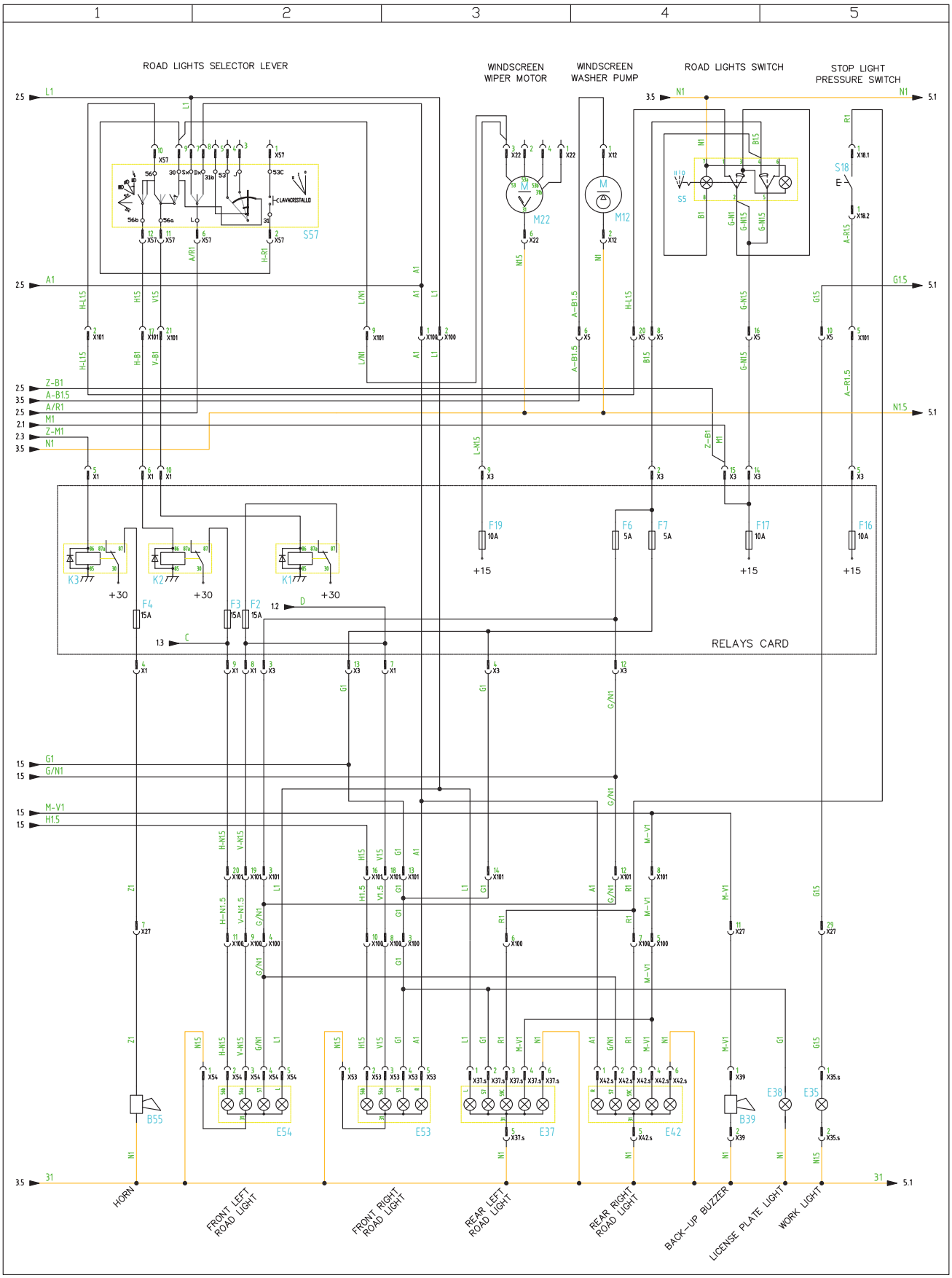
SCHEMES

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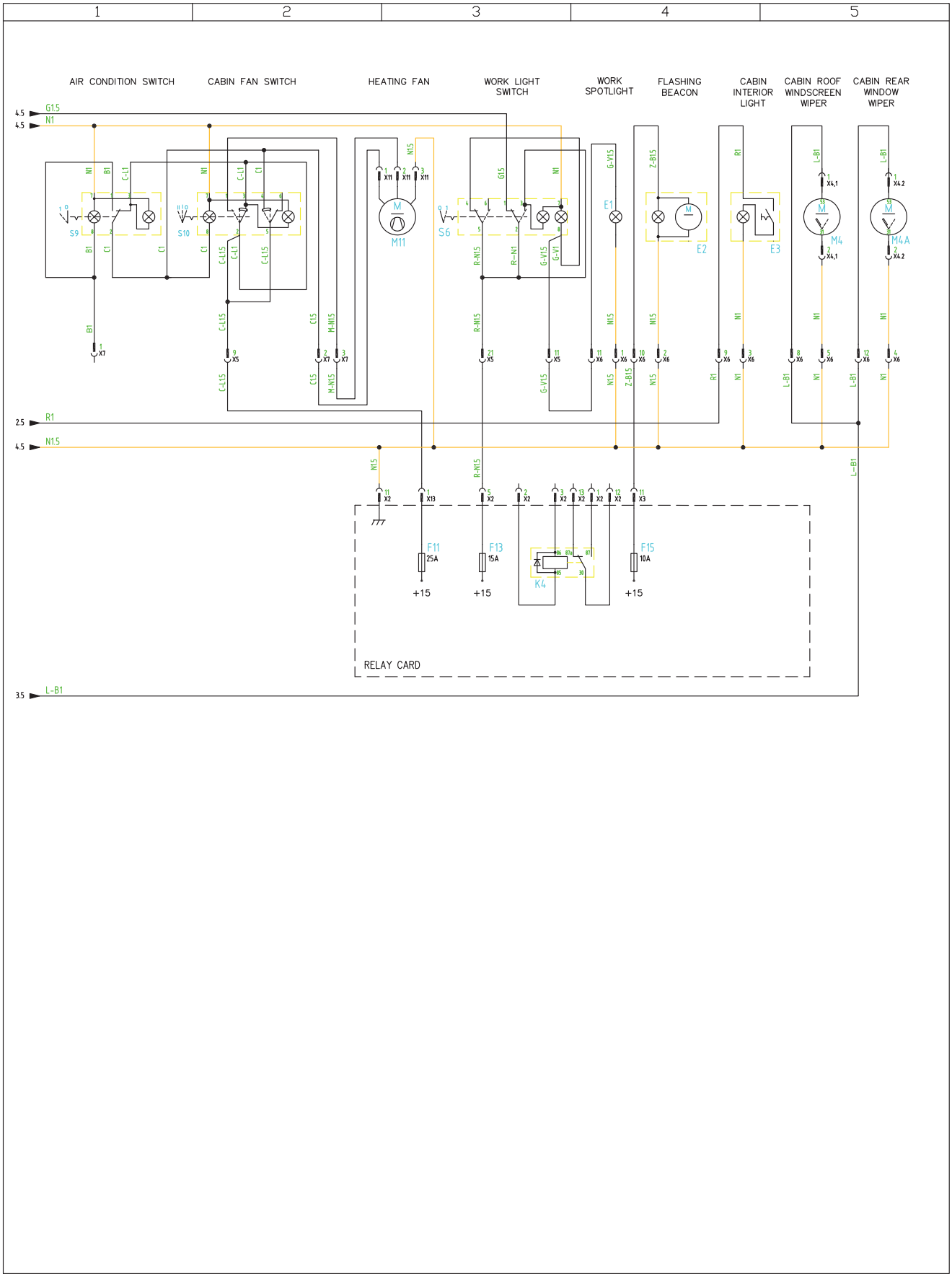
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SCHEMES



SCHEMES

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6.4.1 Wiring diagrams - Component description

1	2	3	4	5

PART LEGEND

Item	Description	Sh
B6	Air filter clogged switch	1.3
B35	Engine oil pressure transducer	1.2
B39	Back-Up horn	4.4
B40	Fuel level gauge	2.1
B41	Hydraulic oil temperature switch	2.5
B45	Parking brake low pressure switch	2.4
B46	Rear wheels aligned sensor	2.5
B50	Hydraulic oil temperature switch	2.3
B51	Hydraulic oil filter clogged switch	2.3
B55	Buzzer	4.1
B10A	Coolant thermistor	1.2
E1	Work spotlight	5.4
E2	Flashing beacon	5.4
E3	Cabin celling light	5.4
E35	Work spotligth	4.5
E37	Rear left road light	4.3
E38	License plate light	4.5
E42	Rear right road light	4.4
E53	Front right road light	4.2
E54	Front left road light	4.2
F1	10A FUSE - Warning light	2.1
F2	15A FUSE - High beam	4.2
F3	15A FUSE - Low beam	4.2
F4	15A FUSE - Horn	4.1
F5	10A FUSE - Road/jobsite switch	3.3
F6	5A FUSE - Position light front right and rear left	4.4
F7	5A FUSE - Position light front left and rear right	4.4
F8	10A FUSE - Optional	1.1
F9	10A FUSE - Auxiliary Hydraulic switch	2.5
F10	5A FUSE - Optional	2.3
F11	25A FUSE - Heater fan switch	5.3
F12	10A FUSE - Forward-reverse switch	2.4
F13	15A FUSE - Spotlights work	5.3
F14	10A FUSE - Rear wheels aligned sensor	2.5
F15	10A FUSE - Flashing beacon light	5.4
F16	10A FUSE - Stop light	4.5
F17	10A FUSE - Road light	4.4
F18	10A FUSE - Optional	1.4
F19	10A FUSE - Windscreen washer motor	4.3
F20	10A FUSE - ECO Multipurpose Instruments	1.2
F102	20A FUSE - Fan	1.2
FG1	60A FUSE - Maxi fuse electric system power	1.1
FG2	40A FUSE - Maxi fuse glow plugs	1.1
G1	Battery	1.1
G9	Alternator	1.1
K1	Relay hig beam	4.2
K2	Relay low beam	4.1
K3	Relay horn	4.1
K4	Relay optional	5.3
K5	Relay securuty low pressure switch parking brake	2.2
K6	Relay trasmission reverse mode	2.3
K7	Relay trasmission forward mode	2.2
K8	Relay starter enabling switch	1.1
K9	Timer	2.2
K01	Preheating glow plugs	1.4
K02	Relay start engine	1.3
K10	Timer enabling antioverload system switch	2.4
K100	Relay fans air conditionig	2.2
K101	Relay air conditionig compressor	2.2
M4	Windsceen cabin roof	5.5
M7	Starter engine	1.1
M11	Heating fan	5.3
M12	Windscreen washer pump	4.4
M21	Air conditioning	1.4
M22	Windscreen washer motor	4.3
M4A	Windscreen rear cabin	5.5
M60	LMI setting	2.3
M106	Air conditioning fan motor	2.2
M196	Air conditioning fan motor	2.2
P25	Main gauges cluster	1.2
R36	Glow plugs	1.4
S1	Parking brake switch	3.4
S2	Continuous flow enabling switch	3.5
S5	Switch light	4.4
S6	Work spotlight switch	5.3
S9	Fan switch	5.2
S10	Air condition switch	5.1
S11	Windscreen washer pump switch	3.3
S13	Steering selector	3.4
S18	Microswitch stop light	4.5
S20	LMI bypass key	2.4
S24	Start-up panel	1.1
S57	Road light switch	4.1
S58	Forward-reverse switch	2.2
S59	Warning switch	2.1

Item	Description	Sh
X13	Power air condition compressor plug	2.3
X61	Steering unit plug	3.1
Y4	Transmission reverse mode solenoid valve	1.5
Y12	Transmission forward mode solenoid valve	1.5
Y13	Additional fuel solenoid valve	1.2
Y34	Engine stop solenoid	1.4
Y37	Fork Up/Down solenoid valve	3.2
Y42	Attachement lock/unlock solenoid valve	3.2
Y53	Continuous flow solenoid valve "B"	3.3
Y54	Continuous flow solenoid valve "A"	3.3
Y49	Parking brake solenoid valve	3.4
Y51	Four wheels steering solenoid valve	3.1
Y52	Crub steering solenoid valve	3.1
X1	Plug-in Connector 11 way - Relay card	
X10A	Plug-in Connector - Coolant thermistor	1.2
X103	Plug-in Connector 3 way - Air conditionig motor	1.4
X106	Plug-in Connector - Air conditionig fan motor	2.2
X11	Plug-in Connector - Heating fan	5.3
X12	Plug-in Connector - Windscreen washer pump	4.4
X12A	Plug-in Connector - Trasmission forward mode solenoid valve	1.5
X13.p	Plug-in Connector - Air conditioning compressor	2.3
X13.s	Plug-in Connector - Air conditioning compressor	2.3
X14	Plug-in Connector 2 way - Power from battery	1.1
X15	Plug-in Connector 15 way - Power to engine	
X18.1	Plug-in Connector - Stop light pressure switch	4.5
X18.2	Plug-in Connector - Stop light pressure switch	4.5
X196	Plug-in Connector - Air conditioning fan motor	2.2
X2	Plug-in Connector 21 way - In-Out relay card	2.2
X20	Plug-in Connector - Joystick	
X21	Plug-in Connector 2 way - In-Out relay card	
X22	Plug-in Connector - Windscreen washer motor	
X25	Plug-in Connector - ECO Multipurpose Instruments	
X26	Plug-in Connector 12 way - In-Out relay card	
X27	Plug-in Connector 31 way - In-Out relay card	
X2d	Plug-in Connector 3 way - Diode	
X3	Plug-in Connector 17 way - Relay card	
X34	Plug-in Connector - Stop engine	
X35.s	Plug-in Connector - Spotlights work boom	
X37.s	Plug-in Connector - Rear left road light	
X39	Plug-in Connector - Back-up horn	
X4	Plug-in Connector 5 way - In-Out relay card	
X4A	Plug-in Connector - Trasmission reverse mode solenoid valve	
X4.1	Plug-in Connector - Windscreen cabin roof	
X4.2	Plug-in Connector - Windscreen rear cabin	
X40.1	Plug-in Connector - Fuel level gauge	
X40.3	Plug-in Connector - Fuel level gauge	
X42.s	Plug-in Connector - Rear right road light	
X46	Plug-in Connector - Rear wheels aligned sensor	
X49	Plug-in Connector - Parking brake solenoid valve	
X5	Plug-in Connector 21 way - In-Out relay card	
X51	Plug-in Connector - Four wheels steering solenoid valve	
X52	Plug-in Connector - Crab steering solenoid valve	
X53	Plug-in Connector - Front right road light	
X54	Plug-in Connector - Front left road light	
X57	Plug-in Connector - Road light switch	
X58	Plug-in Connector - Forward-reverse switch	
X59	Plug-in Connector - Emergency switch	
X6	Plug-in Connector 12 way - In-Out relay card	
X61.p	Plug-in Connector - Steering unit bridge	
X61.s	Plug-in Connector - Steering unit	
X7	Plug-in Connector 3 way - In-Out relay card	

COLOR WIRE LEGEND

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

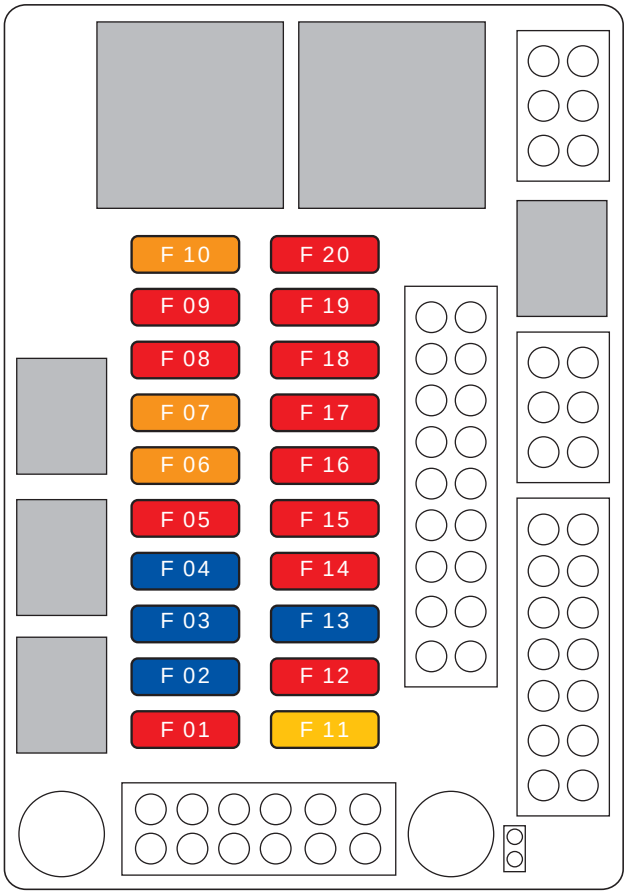
REMARK: Two colorwires are indicated through a combination of the aforesaid initials as follows:
G/V= YELLOW/GREEN (crosswise colouring)
G-V= YELLOW-GREEN (lengthswise colouring)

SCHEMES

6.4.2 Fuses and relays

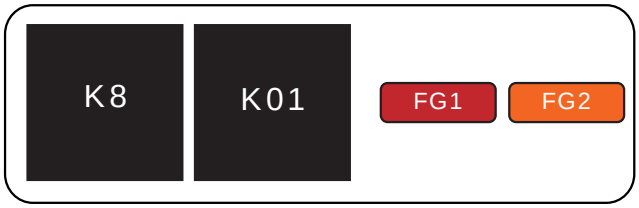
FUSES

Ref.	Circuit	Amp.
F01	FUSE	5
F02	FUSE	10
F03	FUSE	10
F04	FUSE	5
F05	FUSE	10
F06	FUSE	10
F07	FUSE	5
F08	FUSE	5
F09	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



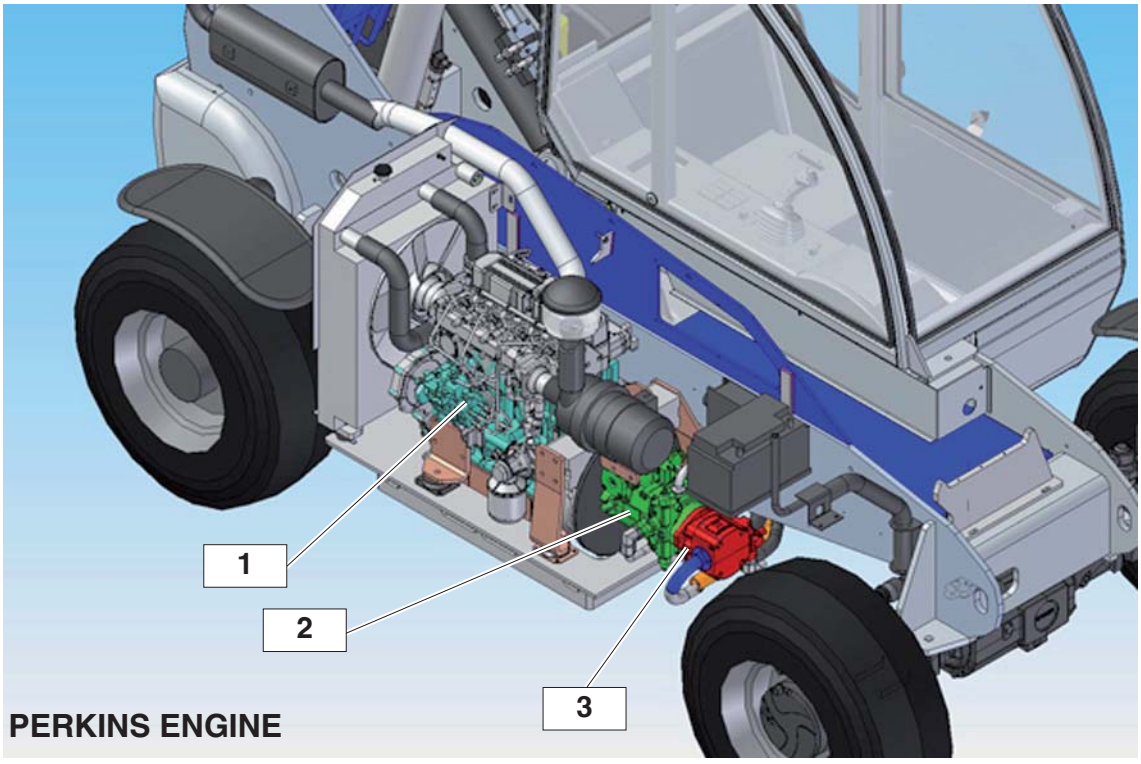
RELAYS

Ref.	Circuit
FG1	MAXIFUSE
FG2	MAXIFUSE
K01	PRE-HEATING RELAY
K8	ENGINE START RELAY

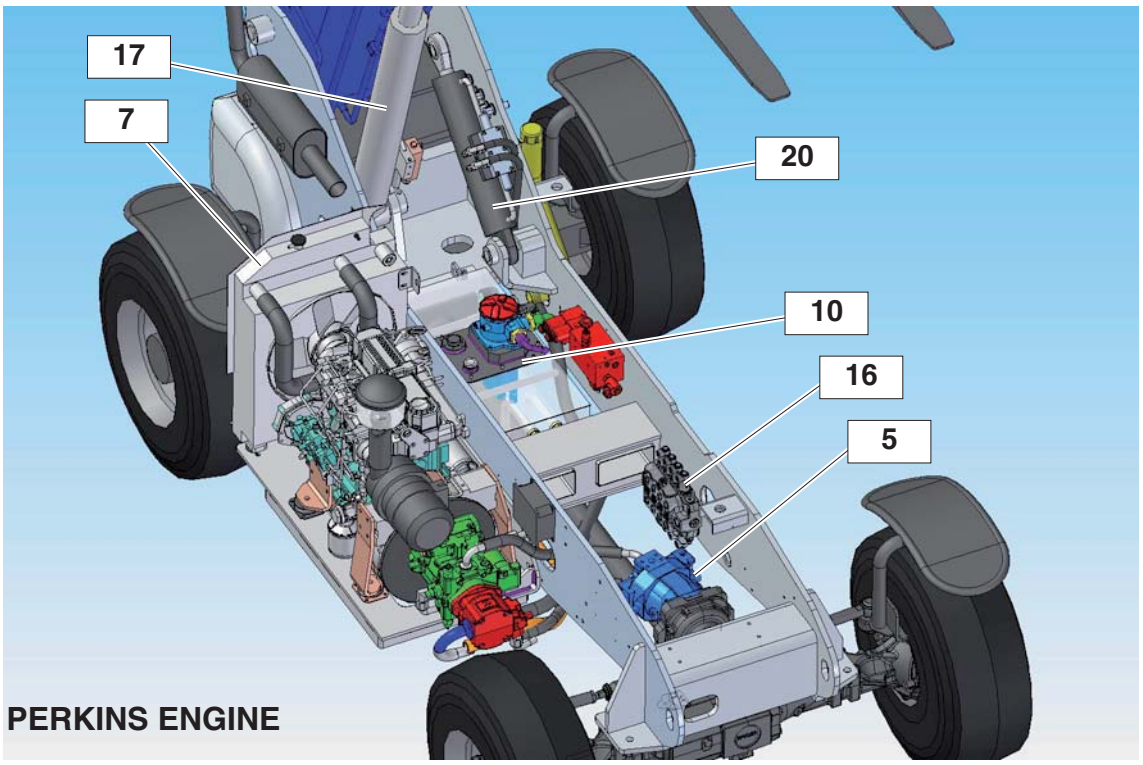


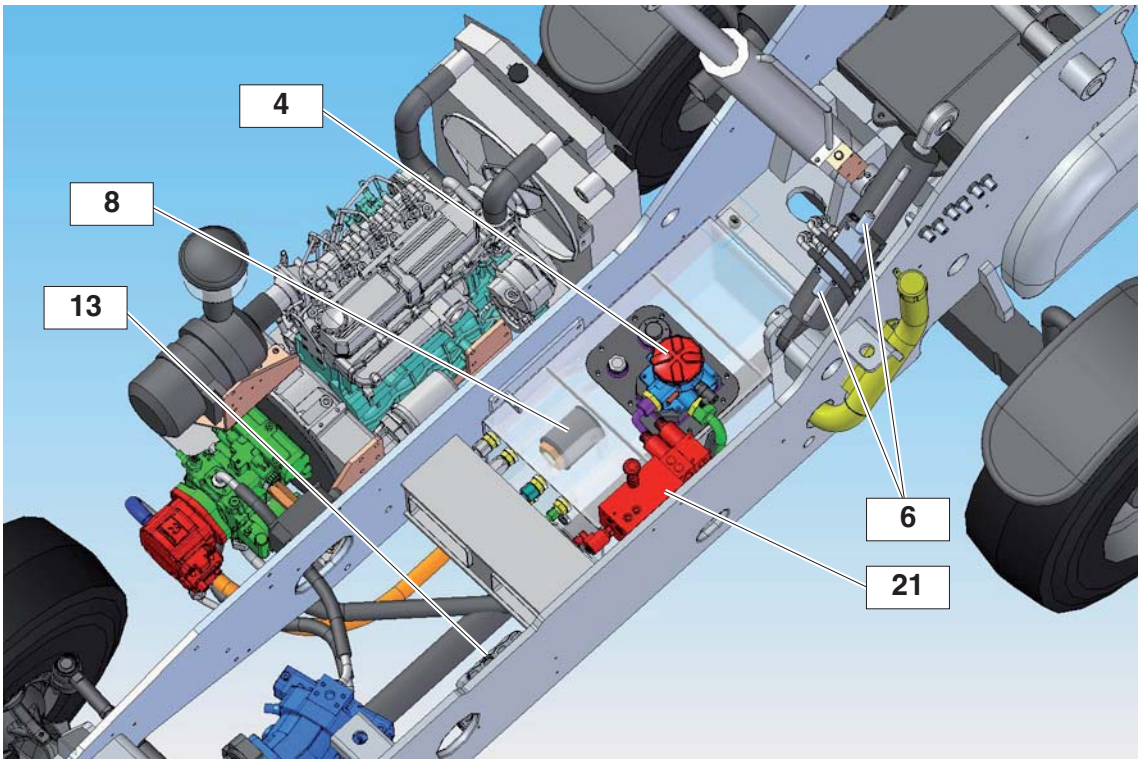
6.5 POSITION OF THE ELECTRICAL AND HYDRAULICAL COMPONENTS ON THE MACHINE

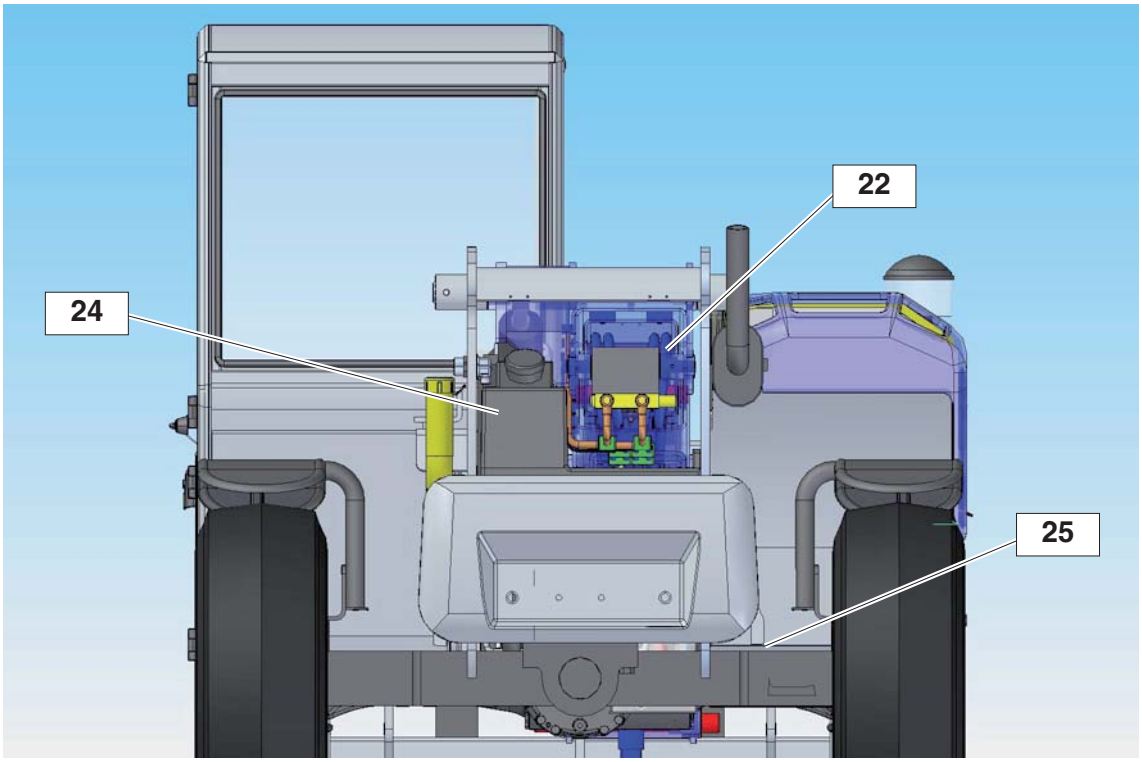
6.5.1 Hydraulical components



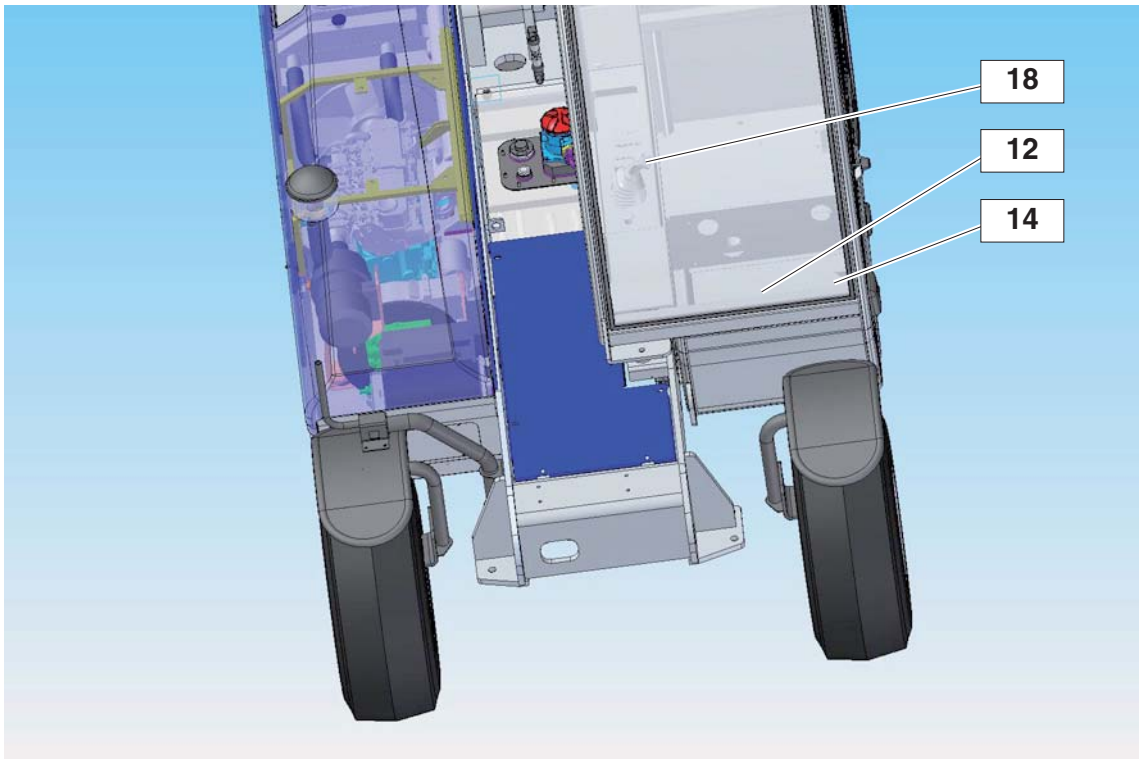
SCHEMES

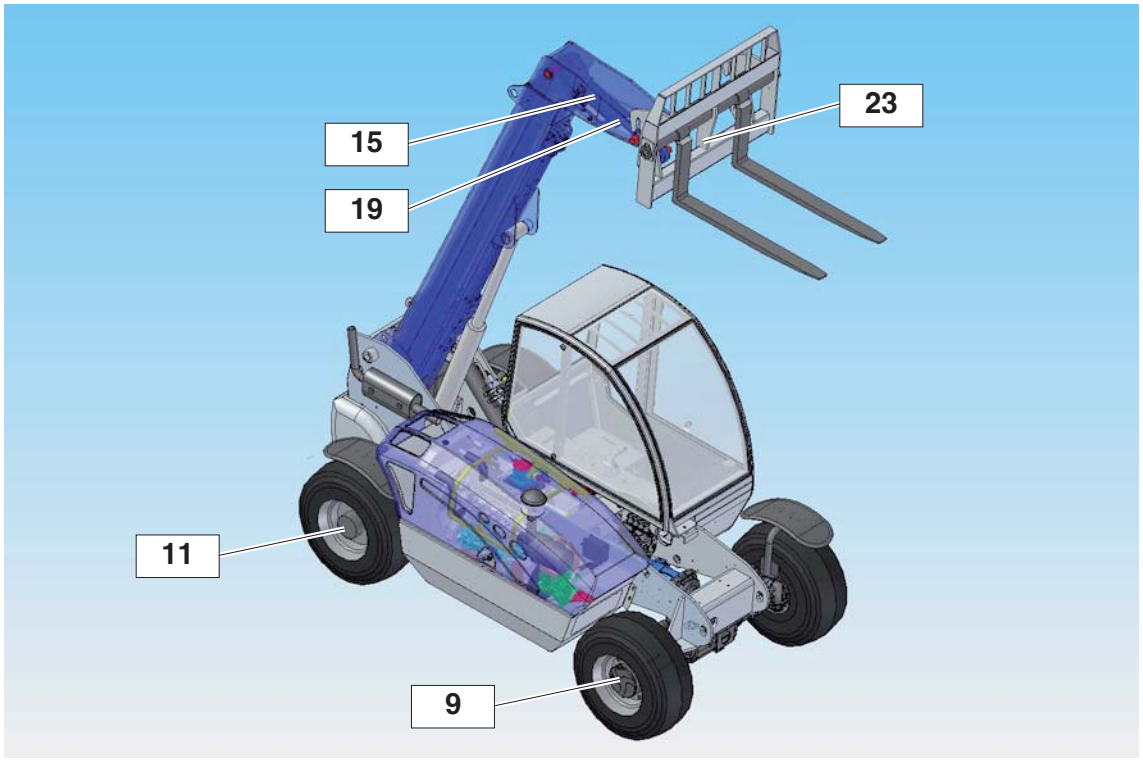



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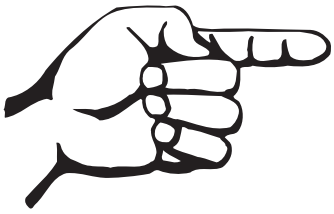
SCHEMES





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
26	Deutz engine expansion tank
27	Driving cab
28	Engine compartment



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Repair Procedures

7.1 TIME SCHEDULE

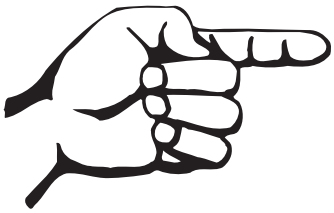
Job	Operators needed	Expected time (h)
change the ignition key	1	1.30
change the speed switch	1	1.00
change the light and horn switch	1	1.00
change the joystick	1	1.00
change the fork locking/releasing pushbutton	1	1.00
change the fork locking/releasing red pushbuttons	1	1.00
change the brake pump	1	1.00
change the boom lifting cylinder	1	2.30
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	1.00
change the fork pitching cylinder	1	2.00
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	1.30
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	1.00
check the one-way valves of the fork compensation cylinder	1	1.00
change the boom internal line for the boom extension	1	1.00
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	1.00
change the drive pump	1	2.30

REPAIR PROCEDURES

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	1.00
change relays and fuses	1	0.30
change the windscreen wiper motor (closed cab version)	1	1.30
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	2.30
change a cardan joint	1	1.00
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	0.30
change the maxi-fuses and search for troubles	1	1.00
bleed the brake circuit	2	0.30 each
disassemble and reassemble a wheel	1	1.00
disassemble thermal engine	2	2.30 each
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	0.30
check the seals of the steering cylinder	2	1.00 each
change the return filter of the hydraulic oil tank	1	0.30
change the hydrostatic steering unit	1	2.00
change the battery	1	0.30
change the exhaust pipe	1	0.30
change the mud-guard supports	1	0.30

REPAIR PROCEDURES

Job	Operators needed	Expected time (h)
change the mud-guards	1	0.30
change the steering wheel	1	0.30
replace the complete solenoid valve block	1	2.00



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TABLE 001

Operation: **Cylinder disassembly** **Boom raising cylinder**	*Table:* ***001*** **TH 19-55**	kg	**76**
			Hrs. / **Min.**: **2** / **30**
Bridge crane, payload 20000 lbs **Textile bridles or chains with hooks**	**Standard tools** **Adjustable stands**		**1**

Operation:

1 Release the attachment

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

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

4 Stop raising when the slinging chains are slightly under tension

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



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

6 With a 0,94 incwrench, disconnect two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.



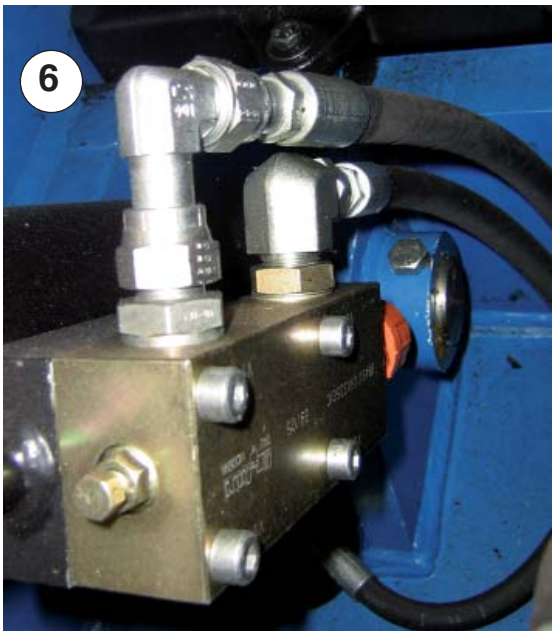


TABLE 001

Operation:	**Cylinder disassembly** **Boom raising cylinder**	*Table:* ***001*** **TH 19-55**

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 0,51 in 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



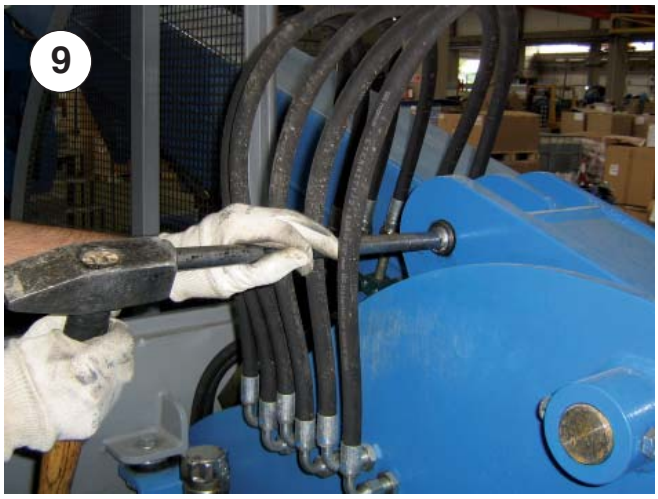


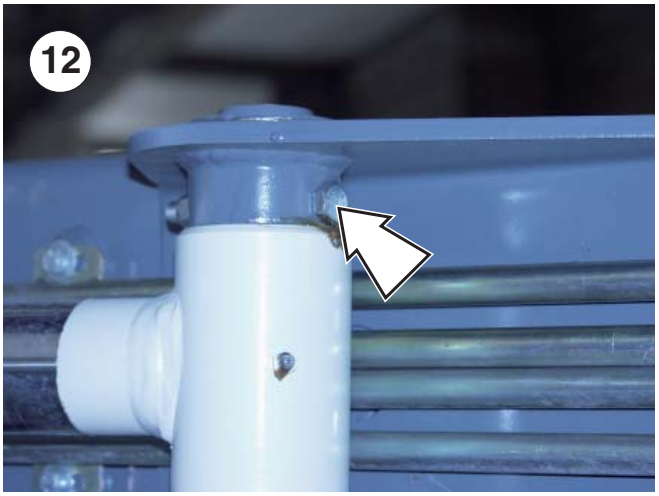




TABLE 001

Operation: **Cylinder disassembly** **Boom raising cylinder**	*Table:* ***001*** **TH 19-55**

12 Remove the screw which fixes the rod pin to the boom using two 0,74 in wrenches



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

14 Put two wooden plugs, each 3,93 in 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 0,74 in wrenches

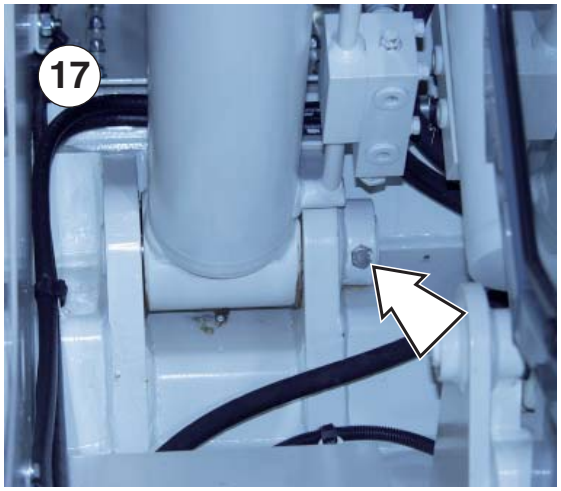


TABLE 001

Operation:	**Cylinder disassembly** **Boom raising cylinder**	*Table:* ***001*** **TH 19-55**

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

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

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



CAUTION

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



TABLE 002

Operation: **Cylinder disassembly** **Fork balance cylinder**	*Table:* ***002*** **TH 19-55**	kg	**26**
			Hrs. / **Min.**: **2** / **-**
Bridge crane, payload 2000 lbs **Textile bridles or chains with hooks**	**Standard tools** **Adjustable stands**		**1**

Operation:

1 Release the attachment

2 Remove the screw fixing the rod pin with two 0,51 in wrenches



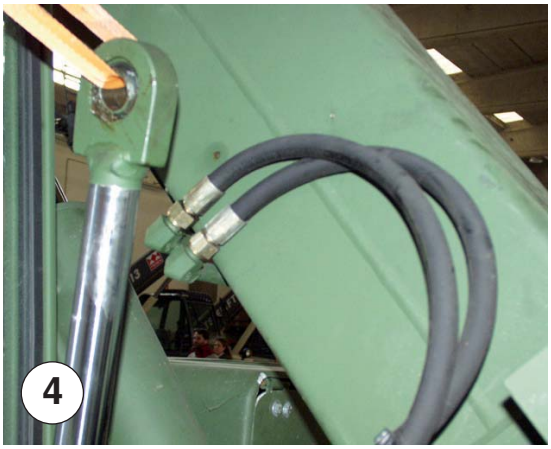
3 Knock out and extract the pin using a plug of soft material (aluminium, copper, wood, etc.)



TABLE 002

Operation: **Cylinder disassembly** **Fork balance cylinder**	Table: ***002*** **TH 19-55**

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

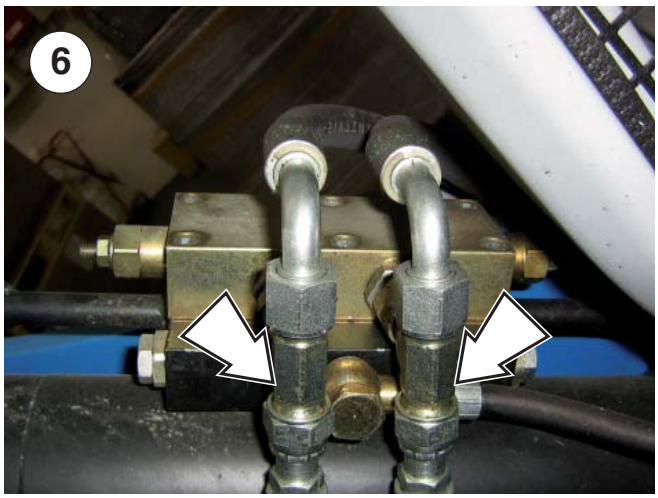


5 Place a container of suitable size under the hydraulic piping before disconnecting

PROTECT THE ENVIRONMENT

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

6 With a 0,94 in 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 0,51 in wrenches

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



10 Remove the cylinder from the machine using the bridge crane

TABLE 003

Operation: **Removing the engine from the machine**	*Table:* ***003*** **TH 19-55**	kg	**340**
			Hrs. / **Min.**
Bridge crane, payload 2000 lbs **Textile bridles or chains with hooks**	**Standard tools**		**2** / **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 0,51 in wrenches, remove the two screws of the spring



4 Again with two 0,51 in 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 using a 0,51 in wrench

7 With two 0,67 in wrenches, remove the six screws fixing the lower cover of the engine





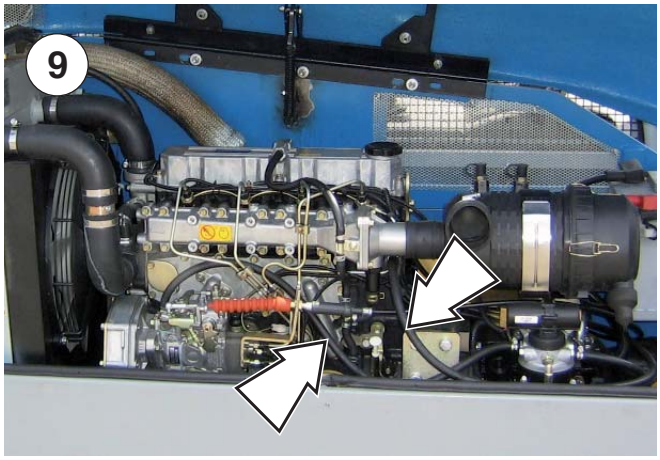


TABLE 003

Operation: **Removing the engine from the machine**	*Table:* ***003*** **TH 19-55**

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 0,67 in wrench to pull out the cable

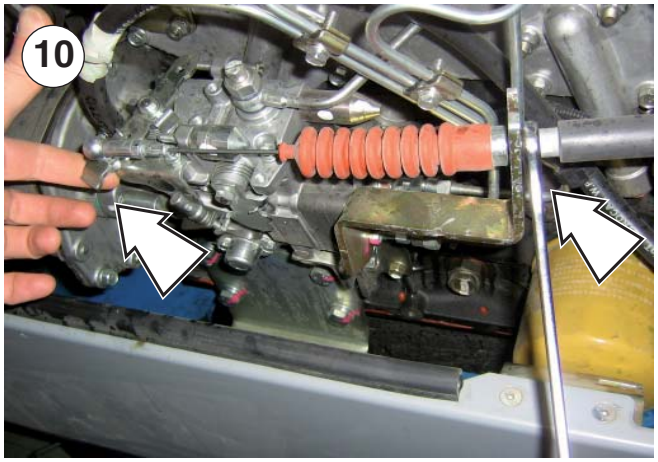




TABLE 003

Operation: **Removing the engine from the machine**	*Table:* ***003*** **TH 19-55**

11 Close the oil tank cocks

12 Disconnect the flexible hose of the silencer loosening the clamps with a 0,51 in wrench



13 Remove the manifold with a 0,67 in 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:

remove the clamps fixing the sleeves to the radiator

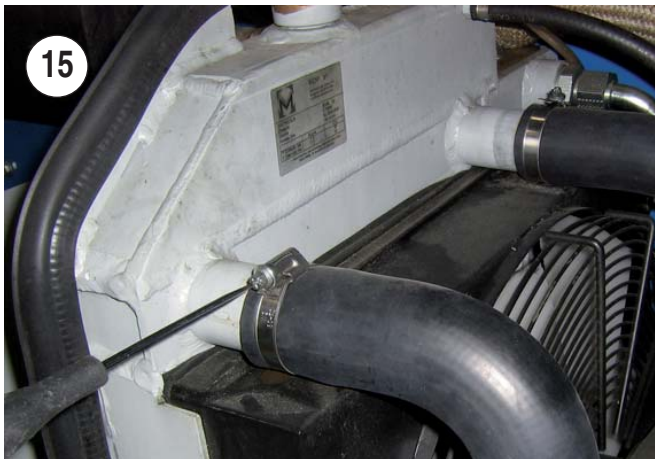


TABLE 003

Operation: **Removing the engine from the machine**	*Table:* ***003*** **TH 19-55**

16 Disconnect the hydraulic pipes of the radiator:

PROTECT THE ENVIRONMENT

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

CAUTION

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

- disconnect the two drain lines of the hydraulic pump with a 1,41 in wrench,
- disconnect the suction line of the hydraulic pump with a 1,96 in wrench,
- disconnect the “low pressure line” duct with a 0,74 in wrench,
- disconnect the four flanges which connect the drive pump to the drive motor with a 0,31 in Allen wrench,
- disconnect the suction line of the service pump with a 0,31 in Allen wrench (**ref. A**),
- disconnect the delivery line ducts of the hydraulic drive and the main valve with a 1,41 in wrench and a 0,94 in wrench.
- disconnect the load sensing signal line from the hydraulic drive with a 0,67 in 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-damping brackets with a 0,86 in wrench

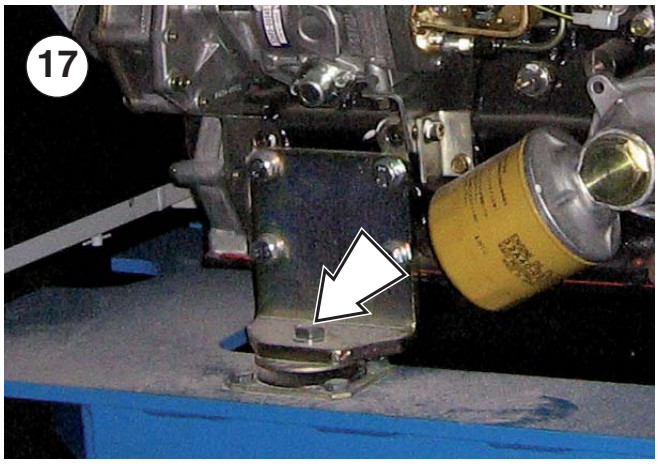
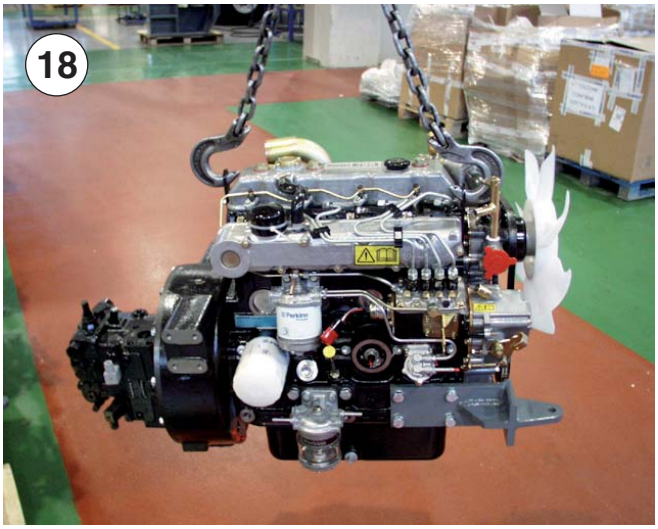


TABLE 003

Operation:	Table: 003
Removing the engine from the machine **Reassembling the engine on the machine**	TH 19-55

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

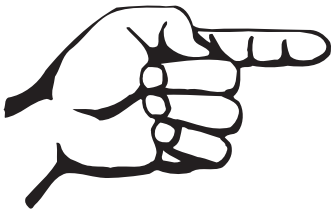
20 Remove the engine from the machine, rest it on a wooden pallet and hold it in position with some plugs

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



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TABLE 004

Operation: **Hydrostatic pump disassembly**	*Table:* ***004*** **TH 19-55**	kg	40
			Hrs. / Min.
Bridge crane or swing hoist, payload 2000 lbs	**Standard tools**		2 / 30
			1

Operation:

PROTECT THE ENVIRONMENT

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

CAUTION

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

1 Using two 0,67 in wrenches, remove the six screws that fix the engine lower cover

2 Remove the lower cover

3 Close the oil tank cocks







TABLE 004

Operation: **Hydrostatic pump disassembly**	*Table:* ***004*** **TH 19-55**

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 1,41 in wrench,
- disconnect the suction line of the hydraulic pump with a 1,96 in wrench,
- disconnect the “low pressure line” duct with a 0,74 in wrench,
- disconnect the four flanges which connect the drive pump to the drive motor with a 0,31 in Allen wrench,
- disconnect the suction line of the service pump with a 0,31 in Allen wrench,
- disconnect the delivery line ducts of the hydraulic drive and the main valve with a 1,41 in wrench and a 0,94 in wrench.
- disconnect the load sensing signal line from the hydraulic drive with a 0,67 in 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 0,74 in 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 0,55 in 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.



8 Proceed in reverse order to re-assemble the hydrostatic pump.

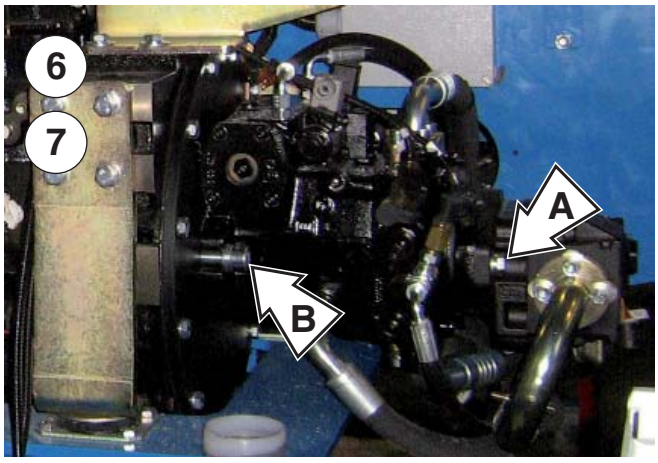


TABLE 005

Operation: **Disassembling the hydraulic motor**	*Table:* ***005*** **TH 19-55**	kg	44
			Hrs. / Min.
Bridge crane or swing hoist, payload 2000 lbs	**Standard tools**		2 / -
			1

Operation:

PROTECT THE ENVIRONMENT

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

CAUTION

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

1 Remove the central covers **A**-**B** of the machine by driving out all the bolts with two 0,51 in wrenches

2 Using a 1,41 in wrench and a 0,67 in wrench, disconnect the hoses

3 Disconnect the two delivery hoses with a 0,74 in wrench

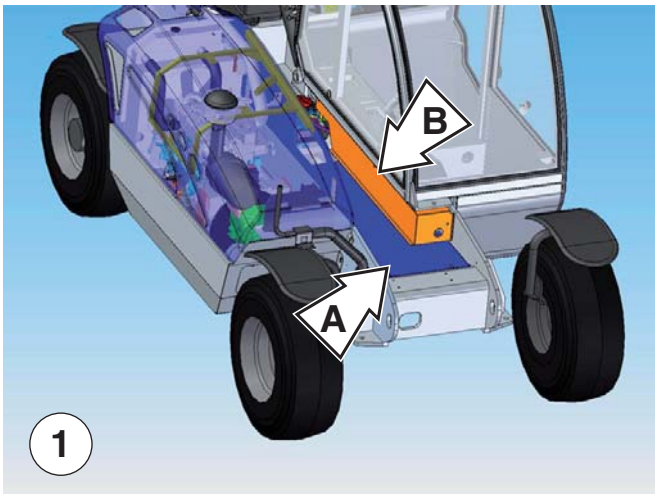


TABLE 005

Operation: **Disassembling the hydraulic motor**	*Table:* ***005*** **TH 19-55**

4 Remove the four locking screws of the motor with a 0,94 in 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

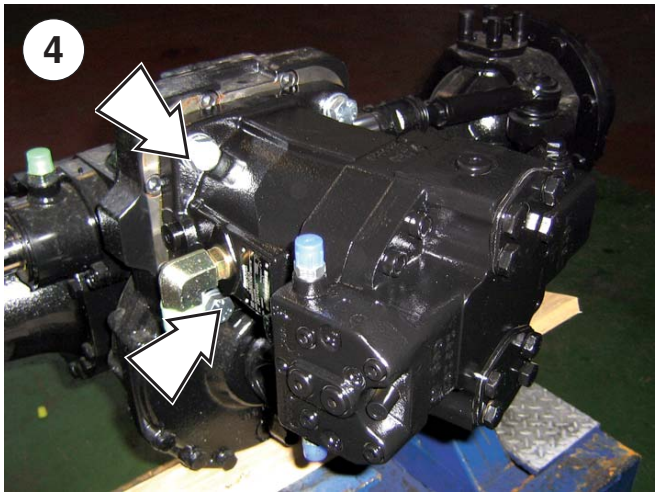


TABLE 006

Operation: **Cylinder disassembly** **Boom extension cylinder**	*Table:* ***006*** **TH 19-55**	kg	**92**
			Hrs. / **Min.**
Bridge crane, payload 2000 lbs **Textile bridles or chains with hooks**	**Standard tools**		**2** / **30**
			1

Operation:

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

2 With a 0,51 on 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

PROTECT THE ENVIRONMENT

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

6 With a 1,06 in wrench, disconnect the two hydraulic hoses from the blocking valve, then plug the disconnected connectors to prevent dust and impurities from entering the circuit.

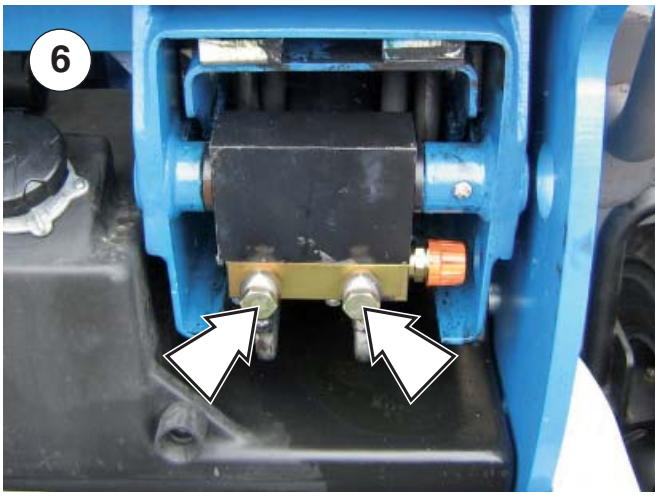
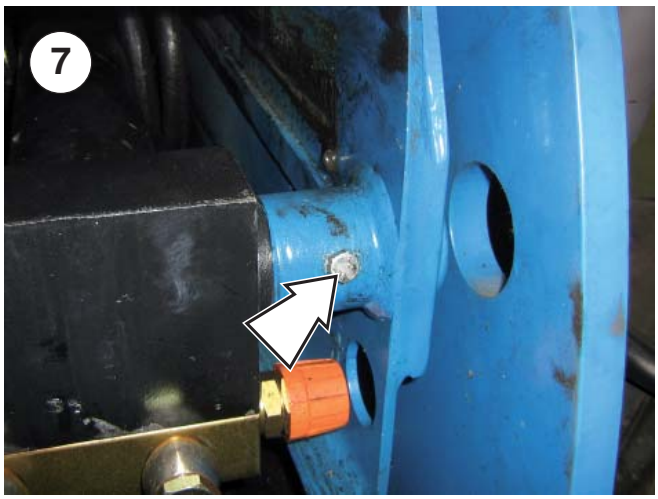


TABLE 006

Operation: **Cylinder disassembly** **Boom extension cylinder**	*Table:* ***006*** **TH 19-55**

7 Loosen and remove the screw fixing the cylinder pin (bottom side) with two 0,51 in 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



TABLE 007

Operation: **Water-oil cooler disassembly**	Table: ***007*** **TH 19-55**	kg	24
			Hrs. / Min.
	Standard tools		2 / -
			1

Operation:

PROTECT THE ENVIRONMENT

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

CAUTION

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

1 Empty the cooler opening the special cock

2 Disconnect the two inlet and outlet hoses from the cooler with a 1,41 in wrench

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

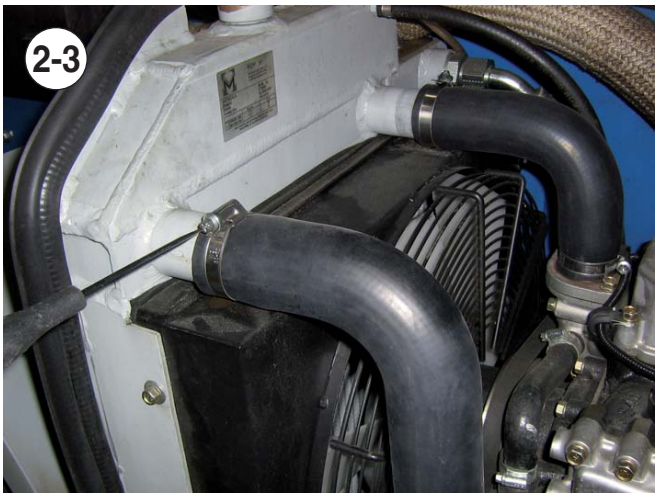


TABLE 007

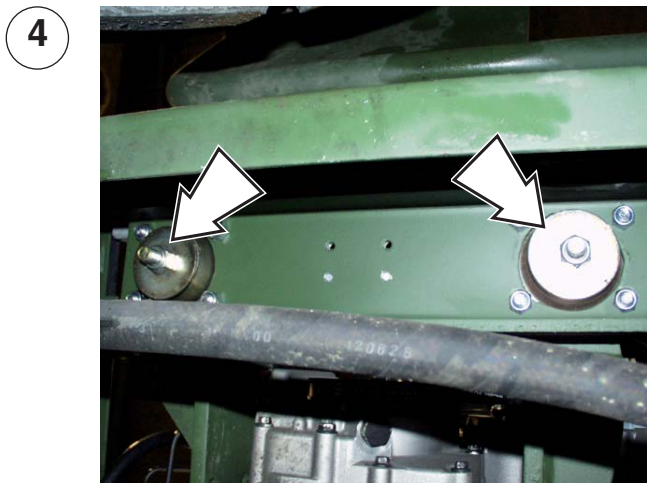
Operation: **Water-oil cooler disassembly**	*Table:* ***007*** **TH 19-55**

4 Remove the two screws of the vibration supports with a 0,86 in wrench

5 Remove the two screws which fix the radiator to the guard wall using a 0,51 in wrench

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

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



VIEW OF THE MACHINE FROM THE BOTTOM

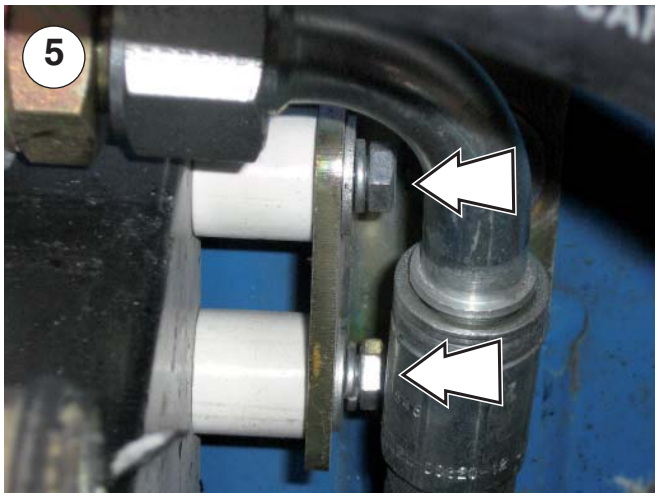


TABLE 008

Operation: **Main valve disassembly**	Table: ***008*** **TH 19-55**	kg	27
			Hrs. / Min.
	 **Standard tools**		2 / 30
			1



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



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.



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

TABLE 008

Operation: **Main valve disassembly**	*Table:* ***008*** **TH 19-55**

CAUTION

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



Operation:

1. Disconnect the delivery and return pipes with a 1,41 in wrench
2. Disconnect all users with a 0,94 in wrench
3. Disconnect all pilot systems with a 0,67 in wrench
4. Remove the 3 fixing screws with two 0,51 in wrenches (screw + lock nut)

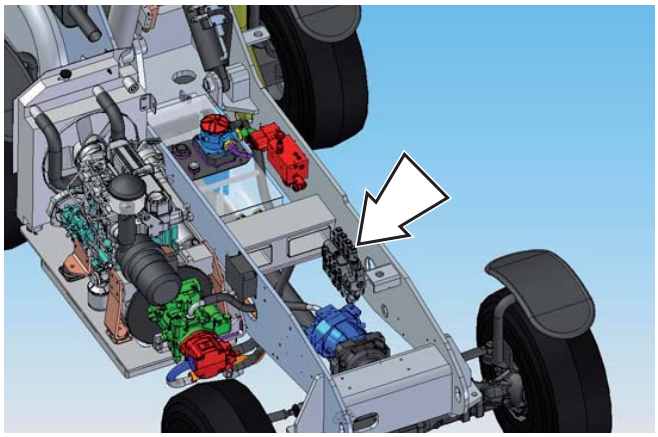


TABLE 009

Operation: **Renewing the slide pads of the telescopic boom**	Table: **009** TH 19-55	kg	-
		Hrs.	Min.
	Standard tools	1	30
			1

ADJUSTING THE PLAY WITH SHIMS

If the play between the boom sections is too great (0,078 in 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:

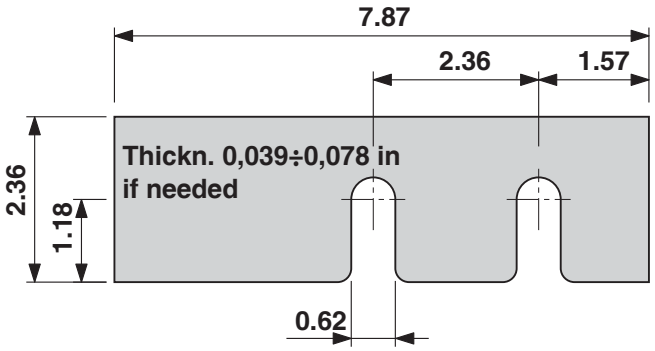
1 Lower the boom to the ground and ensure the telescope is fully retracted

2 With a thickness gauge, check the play of all pads.
After adjustment, the minimum play in the narrowest point must be: **0,019÷0,039 in**

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 0,51 in. For the remaining pads, the minimum thickness must never be less than 0,35 in

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

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



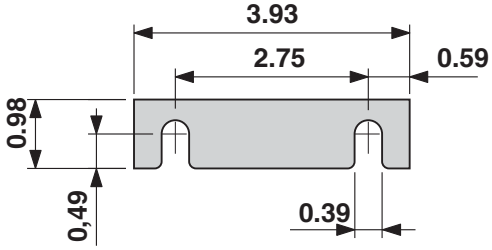
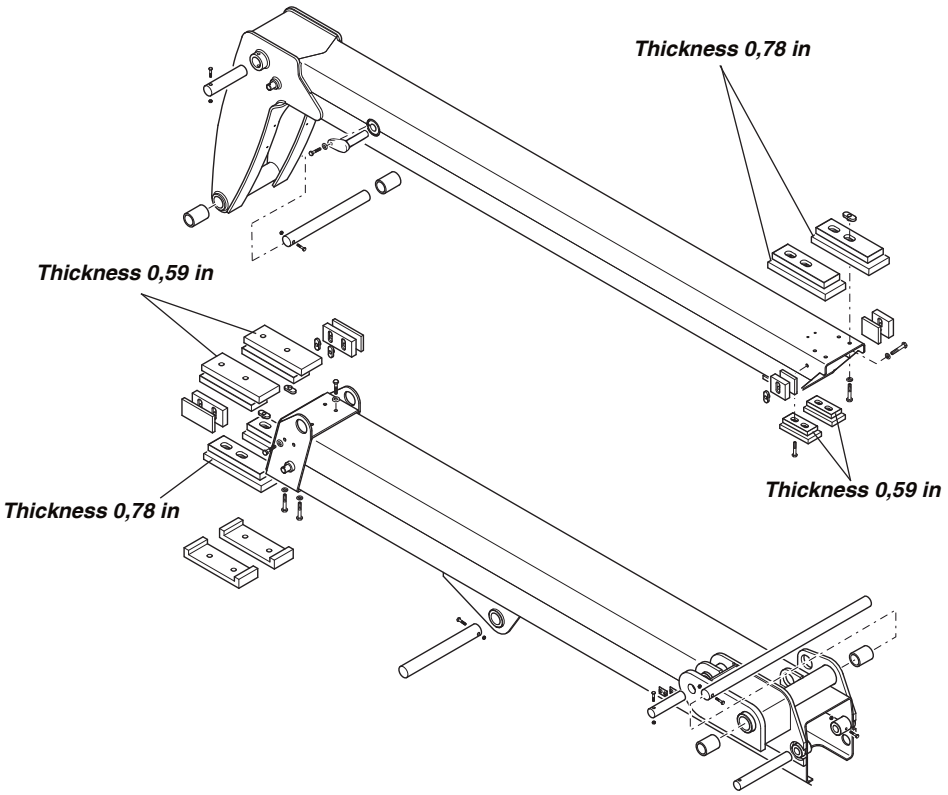


TABLE 009

Operation: **Renewing the slide pads of the telescopic boom**	*Table:* ***009*** **TH 19-55**

6 Refit the fixing screws (torque: 22÷25 lbf·ft) after pouring some Loctite 495 on their threads

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



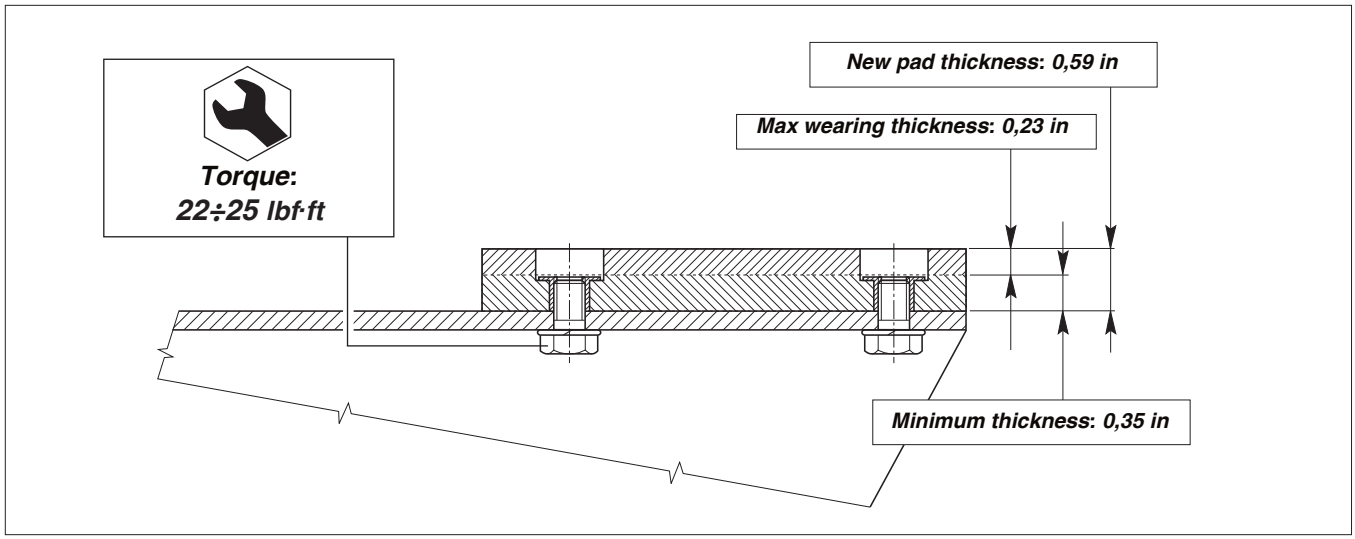


TABLE 009

Operation: **Renewing the slide pads of the telescopic boom**	Table: **009** TH 19-55

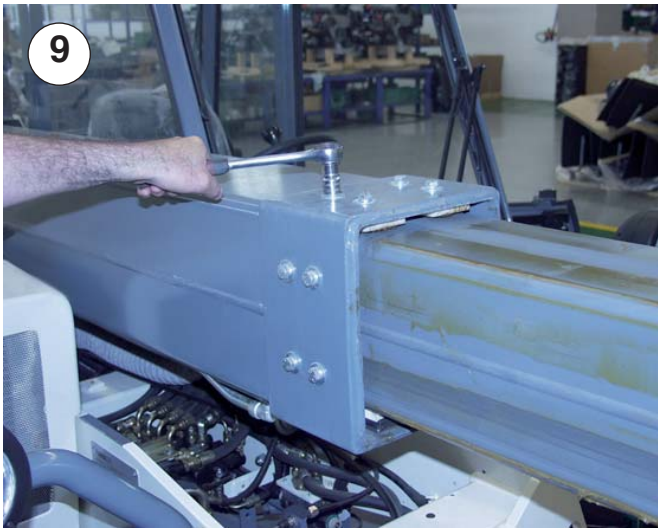
RENEWING THE PADS

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

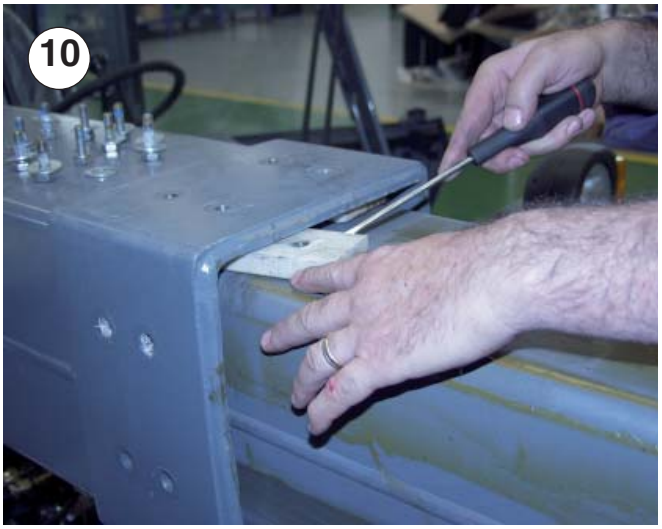
9 With a 0,67 in hexagonal wrench, remove the pad fixing screws

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 22÷25 lbf·ft.



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

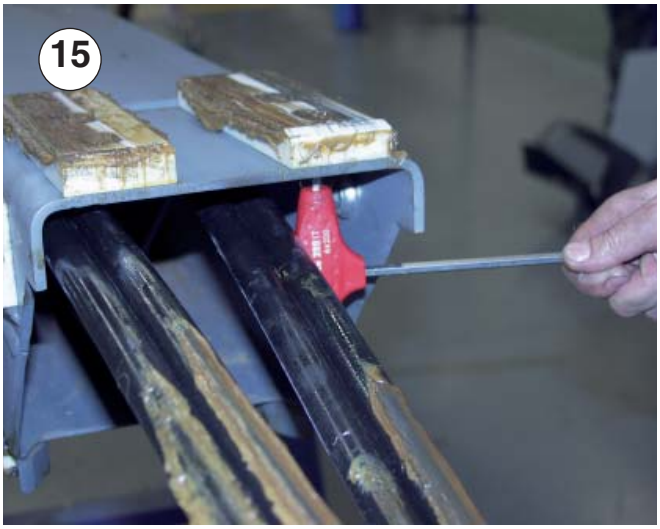
13 Remove the pin from the extension cylinder (rod side) - see table GTH5519 GTH5519-S-006. Move back with the machine slowly to extend about 0.2187227 yd of the telescope out of the fixed section

TABLE 009

Operation: **Renewing the slide pads of the telescopic boom**	*Table:* ***009*** **TH 19-55**

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 **+ 0,039 in** to **+ 0,059 in**

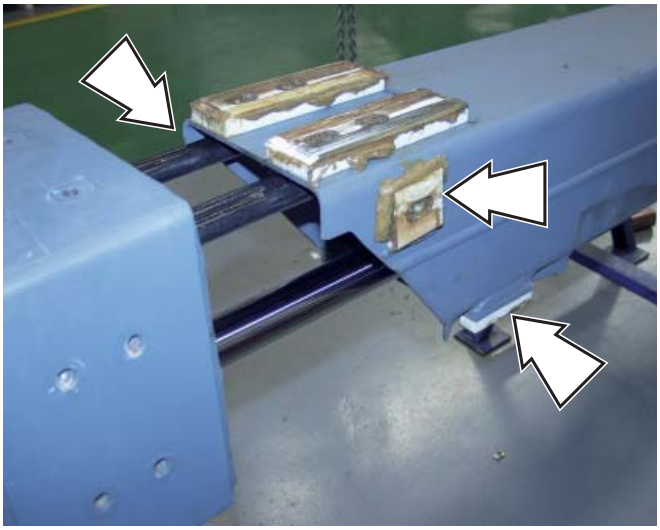
15 With a 0,23 in hexagonal wrench, remove the worn pads. Fit new pads after applying a few drops of Loctite 495 on the threads



CAUTION

Tighten the pad fixing screws to 22÷25 lbf·ft.

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.

TABLE 010

Operation: **Renewing the flexible hoses inside the boom**	Table: **010** TH 19-55	kg	-
		Hrs.	Min.
Standard tools		2	-
		2	

How to renew flexible hoses:

PROTECT THE ENVIRONMENT

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

CAUTION

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

DANGER

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

1 Before disconnecting or refitting a flexible hose, carefully clean the area all around.
2 Blow some compressed air to remove any impurity.
3 For an easier renewal of the hoses, whose run is not clearly visible, proceed as follows:
- remove the bracket **A** which secures the hoses to the second boom telescope
- disconnect the hose to be replaced from both sides
- attach a cord to the side of the hose which reaches the boom tip
- disconnect the hose from the rear side of the boom
- remove the hose pulling the cord until it comes out completely
- disconnect the cord and reconnect the same to the end of the new flexible hose making sure the hose has been previously plugged to prevent dirt from entering the circuit
- proceed in reverse order and re-assemble the hose.

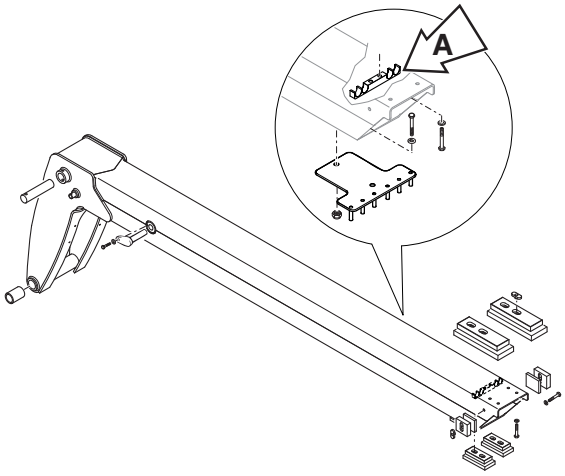


TABLE 010

Operation: **Renewing the flexible hoses inside the boom**	*Table:* ***010*** **TH 19-55**

Useful advice for mounting flexible hoses:

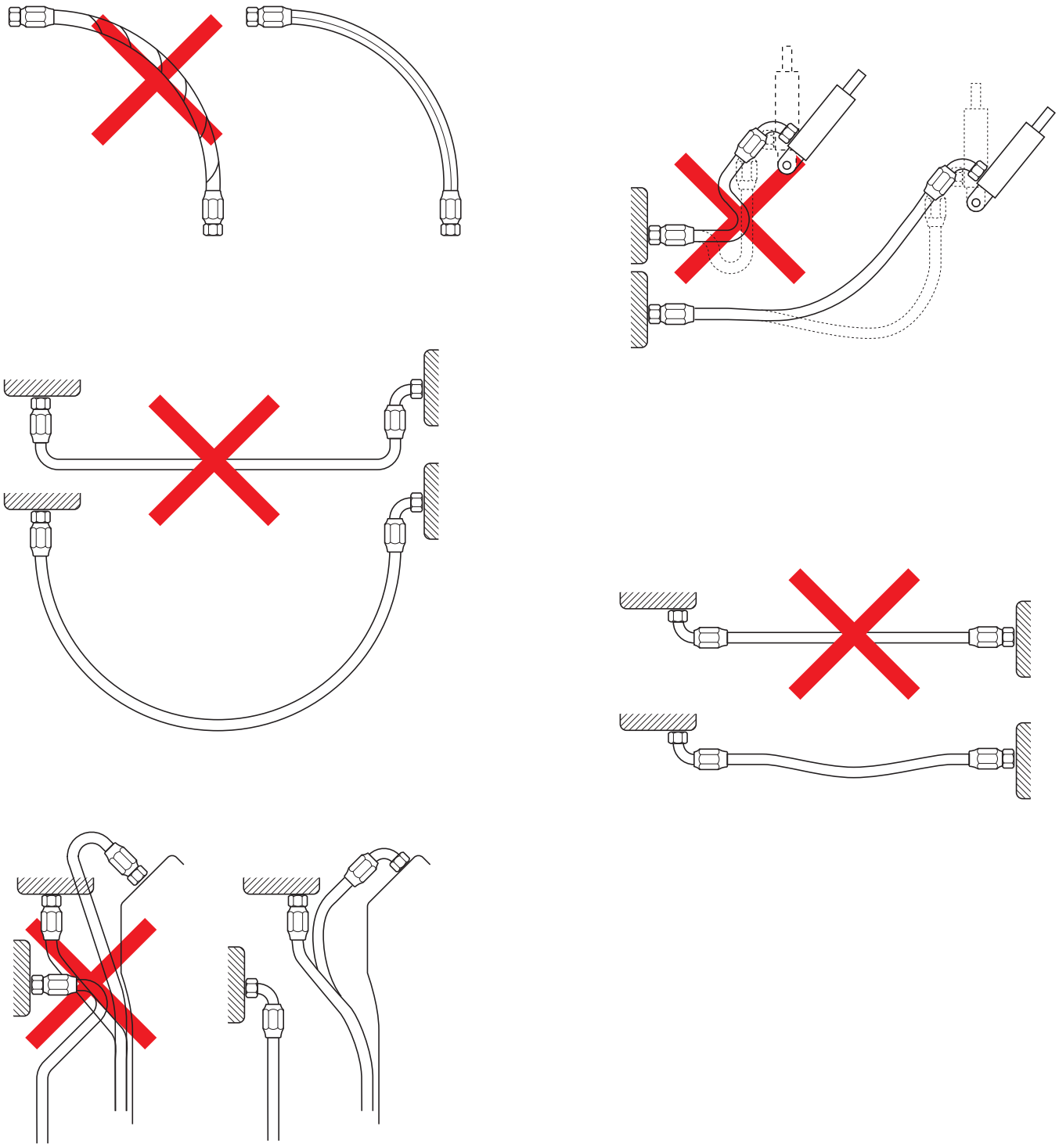


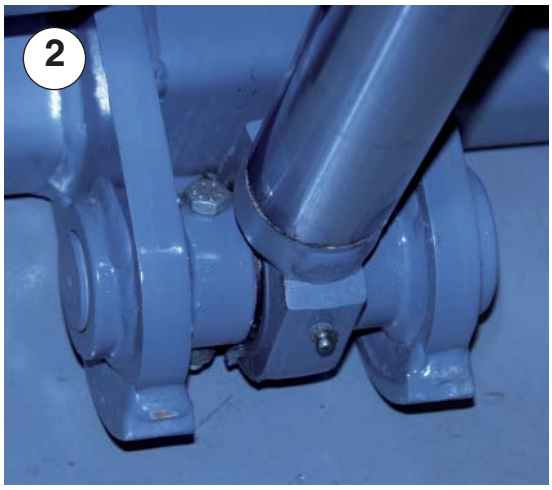
TABLE 011

Operation: **Cylinder disassembly** **Attachment rotation cylinder**	*Table:* ***011*** **TH 19-55**	kg	**36**
			Hrs. / **Min.** **2** / **00**
Bridge crane, payload 2000 lbs **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 0,67 in wrenches



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

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

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



6 Using a 0,51 in wrench, remove the protection cover from the valve of the attachment rotation cylinder



PROTECT THE ENVIRONMENT

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

TABLE 011

Operation: **Cylinder disassembly** **Attachment rotation cylinder**	*Table:* ***011*** **TH 19-55**

7 With a 0,94 in 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 0,67 in 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

