A TEREX COMPANY

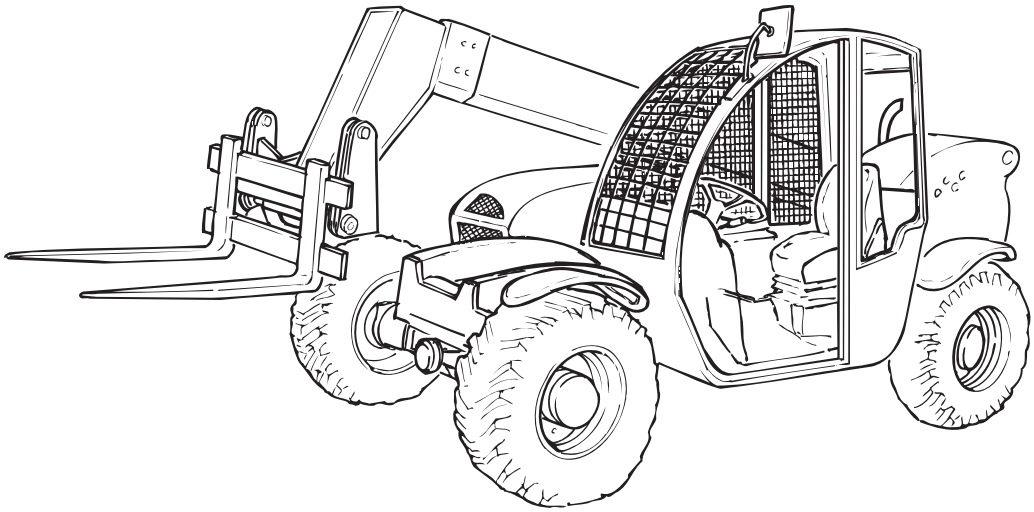
WORKSHOP MANUAL

Code 57.4401.2200 - 1st Edition 03/2006

Handler with telescopic boom

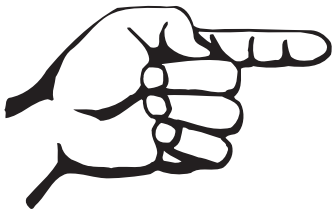
GTH 66-22 *(From serial n. 11982)*

GTH 66-22S *(From serial n. 10816)*



English
Edition

INDEX



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WORKSHOP MANUAL

Code 57.4401.2200 - 1st Edition 03/2006

Number: .....

Consigned to: .....

DECLARATION

I, the undersigned.....

declare that I have received the ***Workshop manual for GENIE lifts series GTH 66-22 • GTH 66-22S.***

Copies consigned: n° ..... on paper

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

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

Yours sincerely

Date .....

For acceptance

The consignee

Company stamp
and signature of the Legal representative

....

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

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LIST OF REVISED PAGES

Revision		Revised pages	Notes	Issued by
No.	Date			
1	03-2006		Publication	
2				
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Sect. 1 SAFETY RULES

Sect. 2 TECHNICAL SPECIFICATIONS

Sect. 3 SCHEDULED MAINTENANCE INSPECTIONS

Sect. 4 SCHEDULED MAINTENANCE PROCEDURES

Sect. 5 TROUBLESHOOTING

Sect. 6 SCHEMES

Sect. 7 REPAIR PROCEDURES

Machine denomination	Literature valid up to serial number
GTH 66-22	11982
GTH 66-22S	10816

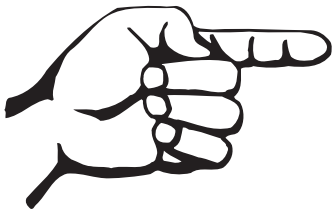
INTRODUCTION

Important
Read, understand and obey the safety rules and operating instructions in the GTH 66-22 • 66-22S Operator's Handbook before attempting any maintenance or repair procedure.
This manual provides the machine owner and user with detailed information on the scheduled maintenance. It also provided qualified service technicians with infromation on troubleshooting and repair procedures.
Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, as well as specific tools and equipment.
In these instances, we strongly recommend letting service and repair the machine at an authorized TEREXLIFT service center.

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Section 1
SAFETY INFORMATION

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1.1 SAFETY RULES

1.1-1 Personal Safety

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

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

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

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

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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

CAUTION

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

NOTICE

Draws the attention to important environment-related information.



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



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

1.1-2 Workplace Safety



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



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



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



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



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



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

1.2 GENERAL REMARKS

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

CAUTION

If you recognise hazardous situations, you can prevent accidents!

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

⚠CAUTION

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

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

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

CAUTION

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

1.3 SERVICEMEN'S REQUISITES

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

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

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

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

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

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

CAUTION

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

CAUTION

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

1.3-1 PERSONAL PROTECTIVE EQUIPMENT

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

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

CAUTION

Use only type-approved protective equipment in good condition.

1.4 SAFETY PRECAUTIONS

⚠DANGER

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

1.4-1 WORKING AREA

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

1.4-2 PRECAUTIONS DURING WORK

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

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

⚠ DANGER

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

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

NOTICE

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

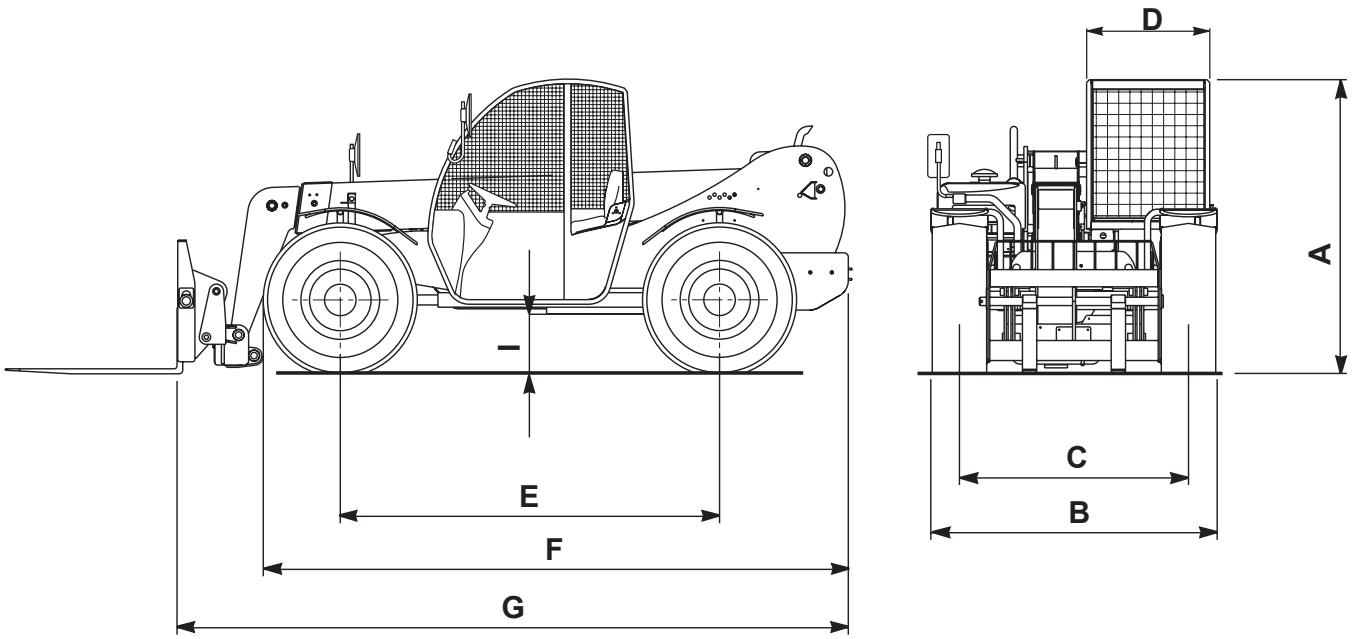
- Use the assistance of a second person to handle loads weighing 30 to 50 kg.
- For loads over 50 kg, the use of special hoisting equipment in good condition and equipped as per enforced regulations is mandatory.

Section 2
TECHNICAL SPECIFICATIONS

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2.1 MAIN DIMENSIONS



			GTH 66-22 • GTH 66-22S
A	Overall height	ft	6' - 9"
B	Overall width	ft	6' - 7"
C	Track	ft	5' - 3"
D	Cab width	ft	2' - 10"
E	Wheel-base	ft	8' - 8"
F	Length to the front tyres	ft	13' - 5"
G	Length to the attachment holding plate	ft	15' - 5"
I	Ground clearance	ft	1' - 4"
•	Internal steering radius	ft	7' - 2"
•	External steering radius	ft	13' - 3"

2.2 TYRES

		GTH 66-22 • GTH 66-22S	
		Standard	**Optional**
- Dimensions		405/70 R24	400/70 R20
- P. R. (or load index)		14 pr	-
- Wheel disc		8 holes DIN 70361	8 holes DIN 70361
- Pressure	bar	4.0	-
- Pressure	Psi	58	-

2.3 LIMIT OF USE

			GTH 66-22 • GTH 66-22S
•	Angle of approach	°	90
•	Departure angle	°	42
•	Ambient temperature	°C	-20÷+40

2.4 WEIGHT

			GTH 66-22 • GTH 66-22S
•	Weight in working order	lb	13245

2.5 SPEED

			GTH 66-22 • GTH 66-22S
•	Travel speed	km/h	0÷32
•	Max. slope with full load	%	60
•	Traction to the dynamometer	lb	13007

2.6 PAYLOAD AND REACH

			GTH 66-22 • GTH 66-22S
•	Max lifting height	ft	22' - 6"
•	Reach at max height	ft	2' - 8"
•	Max reach forward	ft	12' - 6"
•	Attachment holding plate rotation	°	135
•	Maximum payload	lb	6600
•	Payload at max height	lb	5500
•	Payload at max reach	lb	2700

2.7 FORKS (floating type)

			GTH 66-22 • GTH 66-22S
•	Dimensions	in	5.1"x1.8"x47.2"
•	Weight	lb	165+165
•	Fork holding frame - class		FEM II A

2.8 DIESEL ENGINE

			GTH 66-22 • GTH 66-22S
•	Make		DEUTZ AG
•	Model/Type		BF4M 2011
•	Features		Diesel 4 cylinders in line 4 strokes direct injection
•	Bore x Stroke	in	3.7" x 4.41"
•	Total displacement	cu in	189.65
•	Power at 2500 rpm (ISO 3046 IFN)	kW	60

2.9 ELECTRICAL SYSTEM

			GTH 66-22 • GTH 66-22S
•	Voltage	V	12
•	Battery	Ah	100

2.10 MACHINE SOUND LEVELS

			GTH 66-22 • GTH 66-22S
•	Guaranteed sound power level (in accordance with the Directive 2000/14/CE)	dB	Lwa = -
•	Measured sound pressure level (in accordance with the Directive 98/37/CE)	dB	Lpa = -

2.11 VIBRATION LEVELS

			GTH 66-22 • GTH 66-22S
•	Mean assessed vibration level transmitted to arms	m/s^2	< 2.5
•	Mean assessed vibration level transmitted to body	m/s^2	< 0.5

Values calculated in accordance with standard prEN13059

CAUTION

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

2.12 REFUELLING

			GTH 66-22 • GTH 66-22S
•	Diesel engine	l	11+3,5
•	Fuel tank	l	92
•	Hydraulic oil tank	l	90
•	Front differential gear with reduction gear	l	6
•	Rear differential gear	l	5
•	Front wheel reduction gears	l	1,5 + 1,5
•	Rear wheel reduction gears	l	0.7 + 0.7
•	Brake oil tank	l	0.1

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

2.13 TIGHTENING TORQUES

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

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

2.14 DRILL DIAMETERS FOR THREADS

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

2.15 STANDARD TIGHTENING TORQUES FOR FITTING SEALS

■ 60° CONICAL SEALS

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

■ FRONT O-LOK (Parker) SEALS

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

■ 37° COUNTER-SUNK CONICAL SEALS (JIC)

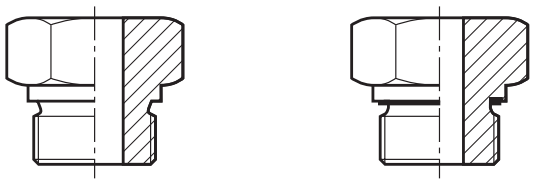
Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	37° CONICAL SEALS (JIC) Nm
7/16"-20	M10x1	15
1/2"-20	M12x1.5	20
9/16"-18	M14x1.5	28
	M16x1.5	62
3/4"-16	M18x1.5	62
7/8"-14	M22x1.5	80
1.1/16"-12	M27x2	110
1.3/16"-12		141
1.5/16"-12	M33x2	160
1.5/8"-12	M42x2	225
1.7/8"-12	M48x2	270
2.1/4"-12	M10x1	360

■ SEALS WITH GRIP-RING

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

■ FITTING ASSEMBLY

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



A B

A Male face
Mechanical seal or copper washer

B Male face
Soft seal with O-ring

2.16 LOCKING MATERIAL

THREAD LOCKERS

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

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

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

GASKETS *Total sealing in 24-72 hours*

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

2.17 HOISTING INSTRUCTIONS

⚠ DANGER

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

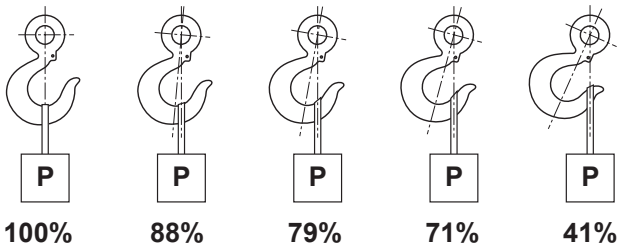
Before removing parts of the machine, make sure that:
- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

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

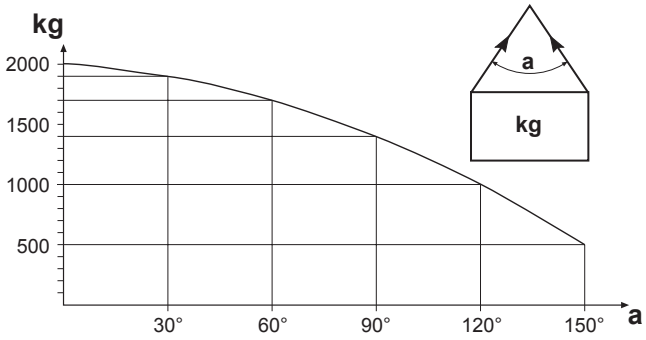
STRANDED ROPES	
Rope diameter mm	Max admissible load kg
10	1000
11.2	1400
12.5	1600
14	2200
16	2800
18	3600
20	4400
22.4	5600
30	10000
40	18000
50	28000
60	40000

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

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



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



2.18 ADVICE TO RENEW FLEXIBLE HOSES

NOTICE

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

CAUTION

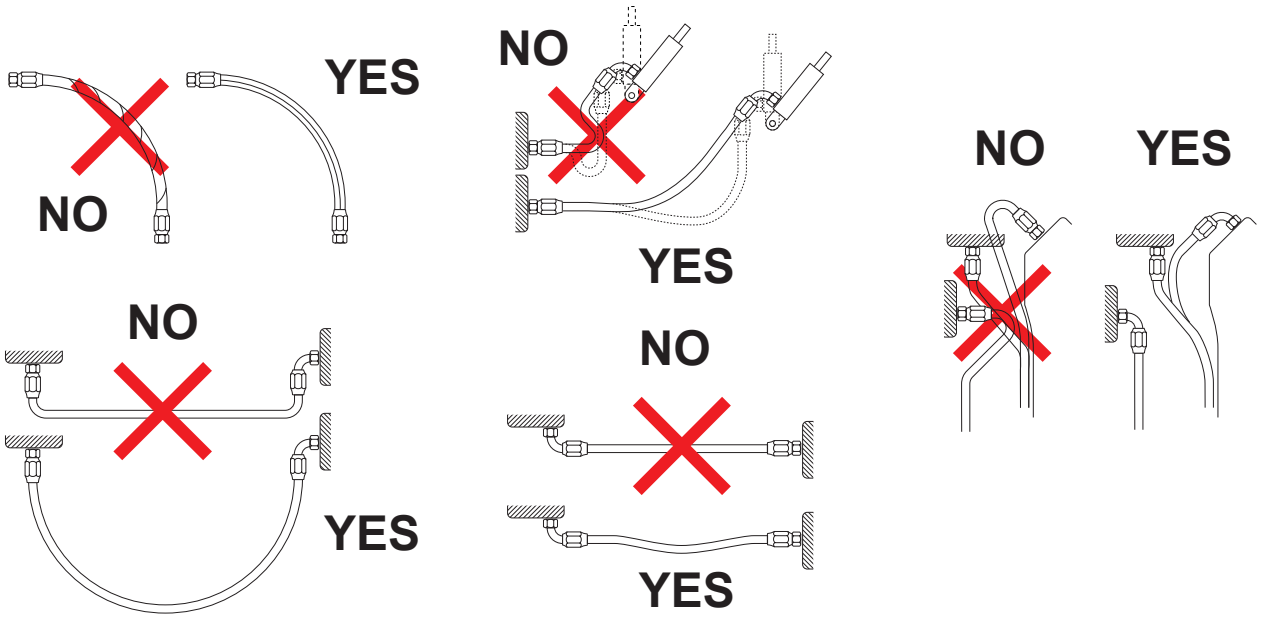
Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

⚠DANGER

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

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

Useful advice for mounting flexible hoses:



2.19 LISTS OF RECOMMENDED SPARE PARTS

GTH 66-22 • 66-22S

Code	Description	Q.ty
07.0704.0133	Control lever	1
07.0704.0118	Red pushbutton cap	1
07.0704.0117	Push button	1
07.0704.0119	Yellow pushbutton cap	1
07.0704.0143	Solenoid	1
07.0703.0472	Starting switch	1
641052	Indicator	1
07.0703.0456	Indicator	1
07.0703.0479	Speed lever	1
07.0703.0476	Switch	1
09.4610.0003	Driving mirror	1
640985	Heater	1
07.0723.0193	Tap	1
09.0803.0244	Lock	1
09.4610.0011	Cylinder	1
09.4661.0010	Plug	1
56.0013.0001	Fuel level indicator	1
02.0117.0101	Grease nipple	2
54.0702.0013	Sliding guide	2
54.0201.0009	Bushing	2
54.0200.0001		6
54.0200.0000	Bushing	4
54.0702.0001	Sliding guide	2
54.0702.0002	Sliding guide	2
54.0702.0005	Sliding guide	2
07.0738.0002	Star wheel	1
641124	Elastic joint	1
09.0804.0900	Elastic joint	1
09.4670.0002	Insulator	2
09.0805.0058	Rubber hose	1
09.0805.0057	Rubber hose	1
53.3001.1100	Manifold	1
53.3001.1000	Manifold	1
09.4645.0024	Cable	1
07.4529.0033	Gasket kit	1
07.0728.0005	Solenoid	1
640636	Gasket kit	1
05.0400.0011	Flexible hose	1
632696	Solenoid	1
992989	Gasket kit	1
09.4661.0014	Plug	1
07.0701.0007	Solenoid	1
06.0401.0214	Seal	4
04.4229.0035	Flexible hose	1
06.0401.0219	Seal	4
04.4229.0034	Flexible hose	1
07.0704.0128	Solenoid	1
639395	Gasket kit	1
04.0605.0248	Flexible hose	1
639992	Gasket kit	1

Code	Description	Q.ty
07.0721.0019	Ball joint	1
07.4529.0091	Gasket kit	1
07.0705.0082	Gasket kit	1
54.0201.0008	Bushing	2
640096	Gasket kit	1
54.0201.0011	Bushing	2
639993	Gasket kit	1
04.0605.0249	Flexible hose	1
07.0703.0096	Removing battery	1
07.4501.0059	Relay	1
07.0703.0061	Fuse 70 A	2
07.0703.0060	Fuse 50 A	2
07.0703.0178	Relay	1
07.0703.0081	Fuse 2 A	5
07.0703.0080	Fuse 5 A	5
634972	Fuse 7,5 A	5
07.0703.0079	Fuse 10 A	5
634973	Fuse 15 A	5
07.0703.0179	Relay	1
07.0709.0117	Wheel stud	8
017.0709.0118	Nut	8
56.0013.0015	Proximity switch	1
07.0709.0417	Gasket kit	1
07.0723.0288	Glass	1
07.0703.0088	Switch	1
07.0723.0144	Handle lock	1
641019	Handle	1
07.0723.0188	Lock	1
07.0723.0140	Stop belt	1
07.0723.0219	Glass	1
07.0723.0221	Wiper motor	1
07.0723.0036	Wiper arm	1
07.0723.0037	Wiper blade	1

GTH 66-22 • 66-22S filters

Code	Description	Q.ty
07.0723.0149	Filter	2
07.4501.0067	Oil filter	2
07.4501.0068	Fuel filter	2
640885	Cartridge	2
07.4501.0041	Cartridge	2
09.4604.0004	Filter	2
07.0700.0000	Filter cartridge	2

2.20 MACHINE PAINT COLOUR

GENIE machines

Up to serial number 14440:

BLU MERCEDES 5928

From serial number 14441 (GTH 66-22) and 14180 (GTH 66-22S):

BLU GENIE

GRIGIO GENIE

NERO RAL 9500

2.21 CHECKING THE CYLINDER MOVEMENT TIMES

CAUTION

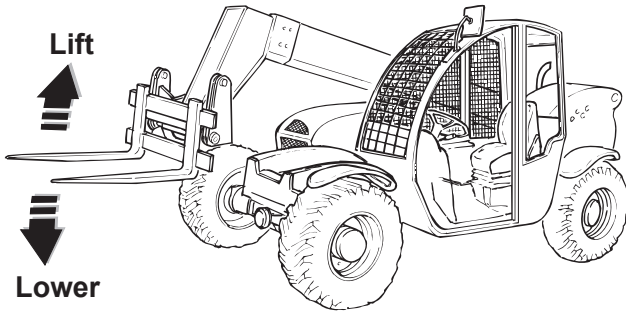
The check of the movement times of the cylinders shall be done with the hydraulic oil at a temperature of 60°.

CAUTION

To check the engine speed, the area easy to reach is the external pulley of the output shaft.

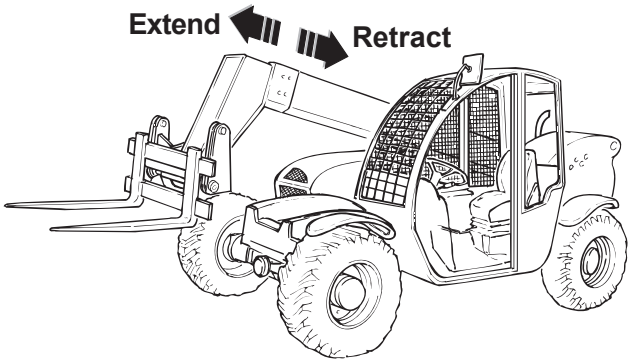
BOOM LIFTING/LOWERING

GTH 66-22 • 66-22S	Time (s)	
	up	down
Max engine speed	9”	7”
Min. engine speed	24”	17”



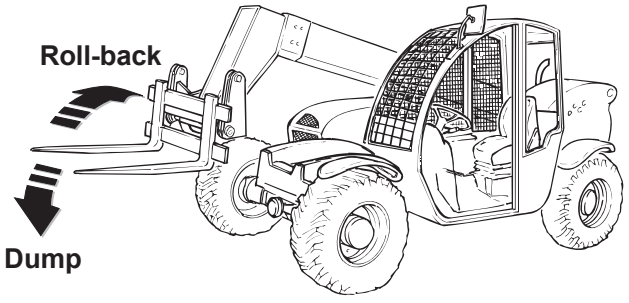
BOOM EXTENSION/RETRACTION

GTH 66-22 • 66-22S	Time (s)	
	out	in
Max engine speed	11”	7”
Min. engine speed	24”	12”



ATTACHMENT DUMPING

GTH 66-22 • 66-22S	Time (s)	
	dumping	roll-back
Max engine speed	4”	5”
Min. engine speed	8”	12”



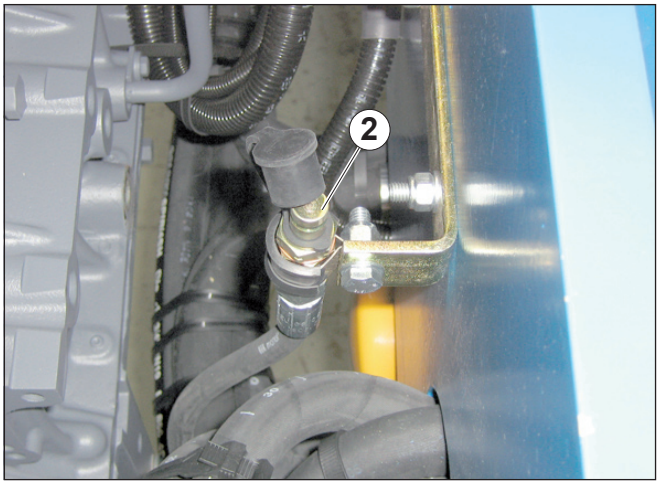
2.22 HYDRAULIC SETTINGS

1. PRELIMINARY OPERATIONS

Warm up the hydraulic oil to 80°C by keeping one of the elements of the boom main valve to full stroke under pressure.
To reach this temperature in a faster way, cover the oil core of the radiator with a carton in the case of a water-oil combined cooler, or the oil radiator if the machine is equipped with a separate oil radiator.

2. CALIBRATING THE BOOM MAIN VALVE

Find the mini-socket for the pressure gauge **ref. 2** on the **Walvoil** main valve (see **annex 5**).



2.1 CALIBRATING THE MAIN VALVE PRESSURE CONTROL VALVE

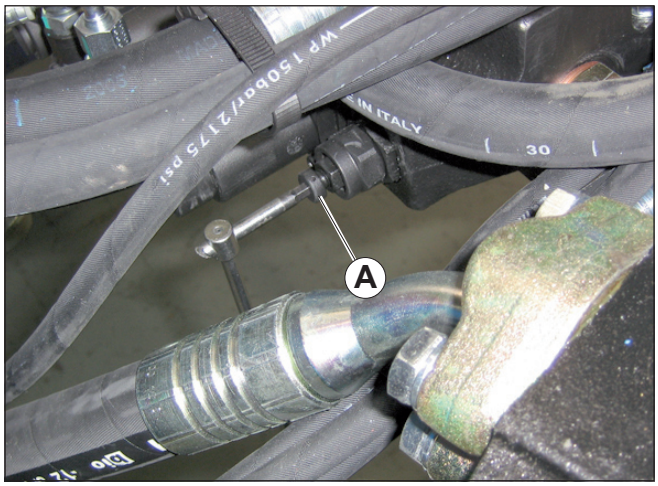
Connect a 0-400 bar manometer to the mini-socket **ref. 2**. Fully raise the boom to end of stroke operating joystick **ref. 1**.
Set valve **A** (see **annex 5**) at 285 bar with the Diesel engine running at max speed.
To calibrate the safety valves **B** (see **annex 5**), proceed as follows:

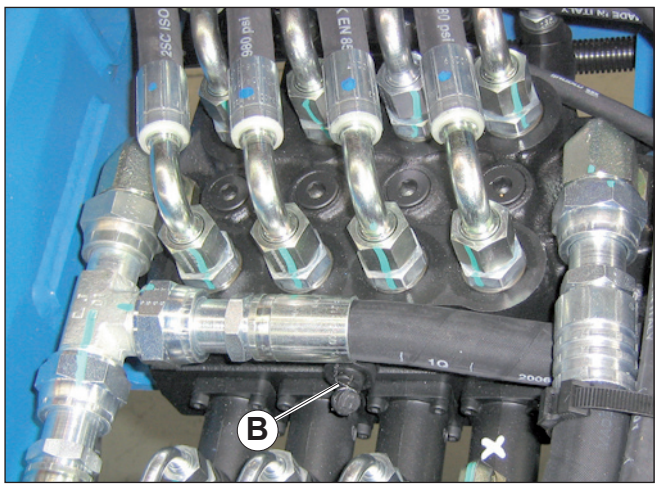
- Connect a 0-400 bar manometer to the mini-socket **ref. 2**.
- Increase the pressure of valve **A** of the main valve to 295 bar moving the lifting cylinder to end of stroke (fully out).
- With the engine running at maximum speed, tilt the forks to one direction by means of the joystick and act on one of the two valves **B** until reaching a pressure of 295 bar.
- Adjust the second valve **B** (295 bar) by pitching the forks back.

CAUTION

Safety valves B are calibrated by the manufacturer Walvoil and are supplied with a lead seal.
Proceed with the operations mentioned above to check the correct calibration or in case of troubles.

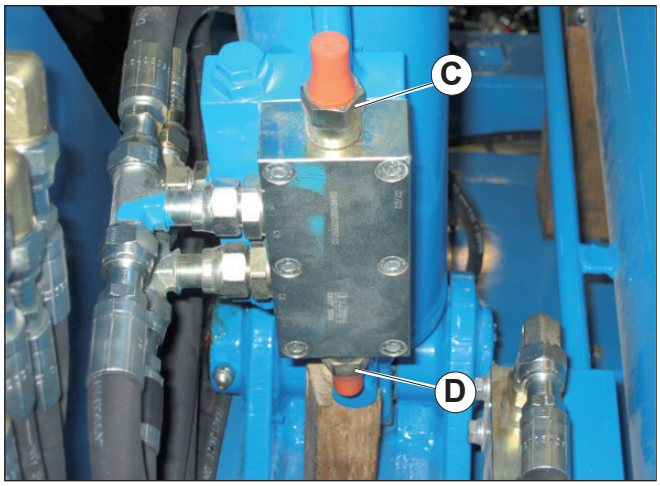
- When both fork inclination valves have been calibrated, reset the pressure control valve to 285 bar by adjusting the adjustment screw **A**.





3. CALIBRATING THE BLOCK VALVES OF THE FORK BALANCE CYLINDER (annexes 4)

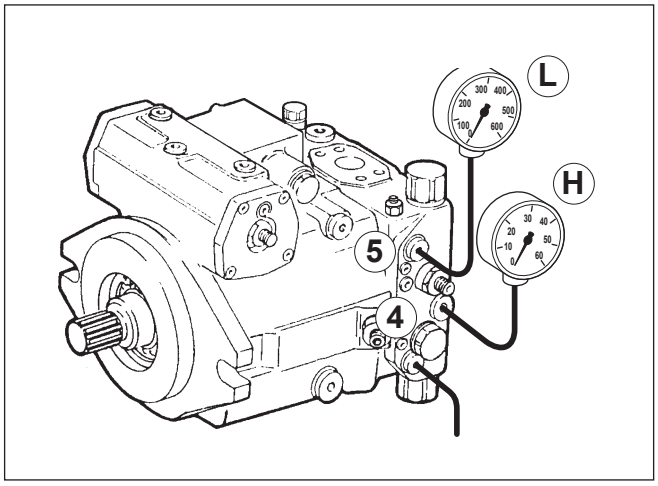
- Loosen the lock nuts of the two valves **C** - **D** and tighten the two registers.
- Re-loosen of one turn and a half both valves and re-tighten the lock nuts.



4. SETTING THE HYDROMATIK PUMP HYDROSTATIC TRANSMISSION

Do the calibration of the hydrostatic transmission with the hydraulic oil at 80°C.

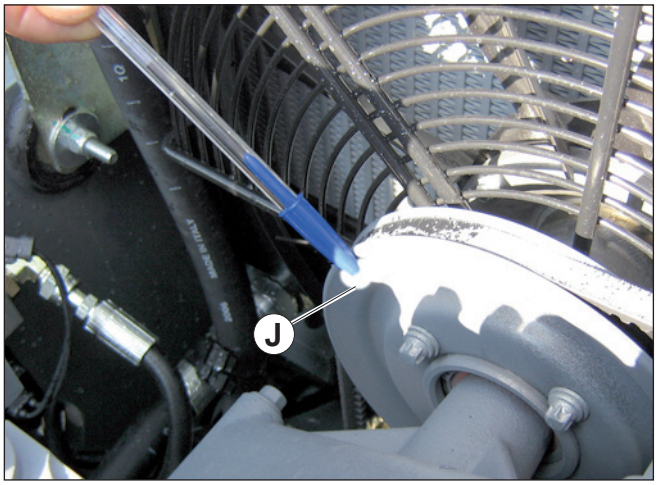
- Connect a 0-60 bar manometer **H** to the mini-socket **ref. 4** to read the boost pressure value.
- Connect a 0-600 bar manometer **L** to the mini-socket **ref. 5** to read the high-pressure value.



⚠WARNING

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

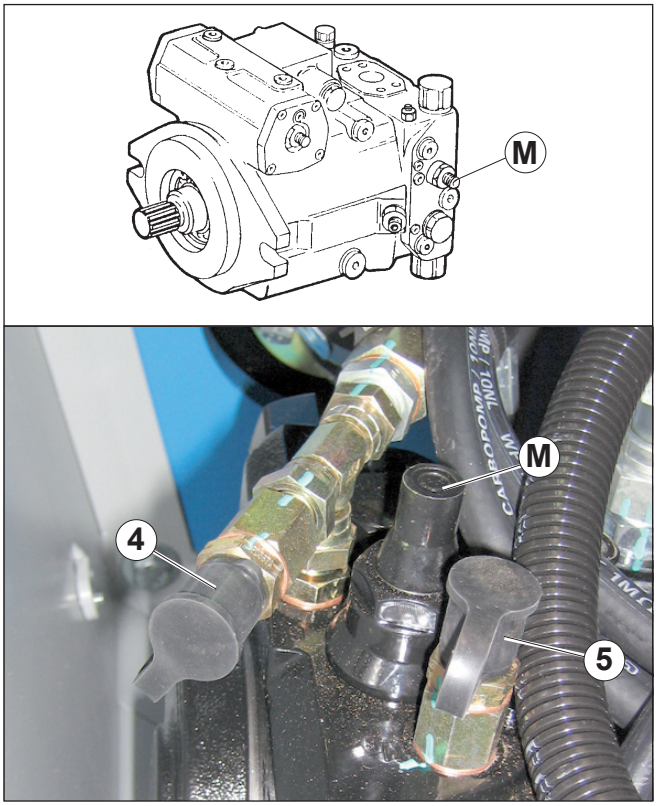
- Hold the selector to neutral position and make sure the maximum speed of the engine does not exceed 2500 rpm. The engine must run at a idle speed of 950 rpm measured on the radiator fan **J**. Otherwise, adjust the minimum speed.



- Read the boost pressure on manometer **H** and ensure it is about 26/28 bar with the engine running at idle speed.
  The boost pressure has not a fixed value but varies from pump to pump.
  Note: In older pump models, it was possible to adjust this value by means of a register.
- Put in the forward or reverse gear.
- Operate the negative brake by pressing the relevant button in the cab, then remove the electric connector **Y** (see **annex 2**).

STARTING THE CALIBRATION

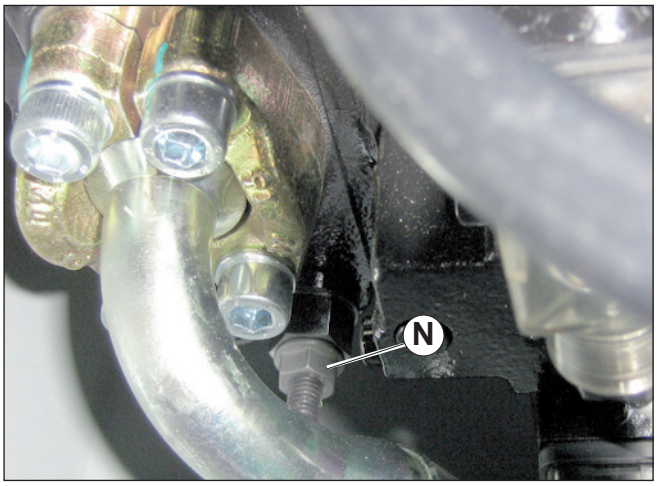
- Set the forward-neutral-reverse selector to the forward position.
- Run the engine at 1200 rpm. Check the value on the tachometer.
- Adjust shutter **M** by means of the register until reading a value of 50 bar on the high-pressure manometer **L**.

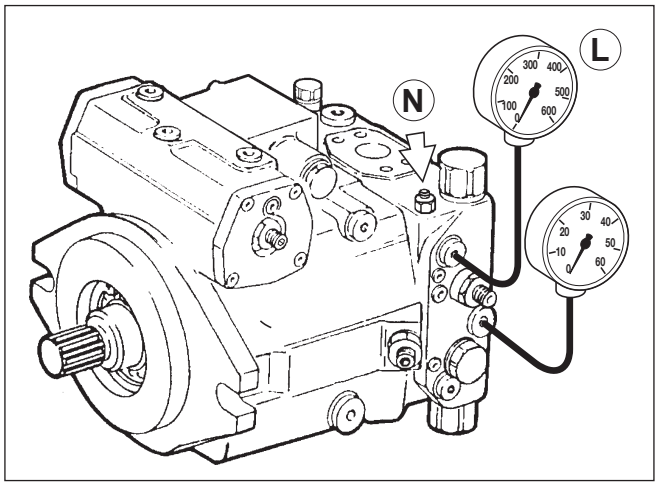


4.1 CALIBRATION OF THE MAXIMUM PRESSURE

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. If this value is less than 430 bar, increase the pressure to 430 bar by means of the pressure cut-off valve **N**.
- Remove the manometers and do an attempt.

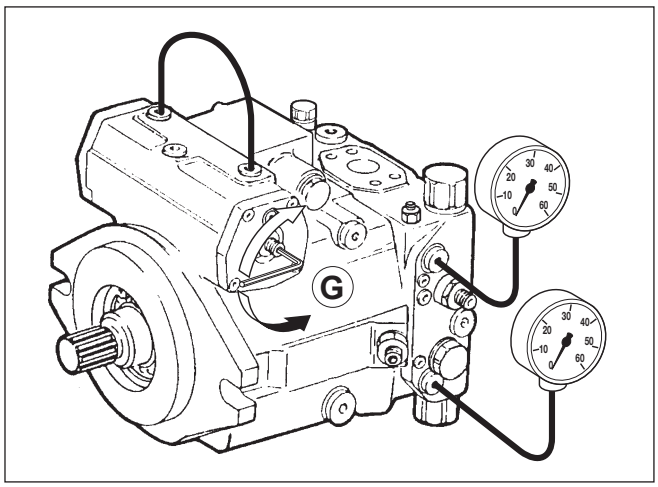




4.2 CALIBRATION OF THE MECHANICAL ZERO

The calibration of the mechanical zero **G** is required if the machine is set to neutral position with the forward-reverse speed lever.

- Set the forward-neutral-reverse selector to neutral position.
- With the engine running at idle speed, adjust the mechanical zero screw by rotating it until the high-pressure manometer reads the same value measured by the boost pressure manometer.

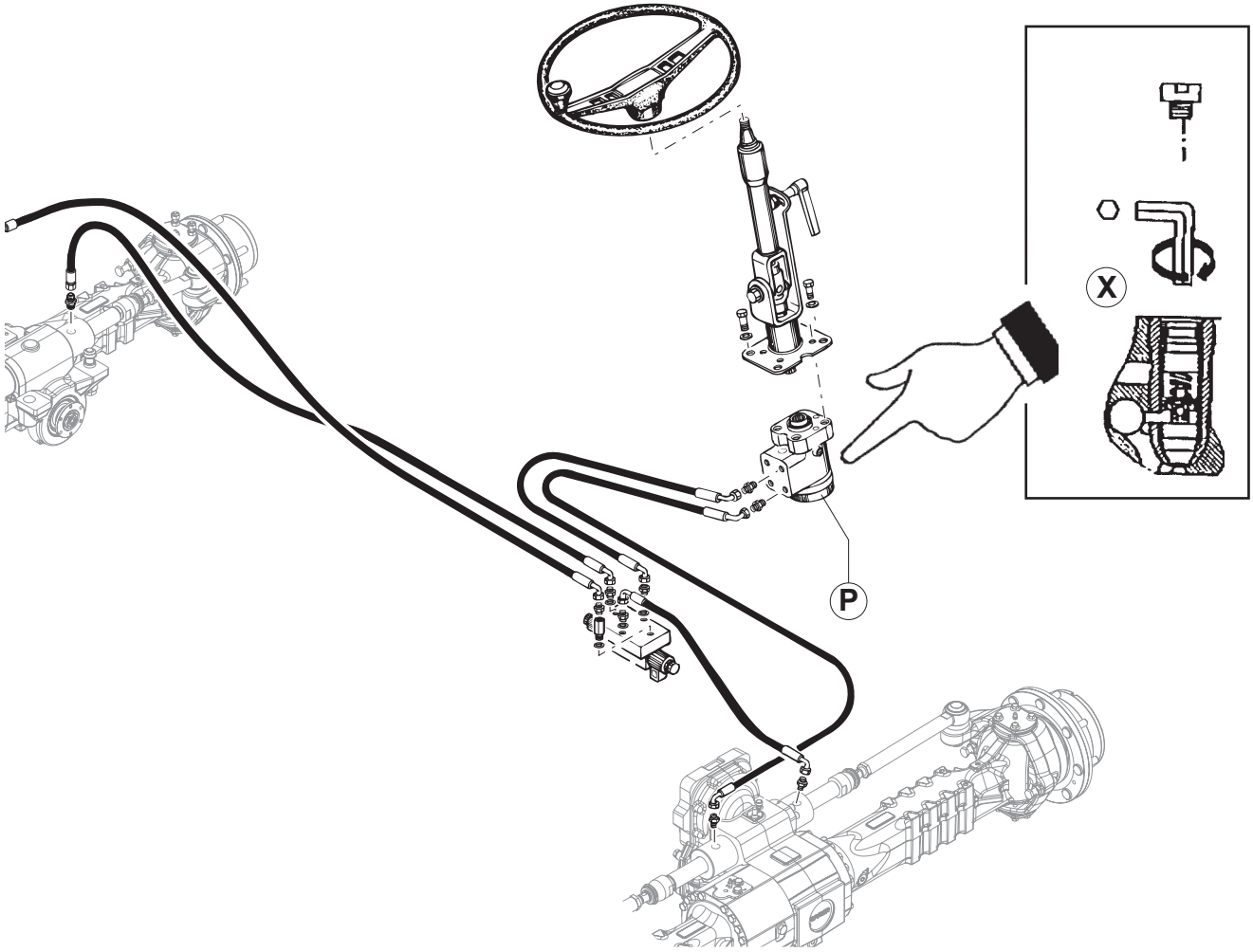


5. CALIBRATING THE POWER STEERING

- Connect a 0-250 bar manometer to position **Z** (see **Annex 1**).
- Select the front axle steering mode.
- Move the steering cylinder to stroke end and make sure the value of the power steering **P** (see **annex 1**) is 170 bar. If the value is less, tighten valve **X**; if the value is greater, loosen the valve.

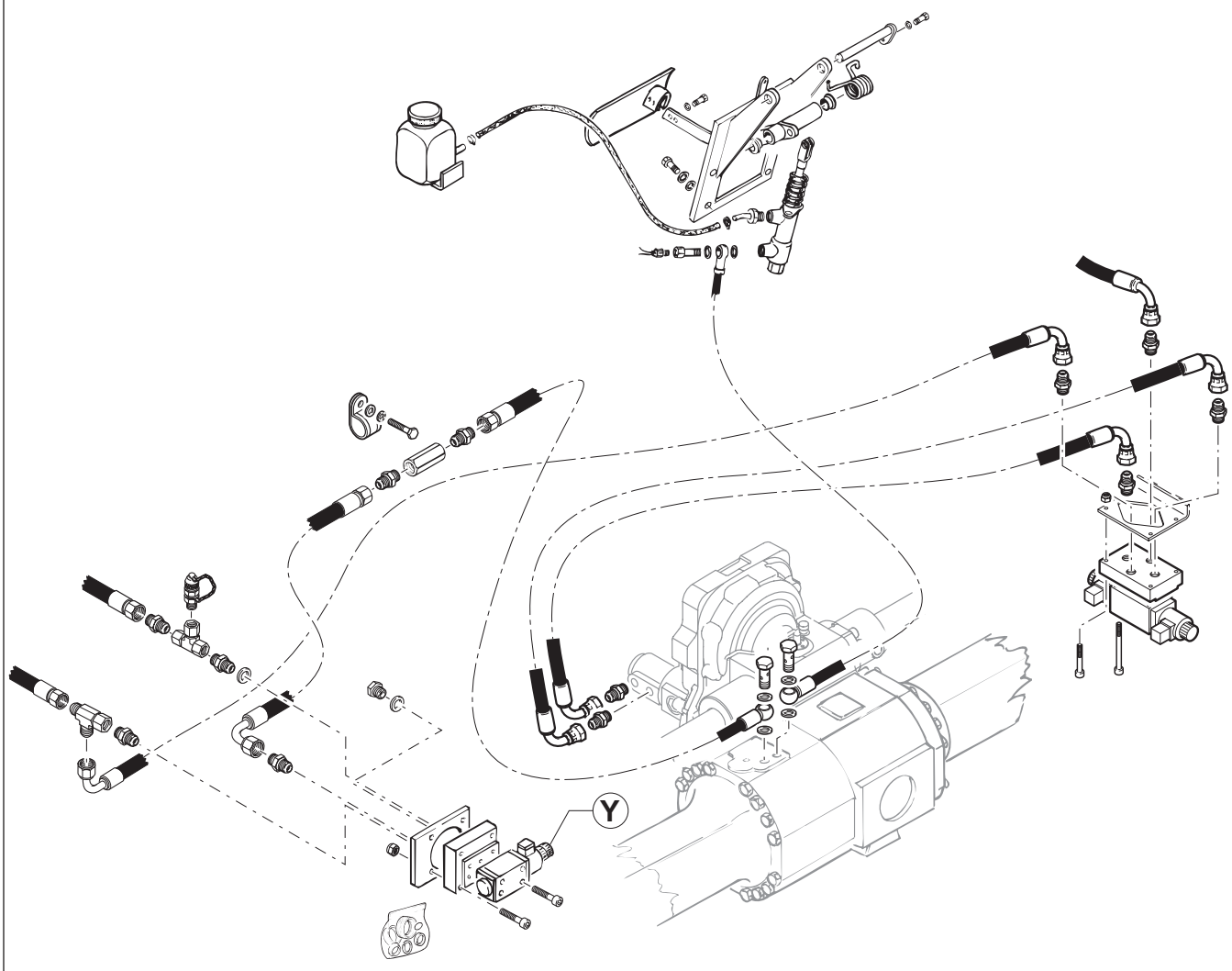
  Note: To gain access to valve **X**, remove the protection cap (see **annex 1**).

POWER STEERING SYSTEM	annex 1



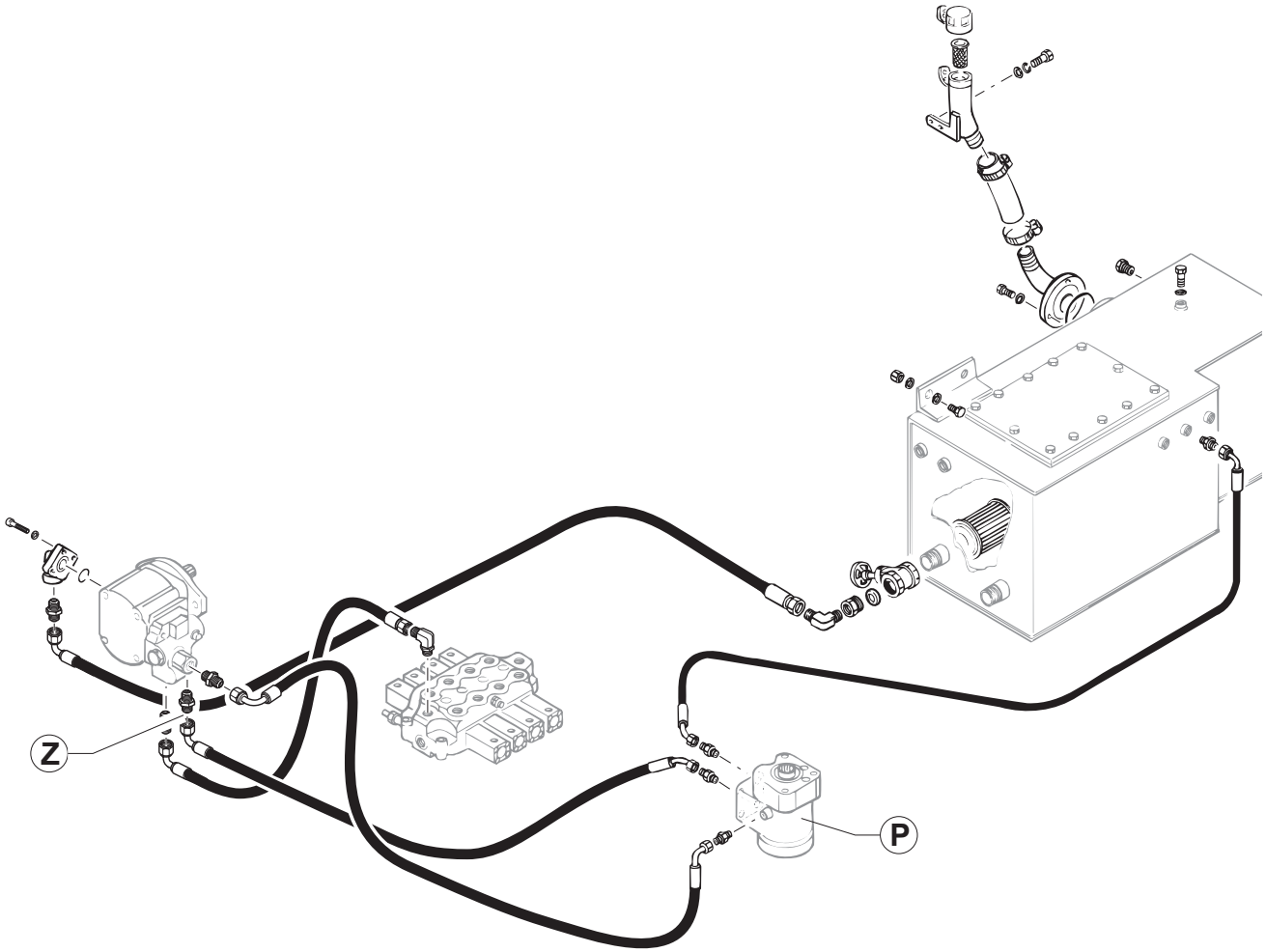
HYDRAULIC SYSTEM - NEGATIVE BRAKE

annex 2



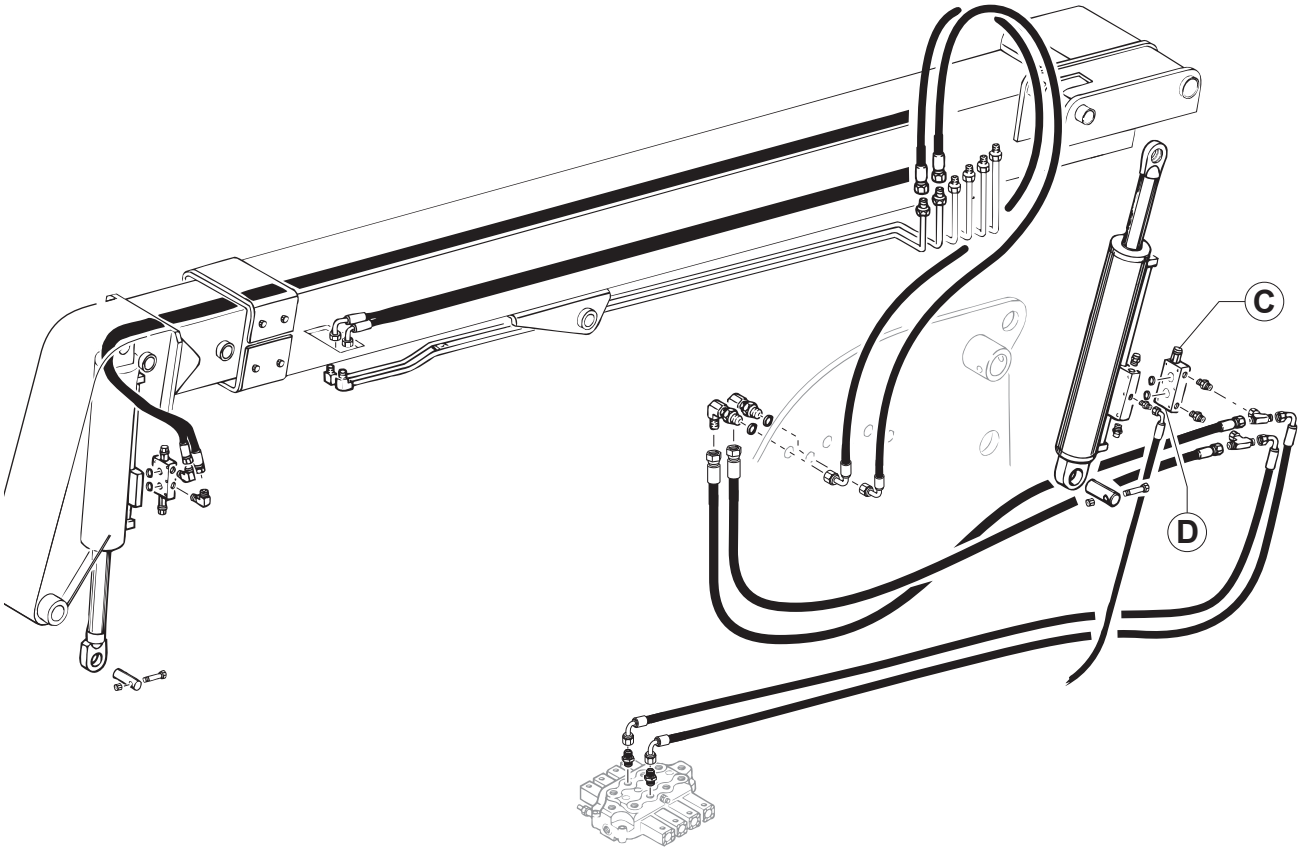
SUCTION SYSTEM - FACILITIES PUMP

annex 3



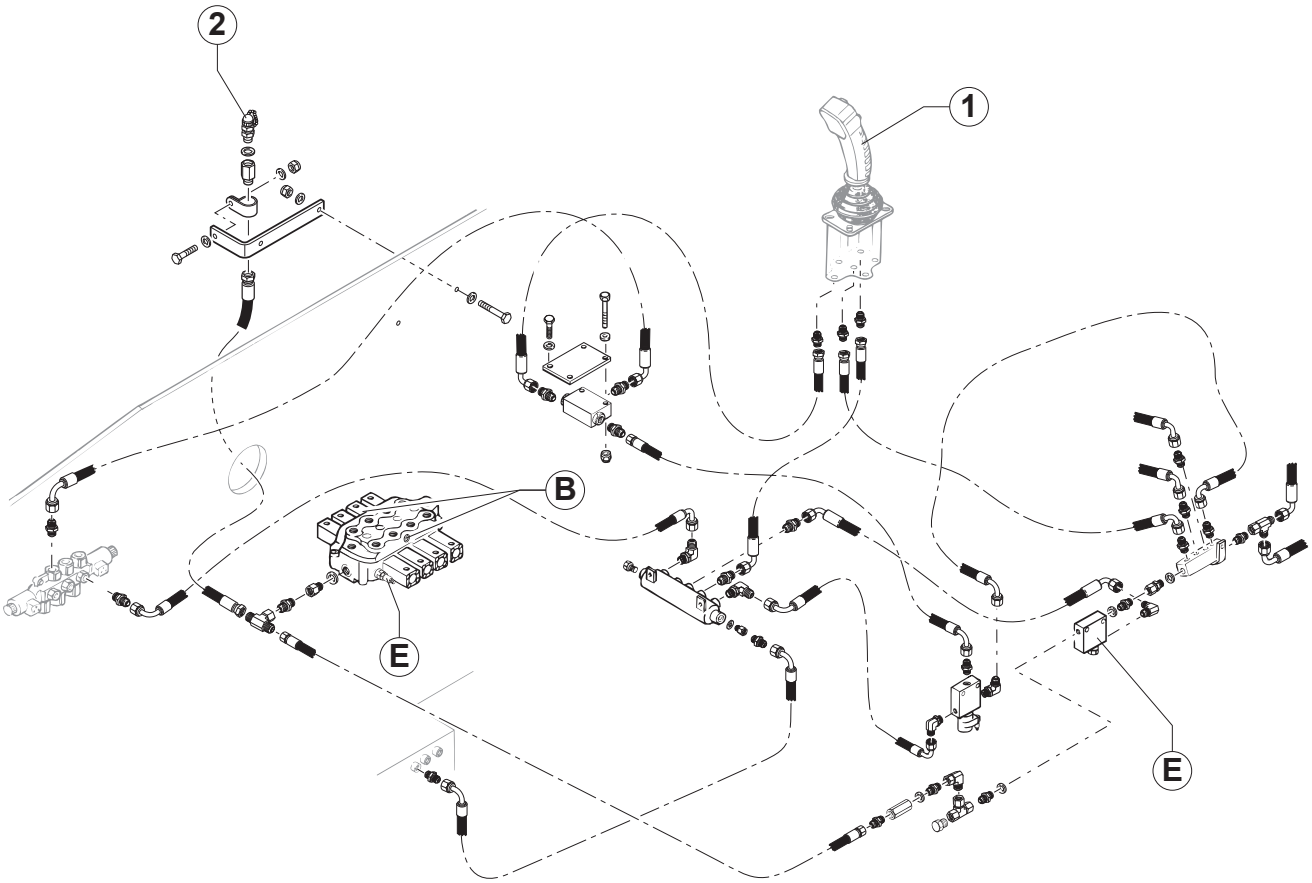
HYDRAULIC SYSTEM - FORK BALANCING

annex 4



HYDRAULIC SYSTEM

annex 5



Section 3
SCHEDULED MAINTENANCE INSPECTIONS

SECTION INDEX

3.1 Introduction.....page 2
3.2 About this section 3
3.3 Maintenance table 4
3.4 Maintenance inspection report 7

3.1 INTRODUCTION

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

⚠WARNING

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

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

3.2 ABOUT THIS SECTION

Intervention times
Maintenance interventions have been divided into 6 different groups in relation to the time at which they must be carried out, say daily, weekly, monthly, every 6 months, yearly or every two 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
Two years	A+B+C+D+E+F

Maintenance table
The maintenance table contains general information on the type of intervention to be carried out at a certain interval.
For the explanation of the maintenance jobs to be done, please refer to chapter 4 "Maintenance Procedures".

Maintenance inspection report
The maintenance report summarises all of the interventions to be carried at a given interval and lets the maintenance technician note the result of the check or intervention carried out.
This card can be photocopied to be used at the different service intervals and to keep a trace of all interventions carried out.

3.3 MAINTENANCE TABLE

TABLE A

During the first 10 working hours:

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

Every 10 working hours or daily:

A-5	Inspect the Operator Manual.
A-6	Inspect the decals and placards.
A-7	Check the engine oil level
A-8	Clean the air suction filter.
A-9	Check and clean the radiator.
A-10	Check the hydraulic oil level in the tank.
A-11	Check the greasing of the boom section pads.
A-12	Grease the forks.
A-13	Grease all joints of the boom, the rear axle shaft joint, the transmission shafts, the front and rear axles and any equipment of the machine.
A-14	Check the efficiency of the lighting electric system.
A-15	Check the efficiency of braking system and parking brake.
A-16	Check the efficiency of the steering selection system.
A-17	Check the efficiency of the fork balancing system.
A-18	Make sure the safety devices installed are in efficient working order.

TABLE B

Within the first 50 working hours:

B-1	Change the engine oil and renew the fuel filter.

Every 50 working hours or weekly:

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

TABLE C

Within the first 100 working hours:

C-1	Change the oil within reduction gears, power divider and differential gears

Every 250 working hours or monthly:

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

TABLE D

Every 500 working hours or every six months:

D-1	Visually check the smoke quantity evacuated from the engine exhaust.
D-2	Check the tightening of the engine fixing screws.
D-3	Check the tightening of the cab fixing screws.
D-4	Check the backlash between pins and bushings in all joints.
D-5	Change the hydraulic oil filter of the transmission.
D-6	Change the hydraulic oil filter in the tank.
D-7	Have the hydraulic system checked by a skilled technician.
D-8	Change the main cartridge of the engine air filter.
D-9	Clean or replace, if nececessary, the air filter in the cab.

TABLE E

Every 1000 working hours or yearly:

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

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***

- *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	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:				
A-5	Inspect the Operator Manual.			
A-6	Inspect the decals and placards.			
A-7	Check the engine oil level.			
A-8	Clean the air suction filter.			
A-9	Check and clean the radiator.			
A-10	Check the hydraulic oil level in the tank.			
A-11	Check the greasing of the boom section pads.			
A-12	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	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.			

Table B		Y	N	R
Within the first 50 working hours:				
B-1	Change the engine oil and renew the fuel filter.			
Every 50 working hours:				
B-2	Check the tension of the alternator belt.			
B-3	Check the tyre inflation.			
B-4	Check the tightening of the wheel nuts.			
B-5	Check the tightening of the cardan shaft screws.			
B-6	Clean the radiator fins.			

Table C		Y	N	R
Within the first 100 working hours:				
C-1	Oil of the differential casing, the wheel reducer and the power divider.			
Every 250 working hours:				
C-2	Change the engine oil and relevant filter.			
C-3	Check the oil level in the front and rear differential gears.			
C-4	Check the oil level in the four wheel reduction gears.			
C-5	Check the main filtering element of the engine air filter.			
C-6	Check the clamping of the cableheads to the battery terminals.			
C-7	Check the air suction hose between engine and filter.			
C-8	Check the cylinder chromium-plated rods.			
C-9	Check the hydraulic lines.			
C-10	Check the electric cables do not rub against the frame or other mechanical components.			
C-11	Check the wear of the sliding pads of the boom sections.			
C-12	Adjust the play of the sliding pads of the boom sections.			
C-13	Remove any grease from the boom, then re-grease the sliding parts of the boom sections.			
C-14	Check the level of the battery electrolyte.			
C-15	Check the efficiency of the block valves.			

Table D		Y	N	R
Every 500 working hours:				
D-1	Visually check the smoke quantity evacuated from the engine exhaust.			
D-2	Check the tightening of the engine fixing screws.			
D-3	Check the tightening of the cab fixing screws.			
D-4	Check the backlash between pins and bushings in all joints.			
D-5	Change the hydraulic oil filter of the transmission.			

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***

- *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 D		Y	N	R
D-6	Change the hydraulic oil filter in the tank.			
D-7	Have the hydraulic system checked by a skilled technician.			
D-8	Change the main cartridge of the engine air filter.			
D-9	Clean or replace, if nececessary, the air filter in the cab.			

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

Section 4
SCHEDULED MAINTENANCE PROCEDURES

SECTION INDEX

4.1 Introduction.....page 2
4.2 About this section.....3
4.3 TABLE A procedures.....4
4.4 TABLE B procedures.....20
4.5 TABLE C procedures.....25
4.6 TABLE D procedures.....39
4.7 TABLE E procedures.....46

4.1 INTRODUCTION

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

⚠WARNING

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

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

4.2 ABOUT THIS SECTION

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

Safety symbols:



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

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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

CAUTION

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

NOTICE

Draws the attention to important environment-related information.

4.3 TABLE A PROCEDURES

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

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

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

NOTICE

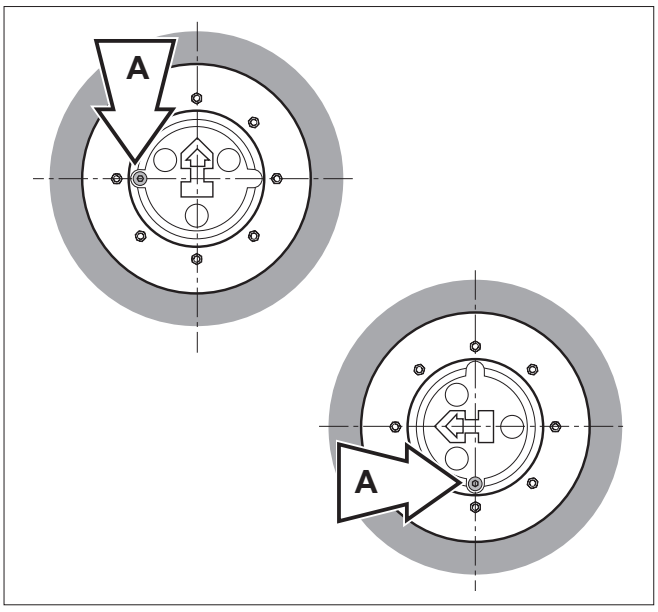
Place a container of suitable size under the plug.

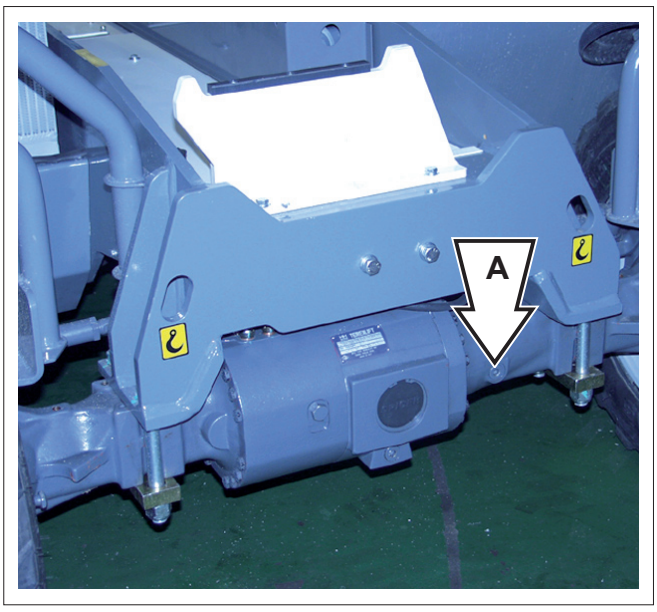
To check the oil level in the **front and rear differential gears**:

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

NOTICE

Place a container of suitable size under the plug.



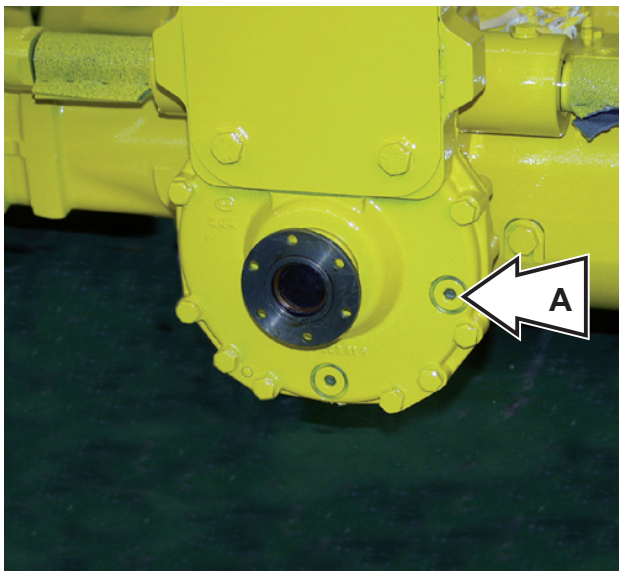


To check the oil level in the **power divider**:

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

NOTICE

Place a container of suitable size under the plug.

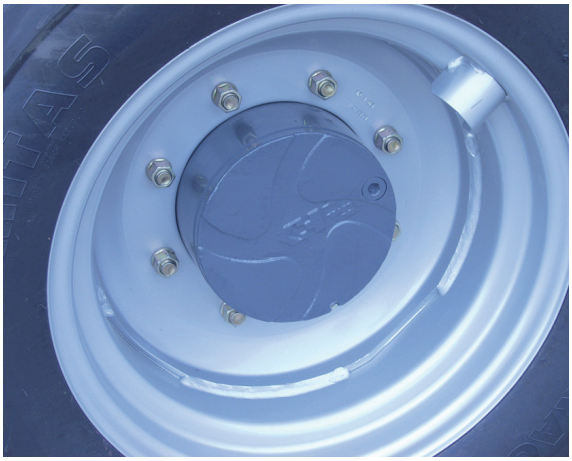


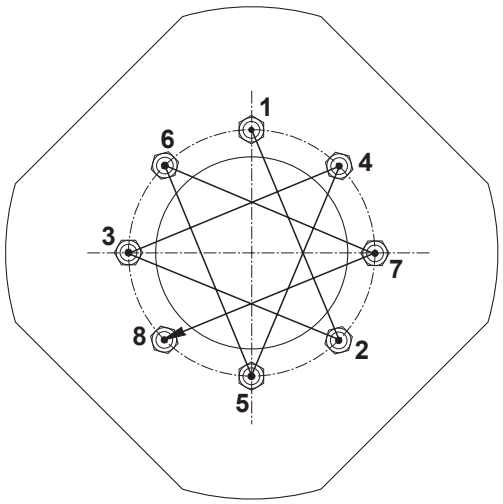
A-2 CHECK THE TIGHTENING OF THE WHEEL BOLTS

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

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

Re-tighten all nuts to a torque 400 Nm.





⚠WARNING

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

⚠WARNING

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

⚠WARNING

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

	STANDARD GTH 66-22 • 66-22S	OPTIONAL GTH 66-22 • 66-22S
Dimensions (front and rear)	405/70 R24	400/70 R20
P.R. (or load index)	14 pr	-
Wheel disc	8 holes DIN 70361	8 holes DIN 70361
Pressure bar/Psi	4.0/58	-

A-3 CHECK THE TIGHTENING OF ALL BOLTS AND NUTS

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

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

A-4 CHECK THE COUPLINGS FOR OIL LEAKS

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

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

A-5 INSPECT THE OPERATOR MANUAL

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

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

In particular:

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

CAUTION

Contact GENIE Service Centre if replacement manuals are needed.

A-6 INSPECT THE DECALS AND PLACARDS

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

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

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

CAUTION

Contact GENIE Service Centre if replacement decals are needed.

A-7 CHECK THE ENGINE OIL LEVEL

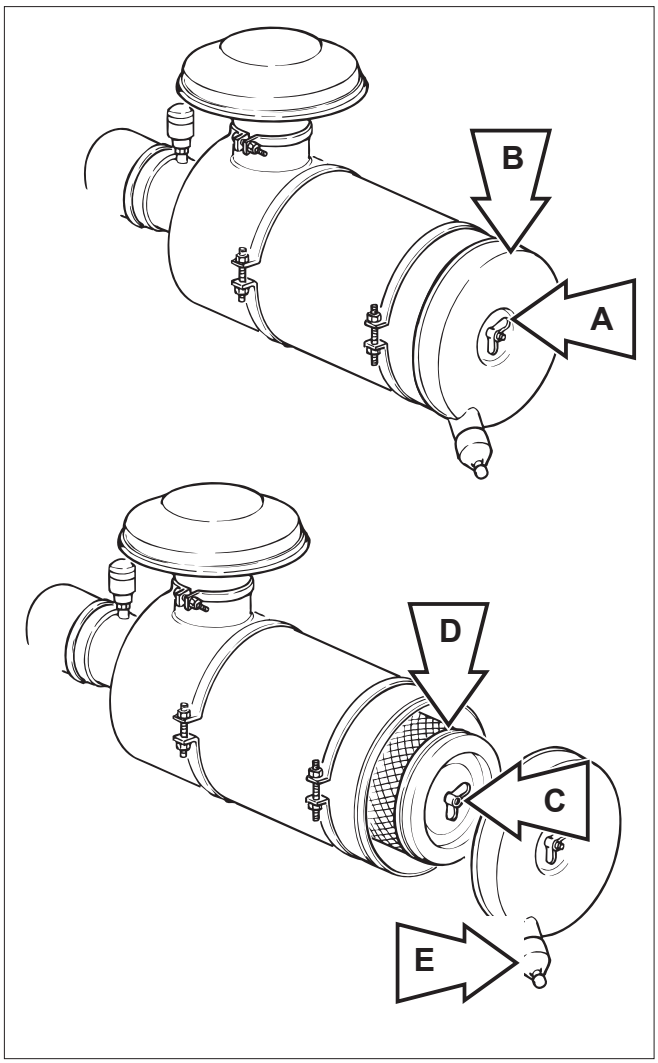
CAUTION

For the engine maintenance, please refer to the specific Operator handbook supplied with the machine.

A-8 CLEAN THE AIR SUCTION FILTER

Clean the engine air filter every 10 hours:

- Stop the engine and engage the parking brake.
- Unscrew wingnut **A** and remove cover **B**.
- Unscrew wingnut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Clean the cartridge by beating it some times on the ground paying attention not to damage the filtering element. Do not dry-clean the filtering element.
- Check the filter box for cracks (light showing through).
- Smear the seal with grease, then refit the element.
- Tighten wingnut **C**, close cover **B** and tighten with wingnut **A**.



⚠WARNING

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

⚠WARNING

Daily remove any dust collected in the filter by pressing the rubber cap E.

A-9 CHECK AND CLEAN THE RADIATOR

⚠ DANGER

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

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

Cleaning using compressed air

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

Cleaning using water under pressure or steam

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

CAUTION

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

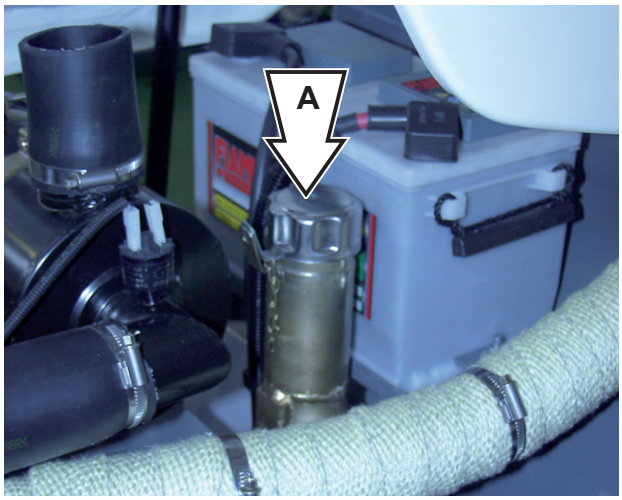
A-10 CHECK THE HYDRAULIC OIL LEVEL IN THE TANK

⚠DANGER

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

Check the hydraulic oil level (visually) through the special level **B** fitted into the tank.

When necessary, add new oil through filler **A**.

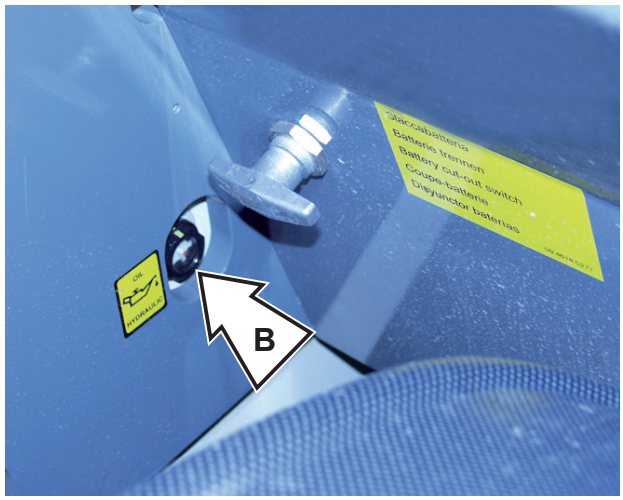


⚠WARNING

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

NOTICE

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



A-11 CHECK THE GREASING OF THE BOOM SECTION PADS

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

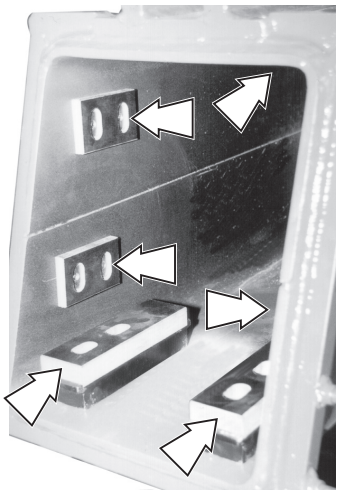
At regular intervals, check that the telescopes are well greased in correspondence of the sliding pads.

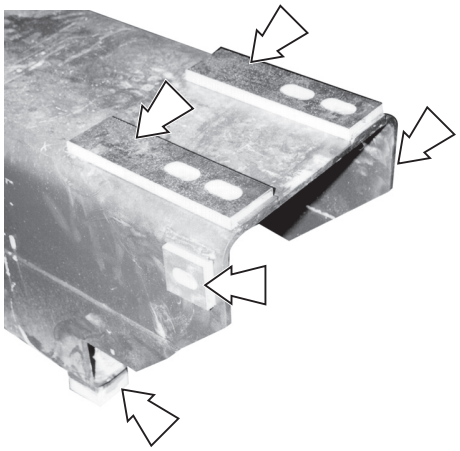
If necessary, scrape off the old grease and brush new grease. We recommend using:

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

CAUTION

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





A-12 GREASE THE FORKS

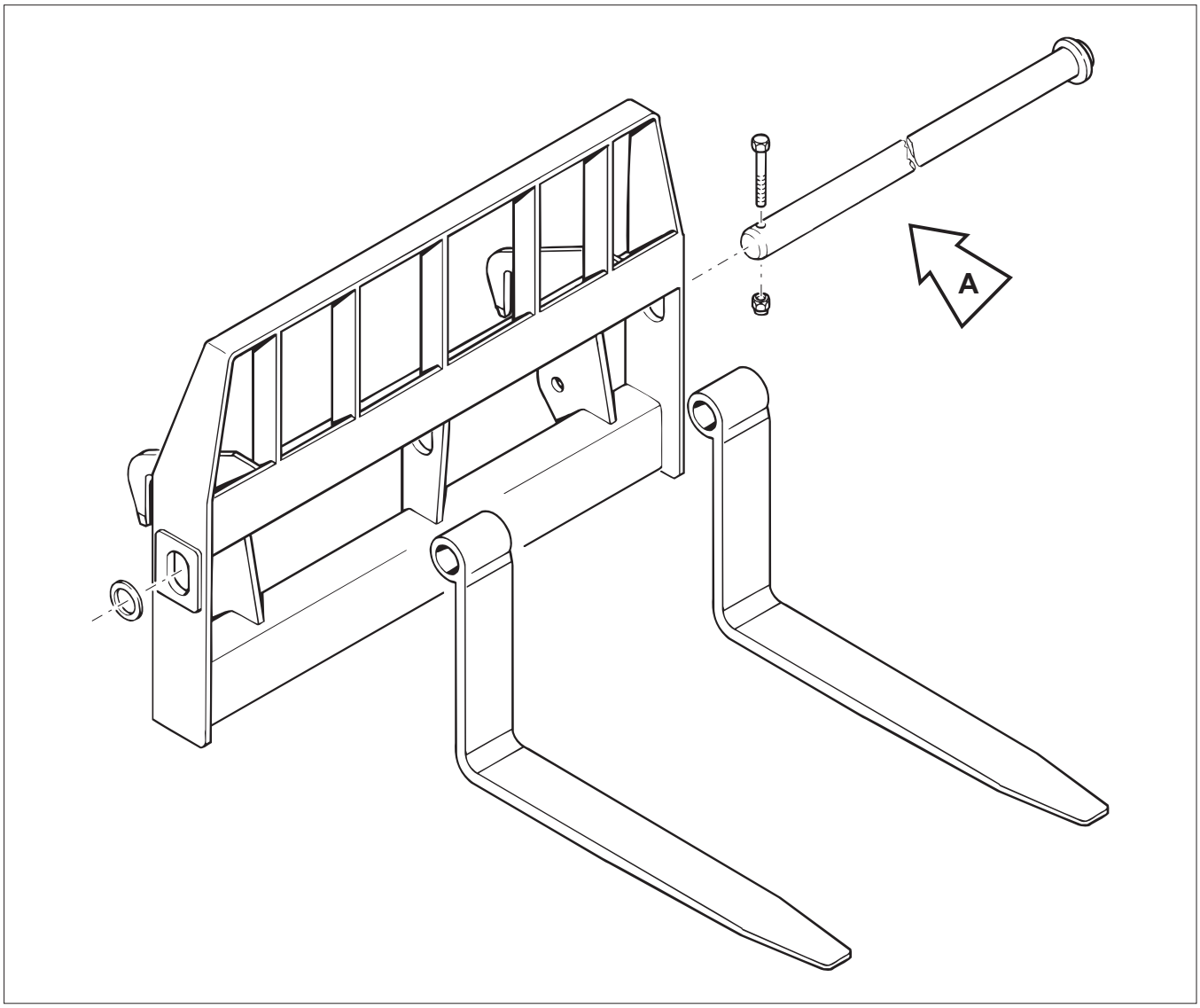
CAUTION

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

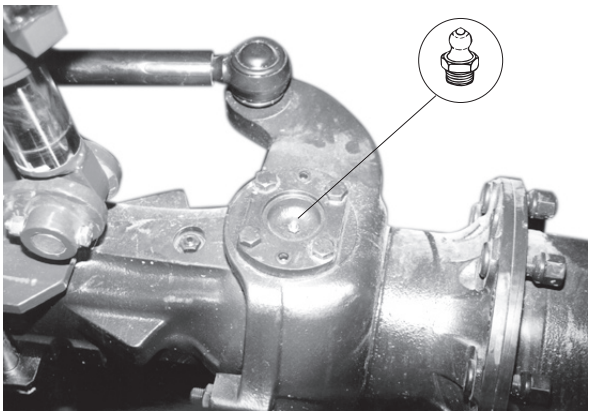
Smear pin **A** with grease to help the forks slide on it.

Recommended grease:

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



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



CAUTION

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

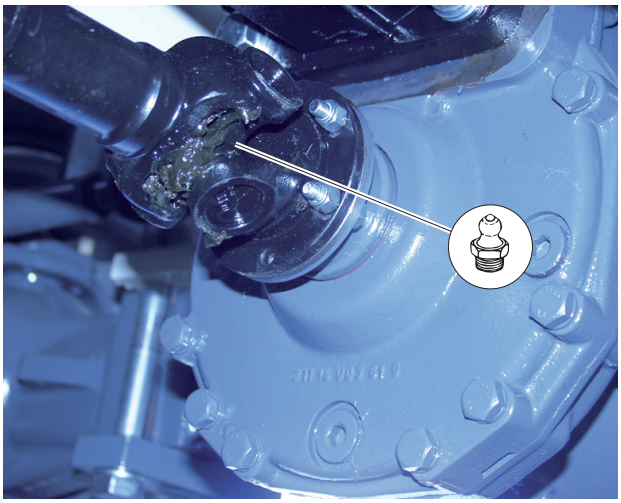
Regularly grease the machine to grant it efficient conditions and a long life.

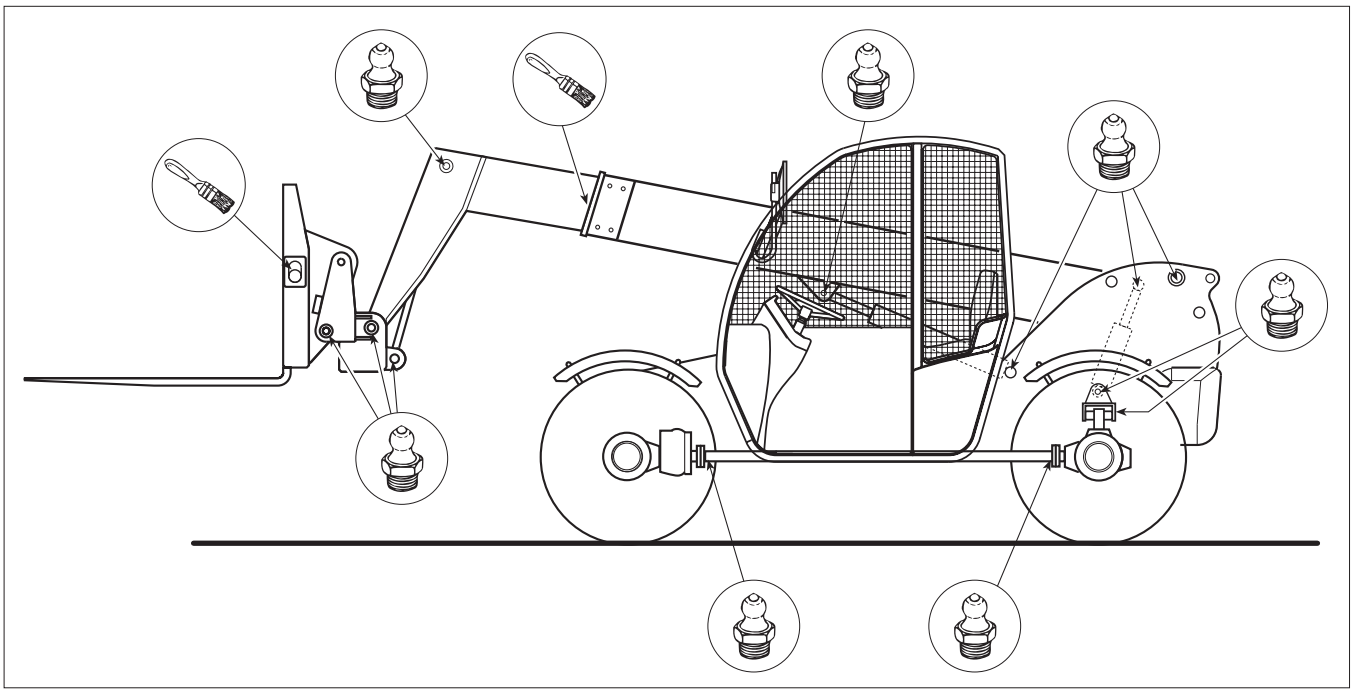
By means of a pump, inject grease into the special greasers.

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

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





A-14 CHECK THE EFFICIENCY OF THE LIGHTING ELECTRIC SYSTEM

If the LIGHTS KIT is installed, check every day that the electrical system powering the lights of the machine is in efficient working order.

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

Also check beacon located on the cab roof.

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

⚠WARNING

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

⚠CAUTION

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

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

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

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

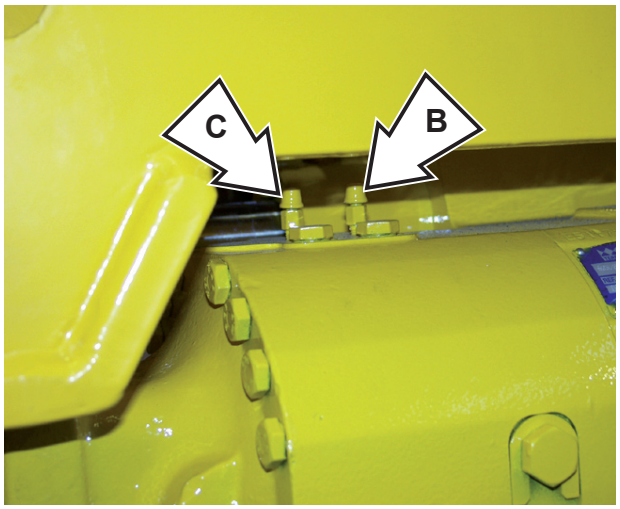
The malfunctioning of the braking system may depend on the presence of air within the hydraulic circuit.
The braking system has two bleeding valves: valve **B** for the service brake circuit and valve **C** for the negative parking brake circuit.

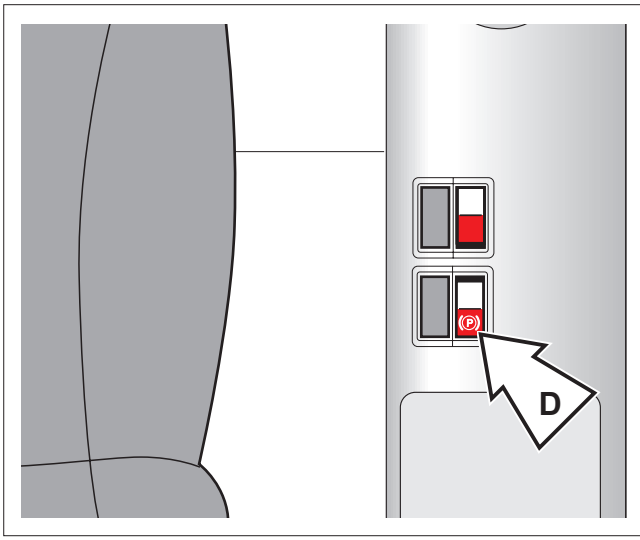
To bleed the circuit of the service brake:
- Make sure that the oil is level within the feeding tank **A**.
- Step on the brake pedal repeatedly.
- Slowly unscrew valve **B** and re-close it as soon as oil mixed with air bubbles comes out.
- Repeat the operation until bubble-free oil comes out.
- Bleed from both sides of the machine.

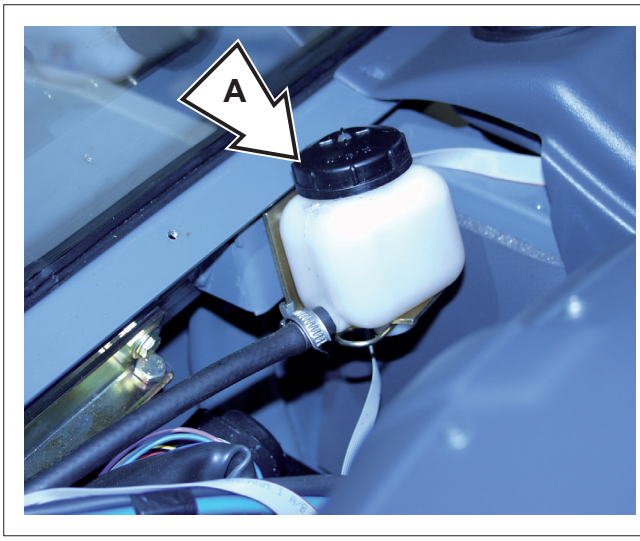
To bleed the circuit of the negative parking brake:
- Press the parking brake button **D**. As soon as the light indicator on the button goes off, start bleeding through valve **C** until air-free oil comes out.

Checking the brake oil level

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

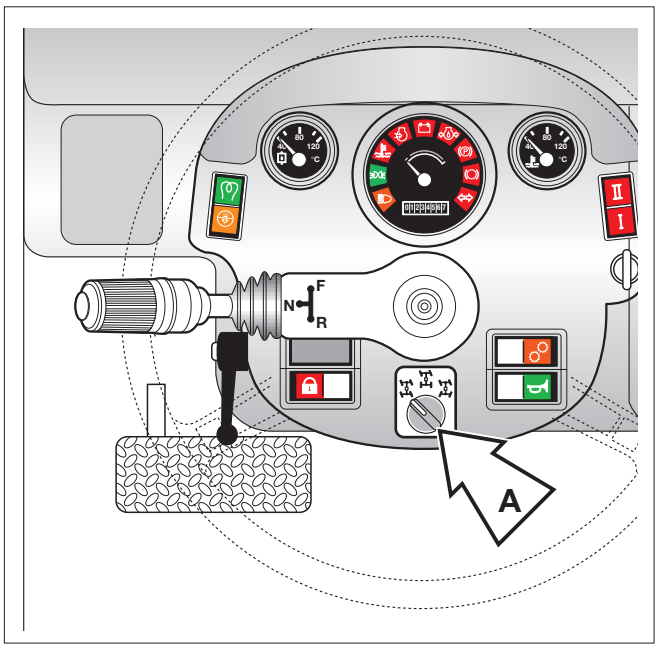
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop

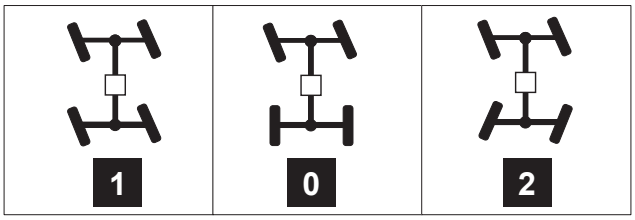
8 Reset the steering selection switch to “two-wheel steer” (pos. **0**)

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.





A-17 CHECK THE EFFICIENCY OF THE FORK BALANCING SYSTEM

WARNING

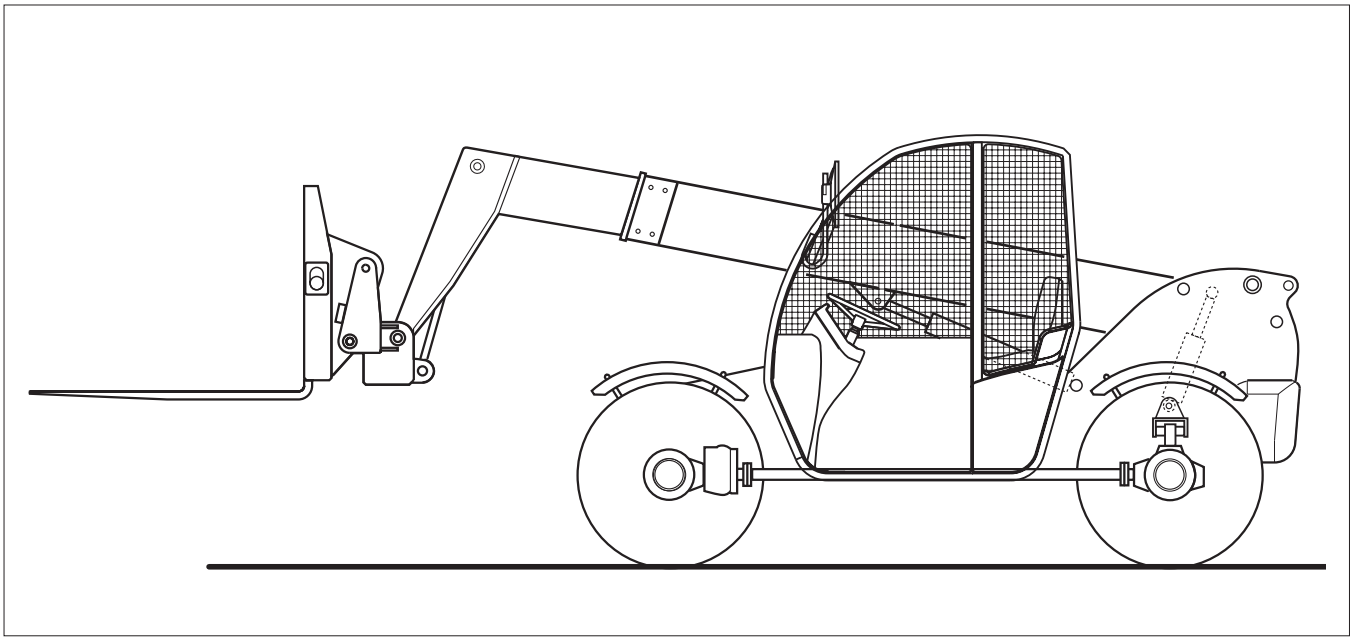
Test the system without any load on the machine's forks.

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

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

CAUTION

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



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

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

4.4 TABLE B PROCEDURES

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

B-2 CHECKTHETENSIONOFTHEALTERNATOR BELT

CAUTION

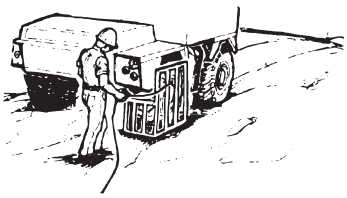
For the engine maintenance, please refer to the specific Operator handbook supplied with the machine.

B-3 CHECK THE TYRE INFLATION

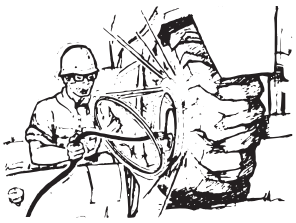
⚠DANGER

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

OKAY



WRONG



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

	STANDARD GTH 66-22 • 66-22S	OPTIONAL GTH 66-22 • 66-22S
Dimensions (front and rear)	405/70 R24	400/70 R20
P.R. (or load index)	14 pr	-
Wheel disc	8 holes DIN 70361	8 holes DIN 70361
Pressure bar/Psi	4.0/58	-

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

⚠WARNING

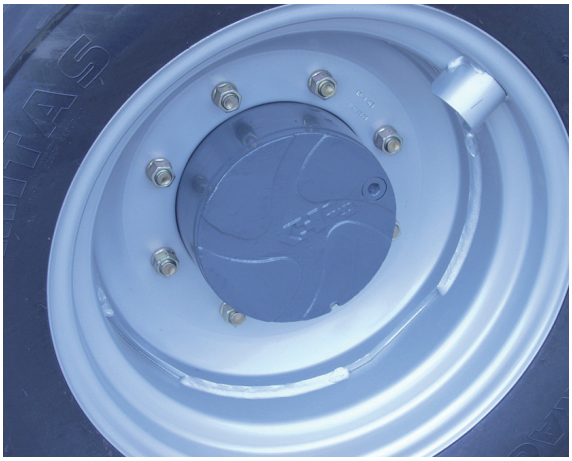
Always use tyres having the dimensions indicated in the vehicle registration card.

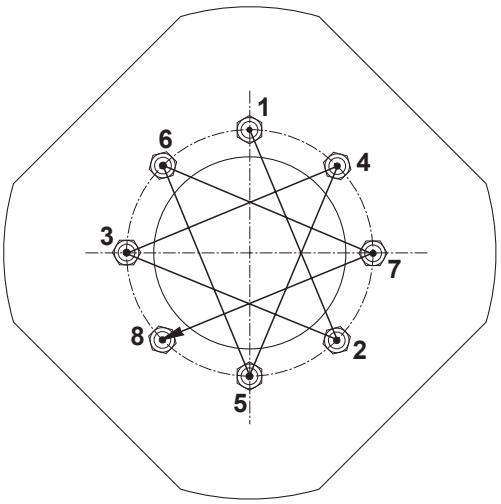
B-4 CHECK THE TIGHTENING OF THE WHEEL NUTS

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

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

Re-tighten all nuts to a torque 400 Nm.





⚠ ATTENZIONE

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

⚠ WARNING

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

⚠ WARNING

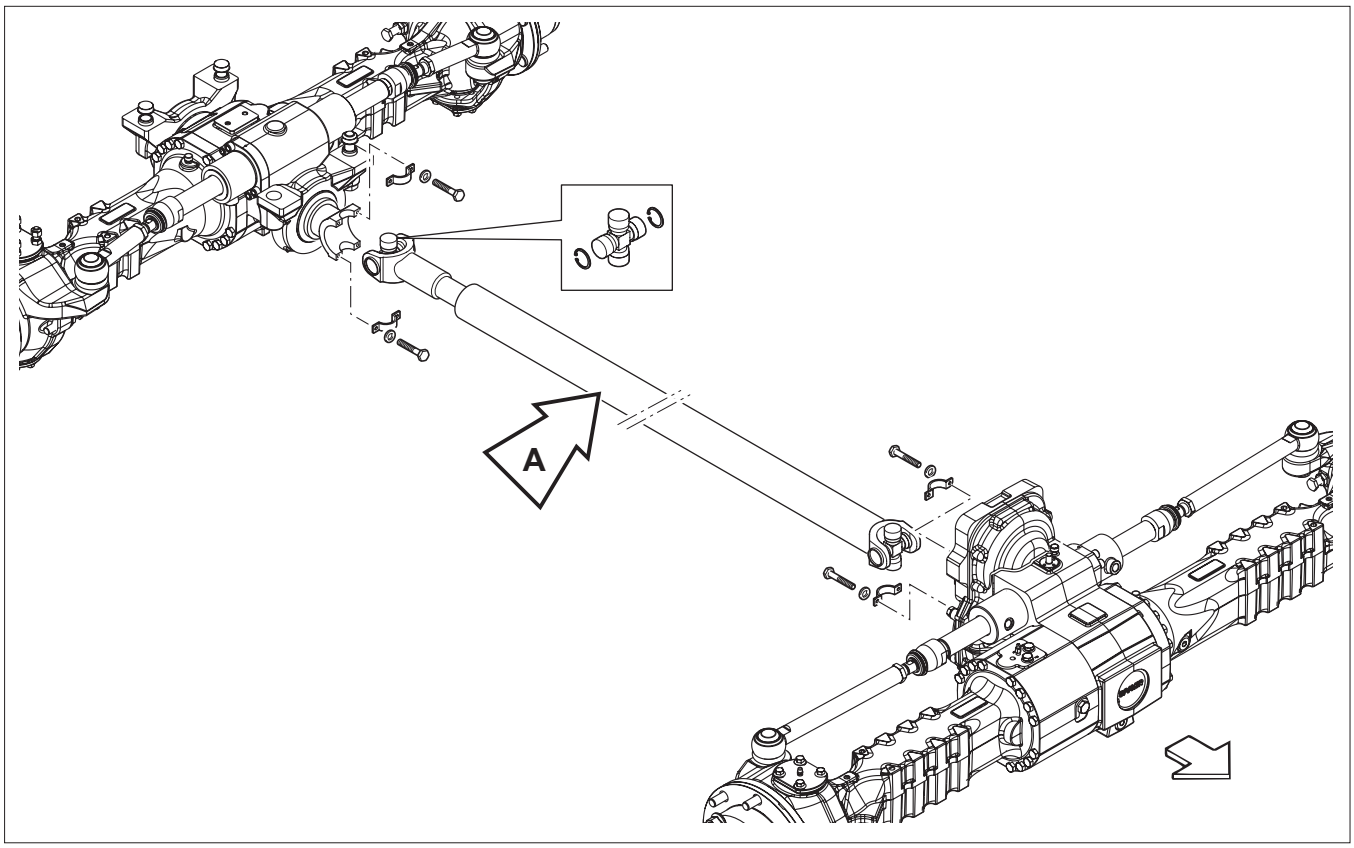
Always use tyres having the dimensions indicated in the vehicle registration card.

	STANDARD GTH 66-22 • 66-22S	OPTIONAL GTH 66-22 • 66-22S
Dimensions (front and rear)	405/70 R24	400/70 R20
P.R. (or load index)	14 pr	-
Wheel disc	8 holes DIN 70361	8 holes DIN 70361
Pressure bar/Psi	4.0/58	-

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”.



B-6 CLEAN THE RADIATOR FINS

⚠ DANGER

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



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

Cleaning using compressed air

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

Cleaning using water under pressure or steam

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

CAUTION

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

4.5 TABLE C PROCEDURES

C-1 CHANGE THE OIL WITHIN REDUCTION GEARS, POWER DIVIDER AND DIFFERENTIAL GEARS

To change 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.

NOTICE

Place a container of suitable size under the plug.

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

Recommended oil:

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

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

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

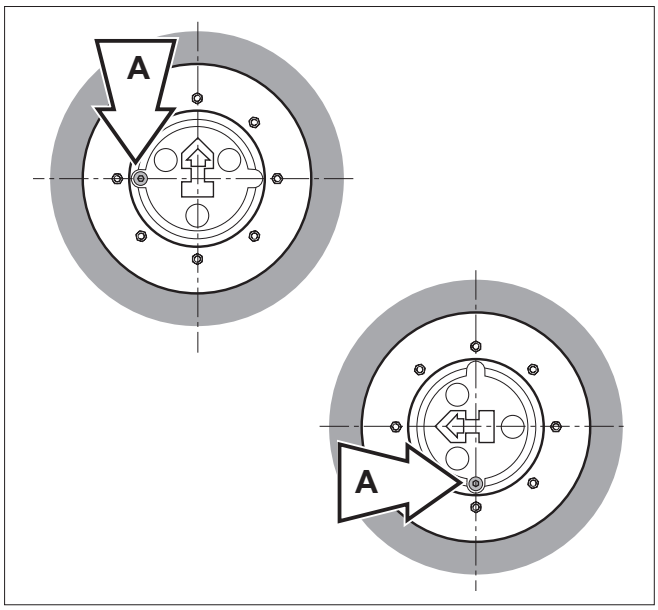
NOTICE

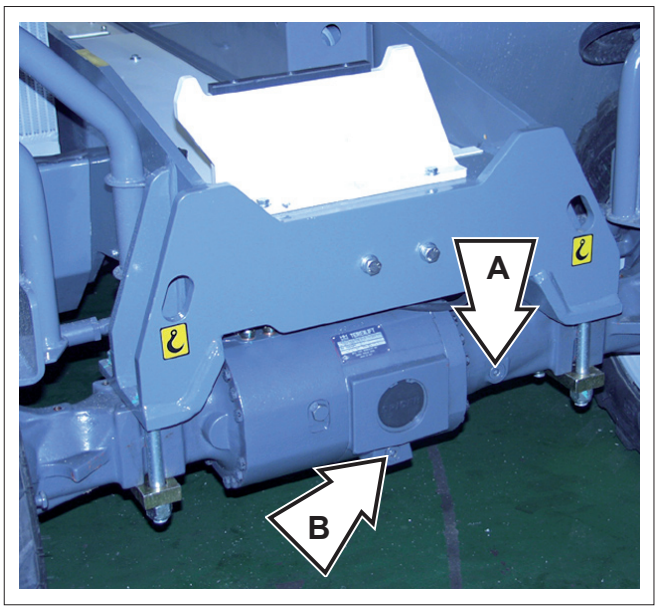
Place a container of suitable size under the plug.

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

Recommended oil:

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





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

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

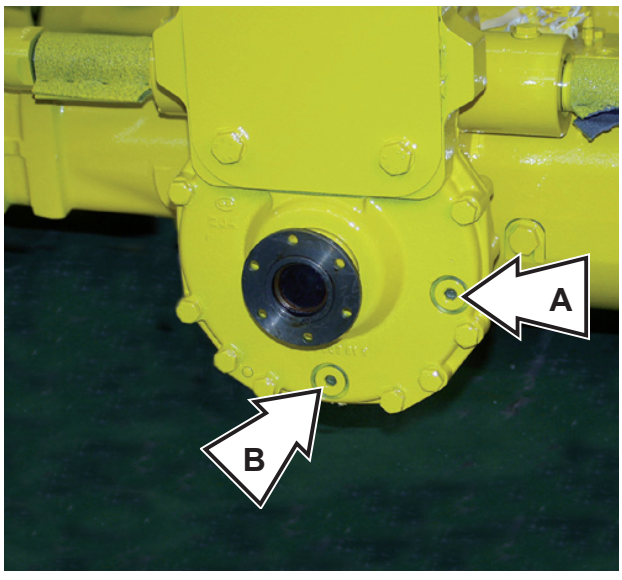
NOTICE

Place a container of suitable size under the plug.

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

Recommended oil:

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



C-2 CHANGE THE ENGINE OIL AND RELEVANT FILTER

CAUTION

For the engine maintenance, please refer to the specific Operator handbook supplied with the machine.

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

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

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

NOTICE

Place a container of suitable size under the plug.

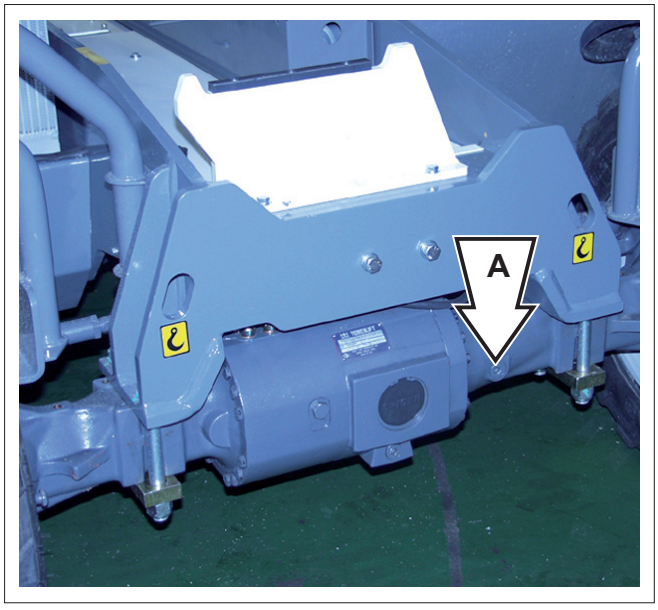
C-4 CHECK THE OIL LEVEL IN THE FOUR WHEEL REDUCTION GEARS

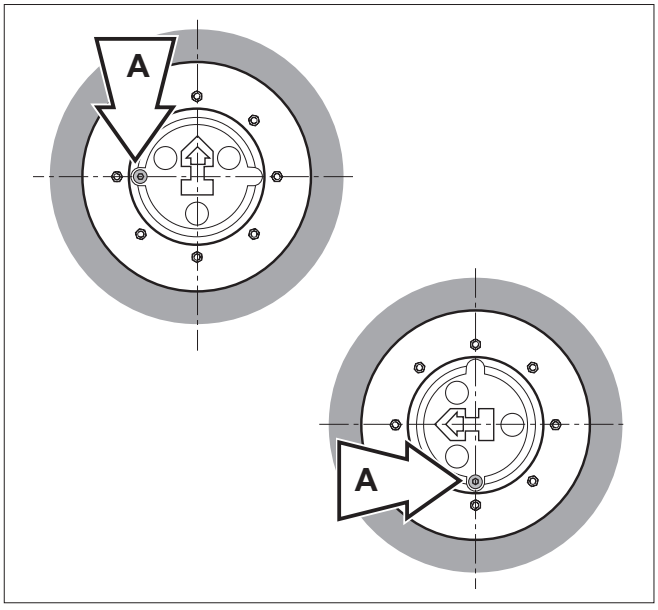
To check the oil level within the **wheel reduction gears**:

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

NOTICE

Place a container of suitable size under the plug.

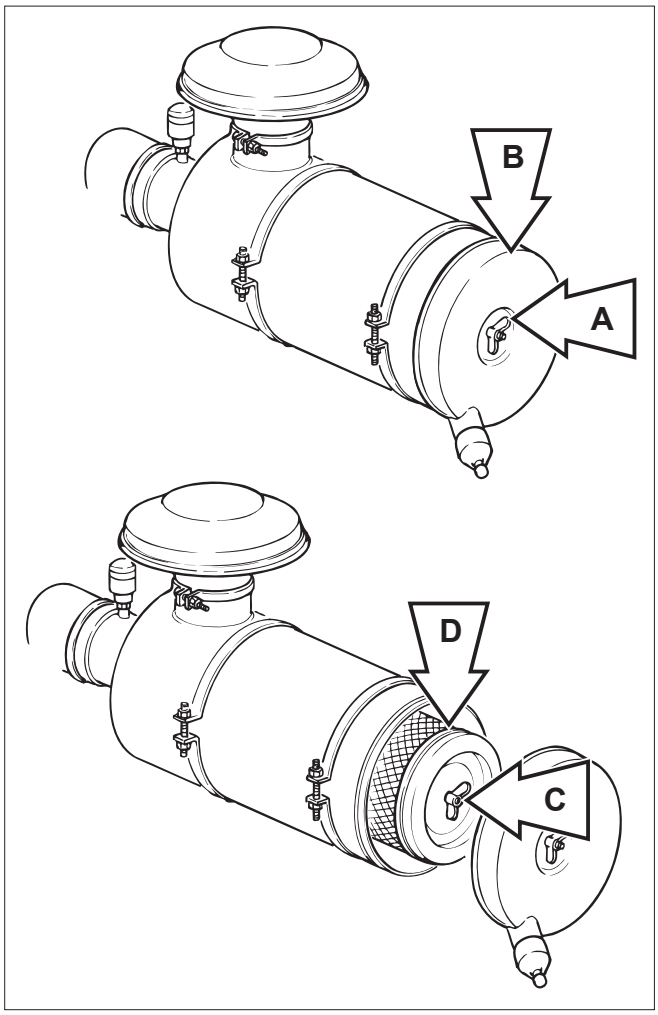




C-5 CHECK AND CLEAN THE ENGINE AIR FILTER

To clean the engine air filter :

- Stop the engine and engage the parking brake.
- Unscrew wingnut **A** and remove cover **B**.
- Unscrew wingnut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Clean the cartridge by beating it some times on the ground paying attention not to damage the filtering element. Do not dry-clean the filtering element.
- Check the filter box for cracks (light showing through).
- Smear the seal with grease, then refit the element.
- Tighten wingnut **C**, close cover **B** and tighten with wingnut **A**.



WARNING

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

C-6 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

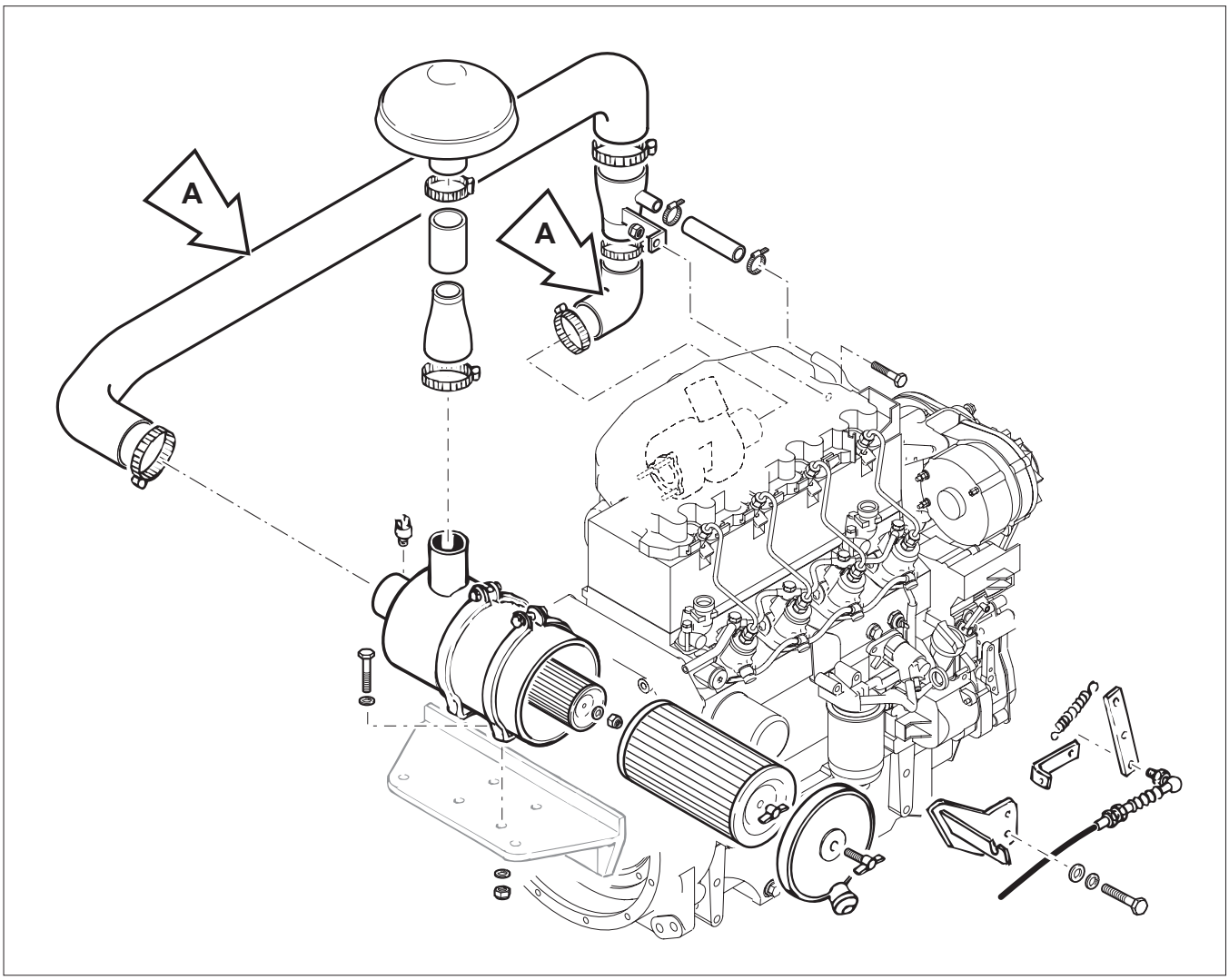
- ***Keep out of items which can produce sparks, of naked flames or lit cigarettes.***
- ***Do not rest metal objects onto the battery. This can result in a dangerous short especially during a recharge.***

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

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

CAUTION

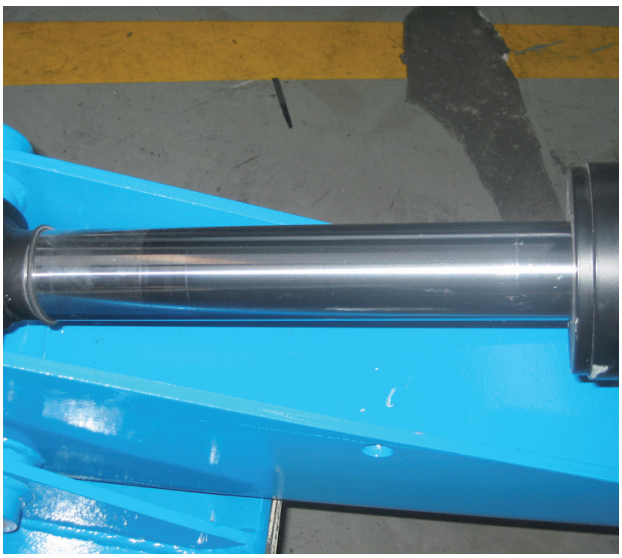
If you use the machine continuously for several days, check these sleeves, as well as the hose clamps more frequently.



C-8 CHECK THE CYLINDER CHROMIUM-PLATED RODS

Visually check the cylinder rods for scoring every month.

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

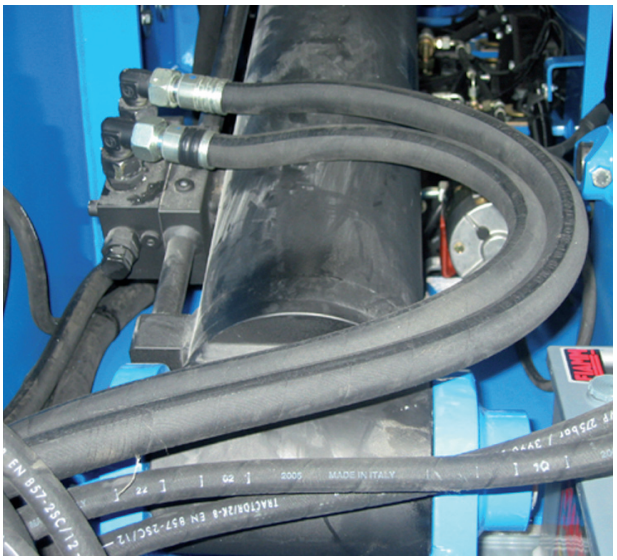


C-9 CHECK THE HYDRAULIC LINES

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

CAUTION

Replace any worn hoses immediately before using the machine again.

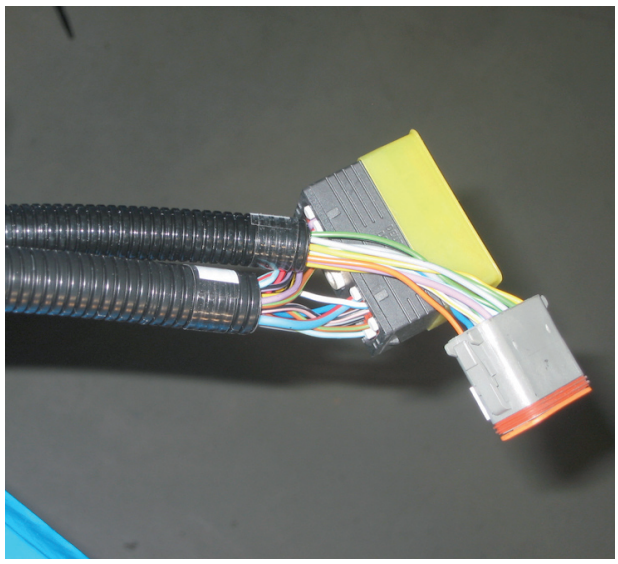


C-10 CHECK THE ELECTRIC CABLES

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

CAUTION

Replace any worn cables immediately before using the machine again.



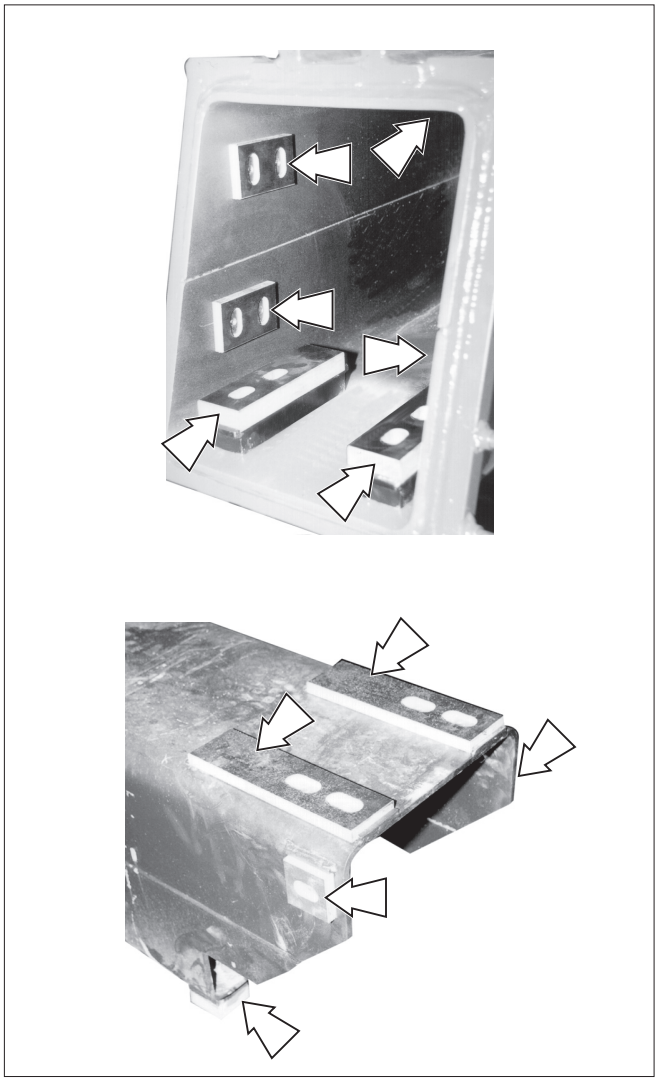
C-11 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

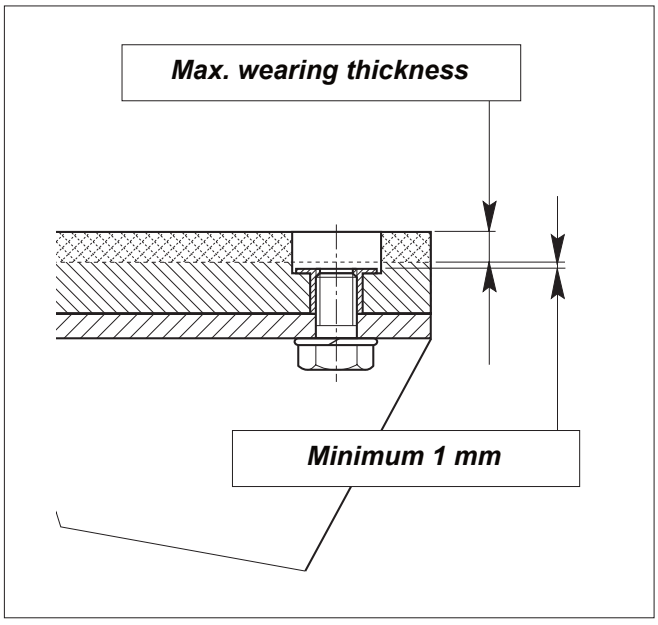
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

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

CAUTION

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





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

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

All pads can be adjusted by the special shims.

Adjusting the pads:

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

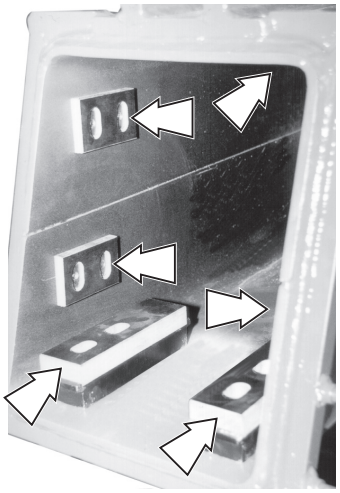
Tightening torques of the pad screws in relation to the screw diameter

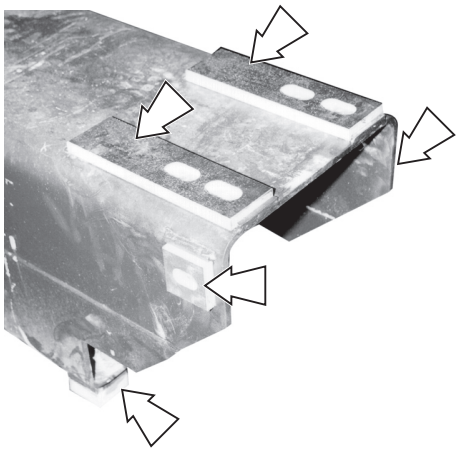
Screws M10	Nm 30
Screws M14	Nm 50

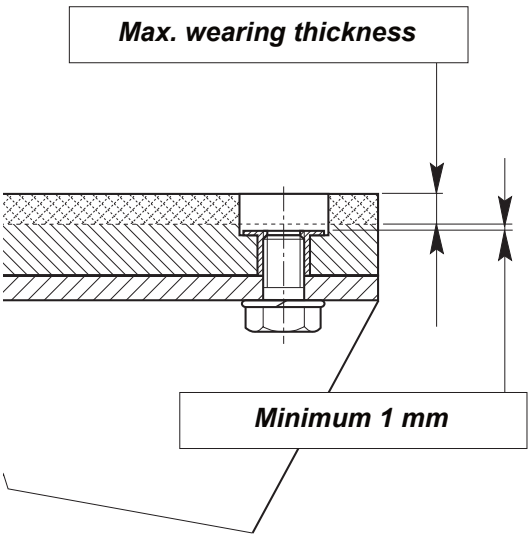
Tightening torques higher than those recommended can cause the break of the pad or of the locking threaded bush.

CAUTION

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







C-13 GREASE THE SLIDING PARTS OF THE BOOM SECTIONS

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

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

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

CAUTION

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

C-14 CHECK THE LEVEL OF THE BATTERY ELECTROLYTE

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

Do not add sulphuric acid; add only distilled water.

C-15 CHECK THE EFFICIENCY OF THE BLOCK VALVES

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

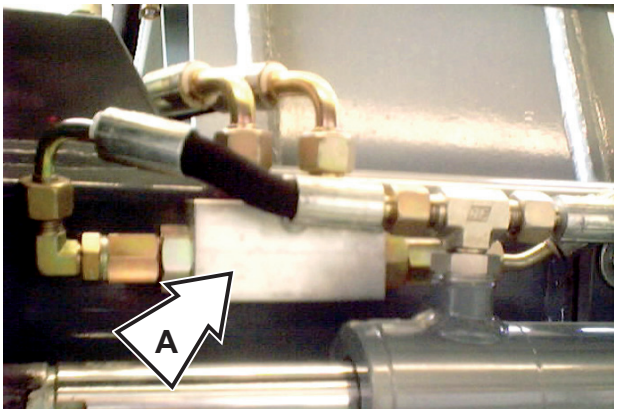
To check the efficiency of a valve, proceed as follows:

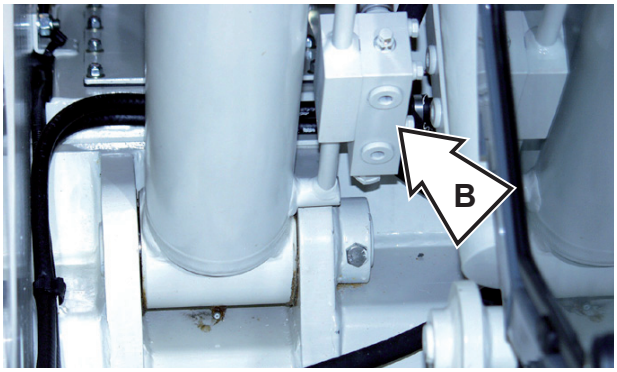
- Load a weight near the maximum payload (3500 kg roughly) onto the boom.
- Raise the load some centimetres above the ground (max 10 cm). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which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

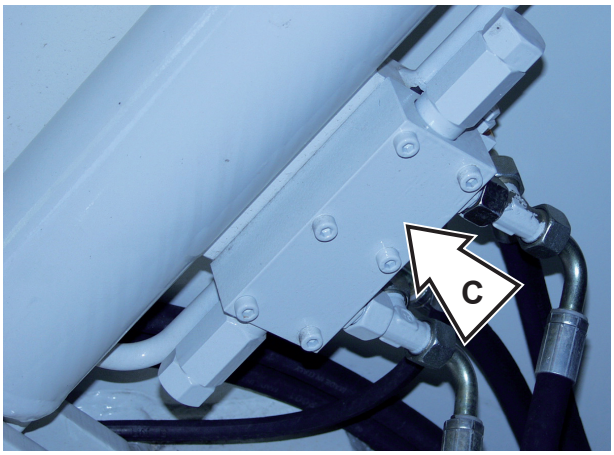
During the check, the load shall remain blocked in position.
Should that not be the case, the valve must be replaced. Contact GENIE Technical Service.

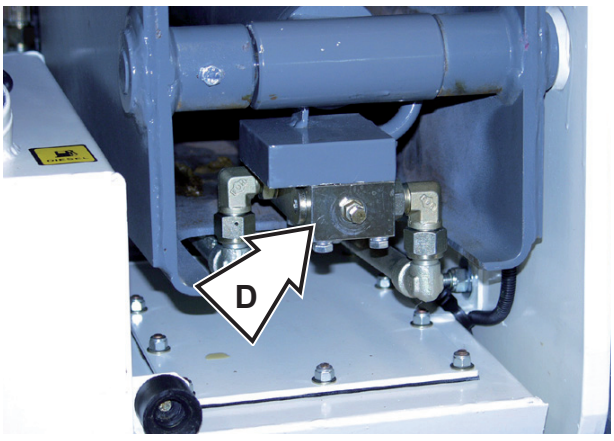
NOTICE

Place a container of suitable size under the plug.









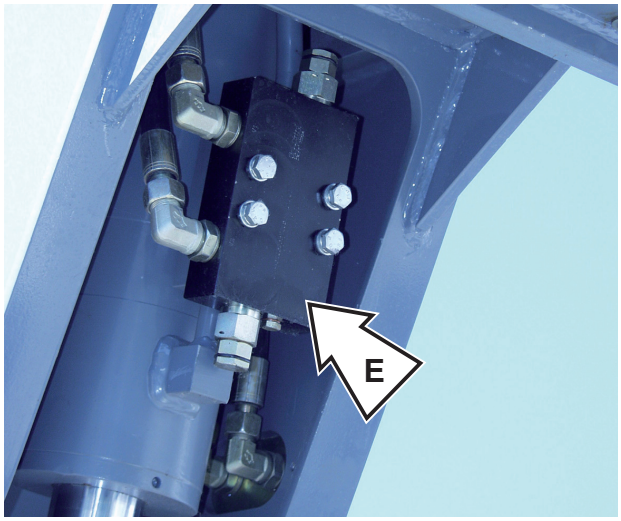
DANGER

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

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

TO REMOVE THE BLOCK VALVES OR THE CYLINDERS

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



4.6 TABLE D PROCEDURES

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

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

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

⚠CAUTION

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

CAUTION

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

D-2 CHECK THE TIGHTENING OF THE ENGINE FIXING SCREWS

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

For this operation, use a torque wrench and tighten the screws to a torque of **130 Nm**.

D-3 CHECK THE TIGHTENING OF THE CAB FIXING SCREWS

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

For this operation, use a torque wrench and tighten the screws to a torque of **200 Nm**.

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

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

CAUTION

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

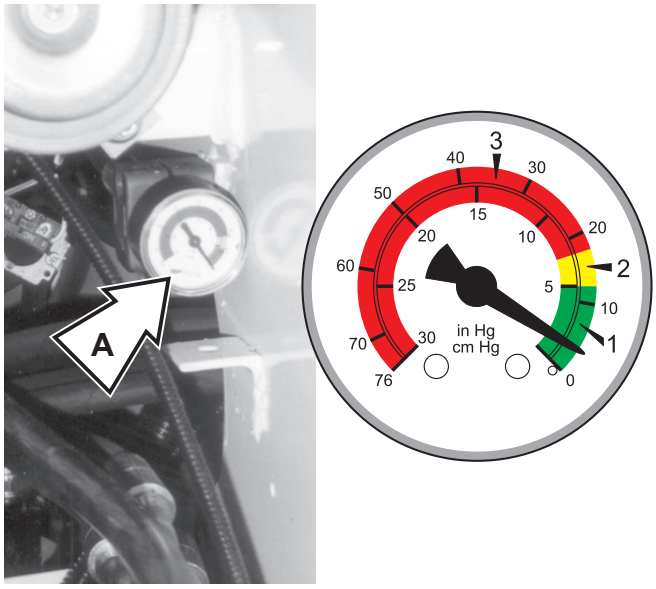
D-5 CHANGE THE HYDRAULIC OIL FILTER OF THE TRANSMISSION

Every 50 hours, check the clogging degree of the filtering element using the vacuometer **A**.
The indexed scale of the vacuometer is divided into 3 areas:

1 - Green area: Normal condition

2 - Yellow area: Replace the filter as soon as possible

3 - Red area: Shut the engine down to prevent damage to the hydraulic system. Change the filter and/or check for the fault reasons.



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

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

NOTICE

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



CAUTION

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

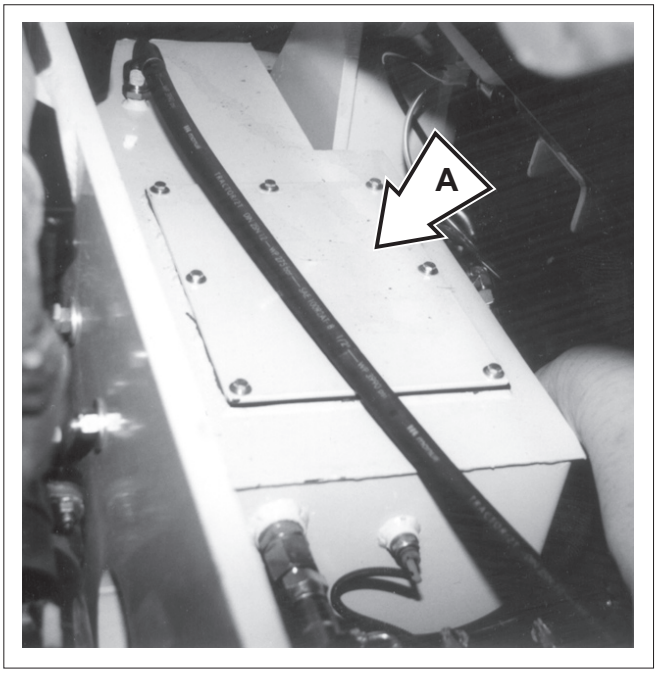
CAUTION

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

D-6 CHANGE THE HYDRAULIC OIL FILTER IN THE TANK

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

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



CAUTION

Hydraulic oil filter canisters cannot be cleaned or washed and refitted.
They must be replaced with new ones of the type recommended by the manufacturer:
Flow rate l/1' = STR 100/1
Filtering = 60 µ
code = 09.4604.0004

NOTICE

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

CAUTION

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

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

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

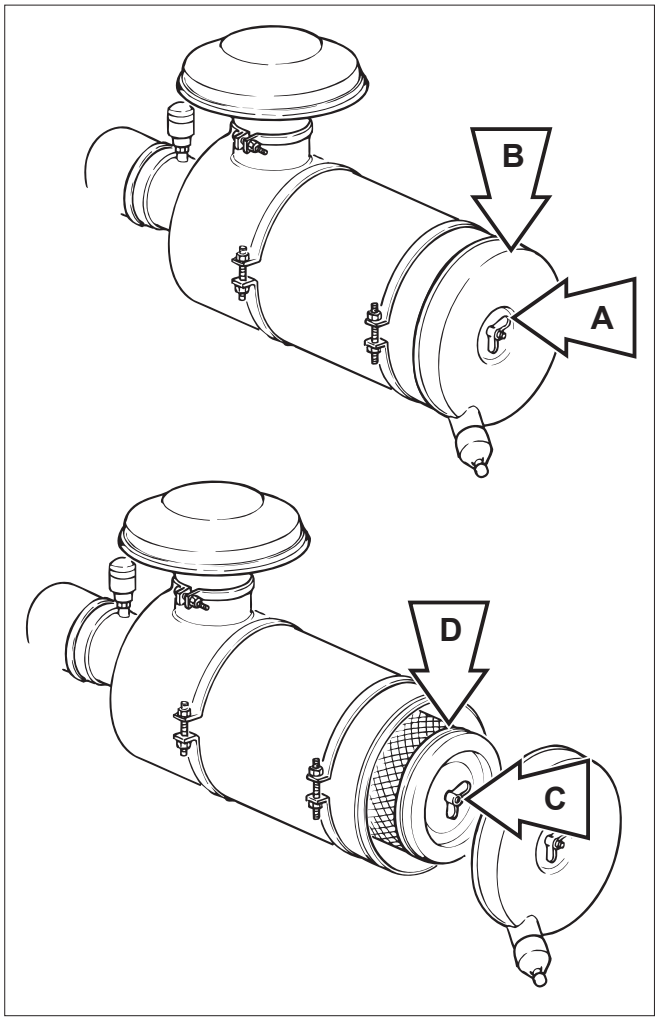
CAUTION

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

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

Changing the external element:

- Stop the engine and engage the parking brake.
- Unscrew wingnut **A** and remove cover **B**.
- Unscrew wingnut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Smear the seal with grease, then mount the new element **D** and make sure it is correctly positioned.
- Tighten wingnut **C**, close cover **B** and tighten with wingnut **A**.

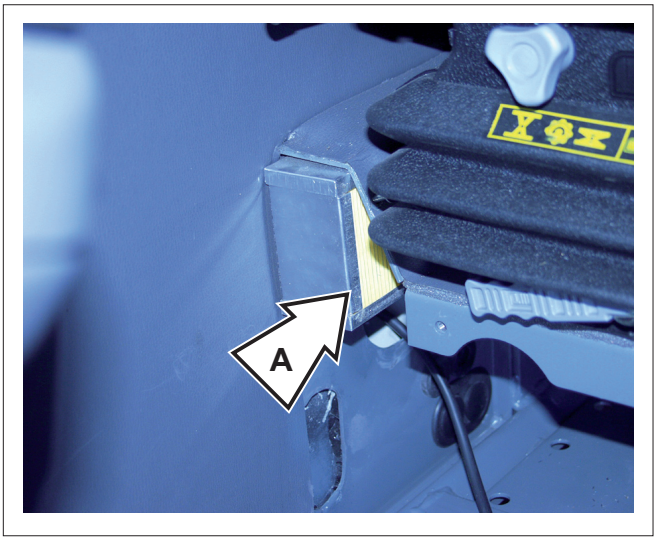


WARNING

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

D-9 CLEAN THE CAB AIR FILTER

If the machine comes with a closed cab, clean the air filter in the cab every six months. Replace the cartridge if the filtering cloth is damaged.



Cleaning and changing the cartridge:

- Shut the engine down and engage the parking brake.
- Pull out the filter **A** located to the left of the driving place.
- Clean the filter bowl.
- Clean the filter cartridge and replace in case of damage.

CAUTION

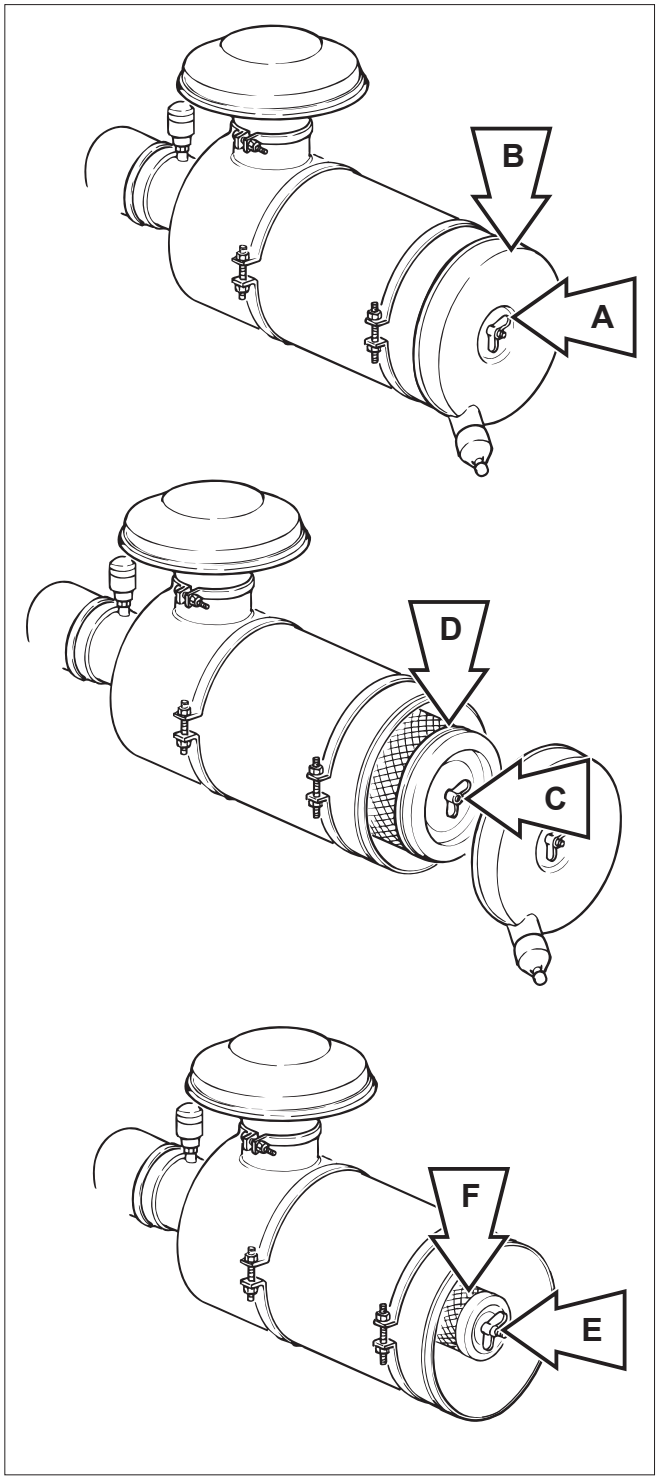
Paper filters must never be cleaned using compressed air or washed with water and/or solvents.

4.7 TABLE E PROCEDURES

E-1 CHANGE THE SAFETY ELEMENT OF ENGINE AIR FILTER

To change the safety element:

- Stop the engine and engage the parking brake.
- Unscrew wingnut **A** and remove cover **B**.
- Unscrew wingnut **C** and remove the outer element **D**.
- Loosen wing nut **E** and remove the inner element **F**.
- Clean the filter bowl.
- Smear the seal with grease, then mount the new element and make sure it is correctly positioned.
- Tighten wingnut **E**.
- Refit the outer element **D** and tighten wingnut **C**.
- Close cover **B** and tighten with wingnut **A**.



⚠WARNING

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

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

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

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

NOTICE

Place a container of suitable size under the plug.

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

Recommended oil:

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

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

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

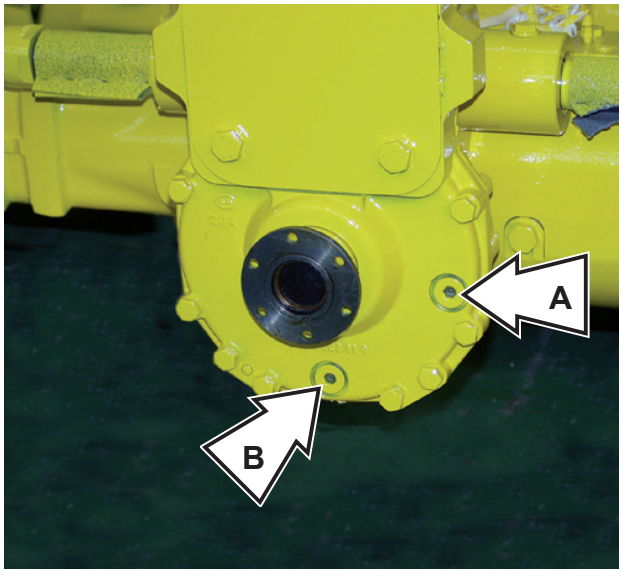
NOTICE

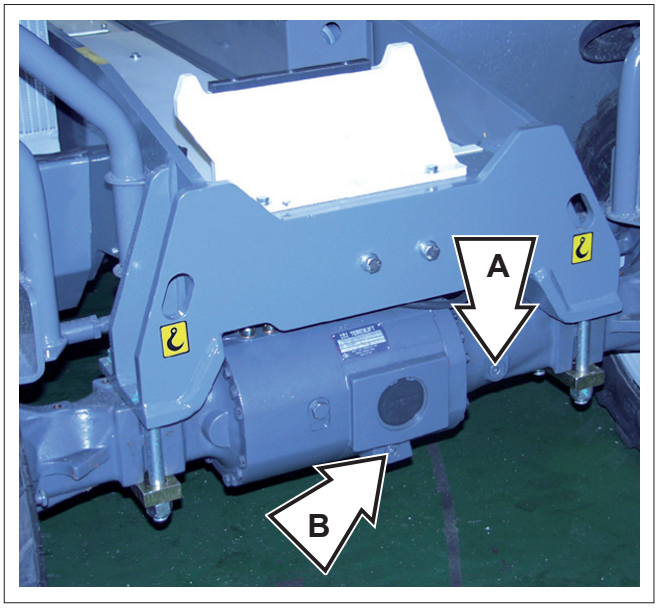
Place a container of suitable size under the plug.

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

Recommended oil:

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





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

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

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

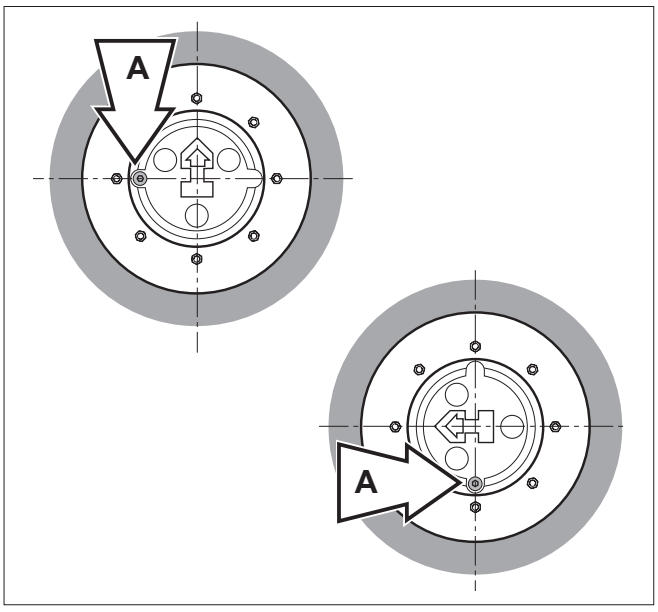
NOTICE

Place a container of suitable size under the plug.

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

Recommended oil:

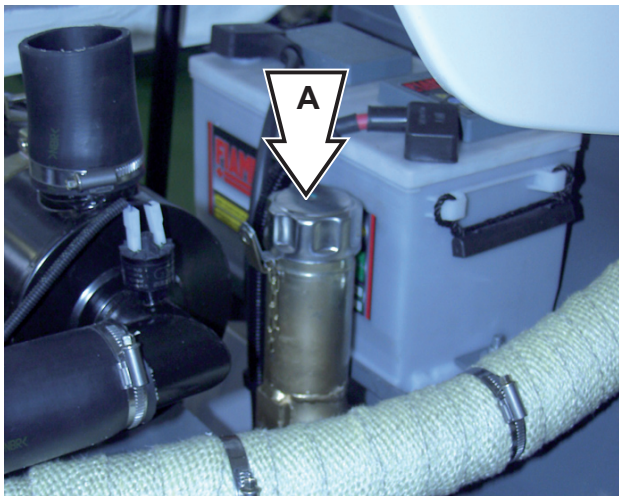
- **FUCHS TITAN GEAR LS 85 W-90 API GL-5 LS / GL-5**

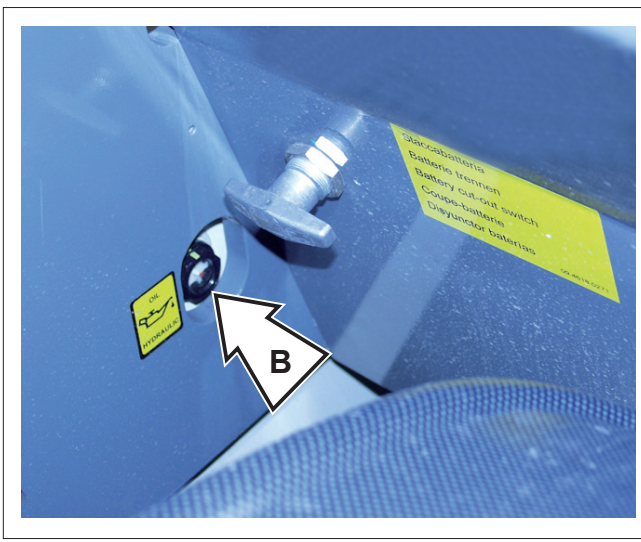


E-4 CHANGE THE HYDRAULIC OIL

To change the hydraulic oil:

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



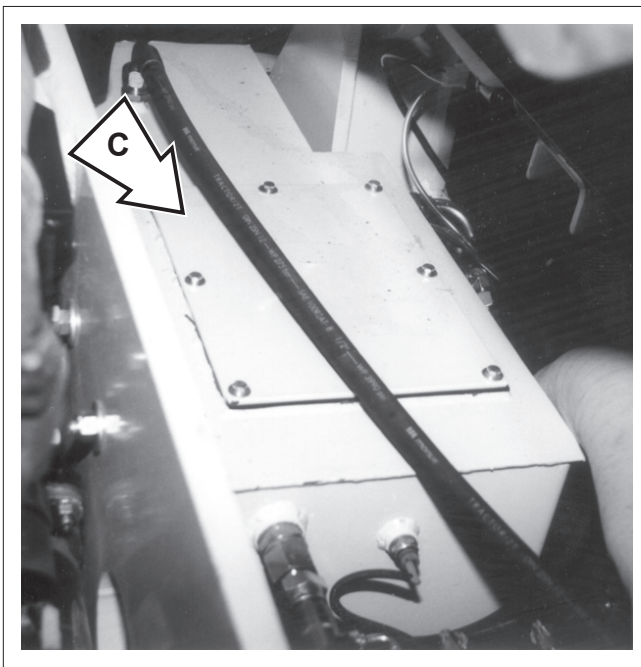


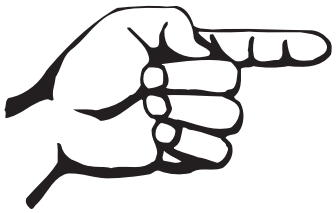
Recommended oil:

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

NOTICE

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





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Section 5
TROUBLESHOOTING

SECTION INDEX

5.1 Introduction.....page 2
5.2 About this section.....3
5.3 Problems-Causes-Solutions.....4
5.3.1 Hydraulic faults.....4
5.3.2 Electrical faults.....9

5.1 INTRODUCTION

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

Before troubleshooting:

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

⚠DANGER

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

⚠WARNING

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

⚠WARNING

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

CAUTION

Perform all troubleshooting on a firm level surface.

CAUTION

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

5.2 ABOUT THIS SECTION

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

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

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

The tables should be read as follows:

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

CAUTION

For any further information, contact the GENIE Service Centre.

5.3 INCONVENIENTI-CAUSE-RIMEDI

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 280 bar
	Hydraulic pump damaged	Replace the pump
	Load sensing valve defective	Check the efficiency of the valve; replace if necessary
	The valve of the main valve leaks	Dismantle the valve, check and eliminate any foreign matters
	Pressure reducing valve maladjusted	Check the efficiency and, if necessary, reset the correct pressure (28 bar)
	Joystick damaged	Check the efficiency of the joystick; replace if necessary
Wrong wheel shafting	Leakage in the steering cylinders	Check and replace the seals if necessary
	Leakage in the steer selection solenoid valve	Check the efficiency of the solenoid valve
The steering wheel is hard (low force in the cylinders)	Low pressure	Check the pressure; in case, reset (170 bar)
	Priority valve damaged	Check the efficiency of the valve; replace if necessary
Low booster supply	Pump damaged	Change the pump
	Motor damaged	Change the motor
The machine drive is not enough	Hydraulic oil filter restricted	Change the oil filter
	Low hydraulic oil level	Replenish the tank up to the recommended level

Problem	Cause	Solution
	The oil in the tank is contaminated	Drain the oil, clean tank and pipes, empty the pumps and add new oil
No shift between 1st and 2nd mechanical gear	Low booster pressure	Check the booster pressure of the drive pump; re-calibrate if necessary
	Gearbox solenoid valve damaged	Check the mechanical movement of the solenoid pin and change the pin if necessary
	Mechanical geearbox piston defective	Check the piston operation
	Gearbox gears damaged	Check the gears and replace if necessary
By stepping down on the pedal, the machine does not brake	Brake pump damaged	Check the pump operation and bleed the system if necessary
	Front axle brakes defective	Check the operation of the brake disks of the front axle
When the engine is stopped, the lifting cylinder does not support the boom	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the engine is stopped, the cylinder does not support the forks	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the engine is stopped and the boom is high, the extension cylinder moves in	Block valves damaged or dirty	Check the efficiency of the valves; replace if necessary
	Cylinder seal defective	Replace the seal
When the load is lifted, the fork cannot be levelled	Seals of the levelling cylinder worn out	Dismantle the cylinder and replace the seals
	Shockproof valves of the main valve dirty or maladjusted	Remove the valves, dry-clean or replace if damaged, and re-calibrate
	One-way valves of the levelling cylinder dirty or damaged	Remove the valves, dry-clean or replace if damaged, and replace in their seats

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

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

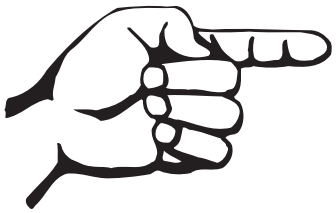
Problem	Cause	Solution
	Foreign matters on the sliding blocks and the relevant surfaces of the boom	Check and eliminate any foreign matters
Low traction	Drive pump defective	Check the pressure values of the drive pump and re-calibrate if necessary. If the overfeeding pressure drops down, replace the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

5.3.2 Electrical faults

Problem	Cause	Solution
No power to dashboard	Battery switch off	Turn on the switch
	Battery down	Check the battery efficiency; replace if necessary
	50A fuse blown	Change the fuse
	Dashboard damaged	Check the dashboard and replace if necessary
	Broken or damaged wiring	Reconnect or replace the wiring
Engine does not start, starter does not run	50A fuse blown	Change the fuse
	Dashboard damaged	Check the dashboard and replace if necessary
	K02 relay damaged	Change the relay
	Speed switch ruined	Check or replace the speed switch
	70A 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 F13 broken	Change the fuse
	Relays K03-K04-K05 damaged	Change the relays

Problem	Cause	Solution
	Forward/reverse speed solenoid valves damaged	Check the efficiency or replace
	Parking brake micro-switch damaged	Check the efficiency or replace
	Parking brake switch	Check the efficiency or replace
	Broken or damaged wiring	Reconnect or replace the wiring
No steer selection	Fuse F12 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	Fuse F4 blown	Change the fuse
	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	Fuse F4 blown	Change the fuse
	Dashboard instrument damaged	Change
	Broken or damaged wiring	Reconnect or replace the wiring
The fuel gauge does not work	Fuse F4 blown	Change the fuse
	Dashboard instrument damaged	Change
	Fuel sensor defective	Check and replace the sensor if necessary
	Broken or damaged wiring	Reconnect or replace the wiring

Problem	Cause	Solution
The engine coolant thermometer does not work	Fuse F4 blown	Change the fuse
	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 F12 blown	Change the fuse
	Road-jobsite-platform selector damaged	Check and replace the selector if necessary
	Yellow button on control lever	Check the efficiency of the yellow pushbutton
	Main valve selection valve	Check the efficiency of the solenoids and replace if they are damaged
	Broken or damaged wiring	Reconnect or replace the wiring
The joystick does not operate the attachment locking/unlocking	Fuse F12 blown	Change the fuse
	Red button on control lever	Check the efficiency of the red pushbutton
	Main valve selection valve	Check the efficiency of the electrical coils and replace if they are damaged
	Mouvement selection button	Check the efficiency or replace



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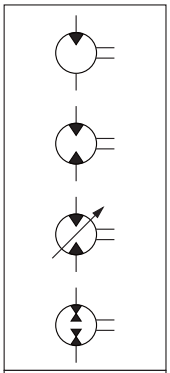
Section 6
SCHEMES

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6.4.11	Engine compartment fuses and relays	20
6.5	Position of the electrical and hydraulical components on the machine	21

6.1 HYDRAULIC SYMBOLS

MOTORS



Fixed motor with one direction of flow

Fixed motor with two directions of flow

Variable motor with two directions of flow

Reversible fixed motor with two directions of flow

PUMP

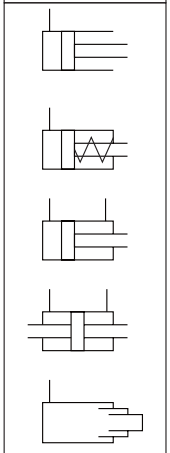
Fixed displacement pump with one direction of flow

Fixed displacement pump with two directions of flow

Variable displacement pump with one direction of flow

Variable displacement pump with flow regulator

CYLINDERS



Single-acting cylinder

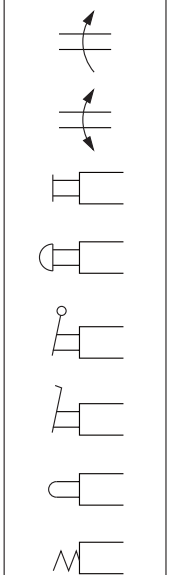
Single-acting cylinder with spring return

Double-acting cylinder

Double-acting cylinder with bilateral rod

Telescopic cylinder

COMMANDS AND CONTROLS



Shaft rotating in one direction

Shaft rotating in two directions

Hand-operated control

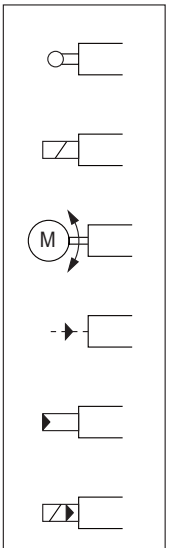
Hand-operated control with pushbutton

Hand-operated control with lever

Hand-operated control with pedal

Mechanical control with pushbutton

Mechanical control with spring



Mechanical control with roller

Electro-magnetic control with winding (solendoid)

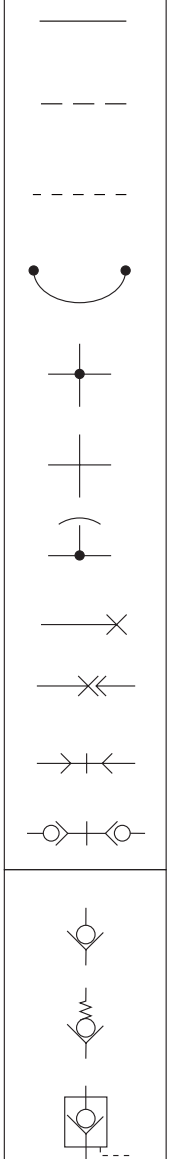
Control with electric motor

Direct pressure control

Indirect (piloted) pressure control

Control with electromagnet and piloted distributor

PIPES AND CONNECTIONS



Induction and return pipe

Piloting pipe

Blow-by pipe

Flexible hose

Connecting point

Pipe cross without connection

Breather

Closed pressure fitting

Pressure fitting with connected pipe

Quick fitting

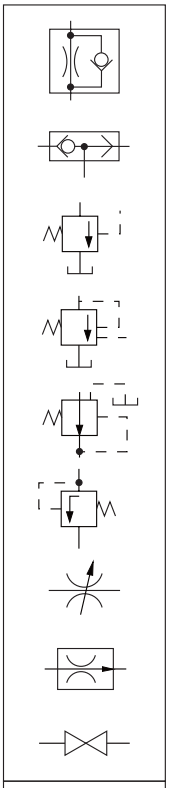
Quick fitting with check valves

DISTRIBUTION - SETTING ELEMENTS

Non-return valve

Calibrated non-return valve

Unlockable non-return valve



Combined non-return and throttle valve

Switching valve

Pressure relief valve with direct control

Pressure relief valve with hydraulic control

Pressure reducing valve

Sequence valve

Adjustable throttle valve

Two-way flow regulator

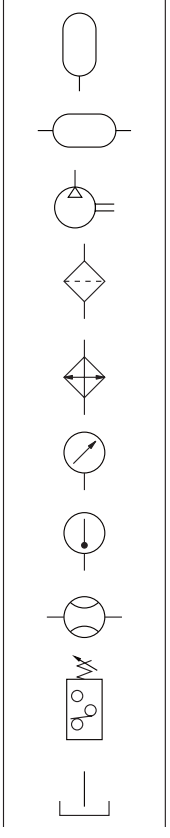
Cut-out cock

POWER SOURCES

Electric motor

Thermal engine

OTHER EQUIPMENT



Accumulator

Water tank

Compressor

Filter

Cooler

Pressure gauge

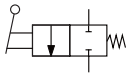
Thermometer

Flowmeter

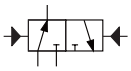
Pressure switch

Drain to tank indication

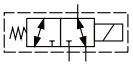
DISTRIBUTION - SETTING ELEMENTS



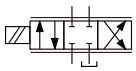
Two-position and two-way distributor, with manual lever control and spring return



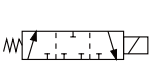
Three-way and two-position distributor, with hydraulic control



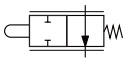
Two-position, three-way distributor, with electro-magnetic control and spring return



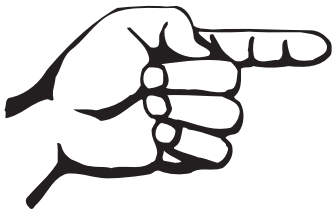
Distributor with mechanical control and span proportional to the action of the same control



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



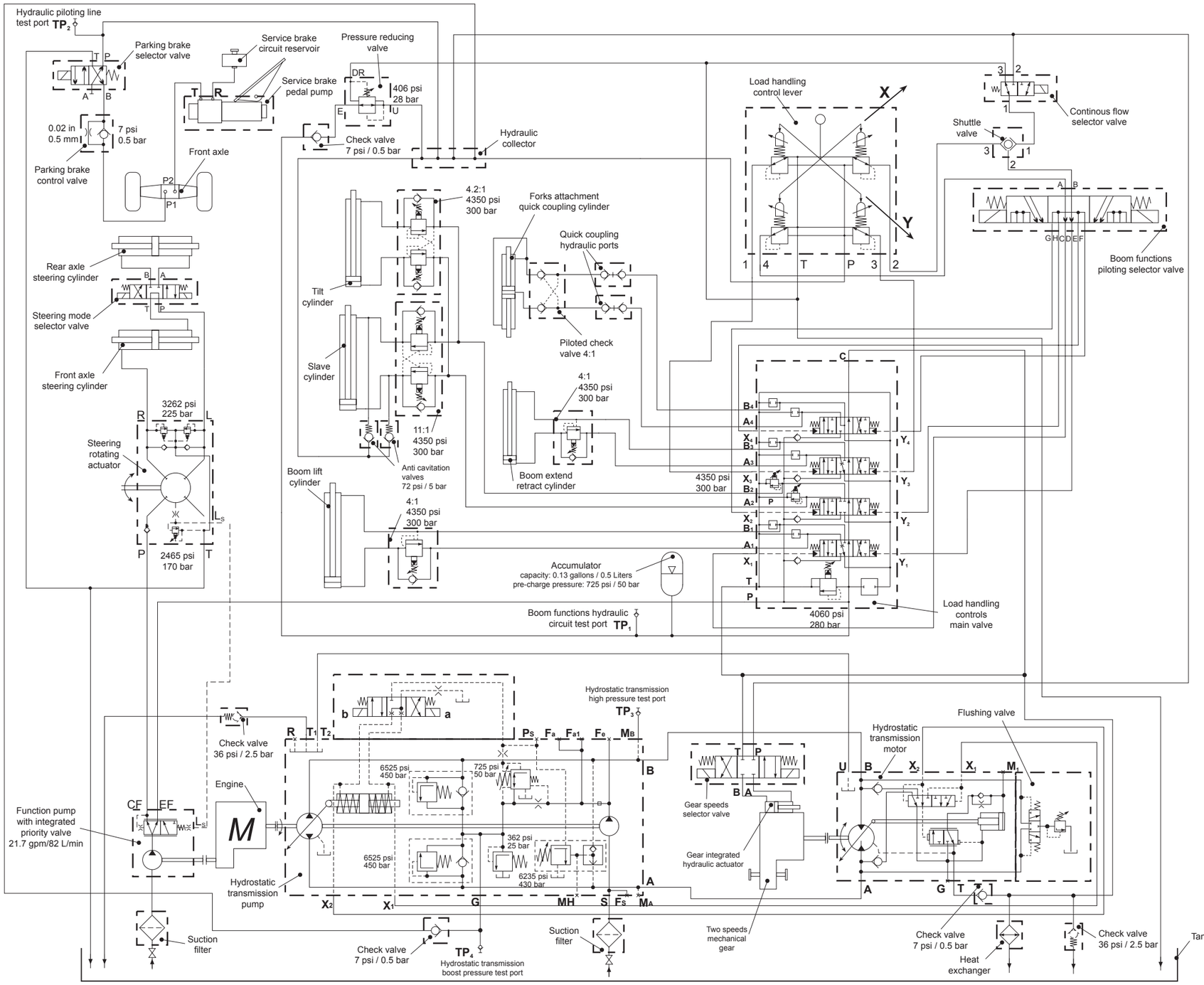
Electro-hydraulic single-acting servo valve

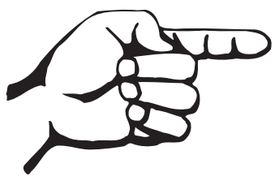


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6.2 HYDRAULIC SCHEME

6.2.1 GTH 66-22 • 66-22S

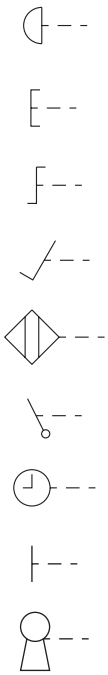




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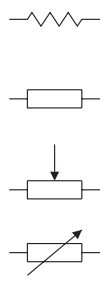
6.3 ELECTRICAL SYMBOLS

ACTUATORS



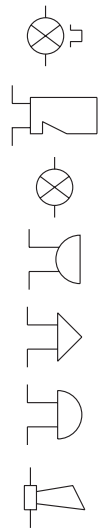
Emergency controls
Pushbutton control
Rotary control
Pedal control
Proximity control
Lever control
Timed control
Mechanical/manual control
Key control

RESISTANCES



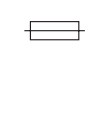
Resistance
Resistor
Potentiometer
Variable resistance

SIGNALS



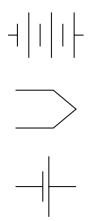
Intermittent lamp
Whistle
Lamp
Buzzer
Siren
Bell
Horn

FUSES AND RELAYS



Horizontal fuse
Relay

ACCUMULATORS



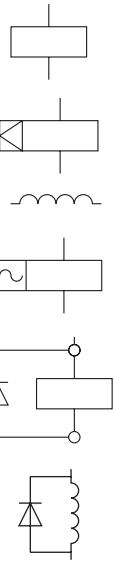
Battery
Thermocouple
Element

TERMINALS AND GROUNDS



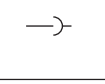
Ring
Ground
Terminal
Ground to frame
Knot
Protection ground
Frame ground 2

COILS



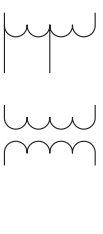
Coil
Mechanical coupling coil
Winding
A/C coil
Coil with diode
Winding with diode

CONNECTORS



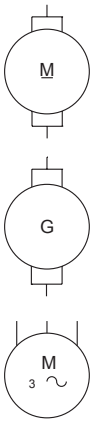
Connector

STATIC APPLICATIONS



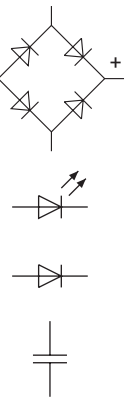
Auto-transformer
Transformer

DYNAMIC APPLICATIONS



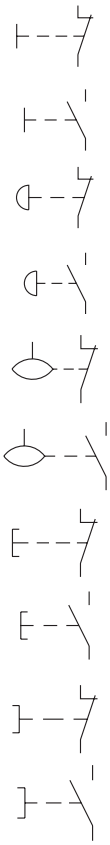
Motor
Generator
As_3p_motor

ELECTRONIC PARTS



Rectifier
Light-emitting diode
Diode
Condenser

PUSHBUTTONS



Manual NC contact
Manual NO contact
NC mushroom-head pushbutton
NO mushroom-head pushbutton
NC level
NO level
Pushbutton with NC return
Pushbutton with NO return
NC tie-rod
NO tie-rod

CONTACTS


Thermal


Normally open (NO)


Normally closed (NC)


NO limit switch


NC limit switch


Contactor

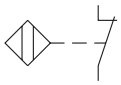

Magneto-thermal closure


Magneto-thermal opening

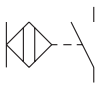

Thermal closure

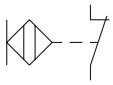

Thermal opening


Exchange


NC proximity


NO proximity


NO mechanical

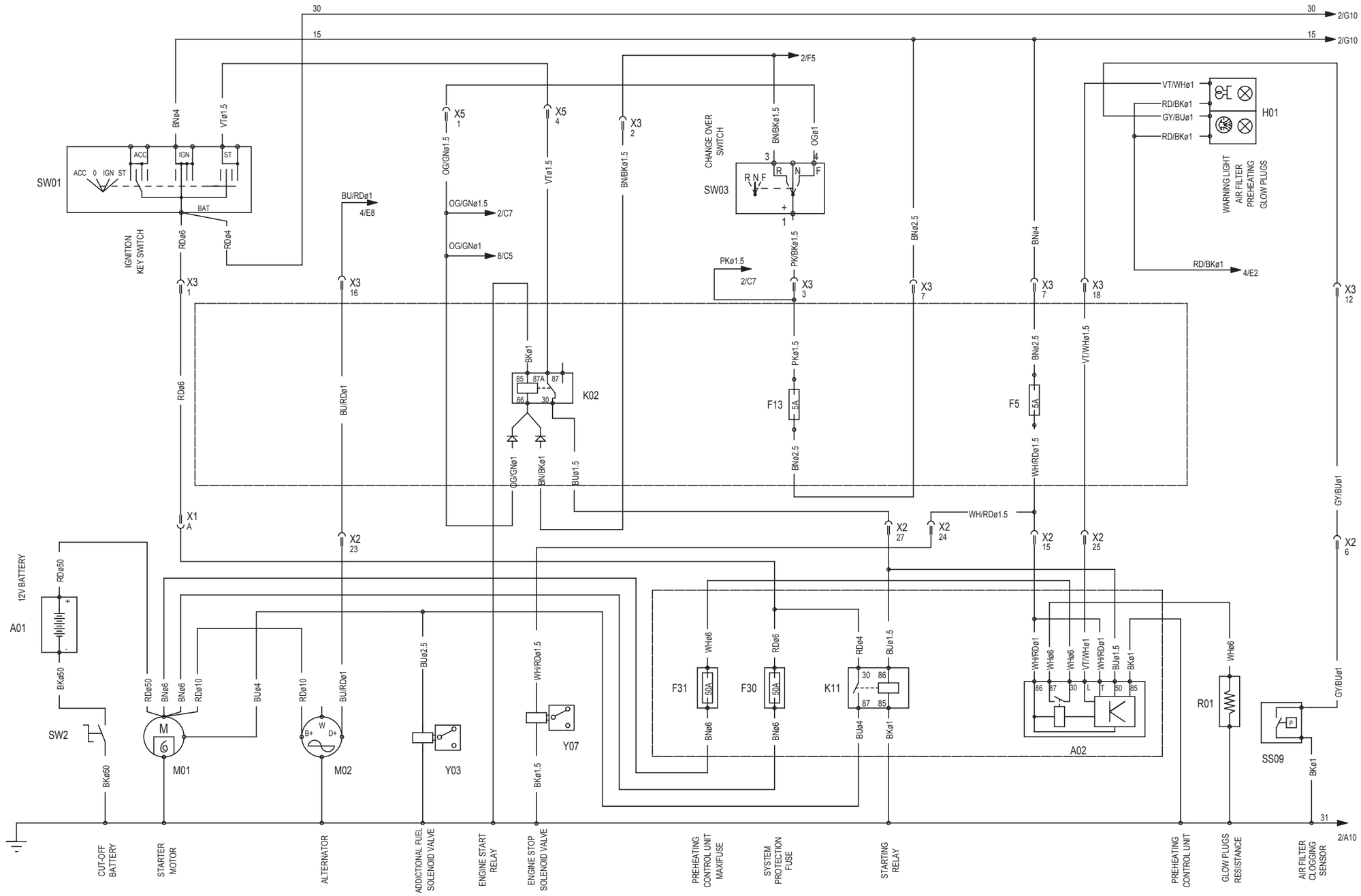

NC mechanical


Selector


Selector2

6.4 WIRING DIAGRAMS

6.4.1 Sheet 1 of 8



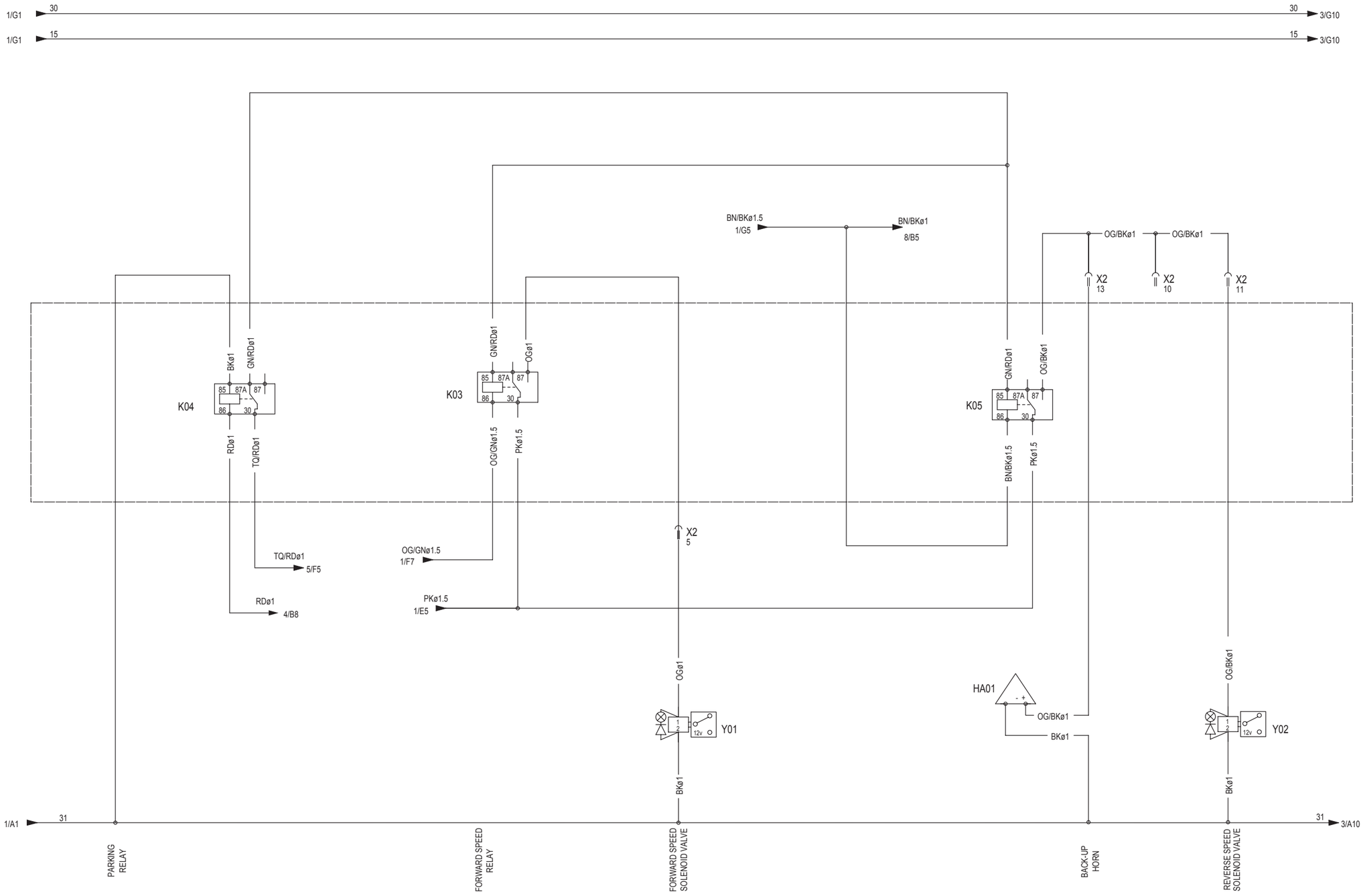
LIST OF ABBREVIATIONS

Label	Description
F##	Fuses
H##	Lamps, lights, warning lights
HA##	Clacson or back-up horn
K##	Relays
M##	Motor or pump
P##	Indicators
R##	Resistance
RP##	Potentiometers
SW##	Switches, selectors
SS##	Sensors, micro-switches, pressure switches, transducers
Y##	Solenoid valves
X##	Connectors
A##	Other components

COLOUR TABLE

Acronym	Colour
BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Purple
GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.2 Sheet 2 of 8



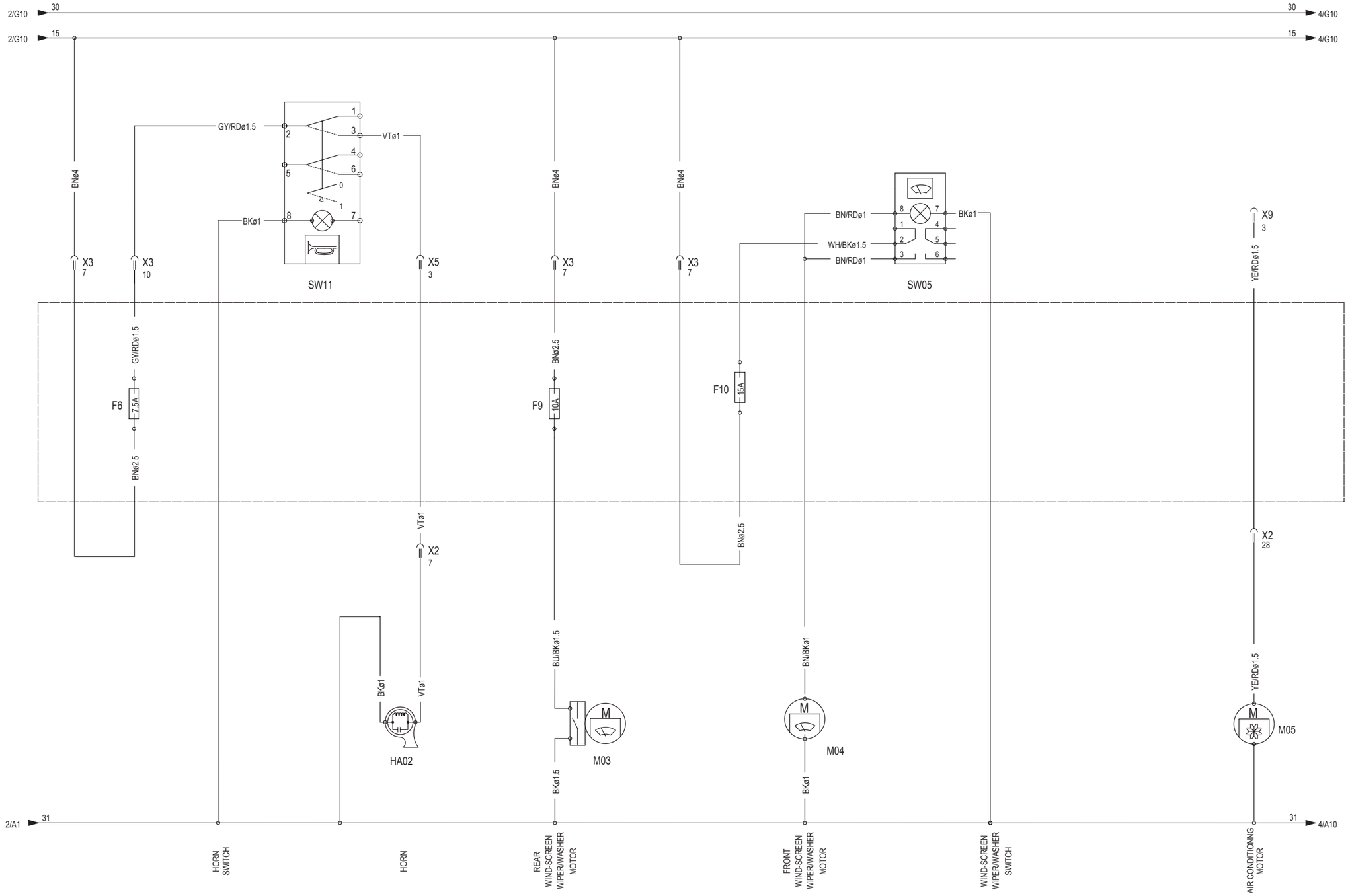
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GN	Green
BU	Blue
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GY	Grey
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PK	Pink
TQ	Light blue

6.4.3 Sheet 3 of 8



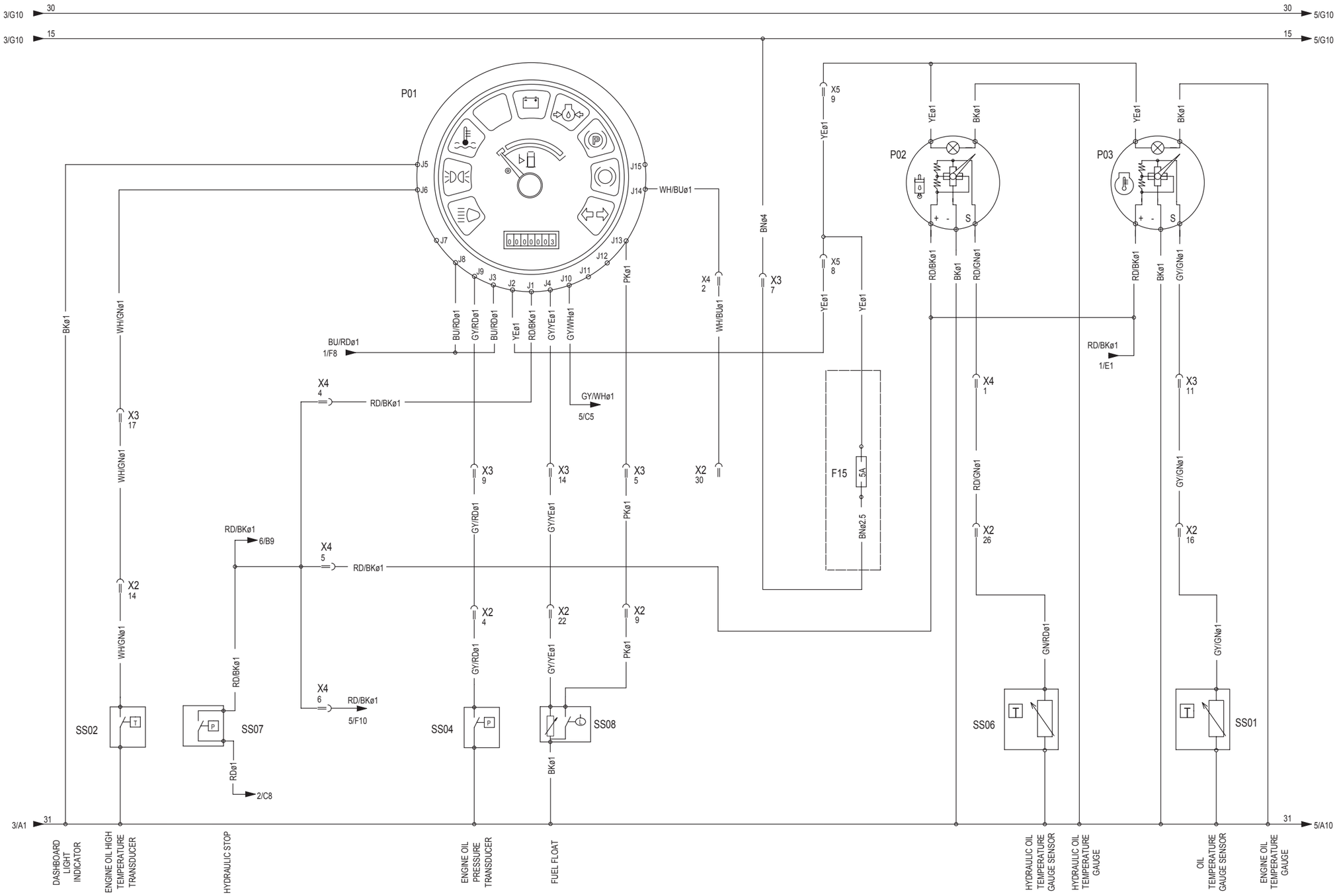
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BU	Blue
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GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.4 Sheet 4 of 8



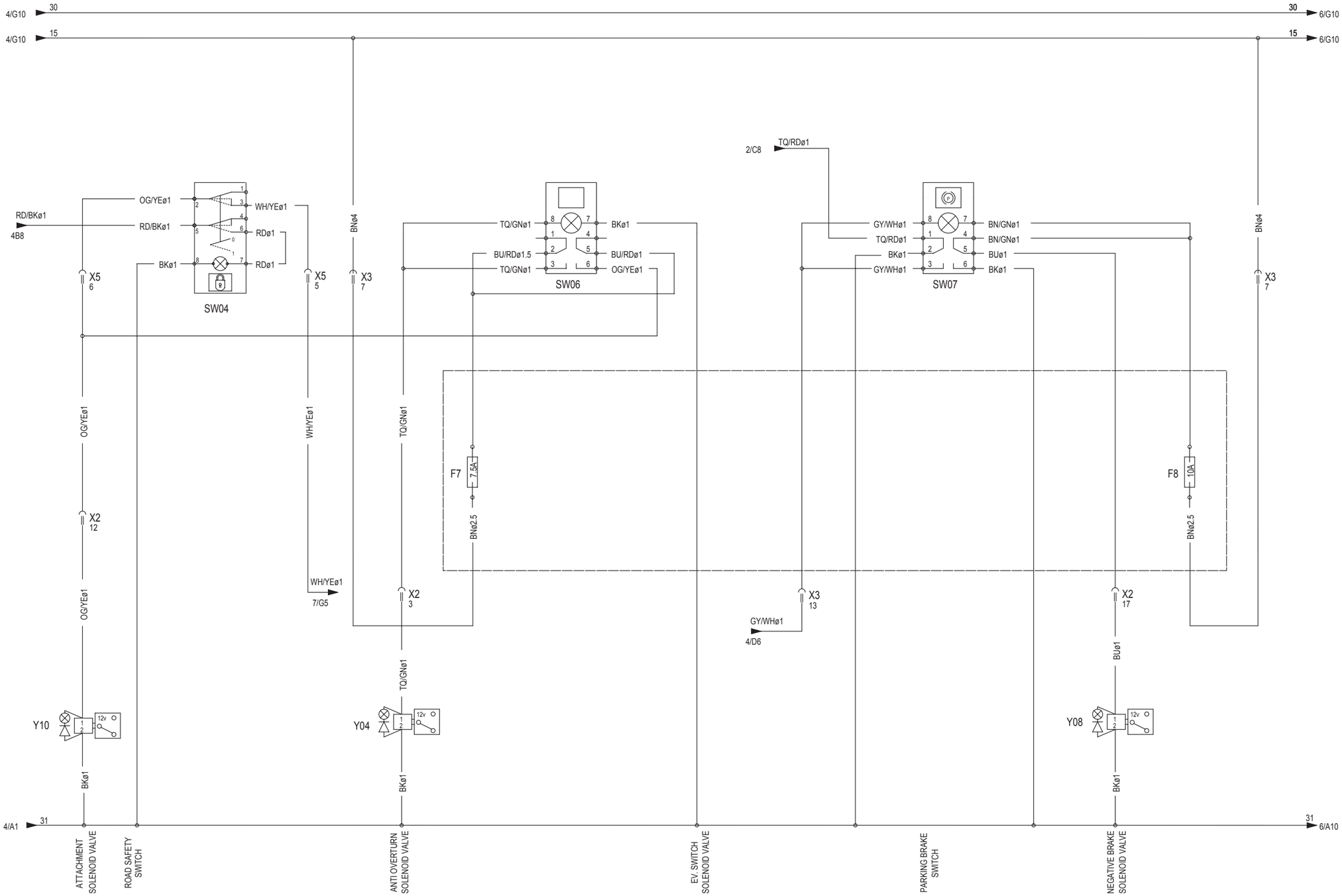
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GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.5 Sheet 5 of 8



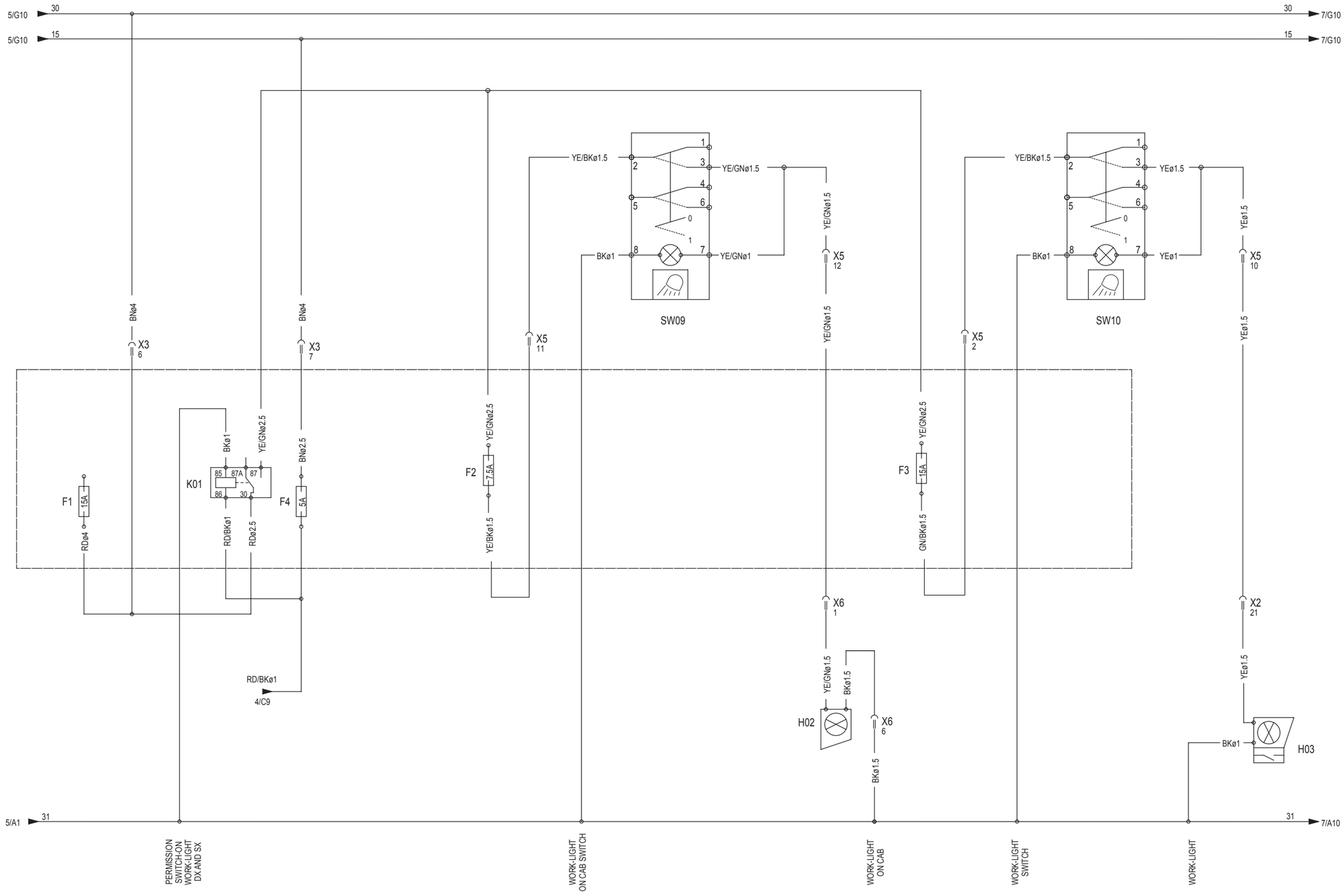
LIST OF ABBREVIATIONS

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A##	Other components

COLOUR TABLE

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OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Purple
GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.6 Sheet 6 of 8



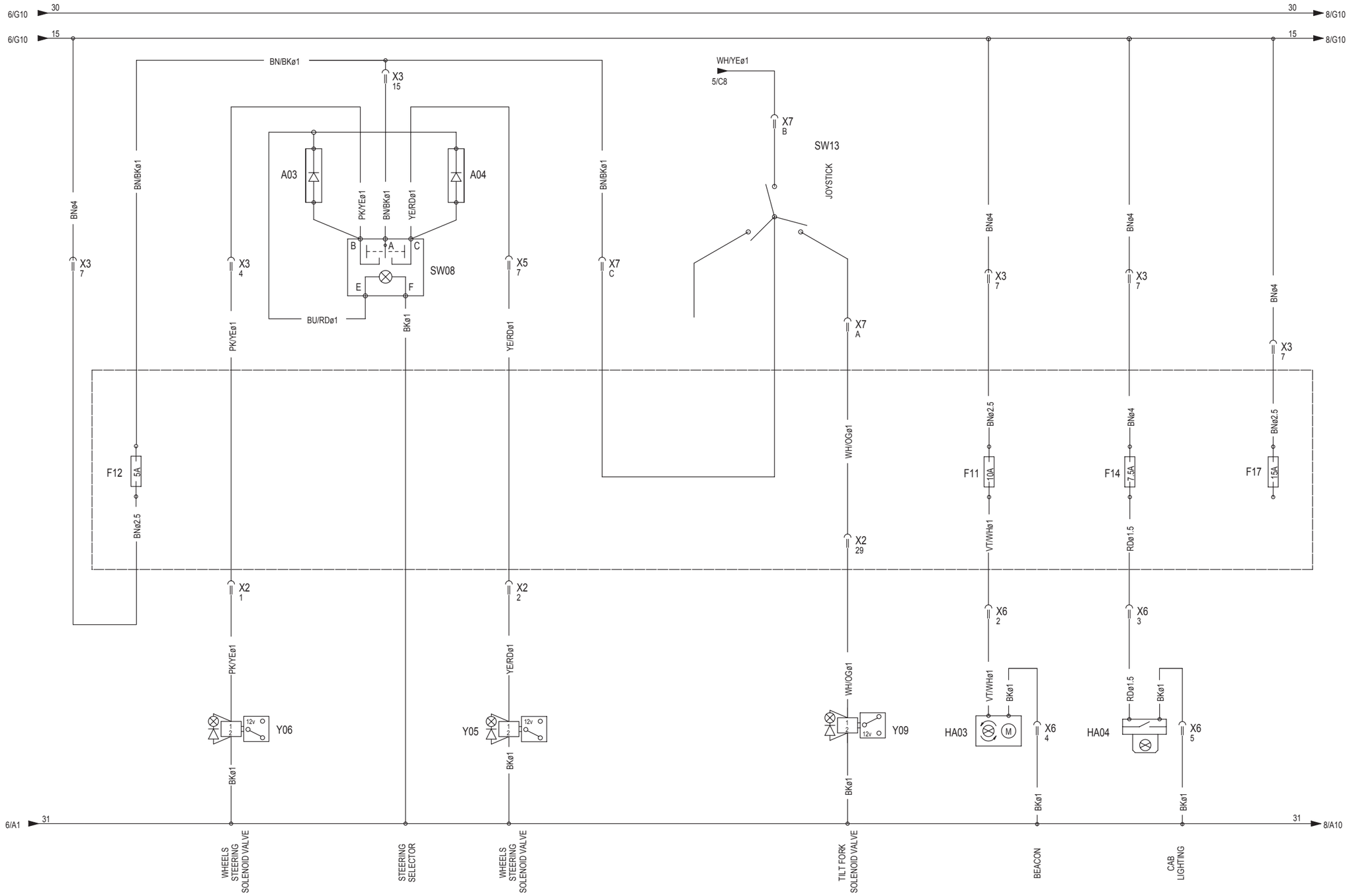
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GY	Grey
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PK	Pink
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6.4.7 Sheet 7 of 8



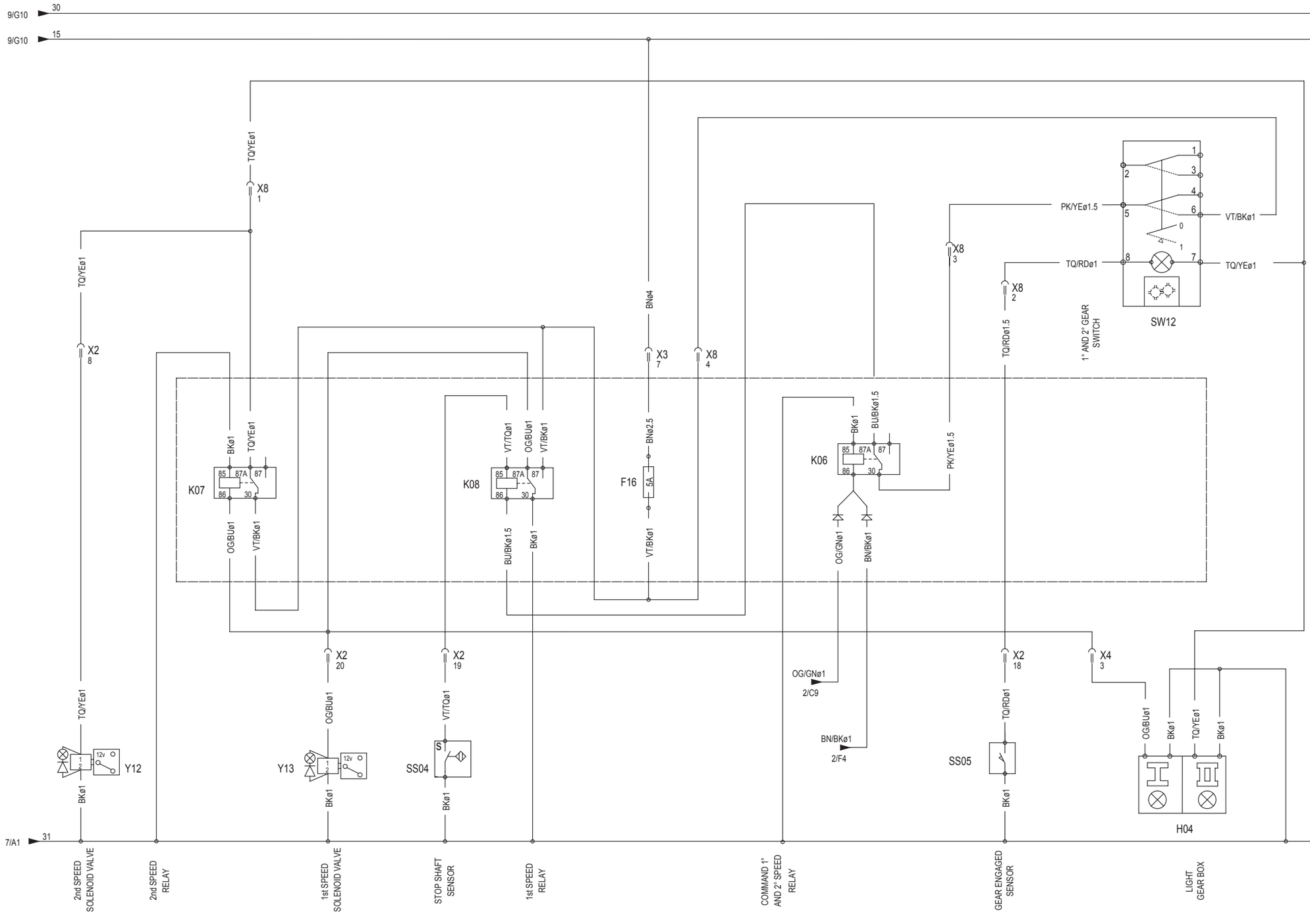
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HA##	Clacson or back-up horn
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OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Purple
GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.8 Sheet 8 of 8



LIST OF ABBREVIATIONS

Label	Description
F##	Fuses
H##	Lamps, lights, warning lights
HA##	Clacson or back-up horn
K##	Relays
M##	Motor or pump
P##	Indicators
R##	Resistance
RP##	Potentiometers
SW##	Switches, selectors
SS##	Sensors, micro-switches, pressure switches, transducers
Y##	Solenoid valves
X##	Connectors
A##	Other components

COLOUR TABLE

Acronym	Colour
BK	Black
BN	Brown
RD	Red
OG	Orange
YE	Yellow
GN	Green
BU	Blue
VT	Purple
GY	Grey
WH	White
PK	Pink
TQ	Light blue

6.4.9 Wiring diagram - Component description

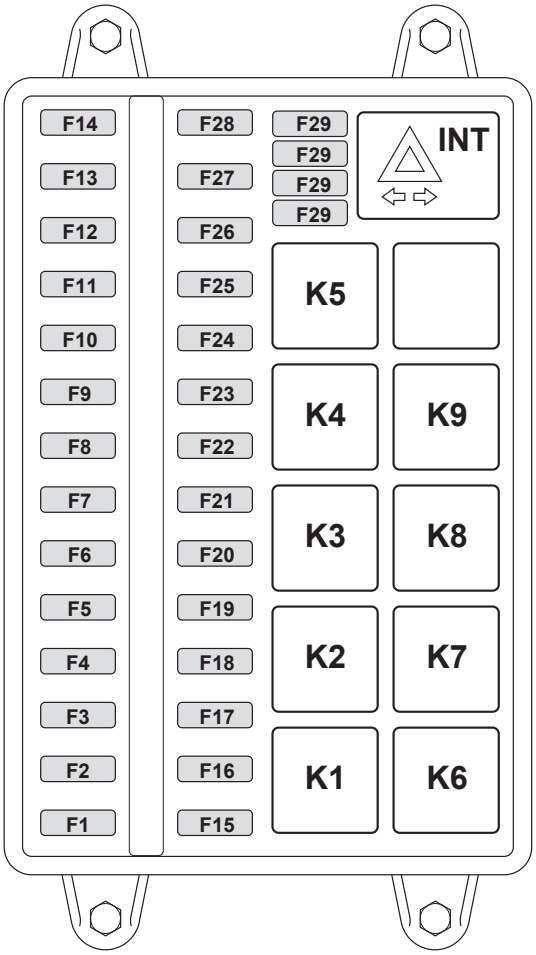
Ref.	Description	Sheet
A01	12 V BATTERY	1
A02	PREHEATING CONTROL UNIT	1
A03	DIODE	7
A04	DIODE	7
F1	OPTIONAL	1
F2	POWER SUPPLY CHANGE GEAR SWITCH	6
F3	POWER SUPPLY LIGHTS WORK	6
F4	POWER SUPPLY E1 RELAY, HYDRAULIC OIL INDICATOR, LIGHT INSTRUMENTS, STOPPED ATTACHMENT SWITCH	1
F5	POWER SUPPLY ENGINE STOP SOLENOID VALVE, CONTROL UNIT GLOW PLUGS	1
F6	HORN	3
F7	POWER SUPPLY ANTI-OVERTURN	5
F8	POWER SUPPLY PARKING BRAKE SWITCH	5
F9	POWER SUPPLY REAR WIND-SCREEN WIPER/WASHER	3
F10	POWER SUPPLY FRONT WIND-SCREEN WIPER/WASHER	3
F11	POWER SUPPLY BEACON	6
F12	POWER SUPPLY STEERING SELECTOR, MANIPULATOR	7
F13	POWER SUPPLY RELAY 3, RELAY 5, CHANGHE OVER SWITCH	1
F14	POWER SUPPLY INTERIOR LAMP	6
F15	LIGHTINING INSTRUMENT PANEL, HYDRAULIC OIL TEMPERATURE INSTRUMENT, MOTOR OIL INSTRUMENT	4
F16	POWER SUPPLY RELAY 7, REALY 8, CHANGE GEAR SWITCH	8
F17	OPTIONAL	8
F18	OPTIONAL	
F19	OPTIONAL	
F20	OPTIONAL	
F21	OPTIONAL	
F22	OPTIONAL	
F23	OPTIONAL	
F24	OPTIONAL	
F25	OPTIONAL	
F26	OPTIONAL	
F27	OPTIONAL	
F28	OPTIONAL	
F30	PREHEATING CONTROL UNIT MAXIFUSE	1
F31	POWER SUPPLY WARM AIR VENTILATOR SWITCH	1
H01	WARNING LIGHTS: AIR FILTER AND PREHEATING GLOW PLUGS	1
H02	CAB LIGHTING	6
H03	WORK-LIGHT	6
H04	LIGHTS CHANGE GEAR	8
HA01	BACK-UP HORN	2
HA02	HORN	3
HA03	BEACON	6
HA04	CAB LIGHT	6
K01	PERMISSION SWITCH-ON LIGHT-WORK DX AND SX	6
K02	SWITCH-ON RELAY	1
K03	FORWARD SPEED RELAY	2
K04	PARKING RELAY	2
K05	REVERSE SPEED RELAY	3
K06	COMMAND 1° AND 2° SPEED RELAY	8
K07	2° GEAR RELAY	8
K08	1° GEAR RELAY	8
K09	OPTIONAL	
K10	OPTIONAL	
K11	STARTING RELAY	1
M01	STARTER MOTOR	1
M02	ALTERNATOR	1
M03	REAR WIND-SCREEN WIPER/WASHER MOTOR	3
M04	FRONT WIND-SCREEN WIPER/WASHER MOTOR	3
M05	AIR CONDITIONING MOTOR	3
P01	WARNING LIGHTS-FUEL GAUGE	4
P02	HYDRAULIC OIL TEMPERATURE GAUGE	4
P03	ENGINE OIL TEMPERATURE GAUGE	4
R01	GLOW PLUGS	1
SW01	IGNITION KEY SWITCH	1
SW02	DISCONNECTION BATTERY	1
SW03	CHANGE OVER SWITCH	1
SW04	ROAD SAFETY SWITCH	5
SW05	WINDSCREEN WIPER SWITCHES	3
SW06	V.S.E. SOLENOID VALVE SWITCH	5
SW07	PARKING BRAKE SWITCH	5
SW08	STEERING SELECTOR	7
SW09	CAB WORK LIGHT SWITCH	6
SW10	WORK LIGHT SWITCH	6
SW11	HORN	3
SW12	1° AND 2° SPEED SWITCH	8
SW13	JOYSTICK	7
SS01	OIL TEMPERATURE GAUGE SENSOR	4
SS02	HIGH TEMPERATURE OIL COOLING MOTOR SENSOR	4
SS03	ENGINE OIL PRESSURE TRANSDUCER	4
SS04	STOP SHAFT SENSOR	8
SS05	GEAR ENGAGED SENSOR	8

Ref.	Description	Sheet
SS06	HYDRAULIC OIL TEMPERATURE GAUGE SENSOR	4
SS07	HYDRAULIC STOP	4
SS08	FUEL FLOAT	4
SS09	AIR FILTER CLOGGING SENSOR	1
Y01	FORWARD SPEED SOLENOID VALVE	2
Y02	REVERSE SPEED SOLENOID VALVE	2
Y03	ADDITIONAL FUEL SOLENOID VALVE	1
Y04	OPTIONAL SOLENOID VALVE	5
Y05	WHEEL STEERING SOLENOID VALVE	7
Y06	WHEEL STEERING SOLENOID VALVE	7
Y07	ENGINE STOP SOLENOID VALVE	1
Y08	NEGATIVE BRAKE SOLENOID VALVE	5
Y09	TILT FORK SOLENOID VALVE	7
Y10	ATTACHMENT SOLENOID VALVE	5
Y12	2° SPEED SOLENOID VALVE	8
Y13	1° SPEED SOLENOID VALVE	8
X01	ENGINE CONNECTOR 2 WAYS LINE FUSES	
X02	ENGINE CONNECTOR 31 WAYS LINE FUSES	
X03	COLUMN CONNECTOR 18 WAYS LINE FUSES	
X04	COLUMN CONNECTOR 6 WAYS LINE FUSES	
X05	CAB CONNECTOR 12 WAYS LINE COLUMN	
X06	CAB CONNECTOR 6 WAYS LINE FUSES	
X07	MANIPULATOR CONNECTOR	
X08	COLUMN CONNECTOR 4 WAYS LINE FUSES	
X09	OPTIONAL INTERMITTENCE CONNECTOR	

6.4.10 Fuses and relays

Fuses

Ref.	Circuit	Amp.
F1	Power supply: interior lamp, emergency switch, turn signals +30	15
F2	Power supply: relay K04	7,5
F3	Optional	15
F4	Front right/rear left position lights, license plate lights, position lights indicator, engine oil temperature indicator	5
F5	Front left/rear right position lights, fuel gauge-hourmeter-warning lamps lighting, engine oil cooling temperature indicator light, fan switch, lights selection switch	5
F6	Right low beam	7,5
F7	Left low beam	7,5
F8	Right high beam	10
F9	Left high beam, high beam warning lamp	10
F10	Horn	15
F11	Windscreen washer kit	10
F12	Optional	5
F13	Optional	5
F14	Optional	7,5
F15	Preheating control unit power supply	5
F16	Not used	15
F17	Not used	15
F18	Not used	15
F19	Not used	7,5
F20	Not used	10
F21	Not used	10
F22	Not used	10
F23	Not used	7,5
F24	Not used	5
F25	Not used	10
F26	Not used	10
F27	Not used	10
F28	Not used	25
F29	Spare fuses	

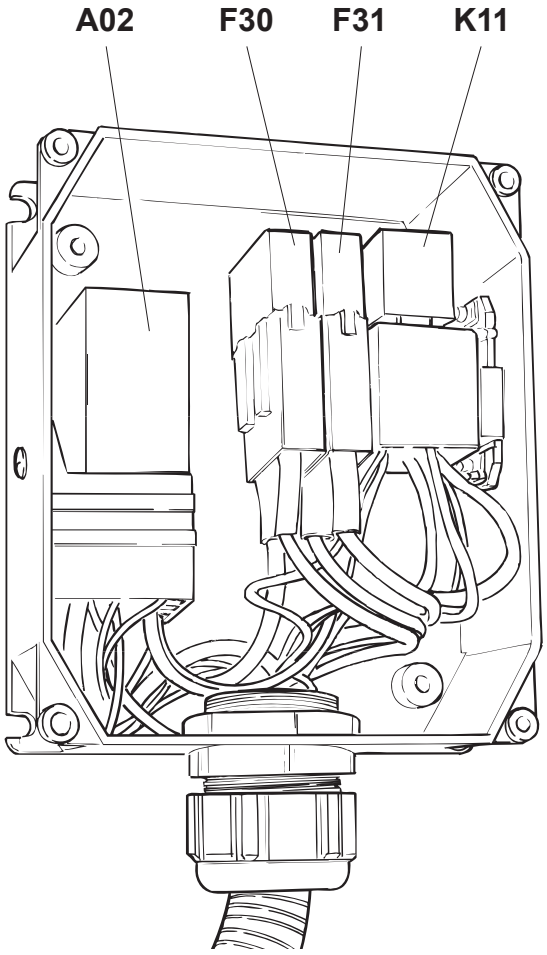


Relays

Ref.	Circuit
K01	Starting enabling command
K02	Forward speed enabling command
K03	Inhibition with brake pedal stepped down
K04	Overload warning system control unit enabling command
K05	Reverse speed enabling command
K06	Overload warning system solenoid valve enabling command
K07	1st and 2nd speed control relay
K08	Shaft stop control unit
K09	K08 power relay

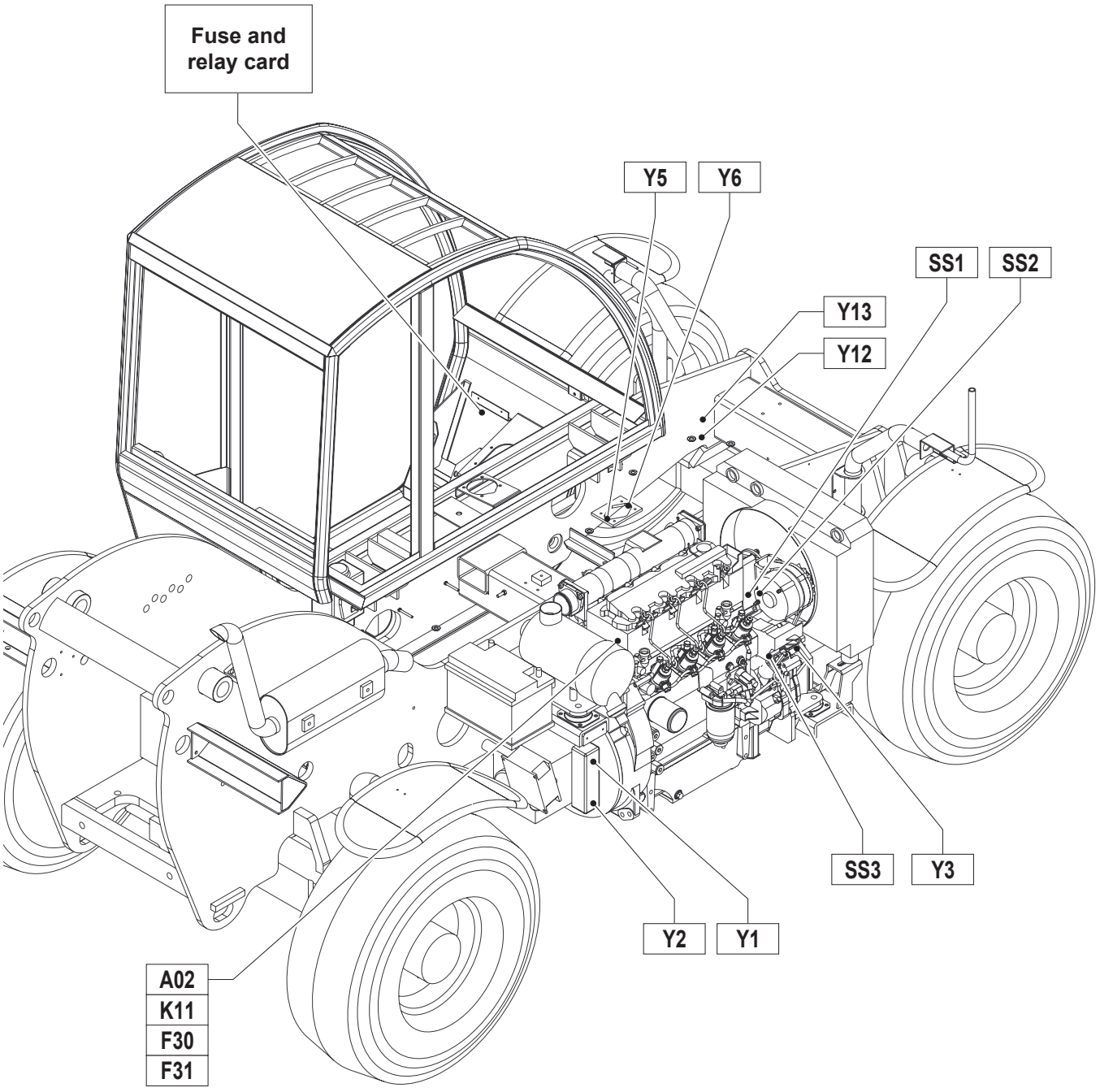
6.4.11 Engine compartment fuses and relays

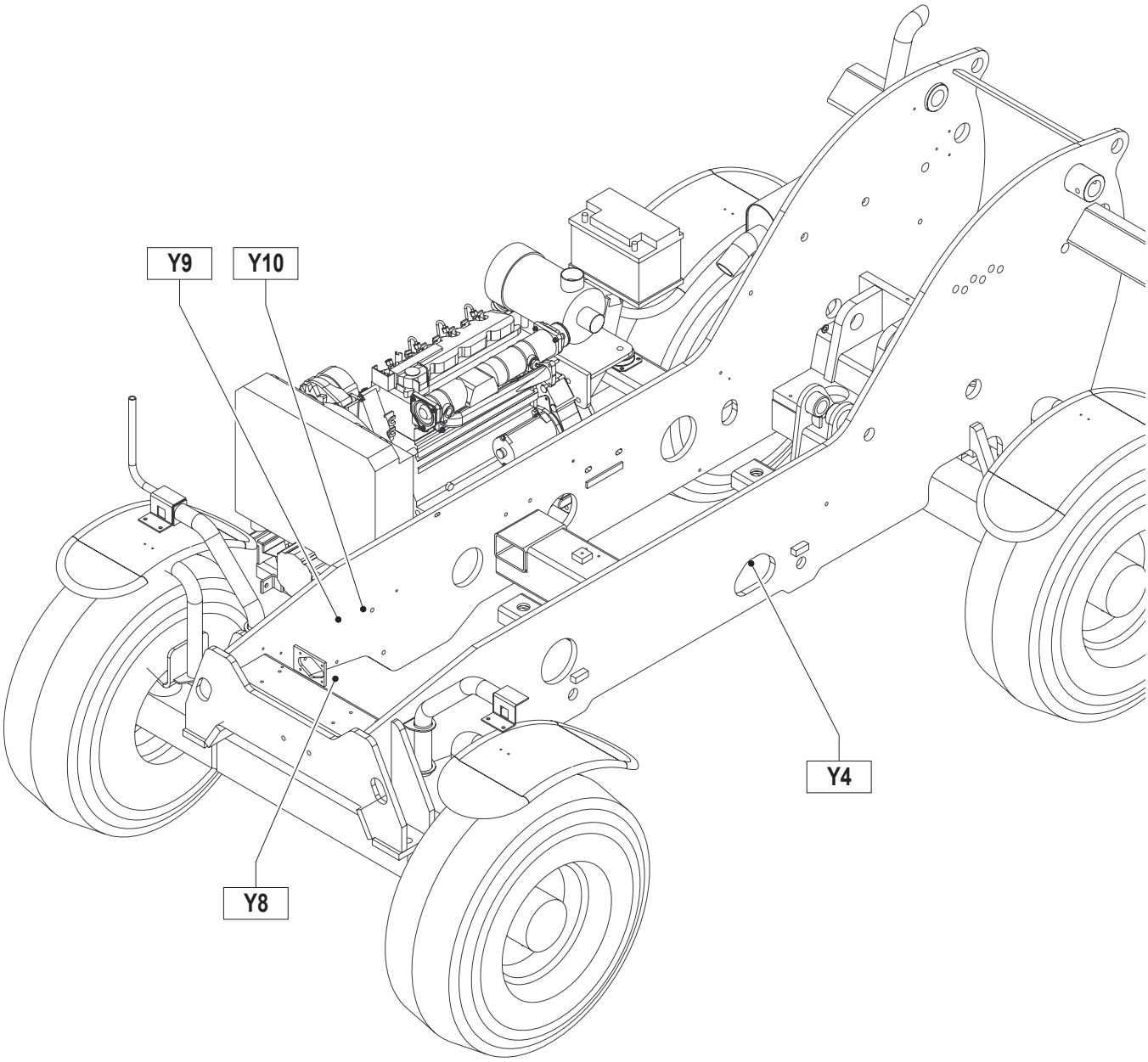
Ref.	Circuit	Amp.
F30	Preheating control unit maxifuse	70
F31	System protection fuse	50
A02	Preheating control unit	
K11	Start relay	



6.5 POSITION OF THE ELECTRICAL AND HYDRAULICAL COMPONENTS ON THE MACHINE

GTH 66-22 • 66-22S




Y9
Y10
Y4
Y8

Section 7
REPAIR PROCEDURES

SECTION INDEX

7.1 Time schedule ..... page 2

7.1 TIME SCHEDULE

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

Job	Operators needed	Expected time (h)
change the drive motor	1	2,00
Change motor. pump. transmission piping + tests	1	5,00
change the actuator control pump	1	2,00
change and calibrate the actuator	1	2,30
change the DFE valve	1	0,30
change relays and fuses	1	0,10
change the windscreen wiper motor (closed cab version)	1	1,00
change a solenoid valve	1	0,30
change the gas pedal complete with cord	1	1,00
change the manual throttle complete with cord	1	0,30
change the front axle shaft	1	2,30
change the rear axle shaft	1	2,00
change 1 cardan joint	1	1,00
change the cardan joints	1	2,00
change the axle shaft hub	1	1,30
change the boom assy	2	4,00 each
change the boom anchoring pin	2	1,00 each
change the attachment locking cylinder pins	1	0,30
change a cab pushbutton	1	0,30
change and test the actuator pressure relief valve or the sliders	1	0,30
change and test the actuator safety valve	1	0,30
change the one-way valve	1	0,20
change the maxi-fuses and search for troubles	1	1,00
bleed the brake circuit	2	0,15 each
disassemble and reassemble a wheel	1	1,00
disassemble the Deutz engine	2	2,30
dismantle the hydraulic oil tank	1	3,00
dismantle the fuel tank	1	2,00
change the oil-water cooler	1	2,00
change the fork pivot pin support	1	2,00
change the engine bonnet	1	0,30
change the canister of the air filter	1	0,05
check the seals of the steering cylinder	2	0,30
change the hydraulic oil filter of the drive pump injection line	1	0,30
change the hydrostatic steering unit	1	1,30
change the battery	1	0,10
change the exhaust pipe	1	0,30
change the mud-guard supports	1	0,30

Job	Operators needed	Expected time (h)
change the mud-guards	1	0,20
change the steering wheel	1	0,10