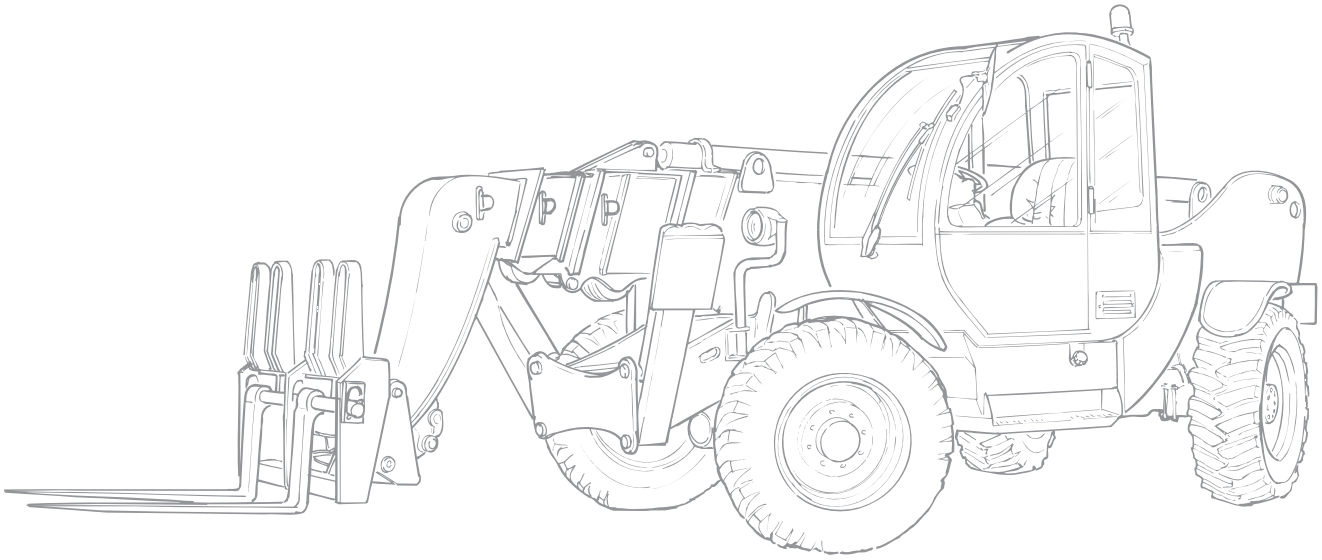
Operator's manual

Part N. ***57.0008.7200***
Rev. 0 ***05/2007***
From serial n. ***16248***
To serial n. ***17660***

English Edition



Genie®
A TEREX COMPANY

GTH-3512

CAUTION: THOROUGHLY READ AND UNDERSTAND THIS HANDBOOK BEFORE OPERATING THE MACHINE
CAUTION: KEEP THIS HANDBOOK IN THE MACHINE AT ALL TIMES

A TEREX COMPANY

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Operator's manual ***57.0008.7200 - GTH-3512***

Produced by: TEREXLIFT Technical Literature Dept. - Studio VEGA - Forlì

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REVISED PAGE LIST

Revision N.	Revision date	Revised pages	Notes	Issued by
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■ INTRODUCTION

This handbook provides information for a safe and proper operation and maintenance of the machine.

STRICTLY COMPLY WITH THE INSTRUCTIONS GIVEN IN THIS HANDBOOK!
READ AND UNDERSTAND THIS HANDBOOK BEFORE STARTING, USING AND CARRYING OUT ANY OPERATION WITH AND ON THE MACHINE.

The handbook is divided into seven sections:

Sect. **A** **GENERAL INFORMATION**
Sect. **B** **SAFETY**
Sect. **C** **OPERATING INSTRUCTIONS**
Sect. **D** **MAINTENANCE**
Sect. **E** **TROUBLESHOOTING**
Sect. **F** **OPTIONAL ATTACHMENTS**
Sect. **G** **TABLES AND ENCLOSURES**

Section **A** contains general concepts that are decisive for the knowledge of the main parts of the machine.
It also contains all necessary data for a correct identification of the machine, the technical features of the machine, etc.

Section **B** is especially addressed to the personnel, who shall operate, repair and service the machine, and, in case of companies with a wide fleet of machines, to those responsible for safety.
It describes the essential compulsory qualities of the personnel in charge and other important information for the safety of persons and things.

Section **C** is mainly addressed to the operators who operate the machine. This section illustrates all control devices.
Additionally, it contains the main use instructions -i.e. engine starting, machine parking, machine storing.

Section **D** is addressed to those responsible for maintenance and the servicemen.
The section describes the maintenance schedule and the relevant intervals.

Section **E** deals with the failure diagnostics.

Section **F** makes a list of the main interchangeable attachments that can be coupled to the machine: dimensions, weight, application field and limits of use.

Section **G** contains tables and various enclosed documents like load charts, wiring diagrams, hydraulic schemes, torque wrench setting table, etc.

Sections are subdivided into chapters and paragraphs that are numbered progressively.

The quickest way to look for information is the reference to the general index or the titles of the single chapters and paragraphs that represent keys for an easy consultation.

Take care of this handbook and keep it in an accessible place within the machine, even after its reading, so that it will always be within reach if in doubt.

If you are unsure about anything, please address to GENIE Assistance Service or to your agent/dealer: addresses, phone and fax numbers are printed in the cover and in the title-page of this manual.

IMPORTANT

Any difference between the contents of this manual and the real functional character of the machine can be attributed to either a machine manufactured before the issue of this manual or to a manual going to be updated after some changed effected on the machine.
Always contact GENIE Assistance Service for any updated version of this manual and any additional information.

■ SYMBOLS

When using the machine, operators could have to face some situations requiring special care and particular knowledge.

When these situations involve the safety of operators or bystanders, the machine efficiency and proper utilisation, this handbook stresses these specific instructions by means of **SPECIAL 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:

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.

ELECTRICAL DANGER

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

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.

ATTENTION

Draws the attention to situations that involve the machine efficiency.

IMPORTANT

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

PROTECT THE ENVIRONMENT

Draws the attention to important environment-related information.

WHEN READING THIS MANUAL, PAY THE GREATEST ATTENTION TO THESE SPECIAL SYMBOLS AND THE EXPLANATION OF THE SITUATIONS THEY EMPHASIZE.

The manual in electronic format also contains the following symbol:

which enables the user to return to the table of contents

GENERAL INDEX

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Section A

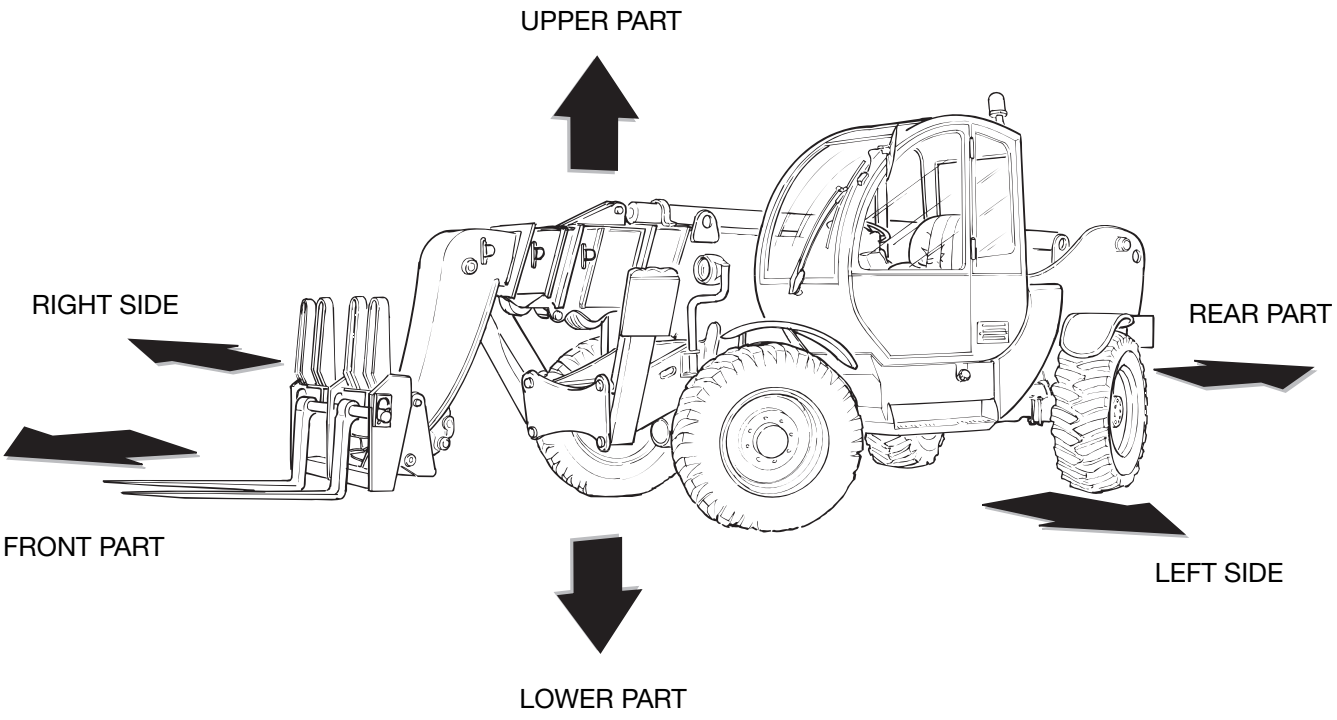
GENERAL INFORMATION

TABLE OF CONTENTS

A-1 CONVENTIONAL REFERENCES

A-1.1 MACHINE POSITION

Conventionally the machine should be considered positioned as shown in the figure.
This convention is necessary to make any reference of this handbook to different machine parts (front, rear, etc.) clear and unmistakable.
Any exception to this rule will always be specified.



■ A-1.2 LABELS AND WARNING PLATES APPLIED ON THE MACHINE

This paragraph lists the labels and warning plates normally applied on standard machines or on special attachments coupled to the machine.

IMPORTANT

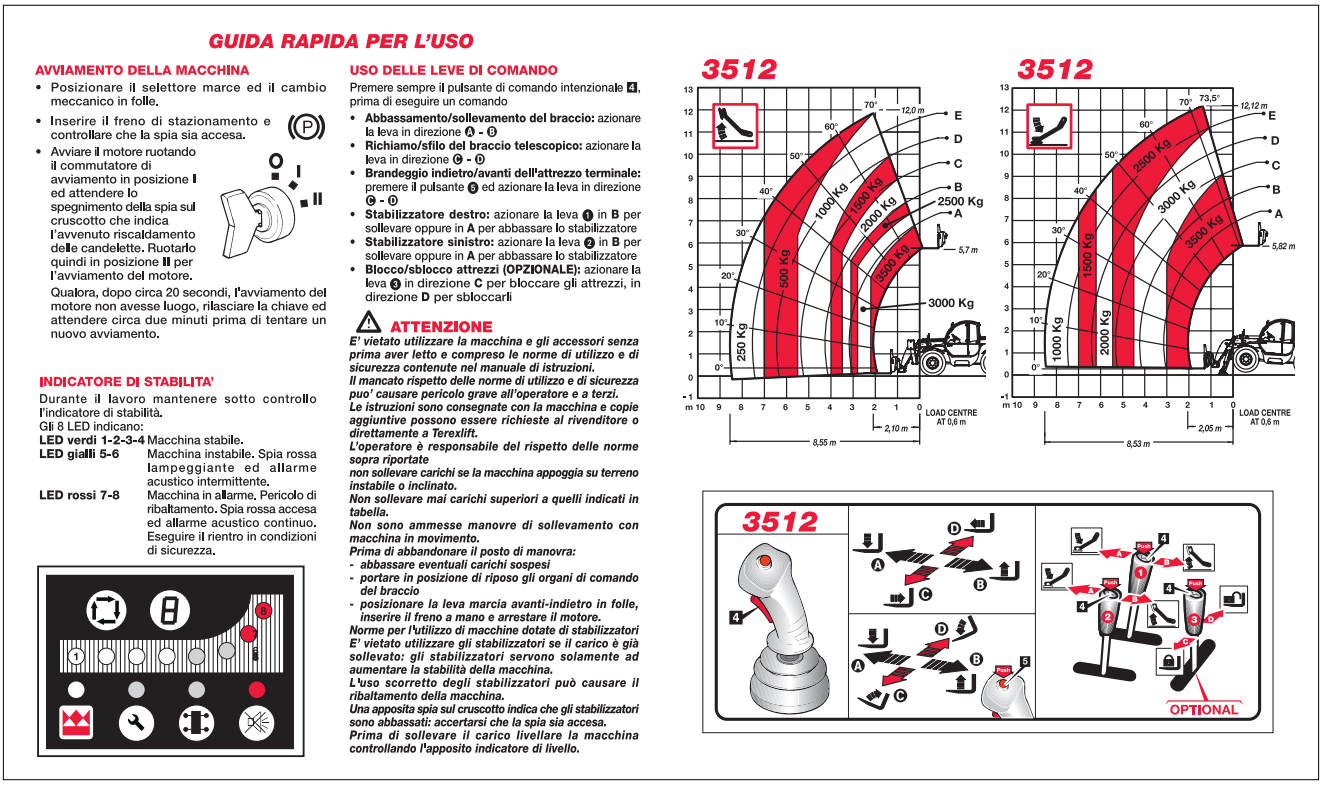
The familiarisation with these labels is never a waste of time.
Make sure they are easy to read. For this purpose, clean them or replace those that become unreadable (either graphic or text).
To clean labels, use a soft cloth, water and soap. Never use solvents, petrol, etc.
When a label is applied on a part to be replaced, make sure that the replaced part is already labelled as required or apply a new label.

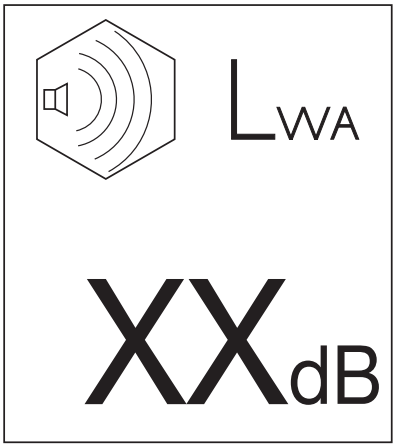
Description:
Labels with transparent background giving a quick overview of the main functions of the handler.

Meaning:
An overview of the operator's handbook concerning:
- control lever,
- machine starting,
- overload warning system
- main safety precautions,

and including the fork load charts with or without use of the outriggers.

Location:
in the cab, on the windscreen, to the right of the driving place.





Description:
label with yellow background and black inscription showing the "**Guaranteed sound power level**".

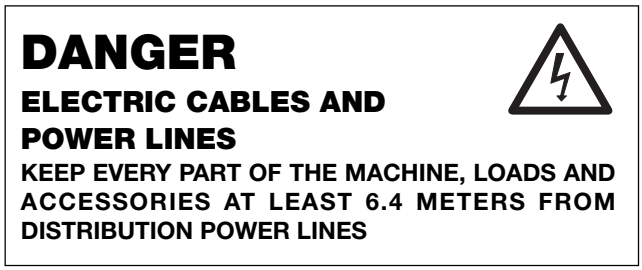
Meaning:
it indicates the guaranteed sound power level measured in accordance with the Directive **2000/14/EC**

Location:
in the cab, on the rear left-side glass.

Description:
label with yellow background and black inscription.

Meaning:
Warning for road circulation which indicates the need to retract and block the forks.

Location:
in the cab, on the windscreen

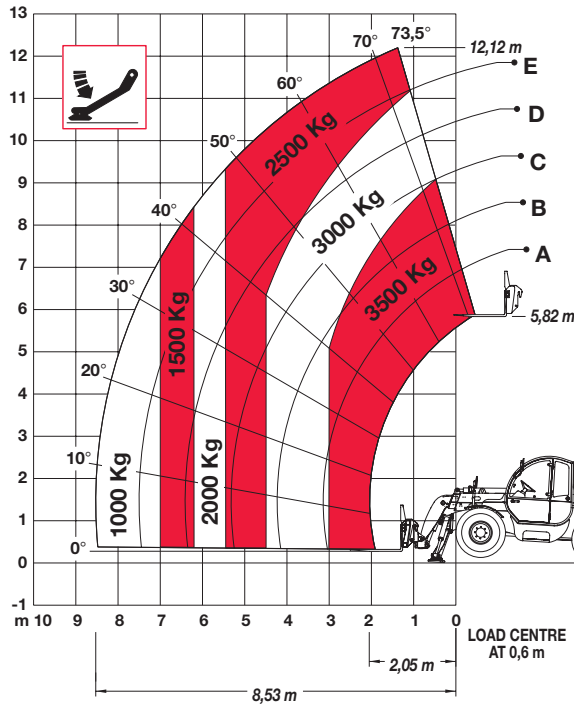


Description:
label with transparent background "**Use limits close to electric lines**".

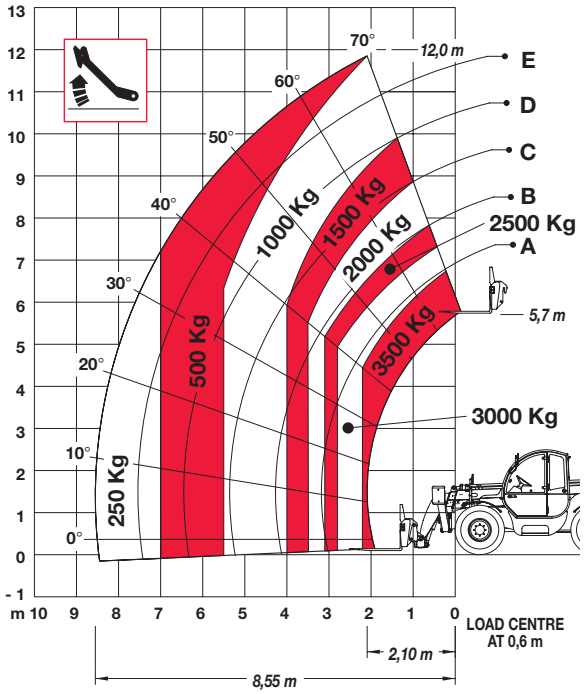
Meaning:
it defines the minimum distance to be kept when the machine is used close to aerial electric lines.

Location:
in the cab, on the windscreen

with outriggers



without outriggers



Description:
label with transparent background "**Load chart for operations with outriggers down**".

Meaning:
it defines the exact working limits of the machine (in terms of **payload** and **reach**) to be strictly respected by the operator when using the machine with lowered outriggers.

Location:
in the cab, inside the quick-guide .

Description:
label with transparent background "**Load chart for operations without outriggers**" (or **with outriggers up**).

Meaning:
it defines the exact working limits of the machine (in terms of **payload** and **reach**) to be strictly respected by the operator when using the machine without outriggers (or with retracted outriggers).

Location:
in the cab, inside the quick-guide .

IMPORTANT

The load charts shown in these pages are supplied as mere example. For the payload limits, see the load charts referring to the specific machine model.

Description:
red/white label "**Keep out of the working range of the machine**".

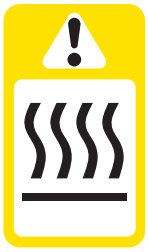
Meaning:
when the machine is running, entering the working range of the machine is prohibited.

Location:
on the telescopic boom, both on the right and on the left.

Description:
label with white background "**Keep out of the working range of the machine"**.

Meaning:
when the machine is running, entering the working range of the machine is prohibited.

Location:
right and left on the machine



Description:
label on yellow background with black drawing "**Hot surfaces. Risk of burns**".

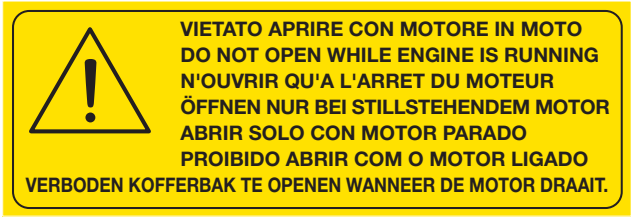
Meaning:
Applied on those surfaces which during operation can become hot and cause burns.

Location:
In all parts involved such as exhaust silencer, thermal engine, heat exchanger.

Description:
label on yellow background with black drawing "**Unscrew the plug with extreme caution: hot water. Risk of burns!**".

Meaning:
Warns the operator of the risk of burns when unscrewing the plug of the compensation tank of the heat exchanger.

Location:
Applied on the compensation tank of the fluid of the heat exchanger.



Description:
label on yellow background "**Do not open while engine is running**".

Meaning:
do not open the engine bonnet when engine is running, since this may result in serious injury due to moving parts or hot components.

Location:
on the engine bonnet.

Description:
label on yellow background "**Maximum pressure on the ground**".

Meaning:
the value indicates the maximum pressure on the ground of the outriggers to prevent the machine from sinking into the ground and avoid instability.

Location:
near each outrigger.

Description:
sticker with black inscription on yellow background warning of the presence of **moving parts**.

Meaning:
Use extreme caution when moving the outriggers. **Presence of moving parts.**

Location:
near each outrigger.

Description:
sticker with black inscription on yellow background warning of the **risk of crushing injury to the hands**.

Meaning:
Use extreme caution when moving the outriggers. **Presence of moving gears and risk of crushing injury to your hands.**

Location:
near each outrigger.

■ A-1.3 EXPLANATION OF THE DIFFERENT SYMBOLS USED ON THE MACHINE

This paragraph illustrates those symbols that are normally applied on the main control devices and instruments of a standard machine, and those that can be applied on accessories or special attachments. They are mainly (ISO) standardised symbols that are now part of the common life. But we consider useful to explain them once again.

IMPORTANT

Spend the necessary time to become familiar with these symbols and to learn their meaning.

Symbol	*Description*
	Hazard warning lights
	Windscreen wiper
	Windscreen washer
	Cab ventilation fan
	Engine coolant temperature
	Lights switch
	Position lights
	High beam
	Fog lamp
	Turn signals
	Parking brake
	Battery charge
	Attachment pushbutton
	Steering mode switch

Symbol	*Description*
	Brake pressure
	Engine oil pressure
	Oil filter soiled
	Boom up
	Boom down
	Boom out
	Boom in
	Attachment locked
	Attachment unlocked
	Fork pitching forward
	Fork pitching back

Symbol	Description	Symbol	Description
	Right stabilizer down		
	Right stabilizer up		
	Left stabilizer down		
	Left stabilizer up		
	Road/jobsite selector switch		
	Lifting point		
	Air filter soiled		
	Speed selector switch		
	1st speed engaged		
	2nd speed engaged		
	Hydraulic oil temperature		
	Fuel gauge		

A-2 MACHINE IDENTIFICATION

IMPORTANT

Check that the operator handbook refers to the delivered machine.
When asking for information or technical assistance, always specify model, type and serial number of the machine.

A-2.1 MACHINE MODEL AND TYPE

Handler with telescopic boom:

❑ model ***GTH-3512***

A-2.2 MANUFACTURER

TEREXLIFT srl

Zona Industriale (Ind. Estate) - I-06019 UMBERTIDE (PG) - ITALY

Enrolled in the register of companies at the Court of Perugia under no. 4823

C.C.I.A.A. n° 102886

Fiscal Code/V.A.T. no. 00249210543

■ A-2.3 MACHINE IDENTIFICATION PLATES

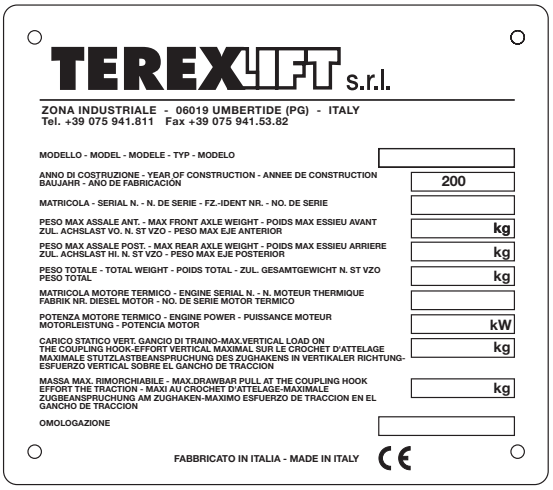
Two identification plates are applied on the machine. They are:

Ⓐ ***Machine data plate and road traffic data plate***

Placed on the front right side of the chassis.

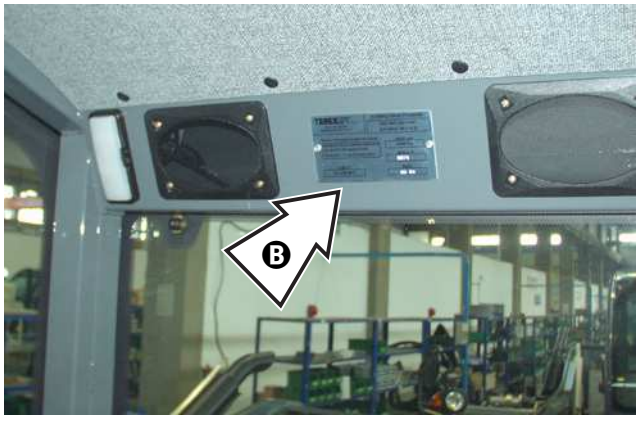
The identification plate contains the main identification data of the machine like model, serial number and year of manufacture.

On the machines destined for the Italian market, this plate also contains the road traffic related data and the weights of the specific model of the machine.



Ⓑ ***ROPS-FOPS cab type-approval plate.***

This plate is located on the top strut at the back of the driving cab.

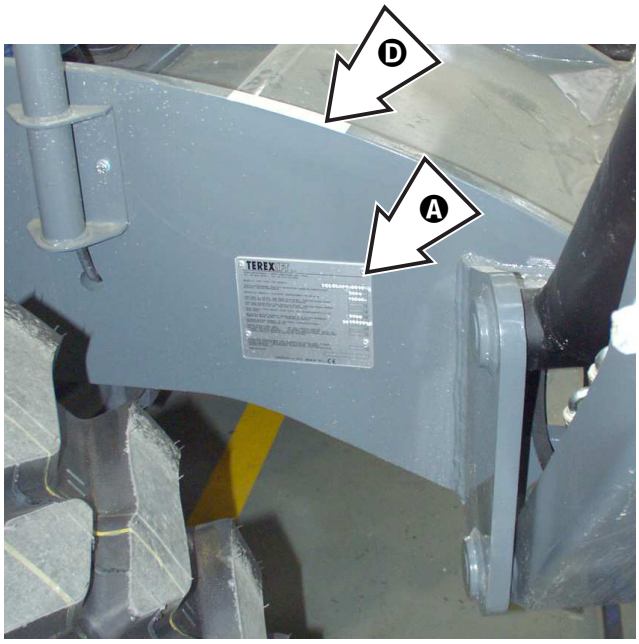


■ A-2.4 CE MARKING

This machine fulfils the safety requirements of the Machinery Directive.The conformity has been certified and the placing of the **CE** marking on the machine demonstrates compliance with the regulatory requirements.
The **CE** marking is placed directly on the identification plate of the machine Ⓐ.

■ A-2.5 CHASSIS SERIAL NUMBER

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



■ A-2.6 IDENTIFICATION PLATES OF THE MAIN PARTS

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

A-3 ALLOWED USE

■ A-3.1 ALLOWED USE

The handlers have been designed and manufactured for lifting, handling and transporting agricultural or industrial products by means of specific attachments (see section **F**) manufactured by TEREXLIFT srl.

Any other use is considered contrary to that established and, therefore, improper.

The compliance with and the strict respect of the operation, maintenance and repair conditions, indicated by the Manufacturer, represent an essential part of the allowed use.

The handler must be used and serviced only by operators knowing its characteristics and the safety procedures in depth.

It is also essential to comply with the safety at work legislation, the precautions concerning the equipment, substances and the environment as well as the local and national road traffic regulations.

ATTENTION

Effecting changes or carrying out interventions on the machine other than those of routine maintenance is expressly forbidden. Any modification of the machine not carried out by GENIE or an authorised assistance centre involves the automatic invalidation of the conformity of the machine to the Directive 98/37/EC.

■ A-3.2 IMPROPER USE

Improper use means a utilisation of the handler following working criteria that do not comply with the instructions of this manual, and that, in general, may result in risks for both operators and bystanders.

DANGER

We list below some of the most frequent and hazardous situations of improper use:

- ***Carrying passengers on the machine***
- ***Not strictly complying with the operation and maintenance instructions of this handbook***
- ***Working beyond the handler working limits***
- ***Working on unstable edges of ditches***
- ***Driving crosswise on slopes or hills***
- ***Working during a storm***
- ***Working on steep slopes***
- ***Using attachments other than those recommended***
- ***Using attachments not approved or directly manufactured by Terexlift***
- ***Working in potentially explosive areas***
- ***Working in confined and non-ventilated environments.***

■ A-3.3 RESIDUAL HAZARDS

Although the machine has been designed and manufactured according to the latest technology and all expected hazards have been eliminated, some operations performed by the machine operator can result in potentially hazardous situations. Among them:

- Hazards deriving from a high work or transfer speed in relation to the load handled or the ground condition of the jobsite.
- Hazards deriving from work procedures adopted during the check or replacement of a block valve (residual pressure - uncontrolled movements).
- Hazards deriving from work procedures adopted while disassembling parts of the machine -e.g. the cylinders, without supporting mobile parts suitably (risk of uncontrolled fall of the part).
- Hazard deriving from an accidental overturning of the machine in the event the operator has not fastened the safety belt.

■ A-3.4 APPLICABLE STANDARDS

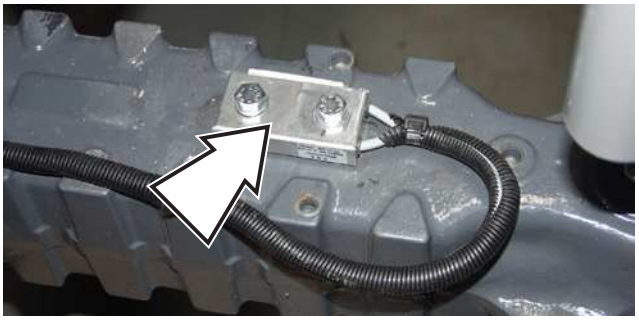
For the operator's safety, the following standards were obeyed during the risk assessment of the handler fitted with telescopic boom:

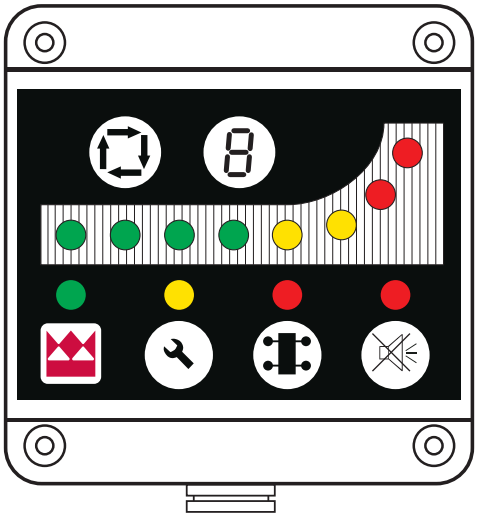
Directive	*Title*
98/37/CE	Machinery Directive
89/336/CEE	Electromagnetic compatibility
2000/14/CE	Environment Acoustic Emissions

Standard	*Title*
EN 1459:1988	Harmonised standard. Safety of industrial trucks - Self- propelled variable reach trucks.
EN 281:1988	Self-propelled industrial trucks sit- down rider-controlled. Rules for the construction and layout of pedals.
EN 1175-2:1998	Electrical requirements - General requirements of internal combustion engine powered trucks
prEN ISO 13564:1996	Test method for measuring visibility from self-propelled trucks.
ISO 2330:1995	Fork-lift trucks - Fork arms - Technical characteristics and testing.
ISO/DIS 3287	Powered industrial trucks. Pictorial signs. Control symbols.
ISO 3449:1992	Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements.
EN 13510: 2002	Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements.
ISO 3776:1989	Tractors for agriculture - Seat belt anchorages.
ISO 3795:1989	Road vehicles, tractors and machinery for agriculture and forestry - Determination of burning behaviour of interior materials.
ISO 5053:1987	Powered industrial trucks - Terminology.
ISO 6292:1996	Powered industrial trucks and tractors - Brake performance and component strength.
EN 13059:2002	Safety of industrial trucks - Test methods for measuring vibration
EN 50081-1: 1997	Electromagnetic compatibility – Generic requirements on emissions - Part 1
EN 50082-1: 1997	Electromagnetic compatibility – Generic requirements on immunity - Part 1
EN 60204-1:1998	Safety of machinery - Electrical equipment of machines - Part 1

■ A-3.5 SAFETY DEVICES

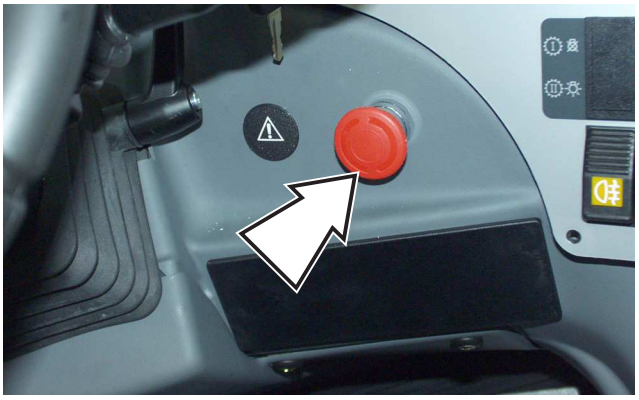
- ***Moment limiting device.*** A load cell is placed on the rear axle. The cab display with 8 LEDs (4 green, 2 yellow and 2 red ones) enables the operator to check the stability variation of the machine.



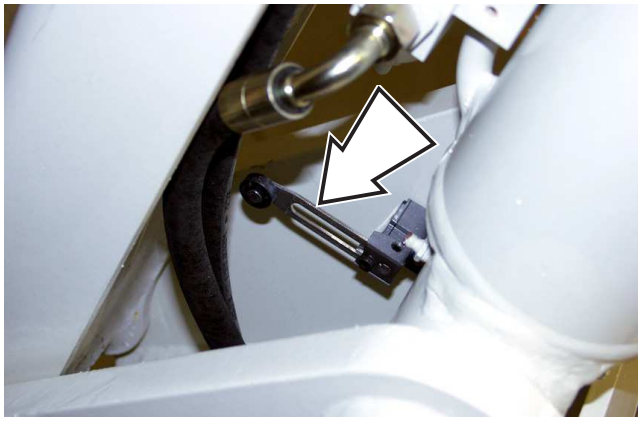


- ***Emergency stop pushbutton***: when pressed down, it stops the engine and blocks the movements of the machine.

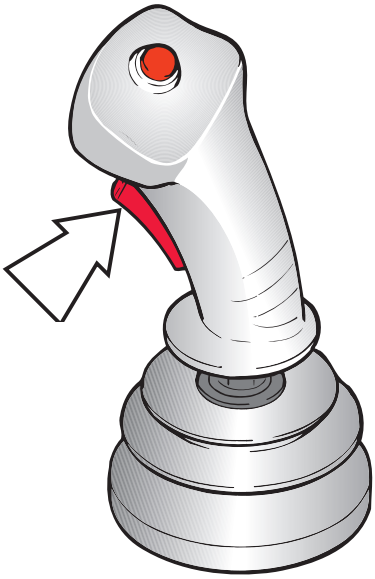
  Before starting work again, find and rectify the relevant causes, then reset the button to neutral position turning it clockwise.



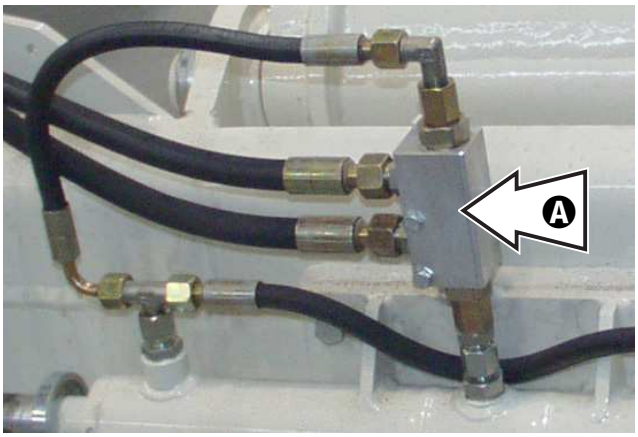
- ***Limit switch on the outriggers***
  When the outriggers are lowered to the ground, the speed switch and the scale selector of the moment limiting system are deactivated.

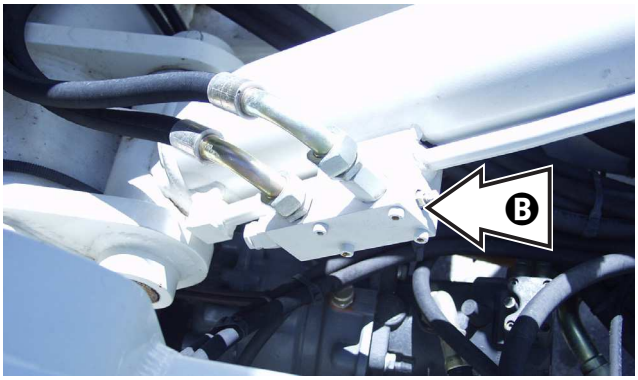


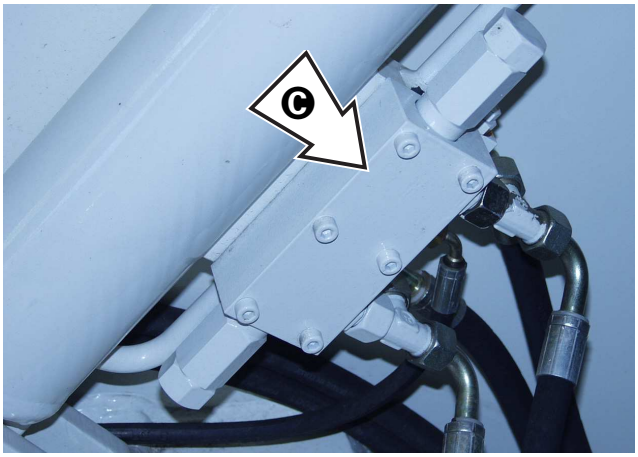
- ***Safety pushbutton on joystick*** (dead man button). This button must be pressed and held down while executing a function with the control lever. If the button is released, the movement in progress will be blocked.

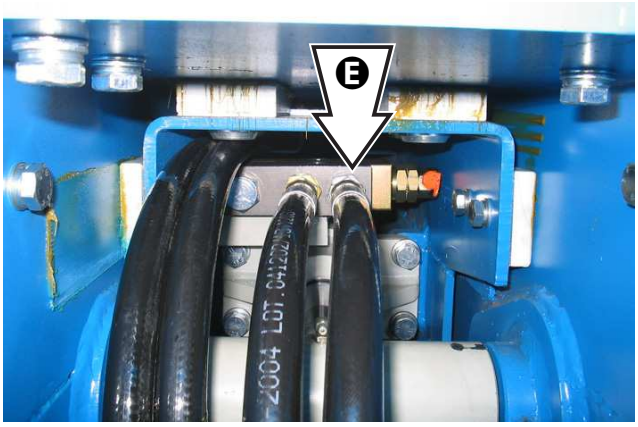


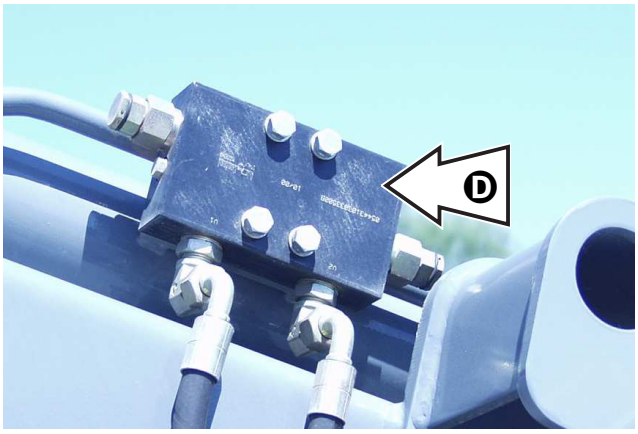
- ***Block valves fitted to all cylinders:***
  - **A** Block valve on attachment coupling cylinder (if present; the hydraulic cylinder is supplied as optional part)
  - **B** Block valve on lifting cylinder
  - **C** Block valve on balance cylinder
  - **D** Block valve on boom extension cylinder (on the external part of the boom)
  - **E** Block valve on boom extension cylinder (on the internal part of the boom)











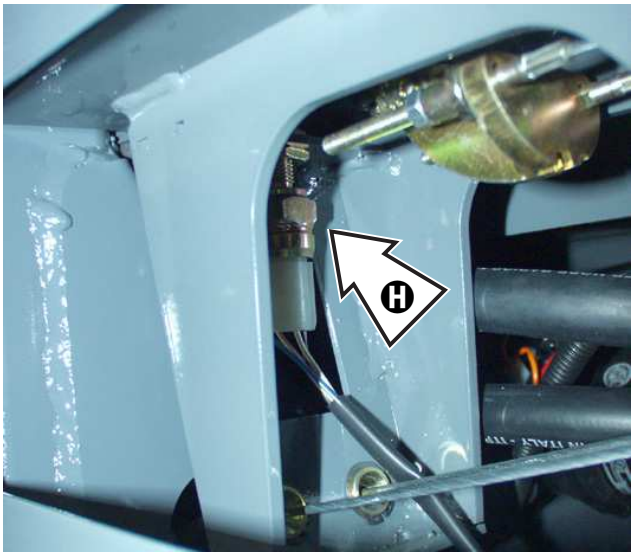
F Block valve on attachment pitching cylinder

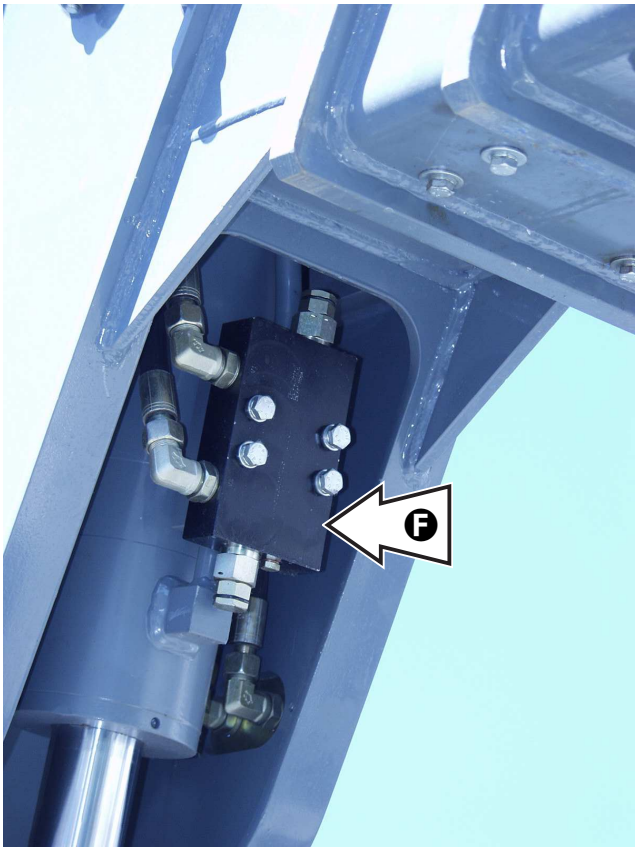
G Block valve on the outrigger cylinder

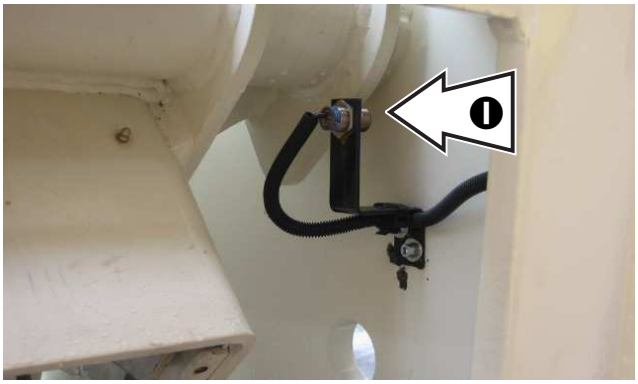
- ***Proximity switch and micro-switch***:

  H Micro-switch on parking brake. This switch prevents the machine from starting if the brake is not been engaged.

  I Proximity switch on the boom. This switch blocks the outriggers and the sway movement when the boom is raised more than 2 metres above the ground

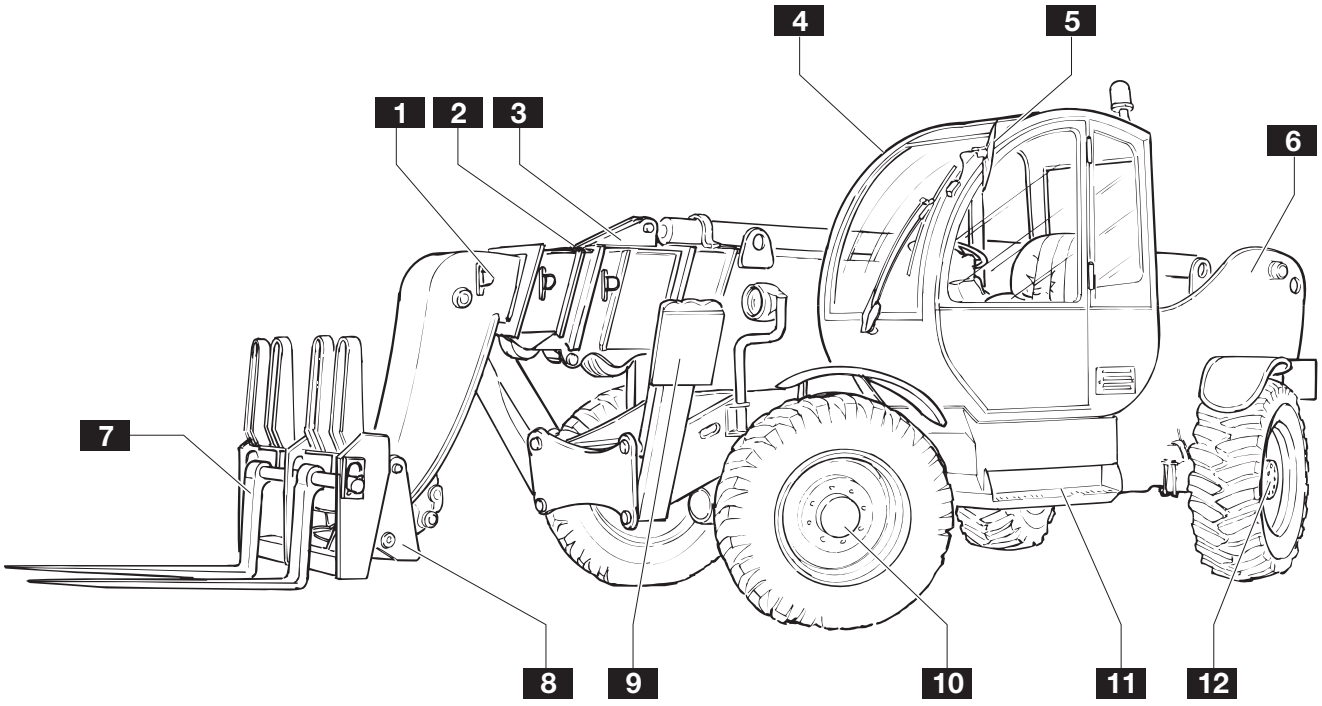






A-4 GENERAL DESCRIPTION

A-4.1 LIST OF THE MAIN COMPONENTS



1 - 3rd boom section
2 - 2nd boom section
3 - 1st boom section
4 - Driving cab according to ROPS-FOPS provisions
5 - Rear view mirror, left side
6 - Chassis
7 - Forks
8 - Attachment holding frame
9 - Left sway cylinder
10 - Front axle
11 - Access step
12 - Rear axle

■ A-4.2 DESCRIPTION OF THE MAIN COMPONENTS

Hydrostatic transmission unit
This unit consists of parts which drive the machine shifting, and namely:
- a variable displacement pump connected to the thermal engine by an elastic joint
- a motor with variable displacement and automatic adjustment in relation to the torque required, directly applied on the axle by the power divider
- a hydraulic oil filter, placed on the injection line from the tank
- a water/oil heat exchanger to cool the circuit down.

Engine
The thermal engine is equipped with a heat exchanger which uses the engine oil as cooling medium.

Steering axles/(front and rear) differential gears
The differential axles transmit the motion to the wheels. The locking device acting on the front axle enables the machine to also move on slippery ground. Both axles are steering; the rear axle is also of sprung type.

Tyres
The machine is equipped with tyres suitably sized for the maximum load allowed on the handler.
When worn, they shall be replaced with new ones having the same dimensions and loading capacity.

Load limiting system
The load limiting system installed on the vehicle enables the operator to work within the rated limits of the machine. A eight-LED display shows the stability variation. When the seventh red LED lights up, all machine movements are stopped, but for the boom retraction.

Boom hydraulic circuit
It consists of a pump connected to the thermal engine which, through a valve, delivers oil to the hydraulic drive and an actuator for the following functions:
- boom lifting/lowering
- telescopic boom extension/retraction
- attachment rotation
- outrigger up/down-movement

It also feeds the following cylinders (supplied as optional parts):
- attachment locking cylinder.

Service hydraulic circuit
It consists of a pump connected to the thermal engine and delivering oil to the brake system.

Telescopic boom
The machine is equipped with a telescopic boom with hydraulic-driven extension. The telescopes slides on interchangeable pads made of wearproof material.

Driving cab
Type-approved driving cab in compliance with standards ISO 3449 and EN 13510 (ROPS and FOPS).

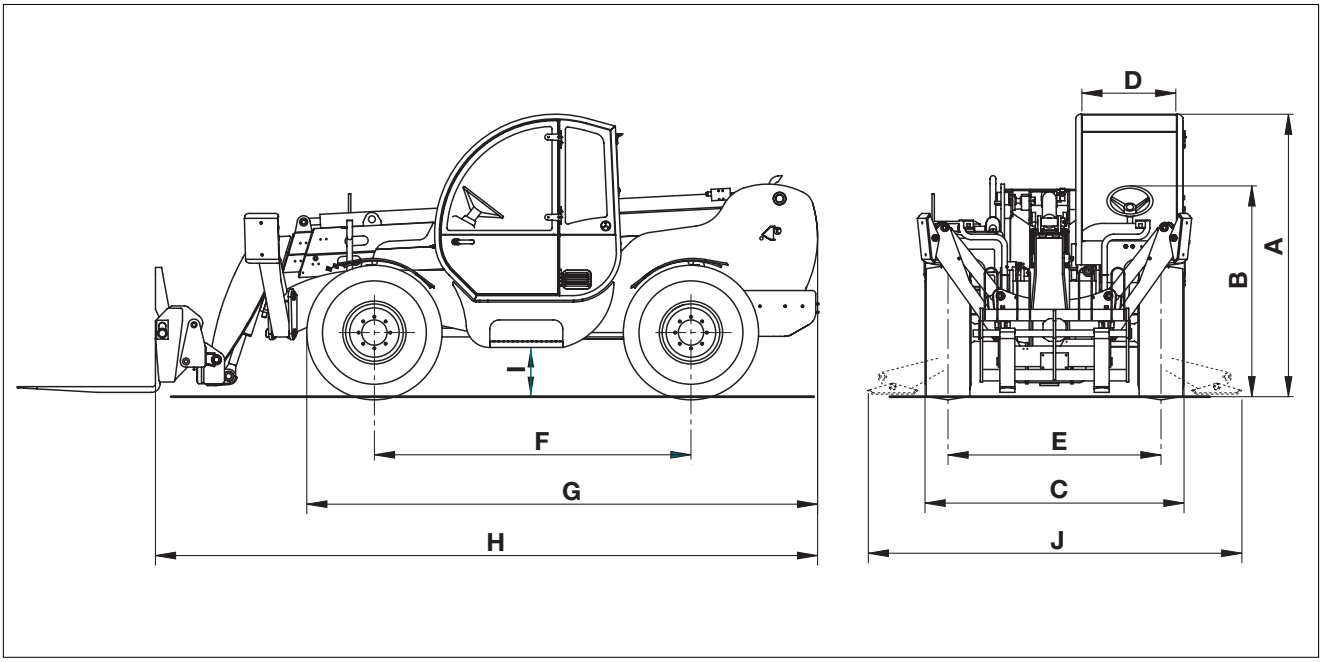
■ A-4.3 OPTIONAL ACCESSORIES

The machine can be fitted with a wide range of optional accessories: please address to ***GENIE*** sales network.

IMPORTANT

Please check the accessories available for your machine.

A-5 TECHNICAL DATA AND PERFORMANCE



	A-5.1 MAIN DIMENSIONS		GTH-3512
A	Overall height	mm	2450
B	Height to the steering wheel	mm	1840
C	Overall width	mm	2250
D	Cab width	mm	860
E	Track	mm	1850
F	Wheel-base	mm	2750
G	Length to the front tyres	mm	4440
H	Length to the forks	mm	5750
I	Ground clearance	mm	430
J	Max width with extended outriggers	mm	2930
•	Internal steering radius	mm	2425
•	External steering radius	mm	4500

	A-5.2 LIMITS OF USE		
•	Angle of approach		37°
•	Departure angle		39°
•	Ambient temperature	°C	-20°/+40°

	A-5.3 WEIGHT		
•	Weight in working order	kg	9000

■ A-5.4 SPEED		GTH-3512
- Transfer speed (*) with 24" tyres	km/h	0÷32
- Max. slope with full load	%	54

(*) = either forward or reverse motion.

■ A-5.5 PAYLOAD AND REACH		
- Max lifting height:		
with outriggers	mm	12120
without outriggers	mm	12000
- Reach at max height (without outriggers)	mm	2050
- Max reach forward (with outriggers)	mm	8530
- Attachment holding plate rotation		132°
- Maximum payload (with outriggers)	kg	3500
- Payload at max height (with outriggers)	kg	2500
- Payload at max reach (with outriggers)	kg	1000

■ A-5.6 FORKS		**Floating type**
- Dimensions	mm	1200x120x45
- Weight	kg	70
- Fork holding frame - class		FEM III

■ A-5.7 DIESEL ENGINE		***Turbo version***
- Make		DEUTZ AG
- Model/Type		BF4M 2011
- Features:		Diesel 4 cylinders in line 4 stroke direct injection
- Bore x Stroke	mm	94 x 112
- Total displacement	cc	3108
- Power at 2300 giri/min	kW	60

■ A-5.8 ELECTRICAL SYSTEM		
- Voltage	V	12
- Battery	Ah	100

■ A-5.9 MACHINE SOUND LEVELS		
- Guaranteed sound power level (in accordance with the Directive 2000/14/CE)	dB	Lwa = 101
- Measured sound pressure level (in accordance with the Directive 98/37/CE)	dB	Lpa = 80

■ A-5.10 VIBRATION LEVELS		
- Mean assessed vibration level transmitted to arms	m/s^2	< 2.5
- Mean assessed vibration level transmitted to body	m/s^2	< 0.5

IMPORTANT

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

A-6 LIFETIME

The lifetime of the machine is 10 000 hours provided all checks, service jobs and overhauls are done at the times scheduled.

DANGER

After this time, the machine must compulsorily be inspected and tested by the Manufacturer before being used again.

A-7 ITEMS SUPPLIED

Following items are supplied together with the machine:

Description	***GTH-3512***
- Spanner CH 19 (for fork positioning)	✘
- Allen wrench CH 6 (for fork positioning)	✘
- 12 V lamps (spare)	✘

A-7.1 LITERATURE SUPPLIED

The machines comes with the following literature:

- Warranty and handing over certificate
- Machine operator's handbook
- Spare parts catalogue
- Engine use and maintenance manual DEUTZ

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Section B

SAFETY

TABLE OF CONTENTS

B-1 GENERAL REMARKS

Most accidents occurring while working, repairing or maintaining 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.

IMPORTANT

If you recognise hazardous situations, you can prevent accidents!

For instance, this handbook makes use of special ***safety symbols*** to stress any potentially hazardous situation.

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 installation, 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 shall absolutely:

- be sure that the operations you are going to carry out are not explicitly forbidden;
- be sure that the methods are safe, say, in compliance with the rules and provisions 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.

IMPORTANT

If in doubt, it is always better to ask! For this purpose, 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.

B-2 REQUISITES OF THE PERSONNEL IN CHARGE

B-2.1 REQUISITES OF THE MACHINE OPERATORS

The operators who use the machine regularly or occasionally (i.e. for transport reasons) shall have the following prerequisites:

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 enforced 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 be familiar with this handbook, its enclosed graphs and diagrams, the identification and hazard warning plates. They shall be skilled and trained about the machine use.

IMPORTANT

The operator shall have a licence (or a driving licence) when provided for by the laws enforced in the country where the machine works. Please, ask the competent bodies. In Italy the operator must be at least 18 year old.

■ B-2.2 REQUISITES OF THE SERVICEMEN

The personnel charged with the machine maintenance shall be qualified, specialised in the maintenance of earth-moving machines, and shall have the following prerequisites:

physical:

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

mental:

ability to understand and apply the enforced 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

training:

they shall read and be familiar with this handbook, its enclosed graphs and diagrams, the identification and warning plates. They shall be skilled and trained about the machine functioning.

IMPORTANT

From a technical point of view, the ordinary maintenance of the machine is not a complex intervention and can be carried out by the machine operator, too, provided he has a basic knowledge of mechanics.

■ B-2.3 WORKING CLOTHES

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

- Overalls or any other comfortable garments. Operators should not wear clothes with large sleeves or objects that can get stuck in moving parts of the machine.
- Protective helmet.
- Protective gloves.
- Working shoes.

IMPORTANT

Use only type-approved working clothing in good condition.

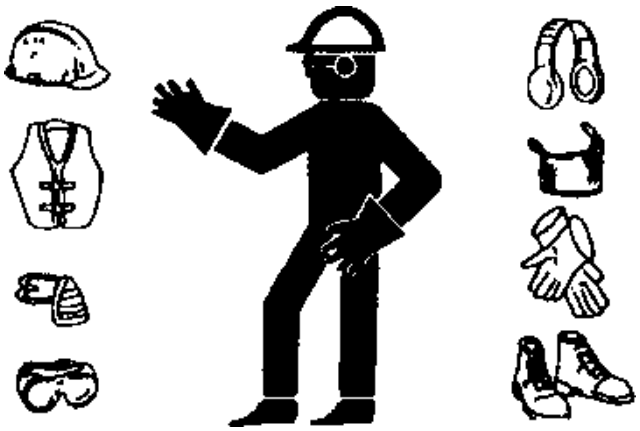
■ B-2.4 PERSONAL PROTECTIVE EQUIPMENT

Under special working conditions, the following personal protective equipment should be used:

- Breathing set (or dust mask).
- Ear-protectors or equivalent equipment.
- Goggles or facial masks.

IMPORTANT

Use only type-approved protective equipment in good condition.



B-3 SAFETY PRECAUTIONS

B-3.1 JOB SITE

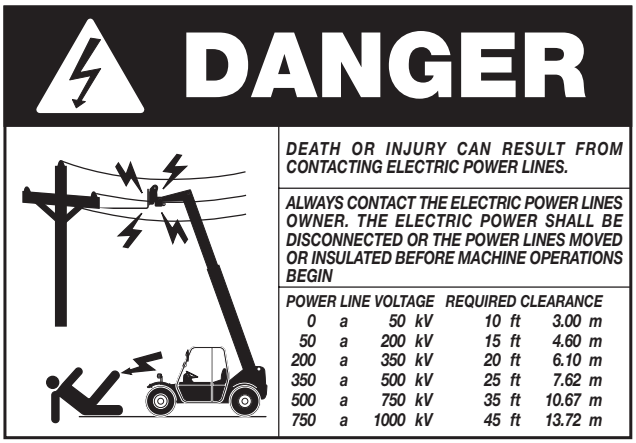
Always take into account the features of the job site where you are going to work:

- Always examine the working area and compare it with the machine dimensions in the different configurations.
- Look for the best route to the job site.
- When the machine is running, nobody can enter its working range.
- While working, keep the working area in order. Never leave objects scattered: they could hinder the machine movements and represent a danger for personnel.

ELECTRICAL DANGER

Pay the greatest attention to overhead electric lines.
Always keep at a minimum safe distance from the telescopic boom and the lifted load. Electrical hazards!

DANGER



DEATH OR INJURY CAN RESULT FROM CONTACTING ELECTRIC POWER LINES.

ALWAYS CONTACT THE ELECTRIC POWER LINES OWNER. THE ELECTRIC POWER SHALL BE DISCONNECTED OR THE POWER LINES MOVED OR INSULATED BEFORE MACHINE OPERATIONS BEGIN

POWER LINE VOLTAGE			REQUIRED CLEARANCE	
0	a	50 kV	10 ft	3.00 m
50	a	200 kV	15 ft	4.60 m
200	a	350 kV	20 ft	6.10 m
350	a	500 kV	25 ft	7.62 m
500	a	750 kV	35 ft	10.67 m
750	a	1000 kV	45 ft	13.72 m

CAUTION

Make sure the machine (wheels and stabilisers) rests on a firm ground to prevent hazardous unstable conditions.
If the ground is not firm enough, position some supporting planks under the stabilisers or the wheels. These plates must grant a specific pressure of 1.2 to 1.5 kg/cm² (500x500mm plates are sufficient).

DANGER

Do not at any time use the machine during a storm.

■ B-3.2 GETTING READY TO WORK

Before any operation, following precautions should be taken:

- First of all, make sure that the maintenance interventions have been carried out with care according to the established schedule (see section **D - Maintenance**).

CAUTION

Set the machine to working configuration and sway it. Use the special inclinometer to the right of the driving place to check that the machine is level before operating it.

- Ensure you have enough fuel to avoid a sudden stop of the engine, especially during a crucial manoeuvre.
- Clean instruments, data plates, lights and the cab windscreen thoroughly.
- Check the correct functioning of all the safety devices installed on the machine and in the job site.
- In case of troubles or difficulties, inform the foreman at once. Never start working under unsafe conditions.
- Do not carry out any repair work in a makeshift way to start working!

■ B-3.3 DURING WORK OR MAINTENANCE

During work, and especially maintenance, always pay the greatest attention:

- 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 **1.5 meters** from the ground), always use approved fall restraint or fall arrest devices

- Do not enter/leave the machine while it is running.
- 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 required, stop the engine.

- 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, check their connection and proper functioning.
- Do not carry out interventions on electric components with voltage over **48V**.
- Do not connect wet plugs or sockets.
- Plates and hazard warning stickers shall never be removed, hidden or become unreadable.

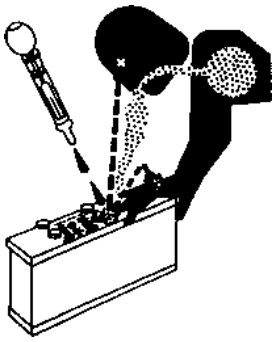
- Except for maintenance purposes, do not remove safety devices, shields, protection cases, etc. Should their removal be necessary, stop the engine, remove them with the greatest care and always remember to refit them before starting the engine and using the machine again.
- Before any maintenance or repair work, stop the engine and disconnect the batteries.
- Do not lubricate, clean or adjust moving parts.
- Do not carry out operations manually when specific tools are provided for this purpose.
- Avoid the use of tools in bad condition or use in an improper way i.e. pliers instead of adjustable wrenches, etc.
- Before carrying out operations on hydraulic lines under pressure or disconnecting hydraulic components, ensure the relevant line has been previously depressurised and does not contain any hot fluid.

DANGER

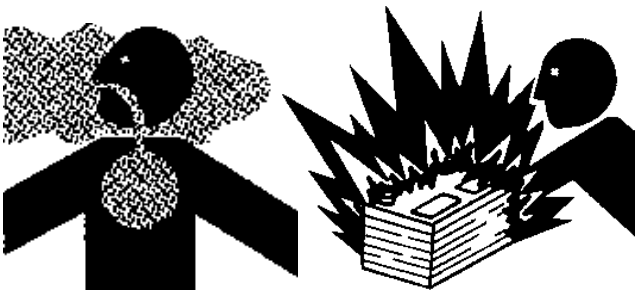
Any intervention on the hydraulic circuit must be carried out by authorised personnel.
The hydraulic circuit of this machine is fitted with pressure accumulators. You and others could be seriously injured if accumulators are not completely depressurised.
For this purpose, shut the engine down and step on the brake pedal 8÷10 times.

- Neither smoke nor use open flames in areas subject to fire dangers and in presence of 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.



- Do not tamper with fire-extinguishers or pressure accumulators: **explosion hazard!**
- After any maintenance or repair work, make sure that no tool, cloth or other object has been left within machine compartments, fitted with moving parts, or where suction and cooling air circulates.
- When working, do not give instructions or signs to several people at the same time. Instructions and signs must be given by one person only.
- Always pay 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 any means.
- After work, never leave the machine under potentially dangerous conditions.



B-4 SAFETY DEVICES

DANGER

Several safety devices have been fitted to the machine. They must never be tampered with or removed (see chap. A-3.5).

Regularly check the efficiency of such devices (see check card, chap. G-5).

In case of faults, stop working immediately and proceed in replacing the defective device.

For the checking procedures, read chap. D-3.15.

B-5 MOMENT LIMITING SYSTEM

The moment limiting system has been developed to help the operator to maintain the machine longitudinal stability. Audible and visual messages are provided when the limits of longitudinal stability are being approached.
However this device cannot replace the experience of the operator. It is up to the user to adopt the necessary safety measures to work within the rated limits of the machine.

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Section C

OPERATING INSTRUCTIONS

TABLE OF CONTENTS

INTRODUCTION

This section provides the operator a practical guide for the gradual learning of the machine use.
The operator should get into the driving cab and carry out the preliminary adjustments, then memorise the position of the different controls and instruments.
The familiarisation with the controls ensures not only correct use during the working phases, but also a prompt and timely intervention of the operator, when he is required to carry out sudden manoeuvres to safeguard his safety and the machine integrity.
It is necessary to learn how to use and foresee the machine reactions. Learn how to operate the machine controls in a safe and open place, without obstacles and anybody standing around. Do not ram the controls. Operate them slowly to understand their effect on the machine.

C-1 BEFORE ENTERING THE MACHINE

Checks and cleaning

- Clean glasses, lights and rear view mirrors.
- Check that pins, joints and bolts are well tightened in position.
- Check for oil, fuel or coolant leaks.

Checking the tyres

- Check the correct inflation of the tyres; see par. **"Tyre inflation"** in the Maintenance section.
- Make sure that the tyre plies are not cut or worn.

DANGER

A tyre burst may result in serious injury; never use the machine if tyres are worn, wrongly inflated or damaged.

C-2 ENTERING THE MACHINE

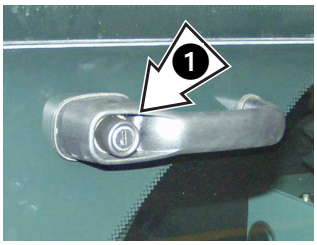
C-2.1 ENTERING THE CAB

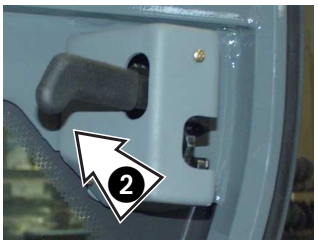
CAUTION

Always make sure that your hands and shoe soles are clean and dry before getting into the driving cab. Always face the machine when entering and leaving it and hold onto the suitable handles.

The handler cab is equipped with an access door on the left-hand side.

Door opening from outside:
- Insert the key and release lock **1**.
- Press the pushbutton **1** and open the door.





Door closing from inside:
- Pull the door with force: it locks automatically.

Door opening from inside:
- Lower lever **2** and release the lock to open the door completely.
- Rotate handle **3** to open the upper section of the door and lock it against the special catch.

To unlock the door latched in open position:
- Press button **4** to unlock the door from the catch
- Once released, re-close the upper section of the door by means of handle **3**.

CAUTION

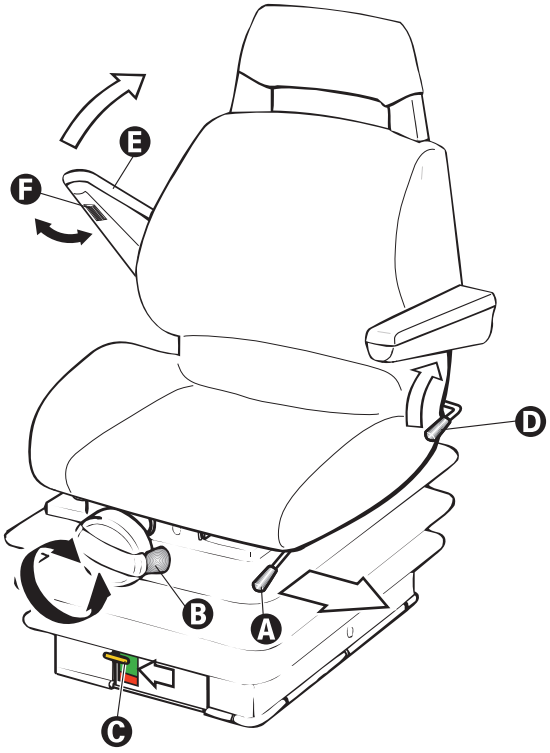
The upper section of the door must be secured to the rear part of the driving cab or latched to the lower section of the same door.

C-2.1.1 Leaving the cab in an emergency

In an emergency, use the rear window of the cab as safety exit-way.
This window has special locking handles with plastic pins **5** easy to pull out when you need to fully open the glass.

■ C-2.2 ADJUSTING THE SEAT

Position the seat so you can comfotarbly reach all the controls. The handler seat is fitted with devices which let you adjust the seat springing, height and distance from the controls, the backrest angle and the armrest height.



- ***Adjusting the seat distance from the controls***
  To slide the seat forward or back, rotate lever **A** and push the seat to the desired direction. Then release the bar and make sure that the seat locks in position.

- ***Adjusting seat height and springing***
  Free the lever of knob **B** and turn clockwise or counter-clockwise until reaching the desired springing. Once you'are correctly seated in the seat check that the yellow indicator **C** is in the green field.

- ***Adjusting the backrest angle***
  Operate lever **D**, press your back firmly against the backrest and put the backrest at the angle you wish, then release the lever.

- ***Adjusting the armrest height***
  Raise armrest **E** and turn wheel **F** to put the armrest at the height you want.

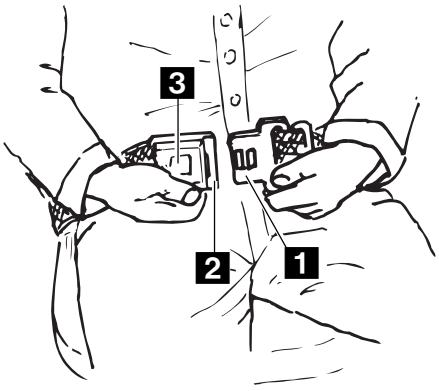
DANGER

- ***The seat is for one person only.***
- ***Don't adjust the seat when the machine is moving.***

■ C-2.3 FASTENING THE SEAT BELTS

Sit correctly in the driving seat; then:

- The safety belts are equipped with reel retractor. To fasten the belt, pull tab **1** and push it into buckle **2**.
- To release the belt, push button **3** and remove the tab from the buckle.
- Make sure that the buckle is correctly located at the hip point and not on the stomach.
- Operate the end adjusters to reach the length you wish and make sure the buckle is always in the middle.



■ C-2.4 ADJUSTING THE STEERING COLUMN

Both steering column and dashboard can be set to a different angle.
To adjust the steering wheel angle, unlock lever **1** and pull or push the steering wheel to the required position, then re-lock lever **1**.

DANGER

Before driving the machine, ensure the steering wheel is perfectly clamped.

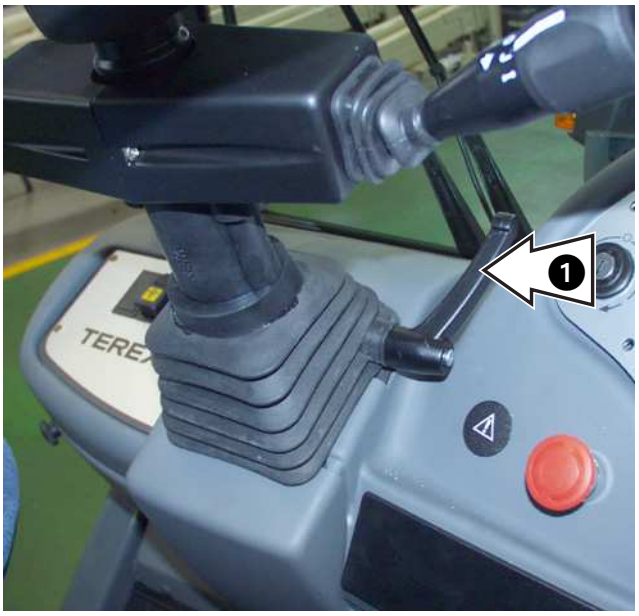
■ C-2.5 ADJUSTING THE REAR VIEW MIRRORS

The machine is fitted with three rear view mirrors:

- The right rear view mirror is located on a special supporting bracket in advanced position and allows checking the area behind the machine, on the right-hand side. To adjust its position, manually rotate the joint it is fitted with.
- The left rear view mirror is placed on the left upper post of the windscreen and allows checking the area behind the machine, on the left-hand side. To adjust its position, manually rotate the joint it is fitted with.
- The rear mirror is fitted on a special supporting bracket, placed on the rear upper part of the frame. It allows checking the area at the back of the machine. To adjust its position, manually rotate the joint it is fitted with.

■ C-2.6 SWITCHING ON THE CAB LIGHTS

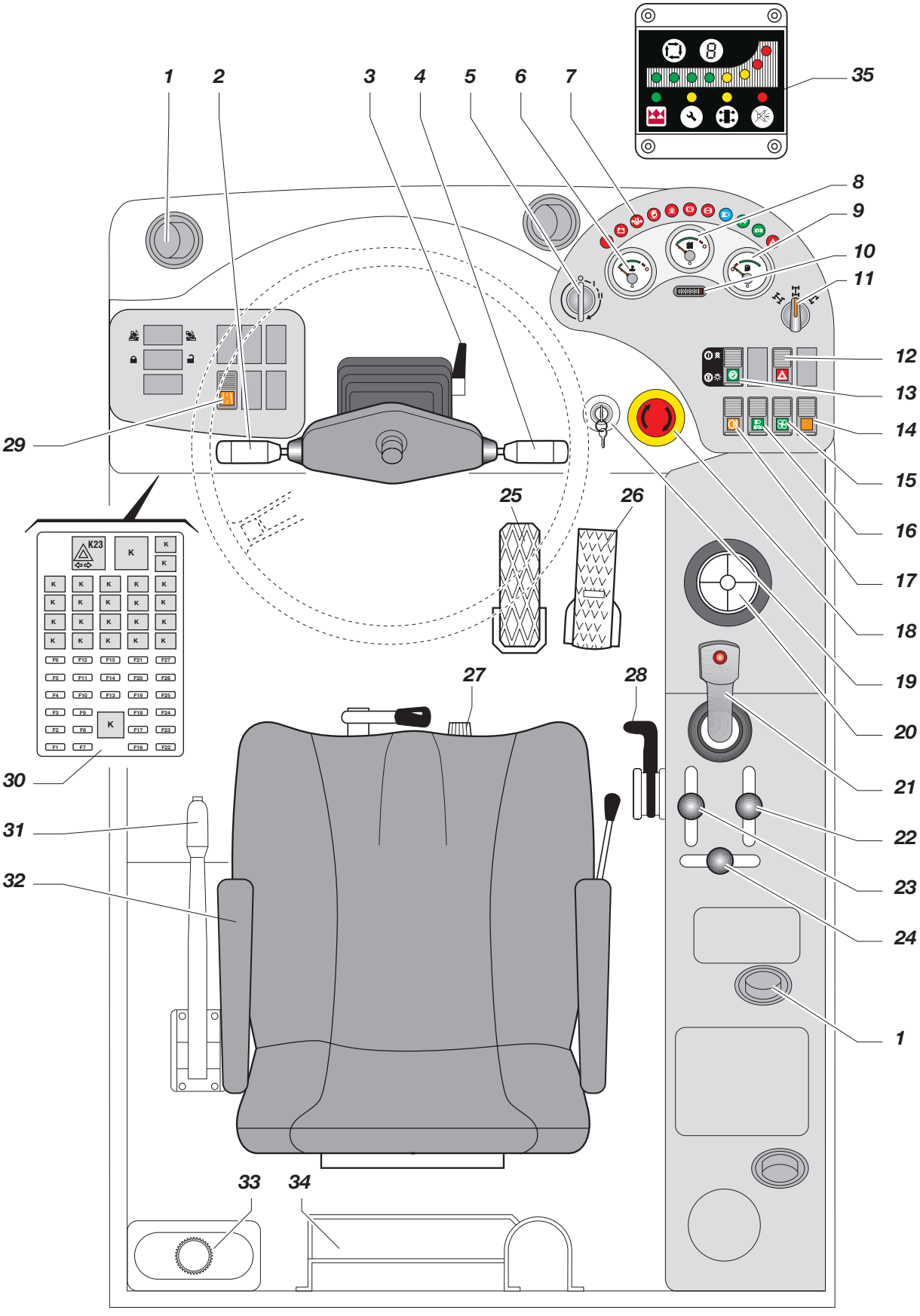
The ceiling light fixture is fixed to the rear top strut of the cab. The relevant lamp is switched on/off by switch **A**.



C-3 DRIVING PLACE

C-3.1 CONTROLS AND INSTRUMENTS

1 Fresh air flap
2 Forward/reverse selector
3 Locking lever - steering column angle adjustment
4 Switch: turn signals - windscreen washer - horn
5 Ignition switch
6 Water temperature indicator
7 Warning lights and light indicators
8 Hydraulic oil temperature indicator
9 Fuel gauge
10 Hourmeter
11 Steering selector switch
12 Hazard warning lights switch
13 Mechanical gearbox pushbutton
14 Brakes mode switch
15 Air conditioning fan switch
16 Road lights switch
17 Fog lamp switch
18 Emergency stop pushbutton
19 Load limiter disabling key
20 Inclinometer
21 Multipurpose control lever
22 Right outrigger control lever
23 Left outrigger control lever
24 Attachment locking/unlocking lever (optional)
25 Brake pedal
26 Gas pedal
27 Cab heater control cock
28 Manual accelerator
29 Road/Jobsite switch
30 Fuse and relay
31 Parking brake
32 Adjustable seat
33 Windscreen washer water tank
34 Glove compartment
35 Moment limiting system control panel



C-3.2 ENGINE CONTROLS AND INSTRUMENTS

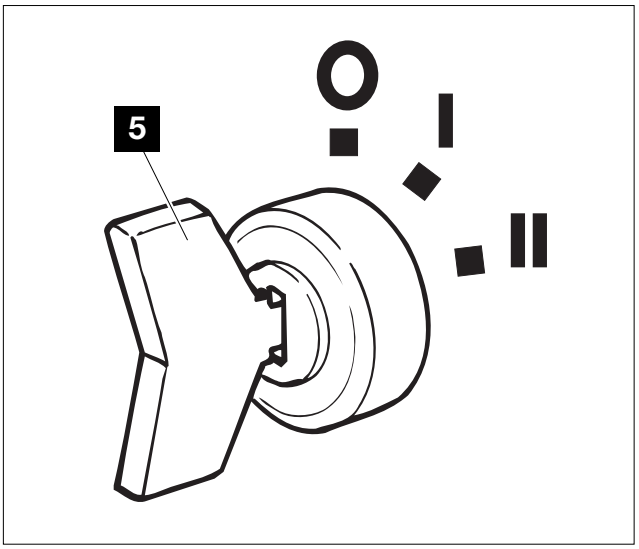
■ *C-3.2.1 Ignition switch - 5*

Three-position switch:

O No circuit under voltage, key can be removed and engine is stopped

I Circuits under voltage, presetting for the engine starting. Board controls and instruments are on. The warning light **7.11** signalling the glow plugs preheating comes on. Wait until the light goes off before starting the engine.

II Engine starting; when released, key springs back to pos. **I** automatically.



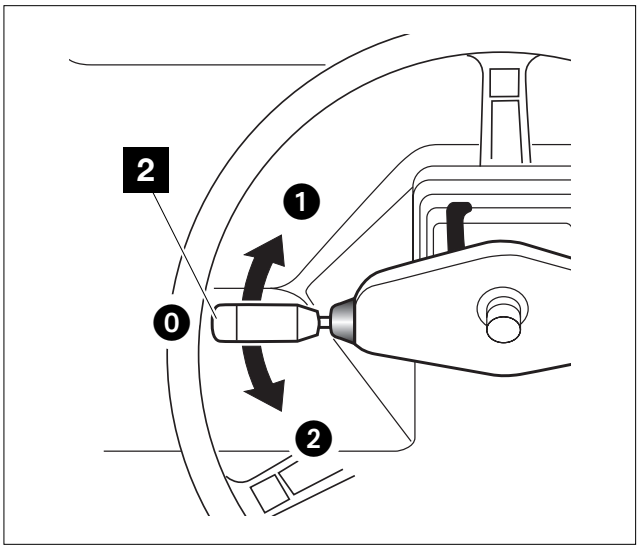
■ *C-3.2.2 Forward/reverse selector - 2*

Three-position selector with lock in neutral position:

0 Neutral position; no speed engaged

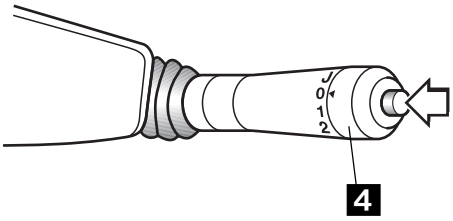
1 Shift lever to pos. **1** to select the forward speed

2 Shift lever to pos. **2** to select the reverse speed

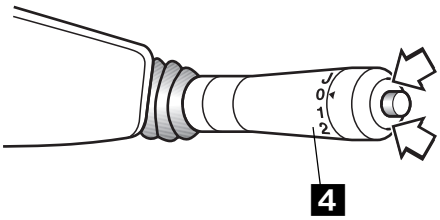


■ *C-3.2.3 Turn signals - Windscreen wiper - Horn - Lights - 4*

■ ***Horn function***:
When sliding the lever along its axis, horn switches on, independently from other pre-set functions.



■ ***Windscreen washer function***:
Push the second stage of the lever along its axis to direct a jet of water onto the cab windscreen.

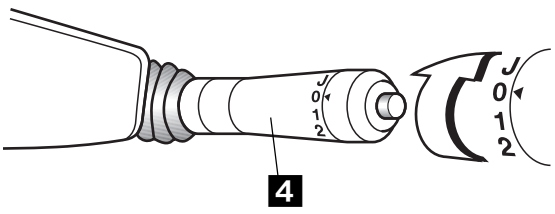


■ ***Windscreen wiper function***:
To operate the windscreen wiper, rotate the lever tip to one of the four positions:

0 Wiper OFF

J Rear wiper (if any)

1 Low speed

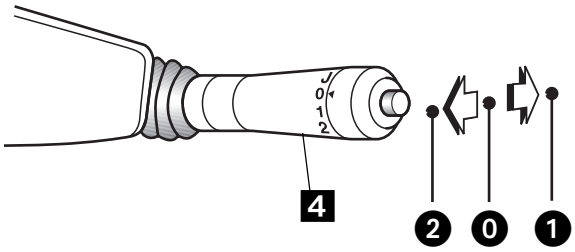


■ ***Lights function***:
To switch the handler lights, lever can be set to three different positions along its vertical axis:

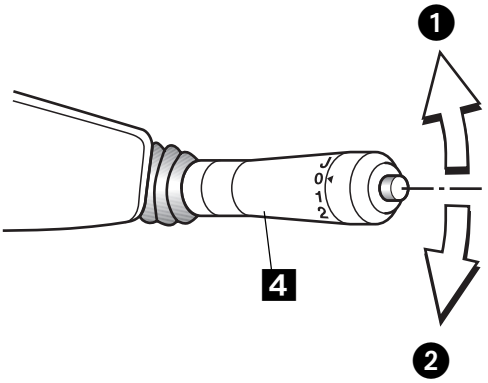
0 low beam ON, stable condition

1 high beam ON, stable condition

2 high beam used for intermittent signalling; when released, the lever springs back to position **0**.



■ ***Turn signals function***:
Set lever to pos. **1** to indicate a turn leftwards or to pos. **2** to indicate a turn rightwards.



■ C-3.2.4 Brakes

25 Service brake pedal

Gradually step on the brake pedal to decelerate and stop the machine. The pedal operates on the axle shafts of both axles.

31 Parking brake

To engage the parking brake, pull the lever upward while holding the locking button pressed down. Release the button when reaching the required braking tension. It operates on the axle shafts of the rear axle and, when engaged, it cuts both forward and reverse gear off.

CAUTION

Never use the parking brake to slow down the machine, unless in an emergency. It may reduce the brake efficiency.

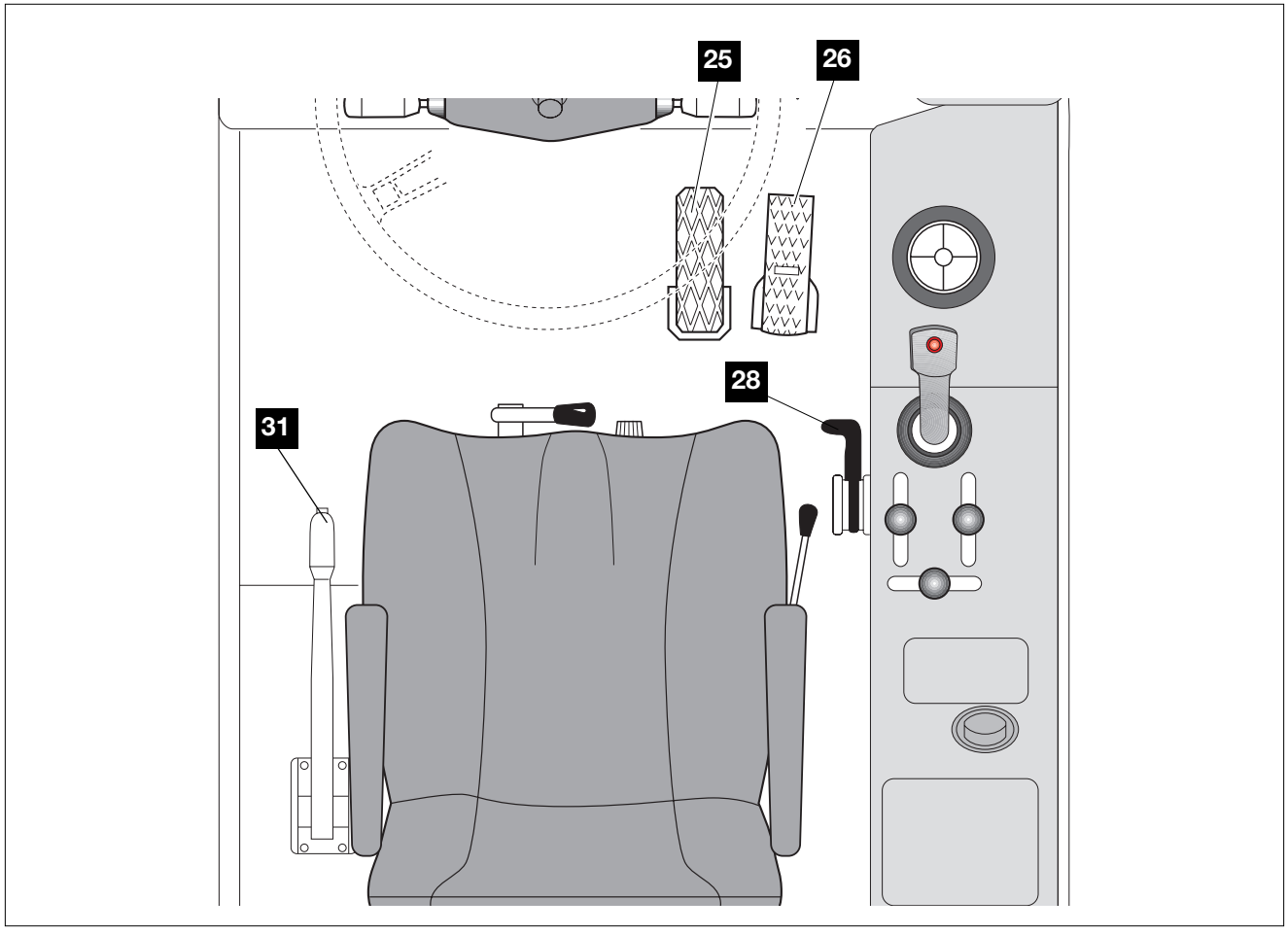
■ C-3.2.5 Accelerator control

26 Gas pedal

Its pressure controls the engine rpm and, coupled to the gearbox, the machine speed. It is fitted with an adjustable stop in the lower part

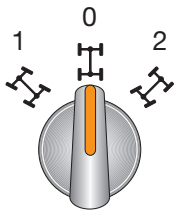
28 Gas lever

By pulling the lever up, the engine rpm increases gradually.
To reduce the rpm, set the lever down



■ C-3.2.6 Steering mode selection

11 Steering mode switch

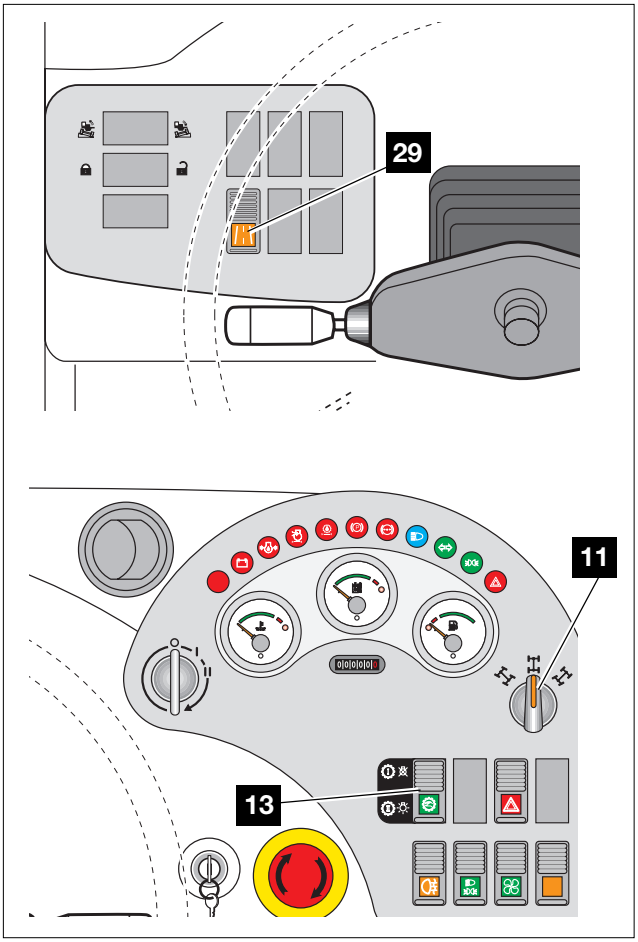


Three-position switch for the selection of the steering mode:

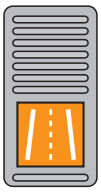
1 Crab steering

0 Two-wheel steering

2 Four-wheel steering



■ C-3.2.7 Road/Jobsite switch - 29



Switch 29 has two positions:

1 The switch is on and the jobsite mode is enabled.

2 The switch is off and the machine is set to road transfer mode.

Each pressure switches the selector from the Road position to the Jobsite position.

In ***Jobsite*** mode:

- all the machine functions are enabled.

In ***Road*** transfer mode:

- the boom movement is disabled
- only the two-wheel steering mode is enabled.

ATTENTION

Switch from the Road position to the Jobsite position only when the machine stands still and the wheels are straight in order not to lose proper shafting alignment. If the wheels must be aligned, consult chapter D.3-13 Shafting alignment in the Maintenance section.

■ C-3.2.8 Mechanical gearbox controls

13 Mechanical gearbox pushbutton

For changing between 1st and 2nd gear.

Push the button to select the required speed.

Each pressure corresponds to the selection of a new speed and the light under the glass corresponding to the selected speed lights up.

ATTENTION

Do not change mechanical gear when the machine is running.

IMPORTANT

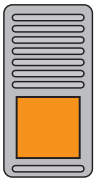
When a gear is not correctly put, the warning light 8.10 comes on (see C-3.3.2).

■ C-3.2.9 Auxiliary drive controls

12 Hazard warning lights switch

Fitted with on-off position, it switches on the turn signals simultaneously. When the hazard warning light is on, the switch flashes

14 Brakes Mode Switch



Switch 14 has two positions:

1) The switch is on, during the braking the hydraulic transmission is on.

2) The switch is off, during the braking the hydraulic transmission is enabled.

15 Air conditioning fan switch

Three-position switch:

0 OFF

1 Low speed

2 High speed

16 Road lights switch

Three-position switch:

0 Lights OFF

1 Position lights ON (the switch indicator lights up partially)

2 Low beam ON (the switch indicator fully lights up).

17 Fog lamp switch

Two-position switch:

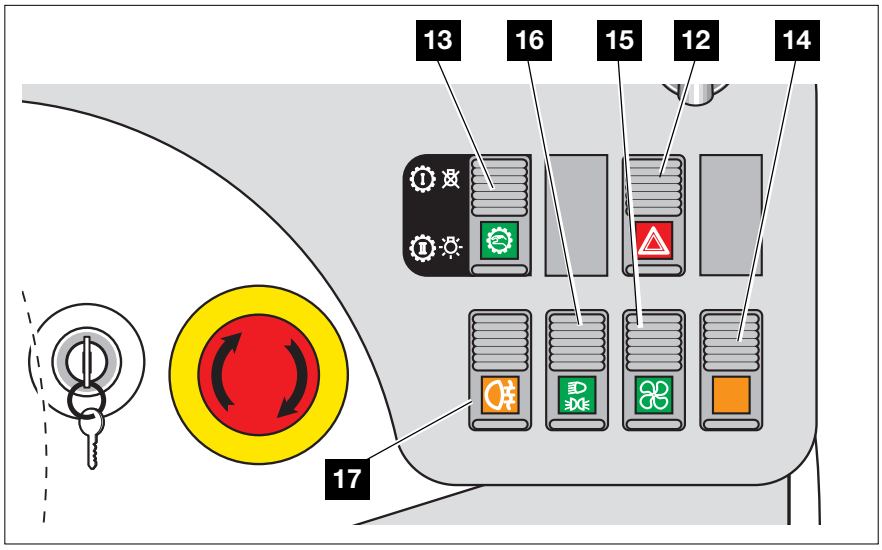
0 Fog lamp OFF

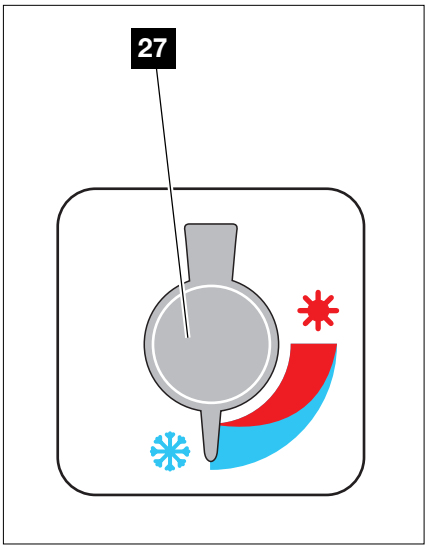
1 Fog lamp ON (the switch indicator lights up).

27 Cab heater control cock

Located on the left side of the driving seat base.

- Rotate clockwise for fresh air
- Rotate anticlockwise for warm air
- Adjust the flow of warm air within the cab by the air conditioning fan switch 15.





■ C-3.3 INSTRUMENTS AND LIGHT INDICATORS

■ *C-3.3.1 Instruments*

6 ***Engine coolant temperature indicator***

Indicates the temperature of the engine oil in the radiator. If the finger is in the red zone and the warning light comes on, you must stop the machine and find and rectify the problem.

8 ***Hydraulic oil temperature indicator***

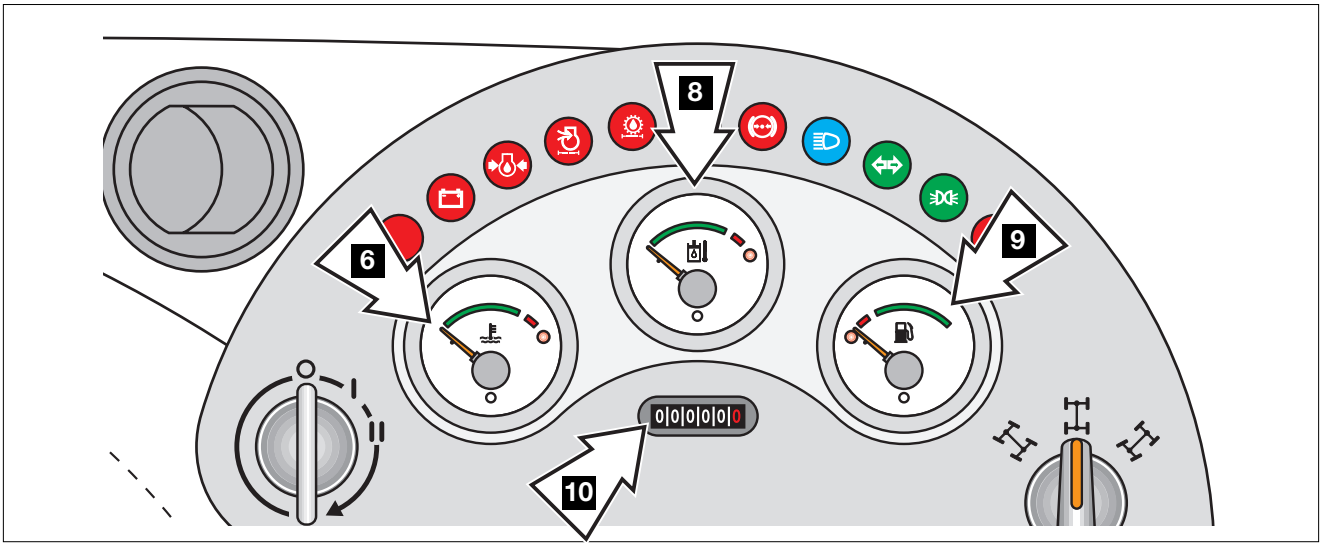
Indicates the temperature of the hydraulic oil within the tank. If the temperature rises above the permissible value or the red warning light comes on, you must stop the machine and find and rectify the problem.

9 ***Fuel gauge***

Indicates the fuel level in the tank.
If the fuel level is low (reserve), the relevant warning light comes on.

10 ***Hour-meter***

Indicates the total operating hours of the machine. Use the hour-meter to gauge the routine maintenance jobs.



■ C-3.3.2 Light indicators - 7

7.1 Indicator light - low battery charge

Indicates a low charge by the alternator.

7.2 Indicator light - hydraulic oil filter clogged

When this lamp sets to on, immediately change the oil filter on the suction line from the tank.

7.3 Indicator light - air filter clogged

When this lamp sets to on, clean or change the filter elements.

7.4 Indicator light - low engine oil pressure

It lights when the engine oil pressure is too low.

7.5 Indicator light - parking brake engaged

When ON, this light indicates that the parking brake is not in its rest position (it is engaged).

7.6 Indicator light - low brake pressure

It lights when the pressure of the braking circuit is too low for a correct functioning

7.7 Indicator light - high beam

Blue indicator light that signals when high beam is ON.

7.8 Indicator light - turn signals

Green indicator light that signals when turn signals are ON

7.9 Indicator light - position lights

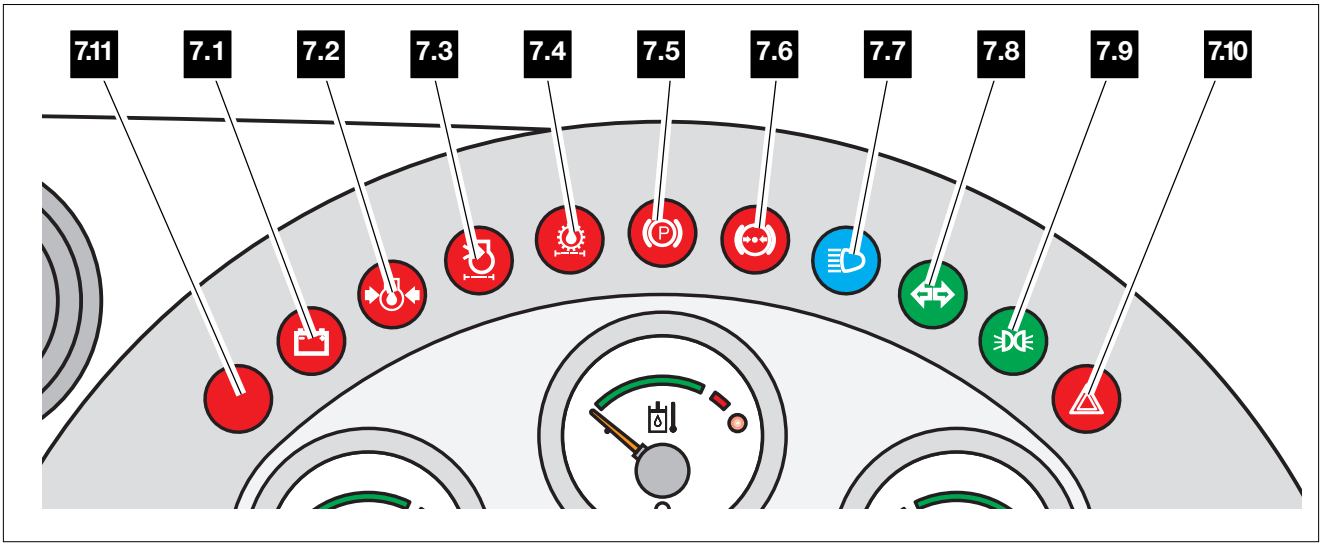
Green indicator light that signals when position lights are ON.

7.10 Indicator light - General alarm

This orange light comes on to warn of a failure of the machine. The light also comes on when the mechanical gear is not put. Contact TEREXLIFT Service Centre.

7.11 Indicator light - Glow plug pre-heating

This orange light comes on during the pre-heating of the engine glow plugs. Before starting the engine wait until this light goes off.

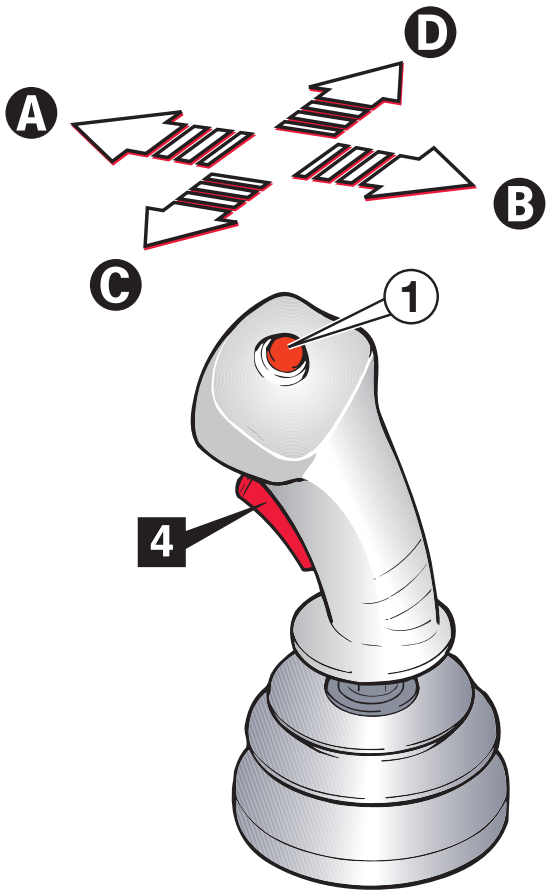


C-3.4 CONTROL LEVER

The handlers are equipped with a joystick with servo-assisted hydraulic control for the boom lifting/lowering movements and the attachment frame forward/back pitching. Pressing the red button **1** on the joystick switches the pitching movement to telescope out/in-movement.

The control lever has an intentional control button **4** that must be pressed and held in position till the end of the movement.
If the button is not pressed down, the lever, though operated, does not perform any function.

Other three levers are installed on the dashboard for the independent operation of the following functions: right and left outrigger movement and attachment locking/unlocking (optional).

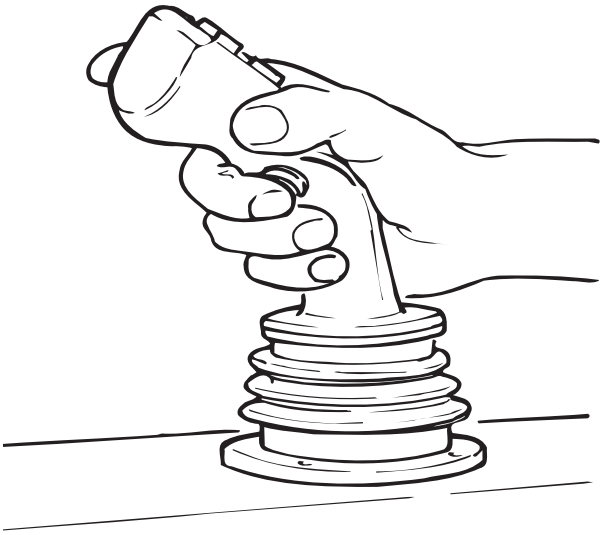


IMPORTANT

Seize the control lever correctly and move it gently. The motion speed of the actuators depends on the lever position: a small movemennt results in a slow motion of the actuators; vice versa, a full range movement of the lever corresponds to the max. speed of the actuator.

CAUTION

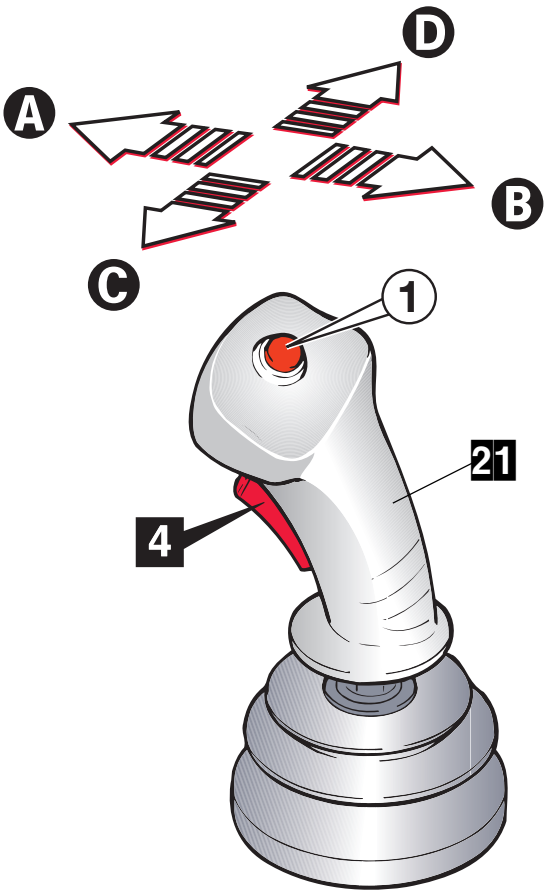
The control lever shall be operated only when correctly seated in the driving place.



CAUTION

Before operating the control lever, make sure that nobody is within the working range of the machine.

■ C-3.4.1 Function selection



After pressing the intentional control pushbutton **4**, the lever **21** is enabled to carry out the following functions:

Without pressing button **1**:

- **Boom lifting/lowering**
  shift the control lever to Ⓐ or Ⓑ
- **Boom extension/retraction**
  shift the control lever to Ⓒ or Ⓓ

Pressing button **1**:

- **Boom lifting/lowering**
  shift the control lever to Ⓐ or Ⓑ
- **Attachment frame forward/back pitching**
  shift the control lever to Ⓒ or Ⓓ

The three levers operate the following functions in an independent way:

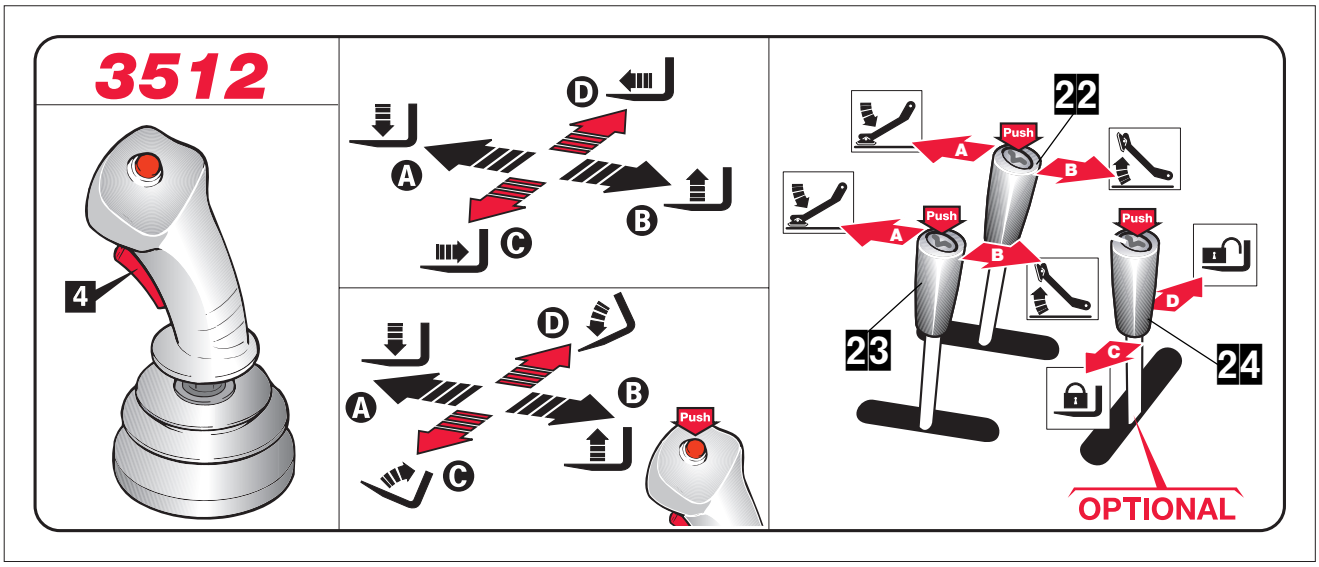
22 Right outrigger movement

23 Left outrigger movement

24 Attachment locking/unlocking (optional)

DANGER

If the intentional control button 4 is pressed with the lever not correctly set to central position, the control of the selected actuator is operated immediately.



■ C-3.4.2 Emergency stop

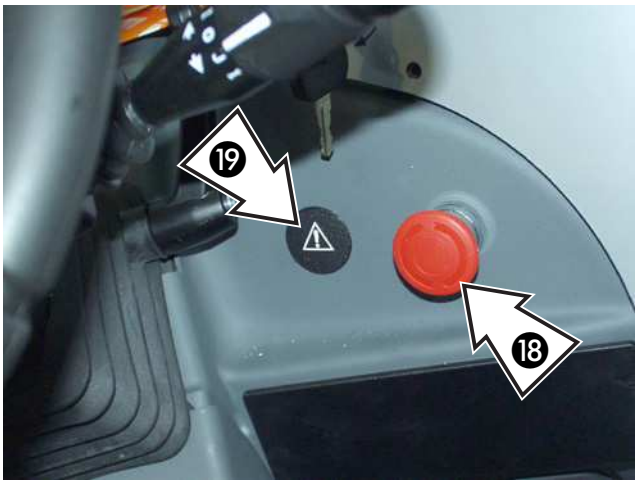
The operated functions can be stopped at any time by pressing the emergency stop button ⑱.

By pressing this button, the engine of the machine is shut down.

Before restarting the machine, it is necessary to reset the pushbutton by rotating it clockwise.

CAUTION

Before restarting the machine, find and rectify the faults that caused the emergency



■ C-3.4.3 Disabling the moment limiting system

The load limiter can be deactivated operating the key-selector placed under the protection cover ⑲.

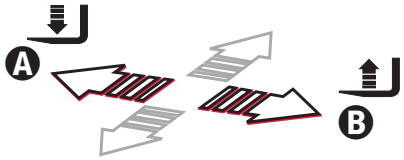
DANGER

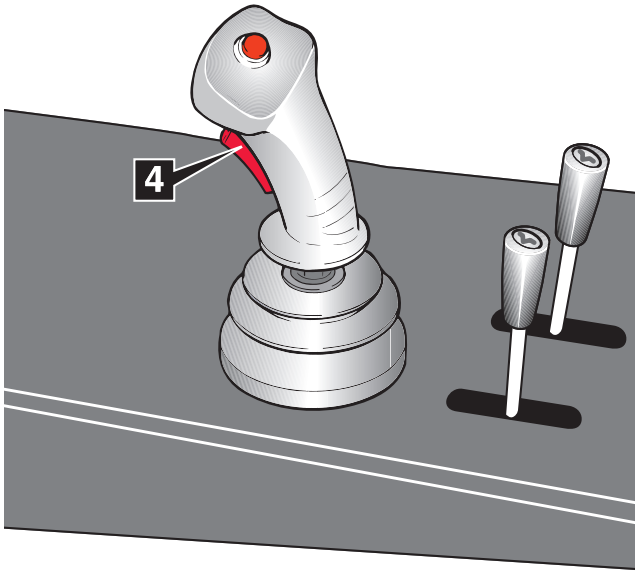
WORKING WITH THE MOMENT LIMITING SYSTEM CUT OUT CAN RESULT IN A MACHINE OVERTURNING AND IN SERIOUS INJURY.

■ *C-3.4.4 Lifting/lowering the boom*

CAUTION

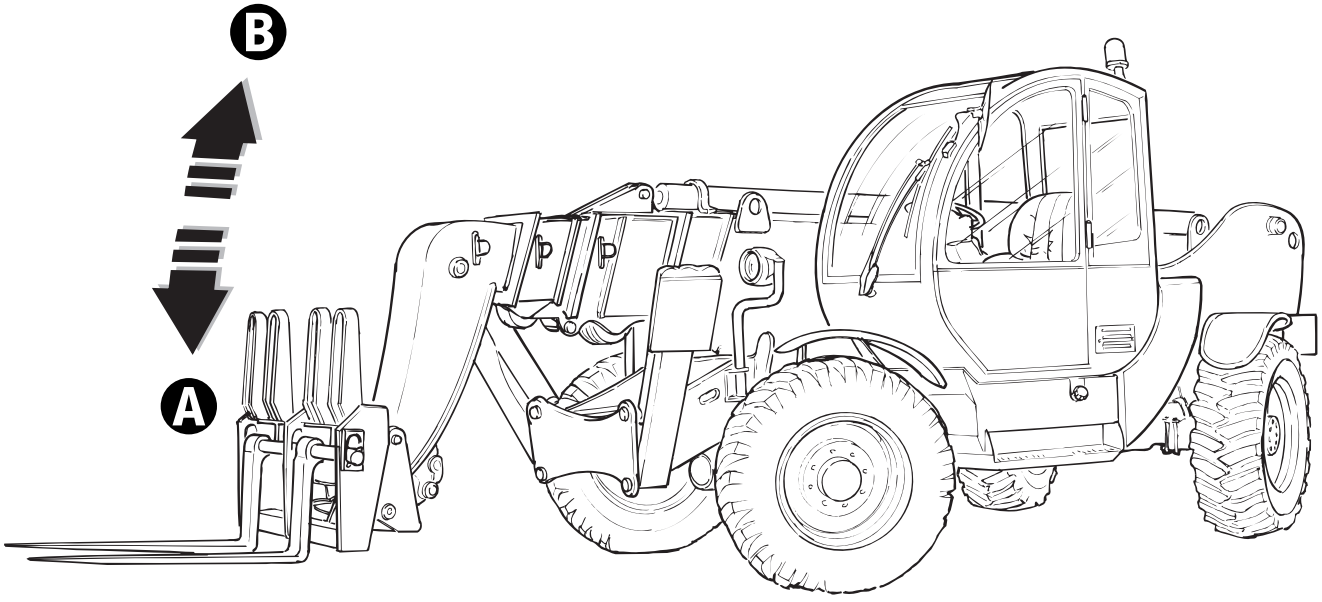
Before operating the boom, make sure that nobody is within the working range of the machine.





To lift or lower the boom:

- Set the control lever to central position and press button 4
- Smoothly shift the lever to position Ⓑ to lift the boom or to position Ⓐ to lower it.



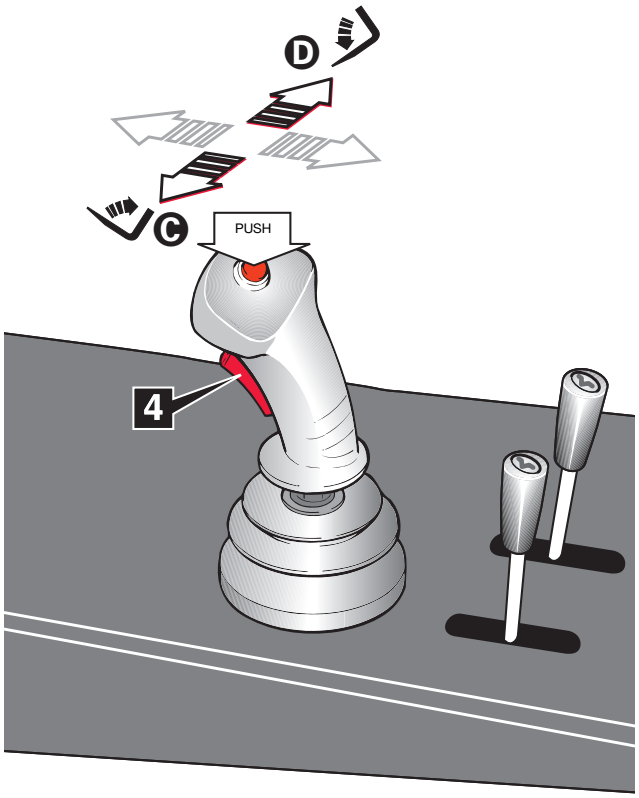
■ C-3.4.5 *Pitching the attachment holding frame forward/back*

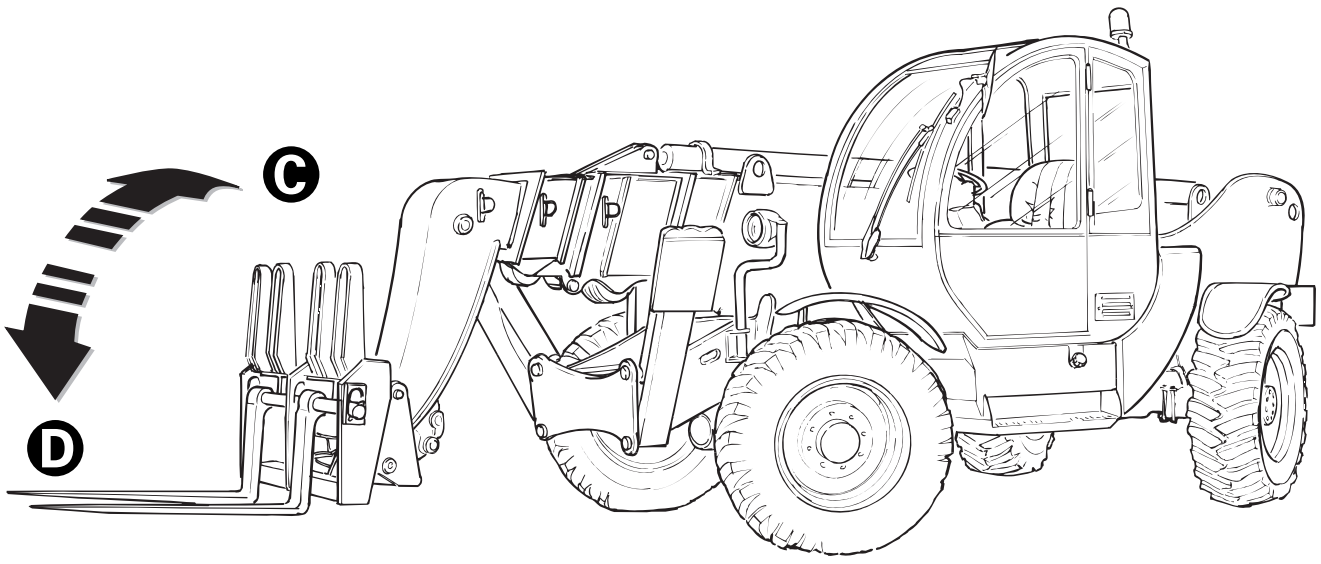
CAUTION

Before operating the boom, make sure that nobody is within the working range of the machine.

To tilt forward/back the attachment holding frame:

- Set the control lever to central position and press button 4
- Press the **Red** pushbutton
- Smoothly shift the lever to position Ⓓ to pitch the holding frame forward
- Smoothly shift the lever to position Ⓒ to pitch the holding frame back





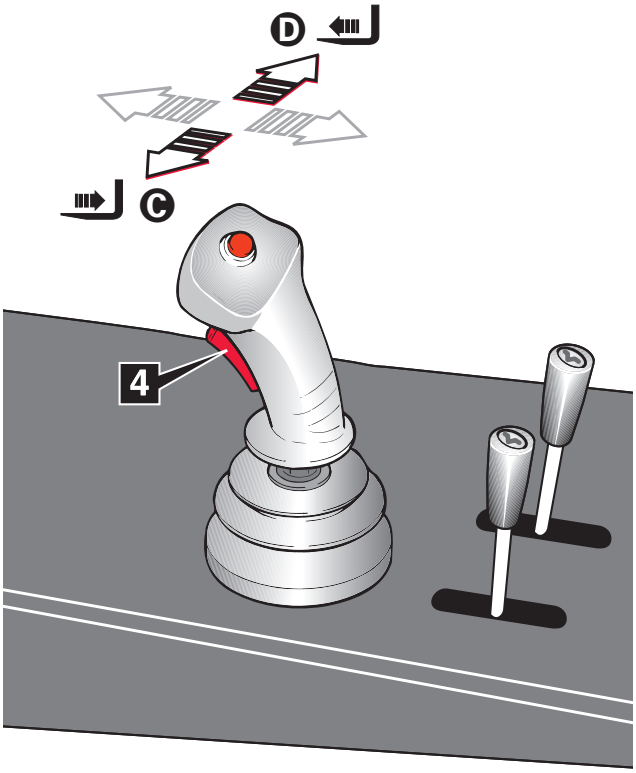
■ C-3.4.6 Extending/retracting the boom

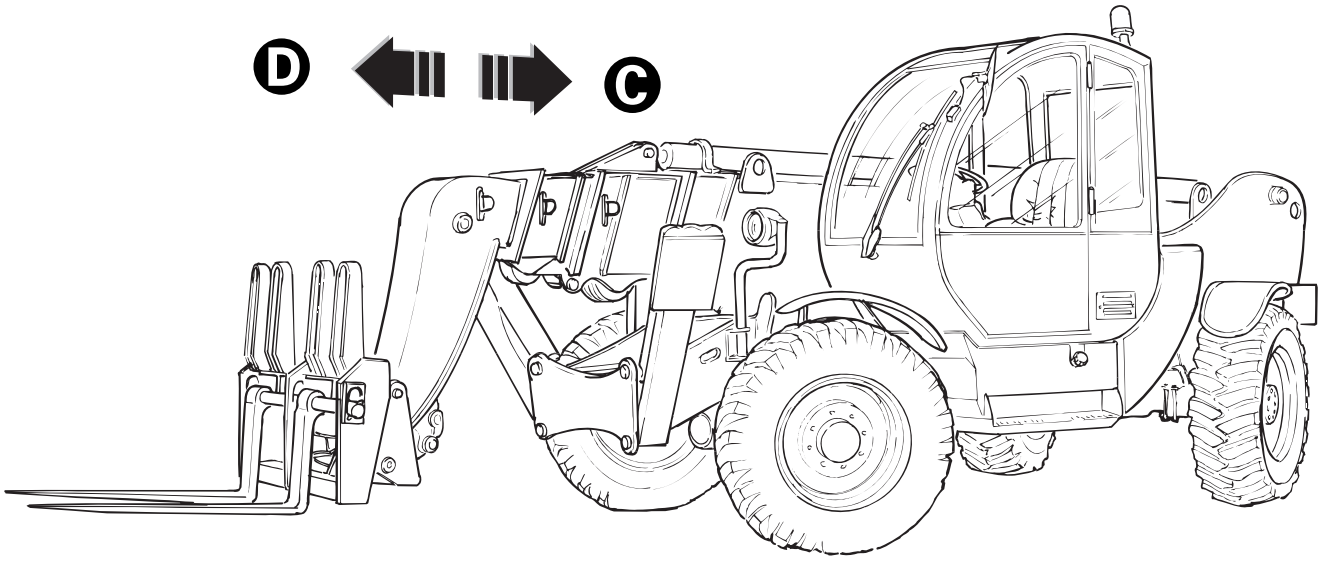
CAUTION

Before operating the boom, make sure that nobody is within the working range of the machine.

To extend or retract the telescopic elements of the boom:

- Set the control lever to central position and press button **4**
- Smoothly shift the lever to position Ⓓ to extend the boom or to position Ⓒ to retract it.

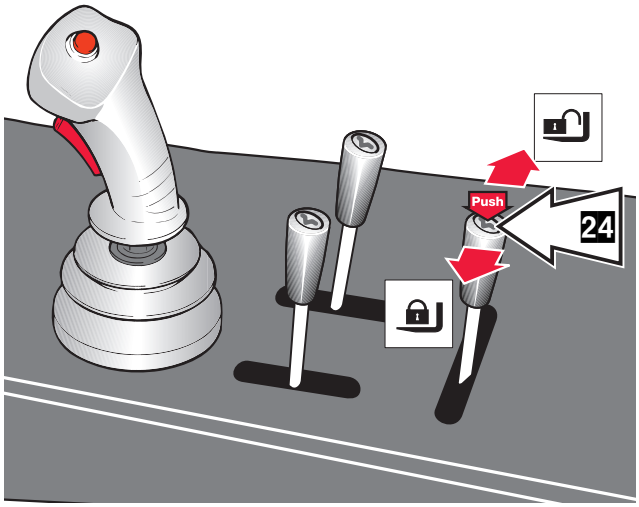




■ C-3.4.7 Quick-coupling the attachments (optional)

CAUTION

Before operating the boom, make sure that nobody is within the working range of the machine.

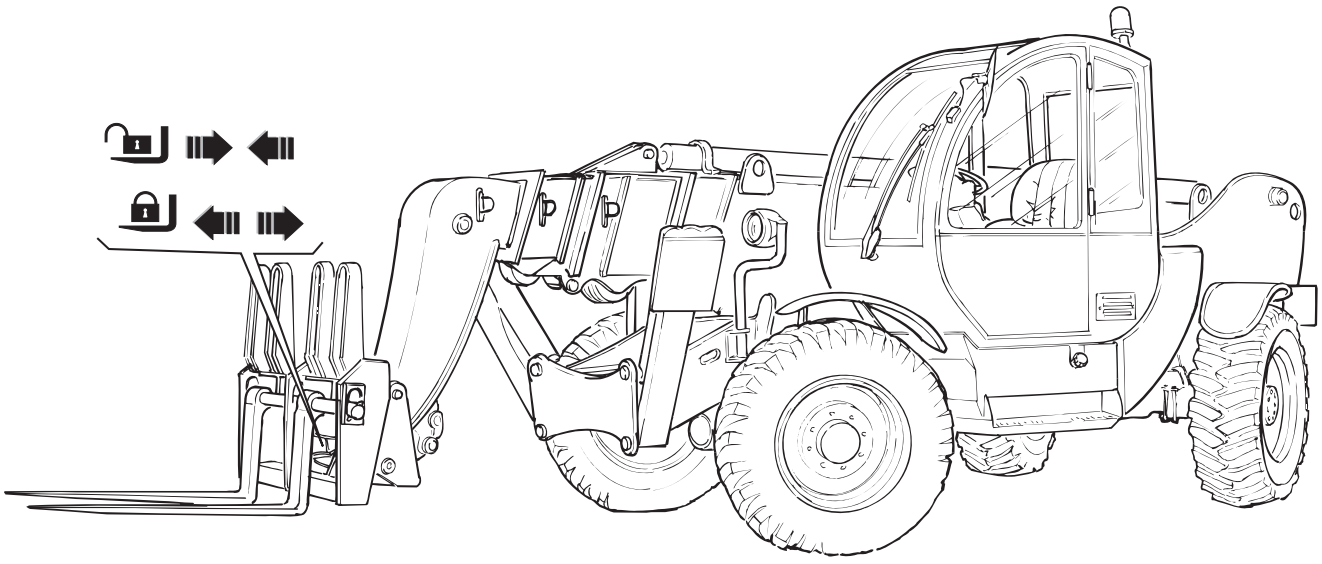


To lock/unlock the attachments:

- Press the button on the lever knob
- Shift lever 24 toward the cab windscreen to unlock the attachment
- Shift the lever toward the operator's seat to lock the attachment

ATTENTION

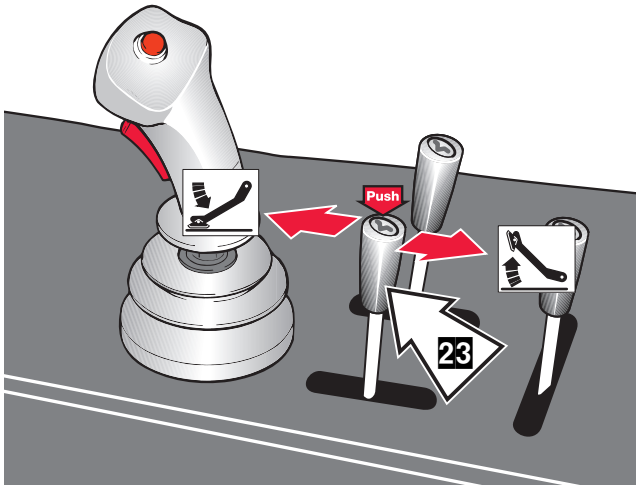
Before using the machine, visually check the attachment is correctly coupled.



■ C-3.4.8 Moving the outriggers

CAUTION

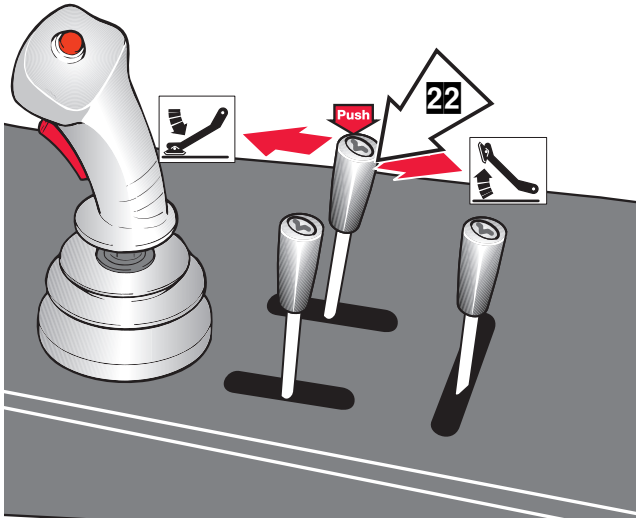
Before lowering the outriggers, make sure that nobody is within the working range of the machine.



To operate the outriggers

Left outrigger (23 lever)

- Press the button on the lever knob
- Push the left lever to lower the left outrigger to the ground
- Pull the left lever to raise the left outrigger.



Right outrigger (22 lever)

- Press the button on the lever knob
- Push the right lever to lower the right outrigger to the ground
- Pull the right lever to raise the right outrigger.

C-4 PLACING INTO OPERATION

C-4.1 BEFORE STARTING THE ENGINE

- To protect operators and bystanders and provide a longer life to your machine, perform a walk-around inspection before starting the engine.
- Remove any dirt or rubbish from the cab interior, and especially from pedals and control levers.
- Remove oil, grease and mud from pedals and control levers.
- Make sure that your hands and shoe soles are clean and dry.
- Check the seat belts can be fastened properly.
- Check that lights, indicators, side/tail lights, hazard indicator lights, wipers and horn are in working order.
- Adjust the driving seat so that you can reach all control levers comfortably and fully depress the brake pedal without moving your back from the driving seat.
- Adjust the rear view mirrors to give you a good view close behind the machine when you are correctly seated.
- Check the parking brake is engaged.

C-4.1.1 Checks at the machine start-up

When power is turned on, the moment limiting system activates automatically. If the power supplied is correct, the green light above the Terex logo comes on. The display remains off while the system runs a self-test. After that, the system is activated and **0** appears on the display.

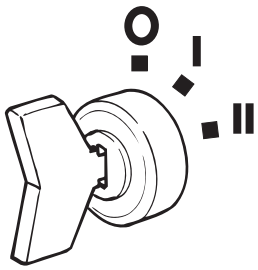
If during the test phase, the moment limiting system finds a fault, it enters the safety mode automatically and an error code will start flashing on the display. For any further information, refer to **chap. C-5.2**.

Also check the efficiency of the safety devices as described in **chap. D-3.16**, namely:

- moment limiting system
- joystick pushbutton
- emergency pushbutton
- machine start-up control
- switch on parking brake
- limit switch on the outriggers

C-4.2 STARTING THE ENGINE

- Put the mechanical gear lever to neutral.
- Step on the gas pedal.
- To start the engine, rotate the ignition switch to position **II**, and release when the engine starts. If the engine does not start within 20 seconds, release the key and wait at least 2 minutes before attempting again.
- After starting the engine, slow down the rpm and wait some seconds before engaging a speed; this allows for a gradual warm up of the engine oil and a better lubrication.



- In case of engine jump-starting, remove the connecting cables (see following chapter).

ATTENTION

If the light indicators do not switch off/on when engine is running, immediately stop the machine and find and rectify the fault.

IMPORTANT

Engine cannot be started if the forward/reverse selector is not in neutral position.

DANGER

After start up, the engine continues to run even if the driver's seat is unoccupied. DO NOT LEAVE THE DRIVING PLACE BEFORE HAVING SHUT THE ENGINE DOWN, LOWERED THE BOOM TO THE GROUND AND ENGAGED THE PARKING BRAKE.

■ C-4.3 JUMP-STARTING THE ENGINE

DANGER

When jump-starting the engine through the battery of another machine, make sure that the two vehicles cannot collide to prevent formation of sparks. Batteries give off a flammable gas and cause an explosion.

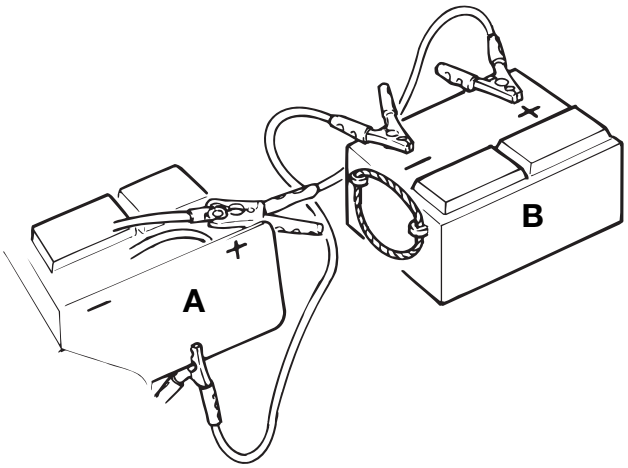
Do not smoke when checking the electrolyte level.

Keep any metal object like buckles, watch straps, etc. clear of the battery positive (+) terminal. These elements can short between the terminal and nearby metal work and the operator can get burned.

The booster supply must have the same rated voltage and output of the battery installed on the handler.

To jump-start the engine:

- Turn off any functions by the special control levers.
- Put the gear lever to neutral and engage the parking brake.
- Ensure the machine battery **A** is connected to the frame earth, the terminals are well tightened and the electrolyte level is regular.
- Connect the two batteries as shown in the figure. Connect first the positive terminals of the two batteries, then the negative terminal of the booster supply **B** to the machine frame earth.
- If the booster supply is installed on a second vehicle, make sure that the latter does not touch the handler; then start the vehicle and reach an rpm corresponding to 1/4 of full throttle.
- Turn the ignition key and start the handler, then follow the procedure explained in chapter C-4.2 “Starting the engine”.
- Disconnect the cables. Remove first the negative terminal from the frame earth, then from the booster supply. Disconnect the positive terminal from the machine battery, then from the booster supply.

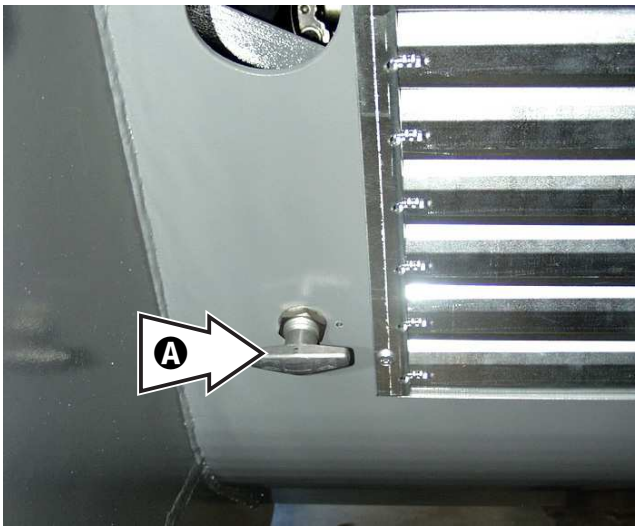


DANGER

Use only a 12V battery; other devices like battery chargers, etc. may cause an explosion of the battery or result in damage to the electrical system.

■ C-4.4 DISCONNECTING THE BATTERY

During maintenance or repair works, and while welding, turn off the battery main switch Ⓐ, located outside the engine compartment in the area of the rear wheel.



■ C-4.5 STARTING THE MACHINE

When the engine reaches the running temperature, ensure all parts are in transfer position and the gearbox lever is in neutral. Then, proceed as follows:

- Select the required steering mode.
- Select the required gear (forward or reverse).
- Release the parking brake.
- Slowly step on the gas pedal to start moving off.

CAUTION

Do not operate the forward/reverse gear lever when the machine is running. The machine would reverse the running direction abruptly and you could seriously be injured.

C-4.6 STOPPING AND PARKING THE MACHINE

When possible, stop the machine on a dry, level and solid ground. Then:

- Bring the machine to a smooth stop by easing up the gas pedal and stepping down on the brake pedal.
- Set the forward/reverse selector to neutral position.
- Engage the parking brake and ensure its indicator light switches on.
- Release the service brake pedal.
- Rest the attachment coupled to the boom flat on the ground.
- Rotate the ignition key to “**0**” and remove the key.
- Leave the driving cab and lock the cab door.
- Set the battery cut-out switch to **OFF** position.

DANGER

Always face the machine when getting off the driving cab; make sure that your hands and shoe soles are clean and dry, and hold to the handholds to prevent falls or slips.

DANGER

Always engage the parking brake after stopping the machine to prevent possible accidental motions of the vehicle.

ATTENTION

Leaving the battery connected can cause a short-circuit posing a fire hazard.

C-5 USING THE HANDLER

This chapter describes some techniques and provides instructions for a safe use of the machine fitted with standard forks. Before using different attachments, thoroughly read the chapter “Optional attachments".

CAUTION

Before using the machine, inspect the job site and check for possible hazardous conditions. Make sure that there are no holes, soft banks or debris that may cause you to lose the control of the machine.

ELECTRICAL DANGER

Pay the greatest attention when working close to electric lines. Check their position and ensure that no part of the machine operates at less than 6.4 meters from distribution power lines.

CAUTION

Always check the weight of the loads going to be handled.
Always refer to the load charts applied on the cab windscreen.

■ C-5.1 USING THE LOAD CHARTS

The charts indicating the maximum permissible load in relation to the boom extension and the type of attachment used are installed on the cab windscreen and/or illustrated in the quick guide.
Chart **A** must be used when working with outriggers, whilst chart **B** shows the payload limits when operating without outriggers.
To operate under safe conditions, always refer to these charts.

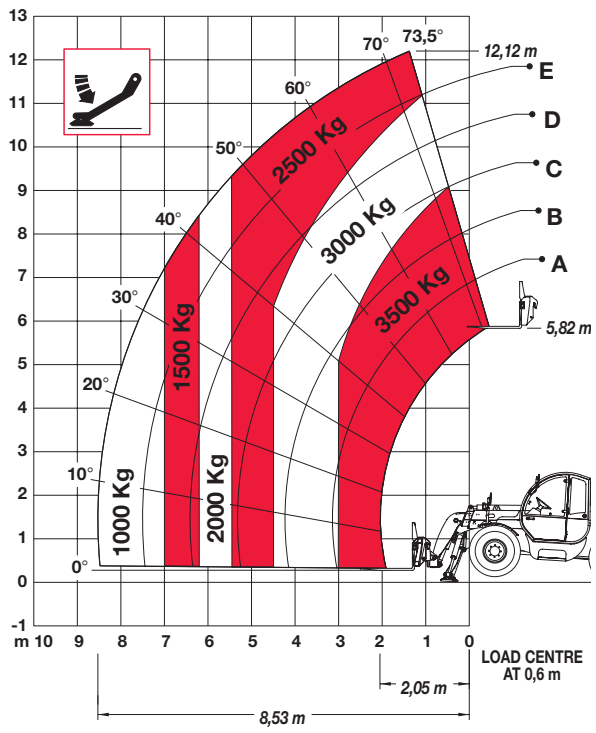
CAUTION

The load charts illustrated in this manual are given only as a mere example. To define the payload limits, refer to the load charts applied within the cab of your machine.

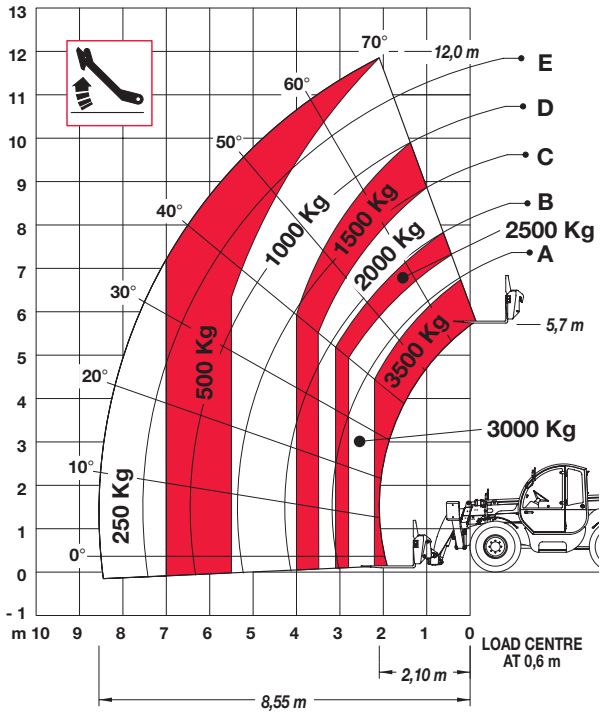
CAUTION

The load charts applied on the cab windscreen refer to a stationary machine standing on a solid and level ground.
Raise the load some centimetres and check its stability before raising it completely.

A



B



■ C-5.2 LOAD LIMITING SYSTEM

On the front top strut of the cab, there is the load limiter 35 which warns the operator of the variation of longitudinal stability of the machine and blocks any manoeuvre of the same before reaching a critical condition.

■ C-5.2.1 Description of the controls

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

The digit on display **2** shows the selected attachment or the alarm code.

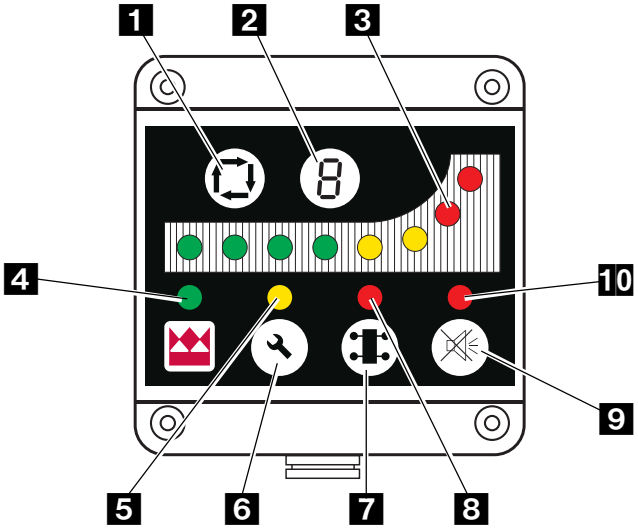
■ C-5.2.2 Operation

When power is turned on, light **4** comes on. The display **2** remains off and the monitoring system runs a self-test before displaying digit **0** to warn that the system is activated.
During operation, the led-bar **3** lights up gradually depending on the variation of stability.

Green LED's: during normal operation when the percentage of overturning moment is between 0 and 89, these LED's are ON. The machine is stable.

Yellow LED's: they light up when the machine tends to overturn and the percentage of overturning moment with respect to the threshold value is between 90 and 100. The system enters the **pre-alarm** mode, light **10** flashes and the buzzer sounds with an intermittent sound.

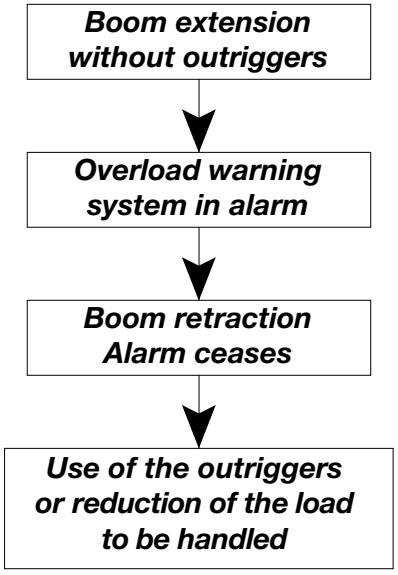
Red LED's: risk of overturning: the percentage of overturning moment is above 100 with respect to the threshold value.
The machine enters the **alarm mode**: light **10** is lit, the buzzer sounds continuously and any dangerous manoeuvre is blocked. The operator can only retract the load (lift and retract the boom).



DANGER

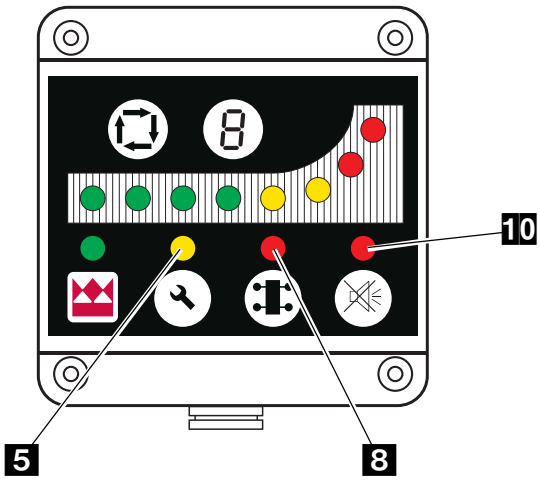
The moment limiting system must not be used to check the load to be handled: it has only been designed to signal possible unbalances of the machine.
Such unbalances may also be caused by an abrupt operation of the levers during the load handling. If, during work, several indicators light up, try to operate the levers more smoothly.

Example of use of the load limiting system



■ C-5.2.3 Alarm codes and resetting

The moment limiter has diagnostic facilities to aid in the identification of faults of the transducers, breakages of the cables or defects of the electronic system.
When a fault is detected, the limiter enters the safety mode. Lights **5**, **8** and **10** start flashing, the buzzer starts sounding and an error code is shown on the display.
The meaning of the error messsages is shown in Section **E** "***Faults and Troubleshooting"***.



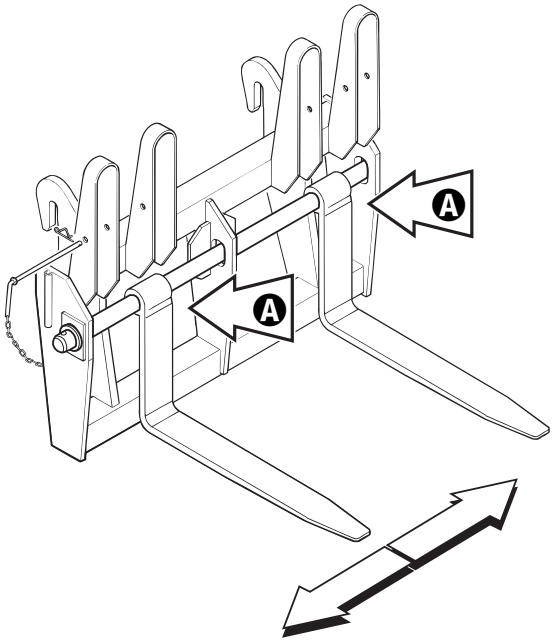
■ C-5.3 HANDLING LOADS

■ C-5.3.1 Adjusting the forks

Forks shall be spaced to suit the load going to be handled.

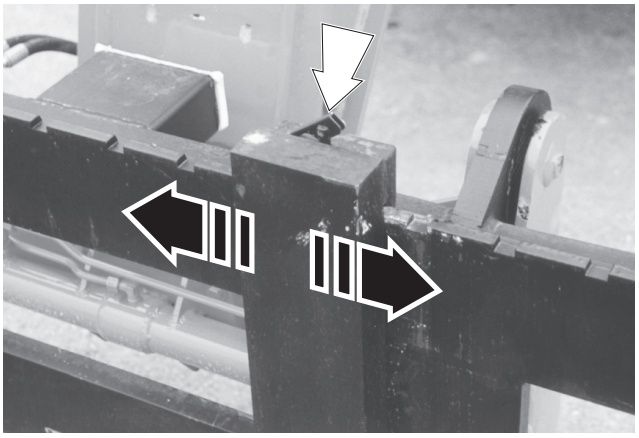
With floating forks

- Loosen the nut of the locking screws **A**.
- Raise the forks and slide them on the pivot until correct spacing.
- Lock the screws re-tightening the nut.



With FEM forks

- Lift the clamping lever of the forks.
- Slide the forks to the desired position, then re-lock the lever.



CAUTION

- ***The centre of gravity of the load must always be halfway between the forks.***
- ***Ensure you exactly know the weight of the load before handling it.***
- ***When extending the boom, do not exceed the payload limit.***
- ***Refer to the payload limits given in the load chart applied on the cab windscreen or in the quick user's guide.***
- ***Space the forks as wide as possible to suit the load being handled.***

■ C-5.3.2 Working phases

When forks are correctly spaced, the handler is ready to use.
Work can be subdivided into three different phases: loading, transfer and unloading.

Loading phase

- Approach the load to the handled perpendicularly and check that the machine is level on the inclinometer.
- Insert the forks under the load and raise the load some centimetres.
- Pitch the forks back and make sure that the overload warning system LEDs are in limits.

Transfer phase

- Do not start or brake abruptly.
- Drive to the unloading point cautiously and keep the load 20÷30 cm from the ground.
- Suit the machine speed to the ground conditions to avoid dangerous jumps, side skids of the vehicle and possible load falls.
- When driving on slopes or ramps, hold the load uphill.

DANGER

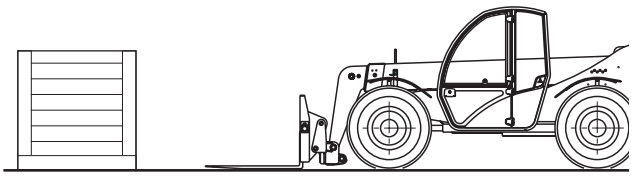
Do not drive on slopes sideways; this wrong manoeuvre is one of the main reasons for accidents due to vehicle overturning.

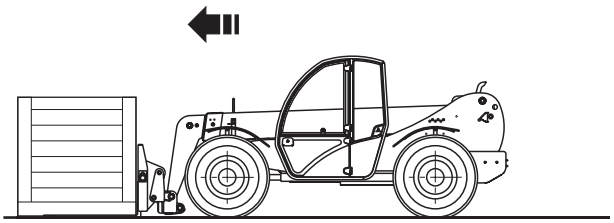
Unloading phase

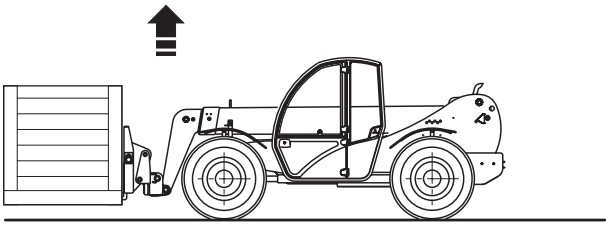
- Drive to the unloading point with straight wheels and bring the machine to a smooth stop leaving enough space to operate the boom.
- Put the parking brake and set the transmission to neutral.
- Position the load some centimetres above the desired position and set the forks level.
- Lower the load and make sure it is level.
- Carefully withdraw the forks by operating the boom retraction control and, if necessary, raise or lower the boom as forks come out.
- When the forks are clear of the load, set them to transfer position.
- Release the parking brake and start a new working cycle.

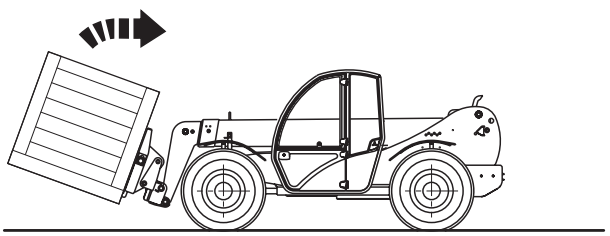
CAUTION

Do not move off when the load is raised 20÷30 cm above the ground. Risk of machine overturning or load fall.









■ C-5.4 CHANGING THE ATTACHMENT

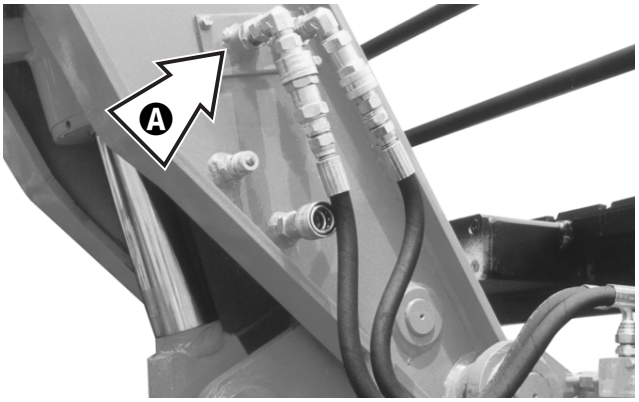
ATTENTION

Use only attachments directly manufactured or recommended by GENIE and detailed in the "Optional attachments" section.

Version with hydraulic locking (optional)

To change an attachment, operate as follows:

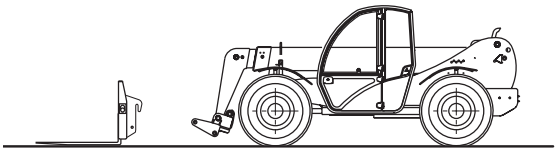
- Drive to the place where you will release the mounted attachment (when possible, a solid and sheltered site).
- Disconnect the quick connectors of the attachment (if any), and connect the hydraulic locking pipes of the attachments to couplings **A**.

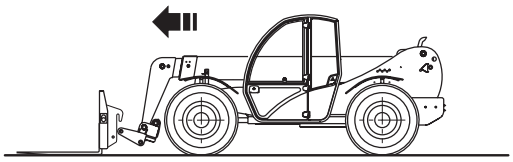


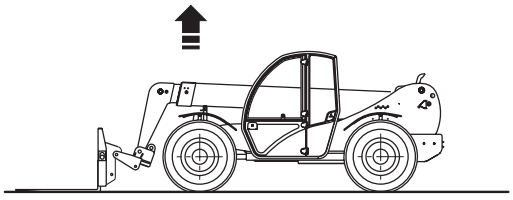
- Rest the attachment flat on the ground.
- Free the attachment operating the control of the attachment locking/unlocking cylinder
- Pitch the attachment holding frame forward and lower the boom to release the attachment upper lock.
- Move back with the machine and drive to the new attachment to be coupled.
- Hold the frame pitched forward and hook the upper lock of the new attachment.
- Retract and raise the attachment some centimetres. It will centre automatically on the quick coupling frame.
- Operate the (optional) control lever to lock the attachment.
- Couple the connectors of the attachment, if any, to the quick couplings of the frame.

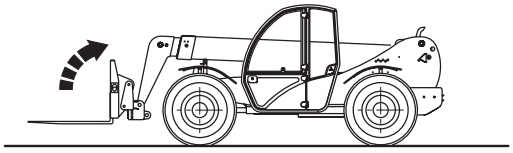
CAUTION

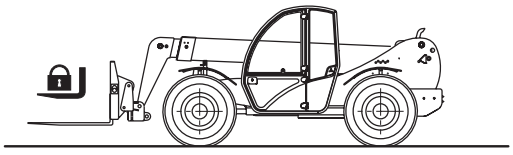
After substitution, visually check the attachment is correctly coupled to the boom, before operating the machine. A wrongly coupled attachment may result in damage to persons or things.







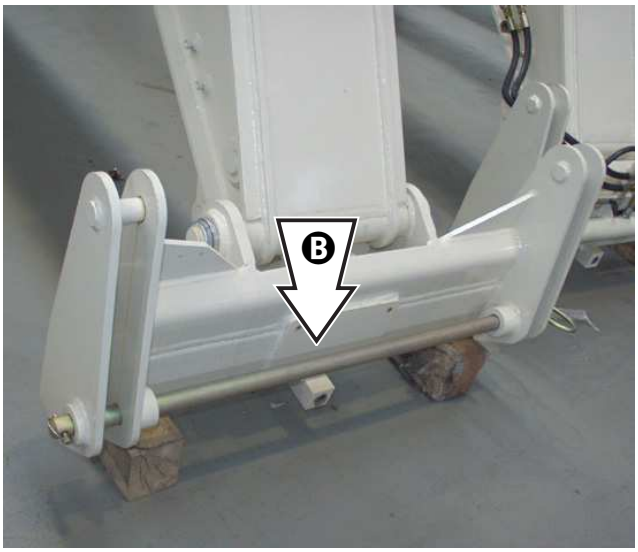




Version with mechanical locking

To change an attachment, operate as follows:

- Drive to the place where you will release the mounted attachment (when possible, a solid and sheltered site).
- Disconnect the quick connectors of the attachment (if any).
- Pull out pin **B** locking the attachment after removing the safety split-pin at its end.
- Rest the attachment flat on the ground.
- Pitch the attachment holding frame forward and lower the boom to release the attachment upper lock.
- Move back with the machine and drive to the new attachment to be coupled.
- Hold the frame pitched forward and hook the upper lock of the new attachment.
- Retract and raise the attachment some centimetres. It will centre automatically on the quick coupling frame.
- Refit pin **B** fixing it with its safety split-pin.
- Re-couple the connectors of the attachment (if any).



CAUTION

After substitution, visually check the attachment is correctly coupled to the boom, before operating the machine. A wrongly coupled attachment may result in damage to persons or things.

C-6 TRANSPORTING THE MACHINE

C-6.1 MOVING A DISABLED MACHINE

Tow the machine only when no alternative is possible, since this operation may result in serious damage to the transmission. When possible, repair the machine on site.

When the machine must be towed:

- Tow the machine for short distances and at a low speed only.
- Use a rigid drawbar.
- Select the two-wheel steer.
- When possible, start the engine and use the hydraulic drive and the braking system.

C-6.2 ROAD TRANSFER

When travelling on public roads, strictly obey the local or national road traffic regulations, as well as the following general precautions:

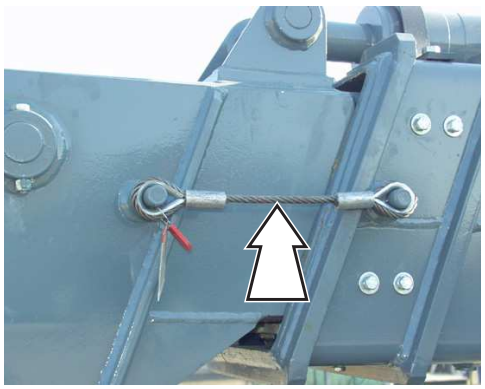
- Set the ROAD/JOBSITE switch to “ROAD”.
- The steering switch will switch to the two-wheel steering mode automatically.
- Lock the machine as indicated in the Registration Card:

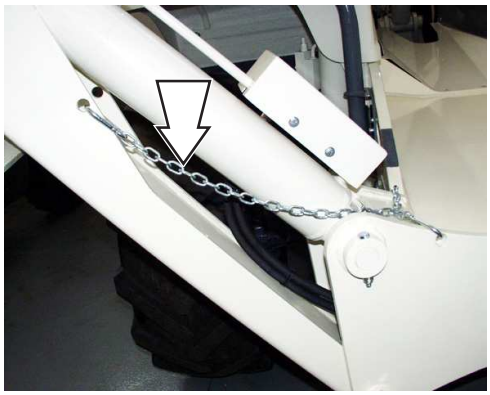
  Lock the boom sections, the lifting cylinder, and the attachment rotation cylinder (see photo).
- Lock the rear wheel steering using the special pins (if any).
- Cover the teeth of the conventional forks with the special guard; or withdraw the floating forks.
- Retract boom and attachment to transfer position.
- Make sure that lights, horn and turn signals are in efficient working order.
- Engage a high speed.
- The transfer speed of the vehicle will depend on the engine rpm and the position of the control lever.

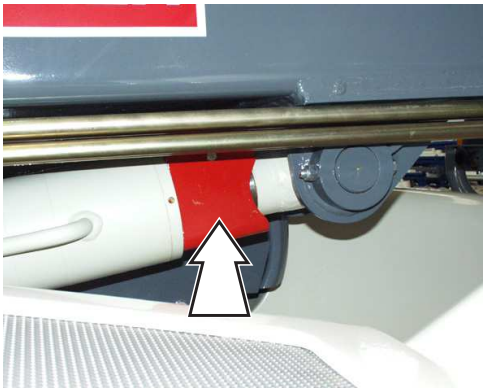
CAUTION

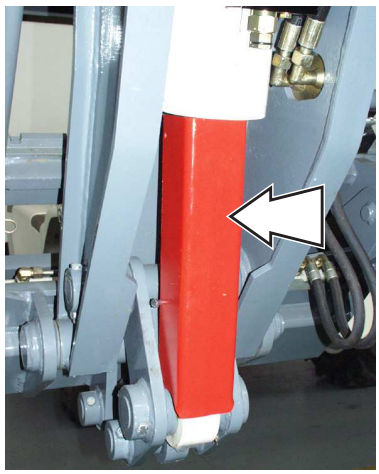
Public road circulation is allowed only for transferring an unloaded machine.

Do not use the machine to tow trailers.





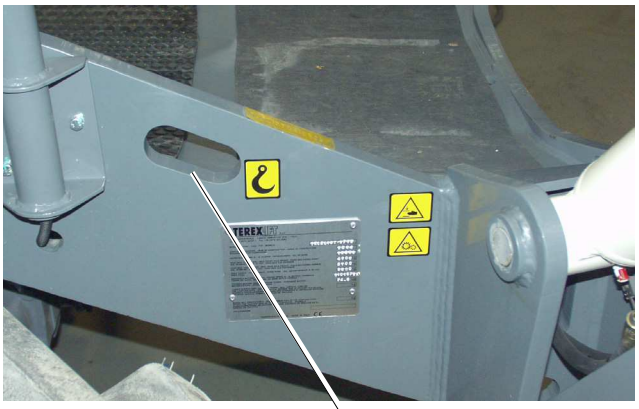




■ C-6.3 LIFTING THE MACHINE

When the machine is required to be lifted, use only means having a suitable capacity. The characteristic data are detailed in the relevant chapter of this manual and on the identification plate.

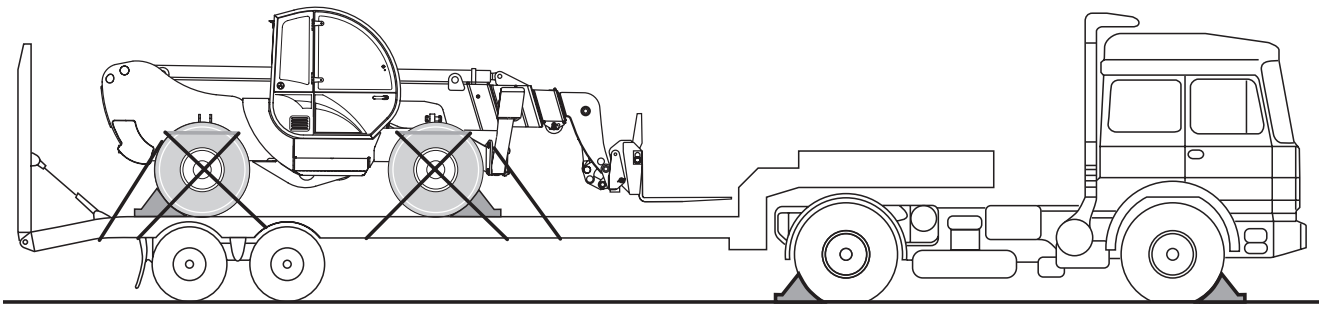
For the machine lifting, anchor the chains to the special lugs on the machine.



■ C-6.4 TRANSPORTING THE MACHINE ON OTHER VEHICLES

To transport the machine on another vehicle, follow the steps below:

- Put chocks at the transporting vehicle wheels.
- Ensure ramps are correctly positioned.
- Retract the boom to transfer position.
- Carefully drive the machine onto the transporting vehicle.
- Engage the parking brake and rest the attachment flat on the vehicle platform.
- Ensure the overall dimensions do not exceed the allowed limits.
- Shut the engine down and close the driving cab of the machine.
- Secure the machine to the vehicle platform by wheel-chocks.
- Anchor the machine to the transporting vehicle with suitable chains.



■ C-6.5 PARKING AND STORAGE

■ C-6.5.1 Short inactivity

Always park the machine in a safe way after a working day, a shift and at night.

Take all precautions to prevent damage to those persons who will approach the machine while stationary:

- Park the machine so that it does not hinder other operations.
- Lower the boom fitted with attachment on the ground.
- Disengage the transmission and engage the parking brake.
- Remove the key from the ignition switch and lock the cab door.
- Disconnect the battery by the appropriate switch ("Battery cut-out switch").

ATTENTION

Leaving the battery connected can cause a short-circuit posing a fire hazard.

■ C-6.5.2 Machine storage

In case of extended inactivity of the machine, follow the above precautions. Additionally:

- Wash the machine thoroughly. For a better cleaning, remove grills and protection casings
- Carefully dry all machine parts by blowing some compressed air.
- Lubricate the machine thoroughly.
- Do a walk-around inspection and replace any worn or damaged part.
- Repair any worn or damaged part.
- Remove the battery, smear its terminals with vaseline and store it in a dry place. Battery can be used for other purposes. Otherwise, periodically check its charge level.
- Refuel the tank to prevent internal oxidation.
- Store the machine in a sheltered and well-ventilated place.
- Start the engine for about 10 minutes at least once a month.

IMPORTANT

Always remember that the ordinary maintenance must be carried out even during the machine inactivity. Pay particular attention to the fluid levels and to those parts subject to ageing. Before re-starting the machine, carry out an extraordinary maintenance and carefully check all mechanical, hydraulic and electrical components.

■ C-6.6 CLEANING AND WASHING THE MACHINE

■ C-6.6.1 Cleaning instructions

Clean the machine in accordance with the following instructions:

- Remove any oil or grease traces with a dry solvent or a volatile mineral alcohol
- Before assembling a new part, remove any protection product (rust-preventer, grease, wax etc.).
- Remove any trace of rust from metal parts with some emery cloth before smearing the part with a protection product (rust-preventer, paint, oil etc.).

■ C-6.6.2 Washing instructions

IMPORTANT

Do not use water at high pressure for washing the machine and especially the distributor, the solenoid valves and electrical parts.

External cleaning

Before washing the machine, check that the engine is shut down and the doors and windows are closed.
Do not, at any times, use fuel to clean the machine. Use water or some steam. In cold climates, dry the locks after washing or smear them with an antifreeze.
Before using the machine again, check its conditions.

Internal cleaning

Wash the machine interior with some water and a sponge. Do not use water at high pressure. After washing, dry with a clean cloth.

Washing the engine

Before washing the engine, protect the air intake filter from water.

■ C-6.7 MACHINE DISPOSAL

PROTECT THE ENVIRONMENT

At the end of the machine life, call in a specialised firm to dispose of it in compliance with the local or national regulations.

■ C-6.7.1 Battery disposal

PROTECT THE ENVIRONMENT

Used lead-acid batteries cannot be disposed of as normal industrial solid wastes. Because of the presence of harmful substances, they must be collected, eliminated and/or recycled in accordance with the laws of the UE.

In Italy, used or discarded batteries have been classified as "Toxic wastes" in accordance with Presidential decree n. 397 of 09/09/1988 and Law n. 475 O.G. n. 18 of 09/11/1988 because they contain lead and sulphuric acid. Their disposal through recycling must be done only through companies authorised and belonging to the "Consorzio Obbligatorio Batterie Esauste e dei rifiuti piombosi" (Cobat) which collect and dispose of used lead-acid batteries throughout the national territory.

Used batteries must be kept in a dry and confined place. Make sure the battery is dry and the cell plugs are tight. Place a sign on the battery to warn of not using it. If before disposal the battery is left in the open air, it will be necessary to dry, smear the box and the elements with a coat of grease and tighten the plugs. Do not rest the battery on the ground; it is always advisable to rest it on a pallet and cover it. The disposal of batteries shall be as rapid as possible.

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Section D

MAINTENANCE

TABLE OF CONTENTS

INTRODUCTION

A thorough and regular maintenance keeps the machine in a safe and efficient working condition.

For this reason, it is advisable to wash, grease and service the machine properly, especially after having worked under particular conditions (muddy or dusty environments, heavy operations, etc.).

Always ensure all machine components are in good condition. Check for oil leaks or loosening of guards, and make sure that the safety devices are efficient. In case of defects, find and rectify them before using the machine again.

The maintenance interventions are based on the machine working hours. Regularly check the hour-meter and keep it in good condition to define the maintenance intervals correctly.

Not respecting the ordinary maintenance schedule of this manual automatically voids GENIE warranty.

IMPORTANT

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

D-1 LUBRICANTS - HEALTH AND SAFETY PRECAUTIONS

Health

A prolonged skin contact with oil can cause irritation. Use rubber gloves and protective goggles. After handling oil, carefully wash your hands with soap and water.

Storage

Always keep lubricants in a closed place, out of the children's reach. Never store lubricants on the open air and without a label indicating their contents.

Disposal

New or exhausted oil is always polluting! Never drain oil on the ground. Store new oil in a suitable warehouse. Pour exhausted oil into cans and deliver them to specialised firms for disposal.

Oil leaks

In case of accidental oil leaks, cover with sand or type-approved granulate. Then scrape off and dispose of it as chemical waste.

First aid

Eyes : In case of accidental contact with the eyes, wash with fresh water. If the irritation persists, seek medical advice.

Intake : In case of oil intake, do not induce vomiting, but seek medical advice.

Skin : In case of a prolonged contact, wash with soap and water

Fire

In case of fire, use carbon dioxide, dry chemical or foam extinguishers. Do not use water.

D-2 ROUTINE MAINTENANCE

A wrong or neglected maintenance can result in possible risks for both operator and bystanders. Make sure maintenance and lubrication are carried out according to the manufacturer's instructions to keep the machine safe and efficient.

The maintenance interventions are based on the machine working hours. Regularly check the hour-meter and keep it in good condition to define the maintenance intervals correctly. Make sure any defect detected during the maintenance is promptly rectified before using the machine.

ATTENTION

All " ▲ " marked operations must be carried out by a skilled technician.

During the first 10 working hours

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

Within the first 50 working hours

1 Change the oil for the first time

Every 10 working hours or daily

1 Check the engine oil level
2 Clean the air suction filter
3 Clean the radiator, if necessary
4 Check the hydraulic oil level in the tank
5 Check the greasing of the boom section pads
6 Grease the attachment holding frame
7 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
8 Check the efficiency of the overload warning system
9 Check the efficiency of the lighting electric system
10 Check the efficiency of braking system and parking brake
11 Check the efficiency of the steering selection system
12 Check the efficiency of the fork balancing system
13 Make sure the safety devices installed are in efficient working order - see procedure in **chap. D-3.16**
14 Check or re-sequence the boom telescopes as indicated in **chap. D-3.17**

Every 50 working hours or weekly

Jobs to be done in addition to those above

1 Check the tension of the alternator belt
2 Check the tyre inflation
3 Check the tightening of the wheel nuts
4 Check the tightening of the Cardan shaft screws
5 Check the tightening of the sliding pads of the telescope.

Every 250 working hours or monthly

Jobs to be done in addition to those above

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

Every 3 working months

1 Check the efficiency of the block valves - see **chap. D-3.16**

Every 500 working hours or every six months

Jobs to be done in addition to those above.

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

Every 1000 working hours or yearly

Jobs to be done in addition to those above

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

■ D-2.1 OIL CHANGE SCHEDULE

	Job	operating hours*	service interval*	Oil type
Engine	Oil level check	10	daily	SHELL RIMULA 15W-40 (API CH-4/CG-4/CF-4/CF; ACEA E3; MB228.3)
	First change	50	-	
	Subsequent changes	250	monthly	
Axles and power divider	Oil level check	250	monthly	FUCHS TITAN GEAR LS 85 W-90 API GL-5 LS / GL-5
	First change	-	-	
	Subsequent changes	1000	yearly	
Hydraulic oil	Oil level check	10	daily	SHELL TELLUS T 46 DENISON HF-1, DIN 51524 part 2 and 3
	First change	-	-	
	Subsequent changes	1000	yearly	

* whichever occurs first

D-3 MAINTENANCE JOBS

DANGER

All maintenance interventions must be carried out with engine stopped, parking brake engaged, working attachments flat on the ground and gear lever in neutral.

CAUTION

When raising a component for maintenance purposes, secure it in a safe way before any maintenance intervention.

CAUTION

Any intervention on the hydraulic circuit must be carried out by skilled personnel.
The hydraulic circuit of this machine is fitted with pressure accumulators. You and others could be seriously injured if accumulators are not completely depressurised.
For this purpose, shut the engine down and step on the brake pedal 8÷10 times.

CAUTION

Before any operation on hydraulic lines or components, make sure there is no residual pressure. For this purpose, stop the engine, engage the parking brake and operate the control levers of the distributors in both working directions (alternately) to depressurise the hydraulic circuit.

ATTENTION

High pressure lines must be replaced by qualified personnel only.
Any foreign matters entering the closed circuit may result in a sudden deterioration of the transmission.

ATTENTION

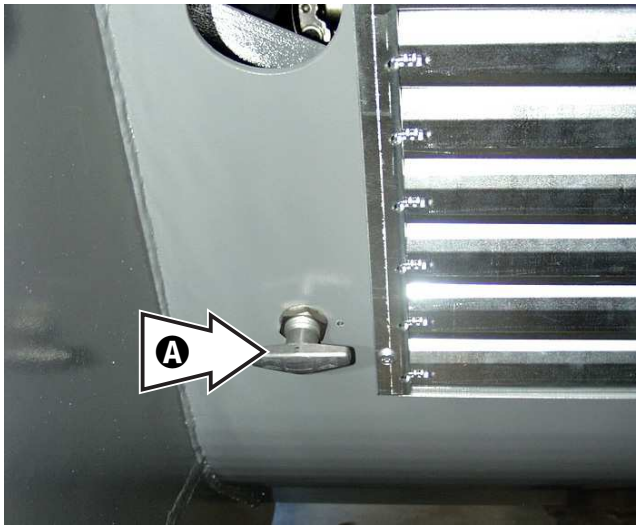
The qualified staff charged with the maintenance of the hydraulic circuit must clean all areas around with care before any intervention.

PROTECT THE ENVIRONMENT

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

D-3.1 DISCONNECTING THE BATTERY

During maintenance or repair works, and while welding, turn off the battery main switch Ⓐ, located outside the engine compartment in the area of the rear wheel.



■ D-3.2 ACCESS TO THE ENGINE AND TANKS COMPARTMENTS

■ Engine compartment

For any operation within the engine compartment, open the protection bonnet.

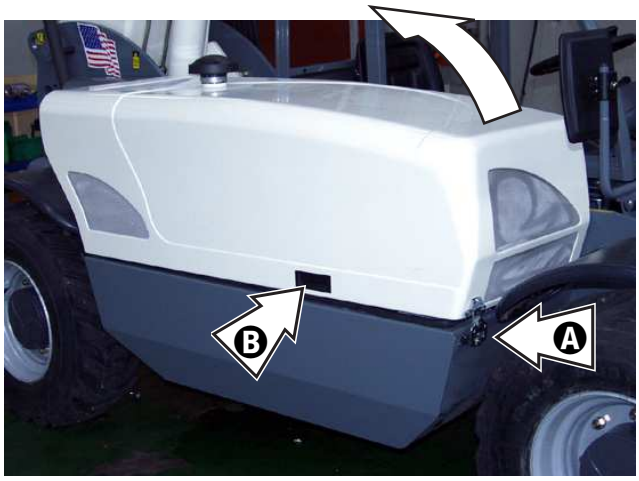
Hood is equipped with lock & key and a supporting rod that holds it in position.

From the engine compartment, you get access to:

- Thermal engine
- Engine air filter Ⓒ
- Hydraulic oil tank plug Ⓕ
- Radiator fluid compensation cup
- Battery

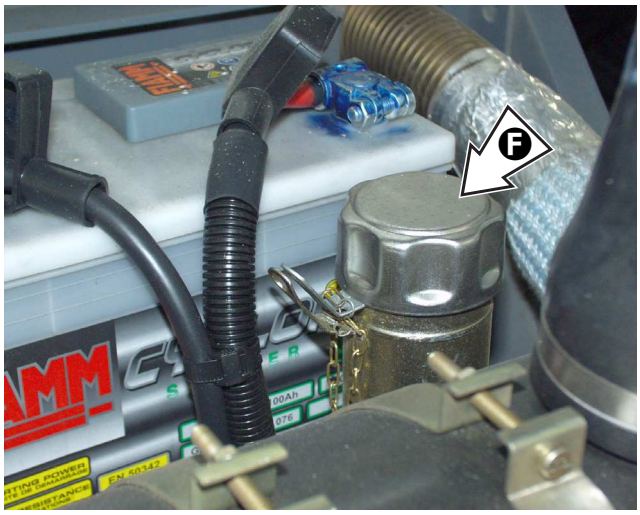
To get access to the engine compartment:

- Shut the engine down and put the parking brake.
- Unlock the engine bonnet lock Ⓐ
- Lift the bonnet using the special handle Ⓑ until it latches in the gas spring.
- To close the bonnet: press on the green locking device Ⓓ on the gas spring and lower the bonnet.



DANGER

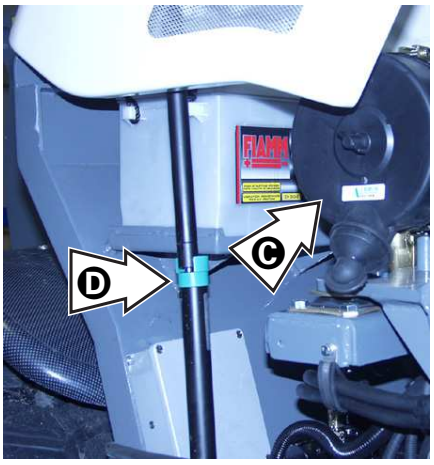
Take all precautions when approaching the engine compartment. Some parts of the engine may be very hot. Always use protective gloves.

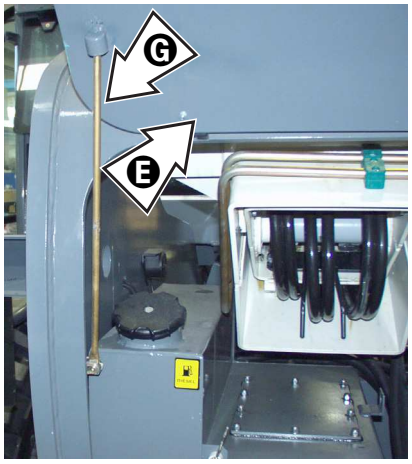


■ Diesel fuel tank compartment

To gain access to the fuel tank, open the rear cover of the machine Ⓔ as follows:

- Shut the engine down and put the parking brake.
- Seize the handle and fully raise the cover.
- Lock the cover in position by placing the bar Ⓖ.

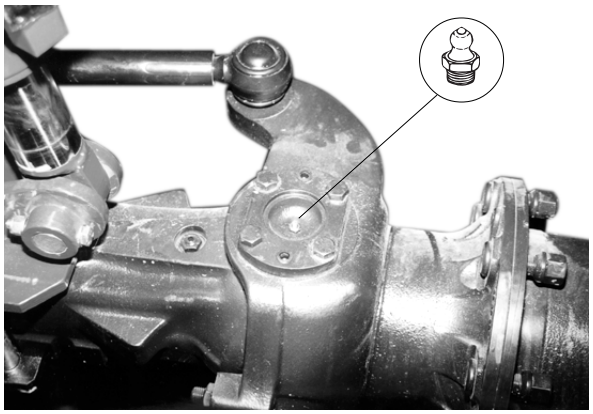




■ D-3.3 GREASING

ATTENTION

Before injecting grease into the greasers, thoroughly clean them to avoid mud, dust or other matters that 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 condition and a long life.

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

As the fresh grease comes out, stop the operation.

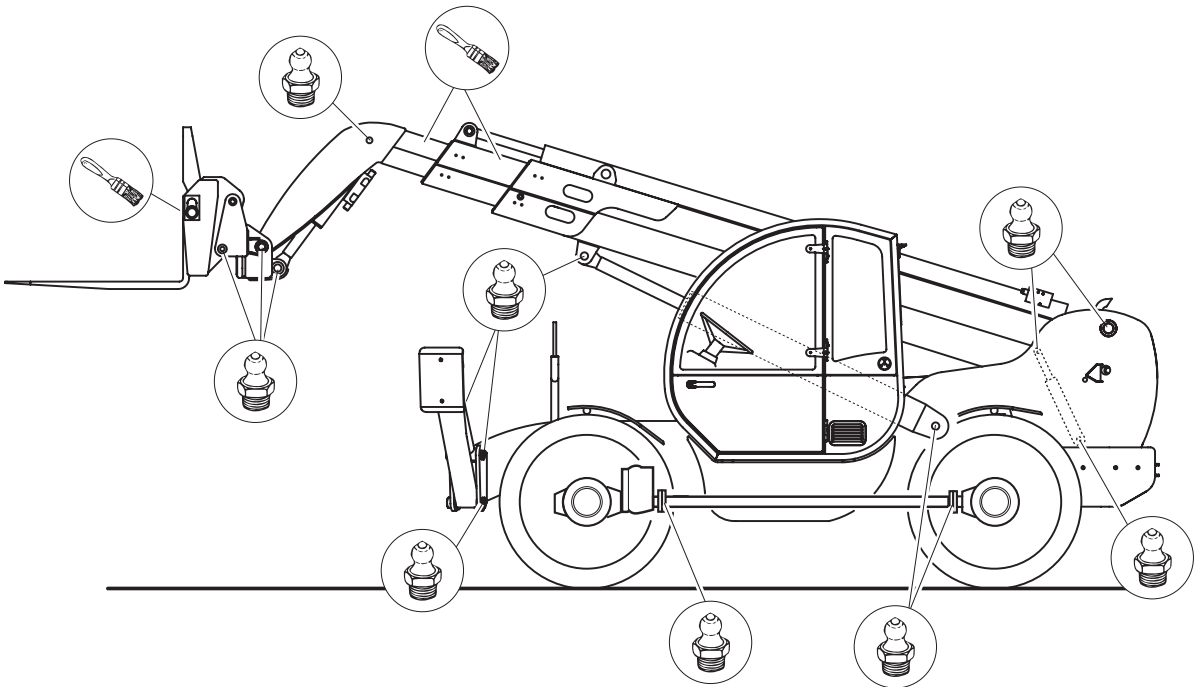
The greasing points are shown in the following figures:

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

SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **Every 10 hours**

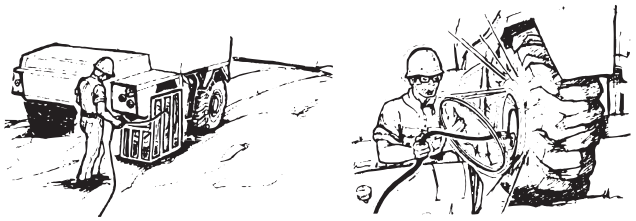


■ D-3.4 TYRES AND WHEELS

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.

YES ***NO***



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

		GTH-3512	
		Standard	**Optional**
Dimensions		405/70 R20	405/70 R24
P.R. (or load index)		14 pr	14 pr
Wheel disc		8 holes DIN 70361	
Pressure	bar	5.5	4.0
	Psi	80	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.

ATTENTION

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

SERVICE INTERVAL

Running-in _____ **Within the first 10 hours**

Ordinary _____ **Every 250 hours**

■ D-3.5 BRAKES

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

■ D-3.6 ENGINE AIR FILTER

Clean the engine air filter every 10 hours; replace the filtering element, if necessary.

1 Cleaning and 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.
- 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 for cracks in the filtering element by introducing a lamp inside.
- Smear the seal with grease, then refit the element.
- Tighten wingnut **C**, close cover **B** and tighten with wingnut **A**.

ATTENTION

As soon as the warning lamp 7.3 on the cab dashboard switches on, replace the outer element.

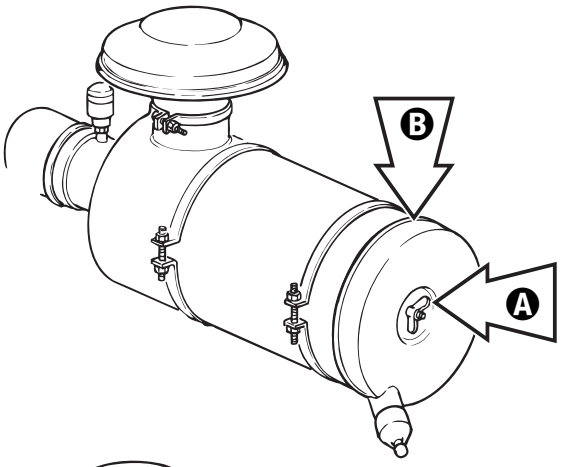
2 Changing the internal element:

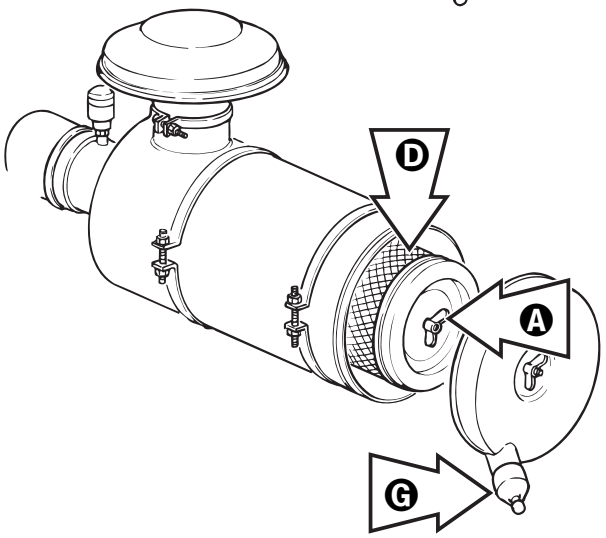
- See step **1** for removing the outer element.
- Loosen wing nut **E** and remove the inner element **F**.
- Clean the filter bowl.
- Smear the seal with grease, then mount the new element and make sure it is correctly positioned.
- Refit the outer element and the cover (see step **1**).

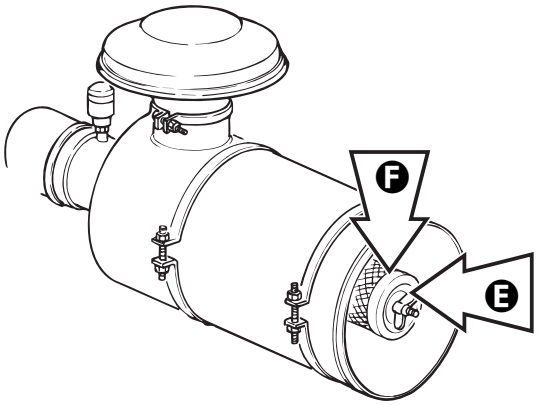
ATTENTION

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

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







SERVICE INTERVAL

Running-in	**None**
Cleaning	**Every 10 hours**
Outer element change	**Every 500 hours**
Inner element change	**Every 1000 hours**

■ D-3.6.1 CAB AIR FILTER

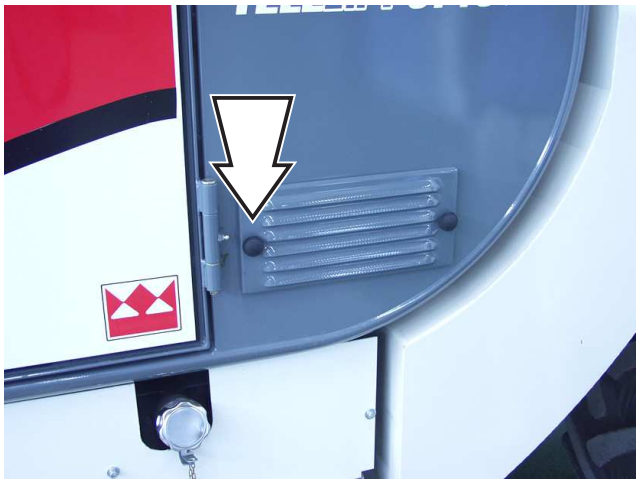
Every six months clean the air filter in the cab. Replace the cartridge if the filtering cloth is damaged.

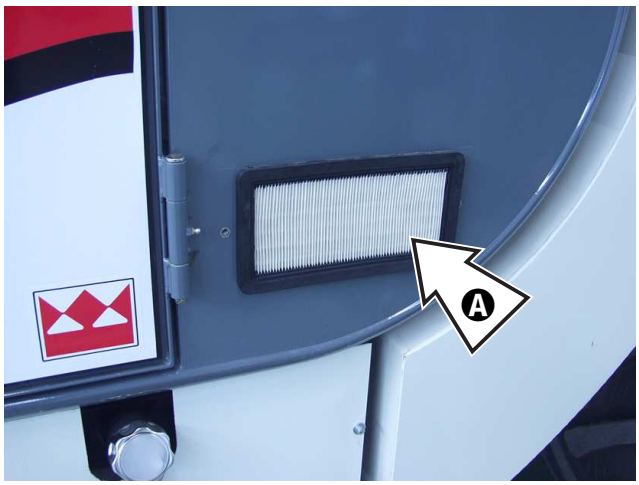
1 Cleaning and changing the cartridge:

- 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

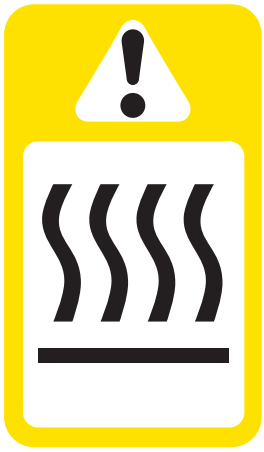
ATTENTION

Do not, at any times, dry-clean the filters. Use some water and/or solvent.





■ D-3.7 ENGINE COOLING SYSTEM



ATTENTION

Engine oil circulates in the radiator. Check the engine oil level and clean the core of the heat exchanger at regular intervals.

To clean the core of the heat exchanger, blow some compressed air from inside outwards. Do not use brushes or other tools. The cooling fins could get damaged.

DANGER

Take any safety measures and use the adequate personal protective equipment when operating near the engine or the radiator.

SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **Every 50 hours**

■ D-3.8 CHECKING THE 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 Ⓑ fitted into the tank.

When necessary, add new oil through filler Ⓐ.

CAUTION

Check the oil level with handler set to transfer position (lowered boom and retracted telescopic element).

SERVICE INTERVAL

Running-in _____ **Within the first 10 hours**

Ordinary _____ **Every 50 hours**

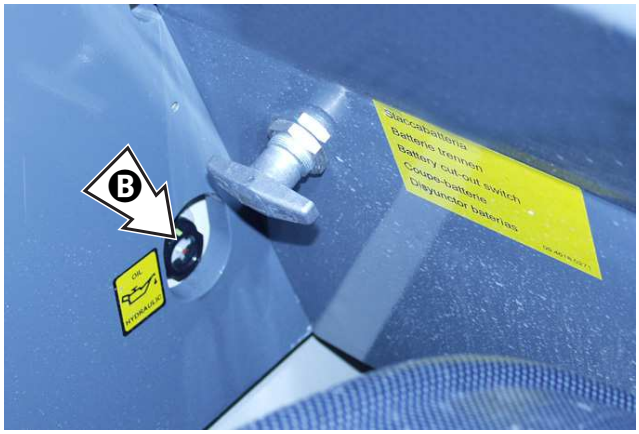
If oil must be changed, proceed as follows:

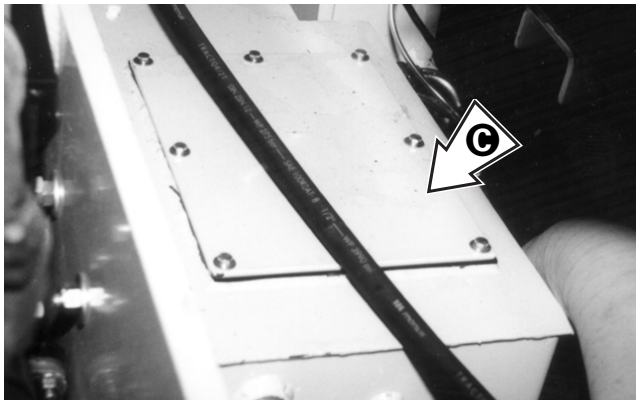
1. Stop the machine on a level ground and make sure the parking brake is engaged.
2. Release the pressure from the hydraulic circuit.
3. Place a container of suitable size under the drain plug, placed in the lower part of the reservoir, and collect any oil leaks.
4. Remove the drain plug and allow oil to flow out into the container.
5. Remove the inspection cover of tank Ⓒ.
6. Carefully wash the tank with Diesel oil and blow a jet of compressed air.
7. Refit the drain plug and the inspection cover.
8. Add new oil by making sure that it matches the recommended type indicated in paragraph D-5.2.2. until it is level with Ⓑ.

SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **Every 1000 hours**





PROTECT THE ENVIRONMENT

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

■ D-3.9 CHANGING THE OIL FILTER CANISTERS ON THE INTAKE LINE

■ D-3.10.1 Transmission oil filter

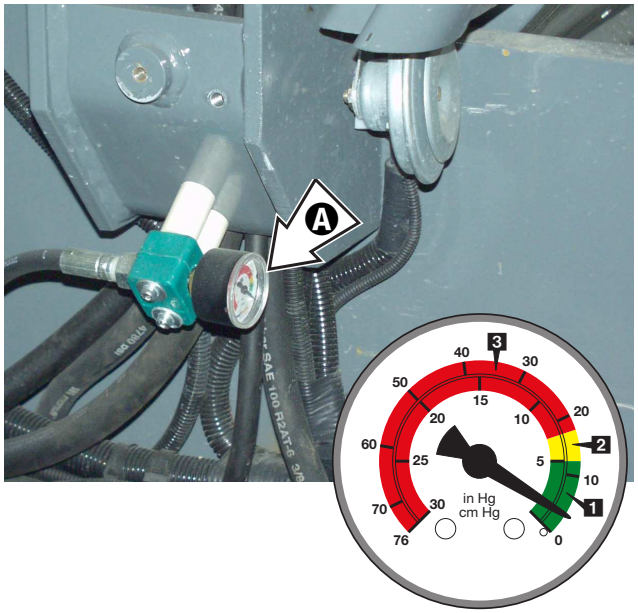
Every 50 hours, check the clogging degree of the filtering element using the vacuometer Ⓐ.

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:

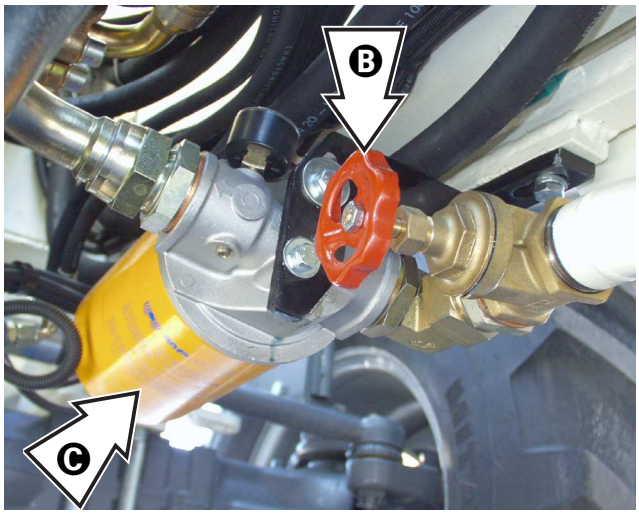
1 Stop the machine on a level ground and engage the parking brake.

2 Place a container of suitable size under the filter to collect any oil leaks, then close cock Ⓑ.

3 Remove the filtering element Ⓒ using a wrench.

4 Change the filtering element, then, before fitting a new one, thoroughly clean and grease both seat and gasket.

5 Hand-tighten and re-open cock Ⓑ.



IMPORTANT

Hydraulic oil filter cartridges cannot be cleaned or washed and refitted.
They must be replaced with new ones of the type recommended by the manufacturer (see par. D-5.2.2).

PROTECT THE ENVIRONMENT

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

IMPORTANT

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

SERVICE INTERVAL

Running-in _____ **None**

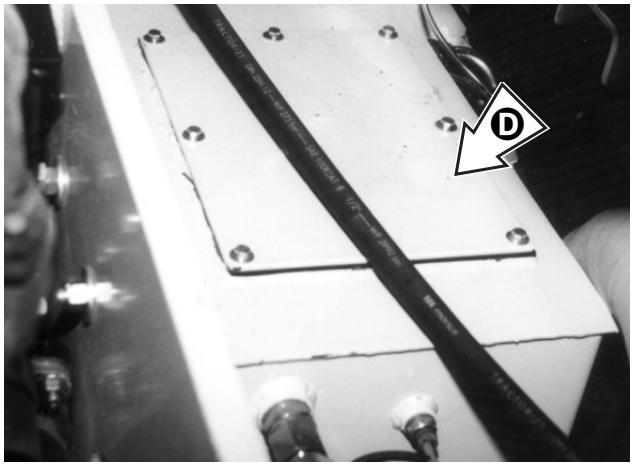
Ordinary _____ **Every 500 hours**

When the dashboard indicator switches on

■ D-3.9.2 Auxiliary circuits oil filter

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

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



SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **Every 500 hours**

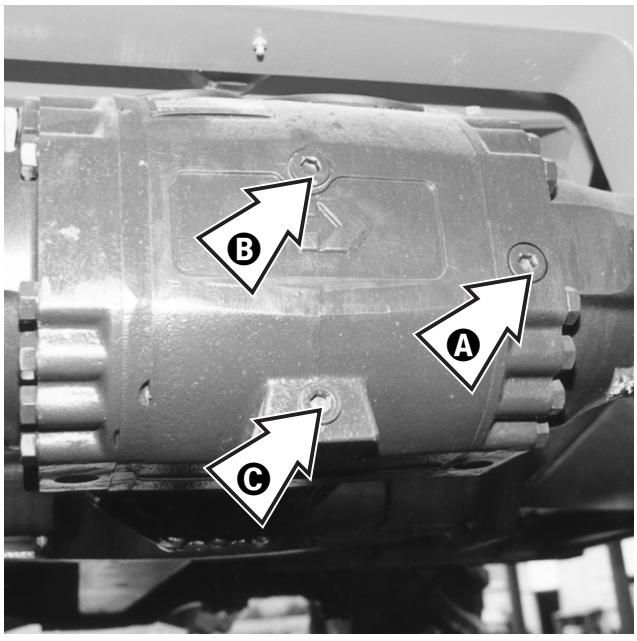
■ D-3.10 OIL LEVEL IN THE DIFFERENTIAL GEARS

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 Ⓐ and check if oil is level with the hole.
- If necessary, top-up through hole Ⓑ until oil comes out from hole Ⓐ.
- Refit and tighten plugs Ⓐ and Ⓑ.

To change the oil:

- Place a container of suitable size under drain plug Ⓒ.
- Loosen the drain plug, the level plug Ⓐ and the filler Ⓑ and allow oil to flow out from the reduction gear.
- Refit and tighten drain plug Ⓒ.
- Add new oil through the filler until it is level with hole Ⓐ.
- Refit and tighten plugs Ⓐ and Ⓑ.



SERVICE INTERVAL

Running-in _____ **Within the first 10 hours**

Ordinary _____ **Every 250 hours**

■ D-3.11 OIL LEVEL IN THE (front/rear) 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 Ⓐ 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 Ⓐ until it is level.
- Refit the plug.

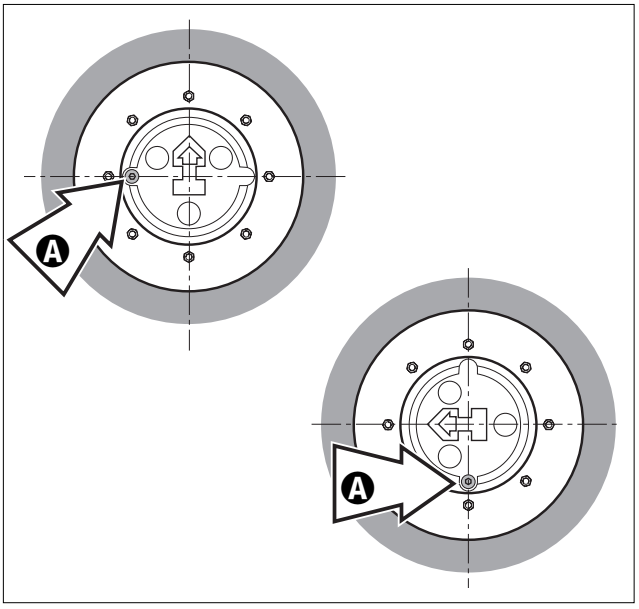
For the oil change:

- Stop the machine and ensure the plug is oriented along the vertical axis.
- Place a container of suitable size under the reduction gear plug.
- Unscrew plug Ⓐ 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 Ⓐ.
- Refit and tighten plug Ⓐ.

SERVICE INTERVAL

Running-in _____ **Within the first 10 hours**

Ordinary _____ **Every 250 hours**



■ D-3.12 OIL LEVEL IN THE POWER DIVIDER

To check the oil level in the power divider:

- Stop the machine on a level ground and make sure the parking brake is engaged.
- Clean level plug Ⓒ all around.
- Remove the plug and check if oil is level with the hole.
- When necessary, add new oil through plug Ⓒ until it is level with the hole.
- Refit and tighten the plug.

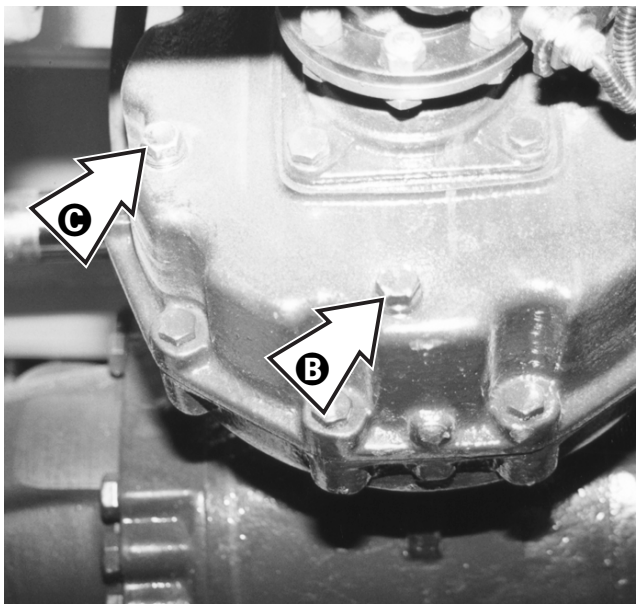
To change the oil:

- Place a container of suitable size under the drain plug.
- Remove the level plug Ⓒ and the filler.
- Remove the drain plug Ⓑ and empty the gearbox.
- Refit and tighten the drain plug Ⓑ.
- Add new oil through the filler until it is level with hole Ⓒ.
- Refit and tighten filler/level plug Ⓒ.

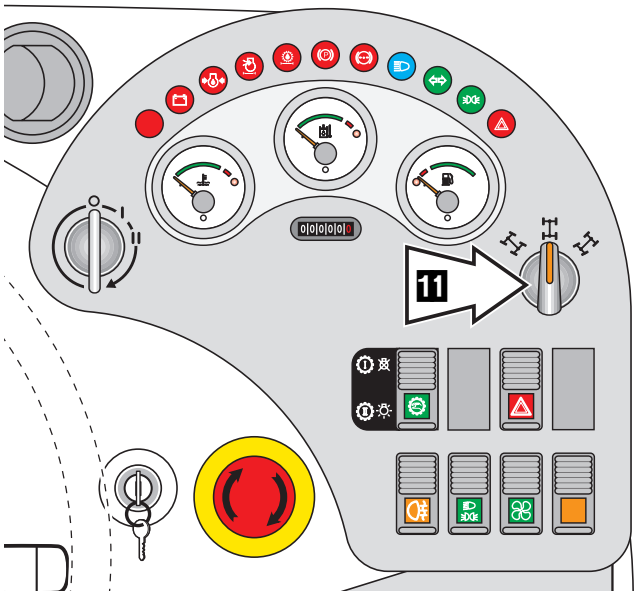
SERVICE INTERVAL

Running-in _____ **Within the first 10 hours**

Ordinary _____ **Every 250 hours**



■ D-3.13 SHAFTING ALIGNMENT



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 **11** 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**)

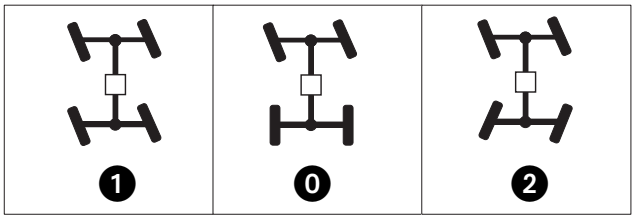
7) Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop

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 aligned.



SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **When necessary**

■ D-3.14 ADJUSTING THE SENSOR DISTANCE

In case of a failure or complete malfunctioning of the sensors due to a loosening of their fixing ring nuts, re-adjust their position:

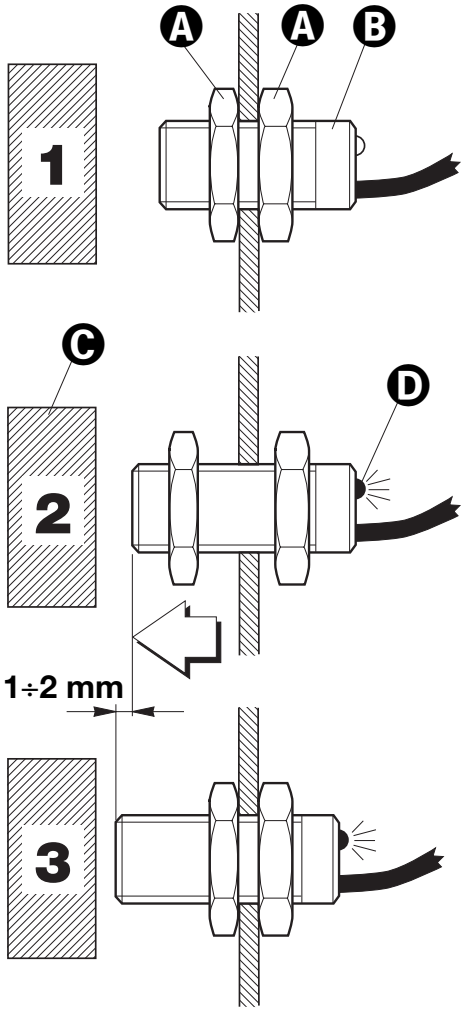
1 Loosen nuts **A** fixing sensor **B**.

2 Set the mobile part **C** of the machine, controlled by the sensor, as close as possible to it.
Move the sensor near the component until the LED indicator **D** lights up.

3 Move the sensor 1÷2 mm nearer. Smoothly tighten the sensor fixing nut and the relevant lock nut.

One proximity sensor is installed on the machine:

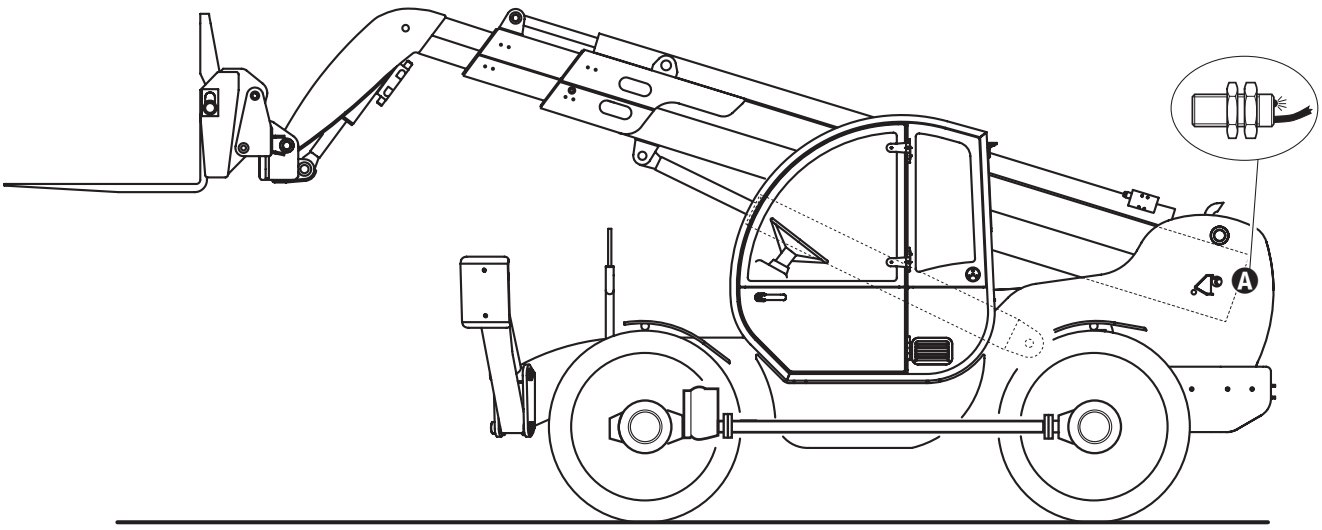
Ⓐ N° 1 proximity sensor disabling the use of the outriggers when the boom is raised more than 2 metres above the ground



SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **When necessary**



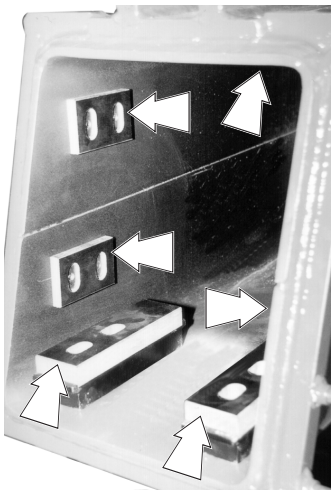
■ D-3.15 ADJUSTING THE SLIDING PADS OF THE BOOM SECTIONS

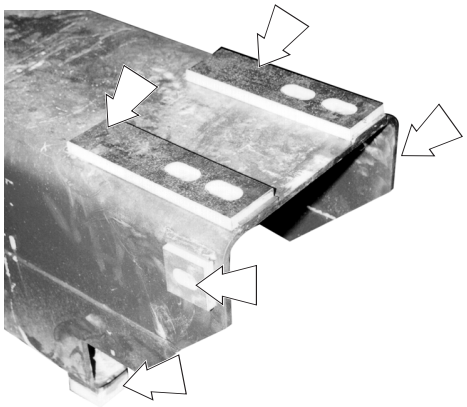
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

All pads can be adjusted by the special shims supplied by GENIE upon demand.

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 torque wrench.





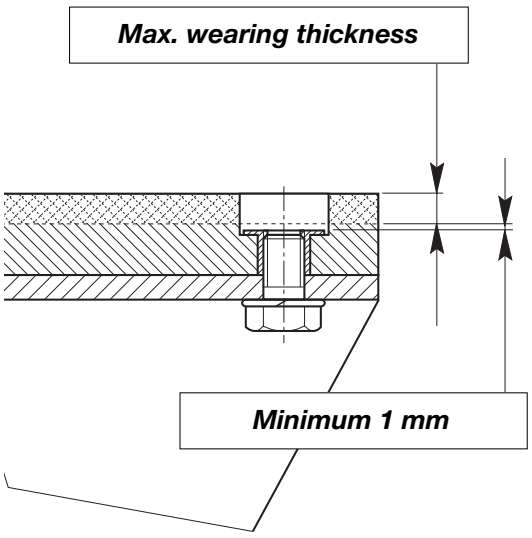
Tightening torques of the pad screws in relation to the screw diameter

Screws M10	Nm 30
Screws M14	Nm 50

Tightening torques higher than those recommended can result in failure of the pad or the threaded locking.

ATTENTION

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.



SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **When necessary**

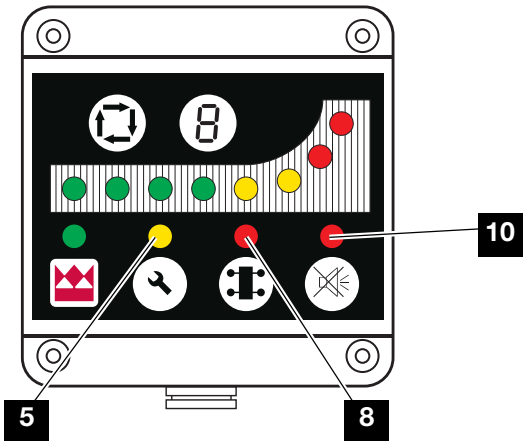
■ D-3.16 CHECKING THE SAFETY DEVICES

■ Checking the moment limiting system

(at every use)

When power is turned on, the DLE moment limiting system runs a self-test. In the case of troubles, LED's **5**, **8** and **10** start flashing, the buzzer sounds, an error code is shown on the display and the machine enters the alarm mode and cannot be operated.
The meaning of the error messages is shown in Section **E** "***Faults and Troubleshooting"***.

To do a manual check, it will be enough to load a weight exceeding the maximum permitted (with the boom fully out) and attempt to lift it.
The system shall enter in alarm; should that not be the case, contact GENIE Technical Service.



■ Checking the machine start control

(at every use)

Attempt to start the engine with the forward or reverse gear put.

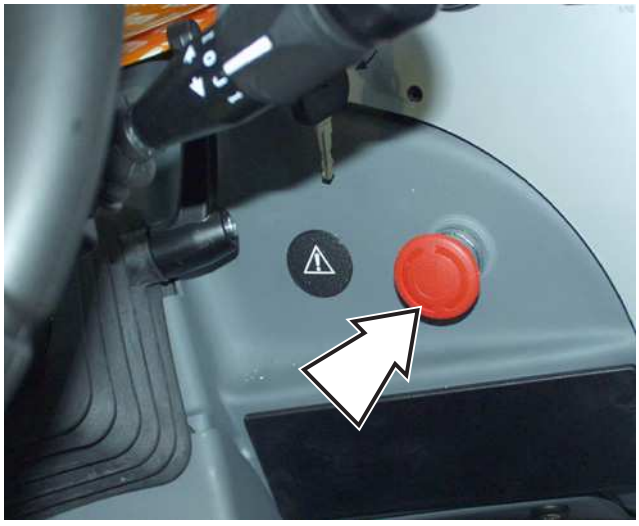
The engine should not start. If the engine starts, contact the GENIE Technical Service.

Repeat the operation putting first one gear, then the other.

■ Checking the emergency stop pushbutton

(at every use)

To check the efficiency of this pushbutton, simply press it down during a movement. The pressure of the pushbutton should cause the movement to stop and the engine to shut down. Should that not be the case, contact GENIE Technical Service.



■ Checking the joystick pushbutton (at every use)

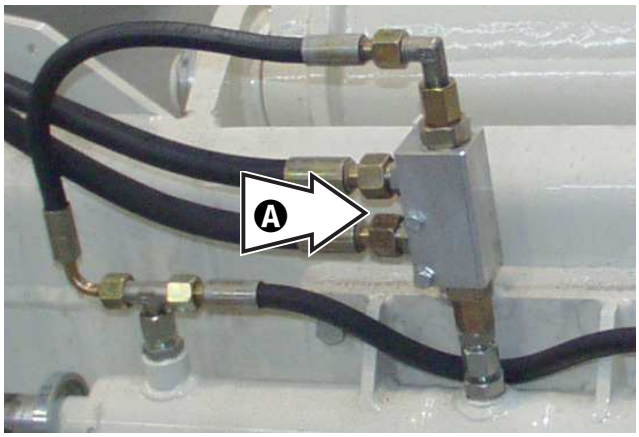
To check if the pushbutton on the control lever is in efficient working order, it will be enough to attempt to operate the lever without pressing this button.
In this condition, the lever should not operate any movement. Should that not be the case, contact GENIE Technical Service.

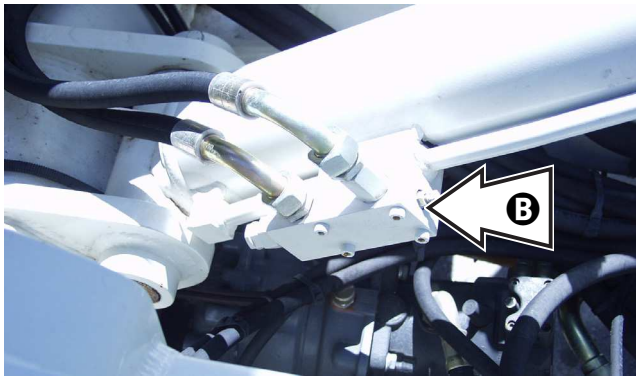
■ Checking the block valves (every 3 months)

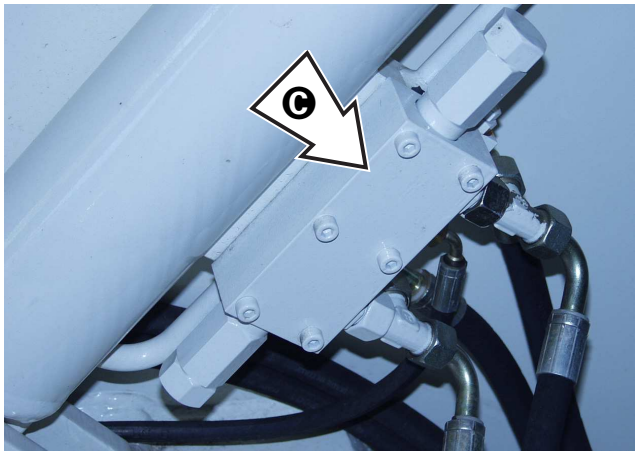
The piloted blocking valves allow to held the load in position in case of burst of a flexible hose.

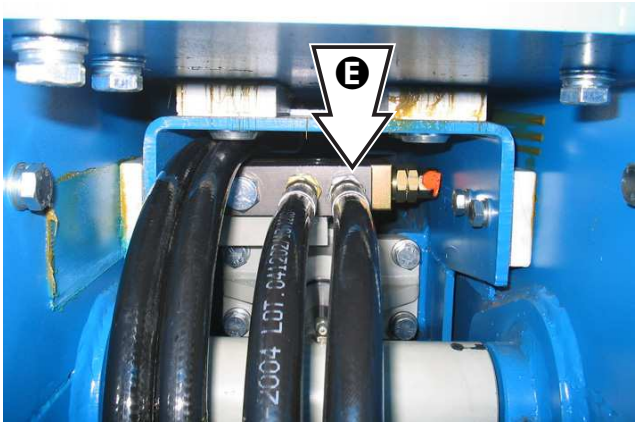
To check the efficiency of a valve, proceed as follows:

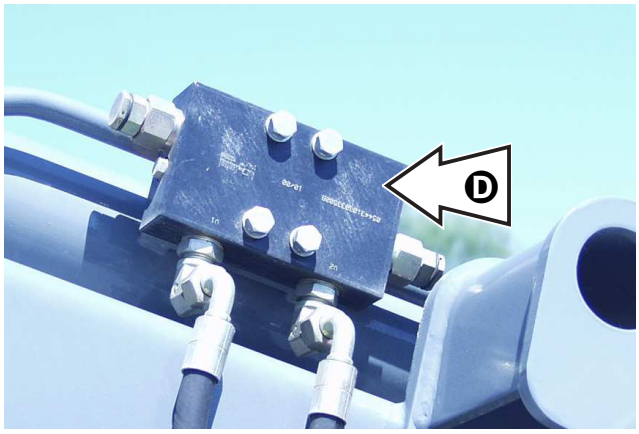
- Load a weight near the maximum payload (3500 kg roughly) onto the boom.
- Raise the load some centimetres above the ground (max 10 cm). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which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





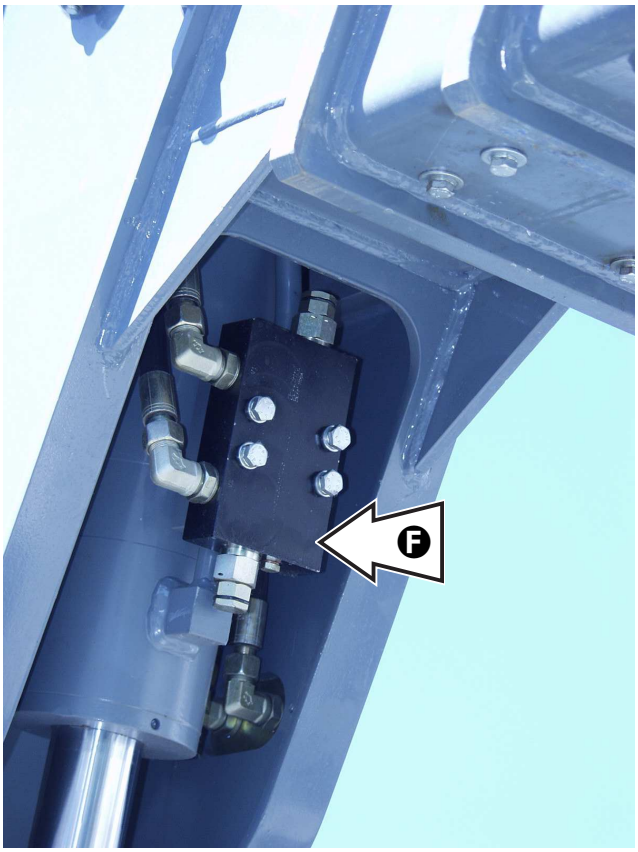






- To check the efficiency of the block valves of the outriggers, lower them to the ground and unload the weight on the tyres. Loosen the cylinder hoses to check the efficiency of the valve.

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.



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.***

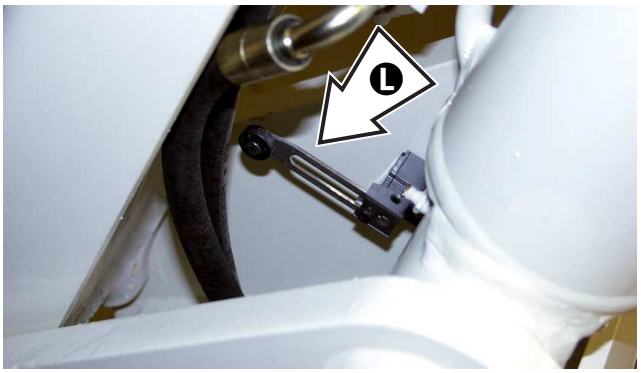
■ Checking the limit switches of the outriggers

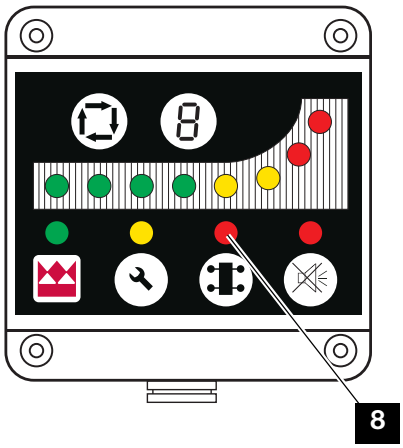
(before any use)

To check the limit switches **L** of the outriggers:

- Lower the outriggers to the ground and attempt to engage a gear.

  If the gear can be engaged, contact the GENIE Technical Service.
- With the outriggers up, light **8** on the moment limiter panel must be off; with the outriggers down to the ground, the same light must be on. Should that not be the case, contact the GENIE Technical Service.

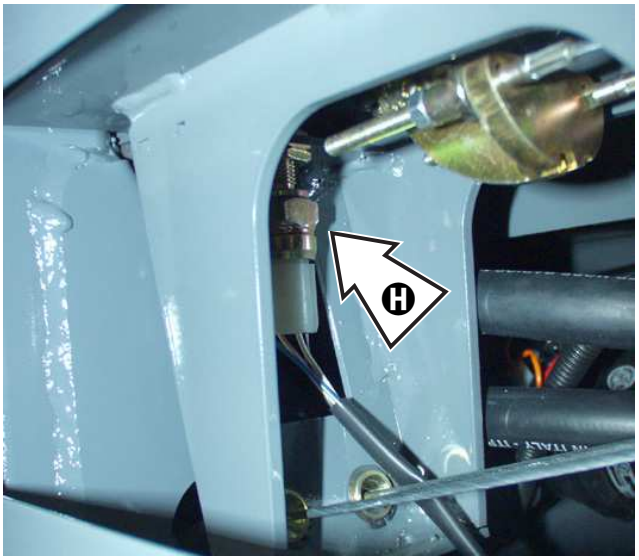




■ Micro-switch H on the parking brake

(before any use)

- To check the efficiency of the parking brake micro-switch, simply sit in the driving place, start the engine and attempt to move the machine with the parking brake engaged. The machine should not move. Should that not be the case, adjust or replace the proximity sensor on the parking brake.

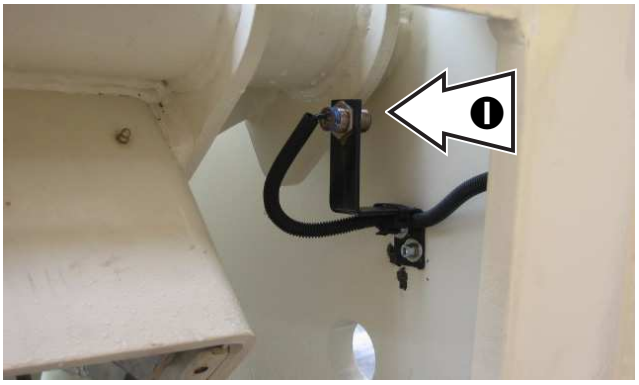


■ Checking the proximity switches *(before any use)*

Sensor I on the boom

- Raise the boom beyond the horizontal and ensure the sway control and the outrigger control are blocked.

  Should that not be the case, contact the GENIE Technical Assistance Service.



For the adjustment of the proximity switches, read **chap. D-3.14.**
If the trouble does not depend on the sensor adjustment, contact the GENIE Technical Assistance Service.

D-3.17 RE-SEQUENCING THE TELESCOPIC BOOM

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

1 Fully retract the telescope cylinder and hold the system over relief (approx. 15 seconds); the boom sections should become equal.

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

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

3 Raise the boom to approx. 60° and operate the retract function over relief for approx. 20 seconds.

4 Lower the fully retracted boom to the lowest angle possible without striking the ground and hold the retract system over relief for approx. 20 seconds.

If, despite these procedures, the boom does not return in sequence, raise the boom to approx. 60°, fully extend and retract it to full stroke and hold the system over relief (approx. 20 seconds) in each direction.
By following these procedures the boom re-sequencing should be correct.

SERVICE INTERVAL

Running-in _____ **None**

Ordinary _____ **When necessary**

D-4 ELECTRICAL SYSTEM

DANGER

All maintenance interventions must be carried out with engine stopped, parking brake engaged, working attachments on the ground and gearbox lever in neutral.

DANGER

When raising a component for maintenance purposes, secure it in a safe way before carrying out any maintenance.

DANGER

Before any operation on hydraulic lines or components, make sure there is no residual pressure. For this purpose, stop the engine, engage the parking brake and operate the control levers of the distributors (in both working directions alternately) to release the pressure from the hydraulic circuit.

D-4.1 BATTERY

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

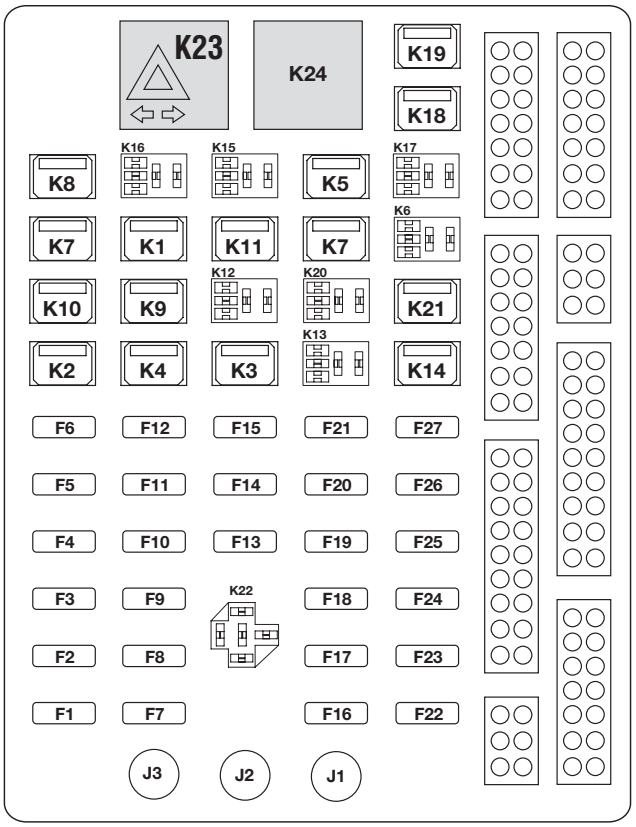
Do not add sulphuric acid; add only distilled water.

D-4.2 FUSES AND RELAYS

The electrical system is protected by fuses placed in the driving cab, on the left. Before replacing a blown fuse with a new one having the same amperage, find and rectify the fault.

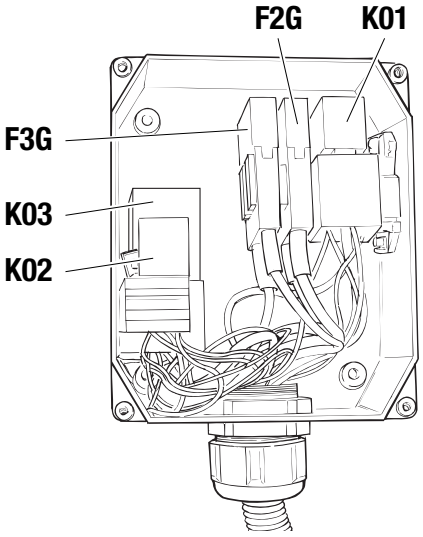
Fuses

Ref.	Amp.	Circuit
F1	10	FUSE - HAZARD WARNING LIGHTS
F2	15	FUSE - HEATING
F3	5	FUSE - STOP LIGHT MICRO-SWITCH
F4	7.5	FUSE - REAR WIPER
F5	10	FUSE - WORK MODE SELECTOR
F6	15	FUSE - LOW BEAM
F7	3	FUSE - RIGHT POSITION LIGHTS
F8	3	FUSE - INSTRUMENT LIGHTING
F9	7.5	FUSE - INDICTAOR LIGHTS POWER SUPPLY
F10	7.5	FUSE - LIGHTS SWITCH
F11	7.5	FUSE - BEACON
F12	10	FUSE - WORK LIGHTS
F13	10	FUSE - WALVOIL CONTROL UNIT
F14	10	FUSE - FORWARD/REVERSE SELECTOR
F15	10	FUSE - HIGH BEAM
F16	15	FUSE - EMERGENCY
F17	10	FUSE - LIGHTS AND FLASHING
F18	10	FUSE - OUTRIGGERS
F19	10	FUSE - WORK MODE SELECTOR
F20	10	FUSE - PLATFORM EMERGENCY BUTTON
F21	15	FUSE - HORN
F22	15	FUSE - PLATFORM FUNCTION
F23	10	FUSE - CAB LIGHTS
F24	10	FUSE - EMERGENCY STOP
F25	10	FUSE - 3B6 CONTROL UNIT
F26	10	FUSE - OUTRIGGERS
F27	10	FUSE - OPTIONAL



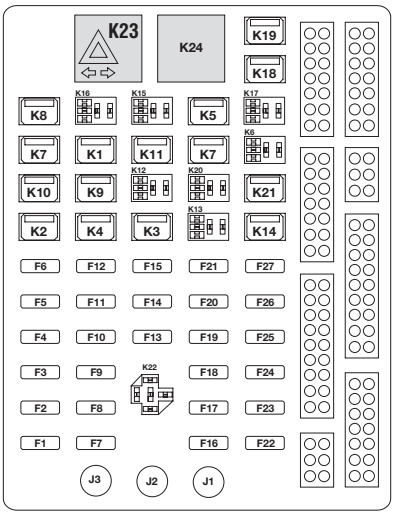
■ *Engine compartment fuses and relays*

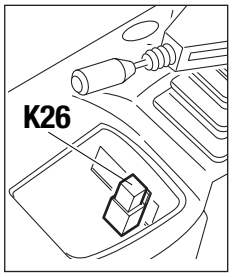
Ref.	Amp.	Circuit
F2G	50	MAIN FUSE
F3G	50	FUSE - GLOW PLUGS
K01		RELAY - START-UP
K02		RELAY - GLOW PLUG LED
K03		RELAY - PRE-HEATING



■ *Relays*

Ref.	Circuit
K1	RELAY - HIGH BEAM
K2	RELAY - LOW BEAM
K3	RELAY - HORN
K4	RELAY - WORK LIGHTS
K5	RELAY - 1st and 2nd MECHANICAL SPEED
K6	RELAY - NOT USED
K7	RELAY - FORWARD SPEED
K8	RELAY - REVERSE SPEED
K9	RELAY - TRANSMISSION DISCONNECTED
K10	RELAY - TRANSMISSION DISCONNECTED
K11	RELAY - START-UP ENABLING COMMAND
K12	RELAY - NOT USED
K13	RELAY - NOT USED
K14	RELAY - OUTRIGGERS
K15	RELAY - NOT USED
K16	RELAY - NOT USED
K17	RELAY - NOT USED
K18	RELAY - OPTIONAL
K19	RELAY - BLOCKED FORKS
K20	RELAY - NOT USED
K21	RELAY - POWER SUPPLY ACTIVATION FROM PLATFORM (only with man-platform)
K22	RELAY - NOT USED
K23	INTERMITTENCE
K24	MODULE - STOPPED SHAFT
K26	SAFETY RELAY - ATTACHMENT COUPLING





ATTENTION

- ***Do not use fuses having a higher amperage than that recommended, since they can damage the electric system seriously.***
- ***If the fuse blows after a short time, look for the fault source by checking the electric system.***
- ***Always keep some spare fuses for an emergency.***
- ***Never try to repair or short blown fuses.***
- ***Make sure the contacts of fuses and fuse-sockets ensure a good electric connection and are not oxidised.***

■ D-4.3 12V DC LAMPS

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

CAUTION

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

IMPORTANT

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.

D-5 REFUELLING

D-5.1 REFUELLING

Part	*Product*	*Capacity (litres)*	*Product specifications see par.*
Diesel engine	Engine oil	11+3.5	D-5.2.1
Fuel tank	Diesel fuel	92	D-5.2.3
Hydraulic system tank	Hydraulic oil	90	D-5.2.2
Gearbox	Oil	1.5	D-5.2.2
Differential gears (each)	Oil	8.7	D-5.2.2
Wheel reduction gears (each)	Oil	0.75	D-5.2.2

D-5.2 PRODUCT SPECIFICATIONS

D-5.2.1 Engine oil

Use the oil recommended by the Diesel engine Manufacturer *(see the relevant handbook delivered with the machine).*
At the delivery, the machine is refilled with:

SHELL RIMULA SAE 15W-40 (API CH-4/ CG-4/ CF-4/CF, ACEA E3, MB 228.3)

D-5.2.2 Lubrication oils and relevant filtering elements

Refill the machine with following lubricants:

Use	*Product*	*Definition*
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 and 3

ATTENTION

Never mix different oils: this may result in troubles and component breaks.

Oils for hydraulic system:

Arctic climates:	Temperatures below -10°C	Use SHELL Tellus T22
Mild climates:	Temperatures from -15°C to + 45°C	Use SHELL Tellus T46
Tropical climates:	Temperatures above + 30°C	Use SHELL Tellus T68

The machine is fitted with the following filtering elements:

Filter	*Flow l/1'*	*Filtering*	*Code*
Transmission oil filter	MPS 150	10 µ	09.4604.0001
Auxiliary circuit oil filter (inside the tank)	STR 100/1	60 µ	09.4604.0004

■ D-5.2.3 Fuel

Use only Diesel fuel with less than 0.5% sulphur content, according to the specifications of the diesel engine operation handbook.

ATTENTION

Quando la temperatura ambiente è inferiore a -20°C impiegare esclusivamente carburante diesel tipo "Arctic", oppure miscele di petrolio e carburante diesel per autotrazione la cui composizione può variare in funzione della temperatura ambiente fino ad un massimo dell'80% di petrolio.

■ D-5.2.4 Grease

For the machine greasing, use:

• Lithium-based Vanguard LIKO grease, type EP2	When greasing by pump
• Graphitized SHELL grease, type GR NG 3	When greasing by brush
• INTERFLON FIN GREASE LS 2	For the telescopic boom sliding blocks

ATTENTION

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

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Section E

PROBLEMS AND TROUBLESHOOTING

TABLE OF CONTENTS

E-1 FAULTS AND TROUBLESHOOTING

This chapter represents a practical guide for the operator for fixing the most common failures and, at the same time, detecting those interventions that must be carried out by qualified technical engineers.
If you are unsure about anything, do not carry out operations on the machine, but call in a skilled technician.

DANGER

Any repair work, maintenance or troubleshooting must be carried out with machine stopped, boom in rest position or laid on the ground, parking brake engaged and ignition key removed.

E-1.1 Problems - Causes - Solutions

PROBLEM	CAUSES	SOLUTIONS
THE DASHBOARD DOES NOT TURN ON	• Battery disconnected • Battery down • Fuse blown (**F2G - 50 A**)	• Connect the battery using the relevant switch • Recharge or replace the battery • Check the main fuse in the engine compartment and replace if necessary
THE ENGINE DOES NOT START ***The starter does not run***	• Forward/reverse gear selector not in neutral position • Battery down • Battery cut-out switch ON • Ignition board defective	• Set the switch to **0** • Recharge or replace the battery • Disconnect the battery • Check and replace if necessary
THE ENGINE DOES NOT START ***The starter runs, but the engine does not start***	• Solenoid valve (**Y00**) • No fuel • Fuel filter clogged • Fuel hose empty (fuel used up) • Starting motor defective	• Check the power supply of solenoid valve **Y00** • Refuel • See engine operator handbook • Refuel, then refer to engine operator handbook • Check and replace if necessary
THE MACHINE DOES NOT MOVE	• Changeover switch in neutral • Parking brake engaged • Fuse blown (**F14**) • Outrigger limit switch activated • Drive system pump defective	• Set the gear switch to correct position • Disengage • Check the fuse and replace if necessary • Check the efficiency of the outrigger limit switches and replace if necessary • Check the efficiency of the control spools and replace if necessary

PROBLEM	CAUSES	SOLUTIONS
	• Forward/reverse selector defective	• Check and replace if necessary
THE MACHINE DRIVE IS NOT ENOUGH	• Hydraulic oil filter clogged	• Replace the filter
THE MOMENT LIMITING SYSTEM DOES NOT CHANGE WORK SCALE	• Outrigger limit switches defective	• Check the efficiency of the outrigger limit switches and replace if necessary
NO SELECTION OF THE STEERING MODE	• "ROAD/JOBSITE" selector set to "ROAD" • Fuse blown (**F5 - 10 A**) • Steering selector defective	• Switch to "JOBSITE" • Check the fuse and replace if necessary • Check and replace if necessary
LOW PARKING BRAKE ACTION	• Insufficient cable tensioning.	• Check and adjust the cable tension by means of the hollow screws • Check and adjust the lead tightening on the cable heads
NO BOOM LOWERING AND EXTENSION, NO HOLDING FRAME PITCHING	• Fuse blown (**F25 - 10 A**)	• Check the fuse and replace if necessary
THE MOMENT LIMITING SYSTEM IS BLOCKED (red LED's ON)	• Low stability condition	• Retract the load within safety limits If the error message is still shown, retract the boom to rest condition using the cutout key of the moment limiting system and address to your nearest authorised workshop.
THE HYDRAULIC OIL THERMOMETER DOES NOT WORK	• This is normal, when the outside temperature is low and/or the machine is used for short periods, since the hydraulic oil cannot warm up over 40÷50°C • Fuse blown (**F9 - 7.5 A**)	• Check the fuse and replace if necessary

PROBLEM	CAUSES	SOLUTIONS
THE BOOM DOES NOT MOVE	• Fuse blown (**F19 - 10 A**) • "ROAD/JOBSITE" switch set to "ROAD"	• Check the fuse and replace if necessary • Switch to "JOBSITE"
CHECKING THE MICRO-SWITCHES WHEN THE DLE IS IN ALARM, THE BOOM IN/OUT MOVEMENTS, THE OUTRIGGER UP-MOVEMENT AND THE MACHINE SWAY FUNCTION REMAIN ACTIVATED	• Check that the connectors are correctly plugged in the actuator	• If the connectors are plugged in correctly, contact the GENIE Technical Assistance.
CHECKING THE MICRO-SWITCHES WITH THE BOOM RAISED 2 METRES ABOVE THE GROUND THE OUTRIGGER UP-MOVEMENT AND THE MACHINE SWAY FUNCTION REMAIN ACTIVATED	• Check that the connectors are correctly plugged in the actuator	• If the connectors are plugged in correctly, contact the GENIE Technical Assistance.
THE DLE MOMENT LIMITING SYSTEM IS IN ALARM	• Fuse blown (**F25 - 10 A**) • System fault	• Check the fuse and replace if necessary.
ALARM MESSAGES OF THE DLE MOMENT LIMITING SYSTEM SHOWN ON THE DISPLAY	**1** E2PROM error **2** Value read from **CELL 1** higher than the maximum permissible **3** Value read from **CELL 2** higher than the maximum permissible	• Turn power off and on and RESET the system. If the error message is still shown, contact GENIE to re-calibrate the unit. • Check the wiring between control panel and load cell • Check that the load cell is fixed correctly • Check the connecting cable or the connectors is/are not shorted • If the error message is still shown, contact the GENIE Service Centre and have the load cell be checked. • Check the wiring between control panel and load cell • Check that the load cell is fixed correctly • Check the connecting cable or the connectors is/are not shorted • If the error message is still shown, contact the GENIE Service Centre and have the load cell be checked.

PROBLEM	CAUSES	SOLUTIONS
ALARM MESSAGES OF THE DLE MOMENT LIMITING SYSTEM SHOWN ON THE DISPLAY	**4** Block relay error during operation	• Check the efficiency of relay and wiring • Stop and restart the machine and run a complete test to check the outputs.If the error message is still shown, contact the GENIE service centre to replace the DLE unit.
	5-6-7-8 Block relay error when power is turned on	• Check the efficiency of relay and wiring • Stop and restart the machine and run a new test. If the error message is still shown, contact the GENIE service centre to replace the DLE unit.
	9 **CELL 1** and **CELL 2** reading incongruence. The values read from the two cells are different.	• Check that the cells are intact and fixed correctly. If the error message is still shown, contact the GENIE service centre to replace the load cell and re-calibrate the unit.
	A Data error in RAM	• Stop and restart the machine. If the error message is still shown, contact the GENIE service centre.
	B Outrigger incongruence	• An input is not read. Check the wiring, the power cord and the connector of the DLE. If the alarm persists, contact the GENIE service centre.
	C Error during check of A.D.C. reading	• Stop and restart the machine. If the error message is still shown, contact the GENIE service centre.

ATTENTION

In case of faults not listed in this chapter, address to the GENIE Technical Service, your nearest authorised workshop or dealer.

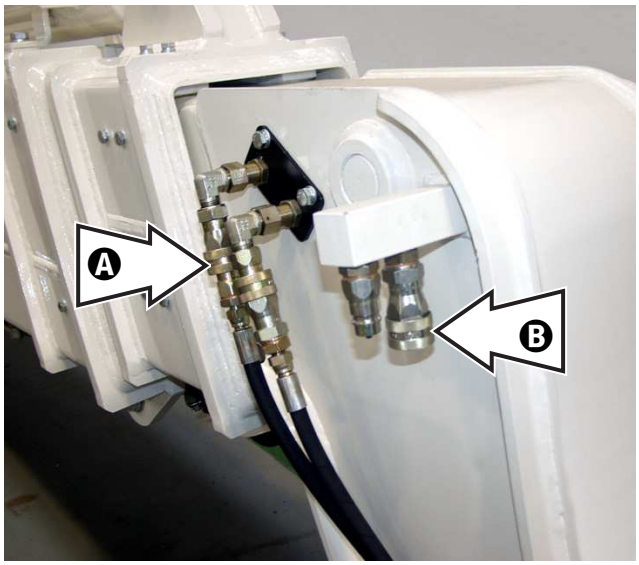
Section F

OPTIONAL ATTACHMENTS

TABLE OF CONTENTS

INTRODUCTION

This section provides information on the optional interchangeable attachments, especially manufactured for the handlers.
Use only genuine attachments, described in this section, after having read their features thoroughly and understood their use.
To install and remove the attachments, follow the instructions supplied in the "OPERATION" section, **par. C-5.4.**



DANGER

When replacing interchangeable attachments, keep any person clear of the working area.

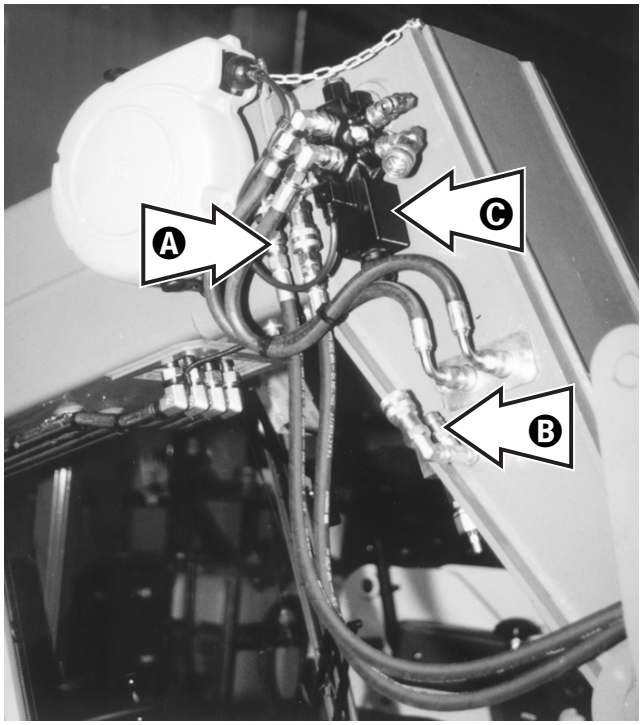
DANGER

Mounting optional attachments, and especially the extension jib, can change the centre of gravity of the machine. Before handling a load, check its weight and compare it with the values on the load charts. The weight of the used attachment must always be deducted from the rated payload.

Procedure to connect hydraulic lines:

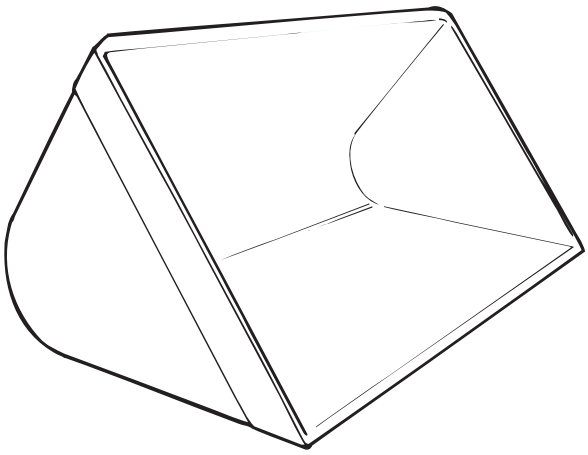
- Couple the new attachment and lock it hydraulically.
- Disconnect the quick couplings Ⓐ of the attachment locking cylinder and connect them to the false connectors Ⓑ to prevent them from getting dirty.
- Connect the feeding hoses of the new attachment to the quick couplings previously set free.

When the new attachment has two hydraulic movements like, for instance, the pole and pipe planter, a flow selecting valve Ⓒ shall be installed on the machine or the attachment. This valve will be operated by the relevant switch in the cab.



■ F-1.1 SHOVEL

Machine	*Code*
GTH-3512	59.0202.0000



Technical data

Capacity	*Litres*	*800*
Width	mm	2250
Length	mm	1000
Height	mm	940
Weight	kg	380
SAE capacity	m^3	0,8

Application
Quick-coupling fitted attachment for moving soil, sand, debris, cereals, etc.

Safety
Strictly obey the general safety precautions given in section **B** “SAFETY”.

Operation

ATTENTION

When using a shovel, load the material only when the boom is completely retracted and push against the heap with straight wheels.

To load/unload the material, operate the rotation lever of the attachment holding plate.

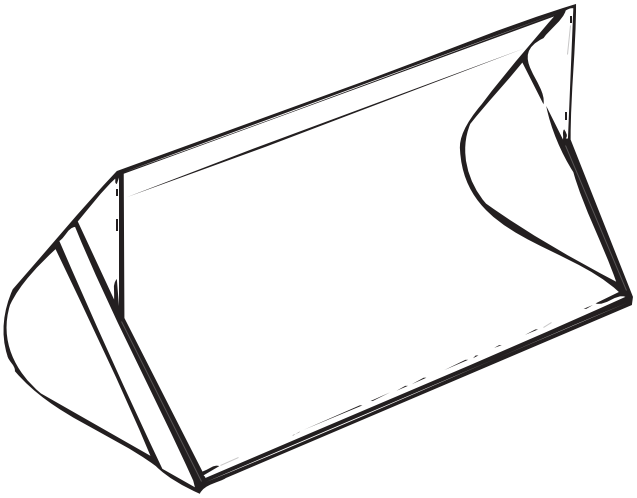
Maintenance
Visually check the shovel for damage before using it.

ATTENTION

Attachment suitable for moving loose material. Do not use for digging operations.

■ F-1.2 CEREAL SHOVEL

Machine	*Code*
GTH-3512	59.0202.1000



Technical data

Capacity	*Litres*	*2000*
Width	mm	2300
Length	mm	1353
Height	mm	1180
Weight	kg	...
SAE capacity	m^3	2,47

Application
Quick coupling attachment for loading cereals or inert materials, etc.

Safety
Strictly obey the general safety precautions given in section **B** "SAFETY".

Operation

ATTENTION

When using a shovel, load the material only when the boom is completely retracted and push against the heap with straight wheels.

To load/unload the material, operate the rotation lever of the attachment holding plate.

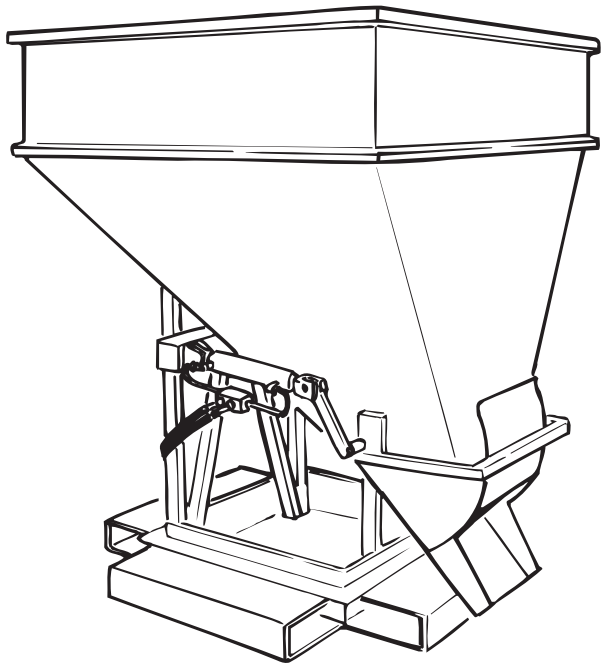
Maintenance
Visually check the shovel for damage before using it.

ATTENTION

Attachment suitable for moving loose material. Do not use for digging operations.

■ F-1.3 CONCRETE SKIP

Capacity	*Code*	
	Man. unloading	*Hydr. unloading*
litres 500	59.0400.0000	59.0400.1000
litres 800	59.0400.2000	59.0400.3000



Application

Attachment coupled to the standard forks of the handler and fixed by means of the special chains with shackle provided.

Safety

Strictly obey the general safety precautions given in section **B** “Safety”.

Operation

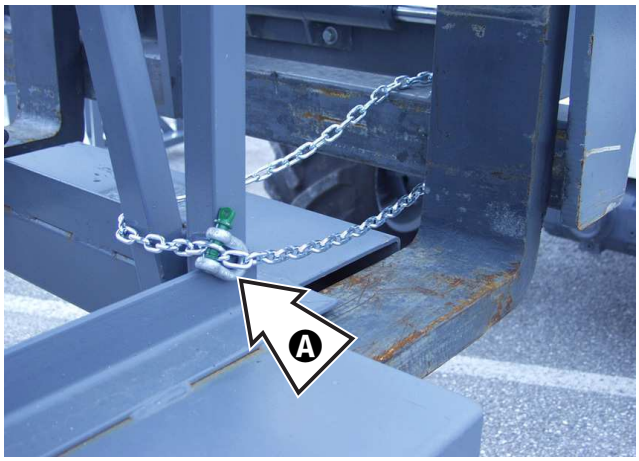
Fork the skip bearing in mind the side where the product will be unloaded.
Secure the skip to the forks using the chains provided.
To unload the concrete, manually operate the gate opening lever if the skip opening is done by hand.
If the skip is equipped with hydraulic cylinder for the gate opening, operate the attachment locking lever after connecting the feeding lines of the new attachment to the quick couplings (see page F-2).

Maintenance

Visually check the skip for damage before using it.
Wash with water after use or in case of prolonged inactivity to prevent the mix or residues from hardening.
Check for oil leaks from hoses and connectors.
Carefully protect the quick connectors once disconnected to prevent impurities from entering the circuit.
Check the chains after every use and replace them if worn or damaged.

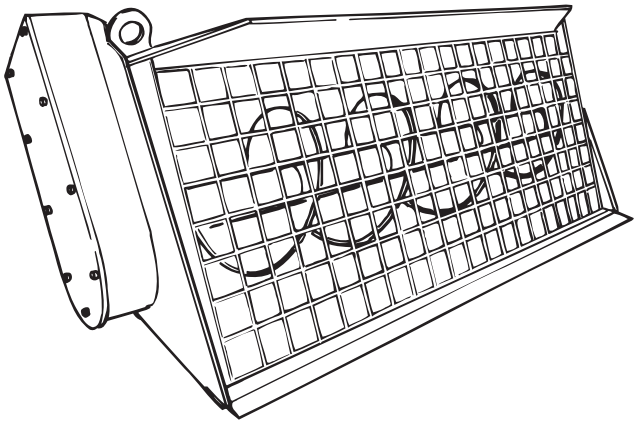
Technical data

Capacity	*Litres*	*500*	*800*
Width	mm	1200	1200
Length	mm	1200	1200
Height	mm	1270	1520
Weight	kg	220	260
SAE capacity	m^3	0,5	0,8



■ F-1.4 MIXING BUCKET

Machine	*Code*
GTH-3512	59.0401.0000



Technical data

		Litres	***500***
Width	mm		1850
Length	mm		900
Height	mm		1000
Weight	kg		340
SAE capacity	m^3		0,35

Application

Quick-coupling fitted attachment for mixing and distributing concrete.

Safety

Strictly obey the general safety precautions given in section **B** “SAFETY”.

Operation

To load/unload the material, operate the rotation lever of the attachment holding plate.

To start the mixing auger, operate the attachment locking lever after connecting the feeding lines of the new attachment to the quick couplings (see page F-2).

Maintenance

CAUTION

Before any maintenance, rest the bucket on the ground, stop the machine, remove the starter key and lock the cab door to prevent anybody from gaining access to the control panel.

Visually check the bucket for damage before using it.

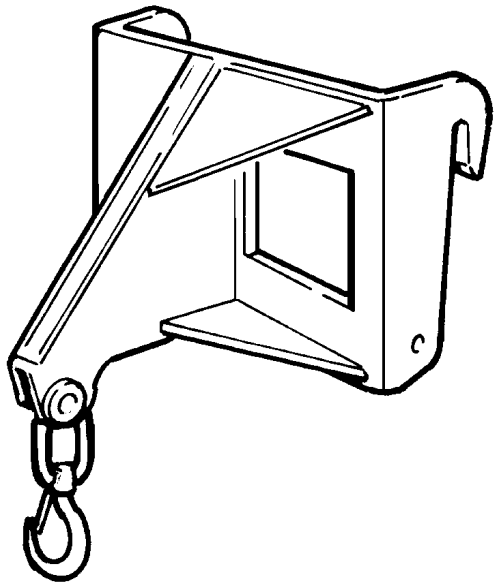
Wash thoroughly with water after use or in case of prolonged inactivity to prevent the mix or residues from hardening.

Check for oil leaks from hoses and connectors.

Carefully protect the quick connectors once disconnected to prevent impurities from entering the circuit.

■ F-1.5 FIXED HOOK ON PLATE

Machine	*Code*
GTH-3512	59.0700.4000



Application
Quick-coupling fitted attachment for lifting loads by means of special slings.

Safety
Strictly obey the general safety precautions given in section **B** "SAFETY".
Do not oscillate the load.
Do not drag hooked loads.
Lift the load before extending the boom.

Operation
Fork the hook and hold it in position by means of the locking cylinder.
All loads must be bridled with special textile slings or chains in compliance with all pertinent regulations.
To handle the load, raise and rotate the telescopic boom of the handler.

Maintenance
Visually check the hook for damage before using it.
Check the safety catch is in good working order.

Technical data

Max payload	*kg*	*3500*
Width	mm	970
Length	mm	620
Height	mm	600
Weight	kg	132

IMPORTANT

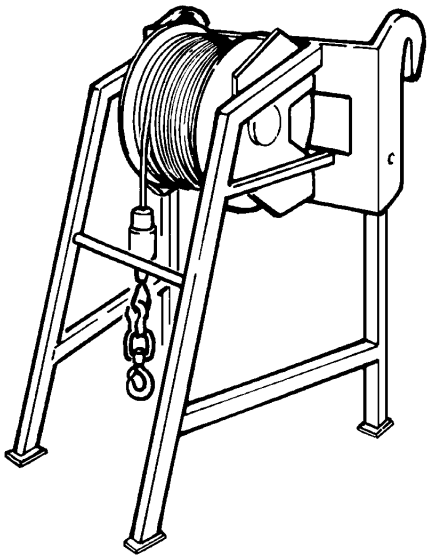
The fixed hook has been designed to support a load of 5400 kg. The max payload corresponds to the nominal capacity rating of the handler on which it is installed and is indicated on the load charts supplied with the equipment.

IMPORTANT

Make sure this attachment can be used in the destination country of the machine. In Italy, this attachment must be enrolled at ISPESL and submitted to yearly test.
Application must be submitted directly by the user.

■ F-1.6 HYDRAULIC WINCH

Machine	*Code*
GTH-3512	59.0901.4000



IMPORTANT

Make sure this attachment can be used in the destination country of the machine. In Italy, this attachment must be enrolled at ISPESL and submitted to yearly test.
Application must be submitted directly by the user.

Technical data

Max payload	*kg*	*3000*
Width	mm	960
Length	mm	880
Height	mm	1650
Weight	kg	280

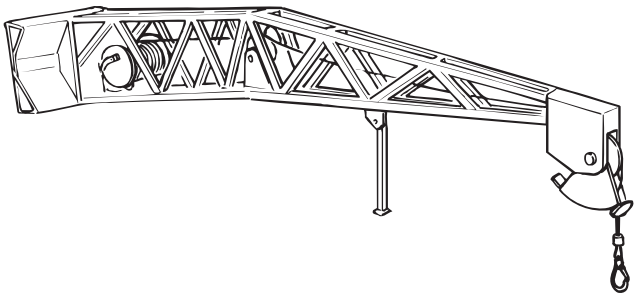
For the use of this attachment, read the specific manual supplied - code: 57.0300.9200

■ F-1.7 EXTENSION JIB

Machine	*Code*	
	mechanical	*hydraulic*
GTH-3512	...	59.0801.9000

IMPORTANT

Make sure this attachment can be used in the destination country of the machine. In Italy, this attachment must be enrolled at ISPESL and submitted to yearly test.
Application must be submitted directly by the user.



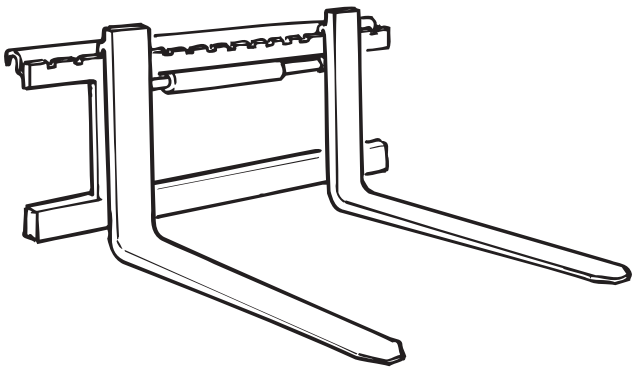
Technical data

Lenght		***4000***
Width	mm	970
Height	mm	600
Weight	kg	360
Payload	kg	900

For the use of this attachment, read the specific manual supplied - code: 57.0300.9200

■ F-1.8 FORKS WITH HYDRAULIC SIDE-SHIFT

Machine	*Code*
GTH-3512	59.0600.8000



Application
Quick-coupling fitted attachment for handling palletised loads.

Safety
Strictly obey the general safety precautions given in section **B** “SAFETY”.
- Do not load loose materials
- Do not move stacked pallets

Operation
To adjust the tilting, operate the rotation lever of the attachment holding plate.
To side-shift, operate the attachment locking lever after connecting the feeding lines of the new attachment to the quick couplings (see page F-2).

Maintenance
Visually check the attachment for damage before using it.
Check for hydraulic oil leaks.
Daily grease the joints using a greasing gun, and smear the sliding guides with graphitized grease.

Technical data

Max payload	*kg*	*3500*
Width	mm	1400
Length	mm	1600
Height (with protection)	mm	1140
Weight	kg	180
Stroke	mm	± 150
Fork attachments		FEM 3

Section G

TABLES AND DOCUMENTS ENCLOSED

TABLE OF CONTENTS

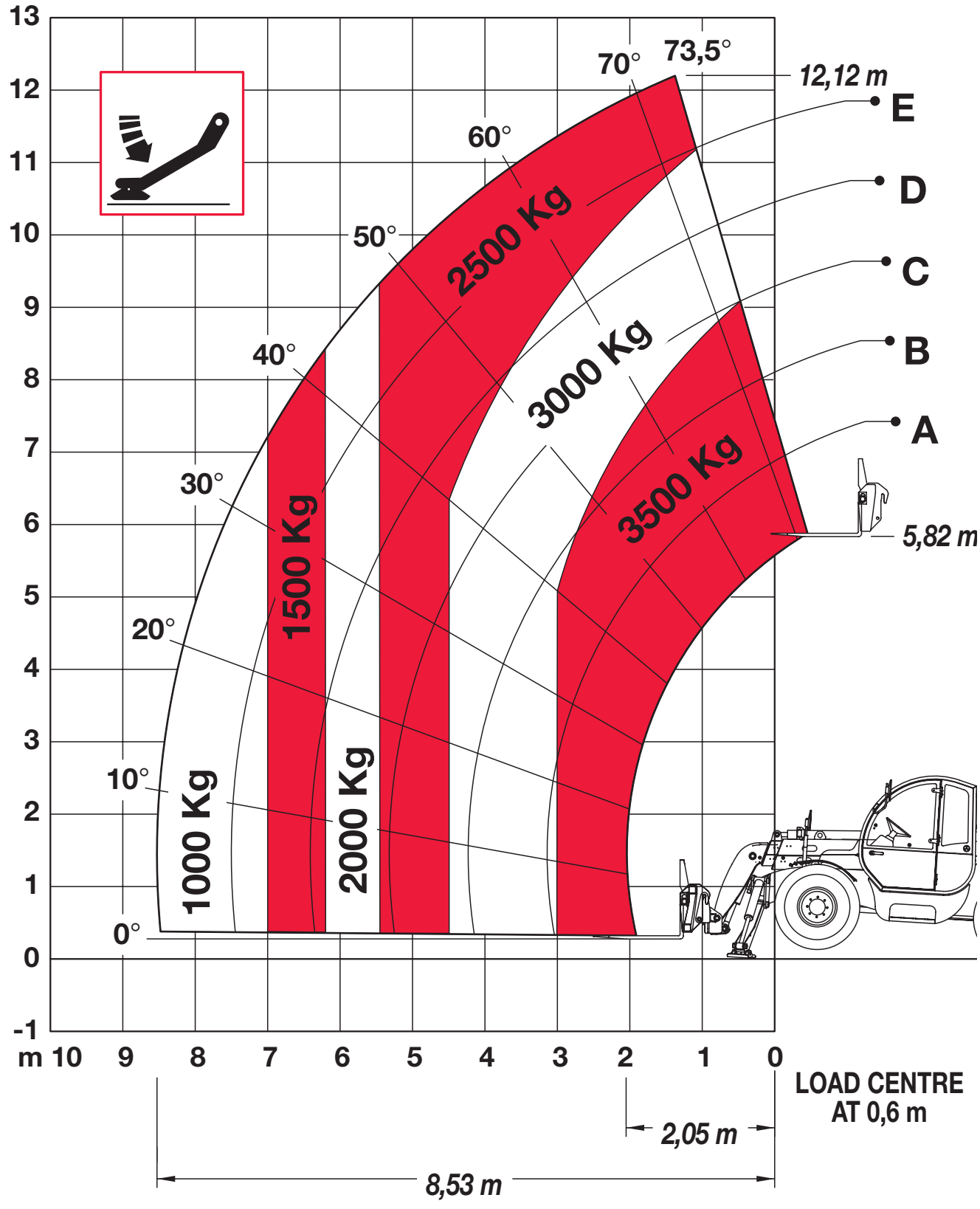
G-1 TIGHTENING TORQUES

D x p	Pre-loading (N)				Tightening torque (Nm)			
	4.8	**8.8**	**10.9**	**12.9**	**4.8**	**8.8**	**10.9**	**12.9**
M 4 x 0,7	1970	3930	5530	6640	1,5	3,1	4,3	5,2
M 5 x 0,8	3180	6360	8950	10700	3	6	8,5	10,1
M 6 x 1	4500	9000	12700	15200	5,2	10,4	14,6	17,5
M 8 x 1,25	8200	16400	23100	27700	12,3	24,6	34,7	41,6
M 8 x 1	8780	17600	24700	29600	13	26	36,6	43,9
M 10 x 1,5	13000	26000	36500	43900	25,1	50,1	70,5	84,6
M 10 x 1,25	13700	27400	38500	46300	26,2	52,4	73,6	88,4
M 12 x 1,75	18900	37800	53000	63700	42,4	84,8	119	143
M 12 x 1,25	20600	41300	58000	69600	45,3	90,6	127	153
M 14 x 2	25800	51500	72500	86900	67,4	135	190	228
M 14 x 1,5	28000	56000	78800	94500	71,7	143	202	242
M 16 x 2	35200	70300	98900	119000	102	205	288	346
M 16 x 1.5	37400	74800	105000	126000	107	214	302	362
M 18 x 2,5	43000	86000	121000	145000	142	283	398	478
M 18 x 1,5	48400	96800	136000	163000	154	308	434	520
M 20 x 2,5	54900	110000	154000	185000	200	400	562	674
M 20 x 1,5	60900	122000	171000	206000	216	431	607	728
M 22 x 2,5	67900	136000	191000	229000	266	532	748	897
M 22 x 1,5	74600	149000	210000	252000	286	571	803	964
M 24 x 3	79100	158000	222000	267000	345	691	971	1170
M 24 x 2	86000	172000	242000	290000	365	731	1030	1230
M 27 x 3	103000	206000	289000	347000	505	1010	1420	1700
M 27 x 2	111000	222000	312000	375000	534	1070	1500	1800
M 30 x 3,5	126000	251000	353000	424000	686	1370	1930	2310
M 30 x 2	139000	278000	391000	469000	738	1480	2080	2490

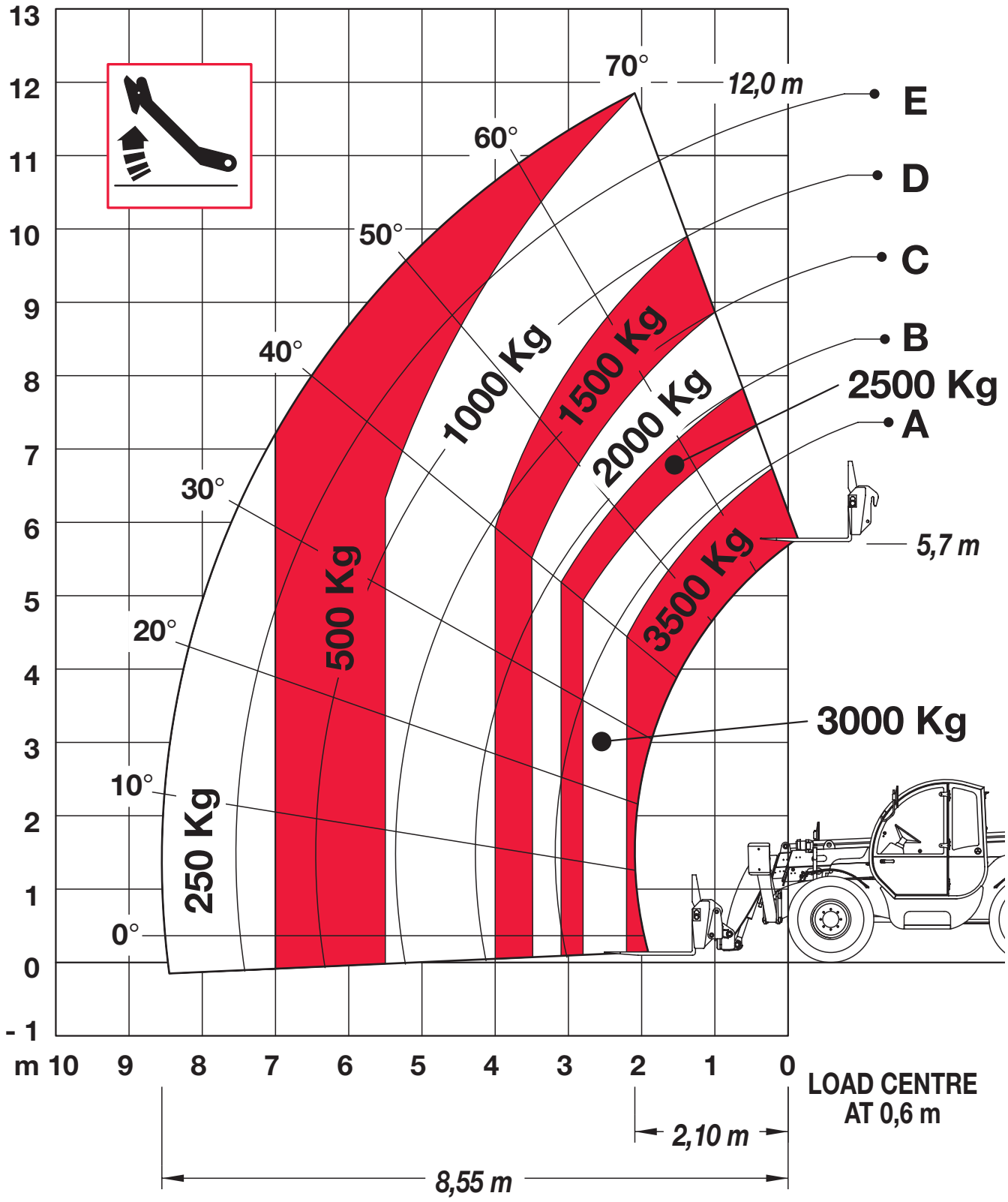
IMPORTANT

Sensor maximum driving torque: 15 Nm.

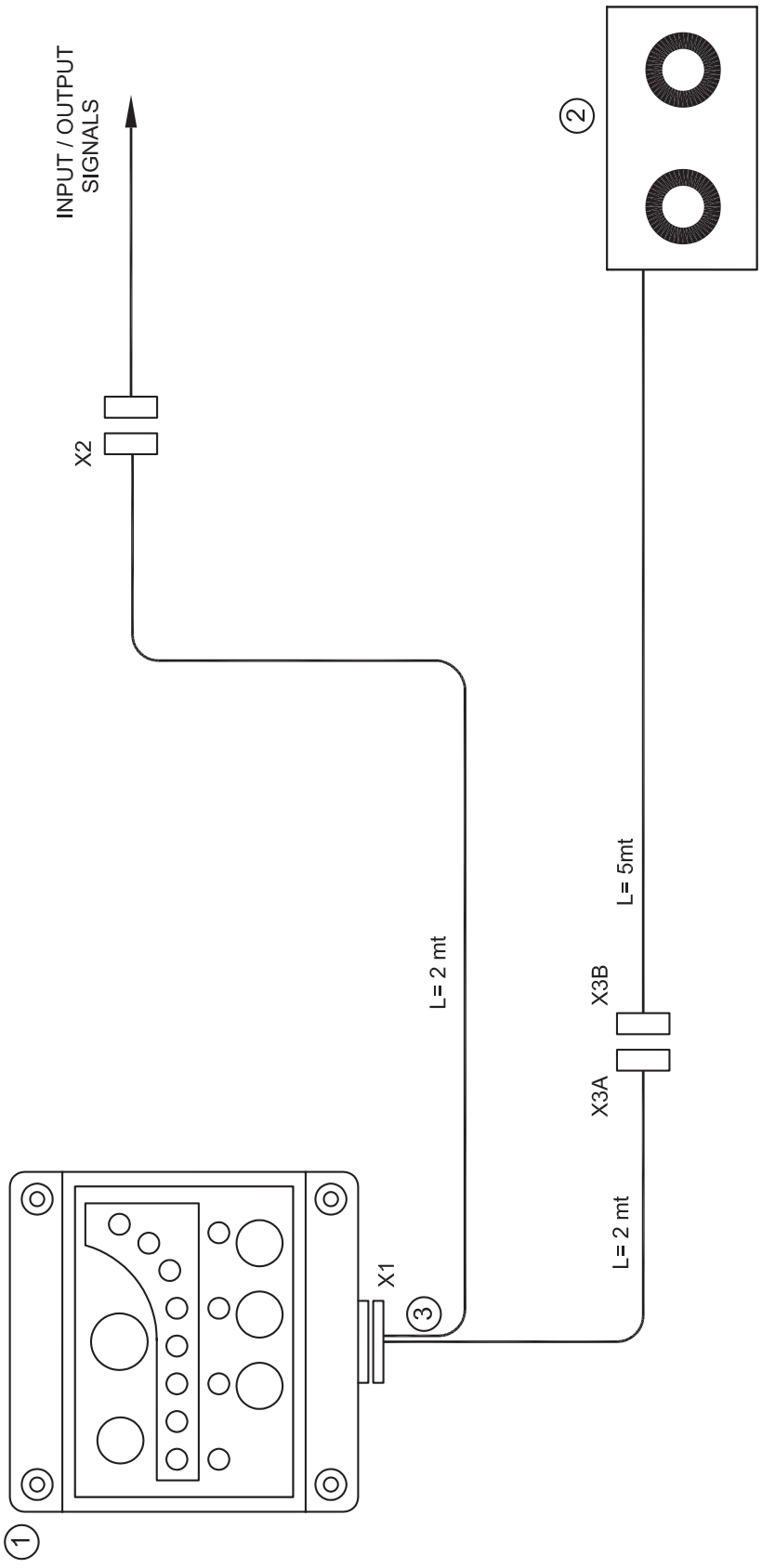
G-2.1 LOAD CHART WITH FORKS - GTH-3512 WITH OUTRIGGERS



■ G-2.2 LOAD CHART WITH FORKS - GTH-3512 WITHOUT OUTRIGGERS

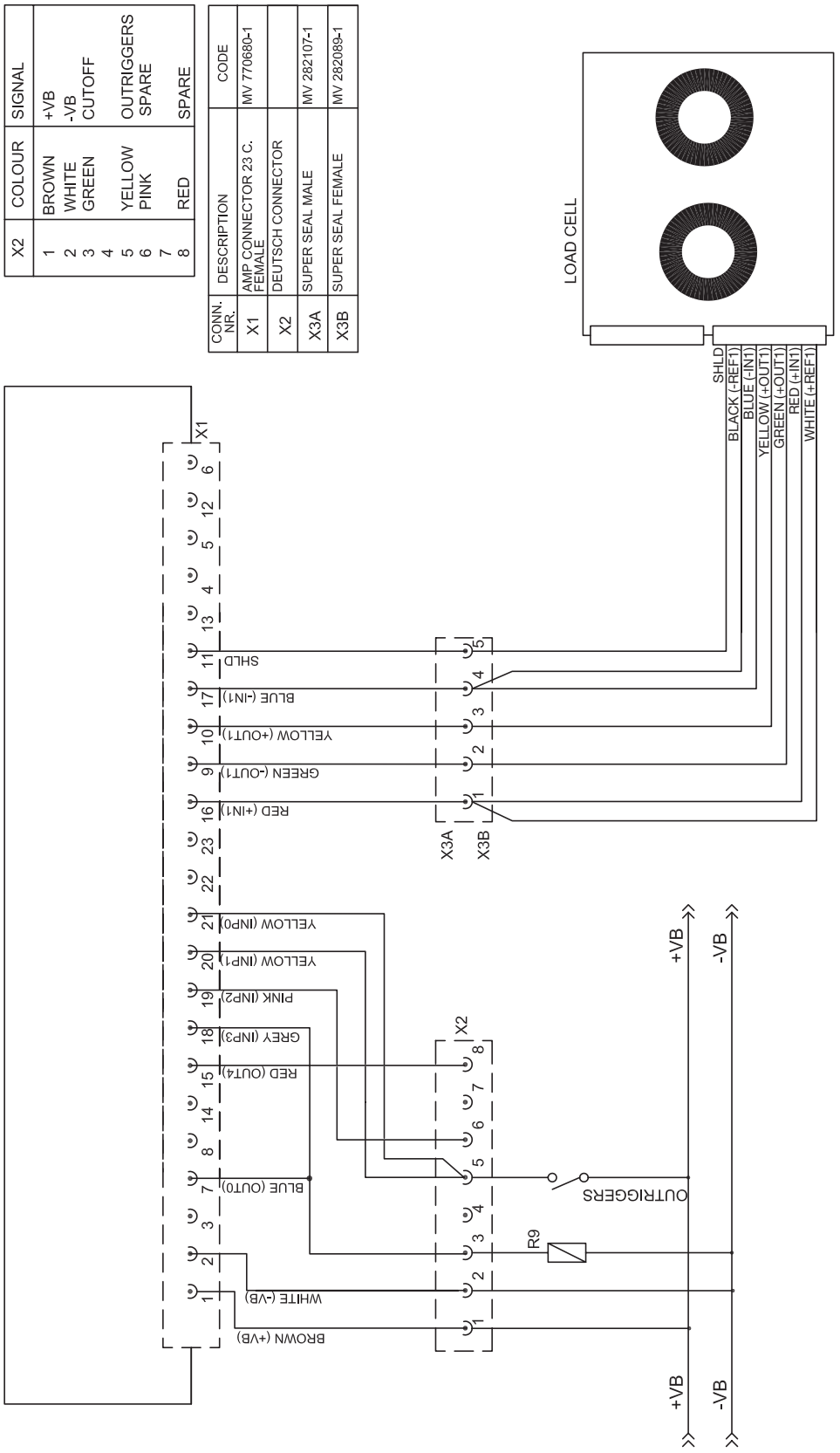


G-3.1.1 MOMENT LIMITING SYSTEM WIRING DIAGRAM - EXTERNAL CONNECTIONS

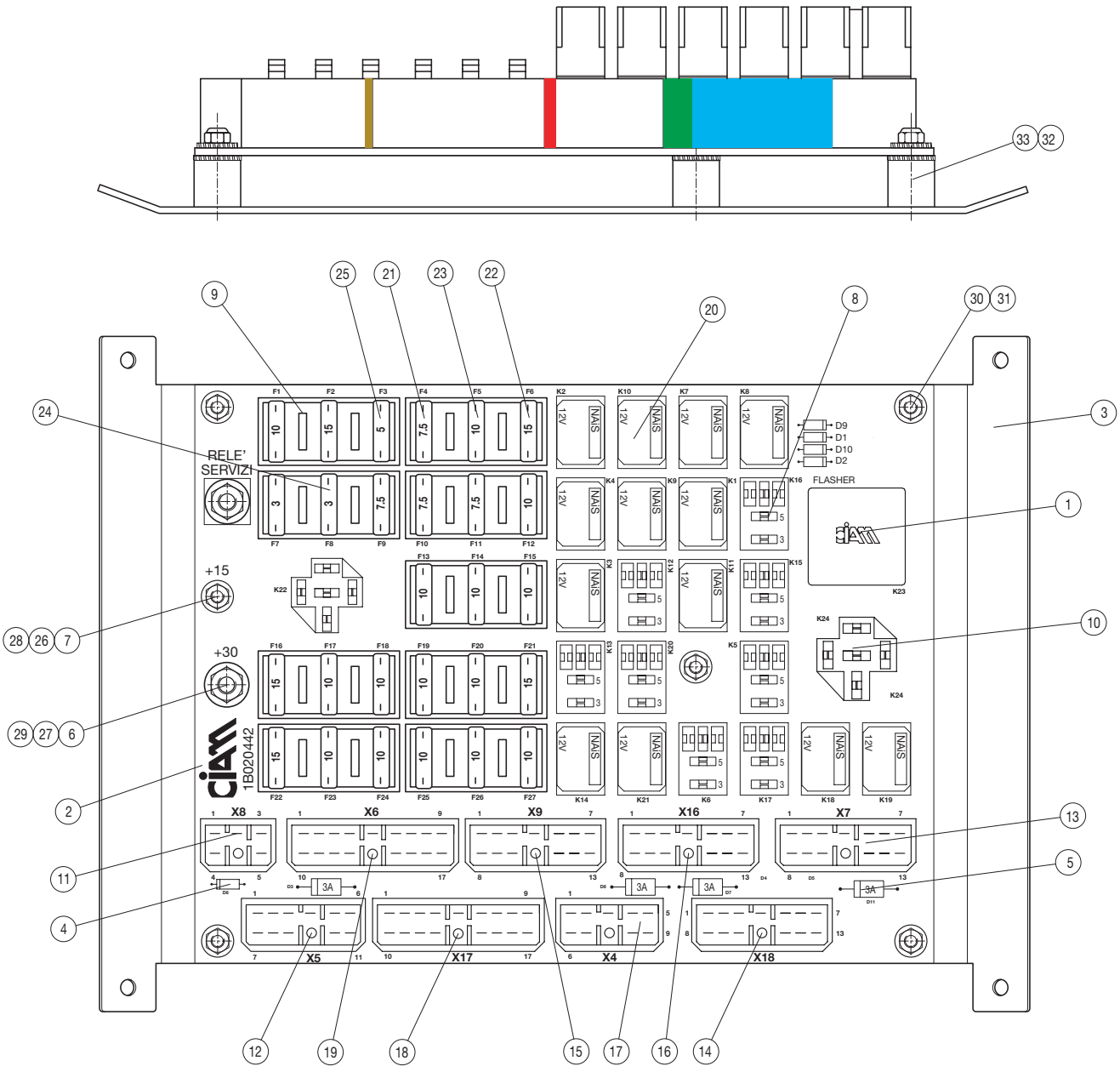


Rif.	Quantity	Title/Name	Article
1	1	PANNELLO DI CONTROLLO	DLE-1X
2	1	BARRA ESTENSIMETRICA SINGOLO PONTE	Y11 FLS-1
3	1	CAVO DI COLLEGAMENTO	CV3 DLE/XX

G-3.1.2 MOMENT LIMITING SYSTEM WIRING DIAGRAM - INTERNAL CONNECTIONS



■ G-3.2 FUSES AND RELAYS BOARD

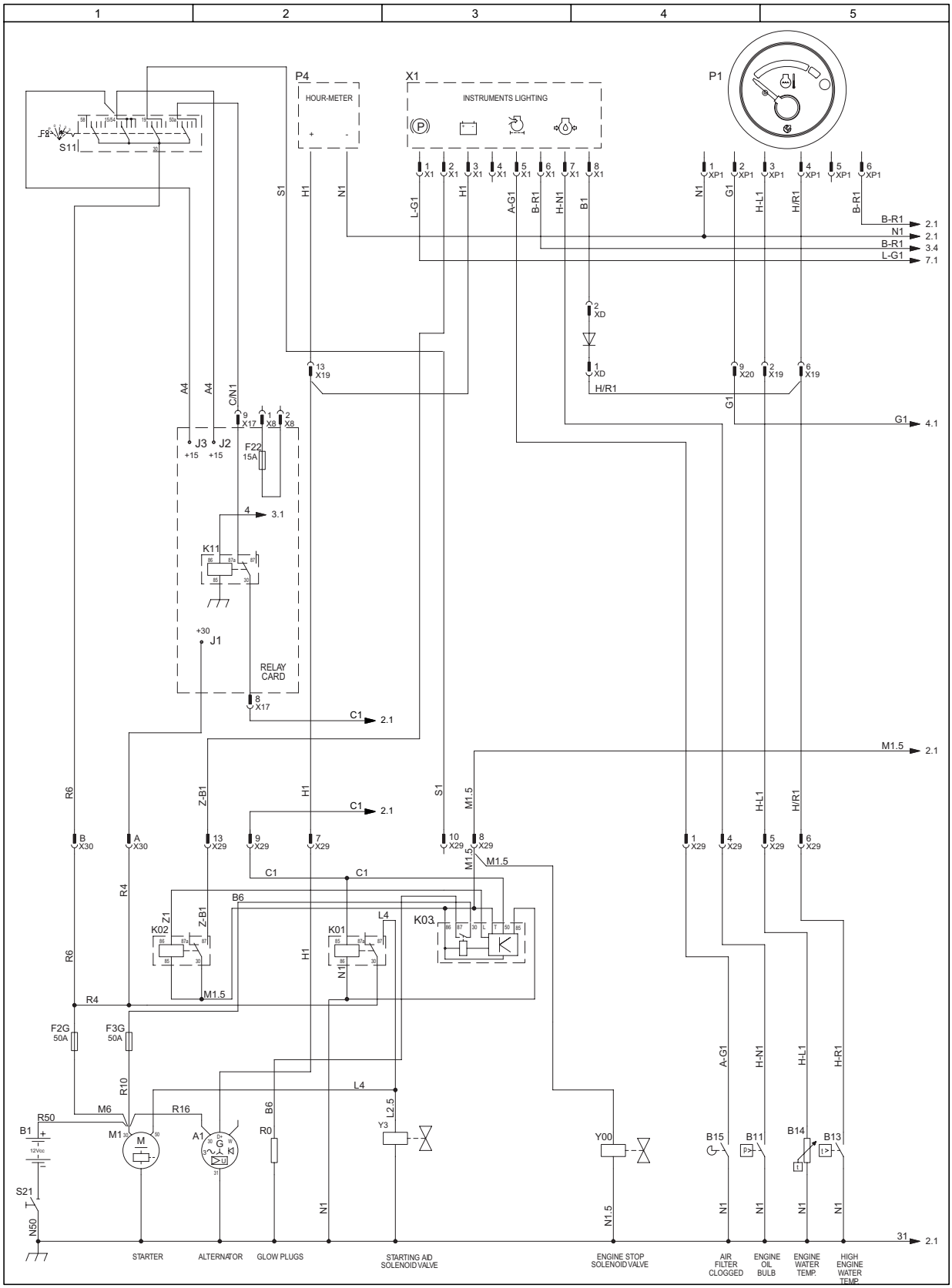


G-3.2.1 FUSES AND RELAYS BOARD (description)

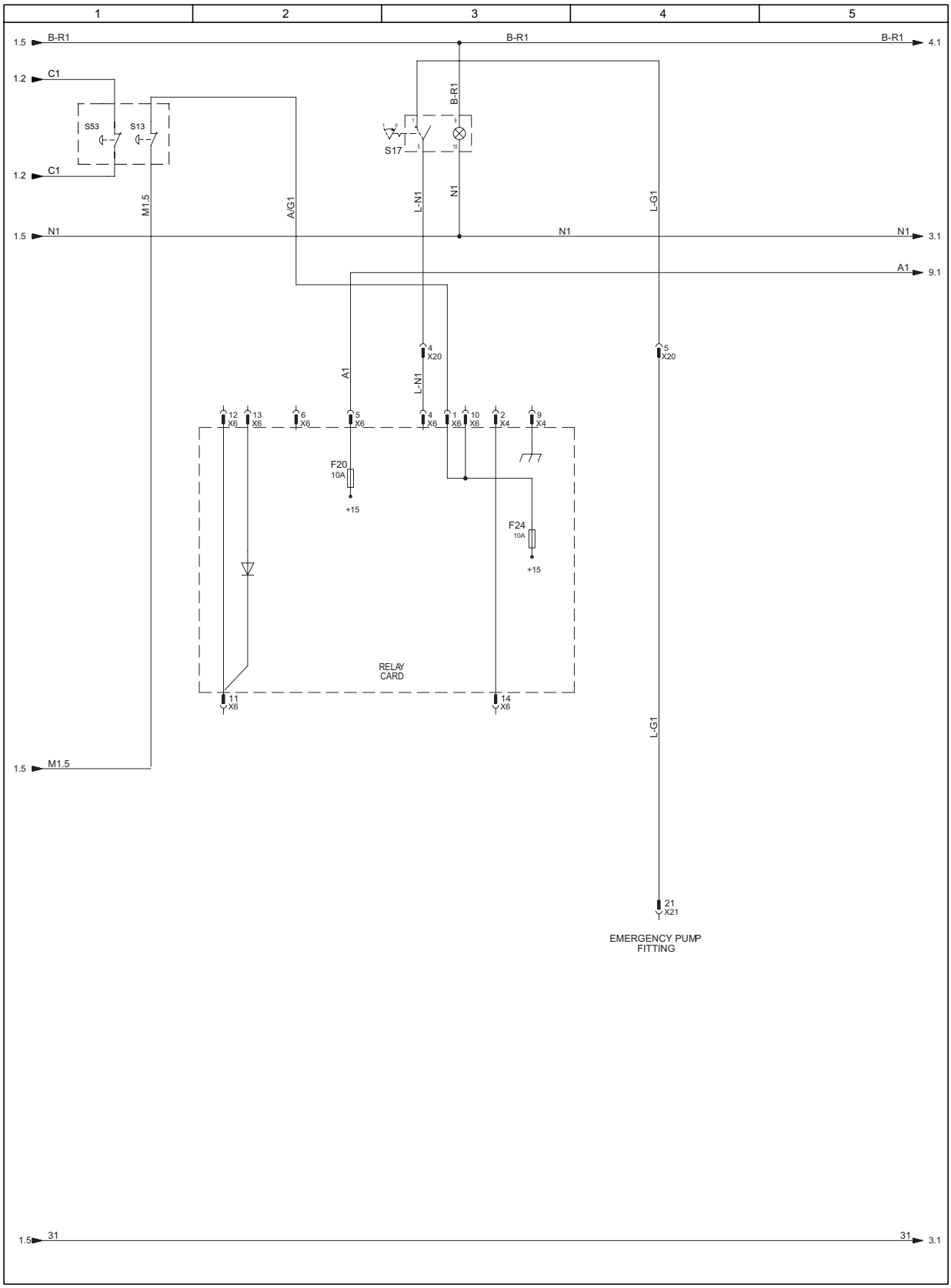
Ref.	Description
1	12V flashing
2	Printed circuit
3	Relay card support
4	1N 4007 diodes, black
5	3 A 1N5408 diodes
6	Power terminal M6
7	Power terminal M5
8	Board relay micro-switch connector
9	Board fuse-box connector
10	Board fuse-box connector
11	5-way MARK II connector - boards
12	11-way MARK II connector - boards
13	13-way MARK.II connector - boards
14	13-way MARK.II connector - light blue
15	13-way MARK.II connector - red
16	13-way MARK.II connector - green
17	9-way MARK II connector - boards
18	17-way MARK II connector - boards
19	17-way MARK II connector - yellow
20	Micro-switch relay with 12V diode
21	7.5A knife-blade fuse
22	15A knife-blade fuse
23	10A knife-blade fuse
24	3A knife-blade fuse
25	5A 257005 knife-blade fuse
26	Washer ø .3x8.9x1.2 UNI1751, stainless steel
27	Washer ø 6.4x11.3x1.6 UNI1751, stainless steel
28	Nut M5 UNI 5588-65, stainless steel
29	Nut M6 UNI 5588, stainless steel
30	Nut M4 UNI 7473, stainless steel
31	Washer 3.5x13.6x2, Certene
32	Washer 4.4x10x1.1, nylon
33	Vibration-proof pad M4x10, stainless steel

G-3.3 GTH-3512 wiring diagram

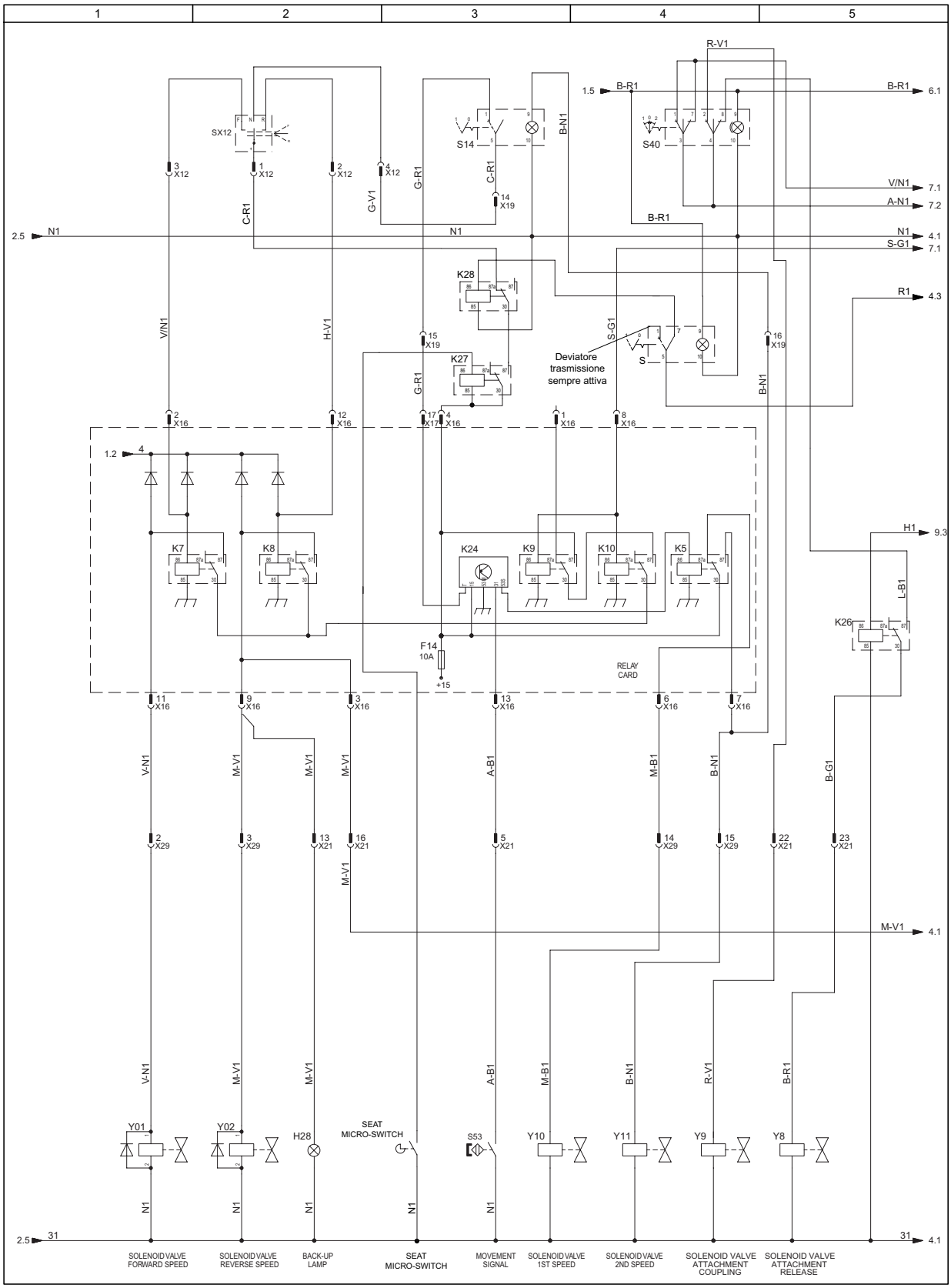
G-3.3.1 Sheet 1 of 9



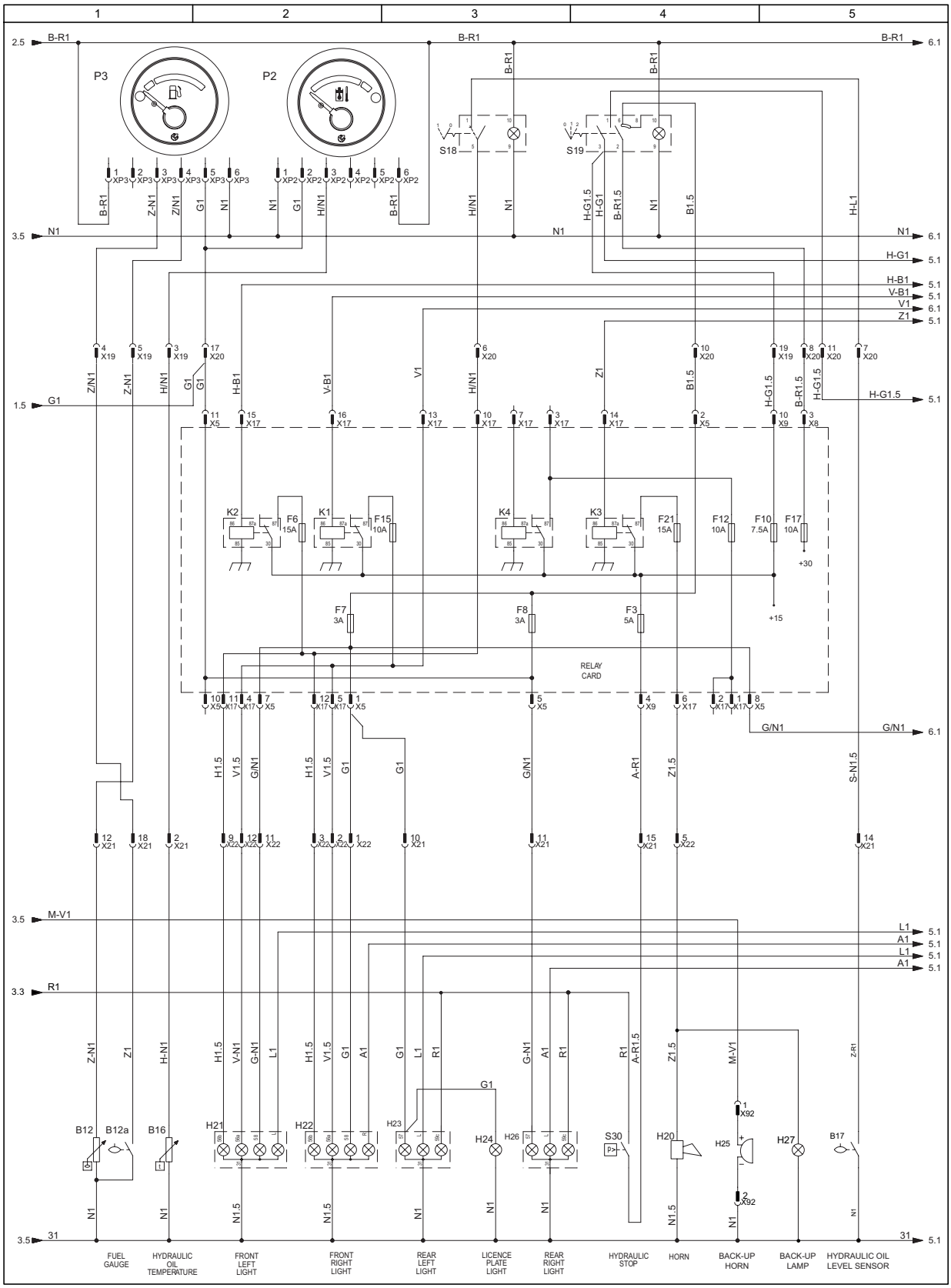
G-3.3.2 Sheet 2 of 9



G-3.3.3 Sheet 3 of 9



G-3.3.4 Sheet 4 of 9



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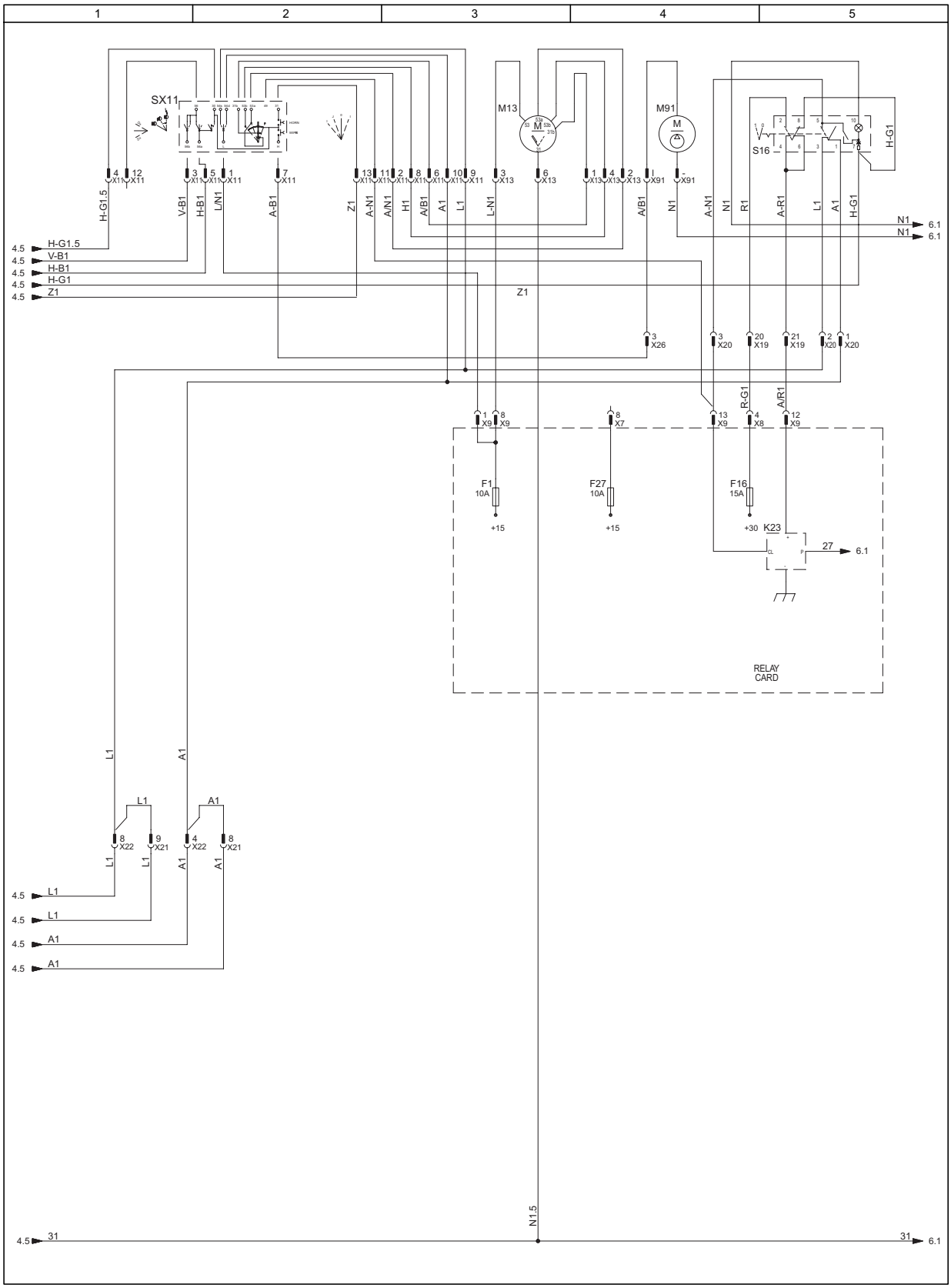
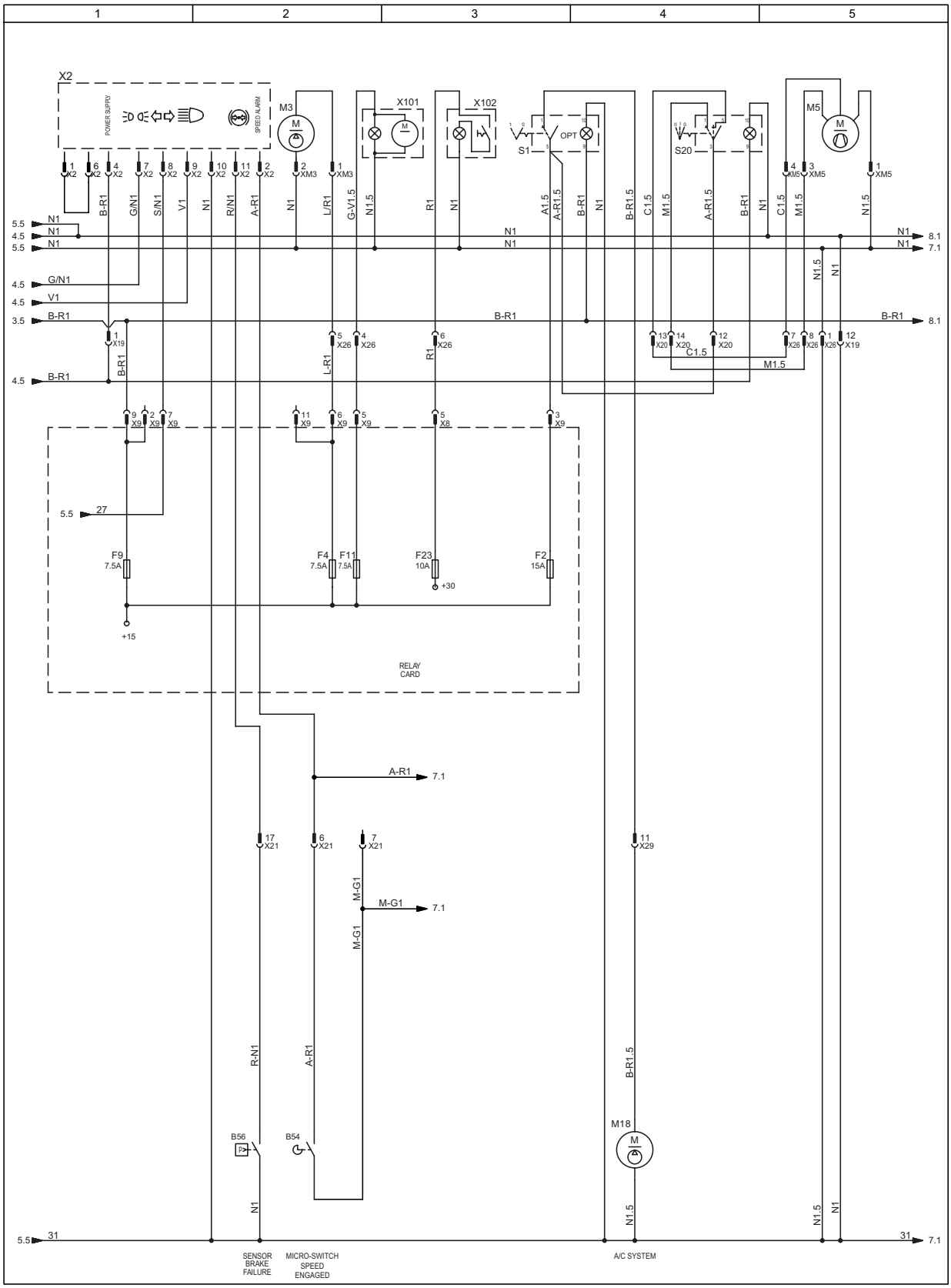
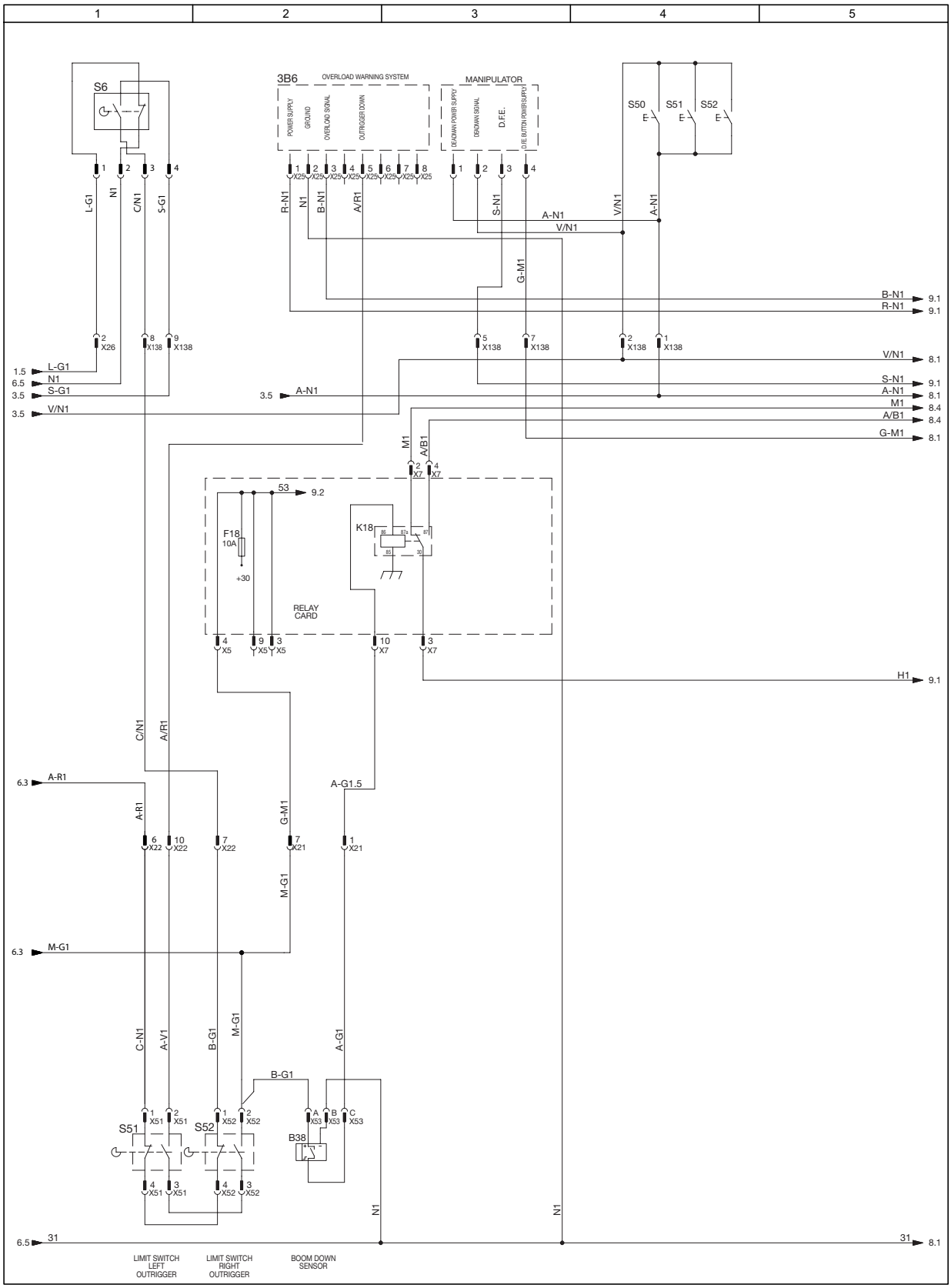


G-3.3.6 Sheet 6 of 9



G-3.3.7 Sheet 7 of 9



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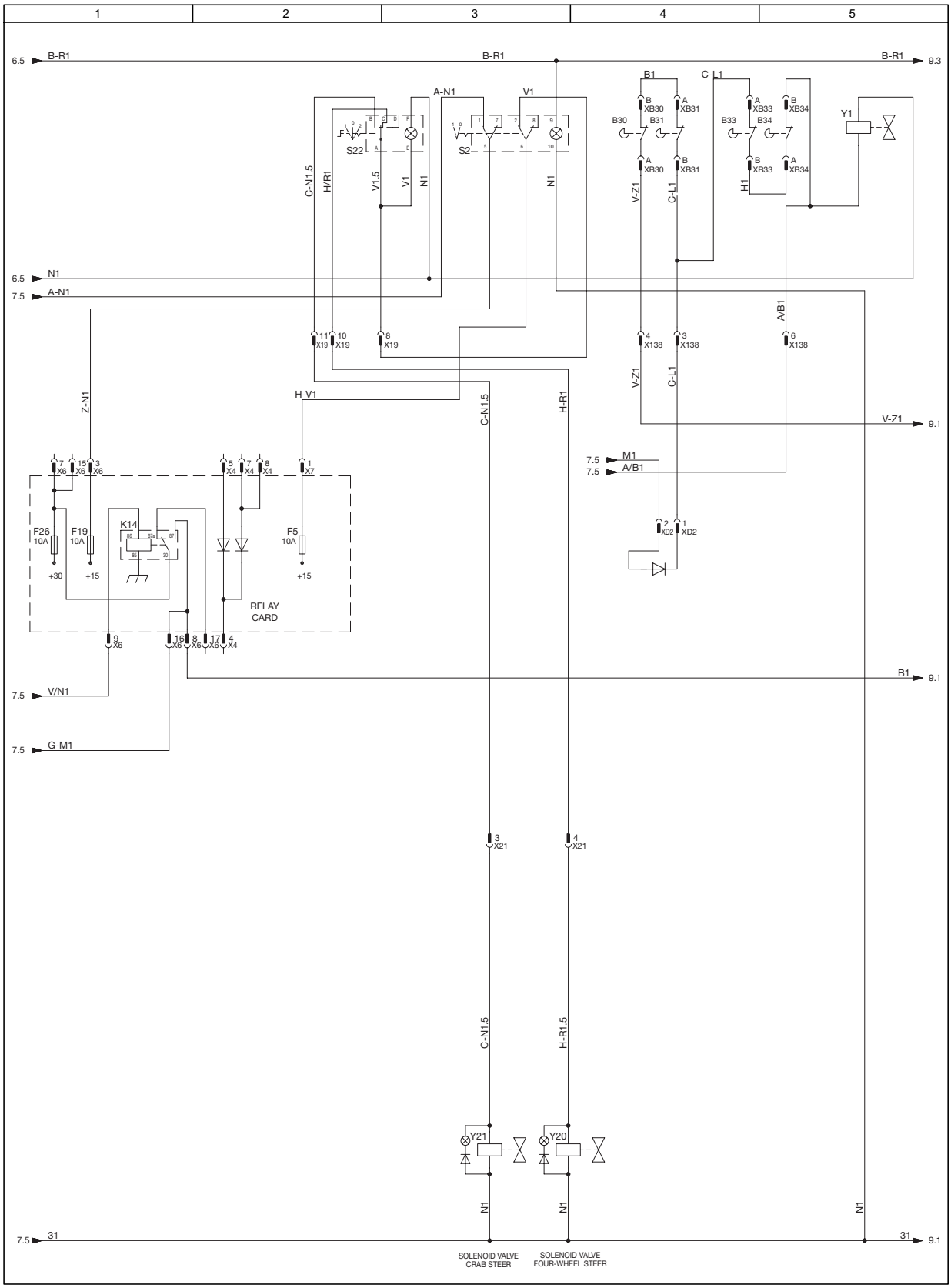
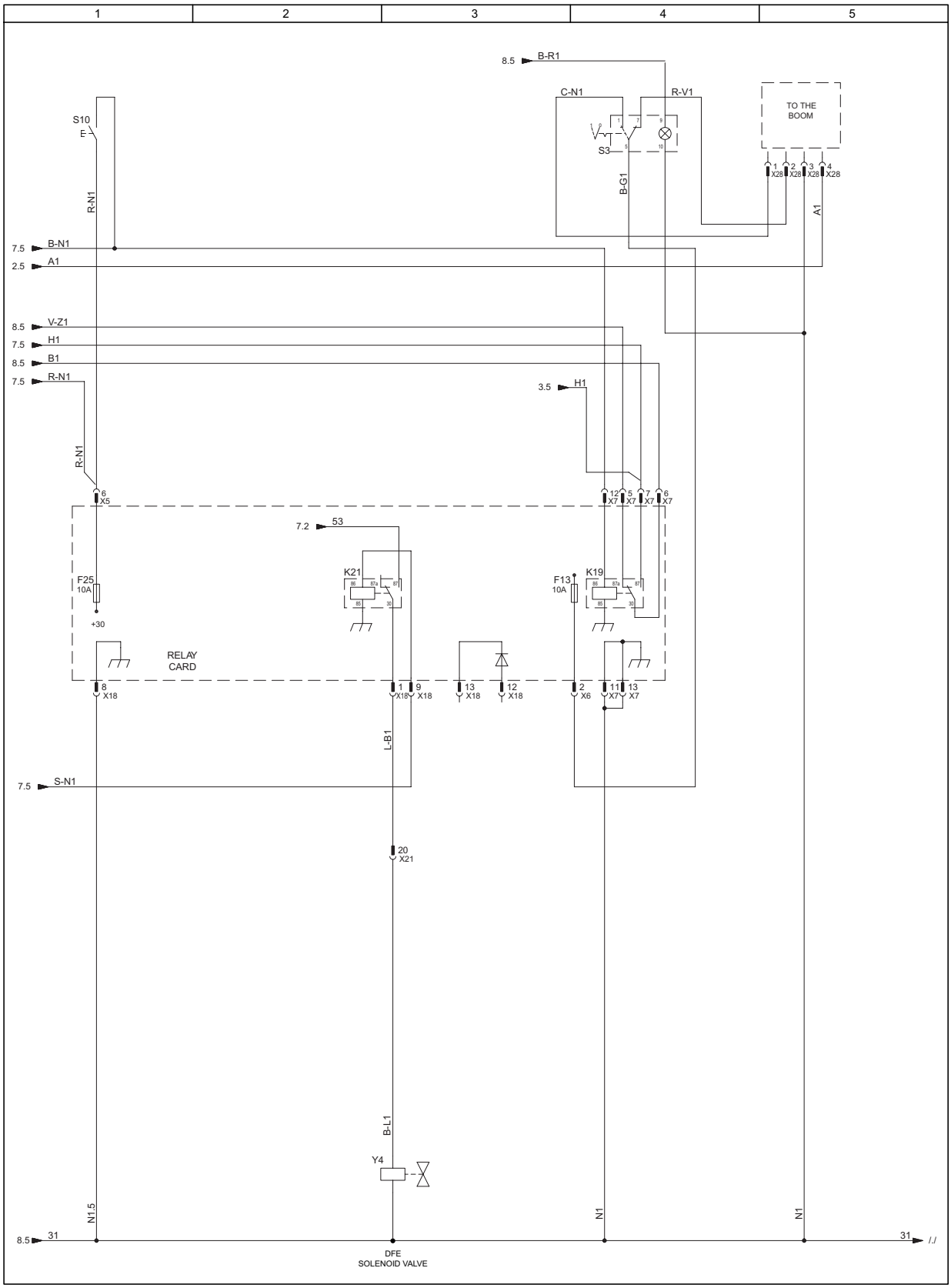


G-3.3.9 Sheet 9 of 9



G-3.3.10 GTH-3512 wiring diagram - Components description

Ref.	Description	Sheet
A1	ALTERNATOR	1
B1	BATTERY	1
B11	PRESSURE SWITCH - ENGINE OIL FILTER	1
B12	FUEL GAUGE	4
B12a	FUEL RESERVE	4
B13	THERMOSTAT - HIGH ENGINE WATER TEMPERATURE	1
B14	THERMOMETER - HIGH ENGINE WATER TEMPERATURE	1
B15	PRESSURE SWITCH - AIR FILTER CLOGGED	1
B16	THERMOMETER - HIGH HYDRAULIC OIL TEMPERATURE	4
B17	HYDRAULIC OIL LEVEL SENSOR	4
B30	MICRO-SWITCH - BOOM IN/OUT	8
B31	MICRO-SWITCH - BOOM UP/DOWN	8
B33	MICRO-SWITCH - LEFT STABILIZER	8
B34	MICRO-SWITCH - RIGHT STABILIZER	8
B38	BOOM LIFTING SENSOR	7
B54	MICRO-SWITCH - GEAR NOT ENGAGED	6
F1	FUSE - HAZARD WARNING LIGHTS 10A	5
F2	FUSE - HEATING 15A	6
F3	FUSE - STOP LIGHT MICRO-SWITCH 5A	4
F4	FUSE - REAR WIPER 7.5A	6
F5	FUSE - WORK MODE SELECTOR 10A	8
F6	FUSE - LOW BEAM 15A	4
F7	FUSE - RIGHT POSITION LIGHTS 3A	4
F8	FUSE - INSTRUMENT LIGHTING 3A	4
F9	FUSE - INDICATOR LIGHTS POWER SUPPLY 7.5A	6
F10	FUSE - LIGHTS SWITCH 7.5A	4
F11	FUSE - BEACON 7.5A	6
F12	FUSE - WORK LIGHTS 10A	4
F13	FUSE - WALVOIL CONTROL UNIT 10A	9
F14	FUSE - SPEED SWITCH 10A	3
F15	FUSE - HIGH BEAM 10A	4
F16	FUSE - EMERGENCY 15A	5
F17	FUSE - LIGHTS AND FLASHING 10A	4
F18	FUSE - OUTRIGGERS 10A	7
F19	FUSE - WORK MODE SELECTOR 10A	8
F20	FUSE - PLATFORM EMERGENCY BUTTON 10A	2
F21	FUSE - HORN 15A	4
F22	FUSE - PLATFORM FUNCTION 15A	1
F23	FUSE - CAB LIGHTS 10A	6
F24	FUSE - EMWERGENCY STOP	2
F25	FUSE - 3B6 CONTROL UNIT 10A	9
F26	FUSE - STABILIZERS 10A	8
F27	FUSE - OPTIONAL	5
F2G	MAIN FUSE 50A	1
F3G	MAIN FUSE 50A	1
H20	HORN	4
H21	FRONT LEFT LIGHT	4
H22	FRONT RIGHT LIGHT	4
H23	REAR LEFT LIGHT	4
H24	LICENCE PLATE LIGHT	4
H25	BACK-UP HORN	3
H26	REAR RIGHT LIGHT	4
H27	BACK-UP LAMP	4
K01	RELAY - START-UP	1
K02	RELAY - PRE-HEATING	1
K1	RELAY - HIGH BEAM	4
K2	RELAY - LOW BEAM	4
K3	RELAY - HORN	4
K4	RELAY - WORK LIGHTS	4
K5	RELAY - 1st and 2nd MECHANICAL SPEED	3
K7	RELAY - FORWARD SPEED	3
K8	RELAY - REVERSE SPEED	3
K9	RELAY - TRANSMISSION DISCONNECTED	3
K10	RELAY - TRANSMISSION DISCONNECTED	3
K11	RELAY - START-UP ENABLING COMMAND	1
K14	RELAY - OUTRIGGERS	8
K18	RELAY - OPTIONAL	7
K19	RELAY - BLOCKED FORKS	9
K21	RELAY - POWER SUPPLY FROM PLATFORM	9
K23	FLASHING FUNCTION	5
K24	MODULE - SHAFT STOPPED	3
K26	SAFETY RELAY	3
M1	STARTING MOTOR	1
M3	REAR WINDSCREEN WIPER/WASHER	6
M5	HEATING FAN	6
M13	WINDSCREEN WIPER/WASHER MOTOR	5
M18	A/C SYSTEM	6
M91	PUMP MOTOR	5
P1	ENGINE WATER THERMOSTAT	1
P2	HYDRAULIC OIL TEMPERATURE	4
P3	FUEL GAUGE	4
P4	HOUR-METER	1
R0	GLOW PLUGS	1
S1	SWITCH - AIR CONDITIONER	6
S2	SWITCH - HYDRAULIC ACTIVATION	8
S3	SWITCH - JIB	9
S6	PARKING BRAKE MICRO-SWITCH	7
S10	MOMENT LIMITING SYSTEM CUTOUT	9
S11	START-UP PANEL	1
S13	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
S14	SWITCH - MECHANICAL GEARBOX	3
S16	SWITCH - HAZARD WARNING LIGHT	5
S17	SWITCH - EMERGENCY PUMP	2
S18	SWITCH - FOG LAMP	4
S19	SWITCH - LIGHTS	4
S20	SWITCH - HEATER	6
S21	BATTERY CUTOUT	1
S22	SWITCH - STEERING	8

TABLES AND DOCUMENTS ENCLOSED

Ref.	Description	Sheet
S30	HYDROSTOP	4
S40	ATTACHMENT SWITCH	3
S50	DEADMAN BUTTON - RIGHT LEVER	7
S51	DEADMAN BUTTON - LEFT LEVER	7
S52	DEADMAN BUTTON - OPTIONAL LEVER	7
S53	EMERGENCY MUSHROOM-HEAD PUSHBUTTON	2
SX11	LIGHT SWITCH	5
SX12	SPEED SWICTH	3
Y00	SOLENOID VALVE - ENGINE STOP	1
Y01	SOLENOID VALVE - FORWARD SPEED	3
Y02	SOLENOID VALVE - REVERSE SPEED	3
Y1	SOLENOID VALVE - PPC	8
Y3	SOLENOID VALVE - STARTING AID	1
Y4	SOLENOID VALVE - DFE	9
Y8	SOLENOID VALVE - ATTACHMENT RELEASE	3
Y9	SOLENOID VALVE - ATTACHMENT COUPLING	3
Y10	SOLENOID VALVE - 1st SPEED	3
Y11	SOLENOID VALVE - 2nd SPEED	3
Y20	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y21	SOLENOID VALVE - CRAB STEER	8
X1	8-WAY MARK CONNECTOR - INSTRUMENT LIGHTING	1
X2	12-WAY MATE'N'LOCK CONNECTOR - INSTRUMENT LIGHTING	6
X4	9-WAY MARK CONNECTOR	2
X5	11-WAY MARK CONNECTOR	7
X6	17-WAY MARK CONNECTOR	2
X7	13-WAY MARK CONNECTOR	9
X8	5-WAY MARK CONNECTOR	1
X9	13-WAY MARK CONNECTOR	4
X10	CONTROL LEVER	7
X11	13-WAY MARK CONNECTOR	5
X12	5-WAY MARK CONNECTOR	3
X13	6-WAY CONNECTOR	5
X16	13-WAY MARK CONNECTOR	3
X17	17-WAY MARK CONNECTOR	1
X18	13-WAY MARK CONNECTOR	9
X19	21-WAY MARK CONNECTOR	1
X20	17-WAY MARK CONNECTOR	1
X21	40-WAY DEUTSCH CONNECTOR - TYPE B	4
X22	12-WAY DEUTSCH CONNECTOR	4
X25	12-WAY DEUTSCH CONNECTOR	7
X26	17-WAY MARK CONNECTOR	5
X28	9-WAY MARK CONNECTOR	9
X29	24-WAY DEUTSCH CONNECTOR	1
X30	2-WAY CONNECTOR	1
X51	4-WAY DEUTSCH CONNECTOR	7
X52	4-WAY DEUTSCH CONNECTOR	7
X53	3-WAY DEUTSCH CONNECTOR	7
X91	2-WAY 90° CONNECTOR	5
X92	2-WAY CONNECTOR	4

Ref.	Description	Sheet
X101	BEACON	6
X102	CAB LIGHTS	6
X138	17-WAY MARK CONNECTOR	7
XB30	2-WAY CONNECTOR	8
XB31	2-WAY CONNECTOR	8
XB33	2-WAY CONNECTOR	8
XB34	2-WAY CONNECTOR	8
XD	5-WAY MARK CONNECTOR	1
XD2	2-WAY CONNECTOR	8
XM3	2-WAY CONNECTOR	6
XM5	4-WAY CONNECTOR	6
XP1	6-WAY CONNECTOR	1
XP2	6-WAY CONNECTOR	4
XP3	6-WAY CONNECTOR	4

WIRE COLOURS

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

REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

G/V = YELLOW/GREEN (crosswise colouring)
G-V = YELLOW-GREEN (lengthswise colouring)

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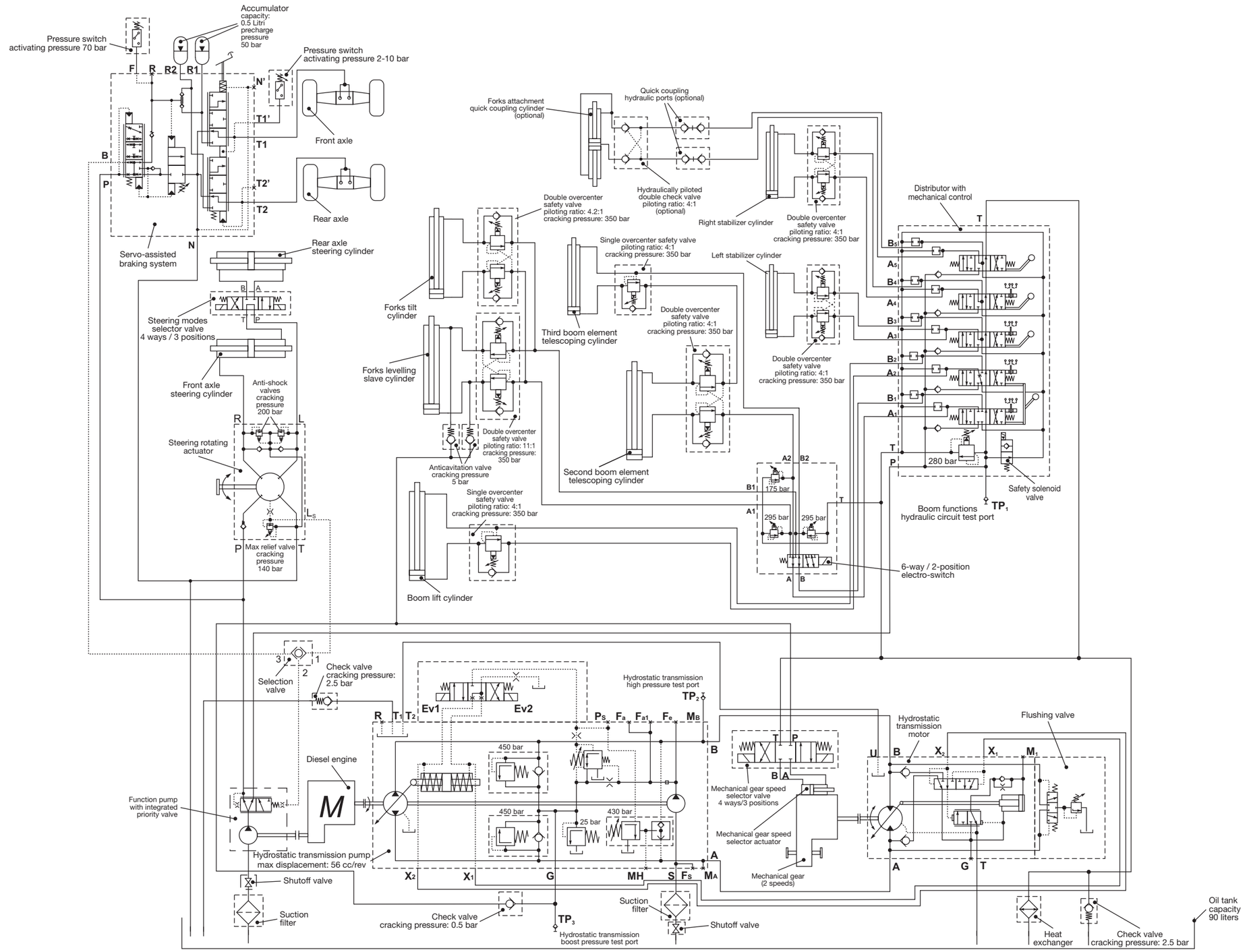
■ G-4 GTH-3512 HYDRAULIC SCHEME



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G-5 ROUTINE CHECK SCHEDULE - SAFETY DEVICES

Date	COMPONENT																				Result/Notes		Signature
	Block.Valve 1	Block.Valve 2	Block.Valve 3	Block.Valve 4	Block.Valve 5	Block.Valve 6	Block.Valve 7	Block.Valve 8	Block.Valve 9				Micro 1	Micro 2	Micro 3	Micro 4	Micro 5	ARB + Display	EMERGENCY	Puls. Joystick	Positive	Negative	
																					❑	❑	
																					❑	❑	
																					❑	❑	
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Table key explanation:

Block valve 1	Block valve on lift cylinder
Block valve 2	Block valve on forks leveling cylinder
Block valve 3	Block valve on telescoping cylinder
Block valve 4	Block valve on attachment moving cylinder
Block valve 5	Block valve on attachment locking cylinder (if present)
Block valve 6	
Block valve 7	
Block valve 8	
Block valve 9	
Micro Stab 1	Micro-switch - right stabilizer
Micro Stab 2	Micro-switch - left stabilizer
Micro Stab 3	
Micro Stab 4	
Micro 1	Proximity switch on parking brake
Micro 2	
Micro 3	
Micro 4	
Micro 5	
ARB + Display	Solenoid valve - moment limiting system - Electronic card and display
EMERGENCY	Emergency stop button
Joystick button	Deadman button on control lever

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