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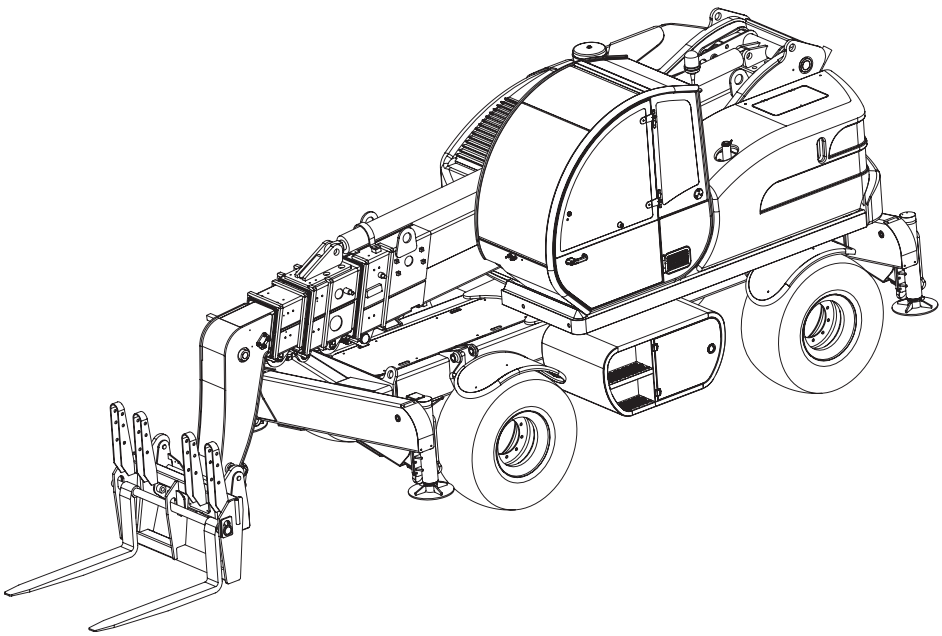
SERVICE MANUAL

Code 57.4402.8200 - 1st Edition 03/2007

Handler with telescopic boom

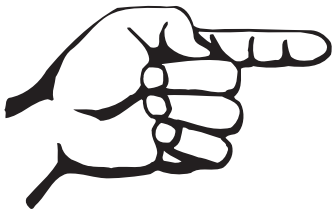
Gyro 4020 *(From serial n. 12888)*

Gyro 4518 *(From serial n. 12508)*



English
Edition

INDEX



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SERVICE MANUAL

Code 57.4402.8200 - 1st Edition 03/2007

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LIST OF REVISED PAGES

Revision		Revised pages	Notes	Issued by
No.	Date			
1	03-2007		Publication	
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23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

MANUAL CONTENTS

INTRODUCTION

Sect. 1 SAFETY RULES

Sect. 2 TECHNICAL SPECIFICATIONS

Sect. 3 SCHEDULED MAINTENANCE INSPECTIONS

Sect. 4 SCHEDULED MAINTENANCE PROCEDURES

Sect. 5 TROUBLESHOOTING

Sect. 6 SCHEMES

Sect. 7 REPAIR PROCEDURES

SERIAL NUMBER IDENTIFICATION

Machine denomination	Literature valid up to serial number
Gyro 4020	12888
Gyro 4518	12508

INTRODUCTION

Important
Read, understand and obey the safety rules and operating instructions in the **Gyro 4020 and Gyro 4518 Operator's Handbook** before attempting any maintenance or repair procedure.
This manual provides the machine owner and user with detailed information on the scheduled maintenance. It also provided qualified service technicians with infromation on troubleshooting and repair procedures.
Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, as well as specific tools and equipment.
In these instances, we strongly recommend letting service and repair the machine at an authorized TEREXLIFT service center.

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DESCRIPTION OF THE MACHINE OPERATION

The oil-pressure system of this machine consists of two macro sections, namely turntable and undercarriage, corresponding to the machine's main parts. From an oil-pressure point of view, these two sections are connected with one another by the 13-way hydraulic rotary joint (**9**).
The source of mechanical energy of this machine is a Deutz turbo-compressed diesel engine (**1**), model BF4M2012, which supplies 74.9 kW at 2300 rev/min and with a max torque of 390 Nm at 1500 rev/min.
On the flywheel side of the engine, and connected to this engine by a Technodrive coupler with elastic joint and with a 1-to-1 ratio, there is a Linde closed-loop pump for hydrostatic drives, model HPV 75-02RE112V (**2**) with electroproportional adjustment valves.
The max displacement of this swashplate pump is 75 cm^3 and the max calibration pressure is 445 bar.
This pump is used to supply hydraulic power under form of pressure and flow rate which is then used for moving the machine.
This pump is used to supply hydraulic power under form of pressure and flow rate which is then used for moving the machine.
On the through-shaft of such drive pump there is a Bosch-Rexroth variable displacement piston pump with swashplate suitable for open lopp circuits, model A10VO45DFR (**3**), equipped with flow and pressure control valve.
The displacement of this pump is 45 cm^3. The function of this pump, through the “load sensing” priority valve (**6**) is to provide hydraulic power, under form of pressure and flow rate to the steering cylinder of the machine (priority side of the valve) and to the telescopic boom and slewing turntable circuits (secondary side of the valve).
This "load sensing" pump is adjusted through an adequate piloting line which provides the pump a pressure signal corresponding to the max load of all the users fed by this pump.
Between pump (**3**) and priority valve (**6**), a one-way valve (**5**) is placed to avoid that oil at pressure, produced by the power-driven emergency pump (**48**), may escape from pump (**3**) when this is stopped.
The assembly of the two pumps involves they have a rotation velocity equal to the speed of the diesel engine.
A third Casappa fixed displacement gear pump suitable for open loop circuits (**4**) with a displacement of 25 cm^3, is installed on the PTO of the engine located on the distribution side.
This pump feeds the servo-assisted braking system (**35**) and the hydraulic motor (**42**) of the heat exchanger fan (**43**) used to cool down the diesel engine and the hydraulic circuit.

The circuit of pump (**4**) is protected by a pressure relief valve **33**) calibrated to 160 bar.
The suction lines of the open-loop pumps (**3**-**4**) and the power-driven emergency pump (**48**) are not protected by filters and are conveyed to a single port on the hydraulic fluid tank (**32**).
Between this port and the suction lines of the aforesaid pumps, there is a gate valve (**31**) that allows to perform important maintenance interventions on the oil-pressure circuit of the machine without emptying the oil tank. This tank has a capacity of 230 litres.
On the contrary, the drive pump (**2**) is protected by a special filter (**45**), placed on the discharge line of pumps (**3**-**4**). This filter purifies the oil from the open circuits of the machine (boom-turntable control circuit and service and parking brake feeding circuit) and allows to have an additional oil port for the drive suction line with a minimum pressure of 0.5 bar.
This construction feature of the filter guarantees significant advantages in terms of absence of cavitation in the drive suction line, especially when the machine is started from cold.
The one-way valve (**34**) set to 1.5 bar protects the pump housing against high pressures and guarantees a certain circulation of the drain oil to the hydrostatic motor reducing, in this way, the temperature.
From port “X” of the drive pump (**2**) low-pressure oil is taken (25-30 bar). This oil is first conveyed to the undercarriage through port 11 of the hydraulic rotary joint (**9**), and then used for the two-speed mechanical gearbox circuit (**51**), for the adjustment of the hydrostatic drive motor (**50**) and for the differential anti-slip circuit through the mechanism placed inside the front axle (**57**).
The hydraulic energy produced by the drive pump (**2**) and conveyed to the undercarriage through ports n.1 and n.2 of the hydraulic rotary joint (**9**), is converted into mechanical power by a closed-loop hydrostatic motor, model Linde HMV 75-02E112V (**50**) equipped with an electroproportional adjustment valve and with a flush valve for reducing the max temperatures inside the drive circuit.
In addition to the high-pressure connections with pump (**2**) throughj ports n. 1 and n. 2 of the hydraulic rotary joint (**9**), the motor (**50**) is hydraulically connected to the turntable through port n.12 of the aforesaid joint from which it receives the flow from the drain circuit of the drive pump (**2**), through port n. 7, to which it conveys all the drain flow, and through port n. 11, from which it takes the low pressure needed for its adjustment.
The electroproportional valves of pump (**2**) and motor (**50**) are controlled by a dedicated electronic control unit (Linde) which is connected to the remaining control devices of the machine through the digital network.

The motor is flanged to a two-speed mechanical gearbox, model 357 (**51**) manufactured by Dana. Speeds are engaged by a special oil-dynamic cylinder (**52**) located inside the gearbox, while the selection of the first and second speed is controlled by a 4-way/3-position solenoid valve (**53**) of the on/off type.
The mechanical torque at the gearbox output is transmitted to the front axle (**57**) and the rear axle (**58**), both model 212HY manufactured by Dana, through Cardan shafts.
The hydraulic drive (**7**) of “load sensing” type with a displacement of 315 cm^3, receives oil from the priority valve (**6**) in relation to the “load sensing” signal sent by the hydraulic drive and connected to such valve with function of pilot signal. In this way, the input flow to the hydraulic drive will be exactly the one needed for the instantaneous steering functions; any excess flow of the valve will be available for the functions of the telescopic boom asn other auxiliary functions.
The steering circuit is protected against input overpressures by a pressure reducing valve set to 140 bar. On the two delivery lines, there are other two reducing valves with anti-shock function set to 200 bar. The scope of these two valves is limiting possible shocks on the steering wheel due to overstress on the steering cylinders. The three pressure reducing valves are installed in the hydraulic drive (**7**) and cannot be regulated from the outside.
The steering circuit is completed by the front steering cylinder (**55**), the rear steering cylinder (**56**) (these cylinders being integral part of the front axle (**57**) and the rear axle (**58**) respectively) and by a 4-way/3-position solenoid valve (**54**) for the selection of the three different steer modes (rear wheels straight, co-ordinate front/rear steering and independent front/rear steering).
When the solenoid valve (**54**) is not energised, the front steering cylinder is fed by the hydraulic drive and the rear cylinder is blocked. When one magnet or the other of the solenoid valve (**54**) is energised, the chambers of the cylinders are connected in a different manner thus causing the desired effect on the steering mode.
The connection of the steering circuit between the section integral of the turntable and the one integral of the undercarriage is done through ports n.8 and n. 9 of the hydraulic rotary joint (**9**).
The Bucher/Tecnord electro-proportional distributor (**8**), with 5 modular sections, receives oil from the secondary line of the priority valve (**6**) and feeds all of the movements of the telescopic boom and the turntable and provides an oil flow to the auxiliary lines for the secondary functions such as turntable lock, outriggers and frame levelling.
This main valve consists of an input head with 3-way pressure compensator used as a flow regulator for the user which works at max load (load sensing), and as a

discharge valve when the pump flow is not used for the boom movements, and of 5 modules.
Four of these modules control specific functions of the telescopic boom (lifting/lowering, attachment holding frame rotation, extension/retraction, attachment lock/unlock) and the fifth module controls the rotation of the turntable of the machine.
In the head there is a pressure relief valve set to 300 bar which, acting on the line of the “load sensing” signal, limits the maximum pressure at the inlet of the main valve through such 3-way compensator.
On the main inlet head of the main valve, there is the pilot line head which includes an inlet safety filter, a pressure relief valve acting on the pilot line, and a safety solenoid valve which, when de-excited, discharges the input pilot pressure, thus preventing the main valve from working.
This solenoid valve is used as a “dead man” control and is activated by the relevant button on the joysticks in the driving cab.
The pilot head delivers oil at pressure to the 5 pilot modules of the main valve. These modules operate the relevant main sliders in relation to the command signal they receive from the joysticks via the control unit.
Module 1 of the main valve controls the telescopic boom lifting cylinder (**12**). This cylinder has one single-acting compensation valve (**13**) with safety function. The control module of element 2 of the main valve is the electro-proportional type with electrical feed-back and integrated electronics. The 1,5-lt. accumulator prefilled at 35 bar (**14**) and located on the line of the differential chamber of the lifting cylinder (**12**), allows for damping the boom swings when the same boom is moved down.
Module 2 of the main valve controls the boom telescopes extension cylinder (**15**). This cylinder is equipped with a double-acting compensation valve (**16**) with safety function. The control module of this element of the main valve is the electro-proportional type with electrical feed-back and integrated electronics.
Module 3 of the main valve controls the cylinder operating the attachment holding plate of the telescopic boom (**17**). This cylinder is equipped with a double-acting compensation valve (**18**) with safety function. Paralleled to this cylinder we find the fork levelling cylinder (**19**) (or balancing cylinder) equipped with a special double-acting compensation valve (**20**). Inside this valve, the one-way valves are installed in a reverse manner with respect to the normal position to avoid the pressurisation of the cylinder when the rotation command of the attachment holding plate is operated.
Again inside this valve, there are other two one-way valves set to 5 bar with anti-cavitation function (**21**). These valves are used to deliver oil, sucked from the low pressure line coming from the pressure relief valve (**11**), to the fork levelling compensation circuit, when such

circuit cannot do it alone.
The control module of element 3 of the main valve is the electro-proportional type with electrical feed-back and integrated electronics.
On the two control lines of the cylinder (**17**), and integral to module 3, there are two pressure relief valves set to 320 bar which protect the automatic levelling system of the forks when the boom is moved up and down and in case of overload on the attachment holding plate (ex. use of the bucket).
Module 4 of the main valve controls the attachment locking cylinder (**23**). This cylinder has a double one-way valve with hydraulic release, acting as safety valve (**24**). The pilot module of element n. 4 of the main valve is the electroproportional type with integrated electric and electronic feedback.
On one of the two hydraulic control lines of this section of the main valve, there is a 3-way/2-position electric divider with on/off control (**22**).
When this divider is not energised, the oil at pressure coming from the module of the main valve, is sent to the attachment locking cylinder. On the contrary, when the divider (**22**) is energised, the oil at pressure from element n.4 of the main valve (**8**), is made available for the auxiliary feeding line of the turntable lock/unlock function and, through port n. 3 of the hydraulic rotary joint (**9**), for the operation of the outriggers and the frame levelling.
On the feeding lines of this cylinder and close to the terminal part of the end trunk, there are two quick-fit connectors (**25**) for the connection of the hydraulic lines of any optional equipment needing a hydraulic power for their operation (e.g. hydraulic winch and jib, mixing bucket, etc.).
Module n. 5 of the main valve controls the hydraulic slewing motor of the turntable (**26**), equipped with brake with internal mechanical block and external hydraulic release. The mechanical torque produced by this motor is transmitted to the turntable through an epicyclic reduction gear with two stages and a slewring with internal toothing.
The feeding line of this motor is equipped with a double-acting compensation valve (**27**), used also as safety and anti-cavitation valve.
The pilot module of this element of the main valve is of electroproportional type with integrated electric and electronic feedback.
Inside this module of the main valve, there is a two-way pressure compensator which keeps the proportionality of the slewing control of the turntable as the loads on this table and the pressure entering the main valve modules change. The pressure of the main valve is adjusted by the three-way compensator placed on the inlet head.
The main valve (**8**) is equipped with a pilot line of the “load sensing” type which, through the exchange valve (**10**), is connected to the priority valve (**6**), which, at

its turn, receives an analog pressure signal from the hydraulic drive (**7**). The exchange valve (**10**) is then connected to the "load sensing" port of pump (**3**), thus guaranteeing the adaptation of the pump adjustment to the maximum load on the various users served by this pump under any conditions.
The pressure relief valve (**11**) calibrated to 30 bar is placed upstream of the pressure inlet port of the main valve (**8**). This valve is used to deliver low-pressure oil (30 bar) to the anti-cavitation circuits of automatic fork levelling system and to feed the pilot line of the same main valve (**8**).
The block cylinder of the slewing turntable (**28**) is equipped with a double one-way valve (**29**) with hydraulic release, acting as safety valve, and is controlled by the 4-way/3-position solenoid valve of the on/off type (**30**).
As already mentioned, the turntable lock/unlock is possible through the simultaneous energisation of module n.4 of the main valve (**8**), the electric divider (**22**) and the solenoid valve (**30**).
The SAFIM S6 servo-assisted braking system with pedal (**35**) receives oil from the pump (**4**) and uses this oil to pressurise 3 hydraulic accumulators (**36**-**37**) connected to the same system.
The oil at pressure contained in these accumulator is then used to operate the service brakes of the two axles (**57**-**58**) and to release the parking brake located inside the rear axle (**58**).
The fill valve inside the braking system takes the flow from the feeding line so the pressure on the line of the accumulators reaches the calibration value of the cutout valve set to 140 bar. When this pressure is reached, the valve gradually releases all the flow to line B for other uses.
The brake pedal located in the driving cab, which is an integral part of the braking system S6, is connected to two proportional sliders which control the two separated lines of the service brake, one for each axle.
Such lines connect the part of circuit in the turntable with the one in the undercarriage through ports n. 5 and n. 6 of the hydraulic rotary joint (**9**). In relation to the stroke of these sliders, a gradual communication between the feeding line, connected to two accumulators (**36**) which, at their turn, are connected to ports R1 and R2 (the accumulators have 0.5-lt. capacity and 50 bar fill pressure), and the service brake lines is established so the flow is distributed to such lines and the discharge line increasing, in this way, the pressure (and as a result the braking force) on the lines of the service brakes. When the sliders are in the rest position, the lines of the service brakes are connected to the discharge.
The pressure switch (**38**) set to 2-10 bar, paralleled to on of the two lines of the service brake, sends an electrical signal when this brake is engaged.

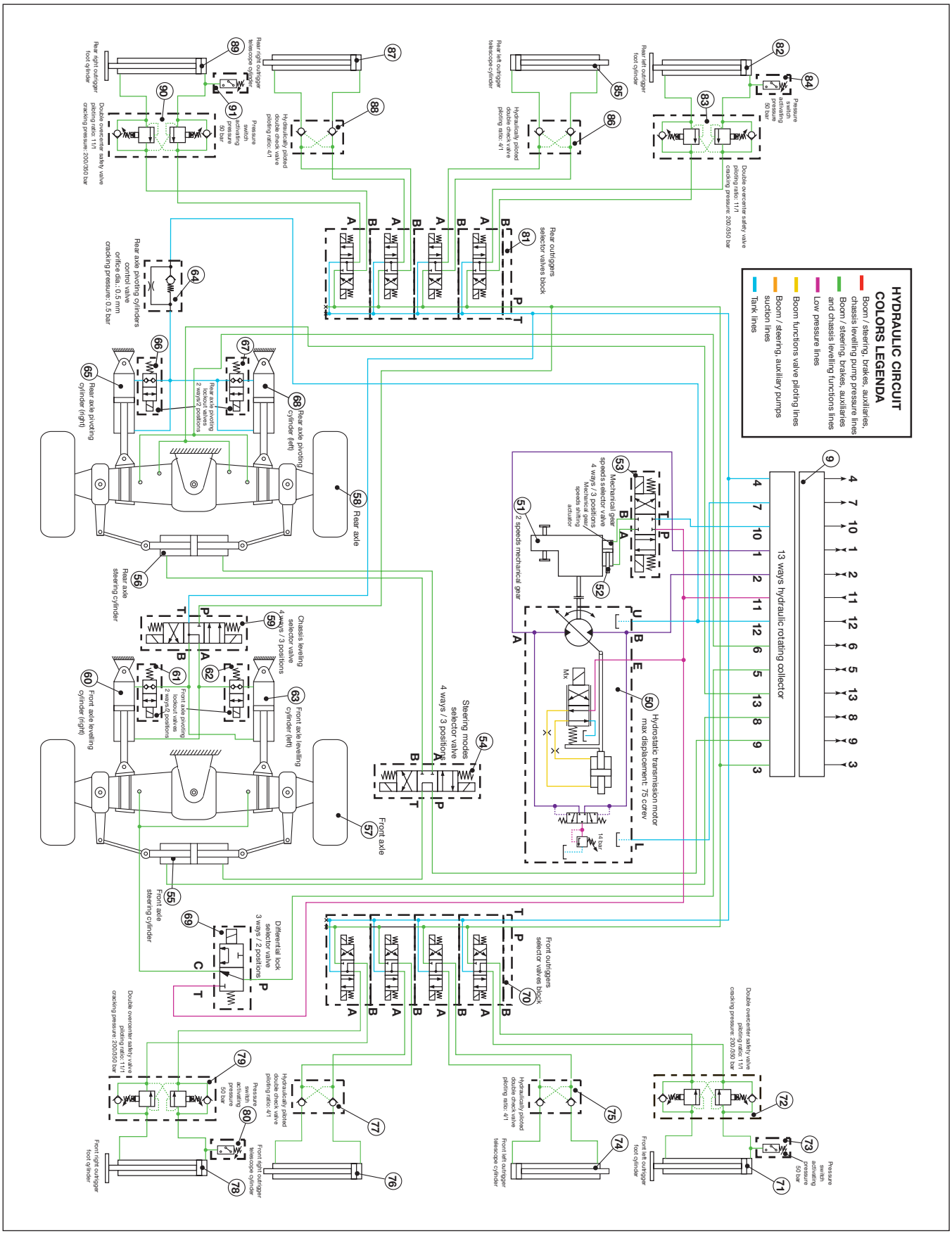
The pressure switch (**39**) set to 70 bar and connected to port F, sends an electrical warning signal when the pressure inside the feeding circuit of the brake lines is too low to guarantee the minimum braking efficiency.
The accumulator (**37**) with 0.5-lt. capacity and 50 bar fill pressure is connected to port R of system S6 and is used to unlock the parking brake of the rear axle (**58**).
The connection of the part of this circuit placed in the turntable to the one of the undercarriage is done through port n. 13 of the hydraulic rotary joint (**9**).
The command of the parking brake is controlled by a special valve with lever control (**40**) located in the driving cab. In relation to the position of the lever, the release line of the parking brake is connected to the pressure line (parking brake unlocked) or the discharge line (parking brake locked).
The two pressure switches (**41**) set to 10-20 bar send an electrical warning signal when the parking brake is activated (brake locked).
The oil which is not used by the SAFIM S6 servo-assisted braking system with pedal, is sent to the Casappa hydraulic geared motor (**42**) with a displacement of 20 cm^3, for the operation of the cooling fan of the heat exchanger (**43**).
Inside the motor housing, there are an anti-cavitation valve and a pressure relief valve with by-pass function set to 140 bar, as well as a solenoid valve which, once electrically energised, directly sends the oil entering to the motor, to the drain.
The function of this solenoid valve, suitably controlled by a thermostatic circuit, is to avoid an operation of the cooling fan of the heat exchnager when the oil is cold. This allows reaching the ideal working temperature of the hydraulic oil faster.
The heat exchanger (**43**) is divided in two sectors; one absorbs heat from the cooling circuit of the diesel engine and the other absorbs heat from the hydraulic circuit of the machine.
The flows of pumps (**3**-**4**) and the partial flow of the drain circuit of the hydrostatic transmission are conveyed to this second sector.
The oil cooled down by the heat exchanger is sent back to tank (**32**).
A one-way valve (**44**) with an opening pressure of 5 bar is installed parallel to heat exchanger (**43**) to protect the same exchanger. In all the cases in which the pressure drop in the exchanger exceeds 5 bar (starts from cold, partial obstruction of the heat exchanger, etc.), valve (**44**) opens so that a part of the flow to the exchanger can be conveyed through this valve by reducing the maximum pressure inside the exchanger (**43**).
On the drain line from the drive motor (**50**), passing through port n.7 of the hydraulic rotary joint (**9**), there are two one-way valves (**46**-**47**) with an opening pressure of 0.5 bar and 1.5 bar, respectively.

The function of these valves is to avoid a pressure of the drain line of motor (**50**) above 1.5 bar which is the admissible limit for the seals placed on the motor shaft.
This circuit allows for the partial passage through the heat exchanger (**43**) of the flow from the pump drain circuit (**2**) and the drive motor (**50**) to keep within the pressure limits mentioned above. Any excess flow will pass through valve (**47**) to directly reach the tank (**32**).
Ports n.4 and n.10 of the hydraulic rotary joint (**9**) are used to connect some drain lines between undercarriage and turntable. In particular, port n.10 is the one which can guarantee the lowest counter-pressure values on the drain, being directly connected to tank (**32**).
The motor-driven pump (**48**), supplied with power by the battery, is used as emergency feeding pump in the event of a failure of the primary control circuit of the telescopic boom. Just downstream of the motor-driven pump (**48**) there is a one-way valve (**49**) which avoids that oil at pressure, produced by the main pump (**3**), may escape through pump (**48**) when this is stopped.
The movements of the front outriggers are controlled by four 4-way/3-position solenoid valves of the o/off type, installed on the oil-pressure block (**70**). This block, through port 3 of the hydraulic rotary joint (**9**), is fed by the simultaneous operation of the 4th element of the electro-proportional main valve (**8**) and of the electric divider (**22**).
The solenoid valve n. 1 of block (**70**) controls the cylinder (**71**) operating the front left stabilising foot. This cylinder is equipped with a double-acting compensation valve(**72**) used also as safety valve.
On the rod side of this cylinder, there is a pressure gauge (**73**) calibrated to 50 bar which detects when the outrigger is lowered to the ground.
The solenoid valve n. 2 of block(**70**) controls the extension cylinder (**74**) of the front left outrigger. This cylinder is equipped with a double one-way valve with hydraulic release, acting as a safety valve (**75**).
The solenoid valve n. 3 of block (**70**) controls the extension cylinder (**76**) of the front right outrigger.
This cylinder is equipped with a double one-way valve with hydraulic release, acting as a safety valve (**77**).
The solenoid valve n. 4 of block (**70**) controls the cylinder (**78**) operating the front right stabilising foot.
This cylinder is equipped with a double-acting compensation valve (**79**) used also as safety valve.
On the rod side of this cylinder, there is a pressure gauge (**80**) calibrated to 50 bar which detects when the outrigger is lowered to the ground.
The movements of the rear outriggers are controlled by four solenoid valves installed on the oil-pressure block (**81**).
This block, through port 3 of the hydraulic rotary joint (**9**), is fed by the simultaneous operation of the 4th element of the electro-proportional main valve (**8**) and of the electric divider (**22**).

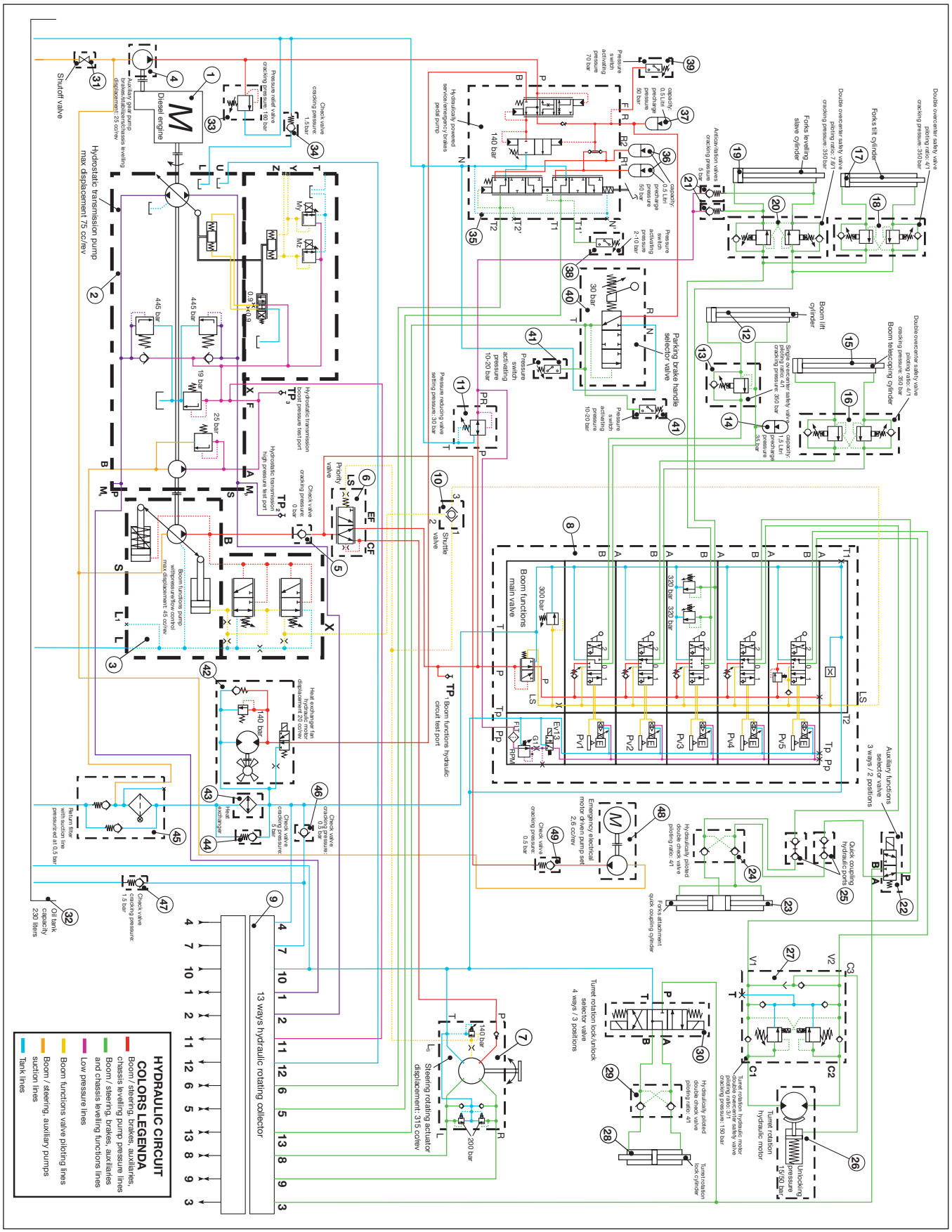
The solenoid valve n. 1 of block (**81**) controls the cylinder (**82**) operating the rear left stabilising foot.
This cylinder is equipped with a double-acting compensation valve (**83**) used also as safety valve. On the rod side of this cylinder, there is a pressure gauge (**84**) calibrated to 50 bar which detects when the outrigger is lowered to the ground.
The solenoid valve n. 2 of block (**81**) controls the extension cylinder (**85**) of the rear left outrigger.
This cylinder is equipped with a double one-way valve with hydraulic release, acting as a safety valve (**86**).
The solenoid valve n. 3 of block (**81**) controls the extension cylinder (**87**) of the rear right outrigger.
This cylinder is equipped with a double one-way valve with hydraulic release, acting as a safety valve (**88**).
The solenoid valve n. 4 of block (**81**) controls the cylinder (**89**) operating the rear right stabilising foot.
This cylinder is equipped with a double-acting compensation valve (**90**) used also as safety valve. On the rod side of this cylinder, there is a pressure gauge (**91**) calibrated to 50 bar which detects when the outrigger is lowered to the ground.
The differential anti-slip circuit is controlled by the 3-way/2-position solenoid valve (**69**). When this valve is not energised, the service brake control line of the front axle (**57**), coming from the SAFIM braking system (**35**) through port 5 of the hydraulic rotary joint (**9**), is connected to the service brake ports of the front axle (**57**). On the contrary, when valve (**69**) is energised, a condition corresponding to the anti-slip control "ON", the service brake ports of the front axle (**57**) are connected to the 25-30bar low-pressure line and help the action of the differential anti-slip system.
The oscillation of the front axle (**57**) is controlled by two cylinders (**60**-**63**) equipped with block solenoid valves (**61**-**62**). The movement of cylinders (**60**-**63**), and thus the front axle oscillation (**57**), is only possible when solenoid valves (**61**-**62**) are energised.
The frame levelling is controlled by a 4-way/3-position ON/OFF solenoid valve (**59**) which feeds in a crossed manner the cylinders (**60**-**63**).
This solenoid valve, through port 3 of the hydraulic rotary joint (**9**), is activated by the simultaneous operation of the 4th element of the electro-proportional main valve (**8**) and of the electric divider (**22**).
The oscillation of the rear axle (**58**) is controlled by two cylinders (**65**-**68**) equipped with block solenoid valves (**66**-**67**). The movement of cylinders (**65**-**68**), and thus the rear axle oscillation (**58**), is only possible when solenoid valves (**66**-**67**) are energised.
The flow control valve (**64**) allows for the free passage of the oil coming from the drive drain circuit during the filling of the cylinders (**65**-**68**) (air venting) and avoids pressure peaks in the circuit of such cylinders when high oscillation speed conditions of the rear axle produce potentially dangerous overpressures in the drive drain

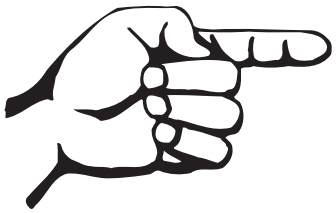
circuit.
As already mentioned, the undercarriage levelling function is possible through the simultaneous energisation of the two spools of the solenoid valve (**59**) and the spools of the solenoid valves (**61**-**62**-**66**-**67**).

Gyro 4020 - 4518 carrier hydraulic scheme



Gyro 4020 - 4518 turntable hydraulic scheme





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Section 1
SAFETY INFORMATION

SECTION INDEX

1.1	Safety rules	page	2
1.1-1	Personal safety		2
1.1-2	Workplace safety		3
1.2	General remarks		4
1.3	Servicemen's requisites		4
1.3-1	Personal protective equipment		5
1.4	General safety precautions		5
1.4-1	Working areas		5
1.4-2	Precautions during work		5

1.1 SAFETY RULES

1.1-1 Personal Safety

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

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

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

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

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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

CAUTION

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

NOTICE

Draws the attention to important environment-related information.



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



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

1.1-2 Workplace Safety



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



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



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



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



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



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

1.2 GENERAL REMARKS

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

CAUTION

If you recognise hazardous situations, you can prevent accidents!

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

⚠CAUTION

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

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

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

CAUTION

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

1.3 SERVICEMEN'S REQUISITES

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

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

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

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

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

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

CAUTION

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

CAUTION

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

1.3-1 PERSONAL PROTECTIVE EQUIPMENT

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

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

CAUTION

Use only type-approved protective equipment in good condition.

1.4 SAFETY PRECAUTIONS

⚠DANGER

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

1.4-1 WORKING AREA

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

1.4-2 PRECAUTIONS DURING WORK

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

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

⚠ DANGER

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

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

NOTICE

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

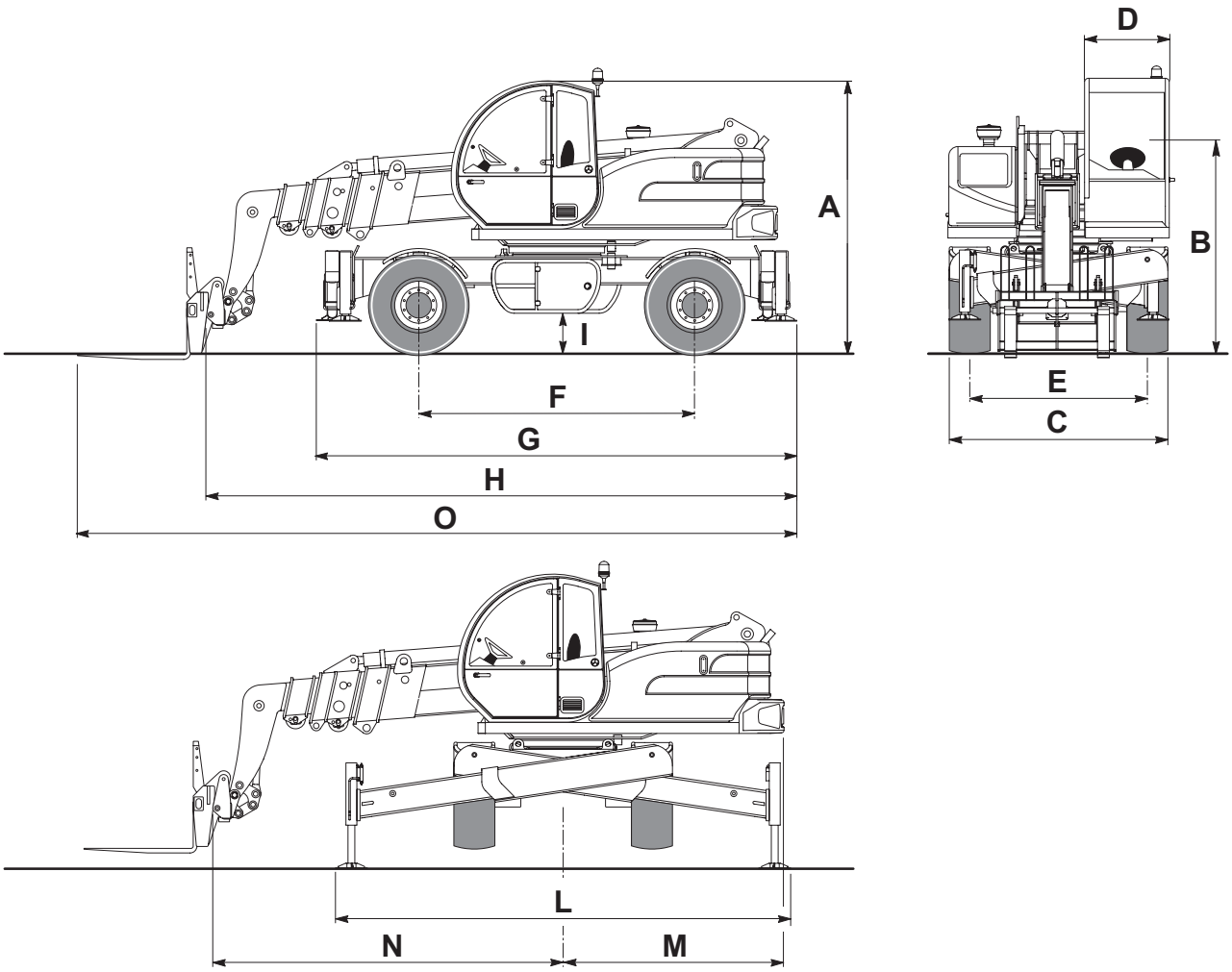
- Use the assistance of a second person to handle loads weighing 30 to 50 kg.
- For loads over 50 kg, the use of special hoisting equipment in good condition and equipped as per enforced regulations is mandatory.

Section 2
TECHNICAL SPECIFICATIONS

SECTION INDEX

2.1	Main dimensions ..... page	2
2.2	Tyres	3
2.3	Limit of use	3
2.4	Weight	3
2.5	Speed	3
2.6	Payload and reach	4
2.7	Forks (floating type)	4
2.8	Diesel engine	4
2.9	Electrical system	4
2.10	Machine sound levels	5
2.11	Vibration levels	5
2.12	Refuelling	6
2.13	Tightening torques	7
2.14	Drill diameters for threads	9
2.15	Standard tightening torques for fitting seals	10
2.16	Locking material	12
2.17	Hoisting instructions	13
2.18	Advice to renew flexible hoses	14
2.19	Lists of recommended spare parts	15
2.20	Machine paint colour	21
2.21	Checking the cylinder movement times	22
2.22	Hydraulic calibrations	26
2.23	Setting the platform	36
2.24	Setting the overload warning system	38
2.25	Ecomatrice panel	39
2.26	Controlling and setting the machine with Winscope	47
2.27	MIDAC system	62

2.1 MAIN DIMENSIONS



			Gyro 4020	Gyro 4518
A	Overall height	mm	3020	3020
B	Height to the steering wheel	mm	2135	2135
C	Overall width	mm	2430	2430
D	Cab width	mm	910	910
E	Track	mm	1950	1950
F	Wheel-base	mm	3030	3030
G	Length to the front tyres	mm	5280	5280
H	Length to the attachment holding plate	mm	7085	6485
I	Ground clearance	mm	440	440
L	Max width with extended outriggers	mm	5015	5015
M	Rear reach from the rotation centre	mm	2425	2425
N	Front reach from the rotation centre	mm	4445	3485
O	Length to the forks	mm	8500	7900

2.2 TYRES

			Gyro 4020	Gyro 4518
•	Dimensions		18-19.5	18-19.5
•	- P. R. (or load index)		16	16
•	- Rim		14x19.5	14x19.5
•	- Wheel disc		10 holes DIN 70361	
•	- Pressure	bar/Psi	6/87	6/87

2.3 LIMIT OF USE

			Gyro 4020	Gyro 4518
•	Angle of approach	°	20	20
•	Departure angle	°	20	20
•	Min/max ambient temperature	°C	-20÷+46	-20÷+46

2.4 WEIGHT

			Gyro 4020	Gyro 4518
•	Weight in working order	kg	15200	14800

2.5 SPEED

			Gyro 4020	Gyro 4518
•	Working speed (*)	km/h	5	5
•	Travel speed	km/h	32	32
•	Max. slope with full load	%	40	45

(*) either forward or reverse motion

2.6 PAYLOAD AND REACH

			Gyro 4020	Gyro 4518
•	Max lifting height:			
	with outriggers	mm	19645	17250
	without outriggers	mm	19395	17000
•	Reach at max height	mm	4180	3650
•	Max reach forward	mm	17415	14900
•	Attachment holding plate rotation	°	145	145
•	Payload at max height with outriggers	kg	2500	3000
•	Payload at max. front reach with outriggers	kg	250	750
•	Payload at max. side reach with outriggers	kg	250	750

2.7 FORKS (floating type)

			Gyro 4020	Gyro 4518
•	Dimensions	mm	1200x130x50	1200x130x50
•	Weight	kg	70	70
•	Fork holding frame - class		FEM III	FEM III

2.8 DIESEL ENGINE

			Gyro 4020	Gyro 4518
•	Make		DEUTZ	DEUTZ
•	Model/Type		BF4M 2012	BF4M 2012
•	Features		Diesel, 4 cylinders in line 4 strokes, direct injection	
•	Bore x Stroke	mm	101x126	101x126
•	Total displacement	cc	4038	4038
•	Power at 2300 rpm (*)	kW	74,9	74,9

(*) gross power calculated according to DIN/SO 3046 IFN

2.9 ELECTRICAL SYSTEM

			Gyro 4020	Gyro 4518
•	Voltage	V	12	12
•	Self-regulated alternator	V	14	14
•	Starting motor (power)	kW	3	3
•	Battery	Ah	160	160

2.10 MACHINE SOUND LEVELS

			Gyro 4020	Gyro 4518
•	Guaranteed sound power level (in accordance with the Directive 2000/14/CE)	dB	Lwa = ...	
•	Measured sound pressure level (in accordance with the Directive 98/37/CE)	dB	Lpa = ...	

2.11 VIBRATION LEVELS

			Gyro 4020	Gyro 4518
•	Average level of transmitted vibrations (*)	m/s^2	< 2.5	< 2.5

(*) Values calculated in accordance with standard prEN13059

CAUTION

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

2.12 REFUELLING

			Gyro 4020	Gyro 4518
•	Diesel engine	l	10,3	10,3
•	Engine cooling system	l	45	45
•	Fuel tank	l	145	145
•	Hydraulic oil tank	l	230	230
•	Gearbox	l	2,7	2,7
•	Differential gears	l	8,5	8,5
•	Wheel reduction gears	l	0,6	0,6
•	Turret rotation reduction gear	l	2,8	2,8

Products:

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

Gearbox-Differential gears-Reduction gears (but for turntable rotation): **TRACTORENAULT THFI 208 LF SAE 80W (API GL-4 / FORD M2C 86B - Massey Ferguson M 1135)**

Turntable rotation reduction gear: **SHELL OMALA 150 (DIN 51 517-3 CLP, ISO 12295-1 TYPE CKC, US STEEL 224, DAVID BROWN 51.53.101)**

Hydraulic system and brakes: **SHELL TELLUS T 46 (DENISON HF-1 DIN 51524 part. 2 e 3)**

2.13 TIGHTENING TORQUES

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

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

2.14 DRILL DIAMETERS FOR THREADS

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

2.15 STANDARD TIGHTENING TORQUES FOR FITTING SEALS

■ 60° CONICAL SEALS

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

■ FRONT O-LOK (Parker) SEALS

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

■ 37° COUNTER-SUNK CONICAL SEALS (JIC)

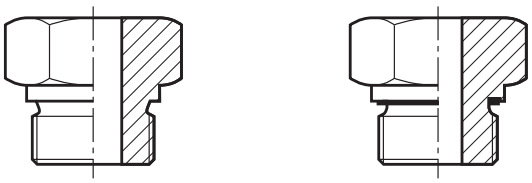
Thread diameter		TIGHTENING TORQUES (0+10%)
inc.	mm	37° CONICAL SEALS (JIC) Nm
7/16"-20	M10x1	15
1/2"-20	M12x1.5	20
9/16"-18	M14x1.5	28
	M16x1.5	62
3/4"-16	M18x1.5	62
7/8"-14	M22x1.5	80
1.1/16"-12	M27x2	110
1.3/16"-12		141
1.5/16"-12	M33x2	160
1.5/8"-12	M42x2	225
1.7/8"-12	M48x2	270
2.1/4"-12	M10x1	360

■ SEALS WITH GRIP-RING

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

■ FITTING ASSEMBLY

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



A B

A Male face
Mechanical seal or copper washer

B Male face
Soft seal with O-ring

2.16 LOCKING MATERIAL

THREAD LOCKERS

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

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

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

GASKETS *Total sealing in 24-72 hours*

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

2.17 HOISTING INSTRUCTIONS

⚠ DANGER

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

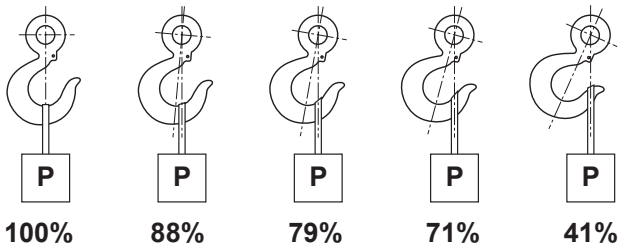
Before removing parts of the machine, make sure that:
- all fixing bolts have been removed
- all hydraulic and electrical parts have been disconnected
- the part to be removed is not blocked.

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

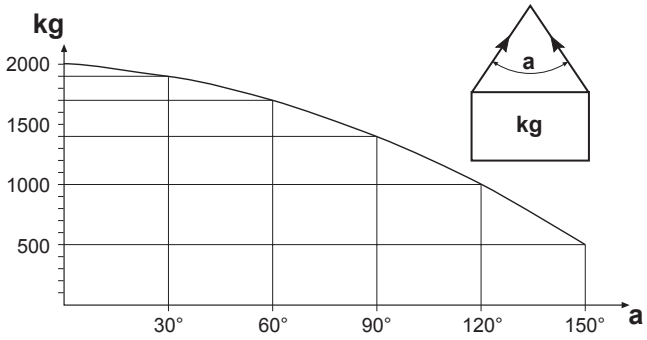
STRANDED ROPES	
Rope diameter mm	Max admissible load kg
10	1000
11.2	1400
12.5	1600
14	2200
16	2800
18	3600
20	4400
22.4	5600
30	10000
40	18000
50	28000
60	40000

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

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



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



2.18 ADVICE TO RENEW FLEXIBLE HOSES

NOTICE

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

CAUTION

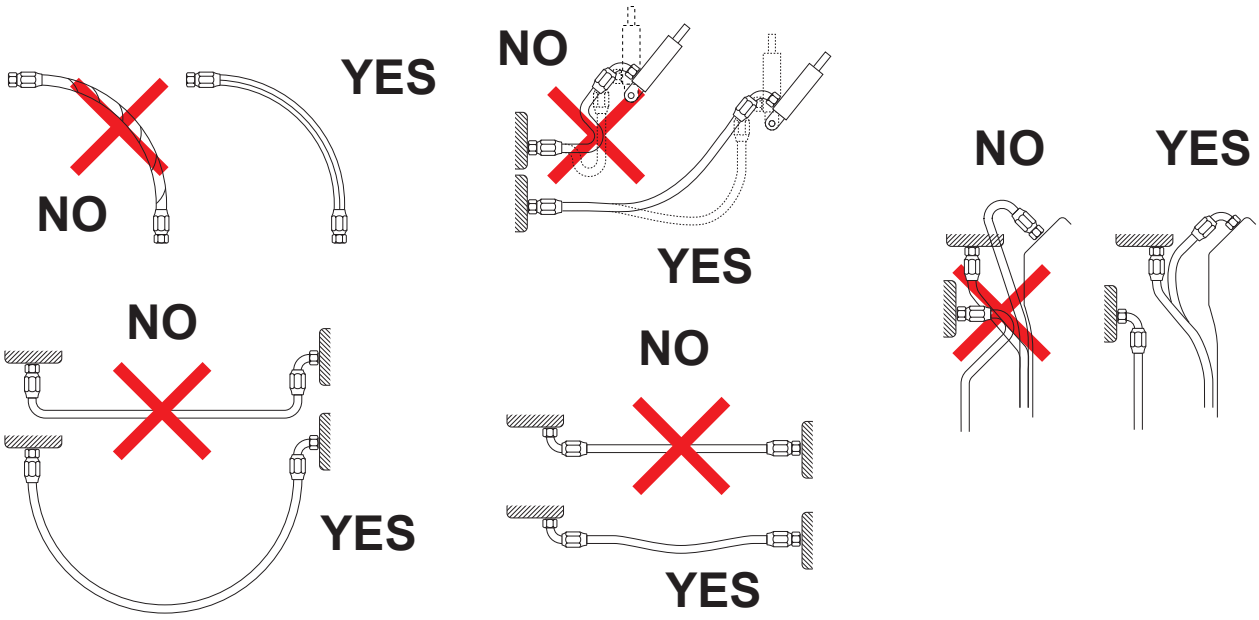
Plug all disconnected parts to prevent dust or impurities from entering the circuit. They can cause serious damage.

⚠ DANGER

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

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

Useful advice for mounting flexible hoses:



2.19 LISTS OF RECOMMENDED SPARE PARTS

Gyro 4020

Code	Description	Q.ty
09.4610.0022	Cylinder	2
07.0740.0050	Handle	1
07.0740.0192	Lock	1
04.4240.0024	Valve	4
636519	Seals kit	4
07.0740.0186	Lever-fitted lock	1
07.0740.0066	Filter	1
07.0740.0087	Glass	1
07.0740.0088	Wiper arm	1
07.0740.0089	Wiper blade	1
07.0740.0104	Door stop	1
07.0740.0202	Driving mirror	1
07.0740.0157	Wiper blade	1
07.0740.0119	Heater	1
07.0740.0218	Tap	1
09.4610.0002	Driving mirror	2
09.4661.0015	Plug	1
09.4661.0014	Plug	1
639981	Seals kit	4
54.0702.0027	Sliding guide	12
638337	Seals kit	4
695971	Sliding guide	12
54.0200.0000	Bushing	26
54.0702.0024	Sliding guide	2
695970	Sliding guide	4
695959	Sliding guide	2
695957	Sliding guide	2
695959	Sliding guide	4
02.0117.0101	Grease nipple	2
04.0605.0363	Flex hose	1
04.0605.0364	Flex hose	1
07.0738.0000	Star wheel	4
09.0803.0281	Mud-guard	2
09.0803.0290	Mud-guard	2
07.0728.0006	Seals kit	2
04.4239.0030	Valve	4
54.0702.0036	Sliding guide	10
54.0702.0034	Sliding guide	10
09.4605.0006	Plug	1
09.4605.0005	Tank	1
09.4656.0006	Gas pedal	1
09.0803.0295	Guard	1
638004	Seals kit	1
07.0730.0034	Seals kit	1
06.0401.0219	O-ring	8
04.4229.0040	Flex hose	1
04.4229.0041	Flex hose	1
04.4229.0043	Flex hose	1
04.4229.0042	Flex hose	1
07.0742.0011	Oil seal	2

Code	Description	Q.ty
07.0706.0043	Seals kit	1
07.0723.0354	Fan	1
640591	Bushing	2
04.4239.0000	Valve	1
640536	Seals kit	1
07.4529.0063	Seals kit	1
07.4529.0065	Seals kit	1
04.4239.0078	Valve	1
54.0001.0001	Pin	2
07.0703.0421	Road/Jobsite selector key	1
07.0740.0050	Handle	1
07.0740.0051	Lever-fitted lock	1
07.0740.0029	Handle	1
07.0703.0125	Key	1
07.0740.0041	Glass	1
07.0709.0497	Articulated tie rod	2
07.0709.0419	Seals kit	1
637536	Seal	2
07.0736.0000	Cable	1

Gyro 4020 electrical components

Code	Description	Q.ty
04.4240.0041	Solenoid	4
07.0728.0007	Solenoid	2
56.0016.0043	Control lever	1
07.0741.0011	Pushbutton	1
07.0741.0010	Cap	1
56.0021.0051	Linde control unit	1
56.0010.0032	Right front light	1
56.0009.0001	Horn	1
56.0013.0004	Sensor	4
56.0010.0030	Left rear light	1
56.0010.0031	Right rear light	1
56.0010.0005	Beacon	1
07.0703.0384	Bulb	1
09.4661.0005	Level indicator	1
07.0703.0418	Turn signals lever	1
07.0703.0436	Speed lever	1
04.4656.0008	Selector	1
07.0741.0012	Dead man button	2
07.0703.0441	Emergency pushbutton	1
56.0016.0042	Control lever	1
07.0740.0072	Wiper motor	1
07.0728.0007	Solenoid	16
637650	Fuse - 3A	2
07.0703.0193	Fuse - 5A	1
634972	Fuse - 7,5A	4
634974	Fuse - 10A	15
634973	Fuse - 15A	5
07.0703.0485	Relay	22
07.0703.0488	Relay	1

Code	Description	Q.ty
07.0703.0487	Relay	1
56.0021.0047	Card	1
05.4329.0000	Accumulator	2
07.0705.0089	Solenoid	1
05.4329.0017	Pressure switch	1
07.0742.0008	Solenoid	2
627043	Solenoid	1
07.0742.0009	Solenoid	1
07.0741.0027	Solenoid	1
56.0013.0000	Sensor	1
07.0722.0013	Solenoid	1
07.0741.0006	Solenoid	1
56.0017.0003	Switch	1
07.0703.0029	Ignition switch	1
07.0703.0577	Contact	1
07.0709.0442	Security switch	1
56.0013.0015	Sensor	1
56.0012.0016	Micro-switch	2
56.0012.0010	Micro-switch	2
56.0012.0021	Sensor	2
07.0709.0730	Sensor	2
56.0005.0000	Fuse	1
07.0703.0069	Fuse - 30A	1
07.0703.0192	Relay	2
07.0703.0535	Relay	1
641143	Fuse	1
05.4329.0002	Pressure switch	1
05.4329.0001	Pressure switch	1
56.0013.0004	Sensor	1
56.0013.0000	Transmitter	1
56.0013.0006	PNA 10A pressure switch	1
56.0012.0000	Sensor	3
07.0703.0486	Relay	4
634973	Fuse - 15A	1

Gyro 4020 filters

Code	Description	Q.ty
07.4501.0070	Oil filter	1
07.4501.0071	Fuel filter	1
07.0700.0020	Cartridge	1
639399	Safety cartridge	1
639400	Cartridge	1
07.0700.0002	Filter cartridge	1

Gyro 4518

Code	Description	Q.ty
09.4610.0022	Cylinder	2
07.0740.0050	Handle	1
07.0740.0192	Lock	1
04.4240.0024	Valve	4
636519	Seals kit	4
07.0740.0186	Lever-fitted lock	1
07.0740.0066	Filter	1
07.0740.0087	Glass	1
07.0740.0088	Wiper arm	1
07.0740.0089	Wiper blade	1
07.0740.0104	Door stop	1
07.0740.0202	Driving mirror	1
07.0740.0157	Wiper blade	1
07.0740.0119	Heater	1
07.0740.0218	Tap	1
09.4610.0002	Driving mirror	2
09.4661.0015	Plug	1
09.4661.0014	Plug	1
639981	Seals kit	4
54.0702.0027	Sliding guide	12
638337	Seals kit	4
695971	Sliding guide	12
54.0200.0000	Bushing	26
54.0702.0024	Bushing guide	2
695970	Sliding guide	4
695959	Sliding guide	2
695957	Sliding guide	2
695959	Sliding guide	4
02.0117.0101	Grease nipple	2
04.0605.0363	Flex hose	1
04.0605.0364	Flex hose	1
07.0738.0000	Star wheel	4
09.0803.0281	Mud-guard	2
09.0803.0290	Mud-guard	2
07.0728.0006	Seals kit	2
04.4239.0030	Valve	4
09.4605.0006	Plug	1
09.4605.0005	Tank	1
09.4656.0006	Gas pedal	1
09.0803.0295	Guard	1
638004	Seals kit	1
07.0730.0034	Seals kit	1
06.0401.0219	O-ring	8
04.4229.0040	Flex hose	1
04.4229.0041	Flex hose	1
04.4229.0043	Flex hose	1
04.4229.0042	Flex hose	1
07.0742.0011	Oil seal	2
07.0706.0043	Seals kit	1
07.0723.0354	Fan	1
640591	Bushing	2
04.4239.0000	Valve	1

Code	Description	Q.ty
640536	Seals kit	1
07.4529.0063	Seals kit	1
07.4529.0065	Seals kit	1
04.4239.0078	Valve	1
54.0001.0001	Pin	2
07.0703.0421	Road/Jobsite selector key	1
07.0740.0050	Handle	1
07.0740.0051	Lever-fitted lock	1
07.0740.0029	Handle	1
07.0703.0125	Key	1
07.0740.0041	Glass	1
07.0709.0497	Articulated tie rod	2
07.0709.0419	Seals kit	1
637536	Seal	2
07.0736.0000	Cable	1

Gyro 4518 electrical components

Code	Description	Q.ty
04.4240.0041	Solenoid	4
07.0728.0007	Solenoid	2
56.0016.0043	Control lever	1
07.0741.0011	Pushbutton	1
07.0741.0010	Cap	1
56.0021.0051	Linde control unit	1
56.0010.0032	Right front light	1
56.0009.0001	Horn	1
56.0013.0004	Sensor	4
56.0010.0030	Left rear light	1
56.0010.0031	Right rear light	1
56.0010.0005	Beacon	1
07.0703.0384	Bulb	1
09.4661.0005	Level indicator	1
07.0703.0418	Turn signals lever	1
07.0703.0436	Speed lever	1
04.4656.0008	Selector	1
07.0741.0012	Dead man button	2
07.0703.0441	Emergency pushbutton	1
56.0016.0042	Control lever	1
07.0740.0072	Wiper motor	1
07.0728.0007	Solenoid	16
637650	Fuse - 3A	2
07.0703.0193	Fuse - 5A	1
634972	Fuse - 7,5A	4
634974	Fuse - 10A	15
634973	Fuse - 15A	5
07.0703.0485	Relay	22
07.0703.0488	Relay	1
07.0703.0487	Relay	1
56.0021.0047	Card	1
05.4329.0000	Accumulator	2
07.0705.0089	Solenoid	1

Code	Description	Q.ty
05.4329.0017	Pressure switch	1
07.0742.0008	Solenoid	2
627043	Solenoid	1
07.0742.0009	Solenoid	1
07.0741.0027	Solenoid	1
56.0013.0000	Sensor	1
07.0722.0013	Solenoid	1
07.0741.0006	Solenoid	1
56.0017.0003	Switch	1
07.0703.0029	Ignition switch	1
07.0703.0577	Contact	1
07.0709.0442	Security switch	1
56.0013.0015	Sensor	1
56.0012.0016	Micro-switch	2
56.0012.0010	Micro-switch	2
56.0012.0021	Sensor	2
07.0709.0730	Sensor	2
56.0005.0000	Fuse	1
07.0703.0069	Fuse - 30A	1
07.0703.0192	Relay	2
07.0703.0535	Relay	1
641143	Fuse	1
05.4329.0002	Pressure switch	1
05.4329.0001	Pressure switch	1
56.0013.0004	Sensor	1
56.0013.0000	Transmitter	1
56.0013.0006	PNA 10A pressure switch	1
56.0012.0000	Sensor	3
07.0703.0486	Relay	4
634973	Fuse - 15A	1

Gyro 4518 filters

Code	Description	Q.ty
07.4501.0070	Oil filter	1
07.4501.0071	Fuel filter	1
07.0700.0020	Cartridge	1
639399	Safety cartridge	1
639400	Cartridge	1
07.0700.0002	Filter cartridge	1

2.20 MACHINE PAINT COLOUR

STANDARD machines

GREY RAL 7012

WHITE RAL 1013

MAT BLACK RAL 9005 (from June 2004 for cylinders)

AUSA machines

ORANGE RAL 2004

GENIE machines

BLUE GENIE

GREY GENIE

BLACK RAL 9500

MZ IMER machines

ORANGE RAL 2010

2.21 CHECKING THE CYLINDER MOVEMENT TIMES

CAUTION

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

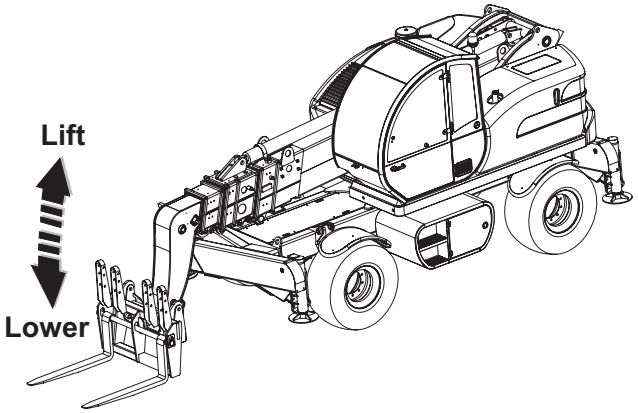
CAUTION

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

BOOM LIFTING/LOWERING

Gyro 4020	Time (s)	
	up	down
Max engine speed	17	11
Min. engine speed	44	30

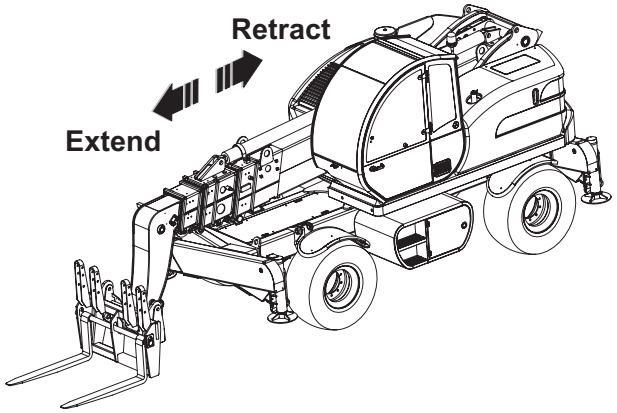
Gyro 4518	Time (s)	
	up	down
Max engine speed	17	11
Min. engine speed	44	30



BOOM EXTENSION/RETRACTION

Gyro 4020	Time (s)	
	out	in
Max engine speed	21,3	17,3
Min. engine speed	90	40

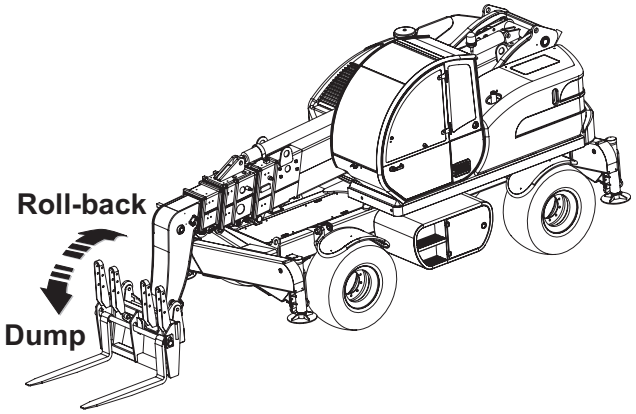
Gyro 4518	Time (s)	
	out	in
Max engine speed	21,3	17,3
Min. engine speed	90	40



ATTACHMENT DUMPING

Gyro 4020	Time (s)	
	roll-back	dumping
Max engine speed	3,8	3,7
Min. engine speed	12	8,6

Gyro 4518	Time (s)	
	roll-back	dumping
Max engine speed	3,8	3,7
Min. engine speed	12	8,6



VERTICAL MOVEMENT 1 OUTRIGGER

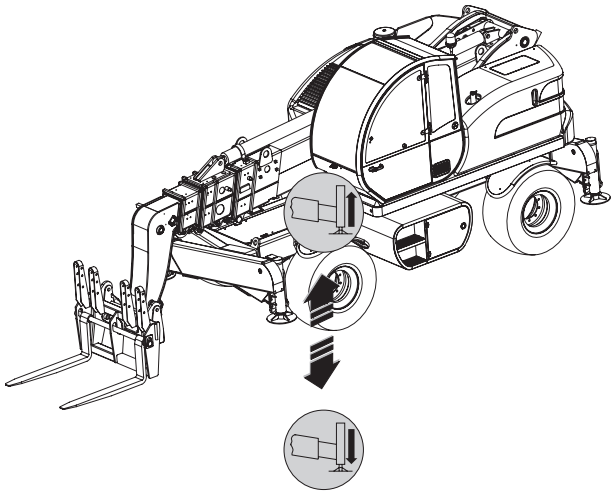
Gyro 4020	Time (s)	
	up	down
Max engine speed	**4,6**	**3,6**
Min. engine speed	**4,6**	**6,3**

Gyro 4518	Time (s)	
	up	down
Max engine speed	**4,6**	**3,6**
Min. engine speed	**4,6**	**6,3**

VERTICAL MOVEMENT 2 OUTRIGGERS

Gyro 4020	Time (s)	
	up	down
Max engine speed	**5,7**	**5**
Min. engine speed	**6,8**	**11,7**

Gyro 4518	Time (s)	
	up	down
Max engine speed	**5,7**	**5**
Min. engine speed	**6,8**	**11,7**



VERTICAL MOVEMENT 4 OUTRIGGERS

Gyro 4020	Time (s)	
	up	down
Max engine speed	**7,3**	**8,3**
Min. engine speed	**11,5**	**23**

Gyro 4518	Time (s)	
	up	down
Max engine speed	**7,3**	**8,3**
Min. engine speed	**11,5**	**23**

HORIZONTAL MOVEMENT - OUTRIGGERS

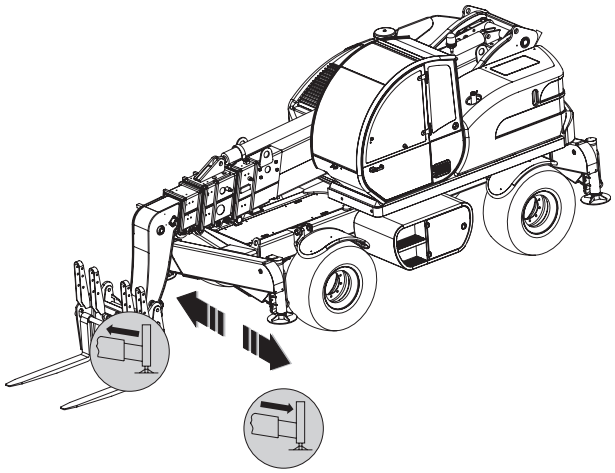
Gyro 4020	Time (s)	
	out	in
Max engine speed	4,5	5,9
Min. engine speed	8	6,3

Gyro 4518	Time (s)	
	out	in
Max engine speed	4,5	5,9
Min. engine speed	8	6,3

HORIZONTAL MOVEMENT - OUTRIGGERS

Gyro 4020	Time (s)	
	out	in
Max engine speed	5,4	6,8
Min. engine speed	13,4	9

Gyro 4518	Time (s)	
	out	in
Max engine speed	5,4	6,8
Min. engine speed	13,4	9



HORIZONTAL MOVEMENT - OUTRIGGERS

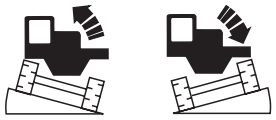
Gyro 4020	Time (s)	
	out	in
Max engine speed	10	9
Min. engine speed	26,9	17

Gyro 4518	Time (s)	
	out	in
Max engine speed	10	9
Min. engine speed	26,9	17

MACHINE SWAY

Gyro 4020	Time (s)	
	left to right	right to left
Max engine speed	**5**	**5**
Min. engine speed	**10**	**10**

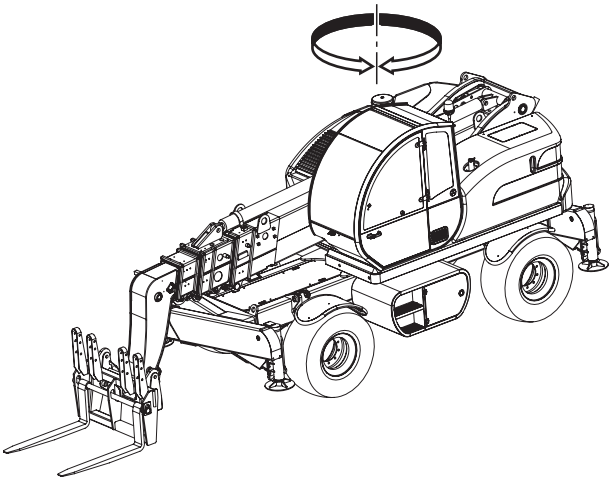
Gyro 4518	Time (s)	
	left to right	right to left
Max engine speed	**5**	**5**
Min. engine speed	**10**	**10**



TURNTABLE ROTATION

Gyro 4020	Time (s)
	360°
Max engine speed	**58**
Min. engine speed	**70**

Gyro 4518	Time (s)
	360°
Max engine speed	**58**
Min. engine speed	**70**



2.22 HYDRAULIC CALIBRATIONS

1. PRELIMINARY OPERATIONS

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

2. SETTING THE BOOM DISTRIBUTOR

Find the manometer mini-socket **ref. 30** on the **Tecnord** distributor (encl. **1**).

2.1 SETTING THE STAND-BY

Connect a 0-60bar manometer to the mini-socket **ref. A**.
Calibrate valve **B** (encl. **4**) on the pump to 40 bar.

CAUTION

The operation shall be carried out with the engine running at idle and without moving any lever of the main valve.

2.2 SETTING THE DISTRIBUTOR PRESSURE CONTROL VALVE

- Remove the 0-60bar pressure gauge from the mini-socket **ref. A** and fit a 0-400bar pressure gauge before lifting the boom to end-of-stroke.
- Calibrate the max pressure valve ref. **C** (encl. **1**) to 330 bar.

CAUTION

If it is not possible to reach 330 bar when setting the main valve, tighten the valve ref. D (see encl. 4) of the Hydromatik pump with variable displacement.

- Once the main valve has been calibrated, proceed with the calibration of valve ref. **D** (encl. **4**) of the variable displacement boom pump to a value of 315 bar.
- Recalibrate the max pressure valve ref. **C** (encl. **1**) to 300 bar.
- During calibration, check that the two safety valves **W** of the main valve (encl. **1**) discharge the pressure exceeding 330 bar.
- Remove the pressure gauge from the mini-socket and re-tighten the protective cap.

3. SETTING THE PRESSURE RELIEF VALVE

- Connect a 0-60bar manometer to the mini-socket **ref. E** (encl. **2**) located on valve **ref. F**. With the engine running at idle, move any of the element of the main valve to end of stroke and then set the valve ref. **F** to 30 bar.
- Remove the pressure gauge from the mini-socket and re-tighten the protective cap.

4. CHECKING THE PRESSURE OF THE LINDE PUMP HYDROSTATIC DRIVE

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

- Connect a 0-60 bar manometer to the mini-socket **ref. G** (encl. **3**) to read the low-pressure value.
- Connect a 0-600 bar manometer to the mini-socket **ref. H** (encl. **3**) to read the high-pressure value.

⚠DANGER

Never connect the pressure gauge to the èpoint corresponding to the reverse speed as this is may result in serious damage for the technicians or the inspector checking the drive calibration.

- Hold the selector to neutral position.
- With the engine running at max speed, make sure that the feeding pressure is 19/20 bar.
  The feeding pressure has no fixed value as it varies from pump to pump.
- Engage the 2nd mechanical speed.
- Ask a second operator to step down on the brake pedal.
- Set the forward-neutral-reverse selector to the forward position.
- Let the engine run at max speed and check that the high pressure value is 445 bar.

5. CALIBRATING THE BRAKING SYSTEM PRESSURE (encl. 3)

- Connect a 0-250 bar pressure gauge to position **L** (encl. **5**).
- Depress the foot brake some times until the value shown on the pressure gauge starts increasing. When the pressure gauge stops, the value shown corresponding to the calibration value of valve **ref. M** (encl. **5**) should be 150 bar. If the value is below 150 bar, loosen valve **ref. L**; if the value is above 150 bar, tighten the valve.

CAUTION

To check the pressure, it is necessary to depress the foot brake some times until the pressure gauge restarts increasing; when it stops in stable position, it shows the calibration value.

⚠DANGER

Fully discharge the pressure from the accumulators before disconnecting the hose. Fluids at pressure are hazardous!

6. CALIBRATING THE POWER STEERING

- Connect a 0-250 bar pressure gauge to position **N** (encl. **6**).
- Select the front-wheel steering mode.
- Move the steering cylinder to end of stroke and make sure the value of the power steering **ref. O** is 140 bar. If the value is below 140 bar, tighten valve **ref. P**; if the value is above 140 bar, loosen the valve.

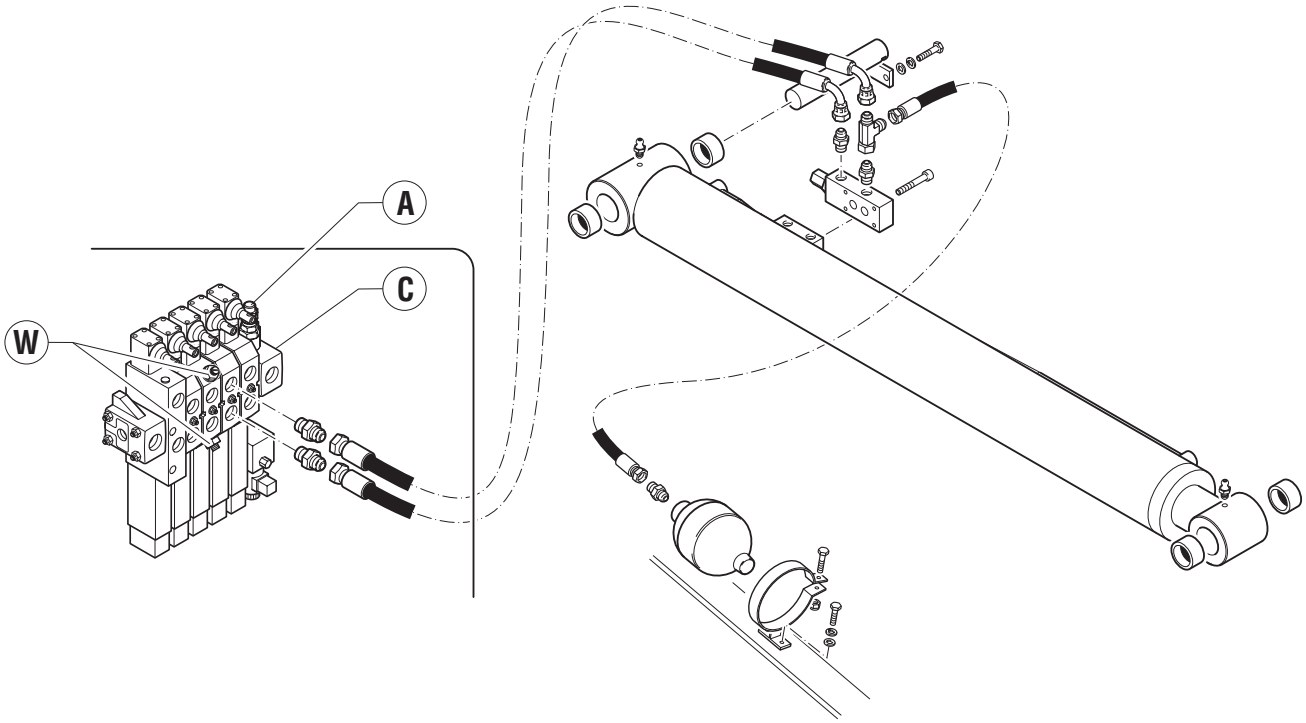
CAUTION

To reach valve ref. P, remove the protection cap (encl. 6).

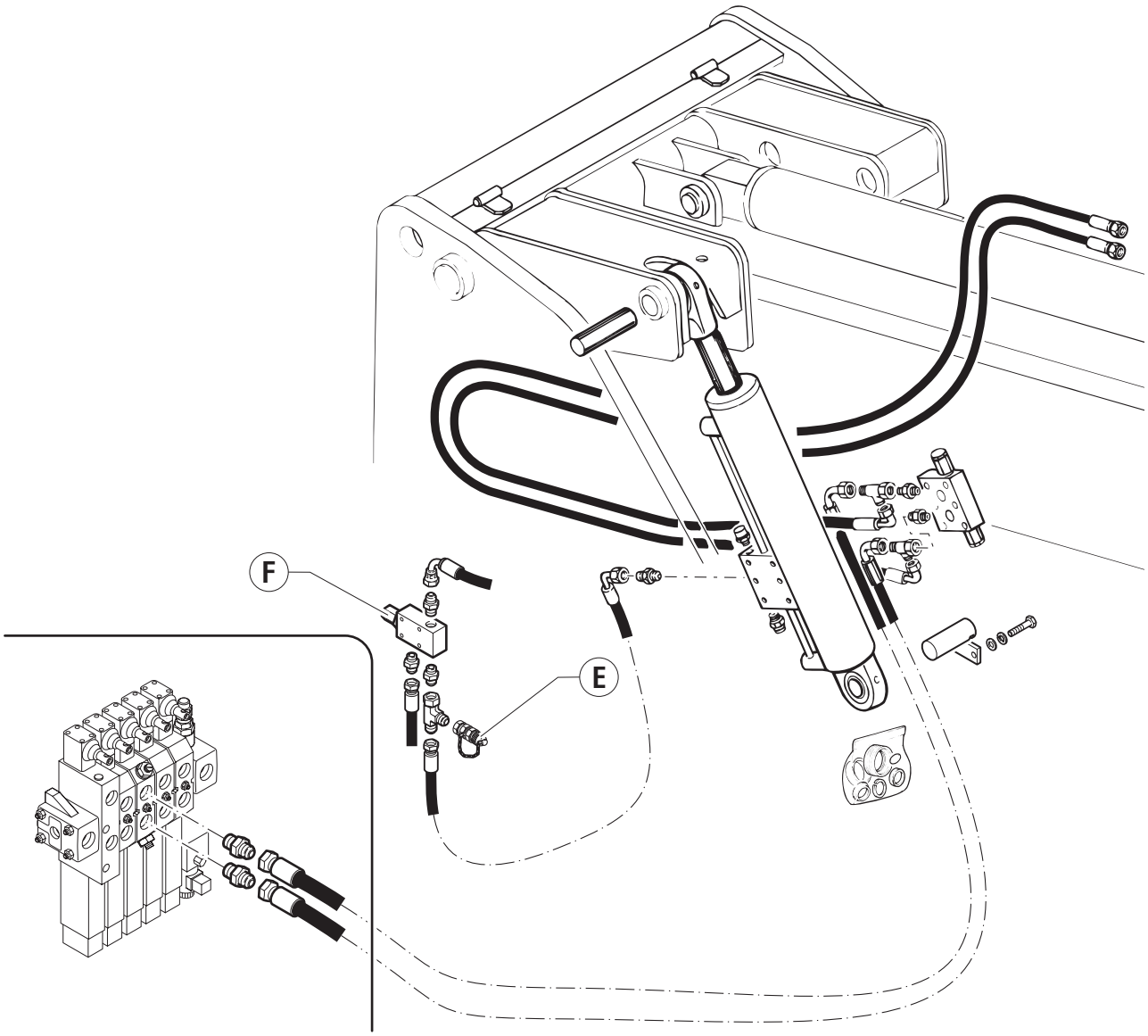
6. SETTING THE SAFETY VALVES OF THE COUNTER-FRAME ROTATION

- Disconnect the two flexible hoses **ref. Q** (encl. **7**) and connect a 0-250bar pressure gauge to both of them.
- Operate the turntable rotation in one direction and verify that the value displayed on the pressure gauge is 150 bar.
- Operate the turntable rotation in the opposite direction and verify that the value displayed on the pressure gauge is 150 bar.
- If the pressure shall be adjusted, remove caps **R** (encl. **7**) and turn the internal screws until reading the correct value on the pressure gauges.

HYDRAULIC SYSTEM - LIFTING	Encl. 1

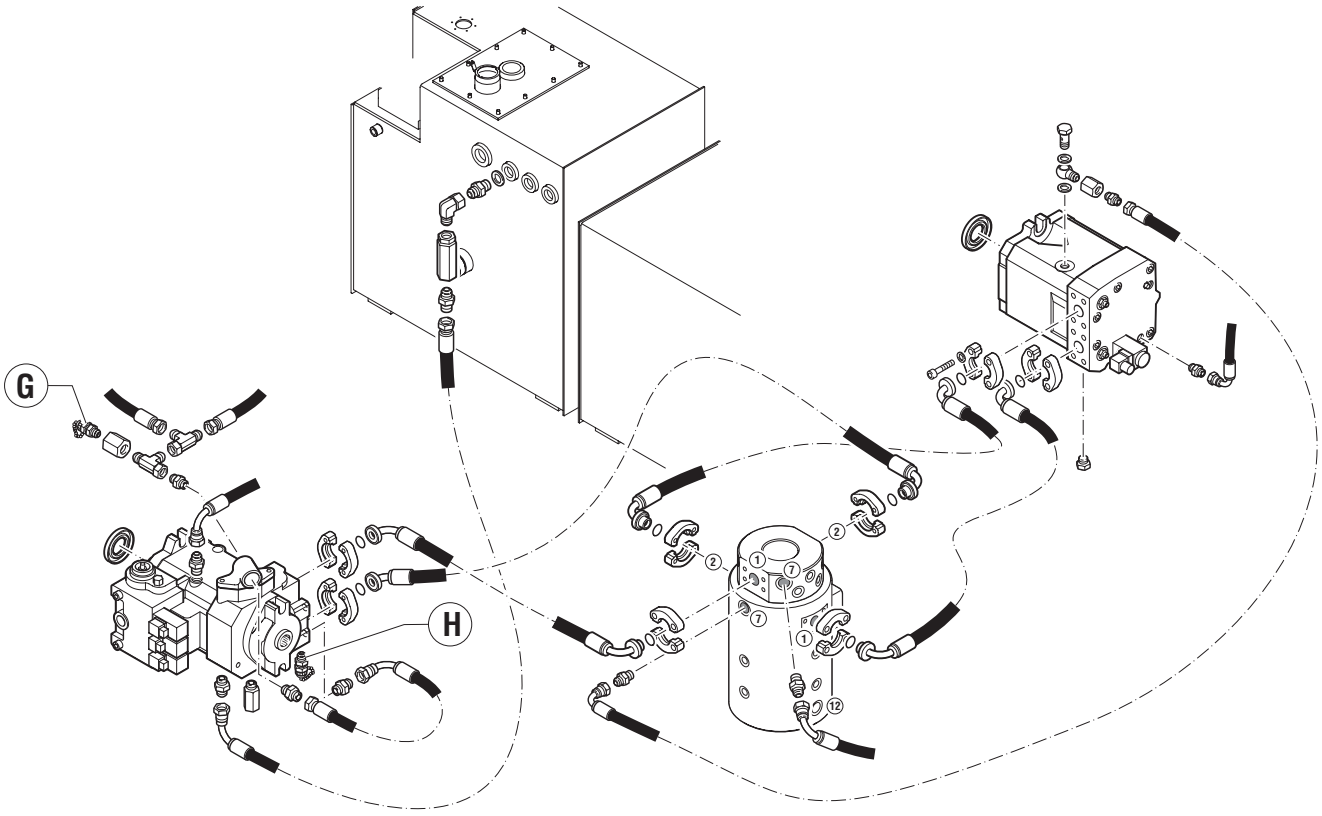


HYDRAULIC SYSTEM - FORK BALANCE	Encl. 2

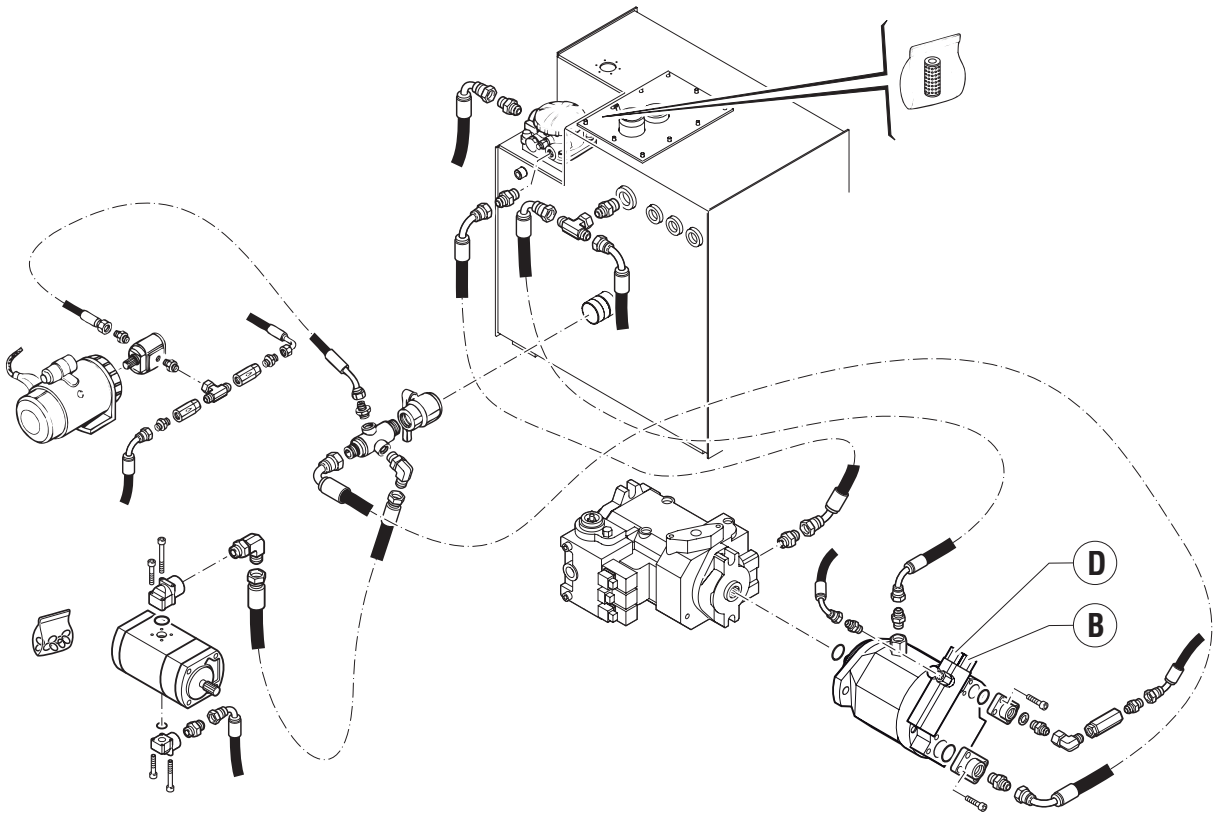


HYDRAULIC SYSTEM - TRANSMISSION

Encl. 3

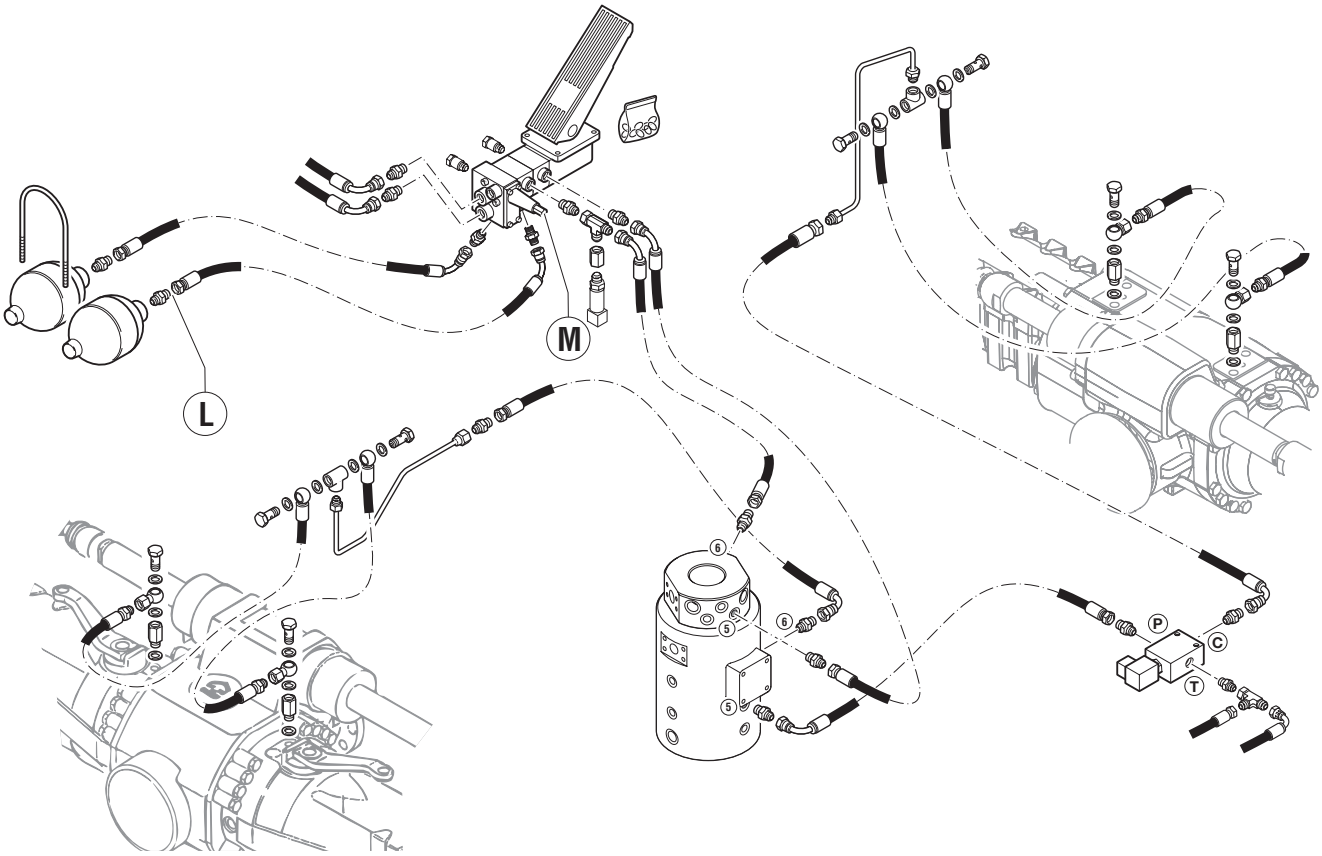


SUCTION SYSTEM HYDRAULIC PUMPS	Encl. 4

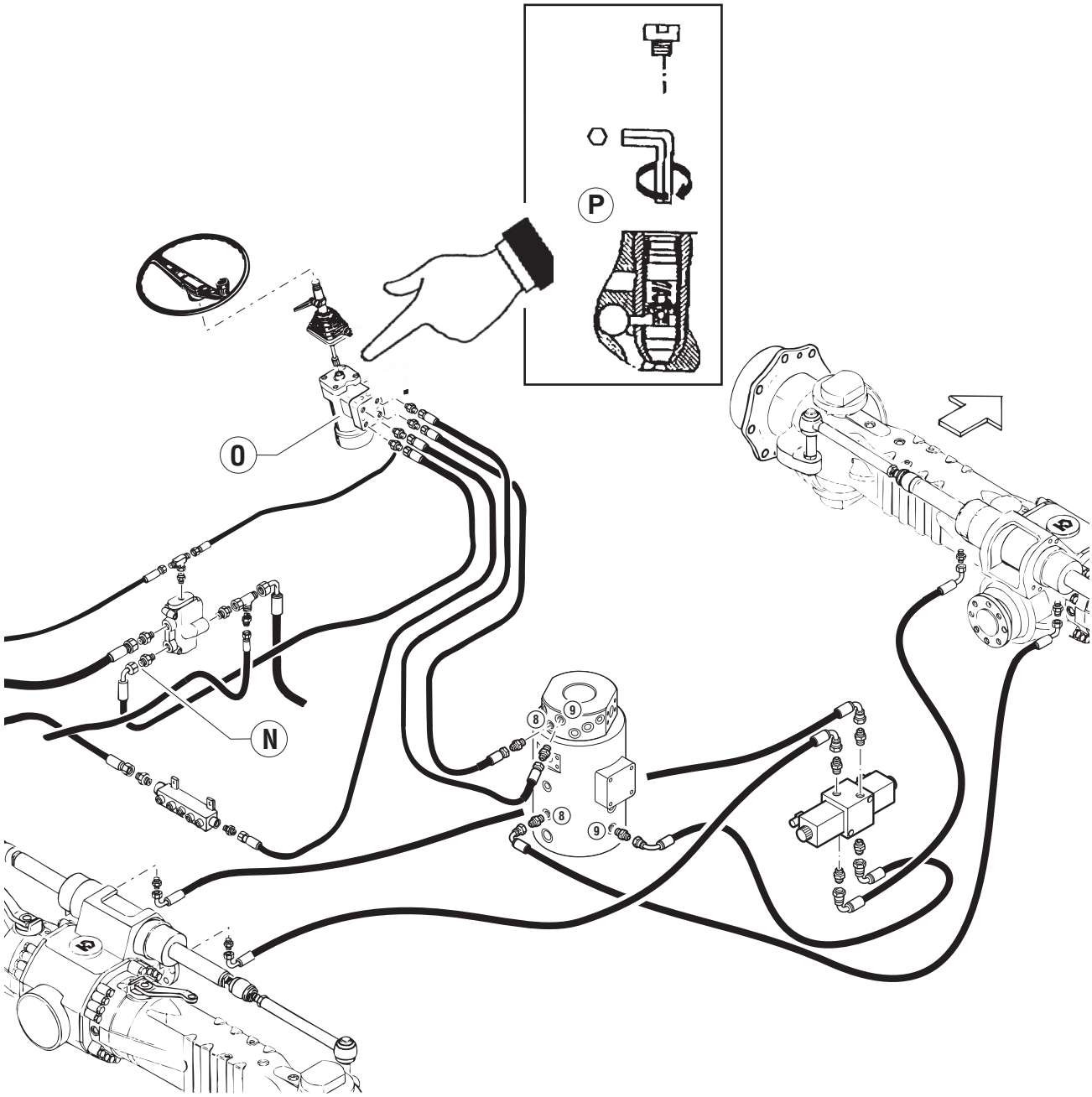


HYDRAULIC SYSTEM - SERVICE BRAKE

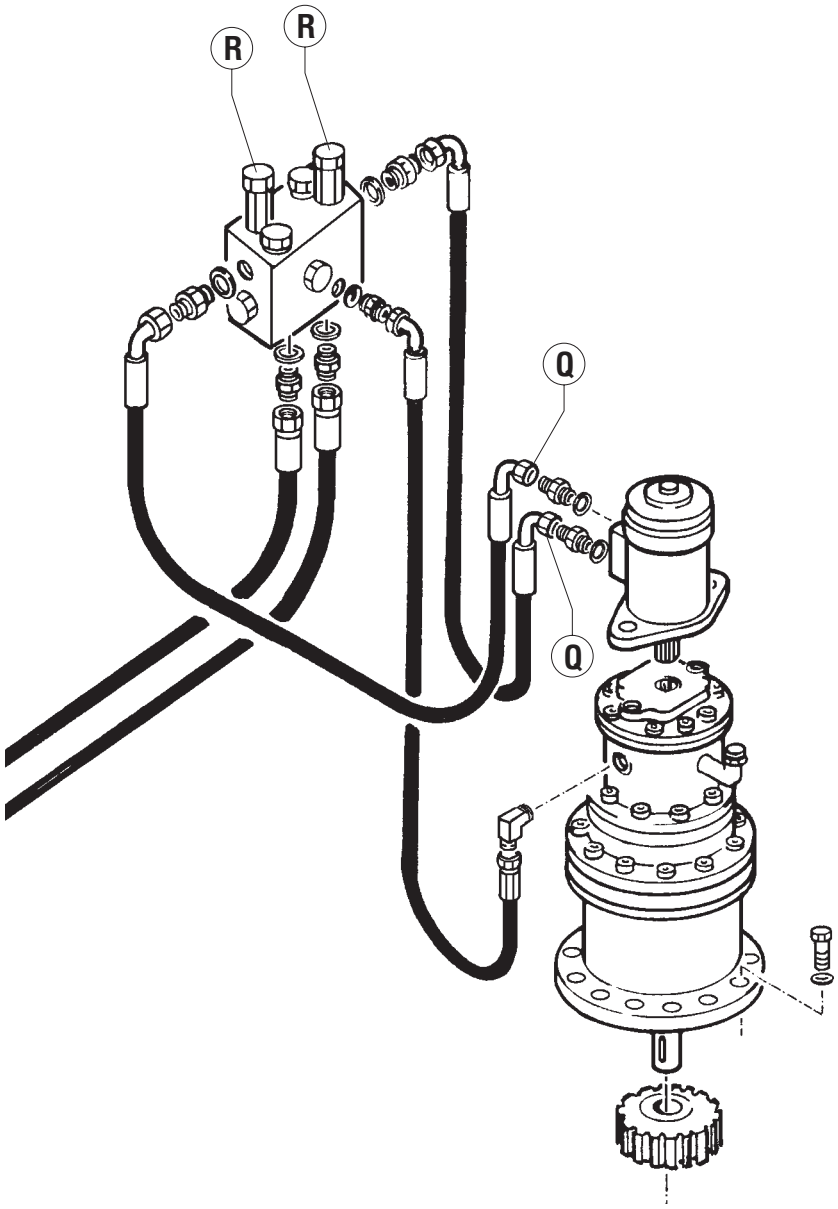
Encl. 5



HYDRAULIC SYSTEM - POWER STEERING	Encl. 6



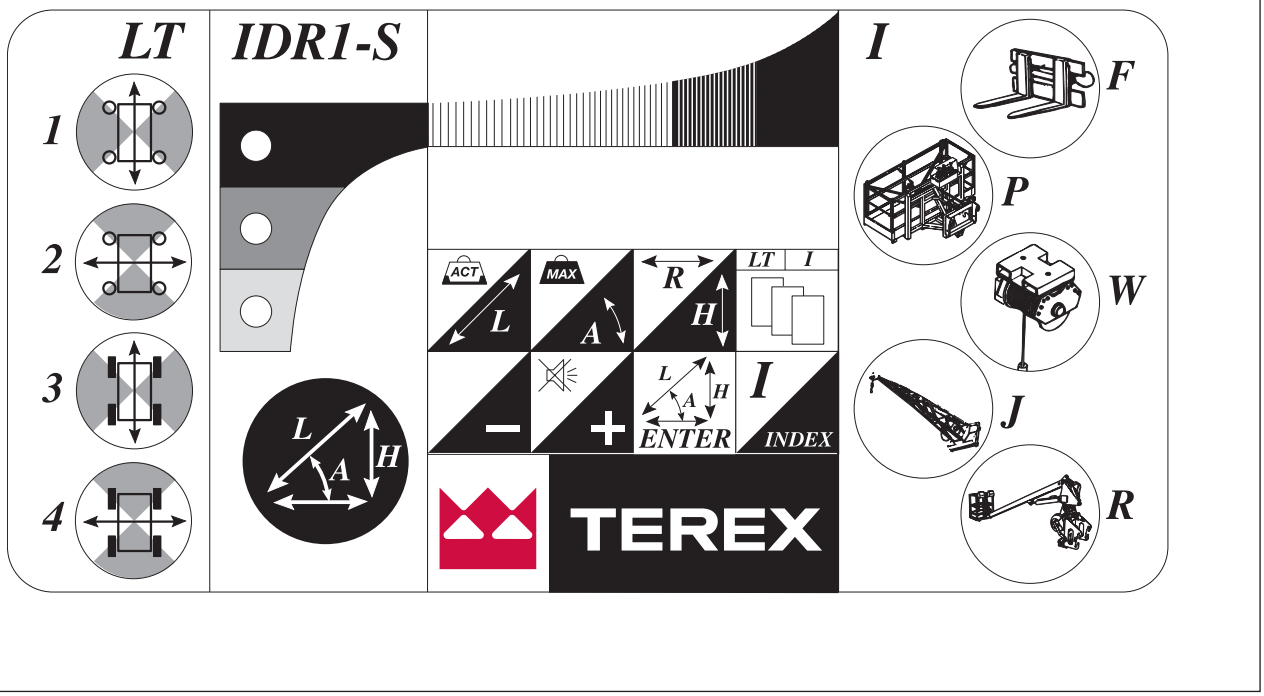
HYDRAULIC SYSTEM - TURNTABLE ROTATION	Encl. 7



2.23 PLATFORM CALIBRATION

- CALIBRATING THE PLATFORM

1. Couple the platform.
2. Stabilise the machine.
3. Stop the engine.
4. Connect the plug on the platform to the power socket on the boom and then turn the platform key to the ON position.
5. Go back to the driving place and turn the dashboard to the ON position and wait until the message "**FORK PLEASE CONFIRM**" appears on the display and then turn the road/jobsite/platform selector to the "platform" position.
6. Wait until the machine recognises the platform automatically and then press "**ENTER**" and type in the password.
7. Press key **+** several times until displaying page 60 "**BASKET EMPTY**" and then press "**ENTER**" and "**INDEX**". In this way, the tare weight value is sent to the platform.
8. Press key **+** several times until displaying page 61 "**BASKET AC.**" and then press "**ENTER**" and, using the "**INDEX**" key, go to the asterisk "*****". Using the "**+**" or "**-**" key, edit the known weight to be applied to the platform (for instance, .70 corresponds to 700 kg) and then press "**ENTER**" once again.
9. Press key **+** several times until displaying page 62 "**BASKET LADEN**" and then load the known weight indicated in point 7 and then press "**ENTER**" and "**INDEX**".
   In this way, the value of known weight is transmitted to the platform for comparison.
10. Press key **+** several times until displaying a page with the "**SAVE**" command, then press "**ENTER**" and wait until the message "**DONE**" is displayed. Wait for two minutes and then stop the engine of the machine.
11. Now the platform is ready for operation.

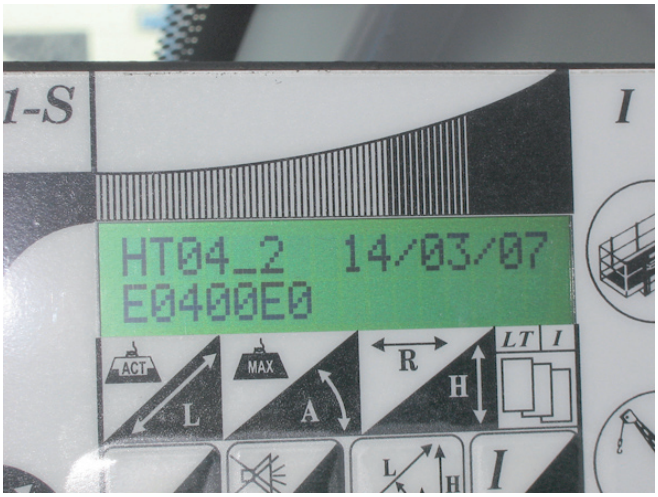


PROCEDURE FOR CONNECTING AND USING THE PLATFORM

1. Couple the platform.
2. Move to the work area and stabilise the machine.
3. Stop the engine.
4. Connect the plug on the platform to the power socket on the boom and then turn the platform key to the ON position.
5. Go back to the driving place and turn the dashboard to the ON position and:

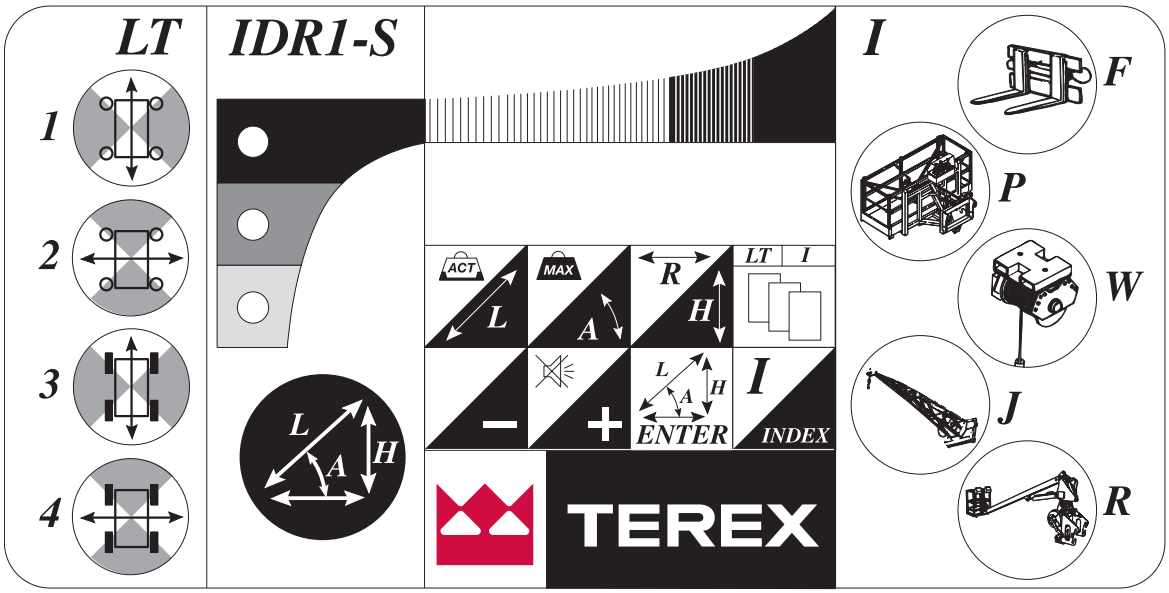
   A-If the date of the software is the one shown in the picture to the side, turn the road/jobsite/ platform selector to the "platform" position then go to the point 6;

   B-If the software has an older date, wait until the message "FORK PLEASE CONFIRM" appears on the display and then turn the road/jobsite/ platform selector to the "platform" position then go to the point 6.
6. Wait until the machine recognises the platform automatically.
7. Now the platform is ready for operation.



2.24 SETTING THE OVERLOAD WARNING SYSTEM

1. Start the engine and before the audible alarm of the overload warning system stops sounding, press **ENTER** and type in the password **4482** acting on **INDEX** to move the cursor on the digits.
2. The display will ask to confirm the equipment "forks". Press **ENTER** and then, by means of the **+** key, find and open page **55 OUTRIGGER IN** and make sure that the outriggers are fully retracted; then press **ENTER** and **INDEX** to confirm.
3. Press key **+** several times until displaying page **56 OUTRIGGER OUT** and then extend all the outriggers and press **ENTER** and **INDEX** to confirm.
4. Press key **+** several times until displaying page **57 ROTAX**; move the turntable to the 0-degree position, lock in place with the pin and then press **ENTER** and **INDEX** to confirm.
5. Press key **+** several times until displaying page **58 LEVELLING** and, using a spirit level, make sure that the machine is level with the two axes, then press **ENTER** and **INDEX** to confirm.
6. Stabilise the machine and, by pressing key **+** several times, open page **12 TRANSDUCER MIN**. Lower and retract the boom completely and then press **ENTER**.
7. Press key **+** several times until displaying page **13 TRANSDUCER MAX** and, once the machine is stabilised, raise the boom up to the maximum angle (check that the boom reaches the max height by turning the load limiter inhibition key) and then extend the boom to max length and then press **ENTER**.
8. Press key **+** several times until displaying page **01 SAVE** and then press **ENTER** and wait until the message **DONE** is displayed.
   Wait for some 2 minutes and then turn off the machine.
9. The first setting phase is completed. Now test all the possible configurations with different weights and make sure that the values given in the load charts in the driving place are respected.



2.25 ECO MATRICE PANEL

1 GENERAL DESCRIPTION

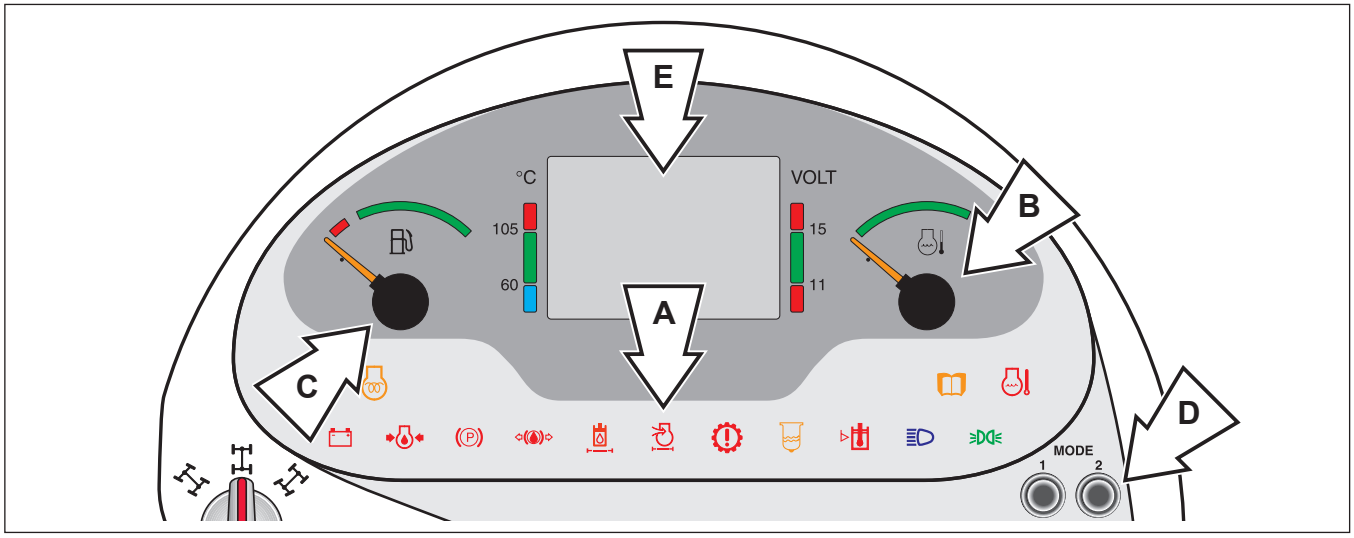
This panel has been developed and is installed on the machine of the GYRO series.
The machine is equipped with the folllowing electronic control units:

1 - Display panel (Unideck)
2 - Engine controller (Deutz)
3 - Linde control unit (Linde)

Control units 1, 2 and 3 share a communication bus with Can-Bus SAE J1939 protocol (250Kbit/s).

2 FUNCTIONS

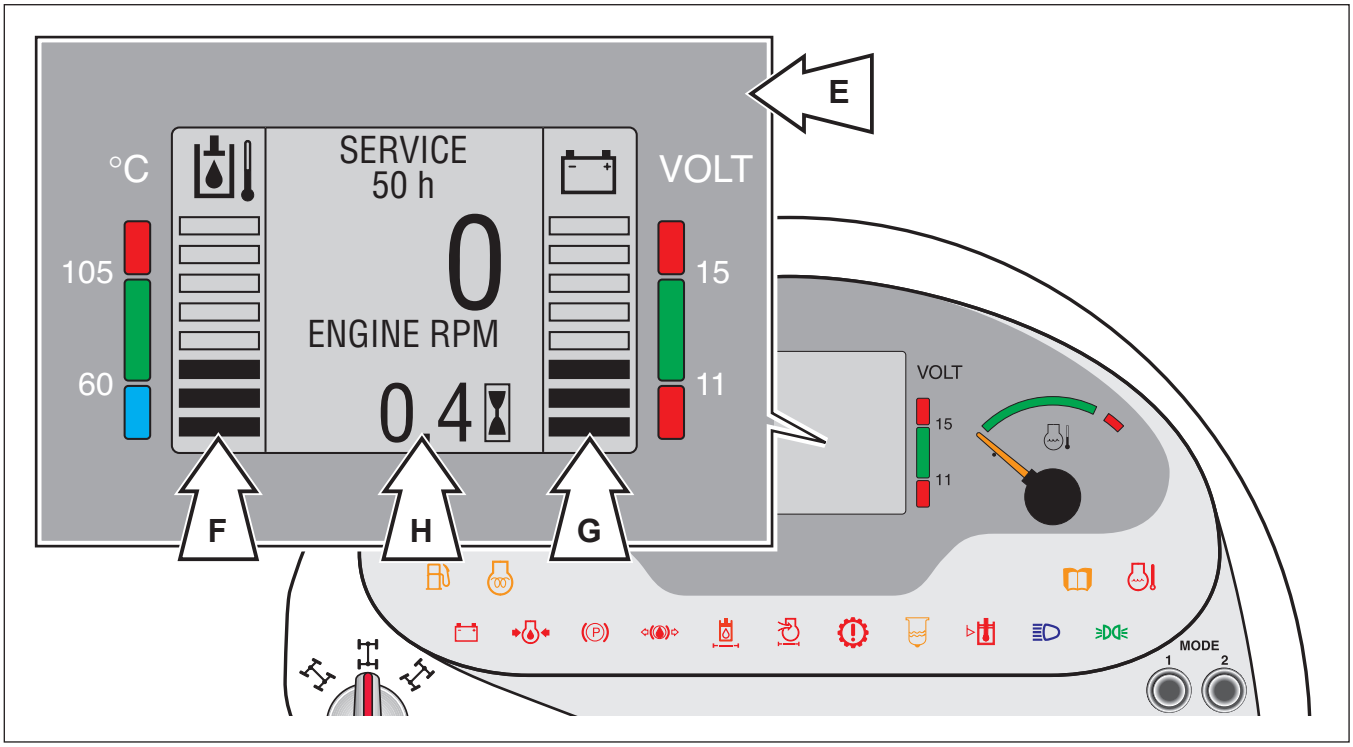
The panel shall receive and display information from the engine controller (via Can) and from the sensors or contacts positioned on the machine.
In the case of a faults, a buzzer starts sounding.
There is a 128x64 matrix display in the central area of the panel to show information such as engine RPM, hydraulic oil thermometer, voltmeter, total hours of work and error messages.
There are also 15 alarm and/or warning lights **ref. A** and two analog gauges, one for the engine coolant temperature **ref. B** and the other for the fuel level **ref. C**.
At night, the different warnings are signalled by red LEDs.
There are also 2 external pushbuttons **ref. D** to access to different functions of the display.



When the machine is started, the display **ref. E** shows:
- Engine rpm
- Hour-meter
- Engine oil temperature
- Battery voltage
- Service (next service intervals)

Additionally, the function buttons **MODE 1** and **MODE 2 rif. D** let you access to and scroll through the menus and sub-menus with the following functions:
- Language selection (Italian/English)
- Service (password-protected function reserved to authorised repair shops)
- Display of the diesel engine errors.

- Central unit multipurpose display



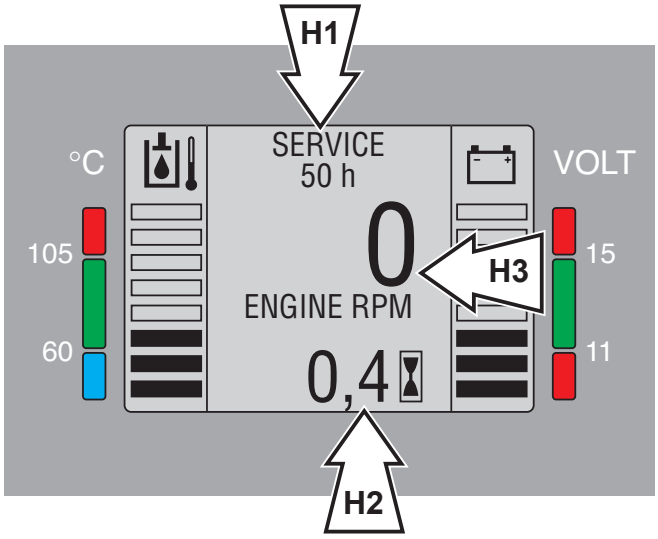
When the machine is turned on, the display ref. **E** will appear as shown in the picture above:

- The black bars **ref. F** on the left indicate the engine oil temperature.
  During normal operation, the temperature should be comprised between 60 and 105 degrees corresponding to the green section of the scale shown on the left of the display.
  If a higher temperature is reached (and the bars of the red zone of the scale come on), you should stop the machine and find and rectify the problem before restarting the machine.

- The black bars ref. G on the right show the battery charge when the engine is stopped, and the alternator charge voltage when the engine is running.
  During normal operation, the temperature should be comprised between 11 and 15 volt corresponding to the green section of the scale on the right of the display.
  If the voltage displayed is less than 11 Volt, the alternator charge could be insufficient or the battery could be discharged. If the voltage is above 15 Volt, the alternator voltage is above the normal working voltage. In both cases, you should stop the machine and find and rectify the problem.

• In the central part **ref. H**, of the display, starting from the top, you find:
  H1: this indicates when next maintenance operations should be done.
  H2: this indicates the diesel engine rpm.
  H3: this is the hour-meter indicating the running time of the machine.Use this meter to correctly gauge the service intervals.

  In the case of faults, field **H1** will be immediately replaced by the message **ERROR** followed by the code of the signalled error.

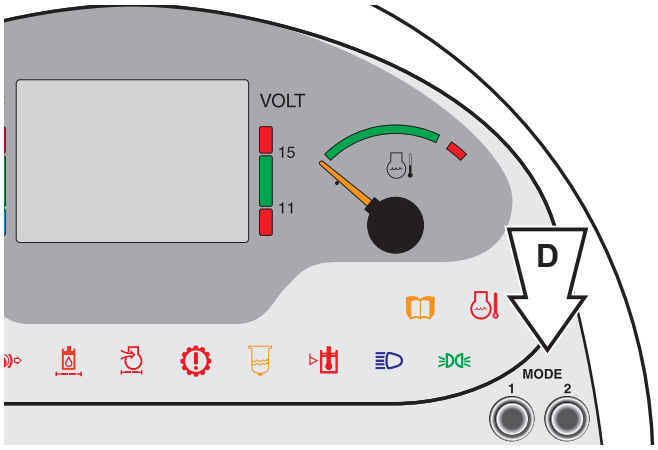


CAUTION

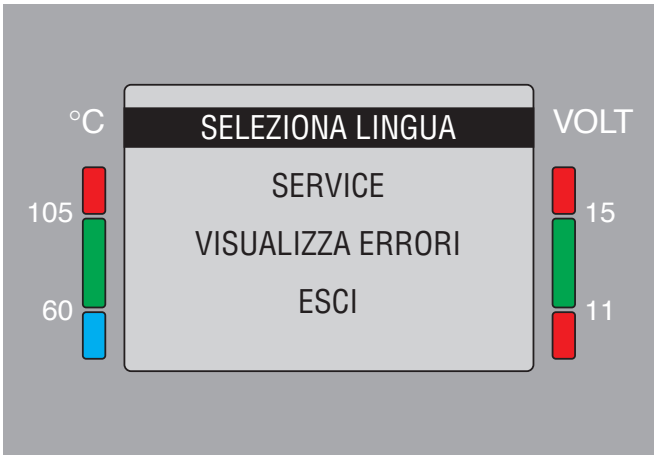
To read the meaning of the numeric code displayed, refer to the errors list in chapter 5 "Troubleshooting".

- Use of menus and sub-menus

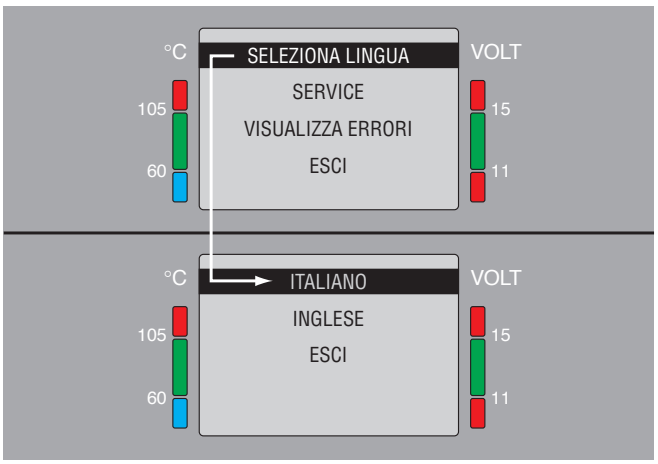
Use the two buttons **MODE 1** and **MODE 2 ref. D** to gain access and scroll through menus and sub-menus.



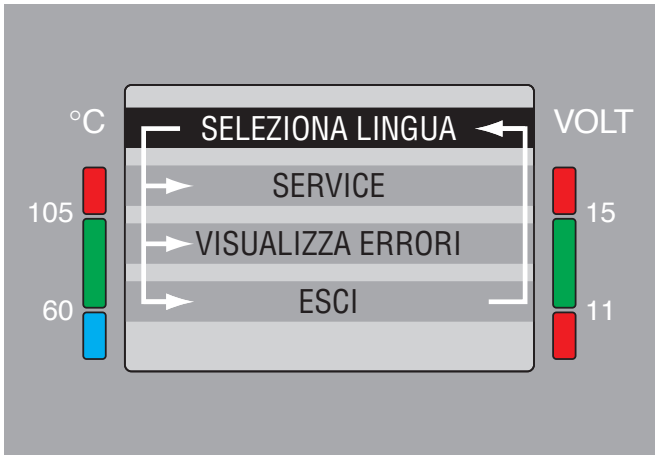
Press the two buttons **MODE 1** and **MODE 2** simultaneously to access to the menu.



Press button **MODE 1** to confirm any selection made.

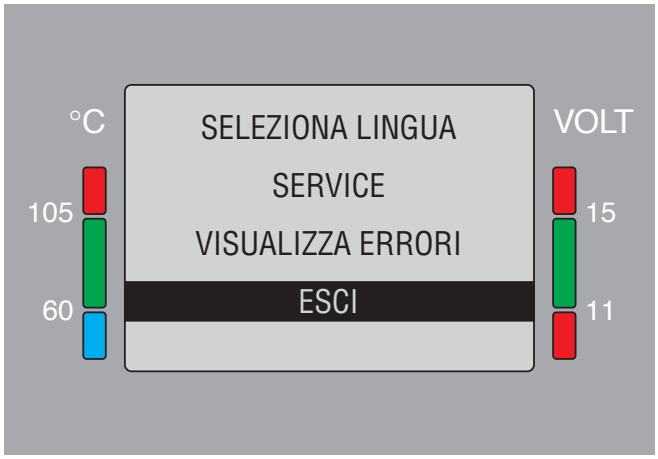


Press button **MODE 2** to scroll through the menu lists (when the last item of the list is reached, the first item is displayed).

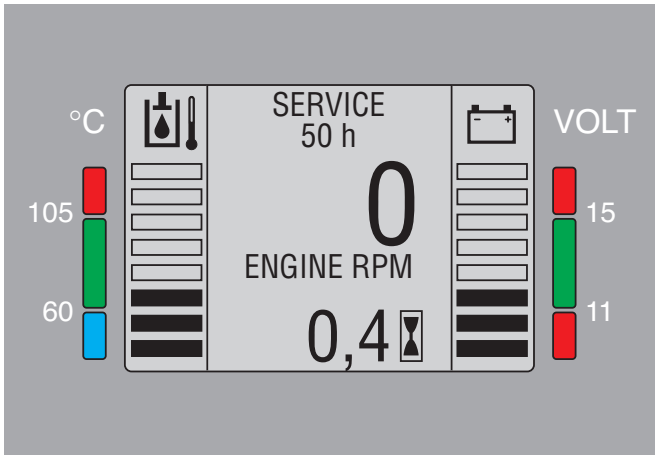


Quitting the menu

- Select **ESCI** using button **MODE 2**.

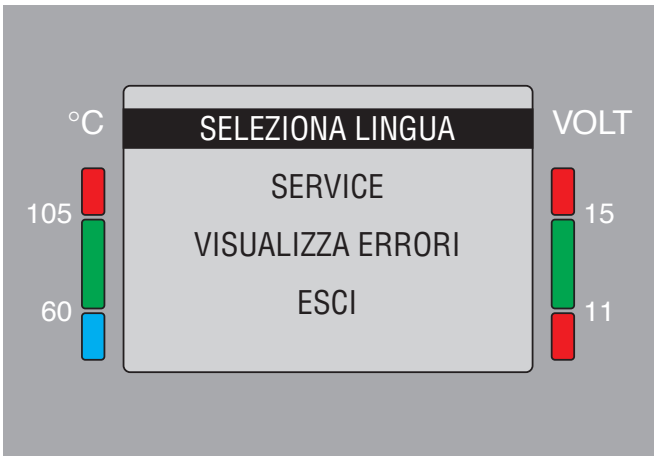


- Press button **MODE 1** to quit and display the home page.

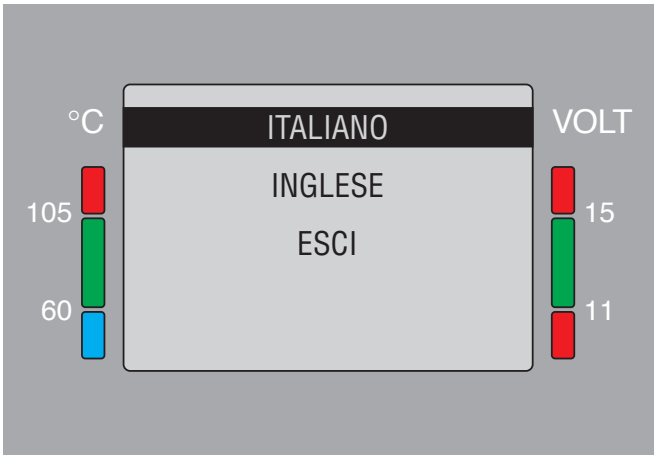


Language selection sub-menu

- Select **SELECT LANGUAGE** using button **MODE 2**.



- Press button **MODE 1** to open the sub-menu.



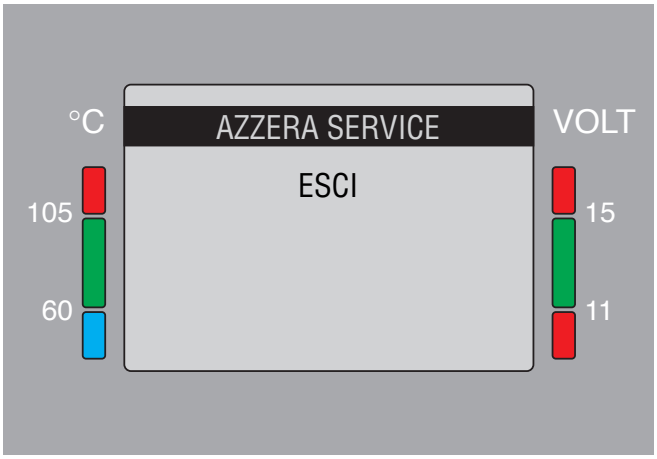
- Press button **MODE 2** to scroll through the list.
- Press button **MODE 2** to select the language and quit the sub-menu (the **EXIT** command lets you quit the menu without changing any settings)
- By quitting the sub-menu, you will go back to the **SERVICE** window of the main menu.

Password protected service sub-menu

- Access to this sub-menu is reserved to authorised service centres and is therefore password protected.
- Select **SERVICE** using button **MODE 2**.



- Press button **MODE 1** to open the sub-menu.



- Press button **MODE 2** to scroll through the list.
- Press button **MODE 1**, type in the password 4482 using buttons **MODE 1** and **MODE 2**, and then check that the text **"Service Reset"** appears.

CAUTION

The service can be reset only after verifying that the scheduled service operations have have been carried out.

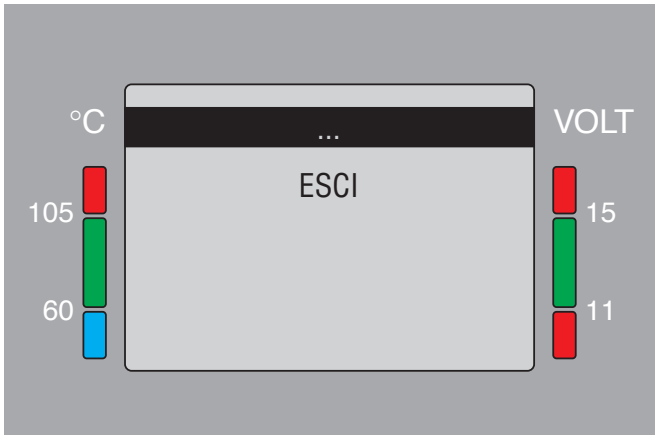
- Press the **ESC** button to quit the menu without changing the settings.
- By quitting the sub-menu, you will go back to the **DISPLAY ERRORS** window of the main menu.

Error display sub-menu

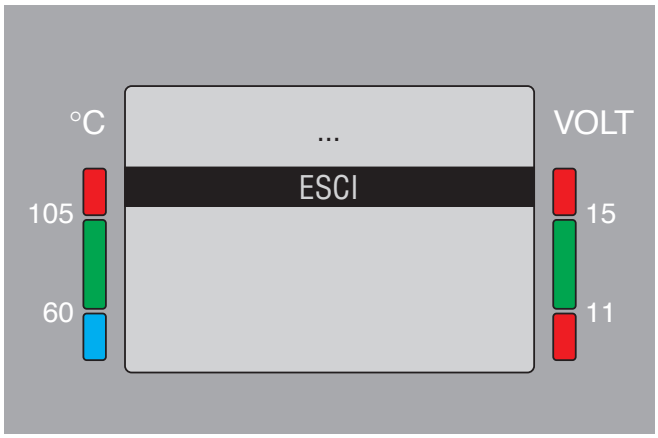
- Select **DISPLAY ERRORS** using button **MODE 2**.



- Press button **MODE 1** to open the sub-menu.



- Press button **MODE 2** to scroll through the errors list.
- To quit the sub-menu, select **EXIT** (using button **MODE 2**) and then press button **MODE 1** to confirm.



- By quitting the sub-menu, you will go back to the **EXIT** window of the main menu.

- Fault display

As already mentioned, when the **DEUTZ** or **LINDE** units detect an internal malfunction, they send an error message.
The system activates the buzzer intermittently and the display shows the corresponding error message.
If the operator presses one of the two buttons **MODE 1** or **MODE 2**, the buzzer stops sounding, but the displayed message remains until the fault is rectified.
If an error is already present (also when the buzzer stopped) and a second error triggers, the panel warns of this second error by turning the relevant light on and by activating the buzzer.
All pressent and active errors are alternate displayed on the screen.
The system can display up to 10 errors. To view the errors list, you can enter the **CONFIGURATION** menu and select the item **VIEW ERRORS**.
If a second error triggers before the operator presses button **MODE 1** or button **MODE 2**, the system store the error in emory and doesn't display the relevant message. Once the operator presses button **MODE 1** or **MODE 2** to stop the buzzer warning of the first error, the second error is displayed on the screen after a few seconds.
If there is at least an error when the machine is turned on, the system activates the buzzer immediately and intermittently and the relevant error message is displayed.
If there are no errors, the system display the message **NO ERROR** which, after a few seconds, turns into the maintenance interval.

- Initial check

When the machine is turned on, the system turns on all the display pixels and the 15 warning lights for one second so the operator can check the proper operation.
Likewise, an audible signal allows to check the buzzer operation.

- Connector

The connector is placed at the back of the panel and is an AMP 36-way type.

Pin	Function
1	Warning light L1 - Alternator
2	NC
3	"Platform mode" digital input CA/+12V
4	NC
5	+12V Key
6	NC
7	NC
8	Warning light L6 - Engine air filter
9	Fuel gauge (ohm)
10	Warning light L7 - Change fault alarm
11	Warning light L10 - Red generic
12	GND
13	NC
14	NC
15	NC
16	Hydraulic oil temperature (ohm)
17	NC
18	+12V Batteria
19	Warning light L9 - Hydraulic oil level
20	NC
21	Left pushbutton
22	Warning light L11 - position lights
23	NC
24	Right pushbuttons
25	Warning light L12 - Fuel reserve
26	NC
27	Warning light L8 - Water in fuel filter
28	NC
29	NC
30	NC
31	NC
32	Warning light L5 - Hydraulic oil filter
33	Warning light L4 - Low brake oil pressure
34	Can H
35	Can L
36	Warning light L3 - Parking brake

2.26 CONTROLLING AND SETTING THE MACHINE WITH WINSCOPE

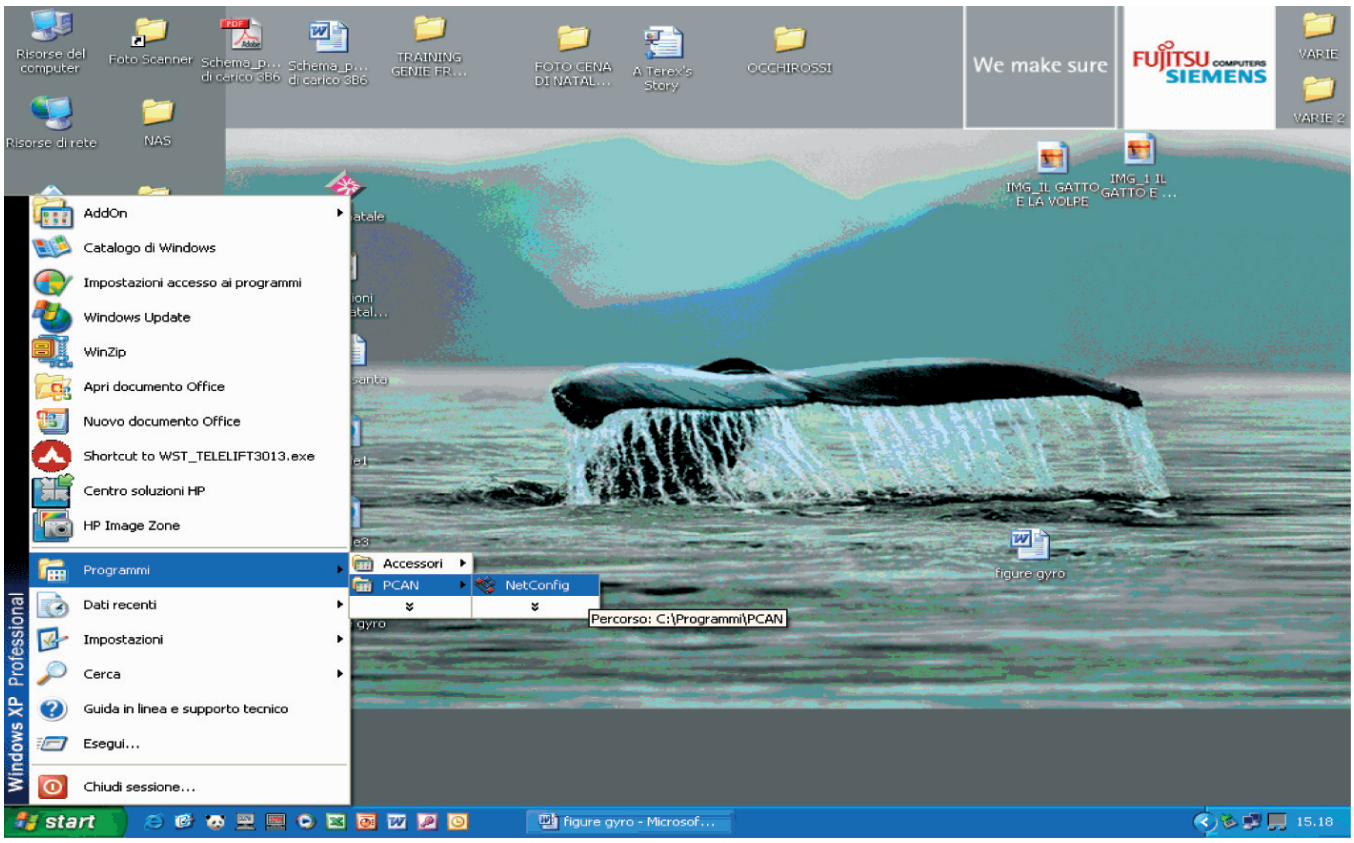
In order to control the system, you shall install 2 programmes:

- **CAN VIEW**
- **WINSCOPE**

CAN VIEW is a tool which lets you display the messages relevant to the CAN network and to interact with the relevant units connected.
WINSCOPE is a programme which lets you display the state of the machine and modify some parameters relevant to the speed of some movements of the machine boom.

- **Configuring the machine: installing and configuring the software**

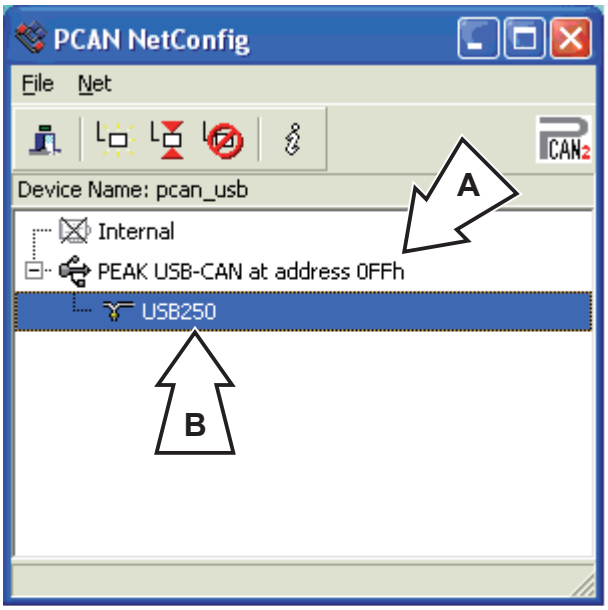
Once the **CAN VIEW** programme has been installed on the PC, you shall configure the same so it can “see” the CAN network.
This operation shall be performed on each single PC unless, for some reasons, the set parameters are changed.
To set the network, launch the programme from the **START => Programmes => PCAN => NetConfig.** menu.



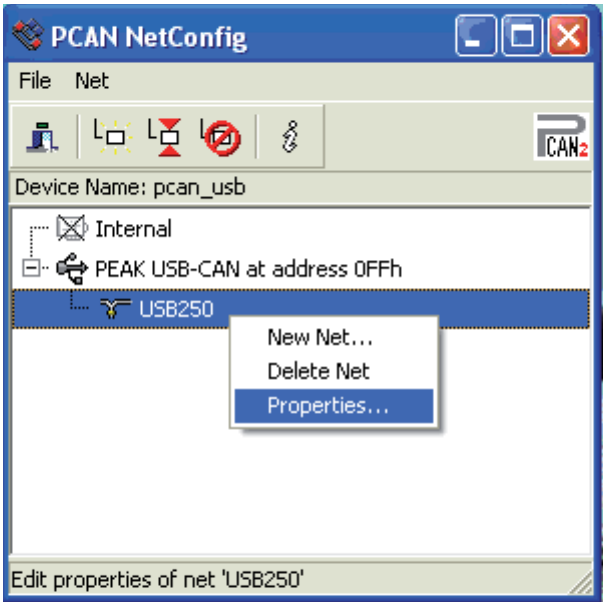
A window equivalent to the one to the side, will appear.

Select the network (if any) under the **PEAK USB-CAN at address 0FFh** node (ref. A). In the example above, this is identified with **USB250** (ref. B) but it could also have another denomination.

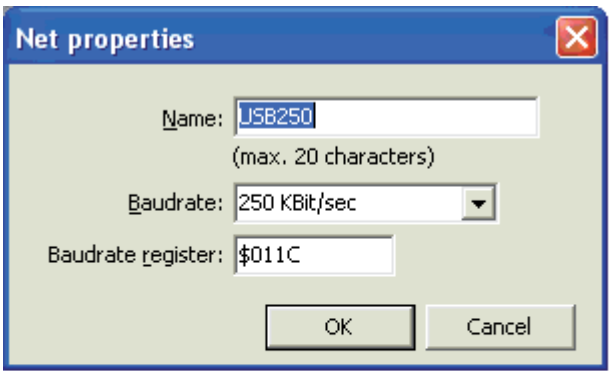
If no network exists, select the **PEAK USB-CAN at address 0FFh** node.



Once the existing network has been selected, press the right button of the mouse and select the **Properties** menu.
If you have selected the **PEAK USB-CAN at address 0FFh** node, choose the **New Net** menu.



In both cases, a window like the one to the side, will appear.
Type in the name you wish to assign to the network (in the example the chosen name is **USB250**) and then select the value 250 Kbit/sec in the **Baudrate** window. The last field present will be filled in automatically.
Press **OK** to quit and save the settings.



Now the network is configured. Unless the set parameters are changed, you shall not repeat this procedure on your PC.

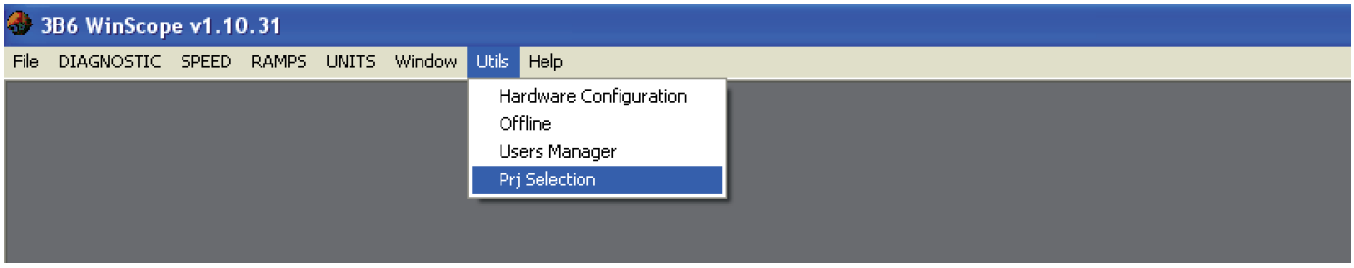
At this point, install the **WINSCOPE** programme on your PC.
The settings are loaded by TEREXLIFT during the machine assembly (e.g.: movement speeds, ramps, etc.).

CAUTION

These data have been empirically evaluated and vary from a machine model to the other; they can changed at any times and for each machine, if necessary.

Installing **WINSCOPE**

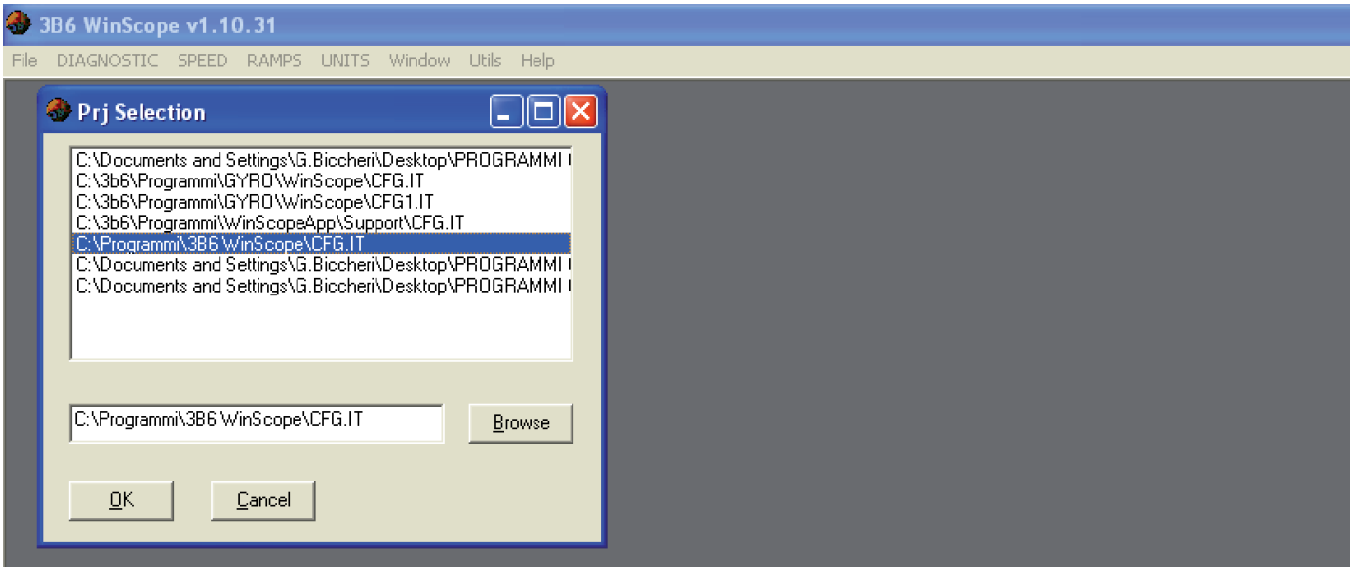
This programme lets you carry out a number of adjustments, including the adjustment of the movement speeds and the ramps.



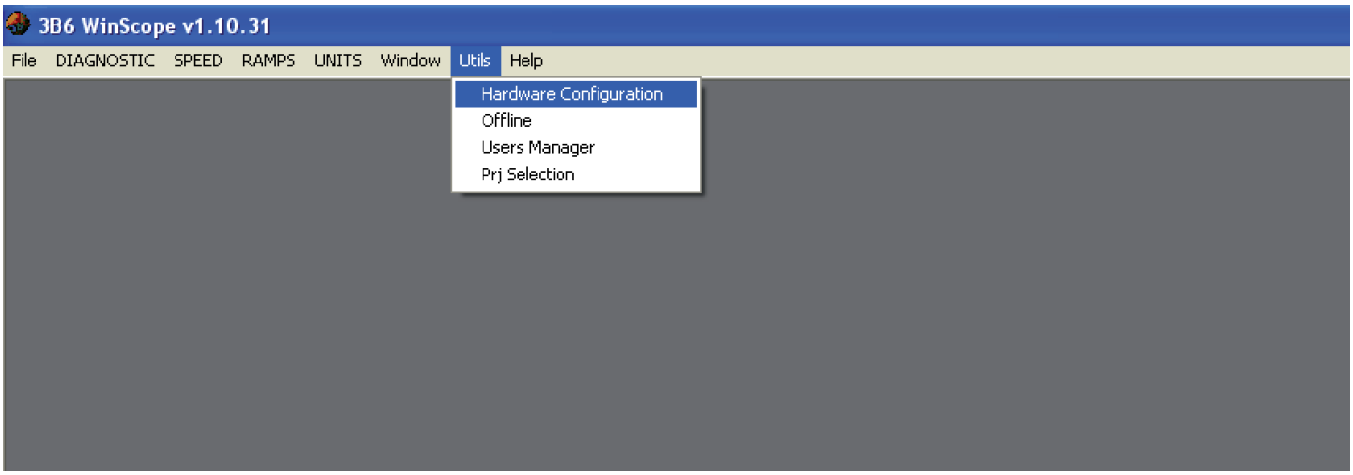
When you use the programme the very first time, you shall configure the same.
Select the **Prj Selection** item from the **Utils** menu.

Select the position of the **CFG.IT** file or press the **Browse** button to search for the same on your PC.
Selecting this file lets you load the menus and parameters of the machine to be used.

Press the **OK** button to close the window.

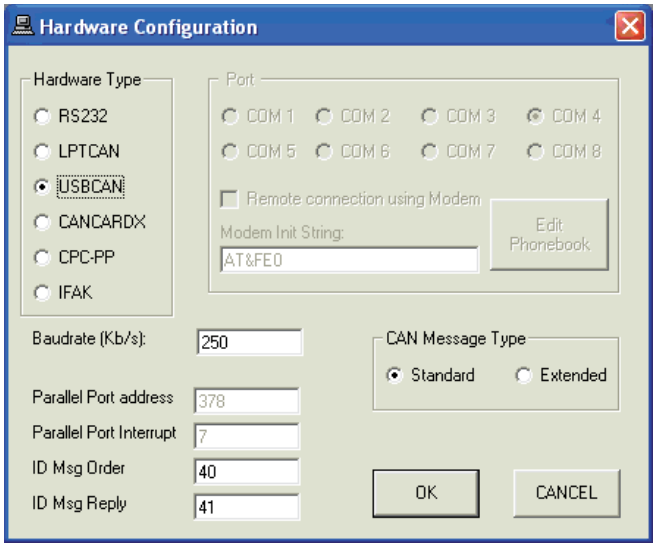


Select the **Hardware Configuration** item from the **Utils** menu.



A window like the one to the side, will appear.

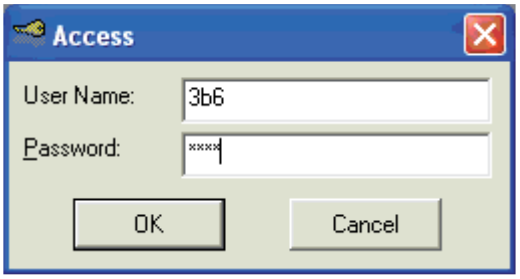
Type the values shown in the picture and press the **OK** button to close the window.
Quit and re-launch the **WINSCOPE** programme to activate the chosen configuration.



Now the programme configuration is completed and this procedure shall never be repeated.

The menu of the main page shows the functions which can be changed.

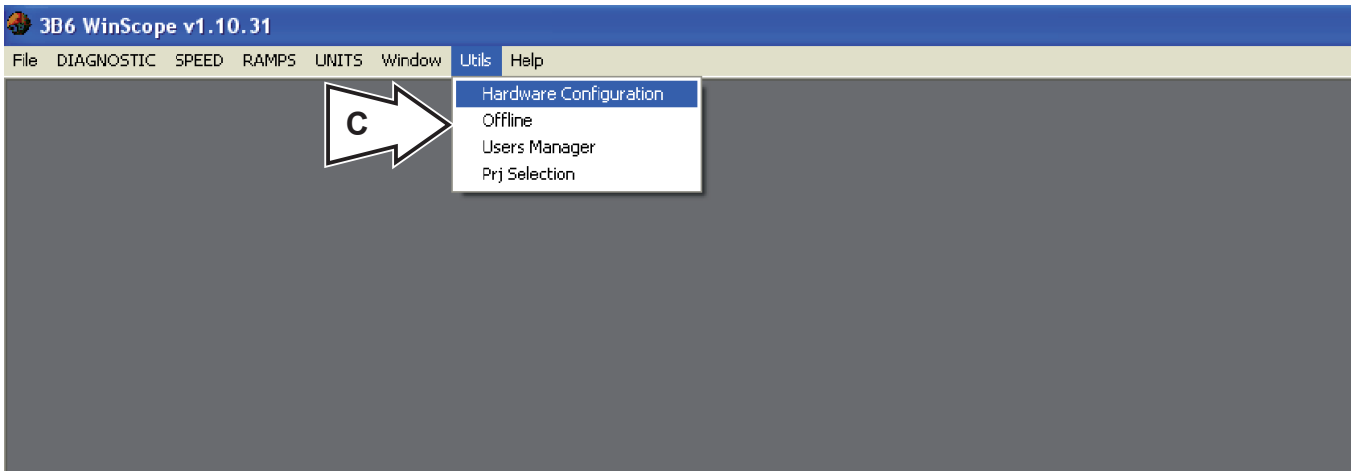
When you launch the **WINSCOPE** programme and select a menu field, the system will ask you to type in your **User Name** and **Password**.
If you want to view the parameters without effecting any changes, press the **Cancel** button.
If, on the contrary, you want to change some parameters, you shall type in **3b6** in the User Name field and **4482** in the Password field and then confirm by pressing the "**OK**" button.



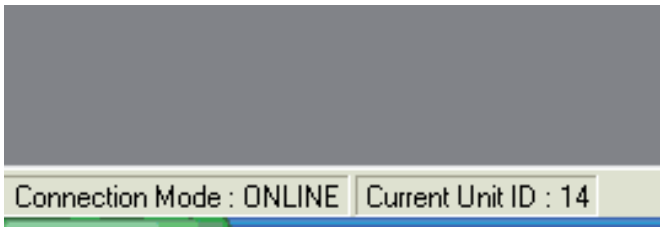
CAUTION

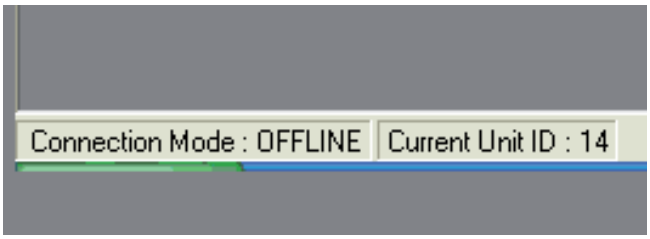
In order to change the machine parameters, you shall turn on the electronic control unit by turning the relevant key to the ON position (this can also be done without starting the diesel engine).

Check that the **WINSCOPE** programme is active (Offline); if the programme is deactivated (Online), as shown in the picture below, press on **C**.

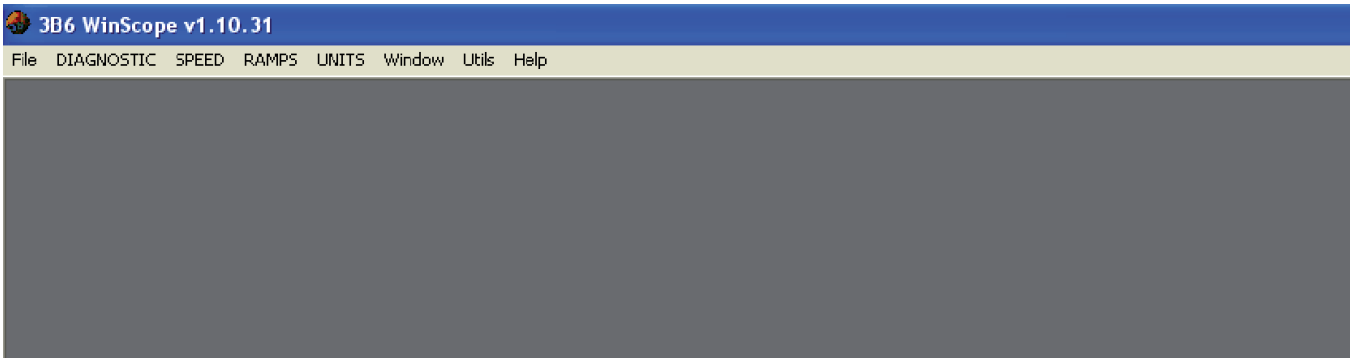


In order to verify if the programme is running properly, check the message in the box on the bottom left of the window. If the message near “Connection Mode” is TIMEOUT, there is no connection with the machine. Check the reason of the disconnection and restart **WINSCOPE**.

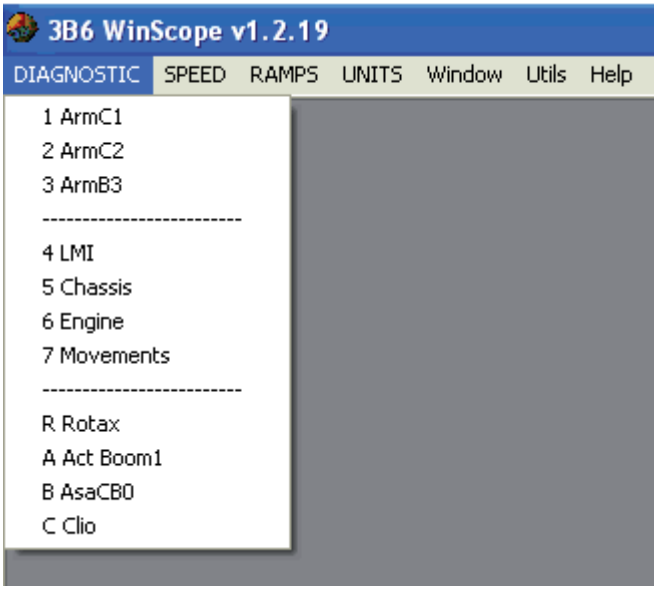




Now you can start using the **WINSCOPE** programme to set the machine parameters.
The main window is similar to the one shown below.

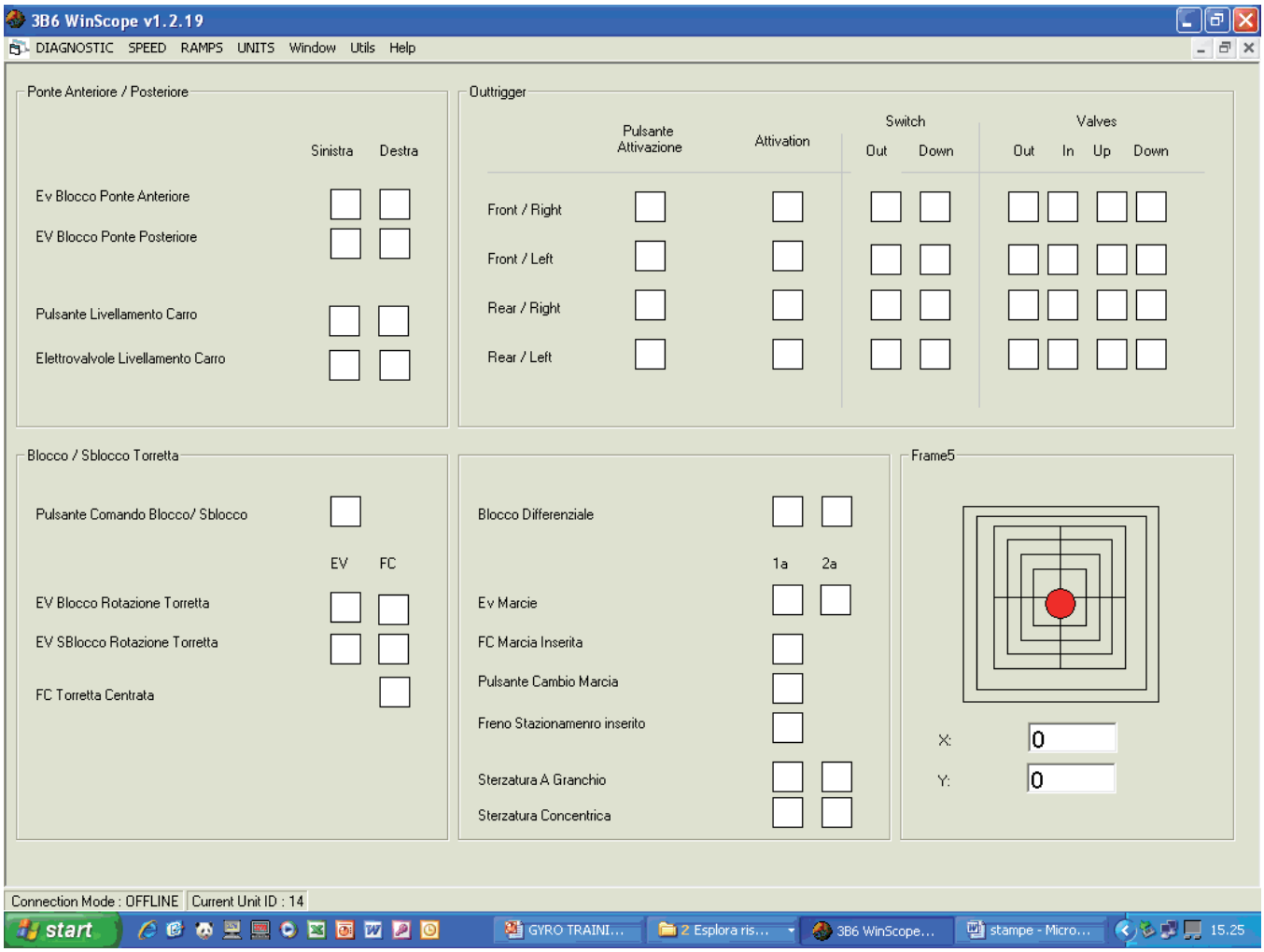


There are 7 drop-down menus at the top of the window.
The first main menu is the **DIAGNOSTIC** menu; the sub-menus are shown in the picture to the side and are relevant to the inputs and outputs of the main electronic board, as well as other features.



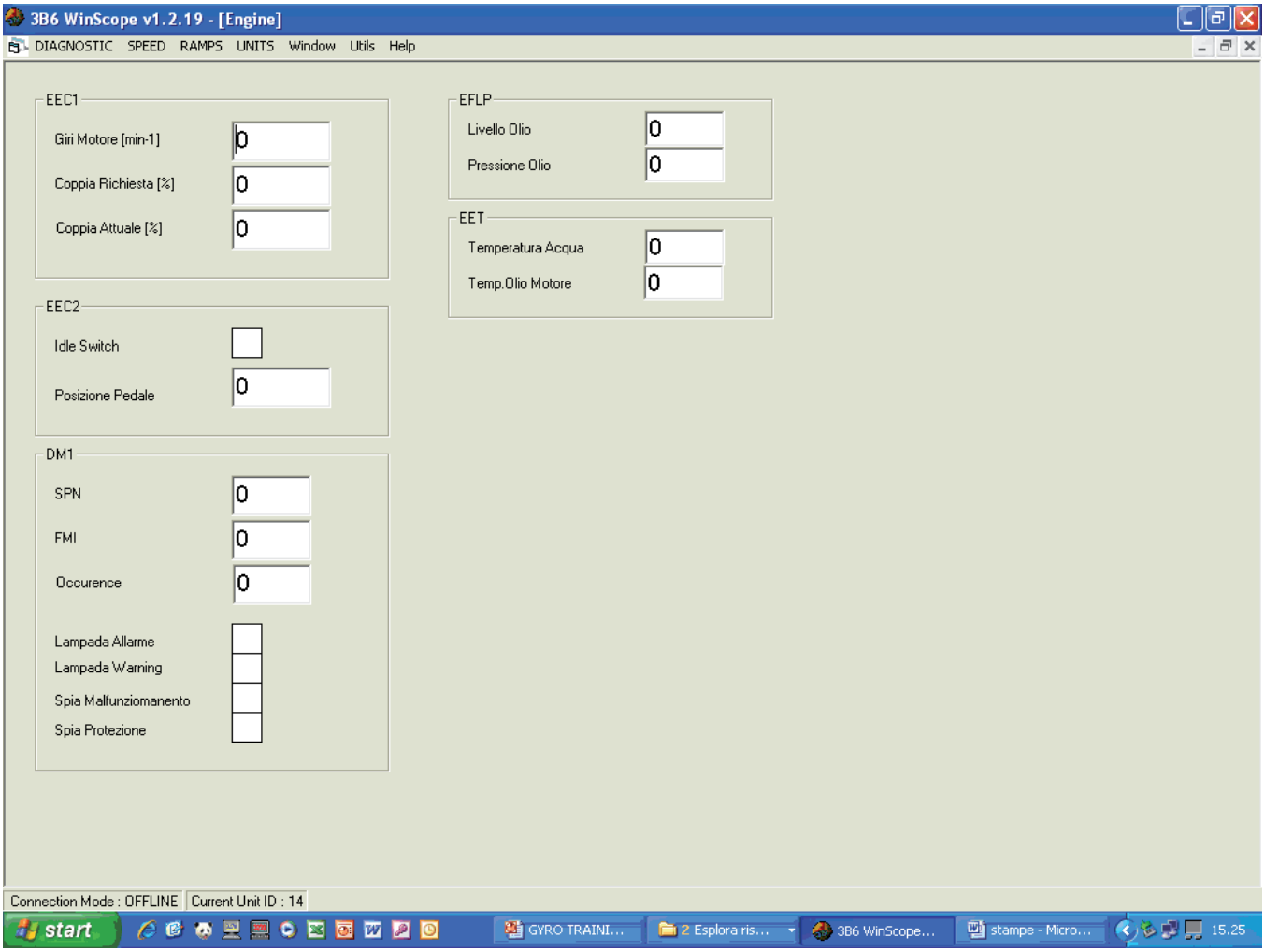
You find the **IN/OUT** description, with the PIN number and a small flag showing if **IN/OUT** is active or not. Additionally, there is a small box where you can view the **CAN** messages from the **BOOM** and to the **BOOM**.
ArmC1 corresponds to the front axle.
ArmC2 and **ArmB3** have equivalent windows; the first is relevant to the rear axle; the second to the machine boom.
These windows display information on the boom position (redundant), the weight value, the pressure transducers, the stabilizers position and the activation of the stabilizer valves.

The **Chassis** sub-menu is similar to the one shown below.

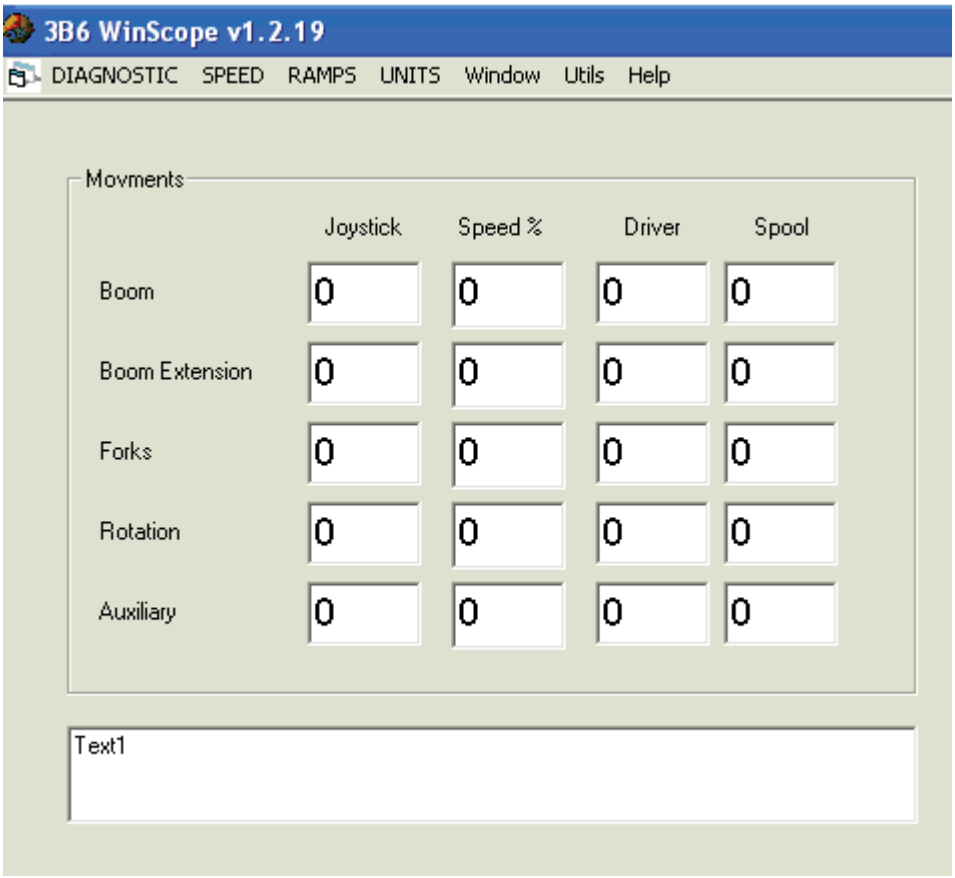


This window displays information on the switches and the stabilizers.

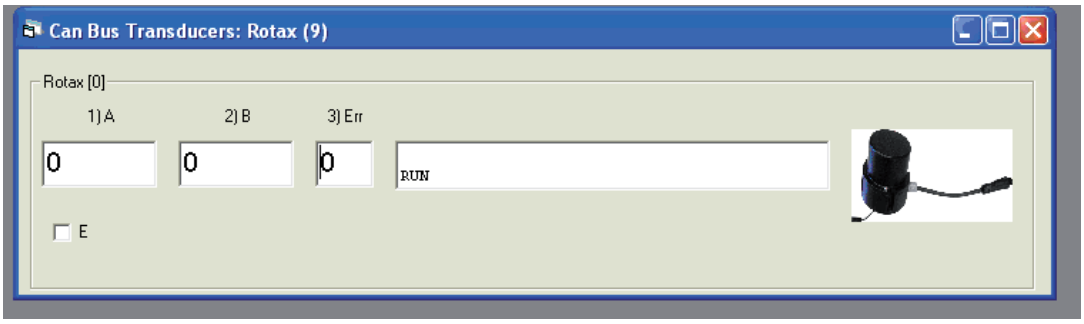
The **Engine** sub-menu displays the main parameters of the diesel engine of the machine.

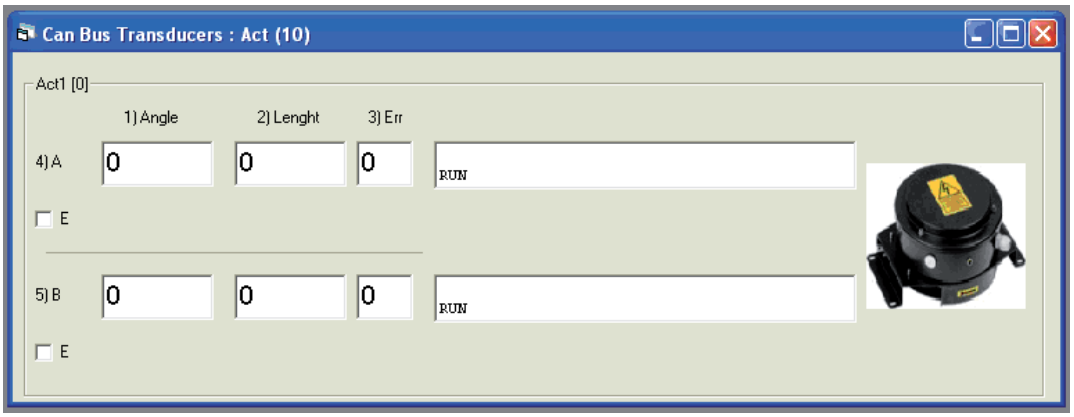


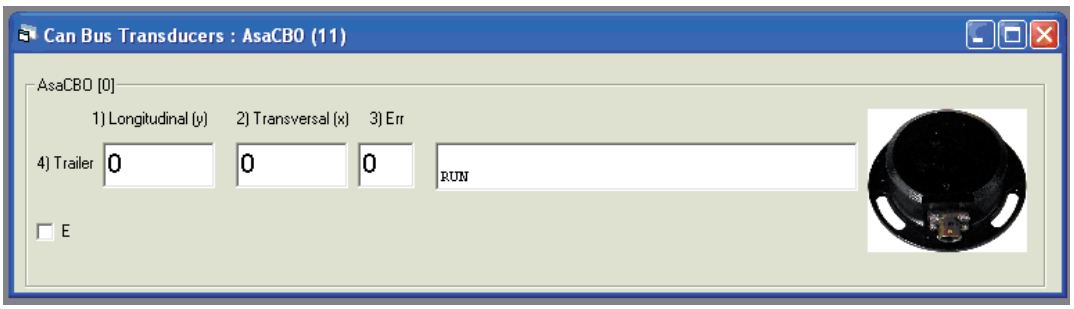
The **Movements** sub-menu indicates the position of the lift, and the speed and position of the boom cursor.

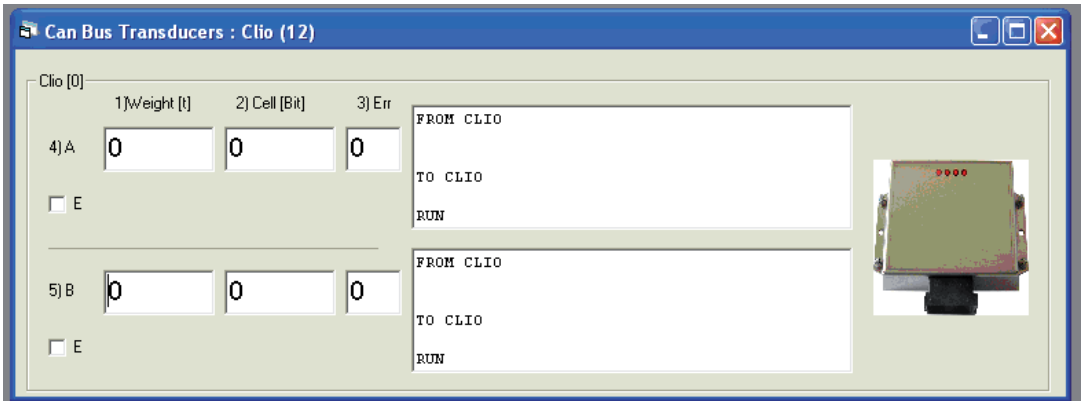


The last four sub-menus are relevant to the **Rotax**, **ACT**, **ASA** and **CLIO** units; they show the actual values and the CAN messages exchanged among these units.

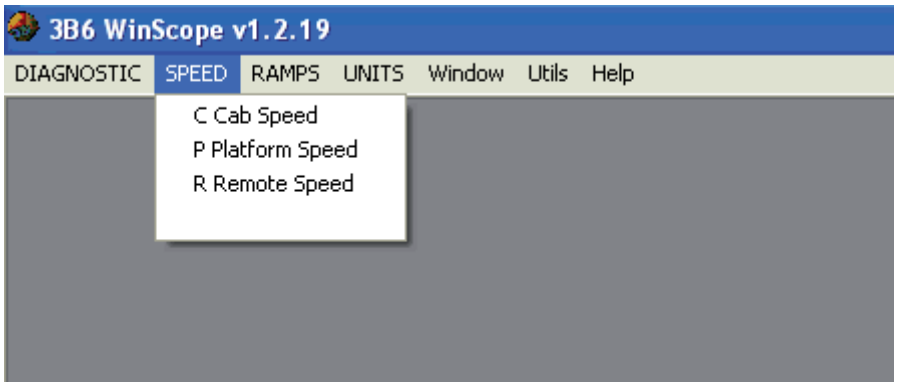








The second main menu is the **SPEED** menu and has 3 sub-menus as shown in the picture below.



From these menus you can adjust the speed of each single movement from any control position. All of them are independent.
Adjust the values in the **VAL** column (some of these parameters have a range within which you shall keep).

3B6 WinScope v1.2.19 - [Cab Speed]

DIAGNOSTIC SPEED RAMPS UNITS Window Utils Help

ID	T0	T1	VAL	UM	TEXT
0	-		0	%	Boom lifting speed
1	-		0	%	Boom lowering speed
2	-		0	%	Boom extending speed
3	-		0	%	Boom retracting speed
4	-		0	%	Clockwise turret rotation speed
5	-		0	%	Anticlockwise turret rotation speed
6	-		0	%	Fork tilting up speed
7	-		0	%	Fork tilting down speed
8	-		0	%	Auxiliary direction 1 speed
9	-		0	%	Auxiliary direction 2 speed

Cab Speed menu

3B6 WinScope v1.2.19 - [Platform Speed]

DIAGNOSTIC SPEED RAMPS UNITS Window Utils Help

ID	T0	T1	VAL	UM	TEXT
0	-		0	%	Boom lifting speed
1	-		0	%	Boom lowering speed
2	-		0	%	Boom extending speed
3	-		0	%	Boom retracting speed
4	-		0	%	Clockwise turret rotation speed
5	-		0	%	Anticlockwise turret rotation speed
6	-		0	%	Platform clockvise rotating speed
7	-		0	%	Platform rotating speed

Platform Speed menu

3B6 WinScope v1.2.19 - [Radio Speed]

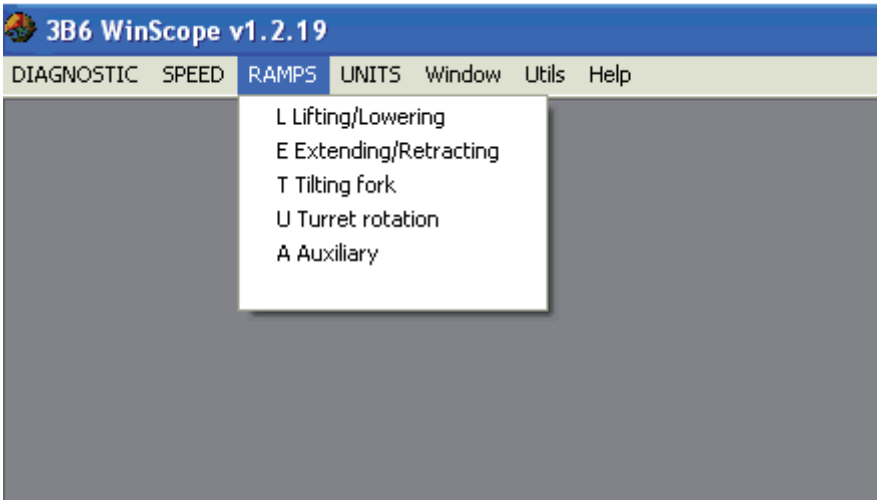
DIAGNOSTIC SPEED RAMPS UNITS Window Utils Help

ID	T0	T1	VAL	UM	TEXT
0	-		0	%	Boom lifting or lowering actual speed
1	-		0	%	Boom lifting high speed
2	-		0	%	Boom lowering high speed
3	-		0	%	Boom lifting low speed
4	-		0	%	Boom lowering low speed
5	-		0	%	Boom lifting minimum speed
6	-		0	%	Boom lowering minimum speed
7	-		0	%	Boom extending or retracting actual speed
8	-		0	%	Boom extending high speed
9	-		0	%	Boom retracting high speed
10	-		0	%	Boom extending low speed
11	-		0	%	Boom retracting low speed
12	-		0	%	Boom extending minimum speed
13	-		0	%	Boom retracting minimum speed
14	-		0	%	Fork tiliting actual speed
15	-		0	%	Fork tiliting up high speed
16	-		0	%	Fork tiliting up high speed

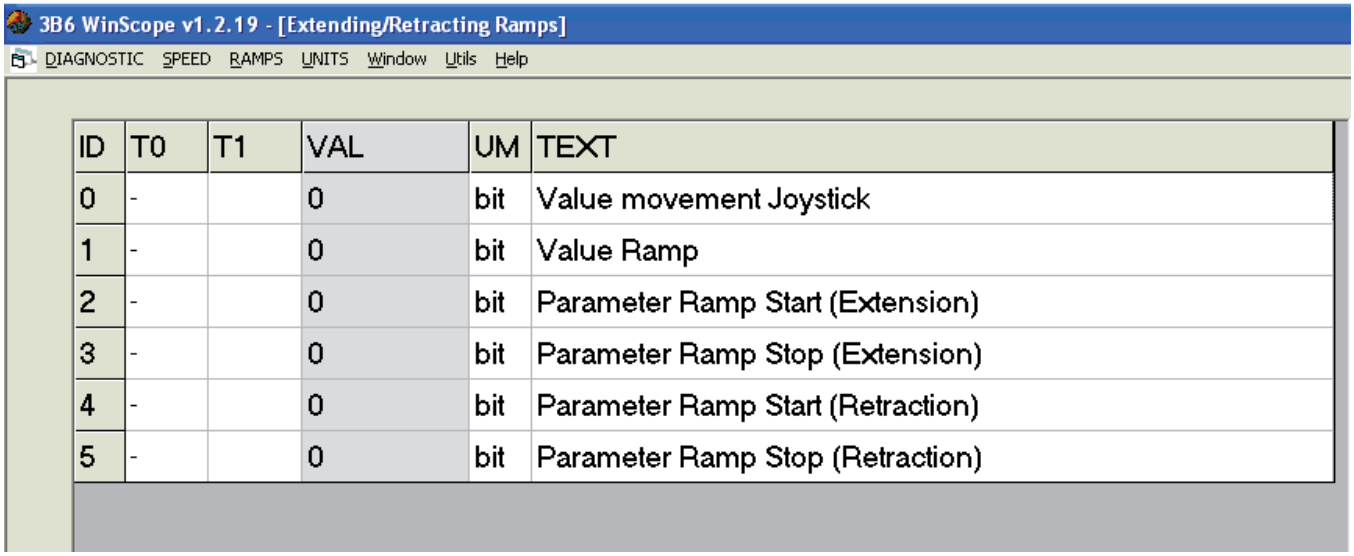
Connection Mode : OFFLINE | Current Unit ID : 14

Radio Remote Control Speed menu

The third main menu is the **RAMPS** menu and has 5 sub-menus (as shown in the picture below), each of them representing a double function of the boom.



As the 5 menus are quite similar, we propose one single example for all of them.



ID	T0	T1	VAL	UM	TEXT
0	-		0	bit	Value movement Joystick
1	-		0	bit	Value Ramp
2	-		0	bit	Parameter Ramp Start (Extension)
3	-		0	bit	Parameter Ramp Stop (Extension)
4	-		0	bit	Parameter Ramp Start (Retraction)
5	-		0	bit	Parameter Ramp Stop (Retraction)

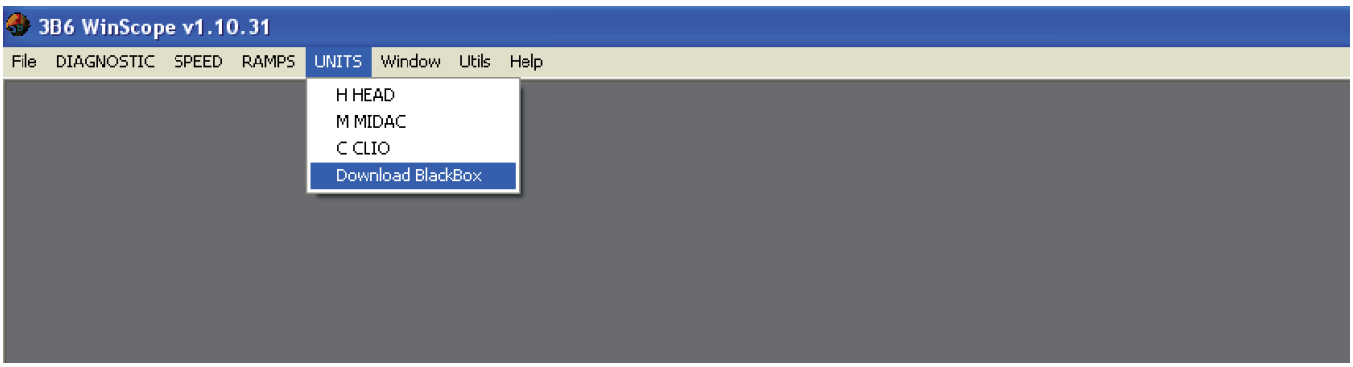
Extending/retracting ramps menu

The value entered in the Ramp field is R, the acceleration time is **T** = 100/R (s); so if you enter R=1000, you will obtain a slow-down/acceleration time of 0.1 seconds.

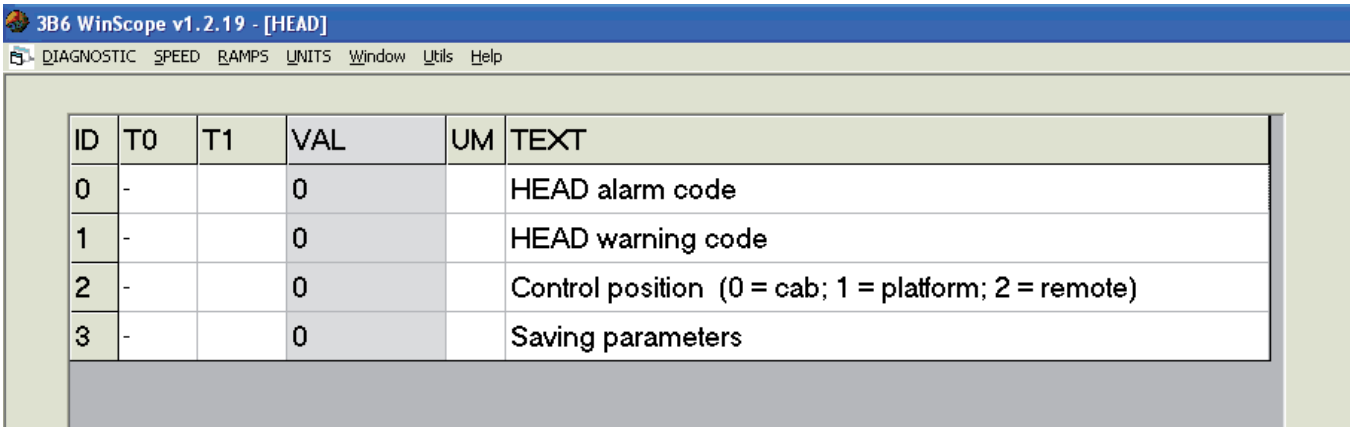
CAUTION

It is advisable not to go below the value of R=100.

The last main menu is the **UNITS** menu and has 4 sub-menus as shown in the picture below.



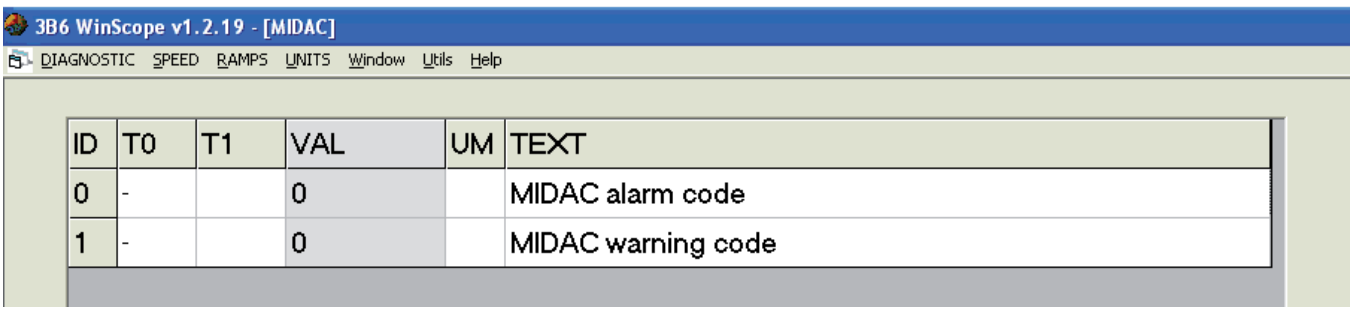
The **HEAD** sub-menu is as follows:



ID	T0	T1	VAL	UM	TEXT
0	-		0		HEAD alarm code
1	-		0		HEAD warning code
2	-		0		Control position (0 = cab; 1 = platform; 2 = remote)
3	-		0		Saving parameters

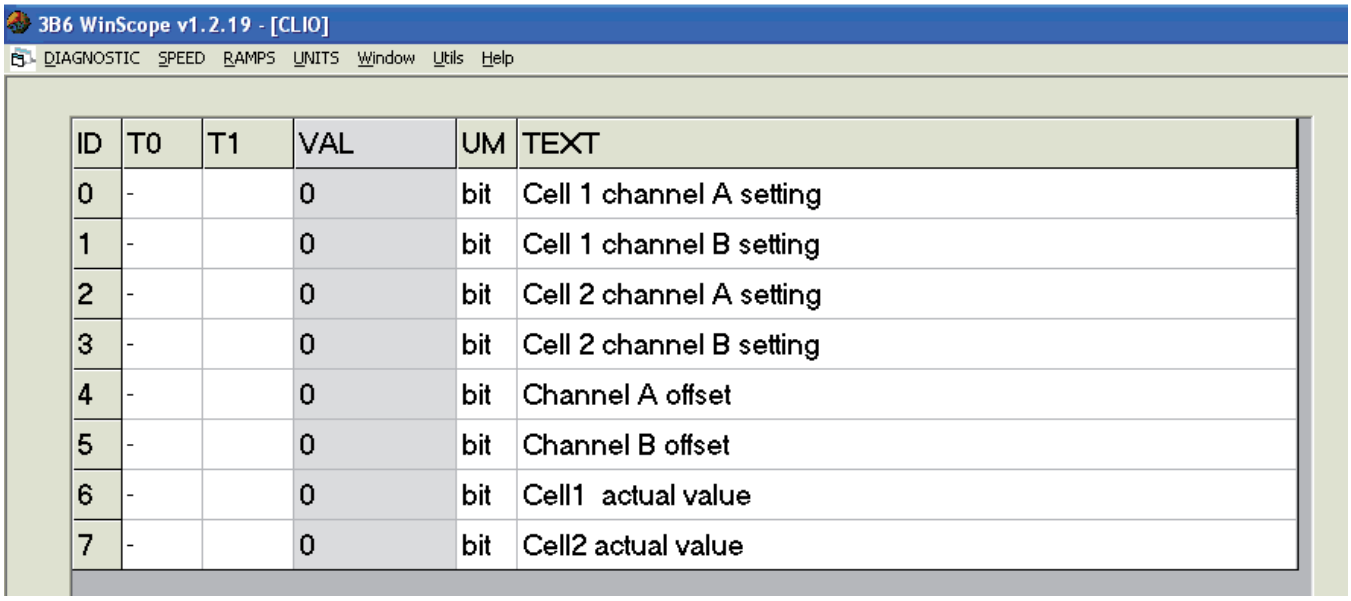
It shows the alarms, the warnings, the flags of the control mode and the **saving parameters** field. The latter is quite important as, after having set the speed and time of the response, you shall save the parameters to turn the same permanent.
Type in **1** in this field and wait for a few seconds until **0** is displayed again to show that the new settings have been saved in memory.

The **MIDAC** sub-menu displays the alarms and warnings for this unit.



ID	T0	T1	VAL	UM	TEXT
0	-		0		MIDAC alarm code
1	-		0		MIDAC warning code

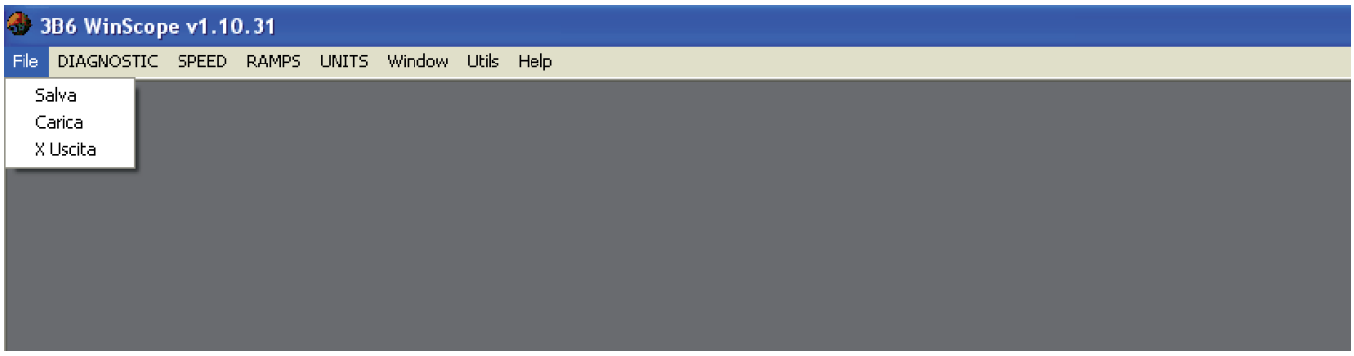
The **CLIO** sub-menu shows some important parameters of this unit, used with aerial platform.



ID	T0	T1	VAL	UM	TEXT
0	-		0	bit	Cell 1 channel A setting
1	-		0	bit	Cell 1 channel B setting
2	-		0	bit	Cell 2 channel A setting
3	-		0	bit	Cell 2 channel B setting
4	-		0	bit	Channel A offset
5	-		0	bit	Channel B offset
6	-		0	bit	Cell1 actual value
7	-		0	bit	Cell2 actual value

The first six are referred to the platform calibration, the last two show the output values of the load cell for the first two channels.

The **DOWNLOAD BLACKBOX** sub-menu lets you display the events which have occurred on the machine on your PC (up to max 1000 events).



Using the **SAVE** button, the current settings are downloaded and saved in your PC, while, by pressing the **LOAD** button, you can load the parameters saved in your PC directly into the machine.

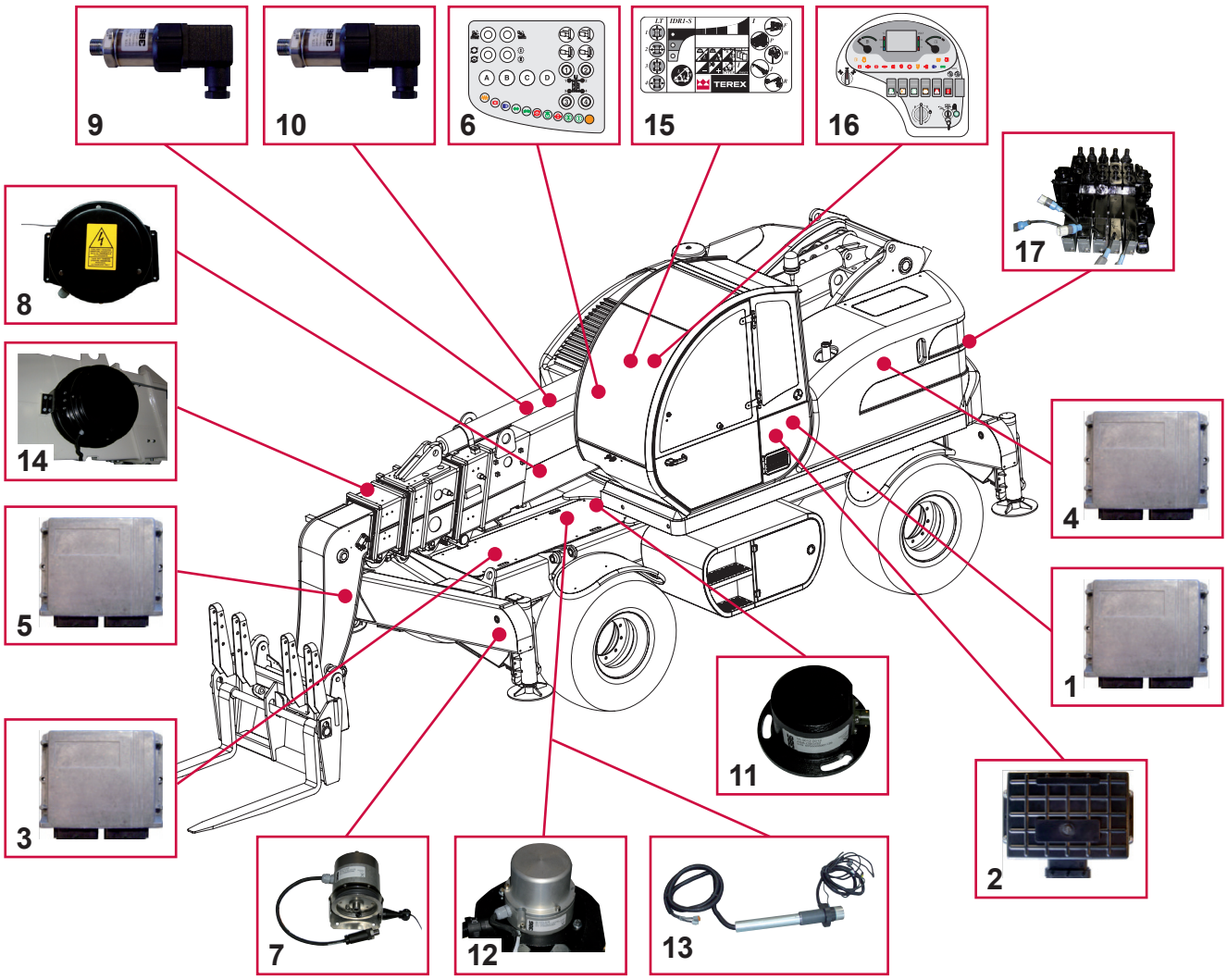
2.27 MIDAC SYSTEM

• General

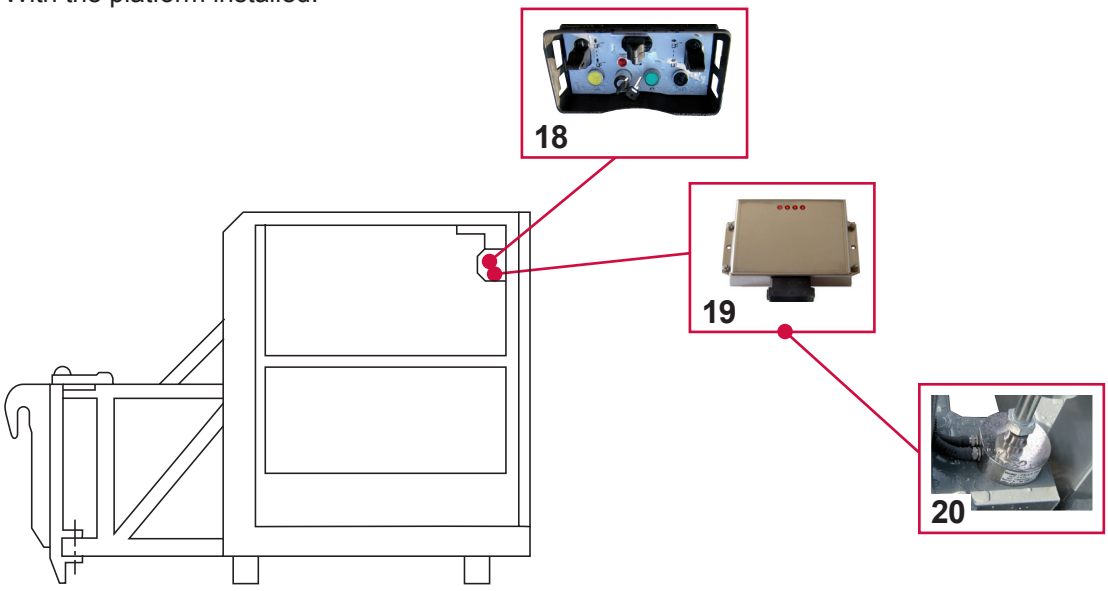
The HT04.x system, dealt with in this chapter, is used for the total control of the Gyro machines.
The main features are as follows:

1. Total management via CANBUS control units
2. Boom movement management from driving place
3. Boom movement management from platform
4. Boom movement management from remote control
5. Outriggers' safety devices management
6. Limiter management according to standard ISO13000 and EN280
7. Variable crossbars management
8. Black Box and alarms management with 500 events in memory.

- Layout



With the platform installed:



Ref.	Description	N.
1	Head type central unit	1
2	Limiter unit	1
3	Arm board - ARM C1 front carriage	1
4	Arm board - ARM C2 rear carriage	1
5	Arm board - ARM C3 platform and signals on boom	1
6	Cab Cluster panel	1
7	Servo-assisted reels for outriggers' extension	4
8	Angle/length servo-assisted reel with double transducers	1
9	Main cylinder pressure transducers	2
10	Compensation cylinder pressure transducers	2
11	Undercarriage levelling sensor	1
12	Turntable rotation Rotax sensor	1
13	8-passage rotary joint	1
14	Reel for 6-passage platform signals	1
15	Cab display	1
16	Right control panel (not 3B6) - Radio unit (not 3B6)	1
17	Boom control driver (not 3B6) - Diagnostic connector	1
18	Control console from platform	1
19	Platform weight control unit	1
20	2.5t redundant load cell	1

HEAD unit 1
It is equipped with a microprocessor for managing the movements, the ramps, etc.
It is positioned on a base and has a block programme (interpreter).

ARM units 3, 4, 5
They are the HEAD slave boards; they have no programmable logics but are equipped with micro-switches and manage the CAN I/O. Their outside aspect is similar to the one of the HEAD, but they have a resin coating as they are used outdoors. Protection degree IP67.

ROTAX unit 12
It is equipped with an electric joint for the passage of the digital signals. There are three potentiometers changed by 120 degrees in phase to guarantee redudancy (each potentiometer has a dead zone of some 40 degrees, therefore with the potentiometers changed in phase, we can read the turret position in redundancy).

CLUSTER panel unit 6
It is equipped with two connectors; the small on reads the CAN and the power supply, the other reads relays, right-hand panel pushbuttons and transfers them all around the machine.

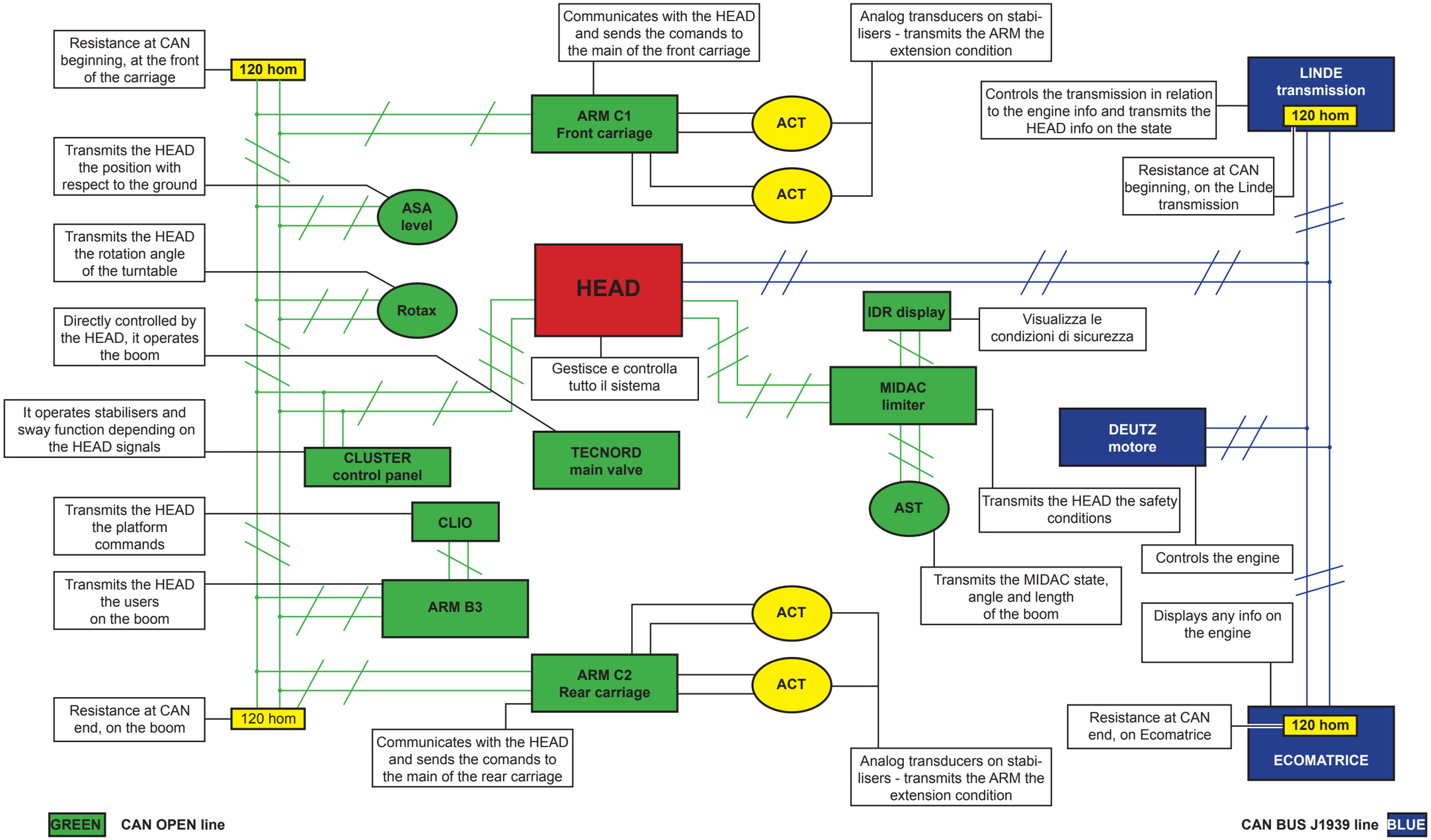
ECOMATRICE unit 16
It reads J1939 and CANOpen. ARM and MIDAC read J1939 and HEAD manages it (it can display the information on engine and transmission).

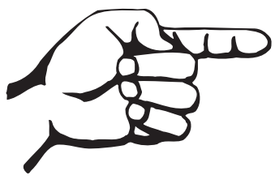
MIDAC unit 2
It has a flash-memory to save programme and charts in memory. It shall be re-programmed via sw with a PC.

ASA unit 11
It reads the two X and Y axes.

REEL unit 14
It is the CAN bus.

CLIO unit 19
It has two CPUs for the redundancy; it reads the two cell channels. It is connected to the CanBus and saves the settings in memory.

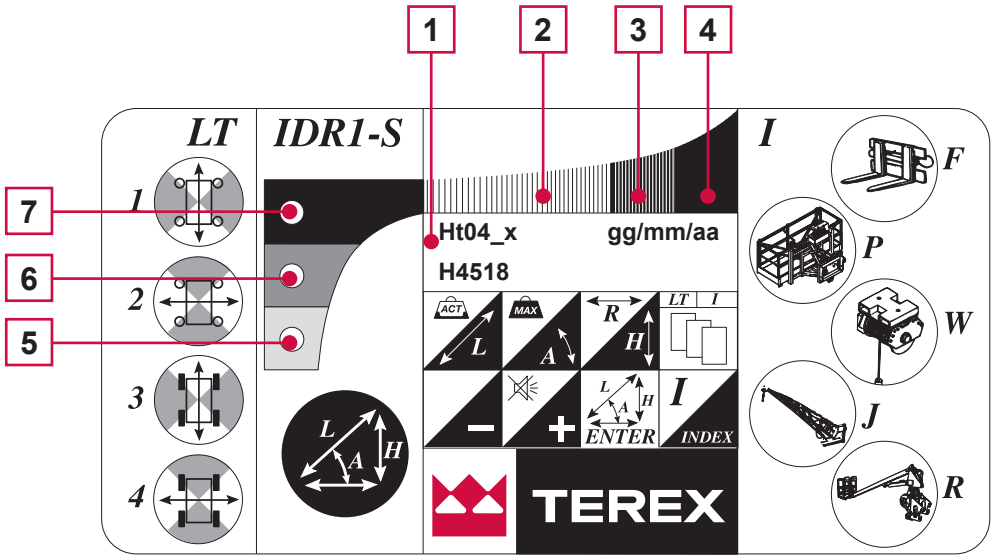

Resistance at CAN beginning, at the front of the carriage
120 hom
Communicates with the HEAD and sends the comands to the main of the front carriage
Analog transducers on stabi-lisers - transmits the ARM the extension condition
ARM C1 Front carriage
ACT
ACT
Controls the transmission in relation to the engine info and transmits the HEAD info on the state
LINDE transmission
120 hom
Resistance at CAN beginning, on the Linde transmission
Transmits the HEAD the position with respect to the ground
ASA level
Transmits the HEAD the rotation angle of the turntable
Rotax
HEAD
IDR display
Visualizza le condizioni di sicurezza
Directly controlled by the HEAD, it operates the boom
Gestisce e controlla tutto il sistema
MIDAC limiter
It operates stabilisers and sway function depending on the HEAD signals
CLUSTER control panel
TECNORD main valve
DEUTZ motore
AST
Transmits the HEAD the safety conditions
Transmits the HEAD the platform commands
CLIO
Controls the engine
Transmits the HEAD the users on the boom
ARM B3
Transmits the MIDAC state, angle and length of the boom
ACT
Displays any info on the engine
ARM C2 Rear carriage
ACT
Resistance at CAN end, on the boom
120 hom
Communicates with the HEAD and sends the comands to the main of the rear carriage
Resistance at CAN end, on Ecomatrice
120 hom
ECOMATRICE
Analog transducers on stabi-lisers - transmits the ARM the extension condition
GREEN
CAN OPEN line
CAN BUS J1939 line
BLUE



Intentionally blank page

- Operator panel

Load % condition and alarms



1. LCD bar on alphanumeric display showing the percentage of lifted load with respect to the max load that can be lifted under such working conditions.

2. White reference with vertical black stripes: Safety zone.

3. Black reference with vertical white stripes: Alarm zone (load lifted above 90% of the max admissible load).

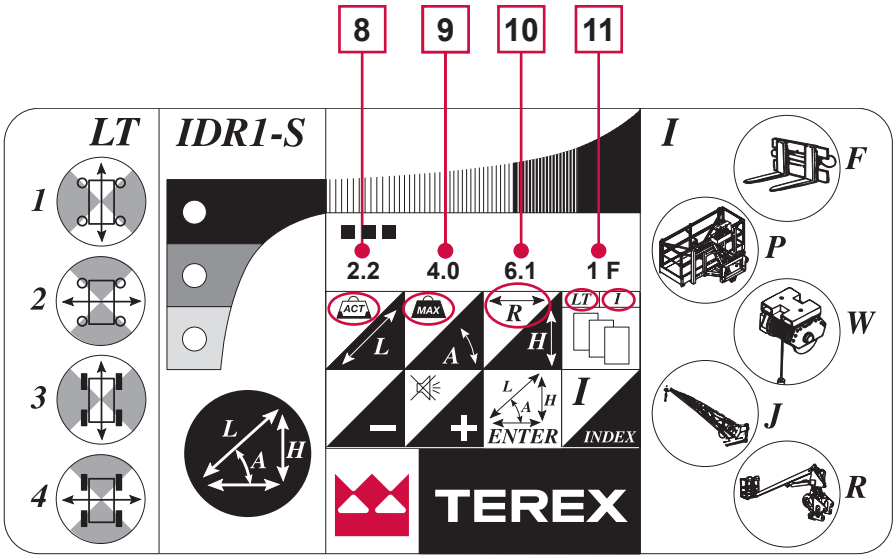
4. Black reference: Block zone (load lifted above 100% of the max admissible load).

5. Green light lit: Safety.

6. Yellow light lit: alarm (external audible alarm sounding).

7. Red light lit: Movements blocked (external audible alarm sounding).

Main work data



8. WEIGHT OF THE LIFTED LOAD, displayed only when you work with the forks with the boom fully retracted (as an option it is displayed when winch and platform are used in any extension condition).

Graphic symbol underneath: (**ACT**) Reading in "tons" with one decimal

9. MAX ADMISSIBLE LOAD in the current machine configuration.

Graphic symbol underneath: (**MAX**) Reading in "tons" with one decimal

10. WORK RADIUS (measures the distance from the slewring centre to the projection of the load application point).

Graphic symbol underneath: (**R**) Reading in "Metres" with one decimal

11. WORK CONFIGURATION

The first digit indicates the operating mode.

Graphic symbol underneath: (**LT**)

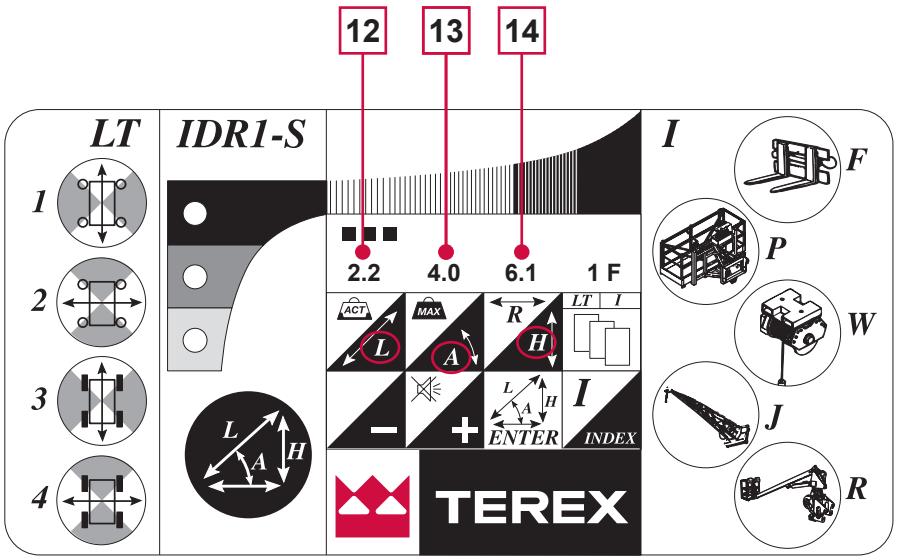
The second digit indicates the equipment used.

Graphic symbol underneath: (**I**)

CAUTION

If the imperial system is selected, loads are expressed in "pounds/1000" and geometrical data in "feet".

Reading of the complementary working data



For some seconds, the values relevant to the complementary readings **L**, **A**, **H** are displayed. Afterwards, the displays shows again the main readings **ACT**, **MAX**, **R**. Pressing the ENTER key displays the previous page once again.

12. BOOM LENGTH

Graphic symbol underneath: (**L**) Reading in "Metres" with one decimal

13. BOOM ANGLE

Graphic symbol underneath: (**A**) Reading in “degrees”.

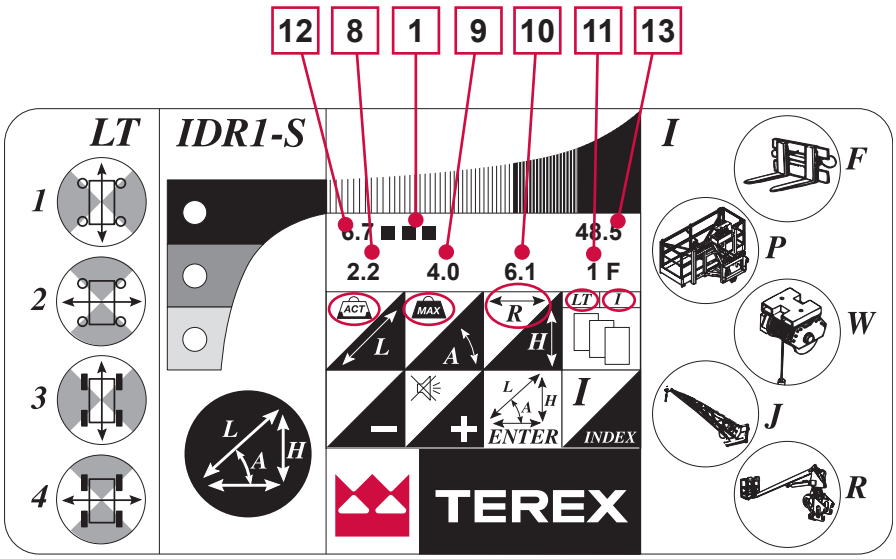
14. GROUND CLEARANCE

Graphic symbol underneath: (**H**) Reading in "Metres" with one decimal.

CAUTION

If the imperial system is selected, loads are expressed in "pounds/1000" and geometrical data in "feet".

Simultaneous reading of all the work data



1. Percent LCD bar

8. WEIGHT OF THE LIFTED LOAD **ACT**

9. MAX ADMISSIBLE LOAD **MAX**

10. WORK RADIUS **R**

11. WORK CONFIGURATION **LT, I**

12. BOOM LENGTH

13. BOOM ANGLE

For the reading of the HEIGHT above the ground **H**, press the ENTER key.

CAUTION

For the GRAPHIC SYMBOLS and the METRIC/ IMPERIAL UNITS OF MEASURE, see the previous notes.

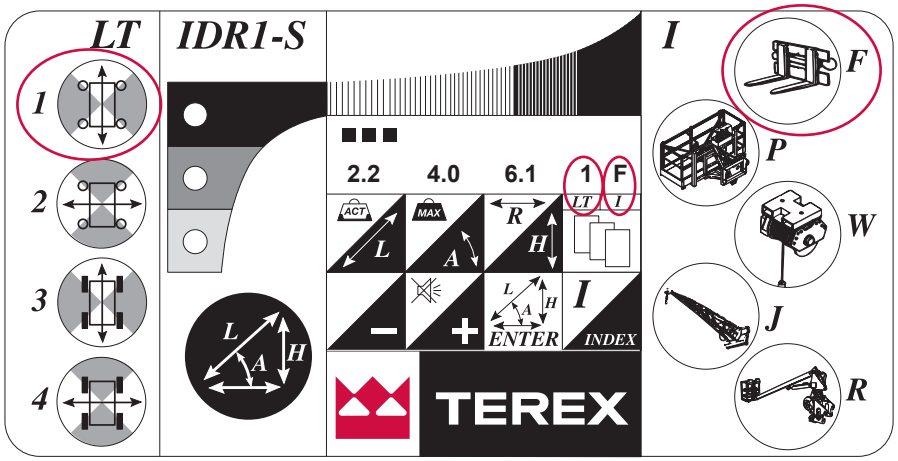
THE DISPLAY ALLOWS TO DISPLAY OTHER DATA ON THE SYSTEM OPERATION.

Display of equipment and operating mode

If the accessory is preset for automatic recognition (presence of the polarisation connector), the equipment change occurs automatically and the system self-recognises the accessory used.
If the accessory is not preset for automatic recognition, the selection is done by hand by selecting the correct Chart (**I**) from the panel.
The setting of the Operating Mode (**LT**) is automatic and selected by external micro-switches.
In the main page (the one usually displayed), the Chart of the selected equipment (**I**) and the Operating Mode (**LT**) of the machine are displayed in the highlighted zone under form of digits.
In the example in the picture, the displayed working condition is:

LT = 1
Front outriggers

I = F
Forks.



As for the symbols on the panel, the possible selections are as follows:

LT main selections (automatic):

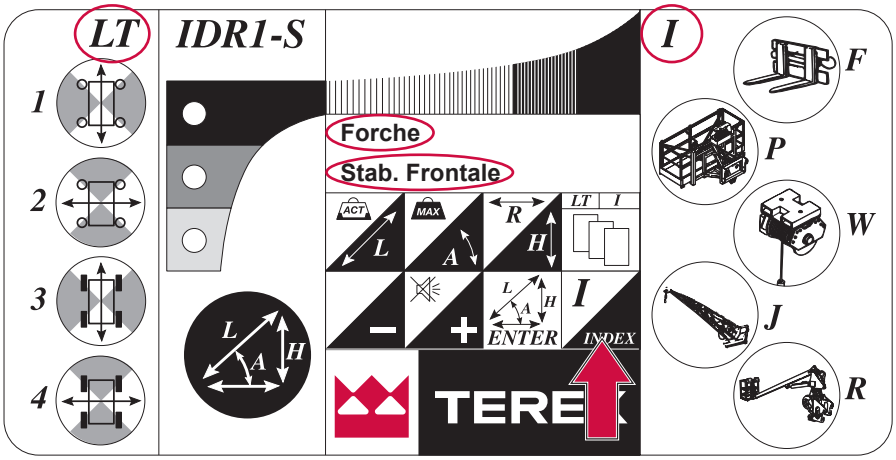
1 = Outriggers - front
2 = Outriggers - side
3 = Wheels - front
4 = Wheels - side

I selections from panel (manual):

F = Forks
P = Platform (basket)
W = Winch
J = Jib
R = Robot

Display of equipment and operating mode as a text

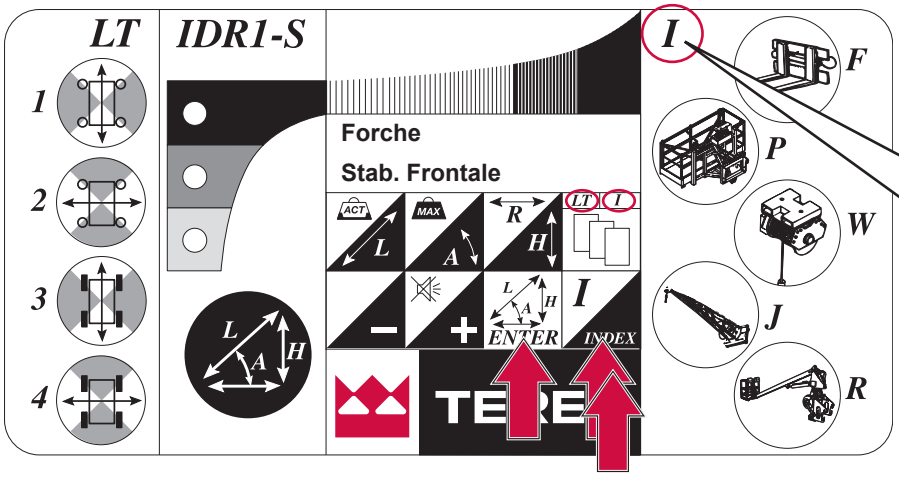
For ease of understanding, the working conditions - i.e. the Operating Mode (**LT**) and the Chart (**I**), can be displayed as a text.
By pressing the INDEX key, the displays shows the description of the set operating mode and the load chart of the selected equipment.
This screen remains for 3 seconds; afterwards the main work page is displayed.



Selecting equipment and operating mode

For accessories with automatic recognition:
If the accessory is preset for the automatic recognition, you have only to install the accessory and plug the connector in the relevant socket at the top of the boom.

For manual accessories:
Starting from the main page, press the INDEX key to open the page with the descriptions of the current Operating Mode (**LT**) and the Chart (**I**) relevant to the equipment being used.
Once the page has been opened, press the INDEX key several times until displaying the adequate chart: each pressure of the key corresponds to the selection of one available accessory.
During this phase, the system enters the block mode.
Once the correct Chart has been chosen, press the ENTER key **to confirm the selection** and activate the control.



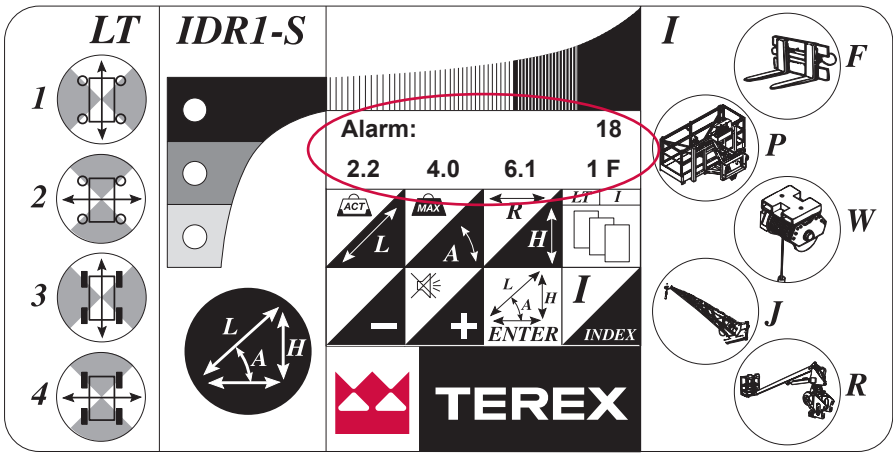
Available accessories

F Forks
P Platform (Basket)
W Winch
J Jib
R Robot

Now the machine can be operated.
The selected Chart will remain set even when the machine is turned off and on again until the next manual selection.

- Self-Diagnosis and alarm messages

The limiter has a self-diagnostic system which recognises the faults of the transducers, breakages of the cables and internal faults of the electronics.
When a fault is detected, the limiter enters the safety mode blocking hazardous manoeuvres and the display shows an alarm message on the top line instead of the %-bar.



In relation to the alarm code displayed, the fault can be identified.
The codes relevant to the detected fault are shown in the "Alarm Codes" appendix with the relevant cause and suggestions for restoring the proper operation.

- Diagnostic system messages

The diagnostic functions are always accessible without entering any password.
From the main page, press the ENTER key to open the diagnostic section.
Once the section is opened, you can scroll through the same forward or backward to select the page you wish.

To help the page search, when the page is changed, the page number and the relevant identification text are displayed.

P02	
P100 W4.1 M5.0 A45 L8.5 R6.0	P = Differential pressure of the lifting cylinder W = Load read by the system (t) M = Max admissible load in the current position A = Main boom angle L = Main boom length R = Radius from fork centre to slewring centre

P03: Alarms	
Alarm xx yy Warning xx yy	Alarm: Alarm code present (0 = no Alarm) Warning: Warning code (0 = Ok). This condition blocks a certain command (ex.: when the boom is lifted, the outriggers cannot be lowered).

The "xx" alarms and warnings are those of HEAD unit; the "yy" alarms and warnings are those of the MIDAC unit. If an alarm is displayed (for instance 30), there will be an alarm 30 and an alarm 1030; in other words, HEAD and MIDAC send the same alarm. If one alarm only is displayed, this means the other board is not set.

P04: Pressures	
P100 L:xxx H:xxx P 40 L:xxx H:xxxx	Top line: P = Differential pressure of the lifting cylinder L: Bottom side pressure H: Rod side pressure Bottom line: P = Differential pressure of the compensation cylinder L: Compensation cylinder bottom side pressure H: Compensation cylinder rod side pressure

P05: Boom	
A 11.1 12.2 1.1 L 8.5 8.6 0.1	Readings of main boom angle and length from reel. Top line: Angle 1, Angle 2 and angle difference. Bottom line: Length 1, Length 2 and length difference.

The values of angle and length coming from the transducer are read by MIDAC (both channels).

P06: Boom1	
a AA.A BB.B CC.C l DD.D EE.E FF.F	Top line: AA.A: Boom angle read by Midac BB.B: Boom angle read by Head CC.C: Angle difference resulting from Midac and Head readings The second channel of the reel (B) reads the angle also from the HEAD; therefore the redudancy condition is satisfied. Bottom line: DD.D: Boom length read by Midac EE.E: Boom length read by Head FF.F: Length difference resulting from Midac and Head readings

P07: AI0-3	
0 B111 2 B222 1 B333 3 xxxx	Analog channels 0-3 readings 0: Bottom side pressure transducer 1: Rod side pressure transducer 2: Pressure transducer on compensation cylinder - bottom side 3: Pressure transducer on compensation cylinder - rod side

P08: AI4-7	
4 B111 5 B222 6 B333 7 xxxx	Analog channels 4-7 readings (presently not used)

P09: Lmi Status	
M * IIII: VVVV	Limiter State visualization (see paragraph Display pages/Settings)

P10: Head Status	
M * IIII: VVVV	Machine State visualization (see paragraph Display pages/Settings)

P11: Rotax	
Rot AAAA BBBB CCCC DDDD EEEE	AAAA: Turntable rotation angle BBBB: Error code from Rotax (it makes the Rotax autonomous) CCCC: Angle 1 from Rotax (in degrees) DDDD: Angle 2 from Rotax EEEE: Angle difference from Rotax (Angle 1 - Angle 2) (it shall be some degrees)

P12: Outrigger	
Stb AAAA BBBB CCCC DDDD	AAA: Front left crossbar out percentage (0 to 1000) BBB: Front right crossbar out percentage CCC: Rear left crossbar out percentage DDD: Rear right crossbar out percentage

P13: Levelling”	
Liv T: XXXX S: XX E: XX L: XXXX	T: Transversal inclination reading L: Longitudinal inclination reading S: Levelling state (0 = no levelling running; 1 and 2 = longitudinal or transversal levelling) E: Error

P14: Clio	
CA AA.AA BBBB CC CB DD.DD EEEE FF	Top line: AA.AA: Cell A load reading BBBB: Cell A reading CC: Error from cell A Bottom line: DD.DD: Cell B load reading EEEE: Cell B reading FF: Error from cell B

P15: Act1A	Main boom: ACT 1A
ACT1A A: aaaa ccc eee L: ssss	Main boom reel: Left transducer See Angle settings A: if ok = 180° ccc: Counter of received messages eee: Error from planarity sensor (if ok=0) L: Length value in bit

P16: Act1B	Main boom: ACT 1B
ACT1B A: aaaa ccc eee L: ssss	Right transducer See Angle settings A: if ok = 180° ccc: Counter of received messages eee: Error from planarity sensor (if ok=0) L: Length value in bit

P17: AsaC				Planarity sensor on carriage
AsaC ccc	 eee	X: aaaa Y: ssss		X: Transversal carriage angle reading Y: Longitudinal carriage angle reading ccc : Counter of received messages eee: Error from planarity sensor

P18: So				Movement display
So	111	222 444	333 555	Lifting: 111: Joystick reading (0 +/- 1000). This is the joystick OUT: + lifting, - lowering. It is independent from the dead zone settings. 222: Percentage of the speed set with the joystick. It decreases when there is an automatic slowdown due to stability. 333: Command to Driver (0 - 1000). It is the command directly sent to the main valve. 444: Error code from Driver 555: Valve slider position (0 +/- 1000). It is the response of the spooler. If a value is displayed, the valve is open and oil can flow through.

P19: Sf				
Sf	111	222 444	333 555	Boom extension / retraction (+ extension, - retraction)

P20: Fo				
Fo	111	222 444	333 555	Fork pitching

P21: Ro				
Ro	111	222 444	333 555	Turntable rotation

P22: Au				
Au	111	222 444	333 555	Accessory

• State display pages

The display in the cab lets you check the state and condition of all the control units of the machine (without entering any password).
By entering a password of adequate level, you can open the relevant pages and change the parameters.

Following the instructions, the display can be used for setting and diagnostic purposes and, in general, for controlling and setting up the machine.

The display pages are as follows:

P09: Lmi Status	
M IIII: * VVVV	Limiter state display

P10: Head Status	
M IIII: * VVVV	Machine state display

- Variables, Parameters and Conditions

The programme manages the following types of data:

I: Digital inputs
They show the signals from the machine (pushbuttons, switches, limit switches). They can be ON (“1”: Closed contact) or OFF (“0”: Open contact).

O: Digital outputs
These are the outputs from the board toward the field and, usually, they control the actuators (lights, relays, solenoid valves, etc.).
They can be:
OFF (“0”): actuator not operated
ON (“1”): actuator operated

M: Internal memories or Flags
These are the internal memories used by the programme and, like the previous ones, they can be ON or OFF or “1” or “0”. They can be used to display the inputs and outputs of the remote boards.

Q: Variables
They are the numeric variables used by the programme. Their value is between -30000 and +30000.

S: Internal variables
They are other numeric variables used only for the board management.

P: Parameters
These are numeric data that can be set and saved in the E2prom memory of the system. Usually they contain the configuration data and the settings.

The meaning of the data depends on the programme and their use shall be analysed each time.

- How to read the value of a datum

The following example will help illustrate the procedure.
If you want to display the variable 10 of the limiter board.

P09: Lmi Status	From the operator menu, open the display page.
* M 0: OFF	One or two seconds after, the page showing the first value of the list, is displayed. In the case shown in the example, this is FLAG 0.
* M 0: OFF	With the ESC key, move the asterisk to letter M.
* Q 0: 0	With the + and - keys, scroll through the letters until displaying letter Q (Variables).
* Q 10: 123	With the ESC key, move the cursor to the index field. With the + and - keys, change the digit until displaying 10. In this case, the digit on the right (123) shows the value of variable 10. Press ENTER to quit the setting mode and replace the cursor to the index field to select another variable.

Second example:
If you want to set the parameter 100 of the machine board to 95.

P10: Head Status	Turn the system on and check that the password entered is the correct one. From the operator menu, open the display page.
* M 0: OFF	One or two seconds after, the page showing the first value of the list, is displayed. In the case shown in the example, this is FLAG 0.
* M 0: OFF	Enter the display mode with the ESC key. Again with the ESC key, move the asterisk to letter M.
* P 0: 0	With the + and - keys, scroll through the letters until displaying letter P (Parameters).
* P 100: 123	With the ESC key, move the cursor to the index field. With the + and - keys, change the digit until displaying 100. In this case, the digit on the right (123) shows the value of parameter 100.
* P 100: 95	With the ESC key, move the cursor to the value field. With the + and - keys, change the digit until displaying 95 corresponding to the required value. Press ENTER to quit the setting mode and replace the cursor to the index field to select another parameter.

• Setting the transducers

The machine transducers can be set directly from the cab display.

The setting pages can be opened only by entering a password of adequate level.

The general operations to be performed are described in other parts of the manual and not repeated as you should already be familiar with them.

The procedures to verify the different components are illustrated in chapter "Operator display".

- Setting the outriggers

On each crossbar there is a length transducer whose minimum and maximum positions shall be set.

The picture shows the pages with the setting commands to be used from the setting menu.

STABILITY 55 Outrigger In	Calibration with crossbars fully retracted.
STABILITY 56 Outrigger Out	Calibration with crossbars fully extended.

To define the minimum position:
- Close the crossbars.
- Open page 55.
- Read the position with retracted crossbars (ENTER).

To define the maximum position:
- Open the crossbars.
- Open page 56.
- Read the position with extended crossbars (ENTER).

- Setting the Rotax

The Rotax is used to measure the angular rotation of the turntable. No setting is needed; only a position reset can be done.

STABILITY 57 Rotax	

To define the zero position:
- Open page 57.
- Align the turntable and insert the lock pin.
- Read the zero position (ENTER).

- Setting the carriage levelling sensor

The ASA-CB0 sensor metering the carriage levelling is used to measure the carriage inclination lengthwise and crosswise. It is factory-set and shall only be set to zero when installed on the machine.

STABILITY 58 Levelling	

To define the zero position:

- Open page 58.
- Move the carriage to the horizontal position both lengthwise and crosswise.
- Read the zero position (ENTER).

- Angle and length transducers

On the boom, there is a servo-assisted reel with two CanBus boards inside to read the boom angle and the boom length.
For the angle, all you have to do is setting the low boom position to zero.
For the extension, you shall also set the fully open position.

TRANSDUCER 12 Trasd Min	Calibration of the basic boom extension and angle alignment in the closed position.
TRANSDUCER 13 Trasd Max	Calibration of the basic boom extension with boom fully extended.

To define the position with the boom retracted:

- With the boom low, retract the same.
- Open page12.
- Press ENTER to define the value with retracted boom.

To define the position with the boom extended:

- With the boom at a high angle, extend the same to end of stroke.
- Open page 13.
- Press ENTER to define the value with extended boom.

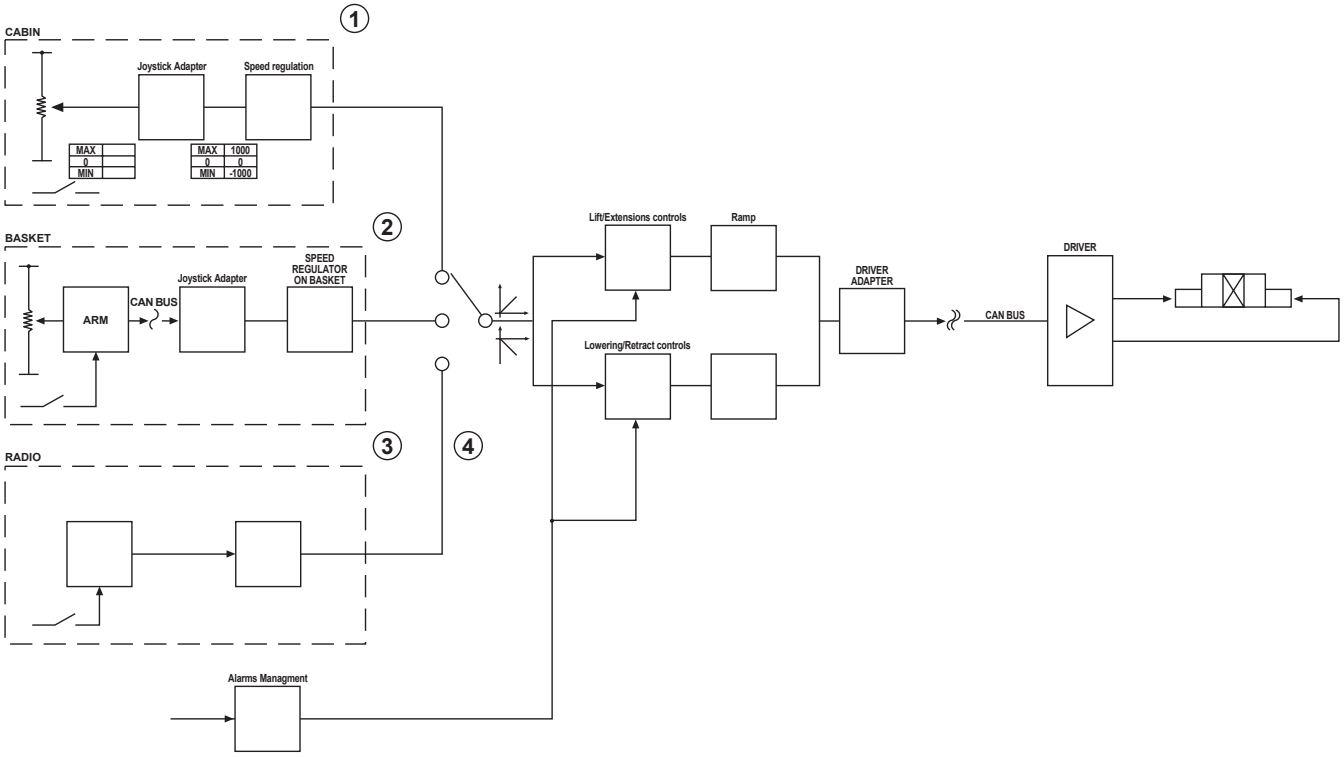
- Setting the CLIO

In order to set the CLIO, you shall measure the tare weight, then load a known weight and enter the loaded weight in tons in the next field (actual); finally you shall send the set value (laden).

• Movements

Movement management is fully electronic.
The joystick signals are read by the machine management board (Head), processed and then adapted to be sent to the driver board which activates the movement.
Suitable control devices are envisaged to avoid unwanted movements in the case of failure.

Block diagram:
The picture shows the block diagram of a typical movement:



- Electronic control

The picture shows the functional diagram of the electronic control.

Ref.	Description
1	Driving place joystick management
1.1	Analog joystick (battery-powered potentiometer)
1.2	Joystick reading and adaptation
1.3	Speed adjustment from driving place
2	Platform joystick management
2.1	Analog joystick
2.2	Console reading for joystick reading
2.3	Joystick reading and adaptation
2.4	Speed adjustment from platform
3	Cab joystick management
3.1	Radio transmitter
3.2	Radio receiver
3.3	Reading and adaptation
3.4	Remote speed adjustment
4	Driving place selection
5	Movement controls
6	Ramps
7	Danfoss command
8	Movement driver control board
9	Alarm management block

Speed adjustment from driving place

For each movement, you can set two different speed values for the two directions by setting a percentage (range 0-100%) with respect to the maximum value.
Setting this value to 100 allows to obtain the maximum command to the valve. Lower values result in a reduction in percentage.
Please note that a command reduction is not always proportional to a speed reduction, as the latter also depends on the slider, the pressure, the cylinder bore, etc.

To change the speed from the driving place, you shall set the parameters listed below.

For the adjustment, you shall simply set the value corresponding to the speed you wish. The column on the right indicates the reference values found on a sample machine (see block 1.3 on layout).

Movement	Associated parameter
Boom lifting	P100
Boom lowering	P101
Clockwise rotation	P102
Counter-clockwise rotation	P103
Fork lifting	P104
Fork lowering	P105
N/A	P106
N/A	P107
Boom extension	P108
Boom retraction	P109
Accessory first speed	P110
Accessory second speed	P111

Speed adjustment from platform

Refer to the notes on the speed adjustment from driving place.

Movement from platform	Associated parameter
Boom lifting	P120
Boom lowering	P121
Clockwise rotation	P122
Counter-clockwise rotation	P123
Fork lifting	P124
Fork lowering	P125
N/U	P126
N/U	P127
Boom extension	P128
Boom retraction	P129
Accessory first speed	P130
Accessory second speed	P131

Speed adjustment via remote control

When the machine is remotely controlled, for each movement there are:

- Low/high speed selected with the selector on the remote control
- Minimum speed activated when the value of the joystick is too low. Dead zone recovery.

As a result, for each movement, there are three parameters. The value is meant as a percentage comprised between 0 and 1000 (1000 = 100%)

Remotely controlled movement	High speed	Low speed	Minimum speed
Boom lifting	P581	P583	P585
Boom lowering	P582	P584	P586
Clockwise rotation	P621	P623	P625
Counter-clockwise rotation	P622	P624	P626
Fork lifting	P601	P603	P605
Fork lowering	P602	P604	P606
Boom extension	P611	P613	P615
Boom retraction	P612	P614	P616
Accessory first speed	P631	P633	P635
Accessory second speed	P632	P634	P636

- Movement control

Movements can be directly controlled from the display without entering any password.

For each movement, the following is displayed:

- reading of the joystick in use (cab/platform/radio)
- speed reduction percentage. This indicates at which joystick's opening the valve is operated (100% max, 0% movement blocked).
- Command to the valve in bits (range 0-255)
- Feedback of the slide position from driver (only for CanBus driver)

				Movement display
***** WW.W	MM.M	RR.R	OM	From the main page, press ENTER several times until displaying the movement pages.
So	111	222 EE	333 FBK	Lifting: 111: Joystick reading 0 +/- 1000 222: Speed percentage set with joystick 333: Command to main valve (0 - 1000) EE: Possible error from driver board FBK: Cursor signal sent by the driver
Sf	111	222 EE	333 FBK	Main extension
Ro	111	222 EE	333 FBK	Rotation
Fo	111	222 EE	333 FBK	Forks
Au	111	222 EE	333 FBK	Auxiliary control

For the reading of the joystick, the following conventions should be respected.

Value	
0	Movement stopped, joystick at rest or within the dead zone
+1000	Max speed during boom lifting or extension or clockwise rotation
-1000	Max sped during boom lowering or retraction or counter-clockwise rotation

The speed adjustment percentage indicates the following:

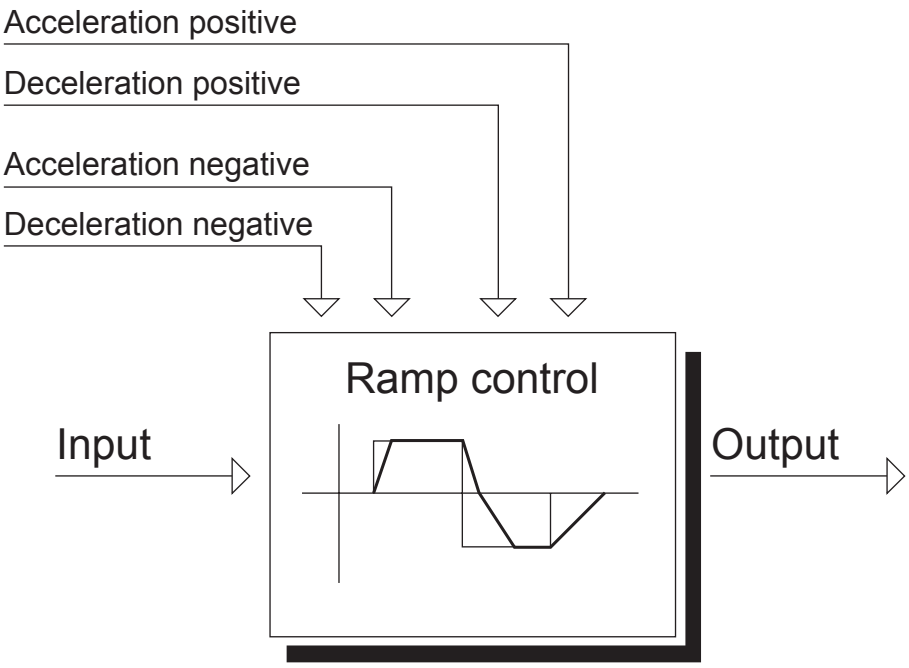
Value	
100	The movement is enabled at the speed controlled by the joystick
100-1	The boom is in a position where a slowdown is active. With the joystick in the same position, the valve is operated to obtain a slower movement.
0	The movement is blocked for some conditions of the machine

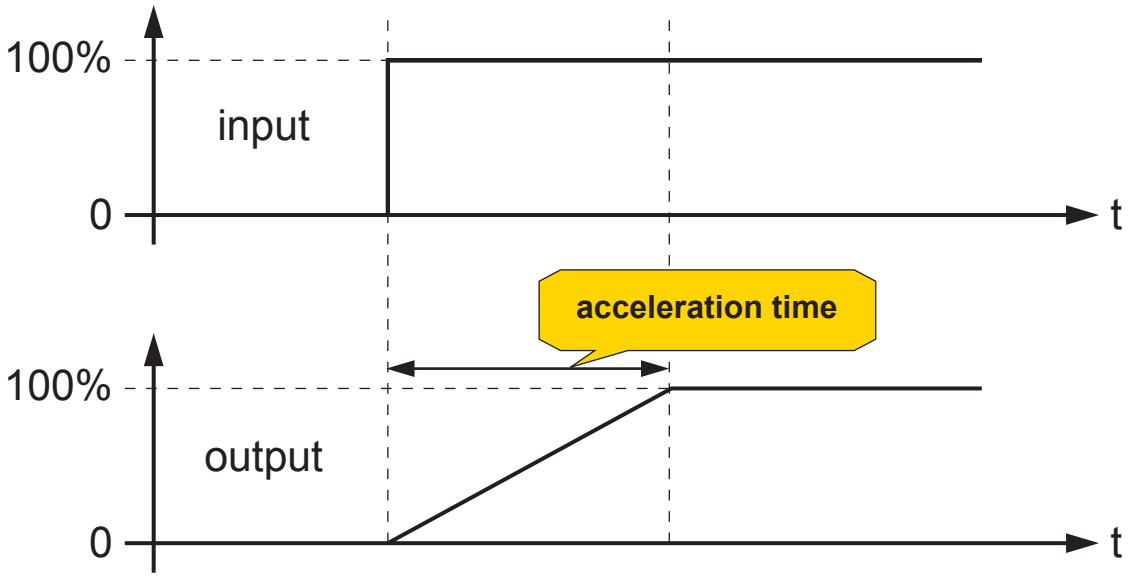
The command to the driver indicates:

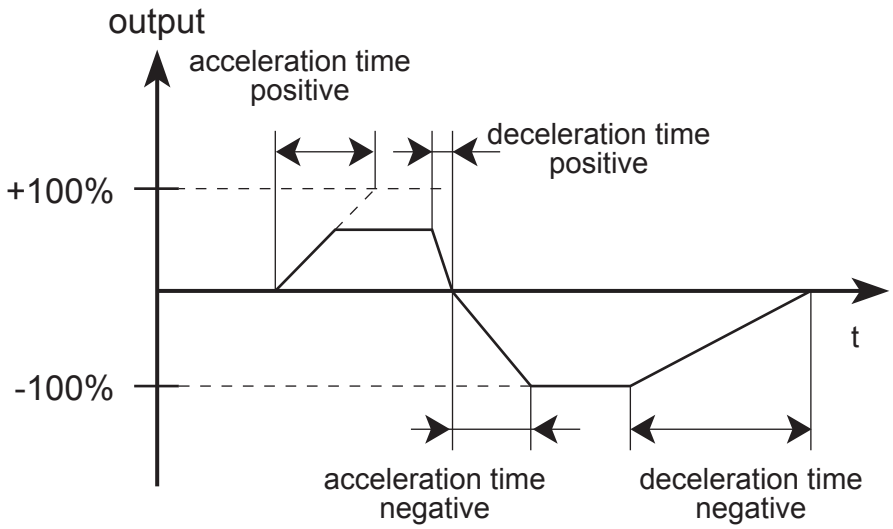
Value	
0	The driver is controlled in the rest position corresponding to the half of the battery voltage
1000	The driver is controlled with maximum opening in one direction
-1000	The driver is controlled with maximum opening in the opposite direction

- Ramps

For each movement, you can set the acceleration ramps (start) and the deceleration ramps (stop) as parameters.







The value is meant as an acceleration, that is a variation to reach the speed required by the joystick; as a result, the higher the value, the faster the adaptation. The time indicated as “acceleration time” is calculated as T = 1000 / Ramp (tenths of second).
The range is 0 - 1000; it is however recommended not to go below 100 (1 second).

Value	Acceleration time (sec)	
1000	0.1	Ramp disabled
500	0.2	
333	0.3	
250	0.4	
200	0.5	
167	0.6	
142	0.7	
125	0.8	
111	0.9	
100	1	Ramp of 1 second
90	1.1	
83	1.2	
76	1.3	
71	1.4	
66	1.5	
50	2	Ramp of 2 seconds
40	2.5	
33	3	

The associated parameters are as follows:

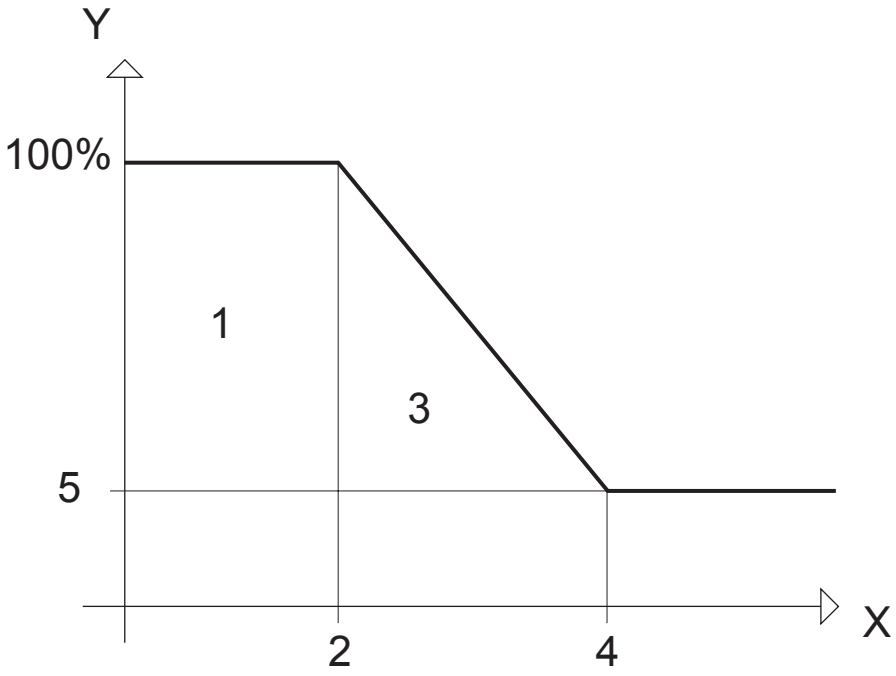
Motion	Output	Input	Positive accel.	Positive decel.	Negative accel.	Negative decel.
Boom lifting/lowering	P706	P707	P708	P709	P710	P711
Boom extension	P726	P727	P728	P729	P730	P731
Forks	P746	P747	P748	P749	P750	P751
Rotation	P766	P767	P768	P769	P770	P771
Accessory	P786	P787	P788	P789	P790	P791

Output will have the same of the input but delayed of the value set as ramp.
Input is the value 0±1000 coming from the joystick.

- Slowdown

For some positions of the boom near the stop points you can activate the slowdown function to allow for a gradual stop or a speed reduction when, for instance, the boom is extended.

The slowdown follows the diagram below in any conditions:



X	Reference height related to the type of movement. It can be the length or the angle of the boom.
Y	Admissible speed percentage controlled with the joystick. Fifty per cent (50%), for instance, indicates that the admissible speed is the half of the speed controlled with the joystick.
1	Zone where no slowdown is envisaged. The admissible speed is the maximum one.
2	Value (angle or length) at which the slowdown begins.
3	Slowdown zone. With the joystick in this position, the speed gets reduced when the slowdown end position is going to be reached.
4	Set point of slowdown end. When this point is reached, the slowdown phase ends and the admissible speed is set to the value entered in point 5.
5	Speed percentage in the position of slowdown end. If you want a motion stop, the value shall be set to 0. If you want a motion at slow speed, you shall set a value higher than the valve's dead zone.

The slowdown function is envisaged for the following cases:
(*1) The fields marked with this symbol are only data display fields.

Main boom lifting and lowering

Slowdown with stop on the upper limit stop of the lifting cylinder.
This prevents a wrong load reading (value increase) and a consequential stall of the system.

Percentage at slowdown end	30%	
Angle at slowdown beginning	P4	So_RallentaBattutaAlto
Slowdown end advance (in degrees from top stop)	P3	AngoloMax - So_ArrestoBattutaAlto

Slowdown with lifting speed reduction on extension.
This is used to reduce the lifting speed with the boom extended.

Current Percentage (*1)	P830
Percentage at slowdown end	P831
Length at Slowdown beginning	P832
Length at Slowdown end	P833
Current length (*1)	P834

Slowdown with lowering speed reduction on extension.
This is used to reduce the descent speed with the boom extended.

Current Percentage (*1)	P835
Percentage at slowdown end	P836
Length at Slowdown beginning	P837
Length at Slowdown end	P838
Current length (*1)	P839

Slowdown with speed reduction and stop on load percentage (only descent).
This activates when the triggering point of the load limiter is almost reached by slowing the motion down to allow for a gradual stop.
In this case, values cannot be modified.

Percentage at slowdown end	30%
Swl at slowdown beginning	90% Pre-alarm
Swl at slowdown end	100% Blockage

Main boom extension and retraction

Slowdown with speed reduction and stop on load percentage.
This activates when the triggering point of the load limiter is almost reached by slowing the motion down to allow for a gradual stop (only out-movement).

Percentage at slowdown end	30%
Swl at slowdown beginning	90% Pre-alarm
Swl at slowdown end	100% Blockage

Rotation

Slowdown with speed reduction of the clockwise rotation on extension.

Current Percentage (*1)	P840
Percentage at slowdown end	P841
Length at Slowdown beginning	P842
Length at Slowdown end	P843
Current length (*1)	P844

Slowdown with speed reduction of the counter-clockwise rotation on extension.

Current Percentage (*1)	P845
Percentage at slowdown end	P846
Length at Slowdown beginning	P847
Length at Slowdown end	P848
Current length (*1)	P849

Slowdown with speed reduction and stop on load percentage.
This activates when the triggering point of the load limiter is almost reached by slowing the motion down to allow for a gradual stop.

Percentage at slowdown end	30%
Swl at slowdown beginning	90% Pre-alarm
Swl at slowdown end	100% Blockage

Stop on forward extension limit stop

Slowdown with extension/retraction speed reduction until reaching a certain extension value.
It allows to avoid the blockage of the motion (with the possibility of returning the boom only) when the boom reaches the end-of-stroke position.

Current Percentage (*1)	P820
Percentage at slowdown end	P821
Length at Slowdown beginning	P822
Length at Slowdown end	P823
Current length (*1)	P824

• Black Box

The system envisages an internal black box where the last 1000 events deemed useful for safety or diagnostic purposes, are stored (data can only be downloaded with Winscope by Terex authorized personnel).

The events stored in memory, are:

- Alarms from Limiter (Midac)
- Alarms from Machine (Head)
- Bypass key operation
- Saving of one setting
- Password setting
- System error
- Black box initialization

For each event, the following data are saved:

- Event code
- Time and Date
- Other event-related parameters, usually indicated in A, B, C
- General conditions of the machine.

CAUTION

The event is saved at the leading edge as well as at the trailing edge. If the key is turned to the bypass position, the activation of the key is detected every time the machine is started.

Event code

It is a numeric code which indicates the type of event which has been saved.

Time and Date

They indicate the time and date at which the event has been saved.

Fields A, B, C

Fields A,B,C contain event-related information as shown in the following table.

Machine conditions

The remaining fields show some important variables such as:

- Angle
- Length
- Pressure
- Applied load
- Maximum load
- Operating mode

Event	Code	A	B	C
Alarm from machine	3	0	Alarm condition	Alarm code
Alarm from Limiter	6	0	Alarm condition	Alarm code
Bypass	90	0		
Settings saving	95	Password	Password level	0
Password setting	96	Password	Password level	
Box initialization	99	Password	Password level	

For the explanation of the alarm code, see alarms list.

- Black Box display

By entering a password of level 3 you can read the data contained in the Black Box and manage this box directly from the display.

OPTIONS 50 Black Box	See page 50. Press ENTER to open the page,
IDX EvntCode EE GG,MMM,YY HH:MM	Show event Top line: IDX: Index of the saved event (position where the event is stored) EE: Event code Bottom line: Date and time at which the event has been stored Active keys in this page: ESC: Return to main menu Key +: Show next event Key -: Show previous event Enter: Show the variable saved in the current event as indicated on the next page
IDX EvntCode EE A : 0 B : 3 C : 2 Angle: .....5.0 Length:.....6.5 Pressure: .....70 Weight: .....0.2 MaxLoad:.....5.0 OM:.....0	Show event Top line: IDX: Index of the saved event (position where the event is stored) EE: Event code Bottom line: Variable saved with the indicated value. With the + and - keys, you can scroll through the other variables stored in memory as indicated. Active keys in this page: ESC: Return to main menu Key +: Show next variable Key -: Show previous variable Enter: Show previous page

• Clio

- Pin-out

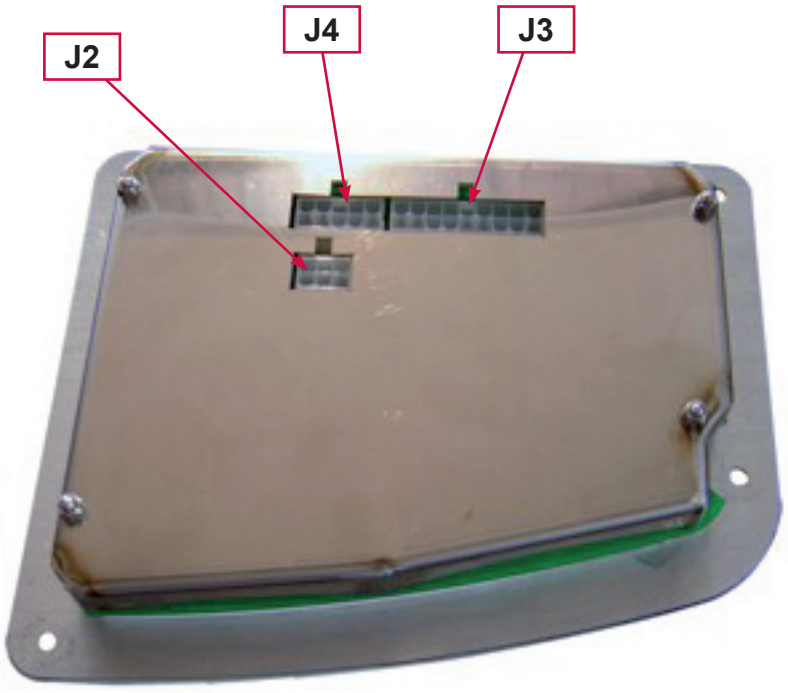
The following table shows the pin-out with an indication of the connection (if present) and the variable of reference displayed.

PIN	ID Code	Signal
1A	R1ANA	Sv LH rotation
2A	DO11 / INP21	PWM Rotation
3A	INP22	
4A	INP12	
5A	+VA2	Cell 2: +V
6A	IN1-	Cell 1: LOW
7A	IN1+	Cell 1: HIGH
8A	+VBE	+VE
1B	R1BNA	+VP
2B	DO21 / INP11	Spare
3B	INP20	
4B	INP10	
5B	IN2 -	Cell 2: Low
6B	AGND2	Cell 2: GND
7B	CANL	CanOpen line: CanL
8B	+VA1	Cell 1: +V
1C	R2ANA	Sv - RH rotation
2C	NC	
3C	-VBE	-VB
4C	NC	
5C	IN2 +	Cell 2: LOW
6C	AGND1	Cell 1: GND
7C	CANH	CanOpen line: CanH
8C	R2BNA	+VP

• Cluster

The Cluster panel is a keyboard located in the driving place on the left which allows for the control of the outriggers, the undercarriage levelling, and the mechanical gears. The controls are identified by the relevant icons.
There are also some inputs to read the signals coming from the dashboard.





- Pin-out

The following table shows the pin-out of the board with an indication of the connection (if present) and the variable of reference on the display.

Connector J2

1	+VB	Power supply +VE	
2	-VB	Power supply -VE	
3	HEART		
4	CAN_H	Can Open line	
5	CAN_L	Can Open line	
6	DGND		

Connector J3

1	DI_00	Glow plugs indicator input	M 60
2	DI_01	High beam indicator input	M 61
3	DI_02	Turn signals indicator input	M 62
4	DI_03	Position lights indicator input	M 63
5	DI_04	Steer selector 1 (crab)	M 0
6	DI_05	Steer selector 2 (four wheels)	M 1
7	DI_06	Selector turned to Road - PLATFORM	M 2
8	DI_07	Selector turned to Jobsite - JOBSITE	M 3
9	DI_08	Differential lock selector	M 39
10	DI_09	Emergency pump pushbutton	M 91
11	DI_10	Bypass key	M90
12	DI_11		
13	DI_12		
14	AI_00		
15	AI_01		
16	AI_02		
17	DO_00	Lamp for Platform	
18	DO_01		

Connector J4

1	+5V		
2	AGND		
3	DO_02		
4	DO_03		
5	NC		
6	AI_03		
7	AI_04		
8	AI_05		
9	AI_06		
10	AI_07		

- Key control

To check the operation of a key, just press the key and verify if the associated signal activates. The following table indicates the variables to be checked.

	Pushbutton	**Flag on display**
1	Pushbutton - front left outrigger enabled	M 31
2	Pushbutton - front right outrigger enabled	M 32
3	Pushbutton - rear left outrigger enabled	M 33
4	Pushbutton - rear right outrigger enabled	M 34
5	Pushbutton - carriage tilted to the right	M 35
6	Pushbutton - carriage tilted to the left	M 36
7	Pushbutton - turntable slewing pin locked/unlocked	M 37
8	Pushbutton - mechanical gearbox	M 38
9	Pushbutton - differential engaged	M 39
10	Pushbutton A (automatic stabilisation)	M 40
11	Pushbutton B	M 41
12	Pushbutton C	M 42
13	Pushbutton D	M 43
14	Pushbutton - crossbars out	M 44
15	Pushbutton - crossbars in	M 45
16	Pushbutton - outriggers out	M 46
17	Pushbutton - outriggers in	M 47

	Warning lights	**Flag on display**
20	Warning light - glow plugs	M 60
21	Warning light - high beam	M 61
22	Warning light - turn signals	M 62
23	Warning light - lights	M 63
24	Warning light - parking brake	M 64
25	Warning light - turntable blocked	M 65
26	Warning light - first speed engaged	M 66
27	Warning light - second speed engaged	M 67
28	Warning light - platform (on the right side of the dashboard)	M 68
29	Warning light - turntable at the front	M 69
30	Warning light - differential locked (N/U)	M 70
31	Warning light - rear right outrigger active	M 71
32	Warning light - rear left outrigger active	M 72
33	Warning light - right left outrigger active	M 73
34	Warning light - front left outrigger active	M 74

• Warnings

The following codes indicate the reason why a manoeuvre cannot be performed.

1001	Machine not stopped
1002	Emergency pressed or no power supply
1003	Alarm (see code list)
1004	No deadman signal
1005	Moment limiter block activated
1006	Platform overload
1007	Manoeuvre not admitted for angle above 55 degrees
1008	Angle congruency
1009	Extension congruency
1010	Manoeuvre not admitted due to generic causes
1011	Slow-down when top stop is reached
1012	Slow-down due to Pre-alarm
1013	Turntable NOT locked
1014	Stabiliser on the ground
1015	Manoeuvre not admitted for angle above 10 degrees
1016	Verticality command blocked as max extension has been reached
1017	Verticality command blocked as max extension has been reached
1018	Command not permitted in “ROAD” configuration
1019	Command not permitted in “PLATFORM” configuration
1020	Turntable NOT unlocked
1021	Horizontality command blocked as max extension has been reached
1022	Horizontality command blocked as min. extension has been reached
1023	Slow-down in relation to extension
1024	Machine not stabilised
1025	Only retraction manoeuvre permitted
1026	Stop due to boom/stabiliser collision

- Midac warnings list

1	Mode change not admitted for high boom angle
2	Operating mode not selected
3	Operating mode to be confirmed
4	The machine is in platform configuration with the wrong operating mode
5	Rope overload (if envisaged)
6	Mode change not admitted for too high load
7	Accessory not compatible with the selected load chart

• Alarms from Midac

Code	Description	File with Instructions
1	Data saved in E2PROM corrupted.	AL_E2prom.doc
2	Signal from angle transducer A below the minimum threshold.	AL_Trasd Potenzometrico.doc
3	Signal from angle transducer A above the maximum threshold.	AL_Trasd Potenzometrico.doc
4	Signal from extension transducer A below the minimum threshold.	AL_Trasd Potenzometrico.doc
5	Signal from extension transducer A above the maximum threshold.	AL_Trasd Potenzometrico.doc
6	Value of extension A below the value with the boom retracted.	AL_Trasd Potenzometrico.doc
7	Value of extension B below the value with the boom retracted.	AL_Trasd Potenzometrico.doc
8	Signal from the low chamber pressure transducer of the lifting cylinder below the minimum value.	AL_Trasd_Pressione.doc
9	Signal from the low chamber pressure transducer of the main cylinder above the maximum value (when applied).	AL_Trasd_Pressione.doc
10	Signal from the high chamber pressure transducer of the lifting cylinder below the minimum value.	AL_Trasd_Pressione.doc
11	Signal from the high chamber pressure transducer of the main cylinder above the maximum value.	AL_Trasd_Pressione.doc
18	Signal from the low chamber pressure transducer of the compensation cylinder below the minimum value.	AL_Trasd_Pressione.doc
19	Signal from the low chamber pressure transducer of the compensation cylinder above the maximum value (when applied).	
20	Signal from the high chamber pressure transducer of the compensation cylinder below the minimum value.	AL_Trasd_Pressione.doc
21	Signal from the high chamber pressure transducer of the compensation cylinder above the maximum value.	AL_Trasd_Pressione.doc
22	Error in the feedback of the watchdog relay.	AL_RiletturaUscite.doc
30	The two readings of the signal of deployed stabilisers are not congruent.	AL_Congruenza Segnali Digitali.doc
31	The two readings of the signal of stabilisers on ground are not congruent.	AL_Congruenza Segnali Digitali.doc
32	The readings of the two angle transducers of the main boom, read by the winders, are not congruent.	AL_Congruenza Trasduttori.doc
33	The readings of the two extension transducers of the main boom, read by the winders, are not congruent.	AL_Congruenza Trasduttori.doc
34	Error from ACT A board.	AL_Act.doc
35	Error from ACT B board.	AL_Act.doc
36	Signal from extension transducer B below the minimum value.	AL_Trasd Potenzometrico.doc
37	Signal from extension transducer B above the maximum value.	AL_Trasd Potenzometrico.doc
38	The reading of the sensor of front turntable is not congruent with the reading of the Rotax angle.	
41	Error in the CRC check of the memory during RunTime.	AL_Crc.doc
42	Error in the CRC check of the system program.	AL_Crc.doc
43	Error in the CRC check of the load charts.	AL_Crc.doc

Code	Description	File with Instructions
49	The chart with the selected attachment is not installed.	
50	An error in the RAM memory where load chart data are saved, has been detected.	AL_Crc.doc
51	An error in the RAM memory where unladen moment data is saved, has been detected.	AL_Crc.doc
52	An error in the RAM memory where attachment parameters are saved, has been detected .	AL_Crc.doc
53	An error in the RAM memory where machine parameters are saved, has been detected .	AL_Crc.doc

• Alarms from CLIO A

Code	Description	File with Instructions
81	CRC error - parameter area	AL_E2prom.doc
82	CLIOA CPU link alarm	
83	Error on the watch dog relay control	
84	Error on the block relay control	
85	Error on the output control	
86	Error on the + 5V check	
90	Lower cell reading at minimum	
91	Upper cell reading at minimum	
92	Congruency error of the load read by the two cells (detected by CLIOA)	
95	Can Bus does not receive message 2	AL_CanBus.doc
96	Can Bus does not receive message 3	AL_CanBus.doc
99	Congruency error of the load read by the two cells (detected by Midac)	

• Alarms from CLIO B

Code	Description	File with Instructions
101	CRC error - parameter area	AL_E2prom.doc
102		
103	Error on the watch dog relay control	
104	Error on the block relay control	
105	Error on the output control	
106	Error on the + 5V check	
110	Lower cell reading at minimum	
111	Upper cell reading at minimum	
112	Congruency error of the load read by the 2 cells (detected by CLIOA)	
115	Can Bus does not receive message 2	AL_CanBus.doc
116	Can Bus does not receive message 3	AL_CanBus.doc

Code	Description	File with Instructions
119	Congruency error of the load read by the 2 cells (detected by Midac)	
120	Can Bus does not receive from ACT1A	
121	Can Bus does not receive from ACT1B	
130	Error in the reading of the transducer on the front right stabiliser	AL_Trasd Potenzometrico.doc
131	Error in the reading of the transducer on the front left stabiliser	AL_Trasd Potenzometrico.doc
132	Error in the reading of the transducer on the rear right stabiliser	AL_Trasd Potenzometrico.doc
133	Error in the reading of the transducer on the rear left stabiliser	AL_Trasd Potenzometrico.doc

• Alarms from Rotax

Code	Description	File with Instructions
135	Error in the reading of height A	AL_Rotax.doc
136	Error in the reading of height B	AL_Rotax.doc
137	Error in the congruency of two angles read by Rotax	AL_Rotax.doc
138	Can Bus does not receive message 1	AL_CanBus.doc
139	Can Bus does not receive message 2	AL_CanBus.doc

• Head alarm list

Usually, if the last digit of the alarm code is 1, there is a Can bus error; if the last digit of the alarm code is 0, there is an error in the board (detected by the built-in board).

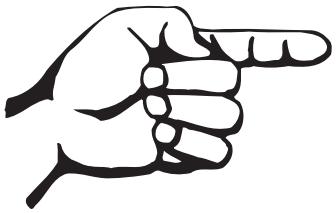
Code	Sub Code	Description	File with Instructions
1001		Error in the CRC control of the calibration data.	AL_E2PromAlarm.doc
1032		The readings of the two main boom angle transducers, read by the winders, are not congruent.	AL_Trasd_Potenziometrici.doc
1033		The readings of the two extension transducers read by the winders are not congruent.	AL_Trasd_Potenziometrici.doc
		Error in the reading of the extension transducer B.	AL_Trasd_Potenziometrici.doc
1100		Error or fault detected on ACT1A board.	AL_Act.doc
1101		No CanBus message from ACT1A.	AL_CanBus.doc
1110		Error or fault detected on ACT1B board.	AL_Act.doc
1111		No CanBus message from ACT1B.	AL_CanBus.doc
1120		Error or fault detected on Carrier ASA board.	AL_Act.doc
1121		No CanBus message from Carrier ASA.	AL_CanBus.doc
1151	1	No CanBus 1 message from CLS.	AL_CanBus.doc
1151	2	No CanBus 2 message from CLS.	AL_CanBus.doc
1151	3	No CanBus 3 message from CLS.	AL_CanBus.doc
1161	1	No CanBus 2 message from ClioA.	AL_CanBus.doc
1161	2	No CanBus 3 message from ClioA.	AL_CanBus.doc
1171	1	No CanBus 2 message from ClioB.	AL_CanBus.doc
1171	2	No CanBus 3 message from ClioB.	AL_CanBus.doc
1200		Error or fault detected on ARM board - Boom.	AL_Arm.doc
1201	1	No CanBus 1 message from ARM - Boom.	AL_CanBus.doc
1201	2	No CanBus 2 message from ARM - Boom.	AL_CanBus.doc
1201	3	No CanBus 3 message from ARM - Boom.	AL_CanBus.doc
1201	4	No CanBus 4 message from ARM - Boom.	AL_CanBus.doc
1201	5	No CanBus 5 message from ARM - Boom.	AL_CanBus.doc
1201	6	No CanBus 6 message from ARM - Boom.	AL_CanBus.doc
1210		Error or fault detected on ARM board - Front carrier.	AL_Arm.doc
1211	1	No CanBus 1 message from ARM - Front carrier.	AL_CanBus.doc
1211	2	No CanBus 2 message from ARM.	AL_CanBus.doc

Code	Sub Code	Description	File with Instructions
1211	3	No CanBus 3 message from ARM.	AL_CanBus.doc
1211	4	No CanBus 4 message from ARM.	AL_CanBus.doc
1211	5	No CanBus 5 message from ARM.	AL_CanBus.doc
1211	6	No CanBus 6 message from ARM.	AL_CanBus.doc
1220		Error or fault detected on ARM board - Front carrier.	AL_Arm.doc
1221	1	No CanBus 1 message from ARM - Front carrier.	AL_CanBus.doc
1221	2	No CanBus 2 message from ARM.	AL_CanBus.doc
1221	3	No CanBus 3 message from ARM.	AL_CanBus.doc
1221	4	No CanBus 4 message from ARM.	AL_CanBus.doc
1221	5	No CanBus 5 message from ARM.	AL_CanBus.doc
1221	6	No CanBus 6 message from ARM.	AL_CanBus.doc
300		Error or fault detected on Lifting driver.	N.U.
1301		No CanBus message.	AL_CanBus.doc
1310		Error or fault detected on Extension driver.	N.U.
1311		No CanBus message.	AL_CanBus.doc
1320		Error or fault detected on Fork driver.	N.U.
1321		No CanBus message.	AL_CanBus.doc
1330		Error or fault detected on Rotation driver.	N.U.
1331		No CanBus message.	AL_CanBus.doc
1340		Error or fault detected on Aux. circuit driver.	N.U.
1341		No CanBus message.	AL_CanBus.doc
1089		Error or fault detected on Lifting Bucher board.	N.U.
1090		Error or fault detected on Extension Bucher board.	N.U.
1091		Error or fault detected on Fork Bucher board.	N.U.
1092		Error or fault detected on Rotation Bucher board.	N.U.
1093		Error or fault detected on Aux. Circuit Bucher board.	N.U.
1094		No CanBus message from Midac.	AL_CanBus.doc
1027		No CanBus message from Engine.	AL_CanBus.doc
1028		No CanBus message from Drive.	AL_CanBus.doc
1095		Joystick activated at machine starting.	
1096		Deadman button detected at machine starting.	
1097		Bypass key detected at machine starting.	

• Automatic platform configuration

In order to guarantee redudancy when the platforms are equipped with Clio (weight reader in the basket), the platform model is saved in the Clio (on both channels) and sent to the Can-Bus.
Management is as follows:

- by connecting the platform plug to the socket located at the top of the boom, the system automatically identifies the connection to a platform and sets for the control duplication.
- The Clio board sends the platform code saved in its memory.
- The machine limiter recognises such code and loads automatically the parameters of the load chart for this platform model. If the load chart relevant to the platform model is not present, the machine will sent an alarm message (warning 7).



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Section 3
SCHEDULED MAINTENANCE INSPECTIONS

SECTION INDEX

3.1 Introduction..... page 2
3.2 About this section 3
3.3 Maintenance table 4
3.4 Maintenance inspection report 8

3.1 INTRODUCTION



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

⚠WARNING

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

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

3.2 ABOUT THIS SECTION

Intervention times

Maintenance interventions have been divided into 7 different groups in relation to the time at which they must be carried out, say daily, weekly, monthly , every 2 months, every 6 months, yearly or every 5 years.
For ease of use, the service intervals have been grouped in different tables, as explained below:

Inspection	Table
Daily	A
Weekly	A+B
Monthly	A+B+C
Two month	A+B+C+D
Six month	A+B+C+D+E
Yearly A+B+C+D+E+F	
Five years (afterwards every two years)	G

Maintenance table

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

Maintenance inspection report

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

3.3 MAINTENANCE TABLE

TABLE A

During the first 10 working hours:

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

Every 10 working hours or daily:

A-5	Check the Operator's Handbook is in good condition and inside the driving place.
A-6	Inspect the decals and placards.
A-7	Check the engine oil level.
A-8	Clean the air suction filter.
A-9	Check and clean the radiator.
A-10	Check the hydraulic oil level in the tank.
A-11	Check the greasing of the boom section pads.
A-12	Grease the forks.
A-13	Grease the counterframe/turntable slewring.
A-14	Grease all joints of boom and stabilisers, the front and rear axle shaft joints, the transmission shafts and any equipment of the machine.
A-15	Check the efficiency of the lighting electric system.
A-16	Check the efficiency of braking system and parking brake.
A-17	Check the efficiency of the steering selection system.
A-18	Check the efficiency of the fork balancing system.
A-19	Make sure the safety devices installed are in efficient working order.
A-20	Check the engine coolant level.
A-21	Ensure the differential locking is efficient.
A-22	Ensure the mechanical gear selection system is efficient.

TABLE B

Within the first 50 working hours:

B-1	Change the engine oil for the first time.
B-2	Grease the sliding parts and the pivot pin of the telescopic boom.

Every 50 working hours or weekly:

B-3	Check the tension of the alternator belt.
B-4	Check the tyre inflation.
B-5	Check the tightening of the wheel nuts.
B-6	Check the tightening of the cardan shaft screws.
B-7	Check the tightening of the screws fixing the counterframe/turntable rotation slewring.
B-8	Check the tightening of the telescope sliding blocks.
B-9	Check the sleeves connecting the air filter to the engine cooling system.
B-10	Check the operation of the emergency pump.
B-11	Check the stabiliser strain gauge.

TABLE C

Within the first 250 working hours:

C-1	Grease the sliding parts and the pivot pin of the telescopic boom.

Every 250 working hours or monthly:

C-2	Change the engine oil and relevant filter.
C-3	Check the oil level in the gearbox.
C-4	Check the oil level in the front and rear differential gears.
C-5	Check the oil level within the wheel reduction gears.
C-6	Check the oil level of the turntable rotation reduction gear.
C-7	Check the main filtering element of the engine air filter. Replace, if necessary
C-8	Check the clamping of the cableheads to the battery terminals.
C-9	Check the cylinder chromium-plated rods.
C-10	Check the hydraulic lines are not worn because of rubbing against the frame or other mechanical components.

C-11	Check the electric cables do not rub against the frame or other mechanical components.
C-12	Check the wear of the sliding pads of the boom sections.
C-13	Adjust the play of the sliding pads of the boom sections.
C-14	Check the level of the battery electrolyte.
C-15	Check the efficiency of the block valves.

TABLE D

Every 500 working hours or every two months:

D-1	Visually check the smoke quantity evacuated from the engine exhaust.
D-2	Check the tightening of the engine fixing screws.
D-3	Check the tightening of the cab fixing screws.
D-4	Check the backlash between pins and bushings in all joints.
D-5	Check the clearance of the slewring.
D-6	Check the hydraulic system.
D-7	Change the main filtering element of the engine air filter.
D-8	Change the fuel filter.
D-9	Change the hydraulic oil filter.

TABLE E

Every 1000 working hours or every six months:

E-1	Change the inner element of engine air filter.
E-2	Change the oil in the differential gears and gearbox.
E-3	Change the oil in the wheel reduction gears.
E-4	Change the oil in the turntable rotation reduction gear.
E-5	Change the hydraulic oil.
E-6	Grease the sliding parts and the pivot pin of the telescopic boom.
E-7	Clean the air filter in the cab.

TABLE F

Every 2000 working hours or yearly:

F-1	Change the engine coolant.

TABLE G

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

G-1	Checking the state of the structure.

3.4 MAINTENANCE INSPECTION REPORT

Model

Serial number

Date

Hour meter

Machine owner

Inspected by

Inspector signature

Inspector title

Inspector company

Instructions:

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

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

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

Legend:

Y = yes, acceptable

N = no, remove from service

R = repaired.

Table A		Y	N	R
During the first 10 working hours:				
A-1	Oil level within reduction gears, differential gears and gearbox.			
A-2	Tightening of the wheel bolts.			
A-3	Tightening of all bolts and nuts.			
A-4	Check the couplings for oil leaks.			
Every 10 working hours:				
A-5	Operator Manual.			
A-6	Decals and placards.			
A-7	Engine oil level.			
A-8	Air suction filter.			
A-9	Radiator.			
A-10	Hydraulic oil level in the tank.			
A-11	Check the greasing of the boom section pads.			
A-12	Grase the forks.			
A-13	Grease the counterframe/ turntable slewring.			
A-14	Grease all joints of boom and stabilisers, the front and rear axle shaft joints, the transmission shafts and any equipment of the machine.			
A-15	Lighting electric system.			
A-16	Efficiency of braking system and parking brake.			
A-17	Steering selection system.			
A-18	Fork balancing system.			
A-19	Safety devices.			
A-20	Engine coolant level.			
A-21	Differential locking.			
A-22	Mechanical gear selection system.			

Table B		Y	N	R
Within the first 50 working hours:				
B-1	Change the engine oil.			
B-2	Grease the sliding parts and the pivot pin of the telescopic boom.			
Every 50 working hours:				
B-3	Alternator belt.			
B-4	Tyre inflation.			
B-5	Tightening of the wheel nuts.			
B-6	Tightening of the cardan shaft screws.			
B-7	Tightening of the screws fixing the counterframe/turntable rotation slewring.			
B-8	Tightening of the telescope sliding blocks.			
B-9	Engine sleeves.			
B-10	Emergency pump.			
B-11	Stabiliser strain gauge.			

Table C		Y	N	R
Within the first 250 working hours:				
C-1	Grease the sliding parts and the pivot pin of the telescopic boom.			
Every 250 working hours:				
C-2	Engine oil and relevant filter.			
C-3	Oil level in the gearbox.			
C-4	Oil level in the differential gears.			
C-5	Oil level within wheel reduction gears.			
C-6	Oil level in the turntable rotation reduction gear.			
C-7	Check engine air filter.			
C-8	Check battery terminals.			
C-9	Cylinder chromium-plated rods.			
C-10	Hydraulic lines.			
C-11	Check the electric cables.			
C-12	Wear of the sliding pads of the boom sections.			
C-13	Play of sliding pads.			
C-14	Level of the battery electrolyte.			
C-15	Block valves.			

Table D		Y	N	R
Every 500 working hours:				
D-1	Smoke quantity evacuated from the engine exhaust.			
D-2	Tightening of the engine fixing screws.			
D-3	Tightening of the cab fixing screws.			
D-4	Backlash between pins and bushings.			
D-5	Check the clearance of the slewring.			
D-6	Check the hydraulic system.			
D-7	Cartridge of the engine air filter.			
D-8	Cartridge of the fuel filter.			
D-9	Hydraulic oil filter.			

Table E		Y	N	R
Every 1000 working hours:				
E-1	Inner element of engine air filter.			
E-2	Oil in the gearbox and differential gears.			
E-3	Oil in the wheel reduction gears.			
E-4	Oil in the turntable rotation reduction gear.			
E-5	Hydraulic oil.			
E-6	Grease the sliding parts and the pivot pin of the telescopic boom.			
E-7	Cab air filter.			

Model

Serial number

Date

Hour meter

Machine owner

Inspected by

Inspector signature

Inspector title

Inspector company

Instructions:

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

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

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

Legend:

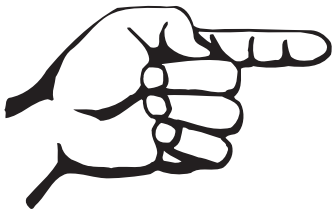
Y = yes, acceptable

N = no, remove from service

R = repaired.

Table F	Y	N	R
Every 2000 working hours:			
F-1 Change the engine coolant.			

Table G	Y	N	R
At 6000 working hours:			
G-1 Checking the state of the structure.			



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Section 4
SCHEDULED MAINTENANCE PROCEDURES

SECTION INDEX

4.1	Introduction..... page	2
4.2	About this section	3
4.3	TABLE A procedures	4
4.4	TABLE B procedures.....	27
4.5	TABLE C procedures.....	36
4.6	TABLE D procedures.....	49
4.7	TABLE E procedures.....	55
4.8	TABLE F procedures	62
4.9	TABLE G procedures	63

4.1 INTRODUCTION



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

  ⚠WARNING

  Failure to properly complete each inspection when required may cause death, serious injury or substantial machine damage.
- ***Immediately tag and remove from service a damaged or malfunctioning machine.***
- ***Repair any machine damage or malfunction before operating machine.***
- ***Unless otherwise specified, perform each procedure with the machine in the following configuration:***
  - ***machine parked on a flat level surface;***
  - ***boom in the stowed position;***
  - ***key switch in the OFF position with the key removed.***

4.2 ABOUT THIS SECTION

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

Safety symbols:



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

⚠DANGER

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

⚠WARNING

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

⚠CAUTION

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

CAUTION

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

NOTICE

Draws the attention to important environment-related information.

4.3 TABLE A PROCEDURES

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

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

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

NOTICE

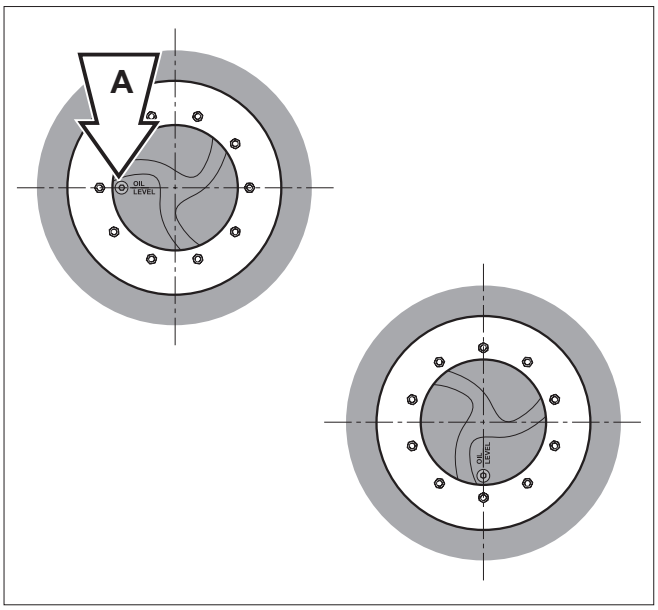
Place a container of suitable size under the plug.

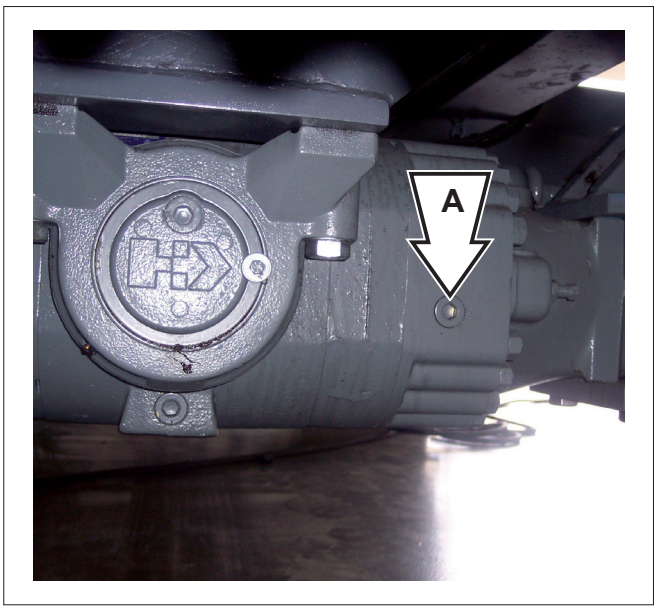
To check the oil level in the front and rear **differential gears**:

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

NOTICE

Place a container of suitable size under the plug.



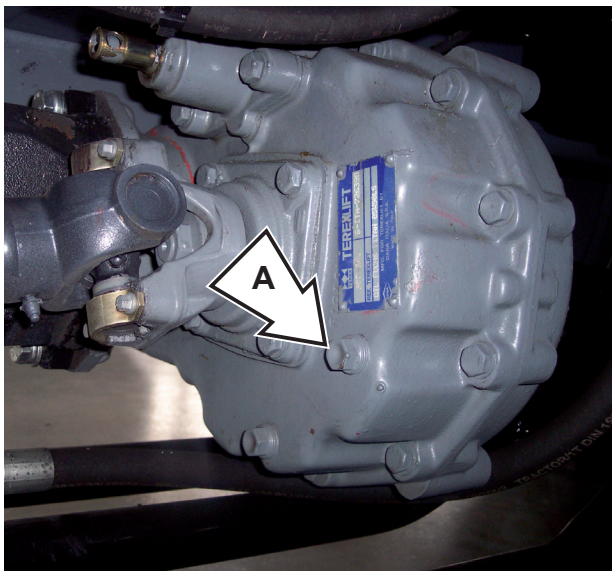


To check the oil level in the **gearbox**:

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

NOTICE

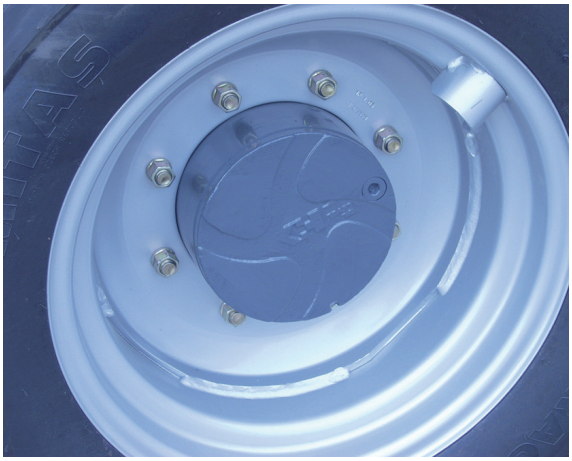
Place a container of suitable size under the plug.

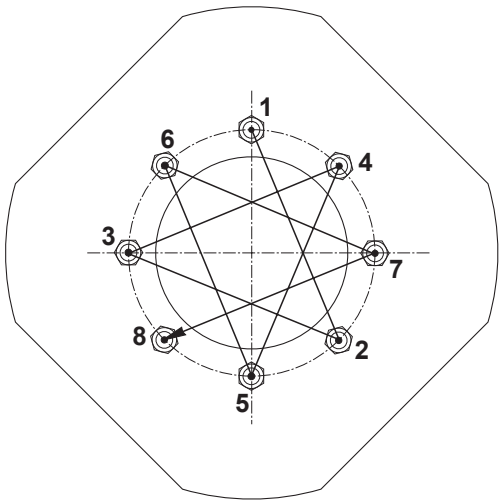


A-2 CHECK THE TIGHTENING OF THE WHEEL BOLTS

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

- Raise the machine by lowering the outriggers to the ground.
- Remove the wheel rolling it on the ground.
- Line up the wheel with the axle and fit the 8 nuts.
- Tighten the nuts following the alternate sequence shown in the picture with a pneumatic screwdriving machine.
- Raise the outrigger and lower the machine to the ground.





Re-tighten all nuts to a torque 300 Nm.

⚠WARNING

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

⚠WARNING

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

⚠WARNING

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

	Gyro 4020	Gyro 4518
Dimensions (front and rear)	18-19,5	18-19,5
P.R. (or load index)	16 pr	16 pr
Rim	14x19,5 / 13x19,5 admissible	14x19,5 / 13x19,5 admissible
Wheel disc	10 holes DIN 70361	10 holes DIN 70361
Pressure bar/Psi	6/87	6/87

A-3 CHECK THE TIGHTENING OF ALL BOLTS AND NUTS

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

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

A-4 CHECK THE COUPLINGS FOR OIL LEAKS

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

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

A-5 INSPECT THE OPERATOR MANUAL

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

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

In particular:

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

CAUTION

Contact TEREXLIFT Service Centre if replacement manuals are needed.

A-6 INSPECT THE DECALS AND PLACARDS

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

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

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

CAUTION

Contact TEREXLIFT Service Centre if replacement decals are needed.

A-7 CHECK THE ENGINE OIL LEVEL

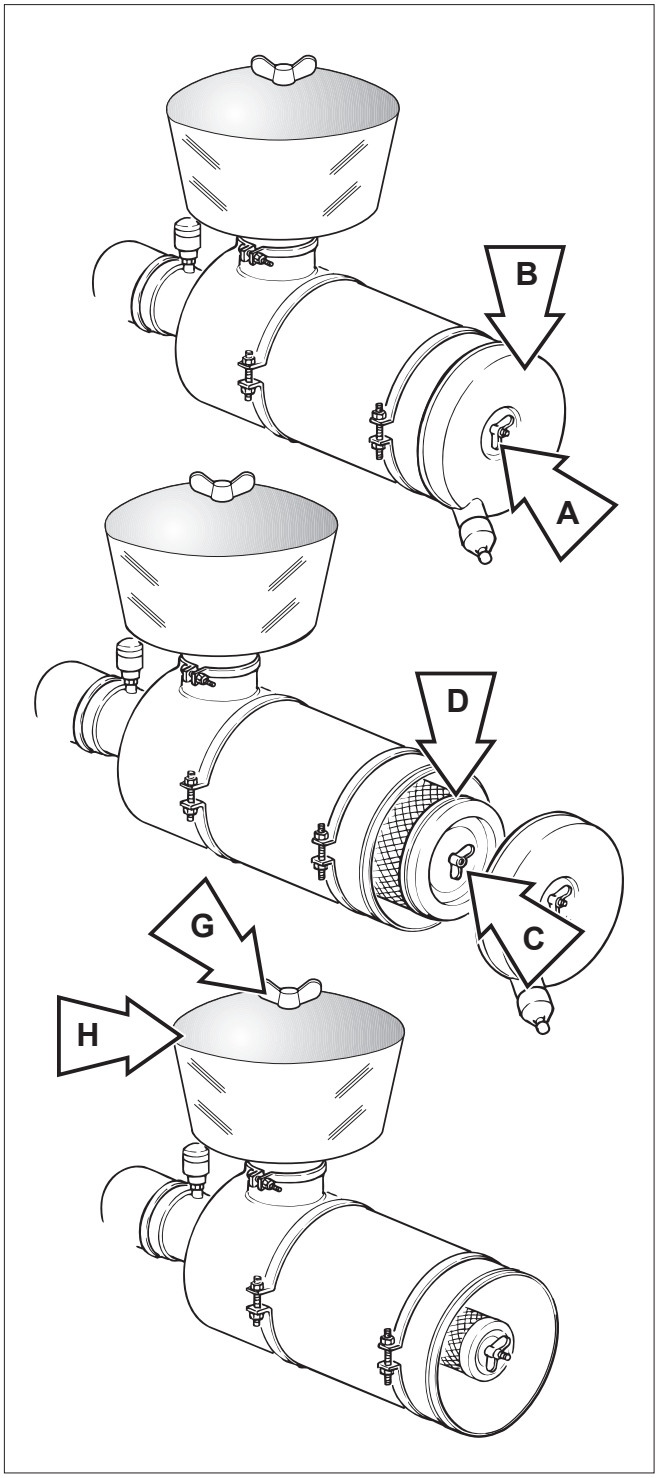
CAUTION

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

A-8 CLEAN THE AIR SUCTION FILTER

Clean the engine air filter every 10 hours:

- Raise the boom and secure it in a stable and safe way.
- Shut the engine down and engage the parking brake.
- Unscrew wing nut **A** and remove cover **B**.
- Unscrew wing nut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Dry clean the cartridge (at max. 6 bar pressure) and direct the air jet from inside to outside.
- Check the filter element for cracks by introducing a lamp inside.
- Smear the seal with grease, then refit the element **D**.
- Re-tighten wing nut **C**, close cover **B** and tighten it with wing nut **A**.



Changing the cyclone pre-filter

Daily clean the cyclone pre-filter:

- Shut the engine down and engage the parking brake.
- Loosen wing nut **G** and remove cover **H**.
- Remove the dust container and empty it.
- Refit the dust container and the cover and tighten the wing nuts.

⚠WARNING

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

⚠WARNING

Never wash the cartridge with water or solvents.

A-9 CHECK AND CLEAN THE RADIATOR

DANGER

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

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

Cleaning using compressed air

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

Cleaning using water at pressure or steam

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

CAUTION

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

A-10 CHECK THE HYDRAULIC OIL LEVEL IN THE TANK

DANGER

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

Check the hydraulic oil level (visually) through the special level **A** fitted into the tank and visible through the slot on the right side of the chassis.

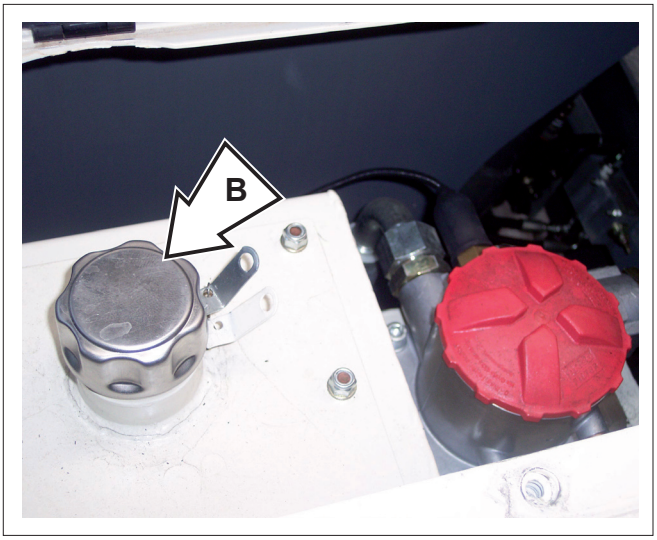


WARNING

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

NOTICE

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



A-11 CHECK THE GREASING OF THE BOOM SECTION PADS

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

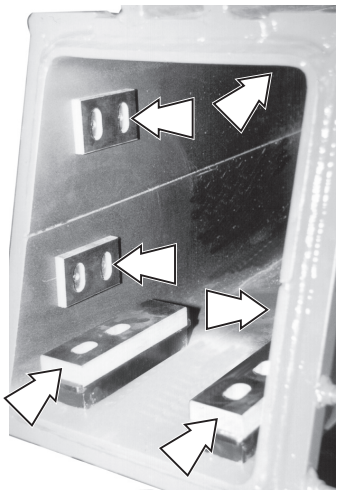
At regular intervals, check that the telescopes are well greased in correspondence of the sliding pads.

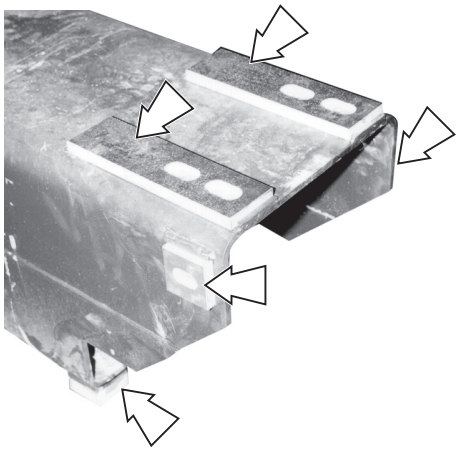
If necessary, scrape off the old grease and brush new grease. We recommend using:

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

CAUTION

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





A-12 GREASE THE FORKS

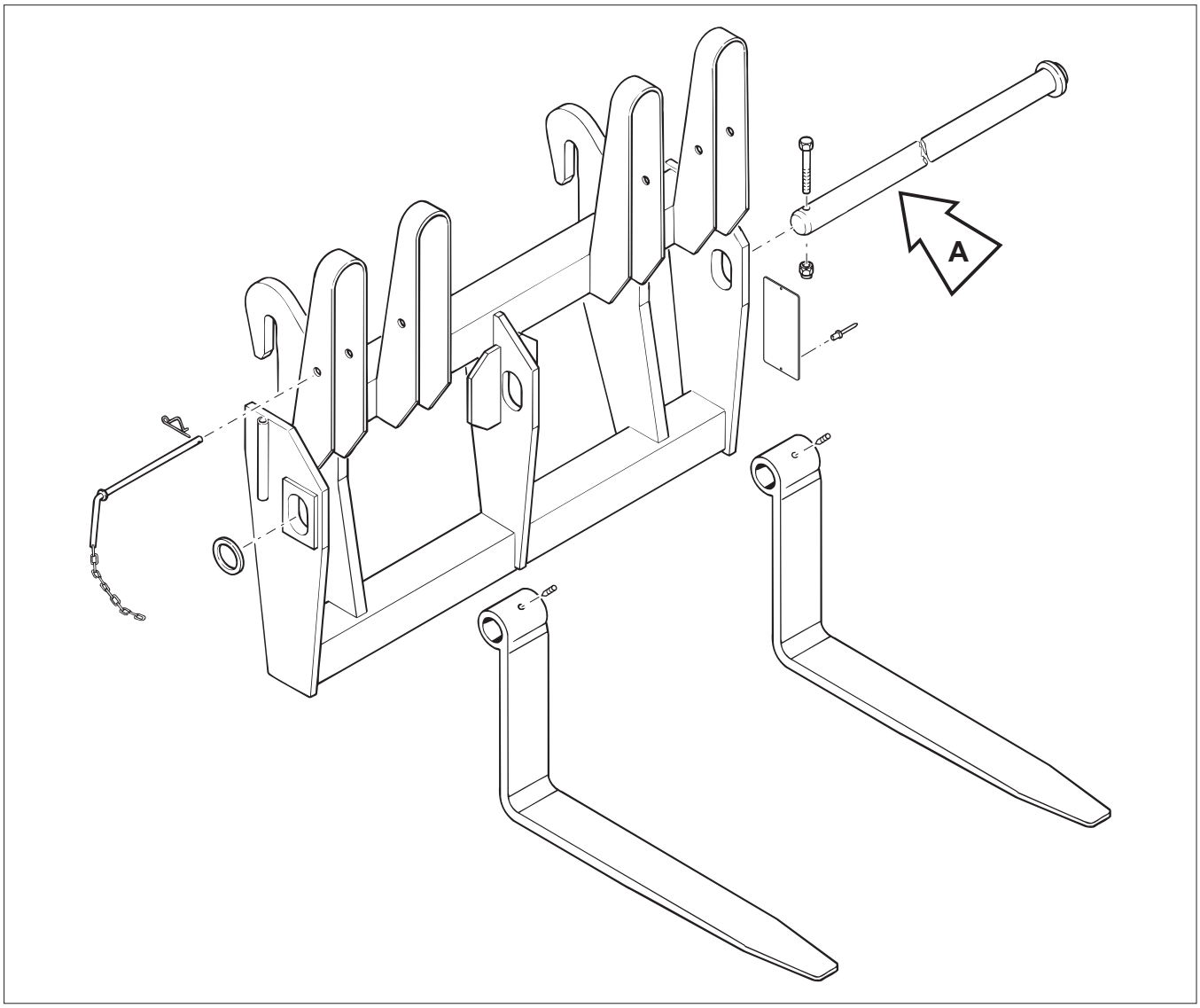
CAUTION

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

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

Recommended grease:

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



A-13 GREASE THE COUNTERFRAME/ TURNTABLE SLEWRING

CAUTION

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

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

As the fresh grease comes out, stop the operation.



A-14 GREASE ALL JOINTS OF BOOM AND STABILISERS, THE FRONT AND REAR AXLE SHAFT JOINTS, THE TRANSMISSION SHAFTS AND ANY EQUIPMENT OF THE MACHINE

CAUTION

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

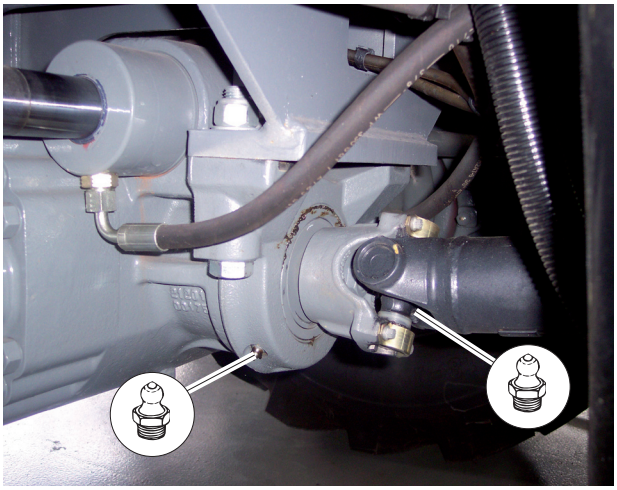
Regularly grease the machine to grant it efficient conditions and a long life.

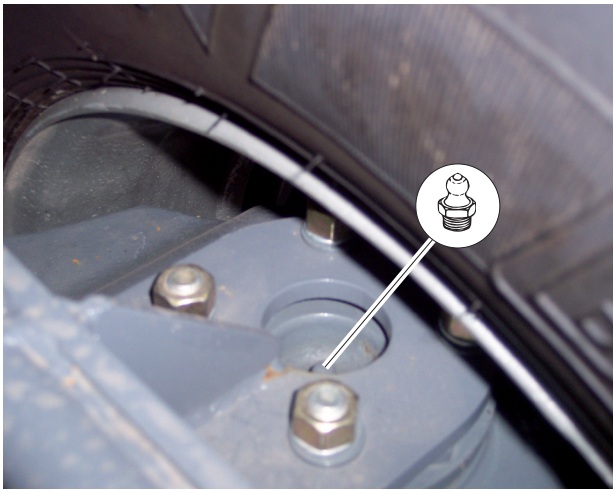
By means of a pump, inject grease into the special greasers.

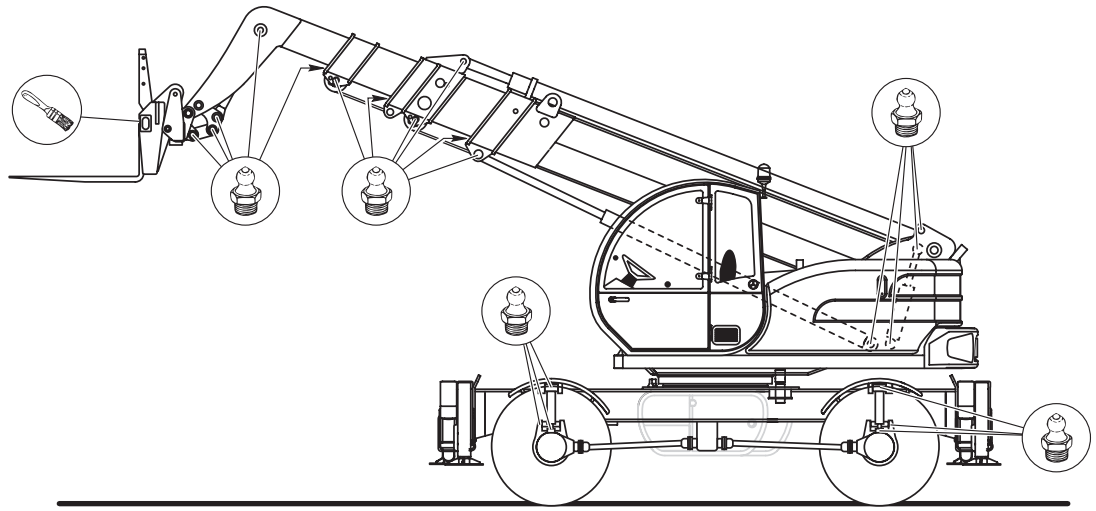
As the fresh grease comes out, stop the operation.

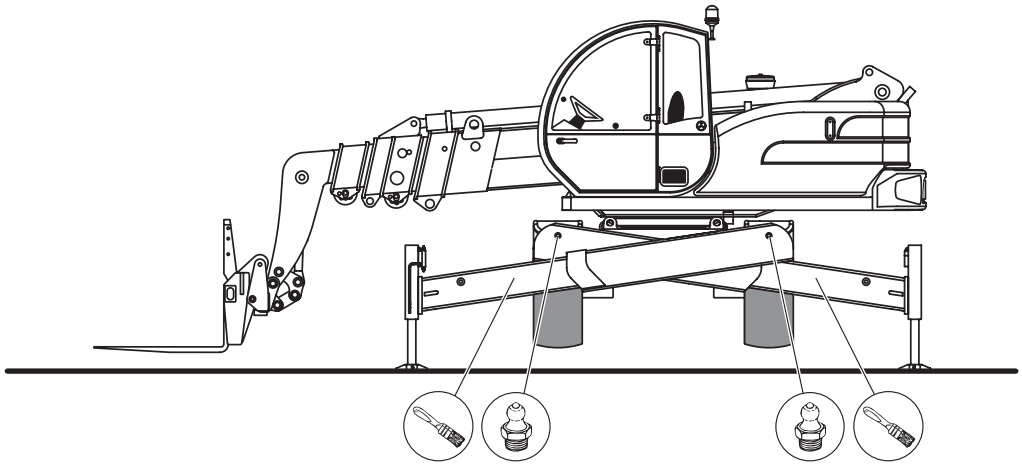
The greasing points are shown in the following figures:

- the symbol  represents the points to be greased by a pump
- the symbol  represents the points to be greased by a brush.
- the coloured symbols show the points to be greased with INTERFLON FIN GREASE LS.









A-15 CHECK THE EFFICIENCY OF THE LIGHTING ELECTRIC SYSTEM

Check every day that the electrical system powering the lights of the machine is in efficient working order.

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

Also check beacon located on the cab roof.

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

⚠WARNING

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

⚠CAUTION

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

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

A-16 CHECK THE EFFICIENCY OF BRAKING SYSTEM AND PARKING BRAKE

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

A-17 CHECK THE EFFICIENCY OF THE STEERING SELECTION SYSTEM

During operation, the alignment of the front and rear axles of the machine can be subject to variations. This can depend on an oil blow-by from the steering control circuit, or on a steering of both axles when front and rear wheels are not perfectly aligned.

To fix this problem, rather than checking the alignment visually, follow the procedure below:

1 Move to a solid and level ground.

2 Set the steering selection switch **A to** “four-wheel steer” (pos. **2**).

3 Rotate the steering up to its stop (either to the right or to the left).

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

5 Rotate the steering up to its stop (turn in the same direction as above).

6 Reset the steering selection switch to “four-wheel steer” (pos. **2**).

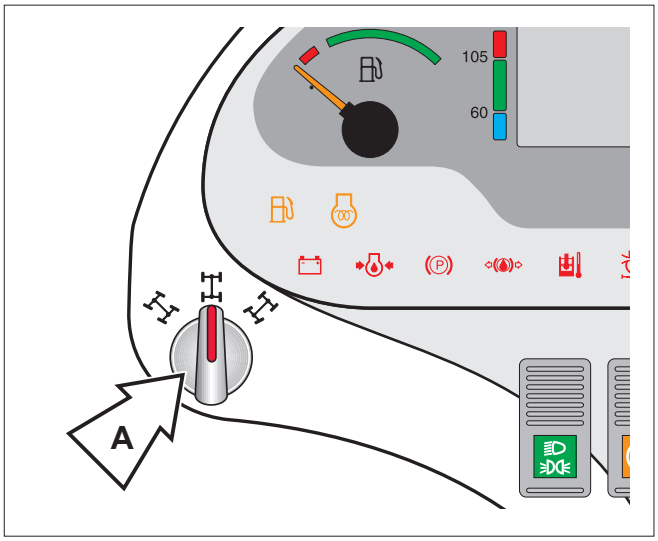
7 Rotate the steering (to the side opposite to point **3**) so that the rear axle reaches its stop.

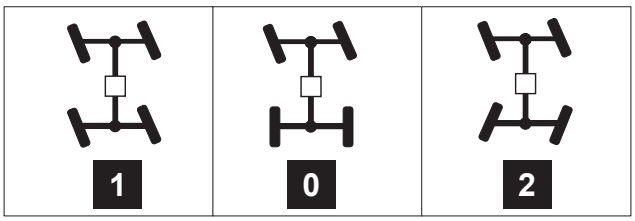
8 Reset the steering selection switch to “two-wheel steer” (pos. **0**).

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

10 Reset the steering selection switch to “four-wheel steer” (pos. **2**).

Now the wheels should be re-aligned.





A-18 CHECK THE EFFICIENCY OF THE FORK BALANCING SYSTEM

WARNING

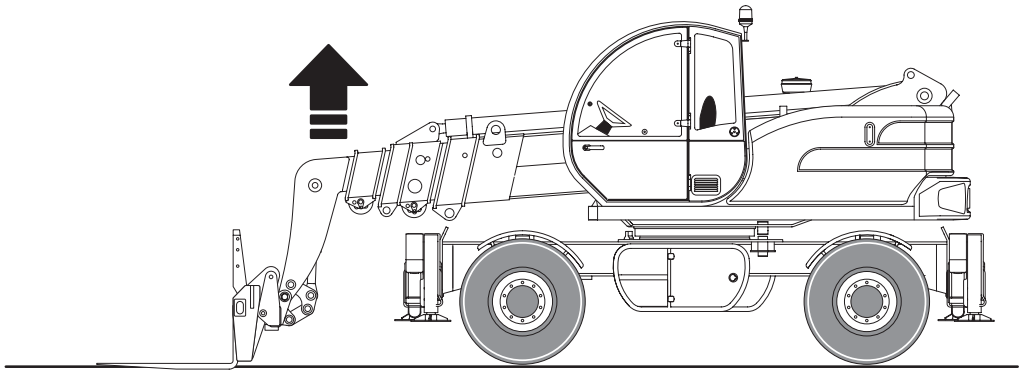
Test the system without any load on the machine's forks.

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

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

CAUTION

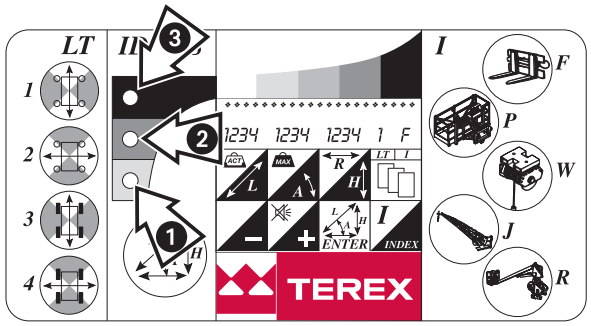
If the forks do not remain parallel to the ground, consult section 5 "Problems - causes - Solutions".



A-19 MAKE SURE THE SAFETY DEVICES INSTALLED ARE IN EFFICIENT WORKING ORDER

Checking the overload warning system
(at every use)

At the machine start-up, the overload warning system runs an automatic check. In the case of troubles, the red LED **3** will come on and the buzzer will sound to warn of the error. The machine will enter the alarm mode and no operation will be allowed.
To check the system manually, proceed as follows:
- Load a weight of 1000 kg.
- Raise the boom about 30 cm above the ground.
- Extend the telescope and check if the system enters the alarm mode once reached the distance indicated in the load charts for the attachment fitted to the machine.
  If the system does not enter the alarm mode, contact the TEREXLIFT Technical Service.

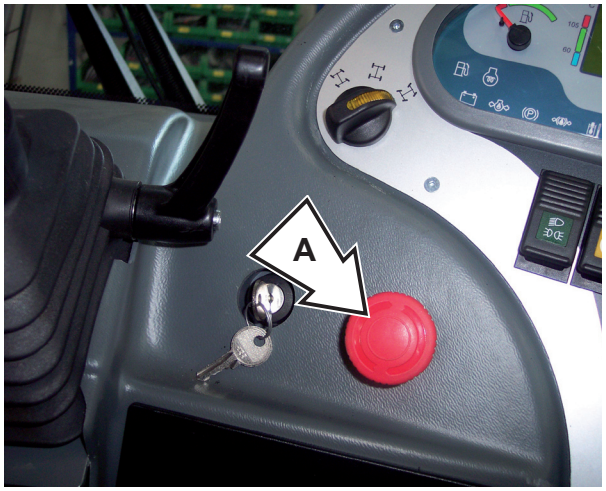


CAUTION

Do this check in the two positions: with the turntable longitudinal and rotated 90°.

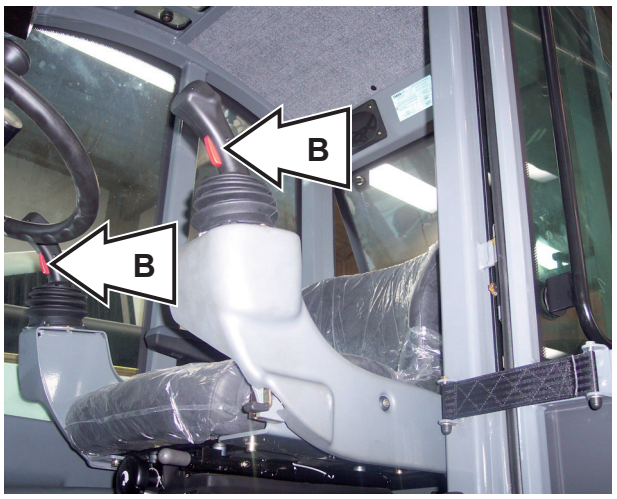
Checking the emergency stop pushbutton
(at every use)

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



Checking the joystick pushbutton
(at every use)

To check the efficiency of the deadman pushbutton **B** on the two joysticks, it is enough to attempt to operate the joystick without pressing this button.
In this condition, the joystick shall not activate any movement. Should that not be the case, contact the TEREXLIFT Technical Service.



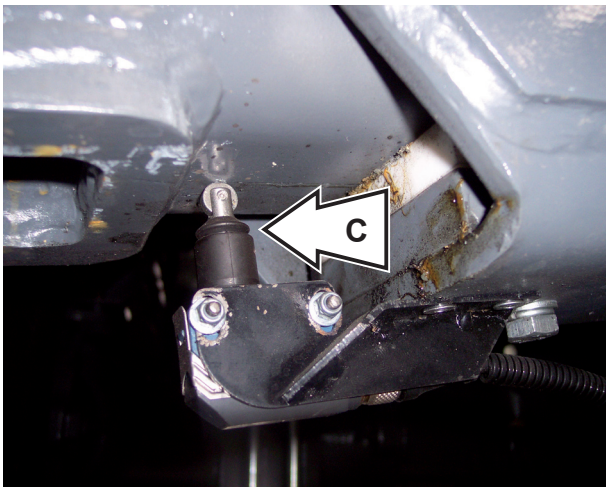
Checking the limit switches of the stabilisers
(at every use)

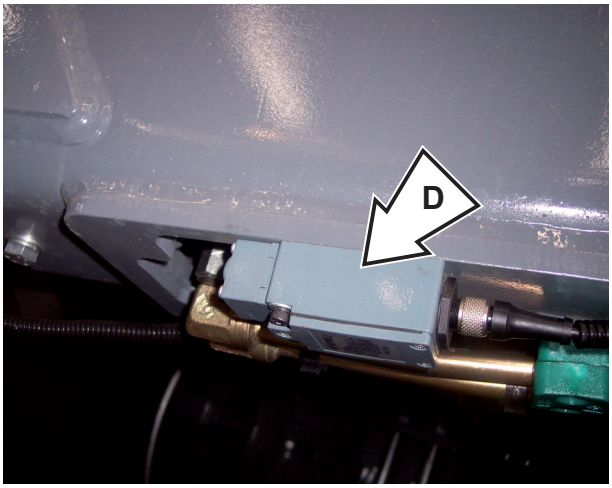
To check the efficiency of the limit switches **C-D** installed in the stabilisers:
- Lower or raise all the stabilisers.
- The display of the ***MIDAC*** moment limiter will change the scale of the admissible payloads accordingly.

Should that not be the case, contact the TEREXLIFT Technical Service.

⚠ DANGER

If a limit switch is faulty or a lever is deformed, immediately replace the part.

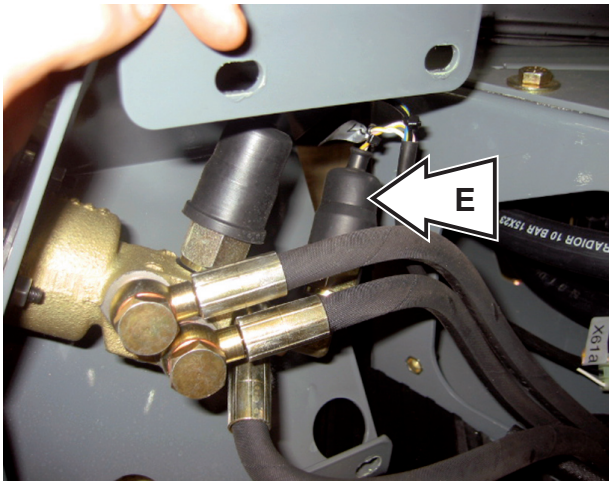




Checking the pressure switch on the parking brake
(at every use)

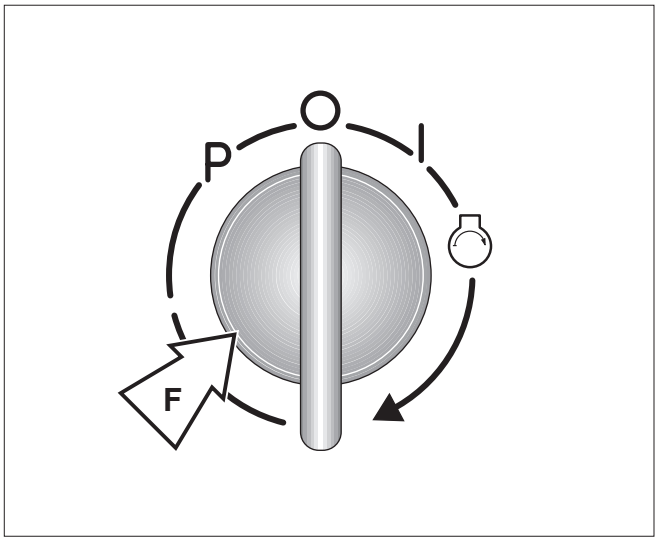
To check the efficiency of this pressure switch **E**, proceed as follows:
- Engage the parking brake and start the engine.
- Attempt to move with the machine. The machine must not move.

Should that not be the case, contact the TEREXLIFT Technical Service.



Checking the machine start control (F)
(at every use)

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



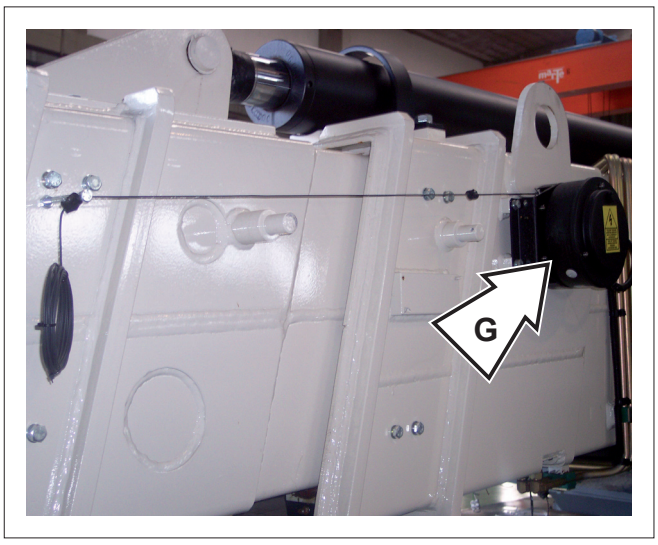
Boom strain gauge
(at every use)

To verify the efficiency of the strain gauge **G** on the boom:
- Visually check the wire for damage.

If the wire is damaged, address to TEREXLIFT Technical Service.

CAUTION

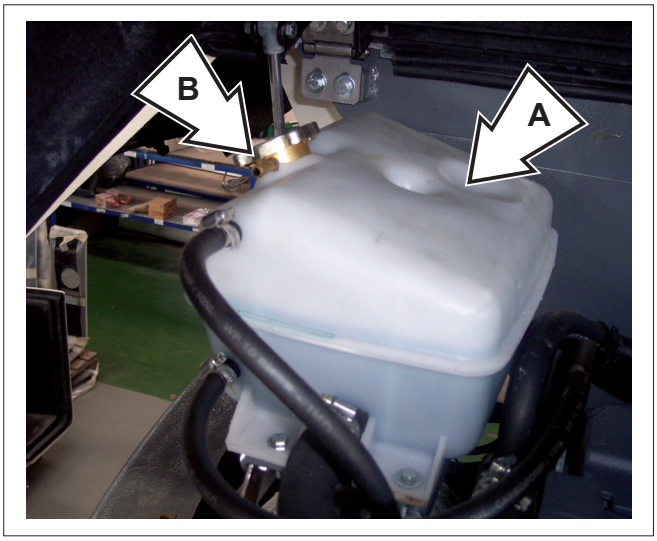
If the strain gauge is defective or its wire is broken, the display will show an error message.



A-20 CHECK THE ENGINE COOLANT LEVEL

DANGER

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



- Weekly check the coolant level within pan **A** before starting working (when coolant is cold).
- When necessary, add clean water or an antifreeze mixture through cap **B**.

On delivery, the machine is filled with a cooling mixture consisting of 50% water and 50% anti-freeze.

TEREX PRO COOL Protection against boiling / freezing		
Product %	Freezing point	Boiling point
33	-17 °C	123 °C
40	-24 °C	126 °C
50	-36 °C	128 °C
70	-67 °C	135 °C

A-21 ENSURE THE DIFFERENTIAL LOCK IS EFFICIENT

To check the differential lock is in efficient working order:

- Drive the machine on a ramp in order to raise one of the two rear wheels above the ground; under normal conditions, only the raised wheel should turn.
- Press the differential lock button and check that also the rear wheel on the ground starts turning.

A-22 ENSURE THE MECHANICAL GEAR SELECTION SYSTEM IS EFFICIENT

To check the gear selection system is in efficient working order:

- Change the speed, go to the gearbox and make sure the travel of the small piston is complete.

4.4 TABLE B PROCEDURES

B-1 CHANGE THE ENGINE OIL

CAUTION

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

B-2 GREASE THE SLIDING PARTS AND THE PIVOT PIN OF THE TELESCOPIC BOOM

CAUTION

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

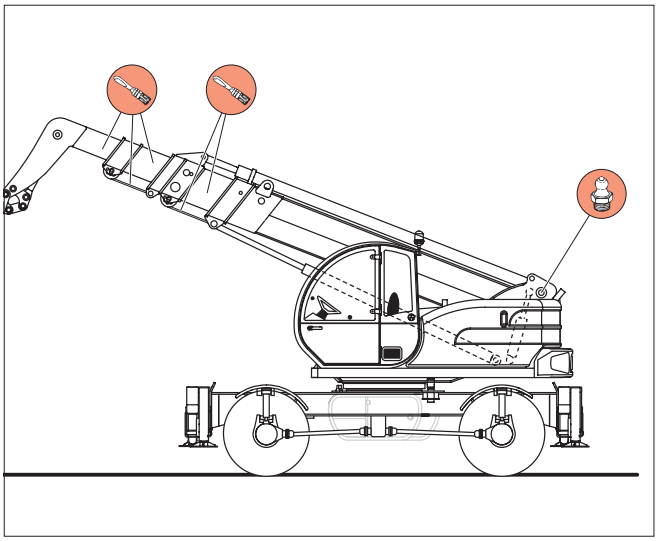
Regularly grease the machine to grant it efficient conditions and a long life.

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

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

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



⚠WARNING

To grease the sliding parts of the boom telescopes and the pivot pin of the boom, use PTFE INTERFLON FIN GREASE LS 2 (code 640772) at the following service intervals:

- ***After the first 50 operating hours (1 week)***
- ***After the first 250 operating hours (1 month)***
- ***Every 1000 operating hours (6 months)***

Remove any old grease from the boom and smear the sliding area of the blocks with a thin coat of grease.

B-3 CHECKTHETENSIONOFTHEALTERNATOR BELT

CAUTION

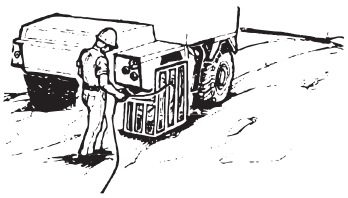
For the engine maintenance, please refer to the specific Operator handbook supplied with the machine.

B-4 CHECK THE TYRE INFLATION

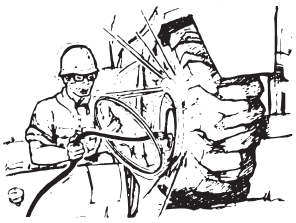
⚠DANGER

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

OKAY



WRONG



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

	Gyro 4020	Gyro 4518
Dimensions (front and rear)	18-19,5	18-19,5
P.R. (or load index)	16 pr	16 pr
Rim	14x19,5 / 13x19,5 admissible	14x19,5 / 13x19,5 admissible
Wheel disc	10 holes DIN 70361	10 holes DIN 70361
Pressure bar/Psi	6/87	6/87

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

⚠WARNING

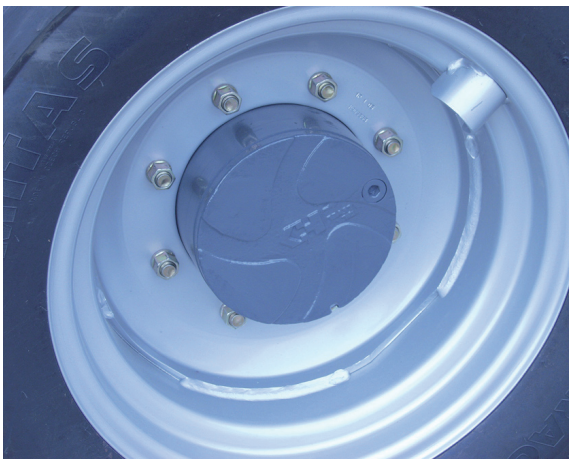
Always use tyres having the dimensions indicated in the vehicle registration card.

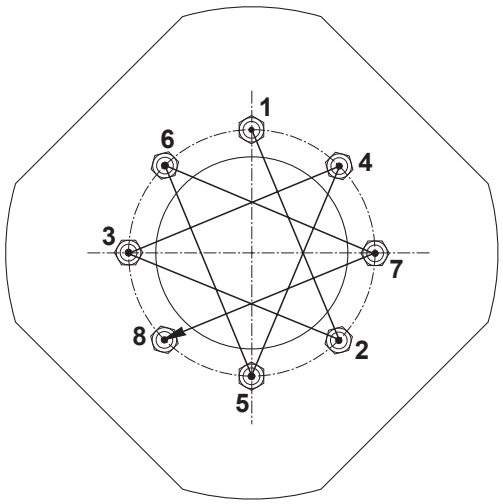
B-5 CHECK THE TIGHTENING OF THE WHEEL NUTS

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

- Raise the machine by lowering the outriggers to ground.
- Remove the wheel rolling it on the ground
- Line up the wheel with the axle and fit the 8 nuts.
- Tighten the nuts following the alternate sequence shown in the picture with a pneumatic screwdriving machine.
- Raise the outrigger and lower the machine to the ground.

Re-tighten all nuts to a torque 300 Nm.





WARNING

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

WARNING

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

WARNING

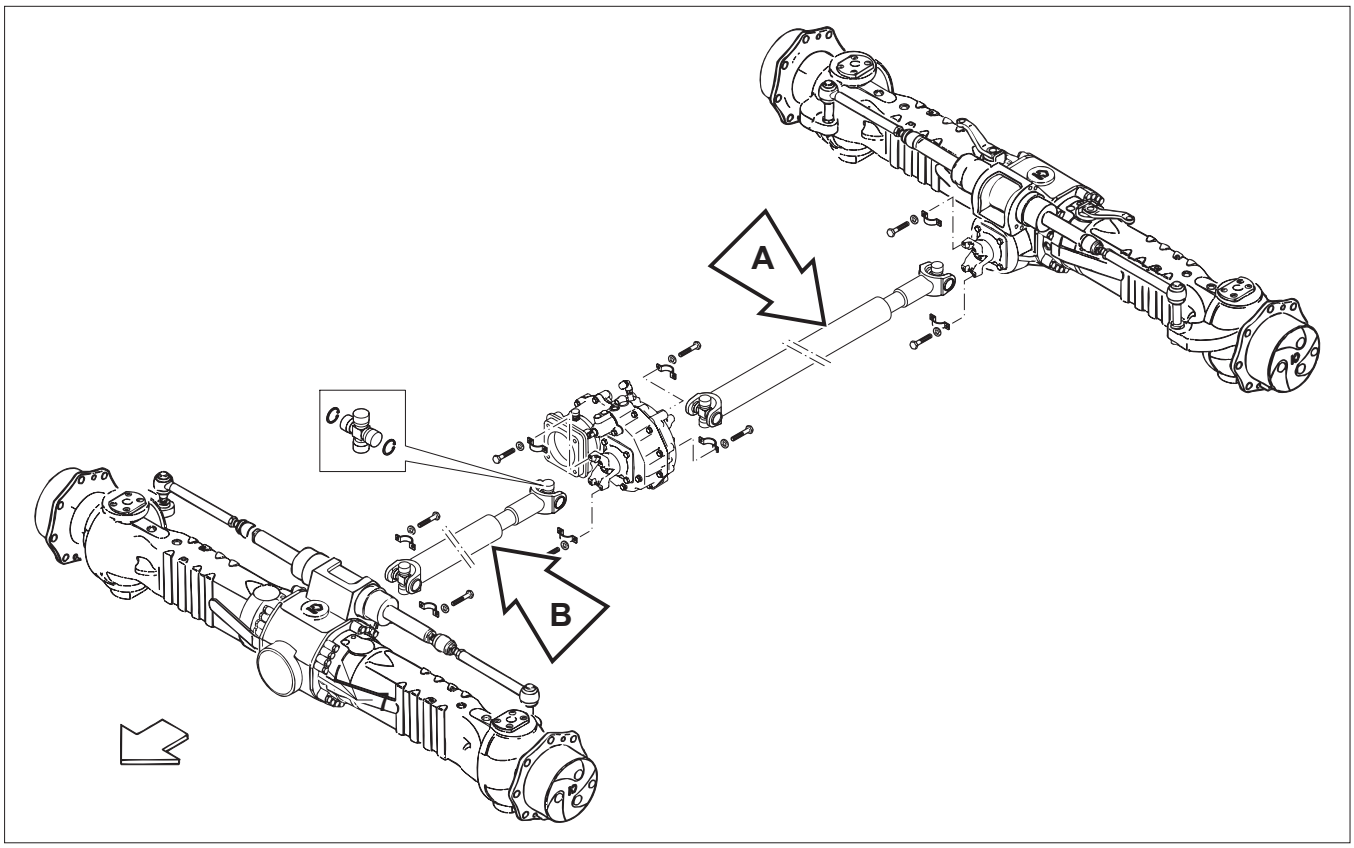
Always use tyres having the dimensions indicated in the vehicle registration card.

	Gyro 4020	Gyro 4518
Dimensions (front and rear)	18-19,5	18-19,5
P.R. (or load index)	16 pr	16 pr
Rim	14x19,5 / 13x19,5 admissible	14x19,5 / 13x19,5 admissible
Wheel disc	10 holes DIN 70361	10 holes DIN 70361
Pressure bar/Psi	6/87	6/87

B-6 CHECK THE TIGHTENING OF THE CARDAN SHAFT SCREWS

Check every week that the screws of the Cardan shafts **A** and **B** are tight.

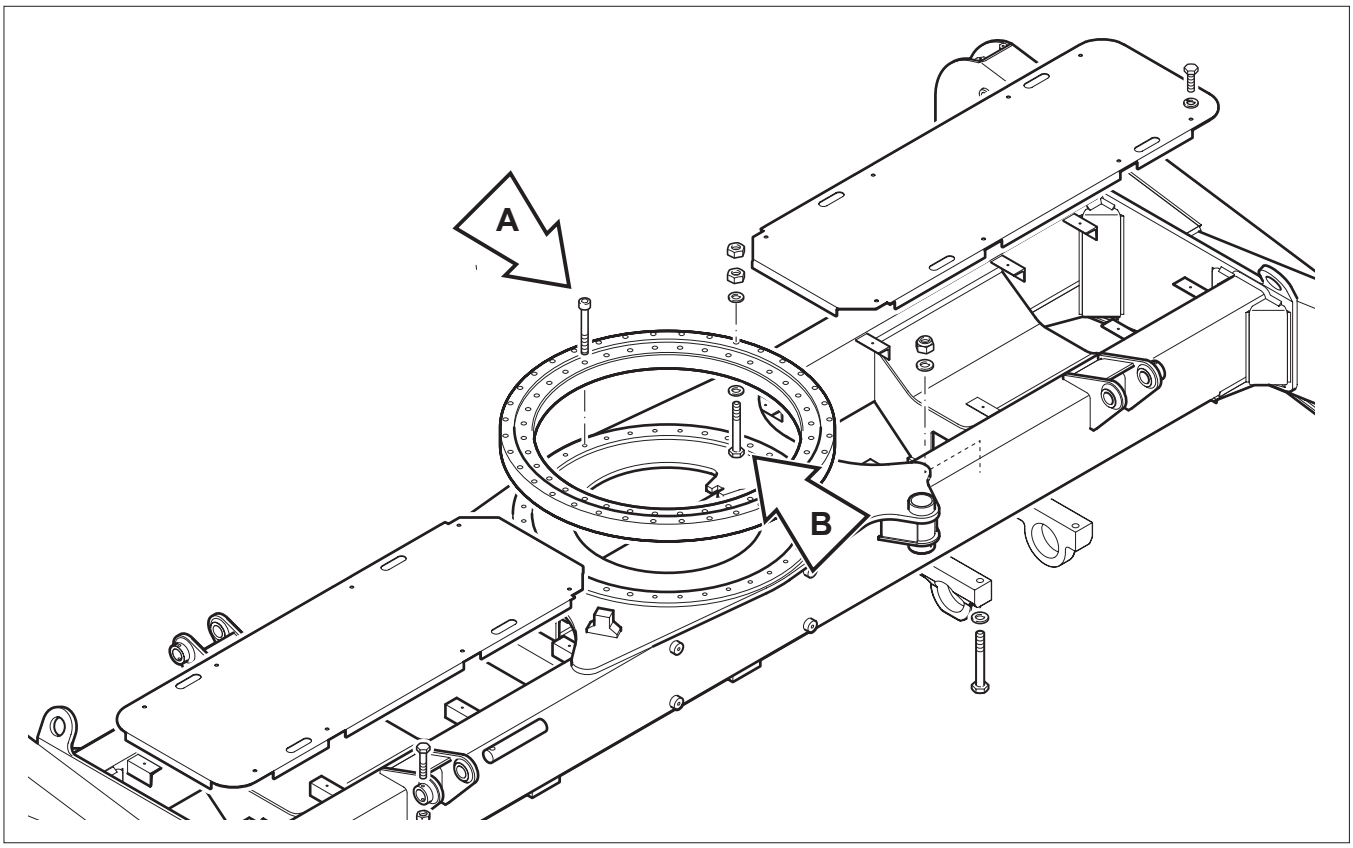
For the correct tightening torques, please refer to par. 2.13 in section 2 “Technical Specifications”.



B-7 CHECK THE TIGHTENING OF THE SCREWS FIXING THE COUNTERFRAME/ TURNTABLE SLEWRING

Check the tightening of screws **A-B** fixing the screw ring **C** every week.

Re-tighten all nuts to a torque 300 Nm.

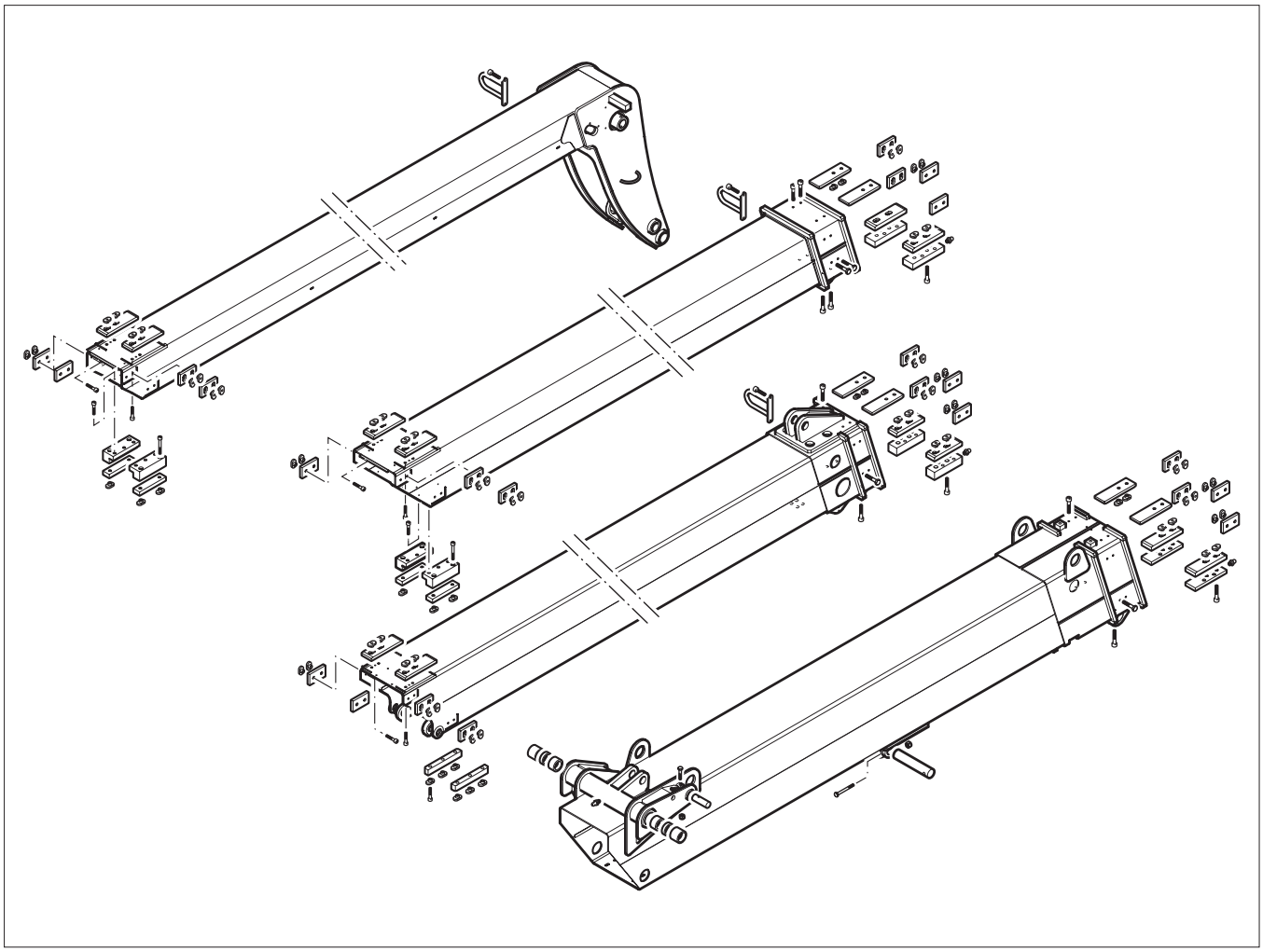


B-8 CHECK THE TIGHTENING OF THE TELESCOPE SLIDING BLOCKS

Check the tightening of the fixing screws of all sliding blocks of the boom telescopes every week.

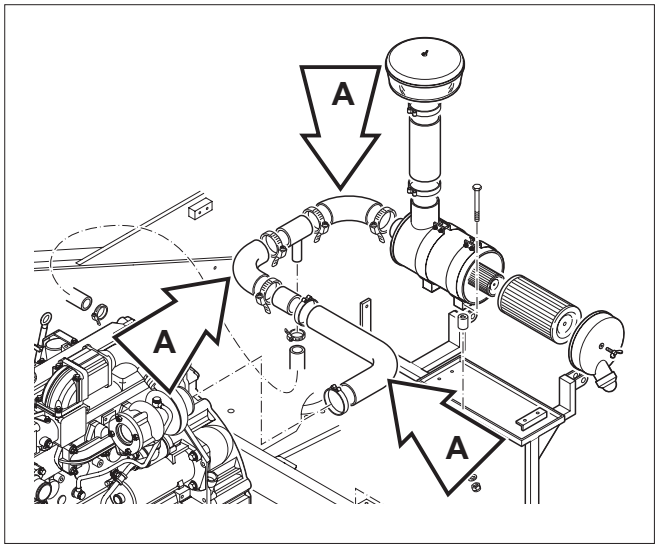
Tighten all screws M10 to a torque of 30 Nm.

Tighten all screws M14 to a torque of 50 Nm.



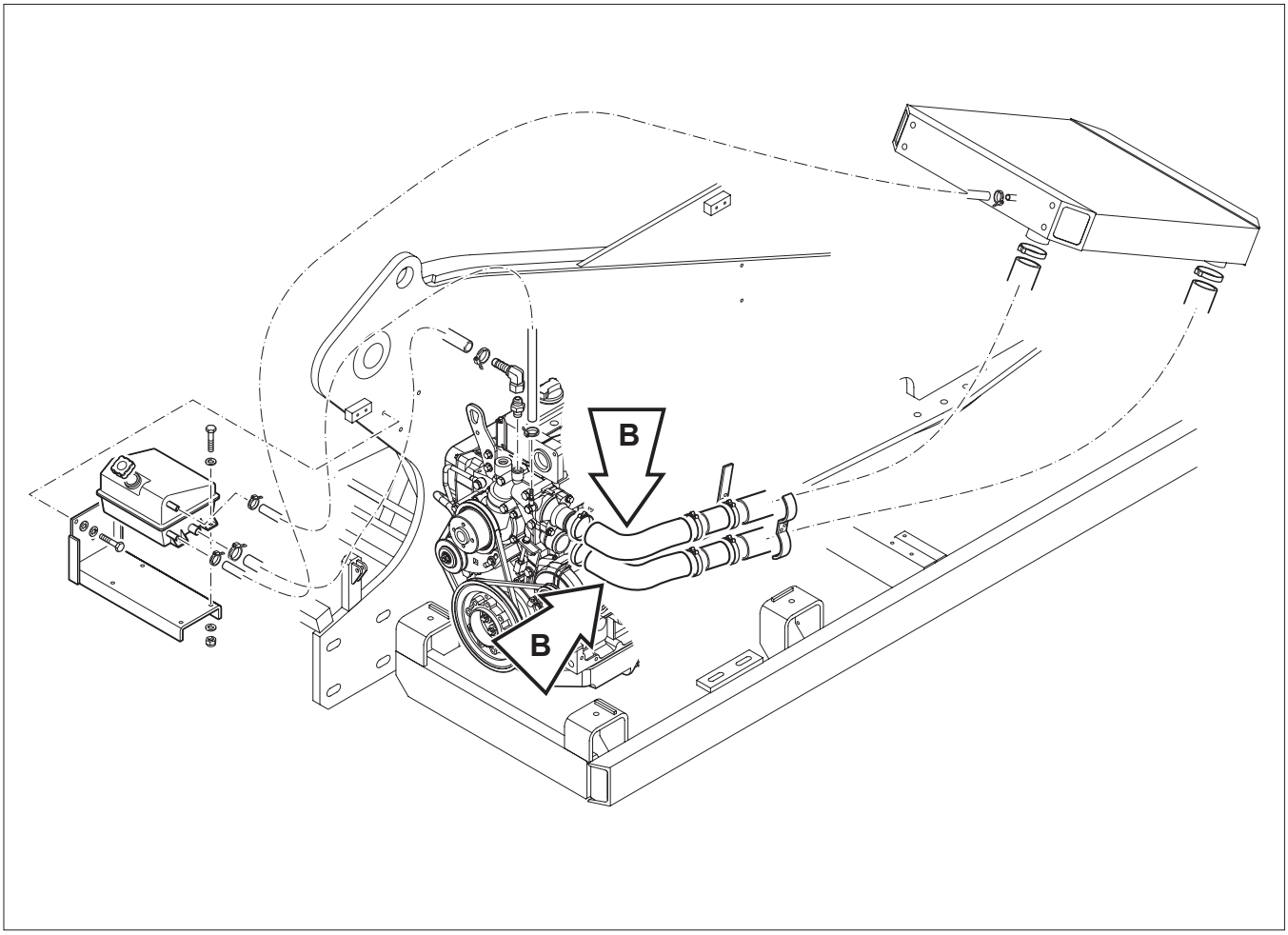
B-9 CHECK THE SLEEVES CONNECTING THE AIR FILTER TO THE ENGINE COOLING SYSTEM

Every week, check the state of the air suction sleeves **A** between engine and filter and of sleeves **B** between engine and cooling radiator.



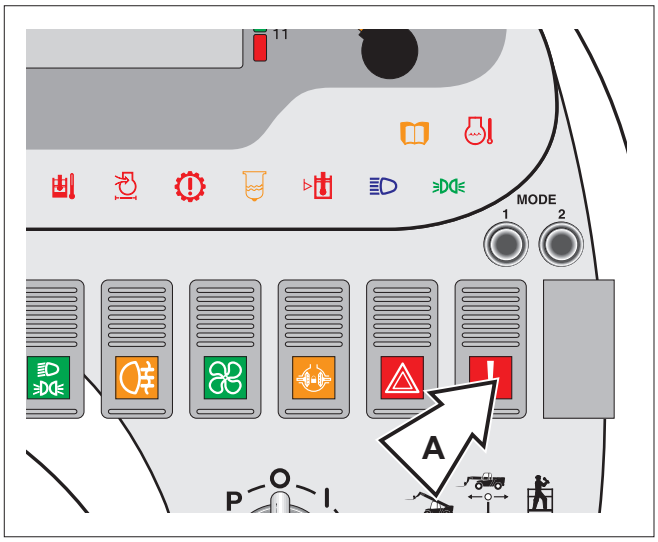
CAUTION

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



B-10 CHECK THE OPERATION OF THE EMERGENCY PUMP

Check the emergency pump is in efficient working order every week.
This pump is not used regularly and, as a result, it could get damaged and be out of order in case of need.
To check that the pump is in efficient order, stop the engine, press the on-off button **A** for some seconds and check that the pump works regularly.

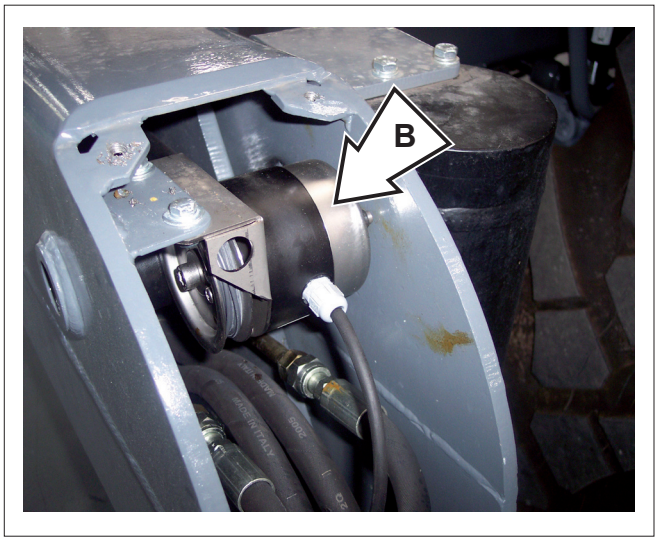


B-11 CHECK THE STABILISER STRAIN GAUGE

To verify the efficiency of the extensometer **B** on the stabilisers, follow the instructions below:

- Using an Allen wrench, unscrew the 4 fixing screws of the protection cover.
- Remove the protection cover and visually check the wire for damage.

If the wire is damaged, address to TEREXLIFT Technical Service.



CAUTION

If the strain gauge gets damaged, the display will show an error message.
If the wire of the strain gauge is broken, the machine does not detect the extension of the arm of the stabiliser (even when extended) and therefore the scale of the permissible payloads is not adapted accordingly.

4.5 TABLE C PROCEDURES

C-1 GREASE THE SLIDING PARTS AND THE PIVOT PIN OF THE TELESCOPIC BOOM

CAUTION

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

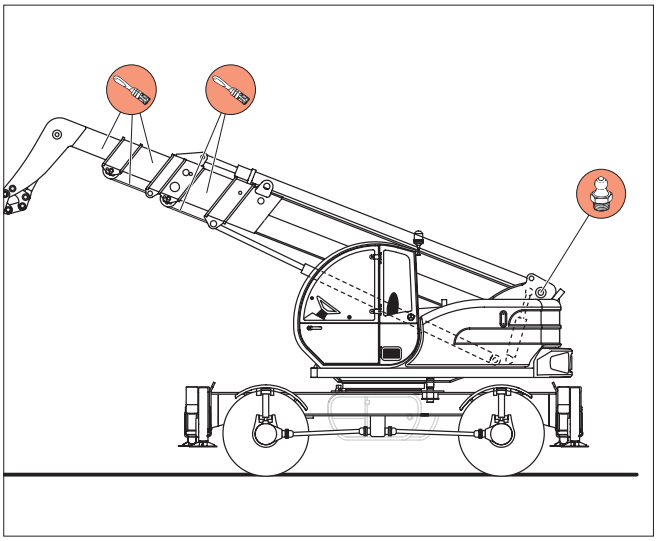
Regularly grease the machine to grant it efficient conditions and a long life.

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

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

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



WARNING

To grease the sliding parts of the boom telescopes and the pivot pin of the boom, use PTFE INTERFLON FIN GREASE LS 2 (code 640772) at the following service intervals:

- ***After the first 50 operating hours (1 week)***
- ***After the first 250 operating hours (1 month)***
- ***Every 1000 operating hours (6 months)***

Remove any old grease from the boom and smear the sliding area of the blocks with a thin coat of grease.

C-2 CHANGE THE ENGINE OIL AND RELEVANT FILTER

CAUTION

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

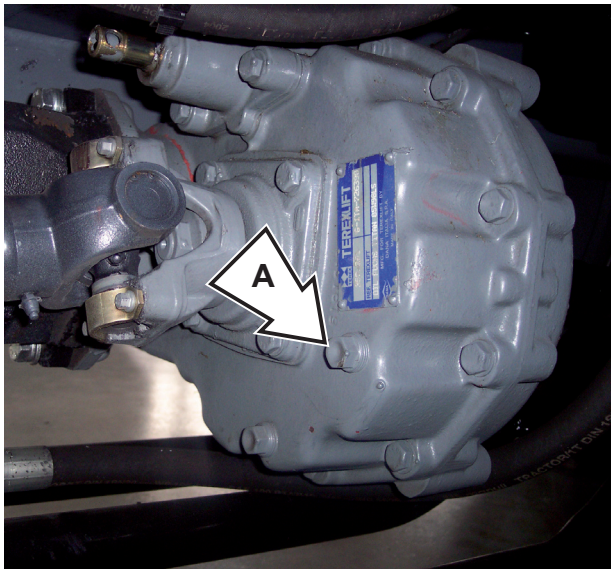
C-3 CHECK THE OIL LEVEL IN THE GEARBOX

To check the oil level in the **gearbox**:

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

NOTICE

Place a container of suitable size under the plug.



C-4 CHECKTHEOILLEVELINTHEDIFFERENTIAL GEARS

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

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

NOTICE

Place a container of suitable size under the plug.

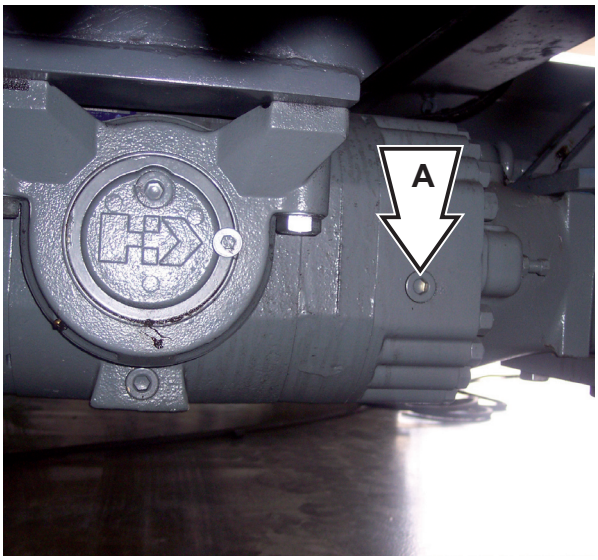
C-5 CHECK THE OIL LEVEL WITHIN THE WHEEL REDUCTION GEARS

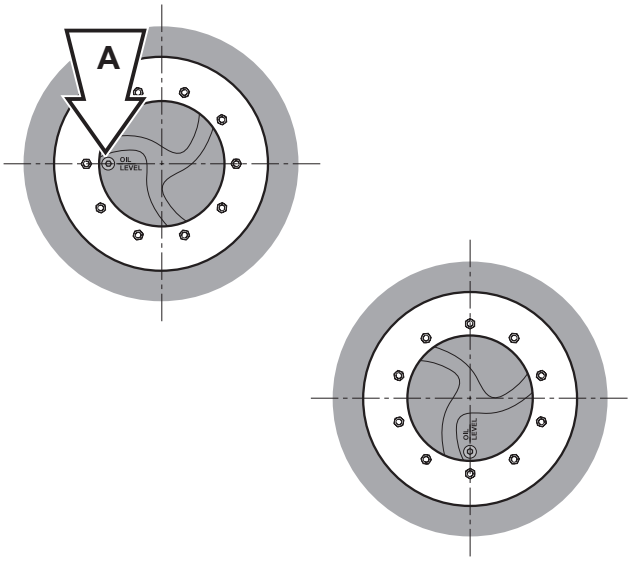
To check the oil level within the wheel **reduction gears**:

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

NOTICE

Place a container of suitable size under the plug.

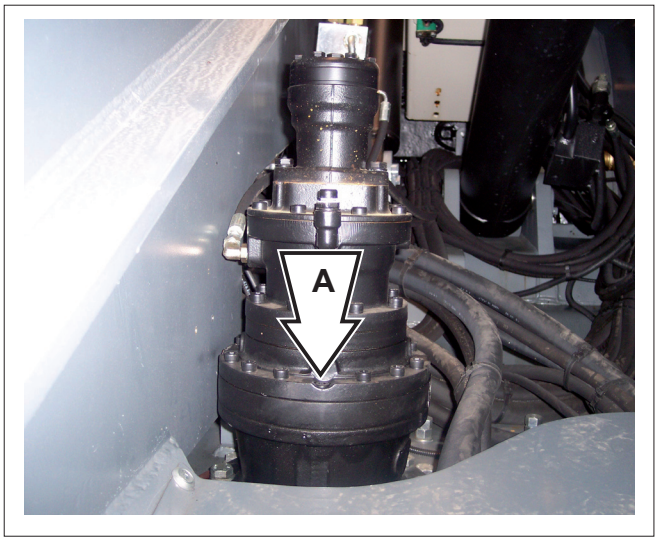




C-6 CHECKING THE OIL LEVEL OF THE TURNTABLE ROTATION REDUCTION GEAR

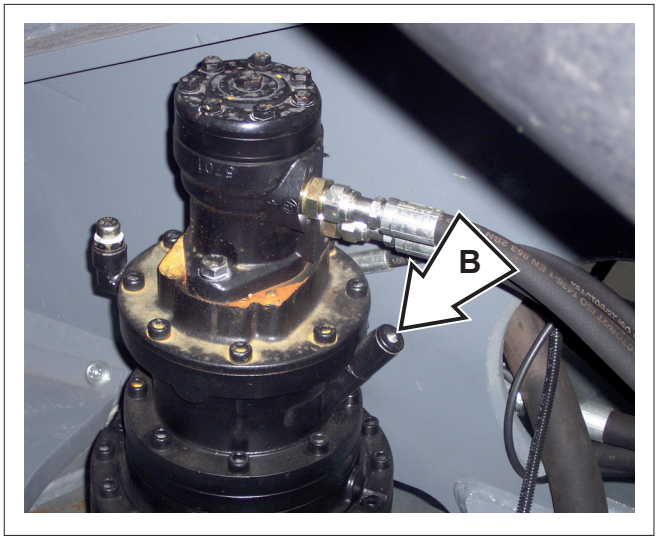
To check the oil level of the **turntable rotation reduction gear**:

- Stop the machine on a level ground and engage the parking brake.
- Clean level plug **A** all around.
- Loosen level plug **A** and check if oil is level with the hole.
- If necessary, unscrew the filling plug **B** and pour new oil through the hole until it starts flowing out of hole **A**.
- Refit and tighten plugs **A** and **B**.



NOTICE

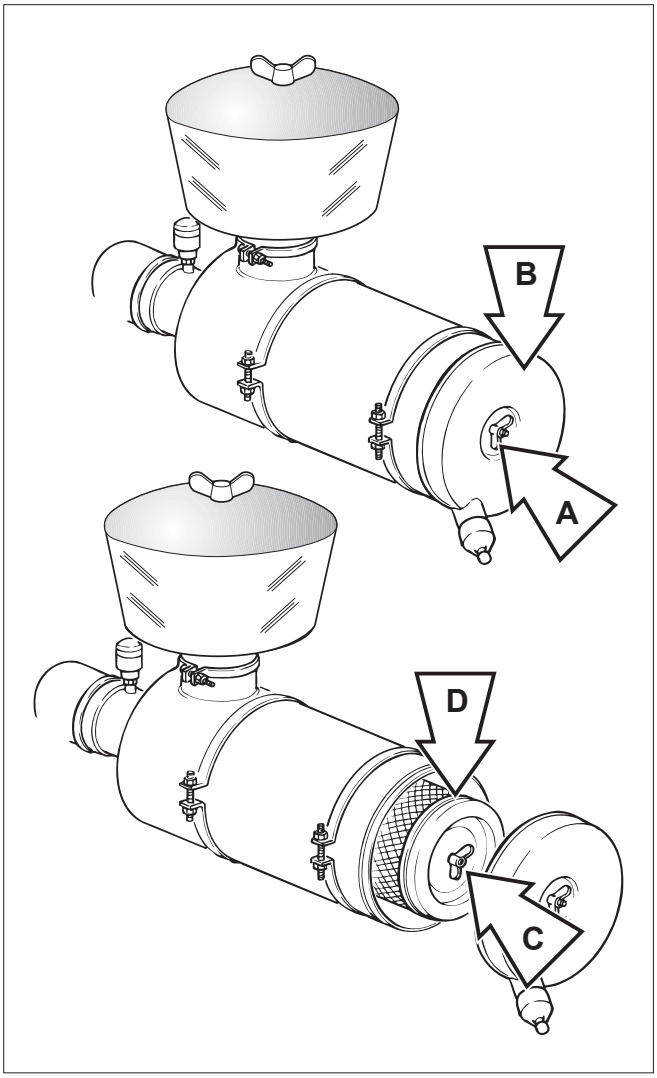
Place a container of suitable size under the plug.



C-7 CHECK AND CLEAN THE ENGINE AIR FILTER

To check and clean the engine air filter:

- Raise the boom and secure it in a stable and safe way.
- Shut the engine down and engage the parking brake.
- Unscrew wing nut **A** and remove cover **B**.
- Unscrew wing nut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Dry clean the cartridge (at max. 6 bar pressure) and direct the air jet from inside to outside.
- Check the filter element for cracks by introducing a lamp inside.
- Smear the seal with grease, then refit the element **D**.
- Re-tighten wing nut **C**, close cover **B** and tighten it with wing nut **A**.



WARNING

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

WARNING

Never wash the cartridge with water or solvents.

C-8 CHECKTHECLAMPINGOFTHECABLEHEADS TO THE BATTERY TERMINALS

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



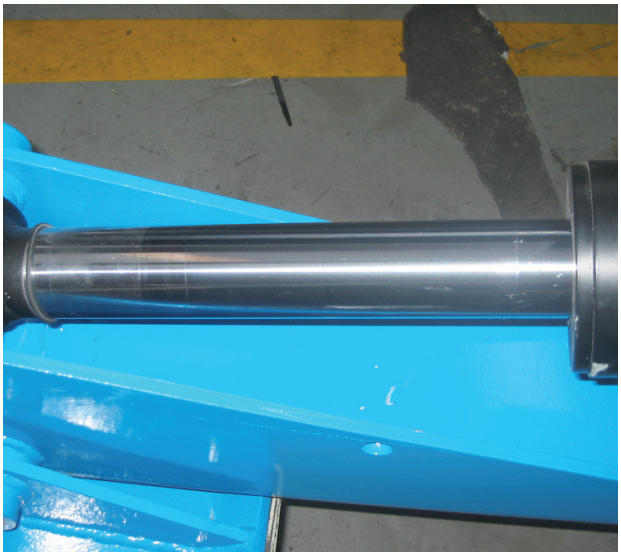
⚠DANGER

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

C-9 CHECK THE CYLINDER CHROMIUM-PLATED RODS

Visually check the cylinder rods for scoring every month.

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

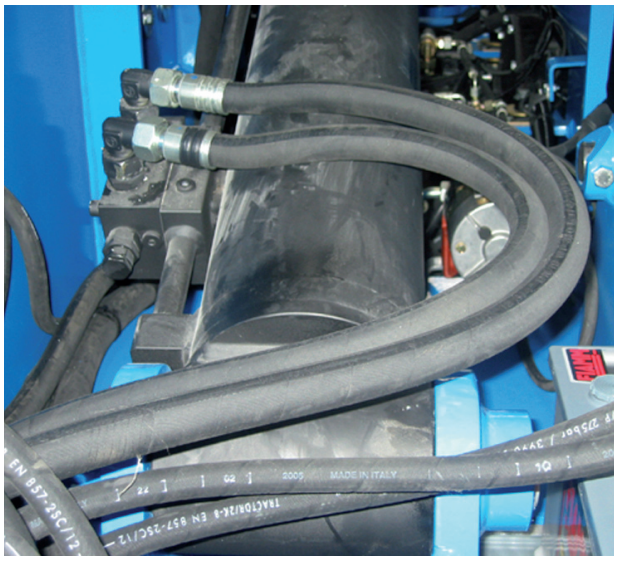


C-10 CHECK THE HYDRAULIC LINES

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

CAUTION

Replace any worn hoses immediately before using the machine again.

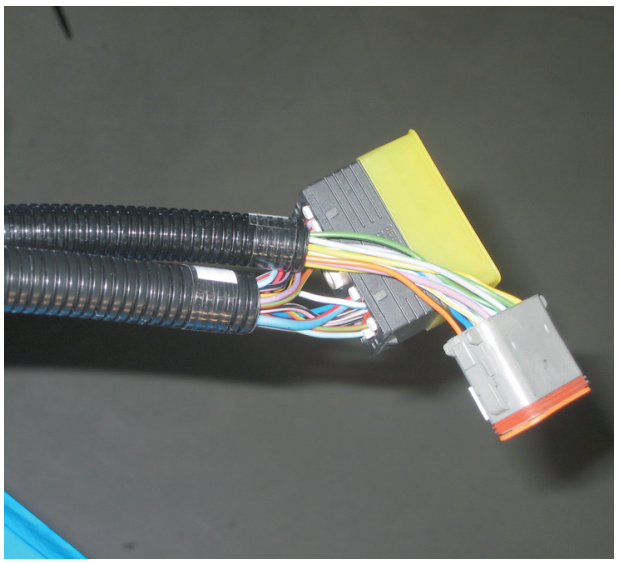


C-11 CHECK THE ELECTRIC CABLES

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

CAUTION

Replace any worn cables immediately before using the machine again.



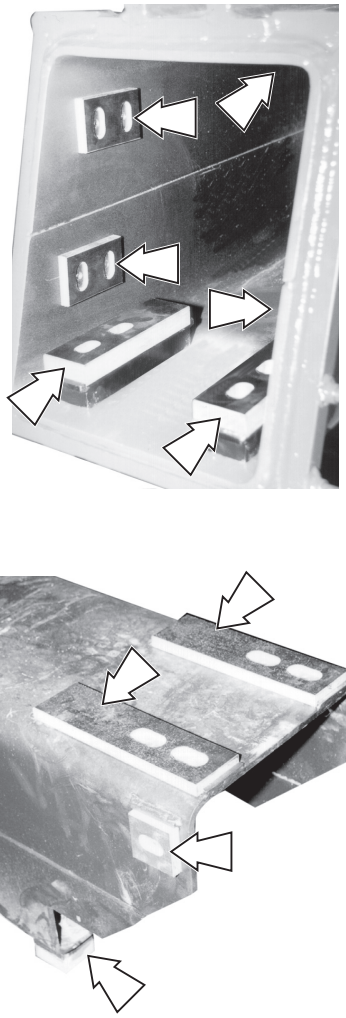
C-12 CHECK THE WEAR OF THE SLIDING PADS OF THE BOOM SECTIONS

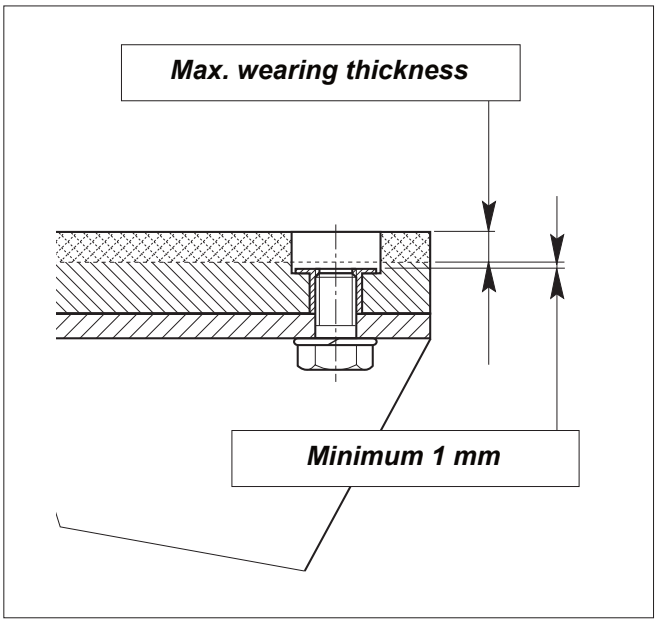
Any boom section is fitted with adjustable pads located on the four sides of the profile. These pads are secured to both fixed and mobile part of every section.

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

CAUTION

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





C-13 ADJUST THE PLAY OF THE SLIDING PADS OF THE BOOM SECTIONS

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

All pads can be adjusted by the special shims.

Adjusting the pads:

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

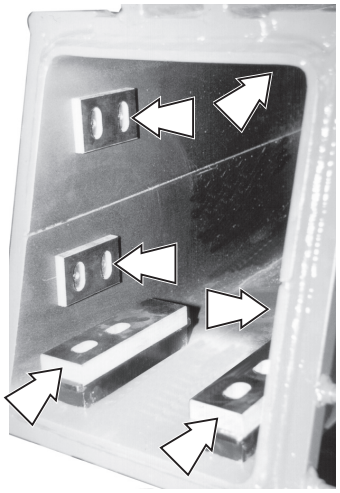
Tightening torques of the pad screws in relation to the screw diameter

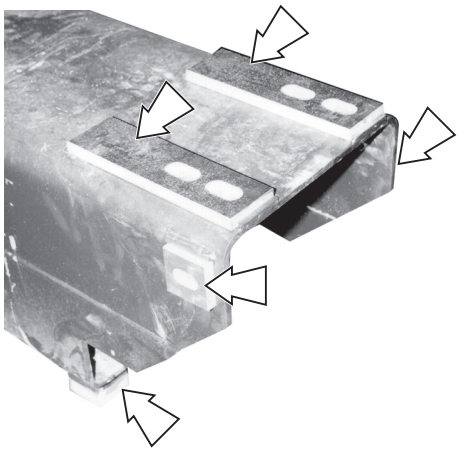
Screws M10	Nm 30
Screws M14	Nm 50

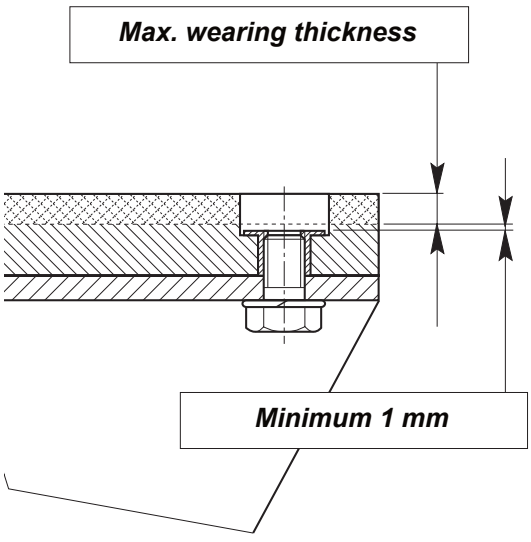
Tightening torques higher than those recommended can cause the break of the pad or of the locking threaded bush.

CAUTION

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







C-14 CHECK THE LEVEL OF THE BATTERY ELECTROLYTE

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

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

⚠ DANGER

Do not add sulphuric acid; add only distilled water.

C-15 CHECK THE EFFICIENCY OF THE BLOCK VALVES

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

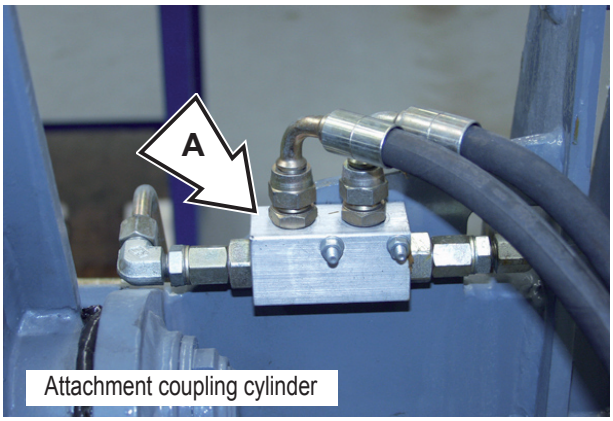
To check the efficiency of a valve, proceed as follows:

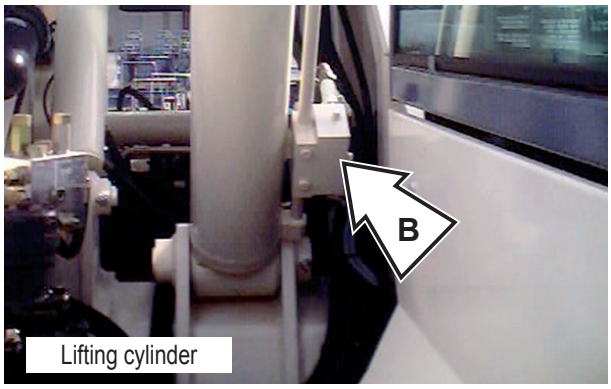
- Load a weight near the maximum payload onto the boom.
- Raise the load some centimetres above the ground (max 10 cm). To check the valve on the telescope extension cylinder move the boom to maximum height and extend it some centimetres.
- Loosen the oil hoses to the cylinder of which you are checking the valve with caution.
- To check the efficiency of the block valves of the outriggers, lower them to the ground and unload the weight of the tyres without raising them. Loosen the cylinder hoses to check the efficiency of the valve.

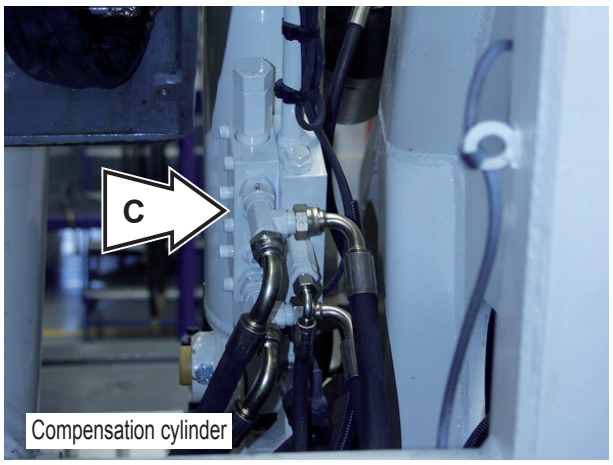
During the check, the oil will flow out of the hoses and the load shall remain blocked in position.
Should that not be the case, the valve must be replaced. Contact TEREXLIFT Technical Service.

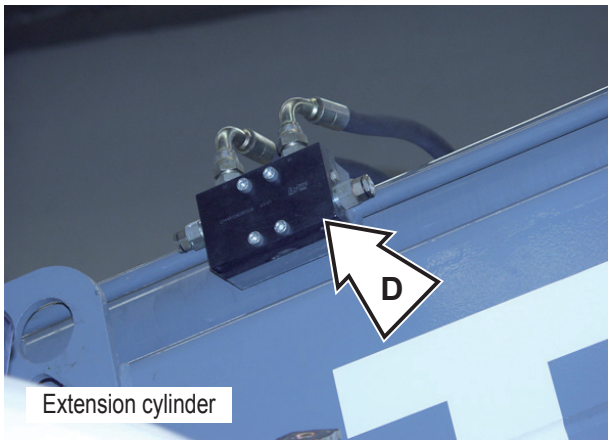
NOTICE

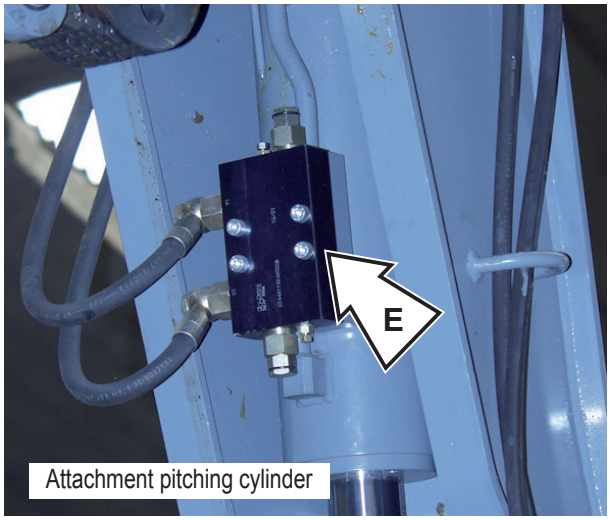
Place a container of suitable size under the hoses.











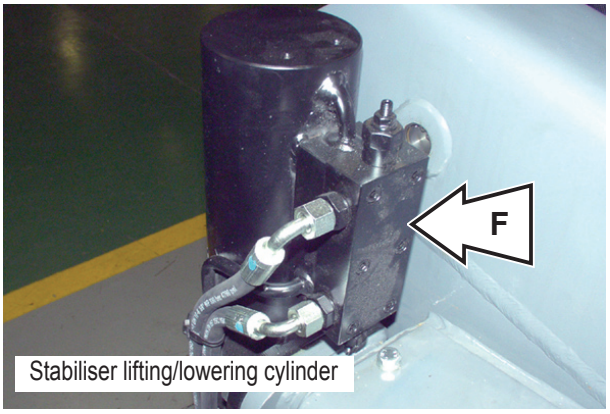
DANGER

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

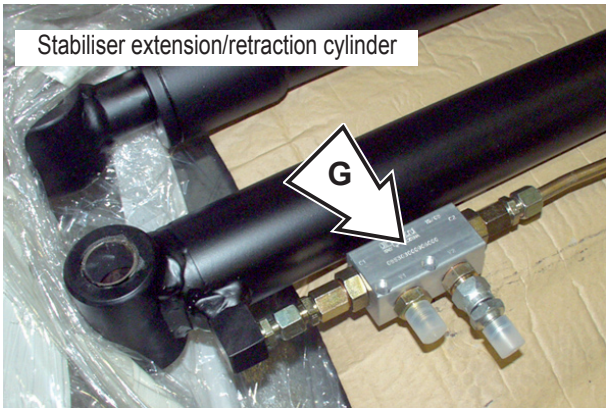
- ***Wear safety glasses***
- ***Wear safety gloves***
- ***Wear safety shoes***
- ***Wear suitable working clothes***
- ***Use guards against leaks of oil at high pressure***
- ***Do the check in a free space with barriers all around to keep non-authorised people away***
- ***Ensure that the part to 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

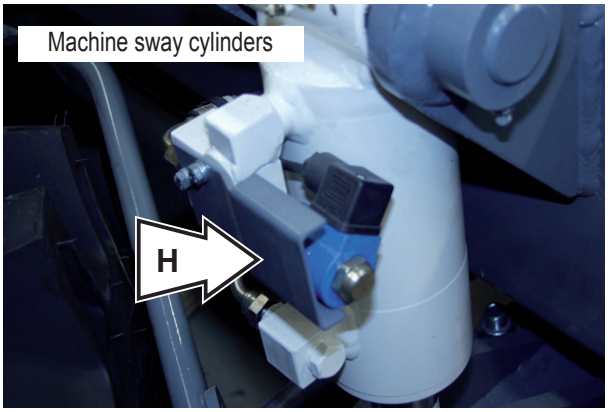
- ***Lower the boom to the ground in a firm way since the removal of the block valve or the cylinder can cause an uncontrolled down-movement.***
- ***After refitting the valve or the cylinder, replenish the circuit and eliminate any air before starting working. To eliminate the air from the circuit,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



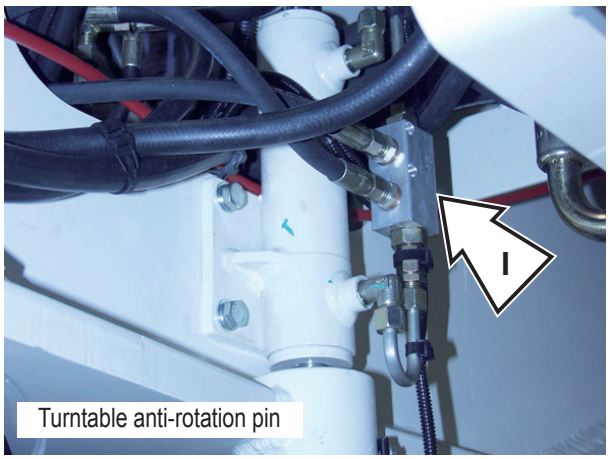
Stabiliser lifting/lowering cylinder



Stabiliser extension/retraction cylinder



Machine sway cylinders



Turntable anti-rotation pin

4.6 TABLE D PROCEDURES

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

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

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

⚠CAUTION

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

CAUTION

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

D-2 CHECK THE TIGHTENING OF THE ENGINE FIXING SCREWS

Every 6 months, check that the screws fixing the engine to the machine chassis are tight.
For this operation, use a torque wrench and tighten the screws to a torque of **130 Nm**.

D-3 CHECK THE TIGHTENING OF THE CAB FIXING SCREWS

Every 6 months, check that the screws fixing the cab to the machine chassis are tight.
For this operation, use a torque wrench and tighten the screws to a torque of **200 Nm**.

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

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

CAUTION

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

D-5 CHECK THE PLAY OF THE SLEWRING

In the event of an excessive play of the slew ring (vibration also with anti-rotation pin fitted), address to Terexlift Service Centre.

D-6 HAVE THE HYDRAULIC SYSTEM CHECKED BY A SKILLED TECHNICIAN

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

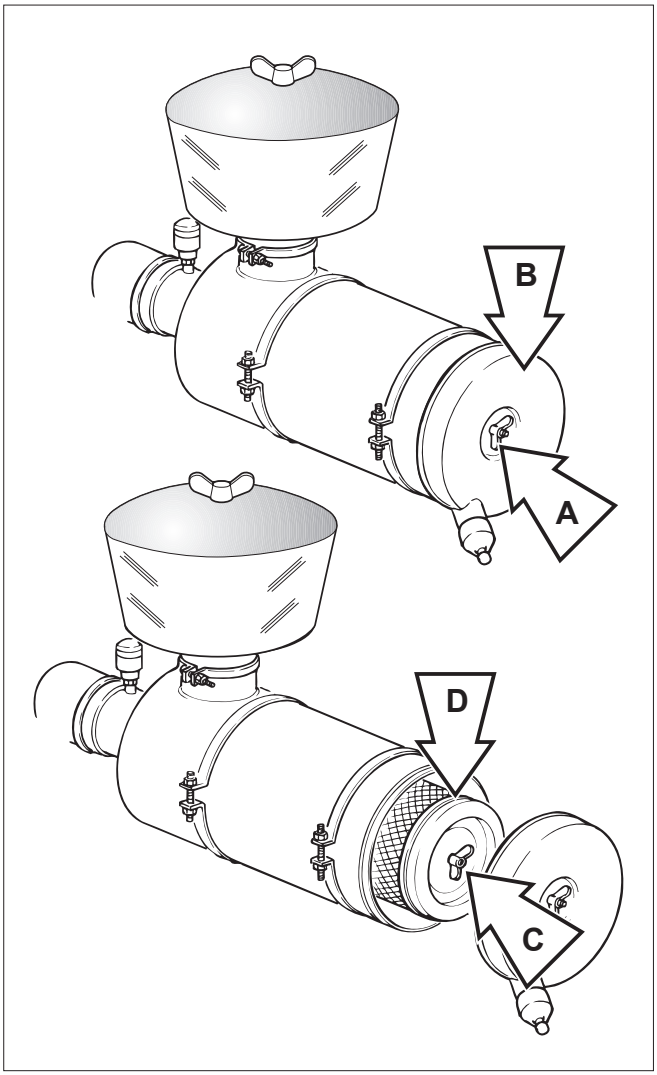
CAUTION

In case of need, please contact TEREXLIFT Service Centre.

D-7 CHANGE THE MAIN CARTRIDGE OF THE ENGINE AIR FILTER

To change the cartridge of the engine air filter:

- Raise the boom and secure it in a stable and safe way.
- Shut the engine down and engage the parking brake.
- Unscrew wing nut **A** and remove cover **B**.
- Unscrew wing nut **C** and remove the outer element **D**.
- Clean the filter bowl.
- Smear the seal with grease, then refit the new cartridge **D** and make sure it is properly fitted.
- Re-tighten wing nut **C**, close cover **B** and tighten it with wing nut **A**.



WARNING

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

WARNING

Never wash the cartridge with water or solvents.

D-8 RENEW THE FUEL FILTER

CAUTION

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

D-9 CHANGING THE HYDRAULIC OIL FILTER

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

- Stop the machine on a level ground and engage the parking brake.
- Place a container of suitable size under the filter to collect any oil leaks.
- Remove the filter cover **A** to get access to the filter element.
- Change the filter element, then, before fitting a new one, thoroughly clean and grease both seat and gasket.
- Refit and tighten the filter cover.

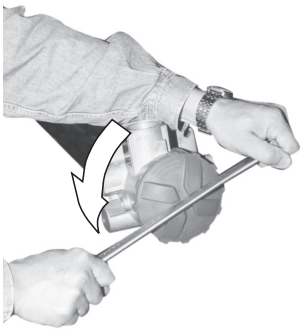


NOTICE

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

CAUTION

Hydraulic oil filter canisters cannot be cleaned or washed and refitted.
They must be replaced with new ones of the type recommended by the manufacturer:
Flow rate l/1' = 250
Filtering = 10 µ
Coupling = 1" 1/4 BSP







CAUTION

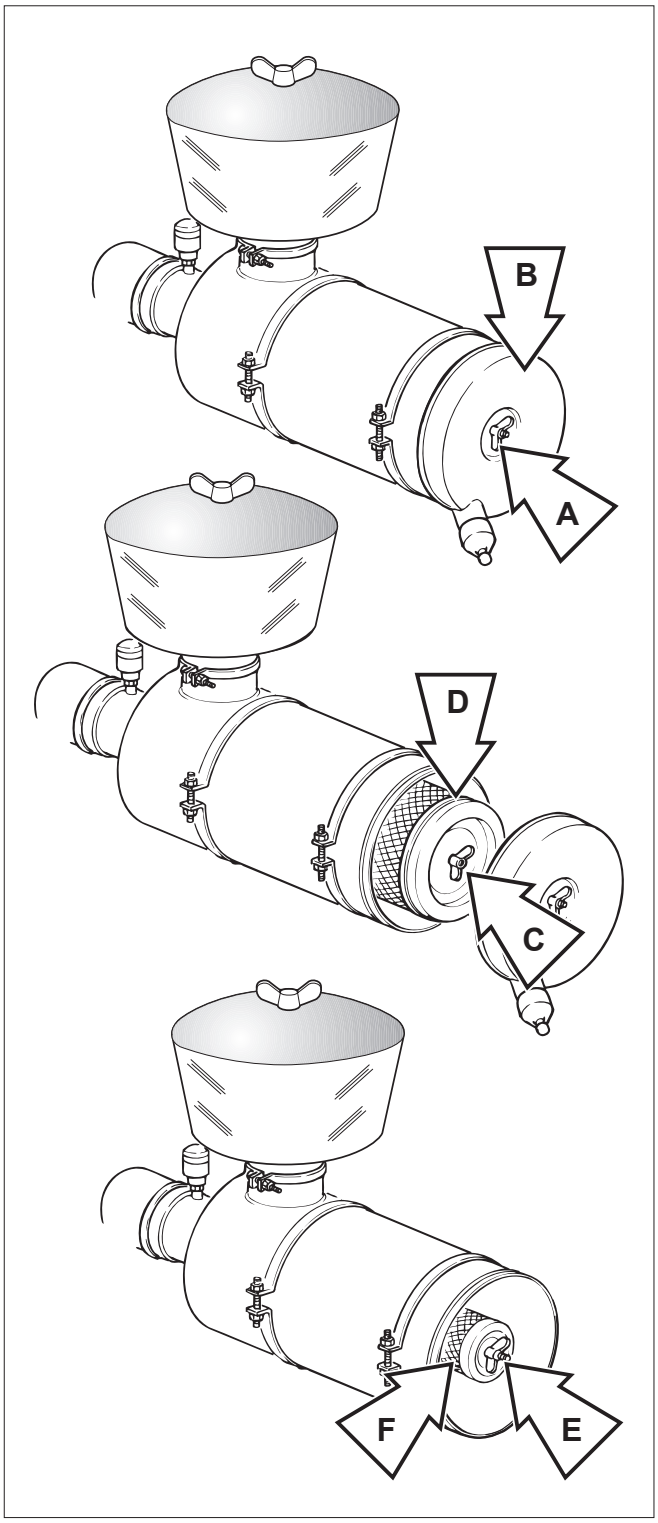
When changing the oil, drain it when it is still hot and the polluting substances are in suspension.

4.7 TABLE E PROCEDURES

E-1 CHANGE THE INNER ELEMENT OF ENGINE AIR FILTER

Changing the inner element:

- Raise the boom and secure it in a stable and safe way.
- Shut the engine down and engage the parking brake.
- Unscrew wing nut **A** and remove cover **B**.
- Unscrew wing nut **C** and remove the outer element **D**.
- Loosen wing nut **E** and remove the inner element **F**.
- Clean the filter bowl.
- Smear the seal with grease, then fit the new element and make sure it is correctly positioned.
- Refit the outer element **D** and cover **B**.



⚠WARNING

The inner element should be replaced every two times the outer element is replaced.

⚠WARNING

Never wash the cartridge with water or solvents.

E-2 CHANGE THE OIL IN THE GEARBOX AND DIFFERENTIAL GEARS

To change the oil in the **gearbox**:

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

NOTICE

Place a container of suitable size under the plug.

- Remove level plug **A**.
- Remove drain plug **B** and empty the gearbox.
- Refit and tighten drain plug **B**.
- Pour new oil through level plug **A** until it is level with hole.
- Refit and tighten level plug **B**.

Recommended oil:

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

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

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

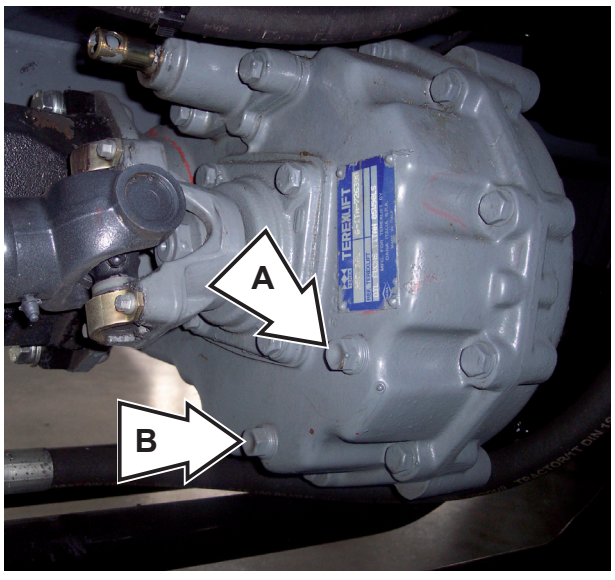
NOTICE

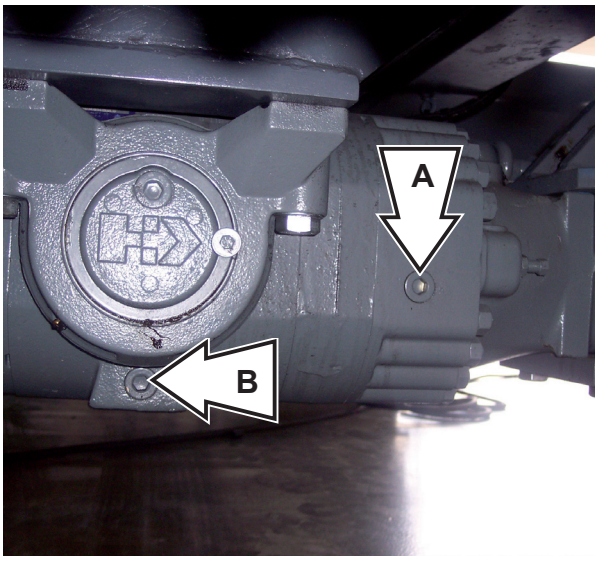
Place a container of suitable size under the plug.

- Loosen both drain plug **B** and level plug **A** and allow oil to flow out from the reduction gear.
- Refit and tighten drain plug **B**.
- Add new oil through the level hole **A**.
- Refit and tighten plug **A**.

Recommended oil:

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





E-3 CHANGE THE OIL IN THE WHEEL REDUCTION GEARS

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

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

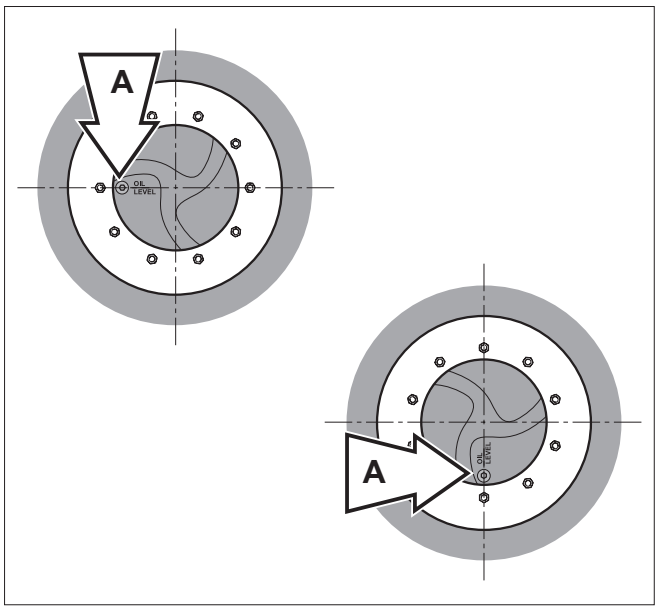
NOTICE

Place a container of suitable size under the plug.

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

Recommended oil:

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



E-4 CHANGE THE OIL IN THE TURNTABLE ROTATION REDUCTION GEAR

To change the oil in the **turntable rotation reduction gear**:

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

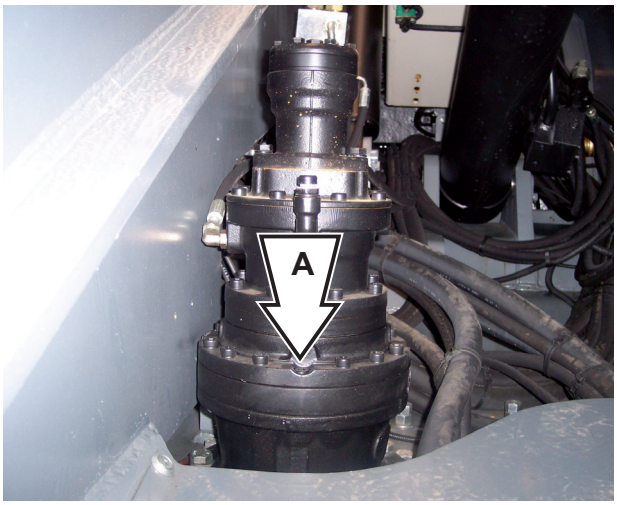
NOTICE

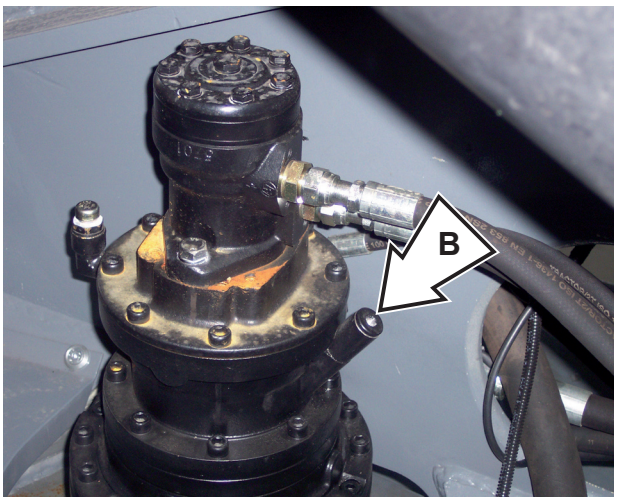
Place a container of suitable size under the plug.

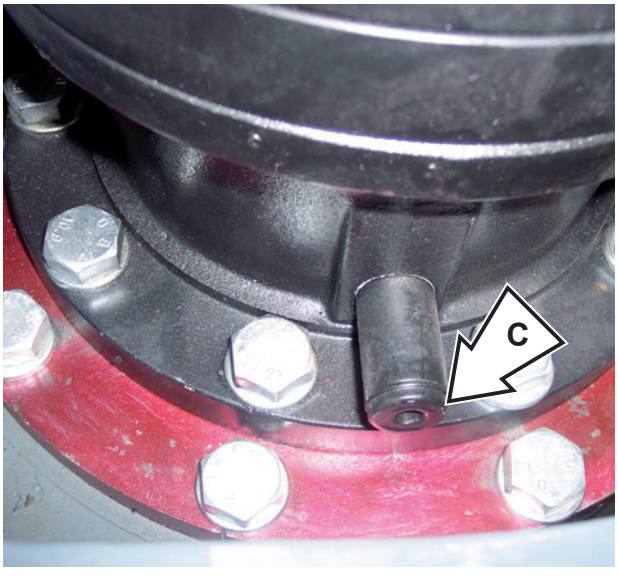
- Remove drain plug **C** and let oil flow out of the reduction gear.
- Unscrew the filling plug **B**.
- Clean level plug **A** all around.
- Loosen level plug **A**.
- Refit and tighten drain plug **C**.
- Pour new oil through the hole of plug **B** until it starts flowing out of hole **A**.
- Refit and tighten plugs **A** and **B**.

Recommended oil:

- **SHELL OMALA 150**
  DIN 51 517-3 CLP, ISO 12295-1 TYPE CKC,
  US STEEL 224, DAVID BROWN 51.53.101







E-5 CHANGE THE HYDRAULIC OIL

To change the hydraulic oil:

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



Recommended oil:

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



NOTICE

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

E-6 GREASE THE SLIDING PARTS AND THE PIVOT PIN OF THE TELESCOPIC BOOM

CAUTION

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

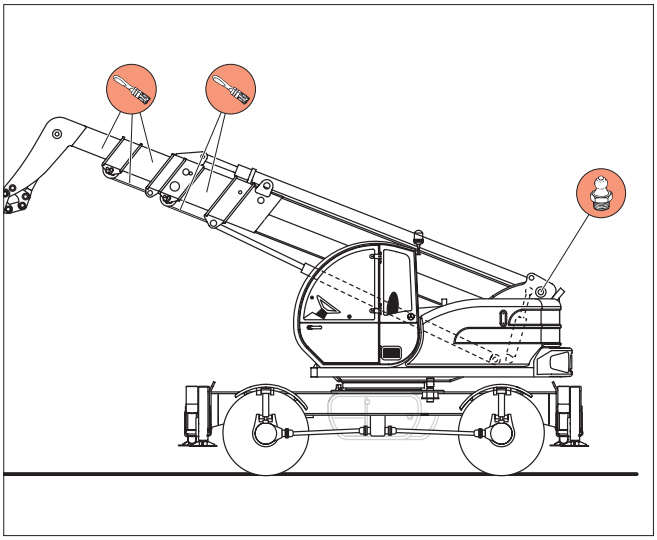
Regularly grease the machine to grant it efficient conditions and a long life.

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

As the fresh grease comes out, stop the operation.

The greasing points are shown in the following figures:

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



WARNING

To grease the sliding parts of the boom telescopes and the pivot pin of the boom, use PTFE INTERFLON FIN GREASE LS 2 (code 640772) at the following service intervals:

- ***After the first 50 operating hours (1 week)***
- ***After the first 250 operating hours (1 month)***
- ***Every 1000 operating hours (6 months)***

Remove any old grease from the boom and smear the sliding area of the blocks with a thin coat of grease.

E-7 CLEAN THE CAB AIR FILTER

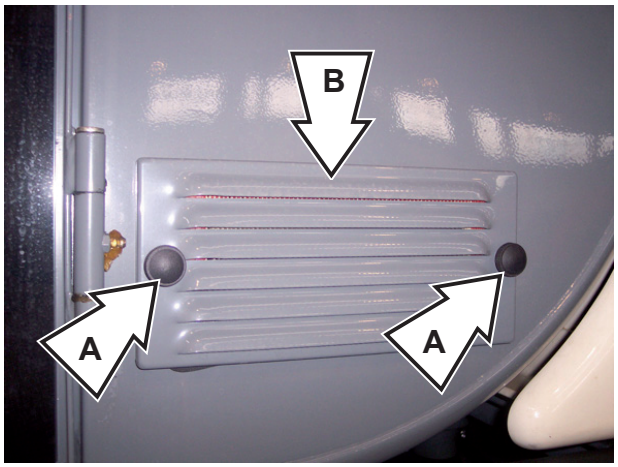
Every six months clean the air filter in the cab. Replace the cartridge if the filtering cloth is damged.

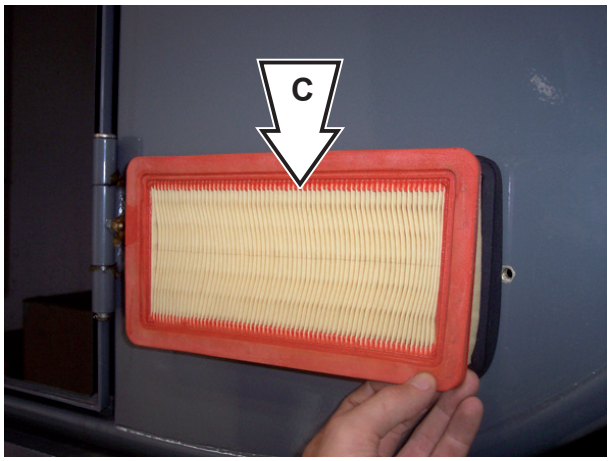
Cleaning and changing the cartridge:

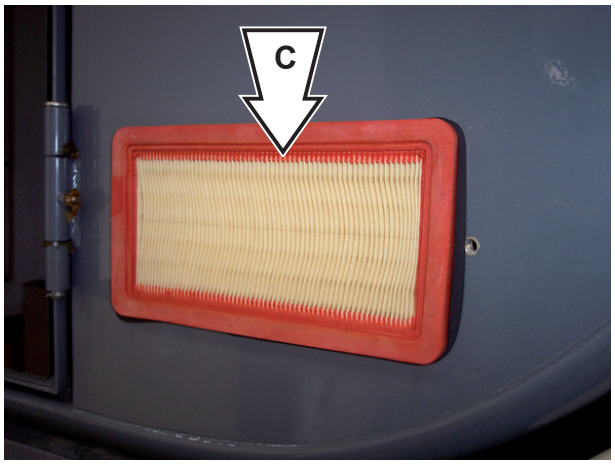
- Shut the engine down and engage the parking brake.
- Loosen knobs **A** and remove the filter cover **B** located on the right of the cab door.
- Remove the filter cartridge **C**.
- Clean the filter bowl.
- Clean the filter cartridge **C**. If the cartridge is damaged, replace it.
- Refit the filter cartridge **C**.
- Refit cover **B** and fix in place with knobs **A**.

CAUTION

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





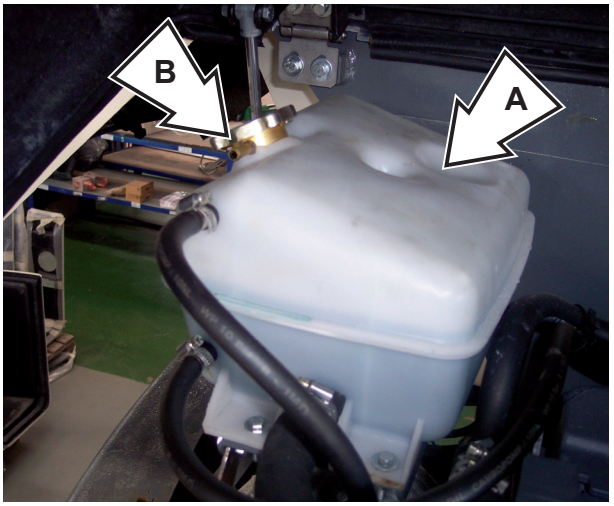


4.8 TABLE F PROCEDURES

F-1 CHANGE THE ENGINE COOLANT

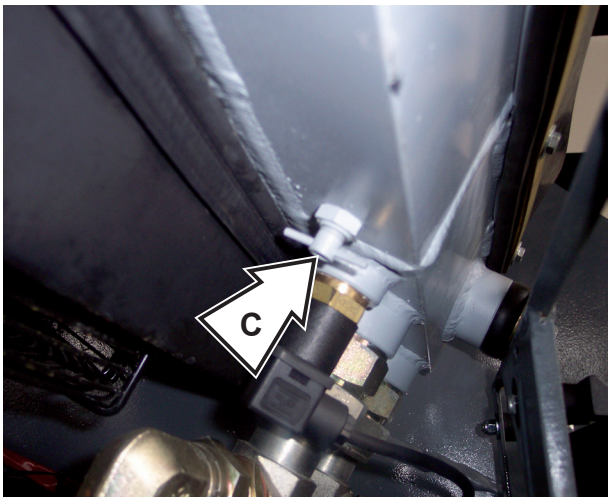
⚠ DANGER

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



To drain the antifreeze:

- To drain the antifreeze.
- Unscrew the plug **C** at the bottom of the radiator. Allow the coolant to flow out into a special container.
- Once the coolant has been drained, refit plug **C** and pour fresh mixture (50% water and 50% antifreeze) in the radiator. This proportion will provide protection down to -38°C.



On delivery, the machine is filled with a cooling mixture consisting of 50% water and 50% anti-freeze.

TEREX PRO COOL Protection against boiling / freezing		
Product %	Freezing point	Boiling point
33	-17 °C	123 °C
40	-24 °C	126 °C
50	-36 °C	128 °C
70	-67 °C	135 °C

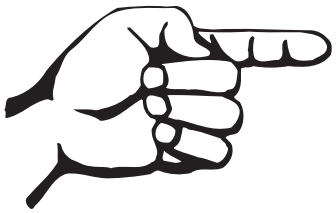
4.9 TABLE G PROCEDURES

G-1 CHECKING THE STATE OF THE STRUCTURE

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

⚠DANGER

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



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Section 5
TROUBLESHOOTING

SECTION INDEX

5.1 Introduction ..... page 2
5.2 About this section 3
5.3 Electrical faults 4
5.4 Hydraulic faults 11
5.5 DEUTZ - LINDE error codes 17

5.1 INTRODUCTION

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

Before troubleshooting:

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

⚠DANGER

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

⚠WARNING

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

⚠WARNING

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

CAUTION

Perform all troubleshooting on a firm level surface.

CAUTION

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

5.2 ABOUT THIS SECTION

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

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

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

The tables should be read as follows:

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

CAUTION

For any further information, contact the TEREXLIFT Service Centre.

5.3 ELECTRIC FAULTS

Problem	Cause	Solution
When key is turned to 1, the dashboard is not powered	Battery discharged	Check the battery, replace if necessary.
	Battery disconnect switch	Check that the switch is in the correct position and it works fine. Replace if damaged.
	Ground	Check that the ground braid between chassis and engine is correctly connected and intact.
	40A maxi-fuse interrupted	Check the fuse; replace if necessary located in the box in the engine compartment).
	Ignition key block	Check that contact **30** of the ignition key is powered; if you have not 12V on contact **15/54**, change the key.
	Fuses-relays board damaged	Check that connections **J1-J2-J3** are tight; replace the board if necessary.
	Problems of the electric line	Check the continuity of the wiring up to the input of the fuse and relay board.
The machine cannot be started from the driving cab	Ignition key	Check that contact **50** of the key supplies 12V when the key is in the start position (turned to the right).
	Emergency stop button	Check that the pushbutton is not pressed or reset the button. Check the button is in efficient working order or replace.
	Relay **K19** damaged	Check the relay; replace if necessary.
	70A relay **K110** damaged	Check the relay; replace if necessary (located in the box in the engine compartment).
	Starting motor connection	Check the starting motor is properly connected.

Problem	Cause	Solution
	Problem on the line from dashboard to engine box	Check the continuity of the wiring up to the input of the engine box.
	30A fuse **FG3** blown	Check the fuse; replace if necessary.
	Starting motor **M1** relay damaged	Check the starting motor coil is powered. If the coil is powered and the motor does not work, change the motor.
	Starting motor damaged	Check and replace if necessary.
	Efficiency of the grounding system	Check and, if necessary, reconnect the grounding system to the chassis.
The starting motor runs but the engine does not start	No fuel	Refuel.
	Injection pump of engine damaged	Check the pump, clean as explained in the engine manual; replace if necessary.
	Air in the tank suction system	Bleed the system.
	15A fuse **F165** blown	Check the fuse; replace if necessary.
	Relay **K164** damaged	Check the relay; replace if necessary.
	Power socket of the Deutz unit damaged	Verify you have 12V on input **14**.
The battery gets discharged too fast	Internal elements broken	Change the battery.
	The alternator does not recharge	Check the efficiency of the alternator and replace if necessary.
	Wrong absorption of the system	Check and rectify.

Problem	Cause	Solution
The machine does not move (with the engine running at a stable speed of 1100 rpm)	15A fuse **F165** blown	Check the fuse; replace if necessary.
	Speed selector **S143** damaged	Check the continuity in the different pins of the speed selector and replace the selector if necessary.
	Forward/reverse speed inputs on Linde controller	Verify you have 12V on pins **2** and **3** of the controller inputs.
	Linde controller in protection mode	Check the connection of the gas pedal and the continuity on pin **22** (gas throttle signal input).
	Forward/reverse speed outputs on Linde controller	Verify you have 12V on pins **28** (forward speed) and **3** (reverse speed) of the controller outputs.
	Service brake pressure switch	Check the connection on the service brake pressure switch.
	Parking brake micro-switch	Check you have 12V on pin **5** of the controller input with the parking brake put.
	Parking brake micro-switch on HEAD controller	Check you have 12V on pin **37** of the controller input with unbraked machine.
	Outrigger micro-switches.	Check the signals of the outriggers' micro-switches using the Winscope programme.
	Forward/reverse speed solenoid valves on Linde pump	With the forward speed engaged, check you have at least 450 mA and max 1220 mA on solenoid valve **Y116**. Check you have the same values on solenoid valve **Y115** when the reverse speed is engaged. Replace the coils of the solenoid valves if necessary. Check you have 12V on solenoid valve **Y123** regardless of the speed engaged.
	Problem of the electric line	Check the wiring continuity and restore if necessary.

Problem	Cause	Solution
The boom does not move	Road/Jobsite/Platform selector damaged.	Check the selector is in efficient working order or replace.
	Control lever power supply	Check you have 5V between pin **4** and pin **44** of the Head control unit.
	Control lever	Check the Head alarms on the 3B6 IDR display and rectify accordingly.
	Problem of the electric line	Check the wiring continuity and restore if necessary.
The 3B6 system doesn't change scale with the machine is on wheels or on stabilisers	10A fuse **F26** blown	Check the fuse; replace if necessary.
	Electric joint	Check the joint is in efficient working order or replace.
	Outrigger micro-switches	Check the micro-switches are in efficient working order (with lowered outriggers, micro-switches **B31-B30-B45-B44** shall be free). Replace the micro-switches if necessary.
	Arm 1 (**A32**) abd Arm 2 (**A46**)	Check you have 12V on pin **1** and pin **2** with the machine stabilised.
	3B6 IDR display	Check for alarms on the display and rectify accordingly.
No steering mode selction (two-wheels, four-wheels, crab)	Solenoid valve **Y55** (crab steer mode)	Check you have 12V when the selector is on the crab steer mode.
	Steering selector **S173**	Check the selector and replace if necessary.
	Steer mode selector **S173** turned to front wheels.	Check you have 12V on pin **A**.
	Steer mode selector **S173** turned to four wheels.	Check you have 12V on pin **B**.
	Steer mode selector **S173** turned to crab steering.	Check you have 12V on pin **C**.
	Road/Jobsite/Platform selector.	Check it is turned to "jobsite".
	Control spools of the steer selection solenoid valve	Check the spools and replace if necessary.

Problem	Cause	Solution
	Problem of the electric line	Check the wiring continuity and restore if necessary.
The horn does not work	10A fuse **F10** blown	Check the fuse and replace if necessary.
	15A fuse **F21** blown	Check the fuse and replace if necessary.
	Relay **K3** damaged	Check the relay; replace if necessary.
	Horn button damaged	Check the button and replace if necessary.
	Horn damaged	Check you have 12V between the two wires connected to the horn; if there is power, change the horn.
	Problem of the electric line	Check the wiring continuity and restore if necessary.
The beacon does not work	7,5A fuse **F11** blown	Check the fuse and replace if necessary.
	Beacon damaged	Check the beacon and replace if necessary.
	Beacon lamp (**X101**) damaged	Check the lamp and replace if necessary.
	Problem of the electric line	Check the wiring continuity and restore if necessary.
The heating fan does not work	15A fuse **F2** blown	Check the fuse and replace if necessary.
	Fan control switch damaged	Check the switch and replace if necessary.
	Heating fan motor damaged	Check the fan motor and replace if necessary.
	Problem of the electric line	Check the wiring continuity and restore if necessary.

Problem	Cause	Solution
The Linde transmission does not work properly	Malfunction	Check the Linder errors list displayed by the Ecomatrice P145.
The air filter restriction warning light does not work	Warning light on Ecomatrice P145 dashboard. Restriction sensor **B161**. Problem of the electric line	Check the warning light and replace if necessary. Check the sensor and replace if necessary. Check the wiring continuity and restore if necessary.
The light warning of a too high engine coolant temperature does not work	Temperature sensing bulb **B120** damaged Warning light on Ecomatrice P145 dashboard Problem of the electric line	Check the bulb and replace if necessary. Check the indicator light and replace if necessary. Check the wiring continuity and restore if necessary.
The Deutz engine oil pressure light indicator doesn't work	Malfunction	Check the Deutz errors list displayed by the Ecomatrice P145.
The Deutz engine oil thermometer doesn't work	Malfunction	Check the Deutz errors list displayed by the Ecomatrice P145.
The hydraulic oil thermometer doesn't work	Instrument on Ecomatrice P145 dashboard Hydraulic oil temperature transducer **B96** damaged Problem of the electric line	Check the instrument and replace if necessary. Check the transducer and replace if necessary. Check the wiring continuity and restore if necessary.
The fuel gauge doesn't work	Instrument on Ecomatrice P145 dashboard Fuel gauge detector **B69** damaged Problem of the electric line	Check the instrument and replace if necessary. Check the fuel detector and replace if necessary. Check the wiring continuity and restore if necessary.

Problem	Cause	Solution
The hour-meter does not work	Instrument on Ecomatrice P145 dashboard	Check the instrument and replace if necessary.
	Alternator.	Check the alternator is in efficient working order, restore the D+ connections and replace the alternator if necessary.
	Problem of the electric line	Check the wiring continuity and restore if necessary.
The overload warning system does not work	Malfunction	Check the MIDAC and IDR errors list, find the alarm displayed on the screen and rectify accordingly.

5.4 HYDRAULIC FAULTS

Problem	Cause	Solution
The counter-frame does not rotate	Slewing geared motor damaged	Check the reduction gear is in efficient working order or replace.
	Internal brake defective	Check the internal seals and replace if necessary.
	Block valves of the slewing geared motor maladjusted	Re-adjust the valves.
	Motor pinion teeth damaged	Change the pinion of the geared motor.
	Motor slew ring teeth damaged	Change the slew ring.
The attachment locking cylinder does not work	Attachment locking cylinder damaged	Check the efficiency of the cylinder; replace the internal seals, if necessary.
	Quick couplings damaged	Check and replace, if necessary.
	The hydraulic line between control block and quick couplings is defective	Check and replace any damaged or restricted hose.
The counter-frame slewing block cylinder does not work	Internal seals worn	Check the seals and replace if necessary.
	Turret slewing block solenoid damaged	Check the cleanliness of the solenoid valve inside or clean if necessary.
	Electric flow divider damaged	Check the mechanical parts of the flow divider: replace the seals or the divider if necessary.
The forks cannot be pitched perfectly	Fork cylinder damaged	Change the seals and check the tightness of the cylinder.
	Block valve damaged	Remove and clean the valve; check its seals and replace if necessary
	The hydraulic line between control block and block valve is defective	Check and replace any damaged or restricted hose.
	Safety valves maladjusted or damaged	Check the efficiency of the safety valves fitted to ports A and B of the control block; adjust or replace.

Problem	Cause	Solution
The boom cannot be moved out	Extension cylinder inside the boom damaged	Check the state of the seals on cylinder, rod and re-sequencing valve (located at the top of the rod); if necessary, repair or replace the cylinder.
	Extension cylinder outside the boom damaged	Check the state of the seals on cylinder, rod and re-sequencing valve (located at the top of the rod); if necessary, repair or replace the cylinder.
	Control block maladjusted	Check the max pressure.
	Mechanical jamming	Check the boom. In case of mechanical jamming, rectify.
	Boom hydraulic feeding line defective	Check the ducts for damage or restrictions; replace if necessary.
The boom cannot be moved up	Lifting cylinder damaged	Change the seals and check the tightness of the cylinder.
	Block valve damaged	Remove and clean the valve; check its seals and replace if necessary.
	Control block maladjusted	Check the max pressure.
The boom jerks when moved down	Accumulator damaged	Carefully check the accumulator and replace the internal diaphragm; recharge until restoring the original pressure (40 bar).
	Low hydraulic oil level	Check the oil level and top up if necessary.
When the boom is moved up or down, the forks cannot be levelled	Balancing cylinder damaged	Check the cylinder efficiency and the state of the internal seals.
	Control block safety valves damaged	Check the efficiency of the safety valves fitted to ports A and B of the control block; adjust or replace.
	Check valve damaged	Remove and clean the valve; check its seal and replace if necessary.
	Pressure relief valve damaged	Remove and clean the valve; check its seal and replace if necessary.

Problem	Cause	Solution
	Block valves damaged	Remove and clean the valves; check their seals and replace if necessary.
	Hydraulic line defective	Check and replace any damaged or restricted hose.
The booms swings when moved out	Pads worn	Check the pads for wear and replace if necessary.
	Poor lubrication of the boom	Smear the sliding zone of the pad with grease.
	Paint or abrasion on the pad sliding rail	Grind and polish the pad's sliding zone on the boom, then grease.
	Low hydraulic oil level	Check the oil level and top up if necessary.
The boom moves hardly in when fully extended and horizontal	Pads worn	Carefully check all of the front and rear pads of the boom; lubricate with the special grease.
	Control block maladjusted	Check the max pressure.
The machine stops when the boom is retracted and the engine runs at idle	When the boom is retracted, the load sensing pump is at maximum displacement; if the engine is running at idle, it cannot tackle the requirement and tends to stop	Increase the engine speed and then retract the boom very slowly; once the boom motion starts, you can increase the speed. **Note:** Do this manoeuvre with the diesel engine running at max speed and by operating the joystick.
The radiator fan does not work	Bushing between engine/radiator damaged	Check and replace the bushing if necessary
	Fan motor damaged	Check and replace the motor if necessary.
	Reducer between engine and radiator fan damaged	Check and replace the reducer if necessary.

Problem	Cause	Solution
The machine sway function does not work	Sway cylinders	Check the internal seals and replace if necessary. Check the cylinder barrel and rod and replace if necessary.
	Safety solenoid valve of the undercarriage panel	Check the solenoid valves is in efficient working order or replace if necessary.
	Safety valve	Check the efficiency of the valve and replace if necessary.
The rear axle unlocking does not work	Cylinders	Check the cylinders and the relevant parts for damage; replace if necessary.
	Cylinders' block valves	Check the efficiency of the valves and replace if necessary.
	One-way valve	Check the efficiency of the valve and replace if necessary.
The machine does not move	Drive pump	Check the max pressure of the drive pump.
Poor boost pressure	Booster pump damaged	Change the pump.
Low traction of the machine	Hydraulic oil suction filter restricted	Change the oil filter.
	Low hydraulic oil level	Top up.
	Hydraulic oil soiled	Change the oil and clean the system.
	Pump and motor worn for serious leakage	Change the pump and drive motor and clean the connecting ducts.
No shifting between 1st and 2nd mechanical gear	Boost pressure low	Check and calibrate the boost pressure.
	Hydraulic rotary joint	Check for fluid oozing out of track 11 of the rotary joint.

Problem	Cause	Solution
	Mechanical gear selection solenoid valve	Check the efficiency of the solenoid valve and replace if necessary.
	Mechanical gearbox actuator	Check the efficiency of the actuator.
No steering selection	Steering selection solenoid valve	Check the sliding of the piston.
Poor action of the parking brake	Negative parking brake damaged	Check the brake is in efficient working order and, in case, replace the disks.
	Hydraulic rotary joint	Check for fluid oozing out of track 13 of the rotary joint.
	Cab actuator damaged	Check the efficiency of the actuator, and replace the internal seals or the complete brake if necessary.
The outriggers do not work	Outrigger cylinders damaged	Check the cylinders and the relevant parts for damage; replace if necessary.
	Cylinders' block valves	Check the efficiency of the valves and replace if necessary.
	Motion control solenoid valves	Check the solenoid valves are in efficient working order or replace if necessary.
	Hydraulic rotary joint	Check for fluid oozing out of tracks **3** (P) and **4** (T) of the rotary joint.
	Electric flow divider	Check the flow divider is in efficient working order or replace if necessary.
	Tecnord main valve	Check the outriggers' main valve is in efficient working order or replace if necessary.
The machine does not steer correctly	Main pump damaged	Check and replace the pump if necessary.
	Load-sensing priority valve	Check and replace the valve if necessary.

Problem	Cause	Solution
	Hydraulic drive	Check the efficiency of the hydraulic drive and replace if necessary.
	Hydraulic rotary joint	Check for fluid oozing out of tracks **8** and **9** of the rotary joint.
	Steering cylinders	Check the steering cylinders and the relevant parts for damage; replace if necessary.
	Steering selection valve	Check the solenoid valve is in efficient working order or replace if necessary.
The boom does not move	Main pump damaged	Check and replace the pump if necessary.
	Load-sensing priority valve	Check and replace the valve if necessary.
	Main valve	Attempt to operate the main valve by hand and check the stand-by pressure.

5.5 LIST OF DEUTZ - LINDE ERROR CODES

Error ID	Problem description
-	No Deutz Active Faults Present
01	Speed sensor 1
	Speed sensor 2
03	Speed sensor
04	Excess speed switch-off
05	Set point sensor 1 (accelerator pedal)
06	Set point sensor 2 (hand throttle)
07	Charge air pressure
08	Oil pressure
09	Coolant temperature
10	Charge air temperature
11	Fuel temperature
30	Oil pressure warning
	Oil pressure switch-off
31	Coolant temperature warning
	Coolant temperature switch-off
32	Charge air temperature warning
	Charge air temperature switch-off
34	Coolant level warning
	Coolant level off
35	Speed warning (with thrust mode operation)
36	Fuel temperature warning
50	Feedback
52	Reference feedback
53	Control travel difference
59	Auto calibration BOSCH-EDC pumps faulty operation
60	Digital output 3 (Switch-off solenoid, pin M 2)
62	Digital output 6, pin M7
63	Excess voltage switch-off solenoid
67	Error Hand Setp1
68	Error CAN Setp1
70	CAN-Bus controller
71	CAN interface SAE J 1939
74	Cable break, short circuit or bus-error
76	Parameter programming (write EEPROM)
77	Cyclic program test

Error ID	Problem description
78	Cyclic RAM test
	Internal fault
	Power supply (Actuator)
	Reference voltage 1
	Reference voltage 2
	Reference voltage 4
86	Internal temperature
87	Atmospheric pressure
90	Parameter fault (EEPROM retrieval or checksum faulty)
93	Stack overflow
99	Out of Deutz error list

Error ID	Problem description
-	No Linde Active Faults Present
101	System configuration change
102	Saftey Relay
103	Watchdog shutdown
104	Sensor Supply
105	Type Code Changed
106	Invalid Type
107	Magnet Current Pump Maximum
108	Magnet Current Pump Forward Minimum
109	Magnet Current Pump Reverse Minimum
110	Magnet Current Hydromotor Minimum
111	Magnet Current Hydromotor Maximum
112	Safety Valve Dif
113	Safety Valve Max
114	Safety Valve Min
115	Drive Switch
116	Drive Pedal Analog
117	Drive Pedal Switch
118	Inch Potentiometer
119	Brake sensor
120	Engine Speed
121	CAN-bus to ECU
122	Gear mismatch
130	Out of Linde error list

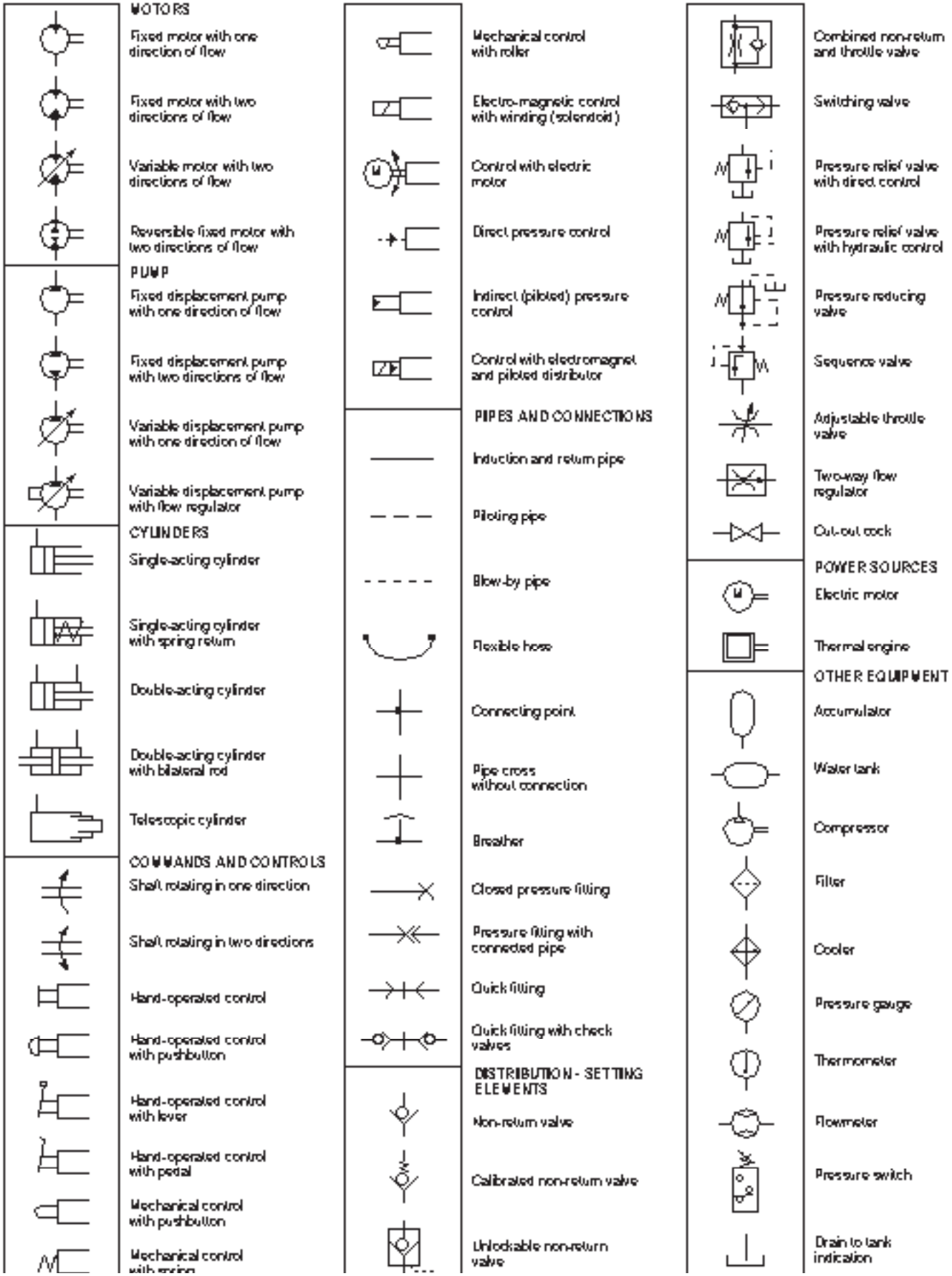
Section 6
SCHEMATICS

SECTION INDEX

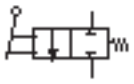
6.1	Hydraulic symbols ..... page	3
6.2	Hydraulic schemes	5
6.2.1	Gyro 4020 - 4518 turntable hydraulic scheme	5
6.2.2	Gyro 4020 - 4518 carrier hydraulic scheme	6
6.2.3	Hydraulic schemes - man-platform	7
6.2.4	Hydraulic scheme - winches	8
6.3	Electrical symbols	9
6.4	Wiring diagrams to serial n. 18011	11
6.4.1	Sheet 1 of 13 to serial n. 18011	11
6.4.2	Sheet 2 of 13 to serial n. 18011	12
6.4.3	Sheet 3 of 13 to serial n. 18011	13
6.4.4	Sheet 4 of 13 to serial n. 18011	14
6.4.5	Sheet 5 of 13 to serial n. 18011	15
6.4.6	Sheet 6 of 13 to serial n. 18011	16
6.4.7	Sheet 7 of 13 to serial n. 18011	17
6.4.8	Sheet 8 of 13 to serial n. 18011	18
6.4.9	Sheet 9 of 13 to serial n. 18011	19
6.4.10	Sheet 10 of 13 to serial n. 18011	20
6.4.11	Sheet 11 of 13 to serial n. 18011	21
6.4.12	Sheet 12 of 13 to serial n. 18011	22
6.4.13A	Sheet 13A of 13 to serial n. 18011	23
6.4.13B	Sheet 13B of 13 to serial n. 18011	24
6.4.14	A/C optional sheet to serial n. 18011	25
6.4	Wiring diagrams from serial n. 18012	26
6.4.1	Sheet 1 of 13 from serial n. 18012	26
6.4.2	Sheet 2 of 13 from serial n. 18012	27
6.4.3	Sheet 3 of 13 from serial n. 18012	28
6.4.4	Sheet 4 of 13 from serial n. 18012	29
6.4.5	Sheet 5 of 13 from serial n. 18012	30
6.4.6	Sheet 6 of 13 from serial n. 18012	31
6.4.7	Sheet 7 of 13 from serial n. 18012	32
6.4.8	Sheet 8 of 13 from serial n. 18012	33
6.4.9	Sheet 9 of 13 from serial n. 18012	34

6.4.10 Sheet 10 of 13 from serial n. 18012 35
6.4.11 Sheet 11 of 13 from serial n. 18012 36
6.4.12 Sheet 12 of 13 from serial n. 18012 37
6.4.13A Sheet 13A of 13 from serial n. 18012 38
6.4.13B Sheet 13B of 13 from serial n. 18012 39
6.4.14 A/C optional sheet 40
6.4.15 Wiring diagram - Component description 41
6.4.16 Fuses and relays 45
6.4.17 Other fuses in the cab 47
6.4.18 Engine compartment fuses and relays 47
6.4.19 Wiring diagrams - man-platforms 48
6.4.20 Wiring diagram - jibs and winches 50
6.4.21 Remote control wiring diagram 51
6.5 Position of the electric and hydraulic components on the machine 53
6.5.1 Electric components 53
6.5.2 Hydraulic components 63

6.2 HYDRAULIC SYMBOLS

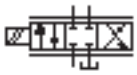


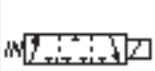
DISTRIBUTION – SETTING ELEMENTS

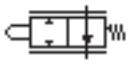

Two-position and two-way distributor, with manual lever control and spring return


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


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

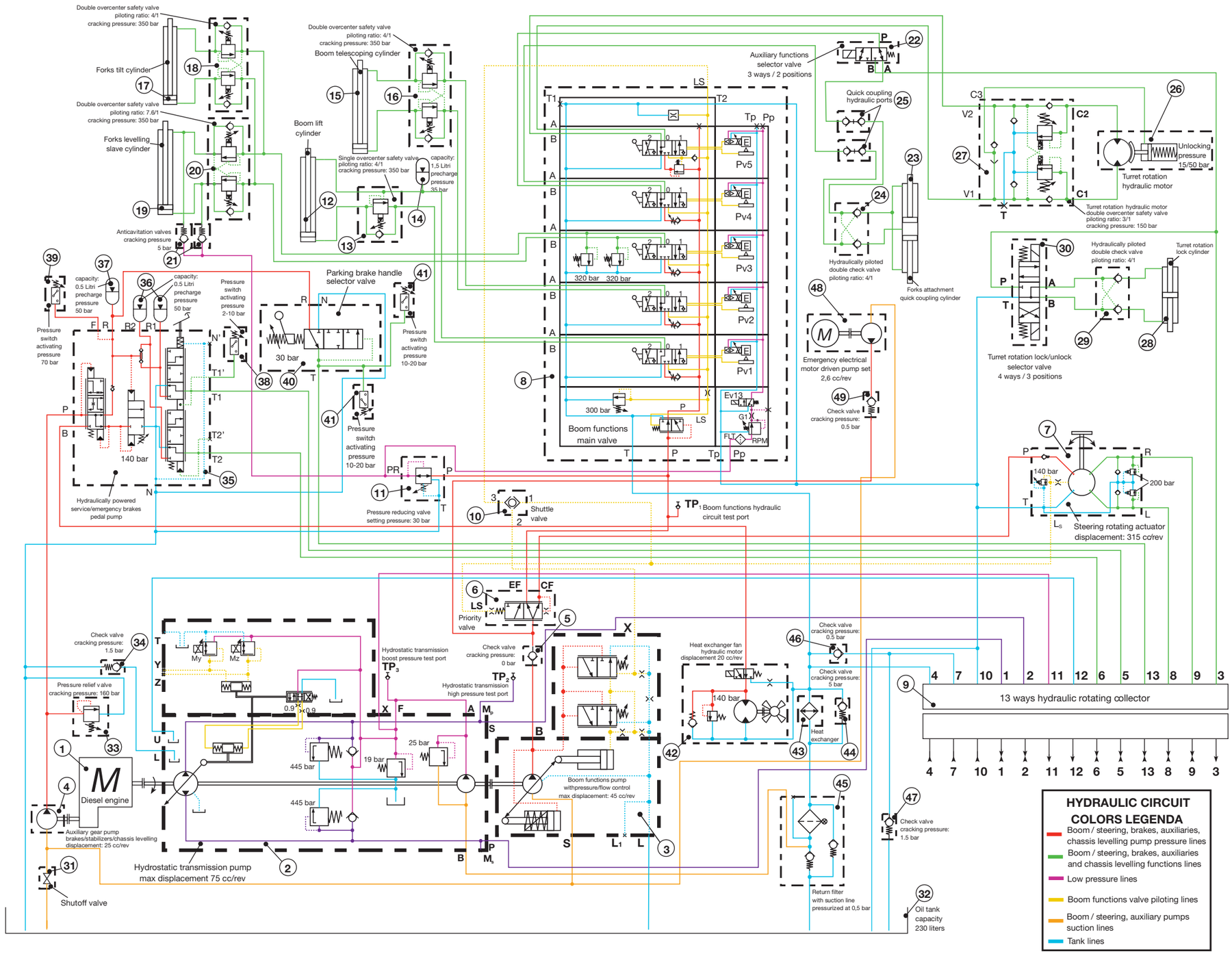

Distributor with mechanical control and span proportional to the action of the same control


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

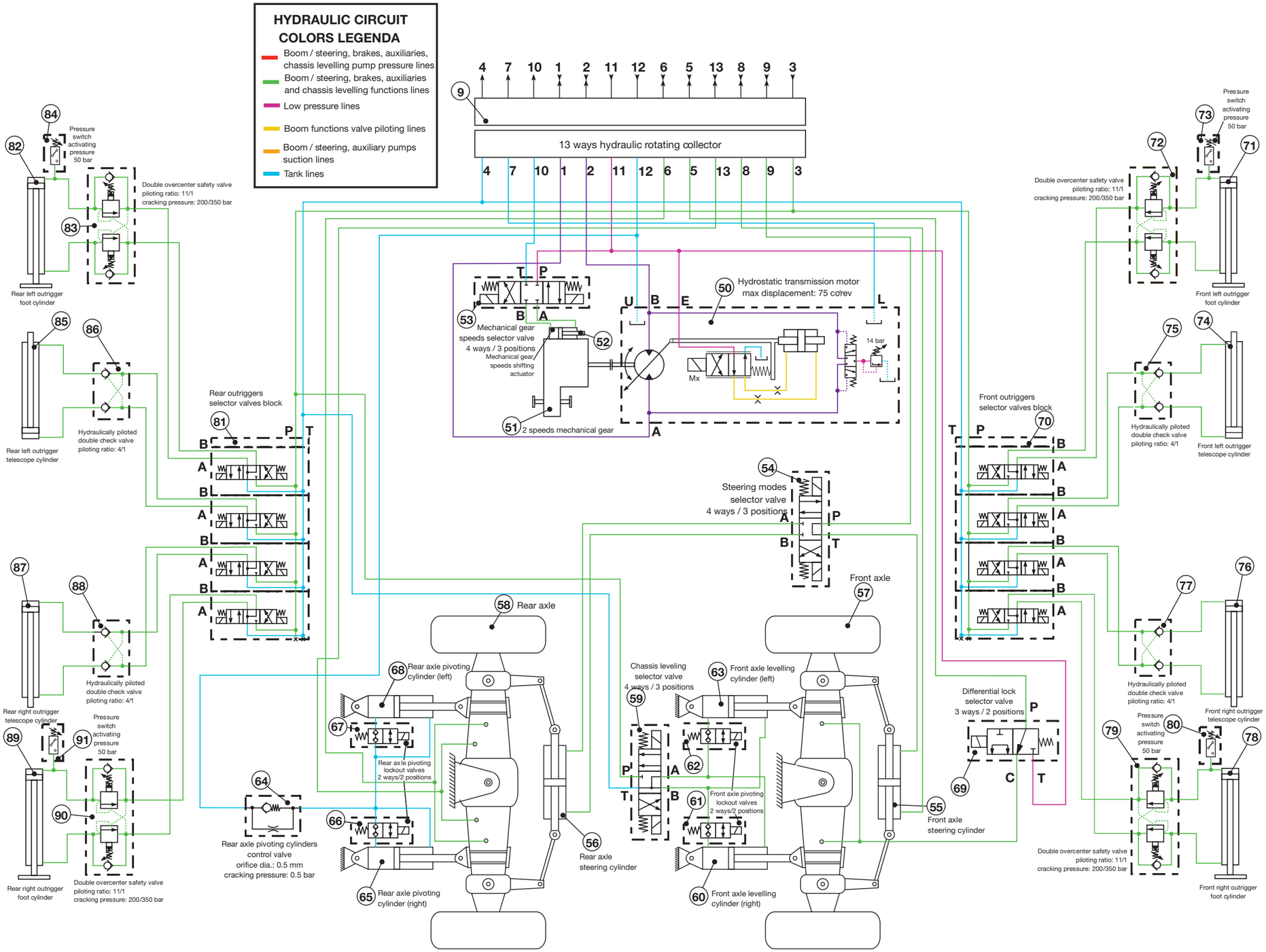

Electro-hydraulic single-acting servo valve

6.2 HYDRAULIC SCHEMES

6.2.1 Gyro 4020 - 4518 turntable hydraulic scheme (code 57.2201.1900 - rev. B)

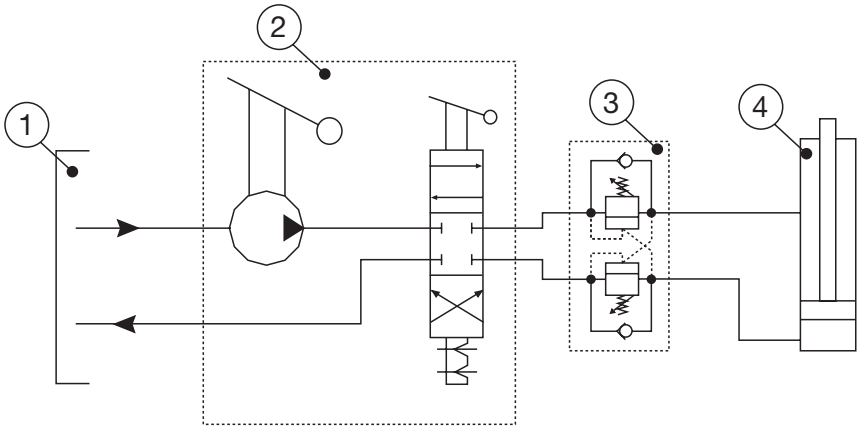


6.2.2 Gyro 4020 - 4518 carrier hydraulic scheme (code 57.2201.1900 - rev. B)



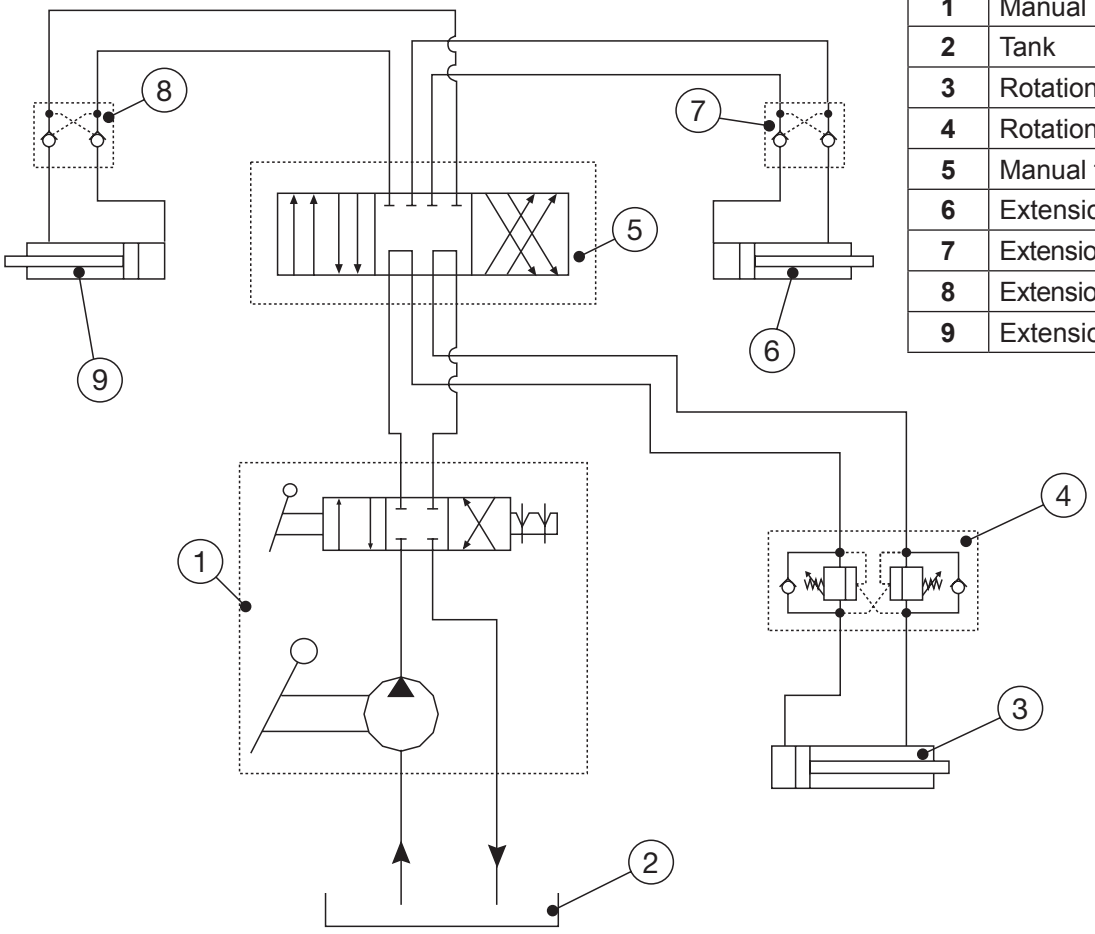
6.2.3 Hydraulic schemes - man-platforms

RNE - REM 4400



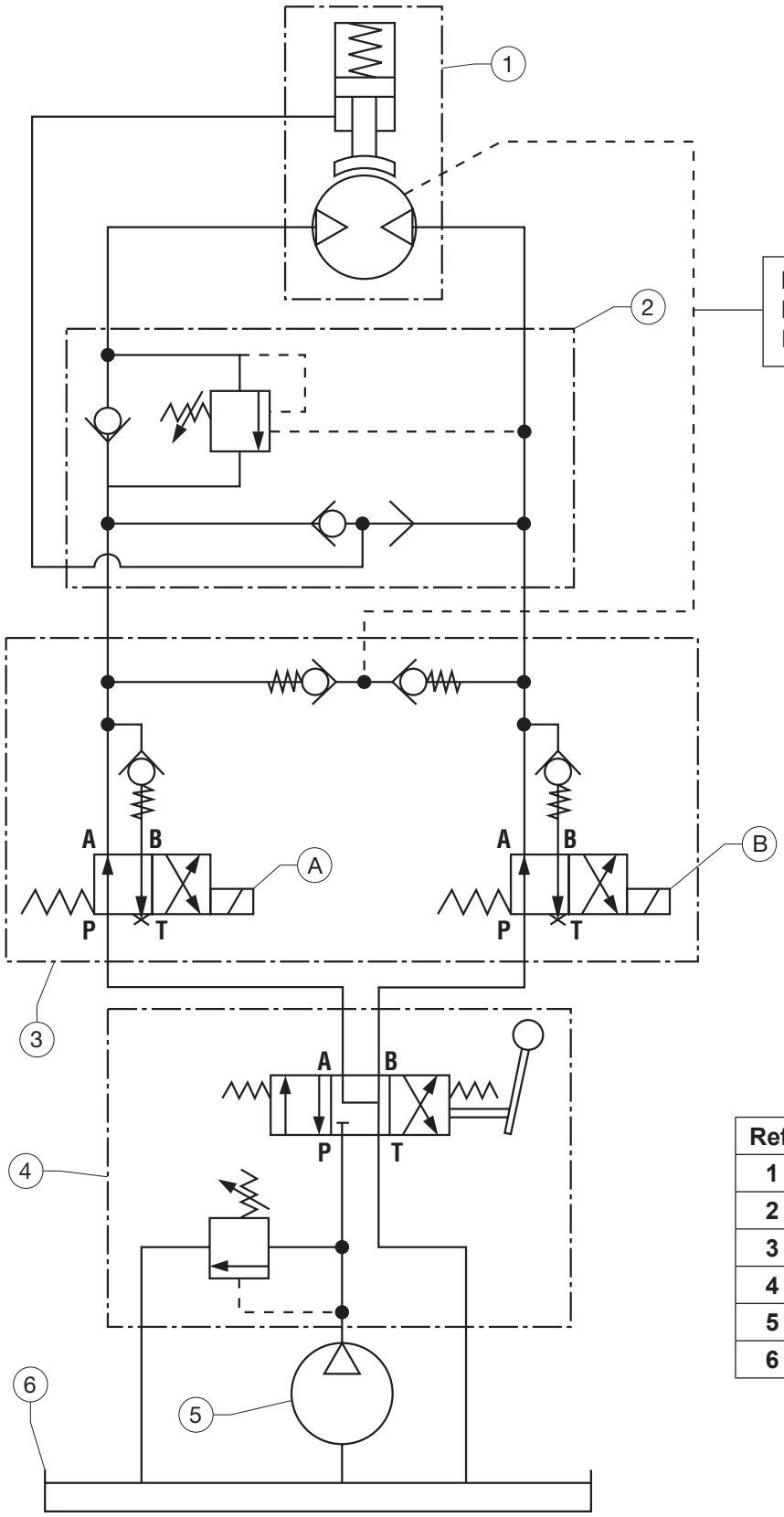
Ref.	Description
1	Tank
2	Manual pump
3	Block valve
4	Rotation cylinder

REM 5500



Ref.	Description
1	Manual pump
2	Tank
3	Rotation cylinder
4	Rotation cylinder block valve
5	Manual flow divider
6	Extension cylinder
7	Extension cylinder block valve
8	Extension cylinder block valve
9	Extension cylinder

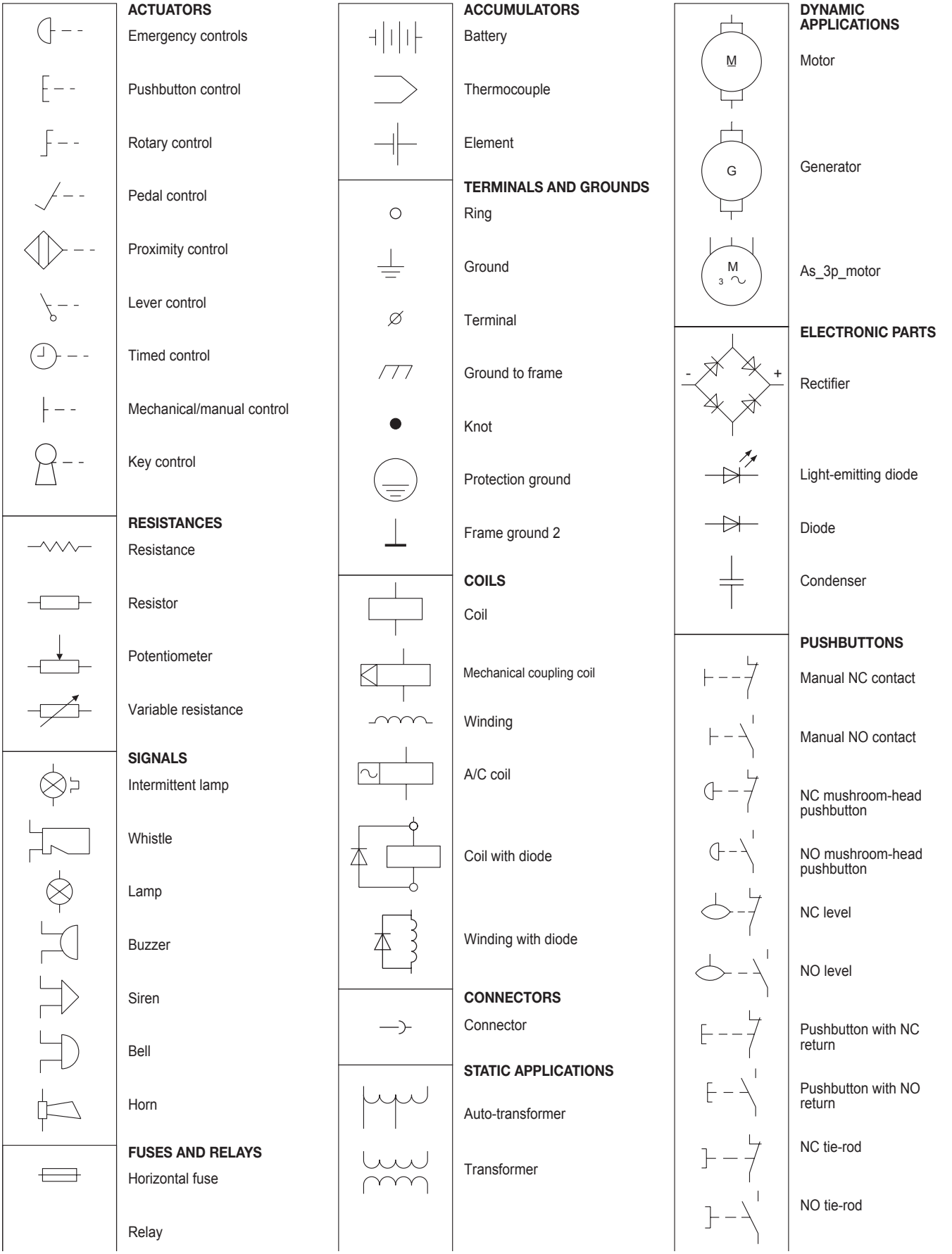
6.2.4 Hydraulic scheme - winches



Discharge line
External for S25 winches
Internal for P9 and P15 winches

Ref.	Description
1	Hydraulic motor
2	Valve
3	Cock
4	Main valve
5	Hydraulic pump
6	Oil tank

6.3 ELECTRICAL SYMBOLS



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

RESISTANCES
- Resistance
- Resistor
- Potentiometer
- Variable resistance

SIGNALS
- Intermittent lamp
- Whistle
- Lamp
- Buzzer
- Siren
- Bell
- Horn

FUSES AND RELAYS
- Horizontal fuse
- Relay

ACCUMULATORS
- Battery
- Thermocouple
- Element

TERMINALS AND GROUNDS
- Ring
- Ground
- Terminal
- Ground to frame
- Knot
- Protection ground
- Frame ground 2

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

CONNECTORS
- Connector

STATIC APPLICATIONS
- Auto-transformer
- Transformer

DYNAMIC APPLICATIONS
- Motor
- Generator
- As_3p_motor

ELECTRONIC PARTS
- Rectifier
- Light-emitting diode
- Diode
- Condenser

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

CONTACTS


Thermal


Normally open (NO)


Normally closed (NC)


NO limit switch


NC limit switch


Contactor

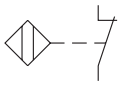

Magneto-thermal closure


Magneto-thermal opening

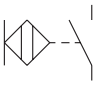

Thermal closure

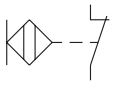

Thermal opening


Exchange


NC proximity


NO proximity


NO mechanical


NC mechanical

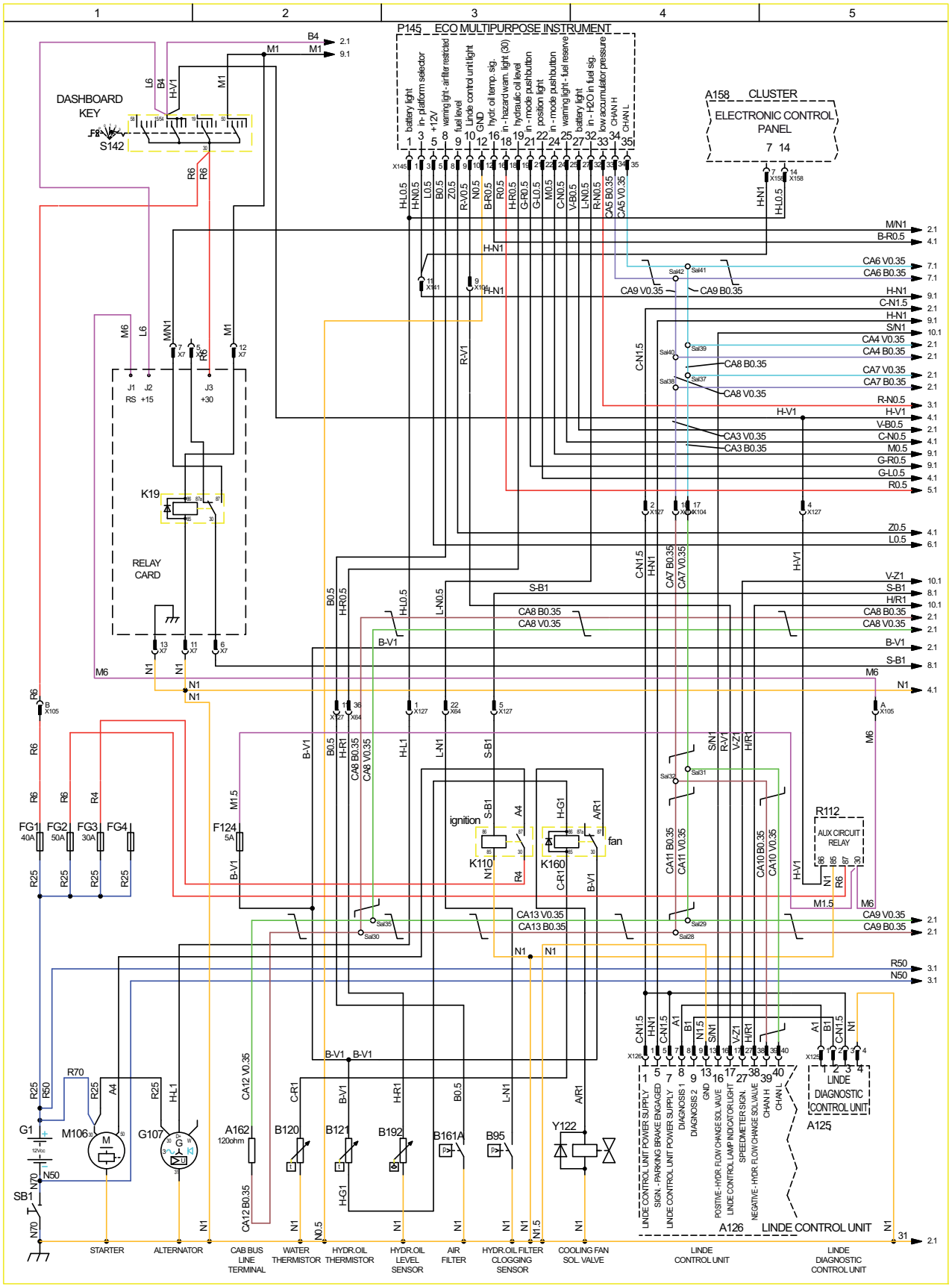

Selector


Selector2

6.4 WIRING DIAGRAMS

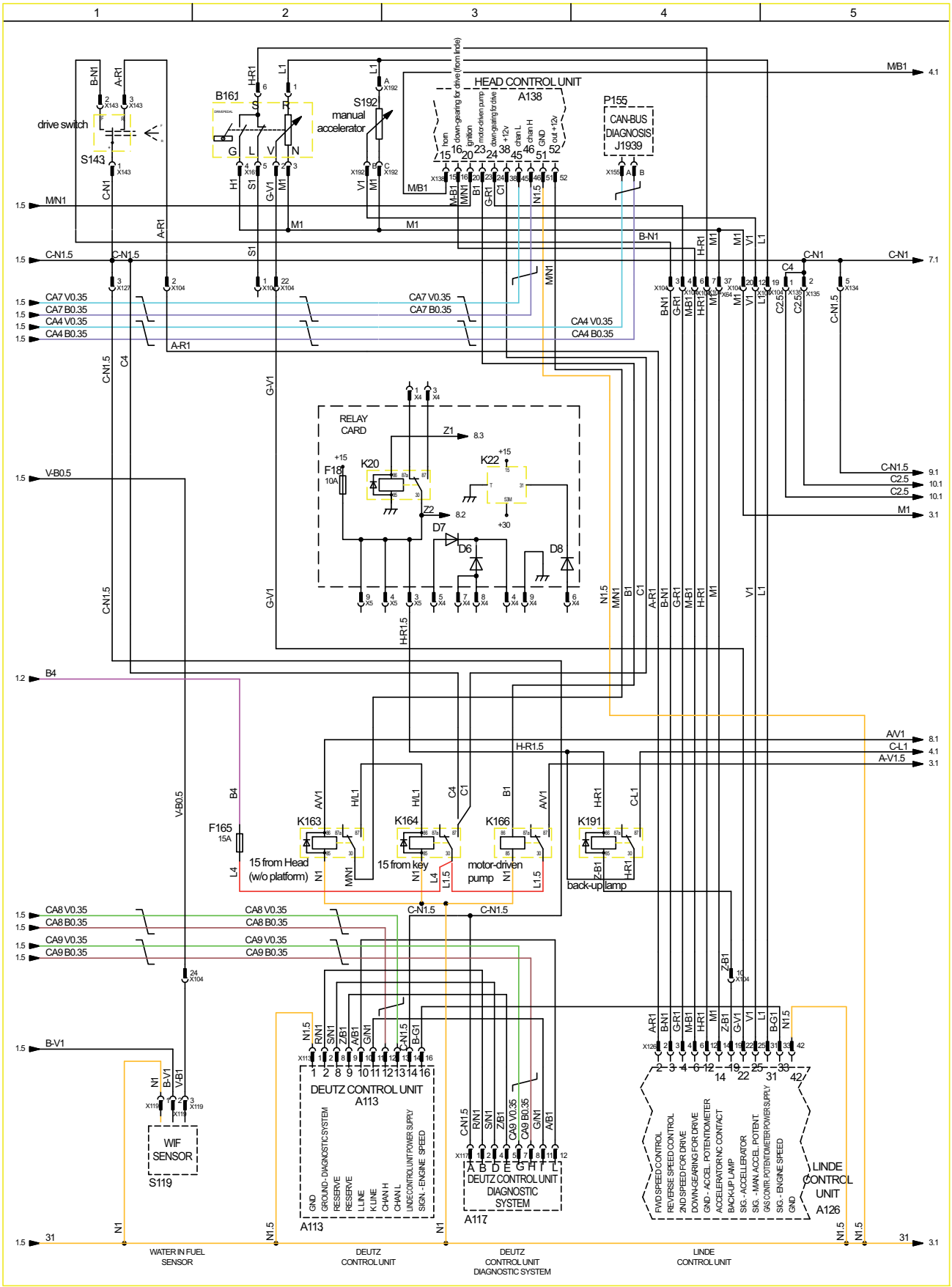
to serial n. 18011

6.4.1 Sheet 1 of 13



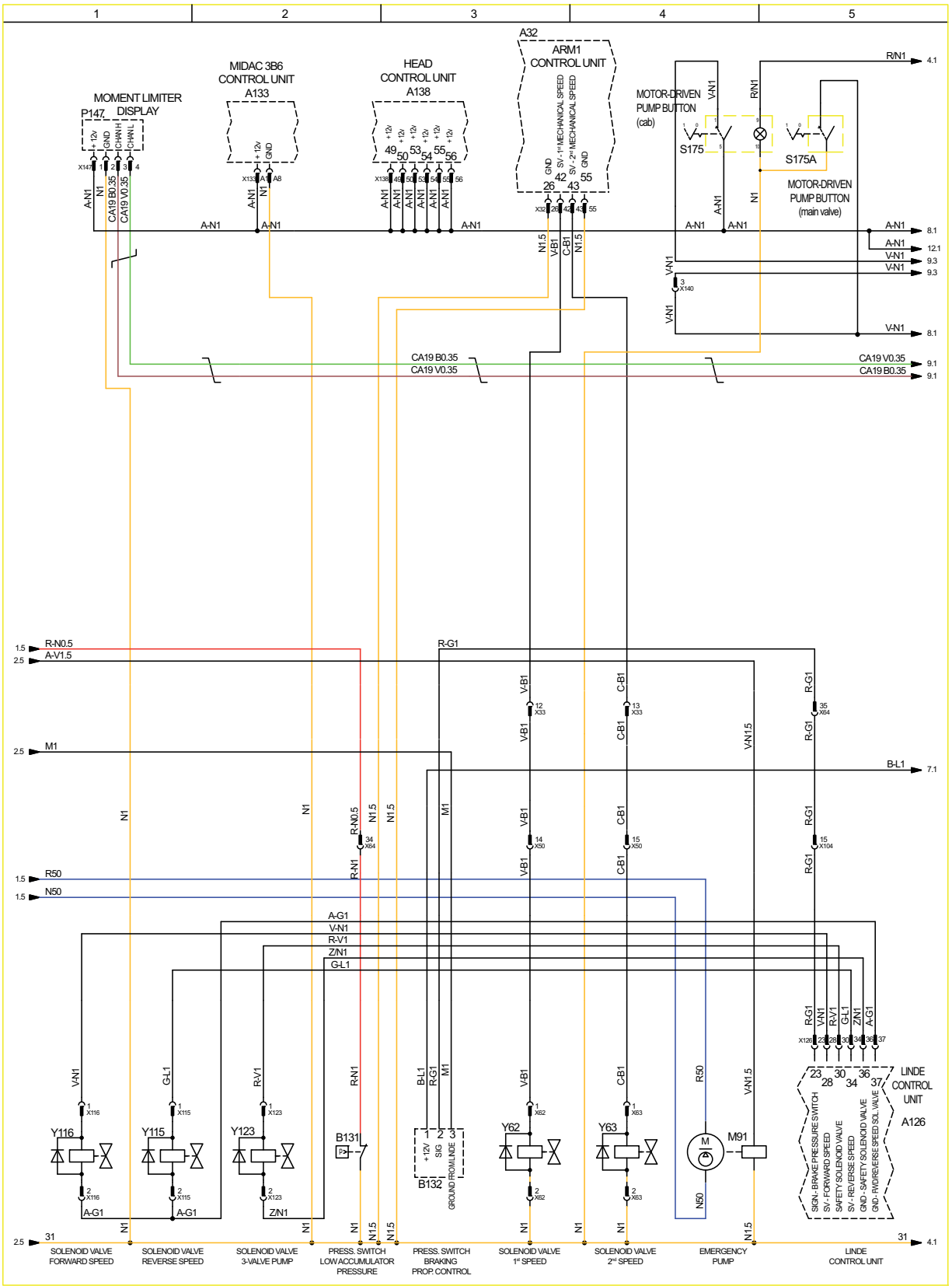
6.4.2 Sheet 2 of 13

to serial n. 18011



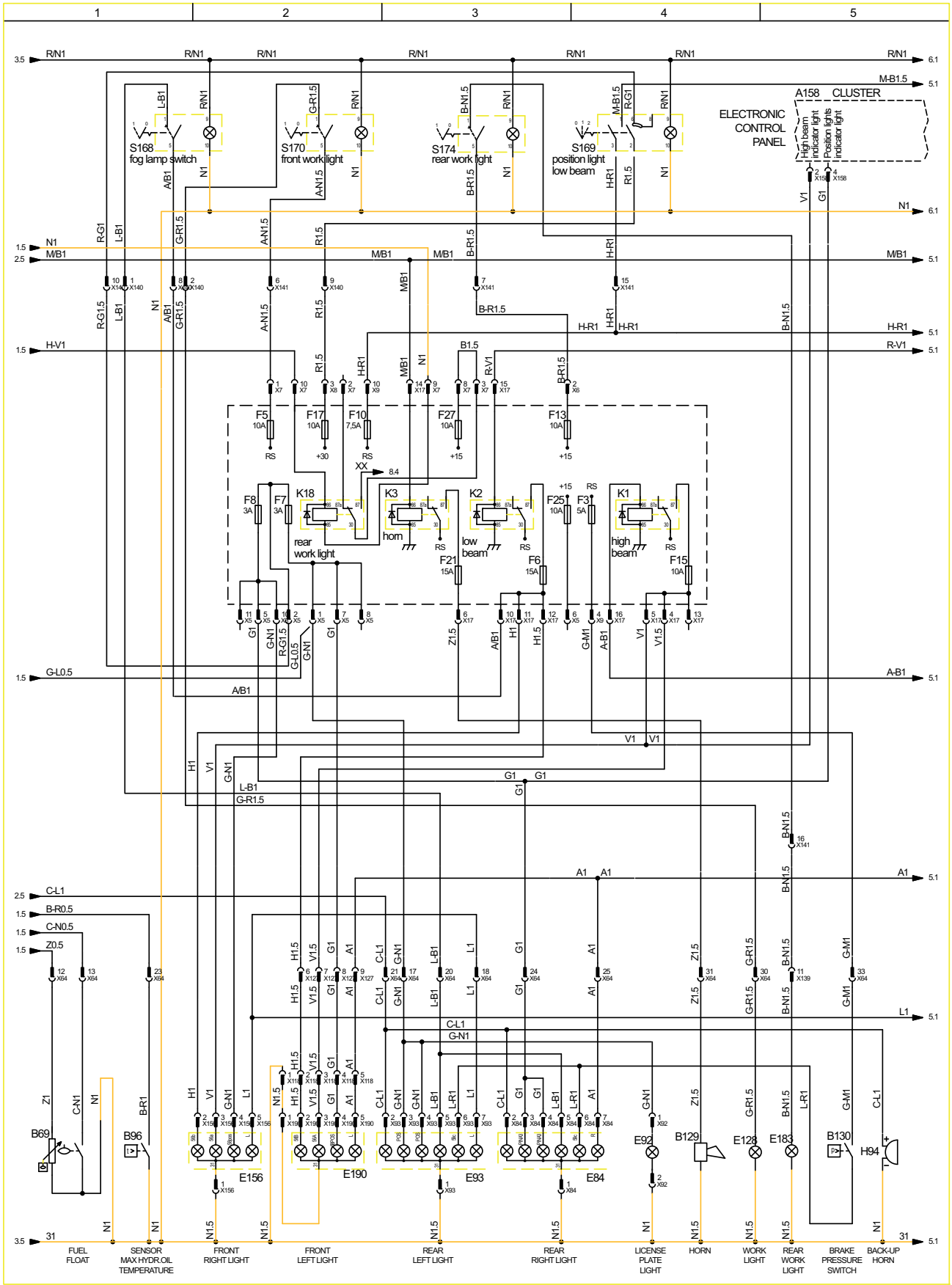
6.4.3 Sheet 3 of 13

to serial n. 18011



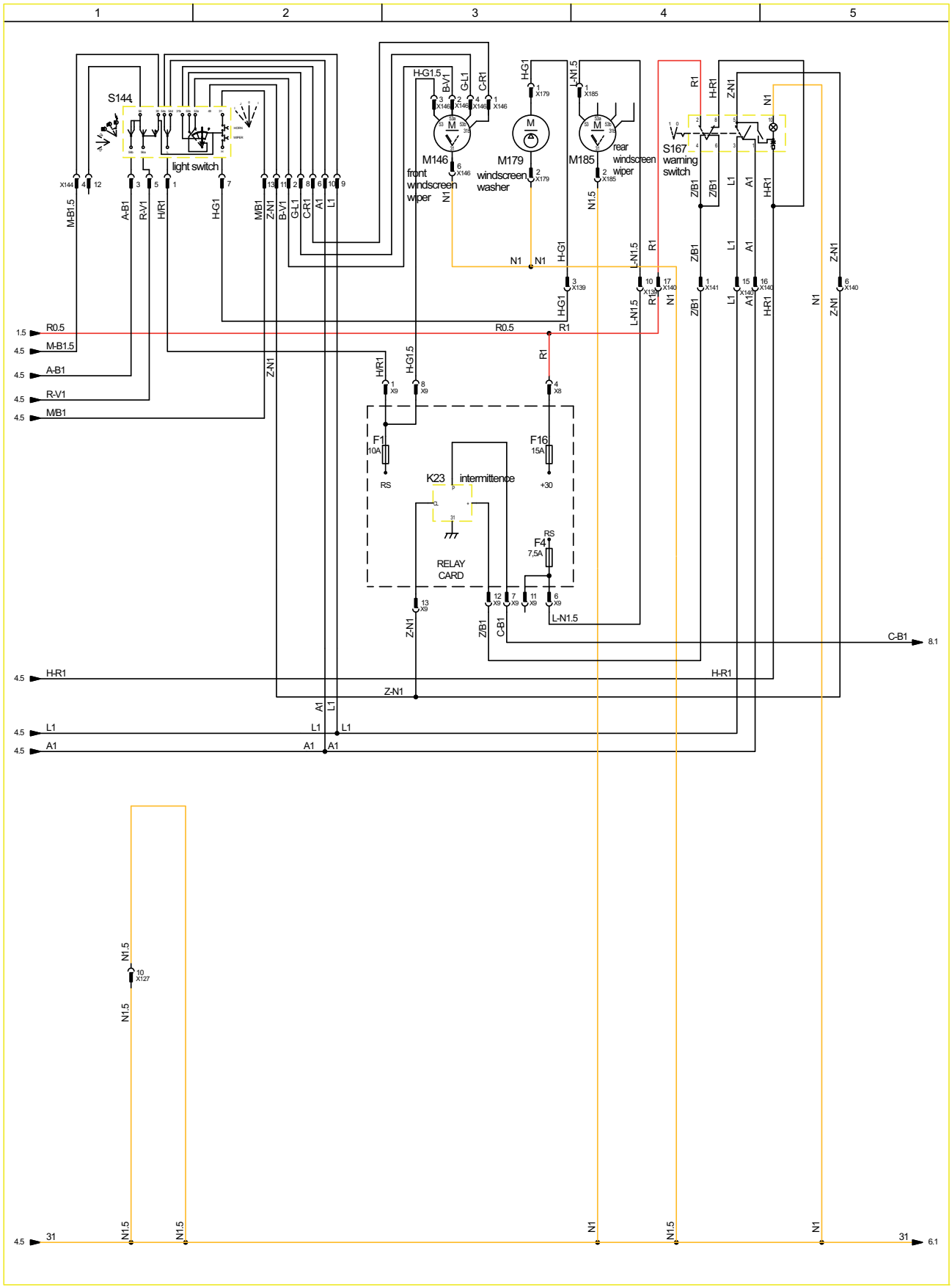
6.4.4 Sheet 4 of 13

to serial n. 18011



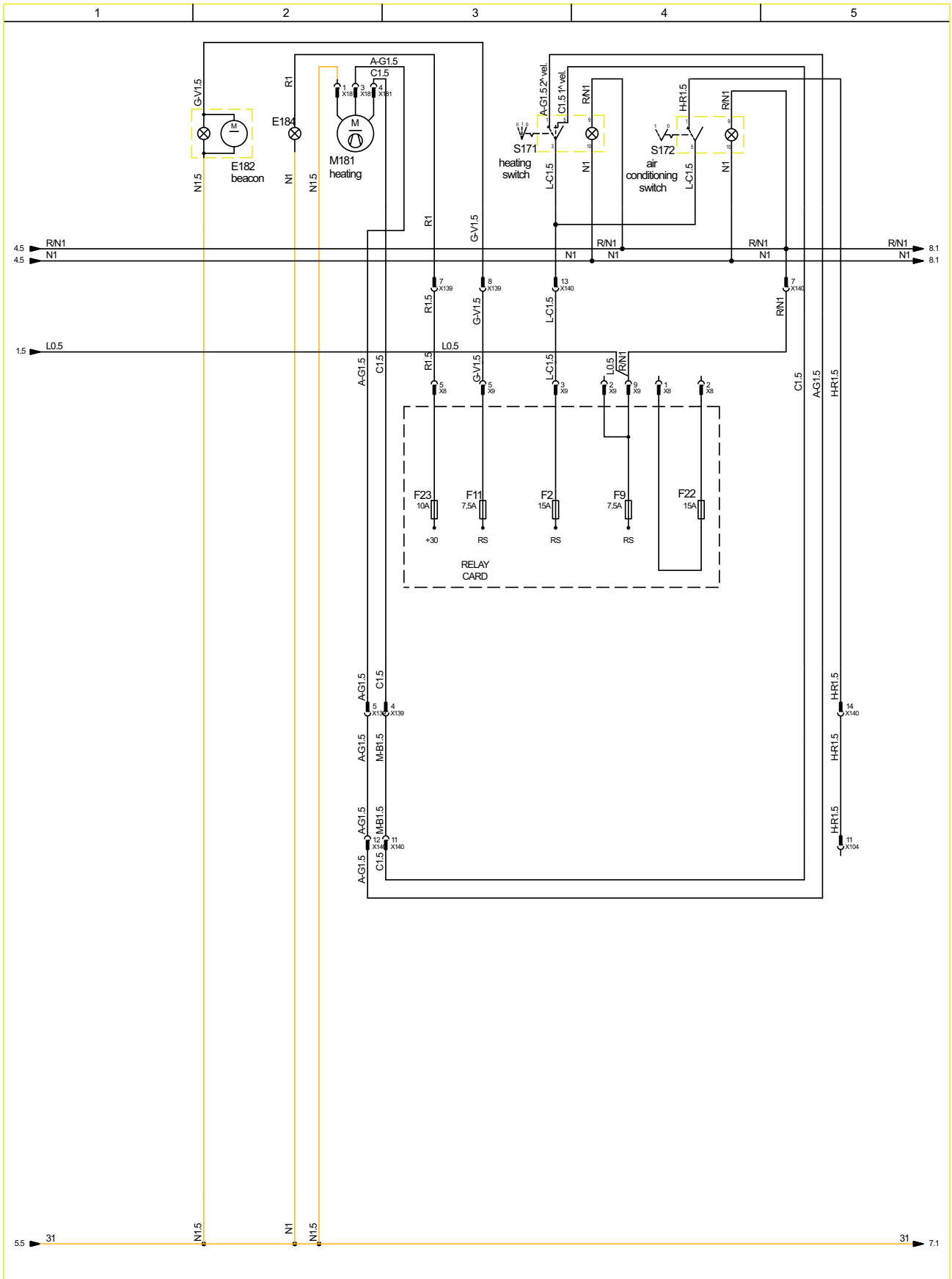
6.4.5 Sheet 5 of 13

to serial n. 18011



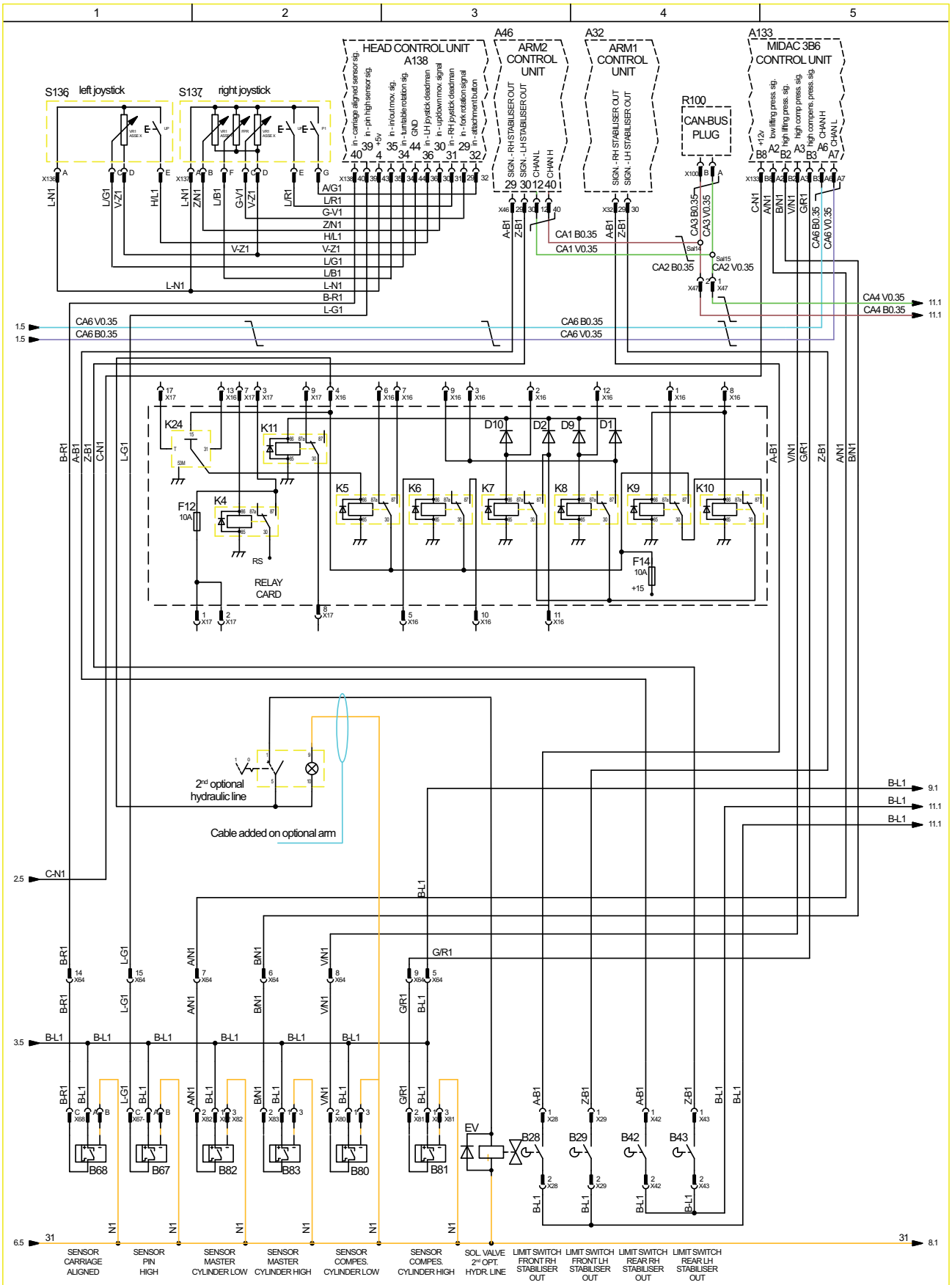
6.4.6 Sheet 6 of 13

to serial n. 18011



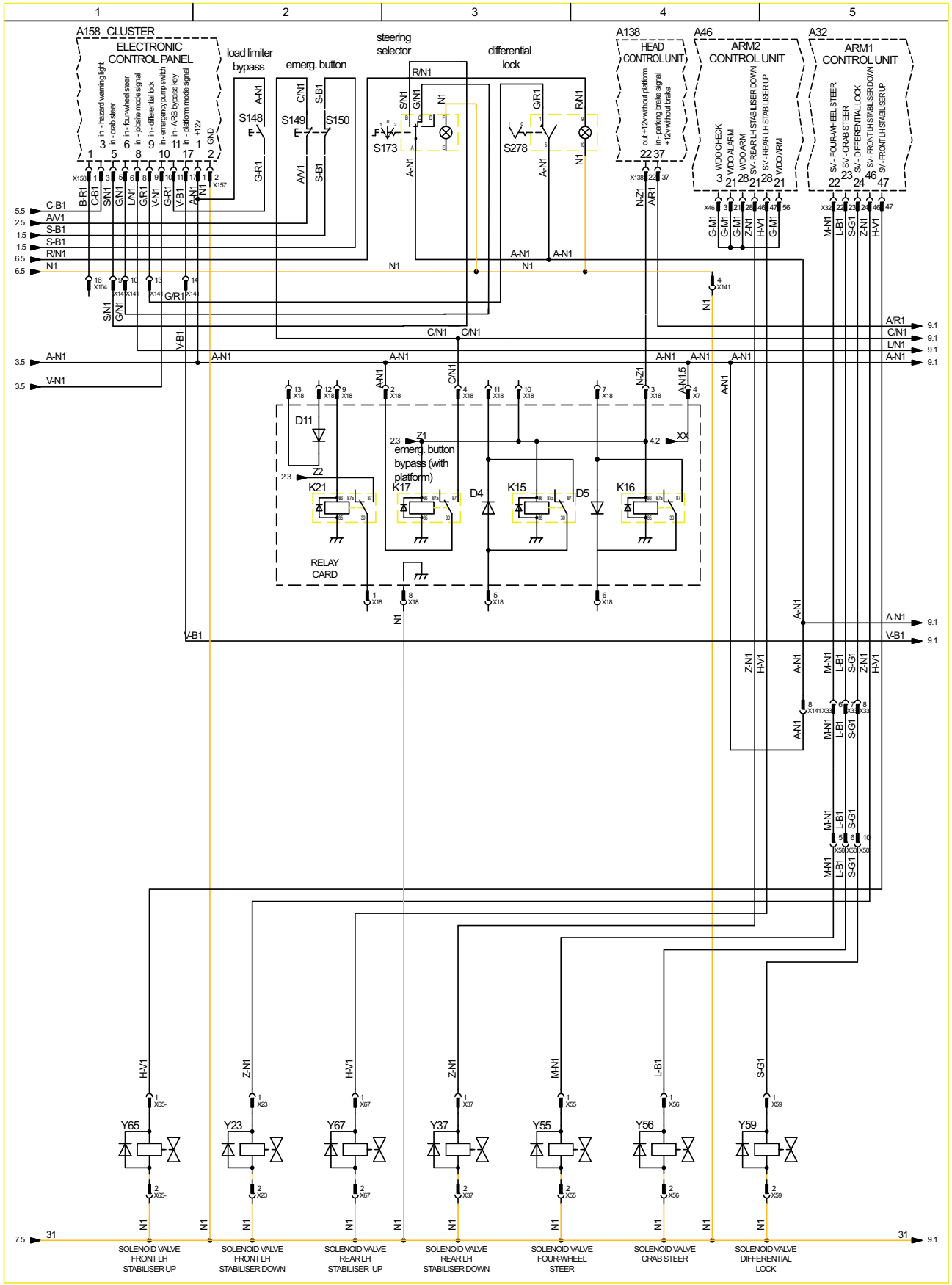
6.4.7 Sheet 7 of 13

to serial n. 18011



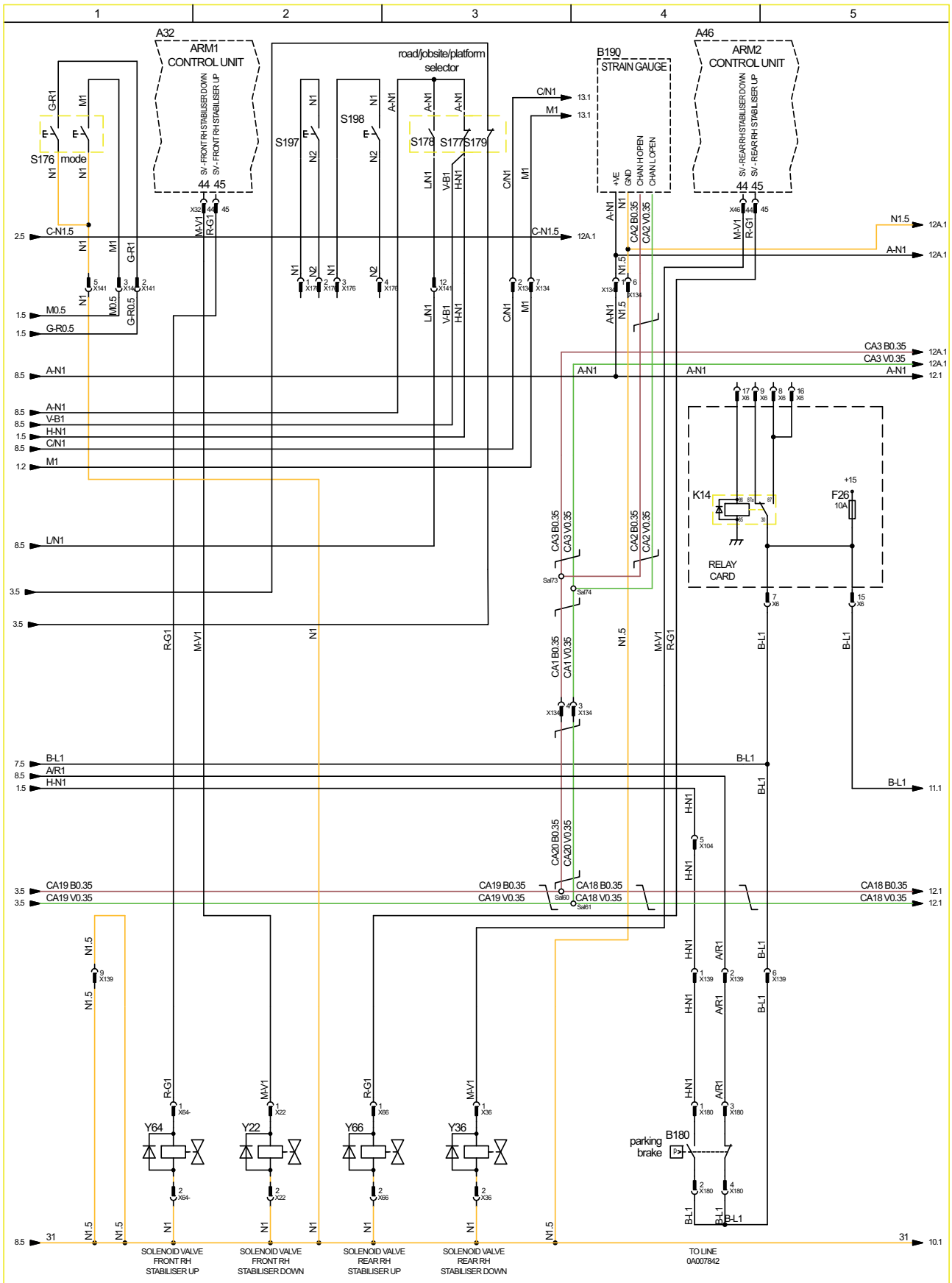
6.4.8 Sheet 8 of 13

to serial n. 18011



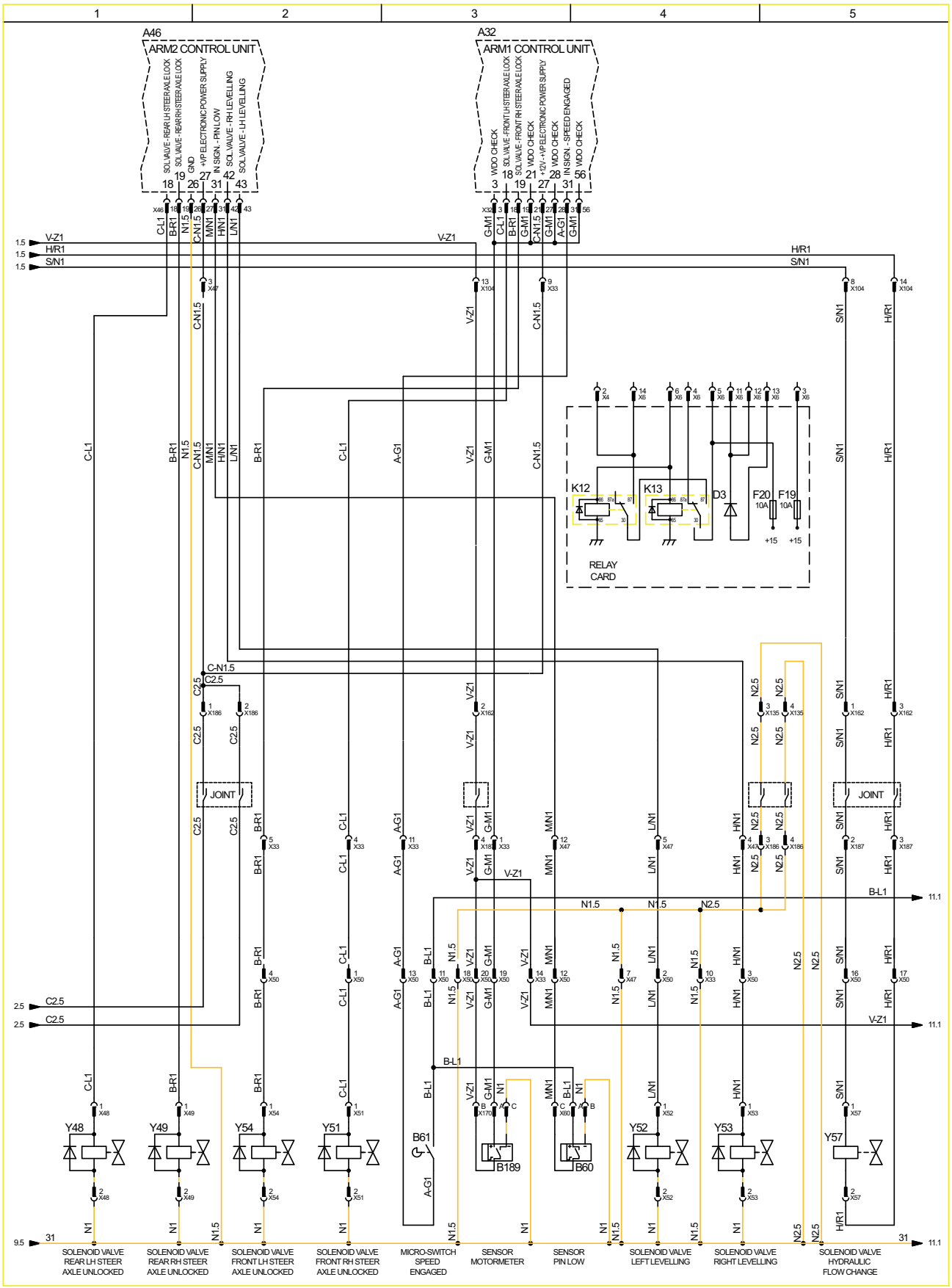
6.4.9 Sheet 9 of 13

to serial n. 18011



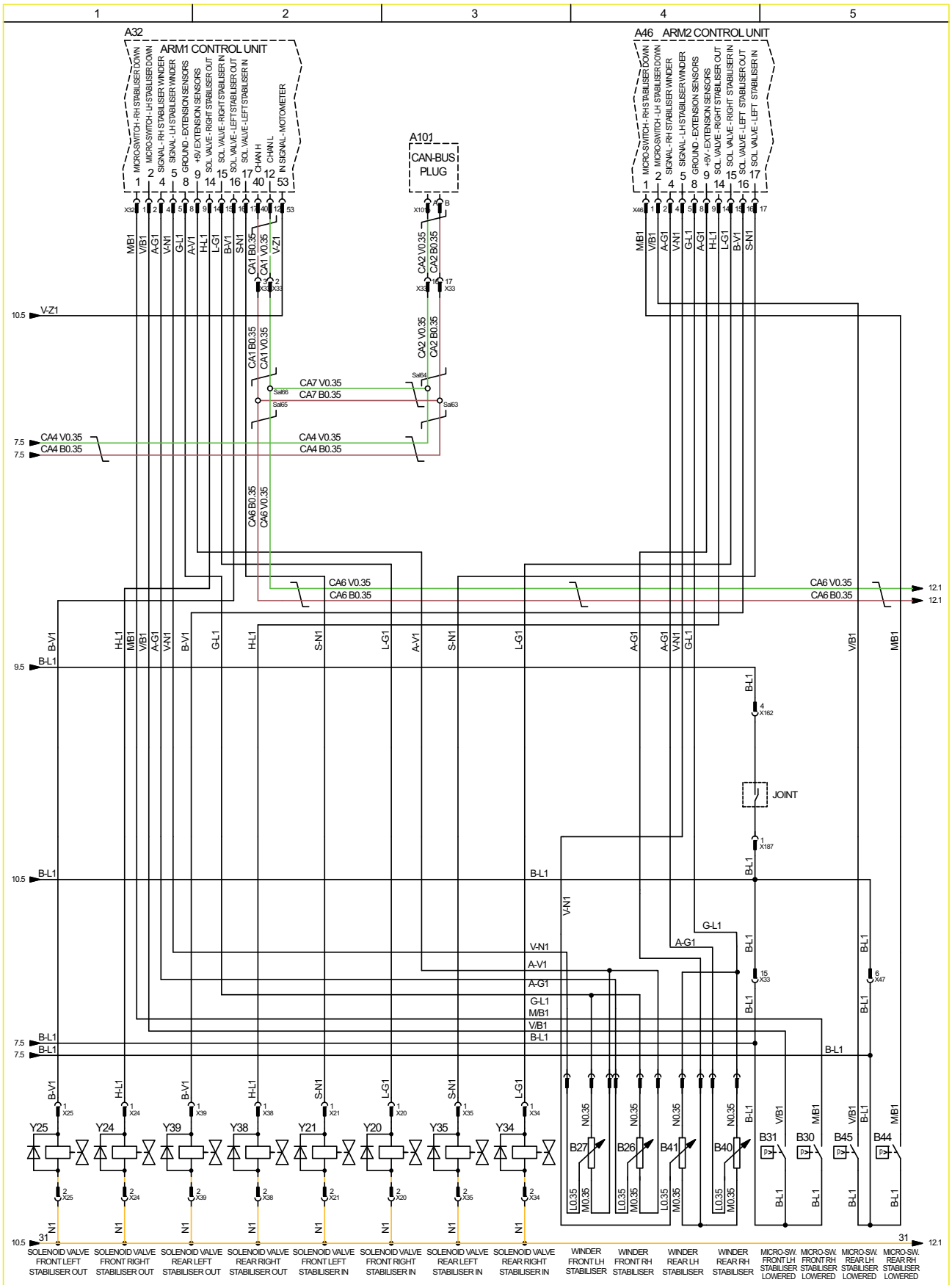
6.4.10 Sheet 10 of 13

to serial n. 18011



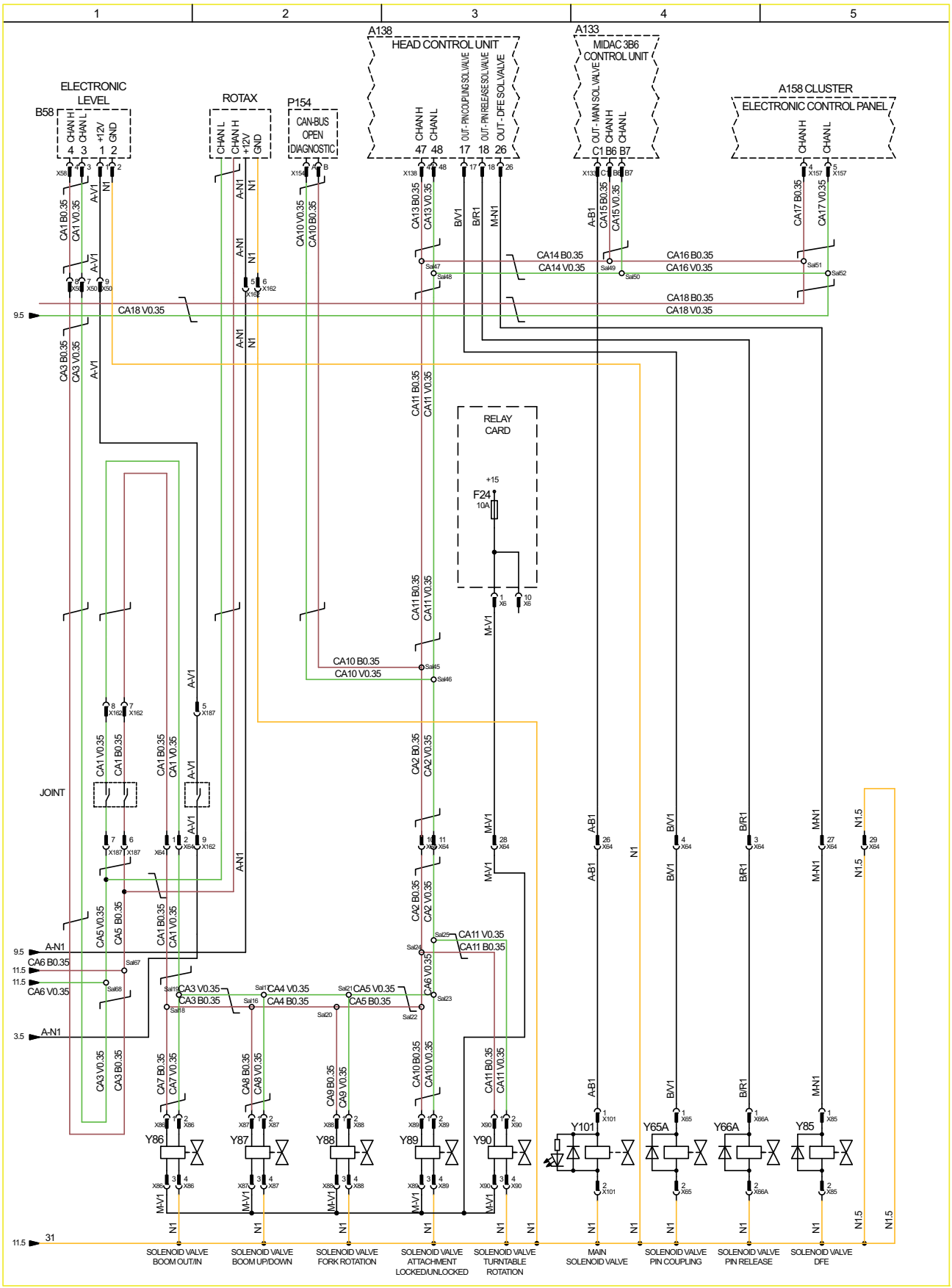
6.4.11 Sheet 11 of 13

to serial n. 18011

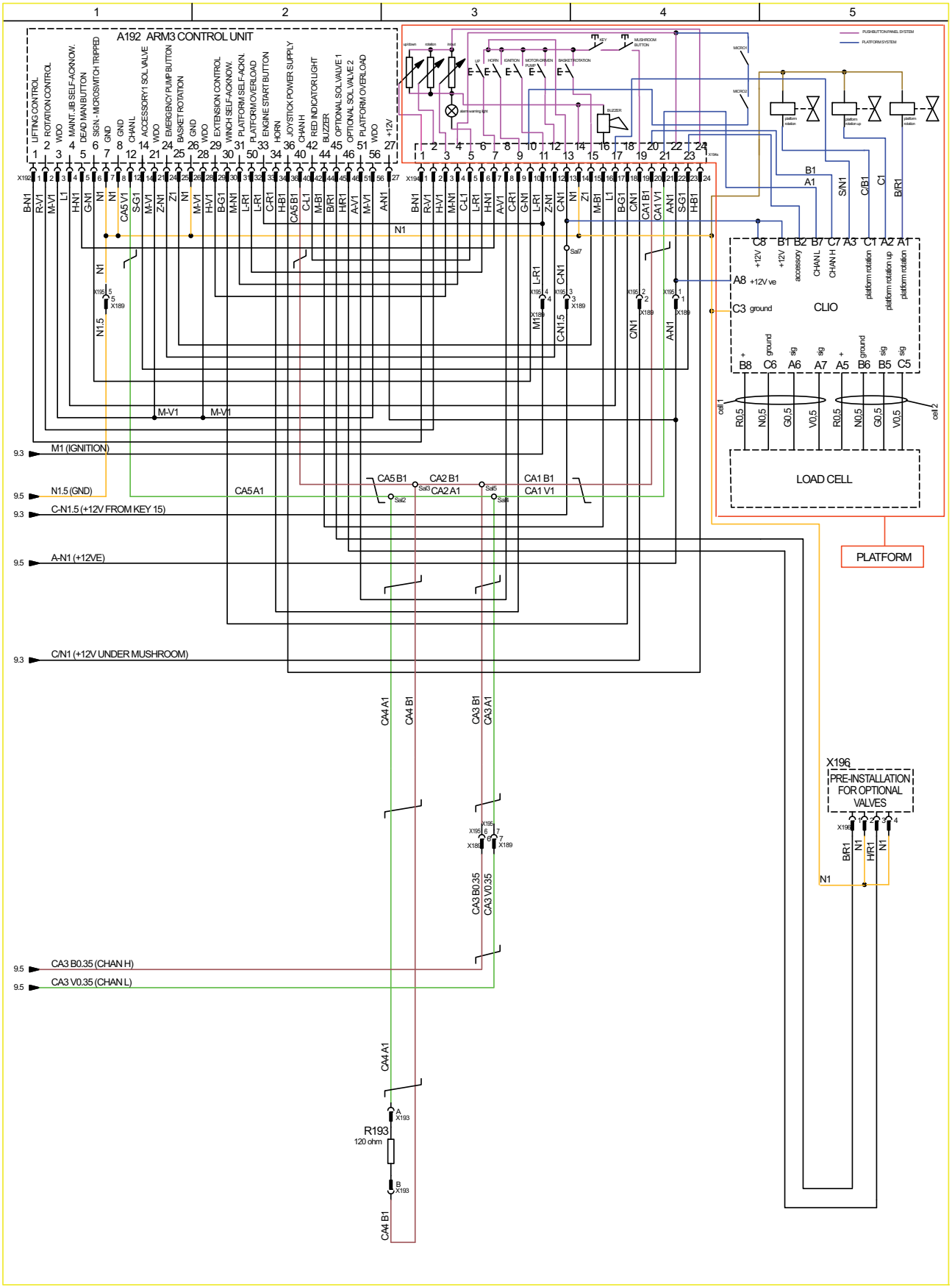


6.4.12 Sheet 12 of 13

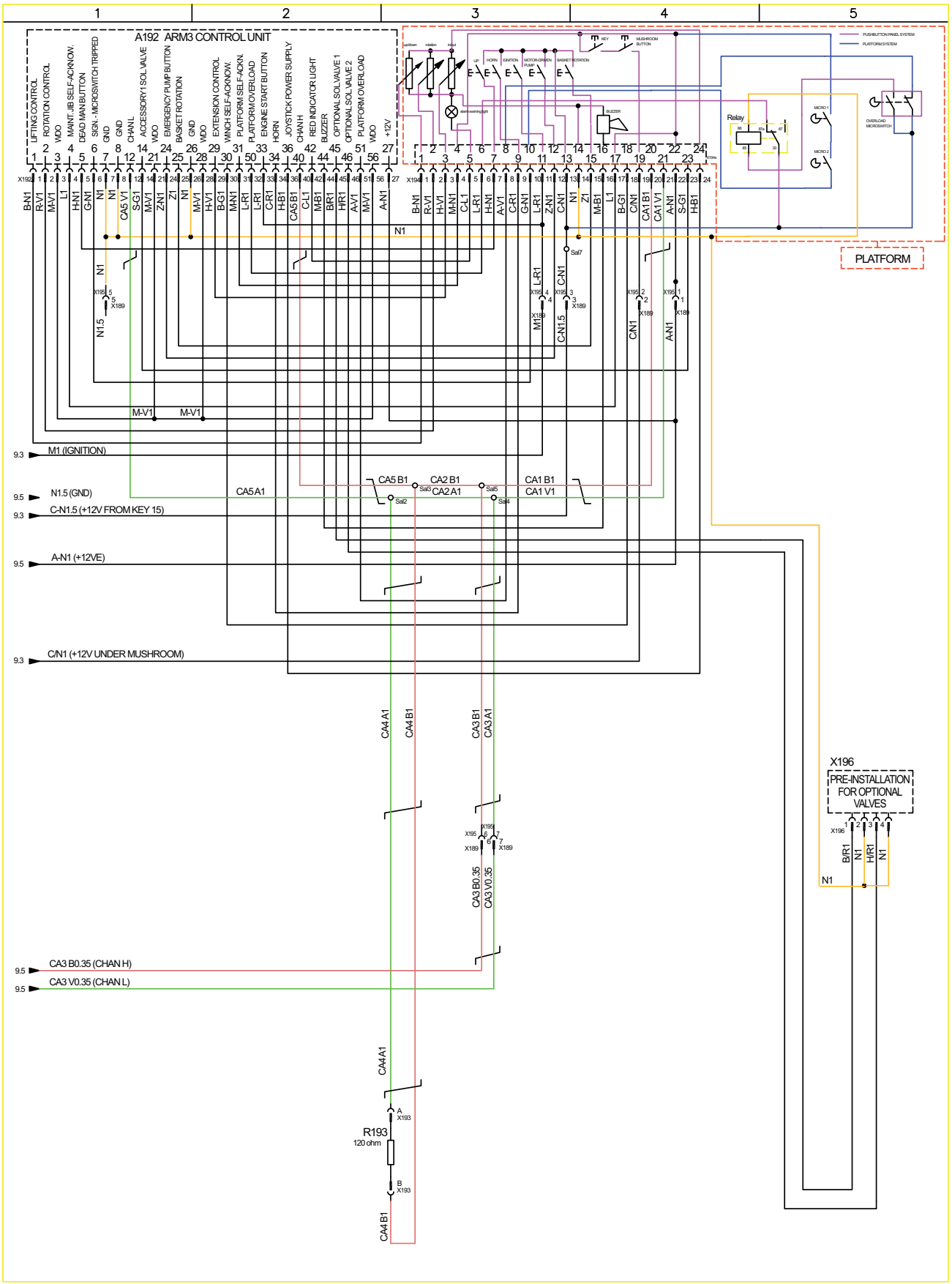
to serial n. 18011



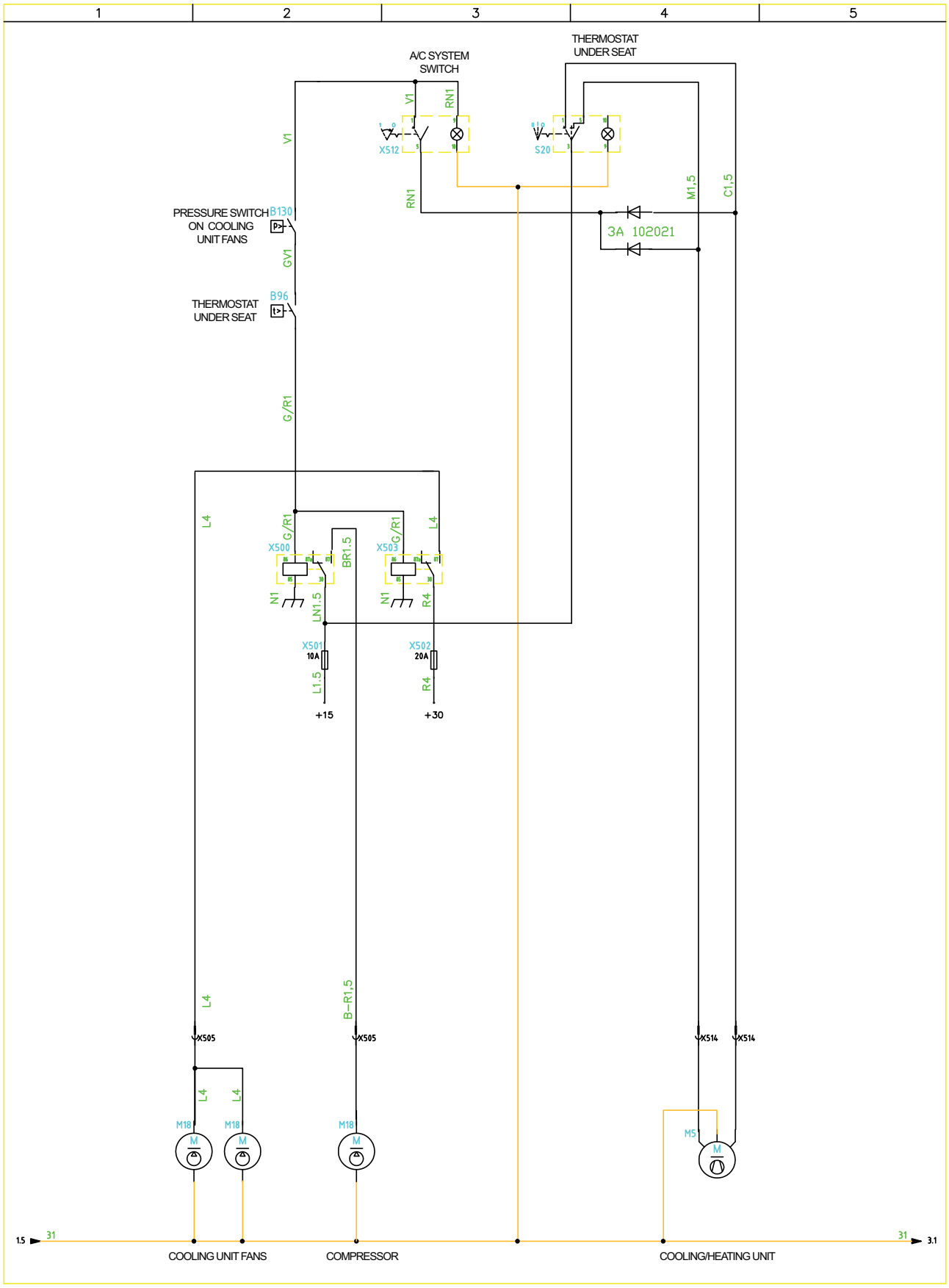
6.4.13 Sheet 13A of 13 (Valid for machines with 2P500-REM4400 and 2P300RNE platform) to serial n. 18011



6.4.13 Sheet 13B of 13 (Valid for machines with 2P300F platform) to serial n. 18011



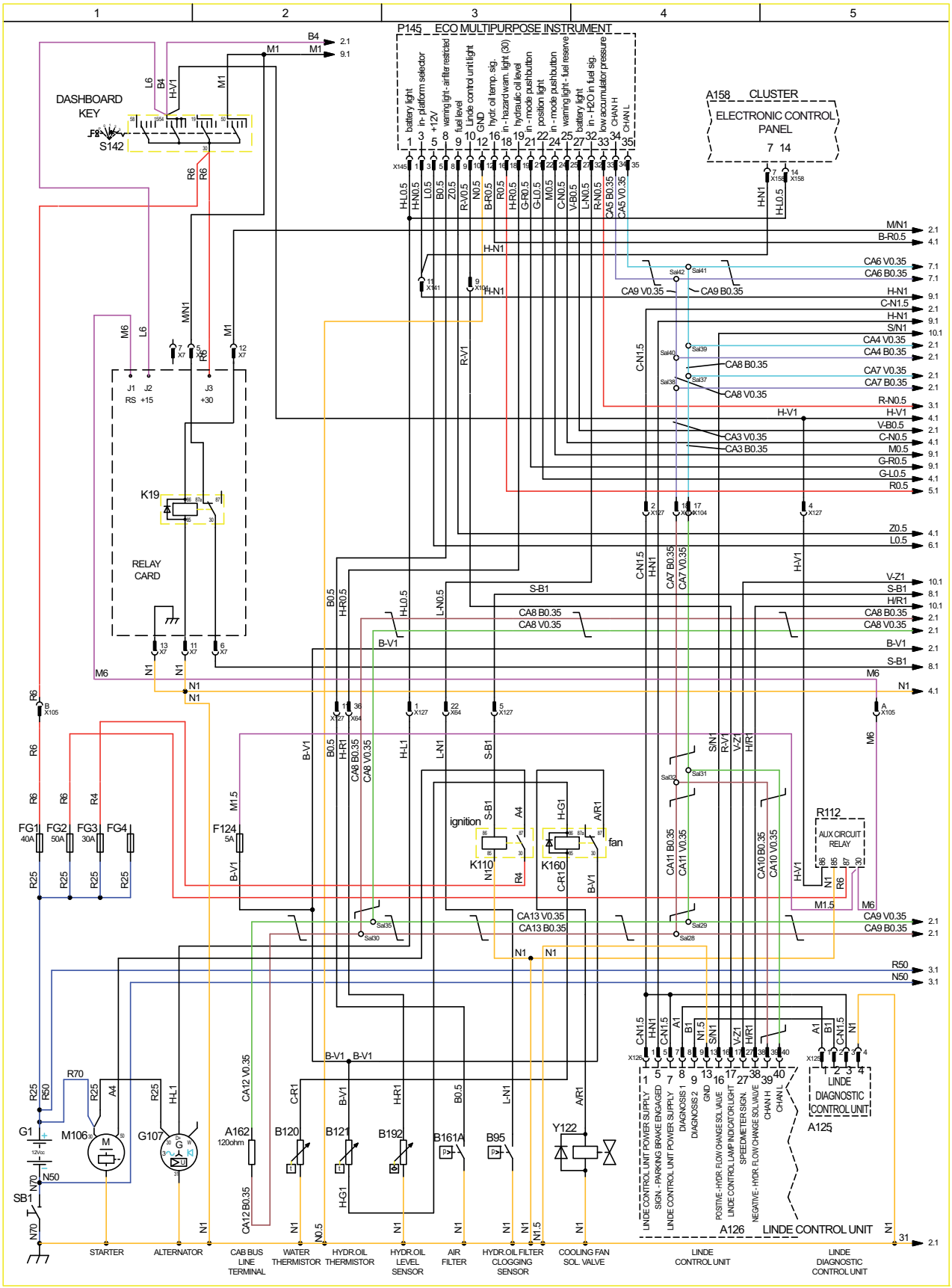
6.4.14 A/C system optional sheet



6.4 WIRING DIAGRAMS

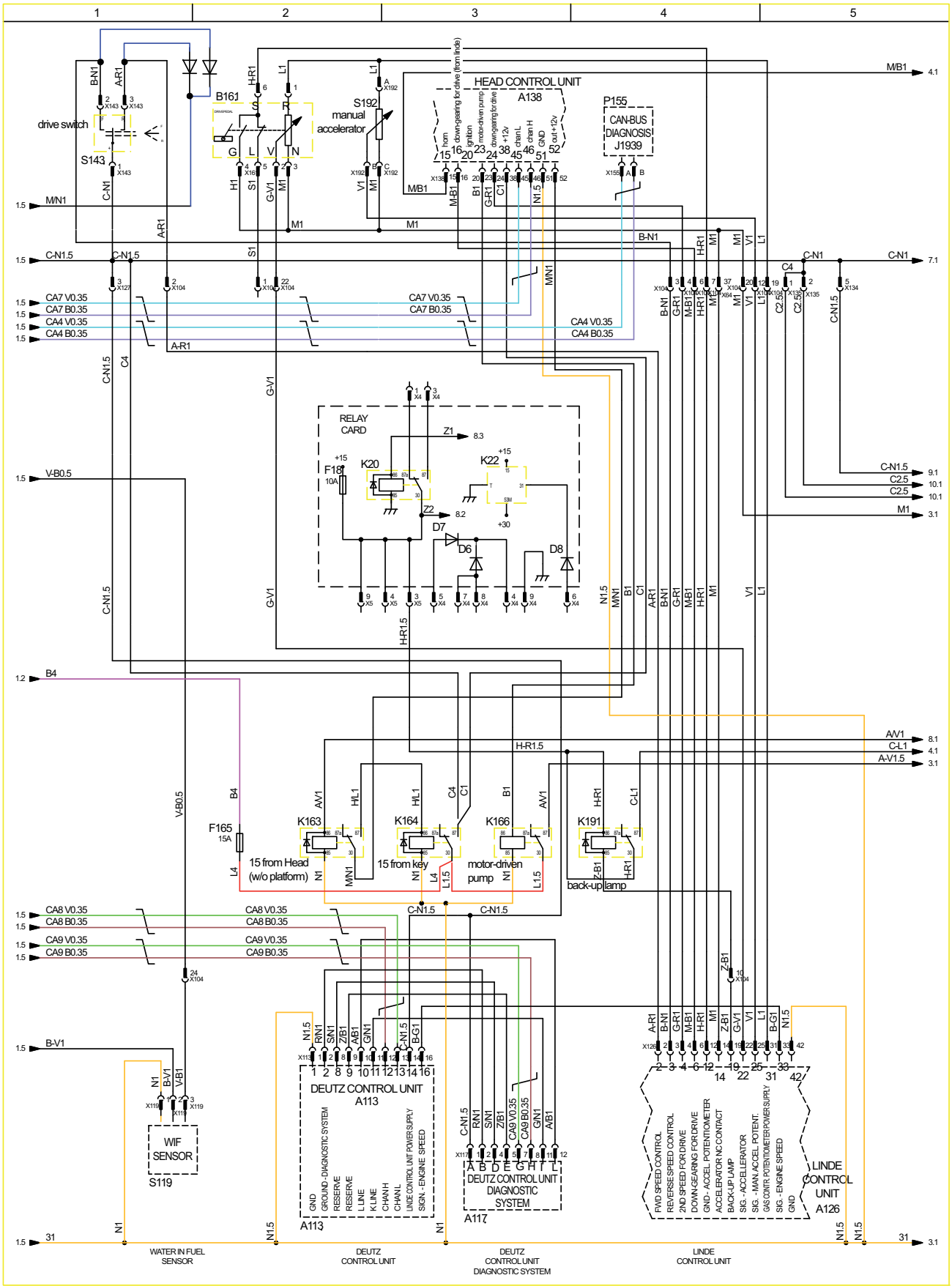
from serial n. 18012

6.4.1 Sheet 1 of 13



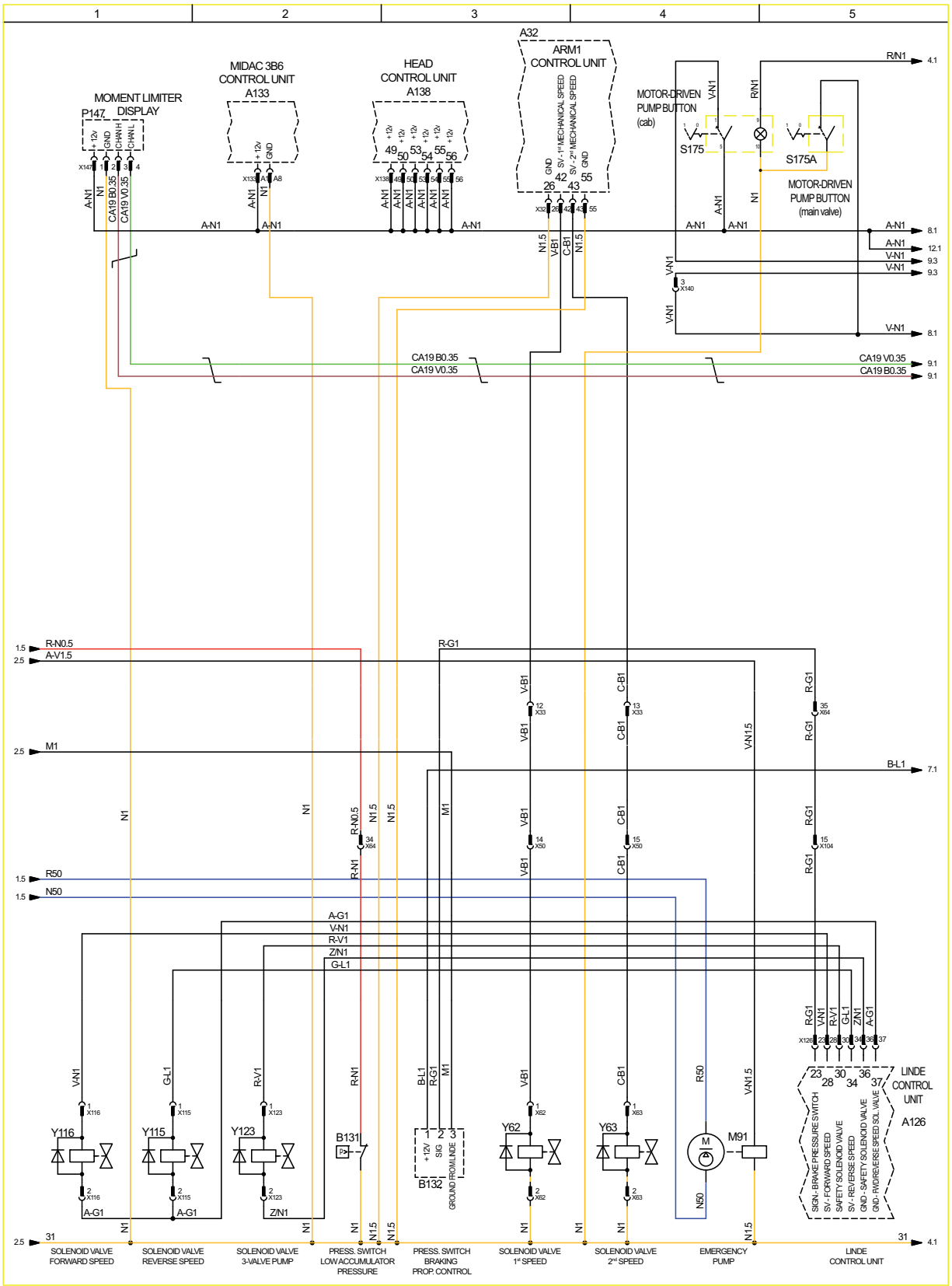
6.4.2 Sheet 2 of 13

from serial n. 18012



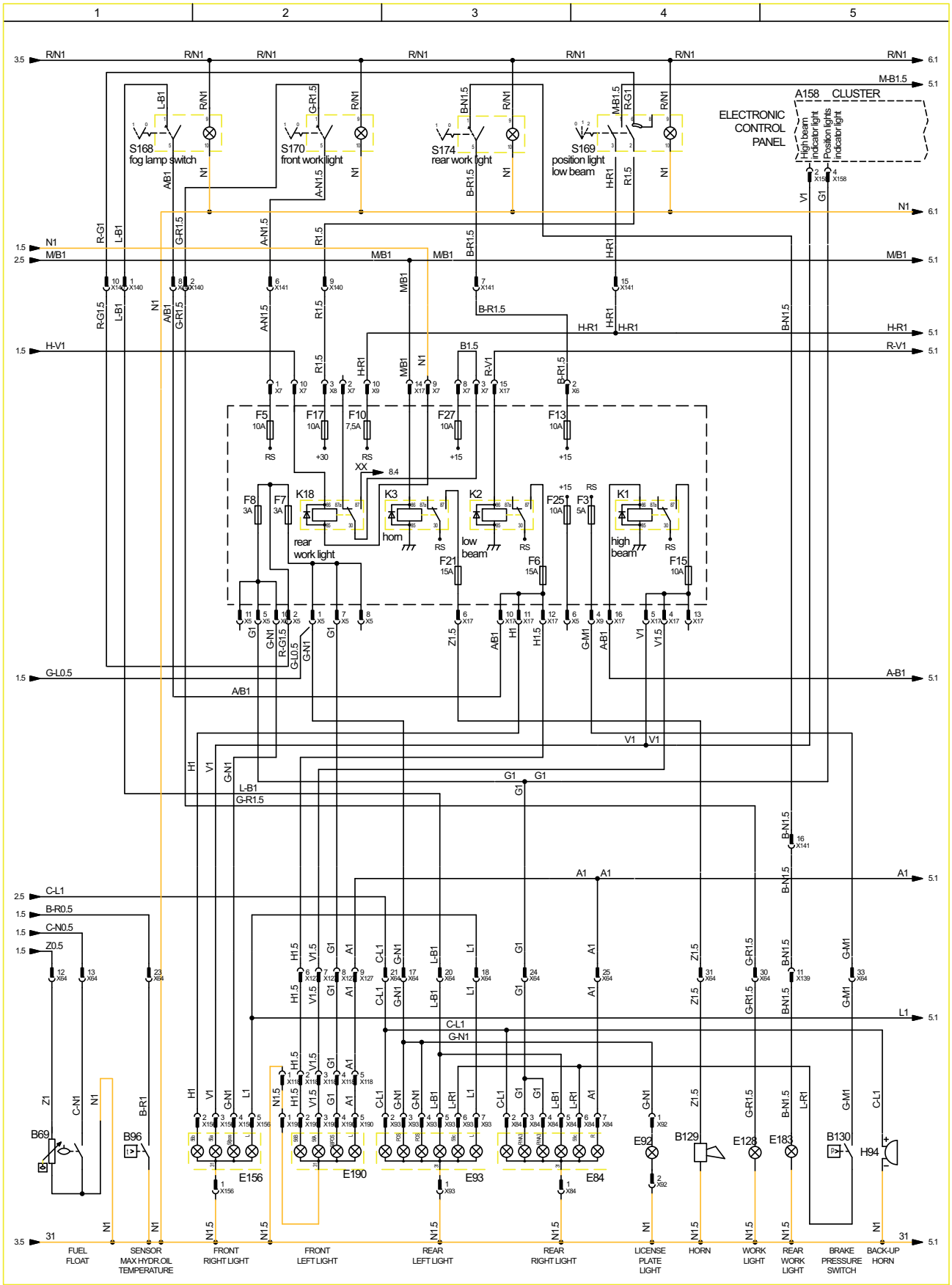
6.4.3 Sheet 3 of 13

from serial n. 18012



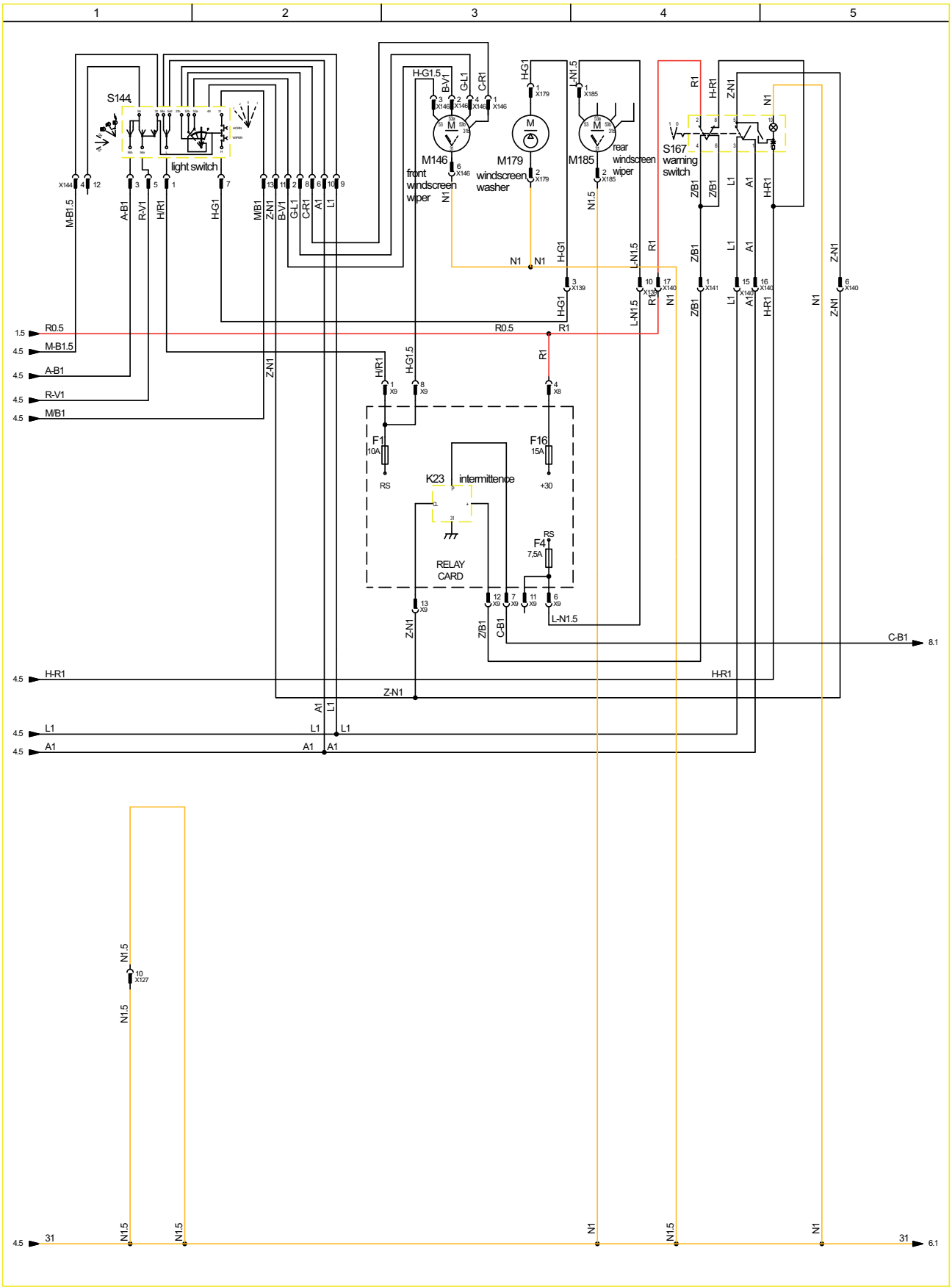
6.4.4 Sheet 4 of 13

from serial n. 18012



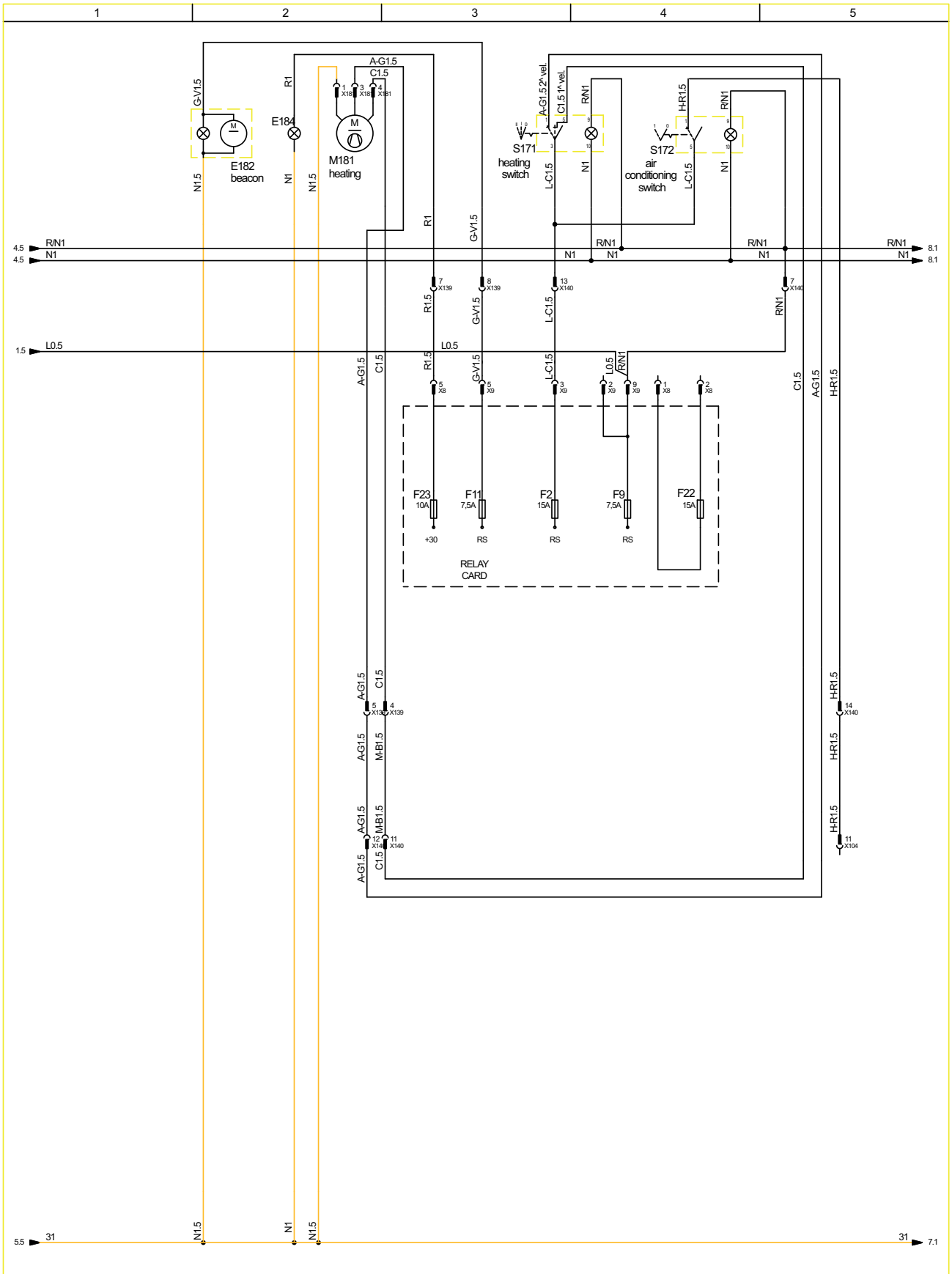
6.4.5 Sheet 5 of 13

from serial n. 18012



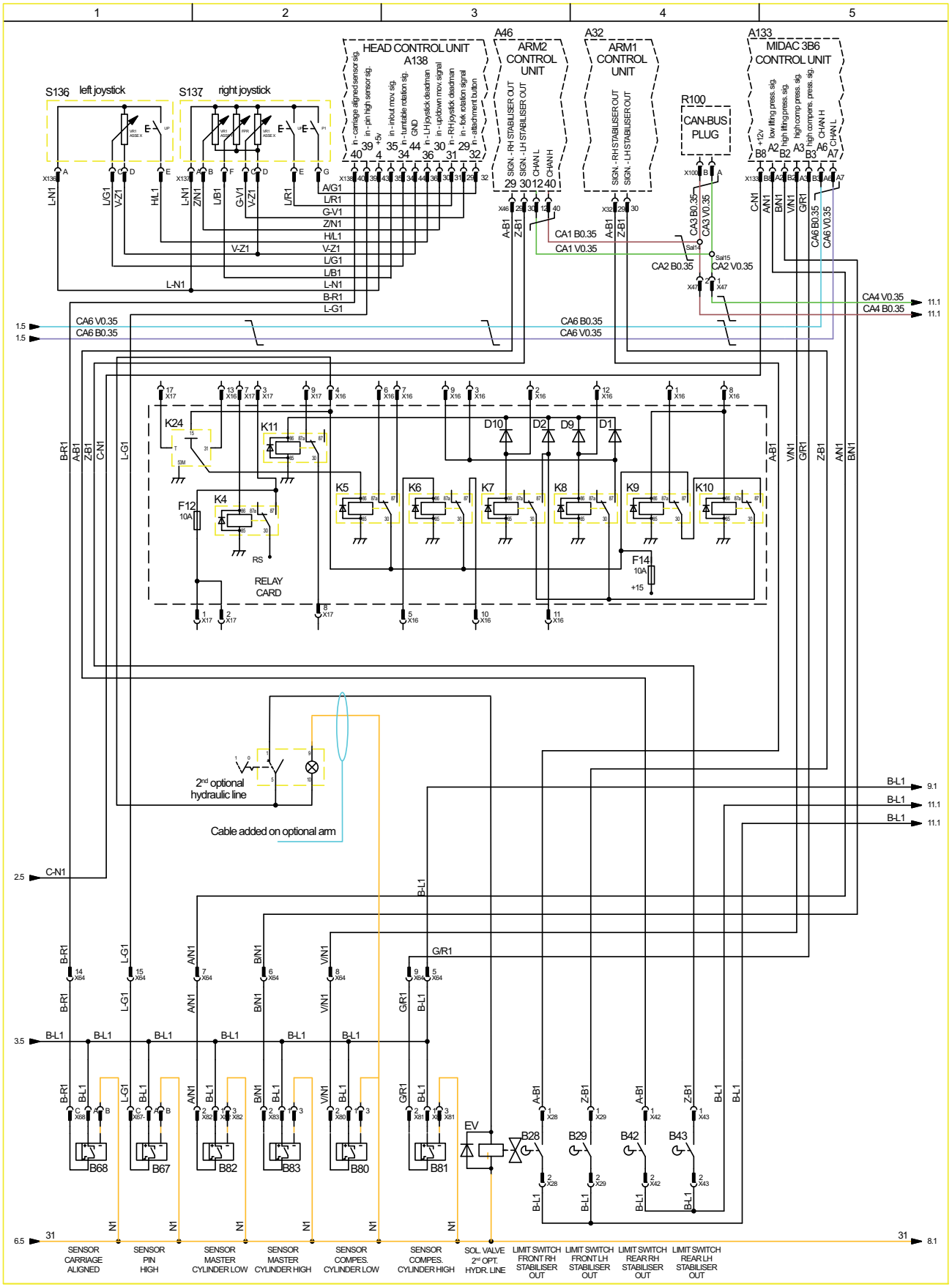
6.4.6 Sheet 6 of 13

from serial n. 18012



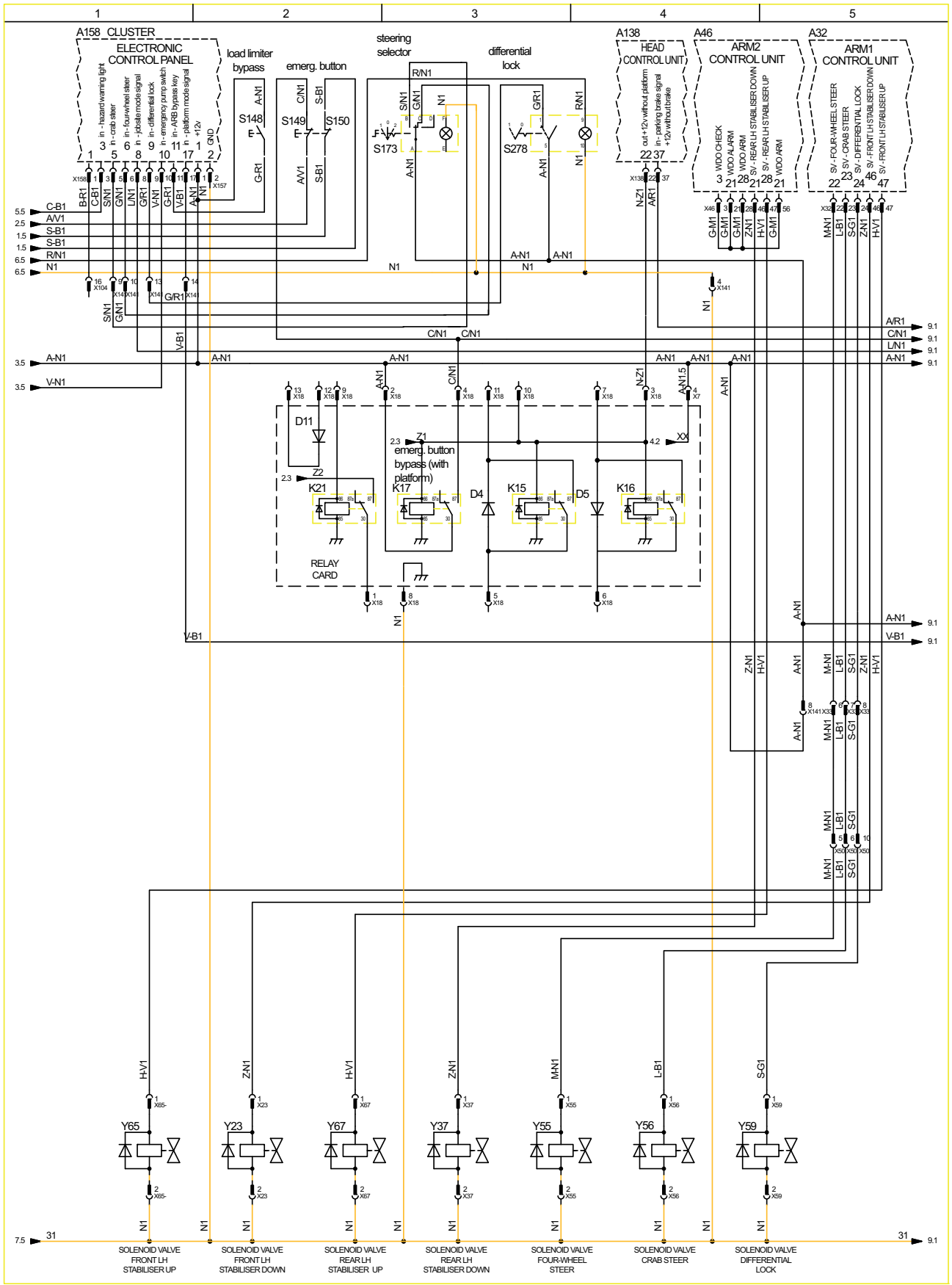
6.4.7 Sheet 7 of 13

from serial n. 18012



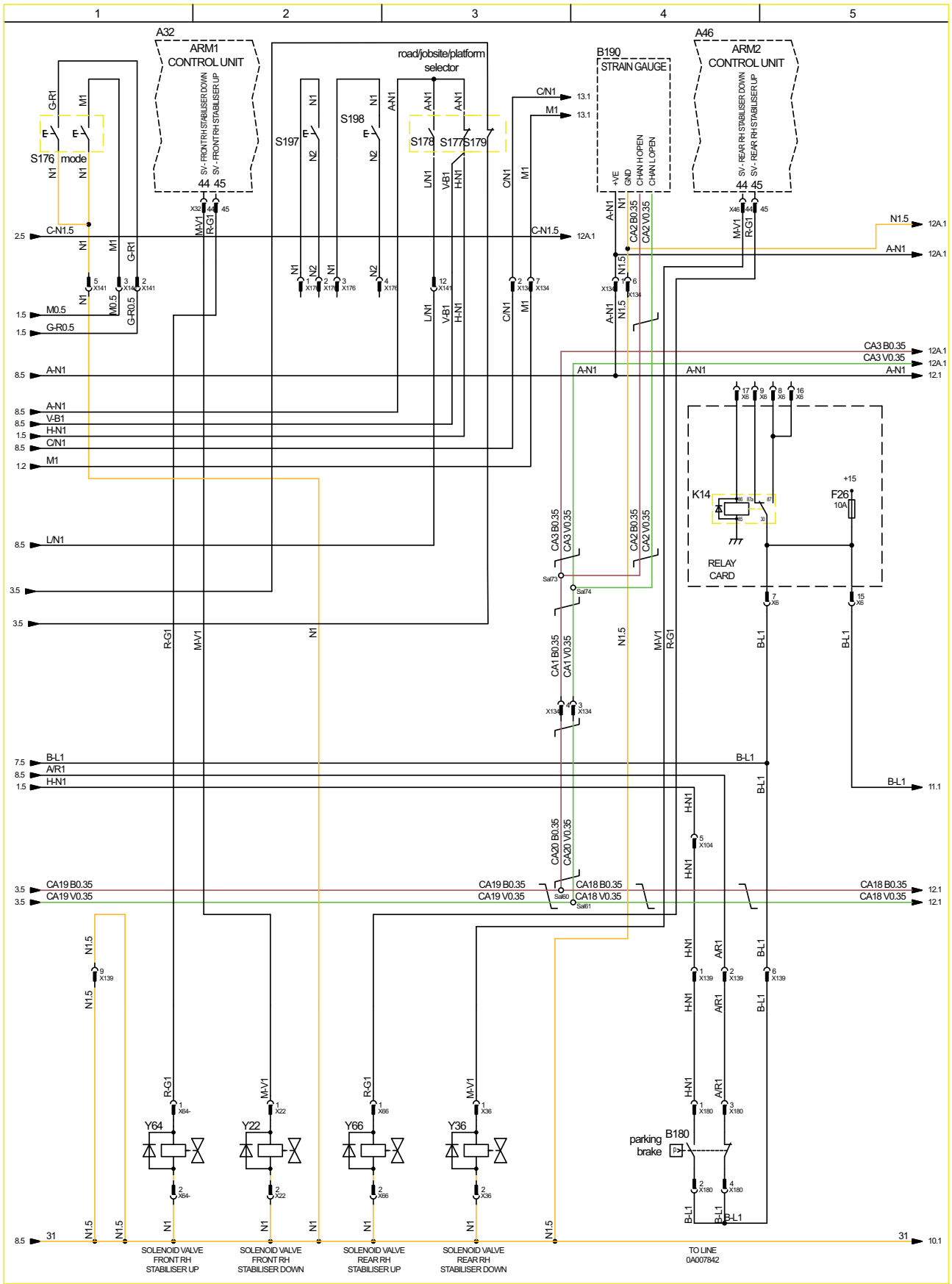
6.4.8 Sheet 8 of 13

from serial n. 18012



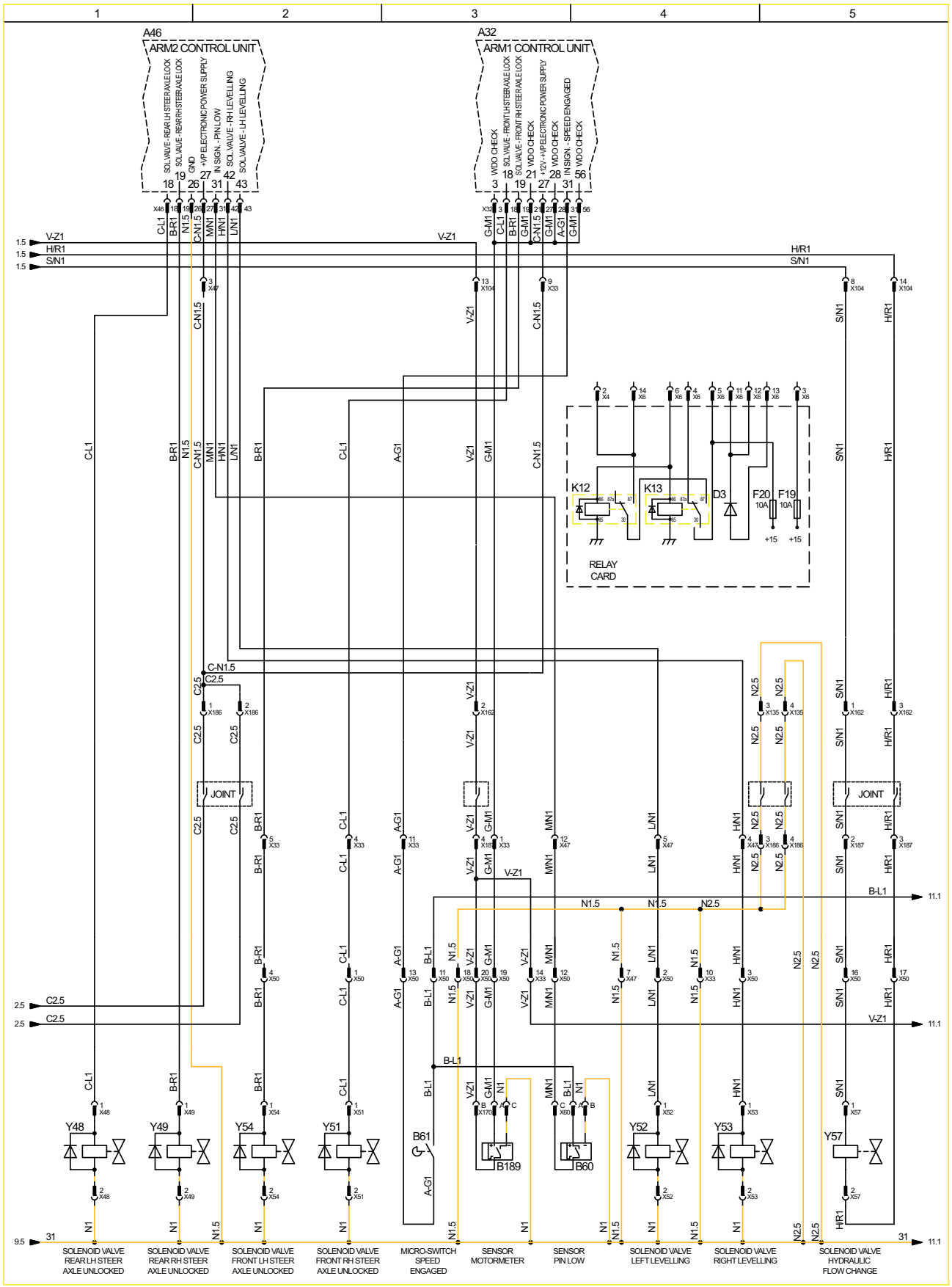
6.4.9 Sheet 9 of 13

from serial n. 18012



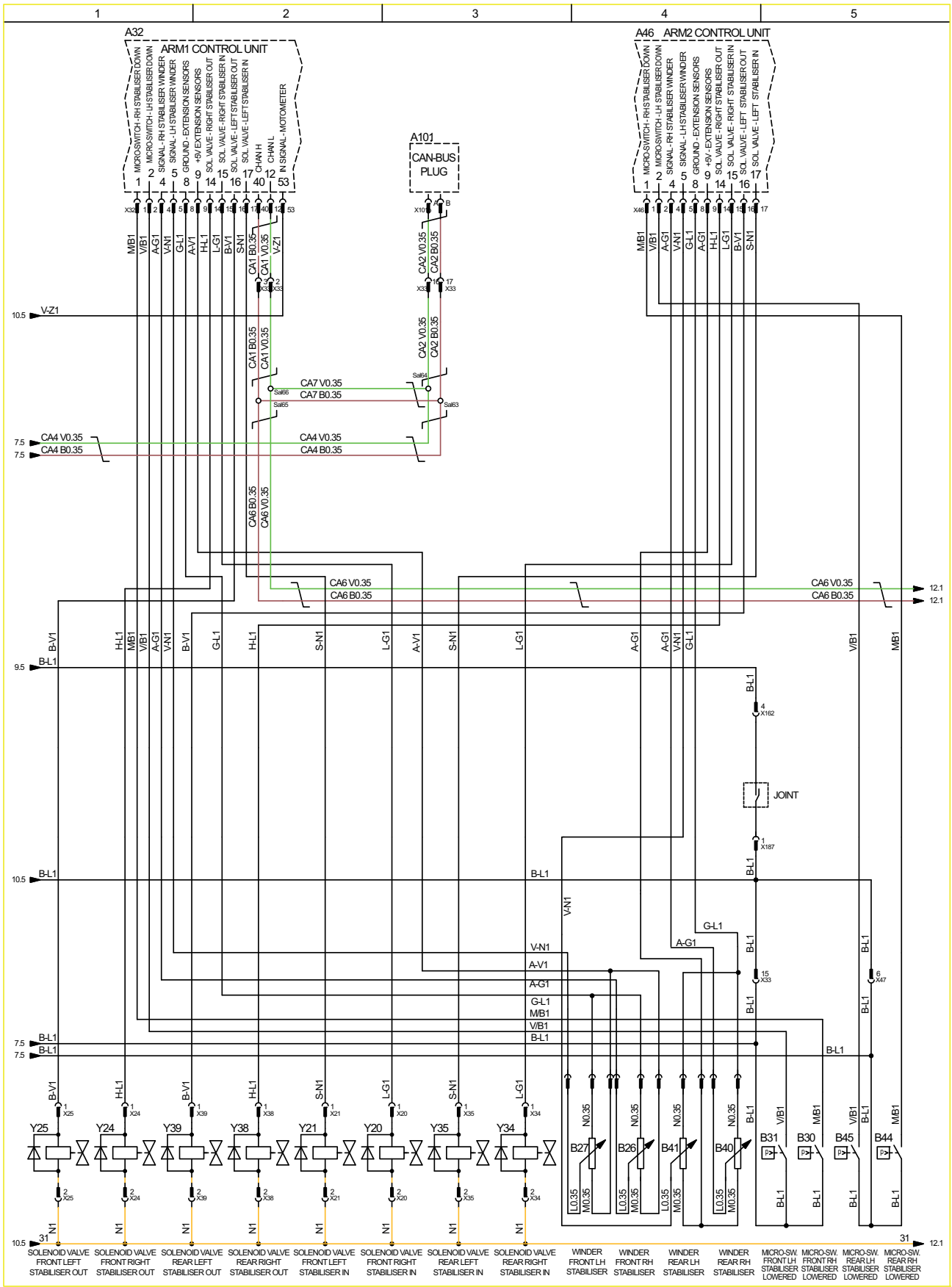
6.4.10 Sheet 10 of 13

from serial n. 18012



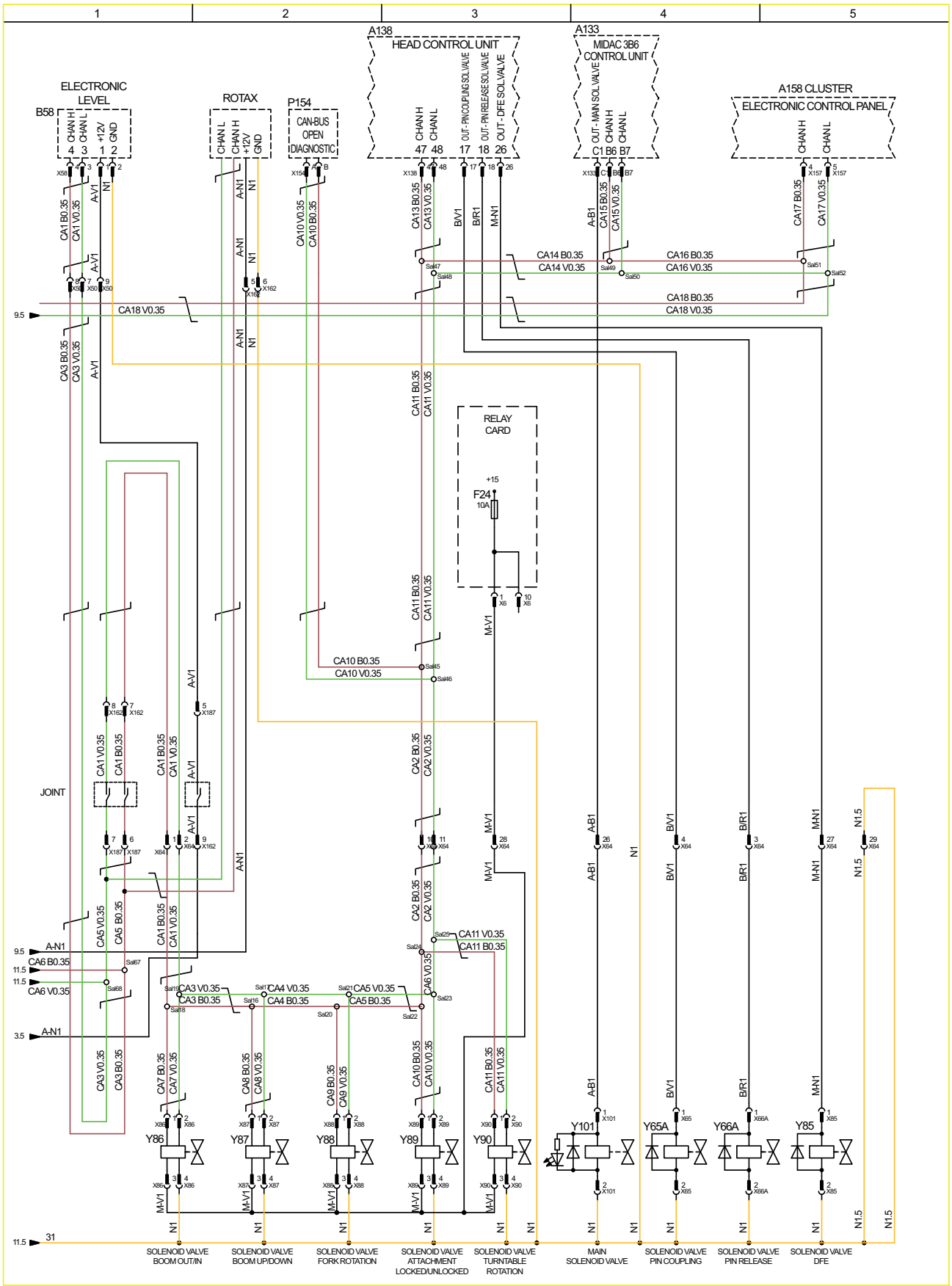
6.4.11 Sheet 11 of 13

from serial n. 18012

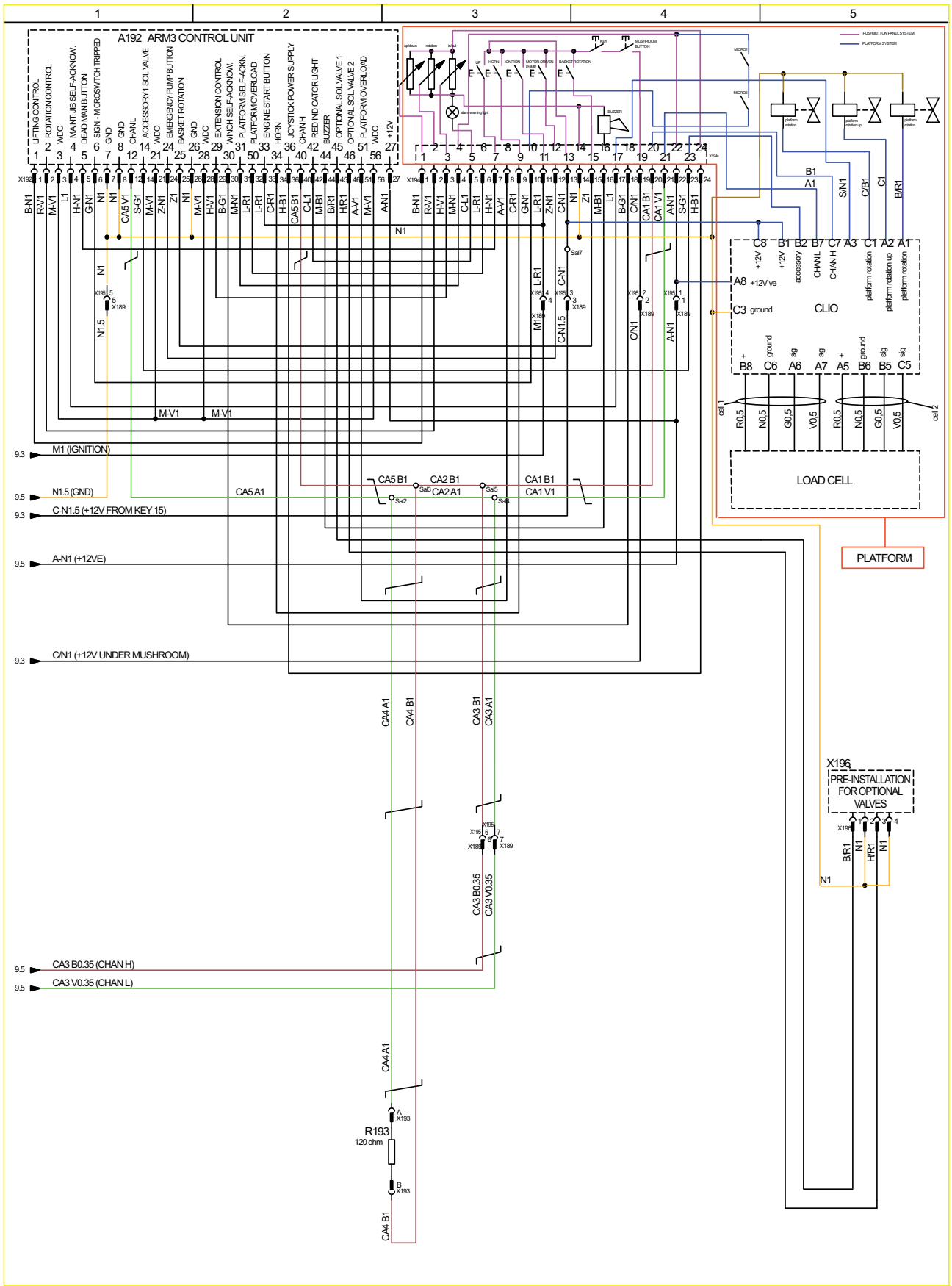


6.4.12 Sheet 12 of 13

from serial n. 18012

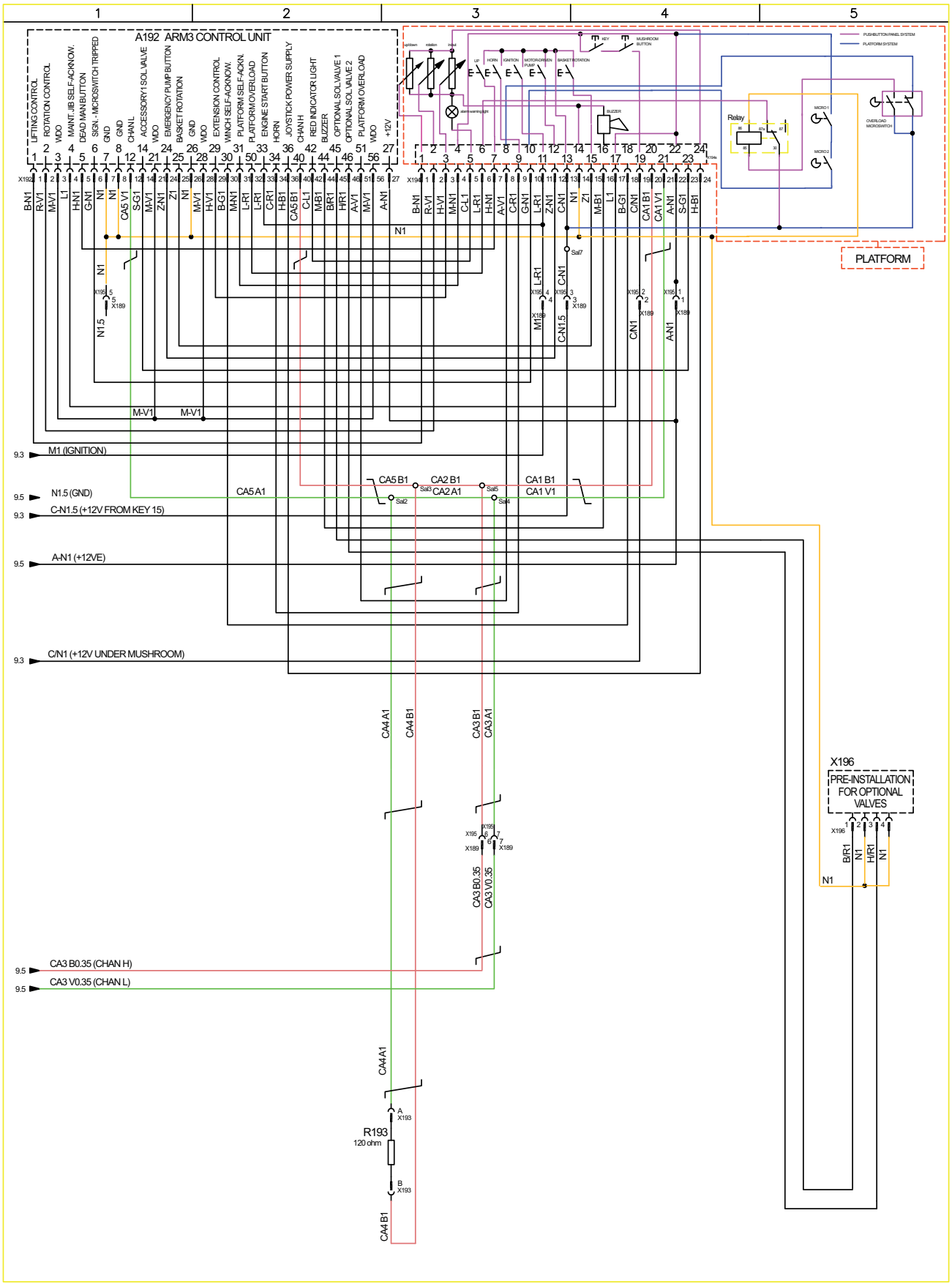


6.4.13 Sheet 13A of 13 (Valid for machines with 2P500-REM4400 and 2P300RNE platform) from serial n. 18012

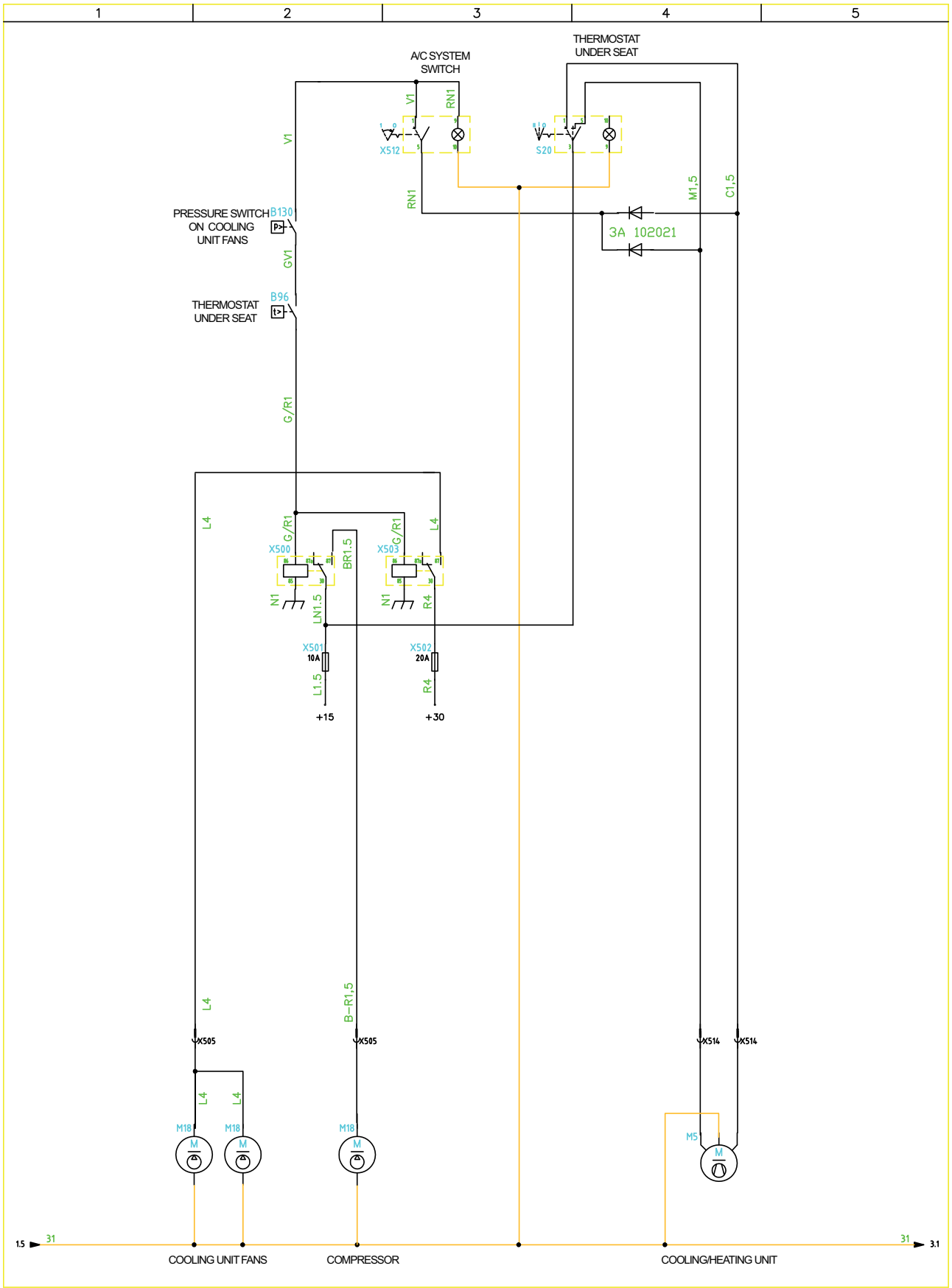


6.4.13 Sheet 13B of 13 (Valid for machines with 2P300F platform)

from serial n. 18012



6.4.14 A/C system optional sheet



6.4.15 Wiring diagram - Component description

REF.	DESCRIPTION	SHEET
A101	CAN BUS PLUG	11
A113	DEUTZ CONTROL UNIT	2
A117	DEUTZ CONTROL UNIT DIAGNOSTIC SYSTEM	2
A125	LINDE CONTROL UNIT DIAGNOSTIC SYSTEM	1
A126	LINDE CONTROL UNIT	1
A158	ELECTRONIC CONTROL PANEL	1
A162	CAN BUS LINE TERMINAL	1
A192	ARM3 CONTROL UNIT	12A
B26	FRONT RH STABILISER WINDER	11
B27	FRONT LH STABILISER WINDER	11
B28	LIMIT SWITCH - FRONT RH STABILISER OUT-MOVEMENT	7
B29	LIMIT SWITCH - FRONT LH STABILISER OUT-MOVEMENT	7
B30	PRESSURE SWITCH - FRONT RH STABILISER DOWN	11
B31	PRESSURE SWITCH - FRONT LH STABILISER DOWN	11
B40	REAR RH STABILISER WINDER	11
B41	REAR LH STABILISER WINDER	11
B42	LIMIT SWITCH - REAR RH STABILISER OUT-MOVEMENT	7
B43	LIMIT SWITCH - REAR LH STABILISER OUT-MOVEMENT	7
B44	PRESSURE SWITCH - REAR RH STABILISER LOWERED	11
B45	PRESSURE SWITCH - REAR LH STABILISER LOWERED	11
B58	ELECTRONIC LEVEL	12
B60	SENSOR - PIN LOW	10
B61	MICRO-SWITCH - SPEED ENGAGED	10
B67	SENSOR - PIN HIGH	7
B68	SENSOR- CARRIER ALIGNED	7
B69	FUEL FLOAT	4
B80	SENSOR - COMPENSATION CYLINDER	7
B81	SENSOR - COMPENSATION CYLINDER	7
B82	SENSOR - MASTER CYLINDER	7
B83	SENSOR - MASTER CYLINDER	7
B95	SENSOR - HYDRAULIC OIL FILTER RESTRICTION	1
B96	SENSOR - MAX HYDRAULIC OIL TEMP.	4
B120	WATER THERMISTOR	1
B121	HYDRAULIC OIL - THERMISTOR	1
B129	HORN	4
B130	PRESSURE SWITCH - BRAKE	4
B131	PRESSURE SWITCH - LOW ACCUMULATOR PRESSURE	3
B132	PRESSURE SWITCH - BRAKING PROPORTIONAL CONTROL	3
B161	GAS PEDAL	2
B161A	AIR FILTER	1
B180	TO LINE 0A007842	9
B189	MOTOMETER SENSOR	10
B190	STRAIN GAUGE	9
B192	SENSOR - HYDRAULIC OIL LEVEL	1
E84	REAR RIGHT LIGHT	4
E92	LICENCE PLATE LIGHT	4
E93	REAR LEFT LIGHT	4
E128	WORK LIGHT	4
E156	FRONT LEFT LIGHT	4
E182	BEACON	6
E183	REAR WORK LIGHT	4
E184	CAB LIGHTS	6
E190	FRONT RIGHT LIGHT	4
F1	FUSE 10A - FRONT WIPER CONTROL UNIT	5
F2	FUSE 15A - A/C & HEATING SYSTEM POWER UNIT	6
F3	FUSE 5A - STOP LIGHTS CONTROL UNIT	4
F4	FUSE 7.5A - REAR WIPER CONTROL UNIT	5
F5	FUSE 10A - FRONT WORK LIGHTS CONTROL UNIT	4
F6	FUSE 15A - LOW BEAM CONTROL UNIT	4
F7	FUSE 3A - REAR LH & FRONT LH POSITION LIGHTS CONTROL UNIT	4
F8	FUSE 3A - REAR RH & FRONT LH POSITION LIGHTS CONTROL UNIT	4
F9	FUSE 7.5A - WARNING LIGHTS POWER UNIT	6
F10	FUSE 7.5A - HAZARD WARNING LIGHTS AND LIGHT SELECTOR CONTROL UNIT	4
F11	FUSE 7.5A - BEACON CONTROL UNIT	6
F12	FUSE 10A - CONTROL UNIT	7
F13	FUSE 10A - REAR WORK LIGHTS CONTROL UNIT	4
F14	FUSE - CONTROL UNIT	7
F15	FUSE 10A - HIGH BEAM CONTROL UNIT	4
F16	FUSE 15A - ECO STR. WARNING CONTROL UNIT	5
F17	FUSE - POSITION LIGHTS CONTROL UNIT	4
F18	FUSE 10A - BACK-UP LAMP	2
F19	FUSE 10A - CONTROL UNIT	10
F20	FUSE 10A - CONTROL UNIT	10
F21	FUSE 15A - HORN CONTROL UNIT	4
F22	FUSE 15A - CONTROL UNIT	6
F23	FUSE 10A - CEILING LIGHTS CONTROL UNIT	6
F24	FUSE 10A - PROPORTIONAL SOLENOID VALVE CONTROL UNIT	12
F25	FUSE - CONTROL UNIT	4
F26	FUSE - SENSORS AND PARKING BRAKE MICRO-SWITCH POWER SUPPLY UNIT	9
F27	FUSE - 3B6 10A RELAYS CONTROL UNIT	4

REF.	DESCRIPTION	SHEET
F124	FUSE - COOLING FAN	1
F165	FUSE +VP	2
FG1	FUSE +30 - IGNITION BOARD	1
FG2	FUSE +30 - FACILITIES RELAY	1
FG3	FUSE +30 - IGNITION RELAY	1
FG4	FUSE - OPTIONAL	1
G1	BATTERY	1
G107	ALTERNATOR	1
H94	BACK-UP HORN	4
K1	RELAY - HIGH BEAM	4
K2	RELAY - LOW BEAM	4
K3	RELAY - HORN	4
K4	RELAY	7
K5	RELAY	7
K6	RELAY	7
K7	RELAY	7
K8	RELAY	7
K9	RELAY	7
K10	RELAY	7
K11	RELAY	7
K12	RELAY	10
K13	RELAY	10
K14	RELAY	9
K15	RELAY	8
K16	RELAY	8
K17	RELAY - PLATFORM EMERGENCY BYPASS	8
K18	RELAY - 3B6	4
K19	RELAY - IGNITION CONSENT	1
K20	RELAY	2
K21	RELAY	8
K22	CONTROL UNIT	2
K23	INTERMITTENCE	5
K24	CONTROL UNIT	7
K110	RELAY - IGNITION	1
K160	RELAY - OIL/WATER RADIATOR FAN	1
K163	RELAY - ELECTRONICS	2
K164	RELAY - POWER SUPPLY	2
K166	RELAY - EMERGENCY PUMP	2
K191	RELAY - BACK-UP LAMP AND HORN	2
M91	EMERGENCY PUMP	3
M106	STARTING MOTOR	1
M146	FRONT WINDSCREEN WIPER	5
M179	WINDSCREEN WASHER PUMP	5
M181	HEATING	6
M185	REAR WINDSCREEN WIPER	5
P145	ECO MULTIPURPOSE INSTRUMENT	1
P147	MOMENT LIMITER DISPLAY	3
P154	CAN-BUS OPEN DIAGNOSIS	12
P155	CAN-BUS J1939 DIAGNOSIS	2
R100	CAN-BUS LINE TERMINAL	7
R112	AUX CIRCUITS RELAY	1
R193	CAN OPEN LINE TERMINAL RESISTANCE	12A
S119	WATER IN FUEL SENSOR	2

REF.	DESCRIPTION	SHEET
S136	LEFT JOYSTICK	7
S137	RIGHT JOYSTICK	7
S142	START-UP PANEL	1
S143	DRIVE SWITCH	2
S144	LIGHT SWITCH	5
S148	MOMENT LIMITER DISCONNECT KEY	8
S149	ENGINE STOP	8
S167	WARNING SWITCH	5
S168	FOG LAMP SWITCH	4
S169	POSITION LIGHTS SWITCH	4
S170	SWITCH - FRONT WORK LIGHTS	4
S171	HEATING SWITCH	6
S172	AIR CONDITIONING SWITCH	6
S173	STEERING SELECTOR	8
S174	SWITCH - REAR WORK LIGHTS	4
S175	EMERGENCY PUMP SWITCH	3
S176	MODE PUSHBUTTONS	9
S192	MANUAL ACCELERATOR	2
S197	MODE 1 PUSHBUTTON	9
S199	MODE 1 PUSHBUTTON	9
S278	SWITCH - DIFFERENTIAL LOCKING	8
SB1	BATTERY CUTOFF	1
X4	9-WAY MARK CONNECTOR	10
X5	11-WAY MARK CONNECTOR	4
X6	17-WAY MARK CONNECTOR	12
X7	13-WAY MARK CONNECTOR	8
X8	5-WAY MARK CONNECTOR	6
X9	13-WAY MARK CONNECTOR	6
X16	13-WAY MARK CONNECTOR	7
X17	17-WAY MARK CONNECTOR	7
X18	13-WAY MARK CONNECTOR	8
X20	2-WAY DEUTSCH CONNECTOR	11
X21	2-WAY DEUTSCH CONNECTOR	11
X22	2-WAY DEUTSCH CONNECTOR	9
X23	2-WAY DEUTSCH CONNECTOR	8
X24	2-WAY DEUTSCH CONNECTOR	11
X25	2-WAY DEUTSCH CONNECTOR	11
X28	2-WAY DEUTSCH CONNECTOR	7
X29	2-WAY DEUTSCH CONNECTOR	7
X32	68-WAY CONNECTOR	11
X33	24-WAY DEUTSCH CONNECTOR	11
X34	2-WAY DEUTSCH CONNECTOR	11
X35	2-WAY DEUTSCH CONNECTOR	11
X36	2-WAY DEUTSCH CONNECTOR	9
X37	2-WAY DEUTSCH CONNECTOR	8
X38	2-WAY DEUTSCH CONNECTOR	11
X39	2-WAY DEUTSCH CONNECTOR	11
X42	2-WAY DEUTSCH CONNECTOR	7
X43	2-WAY DEUTSCH CONNECTOR	7
X46	68-WAY CONNECTOR	11
X47	12-WAY DEUTSCH CONNECTOR	11
X48	2-WAY DEUTSCH CONNECTOR	10
X49	2-WAY DEUTSCH CONNECTOR	10
X50	24-WAY DEUTSCH CONNECTOR	12

REF.	DESCRIPTION	SHEET
X51	2-WAY DEUTSCH CONNECTOR	10
X52	2-WAY DEUTSCH CONNECTOR	10
X53	2-WAY DEUTSCH CONNECTOR	10
X54	2-WAY DEUTSCH CONNECTOR	10
X55	2-WAY DEUTSCH CONNECTOR	8
X56	2-WAY DEUTSCH CONNECTOR	8
X57	2-WAY DEUTSCH CONNECTOR	10
X58	4-WAY CONNECTOR	12
X59	2-WAY DEUTSCH CONNECTOR	8
X60	3-WAY DEUTSCH CONNECTOR	10
X62	2-WAY DEUTSCH CONNECTOR	3
X63	2-WAY DEUTSCH CONNECTOR	3
X64	40-WAY DEUTSCH CONNECTOR - TYPE B	12
X64-	2-WAY DEUTSCH CONNECTOR	9
X65	2-WAY DEUTSCH CONNECTOR	12
X65-	2-WAY DEUTSCH CONNECTOR	8
X66	2-WAY DEUTSCH CONNECTOR	9
X66A	2-WAY DEUTSCH CONNECTOR	12
X67	2-WAY DEUTSCH CONNECTOR	8
X67-	3-WAY DEUTSCH CONNECTOR	7
X68	3-WAY DEUTSCH CONNECTOR	7
X80	3-WAY CONNECTOR	7
X81	3-WAY CONNECTOR	7
X82	3-WAY CONNECTOR	7
X83	3-WAY CONNECTOR	7
X84	7-WAY MARK CONNECTOR	4
X85	2-WAY DEUTSCH CONNECTOR	12
X86	4-WAY DEUTSCH CONNECTOR	12
X87	4-WAY DEUTSCH CONNECTOR	12
X88	4-WAY DEUTSCH CONNECTOR	12
X89	4-WAY DEUTSCH CONNECTOR	12
X90	4-WAY DEUTSCH CONNECTOR	12
X92	2-WAY DEUTSCH CONNECTOR	4
X93	7-WAY MARK CONNECTOR	4
X100	3-WAY DEUTSCH CONNECTOR	7
X101	2-WAY DEUTSCH CONNECTOR	12
X101p	3-WAY DEUTSCH CONNECTOR	11
X104	24-WAY DEUTSCH CONNECTOR	10
X105	3-WAY DEUTSCH CONNECTOR	1
X113	31-WAY DEUTSCH CONNECTOR	2
X115	2-WAY DEUTSCH CONNECTOR	3
X116	2-WAY DEUTSCH CONNECTOR	3
X117	12-WAY MIC 70 CONNECTOR	2
X118	6-WAY DEUTSCH CONNECTOR	4
X119	3-WAY CONNECTOR	2
X123	2-WAY DEUTSCH CONNECTOR	3
X125	4-WAY CONNECTOR	1
X126	52-WAY MT2/JPT CONNECTOR	1
X127	17-WAY MARK CONNECTOR	5
X133	24-WAY FCI SICMA-2 FEMALE CONNECTOR	12
X134	24-WAY DEUTSCH CONNECTOR	9
X135	4-WAY DEUTSCH CONNECTOR	10

REF.	DESCRIPTION	SHEET
X136	21-WAY DEUTSCH CONNECTOR	7
X137	21-WAY DEUTSCH CONNECTOR	7
X138	68-WAY CONNECTOR	12
X139	17-WAY MARK CONNECTOR	9
X140	17-WAY MARK CONNECTOR	6
X141	21-WAY MARK CONNECTOR	9
X143	5-WAY MARK CONNECTOR	2
X144	13-WAY MARK CONNECTOR	5
X145	37-WAY TYCO CONNECTOR	1
X146	6-WAY CONNECTOR	5
X147	6-WAY CONNECTOR	3
X154	3-WAY DEUTSCH CONNECTOR	12
X155	3-WAY DEUTSCH CONNECTOR	2
X156	6-WAY DEUTSCH CONNECTOR	4
X157	6-WAY CONNECTOR	12
X158	18-WAY MIC 70 CONNECTOR	1
X161	6-WAY CONNECTOR	2
X162	12-WAY DEUTSCH CONNECTOR	12
X170	3-WAY DEUTSCH CONNECTOR	10
X176	5-WAY MARK CONNECTOR	9
X179	2-WAY CONNECTOR	5
X180	5-WAY MARK CONNECTOR	9
X181	4-WAY CONNECTOR	6
X185	2-WAY CONNECTOR	5
X186	4-WAY CONNECTOR	10
X187	12-WAY DEUTSCH CONNECTOR	12
X189	8-WAY DEUTSCH CONNECTOR	12A
X190	6-WAY DEUTSCH CONNECTOR	4
X192	3-WAY DEUTSCH CONNECTOR	2
X192.	68-WAY CONNECTOR	12A
X193	3-WAY DEUTSCH CONNECTOR	12A
X194	24-WAY DEUTSCH CONNECTOR	12A
X194S	PLATFORM POWER SOCKET	12A
X195	8-WAY DEUTSCH CONNECTOR	12A
X196	ARRANGEMENT FOR OPTIONAL VALVES	12A
X196	4-WAY DEUTSCH CONNECTOR	12A
Y20	SOLENOID VALVE - FRONT RIGHT OUTRIGGER IN	11
Y21	SOLENOID VALVE - FRONT LEFT OUTRIGGER IN	11
Y22	SOLENOID VALVE - FRONT RIGHT OUTRIGGER DOWN	9
Y23	SOLENOID VALVE - FRONT LEFT OUTRIGGER DOWN	8
Y24	SOLENOID VALVE - FRONT RIGHT OUTRIGGER OUT	11
Y25	SOLENOID VALVE - FRONT LEFT OUTRIGGER OUT	11
Y34	SOLENOID VALVE - REAR RIGHT OUTRIGGER IN	11
Y35	SOLENOID VALVE - REAR LEFT OUTRIGGER IN	11
Y36	SOLENOID VALVE - REAR RIGHT OUTRIGGER DOWN	9

REF.	DESCRIPTION	SHEET
Y37	SOLENOID VALVE - REAR LEFT OUTRIGGER DOWN	8
Y38	SOLENOID VALVE - REAR RIGHT STABILISER OUT	11
Y39	SOLENOID VALVE - REAR LEFT STABILISER OUT	11
Y48	SOLENOID VALVE - REAR LEFT STEERING AXLE UNLOCKED	10
Y49	SOLENOID VALVE - REAR RIGHT STEERING AXLE UNLOCKED	10
Y51	SOLENOID VALVE - FRONT RIGHT STEERING AXLE UNLOCKED	10
Y52	SOLENOID VALVE - LEFT LEVELLING	10
Y53	SOLENOID VALVE - RIGHT LEVELLING	10
Y54	SOLENOID VALVE - FRONT LEFT STEERING AXLE UNLOCKED	10
Y55	SOLENOID VALVE - FOUR-WHEEL STEER	8
Y56	SOLENOID VALVE - CRAB STEER	8
Y57	SOLENOID VALVE - HYDRAULIC FLOW CHANGE	10
Y59	SOLENOID VALVE - DIFFERENTIAL LOCKING	8
Y62	SOLENOID VALVE - 1st SPEED	3
Y63	SOLENOID VALVE - 2nd SPEED	3
Y64	SOLENOID VALVE - FRONT RIGHT STABILISER UP	9
Y65	SOLENOID VALVE - FRONT LEFT STABILISER UP	8
Y65A	SOLENOID VALVE - PIN LOCKING	12
Y66	SOLENOID VALVE - REAR RIGHT STABILISER UP	9
Y66A	SOLENOID VALVE - PIN UNLOCKING	12
Y67	SOLENOID VALVE - REAR LEFT STABILISER UP	8
Y85	SOLENOID VALVE - DFE	12
Y86	SOLENOID VALVE - BOOM OUT/IN	12
Y87	SOLENOID VALVE - BOOM UP/DOWN	12
Y88	SOLENOID VALVE - FORK ROTATION	12
Y89	SOLENOID VALVE - ATTACHMENT LOCKED/UNLOCKED	12
Y90	SOLENOID VALVE - TURNTABLE ROTATION	12
Y101	MAIN SOLENOID VALVE	12
Y115	SOLENOID VALVE - REVERSE SPEED	3
Y116	SOLENOID VALVE - FORWARD SPEED	3
Y122	SOLENOID VALVE - COOLING FAN	1
Y123	SOLENOID VALVE - 3-VALVE PUMP	3

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

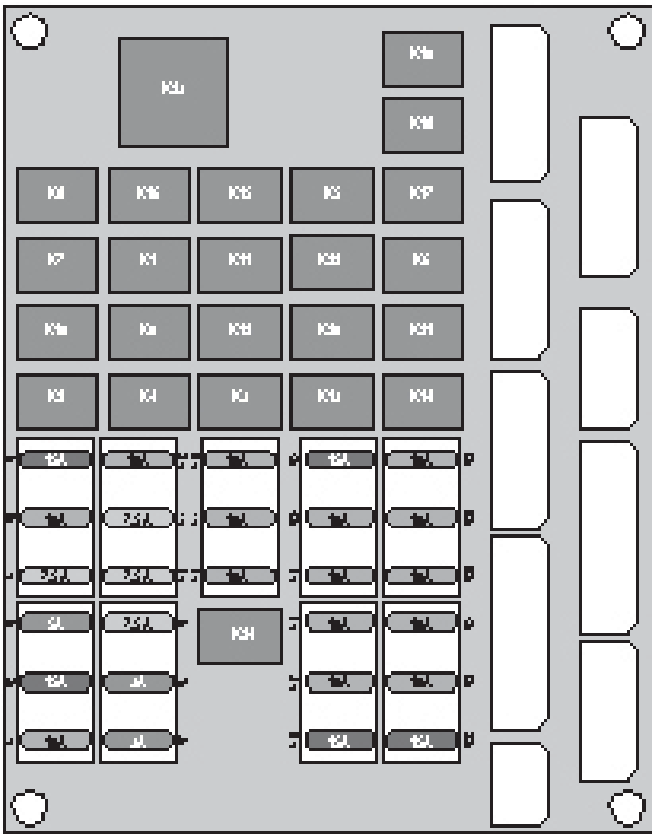
REMARK: Two-colour wires are indicated through a combination of the aforesaid initials as follows:

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

6.4.16 Fuses and relays

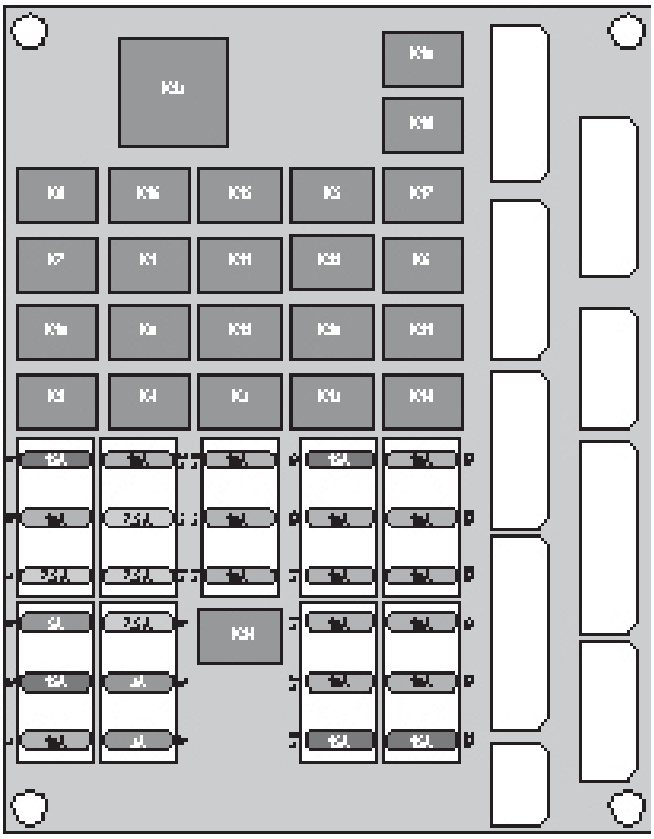
FUSES

Ref.	Circuit	Amp.
F1	FUSE - FRONT WIPER POWER UNIT	10
F2	FUSE - HEATING & A/C SYSTEM POWER SUPPLY CONTROL UNIT	15
F3	FUSE - STOP LIGHTS CONTROL UNIT	5
F4	FUSE - REAR WIPER CONTROL UNIT	7,5
F5	FUSE - FRONT WORK LIGHT SWITCH CONTROL UNIT	10
F6	FUSE - LOW BEAM CONTROL UNIT	15
F7	FUSE - REAR LH AND FRONT RH POSITION LIGHT CONTROL UNIT	3
F8	FUSE - REAR RH AND FRONT LH POSITION LIGHT CONTROL UNIT	3
F9	FUSE - INDICATOR LIGHT POWER SUPPLY CONTROL UNIT	7,5
F10	FUSE - HAZARD WARNING LIGHT AND LIGHT SELECTOR CONTROL UNIT	7,5
F11	FUSE - BEACON CONTROL UNIT	7,5
F12	FUSE - CONTROL UNIT	10
F13	FUSE - REAR WORK LIGHT SWITCH CONTROL UNIT	10
F14	FUSE - CONTROL UNIT	10
F15	FUSE - HIGH BEAM CONTROL UNIT	10
F16	FUSE - ECO STR. WARNING CONTROL UNIT	15
F17	FUSE - POSITION LIGHTS CONTROL UNIT	10
F18	FUSE - BACK-UP LAMP	10
F19	FUSE - CONTROL UNIT	10
F20	FUSE - CONTROL UNIT	10
F21	FUSE - HORN CONTROL UNIT	15
F22	FUSE - CONTROL UNIT	15
F23	FUSE - CEILING LIGHT CONTROL UNIT	10
F24	FUSE - PROPORTIONAL SOLENOID VALVE CONTROL UNIT	10
F25	FUSE - CONTROL UNIT	10
F26	FUSE - PARKING BRAKE SENSOR AND MICRO-SWITCH POWER SUPPLY CONTROL UNIT	10
F27	FUSE - 3B6 RELAY CONTROL UNIT	10



RELAIS

Ref.	Circuit
K1	RELAY - HIGH BEAM
K2	RELAY - LOW BEAM
K3	RELAY - HORN
K4	RELAY - OPTIONAL
K5	RELAY - OPTIONAL
K6	RELAY - OPTIONAL
K7	RELAY - OPTIONAL
K8	RELAY - OPTIONAL
K9	RELAY - OPTIONAL
K10	RELAY - OPTIONAL
K11	RELAY - OPTIONAL
K12	RELAY - OPTIONAL
K13	RELAY - OPTIONAL
K14	RELAY - OPTIONAL
K15	RELAY - OPTIONAL
K16	RELAY - OPTIONAL
K17	RELAY - PLATFORM EMERGENCY BYPASS
K18	RELAY - 3B6
K19	RELAY - IGNITION CONSENT
K20	RELAY - OPTIONAL
K21	RELAY - OPTIONAL
K22	CONTROL UNIT
K23	INTERMITTENCE
K24	CONTROL UNIT



6.4.17 Other fuses in the cab

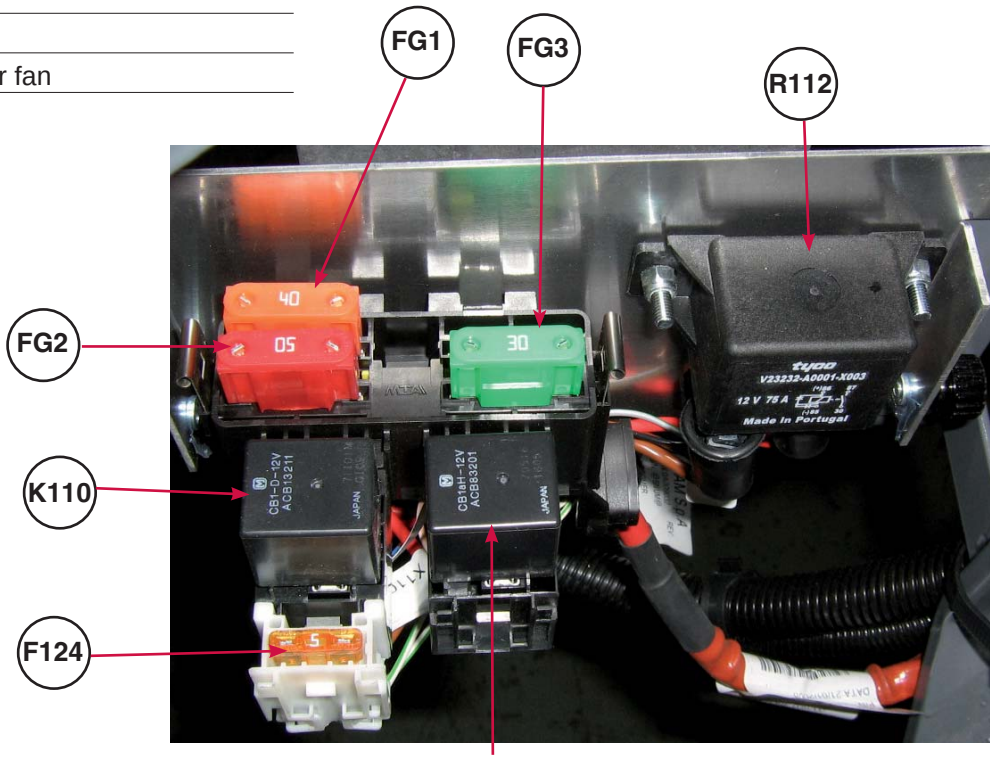
On the right of the main fuse board, the following fuses and relays are installed:

Ref.	Circuit	Amp.
F124	Fuse - cooling fan	5
F165	Fuse +VP	15
K163	RELAY - electronics	
K164	RELAY - power supply	
K166	RELAY - emergency pump	
K191	RELAY - back-up lamp and horn	

6.4.18 Fuses and relays in the engine compartment

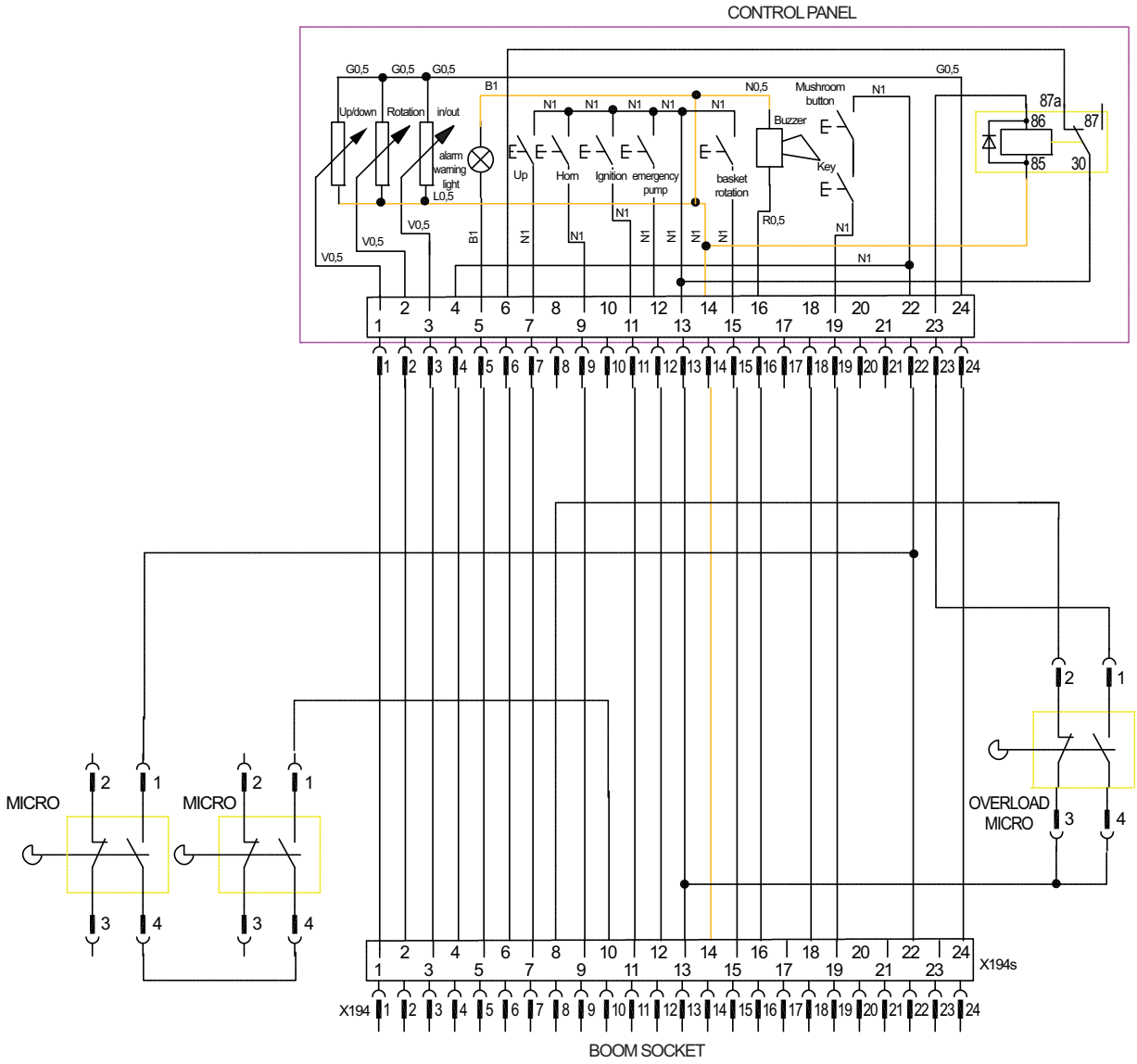
The following fuses and relays are installed in the engine compartment:

Ref.	Circuit	Amp.
FG1	Fuse +30 - ignition board	40
FG2	Fuse +30 - aux circuit relay	50
FG3	Fuse +30 - ignition relay	30
FG4	Fuse - optional	
F124	Fuse - hydraulic oil thermistor	5
R112	Aux circuit relay	
K110	Relay - ignition	
K160	Relay - oil/water radiator fan	

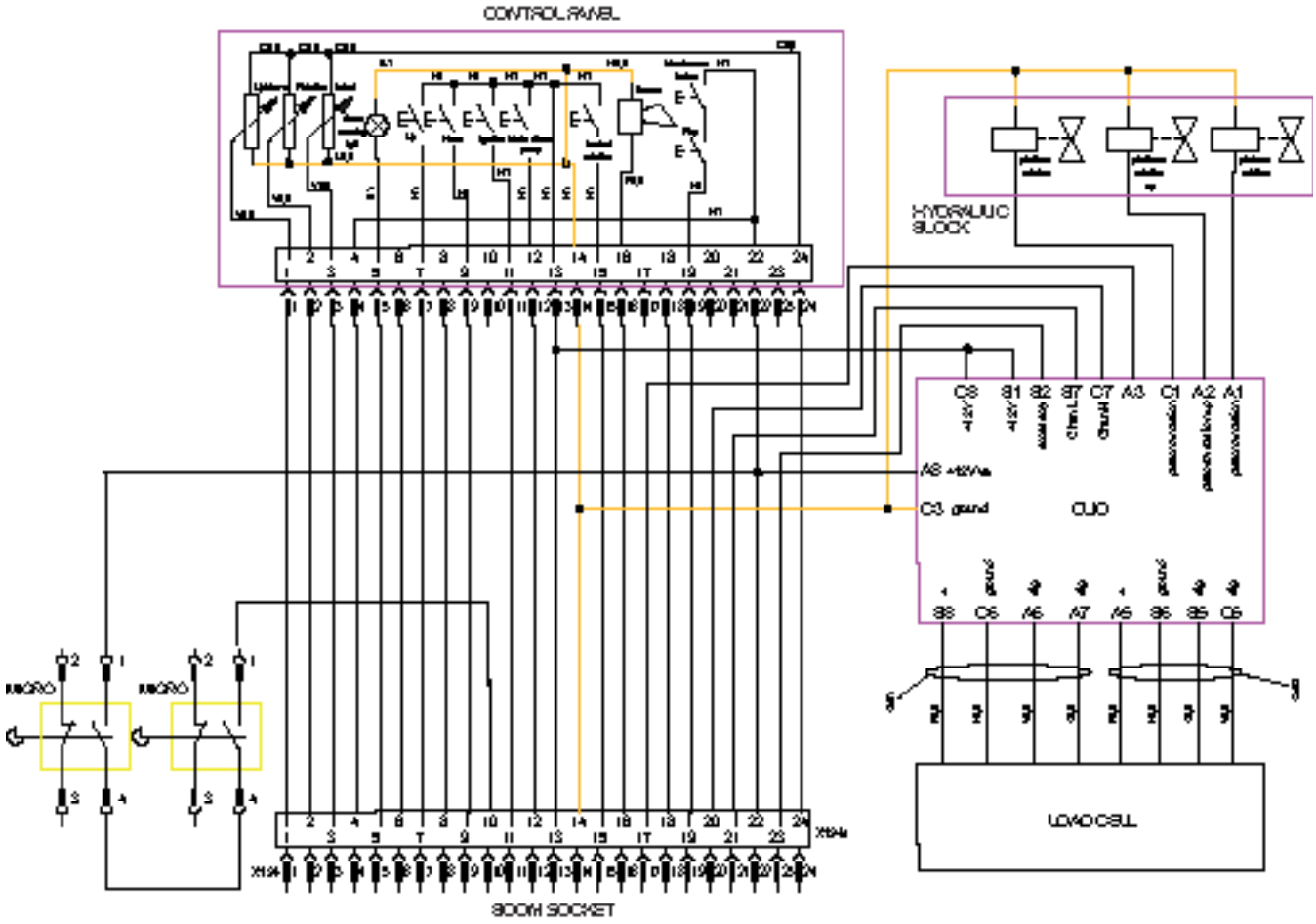


6.4.19 Wiring diagrams - man-platforms

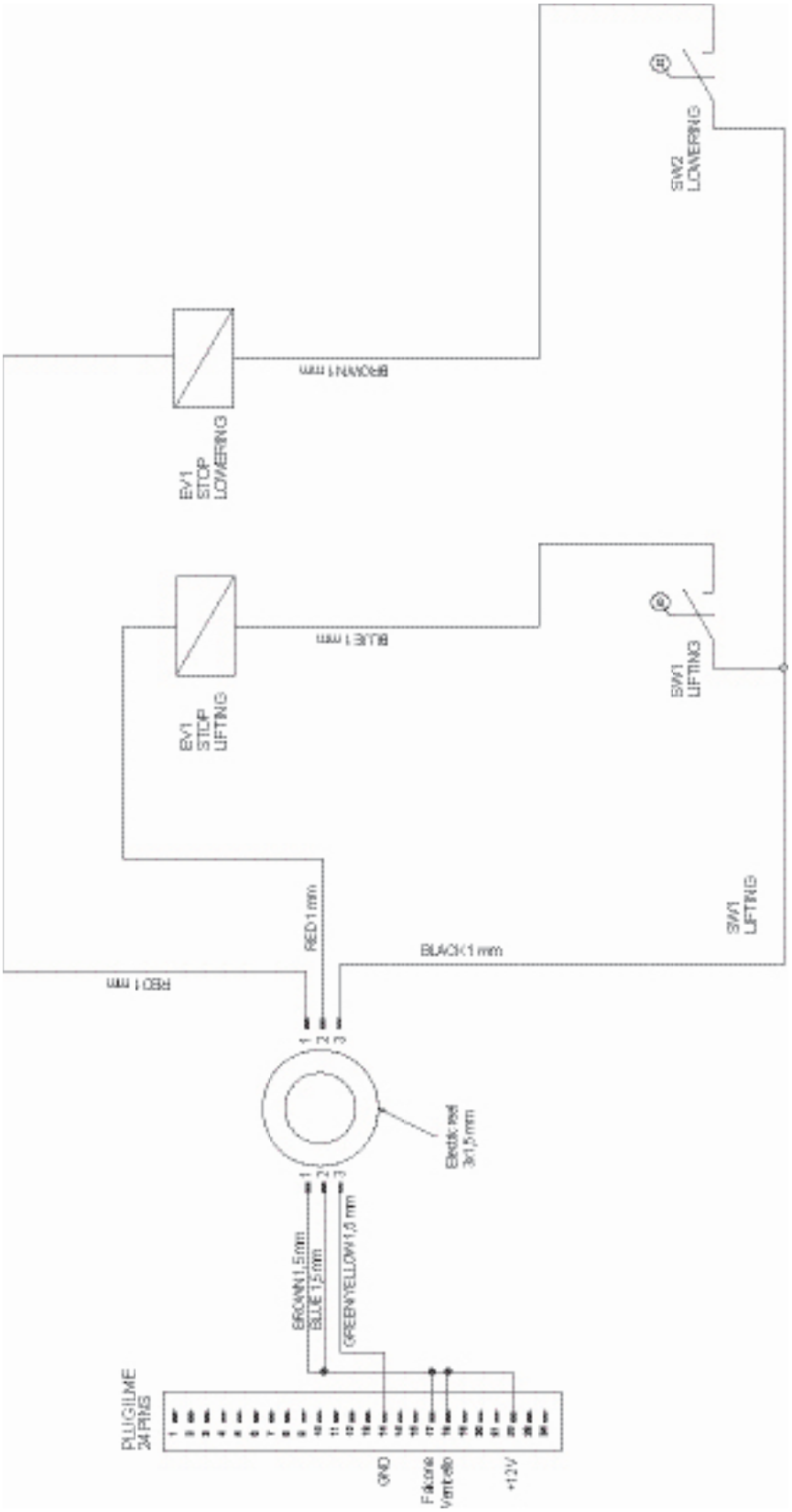
Model 2P300F



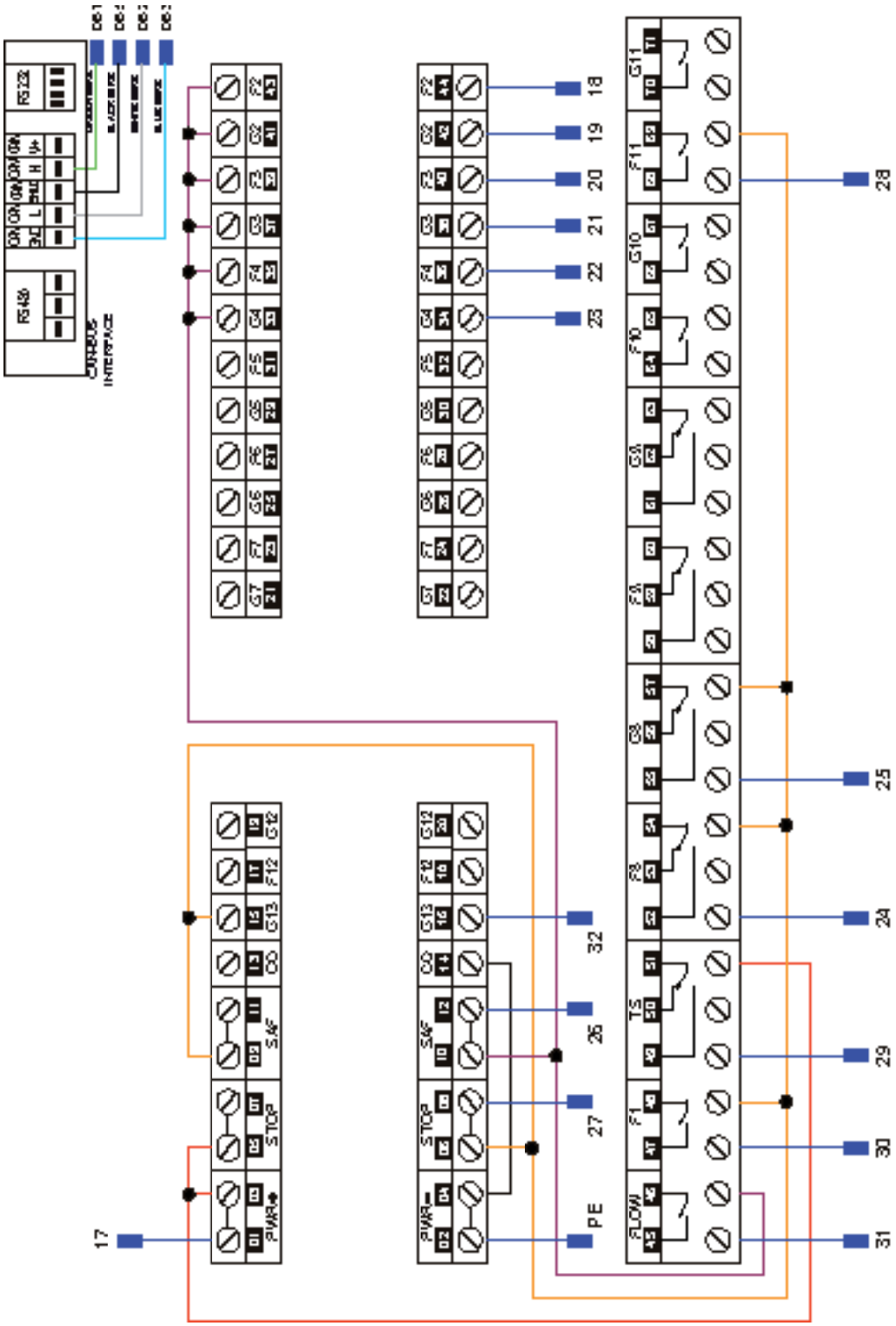
Models 2P500-REM4400 / 2P300RNE

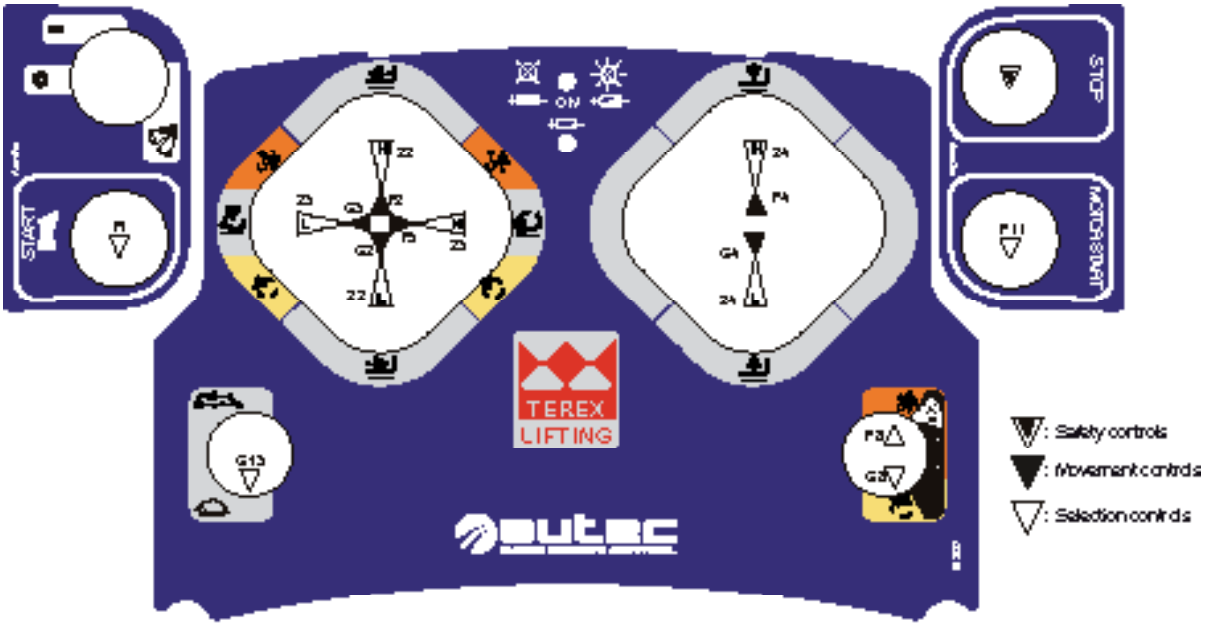


6.4.20 Wiring diagram - jibs and winches



6.4.21 Remote control wiring diagram





RADIO REMOTE CONTROL		PLUG	MOVEMENT	NOTE
DESCRIPTION	PIN	PIN	DESCRIPTION	MEASUREMENT & SETTING
PWR+	1	17	BATT (+)	Power supply (+): +8/30Vdc
F2	44	18		Out +12Vdc
G2	42	19		Out +12Vdc
F3	40	20		Out +12Vdc
G3	38	21		Out +12Vdc
F4	36	22		Out +12Vdc
G4	34	23		Out +12Vdc
F8	52	24		Out +12Vdc
G8	55	25		Out +12Vdc
SAFETY	12	26	SAFETY	Out +12Vdc
STOP	8	27	STOP	Out +12Vdc
F11	68	28	MOTOR START	Out +12Vdc
T.S.	49	29	MOTOR STOP (N.C)	Out +12Vdc
F1	47	30	START	Out +12Vdc
FLOW	45	31	FLOW	Out +12Vdc
G13	16	32		Out +12Vdc
PWR-	2	PE	BATT (-)	Power Supply (-): 0Vdc
RADIO REMOTE CONTROL		PLUG DB9	CAN-BUS	NOTE
DESCRIPTION	PIN	PIN	DESCRIPTION	MEASUREMENT & SETTING
		1	–	
	WHITE	2	CAN-L	Can L Signal
	BLUE	3	CAN_GND	Can Ground
		4	–	
	BLACK	5	CAN_SHLD	Can Cable Shield
		6	GND	
	GREEN	7	CAN_H	Can HSignal
		8	–	
		9	CAN_V+	

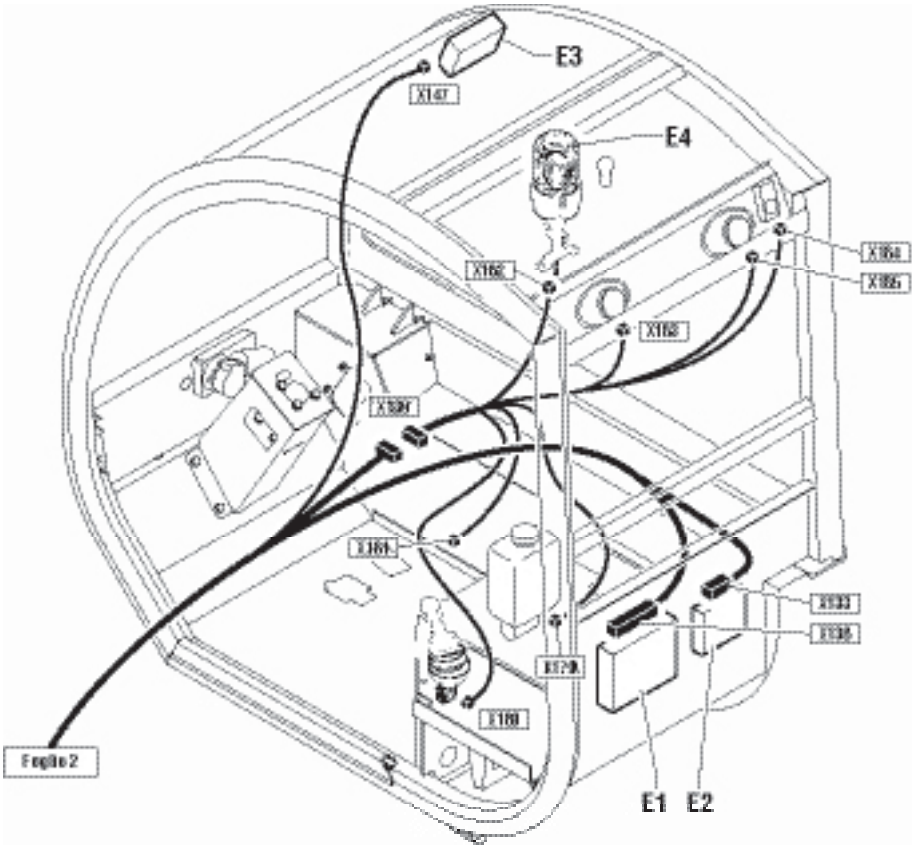
6.5 POSITION OF THE ELECTRIC AND HYDRAULICAL COMPONENTS ON THE MACHINE

CAUTION

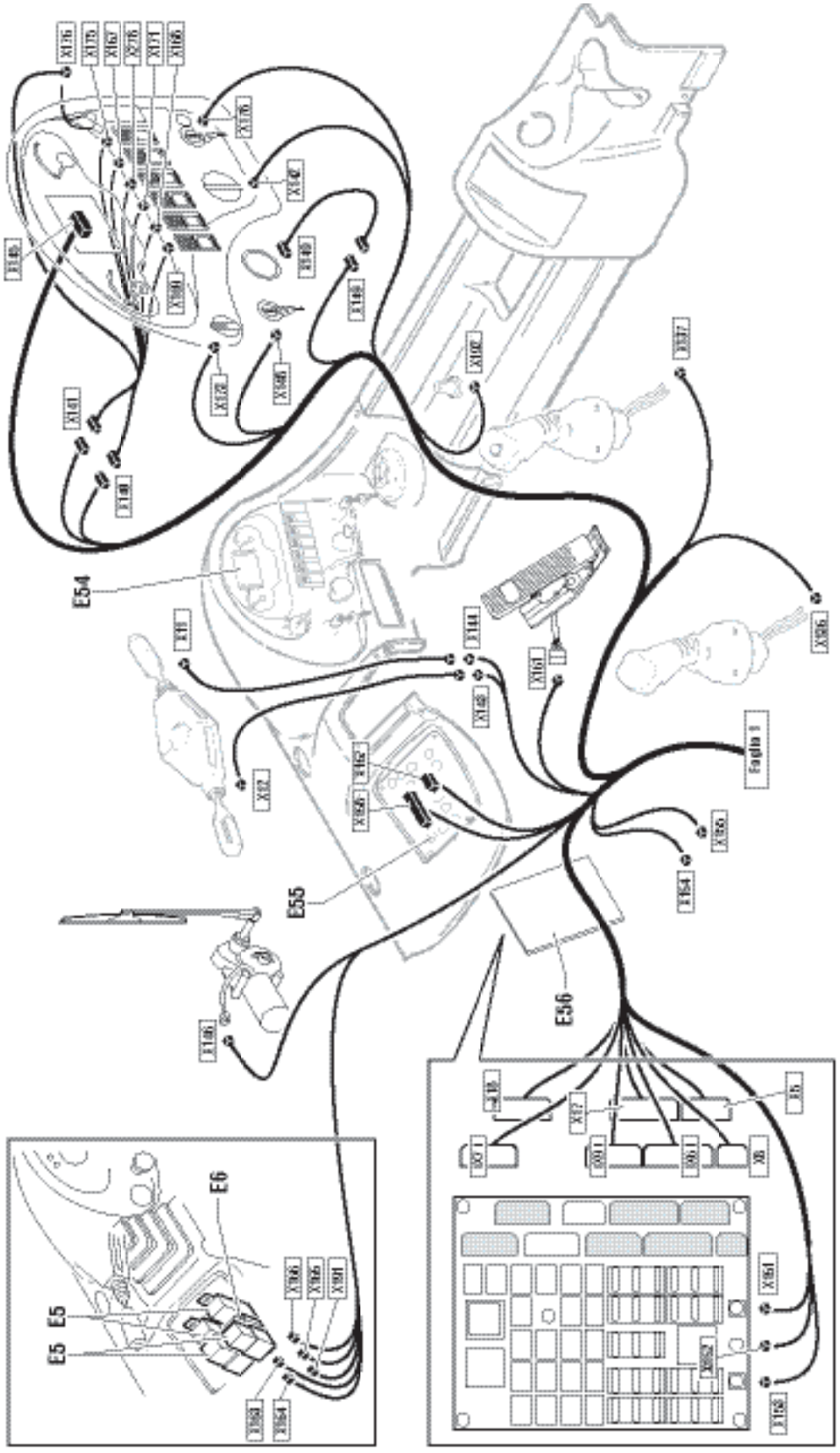
All references with a digit are referred to hydraulic components; the remaining references are initials which can be found on the wiring diagram of the machine.

6.5.1 Electric components

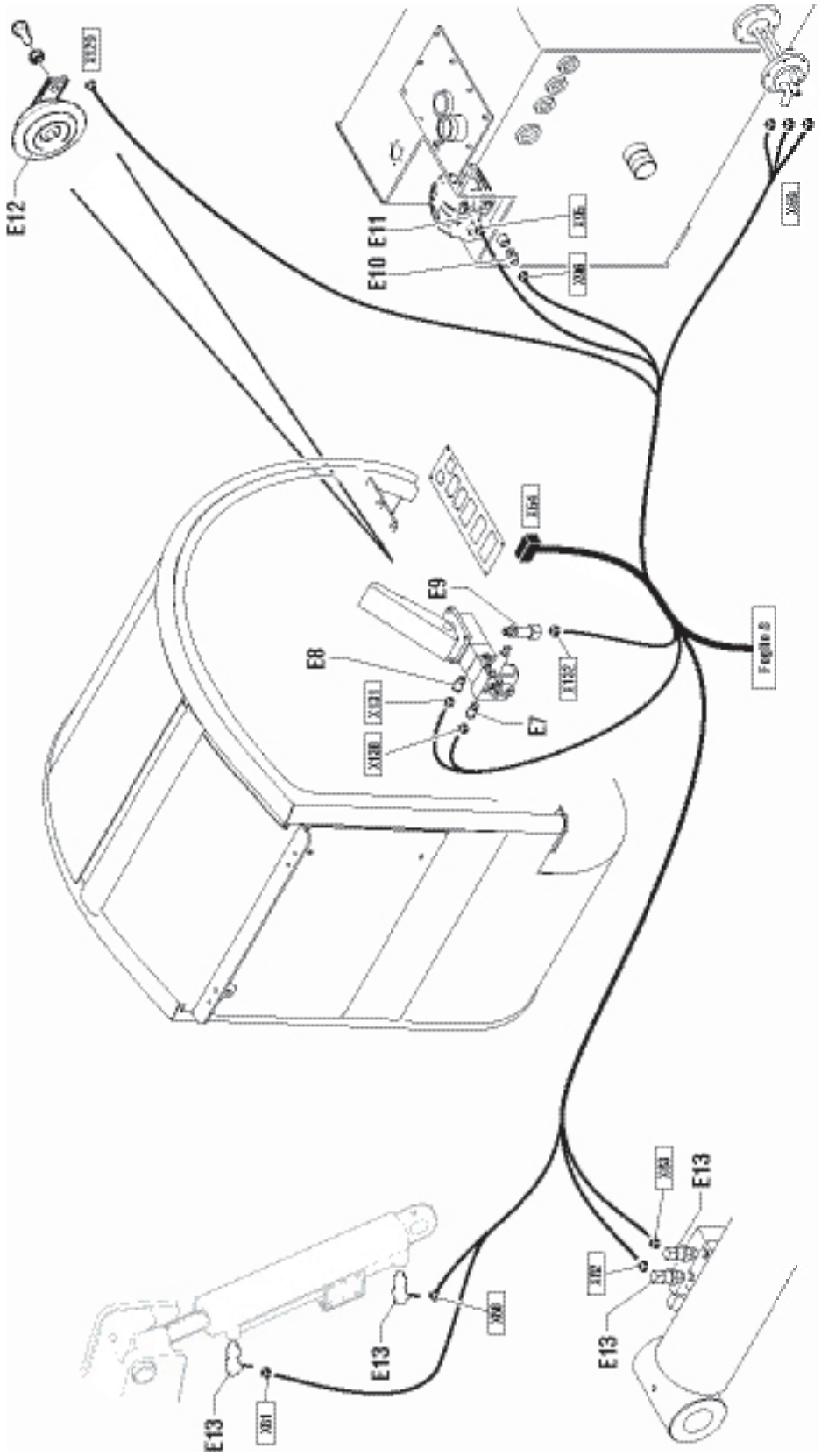
Sheet 1 of 9



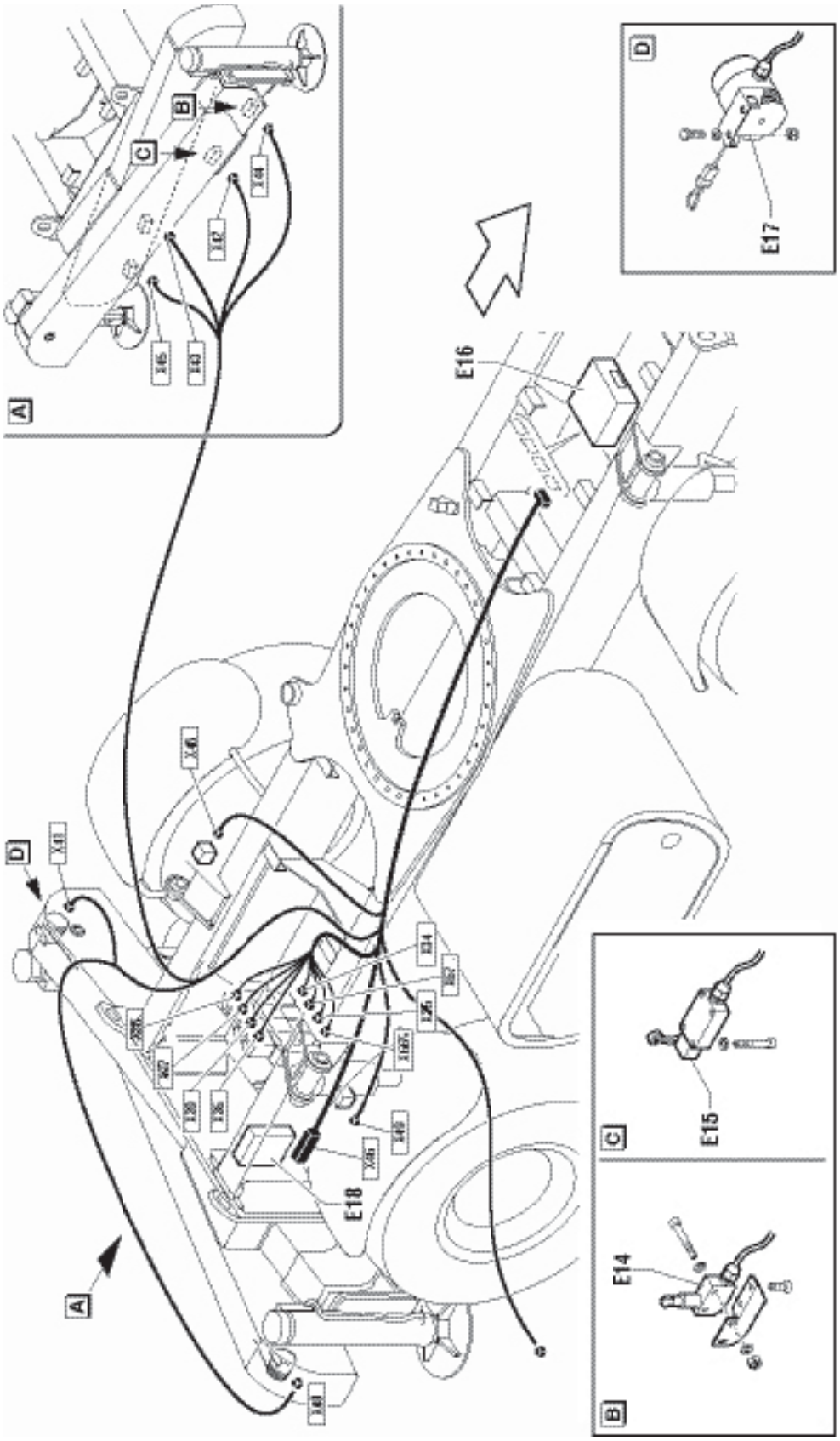
Sheet 2 of 9



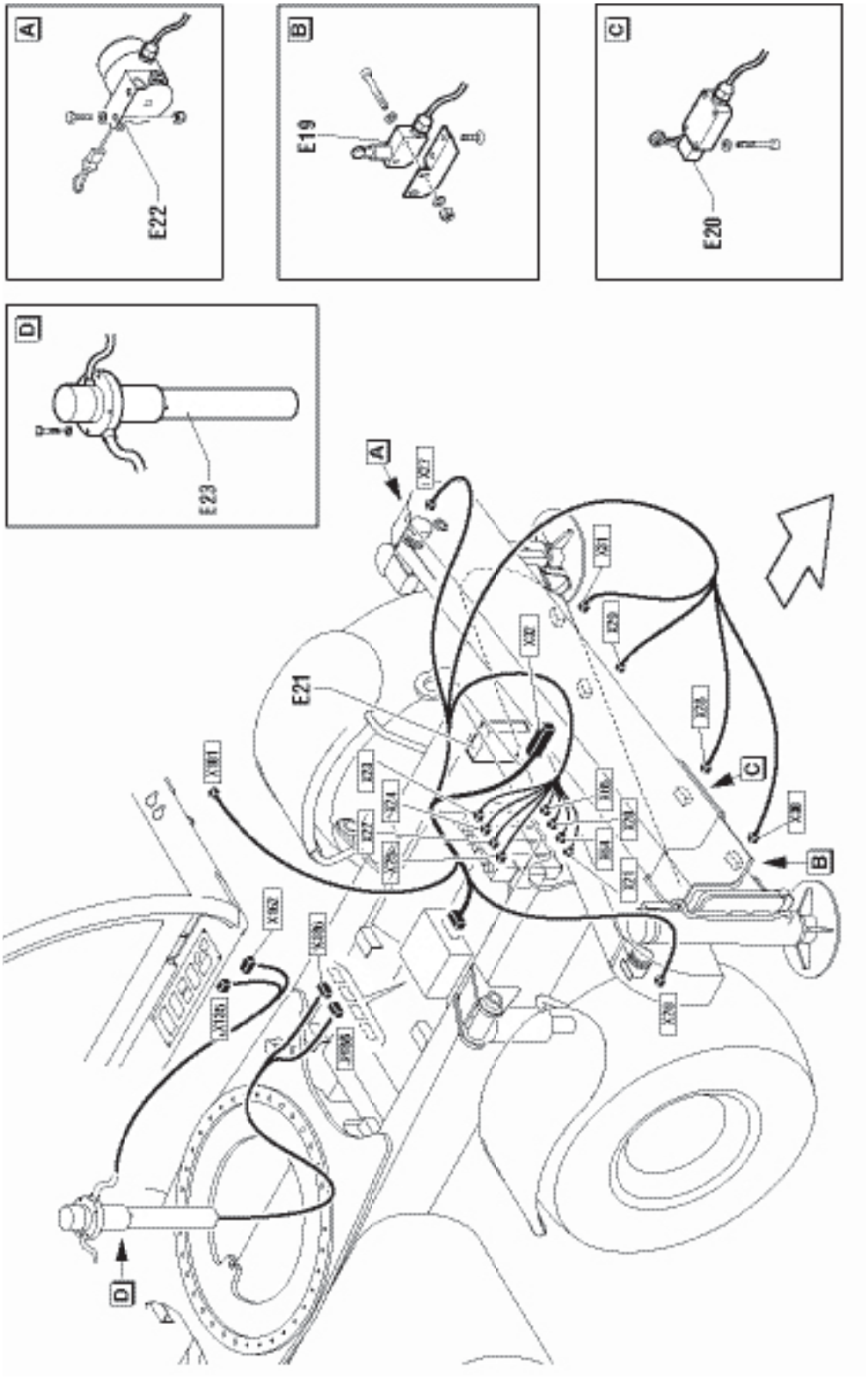
Sheet 3 of 9



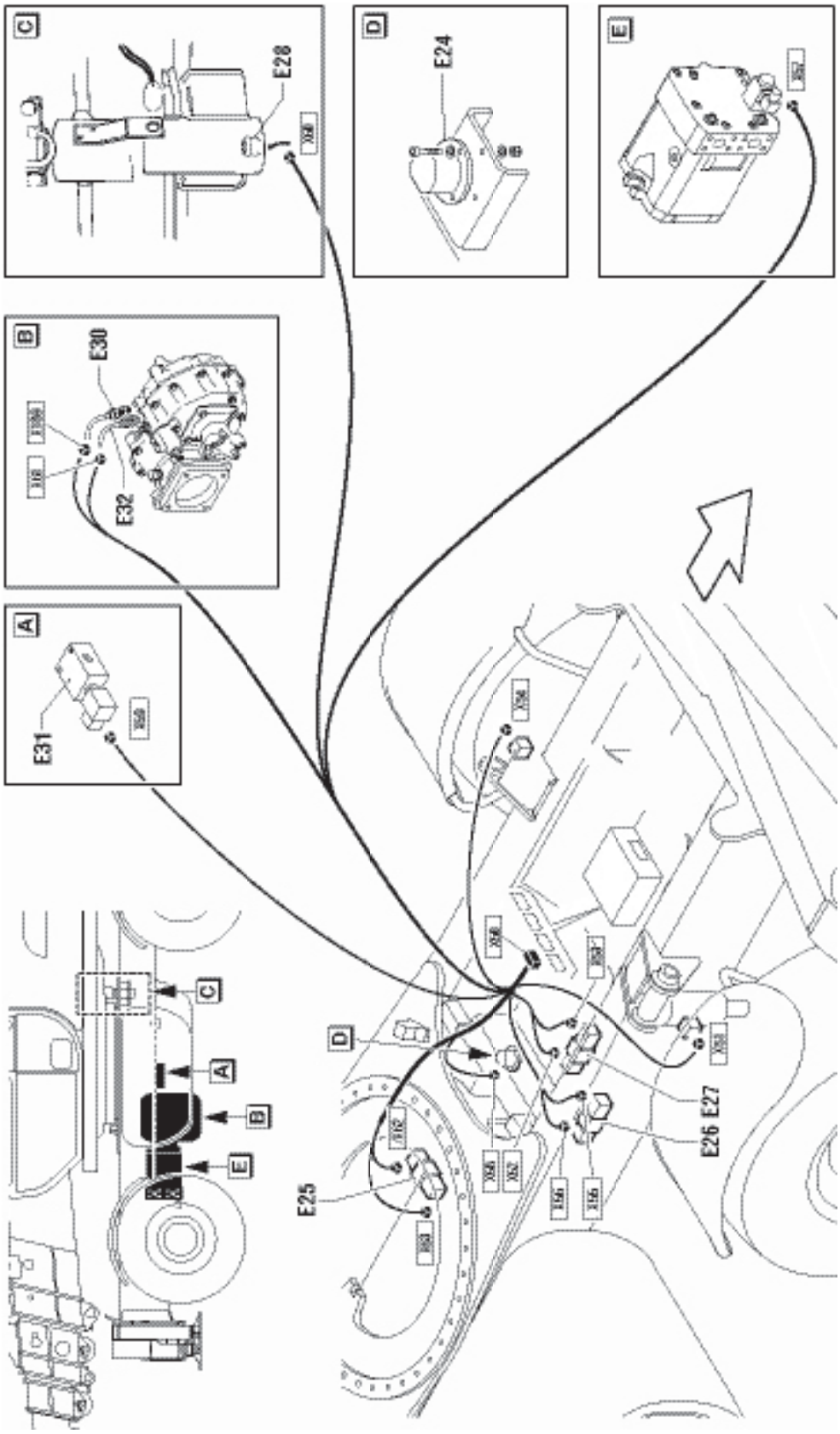
Sheet 4 of 9



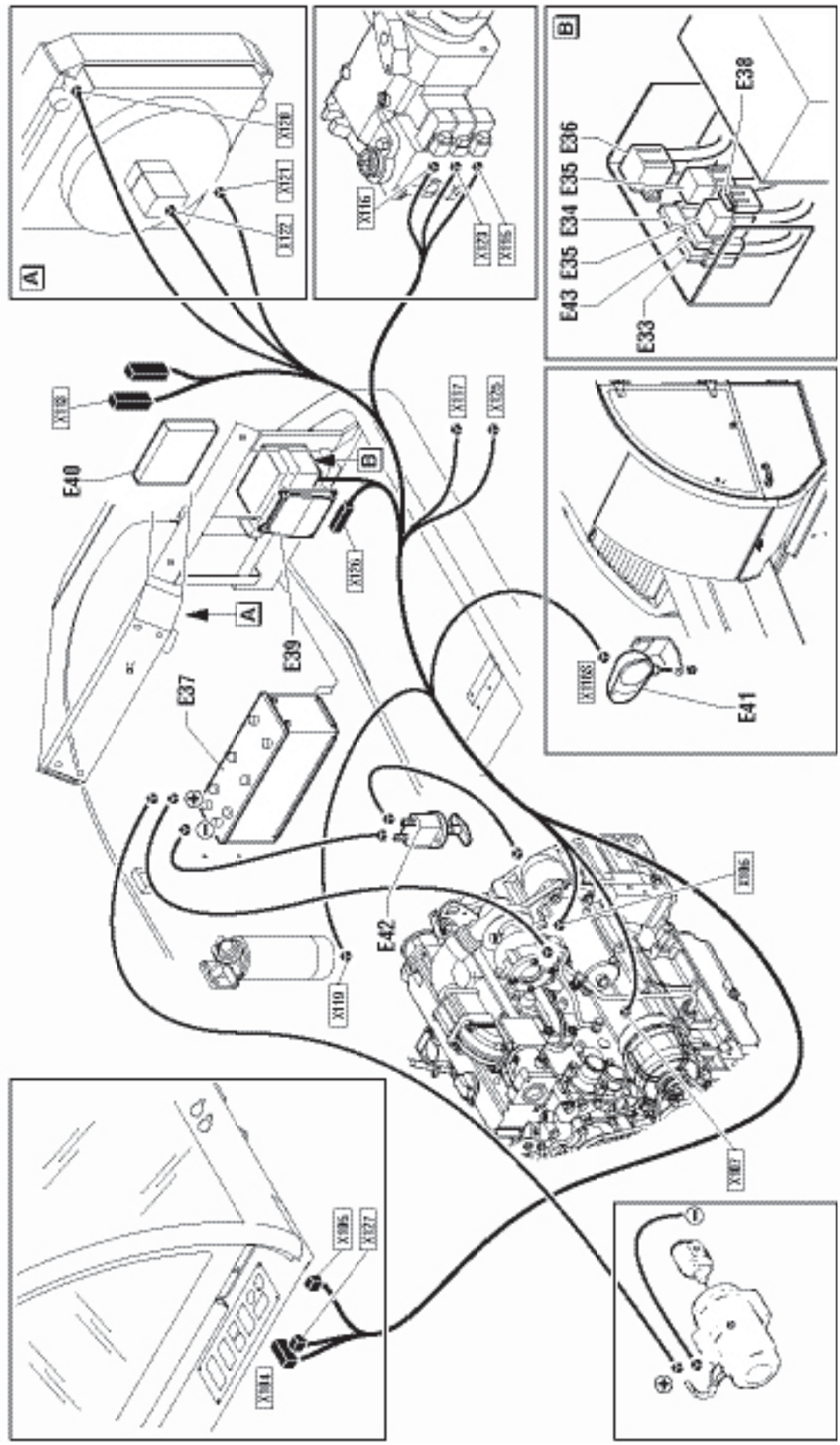
Sheet 5 of 9



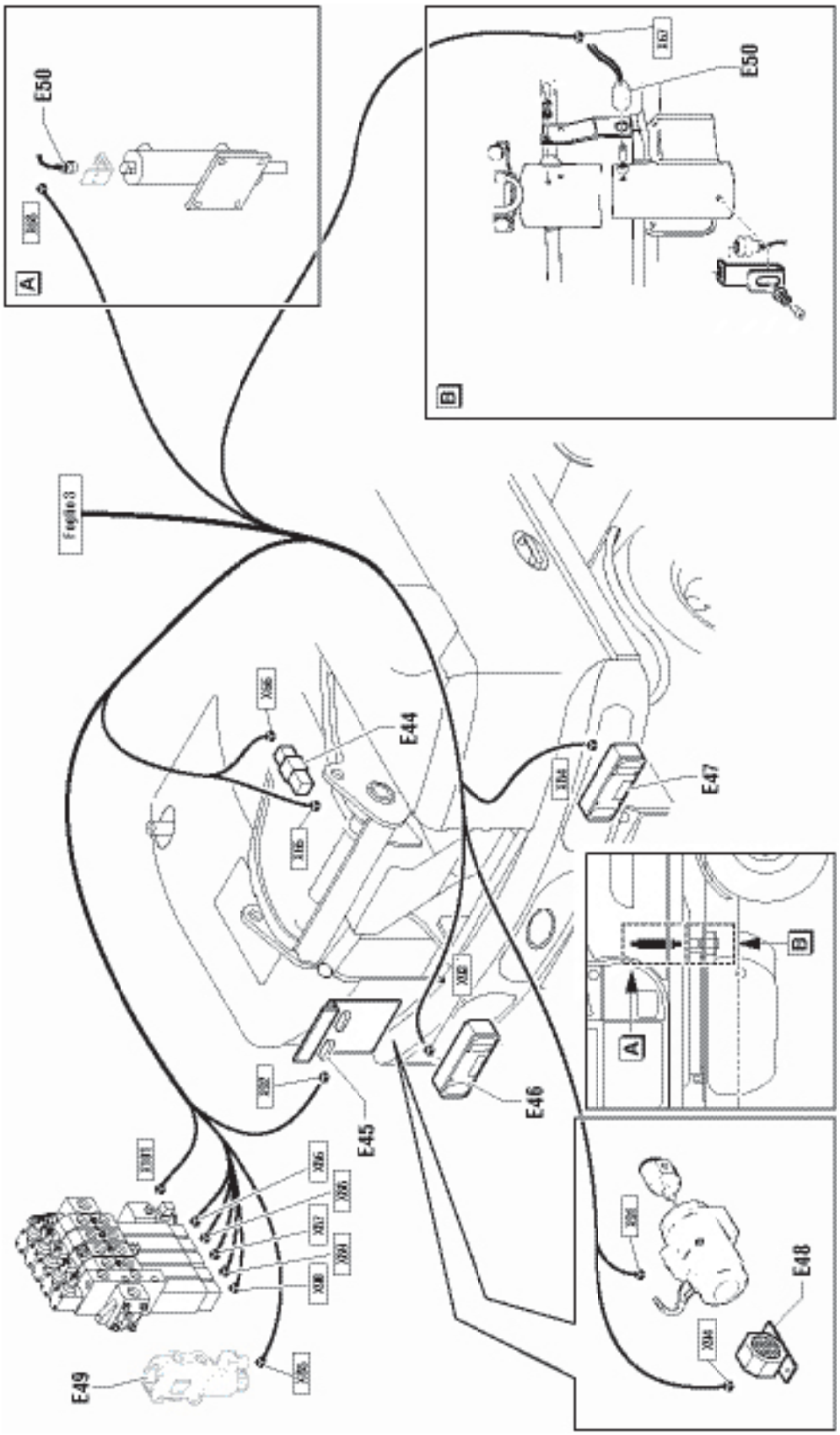
Sheet 6 of 9



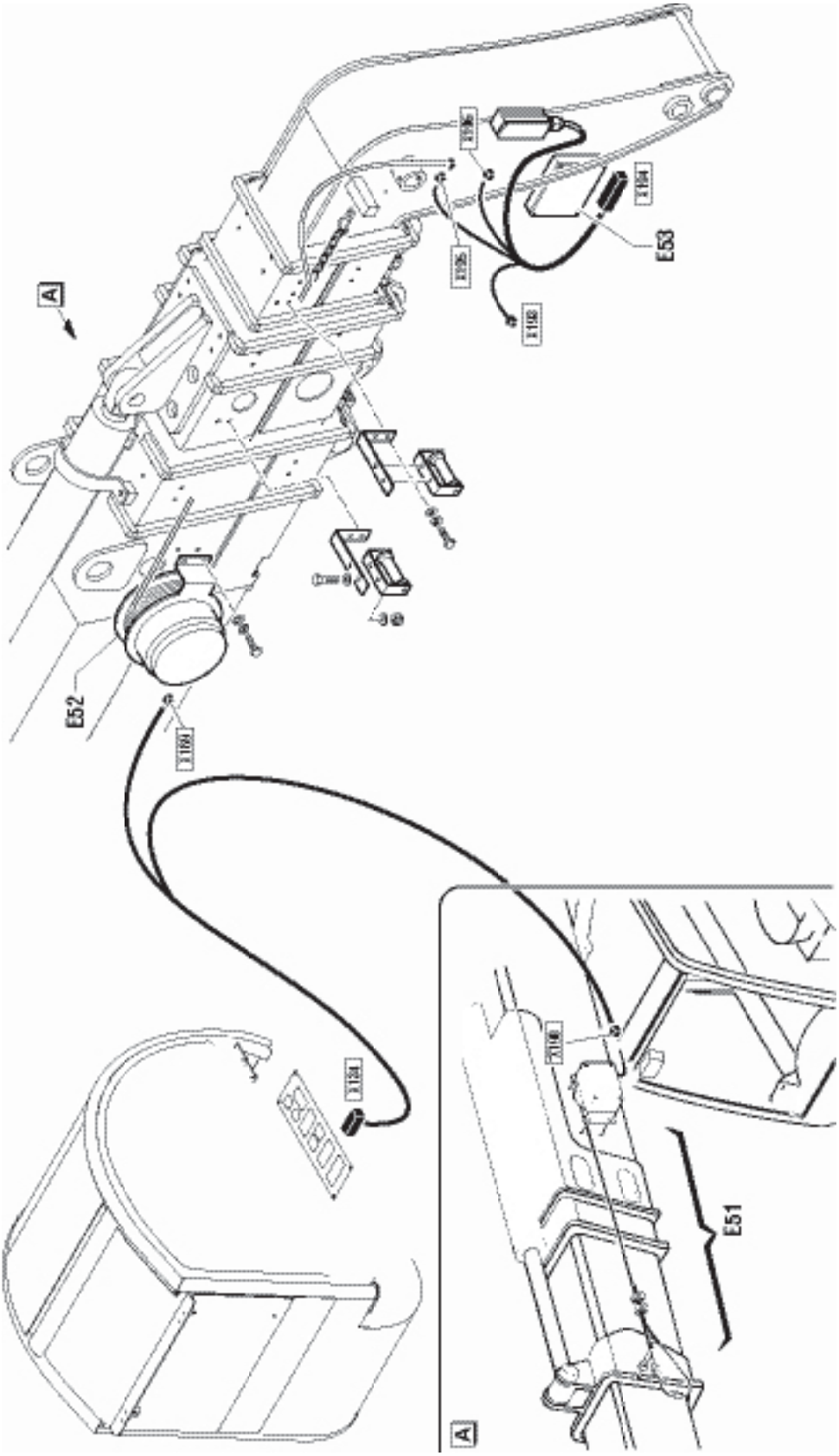
Sheet 7 of 9


A
B
X116
X121
X122
X123
X115
E38
E36
E35
E34
E35
E43
E33
X118
E40
X117
X125
X126
E39
E37
X1163
E41
X119
E42
X106
X107
X105
X127
X104

Sheet 8 of 9



Sheet 9 of 9



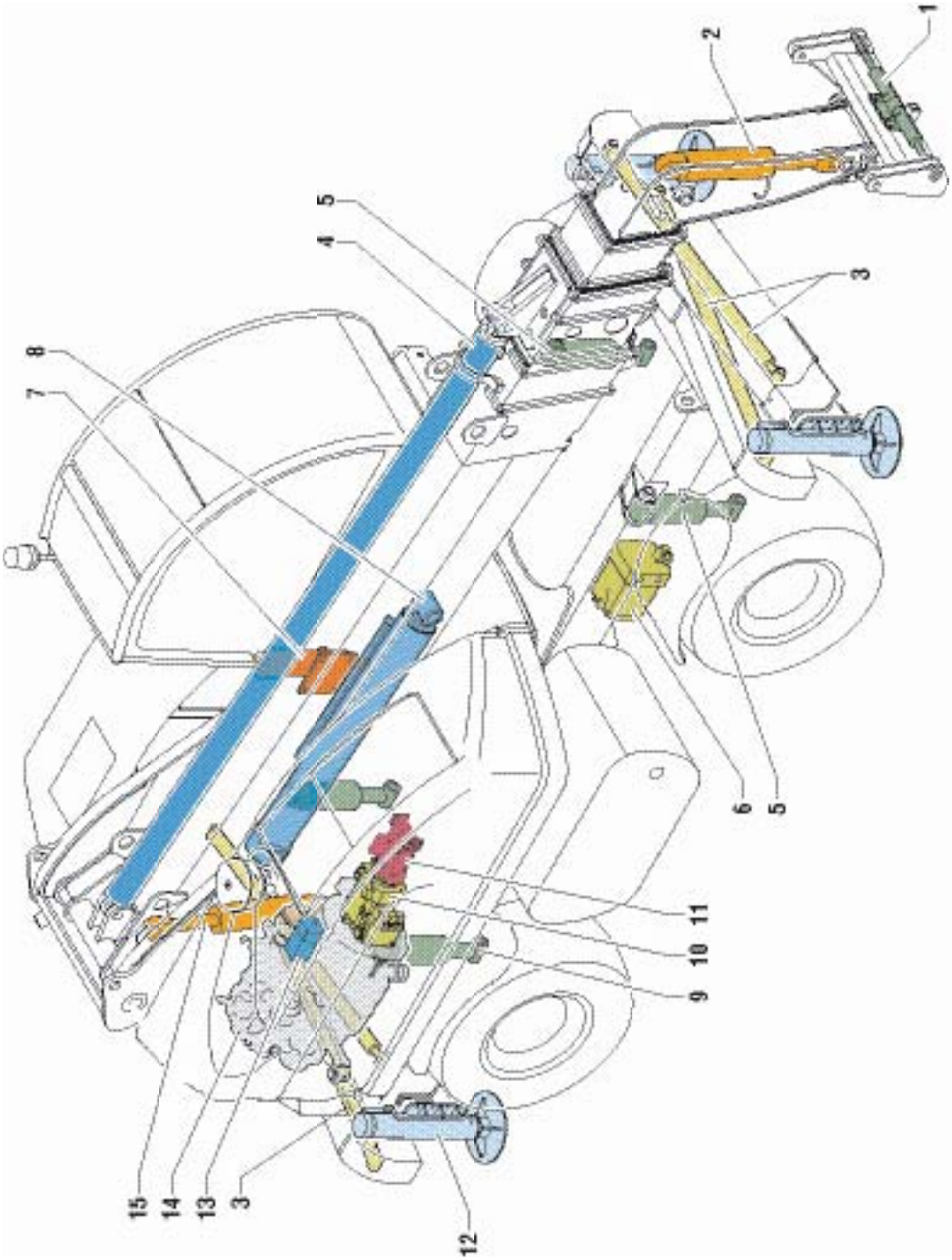
Legend of the electric components

Pos.	Description
E1	Control unit
E2	Control unit
E3	3B6 panel
E4	Beacon
E5	Relay
E6	15A fuse
E7	Pressure switch
E8	Pressure switch
E9	Sensor
E10	Transmitter
E11	Pressure switch PNA 10A
E12	Horn
E13	Sensor
E14	Micro-switch
E15	Micro-switch
E16	Electric box
E17	Reel
E18	3B6 control unit
E19	Micro-switch
E20	Micro-switch
E21	3B6 control unit
E22	Reel
E23	Swivel socket
E24	Level
E25	Solenoid valve - mechanical gear
E26	Solenoid valve - steering
E27	Solenoid valve - frame levelling
E28	Sensor
-	-
E30	Sensor
E31	Solenoid valve - differential locking
E32	Sensor
E33	Fuse
E34	30A fuse
E35	Relay
E36	Relay
E37	Battery
E38	Fuse
E39	Linde control unit
E40	Deutz control unit

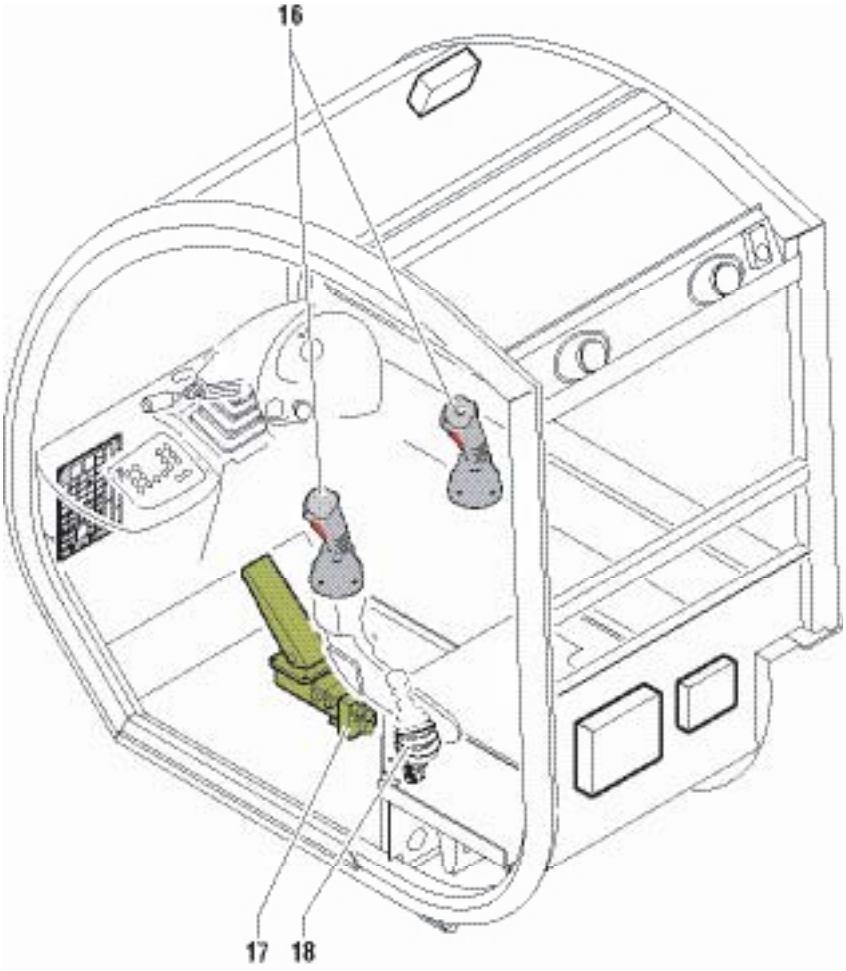
Pos.	Description
E41	Front right light
E42	Battery cutoff
E43	Fuse
E44	Solenoid valve - slewing cylinder lock/ unlock
E45	Light
E46	Rear left light
E47	Rear right light
E48	Horn
E49	Shunt deviaton
E50	Sensor
E51	Complete reel
E52	Reel
E53	3B6 control unit - boom
E54	Ecomatrice
E55	Cluster panel
E56	Fuses and relays box

6.5.2 Hydraulical components

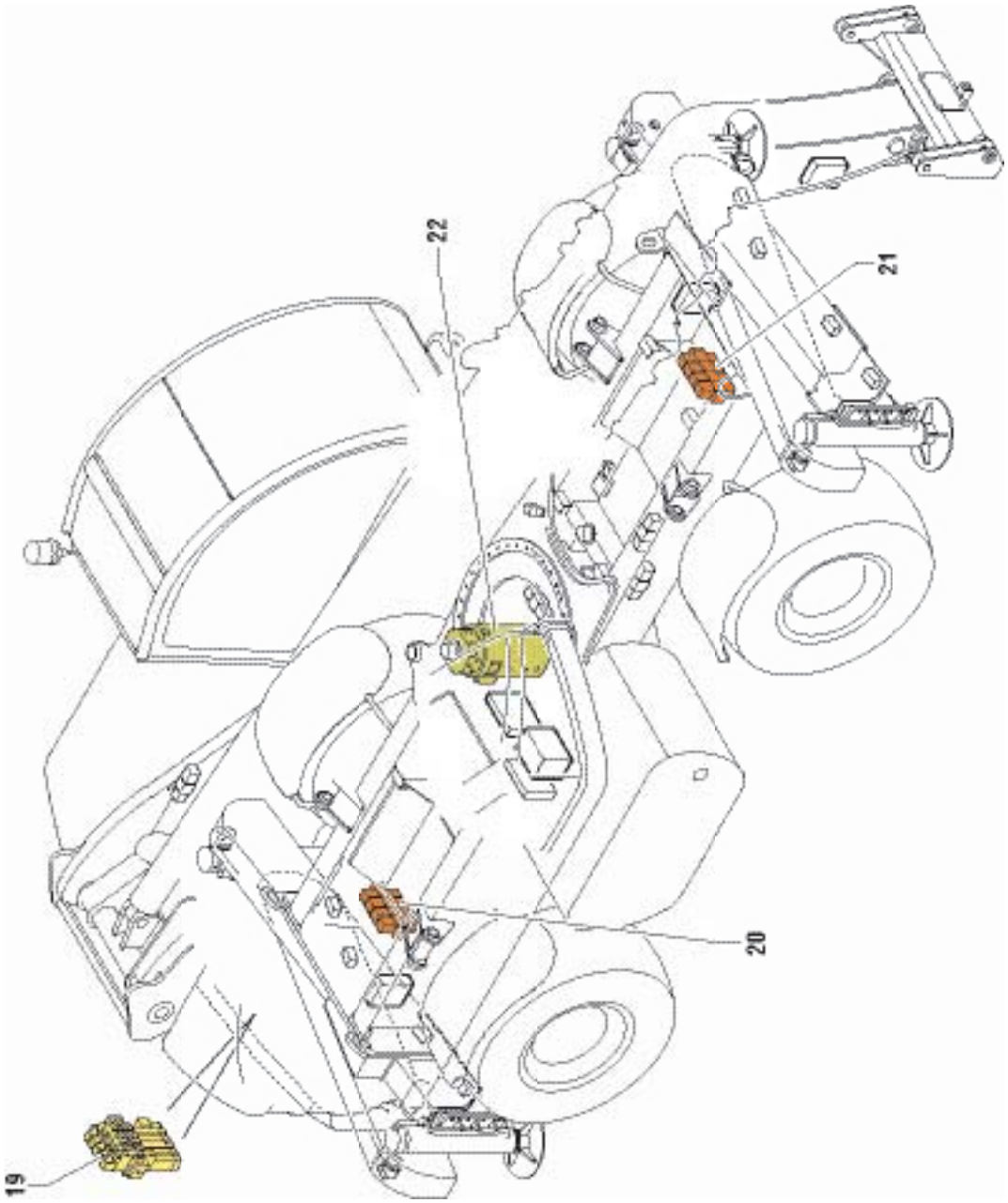
Sheet 1 of 3



Sheet 2 of 3



Sheet 3 of 3



Legend of the hydraulic components

Pos.	Description
1	Attachment coupling cylinder
2	Fork tilting cylinder
3	Stabiliser extension cylinder
4	Boom extension cylinder
5	Front axle lifting cylinder
6	Drive motor
7	Turntable rotation block cylinder
8	Boom lifting cylinder
9	Rear axle lifting cylinder
10	Drive pump
11	Boom pump
12	Outriggers lifting cylinder
13	Brake gear pump
14	Diesel engine
15	Boom lifting cylinder
16	Joystick
17	Brake pump
18	Parking brake
19	Main valve
20	Solenoid valves block
21	Solenoid valves block
22	Hydraulic rotary joint

Section 7
REPAIR PROCEDURES

SECTION INDEX

7.1 Time schedule ..... page 2

7.1 TIME SCHEDULE

Job	Operators needed	Expected time (h)
change the ignition key	1	1,00
change the speed switch	1	0,30
change the lights and horn switch	1	0,30
change the overload warning system display	1	0,15
re-calibrate the 3B6 system	1	1,00
change the load cell	1	2,00
change the overload warning system display and calibrate	1	1,00
change the joystick	1	1,30
change the deadman button	1	0,30
change the joystick movement switch pushbutton	1	0,30
change the brake pump	1	1,00
change the 2 gearbox sensors	1	0,30
change the cardan shaft sensor	1	0,15
change the low boom sensor	1	0,15
change the high boom sensor	1	0,15
change the boom lifting cylinder	1	2,15
change the boom lifting cylinder kit (complete overhaul)	1	1,30
change the block valve of the boom lifting cylinder	1	0,30
change the boom inner cylinder	1	2,50
change the inner boom extension cylinder kit	1	1,30
change the inner boom extension cylinder block valve	1	0,30
change the extension cylinder on the boom	1	1,00
change the extension cylinder kit on the boom	1	1,30
change the valve of the extension cylinder on the boom	1	0,30
change the boom inner cylinder re-phasing valve	1	2,00
change the fork pitching cylinder	1	1,30
change the fork pitching cylinder kit	1	1,30
change the valve of the fork pitching cylinder	1	0,30
change the attachment locking cylinder	1	1,00
change the attachment locking cylinder kit	1	1,15
change the block valve of the attachment locking cylinder	1	0,30
change the outrigger up/down mov. cylinder	1	1,30
change the outrigger up/down mov. cylinder kit	1	1,30

Job	Operators needed	Expected time (h)
change the valve of the outrigger up/down mov. cylinder	1	0,30
change the fork compensation cylinder	1	2,00
change the fork compensation cylinder kit	1	1,30
change the valve of the fork compensation cylinder	1	0,45
check the one-way valves of the fork compensation cylinder	1	0,20
change the machine sway cylinder	1	1,30
change the machine sway cylinder kit	1	1,30
change the machine sway cylinder valve	1	0,30
change the boom inner duct for the boom extension	1	1,00
change the boom internal line for the fork pitching	1	1,30
change the boom internal line for the fork locking	1	1,30
change the boom slide pads	1	3,00
check the pressure of the drive pump	2	0,20 each
check the pressure of the main actuator operating the boom movements	2	0,20 each
check the pressure of brake pump and hydrostatic steering unit	1	0,15
check the safety valves	1	0,15
change the drive pump	1	2,00
change the drive motor	1	2,00
change and test motor, pump and transmission lines	1	5,00
change the actuator control pump	1	1,30
change and calibrate the actuator	1	2,00
change the pump on the engine injection line	1	1,00
change the electrical flow divider	1	0,30
change relays and fuses	1	0,10
change the windscreen wiper motor	1	1,00
change and test the emergency pump coil	1	0,30
change the emergency pump	1	1,00
change the boom chain	2	8,00
change a solenoid valve	1	0,20
change the gas pedal complete with cord	1	1,00
change the manual throttle complete with cord	1	0,30
change the front axle shaft	1	3,00
change the rear axle shaft	1	3,00
change 1 cardan joint	1	1,00
change the cardan joints	1	2,00

Job	Operators needed	Expected time (h)
change the axle shaft hub	1	1,30
change the boom assy	2	5,00 each
change the boom anchoring pin	2	1,00 each
change the attachment locking cylinder pins	1	0,30
change the outrigger cylinder pin	1	0,20
change the platform power socket at the top of the boom	1	0,20
change the complete electric reel	1	2,00
change the platform joystick	1	0,20
change a cab pushbutton	1	0,30
change the platform pushbuttons	1	0,10
change and test the actuator pressure relief valve or the sliders	1	0,30
change and test the actuator safety valve	1	0,30
change the one-way valve	1	0,20
change the maxi-fuses and search for troubles	1	0,10
bleed the braking system	2	0,15 each
change the hydraulic oil filter of the drive pump injection line	1	0,20
change the hydrostatic steering unit	1	1,30
change the beacon	1	0,20
change the battery	1	0,10
change the exhaust pipe	1	0,30
change the mud-guard supports	1	0,20
change the mud-guards	1	0,10
change the parking brake cord	1	0,30
change the steering wheel	1	0,10
dismantle the hydraulic oil tank	1	2,00
dismantle the fuel tank	1	2,00
change a wheel (n° 1)	1	0,15
change the rear axle locking cylinder	1	1,00
change the outriggers	1	1,00
change flexible hoses	1	0,15
change the parking brake lever	1	0,30