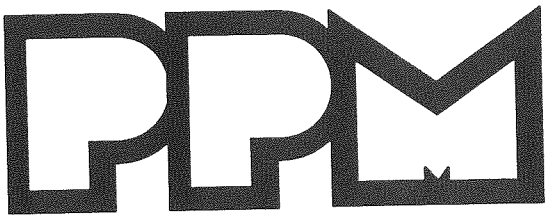


SIEGE SOCIAL ET USINES

Zone Industrielle de la Saule

B.P. 106

71304 – MONTCEAU CEDEX

TEL. : (33) 03 85 67 38 00

FAX : (33) 03 85 67 38 99

ATT 335

LIMITED SERIE

PPM

Responsibilities of all crew members

Any unsafe condition or practice must be corrected or reported to the job supervisor.

Watch for hazards during operations and alert the operator and signalmen of dangers such as power lines, the unexpected presence of people, other equipment or unstable ground conditions.

Management responsibility

See that operators are trained, competent, physically fit and, if required, licensed. Good vision is required as are good judgment, coordination and mental ability. Any person who lacks any of these qualities must not be allowed to operate a crane .

Any person who is associated with working on the crane, including laborers and mechanics, must respect all safety signals and be aware of their own safety as well as that of others. Crane personnel such as mechanics or slingers are supposed to be aware of any particular procedures concerning their jobs on the machine.

Crew members must have good sight and hearing and must also understand standard crane signals, as well as how to give them. They must have sufficient experience to react correctly in unexpected circumstances and rapidly inform the crane operator in any such event.

26. As with all heavy equipment, care must be taken when cranes are driven (traveled) whether on or off the jobsite.

Watch for people, power lines, low or narrow clearances, bridge or road load limits, and steep hills or uneven terrain. Use a signalman in close quarters. Know the height, width, and weight of your machine. Retract and lock outriggers, place the boom in the cradle, and set swing brake or lock before travelling.

28. Using two or more cranes to lift a load involves many hazards not normally encountered in single crane lifts. This operation is only to be carried out under the responsibility of the rigging foreman.

Multi–crane lifts must be carefully engineered, keeping the following points in mind.

–Since the load is not freely suspended, careful engineering studies must be made to ensure that the load carried by each machine is less than its rated capacity.
–Make sure slings are arranged to divide the load as planned.
–Review the lifting plan with operators, signalmen and other crew members before beginning the lift.
–Carefully coordinate crane movements through every stage of the lift.
–Avoid boom side loading (see #16).

29. Leaving a machine unattended can be very dangerous.

Before leaving his seat, the operator must take the following steps to prevent his machine from moving :

– Lower the load to the ground. Lower the boom when necessary.
–Set the slewing brake or lock.
–Set all drum pawls.
–Set parking brakes.
–Select neutral gear.
–Shut off the engine.

30. All wire rope must be inspected daily to determine whether it should be replaced. See the inspection form in the Operator's Manual and contact wire rope manufacturers and their distributors for more information.

Ropes should be changed whenever one of the following anomalies appears :

–In running ropes, six broken wires in one lay or three broken wires in one strand in one lay.
–Wear of one–third of the nominal external dia of each strand
–Obvious abnormal wear for whatever reason.
–Reduction of nominal diameter.
–Evidence of kinking, bird caging, crushing, cuts, abrasions, sharp

■ Make sure the access area and operator's station are clear of oil, foreign material or ice. Remove or attach all maintenance or personal items. Failure to keep these areas clean and tidy can cause serious accidents.

■ Always use your two hands to get on or off the machine, facing it.

■ Never jump off the machine.

■ Make sure the windows of your cab are clean. Make sure the windshield wipers are operating correctly. Dirty windows can cause an accident.

■ Stow away oily rags and other flammable materials in a safe place.

■ All measures should be taken to conserve the environment. Make sure that all used oils and fluids are correctly retrieved and recycled.Do not leave such products in incorrectly labelled, unadapted or open containers.Do not leave any puddles of fluid, of any type, on the ground or on floors.

■ All necessary precautions must be taken to preserve the environment. In particular, recover and recycle all used fluids. Do not leave used fluids in containers which are not suitably labelled, or in open containers.
Do not leave any fluid puddles of any type on ground or floors.
Do not drink or inhale any used oils or fluids such as:
– oil
– grease
– antifreeze
– detergents
Only original containers should be used for storing or transporting oils and fluids.
Do not use containers intended for food (water bottles, beer bottles, etc...)

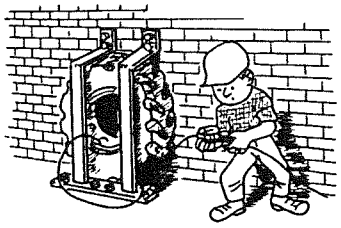
■ For your own security or others, it is compulsory to check the proper tightening of the wheels bolts using the machine wrench. After 50 hours and every 100 hours of service.

■ Inflation pressures are given for cold tires, inflation and pressure control must be carried out on cold tyres. Never deflate a hot tyre.

■ For your own safety and that of others it is essential to check wheel nut tightness with the spanner provided with the machine.Check after the first 50 hours then every 100 hours.

Note :
Check tire pressures weekly or every 50 hours (cold tires).
DANGER : never drive the machine with deflated tires.

■ Check condition of tires with the machine free of load. If the wheel is not fitted on the machine, always use an inflation cage.



■ Do not risk accident while inflating the tires. Never stand in front of the wheel. Use an inflating flexible pipe long enough with a self tightening inflation socket.

■ Deflate the tire before trying to take stones off the tire surface.

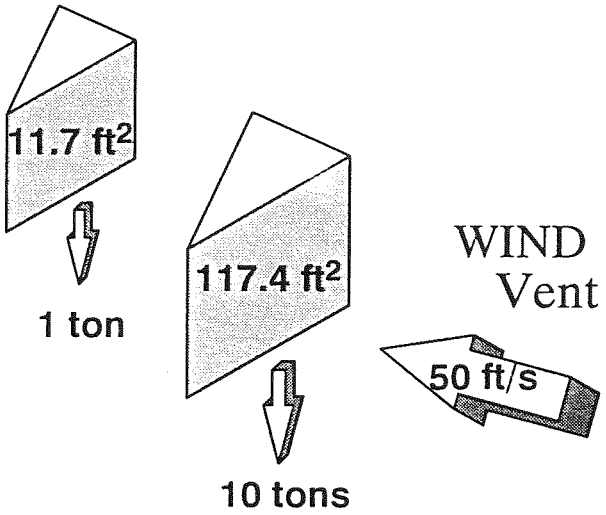
■ When fixing balance weights to be tack welded on the site, use only the special tooling.

■ Never cut, never weld on a rim fitted with an inflated tyre.

Wind force

The crane can be safely used within the limits indicated by the load capacity charts in wind speeds of up to 50 ft/s (31 miles/h – Force 6) and a load surface of 11.74 ft^2/ton.

WARNING:
Make a daily weather and wind speed check by telephoning the nearest meteorological syayion. If wind speed is greater than the acceptable level do not handle loads.



Wind force		Wind speed		Consequences
Beaufort Scale	Termes descriptifs	ft/s	miles/h	inland
0	Calm	0 – 0.65	0.62	Calm, smoke rises vertically
1	Very light	1 – 5	0.62 – 3.1	Wind direction indicated by smoke,not by a weather vane.
2	Light breeze	5.2 – 11	3.7 – 6.8	Wind can be felt on the face, leaves tremble, the weather-vane will move.
3	Low breeze	11.2 – 17.7	7.5 – 11.8	Leaves and small branches move.Flags lift.
4	Reasonable breeze	18 – 26	12.4 – 17.4	The wind raises dust and leaves.Branches move.
5	Strong breeze	26.3 – 35	18 – 24.2	Small bushes start to sway.White horses are seen on the sea.
6	Fresh wind	35.5 – 45.5	24.2 – 30.4	Large branches start to move.
7	Strong wind	50 – 56	31 – 40	All trees are blown and move.
8	High winds	56.5 – 68	38.5 – 46	The wind breaks branches,and it becomes difficult to walk freely.
9	Very high winds	68.5 – 80	46.6 – 54.6	Damage caused to houses (tiles and chimneypots are blown down).
10	Gale force winds	80.5 – 93	55.3 – 63.4	Trees uprooted. Serious damage to houses.
11	Strong gale force winds	93.5 – 107	64 – 72	Important and widespread damage.
12	Hurricane	107.5 – 121	73 – 82.6	Very serious damage.
		Area not to be used with the crane.		

Example of use:

Inspection No. 3 (3rd year

During the year that has just gone by, the crane has been used for occasional port unloading work:

Spectrum class **L2**, that is to say **Km3 = 0.25**

The hour meter **of the upper** shows 3000 hours. Therefore, during this period = 3000 hours – 2000 hours = 1000 hours, and consequently the rate of use of the winch is approximately **30 %**, that is to say **T3 = 300 hours**.

Therefore, for the first inspection, the wear rate **S3** of the theoretical length of use is:

$$S3 = \frac{0.25}{0.125} \times 300h = 600h$$

The theoretical remaining length of use after the first year:

$$D3 = D2 - S3 = 2920h - 600h = 2320h$$

It is necessary to determine if the theoretical remaining length of use is sufficient to last up to the next inspection. If not, the winch must undergo a general overhaul.

Carrier control panel

40 / Fog light control

41 / Flashing light switch and warning light

42 / Suspensions fully down switch and warning light

Turret control panel
– with auxiliary winch –

101 / Front wheels steering wheel

103 /Armrest unlocking lever

104 / Upperstructure locking control

105 / Gear lever

106 / Accelerator pedal

107 / Brake pedal

108 / Rear wheels steering lever

109 / Parking brake control

110 / Cigar – lighter

111 / Winch 1 or 2 / Dericking control joystick

111 / Option "Simultaneous winch operation"
Winch 1 / Dericking control joystick

112 / Slewing / Telescoping joystick

112 / Option "Simultaneous winch operation"
Slewing / Telescoping or Winch 2 joystick

113 / Heating control switch

114 / Manual accelerator

115 / Ignition key–switch

117 / Free slewing pedal

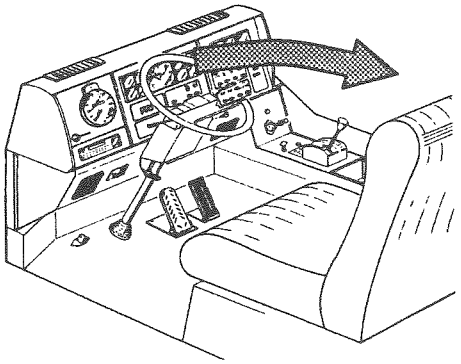
118 / Spirit level

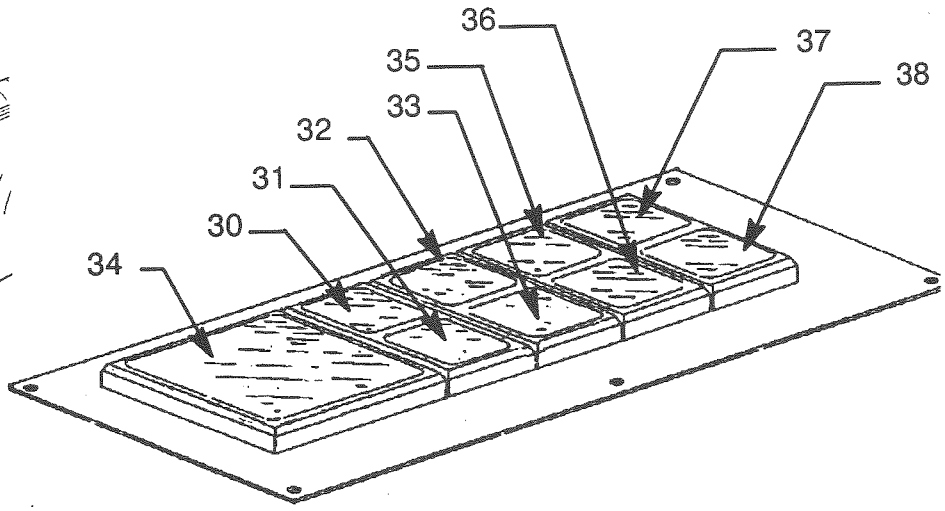
119 / Warning horn

120 / Seat safety device circuit–breaker switch

Driving controls

Carrier cab control panel





CUMMINS engine speeds.
Road and site travel : 2500rpm
- idling speed : 700 rpm
- maximum : 2500 rpm

Crane :
- recommended idling speed : 1200 rpm
- maximum speed : 2100 rpm for ATT240,290 and 340
- maximum speed : 2000 rpm for ATT390

35 / Fuel gauge

This gauge indicates the amount of diesel left in the fuel tank.

36 / Converter oil temperature thermometer

Normal working temperature : 60° to 90°C
Maximum temperature which must not be exceeded : 110 °C
Note : If the convertor oil temperature reaches the maximum permissible level :
- stop the machine
- put into neutral gear (position N)
- accelerate the engine to 1200/1500 rpm for around 2 to3 minutes (until the temperature comes back to normal).

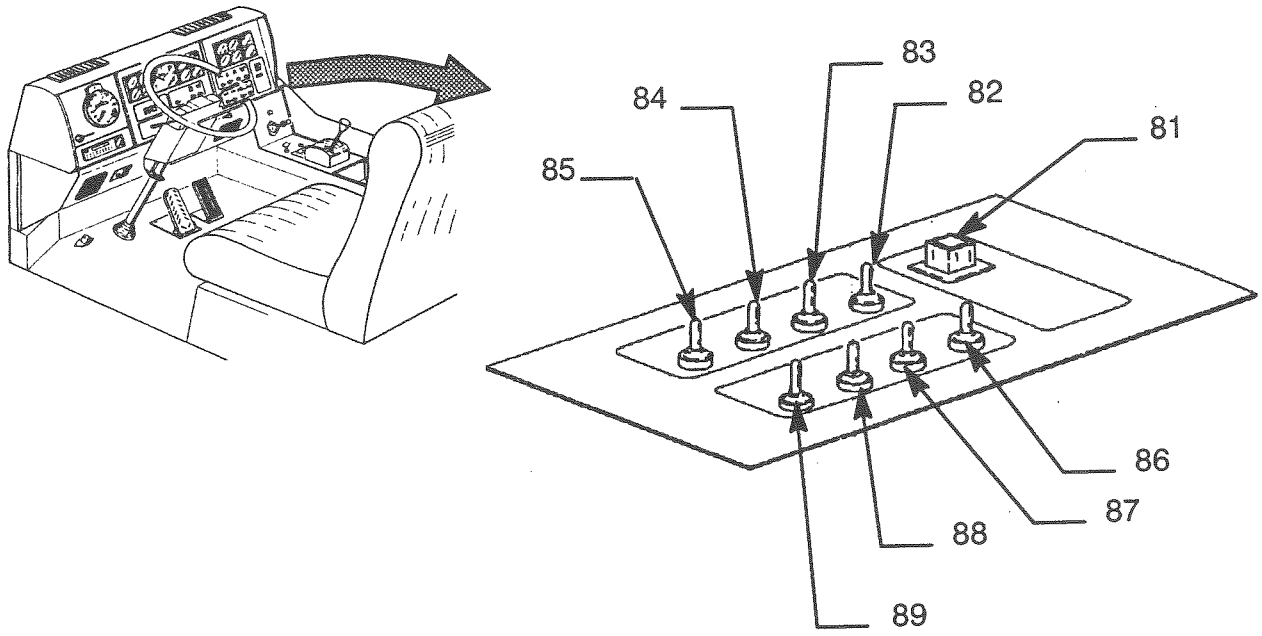
The warning light ref. 60 comes on when the convertor oil temperature is too high.

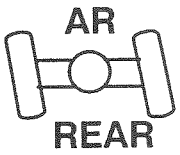
37 / Clutch oil pressure gauge

normal operating pressure : 20 bar.

38 / Not used

Carrier cab control panel





85 / Rear steering locking control

To unlock rear wheel steering, push the switch forward, the warning light on indicates that rear wheel steering is unlocked.
Authorization of rear wheel steering automatically engages the four wheel steering function on the carrier cab steering wheel and allows only one driving speed. To lock rear wheel steering, place the rear wheels in line, using control switch Ref. 21.

Immediately stop the engine .

86 / Engine stop and general warning light

Press until complete engine stop. If the warning light remains on while the engine is running, that indicates a running trouble.

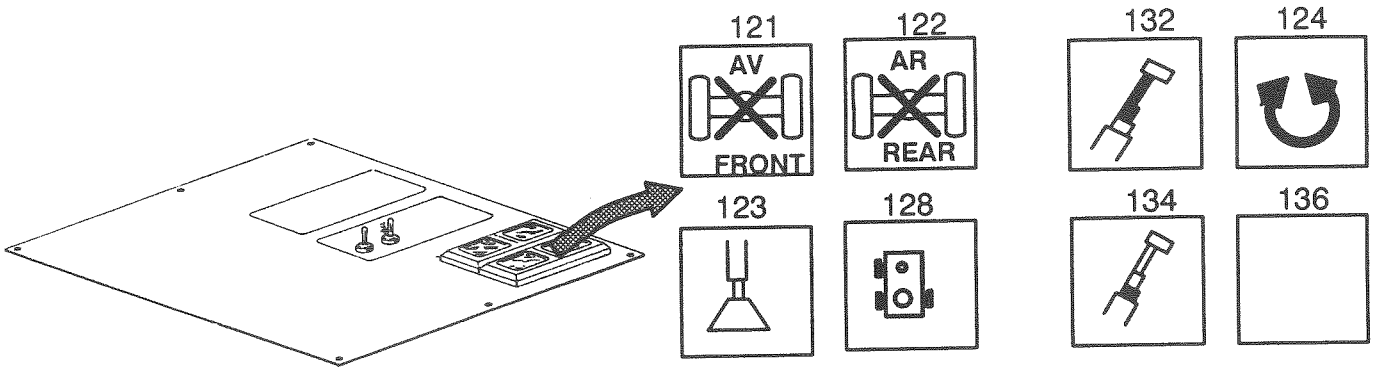
SHUT OFF THE ENGINE IMMEDIATELY

STOP

87 / Gear range selection switch

This switch is only to be used when the gear selector is in neutral position and the machine is at a standstill or travelling at not more than 1kph.

Central control panel

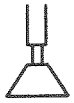


121 / Front wheel differential lock–up warning light

This warning light turns on when using control 156 and remains on as long as the differential is locked.

122 / Rear interwheels differential locking warning light

This warning light turns on when using control 157 and remains on as long as the differential is locked.



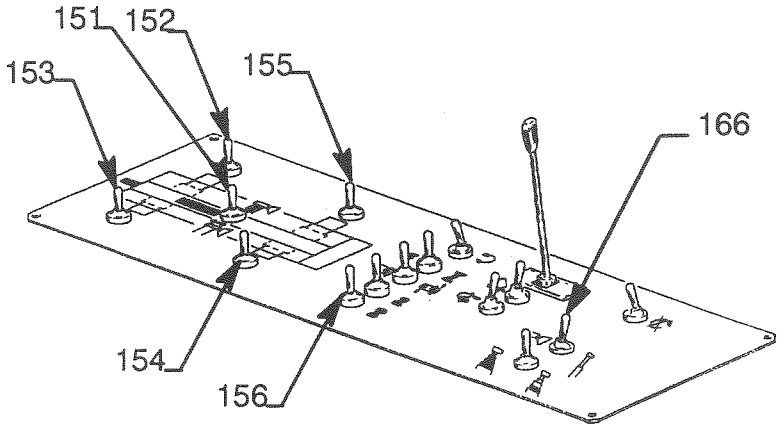
123 / Outriggers selector control

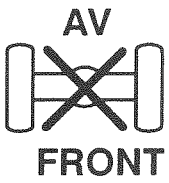
The warning light comes on when control Ref. 165 is in the outrigger position. It means that the outrigger controls can be used in the following manner:

- from the turret cab using controls Ref. 151, 152 a,b,c,d.
- from the ground on the chassis using controls Ref. 204 a,b,c,d,e, if however the switch Ref. 84 in the carrier cab has been placed in the outrigger position and the warning light is on.

124 / Free slewing warning light

Side control panel





156 / Front inter–wheel differential locking control

Activating this control locks–up the differential on the front wheels. The differential remains locked–up during the period that the switch is held in this position.The warning light Ref. 121 comes on and stays lit for the same period.Return to normal position after having overcome the difficult terrain, do not not fully turn the wheels whilst this function is active.

This function should only be used on difficult terrain .

This function can only be used if the front axle is locked up

Stopping the engine

Let the engine slow down to idling speed a few moments before stopping the engine.
Activate the stop switch ref. 86 until the engine comes to a complete stop.
Switch off ignition with the key ref. 2

IMPORTANT : Never stop the engine with the gear range selector in a position other than neutral "N"

Never accelerate just before stopping the engine, the activated turbo compressor may be damaged through lack of lubrification.

Highway driving

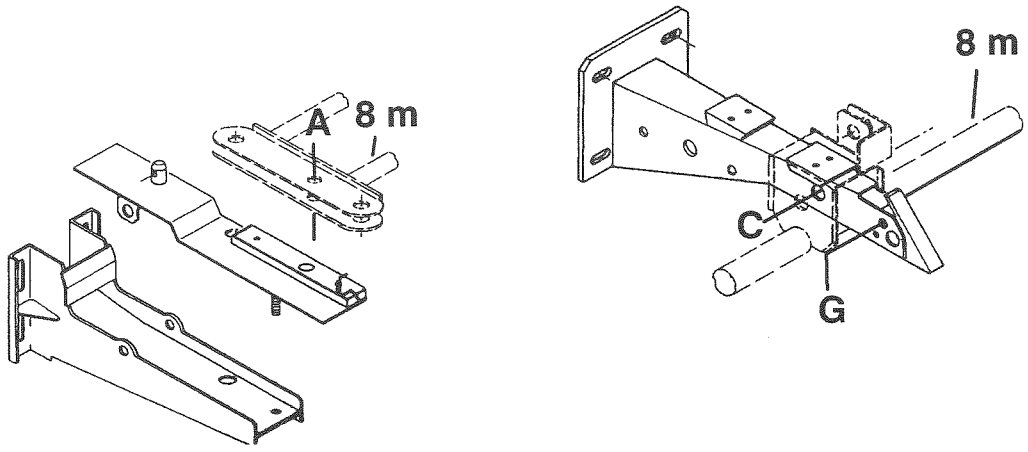
Preliminary operations
1 – Make sure that the engine complies with road regulations.
2 – Make sure that the turret to chassis locking device is in place.
3 – Make sure that the suspension is free and raised (unlocked).
4 – Make sure that the outrigger ground pads are locked away in their storage position, and also the outrigger beams.
5 – Check that all road lights work correctly
6 – Check tyre pressures.
7 – Make sure that the driver, once in a seated position in the cab, can, with the aid of the rear mirrors, survey the full volume of his machine.
8 – To facilitate manoeuvres, always drive the machine with the boom in a lowered horizontal position and the pulley block attached.
9 – Never road drive the machine with a suspended load.
10 – Make sure that the machine's electrical system is working correctly (headlights, direction indicators, sidelights etc....)
11) – Make sure that rear axle steering is inhibited (control ref. 108 in turret cab, warning light ref.127 out ; control ref. 21 in chassis cab and corresponding warning light out)

Whenever highway driving is undertaken, it is essential that the driver makes certain that he has good all round visibility.

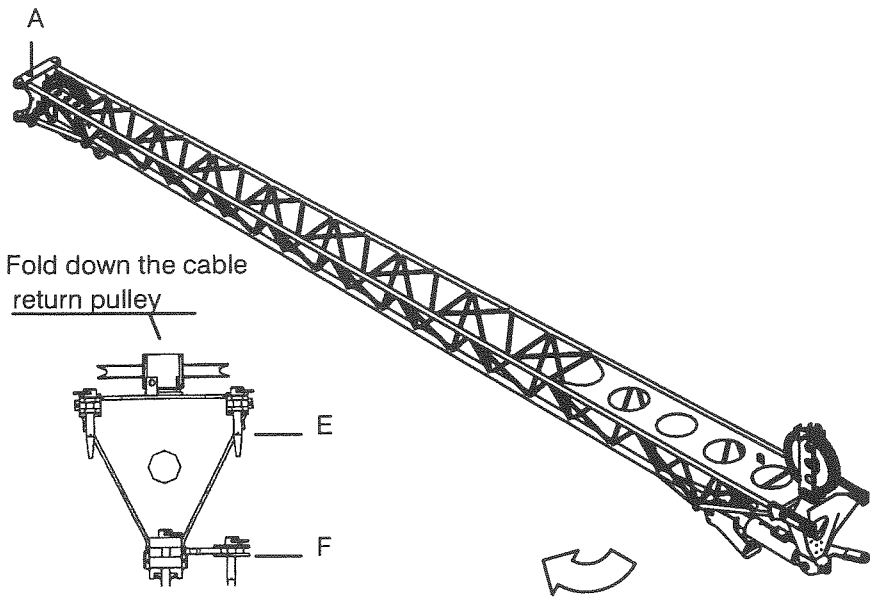
Manually swivel the extension around. To make this easier, slightly raise the boom form the turret cab.

Slightly raise the extension using the remote control unit to bring the extension onto its supports.

Insert the front end anti–return pin (G) while holding the locking device open, fit the safety clip.



Insert the rear swivel pin (A) and fit the safety clip.



Take out the two swivel pins (E) and (F), if necessary use the remote control unit to manoeuver the extension and free the pins.

Folding away the 8 m and 7 m extensions

Raise the machine on fully extended outriggers, on flat, solid and horizontal ground with the wheels clear of the ground.Engine running at idling speed.

Fully retract the boom and slew the turret over the side of the chassis.

Unreeve the extension.

Remove the end of winch stop counterweight.

Connect the two hydraulic hoses

Connect the electric remote control unit.

Disconnect the extention winch–up stop device connector from the control box on the boom head and refit the shunt connector onto this control box.

Flip over the electric switch located on the offset angle ram which supplies power to the end of winch stop device.

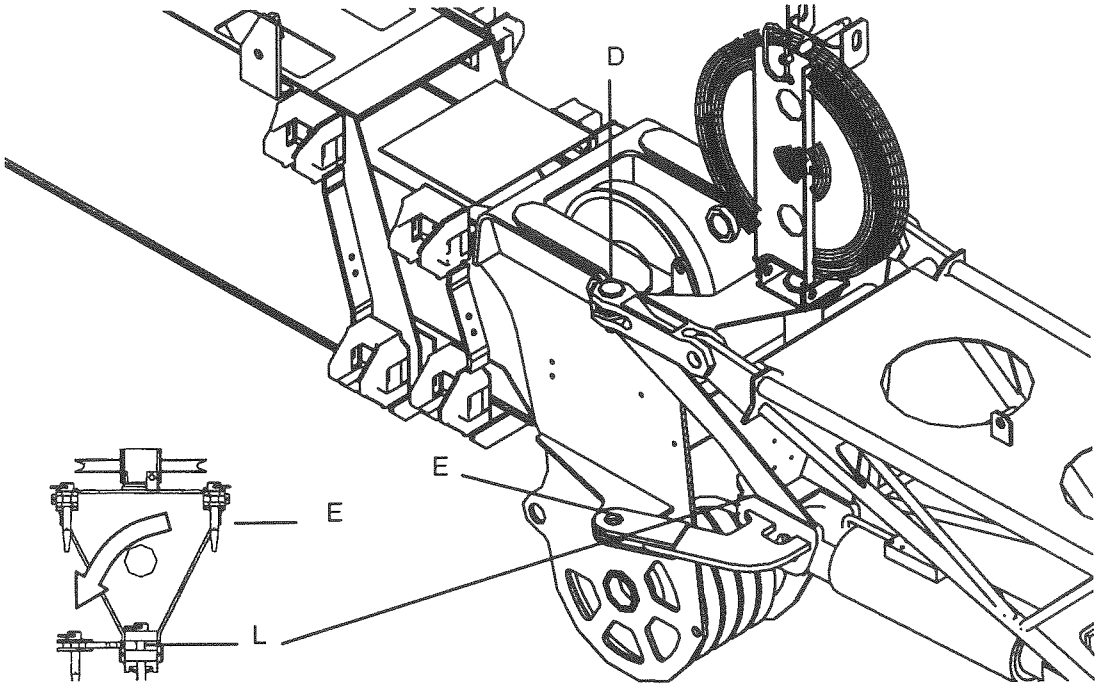
Set the extension offset angle to 0° with respect to the boom.

Fold the 7 m extension away against the side of the 8 m extension.

Refit the link bar (J) between the two extensions

Folding away the dual extension assembly.

Take out the upper left hand side pin (E) and insert it in the lower right hand side swivel bracket.



Operation

For easy access to the seat the rear control console can be released upwards. Once sitting in the operating position, the armrest console can be pushed downwards to lock in the original working position.

The fine backrest adjustment mechanism provides a simple and quick method for finding the optimal working position.

To provide the operator with a comfortable position for his forearms in relation to the operating controls, slide adjustment lever is located underneath the seat cushion to give the required adjustment.

In addition to the above the seat cushion can also be adjusted for height and slope, without leaving the seat, by simple controls located at the front and rear of the seat cushion.

To provide the operator with the correct operating position in relation to the cab control pedals, a second slide lever is located on the base of the seat to give the required adjustment.

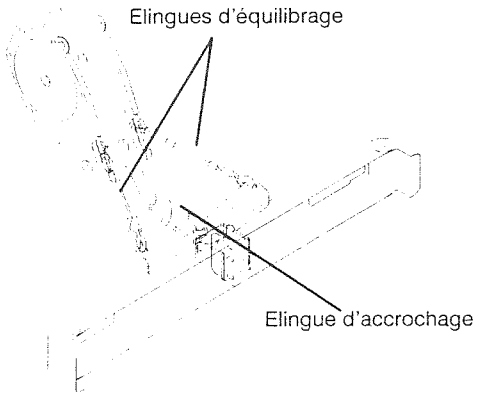
Finally for the optimal driving/operating position the padded armrests located on the consoles can be adjusted in height and width by the fixing screws and locating them in the alternative position provided.

What is meant by telescoping ?

There are 2 telescoping modes :
MODE 1 : 3 section telescoping
MODE 2 : 4 section telescoping

Mode 1 (3 section telescoping) gives good performance when LIFTING HEAVY LOADS, telescoping performance over short and average radii is privileged as stability is reduced over greater distances because of the weight of the boom head (Section T4 being retracted inside section T3).

Mode 2 (4 section telescoping) allows LONG DISTANCE LIFTING (over long radii), in this case stability is privileged as the weight on the boomhead is less important for a boom of an equivalent length (T4 is extended) at the cost of reduced telescoping performance.



Storing the hook block

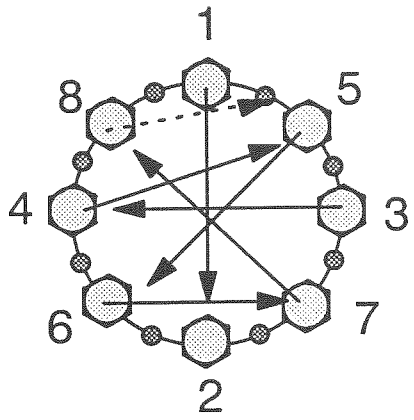
– Completely retract the boom.
– Derrick the boom .
– Lower the hook block to the level of its support.
– Fit the retainer sling.
– Fit the two balancing slings.
– Lower the boom (Derrick down control), and wind in the cable (Load raise control) to bring the boom to a horizontal position on its support.

CAUTION : Taking up cable slack must be carried out with the greatest care so as not to damage the hook block.
This is achieved when the operator is sat in the turret cab seat and the top of the hook block is maintained at the level of the carrier cab roof.

– As soon as the two block safety device is no longer suspended at the end of its sling the load raise function will be inhibited. Override the safety device to finish the operation.
– Gently take up slack on the cable.

CAUTION : Do not put strain on the retainer sling.
This is achieved when the operator is sat in the turret cab seat and the top of the two block safety device counterweight is maintained at the level of the carrier cab roof.

To complete taking up slack on the slings bring the the two block safety device counterweight into slight contact with the dead end of the hoist cable from the cable bracket housing.



Remark :
This operation is valid for all types of slewing ring fasteners, consult the technical specifications for the corresponding torque values.

3 – Afterwards, slewing ring fastener tightness must be checked every 1000 hours. Tooling, verification conditions, method and torque values are the same as in paragraph 2.
a) Verify all the fasteners. Mark all fasteners with a torque value of less than 85% of the nominal value.

If the number of fasteners detected with this characteristic is greater than 20% of the total number, then all the ring fasten ers must be changed.

USE ONLY ORIGINAL PPM SPARE PARTS

b) Otherwise retighten all fasteners with a torque value greater than 85% of the nominal value to the nominal torque value indicated in the table, and in the order as shown in the illustration opposite.
c) Change, one by one and in the recommended order, all the fas-teners detected and marked in step (a) which have a torque value inferior to 85% of nominal value.
ONLY USE GENUINE PPM SPARE PARTS
Tighten to the value indicated in the table.

4 – Systematic exchange :

All slewing ring fasteners, and the slewing ring itself, must be changed every 8000 hours. This job must be carried out by per-sonnel authorized by PPM.

ONLY USE GENUINE PPM SPARE PARTS

5 – Retightening fasteners after their exchange :

Retightening of the slewing ring fasteners must be carried out when fasteners have been exchanged or the slewing ring has been exchanged, therefore a new set of fasteners has been employed, after a bedding–in period of 500 working hours.
Afterwards, periodic torque value verifications are to be carried out every 1000 hours.

Preventive maintenance

Introduction

The environmental working conditions of the machine gouvern its maintenance.The prescribed check–list which follows indicate the points to be verified and the frequency of the verifications.

The check–list takes into account the machine's utilization conditions. The type of work to be done, the dimensions of loads, climatic and ground conditions are all factors to be taken into account.The preventive maintenance lists are given in function of the number of hours worked by the machine.

Any modification to the overall maintenance program must be accompanied by a revision of the machine's new utilization conditions. Carefully study the preventive maintenance check–list before making any changes to the verification frequencies.

The lubrification charts indicate the general greasing points and the type of lubricant to be used on each component

Use the prescribed Check–list

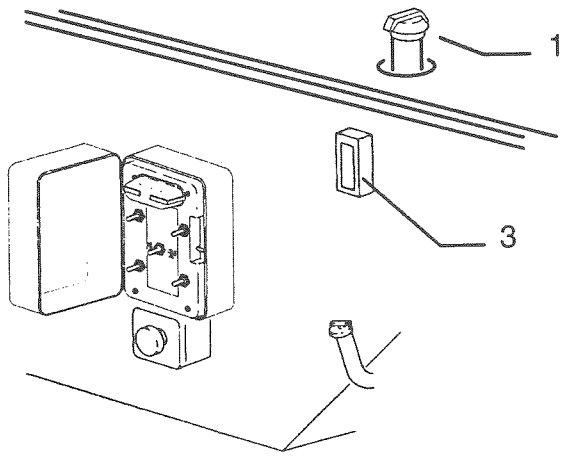
The check–list is an initial guide to preventive maintenance until personal experience allows the definition of an appropriate maintenance program according to different conditions of utilization.

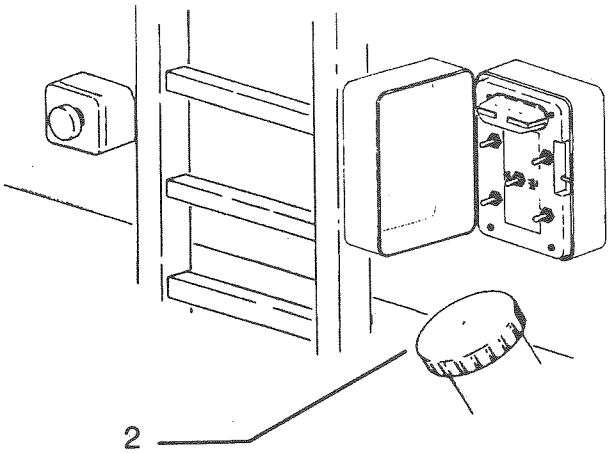
The following check–lists explain the procedures and are classed in a maintenance frequency order.

The check–lists can be recopied as many times as necessary. Any person who carries out a maintenance procedure must indicate this on the checklist so that it can be verified as being done at the moment of the following maintenance program. Completed check–lists are documents which are an integral part of the machine.

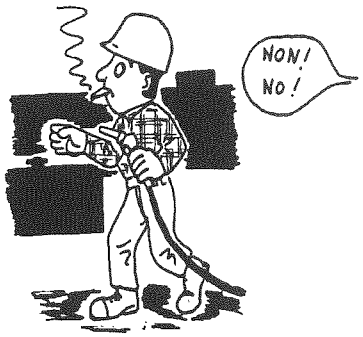
Hydraulic tank and fuel tank levels

1/ Hydraulic oil tank filler cap
2/ Fuel tank filler cap
3/ Hydraulic oil level (Mini – Maxi)





Check level: every ten hours



– Machine on a flat surface
– All rams retracted
– Horizontal boom

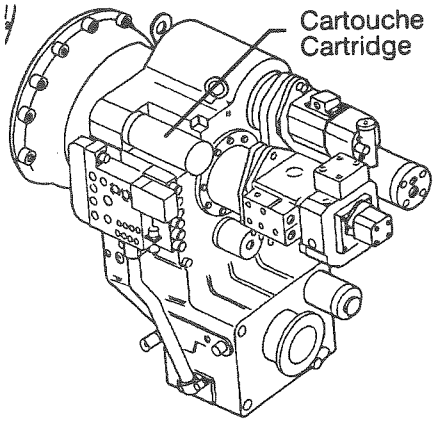
Topping up

By filler cap no. 1 for hydraulic oil, and by filler cap no. 2 for fuel.

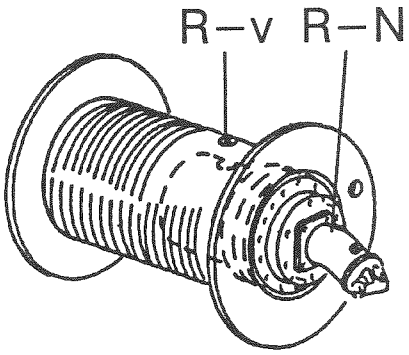
Do not smoke when filling the fuel tank, the fumes are inflammable

Transmission : convertor + powershift unit

Replace the oil filter cartridge and clean the filter location on the convertor. Oil the seal on the filter before fitting hand tighten the filter cartridge .



Winch reducer gear



Check level : every 200 hours (plug R–N)
Capcity : 4 L for 5 t winch
1 L for 3,3 t winch

Steering block

Check the oil level in steering block

Daily inspection
All cables which are in daily active use must be visually inspected every day wherever possible. This consists of a simple visual inspection where no measures are made, whose aim is to detect visible alterations and deformations.However, it is also recommende to make reasonably regular inspections which involve fully unwinding the cable for inspection over the whole length, and particularly on attachment points which are normally awkward to get access to.

Periodic inspections
On regular working mobile cranes : every week.

Brakes

Visually check the brake linings.Check the tightness of brake pipe castle nuts.Torque setting : 160Ndan. This check has to be carried out during the first warranty visit, then every 500 hours.

FOLIOS	FONCTIONS TRAITEES	INDICE	A DIFF	INDICE	A DIFF	INDICE	A DIFF	INDICE	A DIFF	INDICE	A DIFF	INDICE	A DIFF	INDICE	A DIFF
0	RECAPITULATIF FOLIOS AVEC INDICES DE MODIF	A	OUI	B	OUI	C	OUI	D	OUI	E	OUI	F	OUI		
1	DEMARRAGE MOTEUR THERMIQUE ET CHARGE BATTERIES	A	OUI	A	NON	A	NON	D	OUI	D	NON	D	NON		
2	RALENTISSEUR/PRECHAUF. MOTEUR/COMPTEUR VITESSES	A	OUI	A	NON	A	NON	D	OUI	D	NON	D	NON		
3	TEMOINS ALERTES DIVERSES AVEC TEST PORTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
4	TEMOINS ALERTES ET RECEPTEURS DIVERS PORTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
5	COMMANDE BOITE DE VITESSES CABINE PORTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
6	DIRECTION ARRIERE PORTEUR	A	OUI	B	OUI	B	NON	B	NON	B	NON	B	NON		
7	SECURITE CLIMATISATION TOURELLE+EPURATEUR AIR+CEC	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
8	BLOCAGE SUSPENSION AV-AR + AFFALEMENT MACHINE	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
9	CRABOTAGE PONT AVANT/DIFFERENTIELS/STOP MOTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
10	POUTRES ET STABS PORTEUR	A	OUI	B	OUI	B	NON	B	NON	E	OUI	F	OUI		
11	FEUX ROUTE/INDICATEURS DIRECTION/KLAXON PORTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
12	FEUX POSITION/RECUL/BROUILLARD AR/STOPS PORTEUR	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
13	FONCTIONS CABINE PORTEUR	A	OUI	A	NON	C	OUI	C	NON	C	NON	C	NON		
14	DEMARRAGE ET ALERTE GENERALE TOURELLE	A	OUI	A	NON	A	NON	D	OUI	D	NON	D	NON		
15	COMMANDE BOITE DE VITESSES CABINE TOURELLE	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
16	SUSPENSION/PONT AVANT/DIFFERENTIELS/STOP TOURELLE	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
17	POUTRES/STABS/DIRECTION ARRIERE TOURELLE	A	OUI	B	OUI	B	NON	B	NON	B	NON	B	NON		
18	FONCTIONS CABINE TOURELLE	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
19	CEC PPM TYPE DS 350C	A	OUI	B	OUI	C	OUI	D	OUI	D	NON	D	NON		
20	SECURITES FONCTIONS GRUE/3 TRS MORTS/REL. MONTEE	A	OUI	B	OUI	C	OUI	D	OUI	D	NON	D	NON		
21	VERROU. ELEMENT FLECHE/CLIMAT/REL. HYD. EXTENSION	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		
22	FLECHE / FLECHETTE	A	OUI	A	NON	C	OUI	C	NON	C	NON	C	NON		
23	TABLEAU FONCTIONNEMENT BOITE DE VITESSES	A	OUI	A	NON	A	NON	A	NON	A	NON	A	NON		

MODIF	7783	7941	7907	8016	8123	8157
DATE MODIF	30/11/92	24/12/92	10/02/93	16/04/93	12/07/93	01/10/93
FAIT PAR	BOSELLO C	BOSELLO C	BOSELLO C	BOSELLO C	BOSELLO C	BOSELLO C

SCHEMA ELECTRIQUE QUADRAL *ELECTRIC DIAGRAM QUADRAL*	CREATION SRI 7783	RECAPITULATIF FOLIOS AVEC INDICES DE MODIF	CR 104141	F	FOLIO 0

CONTENU DU FOLIO 4 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	DESIGNATION DE LA FONCTION ELECTRIQUE
153	TEMOIN DE CHARGE BATTERIES
156	TEMOIN PASSAGE EN PHASE CONVERTISSEUR
158	TEMOIN FREIN DE PARC
160	ALERTE SERVO DIRECTION PORTEUR
162	ALERTE SERVO DIRECTION PORTEUR [CIRCUIT 2]
166	COMPTE-TOURS MOTEUR THERMIQUE + COMPTEUR HORAIRE
169	PRESSION HUILE EMBRAYAGE
172	VOLTMETRE [MOTEUR CUMMINS]
174	ALERTE PRESSION HUILE MOTEUR THERMIQUE
176	ALERTE PRESSION HUILE MOTEUR THERMIQUE
178	PRESSION HUILE MOTEUR THERMIQUE
180	ALERTE TEMPERATURE EAU MOTEUR THERMIQUE
182	TEMPERATURE EAU MOTEUR THERMIQUE
184	ALERTE PRESSION AIR FREINS AVANTS
186	PRESSION AIR CIRCUIT FREINAGE AVANT
188	ALERTE PRESSION AIR FREINS ARRIERES
190	PRESSION AIR CIRCUIT FREINAGE ARRIERE
192	ALERTE TEMPERATURE HUILE CONVERTISSEUR
194	TEMPERATURE HUILE CONVERTISSEUR
196	JAUGE A GAS OIL

CONTENT OF FOLIO 4 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	ELECTRIC FUNCTIONS NAME
153	BATTERIES CHARGE INDICATOR LAMP
156	TORQUE CONVERTOR PHASE INDICATOR
158	PARKING BRAKE INDICATOR
160	CARRIER/SERVO STEERING WARNING LIGHT
162	CARRIER/SERVO STEERING WARNING LIGHT [CIRCUIT 2]
166	REVOLUTION COUNTER + HOURMETER
169	CLUTCH OIL PRESSURE GAUGE
172	VOLTMETER [CUMMINS ENGINE]
174	ENGINE OIL PRESSURE WARNING LIGHT
176	ENGINE OIL PRESSURE WARNING LIGHT
178	ENGINE OIL PRESSURE GAUGE
180	ENGINE WATER OVERHEATING WARNING LIGHT
182	ENGINE WATER TEMPERATURE INDICATOR
184	FRONT BRAKES AIR PRESSURE WARNING LIGHT
186	FRONT AIR BRAKE PRESSURE GAUGE
188	REAR BRAKES AIR PRESSURE WARNING LIGHT
190	REAR AIR BRAKE PRESSURE
192	CONVERTER OIL TEMPERATURE WARNING LIGHT
194	CONVERTER OIL TEMPERATURE GAUGE
196	FUEL GAUGE

CONTENU DU FOLIO 9 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	DESIGNATION DE LA FONCTION ELECTRIQUE
405	CRABOTAGE PONT AVANT PORTEUR
407	DECRABOTAGE PONT AVANT PORTEUR
416	STOP MOTEUR THERMIQUE
424	ETOUFFOIR MOTEUR THERMIQUE [OPTION]
431	TEMOIN CRABOTAGE PONT AVANT PORTEUR
435	BLOCAGE DIFFERENTIEL INTER-ROUES AVANT
439	TEMOIN PORTEUR BLOCAGE DIFFERENTIEL INTER-ROUES AVANT
441	BLOCAGE DIFFERENTIEL INTER-ROUES ARRIERE
445	TEMOIN PORTEUR BLOCAGE DIFFERENTIEL INTER-ROUES ARRIERE

CONTENT OF FOLIO 9 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	ELECTRIC FUNCTIONS NAME
405	CARRIER/FRONT AXLE RELEASING
407	CARRIER/FRONT AXLE LOCKING
416	ENGINE STOP
424	EXHAUST BRAKE [OPTION]
431	CARRIER/FRONT AXLE LOCKING INDICATOR
435	FRONT INTER WHEELS DIFFERENTIAL LOCKING
439	CARRIER/FRONT INTER-WHEELS DIFFERENTIAL LOCKING INDICATOR
441	REAR INTER WHEELS DIFFERENTIAL LOCKING
445	CARRIER/REAR INTER-WHEELS DIFFERENTIAL LOCKING INDICATOR

CONTENU DU FOLIO 14 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	DESIGNATION DE LA FONCTION ELECTRIQUE
676	COLLECTEUR ELECTRIQUE 50 PISTES LIAISON PORTEUR-TOURELLE
688	TEMOIN ALERTE FONCTIONS MOTEUR/CONVERTISSEUR/FREINAGE/FILTRE
692	ALERTE SONORE FONCTIONS MOTEUR/CONVERTISSEUR/FREINAGE/FILTRE
695	CONVERTISSEUR DE TENSION 24V/12V CONTINUS
696	AUTORADIO CASSETTES-STEREO CABINE TOURELLE

CONTENT OF FOLIO 14 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

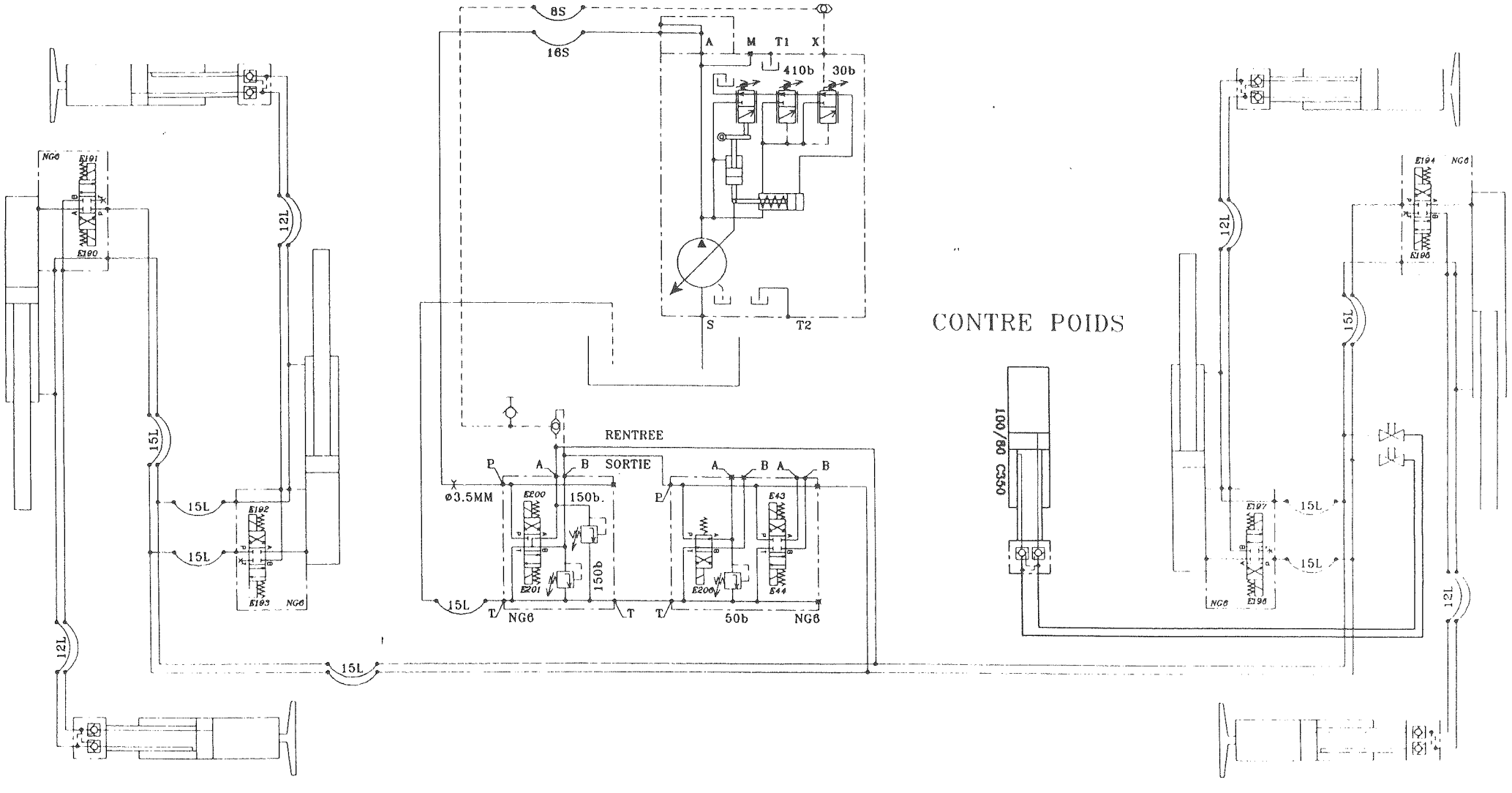
REP	ELECTRIC FUNCTIONS NAME
676	ELECTRICAL SLIP RING LINKAGE TURRET-CARRIER
688	ENGINE/CONVERTER/BRAKES/FILTERS WARNING LIGHT
692	ENGINE/CONVERTER/BRAKES/FILTERS BUZZER
695	24V/12V VOLTAGE CONVERTER
696	TURRET/CAB RADIO

CONTENU DU FOLIO 19 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	DESIGNATION DE LA FONCTION ELECTRIQUE
904	CLE DE SHUNTAGE CEC
906	RELAIS ALIMENTATION CEC ET PLATINE SHUNT
907	AVERTISSEUR SONORE SHUNTAGE CEC
908	RELAIS AUTORISATION UTILISATION CEC
909	RELAIS ALIMENTATION FONCTIONS GRUE
914	SONDE PRISE DE PRESSION FOND DE VERIN RELEVAGE
919	SONDE PRISE DE PRESSION TIGE DE VERIN RELEVAGE
927	RELAIS AUTORISATION TRAVAIL GRUE
930	BOITIER DE DEVERS [OPTION NORMES FRANCE]
935	COLLECTEUR ELECTRIQUE 50 PISTES LIAISON PORTEUR-TOURELLE
940	TEMOIN ZONE DE TRAVAIL SUR ARRIERE
941	CONTROLEUR ETAT DE CHARGES MACHINE
942	SECURITE COUPURE TELESCOPAGE SORTIE [OPTION]

CONTENT OF FOLIO 19 - SCHEMA CR104141F - QUADRAL - 1-OCT-1993

REP	ELECTRIC FUNCTIONS NAME
904	SLI OVERIDE KEY
906	SLI SUPPLY RELAY
907	SLI OVERIDE ALARM HORN
908	RELAY ALLOWING SLI USE
909	SUPPLY RELAY FOR CRANE MOTIONS
914	BIG CHAMBER SLI PRESSURE GAUGE
919	SMALL CHAMBER SLI PRESSURE GAUGE
927	RELAY ALLOWING CRANE MOTIONS
930	TILT SWITCH BOX [FRENCH OPTION]
935	ELECTRICAL SLIP RING LINKAGE TURRET-CARRIER
940	WORKING AREA INDICATOR
941	SAFETY LOAD INDICATOR
942	TELES OUT MOTION CUT OFF [OPTION]



Date	Nom	Etait avant modification					No Modif
Lt PROTO	Date :	Nom:	No	Lt SERIE	Date :	Nom:	No
Premiere Utilisation :							
CdG :							
Poids calcule en KG :							
Piece brute :							
Matiere :							
Verifie le : par :							
Dessine le : 4/93 par : SOWA							

PPM ZI La Saule 71304 MONTCEAU LES MINES

OPTION CONTRE POIDS

Feuille	Ech :		CI	CR 104755
1/	/	A		

3 System description

The PAT DS 350 C load moment indicator consists of a central microprocessor unit, operator's console, a length/angle sensor, pressure transducers and anti-two-block switches.

The system operates according to the principle of reference/actual comparison. The actual values resulting from the force or pressure measurement are compared to the reference data stored in the central processor memory and evaluated in the microprocessor. When reaching the limits an overload warning signal is generated at the operator's console. Simultaneously, the dangerous crane movements such as hoist up, telescope out and boom down are cut-off.

The crane-specific data, i.e. load chart, boom weights, centres of gravity and dimensions are stored in the memory boards of the central unit. These data represent the reference values for the calculation of the operating conditions.

Boom length and boom angle are registered by the length/angle sensor installed inside of the cable reel mounted on the lateral side of the boom. The boom length is measured by the length sensor rope which also serves for the transmission of the anti-two block switch signal.

The crane load is measured by pressure transducers mounted to the piston and rod side of the hoist cylinder.

3.1 System Function

The PAT Load Moment Indicator (LMI) PAT DS350C has an operator's prompting simplifying the work with the crane and the LMI. When having started the engine the system executes an automatic test of the LMI-System, the lamps and the audible signals. In case of an error the respective error code is displayed on the console.

After the automatic test the crane operator has to adjust the operating mode corresponding to the operating condition of the crane. Then, the system is ready for operation.

3.2 Operator's console

The console has got two functions:

- input unit for instructions to the system by the crane operator
- display of important data, information and instructions

Figure 1 illustrates the display and control elements of the console.