



647123EN (09/06/2016)

160 ATJ EURO 3
180 ATJ 2 EURO 3

REPAIR MANUAL

DATE OF ISSUE	OBSERVATION
19 / 09 / 2012	1 st PUBLICATION DATE
19 / 03 / 2013	UPDATE (ADDITION OF THE 180 ATJ 2 EURO 3)
02 / 05 / 2013	UPDATE (ref. CP-NI 547>647, addition ref MR DANA axle som30, modification of hydraulic diagram 70-02, addition of machine selection 80-04, modification speed settings 80-04)
19 / 11 / 2013	UPDATE (10-04 ENGINE VALUES, 20-04 HYDRAULIC VALUES, 20-06 HYDROSTATIC ENGINE REMOVAL, 70-02 HYDRAULIC DIAGRAM, 70-04 HYDRAULIC VALUES, 80-01 LOCATION AND BUNDLES, 80-02 ELECTRIC DIAGRAM, 80-04 NEW UPC
23 / 12 / 2015	UPDATE : Update electric localisation et electric diagrams
31 / 05 / 2016	UPDATE : separation of V2 and V3 electrical diagrams
09 / 06 / 2016	UPDATE : ELECTRICAL CONTROL AND ADJUSTMENT (ASSIST)

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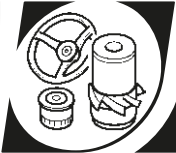
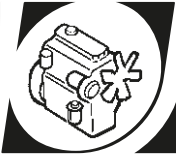
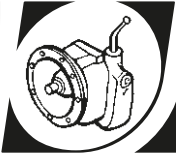
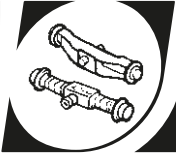
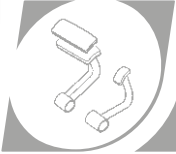
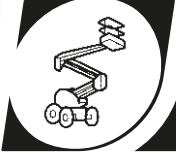
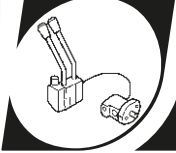
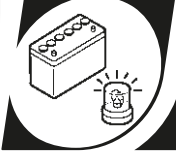
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RULES FOR MAINTENANCE Do not carry out any work on the machine unless you have followed a suitable training course and have the knowledge required for it. Make sure you have taken into consideration all the indicator plates on the machine and in the instruction manual.	
	Be careful not to burn yourself when touching hot liquids or parts when operations have to be done before the machine has had time to cool down.
	Before carrying out any operation on an electrically powered component, activate the battery cut-off. If the telehandler does not have a battery isolation device, disconnect the battery connectors then re-assemble them.
	Before carrying out any welding operations, think about disconnecting computers.
	A machine operating in a contaminated environment should be specifically equipped. Moreover, local safety notices deal with maintenance and repair work on such machines.



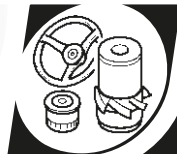
547982 : See the repair manual N° 547982.



70 - HYDRAULIC : See the group N° 70 called «Hydraulic».

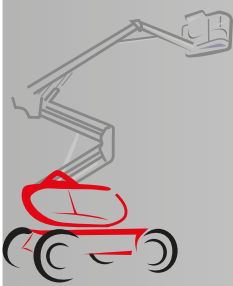
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GENERAL



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- **GENERAL INSTRUCTIONS AND SAFETY NOTICE**
- **GENERAL CONTROL AND ADJUSTMENT**



GENERAL INSTRUCTIONS AND SAFETY NOTICE

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GENERAL INSTRUCTIONS

This chapter sets out the safety instructions to be followed when carrying out repairs on an access platform.

Maintenance or repairs other than those detailed in part: 3 - MAINTENANCE OF THE OPERATOR'S MANUAL for the platform, are to be carried out by qualified personnel (consult your dealer) and under optimum safety conditions to maintain the health of the operator and of others, as well as to avoid damage to the platform.

Insofar that the platform manufacturer does not directly control maintenance or repair operations, the operator and the manager in charge of the establishment shall be responsible for the safety of these processes.

 **BEWARE OF LEAKS - Diesel fuel or hydraulic fluid escaping under high pressure may pierce the skin and cause serious injury. In the event of injury due to a pressurised liquid jet, immediately consult a doctor.**

FRONT and rear are indicated in the figures for ease of understanding.
For information:

PLATFORM TYPE	FRONT	REAR
ARTICULATED	Counterweight	Basket
SCISSOR	Steering axle	Steps
VERTICAL MAST	Counterweight	Basket
TRUCK-MOUNTED PLATFORM	Driver's cab	Basket
TELESCOPIC	Basket extension	Steps

As our policy is one of constant improvement of our products, our range of access platforms may undergo certain modifications, without obligation for us to advise our customers.

SPARE PARTS

Our platforms must be serviced using original MANITOU parts.

BY ALLOWING THE USE OF NON ORIGINAL MANITOU PARTS, YOU RISK:

- Legally, to be held responsible in the event of an accident.
- Technically, to cause operating malfunctions or shorten the life of the lift truck.

The use of counterfeit parts or components not approved by the manufacturer, will cause you to lose the benefit of the contractual guarantee. BY USING ORIGINAL MANITOU PARTS FOR MAINTENANCE OPERATIONS:

YOU BENEFIT FROM OUR KNOW-HOW.

Through its network, MANITOU provides the user with:

- Know-how and competence.
- The guarantee of high-quality work.
- Original replacement parts.
- Help with preventive maintenance.
- Efficient diagnostic help.
- Improvements due to feedback.
- Operator training.

Only the MANITOU network has detailed knowledge of the design of the access platform and therefore the best technical ability to provide maintenance.

FOR COMMERCIALLY-AVAILABLE COMPONENTS (CYLINDERS, ELECTRIC PUMP, SPEED CONTROLLER, CHARGER, ENGINE, ETC.) AND DURING THE PLATFORM GUARANTEE PERIOD:

- | | |
|---------------------|--|
| - Component removal | ALLOWED |
| - Component removal | FORMALLY FORBIDDEN AT THE RISK OF INVALIDATING THE GUARANTEE |

Original replacement parts are distributed exclusively by MANITOU and its dealer network.

The dealer network list is available on the MANITOU web site: www.manitou.com.

TECHNICAL DOCUMENTATION

READ and UNDERSTAND the contents of the OPERATOR'S MANUAL regarding the platform (this manual must be stored in the black storage compartment located in the platform basket). COMPLY in particular with the contents of Chapter 1 - *OPERATING AND SAFETY INSTRUCTIONS* as well as the sections marked with a DANGER symbol.

READ and UNDERSTAND the operating and/or safety instructions given by the STICKERS applied to the platform.

Before starting a procedure given in this REPAIR MANUAL, fully READ it and understand what you have read.

REPAIR PROCEDURES

GENERAL:

POSITION the platform within a horizontal working area that is clean, cleared of any objects and mark it out. If all of these conditions cannot be met (platform on site, in a cold store, etc.), chock the wheels, mark the platform and familiarise yourself with the hazards associated with the environment.

SWITCH OFF THE PLATFORM by means of the battery cut-off before starting a procedure (unless otherwise specified).

The procedure indicates when the weight of a component or an assembly of components exceeds 20 kg, requiring the use of HANDLING EQUIPMENT for removal, insofar as their characteristics (indicated on the manufacturer's plates or the tare plates) are suitable for the operation to be performed.

For cleaning, use non-flammable solvents approved for that purpose.

When removing or refitting a component, scrupulously follow the procedure step by step. Always complete the current stage before commencing the next.

If resistance is felt when removing a component: STOP. Check that the nuts, screws and cables have been removed and that there is no interference with adjoining components.

The most important factor in the preservation of the working life of the platform is to ensure that its vital components are kept very clean.

When it is not specified, refitting operations consist in performing the removal operations in reverse order.

MECHANICAL COMPONENTS:

Use screws having identical characteristics to the original screws and of an appropriate length.

Insofar that the procedures do not specify the values of the tightening torques to be applied to threaded fasteners, the appropriate standard values must be used to suit the characteristics of these fasteners.

HYDRAULICS

Certain hydraulic lines ARE UNDER VERY HIGH PRESSURE, even when the platform is not operating. In order to avoid any accidents:

- Follow the hydraulic line decompression procedure before servicing or repairing one of their components.

Certain cylinders are fitted with valves that are used to secure the platform the moment the movements are stopped, by maintaining hydraulic pressure in the chambers of the cylinder. As a result, a chambers of a cylinder that has been removed might be under VERY HIGH PRESSURE (in excess of 100 bar, in particular in the case of the tilt compensation circuit). You should:

- Perform the operations for decompressing the cylinder to be removed.
- Eliminate any pressure from the chambers of a cylinder before it is removed.

Prior to working on a hydraulic component, clean the area immediately around it, provide containers or rags to recover any fluid leakage during removal. Also provide caps and covers to plug openings and prevent the contamination of the circuit.

Covers, hatches, seals and filters are provided to ensure the purity of the hydraulic fluid and prevent contamination of the circuit. These parts therefore require to be periodically:

- Checked for damage.
- Kept clean.

A cloudy fluid indicates a high moisture content, which will lead to oxidation / corrosion of the circuit's metal components: drain and clean the whole of the circuit, then refill with fresh hydraulic fluid.

Should the circuit prove to be contaminated with foreign matter (metal, rubber, etc.), drain and clean the whole of the circuit then fill with fresh hydraulic fluid.

It is not recommended to mix hydraulic fluids of different types or makes insofar that they cannot be guaranteed to be of similar composition or viscosity.

Refer to Chapter 3 - *MAINTENANCE of the OPERATOR'S MANUAL* to select the appropriate oil for the use of the platform.

SYMBOLS

GENERAL:



GENERAL HAZARD

The associated text must be READ and UNDERSTOOD before continuing to the next stage of the procedure.



ELECTRICAL HAZARD

The associated text must be READ and UNDERSTOOD before continuing to the next stage of the procedure.



HIGH TEMPERATURE HAZARD

The associated text must be READ and UNDERSTOOD before continuing to the next stage of the procedure.



HYDRAULIC PRESSURE HAZARD

The associated text must be READ and UNDERSTOOD before continuing to the next stage of the procedure.



MINIMUM WEIGHT

Indicated in removal procedures, this sign enables the selection of the appropriate handling equipment.



647400EN

Refer to Operator's Manual no. 647400EN.



647400

Refer to spare parts catalogue no. 647400.



80-08-M.193EN

Refer to Chapter no. 80-08-M.193EN of the current repair manual.



§ B - 1

Refer to paragraph B - 1 of the current chapter.

(A1-1)

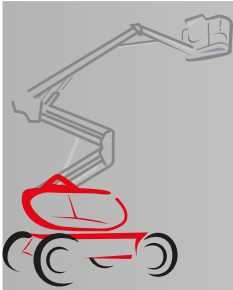
(Figure A1 - Item 1)



Indicates attachment points or bearing surfaces (for lift truck forks) to be used during removal operations.

SERVICING AND REPAIR EQUIPMENT

- Tool box.
- MANITOU hydraulic kit: Part no. to be selected from catalogue 647400.
- Male and female plug adapters for plugging hydraulic hoses and couplers.
- Calibrator: Part no. according to platform type, see the relevant chapter.
- Multimeter.



GENERAL CONTROL AND ADJUSTMENT

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STANDARD TIGHTENING TORQUES

Standard tightening torque to be used when not otherwise indicated in the removal and refitting operations:

- The following tightening torques are given for hexagon head screws without flanges and cylinder head hexagon socket screws.
- The torques are given for a friction coefficient $\mu = 0,20$ corresponding to dry-fitted zinc-plated fasteners and for torque tools having a $\pm 20\%$ class C tightening torque accuracy (equivalent to pneumatic screwdrivers).

NF E25-030-1 Screw / Nut connection:

Tightening torque in N.m ($\pm 20\%$)					
$\varnothing \times$ "coarse" pitch	Grade 8.8	Grade 10.9	$\varnothing \times$ "fine" pitch	Grade 8.8	Grade 10.9
M3 x 0,5	1	1,5	-	-	-
M4 x 0,7	2,4	3,5	-	-	-
M5 x 0,8	4,8	7,1	-	-	-
M6 x 1	8,2	12,1	-	-	-
M8 x 1,25	20	30	M8 x 1	22	32
M10 x 1,5	40	59	M10 x 1,25	43	63
			M10 x 1	46	68
M12 x 1,75	69	102	M12 x 1,5	74	108
			M12 x 1,25	78	115
M14 x 2	111	163	M14 x 1,5	123	181
M16 x 2	175	256	M16 x 1,5	190	279
M18 x 2,5	240	352	M18 x 1,5	279	410
M20 x 2,5	341	501	M20 x 1,5	391	574
M22 x 2,5	470	691	M22 x 1,5	531	780
M24 x 3	588	864	M24 x 2	659	967
M27 x 3	874	1284	M27 x 2	965	1418
M30 x 3,5	1181	1735	M30 x 2	1351	1984
M33 x 3,5	1614	2371	M33 x 2	1821	2674
M36 x 4	2068	3037	-	-	-



**For hexagon screws with flanges:
Apply a torque of accuracy + 10%.**



ENGINE



10

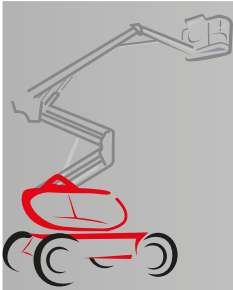
- **ENGINE COMPONENTS LOCATION**
- **ENGINE CONTROL AND ADJUSTMENT**
- **ENGINE REMOVAL**

- **ENGINE CHARACTERISTICS AND SPECIFICATIONS**
- **ENGINE IDENTIFICATION**
- **INSPECTION & MAINTENANCE**
- **SPECIFIC TOOLING**



647124EN

(KUBOTA V1505 ENGINE)

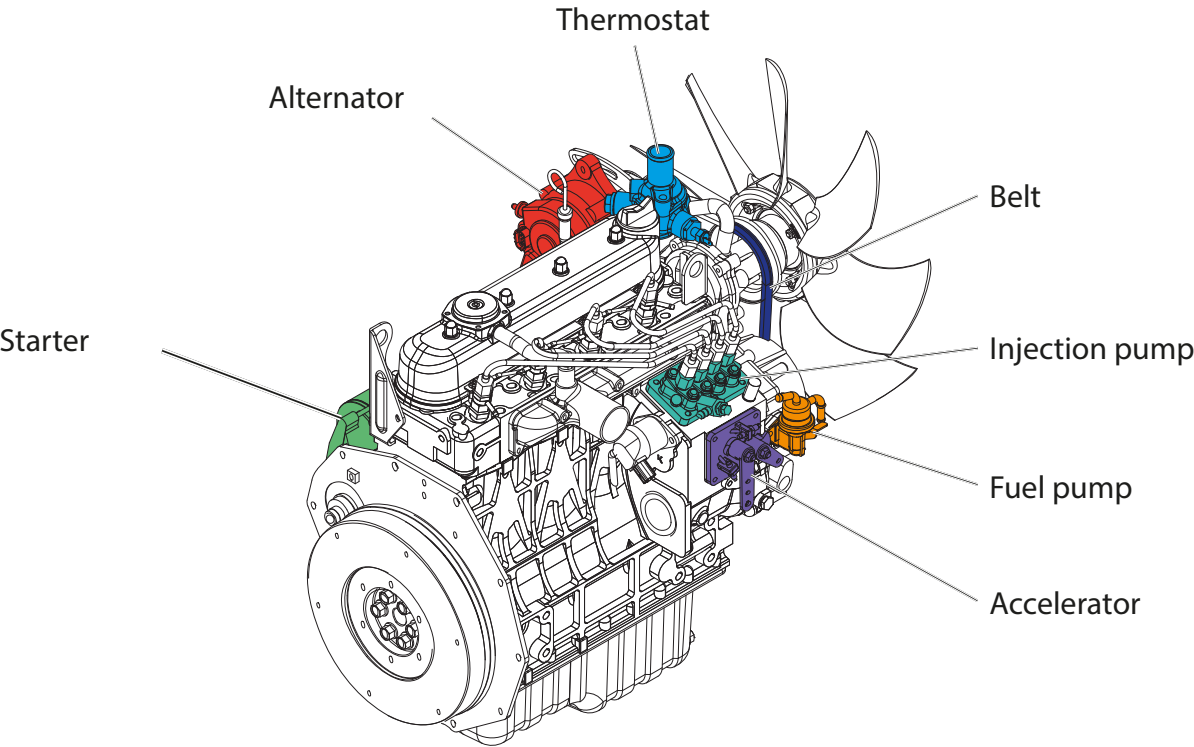
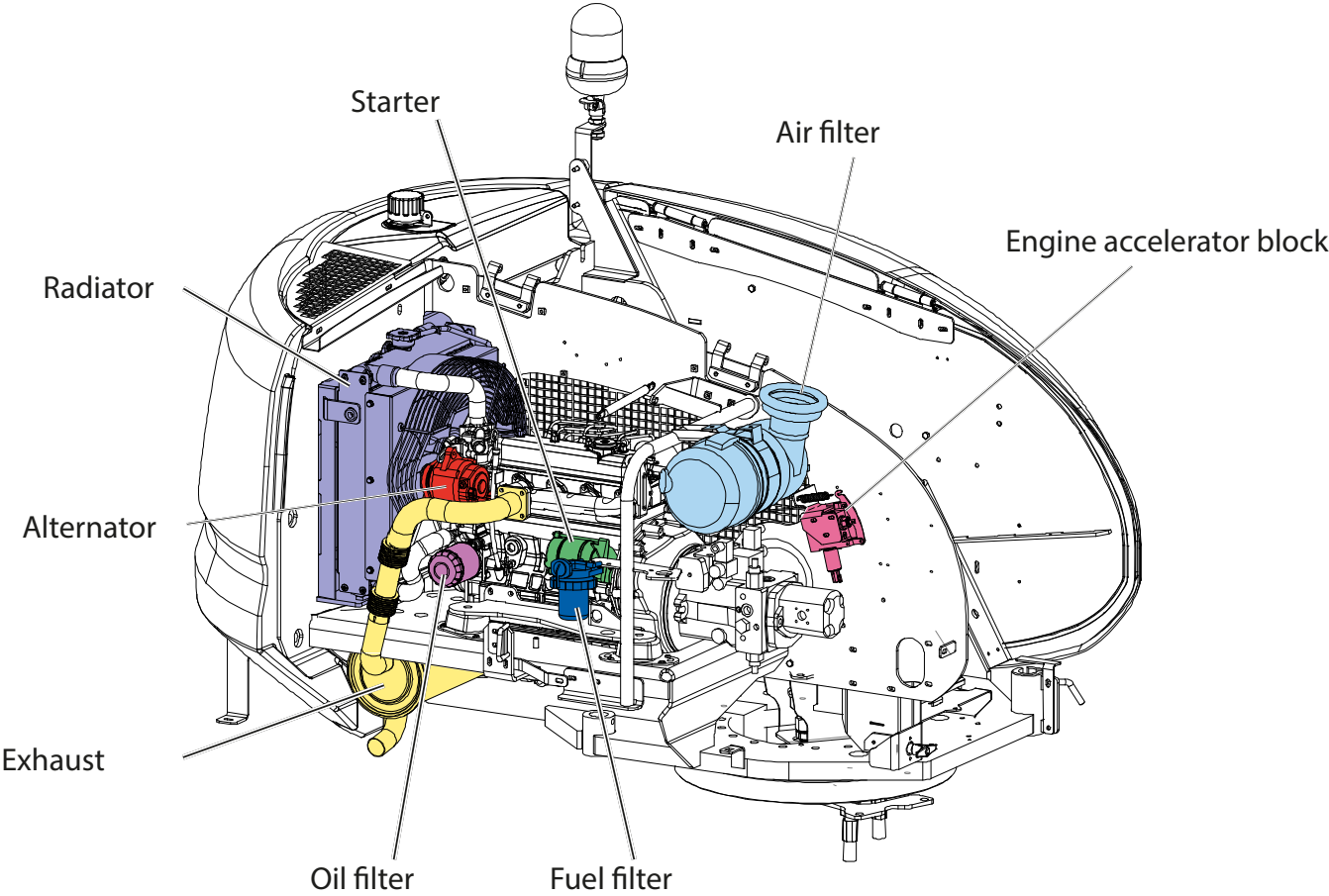


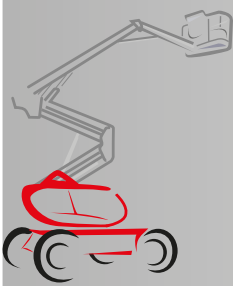
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ENGINE

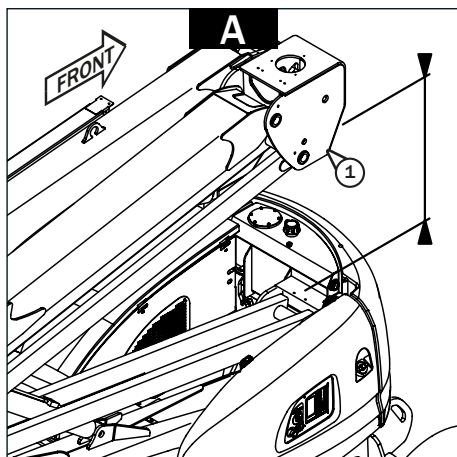
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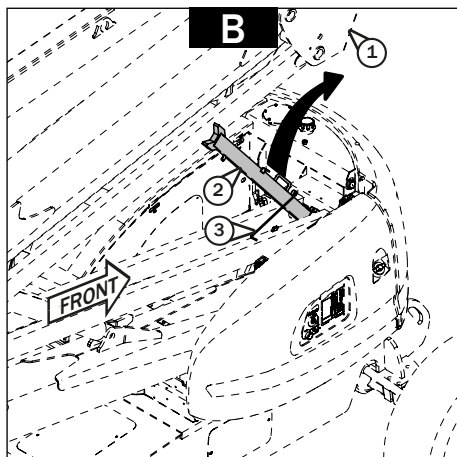
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PROPORTIONAL ENGINE SPEED BLOCK REMOVAL

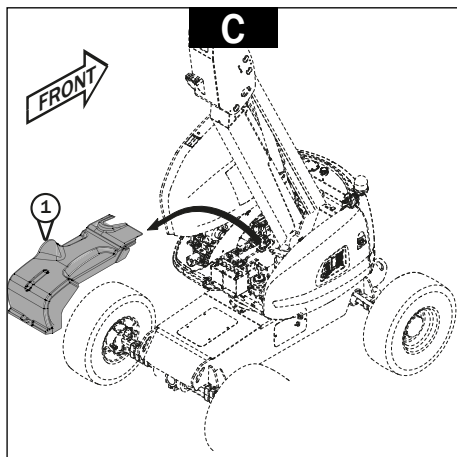
From the base console, raise arms 1/2 until the upper hinge (A-1) is one meter above the counterweight.



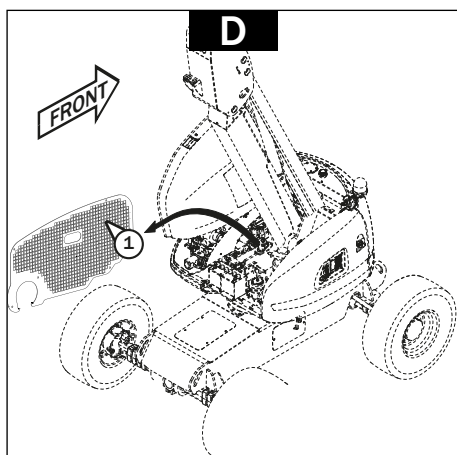
Climb onto the frame, remove the lock nut, manually raise the maintenance support arm (B-2) and place the strut (B-3).

From the base console, lower arms 1-2 until the upper hinge (B-1) comes into contact with the maintenance support arm, then release the controls.

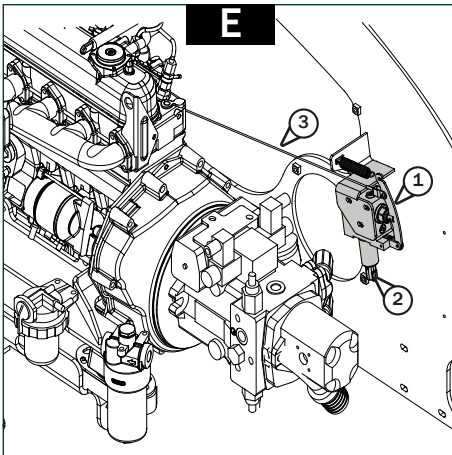
Switch off the engine.



Remove the battery cover (C-1).

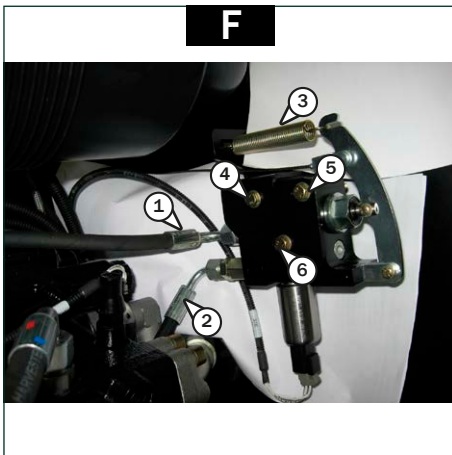


Remove the engine inspection cover (D-1).



Locate the proportional engine speed block (E-1) on the right-hand side of the engine.

Disconnect the power supply harness from the accelerator (E-2).

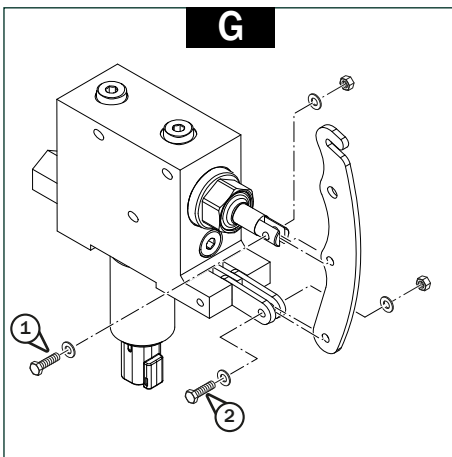


Disconnect the two hydraulic hoses (F-1) and (F-2) and mark them for easy refit.

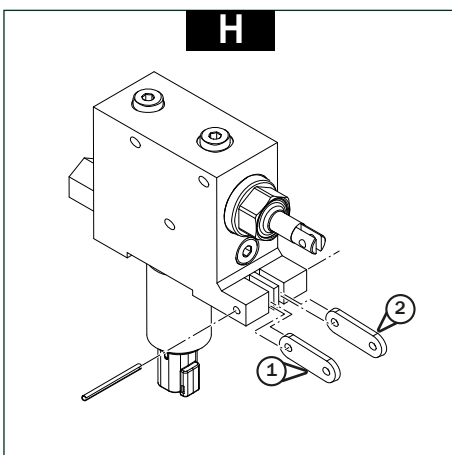
Place the plugs on the hoses.

Remove the accelerator cable (E-3) by removing its pin.

Remove the return spring (F-3).



Remove the link rod by undoing the two screws (G-1) and (G-2).

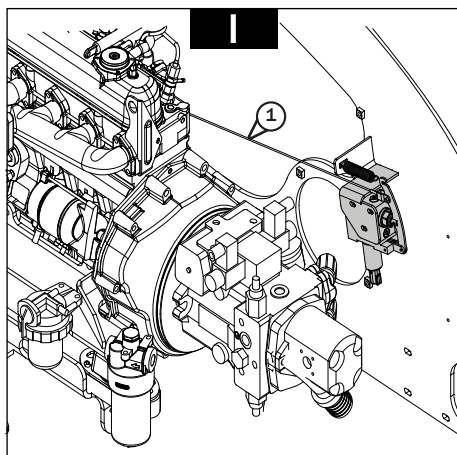


Remove the connecting rods (H-1) and (H-2) with a pin drift.

Remove the proportional engine speed block by undoing the three fastening screws (F-4), (F-5) and (F-6).

PROPORTIONAL ENGINE SPEED BLOCK REFIT

Perform the removal operations described above in reverse order then check the proportional engine speed block adjustment setting.



PROPORTIONAL ENGINE SPEED BLOCK ADJUSTMENT

Check the tension of the accelerator cable (I-1). Adjust if necessary with the adjustment screw located on the proportional engine speed block.

Turn the block so that the accelerator cable (I-1) is slightly tensioned by moving the block in the direction of the arrow (J).

Start the access platform and check that the engine speed is at 1000 ± 50 rpm.

If not, turn the proportional engine speed block until the desired value is reached.

Set the different engine speed thresholds in accordance with the procedure described below.

This procedure is to be performed only on a "hot" machine, with the hydraulic fluid at a temperature exceeding 40°C .

A tolerance of ± 50 rpm. shall apply to each threshold.

Press the Menu key (K-4), position yourself over the padlock using the $\leftarrow/\rightarrow$ keys (K-1) then press OK (K-3).

Enter the code "****" using the $+/ -$ keys (K-2), and confirm by pressing OK after each number.

Go to the "Calibration" icon (L-1) using the arrow keys.

Select the "Calibration accél. Moteur" (Engine accel. Calibration) group with the $+/ -$ keys (K-2) then confirm.

Check the cable tension by setting the max. engine speed to 3050 rpm.

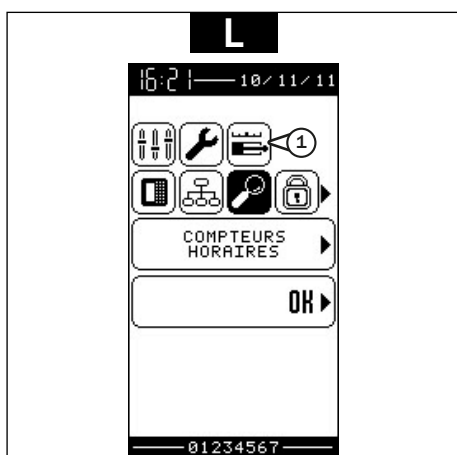
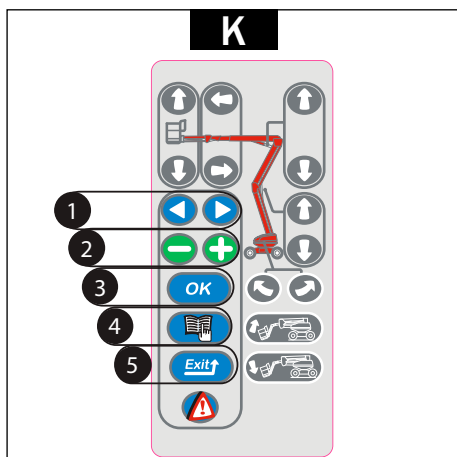
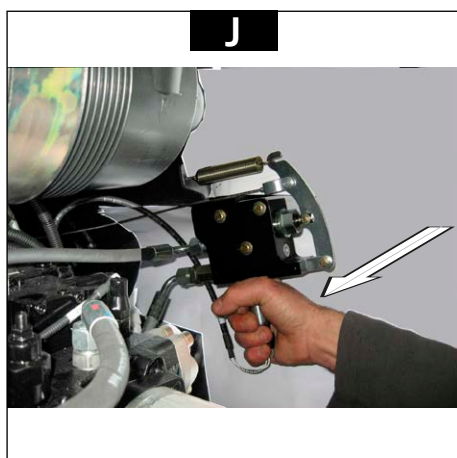
If threshold 5 cannot be set, check and modify the accelerator cable tension.

Next set the values of each threshold to obtain the desired results to within ± 20 rpm.

Between each threshold, press OK to cut-off acceleration then press OK again to initialize.

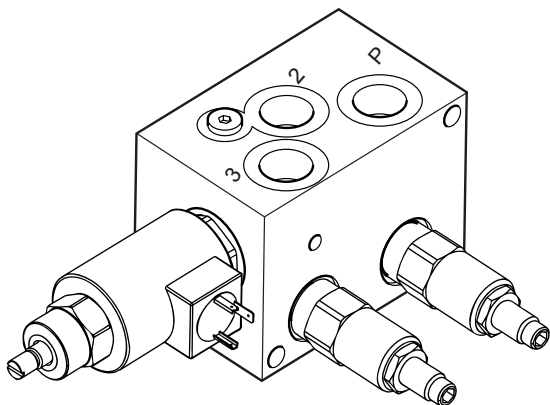
When calibration is completed, leave the "Calibration accél. Moteur" (Engine accel. Calibration) menu by pressing Exit (K-5).

Enter the "Sauvegarde des paramètres" (Save parameters) menu to record the values.

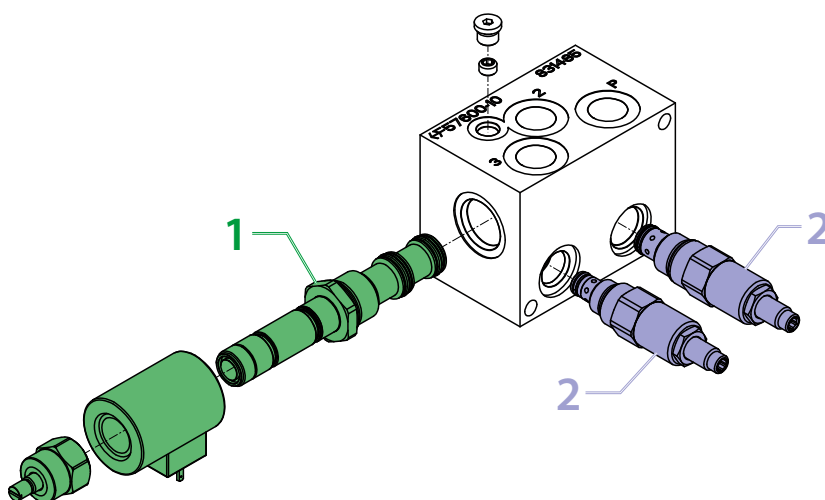
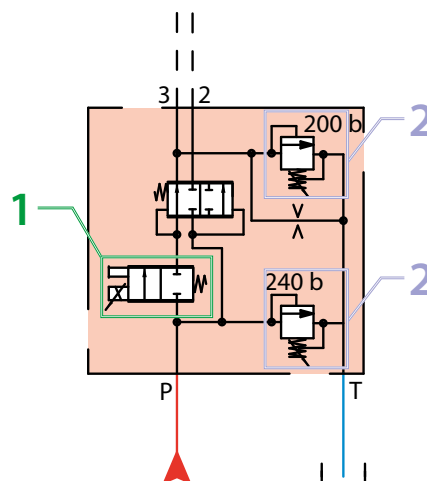


GENERATOR BLOCK*Values present (as an indication)*ROLE:

- Run the generator
- Cut the pressure according to the electrical instructions.

LEGEND:

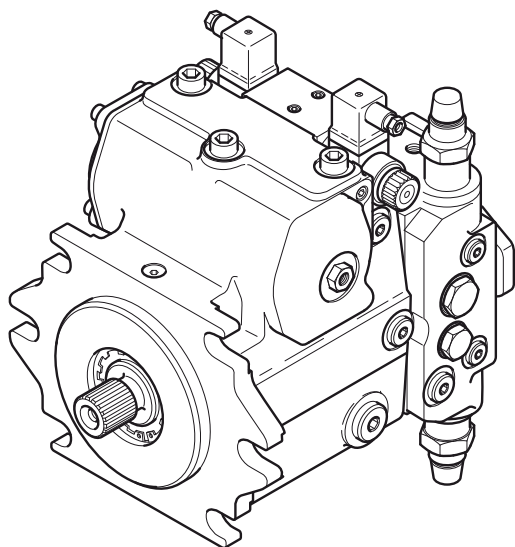
- 1 - NC proportional hydraulic slide valve
- 2 - HP restrictor



Note : _____

Values present (as an indication)

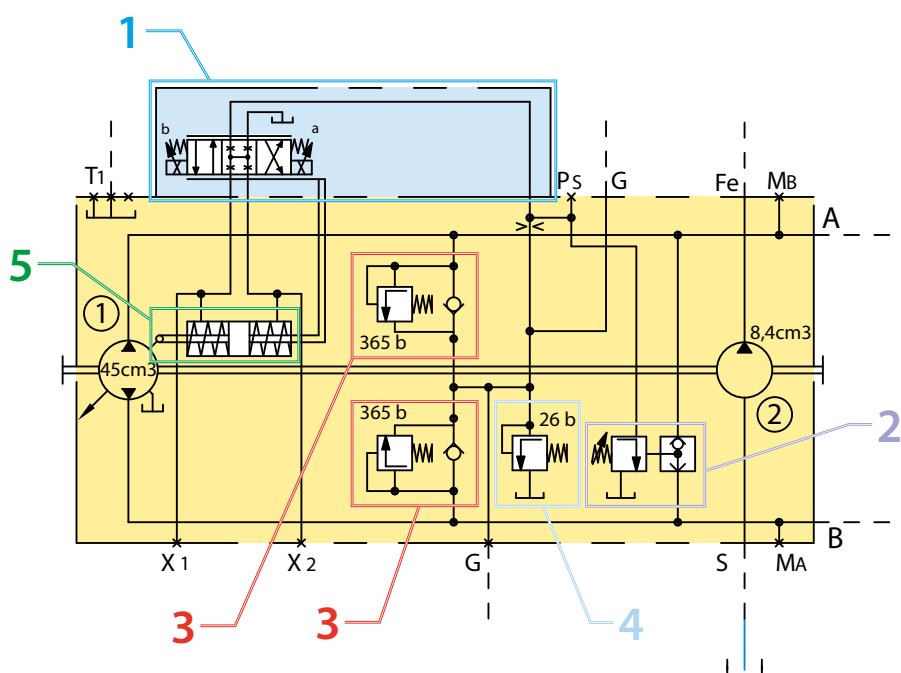
VARIABLE CAPACITY PUMP A10VG

Values present (as an indication)ROLE:

- Enables the machine to translate (forward / reverse movement)

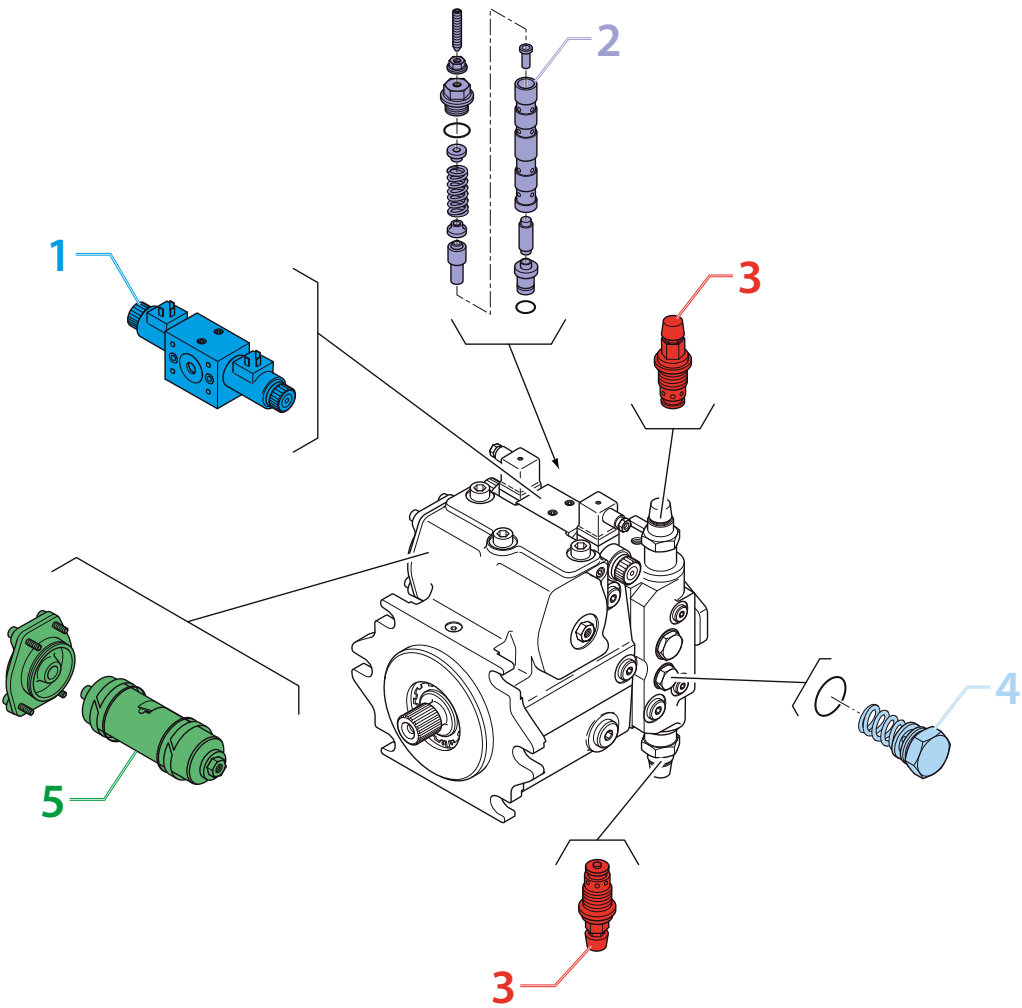
LEGEND:

- 1 - Proportional distributor (Forward / reverse movement)
- 2 - DR valve
- 3 - HP valve
- 4 - Force-feed pressure restrictor
- 5 - Servo-control piston



Note : _____

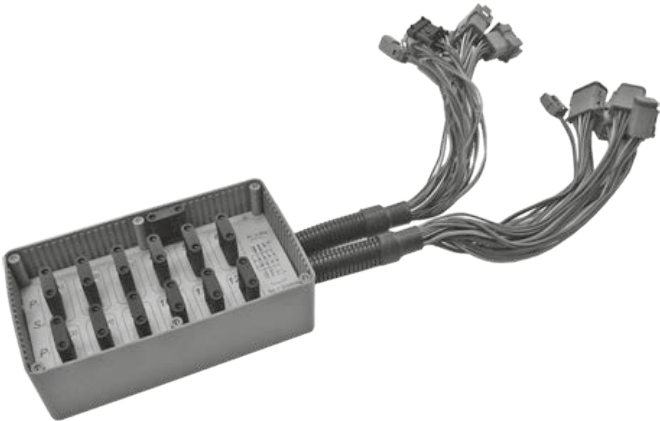
Values present (as an indication)



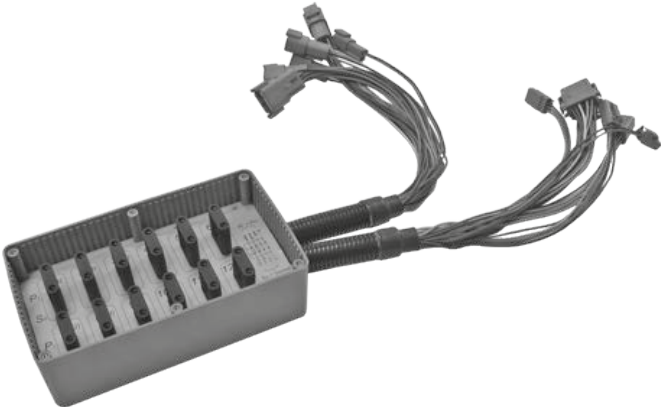


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BREAKOUT BOX KIT



Breakout box (DT connectors)



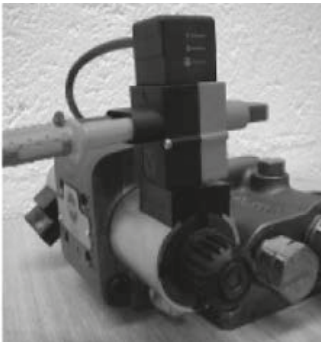
Breakout box (DTM connectors)

Breakout box kit 785503

Consisting of:

1.
- 1 breakout box (DT connectors)..... 785504
2.
- 1 breakout box (DTM connectors)..... 785505

ELECTROVALVE ADAPTER



Electrovalve adapter 662196