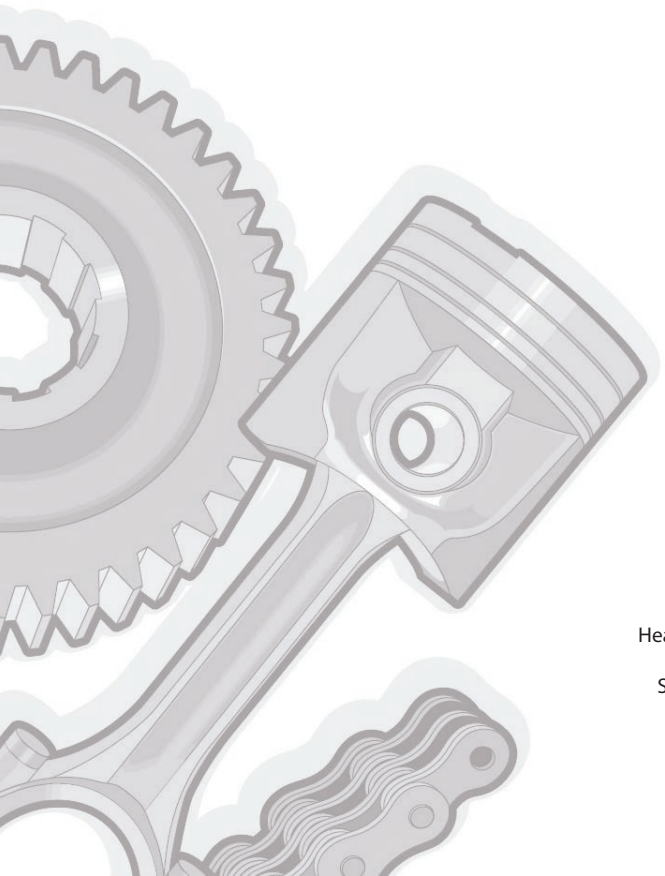
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MANITOU

REPAIR MANUAL
MANUEL DE RÉPARATION
REPARATURANLEITUNG
MANUAL DE REPARACIÓN
MANUALE RIPARAZIONE

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MANITOU BF
Head office: 430, Rue de l'Aubinière
44150 Ancenis - FRANCE
Share capital: 39,548,949 euros
857 802 508 RCS Nantes
Tel: +33 (0)2 40 09 10 11
www.manitou.com

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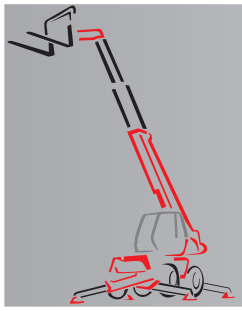
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- GENERAL INSTRUCTIONS AND SAFETY NOTICE

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GENERAL INSTRUCTIONS AND SAFETY NOTICE

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FOREWORD

This section contains general instructions and notes on safety for inspection and maintenance tasks.
Other instructions and warnings are given in the relevant competence sections.

In order to reduce accident risks, ensure the following:

- Follow the instructions given in the operator and maintenance manual for the fork lift truck.
  A manual is supplied with each truck.
- Comply with the instructions given in the safety manual.
- Use suitable instruments for all operations.
- Use original Manitou spare parts.

Failure to comply with the above increases the risk of accidents that can cause serious injury or even death.

If the operator follows the safety instructions and the truck is maintained correctly, factors such as efficiency, reliability and profitability are guaranteed.

When you see the symbol:



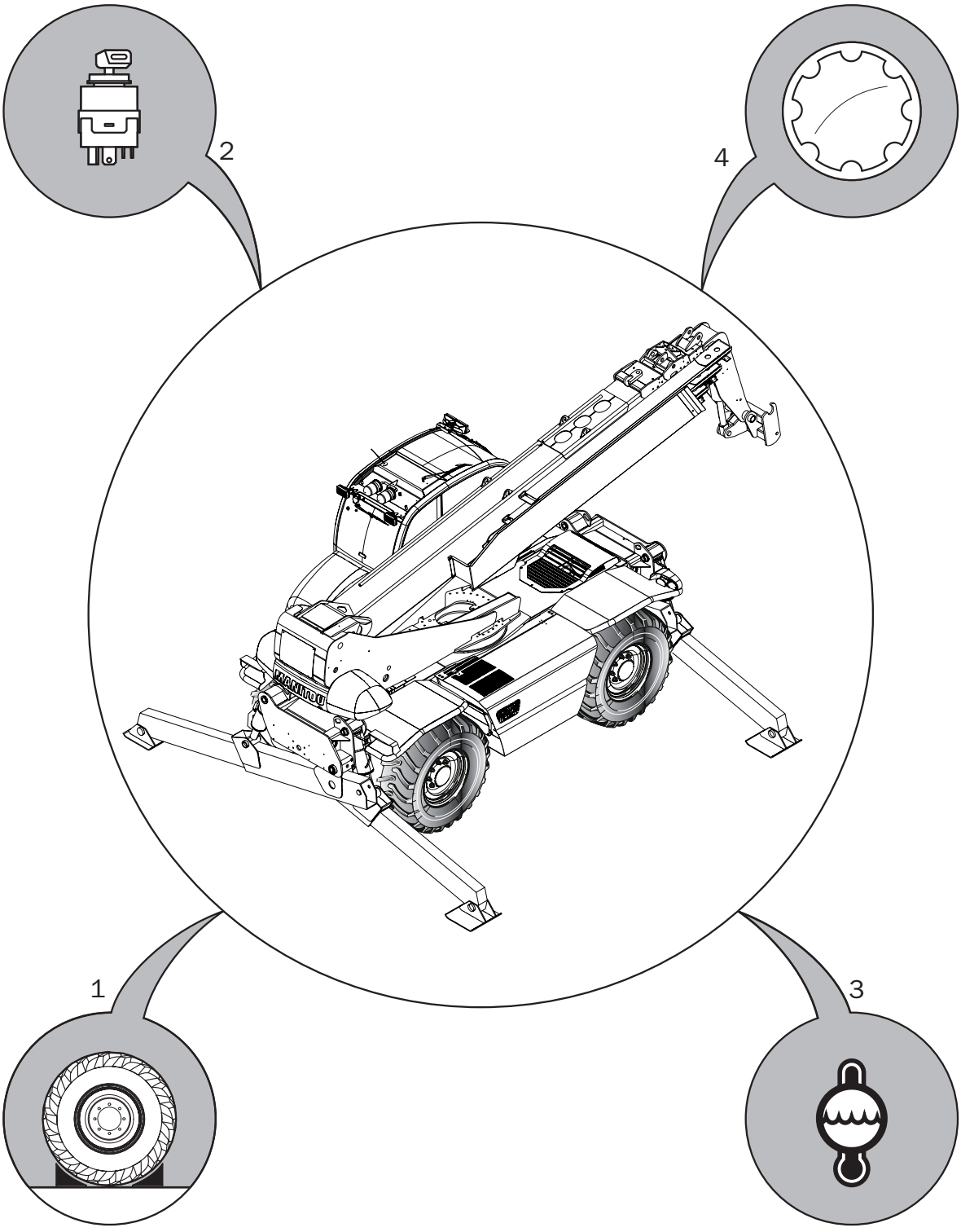
It means: Danger! Warning! Danger for your health, the safety of third parties or the safety of the fork lift truck itself.

The manufacturer cannot foresee all possible dangerous situations. Consequently, the safety instructions given in the safety manual may not cover all possible dangerous situations.
During repair and maintenance work or when driving the truck, the operator must always foresee any risk to his safety, that of others or to the equipment itself.

Manitou shall not be responsible for the use of any lifting equipment, instrument or method of operation other than those specified.

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POSITION FOR MAINTENANCE TASKS



Before any repair work:

1 - Position the machine on a level surface and lock the wheels.
2 - Stop the engine and remove the key from the ignition switch.
3 - Allow the machine to cool down.
4 - Depressurize all the circuits concerned.

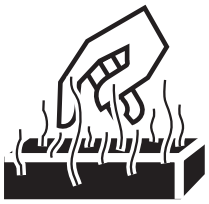
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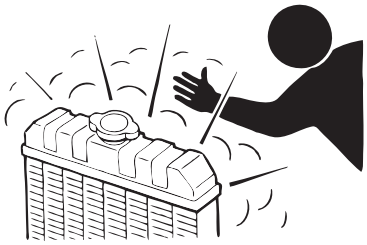
RULES FOR MAINTENANCE



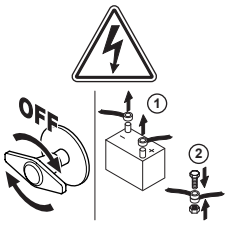
Do not carry out any work on the machine without the correct training and necessary knowledge.

Ensure that you have read all the labels on the machine and in the instruction manual.





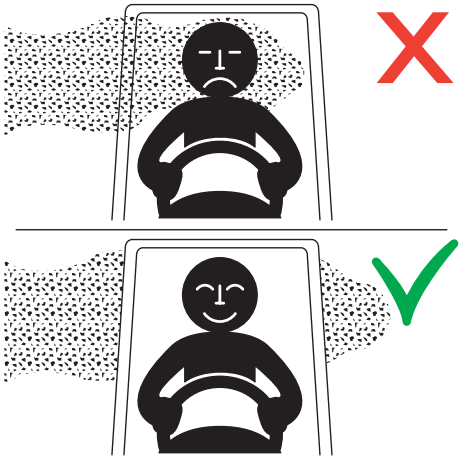
If work has to be done before the machine has had time to cool down, there is a danger of burns in the event of contact with hot liquids or parts.



Before carrying out any work on components with an electrical supply, set the battery switch to OFF.
If the machine does not have a battery switch, disconnect the battery terminals and then replace them later.



Before carrying out any welding work, disconnect the computers.



A machine that is operating in a contaminated environment (toxic or harmful to health) must be suitably equipped. The carrying out of maintenance and repair work on such machines is also subject to the local safety instructions.

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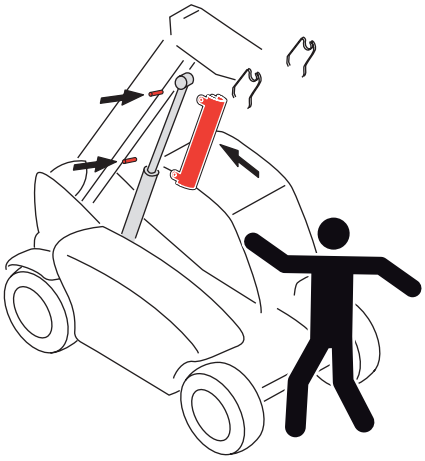


Do not walk on any part of the machine that was not designed for this purpose.



Never wear clothing, jewellery or objects that may become trapped while working and cause accidents

Always wear goggles, protective gloves and safety boots and any other protection necessary for the work to be carried out.



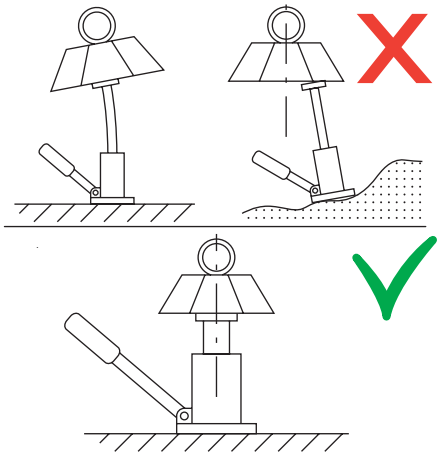
If maintenance work is carried out near to a movable object, ensure that it is firmly secured.





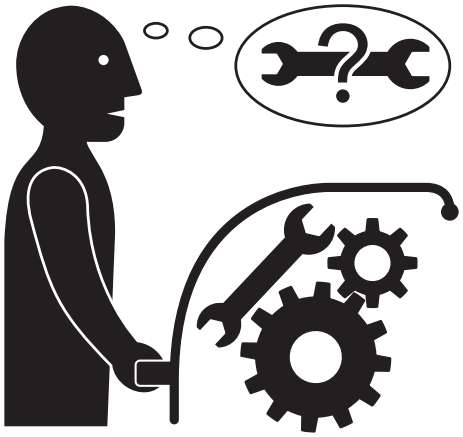
While replacing or draining oil or fuel, or other work with liquids, solids or gases that are harmful to the environment, ensure that all necessary precautions are taken to prevent environmental contamination.

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When lifting or propping up a component of the machine, ensure that the tools used are at least suitable for the load of the component to be lifted and that they comply with the national requirements for lifting devices.

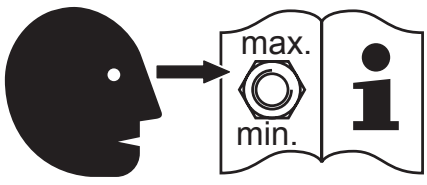
If a jack is used, ensure that it is used on a level, uniform surface, that it is strong enough to support the load, that its lifting range is sufficient and that it is correctly located and positioned under the machine.

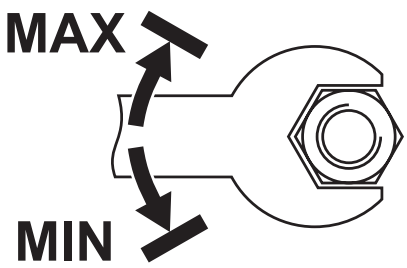


Ensure that there are no objects or instruments that could cause accidents if left in the machine.



Do not check for any missing items by using your hands.

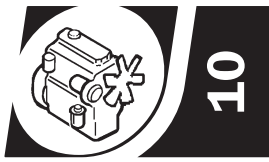




Do not adjust a component beyond the maximum range indicated by the manufacturer.

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ENGINE



- ENGINE COMPONENTS REMOVAL

- ENGINE COMPONENTS REFIT

- CHARACTERISTICS AND SPECIFICATIONS

- COMPONENTS CONTROLS AND ADJUSTMENT

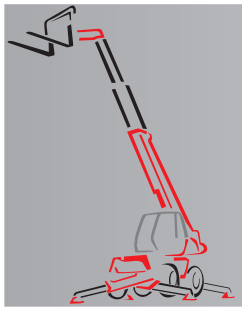


647370EN

(Motor OM 904 LA 120-150-175 cv EURO 3)

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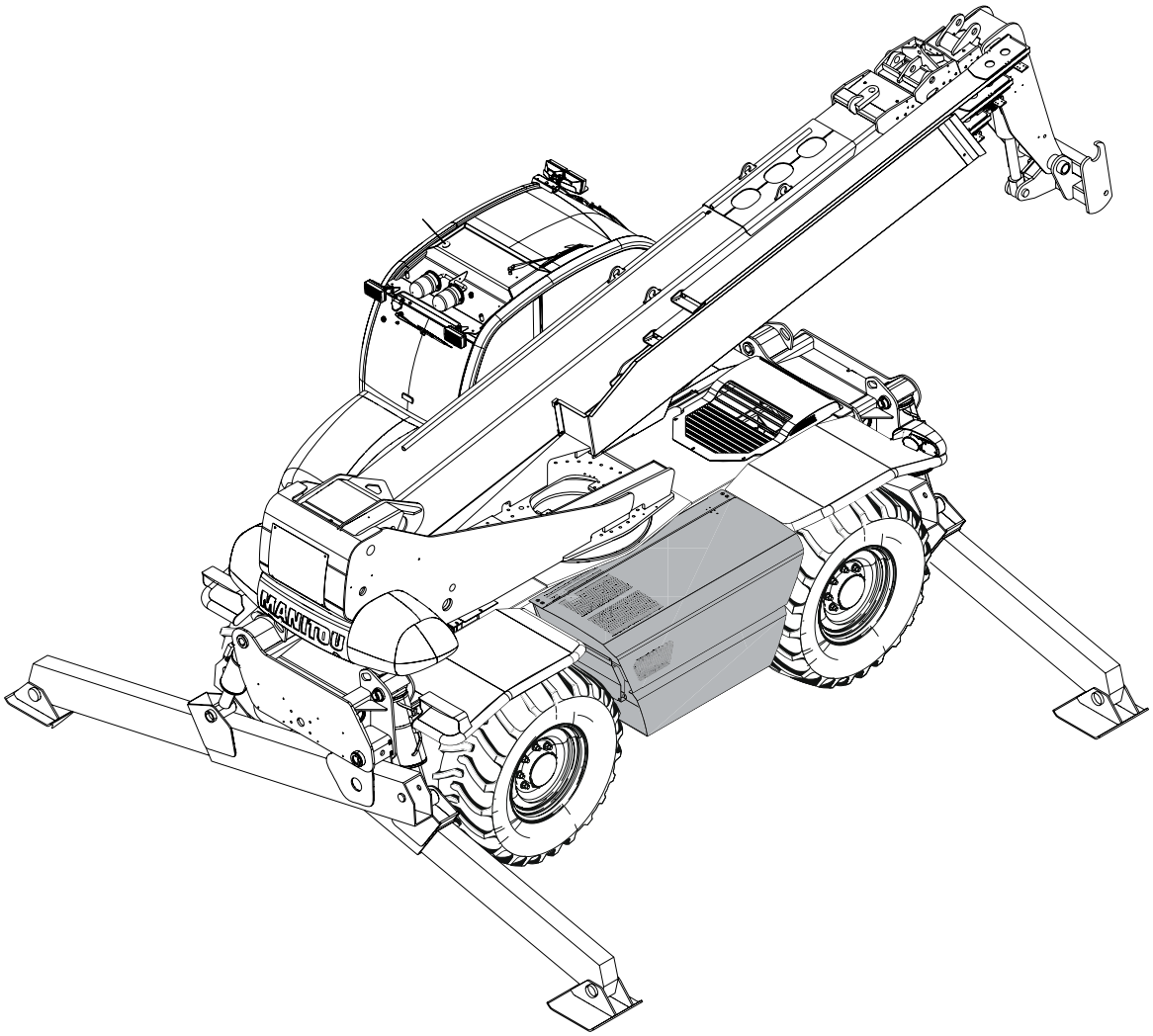


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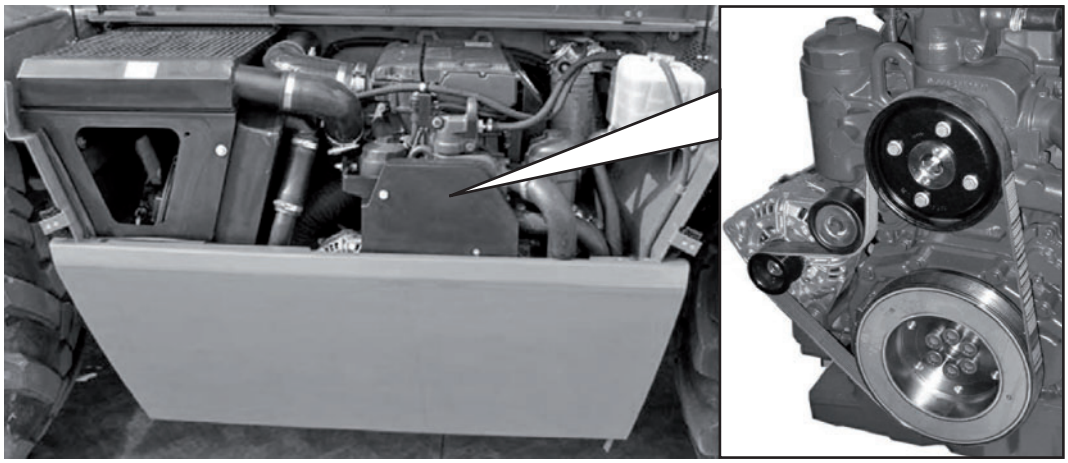
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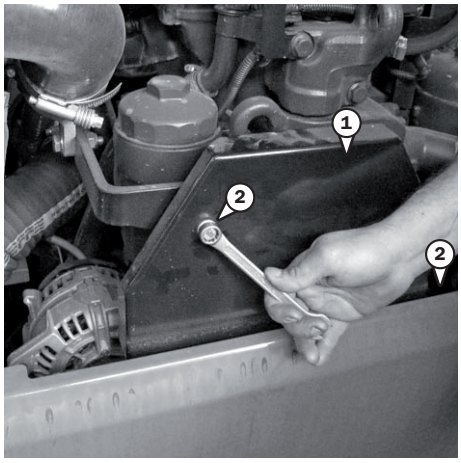


PREPARATION AND SAFETY INSTRUCTIONS

Turn off the ignition switch and disconnect the negative battery terminal.

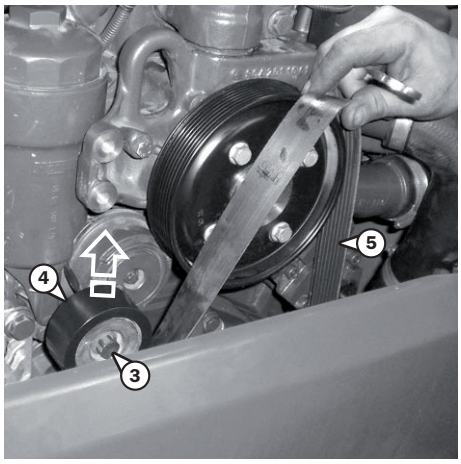
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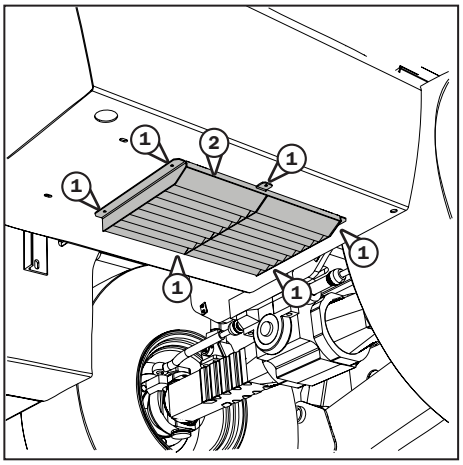


ALTERNATOR BELT REMOVAL

Remove the protective housing (Item 1) by unscrewing the 2 screws (Item 2).



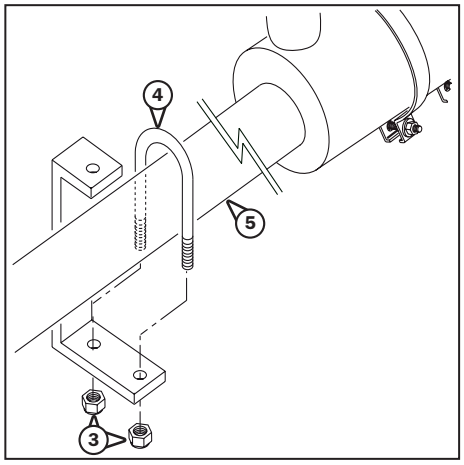
Connect an unlocking lever to the screw (Item 3), tilt the belt tensioning roller upwards (Item 4) and remove the belt (Item 5).



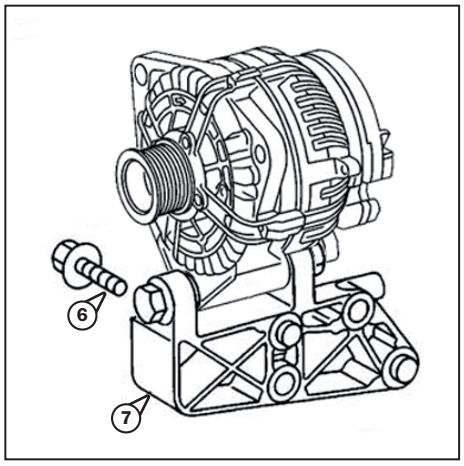
ALTERNATOR REMOVAL

After removing the belt as indicated above, the alternator can be removed.
Unscrew the 6 screws (Item 1) and remove the lower casing (Item 2).

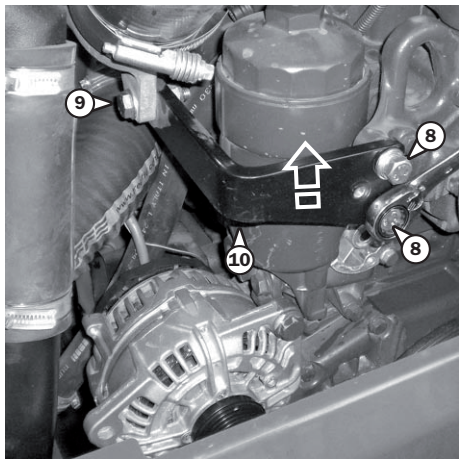
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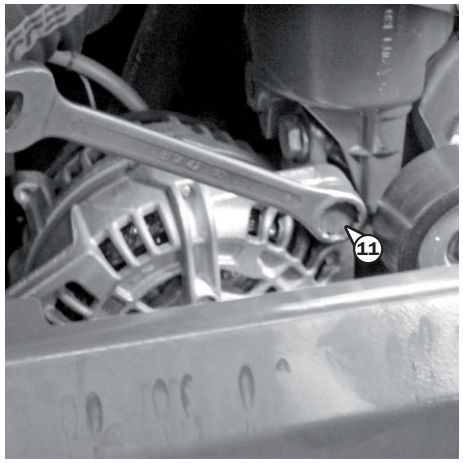
Slacken the 2 nuts (Item 3) locking the 2 clamps (Item 4), holding the air breather pipe (Item 5), thereby facilitating access to the alternator mounting.



Unscrew the 4 screws (Item 6) locking the alternator mounting (Item 7).



Unscrew the 2 screws (Item 8), slacken the screws (Item 9) and turn the mounting of the air coupling (Item 10) upwards to facilitate extracting the alternator.

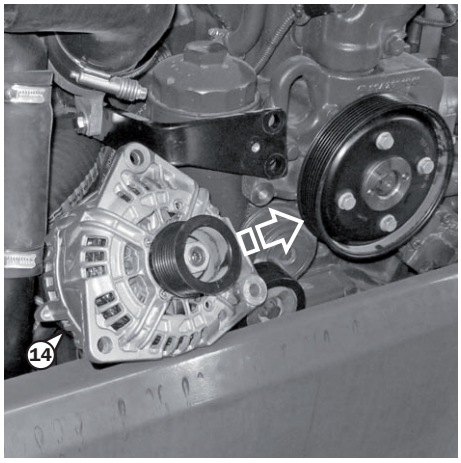


Unscrew the 2 screws (Item 11).

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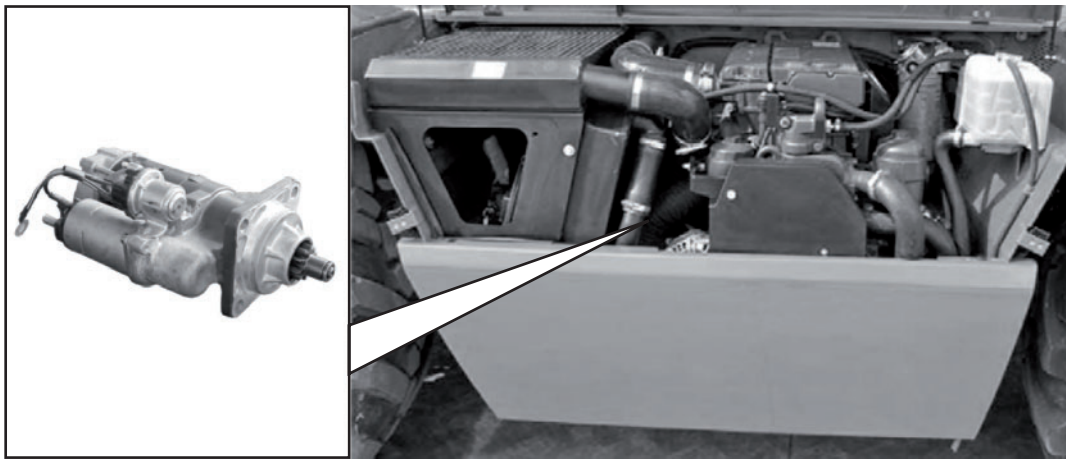


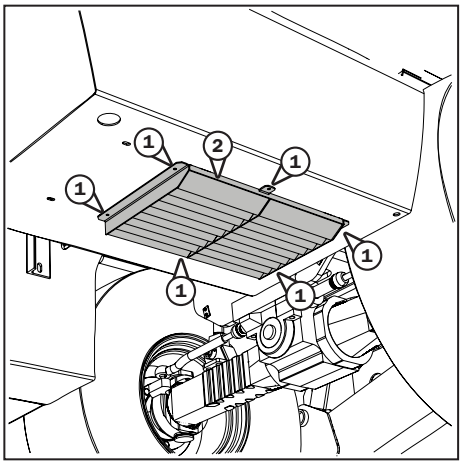
Disconnect the electric cables (Item 12 and 13) connected to the alternator.



The alternator (Item 14) can now be removed.

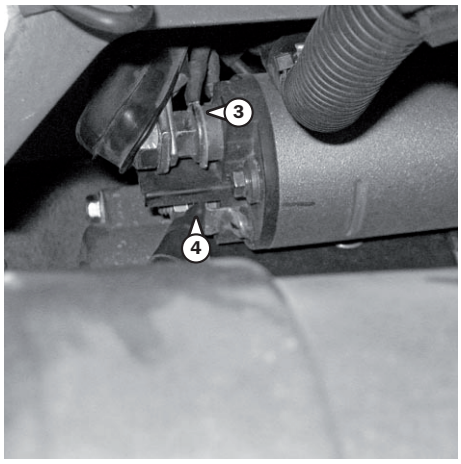
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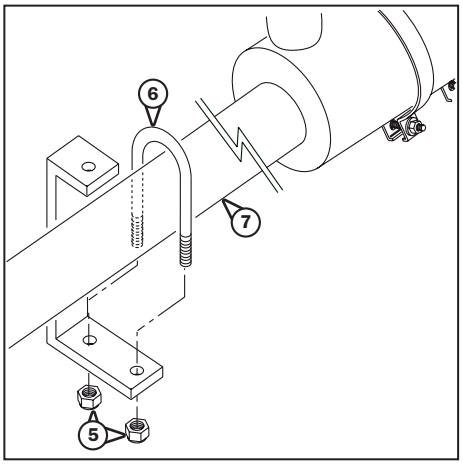


STARTER MOTOR REMOVAL

Unscrew the 6 screws (Item 1) and remove the lower casing (Item 2).

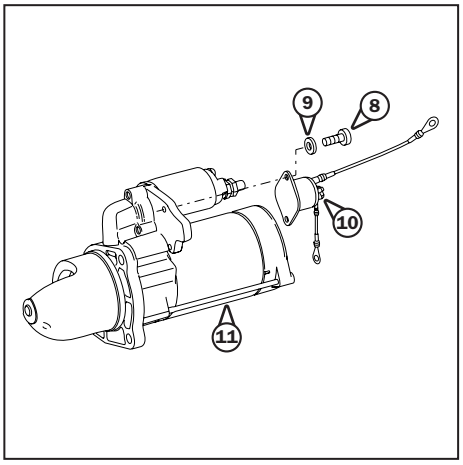


Disconnect the electric cables (Item 3 and 4) connected to the starter motor.

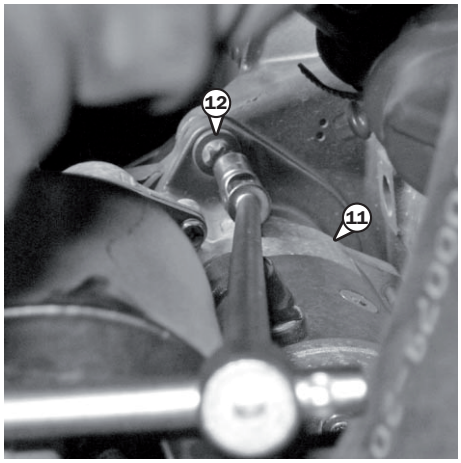


Slacken the 2 nuts (Item 5) locking the 2 clamps (Item 6) holding the air breather pipe (Item 7), thereby facilitating access to the starter motor.

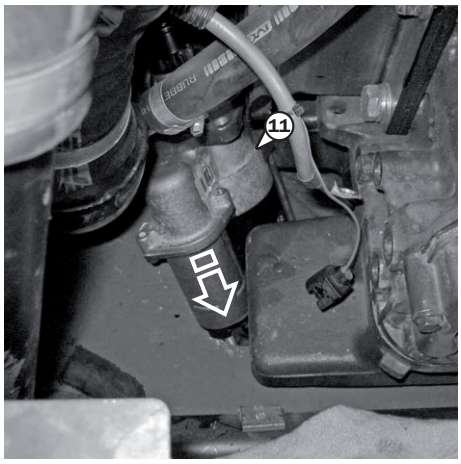
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Unscrew the screws and washers (Item 8 and 9) and remove the slave relay (Item 10) from the starter motor (Item 11).

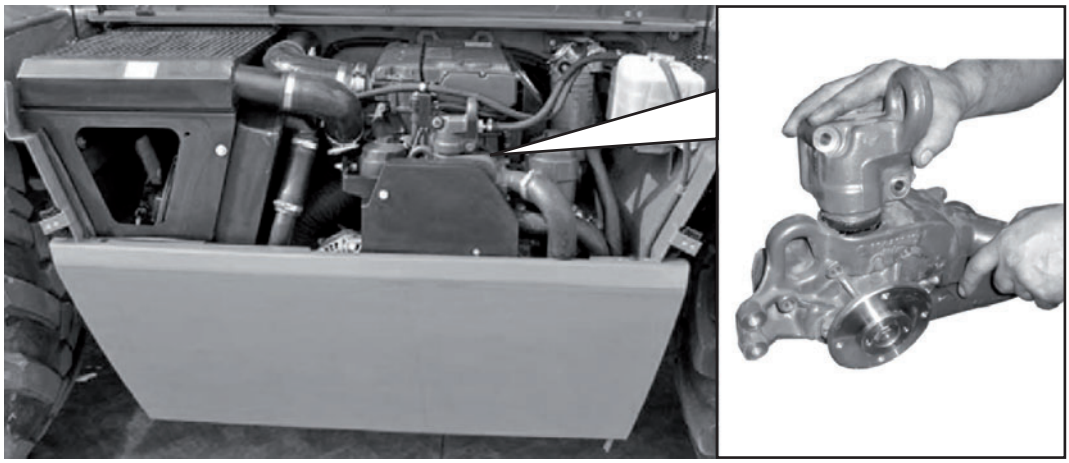


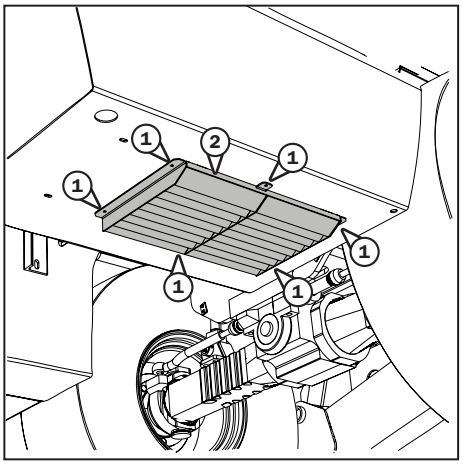
Unscrew the 3 screws (Item 12) and remove the starter motor (Item 11) from the motor mounting plate.



Remove the starter motor (Item 11) by passing it through the opening on the lower side of the motor mounting plate.

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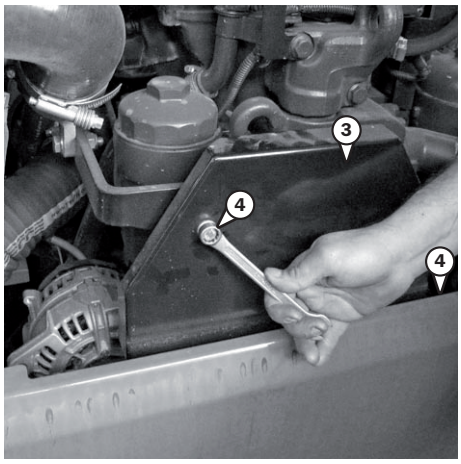




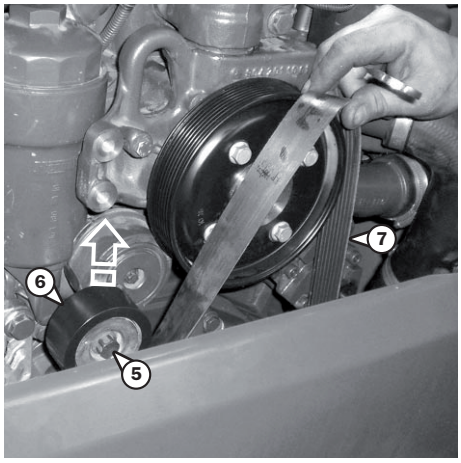
ENGINE COOLING WATER PUMP REMOVAL

Only work on the cooling system if the temperature of the coolant is below 30°C.

Unscrew the 6 screws (Item 1) and remove the lower casing (Item 2).

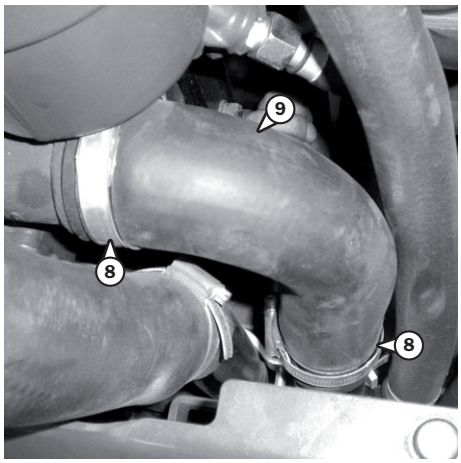


Remove the protective casing (Item 3) by unscrewing the 2 screws (Item 4).

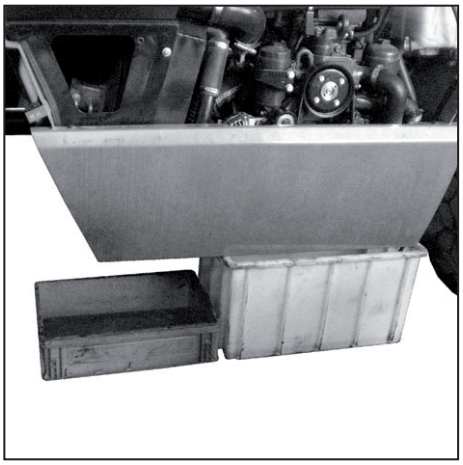


Connect an unlocking lever to the screw (Item 5), turn the tensioning roller (Item 6) upwards and remove the belt (Item 7).

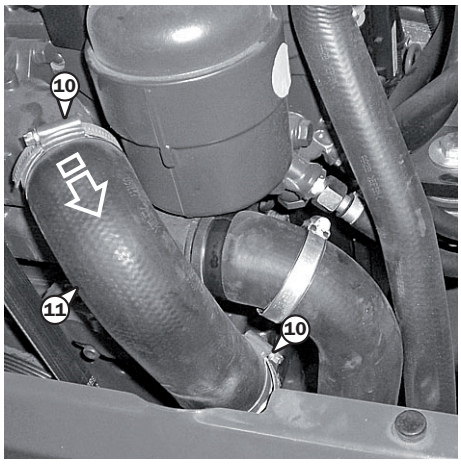
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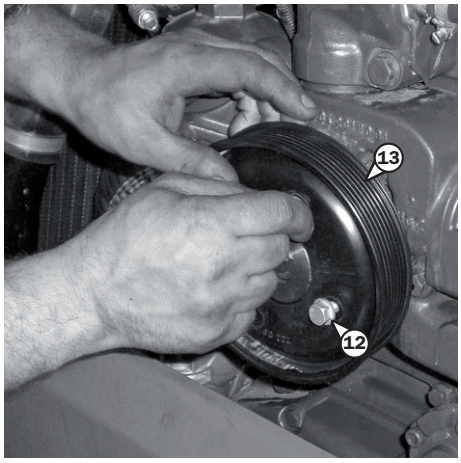
Slacken the 2 clamps (Item 8) on the lower sleeve (Item 9).



Obtain receptacles of adequate size for the quantity of liquid to be collected and place them under the engine sump.
Disconnect lower coupling (Item 9) from the pump. Perform this operation slowly to release the pressure in the system and allow the liquid to drain from the cooling system, emptying it completely.

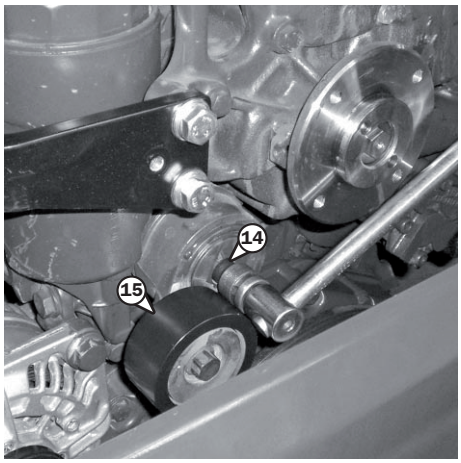


Slacken the 2 clamps (Item 10) on the upper coupling (Item 11) and remove it from the pump.

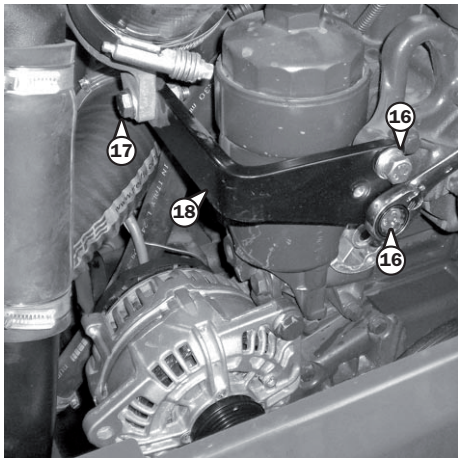


Unscrew the 4 screws (Item 12) and remove the pulley (Item 13).

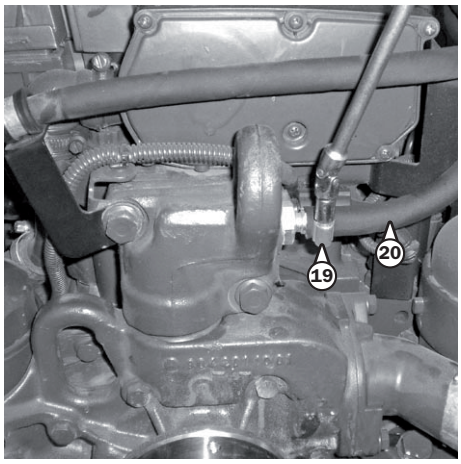
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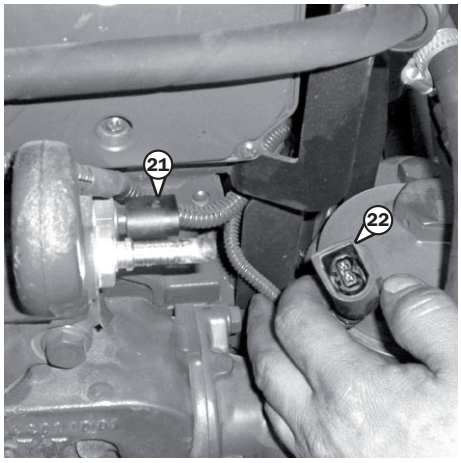
Unscrew the screws (Item 14) and remove the belt tensioner (Item 15).



Unscrew the screws (Item 16 and 17) and remove the clamp (Item 18).

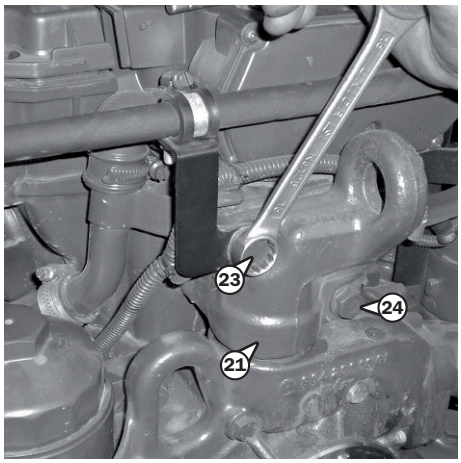


Slacken the clamp (Item 19) and disconnect the drain tube from the thermostatic valve (Item 20).

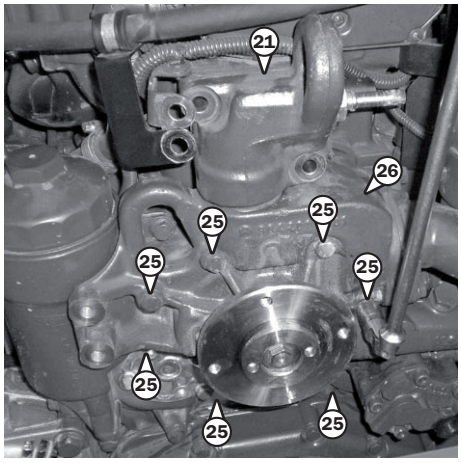


Disconnect the temperature sensor (Item 22) from the thermostatic valve (Item 21).

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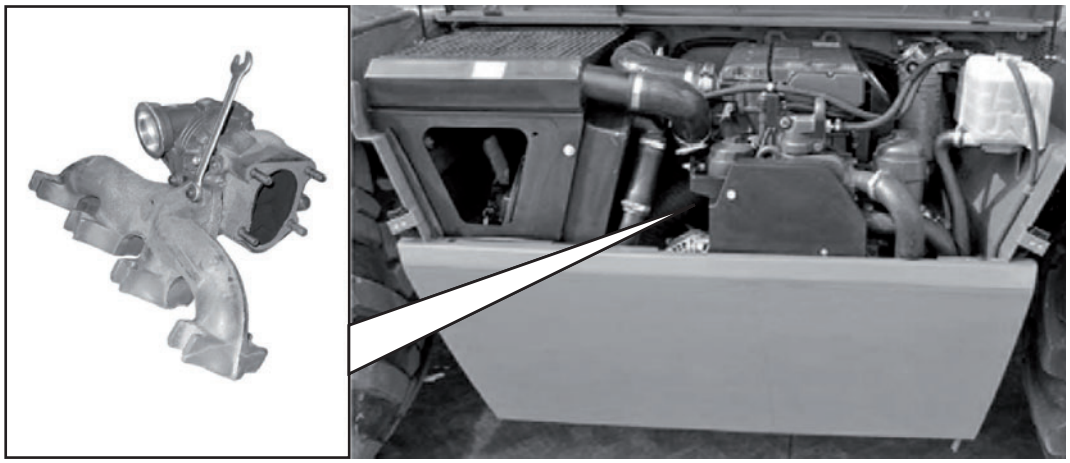


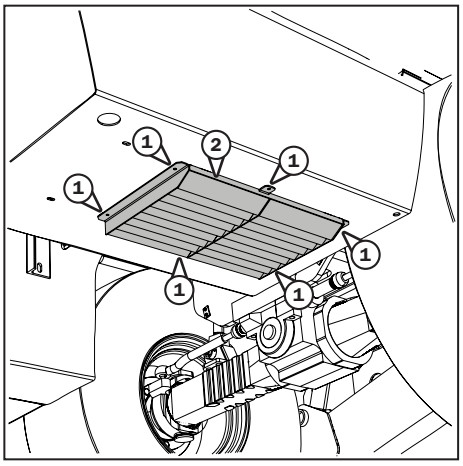
Unscrew the screws (Item 23 and 24) securing the thermostatic valve (Item 21).



Unscrew the 7 screws (Item 25), remove the pump (Item 26) and the thermostatic valve (Item 21).

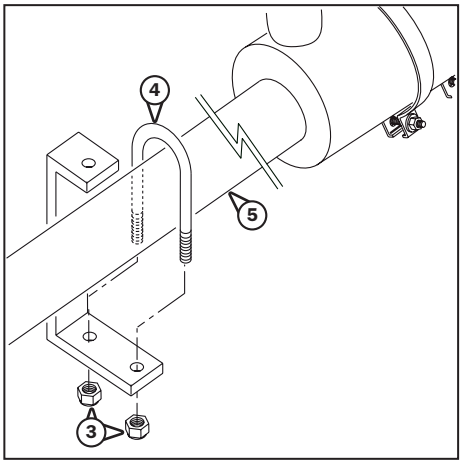
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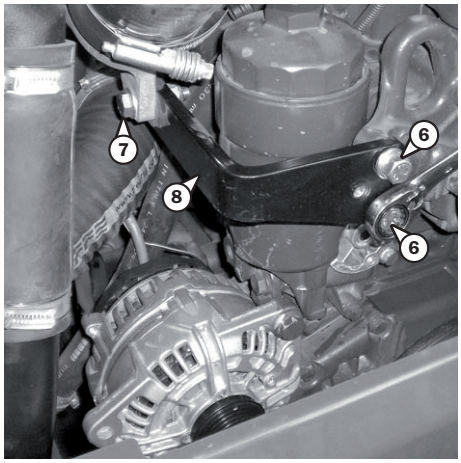


TURBOCHARGER REMOVAL

Unscrew the 6 screws (Item 1) and remove the lower casing (Item 2).

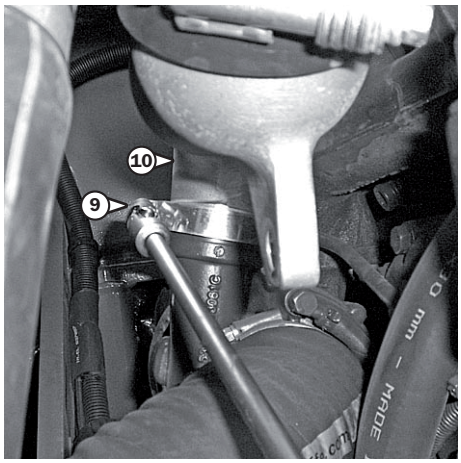


Unscrew the 2 nuts (Item 3) and remove the 2 clamps (Item 4) holding the air breather pipe (Item 5).



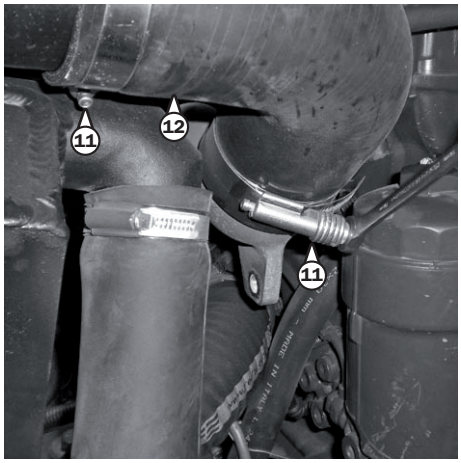
Unscrew the screws (Item 6 and 7) and remove the clip (Item 8).

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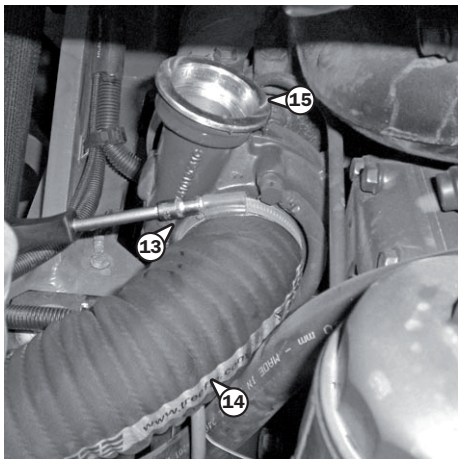


Slacken the clamp (Item 9) and remove the coupling (Item 10).

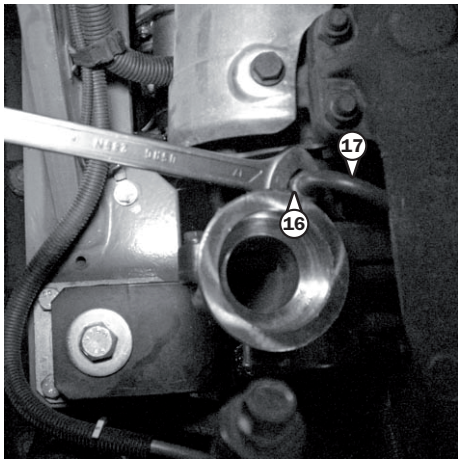
Plug all the pipes to prevent foreign bodies from entering the system.



Slacken the 2 clamps (Item 11) and remove the inlet coupling on the (Item 12) air cooler.

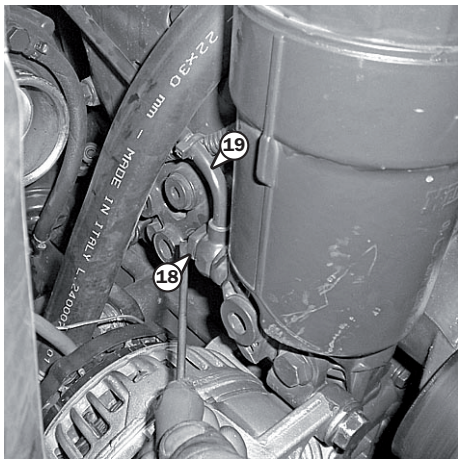


Slacken the clamp (Item 13) and remove the inlet coupling (Item 14) from the turbocharger (Item 15).



Unscrew the fixing (Item 16) and remove the oil outlet pipe (Item 17) from the turbocharger.

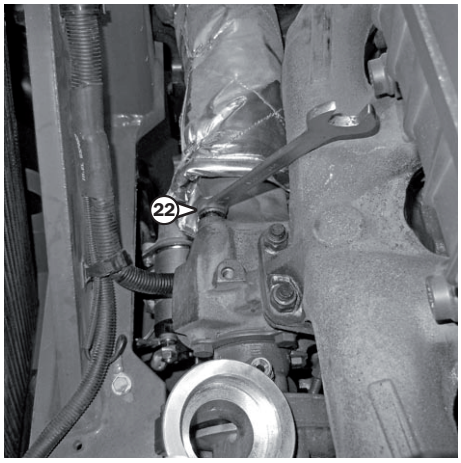
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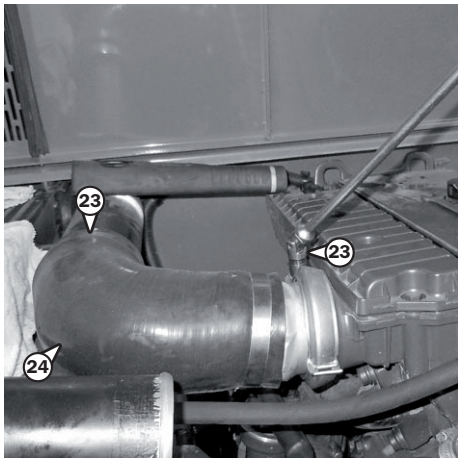
Unscrew the fixing (Item 18) and remove the oil inlet pipe (Item 19).



Unscrew the 4 screws (Item 20) and remove the protective plate (Item 21) from the exhaust manifold.

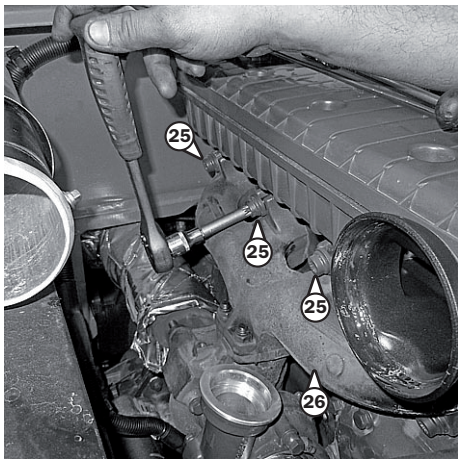


Unscrew the screws (Item 22) holding the turbocharger.

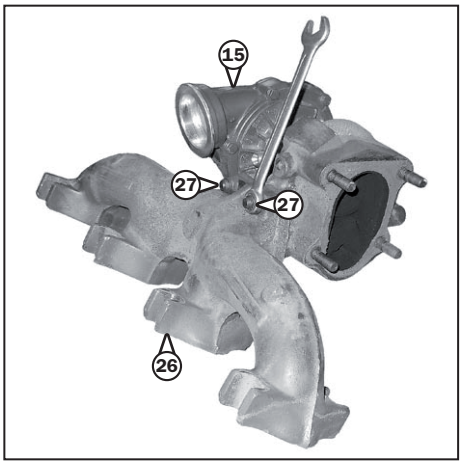


Slacken the 2 clamps (Item 23) and remove the inlet coupling (Item 24) from the engine.

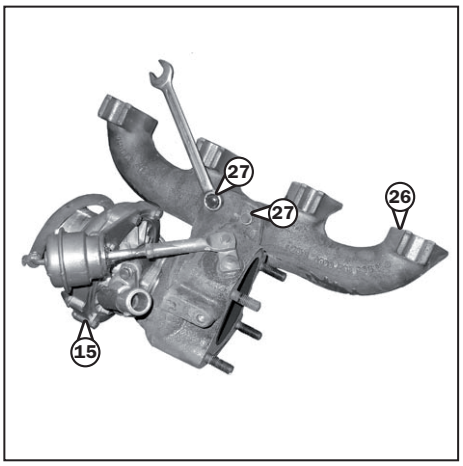
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Unscrew the 8 screws (Item 25) and remove the exhaust manifold (Item 26).

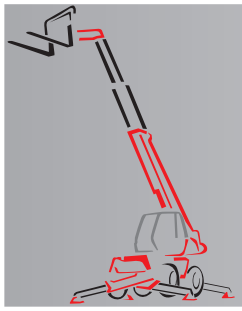


Unscrew the nuts (Item 27) and remove the turbocharger (Item 15) from the exhaust manifold (Item 26).



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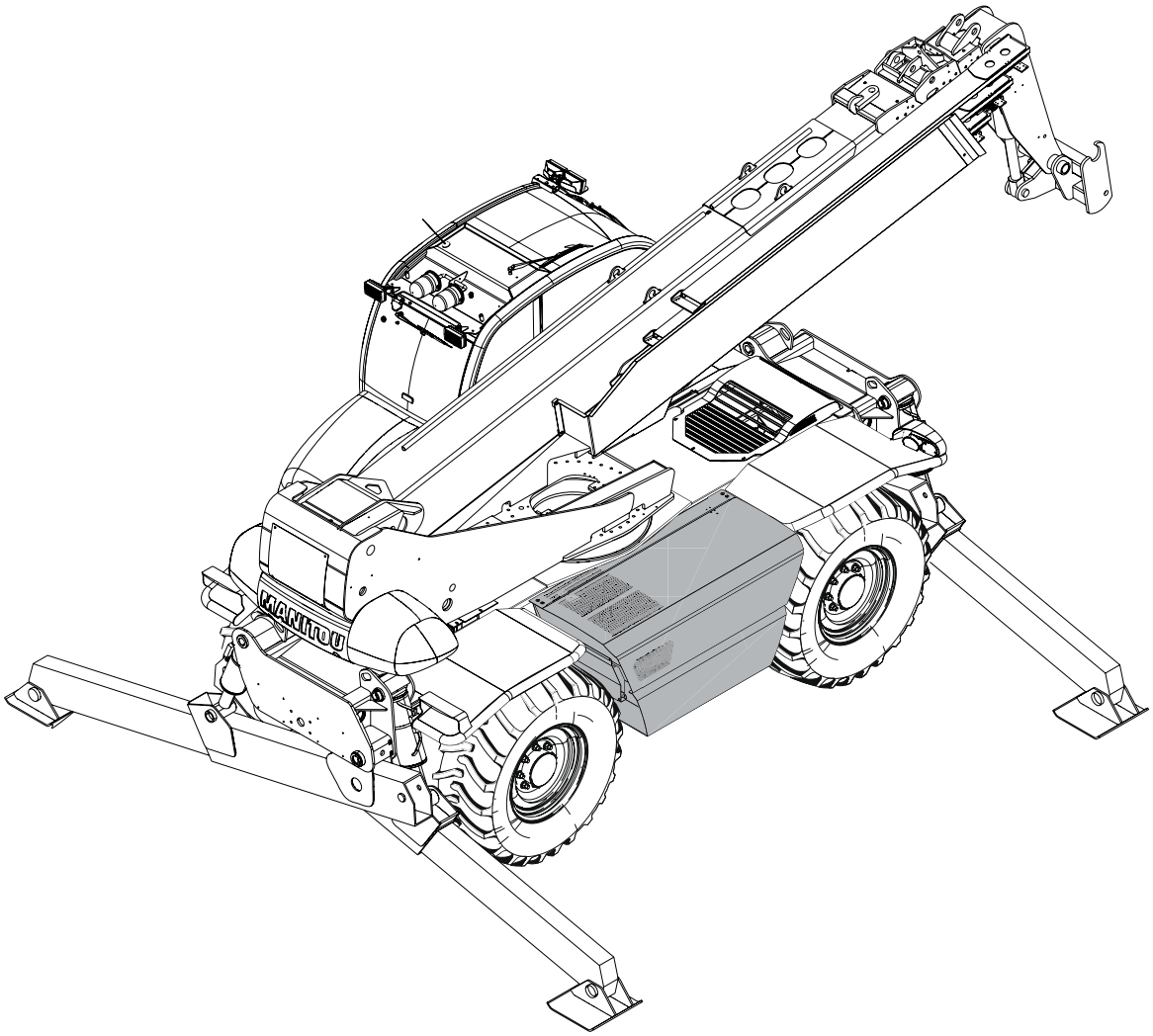


ENGINE COMPONENTS REFIT

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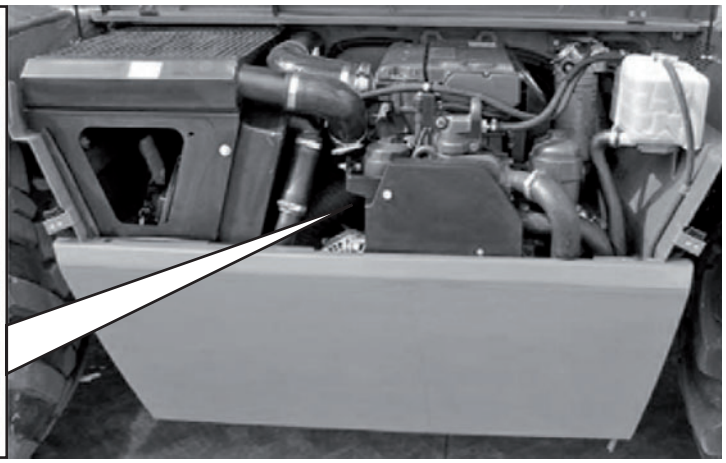


PREPARATION AND SAFETY INSTRUCTIONS

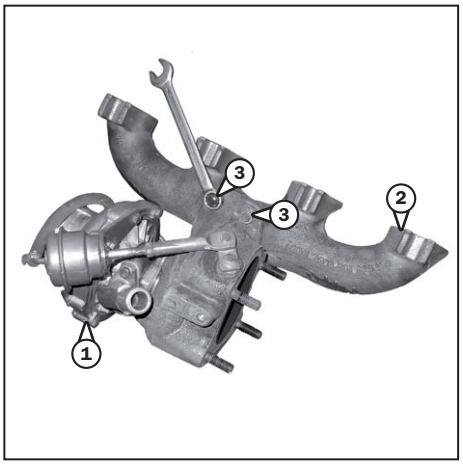
Turn off the ignition switch and disconnect the negative battery terminal.

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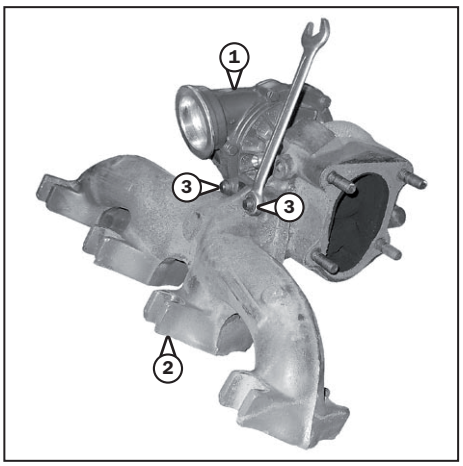


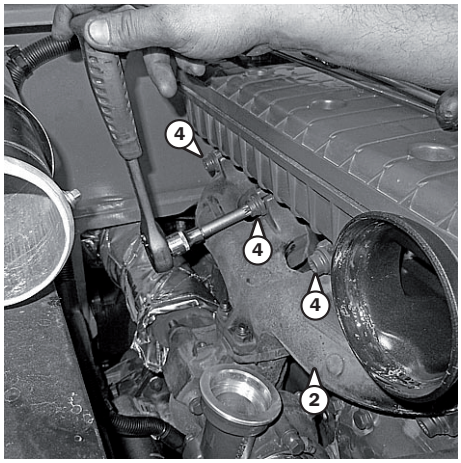


TURBOCHARGER REFIT



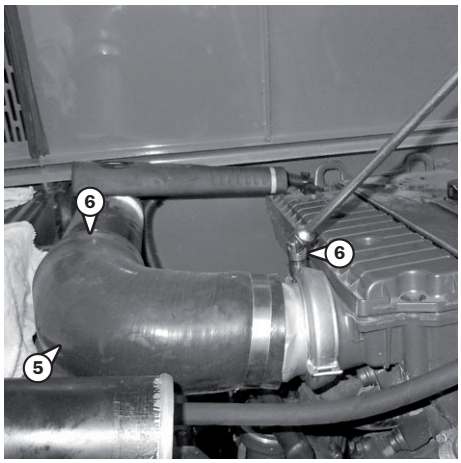
Refit the turbocharger (Item 1) to the exhaust manifold (Item 2) by screwing the nuts on again (Item 3); use a tightening torque of 30 Nm.



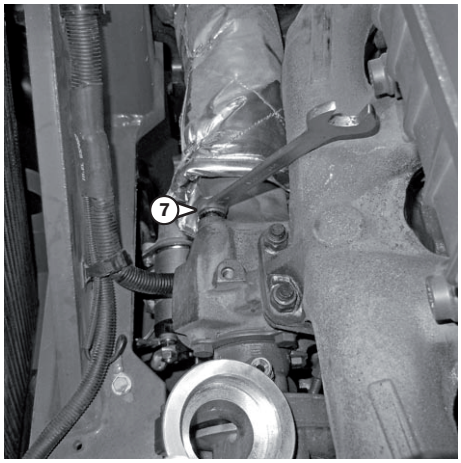


Refit the exhaust manifold (Item 2) to the engine crankcase by screwing in the 8 screws (Item 4); use a tightening torque of 30 Nm.

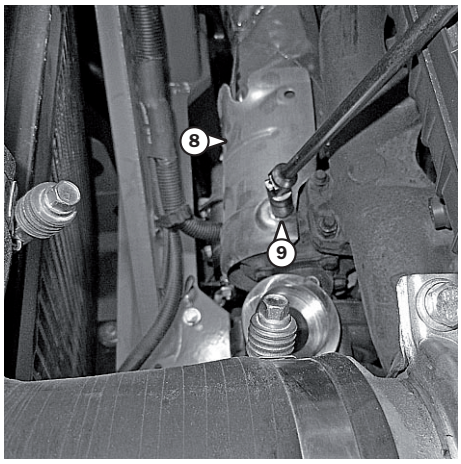
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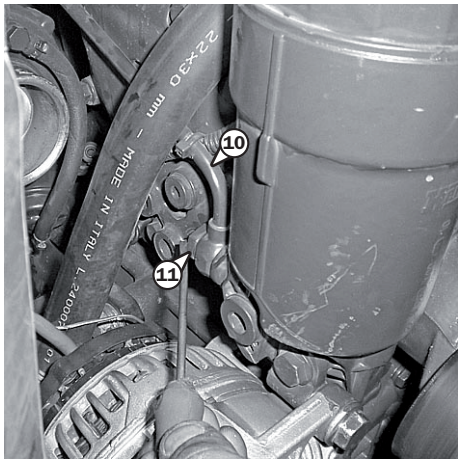
Reconnect the inlet coupling (Item 5) to the engine and tighten the 2 clamps (Item 6).



Screw on the turbocharger with the screws (Item 7).

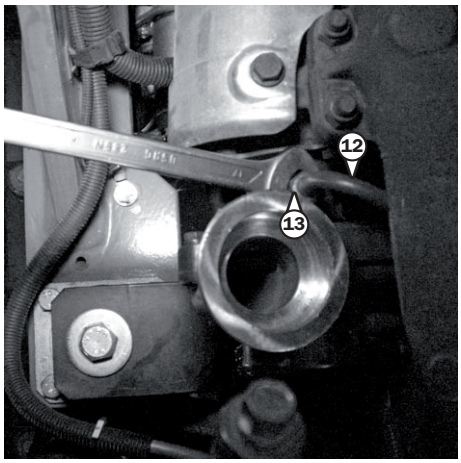


Refit the protective plate (Item 8) to the exhaust manifold by screwing in the 4 screws (Item 9).

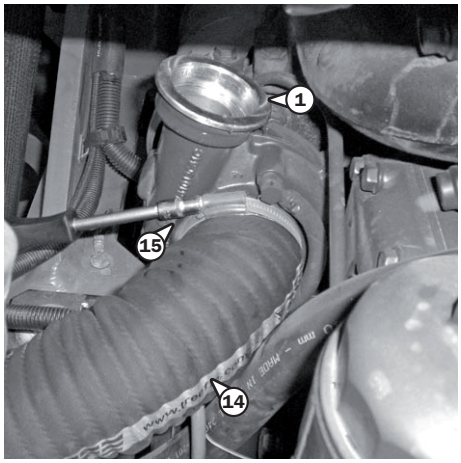


Refit the inlet lubrication tube (Item 10) by screwing on the coupling (Item 11).

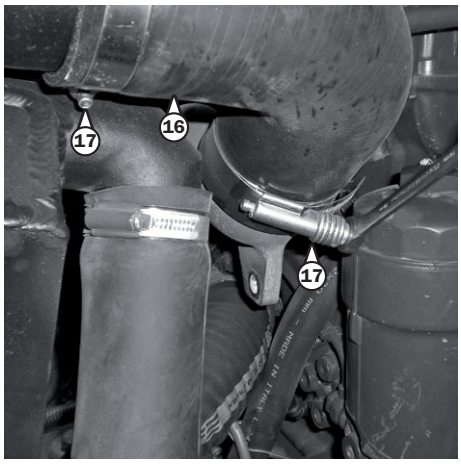
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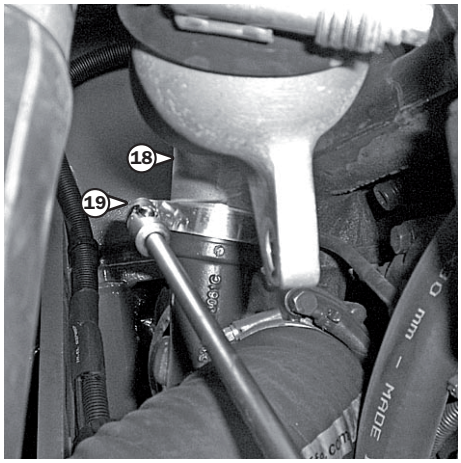
Refit the lubrication supply tube (Item 12) from the turbocharger by screwing on the coupling (Item 13).



Refit the inlet coupling (Item 14) to the turbocharger (Item 1) by tightening the clamps (Item 15).

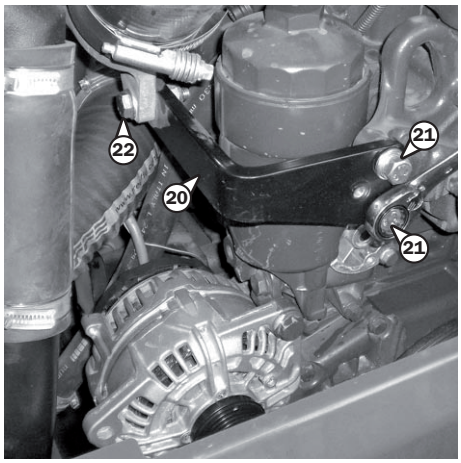


Refit the inlet coupling (Item 16) to the air radiator by tightening the 2 clamps (Item 17).

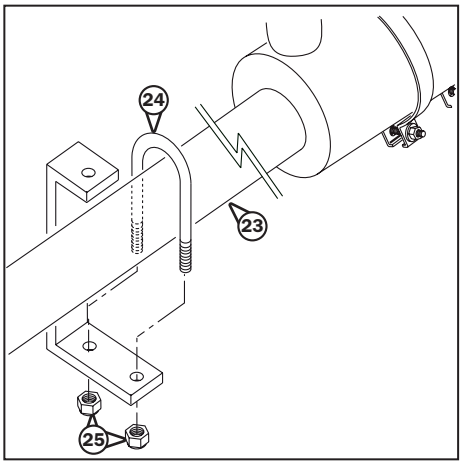


Refit the coupling (Item 18) by tightening the clamp (Item 19).

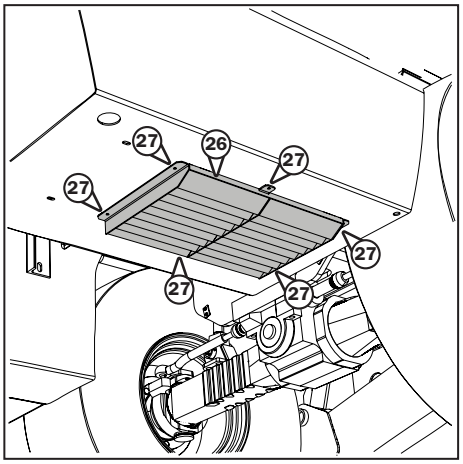
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Refit the bracket (Item 20) to the air unit by screwing in the screws (Item 21 and 22).

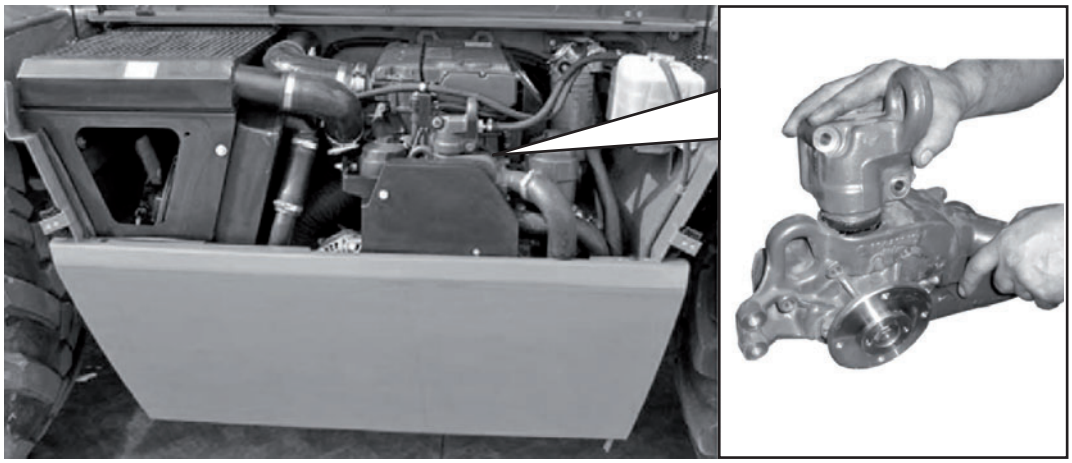


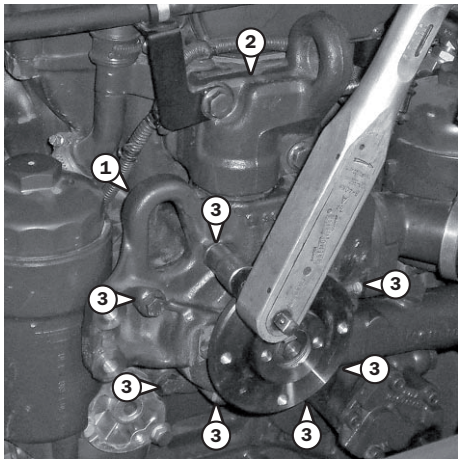
Refit the air inlet pipe (Item 23) locking it with the 2 brackets (Item 24) and screwing the nuts (Item 25) on again.



Refit the lower housing (Item 26) by screwing in the 6 screws (Item 27).

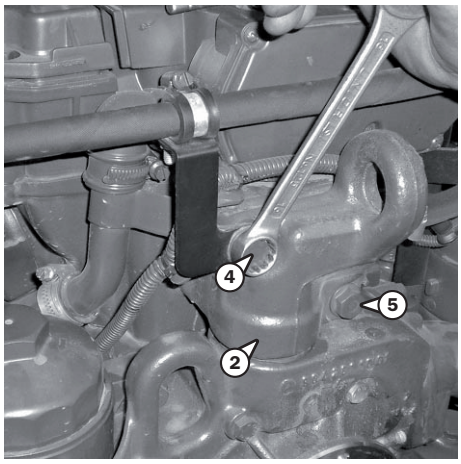
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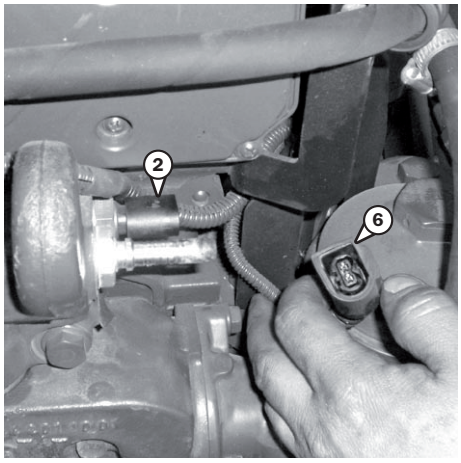


ENGINE COOLING WATER PUMP REFIT

Replace the seals with new ones and refit the pump (Item 1) and thermostatic valve (Item 2) to the engine by screwing in the 7 screws (Item 3), to which loctite threadlock is applied; use a tightening torque of 25 Nm.

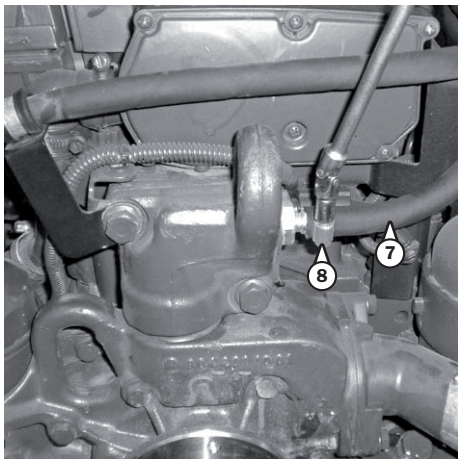


Relock the thermostatic valve (Item 2) by screwing in the screws (Item 4 and 5), to which loctite threadlock is applied; use a tightening torque of 25 Nm.

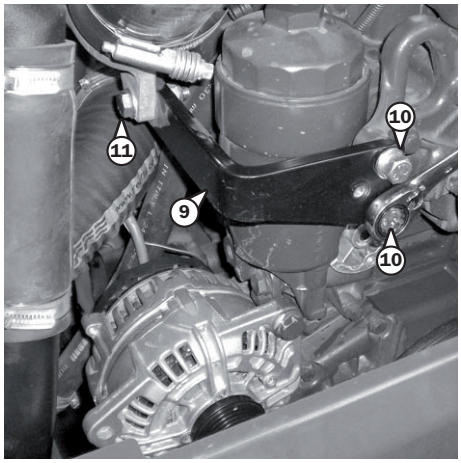


Reconnect the temperature sensor (Item 6) to the thermostatic valve (Item 2).

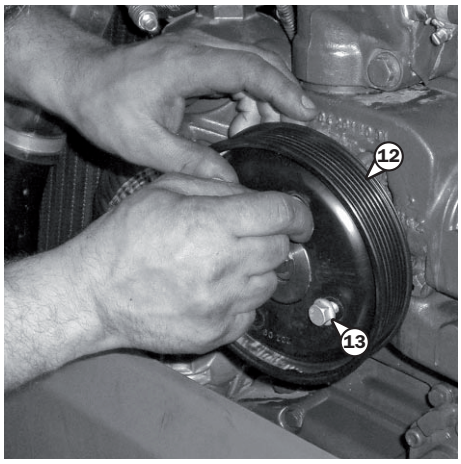
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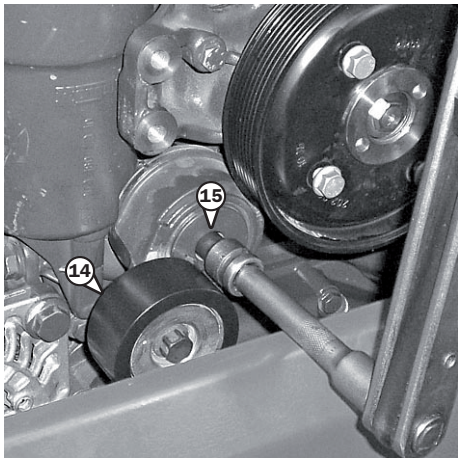
Refit the exhaust pipe (Item 7) to the thermostatic valve by tightening the clamps (Item 8).



Refit the bracket (Item 9) to the air unit by screwing in the screws (Item 10 and 11).

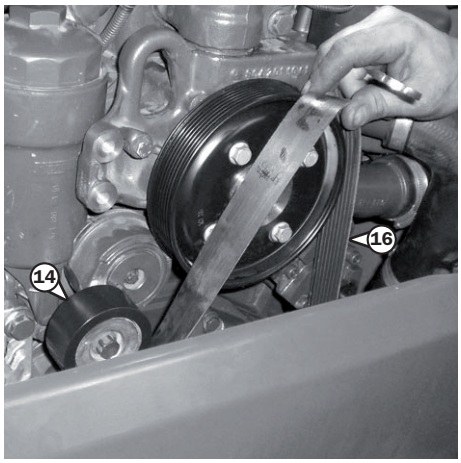


Refit the pulley (Item 12) by screwing in the screws (Item 13) to which loctite threadlock is applied.

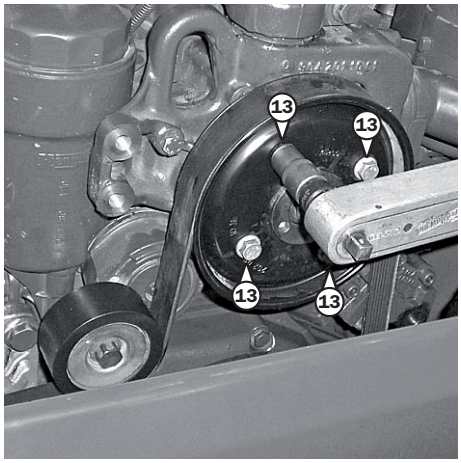


Refit the belt tensioner (Item 14) by screwing in the screws (Item 15), to which loctite threadlock is applied, using a tightening torque of 50 Nm.

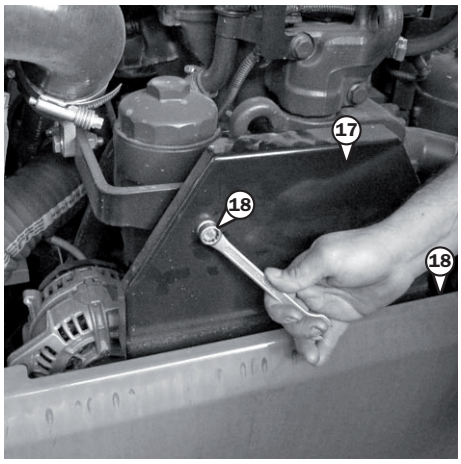
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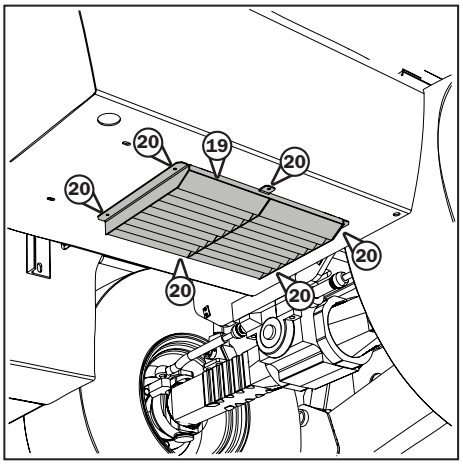
Refit the belt (Item 16) on all the pulleys except the belt tensioner roller.
Lift the belt tensioner roller (Item 14) with a lever, fit the belt, then move the belt tensioner roller back.
Remove the unlocking lever and check that the belt is correctly seated on the pulleys.



Fully tighten the screws (Item 13) using a tightening torque of 25 Nm.

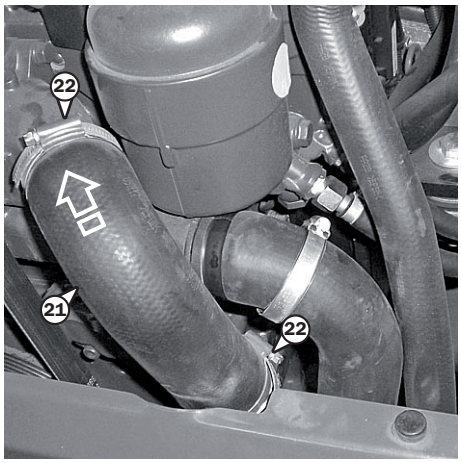


Refit the protective housing (Item 17) by screwing in the 2 screws (Item 18).

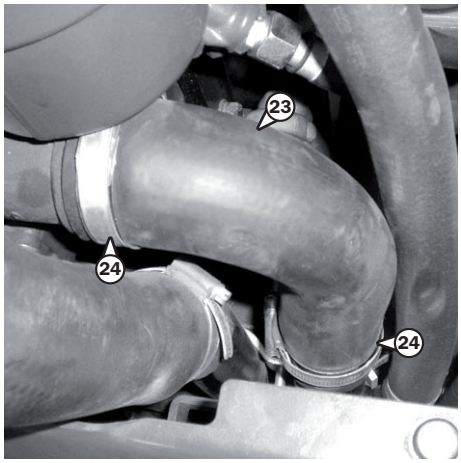


Refit the lower housing (Item 19) by screwing in the 6 screws (Item 20).

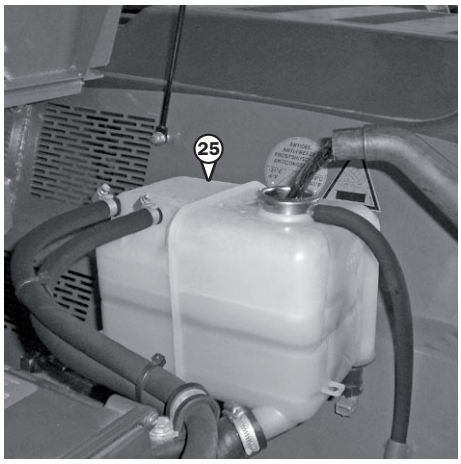
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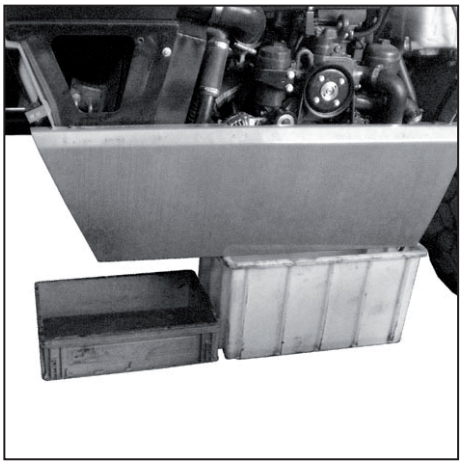
Reconnect the upper coupling (Item 21) to the pump and retighten the 2 clamps (Item 22).



Reconnect the lower coupling (Item 23) to the pump and retighten the 2 clamps (Item 24).

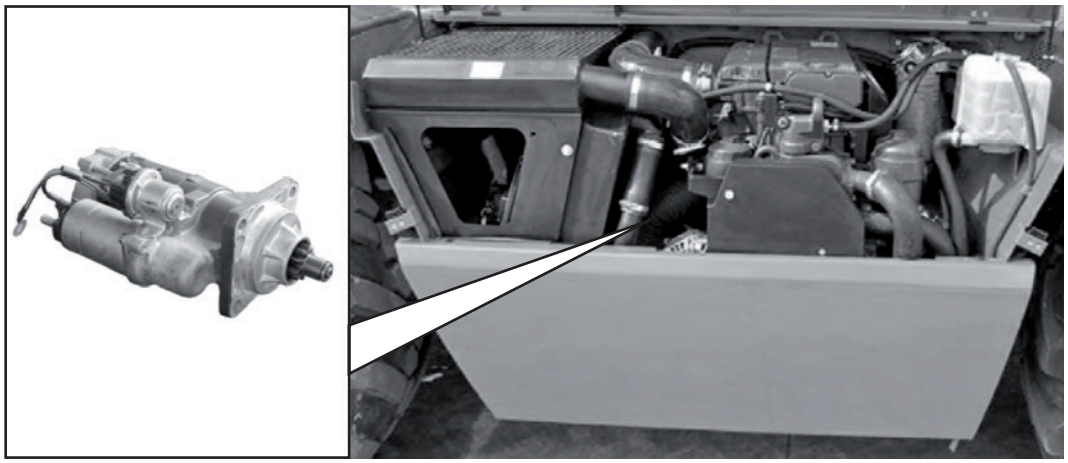


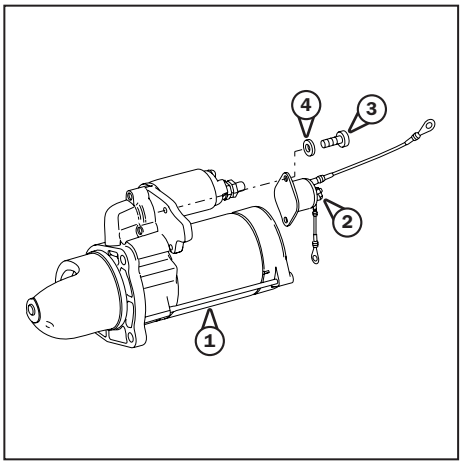
Fill. the cooling system tank (Item 25) with the appropriate fluid; the level of the fluid must be between the maximum and minimum level lines (about 18 litres).



Remove the container from under the engine sump.

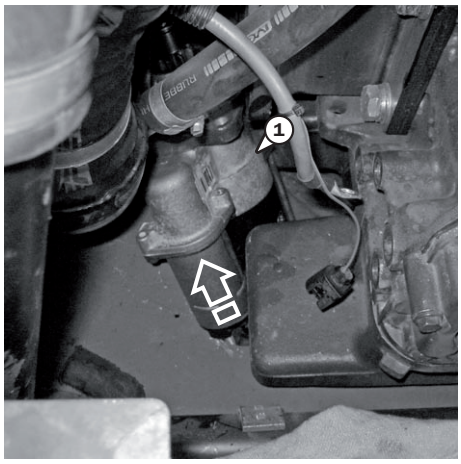
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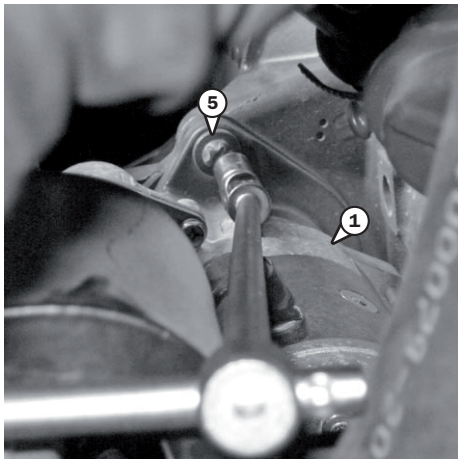


STARTER MOTOR REFIT

Remove the remote switch (Item 2) from the new starter motor (Item 1) by unscrewing the screws and washers (Item 3 and 4).

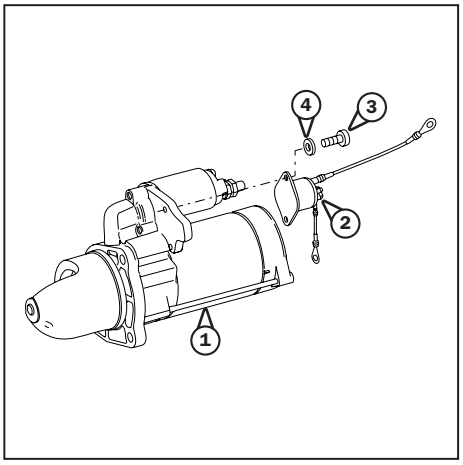


Insert the starter motor (Item 1) through the opening on the base of the engine crankcase.

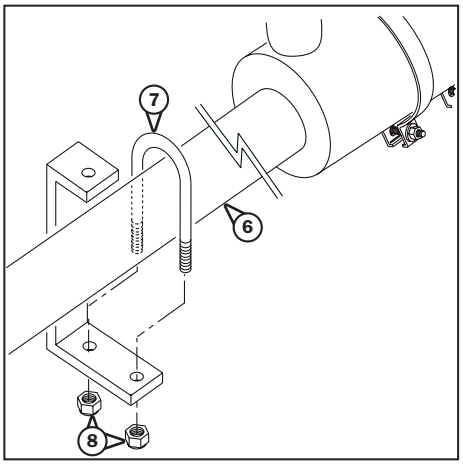


Refit the starter motor (Item 1) to the engine crankcase by screwing in the 3 screws (Item 5).

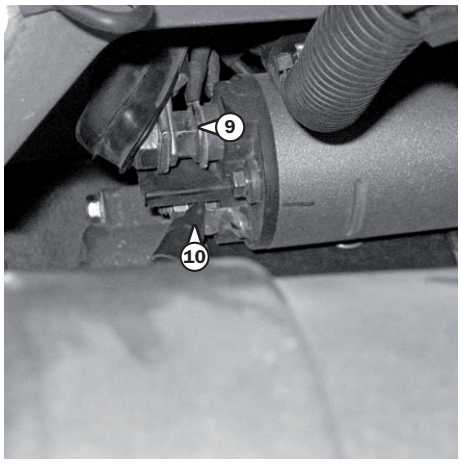
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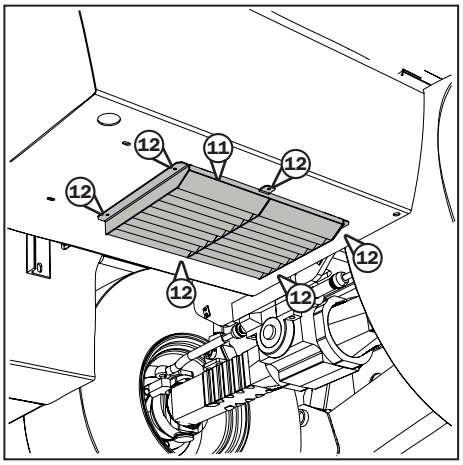
Refit the remote switch (Item 2) to the starter motor (Item 1) by screwing in the screws and washers (Item 3 and 4).



Refit the air inlet pipe (Item 6), locking the 2 brackets (Item 7) and screwing on the 2 nuts (Item 8) again.

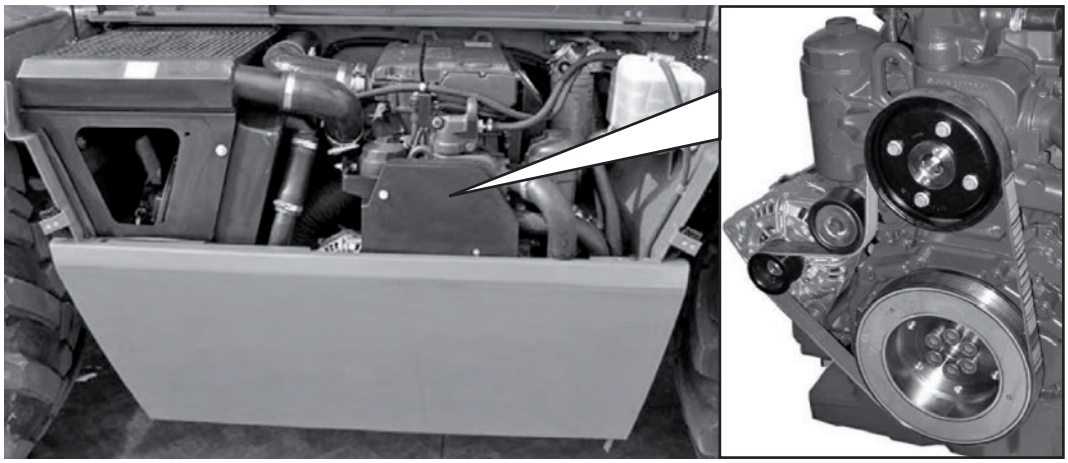


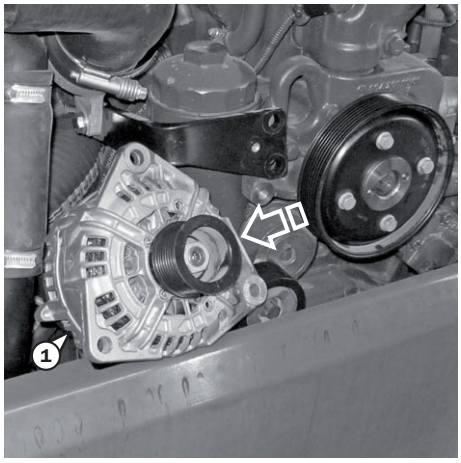
Reconnect the electric cables (Item 9 and 10) to the starter motor.



Refit the lower housing (Item 11) by screwing in the 6 screws (Item 12).

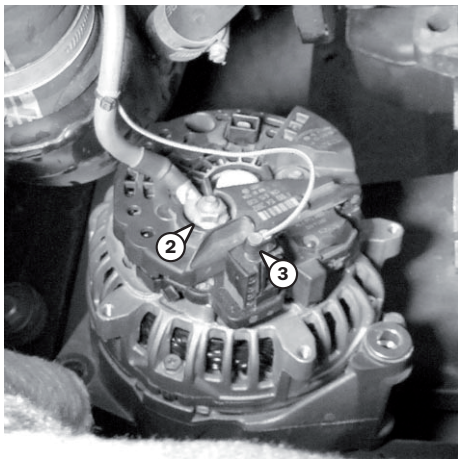
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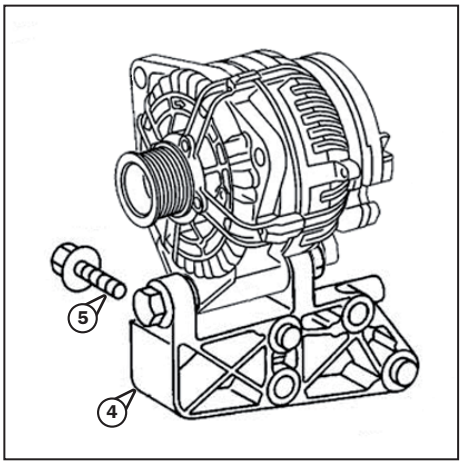


ALTERNATOR REFIT

Insert the new alternator (Item 1).

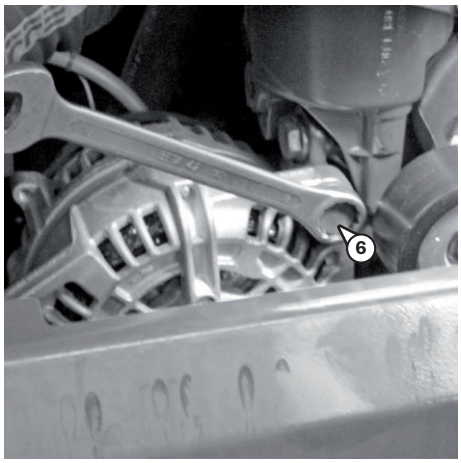


Reconnect the electric cables (Item 2 and 3) to the alternator.

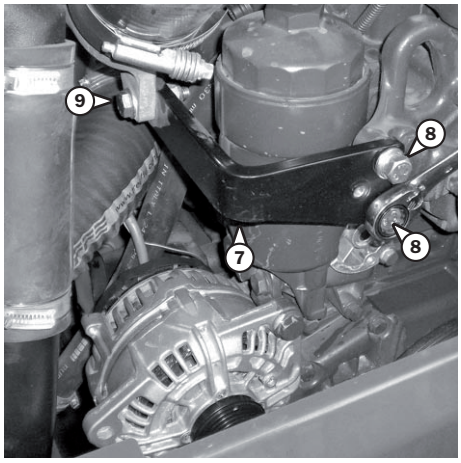


Attach the mounting (Item 4) to the engine by screwing in the 4 screws (Item 5).

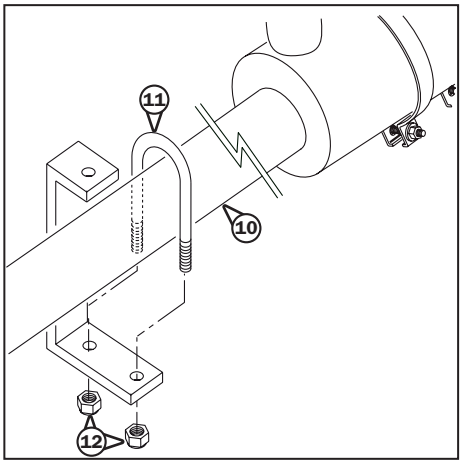
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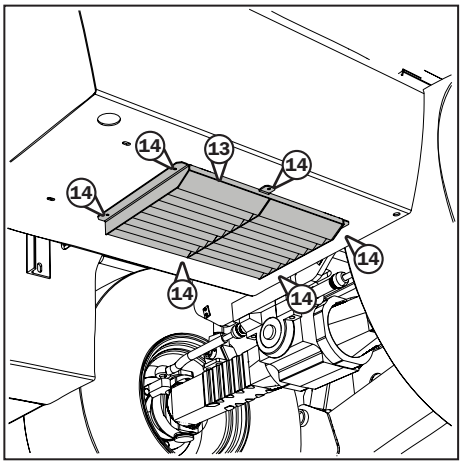
Screw in the 2 screws (Item 6) to secure the alternator.



Reposition the air coupling mounting (Item 7), screw in the 2 screws (Item 8) and tighten the (Item 9).

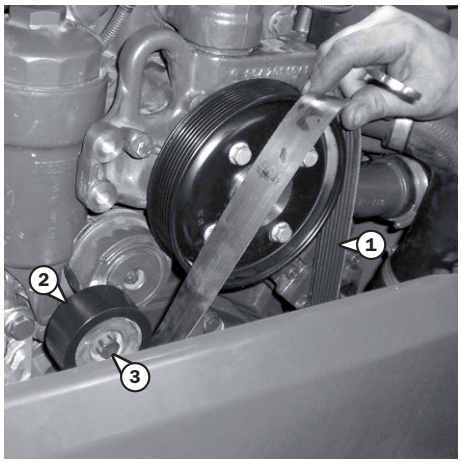


Refit the air inlet pipe (Item 10), locking the 2 brackets (Item 11) by screwing the 2 nuts (Item 12) on again.



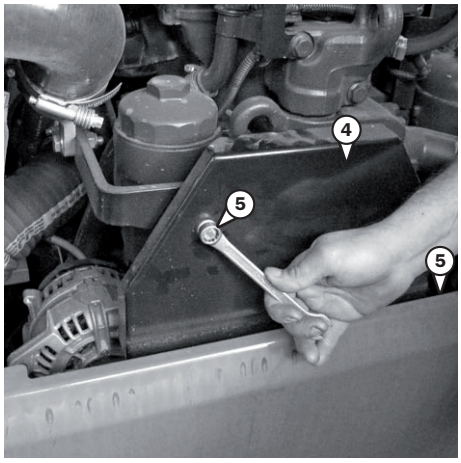
Refit the lower housing (Item 13) by screwing in the 6 screws (Item 14).

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ALTERNATOR BELT REFIT

Refit the belt (Item 1) on all the pulleys except the belt tensioning roller.
Lift the belt tensioner roller (Item 2) with a lever located on the screw (Item 3), fit the belt, then move back the tensioner roller.
Remove the unlocking lever and check that the belt is correctly seated on the pulleys.



Refit the protective housing (Item 4) by screwing in the 2 screws (Item 5).

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OPTIONS - ATTACHMENTS

- *OPTIONS - ATTACHMENTS SCHEMATIC DIAGRAMS*

- *OPTIONS - ATTACHMENTS COMPONENTS LOCATION*

- *OPTIONS - ATTACHMENTS CONTROL AND ADJUSTMENT*

- *FITTING OPTIONS - ATTACHMENTS*

- *CHARACTERISTICS AND SPECIFICATIONS*

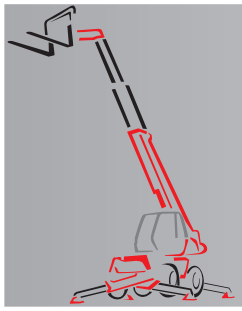
- *COMPONENTS CONTROLS AND ADJUSTMENT*



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OPTIONS - ATTACHMENTS SCHEMATIC DIAGRAMS

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ELECTRICAL DIAGRAMS BY FUNCTION:

– 1 - CABLED AIR CONDITIONING BOX 8

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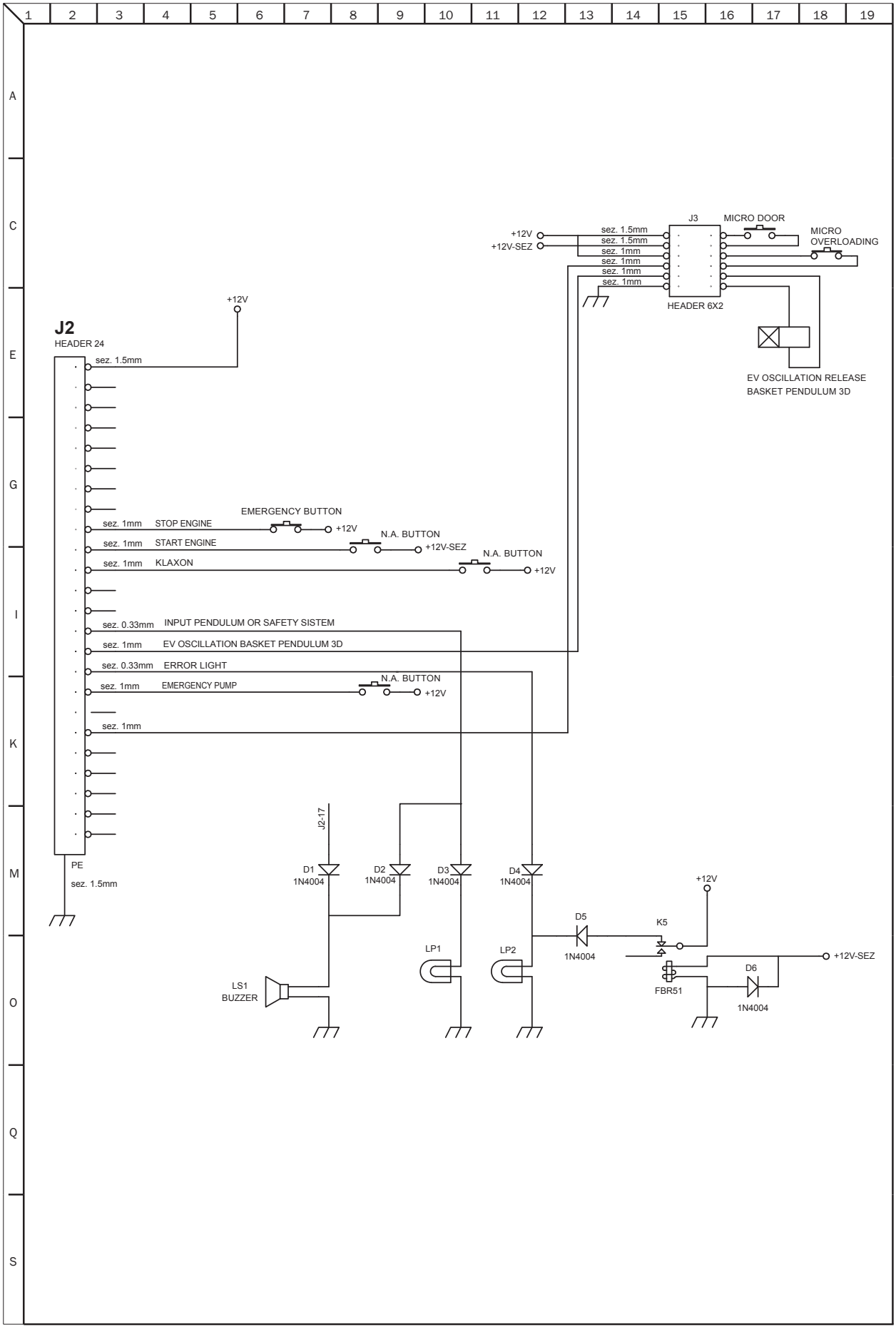
– 3 - REAR CAB AIR CONDITIONING UNIT WIRING 12

– 4 - AIR CONDITIONING WIRING IN CAB 14

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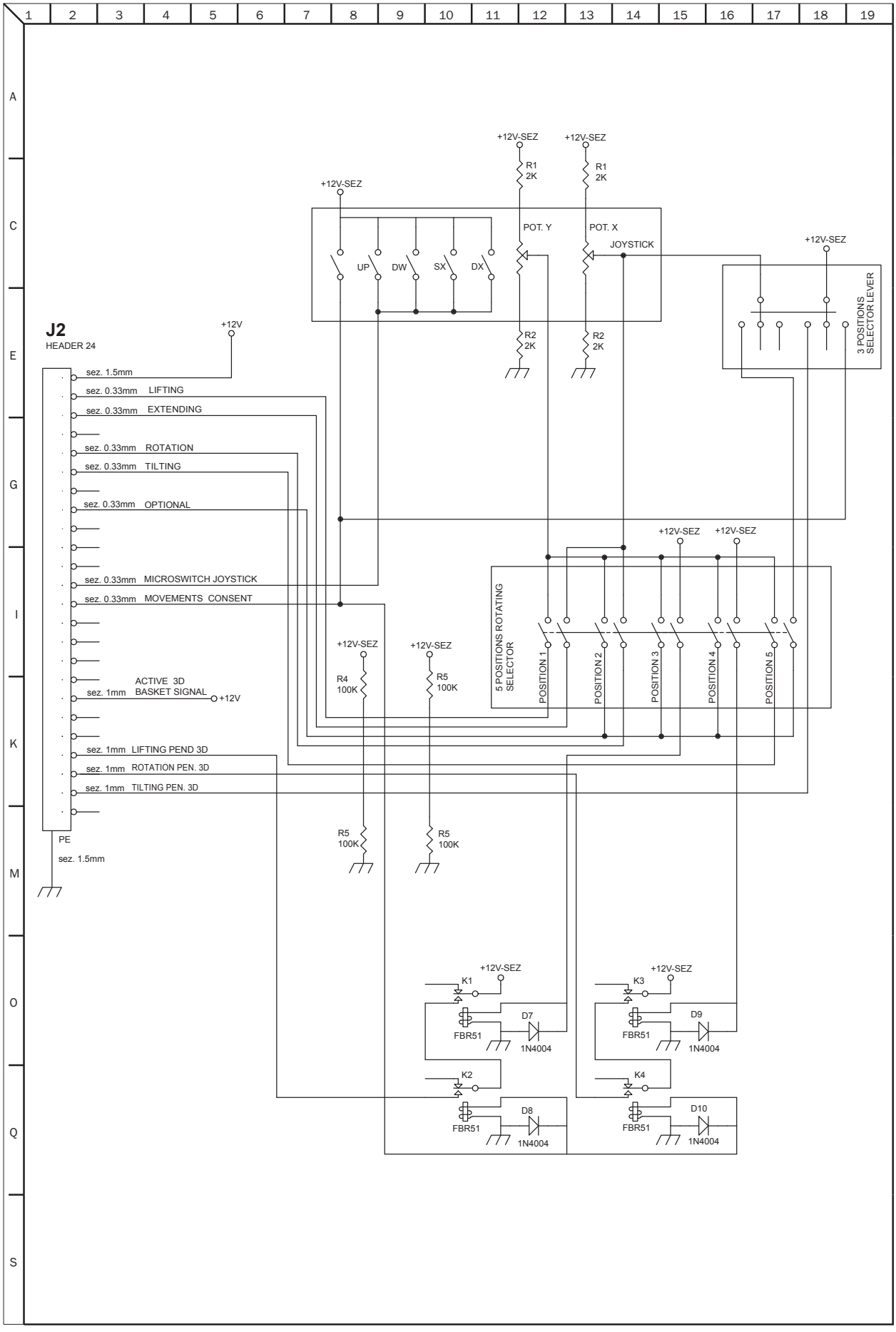
ELECTRICAL PUSHBUTTON PANEL DIAGRAMS

PUSHBUTTON PANEL DIAGRAM PART 1



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PUSHBUTTON PANEL DIAGRAM PART 2



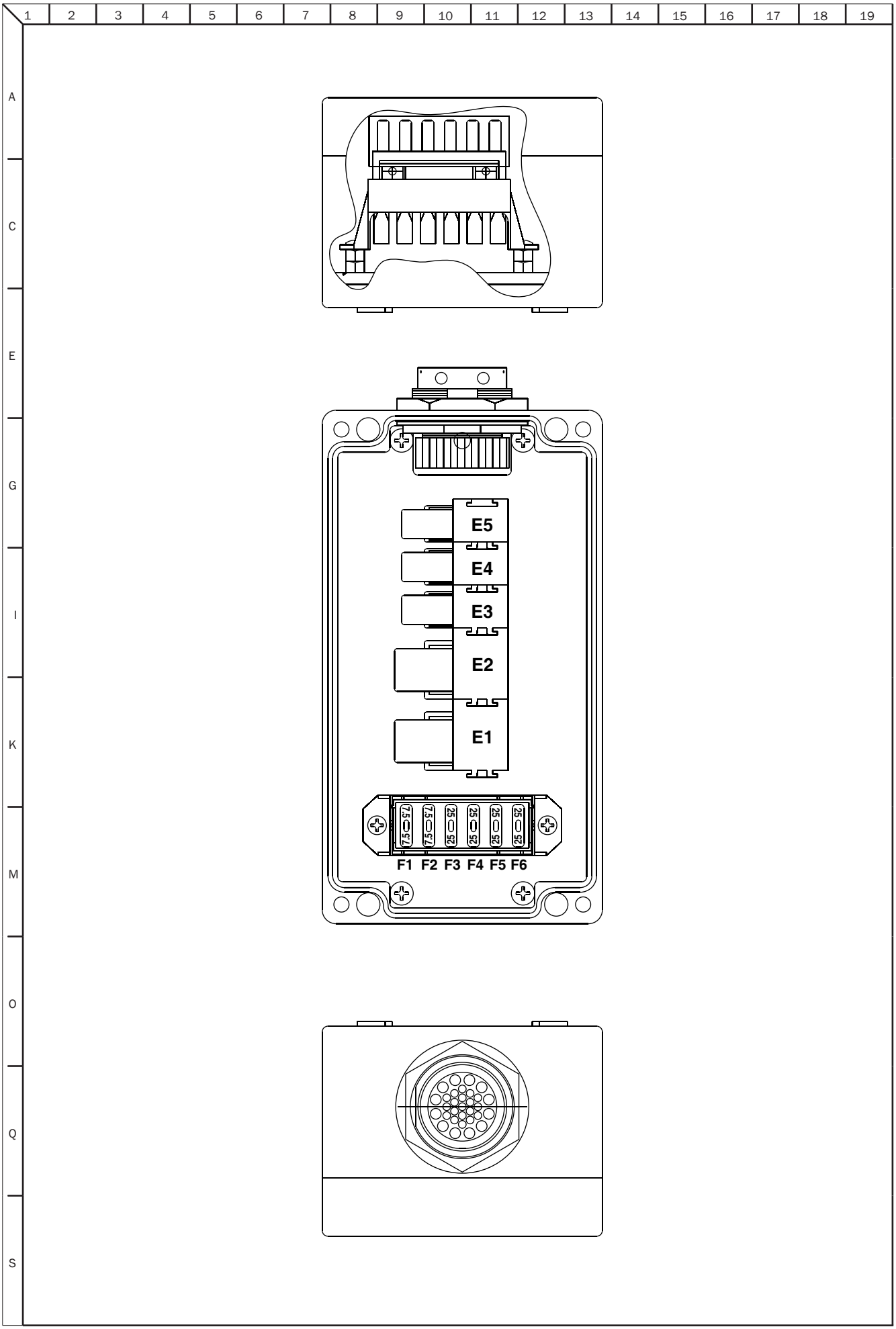
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AIR CONDITIONING ELECTRICAL DIAGRAMS

FUSE AND RELAY BOX

COMPONENTS		
Ref	***Description***	***Position on the diagram***
E1	Relay	K11
E2	Relay	I11
E3	Relay	I11
E4	Relay	I11
E5	Relay	G11
F1	Fuse 7,5A	M9
F2	Fuse 7,5A	M10
F3	Fuse 25A	M10
F4	Fuse 25A	M11
F5	Fuse 25A	M11
F6	Fuse 25A	M12

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POSITION OF THE COMPONENTS ON THE DIAGRAMS

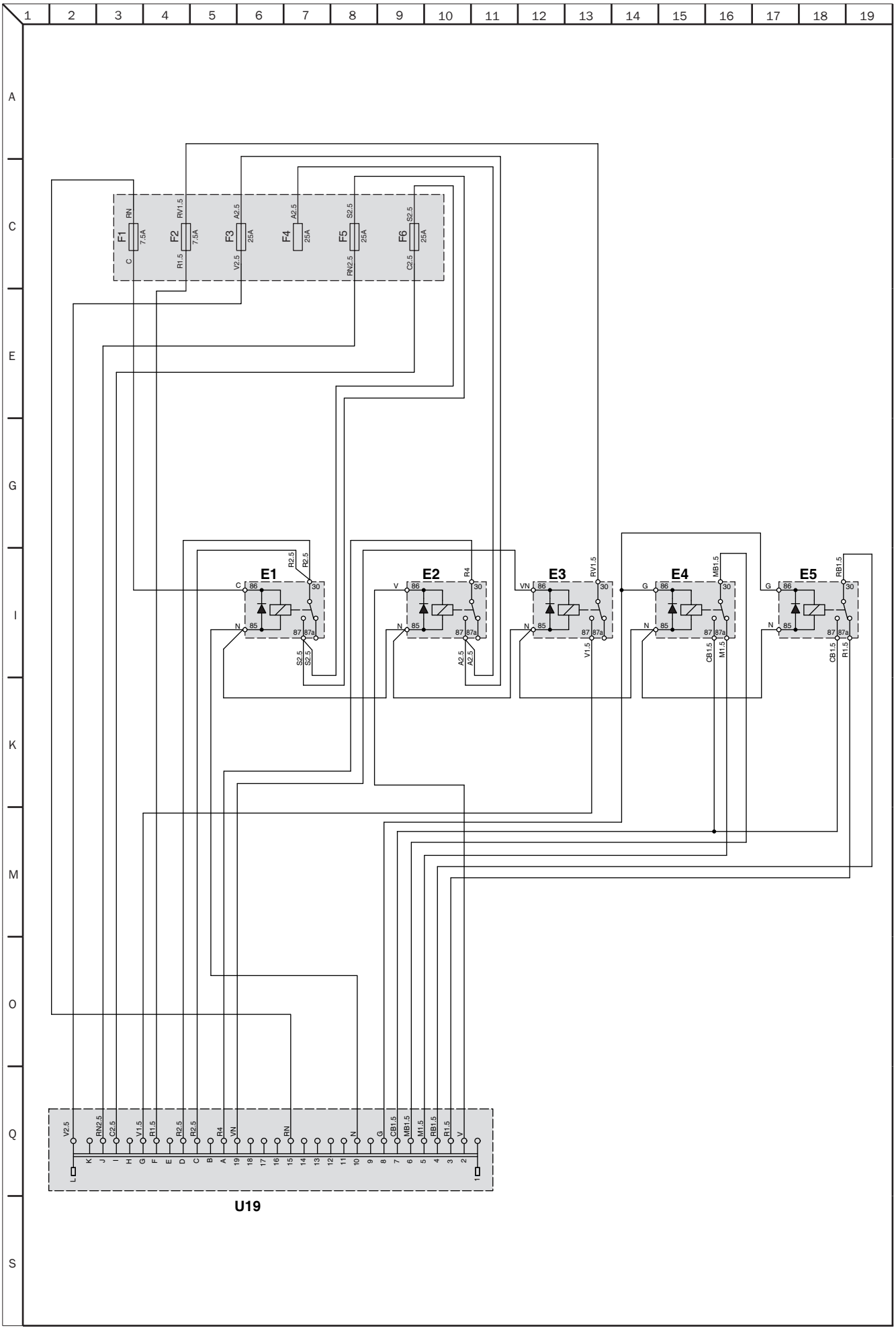
Component	*Diagram 1*	*Diagram 2*	*Diagram 3*	*Diagram 4*
E1	√			
E2	√			
E3	√			
E4	√			
E5	√			
F1	√			
F2	√			
F3	√			
F4	√			
F5	√			
F6	√			
I16a		√		
I123				√
MV1		√		
MV2		√√		
U7				√
U11				√
U14			√	√
U15			√	√
U16			√	
U17			√	
U18+			√	
U18-			√	
U19	√		√	
U28				√
U29				√
U33				√
U34				√
XA/C			√	
XC1		√		

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1 - CABLED AIR CONDITIONING BOX

COMPONENTS		
Ref	***Description***	***Position on the diagram***
E1	Relay	I6
E2	Relay	I10
E3	Relay	I12
E4	Relay	I15
E5	Relay	I18
F1	Fuse 7,5A	C3
F2	Fuse 7,5A	C4
F3	Fuse 25A	C5
F4	Fuse 25A	C7
F5	Fuse 25A	C8
F6	Fuse 25A	C9
U19	Fuse box connector	S6

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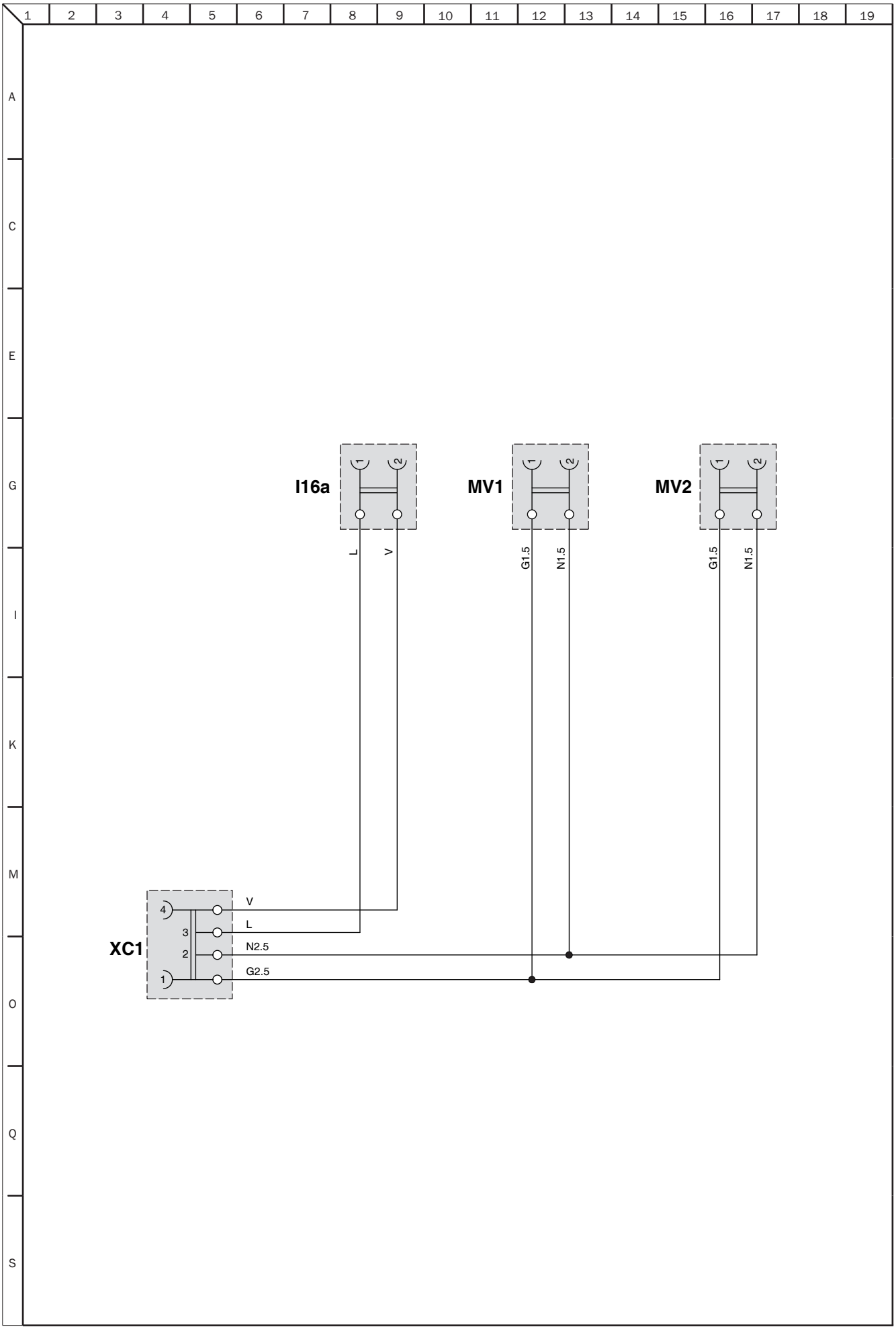


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2 - CONDENSER ELECTRICAL WIRING

COMPONENTS		
Item	***Description***	***Position on the diagram***
I16a	Air conditioning pressure switch	G7
MV1	Fan motor 1	G11
MV2	Fan motor 2	G15
XC1	Upper cab condenser	O3

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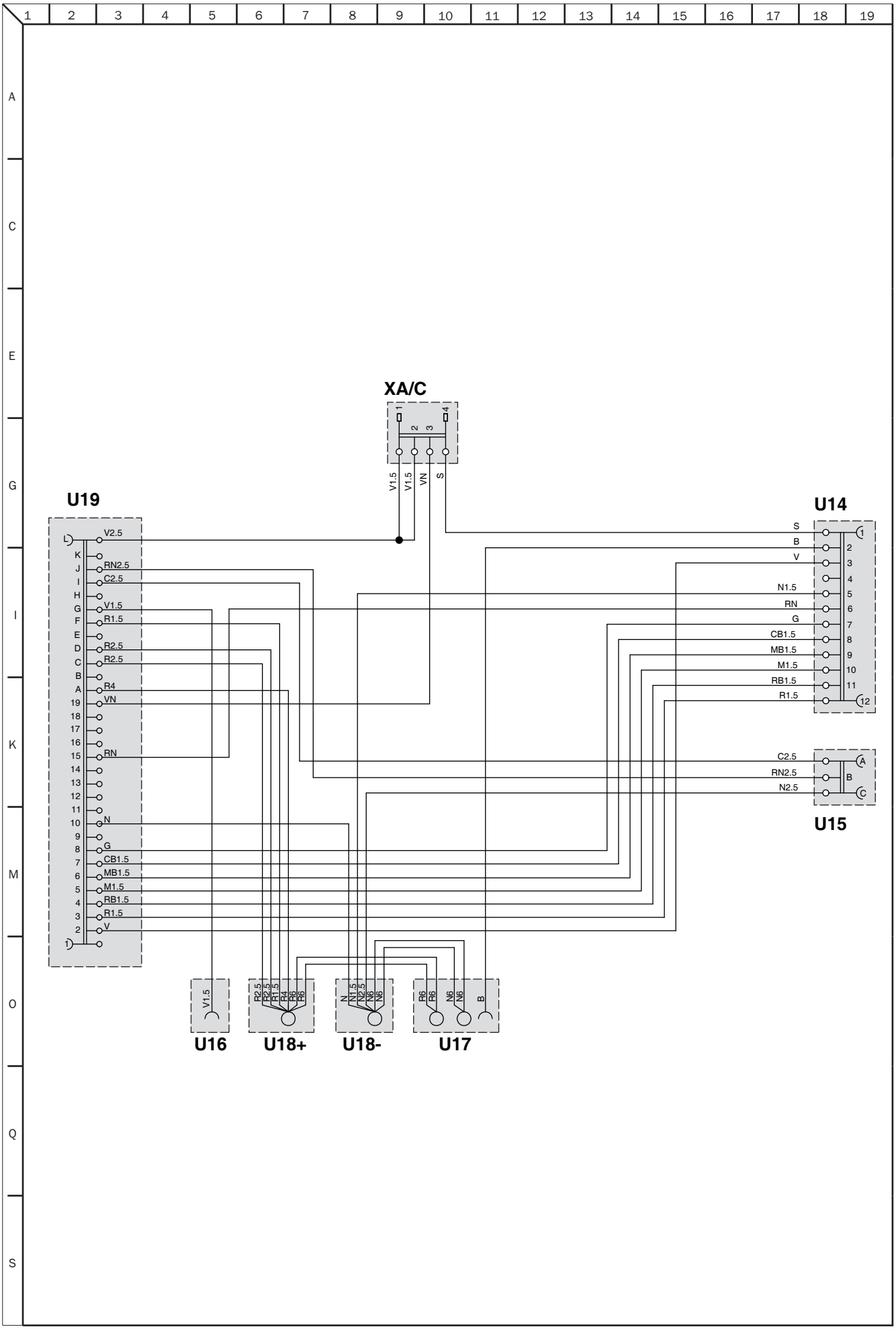


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3 - REAR CAB AIR CONDITIONING UNIT WIRING

COMPONENTS		
Ref	**Description**	**Position on the diagram**
U14	System isolating connectors	G18
U15	System isolating connectors	M18
U16	Air conditioning compressor	O5
U17	Alternator	O10
U18+	Battery	O6 / O7
U18-	Battery	O8
U19	Fuse box connector	G2
XA/C	Truck system connector for cab fans	E9

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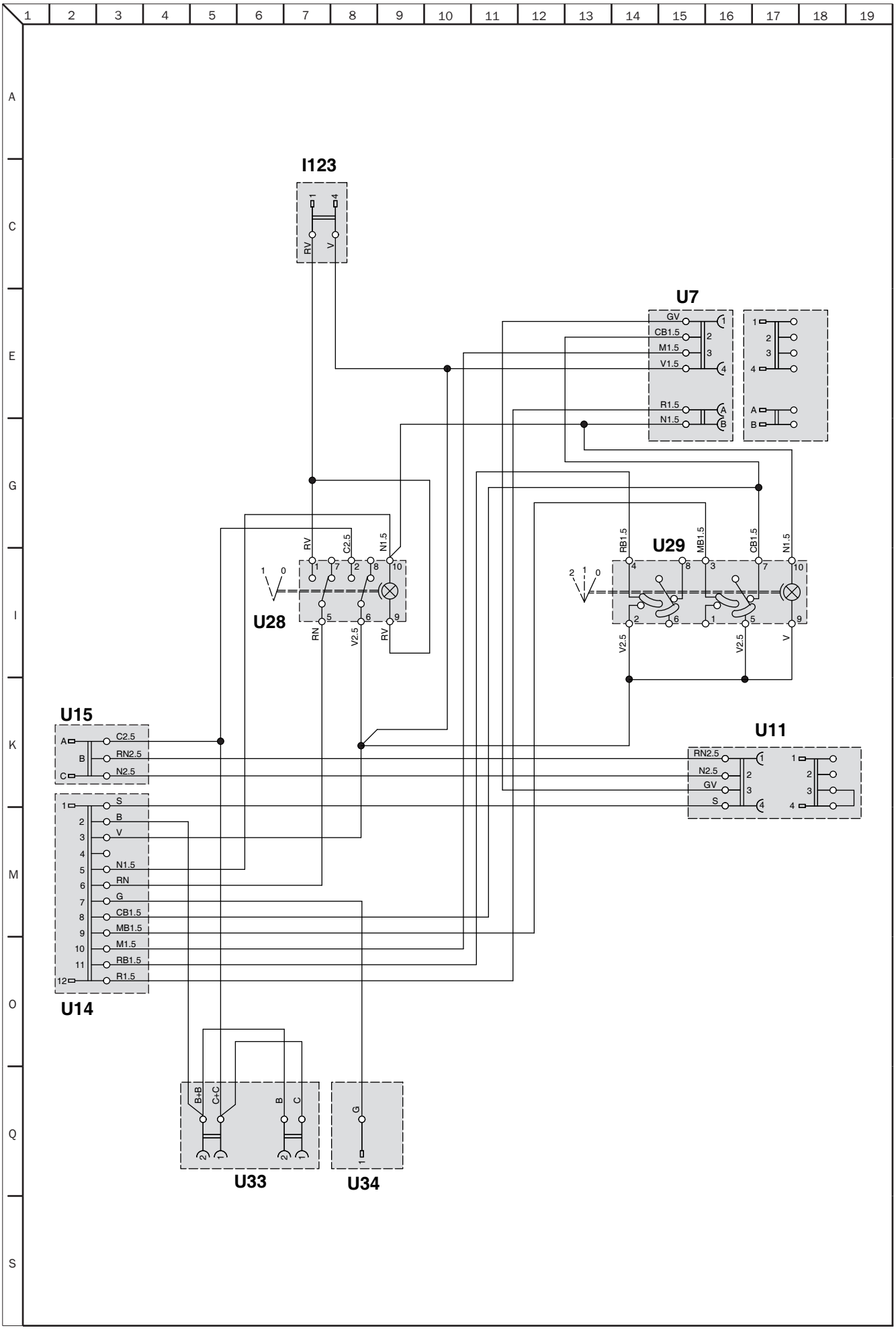


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4 - AIR CONDITIONING WIRING IN CAB

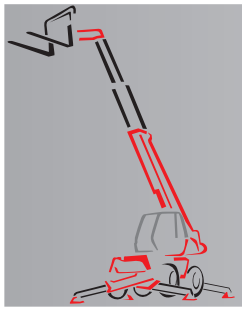
COMPONENTS		
Ref	**Description**	**Position on the diagram**
I123	Instrument panel interface connector	C7
U7	Front evaporator unit	E15
U11	Provision for rear ventilation unit	K17
U14	System isolating connectors	O2
U15	System isolating connectors	K2
U28	Air conditioning switch ON/OFF	I6
U29	Ventilation speed switch	G15
U33	Additional alternator load warning lights	Q6
U34	Heating control connector	Q8

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OPTIONS - ATTACHMENTS COMPONENTS LOCATION

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– DIAGRAM 1 CONDENSER WIRING 7

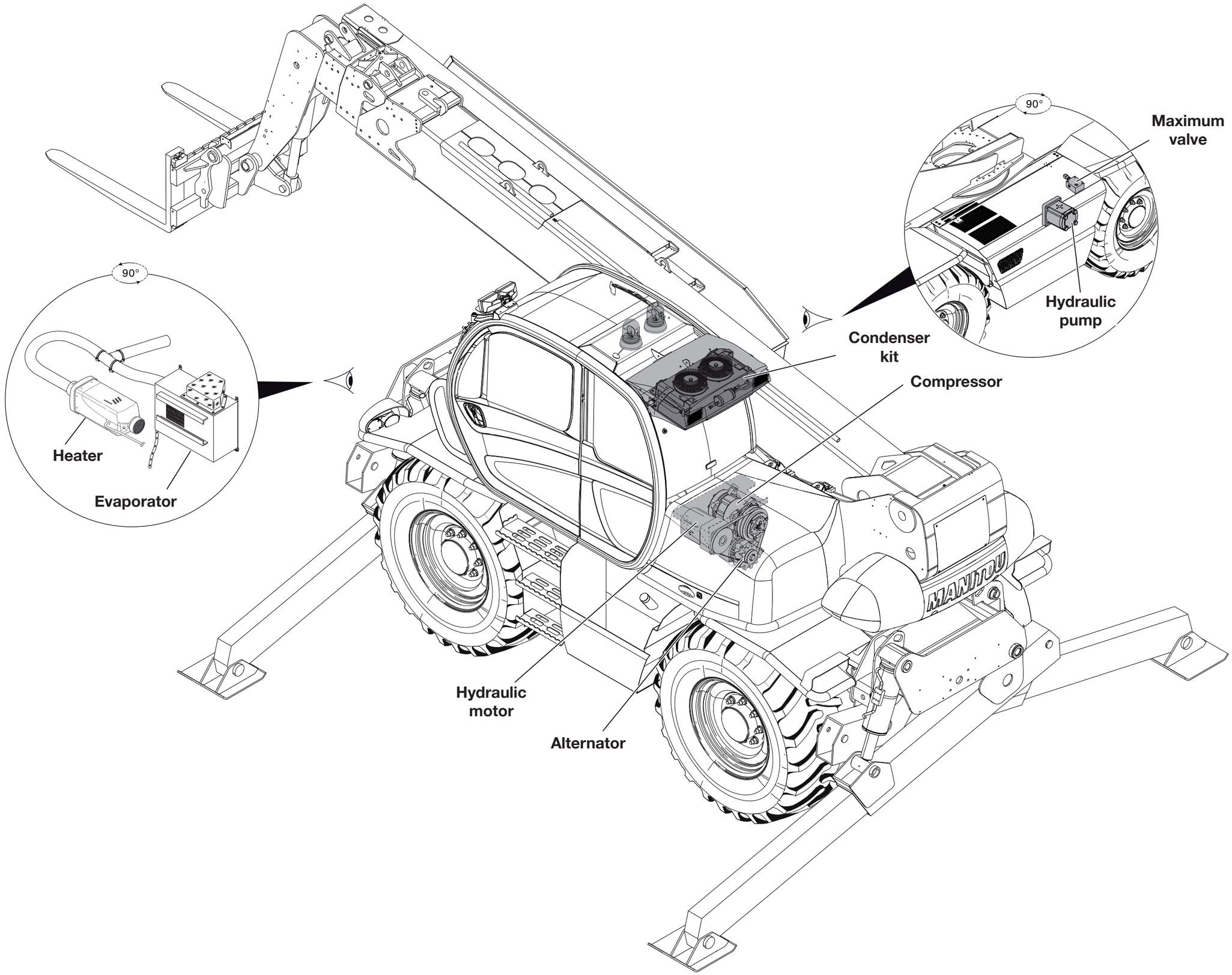
– DIAGRAM 2 REAR CAB UNIT WIRING 8

– DIAGRAM 3 CAB INTERNAL WIRING 9

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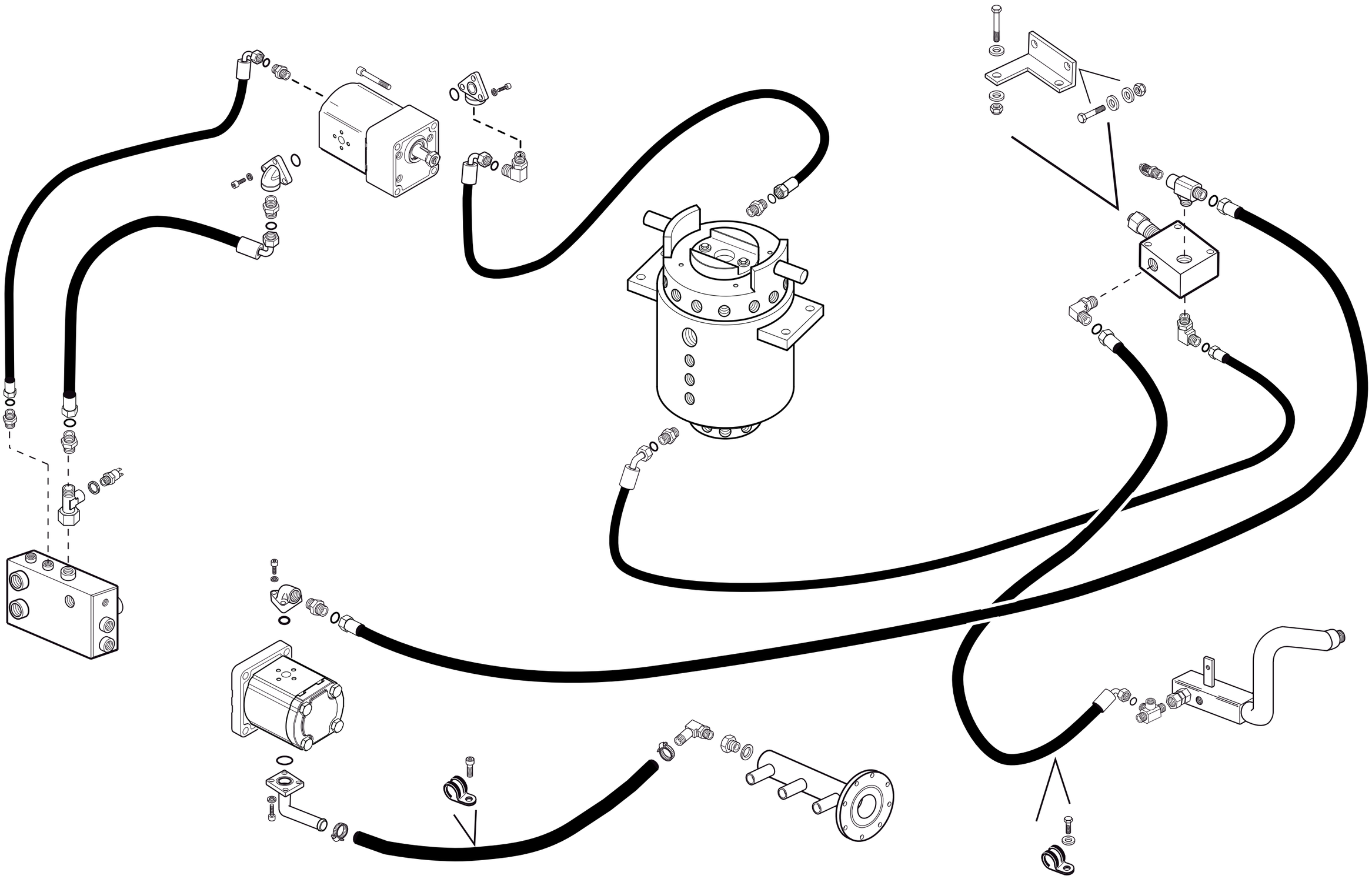
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POSITION OF THE AIR CONDITIONING CONNECTORS



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POSITION OF THE AIR CONDITIONING CONNECTORS



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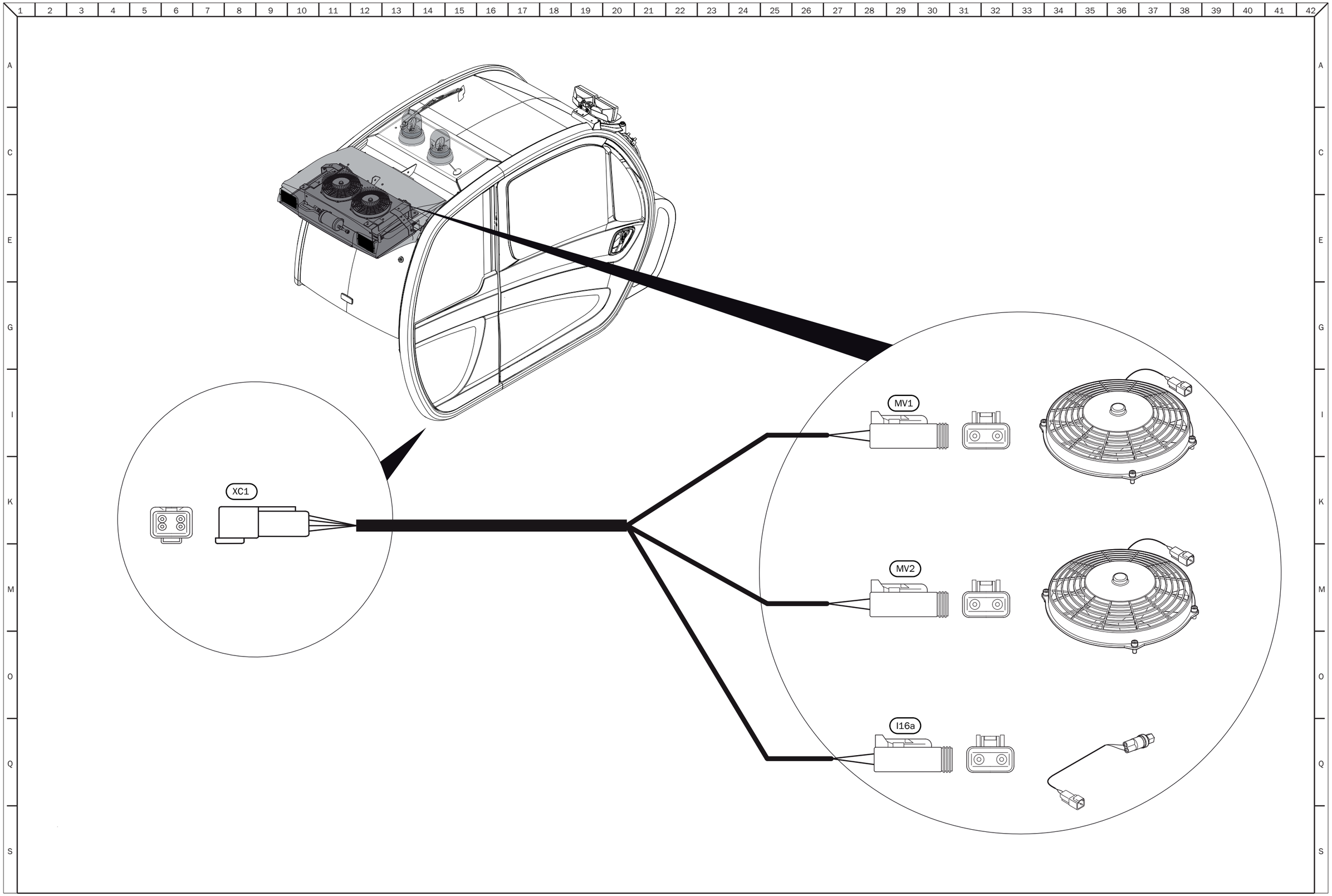
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POSITION OF THE AIR CONDITIONING CONNECTORS

Ref	Description	Position on the diagrams			Comments
		Diagram 1	Diagram 2	Diagram 3	
I16a	Air conditioning pressure switch	Q29			
I123	Instrument panel interface connector			I27	
MV1	Fan motor 1	I29			
MV2	Fan motor 2	M29			
U7	Front evaporator unit			E30	
U11	Provision for rear ventilation unit			E14	
U14	System isolating connectors		I35	C6	
U15	System isolating connectors		M35	I6	
U16	Air conditioning compressor		M19		
U17	Alternator		K26		
U18+	Battery		M17		
U18-	Battery		M13/M14		
U19	Fuse box connector		M6		
U28	Air conditioning switch ON/OFF			I15/I16	
U29	Ventilation speed switch			I11	
U33	Additional alternator load warning lights			K23	
U34	Heating control connector			I19	
XA/C	Truck system connector for cab fans		G25		
XC1	Upper cab condenser	K8			

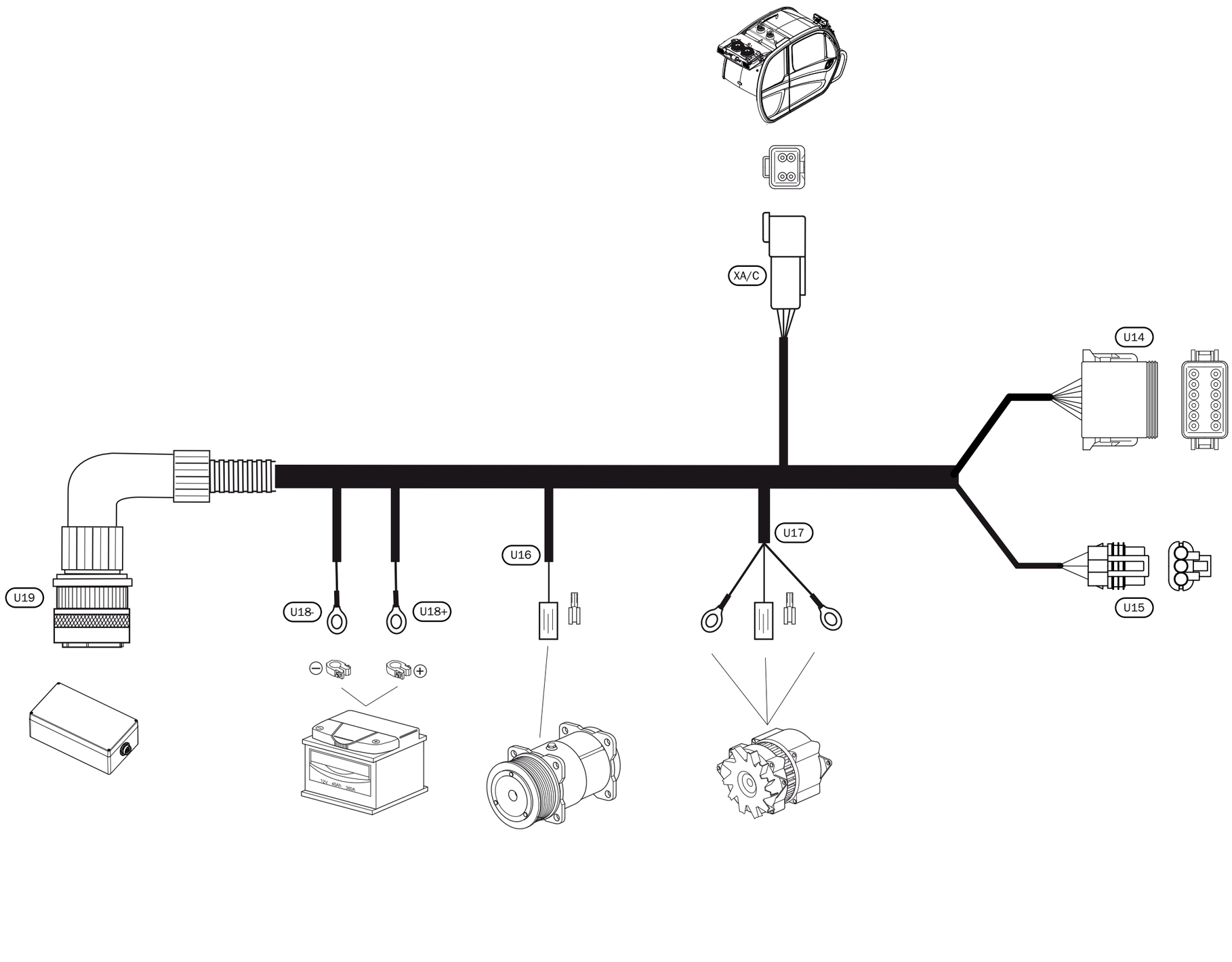
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DIAGRAM 1 CONDENSER WIRING



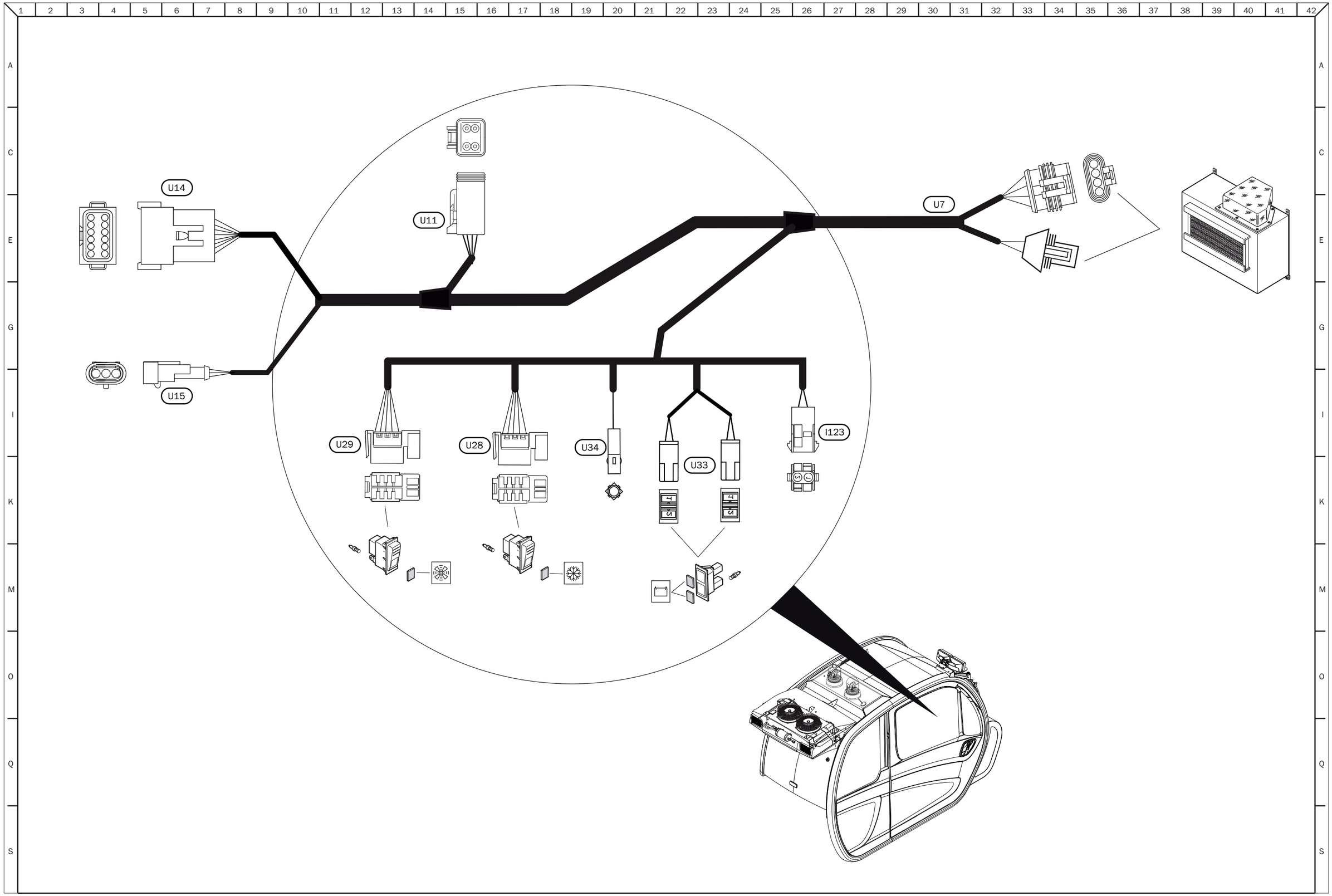
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DIAGRAM 2 REAR CAB UNIT WIRING



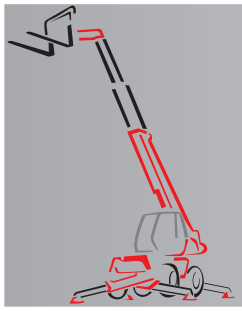
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DIAGRAM 3 CAB INTERNAL WIRING



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OPTIONS - ATTACHMENTS CONTROL AND ADJUSTMENT

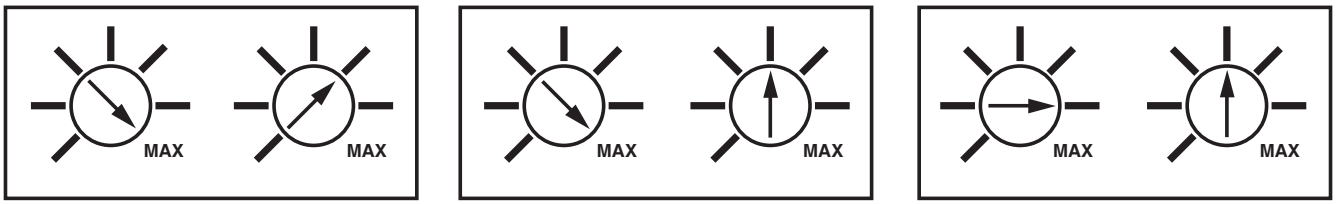
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MRT 1850/2150/2540 EURO 3 POTENTIOMETERS ADJUSTMENT 2

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MRT 1850/2150/2540 EURO 3 POTENTIOMETERS ADJUSTMENT

SPEED OF ROTATION

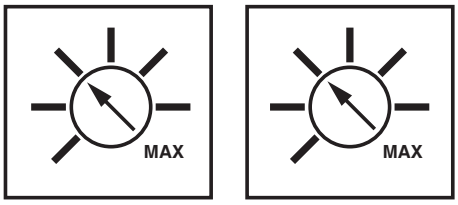


RAMP STOPPED

RAMP STARTING

LIFTING

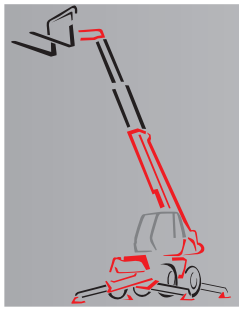
TRAVERSING



Trolley	*1850*	*2150*	*2540*
Maximum height/time (meters/second)	17,7/46	20,4/53	24,6/63
Maximum radius/time (meters/revolution)	14,9/180	14,4/180	15/180

The position of the potentiometers is for information only.
Use the values in the table.

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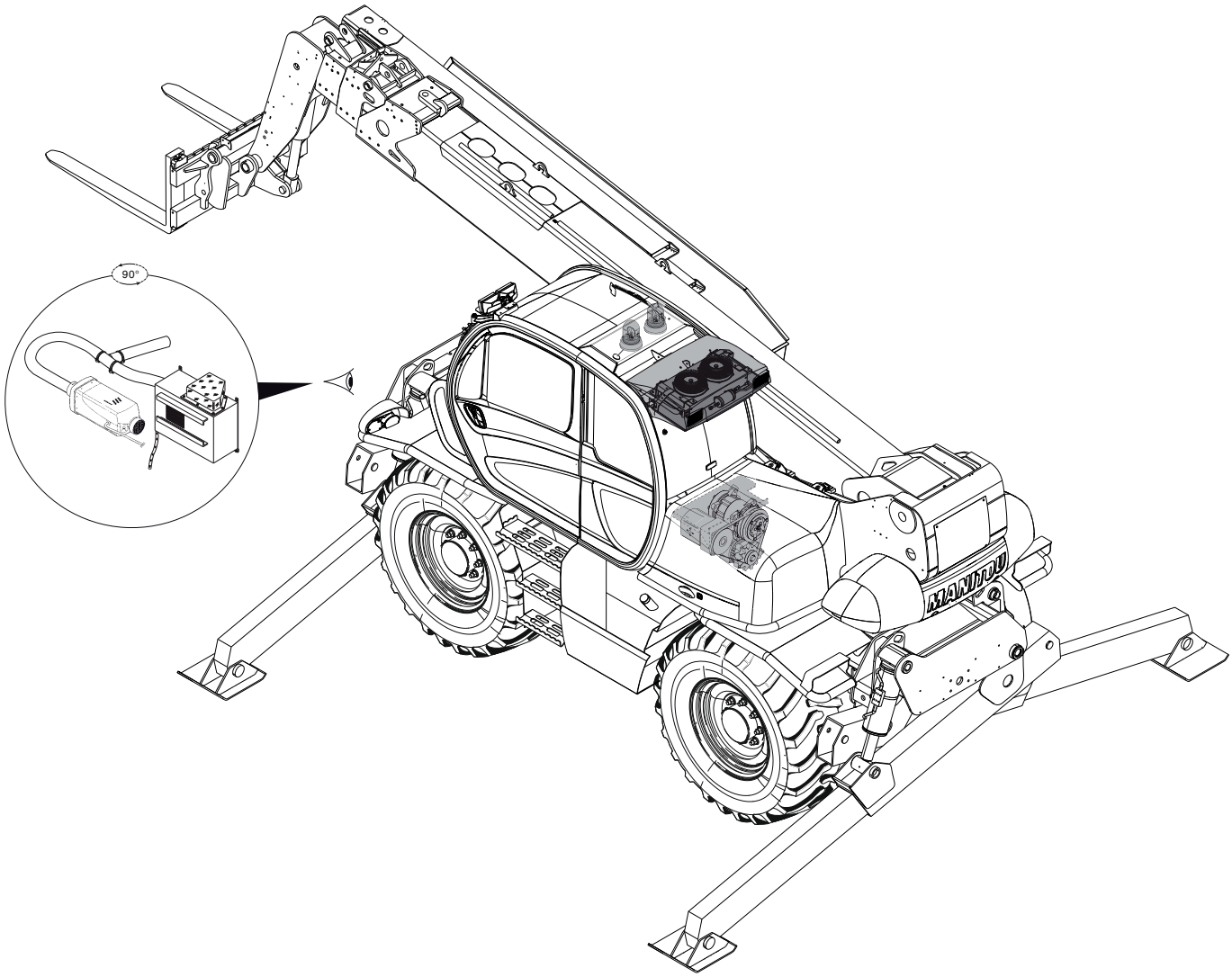
FITTING THE COMPONENTS OPTIONS - ATTACHMENTS

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– FITTING THE AIR CONDITIONING MOTORS 3
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FITTING THE AIR CONDITIONING



GENERAL INFORMATION

To reach the various components, the order of removal must be observed.

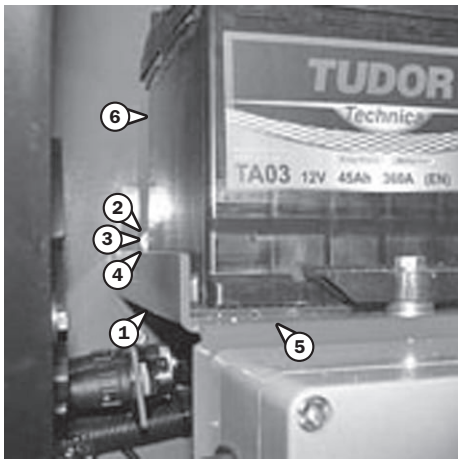
PREPARATION AND SAFETY INSTRUCTIONS

Place the truck on a horizontal surface and extend the stabilisers to ensure the greatest stability and safety.

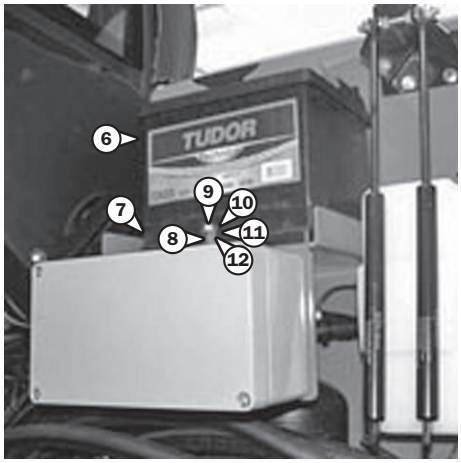
Special instruments:
- Lifting crane (5000 kg. minimum).

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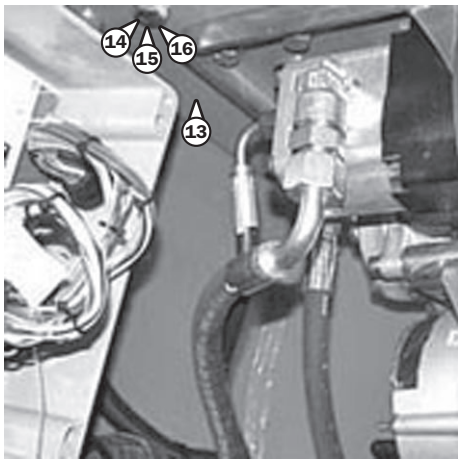
FITTING THE AIR CONDITIONING MOTORS



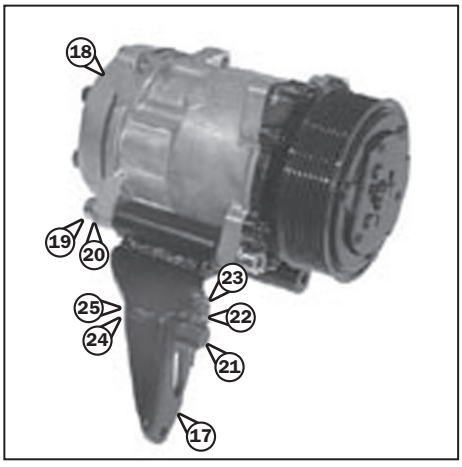
Fit the battery mounting (Item 1) to its base with the screws and washers (Item 2, 3 and 4).
Fit the rubber battery mounting (Item 5) and the battery (Item 6) there.



Fit the edge cover (Item 7) and the battery rest (Item 8) on the mounting (Item 1) locking it with the screw (Item 9), washers (Item 10 and 11) and nut (Item 12).

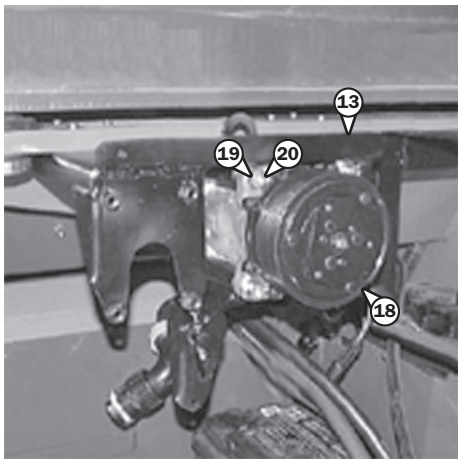


Fit the bracket (Item 13) to the cab with the screws and washers (Item 14, 15 and 16).

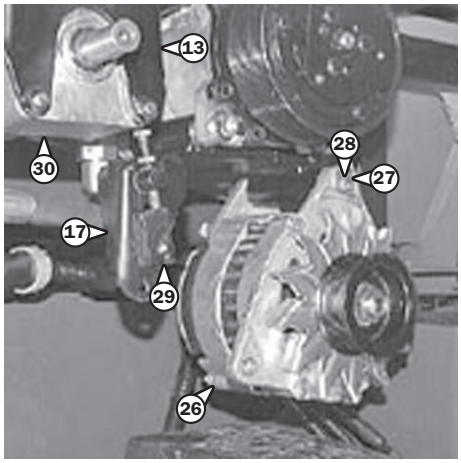


Fit the compressor/alternator mounting bracket
(Item 17) to the compressor (Item 18) with the screws and washers (Item 19 and 20).
Fit the pin (Item 21) for the belt tensioning bracket, the nut (Item 22) and screw (Item 23) to the bracket (Item 17).
Lock the pin (Item 21) with the nut and washer (Item 24 and 25).

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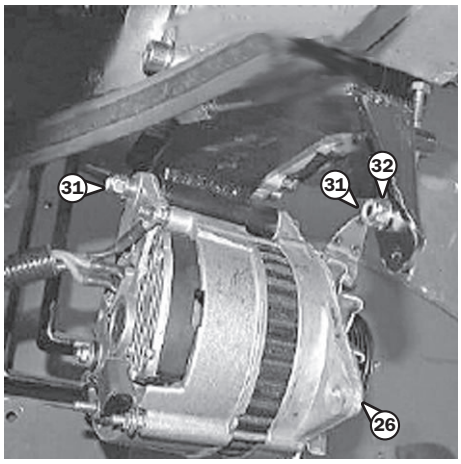


Fit the compressor (Item 18) to the bracket (Item 13) with the screws and washers (Item 19 and 20).



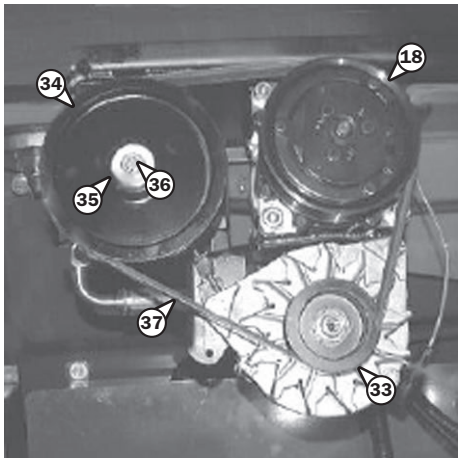
Fit the alternator (Item 26) to the bracket (Item 17) with the screws and washers (Item 27 and 28).
Fit the belt tensioning bracket (Item 29) to the mounting bracket (Item 17).

Fit the hydraulic motor (Item 30) to the bracket (Item 13).



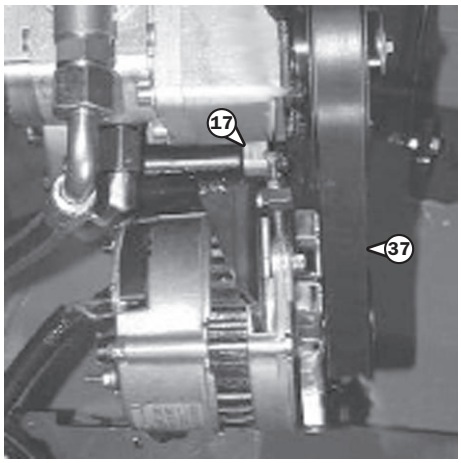
Lock the belt tensioning bracket (Item 29) with the washer (Item 32) and nut (Item 31), without fully tightening it.

Lock the alternator (Item 26) with the nut (Item 31).

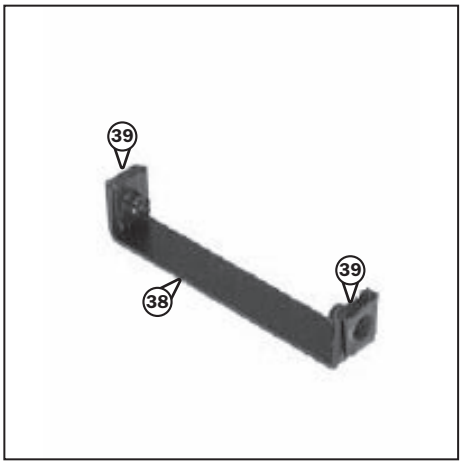


Fit the pulley (Item 33) to the alternator (Item 26) and the pulley (Item 34) with the spacer (Item 35) and screw (Item 36) to the compressor (Item 18).
Fit the belt (Item 37) on the pulleys (Item 33 and 34) and on the compressor pulley (Item 18).

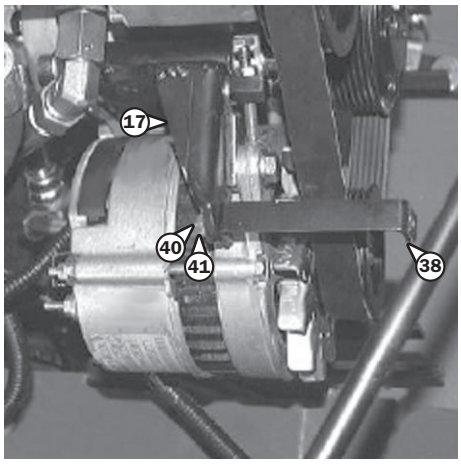
https://truckmanualshub.com/



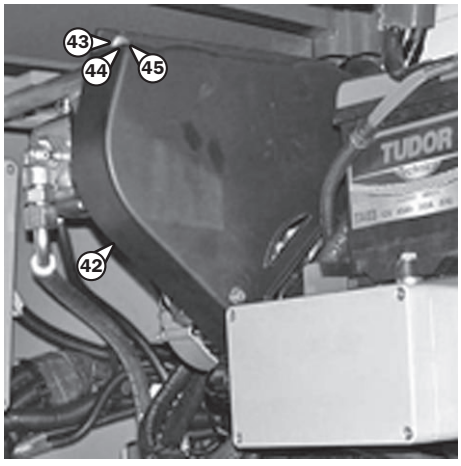
Tension the belt (Item 37) with the bracket (Item 17).



Fit the spring clips (Item 39) to the housing mounting bracket (Item 38).

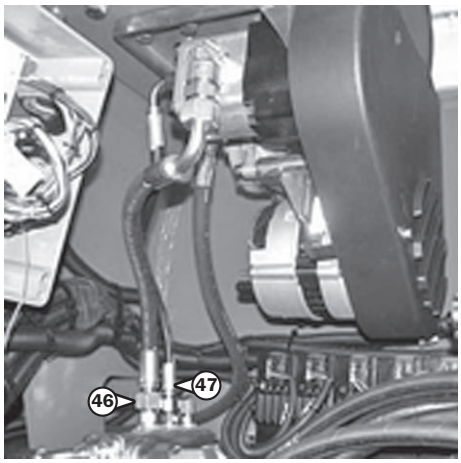


Fit the housing mounting bracket (Item 38) to the belt tensioning bracket (Item 17) with the screw and washer (Item 40 and 41).

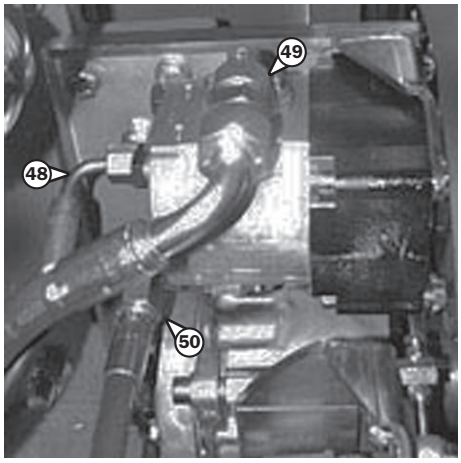


Fit the housing (Item 42) with the screws (Item 43), washers (Item 44) and nuts (Item 45).

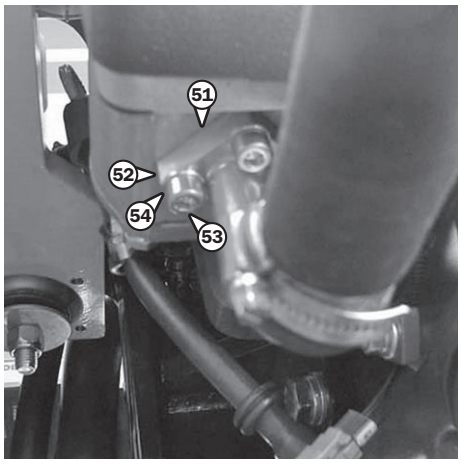
https://truckmanualshub.com/



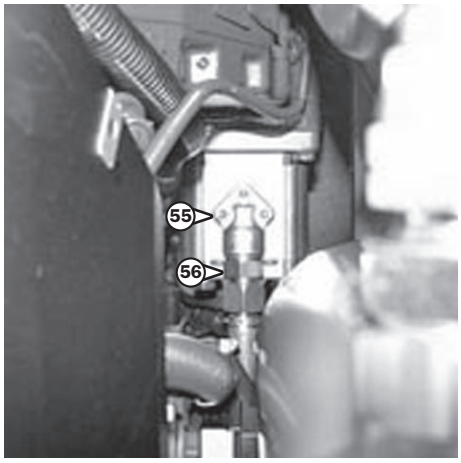
Connect the hydraulic pipes (Item 46 and 47).



Connect the hydraulic pipes (Item 48, 49 and 50) to the hydraulic motor.



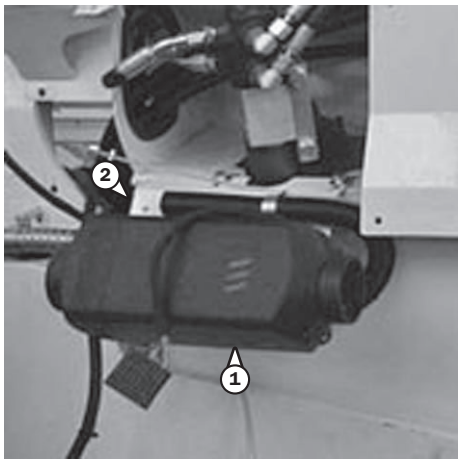
Fit the pump suction hose (Item 52), to the motor, with the seal (Item 51).
Screw in the screws and washers (Item 53 and 54).



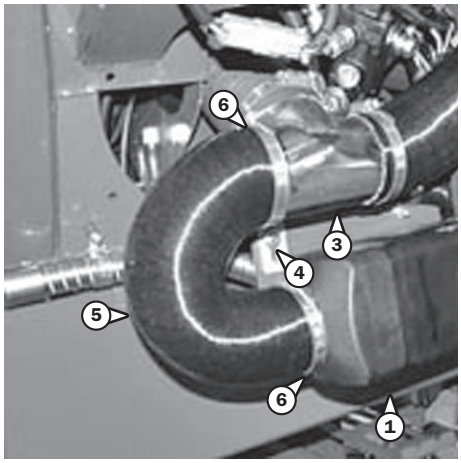
Connect the cast iron pipe (Item 55) to the truck engine and fit it above the nipple (Item 56) and the pipe.

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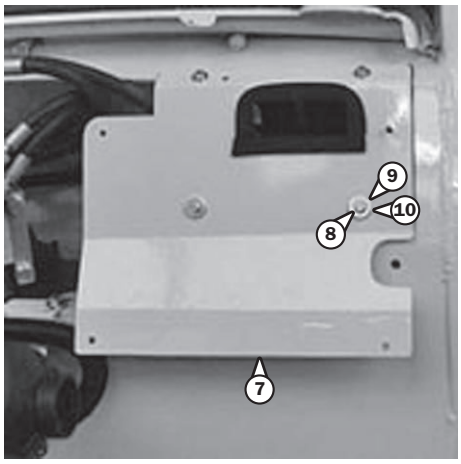
FITTING AIR CONDITIONING TO THE CAB



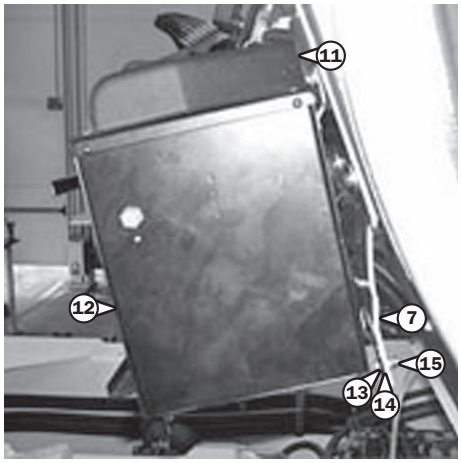
Fit the heater (Item 1) to the appropriate mounting (Item 2).



Fit the three-way duct (Item 3) to the mounting (Item 2) with the appropriate screws (Item 4).
Fit the air pipe (Item 5), to the heater (Item 1) and to the three-way duct (Item 3), locking it with the clips (Item 6).

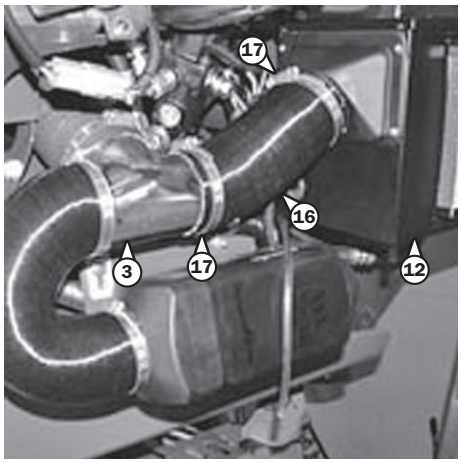


Fit the evaporator mounting (Item 7) to the truck cab with the screws and washers (Item 8, 9 and 10).

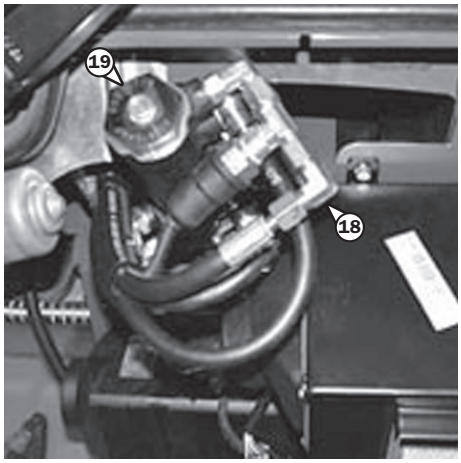


Fit the edge cover (Item 11) to the mounting (Item 7).
Fit the evaporator (Item 12), to the mounting (Item 7), with the screws and washers (Item 13 and 14) and nut (Item 15).

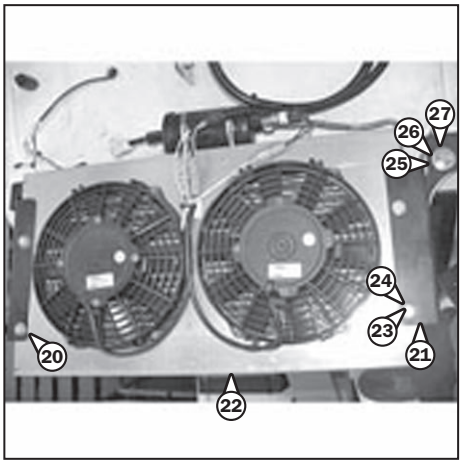
https://truckmanualshub.com/



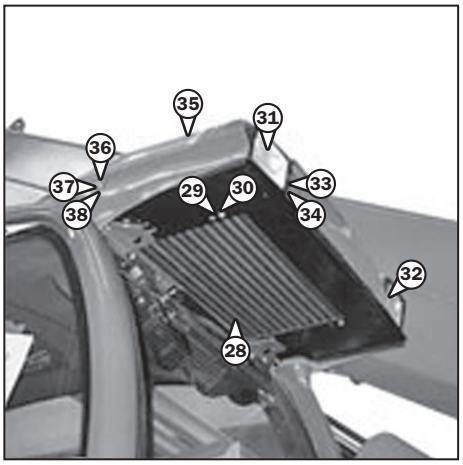
Fit the air pipe (Item 16), to the evaporator (Item 12) and the three-way duct (Item 3), locking it with clips (Item 17).



Fit the hydraulic pipe (Item 18) to the pump (Item 19).

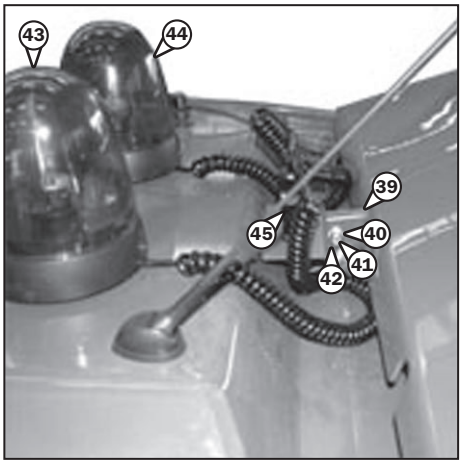


Fit the left (Item 20) and right (Item 21) mounting to the condenser kit (Item 22) screwing in the screws and washers (Item 23 and 24).
Fit the kit (Item 22) above the cab, locking it with the screws and washers (Item 25, 26 and 27).

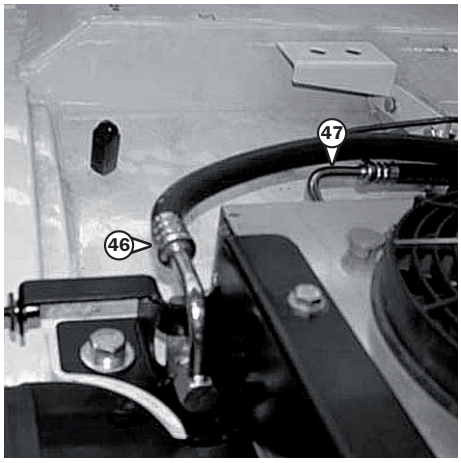


Fit the lower protective grille (Item 28) with the screws and washers (Item 29 and 30), fit the left (Item 31) and right (Item 32) lamp covers with the screws and washers (Item 33 and 34).
Fit the upper bonnet (Item 35) with the screws and washers (Item 36, 37 and 38).

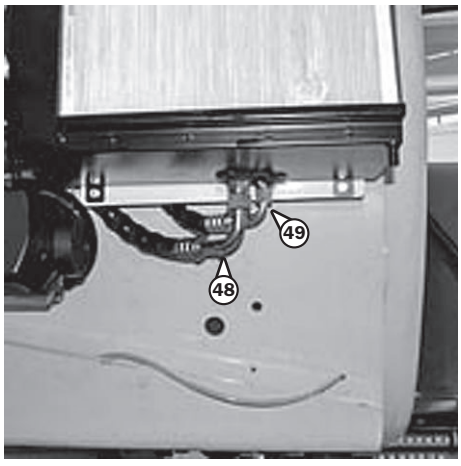
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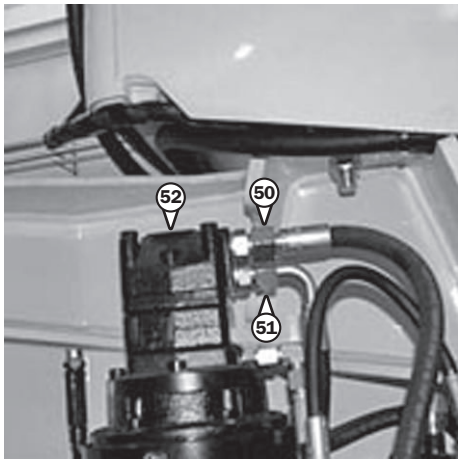
Fit the electric socket mounting (Item 39) on the truck with the screw (Item 40), washer (Item 41) and nut (Item 42). Fit the rotating lamp (Item 43) and emergency lamp (Item 44) and connect the electric sockets (Item 45).



Connect the pipes (Item 46) to the condenser kit (Item 47) and the condenser filter.

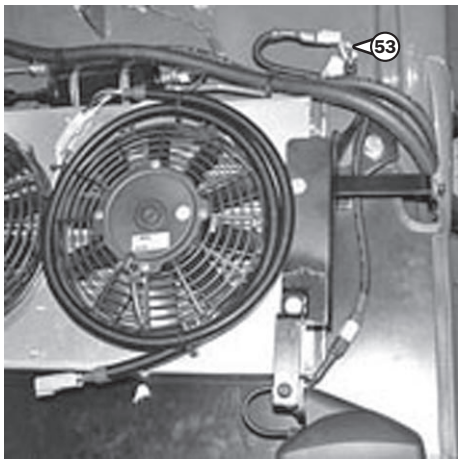


Connect the pipes (Item 48 and 49) to the evaporator.

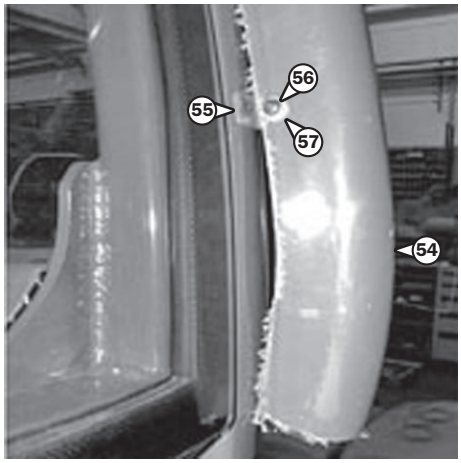


Connect the pipes (Item 50 and 51) to the compressor (Item 52).

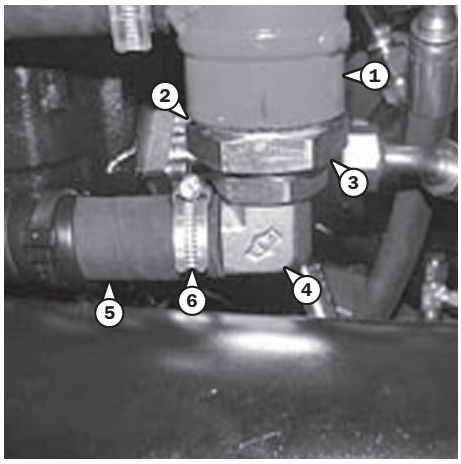
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Connect the electric cables (Item 53).

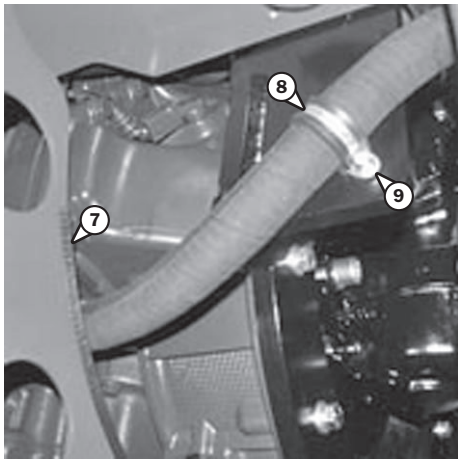


Fit the small duct (Item 54) to the mounting (Item 55) with the screws and washers (Item 56 and 57).



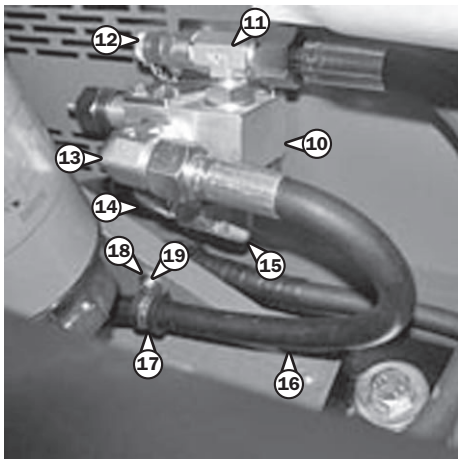
FITTING THE AIR CONDITIONING HYDRAULIC SYSTEM

Fit the washer (Item 2) and reducer (Item 3), to the exhaust manifold (Item 1), above the tyre carrier connection (Item 4) on which the tube will be mounted (Item 5); lock the tube with the clamp (Item 6).

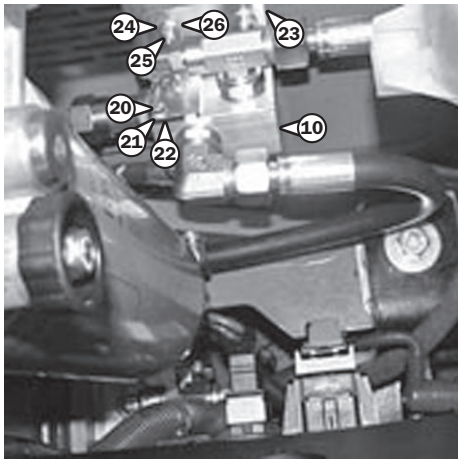


Fit the edge cover to the base (Item 7), to prevent wear on the base.
Lock the tube to the engine with the clamp (Item 8) and screw (Item 9).

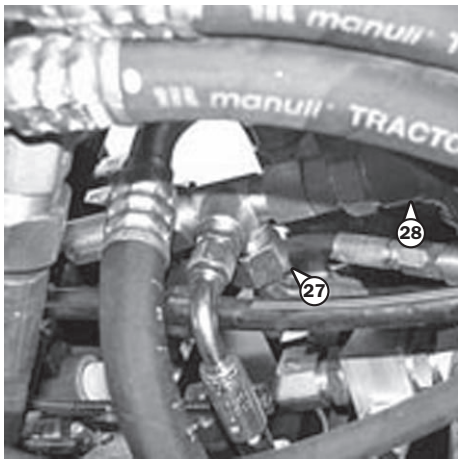
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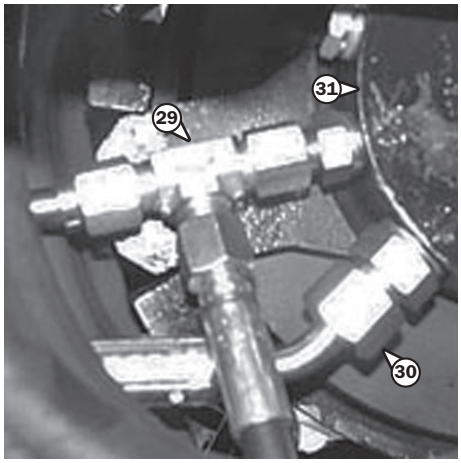
Mount the connectors (Item 11, 12, 13, 14 and 15) on the exhaust valve (Item 10).
Lock the tube (Item 16) to the base with the clamp (Item 17), screws and washers (Item 18 and 19).



Fit the exhaust valve (Item 10) to the mounting (Item 23), locking it with the screws and washers (Item 20, 21 and 22).
Fit the mounting (Item 23) to the base with the screws and washers (Item 24, 25 and 26).



Fit the connectors (Item 27) to the manifold (Item 28).



Fit the connectors (Item 29 and 30) to the hydraulic manifold (Item 31).

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CONTROLS AND TESTS

After fitting the kit, proceed as follows:

1. Charge the system compressor and fill with oil according to the following instructions:

The quantity of R134a gas necessary to charge the system is **Kg. 0,800**.
Simultaneously with charging, a quantity of **100 gr**. of special oil for the SANDEN compressor fitted must be added to the system.
Oil code: AT41234 to be requested from DELPHI product distribution and sales centres for.

2. Checking the pressure in the hydraulic system and checking the number of revolutions of the compressor electropulley:

The pressure in the hydraulic system, at maximum engine revolutions, must be **200 bar** (the pressure is adjustable using the VLP valve by connecting a manometer to the pressure test socket on the “T” coupling of the valve).
Check that, at minimum engine speed, the rotation of the compressor electropulley is between **900 ÷ 1000 r.p.m** (check the number of revolutions with a revolution counter).
Optimum operation of the air conditioning is obtained with an electropulley speed of **3500 r.p.m** with the engine at maximum revolutions and with a hydraulic system pressure of **170 bar**.

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TRANSMISSION



20

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- ***TRANSMISSION SCHEMATIC DIAGRAMS***
- ***TRANSMISSION COMPONENTS LOCATION***
- ***TRANSMISSION CONTROL AND ADJUSTMENT***
- ***TRANSMISSION REMOVAL***
- ***TRANSMISSION REFIT***
- ***TRANSMISSION SPECIFIC TOOLING***

- ***CHARACTERISTICS AND SPECIFICATIONS***
- ***COMPONENTS CONTROLS AND ADJUSTMENT***

647030EN

(Pump series A4VG)

647031EN

(Motor series A6VM)

647039EN

(Pump series H1 45/53)

647040EN

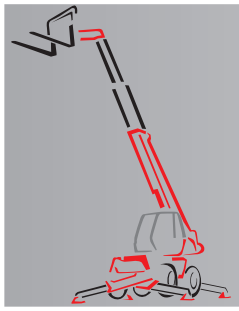
(Motor series 51/51-1)

647379

(Gear change Dana 357)

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TRANSMISSION CHARACTERISTICS AND SPECIFICATIONS

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– COMPOSITION OF THE DR VALVE 24
– OPERATION 24
– CROSS SECTIONAL VIEW OF THE DR VALVE 25
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– DETAILS 28

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SAUER HYDROSTATIC TRANSMISSION

BOOSTER PUMP

Usually built into the body of the main pump, it prevents cavitation of the system by replacing fluid lost by blow-by, also supplying the necessary pressure to the displacement variation system of the main pump.

PUMP/ENGINE CONTROLS

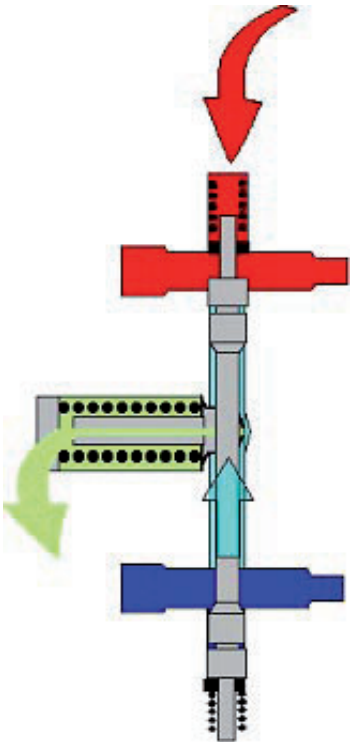
These are the parts that control the displacement variation of both components.

PRESSURE LIMITING VALVES

These limit the maximum pressure in both branches of the transmission.

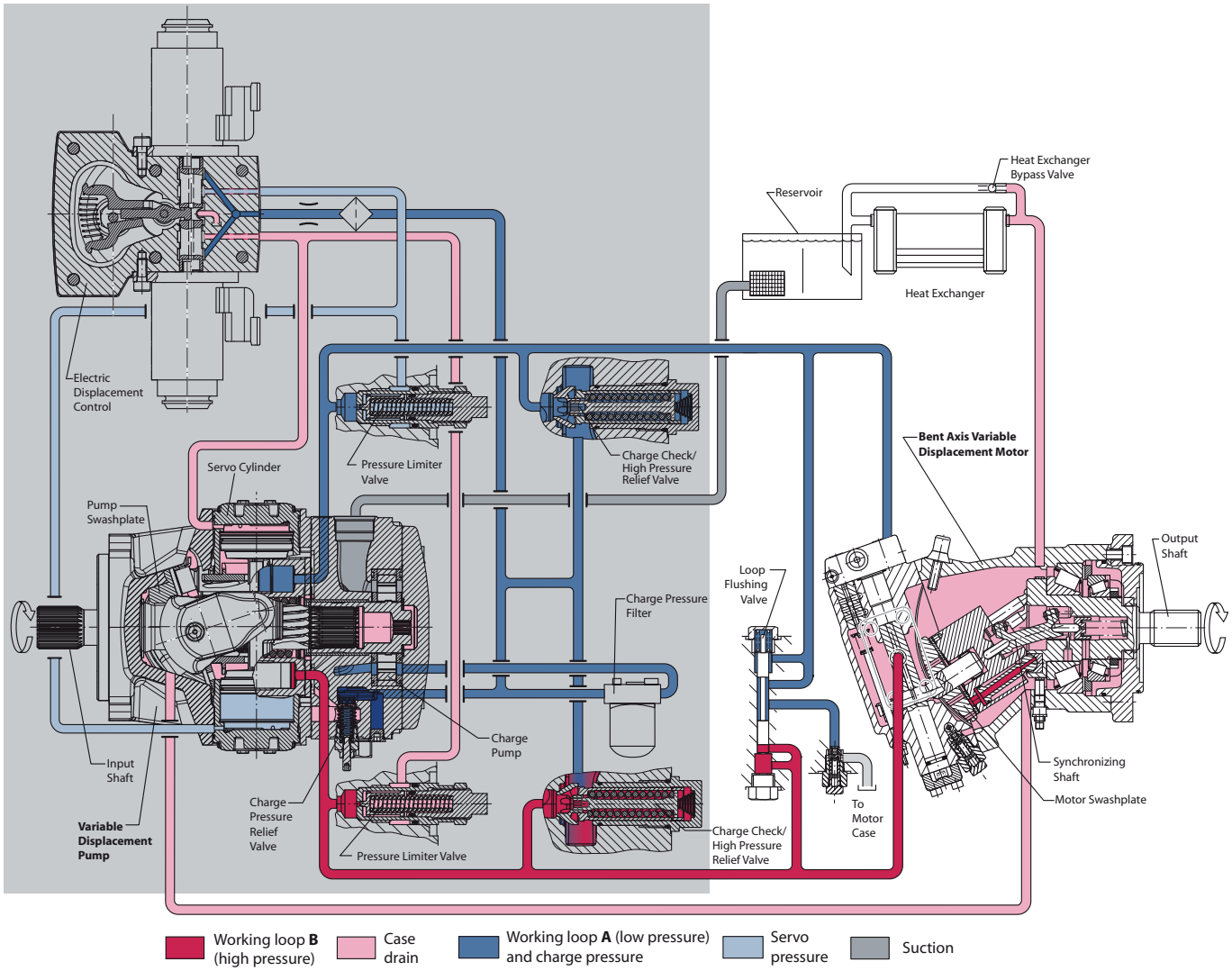
FLUXING VALVE

The purpose of using this valve is to optimise the working conditions, by eliminating contamination from the closed circuit, aiding thermal stability and rapidly expelling the air present in the circuit.



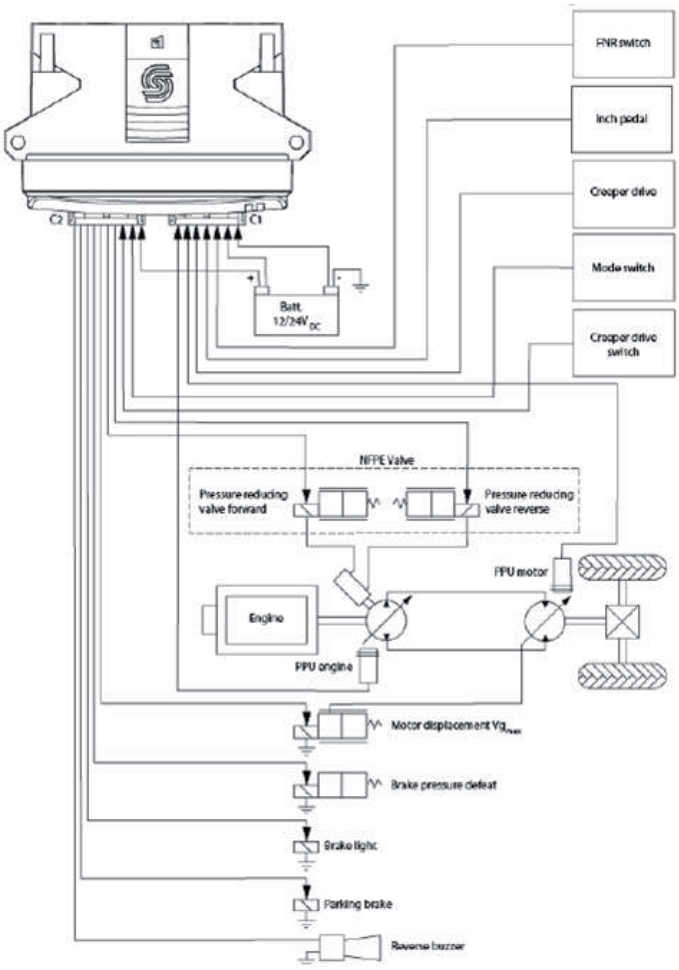
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HYDRAULIC CIRCUIT



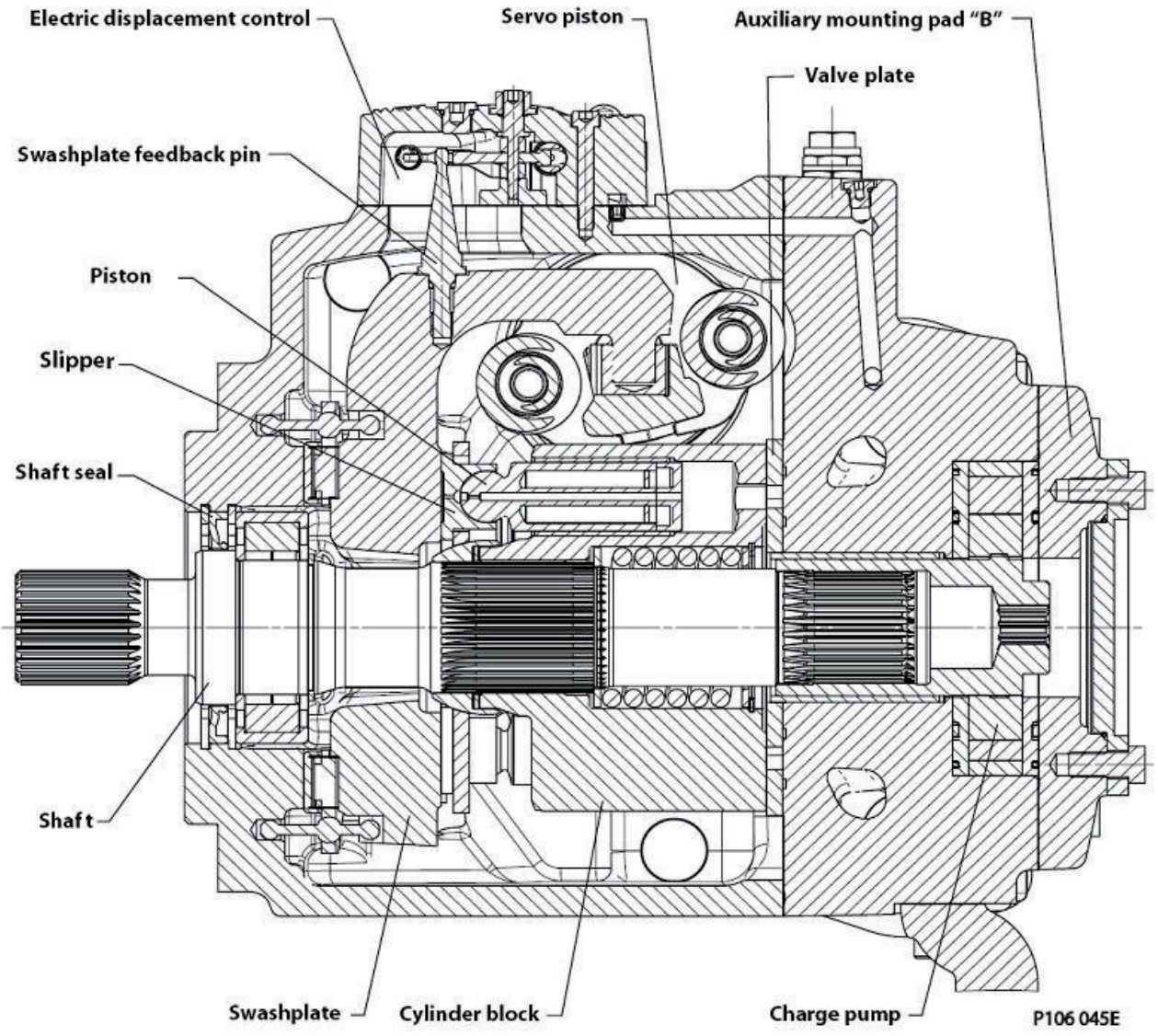
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NFPE AUTOMOTIVE SYSTEM



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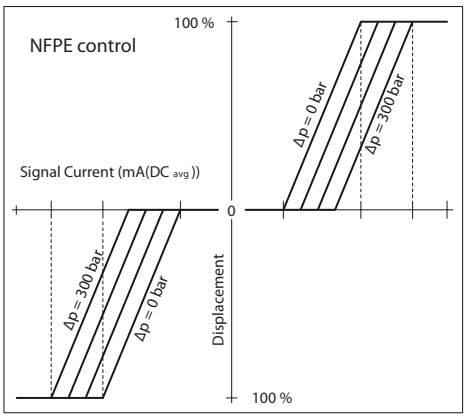
SERIES H1 PUMP



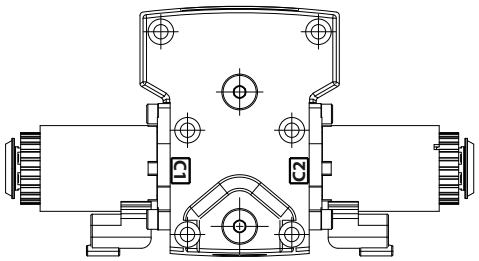
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NFPE PROPORTIONAL ELECTRICAL CONTROL

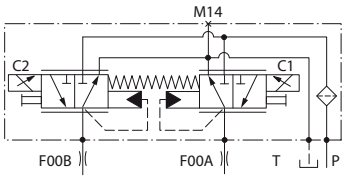
NFPE Proportional Actuation



NFPE / C1 and C2 Location

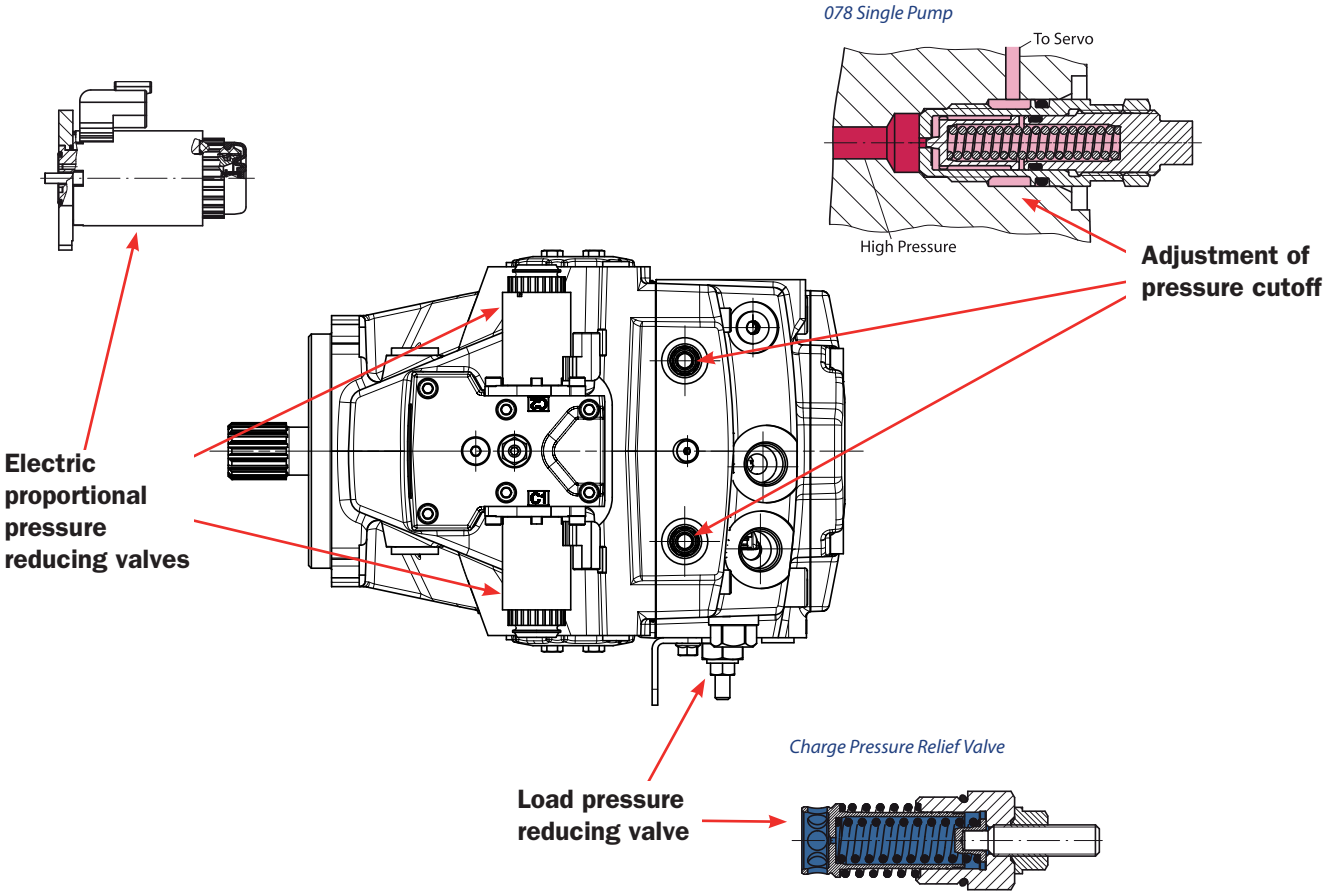


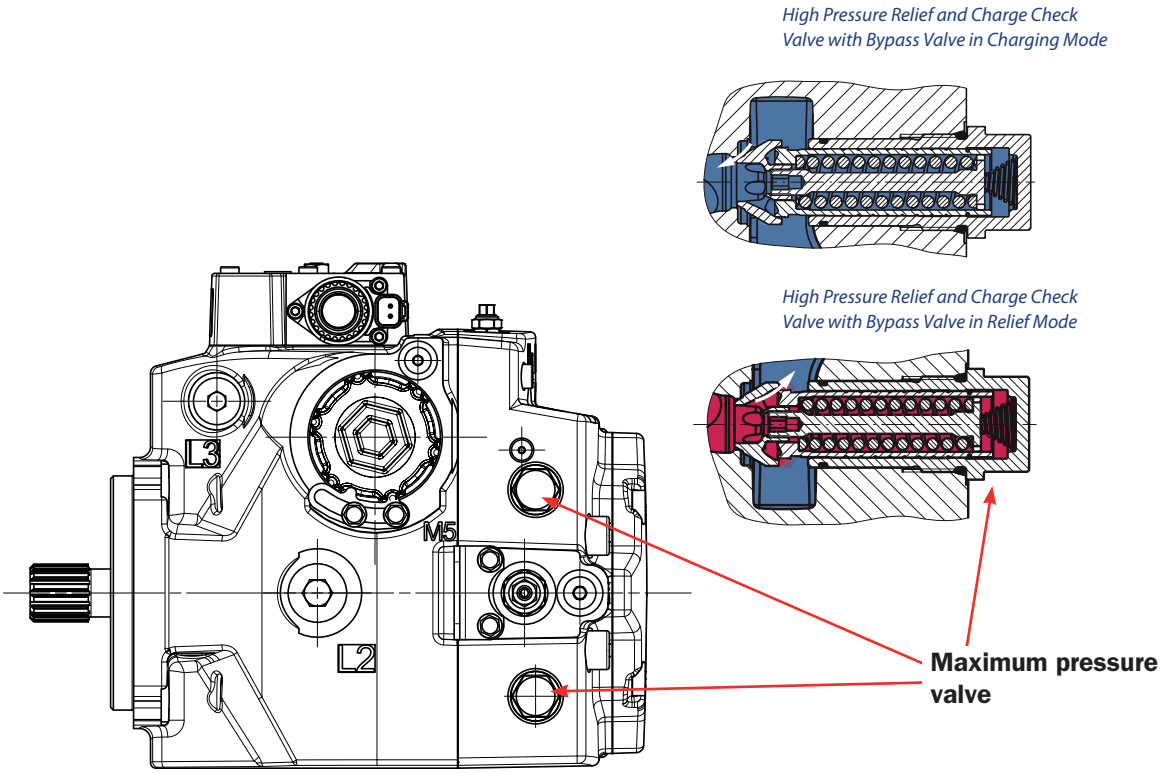
NFPE Schematic



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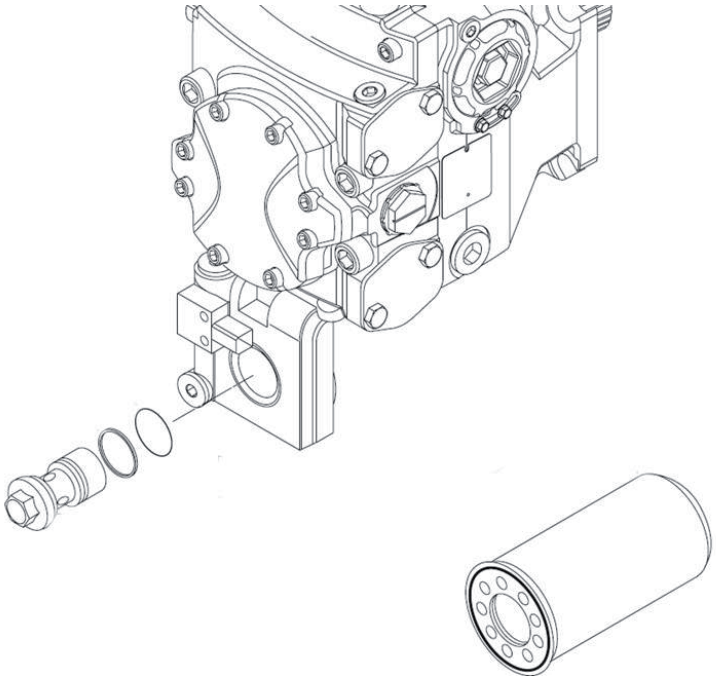
PUMP REGULATOR VALVES





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FILTER (TOTAL PRESSURE FILTRATION)

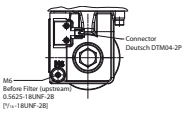


Technical Data, Pressures

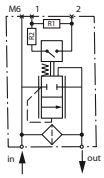
Maximum Charge Pressure	30 bar [435 psi]
Filter Bypass Sensor Switch Closure	Δp 3.7 - 5.1 bar [54 - 74 psi]
Bypass Valve	Δp 5.6 ± 0.9 bar [80 ± 13 psi]

Technical Data, Electric

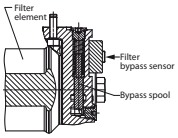
Max. Voltage	48 V
Max. Power	0.6 W
Resistor R1	510 Ω
Resistor R2	160 Ω
Resistor Tolerance	1 %
Temperature Range	-20 °C ÷ +100 °C [-4 °F ÷ +212 °C]
IP Rating (DIN 40 050) with Mating Connector	IP 69K



Schematic

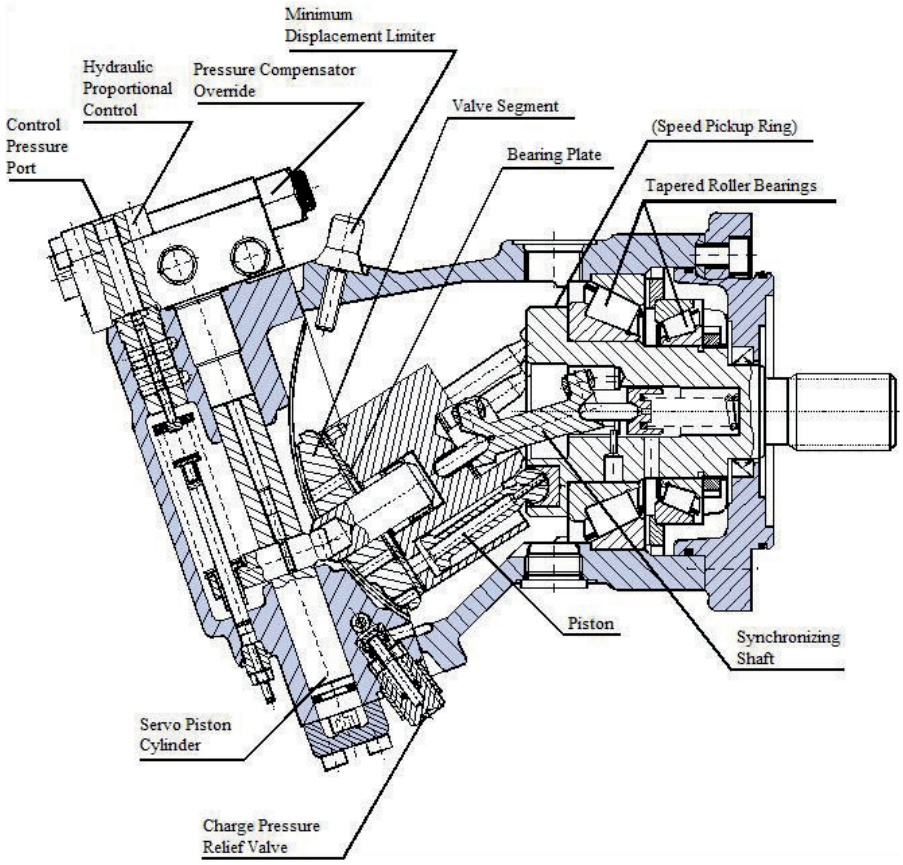


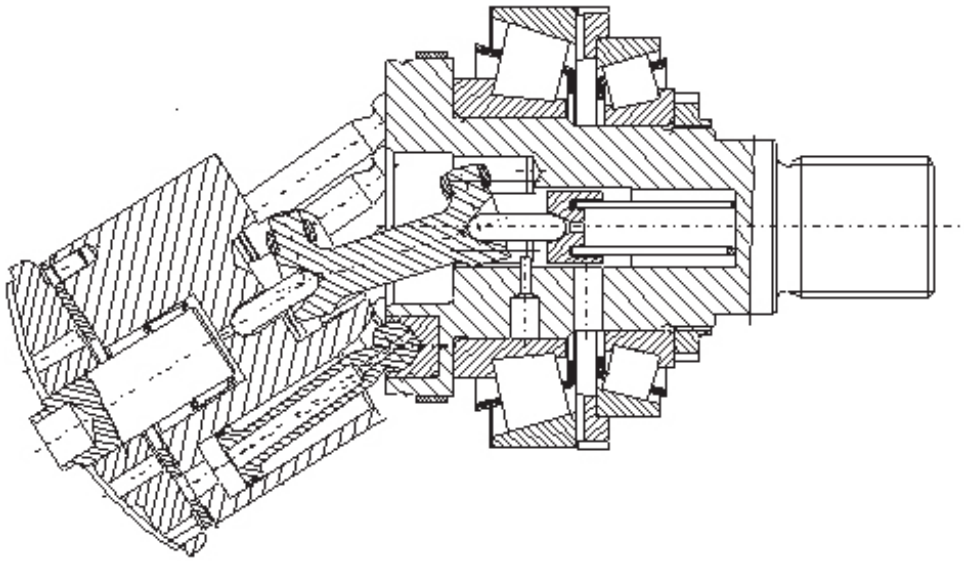
Integral Filter Head with Filter Bypass Sensors



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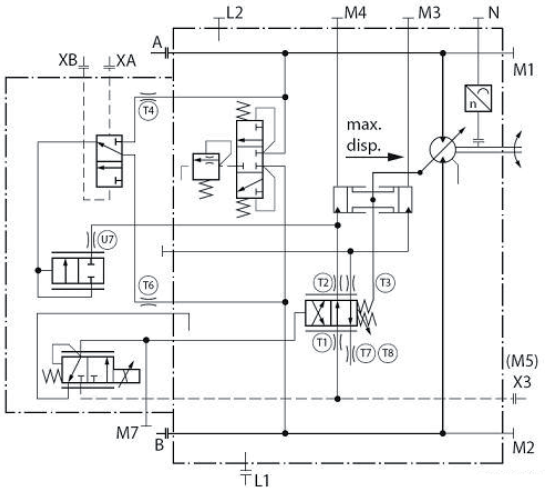
SERIES 51 MOTOR





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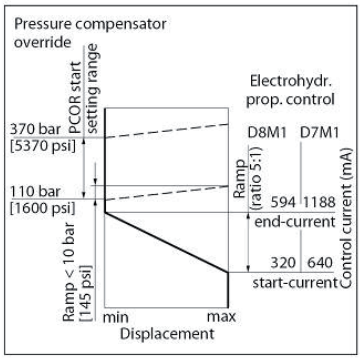
HYDRAULIC CIRCUIT



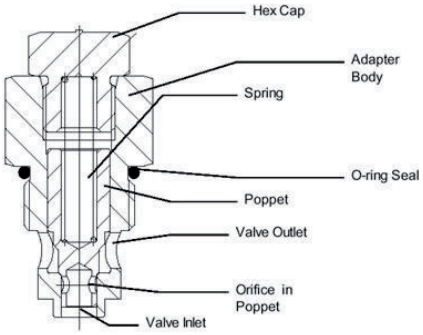
Ports:

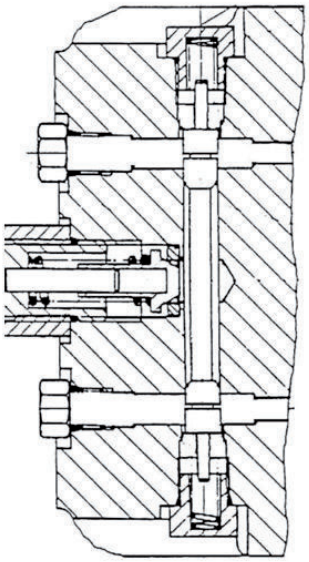
A, B	=	Main pressure lines
L1, L2	=	Drain lines
M1, M2	=	Gage port for A and B
M3, M4	=	Gage port servo pressure
X3 (M5)	=	Servo pressure supply
M7	=	Gage port control pressure
XA, XB	=	Control pressure ports hydr. brake pressure defeat
T1, T2, T3, T4, T6, T7, T8, U7	=	Optional orifices
N	=	Speed sensor

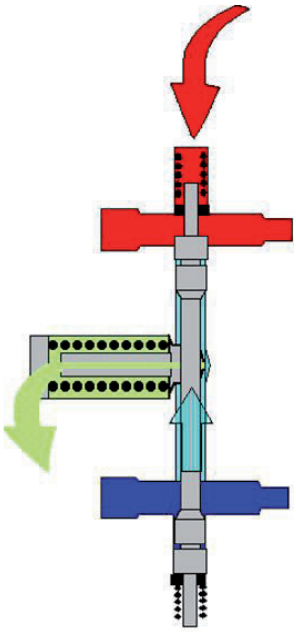
Control Operation D7M1, D8M1



EXCHANGE VALVE

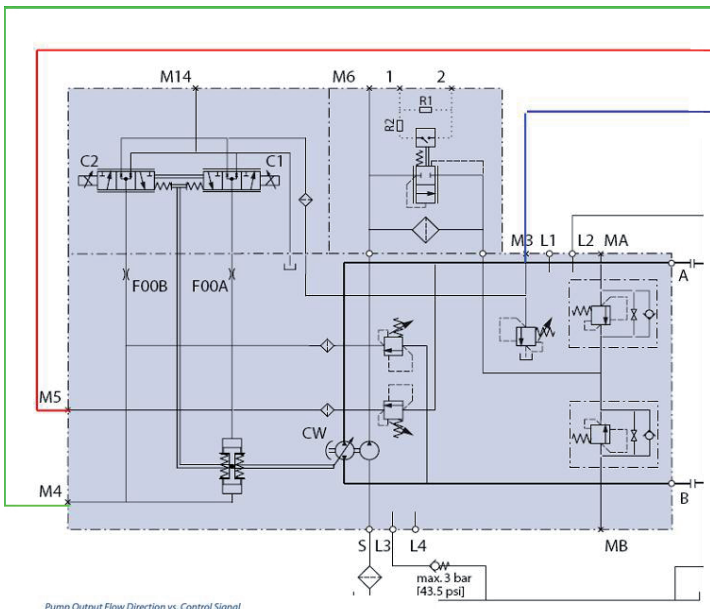


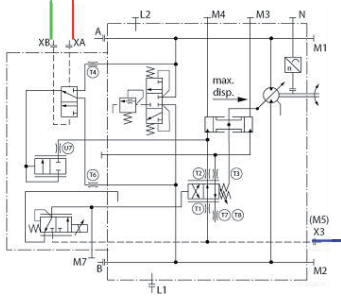




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CONNECTING THE HYDRAULIC CONTROLS





Pump Output Flow Direction vs. Control Signal

Shaft Rotation	CW		CCW	
Coil Energized*	C1	C2	C1	C2
Port A	in	out	out	in
Port B	out	in	in	out
Servo Port Pressurized	M5	M4	M5	M4

Pressure Compensator Operation

Rotation	High pressure port	Control pressure on port	PCOR-Function
CW	A	XA	no
CW	A	XB	yes
CCW	B	XA	yes
CCW	B	XB	no

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PLUS+1 TM MC024-021 AUTOMOTIVE SYSTEM

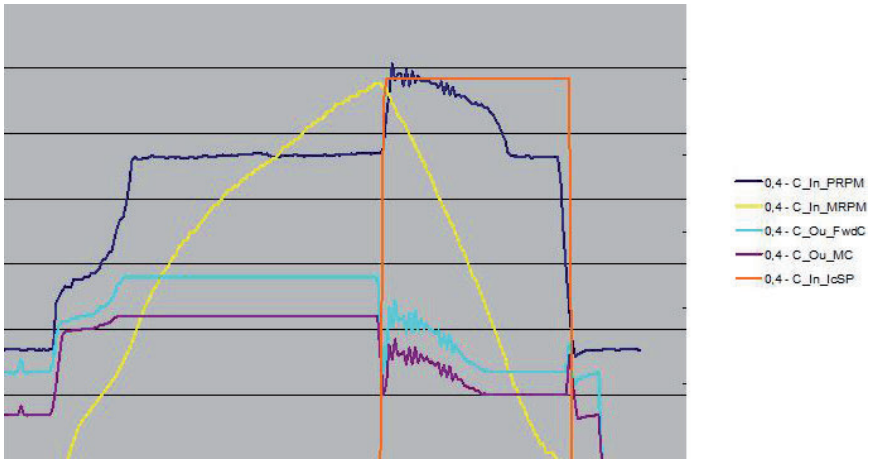
The microprocessor manages both the pump and the engine by means of electrical pressure reducers located on the controls.

AUTOMOTIVE CURVE

The two different curves were designed in agreement with the customer, taking into account the torque characteristics of the diesel engine and the power necessary for the auxiliary services.

SELECTOR (FORWARD/NEUTRAL/REVERSE)

The direction of travel can be selected by using a three-way electrical selector
The deceleration and acceleration times are set according to the position of the selector.



INCHING SENSOR

The inch-brake pedal connected to the potentiometric sensor reduces the current to the proportional valves of the pump, until it is fully zeroed, if necessary.
This function enables the operator to reduce the speed of the vehicle during particular movements in which a high engine speed must be used and provides a way in which the services can operate efficiently.

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MODE SWITCH

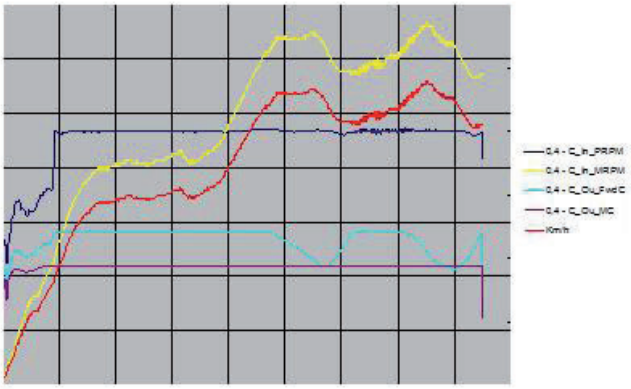
Two independent control curves (translation/working).

MOTOR CONTROL CURVE

The control curve of the motor reducer is generated by a calibration that is dependent on the engine r.p.m.

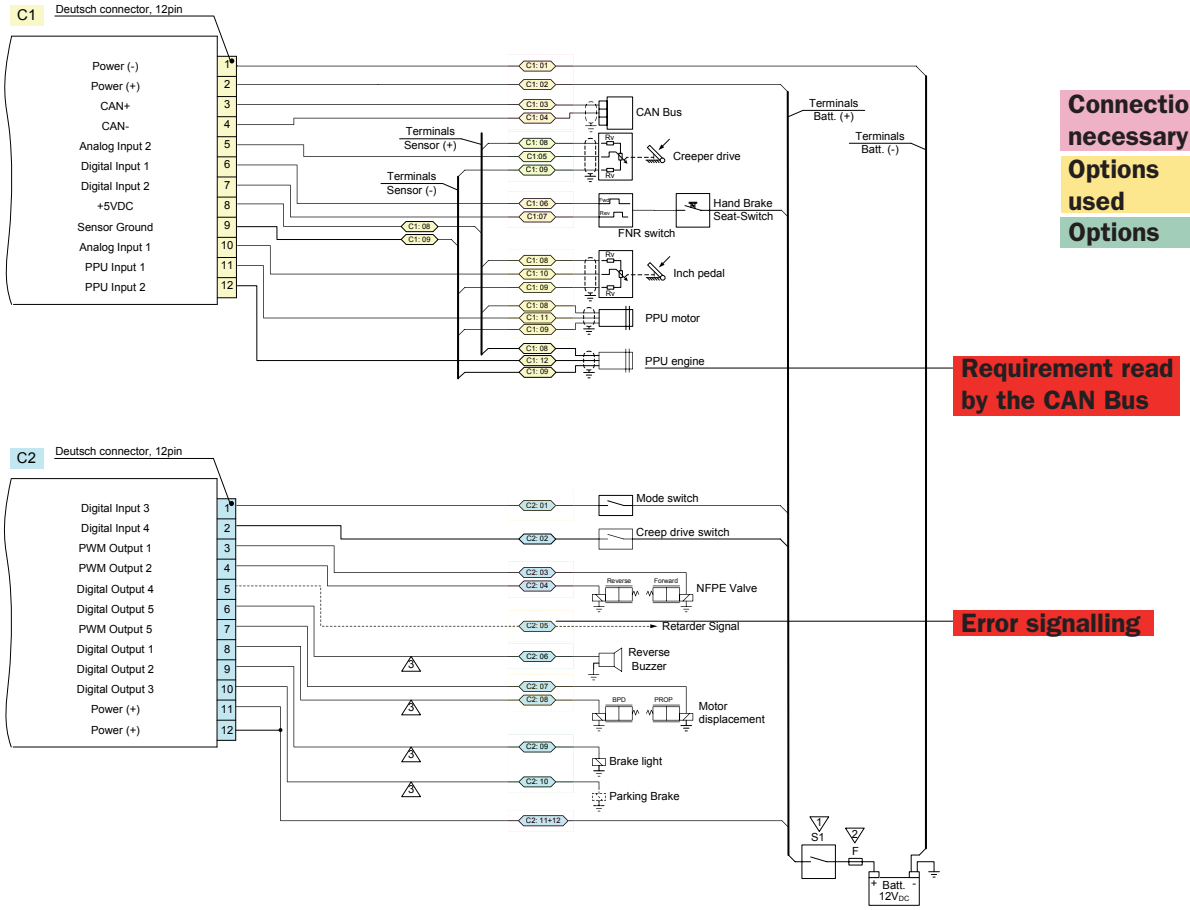
LIMITATION OF CARDAN SHAFT REVOLUTIONS

To avoid overspeed of the cardan shaft, the function reduces the current to the control reducer valves.



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CONNECTION DIAGRAM



Connections necessary

Options used

Options

Requirement read by the CAN Bus

Error signalling

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REXROTH HYDROSTATIC TRANSMISSION

SPECIAL ADVANTAGES OF HYDROMATIK TRANSMISSIONS

Before making any adjustment to DA motors, it is essential to comply with the following operating conditions:

– The adjustment, putting into operation or checking of the operating data of the A4VG71DA 1D2 primary part must be carried out before any recalibration of the A6VM107DA 1 secondar. part.
– The operating temperature must be about 50 - 60 °C (circuit temperature).
– Pressure splitting or cutting must be in operation. On vehicles not fitted with splitting, check that the safety valves are not operating.

Never carry out adjustments or calibrations on a variable motor without a manometer.
All adjustments and calibrations must be made at maximum working pressure and maximum engine revolutions (under load).
For all adjustments on a variable motor, adequate precautions must be taken to prevent unexpected movement of the vehicle.
The best precaution is to raise the vehicle and lock the wheels with the brakes.
Apart from the classical characteristics of hydrostatic transmissions (freedom of installation of the transmission, minimum bulk, instantaneous drive reversal, elimination of friction, dynamic braking), HYDROMATIK transmissions have the following advantages:

1) A4VG71DA 1D2 pumps are the most powerful on the market.

2) The high rotation speed of A4VG71DA 1D2 pumps and A6VM107DA 1 motors.

3) Inclined body construction of A6VM107DA 1 engines; the pistons do not have guides, which enables it to transmit 90% of the nominal torque when starting and a possible wide variation in displacement.

4) Automatic, continuous variation of the transmission ratio, depending on the requirement of the operator (accelerator pedal) or according to the load and best use of the installed power.

5) Conventional control with an accelerator pedal, brake pedal and transmission cutoff (inching).

6) DA regulation acts like a “limited load power adjustment”. The pump with DA regulation is normally mounted on the engine and does not require power calibration, making the corresponding adjustments easier. DA regulation enables maximum pressure and displacement to be obtained, even before the maximum speed of the engine (1600/2000 r.p.m.$^{-1}$) so that the force of the engine at 75% of the movement speed gives a low specific fuel consumption.

7) In the case of an application under load, the average speed of movement is high and the traction force is maximum at a reasonable engine speed, the efficiency of the engine (hourly cubic volume/hourly consumption) is very high.

8) The inching valve, fixed for the first part of the brake pedal stroke, reduces the speed of movement of the vehicle, increasing the engine speed and, consequently,

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Achievement of the maximum lifting speed is then possible at reduced speed, giving improved working efficiency.
Thanks to the inching valve at the moment the driver brakes, initially there is hydrostatic braking, then normal braking, therefore giving economy and long life of the braking system.

9) Slight reduction in engine speed at full load.

10) No overloading of the engine.

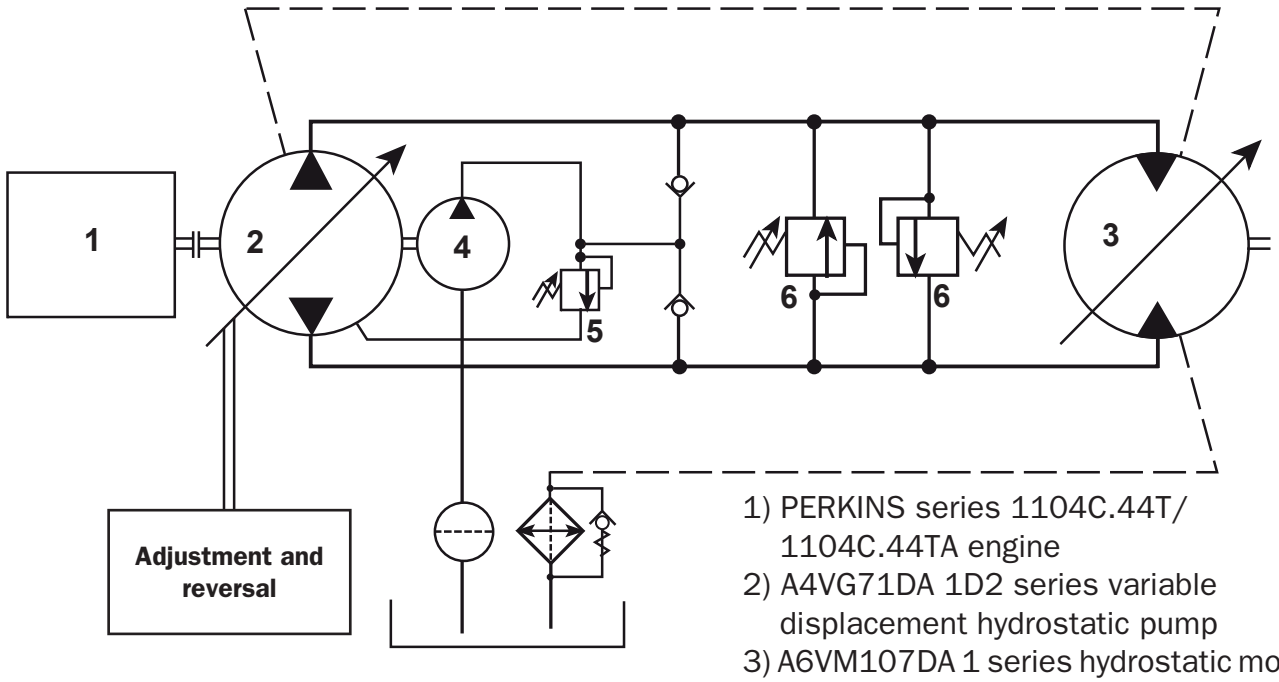
11) On lowering the engine speed, the power of the engine is not converted into heat; the HP limiters do not open thanks to the joint double system: return and DR valve.

12) Checking the displacement of the A6VM variable motor using the same control pressure as the pump (still unique on the market).

13) Installing the DA regulated variable motor enables the displacement of the pump to be adapted ideally to the thermal power (and not the apparent power of the engine).
In this way, the constant flow of power of the pump is optimal and remains satisfactory with the transfer of power to truck movement hydraulics.

14) HP blocking system on A6VM motors that enables them to note the direction of the torque in relation to the direction of travel thereby avoiding harsh and unexpected braking.

MAIN CIRCUIT OF HYDROSTATIC TRANSMISSIONS



1) PERKINS series 1104C.44T/ 1104C.44TA engine
2) A4VG71DA 1D2 series variable displacement hydrostatic pump
3) A6VM107DA 1 series hydrostatic motor with variable displacement
4) Booster gear pump
5) Maximum boost valve
6) High pressure valve

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DESCRIPTION OF OPERATION OF THE HYDROMATIK TRANSMISSION

GENERAL

The hydrostatic transmission optimises the torque available from the engine to the wheels, according to the resistance encountered from the engine and the speed desired by the operator.
The transmission ratio varies continuously and automatically.
The system transmits the power because mineral oil is practically incompressible and can withstand heavy loads.

The A4VG HYDROMATIK.. DA/A6VM..DA transmission consists of two separate parts.

1° An A4VG axial piston with swashplate type pump, flange-mounted to the engine and driven directly from the flywheel by a flexible coupling.

2° An A6VM axial piston type hydraulic motor with inclined body, flange-mounted to a two-speed gearbox located on a differential axle that transfers motion to the wheels.

The pump and hydraulic motor are connected together by flexible pipes as are the various accessories necessary for operation: tank, filter, drainage return to the radiator, etc...

The pump absorbs the maximum power available from the engine and converts it into hydraulic power (product of pressure and flow).

The hydraulic motor, which is the receiving component, absorbs all the hydraulic power.
Producing at the output shaft a torque and speed of rotation that is taken up by an axle and distributed to the wheels.

The transmission ratio is varied by varying the displacement of the pump and the hydraulic motor.

The drive pressure acts against the high pressure on the servo-positioner in a predetermined fixed ratio (1/3).

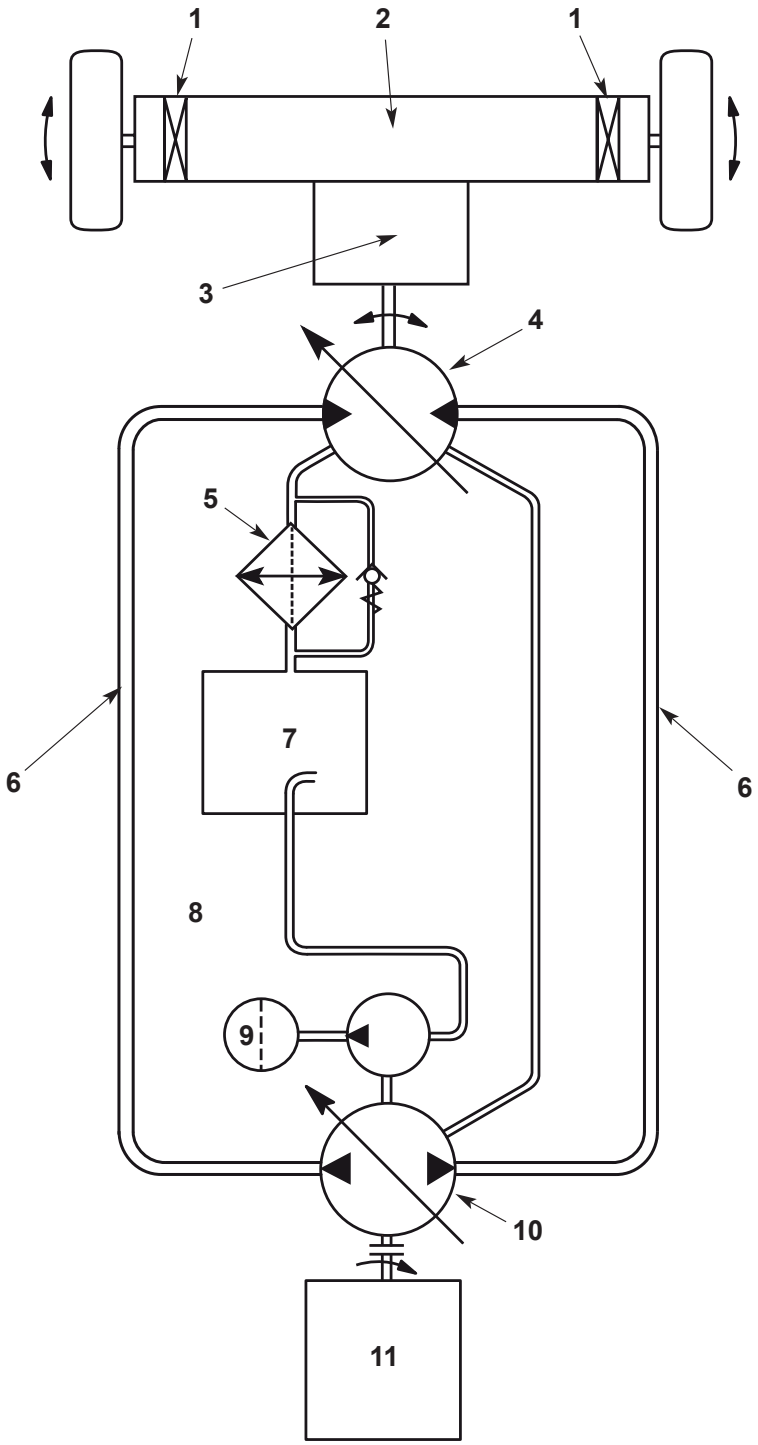
The preponderance of one in relation to the other determines whether the motor does or does not enter into regulation.

The minimum displacement of the motor is limited by a stop screw.

A regulation system controls the switching time of the motor.

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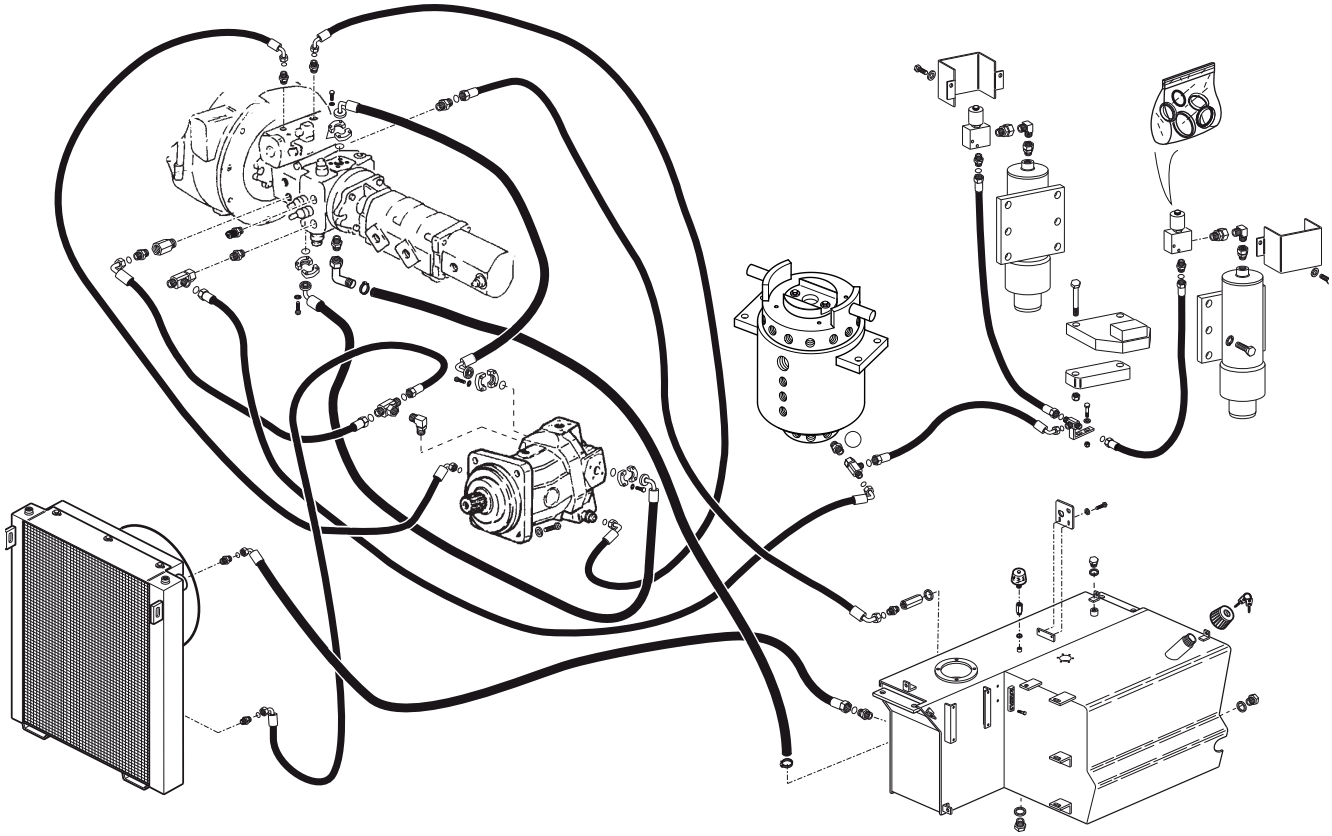
KINEMATIC CHAIN OF TRANSMISSION



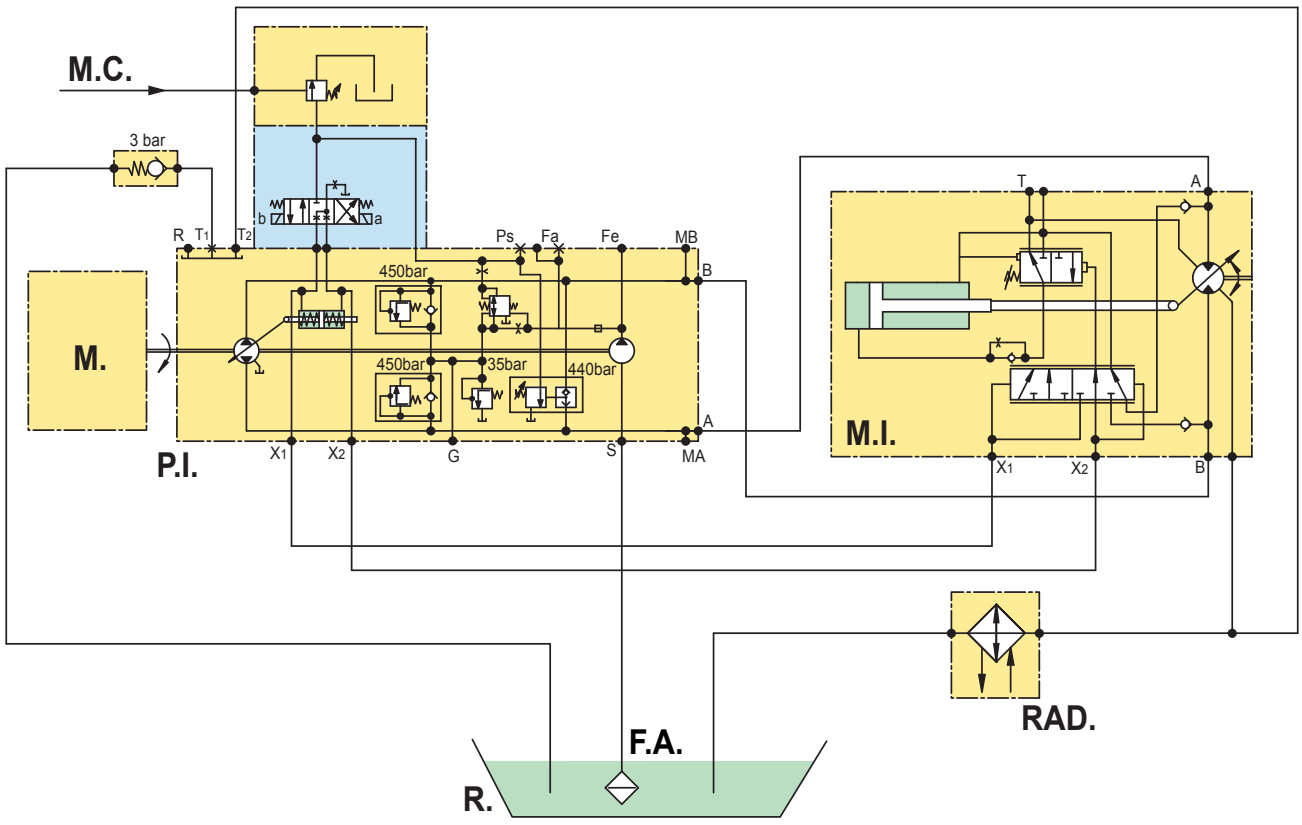
1) Brakes
2) Differential axle
3) 2-speed gearbox
4) Variable displacement motor
5) Oil radiator
6) High pressure flexible pipes
7) Tank
8) Filtration
9) Boost pump
10) Variable displacement pump
11) Engine

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HYDROSTATIC TRANSMISSION AND REAR AXLE LOCK



HYDRAULIC TRANSMISSION SYSTEM



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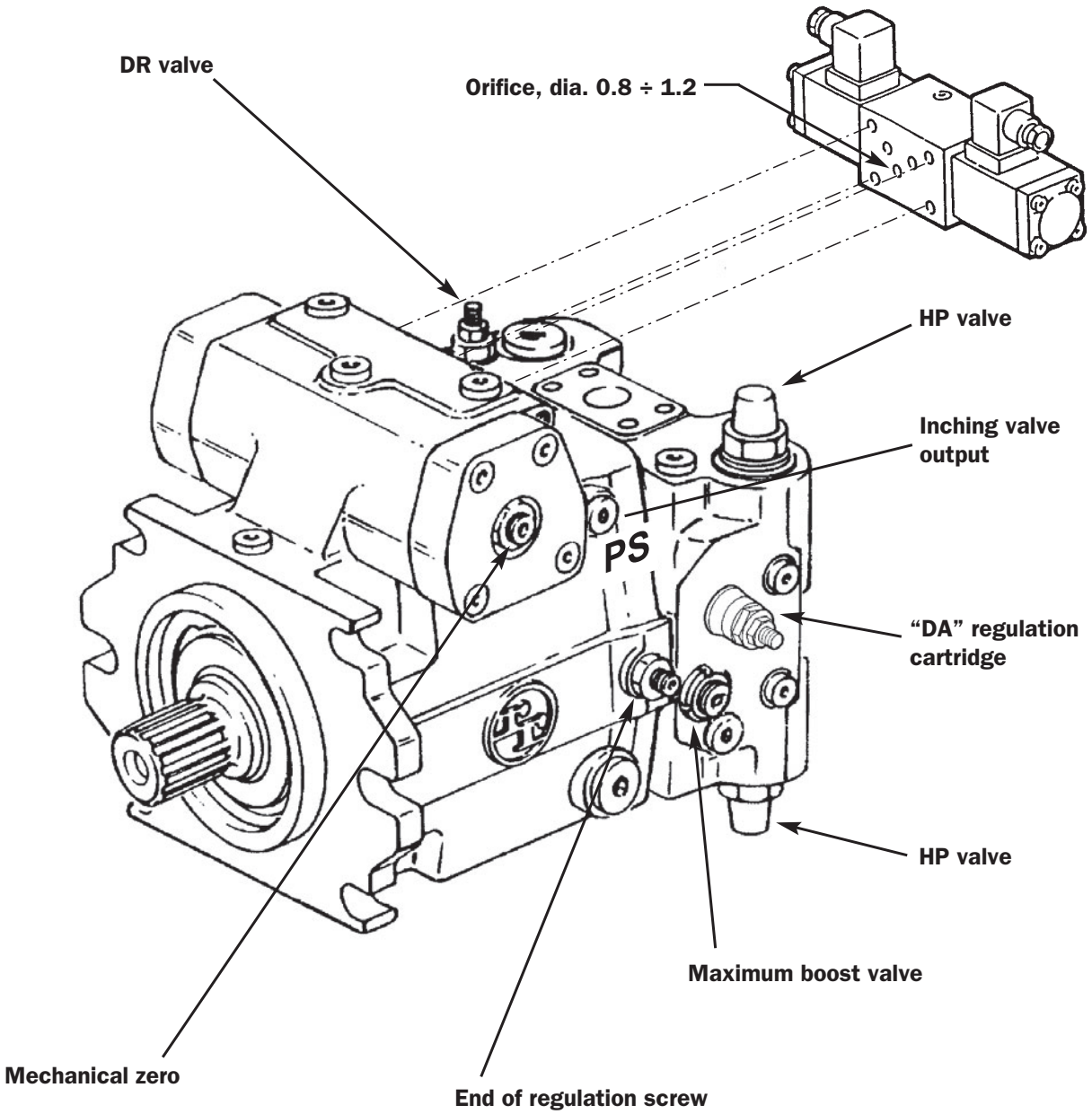
A4VG / 71 DA / 1D2 PUMP

CHARACTERISTICS

As in the A4V series, this pump is fitted with:
- tachymetric speed regulation,
- return regulation of the swashplate,

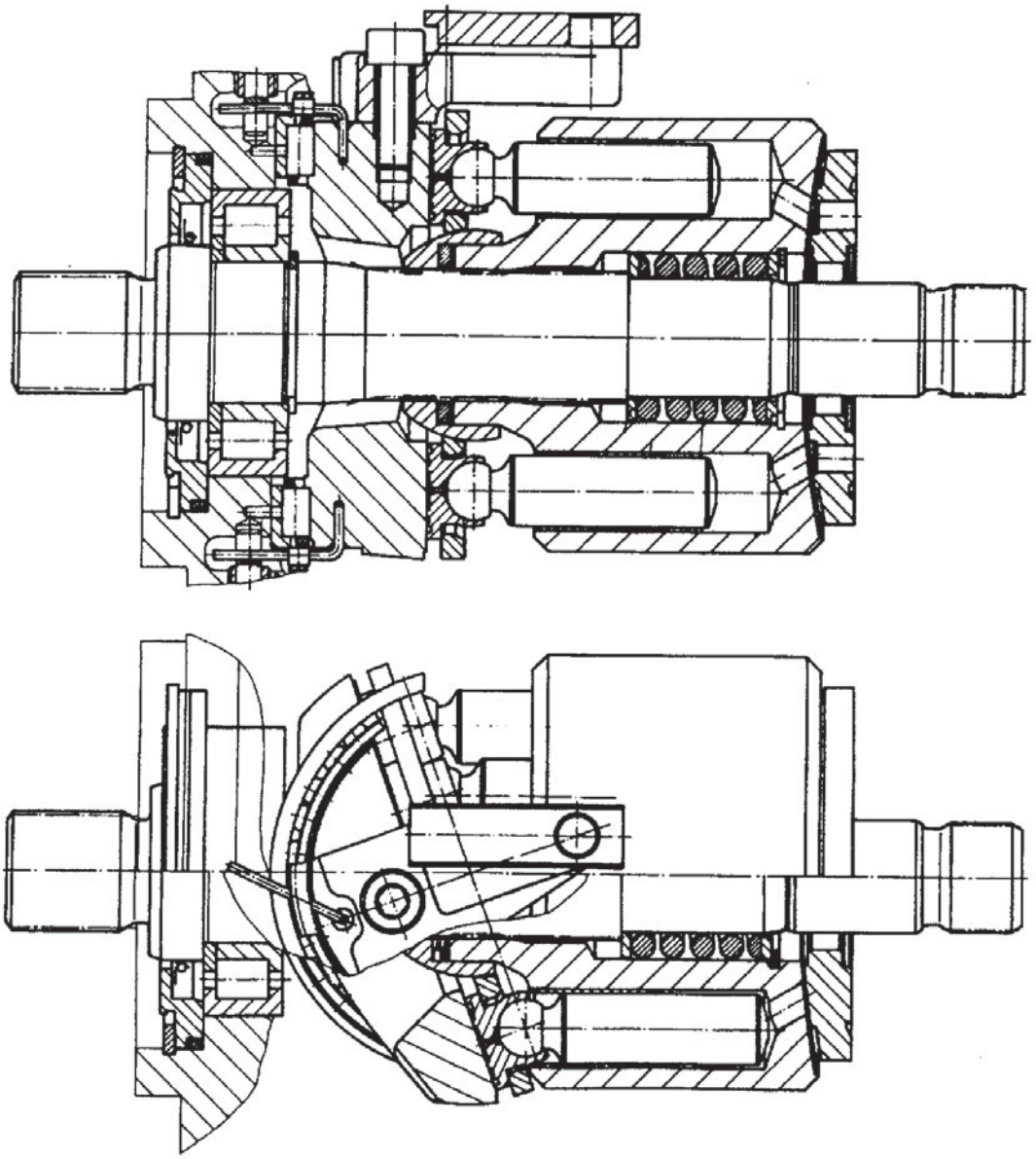
but also:
- DR regulation, known as flow “CANCELLATION VALVE” with pressure maintenance.

Starting from pulley block 71, a locking screw for the orientation bearings of the swashplate is located on the fixing flange part of the pump. Not to be confused with a pressure takeoff plug.



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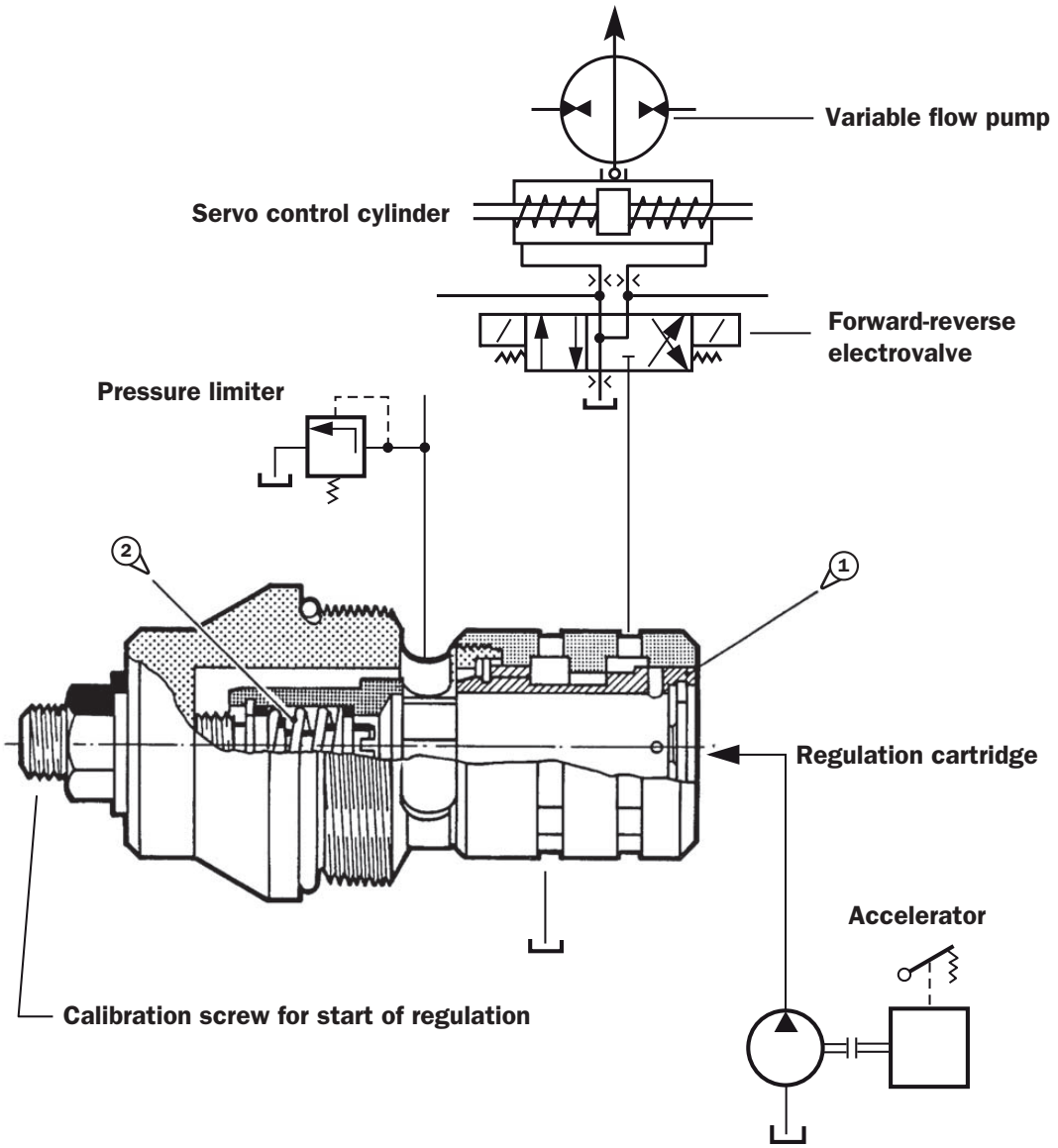
CROSS SECTION OF A4VG / DA PUMP



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OPERATION OF "DA" REGULATION CARTRIDGE

The drive pressure is taken through the boost system regulation cartridge slider of the boost circuit. At maximum engine speed, the drive pressure is a few bar lower than the boost pressure. At minimum speed (850 r.p.m.$^{-1}$), the boost flow, which passes through the calibrated hole in the regulation cartridge element, is not sufficient to create a loss of load that can move the slider (Item 1) due to the force of the spring (Item 2). The drive pressure is therefore zero.
When the operator speeds up the engine to increase the boost flow (to about 1050 r.p.m.$^{-1}$), the boost flow increases; the loss of load in front of the calibrated hole becomes sufficient to move the slider to the left, compressing the spring, thereby uncovering the drive hole.
When the drive pressure reaches about 6 ÷ 7 bar, the servo control cylinder begins to move, tilting the swashplate of the variable flow pump.
The pump begins to deliver (start of regulation). The more the engine speed increases, the more the boost flow and drive pressure increase, and giving greater drive from the pump, and consequently, higher speed of the truck.
To stop, the operator stops accelerating, the boost flow falls, the loss of charge decreases and the spring (Item 2) pushes back the slider (Item 1) stopping the boost flow towards the drive piping. The residual drive pressure is released into the sump.



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CHARACTERISTICS OF DR VALVE

ROLE

Cancelling the flow while maintaining the pressure. This corresponds to returning the pump displacement to “0” before the calibration point of the HP valve is reached.

This valve prevents activation of the HP limiters when accelerating or decelerating (rapid increase in pressure).

The maximum pressure is cut by the HP limiters that also protect the circuit against extremely rapid fluctuations. The flow cancellation calibration while maintaining the pressure extends to all working pressure surfaces. The corresponding calibration values must however be 20 to 30 bar less than those of the HP limiters.

- Less noisy transmission.
- Wider range of calibration.

COMPOSITION OF THE DR VALVE

1) HP circuit flow selector.
2) A slider that connects the drive circuit to the tank to control the pump and maintain 400 bar (start of regulation at 6 ÷ 7 bar, 20 bar up to regulation with max. flow).

The DR valve reduces the basic flow at max. torque.

OPERATION

The MA or MB HP passes through the HP circuit selector upwards or downwards and closing the opposite low pressure orifice (in the direction HP from A to B, the HP passes through the centre of the selector through a small passage).

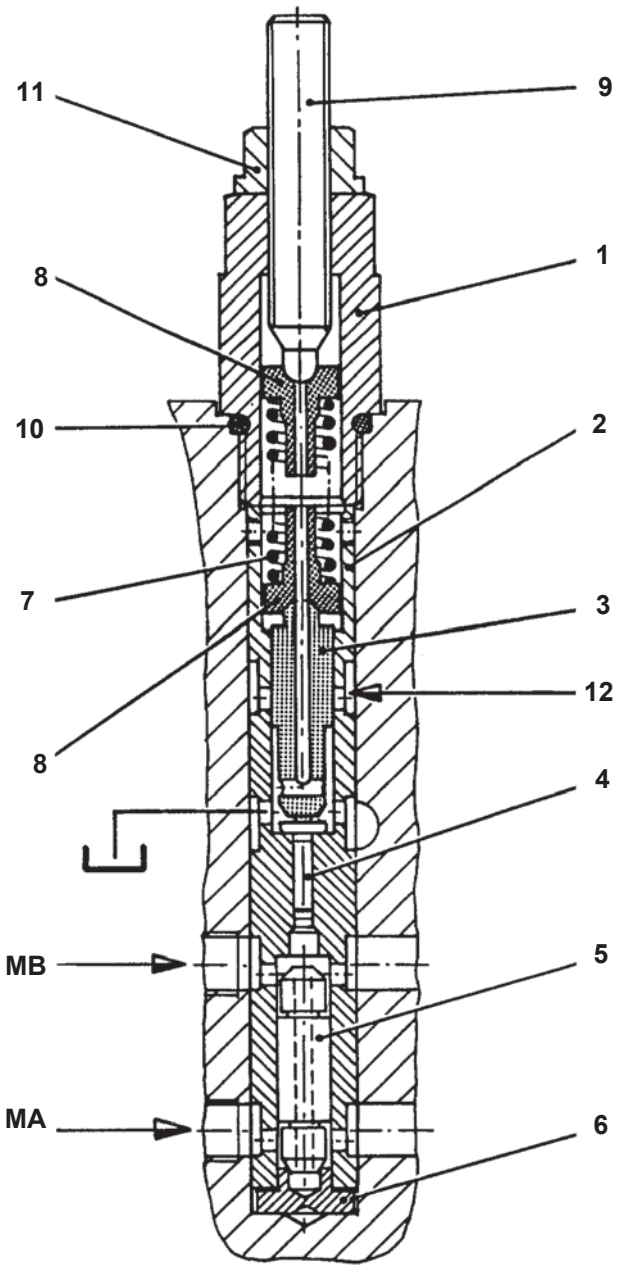
In all cases, the HP presses against the pin, Item 4, which, at the same time raises the regulation slider (Item 3) enabling the drive orifice to communicate with the exhaust, thereby reducing the drive pressure.

This has the effect of reducing the displacement of the pump, so reducing the flow to maintain the HP at 400 bar (reduction of flow for max. torque).

This drive action of the pump acts in the same direction as the return forces generated by the HP and the locking of the distribution plate.

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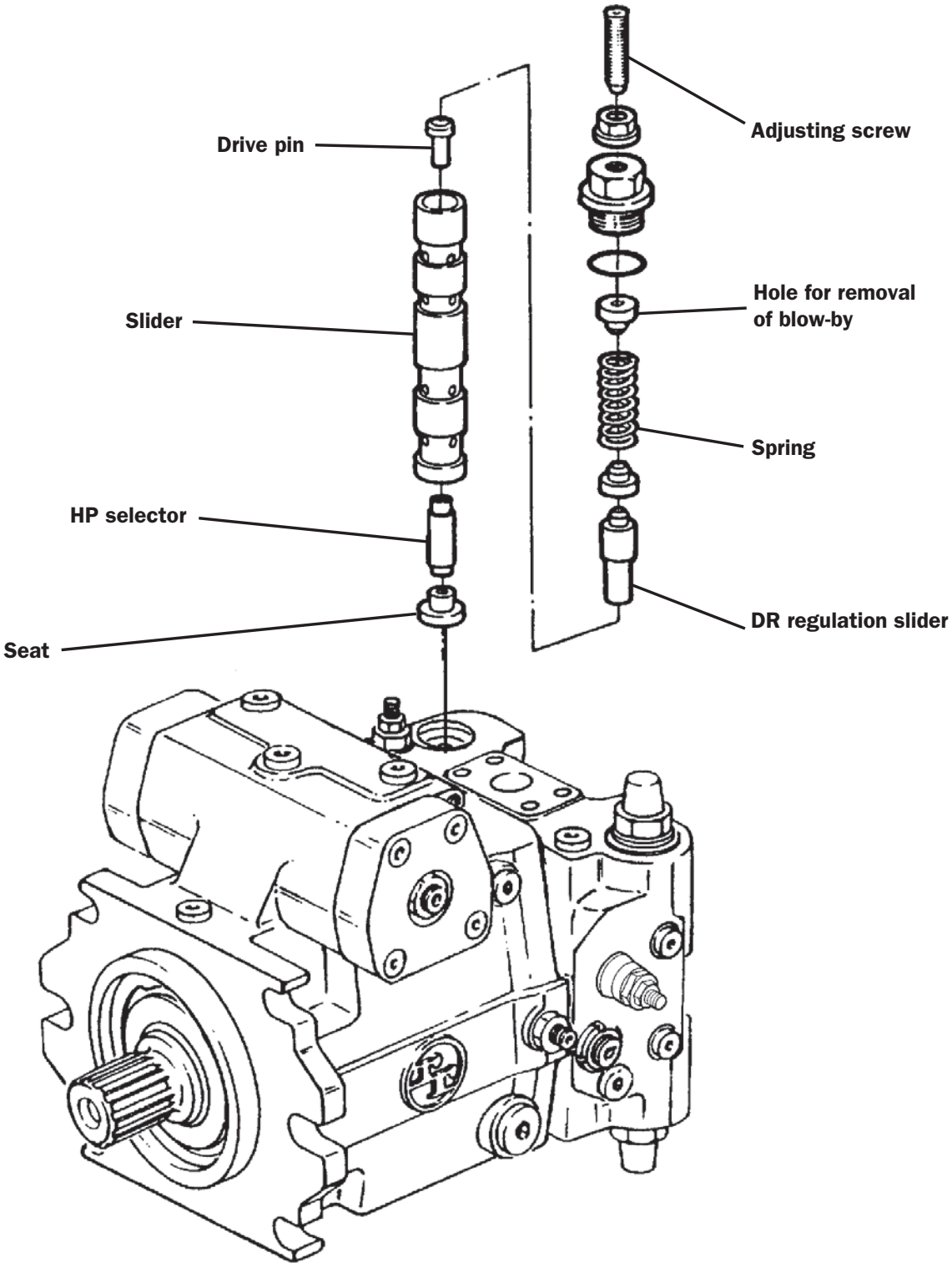
CROSS SECTIONAL VIEW OF THE DR VALVE



1) Restraining bush
2) Bronze slider
3) Slider for DR registration
4) Pin
5) HP selector
6) Seat
7) Spring
8) Spacer
9) Adjusting screw
10) Seal
11) Locknut
12) Drive

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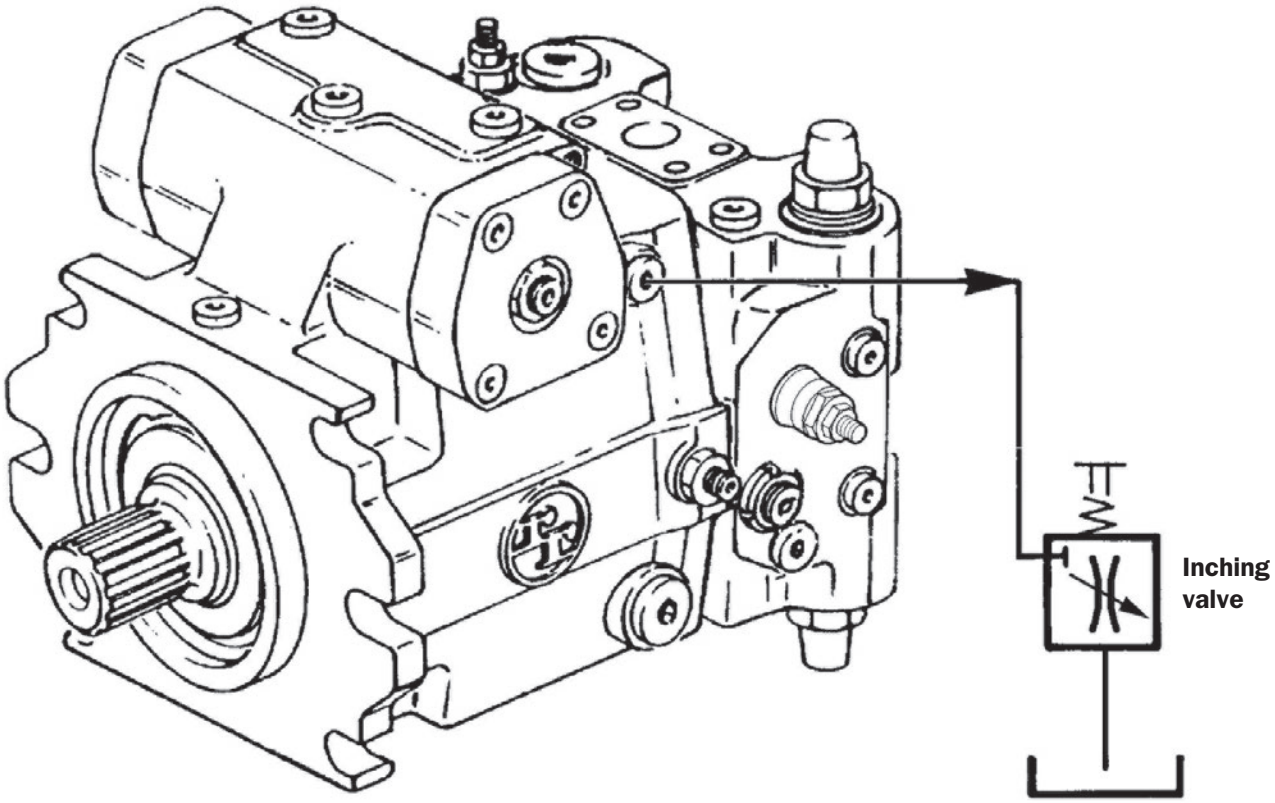
DR VALVE



If there is a large drop in engine speed, check that the drive pin has not "seized" in the slider.

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INCHING CIRCUIT



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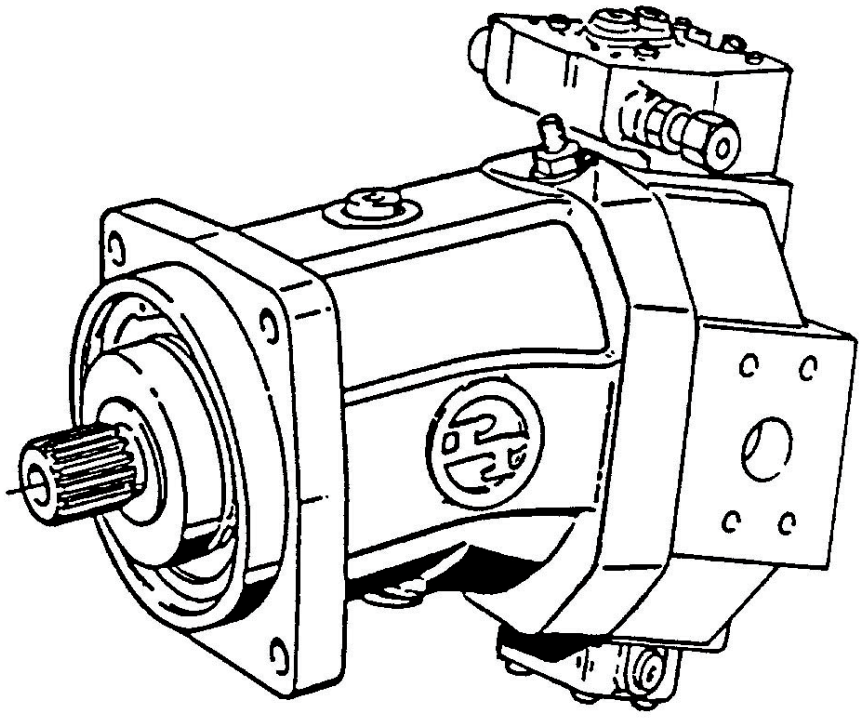
A6VM / 107 DA / 1 MOTOR

CHARACTERISTICS

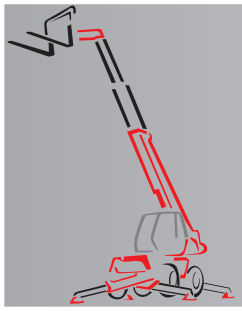
Series 6 variable displacement motor- for open and closed circuits - conical axial piston type with gas-tight piston rings and inclined axis. Displacement 28 to 200 - nominal pressure: 400 bar - maximum pressure: 450 bar.
Suitable for fixed and mobile installations.
Its wide range of adjustment enables this motor to meet the requirements of high torque and speed.
The displacement is variable in the ratio:
V g max / V g min = 4,85 continuous.
The output speed is proportional to the flow absorbed and inversely proportional to the displacement.
The output torque varies as a function of the pressure difference between the high and low pressure outputs, or as a function of the displacement.

DETAILS:

- Wide range of regulation for hydrostatic transmissions.
- Various displacement adjustment devices.
- Reduced cost of the transmissions thanks to the deletion of change in speed or the use of low displacement pumps.
- Small, strong taper roller bearings.
- High maximum power.
- Good starting characteristics.



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TRANSMISSION SCHEMATIC DIAGRAMS

page

SAUER TRANSMISSION . . . . . **A**
REXROTH TRANSMISSION . . . . . **B**

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SAUER TRANSMISSION

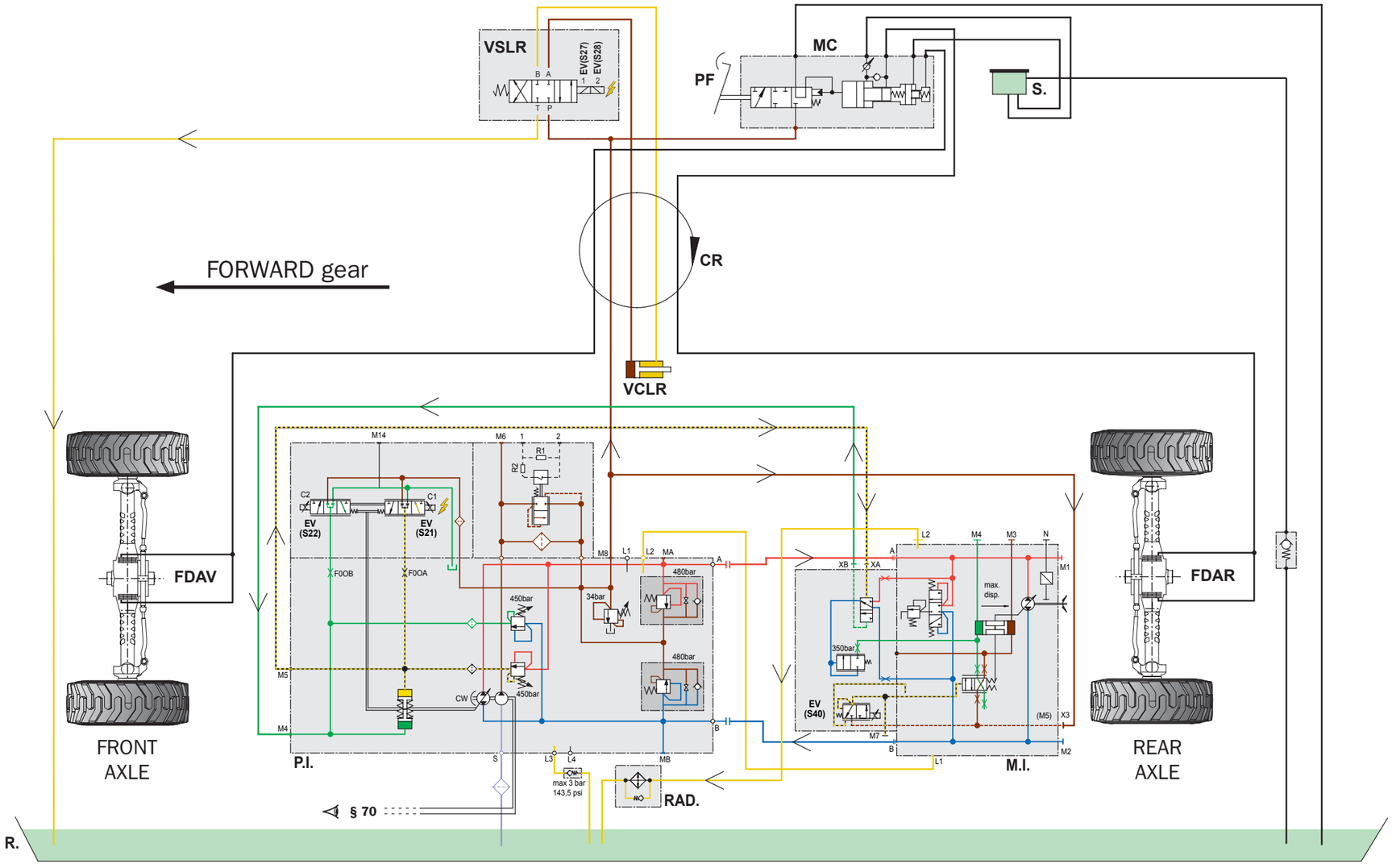
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FORWARD GEAR HYDROSTATIC TRANSMISSION A5
REVERSE GEAR HYDROSTATIC TRANSMISSION A6

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DIAGRAM OF SAUER FORWARD GEAR HYDROSTATIC TRANSMISSION

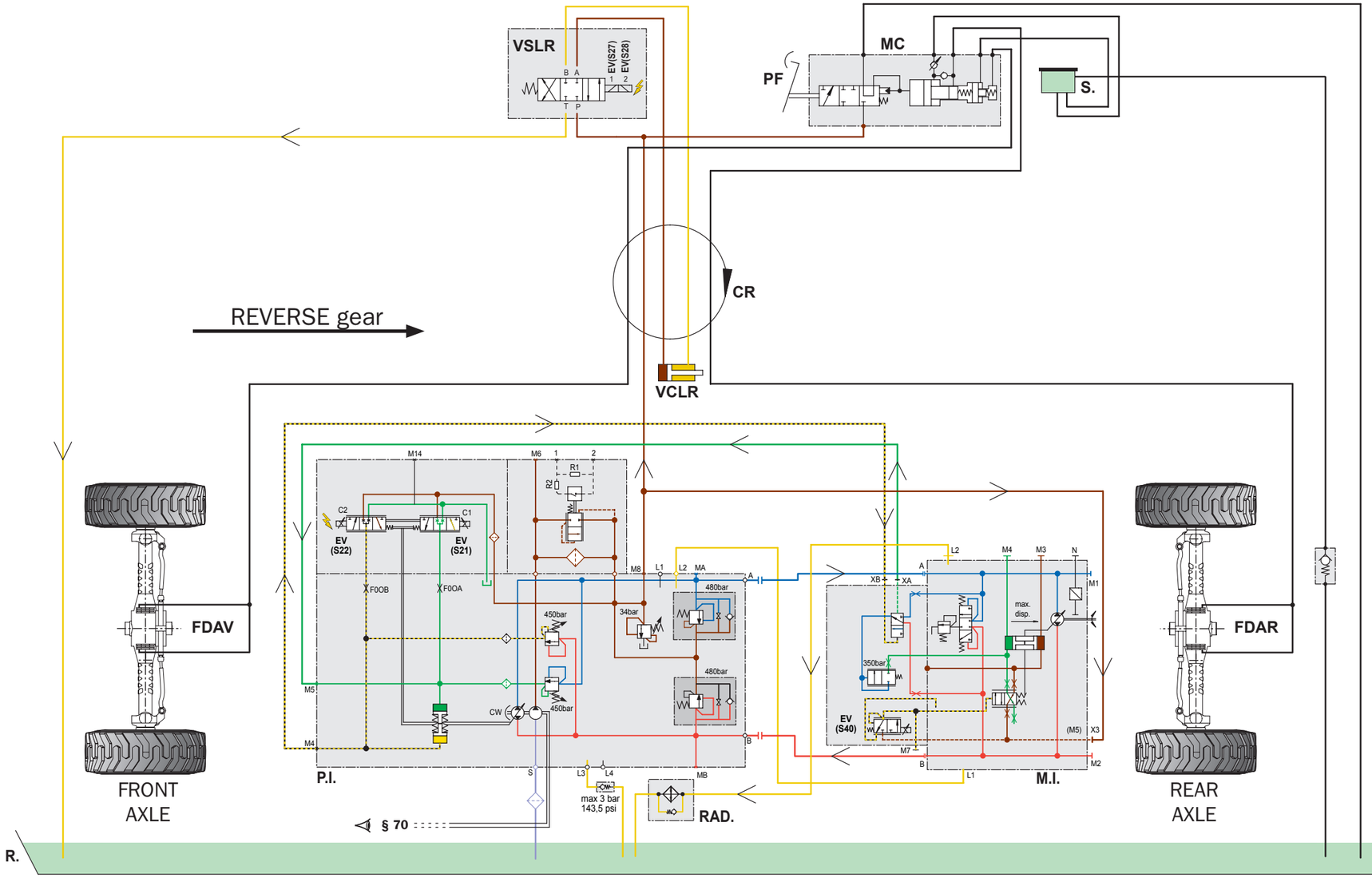


Key:

	High pressure
	Low pressure
	Control pressure
	Drainage pressure
	Load pressure
	Inlet pressure
	Return to outlet
§ 70	See section “70 – hydraulics”
CR	Hydraulic manifold
EV(S21)	Forward gear electrovalve
EV(S22)	Reverse gear electrovalve
EV(S27)	High speed electrovalve
EV(S28)	Low speed electrovalve
EV(S40)	Motor displacement reduction electrovalve
FDAR	Rear disk brakes
FDAV	Front disk brakes
MC	Brake pump
M.I.	Variable displacement motor
PF	Brake pedal
P.I.	Hydrostatic pump
R.	Oil tank
RAD.	Radiator
S.	Oil tank
VCLR	Low speed command cylinder
VSLR	Slow-fast selector valve

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DIAGRAM OF SAUER REVERSE GEAR HYDROSTATIC TRANSMISSION



Key:

	High pressure
	Low pressure
	Control pressure
	Drainage pressure
	Load pressure
	Inlet pressure
	Return to outlet
§ 70	See section “70 – hydraulics”
CR	Hydraulic manifold
EV(S21)	Forward gear electrovalve
EV(S22)	Reverse gear electrovalve
EV(S27)	High speed electrovalve
EV(S28)	Low speed electrovalve
EV(S40)	Motor displacement reduction electrovalve
FDAR	Rear disk brakes
FDAV	Front disk brakes
MC	Brake pump
M.I.	Variable displacement motor
PF	Brake pedal
P.I.	Hydrostatic pump
R.	Oil tank
RAD.	Radiator
S.	Oil tank
VCLR	Low speed command cylinder
VSLR	Slow-fast selector valve

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REXROTH TRANSMISSION

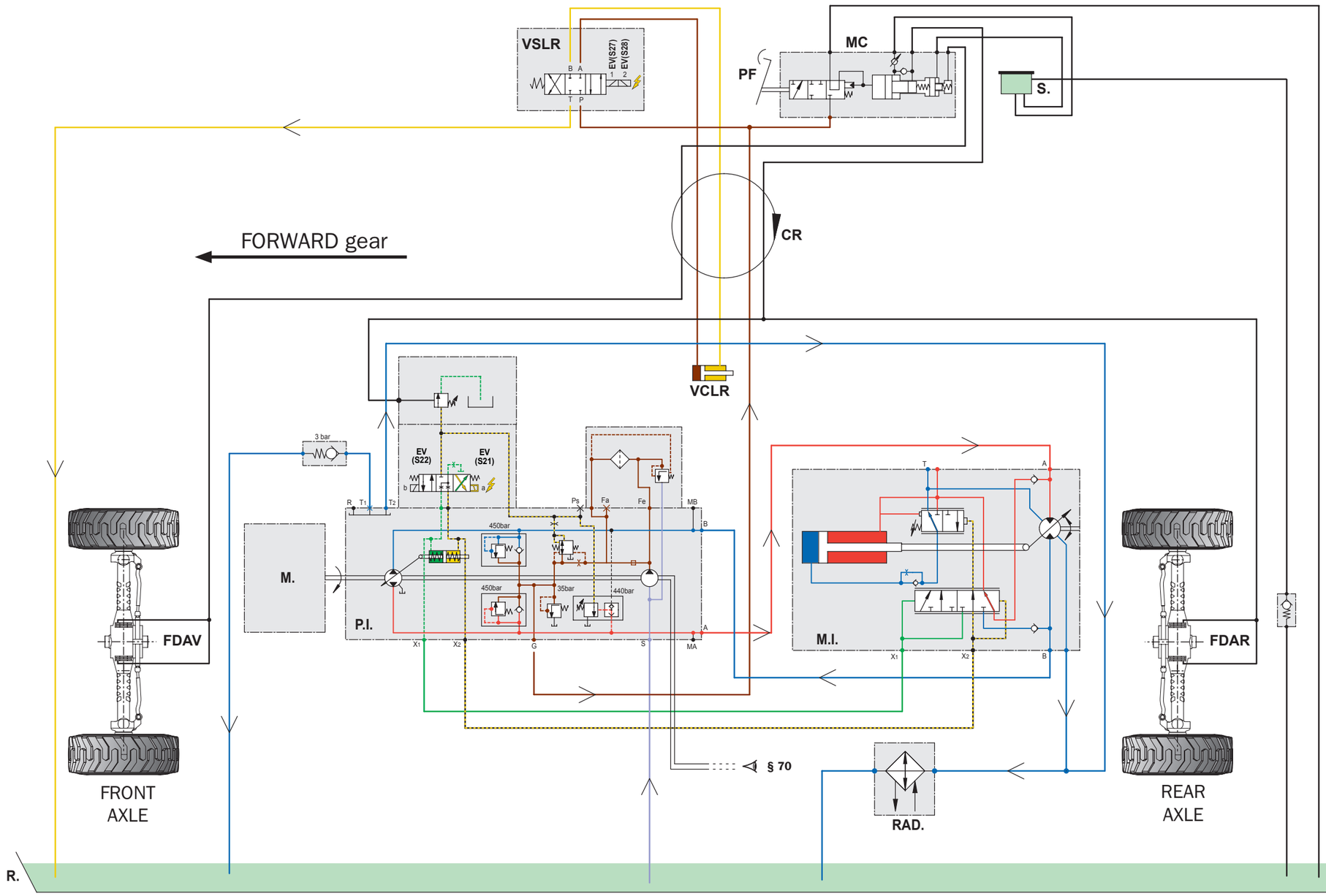
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FORWARD GEAR HYDROSTATIC TRANSMISSION B3
REVERSE GEAR HYDROSTATIC TRANSMISSION B4

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DIAGRAM OF REXROTH FORWARD GEAR HYDROSTATIC TRANSMISSION

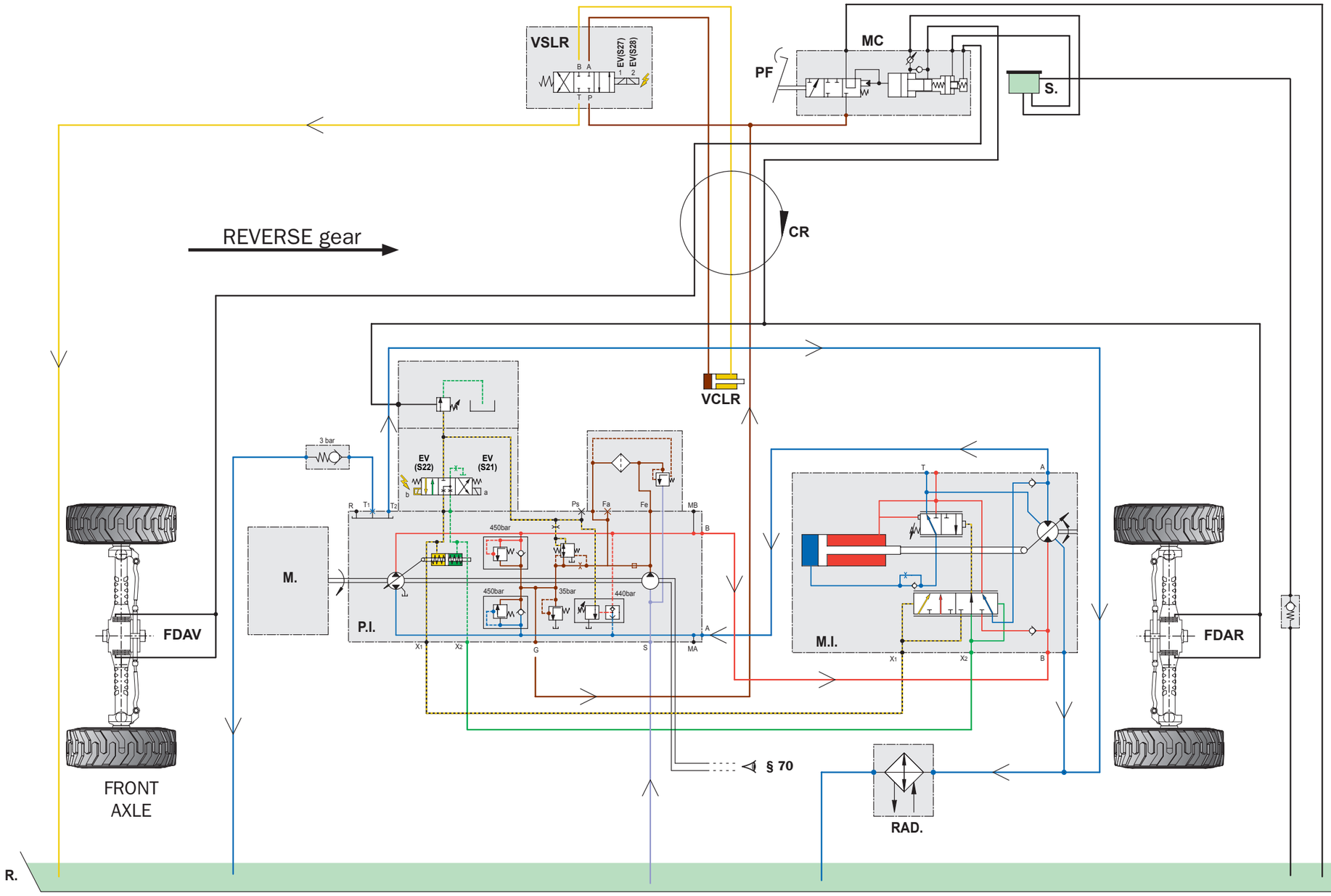


Key:

	High pressure
	Low pressure
	Control pressure
	Drainage pressure
	Load pressure
	Inlet pressure
	Return to outlet
§ 70	See section “70 – hydraulics”
CR	Hydraulic manifold
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EV(S27)	High speed electrovalve
EV(S28)	Low speed electrovalve
FDAR	Rear disk brakes
FDAV	Front disk brakes
M.	I.C. engine
MC	Brake pump
M.I.	Variable displacement motor
PF	Brake pedal
P.I.	Hydrostatic pump
R.	Oil tank
RAD.	Radiator
S.	Oil tank
VCLR	Low speed command cylinder
VSLR	Slow-fast selector valve

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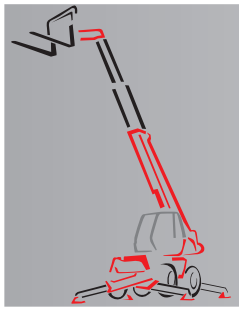
DIAGRAM OF REXROTH REVERSE GEAR HYDROSTATIC TRANSMISSION



Key:

	High pressure
	Low pressure
	Control pressure
	Drainage pressure
	Load pressure
	Inlet pressure
	Return to outlet
§ 70	See section “70 – hydraulics”
CR	Hydraulic manifold
EV(S21)	Forward gear electrovalve
EV(S22)	Reverse gear electrovalve
EV(S27)	High speed electrovalve
EV(S28)	Low speed electrovalve
FDAR	Rear disk brakes
FDAV	Front disk brakes
M.	I.C. engine
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PF	Brake pedal
P.I.	Hydrostatic pump
R.	Oil tank
RAD.	Radiator
S.	Oil tank
VCLR	Low speed command cylinder
VSLR	Slow-fast selector valve

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TRANSMISSION COMPONENTS LOCATION

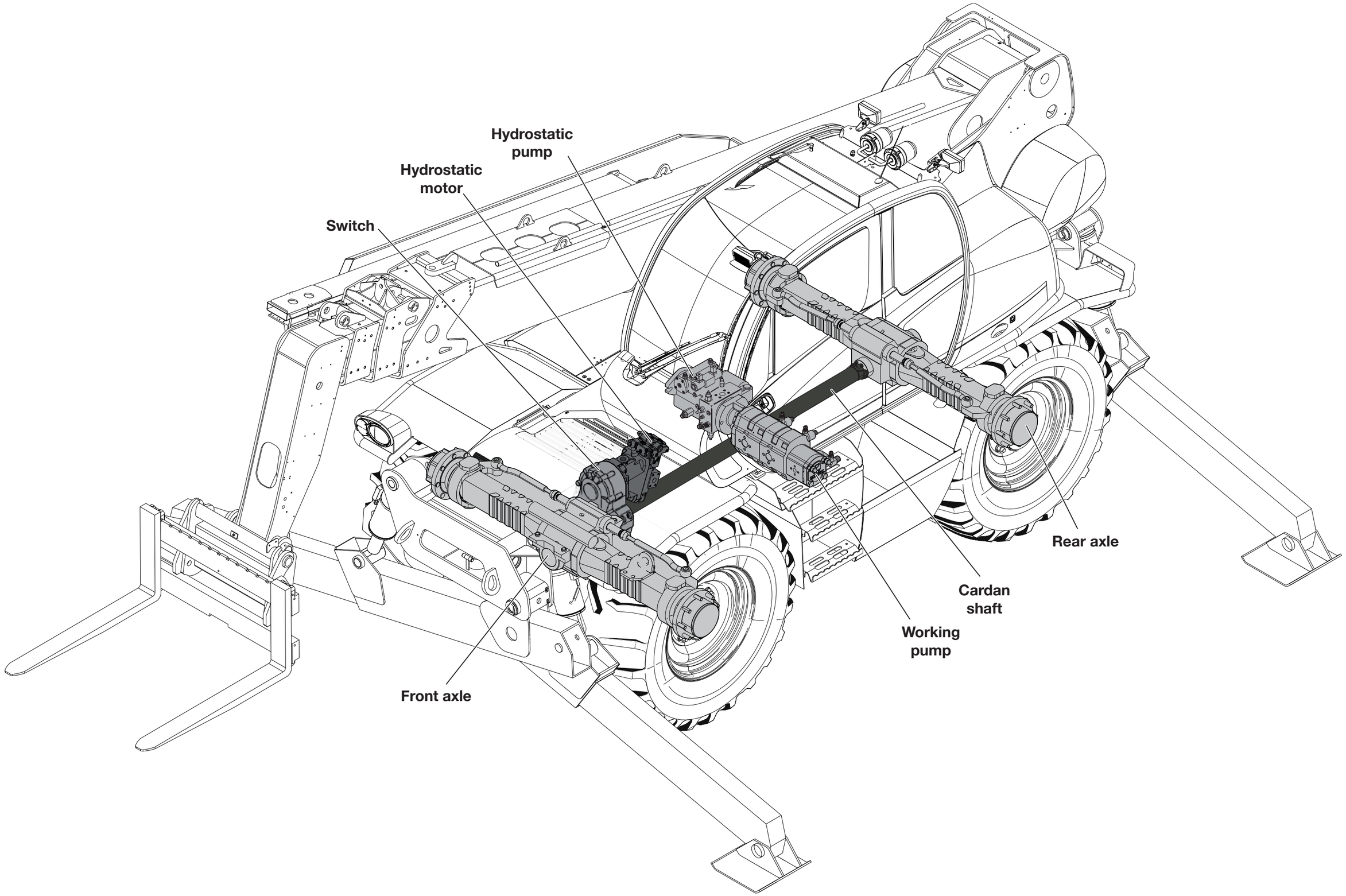
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HYDROSTATIC TRANSMISSION CIRCUIT. 3
HYDROSTATIC TRANSMISSION COOLING CIRCUIT 4

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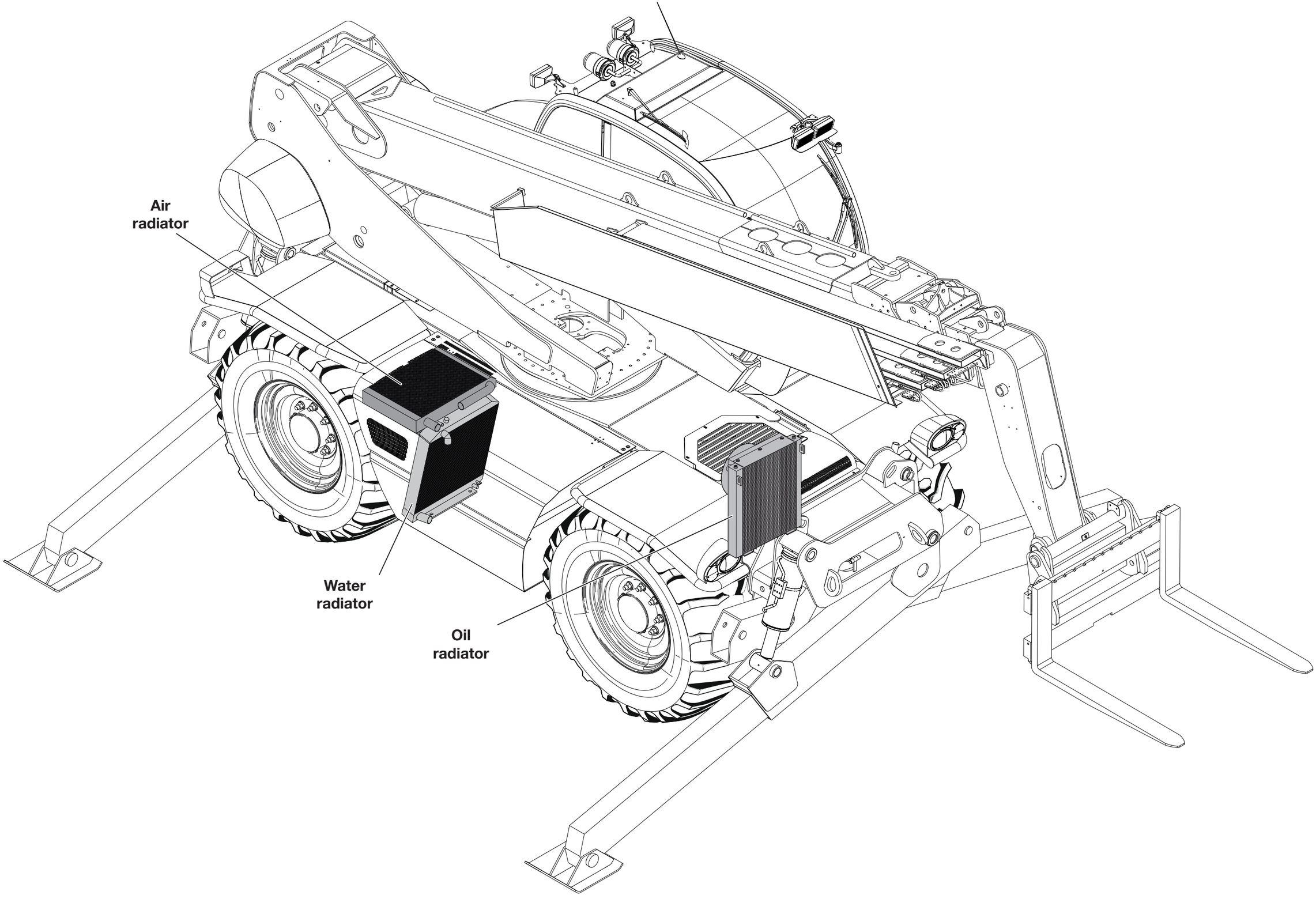
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HYDROSTATIC TRANSMISSION CIRCUIT

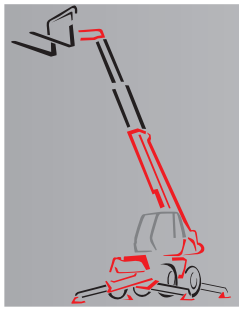


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HYDROSTATIC TRANSMISSION COOLING CIRCUIT



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TRANSMISSION CONTROL AND ADJUSTMENT

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SAUER TRANSMISSION

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– PRESSURE TEST POINTS ON THE MOTOR 6

REXROTH TRANSMISSION

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– HIGH PRESSURE 8
– BOOST PRESSURE 8
– CASING PRESSURE 8
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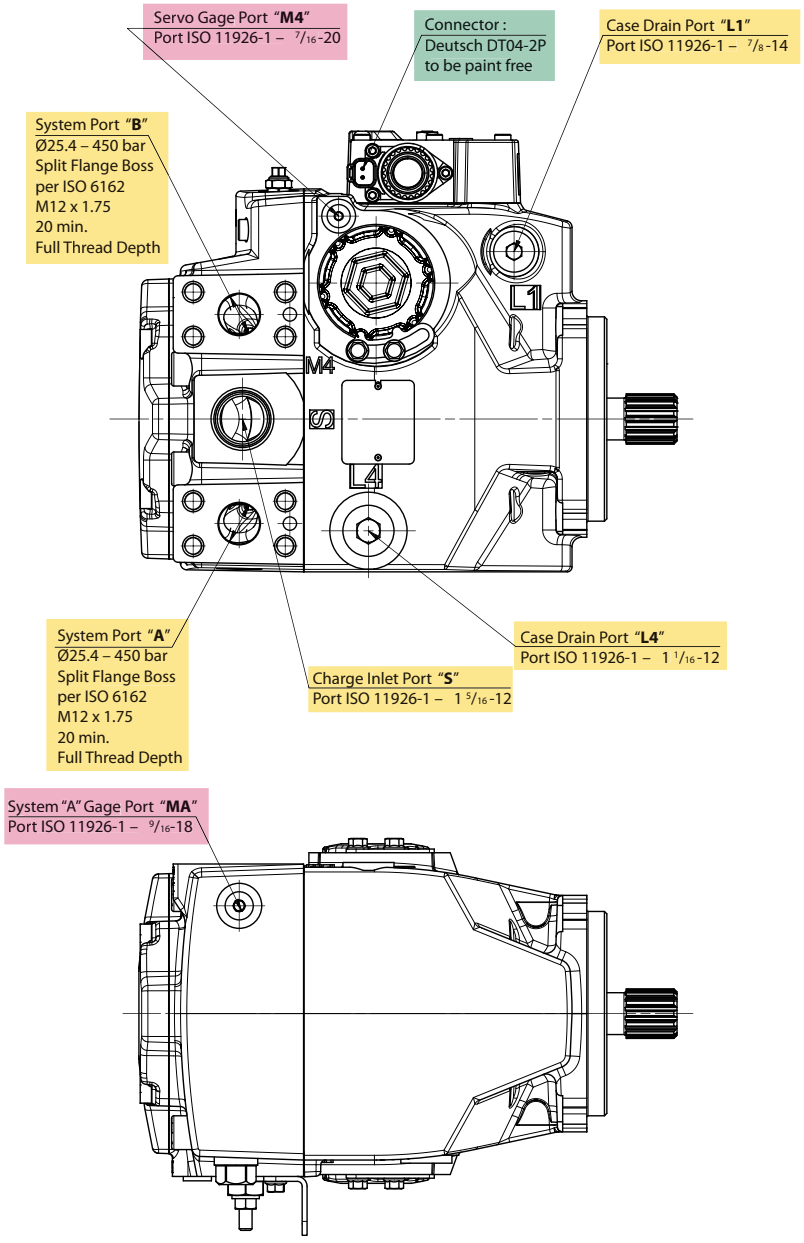
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– START OF REGULATION: 14
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– PUMP / MOTOR 18
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SAUER TRANSMISSION

PRESSURE TEST

PRESSURE TEST POINTS ON THE PUMP



Connections

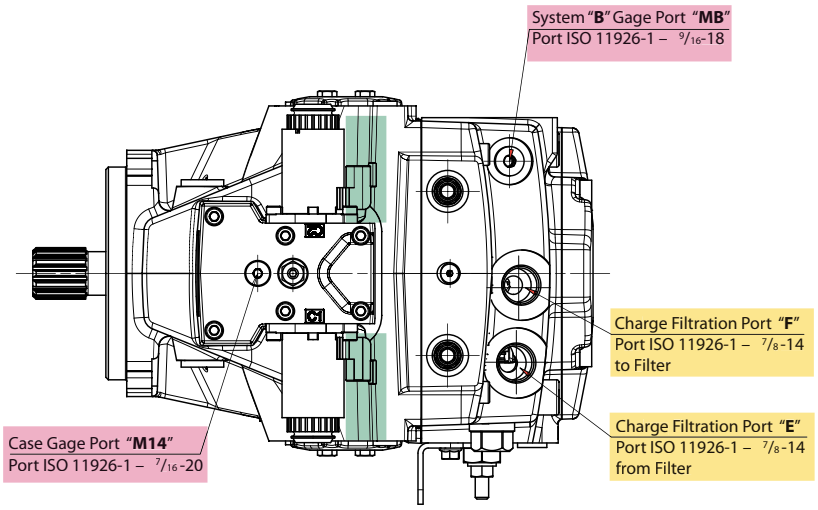
Pressure test points

Electrical connections

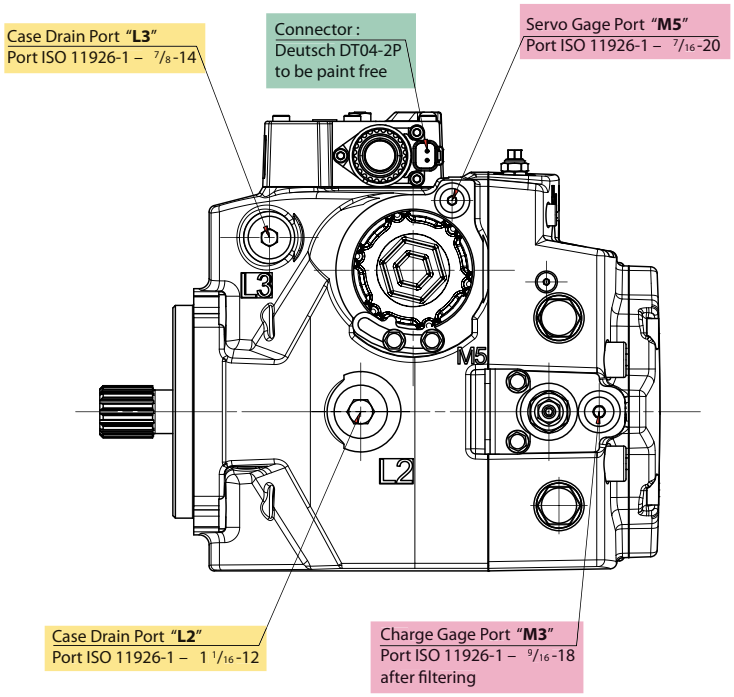
Port Description

Port	Description	Sizes
A	System Port "**A**"	Ø 25.4
B	System Port "**B**"	Ø 25.4
E	Charge Filtration Port, from Filter	7/8-14
F	Charge Filtration Port, to Filter	7/8-14
L1	Case Drain Port	7/8-14
L2	Case Drain Port	1 1/16-12
L3	Case Drain Port	7/8-14
L4	Case Drain Port	1 1/16-12
MA	System "**A**" Gage Port	9/16-18
MB	System "**B**" Gage Port	9/16-18
M3	Charge Gage Port, after Filtering	9/16-18
M4	Servo Gage Port	7/16-20
M5	Servo Gage Port	7/16-20
M14	Case Gage Port	7/16-20
S	Charge Inlet Port	1 5/16-12

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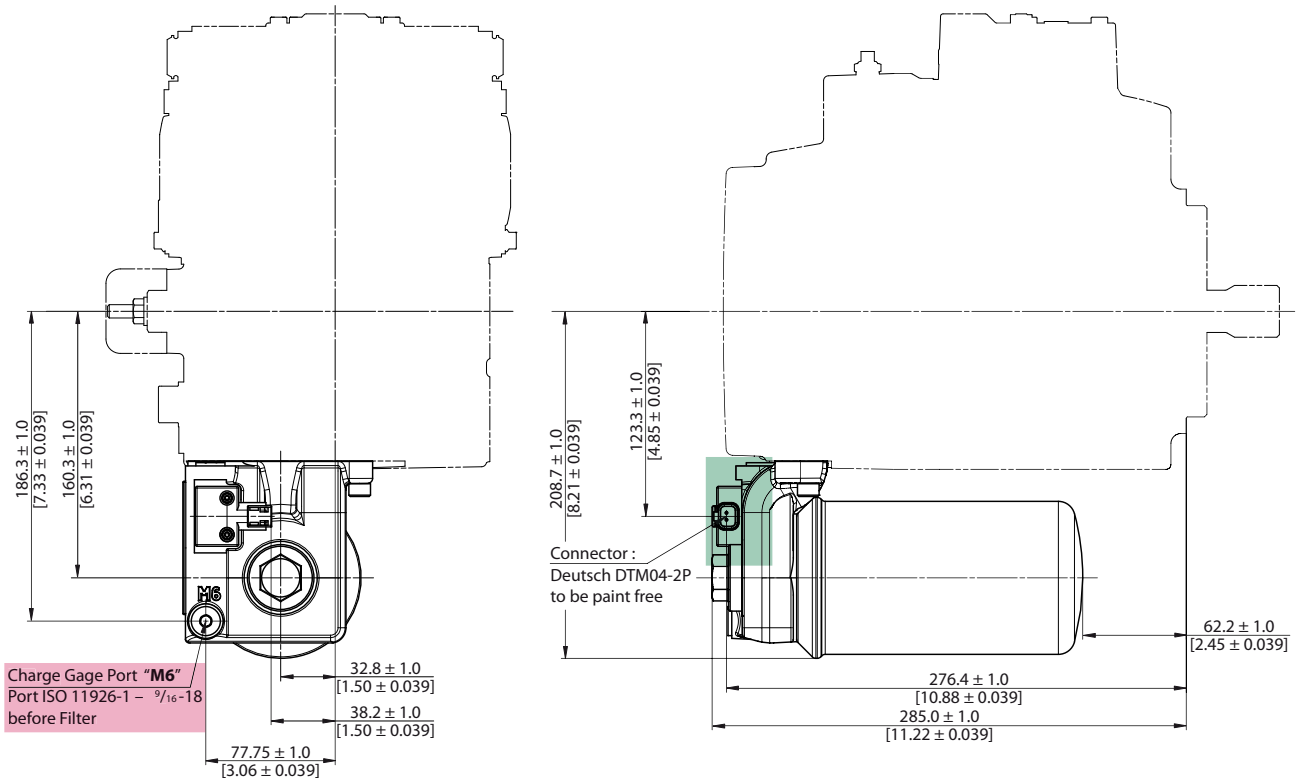
Connections
Pressure test points
Electrical connections



Port Description

Port	Description	Sizes
A	System Port "**A**"	Ø 25.4
B	System Port "**B**"	Ø 25.4
E	Charge Filtration Port, from Filter	7/8-14
F	Charge Filtration Port, to Filter	7/8-14
L1	Case Drain Port	7/8-14
L2	Case Drain Port	1 1/16-12
L3	Case Drain Port	7/8-14
L4	Case Drain Port	1 1/16-12
MA	System "**A**" Gage Port	9/16-18
MB	System "**B**" Gage Port	9/16-18
M3	Charge Gage Port, after Filtering	9/16-18
M4	Servo Gage Port	7/16-20
M5	Servo Gage Port	7/16-20
M14	Case Gage Port	7/16-20
S	Charge Inlet Port	1 5/16-12

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Connections

Pressure test points

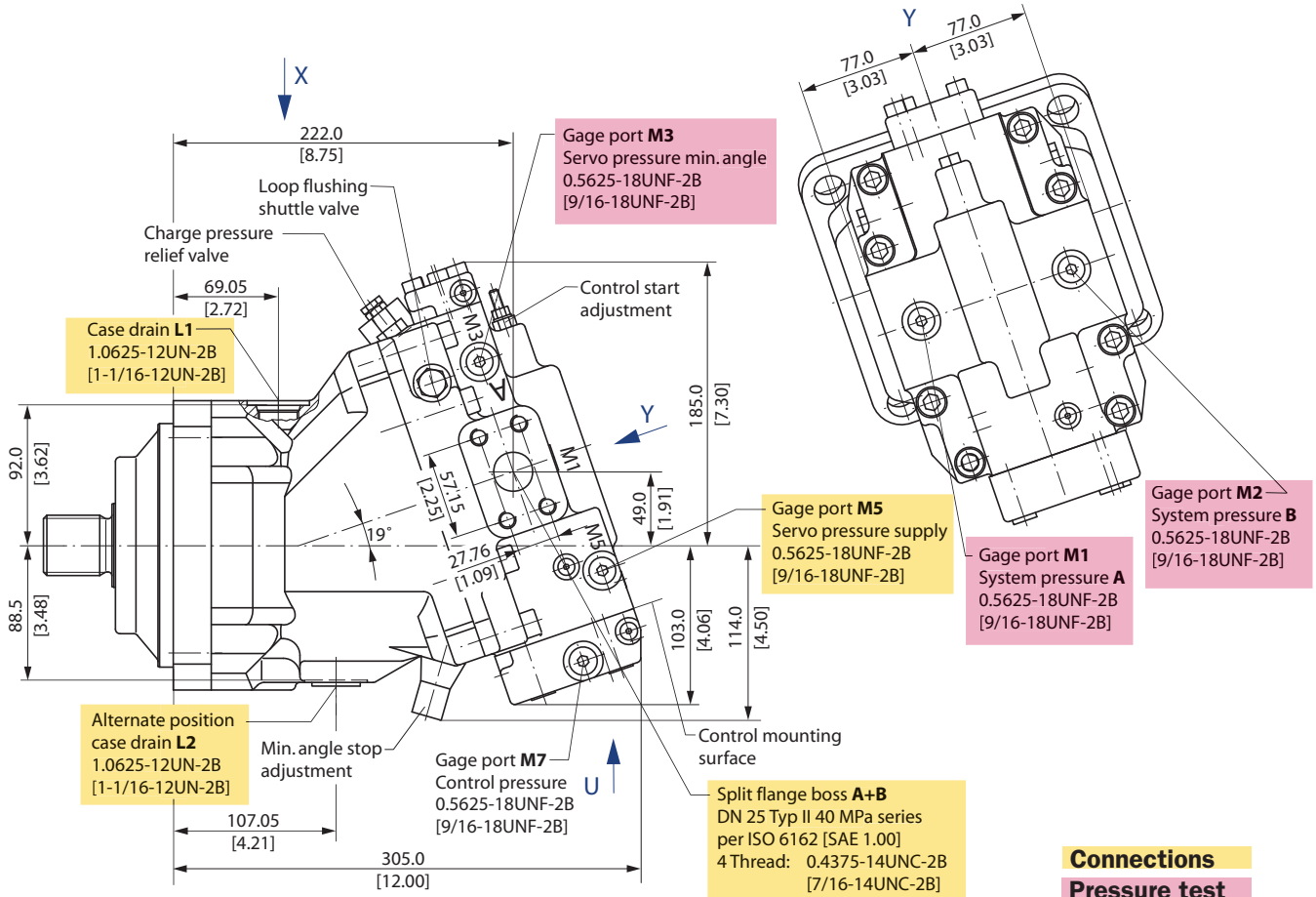
Electrical connections

Port Description

Port	Description	Sizes
A	System Port "**A**"	Ø 25.4
B	System Port "**B**"	Ø 25.4
E	Charge Filtration Port, from Filter	7/8-14
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L1	Case Drain Port	7/8-14
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L3	Case Drain Port	7/8-14
L4	Case Drain Port	1 1/16-12
MA	System "**A**" Gage Port	9/16-18
MB	System "**B**" Gage Port	9/16-18
M3	Charge Gage Port, after Filtering	9/16-18
M4	Servo Gage Port	7/16-20
M5	Servo Gage Port	7/16-20
M14	Case Gage Port	7/16-20
S	Charge Inlet Port	1 5/16-12

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PRESSURE TEST POINTS ON THE MOTOR



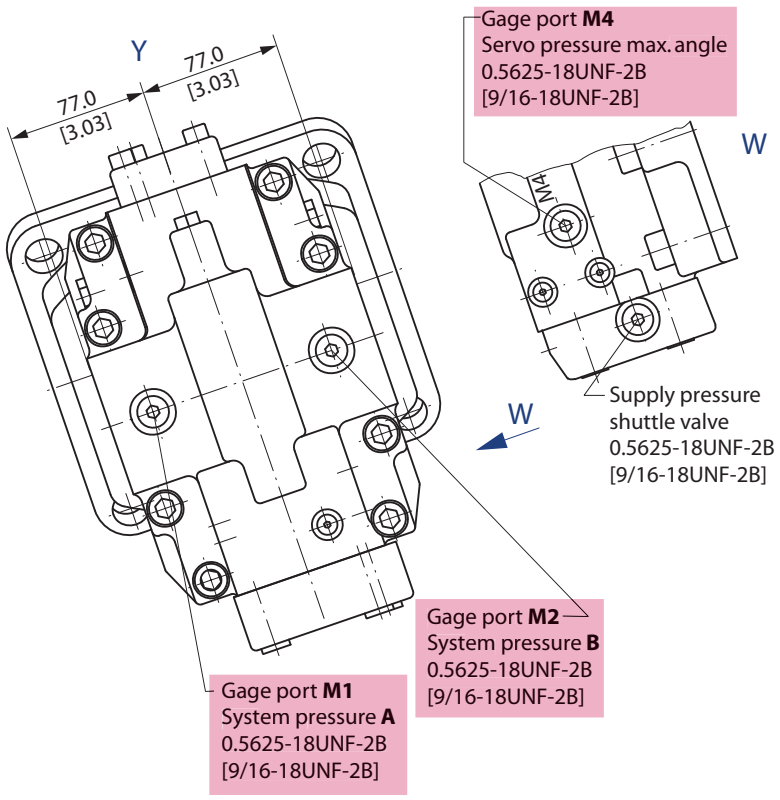
Connections

Pressure test points

Electrical connections

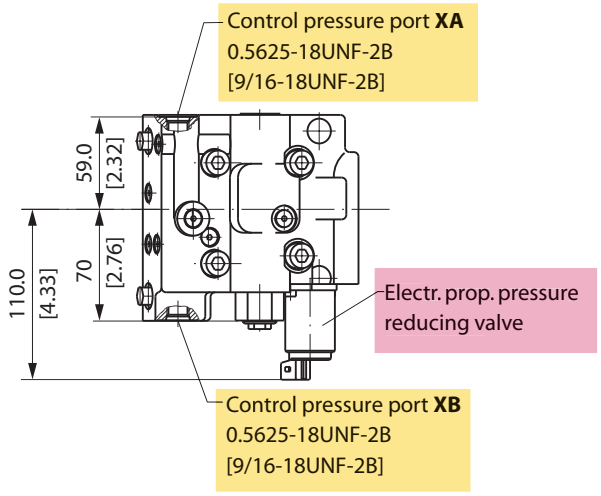
Port	*Description*
A	Pressure port A
B	Pressure port B
L1	Drainage port
L2	Drainage port
M1	Measuring point A
M2	Measuring point B
M3	Min. pressure cc
M4	Max. pressure cc
M5	Piston servo power supply
XA	Reverse input A
XB	Reverse input B

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Connections
Pressure test points
Electrical connections

Port	Description
A	Pressure port A
B	Pressure port B
L1	Drainage port
L2	Drainage port
M1	Measuring point A
M2	Measuring point B
M3	Min. pressure cc
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M5	Piston servo power supply
XA	Reverse input A
XB	Reverse input B

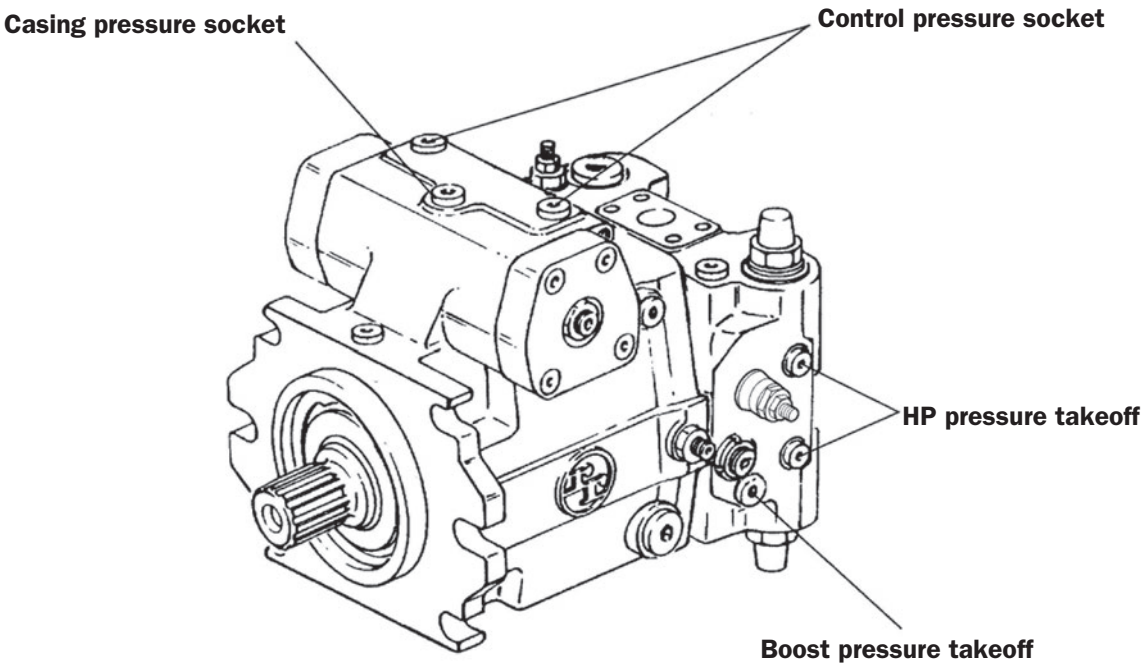


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REXROTH TRANSMISSION

PRESSURE TEST

PRESSURE TEST POINTS ON THE A4VG 71 PUMP



It is necessary (to have basic manometers Item 549671 + Hydromatik Kit Item 209572 in the carrying case)

20-09 Specific transmission tooling

CONTROL PRESSURE

- 2 165711 couplings (Item 55) (M 14 x 150)
- 2 58181 Manometer sockets (Item 49) (M 8 x 100)
- 2 Manometers (0÷40 bar)
- 2 Flexible test hoses 549887

HIGH PRESSURE

- 2 Manometer sockets 477484 (Item 51) (M 12 x 1,5)
- 2 Manometers (0÷600 bar)
- 2 Flexible test hoses 549887

BOOST PRESSURE

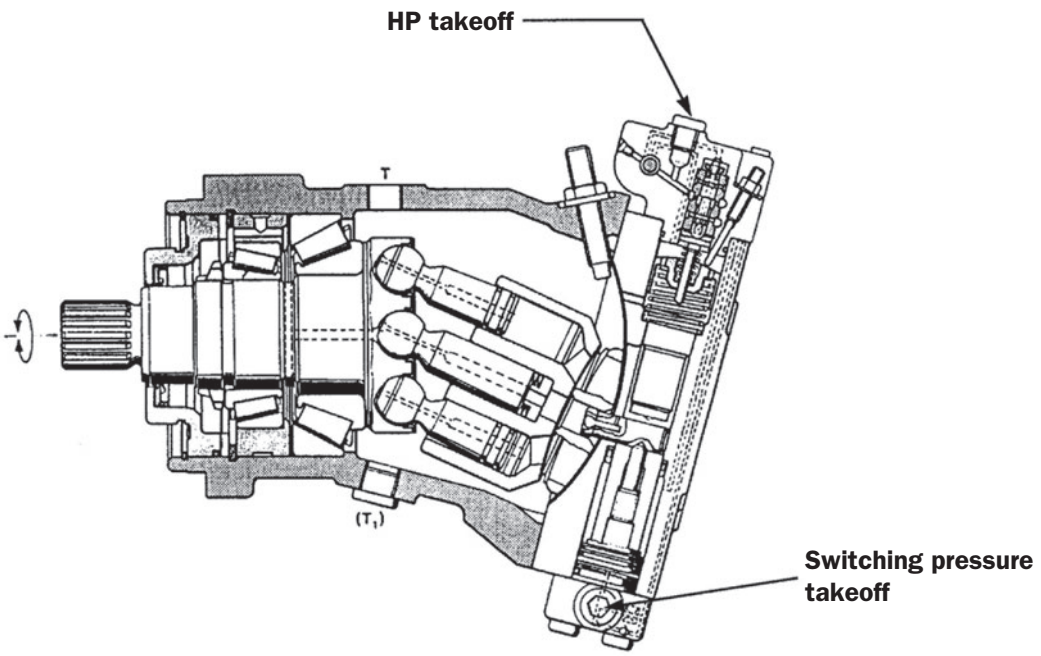
- 1 set of couplings + manometer socket 199175 (Item 53.1) (M 18 x 1,5)
- 1 Manometer (0÷40 bar)
- 1 Flexible test hoses 549887

CASING PRESSURE

- 1 Manometer socket 477484 (Item 51) (M 12 x 1,5)
- 1 Manometers (0÷10 bar)
- 1 Flexible test hoses 549887

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PRESSURE TEST POINTS ON A6VM 107 MOTOR



NB: <u>Il the actual installation of the motor</u> differs from the diagram in that it is <u>turned by 180°</u>.

<u>It is necessary</u> (to have basic manometers Item 549671 + Hydromatik Kit Item 209572 in the carrying case)

20-09 Specific transmission tooling

HIGH PRESSURE

- 1 Manometer socket 58189 (Item 52) (M 14 x 150)
- 1 Manometer (0÷600 bar)
- 1 Flexible test hoses 549887

SWITCHING PRESSURE

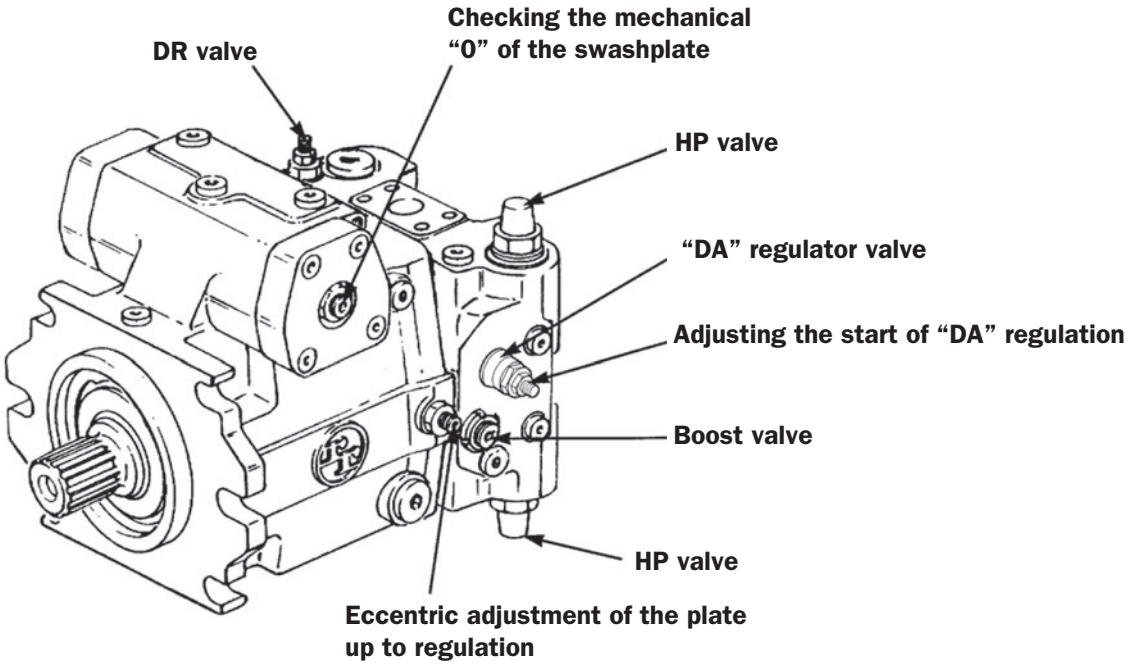
- 1 Manometer socket 477484 (Item 51) (M 12 x 150)
- 1 Manometer (0÷600 bar)
- 1 Flexible test hoses 549887

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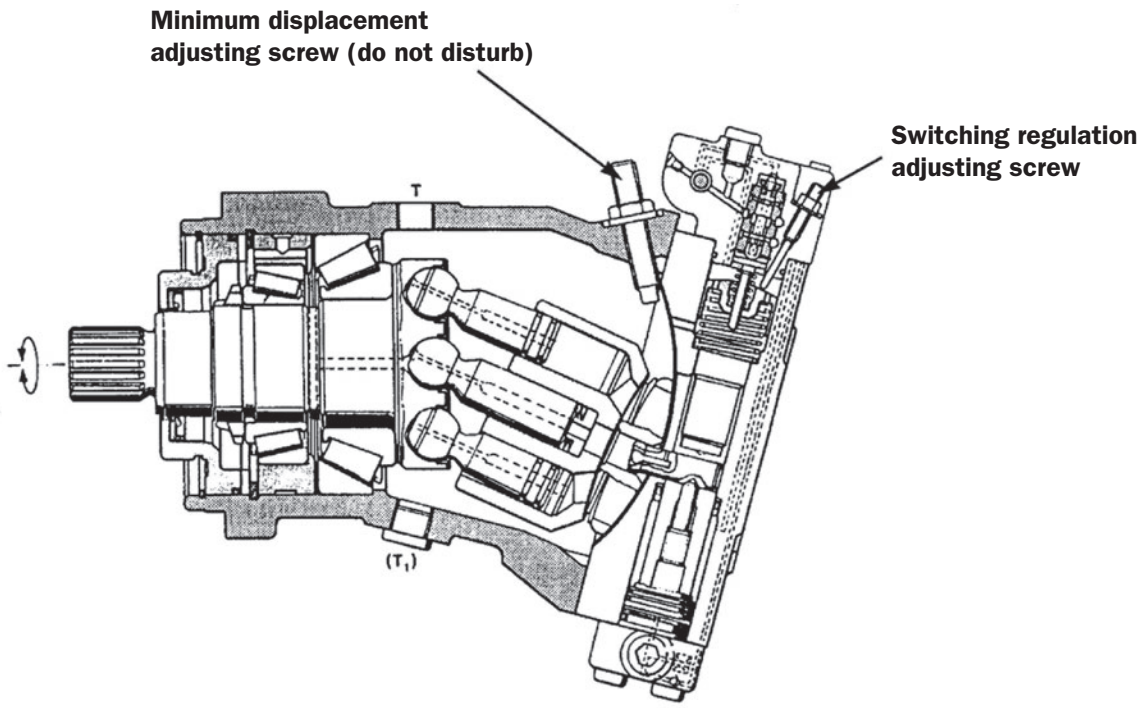
TRANSMISSION CONTROL AND ADJUSTMENT

POINTS ADJUSTMENT ON THE TRANSMISSION

A4VG PUMP



A6VM MOTOR



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TESTS BEFORE SETTING THE TRANSMISSION TO WORK OR AFTER A REPAIR

- Check the oil level in the tank.
- Check that all the couplings of the flexible hoses are fully tightened.
- Check the electrical connections of the electrovalves.
- Ensure that the circuit is completely filled, and at the same time fill the oil filter before fitting.
- Check that the control tubes are correctly fitted:
  - X1 pump with X2 motor,
  - X2 pump with X1 motor.
- In all cases, the control is the opposite of the HP hoses. (Example: if the forward gear HP hose is on the right of the motor, the forward control hose will be on the left and vice versa for reverse gear).
- Connect the boost pressure - control - HP - casing manometers.

SETTING TO WORK:

- For safety reasons, support the vehicle on trestles.
- Turn the engine without starting it to purge the circuit completely. (Disconnect the wire from the stop electrovalve on the injector pump).
- Ensure that the boost pressure rises to at least 15 bar when turning with the starter motor.

"It is essential not to start the transmission with insufficient boost pressure as this will wear the transmission".

- Reconnect the stop electrovalve to the injector pump.
- Start the engine for a few minutes at minimum speed, boost pressure 35 ÷ 40 bar.

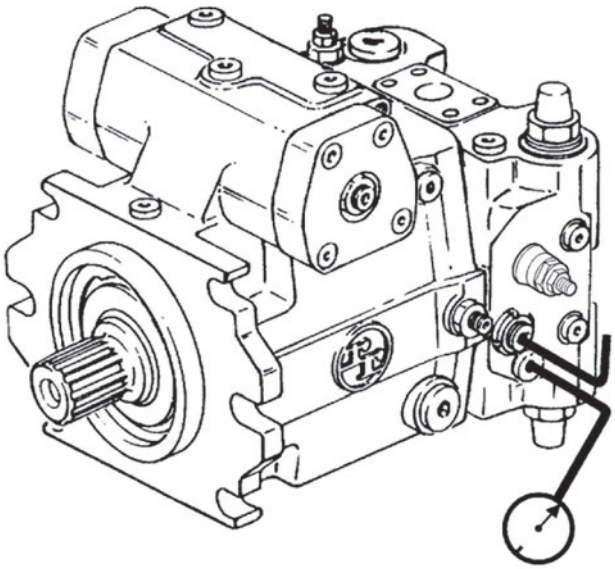
Instability of the needle indicates inlet of air (emulsified oil in the tank and cavitation noise in the transmission).

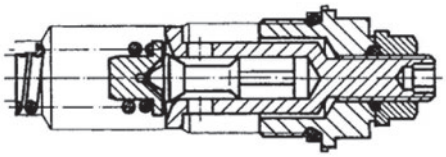
"Selector in neutral" in both HP circuit orifices. The pressure is equal to the boost pressure.

- Heat the oil in the circuit by gradually accelerating (keep the handbrake on to permit measurement of the HP with blocked load).
- When the oil is at a temperature of 50°÷ 60° check the speed of the engine: minimum, maximum and off load. (See technical specifications).

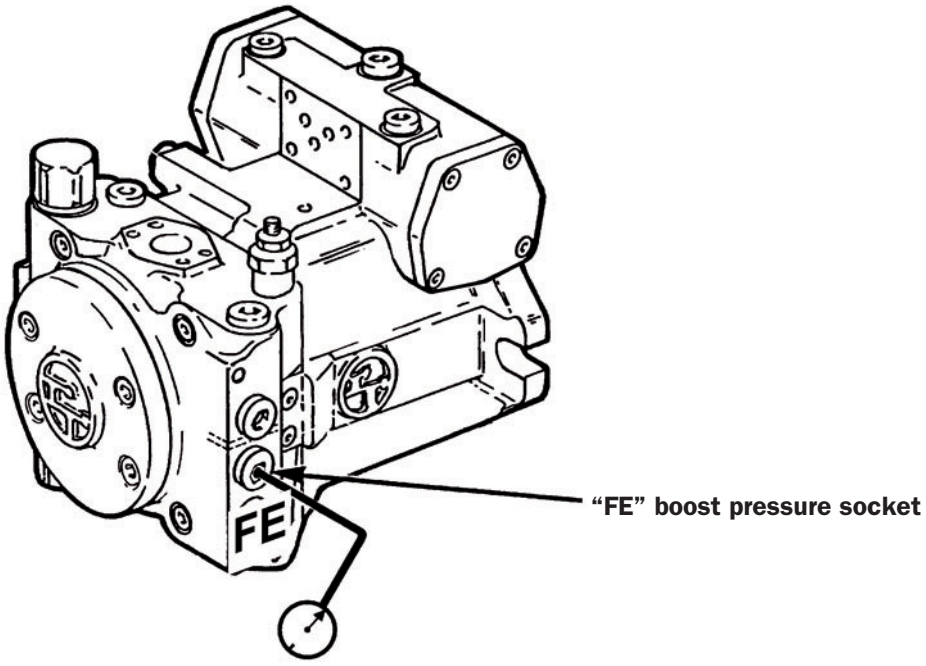
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BOOST PRESSURE CONTROL AND ADJUSTMENT



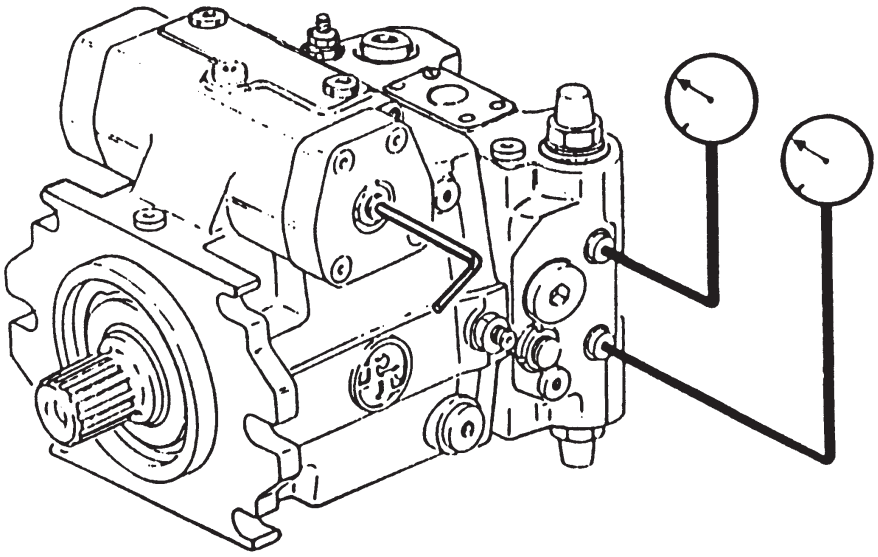


The series A4VG 71 pump is fitted with an adjustable limiter.
To increase the boost pressure, screw in the screw.
At max engine speed, 40 bar.
The oil temperature must not exceed 40 °C.
The pump is already fitted with a pressure socket as in the diagram.
The vehicle must be fully braked.
Check that there is no blow-by in the inching valve.



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ADJUSTING THE MECHANICAL “0” OF THE PUMP



– Connect two small scale manometers (40 ÷ 100 bar) to the HP pressure sockets.
– Ensure that the hand brake is disengaged and that the vehicle is on trestles (wheels suspended in the air).
– Engine at minimum speed.
– Gear selector in neutral.
– Slacken the locknut of the mechanical “0” adjusting screw (19 wrench). Turn the screw slowly clockwise (no. 6 Allen key) until you have noted the lowest speed variation of the HP.
– Mark the direction of the key.
Turn anticlockwise to vary the HP in the other direction of travel.
Mark the direction of the key.
– After that, turn the adjusting screw until the key is half way between the two marks previously made. Tighten the locknut.

CHECK THE ADJUSTMENT:

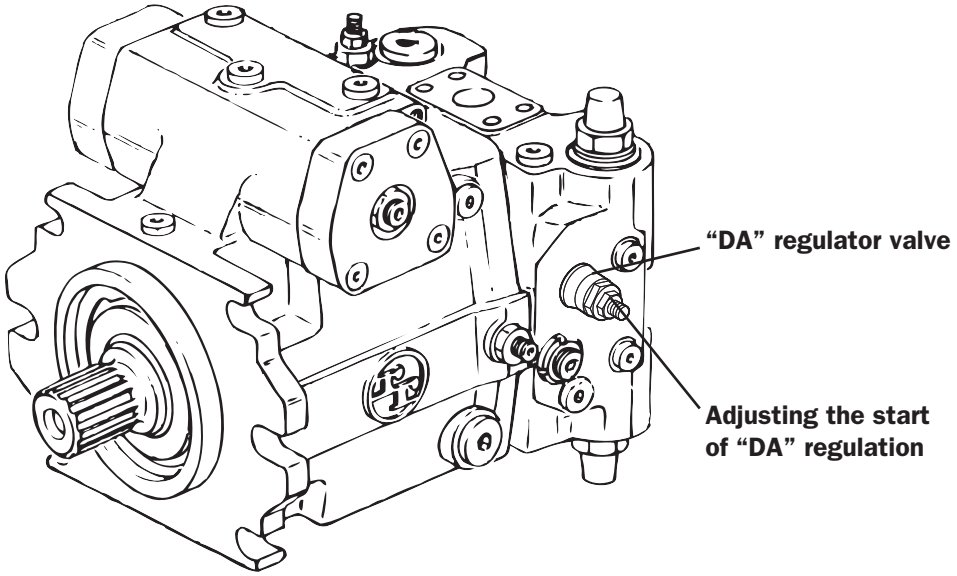
– Connect 2 600 bar manometers to the HP socket:

1) Check the start of regulation in forward and reverse gear with a revolution counter.
Accelerate the engine gently, with the selector in forward gear, until the wheels begin to move.
Note the engine speed.
Repeat the operation in reverse.
Check the two engine speeds which must be the same.

2) Checking the HP and corresponding control pressure, wheels locked, selector in forward gear, gradually accelerate the engine to max. speed.
Note the forward gear and control HP and forward gear pressures.
Repeat for reverse gear; the values must be the same.

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START OF REGULATION CONTROL AND ADJUSTMENT



START OF REGULATION:

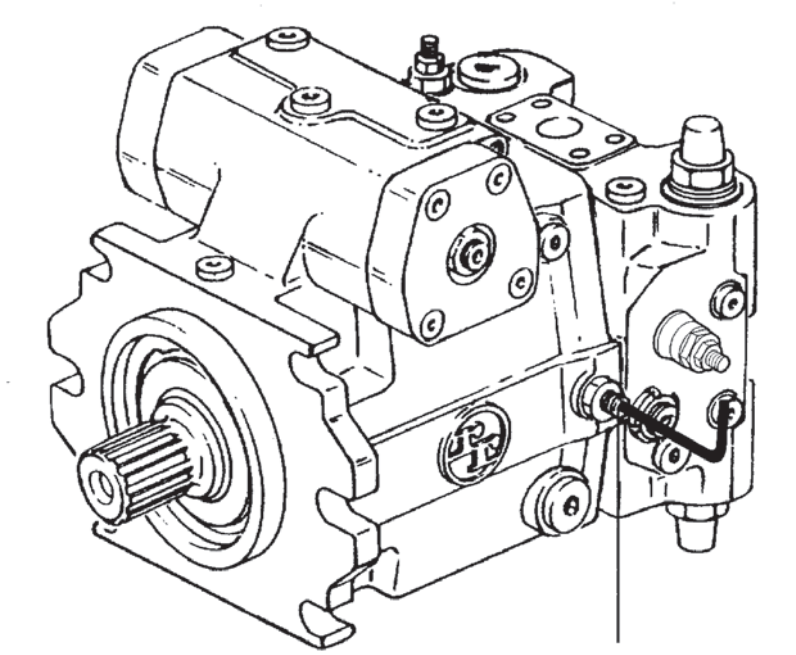
- Measure the minimum engine speed which must be ~ 850 r.p.m.$^{-1}$.
  Regulation must start at 1050 r.p.m^{-1}. To adjust, turn the adjusting screw on the end of the regulation start valve:
  – Screw in to delay the start of advance.
  – Unscrew to advance the start of advance.

- Changing the start of regulation of the delayed advance point displaces the range of adjustment of the pump. The end of "400 bar adjustment for the engine speed in question" regulation must be systematically checked". (1600 ÷ 1800 r.p.m.$^{-1}$).

- Checking the regulation is equivalent to checking the mechanical "0" - Para. 2.

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END OF REGULATION CONTROL AND ADJUSTMENT

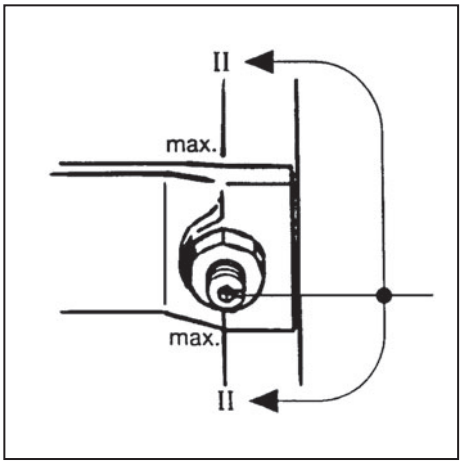


TESTING:

– The vehicle must be on trestles, with the brakes on and inching (brake) in by pass.
– Selector in forward gear.
– With the motor at minimum, check the engine speed.
– Accelerate gradually and check the engine speed (1600 ÷ 1800 r.p.m.$^{-1}$) when the forward gear HP reaches 400 bar.

END OF REGULATION:

The end of regulation of the pump is adjusted by turning the eccentric screw that changes the position of the plate (in the direction of rotation). This has the effect of increasing or decreasing the return force of the tilting swashplate.

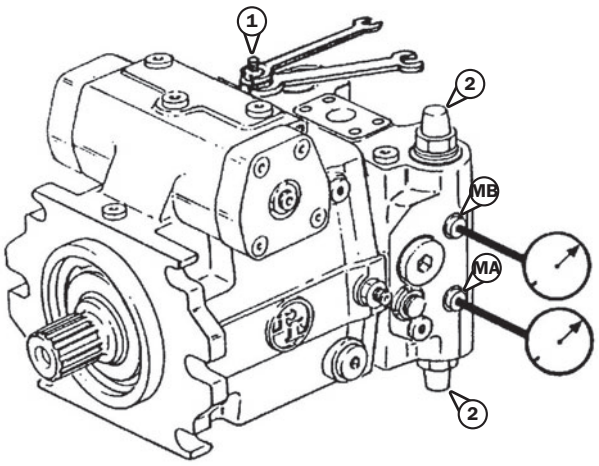


This adjustment is made on the test bench by the manufacturer and must not be altered without prior authorisation from head office.
The milled part of the eccentric must be oriented towards the side of the boost pump.
The margin of adjustment is only 90 % to the right and 90 % to the left. Do not exceed this percentage (risk of mechanical breakage due to interference between the plate and the casing). As for adjusting the HP, this adjustment must be made with the DR valve over calibrated.

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HP LIMITERS CONTROL AND ADJUSTMENT

- Checking and adjusting the HP limiters is carried out with the vehicle on trestles (wheels suspended in the air) and the brakes applied.
  The inching valve must be bypassed eliminate discharging of the pump flow.
- Over calibrate the DR valve -Item 1- to check the actual calibration value of the HP limiters.

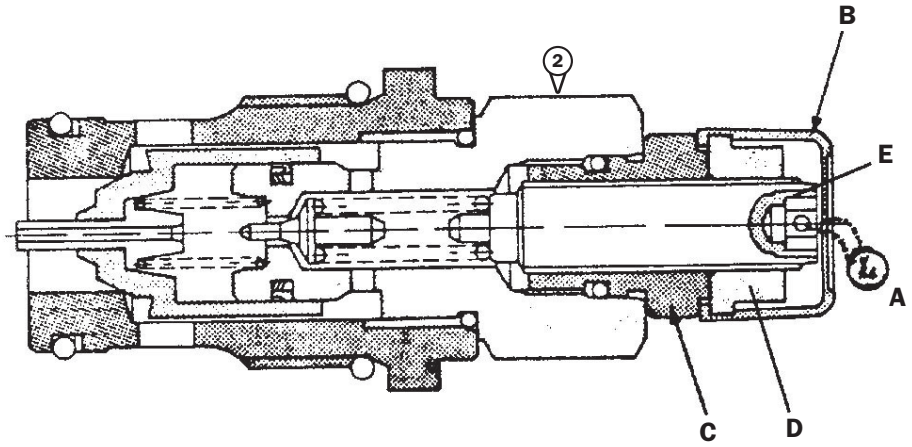


- Screw in the screw (Item 1) one turn.
- The calibration of the HP limiters (Item 2) must be 460 bar.
  During this operation, there will be a large drop in the engine speed to about 500 ÷ 600 r.p.m.$^{-1}$.
  After checking the HP, adjust the DR valve (Item 1) to a value of less than 20 bar from the HP (Item 2).

ADJUSTING THE HP LIMITERS:

Series A4VG 71 DA pump

- Remove the lead seal A.
- Remove plug B.
- Unscrew the locknut D.
- Turn the screw E to increase the pressure.
- Replace the plug and attach a new lead seal to the adjustment.



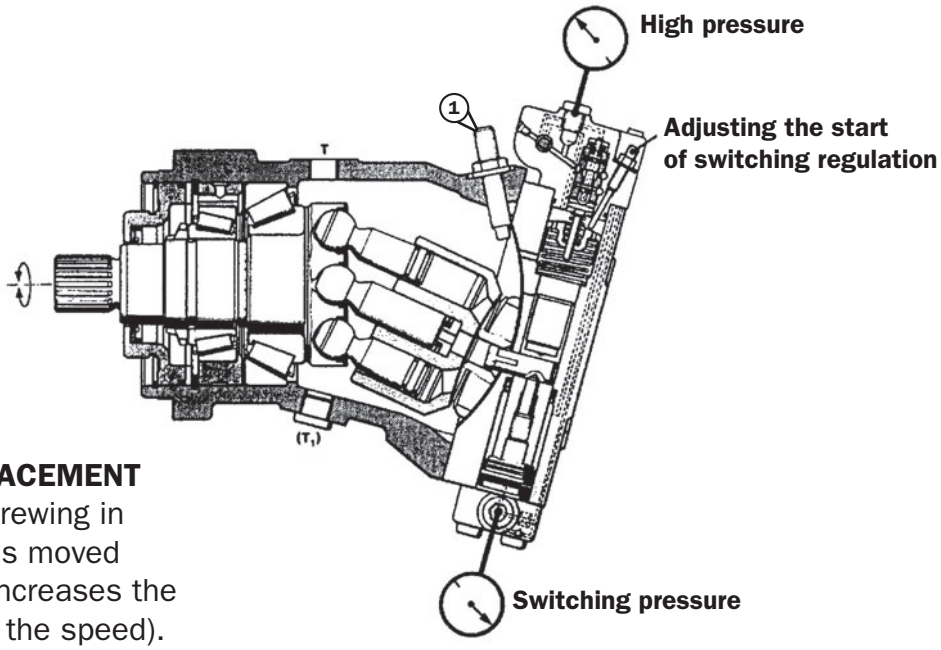
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A6VM MOTOR ADJUSTMENT

A. MINIMUM DISPLACEMENT CONTROL (MAX. SPEED):

- The test is carried out with the vehicle on a flat surface, at max. engine speed and in forward gear.
- Connect two 600 bar range manometers as indicated in the diagram. At max. vehicle speed both pressures must be the same. This means that, taking into account the ratio of the area of the command cylinder, the motor is switched to minimum displacement.
- For an effective speed test (check the technical specifications of the vehicle).

This adjustment (Item 1) is done on the test bench by the manufacturer; it is essential that it is not changed except with the prior authorisation of head office.



(Item 1) MINIMUM DISPLACEMENT ADJUSTING SCREW (by screwing in the screw the swashplate is moved downwards. In this way it increases the displacement and reduces the speed).

B. START OF REGULATION CONTROL

- When the vehicle is at max. speed, gradually press the brakes to raise the HP (the inching valve must be bypassed).
- Note the two pressures. When the HP reaches 260 ÷ 280 bar, the switching pressure will drop and the HP will continue to increase up to the calibration value of the DR valve.
- The start of adjustment of the switching can be calibrated by means of the adjustment screw on the motor.

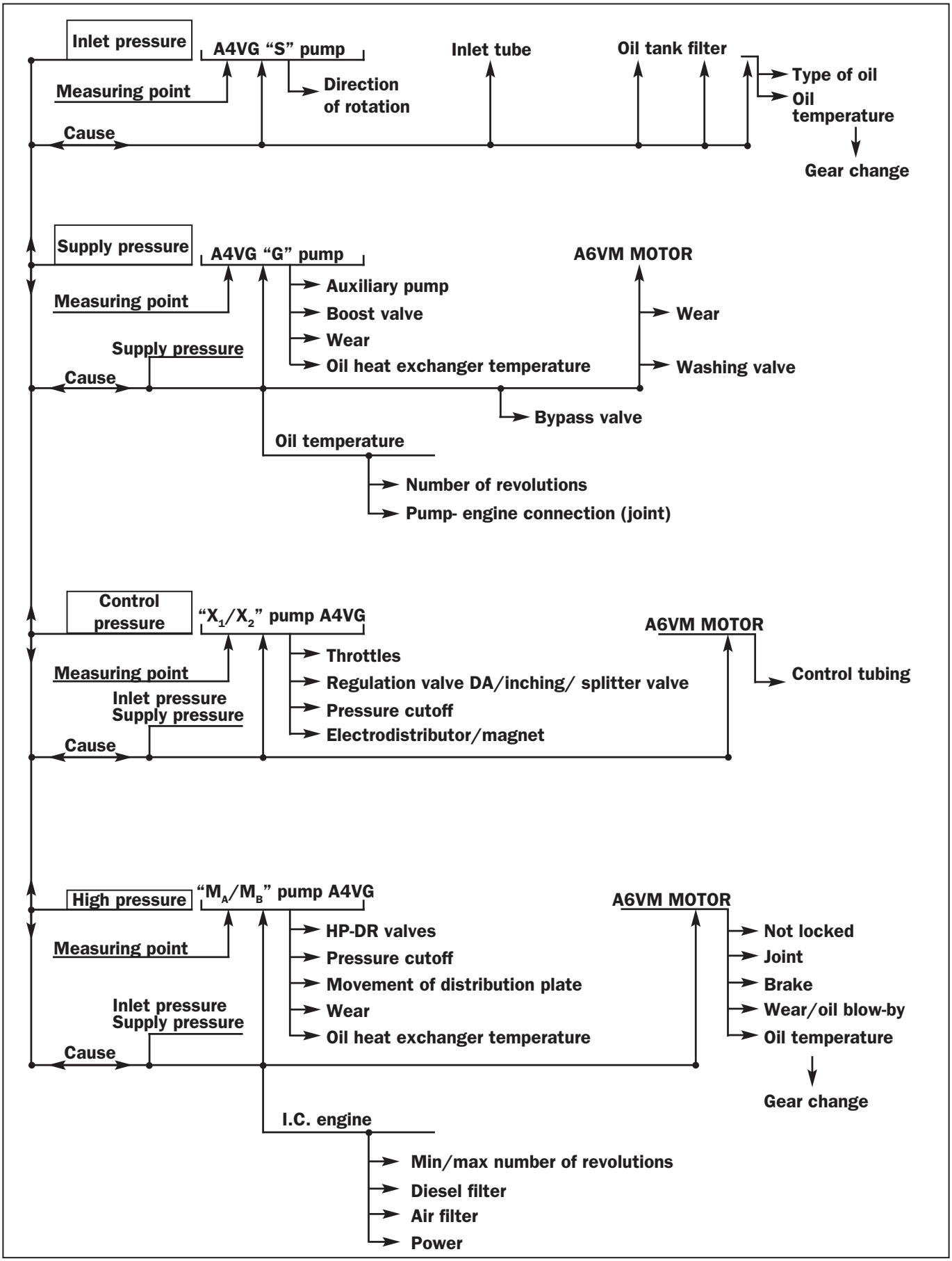
C. MAX. DISPLACEMENT: (MAX TRACTION FORCE)

- To carry out this adjustment, the vehicle must b e locked (brakes applied).
  The test is carried out at max. engine speed in forward gear.
- The switching pressures(on the large section side of the command cylinder) must be near zero bar.
  If necessary, adjust the adjustment screw (screw in to increase the switching pressure or screw out to decrease it).
- A traction force test (on a hook) must be carried out (for the required results, see the User Maintenance manual).

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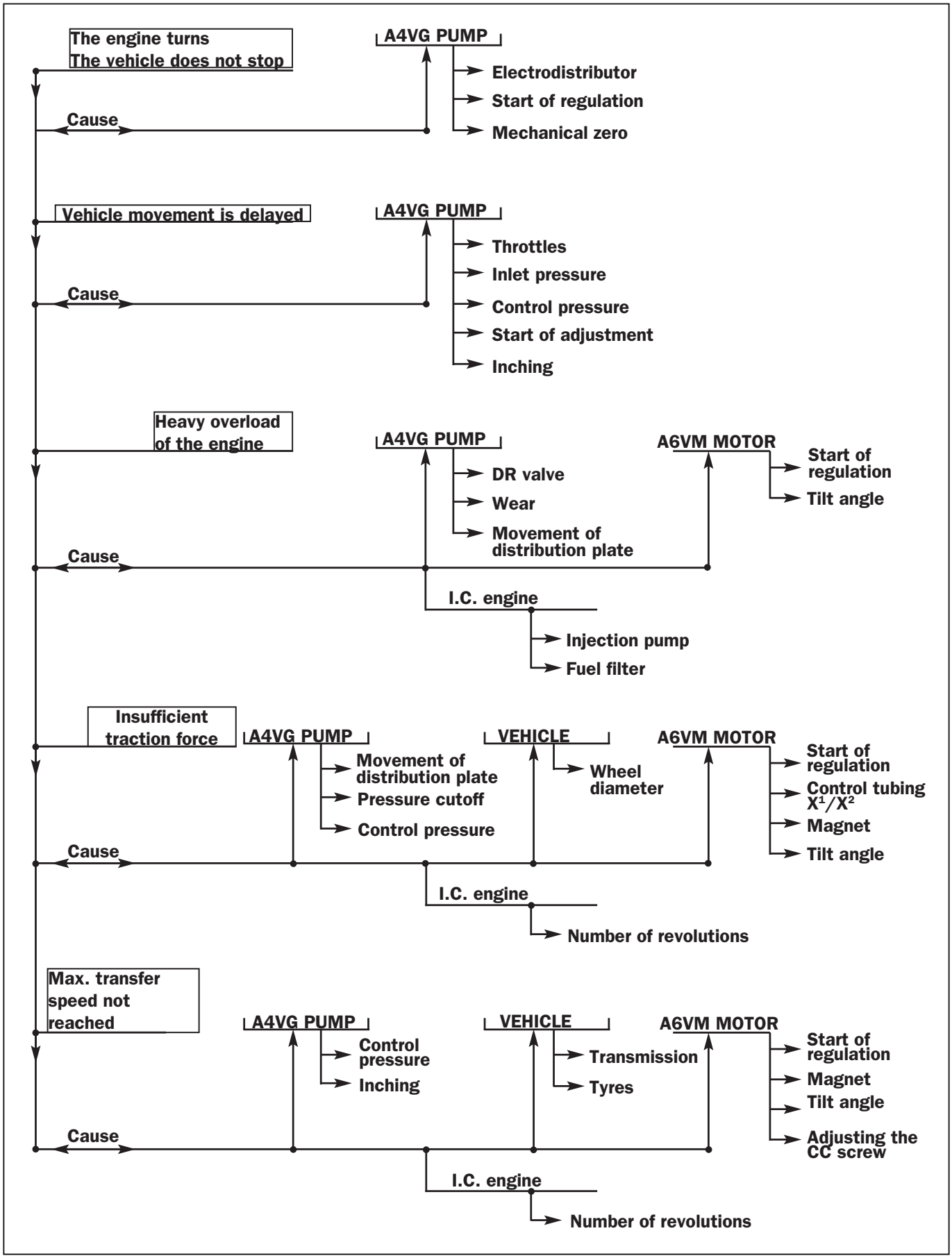
FAULT FINDING

PUMP / MOTOR



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VEHICLE



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20-04-M146EN

MANITOU A4VG–DA / A6VM–DA HYDROSTATIC TRANSMISSION ADJUSTMENT CARD

DATA OF TEST	:	TYPE OF VEHICLE	:	TYPE OF HYDROSTATIC PUMP	:
NAME OF DEALER	:	SERIAL NO.	:	PUMP SERIAL No.	:
NAME OF ENGINEER	:	NUMBER OF HOURS	:	TYPE OF HYDROSTATIC MOTOR	:
				MOTOR SERIAL No.	:

ENGINE SPEED r.p.m.$^{-1}$:

1 minimum:..... **2** max no load:..... **3** max on load hydraulically:..... **4** start of regulation:..... **5** end of regulation 400b :.. **6** max on load fwd. gear:.....

HYDROSTATIC PUMP

TRUCK SITUATION + tests/adjustments CARRIED OUT	*GEAR SELECTOR POSITION*	*ENGINE SPEED*	*BOOST PRESSURE*	*CONTROL PRESSURE*		*HIGH PRESSURE HP*		*CASING WASHING PRESSURE*	*INLET PUMP DEPRESSION*
				FORWARD GEAR	*REVERSE GEAR*	*FORWARD GEAR*	*REVERSE GEAR*		
ADJUSTING THE BOOST PRESSURE	NEUTRAL	MINIMUM							
		MAX.							
NO LOAD ADJUSTING THE START OF REGULATION	FORWARD GEAR	START OF REGULATION							
		MAX.							
	REVERSE GEAR	START OF REGULATION							
		MAX.							
ON LOAD ADJUSTING THE HIGH PRESSURE HP RAISING THE RIGHT CUT OFF VALVE	FORWARD GEAR	MAX.							
	REVERSE FORWARD	MAX.							
ON LOAD ADJUSTING THE RIGHT CUT OFF VALVE	FORWARD AGEAR	MAX.							
	REVERSE GEAR	MAX.							
ON LOAD CHECKING END OF REGULATION	FORWARD GEAR	END OF REGULATION							
	REVERSE GEAR	END OF REGULATION							
ON LOAD ADJUSTING THE INCHING VALVE	FORWARD GEAR	MAX.							

HYDRAULIC MOTOR

TROLLEY STATUS + GEAR SELECTOR POSITION	*HIGH PRESSURE HP*	*PRESSURE CYLINDER COMMAND*
OFF LOAD, IN MOTION, FORWARD GEAR, MAX. ENGINE SPEED		
FORWARD GEAR, IN MOTION AT THE MOMENT OF MAX. ENGINE SPEED SWITCHING		
FORWARD GEAR, ON LOAD, MAX. ENGINE SPEED		

TYPE OF OIL

TEMPERATURE OF OIL ..... °C

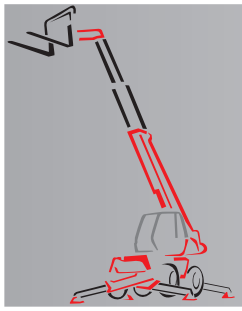
MAX. NO LOAD SPEED:

.....km/h

TRACTION FORCE .....kg

(11/01/2012)

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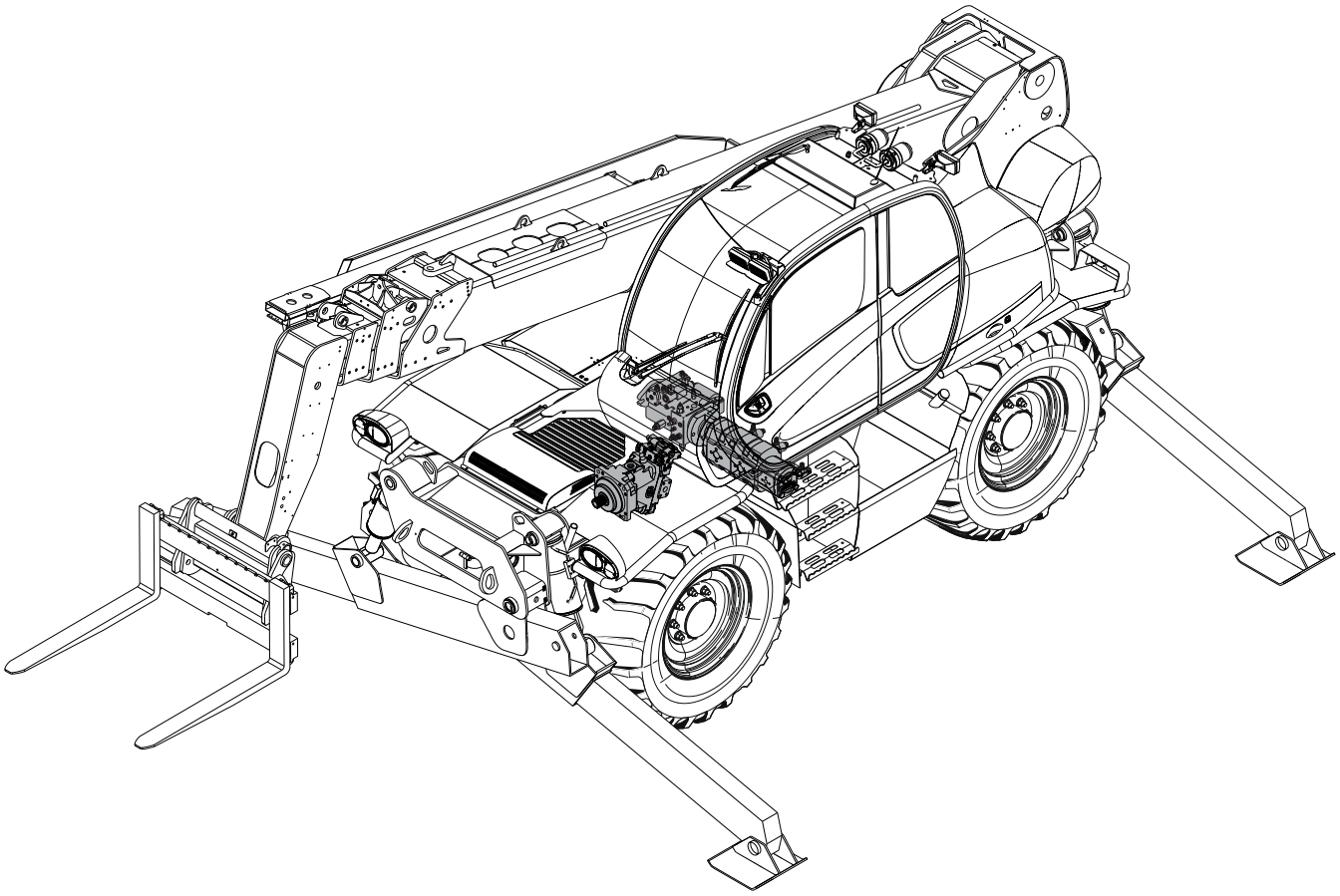


TRANSMISSION REMOVAL

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GENERAL INFORMATION

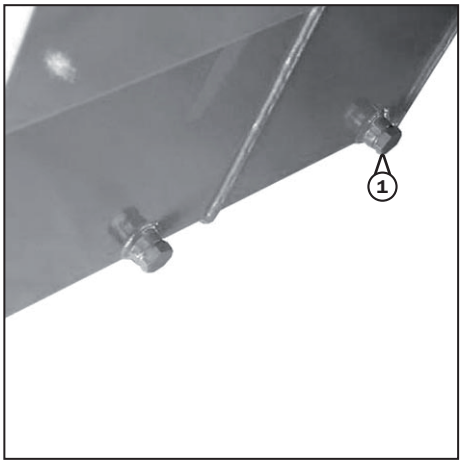
To reach the various components, the order of removal must be observed.

PREPARATION AND SAFETY INSTRUCTIONS

Position the vehicle on a horizontal surface, support it on the stabilisers to ensure maximum stability and safety, turn off the engine.

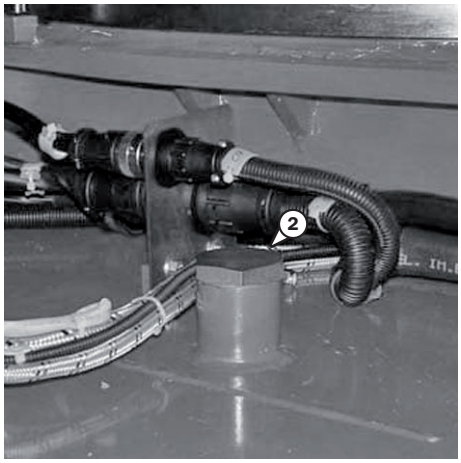
Special instruments:
- Lifting crane (5000 kg. minimum).
- Forklift truck.

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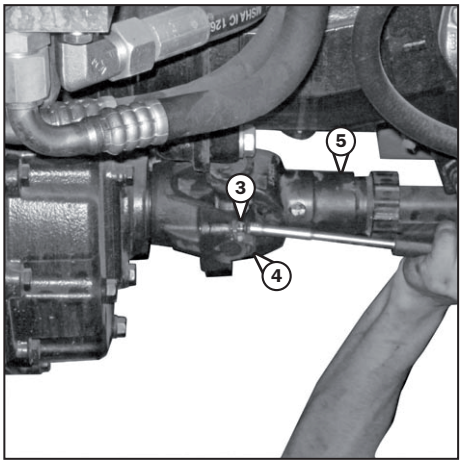


HYDROSTATIC TRANSMISSION REMOVAL

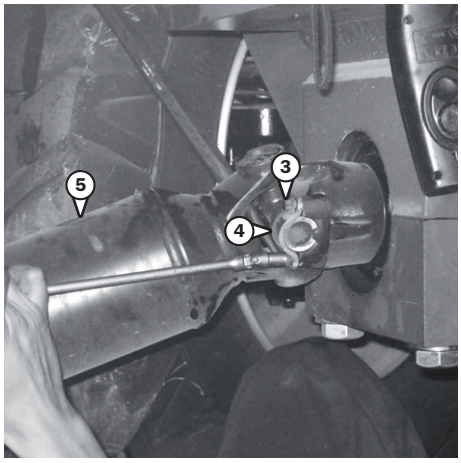
Obtain receptacles of sufficient size for the quantity of oil to be collected and place it under the drain plug (Item 1) of the hydraulic oil tank.
Remove the plug (Item 1) and leave the oil to run out.



To speed up draining of the tank, remove the filler plug (Item 2).



Unscrew the screws (Item 3) and remove the brackets (Item 4) holding the cardan shaft (Item 5) to the front axle.

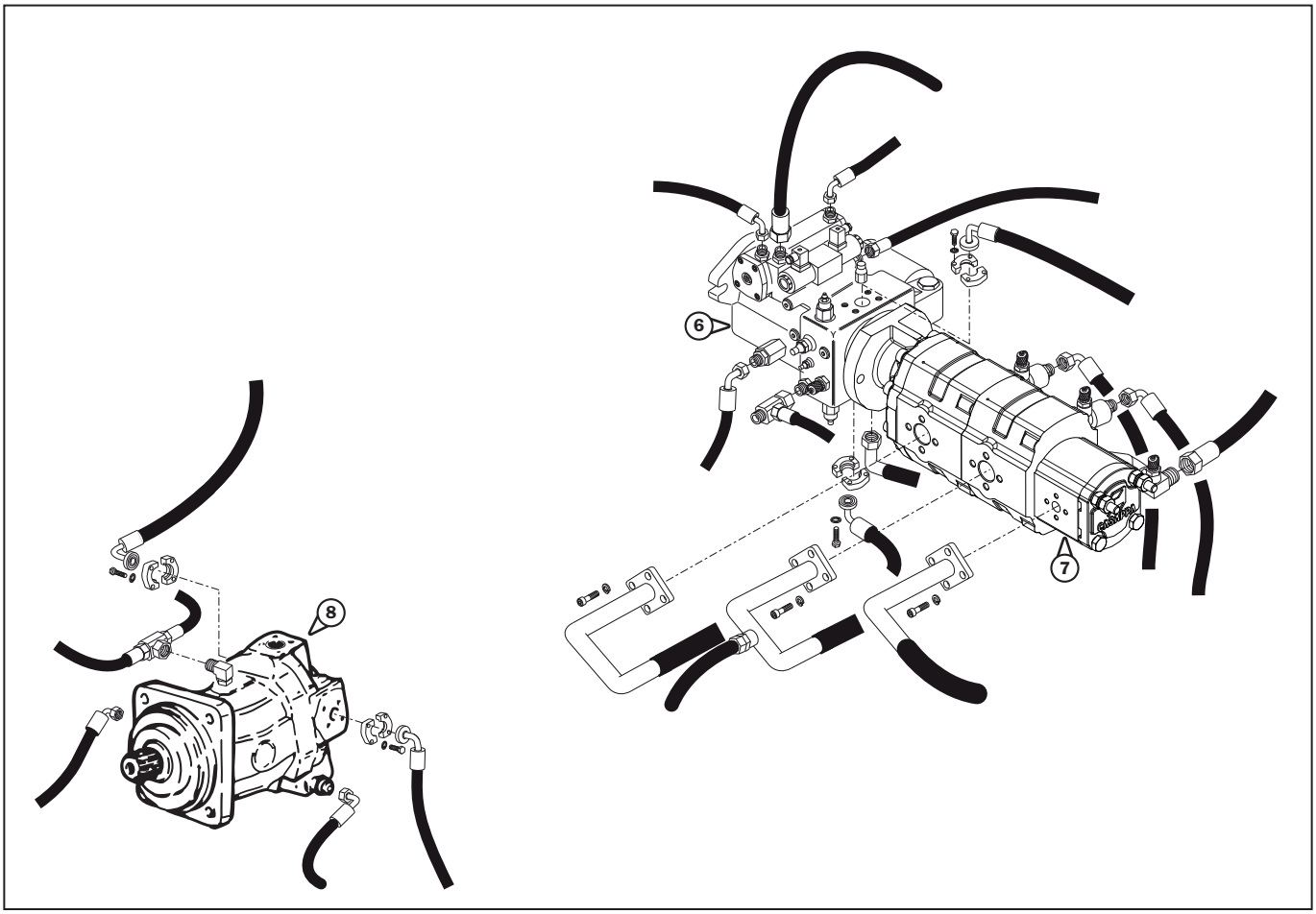


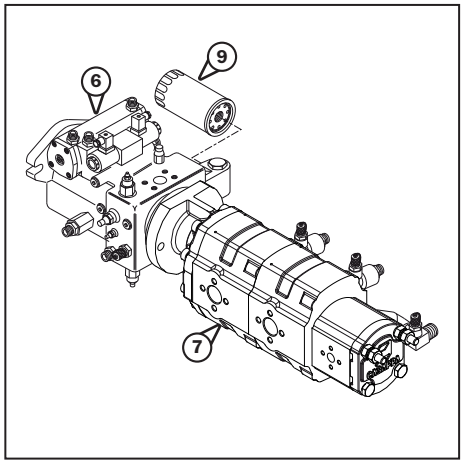
Unscrew the screws (Item 3) and remove the brackets (Item 4) holding the cardan shaft (Item 5) to the rear axle.
Remove the cardan shaft (Item 5) from the vehicle.

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Disconnect all the tubes of the hydraulic oil system and inlet, the hydrostatic pump (Item 6), the services pump (Item 7) and the hydraulic motor (Item 8), taking care to mark the tubes and attachments with a paint brush before removing them, to ensure they are correctly replaced.

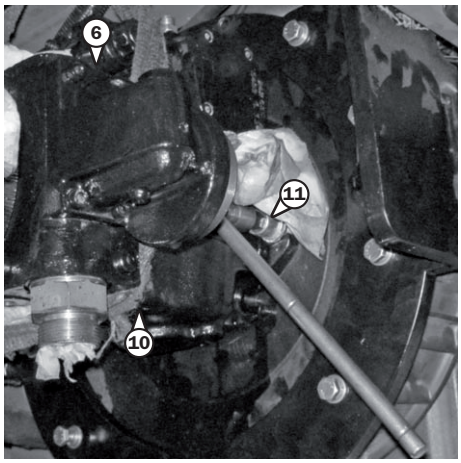
Plug all the hydraulic orifices of the hydrostatic motor and pump to prevent impurities from contaminating the hydraulic system.



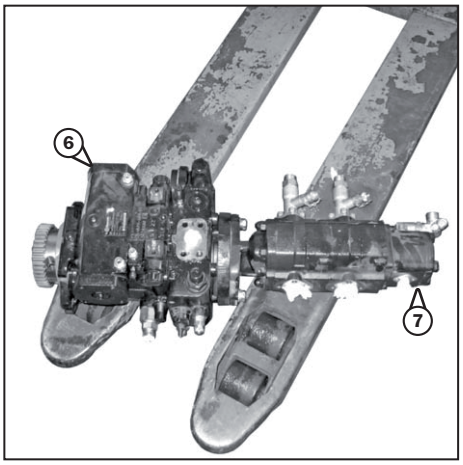


Remove the transmission oil filter (Item 9) from the hydrostatic pump (Item 6) to gain access to remove one of the two screws holding the pump.

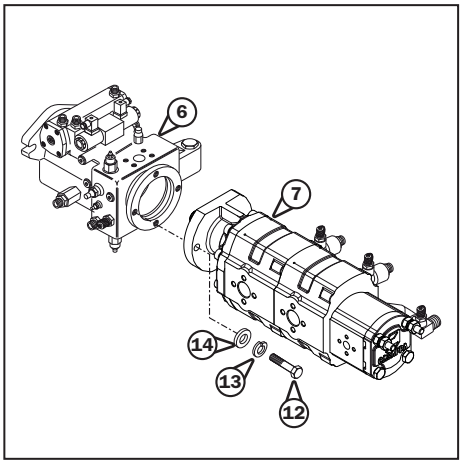
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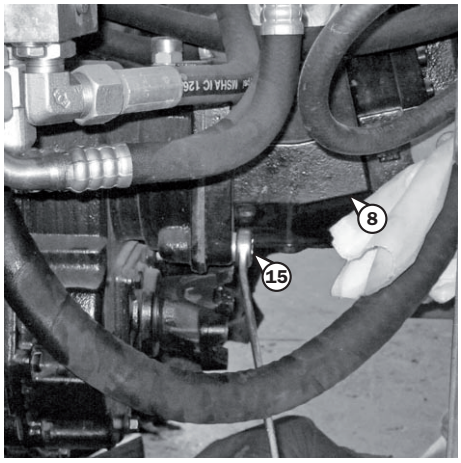
Secure the pumps with belts or ropes (Item 10) to an overhead crane, passing them through the central hole in the fifth wheel.
Remove the 2 screws (Item 11) attaching the pump (Item 6) to the motor.



Support the pumps (Item 6 and 7) on a forklift truck and move them away from the vehicle.

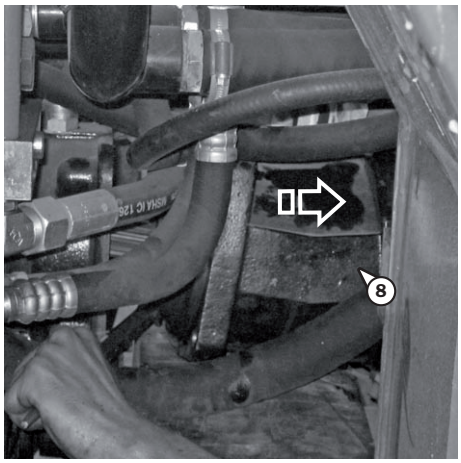


Unscrew the screws (Item 12) and remove the washers (Item 13 and 14) to remove the hydrostatic pump (Item 6) from the services pump (Item 7).



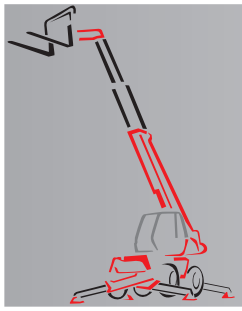
Unscrew the screws (Item 15) attaching the hydrostatic motor (Item 8).

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Place a trolley under the motor (Item 8) and remove the motor from the front axle gearbox until it is not resting on the trolley.
Withdraw it from under the vehicle.

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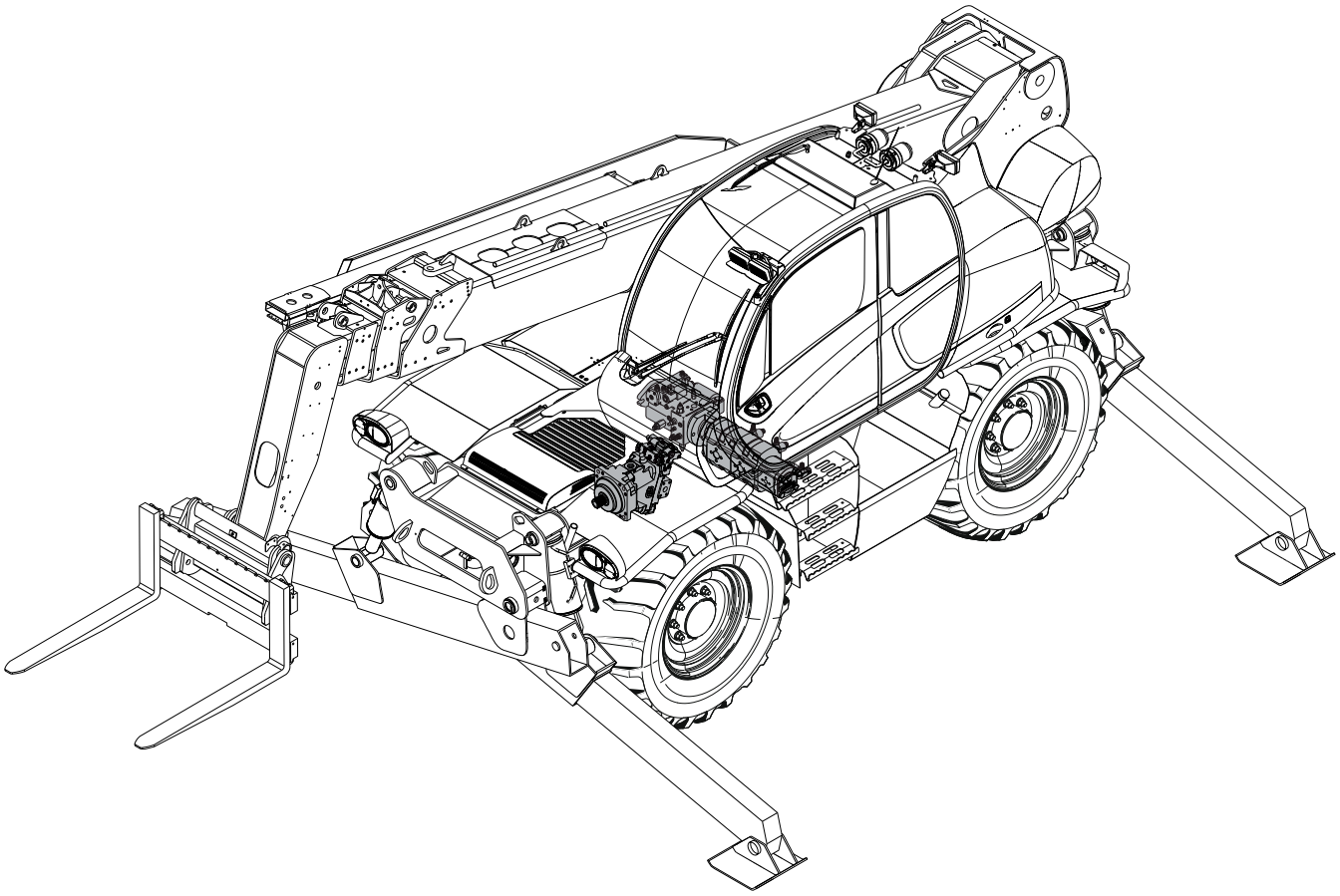


TRANSMISSION REFIT

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GENERAL INFORMATION

To reach the various components, the order of removal must be observed.

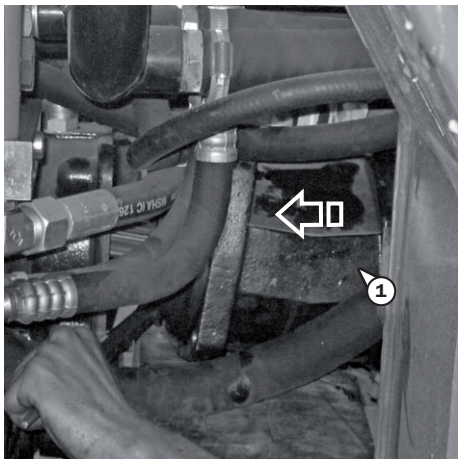
PREPARATION AND SAFETY INSTRUCTIONS

Position the vehicle on a horizontal surface, support it on the stabilisers to ensure maximum stability and safety, turn off the engine.

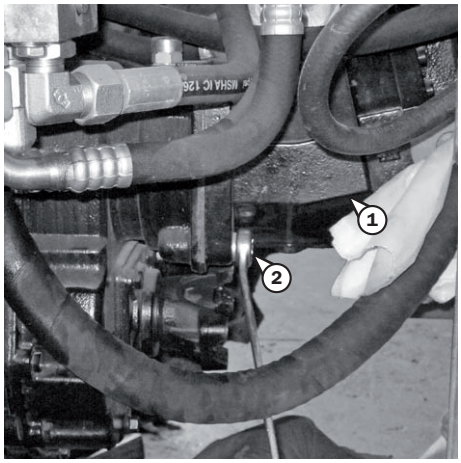
Special instruments:
- Lifting crane (5000 kg. minimum).
- Forklift truck.

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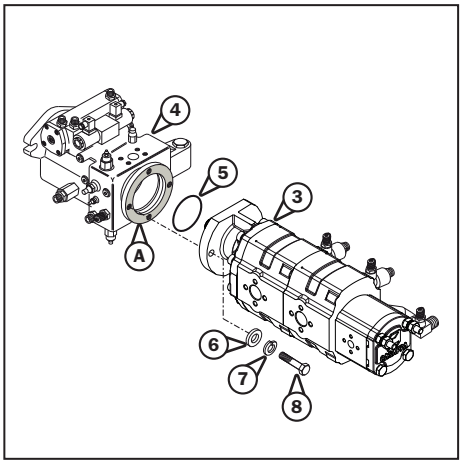
HYDROSTATIC TRANSMISSION REFIT



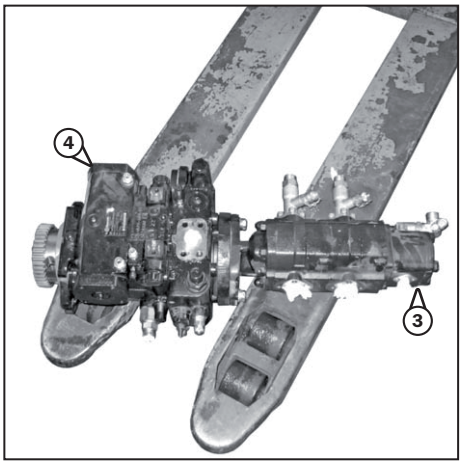
Position the motor (Item 1) under the vehicle with a trolley.
Fit the motor (Item 1) to the front axle gearbox.



Screw in the screws (Item 2) that fix the hydrostatic motor (Item 1) to the front axle gearbox.

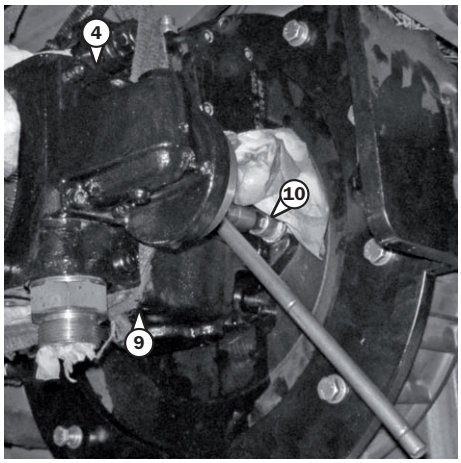


Carefully clean the surface (Item A) of the hydrostatic pump (Item 4) with a cloth and apply a layer of “Motorseals” sealant (working time 15 minutes).
Refit the service pumps (Item 3) to the hydrostatic pump (Item 4) inserting the seal (Item 5) and screwing the screws and washers on again (Item 6 - 7 - 8).
Use a tightening torque of 87 Nm.

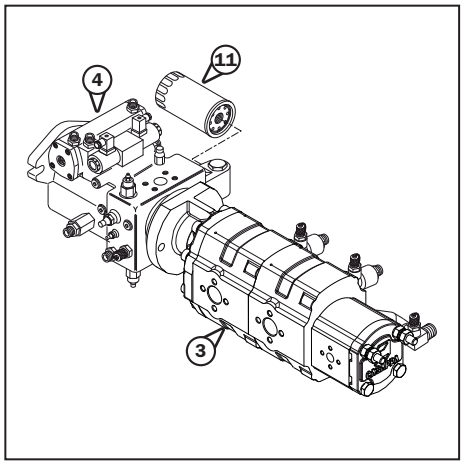


Support the pumps (Items 3 and 4) on a forklift truck and position them under them vehicle.

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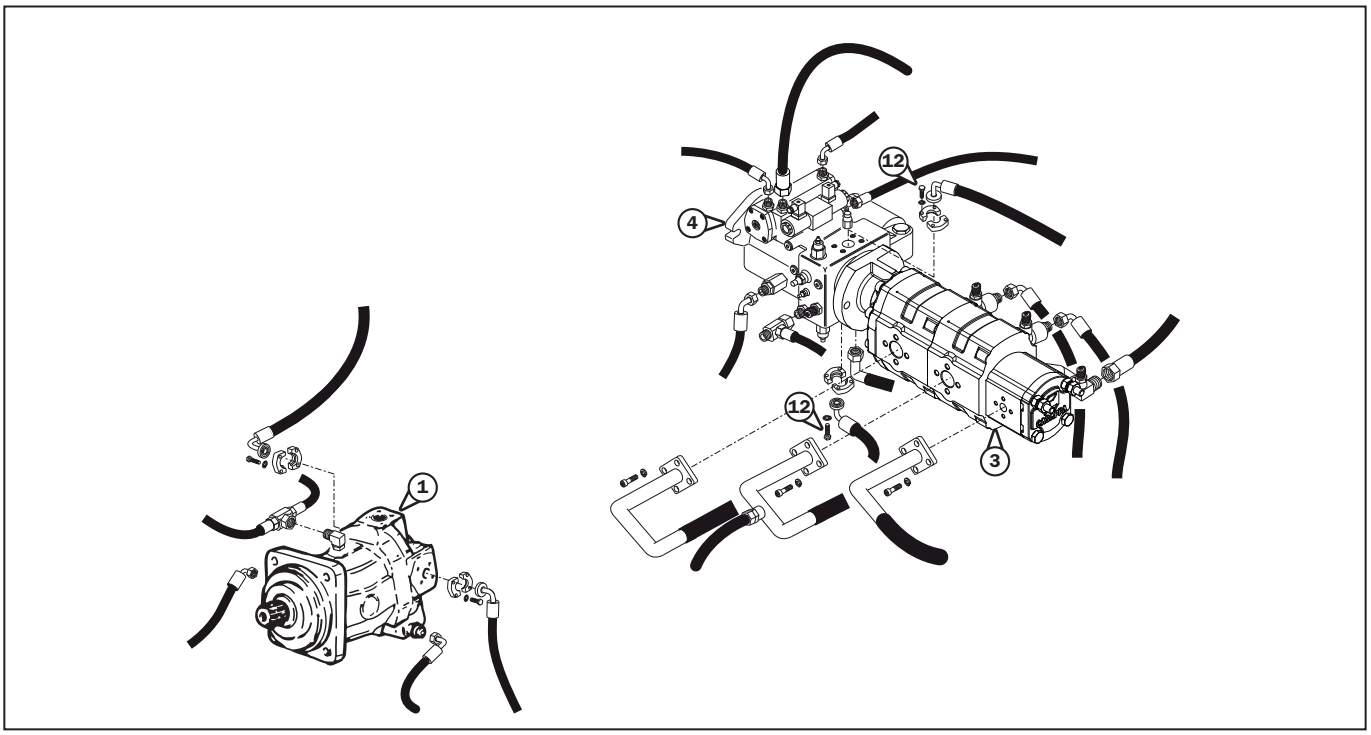


Secure the pumps with straps or ropes (Item 9) to an overhead crane, passing them through the central hole in the thrust ring.
Lift the pump unit and position it on the motor, screwing in the 2 screws (Item 10), using a tightening torque of 250 Nm, to fix the hydrostatic pump (Item 4) to the motor.

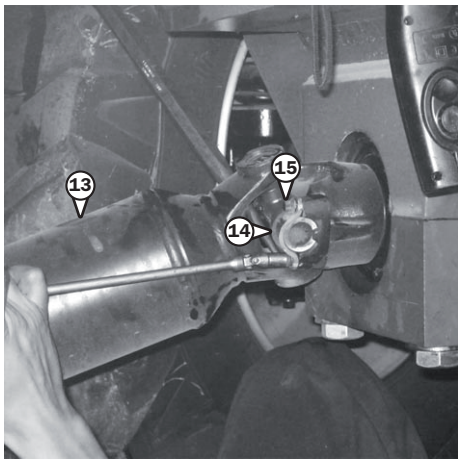


Replace and fit the transmission oil filter (Item 11) on the pump (Item 4).

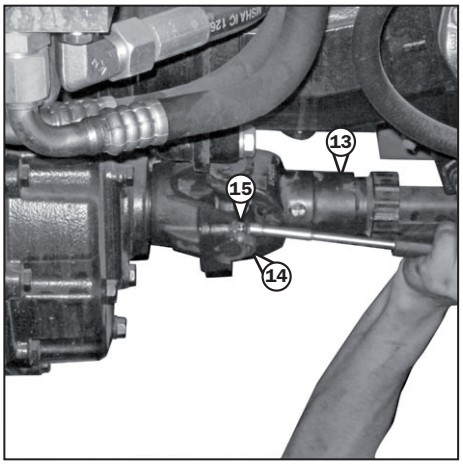
Carefully wash and dry all the tubes in the hydraulic oil and inlet system, refit the tubes to the service pumps (Item 3) on the hydrostatic pump (Item 4) and the hydraulic motor (Item 1), taking care to a reposition them correctly following the marks made with a paint brush during removal.
Tighten the screws (Item 12) using a tightening torque of 87 Nm.



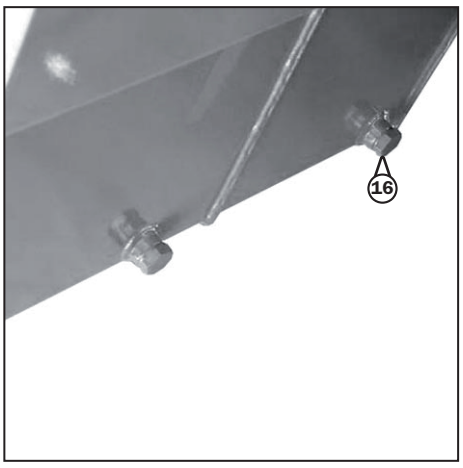
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Refit the cardan shaft (Item 13) to the rear axle, repositioning the clamps (Item 14) and screwing in the screws (Item 15).



Refit the cardan shaft (Item 13) to the front axle, repositioning the clamps (Item 14) and screwing in the screws (Item 15).

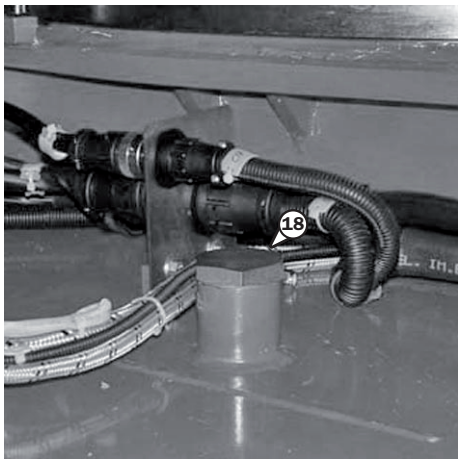


Screw the plug (Item 16) back into the hydraulic oil tank.



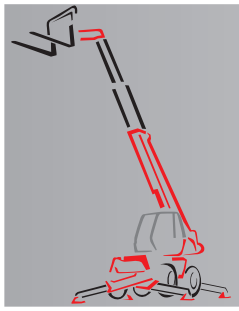
Fill the tank with hydraulic oil (see “LUBRICANTS” manual for the type and quantity).
The oil level is correct when it is between the upper and lower oil indicator marks (Item 17) located under the stepladder.

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Bleed the hydraulic transmission system and screw the plug (Item 18) back in.

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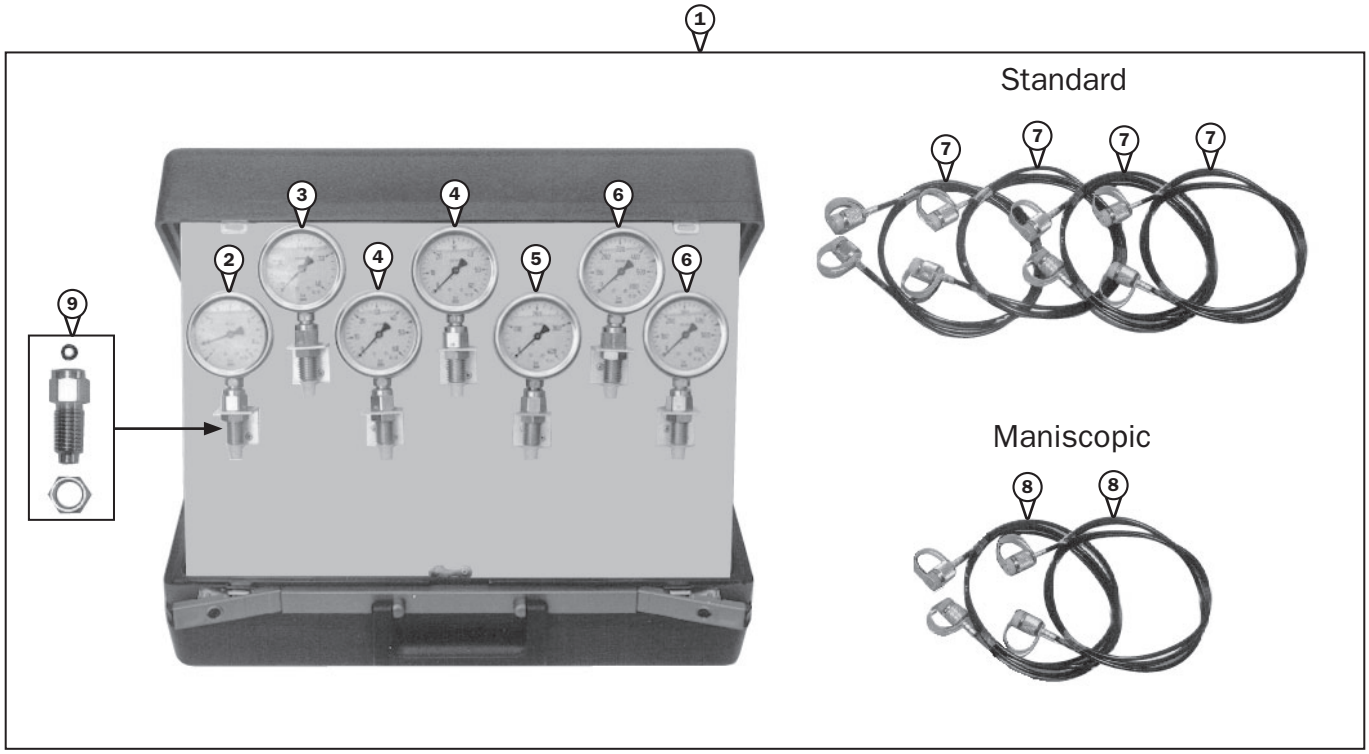
SPECIFIC TRANSMISSION TOOLING

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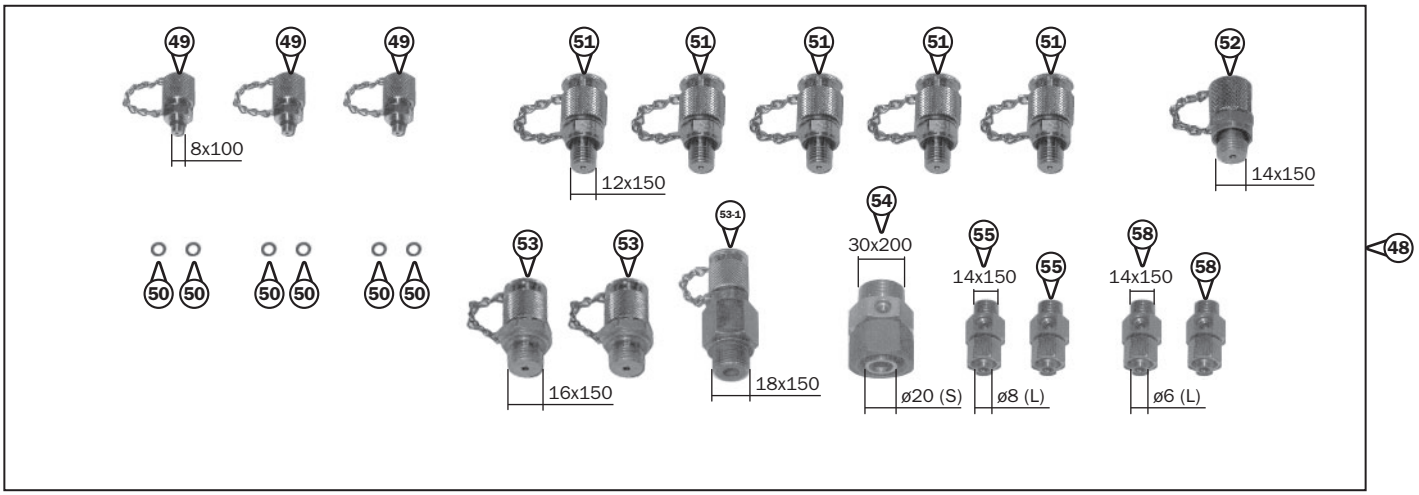
BASIC GEARBOX 2

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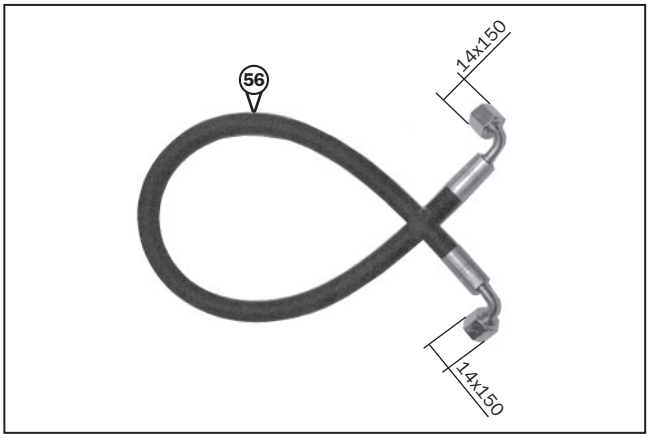
BASIC GEARBOX



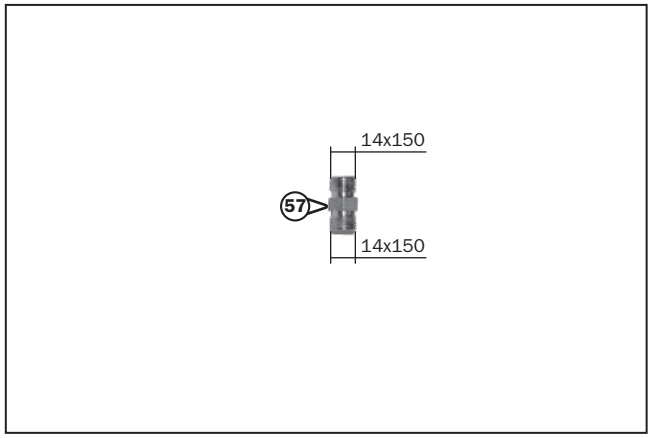
Hydromatik Kit – Assembly 2 - Pump A 4 VG - DA / Engine A 6 VM - DA



Flexible tube (Bypass valve TH7)



Nipple (Valve with flexible hose TH7)



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Ref	Number	Description	QT.
1	**549 671**	**Basic gearbox**	**1**
2	549 882	Manometer 1/9 bar	1
3	549 883	Manometer 0/40 bar	1
4	549 884	Manometer 0/60 bar	2
5	549 885	Manometer 0/400 bar	1
6	549 886	Manometer 0/600 bar	2
7	549 887	Flexible tube	4
8	549 888	Flexible tube for MANISCOPIC	2
9	549 889	Attachment for manometer	7
48	**209 572**	**HYDROMATIK kit**	**1**
49	58 181	Attachment for manometer 8x100	3
50	58 197	O-ring dia. 8	6
51	477 484	Attachment for manometer 12x150	5
52	58 189	Attachment for manometer 14x150	1
53	477 485	Attachment for manometer 16x150	2
53-1	199 175	Attachment for manometer 18x150	1
54	173 568	Connector ø 20	1
55	165 711	Adaptor M/F - dia.8L + M8x100	2
58	706 653	Adaptor M/F - dia.6L + M8x100	2
		By-pass valve TH7	
56	191 000	Flexible tube	1
57	491 632	Connector (M14x150)	1

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AXLE

- ***AXLE REMOVAL***
- ***AXLE REFIT***
- ***CHARACTERISTICS AND SPECIFICATIONS***
- ***COMPONENTS CONTROLS ADJUSTMENT***

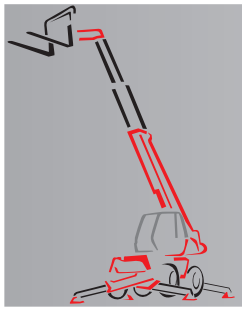
547983EN

(Dana M0212S20 axle)

30

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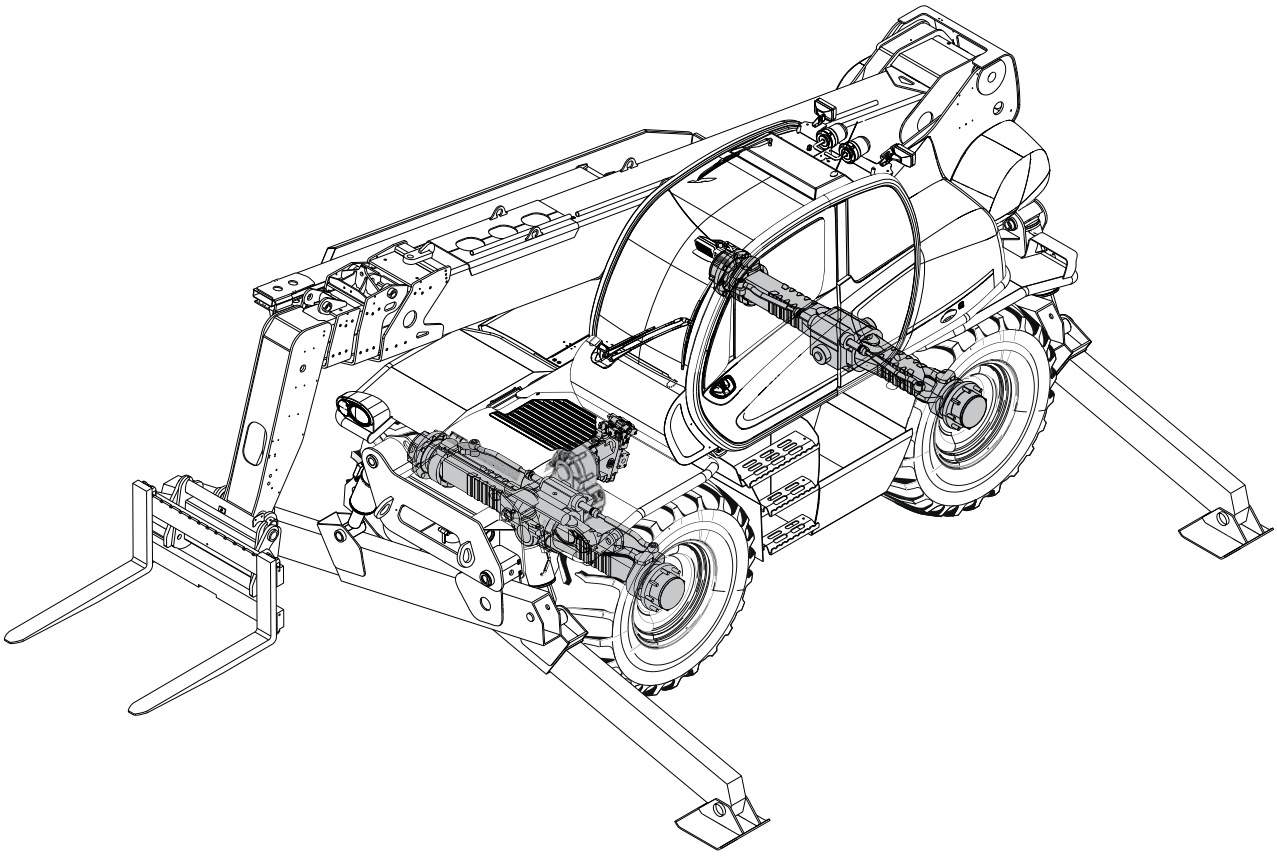
AXLE REMOVAL

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REAR AXLE REMOVAL 6

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FRONT AND REAR AXLES, AND HYDROSTATIC MOTOR REMOVAL



GENERAL INFORMATION

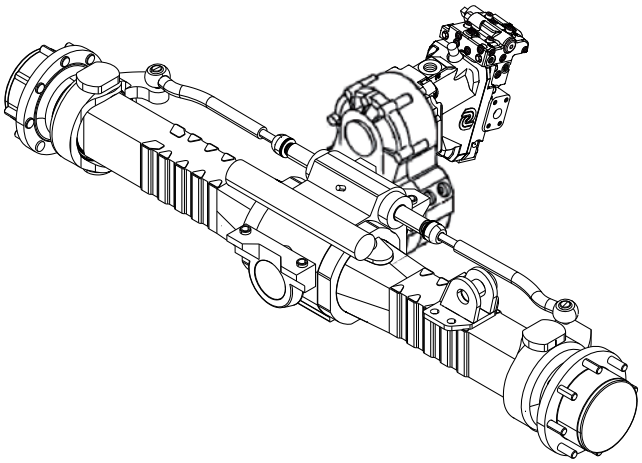
To reach the various components, the order of removal must be observed.

PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface and level it (frame parallel to the front axle).
Support the stabilizers to ensure maximum stability and safety, bringing it to the necessary height to remove the wheels and stop the IC engine.

Special instruments:
- Lifting crane (5000 kg. minimum).

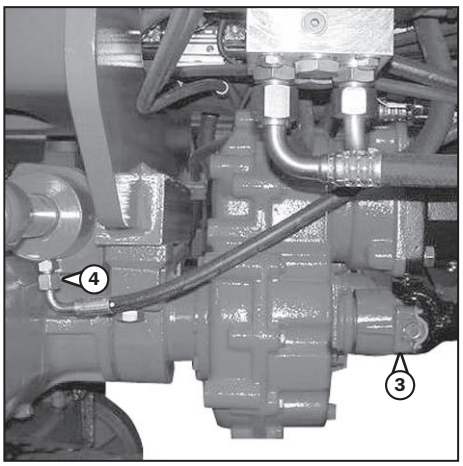
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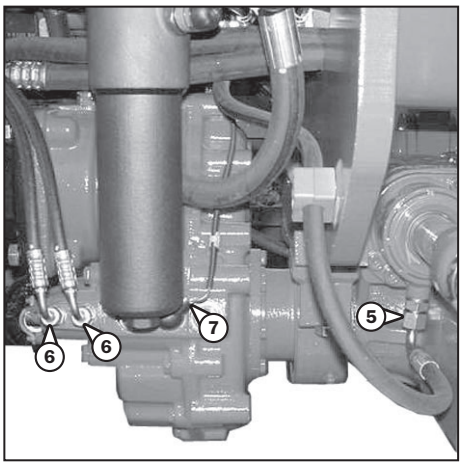


FRONT AXLE AND HYDROSTATIC MOTOR REMOVAL

Unscrew all the nuts (Item 1) and remove the 2 front tyres (Item 2).

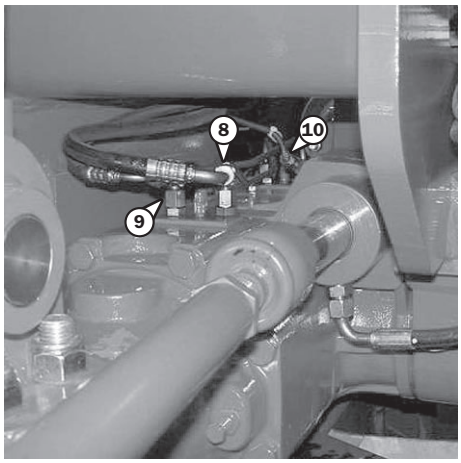


Unscrew the flange fixing screws (Item 3) on the cardan shaft and disconnect the shaft.
Disconnect the tube (Item 4) (on the left side of the axle) associated with operation of the steering.

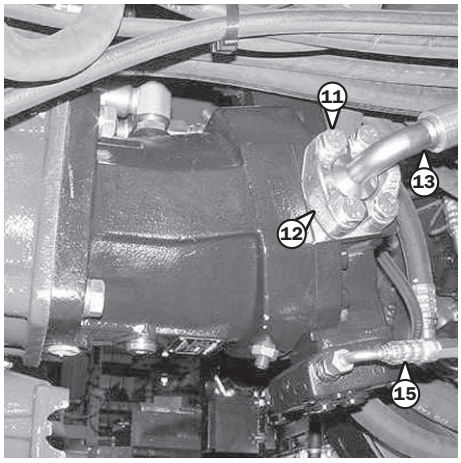


Disconnect the tube (Item 5) (on the right side of the axle) associated with operation of the steering.
Disconnect the 2 tubes (Item 6).
Disconnect the electrical connection (Item 7).

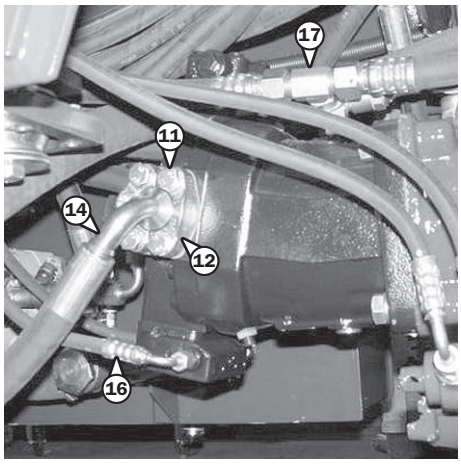
https://truckmanualshub.com/



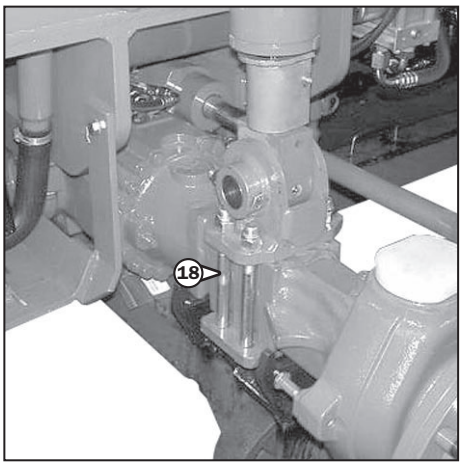
Disconnect the 2 tubes (Item 8 and 9) associated with operation of the road brakes and parking brake.
Disconnect the electrical connection (Item 10) of the wheel alignment sensor.



Unscrew the 8 connecting screws (Item 11) of the 4 flanges (Item 12), located on both sides of the hydrostatic motor and disconnect both the tubes (Item 13 and 14).
Disconnect the hydraulic pipes (Item 15 and 16).

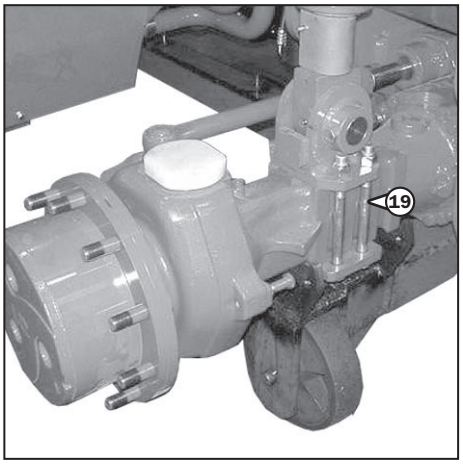


Disconnect the tubes from the “T” connector (Item 17) and disconnect the electrical connection from the connector.

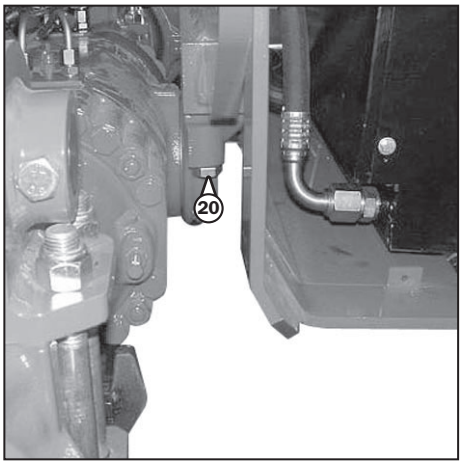


Secure the front axle and hydrostatic motor to an overhead crane or hoist adequate for the weight to be lifted.
Unscrew the 4 screws (Item 18) that fix the axle to the left levelling jack.

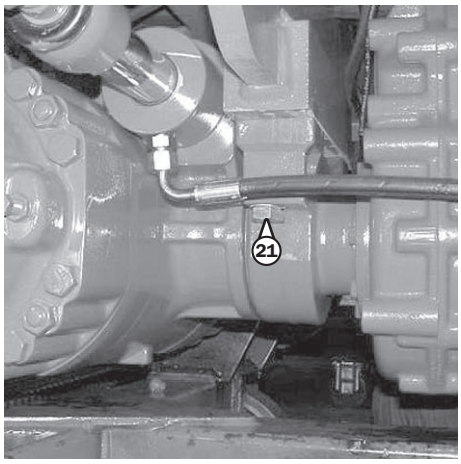
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Unscrew the 4 screws (Item 19) that fix the axle to the right levelling jack.



Unscrew the screws (Item 20) that fix the front axle to the front side frame.

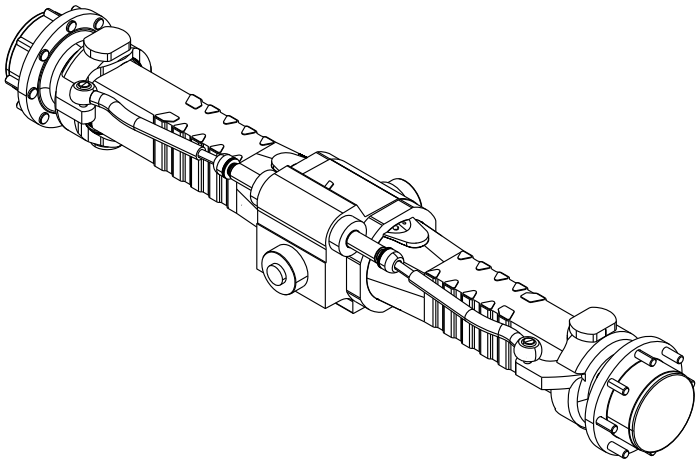


Unscrew the screws (Item 21) that fix the front axle to the rear side frame.

Remove the front axle and hydrostatic motor.

Plug all the hydraulic orifices of the hydrostatic motor and axle to prevent impurities from contaminating the hydraulic system.

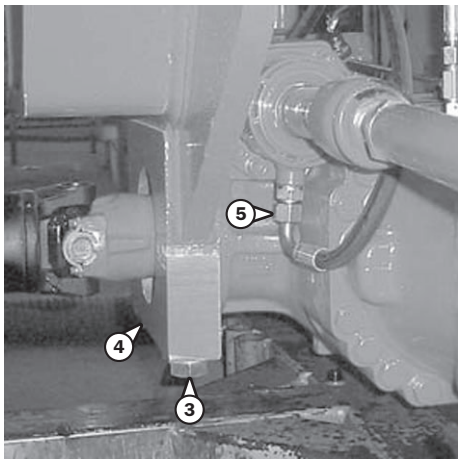
https://truckmanualshub.com/



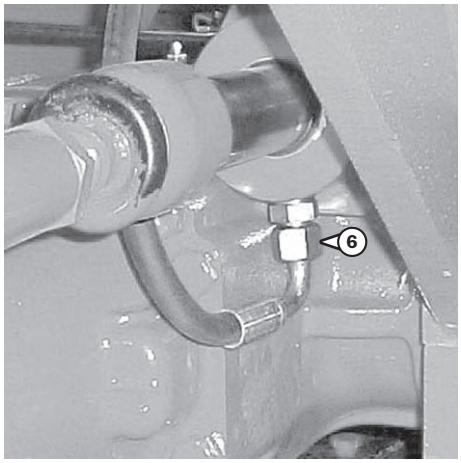


REAR AXLE REMOVAL

Unscrew all the nuts (Item 1) and remove the 2 rear tyres (Item 2).

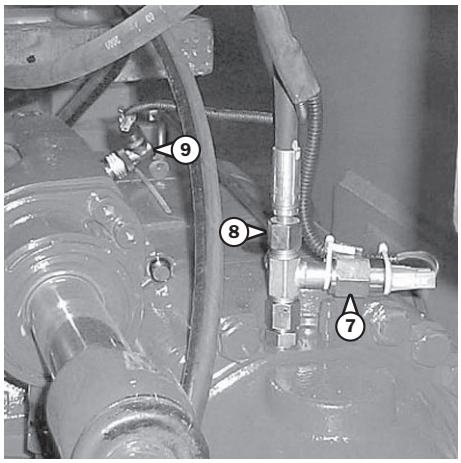


Unscrew the fixing screws (Item 3) of the cardan shaft flange (Item 4) and disconnect the shaft.
Disconnect the tube (Item 5) (on the left side of the axle) associated with operation of the steering.

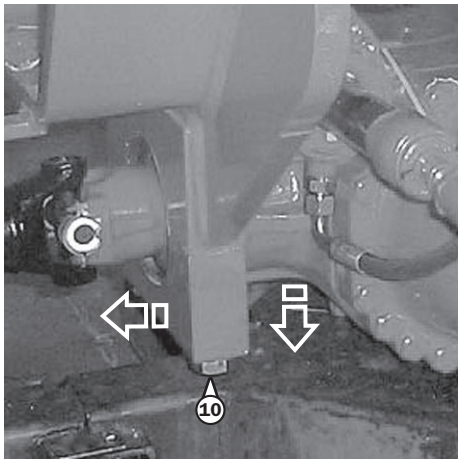


Disconnect the tube (Item 6) (on the right side of the axle) associated with operation of the steering.

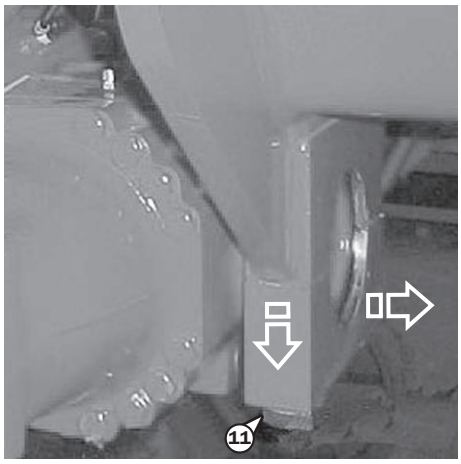
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Disconnect the electrical connection (Item 7) of the brake light.
Disconnect the tube (Item 8) associated with the road brakes.
Disconnect the electrical connection (Item 9) of the wheel alignment sensor.



Secure the rear axle to an overhead crane or hoist adequate for the weight to be lifted.
Unscrew the screws fixing the rear axle to the front side frame (Item 10), taking care to mark the bracket and frame for correct refitting.



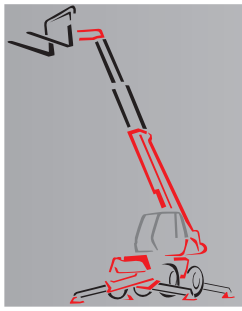
Unscrew the screws fixing the rear axle to the front side frame (Item 11), taking care to mark the bracket and frame for correct refitting.

Remove the rear axle.

Plug all the hydraulic orifices of the axle to ensure that no impurities can contaminate the hydraulic system.

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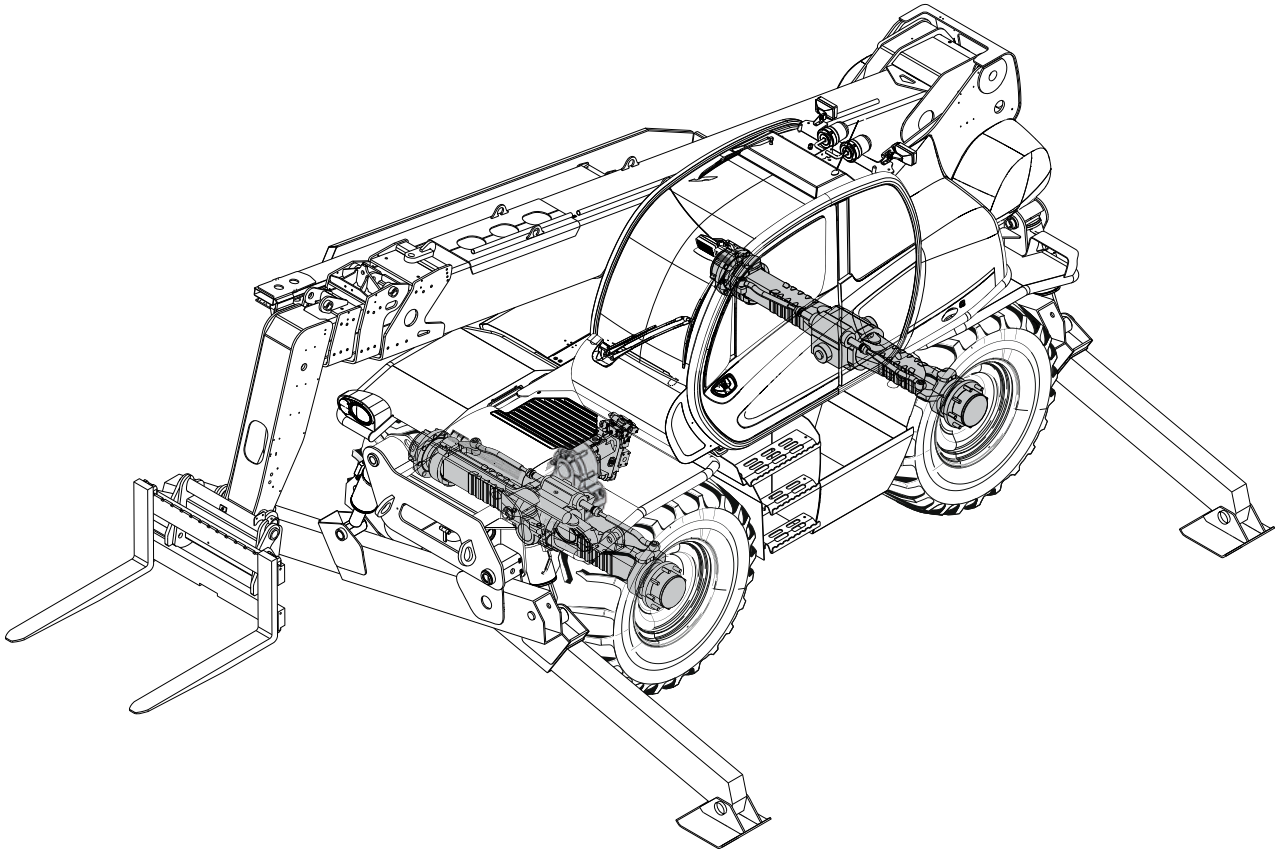
AXLE REFIT

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FRONT AXLE AND HYDROSTATIC MOTOR REFIT 5

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FRONT AND REAR AXLES, AND THE HYDROSTATIC MOTOR REFIT



GENERAL INFORMATION

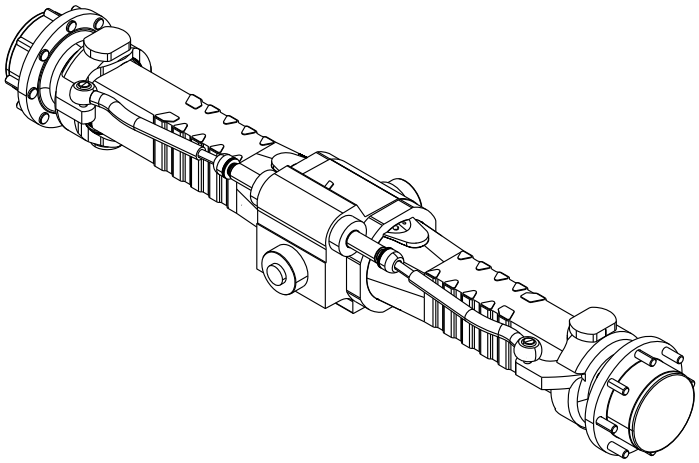
To reach the various components, the order of removal must be observed.

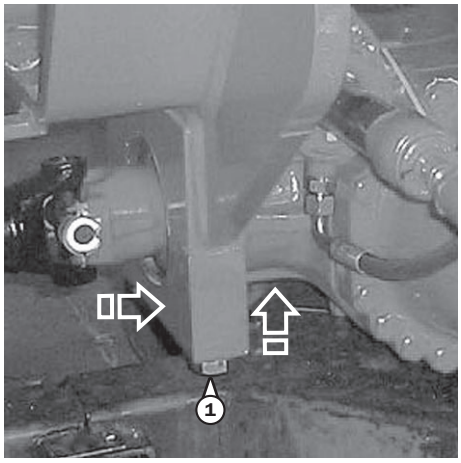
PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface and level it (frame parallel to the front axle).
Support the stabilizers to ensure maximum stability and safety, bringing it to the necessary height to remove the wheels and stop the IC engine.

Special instruments:
- Lifting crane (5000 kg. minimum).

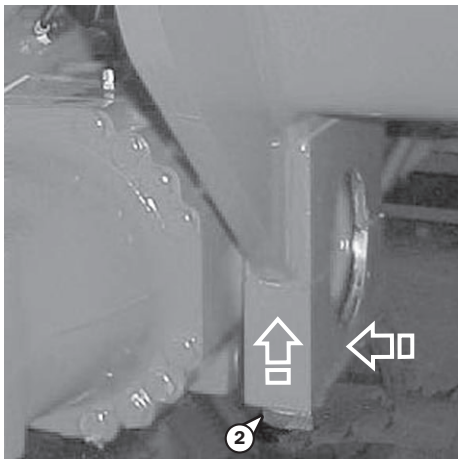
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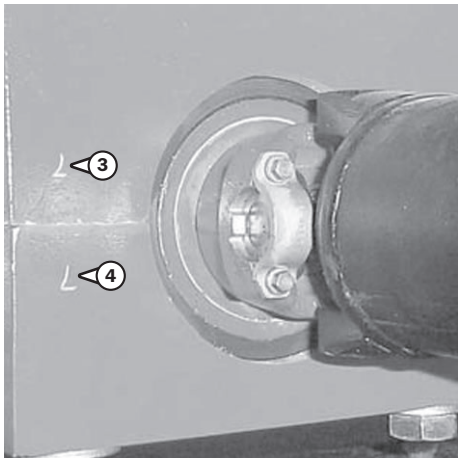


REAR AXLE REFIT

Bring the rear axle into correspondence with its original positional and hold it steady.
Connect the axle to the front side frame by means of the screws (Item 1).

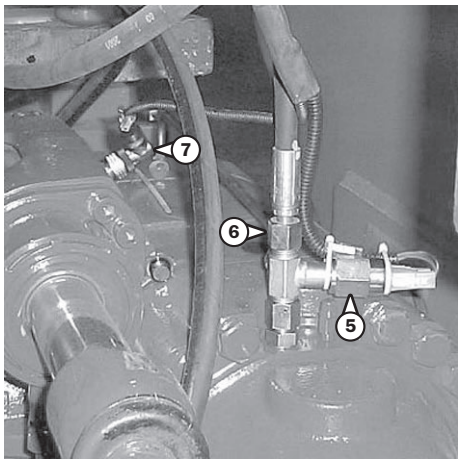


Connect the axle to the rear side frame by means of the screws (Item 2).

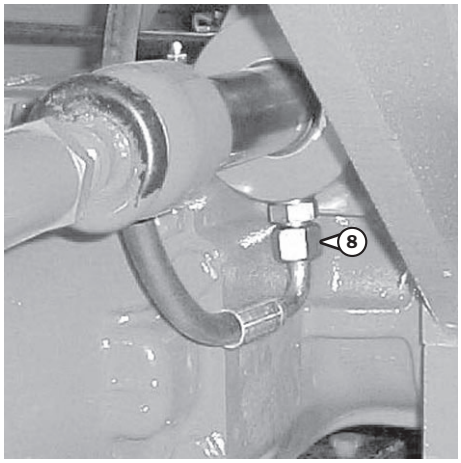


Before connecting it, ensure that the reference (Item 3) punched on the frame corresponds with the reference (Item 4) of the bracket.

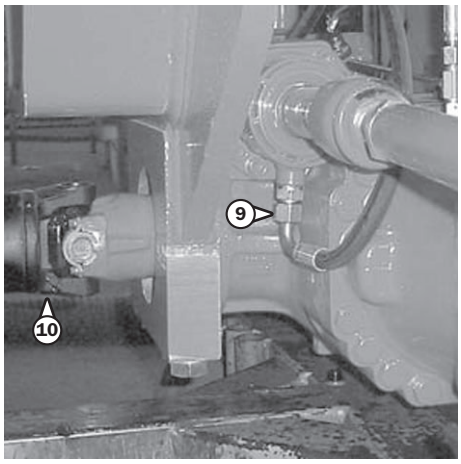
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Reconnect the electrical connection (Item 5) of the brake light.
Reconnect the tube (Item 6) associated with operation of the road brakes.
Reconnect the electrical connection (Item 7) of the wheel alignment sensor.



Reconnect the tube (Item 8) (on the left side of the axle) associated with operation of the steering.



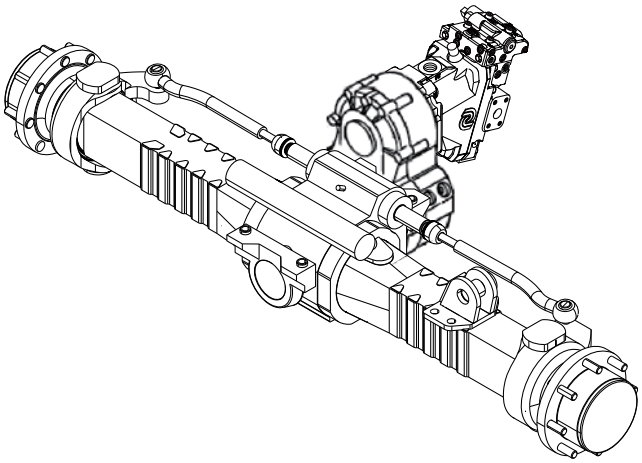
Reconnect the tube (Item 9) (on the left side of the axle) associated with operation of the steering.

Reconnect the cardan shaft (Item 10) in its predefined position using loctite 270 to lock the screws.

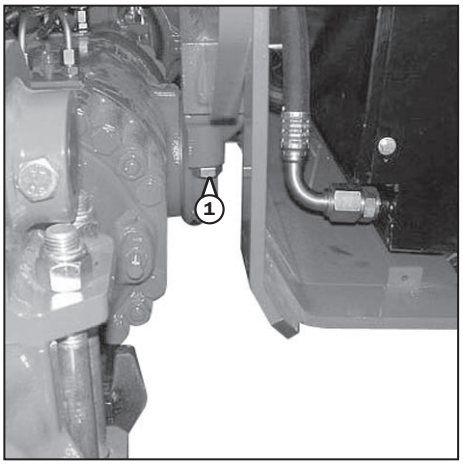


Refit the 2 rear tyres (Item 11) using a tightening torque for the nuts (Item 12) of 740 Nm.

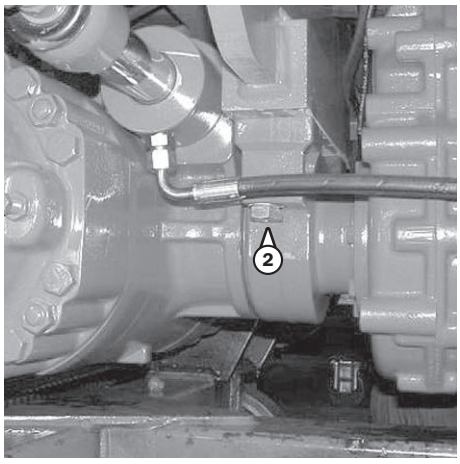
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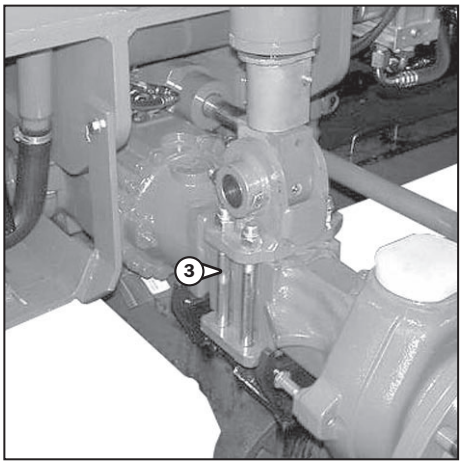
FRONT AXLE AND HYDROSTATIC MOTOR REFIT



Bring the rear axle and hydrostatic motor into correspondence with their original position and hold them steady.
Connect the axle to the frame using the screws (Item 1) on the front side.

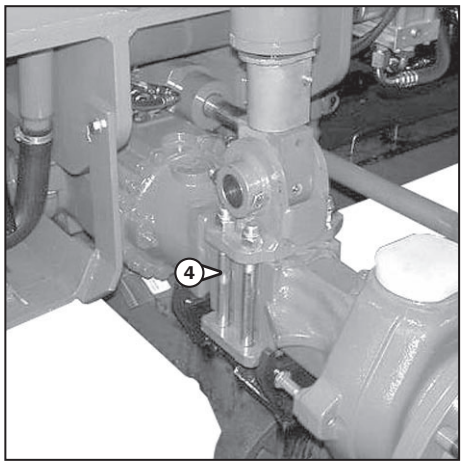


Connect the axle to the frame using the screws (Item 2) on the rear side.

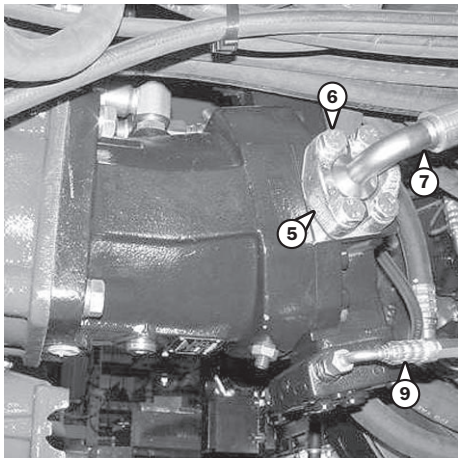


Connect the right levelling jack to the axle by means of the screws (Item 3).

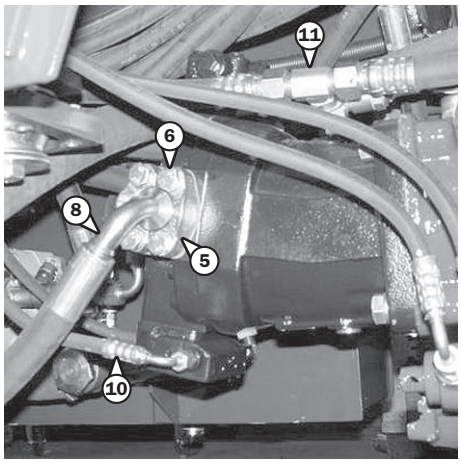
https://truckmanualshub.com/



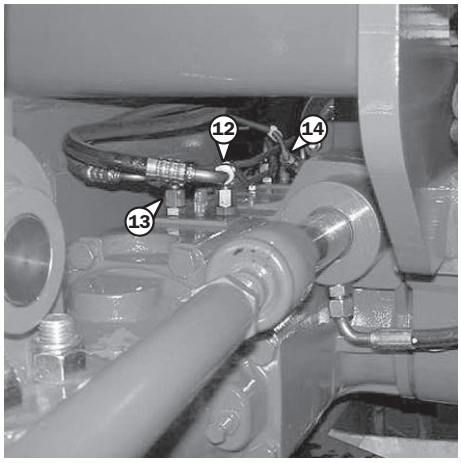
Connect the left levelling jack to the axle by means of the screws (Item 4).



Refit the 4 flanges (Item 5) located on both sides of the hydrostatic motor, screw in the 8 screws (Item 6) and reconnect the 2 tubes (Item 7 and 8).
Reconnect the hydraulic pipes (Item 9 and 10).

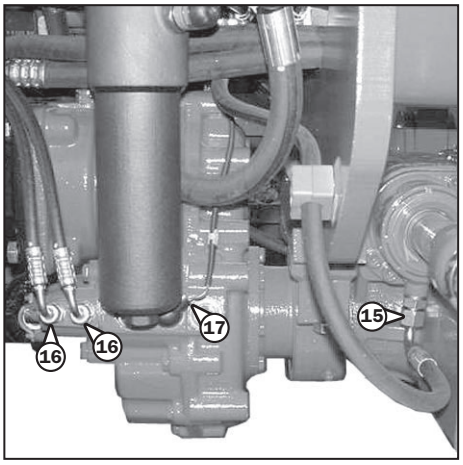


Reconnect the tubes to the “T” connector (Item 11) and reconnect the electrical connection to the connector itself.

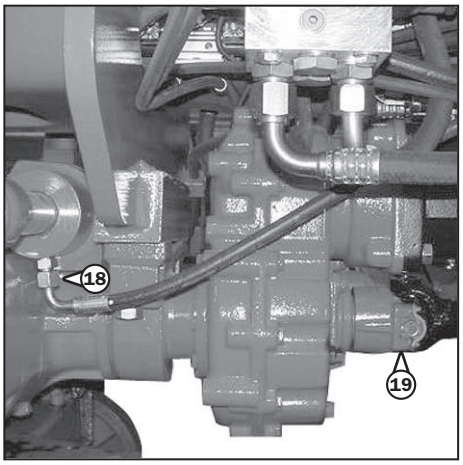


Reconnect the 2 tubes (Item 12 and 13) associated with operation of the road and parking brakes.
Reconnect the electrical connection (Item 14) of the wheel alignment sensor.

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Reconnect the tube (Item 15) (on the right side of the axle) associated with operation of the steering.
Reconnect the 2 tubes (Item 16).
Reconnect the electrical connection (Item 17).



Reconnect the tubes (Item 18) (on the left side of the axle) associated with operation of the steering.
Reconnect the cardan shaft in its predefined position, using loctite 270 to lock the flange screws (Item 19).



Refit the 2 front tyres (Item 20) using a tightening torque for the nuts (Item 21) of 740 Nm.

Before returning the truck to service, remember to check the efficiency of the brakes and, if necessary, bleed the system.

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BRAKE

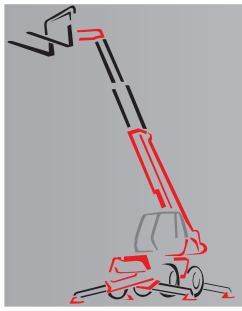
- ***BRAKE CONTROL AND ADJUSTMENT***

- ***BRAKE SPECIFIC TOOLING***



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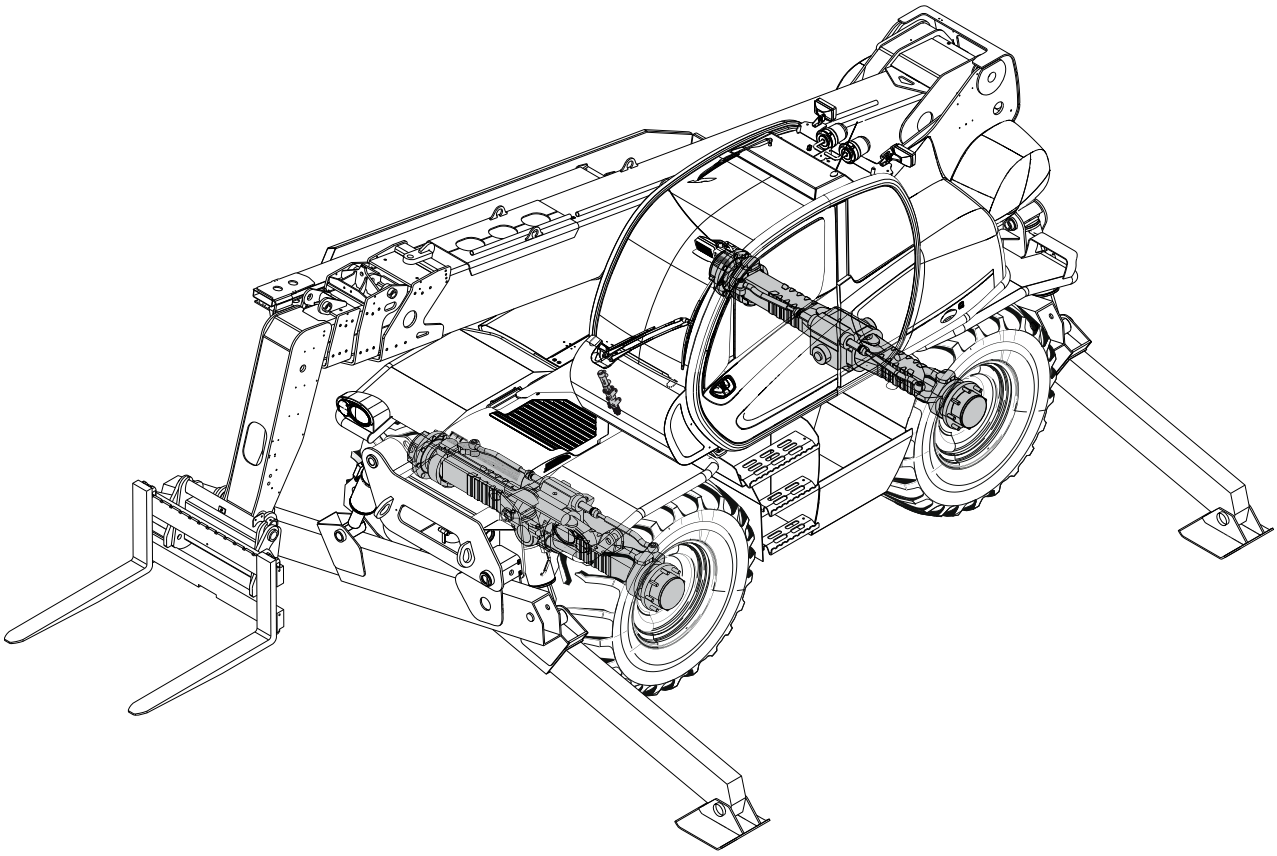
BRAKE CONTROL AND ADJUSTMENT

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PROCEDURE FOR BLEEDING THE BRAKES 3
DIAGRAM OF BRAKE SYSTEM 5
SETTING THE TRUCK AND INCHING PARAMETERS MRT EURO 3 PRIVILEGE SAUER DANFOSS 7
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BLEEDING THE BRAKES AND ADJUSTING INCHING



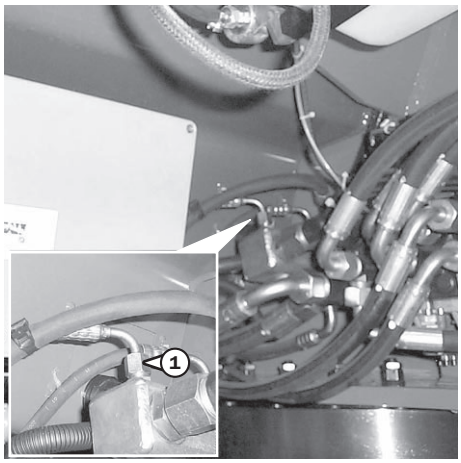
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PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface and stop the IC engine.

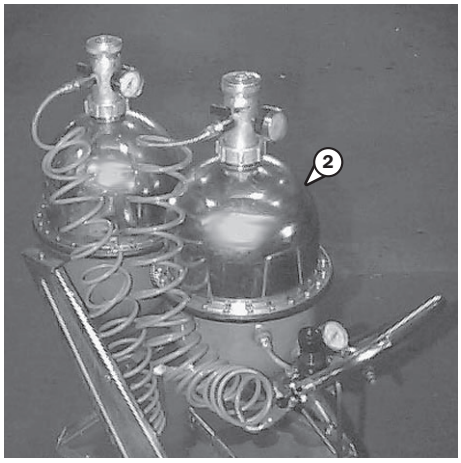
Special instruments:
- Bleeding device.

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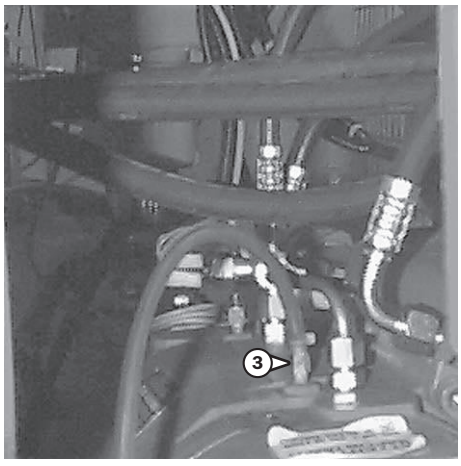


PROCEDURE FOR BLEEDING THE BRAKES

Disconnect the drain tube (Item 1) from the brake fluid reservoir and insert a water tight plug.
Fill the brake fluid reservoir completely.



Connect the brake bleeding device (Item 2) to the tank S (see “Diagram of brake system”), located on the dashboard.

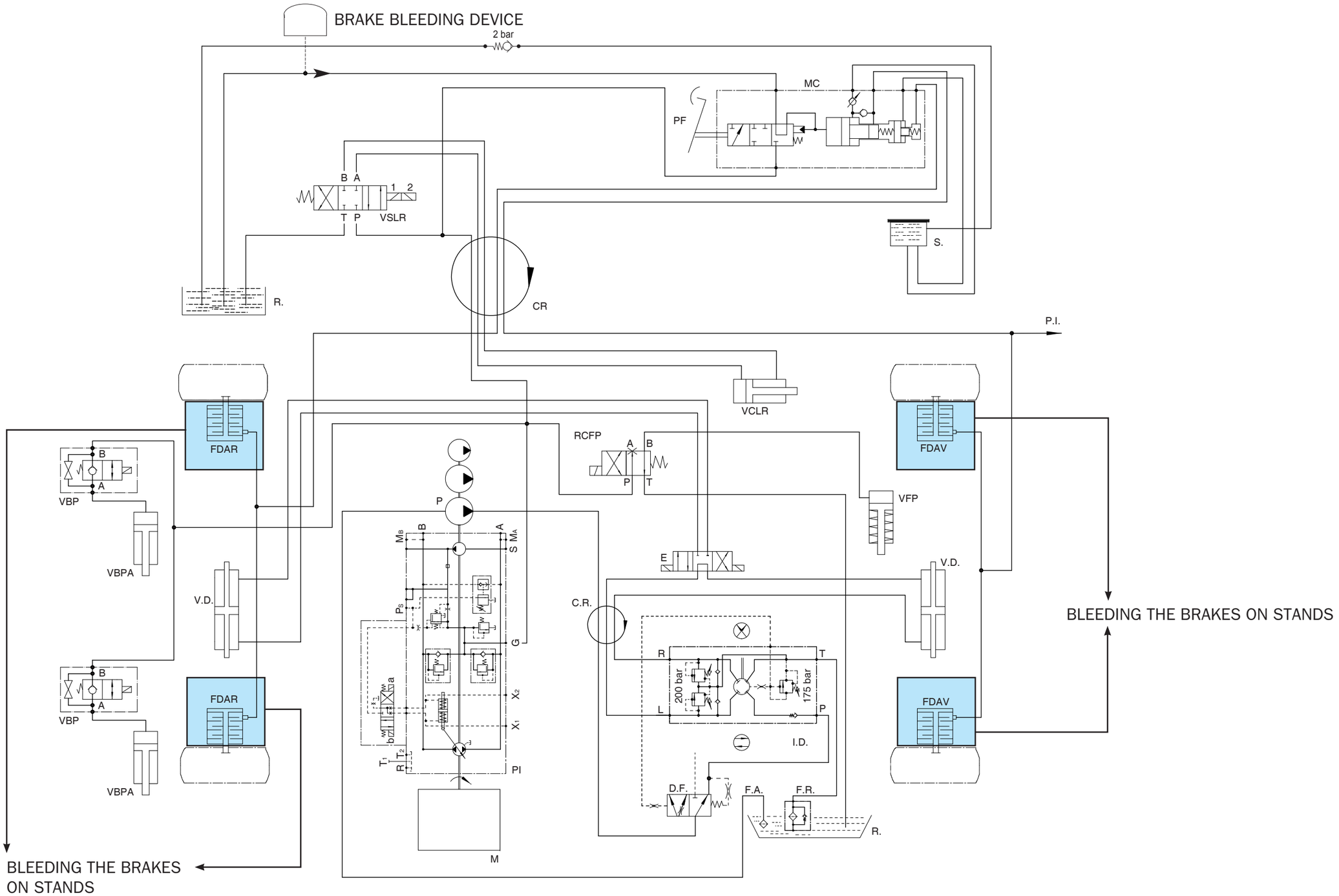


Slacken the 2 bleed screws (Item 3) located on the rear axle and connect the transparent tubes.
Pressurise the brake bleeding device and wait until all the air has passed through the transparent tubes.
Retighten the 2 bleed screws (Item 3) on the rear axle.
Repeat the above procedure for the front axle.
Also ensure that the stroke of the brake pump is normal.
If it is not, adjust the brakes on both axles
(see procedure in the section REMOVING THE AXLES).
- When the brake bleeding procedure has ended, reconnect the hydraulic pipe (Item 1) to the drain manifold.

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DIAGRAM OF BRAKE SYSTEM



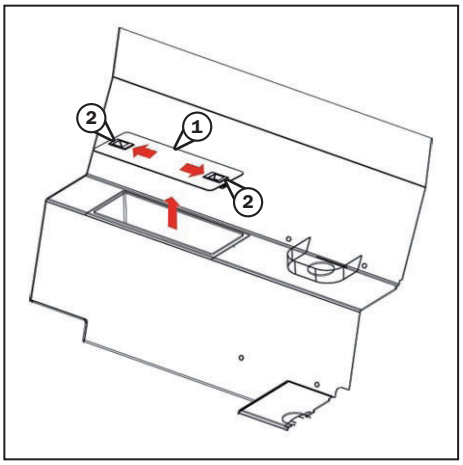
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SETTING THE TRUCK AND INCHING PARAMETERS MRT EURO 3 PRIVILEGE SAUER DANFOSS

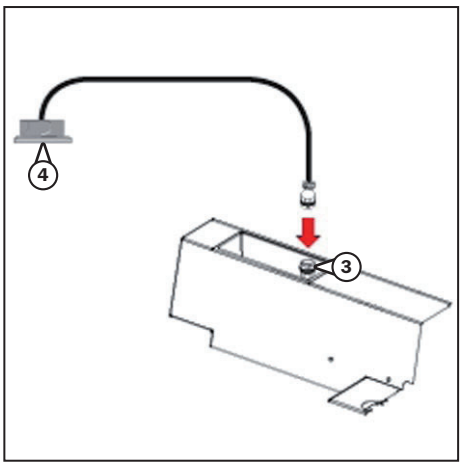
EQUIPMENT REQUIRED FOR SETTING

Connecting cable for diagnostic unit socket.
Connecting cable for diagnostic unit socket/computer.
Computer with the “PLUS+1 GUIDE Service Tool” program installed.



INSTRUCTIONS FOR MAKING THE SETTINGS

Open the fuse box (Item 1) of the ADM diagnostic unit inside the cabin (behind the driver’s seat), using the two pushbutton catches (Item 2).



Connect the connector (Item 3) to the diagnostic socket on the diagnostic unit.

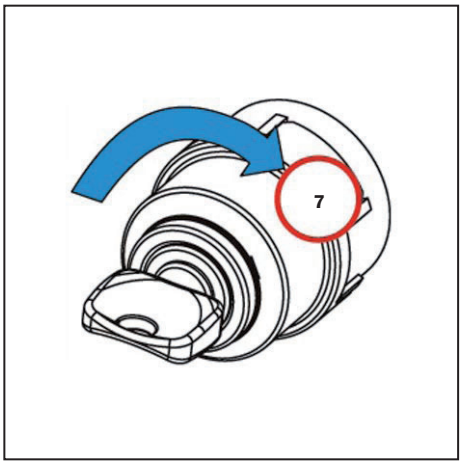


Connect the other end of the cable connected to the diagnostic socket on the diagnostic unit (Item 4) to the USB cable intended for the port on the laptop computer (Item 5).

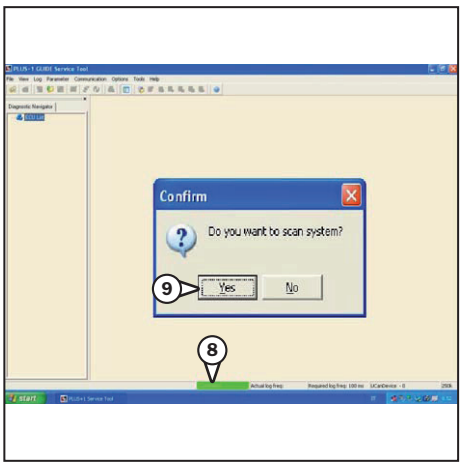
https://truckmanualshub.com/



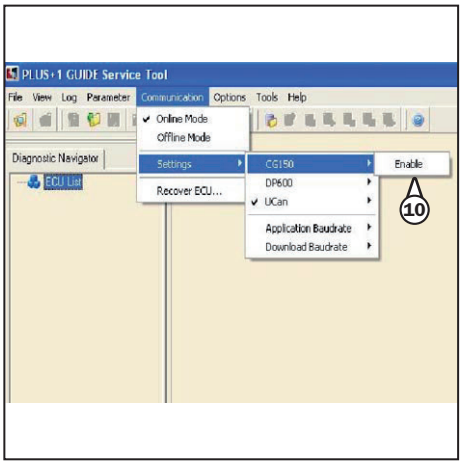
Switch on the laptop computer and launch the program by clicking on the “PLUS+1 GUIDE Service Tool” icon (Item 6).



Turn the ignition key (avoiding starting the engine) of the fork lift truck and turn it to position “1” (Item 7).

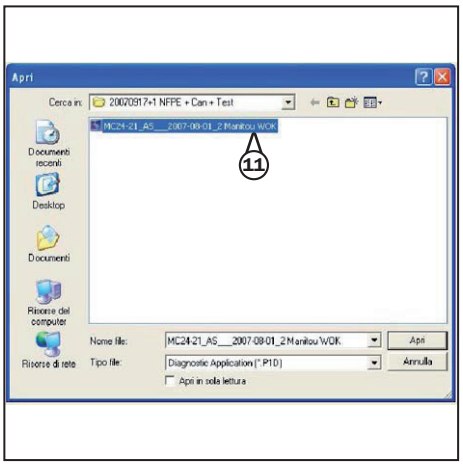


Check that the “Connect” (Item 8) command (shown in green) appears on the program screen (at the bottom).
When the “Confirm” window appears, confirm by selecting the “Yes” pushbutton (Item 9).

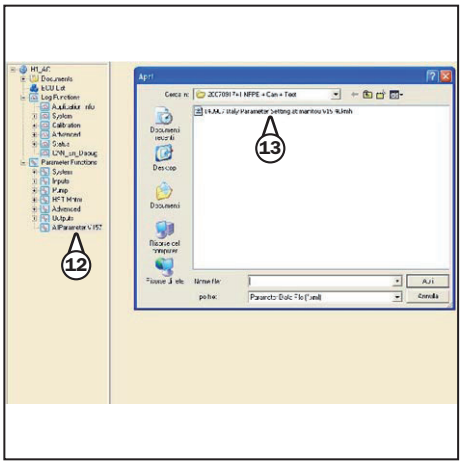


If the previous operation is not to be checked (connection to the fork lift truck) click on the “Communication”, “Settings”, “CG150” commands in succession and then “Enable” (Item 10).

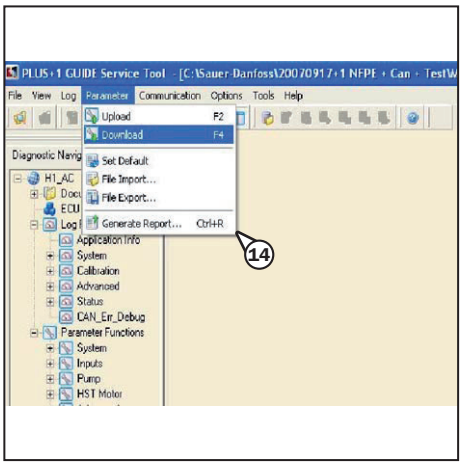
https://truckmanualshub.com/



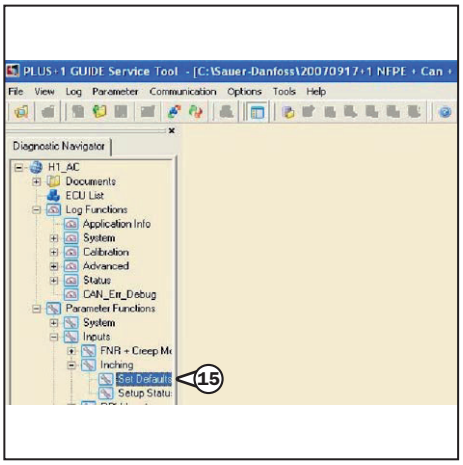
Then click on the “File”, “Open” commands in succession and select the file “101076602_S0168_D0001” (with extension *.P1D) (Item 11).
Confirm the choice by clicking on “Open” and wait for the data to load.



After loading the data, select the “Allparameter V157” command (Item 12) (on the left of the window).
Then click the “Parameter” and “File Import” commands in succession. Select the file “10107602_S0168_P0001 FINAL TESTING CENACCHI 28 NOVEMBER.xml” <u>for MRT Standard models</u>, or the file “10107602_S0168_P0001 FINAL TESTING MACHINE FOR GERMANY.xml” <u>for MRT TUV models</u> (Item 13).
Confirm the choice by clicking on “Open” and wait for the data to load.



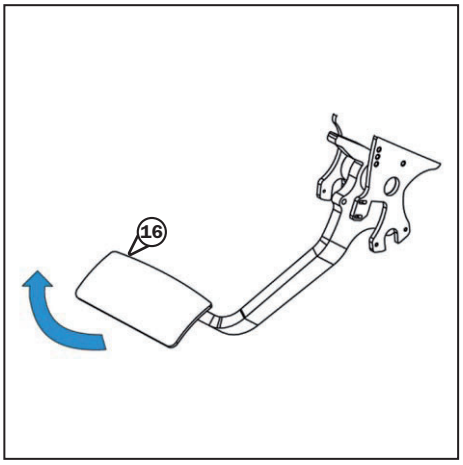
Click the “Parameter” and “Download” (Item 14) commands in succession to save the parameters in the diagnostic unit.



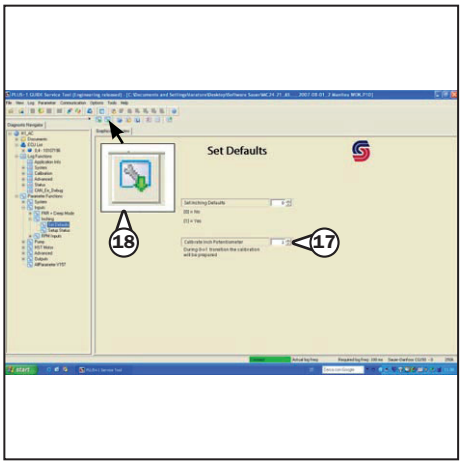
INSTRUCTIONS FOR CALIBRATING THE INCHING PEDAL

From the menu, select the “Parameter Function”, “Inputs”, “Inching”, “Set Defaults” commands in succession (Item 15).

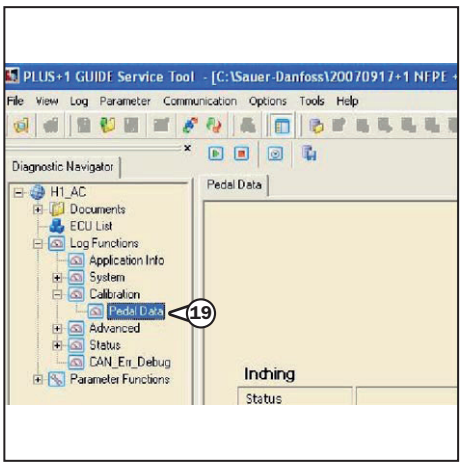
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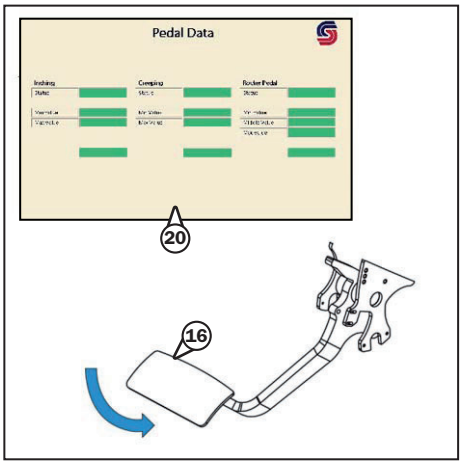
Check that the brake pedal (Item 16) is fully raised.



Select the command “1” of the item “Calibrate Inch Potentiometer” (Item 17).
Confirm the choice by clicking on “Download Parameters” (Item 18) and wait for the data to load.
Select the command “0” of the item “Calibrate Inch Potentiometer” (Item 17).
Confirm the choice by clicking on “Download Parameters” (Item 18) and wait for the data to load.

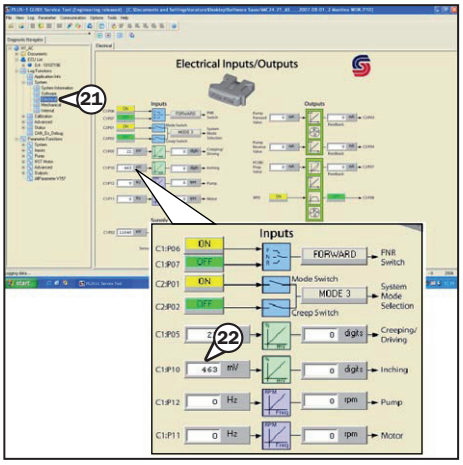


From the menu, select the “Log Function”, “Calibration”, “Pedal Data” (Item 19) commands in succession.

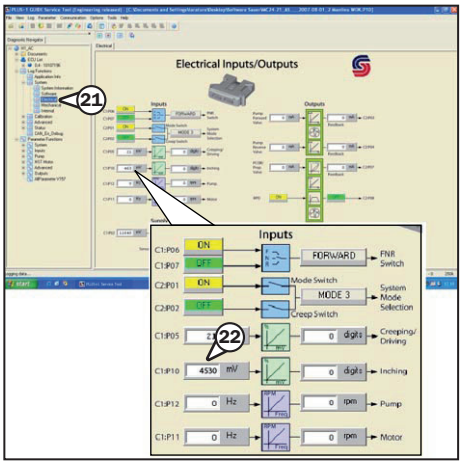


Press the “Start Logging” pushbutton (at the top of the program), press the brake pedal fully down (Item 16), and wait for about three seconds unit calibration is complete (visible from the green icon on the screen).
Refer back to the “All Parameter V157” diagram (Item 12).
Confirm the choice by clicking on “Download Parameters” and wait for the parameters to be saved (Item 20).

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From the menu, select the “Log Function”, “System”, “Electrical”, commands in succession (Item 21).
With the brake pedal fully raised, check that the value displayed in the inching pedal window (Item 22) is between 450 and 550 mV.



With the brake pedal fully depressed, check that the value displayed in the inching pedal window inching (Item 22) is between 4400 and 4700 mV.

If the values displayed are not within the ranges indicated above, adjust the mechanics of the inching potentiometer on the brake pedal. If when pressing the brake pedal the values displayed do not change, check the electrical connections to the inching potentiometer.

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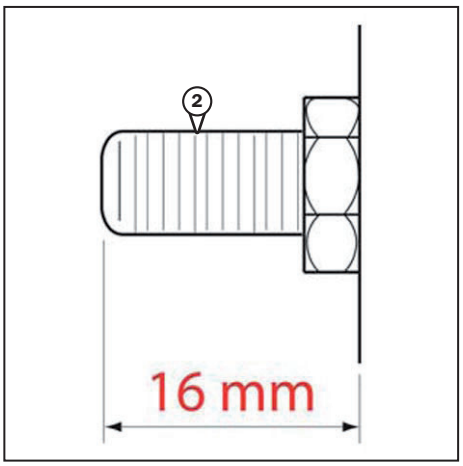
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SETTING THE TRUCK AND INCHING PARAMETERS MRT EURO 3 PRIVILEGE REXROTH

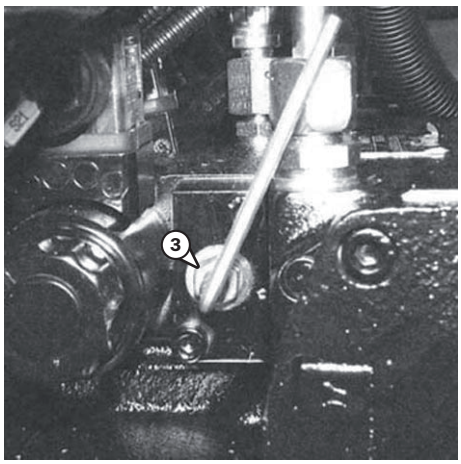


ADJUSTING THE INCHING CLEARANCE ON REXROTH PUMP

Remove the protective cap (Item 1) on the inching adjustment screw.



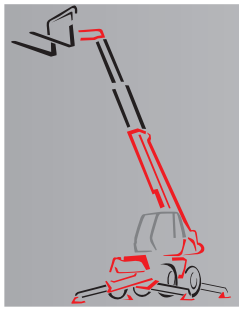
Ensure that the initial measurement of the screw (Item 2) is 16 mm.



Unscrew the locknut (Item 3) on the adjustment screw.

To inhibit the inching function, tighten the screw completely (Item 2).

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SPECIFIC BRAKE TOOLING

page

HYDRAULIC BRAKE BREATHER VALVE 2
PARKING BRAKE BREATHER VALVE WIRING 3

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HYDRAULIC BRAKE BREATHER VALVE



Breather valve complete with components necessary for venting hydraulic brake systems for all Manitou products

MANITOU part no.

Hhydraulic brake breather valve 554019

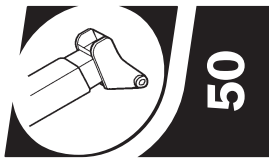
Spare parts:

- Maximum manometer 719980
- Minimum manometer. 719981
- Membrane 661913
- Brake pipe 661914

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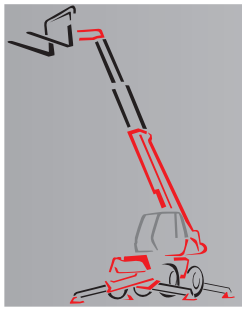
BOOM

- ***BOOM CONTROL AND ADJUSTMENT***
- ***BOOM REMOVAL***
- ***BOOM REFIT***



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BOOM CONTROL AND ADJUSTMENT

page

PREPARATION AND SAFETY INSTRUCTIONS 2

FEET ADJUSTMENT 3

– ARM FEET Ist EXTENSION ADJUSTMENT. 3

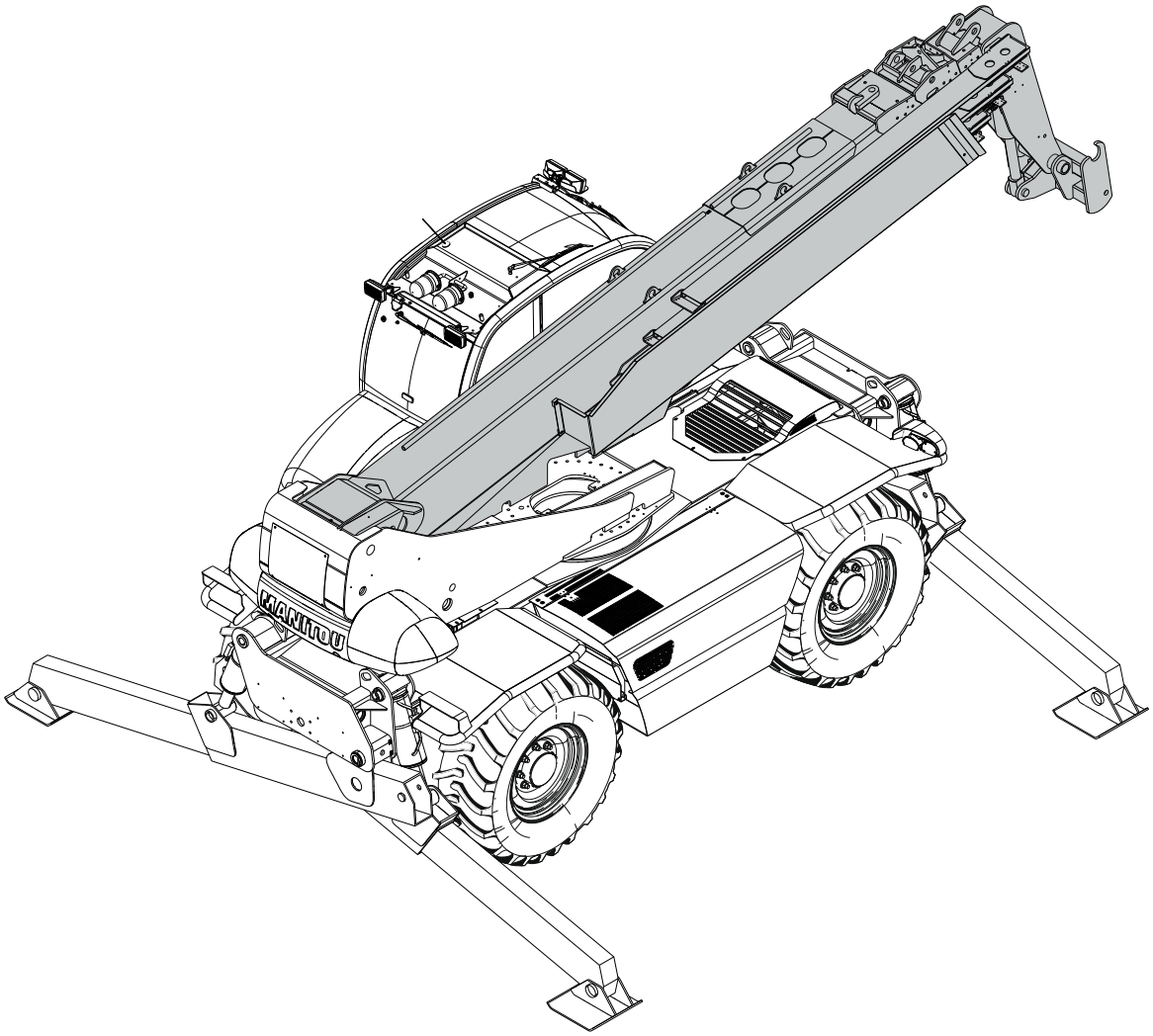
– ARM FEET IInd EXTENSION ADJUSTMENT. 4

– ARM FEET IIIrd EXTENSION ADJUSTMENT. 5

ARM CHAINS ADJUSTMENT 6

https://truckmanualshub.com/

PENTAGONAL TELESCOPIC ARM ADJUSTMENT



PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface, support the stabilisers to ensure maximum stability and safety (do not stop the engine).
If the arm has been removed, use a hydraulic power unit, connecting two tubes to the breather cylinder.

Execute the command to retract the arm to the end of the breather cylinder stroke.

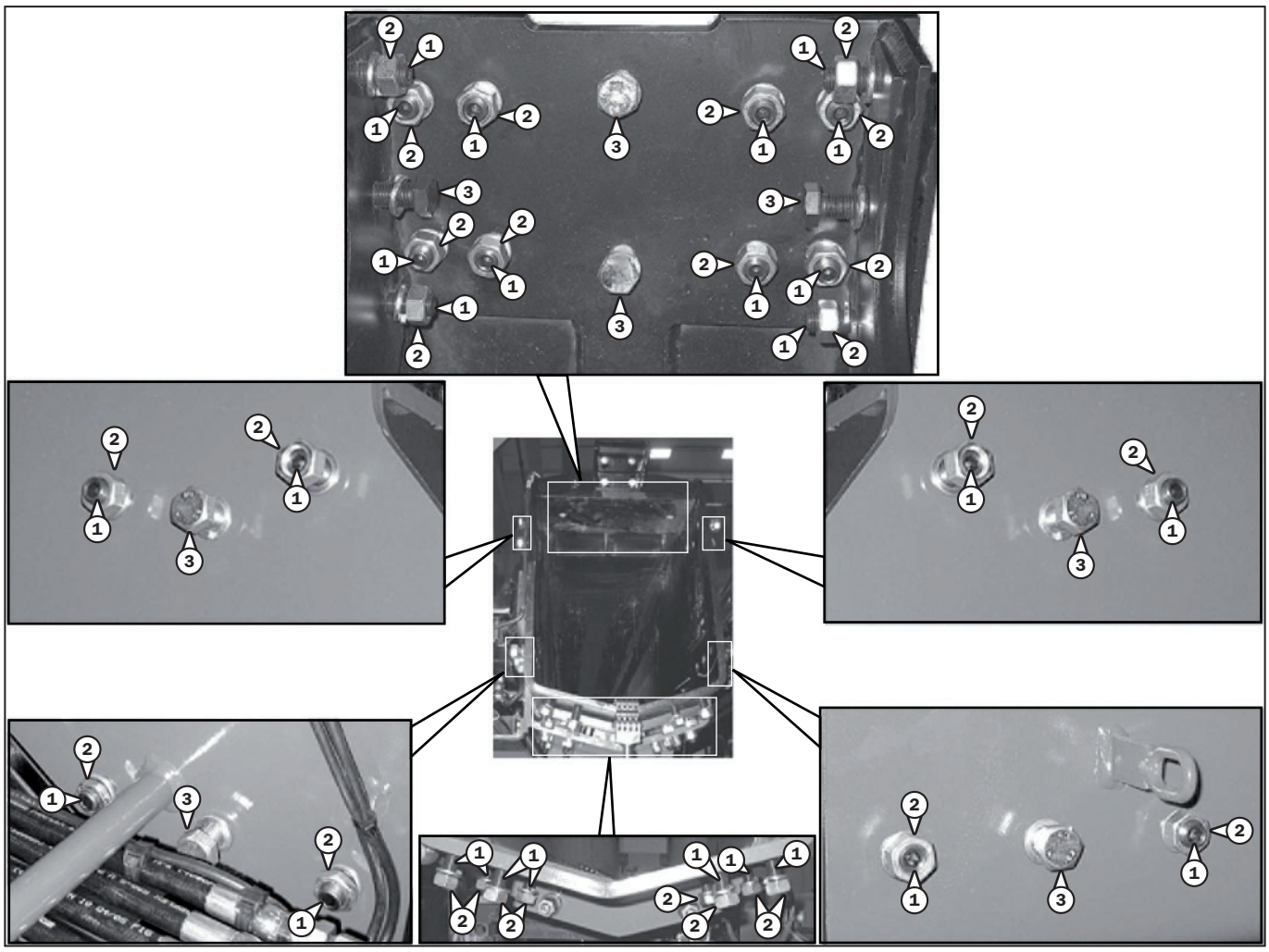
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FEET ADJUSTMENT

ARM FEET Ist EXTENSION ADJUSTMENT

From the rear to the front of the Ist extension arm, screw on the adjusting nuts (Item 1) to the end of the thread and then unscrew them about half a turn anticlockwise before tightening the lateral nuts (Item 2).
To secure the feet to the brackets, the nuts (Item 1) must be screwed on (without tightening them).
Tighten the nuts (Item 2) (keeping the grub screws fixed) and the screws (Item 3) that fix the foot-mounting brackets at the side to the outer arms to a torque of 100 Nm.
Check the correct operation of the arm by extending and retracting it.
If the arm is jerky, unscrew all the grub screws (Item 1) another half turn.
Check that no oil has been lost from the area behind the arm (extension actuator valve).

WARNING: the grub screws are sensitive to the slightest movement, therefore only tighten them when the play between the arms has been eliminated.

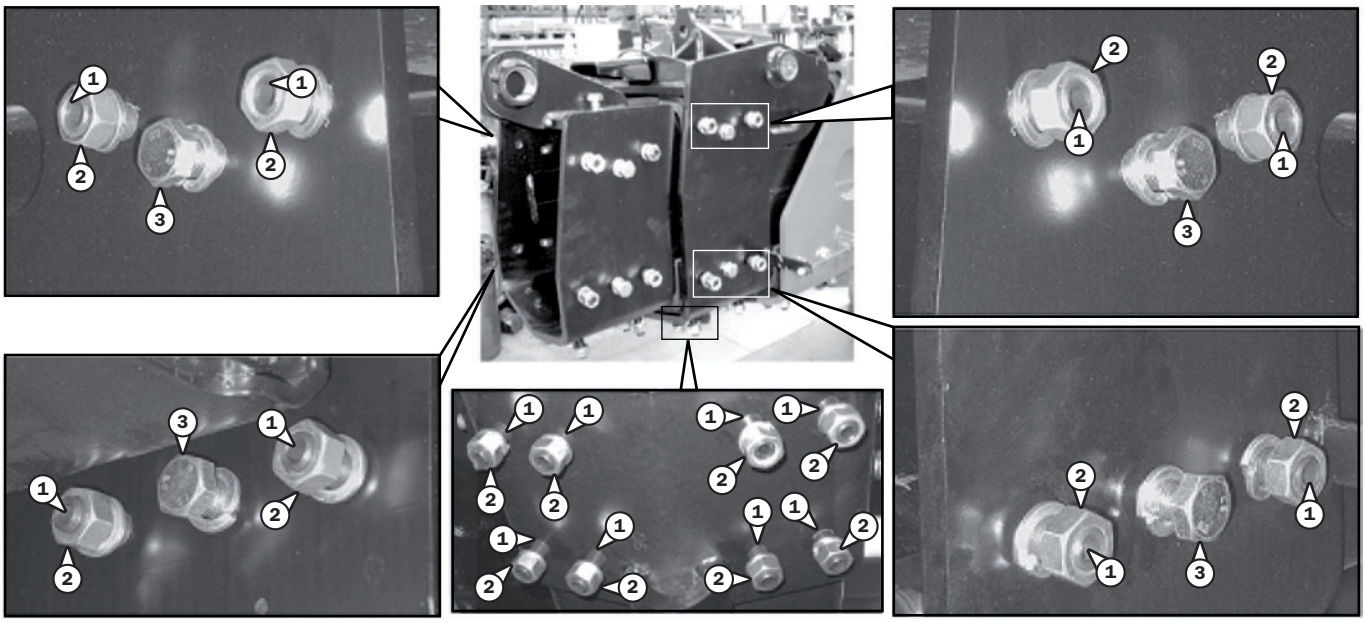


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ARM FEET IInd EXTENSION ADJUSTMENT

From the back of the IInd extension arm to the front of the Ist extension arm, screw in the adjusting grub screws (Item 1) to the end of their thread and then unscrew them about half a turn anticlockwise before tightening the lateral nuts (Item 2).
To secure the feet to the brackets, the nuts (Item 1) must be screwed on (without tightening them).
Tighten the nuts (Item 2) (keeping the grub screws fixed) and the screws (Item 3) that fix the foot-mounting brackets at the side to the outer arms to a torque of 100 Nm.
Check the correct operation of the arm by extending and retracting it.
If the arm is jerky, unscrew all the grub screws (Item 1) another half turn.
Check that no oil has been lost from the area behind the arm (extension actuator valve).

WARNING: the grub screws are sensitive to the slightest movement, therefore only tighten them when the play between the arms has been eliminated.

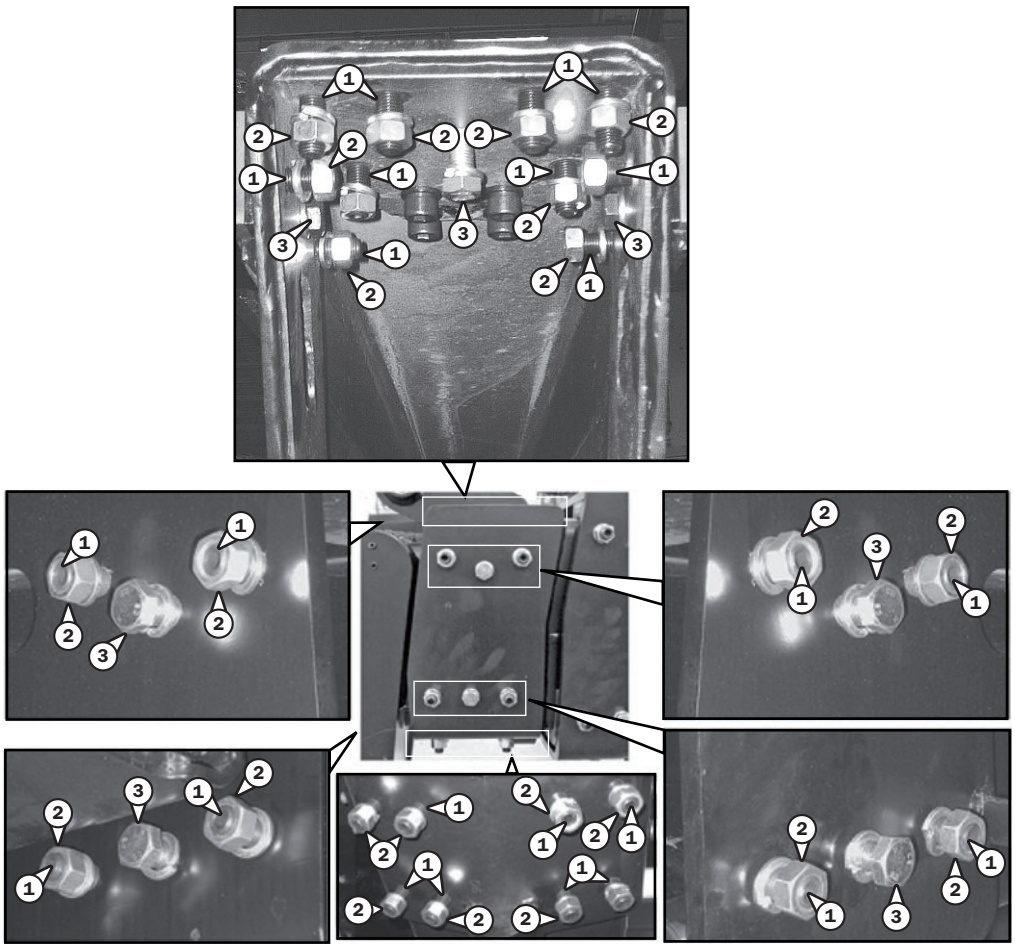


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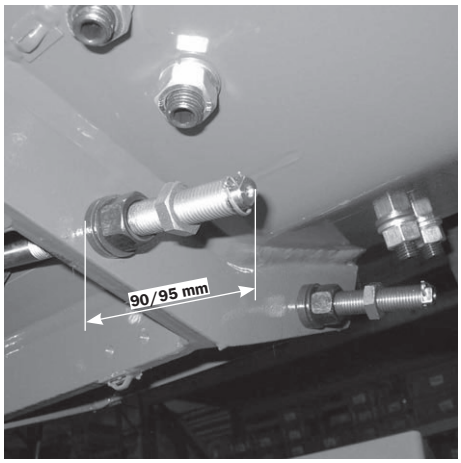
ARM FEET IIIrd EXTENSION ADJUSTMENT

From the back of the IIIrd extension arm to the front of the IInd extension arm, screw in the adjusting grub screws (Item 1) to the end of their thread and then unscrew them about half a turn anticlockwise before tightening the lateral nuts (Item 2).
To secure the feet to the brackets, the nuts (Item 1) must be screwed on (without tightening them).
Tighten the nuts (Item 2) (keeping the grub screws fixed) and the screws (Item 3) that fix the foot-mounting brackets at the side to the outer arms to a torque of 100 Nm.
Check the correct operation of the arm by extending and retracting it.
If the arm is jerky, unscrew all the grub screws (Item 1) another half turn.
Check that no oil has been lost from the area behind the arm (extension actuator valve).

WARNING: the grub screws are sensitive to the slightest movement, therefore only tighten them when the play between the arms has been eliminated.



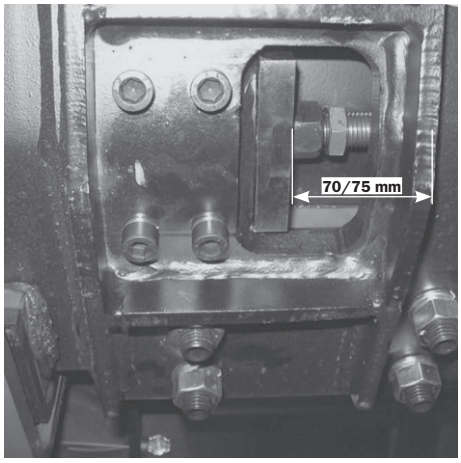
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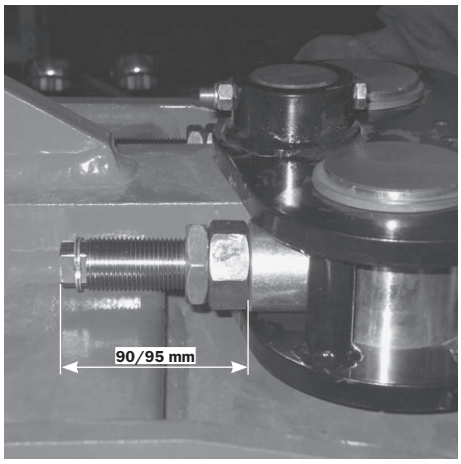
ARM CHAINS ADJUSTMENT

Pretension the internal chains by screwing down the nuts on the pull rods.
Note the values in the table below (the measurements may differ by 20-30 mm):

2 internal chains, 90/95 mm.

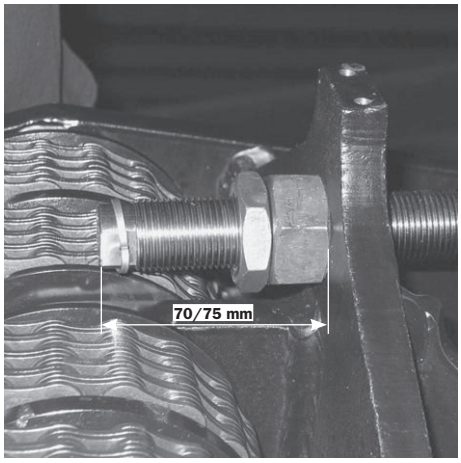


1 internal chain, 70/75 mm.



Pretension the external chains by screwing down the nuts on the pull rods.
Note the values in the table below (the measurements may differ by 20-30 mm):

4 external chains, 90/95 mm.



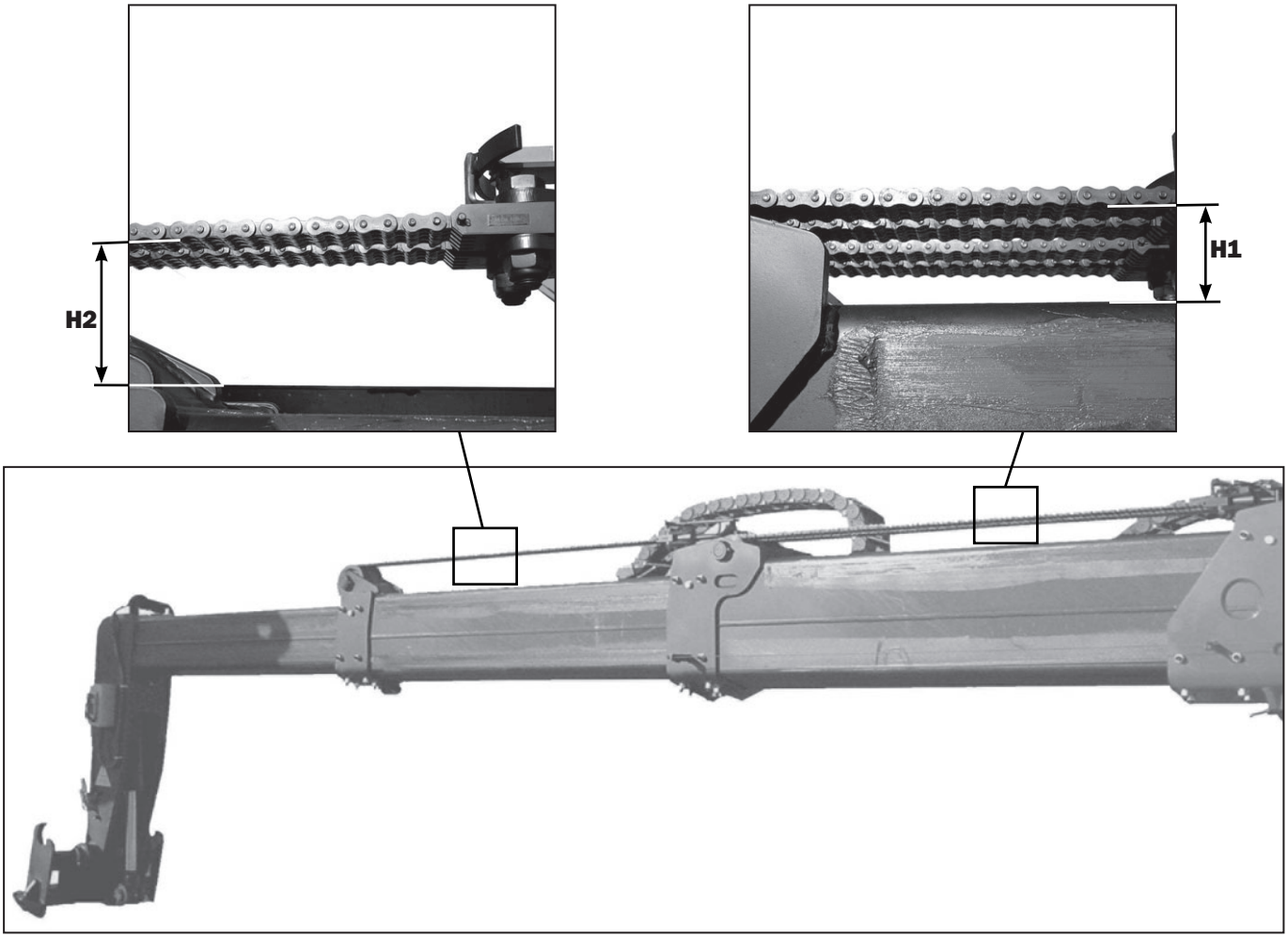
2 external chains, 70/75 mm.

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Then:
Fully extend the telescopic arm in a horizontal position to check the tension in the external chains and possibly retension them.
Ensure that the chains remain under tension (keep the arm extension lever pressed for a few seconds).
Measure the distance between the lower chain side and the arm with a gauge or ruler.
If the values are less than those in the table below, adjust the chains.
For correct adjustment of the internal chains, fully retract the arm extensions and check that each rests perfectly on the mechanical shoulders provided.

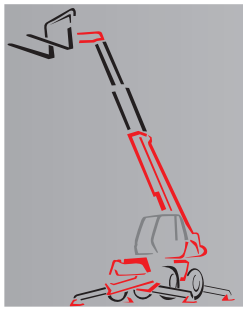
Arm IInd extension		
MRT 1850-2150	Minimum measurement	H2 ≥ 80 mm
	Maximum measurement	H2 ≤ 100 mm
MRT 2540	Minimum measurement	H2 ≥ 116 mm
	Maximum measurement	H2 ≤ 136 mm

Arm Ist extension		
MRT 1850-2150	Minimum measurement	H1 ≥ 80 mm
	Maximum measurement	H1 ≤ 100 mm
MRT 2540	Minimum measurement	H1 ≥ 59 mm
	Maximum measurement	H1 ≤ 79 mm



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BOOM REMOVAL

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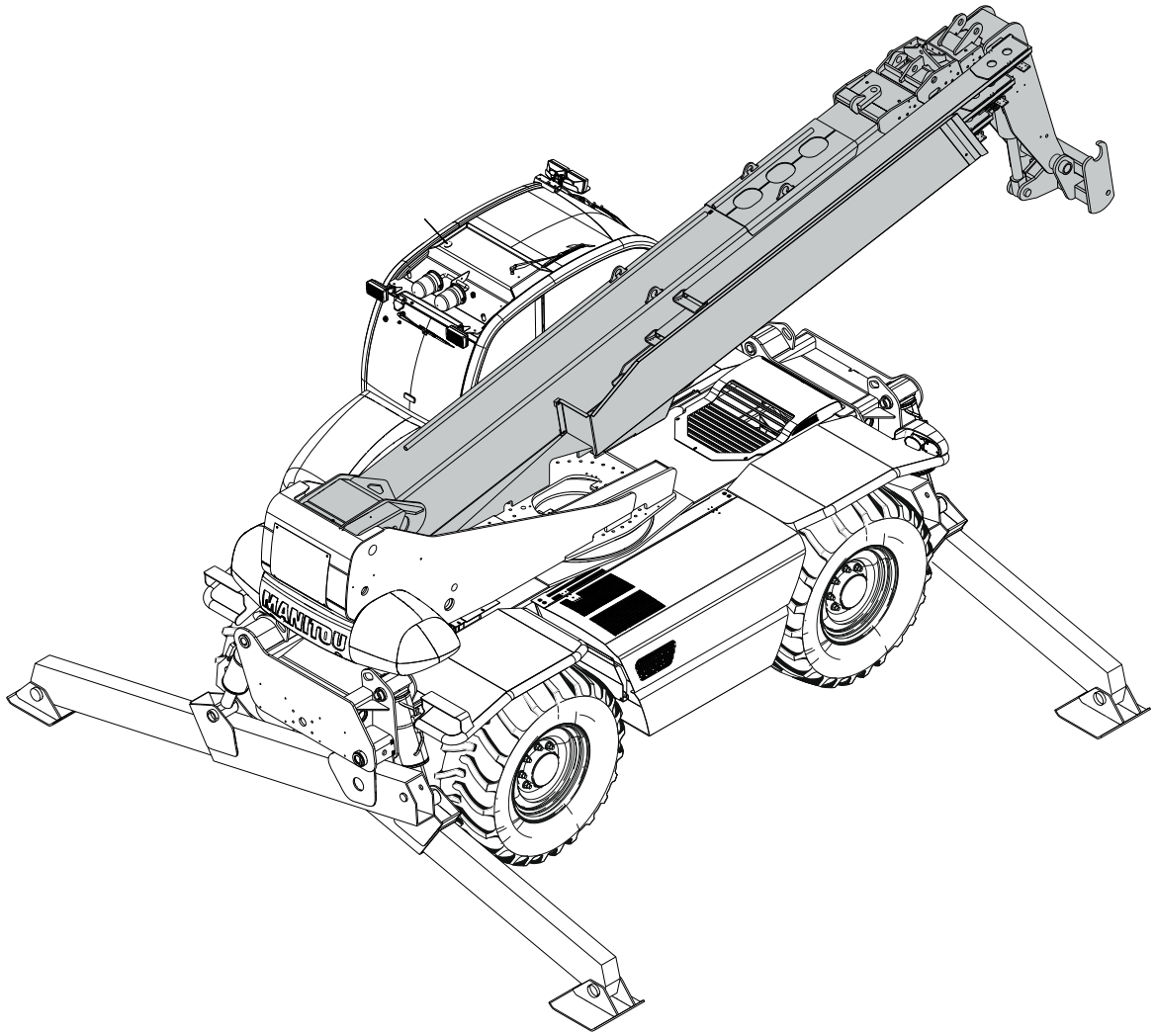
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PENTAGONAL TELESCOPIC BOOM REMOVAL



GENERAL INFORMATION

To reach the various components, the order of removal must be observed.

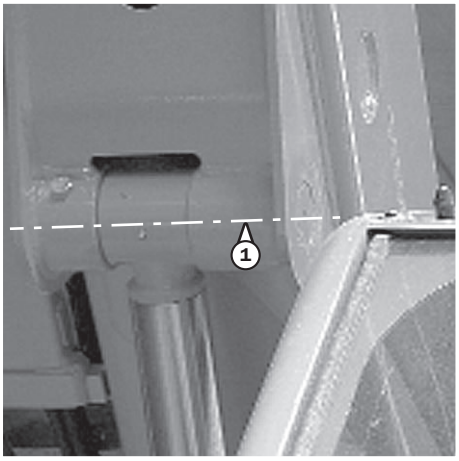
PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface, support the stabilisers to ensure maximum stability and safety (do not stop the engine).

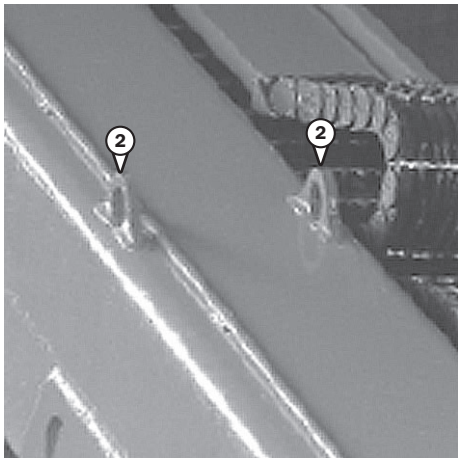
Special instruments:
- Lifting crane (5000 kg. minimum).

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TELESCOPIC BOOM REMOVAL FROM THE TRUCK

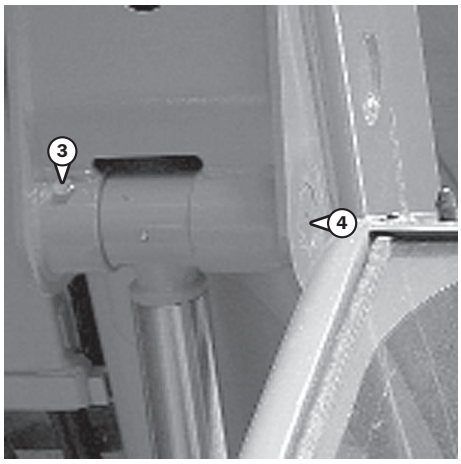


Activate the boom lift command and raise the boom above the profile of the cabin (Item 1), to give easy access to the lifting actuator hinge pin on the rod-boom side from both sides.

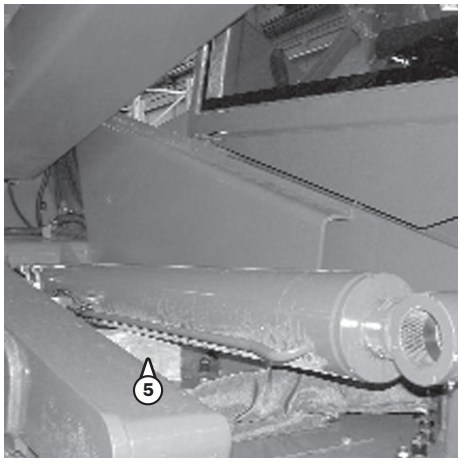


Secure the boom to an overhead crane or hoist through the appropriate eyelets (Item 2) in the top of the boom itself.

Secure the lifting actuator to a support.



Unscrew the locking screw (Item 3) and withdraw the lifting actuator hinge pin on the rod-boom side (Item 4).



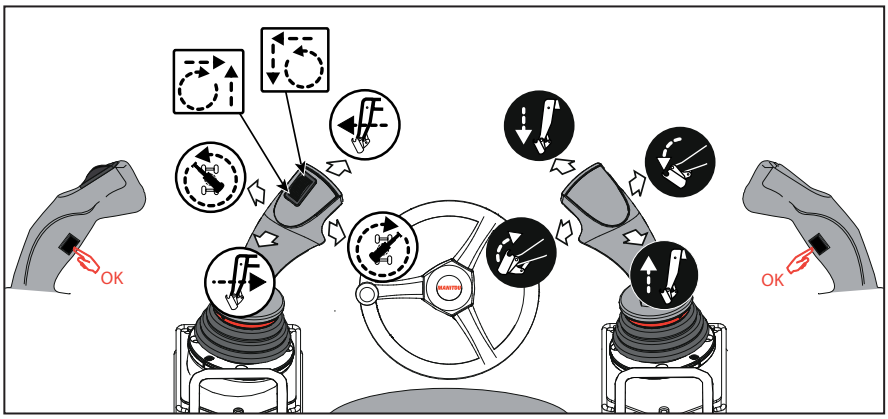
Rest the lifting actuator on the turret, placing a wooden beam under it (Item 5), and retract the rod with the command in the cabin.

Lower the telescopic boom to an almost horizontal position with the overhead crane or hoist used.

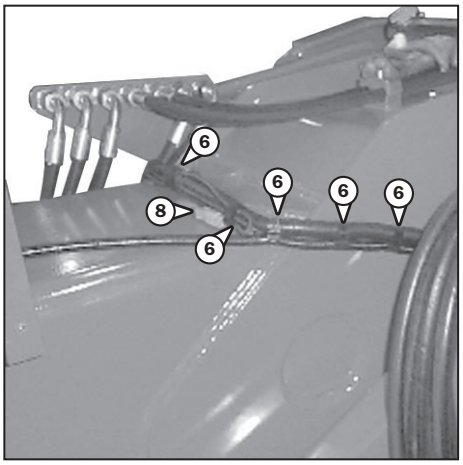
Switch off the engine.

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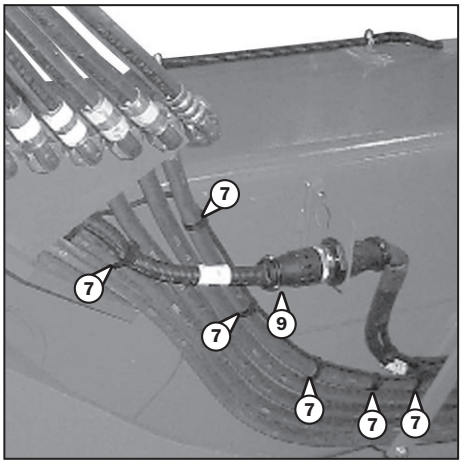
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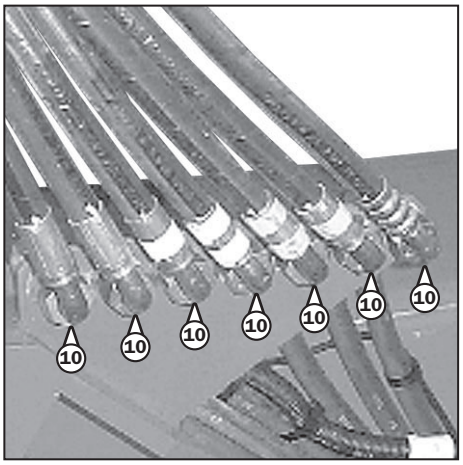
Turn the ignition key to position “I” (ignition key switch on the dashboard) and carry out all movements possible with the commands to release the residual pressure in the hydraulic system.



Turn off the ignition key and disconnect the battery terminals.
Remove all the clamps (Item 6 and 7) of the hydraulic tubes and electric cables in the upper rear part of the boom, making sure that after the operation they are all completely disconnected from each other.
Disconnect the connector on the chain safety microswitch cable (Item 8).

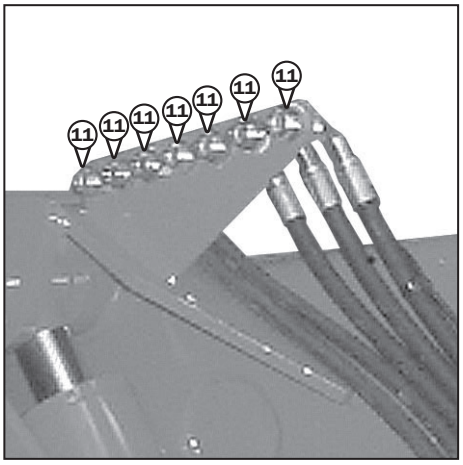


Working on the appropriate bush, disconnect the plug-electric wiring (Item 9) in the top of the boom, if present.

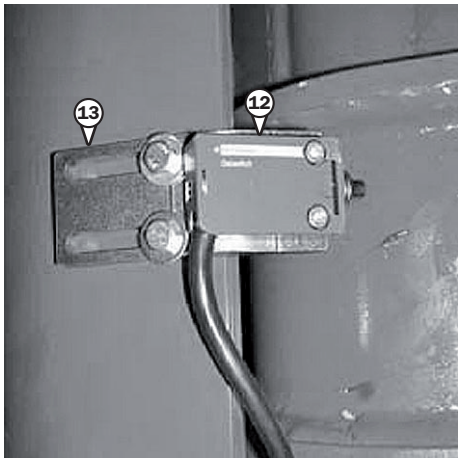


Disconnect the hydraulic pipes supplying the boom (Item 10) taking care to make a corresponding mark for correct refitting.

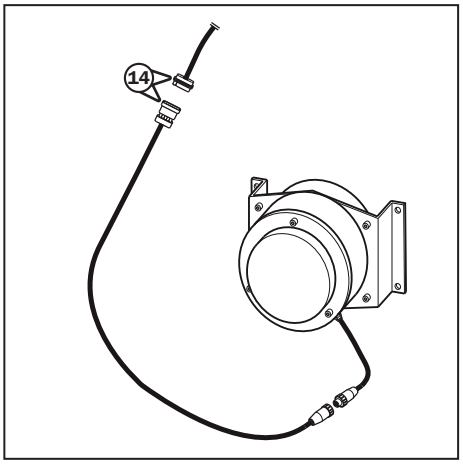
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To avoid losing oil from the hydraulic system, plug all the feed through connectors on the boom with water tight plugs (Item 11).



Remove the raising limit microswitch of the boom (Item 12) with its mounting (Item 13) located at the upper end of the turret, but without disconnecting the electrical connections.



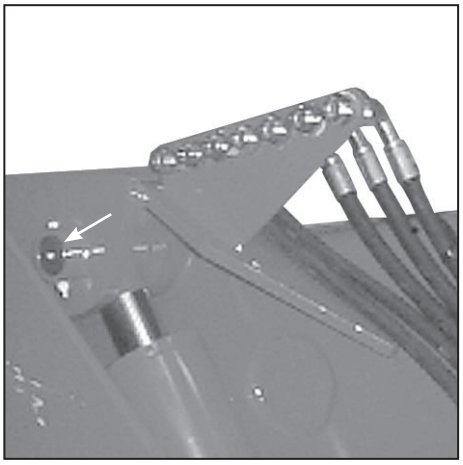
Disconnect connector “X2” (Item 14) of the safety system.



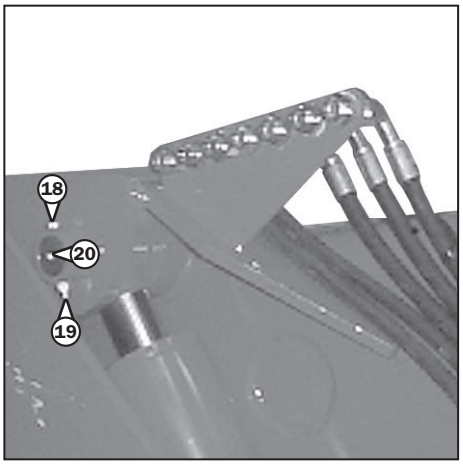
Using the overhead crane or hoist, raise or lower the boom very slowly (a few degrees), to find the balance point between the anchorage force of the boom to the overhead crane and the reaction of the compensating actuator, so that the weight of the boom does not rest entirely on the pin hinging the boom to the turret.

Unscrew the screws and lock nut (Item 15 and 16) and withdraw the pin (Item 17) hinging the boom to the turret.

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With the help of the overhead crane or hoist, pull the boom very slowly and very carefully a few centimetres towards the rear of the truck so that the hinge pin of the compensating cylinder projects from the outline of the turret.
During this operation, try to keep the boom nearly horizontal, and be very careful not to make sharp movements and avoid damaging other components of the truck with the boom (only partially disconnected).

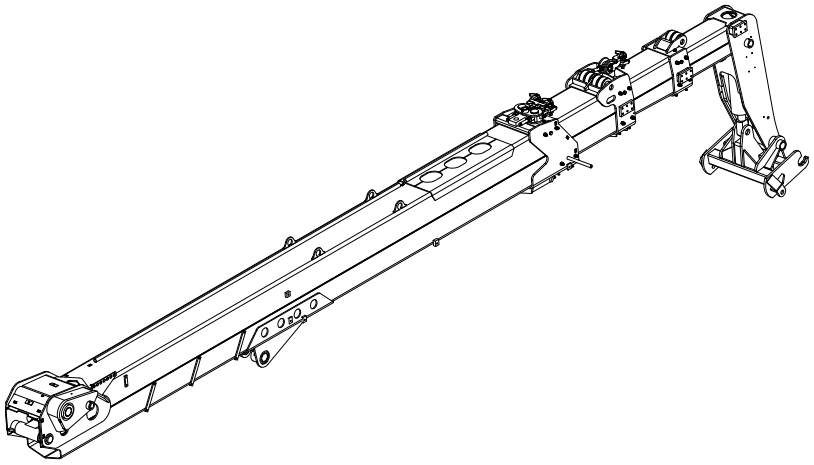


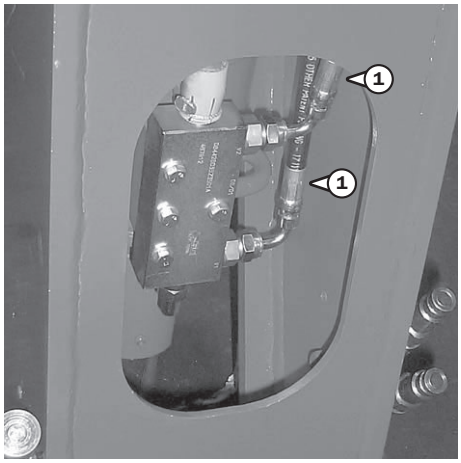
Remove the screws and lock nut (Item 18 and 19) and withdraw the hinge pin (Item 20) of the compensation cylinder with the possible help of an extractor.



With the help of the overhead crane or hoist, remove the boom from the base of the turret.

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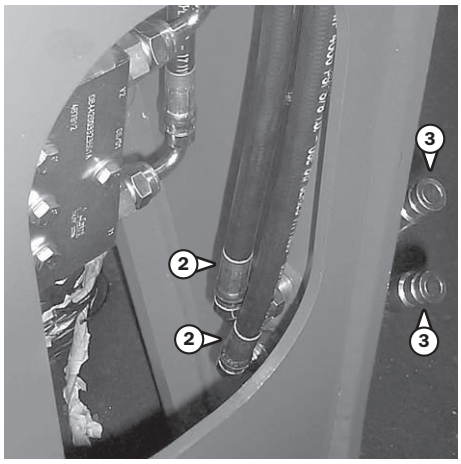




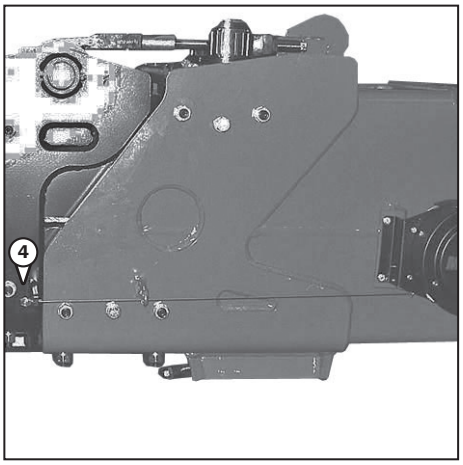
COMPLETE TELESCOPIC BOOM REMOVAL

HYDRAULIC AND ELECTRICAL SYSTEMS REMOVAL OF THE BOOM

After supporting the telescopic boom on two trestles in a horizontal position, disconnect the hydraulic pipes (Item 1) from the valve block on the traverse cylinder and mark them for correct refitting.

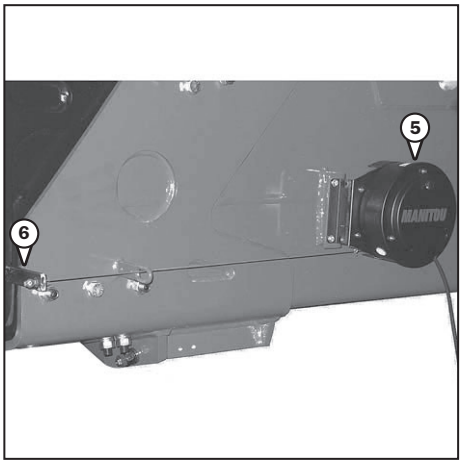


Disconnect the hydraulic pipes (Item 2) from the quick connectors (Item 3) on the left at the top of the boom and mark them for correct refitting.
Disconnect the pipe from the quick connector on the right side of the top of the boom and mark it for correct refitting.

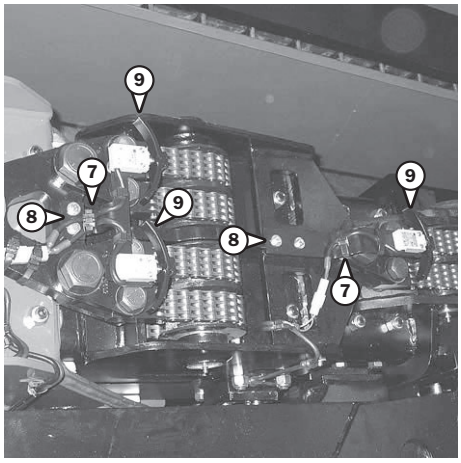


Disconnect the winder cable of the “M.S.S.” from the ring (Item 4) on the Ist extension.

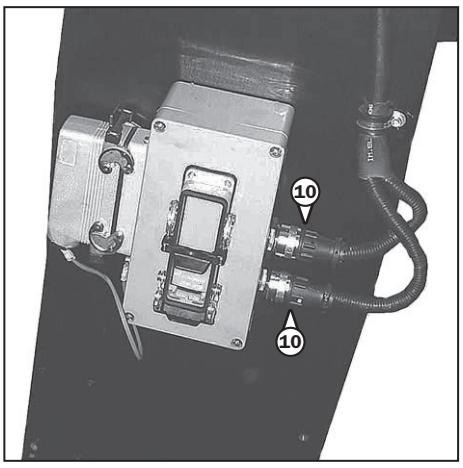
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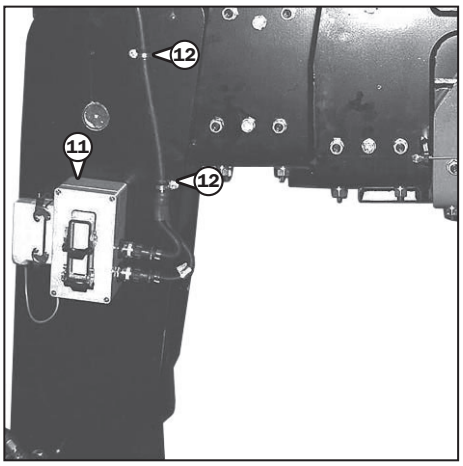
Remove the winder (Item 5) of the “M.S.S.” with its bracket (Item 6) in the left rear of the external boom.



Disconnect the electrical water tight connections of the microswitches on the chain attachment points in the top front of the boom and remove the cable clamps (Item 7).
Remove the microswitch brackets (Item 8) and their counterparts (Item 9), in the top front part of the boom.

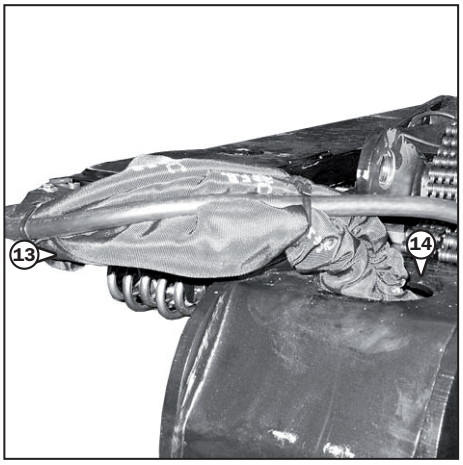


Open the box for the socket card frame and disconnect the electrical cables from the socket (Item 10).

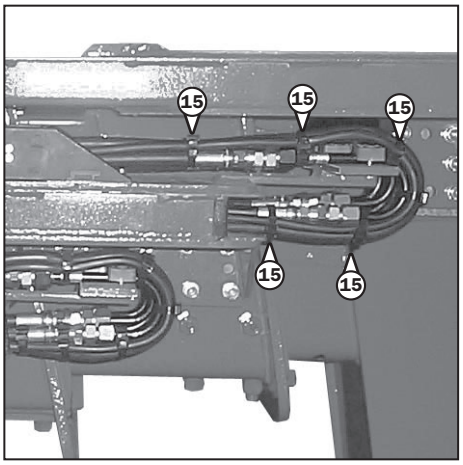


Withdraw the electric cables from the box (Item 11) and free them from their clips (Item 12).

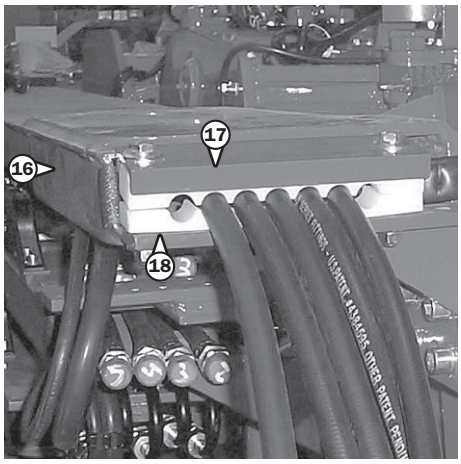
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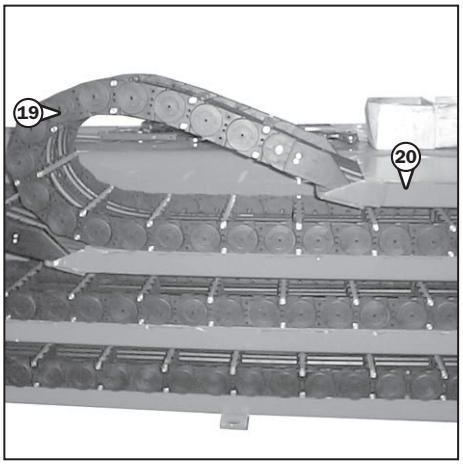
Release the electric cables and hydraulic pipes from their protective sheaths (Item 13) and withdraw the hydraulic pipes through the upper hole in the top of the boom (Item 14).



In the passages between the pipe-carrier tubing and tube supporting chains, release the electric cables from their clips (Item 15).

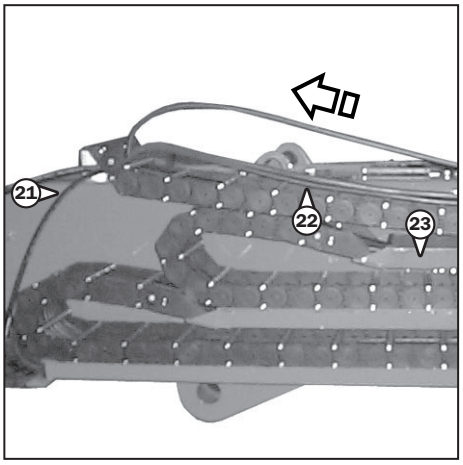


Release the hydraulic pipes from the IIIrd extension chain support tubing (Item 16) removing the locking collar (Item 17 - 18).

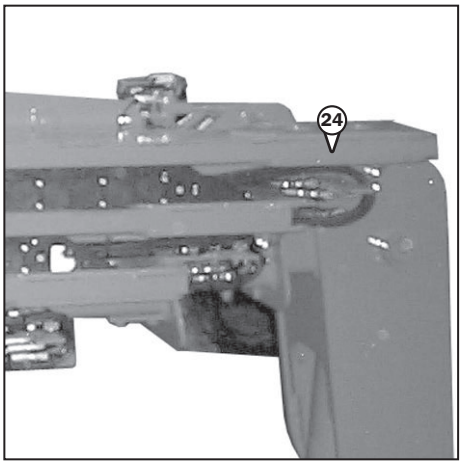


Disconnect the third pipe-carrier chain (Item 19) in the rear part of the tubing (Item 20).

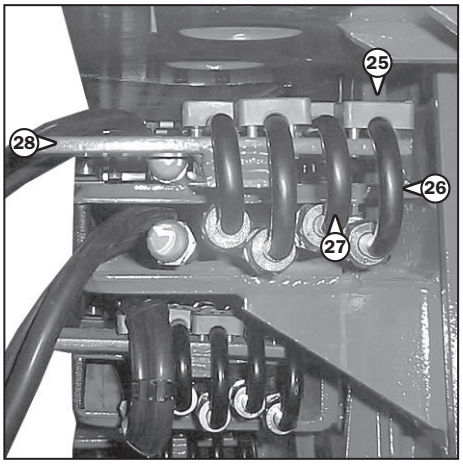
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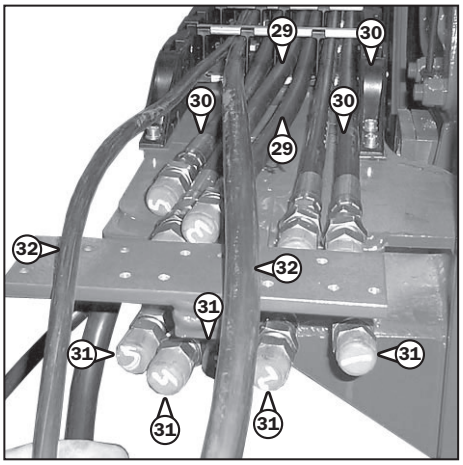
Withdraw the electric cables (Item 21) for the card frame and the hydraulic pipes (Item 22) from the chain-carrier tubing (Item 23).



Remove the tubing (Item 24) from the IIIrd extension boom.



Remove the locking collars (Item 25) of the elbow connectors (Item 26 and 27) from the fixing plate (Item 28) on the IInd extension chain-carrier tubing.

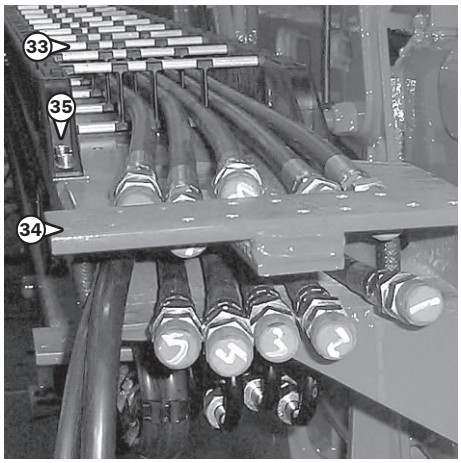


Disconnect the iron tubes (Item 26 and 27) from the hydraulic pipes (Item 29 and 30) inside the third tube-carrier chain; disconnect the iron tubes (Item 26 and 27) from the hydraulic pipes (Item 31) inside the IInd extension chain-carrier tubing.
During this operation, mark the hydraulic pipes for correct refitting.

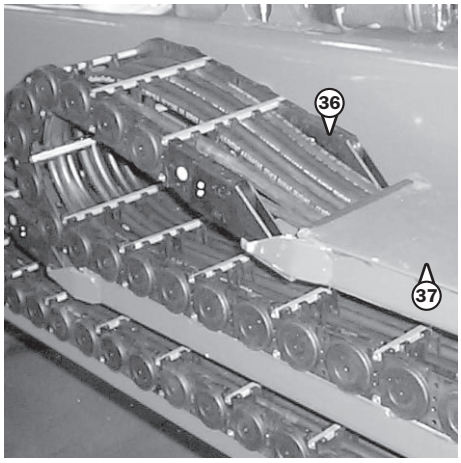
Withdraw the electric cables (Item 32) from the third tube-carrier chain to the quick connector.

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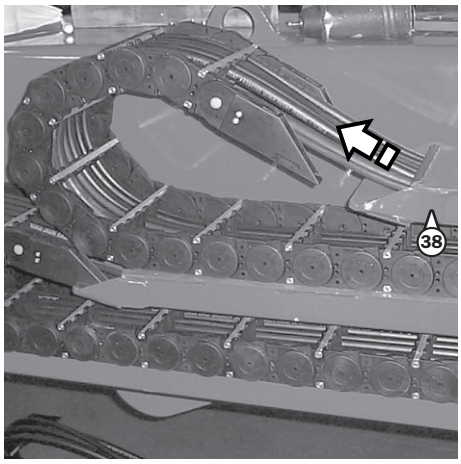
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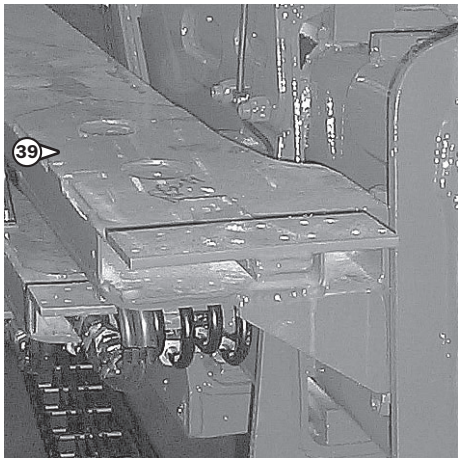
Remove the third tube-carrier chain (Item 33) from the chain-carrier tubing (Item 34) by removing the appropriate screws (Item 35).



Remove the second tube-carrier chain (Item 36) in the rear of the chain-carrier tubing (Item 37).

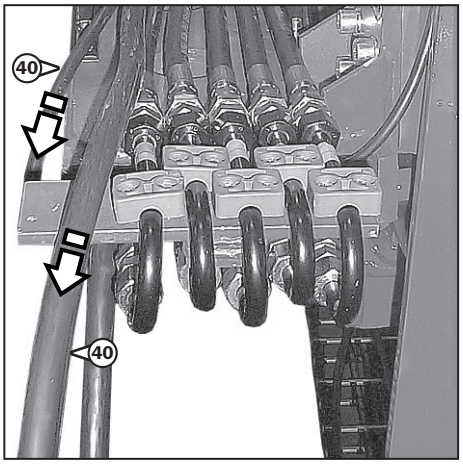


Withdraw the electric cables and hydraulic pipes from the chain-carrier tubing (Item 38).

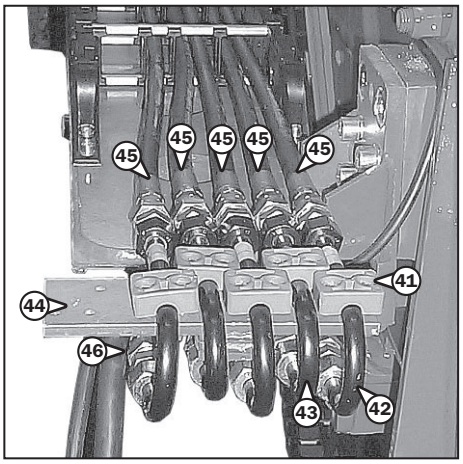


Remove the chain-carrier tubing (Item 39) from the IInd extension boom.

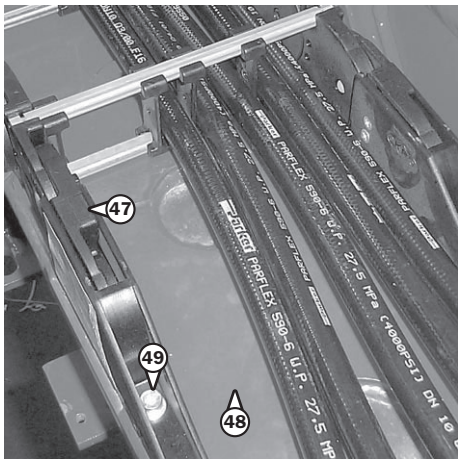
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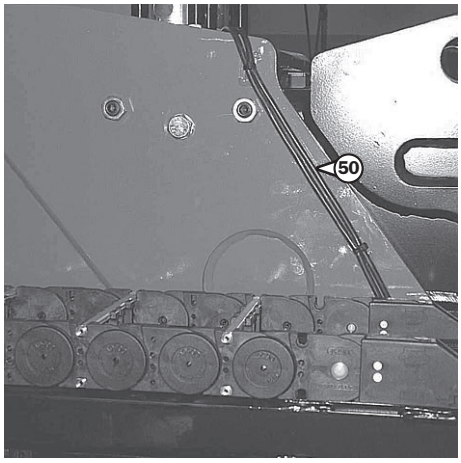
Withdraw the electric cables (Item 40) from the second tube-carrier chain to the quick connector.



Remove the locking collars (Item 41) of the elbow connectors (Item 42 and 43) from the fixing plate on the Ist extension chain-carrier tubing (Item 44).
Disconnect the iron tubes (Item 42 and 43) from the hydraulic pipes (Item 45) inside the second tube-carrier chain; disconnect the iron tubes (Item 42 and 43) from the hydraulic pipes (Item 46) inside the Ist extension chain-carrier tubing.
During this operation, mark the hydraulic pipes for correct refitting.

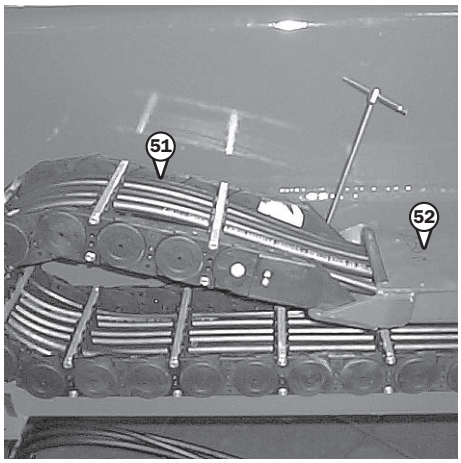


Remove the second tube-carrier chain (Item 47) from the chain-carrier tubing (Item 48) by removing the appropriate screws (Item 49).

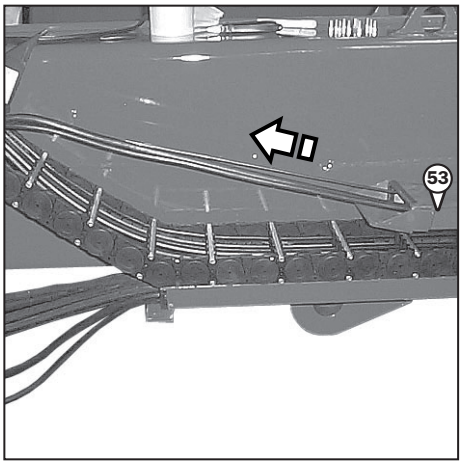


Release from its clamps the cable (Item 50) for the microswitch on the single equaliser arm boom attaching the chain to the boom Ist extension.

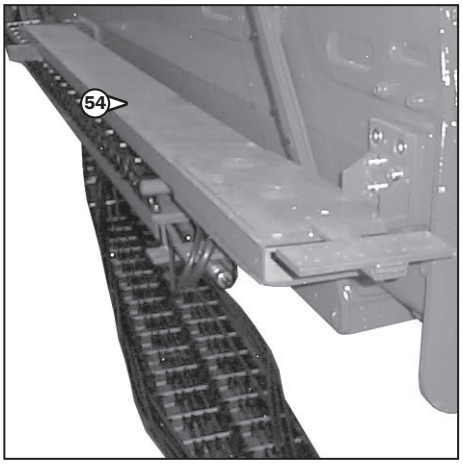
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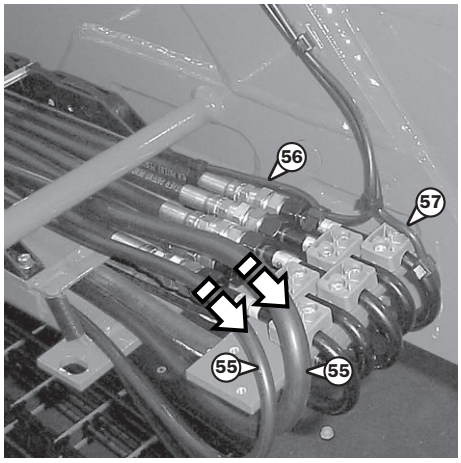
Remove the first tube-carrier chain (Item 51) in the rear of the chain-carrier tubing (Item 52).



Withdraw the electric cables, the cable for the microswitch of the chain attachment on the single balance boom and the hydraulic pipes from the chain-carrier tubing (Item 53).



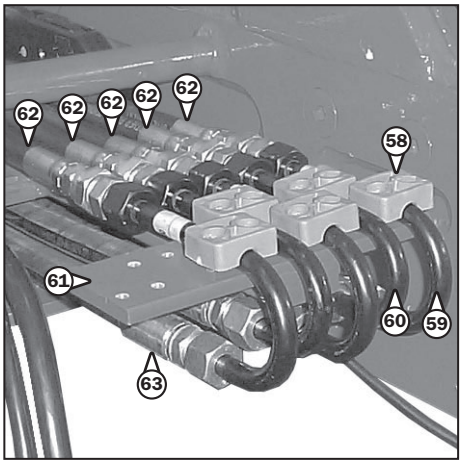
Remove the chain-carrier tubing (Item 54) from the Ist extension boom.



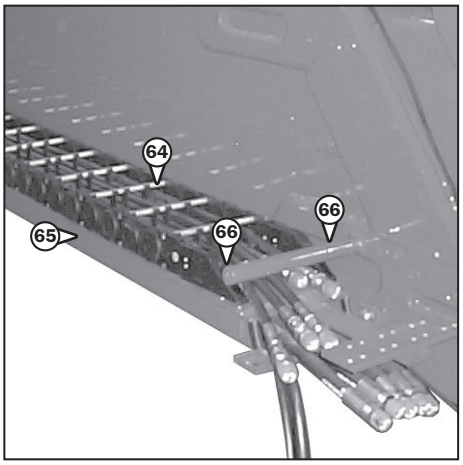
Withdraw the electric cables (Item 55) from the first tube-carrier chain to the quick connector. Release from its clips the cables (Item 56 and 57) for the microswitches of the chain attachments on the equalisers.

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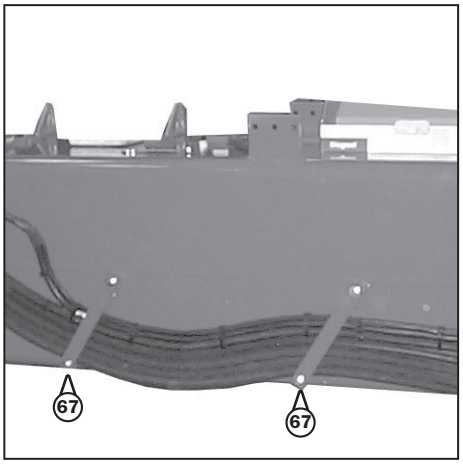
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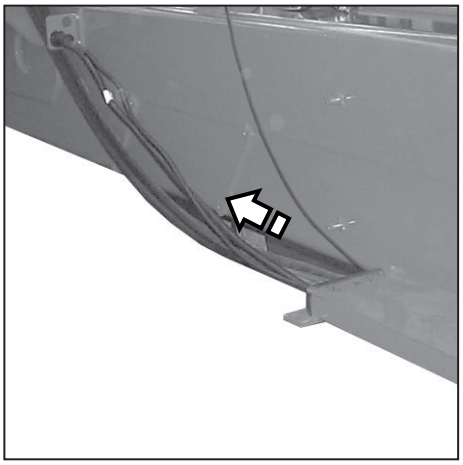
Remove the locking collars (Item 58) of the elbow connectors (Item 59 and 60) from the fixing plate (Item 61) on the external boom chain-carrier tubing.
Disconnect the iron tubes (Item 59 and 60) from the hydraulic pipes (Item 62) inside the first tube-carrier chain; disconnect the iron tubes (Item 59 and 60) from the hydraulic pipes (Item 63) inside the external boom chain-carrier tubing.
During this operation, mark the hydraulic pipes for correct refitting.



Remove the first tube-carrier chain (Item 64) from the chain-carrier tubing (Item 65) by removing the appropriate screws (Item 66).

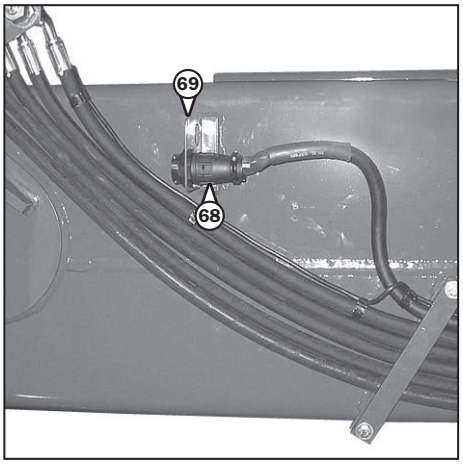


Release the hydraulic pipes and electric cables from the external boom by removing the clamps (Item 67).



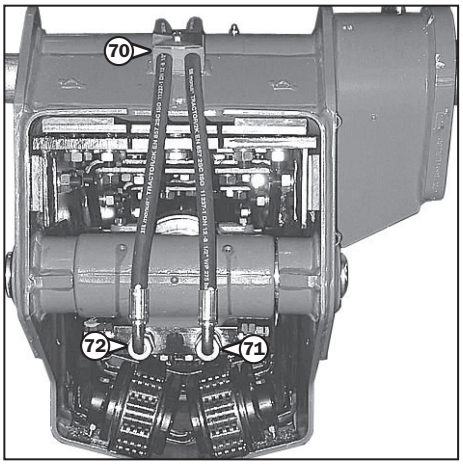
Withdraw the hydraulic pipes and electric cables from the chain-carrier tubing.

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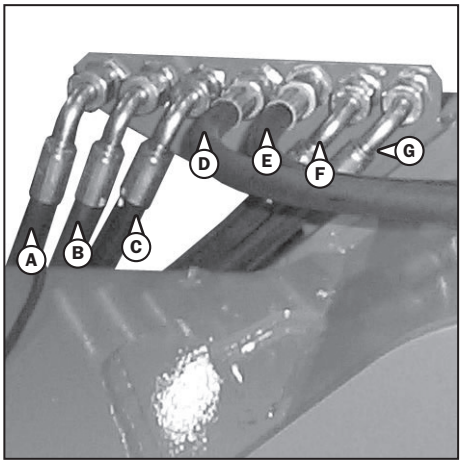


Remove the multi-way plug (Item 68) for the plate basket (Item 69).

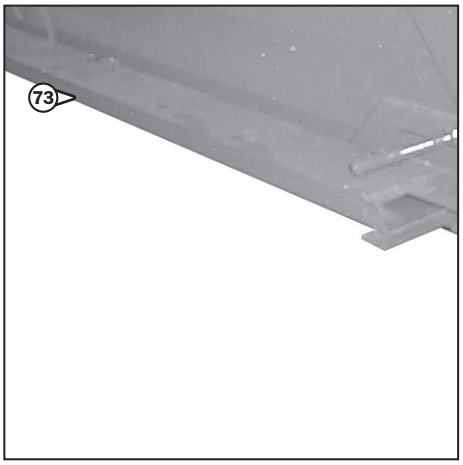
Remove the plate (Item 69) for the electric socket in the right rear of the external boom.



Remove the collar (Item 70) and remove the hydraulic pipes connecting to the extension cylinder (Item 71 and 72).

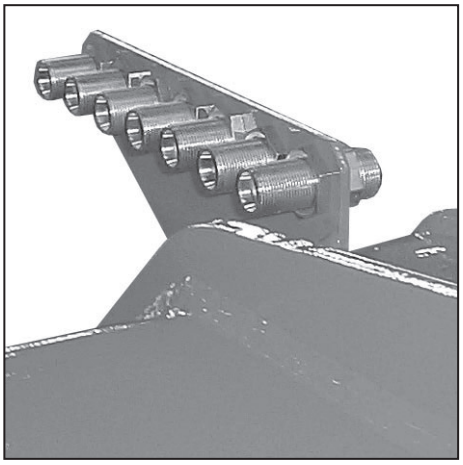


Remove the hydraulic pipes in sequence (Item A - B - C - D - E - F - G) from the feed-through connectors.
Mark the pipes for correct refitting.

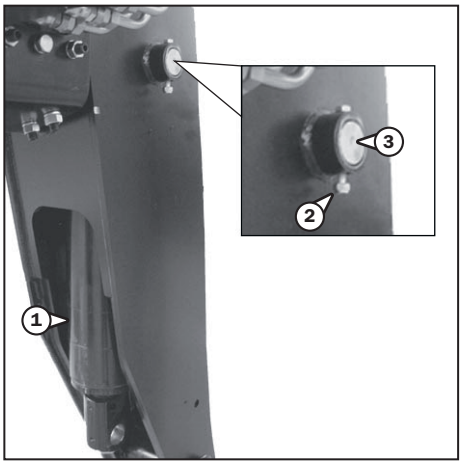


Remove the chain-carrier tubing (Item 73) on the right side of the external boom.

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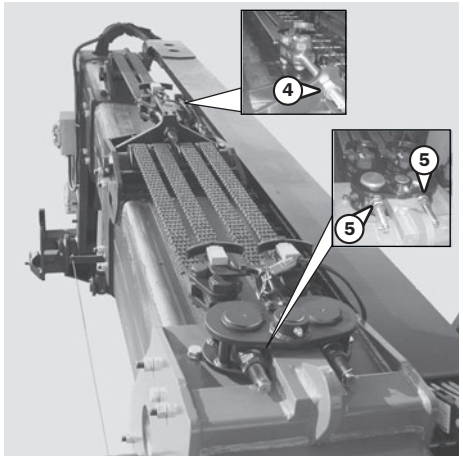
Remove the feed through connectors in the drilled tongue in the rear of the external boom.



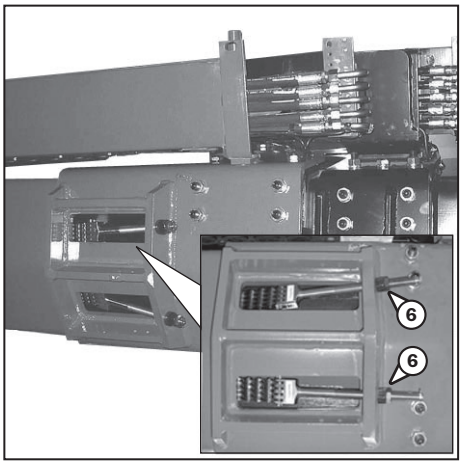
ACTUATORS REMOVAL FROM THE BOOM

Secure the traverse cylinder (Item 1) to the overhead crane or hoist.
Unscrew the screws (Item 2) locking the traverse cylinder hinge pin of the IIIrd extension boom.

Withdraw the pin (Item 3) hinging the traverse cylinder to the IIIrd extension boom.
Remove the traverse cylinder (Item 1) from the base of the IIIrd extension boom.

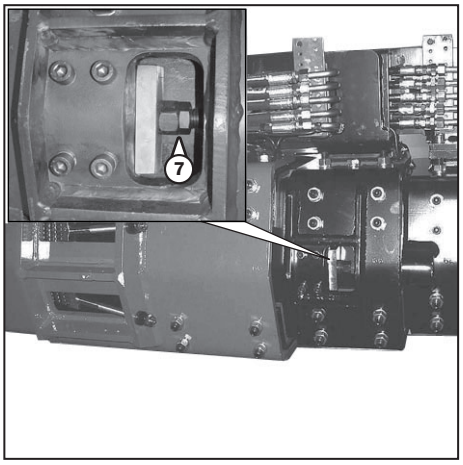


With the boom extended by about 25÷30 cm, unscrew the locknuts and nuts on the tie rods for the boom extending chains (Item 4 and 5) until they are against the split pins.

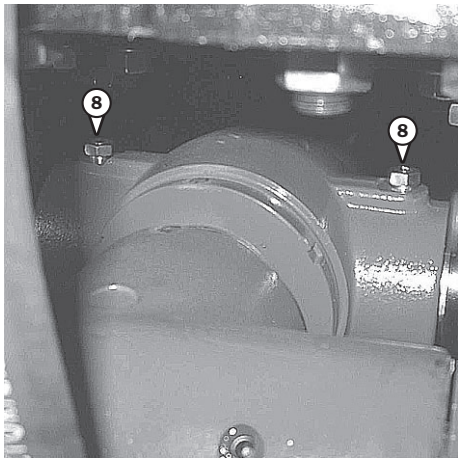


Unscrew the locknuts and nuts (Item 6) of the tie rods of the IInd extension boom retracting chains until they are against the split pins.

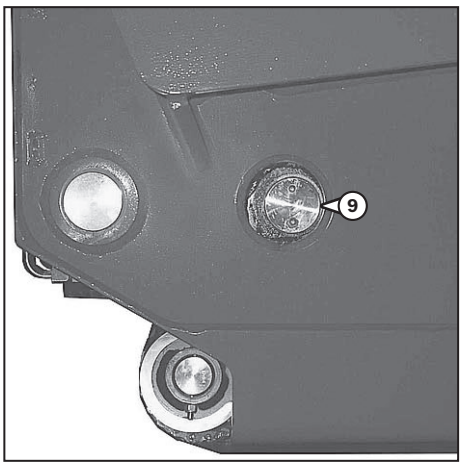
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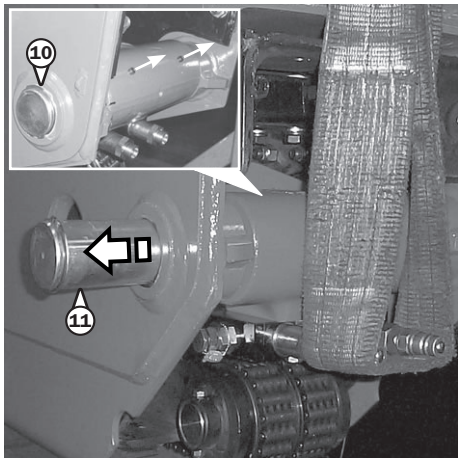
Unscrew the locknuts and nuts (Item 7) on the tie rod of the IIIrd extension boom retracting chain until they are against the split pins.



Remove the screws (Item 8) locking the extension cylinder hinge pins to the Ist extension boom.

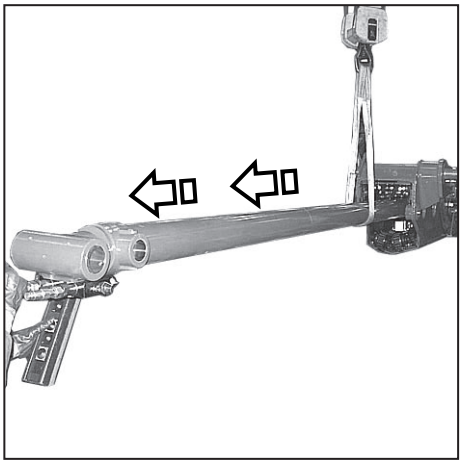


With the help of an extractor, withdraw the extension cylinder hinge pins (Item 9) on the Ist extension boom.

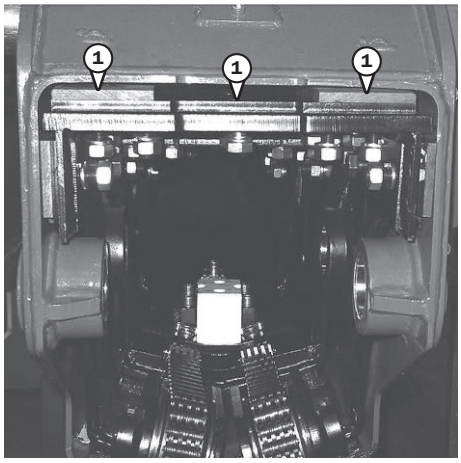


Remove the circlip (Item 10) and withdraw the hinge pin (Item 11) between the extension cylinder and external boom.

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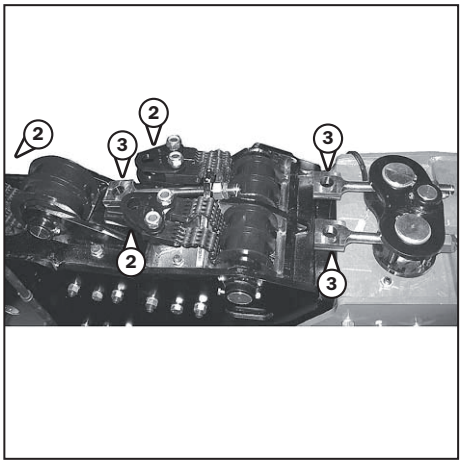
With the help of an overhead crane or hoist, remove the boom extension cylinder.



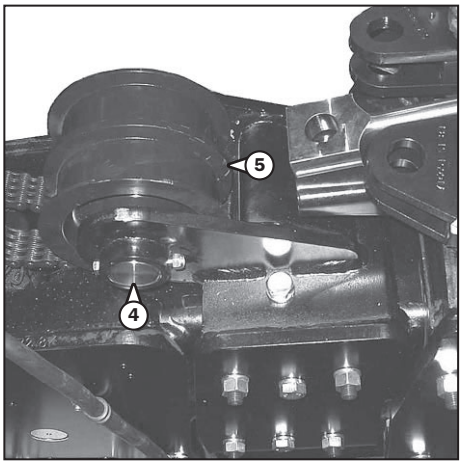
I, II AND III BOOM REMOVAL FROM THE EXTERNAL BOOM

Be careful to mark all the feet with their shims that are removed from the telescopic boom for correct refitting.

Remove the rear runners fixed to the Ist extension with their shims (Item 1).

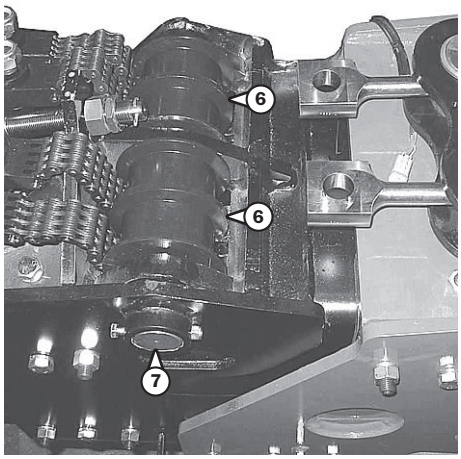


At the top front of the boom, release the 6 chains for extending the arms, removing the equalisers (Item 2) from their tie rods (Item 3).

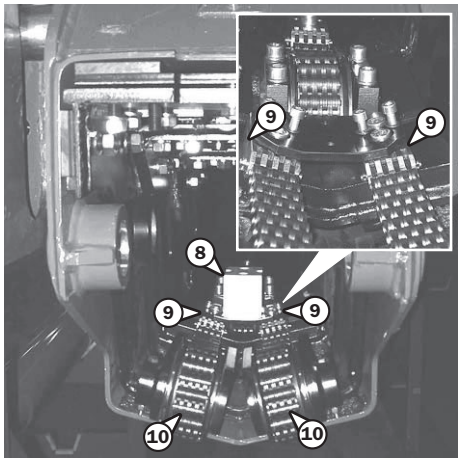


Remove the pulley (Item 4) in the upper front part of the IInd extension boom by removing the pin (Item 5).

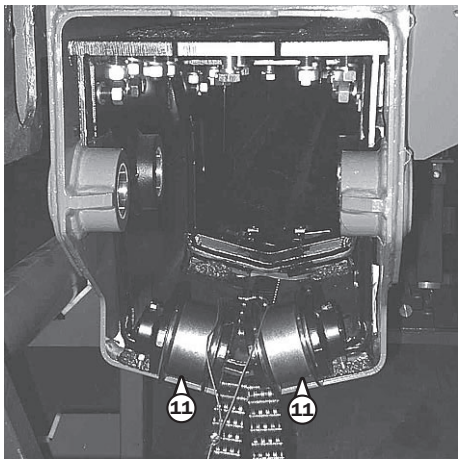
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Remove the pulley (Item 6) in the upper front part of the Ist extension boom by removing the pin (Item 7).

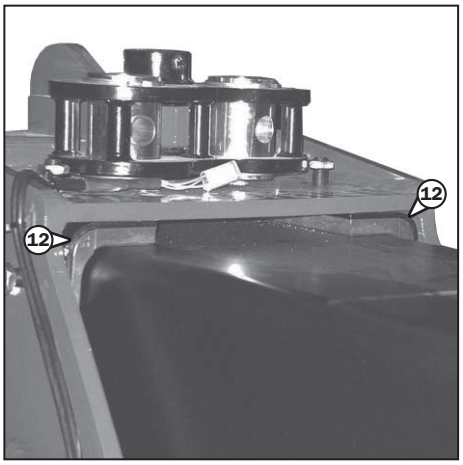


Remove the runner (Item 8) for the sliding of the extension cylinder and disconnect the IInd extension boom the combs (Item 9) attaching the retracting chains of the IInd extension (Item 10).



Remove the pulley (Item 11) in the top of the Ist extension boom.

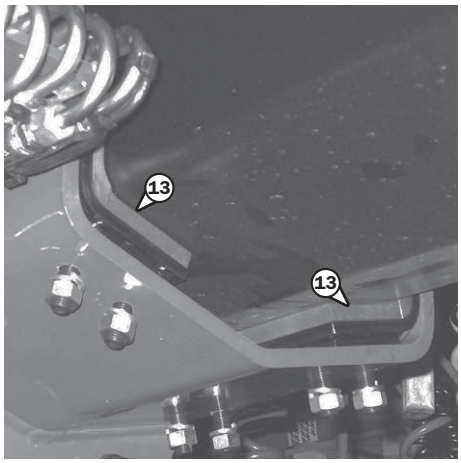
With the help of an overhead crane or hoist, extend the Ist extension boom of the external boom by about 20÷30 cm.



Remove the front upper lateral runners attached to the external boom (Item 12) with their shims.

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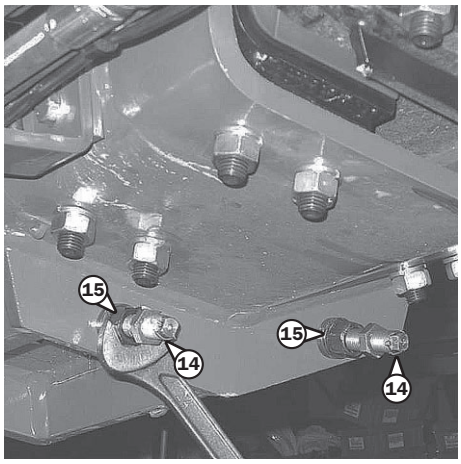
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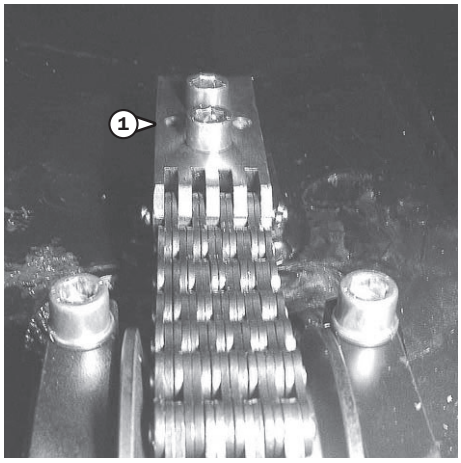
Raise the Ist extension boom with the help of an overhead crane or hoist and remove the lower front runners (Item 13) of the external boom with their shims.



With the help of an overhead crane or hoist, withdraw the Ist, IInd and IIIrd extension booms from the external boom.



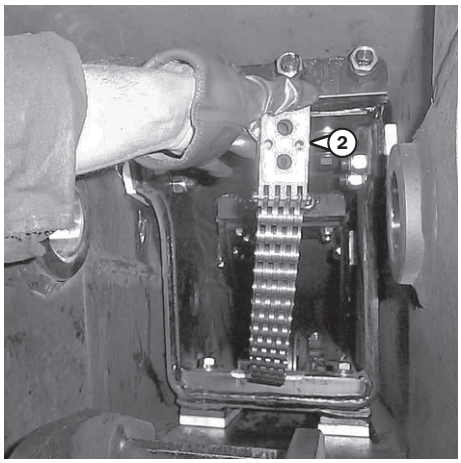
Remove the two split pins (Item 14) and unscrew the nuts and locknuts completely (Item 15), release the chains for retracting the IInd extension boom in the lower front part of the external boom.



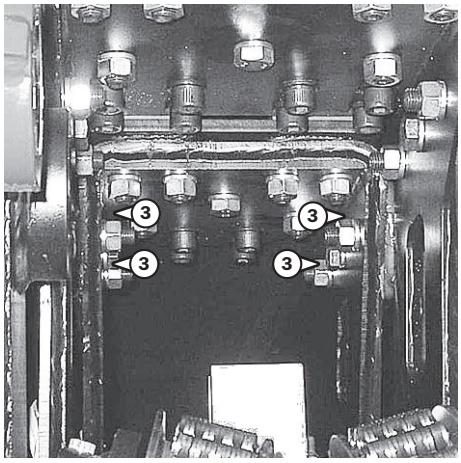
IInd AND IIIrd EXTENSION REMOVAL FROM THE Ist EXTENSION BOOM

Release the Ist retraction chain (Item 1) of the IIIrd extension boom in the rear part of the arms.

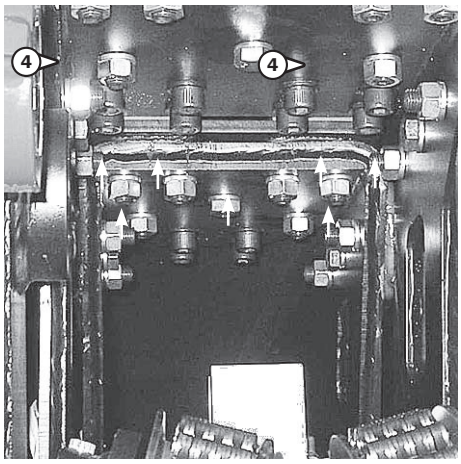
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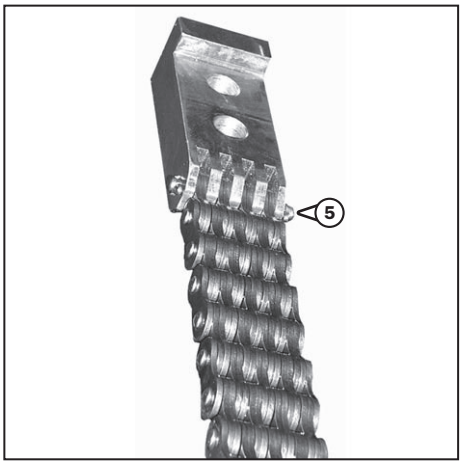
Remove the comb from the chain (Item 2).



Slacken the grub screws of the rear lateral runners (Item 3) with their shims fixed to the IInd extension boom.

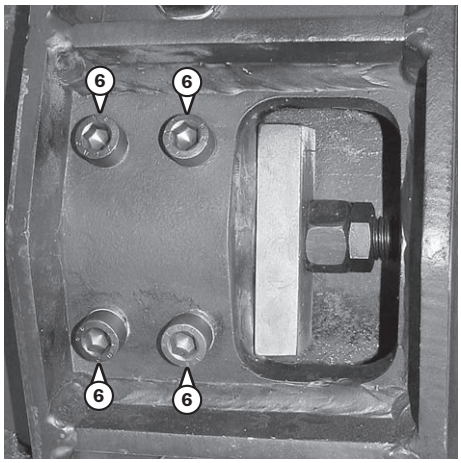


Remove the upper rear runners (Item 4) fixed to the IInd extension boom.

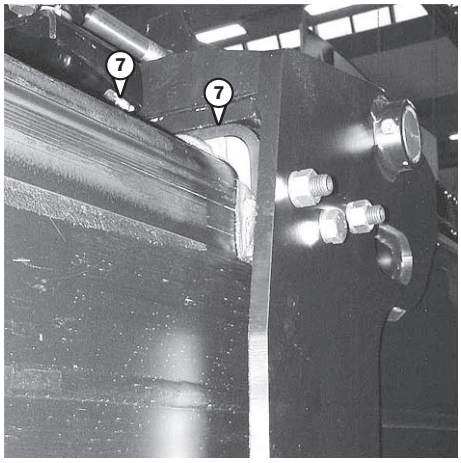


Withdraw the chain from the base of the pulley (Item 5).

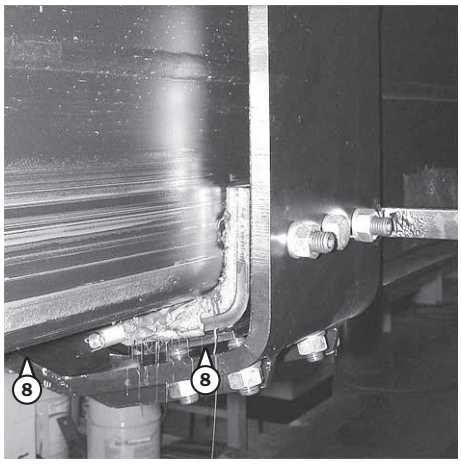
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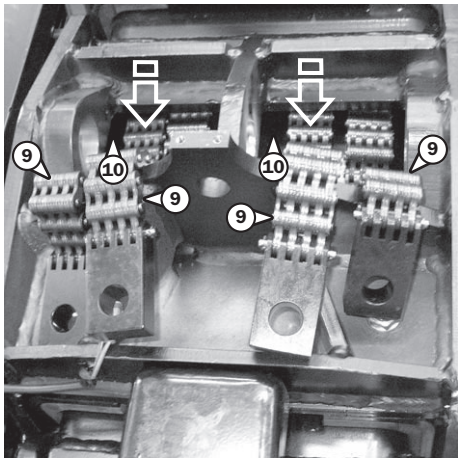
Remove the front fixing clutches of the retracting chain of the IIIrd extension by means of the appropriate screws (Item 6) and extract the chain by pulling it towards the quick connector.



Remove the front lateral and upper runners (Item 7) with their shims fixed to the Ist extension boom.



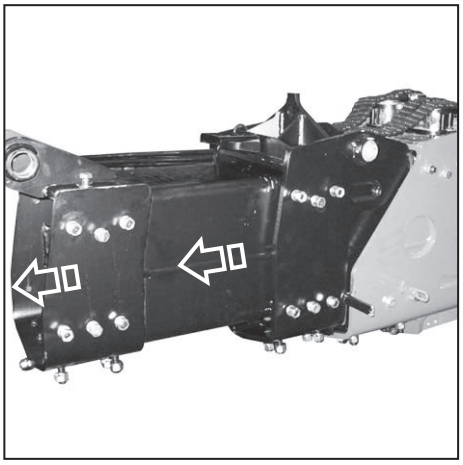
Remove the front lateral and lower runners (Item 8) with their shims fixed to the Ist extension boom.



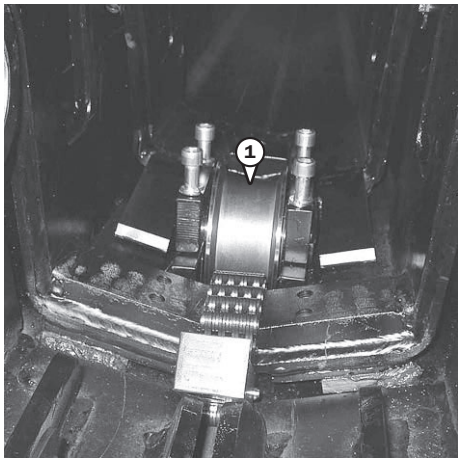
Pass the four chains (Item 9) for extending the IInd extension boom inside the opening in the upper front part of the Ist extension boom (Item 10), and extend it fully on the IInd extension boom.

Tie the chains to the IInd extension boom.

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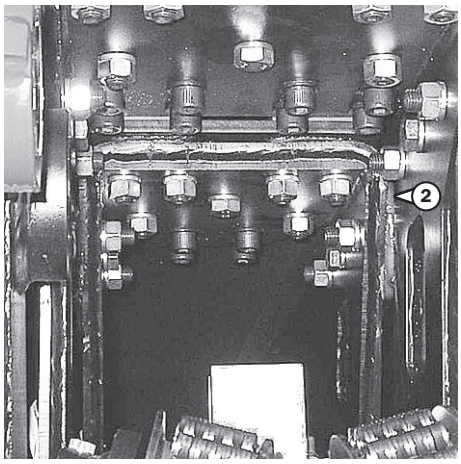


With the help of an overhead crane or hoist, withdraw the IInd and IIIrd extension booms from the Ist extension boom keeping the chains resting on the upper part well stretched.

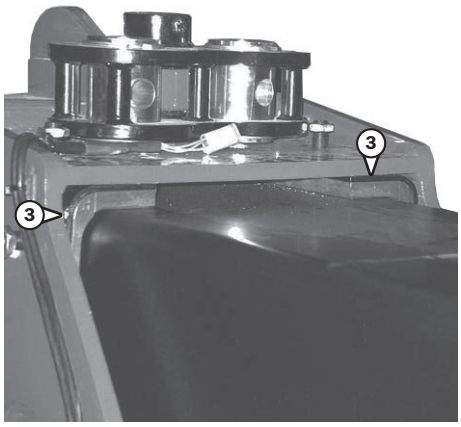


Ist EXTENSION BOOM REMOVAL FROM THE IInd EXTENSION BOOM

Remove the pulley (Item 1), in the rear of the IInd extension boom.

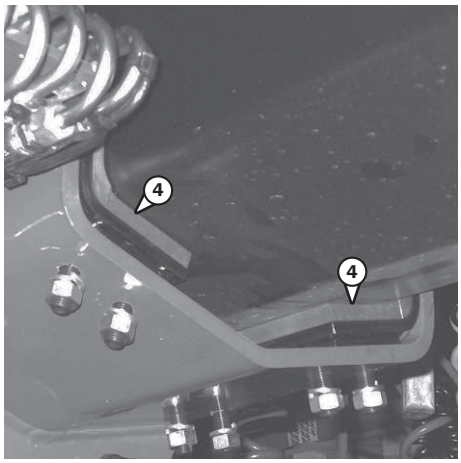


Extend the IIIrd extension boom by 20÷30 cm from the IInd extension boom and remove the lateral runners (Item 2) with their shims fixed to the IIIrd extension boom at the rear.

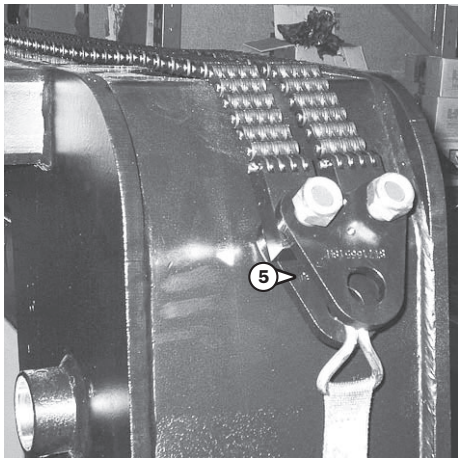


Remove the front and upper lateral runners (Item 3) with their shims fixed to the IInd extension boom.

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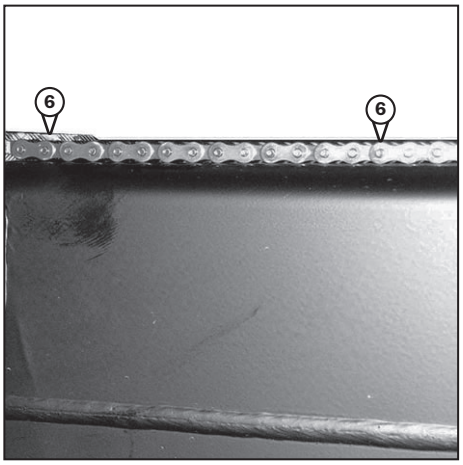
Raise the IIIrd extension boom in the front with the help of an overhead crane or hoist to remove the lower front runners (Item 4) with their shims fixed to the IInd extension boom.



Tie the chains (Item 5) to the IIIrd extension boom.

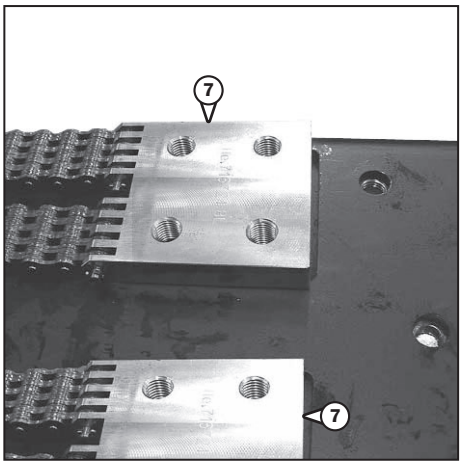


With the help of an overhead crane or hoist, withdraw the IIIrd extension boom from the IInd extension boom keeping the chains resting on the top well stretched, which could be fitted.

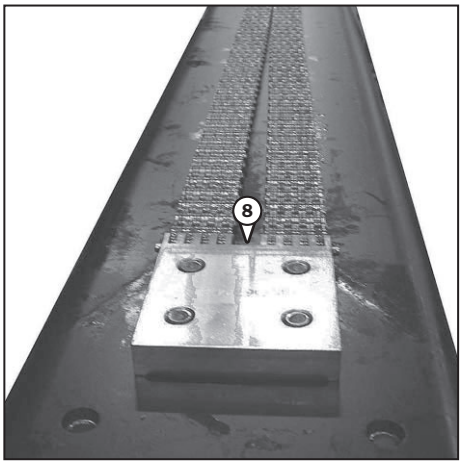


Remove the upper fixing combs in the front of the four extension chains (Item 6) of the IInd extension boom.

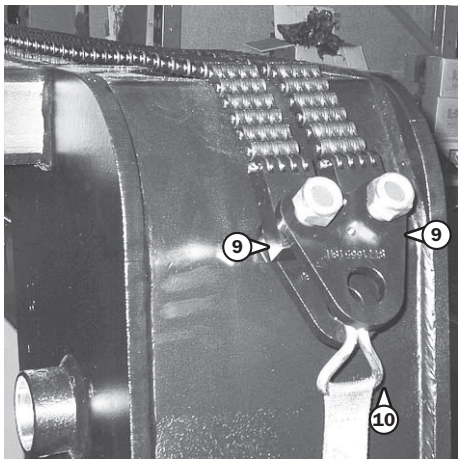
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Remove the fixing tie rods (Item 7) for the extension chains of the IInd extension boom, withdrawing them from the holes in the tail of the IInd extension boom.



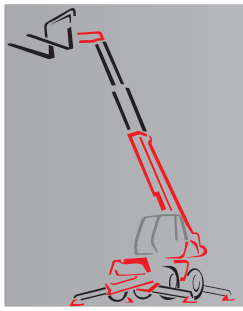
Remove the fixing tie rods (Item 8) for the chains for extending the IIIrd extension boom, extracting it through the appropriate holes in the tail of the IIIrd extension boom.



Disconnect the two combs fixing the upper chain (Item 9) from each other by removing the pair of single equalisers (Item 10).

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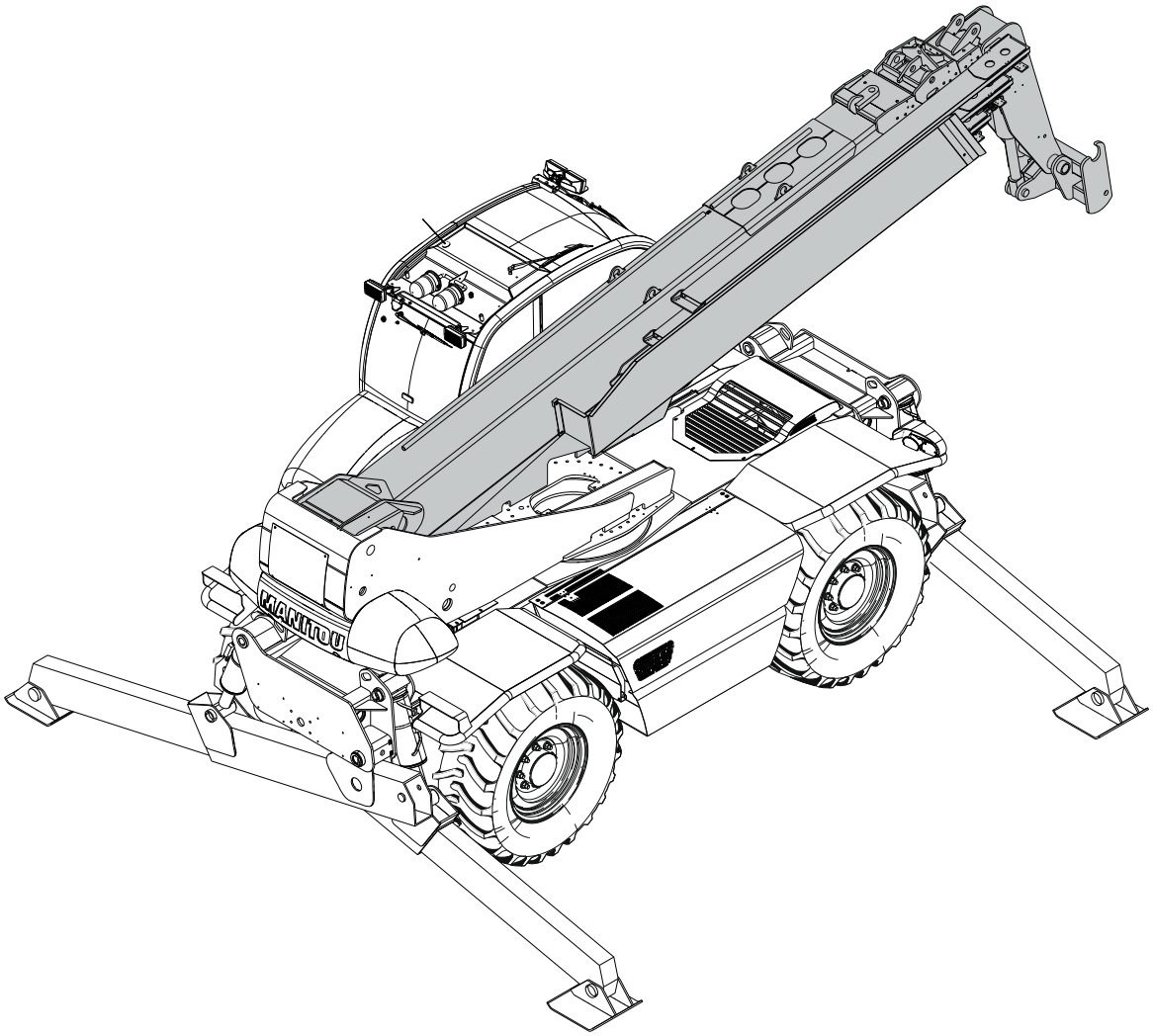
BOOM REFIT

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PENTAGONAL TELESCOPIC BOOM REFIT



PRELIMINARY OPERATIONS

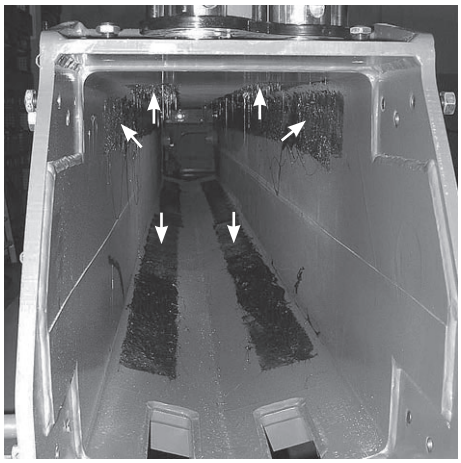
Prepare the framework, checking that the holes are correctly tapped; eliminate burrs from the bushes for the pins, rub down any weld splash around the runner housings.

PREPARATION AND SAFETY INSTRUCTIONS

Place the truck on a horizontal surface and extend the stabilisers to ensure the greatest stability and safety.

Special instruments:
- Lifting crane (5000 kg. minimum).

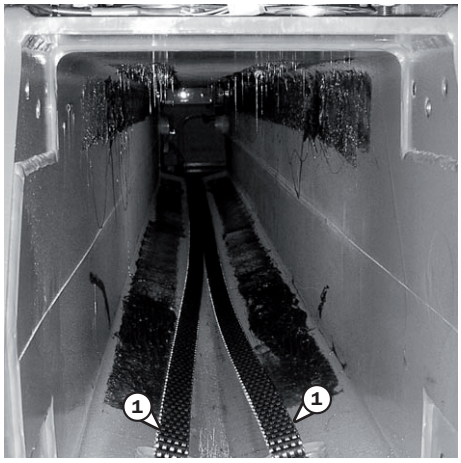
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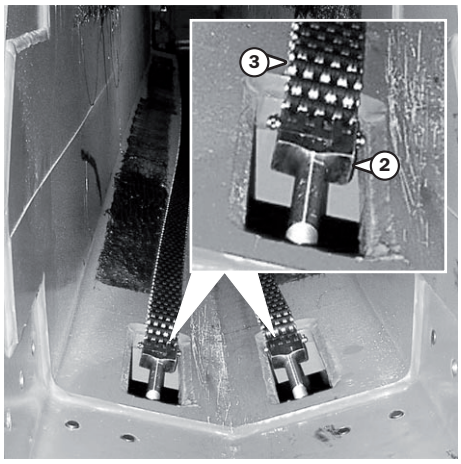
COMPLETE TELESCOPIC BOOM REFIT

PREASSEMBLY OF EXTERNAL BOOM

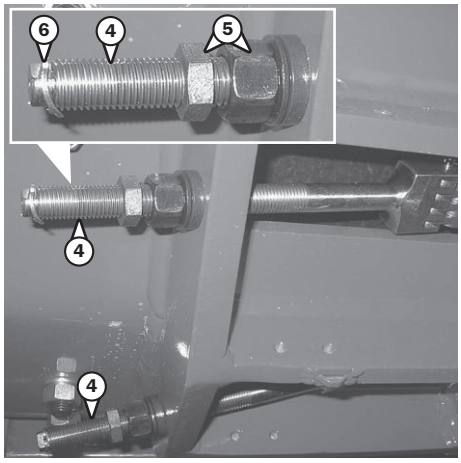
Lubricate the internal walls of the external arm with grease (see “Lubricants” table in the User and Maintenance manual).



Then stretch the chains (Item 1) for retracting the IInd extension boom over them.

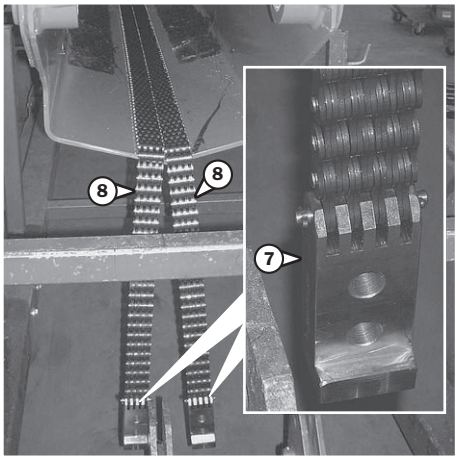


Fit the tie rods (Item 2) with their combs at the front end of the chain (Item 3).

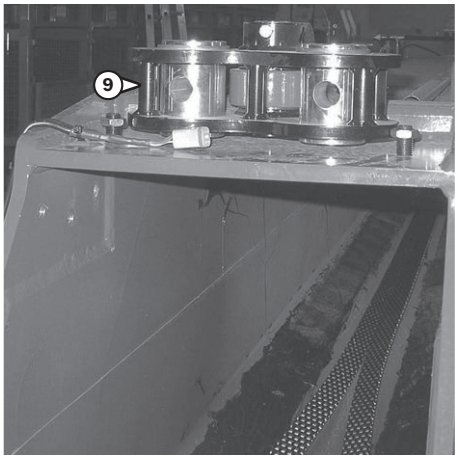


Insert the fixing tie rods (Item 4) into their holes in the lower front of the external boom; for each tie rod fit 2 washers, one cylindrical and one conical and screw on the nut and locknut (Item 5) before inserting the safety split pin (Item 6).

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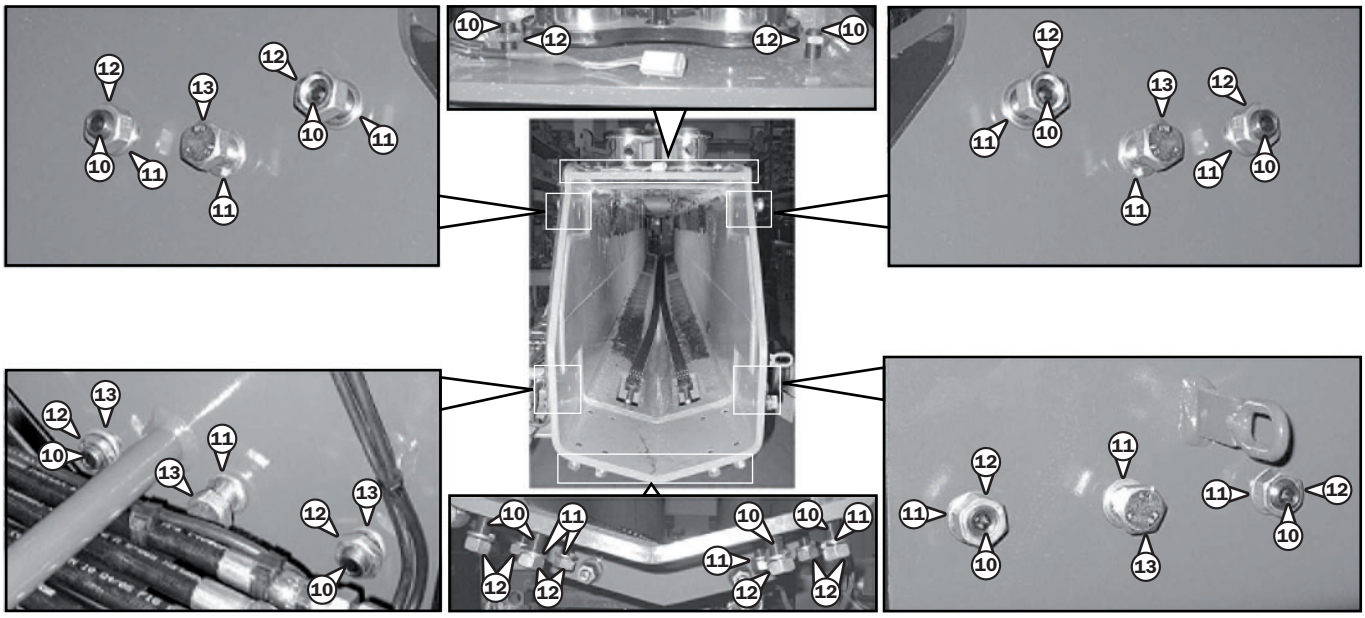


Fit the combs (Item 7) to the rear end of the chain (Item 8) and stretch the chain towards the end of the external boom.

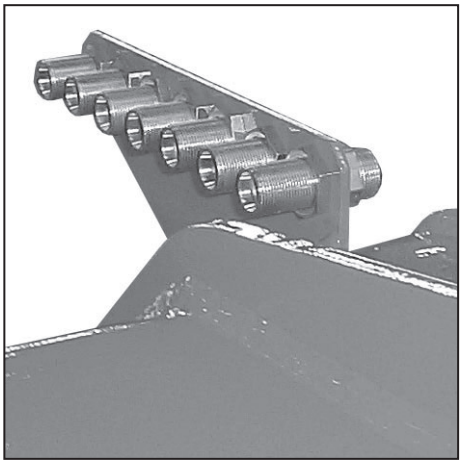


Fit 2 equalisers supporting the external chain tie rods (Item 9), on the upper wall of the external boom.

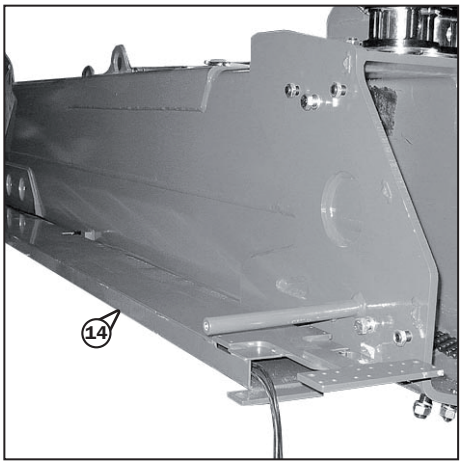
Keeping the boom head on, preassemble on the front walls of the external boom:
- on the right side, runner adjustment grub screws (Item 10) several split washers and locknuts (Item 11 and 12) and runner fixing screws (Item 13);
- on the left side, runner adjustment grub screws (Item 10) with locknuts (Item 12) and runner fixing screws with split washers (Item 11 and 13);
- on the upper side, runner adjustment grub screws (Item 10) with locknuts (Item 12);
- on the lower side, runner adjustment grub screws (Item 10), several split washers and locknuts (Item 11 and 12).



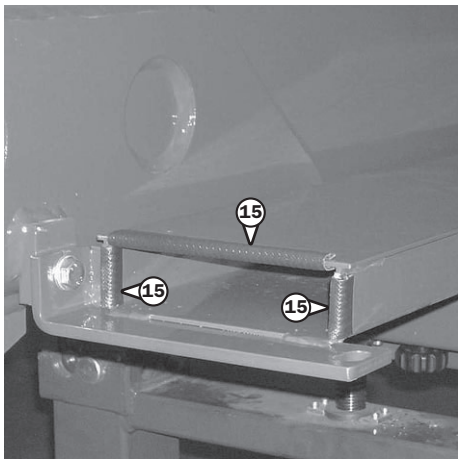
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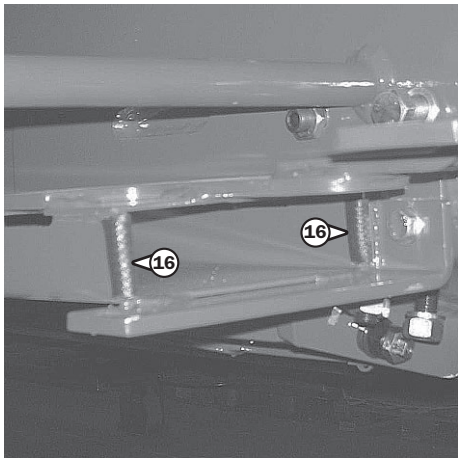
Fit the feed through connectors in the drilled rib in the rear part of the external boom.

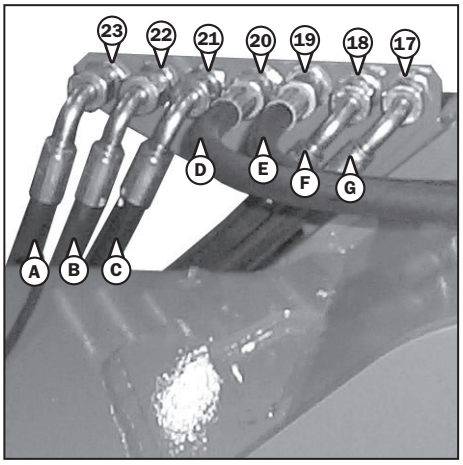


Fit the tubular chain carrier (Item 14) on the right side of the external boom.

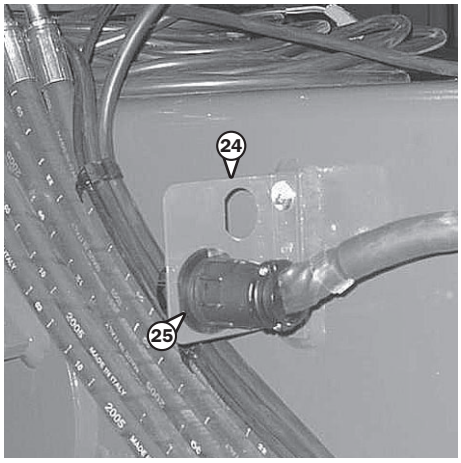


In all the tubular chain carriers fit edge protector seals to the rear (Item 15) and front (Item 16) ends to prevent breakage of the hydraulic pipes.

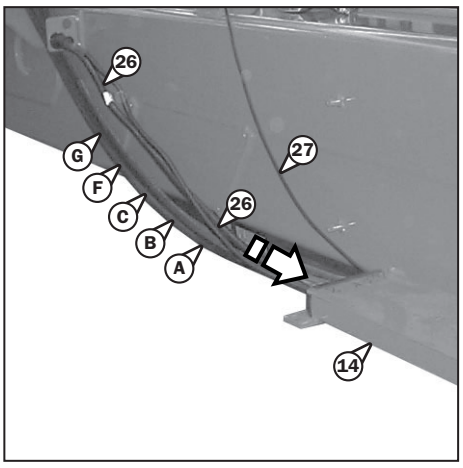




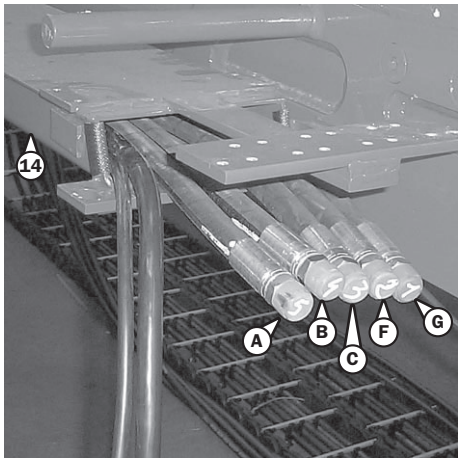
Fit the traverse command hydraulic pipes (Item G and F) to the feed through connectors (Item 17 and 18).
Fit the extension command hydraulic pipes (Item E and D) to the feed through connectors (Item 19 and 20).
Fit the optional command hydraulic pipes (Item C and B) to the feed through connectors (Item 21 and 22).
Fit the hydraulic drain tube (Item A) to the bulkhead feedthrough (Item 23)
Mark all the tubes with the corresponding number.



Fit the electric socket plate (Item 24) in the rear right part of the external arm.
Connect the multipin electric plug (Item 25) of the platform cable to the plate (Item 24).

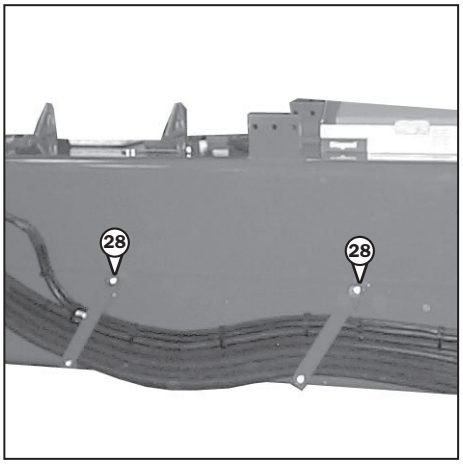


Insert the chain-carrier tube (Item 14):
- the cable for the platform socket (Item 26), keeping it to the outside of the tube;
- the wiring for the 3 chain fault microswitches (Item 27) to the outer boom.

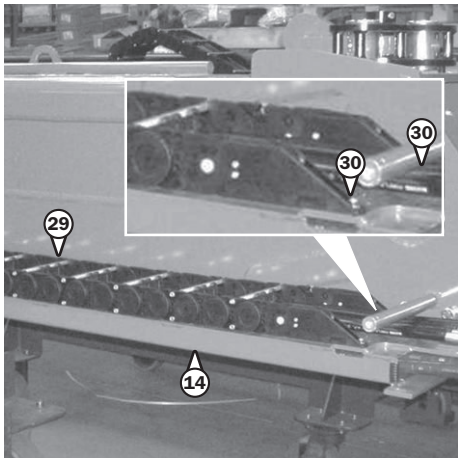


Insert the hydraulic tubes (Item G - F - C - B - A), previously attached to the feedthrough couplings, inside the chain-carrier tube (Item 14) in sequence.

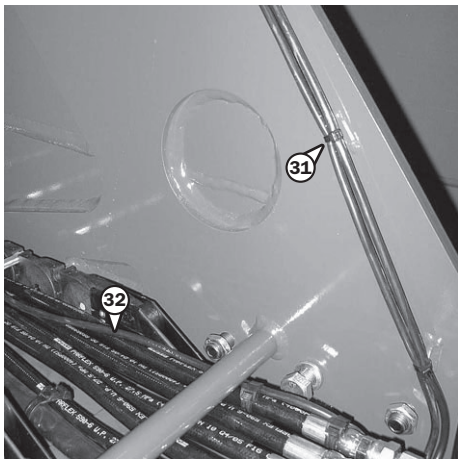
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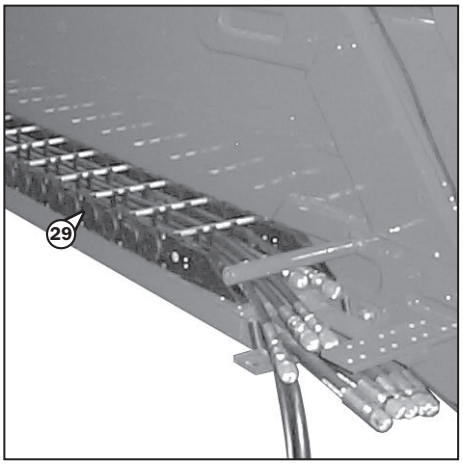
Attach the hydraulic tubes (Item G - F - C - B - A) and the electric cables (Item 26 and 27) to the outer boom with the appropriate clips (Item 28).
Tie the electric cables to the hydraulic tube.



Fit the first tube-carrier chain (Item 29) to the chain-carrier tube (Item 14) using the appropriate screws (Item 30).

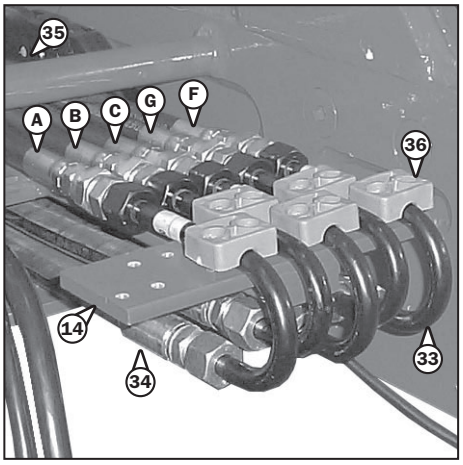


Tie (Item 31) the electric cable for the pair of microswitches directly to the wall of the boom.
Insert the cable for connection to the single microswitch (Item 32) into the tube-carrier chain of the outer boom.

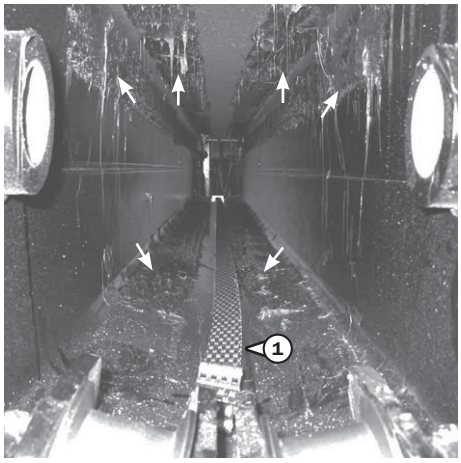


Prepare the hydraulic tubes then insert them into the tube-carrier chain (Item 29) numbering them on the back (E - G = traverse; C - B = optional; A = drainage).

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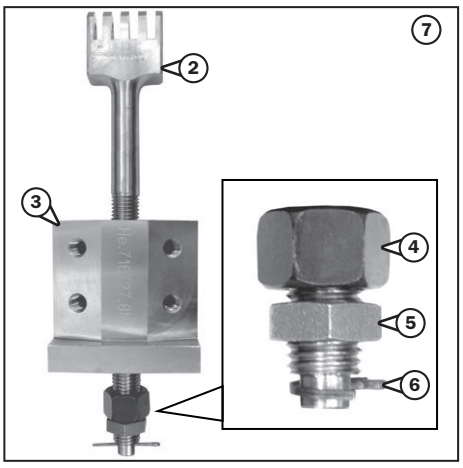


Connect elbow connectors (Item 33) to the tubes (Item 34) inside the tubing (Item 14) and then to the tubes (Item 35) inside the chain (Item 29) following the sequence from the inside of the boom to the outside, alternating the long and short couplings.
Fix the couplings with the collars (Item 36) to the chain-carrier tubing (Item 14).
In the passages between the chain-carrier tubing tube-carrier chains, secure the electric cables to the hydraulic tubes with straps.

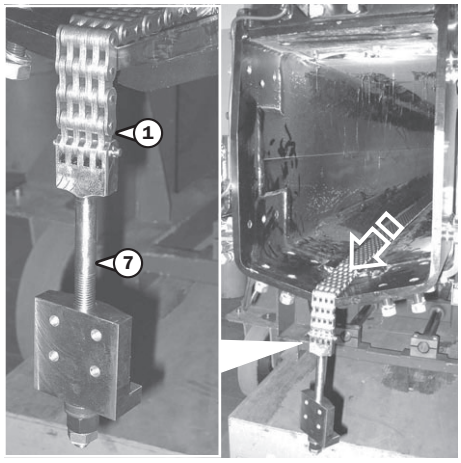


PREASSEMBLY OF BOOM Ist EXTENSION

Lubricate the internal walls of the boom Ist extension with grease (see “Lubricants” table in the User and Maintenance manual) then stretch over the chain (Item 1) for retracting the boom IIIrd extension.

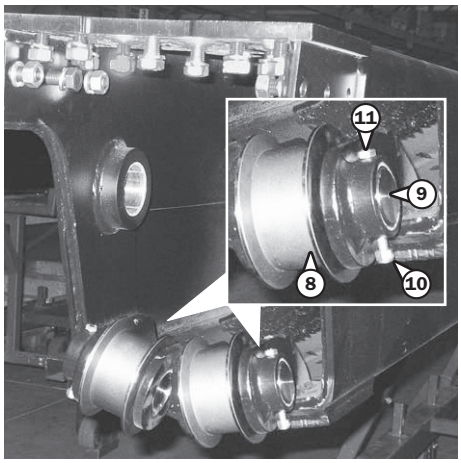


Preassemble the internal chain tie rod for retracting the IIIrd extension: fit the tie rod with combs (Item 2) built-into the fixing for the tie rod (Item 3); screw a nut and locknut (Item 4 and 5) onto the tie rod until the safety split pin (Item 6) can be inserted.



Fit the preassembled tie rod (Item 7) to the front end of the inner chain (Item 1) and stretch the chain towards the front of the external boom.

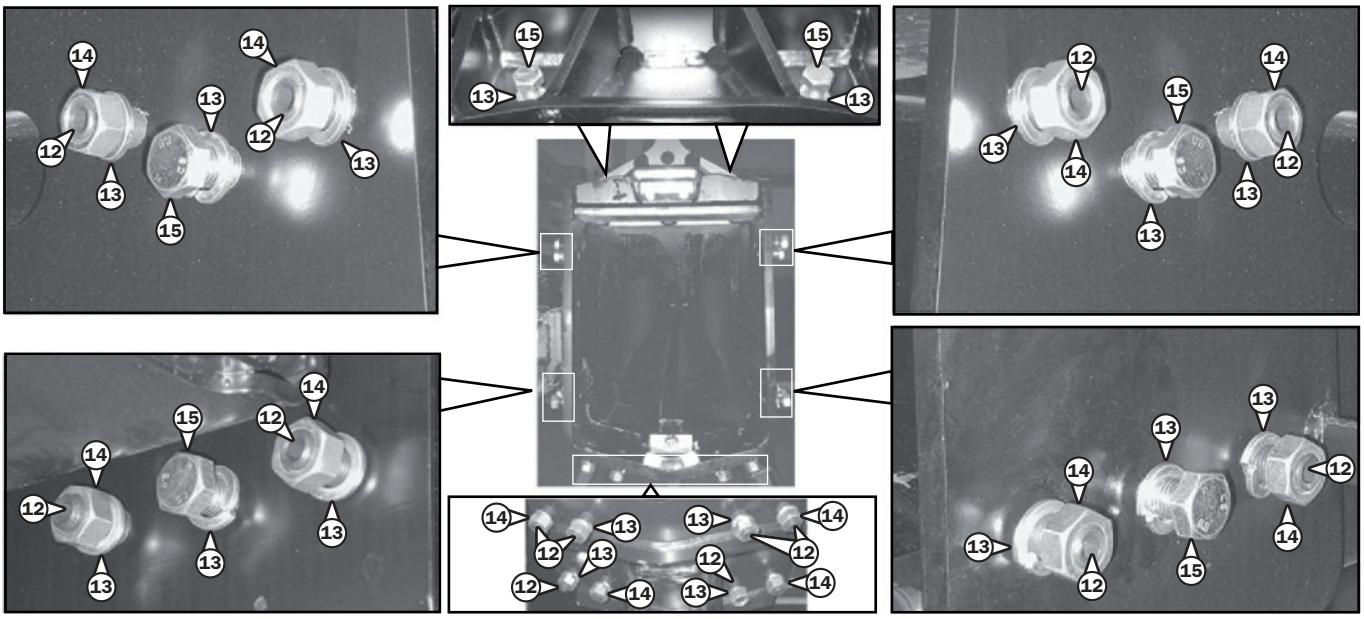
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Fit the pulleys (Item 8) into the rear part of the boom Ist extension, locking the pin (Item 9) with the appropriate screw and nut (Item 10 and 11).

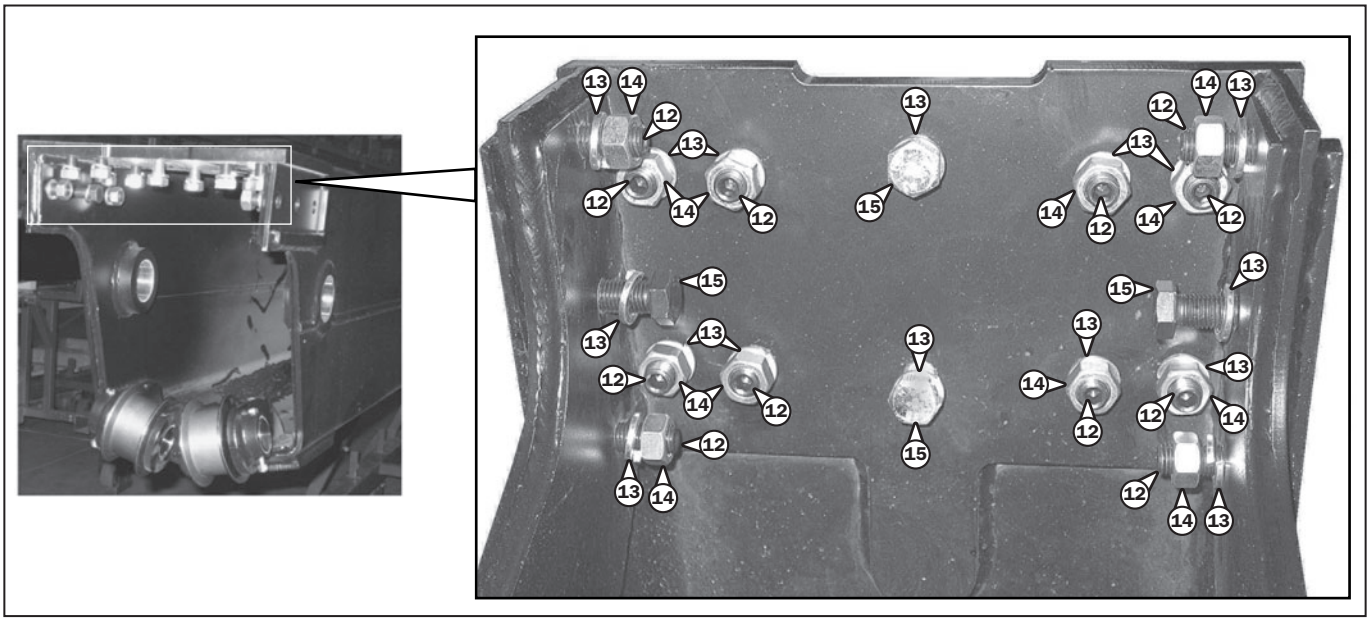
Grease the pulley spindle (see “Lubricants” table in the User and Maintenance manual).

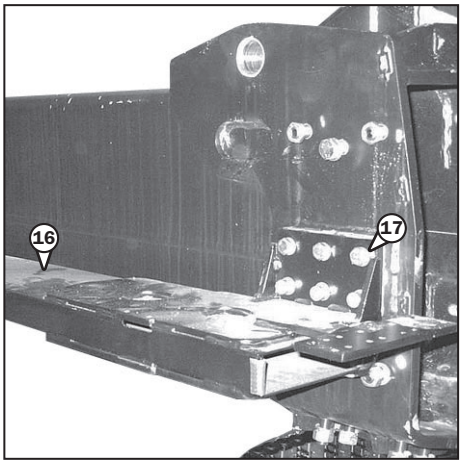
Preassemble on the external walls in front of the Ist extension:
- on the right, foot adjustment grub screws (Item 12) several split washers and locknuts (Item 13 and 14) and foot fixing screws with split washer (Item 15 and 13);
- on the left, foot adjustment grub screws (Item 12 and locknuts (Item 14) and foot fixing screws with split washer (Item 15 and 13);
- on the top, foot adjustment grub screws (Item 12) several split washers and locknuts (Item 13 and 14) foot fixing screws with split washer (Item 15 and 13).



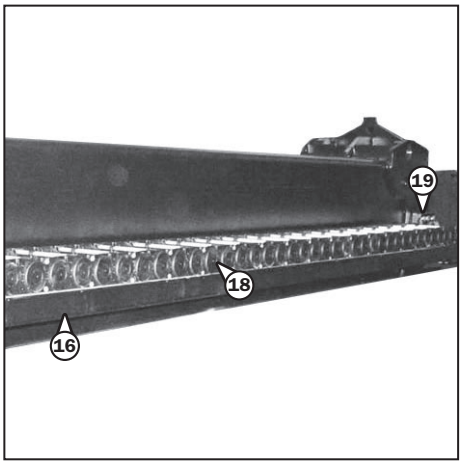
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Behind the boom Ist extension, preassemble to the inner walls:
- on the right and left, foot adjustment grub screws (Item 12) several split washers and locknuts (Item 13 and 14) and foot fixing screws with split washer (Item 15 and 13);
- on the top, foot adjustment grub screws (Item 12) several split washers and locknuts (Item 13 and 14) foot fixing screws with split washer (Item 15 and 13).



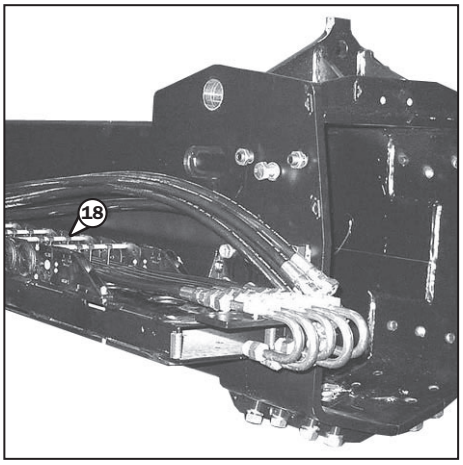


Fit the chain-carrier tube (Item 16) to the boom Ist extension, fixing it at the front with the appropriate screws (Item 17).

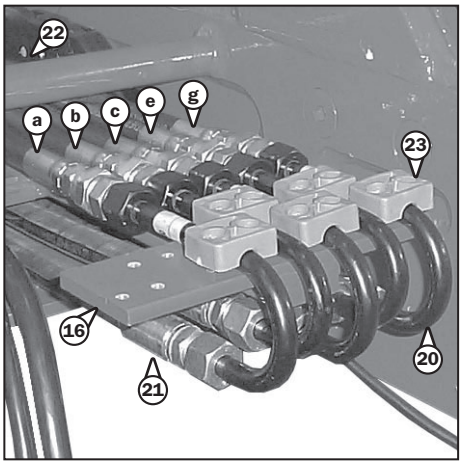


Fit the second tube-carrier chain (Item 18) to the chain-carrier tubing (Item 16), fixing it with the appropriate screws (Item 19).

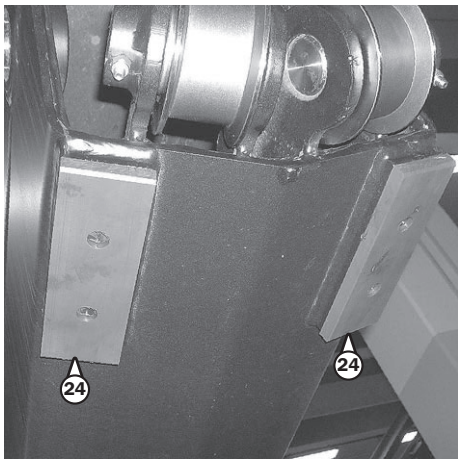
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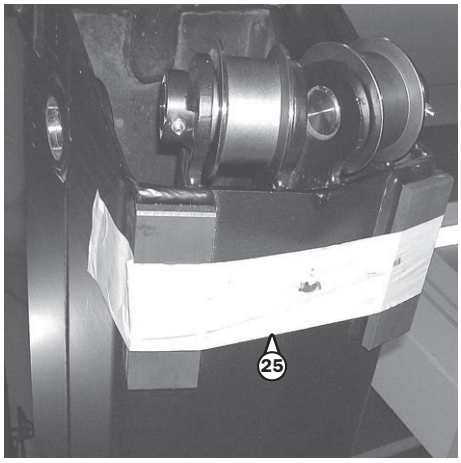
Prepare the hydraulic tubes then insert them into the tube-carrier chain (Item 18) numbering them on the back (E - G = traverse; C - B = optional; A = drainage).



Connect the elbow couplings (Item 20) to the tubes (Item 21) inside the tubing (Item 16) and then to the tubes (Item 22) inside the chain (Item 18) following the sequence from the inside to the outside of the boom, alternating the short and long couplings.
Fix the couplings with the collars (Item 23) to the chain-carrier tubing (Item 16).
In the passages between the chain-carrier tubing tube-carrier chains, secure the electric cables to the hydraulic tubes with straps.



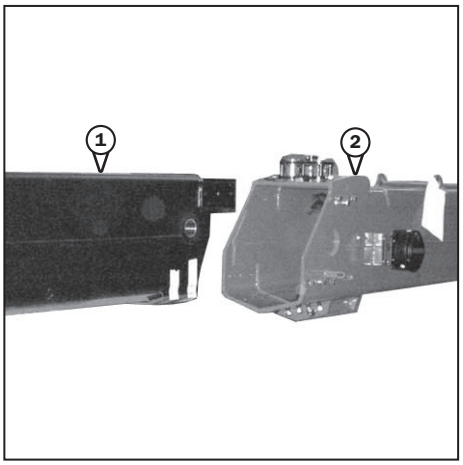
Preassemble the feet (Item 24) and fit them afterwards to the bottom of the boom Ist extension.



Then tape them with rubberised paper (Item 25) so that they do not fall from the tubing.

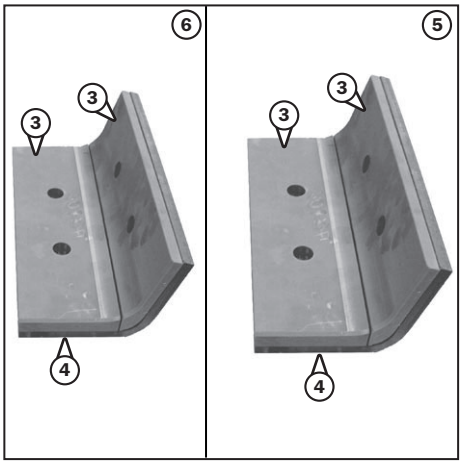
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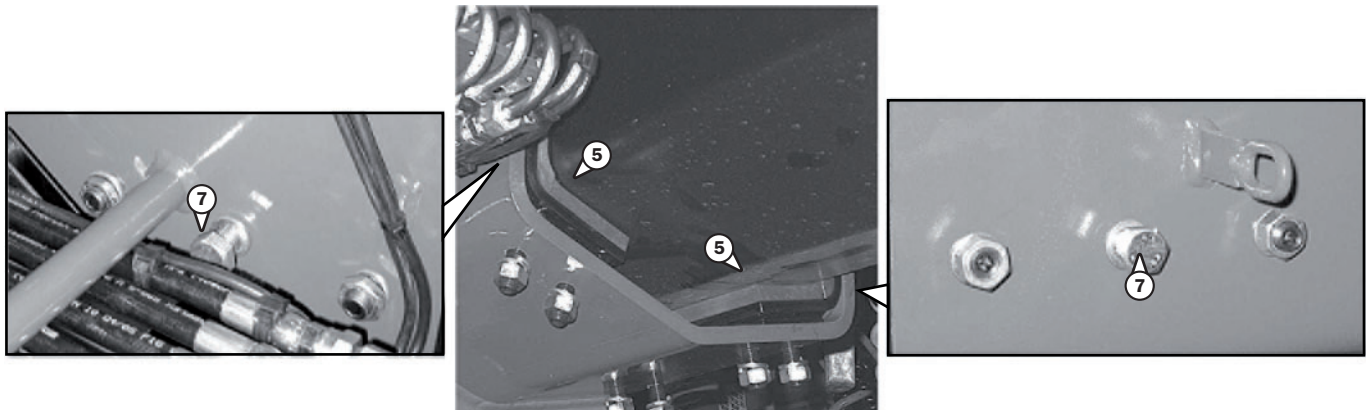
INSERT BOOM Ist EXTENSION INTO EXTERNAL BOOM

With a hoist or overhead crane, lift the boom Ist extension (Item 1) and insert it into the external boom (Item 2), leaving it projecting by 30-40 cm.



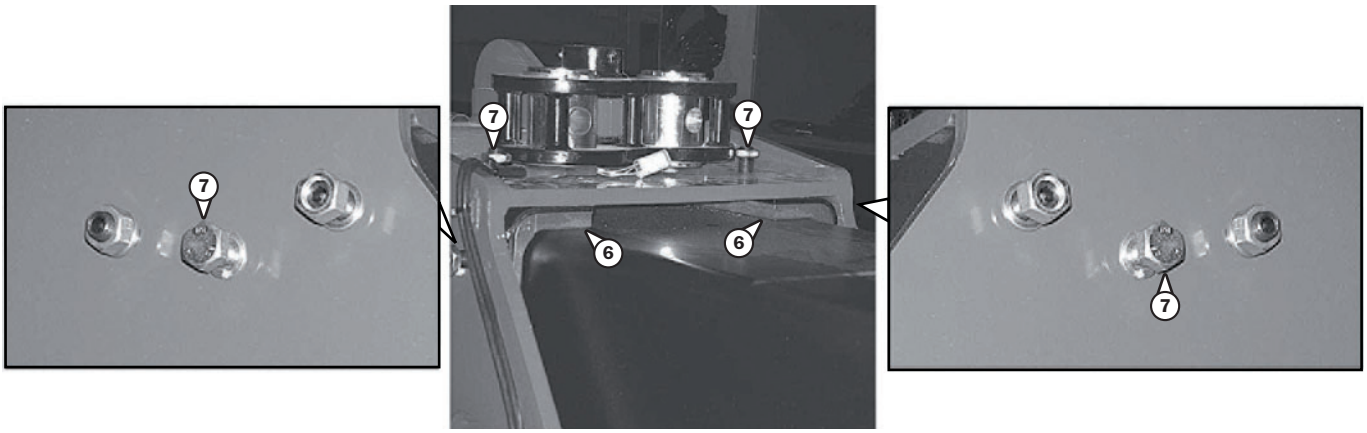
Prepare the feet (Item 3) on their own mountings (Item 4).
Note: the feet and mountings are of two different sizes. When assembled, the smallest are positioned on the top of the boom and the largest on the bottom.

Fit at the front between the external boom and Ist extension the preassembled lower and lateral feet (Item 5).
Only screw in the screws fixing the foot mountings (Item 7), located on the outer boom.

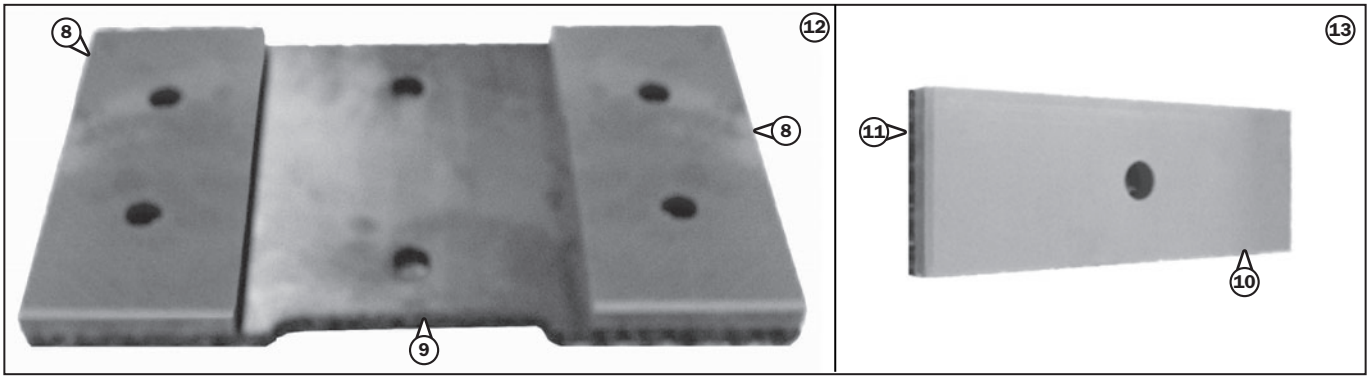


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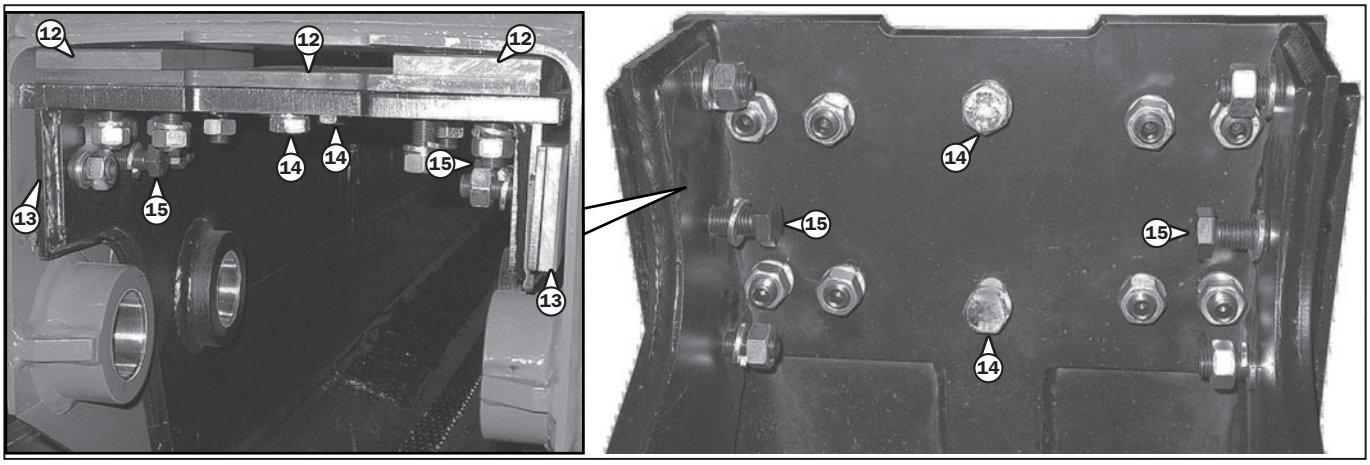
Fit the preassembled upper and lower feet (Item 6) at the front between the external boom and Ist extension.
Only screw in the screws fixing the foot mountings (Item 7), located on the outer boom.



Fully insert the Ist extension into the external boom.
Prepare the feet (Item 8) and upper rear foot mounting plate (Item 9), then the rear side feet plus their mountings (Item 10 and 11).



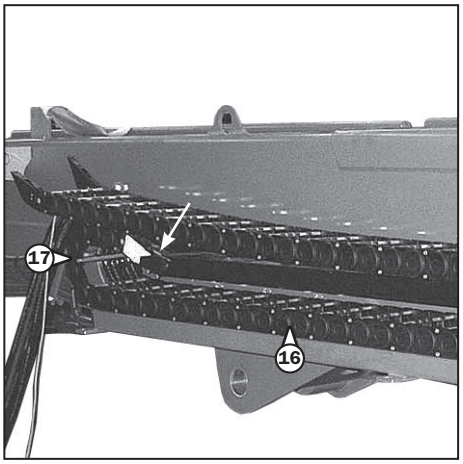
Fit the plate with the preassembled feet (Item 12) on the upper rear side of the boom Ist extension.
Screw in the two screws (Item 14) to secure the plate (Item 9).
Fit the preassembled feet and side mountings (Item 13) at the rear of the boom Ist extension.
Screw in the screws (Item 15) to secure the mountings (Item 11).



Adjust all the feet of the boom Ist extension.

50-04 Boom control and adjustment.

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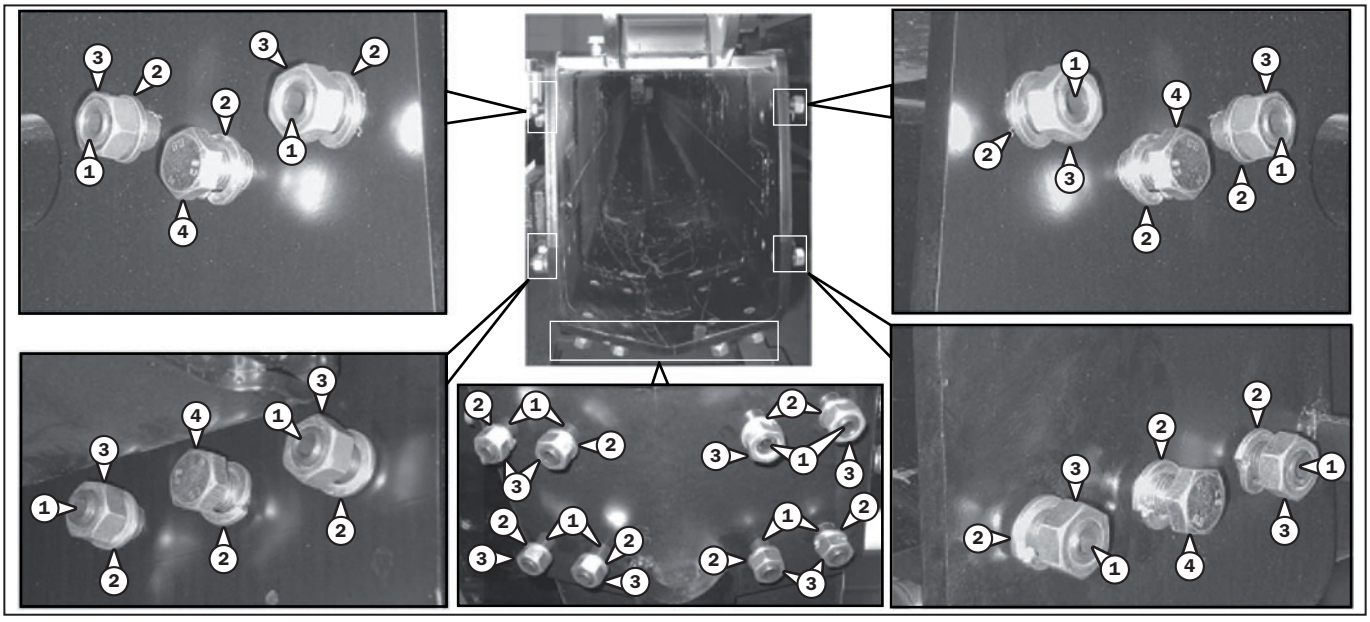
After connecting them, insert the electric cables and hydraulic tubes of the external boom tube carrier chain into the Ist extension tubing.
Fix the tube carrier chain (Item 16) of the boom external to the tubing of the Ist extension with the appropriate screws (Item 17).



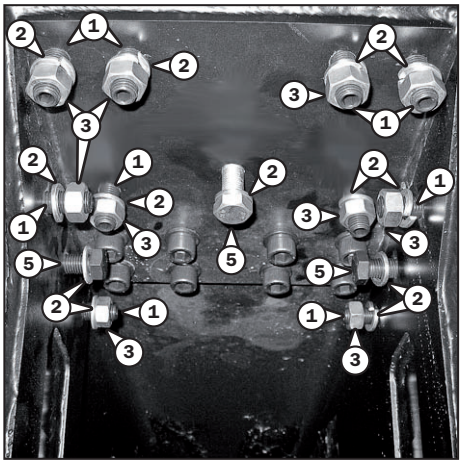
PREASSEMBLY OF THE IInd EXTENSION BOOM

Lubricate with grease (see “Lubricants” table in the User and Maintenance manual) the internal walls of the boom IInd extension.

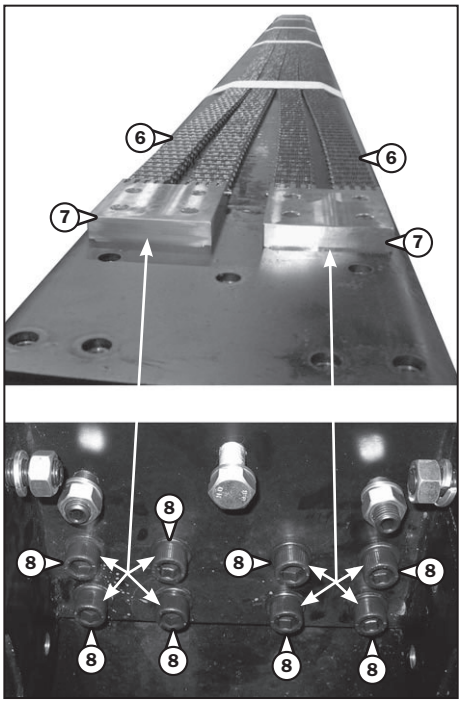
In front of the boom IInd extension, preassemble on the outer walls:
- on the right, feet adjustment grub screws (Item 1) plus split washers and locknuts (Item 2 and 3) and feet fixing with split washers (Item 4 and 2);
- on the left, feet adjustment grub screws (Item 1) and locknuts (Item 3) and feet fixing screws with split washers (Item 4 and 3);
- on the top, feet adjustment grub screws (Item 1) plus split washers and locknuts (Item 2 and 3) and feet fixing screws with split washers (Item 4 and 2).



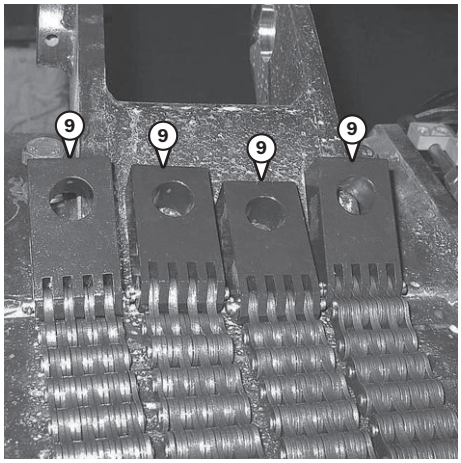
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Behind the boom IInd extension, preassemble on the internal walls:
- on the right and left, feet adjustment grub screws (Item 1) plus split washers and locknuts (Item 2 and 3) and feet fixing screws with split washers (Item 5 and 2);
- on the top, feet adjustment grub screws (Item 1) plus split washers and locknuts (Item 2 and 3) and feet fixing screws with split washers (Item 5 and 2).

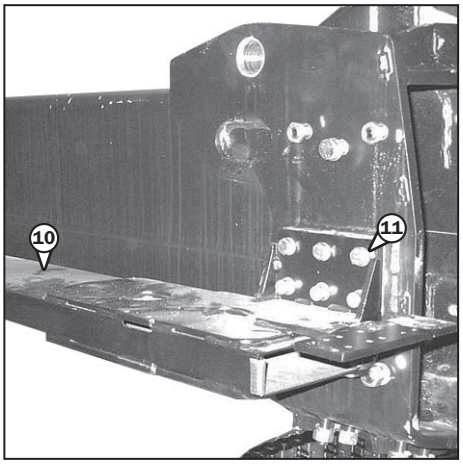


Stretch externally the 4 extension chains of the boom Ist extension (Item 6) on the boom IInd extension.
Assemble the chains with the combs (Item 7) and then fix them to the walls with the screws (Item 8), tightening them from the inside.
Finally tape the chains to the walls of the IInd extension.

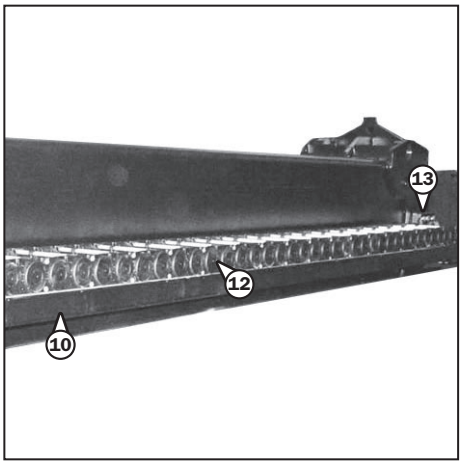


Assemble the fixing combs (Item 9) in front of the 4 extension chains (Item 6).

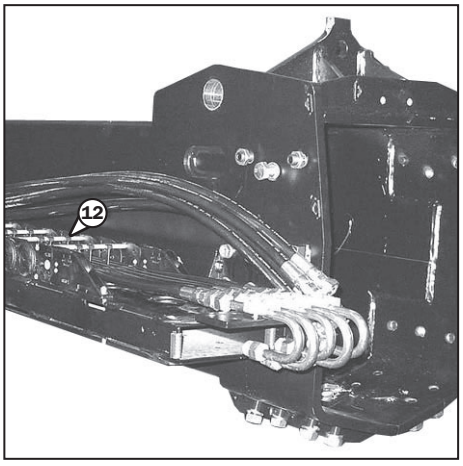
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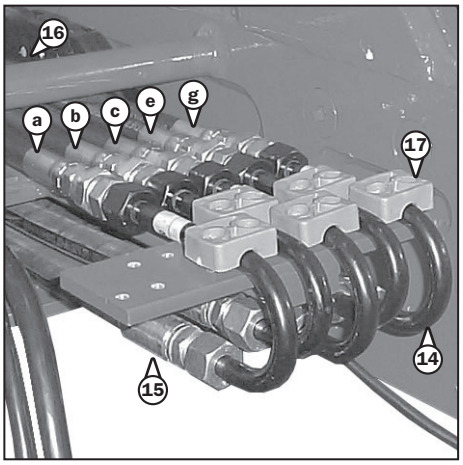
Fit the chain carrier tubing (Item 10) to the boom Ist extension, fixing it at the front with the appropriate screws (Item 11).



Fit the second tube carrier chain (Item 12) on the chain carrier tubing (Item 10), fixing it with the appropriate screws (Item 13).

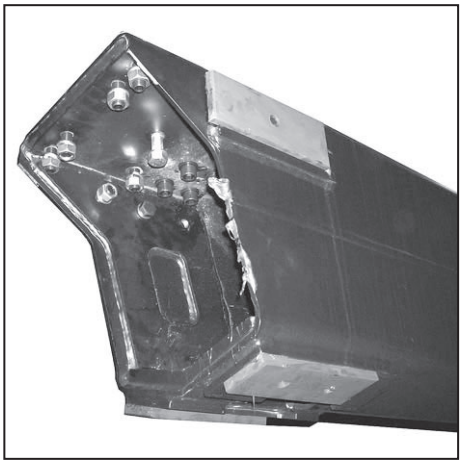


Prepare the hydraulic tubes then insert them into the tube carrier chain (Item 12) numbering them at the back (E - G = traverse; C - B = optional; A = drainage).

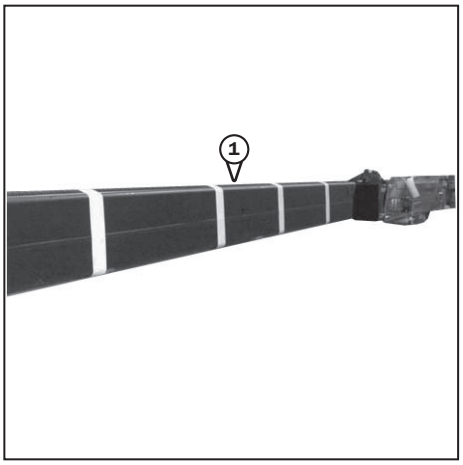


Connect the elbow couplings (Item 14) to the tubes (Item 15) inside the tubing (Item 10) and then to the tubes (Item 16) inside the chain (Item 12) following the sequence from the inside to the outside of the boom.
Fix the couplings with the collars (Item 17) to the chain carrier tubing.
In the passages between the chain-carrier tubing tube-carrier chains, secure the electric cables to the hydraulic tubes with straps.

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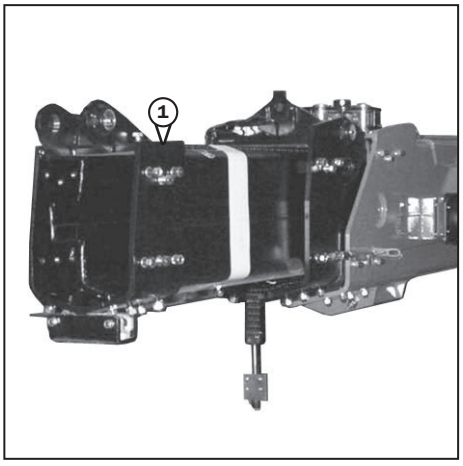


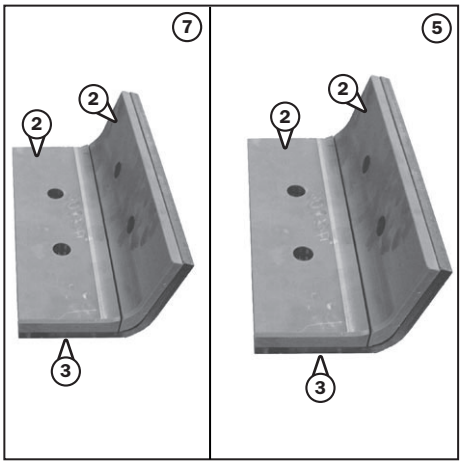
Preassemble the feet and fit them behind the bottom of the boom IInd extension, then tape them with rubberised paper so they do not fall from the tubing.



INSERT THE BOOM IInd EXTENSION INTO THE BOOM Ist EXTENSION

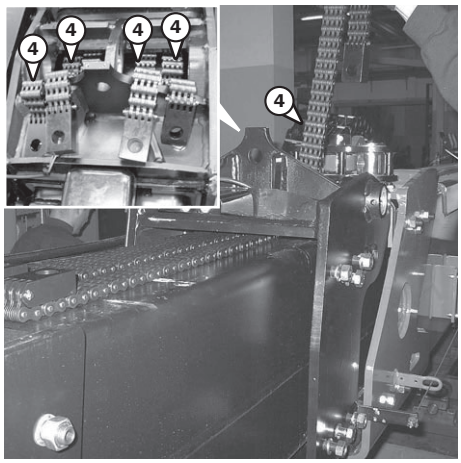
With a hoist or overhead crane, lift the boom IInd extension (Item 1) and insert it into the boom Ist extension, leaving it projecting 30-40 cm.





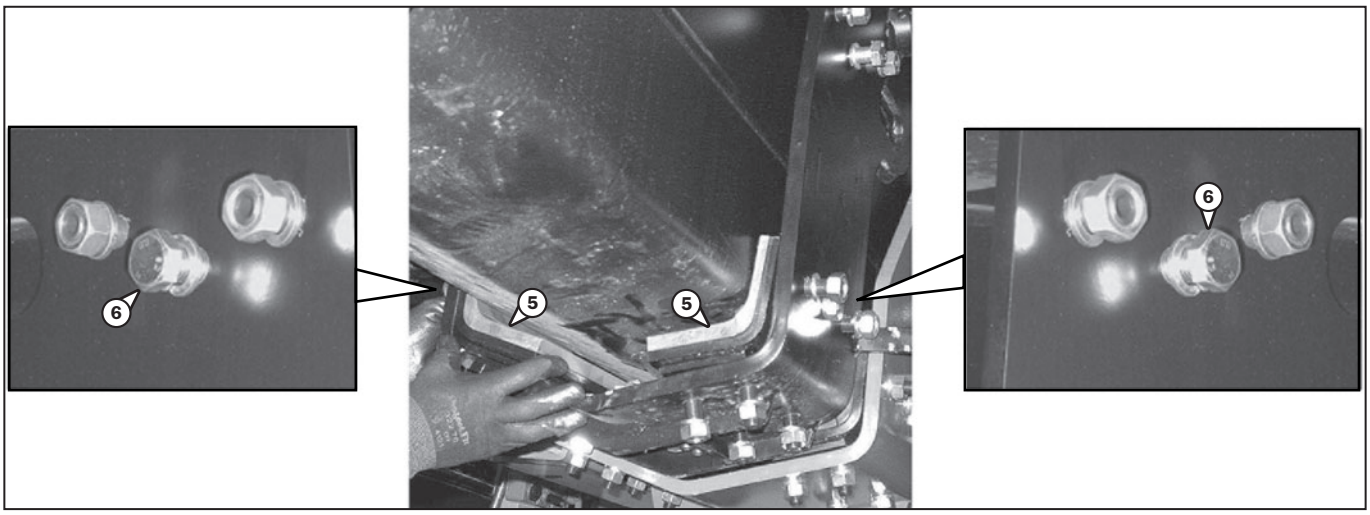
Prepare the feet (Item 2) on their own mountings (Item 3). Note: the feet and mountings are of two different sizes. When assembled, the smallest are positioned on the top of the boom and the largest on the bottom.

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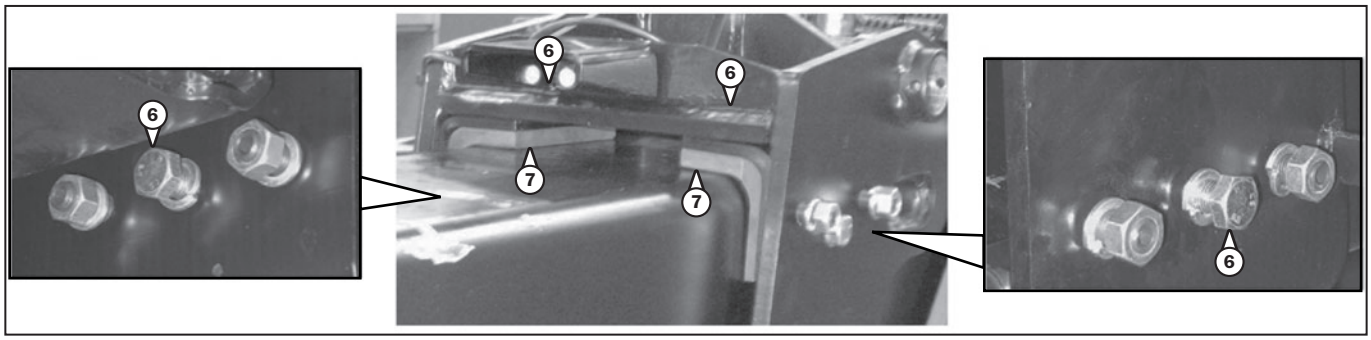


Extend the 4 chains (Item 4) in front from the boom IInd extension to the boom Ist extension.

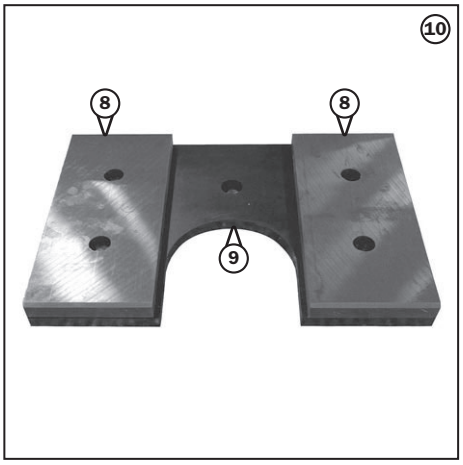
Fit the preassembled lower side feet (Item 5) in front between the boom Ist extension and the boom IInd extension.
Screw in only the fixing the feet mounting (Item 6), located on the external boom.



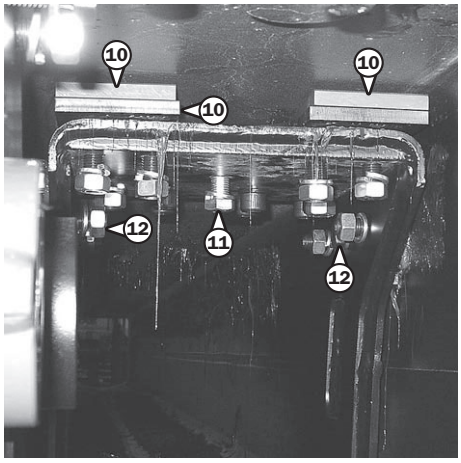
Fit the preassembled upper side feet (Item 7) in front between the boom Ist extension and the boom IInd extension.
Screw in only the fixing the feet mounting (Item 6), located on the external boom.



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Prepare the feet (Item 8) and the upper rear foot mounting plate (Item 9).



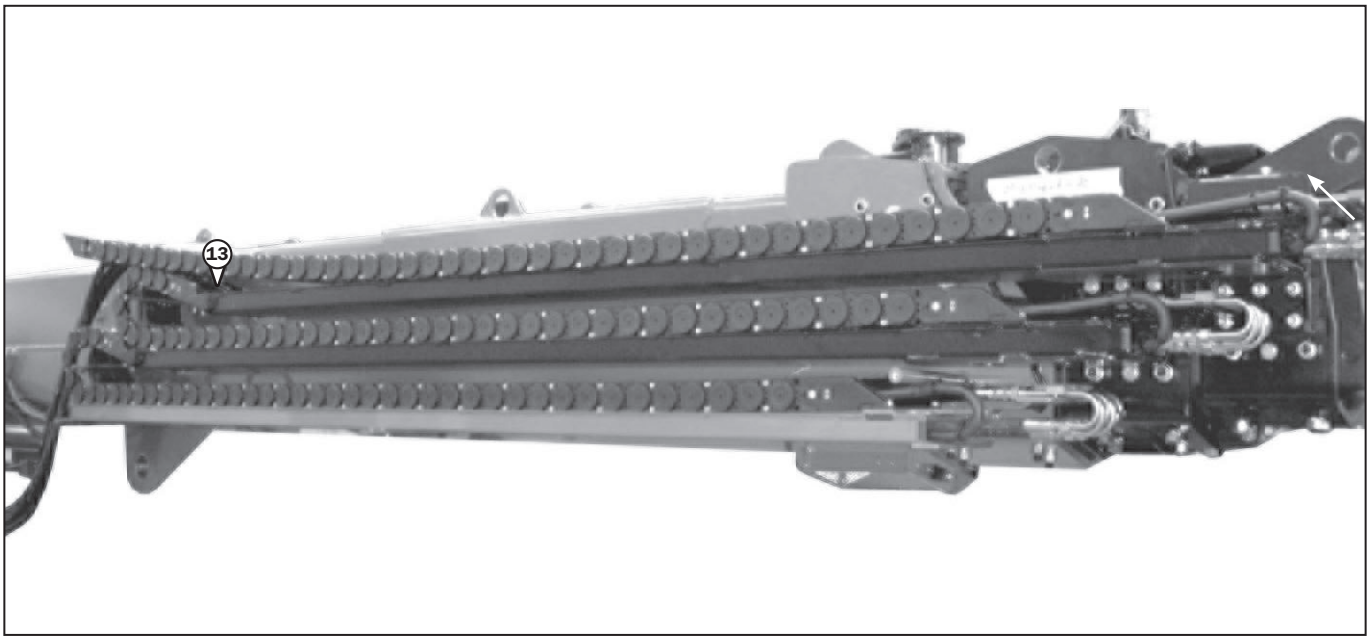
Fit the plate with the preassembled feet (Item 10) to the boom IInd extension, on the rear top side.
Screw in the screws (Item 11) to fix the plate.
Screw in the screws (Item 12) to fix the rear side foot mountings.

Adjust all the feet of boom IInd extension.

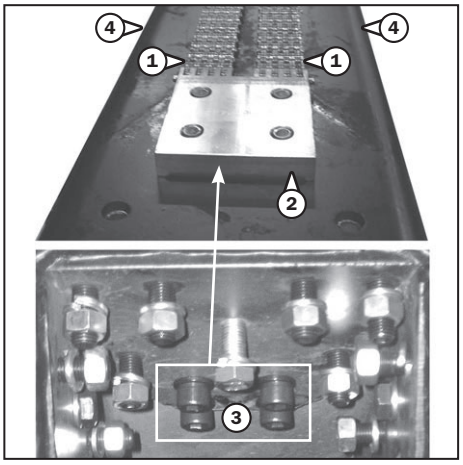
50-04 Boom control and adjustment.

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After connecting the tubes as previously shown, insert the electric cables and hydraulic tubes of the Ist extension tube carrier chain, into the IInd extension tubing.
Fix the tube carrier chain of the Ist extension (Item 13) to the tubing of the IInd extension with the appropriate screws.

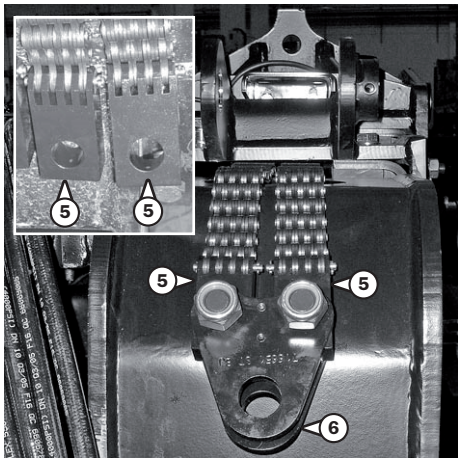


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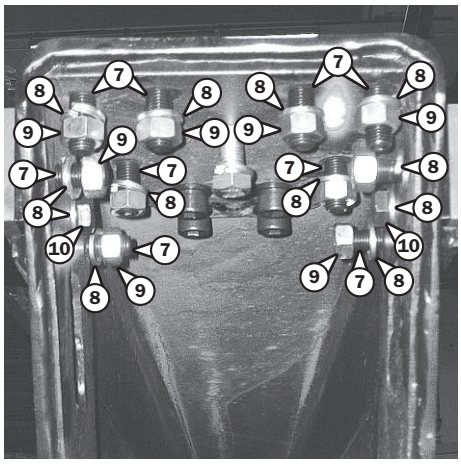


PREASSEMBLING THE BOOM IIIrd EXTENSION

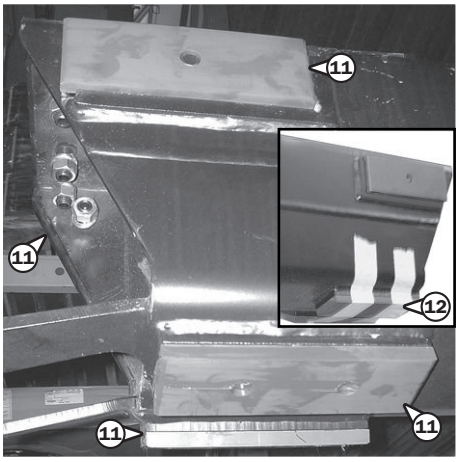
Stretch the 2 extension chains of the IInd boom (Item 1) externally onto the boom IIIrd extension.
Assemble the chains with their combs (Item 2) and then fix them to the walls with their screws, tightening them from the inside (Item 3).
Finally, tape the chains to the wall of the extension (Item 4).



Assemble their fixing combs (Item 5) in front of the 2 extension chains (Item 1).
Lock the 2 combs (Item 5) to their equalisers (Item 6), with the appropriate screws and nuts.
Lock the pivot to the head of the boom.



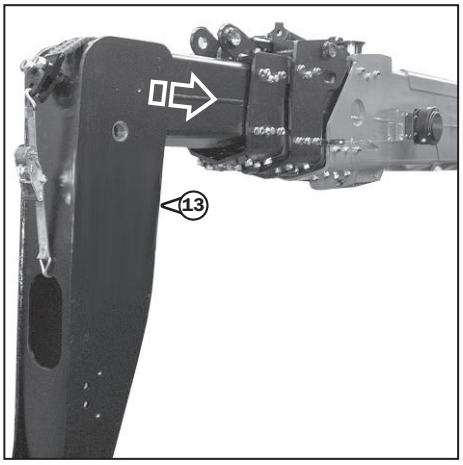
Behind the boom IIIrd extension, preassemble on the internal walls:
- on the right and left, foot adjustment grub screws (Item 7) plus split washers and locknuts (Item 8 and 9) and foot fixing screws with split washers (Item 10 and 8);
- on the top, foot adjustment grub screws (Item 7) plus split washers and locknuts (Item 8 and 9) and foot fixing screws with split washers (Item 10 and 8).



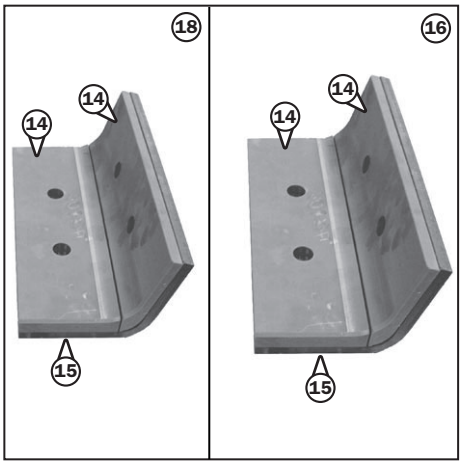
Preassemble the feet (Item 11) and fit them at the back to the bottom and side of the boom IIIrd extension.
Then tape them with rubberised paper (Item 12) so they do not fall off the tubing.

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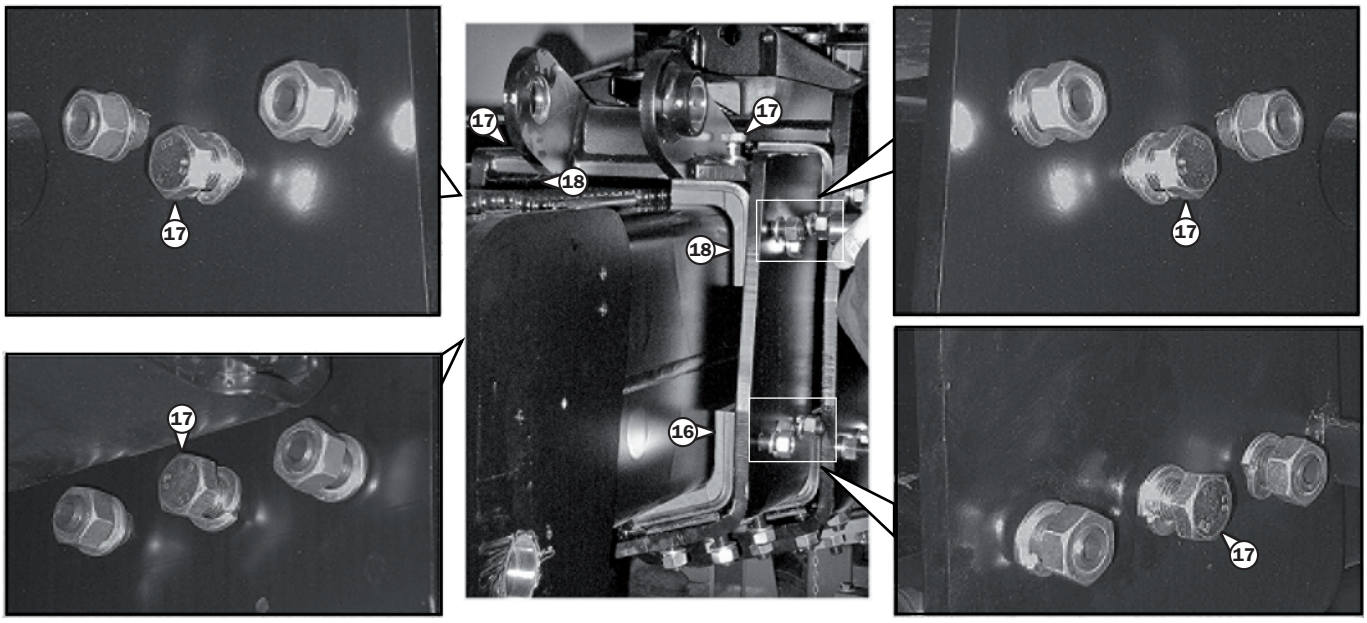


With a hoist or overhead crane, lift the boom IIIrd extension (Item 13) and insert it into the boom IInd extension, leaving it projecting 30-40 cm.

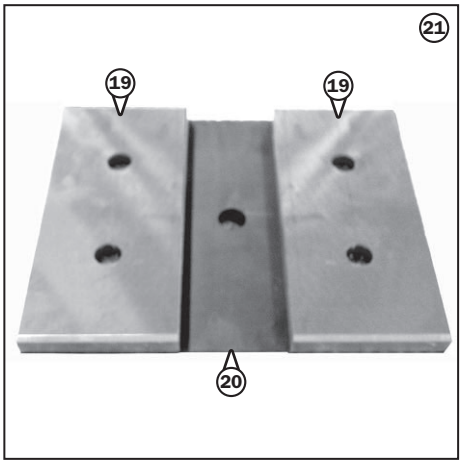


Prepare the feet (Item 14) on their mountings (Item 15).
Note: the feet and mountings are of two different sizes. When assembled, the smallest are positioned on the top of the boom and the largest on the bottom.

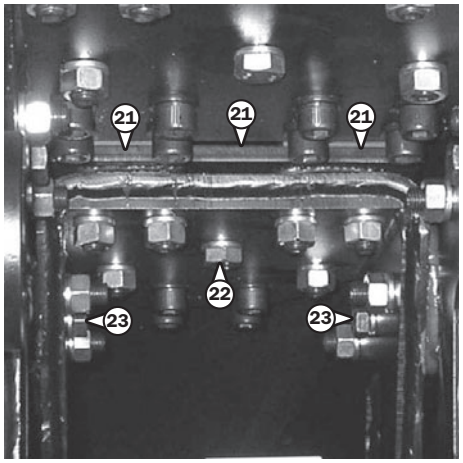
Fit the lower side feet (Item 16) at the front between the boom IInd extension and boom IInd extension.
Screw in only the foot mounting fixing screws (Item 17), on the external boom.
Fit the upper side feet (Item 18) at the front between the boom IInd extension and boom IIIrd extension.
Screw in only the foot mounting fixing screws (Item 17), on the external boom.



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Prepare the feet (Item 19) and the rear upper foot mounting plate (Item 20).



Fit on the boom IInd extension, on the upper rear side, the plate with the preassembled feet (Item 21).
Screw in the screws (Item 22) to fix the plate.
Screw in the screws (Item 23) to fix the rear side feet mountings.

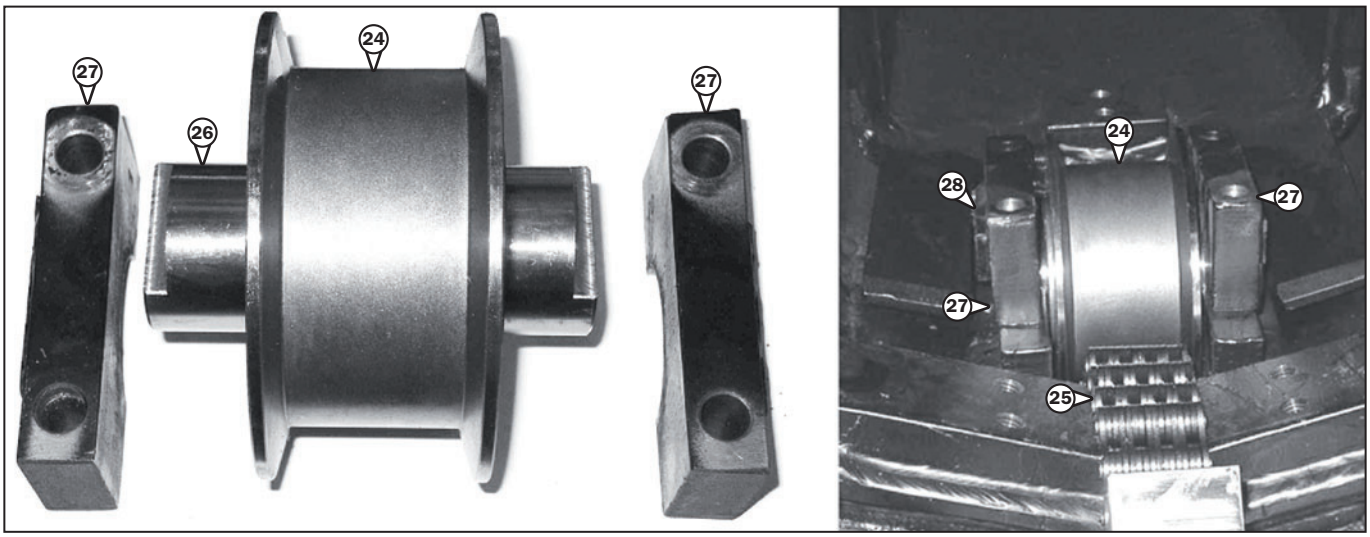
Adjust all the feet of the boom IIIrd extension.

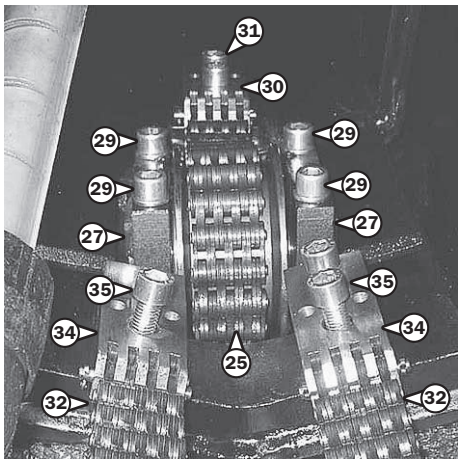
50-04 Boom control and adjustment.

Fully close the IIIrd extension.

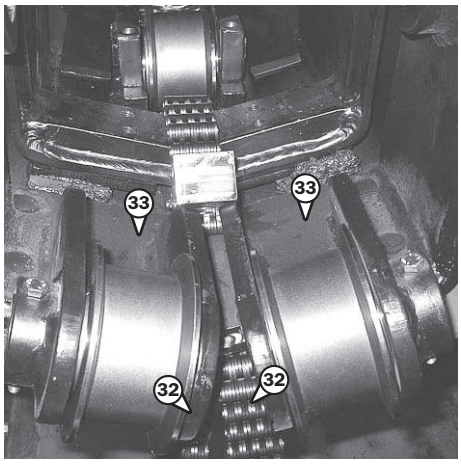
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Prepare the pulley (Item 24) for sliding the single internal chain (Item 25), with its spindle (Item 26) and the 2 crescent washers (Item 27) that lock the spindle.



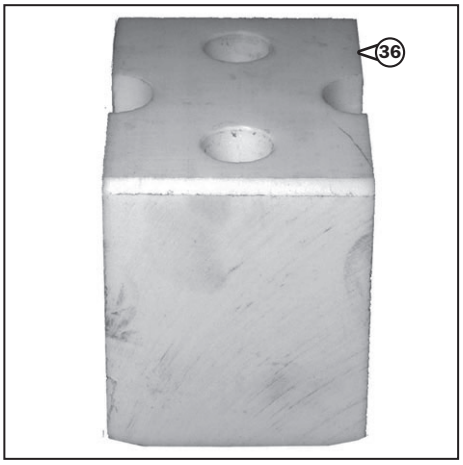


Fit the pulley (Item 24) with its spindle (Item 26) in their seatings in the back of the IIIrd extension, keeping the 2 chamfers (Item 28) of the spindle facing upwards.
Lock the spindle (Item 26) with the 2 crescent washers (Item 27) screwing them on with the appropriate screws (Item 29).
Apply loctite blue 243 before tightening.
Tighten the screws (Item 29) using a tightening torque of 70 Nm.
Slide the single internal chain (Item 25) into the pulley (Item 24) and fix its combs (Item 30) into the lower wall of the IIIrd extension, in its seating, with the appropriate screws (Item 31).

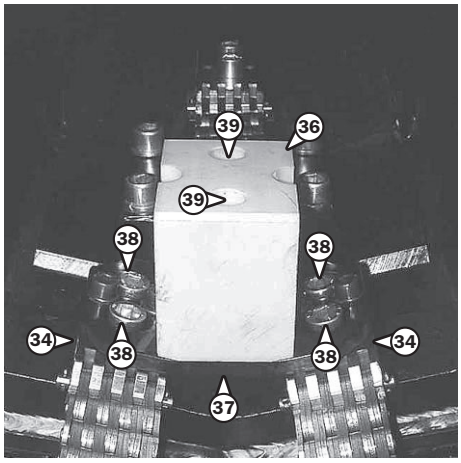


In the rear part of the IInd extension, slide the 2 internal chains (Item 32) into the pulleys (Item 33) of the Ist extension, position the combs (Item 34) of the chains on the lower walls of the IInd extension, in its seating, fixing them with the appropriate screws (Item 35).

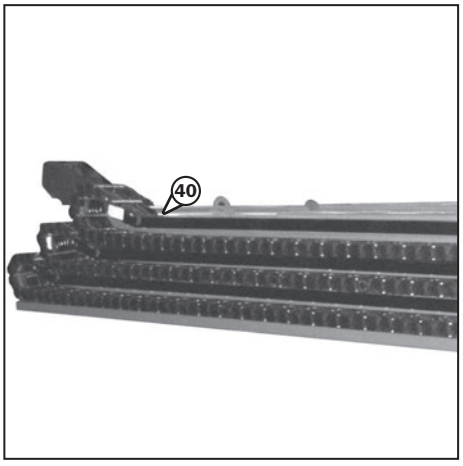
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Prepare the square foot (Item 36).

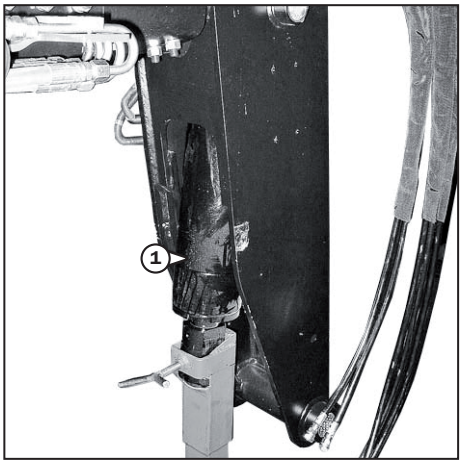


Then support the mounting (Item 37) for the square foot over the combs (Item 34) and fix it with the appropriate screws (Item 38).
Now fit the square foot (Item 36) to the mounting fixing it with the appropriate screws (Item 39).



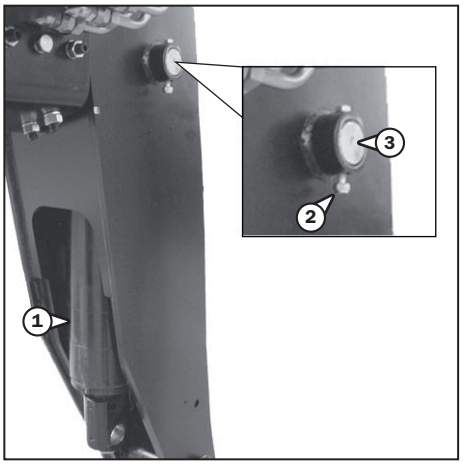
Insert the electric cables and hydraulic tubes of the IInd extension tube carrier chain, into the IIIrd extension tubing.
Fix the IInd extension tube carrier chain to the IIIrd extension tubing with the appropriate screws (Item 40).

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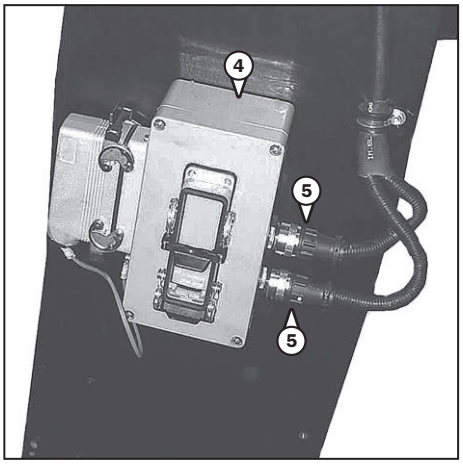


FIT THE TRAVERSE JACK

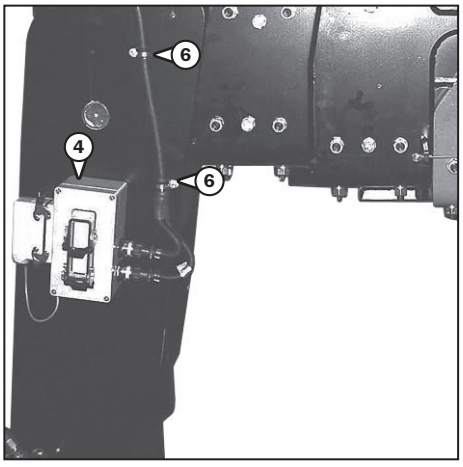
Check that the valve block is correctly mounted on the traverse cylinder (Item 1).
With the help of an overhead crane or hoist insert the traverse cylinder (Item 1) into the seating in the boom IIIrd extension.



Insert the hinge pin (Item 3) into the traverse cylinder (Item 1) and lock it with the appropriate screw (Item 2).
Grease the traverse cylinder hinge pin (see “Lubricants table” in the User and Maintenance manual).



Fit the box (Item 4) for the platform socket on the left side of the head.
Connect the electric cables to the multi-pin socket on the platform (Item 5).

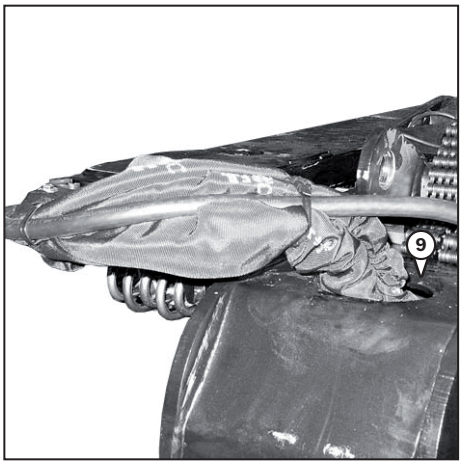


Tie (Item 6) the electric cable to the left side of the head of the boom IIIrd extension.

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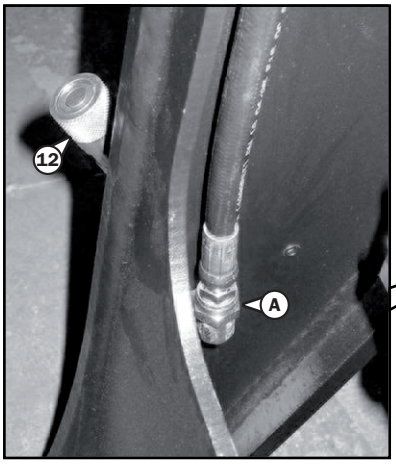


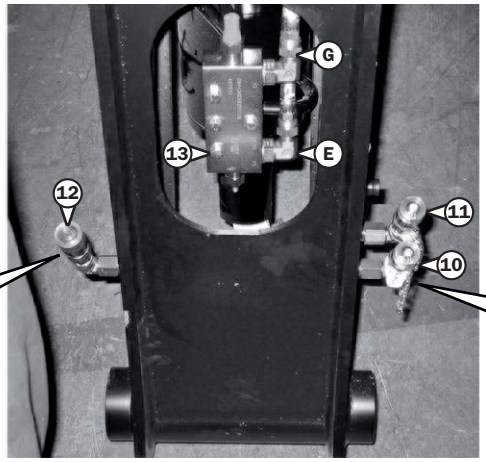
Protect the electric cables socket and the hydraulic tubes for the platform with a sheath (Item 8) then position the hydraulic tubes on the chain carrier tubing with the appropriate collar (Item 7) leaving them free for sliding and orientation.

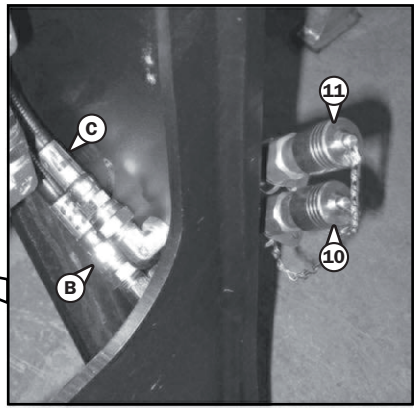


Insert the tubes into the head of the boom through the hole at the top (Item 9).

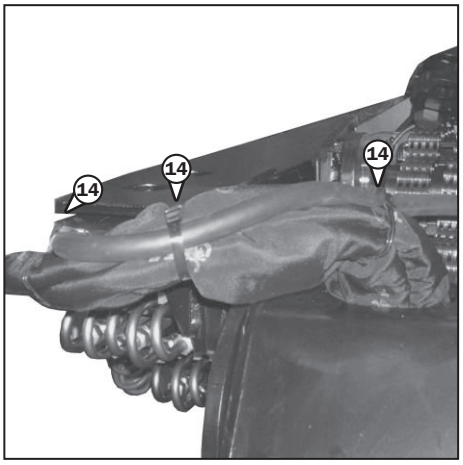
Fit the hydraulic couplings at 90° with the rapid couplings (male) (Item 10 and 11) on the left and (female) (Item 12) on the right of the head of the boom. Fit their plug carrier.
Connect the hydraulic tubes (Item E and G) to the valve block (Item 13) on the traverse cylinder.
Insert the tubes for the options (Item B and C) in the hole in the top of the head of the boom and connect them to the quick connectors (Item 10 and 11) on the left of the head of the boom.
Insert the drainage tube (Item A) in the hole in the top of the head of the boom and connect it to the quick connectoron the right side of the head of the boom (Item 12).



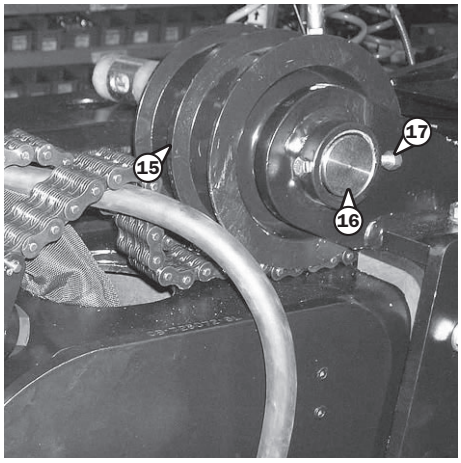




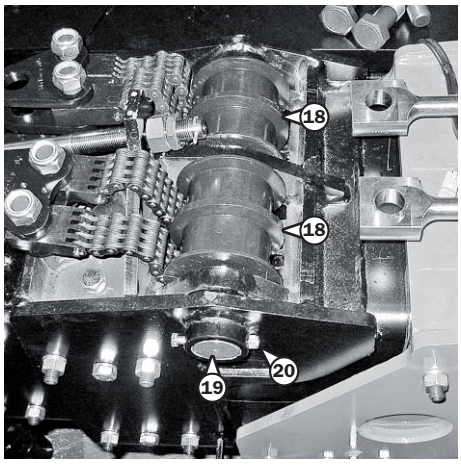
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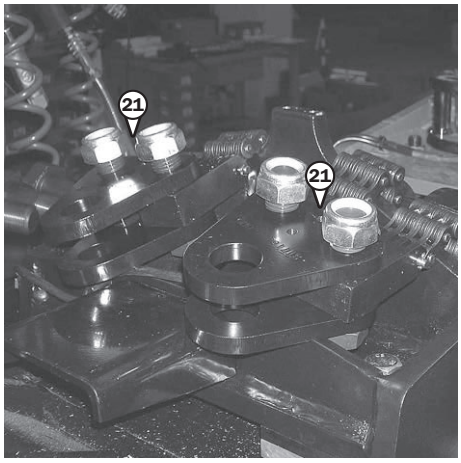
Tie (Item 14) the electric cable assembly to the sheath protecting the traverse command tubes, optional and drainage.



Fit the pulley (Item 15) in the upper front part of the boom IInd extension, locking the spindle (Item 16) with the appropriate screw (Item 17).
Lubricate the pulley spindle with grease (see “Lubricants table” in the User and Maintenance manual).

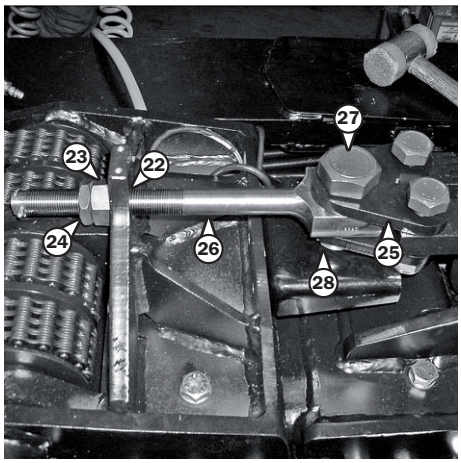


Fit the pulley (Item 18) in the upper front part of the boom Ist extension, locking the spindle (Item 19) with the appropriate screw (Item 20).
Lubricate the pulley spindle with grease (see “Lubricants table” in the User and Maintenance manual).

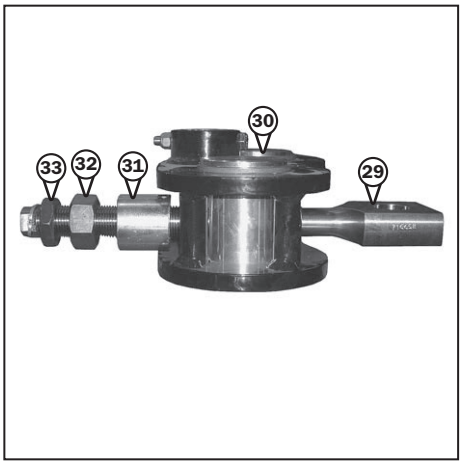


Slide the 6 chains for extending the booms onto the pulleys.
Fix the appropriate equalisers (Item 21) to the combs of the 4 chains.

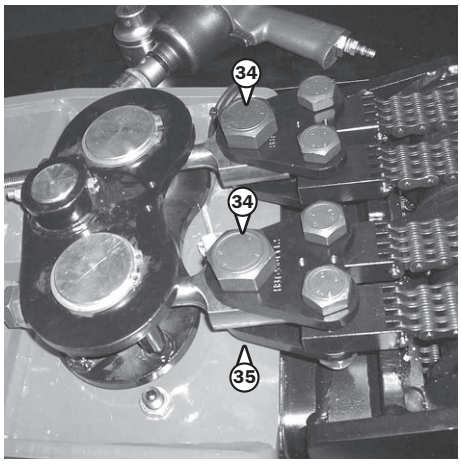
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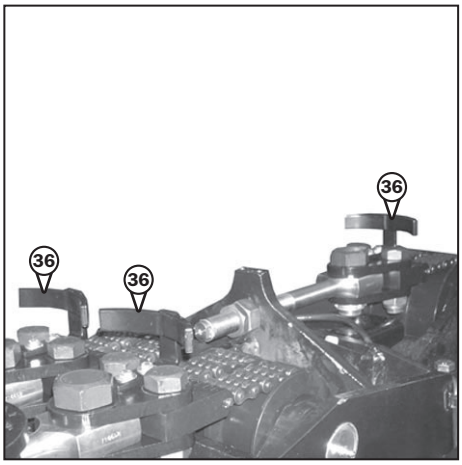
Insert the single tie rod of the 2 chains into the appropriate hole in the Ist extension (Item 22) and lock it with its nut (Item 23) and locknut (Item 24).
Fix the single tie rod (Item 25) in the bilanciere (Item 26) of the 2 chains with the appropriate bolts and nut (Item 27 and 28).



Insert the two tie rods (Item 29) of the 4 chains into the double equalisers (Item 30) on the external boom and lock them with their shims (Item 31), nuts and locknuts (Item 32 and 33).

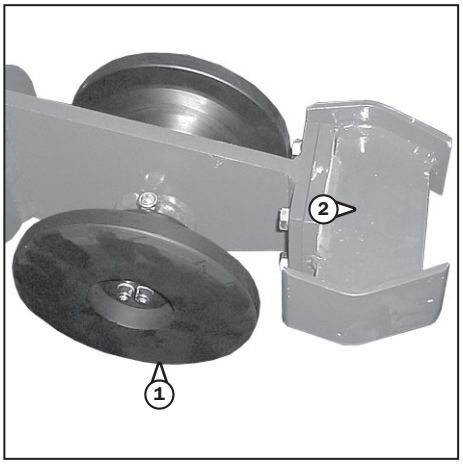


Fix the 2 tie rods in the equalisers of the 4 chains with the appropriate bolts and nuts (Item 34 and 35).
Tighten all the bolts of the equalisers and tie rods of the 6 chains.



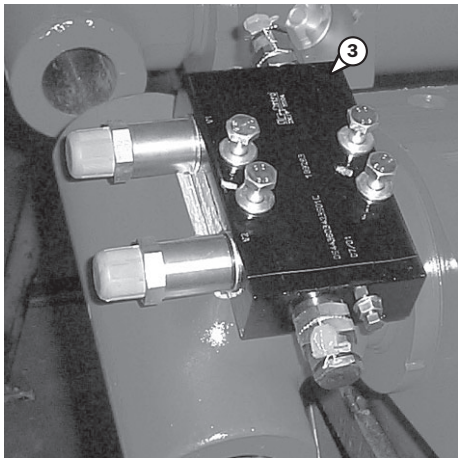
Fit the crescent washers (Item 36) for the microswitches.

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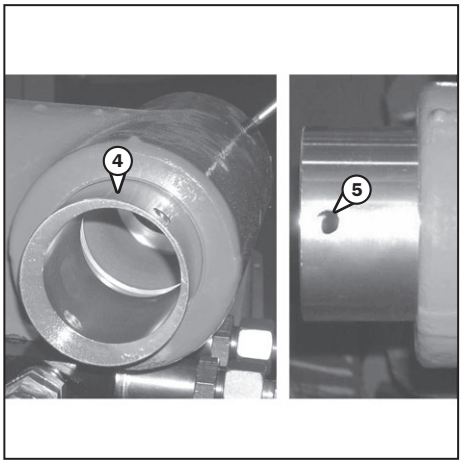


FIT THE EXTENSION JACK

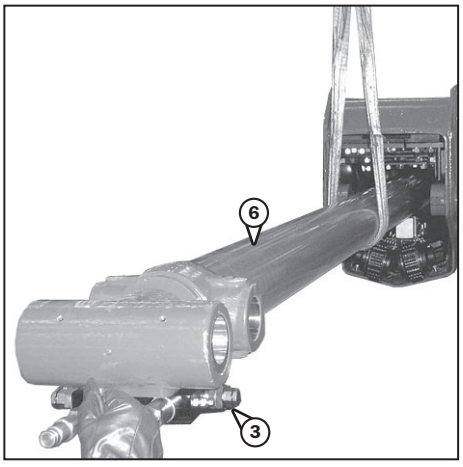
Clean the bushes of the boom extension cylinder.
Check that the rollers (Item 1) and guide (Item 2) are fitted correctly on the extension cylinder.



Check that the valve block (Item 3) is fitted correctly on the extension cylinder.

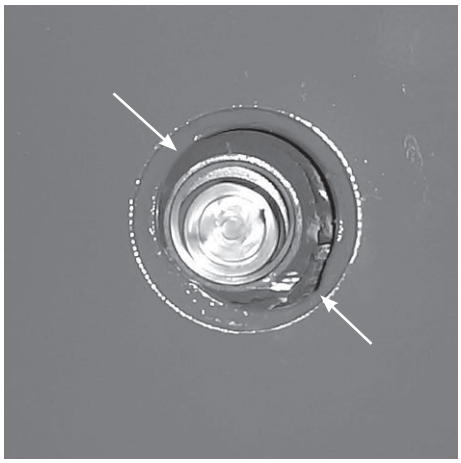


Fit 2 eccentric bushes (Item 4) on the rod side of the extension cylinder (one on each side), with the mounting holes (Item 5) facing outwards.

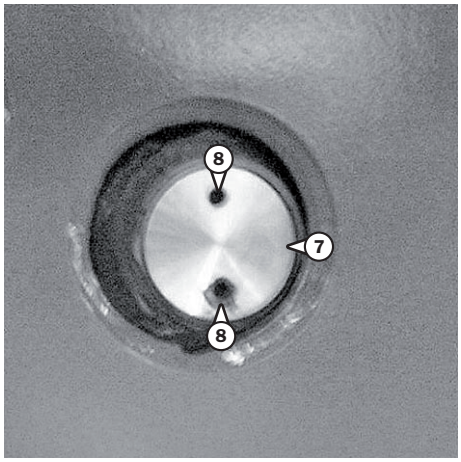


With the help of an overhead crane or hoist, insert the extension cylinder (Item 6) into the boom keeping the valve block (Item 3) facing downwards.

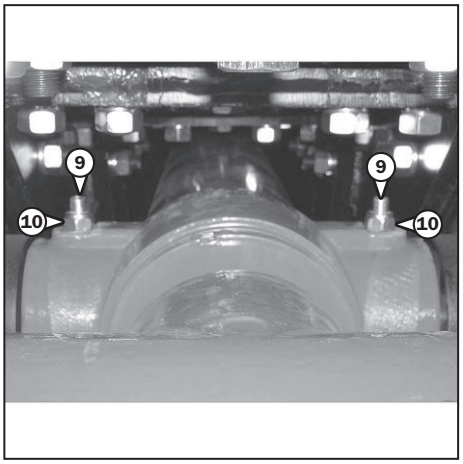
https://truckmanualshub.com/



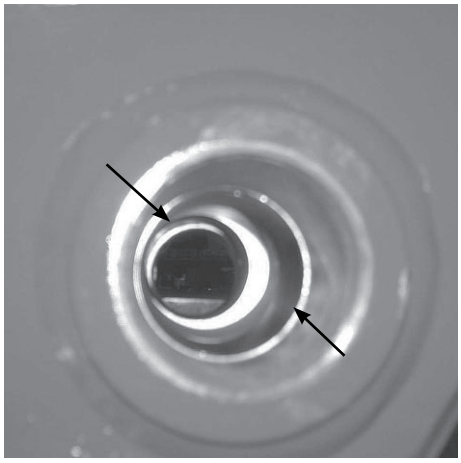
Centre the holes in the bushes in the boom Ist extension with the spindle seats on the liner of the extension cylinder.



Insert both the pins (Item 7) for hinging between the extension cylinder and the boom Ist extension, keeping both the holes (Item 8) perpendicular to the pin.

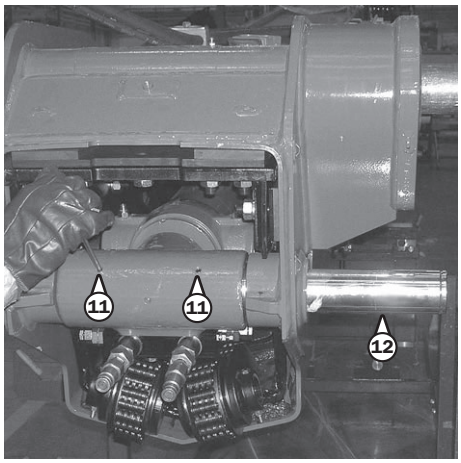


Fix the pins (Item 7) with the screws (Item 9) to the cylinder. Insert the screws upwards and lock them with the nuts (Item 10).



Centre the holes in the boom Ist extension with the seats of the pins on the liner of the extension cylinder.

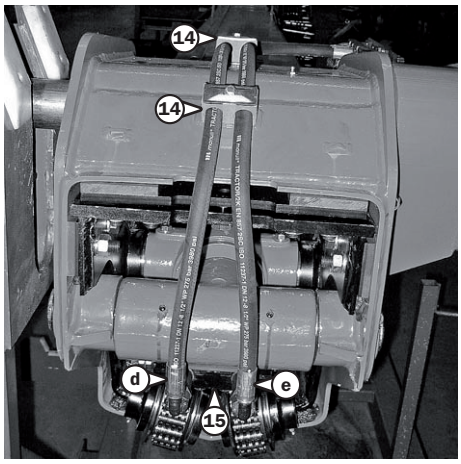
https://truckmanualshub.com/



Screw 2 grub screws (Item 11) onto the cylinder rod to lock the eccentric bushes.
Insert the pin (Item 12) for hinging between the extension cylinder and the external boom and fix it with circlips (Item 13), one on each side.

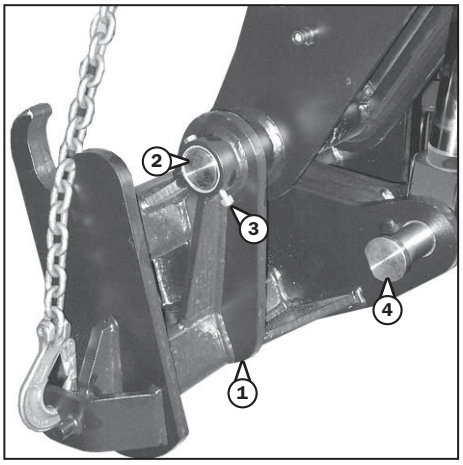
N.B. If necessary, raise the extension cylinder with the help of an overhead crane or hoist to centre the hinge hole with the external boom.
Lubricate the extension cylinder pin with grease (see “Lubricants” table in the User and Maintenance manual).





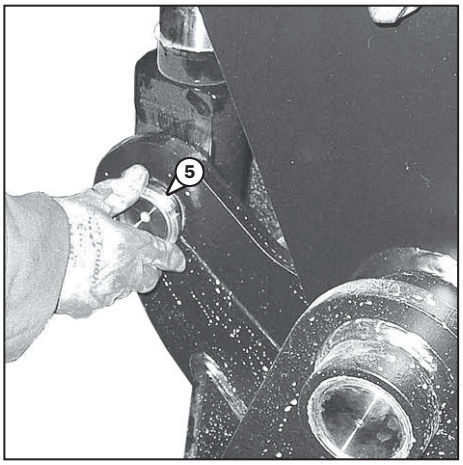
From the feedthrough connectors in the external boom, fit the hydraulic extension command tubes (Item E and D) to the extension cylinder and secure them with the collars (Item 14 and 15).

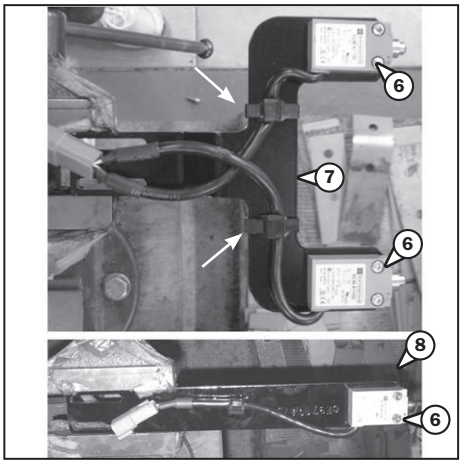
https://truckmanualshub.com/



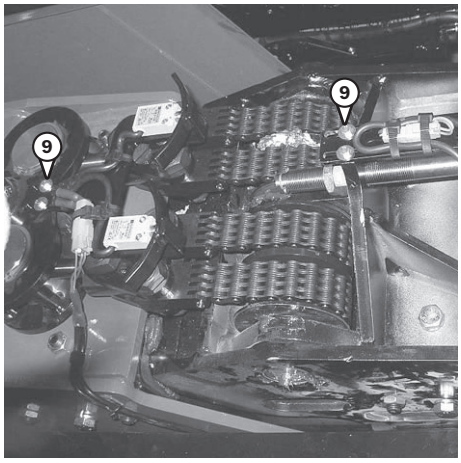
FIT THE QUICK CONNECTOR TO THE HEAD OF THE BOOM

With the help of an overhead crane or hoist, insert the quick connector (Item 1) in the head of the boom.
Insert the pin (Item 2) for hinging with the head of the boom and fix it with the screws (Item 3).
Insert the pin (Item 2) for hinging with the rod of the traverse cylinder (Item 4) and lock it with the ring (Item 5).



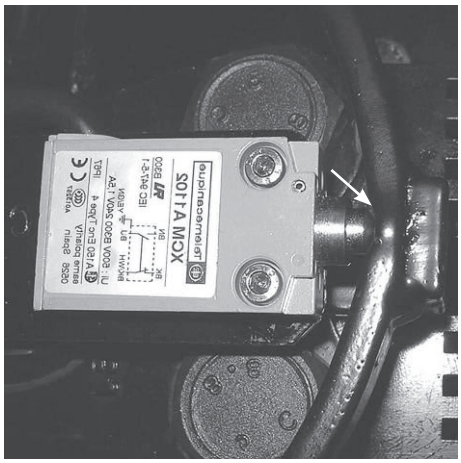


Preassemble the 3 chain fault microswitches (Item 6) to the mountings (Item 7 and 8).

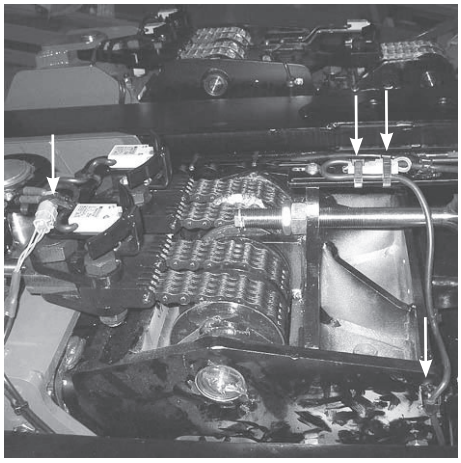


Fix the microswitches to the boom with the appropriate screws (Item 9).

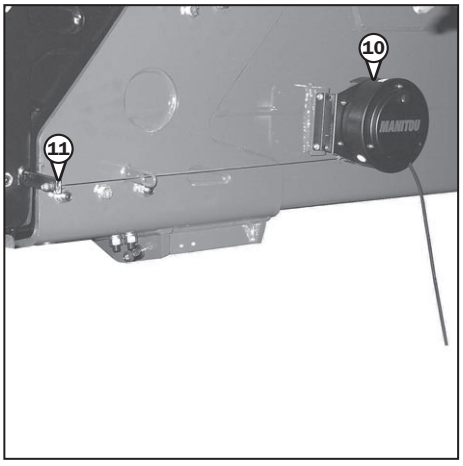
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Adjust the distance between the microswitches and the crescent washer with the appropriate screw to about 1 mm.

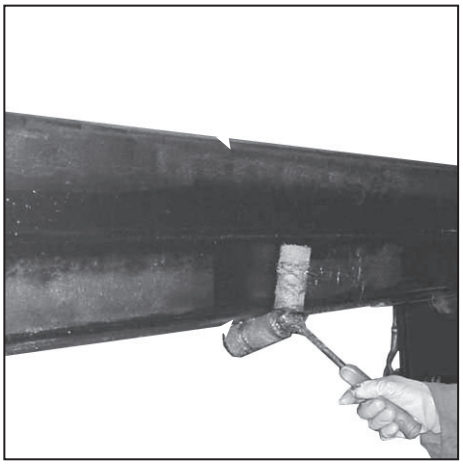


Connect the IInd and IIIrd extension chain microswitches and if necessary secure the cables.



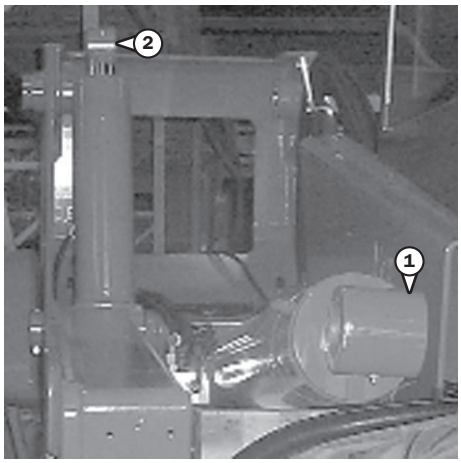
Fit the “M.S.S.” winder (Item 10) in the front left part of the external boom.
Fix the “M.S.S.” winder cable to the ring (Item 11) in the boom Ist extension.

The “M.S.S.” safety system must be calibrated by authorised Manitou personnel.



Extend the boom fully and lubricate the outer walls with grease (See User and Maintenance table).

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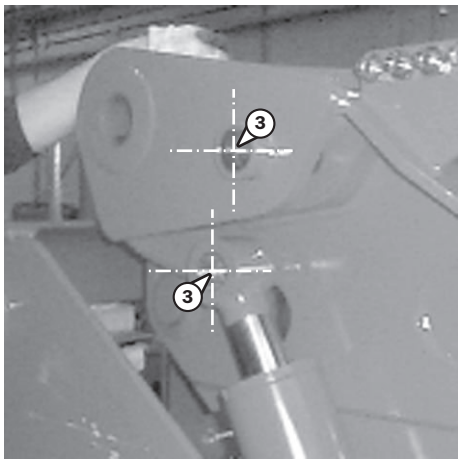


TELESCOPIC BOOM REFIT TO THE VEHICLE

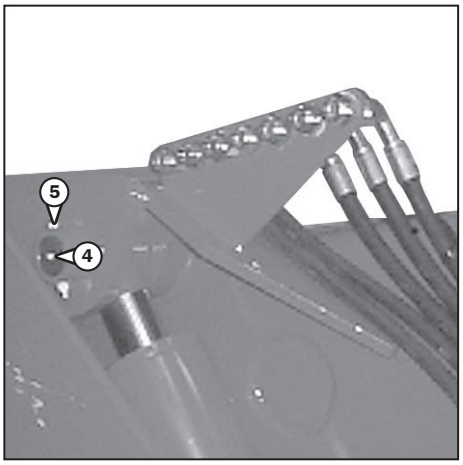
Arrange the turret of the vehicle with the lifting cylinder (Item 1) and compensating cylinder (Item 2) in the positions indicated.



With the help of an overhead crane or hoist, hook the boom into the appropriate eyebolts and position it on the vehicle in the appropriate slot in the turret.



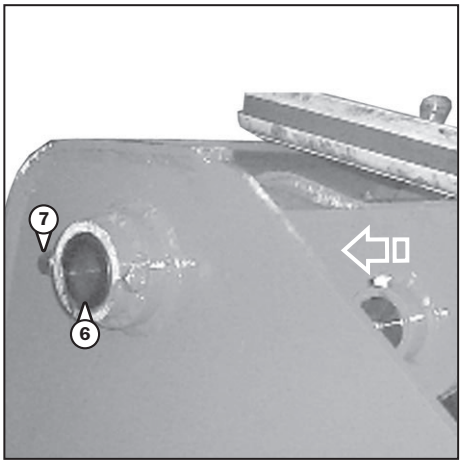
Carry out centring between the compensation jack rod eyebolt and the corresponding bush on the boom (Item 3).



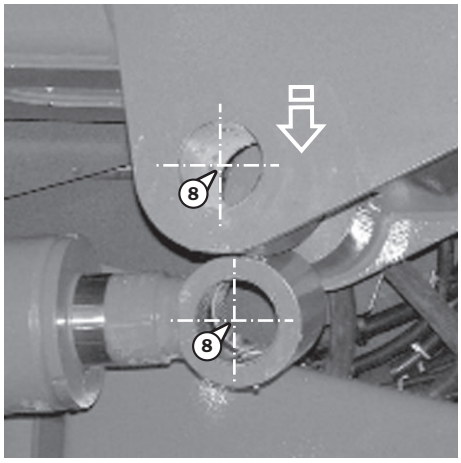
Insert the compensation jack hinge pin (Item 4) into the boom screw in the locking screw (Item 5).

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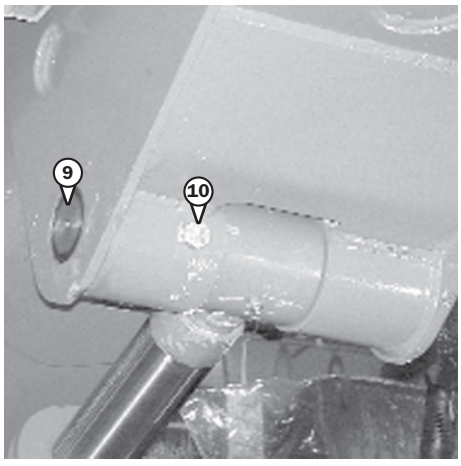
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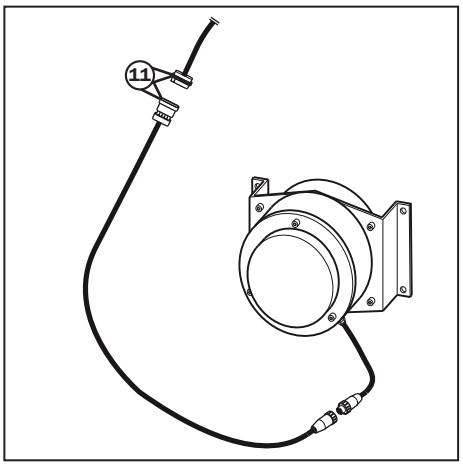
Working with an overhead crane or hoist, centre the bushes in the turret with the bush in the boom to fit the pin hinging the boom to the turret.
Insert the pin (Item 6) hinging the boom to the turret, after coating it with grease, and screw in the locking screw (Item 7).



Working with overhead crane or hoist, lower the telescopic boom to centre the eyebolt of the lifting jack with the appropriate bushes in the lower part of the boom (Item 8).

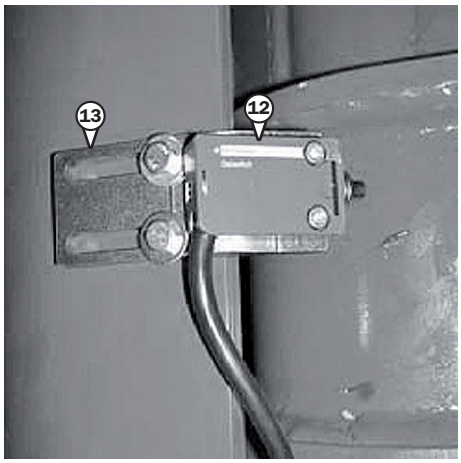


Insert the pin hinging the boom raising jack (Item 9) and fit the pin locking screw (Item 10).



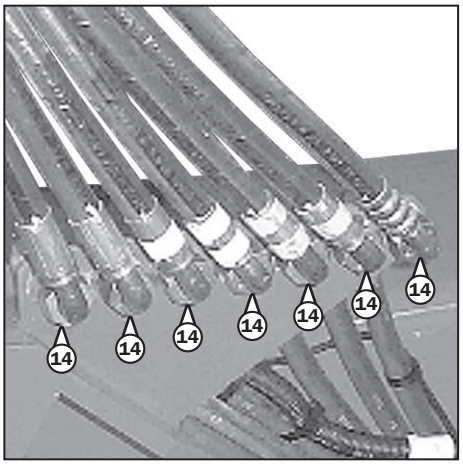
Reconnect safety system connector “X2” (Item 11).

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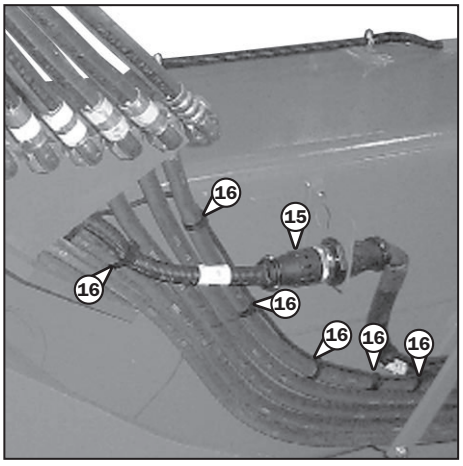


Refit the limit microswitch for raising the boom (Item 12) with its mounting (Item 13) situated at the upper end of the turret.

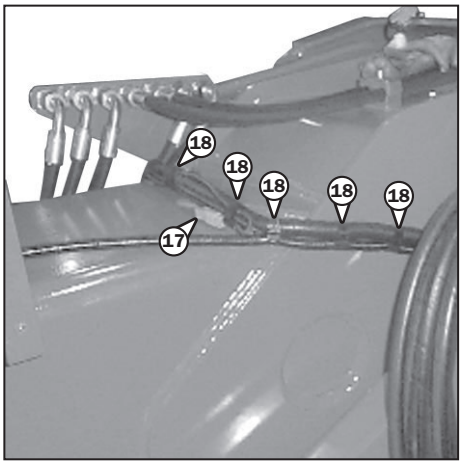
Replace the binding of the electric cables inside the turret.



Reconnect the hydraulic tubes supplying the boom (Item 14) taking care that the tubes correspond.



Working on the appropriate bush, connect the electrical plug-wiring (Item 15) in the rear part of the boom, if present.



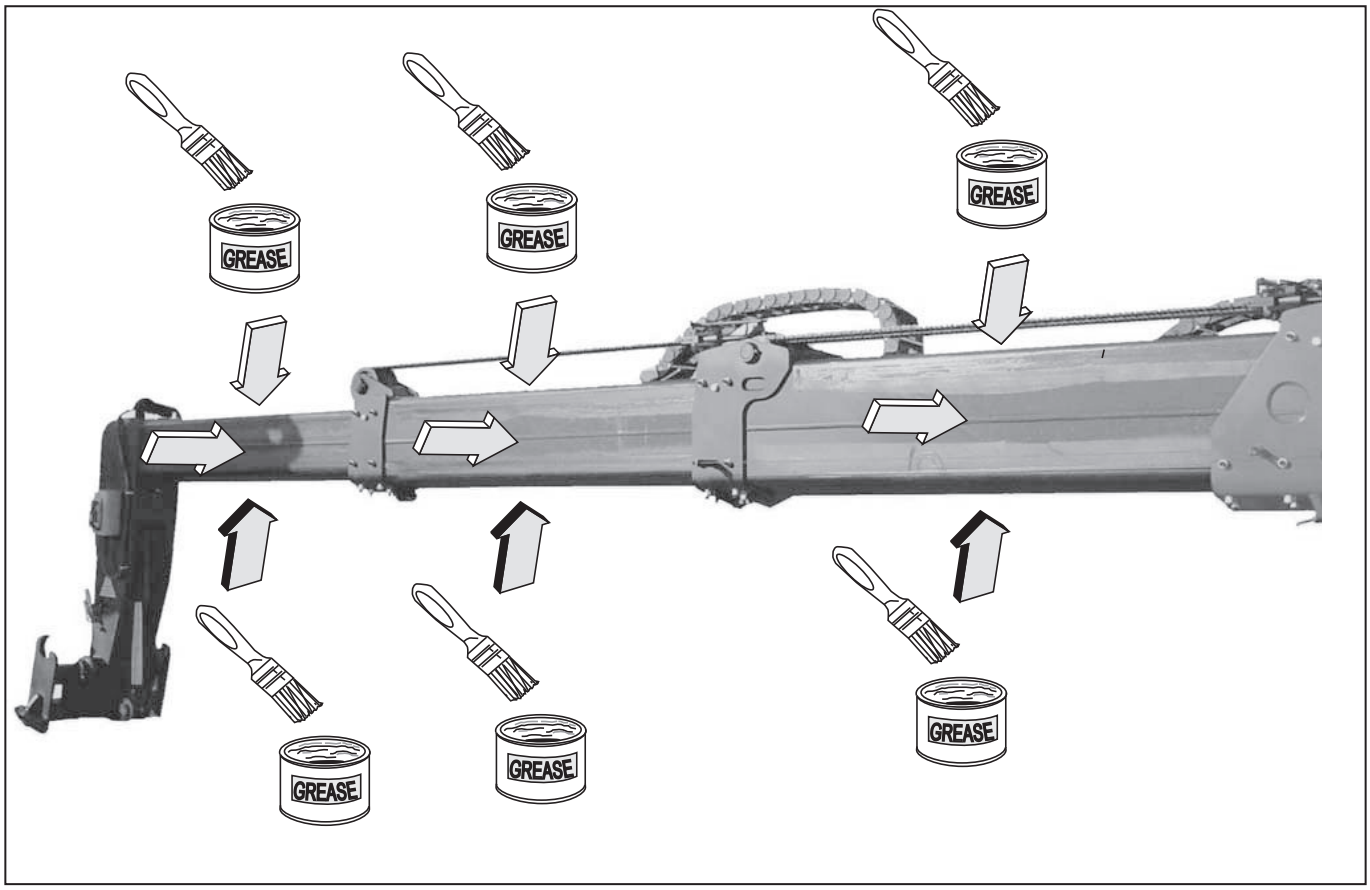
Connect the connector for the cable chain safety microswitches (Item 17).
Replace the fixings of the hydraulic tubes and electric cables in the upper rear part of the boom (Item 16 and 18).

Reconnect the terminals to the battery.

Check correct operation of the limit microswitches (Item 12) for raising the boom.

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Before using the vehicle, grease the feet of the telescopic boom as follows:
- fully extend the telescopic boom.
- using a brush, apply a layer of grease (see "PACKING TABLE" in the User and Maintenance manual) to the sides of the telescopic boom.
- actuate the telescopic boom several times to distribute the grease evenly.
- remove excess grease.



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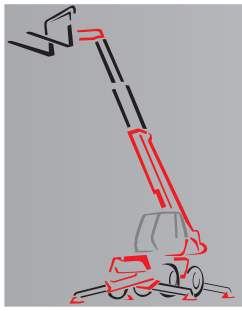
HYDRAULICS

- ***HYDRAULIC SCHEMATIC DIAGRAMS***
- ***HYDRAULIC COMPONENTS LOCATION***
- ***HYDRAULIC CONTROL AND ADJUSTMENT***
- ***HYDRAULIC COMPONENTS REMOVAL***
- ***HYDRAULIC COMPONENTS REFIT***
- ***HYDRAULIC SPECIFIC TOOLING***



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HYDRAULIC SCHEMATIC DIAGRAMS

page

DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH SAUER TRANSMISSION

– LEGEND A3

– DIAGRAM. A5

DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH REXROTH TRANSMISSION

– LEGEND B7

– DIAGRAM. B9

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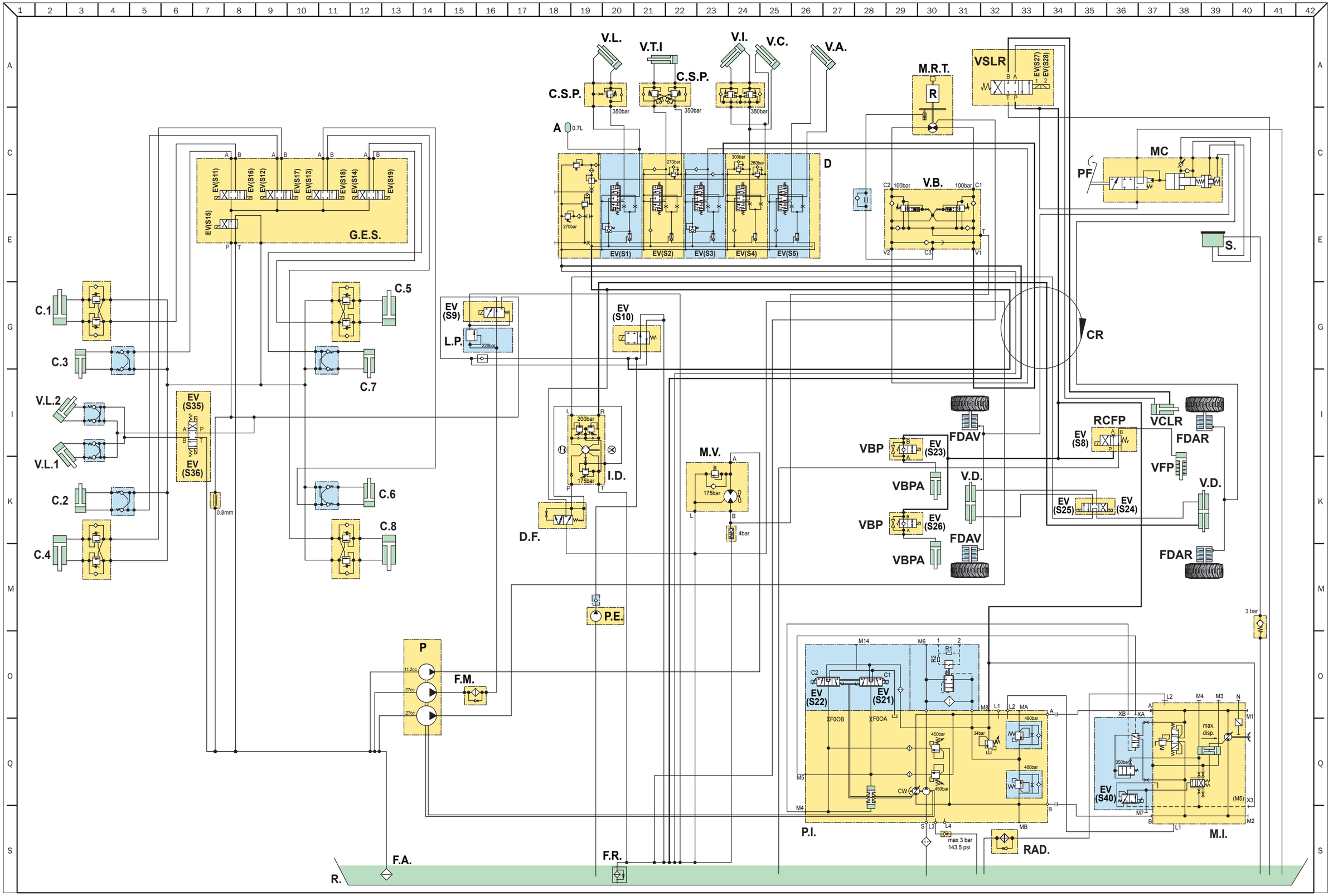
LEGEND FOR DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH SAUER TRANSMISSION			
Ref	**Description**	**Position on the diagram**	**Characteristics (Optional)**
A	ACCUMULATOR	C18	
C.1	FRONT RIGHT STABILISER RAISING-LOWERING CYLINDER	G2	
C.2	FRONT LEFT STABILISER EXTENSION CYLINDER	K2	
C.3	FRONT RIGHT STABILISER EXTENSION CYLINDER	G2	
C.4	FRONT LEFT STABILISER RAISING LOWERING CYLINDER	M2	
C.5	FRONT RIGHT STABILISER RAISING LOWERING CYLINDER	G13	
C.6	REAR LEFT STABILISER EXTENSION CYLINDER	K13	
C.7	REAR RIGHT STABILISER EXTENSION CYLINDER	I12	
C.8	REAR LEFT STABILISER RAISING LOWERING CYLINDER	K13	
C.R.	HYDRAULIC COLLECTOR	G35	
C.S.P.	CONTROLLED SAFETY VALVE	A18 / A22	
D	DANFOSS DISTRIBUTOR	C27	
D.F.	FLOW SPLITTER	K17	
EV(S1)	DANFOSS RAISING ELECTROVALVE SLIDER 100 LT.	E20	
EV(S2)	ELECTROVALVE DANFOSS EXTENSION SLIDER 100 LT.	E21 / E22	
EV(S3)	DANFOSS ROTATION ELECTROVALVE SLIDER 40 LT.	E23	
EV(S4)	DANFOSS TRAVERSING ELECTROVALVE SLIDER 100 LT.	E24	
EV(S5)	ELECTROVALVE OPTIONAL DANFOSS SLIDER 65 LT.	E25 / E26	
EV(S8)	PARKING BRAKE ELECTROVALVE	I35	
EV(S9)	GENERAL ELECTROVALVE STABILISERS	G15	
EV(S10)	EMERGENCY ELECTROVALVE HYDRAULIC SYSTEM EXCLUSION	G20	
EV(S11)	ELECTROVALVE FRONT RIGHT BEAM	C7	
EV(S12)	ELECTROVALVE FRONT LEFT BEAM	C9	
EV(S13)	ELECTROVALVE REAR LEFT BEAM	C10	
EV(S14)	ELECTROVALVE REAR RIGHT BEAM	C12	
EV(S15)	ELECTROVALVE RETRACT/EXTEND STABILISERS	E7	
EV(S16)	ELECTROVALVE FRONT RIGHT STABILISER	C8	
EV(S17)	ELECTROVALVE FRONT LEFT STABILISER	C10	
EV(S18)	ELECTROVALVE REAR LEFT STABILISER	C11	
EV(S19)	ELECTROVALVE REAR RIGHT STABILISER	C13	
EV(S21)	FORWARD ELECTROVALVE	O28 / O29	
EV(S22)	REVERSE ELECTROVALVE	O26	
EV(S23)	ELECTROVALVE REAR AXLE UNLOCKING	I30	
EV(S24)	ELECTROVALVE CRAB STEERING	K36	
EV(S25)	ELECTROVALVE CONCENTRIC STEERING	K34	
EV(S26)	ELECTROVALVE REAR AXLE UNLOCKING	K30	
EV(S27)	ELECTROVALVE FAST GEAR	A33	
EV(S28)	ELECTROVALVE SLOW GEAR	A34	
EV(S35)	ELECTROVALVE LEVELLING CONTROL 1	I6 / I7	
EV(S36)	ELECTROVALVE LEVELLING CONTROL 2	K6 / K7	
EV(S40)	ELECTROVALVE ENGINE DISPLACEMENT REDUCTION	Q25 / Q36	
F.A.	SUCTION FILTER	S13	
F.D.A.R.	REAR DISK BRAKES	I38 / M37	
F.D.A.V.	FRONT DISK BRAKES	I31 / K31	
F.M.	FLOW FILTER	O15	
F.R.	EXHAUST FILTER	S20	
G.E.S.	ELECTROVALVE STABILISER UNIT	E12	
I.D.	HYDRAULIC STEERING	K20	
L.P.	PRESSURE LIMITING VALVE	G15	
M.C.	BRAKE PUMP	C37	
M.I.	VARIABLE DISPLACEMENT ENGINE	S39	

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LEGEND FOR DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH SAUER TRANSMISSION			
Ref	***Description***	***Position on the diagram***	***Characteristics (Optional)***
M.R.T.	TURRET ROTATION MOTOR	A30	
M.V.	FAN MOTOR	I23	
P	TRIPLE GEAR PUMP	O14	
P.E.	ELECTRIC PUMP	M20	
P.F.	BRAKE PEDAL	C35	
P.I.	HYDROSTATIC PUMP	S26	
R	OIL TANK	S11	
RAD.	RADIATOR	S33	
R.C.F.P.	PARKING BRAKE VALVE	I35 / I36	
S	OIL TANK	E39	
V.A.	ACCESSORY CYLINDER	A27	OPTIONAL
V.B.	LOCK AND MOVEMENT CONTROL VALVE	C30	
V.B.P	REAR AXLE LOCKING VALVE	I28 / K28	
V.B.P.A.	REAR AXLE LOCKING CYLINDER	K29 / M29	
V.C.	COMPENSATING CYLINDER	A25	
V.C.L.R.	SLOW SPEED CONTROL CYLINDER	I37 / I38	
V.D.	STEERING CYLINDER	K31 / K39	
V.F.P.	PARKING BRAKE CONTROL CYLINDER	K37	
V.I.	TRAVERSE CYLINDER	A24	
V.L.	LIFTING CYLINDER	A20	
V.L.1.	RIGHT LIFTING CYLINDER	K2	
V.L.2.	LEFT LIFTING CYLINDER	I2	
V.S.L.R.	SLOW SPEED SELECTOR VALVE	A32	
V.T.I.	Ist EXTENSION CYLINDER	A21	

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DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH SAUER TRANSMISSION



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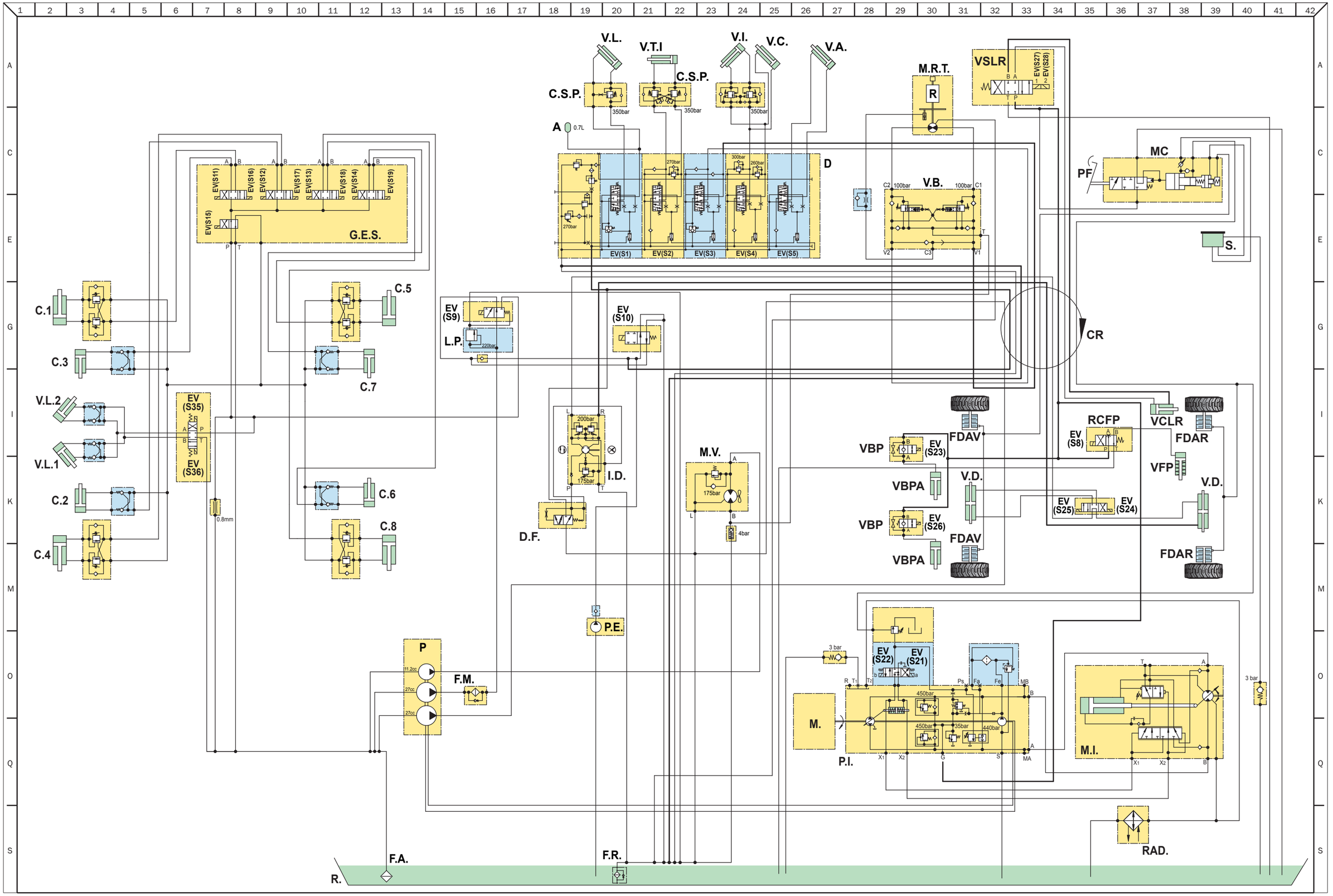
LEGEND FOR DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH REXROTH TRANSMISSION			
Ref	**Description**	**Position on the diagram**	**Characteristics (Optional)**
A	ACCUMULATOR	C18	
C.1	FRONT RIGHT STABILISER RAISING-LOWERING CYLINDER	G2	
C.2	FRONT LEFT STABILISER EXTENSION CYLINDER	K2	
C.3	FRONT RIGHT STABILISER EXTENSION CYLINDER	G2	
C.4	FRONT LEFT STABILISER RAISING LOWERING CYLINDER	M2	
C.5	FRONT RIGHT STABILISER RAISING LOWERING CYLINDER	G13	
C.6	REAR LEFT STABILISER EXTENSION CYLINDER	K13	
C.7	REAR RIGHT STABILISER EXTENSION CYLINDER	I12	
C.8	REAR LEFT STABILISER RAISING LOWERING CYLINDER	K13	
C.R.	HYDRAULIC COLLECTOR	G35	
C.S.P.	CONTROLLED SAFETY VALVE	A18 / A22	
D	DANFOSS DISTRIBUTOR	C27	
D.F.	FLOW SPLITTER	K17	
EV(S1)	DANFOSS RAISING ELECTROVALVE SLIDER 100 LT.	E20	
EV(S2)	ELECTROVALVE DANFOSS SLIDER EXTENSION 100 LT.	E21 / E22	
EV(S3)	DANFOSS ROTATION ELECTROVALVE SLIDER 40 LT.	E23	
EV(S4)	DANFOSS TRAVERSING ELECTROVALVE SLIDER 100 LT.	E24	
EV(S5)	ELECTROVALVE DANFOSS OPTIONAL SLIDER 65 LT.	E25 / E26	
EV(S8)	PARKING BRAKE ELECTROVALVE	I34 / I35	
EV(S9)	GENERAL ELECTROVALVE STABILISERS	G15	
EV(S10)	EMERGENCY ELECTROVALVE HYDRAULIC SYSTEM EXCLUSION	G20	
EV(S11)	ELECTROVALVE FRONT RIGHT BEAM	C7	
EV(S12)	ELECTROVALVE FRONT LEFT BEAM	C9	
EV(S13)	ELECTROVALVE REAR LEFT BEAM	C10	
EV(S14)	ELECTROVALVE REAR RIGHT BEAM	C12	
EV(S15)	ELECTROVALVE RETRACT/EXTEND STABILISERS	E7	
EV(S16)	ELECTROVALVE FRONT RIGHT STABILISER	C8	
EV(S17)	ELECTROVALVE FRONT LEFT STABILISER	C10	
EV(S18)	ELECTROVALVE REAR LEFT STABILISER	C11	
EV(S19)	ELECTROVALVE REAR RIGHT STABILISER	C13	
EV(S21)	FORWARD ELECTROVALVE	O29 / O30	
EV(S22)	REVERSE ELECTROVALVE	O28 / O29	
EV(S23)	ELECTROVALVE REAR AXLE UNLOCKING	I30	
EV(S24)	ELECTROVALVE CRAB STEERING	K36	
EV(S25)	ELECTROVALVE CONCENTRIC STEERING	K34	
EV(S26)	ELECTROVALVE REAR AXLE UNLOCKING	K30	
EV(S27)	ELECTROVALVE FAST GEAR	A33	
EV(S28)	ELECTROVALVE SLOW GEAR	A34	
EV(S35)	ELECTROVALVE LEVELLING CONTROL 1	I6 / I7	
EV(S36)	ELECTROVALVE LEVELLING CONTROL 2	K6 / K7	
F.A.	SUCTION FILTER	S13	
F.D.A.R.	REAR DISK BRAKES	I38 / M38	
F.D.A.V.	FRONT DISK BRAKES	I31 / K31	
F.M.	FLOW FILTER	O15	
F.R.	EXHAUST FILTER	S20	
G.E.S.	ELECTROVALVE STABILISER UNIT	E12	
I.D.	HYDRAULIC STEERING	K20	
L.P.	PRESSURE LIMITING VALVE	G15	
M	I.C. ENGINE	Q26	
M.C.	BRAKE PUMP	C37	
M.I.	VARIABLE DISPLACEMENT ENGINE	Q35	

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LEGEND FOR DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH REXROTH TRANSMISSION			
Ref	***Description***	***Position on the diagram***	***Characteristics (Optional)***
M.R.T.	TURRET ROTATION MOTOR	A30	
M.V.	FAN MOTOR	I23	
P	TRIPLE GEAR PUMP	O14	
P.E.	ELECTRIC PUMP	M20	
P.F.	BRAKE PEDAL	C35	
P.I.	HYDROSTATIC PUMP	Q27	
R	OIL TANK	S11	
RAD.	RADIATOR	S37	
R.C.F.P.	PARKING BRAKE VALVE	I35 / I36	
S	OIL TANK	E39	
V.A.	ACCESSORY CYLINDER	A27	OPTIONAL
V.B.	LOCK AND MOVEMENT CONTROL VALVE	C30	
V.B.P	REAR AXLE LOCKING VALVE	I28 / K28	
V.B.P.A.	REAR AXLE LOCKING CYLINDER	K29 / M29	
V.C.	COMPENSATING CYLINDER	A25	
V.C.L.R.	SLOW SPEED CONTROL CYLINDER	I37 / I38	
V.D.	STEERING CYLINDER	K31 / K39	
V.F.P.	PARKING BRAKE CONTROL CYLINDER	K37	
V.I.	TRAVERSE CYLINDER	A24	
V.L.	LIFTING CYLINDER	A20	
V.L.1.	RIGHT LIFTING CYLINDER	K2	
V.L.2.	LEFT LIFTING CYLINDER	I2	
V.S.L.R.	SLOW SPEED SELECTOR VALVE	A32	
V.T.I.	Ist EXTENSION CYLINDER	A21	

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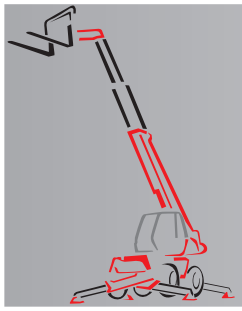
DIAGRAM OF TRUCK HYDRAULIC SYSTEM WITH REXROTH TRANSMISSION



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HYDRAULIC COMPONENTS LOCATION

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– DIAGRAM 2 - HYDRAULIC COMPONENTS LOCATION 6

– DIAGRAM 3 - HYDRAULIC COMPONENTS LOCATION 7

– DIAGRAM 4 - HYDRAULIC COMPONENTS LOCATION 8

– DIAGRAM 5 - CONNECTORS ON THE HYDRAULIC COLLECTOR LOCATION 9

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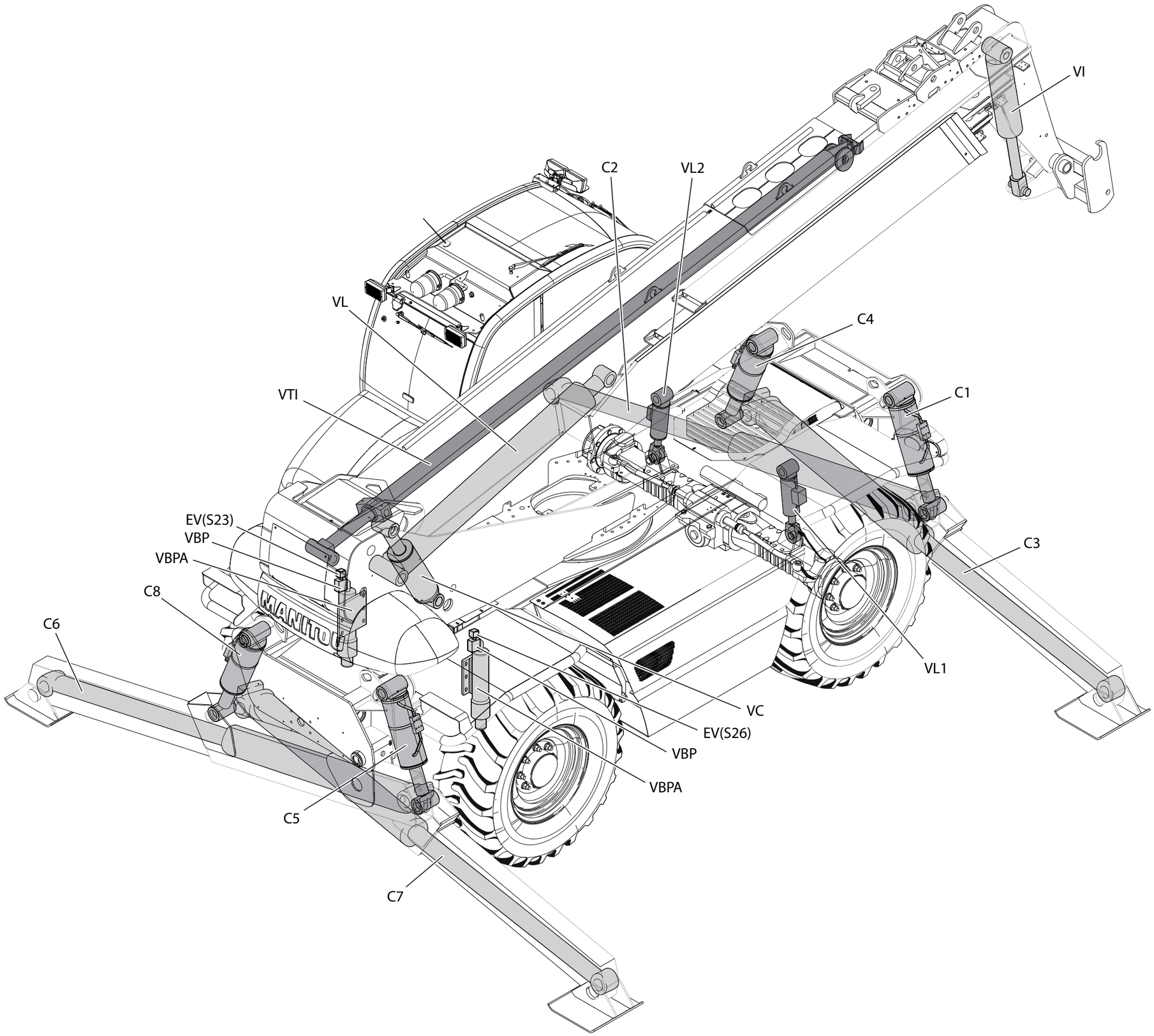
LEGEND - POSITION OF HYDRAULIC COMPONENTS		
Ref	**Description**	**Shown on diagram no.**
A	ACCUMULATOR	3
C.1	FRONT RIGHT STABILISER RAISING-LOWERING CYLINDER	1
C.2	FRONT LEFT STABILISER EXTENSION CYLINDER	1
C.3	FRONT RIGHT STABILISER EXTENSION CYLINDER	1
C.4	FRONT LEFT STABILISER RAISING LOWERING CYLINDER	1
C.5	FRONT RIGHT STABILISER RAISING LOWERING CYLINDER	1
C.6	REAR LEFT STABILISER EXTENSION CYLINDER	1
C.7	REAR RIGHT STABILISER EXTENSION CYLINDER	1
C.8	REAR LEFT STABILISER RAISING LOWERING CYLINDER	1
C.R.	HYDRAULIC COLLECTOR	2
D	DANFOSS DISTRIBUTOR	3
D.F.	FLOW SPLITTER	4
EV(S1)	DANFOSS RAISING ELECTROVALVE SLIDER 100 LT.	3
EV(S2)	ELECTROVALVE DANFOSS SLIDER EXTENSION 100 LT.	3
EV(S3)	DANFOSS ROTATION ELECTROVALVE SLIDER 40 LT.	3
EV(S4)	DANFOSS TRAVERSING ELECTROVALVE SLIDER 100 LT.	3
EV(S5)	ELECTROVALVE DANFOSS OPTIONAL SLIDER 65 LT.	3
EV(S8)	PARKING BRAKE ELECTROVALVE	4
EV(S9)	GENERAL ELECTROVALVE STABILISERS	4
EV(S10)	EMERGENCY ELECTROVALVE HYDRAULIC SYSTEM EXCLUSION	4
EV(S11)	ELECTROVALVE FRONT RIGHT BEAM	4
EV(S12)	ELECTROVALVE FRONT LEFT BEAM	4
EV(S13)	ELECTROVALVE REAR LEFT BEAM	4
EV(S14)	ELECTROVALVE REAR RIGHT BEAM	4
EV(S15)	ELECTROVALVE RETRACT/EXTEND STABILISERS	4
EV(S16)	ELECTROVALVE FRONT RIGHT STABILISER	4
EV(S17)	ELECTROVALVE FRONT LEFT STABILISER	4
EV(S18)	ELECTROVALVE REAR LEFT STABILISER	4
EV(S19)	ELECTROVALVE REAR RIGHT STABILISER	4
EV(S21)	FORWARD ELECTROVALVE	3
EV(S22)	REVERSE ELECTROVALVE	3
EV(S23)	ELECTROVALVE REAR AXLE UNLOCKING	1
EV(S24)	ELECTROVALVE CRAB STEERING	4
EV(S25)	ELECTROVALVE CONCENTRIC STEERING	4
EV(S26)	ELECTROVALVE REAR AXLE UNLOCKING	1
EV(S27)	ELECTROVALVE FAST GEAR	4
EV(S28)	ELECTROVALVE SLOW GEAR	4
EV(S35)	ELECTROVALVE LEVELLING CONTROL 1	4
EV(S36)	ELECTROVALVE LEVELLING CONTROL 2	4
F.A.	SUCTION FILTER	2
F.M.	FLOW FILTER	2
F.R.	EXHAUST FILTER	2
G.E.S.	ELECTROVALVE STABILISER UNIT	4
I.D.	HYDRAULIC STEERING	2
L.P.	PRESSURE LIMITING VALVE	4
M.C.	BRAKE PUMP	2
M.I.	VARIABLE DISPLACEMENT ENGINE	3
M.R.T.	TURRET ROTATION MOTOR	2
M.V.	FAN MOTOR	2
P	TRIPLE GEAR PUMP	3
P.E.	ELECTRIC PUMP	2

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LEGEND - POSITION OF HYDRAULIC COMPONENTS		
Ref	**Description**	**Shown on diagram no.**
P.I.	HYDROSTATIC PUMP	3
R	OIL TANK	2
S	OIL TANK	2
V.B.	LOCK AND MOVEMENT CONTROL VALVE	2
V.B.P	REAR AXLE LOCKING VALVE	1
V.B.P.A.	REAR AXLE LOCKING CYLINDER	1
V.C.	COMPENSATING CYLINDER	1
V.D.	STEERING CYLINDER	3
V.I.	TRAVERSE CYLINDER	1
V.L.	LIFTING CYLINDER	1
V.L.1.	RIGHT LIFTING CYLINDER	1
V.L.2.	LEFT LIFTING CYLINDER	1
V.S.L.R.	SLOW SPEED SELECTOR VALVE	4
V.T.I.	Ist EXTENSION CYLINDER	1

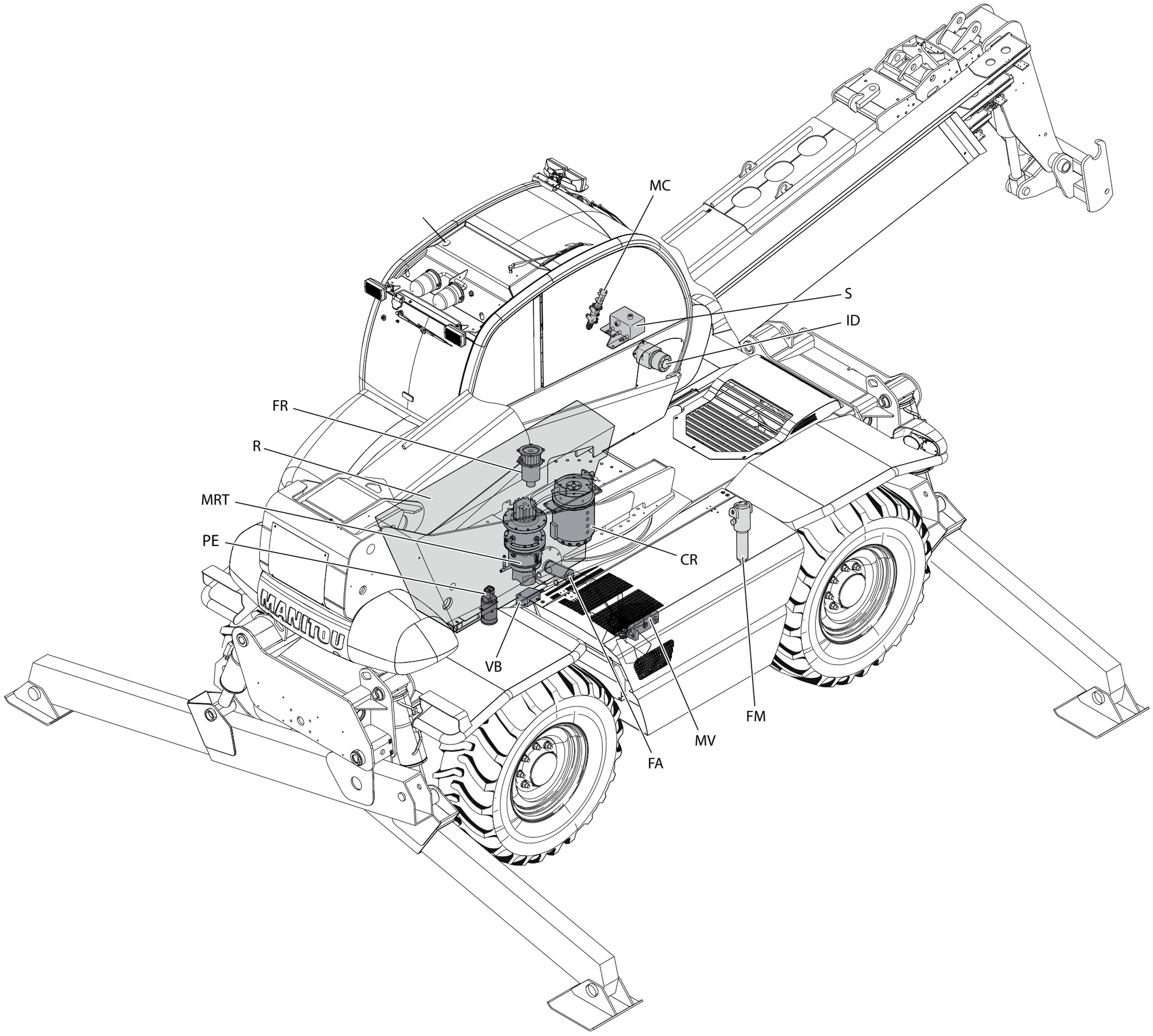
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DIAGRAM 1 - HYDRAULIC COMPONENTS LOCATION



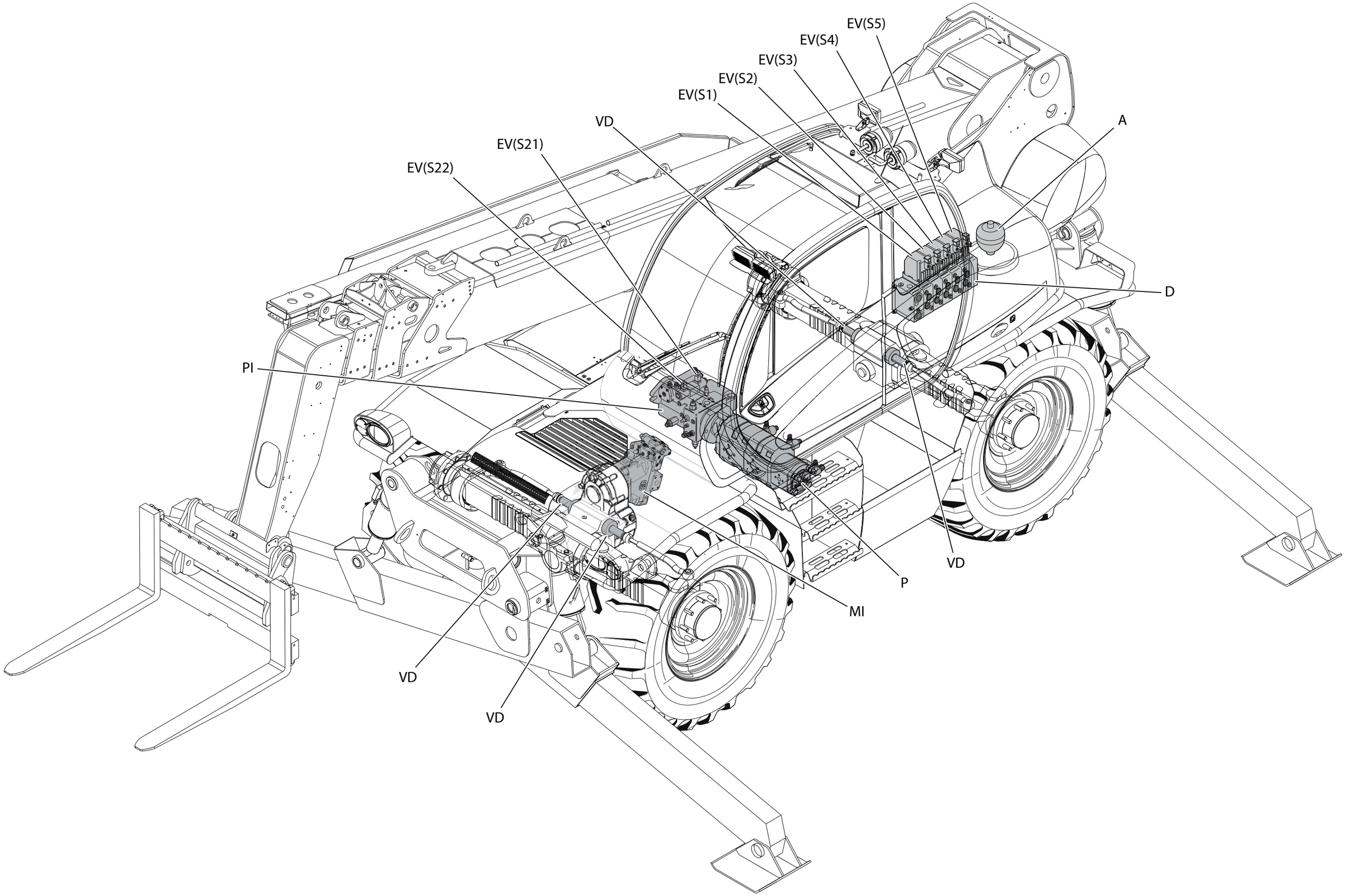
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DIAGRAM 2 - HYDRAULIC COMPONENTS LOCATION



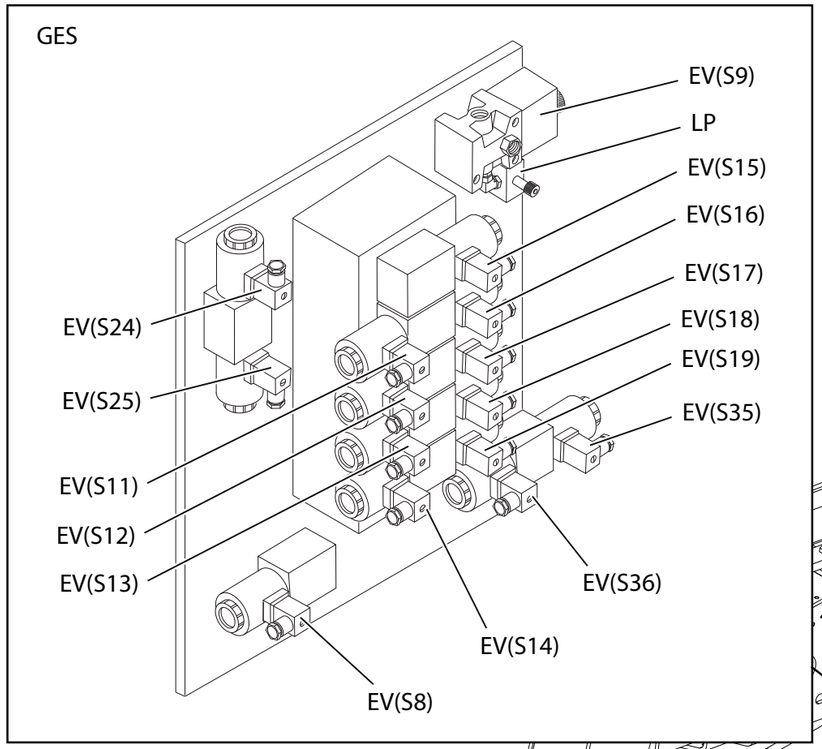
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DIAGRAM 3 - HYDRAULIC COMPONENTS LOCATION



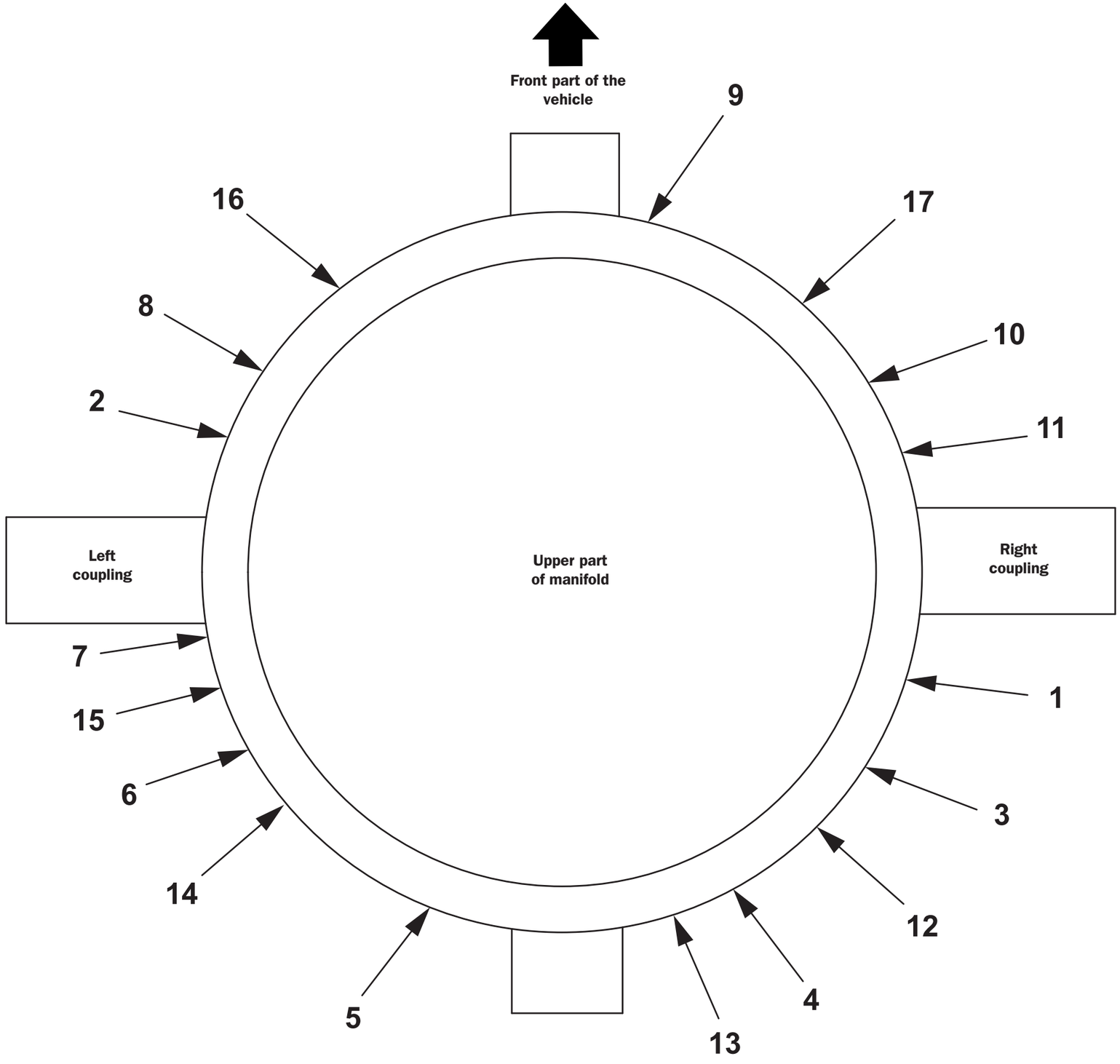
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DIAGRAM 4 - HYDRAULIC COMPONENTS LOCATION



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DIAGRAM 5 - CONNECTORS ON HYDRAULIC MANIFOLD LOCATION

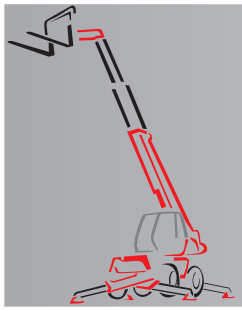


1 - Outlet
2 - Outlet
3 - VSLR valve (B)
4 - Vacuum
5 - VLSR valve (A)
6 - Vacuum
7 - Front axle brakes, inching
8 - Rear axle brakes
9 - Vacuum
10 - Hydrostatic booster pump (G)
11 - Vacuum
12 - Power steering (R), steering (P)
13 - Power steering (L), front axle (left wheel)
14 - Rotation lower side (V_1)
15 - Rotation upper side (V_2)
16 - Electrovalve S10 (P), electrovalve S9 (P), distributor (P)
17 - Priority valve DF

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HYDRAULIC CONTROL AND ADJUSTMENT

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– REMOVAL 10

– TEST 10

– REFIT 10

CLOSING RING SEAL 11

– REMOVAL 11

– TEST 11

– REFIT 11

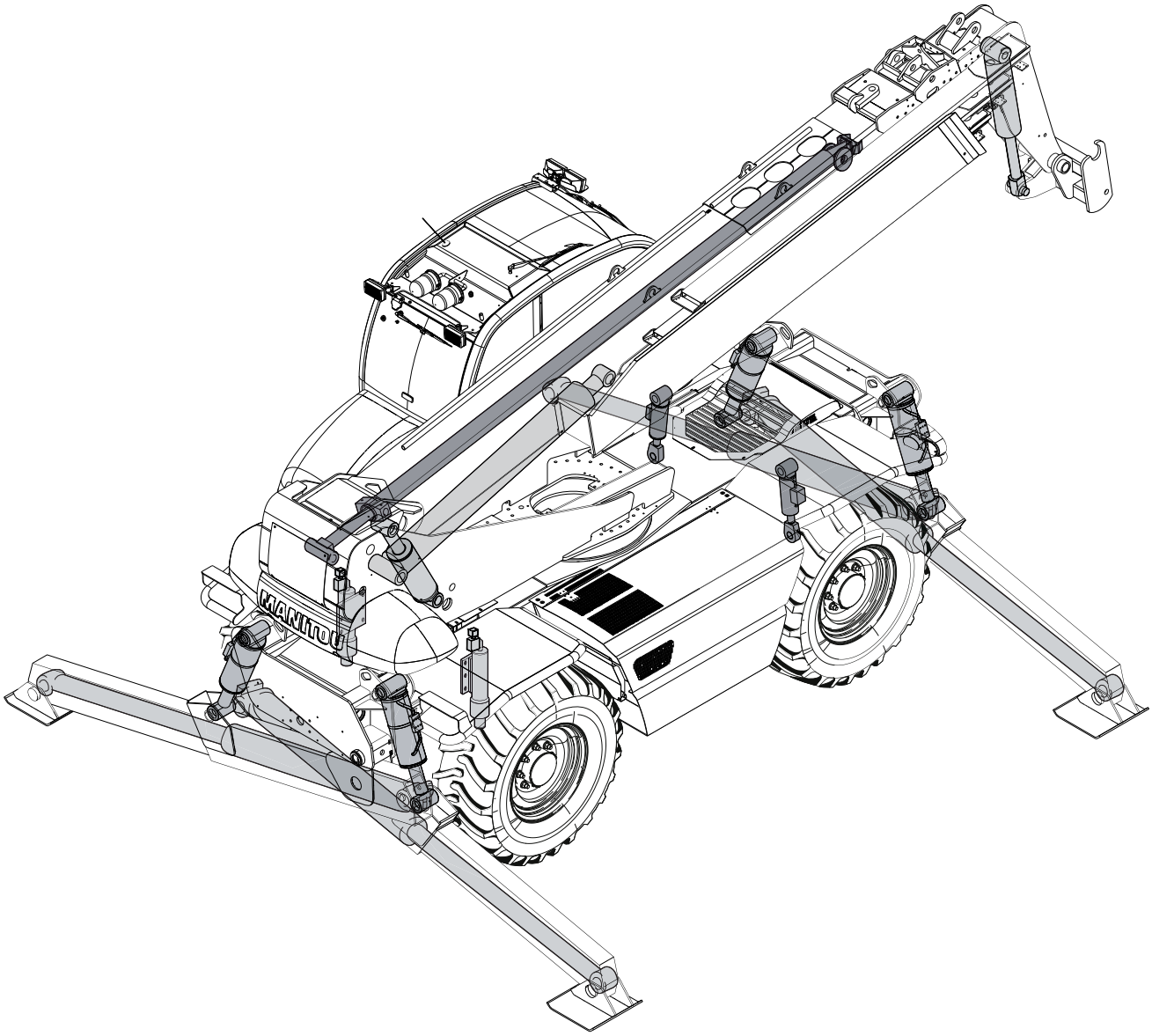
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– REMOVAL 18
– REFIT 18
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GENERAL INFORMATION

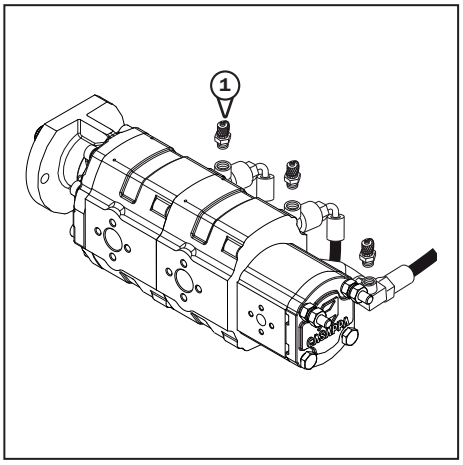
To check the pressures, a suitable manometer must be used, the oil must be at a temperature of about 60°, the engine must be at maximum revolutions for all the tests except for the rotation test which must be carried out at minimum revolutions.

PREPARATION AND SAFETY INSTRUCTIONS

Position the vehicle on a horizontal surface and rotate the turret to 180°.

Special instruments:
- Manometer (600 bar).

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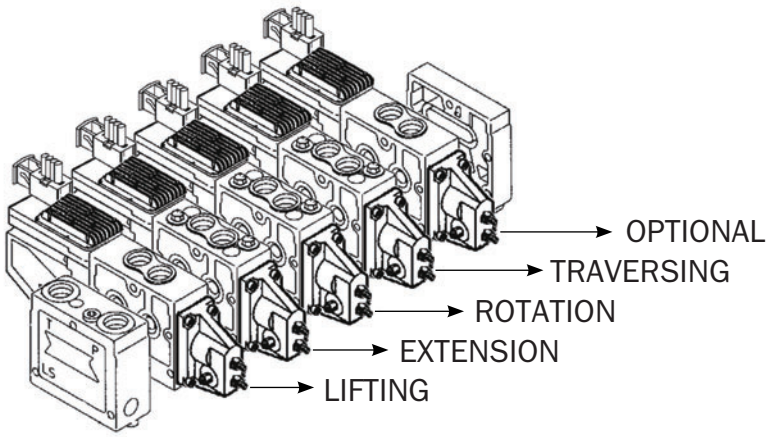
PRESSURE TEST

JIB MOVEMENTS

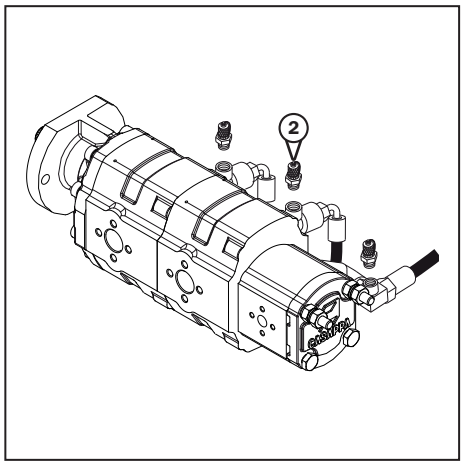
Pump P1: Carry out the test at the pressure socket (Item 1), depending on the model, and use the valve in the distributor to adjust the pressure.

Pressure test	*Value*	*Adjustment*
Power steering	175 bar max.	Danfoss pressure limiter in the body of the power steering
Raising	275 ÷ 280 bar	Main limiter of Danfoss distributor
Lowering	275 ÷ 280 bar	Main limiter of Danfoss distributor
Extending	275 ÷ 280 bar	Main limiter of Danfoss distributor
Retracting	275 ÷ 280 bar	Pre-adjusted anti-shock valve
Right rotation (at min. engine revolutions)	100 ÷ 110 bar	Pressure limiter on motor supply block
Left rotation (at min. engine revolutions)	100 ÷ 110 bar	Pressure limiter on motor supply block
Optional 1	270 bar	Main limiter of Danfoss distributor
Optional 2	270 bar	Main limiter of Danfoss distributor
Compensation (rod side)	250 ÷ 270 bar	Pre-adjusted anti-shock valve

Danfoss 5 part distributor



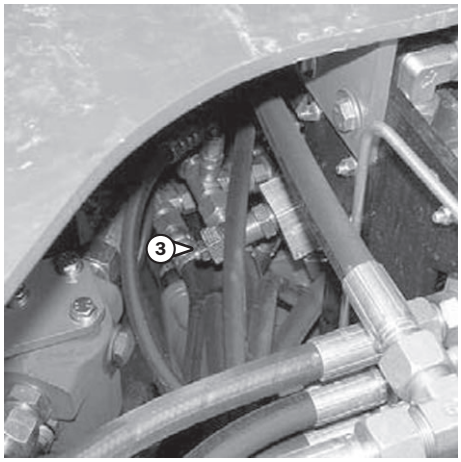
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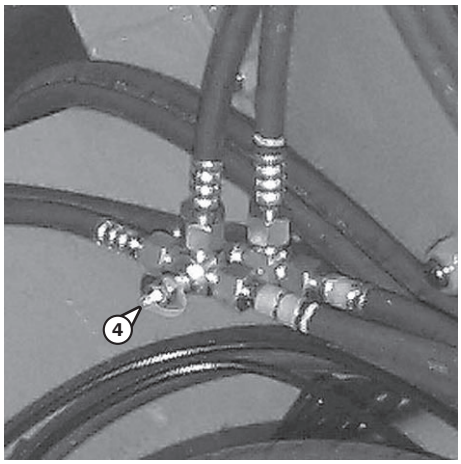
STABILISER MOVEMENTS

Pump P2: Carry out the tests at the pressure socket (Item 2).

Pressure test	*Value*	*Adjustment*
Stabiliser circuit	220 bar	Valve located on the stabiliser electrovalve unit



To adjust the pressure in the stabiliser circuit, use the valve (Item 3) located on the stabiliser electrovalve unit.

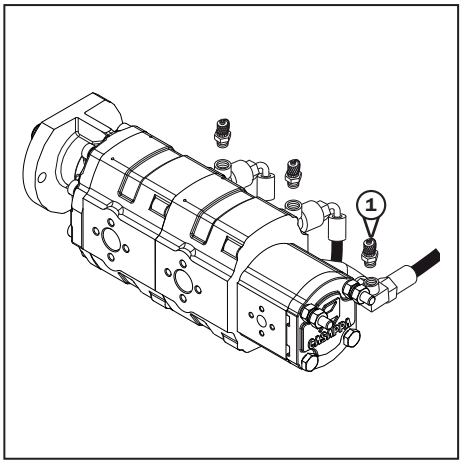


MOVEMENT OF COMPENSATING CYLINDER ON BASEPLATE SIDE

To carry out the compensation pressure test on the baseplate side:
- connect the manometer (Item 4) in the position shown;
- fully raise the jib;
- fully extend the traverse jack;
- accelerate the engine to maximum revolutions and lower the jib.

The pressure must reach 300 bar during the descent.

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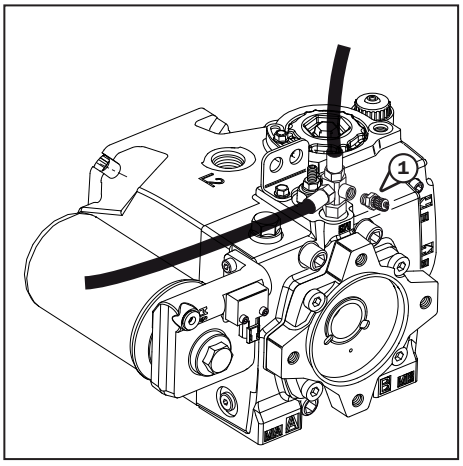


FAN MOTOR

Pump P3: Carry out the tests at the pressure socket (Item 1) depending on the model

Pressure test	*Value*	*Adjustment*
Cooling fan	70 bar	Adjustment of the speed as a function of the pressure is automatic and is regulated by a valve inside the fan motor

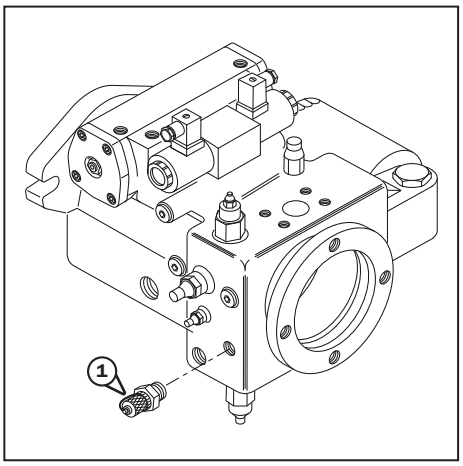
The fan is the suction type.



BOOST PUMP ON THE HYDROSTATIC TRANSMISSION (SAUER)

Pump P4: Carry out the tests at the pressure socket (Item 1).

647039EN - SAUER H1 45/53 pump



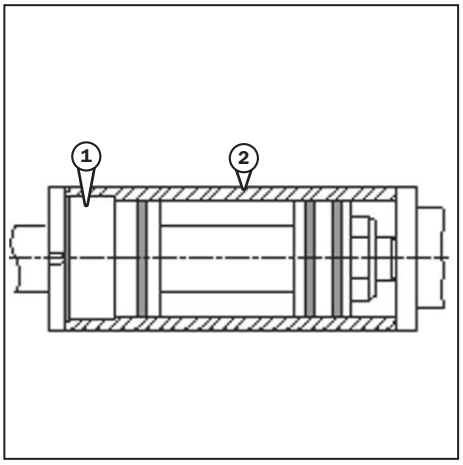
BOOST PUMP ON THE HYDROSTATIC TRANSMISSION (REXROTH)

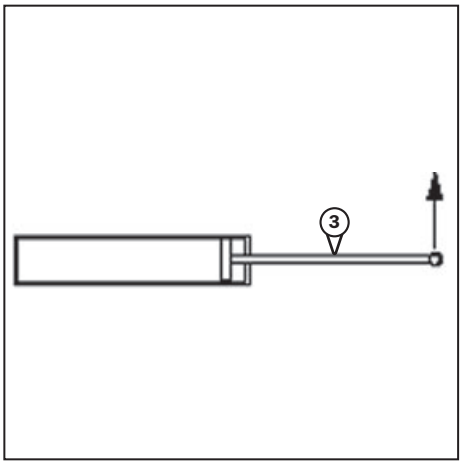
Pump P4: Carry out the tests at the pressure socket (Item 1).

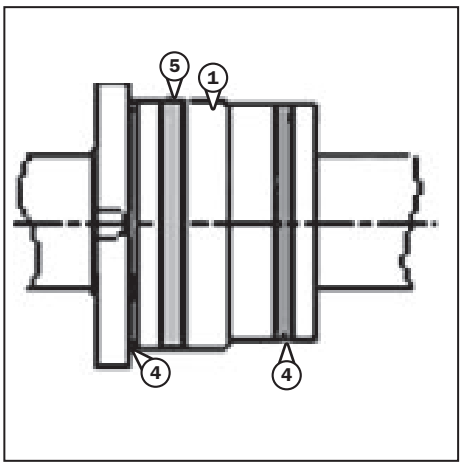
647030EN - REXROTH A4VG pump

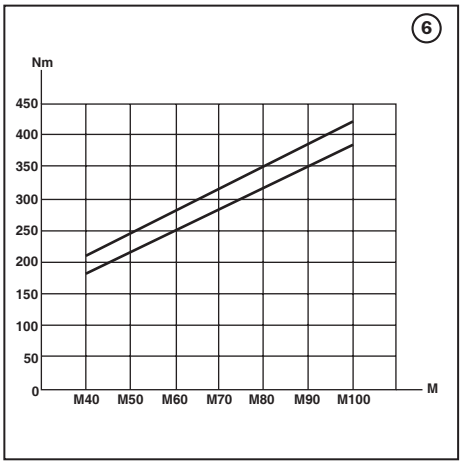
Pressure test	*Value*	*Adjustment*
Parking brake	30 / 35 bar	On the boost pressure limiter
Power assisted braking		
Speed change command (slow and fast)		
Rear axle lock		

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GENERAL RULES FOR REMOVING THE JACKS

COMPLETE ROD

REMOVAL

Put the jack in a vice fitted with jaw protector and, compress the jack gently to avoid deforming the body.
Unlock the closing ring (Item 1) with a pin wench, in case of difficulty in unlocking the ring, pleased refer to the paragraph "REMOVAL" in the section "Application of threadlock".
Fully unscrew the closing ring (Item 1) and extract the complete rod from the body of the jack.
NOTE FOR VERY LONG JACKS:
Pull out the rod as maximum of 200 mm, unscrew the closing ring (Item 1) half a turn (turn gradually, without jerking).
Pull out the rod about 2500 mm, support the rod (Item 3) by the end to avoid forces on the closing ring.
Continue to unscrew the closing ring, if the force is too great, raise and then lower the rod to reduce the friction.

Never force when unscrewing as there is a risk of seizure.

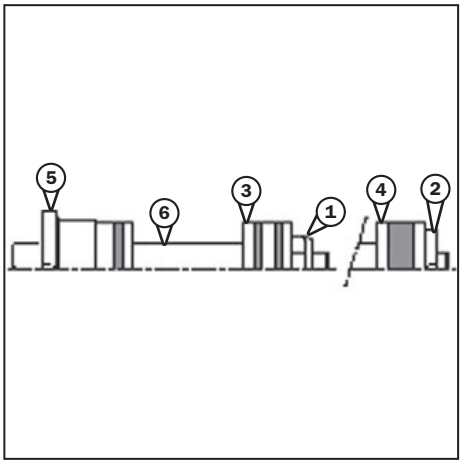
TEST

Remove grease and clean the inside of the jack.
Visually check that the body of the jack is free from scratches, burrs, oxidation etc.

REFIT

Apply hydraulic oil to the piston seals with a brush and refit the complete rod in the body of the jack (Item 2).
Be careful not to damage the seals (Item 4) when they pass through the threads in the body of the jack, apply hydraulic oil to the external seals of the closing ring.
Apply Loctite threadlock 222 (See section "Applying threadlock") to the closing ring (Item 5).
Screw in the ring, lock with a pin wrench and torque wrench to the torque indicated in the table (Item 6), turn the rod one turn to position the seals.
NOTE:
It is advisable to test the jack hydraulically before refitting to the vehicle.
Extend and retract the rod several times.

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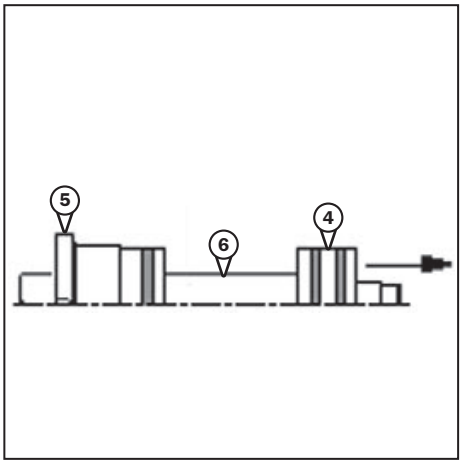


PISTON AND CLOSING RING

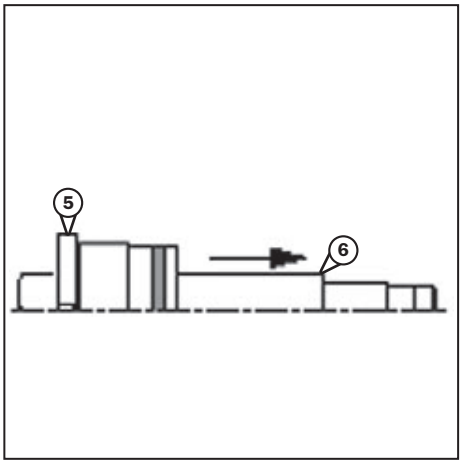
REMOVAL

Place the rod in a vice with jaw protectors tighten to prevent rotation of the unit.

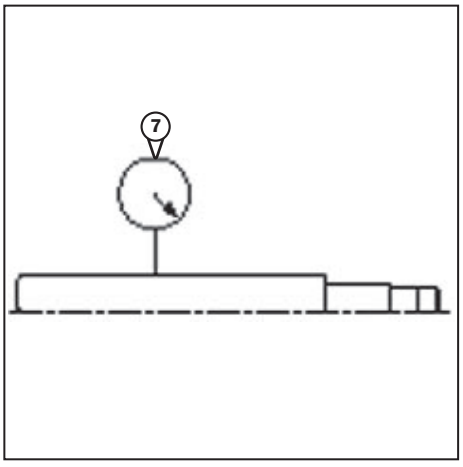
Unlock the nut (Item 1) and unscrew it completely with a polygonal wrench or, depending on the version, remove the pin screw (Item 2) with a hexagonal wrench.



Remove the piston (Item 3) by pulling it by hand or, depending on the version, unscrewing the piston (Item 4) with a pin wrench.



Remove the ring (Item 5) by sliding it along the rod.

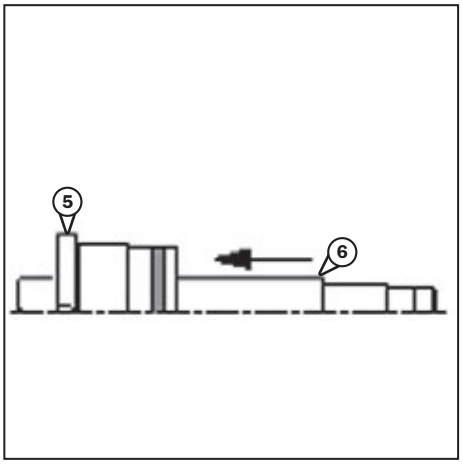


TEST

Using a comparator (Item 7), check the straightness of the rod over its whole length.

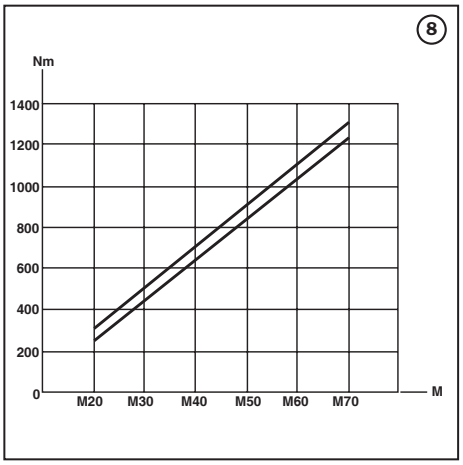
Check that the rod is not chipped, corroded or scratched.

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REFIT

Refit the ring (Item 5) on the rod (Item 6) and reattach the piston (Item 3) to the rod.



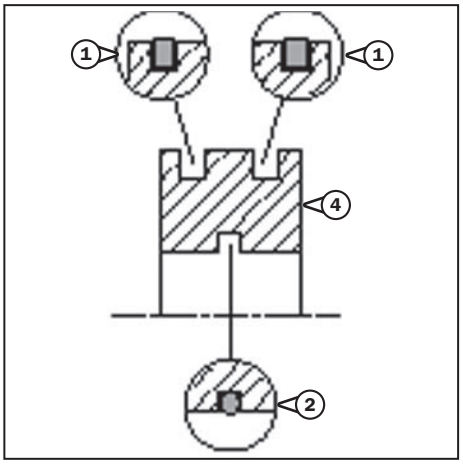
Screw on and lock the nut (Item 1) with a polygonal wrench and torque wrench to the torque indicated in the table (Item 8) or, depending on the version, screw the piston (Item 3) back on with a pin wrench (see tightening torque (Item 8)) and lock it with a pin screw (Item 2).

NOTE:

The pin screw must be fitted using loctite 243, see section "Applying threadlock".

Tightening torque of the screw = 20 Nm.

Strike with a chisel to spread the metal on the screw.



PISTON SEALS

NOTE:

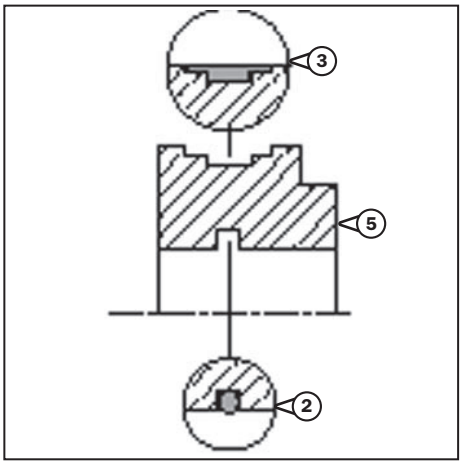
Never use sharp tools (screwdrivers, blades, etc.) for fitting and removing the seals.

It is advisable to work on clean benches, free from swarf.

REMOVAL

Remove the seals (Item 1-2-3) from the piston (Item 4 or 5).

Be careful to avoid damaging the edges and grooves.



TEST

Remove grease and clean the piston.

Check that the grooves and surfaces are smooth and free from scratches.

The grooves must not contain foreign bodies.

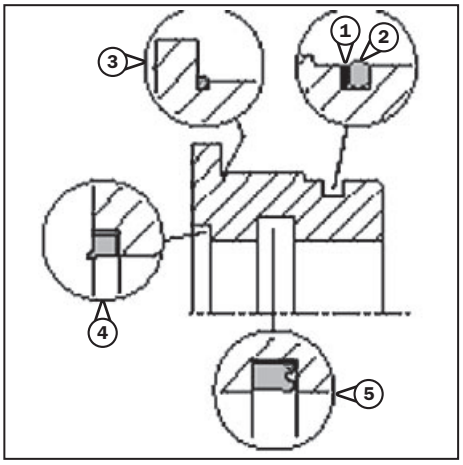
REFIT

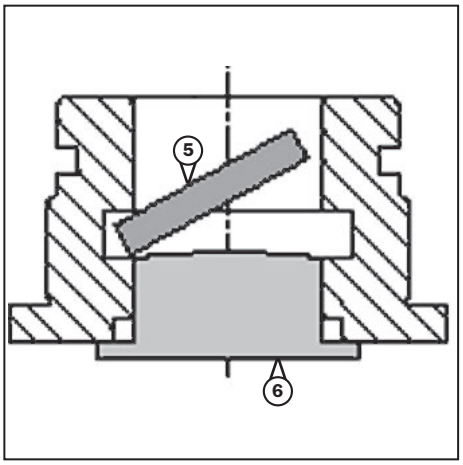
Position the seals after fitting them to the piston (Item 4 or 5).

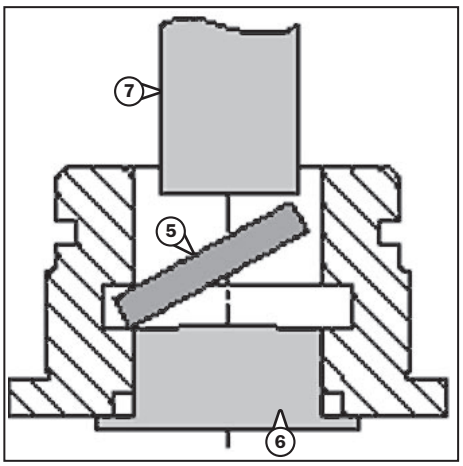
To fit the external seals (Item 1 and 3), open them enough to be able to insert them in the grooves without breaking them.

The internal seal (Item 2) must be fitted by hand.

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CLOSING RING SEALS

NOTE:
Never use sharp tools (screwdrivers, blades, etc.) for fitting and removing the seals.
It is advisable to work on clean benches, free from swarf.

REMOVAL
Remove the seals from the closing ring.
Be careful to avoid damaging the edges and grooves.

TEST
Remove grease and clean the closing ring.
Check that the grooves and surfaces are smooth and free from scratches.
The grooves must not contain foreign bodies.
Fit the ring over the rod by sliding it all the way along.
The play must not be excessive, but it must never be locked rigidly to the ring.

REFIT
Position the seals after fitting (Item 1-2-3-4-5).
The lips of the seal must be orientated towards the pressure side.
To fit the seal to the rod (Item 5), insert it into the groove by holding it with your thumb or a punch (Item 6) without any sharp edges.
Press the seal into the groove with the other hand or with a smooth punch (Item 7). If the seal is very strong, this can be reduced by immersing it in a bath of hydraulic oil at a temperature of 50 °C.
Position the oil scraper (Item 4) using a pad and a mallet.
Fit the O-rings (Item 2 and 3) and the anti-extrusion seal (Item 1) by hand.

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APPLICATION OF THREADLOCK

CHARACTERISTICS

Loctite 222 light threadlock

Application to the threads of the closing ring.

Without Activator	
Time of workability	10 - 30 min.
Curing time	3 - 6 hours
(Jack under pressure)	
With Loctite Activator N	
Time of workability	10 - 20 min.
Curing time	2 - 4 hours
(Jack under pressure)	
Shear resistance	1,5 - 4 N/mm^2

Loctite 243 medium threadlock

Application to M8 screws for locking the pistons.

Without Activator	
Time of workability	10 - 20 min.
Curing time	3 - 6 hours
(Jack under pressure)	
With Loctite Activator N	
Time of workability	5 - 15 min.
Curing time	2 - 4 hours
(Jack under pressure)	
Shear resistance	5 - 7,5 N/mm^2

REMOVAL

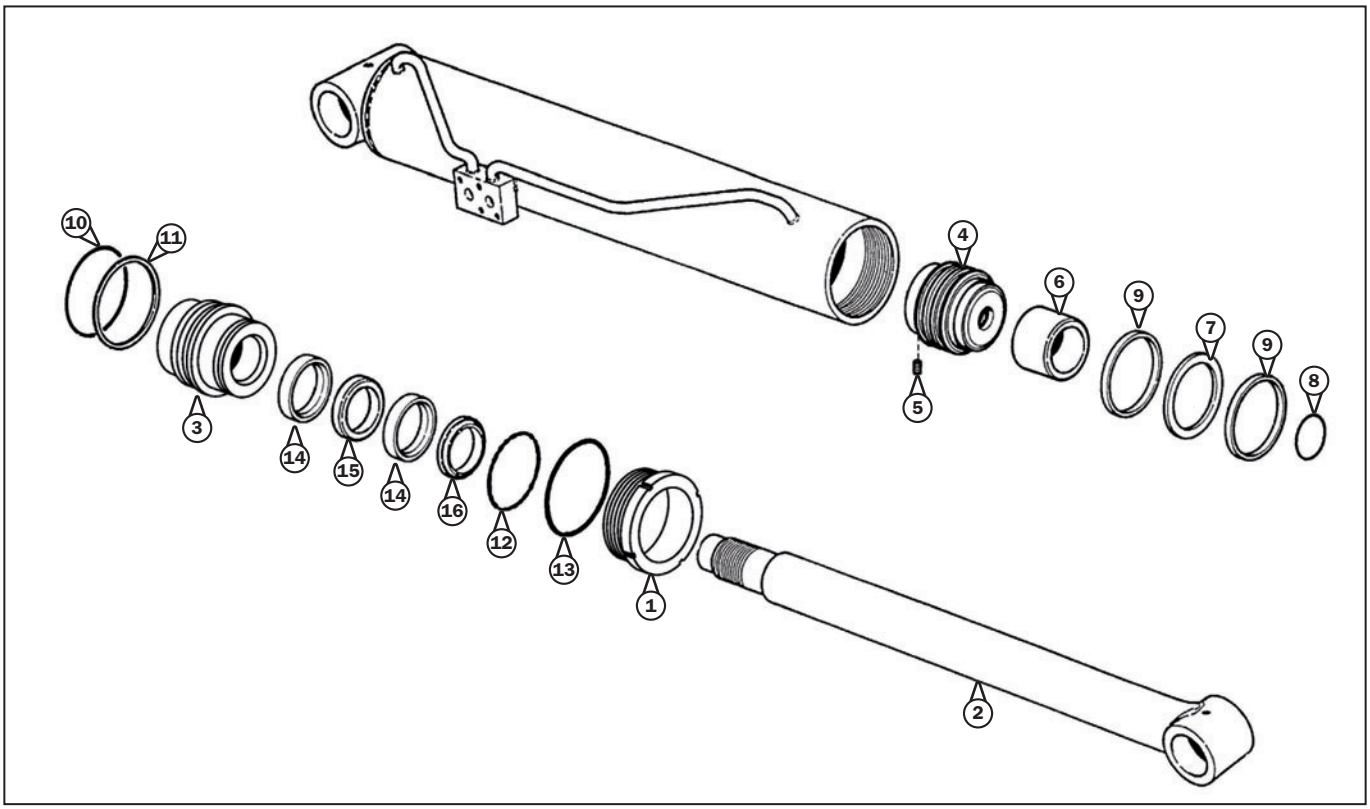
If components fitted with threadlock cannot be unlocked using standard tools, it is advisable to heat the bonded area to temperature T = 250 °C preferably using a hot air gun instead of a blow torch.

NOTE:
If the temperature is close to 0 °C, it is advisable, when fitting, to use a Loctite activator to reduce the curing time.

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LIFTING JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the liner, rod assembly (Item 2) + cylinder head (Item 1 and 3) + piston (Item 4 from the jack).
Remove the Allen screw (Item 5) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 4) of the jack using a hook wrench.
Remove the piston (Item 4), spacer (Item 6) and cylinder head (Item 1 and 3) from the rod.
Remove the seals (Item 7 and 8) and piston guide rings (Item 9).
Remove the seals (Item 10-11-12-13), guide rings (Item 14) and cylinder head seals (Item 15 and 16).
Check the condition of the valve seat and spring, replace the seals and components if necessary.
WARNING in the direction of refitting.

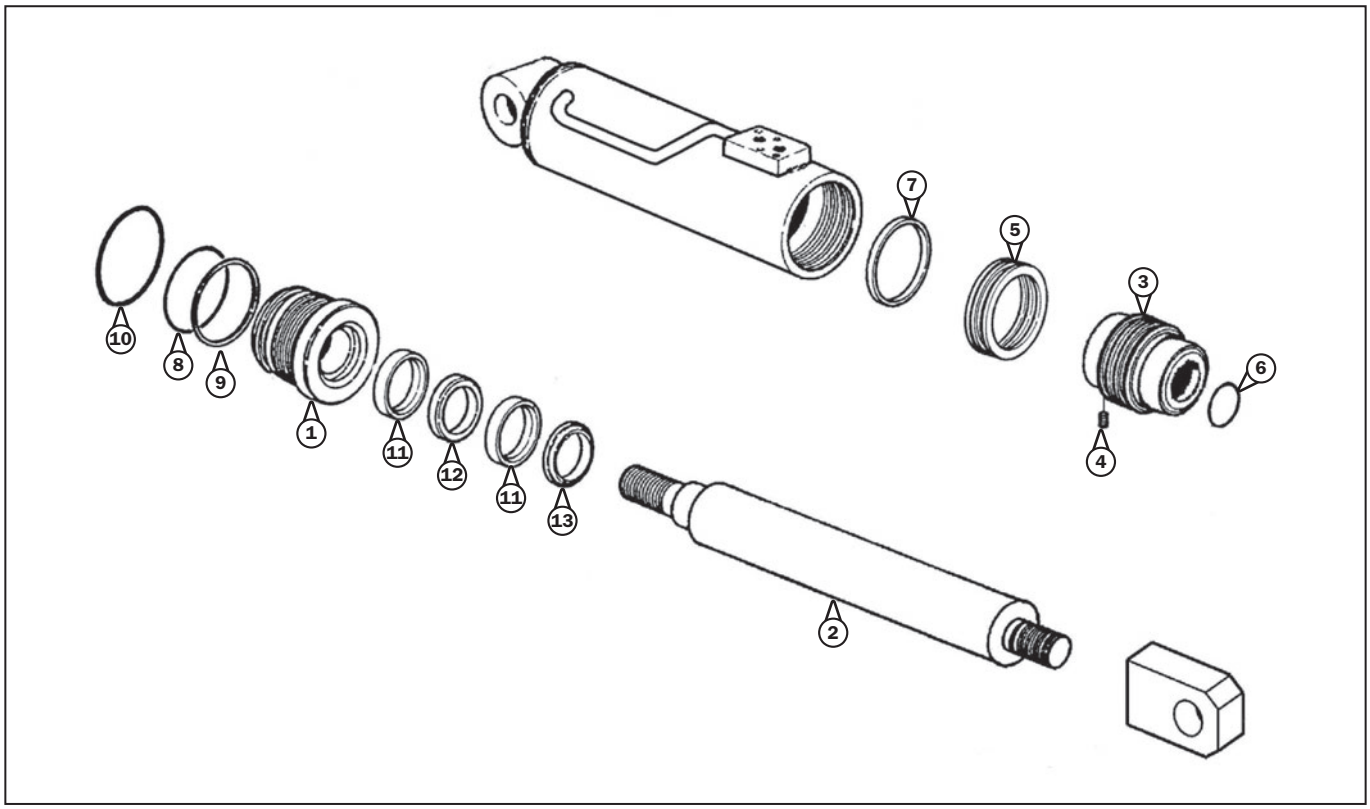
REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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TRAVERSE CYLINDER

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 3) of the jack using a hook wrench.
Remove the piston (Item 3) of the jack and the head (Item 1) from the rod.
Remove the piston seals (Item 5 and 6) and guide rings (Item 7).
Remove the seals (Item 8-9-10), guide rings (Item 11) and head gaskets (Item 12-13).
Check the condition of the valve seat and spring, replace the seals and components if necessary.
WARNING in the direction of refitting.

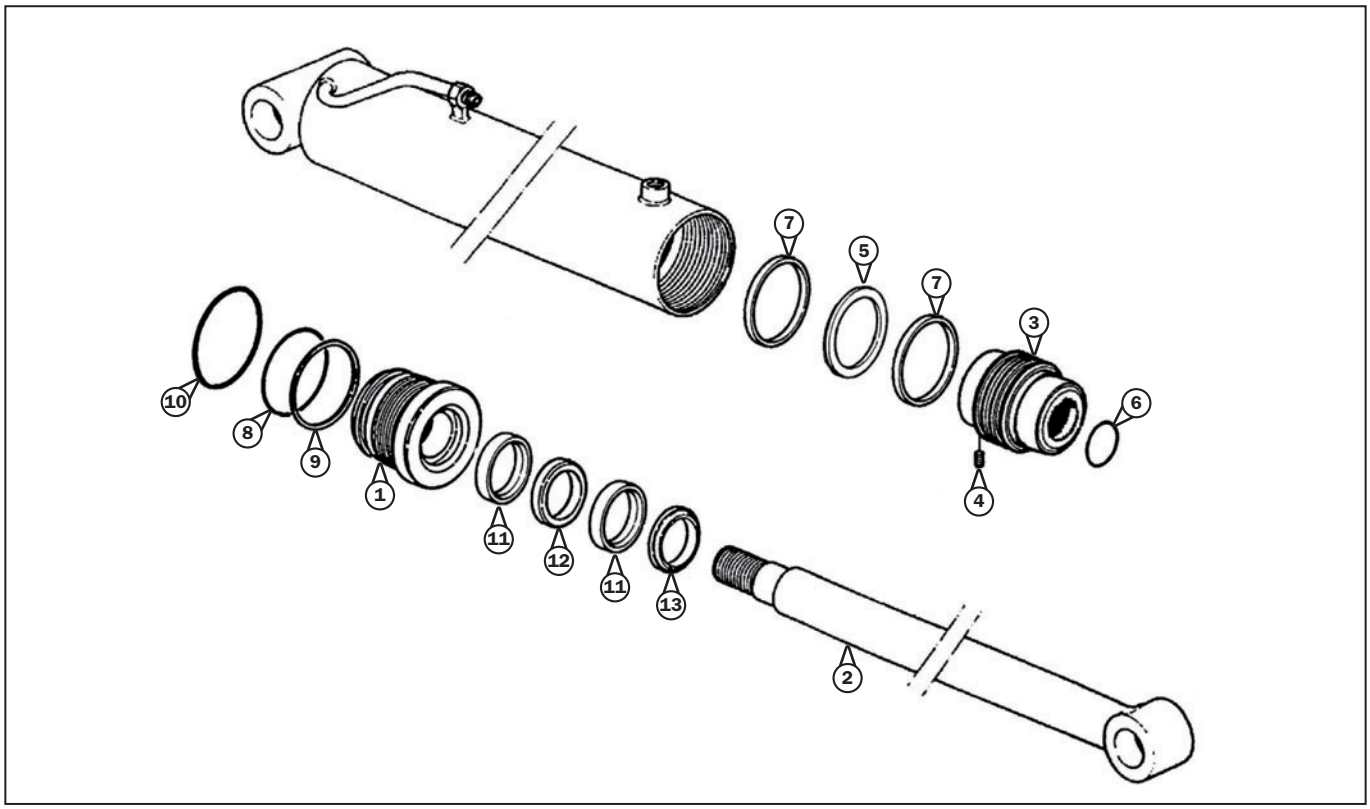
REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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COMPENSATION JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 3) of the jack using a hook wrench.
Remove the piston (Item 3) of the jack and the head (Item 1) from the rod.
Remove the piston seals (Item 5 and 6) and guide rings (Item 7).
Remove the seals (Item 8-9-10), guide rings (Item 11) and head gaskets (Item 12 and 13).
Replace the seals and components if necessary.
WARNING in the direction of refitting.

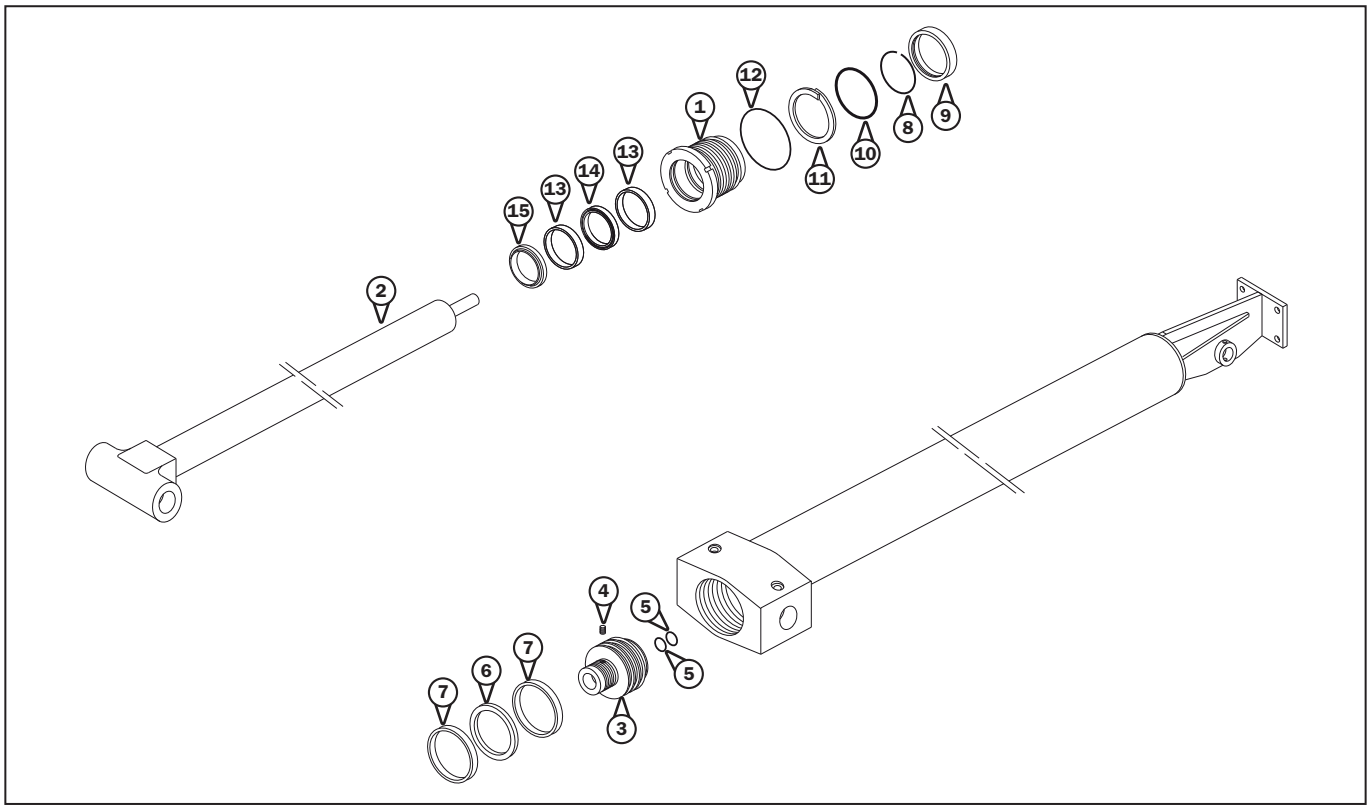
REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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EXTENSION JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 3) of the jack using a hook wrench.
Remove the piston (Item 3) of the jack and the head (Item 1) from the rod.
Remove the piston seals (Item 5 and 6) and guide rings (Item 7).
Remove the sealing ring (Item 8) and take out the spacer (Item 9).
Remove the seals (Item 10-11-12), guide rings (Item 13) and head gaskets (Item 14 and 15).
Check the condition of the valve seat and spring, replace the seals and components if necessary.
WARNING in the direction of refitting.

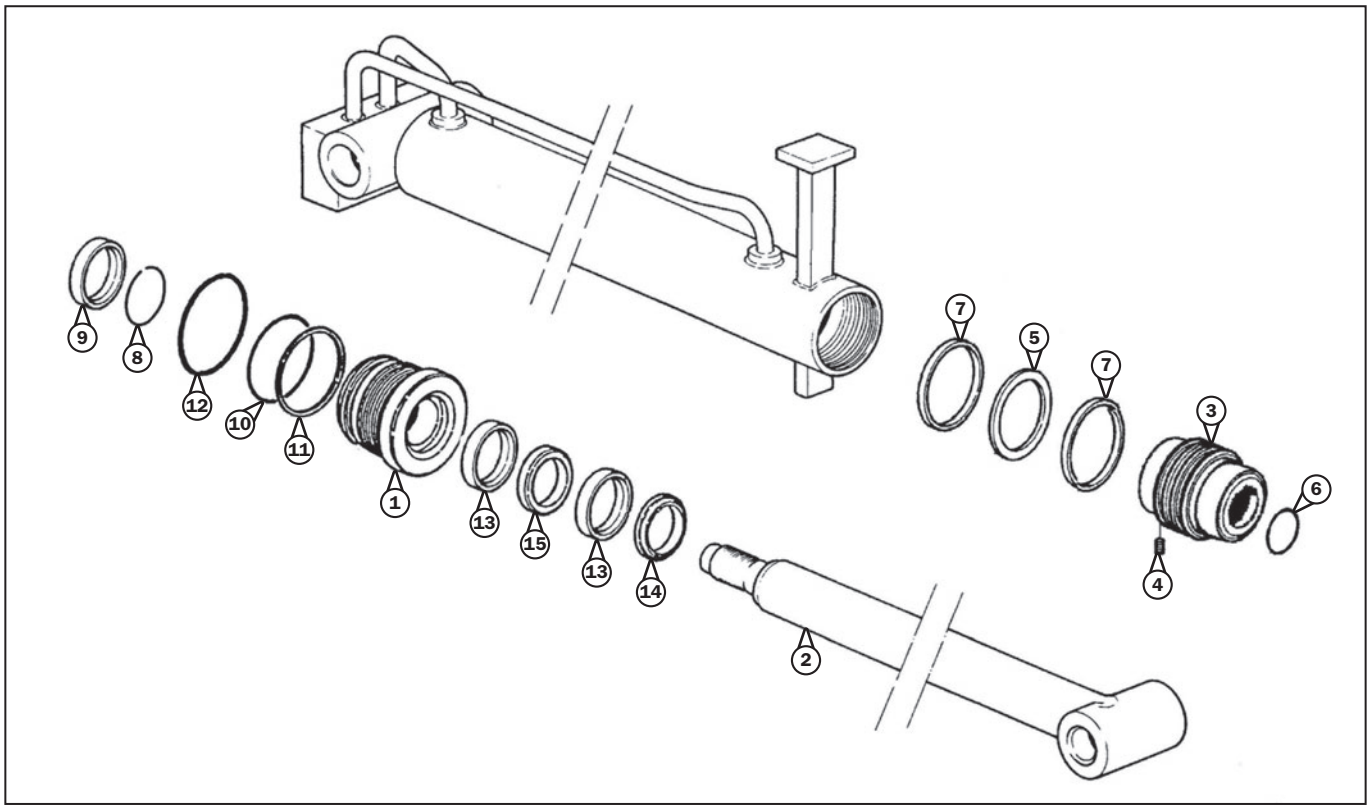
REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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TELESCOPIC STABILISER JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm socket wrench



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 3) of the jack using a hook wrench.
Remove the piston (Item 3) of the jack and the head (Item 1) from the rod.
Remove the piston seals (Item 5 and 6) and guide rings (Item 7).
Remove the sealing ring (Item 8) and take out the spacer (Item 9).
Remove the seals (Item 10-11-12), guide rings (Item 13) and head gaskets (Item 14 and 15).
Replace the seals and components if necessary.
WARNING in the direction of refitting.

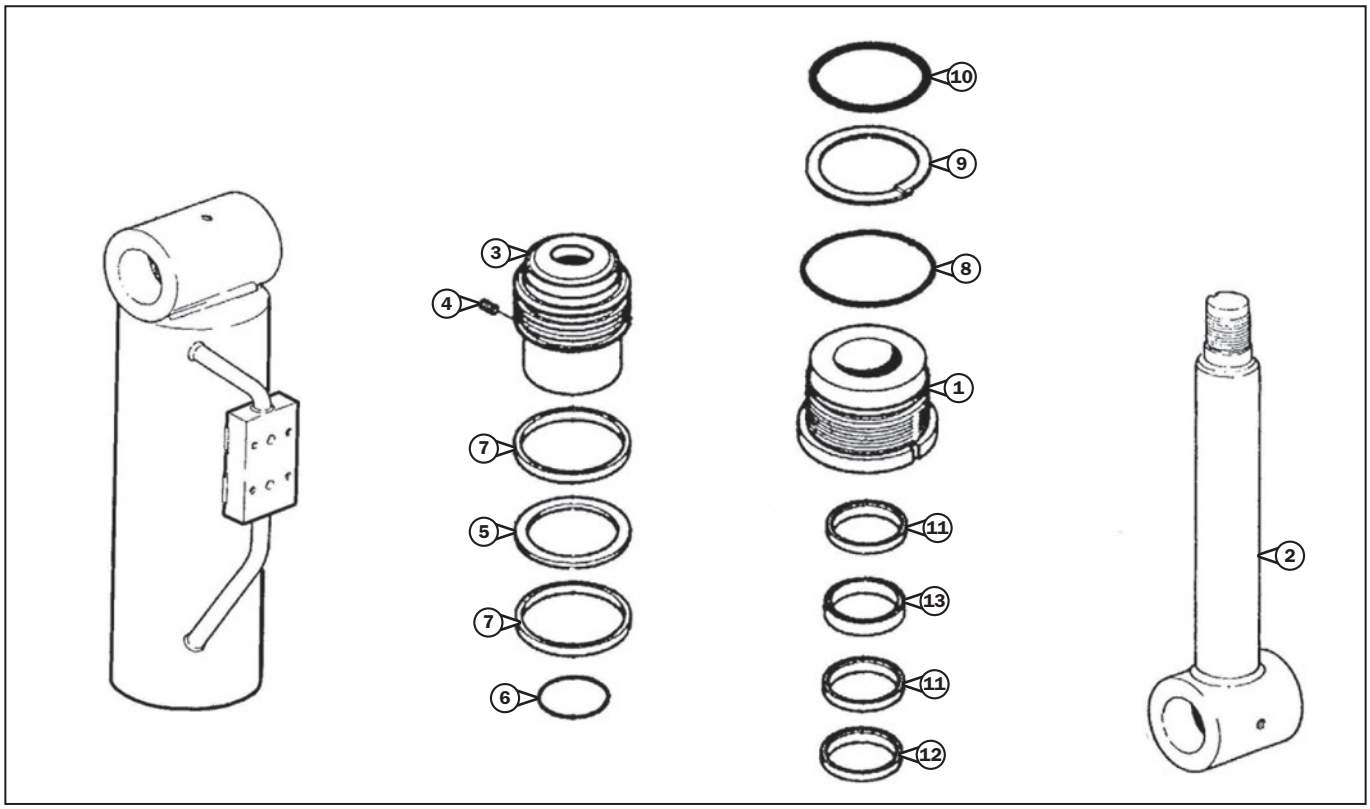
REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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STABILISER INCLINATION JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

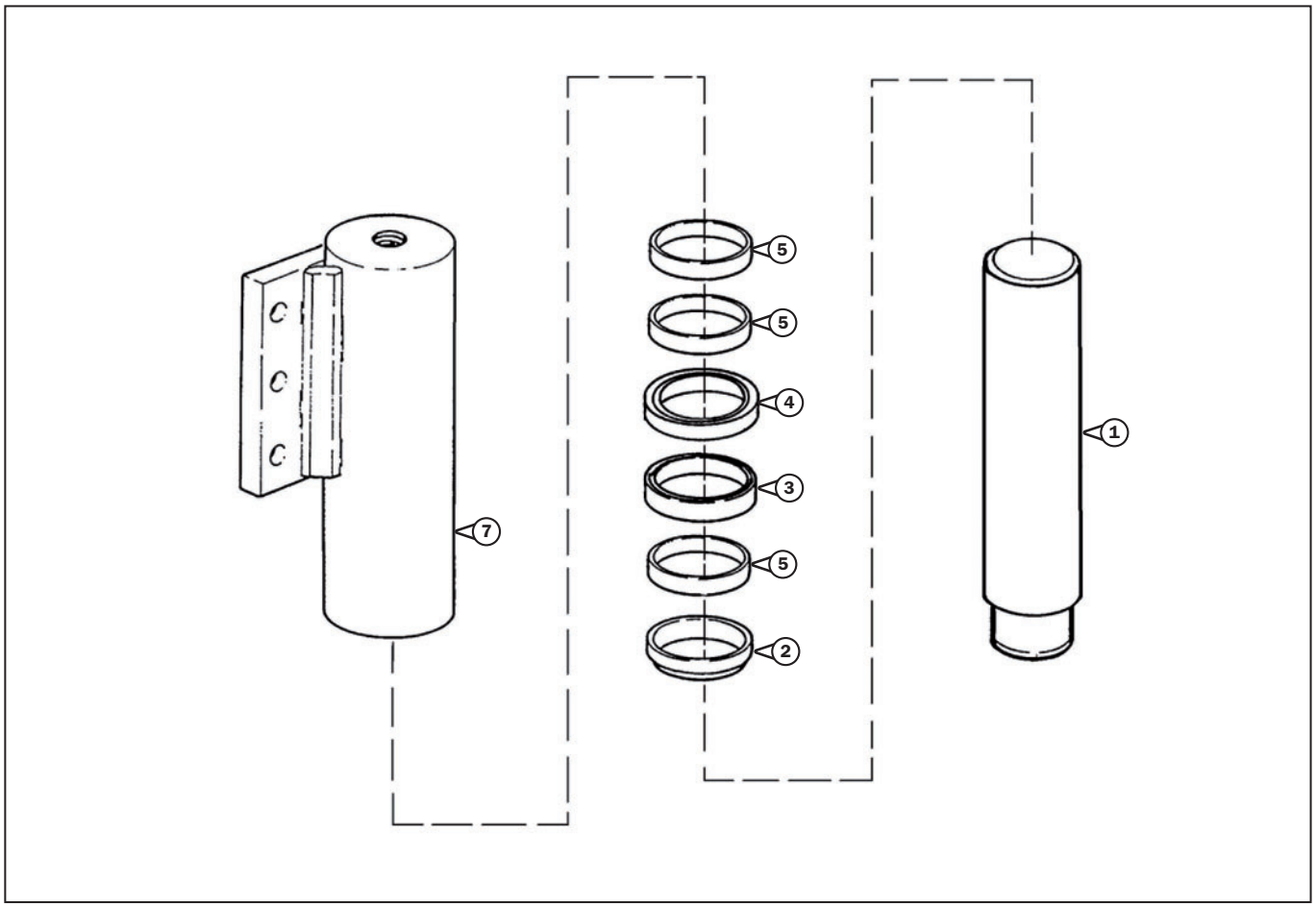
Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the piston (Item 3) of the jack using a hook wrench.
Remove the piston (Item 3) of the jack and the head (Item 1) from the rod.
Remove the piston seals (Item 5 and 6) and guide rings (Item 7).
Remove the seals (Item 8-9-10), guide rings (Item 11) and head gaskets (Item 12 and 13).
Check the condition of the valve seat and spring, replace the seals and components if necessary.
WARNING in the direction of refitting.

REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.

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REAR AXLE LOCKING JACK



REMOVAL

Withdraw the rod (Item 1) from the jack liner.

Remove the seal (Item 2), anti-extrusion seals (Item 3 and 4) and cylinder (Item 7) guide rings (Item 5).

Replace the seals and components if necessary.

REFIT

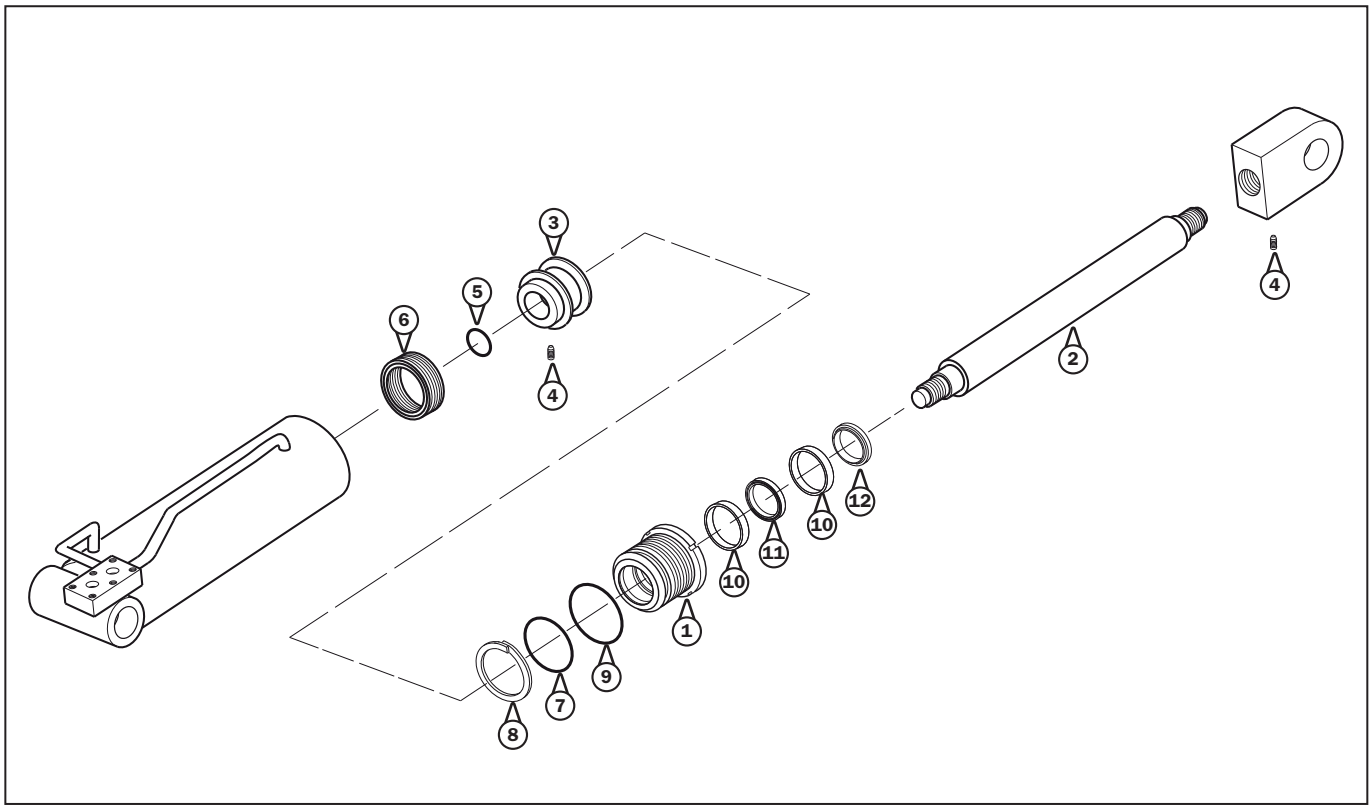
Reverse operation to removal.

Note: Spread hydraulic oil on the seals.

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LEVELLING JACK

Tools required:
- 1 hook wrench (for rings)
- 1 4 mm Allen key



REMOVAL

Unscrew the head (Item 1) with a hook wrench after working on the edge of the liner riveted in the groove in the seat of the cylinder head.
Withdraw the rod assembly (Item 2) + piston (Item 3) from the jack liner.
Remove the Allen screws (Item 4) (4 mm Allen key) from the piston.
WARNING screw locked with loctite (see section “Application of threadlock”).
Unscrew the jack piston (Item 3) using an Allen key, remove the jack piston (Item 3) and the head (Item 1) from the rod.
Remove the seal (Item 5) and the gas-tight piston seals (Item 6), remove the seals (Item 7-8-9), guide rings (Item 10) and head gaskets (Item 11 and 12).
Check the condition of the valve seat and spring, replace the seals and components if necessary.
WARNING in the direction of refitting.

REFIT

Reverse operation to removal.
Note: Remember that the outside edge of the liner must be riveted in one of the grooved seats on the cylinder head.
The Allen screws must be fitted using loctite thread lock.
Spread hydraulic oil on the seals.
When refitting the gas-tight seal assembly (Item 6) “Do not allow the cuts in the anti-extrusion seals to coincide” (separate them by one third of the circumference).

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TURRET ROTATION BRAKE ADJUSTMENT

MRT 1850 / 2150

Turn the valve cock (*clockwise*) until the valve is closed (*Photo 01*).
Then, to obtain the correct adjustment, turn the cock (*anticlockwise*) by **2 turns** (*Photo 02*).

MRT 2540

Turn the valve cock (*clockwise*) until the valve is closed (*Photo 01*).
Then, to obtain the correct adjustment, turn the cock (*anticlockwise*) by **1 ¾ turns** (*Photo 02*).

PHOTO 01

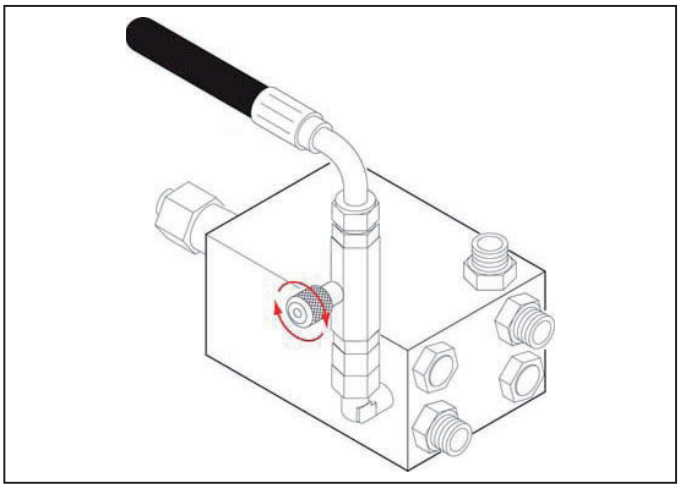
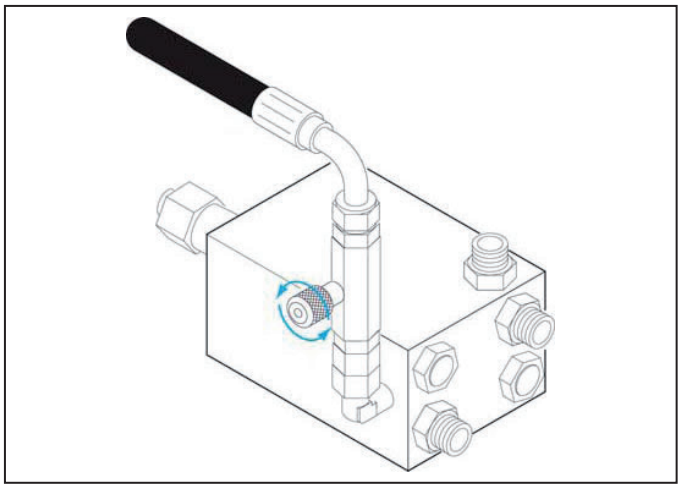
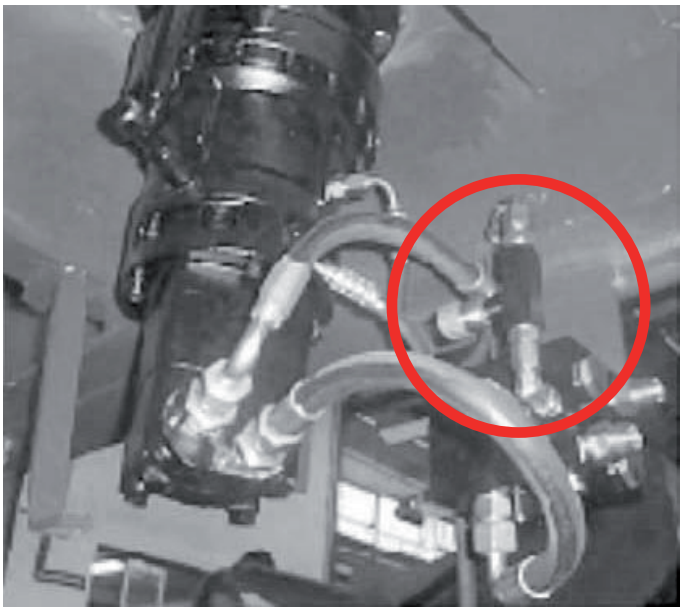


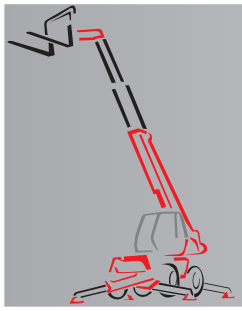
PHOTO 02





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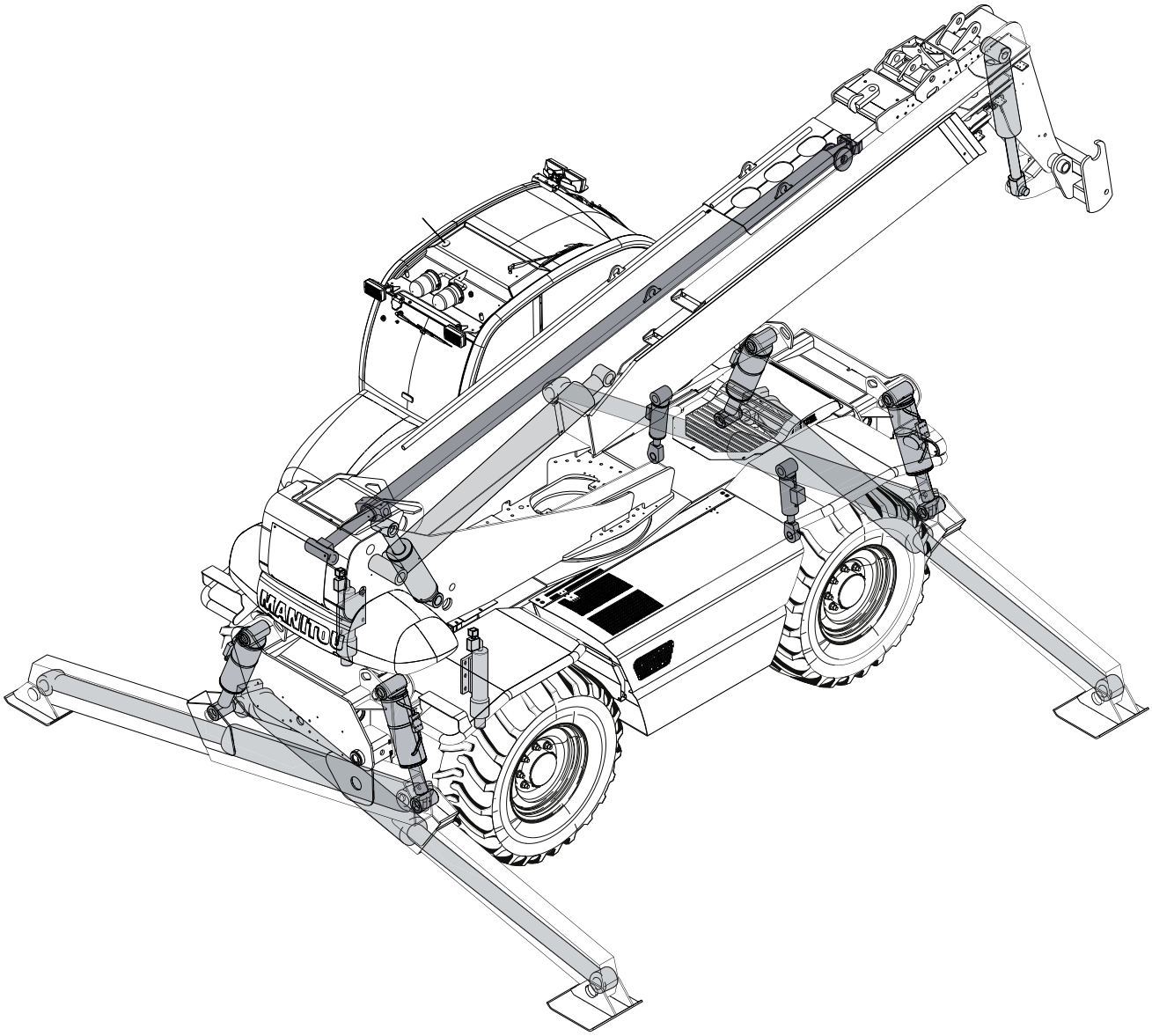


HYDRAULIC COMPONENTS REMOVAL

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– JIB RAISING CYLINDER REMOVAL 10
– TRAVERSE CYLINDER REMOVAL 12

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GENERAL INFORMATION

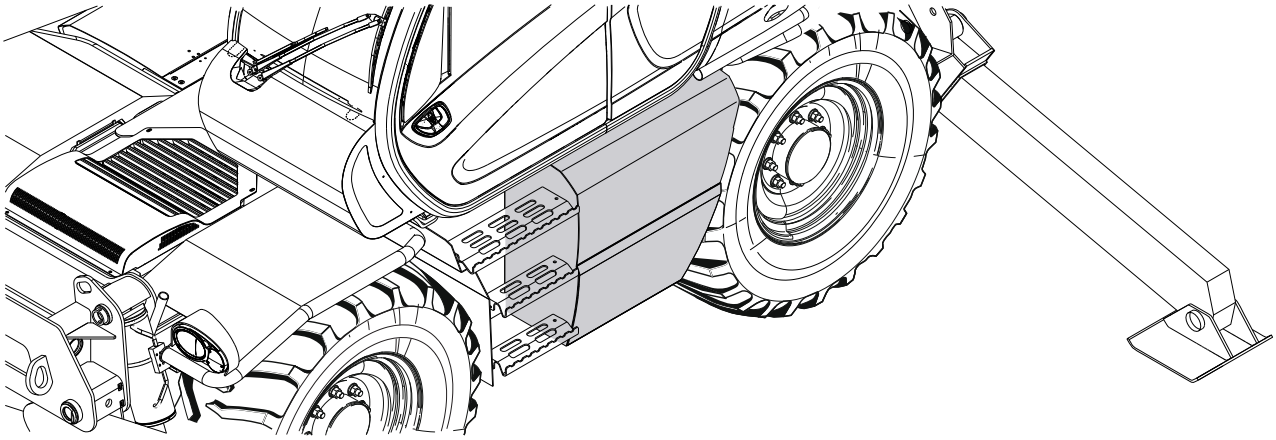
To reach the various components, the order of removal must be observed.

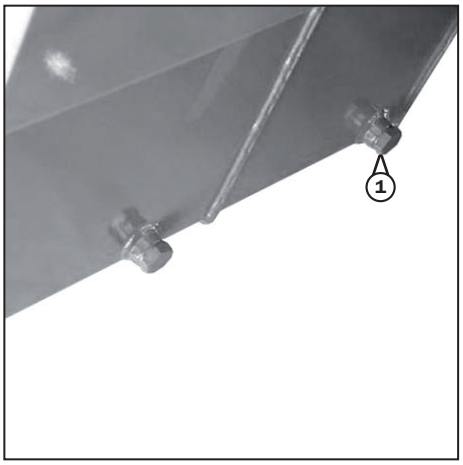
PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface and stop the IC engine.

Special instruments:
- Lifting crane (5000 kg. minimum).

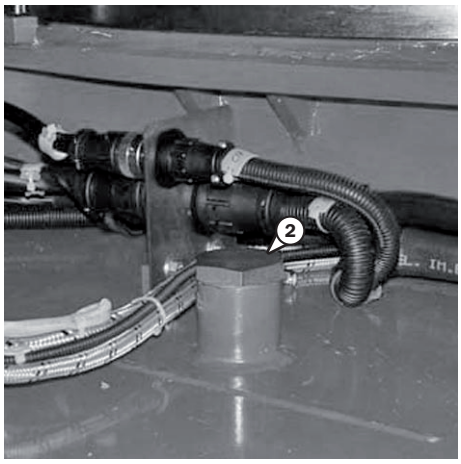
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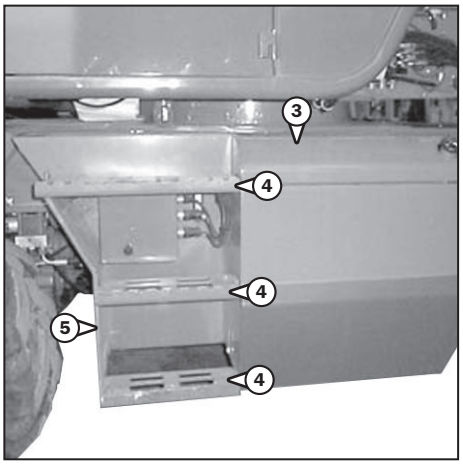


HYDRAULIC OIL AND FUEL TANK REMOVAL

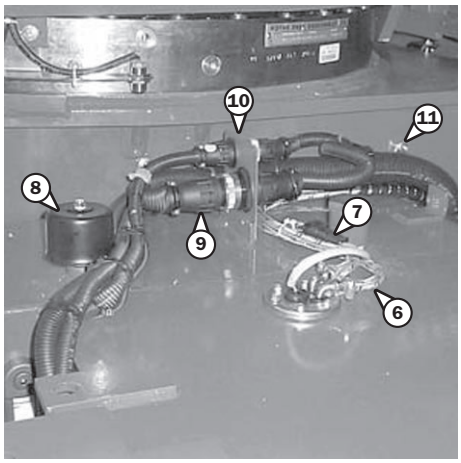
Obtain receptacles of adequate size for the quantity of oil to be collected and position them under the drain plug (Item 1).
Remove the plug (Item 1) and leave the oil to run out.



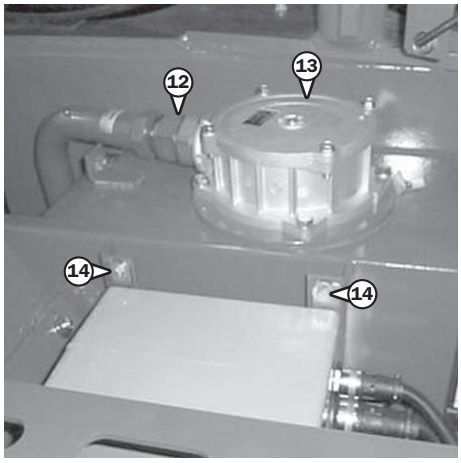
To speed up draining of the tank, remove the filler plug (Item 2).



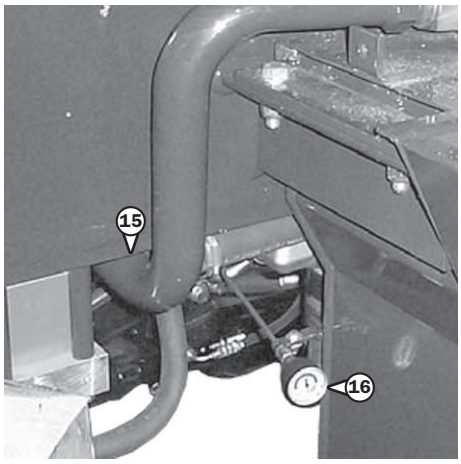
Remove the cover (Item 3), remove the 3 steps of the stepladder (Item 4) and remove the front housing (Item 5).



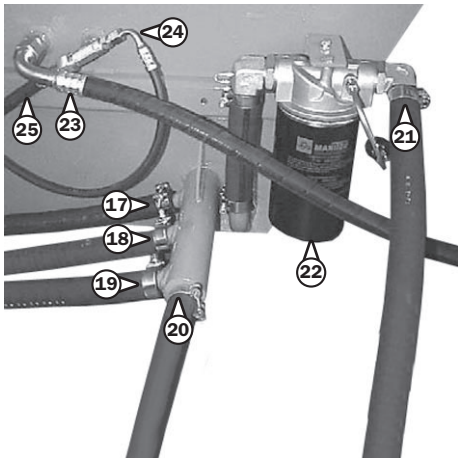
Disconnect the fuel inlet and return tubes (Item 6) mounted on the level indicator and undo the electrical connection (Item 7) of the fuel level indicator.
Unscrew the oil breather screw (Item 8) and screw on an eyelet to secure the tank to the overhead crane or hoist.
Disconnect the electrical socket (Item 9) and the mounting (Item 10) on the tank and unscrew the clip (Item 11) that supports the electric cables, from the frame.



Unscrew the oil return collector (Item 12) mounted on the drain filter (Item 13), remove the relay box by unscrewing the screws, (Item 14).

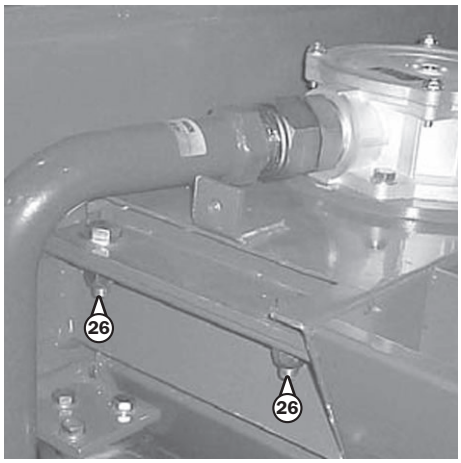


Unscrew the screws (Item 15) fixing the collector to the frame and remove the vacuum indicator (Item 16).

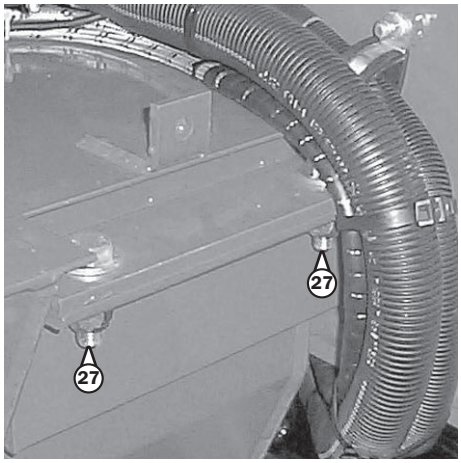


Disconnect the hydraulic oil inlet pipes (Item 17, 18, 19, 20) mounted on the tank.
(Note: the pipe (Item 20) is only present in versions fitted with air conditioning).
Disconnect the hydraulic inlet pipes (Item 21) on the transmission oil filter (Item 22).
Disconnect the hydraulic oil return pipes (Item 23) from the radiator, disconnect the rotation motor hydraulic drain pipe (Item 24) and the hydraulic oil return pipe (Item 25) from the hydrostatic pump.

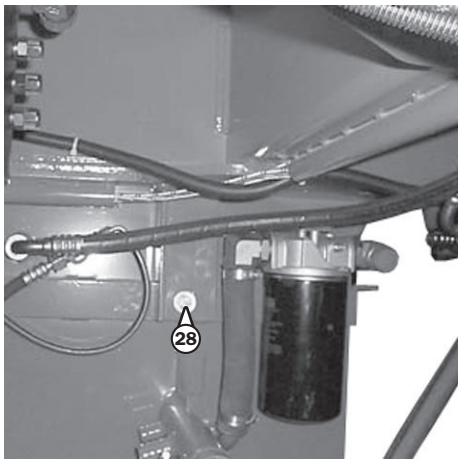
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Unscrew the screws (Item 26) on the front of the tank.



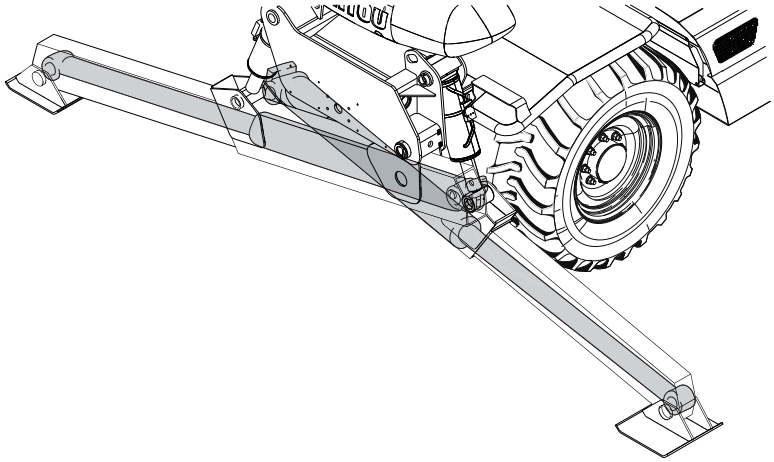
Unscrew the screws (Item 27) on the back of the tank.

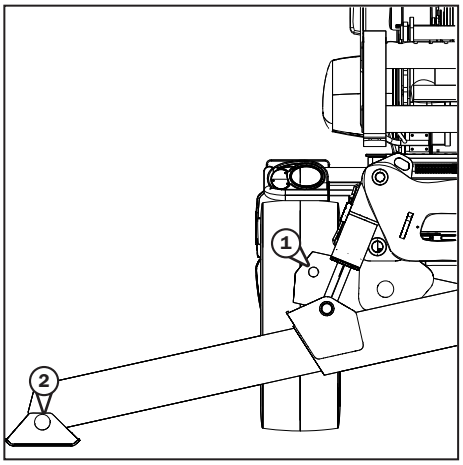


Unscrew the screw (Item 28) on the inside of the tank on the frame.

Remove the tank

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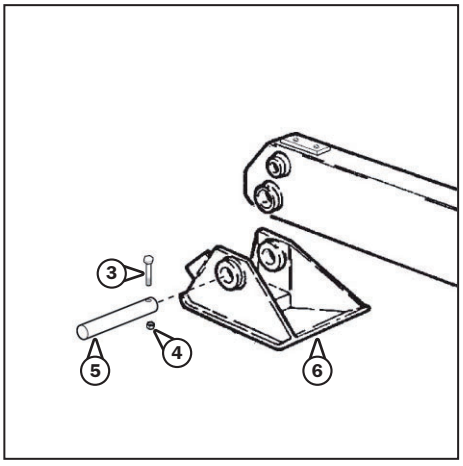




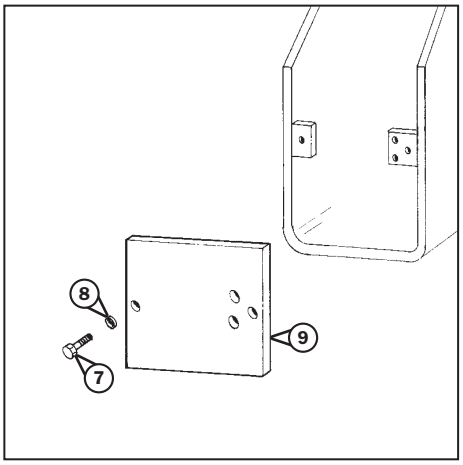
CYLINDERS REMOVAL

STABILISER EXTENSION CYLINDERS REMOVAL

Lower the stabilisers until it is possible to work on the pins (Item 1).
Using the appropriate commands, extend the stabiliser extension jib until it is possible to work on the pins (Item 2).

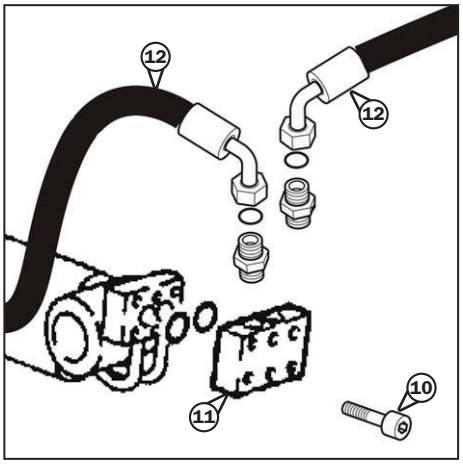


If it is impossible to remove the arm, unscrew the locking screw (Item 3) and the nut (Item 4), remove the pin (Item 5) and take off the foot (Item 6).

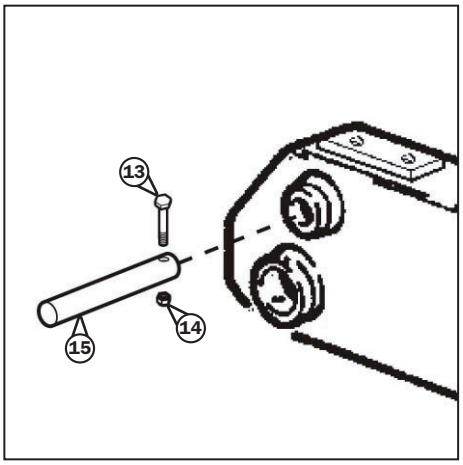


Unscrew the screws (Item 7) and washers (Item 8) and remove the valve protection plate (Item 9).

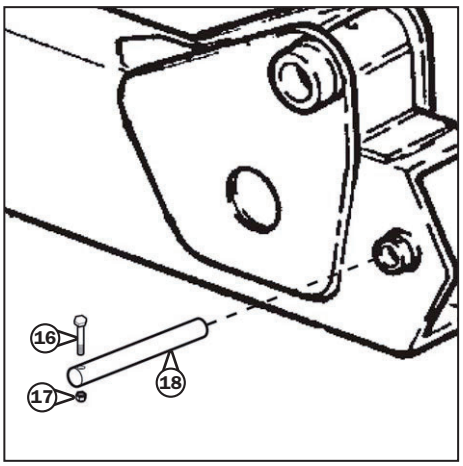
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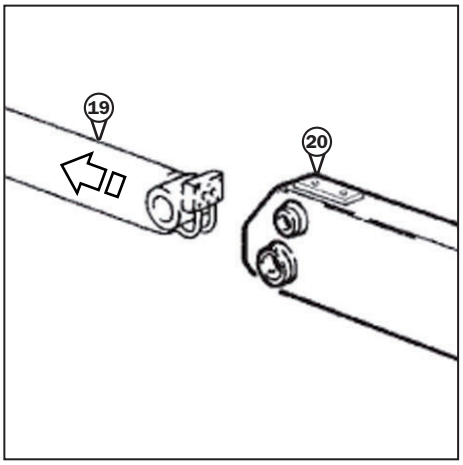
If necessary, unscrew the screws (Item 10), remove the valve (Item 11) on the base of the cylinder and disconnect the two hydraulic supply pipes (Item 12) taking care to mark them with a small brush before removing them to facilitate refitting.
Close the orifices with suitable plugs to prevent any dirt from entering.



Unscrew the locking screw (Item 13) and nut (Item 14) and remove the pin (Item 15).

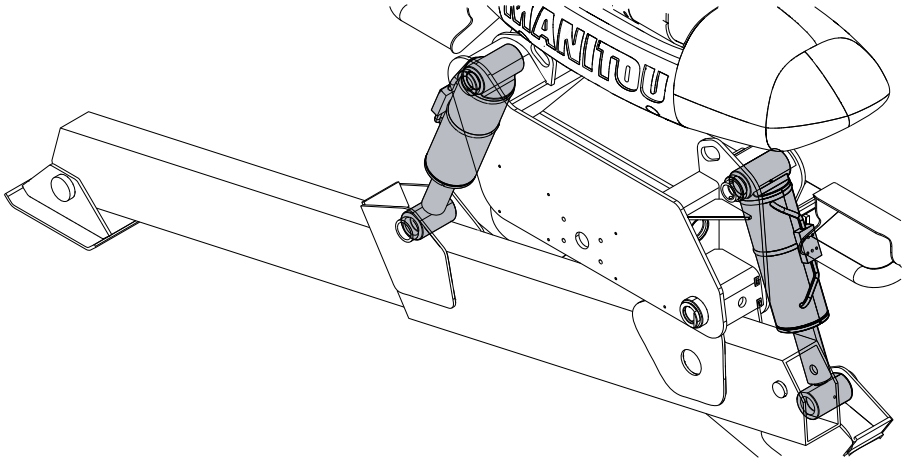


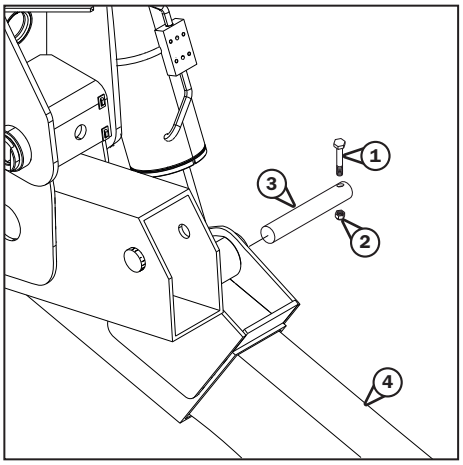
Unscrew the locking screw (Item 16), nut (Item 17) and remove the pin (Item 18).



Withdraw the stabiliser extension cylinder (Item 19) from the side of the bottom plate (Item 20).

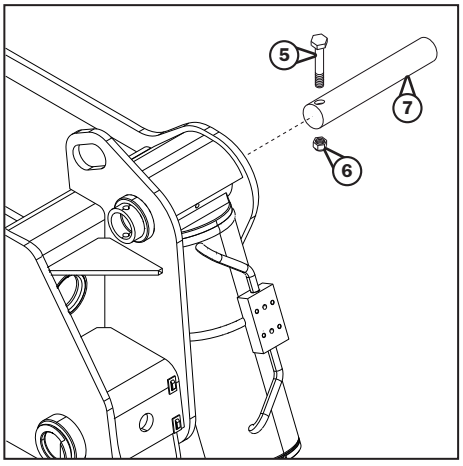
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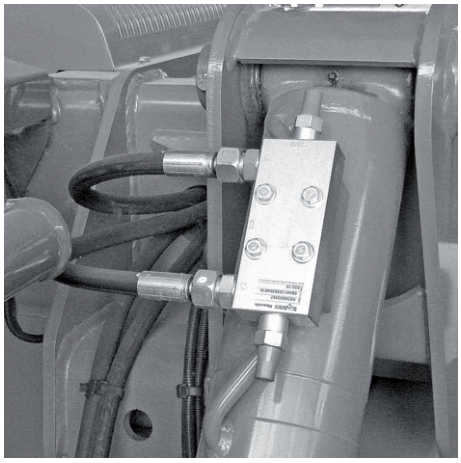


STABILISER RAISING AND LOWERING CYLINDER REMOVAL

To remove the front left or right rear tilt cylinder, it is necessary to remove the mudguard to prevent accidental breakages.
With an overhead crane or hoist, hook the stabiliser jib on the foot side, unscrew the locking screw (Item 1) and nut (Item 2) and remove the pin (Item 3).
Lay down the stabiliser jib with the foot side (Item 4) on the ground.

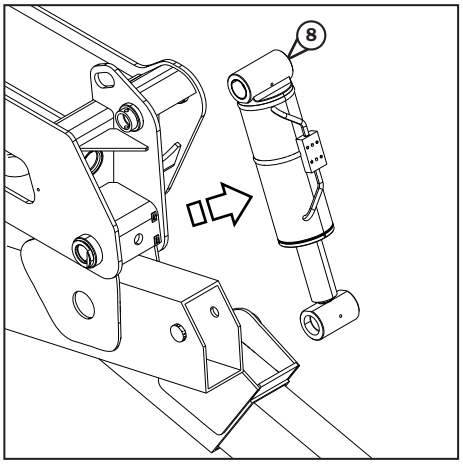


Remove the hydraulic pipes on the tilt stabiliser cylinder valve and seal the orifices with suitable plugs to prevent any dirt from entering.
Secure the cylinder to an overhead crane or hoist with a suitable strap.
Unscrew the locking screw (Item 5) and nut (Item 6) and remove the pin (Item 7).



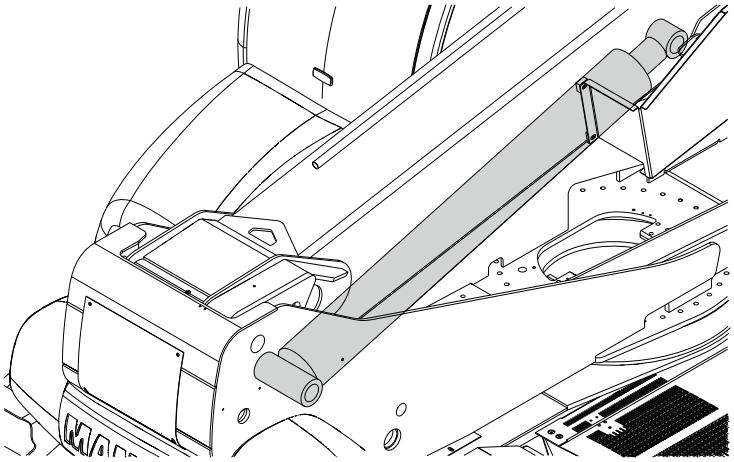
Disconnect all the hydraulic pipes taking care to mark them with a small brush before removing them to facilitate refitting.
Close the orifices with suitable plugs to prevent any dirt from entering.

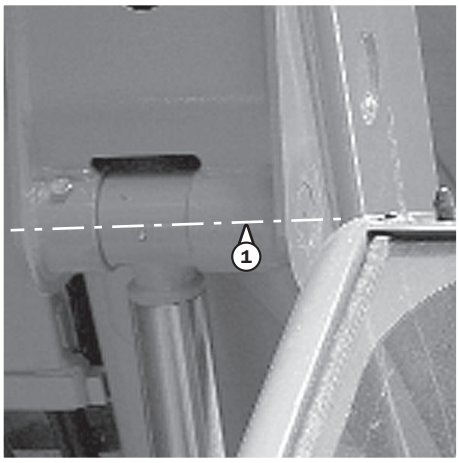
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Withdraw the cylinder (Item 8) from the base.

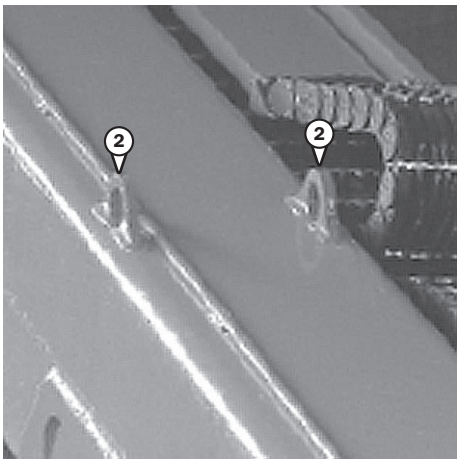
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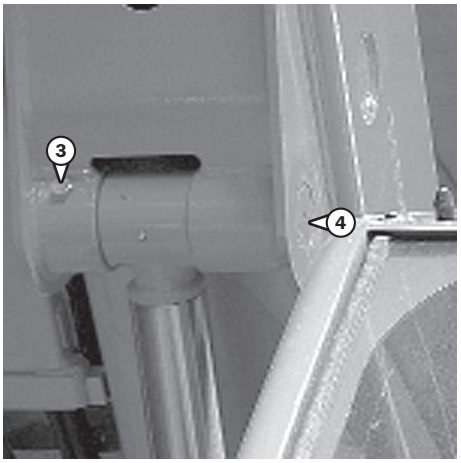
JIB RAISING CYLINDER REMOVAL

Activate the jib lift command and raise the jib above the profile of the cabin (Item 1), to give easy access to the lifting actuator hinge pin on the rod-jib side from both sides.



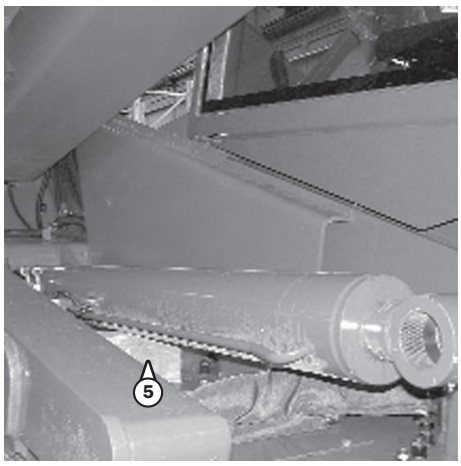
Secure the jib to an overhead crane or hoist through the appropriate eyelets (Item 2) in the top of the jib itself.

Secure the lifting actuator to a support.

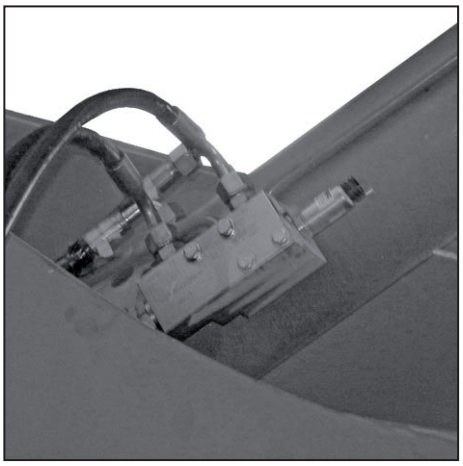


Unscrew the locking screw (Item 3) and withdraw the lifting actuator hinge pin on the rod-jib side (Item 4).

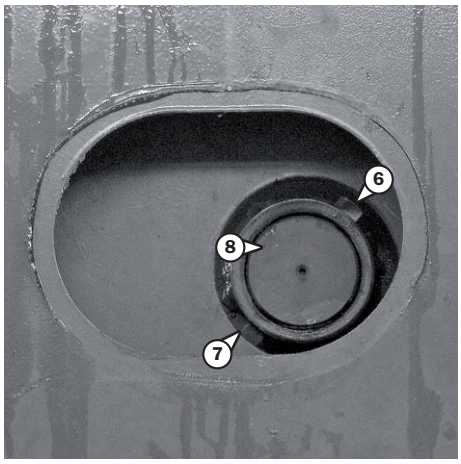
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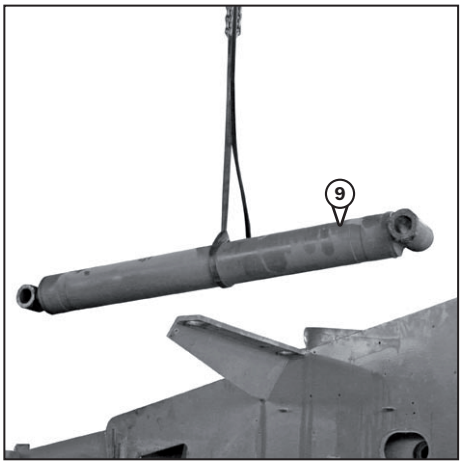
Rest the lifting actuator on the turret, placing a wooden beam under it (Item 5), and retract the rod with the command in the cabin.



Disconnect all the hydraulic pipes taking care to mark them with a small brush before removing them to facilitate refitting.
Close the orifices with suitable plugs to prevent any dirt from entering.

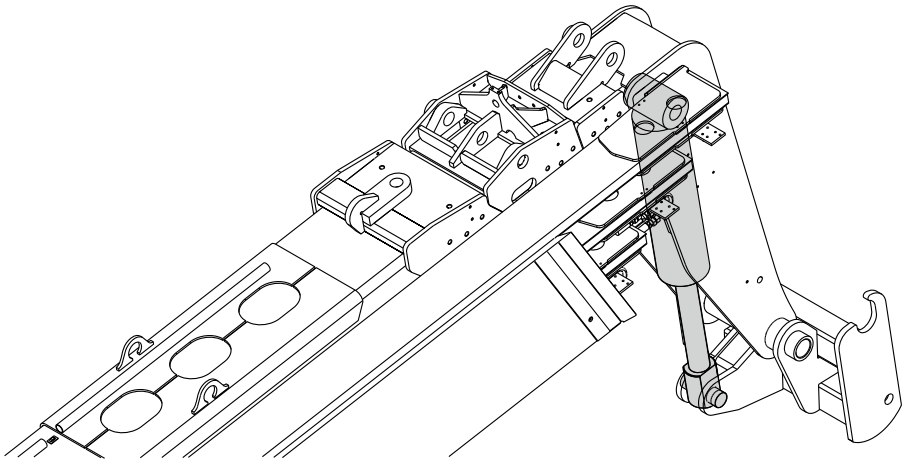


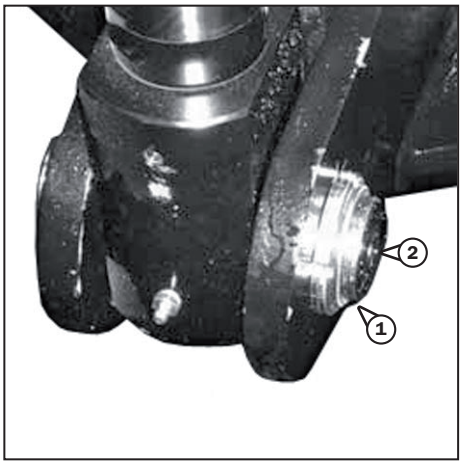
Unscrew the screw (Item 6) and nut (Item 7) and withdraw the pin (Item 8) locking the lifting cylinder.



Remove the lifting cylinder (Item 9) using ropes and an overhead crane.

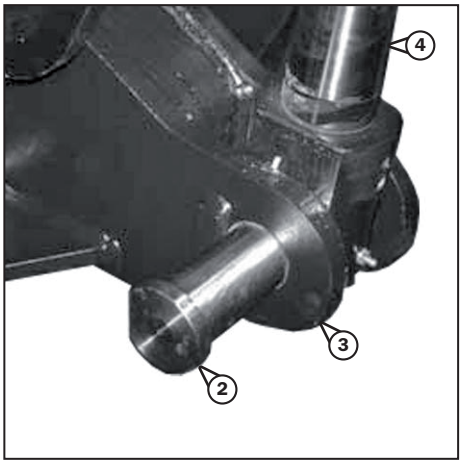
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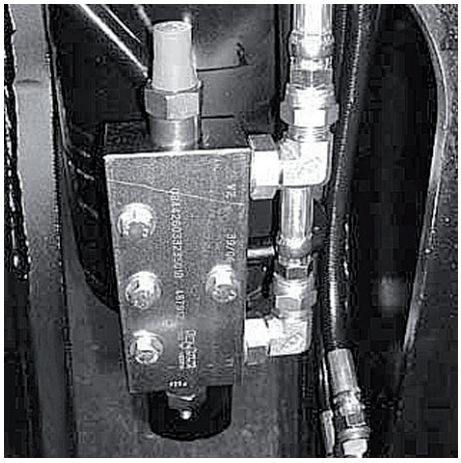


TRAVERSE CYLINDER REMOVAL

Unscrew the bush (Item 1) locking the pin (Item 2).

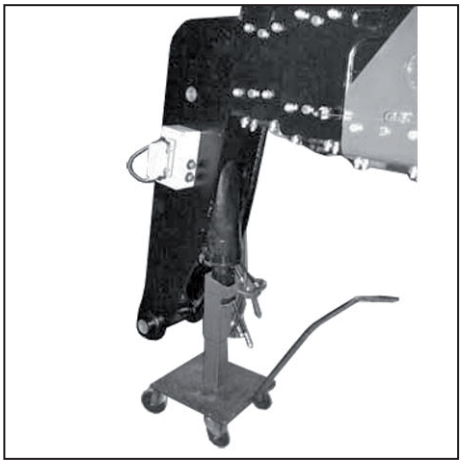


Secure the rapid attachment (Item 3) to an overhead crane.
Remove the pin (Item 2) from the rapid attachment (Item 3) and the traverse cylinder (Item 4).

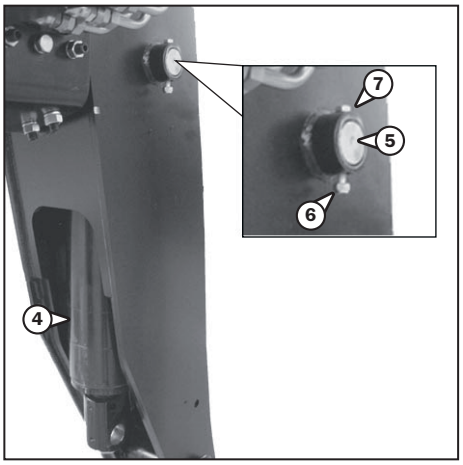


Mark the hydraulic pipes on the traverse cylinder valve and disconnect them.
Close the orifices with suitable plugs to prevent any dirt from entering.

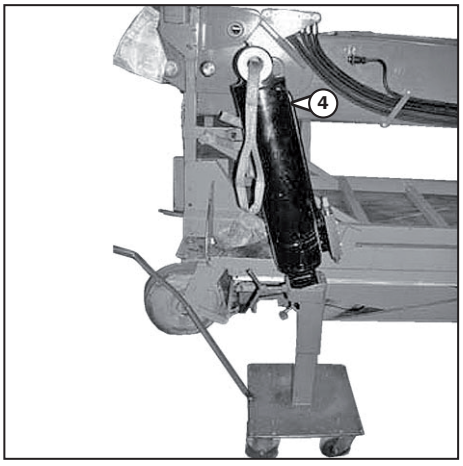
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Secure the traverse cylinder to a suitable jack.



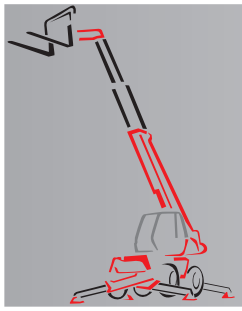
Unscrew the screw (Item 6) and nut (Item 7) and remove the pin (Item 5) to release the traverse cylinder (Item 4).



With the help of ropes, an overhead crane and jack, remove the traverse cylinder (Item 4).

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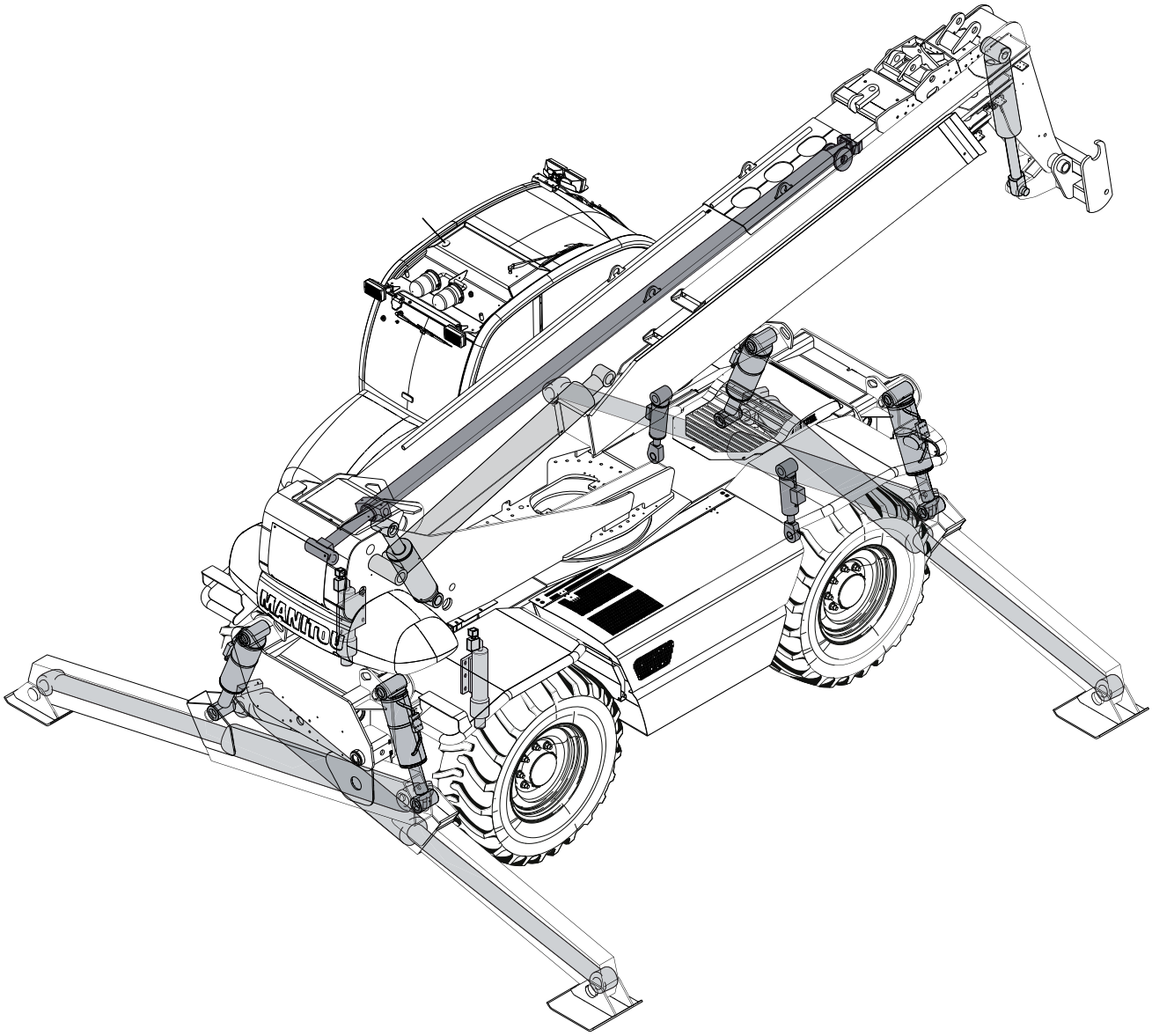


HYDRAULIC COMPONENTS REFIT

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– STABILISER EXTENSION CYLINDERS REFIT. 9
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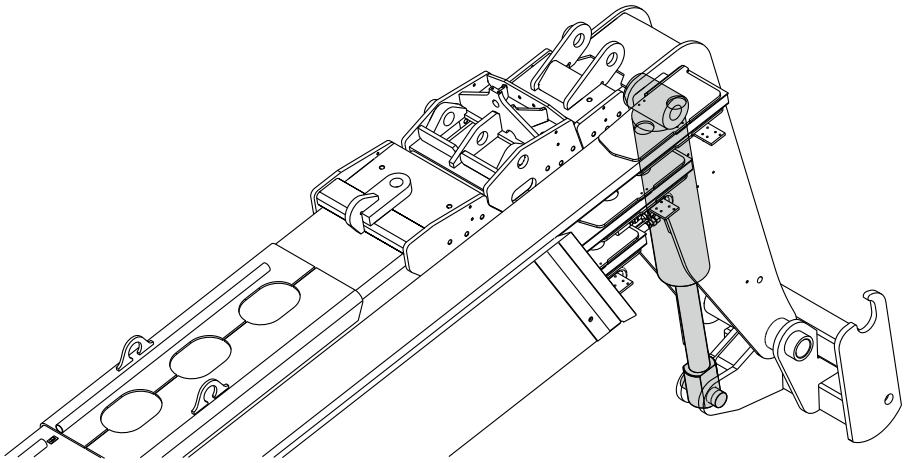


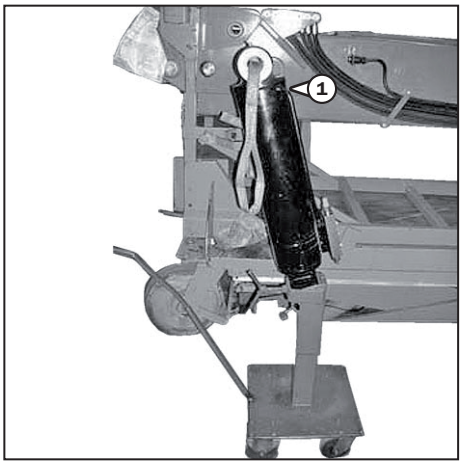
PREPARATION AND SAFETY INSTRUCTIONS

Position the truck on a horizontal surface and stop the IC engine.

Special instruments:
- Lifting crane (5000 kg. minimum).

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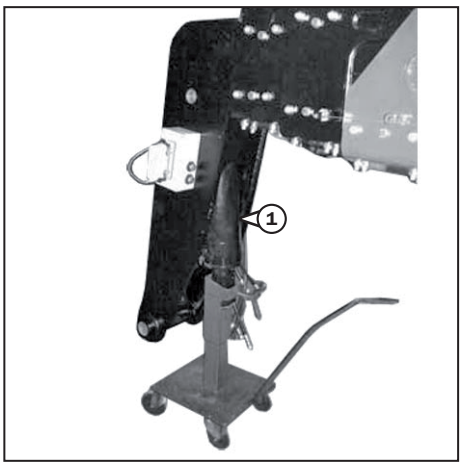




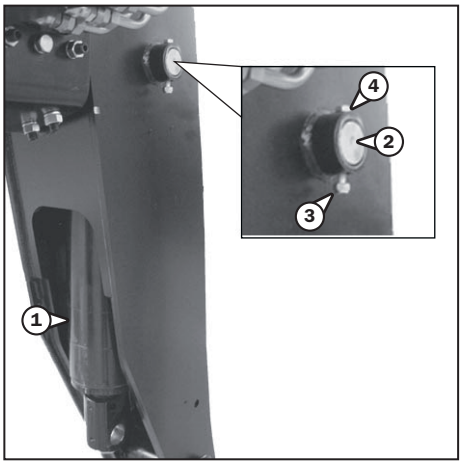
CYLINDERS REFIT

TRAVERSE CYLINDER REFIT

With the help of ropes and an overhead crane, raise the traverse cylinder (Item 1) and place it on a jack.

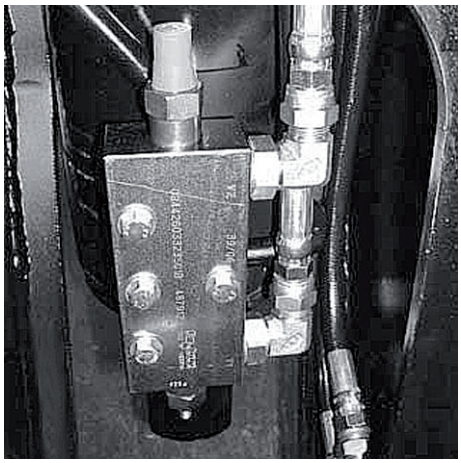


Hinge the traverse cylinder (Item 1) to the baseplate side.

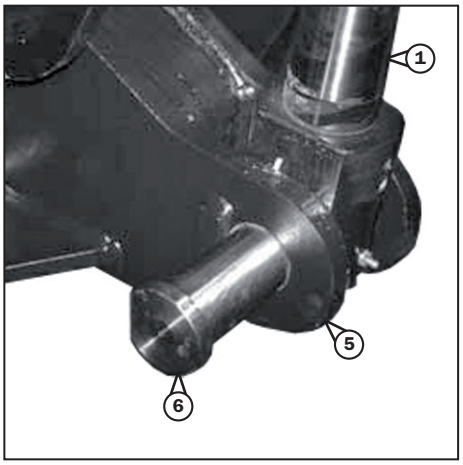


Insert the traverse cylinder hinge pin (Item 2) into the hole in the IIIrd jib extension.
Screw in the screw (Item 3) and lock nut (Item 4).

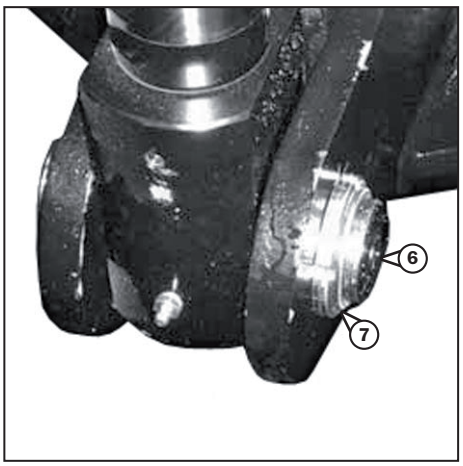
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Reconnect the hydraulic pipes to the cylinder valve, taking care to replace them correctly following the marks made with the brush during the removal phase.
Observe the correct valve ports.

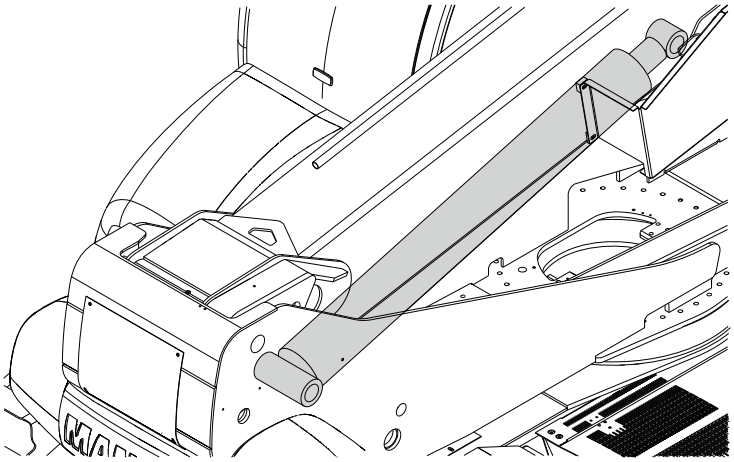


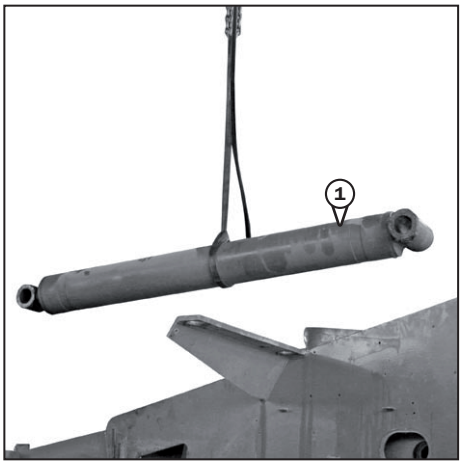
Insert the hinge pin (Item 6) and attach the rod of the traverse cylinder (Item 1) to the rapid attachment (Item 5).



Lock the pin (Item 6) with the bush (Item 7).

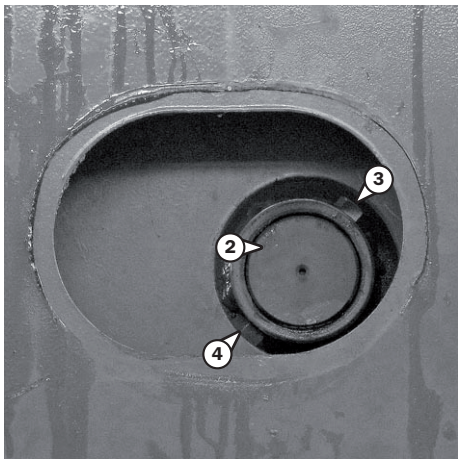
https://truckmanualshub.com/



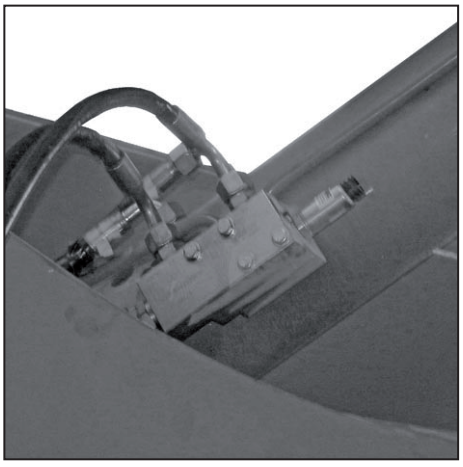


JIB RAISING CYLINDER REFIT

Using ropes and an overhead crane, replace the raising cylinder (Item 1), on the truck.

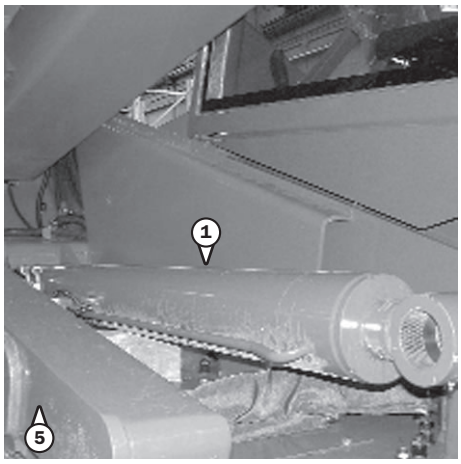


Insert the raising cylinder locking pin (Item 2) into the appropriate hole in the turret and lock it by screwing in the screw (Item 3) and nut (Item 4).

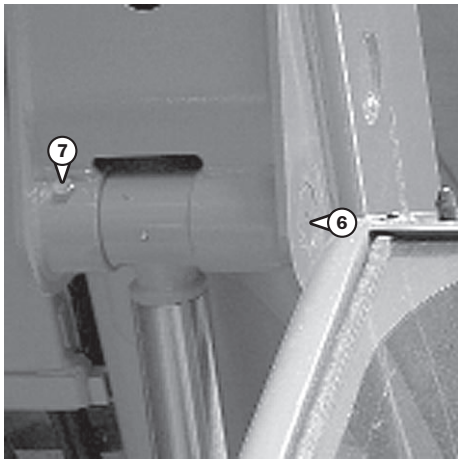


Reconnect the hydraulic pipes to the cylinder valve, taking care to replace them correctly following the marks made with the brush during the removal phase.

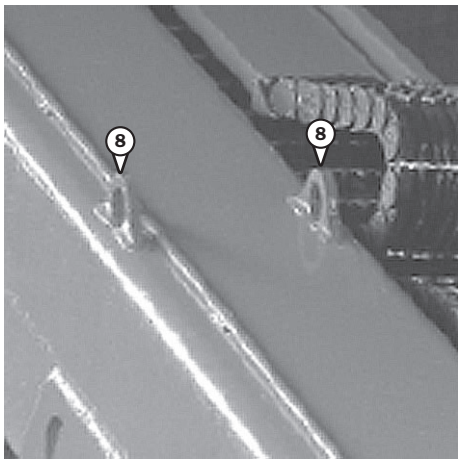
https://truckmanualshub.com/



Lift the raising cylinder (Item 1) from the turret (Item 5), to permit the rod to be inserted into its housing on the jib.



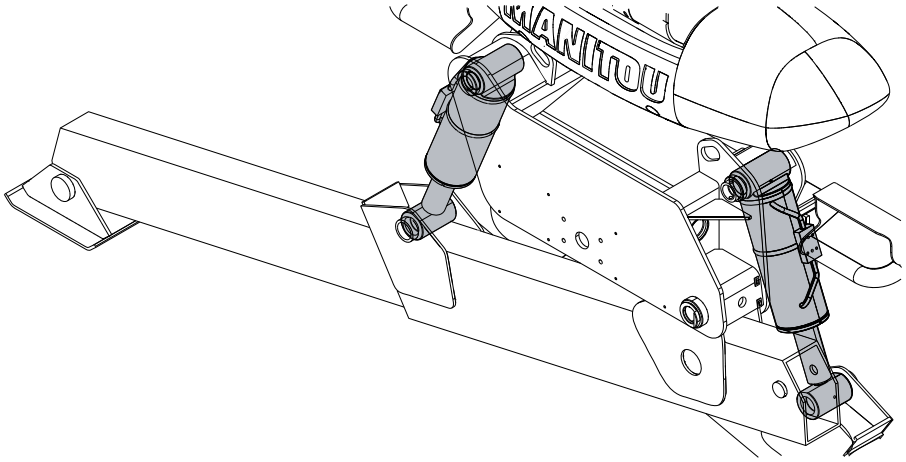
Insert the raising cylinder hinge pin (Item 6), on the rod-jib side, locking it with the screw (Item 7).

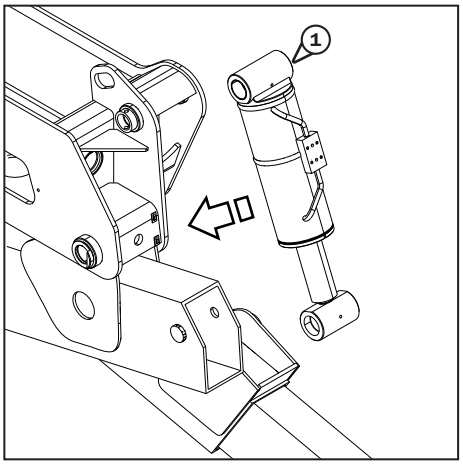


Remove the overhead crane or hoist from the eyelets (Item 8) in the top of the jib itself.

Remove the lifting cylinder support.

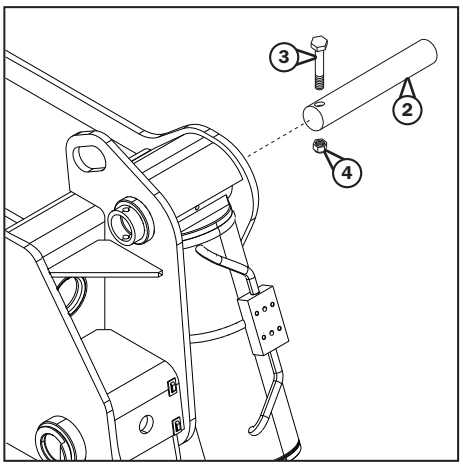
https://truckmanualshub.com/



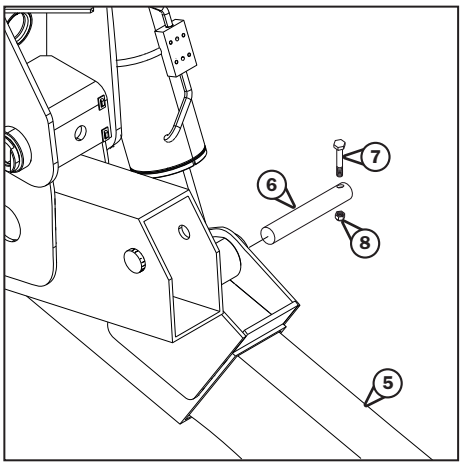


STABILISER RAISING AND LOWERING CYLINDER REFIT

Replace the cylinder (Item 1) on the stabiliser jibs, using an overhead crane or hoist with a suitable strap.

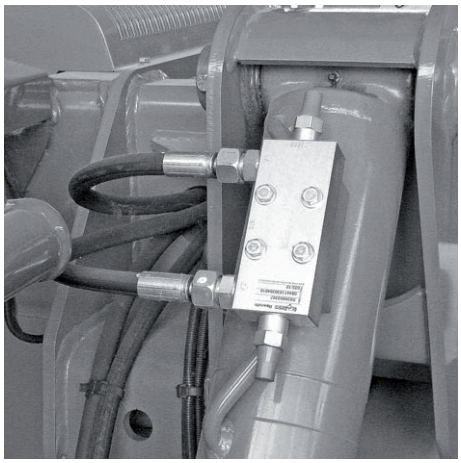


Insert the pin (Item 2) into the hole and lock it by screwing the screw (Item 3) and nut (Item 4).
Refit all the hydraulic pipes on the stabiliser tilt cylinder valve.



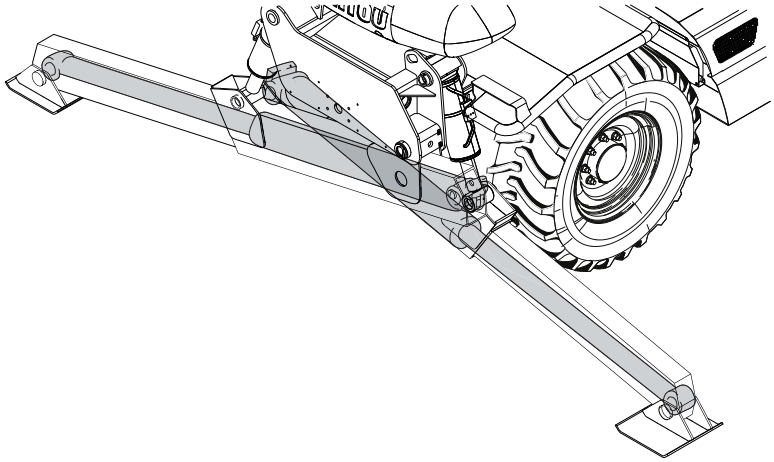
Replace the stabiliser jib on the foot side (Item 5). Using an overhead crane or hoist, insert the pin (Item 6) locking it with the screw (Item 7) and nut (Item 8).
You can now replace the mudguards corresponding to the front left and rear right tilt cylinders.

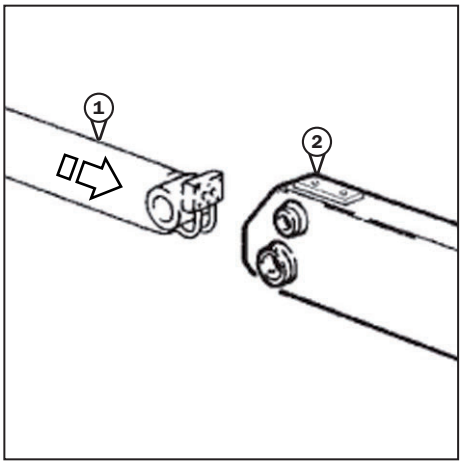
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Reconnect the hydraulic pipes to the cylinder valve, taking care to replace them correctly following the marks made with the brush during the removal phase.

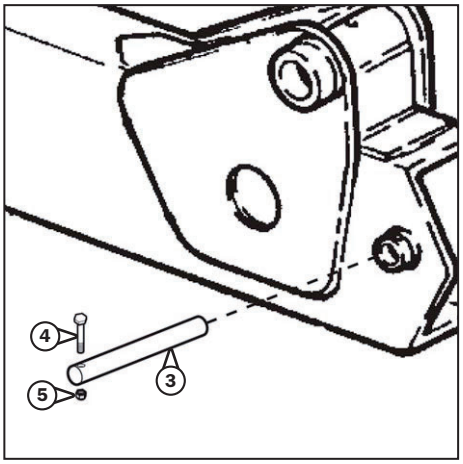
https://truckmanualshub.com/



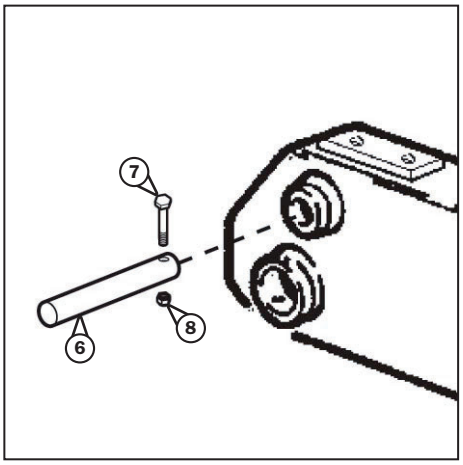


STABILISER EXTENSION CYLINDERS REFIT

Replace the stabiliser extension cylinder (Item 1) by inserting it into the foot (Item 2) on the baseplate side.

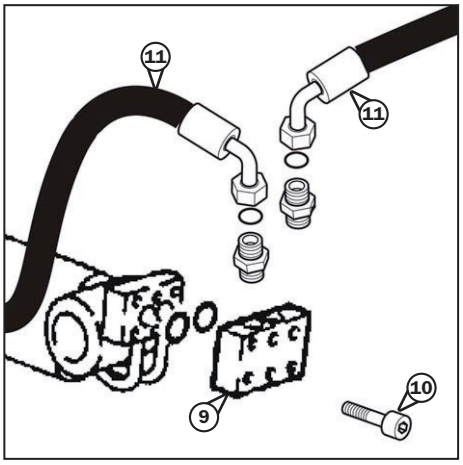


Insert the pin (Item 3) into the appropriate hole locking it with the screw (Item 4) and nut (Item 5).

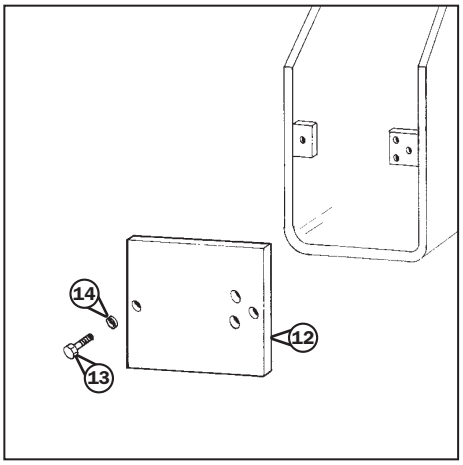


Insert the pin (Item 6), locking it with the screw (Item 7) and nut (Item 8).

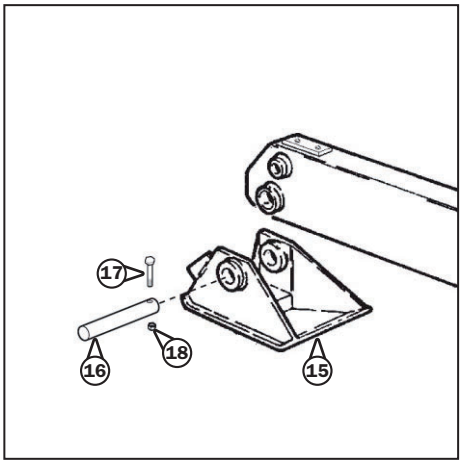
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Refit the valve (Item 9), that may have been previously removed, on the bottom of the cylinder, with the screws (Item 10) and reconnect the two hydraulic supply pipes (Item 11) taking care to replace them correctly by following the marks made with the brush while removing.
Observe the inlet ports.

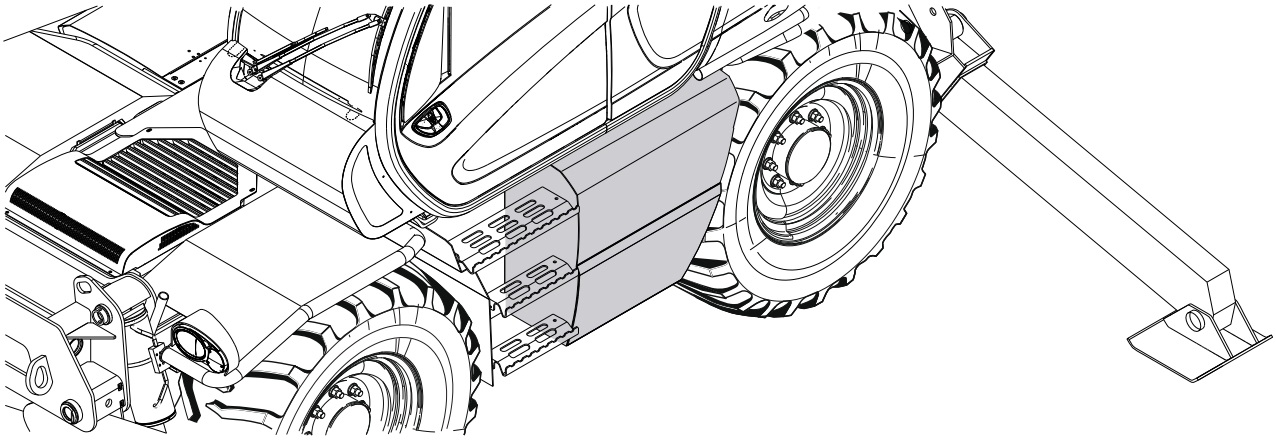


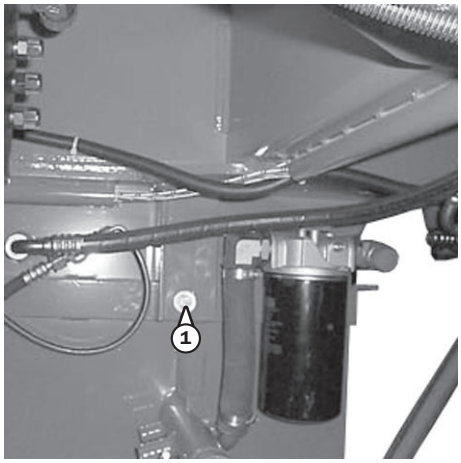
Refit the valve protection plate (Item 12) with the screws (Item 13) and washers (Item 14).



Refit the foot (Item 15), that may have been previously removed, inserting the pin (Item 16) and locking it with the screw (Item 17) and nut (Item 18).

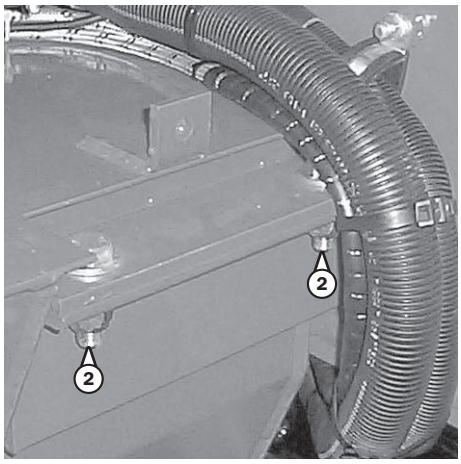
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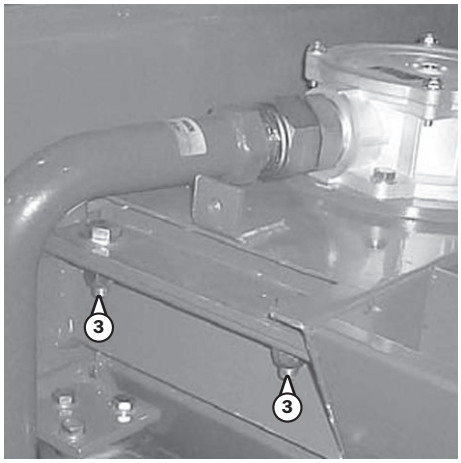


OIL AND FUEL TANK REFIT

Using an overhead crane, replace the tank on the truck, screw in the screw (Item 1), on the inside of the tank to the frame.

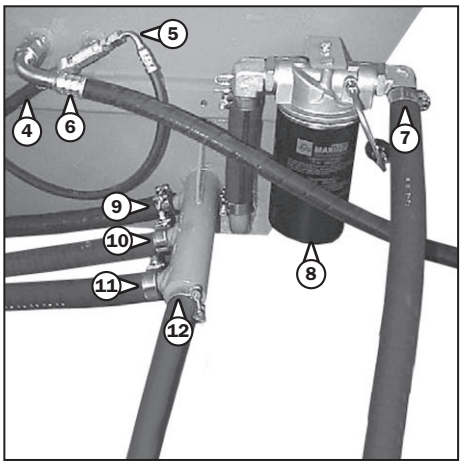


Screw in the screws (Item 2) at the back of the tank.

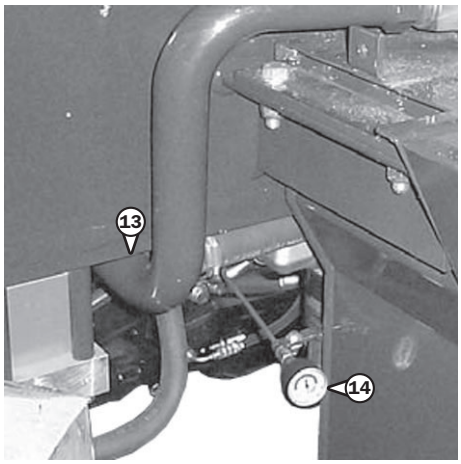


Screw in the screws (Item 3) at the front of the tank.

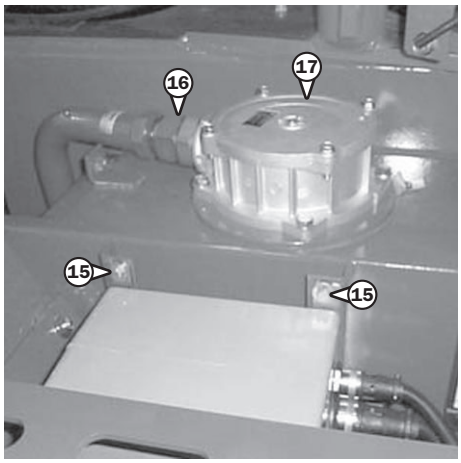
https://truckmanualshub.com/



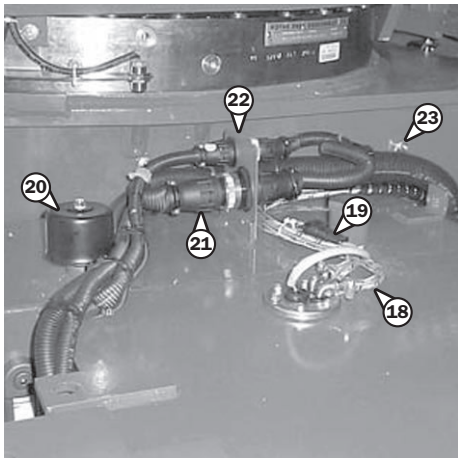
Reconnect the hydraulic oil return pipe (Item 4) from the hydrostatic pump, the hydraulic rotation motor drain pipe (Item 5) and the hydraulic oil return pipe (Item 6) from the radiator.
Reconnect the hydraulic inlet tube (Item 7) to the transmission oil filter (Item 8).
Reconnect the hydraulic oil inlet tubes (Item 9, 10, 11, 12) fitted to the tank.
(Note: the tube (Item 12) is only present in versions fitted with air conditioning).



Screw in the screws (Item 13) fixing the collector to the chassis, refit the vacuum indicator (Item 14).

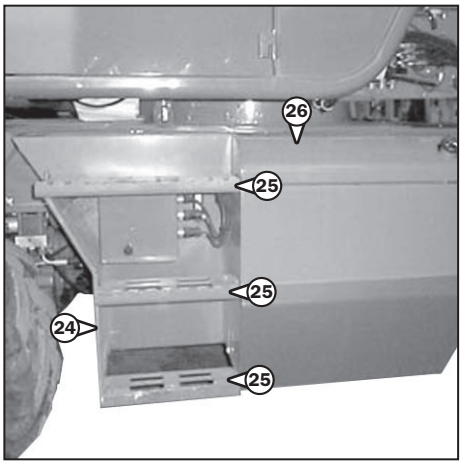


Refit the relay box by screwing in the screws (Item 15), screw on the oil return collector (Item 16) to the discharge filter (Item 17).

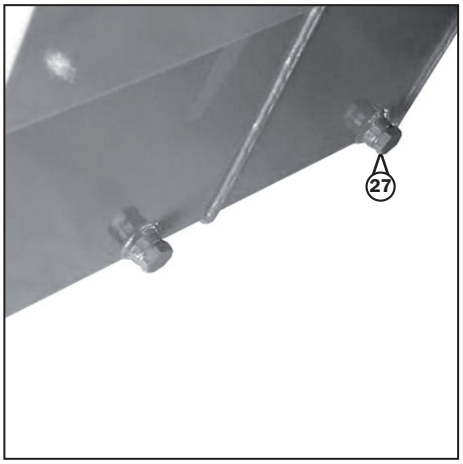


Reconnect the fuel inlet and return tubes (Item 18) mounted on the level indicator and fasten the electrical connections (Item 19) of the fuel level indicator.
Screw on the oil breather filter (Item 20) and remove the forklift truck or hoist used to remove the tank.
Reconnect the electric sockets (Item 21) and the mounting (Item 22) on the tank and screw on the clips (Item 23), that support the electric cables on the chassis.

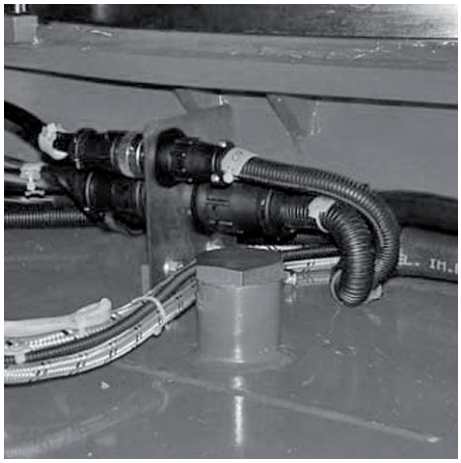
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Refit the front housing (Item 24), refit the 3 steps (Item 25).
Refit the cover (Item 26).



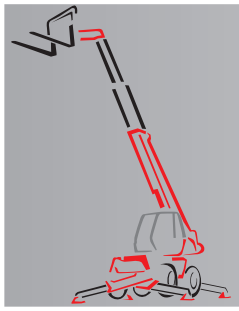
Refit the drain plug (Item 27).



Fill the tank with 210 litres of hydraulic oil.

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HYDRAULIC SPECIFIC TOOLING

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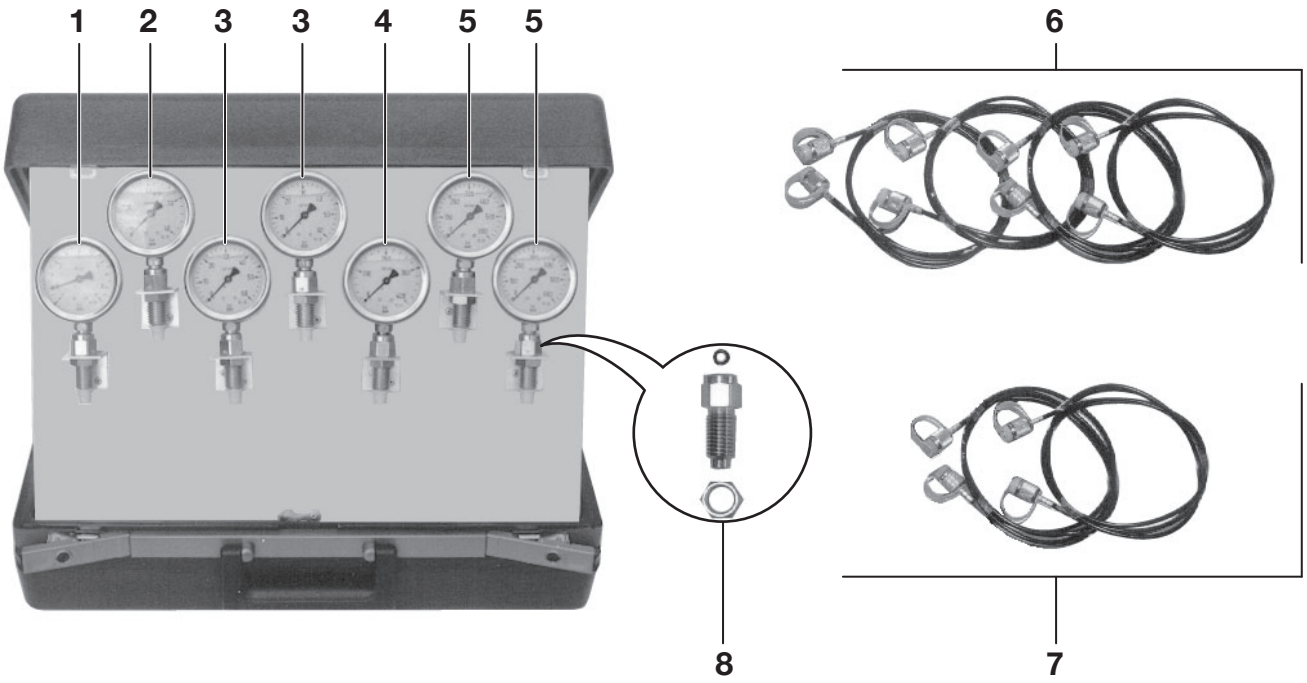
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DIGITAL MANOMETER BOX **3**
– FUNCTIONS : 3

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BASIC MANOMETER BOX



The box contains all the components required for measuring pressures on all Manitou products.



Basic Manometer box.....549671

Consisting of:

1. 1 Manometer 1/9 bar.....549882
2. 1 Manometer 0/40 bar.....549883
3. 2 Manometers 0/60 bar.....549884
4. 1 Manometer 0/400 bar.....549885
5. 2 Manometers 0/600 bar.....549886
6. 4 Standard flexible tubes.....549887
7. 2 Flexible tubes for Maniscopic.....549888
8. 7 Manometer attachments.....549889

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DIGITAL MANOMETER BOX



FUNCTIONS:

- **Manometer Function**: the display makes all the following options possible:

  - Inlet temperature and pressure to +/- 2 °C
  - Maximum and minimum inlet pressure P1 (700 bar in class 0.1)
  - Maximum and minimum outlet pressure P2 (700 bar in class 0.1)
  - Differential pressure dP = P1-P

- **Hold Function**: the user can pause the display at any time to take notes.

- **Unit Function**: the user can change the units of measurement at any time (bar, PSI, kPa, mCe).

- **Calibrate Function**: used to offset the zero point.

- **Loss test Function**: for measuring pressure changes at a predetermined time.

- **Save Function**: up to a maximum of 16,000 values can be saved. The sampling frequency can be set.

- **Zero Function**: 2 sensors can be zeroed.

Digital Manometer box 662187

Consisting of:

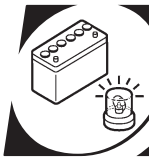
1. 1 Mano dP digital Manometer HP 700 bar
2. 1 Flexible measuring tube DN2 1215/1620, L = 1,5 m, 630 bar
3. 2 Flexible measuring tubes DN2 1620/1620, L = 1,5 m, 630 bar
4. 2 Adapters for 1620 Manometer

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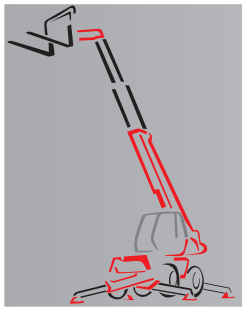
ELECTRICITY

- *ELECTRICAL CHARACTERISTICS AND SPECIFICATIONS*
- *ELECTRICAL SCHEMATIC DIAGRAMS*
- *ELECTRICAL COMPONENTS LOCATION*
- *ELECTRICAL CONTROL AND ADJUSTMENT*
- *ELECTRICAL TROUBLESHOOTING*
- *ELECTRICAL SPECIFIC TOOLING*



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ELECTRICAL CHARACTERISTICS AND SPECIFICATIONS

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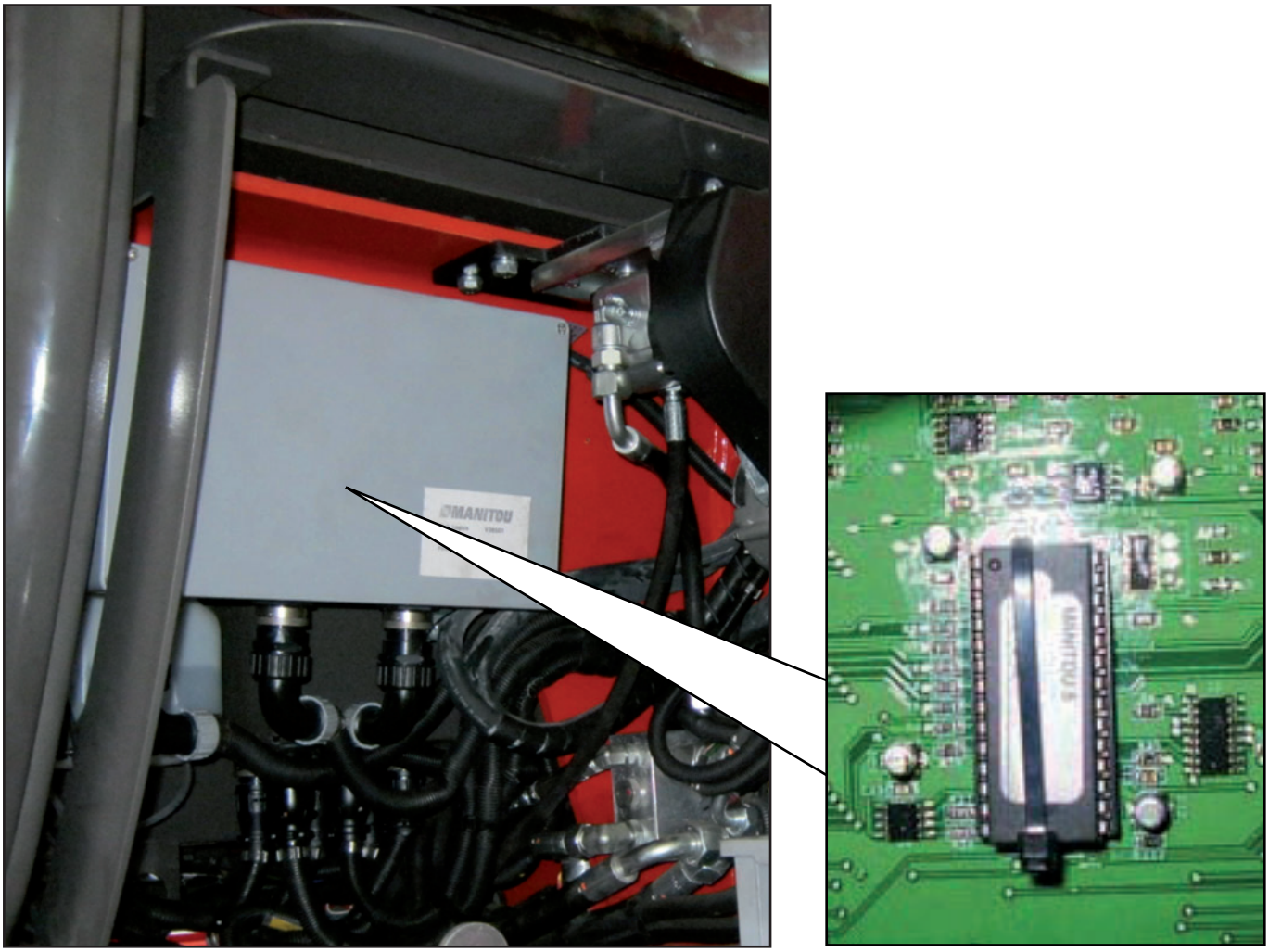
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EEPROM

EEPROM VERSIONS

MRT 1850/2150: 3.23

MRT 2540 : 2.64



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TRUCK WITH FORKS

TRUCK WITH FORKS ON TYRES OR STABILISERS

MOVEMENT PERMITTED FROM THE CAB			
	TURRET WITHIN +/-15°	*TURRET BEYOND +/-15°*	*NOTES*
	JIB WITHIN 55°	*JIB BEYOND 55°*	
	JIB RETRACTED	*JIB EXTENDED*	
EXTENSION OF STABILISERS	√		
LOWERING OF STABILISERS	√	√	
ROTATION OF TURRET	√	√	
TRAVERSE UP	√	√	
TRAVERSE DOWN	√	√	
RAISING OF JIB	√	√	
LOWERING OF JIB	√	√	
RETRACTION OF JIB	√	√	
EXTENSION OF JIB	√	√	
OPTION 1	√	√	
OPTION 2	√	√	
LEVELLING	OPERATES ON THE FRONT, WITH JIB < 3M		
LOCK AXLE	LOCKED (FLASHING LIGHT ON WITH TURRET ROTATED OR JIB > 55°)		

WARNING: the MRT 2540 model cuts off rotation if the jib is > 55°, rotation only permitted within +/- 5°.

WARNING: the stabilisers can only be raised if the turret is within +/-5°, the jib retracted and positioned within 55°.

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED			
	TURRET WITHIN +/-15°	*TURRET BEYOND +/-15°*	*NOTES*
	JIB WITHIN 55°	*JIB BEYOND 55°*	
	JIB RETRACTED	*JIB EXTENDED*	
EXTENSION OF STABILISERS	√	√	
LOWERING OF STABILISERS	√	√	
ROTATION OF TURRET	√	√	
TRAVERSE UP	√	√	
TRAVERSE DOWN	√	√	
RAISING OF JIB	√	√	
LOWERING OF JIB	√	√	
RETRACTION OF JIB	√	√	
EXTENSION OF JIB	√	√	
OPTION 1	√	√	
OPTION 2	√	√	

WARNING: the platform exclusion key has no effect on the above operation.
WARNING: levelling must never be restored with the key.

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TRUCK WITH FORKS ON TYRES OR STABILISERS IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB			
	TURRET WITHIN +/-15°	*TURRET BEYOND +/-15°*	*NOTES*
	JIB WITHIN 55°	*JIB BEYOND 55°*	
	JIB RETRACTED	*JIB EXTENDED*	
EXTENSION OF STABILISERS			
LOWERING OF STABILISERS	√	√	
ROTATION OF TURRET	√	√	The turret can only be moved to the central position, if 1 of the 2 +/-5° proximity sensors can be read
TRAVERSE UP			
TRAVERSE DOWN	√	√	
RAISING OF JIB			
LOWERING OF JIB			
RETRACTION OF JIB	√	√	
EXTENSION OF JIB			
OPTION 1	√	√	
OPTION 2			
LEVELLING	ONLY OPERATES WITH JIB ANGLE < 20° AND EXTENDED		

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED			
	TURRET WITHIN +/-15°	*TURRET BEYOND +/-15°*	*NOTES*
	JIB WITHIN 55°	*JIB BEYOND 55°*	
	JIB RETRACTED	*JIB EXTENDED*	
EXTENSION OF STABILISERS	√	√	
LOWERING OF STABILISERS	√	√	
ROTATION OF TURRET	√	√	
TRAVERSE UP	√	√	
TRAVERSE DOWN	√	√	
RAISING OF JIB	√	√	
LOWERING OF JIB	√	√	
RETRACTION OF JIB	√	√	
EXTENSION OF JIB	√	√	
OPTION 1	√	√	
OPTION 2	√	√	
LEVELLING	ONLY OPERATES WITH JIB ANGLE < 20° AND EXTENDED		

WARNING: the platform exclusion key has no effect on the above operation.

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TRUCK ON STABILISERS WITH PLATFORM

MOVEMENTS PERMITTED FROM PUSHBUTTON PANEL					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION	√	√	√	√	
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√	√	√	
OPTION 2	√	√	√	√	

MOVEMENTS PERMITTED FROM THE PUSHBUTTON PANEL IN TRUCK OVERTURNED CONDITION					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION	√	√	√	√	The turret may only be moved the to the central position, if 1 of the 2 +/-5° proximity sensors can be read.
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

MOVEMENTS PERMITTED FROM THE PUSHBUTTON PANEL IN PLATFORM OVERLOAD CONDITION					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JI					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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MOVEMENTS PERMITTED FROM THE PUSHBUTTON PANEL IN TRUCK OVERTURNED AND PLATFORM IN OVERLOAD CONDITION					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

MOVEMENTS PERMITTED FROM THE PUSHBUTTON PANEL IN PLATFORM WITH DOOR OPEN CONDITION					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

MOVEMENTS PERMITTED FROM THE PUSHBUTTON PANEL IN CONDITION TRUCK OVERTURNED AND PLATFORM WITH DOOR OPEN					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

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TRUCK WITH FIXED PLATFORM / ORH

TRUCK ON STABILISERS WITH FIXED PLATFORM / ORH

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					When the truck is stabilised, all movements are speed limited
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√	√	√	With the platform exclusion key activated all commands from the pushbutton panel are lost, but if pressing the permission pushbutton on the vinco panel the rescue key (permission from the pushbutton panel is prioritised on the key) and command from pushbutton panel is restored. This is because the person on the platform must be able to stop a “dangerous” movement made by the operator in the cabin
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√	√	√	
OPTION 2	√	√	√	√	

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MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					Controlled by the anti-overturning system

N.B. the data given in the abovementioned table are valid in any position of the turret.

TRUCK ON STABILISERS WITH FIXED PLATFORM / ORH IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			Only to return to the centre
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK ON TYRES WITH FIXED PLATFORM / ORH IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			Only to return to the centre
TRAVERSE UP					
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB					
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2					

MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√			
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2	√	√			

N.B. the data given in the abovementioned table are valid in any position of the turret.

TRUCK ON TYRES WITH FIXED PLATFORM / ORH

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2	√	√			

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MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2	√	√			

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2	√	√			

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK WITH PENDULUM PLATFORM

TRUCK ON TYRES WITH PENDULUM PLATFORM IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					+/- 6° then returns to centre
TRAVERSE UP	√	√			
TRAVERSE DOWN					
RAISING OF JIB	√	√			
LOWERING OF JIB					
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2					Controlled by the anti-overturning system

MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√			
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					Controlled by the anti-overturning system

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MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN					
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					Controlled by the anti-overturning system

N.B. the data given in the abovementioned table are valid in any position of the turret.

TRUCK ON TYRES WITH PENDULUM PLATFORM

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			Within +/- 5°
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN					
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			Within +/- 5°
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√			
OPTION 2	√	√			

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN					
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK ON STABILISERS WITH PENDULUM PLATFORM IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

TRUCK ON STABILISERS WITH PENDULUM PLATFORM

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√	√	√	
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√	√	√	
OPTION 2	√	√	√	√	

MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				Only with proximity sensor on pendulum being read
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK WITH RADIO CONTROL

TRUCK ON STABILISERS: MOVEMENTS PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				Because considered to be a platform
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

TRUCK ON TYRES: MOVEMENTS PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√			
TRAVERSE UP	√	√			
TRAVERSE DOWN	√	√			
RAISING OF JIB	√	√			
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√			
EXTENSION OF JIB					
OPTION 1	√	√			
OPTION 2	√	√			

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TRUCK ON STABILISERS: MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√	√	√	
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√	√	√	
OPTION 2	√	√	√	√	

TRUCK ON STABILISERS: MOVEMENTS PERMITTED FROM THE CAB WITH EXCLUSION AND OVERTURNING KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION					
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK ON STABILISERS WITH RADIO CONTROL IN OVERTURNED CONDITION

MOVEMENT PERMITTED FROM THE CAB					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√	√		
TURRET ROTATION	√	√	√		The turret may only be moved the to the central position, if 1 of the 2 +/-5° proximity sensors can be read.
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

MOVEMENTS PERMITTED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	JIB WITHIN H=3m	*JIB WITHIN H=3m*	*JIB BEYOND H=3m*	*JIB BEYOND H=3m*	*NOTES*
	JIB RETRACTED	*JIB EXTENDED*	*JIB RETRACTED*	*JIB EXTENDED*	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√			
TURRET ROTATION	√	√	√	√	The turret may only be moved the to the central position, if 1 of the 2 +/-5° proximity sensors can be read.
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					

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MOVEMENTS PERMITTED FROM THE CAB WITH ANTI-OVERTURNING PREVENTION KEY ACTIVATED					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
RAISING THE STABILISERS	√				
LOWERING THE STABILISERS	√	√	√		
TURRET ROTATION	√	√	√		The turret may only be moved the to the central position, if 1 of the 2 +/-5° proximity sensors can be read.
TRAVERSE UP					
TRAVERSE DOWN					
RAISING OF JIB					
LOWERING OF JIB	√				
RETRACTION OF JIB					
EXTENSION OF JIB					
OPTION 1					
OPTION 2					

N.B. the data given in the abovementioned table are valid in any position of the turret.

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TRUCK ON STABILISERS WITH RADIO CONTROL

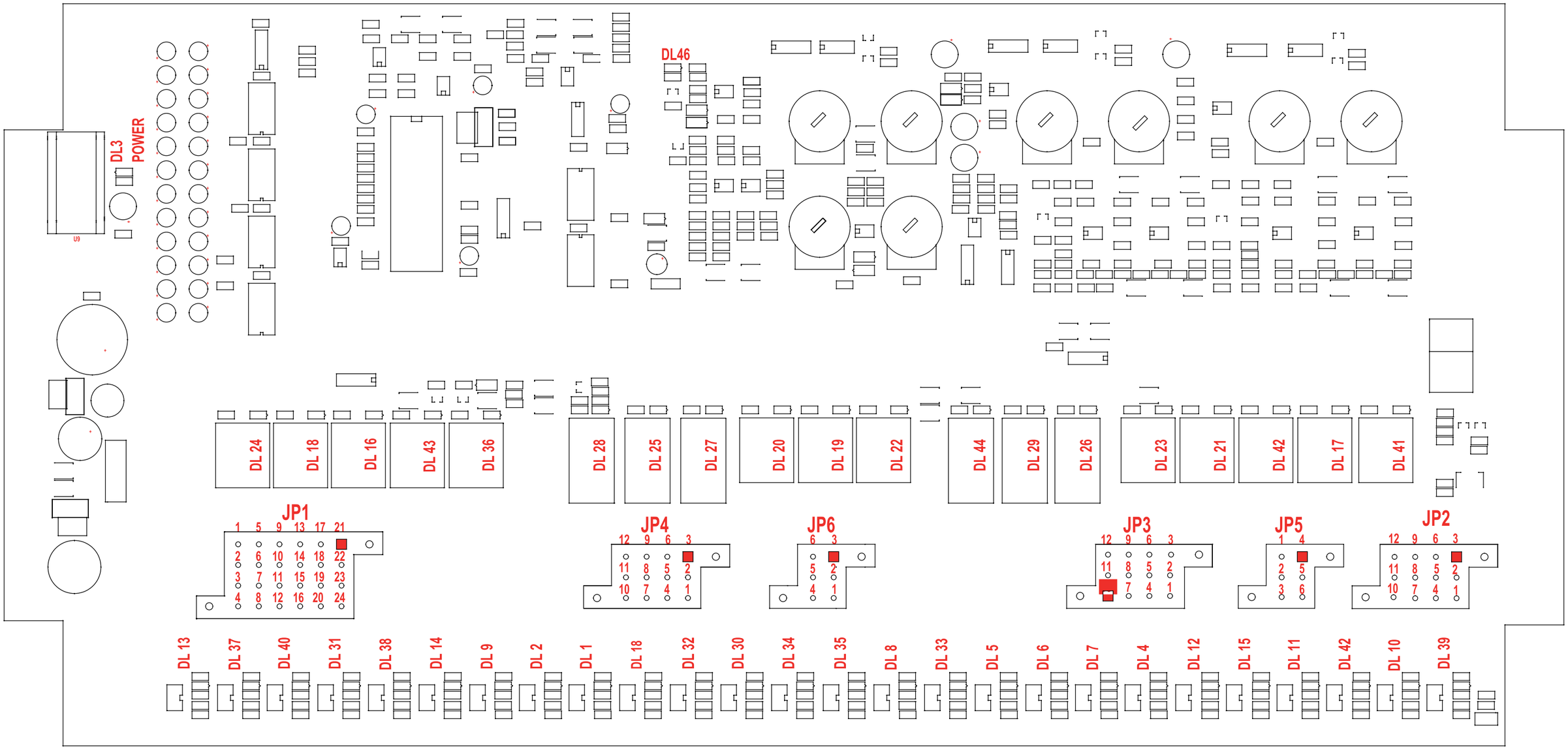
MOVEMENTS PERMITTED FROM THE RADIO CONTROL PUSHBUTTON PANEL					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION	√	√	√	√	
TRAVERSE UP	√	√	√	√	
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB	√	√	√	√	
LOWERING OF JIB	√	√	√	√	
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB	√	√	√	√	
OPTION 1	√	√	√	√	
OPTION 2	√	√	√	√	Controlled by the anti-overturning system

MOVEMENTS PERMITTED FROM THE RADIO CONTROL PUSHBUTTON PANEL IN WITH TRUCK IN OVERTURNED CONDITION					
	JIB WITHIN H=3m	JIB WITHIN H=3m	JIB BEYOND H=3m	JIB BEYOND H=3m	NOTES
	JIB RETRACTED	JIB EXTENDED	JIB RETRACTED	JIB EXTENDED	
TURRET ROTATION	√	√	√	√	The turret may only be moved the to the central position, if 1 of the 2 +/-5° proximity sensors can be read.
TRAVERSE UP					
TRAVERSE DOWN	√	√	√	√	
RAISING OF JIB					
LOWERING OF JIB					
RETRACTION OF JIB	√	√	√	√	
EXTENSION OF JIB					
OPTION 1	√	√	√	√	
OPTION 2					Controlled by the anti-overturning system

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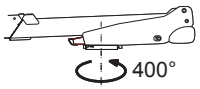
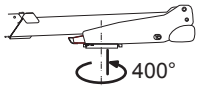
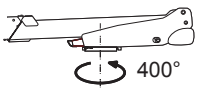
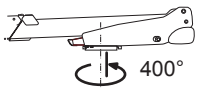
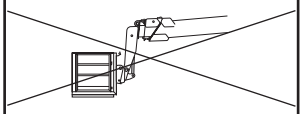
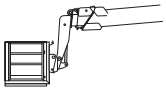
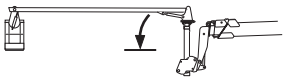
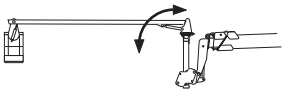
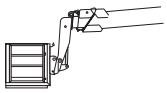
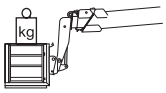
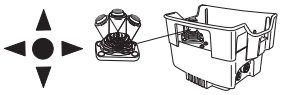
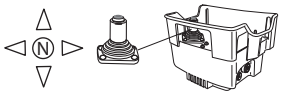
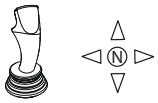
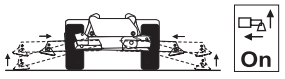
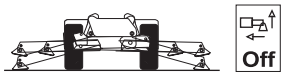
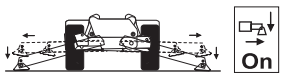
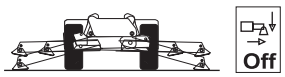
LAYOUT ON COMPONENT SIDE



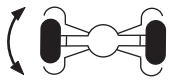
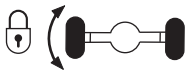
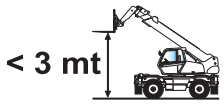
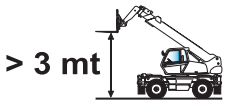
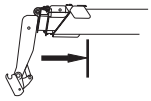
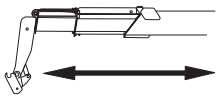
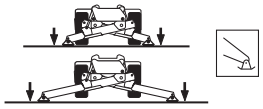
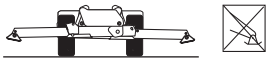
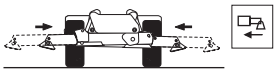
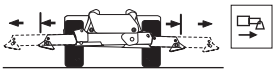
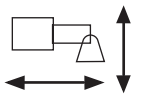
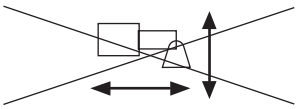
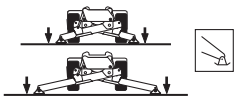
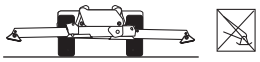
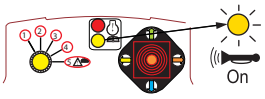
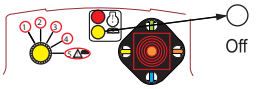
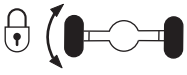
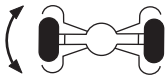
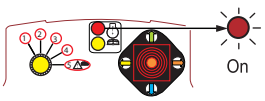
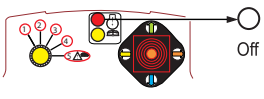
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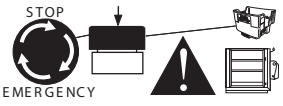
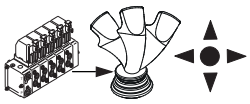
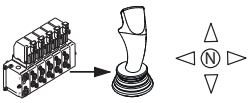
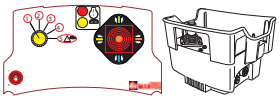
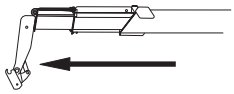
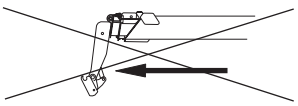
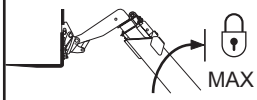
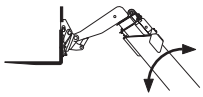
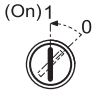
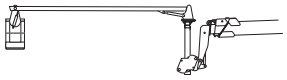
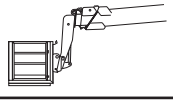
MEANING OF THE LEDS ON THE LOGIC CARD

	MEANING OF THE LEDS ON THE LOGIC CARD				
LED name	**Name Connector**	**Description**	**On**	**Off**	**IN/ OUT**
DL1	JP1-16	Proximity sensor no.1 for management of limited rotation (Signal from I 11)	Does not read the cam 	Reads the cam 	IN
DL2	JP1-12	Proximity sensor no.2 for management of limited rotation (Signal from I 50)	Does not read the cam 	Reads the cam 	IN
DL3	-	Supply voltage	Power ON 	Power OFF 	IN
DL4	JP3-6	Signal from rescue key	Rescue key. activated 	Rescue key. not activated 	IN
DL5	JP4-10	Platform signal present (Activated by operating the pushbutton panel on the box in the head of the jib)	Platform not present 	Platform present 	IN
DL6	JP6-3	Pendulum platform signal (A+B or 3D) with jib lowered (permits the stabilisers to be raised) (Signal from I 39)	Platform jib lowered 	Platform jib not lowered 	IN
DL7	JP3-8 JP6-5	Platform overload microswitch signal operated	Microswitch not operated 	Microswitch operated 	IN
DL8	JP2-11 JP4-6	Platform operator microswitch Is the input of any command from the platform pushbutton panel	Key not in rest position 	Key in rest position 	IN
DL9	JP1-10	Microswitch key in cab This is the input of any command from the cab	Key not in rest position 	Key in rest position 	IN
DL10	JP5-4	Signal for retract or raise stabiliser command	Command active 	Command not active 	IN
DL11	JP3-3	Signal for extend or lower stabilisers command	Command active 	Command not active 	IN

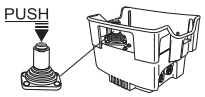
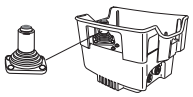
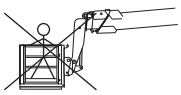
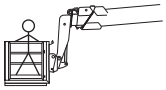
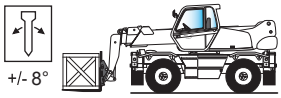
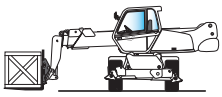
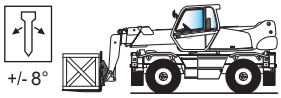
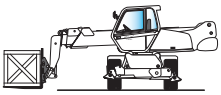
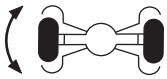
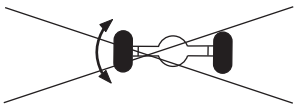
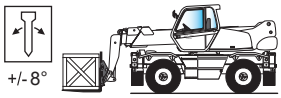
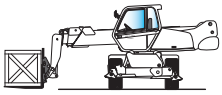
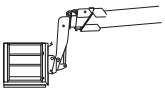
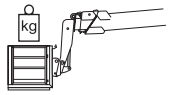
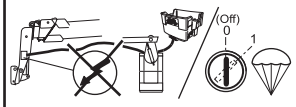
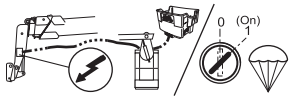
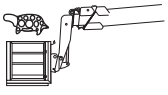
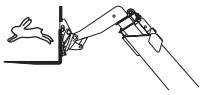
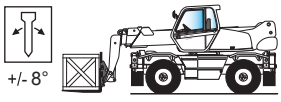
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	MEANING OF THE LEDS ON THE LOGIC CARD				
LED name	**Name Connector**	**Description**	**On**	**Off**	**IN/ OUT**
DL12	JP3-5	Proximity sensor for locking rear axle (Signal from I 60 for jib up and I 7 for turret rotation)	Rear axle free 	Rear axle locked 	IN
DL13	JP1-1	Proximity sensor for sensing the 3 m height of the jib (Signal from I 37)	Jib below 3 m 	Jib above3 m 	IN
DL14	JP1-5	Proximity sensor for reading jib fully retracted (Signal from I 36)	Jib retracted 	Jib not retracted 	IN
DL15	JP3-2	Signal for stabilisers resting on the ground	Stabilisers on the ground 	Stabilisers not on the ground 	IN
DL16	JP1-21	Output for controlling stabilisers extend or retract valve. Operates together with the main valve which is excited	Retracting 	Stabilisers locked or extended 	OUT
DL17	JP5-1	Output for controlling main valve for stabilisers, beams and levelling command	Main valve enabled 	Main valve disabled 	OUT
DL18	JP1-13	Output going to the ant-overturning system to indicate that the truck is stabilised (does not distinguish whether the stabilisers are fully extended or not)	Truck half stabilised 	Truck not stabilised 	OUT
DL19	JP6-2	This output activates the electrovalve to switch the platform to pendulum	Electrovalve energised 	Electrovalve not energised 	OUT
DL20	JP6-6	This output goes to the pushbutton panel to switch on the yellow indicator light and the buzzer. Indicates the condition of the overload microswitch activated with a continuous signal, while it indicates the condition of anti-overturning has occurred by means of an intermittent signal	Microswitch or anti-overturning occurred 	Microswitch or anti-overturning not occurred 	OUT
DL21	JP3-9	Output for indication in cab (flashing) of rear axle locked	Rear axle locked (flashing) 	Rear axle not locked 	OUT
DL22	JP6-1	Output used to activate the red lamp on the pushbutton panel	Red lamp switched on on the pushbutton panel 	Red lamp off 	OUT

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	MEANING OF THE LEDS ON THE LOGIC CARD				
Name LEDS	**Name Connector**	**Description**	**On**	**Off**	**IN/ OUT**
DL23	JP3-12	Signal coming from the emergency lamp on the platform. Normally closed	Emergency roof lamp not pressed 	Emergency roof lamp pressed 	OUT
DL24	JP1-9	Output that carries the supply to the Danfoss distributor. Activated when the truck makes a physical movement	Power supplied 	Power not supplied 	OUT
DL25 DL27 DL28	JP3-1	These 3 leds are associated with three relays that manage the change of extension, optional, traversing, rotation and raising movements of the platform or radio control from the cab. When the movements on the platform or on the radio change, they are activated only if all the conditions required by the platform or the radio control are present (including the manoeuvre consent)	Movements enabled by the platform or by radio control 	Movements enabled from the cab 	OUT
DL26	-	This signal is activated when optional movement is enabled and the signal from the key has a significant value to perform the movement	Optional enabled 	Optional disabled 	
DL29	-	This signal is activated when extension movement is enabled and the signal from the key has a significant value to perform the movement	Extension enabled 	Extension disabled 	
DL30	JP1-22	Proximity sensor for maximum jib elevation (Disables raising)	Maximum height reached 	Maximum height not reached 	IN
DL31	JP1-7	Safety exclusion key	Key inserted 	Key removed 	IN
DL32	JP1-17	Anti-overturning signal	Anti-overturning not occurred 	Anti-overturning occurred 	IN
DL33	JP4-2	Selection between normal and pendulum platform	Pendulum platforms 	Normal platform 	IN
DL34	JP1-8	Radio control presence signal (Activated with the “Radio control” pushbutton on the “Stabilisers” control panel)	Radio control present 	Radio control not present 	IN

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	MEANING OF THE LEDS ON THE LOGIC CARD				
LED name	**Name Connector**	**Description**	**On**	**Off**	**IN/ OUT**
DL35	JP4-9	Signal for consent for platform or radio control manoeuvre (Obtained by pressing the red pushbutton on the pushbutton panel key)	Manoeuvre consent present 	Manoeuvre consent absent 	IN
DL36	JP1-24	Simulation of the presence of a man when working from platform or radio control	Presence of a man not simulated 	Presence of a man simulated 	OUT
DL37 DL38	-	Input not used (must be off)	OFF	OFF	
DL39	JP2-4	Proximity sensor 1 to identify status of front of truck within 8° Is also used to reset the rotation together with centrcab1	The Proximity sensor reads the cam 	The Proximity sensor does not read the cam 	IN
DL40	JP1-4	Proximity sensor 2 to identify status of front of truck within 8° Is also used to reset the rotation together with centrcab 2	The Proximity sensor reads the cam 	The Proximity sensor does not read the cam 	IN
DL41	JP5-5	Output that enables the levelling function or not	Levelling enables 	Levelling disabled 	OUT
DL42	JP5-2	Output that goes to the anti-overturning system to indicate that the condition of the truck at the front is within 8°	Truck in central position 	Truck not in front position 	OUT
DL43	-	Unused free output (must be off)	OFF	OFF	
DL44	-	This output simulates the input of the overload microswitch. It is only activated if with the down platform signal (platform present) normally closed signal of the overload microswitch not present	Overload microswitch not occurred 	Overload microswitch occurred 	
DL45	-	This output is used to supply the pushbutton panel and the platform. The power supply to the platform is removed when the rescue key is turned on	Power supply to the platform removed 	Power supply to the platform on 	
DL46	JP1-3	This led indicates whether the truck is working with limited or fast movement speed	Movements limited 	Movements not limited 	IN
DL48	JP1-6	Proximity 3 to identify that the status of the truck at the front is within 8° Also used to reset the rotation together with centrcab 3	The Proximity sensor reads the cam 	The Proximity sensor does not read the cam 	IN

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DESCRIPTION OF CONNECTORS

CONNECTOR JP1			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP1-1	DL13	Jib height 3 metres sensor	IN
JP1-2	-	Proportional extension input from cab	IN
JP1-3	DL46	Tortoise speed	IN
JP1-4	DL40	1/3 turret sensor in front position	IN
JP1-5	DL14	Jib retracted sensor	IN
JP1-6	DL48	Turret 3/3 sensor in front position	IN
JP1-7	DL31	Exclusion key ssafety	IN
JP1-8	DL34	Cab/radio control command selector	IN
JP1-9	DL24	DANFOSS reel power supply	OUT
JP1-10	DL29	Joystick microswitch in cab	IN
JP1-11	-	Proportional traverse input from cab	IN
JP1-12	DL2	1/2 rotation sensor limited to 400°	IN
JP1-13	DL18	Stabilisers supported from logic to MSS-3B6	OUT
JP1-14	-	+12 V from battery	
JP1-15	-	Proportional raising input from cab	IN
JP1-16	DL1	2/2 sensor rotation limited to 400°	IN
JP1-17	DL32	Input from MSS-3B6	IN
JP1-18	-	Not used	
JP1-19	-	Optional proportional input from cab	IN
JP1-20	-	Crushed microswitch man present simulation	IN
JP1-21	DL16	Stabilisers retract/raise changeover electrovalve	OUT
JP1-22	DL30	Jib fully raised microswitch	IN
JP1-23	-	Proportional rotation input from cab	IN
JP1-24	DL36	Crushed microswitch man present in cab	OUT

CONNECTOR JP2			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP2-1	-	Permission from radio control	IN
JP2-2 JP4-5 JP4-8	-	Proportional traverse input from radio control	IN
JP2-3	-	Radio control power supply	OUT
JP2-4	DL39	2/3 turret sensor in front position	IN
JP2-5 JP4-1	-	Proportional optional input from radio control	IN
JP2-6 JP4-11	-	Proportional raise input from radio control	IN
JP2-7	-	Ground	
JP2-8	-	Stop motor from radio control	IN
JP2-9 JP4-7	-	Proportional extension input from radio control	IN
JP2-10	-	Radio control power supply	OUT
JP2-11 JP4-6	DL8	Radio control joystick switch	IN
JP2-12 JP4-4	-	Proportional rotation input from radio control	IN

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CONNECTOR JP3			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP3-1	-	DANFOSS traverse output	OUT
JP3-2	DL15	Input to stabilisers supported logic	IN
JP3-3	DL11	Input to stabilisers extended logic	IN
JP3-4	-	DANFOSS rotation output	OUT
JP3-5	DL12	Input to rear axle locking logic	IN
JP3-6	DL4	Platform rescue key input	IN
JP3-7	-	DANFOSS extension output	OUT
JP3-8 JP6-5	DL7	Platform overload	IN
JP3-9	DL21	Rear axle locked yellow indicator light	OUT
JP3-10	-	DANFOSS raising output	OUT
JP3-11	-	DANFOSS optional output	OUT
JP3-12	DL23	Power saving power supply	OUT

CONNECTOR JP4			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP4-1 JP2-5	-	Proportional optional input from platform	IN
JP4-2	DL33	Pendulum platform present input	IN
JP4-3	-	Power supply for platform pushbutton panel	IN
JP4-4 JP2-12	-	Proportional rotation input from platform	IN
JP4-5 JP2-2	-	Proportional traverse input from platform	IN
JP4-6 JP2-11	DL8	Joystick microswitch on platform	IN
JP4-7 JP2-9	-	Proportional extension input from platform	IN
JP4-8 JP2-2	-	Proportional traverse input from platform	IN
JP4-9	DL35	Manoeuvre permission from platform	IN
JP4-10	DL5	Platform present input	IN
JP4-11 JP2-6	-	Proportional raising input from platform	IN
JP4-12	-	Motor stop from platform	IN

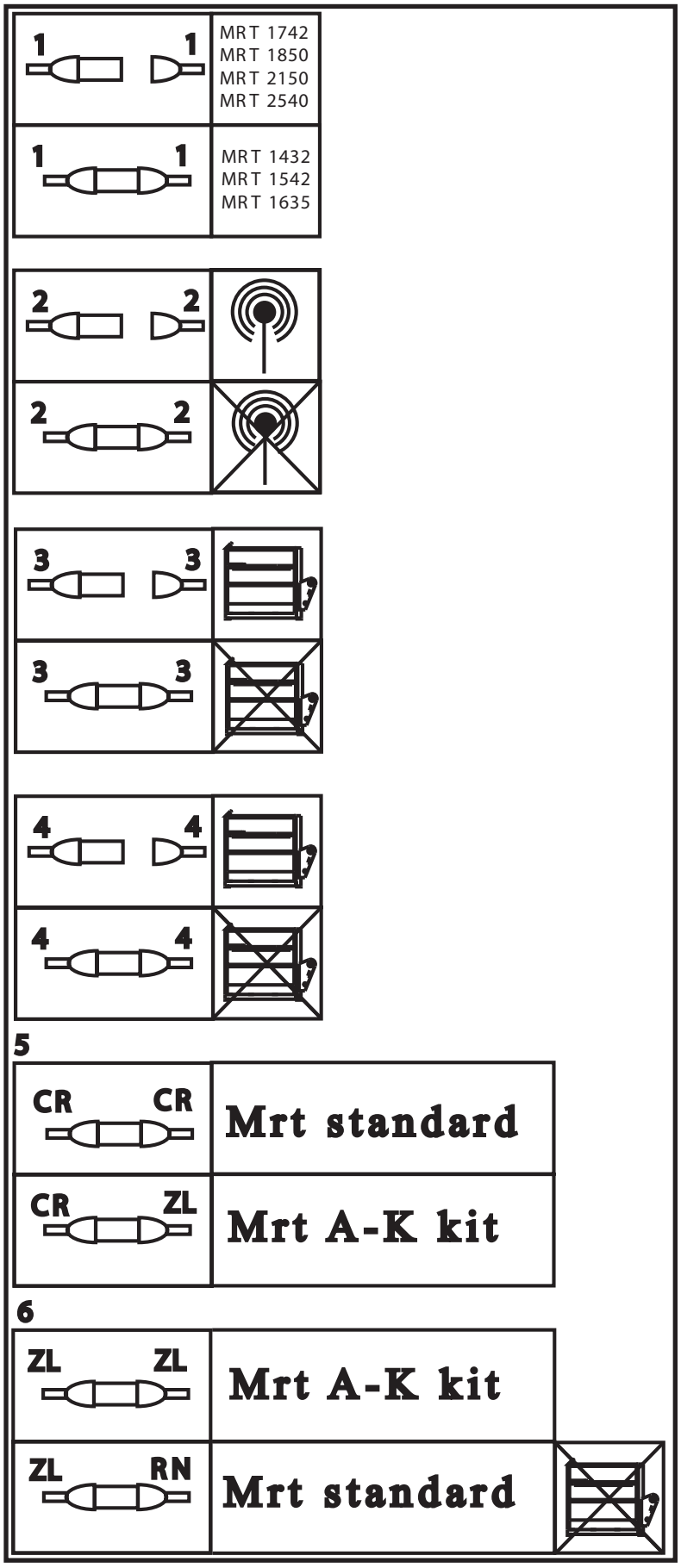
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CONNECTOR JP5			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP5-1	DL17	Main stabiliser electrovalve	OUT
JP5-2	DL42	Turret in front position (output)	OUT
JP5-3	-	Ground	
JP5-4	DL10	Retract stabilisers input signal	IN
JP5-5	DL41	Power supply for levelling system	OUT
JP5-6	-	+12 V battery	

CONNECTOR JP6			
Name Connector	**Name LEDS**	**Description**	**IN/ OUT**
JP6-1	DL22	Red light on pushbutton panel	OUT
JP6-2	DL19	Electrovalve for locking pendulum platform	OUT
JP6-3	DL6	Pendulum platform supported on the truck	IN
JP6-4	-	+12 V battery	
JP6-5	DL7	Platform overload	IN
JP6-6	DL20	Yellow light on pushbutton panel	OUT

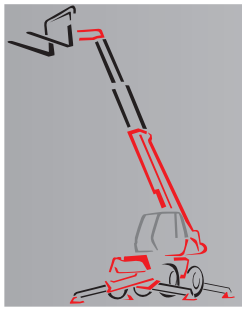
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6 AXLE LOGIC CONFIGURATION



WARNING: Before replacing the logic, check that the wiring numbered 1, 2, 3, 4, 5, 6, inside the box complies with the fitting out of the truck.

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ELECTRICAL SCHEMATIC DIAGRAMS

page

POSITION OF THE COMPONENTS ON THE DIAGRAMS A3
FUSES AND RELAYS IN THE CAB A11
FUSE BOX AND RELAYS ON TRUCK A14

ELECTRICAL DIAGRAMS BY FUNCTION:

– 1 - ENGINE STARTING / COOLING FANS A16
– 2 - HYDRAULIC MOVEMENTS A19
– 3 - SAUER DANFOSS TRANSMISSION. A23
– 4 - PLATFORM/RADIO CONTROL A28
– 5 - SAFETY SYSTEM A32
– 6 - HEADLAMPS / INDICATOR LIGHTS / LIGHTING / SENSORS / PROXIMITY . . . A35
– 7 - CAN BUS A40
– 8 - OPTIONAL LIGHTING / CAR RADIO / WINDSCREEN WIPER A44
– 9 - PNEUMATIC SEAT / 2a / 3a OUTPUT / OPTIONAL CONTINUOUS A48
– 10 - HEATING. A52

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POSITION OF THE COMPONENTS ON THE DIAGRAMS

Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
A1				√		√				
A2						√				
A4		√	√		√					
A5				√						
B1	√			√						
B2				√						
BMG									√	
BMP									√	
BS1								√		
BS2								√		
C1	√									
C2			√							
D1									√	
D2	√									
D3			√							
D4			√							
D5				√						
D6				√						
D7					√	√				
D8		√	√		√					
D9		√	√		√					
D10				√						
D11				√						
D12				√						
D13		√								
D14				√						
D16		√								
D17		√								
D18		√								
D19		√								
D20		√								
D21			√							
D22			√							
D27		√								
DL						√				
DM	√		√	√		√				
DOC									√	
E35				√						
F1									√	
F2								√	√	
F3									√	
F4		√	√	√		√				
F5								√		

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
F6		√	√		√					
F7				√	√				√	
F9						√				
F10								√		
F11								√		
F12				√						
F13										√
F14						√				
F15	√							√		
F16		√			√				√	
F17				√		√				
F18				√					√	
F19								√		
F20		√							√	
F21								√		
F22		√	√						√	
F23	√	√	√	√		√		√	√	
F24										√
F25			√							
F26	√		√	√		√				
F27						√				
F28	√		√			√				
F29	√			√						
F30	√			√						
F31	√			√						
F32	√							√		
F33			√							
F34							√			
F35								√		
F36								√		
F37								√		
F38						√				
F39	√									
F40							√			
F49						√				
F50	√	√								
F52		√								
F53			√		√					
F54					√	√				
F55	√									
F56						√				
F57						√				
F58	√									
F59	√									

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
F60	√									
F61						√				
F62						√				
F75	√			√						
F76				√						
FADX						√				
FASX						√				
FLA1								√		
FLA2								√		
FLB1								√		
FLB2								√		
FLP1								√		
FLP2								√		
FPDX						√				
FPSX						√				
G	√					√				
GF						√				
HL1		√	√	√	√	√				
I1			√							
I2			√							
I3			√							
I4			√							
I5						√				
I6						√				
I7									√	
I8						√				
I9				√						
I10	√			√						
I11		√				√				
I12						√				
I14						√				
I15						√				
I16					√					
I17					√					
I18					√					
I19					√					
I20									√	
I22	√	√							√	
I24			√							
I25				√						
I26		√								
I27		√								
I28		√								
I29		√								

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
I30		√								
I31		√								
I34						√				
I41		√				√				
I43						√				
I51		√	√		√					
I52		√				√				
I53						√				
I54						√				
I55			√							
I56								√		
I62					√					
I63					√					
I64					√					
I65					√					
I66									√	
I69		√							√	
I70				√						
I71						√				
I72		√							√	
I73	√									
I74						√				
I76	√									
I77					√					
I78					√					
I79					√					
I80					√					
I81			√							
I101								√		
I102			√							
IS8						√				
IS38								√		
IS39								√		
IS40								√		
IS41								√		
IS42								√		
IS43								√		
KEY	√			√						
L7					√					
L19					√					
L28		√								
L29		√								
L30		√								
L31		√								

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
L32					√					
L40			√							
M1	√			√						
M3		√							√	
M4		√								
M4C								√		
M5	√									
M5C								√		
M6	√									
M8								√		
M9	√									
M11										√
M12									√	
M101								√		
MA						√				
MC1				√						
MC2				√						
MC3				√						
ML1								√		
ML2								√		
ML3								√		
MP				√						
R1						√				
R5			√							
R6				√						
R7									√	
R8	√									
R9			√							
R10			√							
R11			√							
R12		√			√				√	
R13	√			√		√				
R14			√							
R15	√			√						
R16		√							√	
R19	√									
R20						√				
R21						√				
R22						√				
R23		√								
R24		√								
R25	√									
R26	√									
R27	√			√						

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
R28						√				
R29		√								
R30		√								
R31		√								
R32		√								
R33		√								
R34			√							
R35	√			√						
R37	√			√		√				
R39	√									
ROC									√	
S1		√			√				√	
S2		√							√	
S2TB									√	
S3		√							√	
S3TB									√	
S4		√							√	
S5		√							√	
S8			√							
S9		√								
S10		√							√	
S11		√								
S12		√								
S13		√								
S14		√								
S15		√								
S16		√								
S17		√								
S18		√								
S19		√								
S21			√							
S22			√							
S23		√								
S24			√							
S25			√							
S26		√								
S27			√							
S28			√							
S35		√								
S36		√								
S37								√		
S40			√							
SQ		√	√						√	
STR1-1						√				

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Component	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6	Diagram 7	Diagram 8	Diagram 9	Diagram 10
STR1-2	√		√	√		√				
STR1-3			√			√				
STR1-√							√			
T1						√				
X9		√	√	√	√	√			√	
X12										√
X23						√				
X26						√				
X28	√									
X29	√									
X32										√
X33										√
X37	√		√	√		√				
X38								√		
X39								√		
X40									√	
X41					√	√				
X42										√
X44-X45	√		√			√				
X46								√		
X47	√									
X48	√									
X52		√								
X54						√				
X55		√								
X57	√					√				
X73				√						
X74					√					
X75										√
X76									√	
X96			√			√				
X97			√							
X99			√				√			
X100							√			
X101										√
X102			√							
X103						√				
X107										√
XA			√				√			
XAS						√				
XB			√			√				
XCD								√		
XD24		√								
XD25		√								

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Component	*Diagram 1*	*Diagram 2*	*Diagram 3*	*Diagram 4*	*Diagram 5*	*Diagram 6*	*Diagram 7*	*Diagram 8*	*Diagram 9*	*Diagram 10*
XDG							√			
XOC									√	
XPA			√							

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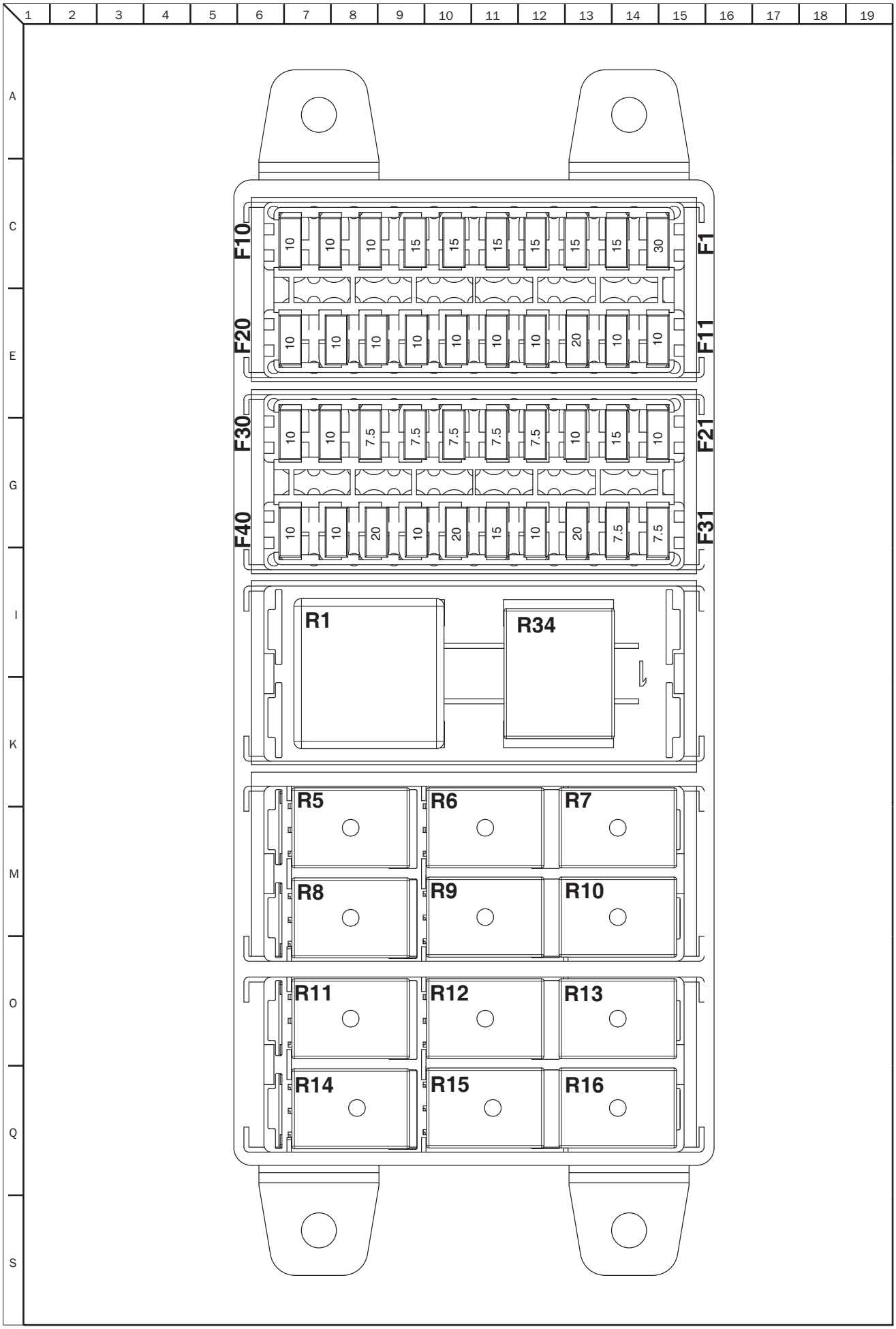
FUSES AND RELAYS IN THE CAB

Ref	*Description*
F1	Large mixing bucket power supply fuse (30A)
F2	Small mixing bucket power supply fuse (15A)
F3	Pneumatic seat power supply fuse (15A)
F4	Emergency pump + brake pressure switch + gear electrovalve power supply fuse (15A)
F5	Headlamp switch working at top of jib power supply fuse (15A)
F6	Stabiliser control panel power supply fuse (15A)
F7	Logic card / anti-overturn instrument power supply fuse (15A)
F8	Heating fan power supply fuse (10A)
F9	Headlamp dipping + acoustic warning power supply fuse (10A)
F10	Headlamp switch working in front of cab power supply fuse (10A)
F11	Headlamp switch working in rear of cab power supply fuse (10A)
F12	Power supply fuse downstream of economiser for platform (10A)
F13	Heater power supply fuse (20A)
F14	“30” emergency switch power supply fuse (10A)
F15	Fuse “30” car radio + connector provision for power supply (10A)
F16	Fuse Danfoss power supply from logic (10A)
F17	Chain breakage system relay power supply fuse (10A)
F18	Optional double triple output power supply fuse (10A)
F19	Power supply fuse rear windscreen wiper (10A)
F20	Power supply fuse hydraulic exclusion system (10A)
F21	Upper windscreen wiper power supply (10A)
F22	Manipulators power supply fuse (15A)
F23	Switch illumination power supply fuse (10A)
F24	Thermostat power supply fuse (7,5A)
F25	Steering Power supply fuse (7,5A)
F26	Gear change power supply fuse (7,5A)
F27	Indicator lights power supply fuse (7,5A)
F28	Power supply fuse tower alignment proximity sensor (7,5A)
F29	Power supply fuse upstream of economiser for platform (10A)
F30	Anti-overturn exclusion key power supply fuse (10A)
F31	Economiser excitation relay power supply fuse (7,5A)
F32	Car radio + antitheft power supply fuse (7,5A)
F33	Electronic transmission gearbox power supply fuse (20A)
F34	Mercedes Engine Diagnostics Fuse (10A)
F35	Window Winder Fuse (15A)
F36	Provision for rear window deicer fuse (20A)
F37	Rear windscreen wiper fuse (10A)
F38	Cigarette lighter “30” fuse (20A)
F39	Mercedes engine control unit “30” fuse (10A)
F40	Mercedes engine diagnostics Fuse (10A)
R1	Intermittence
R5	Relay Mercedes engine control unit
R6	Relay chain breakage system
R7	Double triple output switch power supply relay
R8	Cab aligned relay
R9	Door microswitch relay
R10	Forward gear relay
R11	Reverse gear relay
R12	Danfoss valve relay power supply
R13	Start permission relay
R14	Relay shut down transmission

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Ref	*Description*
R15	Economiser excitation Relay
R16	Hydraulic system exclusion relay
R34	Slow/fast gear bistable relay

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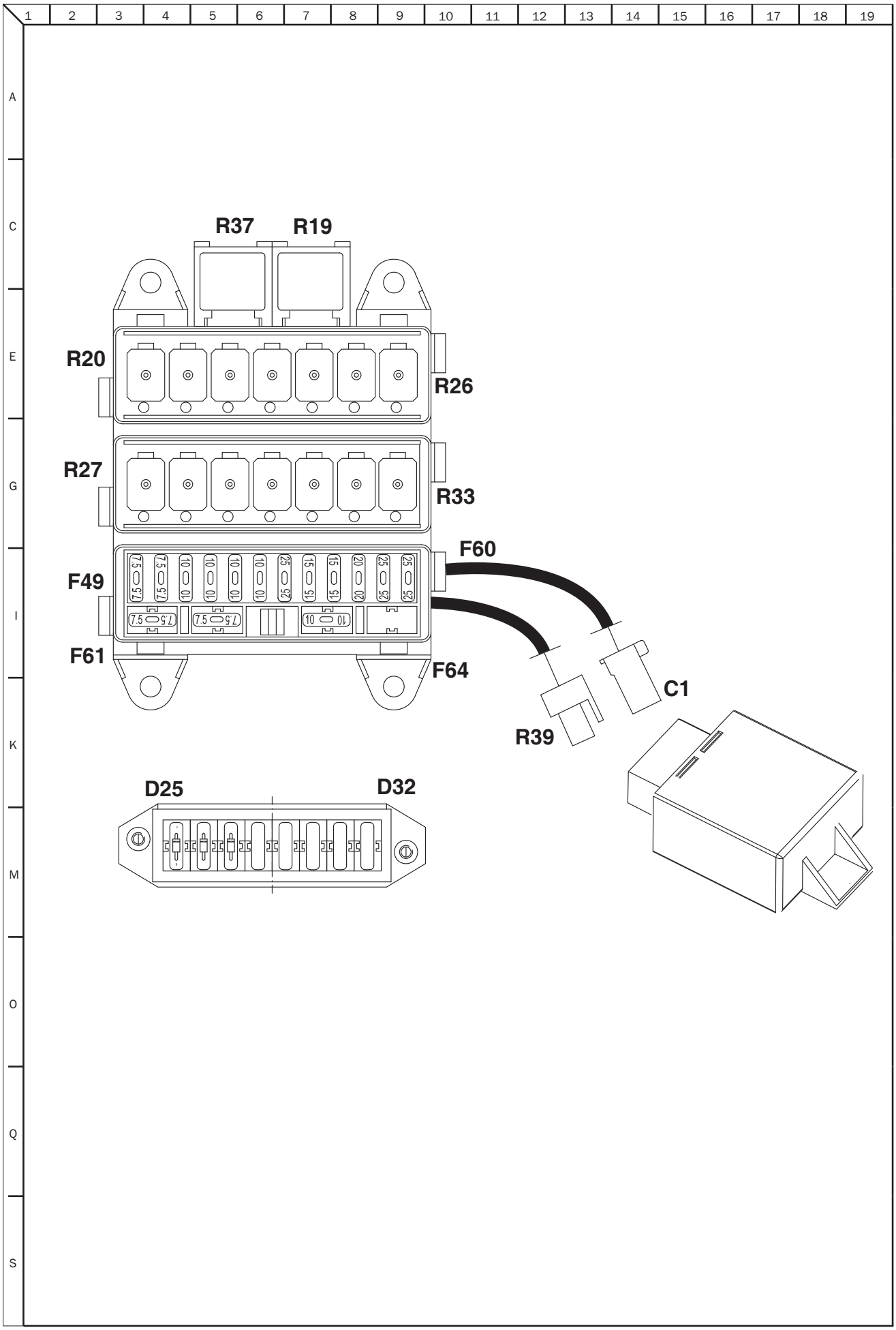
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FUSE BOX AND RELAYS ON TRUCK

Ref	*Description*
D25	Diode 3A
D26	Diode 3A
D27	Diode 3A
F49	Reversing lights power supply fuse (7,5A)
F50	Fuse rear axle oscillation (7,5A)
F51	“15” auxiliary socket power supply fuse (10A)
F52	Main stabiliser relay power supply fuse (10A)
F53	Sidelights/reset gears Fuse (10A)
F54	Stop light relay power supply fuse (10A)
F55	“30” Mercedes engine control unit Power supply fuse (25A)
F56	Dipped headlights power supply fuse (15A)
F57	Main beam power supply fuse (15A)
F58	Fuel heater fuse (20A)
F59	Oil cooling fan 1 power supply fuse (25A)
F60	Oil cooling fan 2 power supply fuse (25A)
F61	Fuse Sidelights power supply (7,5A)
F62	Sidelights power supply fuse (7,5A)
F63	Sidelights “30” auxiliary socket power supply fuse (10A)
F64	Provision not connected
R19	Relay “15” under key
R20	Stop light relay
R21	Main beam relay
R22	Dipped beam relay
R23	Main stabiliser electrovalve relay
R24	Rear axle oscillation permission relay
R25	Fan 1 oil cooling relay
R26	Fan 2 oil cooling relay
R27	Engine starting relay
R28	Reversing light relay
R29	Front right stabiliser beam relay
R30	Rear left stabiliser beam relay
R31	Rear right stabiliser beam relay
R32	Front left stabiliser beam relay
R33	Rear axle oscillation relay
R37	Start command/lights relay
R39	Glow plug remote switch excitation

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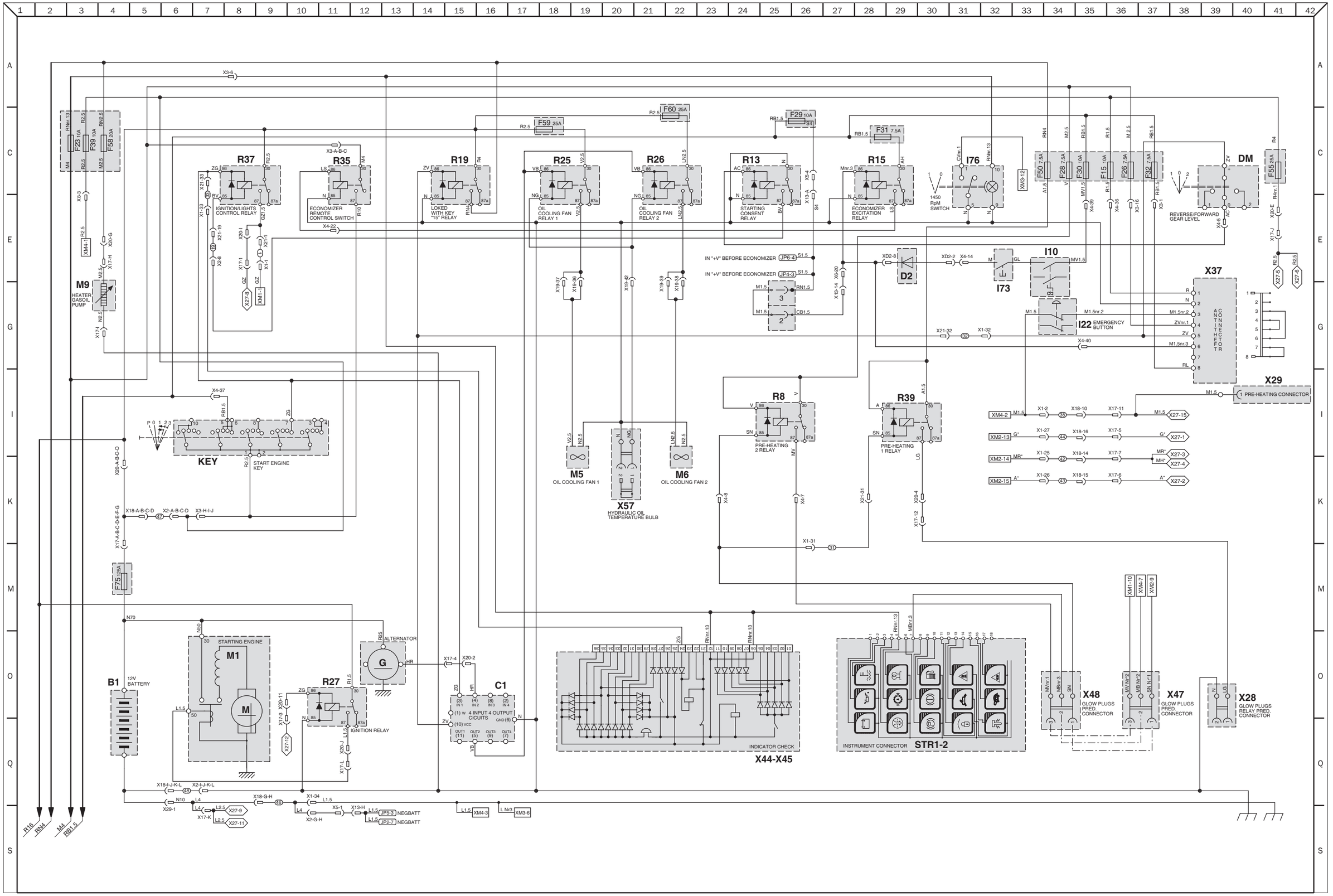
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1 - ENGINE STARTING / COOLING FANS

COMPONENTS		
Ref	**Description**	**Position on the diagram**
B1	Battery 12V	O4
C1	4 IN+ 4 OUT circuit	O16
D2	Diode 3A	E29
DM	Gear change	C40
F15	“30” radio/connector provision power supply fuse position (10A)	C35
F23	Lighting switch power supply fuse (10A)	C3
F26	Gear change power supply fuse (7,5A)	C36
F28	Tower alignment proximity sensor power supply fuse (7,5A)	C34
F29	Economiser power supply fuse platform economiser (10A)	C26
F30	Anti overturn exclusion key power supply fuse (10a)	C35
F31	Economiser excitation relay power supply fuse (7,5A)	C28
F32	Car radio/anti theft power supply fuse (7,5A)	C37
F39	Mercedes control unit fuse “30” (10A)	C3
F50	Rear axle oscillation fuse (7,5A)	C33
F55	Mercedes control unit power supply fuse “30” (25A)	C41
F58	Fuel heater fuse (10A)	C4
F59	Oil cooling fan 1 power supply fuse (25A)	C18
F60	Oil cooling fan 2 power supply fuse (25A)	C22
F75	Main fuse	M4
G	Alternator	O13
I10	Platform exclusion key	E34
I22	Emergency domed pushbutton	G35
I73	Engine start permission with I10 activated	G32
I76	1450 r.p.m. switch	C31
KEY	Starter panel	K7
M1	Starter motor	O8
M5	Oil cooling fan 1	K19
M6	Oil cooling fan 2	K22
M9	Diesel filter heater	G3
R8	Cab aligned relay	I25
R13	Start permission relay	C24
R15	Economiser excitation Relay	C28
R19	Relay “15” under key	C15
R25	Fan 1 oil cooling relay	C18
R26	Fan 2 oil cooling relay	C21
R27	Engine starting relay	O11
R35	Economiser remote switch	C11
R37	Switch on lights command relay	C8
R39	Glow plug remote switch relay	I29
STR1-2	Instrument connector (STR1-2)	Q30
X28	Connector provision for preheating relay	O40
X29	Connectorand provision for preheating	I41
X37	Antitheft connector	E39
X44-X45	Check warning lights	Q25
X47	Provision for air preheating	O38
X48	Provision for air preheating	O35
X57	Hydraulic oil temperature light	K20

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ELECTRICAL DIAGRAM “STARTING / COOLING FAN”



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2 - HYDRAULIC MOVEMENTS

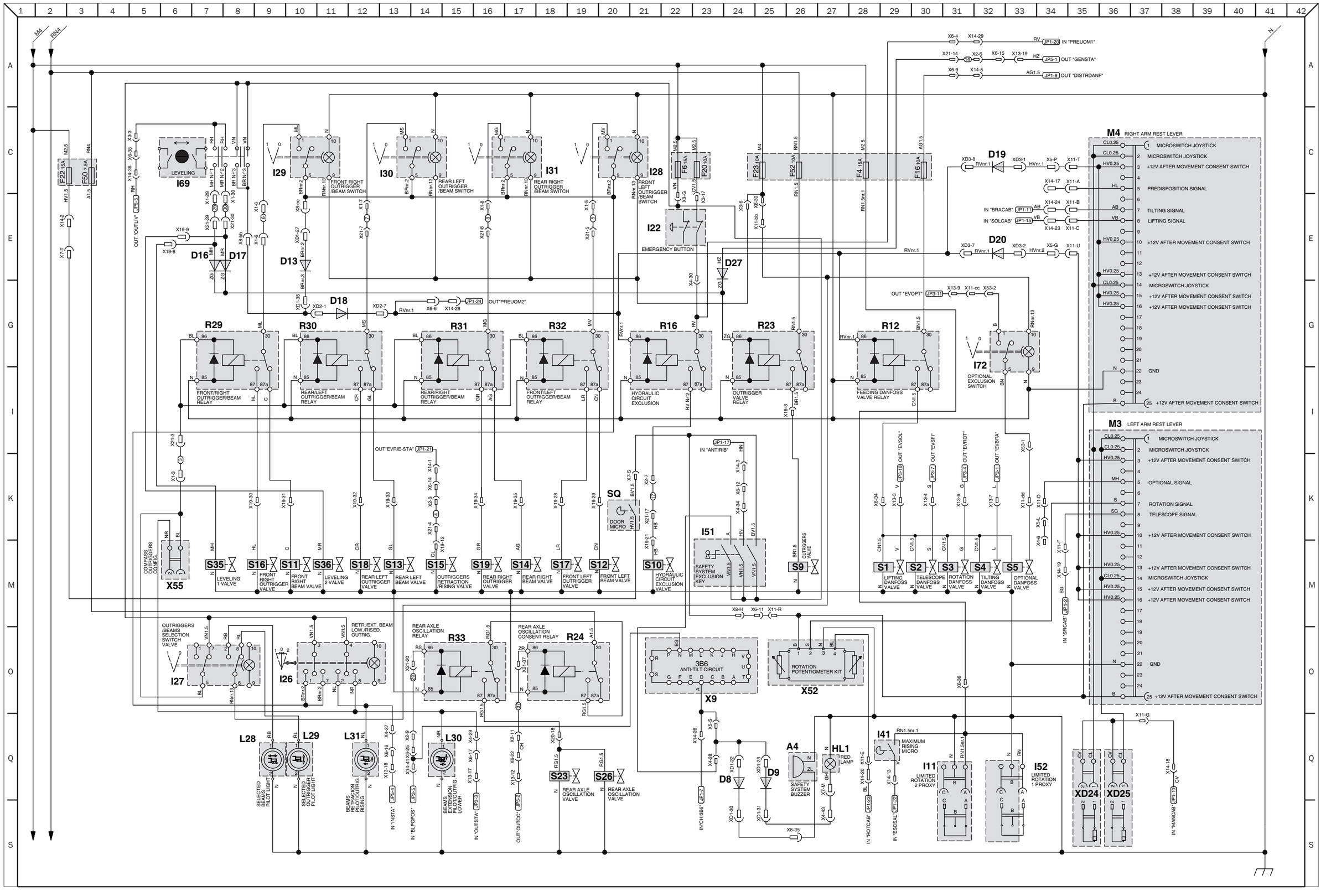
COMPONENTS		
Ref.	**Description**	**Position on the diagram**
A4	Anti overturning alarm buzzer	Q26
D8	Diode 3A	Q24
D9	Diode 3A	Q25
D13	Diode 3A	E10
D16	Diode 3A	E7
D17	Diode 3A	E8
D18	Diode 3A	G11
D19	Diode 3A	C32
D20	Diode 3A	E32
D27	Diode 3A	E24
F4	Fuse pump emergency/brake pressure/gear electrovalve (15A)	C28
F6	Stabiliser control panel power supply fuse (15A)	C22
F16	Danfoss logic power supply fuse (10A)	C30
F20	Hydraulic system exclusion power supply fuse (10A)	C23
F22	Key power supply fuse (15A)	C2
F23	Lighting switch power supply fuse (10A)	C25
F50	Rear axle power supply fuse (7,5A)	C3
F52	Main stabiliser relay power supply fuse (10A)	C26
HL1	Red lamp	Q27
I11	Limited rotation proximity sensor 2	Q30
I22	Emergency domed pushbutton	E21
I26	Stabiliser raised/lowered beam extend/retract switch	O9/O10
I27	Beams/stabiliser selector switch	O6
I28	Left front beam/stabiliser switch	C21
I29	Front right beam/stabiliser switch	C9
I30	Rear left beam/stabiliser switch	C13
I31	Rear right beam/stabiliser switch	C18
I41	Maximum raising microswitch	Q29
I51	Anti-overturn exclusion key Overturning	K23
I52	Limited rotation proximity sensor 1	Q34
I69	Levelling switch	C6
I72	Optional exclusion switch	G32
L28	Selected beam indicator light	Q8
L29	Selected stabilisers indicator light	Q10
L30	Beam extension/lowering stabiliser feet indicator light	Q15
L31	Retract beams/raise stabiliser feet indicator light	Q12
M3	Left side seat lever	I36
M4	Right side seat lever	C36
R12	Danfoss valve power supply relay	G29
R16	Hydraulic system exclusion relay	G22
R23	Main stabiliser electrovalve relay	G25
R24	Rear axle oscillation permission relay	O19
R29	Front right beam/stabiliser relay	G7
R30	Rear left beam/stabiliser relay	G10
R31	Rear right beam/stabiliser relay	G15
R32	Front left beam/stabiliser relay	G18
R33	Rear axle oscillation relay	O15
S1	Danfoss lifting electrovalve	M29
S2	Danfoss extension electrovalve	M30

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COMPONENTS		
Ref	**Description**	**Position on the diagram**
S3	Danfoss rotation electrovalve	M31
S4	Danfoss traverse electrovalve	M32
S5	Danfoss optional electrovalve	M33
S9	Main stabiliser electrovalve	M26
S10	Hydraulic circuit exclusion electrovalve	M21
S11	Front right beam electrovalve	M10
S12	Front left beam electrovalve	M20
S13	Rear left beam electrovalve	M13
S14	Rear right beam electrovalve	M17
S15	Stabiliser retract/raise electrovalve	M14
S16	Front right stabiliser electrovalve	M9
S17	Front left stabiliser electrovalve	M18
S18	Rear left stabiliser electrovalve	M12
S19	Rear right stabiliser electrovalve	M16
S23	Unlock rear axle electrovalve	Q18
S26	Unlock rear axle electrovalve	Q20
S35	Levelling electrovalve 1	M7
S36	Levelling electrovalve 2	M11
SQ	Door microswitch	K20
X9	Anti overturn circuit	O23
X52	Rotation potentiometer kit	O26
X55	Stabiliser calliper configuration connector	M6
XD24	Right man present joystick diode connector	Q35
XD25	Left man present joystick diode connector	Q36

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ELECTRICAL DIAGRAM “HYDRAULIC MOVEMENTS”



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3 - SAUER DANFOSS TRANSMISSION

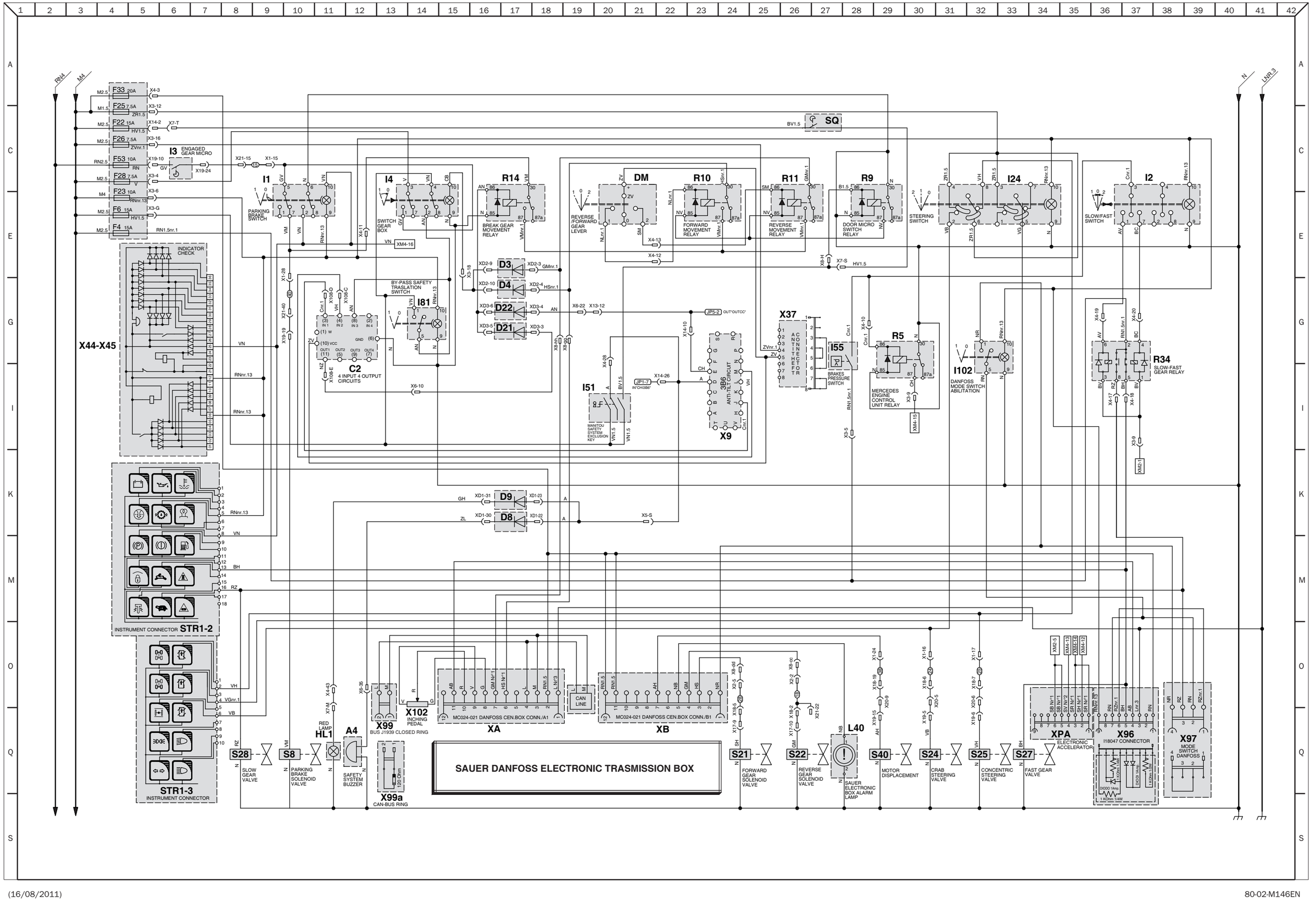
COMPONENTS		
Ref	**Description**	**Position on the diagram**
A4	Anti overturning alarm buzzer	Q12
C2	4 IN+ 4 OUT circuit	I12
D3	Diode 3A	E17
D4	Diode 3A	G17
D8	Diode 3A	K17
D9	Diode 3A	K17
D21	Diode 3A	G17
D22	Diode 3A	G17
DM	Gear change	C21
F4	Emergency/brake pressure/electrovalve gear pump fuse (15A)	E4
F6	Stabiliser control panel power supply fuse (15A)	E4
F22	Manipulators power supply fuse (15A)	C4
F23	Lighting switch power supply fuse (10A)	C4
F25	Steering fuse (7,5A)	A4
F26	Gear change power supply fuse (7,5A)	C4
F28	Tower alignment proximity sensor power supply fuse (7,5A)	C4
F33	Danfoss electronic transmission control unit power supply fuse (20A)	A4
F53	Position/reset gears lights fuse (10A)	C4
HL1	Red lamp	Q11
I1	Parking brake switch	C9
I2	Slow/fast switch	C37
I3	Gear change switch	C6
I4	Switch Gear change reset	C13
I24	Steering switch	C33
I51	Anti overturn exclusion key	I19
I55	Stop pressure switch	G27
I81	Translation safety bypass switch	G14
I102	Danfoss electronic transmission setting authorisation	I31/I32
L40	Danfoss control unit alarm indicator light	Q28
R5	Relay Mercedes engine control unit	G29
R9	Door microswitch relay	C28
R10	Forward gear relay	C23
R11	Reverse gear relay	C26
R14	Relay shut down transmission	C17
R34	Slow/fast gear bistable relay	G38
S8	Parking brake electrovalve	Q10
S21	Forward electrovalve	Q24
S22	Reverse electrovalve	Q26
S24	Crab steering electrovalve	Q30
S25	Concentric steering electrovalve	Q32
S27	High speed electrovalve	Q33
S28	Low speed electrovalve	Q8
S40	Engine displacement reduction	Q29
SQ	Door microswitch	C27
SRT1-2	Instrument connector (STR1-2)	O7
STR1-3	Instrument connector (STR1-3)	Q6
X9	Anti overturn circuit	I24
X37	Antitheft connector	G26
X44-X45	Check warning lights	G3/G4

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COMPONENTS		
Ref	**Description**	**Position on the diagram**
X96	Connector for I18047	Q37
X97	Danfoss settings block	Q39
X99	Bus ring closure J1939	Q13/S13
X102	Electronic brake pedal	Q14
XA	MC024-021 Danfoss control unit connectors/A1	Q16
XB	MC024-021 Danfoss control unit connectors /B1	Q22
XPA	Electronic accelerator pedal	Q34/Q35

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ELECTRICAL DIAGRAM “SAUER DANFOSS TRANSMISSION”



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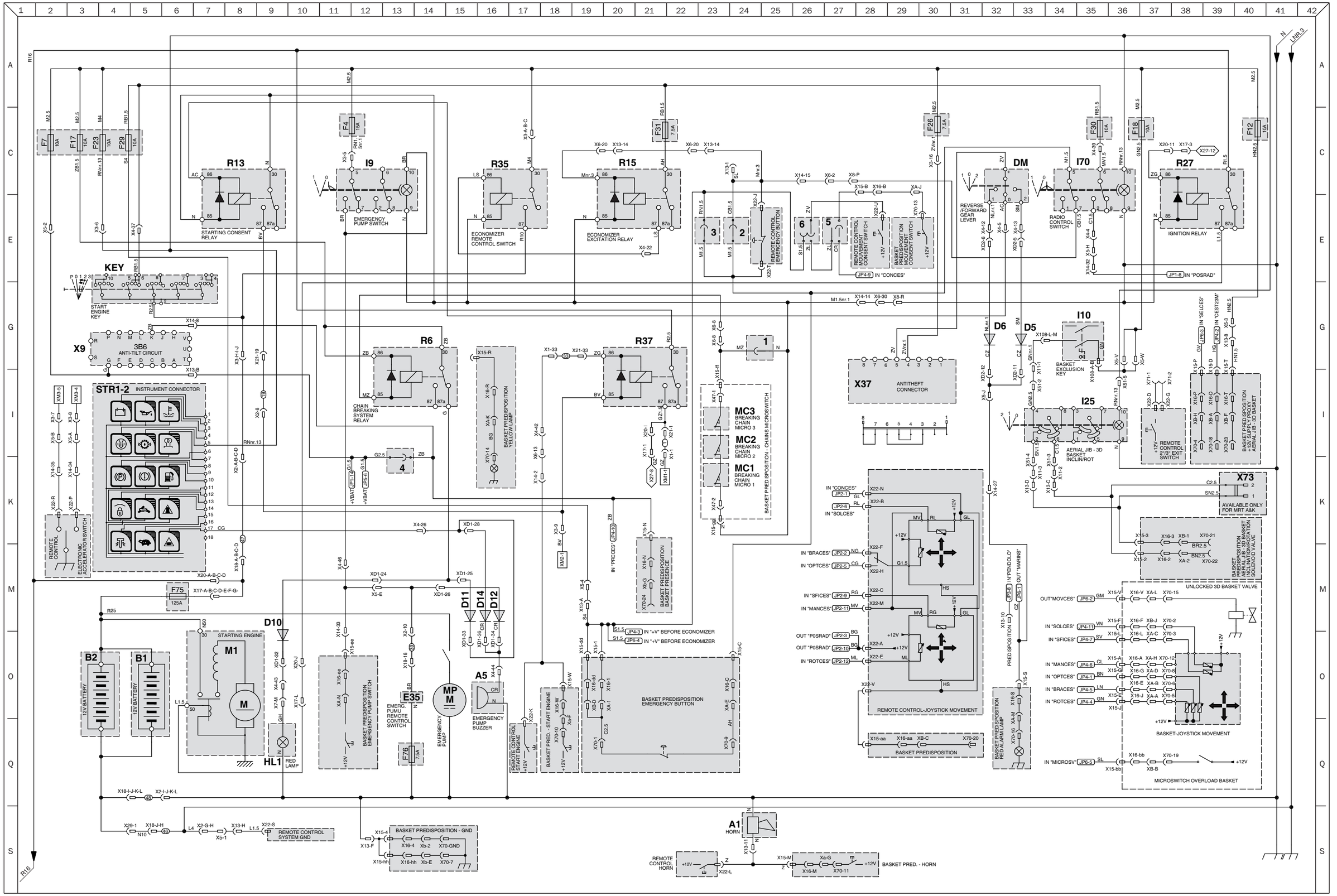
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4 - PLATFORM / RADIO CONTROL

COMPONENTS		
Ref	**Description**	**Position on the diagram**
A1	Acoustic warning	S24
A5	Emergency pump buzzer	O16
B1	Battery 12V	O5
B2	Battery 12V	O3
D5	Diode 3A	G33
D6	Diode 3A	G32
D10	Diode 3A	M9
D11	Diode 3A	M15
D12	Diode 3A	M16
D14	Diode 3A	M16
DM	Gear change	C33
E35	Emergency pump remote switch coil	O13/O14
F4	Emergency/brake pressure/electrovalve gear pump fuse (15A)	C11
F7	Anti overturn instrument card logic power supply fuse (10A)	C2
F12	Power supply fuse downstream of platform economiser (10A)	C40
F17	Chain breakage circuit relay power supply fuse (10A)	C3
F18	Optional-double/triple output fuse (10A)	C36
F23	Lighting switch power supply fuse (10A)	C3
F26	Gear change power supply fuse (7,5A)	C30
F29	Power supply fuse platform economiser (10A)	C4
F30	Anti overturn exclusion key power supply fuse (10A)	C35
F31	Economiser excitation relay power supply fuse (7,5A)	C21
F75	Main fuse	M6
F76	Fuse emergency pump remote switch	Q13
HL1	Red lamp	Q9
I9	Emergency pump remote switch	C12
I10	Platform exclusion key	G35
I25	Tilt/aerial rotation jib/3D platform switch	I35
I70	Radio control connector	C35
KEY	Starter panel	E4
M1	Starter motor	O8
MC1	Chain 1 microswitch	K24
MC2	Chain breakage microswitch 2	I24
MC3	Chain breakage microswitch 3	I24
MP	Emergency pump	O15
R6	Relay chain breakage system	G14
R13	Start permission relay	C8
R15	Economiser excitation relay economiser	C20
R27	Engine starting relay	C38
R35	Economiser remote switch	C16
R37	Switch on lights command relay	G21
SRT1-2	Instrument connector (STR1-2)	I4
X9	Anti overturn circuit	G3
X37	Antitheft connector	I28
X73	3D Platform rotation inclination	K40

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ELECTRICAL DIAGRAM “PLATFORM / RADIO CONTROL”



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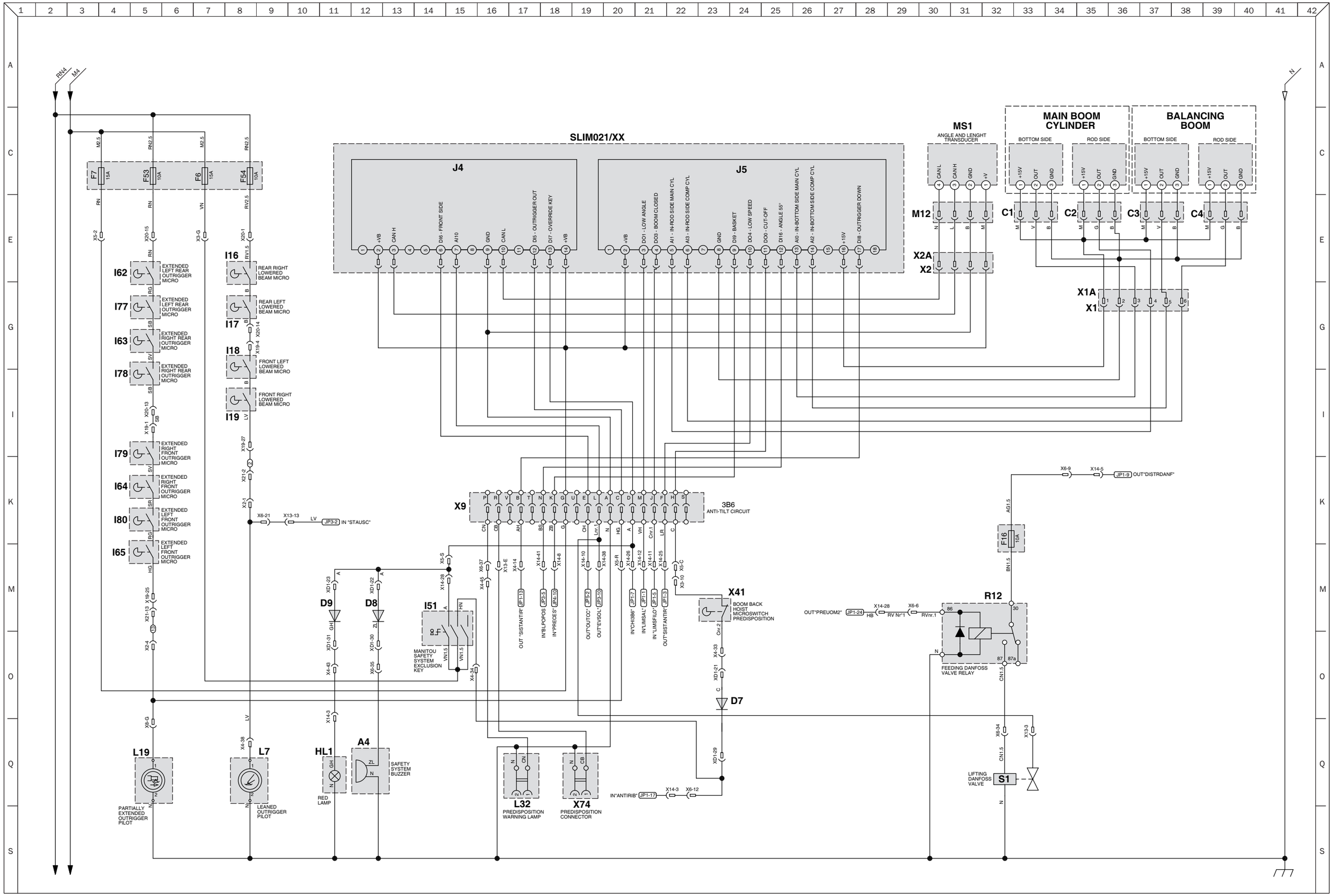
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5 - SAFETY SYSTEM

COMPONENTS		
Ref	**Description**	**Position on the diagram**
A4	Anti-overturn buzzer Overturning	Q12
D7	Diode 3A	O24
D8	Diode 3A	M12
D9	Diode 3A	M11
F6	Stabiliser instrument panel power supply fuse (15A)	C7
F7	Anti-overturn instrument logic card power supply fuse (15A)	C3
F16	Danfoss logic power supply fuse (10A)	K32
F53	Sidelights/reset gears fuse (10A)	C5
F54	Stop lights relay power supply fuse (10A)	C8
HL1	Red lamp	Q11
I16	Rear right beam lowered	E8
I17	Microswitch left beam lowered microswitch	G8
I18	Front left beam lowered microswitch	G8
I19	Front right beam lowered microswitch	I8
I51	Anti overturn exclusion key	M14
I62	Rear left stabiliser extended microswitch	E4
I63	Rear right stabiliser extended microswitch	G4
I64	Front right stabiliser extended microswitch	K4
I65	Front left stabiliser extended microswitch	M4
I77	Rear left stabiliser extended microswitch	G4
I78	Rear right stabiliser extended microswitch	I4
I79	Front right stabiliser extended microswitch	I4
I80	Front left stabiliser extended microswitch	K4
L7	Stabilisers supported indicator light	Q9
L19	Stabilisers partially extended indicator light	Q5
L32	Provision for danger lamp	Q17
R12	Danfoss valve power supply relay	M32
S1	Danfoss lifting electrovalve	Q32
X9	Anti overturn circuit	K15
X41	Winch behind jib microswitch	M24
X74	Provision for connector	Q19

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ELECTRICAL DIAGRAM “SAFETY SYSTEM”



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6 - HEADLAMPS / INDICATOR LIGHTS / LIGHTING / SENSORS / PROXIMITY

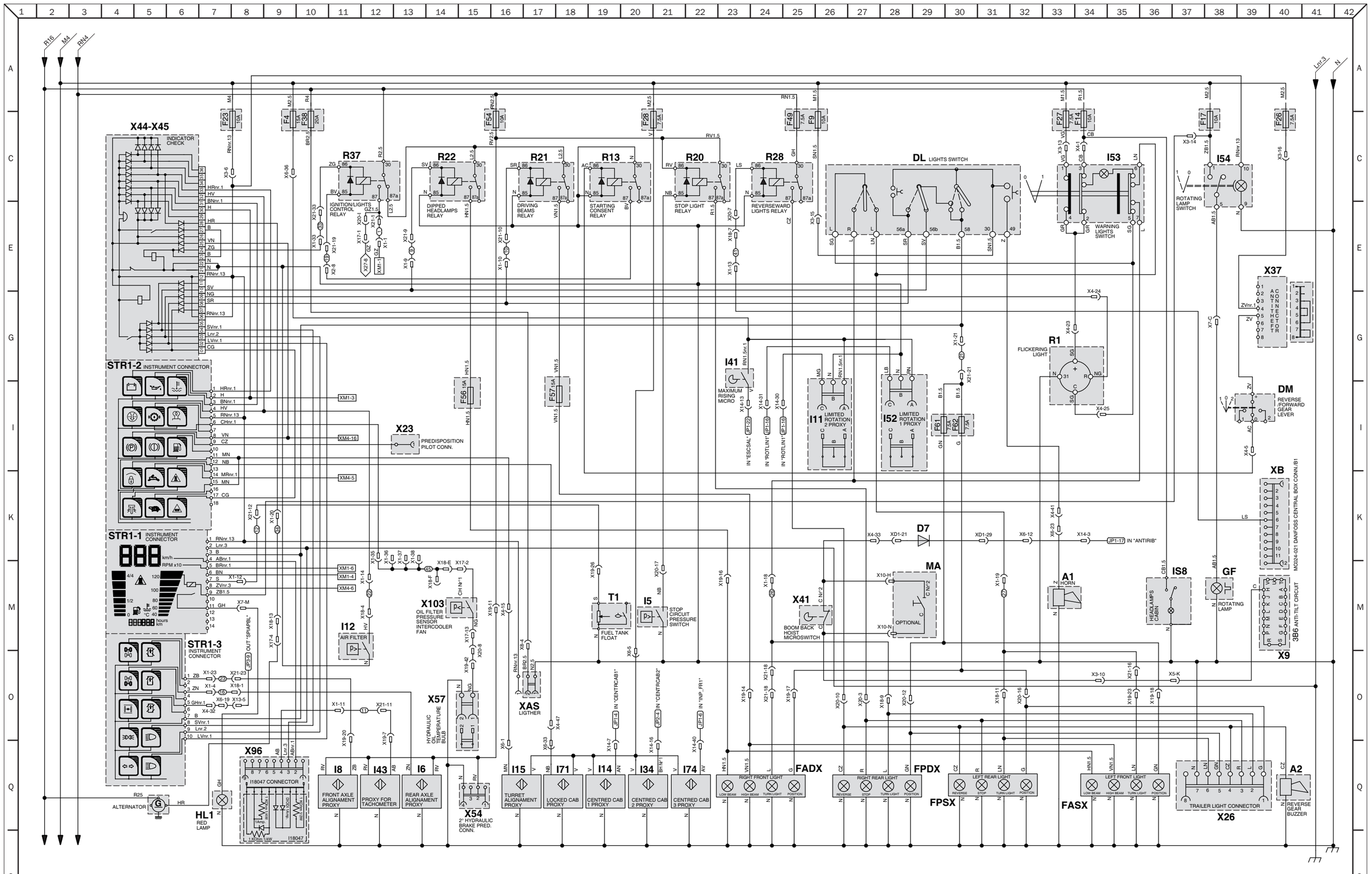
COMPONENTS		
Ref	**Description**	**Position on the diagram**
A1	Acoustic warning	M33
A2	Reverse gear horn	Q40
D7	Diode 3A	K29
DL	Headlamp dipping	C29
DM	Gear change	I40
F4	Fuse pump emergency/brake pressure/gear electrovalve (15A)	C9
F9	Headlamp dipping and klaxon power supply fuse (10A)	C25
F14	“30” emergency switch power supply fuse (10A)	C34
F17	Chain breakage circuit relay power supply fuse (10A)	C38
F23	Lighting Switches power supply fuse (10A)	C7
F26	Gear change power supply fuse (7,5A)	C40
F27	Direction indicator lights power supply fuse (7,5A)	C33
F28	Tower alignment proximity sensor power supply fuse (7,5A)	C20
F38	Fuse and “30” cigarette lighter (20A)	C10
F49	Reversing lights relay power supply fuse (7,5A)	C25
F54	Stop light relay power (10A)	C15/C16
F56	Dipped headlamps power supply fuse (15A)	I15
F57	Main beam headlamp power supply fuse (15A)	I17
F61	Side lights power supply fuse (7,5A)	I29
F62	Side lights power supply fuse (7,5A)	I30
FADX	Front right lamp	Q25
FASX	Front left lamp	Q33/Q34
FPDX	Front right lamp	Q29
FPSX	Rear left lamp	Q29/Q30
G	Alternator	Q5
GF	Rotating lamp	M38
HL1	Red lamp	Q7
I5	Stop circuit pressure switch	M20
I6	Rear axle alignment proximity sensor	Q13
I8	Front axle alignment proximity sensor	Q11
I11	Limited rotation proximity sensor 2	I26
I12	Air filter	M11
I14	Cab centred proximity sensor 1	Q19
I15	Tower alignment proximity sensor	Q16
I34	Cab centred proximity sensor 2	Q20
I41	Maximum raising microswitch	G23
I43	Proximity sensor for speedometer	Q12
I52	Limited rotation proximity sensor 1	I28
I53	Emergency arrows switch	C35
I54	Rotating lamp switch	C38
I71	Cab locked proximity sensor	Q18
I74	Cab centred proximity sensor 3	Q22
IS8	Roof light in cab	M37
MA	Horn microswitch	M29
R1	Intermittence	G33
R13	Start permission relay	C19
R20	Stop light relay	C22
R21	Main beam headlamps relay	C17
R22	Dipped beam headlamps relay	C14

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COMPONENTS		
Ref	**Description**	**Position on the diagram**
R28	Reversing light relay	C24
R37	Switch on lights command relay	C11
STR1-1	Instrument connector (STR1-1)	K4
STR1-2	Instrument connector (STR1-2)	G4
STR1-3	Instrument connector (STR1-3)	M7
T1	Fuel float	M19
X9	Anti overturn circuit	O40
X23	Connector provided for indicator lights	I13
X26	Trailer lights connector	Q38
X37	Antitheft connector	E40
X41	Winch behind jib microswitch	M25
X44-X45	Check warning lights	C5
X54	Hydraulic braking 2nd connector	Q15
X57	Hydraulic oil temperature light	O14
X96	Connector for I18047	Q8
X103	Intercooler fans oil filter pressure switch	M14
XAS	Cigarette lighter	O17
XB	MC024-021 connector/B1 control unit Danfoss	I40

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ELECTRICAL DIAGRAM “LIGHTS / INDICATOR LIGHTS / LIGHTING / SENSOR / PROXIMITY”



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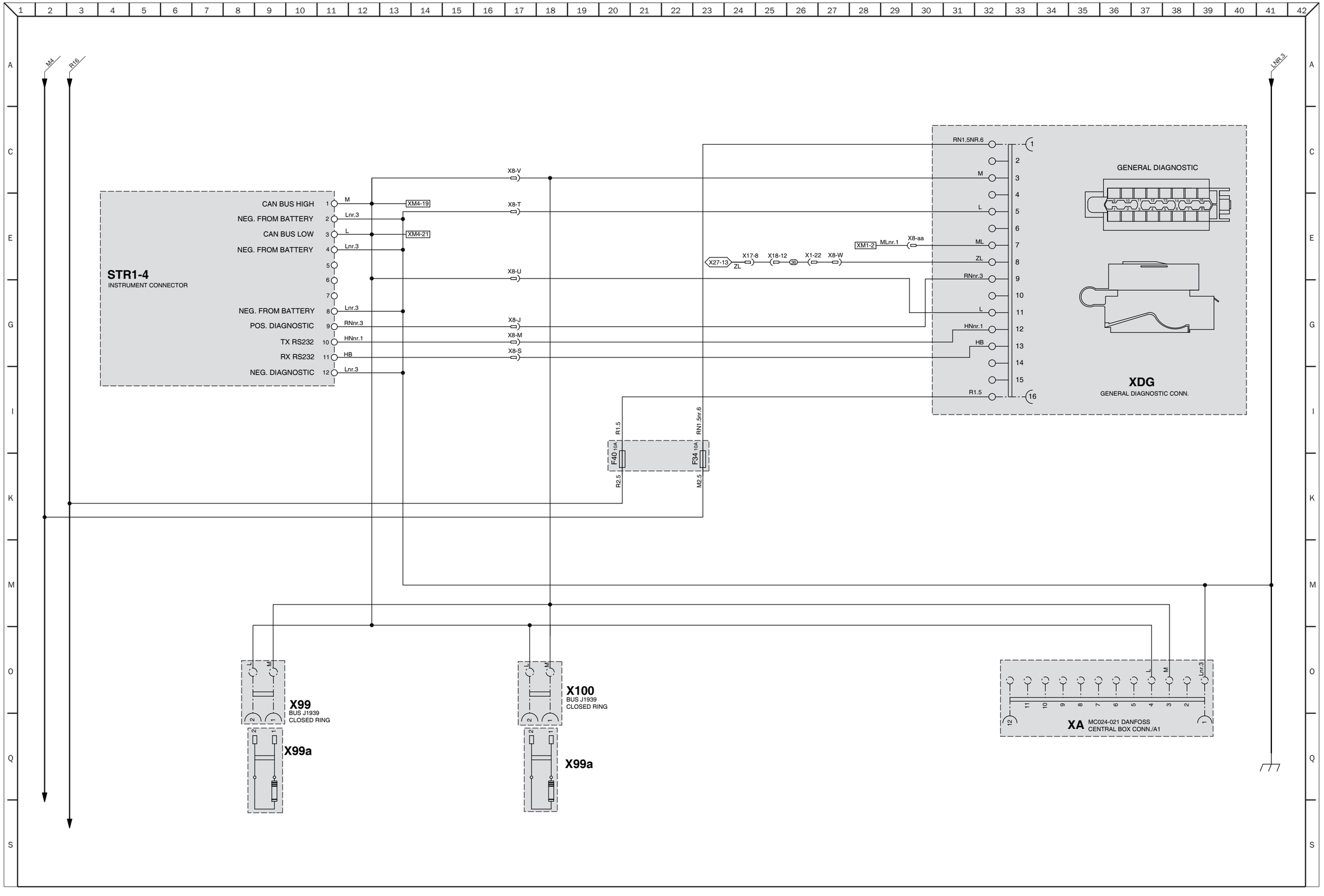
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7 - CAN BUS

COMPONENTS		
Ref	**Description**	**Position on the diagram**
F34	Mercedes engine diagnostics fuse (10A)	K23
F40	Mercedes engine diagnostics fuse (10A)	K20
STR1-4	Instrument connector (STR1-4)	E4/E5
X99	Bus ring closure J1939	O10
X100	Bus ring closure J1939	O19
XA	Connector MC024-021/Danfoss control unit A1	Q35
XDG	Main diagnostics connector	I37

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ELECTRICAL DIAGRAM “CAN BUS”



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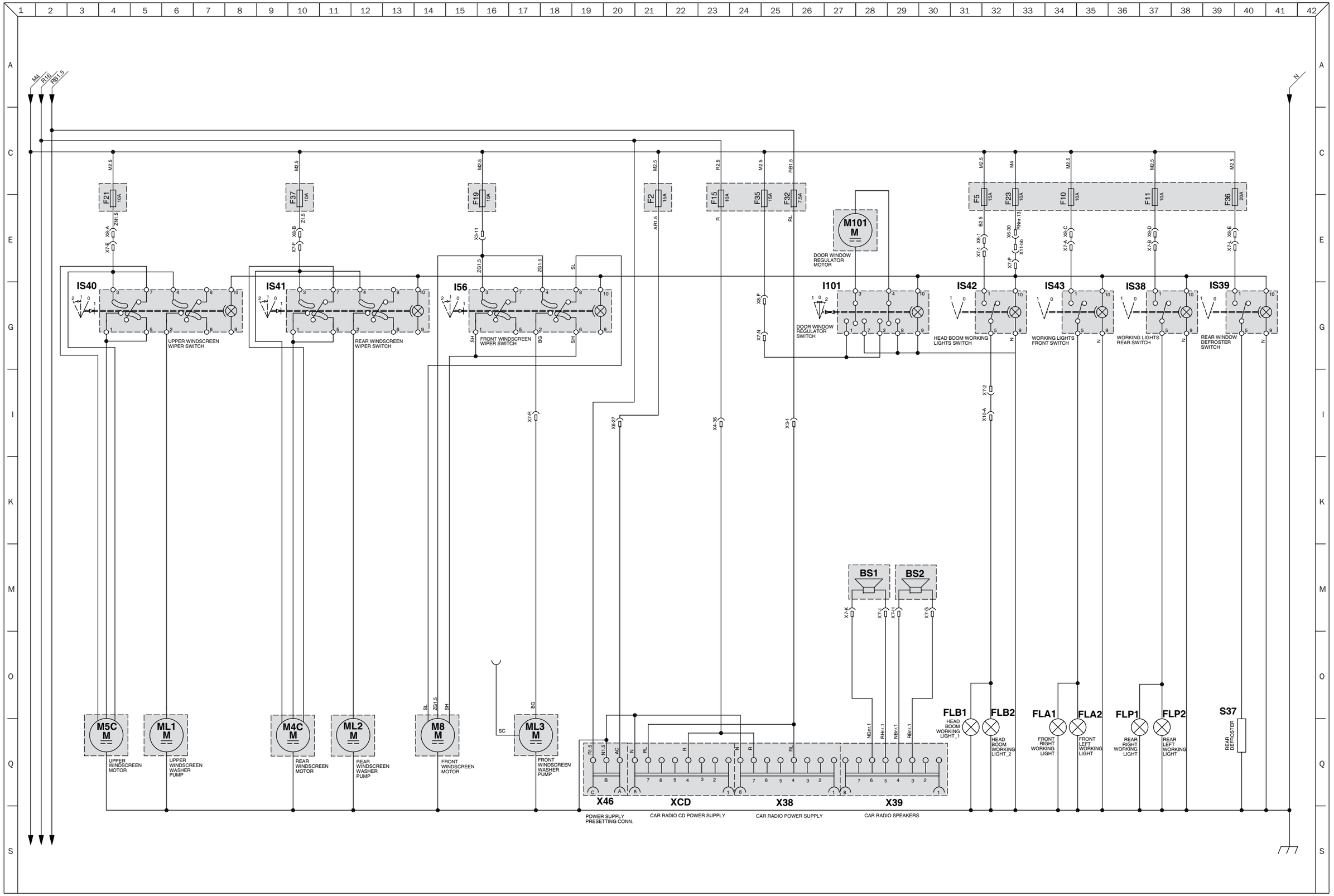
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8 - OPTIONAL LIGHTING / CAR RADIO / WINDSCREEN WIPER

COMPONENTS		
Ref	**Description**	**Position on the diagram**
BS1	Right box	M28
BS2	Left box	M29/M30
F2	Small mixing bin fuse (15A)	E21
F5	Working lights fuse on head of jib (15A)	E31
F10	Power supply fuse working lights in front of cab (10A)	E34
F11	Working lights behind cab power supply fuse (10A)	E37
F15	Power supply fuse “30” radio/provision for connector (10A)	E23
F19	Front windscreen wiper power supply fuse (10A)	E15/E16
F21	Upper windscreen wiper power supply fuse (10A)	E4
F23	Lighting Switches power supply fuse (10A)	E32
F32	Car radio/antitheft power supply fuse (7,5A)	E25
F35	Power supply fuse Window winder switch (15A)	E24
F36	Rear window deicer fuse (20A)	E39
F37	Rear windscreen wiper power supply fuse (10A)	E10
FLA1	Front right working headlight	O33/O34
FLA2	Front left working headlight	O35
FLB1	Working light on head of jib_1	O30/O31
FLB2	Working light on head of jib_2	O32
FLP1	Rear left working light	O36
FLP2	Rear left working light	O37/O38
I56	Front windscreen wiper switch	G15
I101	Window winder switch	G27
IS38	Rear working light switch	G36/G37
IS39	Rear window deicer switch	G39
IS40	Upper windscreen wiper switch	G3
IS41	Rear windscreen wiper switch	G9
IS42	Jib head working light switch	G31
IS43	Front working lights switch	G34
M4C	Rear windscreen wiper motor	Q10
M5C	Upper windscreen wiper motor	Q4
M8	Front windscreen wiper motor	Q14
M101	Window winder motor	E27/E28
ML1	Upper windscreen wiper pump	Q6
ML2	Rear windscreen wiper pump	Q11/Q12
ML3	Front windscreen wiper pump	Q17
S37	Rear window deicer	O39
X38	Car radio power supply connector	Q25
X39	Car radio boxes connector	Q29
X46	Provisional power supply connector	Q19/Q20
XCD	Car radio with CD power supply connector	Q22

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ELECTRICAL DIAGRAM “OPTIONAL LIGHTING / CAR RADIO / WINDSCREEN WIPER”



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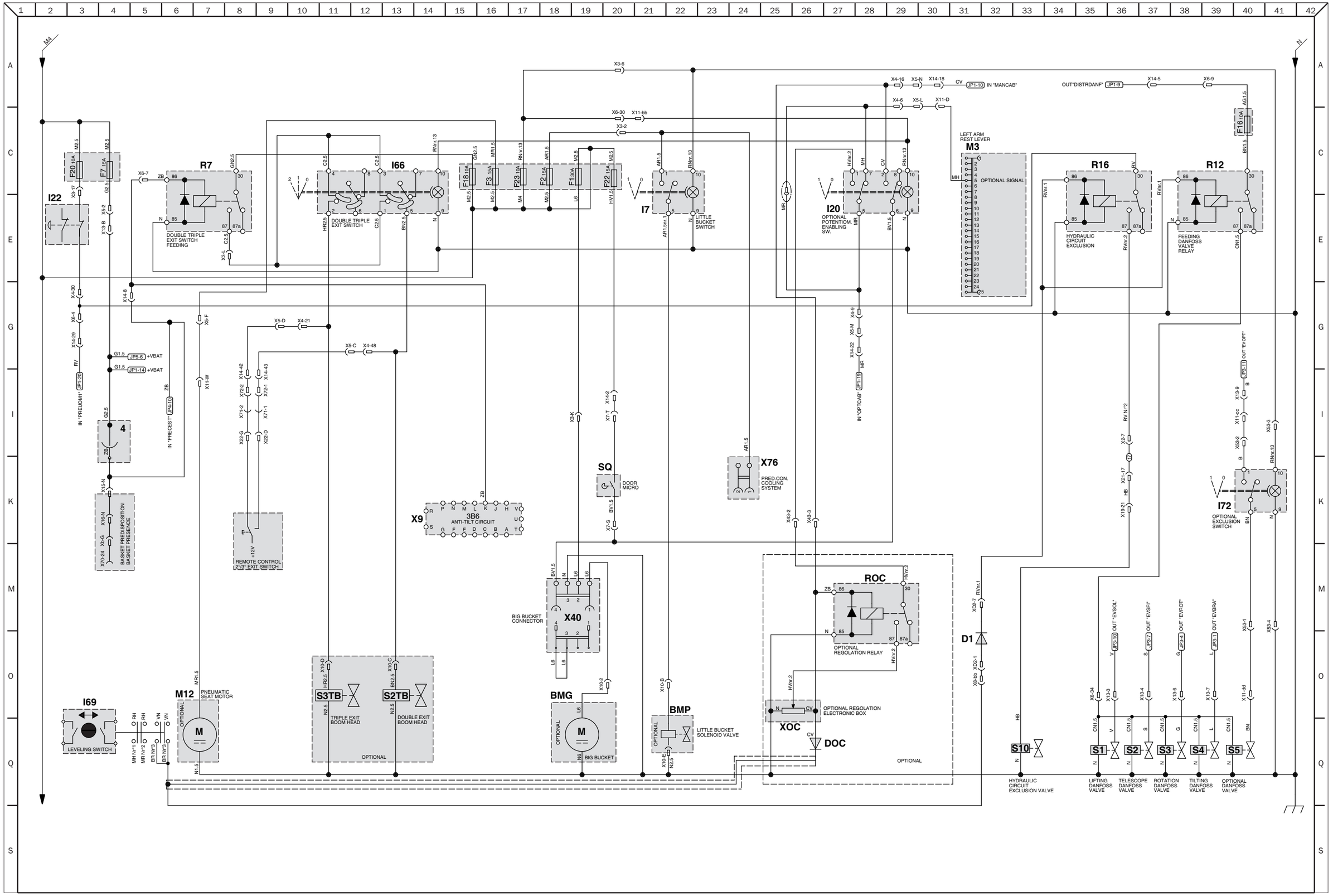
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9 - PNEUMATIC SEAT / 2a / 3a OUTPUT / OPTIONAL CONTINUOUS

COMPONENTS		
Ref	**Description**	**Position on the diagram**
BMG	Large mixing bin	O18
BMP	Small mixing bin electrovalve	O22
D1	Diode 3A	O31
DOC	Diode 3A	Q27
F1	Large mixing bin power supply fuse (30A)	C19
F2	Small mixing bin power supply fuse (15A)	C18
F3	Pneumatic seat power supply fuse (15A)	C16
F7	Logic card/anti-overturn instrument power supply fuse (15A)	C4
F16	Danfoss logic power supply fuse (10A)	C40
F18	Optional-double/triple output fuse (10A)	C15
F20	Hydraulic system exclusion power supply fuse (10A)	C3
F22	Lever power supply fuse (15A)	C20
F23	Switch illumination power supply fuse (10A)	C17
I7	Small mixing bin switch	E21
I20	Optional potentiometer enabling switch	E27
I22	Emergency domed pushbutton	E2
I66	Double/triple output switch	C13
I69	Levelling switch	O3
I72	Optional exclusion switch	K39
M3	Left side seat lever	C31
M12	Pneumatic seat motor	O6
R7	Double/triple output switch relay	C7
R12	Danfoss valve power supply relay	C39
R16	Hydraulic system exclusion relay	C35
ROC	Optional adjustment relay	M28
S1	Danfoss lifting electrovalve	Q35
S2	Danfoss extension electrovalve	Q36
S2TB	Double output jib head electrovalve	O13
S3	Danfoss rotation electrovalve	Q37
S3TB	Triple output jib head electrovalve	O11
S4	Danfoss traverse electrovalve	Q38/Q39
S5	Danfoss optional electrovalve	Q39/Q40
S10	Hydraulic circuit exclusion electrovalve	Q33
SQ	Door microswitch	K20
X9	Anti overturn circuit	K14
X40	Large mixing bucket connector	M18/M19
X76	Connector provided for air conditioning	K25
XOC	Optional Adjustment card	Q25/Q26

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ELECTRICAL DIAGRAM “PNEUMATIC SEAT / 2a / 3a OUTPUT / OPTIONAL CONTINUOUS”



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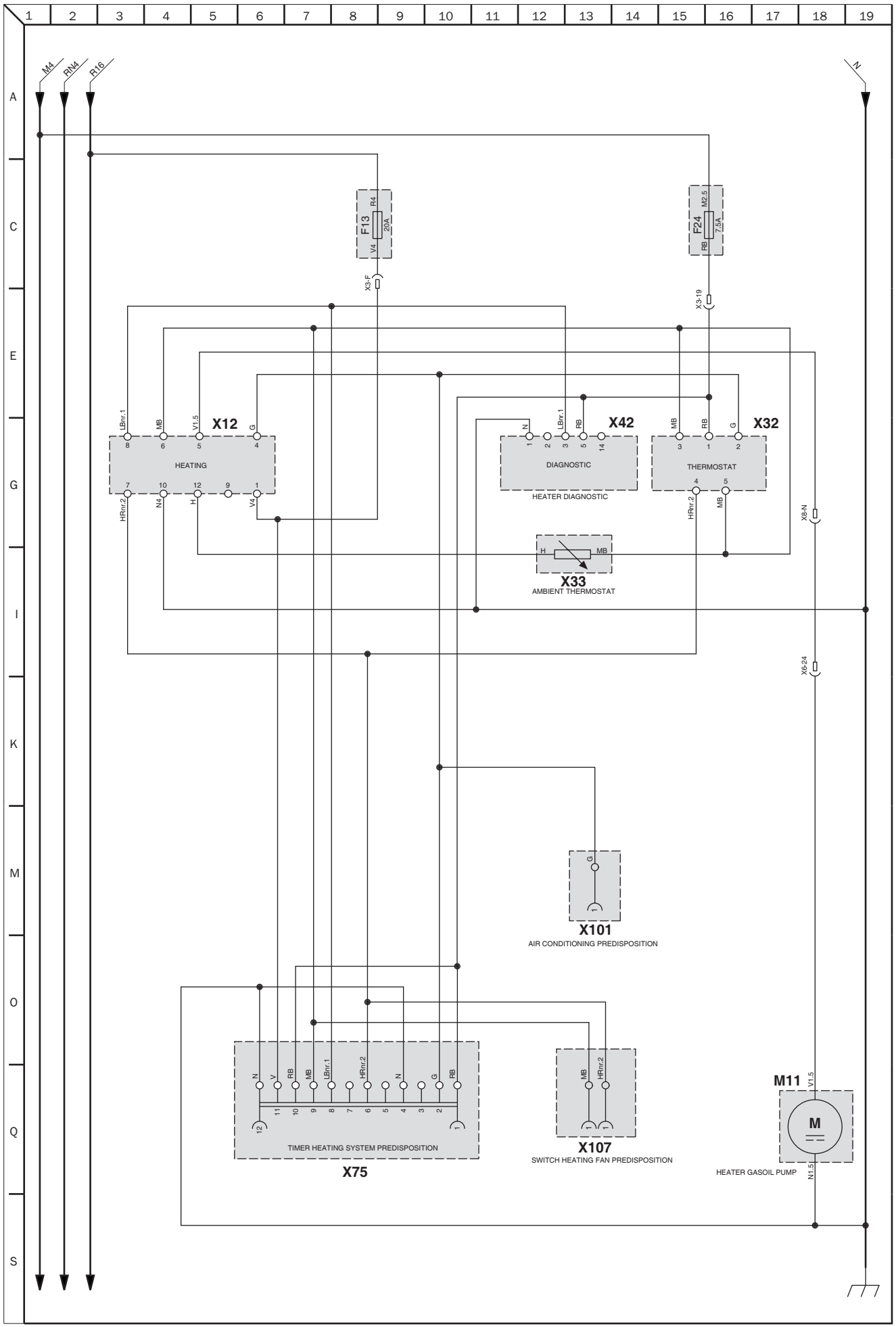
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10 - HEATING

COMPONENTS		
Ref	**Description**	**Position on the diagram**
F13	Heating power supply fuse (20A)	C8
F24	Thermostat power supply fuse (7,5A)	C15
M11	Heating pump	Q17
X12	Heating	G5
X32	Thermostat	G17
X33	Ambient thermostat	I13
X42	Heating diagnostics connector	G14
X75	Provision for heating timer	Q8
X101	Provision for air conditioning power supply	M13
X107	Provision for heating fan	Q13

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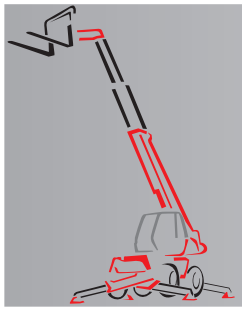
ELECTRICAL DIAGRAM “HEATING”



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ELECTRICAL COMPONENTS LOCATION

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ELECTRICAL COMPONENTS LOCATION. A2

ELECTRICAL COMPONENTS LOCATION UP TO TRUCK 22725 - 758856

– CONNECTORS A5
– GROUNDS. A8

ELECTRICAL COMPONENTS LOCATION FROM TRUCK 22756 - 758886

– CONNECTORS A11
– GROUNDS. A14

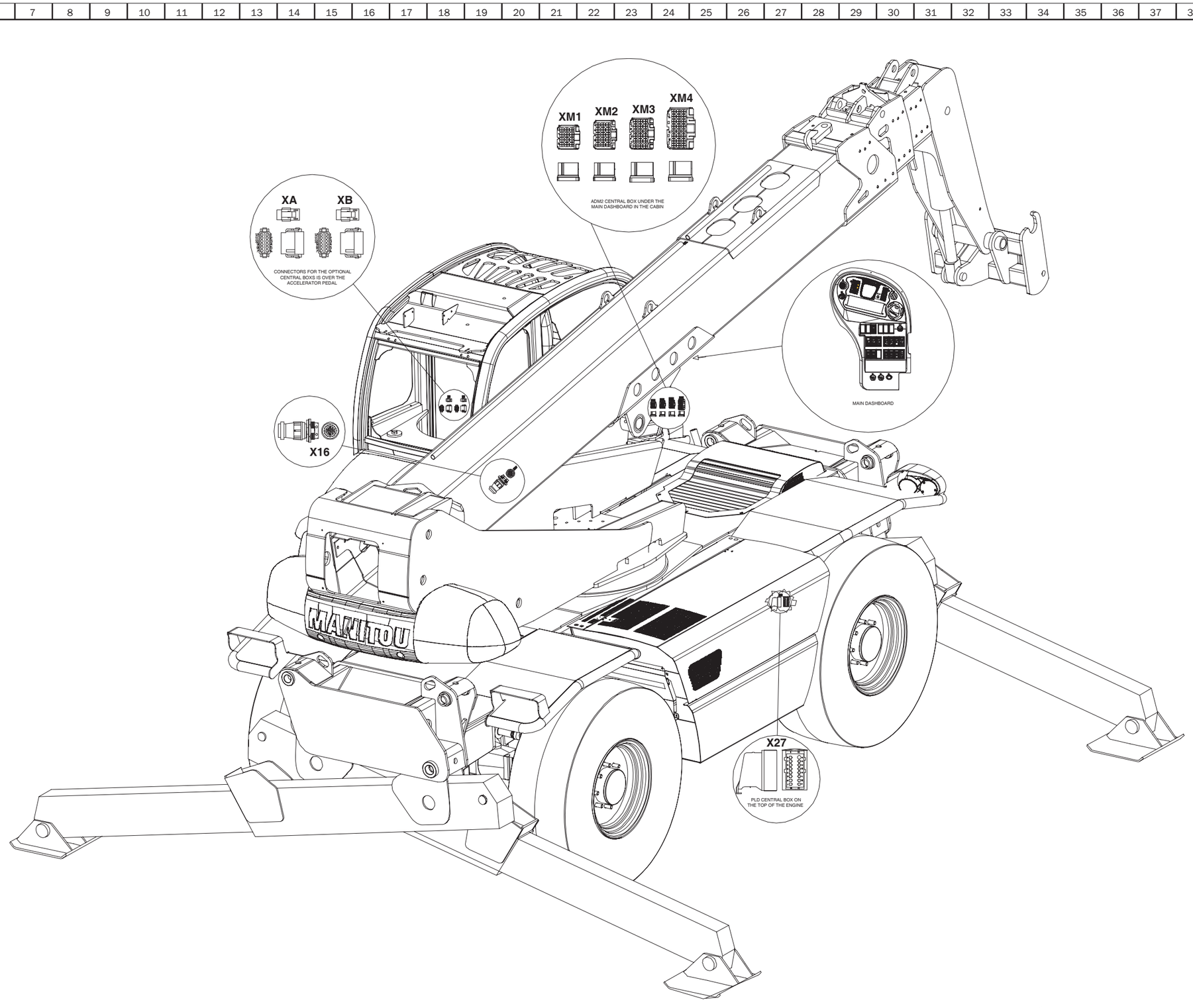
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ELECTRICAL COMPONENTS LOCATION

Ref	Description	Position on the diagram	
		Right side of truck	Left side of truck
X1	System isolating connectors		K40
X2	System isolating connectors		C31
X3	System isolating connectors		C29
X4	System isolating connectors		C29
X5	System isolating connectors		C31
X6	System isolating connectors		E31
X7	System isolating connectors		K41
X8	System isolating connectors		E29
X9	Anti overturn circuit		G40
X10	System isolating connectors		I40
X11	System isolating connectors		K40
X13	System isolating connectors		E37/E38
X14	System isolating connectors		G37/G38
X15	System isolating connectors		E37/E38
X16	System isolating connectors	I15	
X18	System isolating connectors		G16/G17
X19	System isolating connectors		Q24
X20	System isolating connectors		Q25
X21	System isolating connectors		Q26
X22	Connector provided for radio control		C35/C36
X27	System isolating connectors	M27	
X70	System isolating connectors		I7
XA	Connector MC024-021/A1 Danfoss control unit	C14	
XB	Connector MC024-021/B1 Danfoss control unit	C15	
XD1/XD2	System isolating connectors		E29
XD3	System isolating connectors		E30
XDG	Main diagnostics connector		E31
XM1	System isolating connectors	A21	
XM2	System isolating connectors	A22	
XM3	System isolating connectors	A23	
XM4	System isolating connectors	A24	

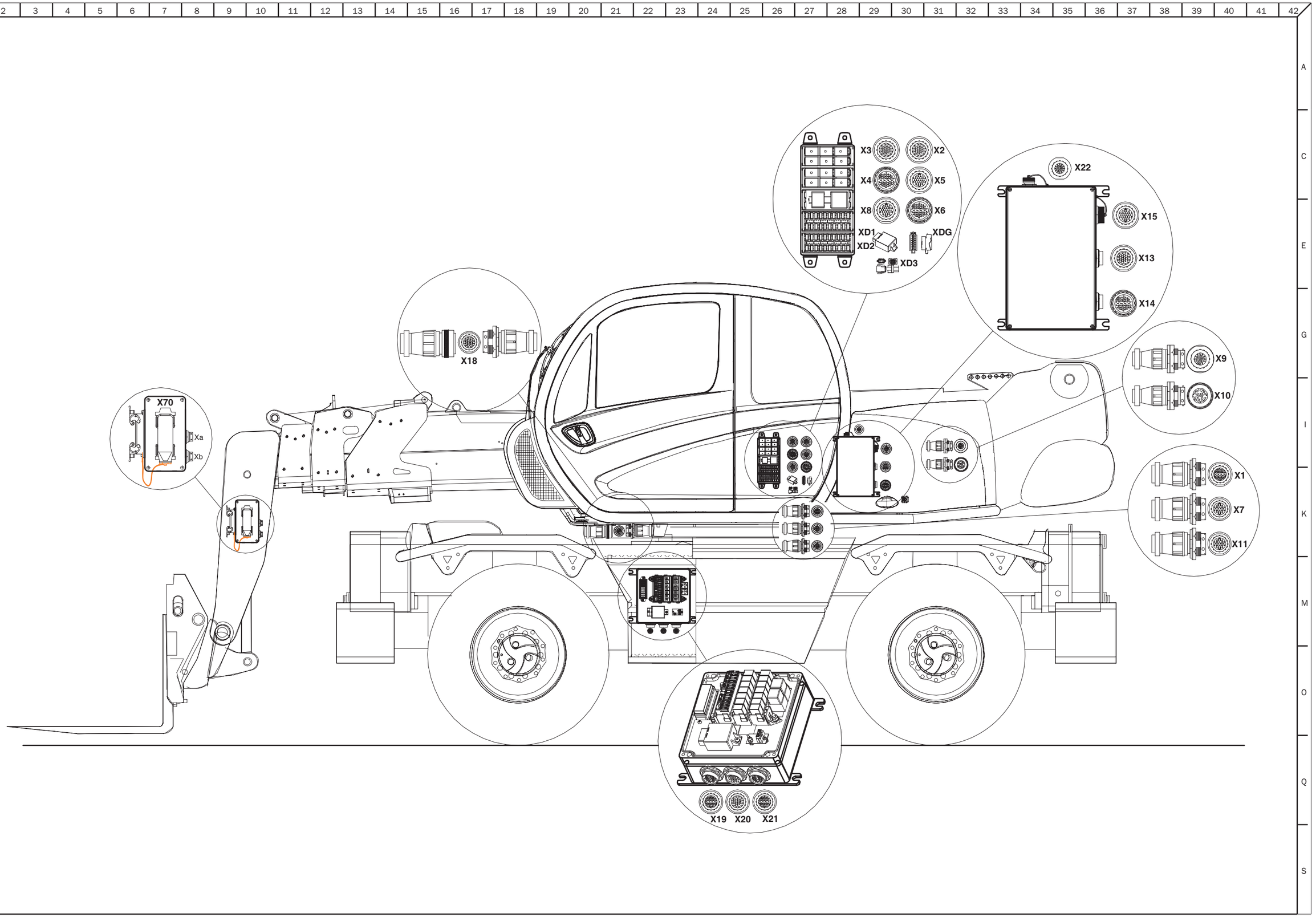
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ELECTRICAL COMPONENTS LOCATION ON RIGHT SIDE OF TRUCK



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ELECTRICAL COMPONENTS LOCATION ON LEFT SIDE OF TRUCK



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CONNECTORS UP TO TRUCK 22725 - 758856

Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Rear turret	A1	Acoustic warning	G19		
Rear	A2	Reverse gear horn	K7		
Rear turret	A4	Anti overturning alarm buzzer	I9		
Cab	A5	Emergency pump buzzer		O35	
Cab	DL	Headlamp dipping		G15	
Cab	DM	Gear change		G17	
Engine	F75	Main fuse	K19		
Rear	F76	Emergency pump remote switch fuse	K20		
Front	FADX	Front right lamp	M28		
Front	FASX	Front left lamp	E28		
Rear	FPDX	Front right lamp	O4		
Rear	FPSX	Rear left lighting	E4		
Engine	G	Alternator	M17		
Cab	I1	Parking brake switch		G29	
Cab	I2	Slow/fast switch		G30	
Front	I3	Gear change switch	I24		
Cab	I4	Gear change reset switch		G29	
Rear	I5	Stop circuit pressure switch	I7		
Rear	I6	Rear axle alignment proximity sensor	I8		
Cab	I7	Small mixing bin switch		E7	
Front	I8	Option	I23		
Cab	I9	Rear axle alignment proximity sensor		E28	
Cab	I10	Platform exclusion key		K30	
Rear turret	I11	Limited rotation proximity sensor 2	I11		
Rear	I12	Slow/fast switch	K10		
Rear turret	I14	Gear change reset switch	I17		
Rear turret	I15	Tower alignment proximity sensor	G15		
Rear	I16	Rear right beam lowered microswitch	M4		
Rear	I17	Rear left beam lowered microswitch	G3		
Front	I18	Front left beam lowered microswitch	G29		
Front	I19	Front right beam lowered microswitch	M30		
Cab	I20	Optional potentiometer enabling switch		E8	Option
Cab	I22	Emergency domed pushbutton		G14	
Cab	I24	Steering switch		I29	
Cab	I26	Stabiliser raised/lowered beam extend/retract switch		G32 / G33	
Cab	I27	Beams/stabiliser selector switch		I32 / I33	
Cab	I28	Front left beam/stabiliser switch		G31	
Cab	I29	Front right beam/stabiliser switch		G32	
Cab	I30	Rear left beam/stabiliser switch		I31	
Cab	I31	Rear right beam/stabiliser switch		I32	
Rear turret	I34	Cab centred proximity sensor 2	G17		
Cab	I35	Electric accelerator switch		E29	Option
Rear turret	I41	Maximum raising microswitch	K3		
Front	I43	Proximity sensor for speedometer	I24		Option
Cab	I51	Anti overturn exclusion key		K29	
Rear turret	I52	Limited rotation proximity sensor 2	I12		
Cab	I53	Emergency arrows switch		C26	
Cab	I54	Rotating lamp switch		I29	
Cab	I55	Stop pressure switch		Q39	
Cab	I56	Front windscreen wiper switch		E5	

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Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Rear	I62	Rear left stabiliser extended microswitch	G3		
Rear	I63	Rear right stabiliser extended microswitch	M4		
Front	I64	Front right stabiliser extended microswitch	M30		
Front	I65	Front left stabiliser extended microswitch	G29		
Cab	I66	Double/triple output switch Option		E4	
Cab	I68	Provision for heating fan switch		O38	Option
Cab	I69	Levelling switch		G33	Option
Cab	I70	Radio control connector		E29	
Rear turret	I71	Cab locked proximity sensor	G15		
Cab	I73	Engine start permission with I10 activated		K31 / K32	
Rear turret	I74	Cab centred proximity sensor 3	I17		
Cab	I75	Engine revolutions memorisation switch		E31	Option
Cab	I76	1450 switch/min switch		E30	Option
Rear	I77	Rear left stabiliser extended microswitch	E3		
Rear	I78	Rear right stabiliser extended microswitch	M4		
Front	I79	Front right stabiliser extended microswitch	M30		
Front	I80	Front left stabiliser extended microswitch	G29		
Cab	I102	Danfoss electronic transmission setting authorisation		O35	Option
Cab	KEY	Starter panel		C33	
Cab	L7	Stabilisers supported indicator light		O38	Option
Cab	L19	Stabilisers partially extended indicator light		O38	Option
Cab	L28	Selected beam indicator light		I34	
Cab	L29	Selected stabilisers indicator light		I34	
Cab	L30	Beam extension/lowering stabiliser feet indicator light		G34	
Cab	L31	Beams retracted/feet raised stabiliser indicator light		G34	
Cab	L32	Provision for danger lamp		Q38	Option
Cab	L40	Danfoss control unit alarm indicator light		E32	
Engine	M1	Starter motor	M16		
Driving position	M3	Left side seat lever	E20		
Driving position	M4	Right side seat lever	G20		
Front	M5	Oil cooling fan 1	I26		
Front	M6	Oil cooling fan 2	I26		
Cab	M8	Front windscreen wiper motor		Q39	
Engine	M9	Diesel filter heater	M17		
Cab	M10	Provision for heating fan		O37	Option
Rear turret	M11	Heating pump	I12		
Driving position	M12	Pneumatic seat motor	G19		
Cab	R35	Economiser remote switch		O35	
Rear turret	S1	Danfoss lifting electrovalve	I12		
Rear turret	S2	Danfoss extension electrovalve	I11		
Rear turret	S3	Danfoss rotation electrovalve	I11		
Rear turret	S4	Danfoss traverse electrovalve	I10		
Rear turret	S5	Danfoss optional electrovalve	I10		
Front	S8	Parking brake electrovalve	I22		
Front	S9	Main stabiliser electrovalve	K22		
Front	S10	Hydraulic circuit exclusion electrovalve	E23		
Front	S11	Right front beam electrovalve	K22		
Front	S12	Front left beam electrovalve	K23		
Front	S13	Rear left beam electrovalve	K23		
Front	S14	Rear right beam electrovalve	K24		
Front	S15	Stabiliser retract/raise electrovalve	K25		
Front	S16	Front right stabiliser electrovalve	K25		

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Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Front	S17	Front left stabiliser electrovalve	K25		
Front	S18	Rear left stabiliser electrovalve	I25		
Front	S19	Rear right stabiliser electrovalve	K22		
Engine	S21	Forward electrovalve	K16		
Engine	S22	Reverse electrovalve	K17		
Rear	S23	Unlock rear axle electrovalve	G7		
Front	S24	Crab steering electrovalve	K23		
Front	S25	Concentric steering electrovalve	K23		
Rear	S26	Unlock rear axle electrovalve	K7		
Cab	S27	High speed electrovalve		O33	
Cab	S28	Low speed electrovalve		O34	
Front	S35	Levelling electrovalve 1	K24		Option
Front	S36	Levelling electrovalve 2	K25		Option
Front	S40	Engine displacement reduction	K26		
Cab	SC	System isolating connectors		Q36	Option
Cab	STR1-1	Instrument connector (STR1-1)		C29	
Cab	STR1-2	Instrument connector (STR1-2)		C27	
Cab	STR1-3	Instrument connector (STR1-3)		C31	
Cab	STR1-4	Instrument connector (STR1-4)		A28	
Front	T1	Fuel float	G16		
Cab	X1	System isolating connectors		O28	
Cab	X2	System isolating connectors		Q27	
Cab	X3	System isolating connectors		Q25	
Cab	X4	System isolating connectors		Q25	
Rear turret	X5	System isolating connectors	G12		
Rear turret	X6	System isolating connectors	G12		
Cab	X7	System isolating connectors		O28	
Cab	X8	System isolating connectors		Q25	
Rear turret	X9	Anti overturn circuit	I8/I9		
Cab	X10	System isolating connectors		Q22	Option
Driving position / Rear turret	X11	System isolating connectors	E13		
Cab	X12	Heating		Q39	
Rear turret	X13	System isolating connectors	G13		
Rear turret	X14	System isolating connectors	G13		
Platform	X15	System isolating connectors	E13		
Platform	X16	System isolating connectors	K9		
Engine / Rear	X17	System isolating connectors	K21		
Rear	X18	System isolating connectors	G22		
Front	X19	System isolating connectors	E21		
Rear	X20	System isolating connectors	E21		
Rear	X21	System isolating connectors	E21		
	X22	System isolating connectors	E12		
Cab	X23	Connector provided for indicator lights		O35	Option
Front	X24	Provisional power supply	I30		Option
Rear	X26	Trailer lights connector	K7		
Engine	X27	System isolating connectors	M18		
Engine	X28	Connector provision for preheating relay	M19		
Engine / Rear	X29	Connector provided for preheating	M20 / K8		
Cab	X32	Thermostat		Q35	
Cab	X33	Ambient thermostat		O38	
Cab	X34	System isolating connectors		O35	Option
Cab	X37	Antitheft connector		O37	

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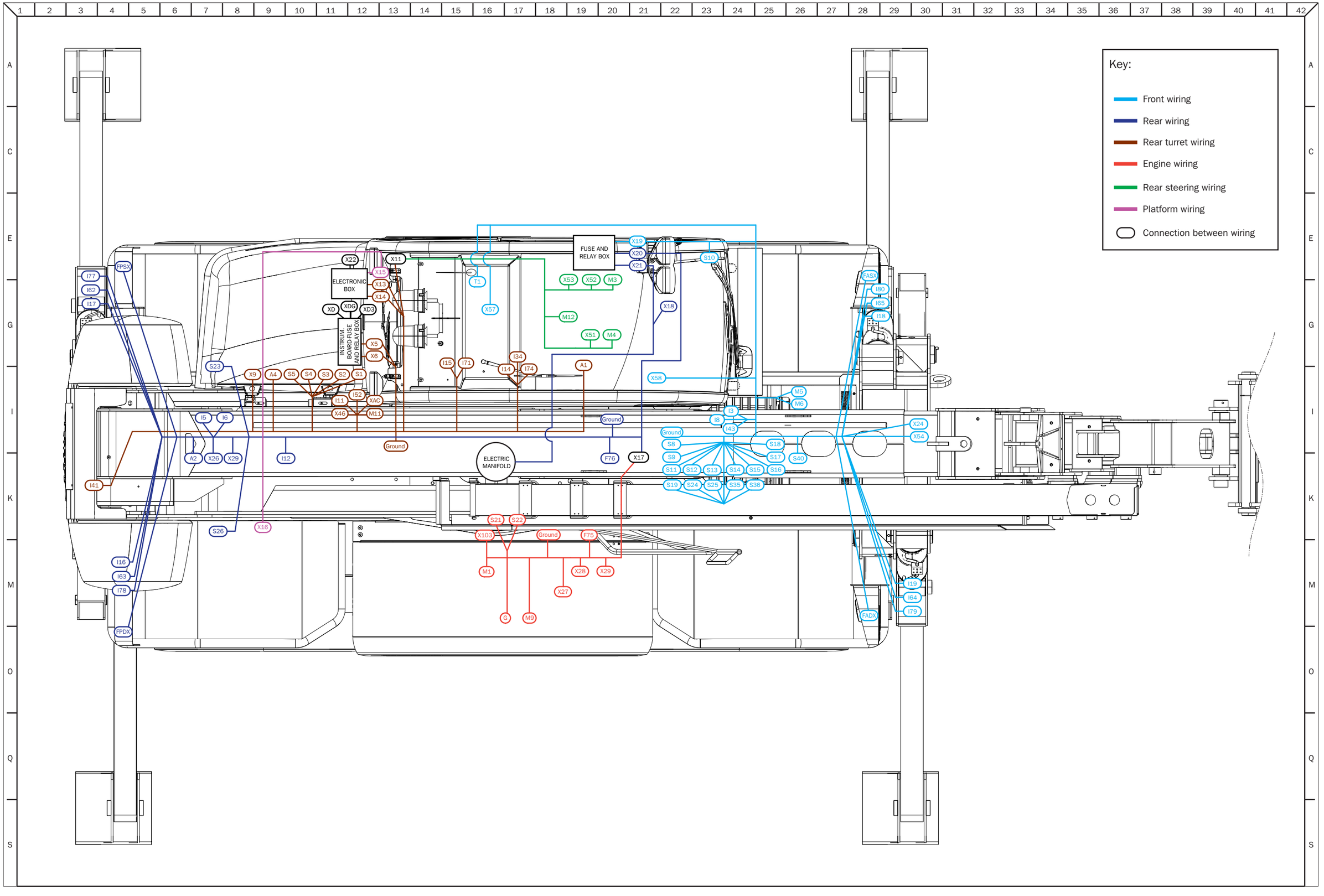
Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Cab	X38	Car radio power supply connector		I30	
Cab	X39	Car radio boxes connector		I31 / I32	
Cab	X40	Large mixing bucket connector		O35	Option
Cab	X41	Microswitch behind right jib		O35	Option
Cab	X42	Heating diagnostics connector		O36	
Cab	X43	System isolating connectors		Q37	Option
Cab	X44-X45	Check warning lights		O34 / O35	
Rear turret / Cabin	X46	Provisional power supply connector	I11	I29	
Cab	X47	Provision for air heating		O37	
Cab	X48	Provision for air heating		O37	
Driving position	X51	System isolating connectors	G19		
Driving position	X52	Rotation potentiometer kit	E19		
Driving position	X53	System isolating connectors	E19		
Front	X54	Hydraulic braking 2nd connector	I30		Option
Cab	X55	Stabiliser calliper configuration connector		O36	Option
Front	X57	Hydraulic oil temperature light	G16		
Front	X58	Optional connector kit for locking stabilisers	I21		Option
Cab	X75	Provision for heating timer		Q35	Option
Cab	X76	Connector provided for air conditioning		Q35	Option
Cab	X96	Connector for I18047		Q38	
Cab	X97	Sauer Danfoss setting blocks		Q37	
Cab	X99	Bus ring closure J1939		O38	
Cab	X100	Bus ring closure J1939		Q39	
Cab	X101	Provision for air conditioning power supply		Q35	Option
Cab	X102	Electronic brake pedal		O35	
Engine / Cab	X103	Intercooler fans oil filter pressure switch	K16	O38	
Cab	XA	MC024-021 Danfoss control unit connectors/A1		Q36	
Rear turret	XAC	Provision for air conditioning connector	I12		
Cab	XAS	Cigarette lighter		C25	
Cab	XB	MC024-021 Danfoss control unit connectors /B1		Q37	
	XD	System isolating connectors	G11		
	XD3	System isolating connectors	G12		
	XDG	Main diagnostics connector	G12		
Cab	XM1	System isolating connectors		O39	
Cab	XM2	System isolating connectors		O39	
Cab	XM3	System isolating connectors		O39	
Cab	XM4	System isolating connectors		O39	
Cab	XPA	Electronic accelerator pedal		G17	

GROUNDS UP TO TRUCK 22725 - 758856

Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Front	Ground	Ground	I22		
Rear	Ground	Chassis ground	I20		
Rear turret	Ground	Chassis ground	I13		
Engine	Ground	Engine ground	K18		
Cab	Ground	Instrument panel ground		Q36	

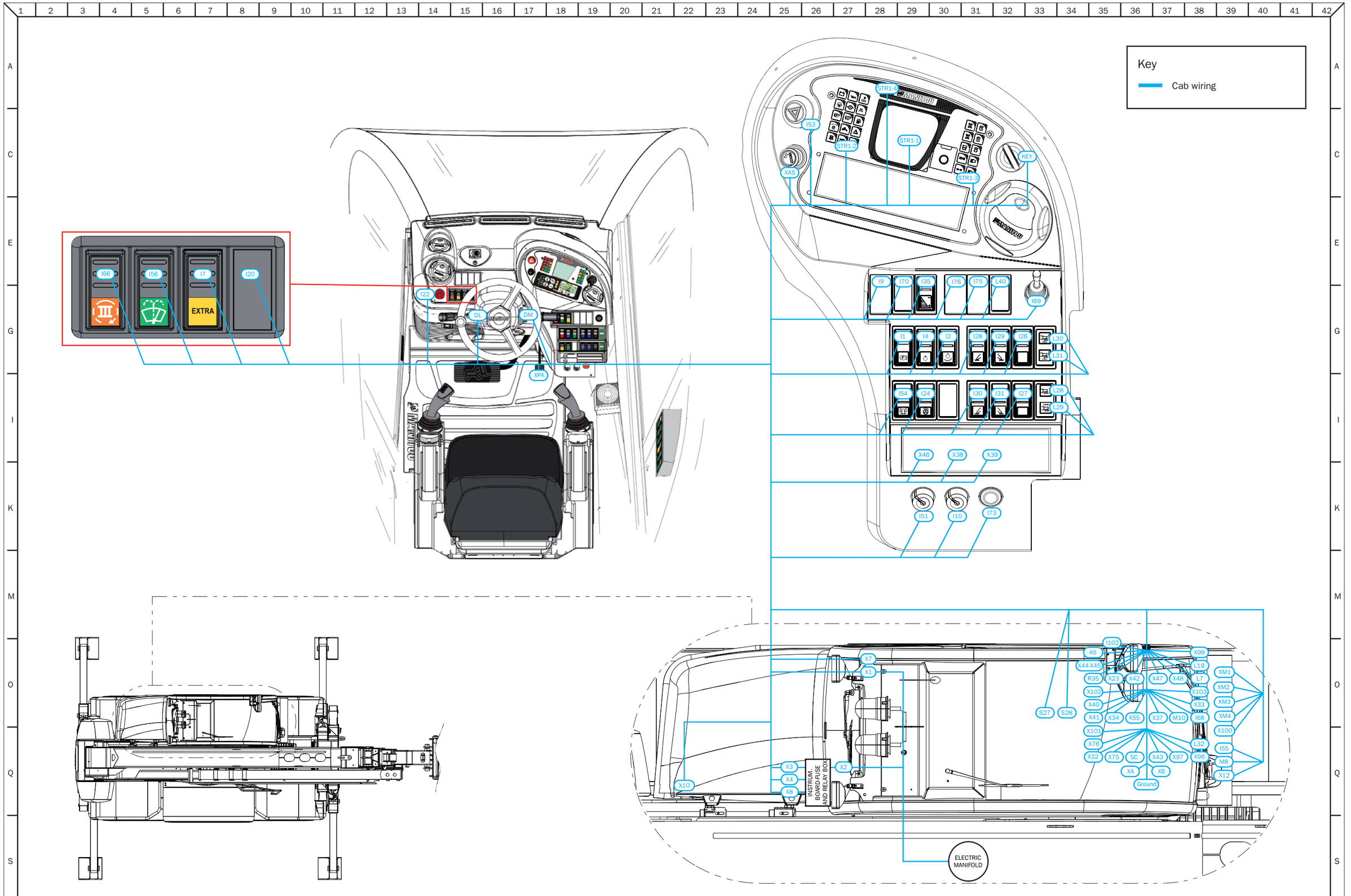
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DIAGRAM 1 UP TO TRUCK 22725 - 758856



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DIAGRAM 2 UP TO TRUCK 22725 - 758856



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CONNECTORS FROM TRUCK 22756 - 758886

Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Rear turret	A1	Acoustic warning	G19		
Rear	A2	Reverse gear horn	K7		
Rear turret	A4	Anti overturning alarm buzzer	I9		
Cab	A5	Emergency pump buzzer		O35	
Cab	DL	Headlamp dipping		G15	
Cab	DM	Gear change		G17	
Engine	F75	Main fuse	K19		
Rear	F76	Emergency pump remote switch fuse	K20		
Front	FADX	Front right lamp	M28		
Front	FASX	Front left lamp	E28		
Rear	FPDX	Front right lamp	O4		
Rear	FPSX	Rear left lighting	E4		
Engine	G	Alternator	M17		
Cab	I1	Parking brake switch		G29	
Cab	I2	Slow/fast switch		G30	
Front	I3	Gear change switch	I24		
Cab	I4	Gear change reset switch		G29	
Rear	I5	Stop circuit pressure switch	I7		
Rear	I6	Rear axle alignment proximity sensor	I8		
Cab	I7	Small mixing bin switch		E7	
Front	I8	Option	I23		
Cab	I9	Rear axle alignment proximity sensor		E28	
Cab	I10	Platform exclusion key		K30	
Rear turret	I11	Limited rotation proximity sensor 2	I11		
Rear	I12	Slow/fast switch	K10		
Rear turret	I14	Gear change reset switch	I17		
Rear turret	I15	Tower alignment proximity sensor	G15		
Rear	I16	Rear right beam lowered microswitch	M4		
Rear	I17	Rear left beam lowered microswitch	G3		
Front	I18	Front left beam lowered microswitch	G29		
Front	I19	Front right beam lowered microswitch	M30		
Cab	I20	Optional potentiometer enabling switch		E8	Option
Cab	I22	Emergency domed pushbutton		G14	
Cab	I24	Steering switch		I29	
Cab	I26	Stabiliser raised/lowered beam extend/retract switch		G32 / G33	
Cab	I27	Beams/stabiliser selector switch		I32 / I33	
Cab	I28	Front left beam/stabiliser switch		G31	
Cab	I29	Front right beam/stabiliser switch		G32	
Cab	I30	Rear left beam/stabiliser switch		I31	
Cab	I31	Rear right beam/stabiliser switch		I32	
Rear turret	I34	Cab centred proximity sensor 2	G17		
Cab	I35	Electric accelerator switch		E29	Option
Rear turret	I41	Maximum raising microswitch	K3		
Front	I43	Proximity sensor for speedometer	I24		Option
Cab	I51	Anti overturn exclusion key		K29	
Rear turret	I52	Limited rotation proximity sensor 2	I12		
Cab	I53	Emergency arrows switch		C26	
Cab	I54	Rotating lamp switch		I29	
Cab	I55	Stop pressure switch		Q39	
Cab	I56	Front windscreen wiper switch		E5	

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Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Rear	I62	Rear left stabiliser extended microswitch	G3		
Rear	I63	Rear right stabiliser extended microswitch	M4		
Front	I64	Front right stabiliser extended microswitch	M30		
Front	I65	Front left stabiliser extended microswitch	G29		
Cab	I66	Double/triple output switch Option		E4	
Cab	I68	Provision for heating fan switch		O38	Option
Cab	I69	Levelling switch		G33	Option
Cab	I70	Radio control connector		E29	
Rear turret	I71	Cab locked proximity sensor	G15		
Cab	I73	Engine start permission with I10 activated		K31 / K32	
Rear turret	I74	Cab centred proximity sensor 3	I17		
Cab	I75	Engine revolutions memorisation switch		E31	Option
Cab	I76	1450 switch/min switch		E30	Option
Rear	I77	Rear left stabiliser extended microswitch	E3		
Rear	I78	Rear right stabiliser extended microswitch	M4		
Front	I79	Front right stabiliser extended microswitch	M30		
Front	I80	Front left stabiliser extended microswitch	G29		
Cab	I81	Replacing translation safety system switch		I30	
Cab	I102	Danfoss electronic transmission setting authorisation		O35	Option
Cab	KEY	Starter panel		C33	
Cab	L7	Stabilisers supported indicator light		O38	Option
Cab	L19	Stabilisers partially extended indicator light		O38	Option
Cab	L28	Selected beam indicator light		I34	
Cab	L29	Selected stabilisers indicator light		I34	
Cab	L30	Beam extension/lowering stabiliser feet indicator light		G34	
Cab	L31	Beams retracted/feet raised stabiliser indicator light		G34	
Cab	L32	Provision for danger lamp		Q38	Option
Cab	L40	Danfoss control unit alarm indicator light		E32	
Engine	M1	Starter motor	M16		
Driving position	M3	Left side seat lever	E20		
Driving position	M4	Right side seat lever	G20		
Front	M5	Oil cooling fan 1	I26		
Front	M6	Oil cooling fan 2	I26		
Cab	M8	Front windscreen wiper motor		Q39	
Engine	M9	Diesel filter heater	M17		
Cab	M10	Provision for heating fan		O37	Option
Rear turret	M11	Heating pump	I12		
Driving position	M12	Pneumatic seat motor	G19		
Cab	R35	Economiser remote switch		O35	
Rear turret	S1	Danfoss lifting electrovalve	I12		
Rear turret	S2	Danfoss extension electrovalve	I11		
Rear turret	S3	Danfoss rotation electrovalve	I11		
Rear turret	S4	Danfoss traverse electrovalve	I10		
Rear turret	S5	Danfoss optional electrovalve	I10		
Front	S8	Parking brake electrovalve	I22		
Front	S9	Main stabiliser electrovalve	K22		
Front	S10	Hydraulic circuit exclusion electrovalve	E23		
Front	S11	Right front beam electrovalve	K22		
Front	S12	Front left beam electrovalve	K23		
Front	S13	Rear left beam electrovalve	K23		
Front	S14	Rear right beam electrovalve	K24		
Front	S15	Stabiliser retract/raise electrovalve	K25		

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Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Front	S16	Front right stabiliser electrovalve	K25		
Front	S17	Front left stabiliser electrovalve	K25		
Front	S18	Rear left stabiliser electrovalve	I25		
Front	S19	Rear right stabiliser electrovalve	K22		
Engine	S21	Forward electrovalve	K16		
Engine	S22	Reverse electrovalve	K17		
Rear	S23	Unlock rear axle electrovalve	G7		
Front	S24	Crab steering electrovalve	K23		
Front	S25	Concentric steering electrovalve	K23		
Rear	S26	Unlock rear axle electrovalve	K7		
Cab	S27	High speed electrovalve		O33	
Cab	S28	Low speed electrovalve		O34	
Front	S35	Levelling electrovalve 1	K24		Option
Front	S36	Levelling electrovalve 2	K25		Option
Front	S40	Engine displacement reduction	K26		
Cab	SC	System isolating connectors		Q36	Option
Cab	STR1-1	Instrument connector (STR1-1)		C29	
Cab	STR1-2	Instrument connector (STR1-2)		C27	
Cab	STR1-3	Instrument connector (STR1-3)		C31	
Cab	STR1-4	Instrument connector (STR1-4)		A28	
Front	T1	Fuel float	G16		
Cab	X1	System isolating connectors		O28	
Cab	X2	System isolating connectors		Q27	
Cab	X3	System isolating connectors		Q25	
Cab	X4	System isolating connectors		Q25	
Rear turret	X5	System isolating connectors	G12		
Rear turret	X6	System isolating connectors	G12		
Cab	X7	System isolating connectors		O28	
Cab	X8	System isolating connectors		Q25	
Rear turret	X9	Anti overturn circuit	I8/I9		
Cab	X10	System isolating connectors		Q22	Option
Driving position / Rear turret	X11	System isolating connectors	E13		
Cab	X12	Heating		Q39	
Rear turret	X13	System isolating connectors	G13		
Rear turret	X14	System isolating connectors	G13		
Platform	X15	System isolating connectors	E13		
Platform	X16	System isolating connectors	K9		
Engine / Rear	X17	System isolating connectors	K21		
Rear	X18	System isolating connectors	G22		
Front	X19	System isolating connectors	E21		
Rear	X20	System isolating connectors	E21		
Rear	X21	System isolating connectors	E21		
	X22	System isolating connectors	E12		
Cab	X23	Connector provided for indicator lights		O35	Option
Front	X24	Provisional power supply	I30		Option
Rear	X26	Trailer lights connector	K7		
Engine	X27	System isolating connectors	M18		
Engine	X28	Connector provision for preheating relay	M19		
Engine / Rear	X29	Connector provided for preheating	M20 / K8		
Cab	X32	Thermostat		Q35	
Cab	X33	Ambient thermostat		O38	
Cab	X34	System isolating connectors		O35	Option

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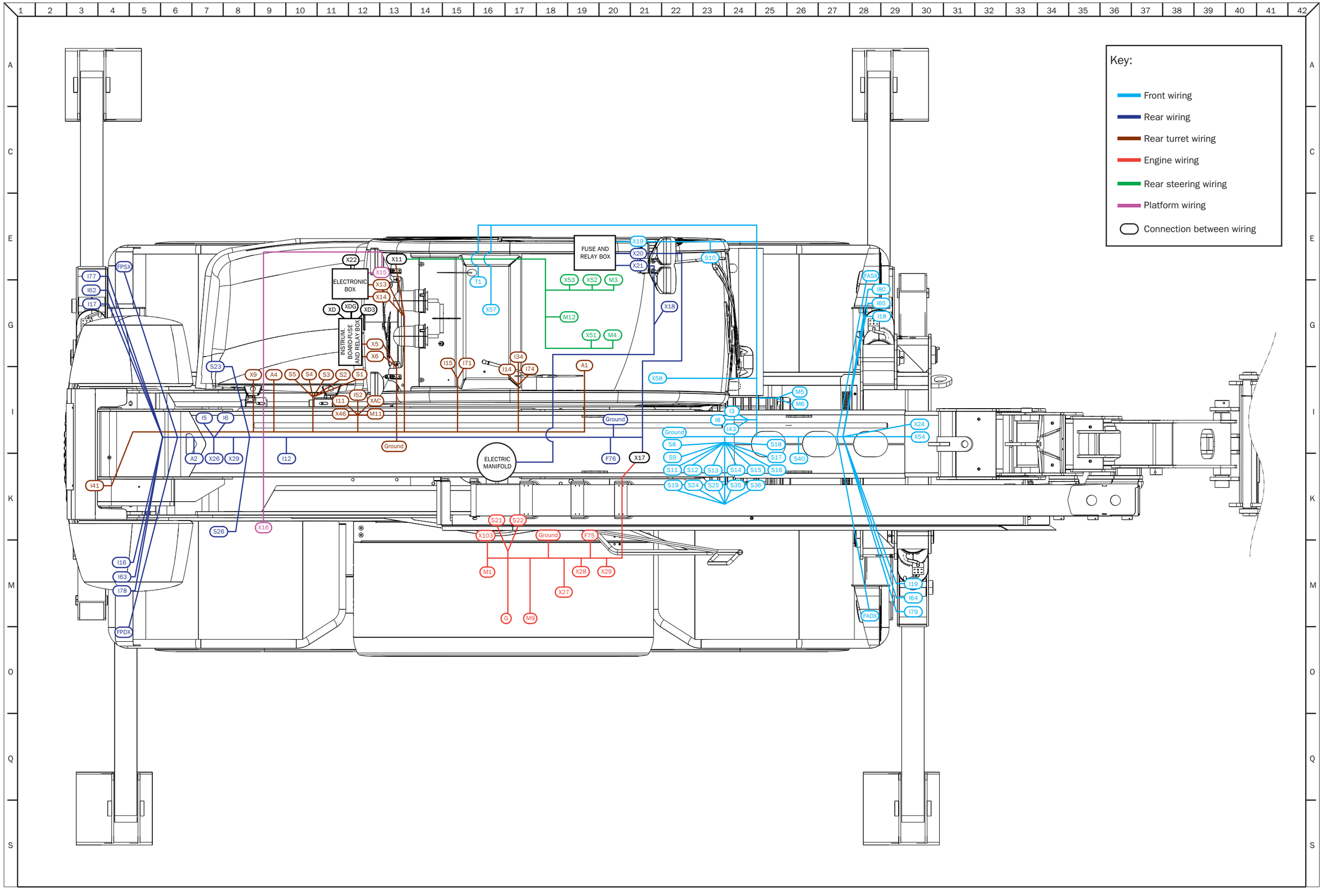
Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Cab	X37	Antitheft connector		O37	
Cab	X38	Car radio power supply connector		I30	
Cab	X39	Car radio boxes connector		I31 / I32	
Cab	X40	Large mixing bucket connector		O35	Option
Cab	X41	Microswitch behind right jib		O35	Option
Cab	X42	Heating diagnostics connector		O36	
Cab	X43	System isolating connectors		Q37	Option
Cab	X44-X45	Check warning lights		O34 / O35	
Rear turret	X46	Provisional power supply connector	I11		
Cab	X47	Provision for air heating		O37	
Cab	X48	Provision for air heating		O37	
Driving position	X51	System isolating connectors	G19		
Driving position	X52	Rotation potentiometer kit	E19		
Driving position	X53	System isolating connectors	E19		
Front	X54	Hydraulic braking 2nd connector	I30		Option
Cab	X55	Stabiliser calliper configuration connector		O36	Option
Front	X57	Hydraulic oil temperature light	G16		
Front	X58	Optional connector kit for locking stabilisers	I21		Option
Cab	X76	Connector provided for air conditioning		Q35	Option
Cab	X96	Connector for I18047		Q38	
Cab	X97	Sauer Danfoss setting blocks		Q37	
Cab	X99	Bus ring closure J1939		O38	
Cab	X100	Bus ring closure J1939		Q39	
Cab	X101	Provision for air conditioning power supply		Q35	Option
Cab	X102	Electronic brake pedal		O35	
Engine / Cab	X103	Intercooler fans oil filter pressure switch	K16	O38	
Cab	X107	Provision for heating timer		Q35	Option
Cab	X108	System isolating connectors		Q38	
Cab	XA	MC024-021 Danfoss control unit connectors/A1		Q36	
Rear turret	XAC	Provision for air conditioning connector	I12		
Cab	XAS	Cigarette lighter		C25	
Cab	XB	MC024-021 Danfoss control unit connectors/B1		Q37	
Cab	XCD	Provisional power supply connector		I29	
	XD	System isolating connectors	G11		
	XD3	System isolating connectors	G12		
	XDG	Main diagnostics connector	G12		
Cab	XM1	System isolating connectors		O39	
Cab	XM2	System isolating connectors		O39	
Cab	XM3	System isolating connectors		O39	
Cab	XM4	System isolating connectors		O39	
Cab	XPA	Electronic accelerator pedal		G17	

GROUNDS FROM TRUCK 22756 - 758886

Type of wiring	Ref	Description	Position on the diagrams		Comments
			Diagram 1	Diagram 2	
Front	Ground	Ground	I22		
Rear	Ground	Chassis ground	I20		
Rear turret	Ground	Chassis ground	I13		
Engine	Ground	Engine ground	K18		
Cab	Ground	Instrument panel ground		Q36	

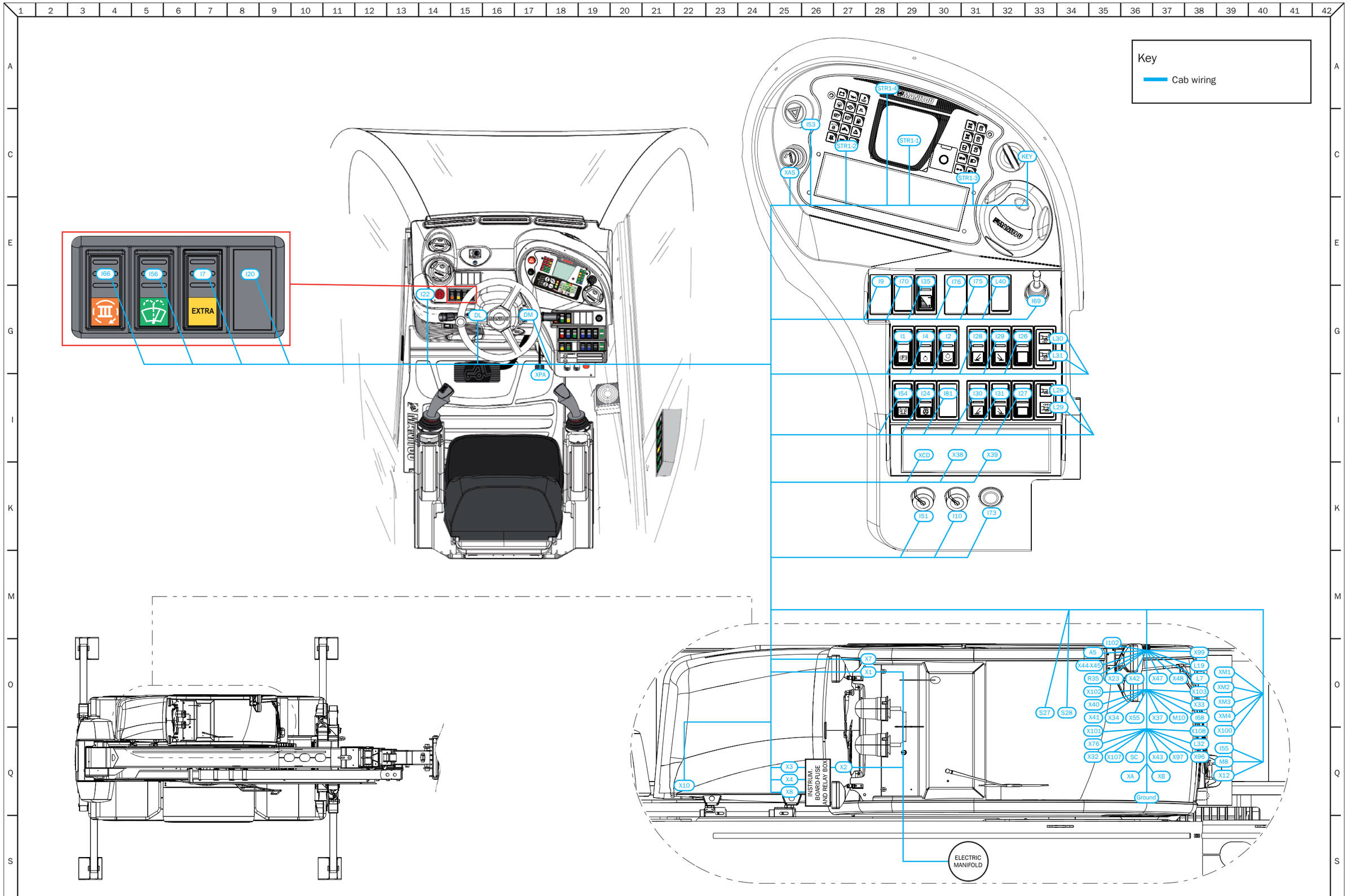
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DIAGRAM 1 FROM TRUCK 22756 - 758886



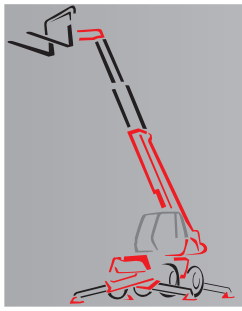
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DIAGRAM 2 FROM TRUCK 22756 - 758886



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ELECTRICAL CONTROL AND ADJUSTMENT

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PRINCIPLE OF OPERATION

MANAGEMENT OF OPERATING CONDITIONS

Pressure sensor



Angle and extension sensor



Truck information

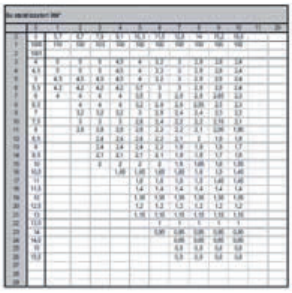
Stabiliser information

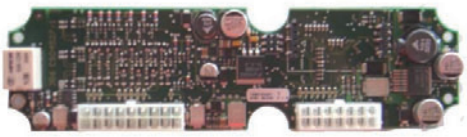
Turret position information

Overhead platform information

⇩

Comparison between the values measured on the truck and the load tables saved in the SLIM memory





⇩

Reading of the load conditions on the truck



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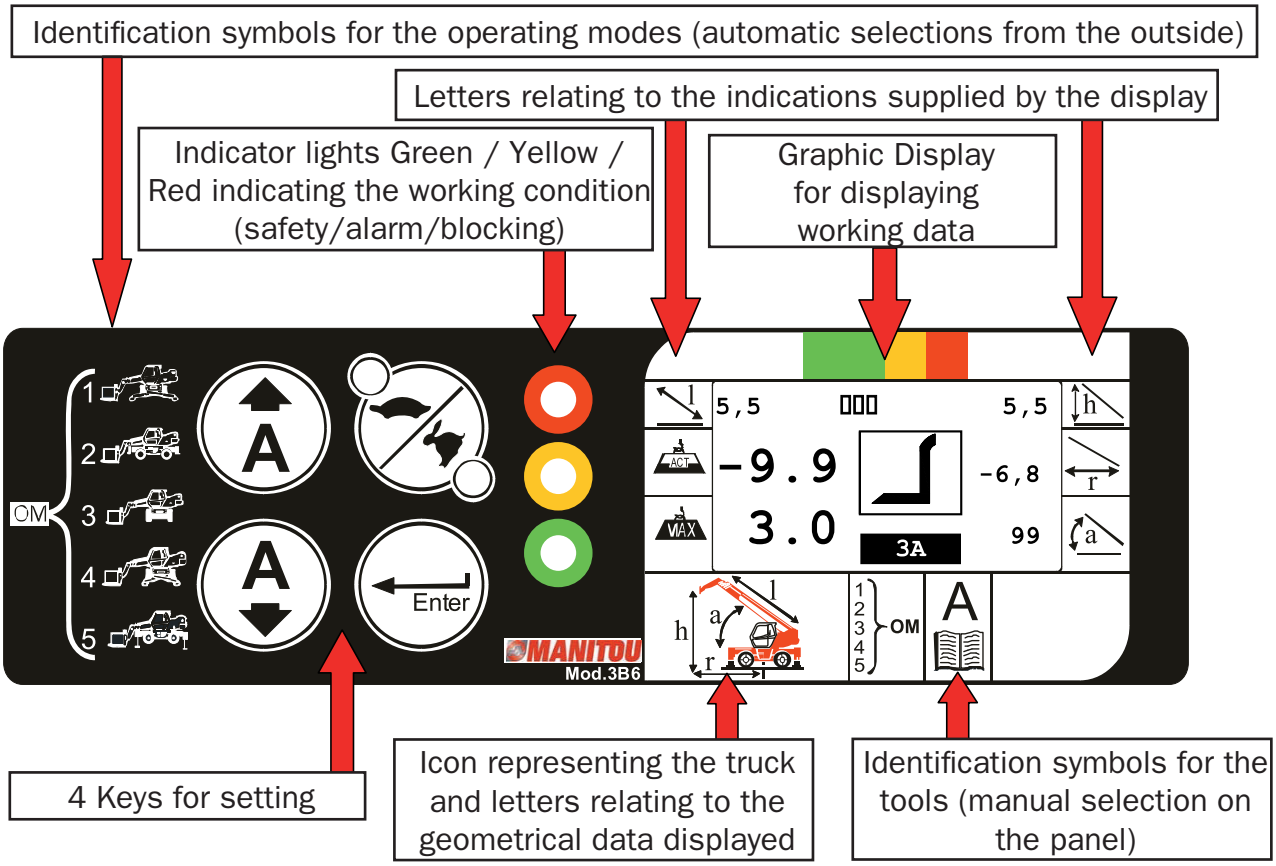
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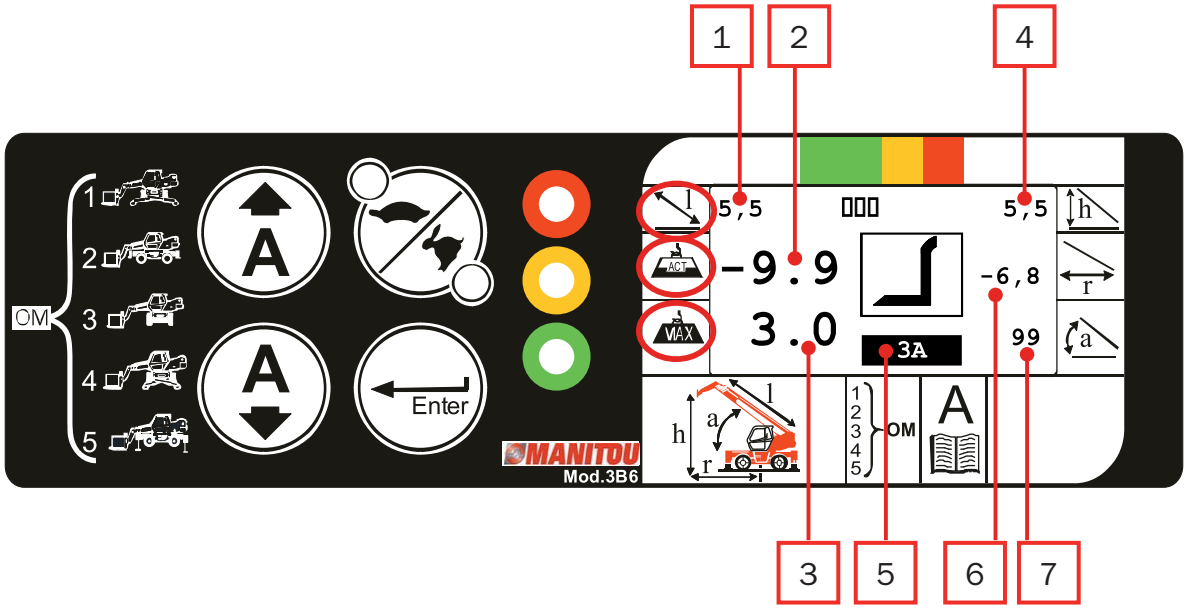
POSITIONING THE SENSORS ON THE TRUCK



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DESCRIPTION OF THE CONTROL PANEL





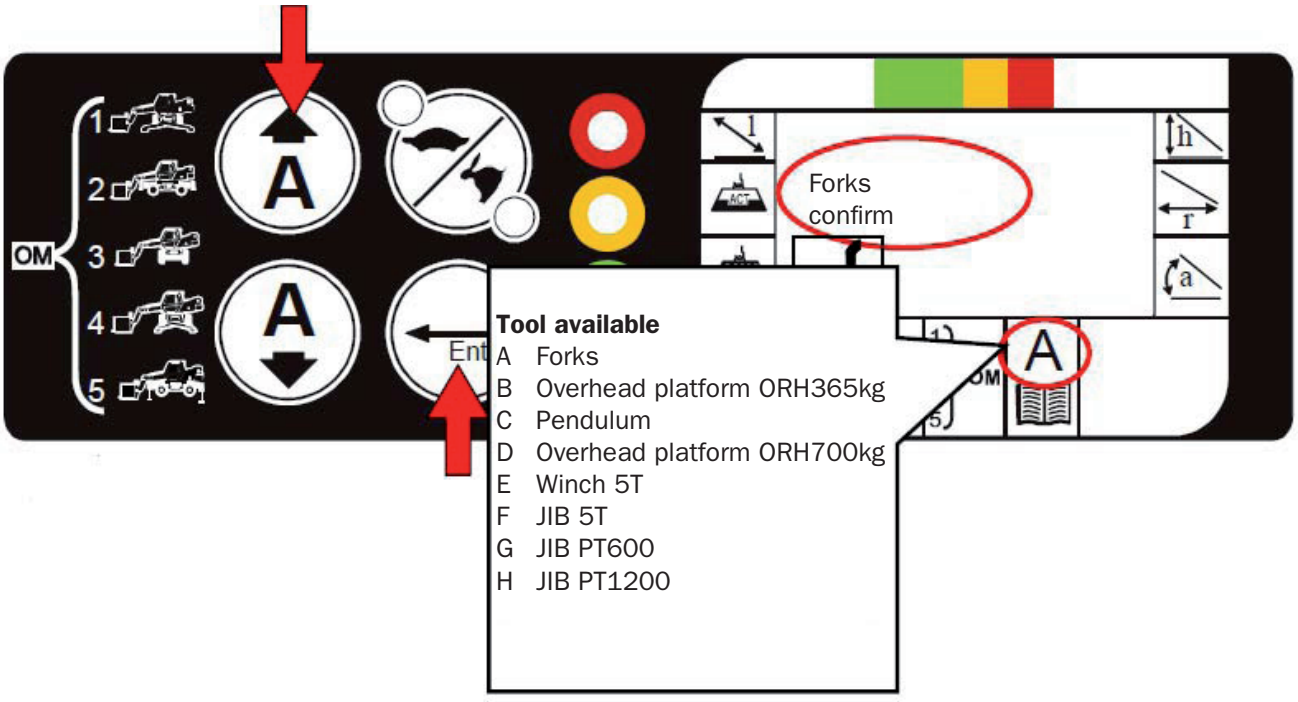
1	Jib length
2	Actual weight on the forks
3	Maximum permissible weight in the present position of the truck
4	Distance between the ground and load centre
5	Loading table selected according to the truck position and the chosen accessory
6	Distance between the centre of the truck and the mean point of the load
7	Jib angle

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PROCEDURE FOR REPLACING AN ACCESSORY

The choice of a loading table suitable for the accessory selected is the responsibility of the driver.

1) On the truck stability information display, press the up arrow key several times to select the loading table according to the list avaiable.



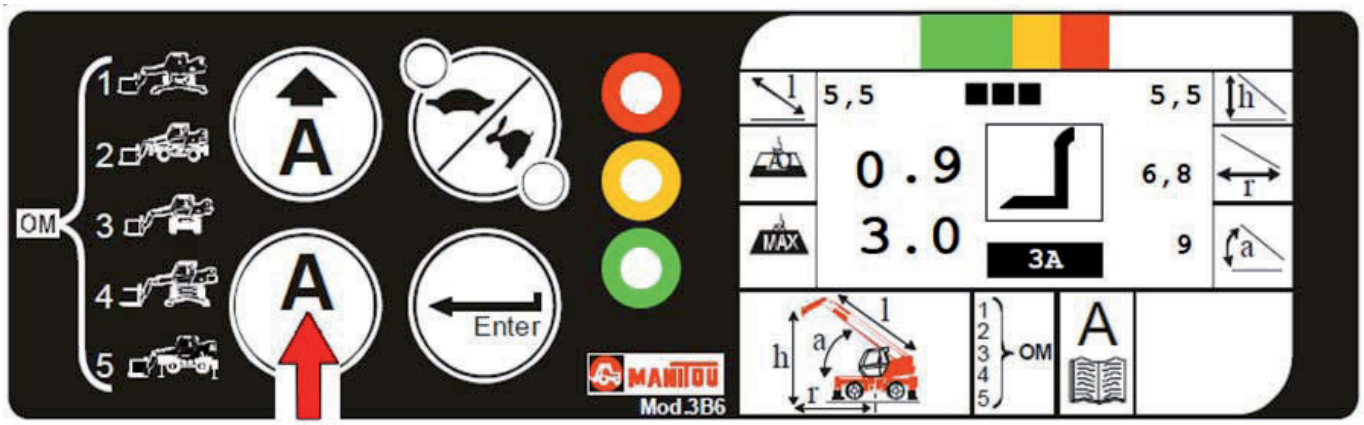
2) Press the key  to confirm the choice.

If an overhead platform is attached to the truck, without having selected the relevant loading table, the display will indicate "WARNING 4". There are various types of overhead platform.

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PROCEDURE FOR ADJUSTING THE BRIGHTNESS OF THE DISPLAY



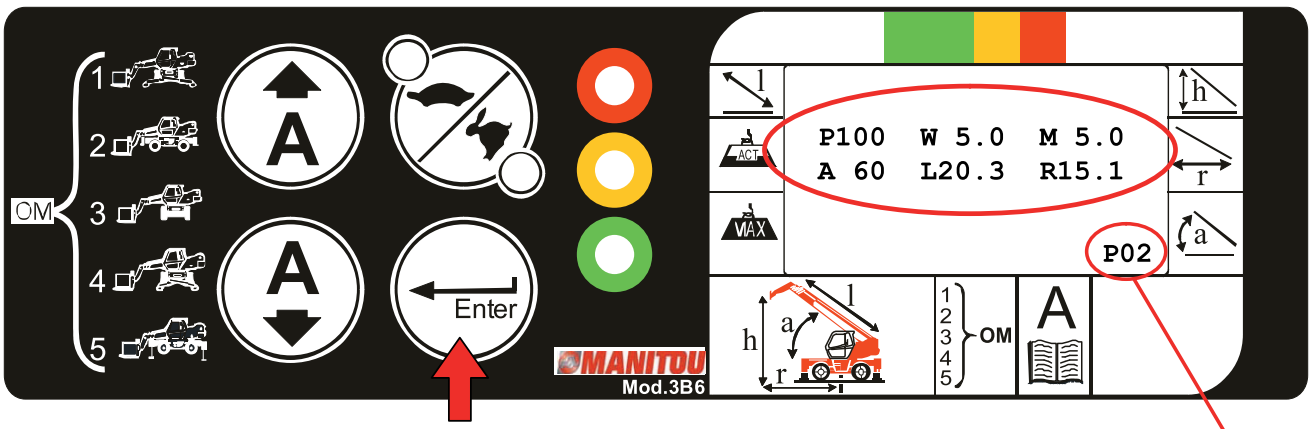
1) Press the down arrow key
2) The contrast is changed automatically; then press the key  to confirm the level of contrast chosen

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PAGES OF THE DIAGNOSIS SYSTEM

The pages of the diagnosis system make it possible to define problems in the 3B6 system.
To access these pages, press the key (Enter) several times.

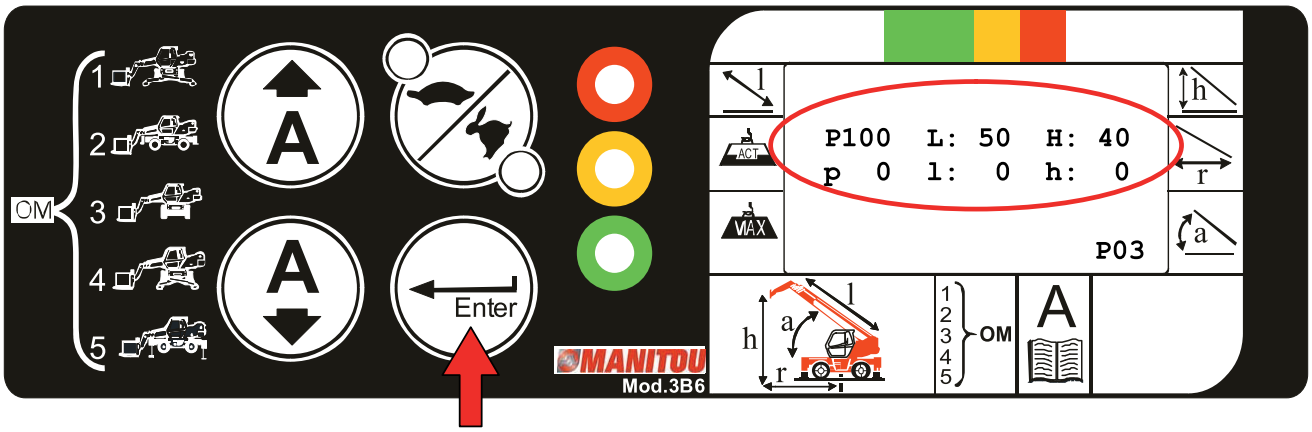
SYSTEM DIAGNOSIS PAGE 2



Number of pages

- P: Differential pressure between the upper and lower chambers of the main cylinder expressed in bar
- W: Weight lifted on the forks
- M: Maximum permissible load in the present position of the truck
- A: Jib Angle
- L: Jib Length
- R: Distance between the centre of the turret and the centre of the load (50 cm from the base of the forks)

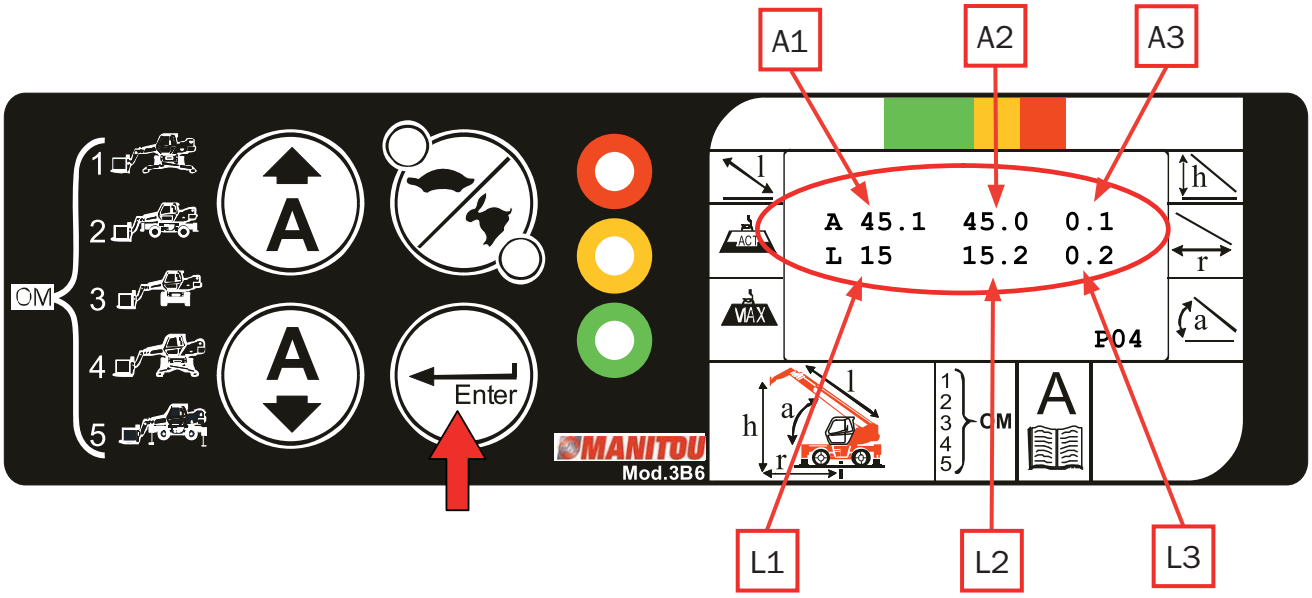
SYSTEM DIAGNOSIS PAGE 3



- P: Differential pressure between the upper and lower chambers of the lifting cylinder
- L: Pressure in the lifting cylinder chamber on the piston side
- H: Pressure in the lifting cylinder chamber on the rod side
- p: Differential pressure between the upper and lower chambers of the compensating cylinder
- l: Pressure in the chamber of the compensating cylinder on the piston side
- h: Pressure in the chamber of the compensating cylinder on the rod side

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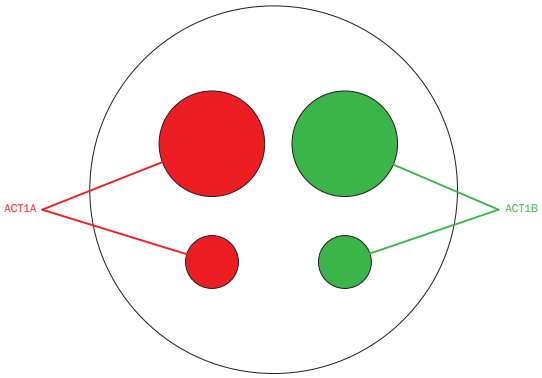
SYSTEM DIAGNOSIS PAGE 4



- A1: Angle sensor information ASA 1A
- A2: Angle sensor information ASA 1B
- A3: Difference between angles ASA 1A and ASA 1B Max 0,5°
- L1: ASA 1A extended sensor information
- L2: ASA 1b extended sensor information
- L3: Difference between extension ASA 1A and ASA 1B Max 50 cm

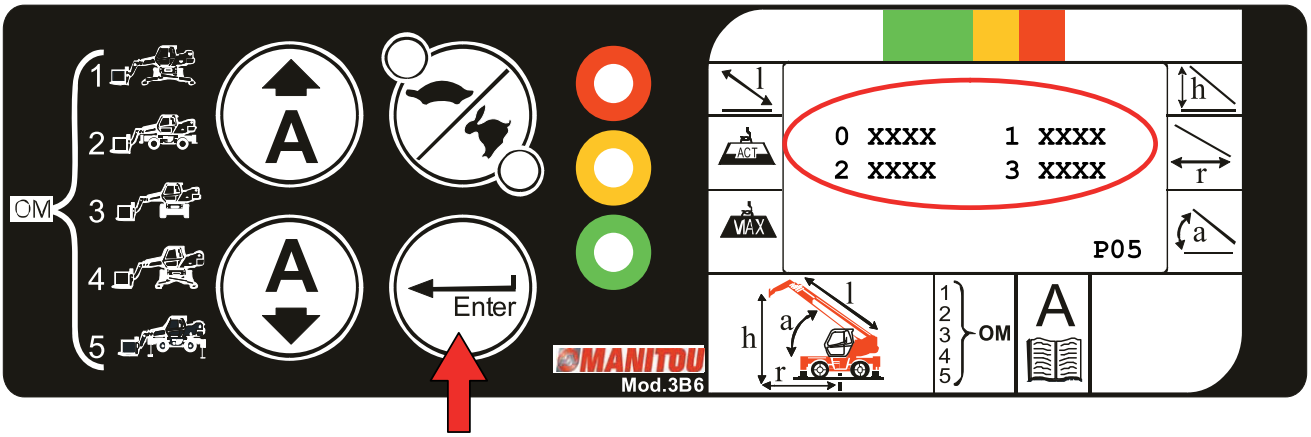
Extension and angle sensor information referred to the truck

MRT 1850			*MRT 2150*			*MRT 2540*	
L min.	5,5		L min.	6,2		L min.	7,2
L max.	16,4		L max.	19,4		L max.	23,3
A min.	-2,8		A min.	-1,9		A min.	-3
A max.	79,7		A max.	78		A max.	80



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SYSTEM DIAGNOSIS PAGE 5

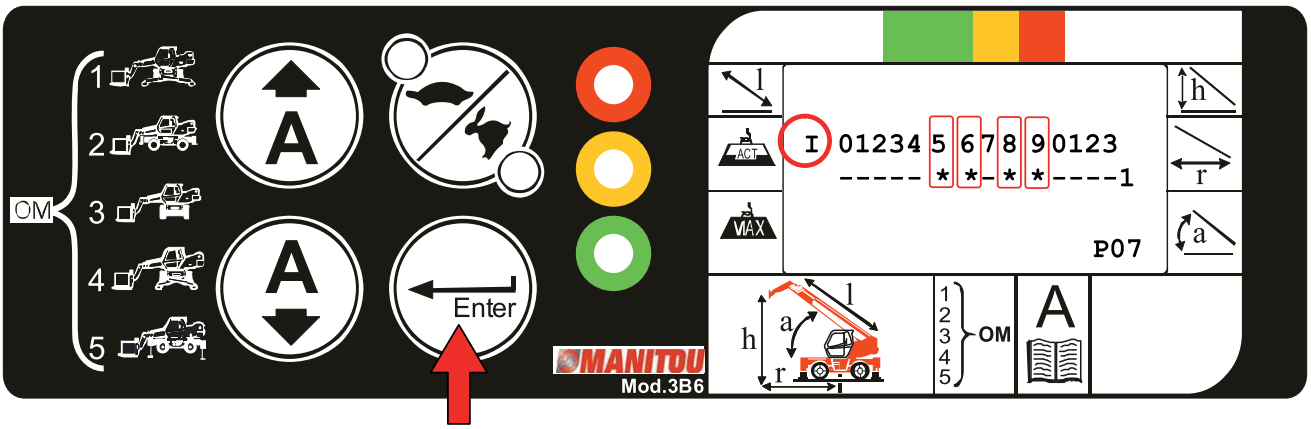


Information expressed in bits (Not used)

SYSTEM DIAGNOSIS PAGE 6

Information expressed in bits (Not used)

SYSTEM DIAGNOSIS PAGE 7

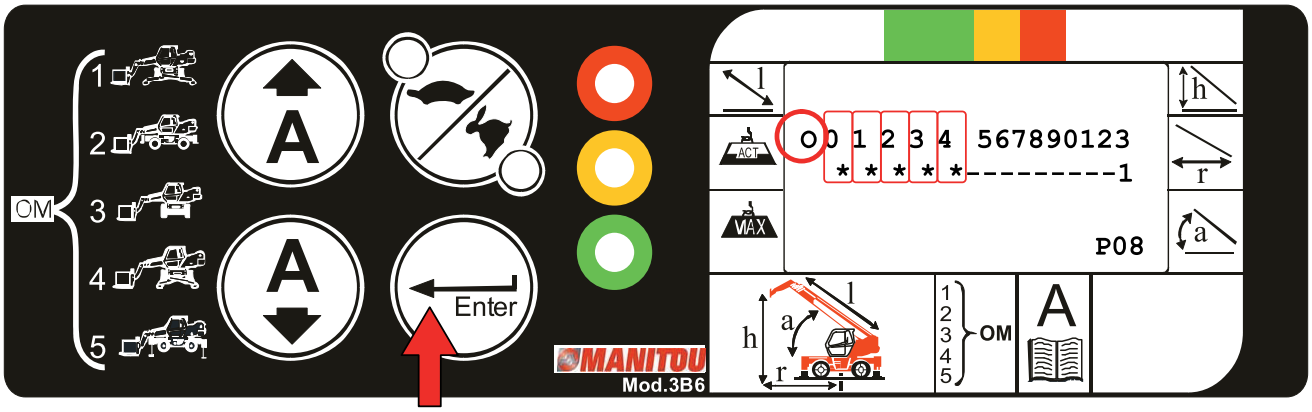


Information in input from the various sensors (* = 12v)

- INP 5: Stabiliser extended information
- INP 6: Front turret information
- INP 8: Stabilisers in support information
- INP 9: Information on presence of overhead platform

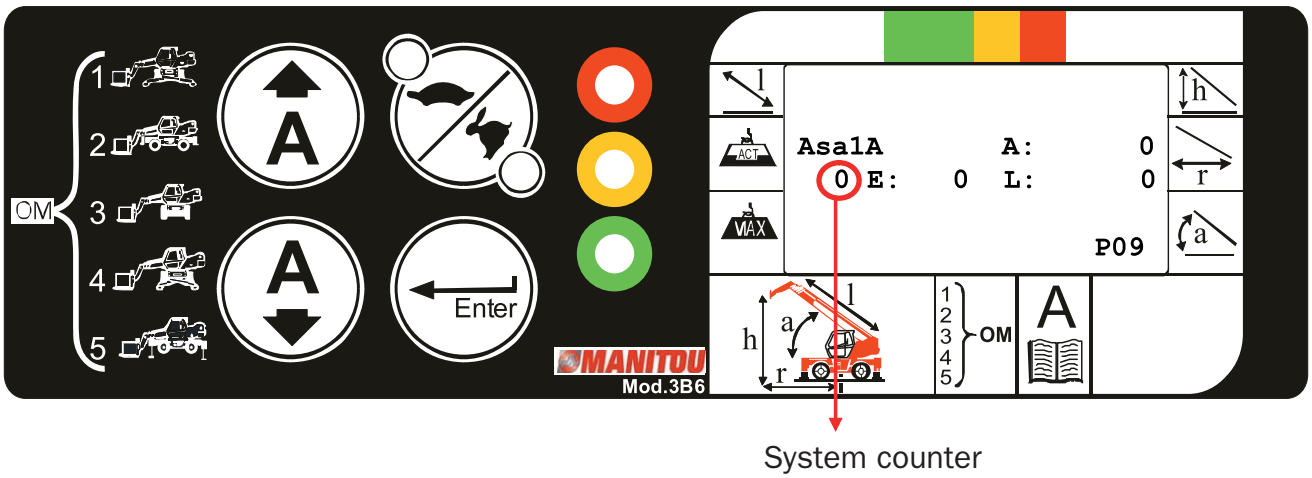
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SYSTEM DIAGNOSIS PAGE 8



Output information (* = 12v)
- OUT 0: Locking information
- OUT 1: Lower jib at 3m
- OUT 3: Jib retracted
- OUT 4: Information to reduce the speed of movement (hair/tortoise)

SYSTEM DIAGNOSIS PAGE 9

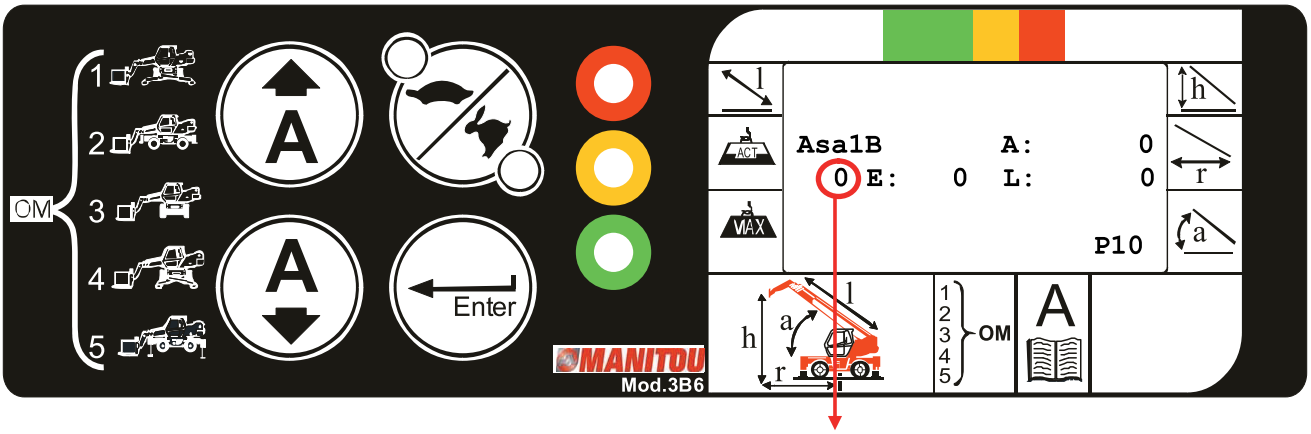


System counter

System counter: This number changes continuously since it indicates whether the communication between the winder and the display is operating correctly.
- A: Information in bits from the angle sensor ASA 1A (about 1800 bits with jib at 0°)
- L: Information in bits from the extension sensor ASA 1A (about 50 bits with the jib retracted)

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SYSTEM DIAGNOSIS PAGE 10



System counter: This number changes continuously since it indicates whether the communication between the winder and the display is operating correctly.

- A: Information in bits from the ASA 1B extension sensor (about 1800 bits with jib at 0°)
- L: Information in bits from the ASA 1B extension sensor (about 973 bits with the jib retracted)

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LIST OF ALARM CODES

Alarm codes	*Description*	*Operations to be carried out*
1	Memory data not consistent	Switch off and restart Ensure that the eprom is correctly seated in its socket If the alarm persists, replace the Slim
2	ASA 1A Angle sensor reading less than the minimum value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
3	ASA 1A Angle sensor reading greater than the maximum value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
4	ASA 1A extension sensor reading less than the minimum value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
5	ASA 1A extension sensor reading greater than the maximum value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
6	Value of the ASA 1A sensor less than the calibration value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
7	Value of extension sensor ASA 1B less than the calibration value	Check on the page 4 of the diagnosis system that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
8	Reading of the pressure sensor in the lifting cylinder (piston side) below the minimum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals
9	Reading of the pressure sensor in the lifting cylinder (piston side) above the maximum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals
10	Reading of the pressure sensor in the lifting cylinder (rod side) below the minimum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals
11	Reading of the pressure sensor in the lifting cylinder (rod side) greater than the maximum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals
12	Internal error code ASA 1A CAN-BUS	Check that the sensor is connected correctly to the card Check that the wiring of the 3B6 system is in good condition
13	Internal error code ASA 1B CAN-BUS	Check that the sensor is connected correctly to the card Check that the wiring of the 3B6 system is in good condition
14	Uncontrolled output blockage with telescopic element at rest	Extend the telescopic element then check on page 8 that the output is no longer active. Check the condition of the wiring between output 3 (J5-4) and the electronics card (JP1-5)
15	Uncontrolled blocked output of telescopic section less than 3m	Fully raise the jib then check on page 8 that output 4 is no longer active. Check the condition of the wiring between output 4 (J5-10) and the electronics card (JP1-1)

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Alarm codes	Description	Operations to be carried out
16	Uncontrolled blocked output Key Info CEC (load limiter)	Retract and fully lower the telescopic element, remove the load from the jib so that it is no longer overloaded. Check the condition of the wiring between output 16 (J5-12) and the electronics card (JP1-17)
17	Uncontrolled blocked output of overhead platform	Not used
18	Reading of the pressure sensor in the compensating cylinder (piston side) less than the minimum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals J5-14
19	Reading of the pressure sensor in the compensating cylinder (piston side) greater than the maximum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check the sensor signals J5-14
20	Reading of the pressure sensor in the compensating cylinder (rod side) less than the minimum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check sensor signals J5-6
21	Reading of the pressure sensor in the compensating cylinder (rod side) greater than the maximum	Check on system diagnostic page 3 that the values are not marked “EE” Check the wiring of the 3B6 system Check sensor signals J5-6
22	Uncontrolled blocked output Relay alarms WDO	Check the battery voltage Switch off and restart
23	Not used	
24	Uncontrolled blocked output Extension of telescopic element	
25	Uncontrolled blocked output Retraction the telescopic element	
26	Uncontrolled blocked output Lowering the jib	
27	Uncontrolled blocked output Raising the Jib	
28	Communication error CAN BUS ASA 1A	Check on page 9 of the system diagnostics that the bus system contactor advances constantly Check CAN-BUS wiring
29	Communication error CAN BUS ASA 1B	Check on page 9 of the system diagnostics that the bus system contactor advances constantly Check CAN-BUS wiring
30	Stabiliser extended end of stroke congruence alarm	Check the inputs, card connections and sensors
31	Stabiliser extended mid stroke congruence alarm	Check the inputs, card connections and sensors
32	Angle congruence alarm	Check the values ASA 1A and ASA 1B on page 4 of the system diagnostic Calibrate the cable winder
33	Extension congruence alarm	Check the values ASA 1A and ASA 1B on page 4 of the system diagnostic Calibrate the cable winder
34	Angle sensor reading ASA 1B less than minimum value	Check on page 4 of the system diagnostic that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
35	Angle sensor reading ASA 1B greater than maximum value	Check on page 4 of the system diagnostic that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
36	Extension sensor reading less than minimum value	Check on page 4 of the system diagnostic that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system

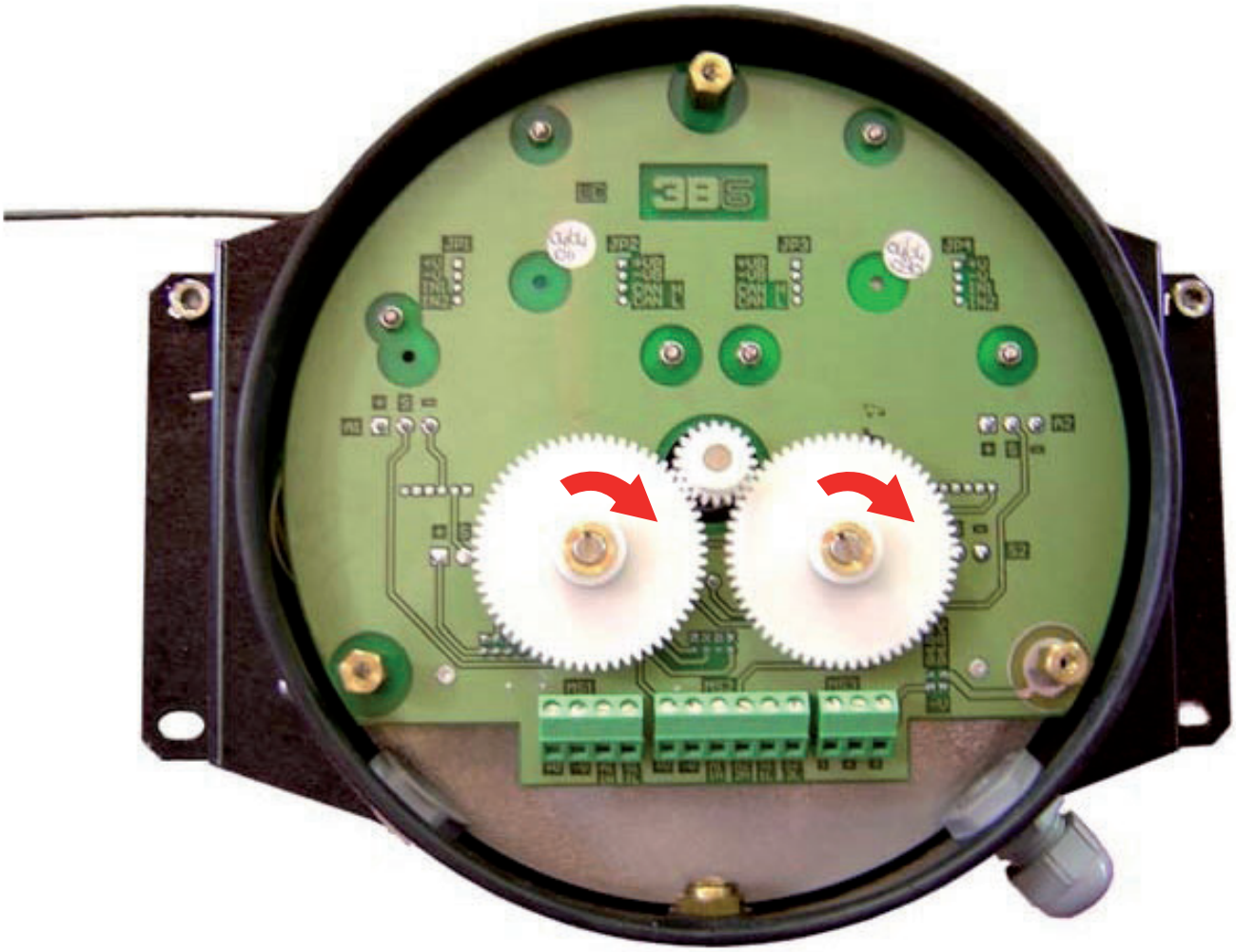
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Alarm codes	Description	Operations to be carried out
37	Extension sensor reading greater than maximum value	Check on page 4 of the system diagnostic that the values are not marked “EE” Check the CAN BUS connection Check correct operation of the sensor Calibrate the system
38	Frontal stroke congruence alarm	Check the inputs, card connections and sensors
39	Not used	
40	Not used	
41	CRC Error on EPROM	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
42	CRC Error on EPROM	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
43	CRC Error on EPROM	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
44	CRC Error on EPROM	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
45	Not used	
46	Not used	
47	Not used	
48	Not used	
49	Not used	
50	Error in memory area	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
51	Error in memory area	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
52	Error in memory area	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim
53	Error in memory area	Switch off and restart. Ensure that the Eprom is correctly seated in its socket If the alarm persists, replace the Slim

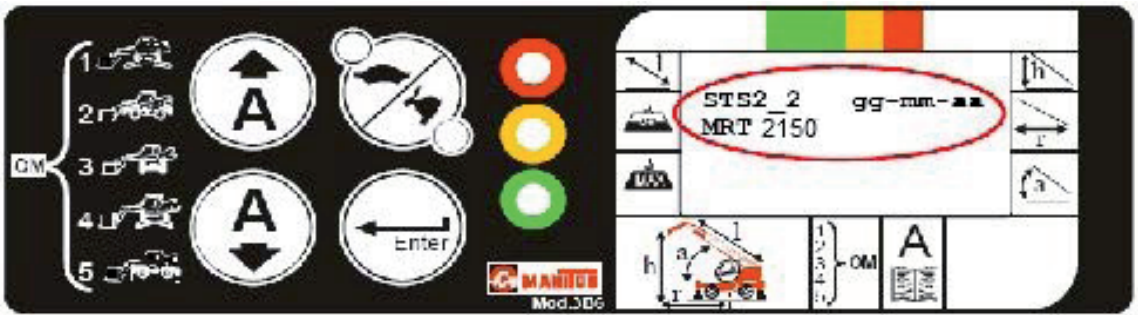
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CALIBRATING THE CABLE WINDER 3B6

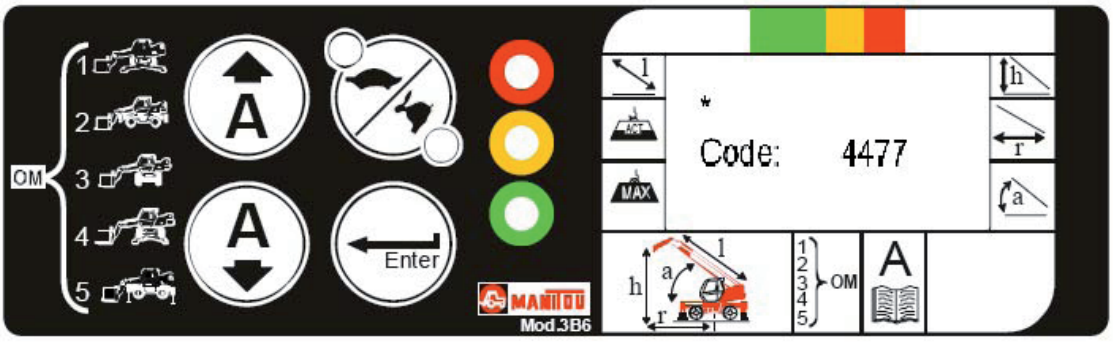
• Open the cable winder door on the front of the jib with an Allen key.
Remove the electronics card from the cable winder and turn the white potentiometer gears clockwise to the end of their stroke.



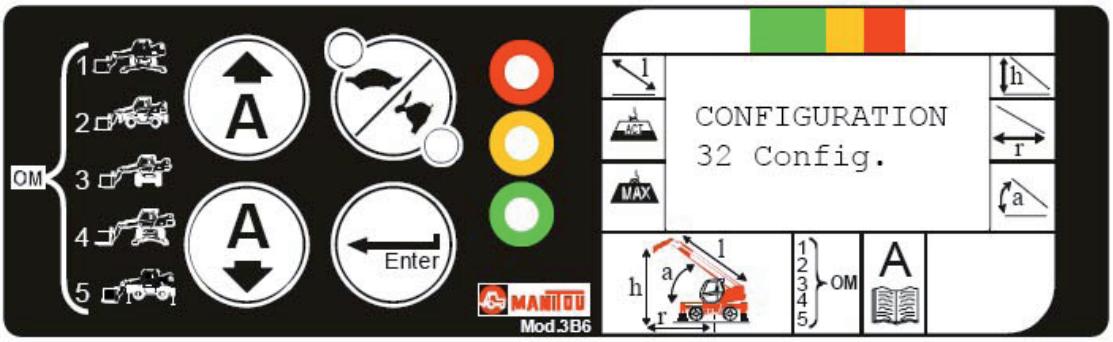
- Then turn each potentioimeter back (anticlockwise) one turn.
- Climb into the cab of the vehicle.
- Switch on.
- Support the machine on the stabilisers and in line with the chassis.



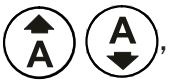
- When the image shown above appears on the display, press the key Enter

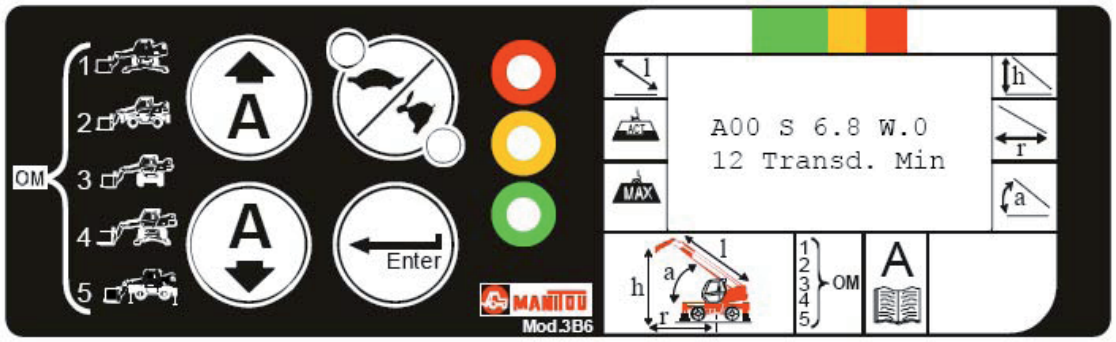


- When the image shown above appears on the display, press the key Enter
- At this point the password setting page appears, press key several times to move the asterisk placing it over the first 4, then with the arrow keys A A change the number 4 to number 2.
- Press the pushbutton again to access the second number.
- After setting the first level password (that is the type of vehicle) press key Enter and then the pushbutton

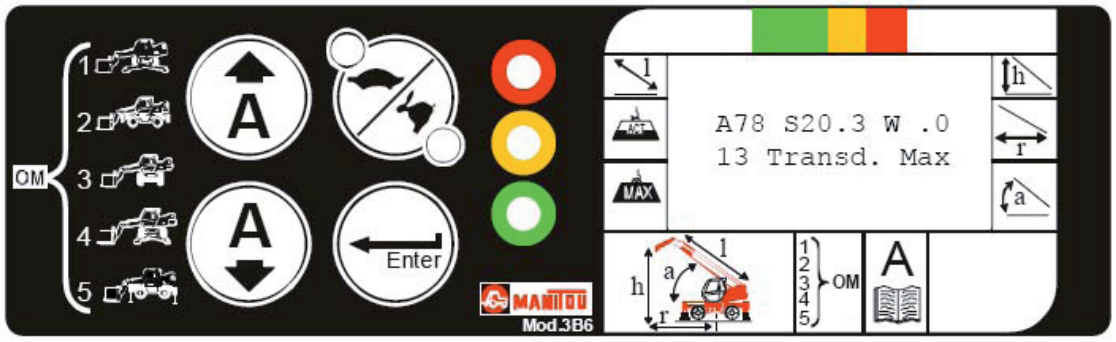


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- Using the arrows  , search menu 12 transd min.



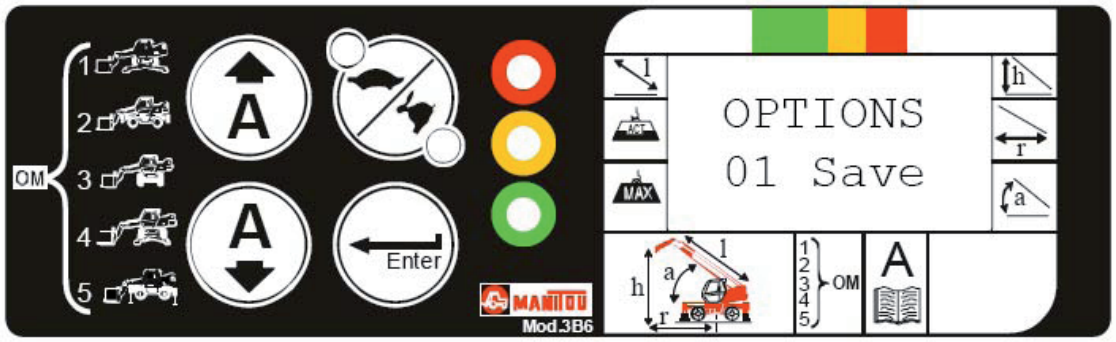
- Fully retract the telescopic element and lower the jib to the maximum then press the key 
- At this point you will have set the system minimum point.
- Now using  search menu 13 transd max.



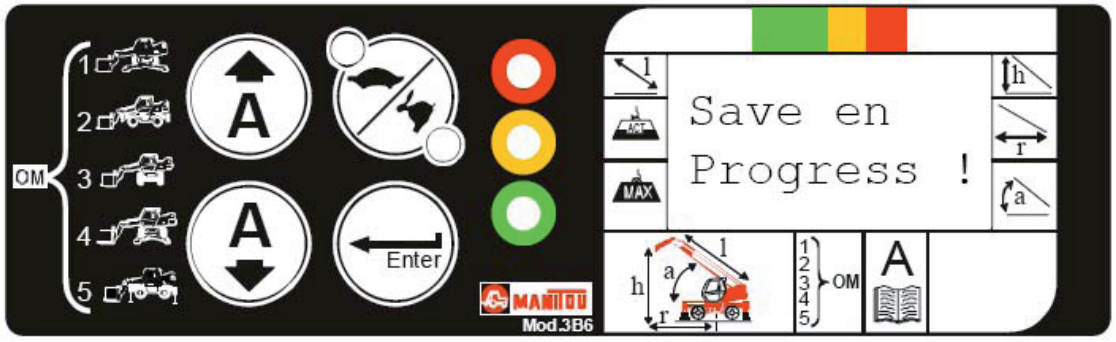
- Fully raise the jib and extend it as far as possible.
- Press the pushbutton  and then 
- At this point you will have set the system maximum point.

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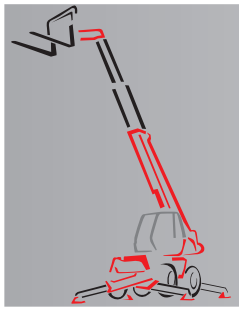
- Now with the  keys search menu 01 SAVED.



- Press the pushbutton  and wait until DONE (finished) appears on the display.



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ELECTRICAL TROUBLESHOOTING

page

SAUER TRANSMISSION 2
– SAUER TRANSMISSION FAULTS 2
– SAUER TRANSMISSION ERROR CODES 3
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– INSTRUCTIONS FOR OPERATION 4
– UNIVERSAL CONNECTION TO THE DIAGNOSTIC TESTER FOR ALL EBERSPÄCHER HEATERS VERSIONS “C”-“C COMPACT” - AIRTRONIC AND HYDRONIC. 6
– AIR HEATER FAULT CODES 7

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SAUER TRANSMISSION

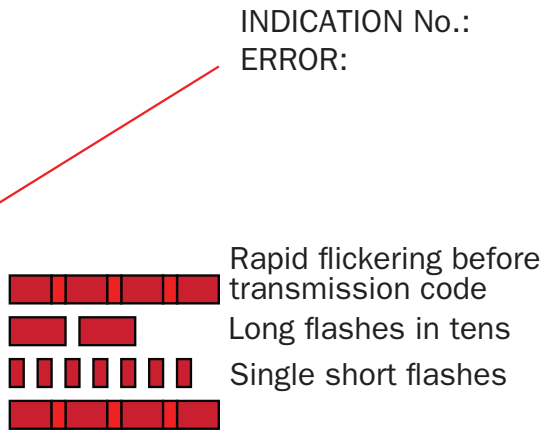
SAUER TRANSMISSION FAULTS

Problem	*Check*	*Remedy*
The pump does not come up to pressure.	Check the load pressure in M3. Check the coupling between the pump and the fuel.	Replace the filter or add oil to the tank. Replace the pump shaft or sleeve if worn.
The pump comes up to pressure but not in both directions of travel.	Check the flow in the two reducers. Check errors from the instrument panel.	If necessary, replace it. See table of errors.
The pump has no thrust force or only moves in one direction.	Check the pressure at points M1 M2 M3. Check that the changeover selector valve on the engine is not blocked on one side. Check that the pressure drop across the filter at points M5 and M6 is not greater than 2,2 bar.	Test and reverse or replace the maximum valve. Replace the valve and check that there is no interference in the seating. Replace the filter.
The truck movement is delayed in both directions of travel	Check the load pressure of the pump. Check whether the filter is clogged, making the check at points M5 M6 on the pump.	Adjust the supply valve on the pump. Replace the filter.
Excessive heating of the oil in the transmission.	Check the load pressure drop in pump M3 between the zero and working position. Check the oil level in the tank. Check the type of oil used and the cleanliness of the filter. Check the efficiency of the radiator.	Replace the pump because it is damaged. Add oil. Change the oil or replace the filters if clogged. Clean the radiator.
The truck does not reach its maximum speed.	Check the Error. Check that the working and load pressure of the pump are correct. Check that the motor is at minimum displacement, checking that there is pressure at point M3 of the motor and that there is no longer pressure at point M4.	See error table. Replace the pump because it is damaged. Check the stopping position of the motor displacement, start-point, regulator valve and for obstructions in the controls.

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SAUER TRANSMISSION ERROR CODES





Fault	*Description of fault*	*Causes/remedies*
11	(Not available with MC024-021).	SAFE - Mode
15	Voltage error of battery or sensor.	SAFE - Mode
19	Error in forward gear pump valve.	SAFE - Mode
23	Error in reverse gear pump valve.	SAFE - Mode
27	Error in motor valve.	SAFE - Mode
31	Error in engine RPM.	LIMITED - Mode
35	FNR short circuit error	SAFE - Mode
39	Loss of inching sensor.	LIMITED - Mode
43	(sliding actuation error)	LIMITED - Mode
47	(method of sliding error)	LIMITED - Mode
51	(Not available with MC024-021).	LIMITED - Mode
55	Elimination of rupture pressure error (or parking brake error or brake light error)	SAFE - Mode
59	Loss of cardan shaft revolution sensor (HST motor RPM error).	LIMITED - Mode
70	(CAN error).	LIMITED - Mode

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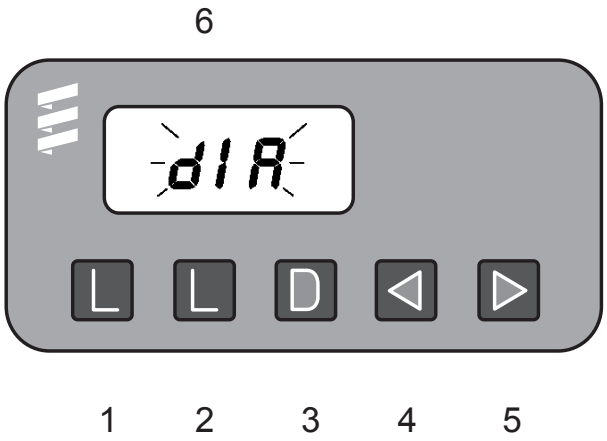
HEATING

INSTRUCTIONS FOR OPERATION

Order number: Manitou Code **711231**

The fault diagnosis equipment can be used for all models of Eberspächer; AIRTRONIC and HYDRONIC heaters, including versions "C", "C compact" and "P" previously sold.

1 - Cancel memorised faults
2 - Cancel memorised faults
3 - Diagnosis request
4 - Reverse, faults F5 – F1, actual (AF)
5 - Forwards, actual fault (AF), F1 – F5
6 - Display



Shown on the display, after connection



= intermittent signalling

After pressing key "D" the display shows



= intermittent signalling, and after about 8 seconds



= no fault present, **or**



= actual fault (example: interruption of flame sensor), **or**



= diagnosis not possible (incorrect connection or heater not switched on)

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- **MEMORISATION OF FAULTS**
  The control unit can memorise up to 5 faults, read from the diagnosis equipment and then displayed. The present fault is memorised in memory space F1. I faults previously memorised migrate to F5. If all the memory spaces are full, memory space F5 will be overwritten.
- **OVERHEATING**
  When 3 overheating events are noted in succession - fault 12/13 - the display shows AF 15 which means that the control unit is locked.
- **TOO MANY STARTING ATTEMPTS**
  When the heater performs 10 starting attempts in succession - fault 52 - the display shows AF 50; which means that the control unit is locked.
- **CANCELLATION OF FAULT MEMORISATION AND UNLOCKING OF CONTROL UNIT**
  Simultaneously press the 2 keys “L” “L“ until the display shows:





The control unit is unlocked and memorised faults from F1 to F5 are deleted.

N.B. Il automatic lock not present in all control units.

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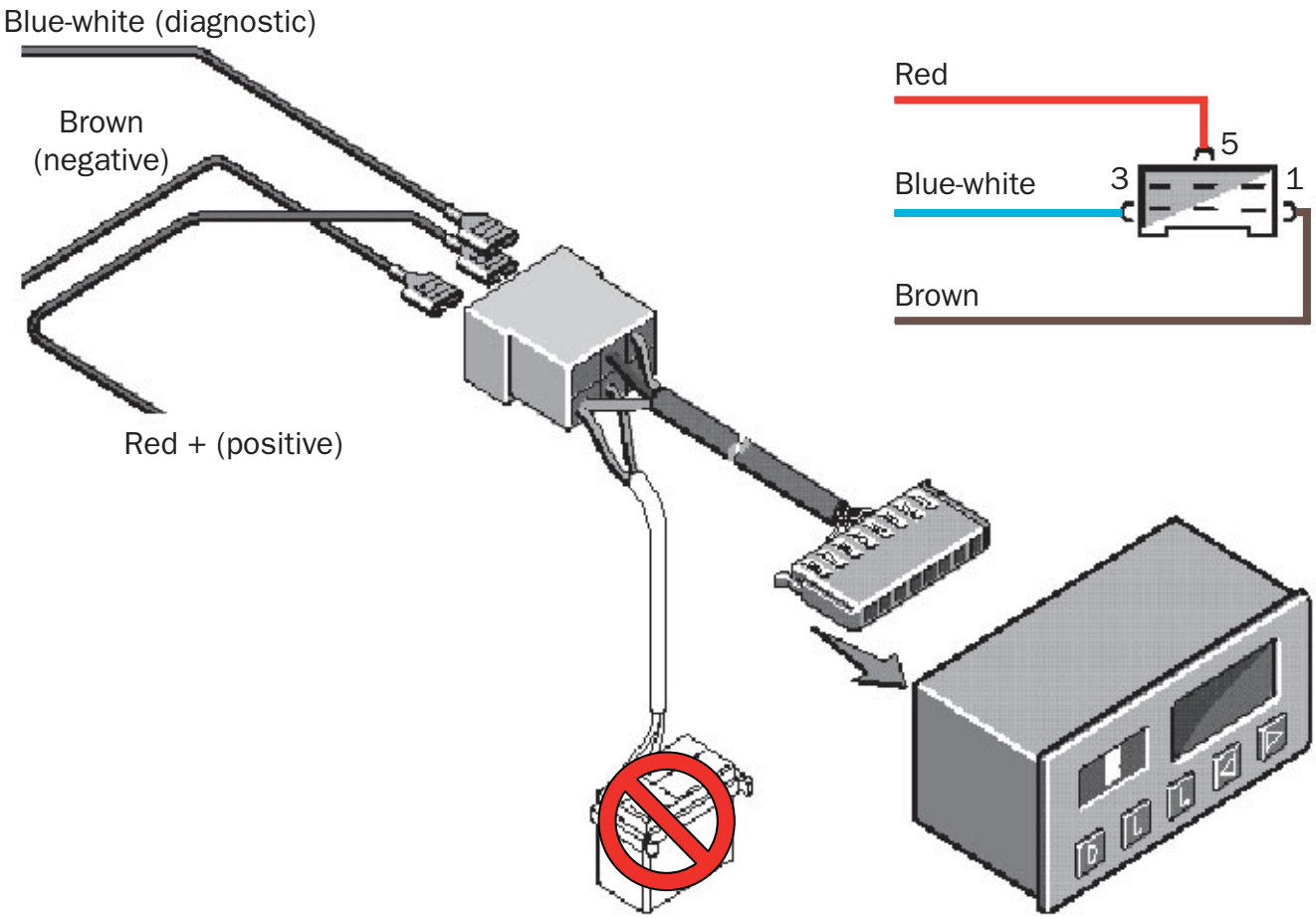
UNIVERSAL CONNECTION TO THE DIAGNOSTIC TESTER FOR ALL EBERSPÄCHER HEATERS VERSIONS “C”-“C COMPACT” - AIRTRONIC AND HYDRONIC

Connect 3 cables to the 6-pin connector on the diagnostic equipment (see diagram):

a) pin 1 (brown wire) - to the negative
b) pin 5 (red wire) - to the positive
c) pin 3 (blue/white wire) - to the free blue/white wire in the cable harness (*)

(*) In versions where the blue/white wire is connected to the command device, disconnect this wire from the command and connect it to pin 3.
N.B. There is no fault code signalling if the wire is connected both to the command device and pin 3 of the diagnostic equipment.

- **SWITCH ON THE HEATER**
  After pressing key “D” the present fault, consisting of 2 digits, is shown on the diagnostic tester display.



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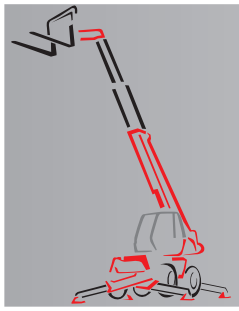
AIR HEATER FAULT CODES

Fault	*Description of fault*	*Causes/remedies*
000	Operation without faults.	.....
001	Over-voltage signalling.	Warning of over-voltage problems, check the regulator.
002	Low voltage signalling.	Warning of low voltage problems, charge the battery.
004	Warning of short circuit in fresh air output signal.	Eliminate short circuit/overload.
005	Warning of short circuit in antitheft system.	Eliminate short circuit/overload.
009	ADR switched off through D+ o force sensor.	Check ADR connecting cables.
010	Switched off due to over-voltage.	Check the regulator. Check the alternator.
011	Switched off due to low voltage.	Check regulator and battery. Check the alternator.
012 013 014	Overheating - interruption to the fillerpump. Heat exchanger temperature too high.	Check for any obstructions in the fresh air inlet and warm, air outlet. Check the power supply to the filler pump and overheating switch/sensor.
015	Operation locked.	Excessive overheating. Eliminate the cause and unlock the control unit using the diagnostic equipment.
017	Overheating (2^{at} warning threshold).	Check the overheating sensor.
020 021	Interruption of glow plug. Overload or short circuit at glow plug output.	Check, and if necessary replace the glow plug and/or glow plug resistance, check connecting cables and pins, check connection to the glow plug relay. Check, and if necessary replace glow plug.
022	Glow plug relay defective. Short circuit in glow plug relay.	Check, and if necessary replace glow plug relay.
023 024	Voltage regulator: break in coil connection. Voltage regulator: short circuit in coil connection.	Check connecting cables and pins, check connection to glow plug and replace voltage regulator if necessary.
025	Short circuit in output from diagnostic system.	Check output connection from the diagnostic system.
029/030 031/032 033	Electric motor does not turn. Relay for varying engine revolutions not working. Irregularity in engine revolutions (outside tolerance).	Check engine revolutions, replace it if necessary. Check the engine revolutions variation relay and printed circuit. Check connections to the electric motor.
035 036	Reduced power relay, breakage in the coil. Reduced power relay, coil short circuit.	Check / replace relay. Check cables and pins.
038 039	Interruption in vehicle fan control relay. Shortcircuit in vehicle fan control relay.	Check cables and pins, check the relay and replace if necessary.
043	Short circuit in output of external components/filler pump.	Eliminate short circuit/overload.
047 048	Short circuit in filler pump Interruption in filler pump.	Check and/or replace filler pump and check filler pump and electrical supply.
050	Operation locked.	The number of start attempts possible was exceeded. Check fuel supply, exhaust pipe and inlet pipe. Check glow plug and replace if necessary Unlock the control unit using the diagnostic equipment.
051	Recognising defective flame before ignition. Flame sensor defective.	Check the flame sensor and replace if necessary.
052	Will not start. Safety time exceeded.	Check fuel supply, inlet pipes and exhaust gases; check glow plug and replace if necessary.
053 054 055 056	Interruption of flame: in ignition phase (“power”) at “maximum” power at “medium” power at “minimum” power	The heater is on (flame recognised) and flame interruption signal in one of the phases. Check fuel quantity/supply and number of engine revolutions. If the fuel is OK, check and/or replace flame sensor.
057	Short circuit in flame sensor or reversed connection.	Check the cable and pin to flame sensor.
058	Flame during washing.	Check flame sensor.
060 061	Interruption to temperature sensor. Short circuit in temperature sensor.	Check temperature sensor connectors, check temperature sensor on printed circuit or control unit and the additional one if necessary.
062 063	Interruption to command device. Short circuit in command device.	Check cables and pins to the command device and replace if necessary.

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Fault	*Description of fault*	*Causes/remedies*
064 065	Interruption of flame sensor. Short circuit in flame sensor.	Check the connector on the flame sensor cable. Check the flame sensor and replace if necessary,
071 072	Interruption to the overheating sensor. Short circuit in overheating sensor.	Check overheating sensor and replace if necessary Check cables and connections.
090 091	Occasional internal disturbance. External voltage disturbances.	Replace control unit. Eliminate the cause.
092/093 094/097	Control unit defective.	Replace control unit.
096	Command unit (internal temperature measurement sensor defective).	Replace control unit or use additional temperature sensor.
255	Fault memory deleted.	.....

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ELECTRICAL SPECIFIC TOOLING

page

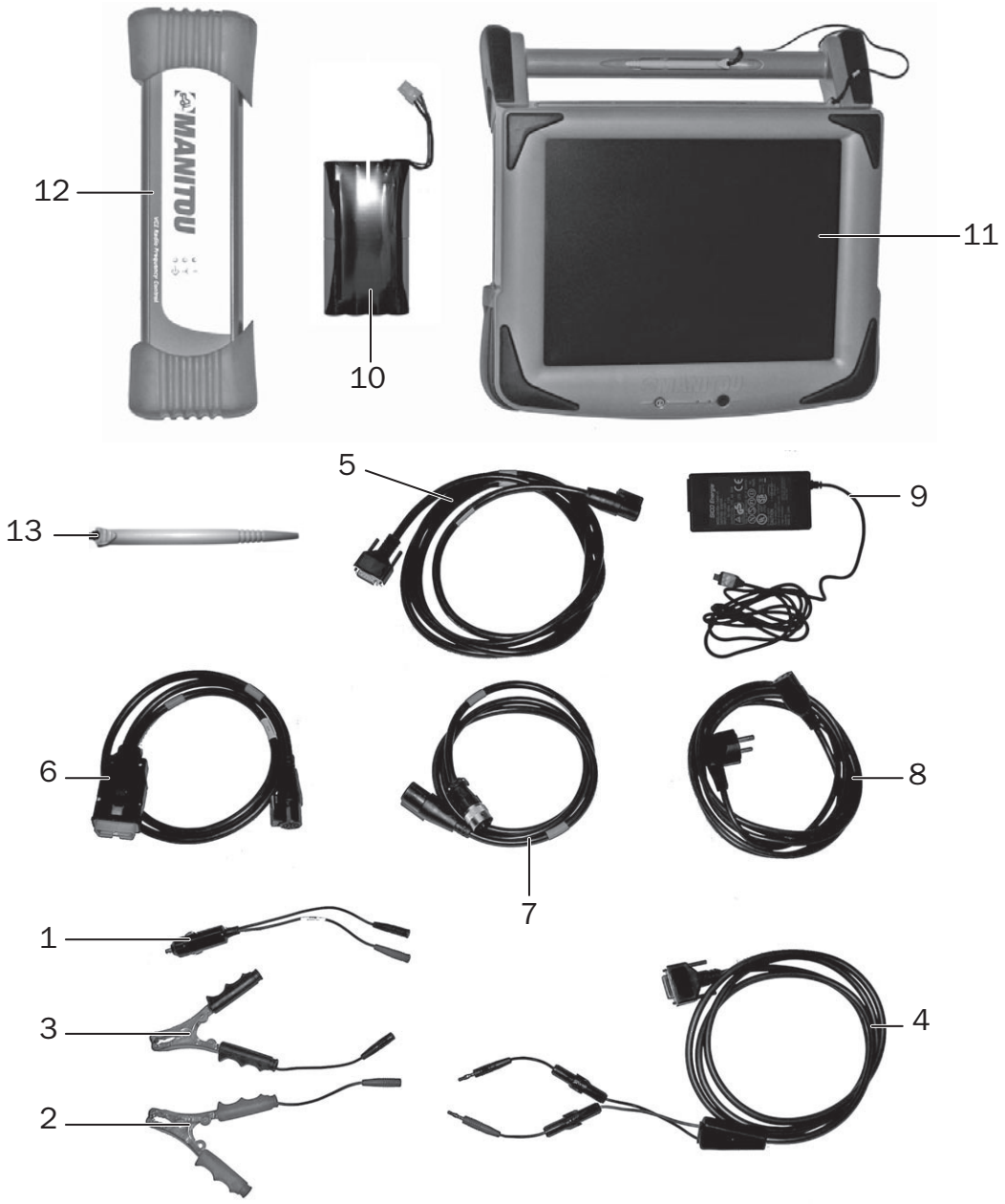
DIAGNOSTICS CARRYING CASE 2
OFFICE TROLLEY 4

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DIAGNOSTICS CARRYING CASE



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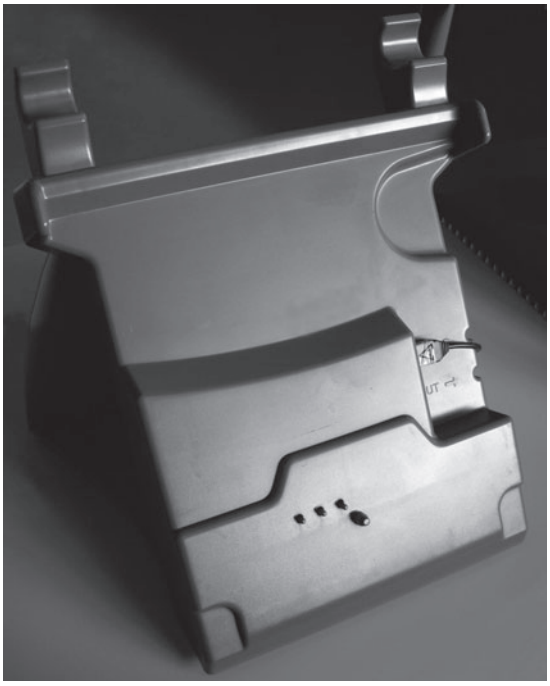
Diagnostics carrying case 746120

Consisting of:

1. 1 Power supply cable with cigarette lighter plug 745240
2. 1 Cable for red battery clips 745241
3. 1 Cable for black battery clips 745242
4. 1 Power supply cable 745243
5. 1 Cable for laptop VCI 745244
6. 1 Cable for Manitou OBD Diag 745245
7. 1 Cable for Manitou RC2 / RC4 Diag 745246
8. 1 Standard mains cable CE L : 3m 745247
9. 1 Power supply unit Diag 3G 60W 745251
10. 1 Battery LI-ION 7,4V / 9,6AH 745367
11. 1 PAD (PC set for industrial use + carrying case) 745438
12. 1 VCI (Vehicle Communication Interface / PAD) 745439
13. Steel pens (set of 3) 745368

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Docking station



Docking station (battery load) 745236

OFFICE TROLLEY



Office trolley (trolley + station set) 745235

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FRAME - BODY

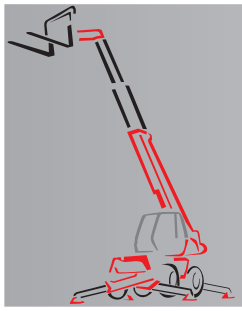
- CHASSIS COMPONENTS REMOVAL

- CHASSIS COMPONENTS REFIT



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https://truckmanualshub.com/



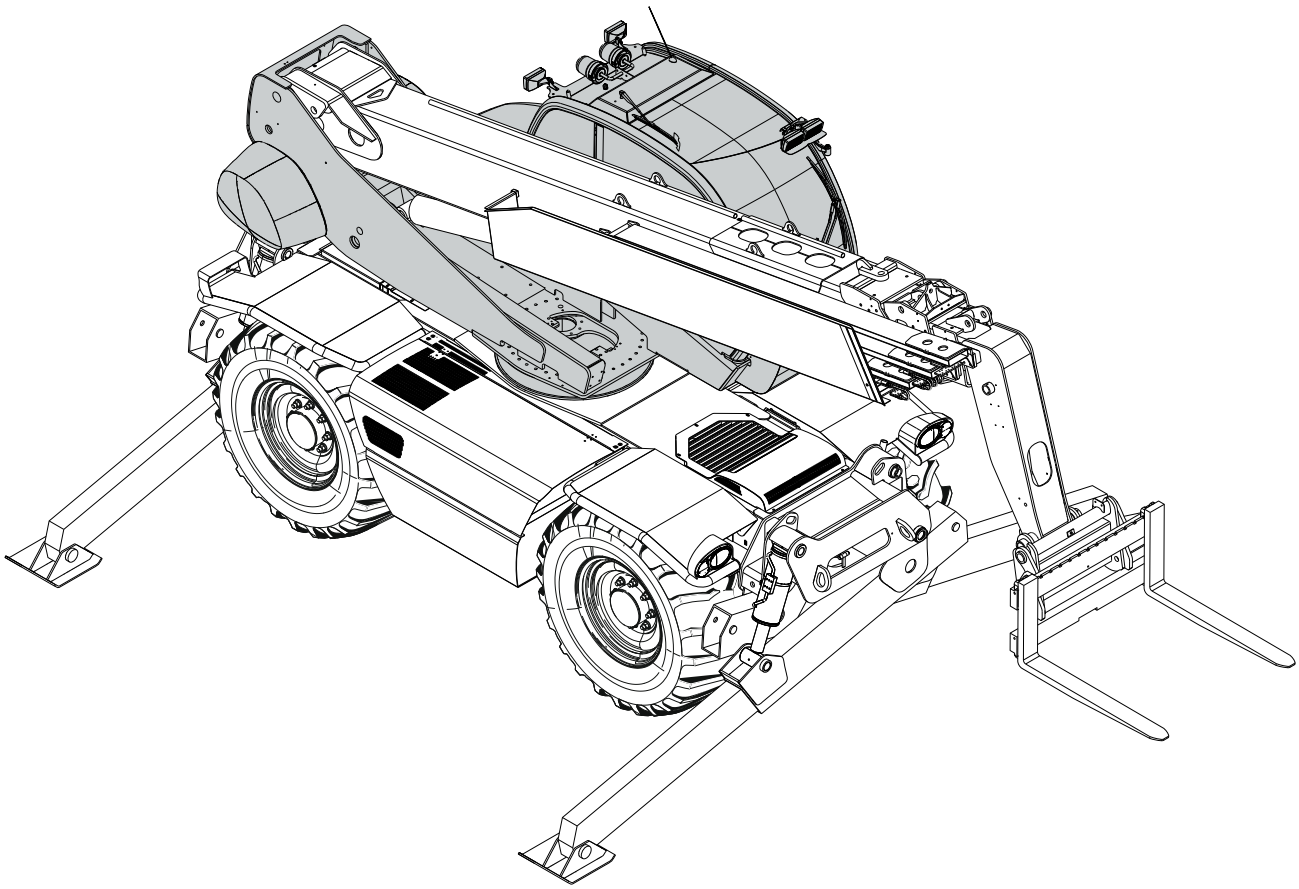
COMPONENTS REMOVAL FROM THE CHASSIS

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– CAB HOUSING REMOVAL 3
– DISCONNECT THE CAB ELECTRICAL SYSTEM 5
– DISCONNECT THE CAB HYDRAULIC SYSTEM 6
– CAB REMOVAL 7
DISCONNECT THE CABIN AIR CONDITIONING (OPTIONAL) 9
TURRET REMOVAL 11
– DISCONNECT THE TURRET HYDRAULIC SYSTEM 11
– TURRET SENSORS REMOVAL 13
– TURRET LIFTING CYLINDER REMOVAL 14
– TURRET REMOVAL 14
THRUST RING REMOVAL 17

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CAB, TURRET AND THRUST RING REMOVAL



GENERAL INFORMATION

To reach the various components, the order of removal must be observed.

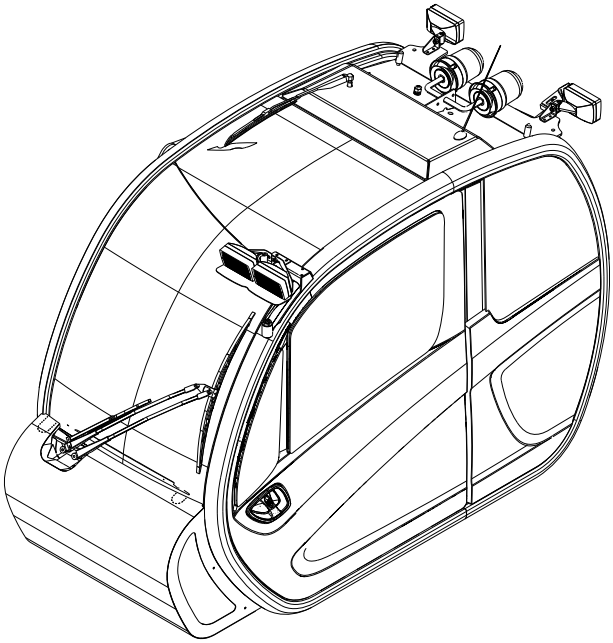
PREPARATION AND SAFETY INSTRUCTIONS

Place the truck on a horizontal surface and extend the stabilisers to ensure the greatest stability and safety.

Special instruments:
- Lifting crane (5000 kg. minimum).

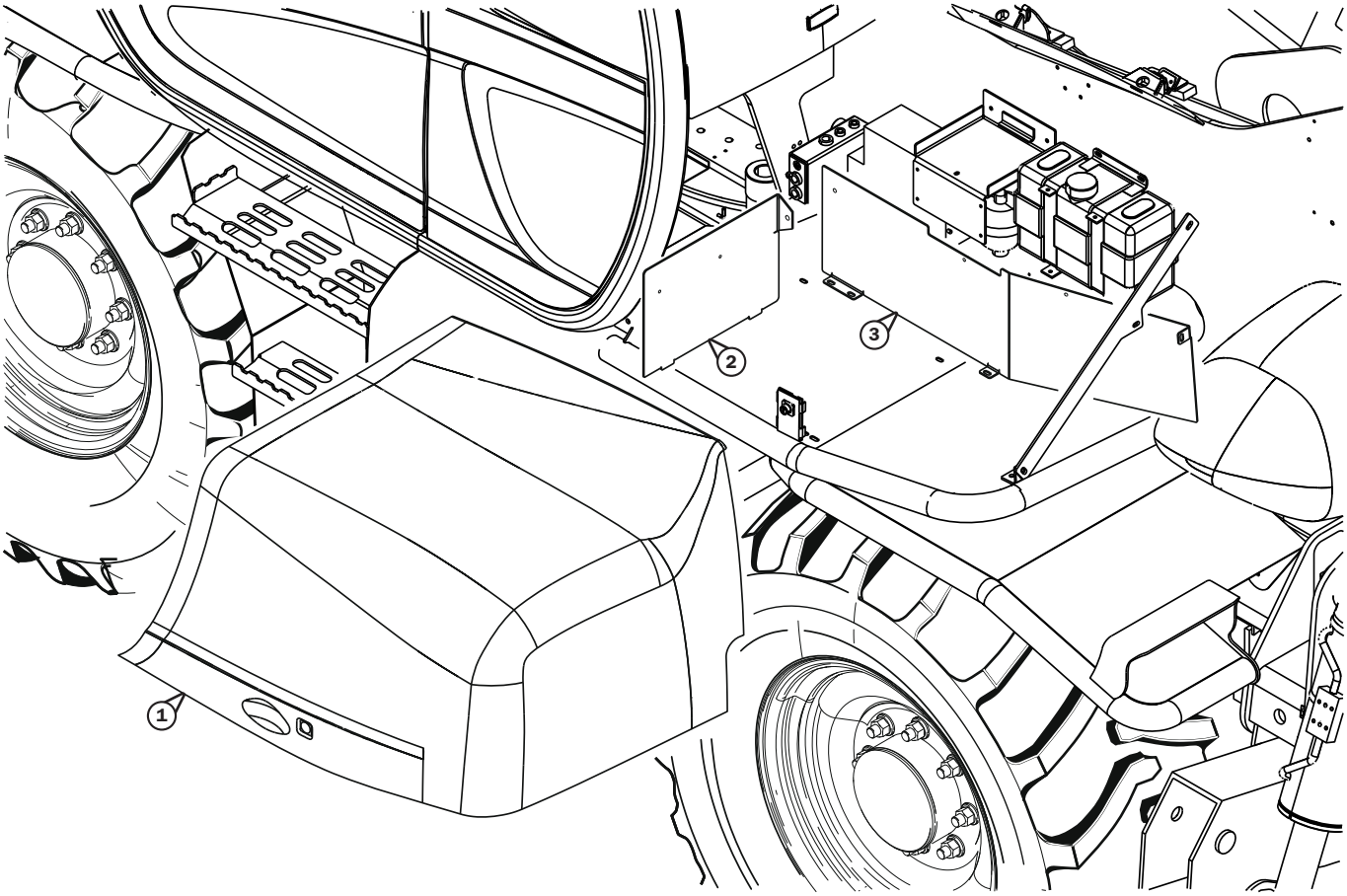
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CAB REMOVAL



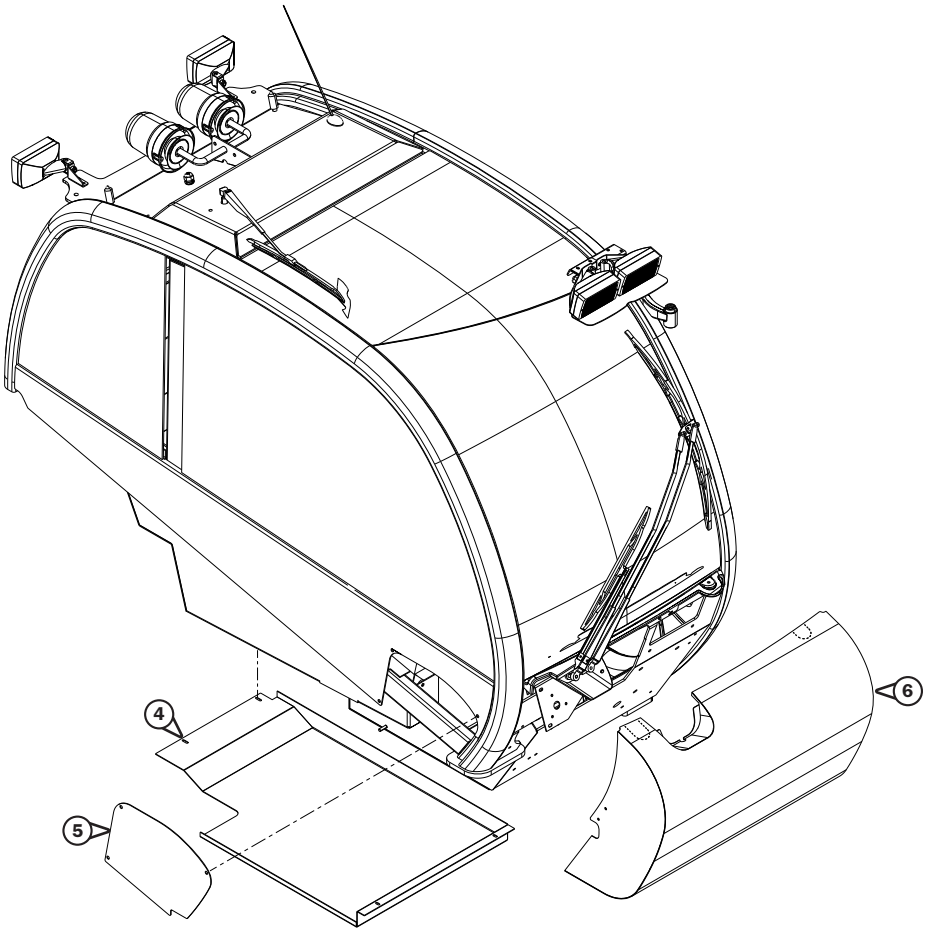
CAB HOUSING REMOVAL

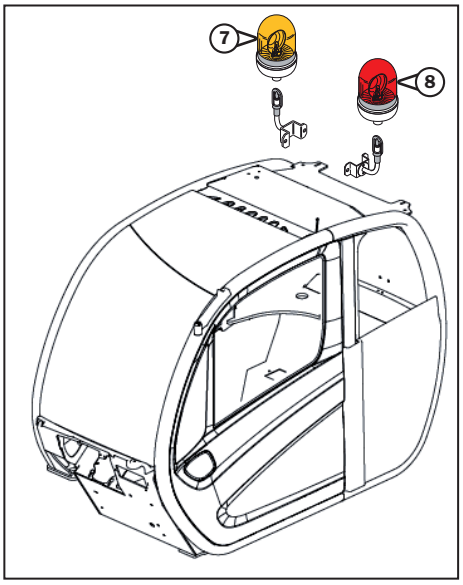
Remove the bonnet (Item 1), the housing (Item 2) covering the logic box and the housing (Item 3) protecting the heating tank.



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Remove the casing under the cab (Item 4), the housing (Item 5) protecting the power steering and the distributor housing (Item 6).





Disconnect the rotating lamp and emergency lamp (Item 7 and 8) from the cab.

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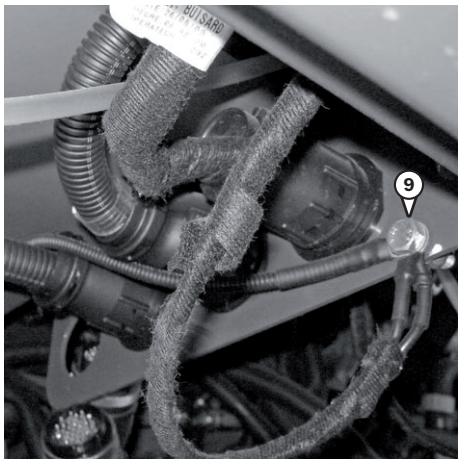


DISCONNECT THE CAB ELECTRICAL SYSTEM

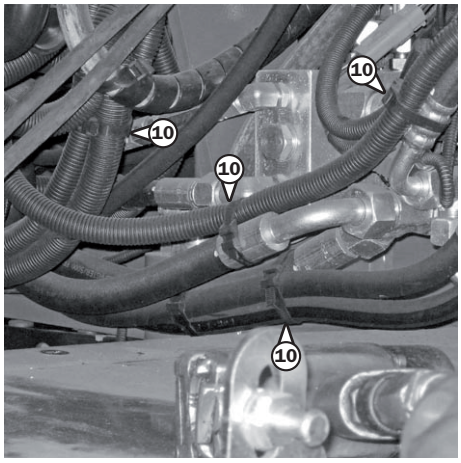
Disconnect all the logic box connectors.



Disconnect all the fuse box connectors.



Disconnect the feedthough electrical connectors under the cab and disconnect the ground cable (Item 9).

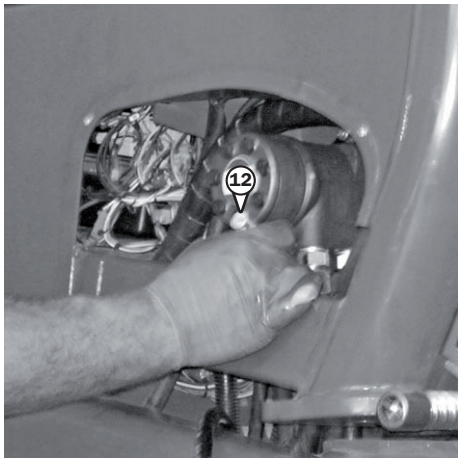


Remove all the clips (Item 10) holding the cables and tubes of the cab electrical and hydraulic systems.

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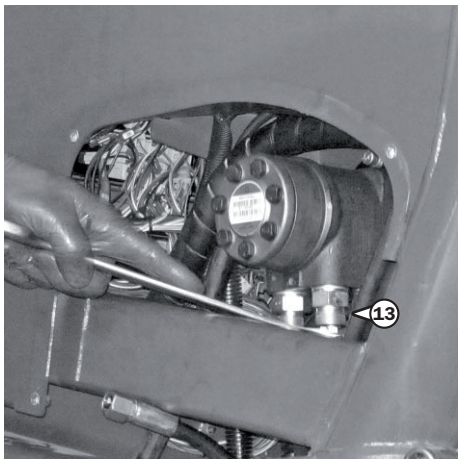


Disconnect the MSS system display from the instrument panel (Item 11).

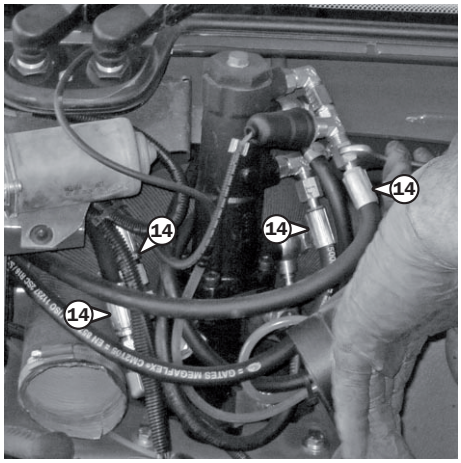


DISCONNECT THE CAB HYDRAULIC SYSTEM

Mark, with a brush (Item 12), all the hydraulic system tubes for correct refitting.

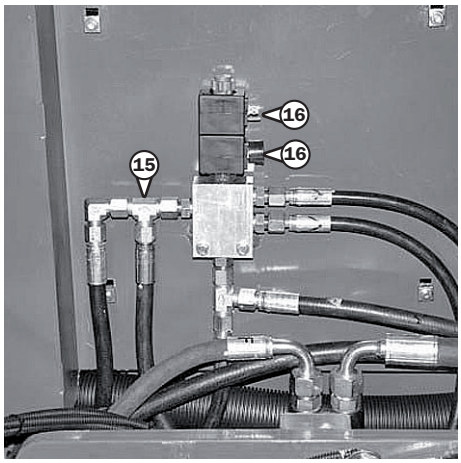


Disconnect the hydraulic pipes (Item 13) of the power steering.

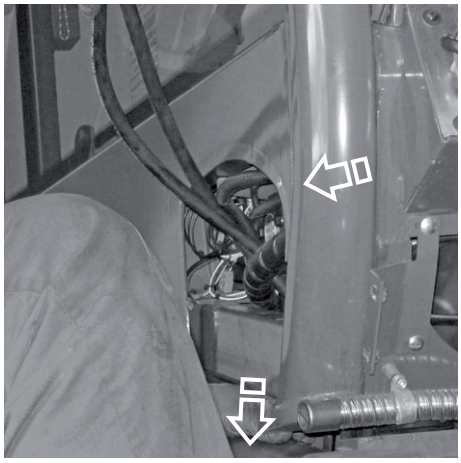


Disconnect the hydraulic pipes (Item 14) from the brake pump.

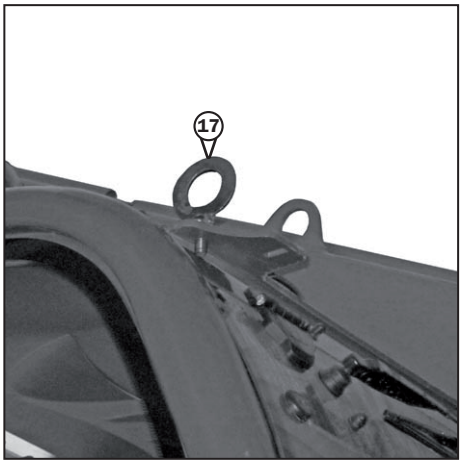
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Disconnect the hydraulic pipe (Item 15) and the coil (Item 16) of the slow/fast gear change electrovalve.

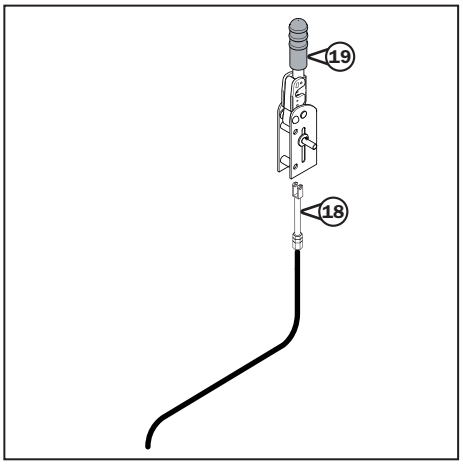


Remove the brake pump cables though the opening in the power steering housing and remove them from underneath the cab.



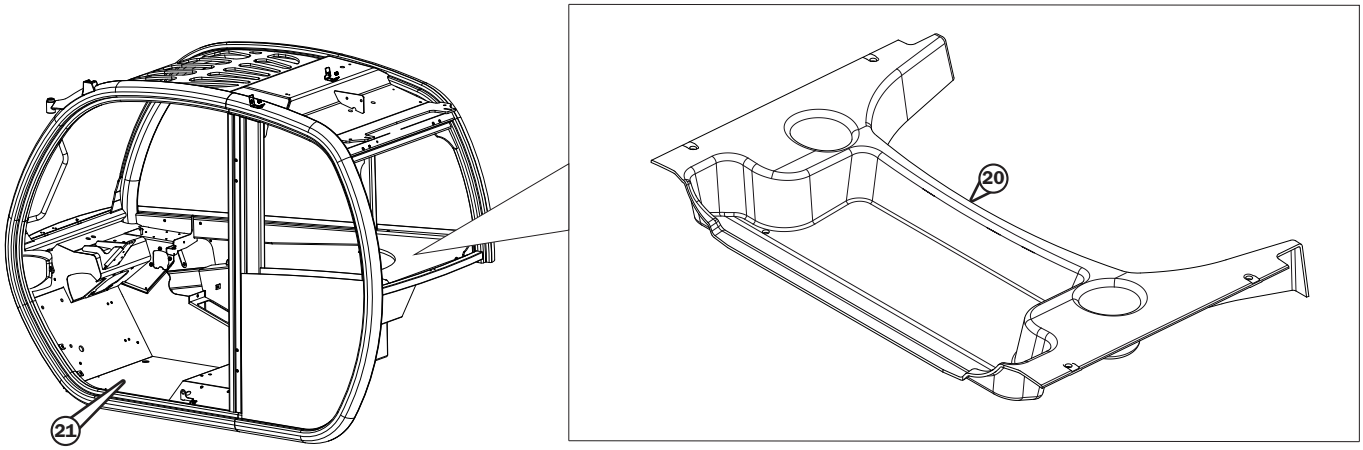
CAB REMOVAL

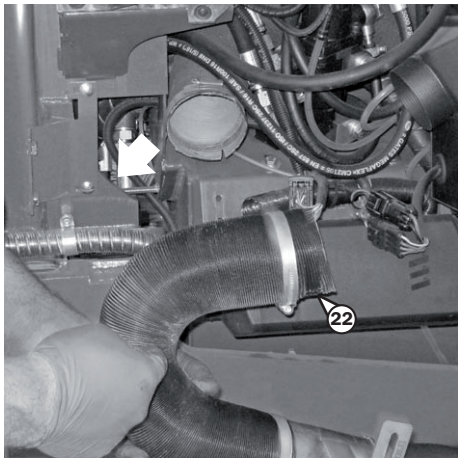
Fit the eyebolts (Item 17) to the cab and secure them to an overhead crane with ropes and chains.



Remove the cable (Item 18) from the rotation locking pin lever (Item 19) from inside the cab.

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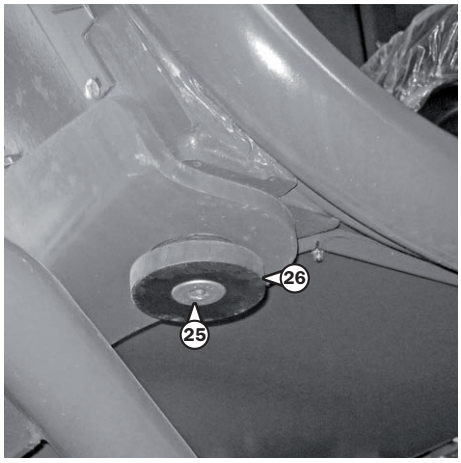




Remove the plastic housing (Item 20), to gain access to the nuts that lock the rear cab mountings, remove the mat (Item 21) to gain access to the nut that locks the front left cab mounting.
It may be necessary to remove or move the pipe (Item 22) from the burner, or its bracket, to gain access to the nut that locks the front right cab mounting.

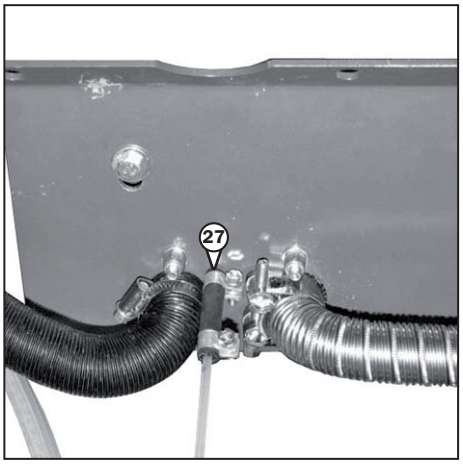


Unscrew the nuts (Item 23) and remove the antivibration mounts (Item 24).



Unscrew the screws (Item 25) and remove the antivibration mounts (Item 26).

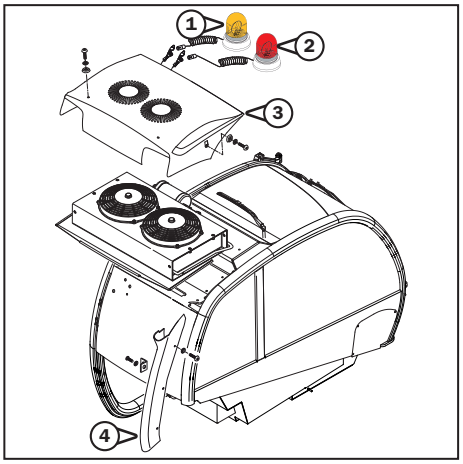
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Disconnect the diesel tubes (Item 27) from the heater on the rear side of the mounting plate.

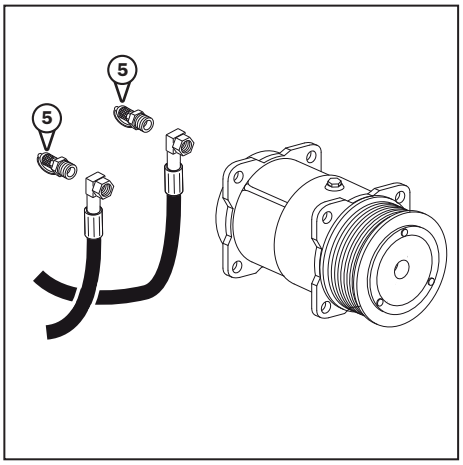


With the aid of ropes and an overhead crane, gently lift the cab, make sure that no cables or hydraulic pipes are still connected and then remove the cab from the truck.



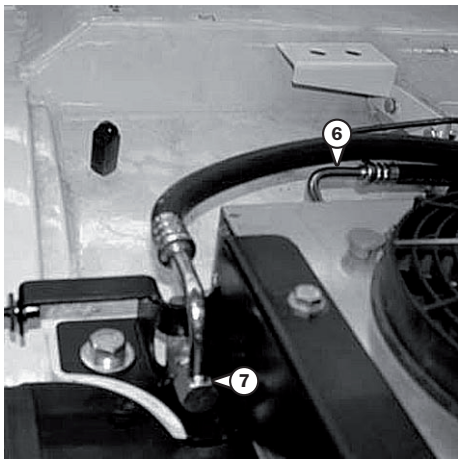
DISCONNECT THE CABIN AIR CONDITIONING (OPTIONAL)

If the cab has an air conditioning system, it must be removed before removing the cab. Remove the rotating lamp and emergency lamp (Item 1 and 2), remove the housing (Item 3) of the air conditioning radiators and the rear right duct (Item 4).

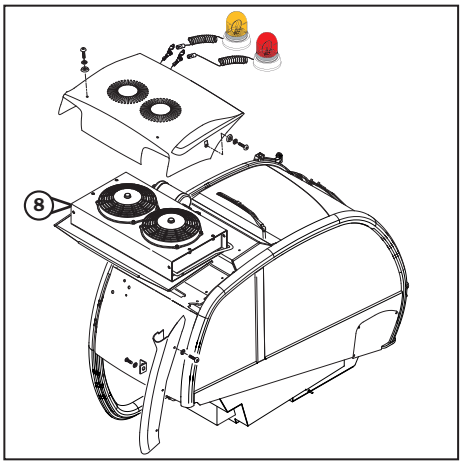


Connect an air conditioning degassing plant to the couplings (Item 5).

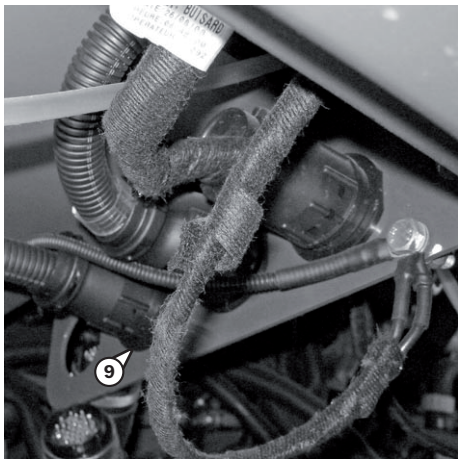
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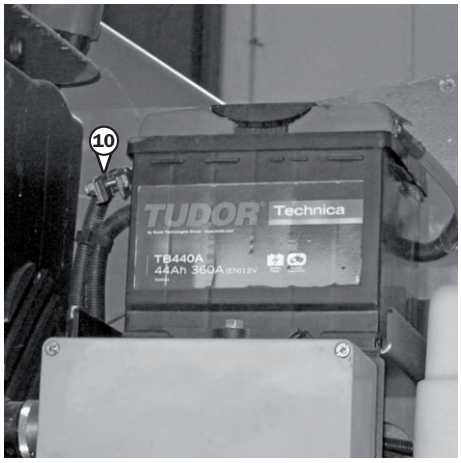
Disconnect the tubes (Item 6 and 7) from the air conditioning radiator unit.



Remove the air conditioning unit (Item 8).



Remove the feedthrough connector (Item 9) associated with this option.



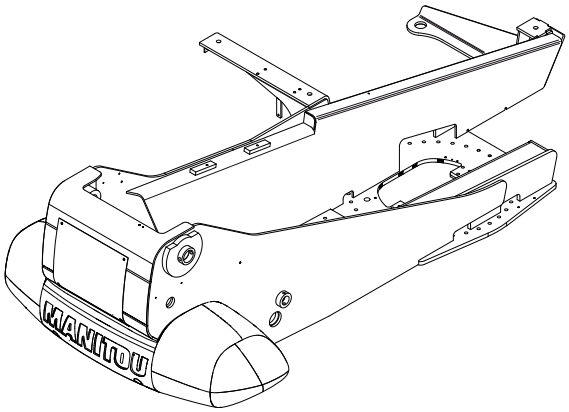
Disconnect the negative ground (Item 10) of the additional battery for the air conditioning.

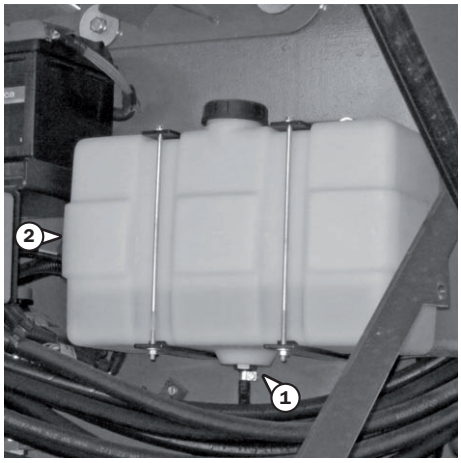
The cab can now be removed.

“CAB REMOVAL” in this section.

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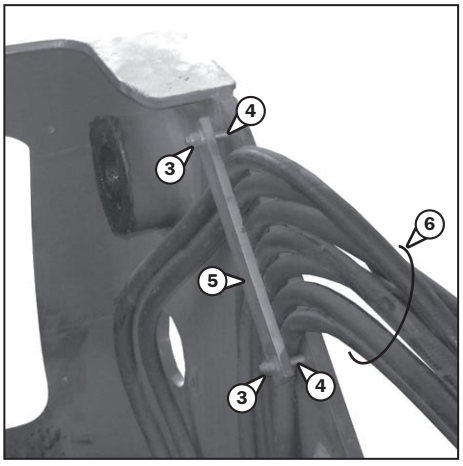
TURRET REMOVAL



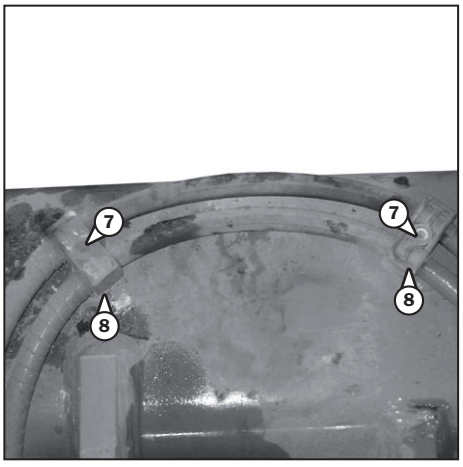


DISCONNECT THE TURRET HYDRAULIC SYSTEM

Disconnect the diesel tube (Item 1) or if considered necessary, remove the tank (Item 2).

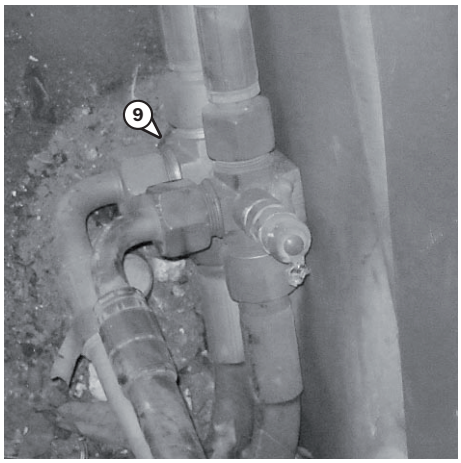


Unscrew the screws and nuts (Item 3 and 4) and remove the plate (Item 5) that locks the bundle of tubes (Item 6).

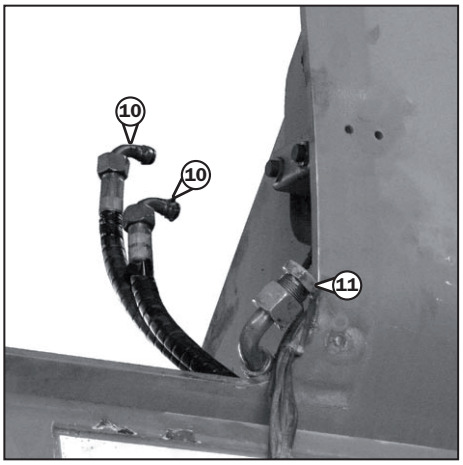


Unscrew the screws (Item 7) and remove the collars (Item 8).

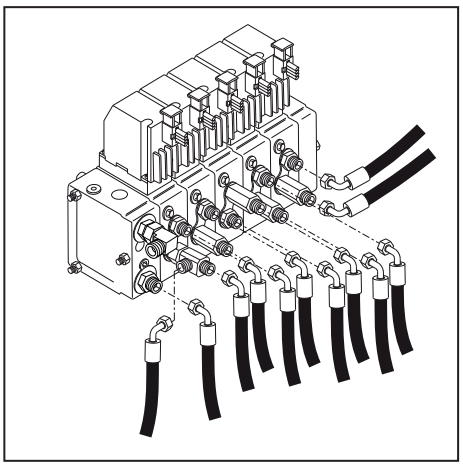
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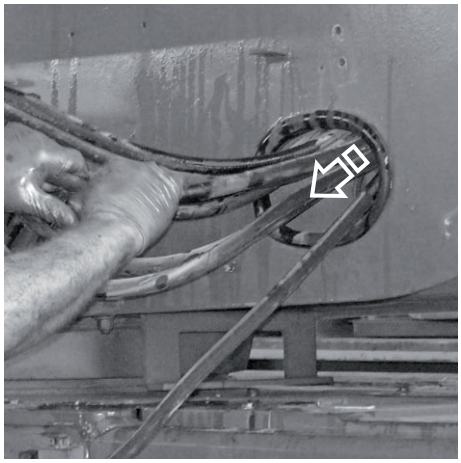
Remove the cylinder couplings (Item 9).



Disconnect the tubes (Item 10 and 11).

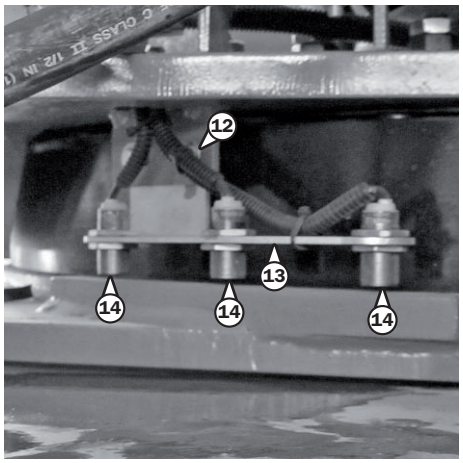


Disconnect all the hydraulic pipes from the distributor, being careful to mark them with a brush before disconnecting them, to facilitate refitting.



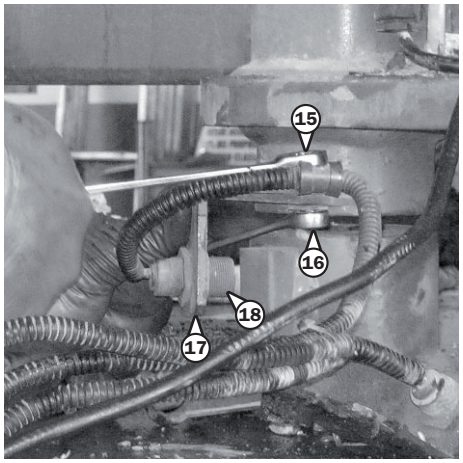
While the above operation is being performed, withdraw the pipes from the slot in the turret.

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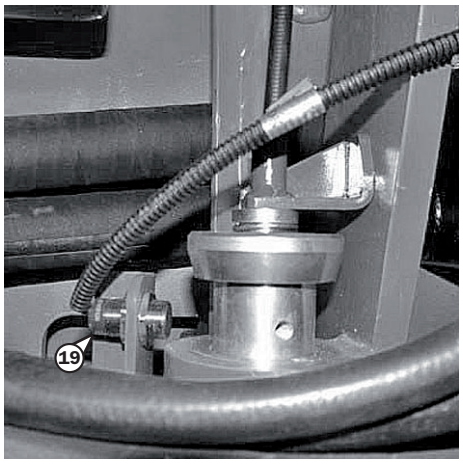


TURRET SENSORS REMOVAL

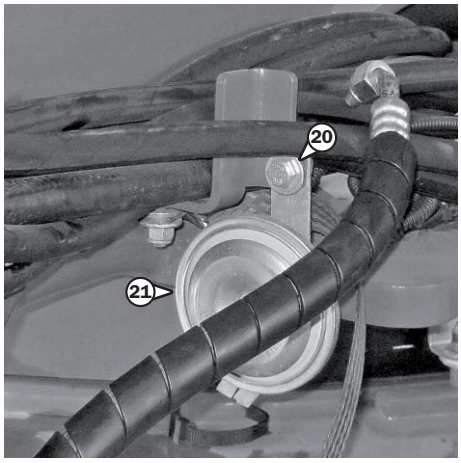
Unscrew the screws (Item 12) and remove the bracket (Item 13) that supports the sensors (Item 14) that detect rotation of the turret beyond 15°.



Unscrew the screw and nut (Item 15 and 16) and remove the bracket (Item 17) that supports the thrust ring centring sensor (Item 18).

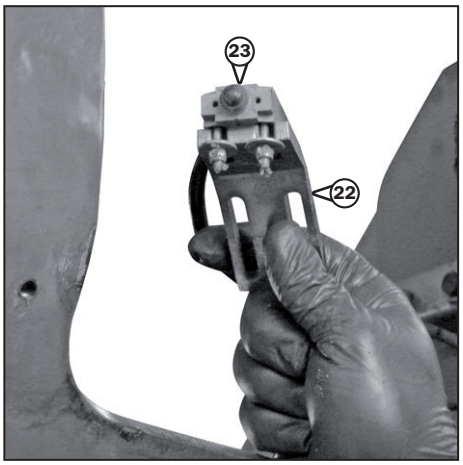


Remove the presence of the thrust ring locking pin microswitch (Item 19).

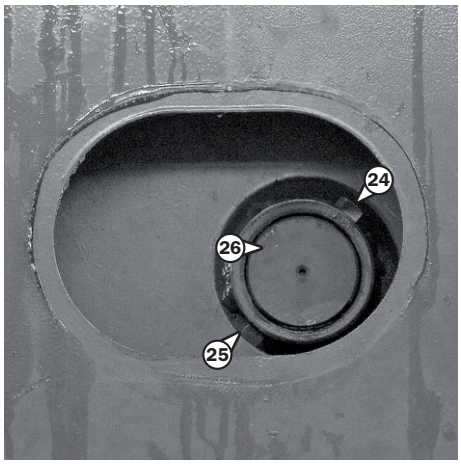


Unscrew the screw (Item 20) and remove the klaxon (Item 21).

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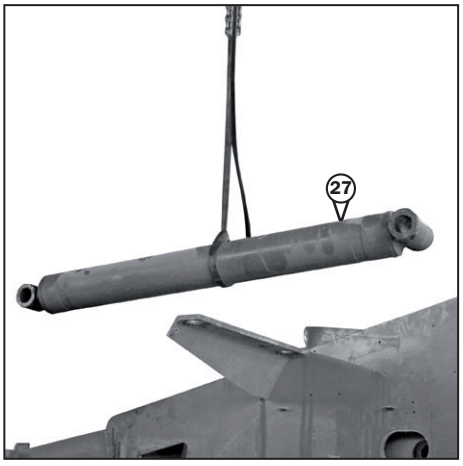


Remove the mounting (Item 22) and the maximum jib height microswitch (Item 23).

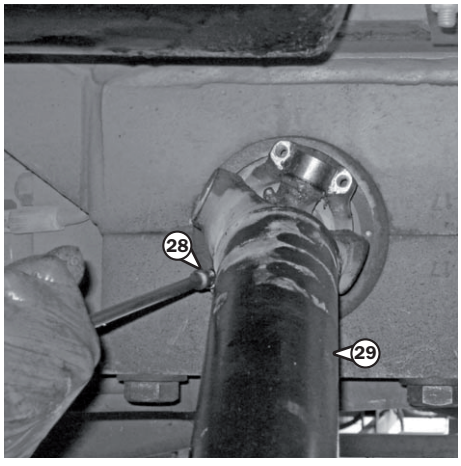


TURRET LIFTING CYLINDER REMOVAL

Unscrew the screw (Item 24) and nut (Item 25) and extract the pin (Item 26) locking the lifting cylinder.



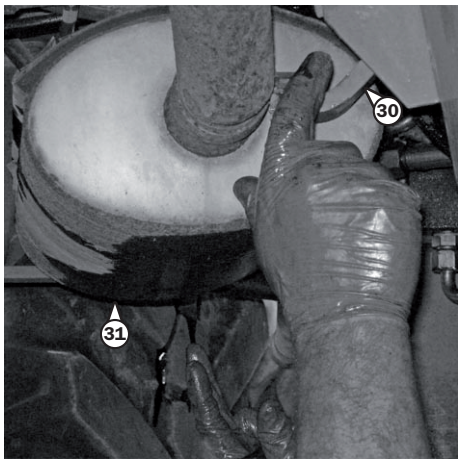
Remove the lifting cylinder (Item 27) with a rope and overhead crane.



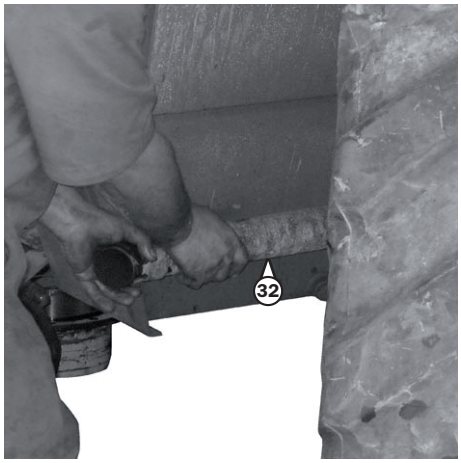
TURRET REMOVAL

Secure the turret to an overhead crane.
Unscrew the screws (Item 28), from both sides of the shaft and remove the cardan shaft (Item 29) from under the truck.

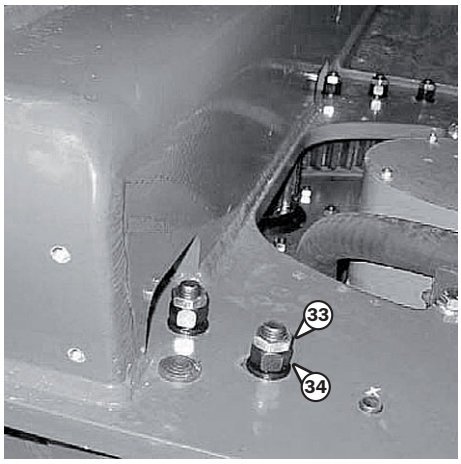
https://truckmanualshub.com/



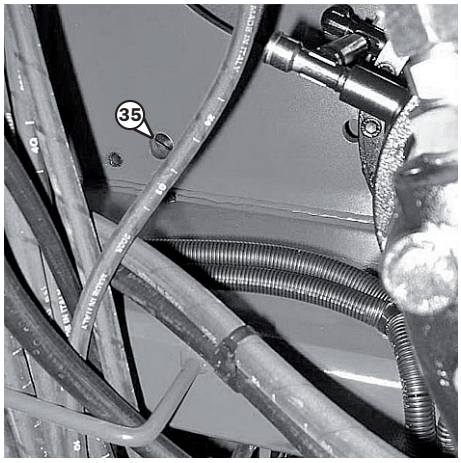
Remove the bracket (Item 30) to release the silencer (Item 31).



Remove the silencer (Item 32).



Unscrew the locknuts (Item 33) and nuts (Item 34).



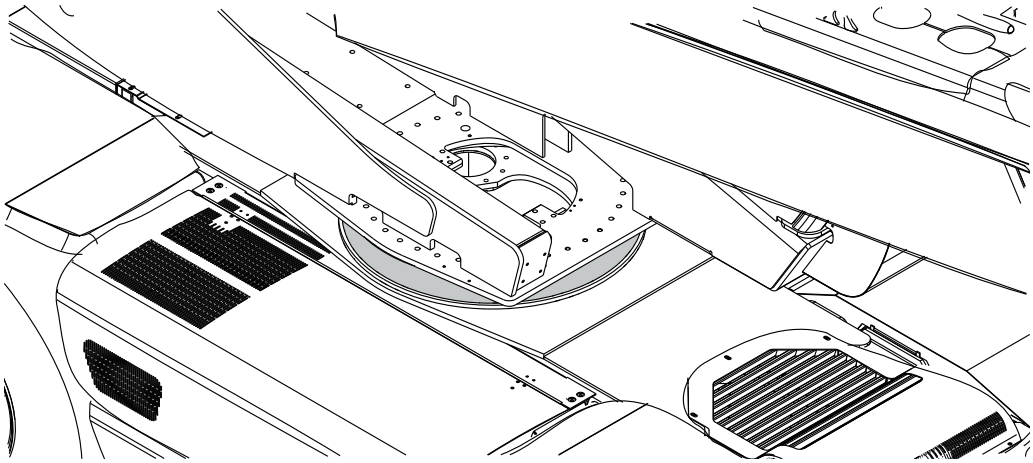
Remove the nuts (Item 34) by unscrewing the screws (Item 35) which can be reached through a hole under the chassis.
Turn the truck by the angle necessary to be able to reach all the screws one at a time through the hole.

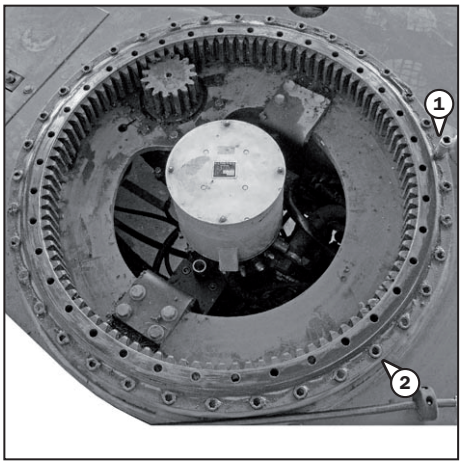
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Remove the turret (Item 36).

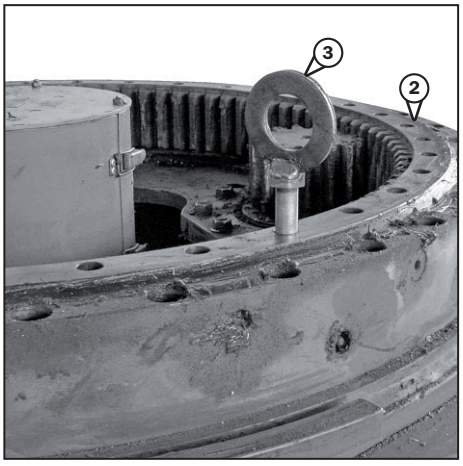
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THRUST RING REMOVAL

Unscrew the screws (Item 1) that lock the thrust ring (Item 2).



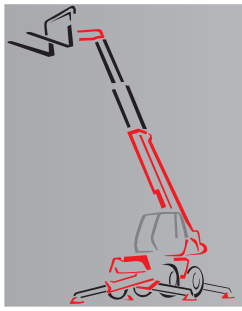
Insert two eyebolts (Item 3) in the two holes in the thrust ring (Item 2), aligned at about 180°.



Lift the thrust bring (Item 2) with an overhead crane.

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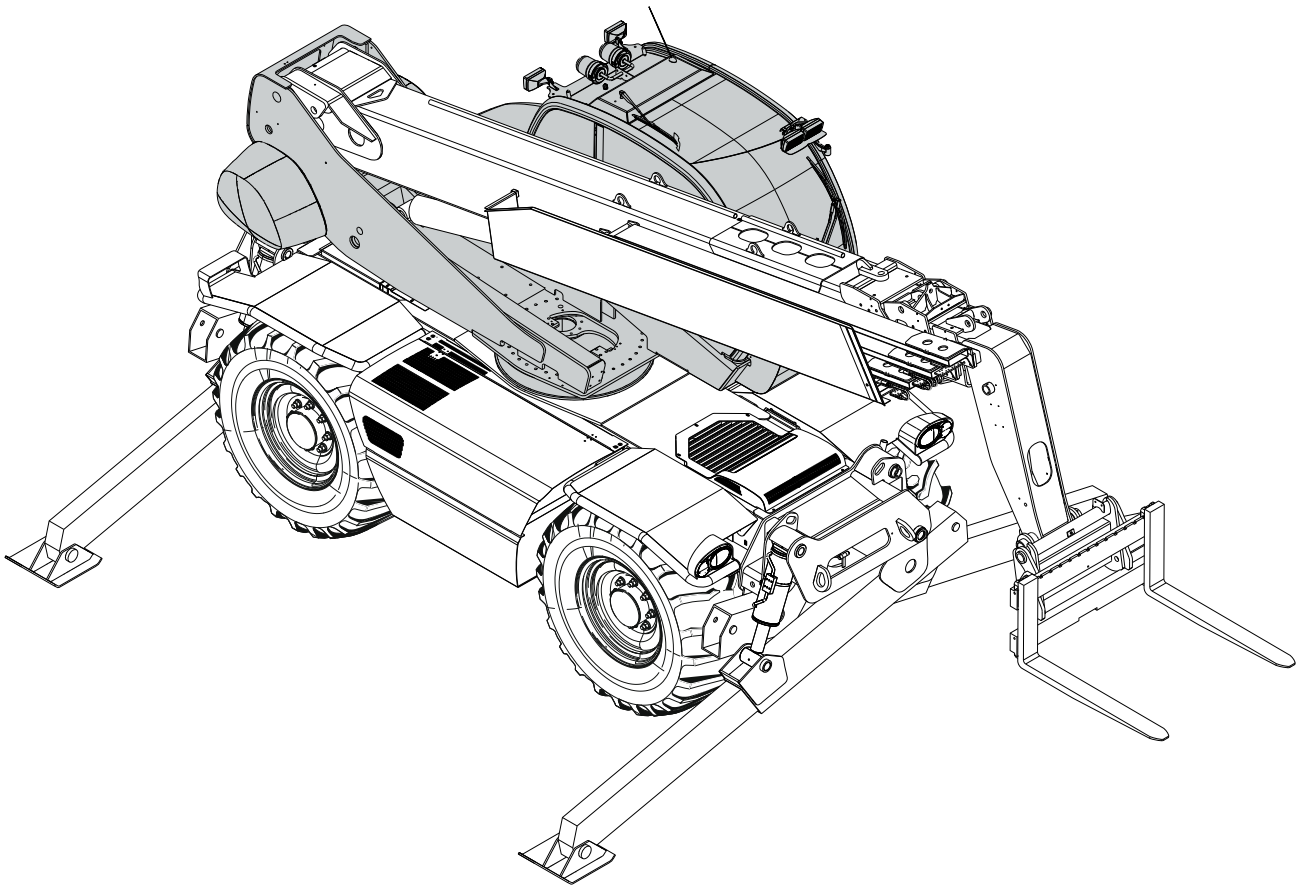
COMPONENTS REFIT ON THE CHASSIS

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CAB, TURRET AND THRUST RING REFIT



GENERAL INFORMATION

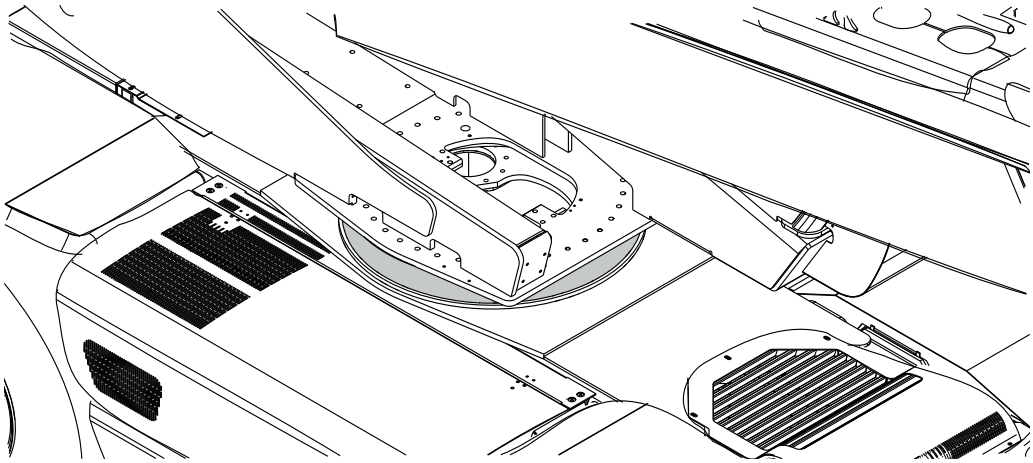
To reach the various components, the order of removal must be observed.

PREPARATION AND SAFETY INSTRUCTIONS

Place the truck on a horizontal surface and extend the stabilisers to ensure the greatest stability and safety.

Special instruments:
- Lifting crane (5000 kg. minimum).

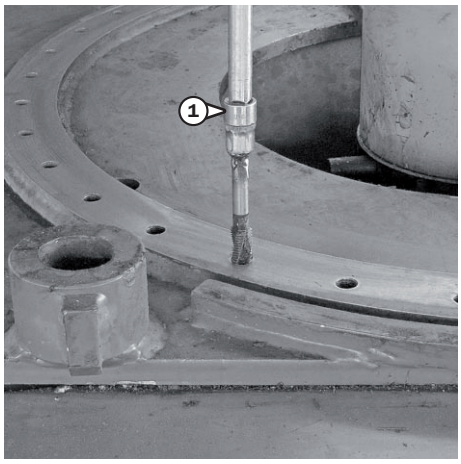
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THRUST RING REFIT

Carefully clean the seating on the truck, where the new thrust ring will be fitted.

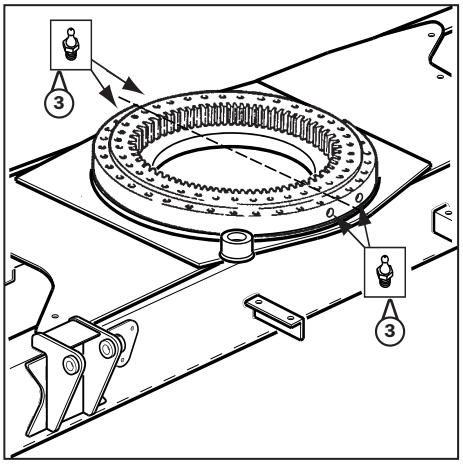


Clean up the threads in the holes for the thrust ring locking screws with a tapping attachment (Item 1).

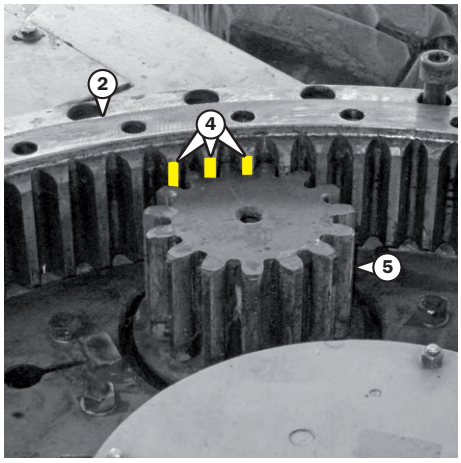


Check that the lower surface of the new thrust ring (Item 2) is clean and, with the aid of an overhead crane, place the thrust ring on the truck.

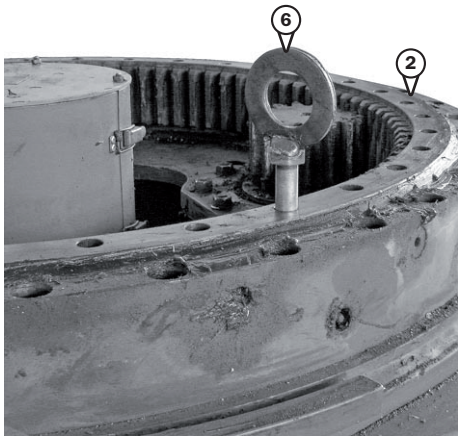
https://truckmanualshub.com/



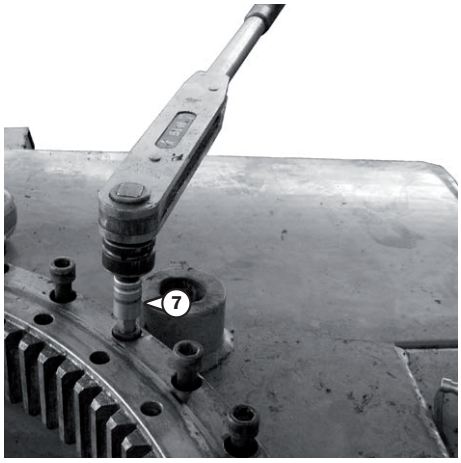
While placing the thrust ring on the truck, be careful to direct the edges of the thrust ring, on which the grease nipples (Item 3) are mounted, towards the right and left sides of the base.



The thrust ring gear (Item 2) has 3 coloured reference teeth (Item 4) that must mesh with the corresponding teeth of the reduction gear (Item 5).

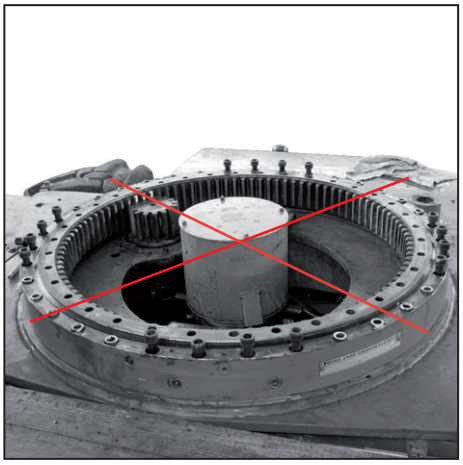


Remove the eyebolts from the thrust ring (Item 6).



Apply loctite thread lock to the screws (Item 7) and tighten the screws to a torque of 346 Nm.

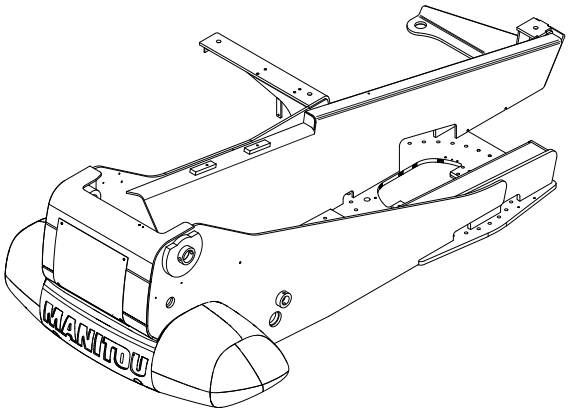
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The tightening sequence of the screws is crosswise with respect to the centre of the thrust ring, that means tighten one screw, then the one diametrically opposite, so that the thrust ring is screwed evenly onto the base.

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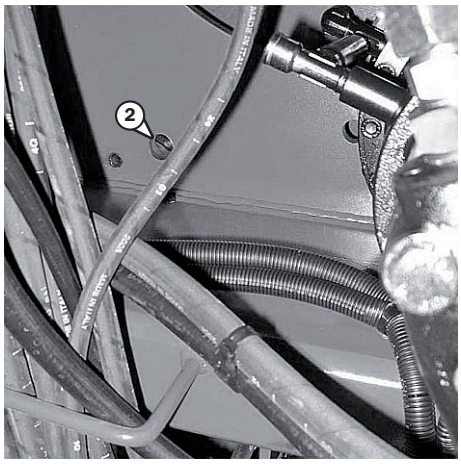
TURRET REFIT



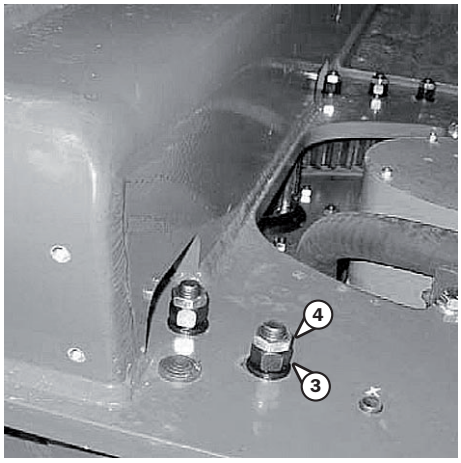


REPOSITIONING THE TURRET

With the aid of ropes and an overhead crane, replace the turret (Item 1) on the truck.



Refit the screws (Item 2) through the hole under the chassis.
Turn the truck by the angle necessary to give access to all the screw holes, one at a time, through the hole.

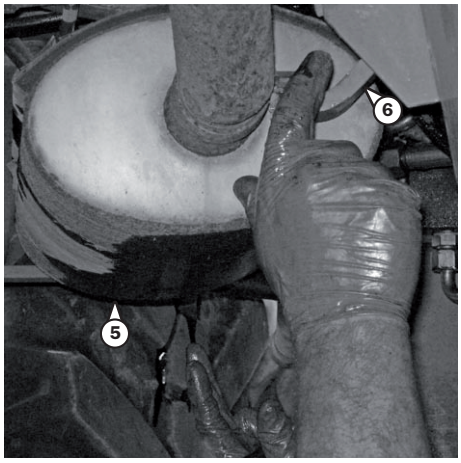


Screw on the nuts (Item 3) and locknuts (Item 4).

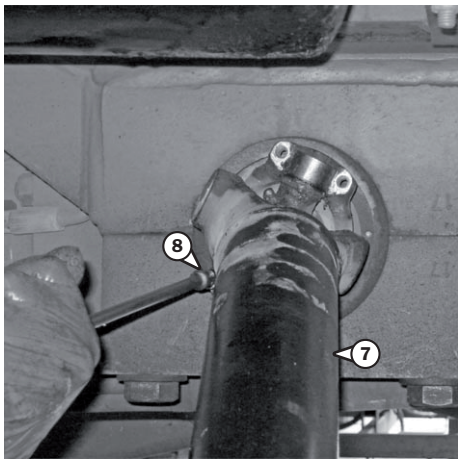
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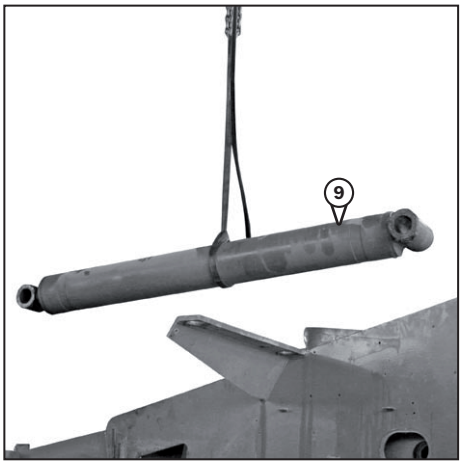
Replace the silencer (Item 5).



Refit the bracket (Item 6) to lock the silencer (Item 5).

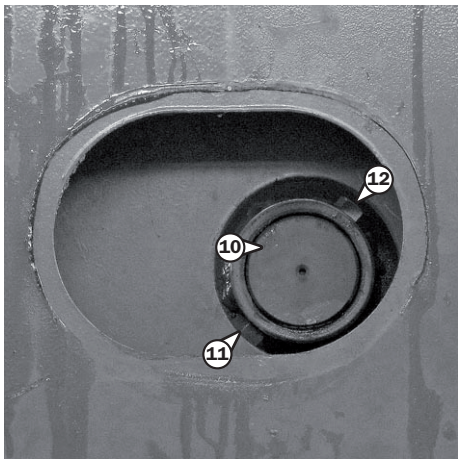


Remove the ropes and release the turret from the overhead crane.
Refit the cardan shaft (Item 7) under the truck by screwing in the screws (Item 8) from both sides.

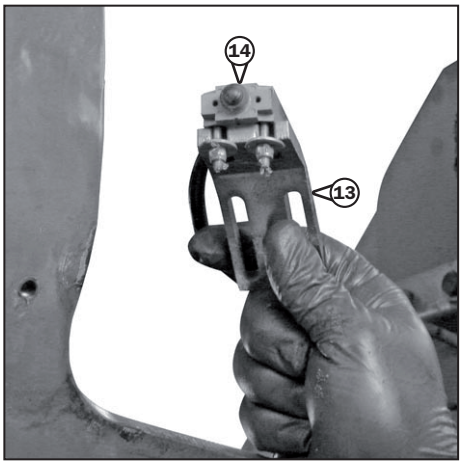


LIFTING CYLINDER REFIT ON THE TURRET

Replace the lifting cylinder (Item 9), using ropes and an overhead crane.

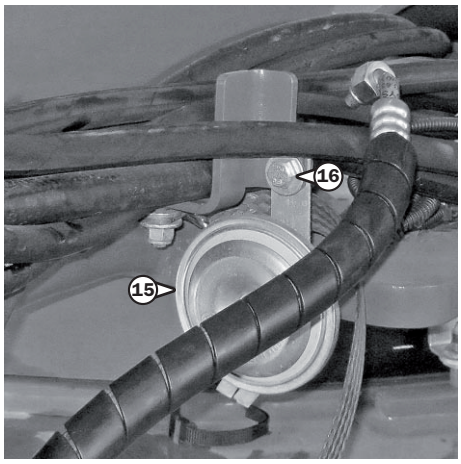


Insert the lifting cylinder locking pin (Item 10) in its seating and lock it by screwing in the screw (Item 11) and nut (Item 12).

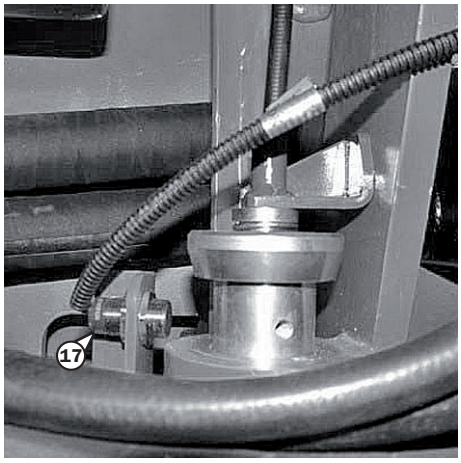


TURRET SENSORS REFIT

Replace the mounting (Item 13) and the maximum jib height microswitch (Item 14).

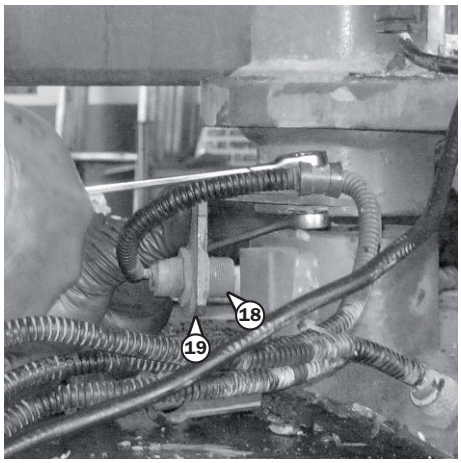


Refit the klaxon (Item 15) by screwing in the screw (Item 16).

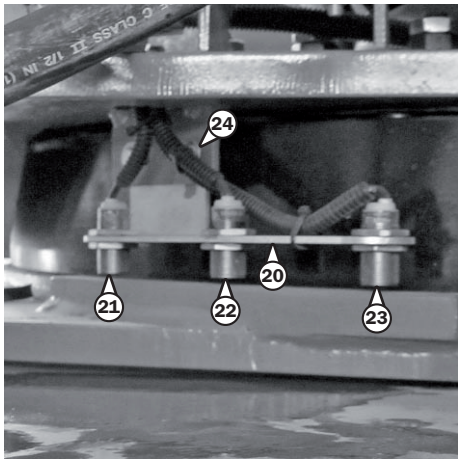


Refit the thrust ring locking pin presence sensor “I71” (Item 17).

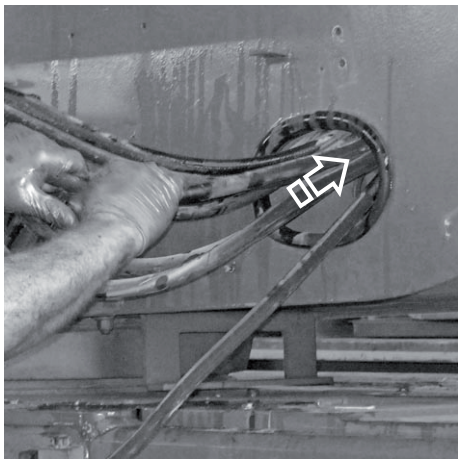
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Fit the thrust ring centring sensor “I15” (Item 18) on the bracket (Item 19) and lock it to the truck.

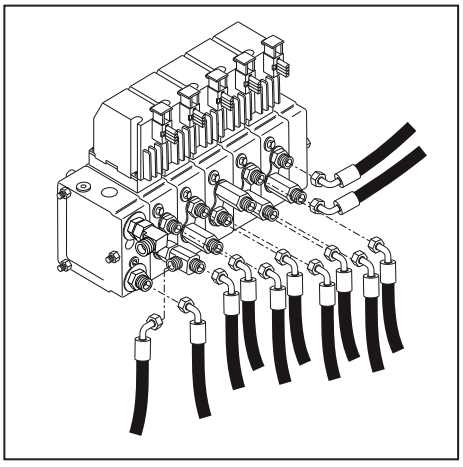


Refit the bracket (Item 20) that supports sensors “I14” (Item 21), “I74” (Item 22) and “I34” (Item 23) that detect rotation of the turret beyond 15° by screwing in the screws (Item 24).



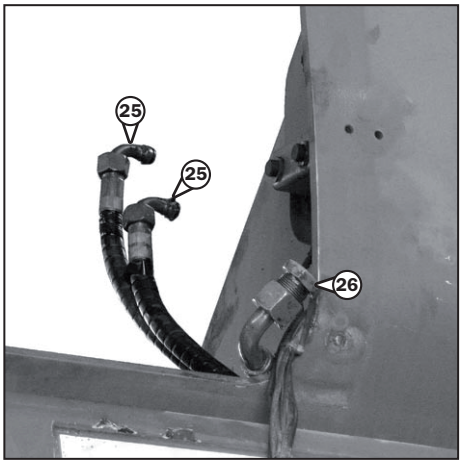
RECONNECT THE TURRET HYDRAULIC SYSTEM

Insert the hydraulic pipes into the slot in the turret.

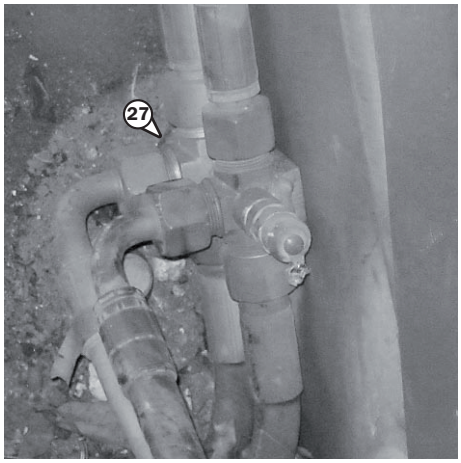


Reconnect all the hydraulic pipes to the distributor, following the marks made when removing them.

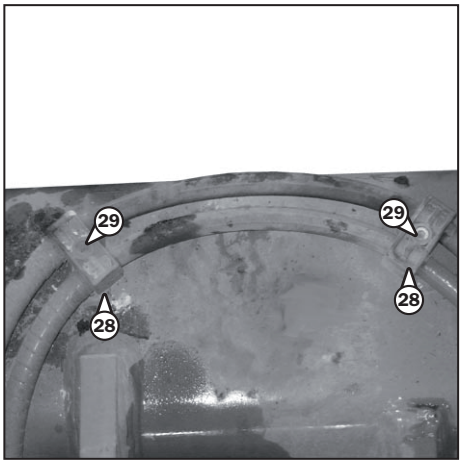
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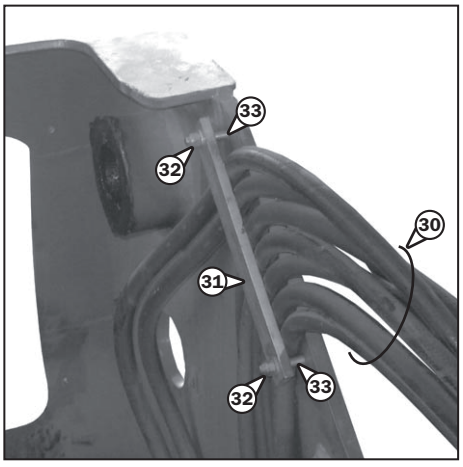
Reconnect the pipes (Item 25 and 26).



Refit the couplings (Item 27).

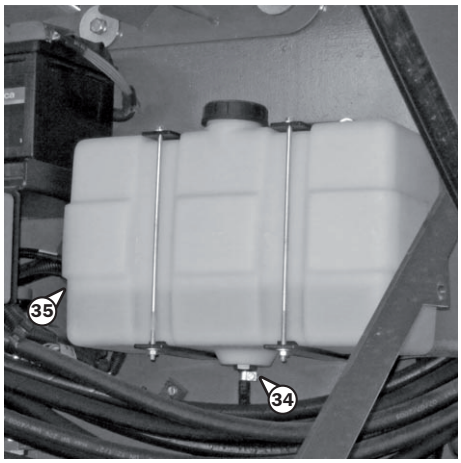


Refit the collars (Item 28) and screw in the screws (Item 29).



Lock the bundle of pipes (Item 30) with the plate (Item 31) by screwing in the screws and nuts (Item 32 and 33).

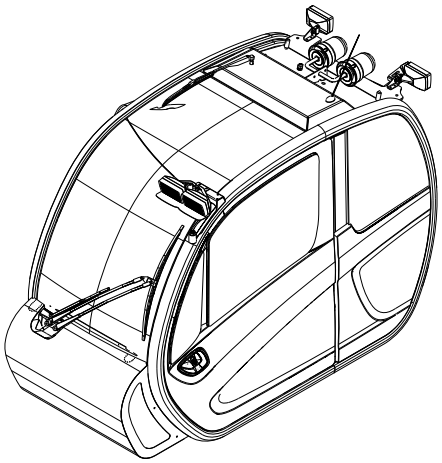
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Reconnect the fuel line (Item 34) to the tank (Item 35) or, if it was necessary to remove the tank, replace it on the truck.

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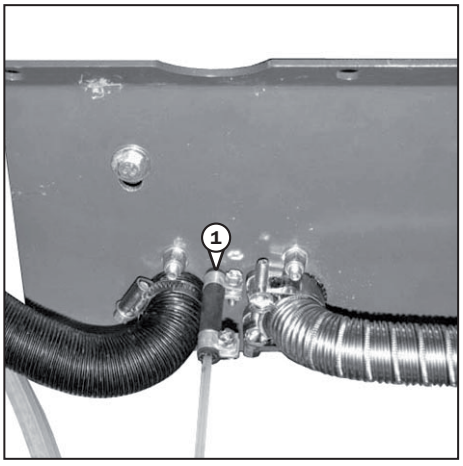
CAB REFIT



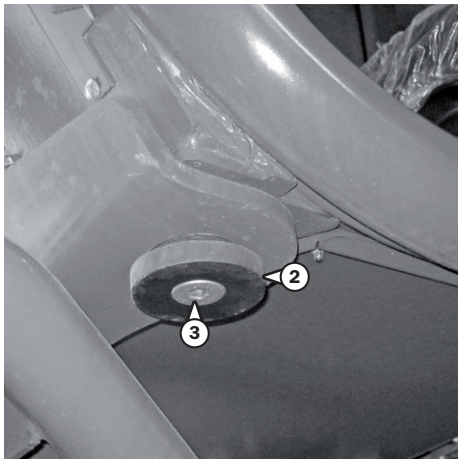


REPOSITIONING THE CAB

With the aid of ropes and an overhead crane, replace the cab on the truck.



Connect the heater fuel line (Item 1) from the rear of the mounting plate.

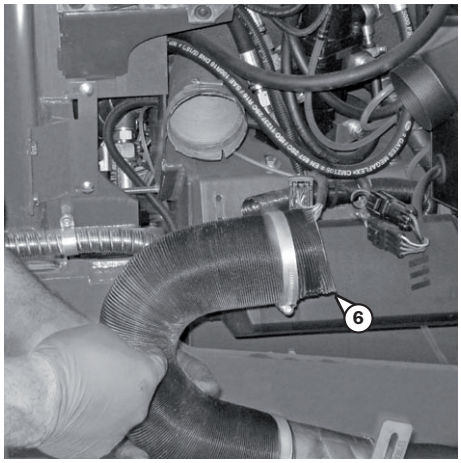


Fit the antivibration mounts (Item 2) by screwing in the screws (Item 3).

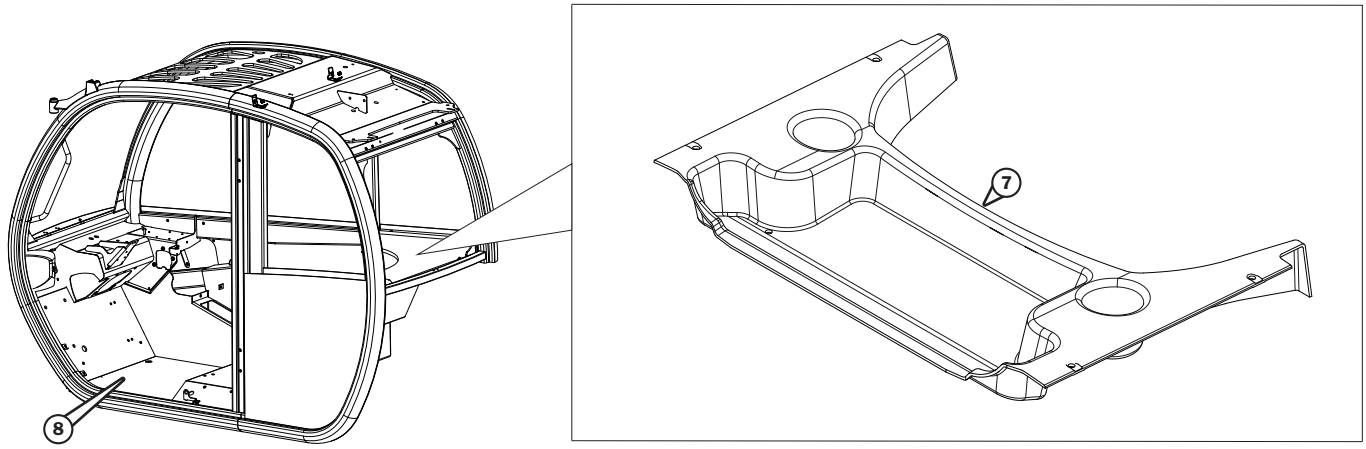
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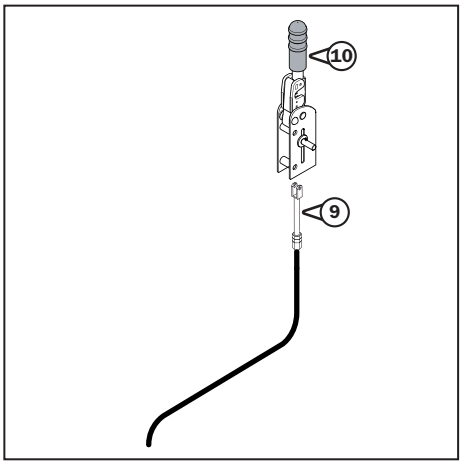


Fit the antivibration mounts (Item 4) by screwing on the nuts (Item 5).



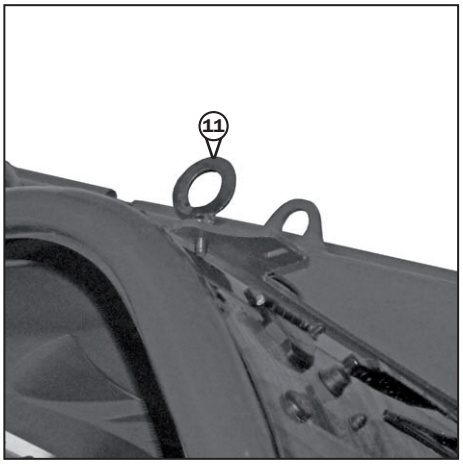
Refit the burner tube (Item 6), or its bracket, which may have been moved at the assembly stage, to reach the nuts locking the front right cab mounting.
Refit the plastic housing (Item 7) and the mat (Item 8).



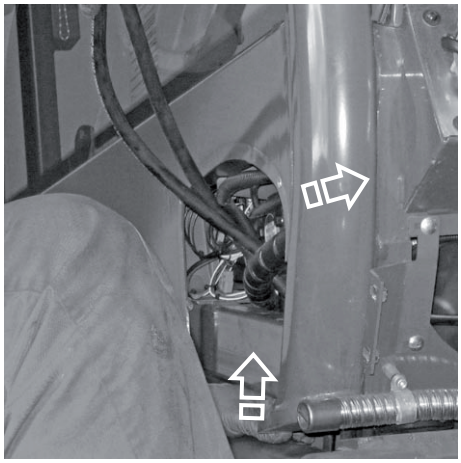


Reconnect the wire (Item 9) to the rotation locking pin lever (Item 10) inside the cab.

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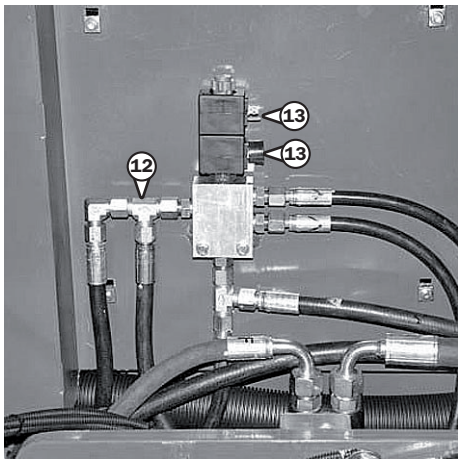


Remove the eyebolts (Item 11) from the cab.

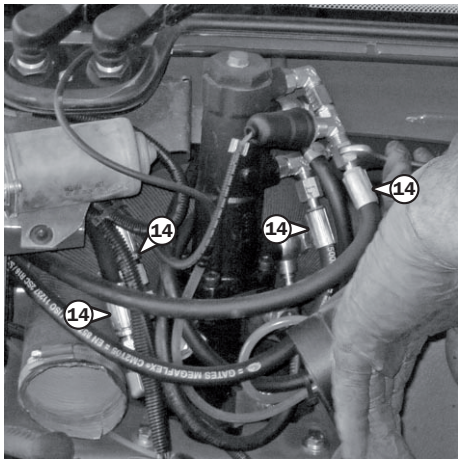


RECONNECT THE CAB HYDRAULIC SYSTEM

Insert the hydraulic braking system cables from under the cab and through the opening in the power steering housing and take them out to the front of the cab near the brake pump.



Reconnect all the hydraulic pipes according to the marks made with a paint brush when removing.
Reconnect the hydraulic pipe (Item 12) and coil (Item 13) of the slow/fast gear change electrovalve.

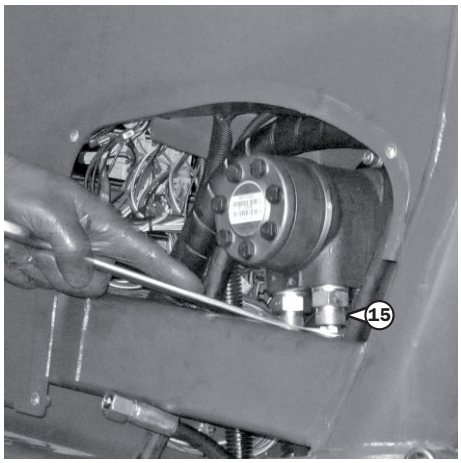


Reconnect all the hydraulic pipes (Item 14) to the brake pump.

Bleed the brakes:

40 - Brake control and adjustment

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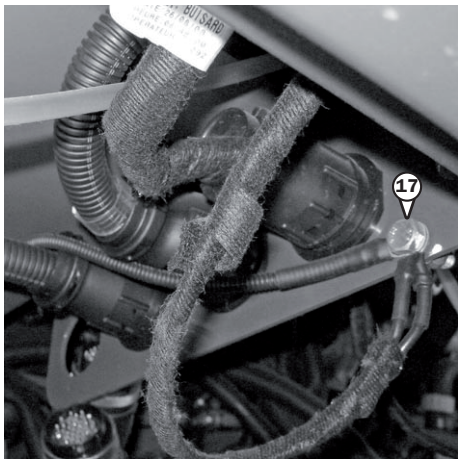


Reconnect the hydraulic pipes (Item 15) to the power steering.

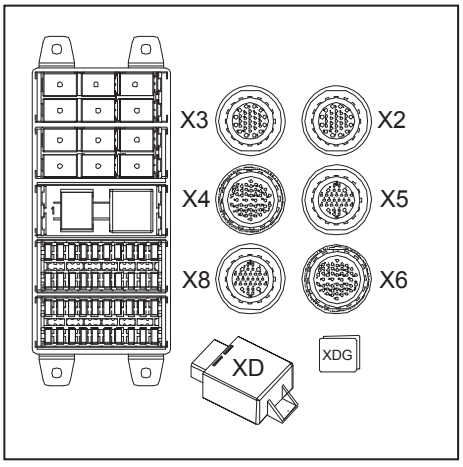


RECONNECT THE CAB ELECTRICAL SYSTEM

Reconnect the MSS system display (Item 16) to the instrument panel.

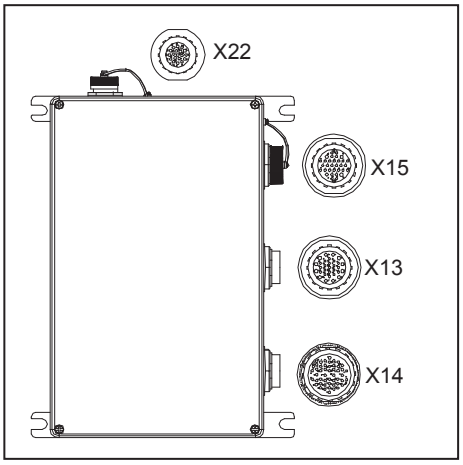


Reconnect the feed through electrical connectors under the cab and reconnect the ground cable (Item 17).

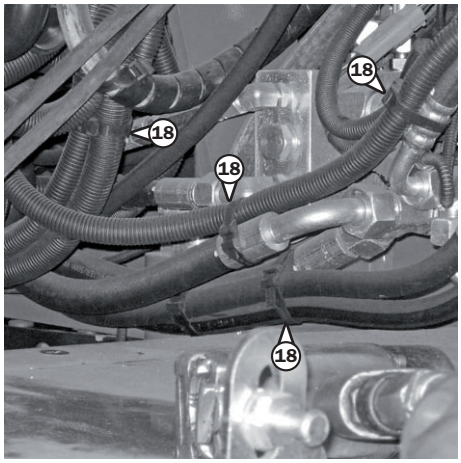


Reconnect all the connectors to the fuse box.

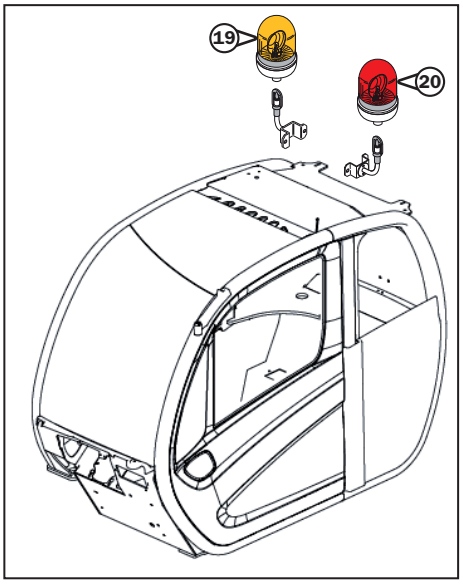
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Reconnect all the connectors to the logic box.



Secure the cables and pipes of the cab electrical and hydraulic system with clips (Item 18).

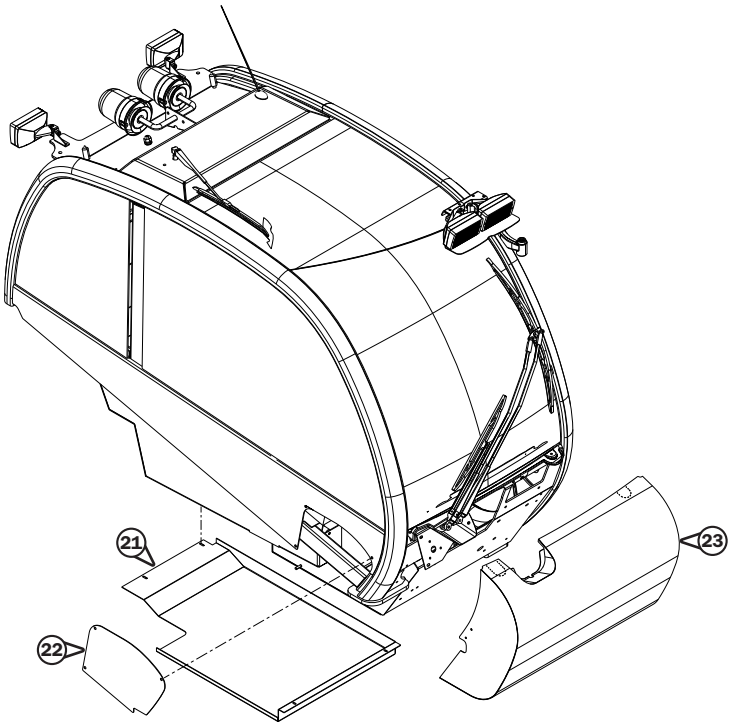


CAB HOUSING REFIT

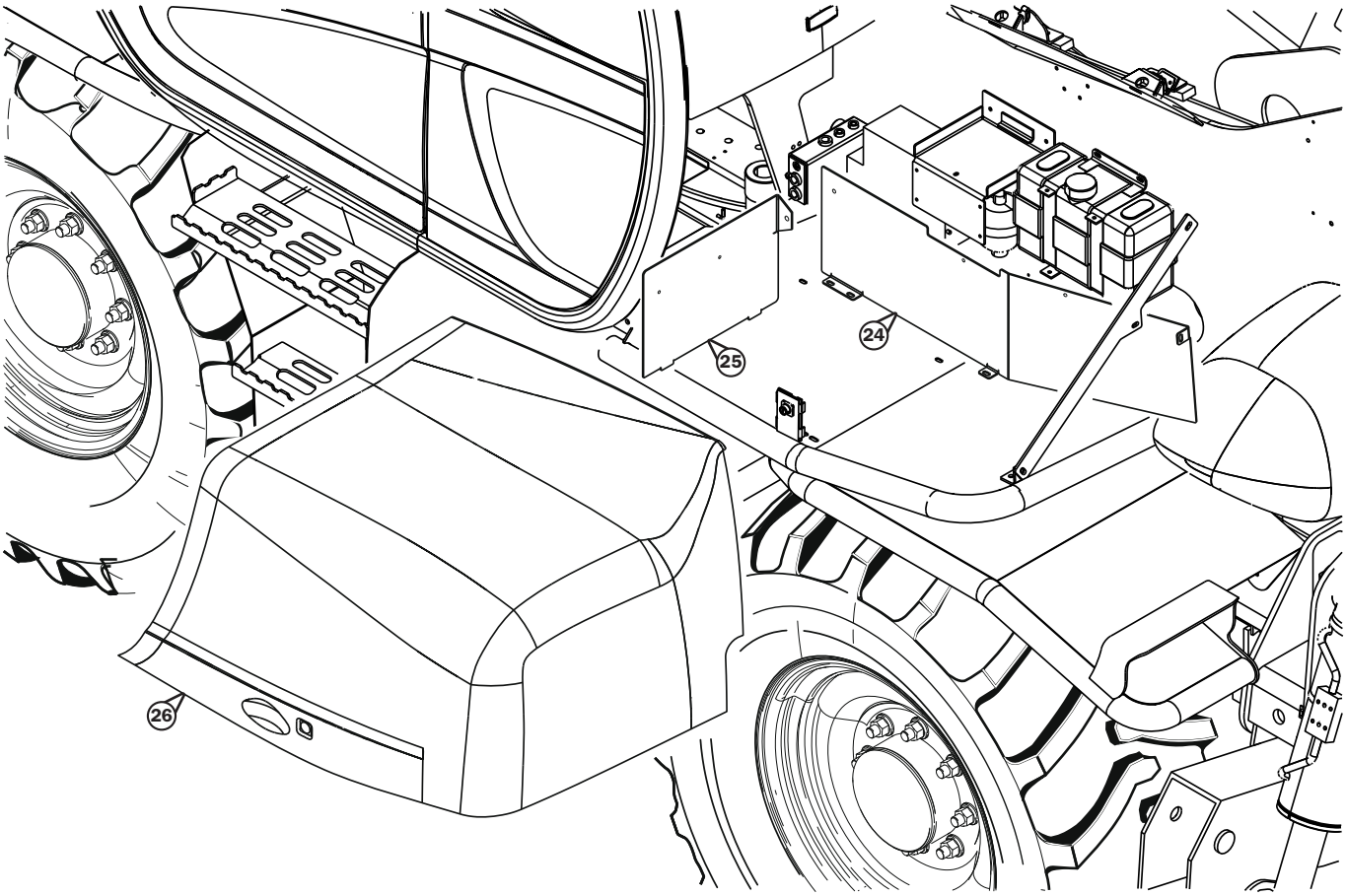
Reconnect the rotating lamp and emergency lamp (Item 19 and 20) to the cab.

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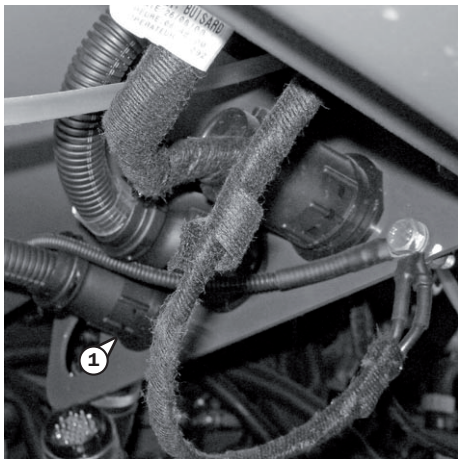
Refit the housing bay under the cab (Item 21), the power steering protective housing (Item 22) and the distributor cover (Item 23).



Refit the heating tank protective housing (Item 24), the logic box cover (Item 25) and the bonnet (Item 26).

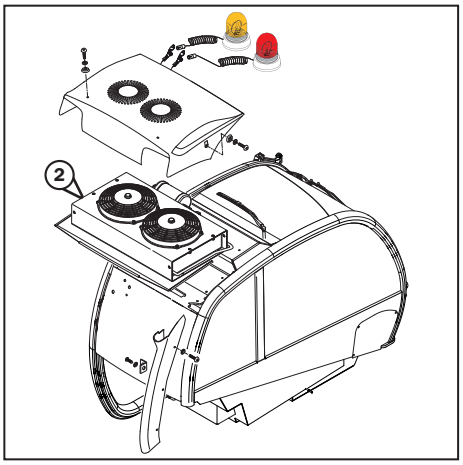


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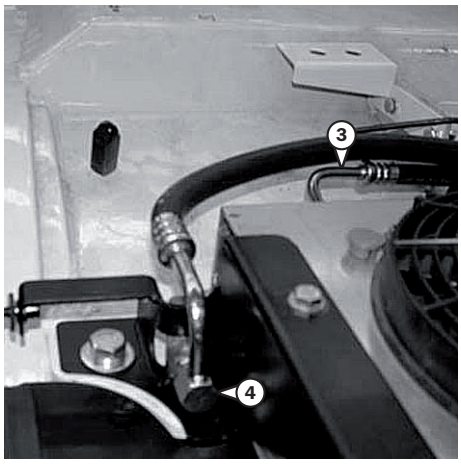


CONNECT THE AIR CONDITIONING TO THE CAB (OPTIONAL)

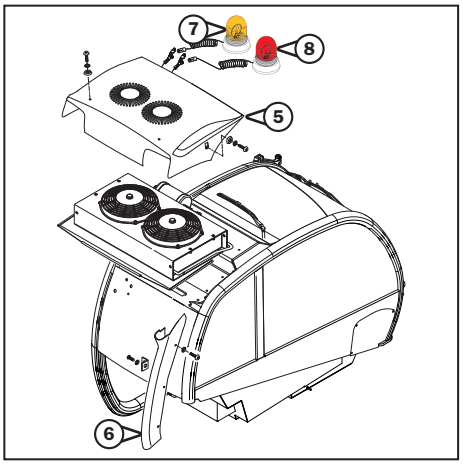
If air conditioning is fitted to the truck, it must be refitted after fitting the cab. Reconnect the feedthrough connectors (Item 1) for this option.



Refit the air conditioning system (Item 2).

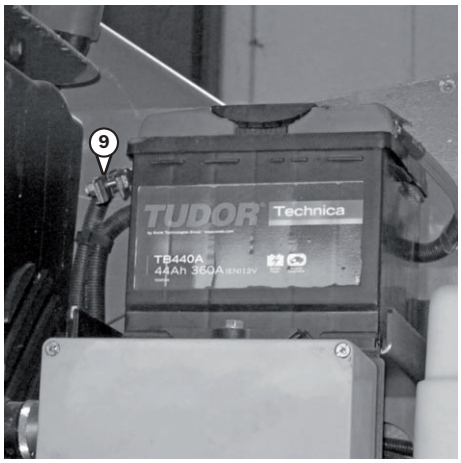


Reconnect the pipes (Item 3 and 4) to the air conditioning radiator unit.

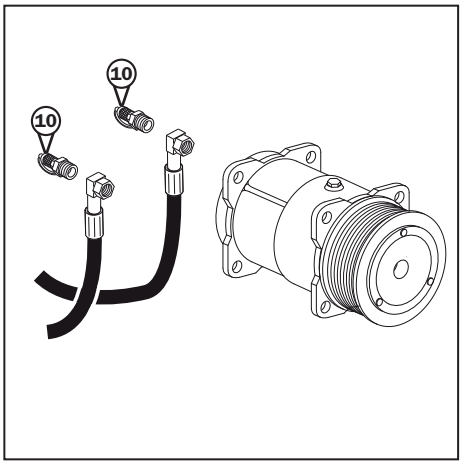


Refit the air conditioning radiator housing (Item 5) and the right rear duct (Item 6), refit the rotating lamp and emergency lamp (Item 7 and 8).

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Reconnect the negative ground (Item 9) of the additional battery for the air conditioning.



Connect, an air conditioning gassing plant to the appropriate couplings (Item 10), and charge the system with the appropriate gas.

110 - Options - Attachments

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