- ***GENERAL SAFETY STANDARDS***

- ***GENERAL FEATURES***

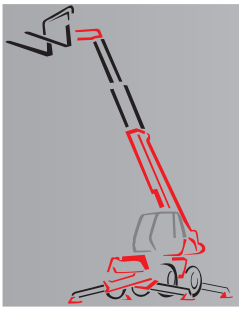
ENGINE

- *POSITION OF THE ENGINE COMPONENTS*
- *CHECKING AND ADJUSTING THE ENGINE*
- *REMOVING THE ENGINE*
- *REINSERTING THE ENGINE*

- *FEATURES AND TECHNICAL SPECIFICATIONS OF THE ENGINE*
- *CHECKING AND ADJUSTING THE ENGINE*
- *TROUBLESHOOTING IN THE ENGINE*
- *SPECIAL TOOLS FOR THE ENGINE*

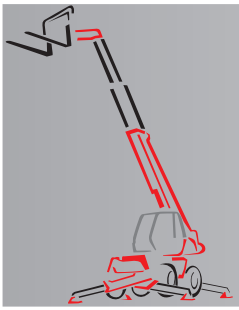
647173FR

(ENGINE 854E-E34TA)



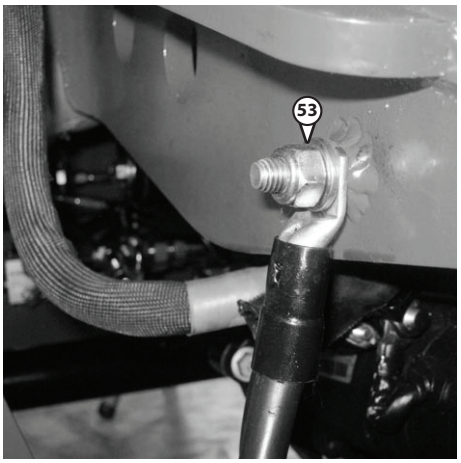
CHECKING AND ADJUSTING THE ENGINE

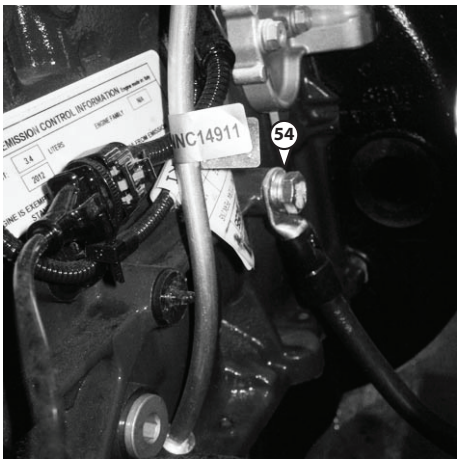
pages



REMOVING THE ENGINE

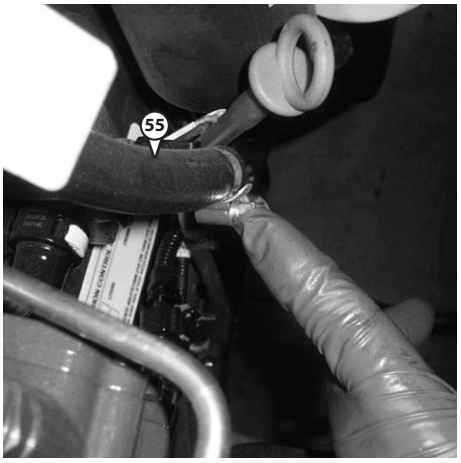
page



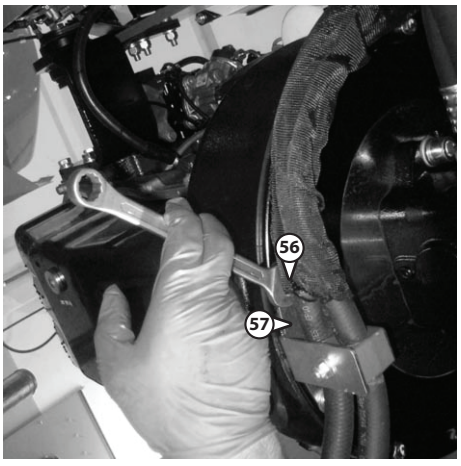


Disconnect the earth wires (Ref. 53) on the LH side of the engine compartment.

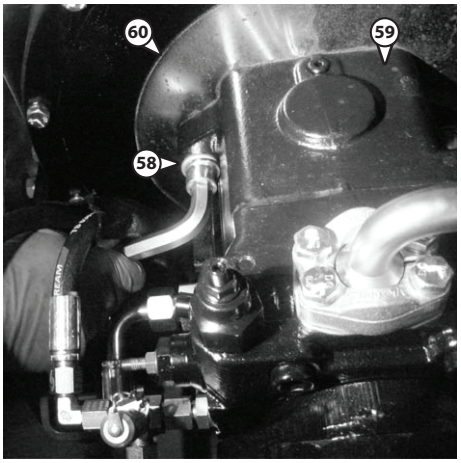
Disconnect the earth wires (Ref. 54) on the RH side of the engine.



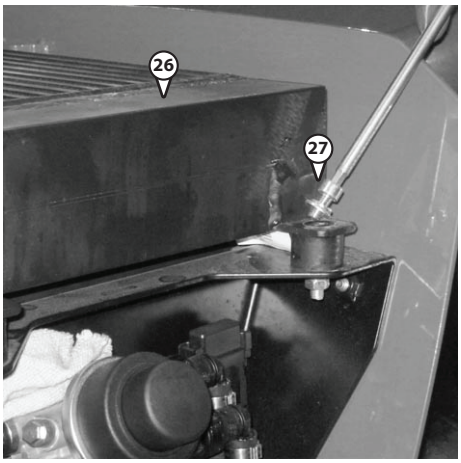
Disconnect the pipe (Ref. 55) from the fuel pump.



Slacken the screws (Ref. 56) to remove the engine support (Ref. 57).

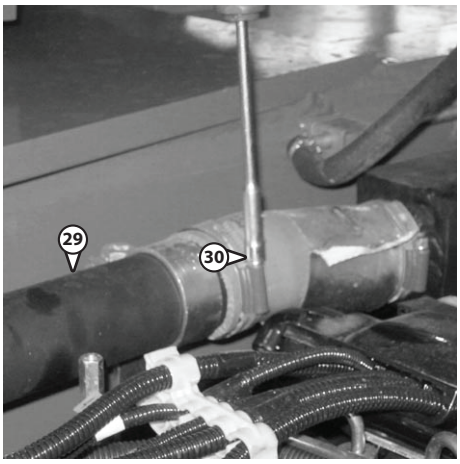


Slacken the screws (Ref. 58) which block the hydrostatic pump (Ref. 59)
on the engine (Ref. 60).

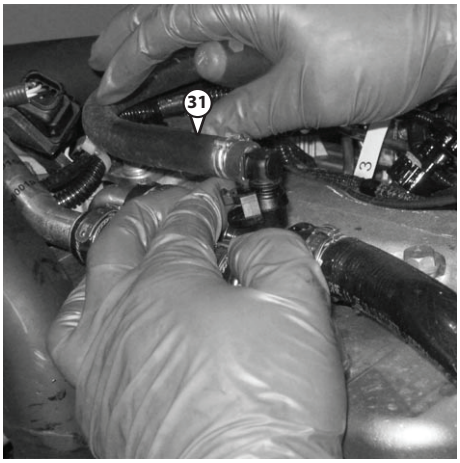


Refit the air cooling radiator (Ref. 26) on the engine compartment by means of the screws (Ref. 27).

Connect the connector (Ref. 28) on the fan.



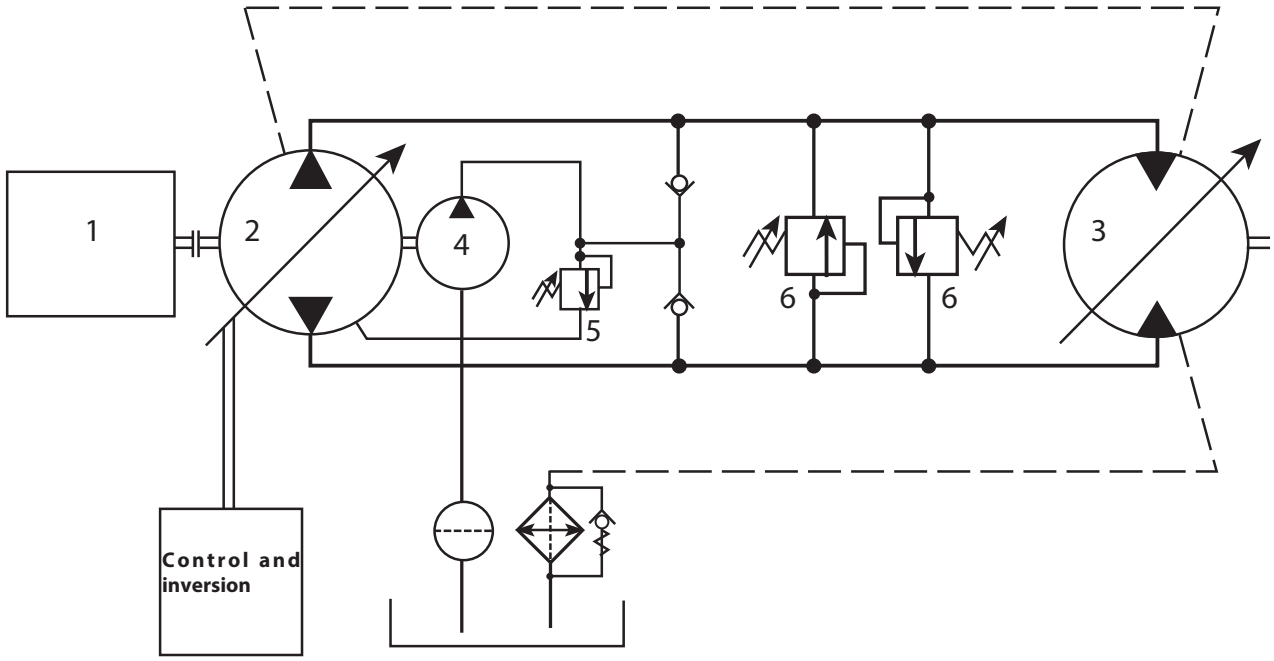
Connect the pipe (Ref. 8) on the air cooling radiator (Ref. 26) by screwing the clamp (Ref. 30).



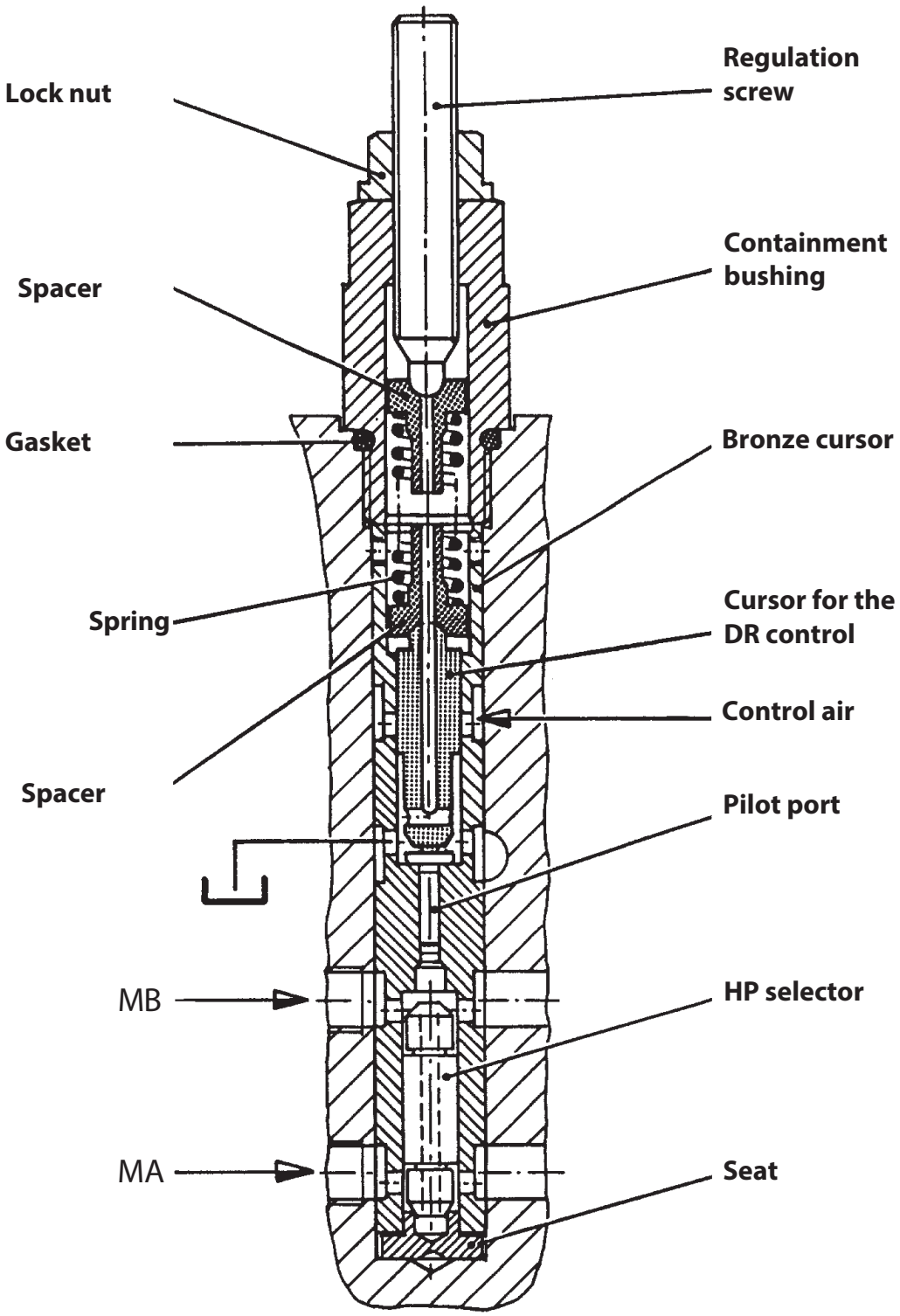
Connect the tube (Ref. 31) on the engine.

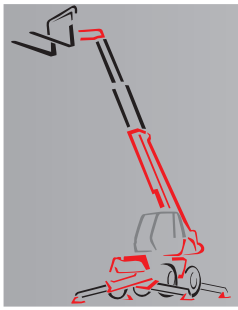
MAIN CIRCUIT OF HYDROSTATIC TRANSMISSIONS

1) 854E-E34TA series PERKINS engine.
2) A4 VG 56 DA 18 series variable displacement hydrostatic pump.
3) A6 VM 107 DA 1 series variable displacement hydrostatic motor.
4) Booster gear pump.
5) Booster pressure relief valve
6) High pressure valves.



CROSS-SECTION VIEW OF DR VALVE





CHECKING AND ADJUSTING THE TRANSMISSION

page

A6 VM 80 ENGINEBPRESSURE CONTROL POINTS

Note: The actual assembly of the motor differs from that shown in the Figure since it is rotated through 180°.

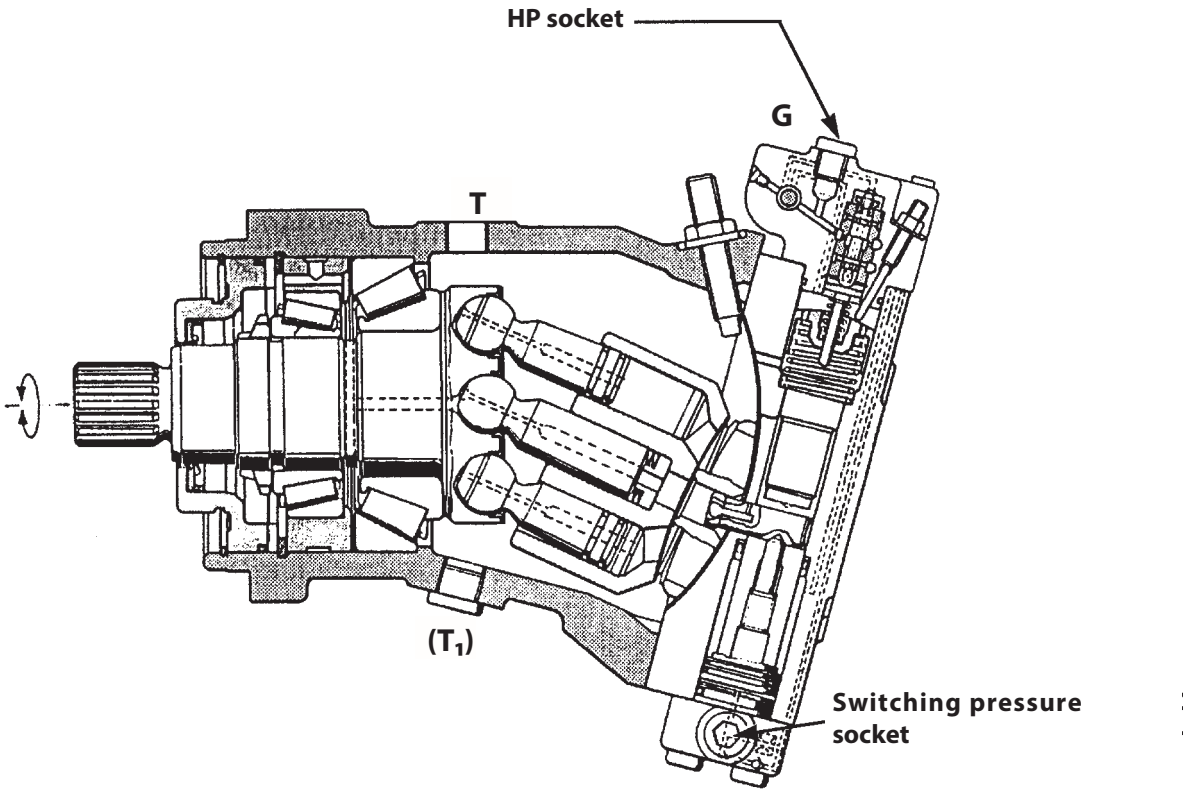
Necessary (the case must contain basic pressure gauge sockets Ref. 549671 + Hydromatik Kit Ref. 209572).

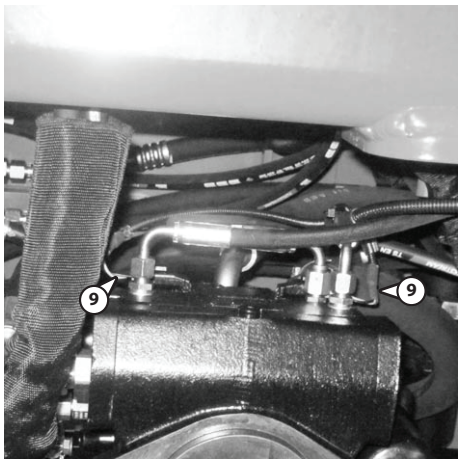
HIGH PRESSURE

- 1 Pressure gauge socket 58189 (Ref. 52) (M 14 x 150)
- 1 Pressure gauge (0 - 600 bar)
- Test flexible tubes 549887

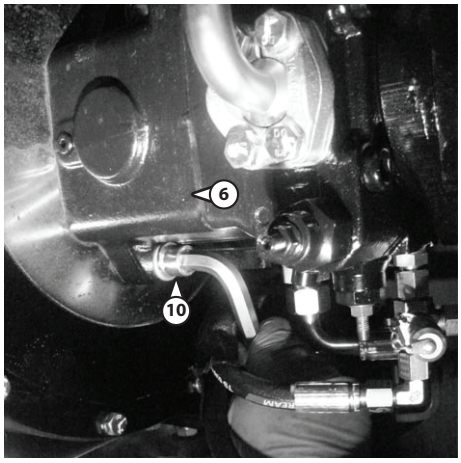
SWITCHING PRESSURE

- 1 Pressure gauge socket 477484 (Ref. 51) (M 12 x 150)
- 1 Pressure gauge (0 - 600 bar)
- 1 Test flexible tubes 549887



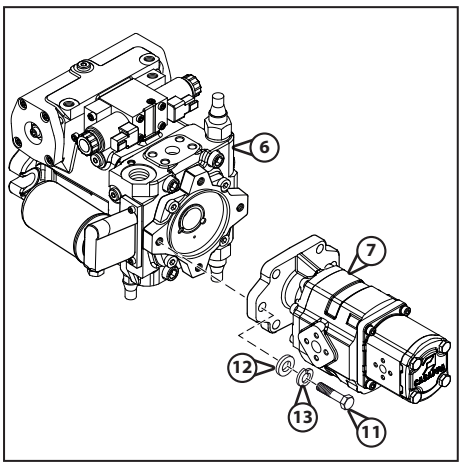


Disconnect all the electric connectors (Ref. 9) from the hydrostatic pump.

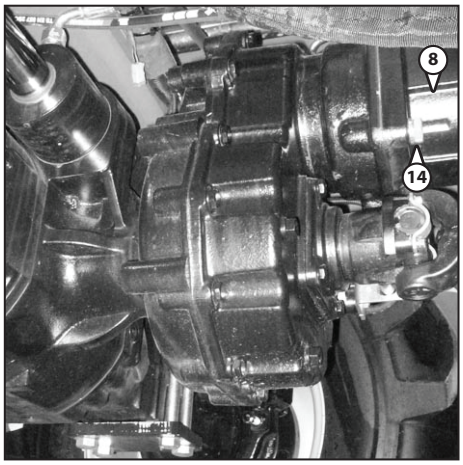


Secure the pumps by means of belts or ropes to an overhead crane, passing these through the central opening of the slewing ring bearing.
Remove the screws (Ref. 10) which secure the pump (Ref. 6) to the motor.

Place the pumps (Ref. 6 and 7) on a pallet jack and take these out of the vehicle.



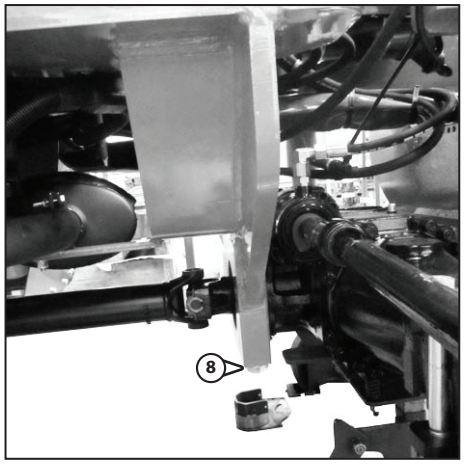
Slacken the screws (Ref. 11) and remove the washers (Ref. 12 and 13) to dismantle the hydrostatic pump (Ref. 6) from the services pump (Ref. 7).



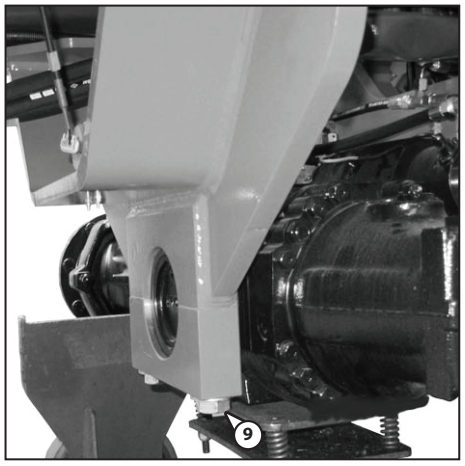
Slacken the screws (Ref. 14) which block the hydrostatic motor (Ref. 8) on the gearbox.

Place the motor (Ref. 8) on a trolley and remove it from the front axle reducer so that it comes to rest on the trolley.
Remove it from under the vehicle.

Ref.	Number	Description	Qty.
1	**549 671**	**Standard box**	**1**
2	549 882	1/9 bar Pressure gauge	1
3	549 883	0/40 bar Pressure gauge	1
4	549 884	0/60 bar Pressure gauge	2
5	549 885	0/400 bar Pressure gauge	1
6	549 886	0/600 bar Pressure gauge	2
7	549 887	Hose	4
8	549 888	Hose for MANISCOPIC	2
9	549 889	Fitting for pressure gauge	7
48	**209 572**	**HYDROMATIK Kit**	**1**
49	58 181	8x100 fitting for pressure gauge	3
50	58 197	O-ring ø 8	6
51	477 484	12x150 fitting for pressure gauge	5
52	58 189	14x150 fitting for pressure gauge	1
53	477 485	16x150 fitting for pressure gauge	2
53-1	199 175	18x150 fitting for pressure gauge	1
54	173 568	Connector ø 20	1
55	165 711	M/F adapter connector - ø8L + M8x100	2
58	706 653	M/F adapter connector - ø6L + M8x100	2
		By-pass valve TH7	
56	191 000	Hose	1
57	491 632	Connector (M14x150)	1



Secure the rear axle to an overhead crane or elevator suitable for the weight to be supported.
Slacken the screws (Ref. 8) fixing the rear axle to the front of the chassis, taking care to mark the bracket and the chassis for correct reassembly.



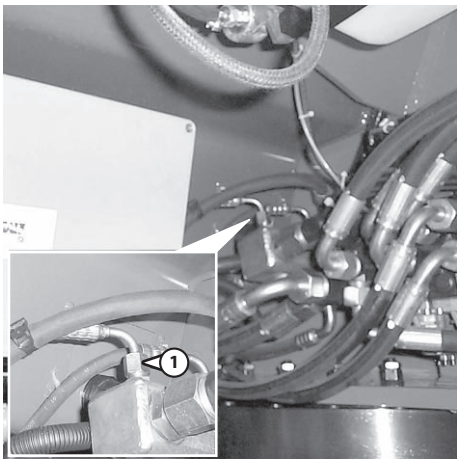
Slacken the screws (Ref. 9) fixing the rear axle to the rear of the chassis, taking care to mark the bracket and the chassis for correct reassembly.

Remove the rear axle from the vehicle.

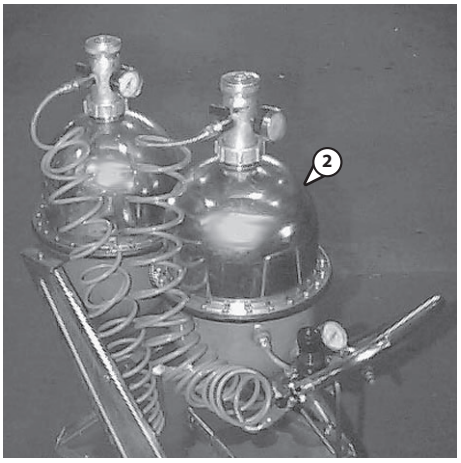
BRAKE

- *FEATURES AND TECHNICAL SPECIFICATIONS OF THE BRAKES*
- *POSITION OF THE BRAKES COMPONENTS*
- *CHECKING AND ADJUSTING THE BRAKES*
- *SPECIAL TOOLS FOR THE BRAKES*

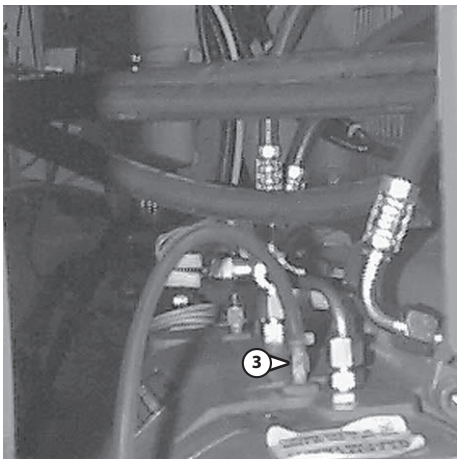
BRAKES BLEEDING PROCEDURE



Disconnect the drainage pipe (Ref. 1) of the brakes fluid tank and fit a hydraulic sealing cap.
Fill the brakes fluid tank completely.



Connect the brakes bleeding device (Ref. 2) on the tank **S** (see "Brakes system layout"), on the dashboard.



Slacken the two bleed screws (Ref. 3) on the front axle and fit the transparent tubes on them.
Pressurise the brake bleed device, and wait for the air to flow out completely through the transparent tubes.
Retighten the two bleed screws (Ref. 3) of the front axle.
Make sure the brake pump stroke is normal.
If this is not the case, adjust the brakes.
(◁ 30-06 - REMOVING THE AXLE).

– When the brakes bleeding procedure is complete, reconnect the hydraulic tube (Ref. 1) to the exhaust manifold.

BOOM WITH THREE EXTENSIONS

Consists of four elements:

- 1 FIXED
- 3 MOVABLE (T1 - T2 - T3)

Distribution:

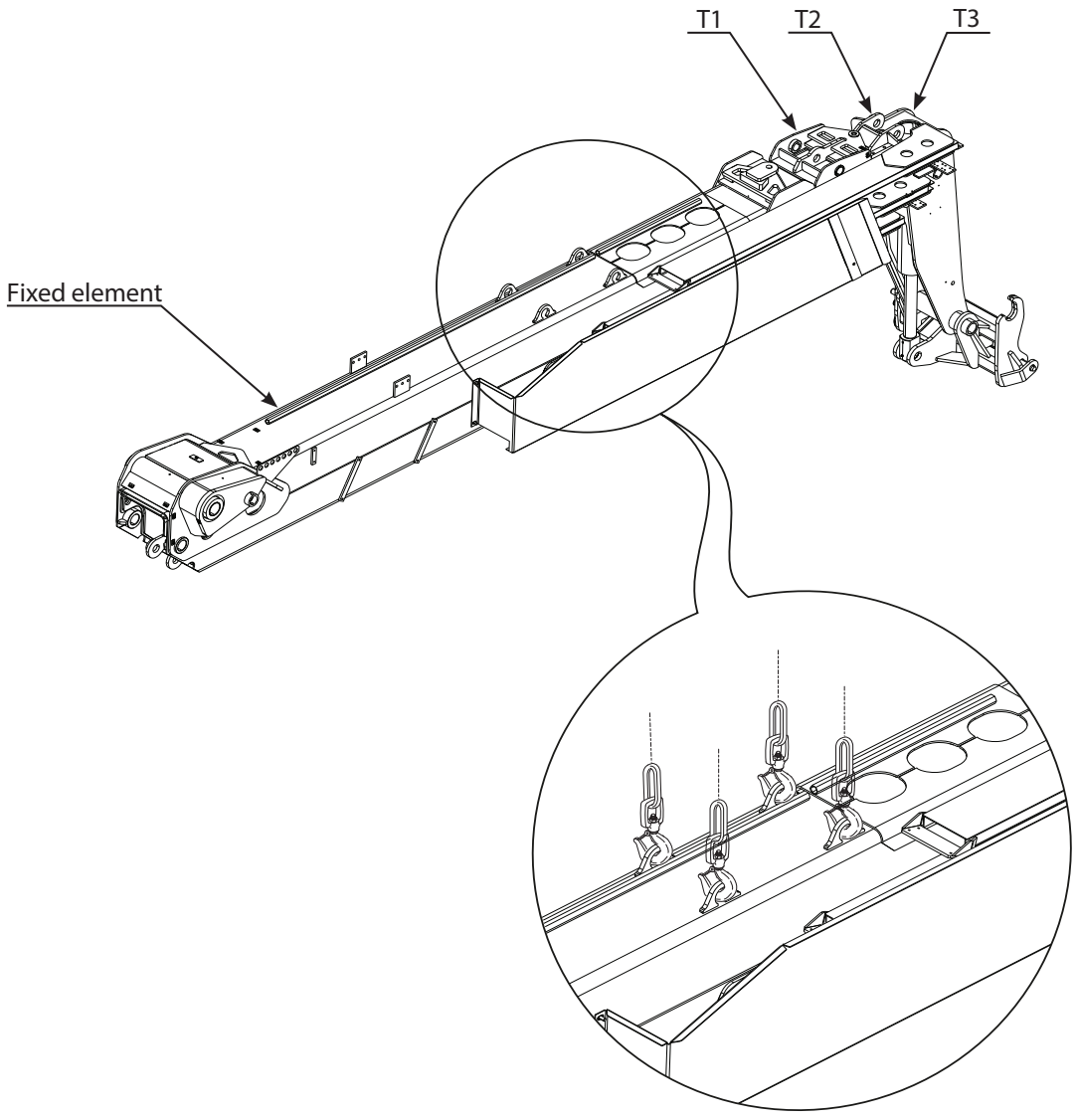
Distribution of boom with three extensions controlled simultaneously.
⇒ T1, T2 and T3 are extended simultaneously.

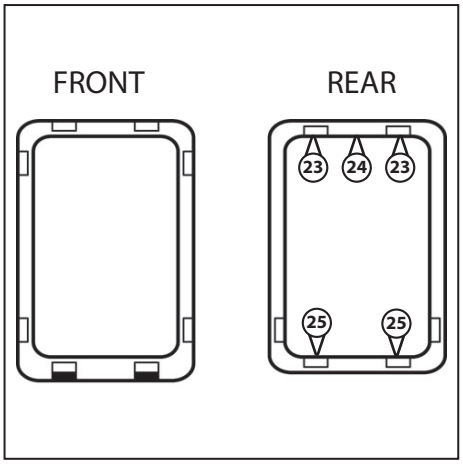
Vehicles with boom with three extensions:

– **MRT 1840 ST3B**

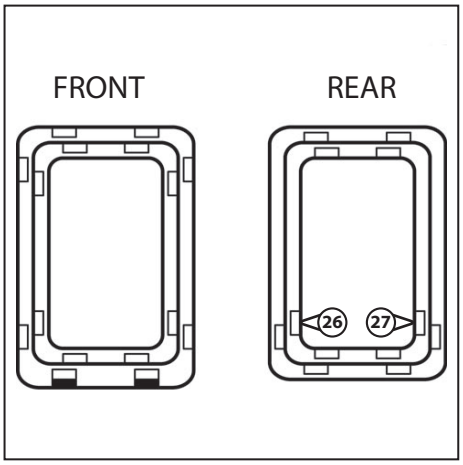
Boom weight:

Vehicle	*Boom weight:*
MRT 1840	2941 kg



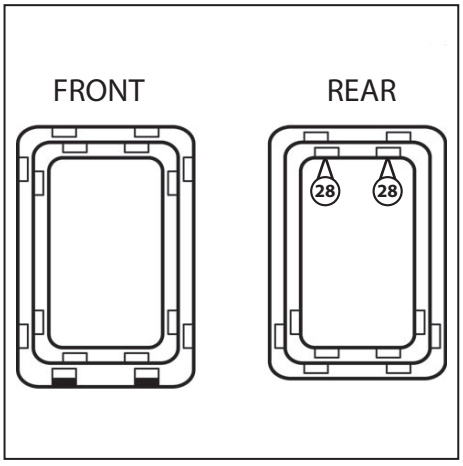


Retract the II extension boom in the I extension boom completely.
Make sure the two rear upper sliding blocks (Ref. 23) of the II extension boom adhere perfectly to the upper surface of the I extension boom, using shims, if necessary.
Block the upper part of the telescopic boom with a clamp, on the rear side (Ref. 24) to fit the lower sliding blocks (Ref. 25), using shims, if necessary.
Block the sliding blocks by means of fixing screws.
Remove the clamp.

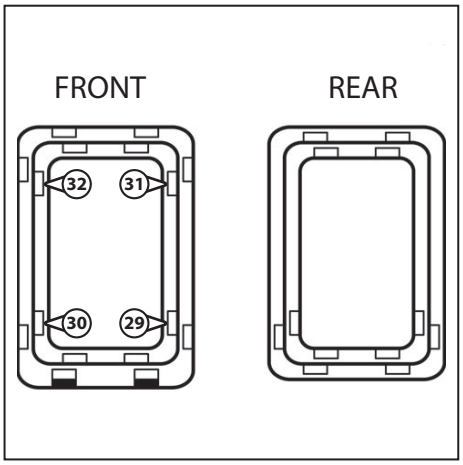


Align the II extension boom in relation to the I extension boom.
Insert the lateral sliding blocks (Ref. 26 and 27) in the rear lower part of the Ist extension boom, using shims if necessary, and block.

Note: the shims of the sliding blocks (Ref. 26 and 27) may be different.

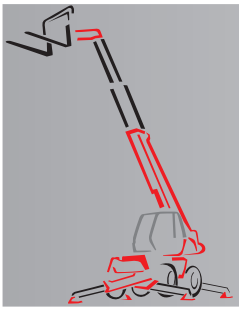


Extend the II extension boom from the I extension boom by about 0.5m.
Insert the sliding blocks (Ref. 28) in the upper part of the Ist extension boom, in the front, using shims if necessary, and block.



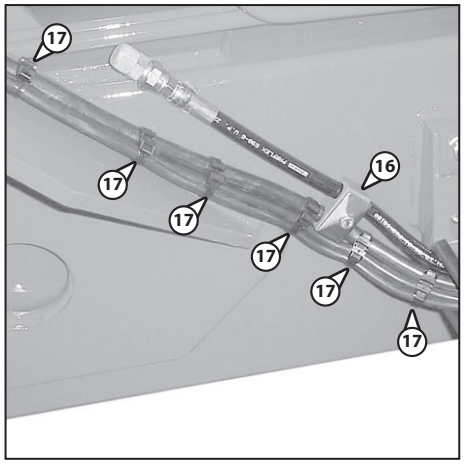
Align the II extension boom in relation to the I extension boom.
Insert the lateral sliding blocks (Ref. 29 and 30) in the front lower part of the Ist extension boom, using shims if necessary, and block.
Insert the sliding blocks (Ref. 31 and 32) in the upper part, using shims if necessary, and block.

Note: the shims of the sliding blocks (Ref. 29, 30, 31 and 32) may be different.



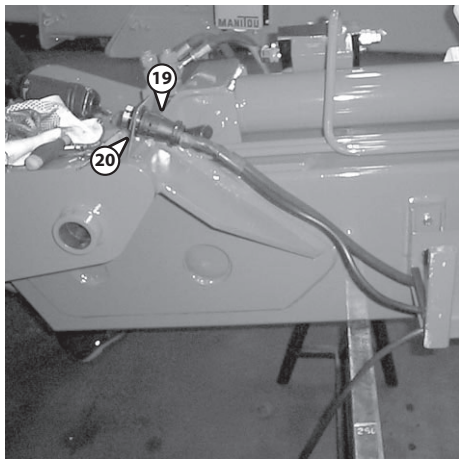
BOOM REMOVAL

page



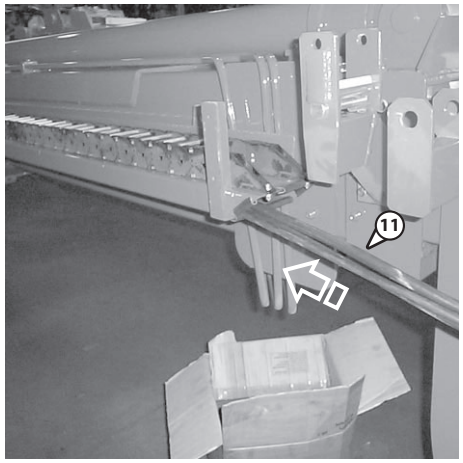
Release the electric cables and hydraulic tube in the rear part of the tubular element by removing the collar (Ref. 16) and all the clamps (Ref. 17).

Release the electric cables and the hydraulic drainage tube from the sheath (Ref. 18).



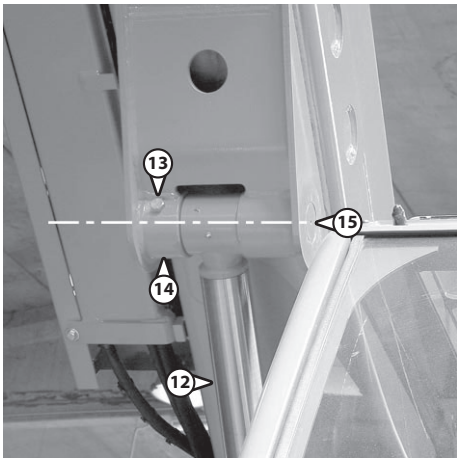
Disconnect the multiple power socket (Ref. 19) for the platform from the pinholder plate (Ref. 20).

Remove the plate (Ref. 20) for the electric socket at the back on the RH of the outer boom.

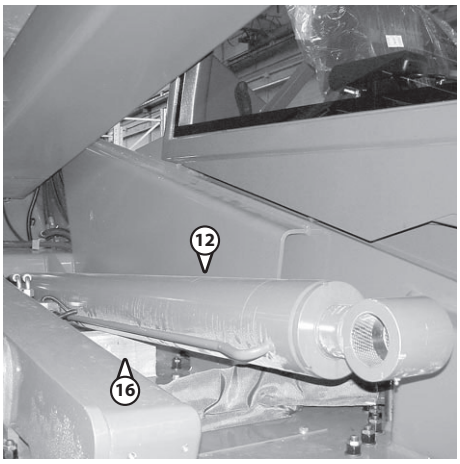


Remove the cables (Ref. 11) for the platform socket and the hydraulic tube for drainage (Ref. 4) at the top of the boom, completely, from the back of the chainholder tube.

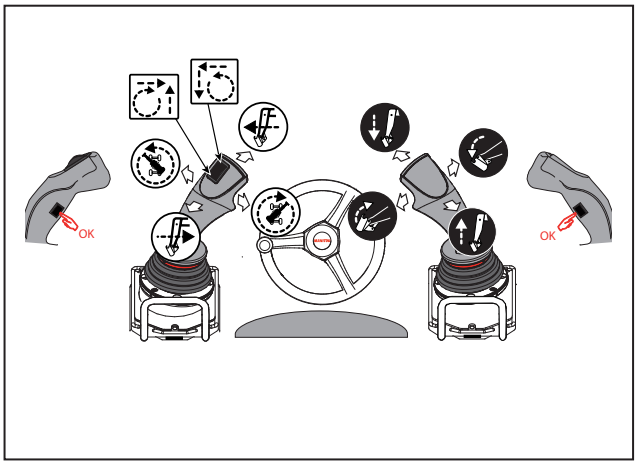
Secure the boom to an overhead crane or an elevator by means of the eyelets provided for the purpose (Ref. 11) in the upper part of the boom.



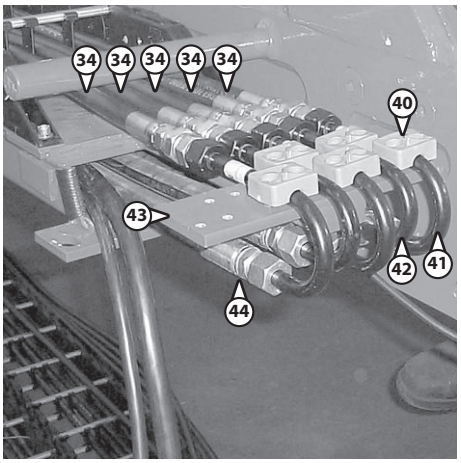
Secure the lift cylinder (Ref. 12) to a support.
Slacken the stop screw (Ref. 13), the nut (Ref. 14) and remove the lift cylinder hinge pin (Ref. 15) of the rod-boom side.



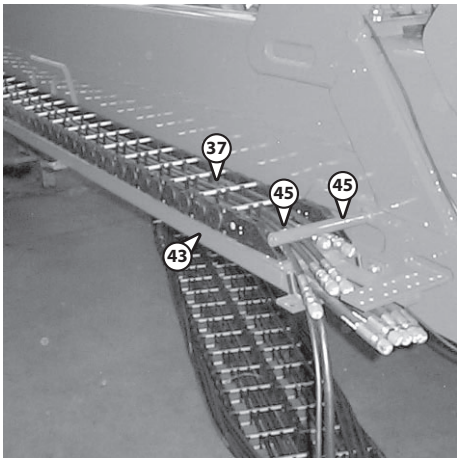
Place the lift cylinder (Ref. 12) on the turret, resting it on a wooden beam (Ref. 16) and retract the rod using the control in the cab.
Lower the telescopic boom to an almost horizontal position by acting on the overhead crane or elevator used.
Stop the I.C. engine.
Reactivate the ignition key to position "I" (ignition key-dashboard contact) and carry out all possible movements with the commands to discharge residual pressure from the hydraulic circuit.
Deactivate the ignition key and disconnect the terminals from the battery.



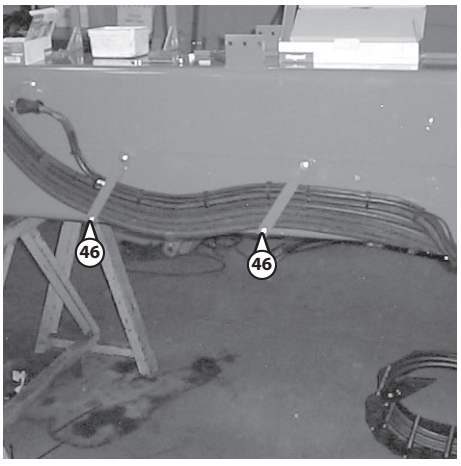
50



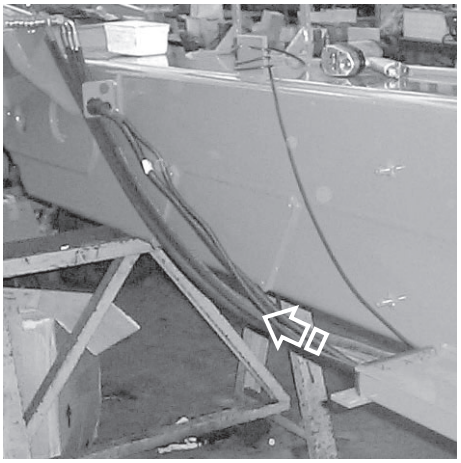
Remove the locking collars (Ref. 40) of the iron tubes (Ref. 41 and 42) from the fixing plate on the outer boom chain-holder tube (Ref. 43).
Disconnect the iron tubes (Ref. 41 and 42) from the hydraulic pipes (Ref. 34) inside the first tube-holder chain; disconnect the iron tubes (Ref. 41 and 42) from the hydraulic pipes (Ref. 44) inside the outer boom chain-holder tube.
During this operation, mark the hydraulic tubes for correct reassembly.



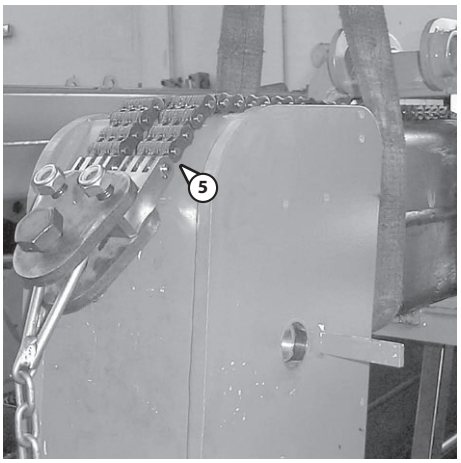
Dismantle the first tube-holder chain (Ref. 37) from the chain-holder tube (Ref. 43) by removing the screws concerned (Ref. 45).



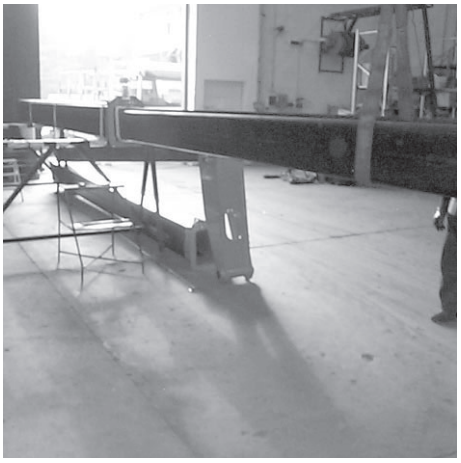
Free the hydraulic pipes and electric cables from the outer boom by removing the brackets (Ref. 46).



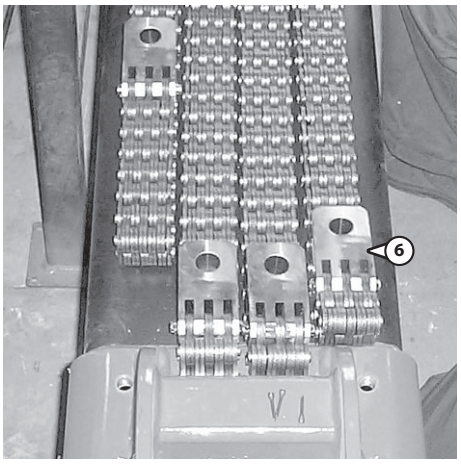
Remove the hydraulic pipes and electric cables from the chain-holder tube.



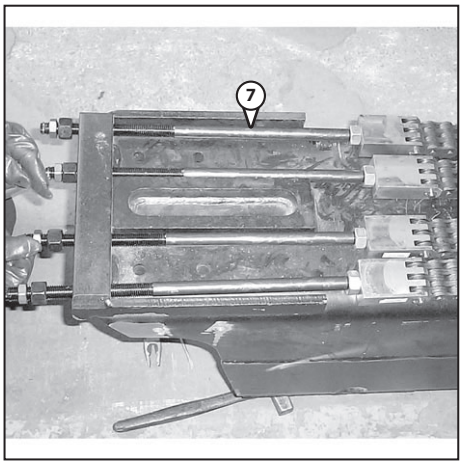
Secure the chains (Ref. 5) to the III extension boom.



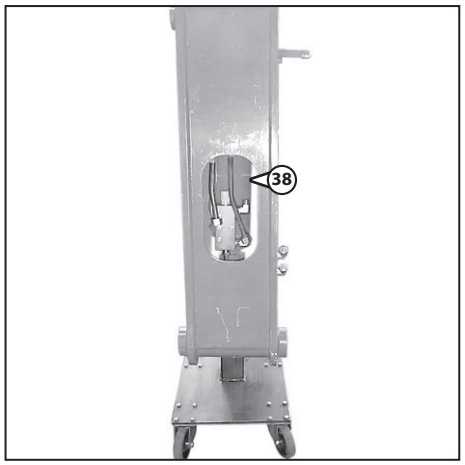
Using an overhead crane or elevator, extend the III extension boom from the II extension boom, keeping the chains resting on the upper part stretched taut, as they can get entangled.



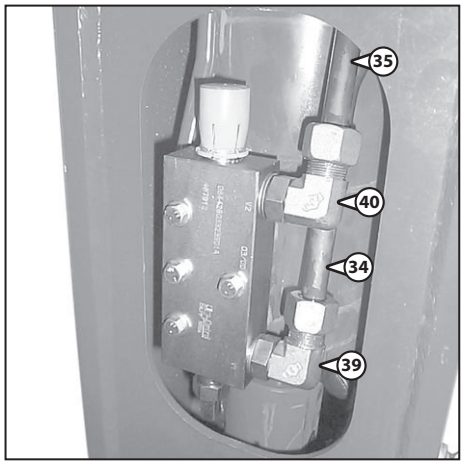
Remove the upper end connectors in the front part of the four chains (Ref. 6) for extension of the II extension boom.



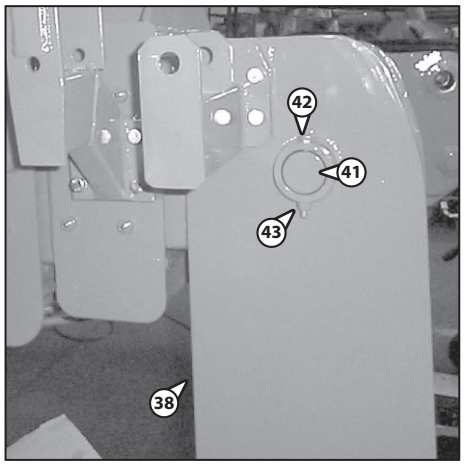
Remove the tierods (Ref. 7) fixing the II extension boom extension chains, through the holes provided at the tail end of the II extension boom.



Insert the slewing cylinder (Ref. 38) in the seat in the telescopic boom.

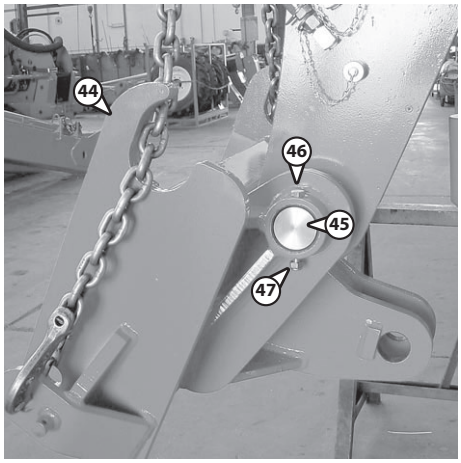


Screw the iron tube through two turns of the thread on the valve on the slewing cylinder.
- Fit the iron tube (Ref. 34) to the union (Ref. 39).
- Fit the iron tube (Ref. 35) to the union (Ref. 40).



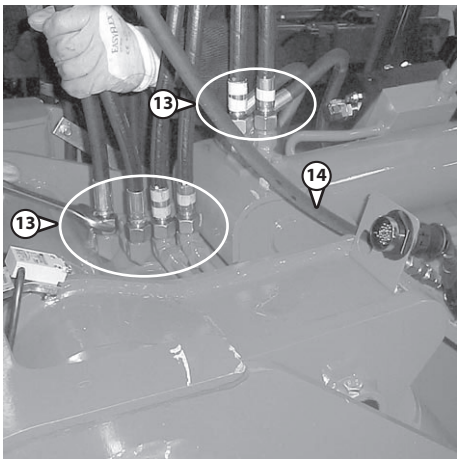
Grease the slewing cylinder hinge pin (Ref. 41) at the II extension boom and insert it in the hole provided.
Fit the screw (Ref. 42) and the pin locking nut (Ref. 43).

Using an overhead crane, insert the quick-coupling (Ref. 44) in the seat on the II extension boom.

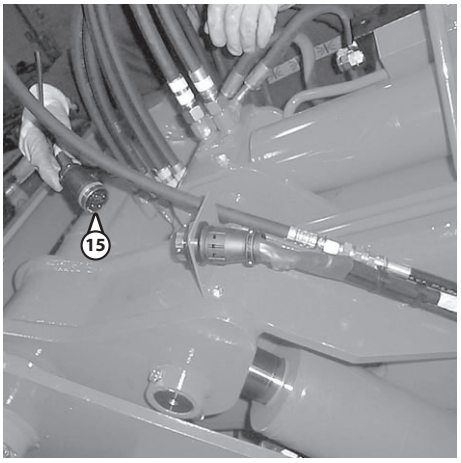


Grease the quick-coupling (Ref. 44) hinge pin (Ref. 45) at the II extension boom and insert it in the hole provided.
Fit the screw (Ref. 46) and the quick-coupling hinge pin locking nut (Ref. 47).

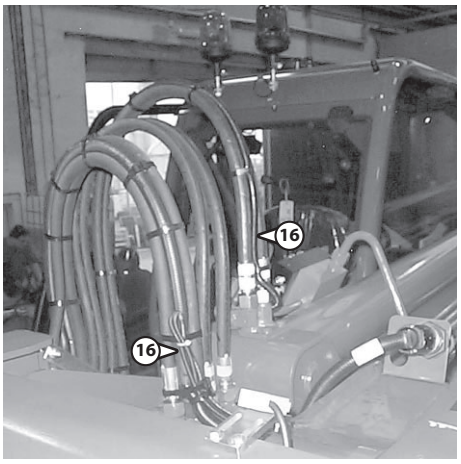
50



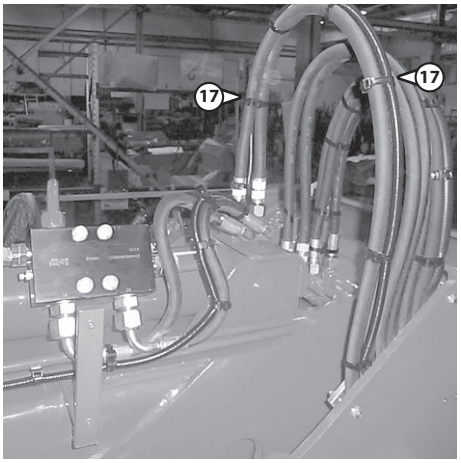
Reconnect the hydraulic pipes (Ref. 13) for the boom supply, taking care to make sure the connections are correct.
Reconnect the ducting tube (Ref. 14) for drainage at the head of the boom, if present.

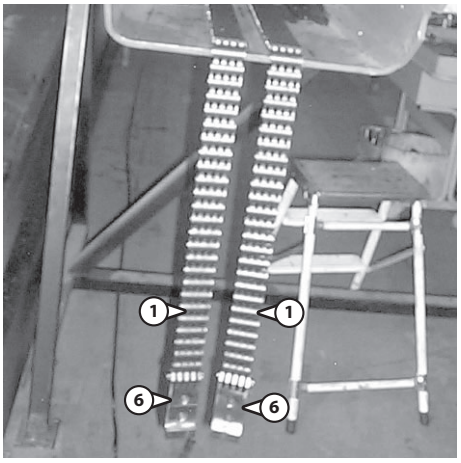


Adjust the ring nut concerned to connect the plug-wiring (Ref. 15) on the back of the boom, if present.

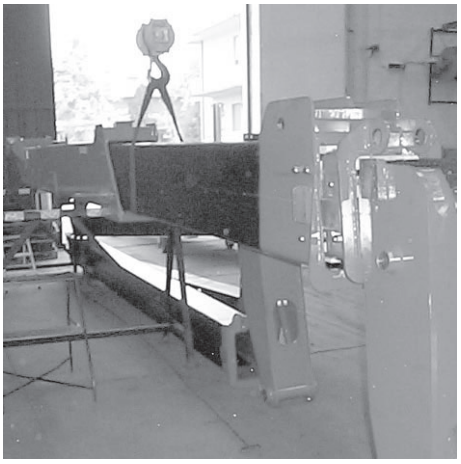


Restore the clamps of the hydraulic tubes and electric cables (Rif. 16) and (Rif. 17) placed in the upper part at the back of the boom.





Fit the end connectors (Fig. 6) at the rear end of the chains (Ref. 1) and stretch these towards the rear of the outer boom.

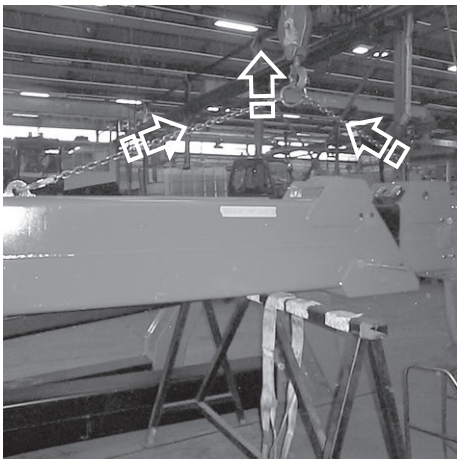


REFITTING THE I°, II° AND III° EXTENSION BOOMS IN THE OUTER BOOM

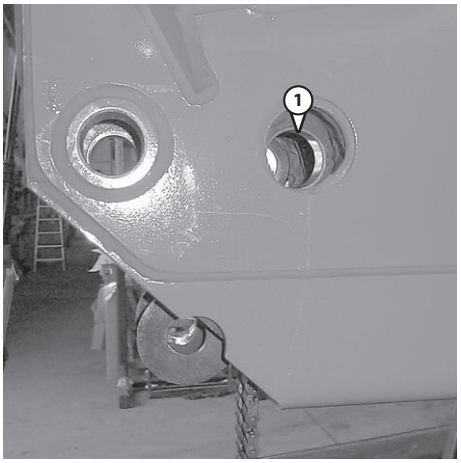
Using an overhead crane or elevator, insert the I, II and III extension booms into the outer boom leaving them projecting by about 30-35 cm to make it easier to fit the front sliding blocks.

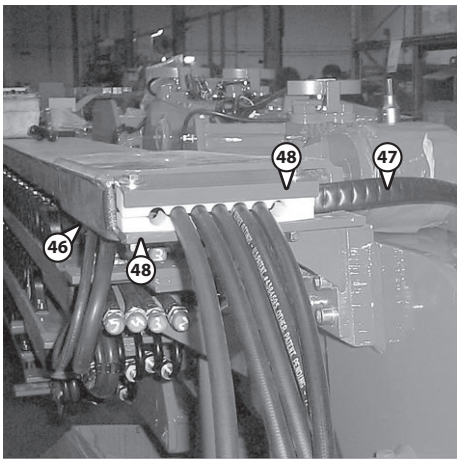
Fit the sliding blocks on the I extension boom and on the outer boom.

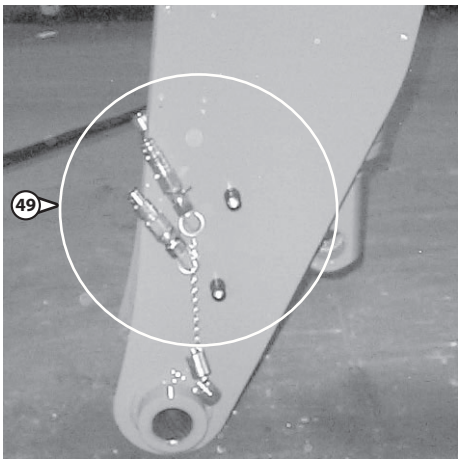
◅ **CHAPTER 50-04 : Boom control and adjustment**



With the help of an overhead crane or an elevator, close the assembled boom almost completely, to obtain coaxiality of the holes of the bushes (Ref. 1) present at the back of the outer boom and I extension boom.

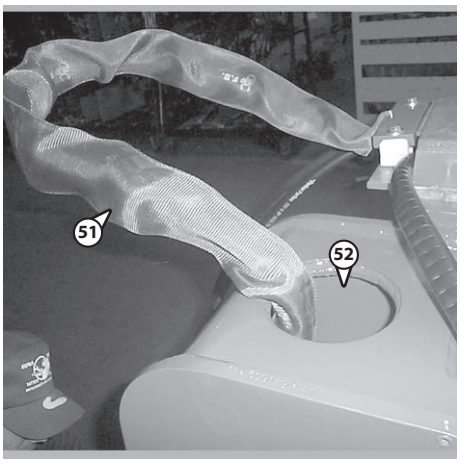




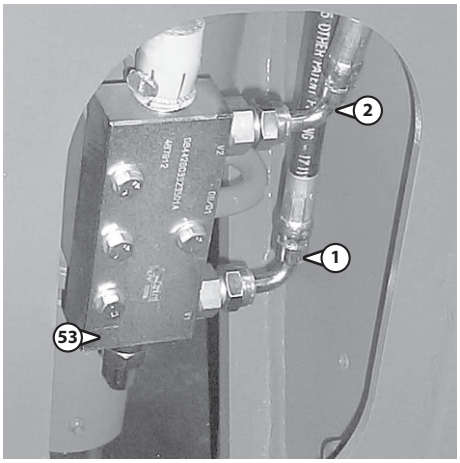


Protect with a sheath (Ref. 47) the electric cables (Ref. 23) for the platform and position the hydraulic tubes (Ref. 41) on the chain-holder tube (Ref. 46) by means of the collar (Ref. 48), leaving them free for sliding and orientation.

Fit the 90° hydraulic unions with quick-release couplings (male) (Ref. 49) on the LH and (female) (Rif. 50) on the RH of the head of the boom.



Protect with a sheath (Ref. 51) the tubes for slewing derived from the first tubes numbered "1, 2" and insert these in the upper opening (Ref. 52) of the head of the boom.



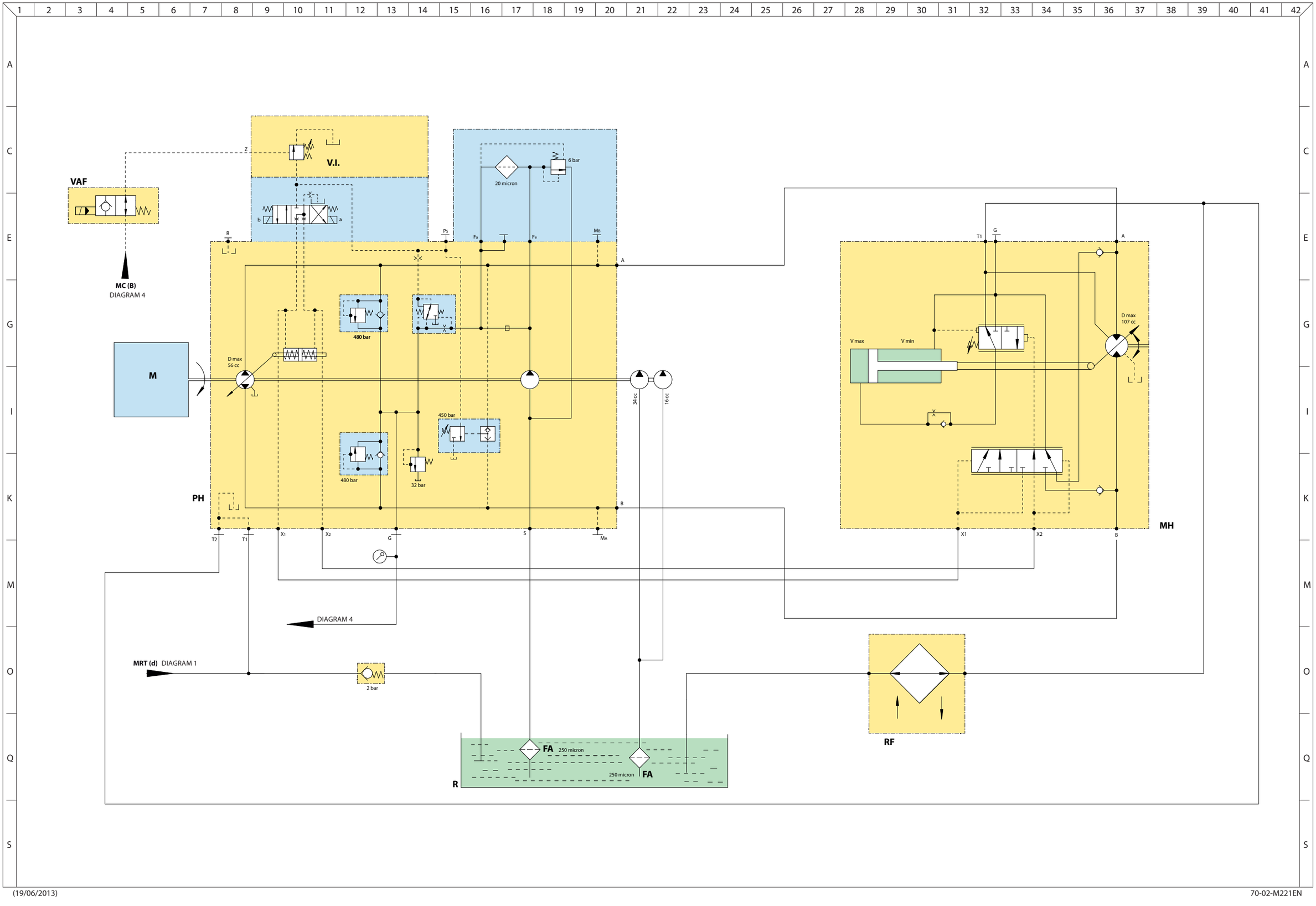
Connect the hydraulic pipes "1, 2" to the valve block on the slewing cylinder (Ref. 53).

HYDRAULICS

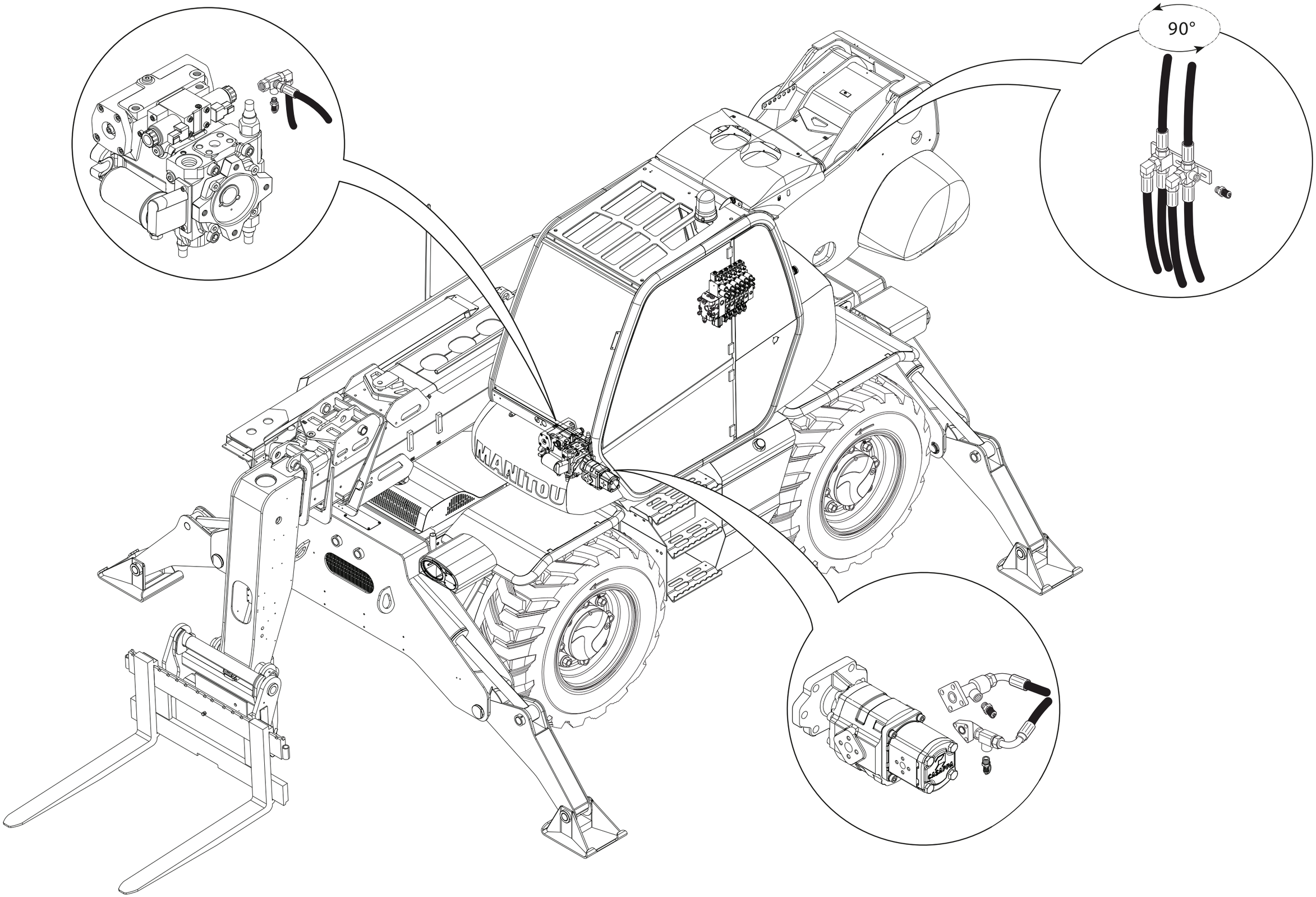
- ***HYDRAULIC SCHEMATIC DIAGRAMS***
- ***HYDRAULIC COMPONENTS LOCATION***
- ***HYDRAULIC CONTROL AND ADJUSTMENT***
- ***HYDRAULIC COMPONENTS REMOVAL***
- ***REFITTING HYDRAULIC COMPONENTS***
- ***HYDRAULIC SPECIFIC TOOLING***

MRT 1840 ST3B (400°)

3 - HYDROSTATIC TRANSMISSION HYDRAULIC DIAGRAM

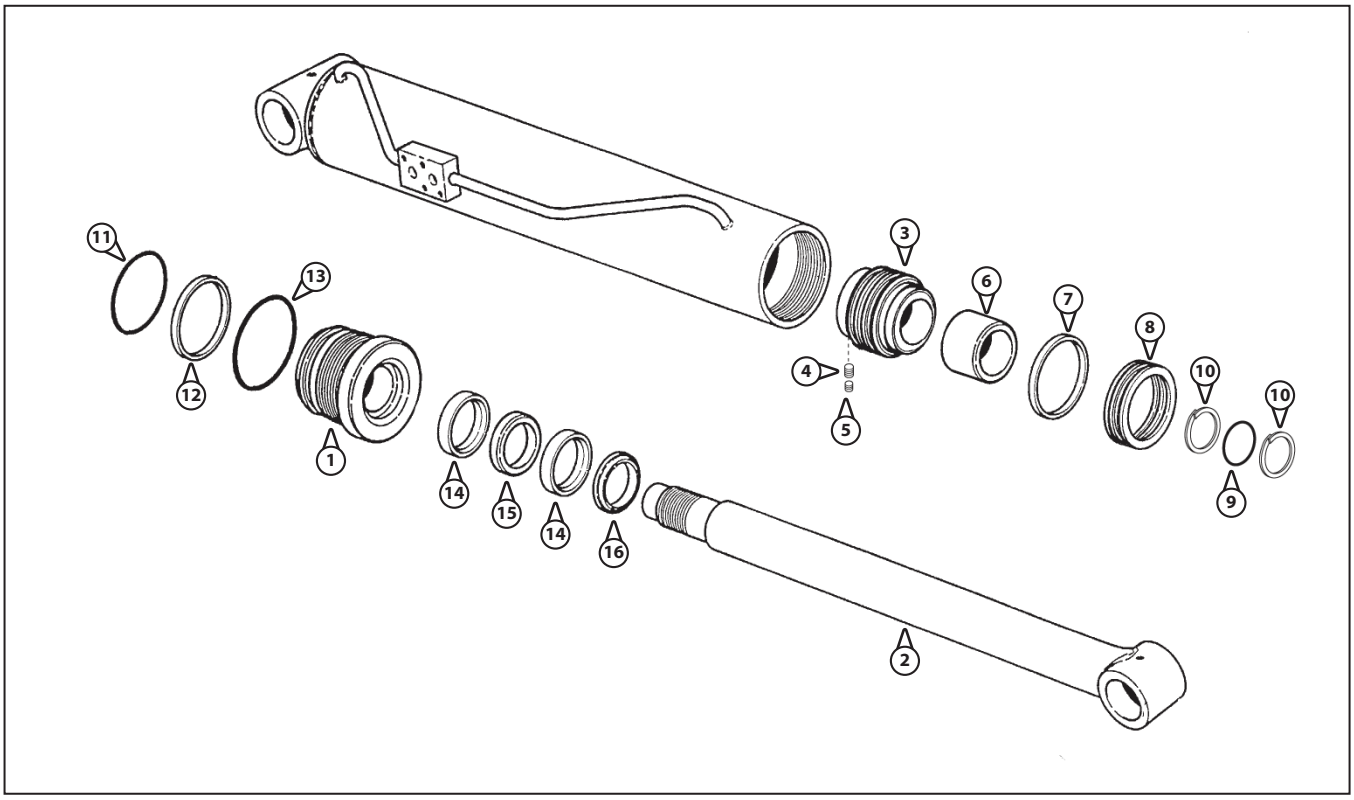


LOCATION OF THE PRESSURE PLUGS



LIFT CYLINDER

Tools required:
- 1 hook spanner (for ring nuts)
- 1 4mm Allen key

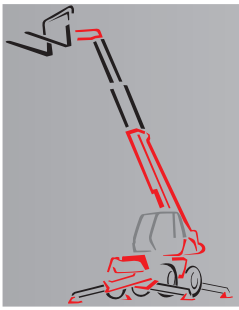


DISASSEMBLY

Unscrew the head (Ref. 1) using a hook spanner by dislodging the tab on the rim of the jacket that is staked into a corresponding location on the head.
Remove the rod (Ref. 2) + head (Ref. 1) + piston (Ref. 3) assembly from the cylinder jacket.
Remove the Allen screw (Ref. 4) (4mm Allen key) and grub screw (Ref. 5) of the piston.
Attention: screw locked with loctite (see "Application of threadlock" chapter).
Unscrew the piston (Ref. 3) of the cylinder using a hook spanner.
Remove the piston (Ref. 3) of the cylinder, the spacer (Ref. 6) and the head piece (Ref. 1) from the rod.
Remove the gaskets (Ref. 7-8-9) and the guide rings (Ref. 10) of the piston.
Remove the gaskets (Ref. 11-12-13), the guide rings (Ref. 14) and the gaskets (Ref. 15 and 16) of the head piece.
Check the condition of the valve, the valve seat and spring; change the gaskets and the components if necessary.
Attention to the direction of reassembly.

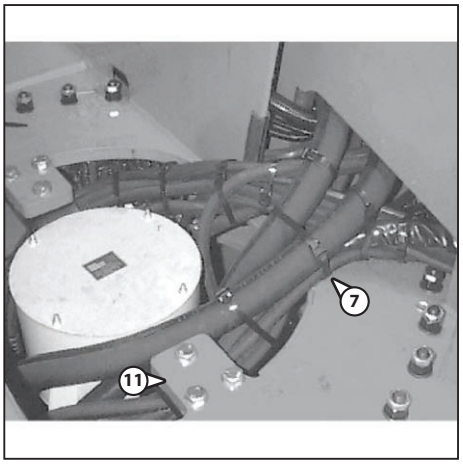
REASSEMBLY

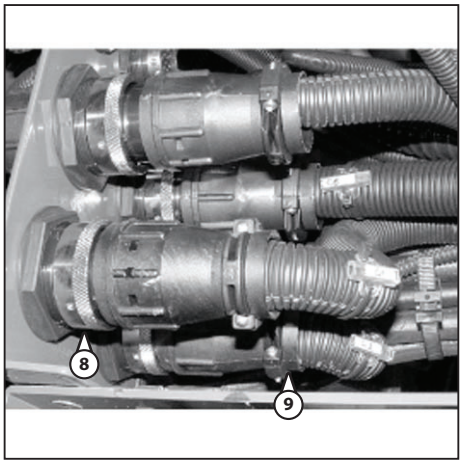
Operation reverse to that for disassembly.
Note: The outer tab of the jacket must be staked into the corresponding location on the head to prevent the head from working loose.
Loctite threadlock must be used for fitting the Allen screw.
Smear hydraulic fluid on the gaskets.

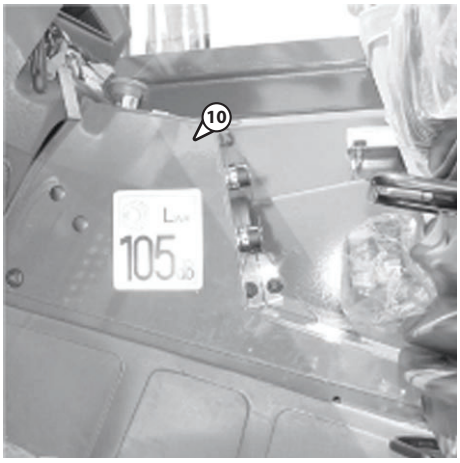


HYDRAULIC COMPONENTS REMOVAL

page



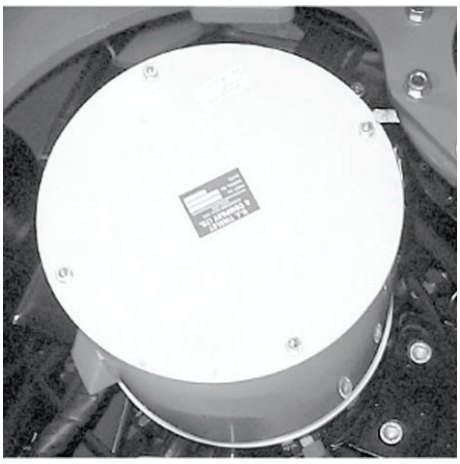




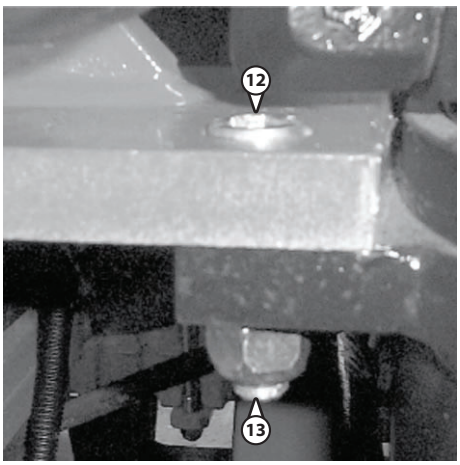
Cut the string clamps (Ref. 7).

Disconnect the electric connectors (Ref. 8 and 9) from the cab positioned under the stabilizers panel (Ref. 10).

Remove the hydraulic rotation connector tabs (Ref. 11).



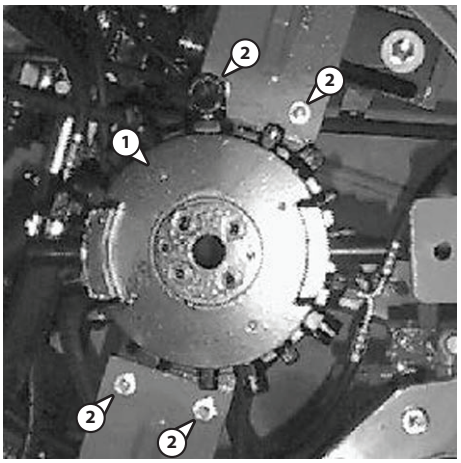
Disconnect all the tubes from the hydraulic rotation connector.



Secure the hydraulic/electric rotation connector to an elevator or an overhead crane.

Unscrew the screws and fixing nuts (Ref. 12 and 13) and remove from the vehicle.

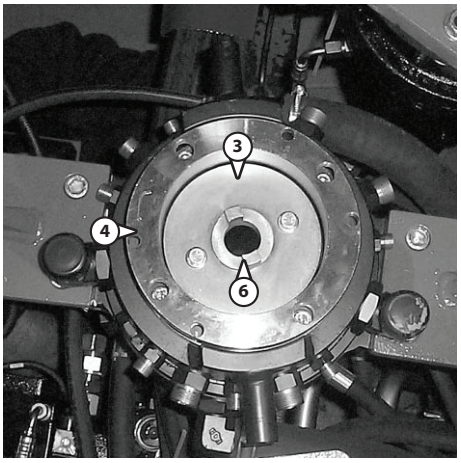
70



REFITTING THE HYDRAULIC ROTATION CONNECTOR (ONLY FOR MRT 1840 - 360°)

Using an overhead crane or elevator fit the hydraulic rotation connector (Ref. 1) in its seat on the vehicle chassis.

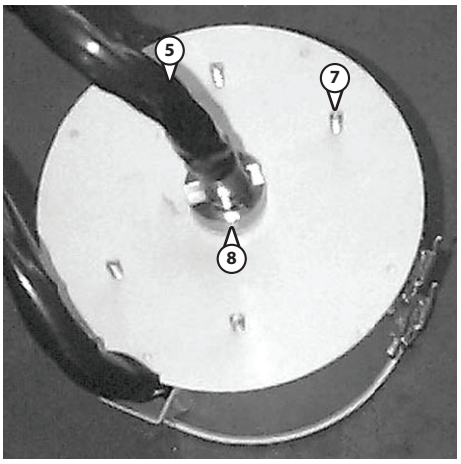
Fit the fixing screws (Ref. 2).



Fit the drive support (Ref. 3) of the rotary electric connector.

Fit the drive flange (Ref. 4) of the rotary electric connector.

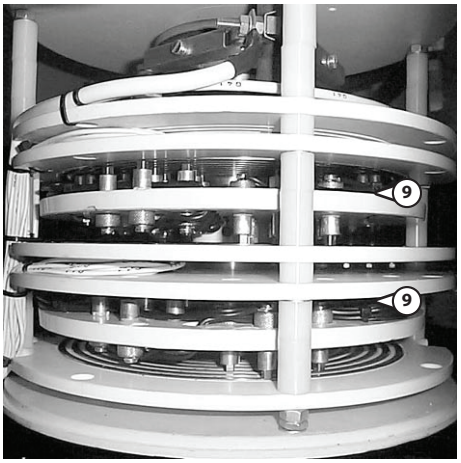
Insert the electric wiring (Ref. 5) from the top downwards into the through hole (Ref. 6) of the rotary hydraulic connector.



Lubricate the electric wiring with oil or grease before inserting the cable bundle in the hydraulic rotation connector (failure to carry out this lubrication can lead to breakage of the electric wiring).

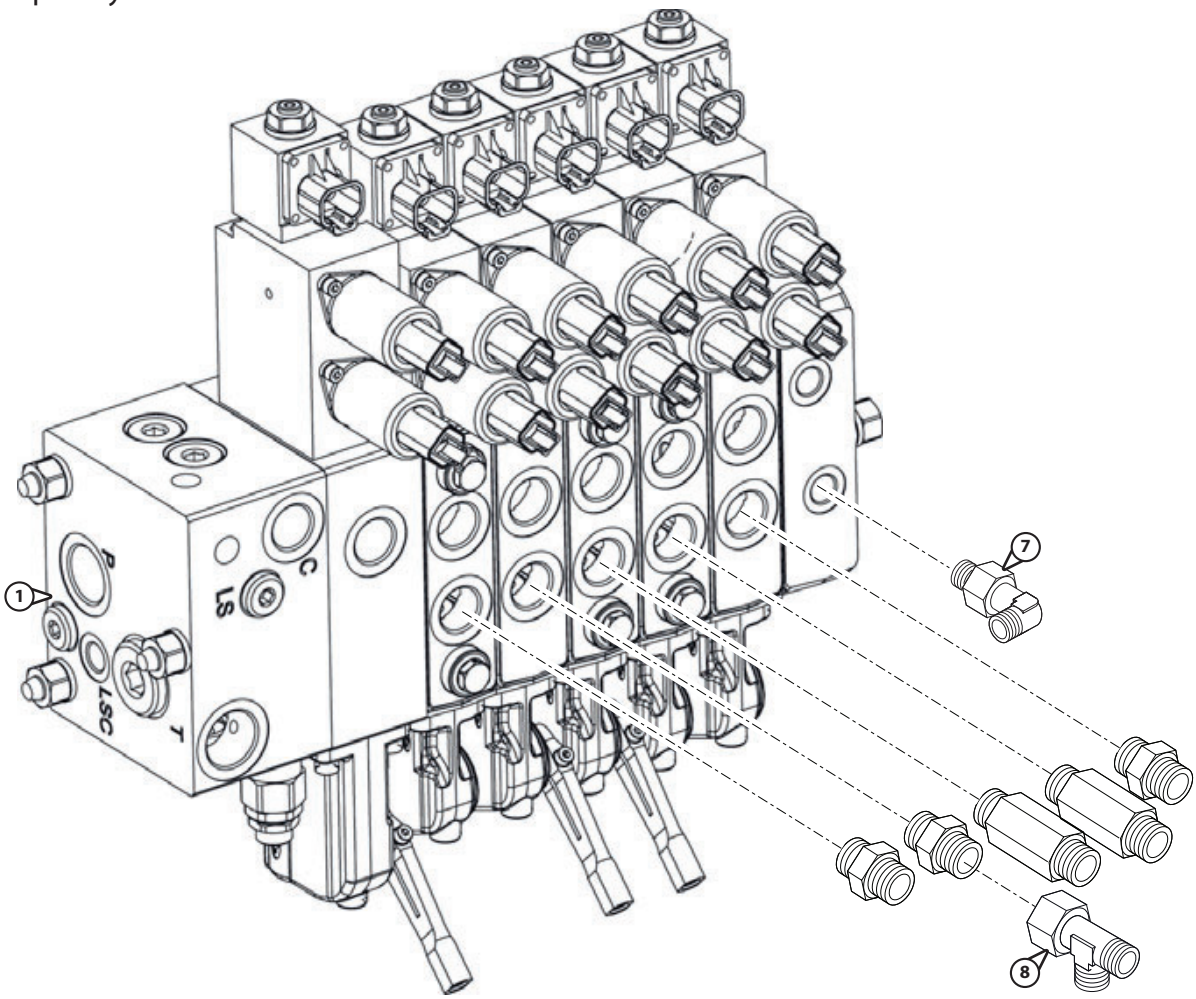
Align the holes of the support with the rotary electric connector fixing screws (Ref. 7).

Align the drive coupling of the electric connector (Ref. 8) with the flange concerned; turn the electric element (Ref. 9) to insert the drive coupling correctly.



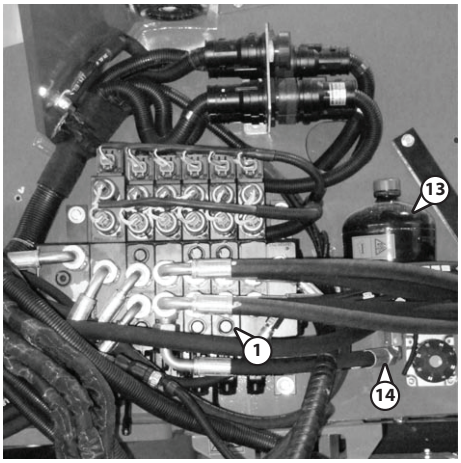
70

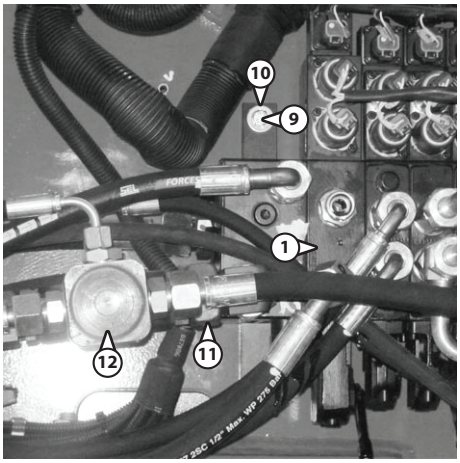
Fit all the unions on the directional control valve (Ref. 1), but do not tighten unions (Ref. 7 and 8) completely.



With the help of an overhead crane, fit the directional control valve (Ref. 1) on the chassis and fix it using the screws (Ref. 9) and washers (Ref. 10).
Fit the tube (Ref. 11) on the exhaust manifold (Ref. 12).

Fit the accumulator (Ref. 13) on the bracket and fit the tube (Ref. 14).





OPERATING LOGIC OF THE VEHICLE

The software program inserted in the MC2M control unit limits the movements of the vehicle on the basis of the:
- accessory fitted;
- state of the vehicle (on tyres or stabilizers)
- position of the boom;
- position of the cab;
- type of command (from cab or by radio control).

The operating logics implemented in the vehicle software are described below.

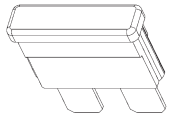
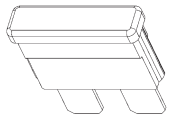
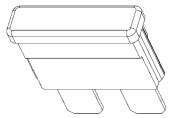
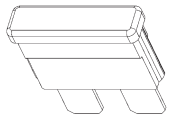
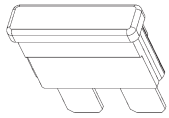
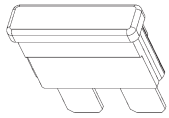
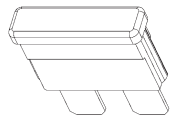
MOVEMENTS ALLOWED FROM THE CAB WITH PLATFORM EXCLUSION KEY ACTIVATED					
	BOOM WITHIN H=3m	BOOM WITHIN H=3m	BOOM BEYOND H=3m	BOOM BEYOND H=3m	NOTES
	BOOM RETRACTED	BOOM EXTENDED	BOOM RETRACTED	BOOM EXTENDED	
STABILIZERS RAISED	√				
STABILIZERS LOWERED	√	√			
TURRET ROTATION	√	√			
SLEWING UPWARDS	√	√			
SLEWING DOWNWARDS	√	√			
BOOM ASCENT	√ (only up to H=3m)	√ (only up to H=3m)			
BOOM DESCENT	√	√	√	√	
BOOM RETRACTION	√	√			
BOOM EXTENSION					
OPTION 1	√	√			
OPTION 2	√	√			

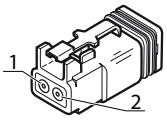
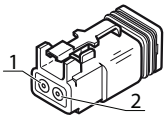
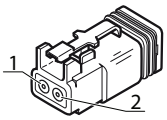
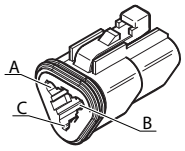
MOVEMENTS ALLOWED FROM THE CAB WITH ROLLOVER PROTECTION EXCLUSION KEY ACTIVATED					
	BOOM WITHIN H=3m	BOOM WITHIN H=3m	BOOM BEYOND H=3m	BOOM BEYOND H=3m	NOTES
	BOOM RETRACTED	BOOM EXTENDED	BOOM RETRACTED	BOOM EXTENDED	
STABILIZERS RAISED	√				
STABILIZERS LOWERED	√	√			
TURRET ROTATION	√	√			
SLEWING UPWARDS	√	√			
SLEWING DOWNWARDS	√	√			
BOOM ASCENT	√ (only up to H=3m)	√ (only up to H=3m)			
BOOM DESCENT	√	√	√	√	
BOOM RETRACTION	√	√			
BOOM EXTENSION					
OPTION 1	√	√			
OPTION 2	√	√			

NOTE: The data given in the afore-mentioned Tables are applicable for all positions of the turret.

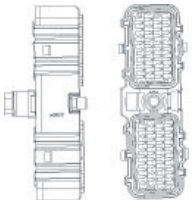
MOVEMENTS ALLOWED FROM THE CAB WITH ROLLOVER PROTECTION EXCLUSION KEY ACTIVATED					
	BOOM WITHIN H=3m	BOOM WITHIN H=3m	BOOM BEYOND H=3m	BOOM BEYOND H=3m	NOTES
	BOOM RETRACTED	BOOM EXTENDED	BOOM RETRACTED	BOOM EXTENDED	
STABILIZERS RAISED	√				
STABILIZERS LOWERED	√	√	√		
TURRET ROTATION	√	√	√		The turret can be brought to the central position only if 1 of the 2 proximity switches +/-5° is reading.
SLEWING UPWARDS					
SLEWING DOWNWARDS					
BOOM ASCENT					
BOOM DESCENT	√				
BOOM RETRACTION					
BOOM EXTENSION					
OPTION 1					
OPTION 2					

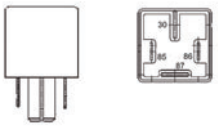
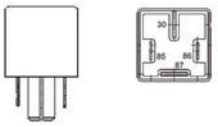
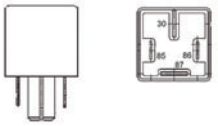
NOTE: The data given in the afore-mentioned Tables are applicable for all positions of the turret.

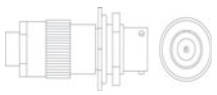
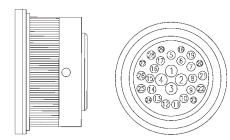
Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
F33	IN		1	R78	87	
	OUT	Red-Green	1	X20	G	
				I66	10	
				I7	10	
				I59	10	
				I57	10	
				I56	10	
				I68	10	
				I58	10	
				I67	10	
				X20	G	
F34	IN		1	R35	87	
	OUT	Pink	1	DM	7	
F35	IN		1	R35	87	
	OUT	Yellow-Black	1	R82	30	
				R75	30	
F36	IN	Red	1	KEY	1	
				R74	30	
				R35	30	
				XA/C	1	
				XA/C	2	
				XA/C	A	
				XA/C	B	
				R78	30	
				R80	30	
				X1b	1	
	OUT	Orange-White	1	XS1	7	
				X20	F	
F37	IN		1	R74	87	
	OUT	Blue-Yellow	1	X32b	1	
				X21	10	
				X42	5	
				X107	1	
				X107	10	
F38	IN	White-Red	1	R81	87	
				R78	86	
				R80	86	
				KEY	6	
	OUT	Grey-Green	1,5	X16	1	
F39	IN	White-Red	1	R81	87	
				R78	86	
				R80	86	
				KEY	6	
	OUT	White-Red	1	X22	25	
				MA	2	

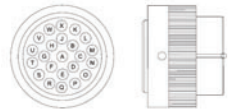
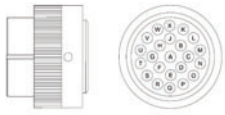
Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
I10	2	Brown-Blue	1	X70	1	
				X21	25	
	3	Green-Brown	1	X21	18	
	4	White	1	I73	2	
I11	1	Pink-Red	1	I52	1	
				X22	8	
	2	Black	1	GND		
	3	Light blue-Grey	1	MC2Mb-3	R36	
I14	1	Yellow-Red	1	I34	1	
				I74	1	
				X22	1	
	2	Black	1	GND		
	3	Orange	1	MC2Mb-3	L15	
I15	1	Orange-Blue	1	I71	1	
				X22	10	
	2	Black	1	GND		
	3	Brown-Black	1	MC2Mb-3	L35	
I16	1	Purple	1	I17	1	
				I22	A	
				I23	A	
				X4	7	
	2	Blue-White	1	X3	20	
I17	1	Purple	1	I16	1	
				I22	A	
				I23	A	
				X4	7	
	2	Purple-White	1	X3	21	
I18	1	Pink	1	I19	A	
				I20	A	
				I21	1	
				X5	3	
	2	Grey-White	1	MC2Ma-3	L10	
I19	A	Pink	1	I18	1	
				I20	A	
				I21	1	
				X5	3	
	B	Brown-Yellow	1	MC2Ma-3	R28	
	C	Black	1	GND		
I20	A	Pink	1	I18	1	
				I19	A	
				I21	1	
				X5	3	
	B	Grey-Yellow	1	MC2Ma-3	R29	
	C	Black	1	GND		

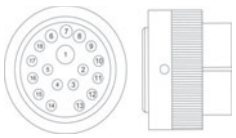
Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
I58	1	Yellow-Green	1,5	X7	B	
	5	Yellow-Purple	1,5	F54	OUT	
	9	Black	1	GND		
	10	Red-Green	1	I68	10	
				I57	10	
				I67	10	
				I56	10	
				X20	G	
				I66	10	
				F33	IN	
				I7	10	
				I59	10	
I59	1	Yellow-Black	1,5	F51	OUT	
	5	Yellow-Red		X7	A	
	9	Black	1	GND		
	10	Red-Green	1	I68	10	
				I57	10	
				I67	10	
				I56	10	
				X20	G	
				I66	10	
				F33	IN	
				I7	10	
				I58	10	
I66	1	Orange-Yellow	1	F68	OUT	
				I55	1	
				I66	3	
				I66	4	
	2	Green-Black	1	X21	22	
	3	Orange-Yellow	1	F68	OUT	
				I55	1	
				I66	1	
				I66	4	
	4	Orange-Yellow	1	F68	OUT	
				I55	1	
				I66	1	
				I66	3	
	5	Green-Black	1	X21	6	
	9	Black	1	GND		
	10	Red-Green	1	I68	10	
				I57	10	
				I67	10	
				I56	10	
				X20	G	
				I59	10	
				F33	IN	
				I7	10	
				I58	10	

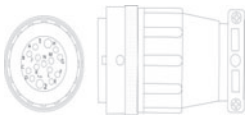
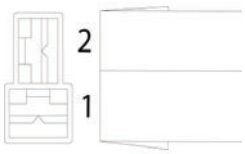
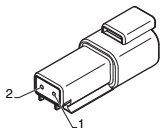
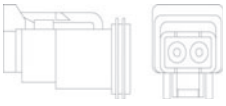
Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
MC2MA-3	R18	Orange-Green	1	S17	1	
	R19	Orange-Yellow	1	S19	1	
	R20	Orange-Black	1	S18	1	
	R28	Brown-Yellow	1	I19	B	
	R29	Grey-Yellow	1	I20	B	
	R33	White-Orange	1	X3	16	
	R34	White-Grey	1	X3	17	
	R36	Yellow	1	XSC	26	
	R37	Brown	1	XSC	31	
	R38	Blue-Yellow	1	X3	18	
	R39	Purple-Yellow	1	X3	19	
	L4	Orange	1	T1	2	
	L5	Pink	1	XSC	25	
	L6	Black-Red	1	X28	C	
	L9	Brown-White	1	I21	2	
	L10	Grey-White	1	I18	2	
	L11	Blue-White	1	X3	20	
	L12	Purple-White	1	X3	21	
	L15	Grey	1	XSC	21	
	L19	Grey-Purple	1,5	X5	14	
	L20	Green	1	XSC	22	
	L21	Pink-Yellow	1	I8	1	
	L22	Pink-White	1	X3	7	
	L23	Pink	1	I3	2	
	L26	Blue	1	XSC	23	
	L29	Purple	1	XSC	24	
	L34	Light blue-Orange	1	X5	26	
				X16	19	
	L36	Brown-Red	1	I43	3	
				X5	24	
	L37	Yellow-Red	1,5	X5	5	
				X16	4	
	L39	Blue-Black	1	FASX	2	
				X3	5	
				X16	8	
	L40	Blue	1	FADX	2	
				X3	6	
				X16	9	
MC2MB-1	1	Red-Black	2,5	MC2Mb-1	2	
				MC2Mb-1	3	
				X23	1	
			1,5	MDCP	3	
	2	Red-Black	2,5	MC2Mb-1	1	
				MC2Mb-1	3	
			6	X23	1	
			1,5	MDCP	3	
	3	Red-Black	2,5	MC2Mb-1	1	
				MC2Mb-1	2	
			6	X23	1	
			1,5	MDCP	3	
	4	Black	2,5	GND		

Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
R35	87	Brown	10	F59	IN	
				F35	IN	
				F64	IN	
				F69	IN	
				F51	IN	
				F72	IN	
				F43	IN	
				F67	IN	
				F66	IN	
				F54	IN	
				F44	IN	
				F34	IN	
				F46	IN	
				F48	IN	
R74	30	Red	6	F60	IN	
				R78	30	
				X1b	1	
				R80	30	
				XA/C	1	
				XA/C	2	
				XA/C	A	
				XA/C	B	
				F70	IN	
				F40	IN	
				F49	IN	
				R35	30	
				KEY	1	
	85	Black	1	GND		
	86	Purple-Red	1	R81	30	
				R35	86	
	87	Blue	6	F37	IN	
				F65	IN	
				F68	IN	
				F62	IN	
				F42	IN	
				F45	IN	
R75	30	Yellow-Black	2,5	F35	OUT	
				R82	30	
	85	Black	1	GND		
	86	Pink-White	1	X22	28	
	87	Blue-Green	2,5	X22	5	
				X22	6	
R76	30	Black	1	GND		
	85	Black	1	GND		
	86	Light blue-Yellow	1	X22	15	
	87	Light blue	1	I22b	12	
R77	30	Pink-Black	1,5	X22	19	
	85	Black	1	GND		
	86	Grey-Green	1	X22	18	
	87	Pink	1,5	F64	OUT	

Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
X2	13	White-Red	1	X31	1	
	14	Black	2,5	Battery negative		
	15	Black-White	1	X31	2	
	16	Black	2,5	Battery negative		
	17	White-Yellow	1	X31	3	
	18	Black	2,5	GND		
X2	1	Blue-Yellow	1	ECM-K1	84	
	2	Black-Blue	1	ECM-K1	83	
	3	Pink-Green	1	X1	F	
	4	Orange-Red	1	ECM-K1	16	
	5	Orange-Green	1	ECM-K1	60	
	6	Orange-Black	1	ECM-K1	38	
	7	Orange-Yellow	1	ECM-K1	76	
	8	Blue	4	X2	10	
				F13b	IN	
				CLP	2	
	9	Pink-Yellow	1	ECM-K1	80	
	10	Blue	2,5	F13b	IN	
				CLP	2	
				X2	8	
	11	Black-Yellow	1	ECM-K1	79	
	12	Black	2,5	ECM-K1	6	
	13	White-Red	1	ECM-K1	14	
	14	Black	2,5	ECM-K1	4	
	15	Black-White	1	ECM-K1	36	
	16	Black	2,5	ECM-K1	2	
	17	White-Yellow	1	ECM-K1	58	
	18	Black	2,5	GND		
X2b	1	Black	25	GND		
X3	1	Red-Black	2,5	X3	2	
				X3	3	
				X4	16	
				X4	18	
	2	Red-Black	2,5	X3	1	
				X3	3	
				X4	16	
				X4	18	
	3	Red-Black	2,5	X3	1	
				X3	2	
				X4	16	
				X4	18	
	4	Black	2,5	Battery negative		
	5	Blue-Black	1,5	FPSX	4	
				X26	6	
	6	Blue	1,5	FPDX	4	
				X26	2	
	7	Pink-White	1	I6	1	
	8	Orange-Red	1	X2	4	

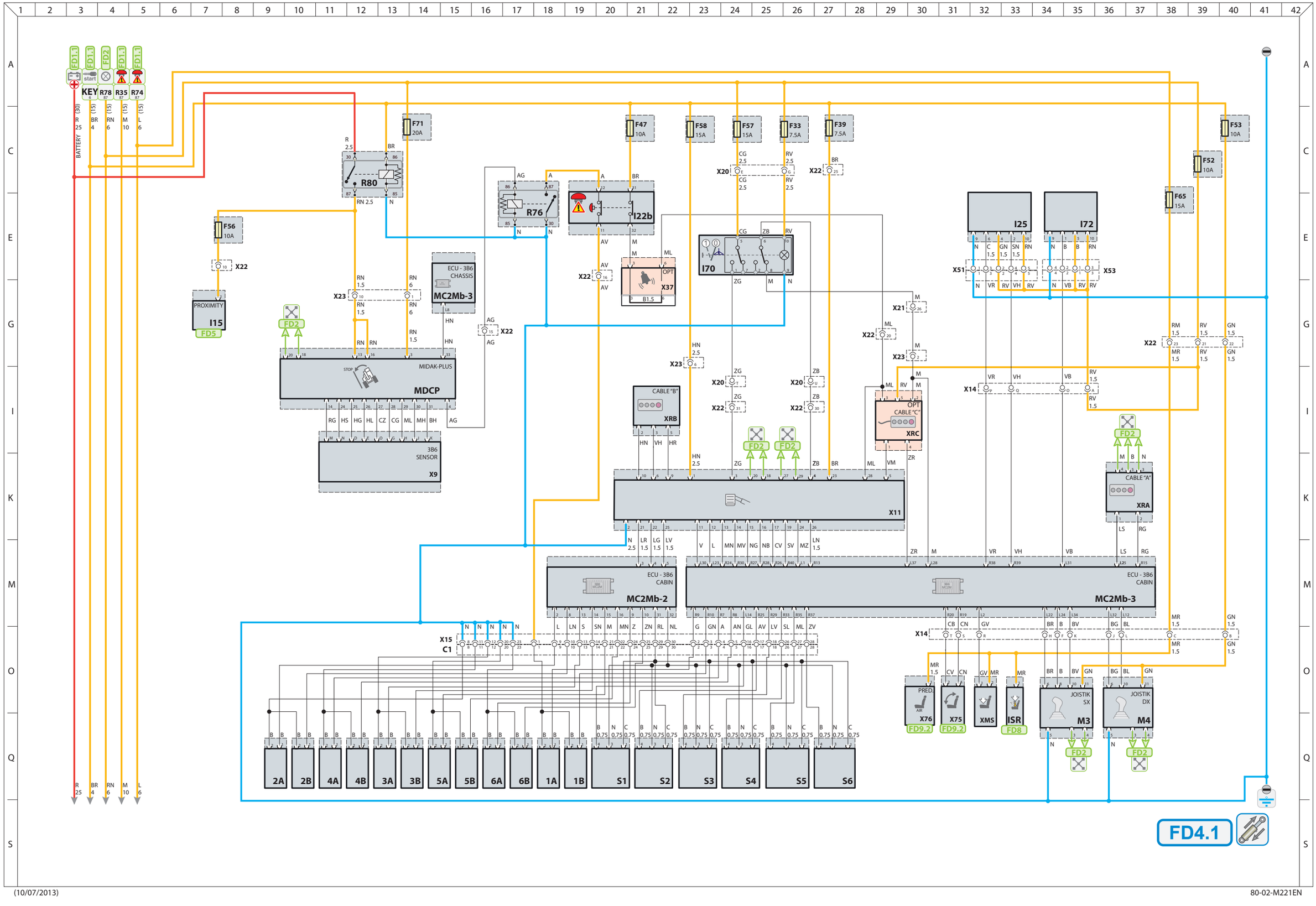
Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
X14	R	Yellow-Green	1	XMS	1	
	S	Orange-Black	1	X75	4	
	T	Orange-Green	1	X75	2	
	U	Brown	0,5	M3	3	
				M4	3	
	V	White	0,5	M3	4	
				M4	4	
	W	Shield	/	SCH*	CAN-OPEN Line cable shield	
	X	Red	1	XSP	1	
X14	A	Red-Green	1,5	X22	21	
				XRC	5	
	B	Yellow-Black	1,5	X22	22	
	C	Brown-Red	1,5	X22	23	
				X46	A	
	D	Black	1,5	GND		
	E	Black	1,5	GND		
	F	White	1	MC2Mb-3	L24	
	G	White-Black	1	MC2Mb-2	18	
	H	White-Red	1	MC2Mb-3	L22	
	J	White-Yellow	1	MC2Mb-3	L32	
	K	White-Green	1	MC2Mb-3	L34	
	L	White-Blue	1	MC2Mb-3	L12	
	M	White-Pink	1	MC2Mb-3	L33	
	N	White-Orange	1	MC2Mb-3	R23	
	O	Green-White	1	MC2Mb-3	L31	
	P	Green-Red	1	MC2Mb-3	R38	
	Q	Green-Grey	1	MC2Mb-3	R39	
	R	Yellow-Green	1	MC2Mb-3	L2	
	S	Orange-Black	1	MC2Mb-3	R19	
	T	Orange-White	1	MC2Mb-3	R20	
	U	Brown	0,5	MC2Mb-2	25	
				MDCP	19	
				X9	P	
				X11	18	
				X23	16	
				XRA	4	
	V	White	0,5	MC2Mb-2	23	
				MDCP	20	
				X9	Q	
				X11	20	
				X23	17	
				XRA	5	
	W	Shield	/	MC2Mb-2	24	
				X9	R	
				X23	18	
				XRA	3	
	X	Red	1	X10	19	
				X23	9	
				X46	B	

Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
X22	13	Green-Black	1	MC2Mb-3	L18	
	14	Red-Black	1	MC2Mb-3	L26	
	15	Light blue-Yellow	1	MDCP	4	
	16	Light blue-Green	1	X15	1	
	17	Grey-Purple	1	MC2Mb-3	L3	
	18	Grey-Purple	1	MC2Mb-3	R4	
	19	Pink-Black	1	X9	A	
				X9	B	
	20	Brown-Blue	1	X11	28	
				XRC	3	
	21	Red-Green	1,5	X14	A	
				XRC	5	
	22	Yellow-Black	1,5	X14	B	
	23	Brown-Red	1,5	X14	C	
			1	X46	A	
	24	Green	1,5	M11	1	
	25	White-Red	1	X9	T	
				X10	6	
				X11	23	
	26	Brown-Black	1	MC2Mb-3	L10	
	27	Brown-Green	1	MC2Mb-3	L11	
	28	Pink-White	1	MC2Mb-2	19	
	29	Pink-Yellow	1	MC2Mb-2	20	
	30	Purple-White	1	X11	4	
	31	Purple-Yellow	1	X11	3	
X23	1	Red-Black	6	F71	OUT	
	2	Brown	1	R81	86	
				X16	6	
				X21	26	
	3	Grey-Red	1	X20	H	
	4	Pink-Grey	1	X21	4	
	5	Grey	1	XS1	3	
	6	Grey-Black	2,5	F58	OUT	
	7	White	2,5	I67	5	
	8	Blue	6	X40	1	
	9	Red	1,5	F49	OUT	
				X37	1	
				X20	C	
	10	Red-Black	1,5	F56	OUT	
				X21	14	
				R80	87	
				X16	5	
	11	Brown-Pink	1	MA	1	
	12	Black	1,5	GND		
	13	Brown	0,5	X21	12	
				X504	2	
				OBD2	3	
				X16	27	

Connectors wiring						
Ref.	**Pin**	**Wire colour**	**Section**	**Destination**	**Pin**	**Image**
XA/C	B	Red	1	F60	IN	
				KEY	1	
				F36	IN	
				F61	IN	
				R78	30	
				R35	30	
				R80	30	
				X1b	1	
				XA/C	1	
				XA/C	2	
				XA/C	A	
				F70	IN	
				F40	IN	
				F49	IN	
				R74	30	
	C	Black	1	GND		
	D	Black	1	GND		
	E	Black	1	GND		
	F	Black	1	GND		
	G	Black	1	GND		
	H	Black	1	GND		
	J	Black	1	GND		
	K	Blue-Red	1,5	F42	OUT	
XAS	1	Black	2,5	GND		
	2	White	2,5	X20	B	
	1	Red-Green	1	I2	10	
				I54	10	
				I24	10	
				I76	10	
				I78	10	
				I79	10	
				I9	10	
				X20	G	
				I28	10	
				I29	10	
				I30	10	
				I31	10	
				I27	6	
				I35	10	
				I77	10	
				I70	10	
				I4	10	
				I1	10	
XBI	1	White-Yellow	1	R5	86	
				R15	30	
	2	Yellow-Purple	1	X1	H	
				R15	87a	
XBS	1	Brown-Yellow	1	I26	2	
				L31	1	
	2	Brown-Green	1	X21	3	

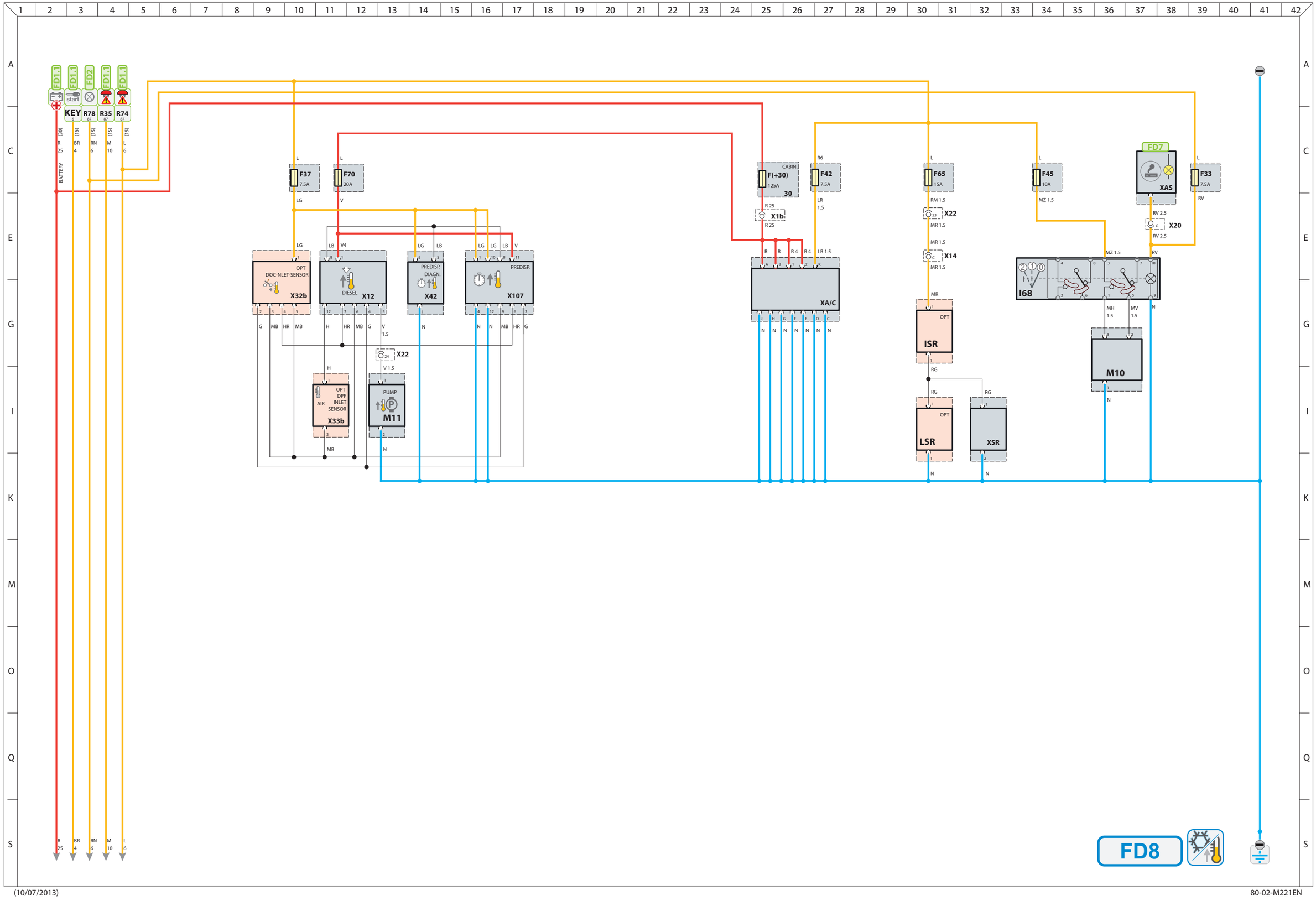
Connector	Diag. 1.1	Diag. 1.2	Diag. 2	Diag. 3	Diag. 4.1	Diag. 4.2	Diag. 5	Diag. 6	Diag. 7	Diag. 8	Diag. 9.1	Diag. 9.2	Diag. 10
X88			√										
X101												√	
X103												√	
X107										√		√	
X500			√										
X503			√										
X504			√										
XA/C										√			
XAS									√	√			
XB1											√		
XBS						√						√	
XCD									√				
XD+	√												√
XD1		√	√				√						
XDK	√		√										
XMS					√							√	
XPA		√											
XRA			√		√						√		
XRB					√						√		
XRC		√			√						√		
XRD	√			√									
XRS				√									
XS1								√			√		
XS2											√		
XSC	√										√	√	
XSP											√		
XSR										√			
XVR											√		

DIAGRAM 4.1

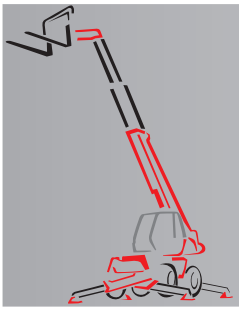


80

DIAGRAM 8


FD1.1
FD1.1
FD2
FD1.1
FD1.1
start
KEY
R78
R35
R74
BATTERY
F37 7.5A
F70 20A
F(+30) 125A
30
CABIN.
F42 7.5A
F65 15A
F45 10A
F33 7.5A
FD7
XAS
X1b
X22
X20
X14
XA/C
OPT DOC-NLET-SENSOR
X32b
DIESEL
X12
PREDISP. DIAGN.
X42
PREDISP.
X107
OPT DPF INLET AIR SENSOR
X33b
PUMP
M11
OPT
ISR
LSR
XSR
I68
M10
FD8

Ref.	Description	Position on wiring diagram						Observations
		Assembly 1	Assembly 2	Chassis	Turret	Cab	Engine	
I22b	N.C. contacts for mushroom-shaped emergency button		E4			K25		
I23	LH rear stabilizer pressure switch	G7		E32				
I24	Steering selection switch		I34			I39		
I25	Articulated platforms movements ABC switch	G21				K8		
I26	Beams in/out or stabilizers up/down switch		G37			G38		
I27	Beams and stabilizers selection switch		I37			K40		
I28	RH front beam/stabilizer switch		G36			G38		
I29	LH front beam/stabilizer switch		G36			G38		
I30	RH rear beam/stabilizer switch		I36			I40		
I31	LH rear beam/stabilizer switch		I36			I40		
I34	Cab +/- 15° LH rotation sensor	I19			K24			
I35	RPM switch		E34			K36		
I41	Boom ascent maximum micro switch	K3			A30			
I43	Speedometer sensor	K38		K12				
I51	Rollover protection exclusion key		K34			M37		
I52	RH limited rotation	K20			K18			FOR MRT 400° ONLY
I53	Emergency direction lights switch		C30			G33		
I54	Rotary beacon switch		I33			I39		
I55	Brakes pump pressure switch		O28/O29			G22		
I56	Front windscreen wiper switch		C6			K25		
I57	Upper/rear windscreen wiper switch		C7			I24		
I58	Cab roof front work lights switch		E7			K25		
I59	Cab roof rear work lights switch		E8			I23		
I66	Boom head 2° 3° extension switch		E9/E10			I24		
I67	Boom head work lights switch		E6			K24		
I68	Heating fan switch		C8			I24		
I69	Levelling joystick		G37			K35		
I70	Radio control switch		E33			K35		
I71	Blocked cab proximity switch	I19			K22			
I72	Optional exclusion switch	G21				M10		
I73	Start up enabling with I10 activated		K36			M37		
I74	Cab +/- 5° control unit rotation sensor	I19			K24			
I76	Boom suspension switch		E36			M36		
I77	Perkins tier4 engine regeneration disenabling/ enabling switch		E35			M36		
I78	Sideshift by-pass switch		I35			I39/I40		
I79	Automatic levelling switch		E36			M36		
ISR	Connector for heated seat	G21				K6		
J1939	J1939 can bus line		E35			I33/I34		
KEY	Ignition key		C37			E31		
L28	Selected beams indicator		I38			K40		
L29	Selected stabilizers indicator		I38			K40		
L30	Stabilizers feet beams/descent extension indicator		G38			G39		
L31	Stabilizers feet beams/descent retraction indicator		G38			I39		
LRPM	RPM limitation solenoid valve	G26		M20				
LSR	Heated seat control activation	G20				K6		
M3	Operator LH side joystick	E20				M9		
M4	Operator RH side joystick	G19				K5		



ELECTRICAL CONTROL AND ADJUSTMENT

page

In the Diagnostics page, use F7 to display the page containing the error messages log record. (These pages are password-protected)

Checking movement

Checking of the movement is done by means of two independent channels.

- The system samples and calculates the CAN BUS or ANALOG electric signals coming from the joystick and guides the movement in proportion taking into account all the safety logics.
- The presence of an operator is necessary for the working of the system. This means the system stops all movement in case a component is faulty.

Associated parameter:

Movement	*Output*	*Input*	*Positive accel.*	*Positive decel.*	*Negative accel.*	*Negative decel.*
Boom up/Boom down	P706	P707	P708	P709	P710	P711
Telescopic boom	P726	P727	P728	P729	P730	P731
Forks						
Slewing	P766	P767	P768	P769	P770	P771
Options	P786	P787	P788	P789	P790	P791
Winch	P806	P807	P808	P809	P810	P811

The ramp values depend on the drawbar. (cab/radio or platform).

If there is a control from the cab, the ramp values are obtained from the Cab Table. (See Table below)

The Winscope pages of the ramps parameters are in the page of each movement.

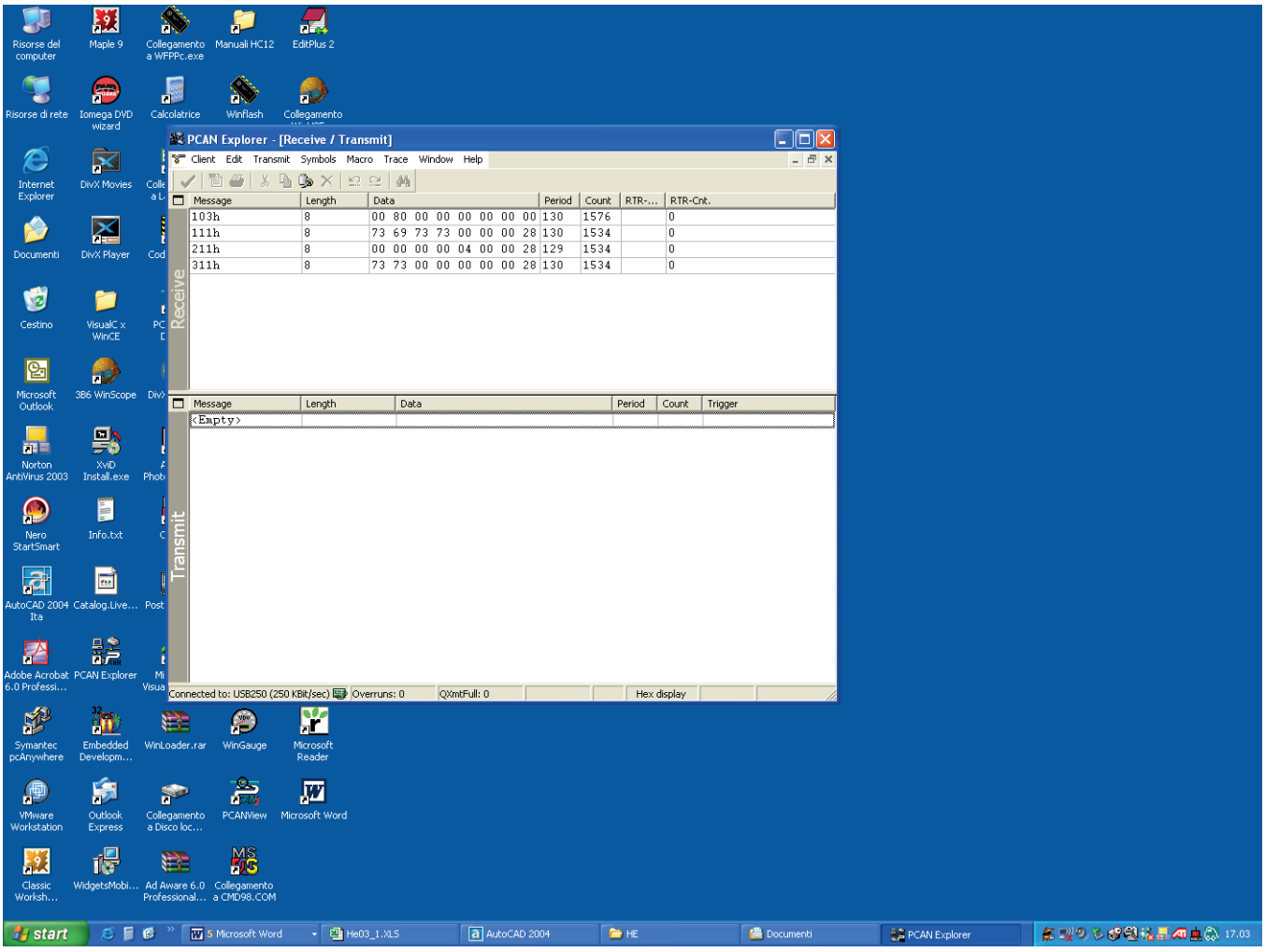
The cab and platform ramps are divided into two blocks:
Cab ramp or radio:

Movement	*Positive accel.*	*Positive decel.*	*Negative accel.*	*Negative decel.*
Boom up/Boom down	P1500	P1501	P1502	P1503
Telescopic boom	P1505	P1506	P1507	P1508
Forks				
Slewing	P1515	P1516	P1517	P1518
Options	P1520	P1521	P1522	P1523

Platform ramps:

Movement	*Positive accel.*	*Positive decel.*	*Negative accel.*	*Negative decel.*
Boom up/Boom down	P1530	P1531	P1532	P1533
Telescopic boom	P1535	P1536	P1537	P1538
Forks				
Slewing	P1545	P1546	P1547	P1548
Options	P1550	P1551	P1552	P1553

Code	Description
IDS_ALARM102	MCT: directional control valve fault [boom extension]
IDS_ALARM103	MCT: directional control valve fault [Rotation]
IDS_ALARM104	MCT: directional control valve fault [Fork]
IDS_ALARM105	MCT: directional control valve fault [Optional]
IDS_ALARM107	MCT: Transmission unit fault condition
IDS_ALARM109	Cab Joystick fault [Boom A lift]
IDS_ALARM110	Cab Joystick fault [Boom B lift]
IDS_ALARM111	Cab Joystick fault [Forks A]
IDS_ALARM112	Cab Joystick fault [Forks B]
IDS_ALARM113	Cab Joystick fault [Rotation A]
IDS_ALARM114	CabJoystick fault [Rotation B]
IDS_ALARM115	Cab Joystick fault [Boom A extension]
IDS_ALARM116	Cab Joystick fault [Boom B extension]
IDS_ALARM118	Cab Joystick fault condition [Optional A]
IDS_ALARM119	Cab Joystick fault condition [Optional B]
IDS_ALARM121	Cab Joystick congruence [Boom lift]
IDS_ALARM122	Cab Joystick congruence [Fork]
IDS_ALARM123	Cab Joystick congruence [Rotation]
IDS_ALARM124	Cab Joystick congruence [Boom extension]
IDS_ALARM125	Cab Joystick congruence [Optional]
IDS_ALARM127	Congruence [RH rear axle unlocked valve]
IDS_ALARM128	Congruence [LH rear axle unlocked valve]
IDS_ALARM136	Can bus Timeout [Pvsk Module]
IDS_ALARM137	Can bus Timeout [Boom lift Module]
IDS_ALARM138	Can bus Timeout [Forks Module]
IDS_ALARM139	Can bus Timeout [Boom extension Module]
IDS_ALARM140	Can bus Timeout [Boom rotation Module]
IDS_ALARM141	Can bus Timeout [Boom optional module]
IDS_ALARM145	Error on Pvsk valve feedback
IDS_ALARM146	Error on Boom lift valve feedback
IDS_ALARM147	Error on Forks valve feedback
IDS_ALARM148	Error on Boom extension valve feedback
IDS_ALARM149	Error on Rotation valve feedback
IDS_ALARM150	Error on Optional valve feedback
IDS_ALARM163	Error_Tcu: Watchdog
IDS_ALARM164	Error_Tcu: DSP reference voltage
IDS_ALARM165	Error_Tcu: Injection channel
IDS_ALARM166	Error_Tcu: Battery voltage
IDS_ALARM167	Error_Tcu: Sensor voltage
IDS_ALARM172	Error_Tcu: FNR switch
IDS_ALARM173	Error_Tcu: Crawler gear sensor
IDS_ALARM174	Error_Tcu: Advancement sensor
IDS_ALARM175	Error_Tcu: Pump rpm/min status
IDS_ALARM176	Error_Tcu: Pump angle sensor
IDS_ALARM177	Error_Tcu: Switch2 mode
IDS_ALARM178	Error_Tcu: Engine rpm/min sensor
IDS_ALARM179	Error_Tcu: Engine direction sensor
IDS_ALARM181	Error_Tcu: AVA pump valve
IDS_ALARM182	Error_Tcu: IND pump valve
IDS_ALARM183	Error_Tcu: Engine prop valve
IDS_ALARM184	Error_Tcu: COR valve



The presence of various messages means the CAN LINE is OK.

If the CAN LINE is not operative:

- Disconnect all the units and devices from the BUS.
- Check all the CAN BUS wiring thoroughly, and especially check to make sure the CANH and CANL lines do not cross at any point.
- Check the presence of "RESISTANCES AT THE END OF THE LINE".
- Check one device at a time at the BUS and check the activity using the PCAN Explorer software.
- Bear in mind that the working of a unit may not be correct even if it is OK from the point of view of hardware.

CHASSIS LEVELLING SENSOR CALIBRATION

The function of the levelling sensors (ASA-CBO) is to measure the longitudinal as well as transverse inclination of the chassis. These are already calibrated when supplied and only need to be reset for installation on the vehicle.

STABILITY 58 Levelling	

To obtain the zero position:
- Display page 58.
- Move the chassis transversely as well as longitudinally.
- Press ENTER to obtain the zero position.

ANGLE AND LENGTH CALIBRATION

A cable reel is provied on the boom with double CAN BUS board for reading the boom angle and length. The angle only requires reset. While the length requires calibration in the completely open and completely closed positions.

TRANSDUCER 12 Transd. Min	Calibrations of boom length and angle with vehicle closed.
TRANSDUCER 13 Transd. Max	Boom length calibration with vehicle open

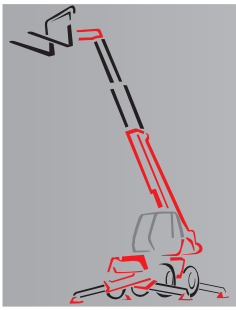
To set the closed position of the vehicle:
- Close the boom and lower it completely.
- Display page 12.
- Press ENTER to obtain the calibration of the closed position

To set the open position of the vehicle:
- Open the boom and move it upwards completely to the end of the cylinder travel.
- Display page 13.
- Press ENTER to obtain the calibration of the open position

DRIVER'S CAB

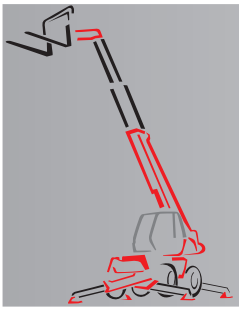
- ***DRIVER'S CAB REMOVAL***

- ***DRIVER'S CAB REFIT***



DRIVER'S CAB REFIT

page



FRAME REMOVAL

page