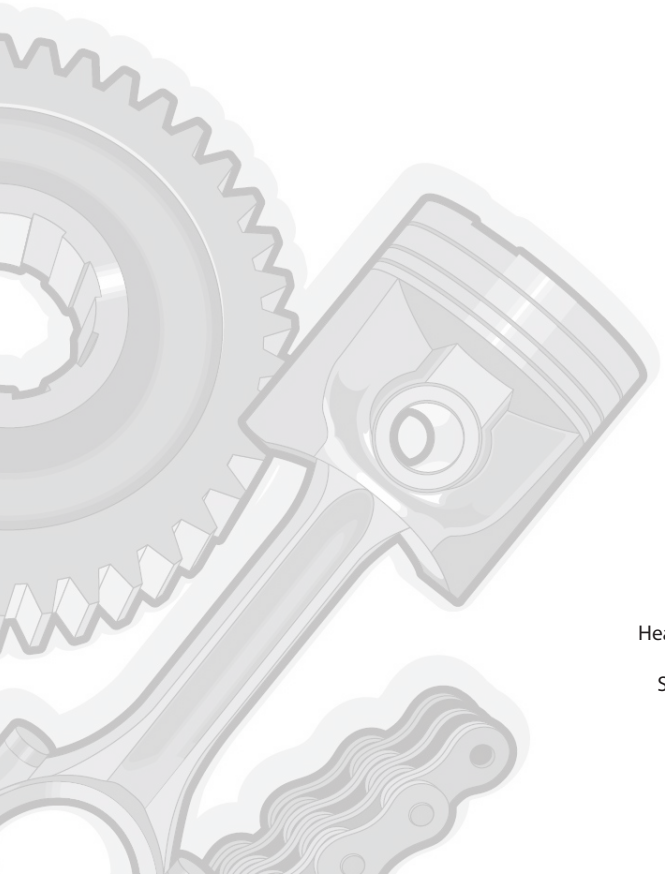
MANITOU

HANDLING YOUR WORLD

REPAIR MANUAL
MANUEL DE RÉPARATION
REPARATURANLEITUNG
MANUAL DE REPARACIÓN
MANUALE RIPARAZIONE



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PREAMBLE

This chapter deals with the general instructions and safety notice during inspection and maintenance work. Other instructions and warnings are indicated in each chapter concerned.

In order to reduce accident risks, make sure to:

- Follow the instructions in the truck operating and maintenance manual.
  ⇒ This manual should be found in all trucks.
- Please follow all safety instructions.
- Use the appropriate tools for any work to be performed.
- Use original Manitou spare parts.

Any non-compliance increases the risk of accidents occurring which may lead to causing grievous bodily harm and even death.

An efficient, dependable and profitable combination will be formed if the operator follows the safety manual correctly and the machine is serviced properly.

When you see this symbol:

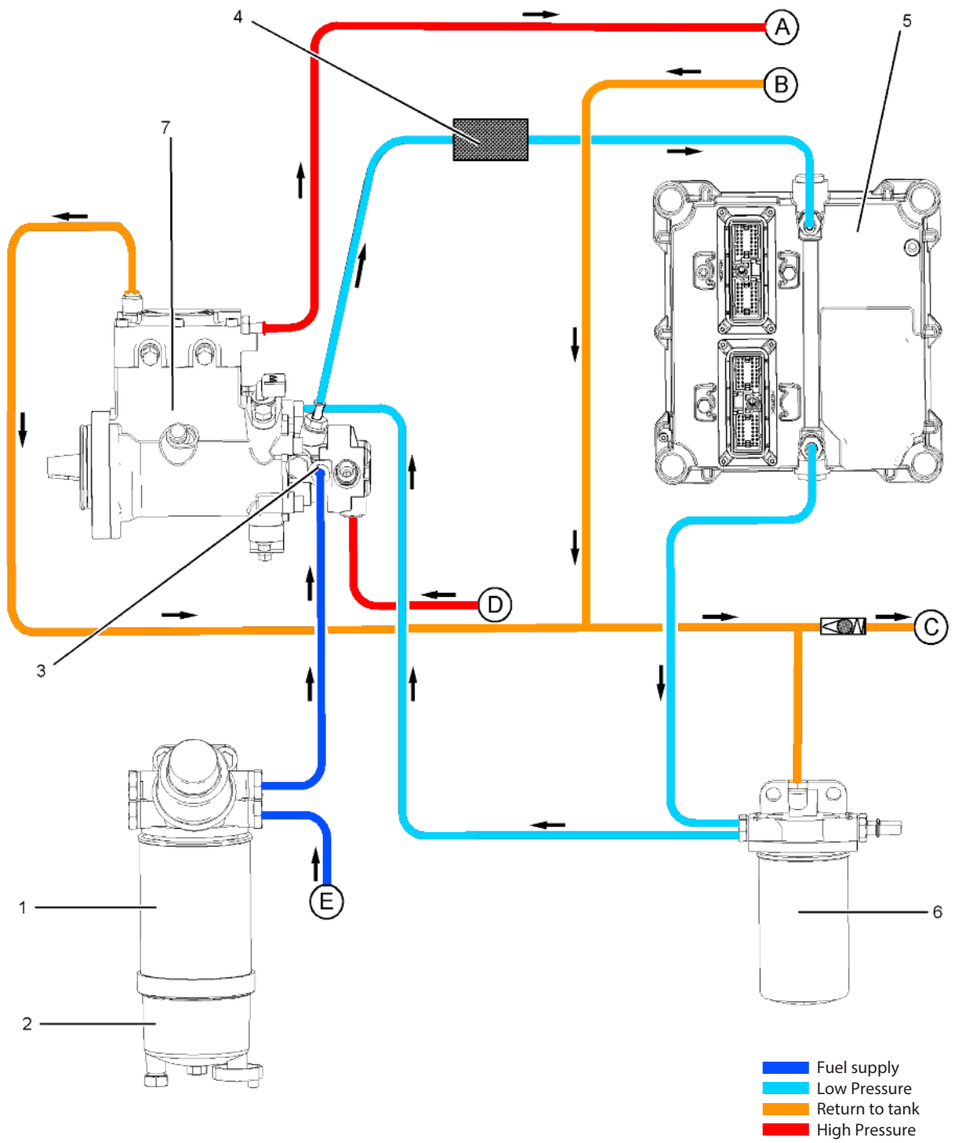
It means: Warning! Be careful! Your safety, somebody else's or the safety of the lift truck itself is at risk.

The manufacturer cannot predict all possible risky situations. Consequently, the safety instructions given in the safety manual are not exhaustive.
At any time, as an operator, you must envisage, within reason, the possible risk to yourself, to others or to the lift truck itself when you repair, service or drive it.

Manitou cannot be held responsible for the use of any lifting devices, tools or operating methods other than those specified.

FUEL CIRCUITS LOCATION

LOW PRESSURE

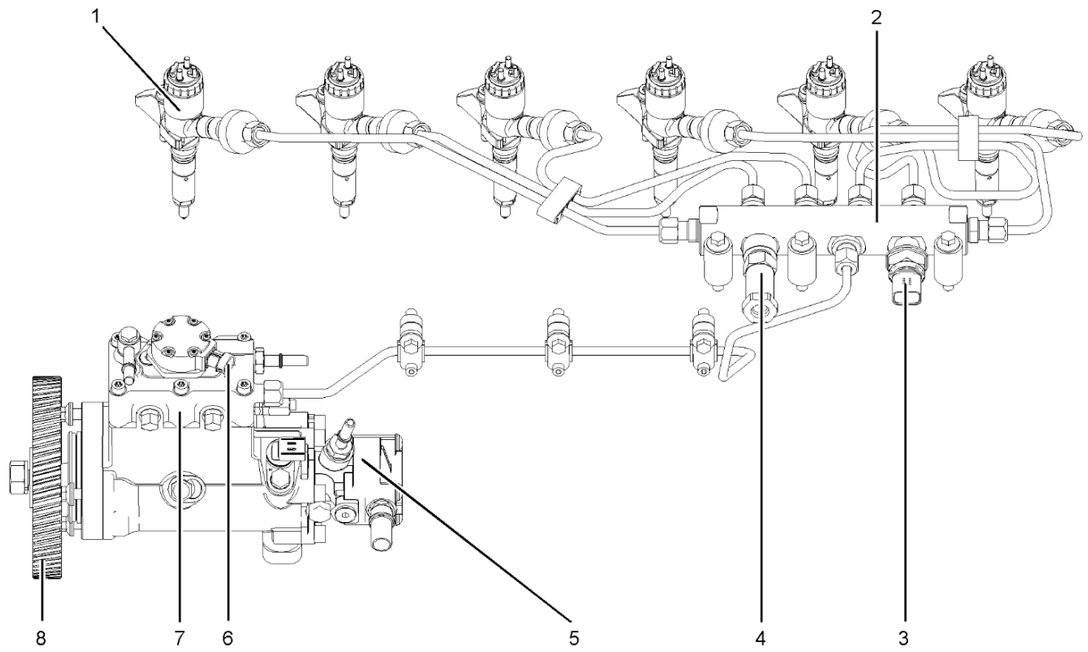


Key:

1 - Primary fuel filter
2 - Water separator
3 - Fuel pump
4 - Fuel cooler (option)
5 - ECM
6 - Secondary fuel filter
7 - Injection pump

A - High pressure fuel output to high pressure fuel manifold
B - Relief valve (PRV) return to high pressure fuel manifold
C - Return to fuel tank
D - Electronic injector return
E - Fuel feed from fuel tank

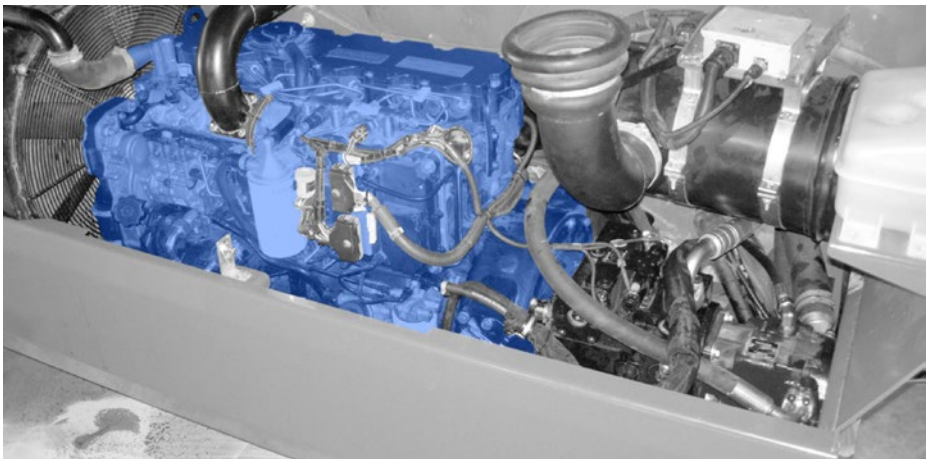
HIGH PRESSURE

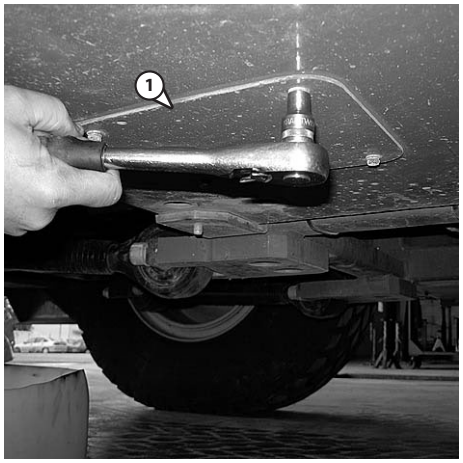


Key:

1 - Electronic injectors
2 - High pressure fuel collector
3 - Fuel pressure sensor
4 - Fuel relief valve

5 - Fuel pump
6 - Injection pump solenoid
7 - Injection pump
8 - Injection pump speed





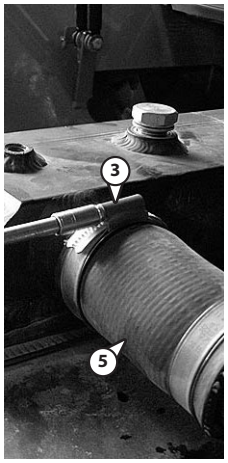
I.C. ENGINE REMOVAL

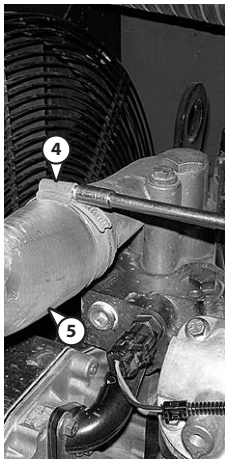
Remove the draining hatch (Item 1) situated under the engine housing. To do so, remove the 4 screws.

Place a hydraulic tank under the cooler and then drain the cooling liquid by opening its drain plug.

⇒ Quantity of cooling liquid = 18L

Open the drain plug (Item 2) to release the flow.



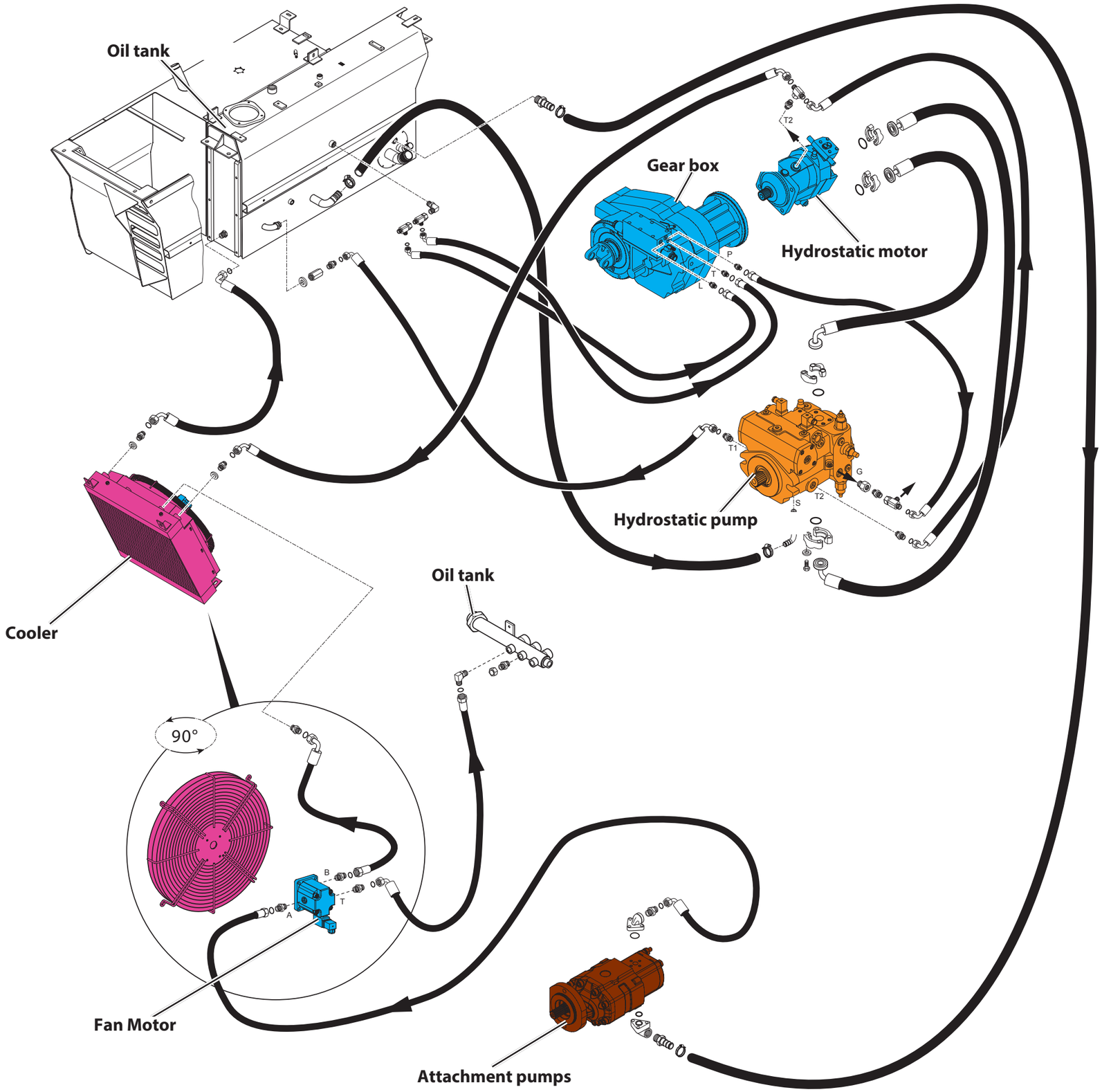


Loosen the 2 clamps (Items 3 and 4) of the “calorstat-cooler” hose (Item 5).

Remove the hose (Item 5).

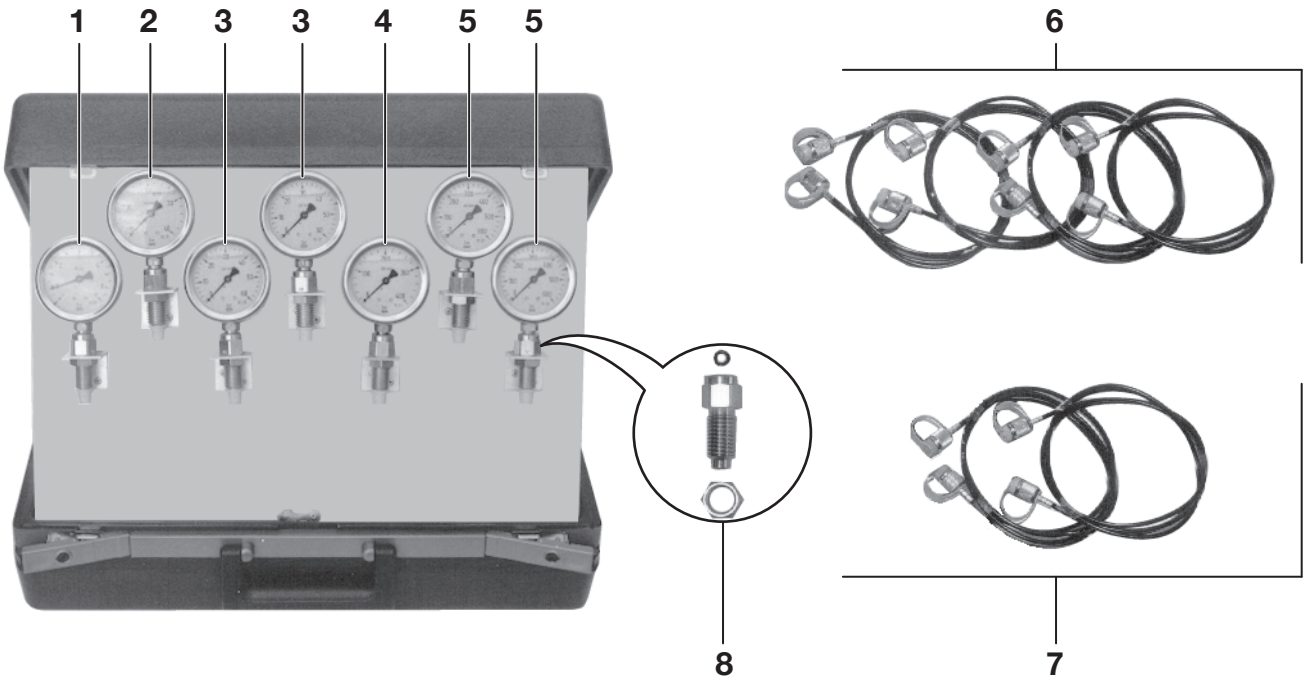
	Manitou code	FMI	Perkins	Components	Description	Engine shutdown from the ECM	Reduced power	Reduced engine speed
CODES	1347	6	1779	Fuel Rail Pressure Valve Solenoid	Short Circuit			
	2882	2	1743	Engine operation Selector Mode Switch	Data Erratic, Intermitent, or Incorrect			
	-	-	-	All Good			YES	
EVENTS	100-01	3	E360	Engine Oil Pressure	Low Oil Pressure (2 sec.)			
	100-17	1	E360	Engine Oil Pressure	Low Oil Pressure (8 sec.)			
	105-15	1	E539	Inlet Manifold Air Temperature	Above Normal = Lamp			
	105-16	2	E539	Inlet Manifold Air Temperature	Above Normal = DERATE		1%/s	
	107-15	1	E172	Air Filter	Clog Filter			
	110-00	3	E361	Engine Coolant Temperature.	Engine Shutdown = Level 3 (118°)			
	110-15	1	E361	Engine Coolant Temperature.	Lamp = Level 1 (113°)			
	110-16	2	E361	Engine Coolant Temperature.	Derate = Level 2 (114°)		1%/s	
	111-01	3	E2143	Engine Coolant Level	Low Low Level	Possible		
	157-00	1	E396	Fuel Rail	Too High Pressure	YES	YES	YES
	157-01	1	E398	Fuel Rail	Too Low Pressure		YES	
	190-15	1	E362	Engine Overspeed	Overspeed			
	97-15	1	E232	Fuel Water Separator	Water Level Too High			

TRANSMISSION AND COOLING CIRCUIT FLUID FLOW



BASIC MANOMETER KIT

This box contains all the components required for measuring pressure on all Manitou products.



Basic Manometer kit..... 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 hoses 549887
7. 2 Hoses for Maniscopic 549888
8. 7 Manometer tap connectors 549889

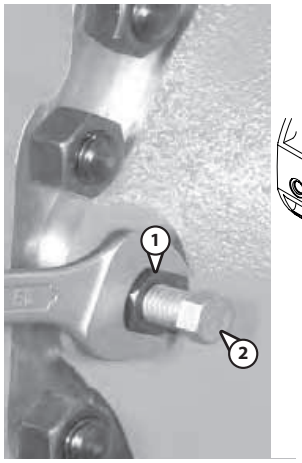
FREEWHEEL AND TOWING

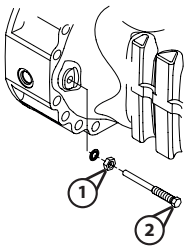
This maneuver is dangerous. Put the lift truck carefully into neutral before towing, because the parking brake system is out of service.

Towing can be carried out at very low speed and over short distances. How to intervene:

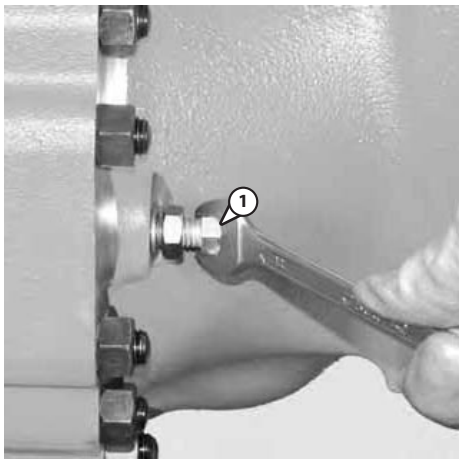
- Put the forward-reverse gear switch into neutral (N).
- Wedge the truck in place
- Loosen/deactivate the parking brake.
- Switch on the hazard warning lights.

MECHANICAL UNLOCKING OF THE NEGATIVE BRAKE ON FRONT AND REAR AXLE





– Loosen the locknuts (Item 1) of the manual mechanical unlocking screws (Item 2) by bringing the locknuts back by 8 mm approx.

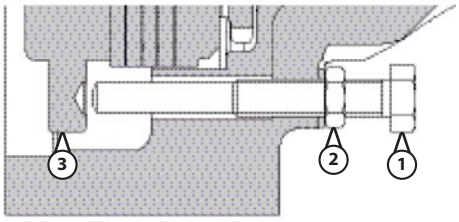


– Tighten the screws (Item 1) until they stop on the pressure plate (Item 3).

– With a wrench, alternately tighten the screws (Item 1) by one 1/4 turn at a time to restrain the Belleville springs and release the disc brakes.

Note: The travel required for unlocking is 1 turn.

It is important that the opposing screws are screwed by the same number of turns.

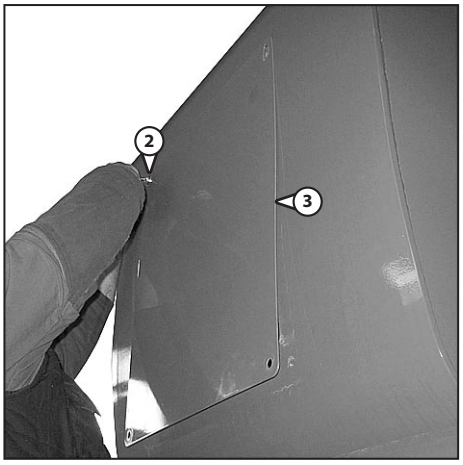


– Put the towing device into place.

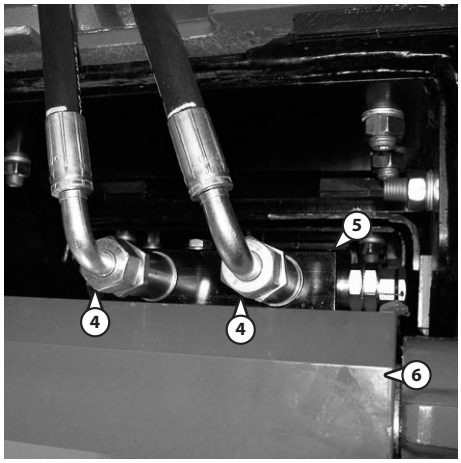
– Remove the chocks.

Do not tow truck at a speed greater than 6 km/h. Maximum towing distance: 5 km.

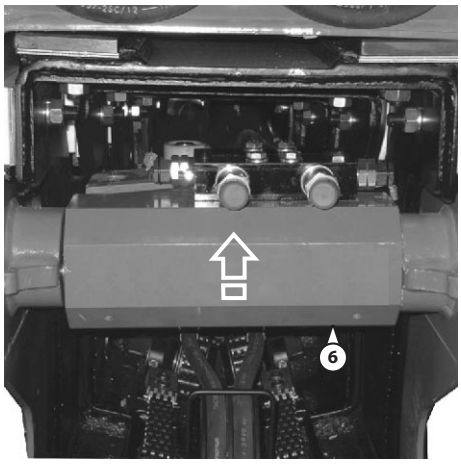
This procedure is also available in the AXLE MR 647142FR



Unscrew the screws (Item 2) and remove the rear casing (Item 3) from the turret.

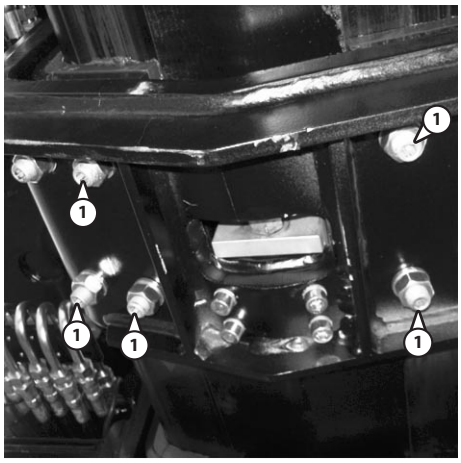


Disconnect the pipes (Item 4) from the valve (Item 5) of the Ist extension ram (Item 6).



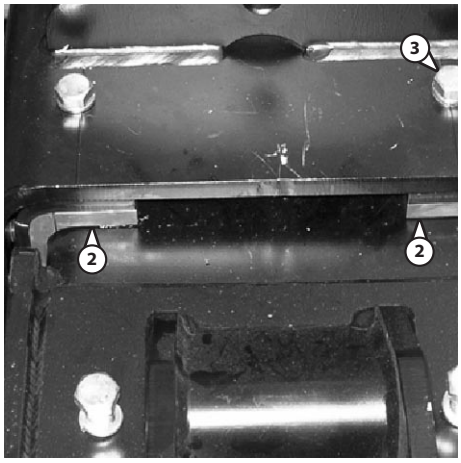
Secure the upper cylinder to the overhead crane by tying it with a with a noose; slightly raise the ram (Item 6) until the load on the pins is removed.

Remove the seeger clip. (Item 7) and withdraw the rear hinge pin (Item 1) of the ram (Item 6).

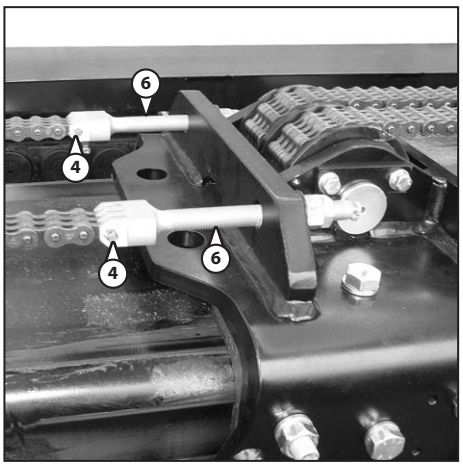


REMOVING THE IIIRD AND IVTH BOOMS FROM THE IIND EXTENSION BOOM

With the help of the overhead crane, keep the framework of the IIIrd extension boom raised and remove the lower foot-carrier plates by unscrewing the lower lateral grub screws (Item 1).

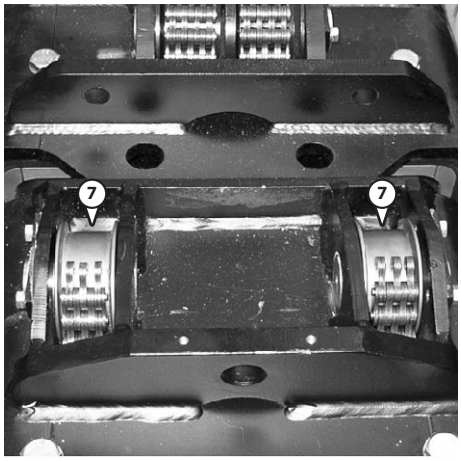


Remove the upper foot-carrier plates of the IInd extension (Item 2) using the grub screws and upper lateral grub screws (Item 3).



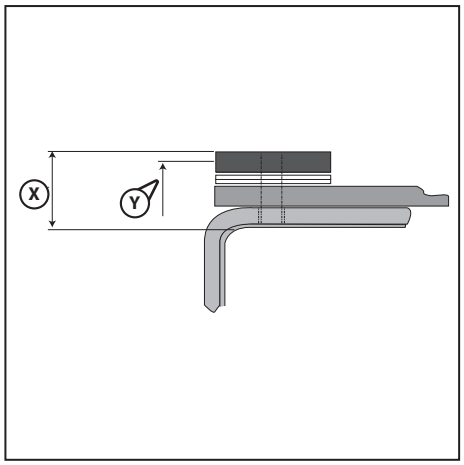
Ensure that the chains attached to the upper part of the Ist extension are not under tension.

Withdraw the pins (Item 4) that attach the chains (Item 5) to the tie rods (Item 6).

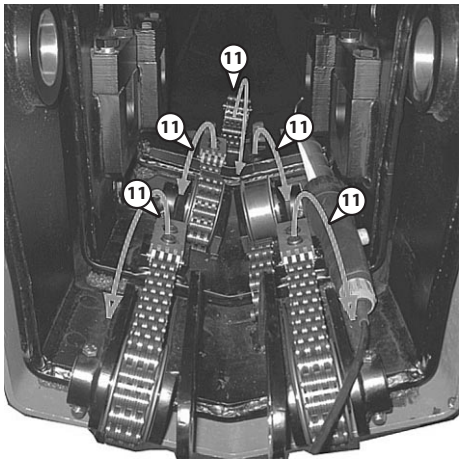


Remove the pulley (Item 7).
Withdraw the chains towards the front of the boom, stretching them at the upper part of the framework of the IIIrd extension boom.

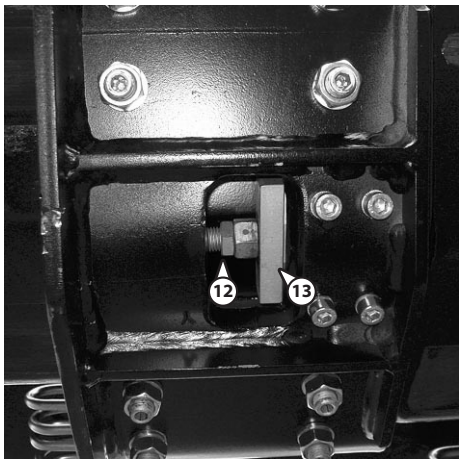
Warning: secure the chains to the top of the boom so that when extracting the framework they are under tension and therefore cannot slide laterally.



For fitting the grub screws, check the measurement “X” from which 6 mm must be subtracted to obtain the exact measurement “Y” of insertion of the grub screw into the framework.
Warning : do not exceed the maximum height of the grub screw otherwise there would be a risk of interference with the framework.



Refit the five chain attachment points (Item 11) on the IInd, IIIrd and IVth extensions.



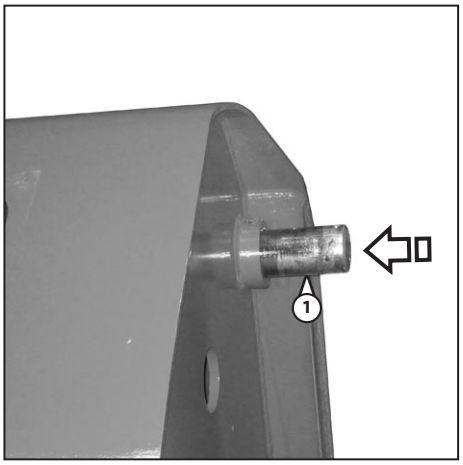
Refit the chain tie rods (Item 12) to the iron block (Item 13).

Lock the lower chain tie rods (Item 14) in the lower front part of the boom.

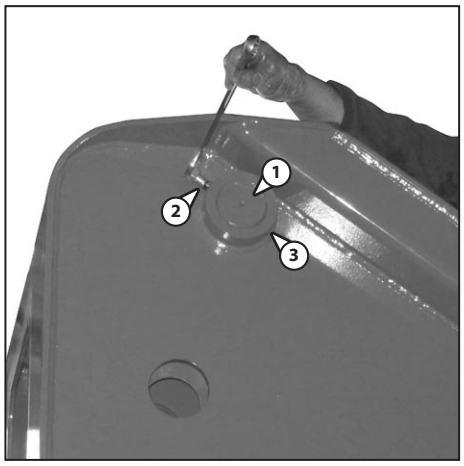
REFITTING THE TELESCOPIC BOOM TO THE TRUCK

With the help of an overhead crane or hoist, raise the boom and position it on the truck in its seating on the turret.

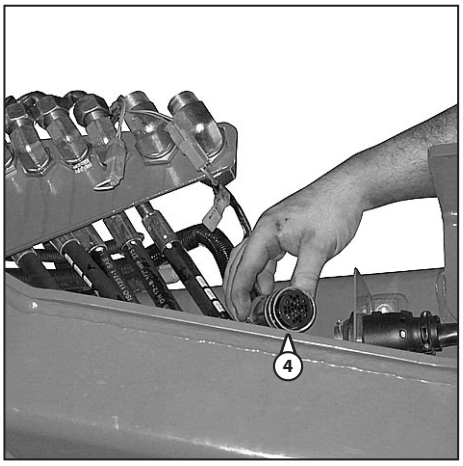
Take care when lifting. To prevent the boom becoming unbalanced and overturning, it must be guided by an operator.



Insert the boom/turret hinge pin (Item 1) into the appropriate hole.



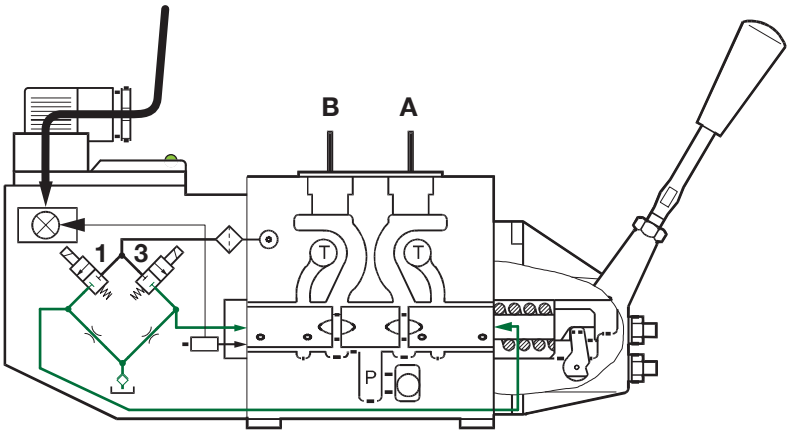
Lock the pin (Item 1), with the screw (Item 2) and nut (Item 3).



Reconnect the basket electrical system connector (Item 4) and the safety system connector.

Values indicative only

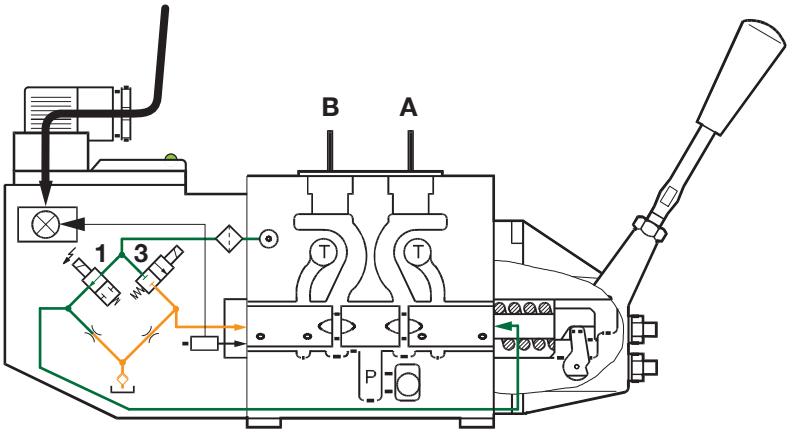
The electronic system is always comparing the Usc control signal with the Usp position signal. This signal will be within: 0,25U and 0,75 U. U is the electronic control unit's voltage.



Signal = 0,50 x U

Consequences:

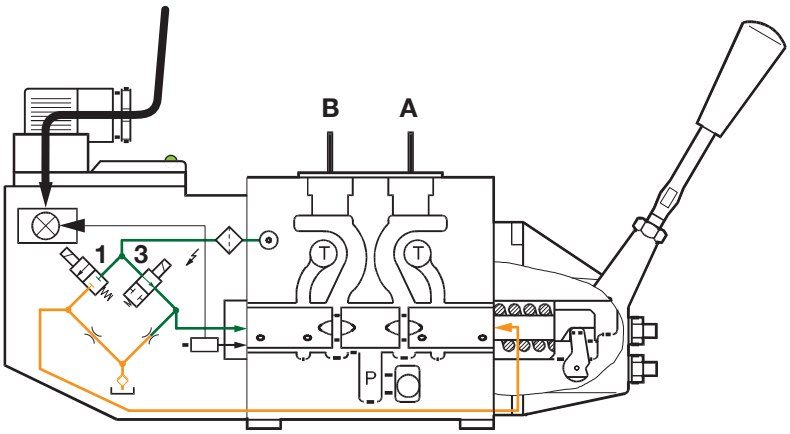
- No excited electrovalve.
- No slide movement.
  (No flowrate towards «A» and «B».)



Signal = 0,25 x U

Consequences:

- Electrovalves 1 and 2 excited.
- Max. movement of slide towards «A».
  (Max flowrate towards «A».)

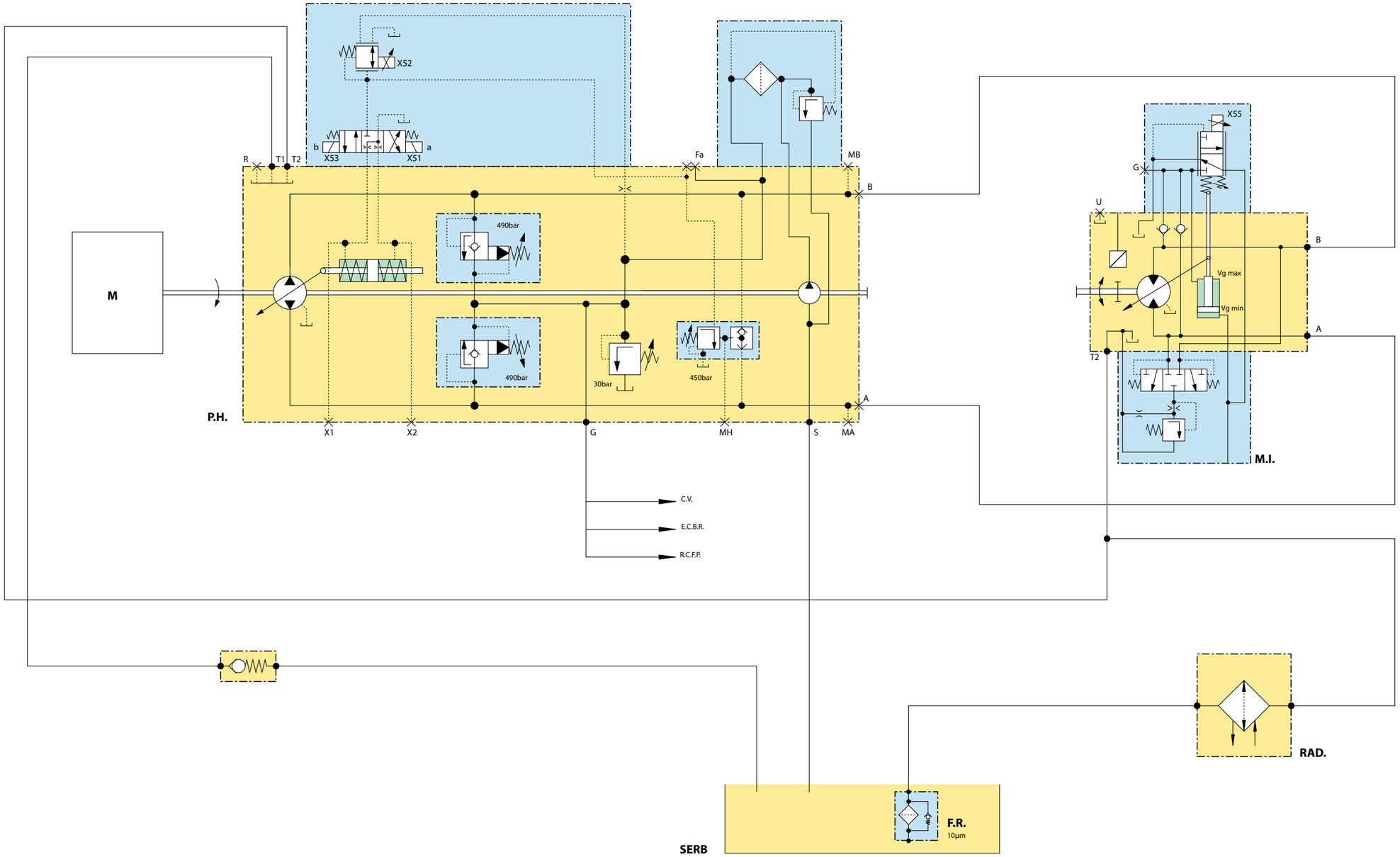


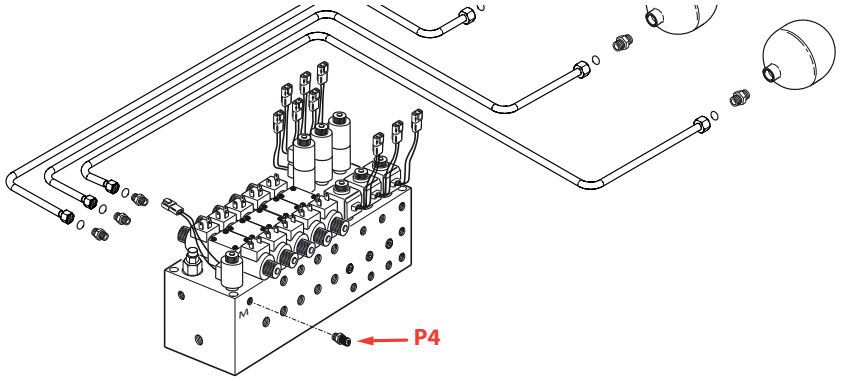
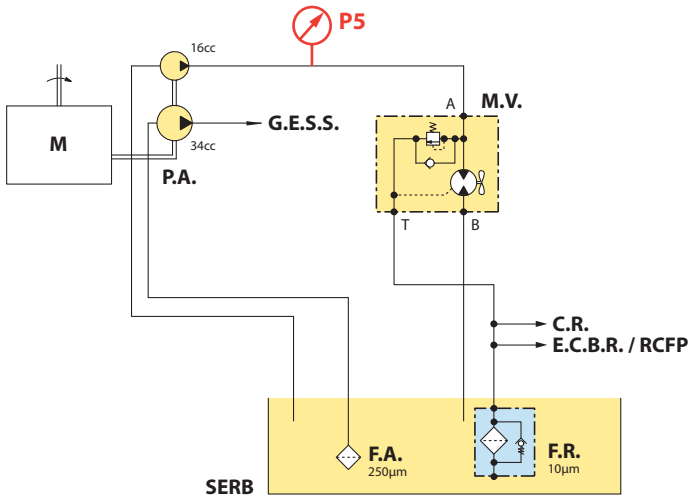
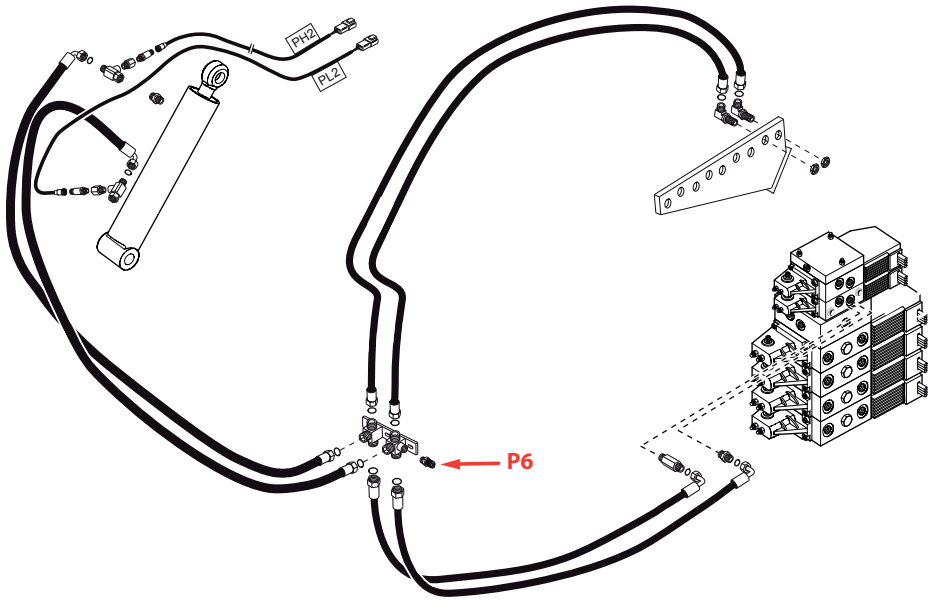
Signal = 0,75 x U

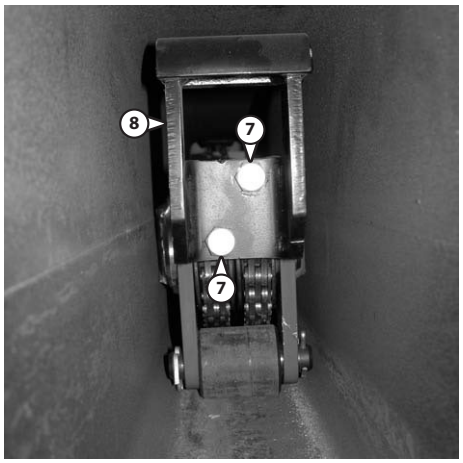
Consequences:

- Electrovalves 3 and 4 excited.
- Max. movement of slide towards «B».
  (Max. flowrate towards «B».)

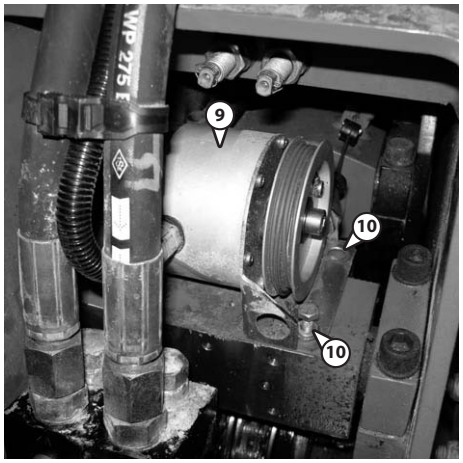
4 – HYDROSTATIC TRANSMISSION SCHEMATIC DIAGRAM



	Showing on machine	Pressure port	Line function	Control component: Minimum value	Control component: Maximum value	Theoretical value: Mini	Theoretical value: Maxi	Value measured on machine: Mini	Value measured on machine: Maxi
P4	Yes	Stabiliser line	Stabiliser system power supply	Connection to the tank	LP stabiliser system	0b	220b	0b	235b
									
P5	No	Fan line	Fan motor power supply	Mini RPM resistance	Maxi RPM resistance	8b	175b	8b	95b
							
P6	Yes	Compensation cylinder	Compensating cylinder on pillar side	Connection to the tank	Secondary valve 300b	0b	300b	/	/
									

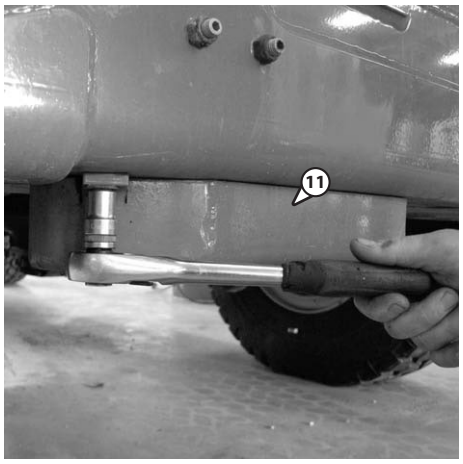


Remove the 2 screws (Item 7) of the cylinder guide (Item 8) and then remove it.

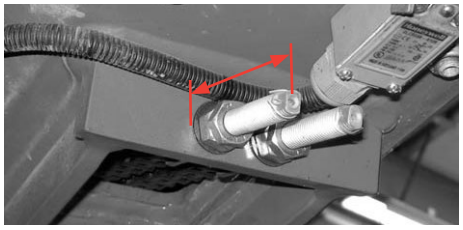


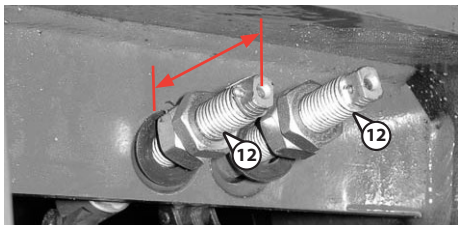
Remove the length sensor (Item 9) by unscrewing its 2 screws (Item 10). Position it on the outside of the stabiliser.

Note: Each length sensor is specific to its stabiliser and has a different reference.



Remove the protective casing (Item 11) under the stabiliser.





Using a slide caliper, take the dimension for the 4 chain tensioners. These measurements will be useful for reassembling the chains provided that they are not replaced by new ones.

Only loosen the telescope extension chains behind the stabiliser base. Next dislodge the 2 tensioners (Item 12).

OPERATING CONDITIONS

MACHINE WITH FORKS

MACHINE WITH FORKS ON WHEELS OR STABILISERS

MOVEMENTS AUTHORISED FROM THE CAB			
	TURRET UP TO +/-15°	TURRET MORE THAN +/-15°	COMMENTS
	BOOM UP TO 55°	BOOM MORE THAN 55°	
	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X		
STABILISER DESCENT	X	X	
TURRET ROTATION	X	X	
TOP TILT	X	X	
BOTTOM TILT	X	X	
BOOM ASCENT	X	X	
BOOM DESCENT	X	X	
BOOM RETRACTION	X	X	
BOOM EXTENSION	X	X	
OPTION 1	X	X	
OPTION 2	X	X	
LEVELLING CORRECTION	OPERATION ON FRONT SIDE, WITH BOOM < 3M		
AXLE LOCKING	LOCKED (INDICATOR LAMP FLASHING) WITH TURRET ROTATED OR BOOM > 55°		

WARNING: The rotation is cut-off if the boom is > 55°, rotation only authorised up to +/- 5°.
WARNING: The stabilisers may be raised if the turret is positioned up to +/-5°, the boom retracted and positioned at 55° maximum.

MOVEMENTS AUTHORISED FROM CAB WITH ANTI-TILT EXCLUSION BUTTON ACTIVATED			
	TURRET UP TO +/-15°	TURRET MORE THAN +/-15°	COMMENTS
	BOOM UP TO 55°	BOOM MORE THAN 55°	
	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X	X	
STABILISER DESCENT	X	X	
TURRET ROTATION	X	X	
TOP TILT	X	X	
BOTTOM TILT	X	X	
BOOM ASCENT	X	X	
BOOM DESCENT	X	X	
BOOM RETRACTION	X	X	
BOOM EXTENSION	X	X	
OPTION 1	X	X	
OPTION 2	X	X	

WARNING: the platform exclusion button has no effect on the operation mentioned above.
WARNING: the levelling correction is never made by the button.

MACHINE ON WHEELS WITH FIXED BASKET / ORH

MOVEMENTS AUTHORISED FROM THE CAB					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION	X	X			
TOP TILT	X	X			
BOTTOM TILT	X	X			
BOOM ASCENT	X (only up to H = 3 m)	X (only up to H = 3 m)			
BOOM DESCENT	X	X	X	X	
BOOM RETRACTION	X	X			
BOOM EXTENSION					
OPTION 1	X	X			
OPTION 2	X	X			

MOVEMENTS AUTHORISED FROM CAB WITH PLATFORM EXCLUSION BUTTON ACTIVATED					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION	X	X			
TOP TILT	X	X			
BOTTOM TILT	X	X			
BOOM ASCENT	X (only up to H = 3 m)	X (only up to H = 3 m)			
BOOM DESCENT	X	X	X	X	
BOOM RETRACTION	X	X			
BOOM EXTENSION					
OPTION 1	X	X			
OPTION 2	X	X			

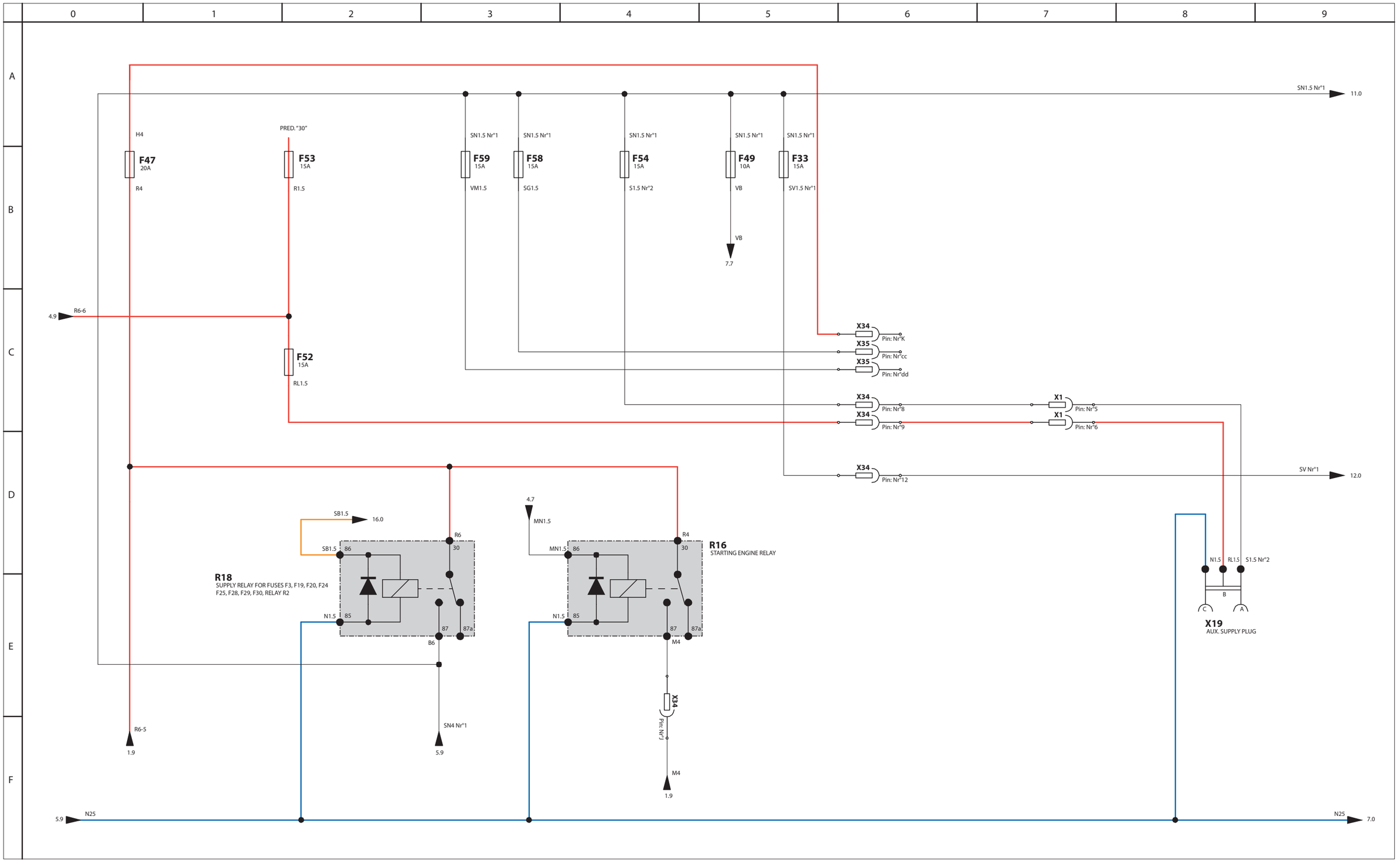
MACHINE WITH RADIO CONTROL

MACHINE ON STABILISERS

MOVEMENTS AUTHORISED FROM THE CAB					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION					
TOP TILT					
BOTTOM TILT					
BOOM ASCENT					
BOOM DESCENT	X				As considered as platform
BOOM RETRACTION					
BOOM EXTENSION					
OPTION 1					
OPTION 2					

MOVEMENTS AUTHORISED FROM CAB WITH PLATFORM EXCLUSION BUTTON ACTIVATED					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION	X	X	X	X	
TOP TILT	X	X	X	X	
BOTTOM TILT	X	X	X	X	
BOOM ASCENT	X (ALSO MORE THAN 3 m)	X (ALSO MORE THAN 3 m)	X (ALSO MORE THAN 3 m)	X (ALSO MORE THAN 3 m)	
BOOM DESCENT	X	X	X	X	
BOOM RETRACTION	X	X	X	X	
BOOM EXTENSION	X	X	X	X	
OPTION 1	X	X	X	X	
OPTION 2	X	X	X	X	

Electrical components and connectors			
Wiring harness type	**Item**	**Designation**	**Diagram**
Dashboard	L104	Stabiliser extension/descent indicator lamp	20
Dashboard	L105	Stabiliser retraction/ascent indicator lamp	20
Dashboard	L112	Stabiliser indicator lamp selected	20
Dashboard	L113	Telescope indicator lamp selected	20
Cab	M40	Upper windscreen wiper motor	32
Cab	M40a	Upper windscreen wiper pump motor	32
Cab	M41	Rear screen wiper motor	33
Cab	M41a	Rear windscreen wiper pump motor	33
Cab	M44	Electric window motor	33
Cab	M122	Front windscreen wiper pump motor	19
Rear frame	MAIN FUSE	Main fuse	1
Frame fuse box and relay	Midac_C1	Midac_C1 control unit input/output	5
Turret	Midac_T1	Midac_T1 control unit input/output	27
	P.MIL.	Military plug	1
Turret	PH1	Lifting cylinder CEC pressure sensor on rod side	29
Turret	PH2	Compensating cylinder CEC pressure sensor on rod side	29
Turret	PL1	Lifting cylinder CEC pressure sensor on piston side	29
Turret	PL2	Compensating cylinder CEC pressure sensor on piston side	29
Frame fuse box and relay	PROGRAMMING	Connector for programming	7
	QS1	Short circuit	1
Cab	R	Rear defrosting resistance	33
Cab fuse box and relay	R1	Horn relay	18
Cab fuse box and relay	R2	Operator panel supply relay	17
Cab fuse box and relay	R3	Red rotating beacon light relay	18
Cab fuse box and relay	R4	"15" supply relay	17
Cab fuse box and relay	R5	Flashing unit	18
Cab fuse box and relay	R6	Arm_T1 relay Watchdog	27
Cab fuse box and relay	R7	Electronic control units supply relay	17
Cab fuse box and relay	R8	Seat tilt relay	17
Cab fuse box and relay	R9	Seat tilt relay	17
Cab fuse box and relay	R10	Arm_T1 control unit supply relay	27
Cab fuse box and relay	R11	Start-up validation relay	18
Cab fuse box and relay	R12	Cab user points fuse supply relay	32
Cab fuse box and relay	R13	Large mixing bucket relay	17
Frame fuse box and relay	R16	Engine starting relay	6
Frame fuse box and relay	R17	Arm_T1 control unit watchdog relay	5
Frame fuse box and relay	R18	Supply for fuses	6
Frame fuse box and relay	R19	Rear fog lights relay	2
Frame fuse box and relay	R20	Light position relay	2
Frame fuse box and relay	R21	Reverse gear relay	2
Frame fuse box and relay	R22	Low beam relay	2
Frame fuse box and relay	R23	Engine starting relay	4
Frame fuse box and relay	R24	Main beam relay	2
Frame fuse box and relay	R25	Stop light relay	2
Frame fuse box and relay	R26	Hydraulic cooling fan relay	4
Frame fuse box and relay	R27	Arm_C1 control unit supply relay	12
Frame fuse box and relay	R28	Arm_C2 control unit supply relay	14
Frame fuse box and relay	R29	Back-up pump relay	4
Frame fuse box and relay	R30	Truck control unit supply relay	5
Movement locking system	R99	Re-supply relay	25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D
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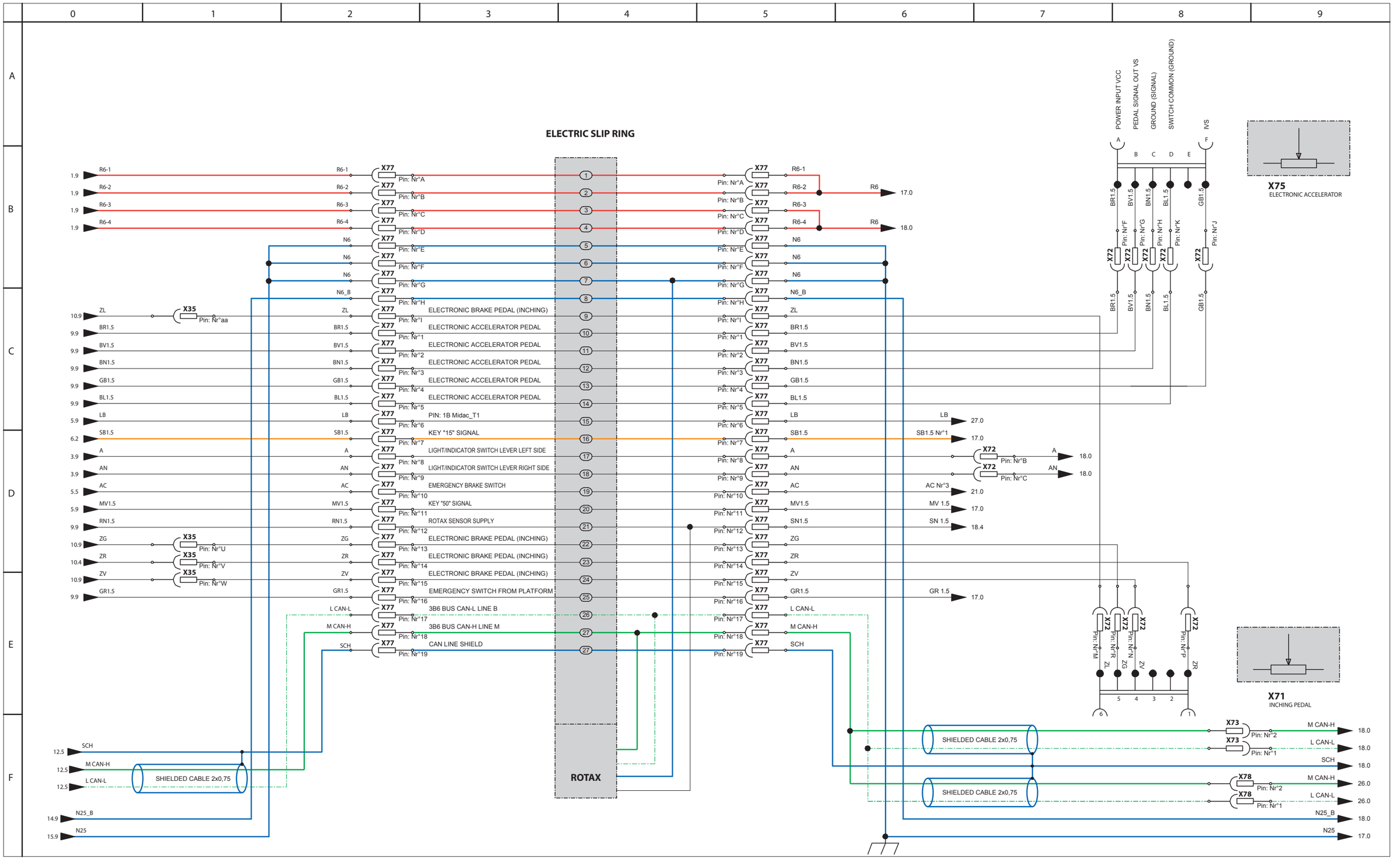
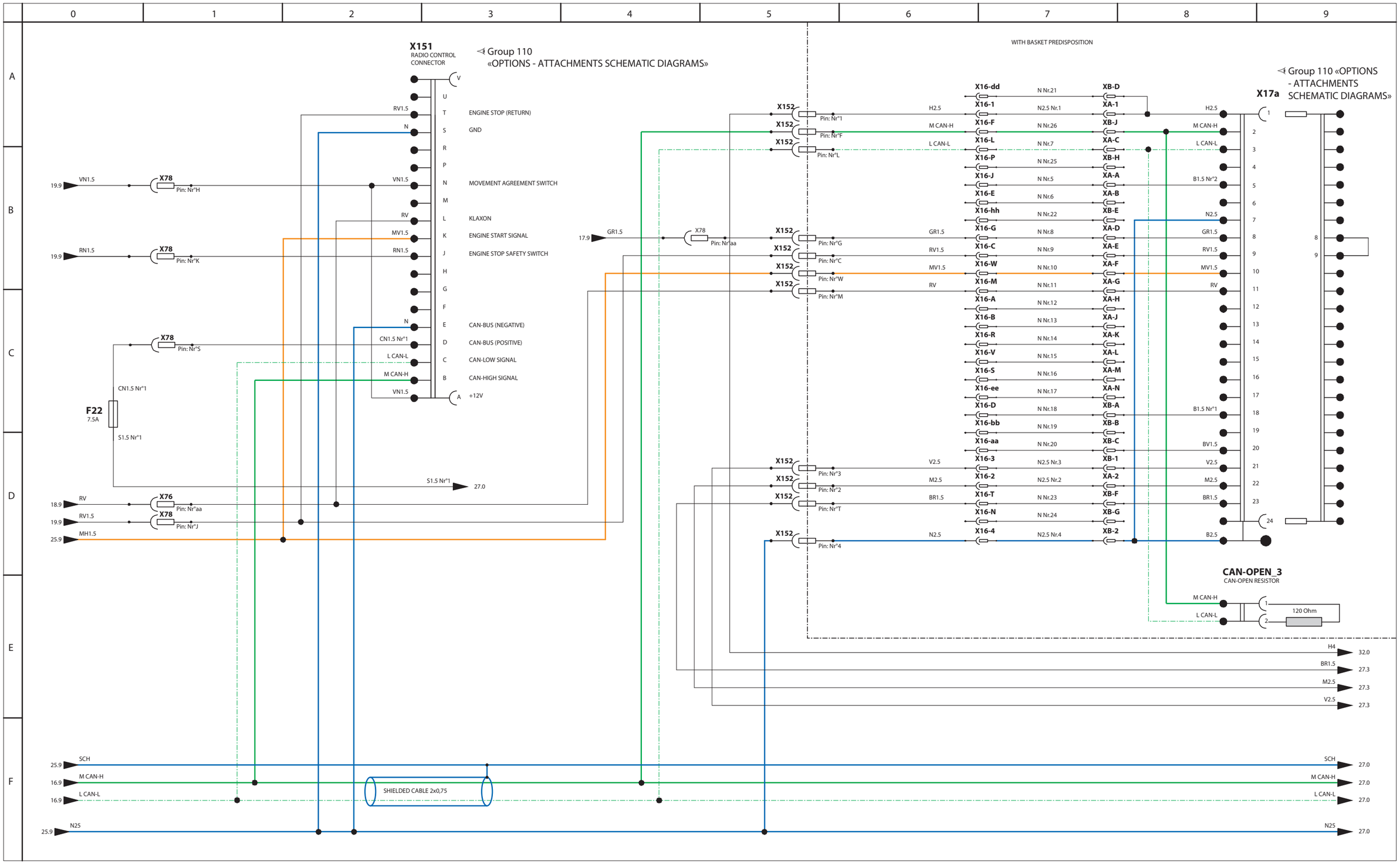
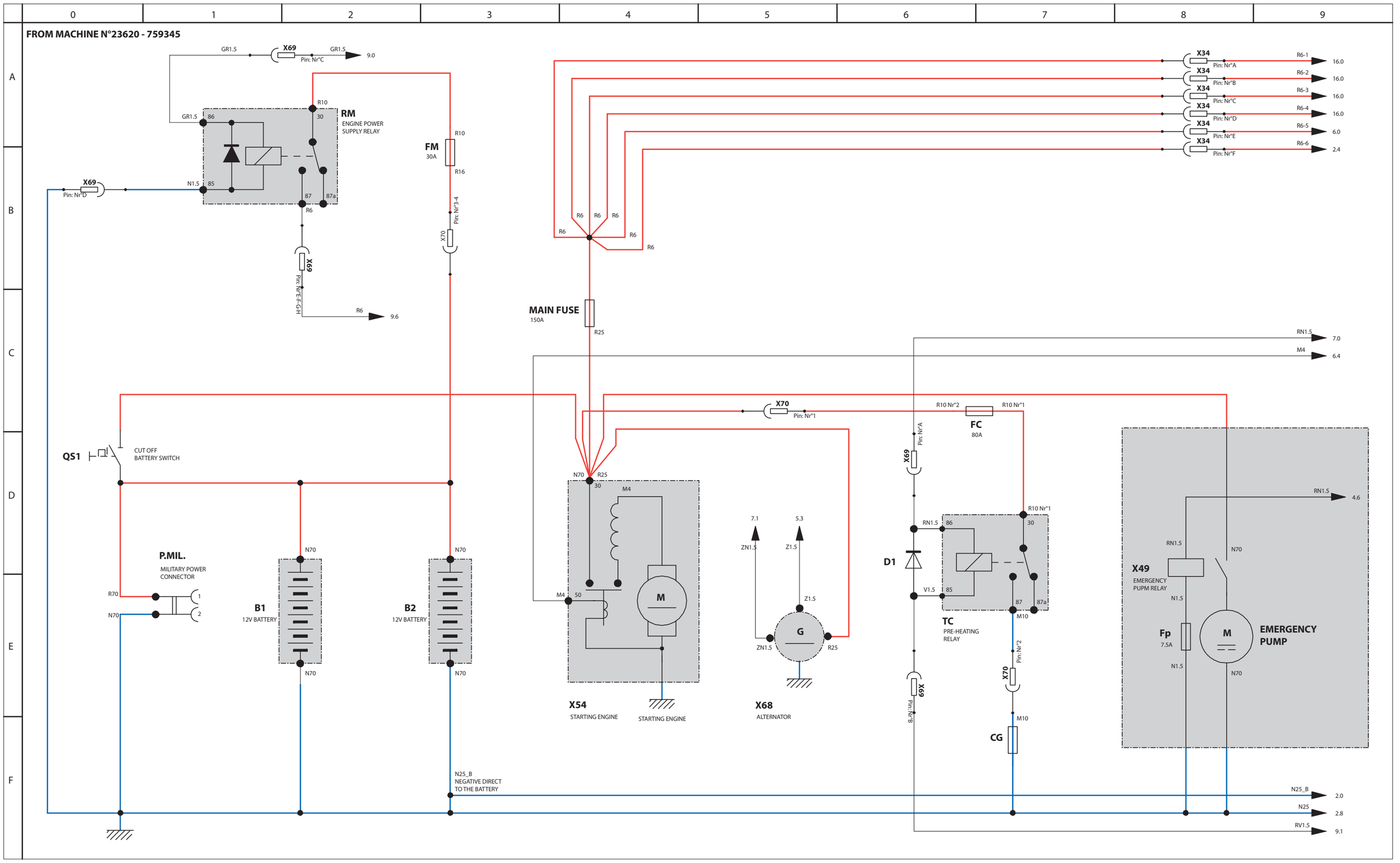
F
SN1.5 Nr°1
11.0
H4
F47
20A
R4
PRED."30"
F53
15A
R1.5
SN1.5 Nr°1
F59
15A
VM1.5
SN1.5 Nr°1
F58
15A
SG1.5
SN1.5 Nr°1
F54
15A
S1.5 Nr°2
SN1.5 Nr°1
F49
10A
VB
VB
7.7
SN1.5 Nr°1
F33
15A
SV1.5 Nr°1
4.9
R6-6
F52
15A
RL1.5
X34
Pin: Nr°K
X35
Pin: Nr°cc
X35
Pin: Nr°dd
X34
Pin: Nr°8
X34
Pin: Nr°9
X1
Pin: Nr°5
X1
Pin: Nr°6
X34
Pin: Nr°12
SV Nr°1
12.0
SB1.5
16.0
R18
SUPPLY RELAY FOR FUSES F3, F19, F20, F24
F25, F28, F29, F30, RELAY R2
SB1.5
86
R6
30
N1.5
85
87
87a
B6
4.7
MN1.5
MN1.5
86
R4
30
R16
STARTING ENGINE RELAY
N1.5
85
87
87a
M4
X34
Pin: Nr°J
M4
1.9
R6-5
1.9
SN4 Nr°1
5.9
N1.5
RL1.5
S1.5 Nr°2
B
C
A
X19
AUX. SUPPLY PLUG
5.9
N25
N25
7.0

16 – ROTATING MANIFOLD, ACCELERATOR PEDAL, INCHING PEDAL



26 – BASKET RADIO CONTROL CONNECTOR OPTION

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D
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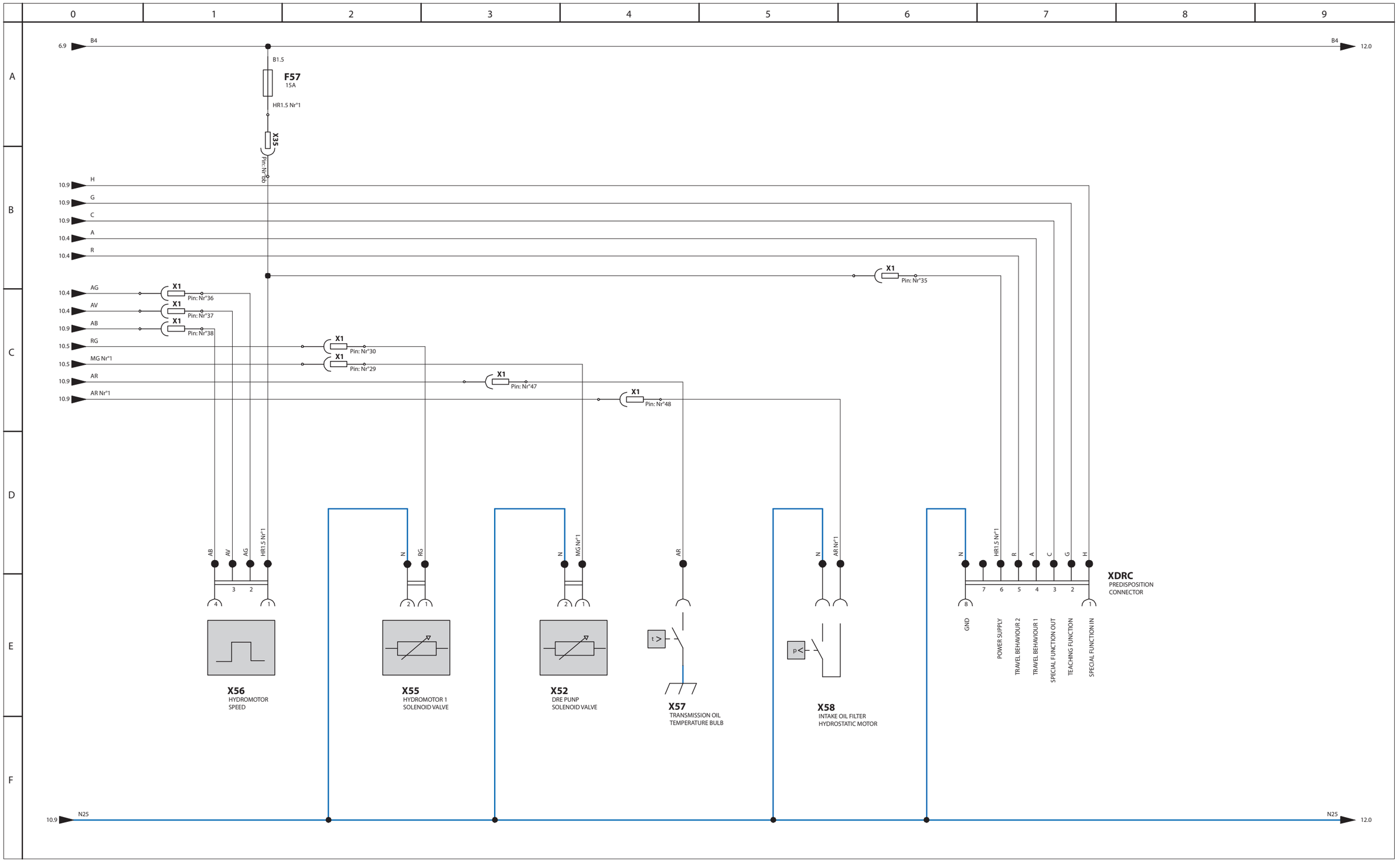
F
FROM MACHINE N°23620 - 759345
GR1.5
X69
Pin: Nr°C
GR1.5
9.0
R10
RM
ENGINE POWER
SUPPLY RELAY
GR1.5
86
30
X69
Pin: Nr°D
N1.5
85
87
87a
R6
FM
30A
R10
R16
X70
Pin: Nr°3-4
X69
Pin: Nr°E-F-G-H
R6
9.6
X34
Pin: Nr°A
R6-1
16.0
X34
Pin: Nr°B
R6-2
16.0
X34
Pin: Nr°C
R6-3
16.0
X34
Pin: Nr°D
R6-4
16.0
X34
Pin: Nr°E
R6-5
6.0
X34
Pin: Nr°F
R6-6
2.4
R6
R6
R6
R6
R6
MAIN FUSE
150A
R25
RN1.5
7.0
M4
6.4
X70
Pin: Nr°1
R10 Nr°2
R10 Nr°1
FC
80A
X69
Pin: Nr°A
QS1
CUT OFF
BATTERY SWITCH
N70
R25
30
M4
M4
50
M
X54
STARTING ENGINE
STARTING ENGINE
7.1
5.3
ZN1.5
Z1.5
Z1.5
G
ZN1.5
R25
X68
ALTERNATOR
RN1.5
86
30
R10 Nr°1
D1
V1.5
85
87
87a
M10
TC
PRE-HEATING
RELAY
X69
Pin: Nr°B
X70
Pin: Nr°2
M10
CG
RN1.5
4.6
RN1.5
N70
X49
EMERGENCY
PUPM RELAY
N1.5
Fp
7.5A
N1.5
M
EMERGENCY
PUMP
N70
P.MIL.
MILITARY POWER
CONNECTOR
R70
N70
1
2
N70
B1
12V BATTERY
N70
N70
B2
12V BATTERY
N70
N25_B
NEGATIVE DIRECT
TO THE BATTERY
N25_B
2.0
N25
2.8
RV1.5
9.1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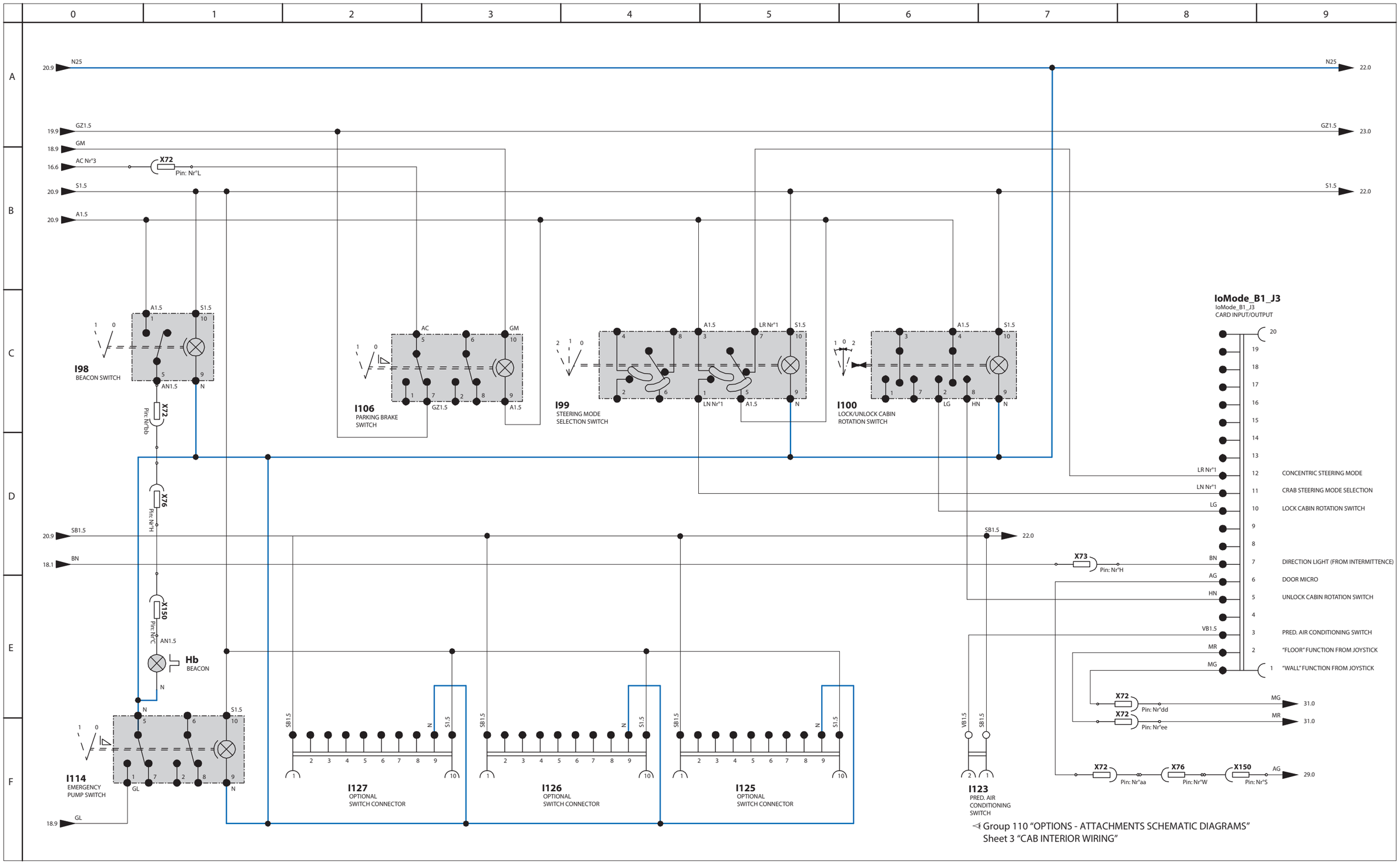
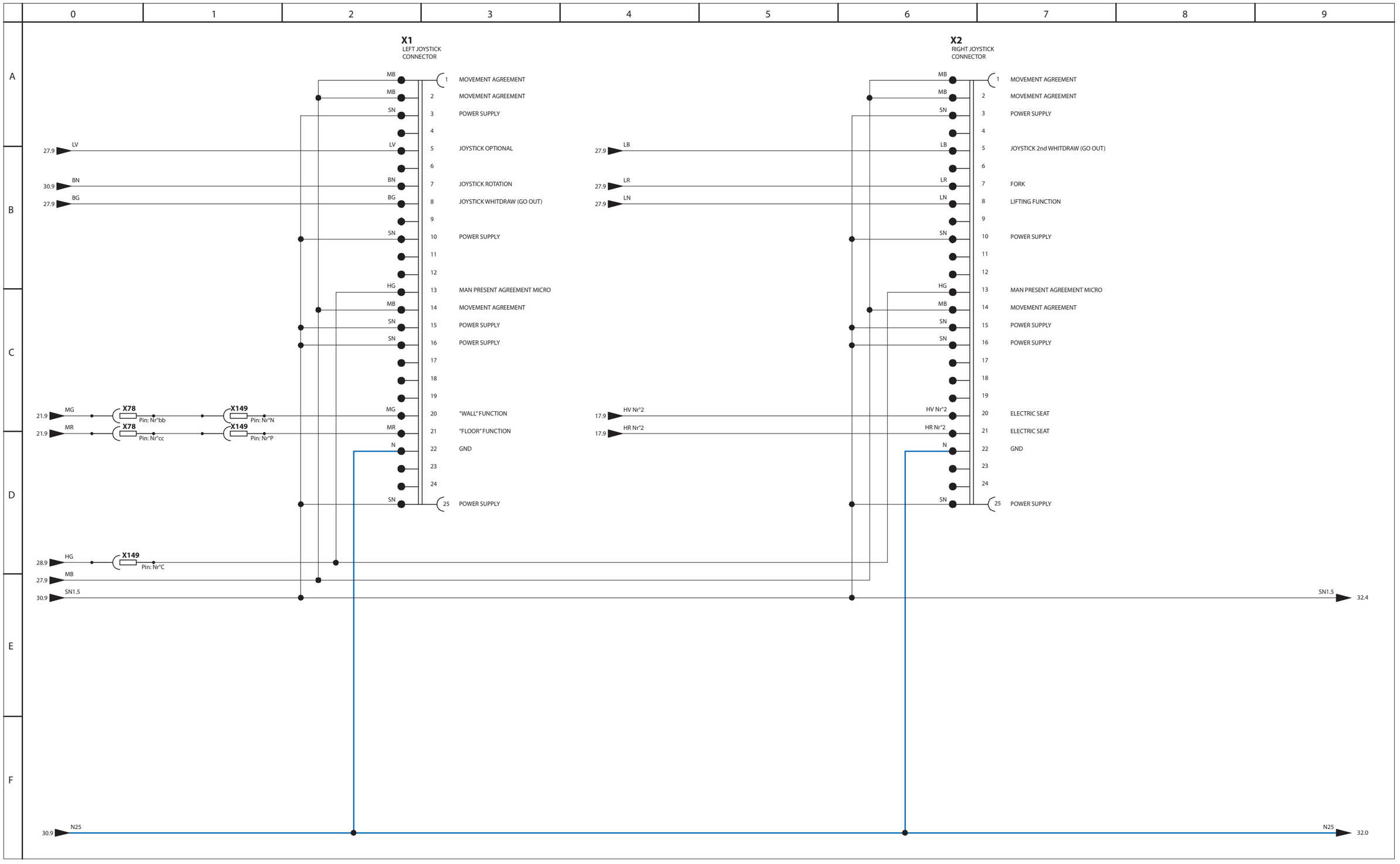
A
B
C
D
E
F
6.9 B4
B4 12.0
B1.5
F57
15A
HR1.5 Nr°1
X35
Pin: Nr°6b
10.9 H
10.9 G
10.9 C
10.4 A
10.4 R
X1
Pin: Nr°35
10.4 AG
10.4 AV
10.9 AB
10.5 RG
10.5 MG Nr°1
10.9 AR
10.9 AR Nr°1
Pin: Nr°36
Pin: Nr°37
Pin: Nr°38
Pin: Nr°30
Pin: Nr°29
Pin: Nr°47
Pin: Nr°48
AB
AV
AG
HR1.5 Nr°1
N
RG
MG Nr°1
AR
AR Nr°1
3 2
4 1
2 1
X56
HYDROMOTOR
SPEED
X55
HYDROMOTOR 1
SOLENOID VALVE
X52
DRE PUNP
SOLENOID VALVE
t >
X57
TRANSMISSION OIL
TEMPERATURE BULB
p <
X58
INTAKE OIL FILTER
HYDROSTATIC MOTOR
7 6 5 4 3 2
8 1
GND
POWER SUPPLY
TRAVEL BEHAVIOUR 2
TRAVEL BEHAVIOUR 1
SPECIAL FUNCTION OUT
TEACHING FUNCTION
SPECIAL FUNCTION IN
XDRC
PREDISPOSITION
CONNECTOR
10.9 N25
N25 12.0



◁ Group 110 "OPTIONS - ATTACHMENTS SCHEMATIC DIAGRAMS"
Sheet 3 "CAB INTERIOR WIRING"

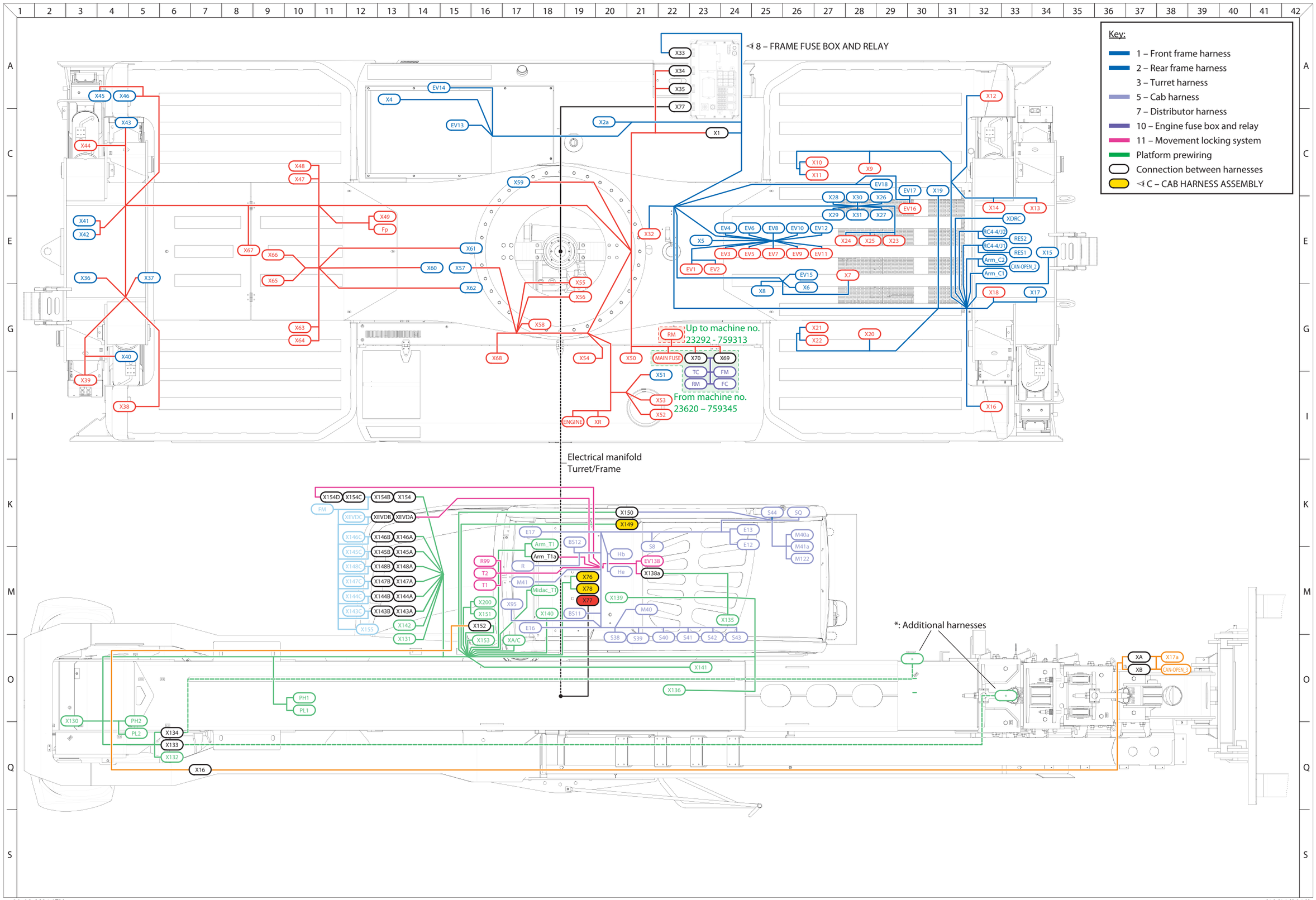
31 – DANFOSS JOYSTICK CONNECTOR

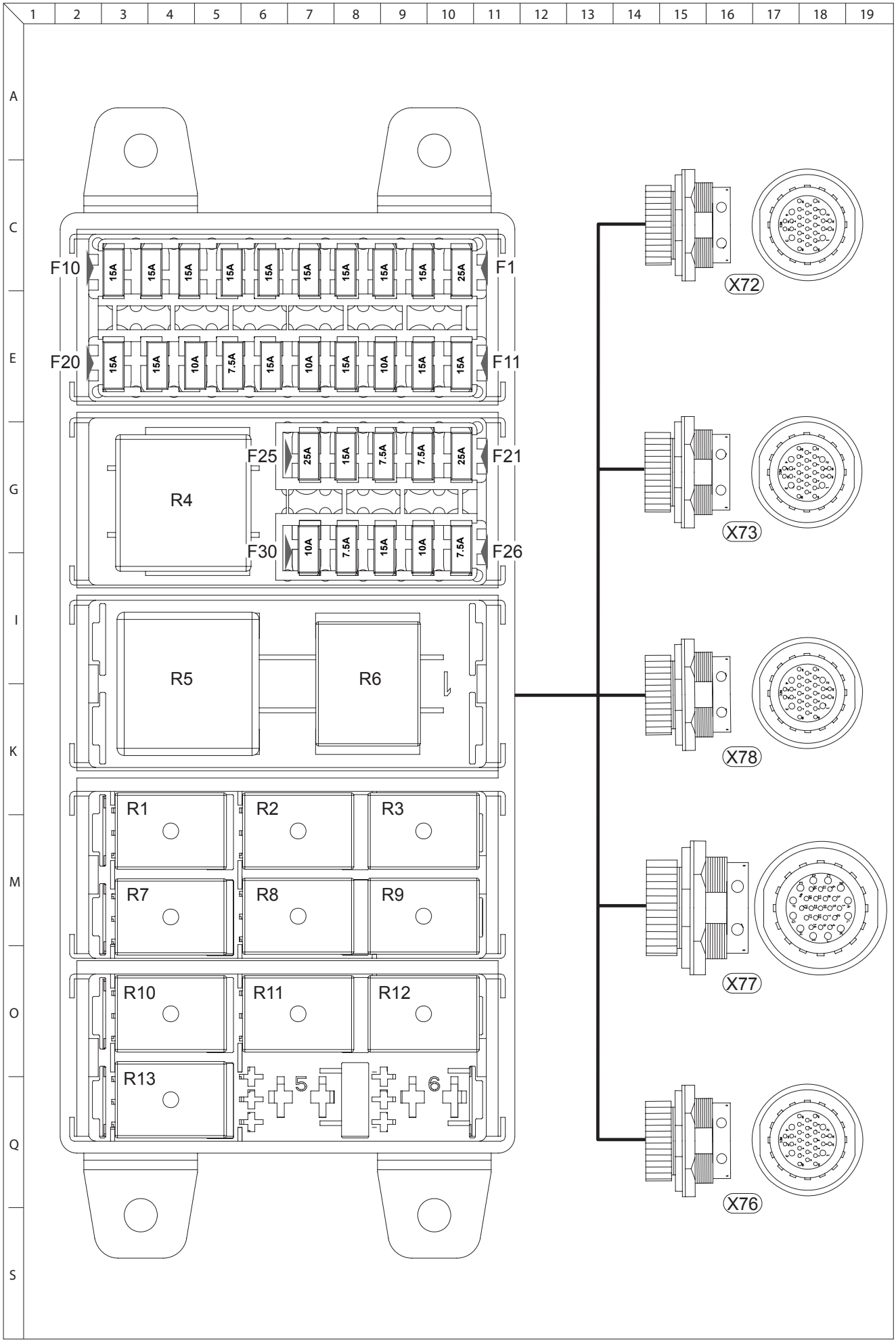


KEY / POSITION OF CONNECTORS

Electrical components and connectors						
Wiring harness type	***Item***	***Designation***	***2D Location***			***Harness details***
			A	***B***	***C***	
Frame fuse box and relay	11 MIC	Connector for reservation				8
Front frame	Arm_C1	Arm_C1 control unit input/output		E32		1
Front frame	Arm_C2	Arm_C2 control unit input/output		E32		1
Turret	Arm_T1	Arm_T1 control unit input/output connector		M18		3
Turret/ movement locking system	Arm_T1a	Turret/movement locking system harness interface		M18		3 / 11
Cab	BS11	Right loudspeaker		M19		5
Cab	BS12	Left loudspeaker		M19		5
Frame fuse box and relay	CAN-J1939	BUS J1939 balancing resistance				8
Frame fuse box and relay	CAN-OPEN_1	OPEN CAN connector				8
Front frame	CAN-OPEN_2	CAN BUS balancing resistance		E33		1
Platform prewiring	CAN-OPEN_3	OPEN CAN balancing resistance		O37		
Cab	E12	Front right working light		K24		5
Cab	E13	Left front work light		K24		5
Cab	E16	Rear right working light		M17		5
Cab	E17	Rear left working light		K17		5
Rear frame	ENGINE	Engine connector		I19		2
Front frame	EV1	Turret locking shaft ascent electrovalve		E23		1
Front frame	EV2	Turret locking shaft descent electrovalve		E23		1
Front frame	EV3	Stabiliser descent/extension electrovalve		E24		1
Front frame	EV4	Stabiliser ascent/retraction electrovalve		E24		1
Front frame	EV5	Rear left stabiliser electrovalve		E24		1
Front frame	EV6	Rear left telescope electrovalve		E24		1
Front frame	EV7	Right rear stabiliser electrovalve		E25		1
Front frame	EV8	Rear right telescope electrovalve		E25		1
Front frame	EV9	Front right stabiliser electrovalve		E26		1
Front frame	EV10	Front right telescope electrovalve		E26		1
Front frame	EV11	Front left stabiliser electrovalve		E27		1
Front frame	EV12	Front left telescope electrovalve		E27		1
Front frame	EV13	Hydraulic oil cooling electrovalve		C15		1
Front frame	EV14	Engine oil temperature sensor		A14		1
Front frame	EV15	Parking brake electrovalve		E26		1
Front frame	EV16	Short steering electrovalve		E29		1
Front frame	EV17	Crab steering electrovalve		C29		1
Front frame	EV18	Air-conditioning electrovalve		C29		1
Movement locking system	EV138	LS cut-off electrovalve at start-up		M21		11
Turret	EV142	Air-conditioning electrovalve connector reservation				3
Movement locking system	EVD	Movement cut-off electrovalve				11
Cab fuse box and relay	F1	Platform fuse				9
Cab fuse box and relay	F2	Cab front working lights fuse				9
Cab fuse box and relay	F3	Cab rear working lights fuse				9
Cab fuse box and relay	F4	Working lights fuse on telescope/upper windscreen wiper				9
Cab fuse box and relay	F5	Rear windscreen wiper windscreen washer fuse				9
Cab fuse box and relay	F6	Rear windowdefrost power supply fuse				9
Cab fuse box and relay	F7	Electric window fuse				9
Cab fuse box and relay	F8	Dashboard switch power supply fuse				9
Cab fuse box and relay	F9	Seat equipment power supply fuse				9

B – FRAME AND TURRET HARNESS ASSEMBLY




1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
A C E G I K M O Q S
F10
F1
F20
F11
F25
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F26
15A
10A
7.5A
25A
R4
R5
R6
R1
R2
R3
R7
R8
R9
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R13
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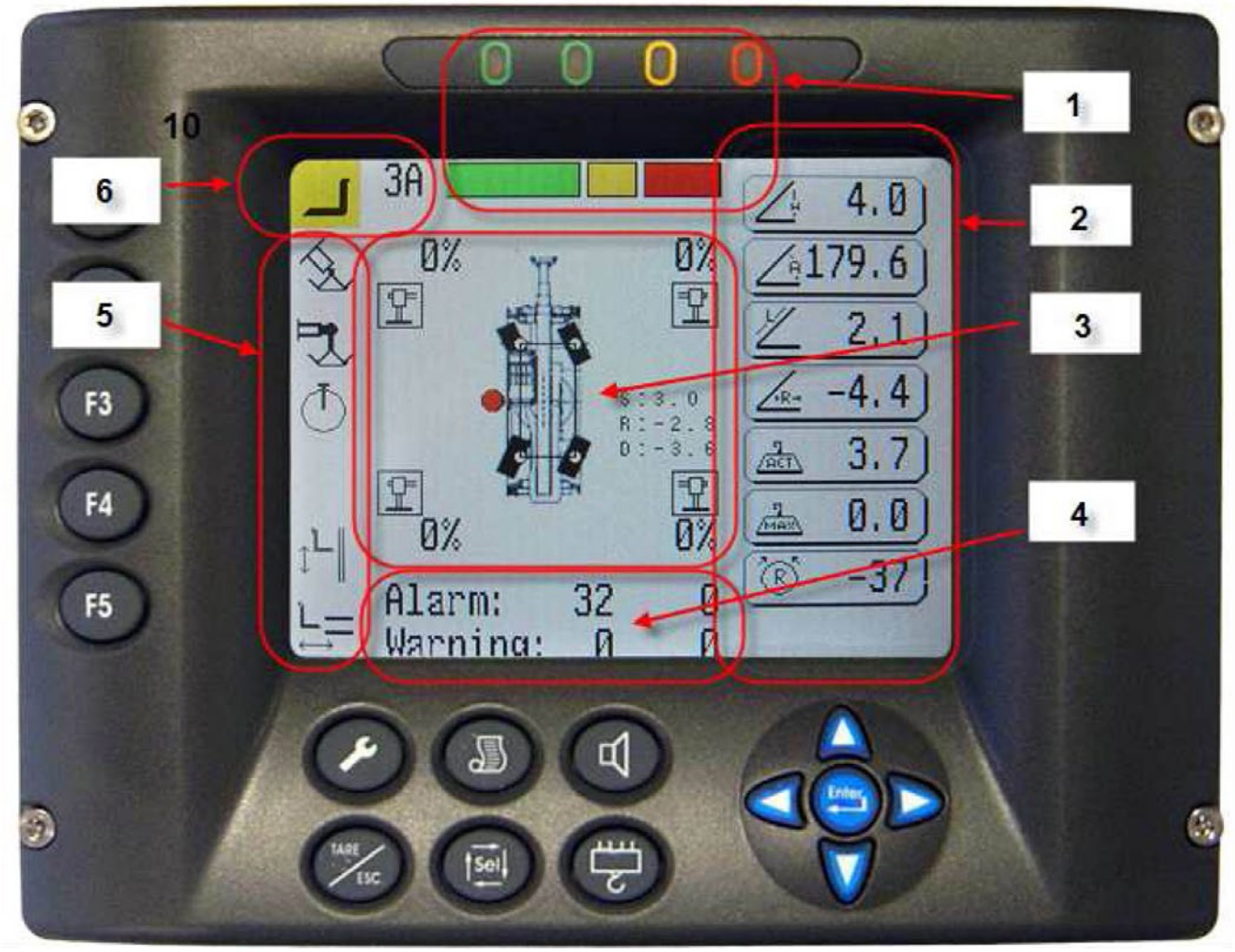
X72
X73
X78
X77
X76

RATED CAPACITY LIMITER PAGE (F2)



1	Percentage bar	LCD bar showing the load lifted as a percentage in relation to the maximum load authorised under this working condition. Green reference: Secure area Yellow reference: Warning area (load lifted greater than 90% of the maximum load authorised). Red reference: Cut-out area (load raised greater than 100% of the maximum load authorised).
2	Rated capacity limitation information	According to the icons on the screen: - Height - Telescope angle - Telescope length - Range - Actual load - Maximum load authorised in the current position - Turret angle
3	Stability area	See paragraph on Stability
4	Messages area	Area of generic text used for diagnostics and during calibration. Under normal conditions, it is possible for alerts or warning messages to appear.
5	Generic indicator lamps	In accordance with the icons on the screen - Extended stabiliser - Stabiliser on ground - Turret centred - Turret locked - Vertical control - Horizontal control
6	Truck configuration	Shows an icon with the attachment selected and the operating mode code according to the machine manual

CALIBRATION OF MACHINE SENSORS

The machine is calibrated directly from the cab display.
The calibration procedures can be accessed after having entered the first password

Procedure for entering the password

– Start the engine as soon as the screen below appears; press on the "ENTER" button

– The following screen appears.

– Using the button 

, move the asterisk above the figure that you wish to change.

2 - In the "ECU" dropdown list, it is possible to adjust the speed of the machine's movements.

⇒ Choose the speed of movements that you want to adapt for the cab, platform or radio.
⇒ In the table displayed, enter the value required (100% = max. speed).

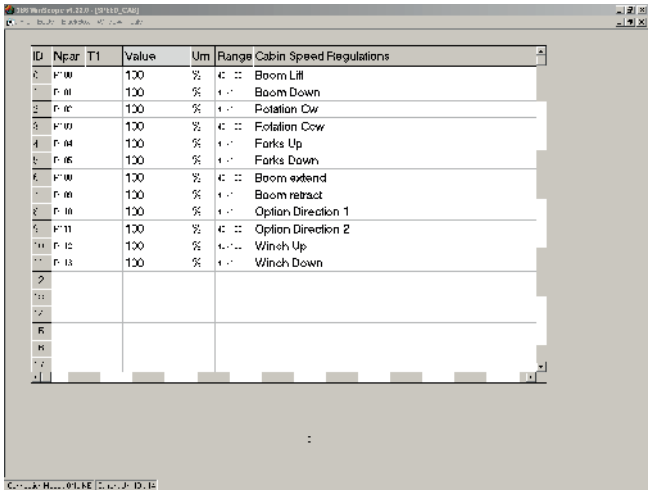


Figure 1: Cab

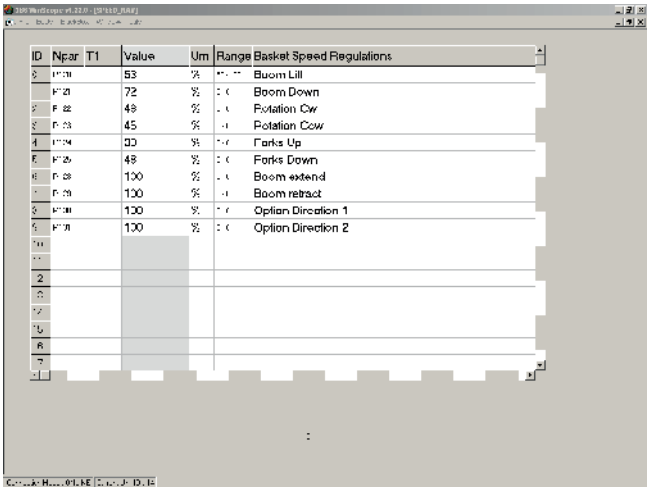


Figure 2: Platform

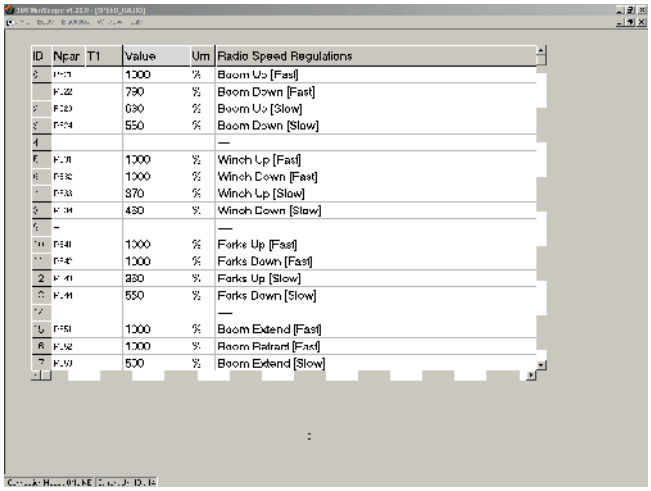


Figure 3: Radio

METERING PUMP ASSEMBLY POSITIONS

Always place the metering pump with the discharge side towards the top.

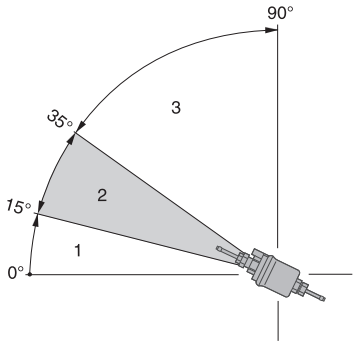
Observe the minimum tilt of 15.

It is possible to choose an assembly position with a tilt greater than 15°, but tilts between 15° and 35° are preferred.

The fuel pipes between the metering pump and the heating system must, if possible, be managed from bottom to top.

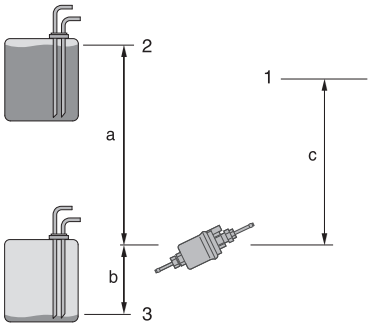
Positions permitted

a = Tilts permitted
b = Preferable
c = Not permitted
d = Metering pump



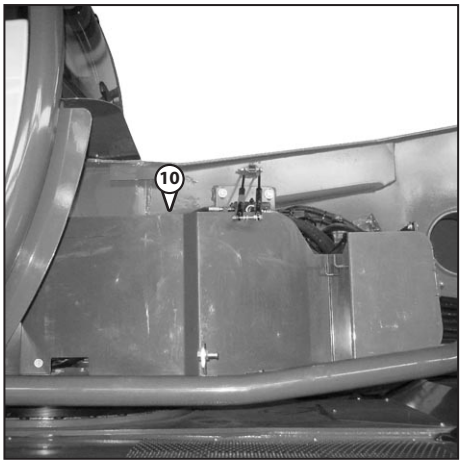
Manometric heights permitted

Elevation difference between the vehicle tank and the metering pump:
a = 3 m max.
Elevation difference for unpressurised tanks:
b = 1 m max. – for suction pipe with internal Ø 2 mm
b = 1,5 m max. – for suction pipe with internal Ø 5 mm



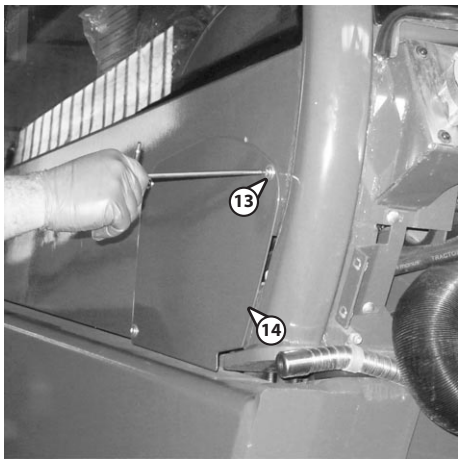
Check that the tank vent is clear.

Elevation difference in case of tank with low pressure at suction (valve of 0,03 bar on tank cap):
b = max. 0,4 m
Elevation difference between the metering pump and heating system:
c = max. 2 m

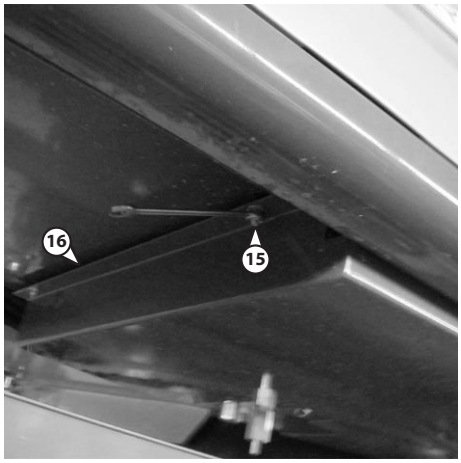


After unscrewing all the fixing screws, remove the housing (Item 10) protecting the distributor.

Unscrew the screws (Item 11), remove their washers and remove the front cover housing (Item 12).

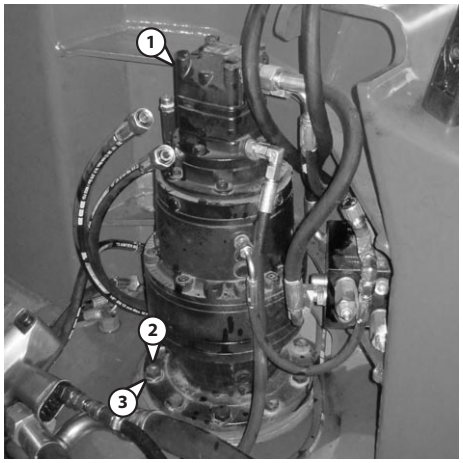


Unscrew the screws (Item 13) remove their washers and remove the housing (Item 14) protecting the power steering.



Unscrew the screws (Item 15) with their washers and remove the housing (Item 16) protecting the space under the cab.

With the help of the overhead crane, remove the turret from the truck frame, resting it on a horizontal surface or safe supports that can bear the weight.

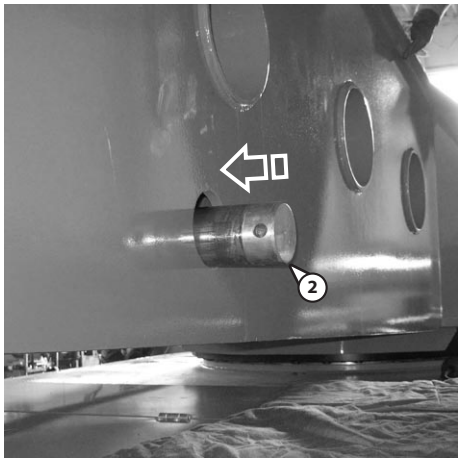


REMOVING THE TURRET ROTATION MOTOR

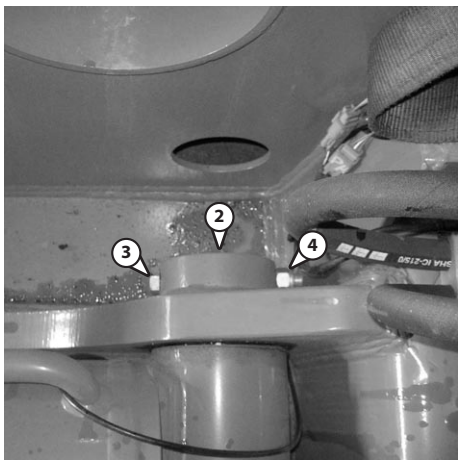
Disconnect all the hydraulic pipes of the turret rotation motor (Item 1).
Secure the motor (Item 1) with ropes and an overhead crane, unscrew all the screws (Item 2) remove the washers (Item 3) and lift the rotation motor (Item 1) until it is removed from the turret.

REFITTING THE LIFTING RAM TO THE TURRET

With the help of the overhead crane, place the lifting ram (Item 1) on the turret.



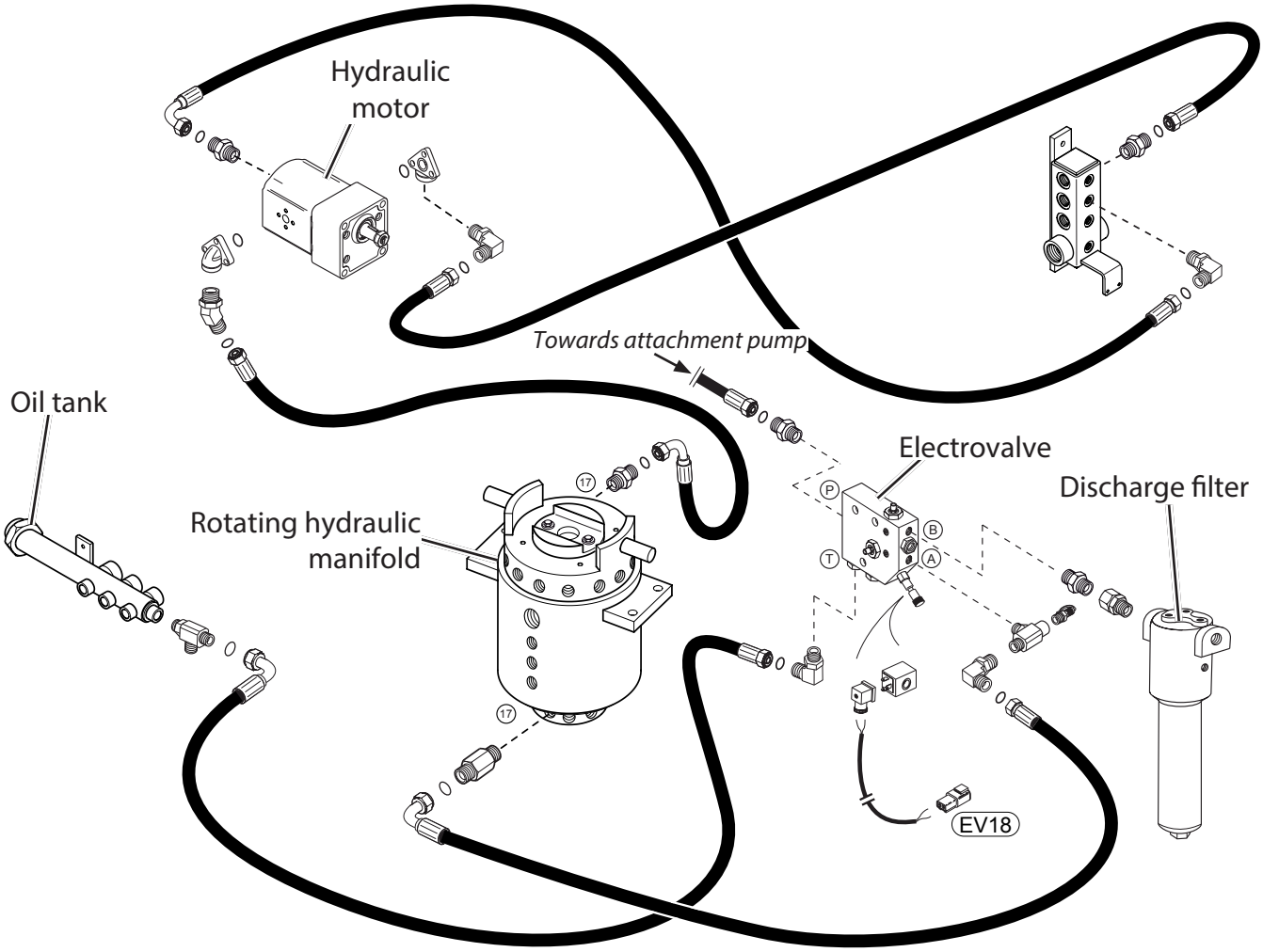
Insert the pin (Item 2) locking the ram (Item 1) on the base plate side through the appropriate hole in the turret.



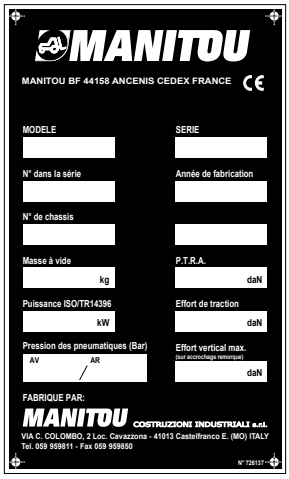
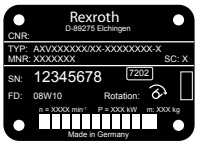
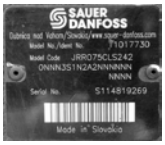
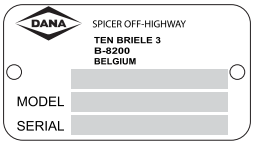
Screw in the screw (Item 3) and nut (Item 4) to lock the pin (Item 2).

Reconnect the grease nipple (Item 5) to the ram (Item 1).

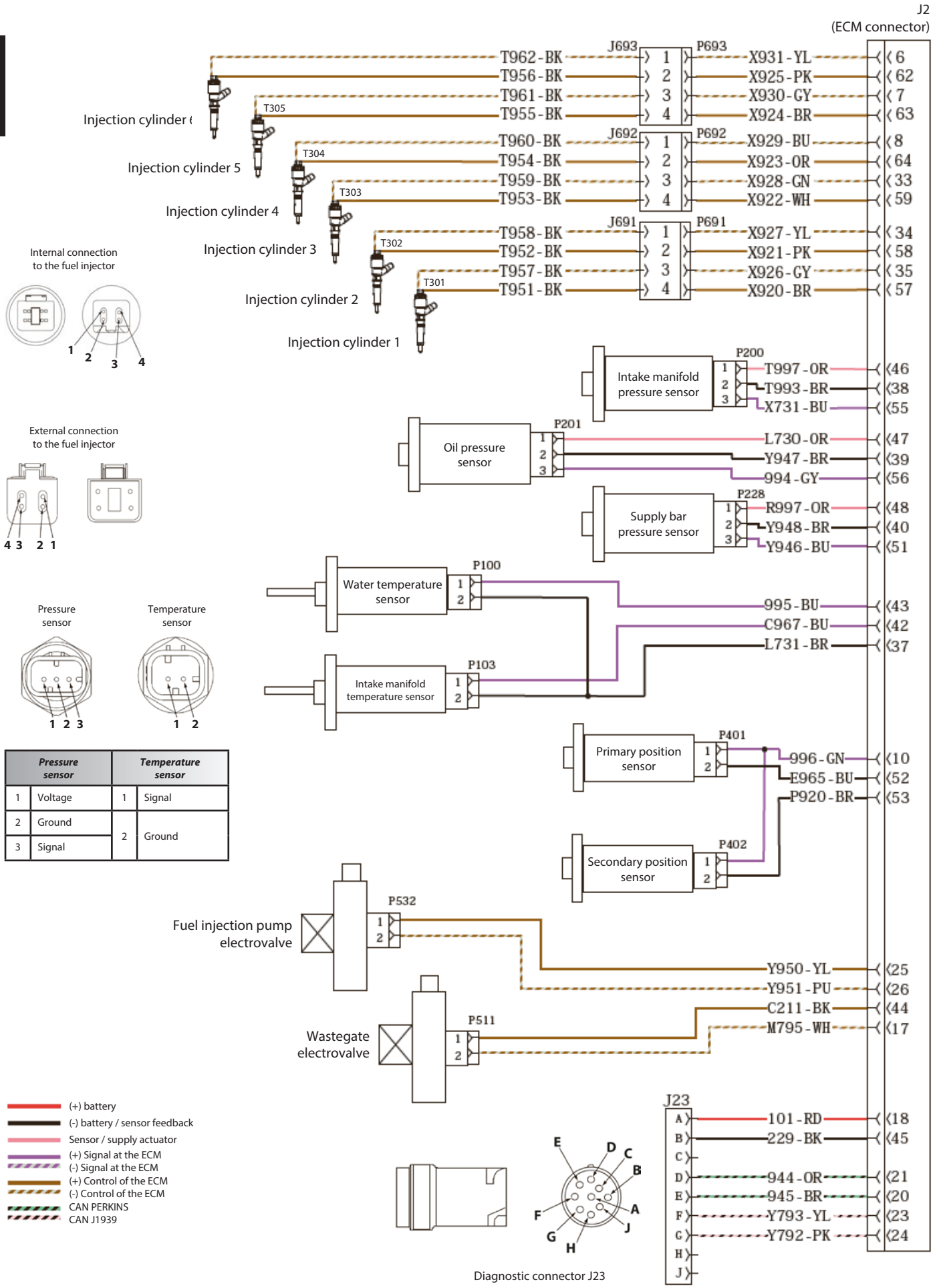
AIR-CONDITIONING COMPONENTS OVERVIEW



IDENTIFICATION PLATES

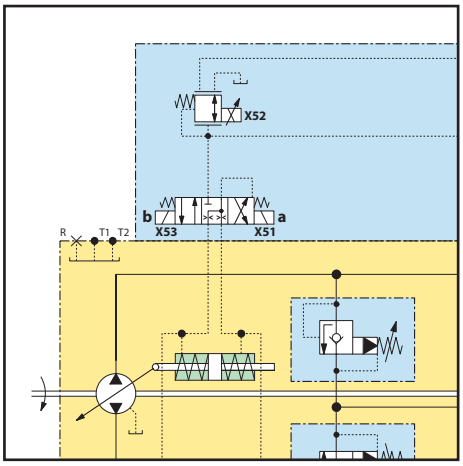
Descriptions	*Plates*
1 - Manufacturer's plate	
2 - Cab plate	
3 - Engine plate	
4 - Hydrostatic pump plate **5 -** Hydrostatic motor	
6 - Hydraulic pump plate	
7 - Rear axle plate **8 -** Front axle plate	
9 - Frame plate	
10 - Attachments pump	
11 - Gear box	

PERKINS ENGINE ELECTRICAL DIAGRAM



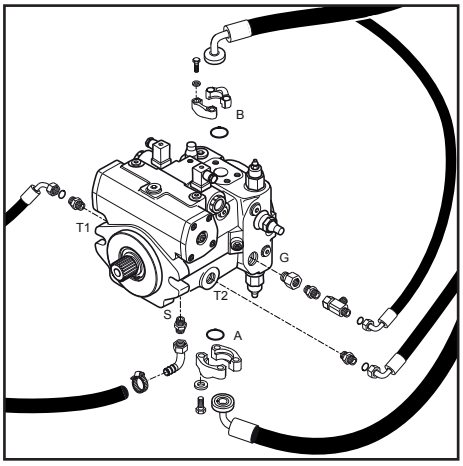
Pressure sensor		Temperature sensor	
1	Voltage	1	Signal
2	Ground	2	Ground
3	Signal		

Diagnostic connector J23



Disconnect the electrical connectors on the hydrostatic pump.

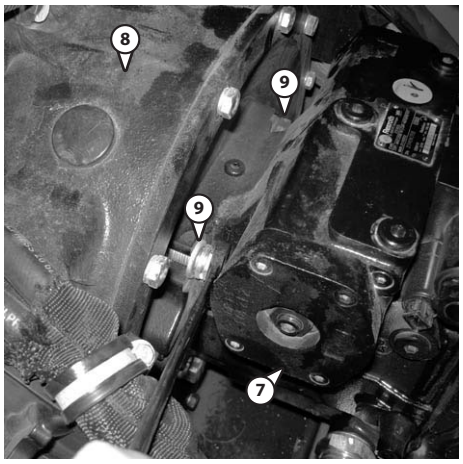
⇒ X51 = Reverse gear electrovalve (port “a”)
⇒ X53 = Forward gear electrovalve (port “b”)
⇒ X52 = Hydrostatic pump DRE valve



Disconnect the following hoses:

⇒ Discharge hose in B
⇒ Drainage hose in T1
⇒ Cooling hose in T2
⇒ Discharge hose in A
⇒ Suction hose in S
⇒ Cooling hose (to CV, ECBR and RCFP) in G

If needed, mark the hoses to facilitate reassembly.



Disassemble the hydrostatic pump (Item 7) of the engine (Item 8). To do so, remove the 4 screws (Item 9).

Position a lifting system + strap above the hydrostatic pump. Raise it slightly in order to relieve its shaft.

Using a crowbar, disassemble the engine’s hydrostatic pump.

Remove the “hydraulic pump + hydrostatic pump” assembly in the engine housing.

PERKINS 1106D EURO 3 ENGINE ERROR CODES LIST

The codes can be viewed on the PAD diagnostic tool.

	Manitou code	FMI	Perkins	Components	Description	Engine shutdown from the ECM	Reduced power	Reduced engine speed
CODES	29	2	774	Secondary Throttle Position Sensor	Data Erratic, Intermitent, or Incorrect			YES
	29	3	774	Secondary Throttle Position Sensor	Voltage Above Normal			YES
	29	4	774	Secondary Throttle Position Sensor	Voltage Below Normal			YES
	29	8	774	Secondary Throttle Position Sensor	Abnormal Frequency, Pulse Width, or Period			YES
	29	12	774	Secondary Throttle Position Sensor	Wrong System or Conponant			YES
	91	2	91	Primary Throttle Position Sensor	Data Erratic, Intermitent, or Incorrect			YES
	91	3	91	Primary Throttle Position Sensor	Voltage Above Normal			YES
	91	4	91	Primary Throttle Position Sensor	Voltage Below Normal			YES
	91	8	91	Primary Throttle Position Sensor	Abnormal Frequency, Pulse Width, or Period			YES
	91	12	91	Primary Throttle Position Sensor	Wrong System or Conponant			YES
	100	3	100	Engine Oil Pressure Sensor	Voltage Above Normal			
	100	4	100	Engine Oil Pressure Sensor	Voltage Below Normal			
	100	10	100	Engine Oil Pressure Sensor	Sensor 5V Supply Connection Open Circuit			
	105	3	172	Inlet Manifold Air Temperature Sensor	Voltage Above Normal			
	105	4	172	Inlet Manifold Air Temperature Sensor	Voltage Below Normal			
	102	3	1785	Inlet Manifold Air Pressure Sensor	Voltage Above Normal			
	102	4	1785	Inlet Manifold Air Pressure Sensor	Voltage Below Normal			
	102	10	1785	Inlet Manifold Air Pressure Sensor	Sensor 5V Supply Connection Open Circuit		YES	
	110	3	110	Engine Coolant Temperature Sensor	Voltage Above Normal			
	110	4	110	Engine Coolant Temperature Sensor	High Coolant Temperature SHUTDOWN			
	157	3	1797	Fuel Rail Pressure Sensor	Voltage Above Normal		YES	
	157	4	1797	Fuel Rail Pressure Sensor	Voltage Below Normal		YES	
	158	2	1834	Keyswitch	Data Erratic, Intermitent, or Incorrect	YES		
	168	0	168	ECM Battery Power	Excesive Battery Power	YES		
	168	1	168	ECM Battery Power	Low Battery Power	YES		
	168	2	168	ECM Battery Power	Intermittent	YES		
	190	8	190	Speed/Timing Sensor	Abnormal Frequency, Pulse Width, or Period	With 261-11	YES	
	630	2	268	Customer or System Parameters	Data Incorrect	YES	YES	

Figure 1: PAD screen shot

ERROR CODES

The codes can be viewed on the PAD diagnostic tool under the heading “RC2/2 ECU”, as well as in Group 20: Section “Transmission troubleshooting”.

PARKING BRAKE

CHARACTERISTICS

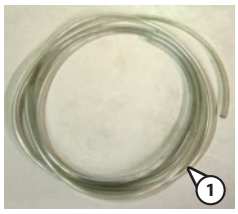
Type: Disk immersed in oil
Pressure: 40 bar

A negative controlled electro-hydraulic system acts on the front and rear axle.

PURGING PROCEDURE

Tools required:

⇒ 1 transparent hose (Item 1)
⇒ 1 container
⇒ 1 10 mm wrench



Purging order:

1 - Rear right purge screw
2 - Rear left purge screw
3 - Front right purge screw
4 - Front left purge screw

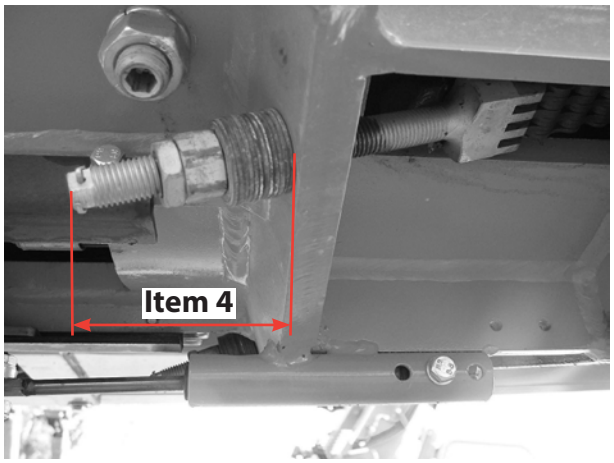
Stabilise the machine on level ground. Wedge the machine in place to prevent any movement during the bleeding procedure.

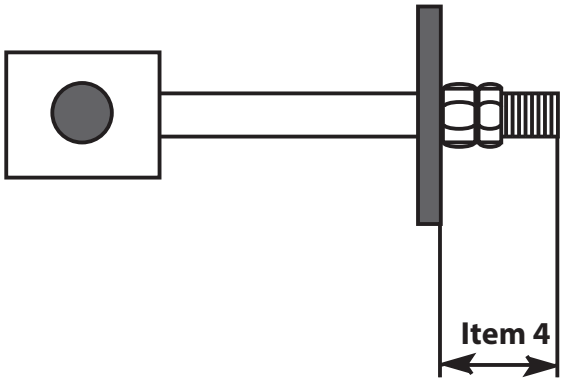
Start machine.

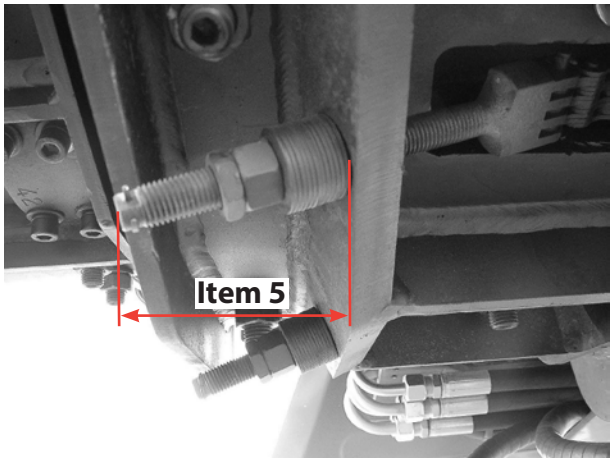
Deactivate the parking brake using the switch (Item 2) inside the cab.

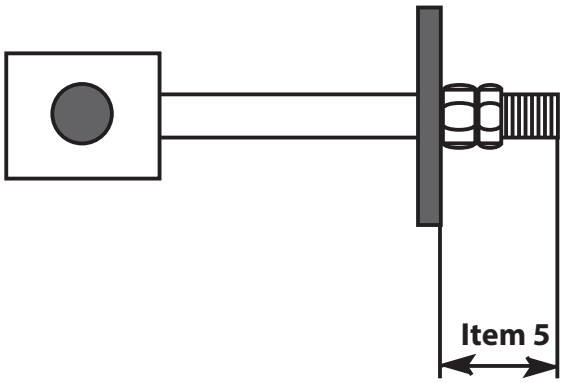
LIST OF COMPONENT PART NOS.

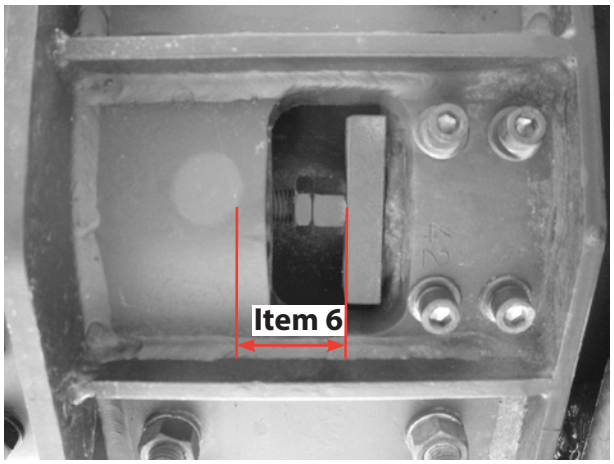
Part no.	*Description*	*Characteristics (Options)*
3B6	Roller	
CSD	Double lock valve	
CSP	Controlled safety valve	
MC1	Micro chain 1	
MC2	Micro chain 2	
TC	Remote camera	OPTION
VI	Traverse ram	
VTI1	First extension ram	
VTI2	Second extension ram	
X134	Roller connector	
X152	Connector provided for basket	

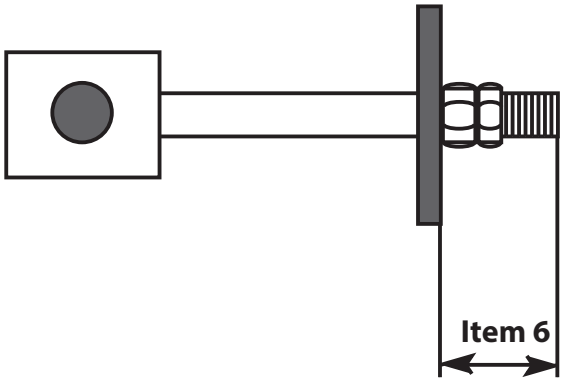










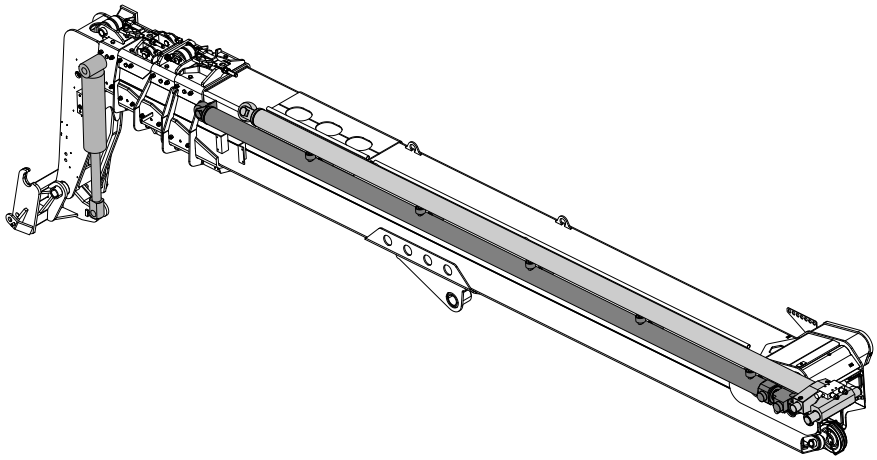


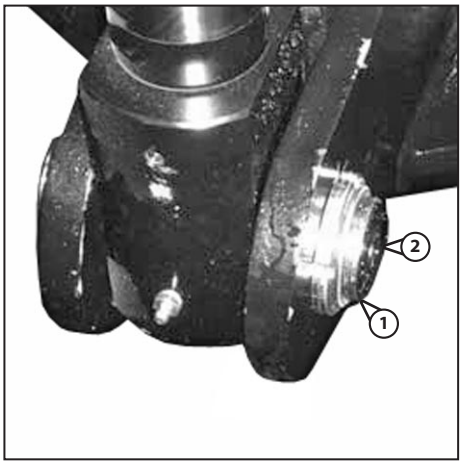
Pretension the internal chains by screwing down the nuts on the pull rods.

Use the values given in the table below:

2 internal chains, 1st extension, 80 mm (Item 4).
2 internal chains, 2nd extension, 85 mm (Item 5).
1 internal chain, 3rd extension, 85 mm (Item 6).

(Values measured from the outside of the pins of the chains to the outside of the chassis).

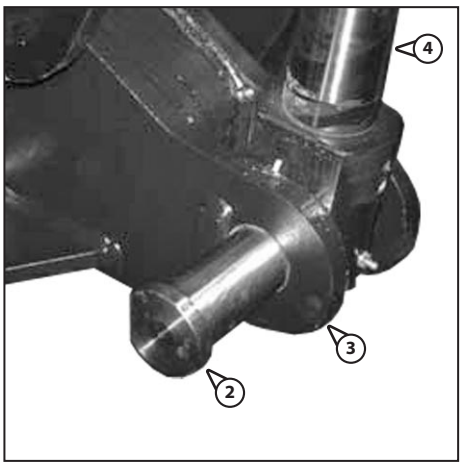




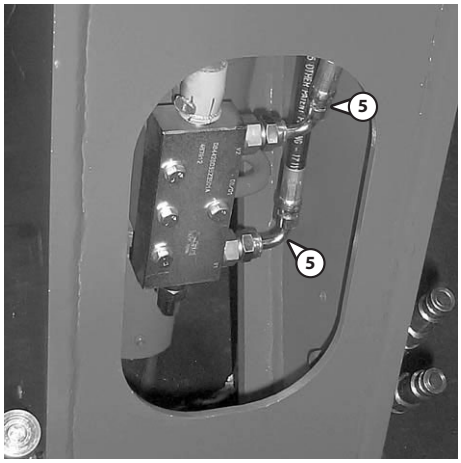
REMOVING THE RAMS FROM THE BOOM

REMOVING THE TRAVERSE RAM

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

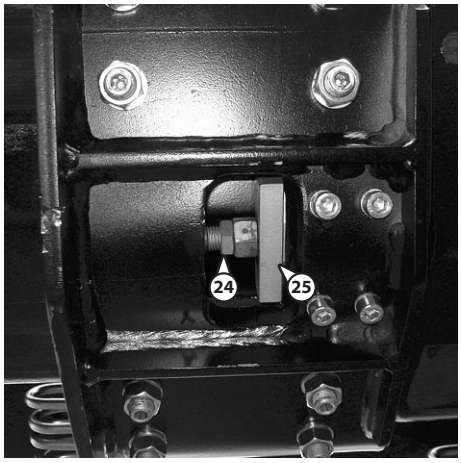


Secure the rapid attachment (Item 3) to an overhead crane. Remove the pin (Item 2) from the quick connector (Item 3) and the traverse ram (Item 4).

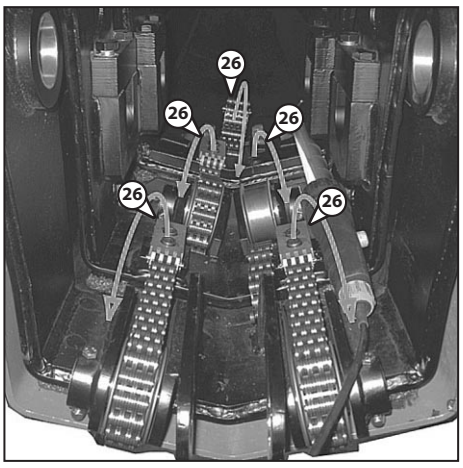


Disconnect the hydraulic pipes (Item 5) from the ram lock valve.

Slacken the pull rods (Item 23) of the lower chains in the lower front part of the boom.



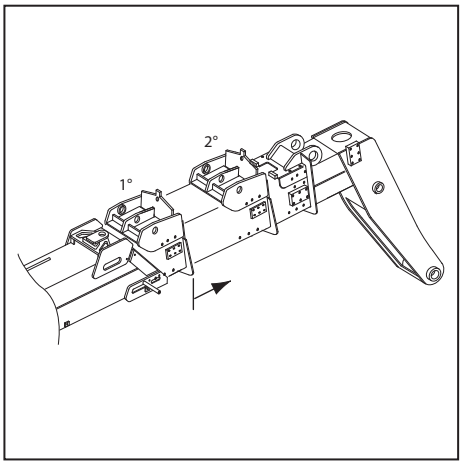
Completely remove the chain tie rod (Item 24) from the iron block (Item 25) so that the framework can then be removed from the IIIrd and IVth extension.



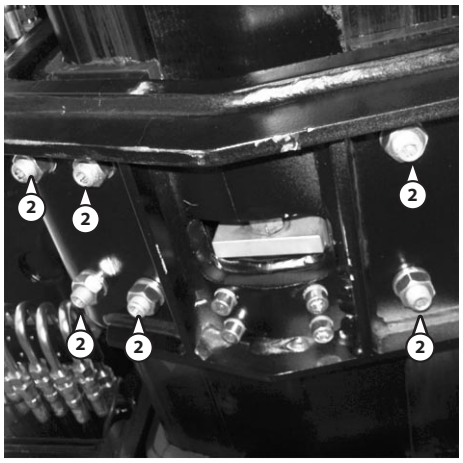
Warning: before carrrying out this operation, check that the chains are not under tension.

Remove the five chain attachment points (Item 26) on the IInd, IIIrd and IVth extension.

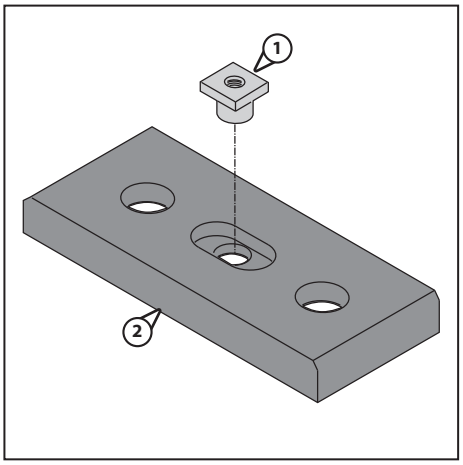
Stretch the chains towards the rear of the truck so that they do not interfere with the removal operation.



Extract the IInd extension boom manually by about 20 cm to permit extraction of the upper rear feet.

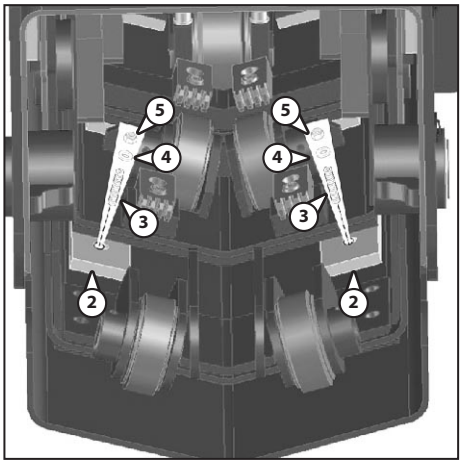


Using the grub screws (Item 2) raise the lower foot-carrier plates until the framework is not in contact with the upper feet; adjust it so that there is 1,5/2 mm clearance between the feet and the framework (take care not to strain the frameworks excessively).

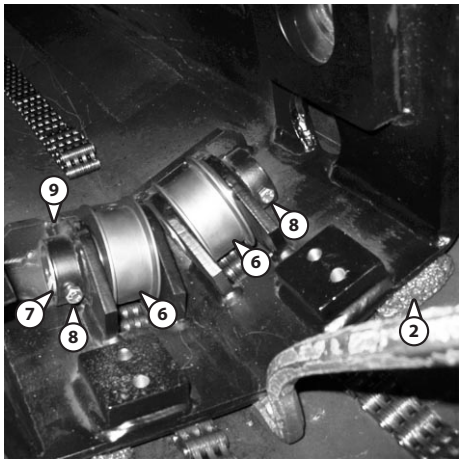


REFITTING THE IIND, IIIRD AND IVTH BOOMS INTO THE IST EXTENSION BOOM

Prepare the feet by fitting the threaded inserts (Item 1) to them.
Taking great care, with the help of an overhead crane, insert the IInd, IIIrd and IVth extensions into the framework of the Ist extension boom by sliding it on the lower feet.
Before proceeding with the operation, spread a layer of grease on the sliding area of the feet.
Do not fully insert the frameworks, but leave them extended by about 50 cm to enable the front feet to be fitted.

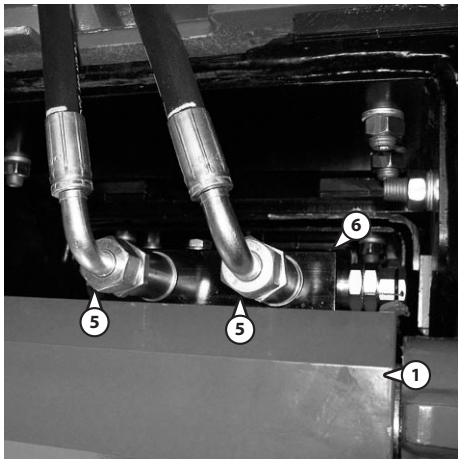


Raise the framework of the IInd extension and fit the feet (Item 2) to the lower part.
Fix the feet using the grub screws (Item 3), washers (Item 4) and self-locking nuts (Item 5); use medium strength Loctite thread lock on the two central grub screws.

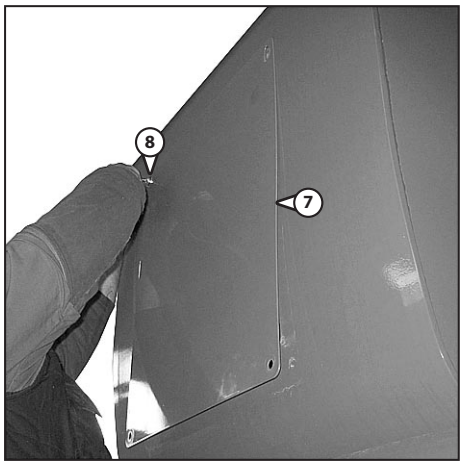


Refit the pulleys (Item 6) and insert the pins (Item 7), locking them with the associated screws (Item 8) and nuts (Item 9).

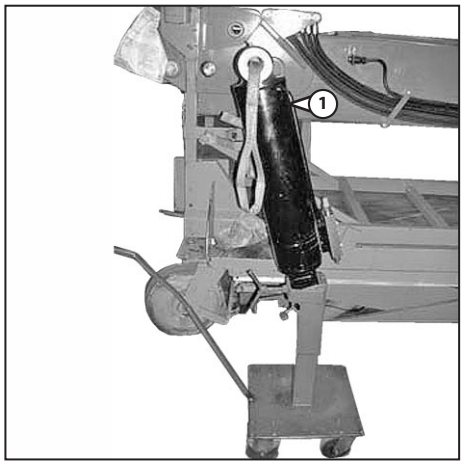
Reinsert the rear hinge pin (Item 3) of the ram (Item 1) and refit the seeger clip (Item 4).



Reconnect the pipes (Item 5) to the valve (Item 6) of the Ist extension ram (Item 1).



Refit the rear turret housing (Item 7) by screwing in the screws (Item 8).



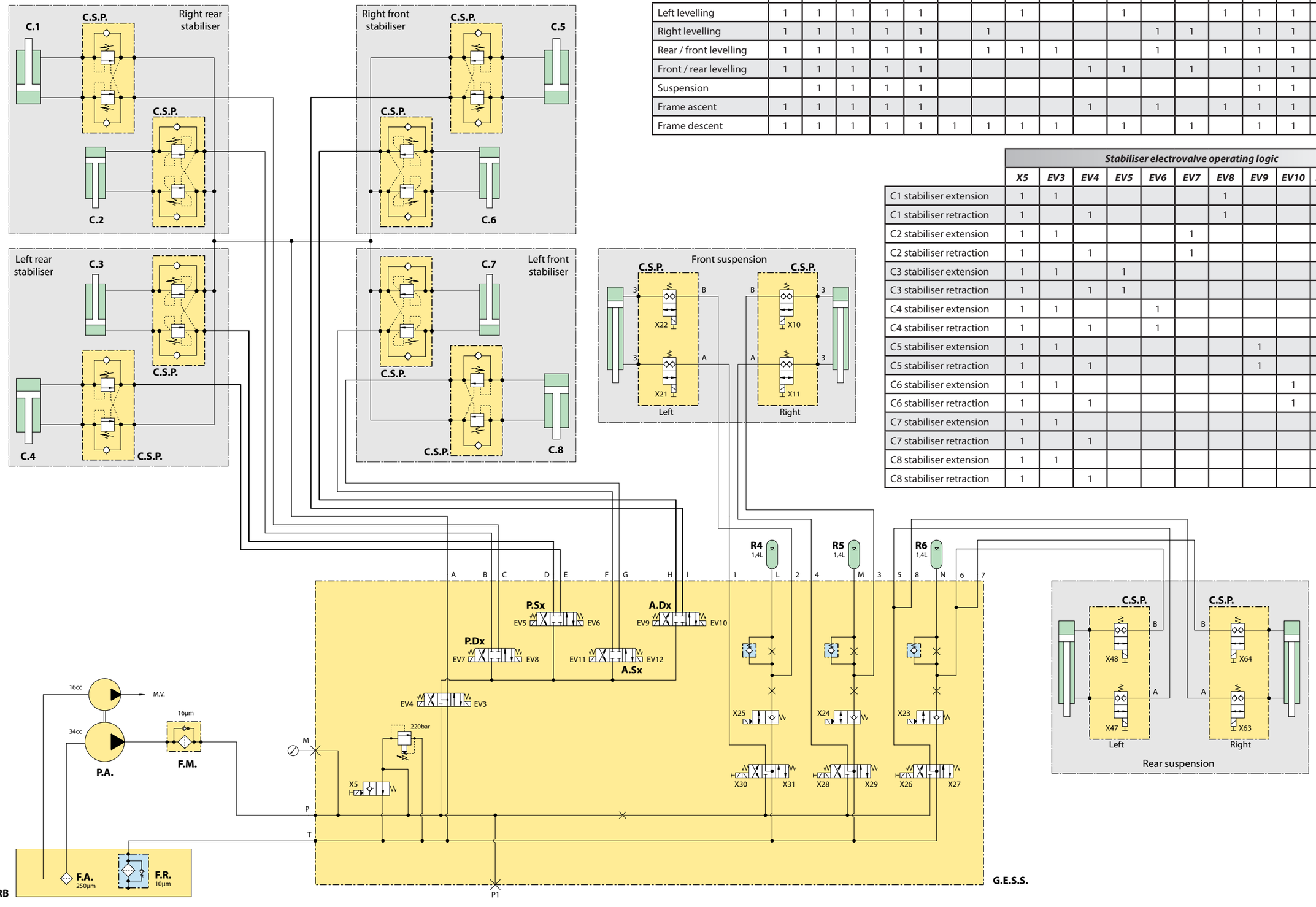
REFITTING THE TRAVERSE RAM

With the help of ropes, an overhead crane and a jack, refit the traverse ram (Item 1) to the head of the boom.

2 – STABILISERS - SUSPENSION SCHEMATIC DIAGRAM

	Suspension electrovalve operating logic																	
	X5	X10	X11	X21	X22	X23	X24	X25	X26	X27	X28	X29	X30	X31	X47	X48	X63	X64
Left levelling	1	1	1	1	1			1			1			1	1	1	1	1
Right levelling	1	1	1	1	1		1					1	1		1	1	1	1
Rear / front levelling	1	1	1	1	1		1	1	1			1		1	1	1	1	1
Front / rear levelling	1	1	1	1	1					1	1		1		1	1	1	1
Suspension		1	1	1	1										1	1	1	1
Frame ascent	1	1	1	1	1					1		1		1	1	1	1	1
Frame descent	1	1	1	1	1	1	1	1	1		1		1		1	1	1	1

	Stabiliser electrovalve operating logic										
	X5	EV3	EV4	EV5	EV6	EV7	EV8	EV9	EV10	EV11	EV12
C1 stabiliser extension	1	1					1				
C1 stabiliser retraction	1		1				1				
C2 stabiliser extension	1	1				1					
C2 stabiliser retraction	1		1			1					
C3 stabiliser extension	1	1		1							
C3 stabiliser retraction	1		1	1							
C4 stabiliser extension	1	1			1						
C4 stabiliser retraction	1		1		1						
C5 stabiliser extension	1	1						1			
C5 stabiliser retraction	1		1					1			
C6 stabiliser extension	1	1							1		
C6 stabiliser retraction	1		1						1		
C7 stabiliser extension	1	1								1	
C7 stabiliser retraction	1		1							1	
C8 stabiliser extension	1	1									1
C8 stabiliser retraction	1		1								1

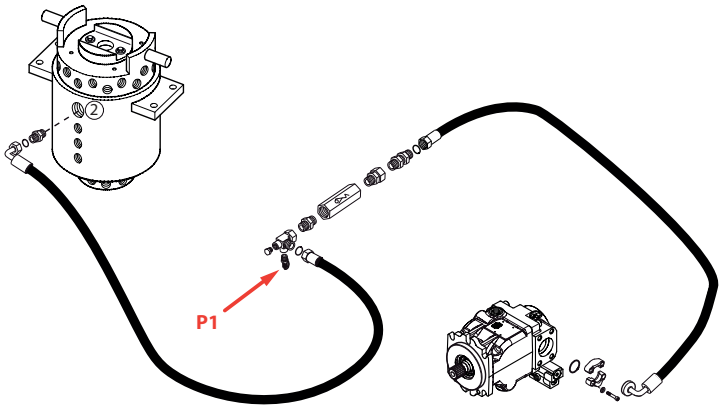


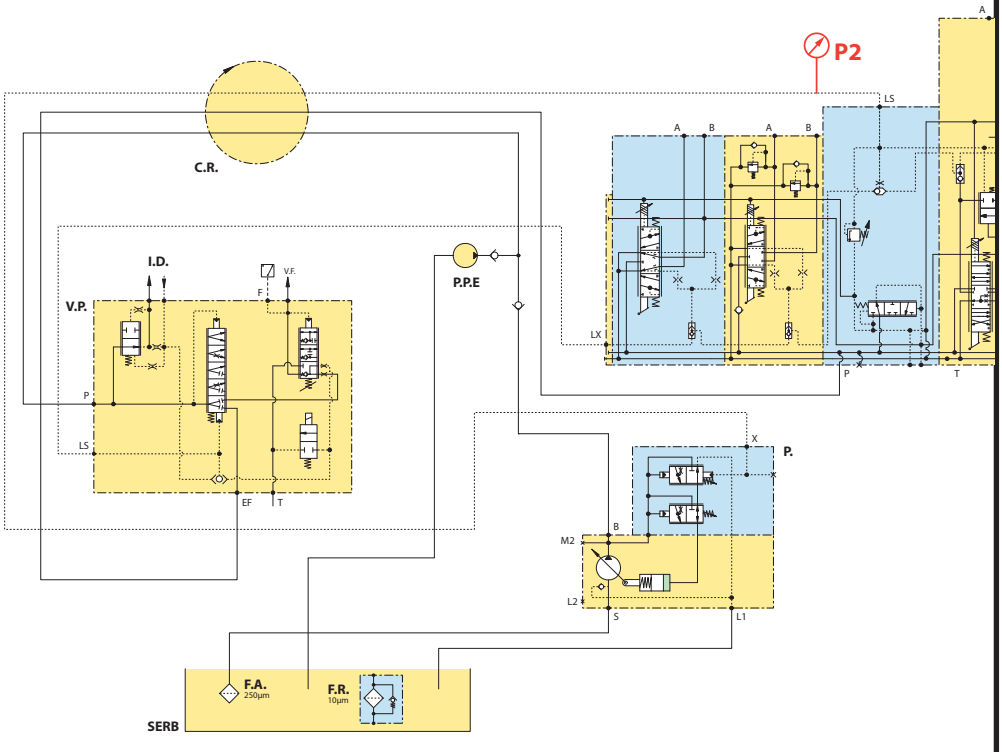
PRESSURE TEST PORTS

To view the pressure test port values of the hydrostatic transmission:

Group 20 - "TRANSMISSION CONTROL AND ADJUSTMENT"

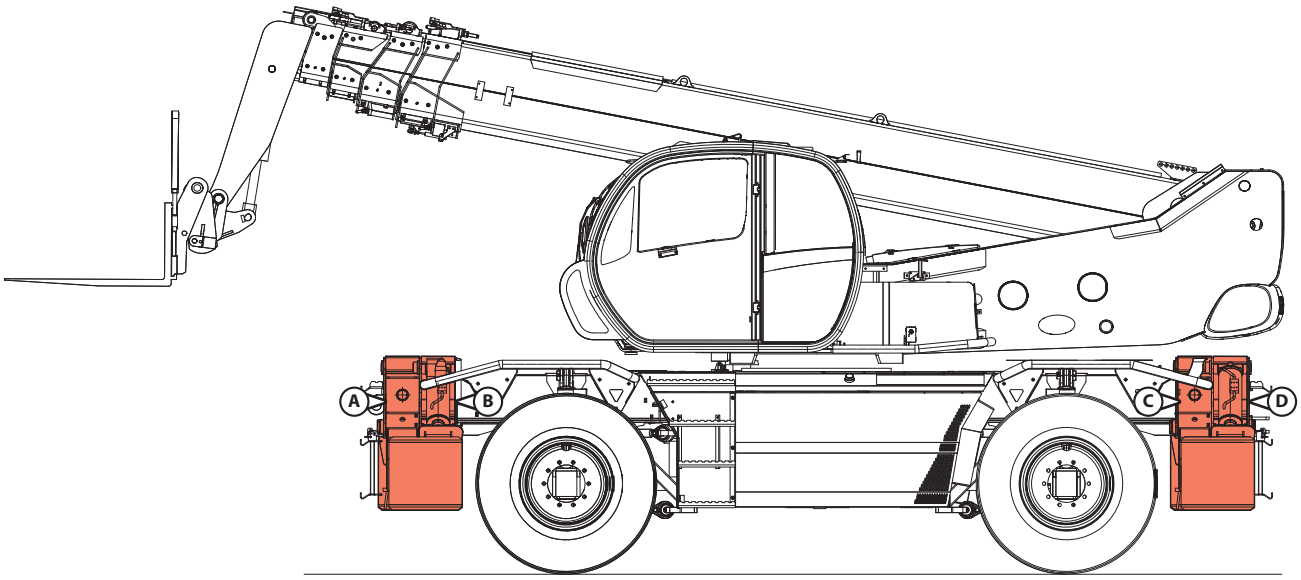
	Showing on machine	Pressure port	Line function	Control component: Minimum value	Control component: Maximum value	Theoretical value: Mini	Theoretical value: Maxi	Value measured on machine: Mini	Value measured on machine: Maxi
P1	Yes	Distributor PP	Distributor power supply	Movement cut-off EV (EVX)	LP LS distributor + Δp distributor	0b	295b	0b	270b
P2	No	Distributor LS line	Load signal	Connection to the tank	Distributor LP LS	0b	270b	0b	245b





70

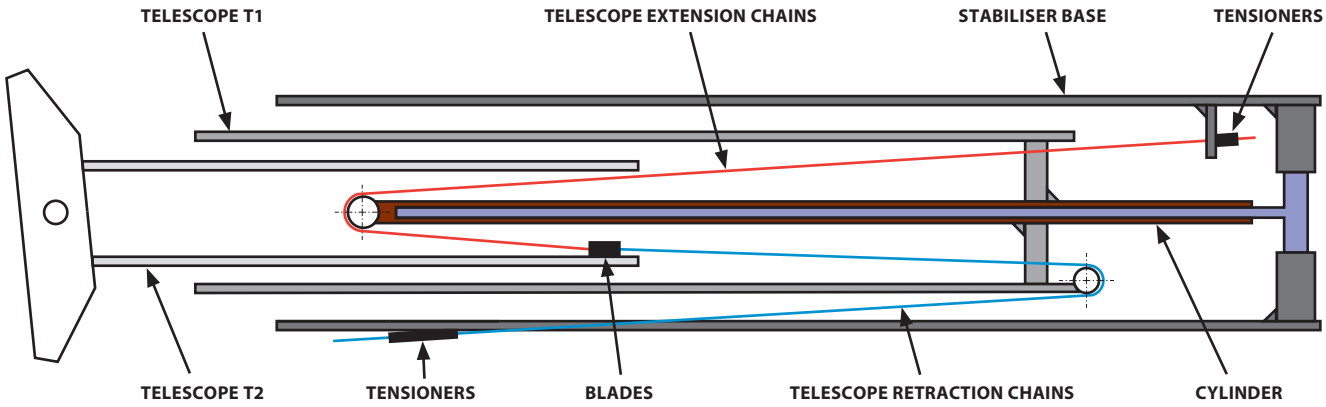
STABILISER HYDRAULIC CYLINDER + CHAINS



Key:

A - Front right stabiliser
B - Front left stabiliser
C - Rear right stabiliser
D - Rear left stabiliser

SCHEMATIC DIAGRAM OF OPERATION



PREPARATION AND SAFETY INSTRUCTIONS

- Deactivate battery power supply using a battery cut-off.
- Before any work, lower the stabiliser opposite to the one that has to be removed. This step will enable better access for the removal of the cylinder and the extraction of the chains.

Example: When stabiliser A is removed, lower stabiliser B.

MACHINE ON WHEELS WITH FIXED BASKET / ORH WHEN TILTING

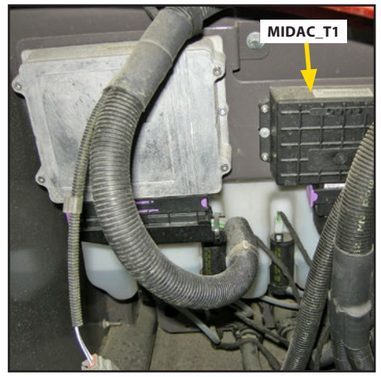
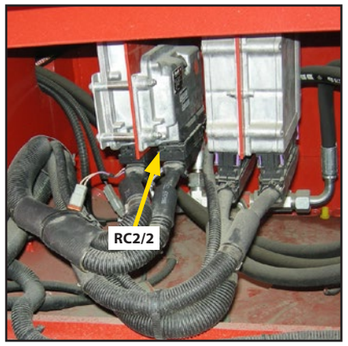
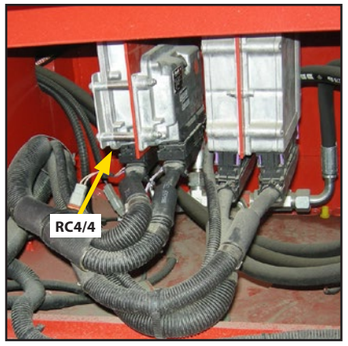
MOVEMENTS AUTHORISED FROM THE CAB					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION	X	X			Only to return to the centre
TOP TILT					
BOTTOM TILT	X	X			
BOOM ASCENT	X (only up to H = 3 m)	X (only up to H = 3 m)			
BOOM DESCENT					
BOOM RETRACTION	X	X			
BOOM EXTENSION					
OPTION 1	X	X			
OPTION 2					

MOVEMENTS AUTHORISED FROM CAB WITH PLATFORM EXCLUSION BUTTON ACTIVATED					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				
STABILISER DESCENT	X	X			
TURRET ROTATION					
TOP TILT					
BOTTOM TILT	X	X	X	X	
BOOM ASCENT	X (only up to H = 3 m)	X (only up to H = 3 m)			
BOOM DESCENT					
BOOM RETRACTION	X	X	X	X	
BOOM EXTENSION					
OPTION 1	X	X	X	X	
OPTION 2					

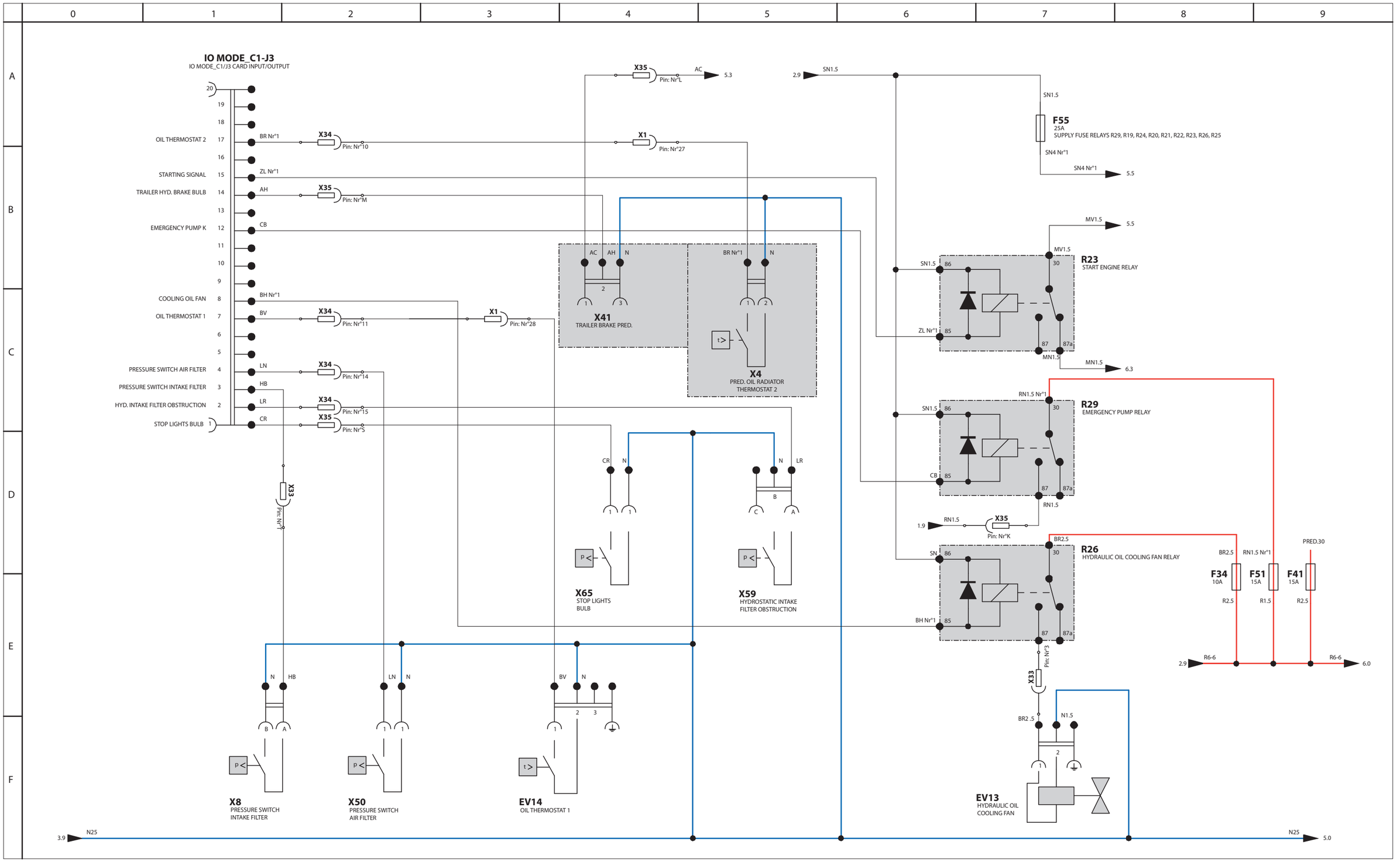
MACHINE ON STABILISERS WITH PENDULAR PLATFORM

MOVEMENTS AUTHORISED FROM THE CAB					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				Only with detector on pendular reading
STABILISER DESCENT	X	X			
TURRET ROTATION					
TOP TILT					
BOTTOM TILT					
BOOM ASCENT					
BOOM DESCENT					
BOOM RETRACTION					
BOOM EXTENSION					
OPTION 1					
OPTION 2					

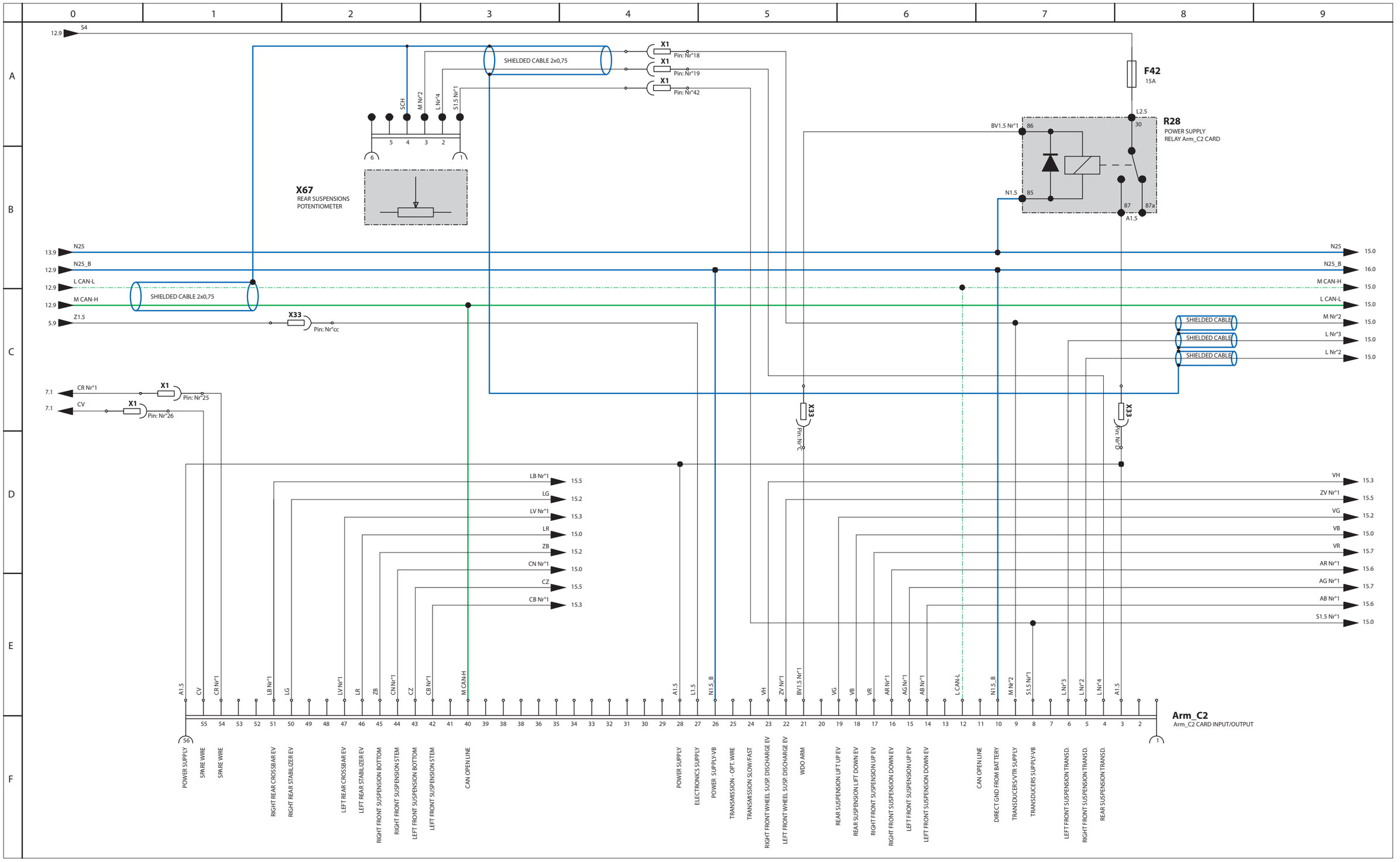
MOVEMENTS AUTHORISED FROM CAB WITH PLATFORM EXCLUSION BUTTON ACTIVATED					
	BOOM UP TO H=3 m	BOOM UP TO H=3 m	BOOM MORE THAN H=3 m	BOOM MORE THAN H=3 m	COMMENTS
	RETURN BOOM	BOOM EXTENDED	RETURN BOOM	BOOM EXTENDED	
STABILISER ASCENT	X				Only with detector on pendular reading
STABILISER DESCENT	X	X			
TURRET ROTATION	X	X	X	X	
TOP TILT	X	X	X	X	
BOTTOM TILT	X	X	X	X	
BOOM ASCENT	X (also more than 3 m)	X (also more than 3 m)	X	X	
BOOM DESCENT	X	X	X	X	
BOOM RETRACTION	X	X	X	X	
BOOM EXTENSION	X	X	X	X	
OPTION 1	X	X	X	X	
OPTION 2	X	X	X	X	

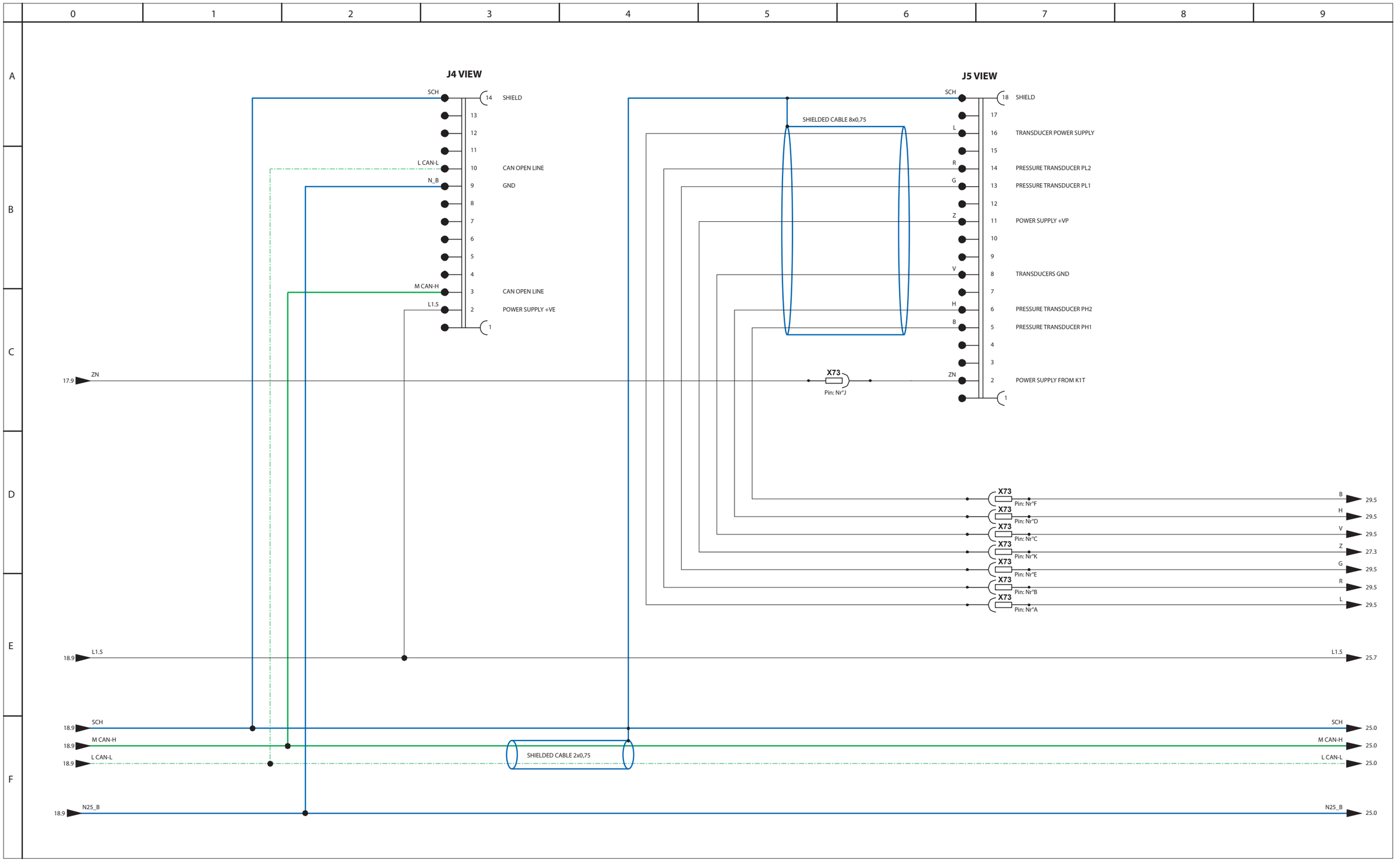
ECU	Type	PIN	value	Designation	Item	ECU location
Midac T1	Inlet	1c	3V / 6V / 9V	Winch cab analogue signal on-board	X2 / 5	
	Inlet	2a	3V / 6V / 9V	Turret rotation speed adjustment potentiometers	X6a	
	Inlet	2c	3V / 6V / 9V	TILTING cab analogue signal	X2 / 7	
	Inlet	3a	3V / 6V / 9V	TELESCOPE cab analogue signal	X1 / 8	
	Inlet	3c	3V / 6V / 9V	LIFTING cab analogue signal	X2 / 8	
	Inlet	4c	3V / 6V / 9V	ATTACHMENT cab analogue signal	X1 / 5	
	Inlet	8c	12V	Attachment control neutralization	I72	
	Inlet	26	12V	Left cab manipulator neutral contact	X1/1;2;14;	
	Inlet	26	12V	Right cab manipulator neutral contact	X2 / 1;2;14;	
	Inlet	30;31	12V	3D platform tilting/rotation switch	I25	
	Inlet	32	12V	Cab manipulator consent	X1 / 13	
	Inlet	32	12V	Cab manipulator consent	X2 / 13	
RC 2-2	Inlet	33	Frequency	Speed sensor (gear box)	X60	
	Outlet	J1-30	Analogue	2nd gear electrovalve (gear box)	X62	
	Outlet	J1-31	Analogue	1st gear electrovalve (gear box)	X61	
RC4-4	Inlet	10	12V	Forward gear info from ARM_C1 terminal 52	ARM C1	
	Inlet	11	12V	Reverse gear info from ARM_C1 terminal 53	ARM C1	
	Inlet	12	0V	Hydrostatic pump oil filter clogging	X58	
	Inlet	20		Electronic brake pedal (Inching)	X71	
	Inlet	21	12V	Door info from ARM_C1 terminal 47	ARM C1	
	Inlet	23	0V	Hydrostatic transmission oil temperature sensor	X57	
	Inlet	44		Hydrostatic motor speed sensor	X56	
	Outlet	J2-15	12V	Reverse gear electrovalve	X51	
	Outlet	J2-29	12V	Forward gear electrovalve	X53	
	Outlet	J2-30	Analogue	Hydrostatic motor switch electrovalve	X55	
	Outlet	J2-31	Analogue	Hydrostatic pump DRE valve	X52	
VIEW J5	Inlet	5	Analogue	Lifting cylinder CEC pressure sensor on rod side	PH1	
	Inlet	6	Analogue	Compensating cylinder CEC pressure sensor on rod side	PH2	
	Inlet	13	Analogue	Lifting cylinder CEC pressure sensor on piston side	PL1	
	Inlet	14	Analogue	Compensating cylinder CEC pressure sensor on piston side	PL2	
X151	Inlet	N;A	12V	Radio control switch	I115	◁ Group 80 - Electrical components location
X6 a	Inlet		3V / 6V / 9V	ROTATION cab analogue signal	X1 / 7	◁ Group 80 - Electrical components location
Plus start-up action	Outlet		12V	LS cut-off electrovalve at start-up	EV138	◁ Group 80 - Electrical components location

Electrical components and connectors			
Wiring harness type	**Item**	**Designation**	**Diagram**
Cab fuse box and relay	F8	Dashboard switch power supply fuse	19
Cab fuse box and relay	F9	Seat equipment power supply fuse	18
Cab fuse box and relay	F10	Switch lighting fuse	19
Cab fuse box and relay	F11	Dashboard switch power supply fuse	22
Cab fuse box and relay	F12	Security sensor power supply fuse	29
Cab fuse box and relay	F13	Dashboard switch power supply fuse	19
Cab fuse box and relay	F14	Red hazard warning light relay power supply fuse	18
Cab fuse box and relay	F15	Sensor power supply fuse under cab	29
Cab fuse box and relay	F16	Operator panel power supply fuse	17
Cab fuse box and relay	F17	Horn relay power supply fuse	18
Cab fuse box and relay	F18	Emergency stop palm button supply fuse	19
Cab fuse box and relay	F19	Seat tilt supply fuse	17
Cab fuse box and relay	F20	Seat supply fuse	30
Cab fuse box and relay	F21	Large mixing bucket fuse	22
Cab fuse box and relay	F22	CAN BUS supply fuse for radio control	26
Cab fuse box and relay	F23	Arm_T1 control unit relay supply fuse	27
Cab fuse box and relay	F24	Relay supply fuse for electronic control units	17
Cab fuse box and relay	F25	Heating timer reservation fuse	23
Cab fuse box and relay	F26	Emergency "30" fuse	18
Cab fuse box and relay	F27	Car radio "30" fuse	23
Cab fuse box and relay	F28	Cigarette lighter fuse	23
Cab fuse box and relay	F29	Reservation supply fuse	33
Cab fuse box and relay	F30	Cab interior lighting fuse	33
Frame fuse box and relay	F31	Front left, rear right positions fuse	3
Frame fuse box and relay	F32	Front right, rear left positions fuse	3
Frame fuse box and relay	F33	Contact and rear cable reel fuse	6
Frame fuse box and relay	F34	Oil radiator cooling fuse	4
Frame fuse box and relay	F35	Rotax preheating/sensor fuse	7
Frame fuse box and relay	F36	Left low beam fuse	3
Frame fuse box and relay	F37	Right low beam fuse	3
Frame fuse box and relay	F38	Arm_C1 supply fuse	12
Frame fuse box and relay	F39	Left main beam fuse	3
Frame fuse box and relay	F40	Right main beam fuse	3
Frame fuse box and relay	F41	"30" reservation fuse	4
Frame fuse box and relay	F42	Arm_C2 relay supply fuse	14
Frame fuse box and relay	F43	Rear fog light reservation fuse	2
Frame fuse box and relay	F44	Reverse functions fuse	2
Frame fuse box and relay	F45	Control units supply fuse	5
Frame fuse box and relay	F46	Rexroth resources supply fuse	8
Frame fuse box and relay	F47	Battery "30" reservation fuse	6
Frame fuse box and relay	F48	Brake light fuse	2
Frame fuse box and relay	F49	Connector fuse for programming	6
Frame fuse box and relay	F50	Alternator fuse	5
Frame fuse box and relay	F51	Back-up pump relay fuse	4
Frame fuse box and relay	F52	Battery "30" reservation fuse	6
Frame fuse box and relay	F53	Battery "30" reservation fuse	6
Frame fuse box and relay	F54	Start button "15" reservation fuse	6
Frame fuse box and relay	F55	Relay fuse supply R29, R19, R24, R20, R21, R22, R23, R26, R25	4
Frame fuse box and relay	F56	Rexroth resources supply fuse	8
Frame fuse box and relay	F57	Hydrostatic speed sensor fuse	11
Frame fuse box and relay	F58	Start button "15" reservation fuse	6

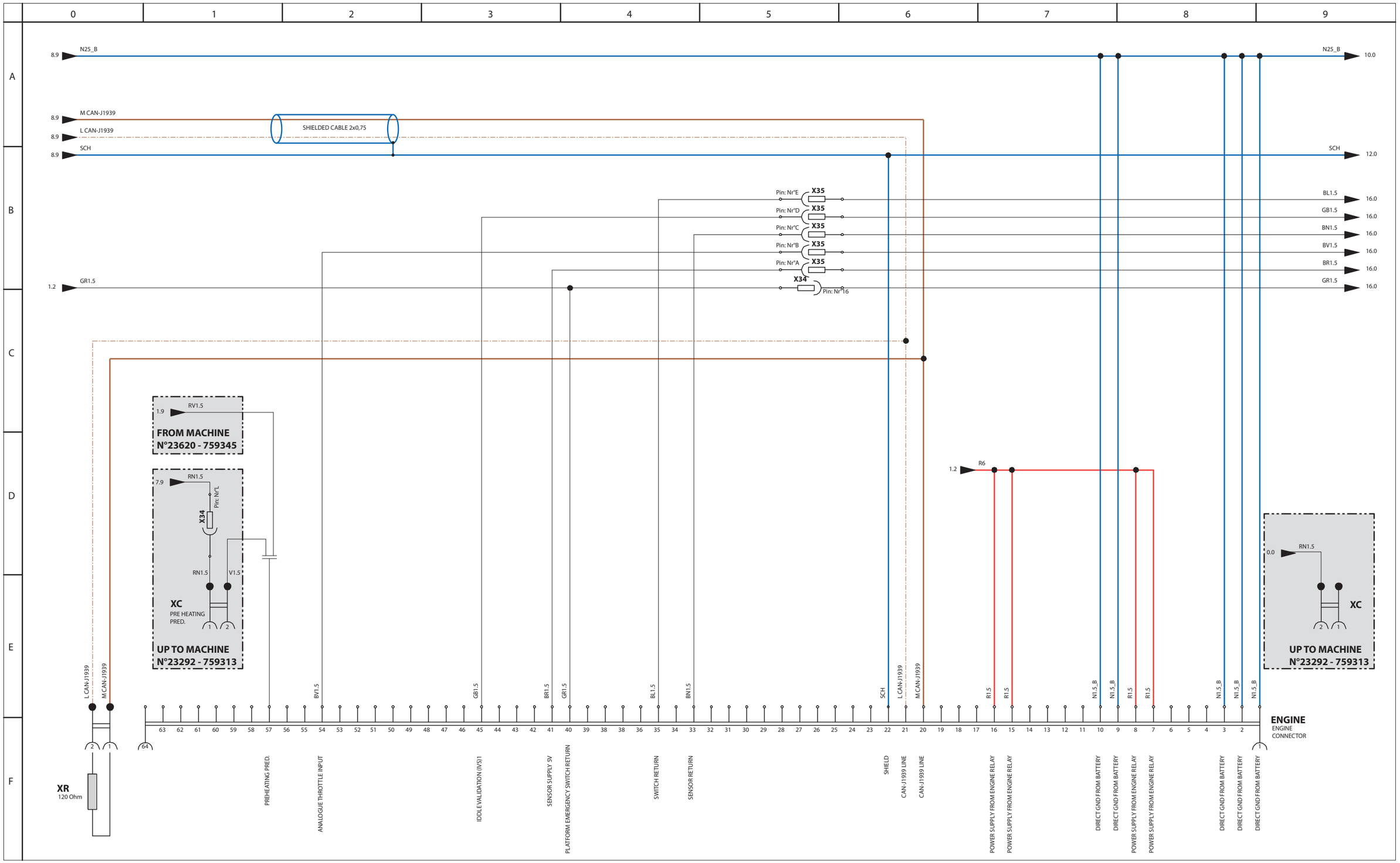

IO MODE_C1-J3
IO MODE_C1/J3 CARD INPUT/OUTPUT
OIL THERMOSTAT 2
STARTING SIGNAL
TRAILER HYD. BRAKE BULB
EMERGENCY PUMP K
COOLING OIL FAN
OIL THERMOSTAT 1
PRESSURE SWITCH AIR FILTER
PRESSURE SWITCH INTAKE FILTER
HYD. INTAKE FILTER OBSTRUCTION
STOP LIGHTS BULB
X35 Pin: Nr°L
AC 5.3
X34 Pin: Nr°10
X1 Pin: Nr°27
X34 Pin: Nr°11
X1 Pin: Nr°28
X34 Pin: Nr°14
X34 Pin: Nr°15
X35 Pin: Nr°S
X33 Pin: Nr°1
X41
TRAILER BRAKE PRED.
X4
PRED. OIL RADIATOR THERMOSTAT 2
X65
STOP LIGHTS BULB
X59
HYDROSTATIC INTAKE FILTER OBSTRUCTION
X8
PRESSURE SWITCH INTAKE FILTER
X50
PRESSURE SWITCH AIR FILTER
EV14
OIL THERMOSTAT 1
2.9 SN1.5
SN1.5
F55
25A
SUPPLY FUSE RELAYS R29, R19, R24, R20, R21, R22, R23, R26, R25
SN4 Nr°1
SN4 Nr°1 5.5
MV1.5 5.5
R23
START ENGINE RELAY
MN1.5 6.3
R29
EMERGENCY PUMP RELAY
RN1.5
1.9 RN1.5
X35 Pin: Nr°K
R26
HYDRAULIC OIL COOLING FAN RELAY
F34 10A
F51 15A
F41 15A
PRED.30
R6-6 6.0
X33 Pin: Nr°3
EV13
HYDRAULIC OIL COOLING FAN
3.9 N25
N25 5.0

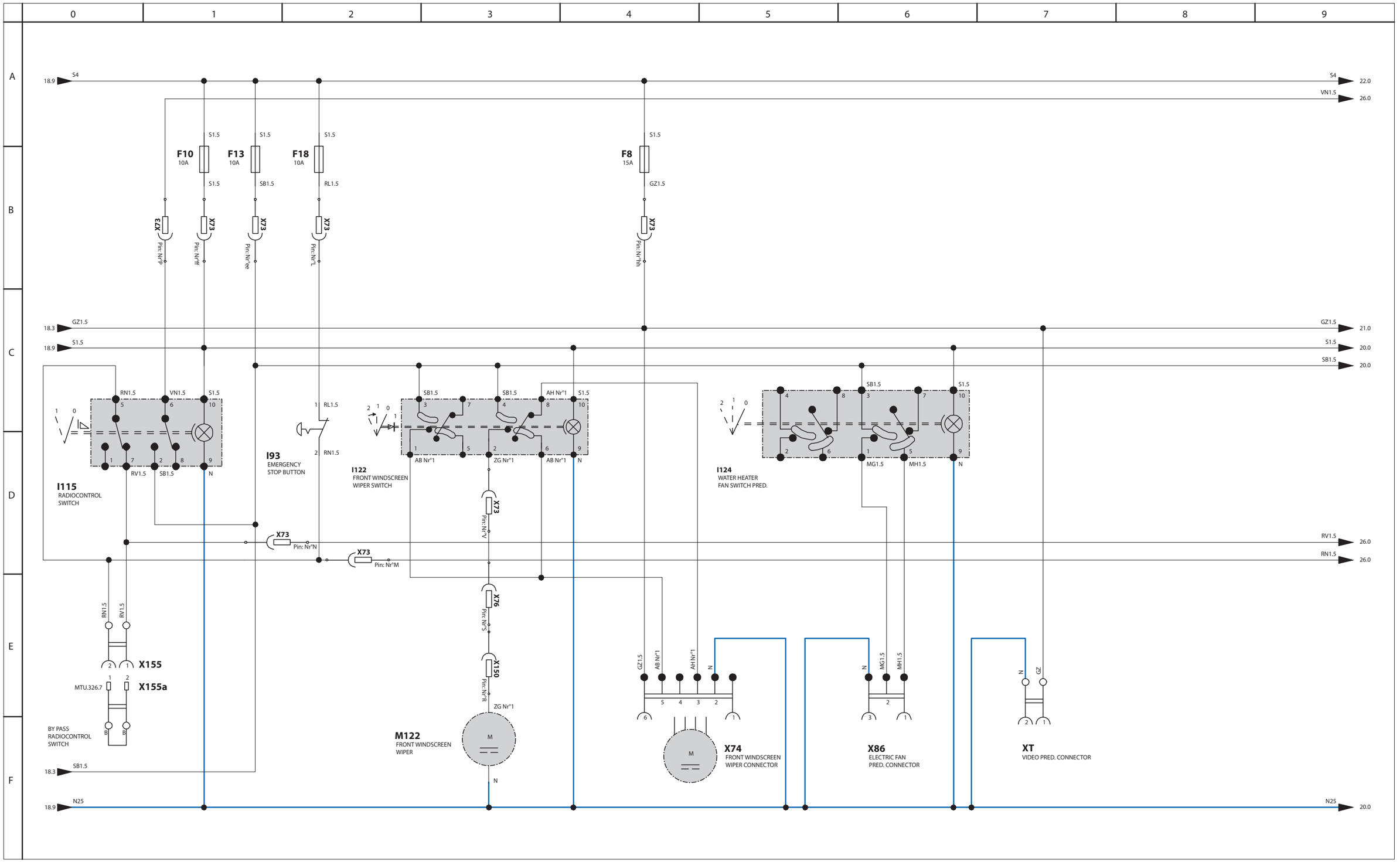
14 – ARM_C2 CONTROL UNIT INPUT/OUTPUT



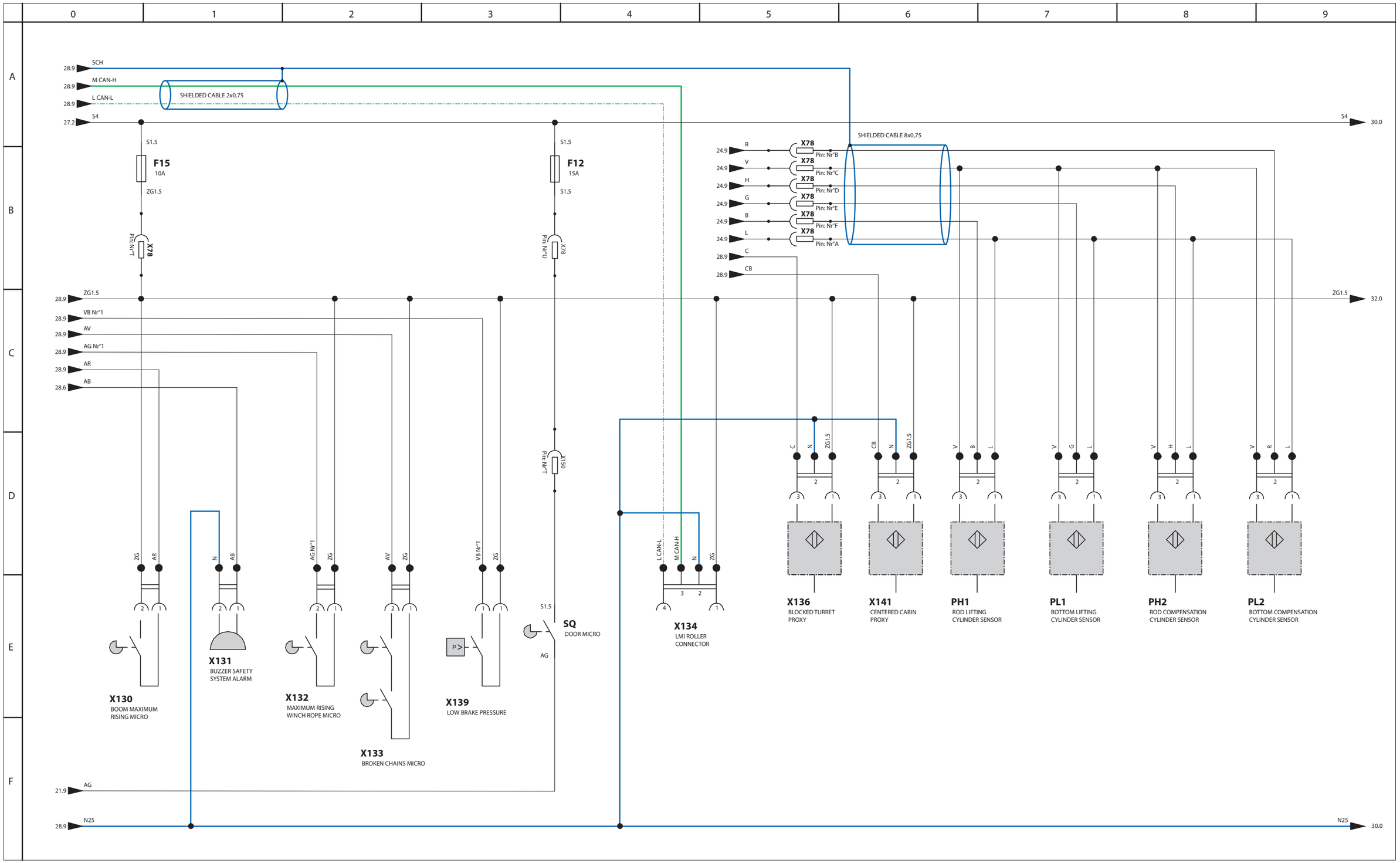

J4 VIEW
SCH
14 SHIELD
13
12
11
L CAN-L
10 CAN OPEN LINE
N_B
9 GND
8
7
6
5
4
M CAN-H
3 CAN OPEN LINE
L1.5
2 POWER SUPPLY +VE
1
J5 VIEW
SCH
18 SHIELD
17
SHIELDED CABLE 8x0,75
L
16 TRANSDUCER POWER SUPPLY
15
R
14 PRESSURE TRANSDUCER PL2
G
13 PRESSURE TRANSDUCER PL1
12
Z
11 POWER SUPPLY +VP
10
9
V
8 TRANSDUCERS GND
7
H
6 PRESSURE TRANSDUCER PH2
B
5 PRESSURE TRANSDUCER PH1
4
3
ZN
2 POWER SUPPLY FROM K1T
1
17.9 ZN
X73
Pin: Nr°J
X73 Pin: Nr°F B 29.5
X73 Pin: Nr°D H 29.5
X73 Pin: Nr°C V 29.5
X73 Pin: Nr°K Z 27.3
X73 Pin: Nr°E G 29.5
X73 Pin: Nr°B R 29.5
X73 Pin: Nr°A L 29.5
18.9 L1.5
L1.5 25.7
18.9 SCH
SCH 25.0
18.9 M CAN-H
M CAN-H 25.0
18.9 L CAN-L
L CAN-L 25.0
SHIELDED CABLE 2x0,75
18.9 N25_B
N25_B 25.0

Electrical components and connectors			
Wiring harness type	**Item**	**Designation**	**Diagram**
	X143	Attachment electrovalve on DANFOSS distributor	30
Turret	X143A		
Distributor	X143B		
	X143C		
	X144	Tilting/compensation electrovalve on DANFOSS distributor	30
Turret	X144A		
Distributor	X144B		
	X144C		
	X145	Telescope extension electrovalve on DANFOSS distributor	30
Turret	X145A		
Distributor	X145B		
	X145C		
	X146	Boom lifting electrovalve on DANFOSS distributor	30
Turret	X146A		
Distributor	X146B		
	X146C		
	X147	Turret rotation electrovalve on DANFOSS distributor	30
Turret	X147A		
Distributor	X147B		
	X147C		
	X148	Winch electrovalve on DANFOSS distributor	30
Turret	X148A		
Distributor	X148B		
	X148C		
Turret/Seat	X149	Turret/seat harness interface	17, 27, 30, 31, 32
Turret/Cab	X150	Turret/cab harness interface	18, 19, 21, 23, 29, 32, 33
Turret	X151	Turret/radio control harness interface	26
Turret/Platform prewiring	X152	Turret/platform harness interface	26
Turret	X153	Option connector	28
Turret	X154	Turret/movement locking system harness interface (Option)	25
Distributor	X154B		
	X154C		
Movement locking system	X154D		
Dashboard	X155	Radio control switch by-pass	19
Distributor	X155	Electronic module for EVD valve management	30
Dashboard/ Cab interior air-conditioning	X160	Dashboard/cab interior air conditioning harness interface	23
Dashboard	X161	Pressure sensitive switch	23
Turret	X200	Green indicator lamp prewiring	26
Platform prewiring	XA	Telescope head a platform prewiring connector	26
Platform prewiring	XB	Telescope head b platform prewiring connector	26
Rear frame	XC	Preheat prewiring option connector	9
Dashboard	XCD	Car radio connector with CD player	9
Frame fuse box and relay	XDG	OBD2 connector	7
Front frame	XDRC	Reservation connector XDRC	11
Movement locking system	XEVDA	Movement cut-off electrovalve	30
Distributor	XEVDB		
	XEVDC		
Rear frame	XR	BUS J1939 balancing resistance	9
Dashboard	XT	Video connector prewiring	19


0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
8.9 N25_B
N25_B 10.0
8.9 M CAN-J1939
8.9 L CAN-J1939
8.9 SCH
SCH 12.0
SHIELDED CABLE 2x0,75
Pin: Nr°E X35 BL1.5 16.0
Pin: Nr°D X35 GB1.5 16.0
Pin: Nr°C X35 BN1.5 16.0
Pin: Nr°B X35 BV1.5 16.0
Pin: Nr°A X35 BR1.5 16.0
X34 Pin: Nr°16 GR1.5 16.0
1.2 GR1.5
RV1.5
1.9
FROM MACHINE
N°23620 - 759345
RN1.5
7.9
Pin: Nr°L
X34
RN1.5
V1.5
XC
PRE HEATING
PRED.
1
2
UP TO MACHINE
N°23292 - 759313
1.2 R6
RN1.5
0.0
XC
2
1
UP TO MACHINE
N°23292 - 759313
L CAN-J1939
M CAN-J1939
2
1
XR
120 Ohm
64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 38 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
PREHEATING PRED.
BV1.5
ANALOGUE THROTTLE INPUT
GB1.5
IDDLE VALIDATION (IVS)1
BR1.5
GR1.5
SENSOR SUPPLY 5V
PLATFORM EMERGENCY SWITCH RETURN
BL1.5
SWITCH RETURN
BN1.5
SENSOR RETURN
SCH
SHIELD
L CAN-J1939
CAN-J1939 LINE
M CAN-J1939
CAN-J1939 LINE
R1.5
R1.5
POWER SUPPLY FROM ENGINE RELAY
POWER SUPPLY FROM ENGINE RELAY
N1.5_B
N1.5_B
R1.5
R1.5
DIRECT GND FROM BATTERY
DIRECT GND FROM BATTERY
POWER SUPPLY FROM ENGINE RELAY
POWER SUPPLY FROM ENGINE RELAY
N1.5_B
N1.5_B
N1.5_B
DIRECT GND FROM BATTERY
DIRECT GND FROM BATTERY
DIRECT GND FROM BATTERY
ENGINE
ENGINE
CONNECTOR


0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
18.9 S4
S4 22.0
VN1.5 26.0
F10 10A
F13 10A
F18 10A
F8 15A
S1.5
SB1.5
RL1.5
GZ1.5
X73
Pin: Nr°P
Pin: Nr°ff
Pin: Nr°ee
Pin: Nr°L
Pin: Nr°hh
18.3 GZ1.5
GZ1.5 21.0
18.9 S1.5
S1.5 20.0
SB1.5 20.0
RN1.5
VN1.5
RV1.5
MG1.5
MH1.5
I115
RADIOCONTROL
SWITCH
I93
EMERGENCY
STOP BUTTON
I122
FRONT WINDSCREEN
WIPER SWITCH
I124
WATER HEATER
FAN SWITCH PRED.
AB Nr°1
ZG Nr°1
AH Nr°1
RV1.5 26.0
RN1.5 26.0
Pin: Nr°N
Pin: Nr°M
Pin: Nr°V
X76
Pin: Nr°S
X150
Pin: Nr°R
X155
X155a
MTU.326.7
BY PASS
RADIOCONTROL
SWITCH
M122
FRONT WINDSCREEN
WIPER
X74
FRONT WINDSCREEN
WIPER CONNECTOR
X86
ELECTRIC FAN
PRED. CONNECTOR
XT
VIDEO PRED. CONNECTOR
18.3 SB1.5
18.9 N25
N25 20.0
N

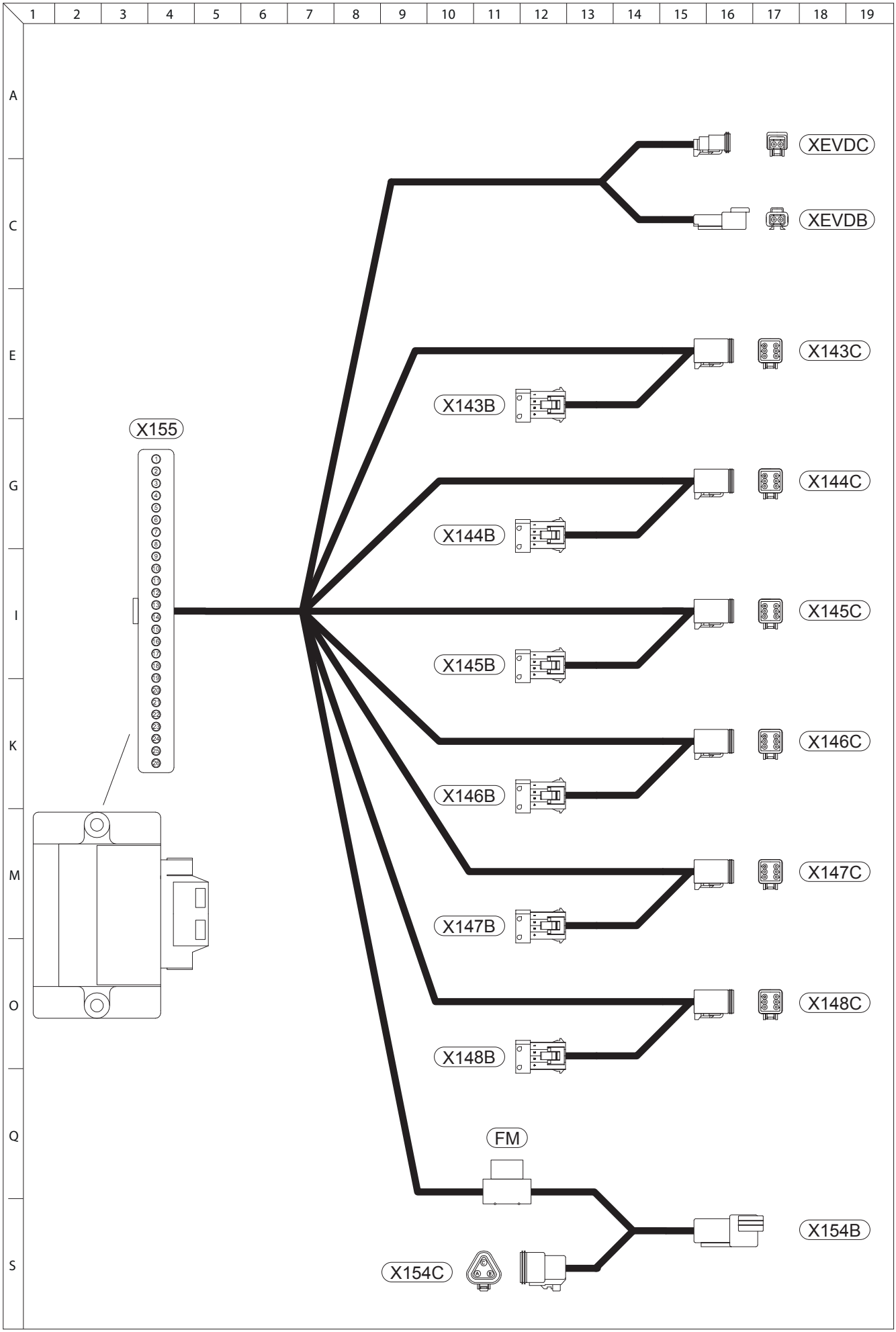
29 – DOOR CONTACT, TURRET ROTATION AND JIB CONTACTS, CYLINDER PRESSURE SENSITIVE SWITCHES



EMERGENCY STOPS AND ECM POWER SUPPLY

R2
F16
VIEW
WDO
10-J4 3-J4 9-J4
Midac_T1
WDO
8b
7b 6b
8a
R6 / R17
CAN OPEN L
CAN OPEN H
X151
V
T
J
A
X152
G
C
BY PASS
(if no basket harness)
X17a
From the start
contact key 15
R4
I93
I96
NO
I95
NO
I115
F8 (without OBD)
or
F27 (with OBD)
BY PASS
RADIOCONTROL
SWITCH (if no I115
& X151)
X155
(with OBD)
X155a
X154
(without OBD)
1
2
H
L
25
ELECTRIC SLIP RING
MAIN FUSE
150A
QS1
CUT OFF
BATTERY SWITCH
12V
BATTERY
FM
RM
CAN OPEN L
CAN OPEN H
CAN L J1939
CAN M J1939
Midac_C1
ECM
Engine

Ground						
Wiring harness type	Item	Designation	Location 2D			Harness details
			A	B	C	
Front frame	GROUND	Front frame ground				1
Front frame	GROUND	Front left frame ground				1
Rear frame	GROUND-B	Rear frame ground				2
Turret	GROUND	Turret ground				3
Dashboard	GROUND	Dashboard ground			C27	4
Cabine	GROUND	Cabin ground				5


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
A C E G I K M O Q S
XEVDC
XEVDB
X143C
X143B
X155
X144C
X144B
X145C
X145B
X146C
X146B
X147C
X147B
X148C
X148B
FM
X154B
X154C

2	Calibration and maintenance button
	This button, used with the appropriate password, activates the calibration menu. Only accessible on the F2 page.

3	Operator configuration button
	This button activates (with or without password) the Operator parameter menu (Contrast, screen brightness, etc.). Accessible on the F2 page.

4	Attachment selection
	Press this button to change the attachment being used.

5	Horn button
	This button switches off the horn.

6	Hook button
	Not used.

7	Arrow and ENTER buttons
	These buttons are used to move around in the menu and confirm the selections.

8	Tare/Escape button
	To exit the command or page in progress.

9	Green/yellow/red indicator lamps
	Status of actual load Green = OK Yellow = warning: load between 90% and 100% Red = overload: the movement is not authorised

P14 : Au	Option movement
Au 111 222 333	111: Control lever tester 0 +/- 1000 222: Percentage of speed introduced by the control lever 333: Danfoss control(0 – 256)

	MINI	Neutral	MAXI
111	-1000	0	1050
333	200	512	900

P15 : Ar	Winch movement
Ar 111 222 333	111: Control lever tester 0 +/- 1000 222: Percentage of speed introduced by the control lever 333: Danfoss control(0 – 256)

P16: trans pressures	
0 B111 2 B222 1 B333 3 xxxx	Values from pressure sensors in Bit (0-1024) 0: Pillar side pressure sensor on lifting cylinder 1: Rod side pressure sensor on lifting cylinder 2: Pillar side pressure sensor on compensating cylinder 3: Rod side pressure sensor on compensating cylinder

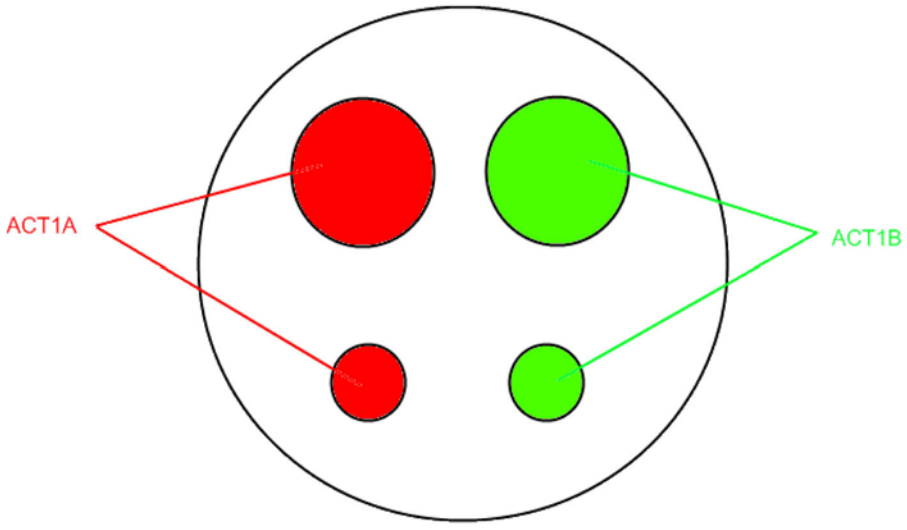
P17: Lmi status	
* M IIII: VVVV	View status (see below)

P18: Mac.Status	
* M IIII: VVVV	View status (see below)

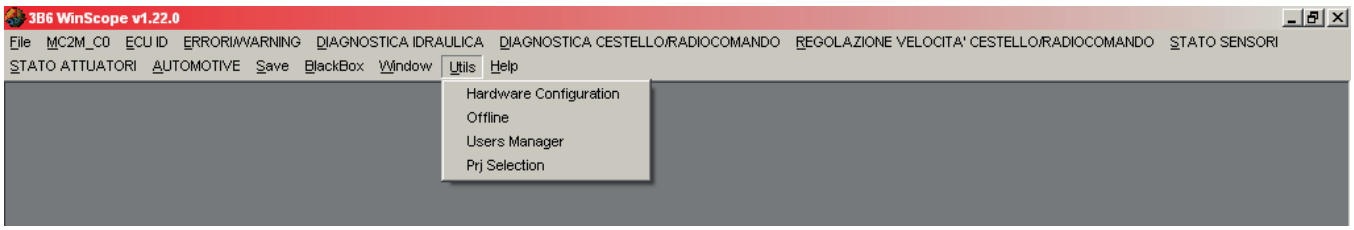
P19: Not used	

P20 : Act1A	Main telescope reel: ACT 1A
ACT1A A:aaaa ccc Eee L:ssss	Main telescope reel: left sensor A: aaaa Angle sensor value (boom value at 0° XXXX bits) C: cccc Message counter E: ee Sensor error L: sssss Length sensor value (value completion boom completion folded XXXXX bits)

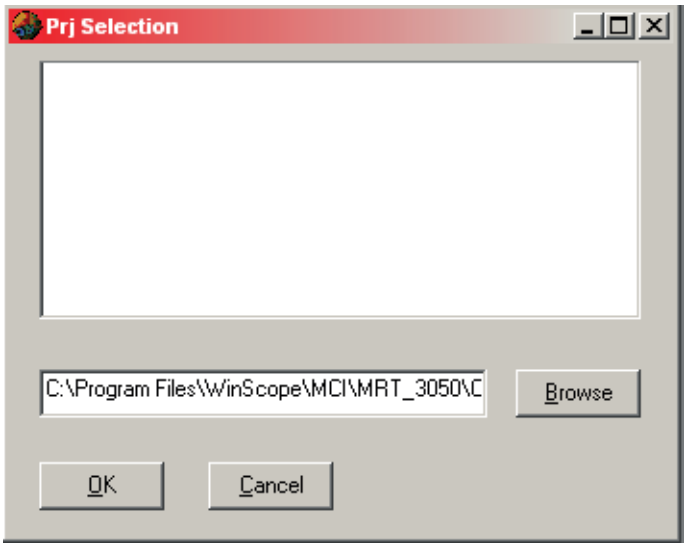
P21 : Act1B	Main telescope reel: ACT 1B
ACT1B A:aaaa ccc Eee L:ssss	Main telescope reel: right sensor A: aaaa Angle sensor value (boom value at 0° XXXX bits) C: cccc Message counter E: ee Sensor error L: sssss Length sensor value (value completion boom completion folded XXXXX bits)



3 - In the *"**Utils**"* dropdown menu, choose *"**Pri Selection**"*.

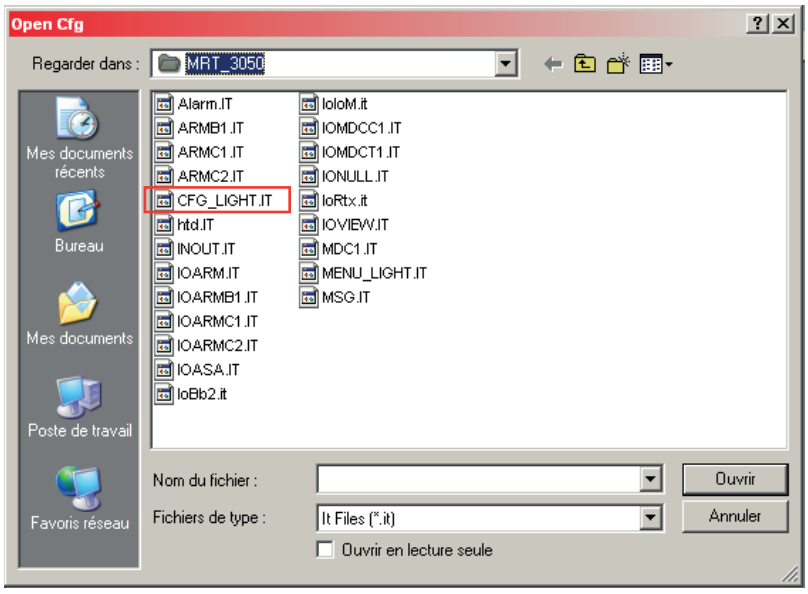


4 - Click on *"**Browse**"*



5 - Search for the file that corresponds to the machine that you wish to carry out diagnostics on.

⇒ MRT 3050: *"**C/Program Files/Winscope/MCI/MRT3050/CFG_LIGHT.IT**"*



6 - Click on *"**Open**"*.

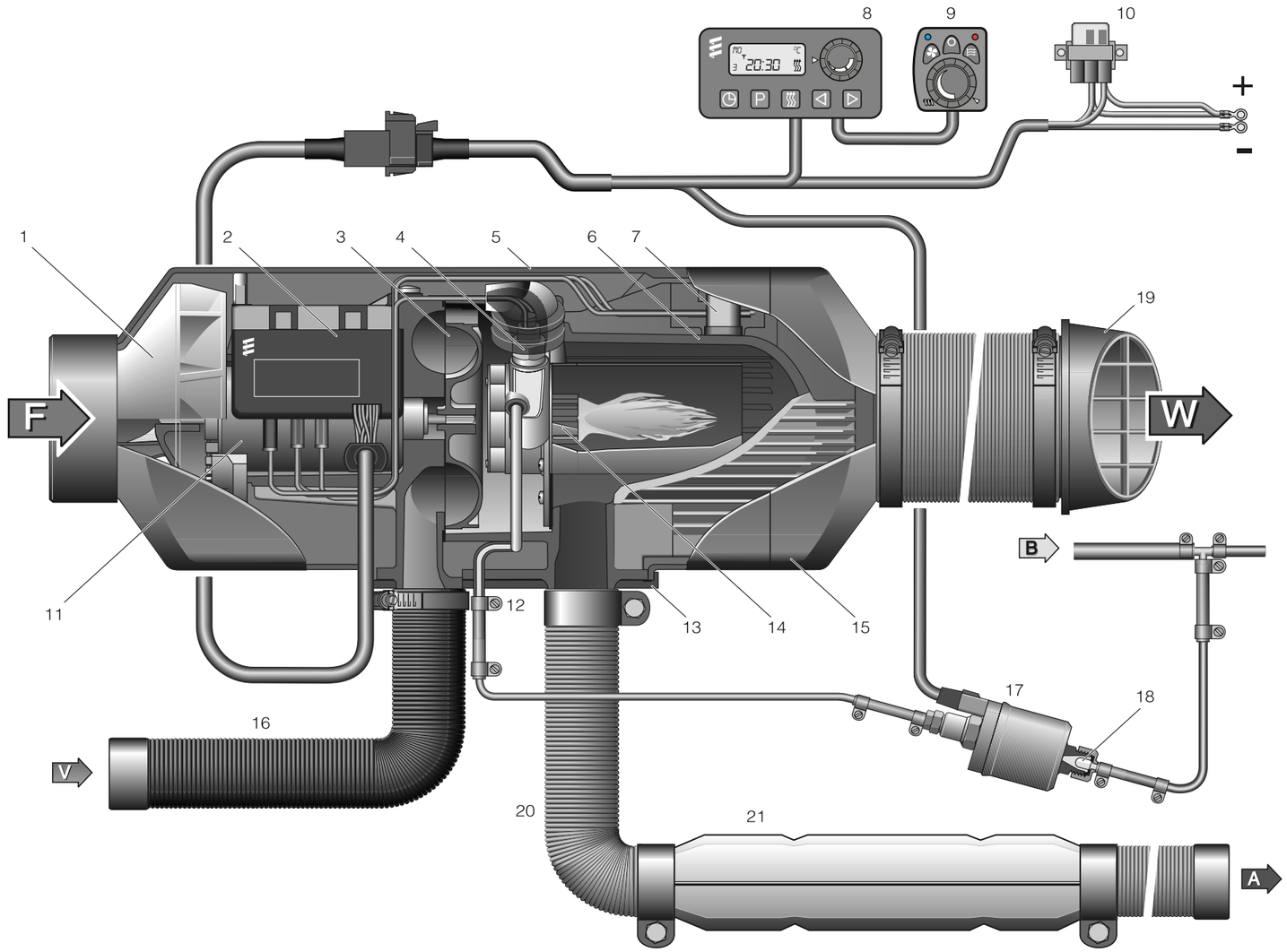
CROSS-SECTION VIEW OF HEATING SYSTEM

LIST OF PARTS

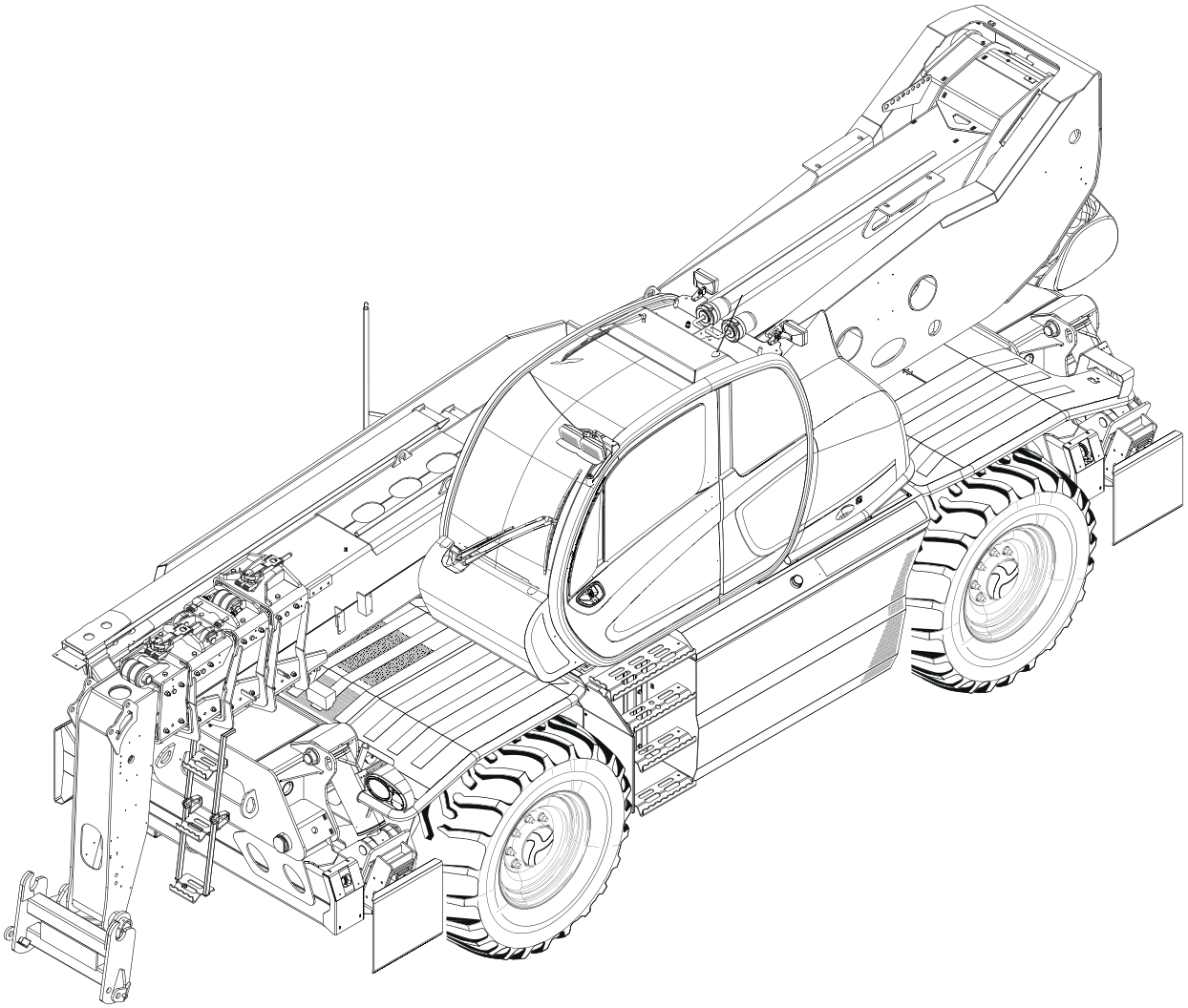
1 - Hot air blower
2 - Electronic control box
3 - Combustion air blower
4 - Spark plug
5 - Cover
6 - Heat exchanger
7 - Flame/overheating sensor
8 - Timer with potentiometer
9 - "Heating/fan" switch
10 - Fuse box with main fuse and "control element" fuse
11 - Electric motor
12 - Fuel connector
13 - Flange seals
14 - Combustion chamber
15 - Heater vent
D2= Ø 60 mm
D4= Ø 75/90 mm
16 - Combustion air pipe
17 - Metering pump
18 - Fuel filter fitted in the metering pump
19 - Swivelling burner
20 - Exhaust pipe
21 - Exhaust

CIRCUITS

F - Fresh air
W - Hot air
A - Exhaust gas
B - Fuel
V - Combustion air



REMOVING THE CAB, TURRET AND THUST RING



GENERAL INFORMATION

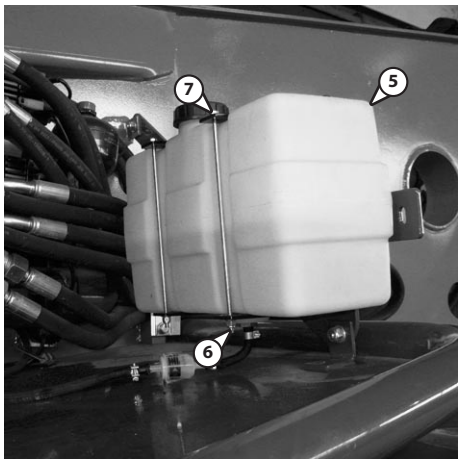
To reach the various components, the order of removal must be observed.
Mark all the hydraulic pipes and electrical connections with a felt tip pen before removing them to ensure correct repositioning during reassembly.

Plug all hydraulic orifices to prevent any impurities from contaminating the hydraulic system.

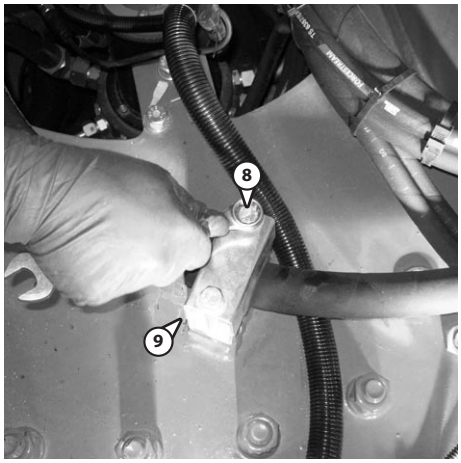
PREPARATION AND SAFETY INSTRUCTIONS

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

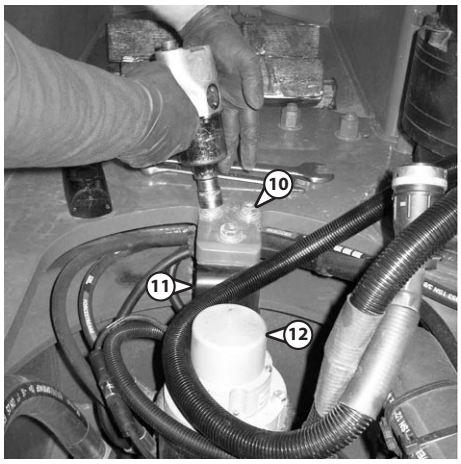
Special instruments:
- Lifting crane (5000 kg. minimum).
- Hydraulic power unit.



Unscrew the nuts (Item 6) and remove the tie rods (Item 7) to remove the heating fluid tank (Item 5).

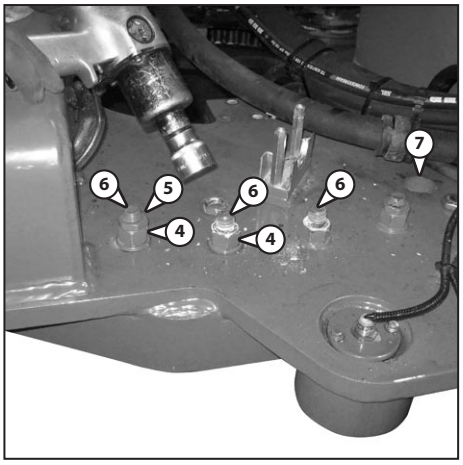


Unscrew the screws (Item 8) and remove the collars (Item 9) to release the pipes from the turret.

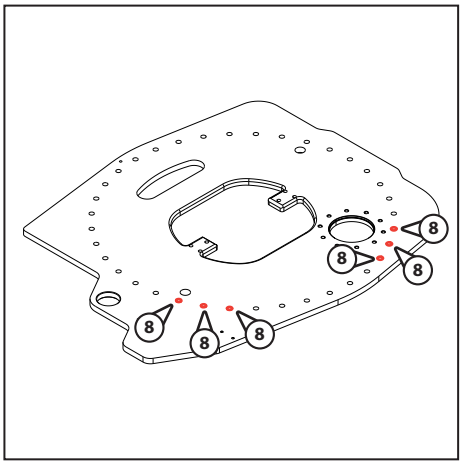


Unscrew the screws (Item 10) to release the brackets (Item 11) from the turret that support the rotating manifold (Item 12).

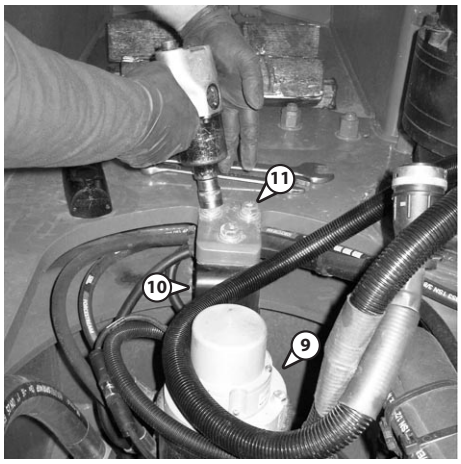
Disconnect all the hydraulic pipes from the rotating manifold (Item 12).



Screw on the nuts (Item 4) and lock nuts (Item 5) using a tightening torque of 562 Nm.
Using the hydraulic power unit, pump oil into the oil system to cause rotation of the hub of the rotation motor (Item 1) and thus rotation of the thrust ring.
Through the appropriate holes (Item 3) under the frame, screw in the screws (Item 6) to attach the turret to the truck frame, using the hydraulic power unit, rotate the turret as much as necessary to screw in all the screws, two at a time.
Replace the plugs in the two holes (Item 7) in the turret.

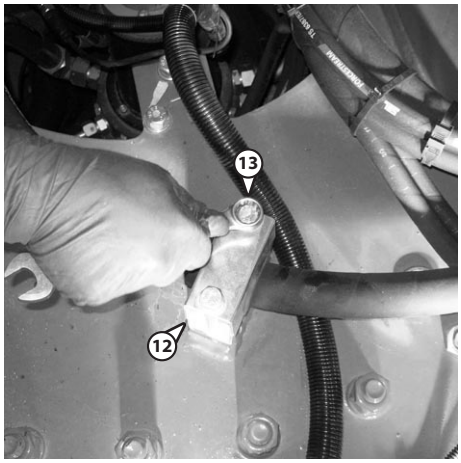


Warning: the six lowest screws and their nuts are fitted to correspond with the holes (Item 8) in the frame plate.

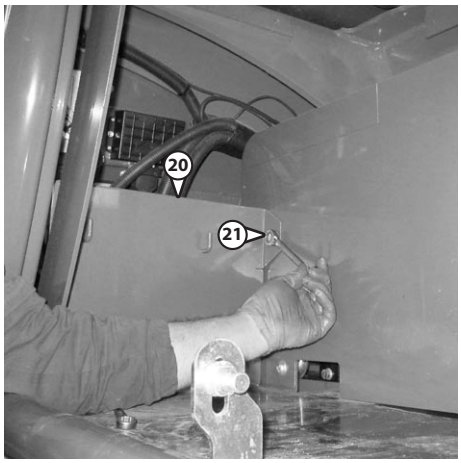


Disconnect the power unit pipes (Item 2) and reconnect the hydraulic plant pipes to the turret rotation motor (Item 1).

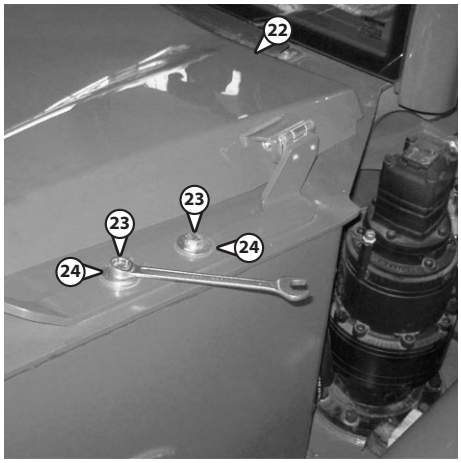
Reconnect all the pipes to the rotating manifold (Item 9), attach the brackets (Item 10) to the turret by screwing in the screws (Item 11).



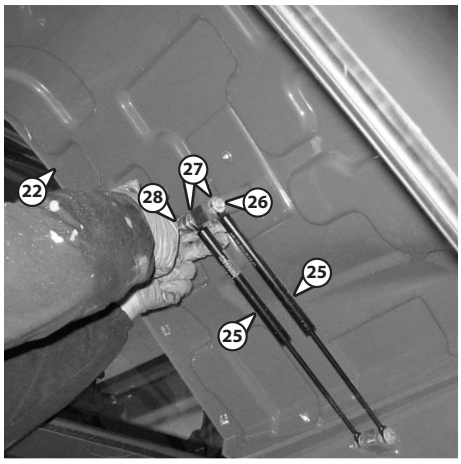
Lock the hydraulic pipes to the turret with the collars (Item 12) by screwing in the screws (Item 13).



Refit the rear housing (Item 20) of the cab by screwing in the screws (Item 21).

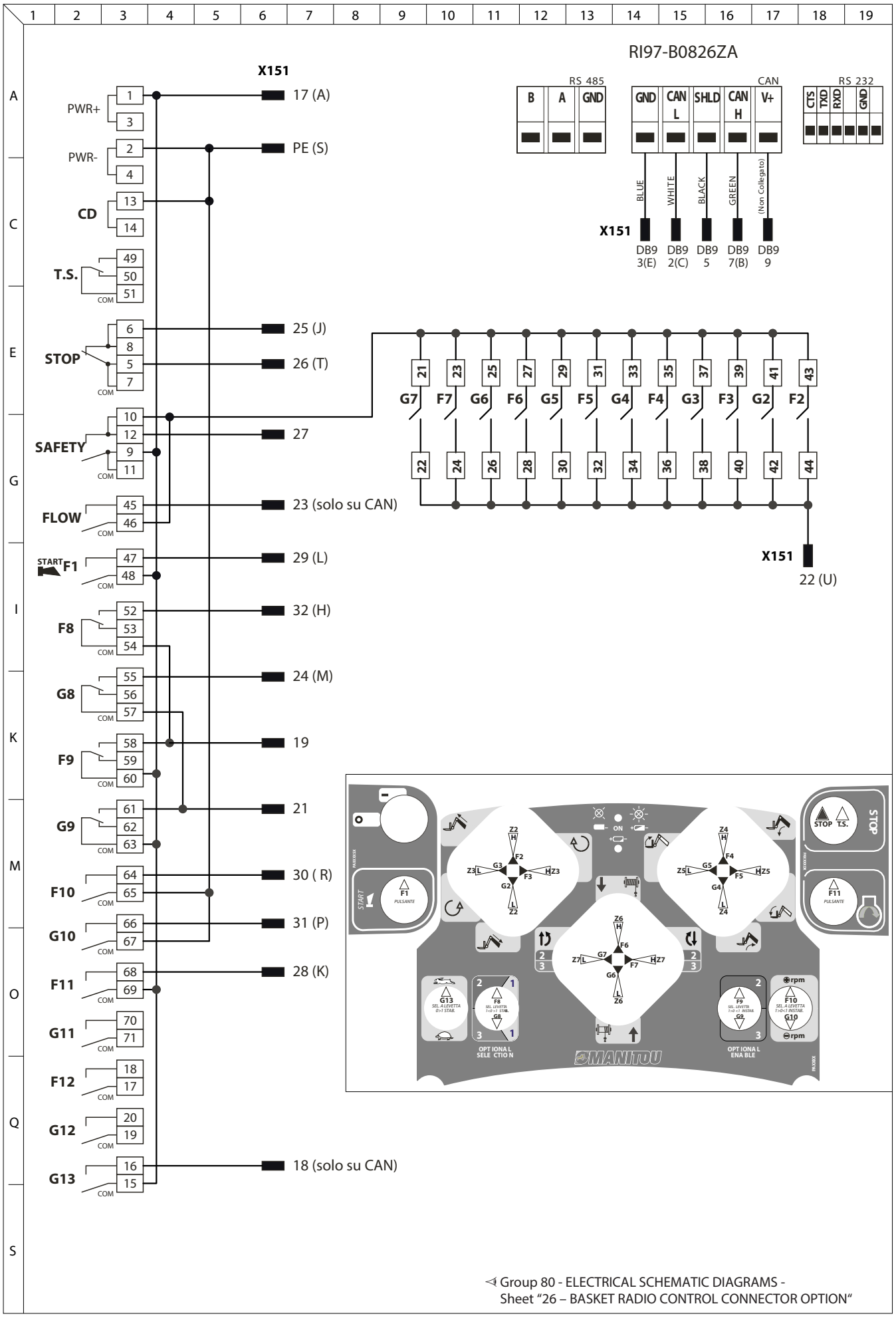


Replace the engine cover (Item 22) on the truck and fix it with the screws (Item 23) and washers (Item 24).



Refit the tie rods (Item 25) to the engine cover (Item 22) by screwing in the screws (Item 26), washers (Item 27) and nuts (Item 28).

RADIO CONTROL SCHEMATIC DIAGRAM



◁ Group 80 - ELECTRICAL SCHEMATIC DIAGRAMS - Sheet “26 – BASKET RADIO CONTROL CONNECTOR OPTION“