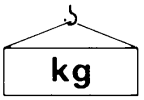
DEUTZ FAHR

SAME DEUTZ-FAHR DEUTSCHLAND GmbH

WORKSHOP MANUAL

AGROTRON 106 MK3
AGROTRON 110 MK3
AGROTRON 115 MK3
AGROTRON 120 MK3
AGROTRON 135 MK3
AGROTRON 150 MK3
AGROTRON 165 MK3

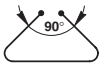
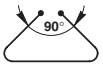
LIFTING INSTRUCTIONS



⚠ Components weighing over 25 kg or of significant size must be supported and removed using suitable lifting equipment with wire rope or polyester slings.
In the paragraphs regarding removal and refitting operations, the weight of the component or assembly to be lifted is indicated with the symbol 

WIRE ROPES - SLINGS

- Use wire ropes or polyester slings of suitable capacity for the parts to be lifted, referring to the following tables:

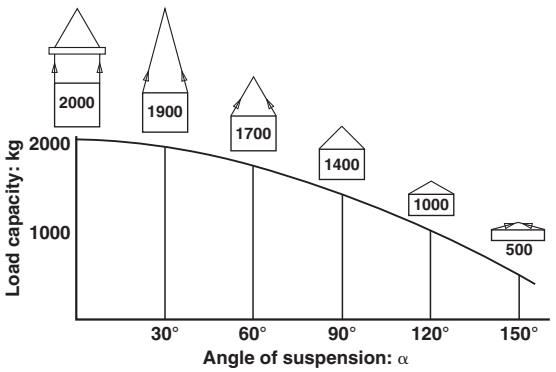
WIRE ROPES (standard twisted «S» or «Z» type)				POLYESTER SLINGS (eye-and-eye - simple loop)				
Ø rope mm	Capacity (kg)			Width (mm)	Capacity (kg)			
								
8	650	620	500	25	500	400	860	700
10	1000	1740	1420	50	1000	800	1730	1410
12	1450	2500	2050	62	1250	1000	2160	1760
14	2000	3460	2820	75	1400	1120	2420	1980
16	2600	4500	3670	100	2000	1600	3460	2820
18	3300	5710	4660	150	2500	2000	4330	3530

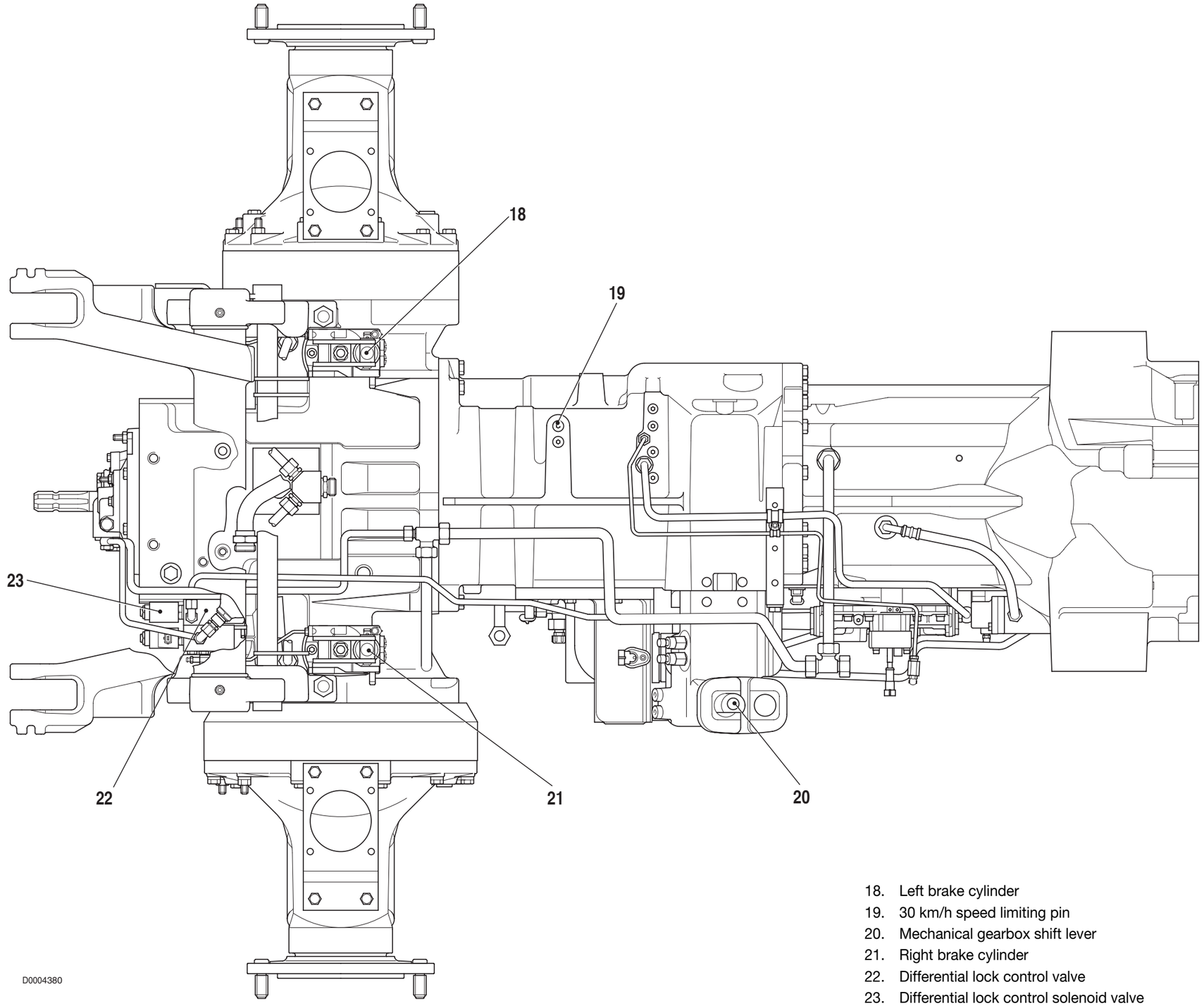
NOTE. Lifting capacities are calculated with a safety coefficient.

- The lifting hook should be attached to the central part of the rope or sling; if the hook is attached near the ends of the rope/sling, this could cause the load to slip during lifting.
- Never lift a heavy load using a single rope; always use two or more symmetrically arranged ropes.

⚠ Suspension of a load from a single rope could cause the load to start rotating and consequently cause the rope strands to untwist or the load to slip; this could lead to serious injury.

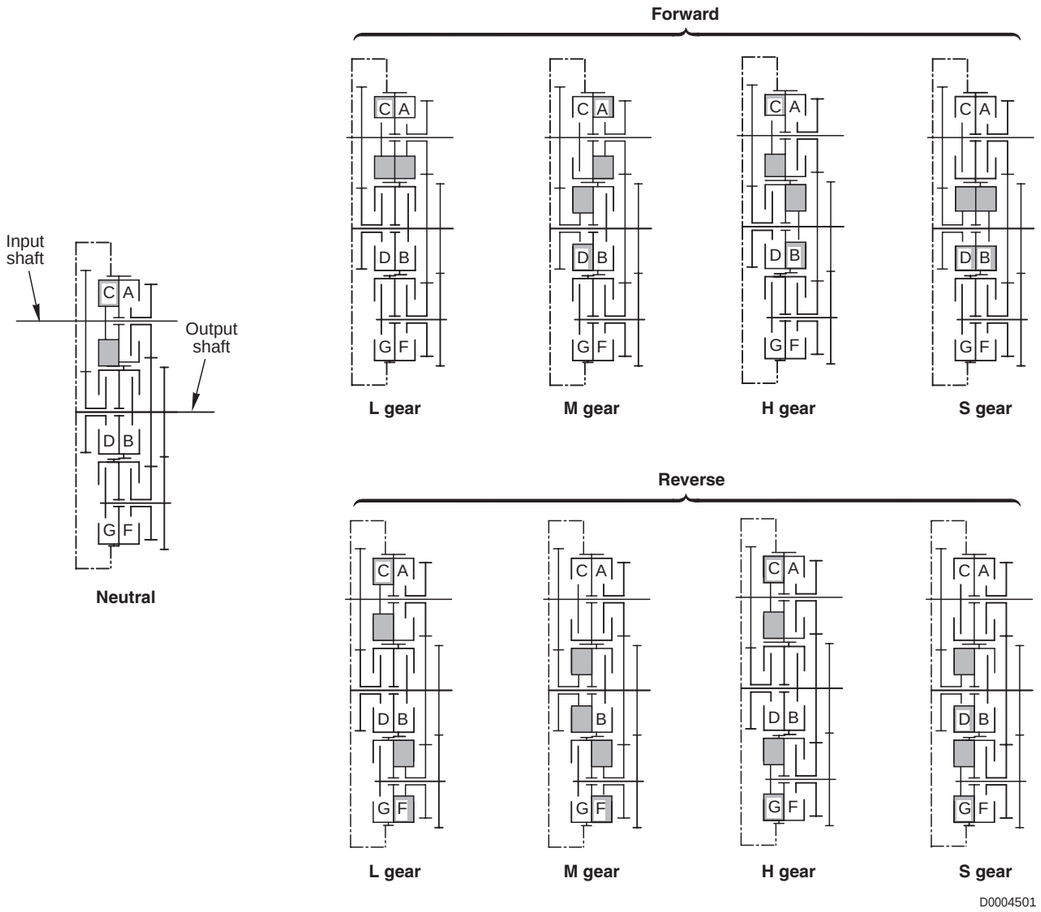
- Never lift a heavy load when the two branches of the ropes form a wide angle.
The permitted load (kg) decreases in inverse proportion to the angle of suspension; the table below indicates how the permitted load varies according to the angle of suspension for two Ø 10 mm ropes each with a load capacity of 1000 kg.





18. Left brake cylinder
19. 30 km/h speed limiting pin
20. Mechanical gearbox shift lever
21. Right brake cylinder
22. Differential lock control valve
23. Differential lock control solenoid valve

1.1.6 CLUTCH ENGAGEMENT AND SOLENOID VALVE OPERATION SCHEMATIC



Solenoid valve operation when shifting from L to S gear (L–~~M~~–~~H~~–~~S~~)

Solenoid valve	Forward				Reverse			
	L	M	H	S	L	M	H	S
Y6	●	●	●	●				
Y7					●	●	●	●
Y1	●	●			●	●		
Y2		●		●		●		●
Y3		❍	❍	❍		❍	❍	❍
Y4			❍				❍	

● = Solenoid valve energised

❍ = Solenoid valve briefly energised during gear change

Solenoid valve operation when shifting from S to L gear (S–~~H~~–~~M~~–~~L~~)

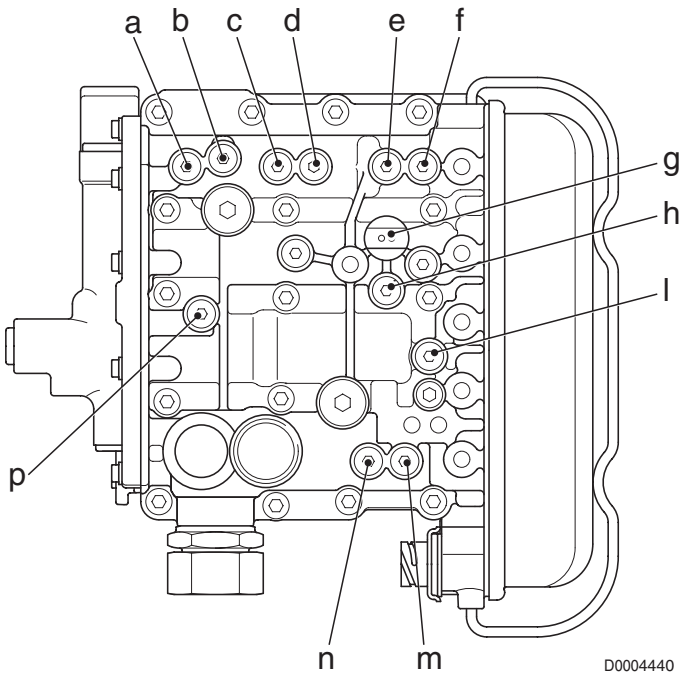
Solenoid valve	Forward				Reverse			
	S	H	M	L	S	H	M	L
Y6	●	●	●	●				
Y7					●	●	●	●
Y1			●	●			●	●
Y2	●		●				●	
Y3		❍	❍	❍		❍	❍	❍
Y4			❍				❍	

● = Solenoid valve energised

❍ = Solenoid valve briefly energised during gear change

A. GEARBOX CONTROL VALVE

PRESSURE TEST POINTS

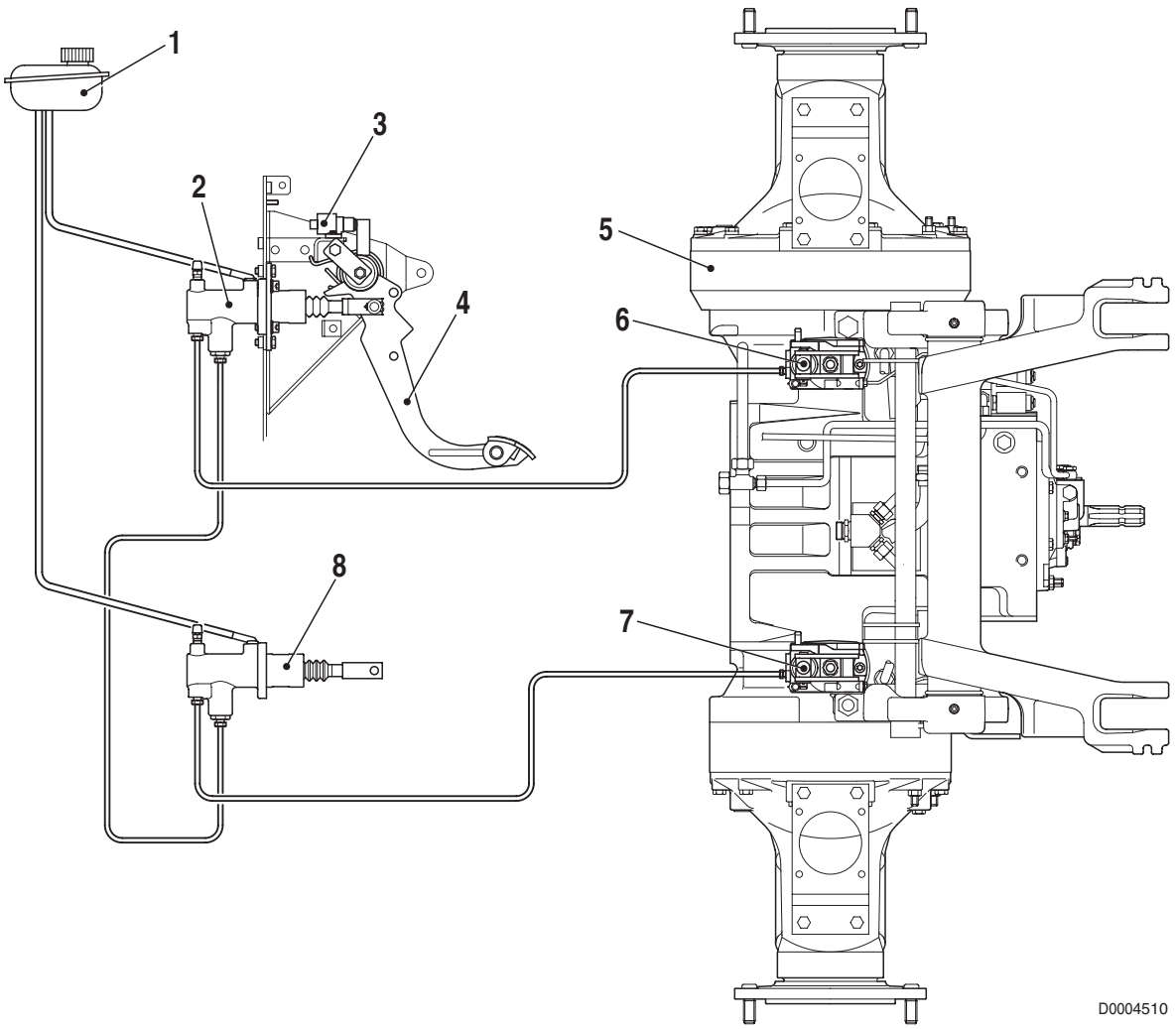


Pos.	Function	Thread size
a.	**A** or **F clutch pressure**	M10x1
b.	**B** or **G clutch pressure**	M10x1
c.	**Y3** or **Y4 solenoid valve pressure**	M10x1
d.	Pressure **Pg** to relief valve	M10x1
e.	Pressure **Pr** from relief valve (18 bar)	M10x1
f.	Engagement pressure of clutch **C** or **D**	M10x1
g.	General pressure (18 bar)	M10x1
h.	Engagement pressure of clutch **A/B** or **F/G**	M10x1
l.	Pilot pressure (10 bar)	M10x1
m.	D clutch pressure	M10x1
n.	C clutch pressure	M10x1
p.	Modulated pressure	M10x1

2. BRAKING SYSTEM

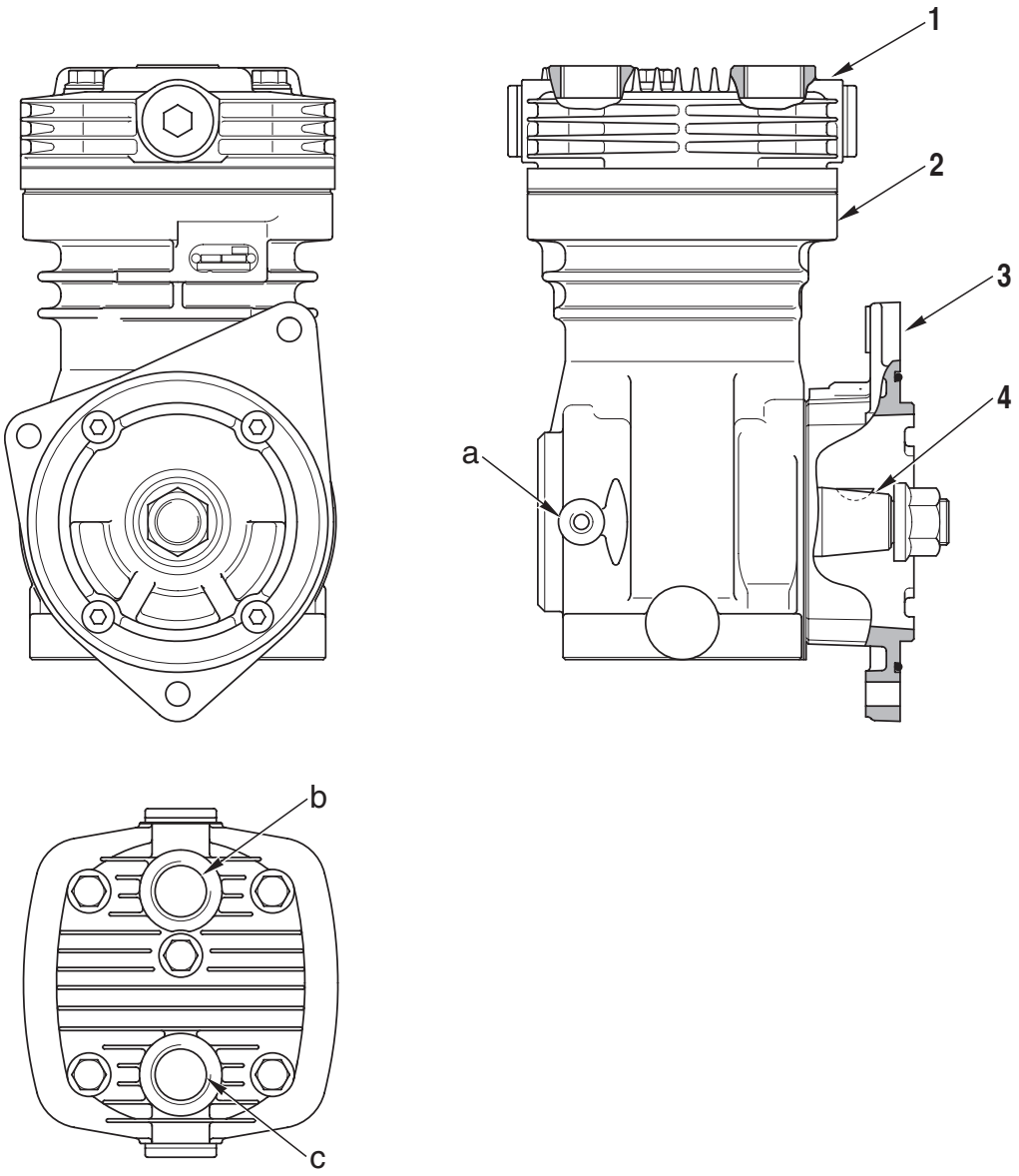
DESCRIPTION

The braking system is comprised of 2 braking devices (one for each rear wheel) operated by two hydraulic pumps by way of mechanical controls.
Each pump supplies fluid to the brake on one side (left or right) thereby allowing the operator to brake on one side only and thus reduce the steering radius.



1. Brake fluid reservoir
2. Right master cylinder
3. Brake microswitches (n° 2)
4. Brake pedal
5. Rear axle
6 Right brake
7. Left brake
8 Left master cylinder

COMPRESSOR



D0004620

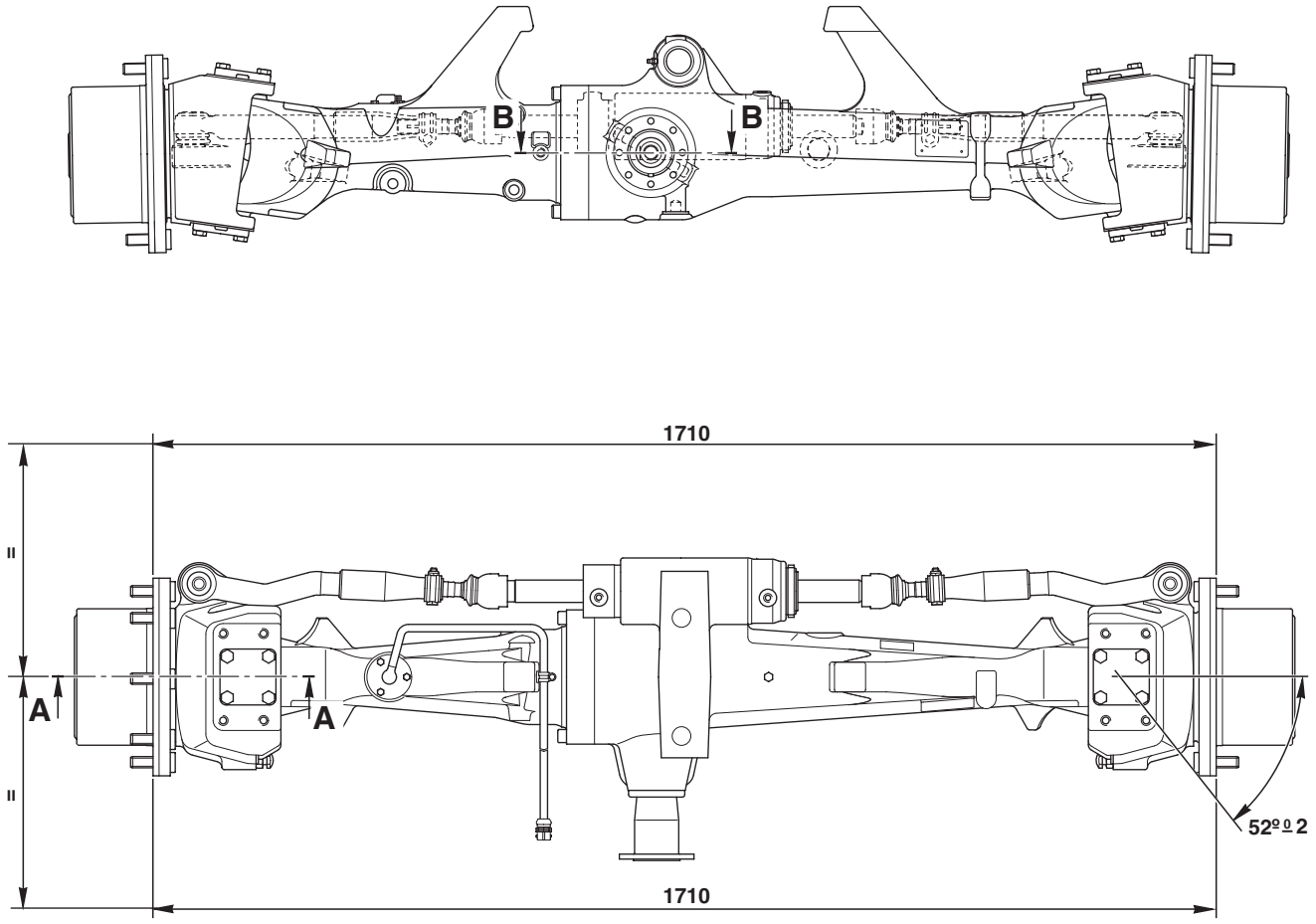
a. Port 0.1 - Compressor lubrication
b. Port 0
c. Port 2 - Compressed air delivery

1. Cylinder head
2. Cylinder
3. Flange
4. Crankshaft

TECHNICAL DATA

Bore: 90 mm (3.546 in.)
Stroke: 36 mm (1.418 in.)
Displacement: 229 cm^3
Max. pressure.: 10 bar (145 psi)
Crankshaft end float: 0.08–0.38 mm (0.003 – 0.015 in.)

4. FRONT AXLE



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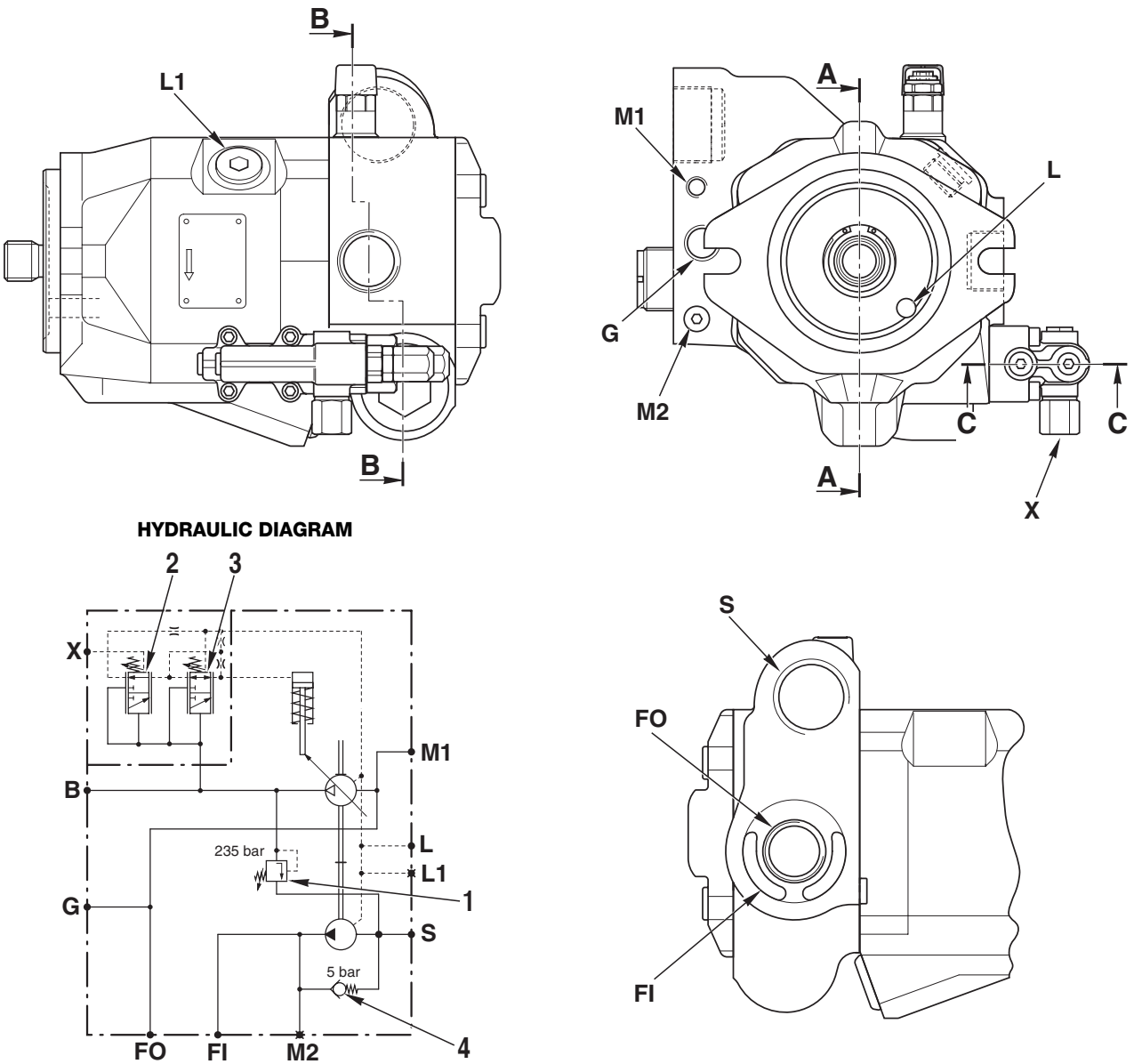
5.1 VARIABLE DISPLACEMENT PUMP



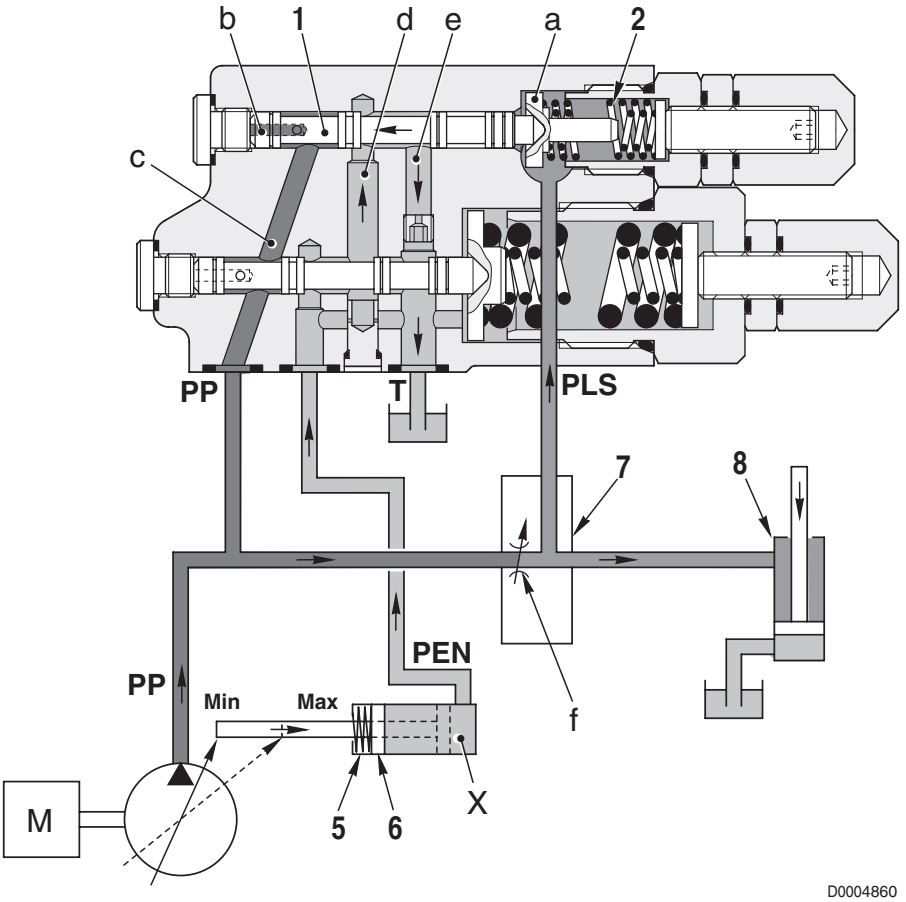
FUNCTION

Port L: drain
Port X: LS signal
Port S: suction
Port B: delivery
Port G: transmission lubrication
Port FI: filter inlet
Port FO: filter outlet

COMPONENTS

1. Antishock valve
2. Load Sensing valve
3. Pressure cut-off valve
4. By-pass valve

b. When a control lever is operated

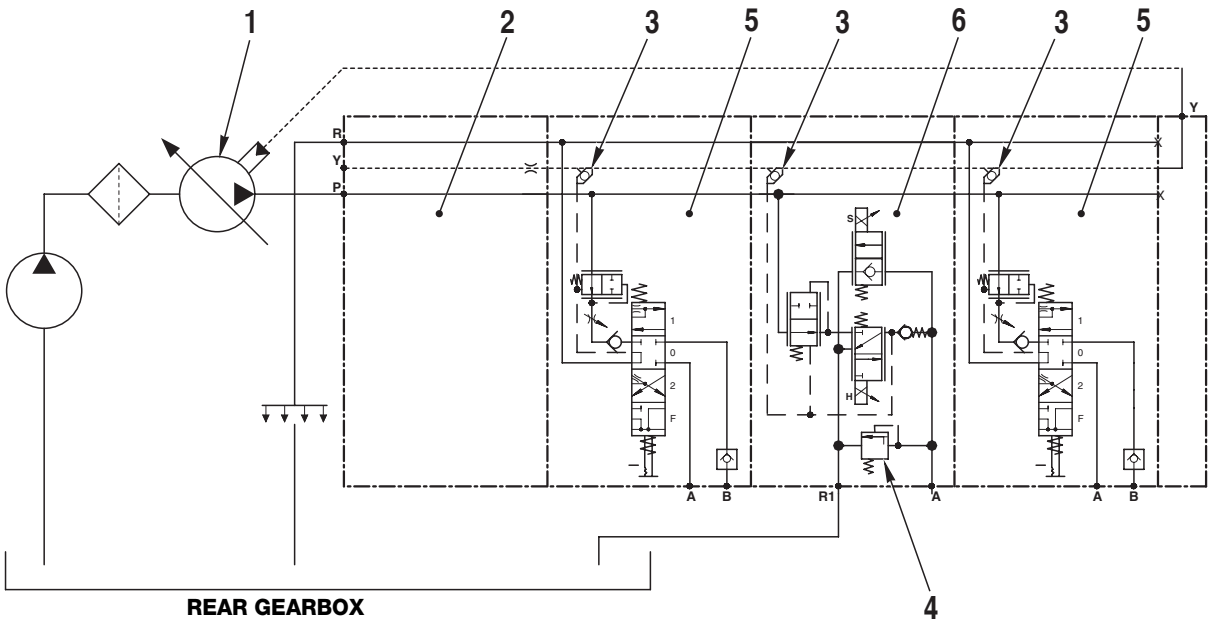


- When a control lever is moved from the NEUTRAL position, this generates an **LS** signal corresponding to the load delivery pressure **PLS**.
- The **LS** signal pressure in chamber **a** causes the spool to shift to the left, thereby connecting the passages **d** and **e**. The chamber **X** is depressurised and the spring (5) causes the swash plate to move to the maximum displacement angle.
- System balance is restored when the pressure Δ**PR** exerts on the spool (1) a force equal to the difference in force due to the spring (2) thus restoring the connection between the passages **c** and **d**.

VERSION WITH VARIABLE DISPLACEMENT PUMP

FUNCTION

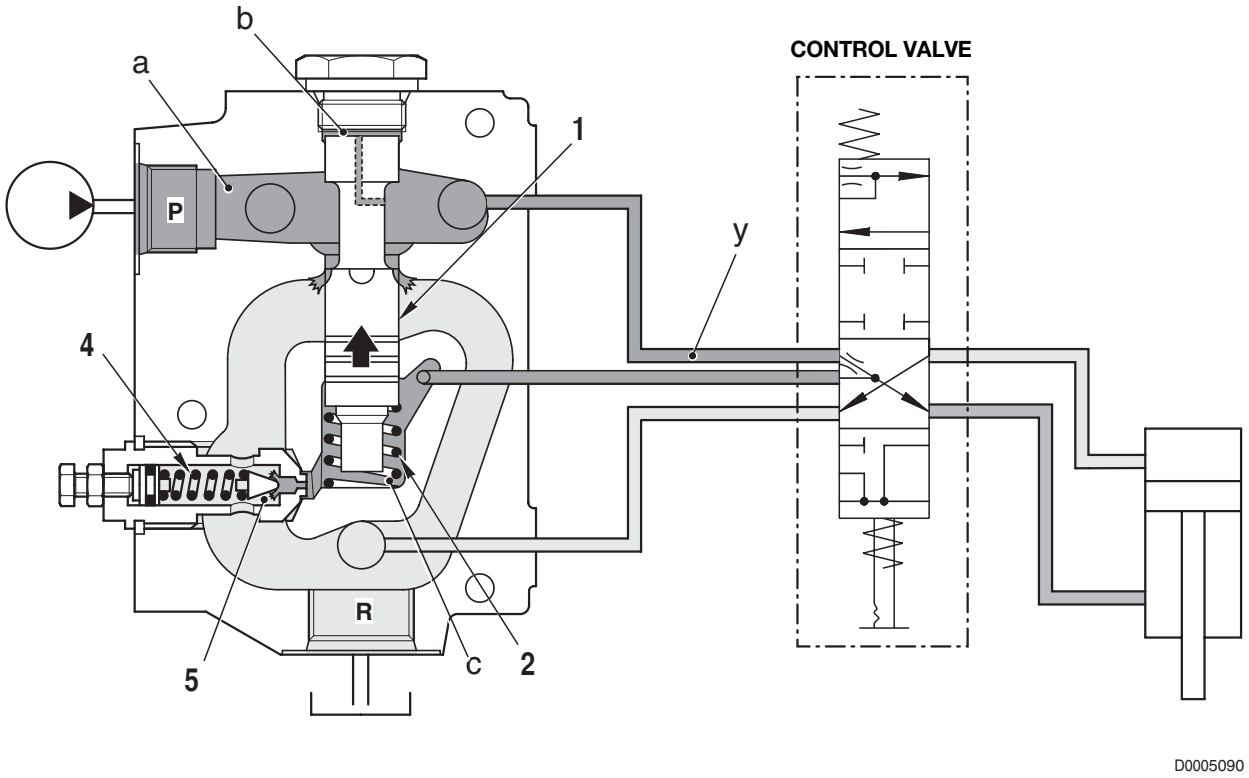
The function of the auxiliary services control valve is to control the flow of pressurised oil to the auxiliary services and the rear lift.
This control valve is of the parallel circuit Load Sensing type.



DESCRIPTION

- The pressurised oil from the pump (1) enters the inlet section (2); from here it is distributed to the spool sections through internal passages.
- All the spools, when operated, generate a pressure signal (Load Sensing signal) that is equal to the pressure demand from each load.
  The highest of these pressure signals, selected by the bistable valves (3), is sent to the variable displacement pump through port **Y** of the control valve.
- On the lift spool section (6) there is an antishock valve (4) (on the UP control side) that serves to prevent excessive pressure caused by jolting of the implement.

2. When an actuator is operated



- When an actuator is operated, the pressure required for its operation is also directed to the channel **y** (Load Sensing signal channel) and then sent to chamber **c** of the manifold.
- This causes the spool (1) to shift upwards and the oil required to operate the load is sent to the control valve.
- When the load pressure balances the force of the spring (4), poppet (5) is shifted to the left, allowing limitation of the operating pressure.

1.1.2 HARDWARE AND SOFTWARE

You should have the following minimum system configuration in order to work with SERDIA:

Hardware:

- Notebook o PC (IBM-AT compatible):.... with 1 serial interface RS 232 (There should be no mouse connected) and parallel printer interface
- Grafiphs carde:..... VGA/SVGA
- Processor: ..... 80486 (or later)
- Frequenz:..... 100 MHz
- RAM:..... 8 MB RAM (or later)
- Hard disk (free memory capacity): ..... 15 MB (or later)
- Diskdrive:..... 3,5” (1,44 MB)

ECUs (engine):

- EMR (Elektronischer Motor-Regler)..... Electronic engine governor,
  ECU TN 0211 1910 e 0211 2017
  Software Version N° 12.1.08 and lower
- Diagnostics interface..... Serial in ace. with ISO 9141

Interface, connector piece between ECU (engine) and PC:

- Level adaptator for ISO 9141, SAE J1708 e RS 485
- Safety switch with dongle function, copy protection
- Power supply range 12-24 V
- Power supply side: Engine
- Protective switch against incorrect polarity and surge voltage
- Decoupling

Software:

- Operating system ..... DOS versione 5.0 or later
- User surface ..... MS-Windows® 3.11 or Windows 95

Installation is also possible under Windows 3.1; however, this creates a specific Windows problem: Conflicts may occur when accessing serial interface COM1 (see Chapter 8, What should you do if...?). Further information is also given in the Readme file supplied with SERDIA).

For proper display of the contents of the SERDIA windows under Windows 3.11, you should install the standard screen driver (VGA).

1.2 ORDERING

SERDIA can be ordered, like the DEUTZ special tools, through:

SAME-DEUTZ-FAHR GROUP S.p.A.

Viale F. CASSANI, 15

24047 TREVIGLIO (BG) - ITALIA

1.2.1 FIRST-TIME USERS

For first-time users, we recommend the SERDIA package Re-order No. 5.9030.740.4/10.

Scope of supply:

- SERDIA software (1 x 3.5' installation diskette)
- Diagnostics interface with implemented user level
- Brief instructions on installation
- A list of tools and modifications usefui when troubleshooting, is included
- Carrying case

2. ECU SELECTION

2.1 GENERAL

DEUTZ engines may be equipped with one or several ECUs (e.g. the combination MVS with EMS). SERDIA, however, can only communicate with one ECU. Exception: the error list can also be read from the MVS ECU via EMS.

It is therefore necessary to first select the desired ECU from the menu poin "ECU selection".

Recognition of the different ECUs is managed by SERDIA for the user.

Possible ECUs:

EMR (Electronic Engine Governor)

MVS (Magnetic Valve System)

EMS (Engine-Monitoring System)

2.2 RECOGNITION OF ECUS

SERDIA automatically assists recognition of the connected ECUs upon program start. Identification may take up to 60 seconds as the possible interfaces and ECUs have to be polled one after the other.

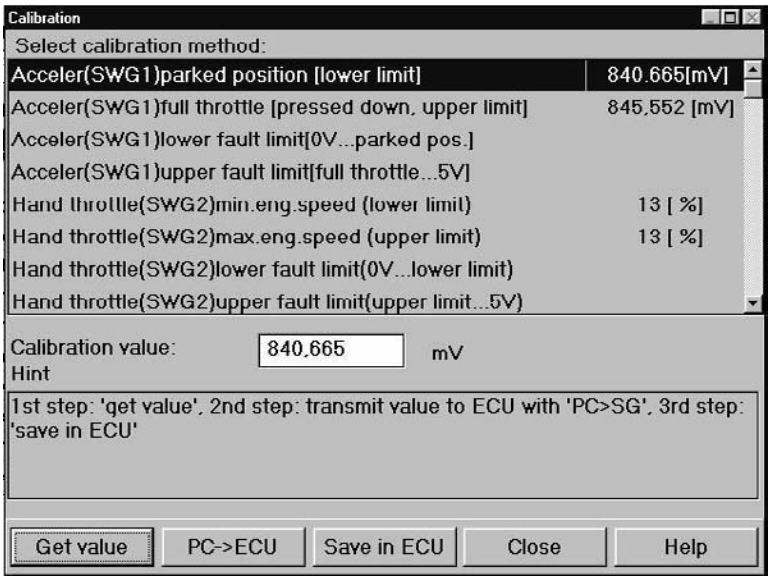
Following successful recognition the ECU selection screen is automatically overlayed. Only the recognized ECUs are offered for selection. The ECUS which are not selectable are marked by a grey font.

2.3 IDENTIFICATION DATA

2.3.1 EMR IDENTIFICATION

- Meaning of data displayed: **DEUTZ part number**.
- **Product number:** Type of selected ECU: 1 = EMR - 2 = MVS - 3 = EMS
- **Hardware version number:** This number indicates the development status of the ECU.
- **Software version number:** Number of the EEPROM contained in the ECU. If the digit left from the decimal changes (e.g. from 2.1 to 3,1), the data set does no longer suit the ECU. In this case it is necessary to consult the headquarters.
- **Day, month, year:** Date of the latest parameterization on the ECU.
- **Service ID:** Serial number of the interface used for the previous access. The leading digit indicates the access level.
- **Interface serial number:** Serial number of the currently used interface.

MK 3	TTG	Parameter	Unit	Min.	Max.	typ Wert	Description
Page 5: Position governor							
Only change the following 10 parameters in consultation with the head office							
		Posgvnr: P part	%	0	100	10	Gain factor P part
		Posgvnr: 1 part	%	0	100	5	Gain factor I part
		Posgvnr: D part	%	0	100	5	Gain factor D part
		Posgvnr: DT2 part	%	0	100	10	Gain factor DT2 part
		Posgvnr: Gain	%	100	200	180,1	Gain factor with minor speed fluctuation
		Posgvnr: gain range	mm	0	1	0,25	Gain fluctuation range for gain factor
		QuickCurrentDecSteepness	1/min	0	65535	40000	
		QuickCurrentDecTime	ms	0	65535	50	
Page 6: Functions							
		Assign config. top curve		0	2	0	Torque curve variants (2 variants∗), Perm, values: 0 = torque curve 1 1 = Switching betw. torque curves 1+2
		Ass spec. eng. speed config		0	6	0	Setpoint eng. speed values (6 variants ∗) Perm, values: 0 = Only variable speed governing 1 = Switching betw. eng. speeds 1 and 2 2 = Switching betw. fixed / variable speed 3, 4 = Switching betw.speed variable / save: (3 = w. setp.speed, 4 = w. actual speed) 5 = two setpoint transmitters
		Ass droop config		0	3	0	Speed droop selection (4 variants∗) Perm, values: 0 = constant speed droop 1 = variable speed droop 2 = switching between speed droop 1 and 2 3 = switching betw.const. / variable speed droop
		Ass governor config		0	6	0	Type of governing (4 variants∗) Perm, values: 0 = Variable-speed governing 1 = Min-max-speed governing 2 = Switching betw.var./min.-max. speed governingx
For the following 14 functions: On = 1, Off = 0							
		BoostPressSim (on/off)		0	1	0	Boost pressure simulation
		BoostPressMeas (on/off)		0	1	1	Boost pressure measurement
		EngSpeed sensor2 (on/off)		0	1	0	Redundant eng. speed sensing
		VehSpeedLimit (on/off)		0	1	1	Veh. speed limit
		CylinderShutoff (on/off)		0	1	1	Overrun cond. with overspeed
		LimpHomeOper		0	1	0	Limp-home upon control rod travel sensor failure
		Torque Indicator(on/off)		0	1	1	Torque computation (off: referred to torque curve, on: torque curve point)
		SAME Output (on/off)		0	1	0	Customer-specific output function
		QuickCurrentDec (on/off)		0	1	0	
		BOSCH EDC inline p. (on/off)		0	1	0	
		TempMonitoring (on/off)		0	1	0	Temperature monitoring
		OilPressMon(on/off)		0	1	0	Oil pressure monitoring



TERMINOLOGY EXPLANATIONS:

Acceler(SWG1): Accelerator pedal sensor (setpoint generator 1), Input 24 FS

Hand throttle(SWG2): Hand throttle potentiometer (setpoint generator 2), Input 20 FS

GENERAL PROCEDURE DURING CALIBRATION PROCESS:

- Select calibration size in upper window.
- Move accelerator pedal/hand throttle potentiometer to desired position.
- "Get value" switch activated: Actuate switch, the calibration value assigned to the position is shown in the editing field.
- "Get value" switch not activated: Enter calibration value in editing field.
- Upload calibration value with "PC->ECU" to ECU.
- Save calibration value with "Save in ECU" in ECU.
- Switch ignition on/off.

EXPLANATION OF FUNCTION SWITCH:

Get value: If the "Get value" switch has been set to activated, you can fetch the calibration value belonging to a pedal position using this switch.

PC->ECU: The calibration value displayed is uploaded to the ECU.

Save in ECU (only applies for EMR): The calibration data are permanently saved in the ECU.

8.1.2 INTERFACE CONFIGURATION WITH ISETUP

On PCs the COM1 interface may be occupied by the mouse. In this case, you should connect the interface to the second serial interface (COM2). You can then configure this port using SETUP in order to communicate with the interface.

PROCEED AS FOLLOWS:

- Call program SETUP.EXE.
- Select the other COM port and confirm with OK..
- Initialization file ISODRV.INI is updated automatically.
- Re-start Windows.

ATTENTION!

- **On many PCs the second serial interface is 25 pole. If this is the case, you should use a hardware adapter (conversion from 25 to 9 poles) when connecting the 9 pole diagnostics interface.**

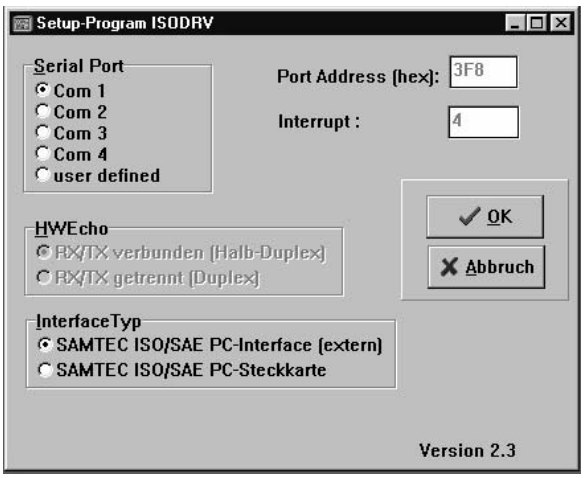


Figure: Help file screen from SETUP.EXE

8.1.3 ACCESS CONFLICTS UNDER WINDOWS 3.1

The interface driver ISODRV.386 can only be loaded statically. You enter the driver ISODRV.386 in Windows file SYSTEM.INI under section [386Enh] (at the same time specifying your current directory). This can result in problems with other application programs occurring that also access the serial interface.

REMEDY:

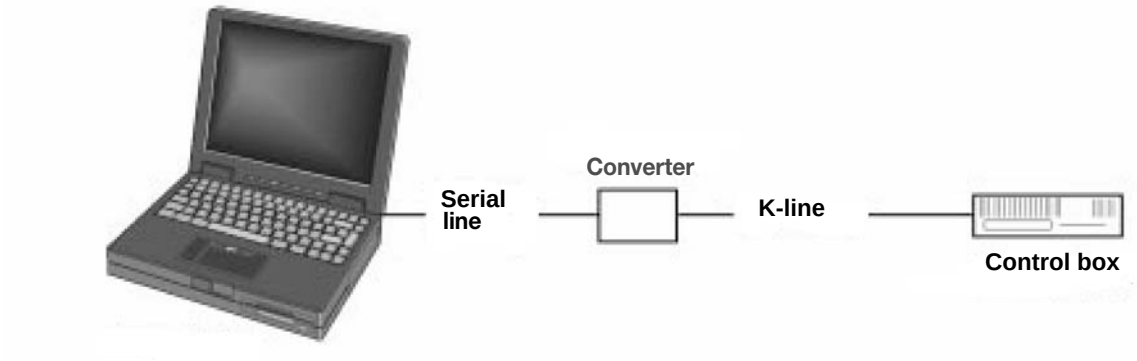
- Call program ISETUP.EXE.
- Delete driver entry from SYSTEM.INI.
- Re-start Windows 3.1.

ACTUATOR/ECU COMPATIBILITY

ECU Part No.	Software version No. EMR	Corresponding actuator, P/N	What to do if the actuator fails
0211 1846		0211 1841	If you are replacing parts, this combination must be replaced in its entirety by the combination 0211 1911 / 0211 1910. Please consult head office before proceeding further.
0211 1910		0211 1911	
0211 2017 < K 953 430	1,08 1,11	0211 1926	The actuator is identical with 0211 1911 as far as contents are concerned. Only the casing securing method is different.
0211 2088	1,10	0211 1926	

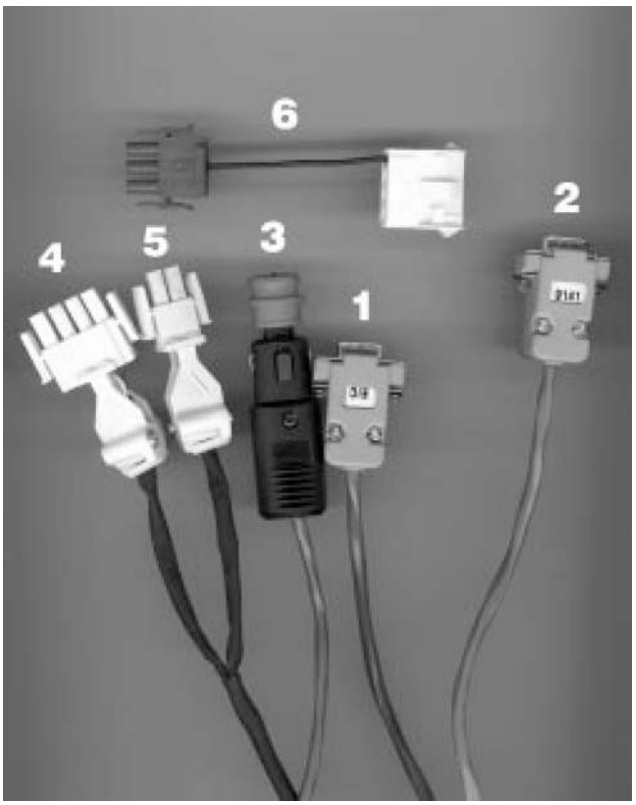
- Re-connect to the ECU and switch on engine.
- Using SERDIA, under the menu "Parameters"->"Configuration" use the button "PC->ECU" to transfer the parameters to the EMR and test the engine for correct running.
- If the engine is running properly, save the parameters in the EC.
- When you have completed the tests with SERDIA, delete the error memory.
- In the SERDIA main menu, print out the list for ECU identification and under "Extras" print out the logistics data, to serve as documentation.
- You must send the old actuator to head office together with the documentation.

1.2 HARDWARE REQUIREMENTS



Hardware Setup

1.2.1 INTERFACE CABLE (SERIAL)



The depicted interface cable is plugged into the serial interface (COM 1 or COM 2) of the computer and connected with the corresponding connectors of the adapter cable.

1 - Plug (designation ”EIC”) for connection to the serial interface (RS 232) at the computer for diagnosis INFOCENTER.
2 - Plug (designation ”9141”) for connection to the serial interface (RS 232) at the computer for diagnosis POWERSHIFT- and POWERSHUTTLE-transmission, AGROTRONIC-hD and spring-suspended front axle.
3 - Plug for 12 V supply of the interface cable for connection to the cigar lighter.
4 - Diagnosis plug for AGROTRONIC-hD, gear box control and spring-suspended front axle, 4-pole.
5 - Diagnosis plug for INFOCENTER, 2-pole.
6 - Adapter for diagnosis POWERSHIFT transmission, old version.

- **Diagnosis > HEX data display**
  This menu item is not relevant for diagnosis, as only internal data in hexadecimal notation is displayed here.
  On selection of the menu item HEX data display the window shown below appears, in which the user can enter up to four hexadecimal addresses.

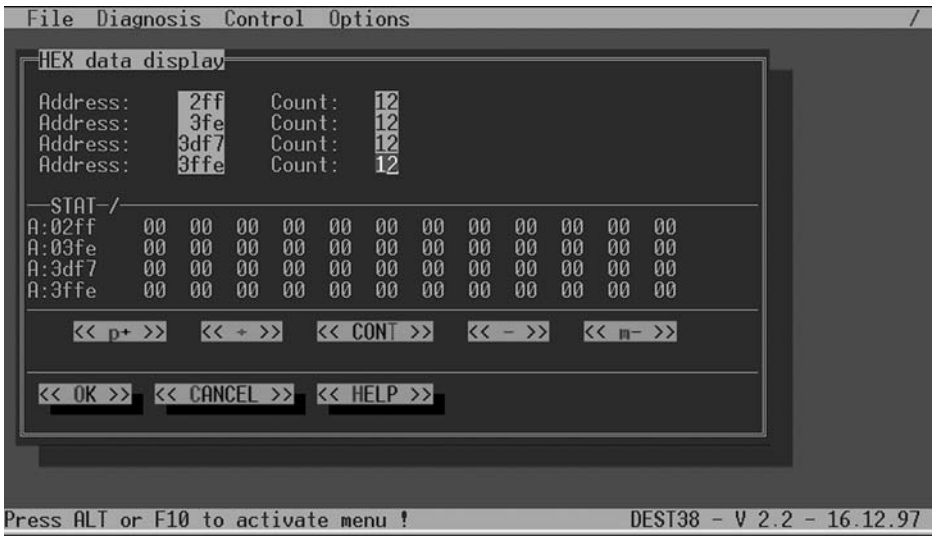


Fig. 10 - HEX data display

In addition to the address data the user has to enter the number of bytes (maximum 13) he wants to read at this start address. On confirmation with OK their contents are dumped on the screen.

With << + >> / << - >> the start addresses are incremented resp. decremented by one.

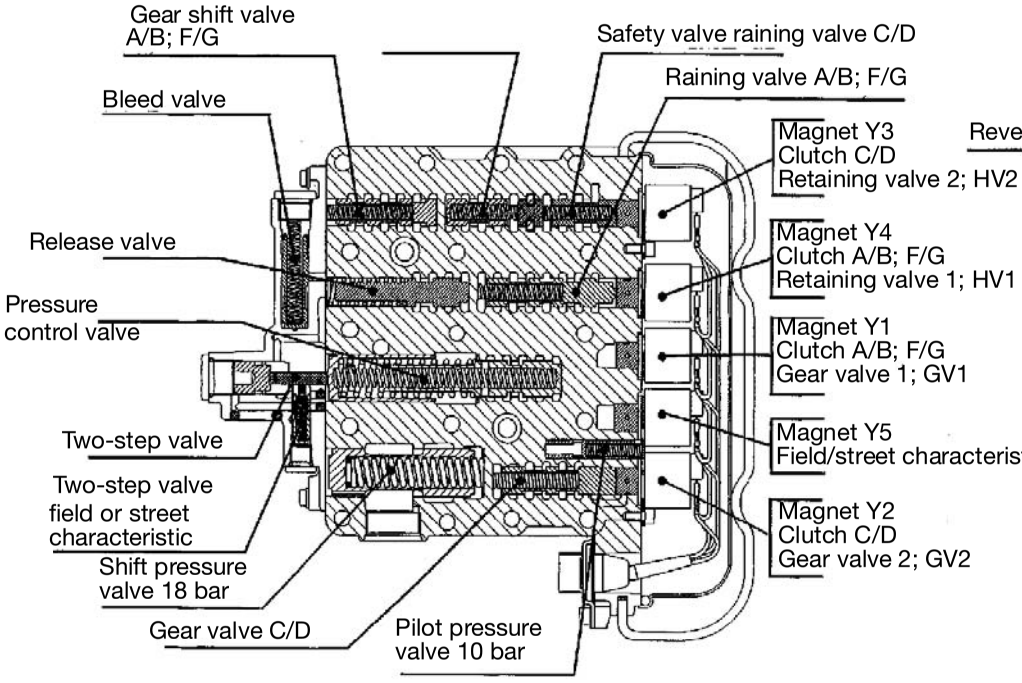
With << ++ >> / << — >> the start addresses are increased resp. decreased by 13 (decimal).

With << CONT >> the contents are read continually. Selection of this button causes the label to change to "<< STAT >>". Reselection toggles again. Pressing the key ESC or ALT + C quits this menu item.

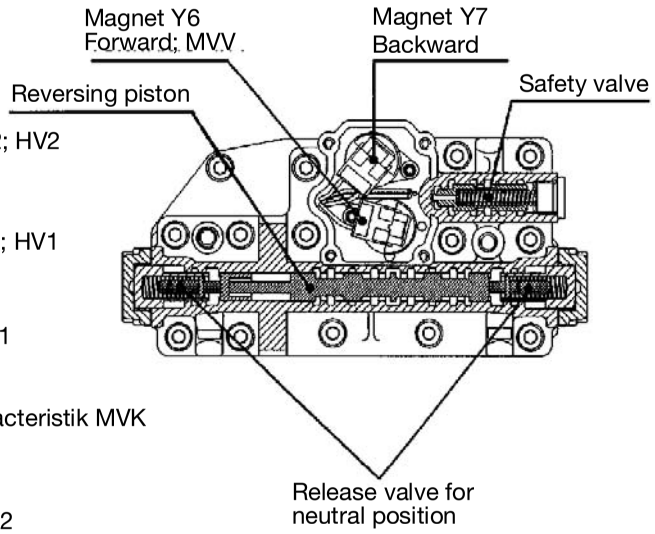
3.4 ERROR CODE LIST WITH DESCRIPTION

Code	Type of error/location	Possible error cause	Possible remedy	System reaction	Remarks
10	system pressure 18 bar	oil pressure switch defective (does not open) KM system pressure defective	check switch check cabling check system pressure	warning lamp is lighting pressure	Only diagnosed if Nmot > 2,55 sec over 1000 rpm; switch opens on
20	temperature sensor	LU, KM, K+ temperature sensor defective multiple error	check cabling check temperature sensor Check sensor Nlsa cabling check clutch sensor	Default: cold clutch hold time, filling time only field characteristic on K+: permanent neutral, permanent beep	in case of AMUX overdrive: permanent neutral
30	engine load signal	LU, KM, K+ engine load signal faulty wrong configuration on end-of-line programming	check cabling check engine load signal del motore (300 Hz, 5-95% pulse width)	field characteristic substitution torque	reserved, as no engine load signal is existing Observe configuration on end-of-line programming!
80		–	–	–	reserved for further digital output, LU, KM
81	transfer valve 1 LU, KM	LU, KM valve faulty	check cabling check valve	powershift blocked	LU, KM is diagnosed if valve is switched off
82	transfer valve 2 LU, KM	LU, KM valve faulty	check cabling check valve	powershift blocked	LU, KM is diagnosed if valve is switched off
81	characteristic line valve LU, KM	LU, KM valve faulty	check cabling check valve	powershift blocked	only forr T7200 LU, KM is diagnosed if valve is switched off
82	warning lam (oil pressure, overspeed)	LU, KM lamp defective	check cabling check lamp	–	LU, KM can only be diagnosed when system is switched on LU, KM diagnosis depends on vehicle configuration customer: no diag.
90	(LU, KM)	–	–	–	(LU, KM) reserved for further digital output, K+

3.8 ELECTRO-HYDRAULIC GEAR SHIFT T-7200 / T-7300



4-GEAR POWERSHIFT CONTROL UNIT



FORWARD-BACKWARD CONTROL BLOCK

- **<< INTERNAL >> Internal variables**
  Upon selecting << INTERNAL >> a list of the "internal variables" appears on the right side of the screen together with their values and physical units. All displayed values are calculated by the E-box.
-

Fig. 31 - Internal variables

HK pressure Pressure at the main clutch (calculated by means of measuring the current which flows to the proportional valve)

HK contact pres Contact pressure of the main clutch evaluated during end-of-line programming

HK pedal position Position of the clutch pedal (calculated from the voltage level of the angle sensor at the clutch pedal)

- **Diagnosis > Set output ports**

CAUTION!

- **Due to safety reasons this menu item can only be selected when the engine has stopped!**
- **If the menu item "End-of-line programming" has been previously executed the ignition on the vehicle needs to be switched off and on again once. Otherwise the digital outputs cannot be activated!**

Fig. 32 - Select output ports

4.3 ERROR CODES POWER-SHUTTLE /DEST 45

Legend error code list T7x00 V/R-auto EST 45

Validity: V410 (IV) version

General

In case of a multiple error only the error code with the highest external error number will be displayed on the screen. Simultaneously the error symbol ”wrench” appears on the display. The external error numbers are sorted according to the severity of the required reaction upon an error.

Rough sub-division of the external error number

0 ...9 reserved for operation indications

10 ...99 Operation mode normal, operation mode stand-by strategy, operation mode limp home, operation mode emergency operation, operation mode vehicle shut-down (except for EE), operation mode permanent neutral

Abbreviations

- LU Line interruption
- KM Short circuit to ground
- K+ Short circuit to vehicle electrical system plus general
- Nmot Speed at powershift gear input (=nLSE)
- nLSA Speed at powershift gear output
- nHK Speed at main clutch output
- nAB Speed at output, ground speed
- HK Main clutch
- HKPed Main clutch pedal
- ED Digital input
- EU Analog input voltage (U)
- ER Analog input resistance (R)
- EF Frequency input (F)
- AU Voltage output (U) (plus supply sensor system)
- VMG Ground supply transmitter (sensor system)
- VMGA Ground supply transmitter analog (sensor system)
- ADM Digital output ground
- AIP Current output (I) proportional
- VPS Plus supply (actuator system)

Code	Error location/error cause	System reaction	possible remedy	Remarks
89	VPS1 plausibility (KM, K+)	Neutral shifting Operation mode SHUT DOWN VEHICLE	Check cabling (KM, K+) Check voltage at VPS 1 Check voltage at term30 Check cabling delle valvole F/R (K+)	• Self preservation • Upon neutral shifting permanent beep • EC also defective with term30 • LU VPS can also lead to sequence errors F-/R-/prop.-SV) • Possibly sequence error resulting from counter supply (K+) at F/R valve upon power on • Possibly sequence error from LU proportional valve • Possibly sequence error from: Safety processor not programmed
90	VPS2 plausibility (KM, K+)	Neutral shifting Operation mode PERMANENT NEUTRAL	Check cabling (KM, K+) Check voltage at VPS 2 Check voltage at term30 Check cabling di GV/HV/MVKI (K+)	• Self preservation • Upon neutral shifting permanent beep • EC also defective with term30 • LU VPS2 can only be detected via sequence errors • Possibly sequence error resulting from counter supply (K+) at GV/HV/MVKI upon power on • Possibly sequence error from: Safety processor not programmed
91	HK plausibility circuit	Neutral shifting Operation mode SHUT DOWN VEHICLE	Engage/disengage creep speed lever Check cabling at proportional valve (K+) Check proportional valve Check HK Check speed sensory system Nlsa, Nhk Check hydraulic system	•HK plausibility only if configured •Self preservation •Plausibility circuit: Nisa-HK-Nhk •For T72 creep speed lever Position”N” is possible!
92	Vehicle electrical system overvoltage	Neutral shifting Operation mode SHUT DOWN VEHICLE	Ignition off/on Check vehicle electrical system Check cabling	

5. AGROTRONIC-HD + ASM

As a preparatory measure the connection between tractor (E-box) and computer needs to be established so as to check the Agrotronic-hD + ASM resp. to calibrate the valves. The interface cable and the adapter cable are serving for this purpose (see figure).

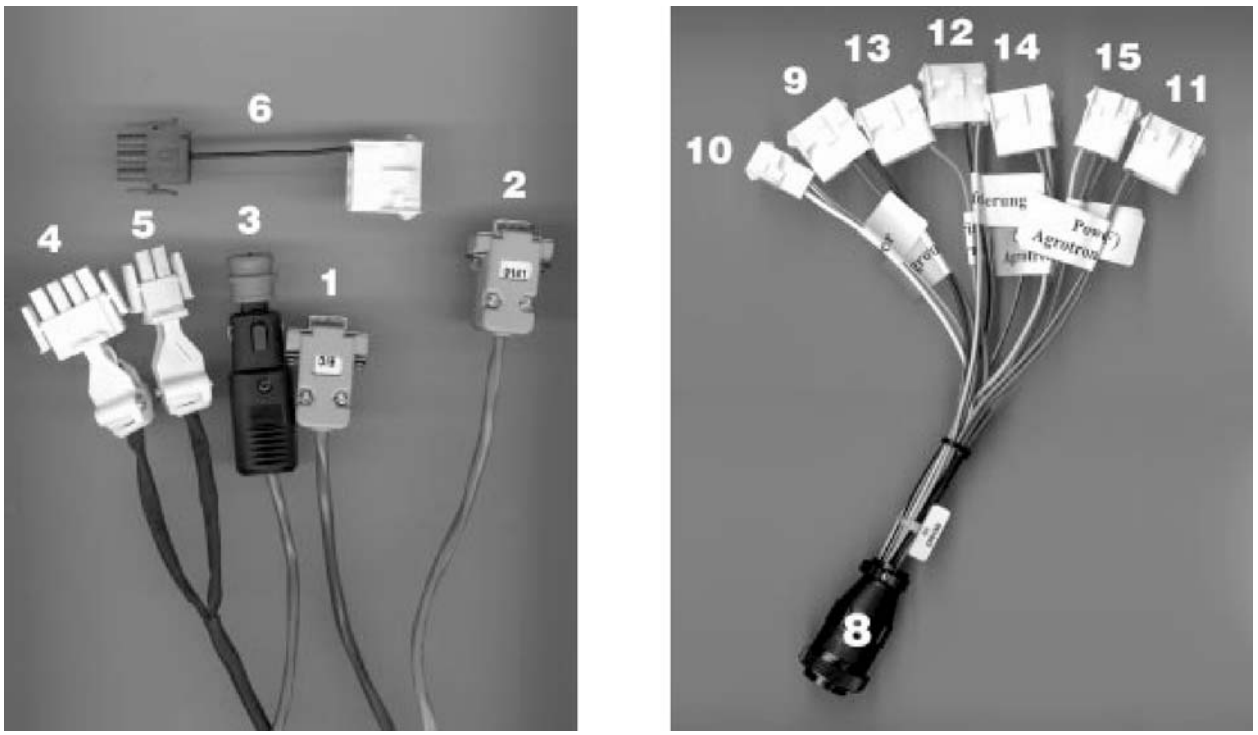


Fig. 45 - Interface cable and adapter cable

- Connect plug (2) of the interface cable with the designation ”9141” to the computer (COM interface)
- Connect plug (3) of the interface cable for the 12 V supply to the cigar lighter
- Connect the 4-pole plug (4) of the interface cable to the plug (9) – designation ”Agrotronic-hD” – of the adapter cable
- Insert the central plug (8) of the adapter cable into the central diagnosis interface in the fuse box
- Switch on ignition and start the motor
- Start the computer and call the EDS program (compare item A 1.3 – Launching and terminating of the EDS program)
- Make sure that the right option is called in the initial menu:
  Opzione 2 -> plug (2) with the designation ”9141” to interface **COM 1**
  Opzione 3 -> plug (2) with the designation ”9141” to interface **COM 2**

NOTE. Agrotron tractors with the vehicle identification numbers up to 80xx 1999 (i.e. green cabin) usually are not equipped with a central diagnosis interface.

To be able to check the Agrotronic-hD however, with these tractors it is necessary to connect the 4-pole plug (4) of the interface cable directly with the 4-pole diagnosis terminal of the hydraulic system. The diagnosis terminal is located in the cabin at the rear on the right side under the floor mat, resp. in the right panelling (close to the E-box).

5.2.4 NON-CRITICAL ERRORS

Error code	Short description	Error description
31	Draft sensor right	Signal not OK. - Wire breakage - Draft sensor not connected - Short circuit or short circuit to ground - Draft sensor has been overloaded
32	Draft sensor left	Signal not OK. - Wire breakage - Draft sensor not connected - Short circuit or short circuit to ground - Draft sensor has been overloaded
34	Lower rate (Lowering speed control)	Signal not OK - Wire breakage or potentiometer not connected
36	Intermix (Function selector knob)	Signal not OK. - Wire breakage or potentiometer not connected
37	Main control valve unit	Despite of current flowing through the solenoid for lifting the hoisting unit is not lifting within 30 sec because. - the oil supply for the control drive unit is not OK - the control drive unit became stuck
41	True ground speed (RADAR)	Signal not OK. - Error only occurs when the traction control is switched on.
42	Indicated (theoretical) ground	Signal not OK. - speed Error only occurs when the traction control is switched on. **CAUTION**: If both speed signals are not OK no error will be indicated, as this state is normal upon standstill of the tractor.
44	External sensor	Signal not OK or short circuit to power supply voltage.
45	Output signal to front axle drive relay	Signal not OK. Wire breakage or short circuit
46	Output signal to solenoid valve differential lock	Signal not OK. Wire breakage or short circuit
51	Calibration lifting solenoid	Calibration not carried out correctly.
52	Calibration lowering solenoid	Calibration not carried out correctly.

The values of charge control and terminal 15 reference will change when the engine is running:

Check analog inputs:

0	Tank	11,4%	analog value
1	Temperature	100%	analog value
2	Charge control	100%	analog value
3	Terminal 15 reference	13,7 Volt	terminal 15 voltage

- **Analog inputs > Tank**
  The signal of the tank transducer at plug X 131, pin 13 of the INFOCENTER is tested: The indicated % value corresponds to the actual tank level. It is the percentage of the existing terminal 15 reference. When the plug is pulled off from the tank transducer 100% will be indicated.

- **Analog inputs > Temperature**
  The signal of the temperature sensor (engine coolant) at plug X 131, pin 15 of the INFO-CENTER is tested. The relation between the input signal and the reference voltage terminal 15 is indicated in %.

- **Analog inputs > Charge control**
  The signal of the charge control for the electric generator at plug X 131, pin 7 of the INFO-CENTER is tested. When the engine is running a display of 100% indicates proper charging by the electric generator.

- **Analog inputs > Terminal 15 reference**
  The power supply on terminal 15 at plug X 130, pin 2 of the INFOCENTER is tested. The indication 13,7 V is the actual operating voltage.

Press the ENTER key to return to the TEST MODE.

TEST MODE > F6 POINTER

Upon pressing the key F6 the following window appears: The cursor is flashing behind “engine speed angle”. Engine speed angle signifies Revolution Counter Angle.

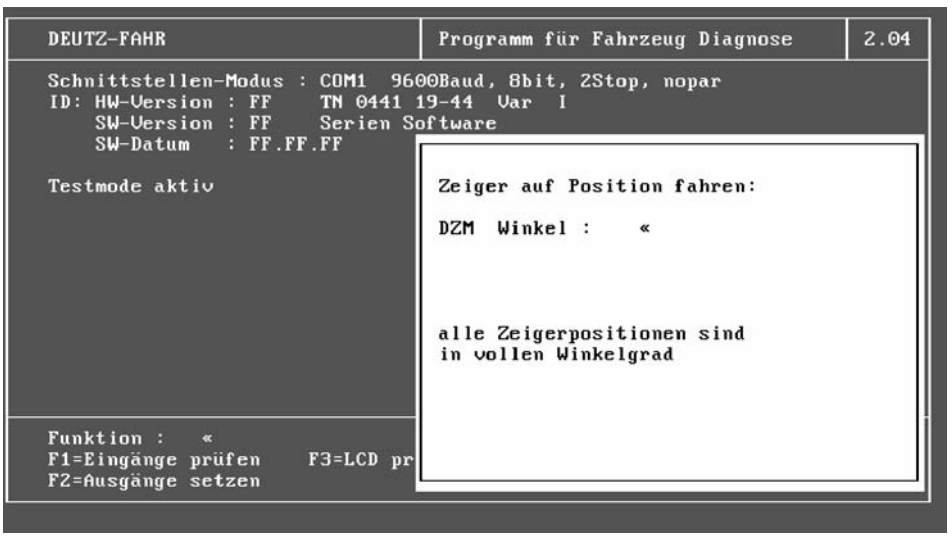


Fig. 60 - Move pointer to position

- **Pointer > Engine speed angle**
  Enter an angle, e.g. 180.
  - Display: DZM angle 180 <<
  After pressing the ENTER key the pointer of the engine speed indication will move from its 0 position by 180 (to about 1900 rpm).

7.1.5 CLEAR CONTROLLER ERROR

All errors saved in the control box are erased.

Fig. 69 - Clear Controller Errors

7.1.6 RELOAD EEPROM WITH DEFAULT

By means of this menu the parameters (standard data) are written into the control box, e.g. upon replacement or data loss of the control box (for the list of parameters refer to submenu item 2.3 in this manual). The parameters are permanently saved in the program EDS and cannot be altered.

Fig. 70 - Reload EEPROM with Defaults

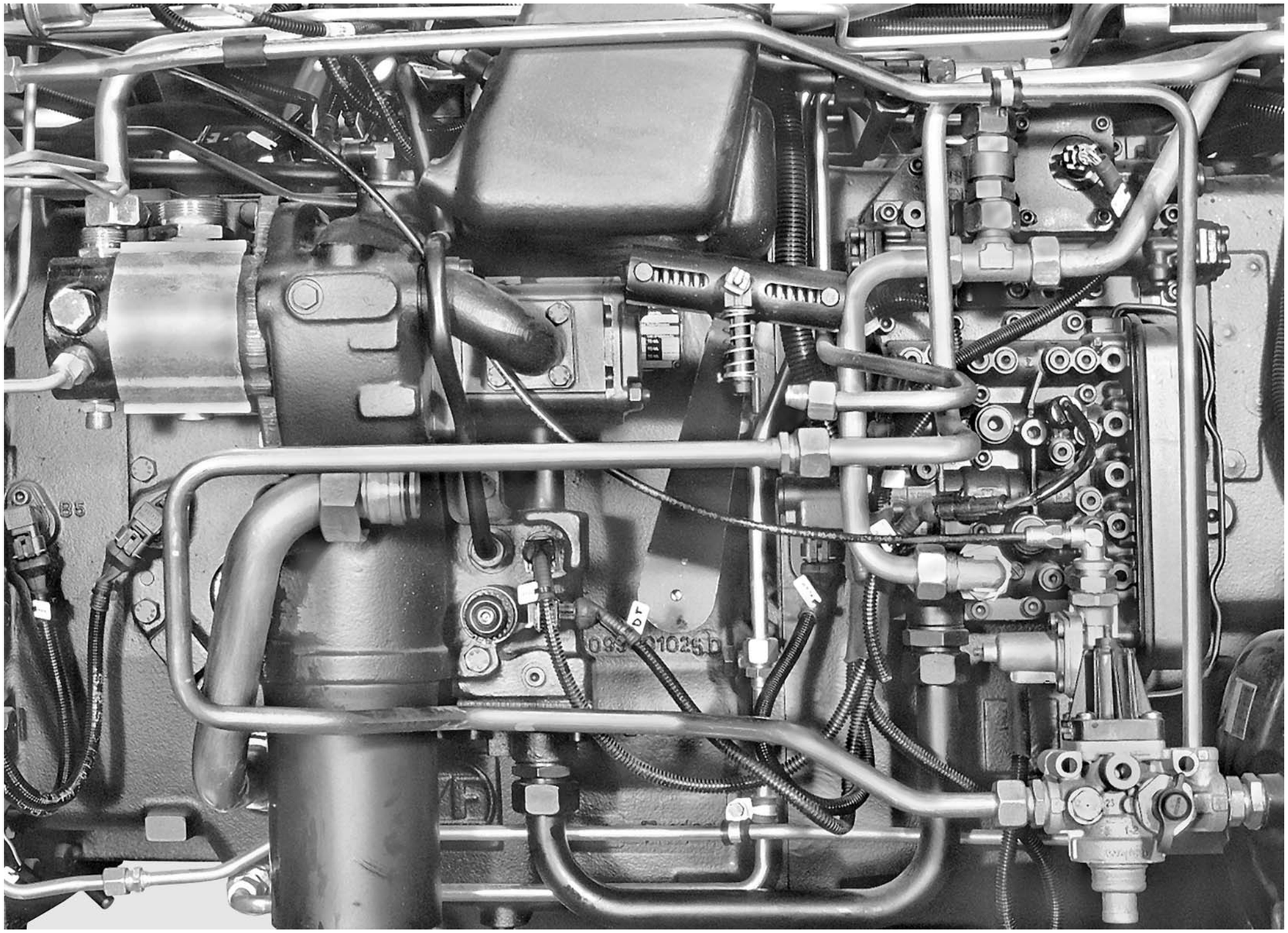
7.1.7 CALIBRATE SENSOR

This menu item is not executable. The position sensor setting is carried out upon lowered axle by means of corresponding adjustment in the support to 1,8 – 1,9 Volt.

7.1.8 QUIT

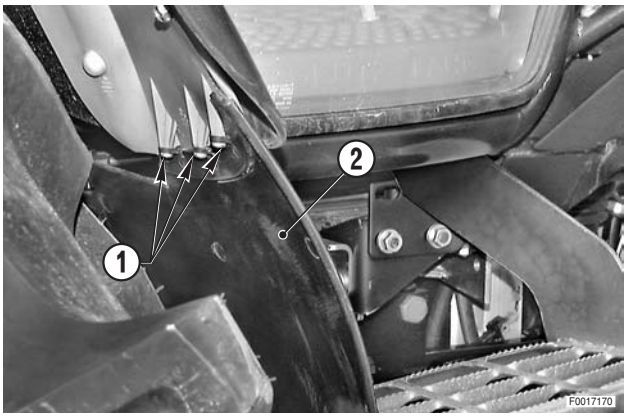
The diagnosis program of the spring-suspended front axle is terminated and the EDS initial menu reappears.

DETAIL OF PUMP SIDE SYSTEMS AND WIRING (CC VERSION WITH PRIORITY VALVE)

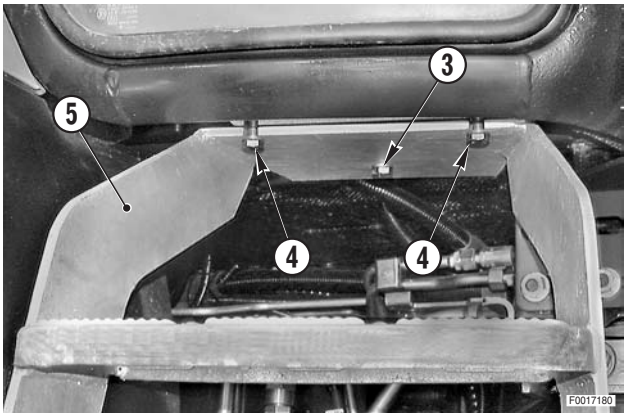


REMOVAL OF THE CAB ACCESS STEPS

1 - Unscrew and remove the bolts (1) securing the lower fender (2).



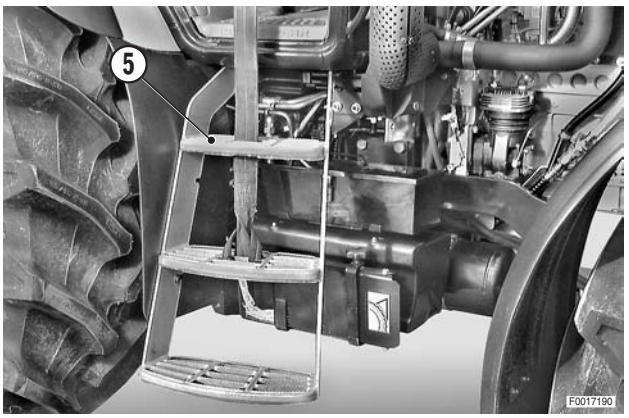
2 - Loosen the bolts (3) and (4) securing the steps (5).
★ For safety reasons, do not remove the bolts yet.



3 - Attach a hoist to the steps (5).

kg Steps: 17 kg (37.5 lb.)

4 - Remove the central bolt (3), disengage the steps (5) from the two remaining bolts (4) and remove the steps.



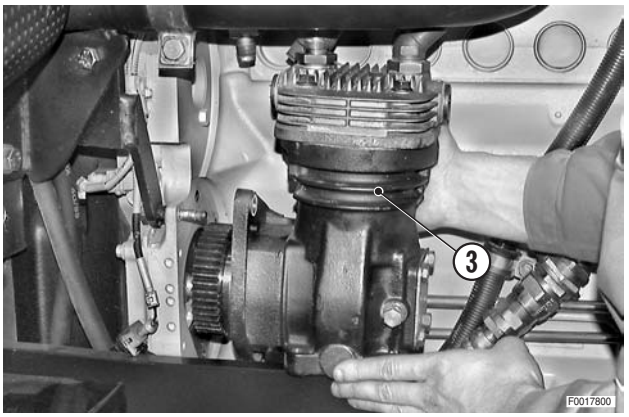
REFITTING THE CAB ACCESS STEPS

- Refitting is the reverse of removal.

7 - Remove the compressor (3) complete with the O-ring seal (15).

※ 1

kg Compressor: 12 kg (26.4 lb.)



REFITTING THE AIR COMPRESSOR

- Refitting is the reverse of removal.

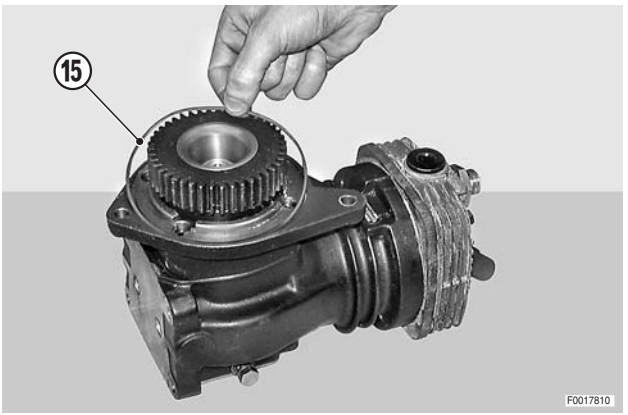
⚠ If the oil has been drained from the compressor crankcase, add engine oil before re-connecting the lube pipe.

Quantity of lubricating oil:
approximately 100 g (0.220 lb.)

※ 1

★ Check the condition of the O-ring (15).

★ Apply grease to the seating to hold the O-ring (15) in position.



After flushing, the moisture-free oil recovered during the discharging operation must be re-introduced into the system, followed by the refrigerant.

Quantity of refrigerant (R134a):

Mod.	106	110	115	120	135	150	165
g	1600	1600	1600	1600	1600	1600	1950
oz.	56.4	56.4	56.4	56.4	56.4	56.4	68.74

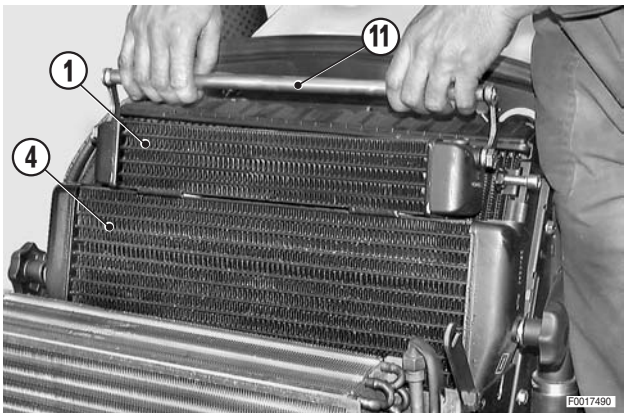
Quantity of oil: the quantity recovered.

If the system has to be discharged and flushed in order to renew a system component, the quantity of oil in the replaced component must be measured and the same amount of new oil must added to that recovered with the refrigerant.

For details of the oil and refrigerant recharging procedure, refer to the instructions supplied with the service machine.

6 - Remove the cooler assembly (1), (4) by pulling the handle (11) upwards.

⚠ Keep the coolers vertical to prevent spillage of oil/fuel.

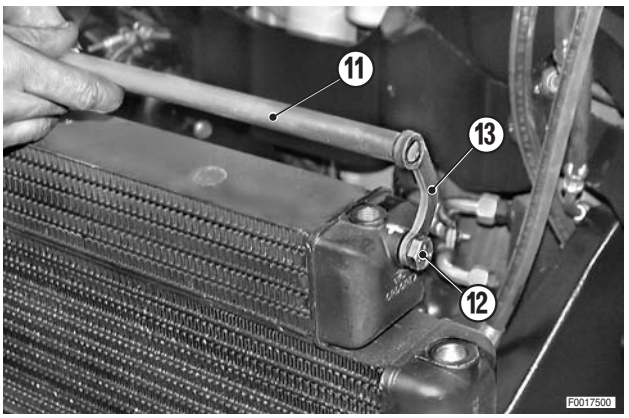


7 - **Only if the assembly is to be renewed:**

a - Draw off the fuel and oil from the coolers.

b - Recover the pivot bolts (12), the brackets (13) and the handle (11) and fit to the new assembly.

※ 1



REFITTING THE GEARBOX OIL/ FUEL COOLERS

- Refitting is the reverse of removal.

※ 1

Bracket retaining bolts: Loctite 222

1 - Start the engine and allow the gearbox oil and fuel to circulate for about 5 minutes to fill the coolers; check the seals and fittings for leaks.

2 - Stop the engine and check the gearbox oil level; top up, if necessary.

⚠ This operation is essential if new coolers have been fitted.

REMOVAL OF THE FAN (Model 165 CV)

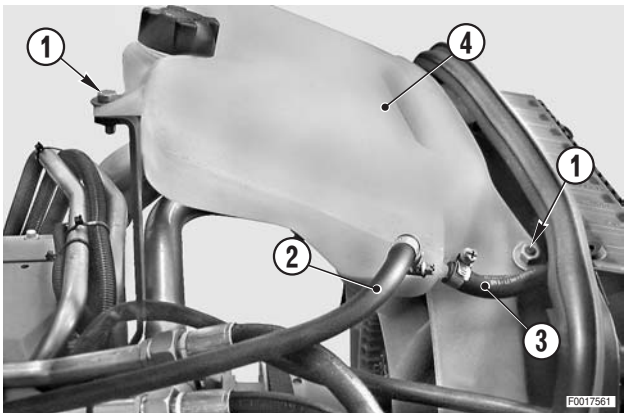
⚠ Remove the battery cover and disconnect the negative battery lead (–).

1 - Remove the side panels, the lamp assemblies and lower grille.
(For details, see «REMOVAL OF THE HOOD AND SIDE PANELS»).

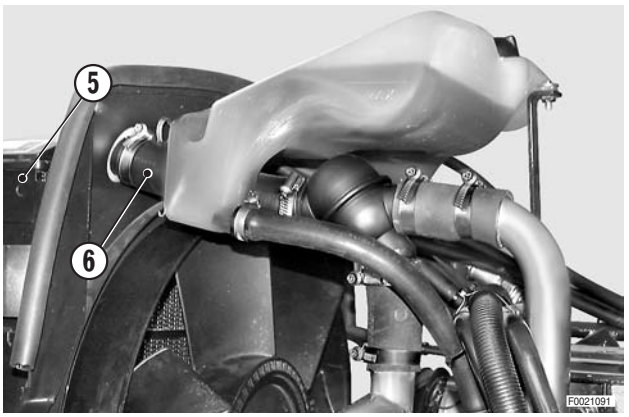
2 - Drain the engine cooling system.

Coolant: 23 ℓ (6.07 US.gall.)

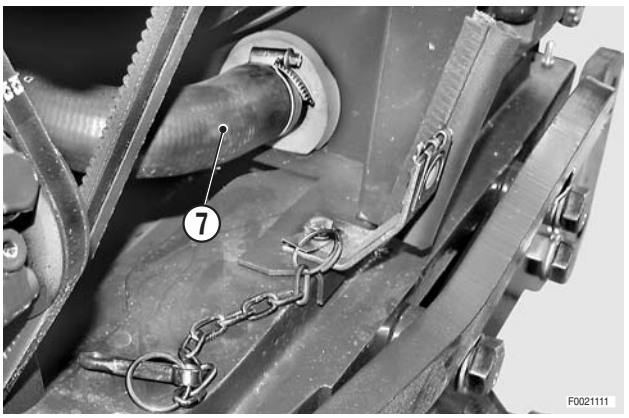
3 - Disconnect the expansion tank (4) from the mechanical fixings (1) and from the pipes (2), (3) on the right-hand side.



4 - Disconnect the upper hoses (6) from the radiator assembly (5).

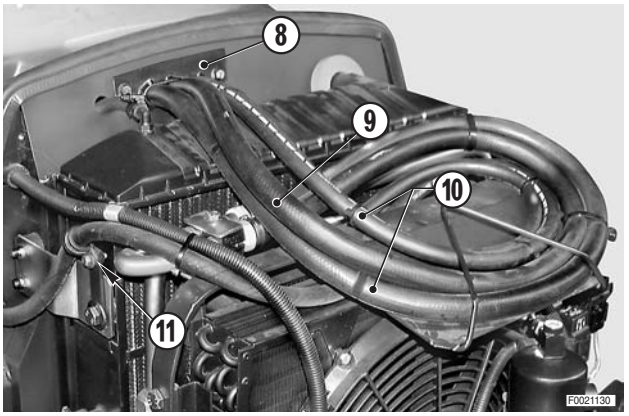


5 - Disconnect the lower hose (7) from the radiator assembly.

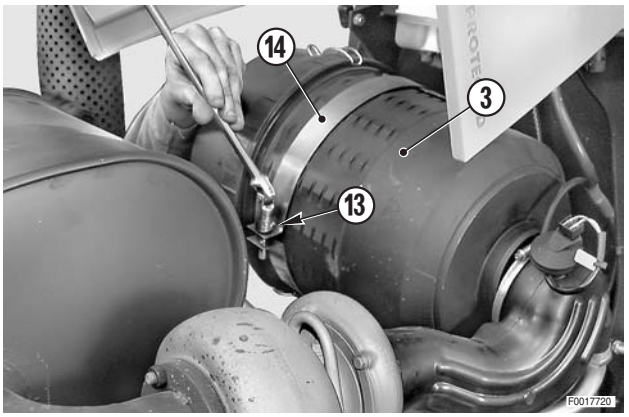


6 - Undo and remove the guide (8) for the pipes (9) and (10).

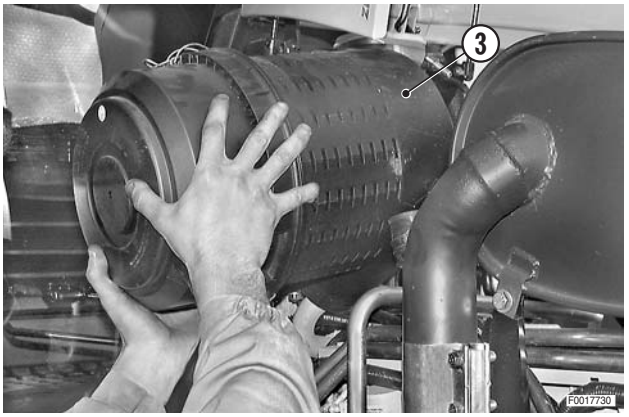
7 - Loosen the screw (11) and release the wiring clip.



7 - Slacken off the screw (13) of the air cleaner (3) retaining strap (14).



8 - Remove the complete air cleaner assembly (3).



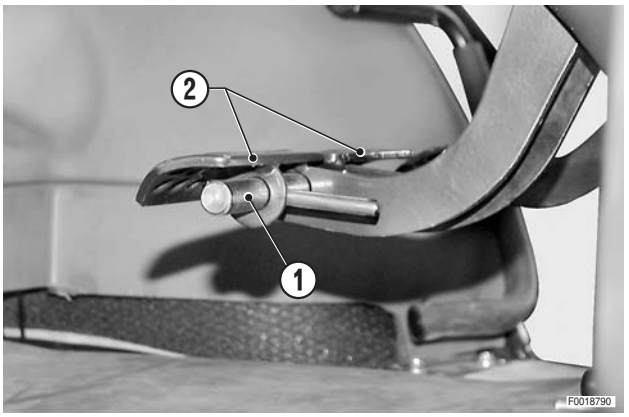
REFITTING THE AIR CLEANER

- Refitting is the reverse of removal.
  - ★ Check that all the hose clamps are fully tightened.

ADJUSTMENT OF THE BRAKE LIGHT SWITCHES

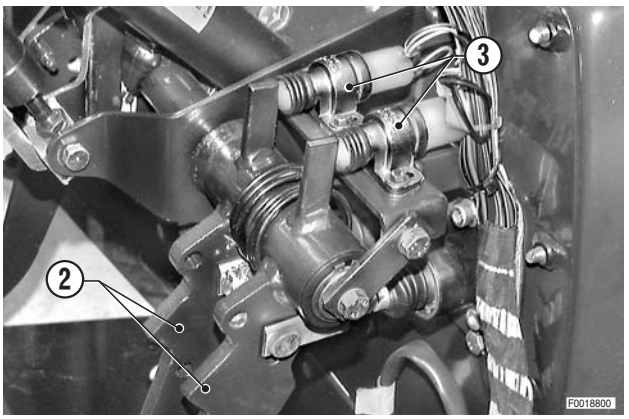
★ The switch for each pedal is adjusted separately.

1 - Check that the pedal latch pin (1) slides freely to connect and disconnect the two pedals (2).

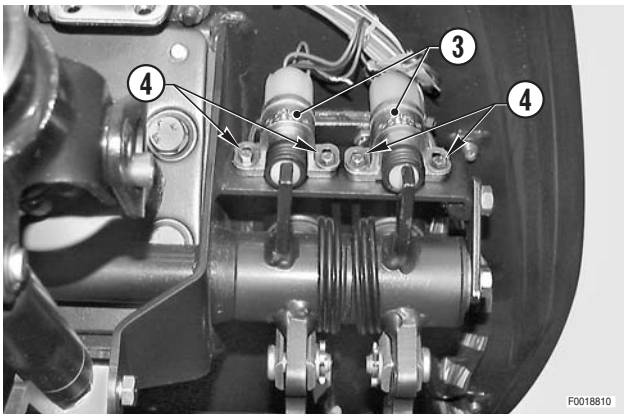


2 -Force the pedals (2) upwards and check that the brake light switches (3) have an extra opening travel of 1±0.2 mm (0.04±0.008 in.).

★ This extra travel protects the switches from impacts at the end of travel caused by sudden release of the pedals.

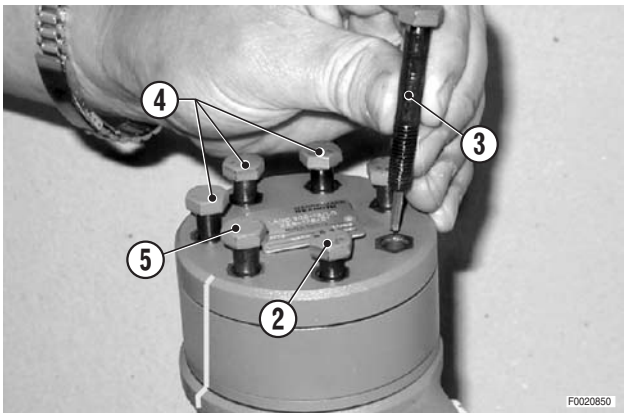


3 - If the switches (3) do not have this extra travel, loosen the screws (4) so that they just grip the switch; move the switch towards the front of the tractor and tighten down the screws (4) to fix it in position.



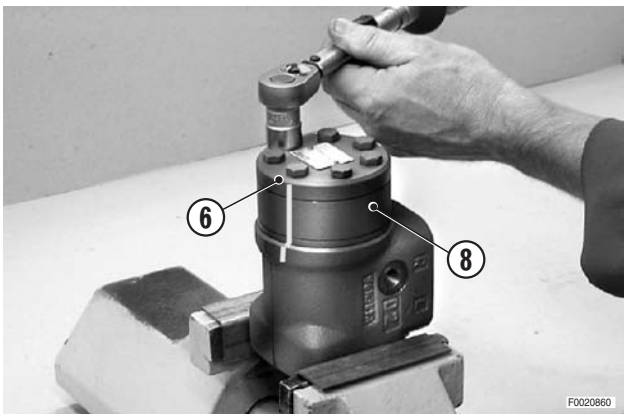
11 - Insert the screws (2), (3), (4), (5) following the indications in the exploded view.

★ Screw (3) must be installed in the position in correspondence to the ball valve (17).

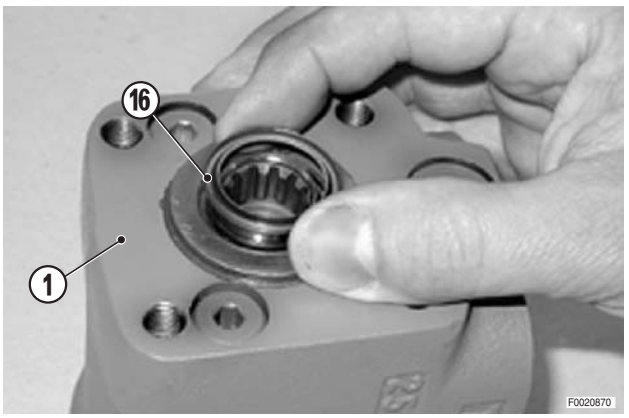


12 - Tighten down the cover screws (6) and the metering unit (8) in a cross-wise sequence.

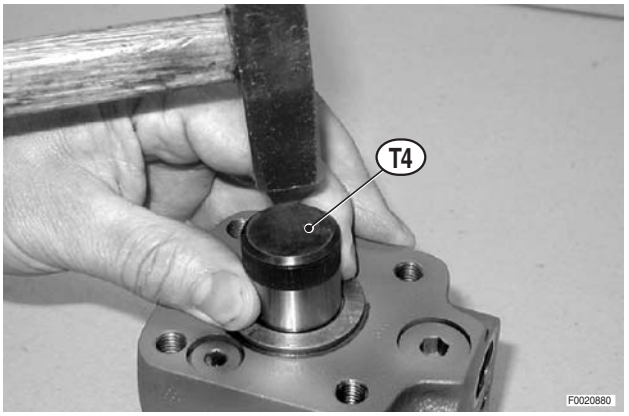
Nm Screws: 30±3 Nm (22±2 lb.ft.)



13 - Turn the power steering unit over; locate the dust seal (16) on the housing (1) with seal lip facing upwards.



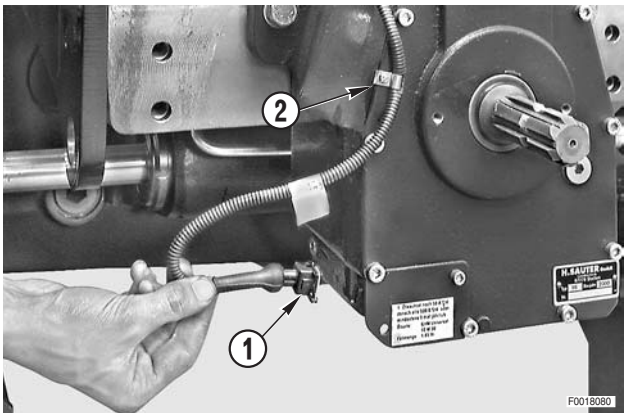
14 - Using the tool **T4** (code 00239499), and a hammer, drive the dust seal home without using excessive force.



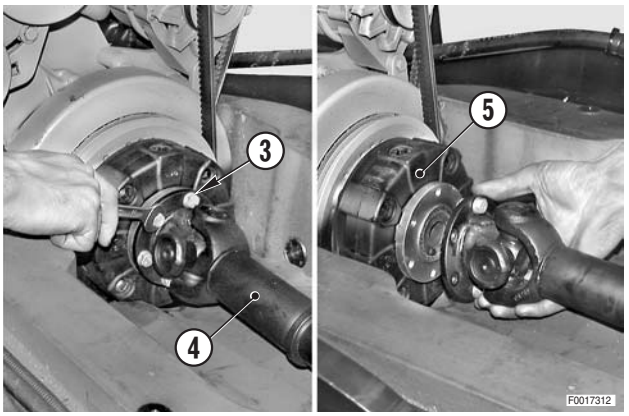
REMOVAL OF THE FRONT PTO ASSEMBLY

1 - Remove the front lift assembly.
(For details, see «REMOVAL OF THE FRONT LIFT ASSEMBLY»)

2 - Unplug the connector (1) and release the wiring from the clip (2).



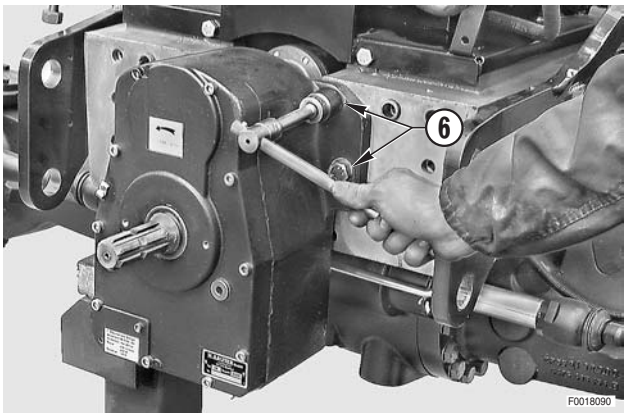
3 - Fully unscrew the bolts (3) securing the cardan shaft (4) to the flexible coupling (5) and detach the flange.



4 - Unscrew the four bolts (6) but only remove the two lower bolts.

★ Leave the two upper bolts in position for safety.

※ 1

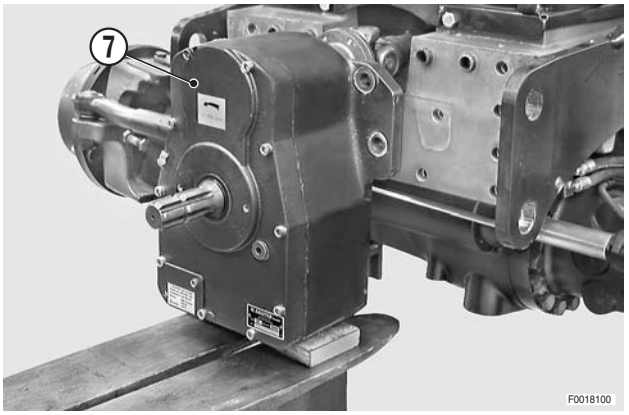


5 - Fit a non-slip block to a trolley jack; position the non-slip block under the PTO assembly.

6 - Remove the two upper bolts previously left for safety and remove the PTO assembly (7) while supporting the cardan shaft (4).

★ If neccessary, use a lever to help separate the assembly from the tractor.

kg PTO: 70 kg (154 lb.)



REFITTING THE FRONT PTO ASSEMBLY

- Refitting is the reverse of removal.

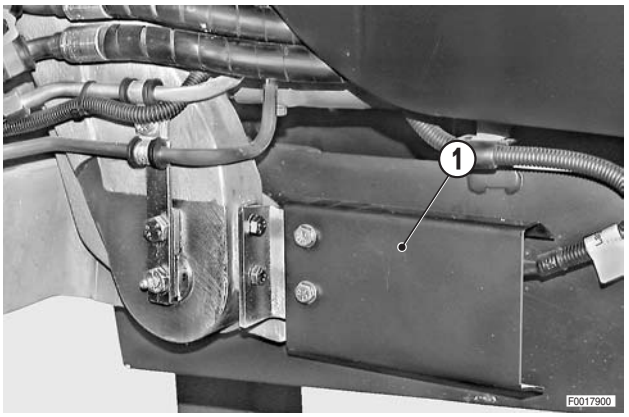
※ 1

Nm Screw: 214 Nm (157.7 lb.ft.)

REMOVAL AND POSITIONING OF THE FRONT SUSPENSION POSITION SENSOR

1. Removal

1 - Remove the cover (1).

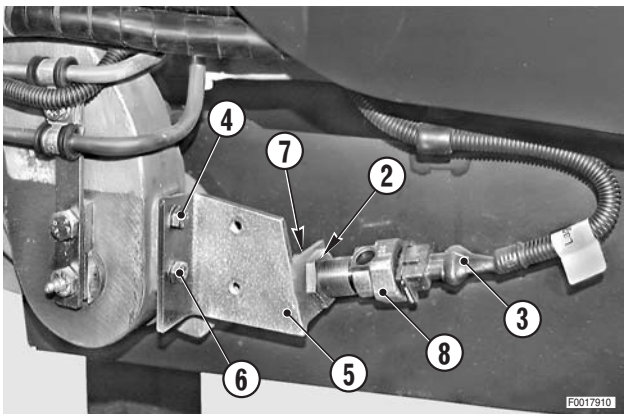


2 - Loosen the rear nut (2).

3 - Unplug the connector (3).

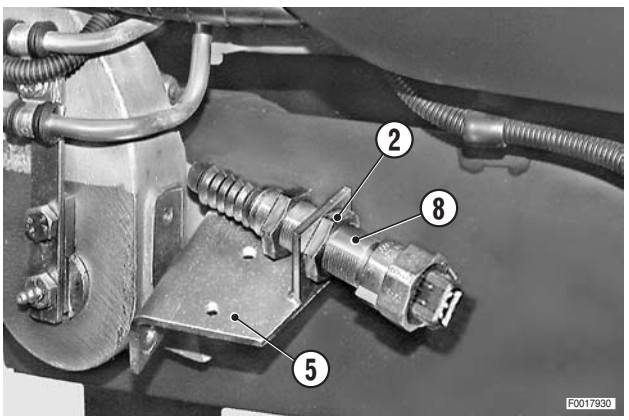
4 - Unscrew and remove the upper retaining bolt (4) of the support (5) and loosen the lower bolt (6); rotate the support (5).

5 - Remove the front nut (7) and remove the sensor (8).



2. Positioning

1 - Start the engine, fully extend the front suspension cylinders and fit the sensor (8) to the support (5) with the front nut (2) fully unscrewed.



2 - Fix the support (5) and push the sensor (8) in the direction "**X**" until the pin (9) is fully retracted.

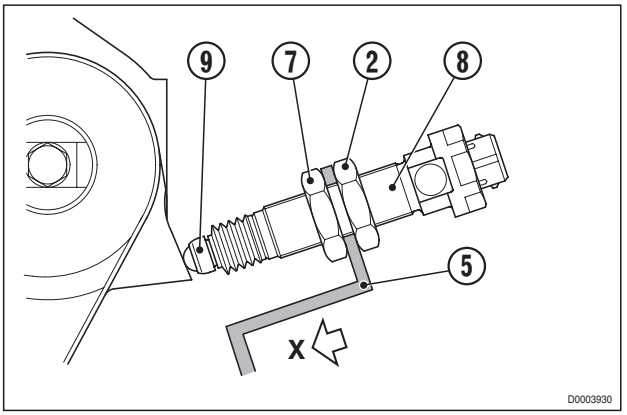
3 - Keeping the pin in this position, screw in the rear nut (2) right up to the support (5).

4 - Screw the front nut (7) up to the support (5).

5 - Back off the nut (7) by one turn and tighten the nut (2) to secure the sensor.

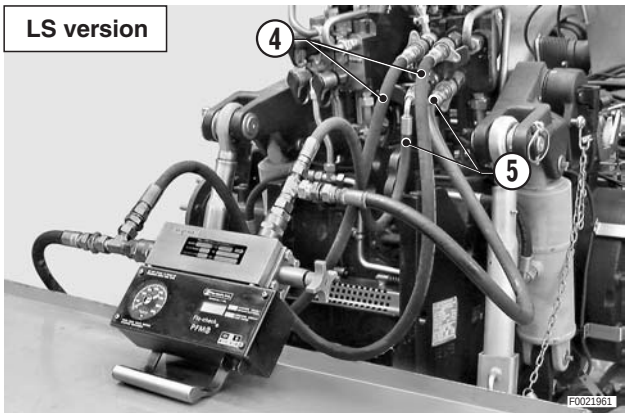
★ This adjustment prevents the possibility of the sensor sustaining impact damage at the end of its travel.

Nm Nuts: 30±6 Nm (22.1±4.4 lb.ft.)



6 - Take the engine revs up to 2300 rpm and repeat the operations in points 2, 3, 4 and 5 also in this condition.

7 - Check the readings taken against the values indicated in the tables below.



CC CIRCUIT

Pressure bar (psi)	Flow rate at 1000 rpm ℓ/min (US.gpm)	Flow rate at 2350 rpm ℓ/min (US.gpm)
50 (725)	32.0 (8.45)	76.0 (20.08)
100 (1450.3)	31.5 (8.32)	75.0 (19.82)
150 (2175.5)	31.0 (8.19)	73.5 (19.42)

LS CIRCUIT

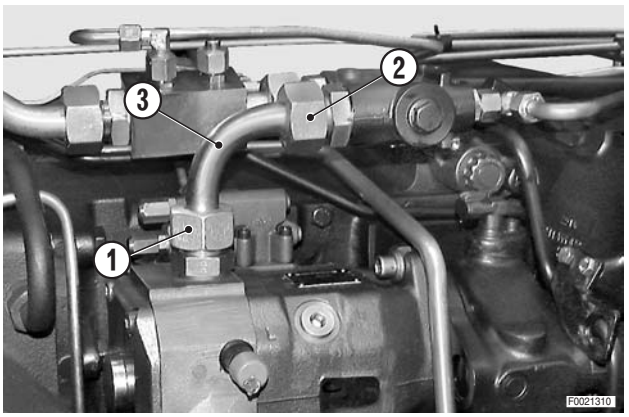
Pressure bar (psi)	Flow rate at 1000 rpm ℓ/min (US.gpm)	Flow rate at 2350 rpm ℓ/min (US.gpm)
50 (725)	44.5 (11.76)	107 (28.27)
100 (1450.3)	44.0 (11.62)	106 (28.00)
150 (2175.5)	43.5 (11.50)	104 (27.48)

REMOVAL OF THE PRIORITY VALVE (Modd. 120-165 CV) (..... –>)
(Versions with variable displacement pump)

1 - Remove the right rear wheel.
(For details, see «REMOVAL OF THE REAR WHEELS»).

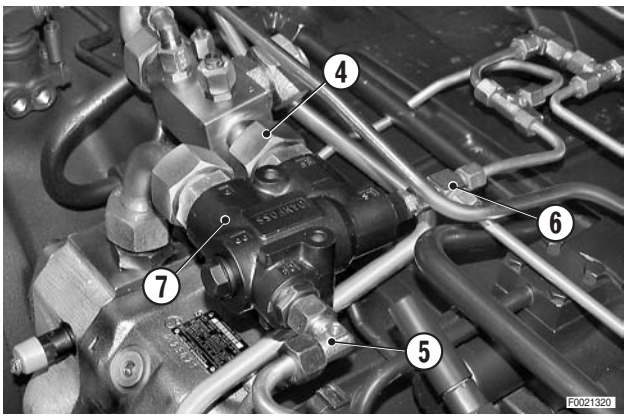
2 - Switch off the engine and thoroughly clean the area around the valve.

3 - Loosen the fittings (1), (2) and remove the pipe (3).
★ Plug the pipes and the open fittings to prevent the entry of contaminants.



4 - Disconnect, in the order given, the return pipe (4), the power steering delivery pipe (5) and the Load Sensing signal pipe (6).

5 - Remove the valve (7).



REFITTING THE PRIORITY VALVE

- Refitting is the reverse of removal.

1 - Start the engine and turn the steering wheel repeatedly to full lock in both directions in order to expel air from the steering system and check for leaks.

ASSEMBLY OF THE AUXILIARY CONTROL VALVE BLOCKS

- Assembly is the reverse of disassembly.

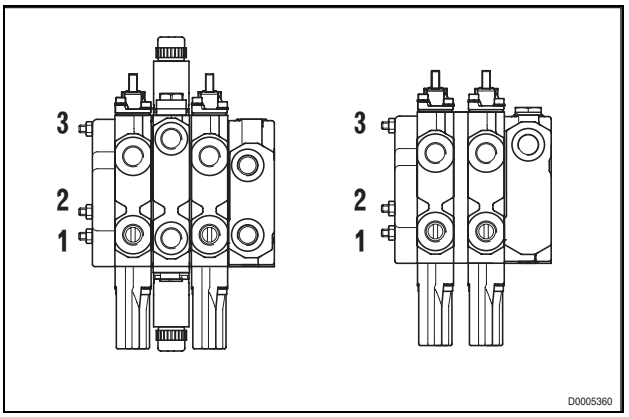
※1

Nm Nut tightening torque:
30±3 Nm (22±2.2 lb.ft.)

★ Nut tightening sequence: 1-2-3
(See drawing)

※2

★ Ensure that the O-ring seals are correctly positioned before fitting the sections together.

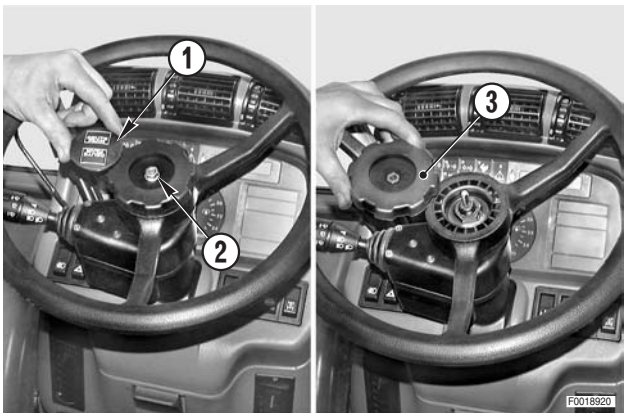


REMOVAL OF THE STEERING WHEEL, STEERING COLUMN SWITCH UNIT AND INSTRUMENT PANEL

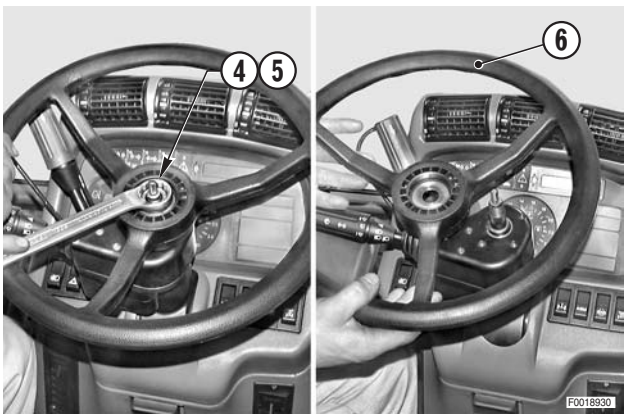
⚠ Remove the battery cover and disconnect the negative battery lead (–.

1 - Remove the centre cover (1) and remove the nut (2) with its washer.

2 - Remove the locknut (3) for telescopic adjustment of the steering wheel.



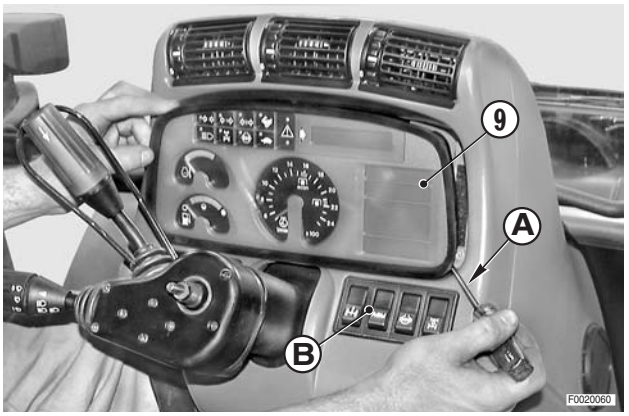
3 - Remove the nut (4), the toothed washer (5) and remove the steering wheel (6). ※ 1



4 - Remove the circlip (7) and remove the steering column switch unit (8) from the steering column.

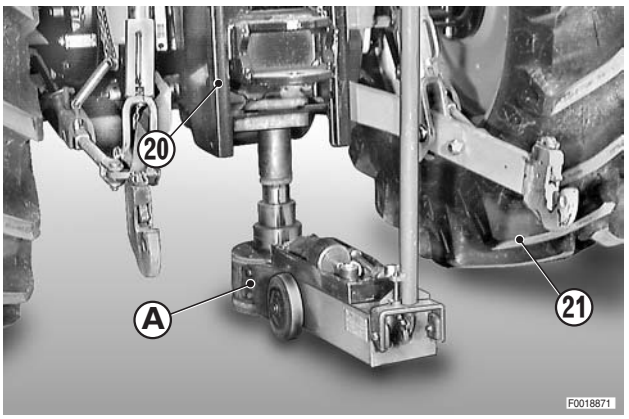
5 - Insert a thin blade "**A**" under the gasket and prise off the instrument panel (9).

★ Alternatively, withdraw the right and left switch groups "**B**" and push the instrument panel from the inside.



10 - Unscrew and remove the lower bolt (18) of the console (19).

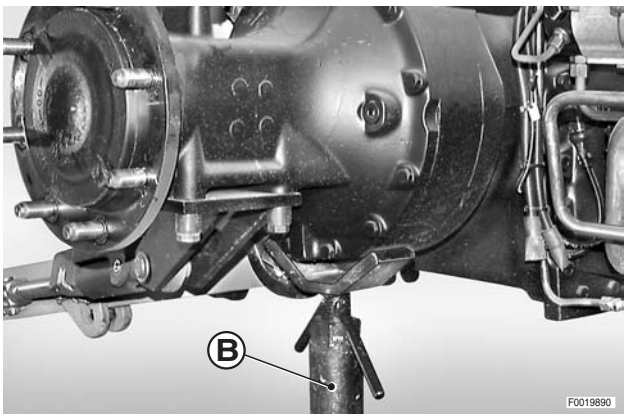
11 - Position a hydraulic jack "**A**" with a non-slip block under the tow hook (20) so that it is inclinded towards the right-hand wheel; raise the tractor so that the right wheel is off the ground (21).



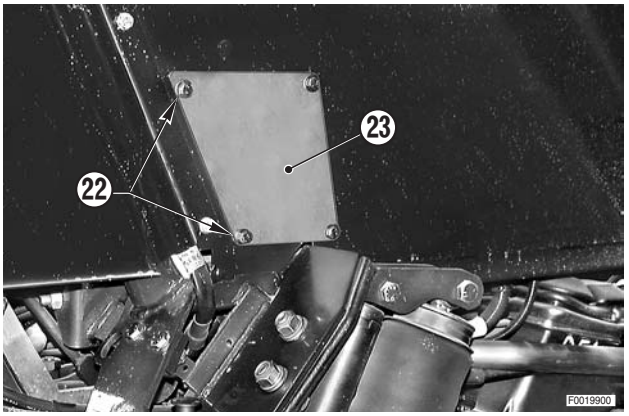
12 - Position a jack "**B**" with safety wings under the right brake assembly; remove the right wheel and lower the tractor onto the stand.

1

★ Stand load capacity: minimum 2 tons



13 - **In case of console removal only**:
Remove the four screws (22) and remove the cover plate (23).

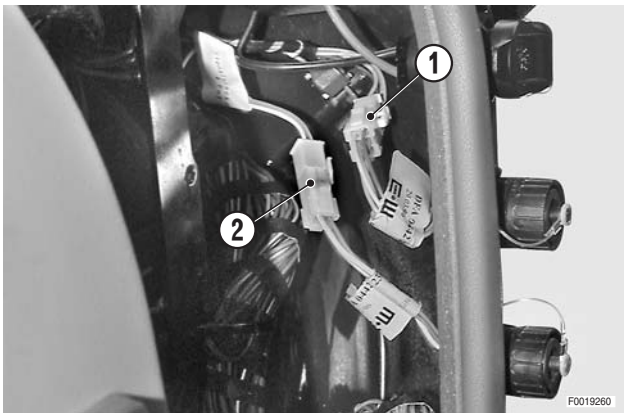


REMOVAL OF THE FUSE AND RELAY BOARD

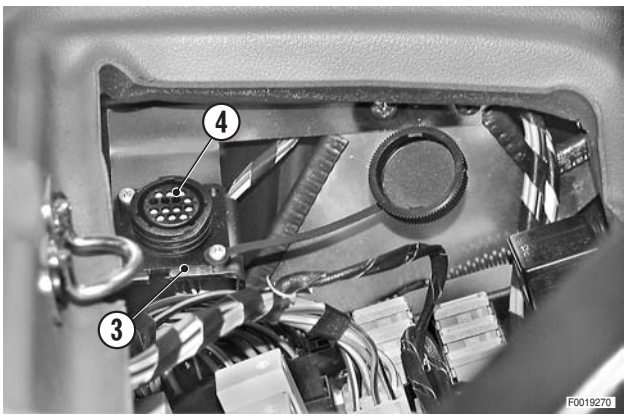
⚠ Remove the battery cover and disconnect the negative battery lead (–).

1 - Remove the ECUs of the lift, the front suspension and the transmission.
(For details, see «REMOVAL OF THE LIFT, FRONT SUSPENSION AND TRANSMISSION ELECTRONIC CONTROL UNITS»).

2 - Unplug the connectors (1) and (2) from the signal outlet sockets and the external outlet socket for trailer-mounted implements.

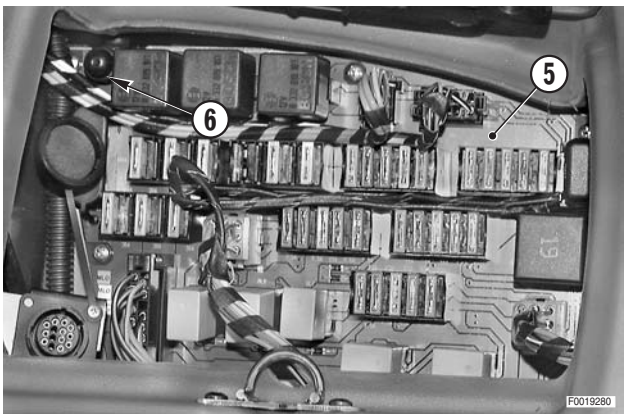


3 - Remove the bracket (3) of the diagnostics outlet (4) and place it to one side.

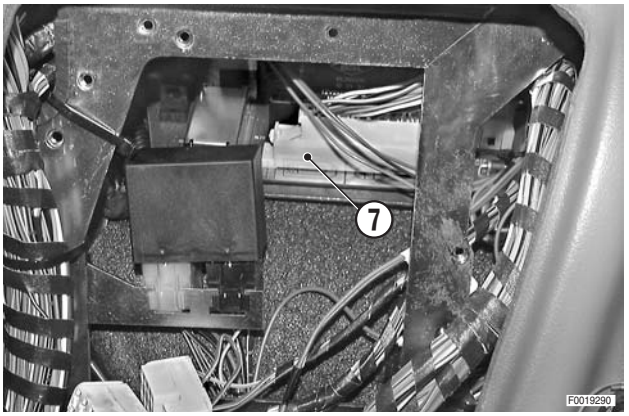


4 - Disconnect the connectors (P2), (P6), (P3), (P5), (J1), (J2) and (J3) from the fuse/relay board.
★ The connectors are marked with the same symbols as the sockets on the circuit board.

5 - Remove the cover and disconnect the earth lead (6).



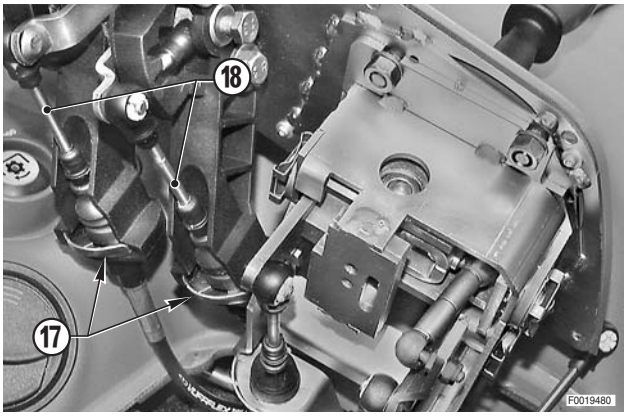
6 - Disconnect the connector (7) (P5), which is accessed through the ECU compartment.



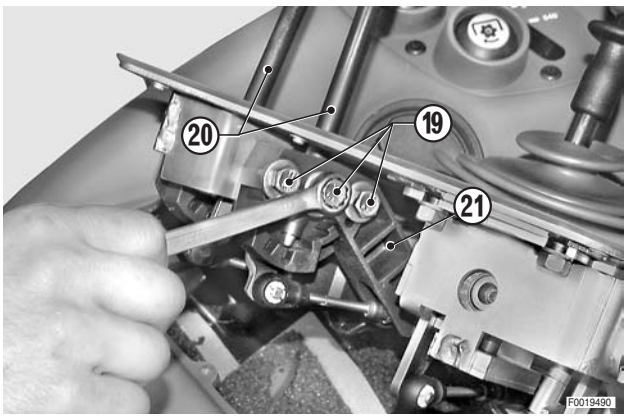
2.2 Removal of the individual service valve control levers

1 - Remove the yokes (17) securing the outer cables and disconnect the inner cables (18). ※1

★ Label the cables to avoid confusion on reconnection.

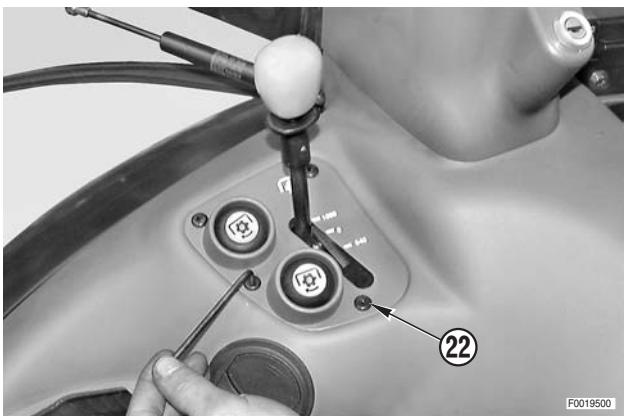


2 - Unscrew and remove bolts(19) with their washers and remove the levers (20) and the lever pivot supports (21).



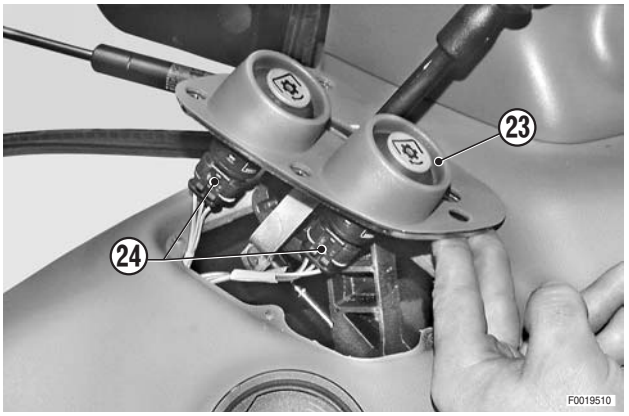
2.3 Removal of the PTO control panel

1 - Unscrew and remove the screws (22).



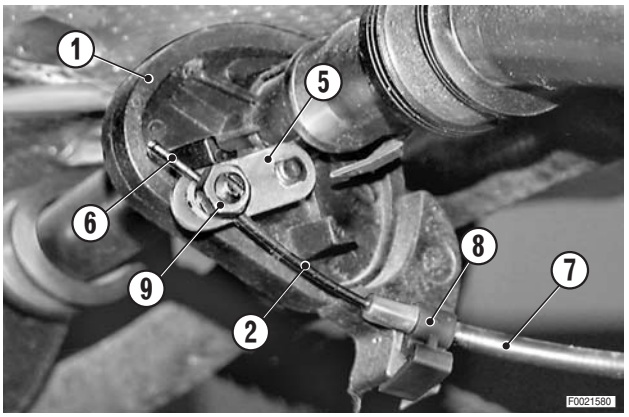
2 - Lift the control panel (23) and unplug the connectors (24).

★ Label the connectors to avoid confusion on reconnection.



2 - Turn the lever (5) of the heater valve (1) up to to the stop (6).

3 - Fix the outer part (7) of the control cable (2) with the spring clip (8) and the inner cable (2) with the screw (9).



1 - Fill the cooling system.

Coolant:

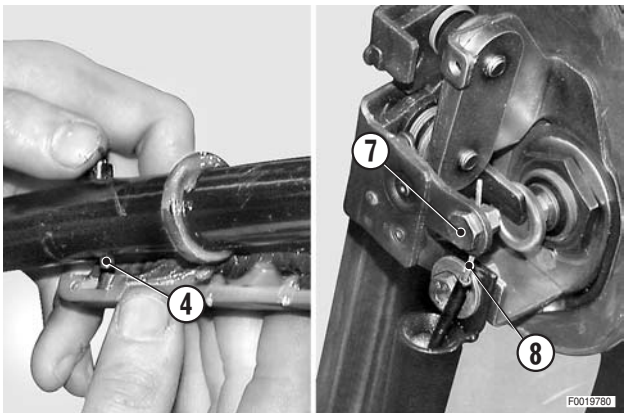
Mod.	106	110	115	120	135	150	165
ℓ	17.5	17.5	17.5	21	21	21	23
US. gall.	4.62	4.62	4.62	5.54	5.54	5.54	6.07

2 - Fully open the heater valve.

3 - Start the engine: allow the coolant to circulate and check for leaks.

4 - Stop the engine and top up the coolant level.

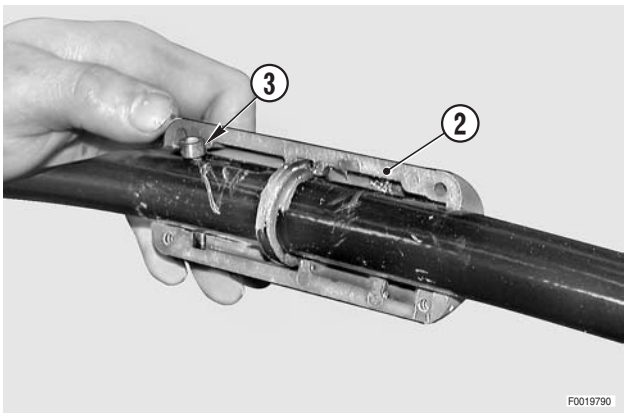
5 - Feed the new cable starting from the handle side; engage it with the pin (4) and the clamp nut (7).
With the cable under slight tension, tighten down the clamp nut.



6 - Lubricate the bushes (3) and the slide ways for the handle; fit the bushes to the pin and refit the handle (2).

Slide ways and bushes: Molikote

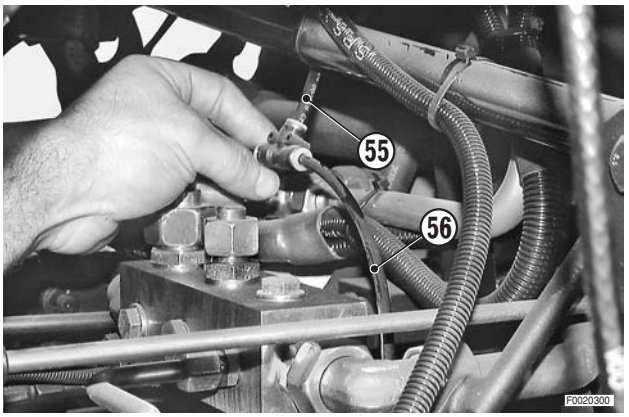
7 - Check that the door opens correctly and complete the refitting procedure.



34 - Slowly raise the cab by about 15 cm and disconnect the connection pipe (55) to the cab suspension valve and the pipe (56) from the reservoir (54) from the **T** fitting.

kg Complete cab assembly: 780 kg (1718 lb.)

35 - Release the wiring from all the clips and remove the cab while guiding the pipes and control cables.

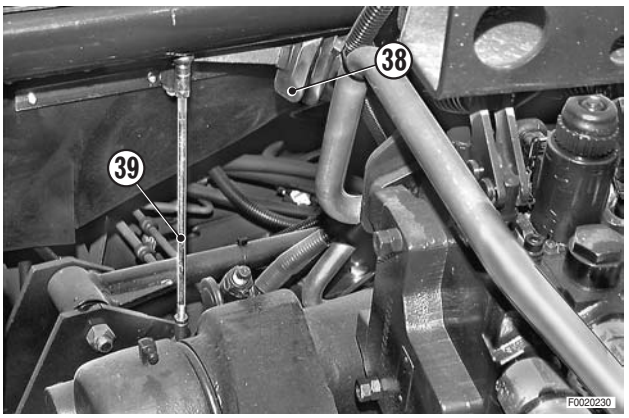


REFITTING THE CAB

- Refitting is the reverse of removal.

※ 1

Nm Air conditioning pipes fittings:
delivery(5/8" - 18UNF):13.6–20.3 Nm (10–15 lb.ft.)
suction (7/8" - 14UNF): 35.3–42 Nm (26–31 lb.ft.)



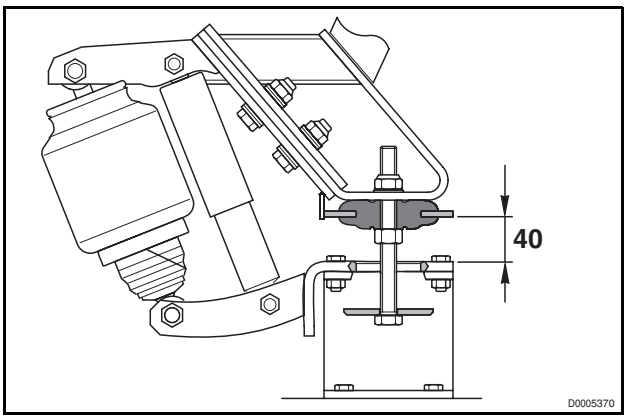
※ 2

★ Check the adjustment of the tie-rod (39) to obtain the correct cab lifting height (without operator).

1 - Fill the engine cooling system.

Coolant:

Mod.	106	110	115	120	135	150	165
ℓ	17.5	17.5	17.5	21	21	21	23
US. gall.	4.62	4.62	4.62	5.54	5.54	5.54	6.07



2 - Fully open the cab heater valve.

3 - Start the engine and check the hydraulic, pneumatic and heating systems for leaks.

4 - Turn the steering wheel back and forth between the full lock positions to expel any air from the power steering circuit.

5 - Switch off the engine; check the coolant level and top up if necessary.

6 - Bleed the hydraulic brake system.
(For details, see «BLEEDING THE BRAKE SYSTEM»).

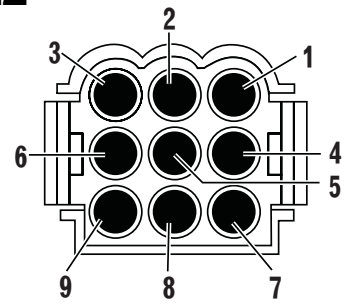
SECTION 40

CONTENTS

Description	Code	Technical (para. 3.2.xx)	Connector	System (para. 4.xx)	Notes
Fuse F100 (30 A)	0442.7647		X16	12	
Gear change solenoid valves	0441.6685		EV GROUP	16-17	
Gear change solenoid valves	0443.6315		EV GROUP	16-17	
Gear shift pushbutton panel			X74	16-17	
Gearbox output shaft speed sensor	0443.8449	42	NLSA	16-17	
Glowplug			X46	3	
Handbrake switch	0439.1395	12	X90	13-14	
Hazard lights switch lighting			X96	5	
Horn	0116.9304		X49	5	
Infocenter			ST1-ST2	3-4-5-9-10-13-14-16-17-18-19-20	
Interior roof light	0442.6316		X23	6	
ISO4 socket (Power for external implements)	0442.2323.4		ISO4	10	
ISO7 socket (Connection for external implements)	0442.2324.4		ISO7	4-10-20	
Left brake pedal switch	0439.1395	13	X60	13-15-18	
Left front loudspeaker	012.1725.0		X29	11	
Left heater fan	010.2537.0		X105	12	
Left rear loudspeaker	012.1726.0		X30	11	
Lift control lever			X78	19	
Lift control lever			EHR	19	
Lift draft sensor	0441.5586.4	32	LEFT DRAFT RIGHT DRAFT	19	
Lift lowering solenoid valve	0441.8229	6	EV DW	19	
Lift raising solenoid valve	0441.8229	10	EV UP	19	
Lights selector switch	0443.8653		AS4	5-8	Powershift
Lights selector switch	0443.8656		AS4	5-8	Powershuttle
Lower worklights switch	0441.1496.4		3A	5-7	
Motor for supplementary air conditioning fan	0442.6490		X19	12	
Number plate light			X92	5	
Preheating control unit	0117.9712		X52	2	
Pressure switch - hydraulic oil filter clogging	0118.0413		FILTER	16-17	
Pressure switch for supplementary air conditioning fan	0442.3185		X18	12	
Pressure switch, clutch pedal depressed	0441.3195	18	X101	17	Powershift
Proportional solenoid valve	0443.4425	7	EV PROP	16	
PTO AUTO control switch			X98	20	
Radar	0443.8654	20	RADAR	19	
Radar (UK)	0443.8655	21	RADAR	19	
Radar control switch	0441.4584		X73	19	

Connector	Type	Wiring code	Connection wiring or component code	Component description
NAB	9	0443.7848	0443.8436	Speed sensor for odometer
NEUTRAL LS	10	0443.7848	0441.6995	Transmission neutral sensor (red switch)
NHK	9	0443.7848	0443.8450	Transmission speed sensor
NLSA	9	0443.7848	0443.8449	Gearbox output shaft speed sensor
NLSE	9	0443.7848	010.2874.2	Engine speed sensor
P	6	0443.7847 0.012.3639.4		Engine oil pressure switch
P1		0443.7357 0442.9937.4		
P2	18	0443.7357 0442.9937.4		
P3	20	0443.7357 0442.9937.4		
P4		0443.7357 0442.9937.4		
P5	20	0443.7357 0442.9937.4		
P6	21	0443.7357 0442.9937.4		
POS. SENS.	9	0443.7848	0443.8667	Rear lift position sensor
PRESS. SWITCH	10	0443.7848	0441.6706 0443.1690	Transmission oil low pressure switch
PS	10	0443.7848		Configuration connector (PS)
PTO	9	0.012.2010.4 0.012.4420.4 0442.9835 0442.9886	0441.1533	Rear PTO control pushbutton (on fender)
PTO SEN	9	0443.7848		Rear PTO speed sensor
RADAR		0443.7848	0443.8654 0443.8655	Radar
RIGHT DRAFT	12	0443.7848	0441.5586.4	Lift draft sensor (left)

22



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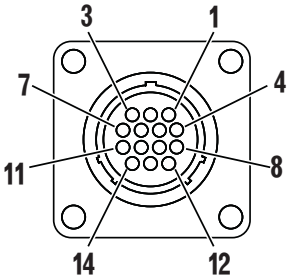

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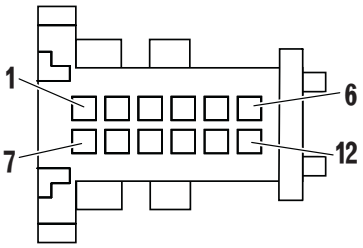

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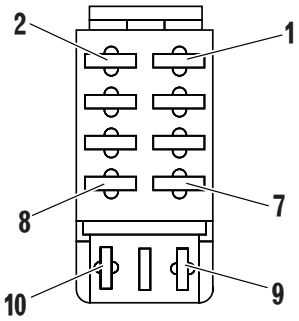

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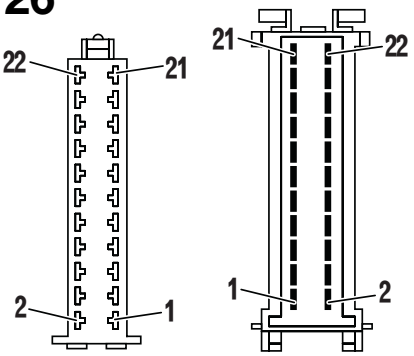

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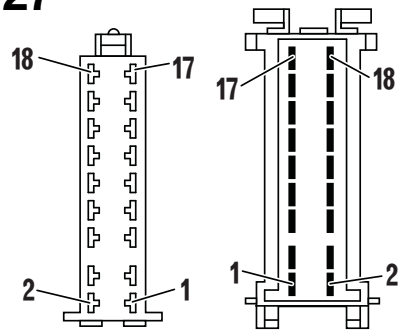

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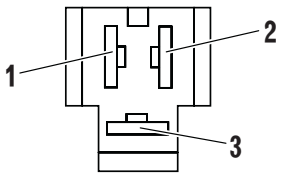

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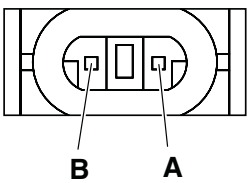

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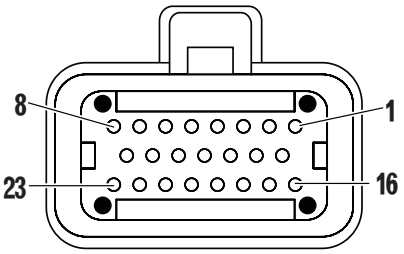

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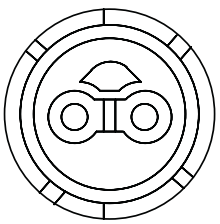

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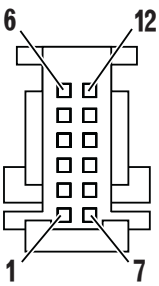

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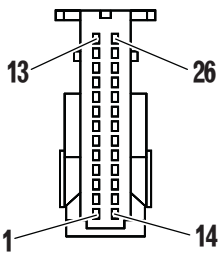
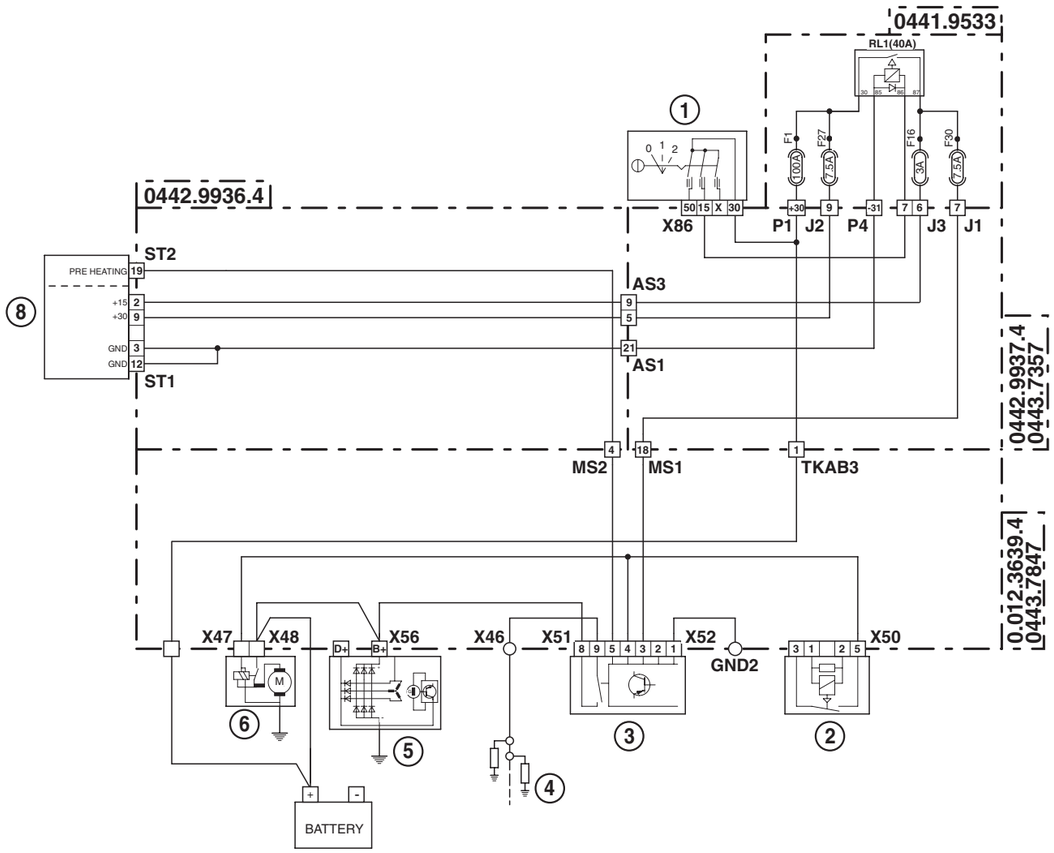


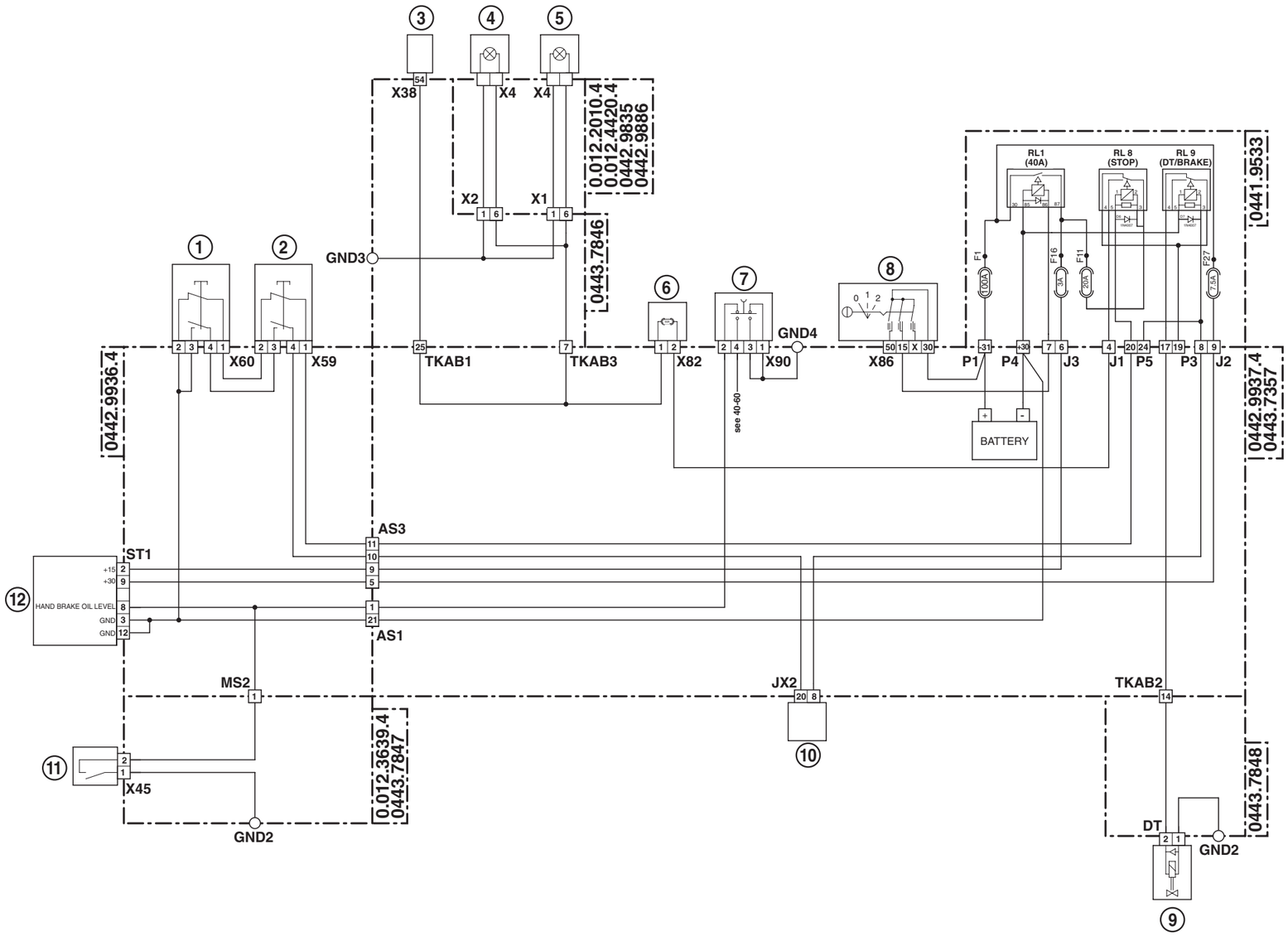
Pin	Volts	Code	Description
31	+12V	EDM1	Engine start signal (+50)
32		AIP3	Power - solenoid valve Y6
33		ADM8	Power - solenoid valve Y4
34		ADM7	Power - solenoid valve Y3
35			Not utilised
36		SD4	Vehicle speed output
37		AU	Power (+) clutch pedal angular position sensor
38		EU1	Analogue input, angular position of clutch pedal sensor signal
39		ER1	Analogue input, temperature sensor signal
40		EF6	Digital input, output revs sensor (nLsa)
41			Not utilised
42			Not utilised
43			Not utilised
44		ED8	Digital input, clutch pedal travel limit sensor
45		VPI	Battery positive (15+)
46			Not utilised
47			Not utilised
48			Not utilised
49			Not utilised
50		AIP7	Power - solenoid valve Y5
51			Not utilised
52			Not utilised
53			Not utilised
54			Not utilised
55		AIP4	Power - solenoid valve Y7
56	0V	AIP1	Power (-) proportional solenoid valve
57	+12V	ADM5	Power - solenoid valve Y1
58			Not utilised
59			Not utilised
60			Not utilised
61			Not utilised
62		EF4	Digital input, revs sensor (nAb)
63		ED1	Analogue input, forward travel command signal
64			Not utilised
65		ED2	Analogue input, neutral command signal
66			Not utilised
67		ED6	Digital signal - range upshift pushbutton
68	+12V	VPE2	Battery positive (30+)

4.3 PREHEATING



1 Starter switch
2 Control relay for engine starting
3 Preheating control unit
4 Glowplug
5 Alternator
6 Starter motor
7 Infocenter

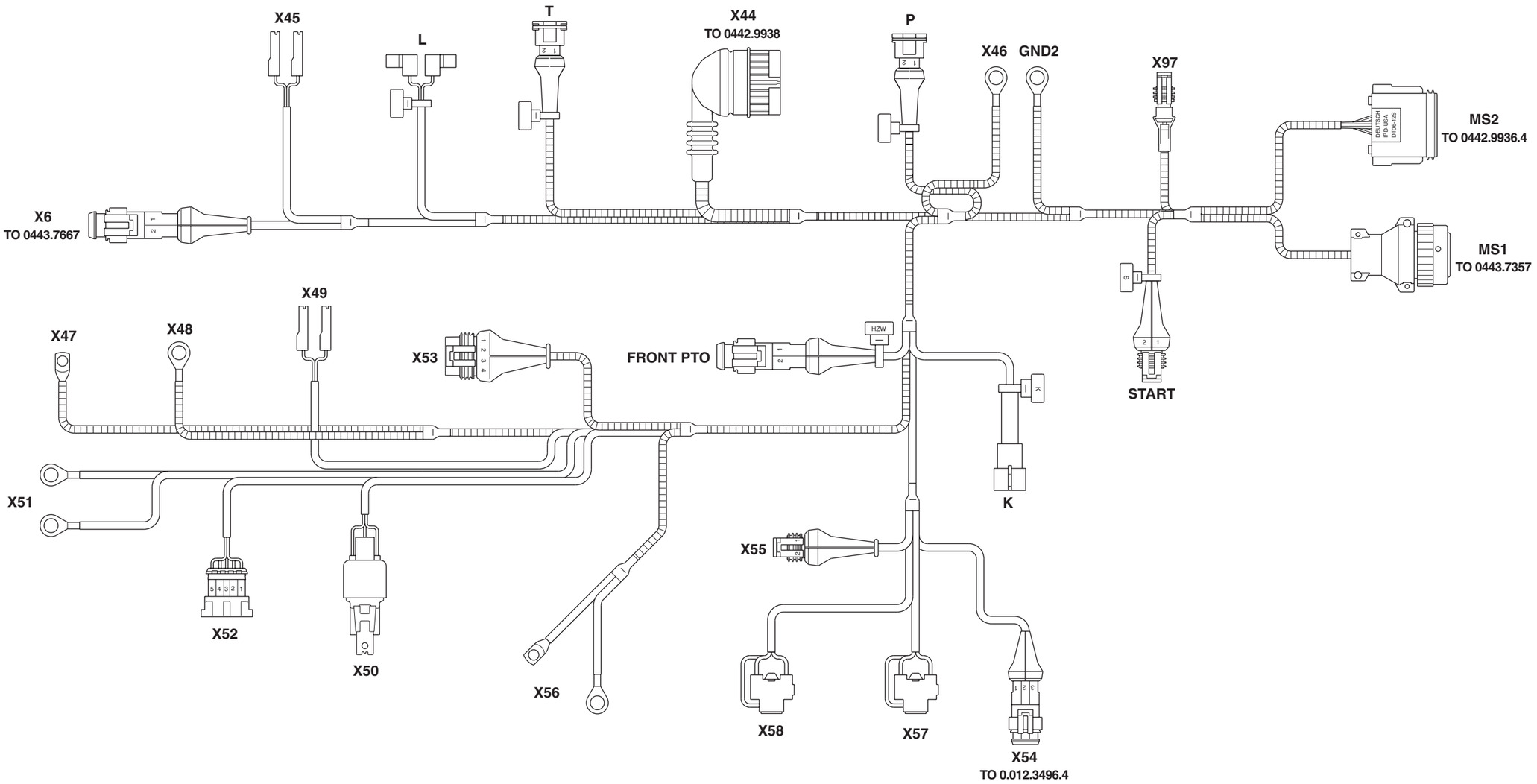
4.13 BRAKES



1 Left brake pedal switch
2 Right brake pedal switch
3 Trailer socket (For lights and auxiliary power)
4 Rear left side lights and direction indicators
5 Rear right side lights and direction indicators
6 Brake lights fuse F102 (15 A)
7 Handbrake switch
8 Starter switch
9 4WD control solenoid valve
10 Diagnostics connector
11 Brake fluid level sensor
12 Infocenter

5. PLANIMETRY, WIRING DIAGRAM AND CONNECTORS LOCATION

ENGINE WIRING (120–165 CV) (1/2)

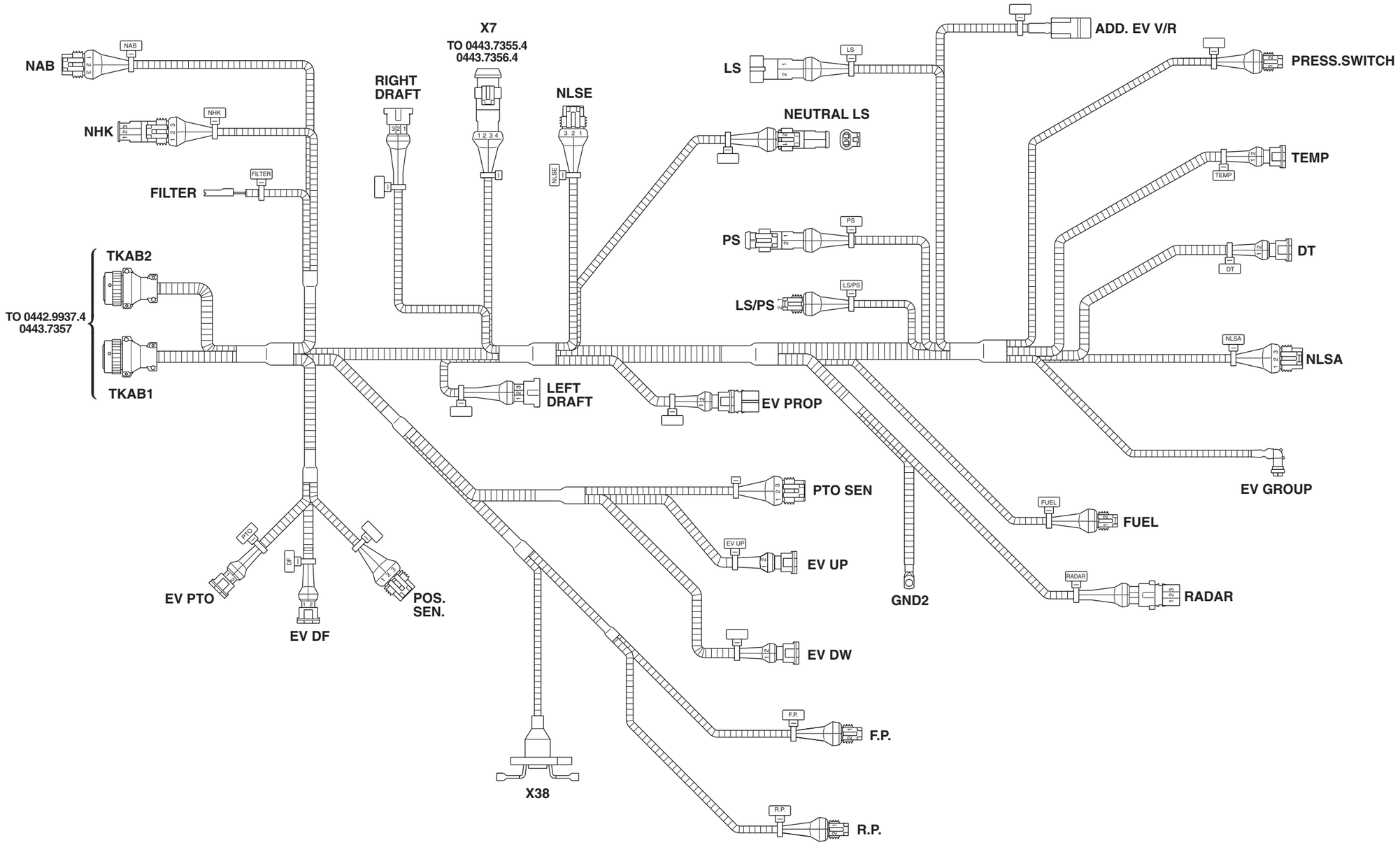


FRONT PTO Front PTO solenoid valve
K Air conditioning compressor
L Air cleaner clogged sensor
MS1 To front console wiring
MS2 To front console wiring
P Engine oil pressure switch
START Start enable switch (Green)
T Coolant temperature sensor
X6 To clutch sensor wiring
X44 To internal combustion engine wiring
X45 Brake fluid level sensor
X46 Glowplug
X47 Starter motor
X48 Starter motor
X49 Horn
X50 Relay - engine starting
X51 Preheating control unit
X52 Preheating control unit
X53 Steering angle sensor
X54 To Clean Fix wiring
X55 Air conditioning pressure switch
X56 Alternator
X57 Front right headlamp
X58 Front left headlamp
X97 Steering system pressure switch

19

20

TRANSMISSION WIRING (1/2)



ADD. EV. V/R Forward/reverse solenoid valves
DT 4WD control solenoid valve
EV DF Diff lock solenoid valve
EV DW Lift lowering solenoid valve
EV GROUP Gear change solenoid valves
EV GROUP Gear change solenoid valves
EV PROP Proportional solenoid valve
EV PTO Rear PTO solenoid valve
EV UP Lift raising solenoid valve

FILTER Pressure switch - hydraulic oil filter clogging
FP Front windscreen washer pump
FUEL Fuel level sensor
LEFT DRAFT Lift draft sensor (left)
LS Configuration connector (Power shift)
LS/PS Configuration connector Power Shift/Power Shuttle
NAB Speed sensor for odometer
NEUTRAL LS Transmission neutral sensor (red switch)
NHK Transmission speed sensor

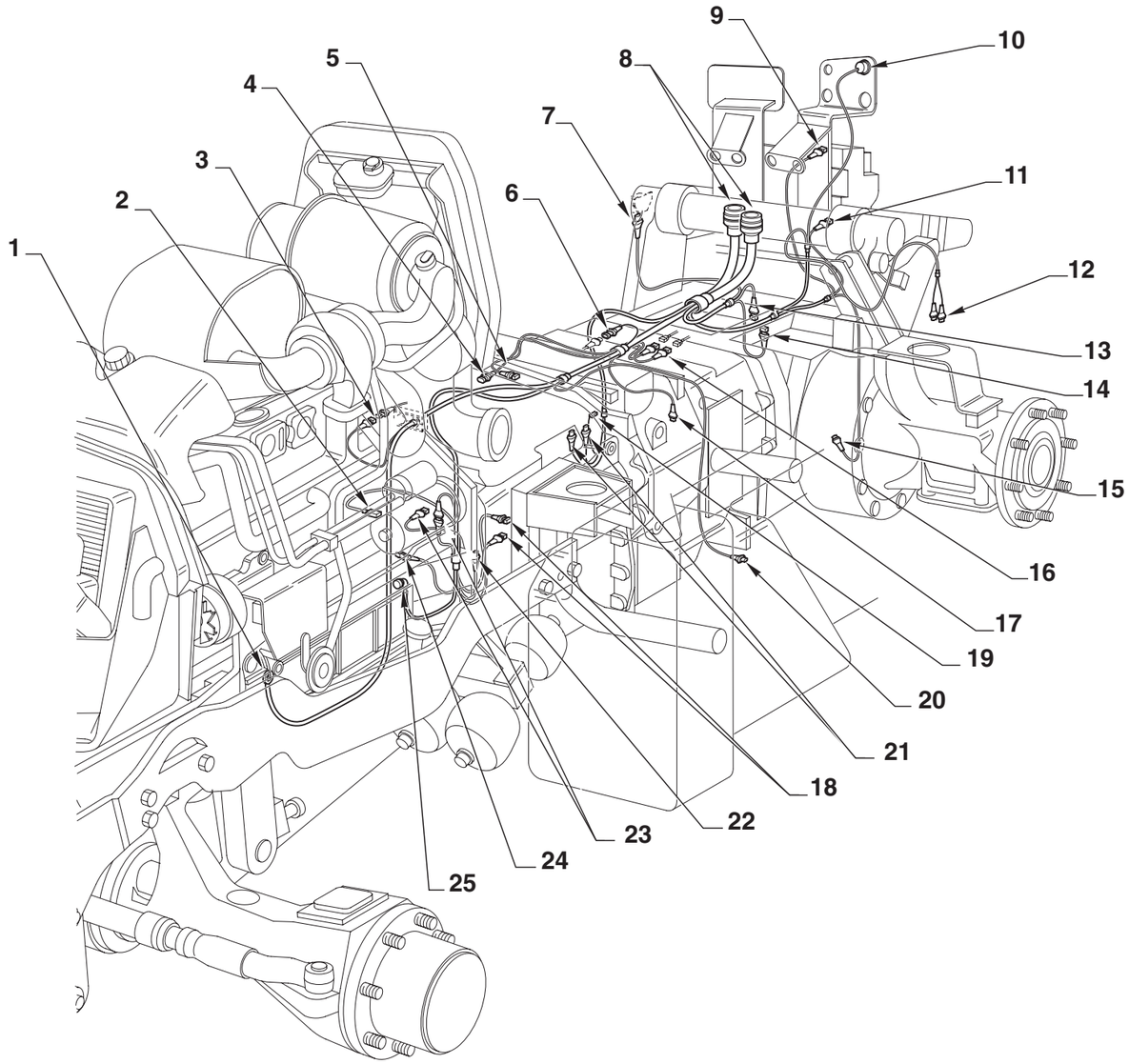
NLSA Gearbox output shaft speed sensor
NLSE Engine speed sensor
POS. SENS. Rear lift position sensor
PRESS. SWITCH Transmission oil low pressure switch
PS Configuration connector Power Shuttle
PTO SEN Rear PTO speed sensor
RADAR Radar
RIGHT DRAFT Lift draft sensor (right)
RP Rear screen washer pump

TEMP Transmission oil temperature sensor
TKAB1 To side console wiring
TKAB2 To side console wiring
X7 To trailer braking wiring
X38 Trailer socket

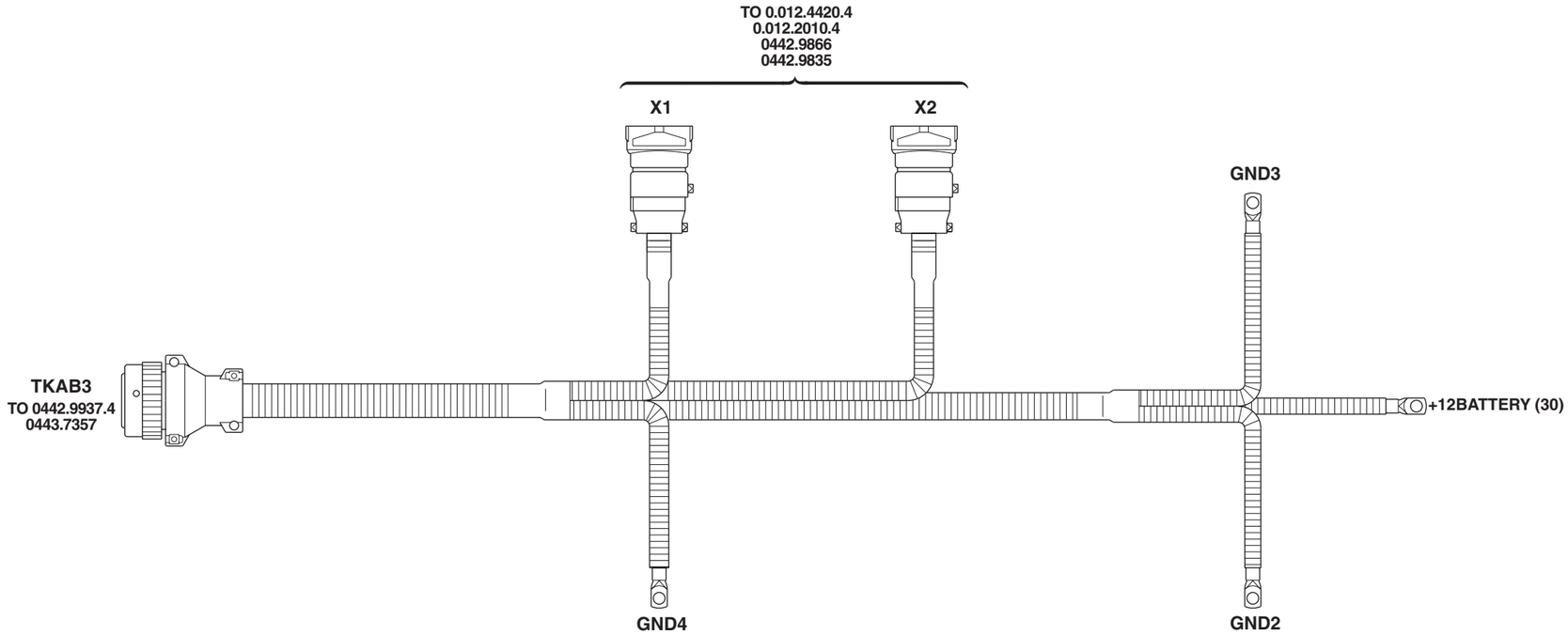
24

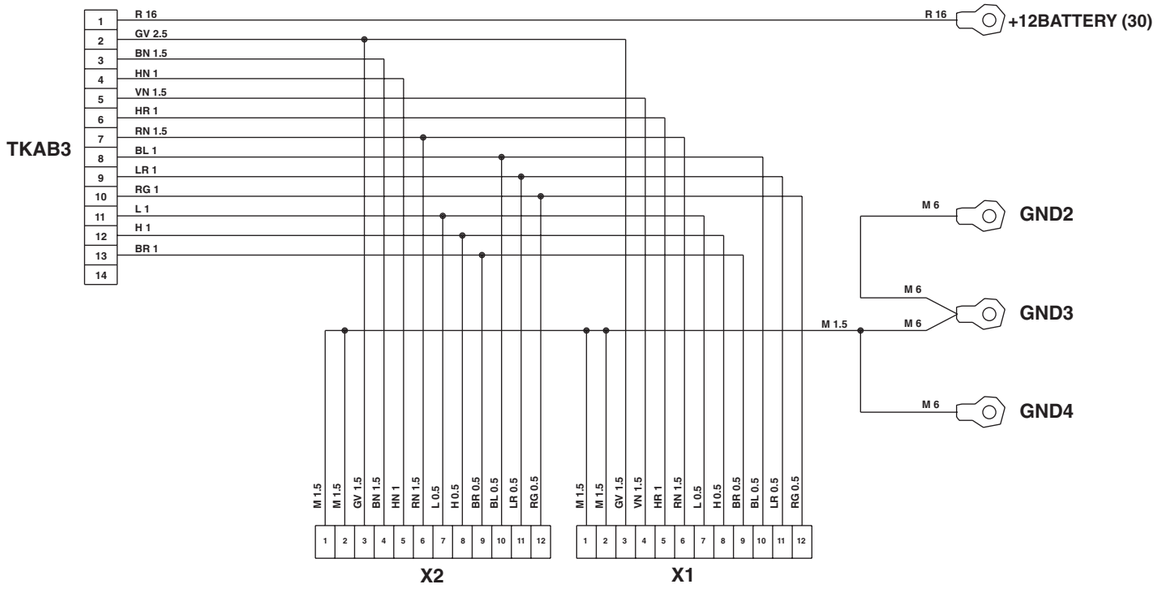
25

TRANSMISSION WIRING



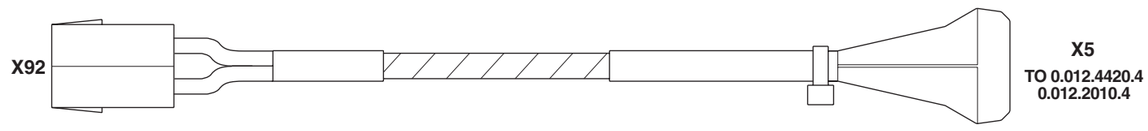
CAB POWER SUPPLY WIRING

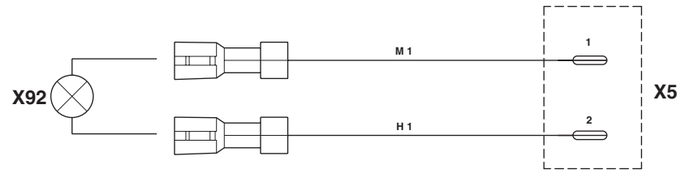




TKAB3 To side console wiring
X1 To fender wiring
X2 To fender wiring

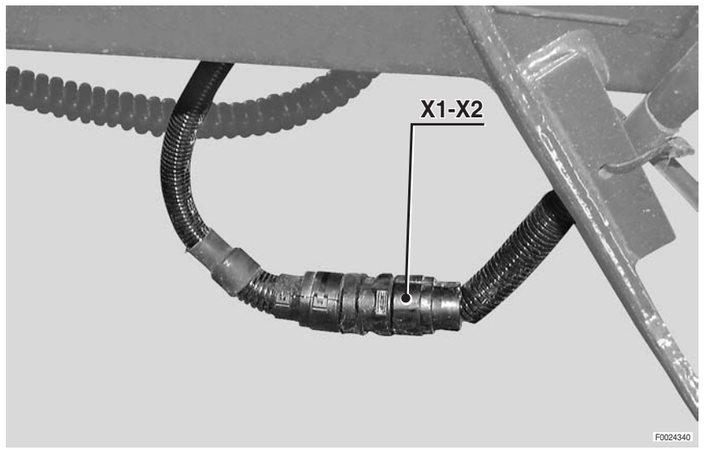
NUMBER PLATE LIGHT WIRING





X5 To fender wiring
X92 Number plate light

4



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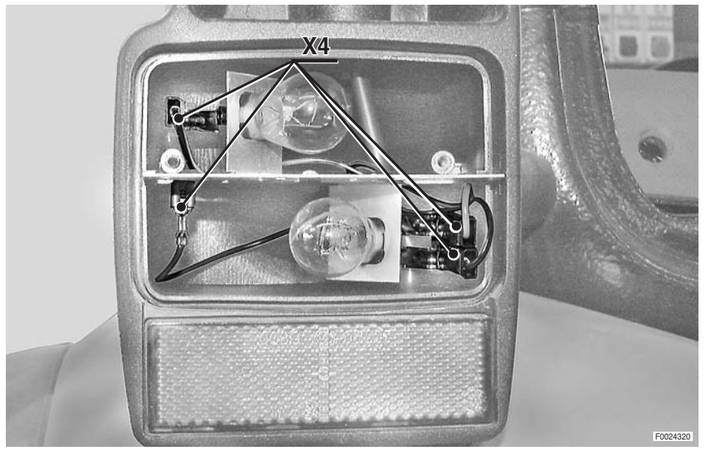

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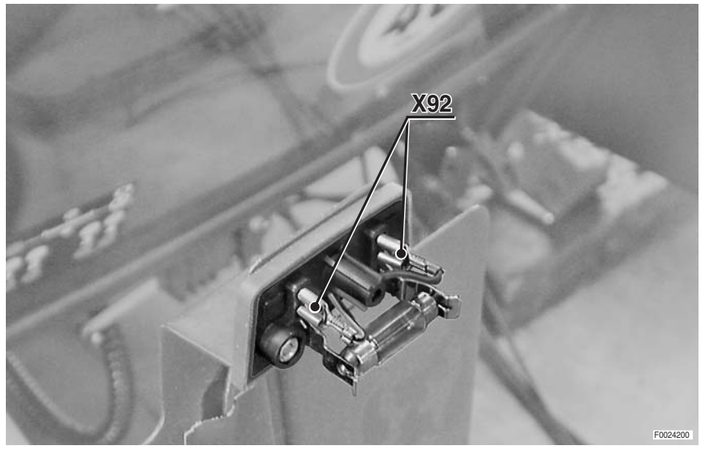
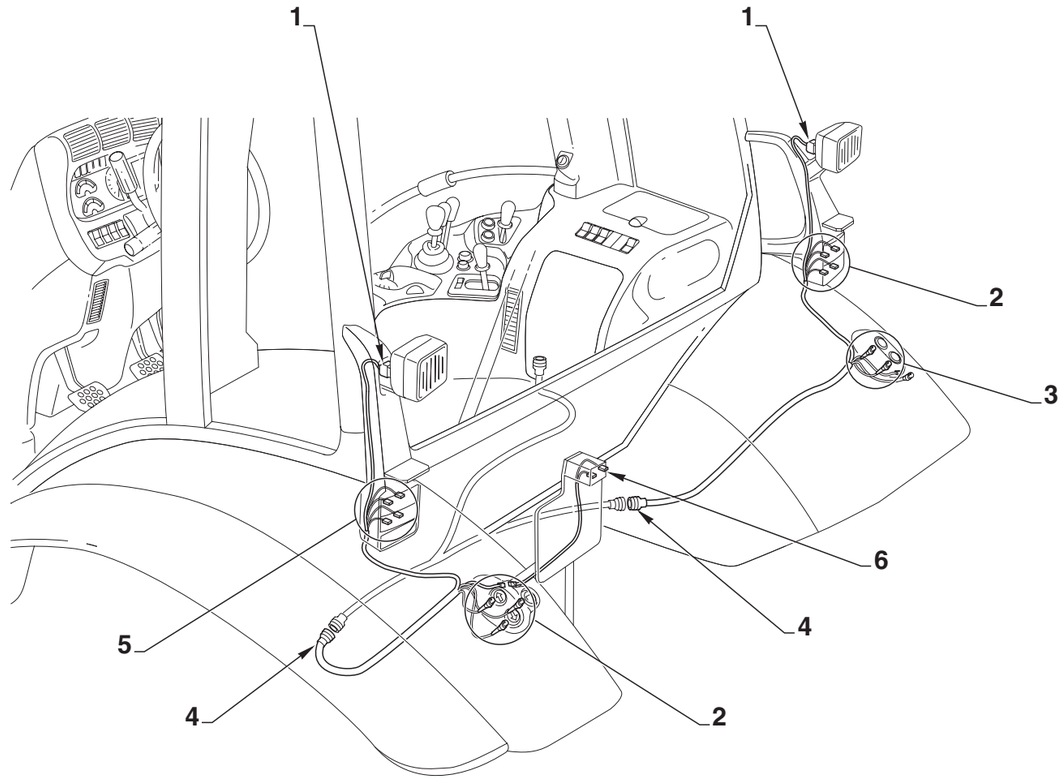
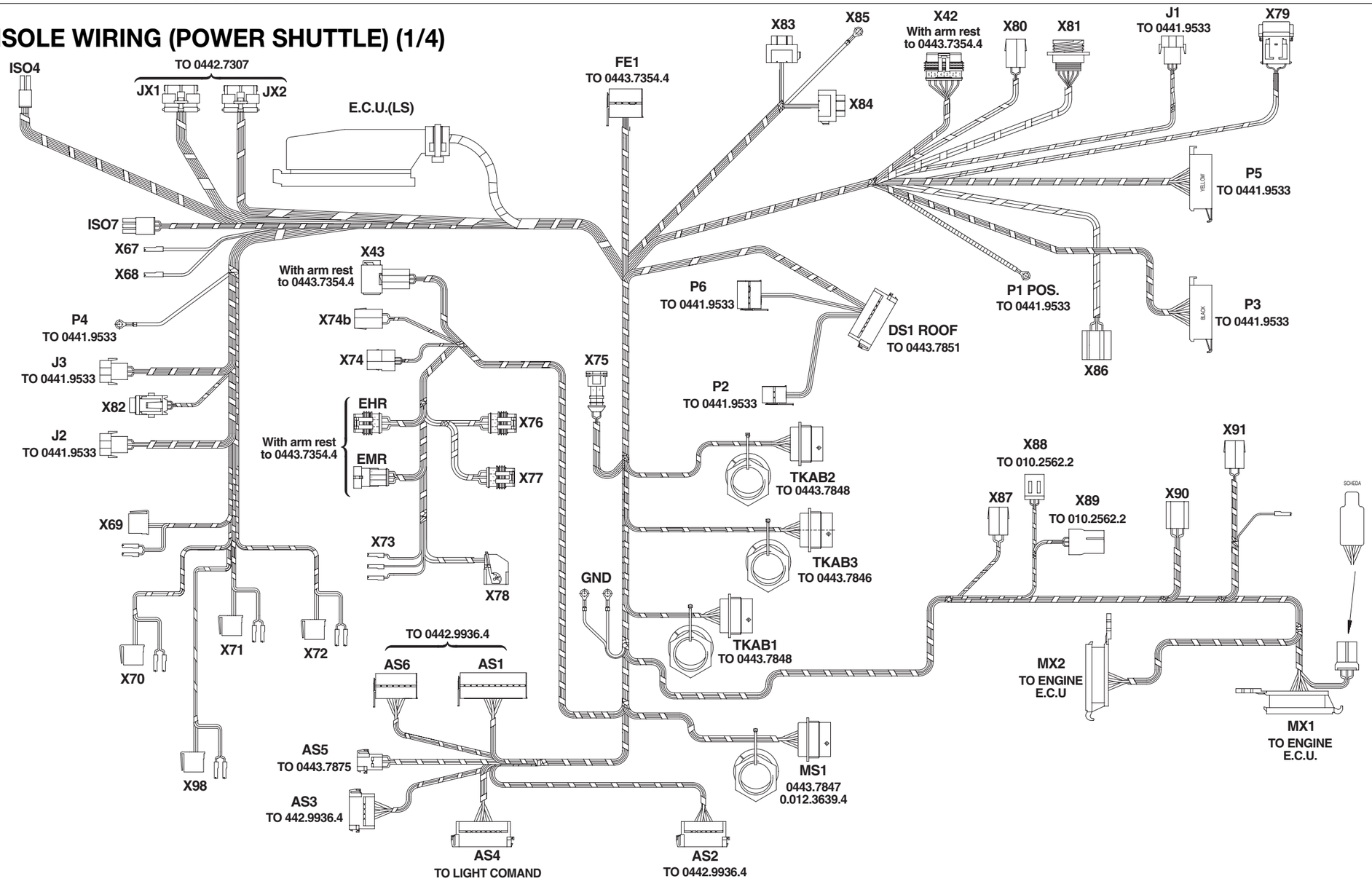


FENDER AND NUMBER PLATE LIGHT WIRINGS



FENDER	PLATE LIGHT
0.012.2010.4	0.012.2018.4
0.012.4420.4	0441.4114
0442.9835	0442.9887
0442.9886	

SIDE CONSOLE WIRING (POWER SHUTTLE) (1/4)



AS1 To front console wiring
AS2 To front console wiring
AS3 To front console wiring
AS4 Lights selector switch
AS5 To display wiring
AS6 To front console wiring
DS1 To roof wiring
ECU LS Transmission control unit
EHR Lift control lever
EMR Throttle lever
FE1 To cab front suspension ECU
ISO4 Socket (Power for external implements)
ISO7 Socket (Connection for external implements)

J1 To fuses plate
J2 To fuses plate
J3 To fuses plate
JX1 Rear lift control unit
JX2 Rear lift control unit
MS1 To engine wiring
MX1 Engine control unit
MX2 Engine control unit
P1 To fuses plate
P2 To fuses plate
P3 To fuses plate
P4 To fuses plate
P5 To fuses plate

P6 To fuses plate
TKAB1 To transmission wiring
TKAB2 To transmission wiring
TKAB3 To cab power supply wiring
X42 Engine speed keypad
X43 To armrest wiring
X67 Auxiliary power socket (Earth)
X68 Auxiliary power socket (Positive)
X69 Rear screen wiper switch
X70 Clean Fix control switch
X71 Rotating beacon control switch
X72 Rear worklights switch
X73 Radar control switch

X74 Gearshift control pushbutton panel
X74b Gearshift control pushbutton panel (not used)
X75 Super-reduction engagement switch
X76 Front PTO control pushbutton
X77 Rear PTO control pushbutton
X78 Lift control lever
X79 Fuse F50 (30 A)
X80 Supplementary power
X81 Diagnostics connector
X82 Fuse (15 A)
X83 Direction indicators flasher unit
X84 Direction indicators flasher unit
X85 Direction indicators flasher unit

X86 Starter switch
X87 Compressor for driver's seat air suspension
X88 To air conditioner wiring (Cab)
X89 To air conditioner wiring (Cab)
X90 Handbrake switch
X91 Cigar lighter
X98 PTO AUTO switch

D0003970

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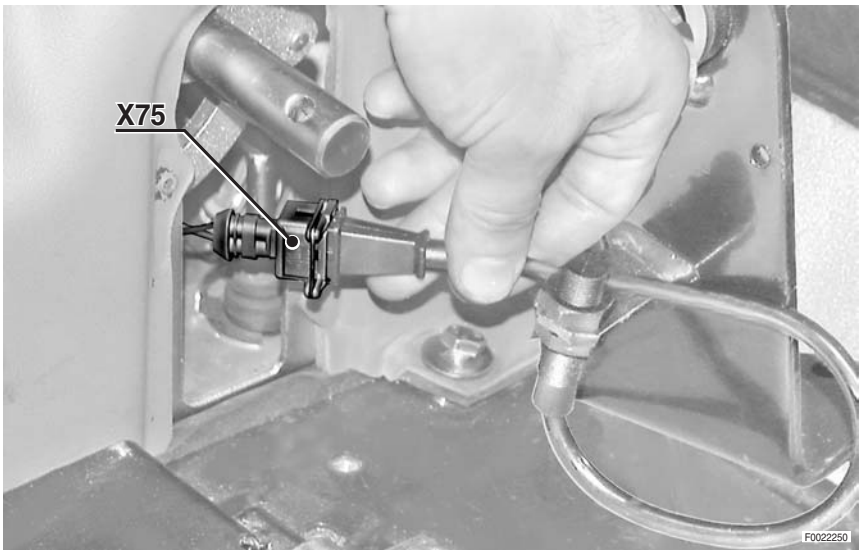

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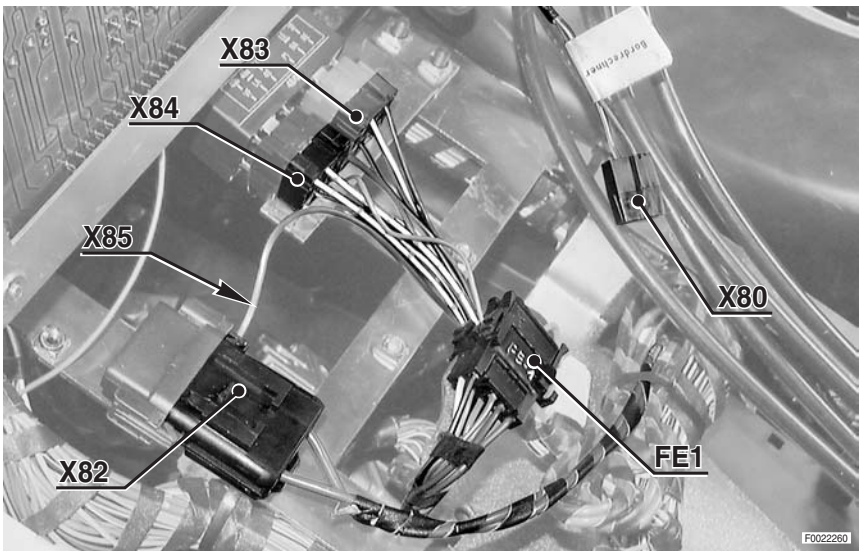

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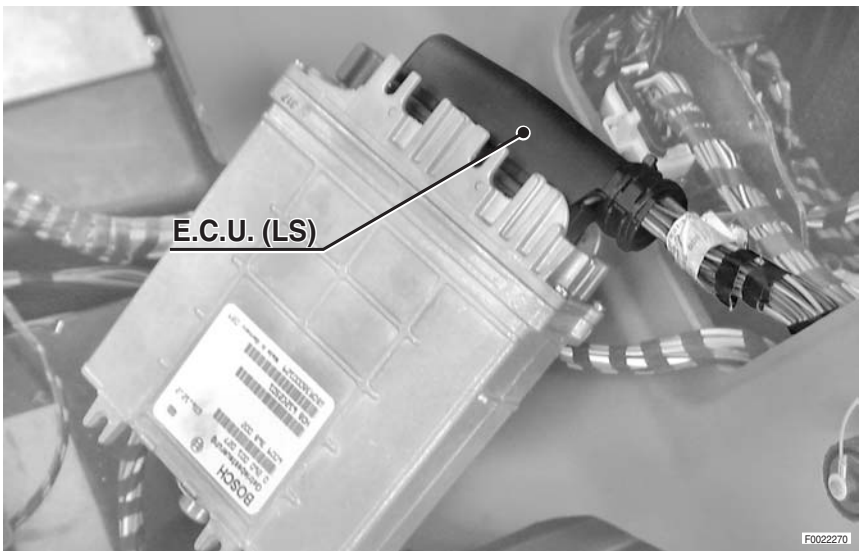
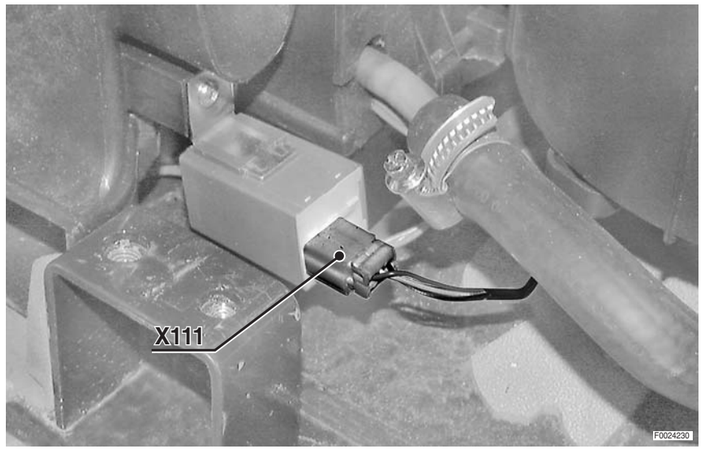


PHOTO SHOWS THE POWER SHUTTLE VERSION

4



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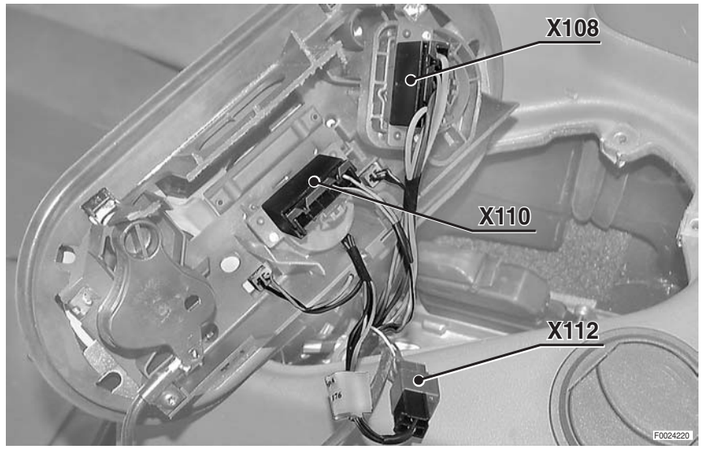
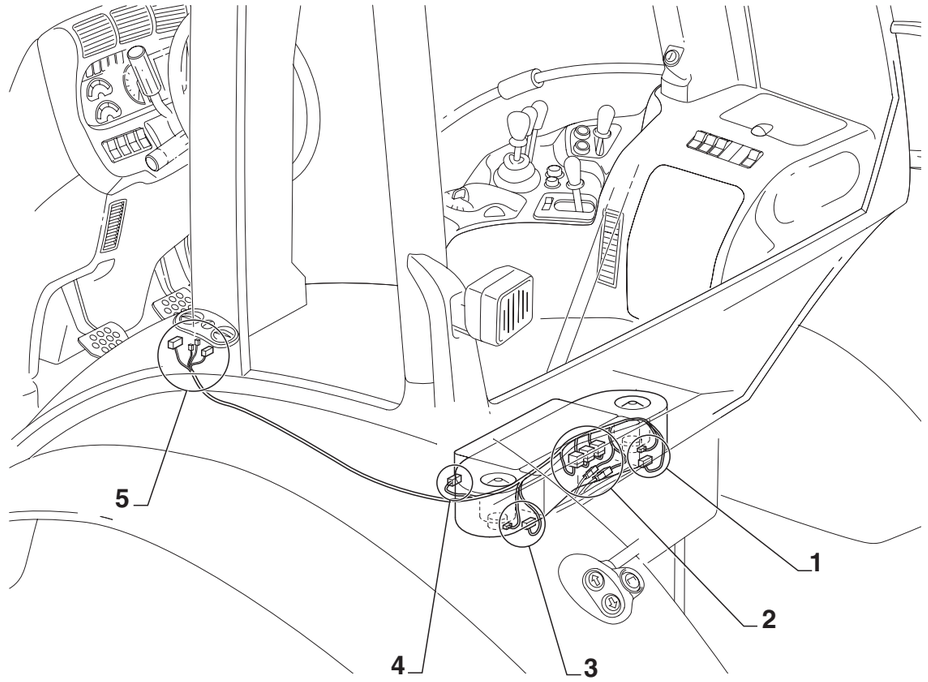
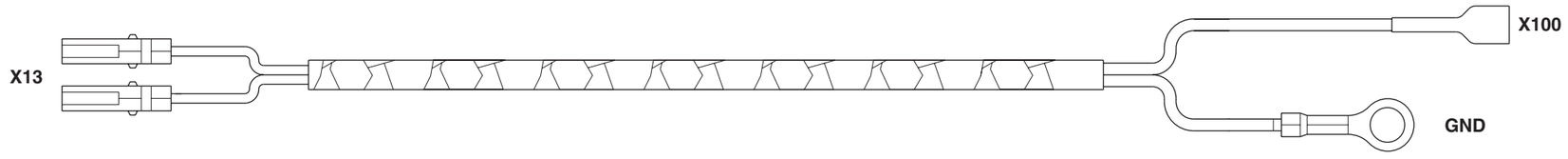
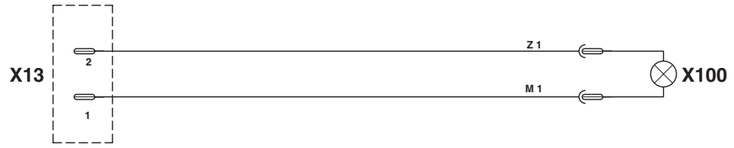


AIR CONDITIONING WIRING



ROTATING BEACON WIRING





X13 To roof wiring
X100 Rotating beacon