

WORKSHOP MANUAL

AGROTRON 108
AGROTRON 118
AGROTRON 128



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HOW THE MANUAL IS STRUCTURED

- SECTION 00** Contains the general safety rules, information on how to use and update the manual, the symbols used, the products required, the standard tightening torques and a conversion table for units of measurement.
- SECTION 10** Contains technical descriptions and information regarding the mechanical and hydraulic operation of machine components, the designations of the various components, hydraulic diagrams and general technical data.
- SECTION 20** Contains information on the tractor's electrical and electronic systems, the procedures for putting into service, the list of alarms and a guide to the use of the software required for tractor and engine configuration and access to diagnostic codes.
- SECTION 30** Contains the methods, checks and adjustments regarding the external components; the operations dealt with in this section do not require removal of the various assemblies that form the tractor frame and cab.
- SECTION 40** Contains information and diagrams regarding the machine's electrical and electronic systems.

ATTENTION!

This manual does not contain the engine and transmission sections.

For these sections refer to the follow manuals:

Engine DEUTZ 2012	0312 0361	Italian English French German
Trasmission/rear axle 7200 L-S-H	0298 6831	German
	0298 6832	English
	0298 6833	French
	0298 6834	Spanish
Front axle ZF 2025-2035-2045 AS	0298 6803	German
	0298 6856	English
	0298 6857	French
	0298 6858	Spanish

SECTION 10

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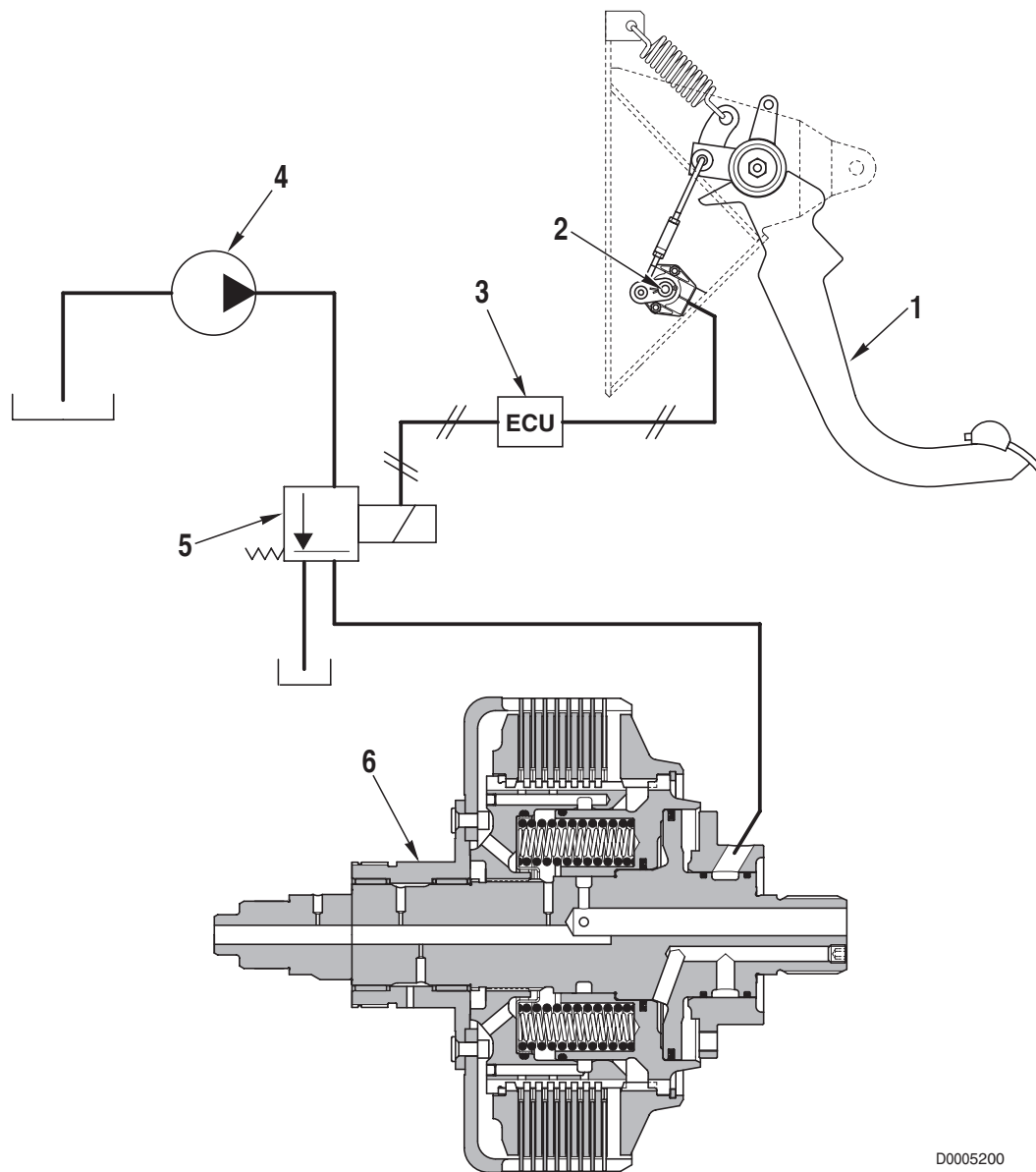
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1.1.4 MAIN CLUTCH

The main clutch of the POWER SHUTTLE transmission is an oil-bath multiplate unit with hydraulic control.

Clutch operation is entirely automatic and is controlled by an electronic control unit which receives signals from the clutch pedal position sensor.

The system has a clutch control solenoid valve that directs pressurised fluid to the clutch in accordance with the pedal position.



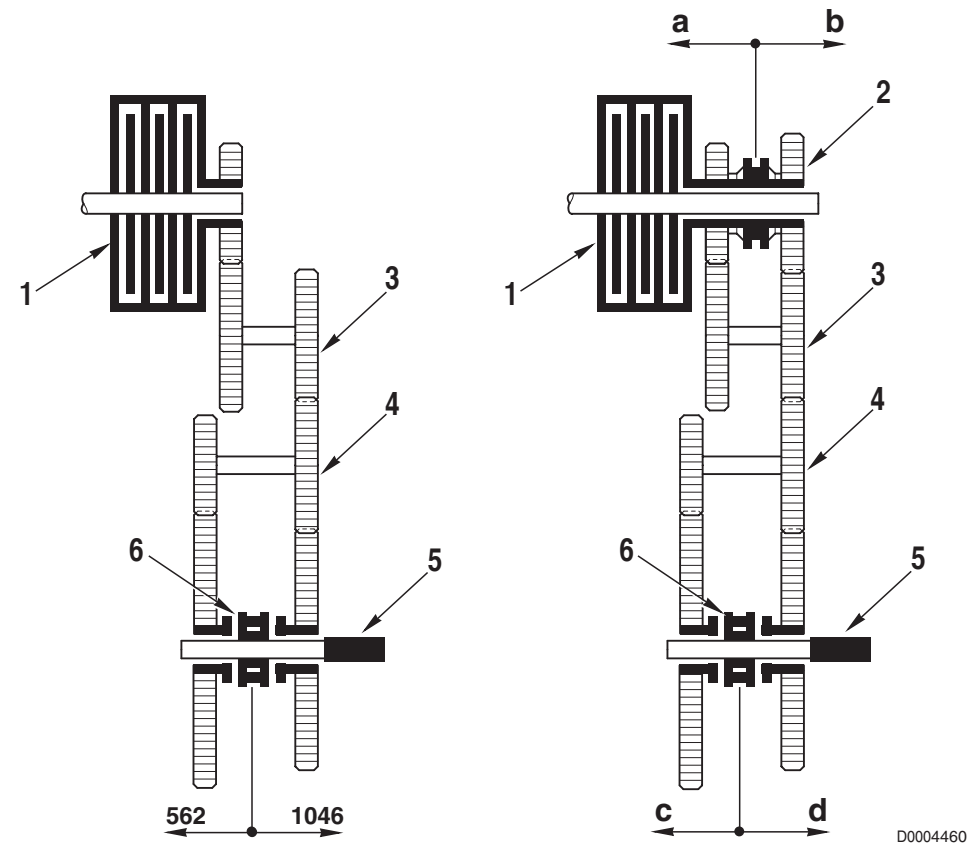
D0005200

1. Clutch pedal
2. Clutch pedal position sensor
3. Electronic transmission control unit
4. Transmission gear pump
5. Clutch control proportional solenoid valve
6. Main clutch

1.3 REAR PTO

DESCRIPTION

The rear PTO provides drive for external implements at a preselected rotation speed.
 The rotary drive is taken directly from the engine and then reduced through a 2 -or 4-speed gearbox with manual speed selection.
 The PTO is engaged by way of an electro-hydraulically controlled clutch.

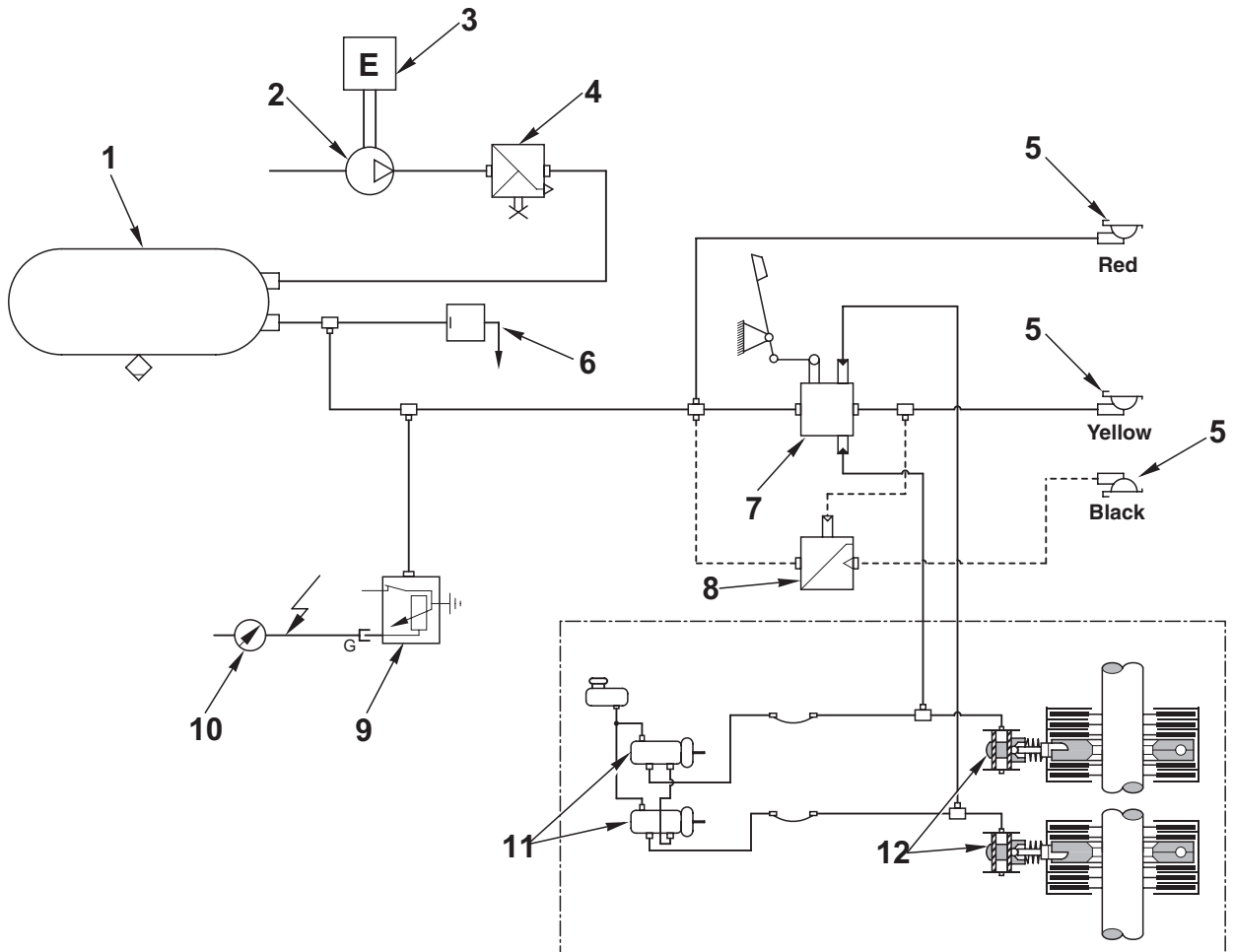


- 1. Clutch
- 2. Synchronizer 1
- 3. Intermediate shaft
- 4. Intermediate shaft
- 5. PTO shaft
- 6. Synchronizer 2

Speed of PTO output shaft - 4-speed version

Synchronizer 1	Synchronizer 2	
	c	d
a	562	1046
b	772	1437

2.3.4 AIR TRAILER BRAKING (EXPORT VERSION)



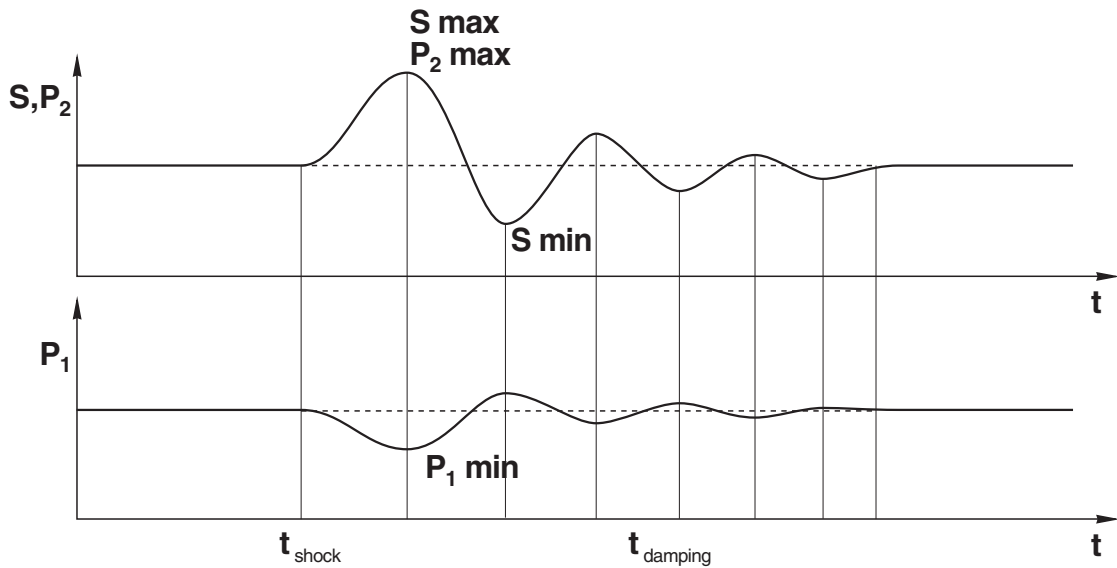
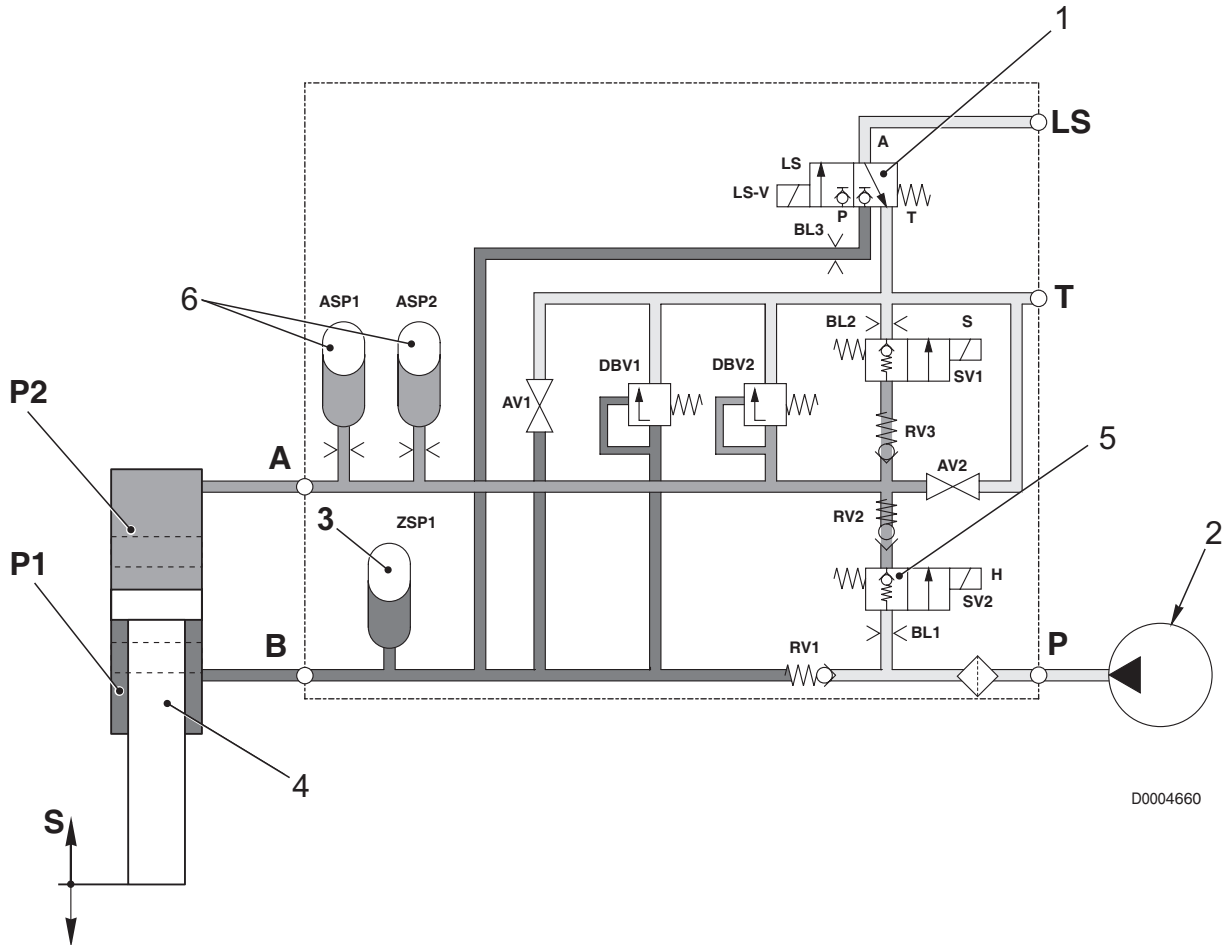
STANDARD SYSTEM BRAKING

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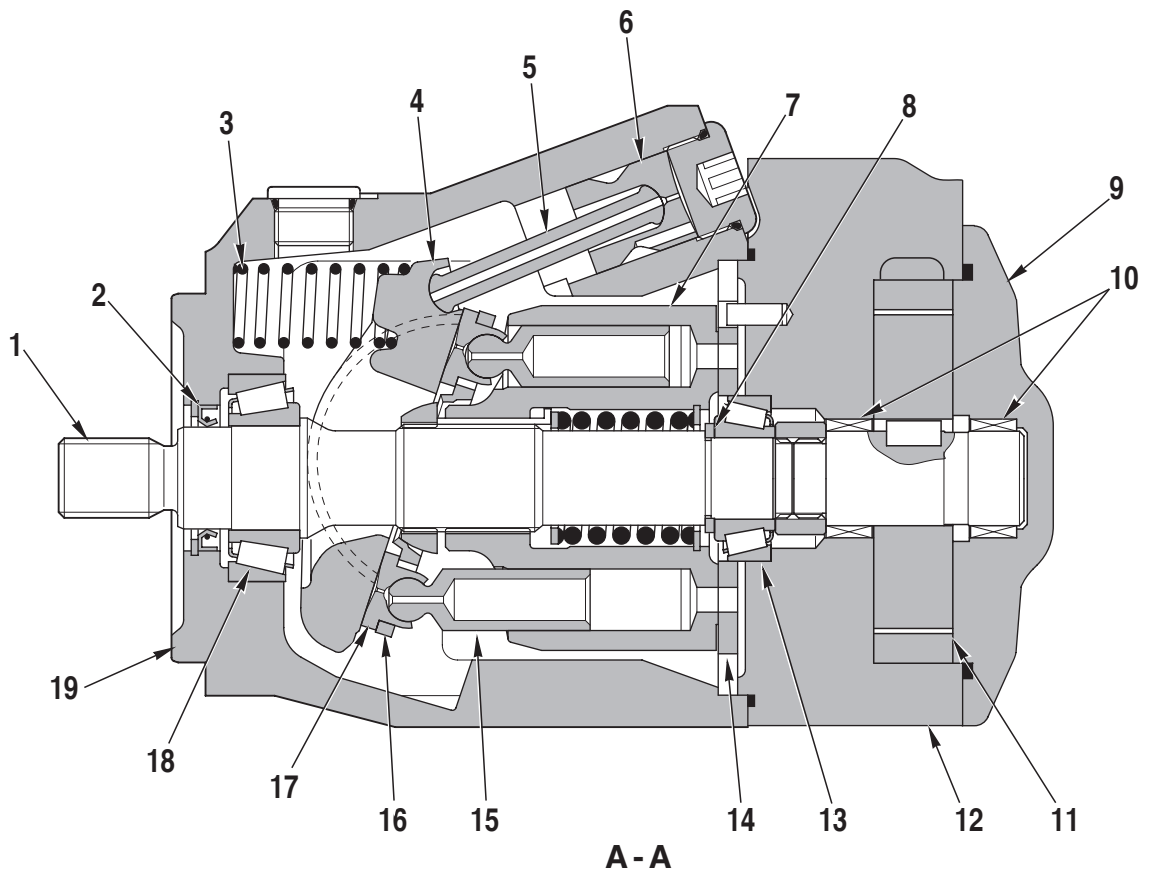
- | | |
|---|----------------------------------|
| 1. Compressed air reservoir | 7. Trailer braking valve (2-way) |
| 2. Air compressor | 8. Trailer braking valve (1-way) |
| 3. Engine | 9. Circuit pressure sensor. |
| 4. Pressure limiting valve
(7.8 bar (113 psi)) | 10. Circuit pressure indicator |
| 5. Quick-action coupler for trailer | 11. Brake master cylinder |
| 6. Feed valve for cab air suspension | 12. Brake |

3. When the system is active

- When the tractor is in motion and the wheels encounter an obstacle, the front axle is pushed upwards.
- This causes the pressure P2 to increase (the accumulators 6 are compressed) while the pressure P1 decreases (accumulator 3 is decompressed).
- The pressure balance is thus altered and the system (which is closed) acts to restore the original condition.



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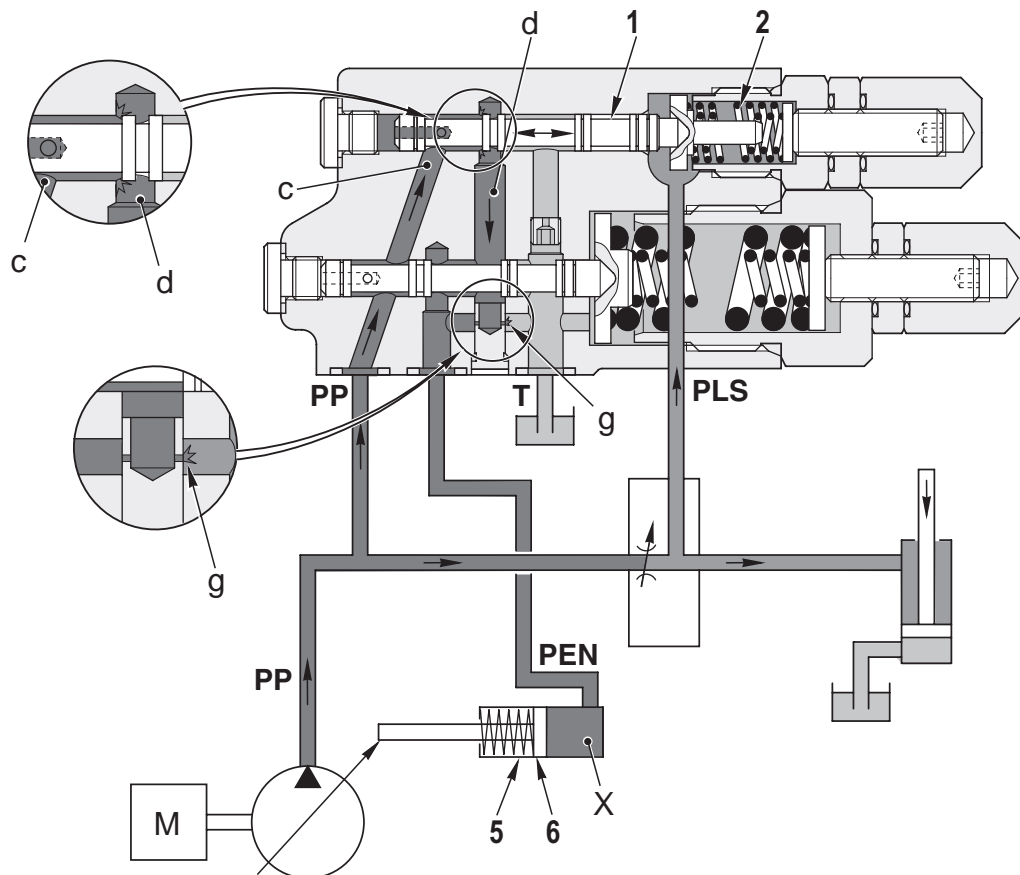


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COMPONENTS

- | | |
|------------------------------|--------------------------|
| 1. Input shaft | 11. Boost pump |
| 2. Oil seal | 12. Boost pump housing |
| 3. Swash plate return spring | 13. Bearing |
| 4. Swash plate | 14. Valve plate |
| 5. Control rod | 15. Pistons (n° 9) |
| 6. Control piston | 16. Piston retainer ring |
| 7. Cylinder barrel | 17. Piston shoe |
| 8. Spacer | 18. Taper roller bearing |
| 9. End cover | 19. Pump housing |
| 10. Roller bearings | |

c. When the flow rate stabilises

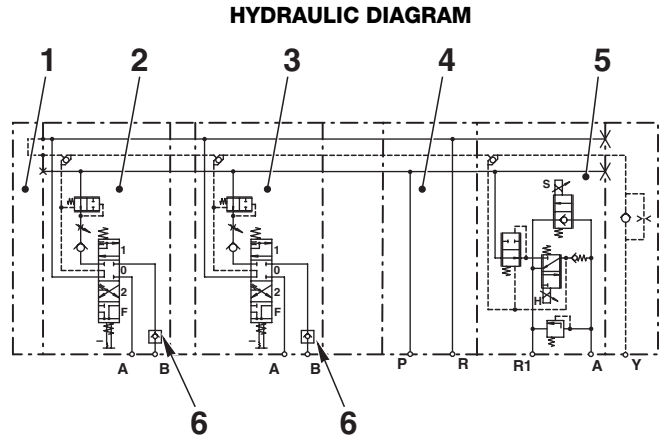
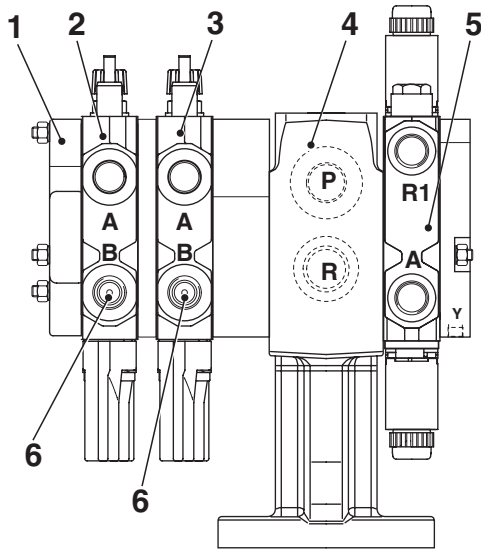


D0004870

- When the pump delivery reaches the demand from the auxiliary control valve, the pump delivery pressure **PP** present in the chamber **b** of the **LS** valve balances the combined force of the pressure **PLS** of the **LS** in chamber **a** and the force exerted by the spring (6).
On reaching this state of equilibrium, the piston (1) comes to a stop in an intermediate position.
- In this condition, the passage connecting chamber **c** to chamber **d** remains partially open, thereby maintaining the pressure in chamber **d**.
An oil flow enters the control piston (6) at a sufficient pressure to balance the force exerted by the spring (5).
- The stability of this equilibrium is ensured by a stabilised flow from the restrictor **g**.
- The force of the spring (2) is regulated so that the piston (1) is balanced when $\mathbf{PP - PLS = \Delta PR = 22 \text{ bar (319 psi)}}$.
- In practical terms, pump delivery is made proportional to the aperture of the auxiliary control valve, maintaining the pressure difference $\mathbf{\Delta PR = 22 \text{ bar (319 psi)}}$.
- This condition remains unaltered until there is a change in the operating conditions (e.g. a change in engine speed, reduction or increase in the demand for flow or pressure, etc.).

5.5.2 TYPES OF CONTROL VALVE WITH VARIABLE DISPLACEMENT PUMP (LS)

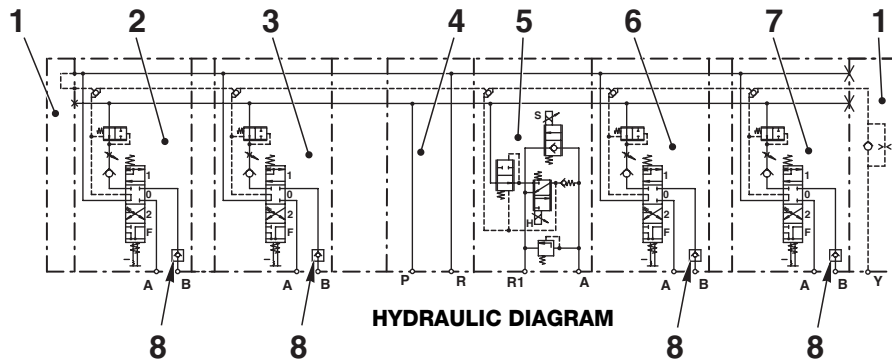
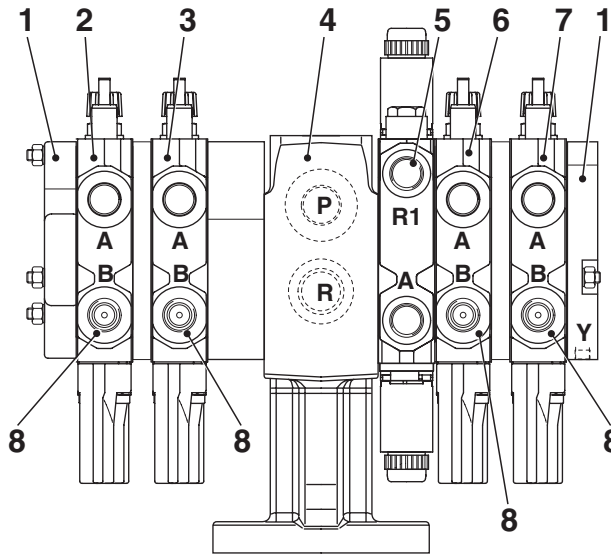
4-WAY VERSION



D0022620

- | | |
|-------------------------------|-------------------------------|
| 1. Cover plate | 4. Control valve section n° 2 |
| 2. Control valve section n° 1 | 5. Inlet manifold |
| 3. Lift control valve section | 6. Check valve |

8-WAY VERSION

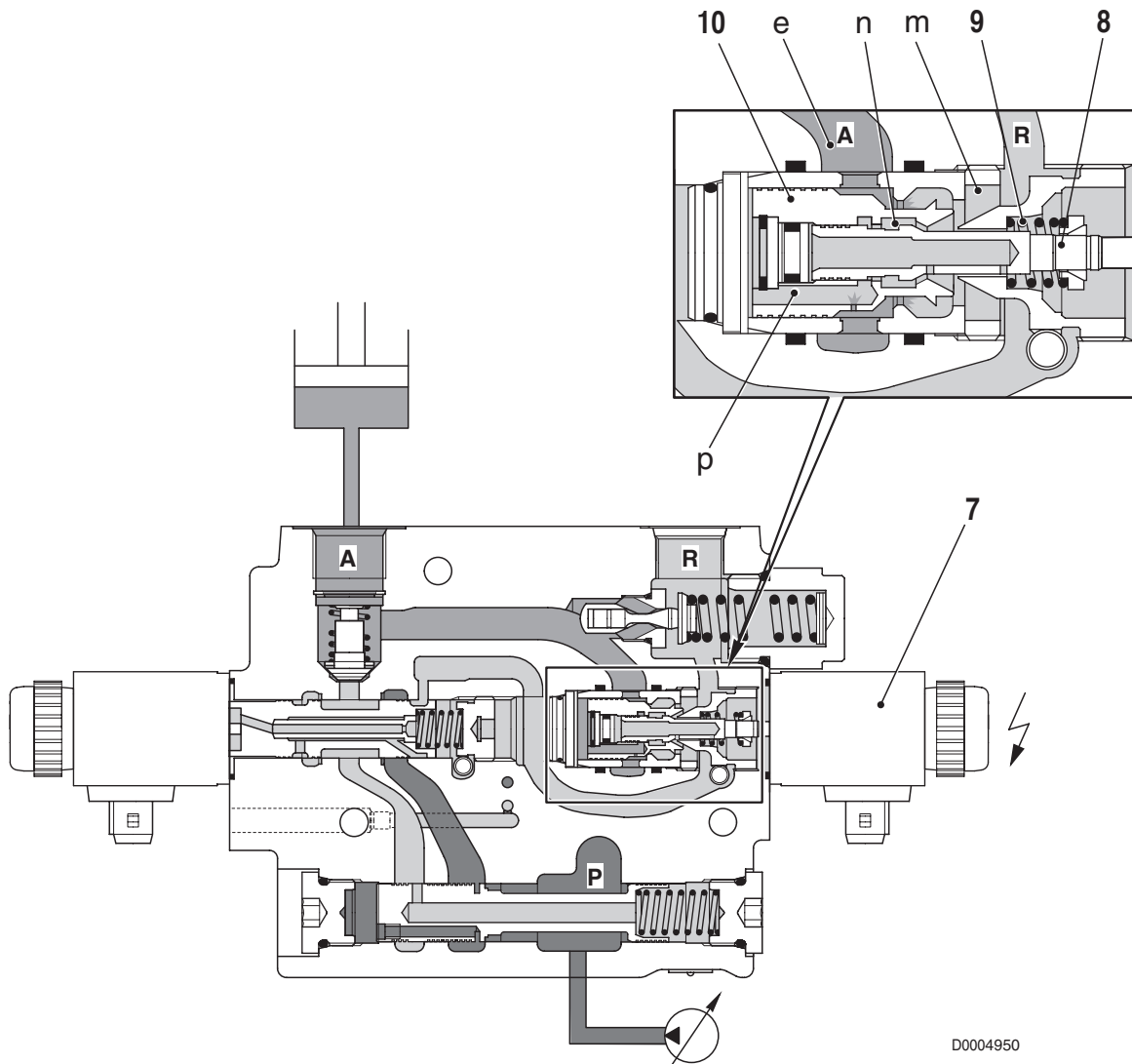


D0022680

- | | |
|-------------------------------|-------------------------------|
| 1. End cover | 5. Lift control valve section |
| 2. Control valve section n° 1 | 6. Control valve section n° 3 |
| 3. Control valve section n° 2 | 7. Control valve section n° 4 |
| 4. Inlet manifold | 8. Check valve |

3. When the lift is lowered

- During lifting or when the lift is stationary, the spool (8) is pushed to the right by the spring (9).
- As a result, the passage between the chambers **m** and **n** is closed and the pressure in chamber **p** pushes the spool (10) to the right.
- When the lift is lowered, the electronic lift control energises the solenoid (7) that moves the spool (8) to the left.
- The oil in chamber **n** can flow into chamber **m** and the pressure in chamber **p** is reduced.
- Now the force balance coming from the pressure in the chambers **e** and **p** influencing the spool (10), is disturbed and moved to the left. Oil can flow now from **e** to **m**.
- As a result, the oil in the lift cylinders is directed to the drain circuit and the lift is lowered.
- As the solenoid is of the proportional type, the more current supplied, the more the spool (8) shifts to the left, thereby allowing more oil to flow and the lift to descend more rapidly.
- The electronic control obtains float position by energising the solenoid valve (7) and holding it fully open.
- In this condition, the oil in the lift cylinders is sent to the drain circuit so that the lift is free to move up and down and follow the contours of the terrain.



1.2 “SERDIA 3.5 LEVEL III” SOFTWARE

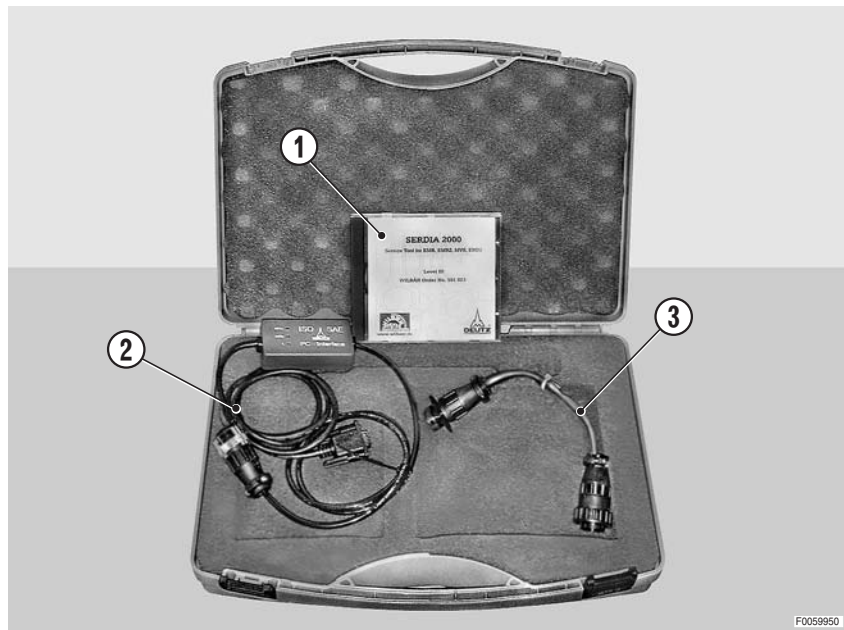
SERDIA is the name given to a software package (code 5.9030.740.4/10) for installation on a portable computer, designed to assist the technician in making an accurate analysis of faults, setting up the tractor for service and verifying the correct operation of electrical components associated with the engine.

With SERDIA, the technician can:

- display errors (faults) that have occurred;
- program the control unit;
- carry out sensor calibration or setting procedures.

1.2.1 DESCRIPTION OF THE KIT

The SERDIA software is supplied to Authorised Workshops in a carrying case with all the basic items needed for operation. The case contains:



Pos.	Code	Description	Qty
	5.9030.740.4/10	Case, complete	1
1	5.9030.740.0	. Installation disk	1
2	5.9030.740.2	. Level III interface, General revision	1
3	5.9030.741.0	Adapter cable (not included in kit)	1

The exchange of data between the SERDIA software and the control units occurs by way of a diagnosis socket incorporated into a wiring harness of the tractor.

Accordingly, the SERDIA package is supplied with an interface cable that must be used on the particular model and version of tractor being serviced.

3.3.2 ASM SYSTEM

The lift control unit also governs the ASM system which, when activated by the operator, manages the engagement and disengagement of the four wheel drive clutch and differential lock mechanism automatically.

The parameters used to determine exclusion of the differential lock and disengagement of the four-wheel drive are:

- wheel speed;
- steering angle;
- type of braking action (one or two pedals).

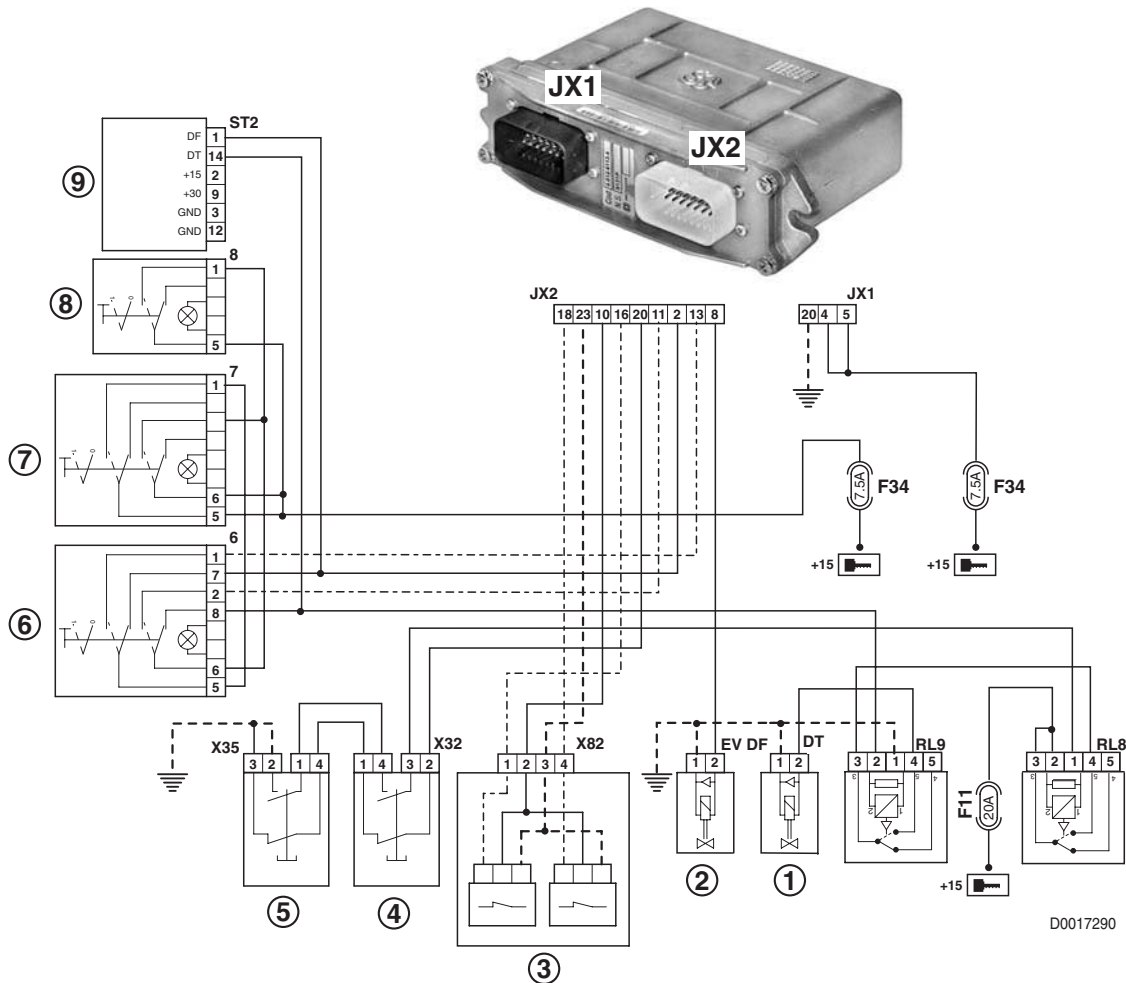
The command which activates the system, and the signals from the brake pedal, wheel speed and steering angle sensors are all routed directly to the control unit.

The control unit processes the data and, according to the status of the system and the parameter settings, activates or deactivates the solenoid valves controlling engagement of four-wheel drive and of the differential locks.

The hydraulic lift control unit warns the operator of any malfunction in monitored components by way of a red Led (lift transport lock indicator) located on the lift control console.

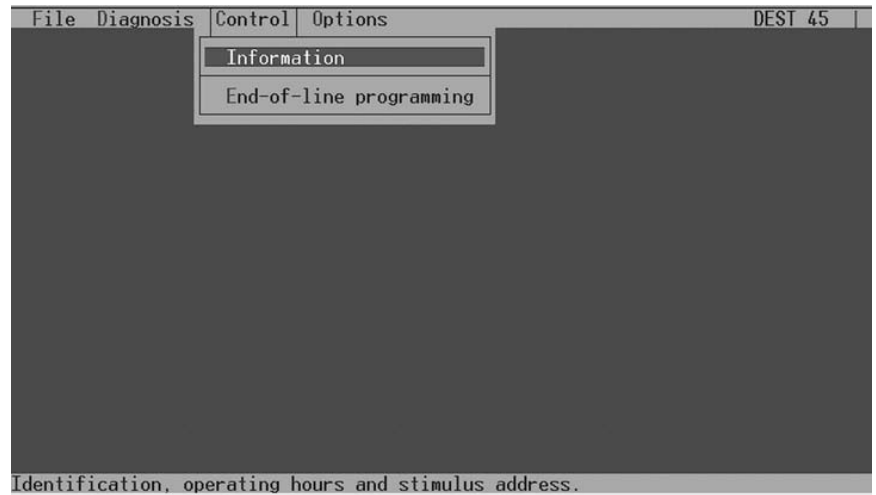
Faults are indicated using a system of coded flash sequences which, depending on how the control unit has been configured, will either specify the precise nature of the fault (extended alarm) or simply identify the device affected (standard alarm). Also, and likewise depending on the configuration, the unit can display only the alarm with the lowest code (rotation of alarms deactivated), or it can display all the active alarms (rotation of alarms activated).

The ART shows the 10 most recent alarms generated, and if a further alarm is triggered, the first of the ten will be eliminated. To verify, using the ART, whether or not an alarm detected is "active", the technician must cancel all the alarms, turn the starter key to the "O" (OFF) position, then make a fresh connection to the control unit.

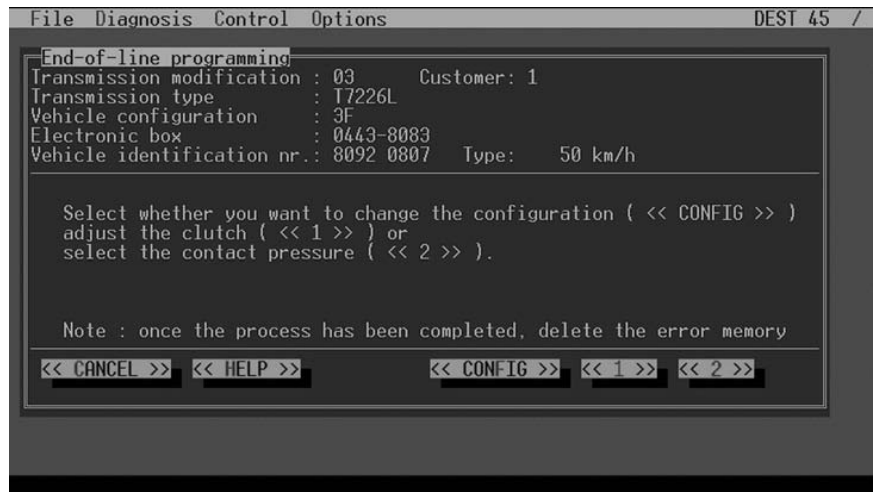


- | | |
|--|------------------------------|
| 1 - Four wheel drive (4WD) clutch solenoid valve | 6 - ASM switch |
| 2 - Differential lock solenoid valve | 7 - Differential lock switch |
| 3 - Steering angle sensor | 8 - 4WD switch |
| 4 - Right brake pedal switch | 9 - Instrument panel |
| 5 - Left brake pedal switch | |

5 - Select "END-OF-LINE PROGRAMMING" from the "CONTROL" menu.

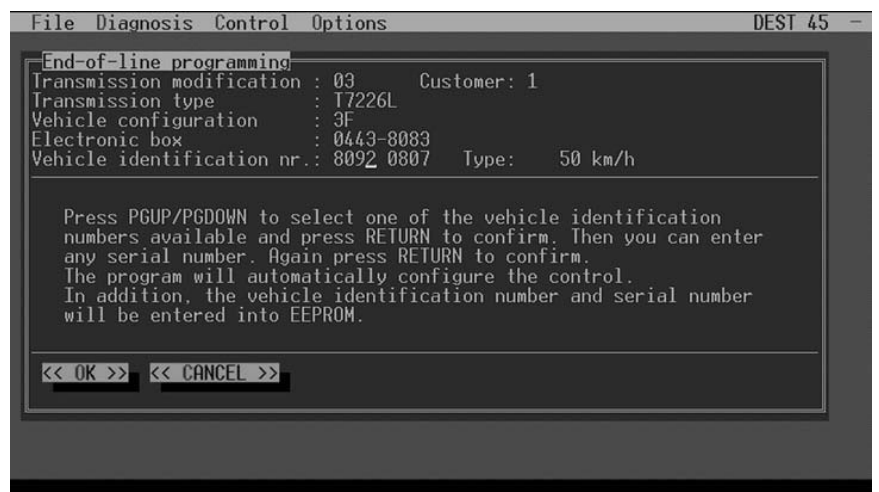


6 - Select "CONFIG".



7 - Use the "PAGE UP" or "PAGE DOWN" functions to find the identification number of the vehicle corresponding to the first four digits of the serial number, then press Enter to confirm the value and type the remaining four numbers to complete the serial number of the machine (in the example illustrated, the version is 8092 and the serial number 0807).

8 - Proceed to calibrate the clutch pedal position sensor and the main clutch as described in the following chapters.



Standard flash	Extended flash	Display on ART	Description	Page
34	71	DownSpeedPotent.	The control unit detects that the rate-of-drop potentiometer is disconnected or short-circuiting.	20-70
36	73	CtrlMode Potent.	The control unit detects that the MIX potentiometer is disconnected or short-circuiting.	20-72
41	65	Radar NotConnect.	The control unit detects that the radar is disconnected.	20-68
42	64	WheelSensNotConn.	The engine control unit detects that the signal from the wheel speed pickup is either non-existent or incorrect.	20-67
51	41	ShortCircuit4WD	The control unit detects that the 4WD clutch solenoid valve relay is short-circuiting.	20-55
	43	4WD NotConnected	The control unit detects that the 4WD clutch solenoid valve relay is disconnected.	20-62
52	51	ShortCircuitDIF -OK -	The control unit detects that the differential lock solenoid valve is short-circuiting.	20-63
	53	EvDIFDeconnect.	The control unit detects that the differential lock actuator solenoid valve is disconnected.	20-64
53	14	ASM-ShortCircuit	The control unit detects that either the differential lock or four wheel drive solenoid valve is short-circuiting.	20-52
54	76	EEPROM :OPTION	The control unit detects a bad reading of data from EEPROM.	20-74
	77	EEPROM : SPEED	The control unit detects a bad reading of data from EEPROM.	20-74
	78	EEPROM : CALIB	The control unit detects a bad reading of data from EEPROM.	20-74
55	81	EEPROM : CTRL	The control unit detects a bad reading of data from EEPROM.	20-75
	82	EEPROM : PWM	The control unit detects a bad reading of data from EEPROM.	20-75
	83	EEPROM : DRAFT	The control unit detects a bad reading of data from EEPROM.	20-75
	84	EEPROM : SLIP	The control unit detects a bad reading of data from EEPROM.	20-76
	85	EEPROM : POS	The control unit detects a bad reading of data from EEPROM.	20-76
	86	EEPROM : AB	The control unit detects a bad reading of data from EEPROM.	20-76
	87	EEPROM : SFCFG	The control unit detects a bad reading of data from EEPROM.	20-77
	88	EEPROM : SLCFG	The control unit detects a bad reading of data from EEPROM.	20-77

Extended alarm: 24
Standard alarm: 11



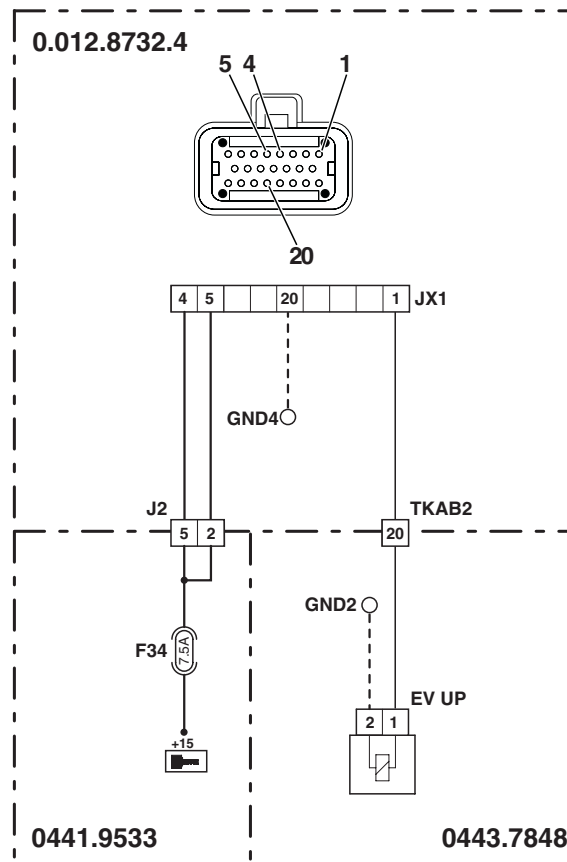
← EvUpNotConnect.D

DESCRIPTION

The control unit detects, in the presence of an energizing signal (dynamic safety), that the lift Up solenoid valve coil is not connected.

CHECK

- Check that the contacts on connector “EV UP” and on those of the lift control unit, “JX1” and “JX2”, are firmly attached and not oxidised.
- Test the internal resistance of the lift Up control solenoid (for details, see section 40).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 1 of connector “EV UP” and to pin 1 of connector “JX1”, and measure the resistance to check the continuity of the circuit (meter reading: 0 Ohm).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 2 of connector “EV UP” and to chassis earth, and measure the resistance to verify the continuity of the circuit (meter reading: 0 Ohm).
- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.



D0017580

Extended alarm: 64
Standard alarm: 42



← WheelSensNotConn.

DESCRIPTION

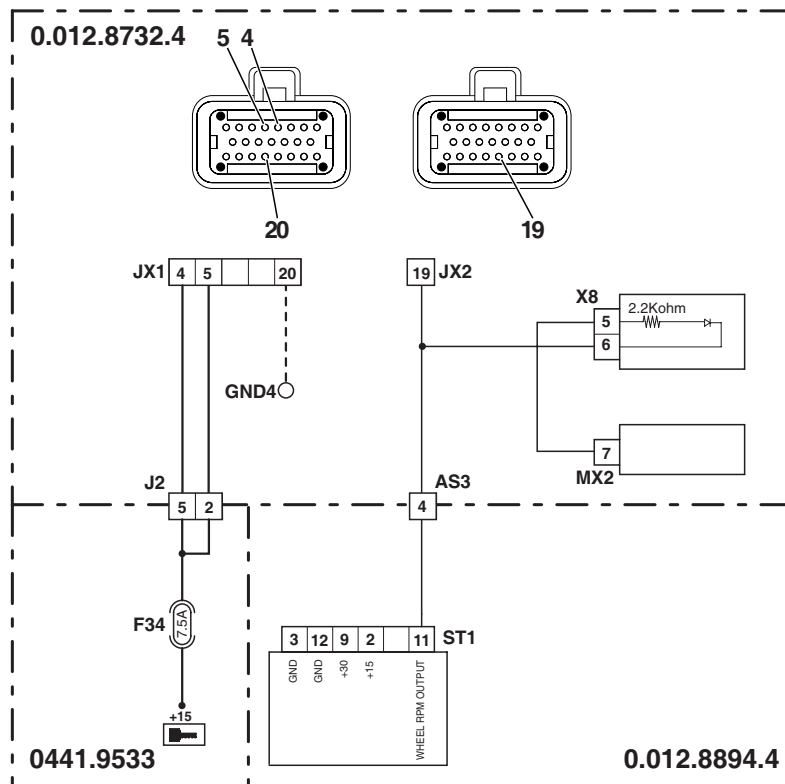
The engine control unit detects that the signal from the wheel speed pickup is either non-existent or incorrect.

NOTA

If, when this alarm is triggered, the Infocenter continues to indicate the ground speed, the fault will be on the line between the Infocenter and the transmission control unit; conversely, if the speed is not indicated with the machine in motion, the problem is in the connection between the wheel sensors, the transmission control unit and the Infocenter (for details on how to identify the fault, see transmission alarm N° 47).

CHECK

- Check that the contacts on connector “ST1” of the Infocenter, connector “X8” of the engine control unit circuit board, connector “MX2” of the engine control unit and connectors “JX1” and “JX2” of the lift control unit, are all firmly attached and not oxidised.
- Check with the SERDIA program that the engine control unit is receiving the ground speed signal. If the signal is being acknowledged, renew the lift control unit.
- Connect a test meter to pin 11 of connector “ST1” and pin 19 of connector “JX2”, and measure the resistance to verify the continuity of the circuit (meter reading: 0 Ohm).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 19 of connector “JX2” and to cab earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).
- With the starter key in the “I” (ON) position, connect a test meter to pin 19 of connector “JX2” and to cab earth, and check that there are no short circuits to positive (meter reading: 0V).
- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed..



D0017650

Extended alarm: 87
Standard alarm: 55



← EEPROM : SFCFG

DESCRIPTION

The control unit detects a bad reading of data from EEPROM.

CHECK

- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.
-

Extended alarm: 88
Standard alarm: 55



← EEPROM : SLCFG

DESCRIPTION

The control unit detects a bad reading of data from EEPROM.

CHECK

- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.

ALARM N° 13**DESCRIPTION**

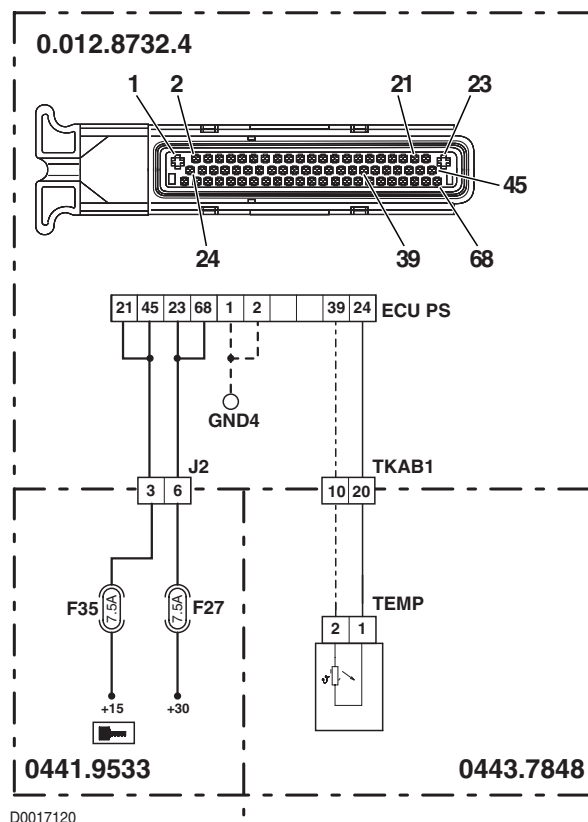
The control unit detects a problem with the power input to the temperature sensor.

ECU RESPONSE.

The control unit does not limit the operation of the transmission, but sets the transmission temperature to the “Transmission cold” default value (HK pedal holding time, splitter holding time, slip times).

CHECK

- Check that the contacts on connector “TEMP” and on that of the lift control unit, “ECU PS”, are firmly attached and not oxidised.
- Verify the correct operation of the sensor (for technical details, see section 40).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 1 of connector “TEMP” and to transmission earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 2 of connector “TEMP” and to transmission earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).
- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the transmission control unit must be renewed.



ALARM N° 27**DESCRIPTION**

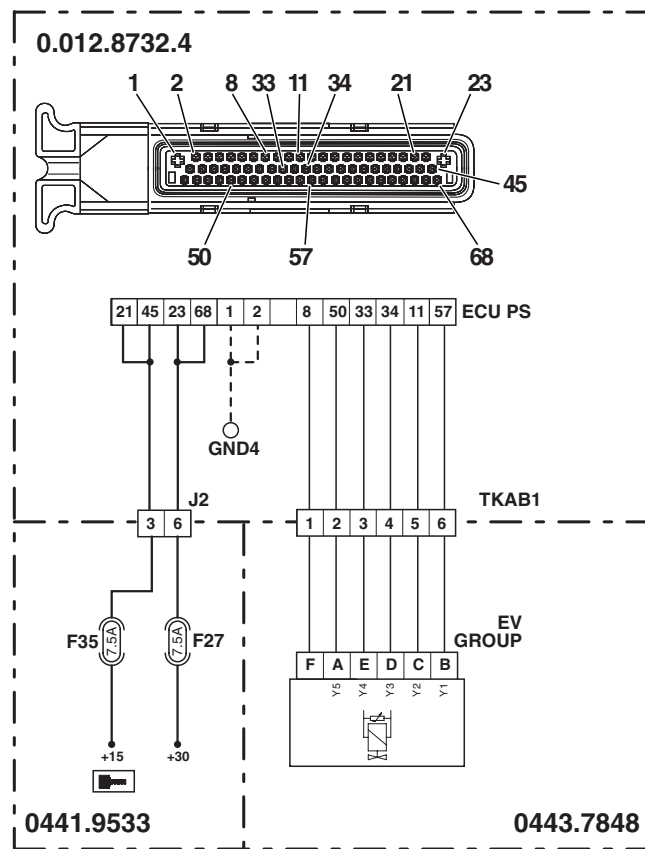
The control unit detects that solenoid Y5 (controlling field/road mode selection) is either not connected or faulty.

ECU RESPONSE

The control unit limits operation to "STAND-BY STRATEGY" mode.

CHECK

- Check that the contacts on connector "EV GROUP" and connector "ECU PS" of the transmission control unit are firmly attached and not oxidised.
- With the starter key in the "O" (OFF) position, connect a test meter to pin A and pin F of connector "EV GROUP" on the transmission, and measure the resistance of the solenoid (for details, see section 40).
- With the starter key in the "O" (OFF) position, connect a test meter to pin A of connector "EV GROUP" and pin 50 of connector "ECU PS", and measure the resistance to verify the continuity of the circuit (meter reading: 0 Ohm).
- Clear all alarms, turn the starter key first to "O" (OFF) and then back to the "I" (ON) position again, and if the alarm is still present, the control unit must be renewed.



ALARM N° 37**DESCRIPTION**

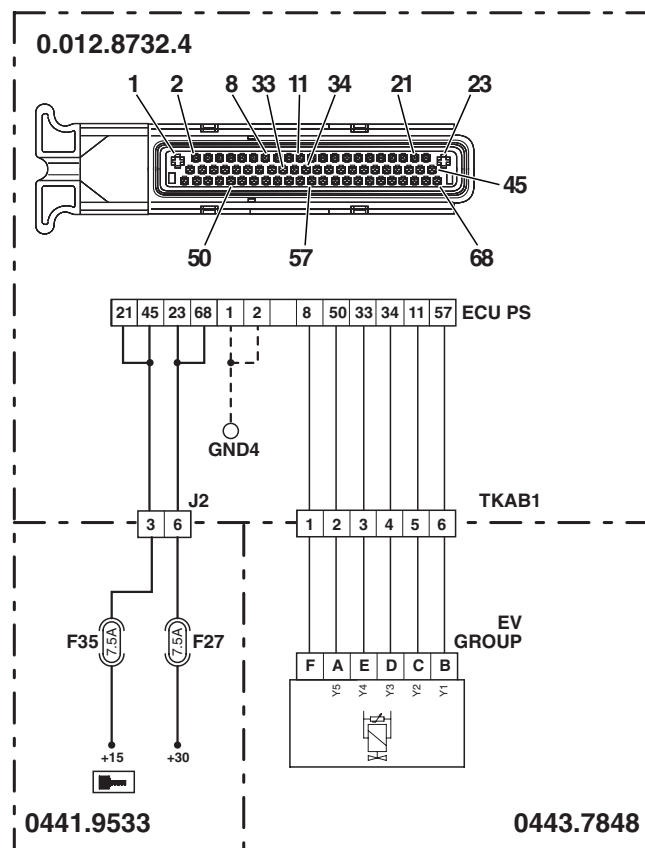
The control unit detects that the control line of solenoid Y2 is short-circuiting to earth

ECU RESPONSE

The control unit limits operation to "STAND-BY STRATEGY" mode.

CHECK

- Check that the contacts on connector "EV GROUP" and connector "ECU PS" of the transmission control unit are firmly attached and not oxidised.
- With the starter key in the "O" (OFF) position, connect a test meter to pin C and pin F of connector "EV GROUP" on the transmission, and measure the resistance of the solenoid (for details, see section 40).
- With the starter key in the "O" (OFF) position and connector "ECU PS" unplugged, connect a test meter to pin C of connector "EV GROUP" and to pin 11 of connector "ECU PS", and measure the resistance to verify whether or not there are short circuits to earth (meter reading: infinity).
- With the starter key in the "O" (OFF) position and connector "ECU PS" unplugged, connect a test meter to pin F of connector "EV GROUP" and to pin 8 of connector "ECU PS", and measure the resistance to verify whether or not there are short circuits to earth (meter reading: infinity).
- With the starter key in the "O" (OFF) position, connect a test meter to pin C and pin F of connector "EV GROUP", and measure the resistance to verify that the wires are not short-circuiting one to another (meter reading: infinity).
- Clear all alarms, turn the starter key first to "O" (OFF) and then back to the "I" (ON) position again, and if the alarm is still present, the control unit must be renewed.



ALARM N° 52**DESCRIPTION**

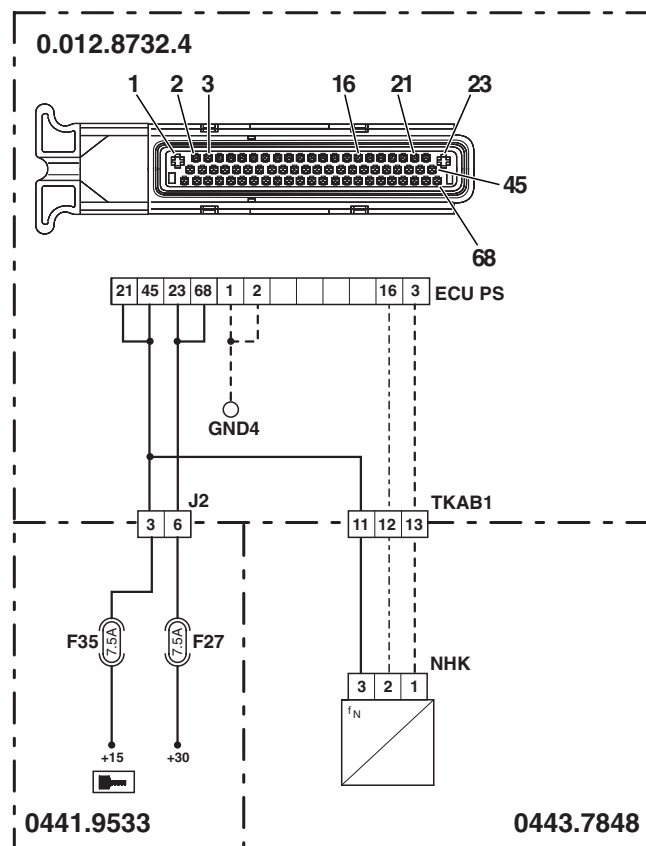
The control detects unreliable information coming from the rpm sensor nHk

ECU RESPONSE

The control unit limits operation to "LIMP-HOME" mode, and at the first attempt to shuttle in either direction, the transmission will revert to neutral, emitting a continuous beep.

CHECK

- Check that the contacts on connector "NHK" and on connector "ECU PS" of the transmission control unit are firmly attached and not oxidised.
- Verify the correct operation of the sensor (for technical details, see section 40).
- With the starter key in the "I" (ON) position, check that the power input to the transmission output speed sensor is correct (12V measured between pin 3 (positive) and pin 1 (negative) of connector "NHK").
- Clear all alarms, turn the starter key first to "O" (OFF) and then back to the "I" (ON) position again, and if the alarm is still present, the control unit must be renewed.



ALARM N° 67

DESCRIPTION

The control unit detects that the power input to the clutch pedal position sensor is lower than the correct value

ECU RESPONSE

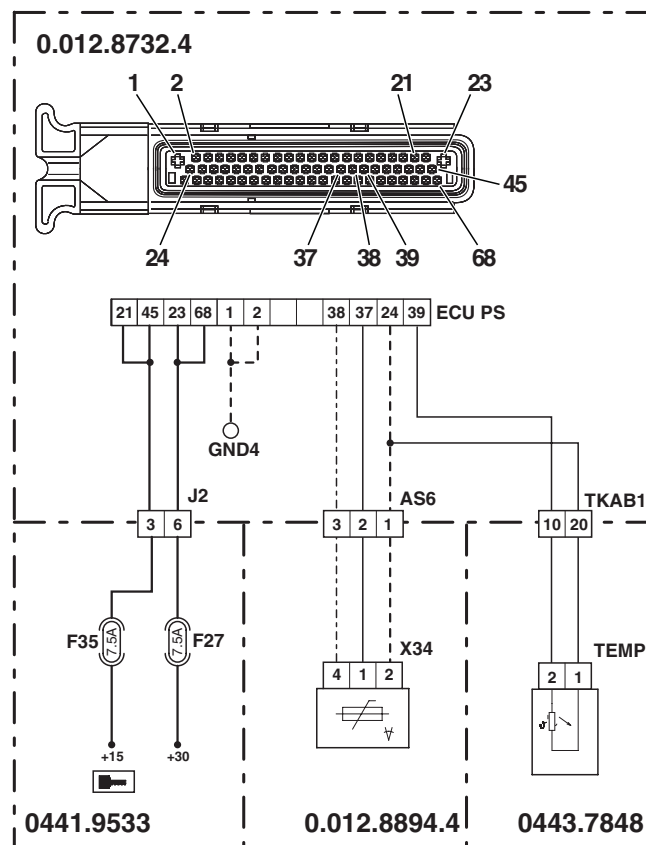
The control unit limits operation to “EMERGENCY DRIVE” mode, the transmission reverts to neutral and a continuous beep is sounded. In the event that one or more of alarms 85, 92 and 93 should also be activated, the transmission will be switched to “TC-SHUTDOWN” mode.

NOTE

This alarm could be displayed as a result of alarm 69 being activated.

CHECK

- In the event that there are other alarms activated, relating to the clutch pedal position sensor or the transmission oil temperature sensor, verify the cause as described under the relative alarm headings before proceeding as follows.
- Check that the contacts on connector “X34” of the clutch pedal position sensor, connector “TEMP” of the transmission oil temperature sensor, and connector “ECU PS” of the transmission control unit, are all firmly attached and not oxidised.
- With the starter key in the “I” (ON) position, check that the power input to the clutch pedal position sensor is correct (5V measured between pin 2 (positive) and pin 1 (negative) of connector “X34”).
- Verify the correct operation of the sensor (for technical details, see section 40).
- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.



D0017440

ALARM N° 87

DESCRIPTION

The control unit detects that the type of vehicle has not been programmed correctly

ECU RESPONSE

The control unit limits operation to "TC-SHUTDOWN" mode.

CHECK

- Reprogram the control unit, entering the correct tractor model data, and repeat the calibration procedure for the main clutch and the clutch pedal.
- Clear all alarms, turn the starter key first to "O" (OFF) and then back to the "I" (ON) position again, and if the alarm is still present, the control unit must be renewed.

ALARM GEN2

DESCRIPTION

Transmission slips unexpectedly from forward or reverse drive into neutral.

ECU RESPONSE

The display indicates forward drive, reverse drive and neutral status simultaneously, and a continuous beep is sounded.

CHECK

- Reprogram the control unit, entering the correct tractor model data, and repeat the calibration procedure for the main clutch and the clutch pedal.
 - Check the wiring, following the procedures described for alarms 53, 54, 55, B56, B57 and B58.
 - Check the pressure in the hydraulic circuit of the transmission system.
 - Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.
-

ALARM GEN3

DESCRIPTION

The transmission continues to shift range automatically every 1 or 2 seconds

ECU RESPONSE

None

CHECK

- Reprogram the control unit, entering the correct tractor model data, and repeat the calibration procedure for the main clutch and the clutch pedal.
- Check the wiring, following the procedures described for alarms 36, 37, 38, 39, 40 and 41.
- Check the wiring, following the procedures described for alarms 53, 54, 55, B56, B57 and B58.
- Check the pressure in the hydraulic circuit of the transmission system.
- Clear all alarms, turn the starter key first to “O” (OFF) and then back to the “I” (ON) position again, and if the alarm is still present, the control unit must be renewed.

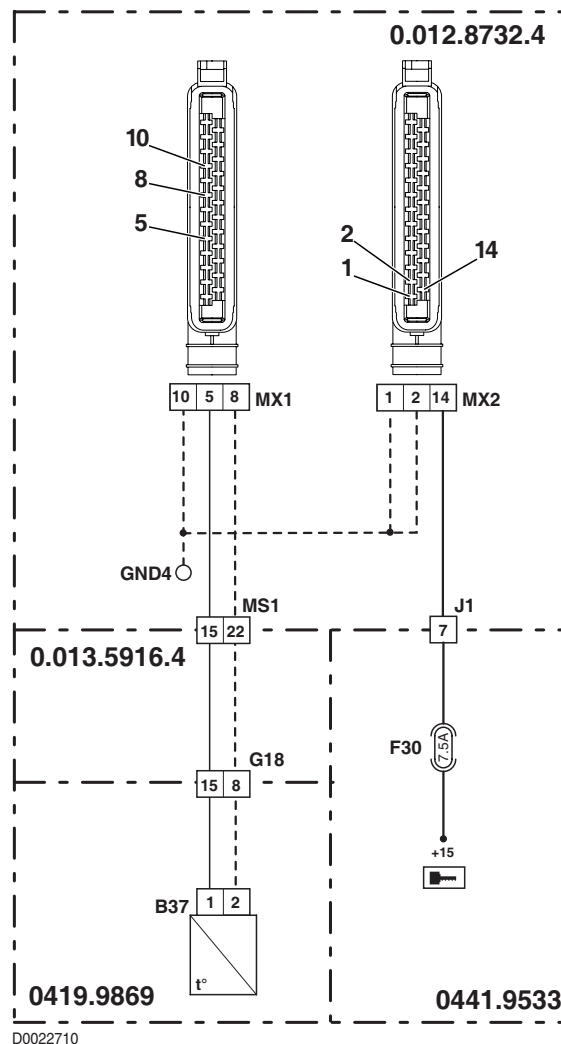
SERDIA ALARM N° 11

DESCRIPTION

The engine control unit has detected that the fuel temperature signal is either non-existent or unreliable.

CHECK

- Check for electrical continuity between pin 1 of connector “B37” and pin 5 of connector “MX1”.
- Check for electrical continuity between pin 2 of connector “B37” and pin 8 of connector “MX1”.
- Verify the correct operation of the sensor (for technical details, see section 40).
- With connector “MX1” unplugged from the engine control unit and the starter key in the “I” (ON) position, connect a test meter to pin 1 of connector “B37” and to engine earth, and check that there is no voltage registering (meter reading 0V).
- With connector “MX1” unplugged from the engine control unit and the starter key in the “I” (ON) position, connect a test meter to pin 2 of connector “B37” and to engine earth, and check that there is no voltage registering (meter reading 0V).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 1 of connector “B37” and to engine earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).
- With the starter key in the “O” (OFF) position, connect a test meter to pin 2 of connector “B37” and to engine earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).



D0022710

SERDIA ALARM N° 83

DESCRIPTION

The control unit detects that the power input to the accelerator pedal or hand throttle position sensor is either non-existent or incorrect.

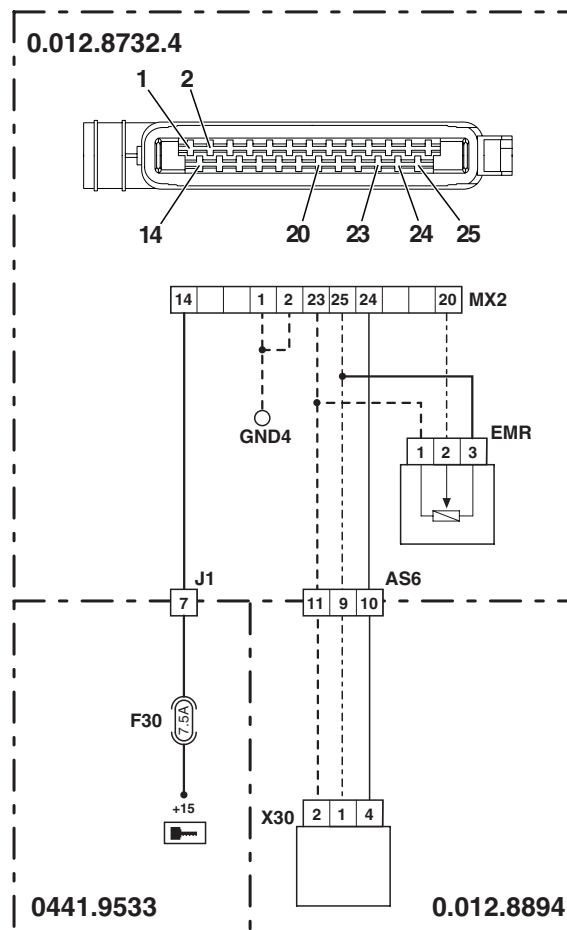
NOTE

The wiring and the sensor can be checked using connector "X31" located under the floor mat at the front of the cab, on the right hand side.

If an armrest control is installed, check the hand throttle power input starting from the connector located internally of the armrest.

CHECK

- Check that the power input to the accelerator pedal and hand throttle position sensors is correct (5 Vdc approx measured between pin 1 (positive) and pin 2 (negative) of connector "X30" or pin 1 (positive) and pin 3 (negative) of connector "EMR").
- Turn the starter key first to "O" (OFF) and then back to the "I" (ON) position.
- See if the alarm is still indicated; if so, contact Technical Assistance.



D0017200

ALARM N° 15



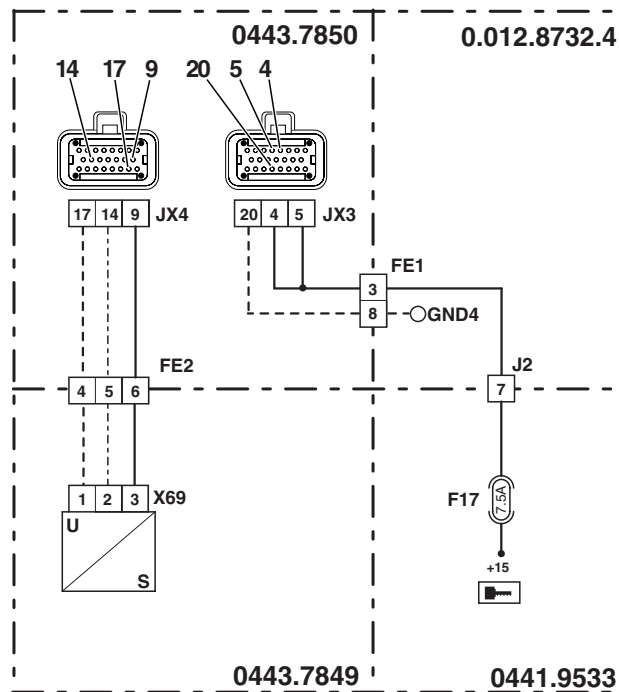
← PO. SE. Fa. or NC

DESCRIPTION

The control unit detects that the front suspension position sensor is disconnected.

CHECK

- Check that the contacts on connector “X69” of the front axle suspension position sensor and connector “JX4” of the control unit are firmly attached and not oxidised.
- With the starter key in the “I” (ON) position, check that the power input to the front suspension position sensor is correct (8 Vdc approx measured between pin 3 (positive) and pin 1 (negative) of connector “X69”).
- Check for electrical continuity between pin 14 of connector “JX4” and pin 2 of connector “X69”.
- With the starter key in the “O” (OFF) position, connect a test meter to pin 2 of connector “X69” and to transmission earth, and measure the resistance to verify that there are no short circuits to earth (meter reading: infinity).
- Verify the correct operation of the sensor (for technical details, see section 40).
- If the fault persists, renew the control unit.



D0017240

6. OPERATOR'S MANUAL EDS (Electronic Diagnosis System)

1. GENERAL INTRODUCTION

The electronic components in the AGROTRON are tested and programmed by means of the Electronic Diagnosis System (EDS) from DEUTZ-FAHR.

The existing version of the EDS consists of an interface cable and an adapter cable as well as of an installation disk with the corresponding programs.

The PC program and the cables are distributed via:

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

Viale F. CASSANI, 15

24047 TREVIGLIO (BG) - ITALIA

1.1 FUNCTIONAL SCOPE

The EDS software includes the following subprograms:

- **POWERSHIFT (not used for this tractor) and POWERSHUTTLE transmission**
 - Diagnosis
 - Readout of the gear box error memory
 - Programming of the gear box, e.g. upon replacement of the box (end-of-line programming)
 - Calibration of the sensor at the clutch pedal (end-of-line programming)
 - Evaluation of the contact pressure of the main clutch (only for power shuttle)
- **Agrotronic-hD (not used for this tractor)**
 - Diagnosis
 - Readout of the AGROTRONIC-hD box error memory
 - Calibrate valves
- **Infocenter**
 - Diagnosis
 - Programming of the constant values
- **Spring-suspended front axle (not used for this tractor)**
 - Diagnosis
 - Readout of the control box error memory
 - Reading resp. loading of the control box standard data (parameters) converter

3.2.2 MENU DIAGNOSIS

- **Diagnosis > Read error memory**

The menu item "Read error memory" opens a window divided into two parts in which the contents of the error memory are displayed in chronological order.



Fig. 25 - Read error memory

The double frame and the highlighted lines "Read error memory" resp. "Error description" show which part of the window is currently active.

In the left part of the window the current operating-hours of the transmission-E-box (not to be compared with the operating hours of the infocenter!) and the number of the various errors detected by the transmission-E-box are displayed. Below the errors stored in the E-box are indicated. In the column "Errors" the respective error codes are listed. The column "active" indicates the corresponding error status. "Y" stands for yes; i.e. the error is currently active – resp. "N" for no; i.e. the error is currently not active. The third column "Number" indicates how many times the respective error has occurred. The information under "Operating-hours" indicates when the respective error has occurred.

The user can select an error with the cursor keys and cause a detailed error description to be displayed on the right side of the screen by means of clicking on OK or pressing ENTER. The error text can be scrolled by means of the cursor keys if it exceeds the size of the right window.

Pressing of ESC or C reactivates the left screen window.

If the left window is active, all errors can be saved in a text file with their detailed description by means of pressing F2. In addition to the error descriptions the current operating-hours counter, the identification data, the current date as well as the vehicle identification number and the number of the electronic box are saved. However, vehicle identification number and number of the electronic box can only be saved if the corresponding entry in the EEPROM is valid.

Code	Error location/error cause	System reaction	possible remedy	Remarks
48	nAB speed transmitter KM	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep Upon reversing standstill is not absolutely required!
49	nAB speed transmitter gradient (Plausibility)	Operation mode LIMP-HOME Check cabling Check speed sensor	Ignition off/on standstill threshold	<ul style="list-style-type: none"> Inadmissible speed discontinuity from transmitter failure threshold to Upon reversing demand neutral shifting, permanent beep Upon reversing standstill is not absolutely required!
50	nHK speed transmitter LU, K+	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep
51	nHK speed transmitter KM	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep
52	nHK speed transmitter gradient (Plausibility)	Operation mode LIMP-HOME	Ignition off/on Check cabling Check speed sensor	<ul style="list-style-type: none"> Inadmissible speed discontinuity from transmitter failure threshold to standstill threshold Upon reversing demand neutral shifting, permanent beep
53	nLSA speed transmitter LU, K+	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep
54	nLSA speed transmitter KM	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep
55	nLSA speed transmitter gradient (Plausibility)	Operation mode LIMP-HOME	Ignition off/on Check cabling Check speed sensor	<ul style="list-style-type: none"> Inadmissible speed discontinuity from transmitter failure threshold to standstill threshold Upon reversing demand neutral shifting, permanent beep
56	nMOT speed transmitter LU, K+	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep
57	nMOT speed transmitter KM	Operation mode LIMP-HOME	Check cabling Check speed sensor	<ul style="list-style-type: none"> Upon reversing demand neutral shifting, permanent beep

3.9 SENSORS AND SOLENOID VALVES AT THE TRANSMISSION T-7200

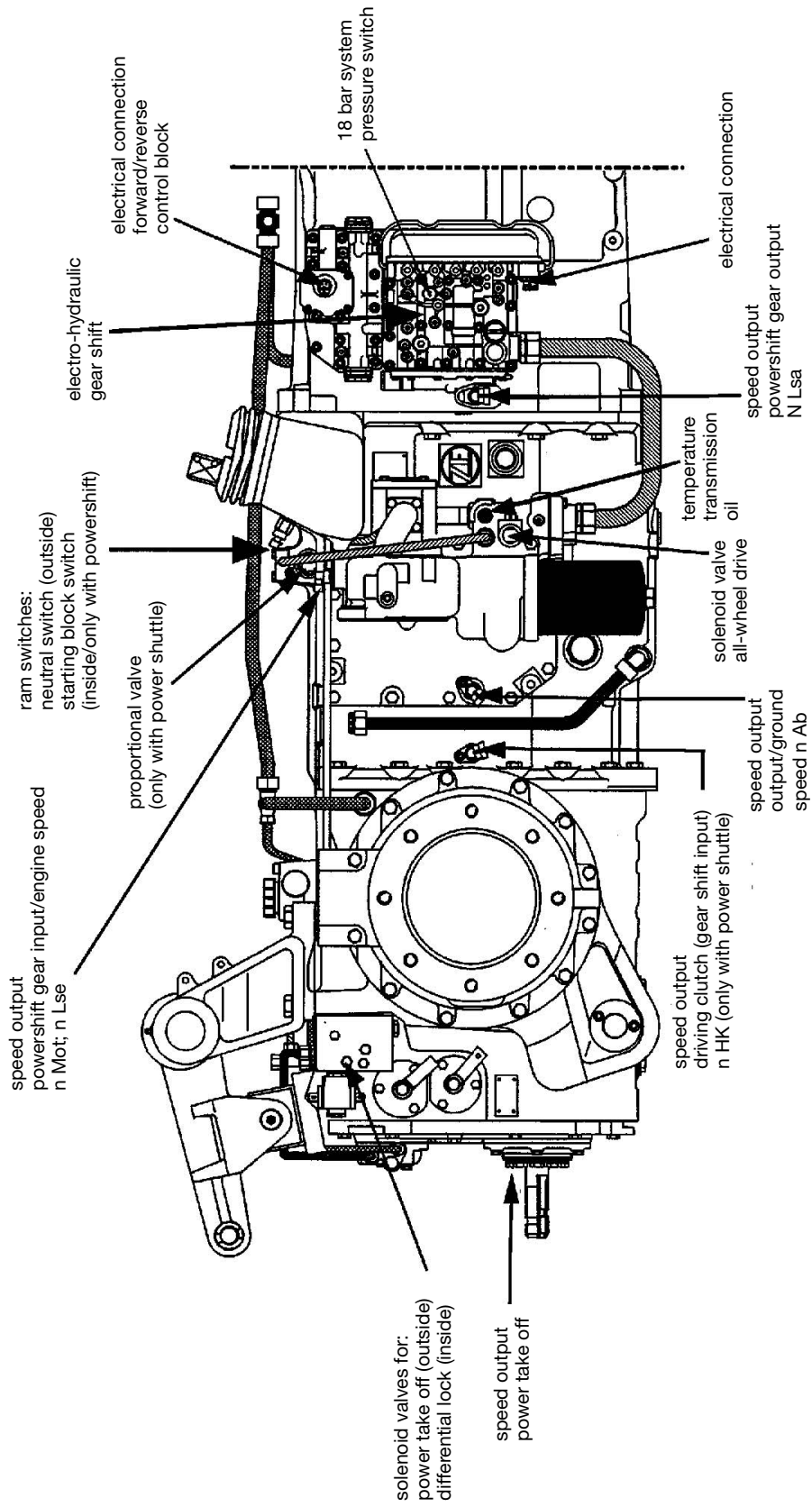




Fig. 57 - Set outputs

The last line "End output menu" is marked by a bar. Press the cursor keys to move the bar to the desired function and start the function by pressing ENTER.

- **Set outputs > Lamp test**

All LEDs (light emitting diodes) in the INFOCENTER are tested.

- Indication: All LEDs are lighting up.

For terminating the test step select "Reset outputs" and press the RETURN key.

- Indication: All LEDs are extinguishing.

- **Set outputs > Warning lamp**

The central warning light in the INFOCENTER 3 is tested.

- Indication: The warning light is lighting up.

For terminating the test step select "Reset outputs" and press the RETURN key.

- Indication: The warning light is extinguishing.

- **Set outputs > Beep**

The acoustic alarm - beep - in the INFOCENTER 3 is tested.

- Indication: The acoustic alarm - beep - is sounding.

For terminating the test step select "Reset outputs" and press the RETURN key.

- Indication: Beep stops.

- **Set outputs > true ground speed**

With this test step a signal is transmitted from the output of the true ground speed (plug X130 pin 5) to pin 1 of the signal socket.

- Indication: Ground frequency on.

Now a voltage signal is existing at the 7-pole signal socket. Measuring is possible between pin 1 (true ground speed signal) and pin 7 (ground).

- Setpoints

with ground frequency on: approx. 0,8 V (DC)

with ground frequency off: approx. 8 V (DC)

9. SERDIA (LEVEL III)

1. SETUP AND COMMUNICATIONS

SERDIA is a software program. Together with the notebook and the interface, it constitutes a tool which serves as an aid to communication with the engine ECUs.

SERDIA supports DEUTZ ECUs EMR, EMS and MVS. You can also communicate with three different ECUs using just one software product.

Any changes you wish to make to the ECUs as far as settings, parametrizations, error deletion and calibration are concerned are only possible with SERDIA.

SERDIA runs under the MS Windows®3.11 and Windows95 (98) user surface.

You can choose English or German as the user language when carrying out program installation.

The user surface enables the user to call up the functions required simply by clicking on the appropriate buttons.

The menu points listed below are available:

- ECU selection
- Measured values
- Parameters
- Error memory
- Function test
- Extras

1.1 MINIMUM EQUIPMENT REQUIRED

To run SERDIA, the following minimum equipment configuration is required:

1.1.1 CONTROL UNITS

- EMR1, Electronic engine controller System description TN 0297 7432
- EMR2, electronic engine controller System description TN 0297 9885
- MVS, solenoid valve system System description TN 0297 7488
- EMS2, engine monitoring system System description TN 0297 7930

1.1.2 DIAGNOSTIC CONNECTOR

Serial diagnostic connector TN 0419 9615 as specified in ISO 9141 and SAE J1587

1.1.3 INTERFACE

Link from control module (engine) to PC

- Level adaptation for ISO 9141, SAE J1708 and RS 485
- Security system with dongle, copy protection
- 12-24 V voltage supply range
- Supply source: engine
- Safety switching for protection against overvoltage and incorrect pole connection
- Galvanic isolation

1.1.4 PC/ NOTEBOOK

Minimum equipment required:

- Notebook or PC with 1 RS 232 serial interface PC (IBM-AT compatible) (should not be otherwise occupied, for example, mouse or IR interface).
- Parallel interface for printer
- Graphics card VGA/SVGA

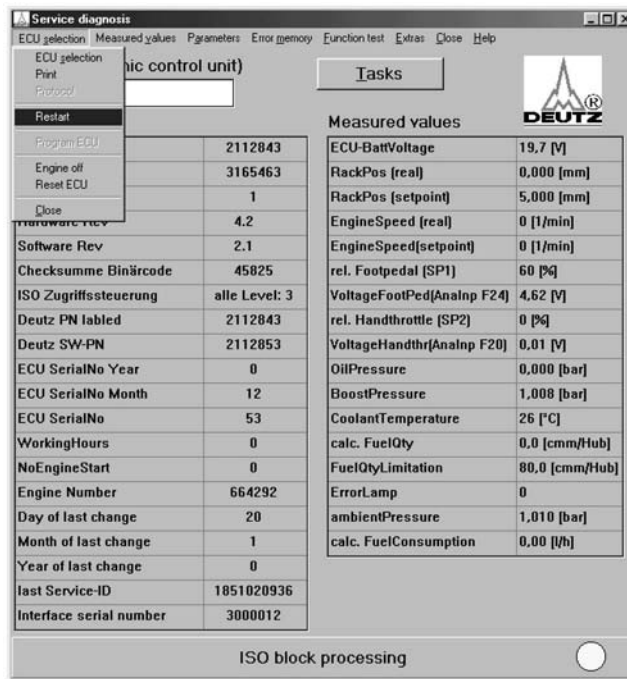
2. ECU SELECTION

2.1 SELECTING TWO CONTROL UNITS

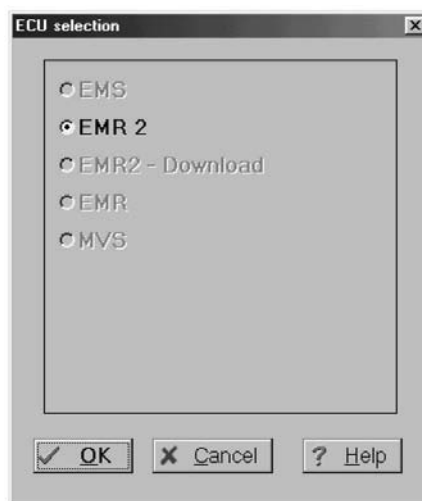
DEUTZ engines can be equipped with two control units (for example, MVS in combination with EMS2).

However, SERDIA can only communicate with one control unit. Exception: Error lists and measured values can also be read from the MVS control unit through an EMS2.

SERDIA tries to set up a connection automatically to the last control unit identified. If another control unit is to be selected, the control unit recognition process must be repeated by opening the "ECU selection/Restart" menu (this takes about 30 seconds).



After they have been successfully recognised, the control unit selection screen is opened. Only identified control units are presented for selection. Non-selectable control units are greyed out.



Possible control units are:

- EMR1, EMR2 (Electronic engine controller)
- MVS (Solenoid valve system)
- EMS2 (Engine Monitoring System)

2600EngineNo:Low	2730SetpLimitCan	2852DigitalOut2
2601EngineNo:High	2731SetpLimitVelocity	2853DigitalOut3
2602FunctionSetNo:Low	2740Setp1Source:Analog	2854DigitalOut4
2603FunctionSetNo:High	2741Setp1Source:PWM	2855DigitalOut5
2604CanSetNo:Low	2742Setp1Source:Subst	2856DigitalOut6
2605CanSetNo:High	2743Setp1Source:Can	2857DigitalOut7
2606ASAP2SetNo	2750CurrSetp:Setpoint1	2861DigitalOut1State
2607SerdialD:Low	2751CurrSetp:Setpoint2	2862DigitalOut2State
2608SerdialD:High	2752CurrSetp:SpeedFix1	2863DigitalOut3State
2609SerdiaDate:Day	2753CurrSetp:SpeedFix2	2864DigitalOut4State
2610SerdiaDate:Month	2754CurrSetp:Freeze	2865DigitalOut5State
2611SerdiaDate:Year	2755CurrSetp:FreezeSetp	2866DigitalOut6State
2612EOLDate:Day	2756CurrSetp:HoldButton	2867DigitalOut7State
2613EOLDate:Month	2757CurrSetp:MinButton	2868StatusErrorLamp
2614EOLDate:Year	2758CurrSetp:MaxButton	2900Setpoint1Extern
2701FuelLimitMax	2759CurrSetp:CallIdle	2901Setpoint2Extern
2702FuelLimitStart	2761CurrSetp:Veloldle	2902BoostPressure
2703FuelLimitSpeed	2810SwitchDroop2	2903OilPressure
2704FuelLimitBoost	2811SwitchDroopCurve	2904CoolantTemp
2705FuelLimitSimBoost	2812SwitchSpeedFix1	2905CharAirTemp
2706FuelLimitVelocity	2813SwitchSpeedFix2	2906FuelTemp
2707FuelLimitCan	2814SwitchSpeedLimit2	2920BoostPressureCorr
2710FuelLimitMinActive	2815SwitchSpeedLimit3	2921FuelTempCorr
2711FuelLimitMaxActive	2816SwitchGovernIMOrAll	2930AmbientPressure
2712StartLimitActive	2817SwitchFreezeSpeed	2931AmbientPressActive
2713SpeedLimitActive	2818SwitchFreezeSetp	3000ConfigurationError
2714BoostLimitActive	2819SwitchOilLevel	3001ErrPickUp1
2715SimBoostLimitActive	2820SwitchCoolantLevel	3002ErrPickUp2
2716VelocityLimitActive	2821SwitchSpeedInc	3003ErrVelocity
2717CanLimitActive	2822SwitchSpeedDec	3004ErrOverSpeed
2720SpeedLimit1Active	2823SwitchMinButton	3005ErrSetp1Extern
2721SpeedLimit2Active	2824SwitchMaxButton	3006ErrSetp2Extern
2722SpeedLimit3Active	2825SwitchHoldButton	3007ErrBoostPressure
2723ReduceCan	2826SwitchBrake	3008ErrOilPressure
2724ReduceOilPressure	2827SwitchNeutral	3009ErrCoolantTemp
2725ReduceCharAirTemp	2828SwitchGlowPlug	3010ErrCharAirTemp
2726ReduceCoolantTemp	2829SwitchEngineStop	3011ErrFuelTemp
2727ReduceAmbientPress	2851DigitalOut1	3030ErrOilPressWarn

DESCRIPTION OF THE FIELDS:

- **Error location:** List of error locations from which an individual error location can be selected for detailed information. Because there can be several causes of error for some components, this list may list some error locations several times. For example, oil pressure monitoring: Power rating and switch-off limit.
- **Type of error:** All the information contained in this field refers to the error location selected in the top field.
- **Environment data:** Additional details (e.g. measured values) which contain more information on the selected error location.
- **Total no. of errors:** Sum of all recorded error locations.
- **Frequency:** Frequency at which the selected error location occurs.
- **Error status:** Selected error active or passive.

EXPLANATION OF THE FUNCTION BUTTONS:

- **Read EM:** This function button is used to read out the error memory again from the control unit and the display is updated.
- **Clear EM:** This function button sends a request to the control unit to delete the error memory

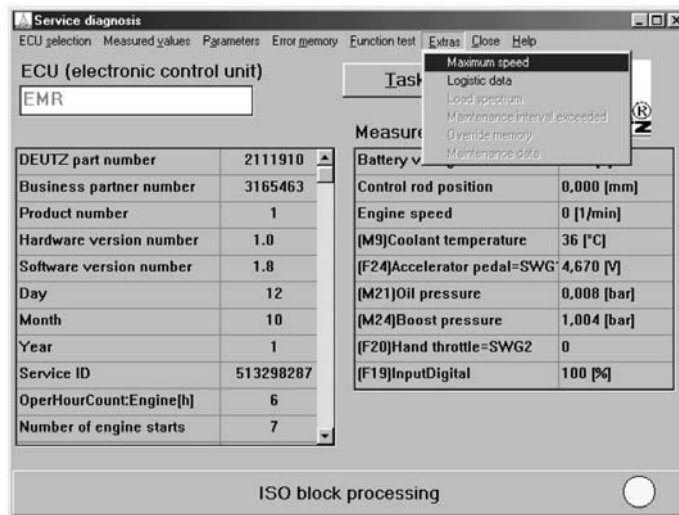
5.2 ERROR TABLE**5.2.1 EMR1 ERROR TABLE**

8002:(F18)Signal monitoring PWM-Inp1
 8012:(F21)Signal monitoring PWM-Inp2
 8020:ECU (positioner actuation)
 8030:shutoff magnet
 8112:(M17)Rack travel sensor
 8120:(F24)AccelerPedal(SWG1)
 8130:(F20)HandThrottle(SWG2)
 8140:(M9)CoolantTempSensor
 8150:(M24)BoostPressureSensor
 8160:(M21)OilPressureSensor
 8170:(M13)Speed 1, camshaft
 8180:(M11)Speed 2, terminal W
 8190:(intern)ElectronicsTemperature
 81A0:(M11)Engine speed sensor
 8210:Data loss EEPROM
 8220:Data loss coil data
 8230:EDC calibration error
 8305:Speed monitoring
 8343:Coolant temp. monitoring
 8345:Eng.OFF->CoolantTempMonit
 8363:Oil pressure monitoring
 8365:Eng.OFF->OilPressMonit
 8405:Actuator (positioner, travel meter, fuel rack)
 8500:ISO-Bus-Error
 8600:CAN-Bus-Error

The possible types of error are:

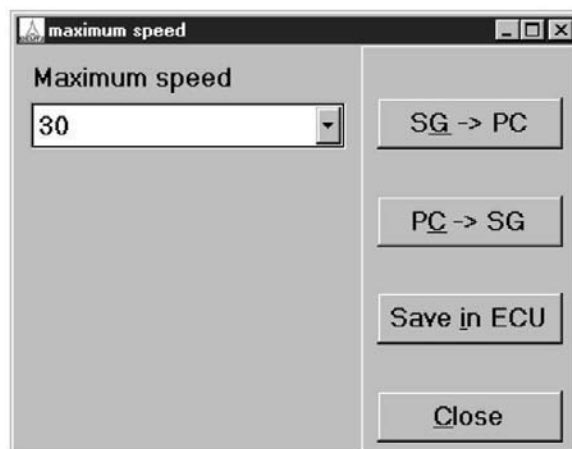
- (0) Broken cable or short-circuit
- (1) Broken cable or short-circuit
- (2) Measuring point defective
- (3) Power reduced
- (4) Limit exceeded, power reduction activated
- (5) Shutoff limit exceeded/ fallen below

6. EXTRAS



6.1 MAXIMUM SPEED

This screen can be used to select from three different maximum vehicle speeds (30, 40, 50 km/h) (not implemented yet in EMR2)..



6.2 LOGISTIC DATA

The screen is used to read and print the logistic data stored in the control unit.

EMR1/EMR2:

- Engine Serial Number
- Part number, EMR function data set
- Part number, ASAP2 data set
- Date, month and year of manufacture
- EMR2 only:
- Part number, CAN function data set
- Hours of operation
- Number of engine starts

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Note the P part determined for each, and enter the average in "SpeedGvnr: P part".

The different P parts given by the various load and speed points must be corrected in the PID performance map.

- The D and I parts (Page 4) are now set applying the same procedure, i.e. raising the values by 5 % first till unstable, then reduce again by 25 %.

2. Parameters for static and dynamic operation.

Setting the "SpeedGvnr: damping" and "SpeedGvnr: damping range" parameters (Page 4).

The "SpeedGvnr: damping range" parameter determines the speed band in which speed is in the static range. For example, entering a value of 15 r.p.m. sets a +/- 15 r.p.m. band around the nominal speed .

The "SpeedGvnr: damping" parameter determines the lowering of the governor parameter (PID parts) for the static range, i.e. if the speed is within the speed band around nominal value, the governor parameter (PID parts) falls to the value for the damping factor.

For example, SpeedGvnr: P part =10 %

SpeedGvnr: damping =65 %

This has the effect that, in the static engine condition of nominal speed range +/- damping range, the P part falls to 6.5 %. The aim of this step is that the engine will run smoothly and precisely within the speed band, without responding strongly to slight speed changes. If the engine runs outside of the speed band due to a fault, the set governor parameters become effectively 100 % again and the governor will quickly correct the speed error as far as possible. Standard settings - see "Governor basic setting". Setting corrections can only be made through the engine running test.

3. Speed and load dependent parameters.

For the P, I, D basic parameters there are corresponding performance maps that depend on speed and injected quantity (load) (Page 17). The effective parameters are determined by multiplying the basic parameter by the content of the performance map.

For example, SpeedGvnr: P part =10 %

Map P part =200 % at 2000 r.p.m. and 50 cmm/stroke

Result: For the given operating point, the P part becomes effectively 20 %.

8.2.2 ACCELERATOR PEDAL CALIBRATION

An accelerator pedal is usually designed as a foot pedal, operated by the driver of a vehicle. However, the input provided for the accelerator pedal (vehicle connector Pin 24) can also be used as a remote input, like those used in locomotives and ships. In all cases, calibration is required.

Calibration must be carried out both at initial startup (either by the customer or by service engineers), and whenever a replacement is made.

The accelerator pedal is not always supplied by DEUTZ AG. However, we recommend the pedal value sensor (DEUTZ Part No. 0419 9457. Other accelerator pedals can also be installed by the customer, subject to confirmation with company head office.

The following are then required:

- Connection as in EMR1 System overview:
Signal input (Pin 24/vehicle connector) to GND (Pin 23/vehicle connector)
- Analog signal:
> 0.5 V (accelerator pedal in 'parked' position), for example 1 V
< 4.5 V (accelerator pedal at 'full throttle'), for example 4V
- The EMR1 provides a reference voltage at the vehicle connector (Pin 25, +5 V).
This reference voltage is also intended for the manual throttle potentiometer.
Therefore the total load current should not go over 25 mA if the pedal value sensor and manual throttle potentiometer are arranged in parallel, (i.e. total resistance > 200 Ω.)

Calibrazione acceleratore per mezzo del menu "Calibrazione":

Accelerator pedal calibration using the "Calibration" menu:

Calibration is menu-driven. Both end stops "parked position" and "full throttle" are calibrated as limit values. See "General procedure for calibration", Chapter , "Calibration".

Accelerator pedal calibration using the "Measured values" and "Configuration" menus:

The aim of calibration is to inform the control unit of the limit values for the two end stops: "parked position" as the lower and "full throttle" as the upper reference point. Also, the "upper fault value" (+5 % from upper reference point) and "lower fault value" (-5 % from upper reference point) must be entered, relative to the two reference points.

SECTION 30

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6 - Unscrew and remove the side screws (7) and washers securing the hood support (3).

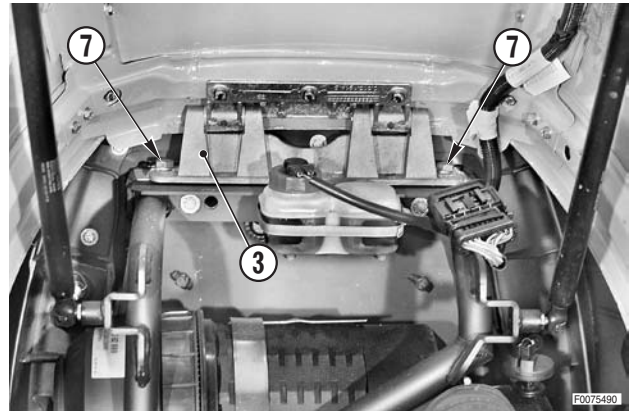
NOTE. The side screws (7) must be removed (with the hood closed) through the apertures exposed by removal of the left panel.

7 - Remove the hood.



Hood: 48 kg (105.7 lb.)

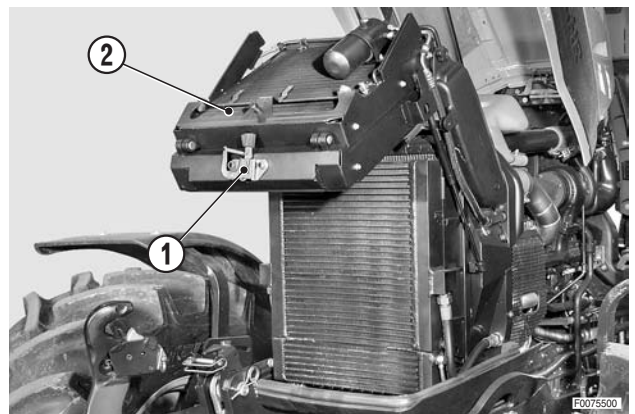
NOTE. In the absence of the specific equipment, four persons will be required in order to remove the hood.



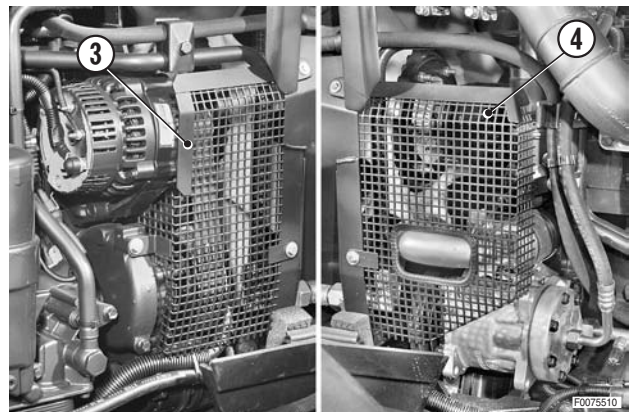
3. Removal of the lower guard

1 - Detach the lower stop (1).

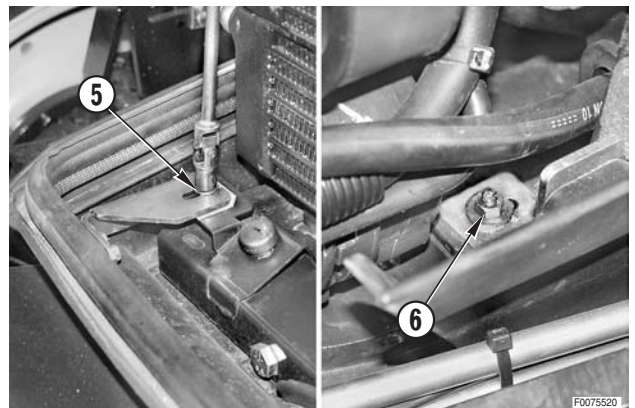
2 - Lift the condenser-intercooler assembly (2) and place it in the position for cleaning.



3 - Remove the guards (3) and (4).

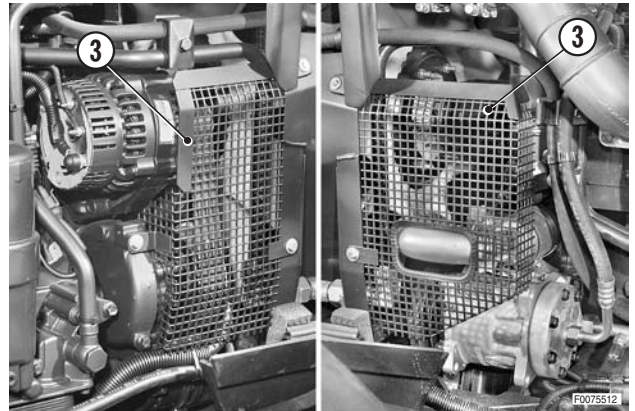


4 - Unscrew and remove the front bolts (5) and the rear nuts (6) with their washers.

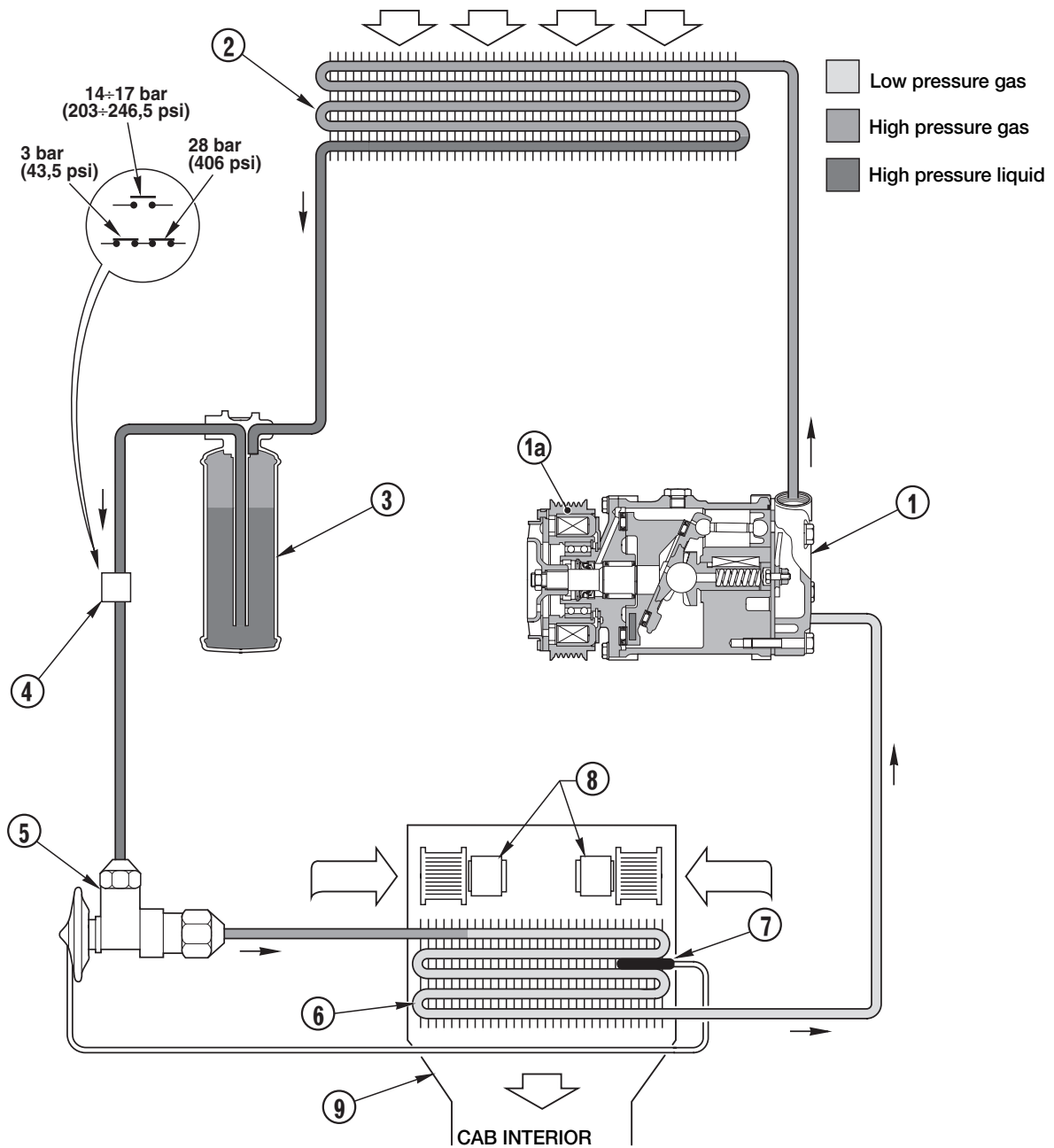


11 - Reposition the radiator/coolers assembly and refill with the appropriate liquids.

12 - Refit the guards (3).



AIR CONDITIONING SYSTEM



D0022890

- 1 - Compressor with electromagnetic clutch
- 2 - Condenser
- 3 - Receiver-drier
- 4 - Bistable pressure switch for compressor clutch engagement/disengagement
- 5 - Expansion valve
- 6 - Evaporator
- 7 - Evaporator temperature sensor
- 8 - Cab air blowers
- 9 - Air cowling

TECHNICAL SPECIFICATIONS

- Minimum and maximum safety pressure: 2.4 ÷ 28.5 bar (34.8 – 413.3 psi)
- Refrigerant type: R134a
- Refrigerant quantity:

Mod.	108	118	128
g	1950	1950	1950
oz.	68.74	68.74	68.74

- Total quantity of moisture-free oil added at 1st charging: 210 cm³ (12.81 Cu.in.)

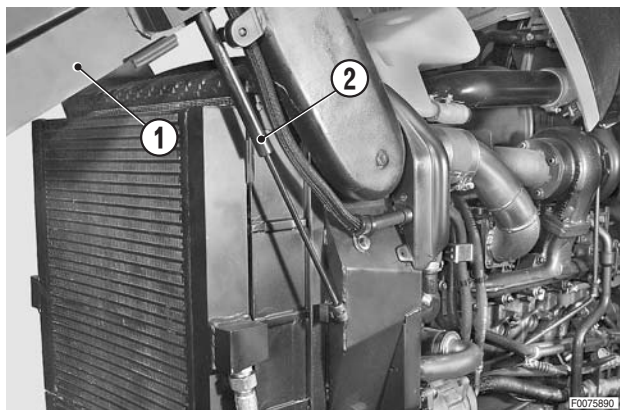
REMOVAL OF THE INTERCOOLER

! Remove the key from the starter switch and remove the engine side panels and front grille.

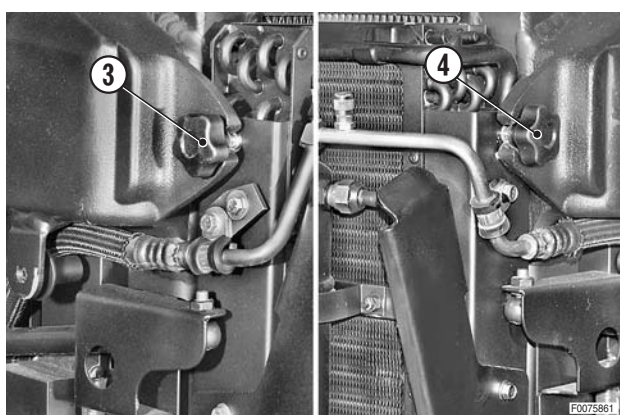
- 1 - Detach and lift the intercooler assembly (1).
- 2 - While supporting the assembly (1), detach the gas springs (2).

! The gas springs must be detached from the intercooler.

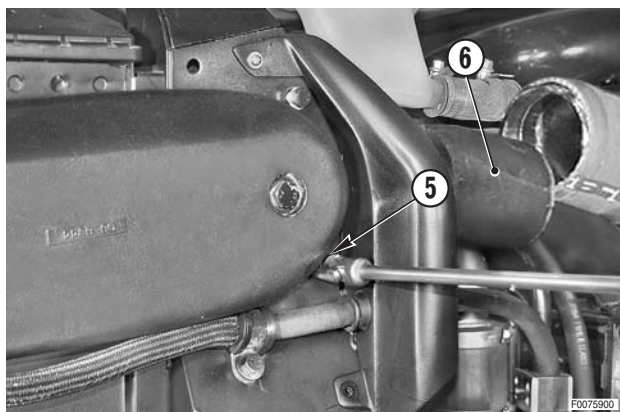
- 3 - Lower the intercooler assembly (1) while supporting it down to the lower catch.




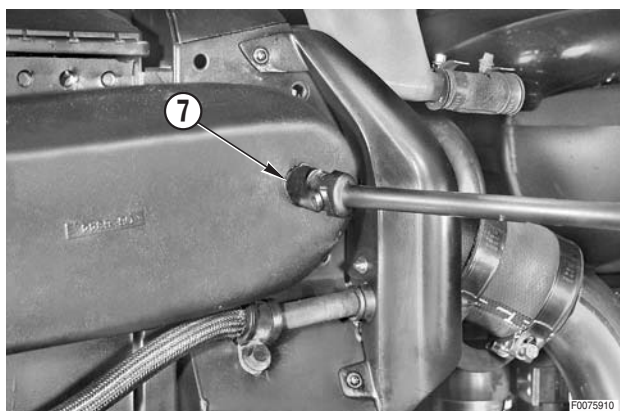
- 4 - Unscrew and remove the knobs (3) and (4) and turn the condenser over.



- 5 - Unscrew and remove the bolts (5) securing the intercooler internal inlet and outlet hoses (6).



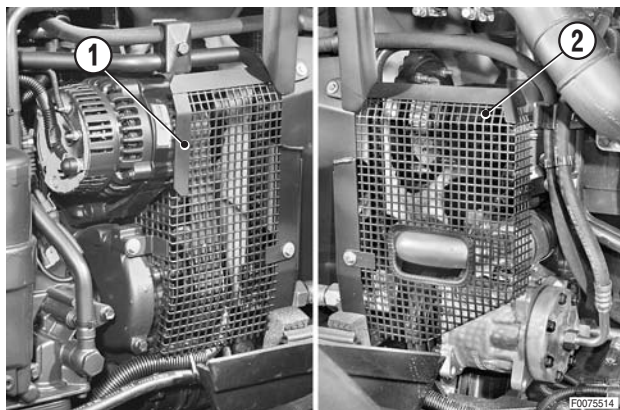
- 6 - Unscrew and remove pivot bolts (7) of the intercooler assembly and the relative washers.  1



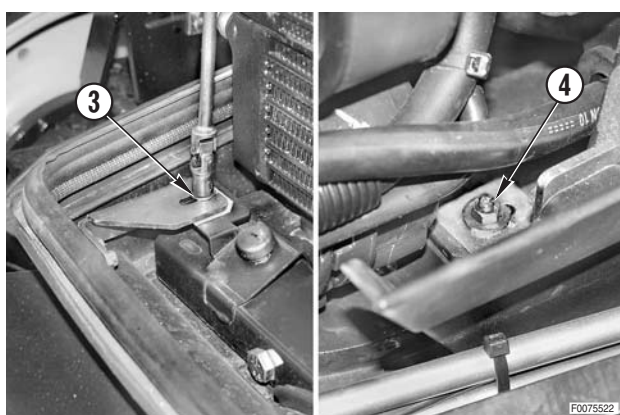
REMOVAL OF THE RADIATORS - COOLERS ASSEMBLY

! Remove the key from the starter switch and remove the engine hood. (For details see "REMOVAL OF THE ENGINE HOOD-LAMP ASSEMBLIES").

1 - Remove the guards (1) and (2).

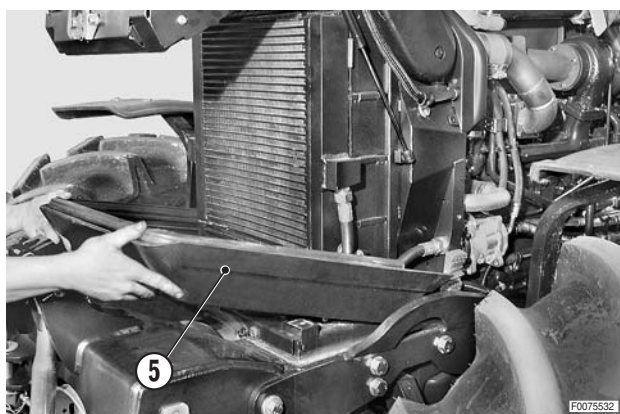


2 - Unscrew and remove the front bolts (3) and rear nuts (4) with their washers.

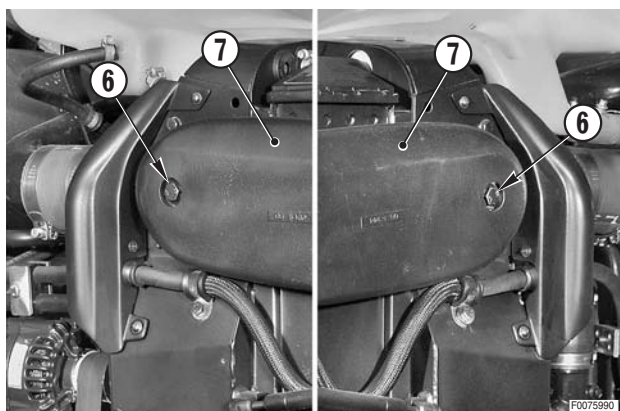


3 - Remove the lower guard (5), withdrawing it towards the front of the tractor.

4 - Recover the refrigerant from the air conditioning system. (For details, see "MAINTENANCE OF THE AIR CONDITIONING SYSTEM").

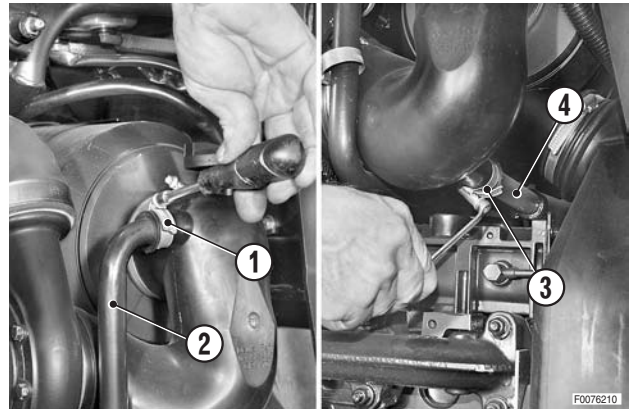


5 - Remove the screws (6) and release the dividers (7).

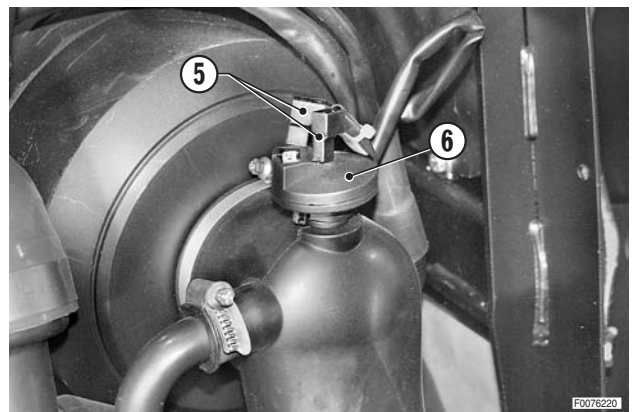


REMOVAL OF THE TURBOCHARGER

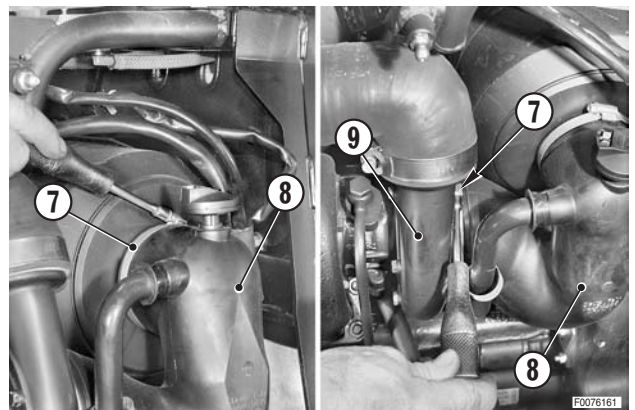
- 1 - Remove the silencer.
(For details, see "REMOVAL OF THE SILENCER").
- 2 - **For versions with air trailer braking only**
Loosen the clamp (1) and disconnect the inlet pipe (2) of the air compressor for the trailer braking system.
- 3 - Loosen the clamp (3) and disconnect the oil vapour pipe (4).



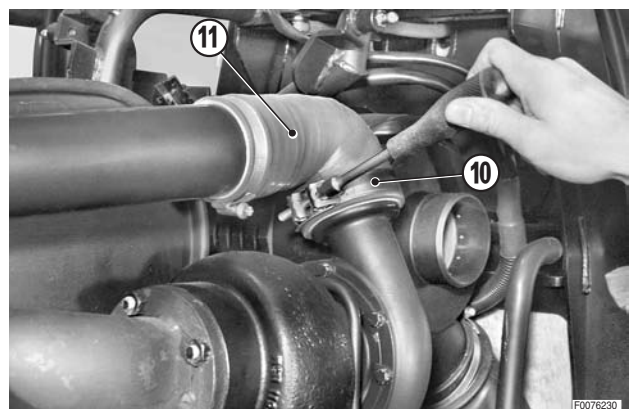
- 4 - Disconnect the connectors (5) of the filter clogging sensor (6).



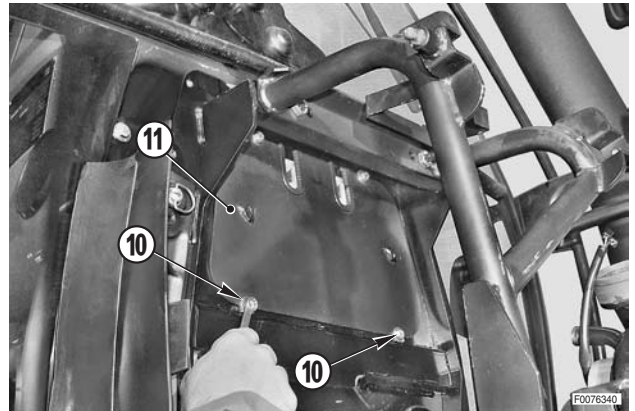
- 5 - Loosen the clamps (7) securing the hose (8) connecting the filter to the turbocharger (9); remove the hose (8).



- 6 - Loosen the clamp (10) securing the outlet pipe (11) to the intercooler.

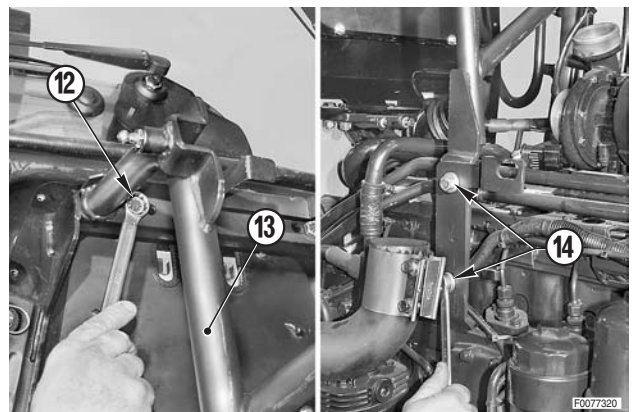


10 - Unscrew and remove the screws (10) and remove the insulation panel (11).

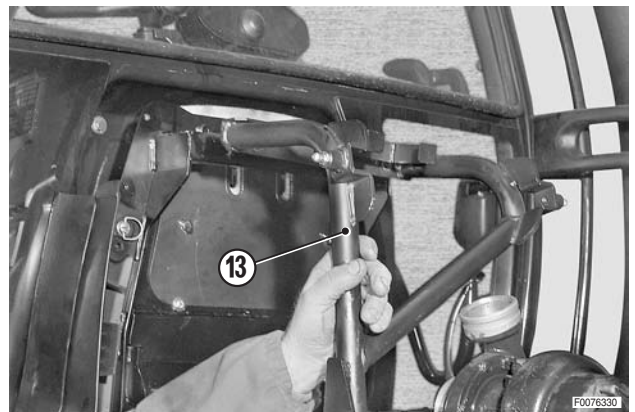


11 - Loosen the upper screws (12) securing the hood support (13).

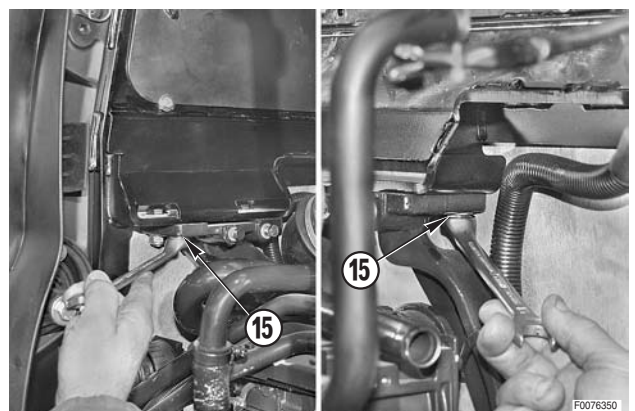
12 - Unscrew and remove the lower screws(14).



13 - Remove the upper screws (12) and remove the hood support (13).

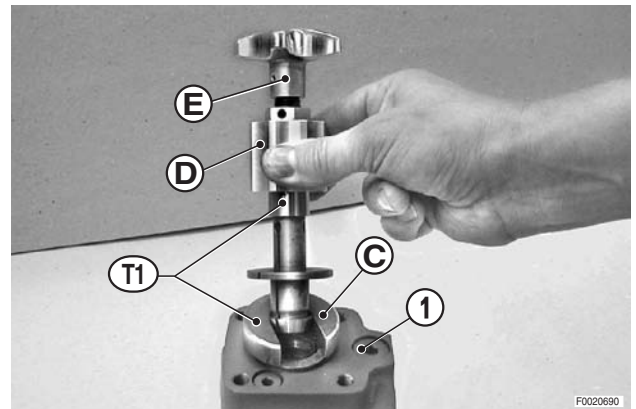


14 - Unscrew and remove the four nuts (15) with their washers.

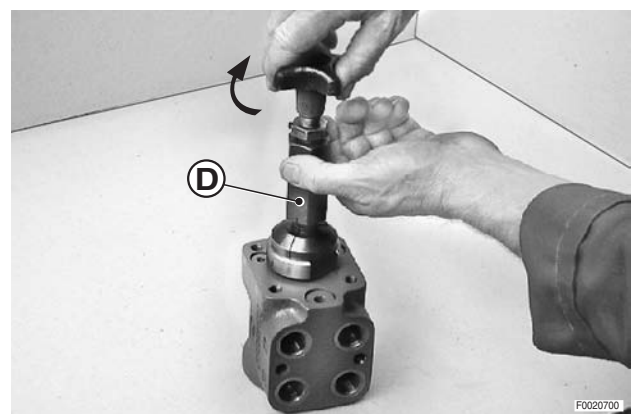


2. Removal of the seals

- 1 - The inner seal (15) is to be removed using tool **T1** (cod. 00239496).
Insert the ring "**C**" in the power steering housing (1) followed by the expander "**E**" fully closed.

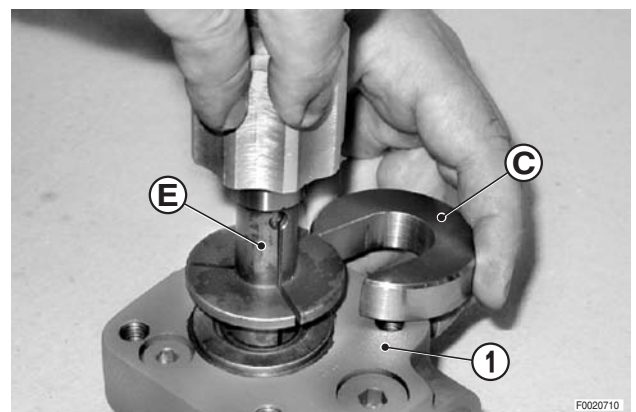


- 2 - Open the expander "**E**" by turning the knob while holding the locknut "**D**".



- 3 - Remove the ring "**C**" and push the expander "**E**" inside the power steering housing (1) to withdraw the seal (15).

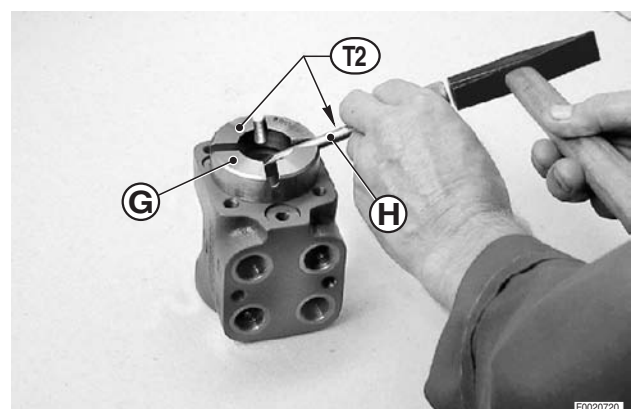
- 4 - Slacken off the expander and withdraw it.



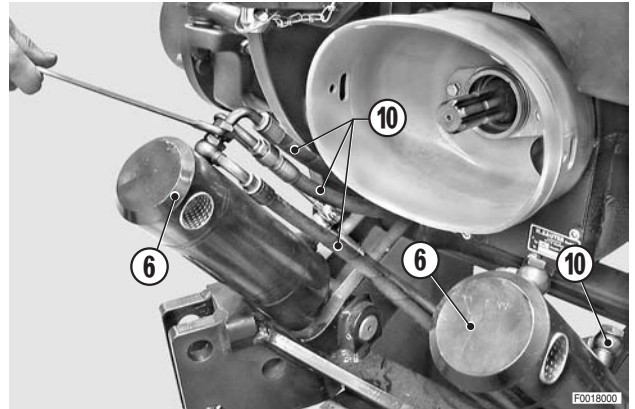
3. Removal of the dust seal

Remove the dust seal using tool **T2** (cod. 00239497).
Insert the ring nut "**G**" in the housing and, using the extractor "**H**" and a hammer, remove the dust seal (16).

- ★ Take care not to damage the seating.



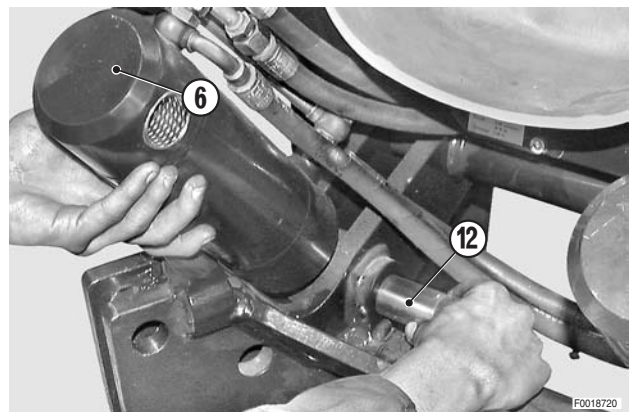
- 6 - Disconnect the four pipes (10) from the cylinders (6).
 ★ Label the pipes to avoid confusion on reconnection.



- 7 - Using a pin punch, remove the spring pins (11) securing the lower cylinder pivot pins.



- 8 - Withdraw the pivot pins (12) and remove the cylinders (6).

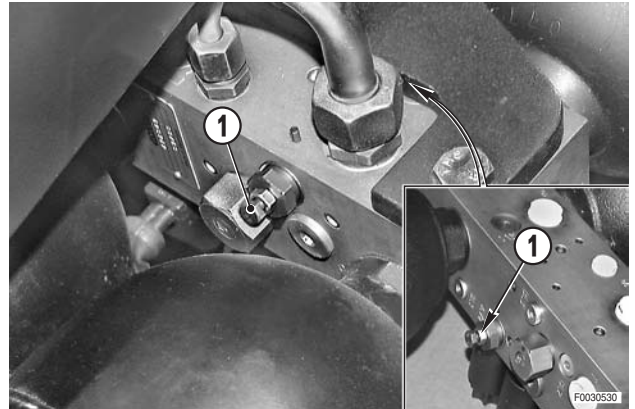


REFITTING OF THE FRONT LIFT CYLINDERS


- Refitting is the reverse of removal.
- 1 - Start the engine and repeatedly raise and lower the lift to the limit of its travel in order to bleed the system and check for leaks.
 - 2 - Stop the engine, check the gearbox oil level and top up if necessary.

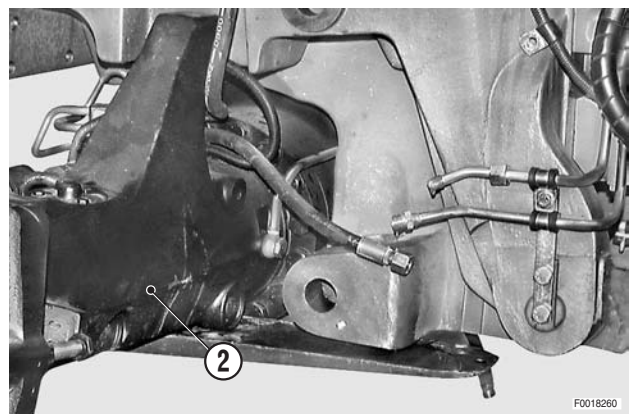
REMOVAL OF THE FRONT AXLE AND SWINGING SUPPORT (Versions with front suspension)

- ⚠ 1 - Before switching off the engine, disengage the front suspension by pressing the pushbutton in the cab for at least 20 seconds.
- 2 - Apply the parking brake.
- ⚠ 3 - Discharge the residual pressure from the suspension system by unscrewing the valve (1) about two full turns.
- ★ Wait a few minutes after discharging the pressure, then re-close the valve.

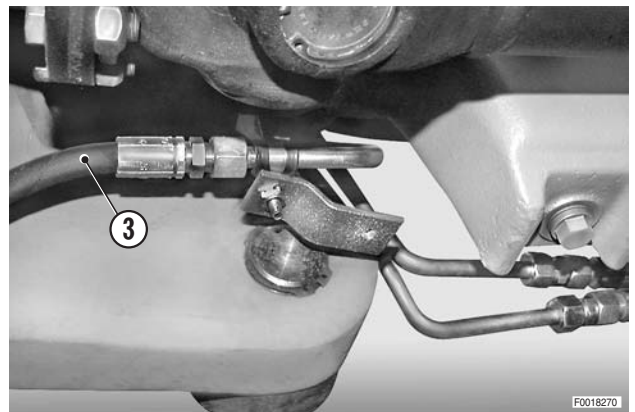


- 1 - Remove the front suspension cylinders. (For details, see "REMOVAL OF THE FRONT SUSPENSION CYLINDERS").
- 2 - Position a trolley jack under the axle (2) and the swinging support; raise the jack until it supports both the assemblies.

 Group assembly: 455 kg (1002 lb.)

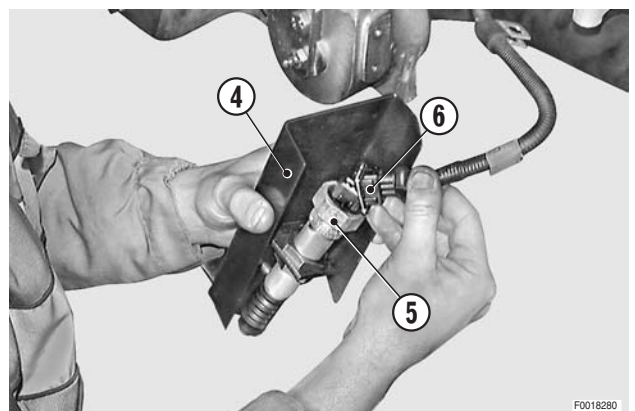


- 3 - Remove the cover and the 4WD shaft . (For details see "REMOVAL OF THE 4WD PROPELLER SHAFT").
Disconnect the differential lock pipe (3).
- ★ Plug the ends of the pipes to prevent the entry of contaminants.



- 4 - Remove the support (4) of the position sensor (5) and unplug the connector (6).

⊠ 1



REMOVAL OF FUEL TANK

! Remove the battery cover and disconnect the negative battery lead (-).

- 1 - Remove the left rear wheel.
(For details, see "REMOVAL OF THE REAR WHEELS").
- 2 - Vent all the compressed air from the cab suspension system.

! For machines equipped with air trailer braking, release all the compressed air from the brake circuit.

! The tank must be removed and handled only when empty; use a service pump to empty the tank.

- 3 - Unplug the connector (1) of the fuel level sender.

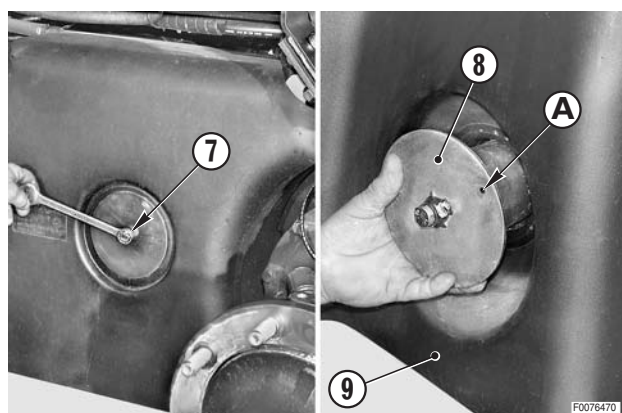
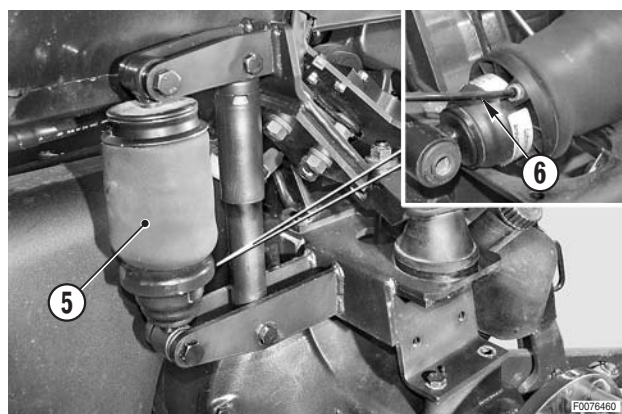
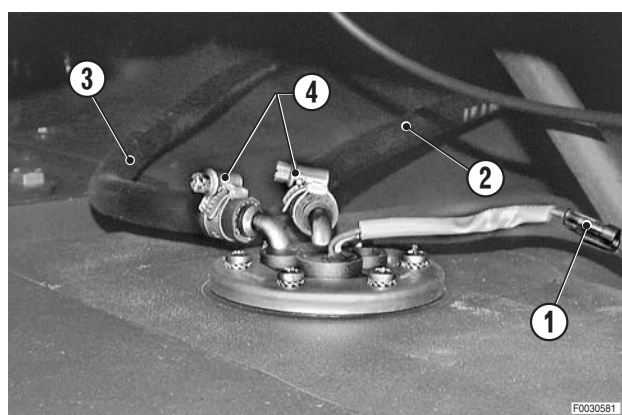
- 4 - Mark the fuel feed and return lines (2) and (3).
Loosen the clips (4) and disconnect the hoses.

- 5 - Disconnect the air inlet line (6) from the L.H. cab suspension piston (5).

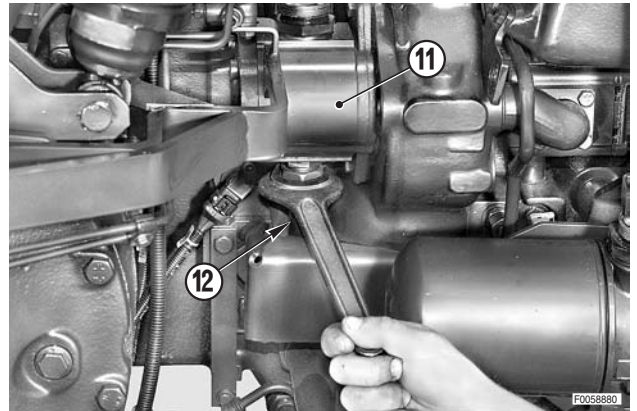
※ 1

- 6 - Undo the bolts (7) and remove the alignment washers (8) by which the tank (9) is retained.

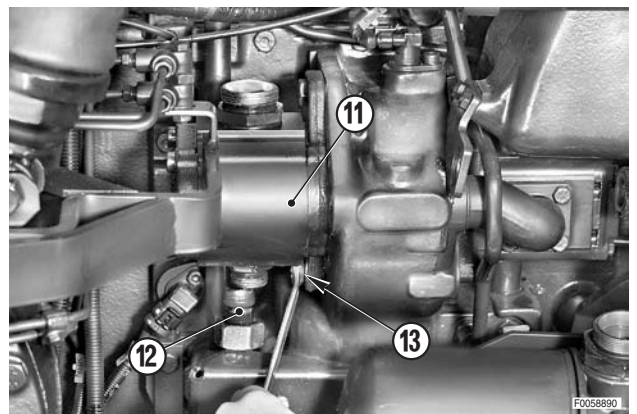
★ Note the position of the hole "A" of the eccentric washer for levelling the tank.



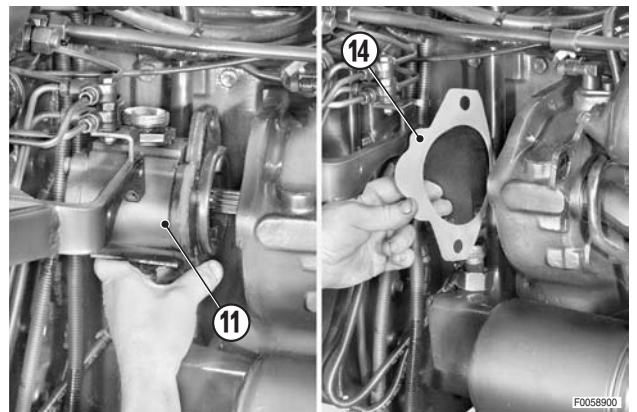
4 - Disconnect the pressure pipe (12) from the pump (11).



5 - Loosen and remove the bolts (13) securing the pump (11).



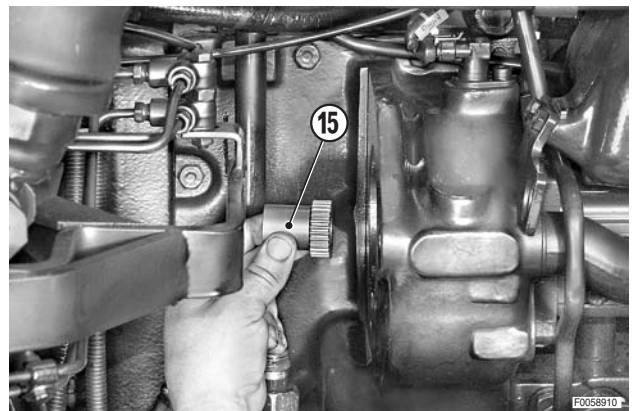
6 - Remove the pump (11) and the seal (14).
★ Renew the seal every time the pump is removed.



7 - Take out the drive coupling (15).

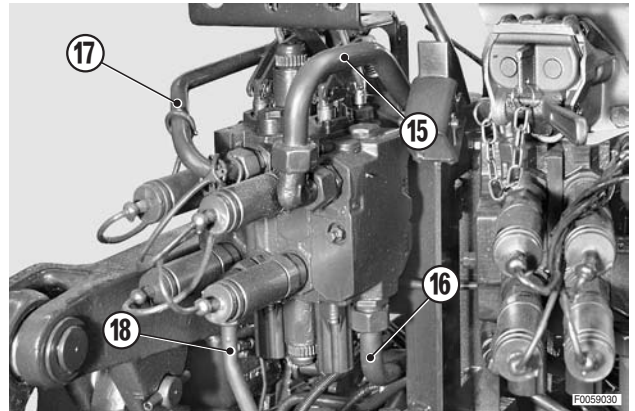
REFITTING THE GEAR PUMP

- Refitting is the reverse of removal.

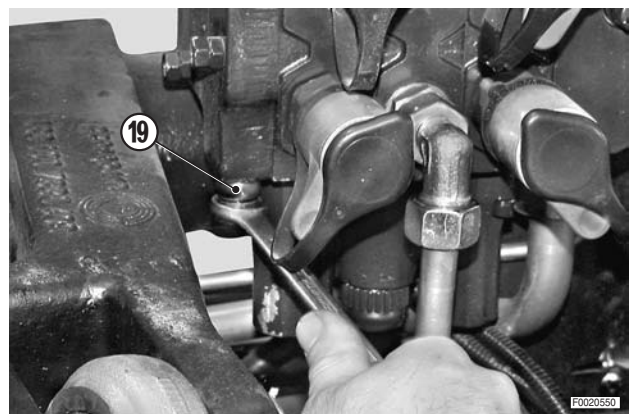


2. Left control valve

- 1 - Disconnect the delivery (15) and return (16) pipes from the control valve.
- 2 - Disconnect the pipes (17) and (18) from the lift control valve.



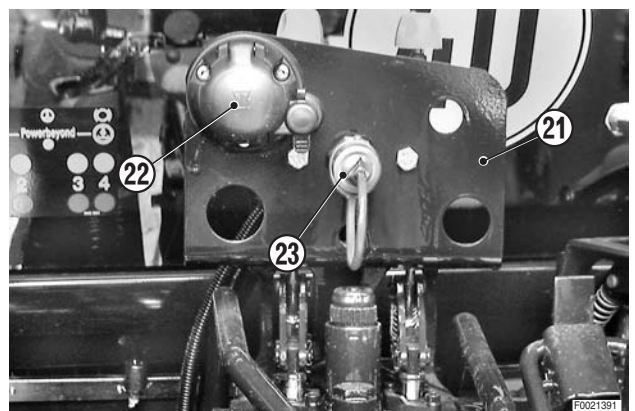
- 3 - **Machines with front suspension only:**
Disconnect the LS signal pipe (19) from the outer control valve.
★ Always renew the copper gaskets.



- 4 - Disconnect the control cables (20) from the control valve levers.
★ Label the control cables to avoid confusion on re-connection.

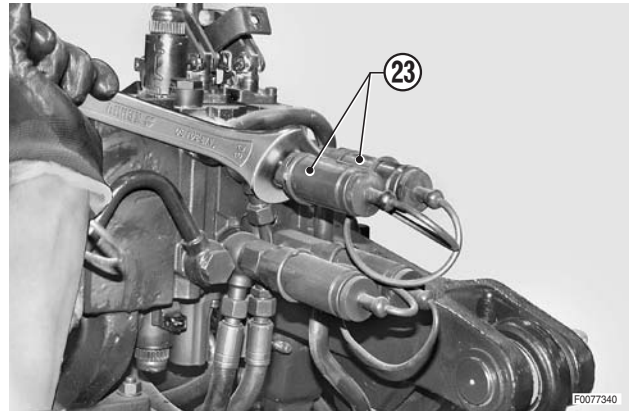


- 5 - Remove the bracket (21) supporting the external electrical outlet (22) and, where present, the supplementary hydraulic couplers (23) and position the bracket to one side.
★ The bracket (21) is fixed to the upper studs of the control valve and to the control valve support plate.

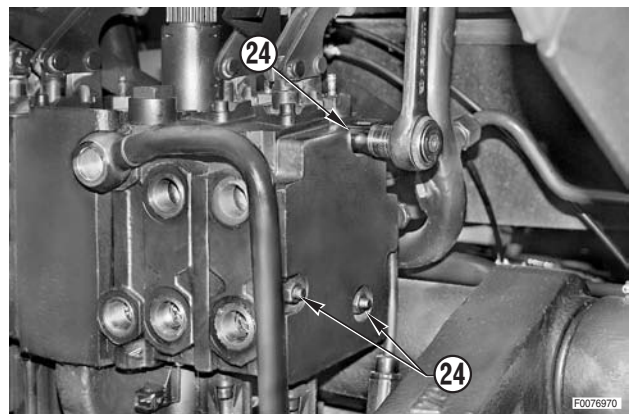


15 - Remove the quick-action couplers (23) and the relative gaskets.

★ Always renew the copper gaskets.

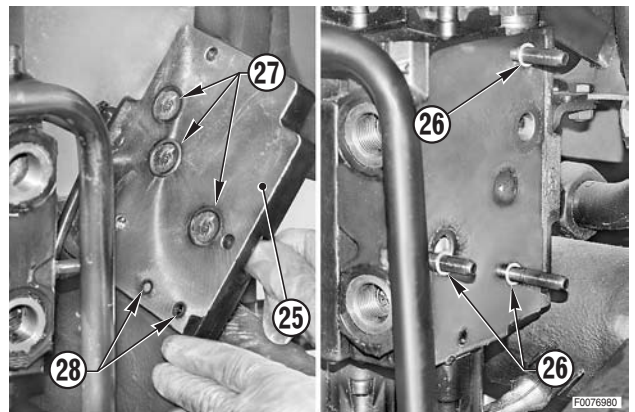


16 - Progressively loosen and remove the nuts (24) and washers securing the valve sections.

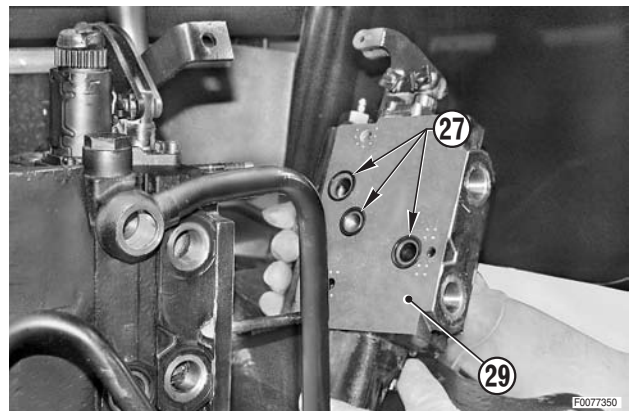


17 - Remove the end cover (25) and spacers (26).

★ Check that the O-rings (27) and (28) are present on the end cover (25).



18 - Remove the first section (29) complete with O-rings (27).



- 8 - Check the adjustment by first lowering the lift (using external pushbutton (3)) to an intermediate position and then raising to the maximum height by holding the pushbutton pressed; the lift arms should stop before reaching the mechanical limit and thus over-pressurising the hydraulic system, at which point the reference marks should be the distance apart indicated in step 6.

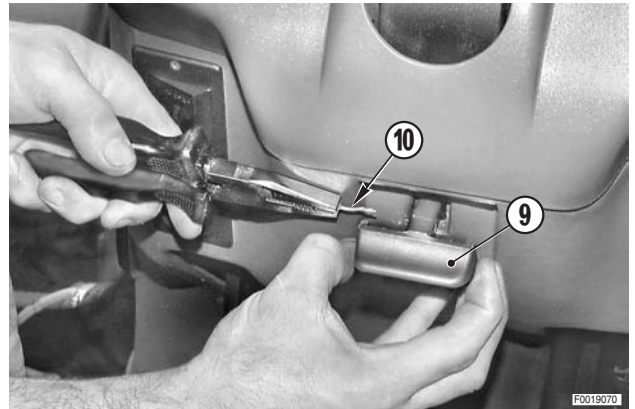
⚠ If the hydraulic system is maintained at maximum pressure for more than 30 seconds during the adjustment procedure, the system will automatically switch to neutral and the error code “37” will be signalled. In this case, before repeating the adjustment procedure, first turn the ignition key to the “O” position.

- 9 - If necessary, alter the position of the sensor by turning it a few degrees in a counter-clockwise direction.

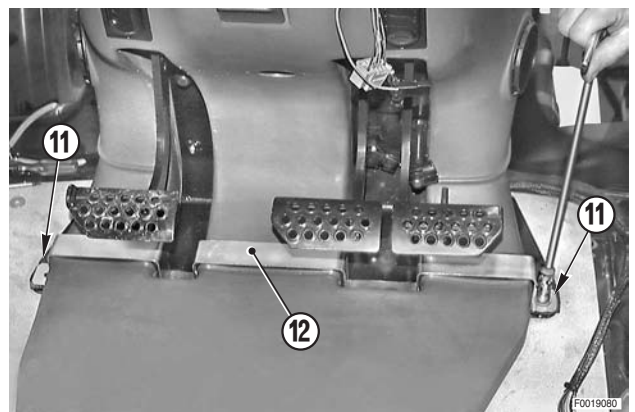


- 8 - Fully lower the steering column.
Pull outwards the lock handle (9) of the steering tilt adjustment; remove the cotter pin (10) and remove the handle.

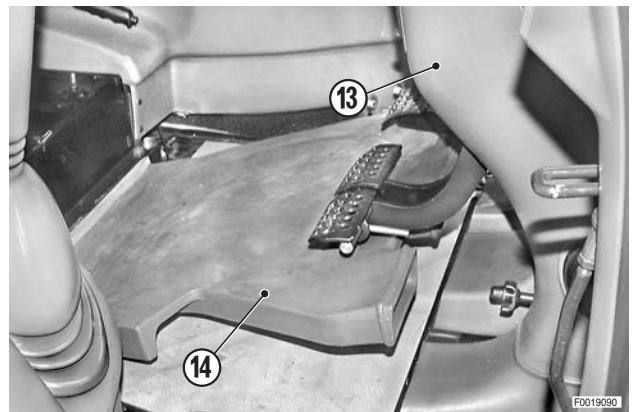
★ Renew the cotter pin at each reassembly.



- 9 - Unscrew and remove the retaining screws (11) of the air duct fascia (12).

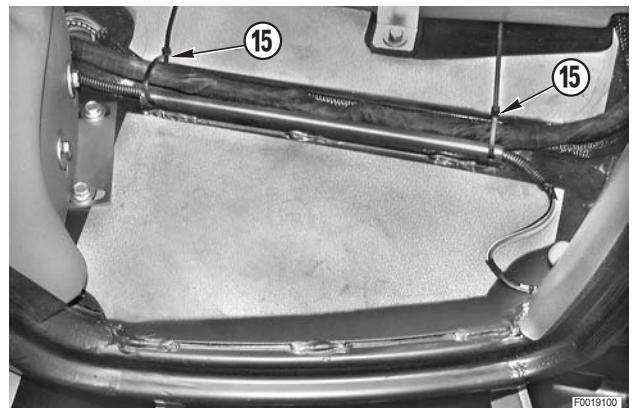


- 10 - Detach the air duct (14) from the centre shroud (13) and remove it.



- 11 - Remove the cable ties (15) to release the wiring from the guide fixed to the footplate.

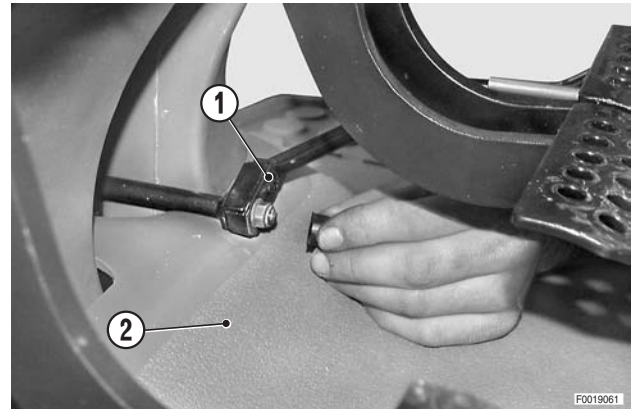
★ Note that the cable ties are located in grooves.



REMOVAL OF THE LEFT-HAND CONSOLE

! Remove the battery cover and disconnect the negative battery lead (-).

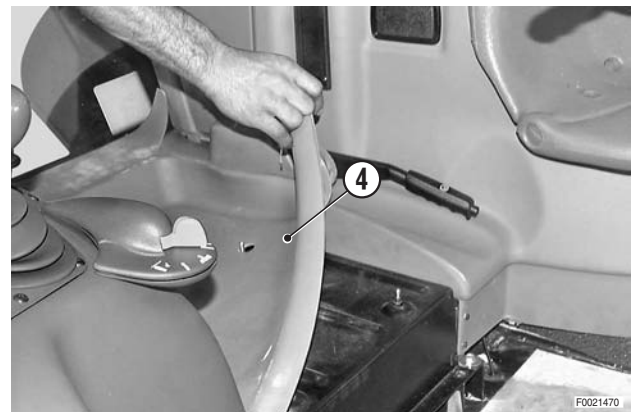
- 1 - Remove the seat. (For details, see "REMOVAL OF THE DRIVER'S SEAT").
- 2 - Remove the accelerator pedal (1) and remove the front floor mat (2).



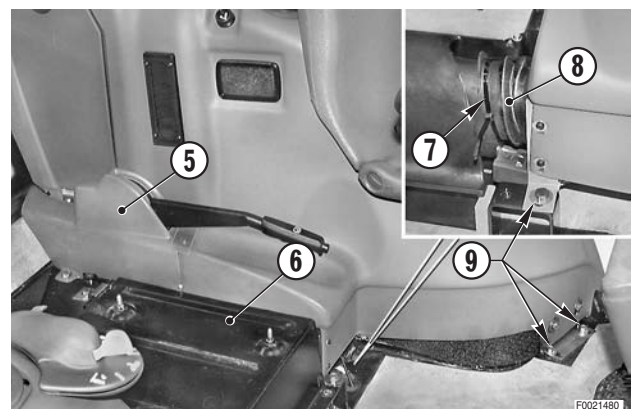
- 3 - **Only where fitted.**
Remove the passenger seat (3).



- 4 - Remove the rear floor mat (4).

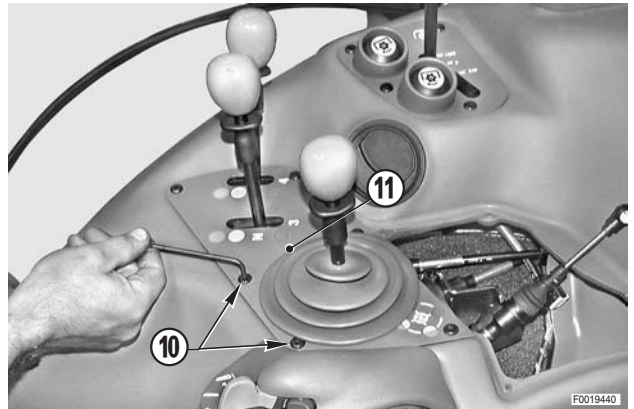


- 5 - Remove the parking brake cover (5).
- 6 - Remove the seat support (6) and remove the strap (7) to disconnect the hose (8).
Remove the screw (9).

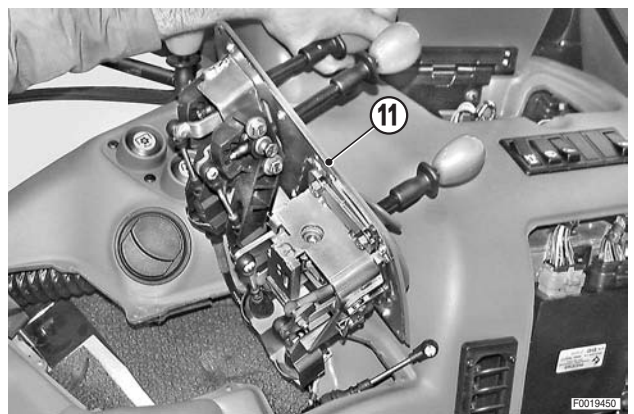


2. Removal of the auxiliary service valve control levers

- 1 - Remove the lift control panel as described in the previous paragraph.
- 2 - Unscrew and remove fixing screws (10) of the control levers assembly (11).

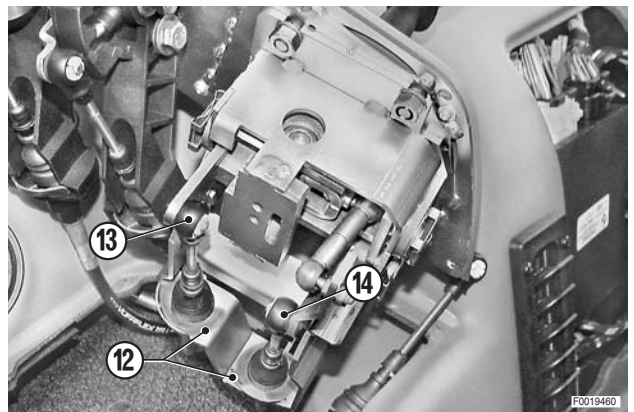


- 3 - Lift the assembly (11) and rotate it through 90°.

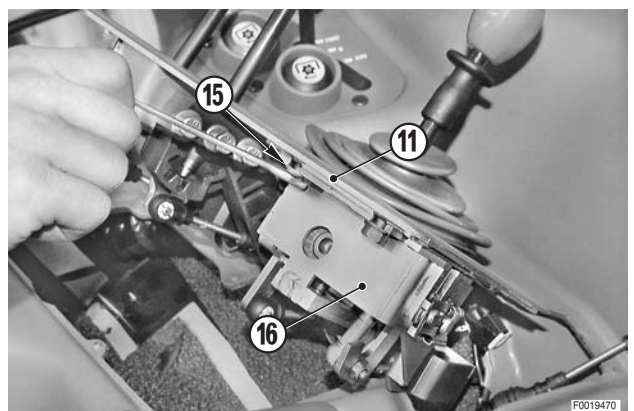


2.1 Removal of the cross-gate control lever assembly

- 1 - Remove the yokes (12) securing the outer cables and disconnect the cables (13) and (14). ✖ 1
 ★ Label the control cables to avoid confusion on re-connection.



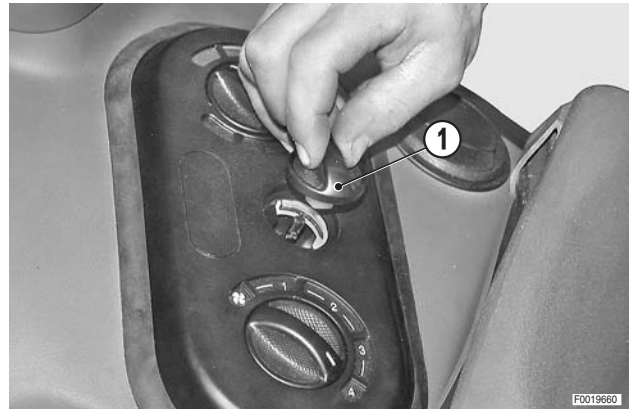
- 2 - Unscrew and remove the nuts (15) with their washers; withdraw the control assembly (16) from the panel (11).



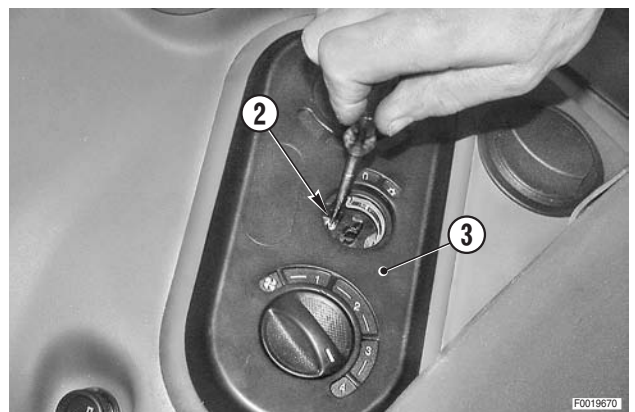
REMOVAL OF THE CLIMATE CONTROL PANEL

! Remove the battery cover and disconnect the negative battery lead (-).

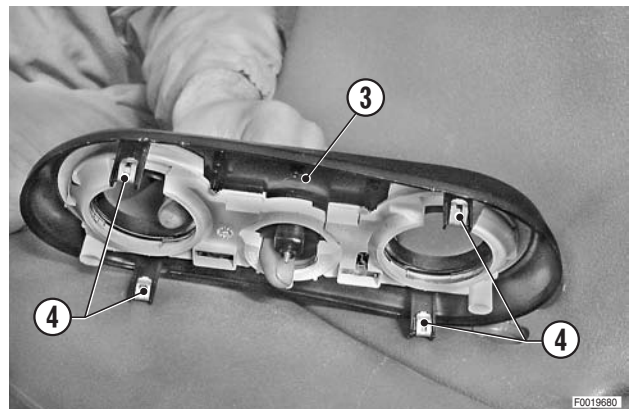
1 - Pull off the air conditioning on/off knob (1).



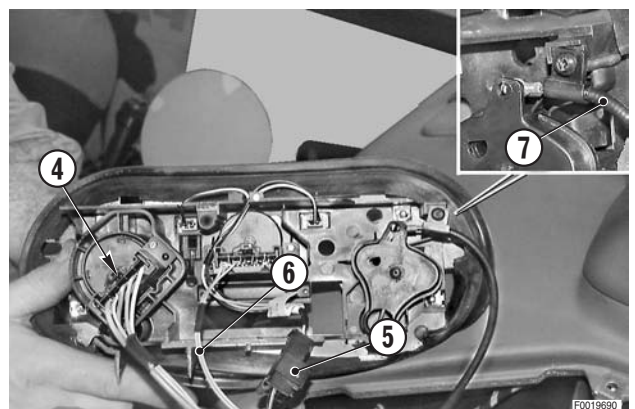
2 - Unscrew and remove the fixing screws (2) of the control panel (3).



3 - Detach the control panel (3) by pressing the spring clips (4) securing it to the left-hand console.



4 - Lift the panel (3), disconnect the connectors (4) and (5), the wiring (6), and the heater control cable (7).

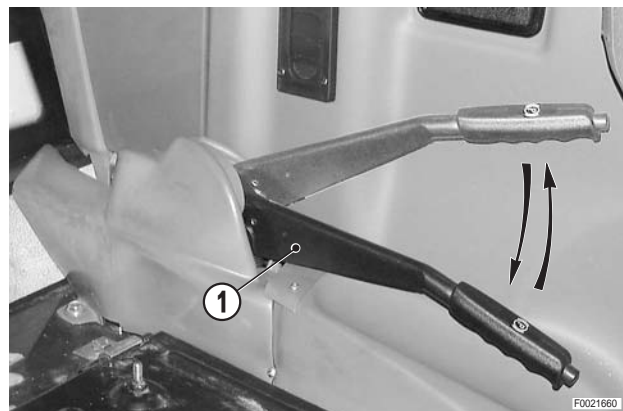


REFITTING THE CLIMATE CONTROL PANEL

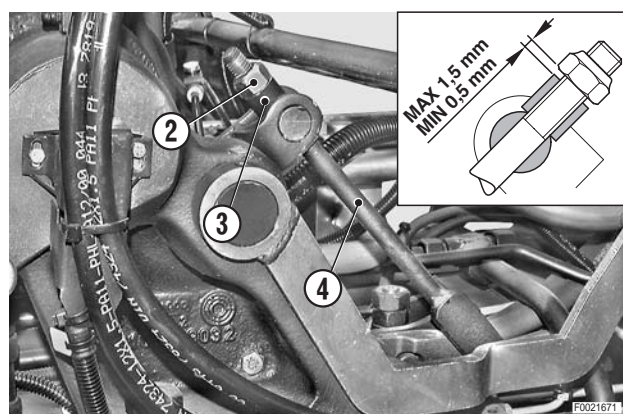
- Refitting is the reverse of removal.

ADJUSTMENT OF THE PARKING BRAKES

- 1 - Before proceeding with the adjustment, operate the handbrake lever (1) repeatedly in order to eliminate any play and check that the control cable slides freely.
- 2 - Apply a dynamometer with a scale of up to 500 Nm to the handgrip, and raise the handbrake lever to the first notch; check that the force applied to reach the first notch is within the normal limits.
 - ★ Normal force: 300±30 N (55±5 lb.)

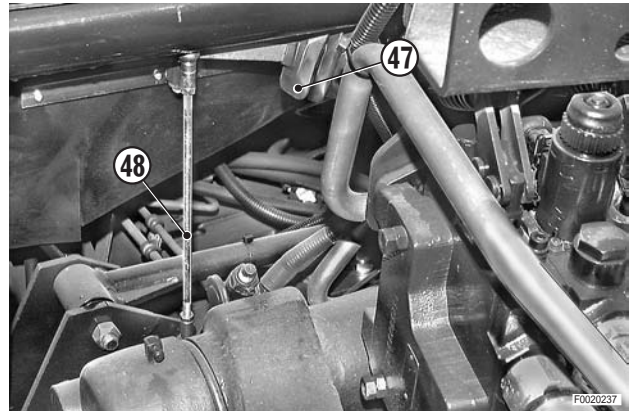


- 3 - If the force is outside these limits, screw out the nut (2) with the least clearance and screw in the nut (3) with most clearance.
- 4 - Then check that the distances between the nuts (2) and (3) of the tie-rods (4) are 0.5–1.5 mm (0.02 – 0.06 in.).



- 5 - Take the tractor to straight section of asphalted road at least 50 m (97 yard) in length.
- 6 - Engage gear and move off.
- 7 - With the tractor in motion, depress the clutch pedal and fully apply the handbrake (1); check that the rear wheels lock up simultaneously.
- 8 - If the rear wheels do not lock up at the same time, **screw in** gradually and by just a few degrees the nut (2) **corresponding to the wheel that fails to lock up** and **screw out the nut corresponding to the other wheel**.
- 9 - Repeat the previous operations until both rear wheels lock up simultaneously when the handbrake is fully applied.

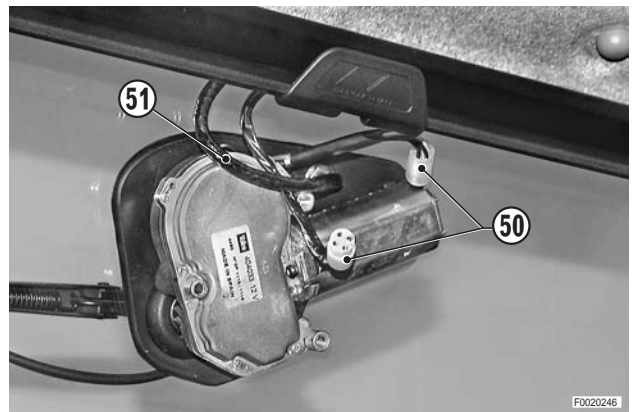
27 - Detach the tie-rod (48) from the cab lifting control valve (47). ※ 2



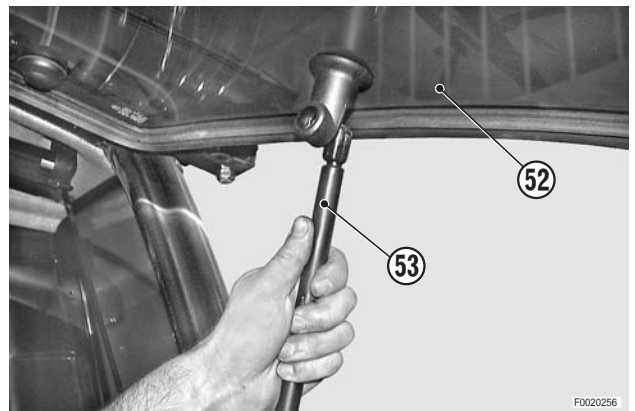
28 - Remove the exhaust pipe end fitting (49) from the cab.
 (For details, see "REMOVAL OF THE EXHAUST PIPE").



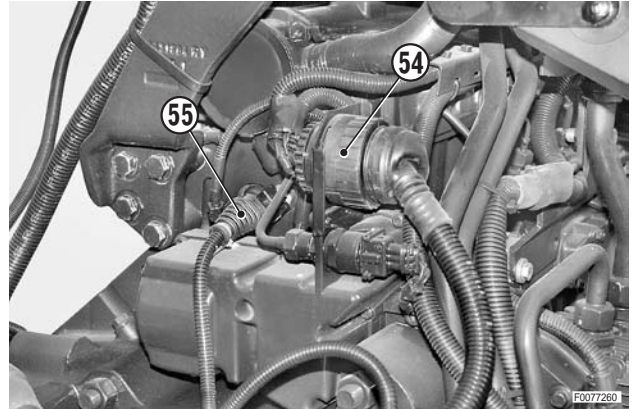
29 - Remove the cover of the rear screen wiper and unplug the connector (50) and the screen wash pipe (51).



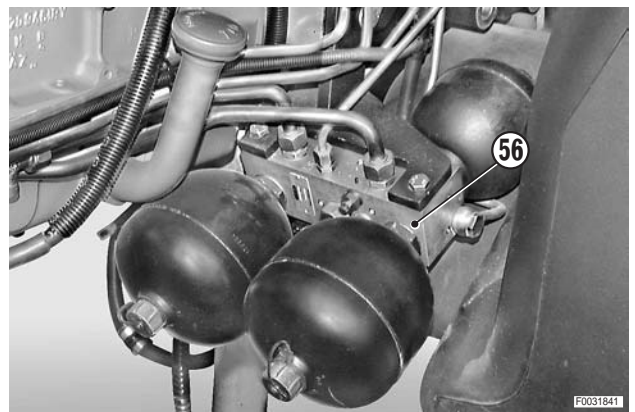
30 - Disconnect the gas springs (53) from the rear window (52); lower the window (52).



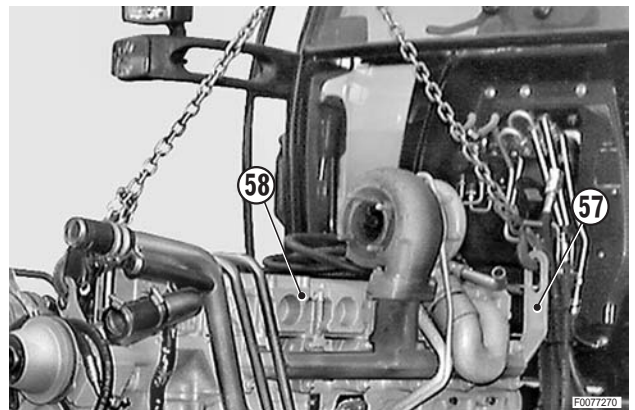
- 31 - Release the wiring from the clips and unplug the engine ECU connector (54).
★ Turn the ringnut anticlockwise.
- 32 - Unplug the connector (55) of the engine coolant temperature sensor.
★ Free the entire harness from the quick-release straps, and direct tidily toward the rear of the machine.



- 33 - Remove the front suspension solenoid valves assembly (56).
(For details, see "REMOVAL OF THE FRONT SUSPENSION VALVES").



- 34 - Fit the bracket (57); sling the engine (58) to a hoist.
Take up the slack in the lifting slings or ropes.



b. Defective pin welding or crimping

The pins of the male and female connectors make good contact in the crimped or welded area, but the wires are subjected to excessive tension, leading to breakage of the insulation or the wire itself and a poor connection.

c. Disconnecting wiring

If components are disconnected by pulling on the wires, or if components are removed with the wires still connected, or if the wiring is subject to a heavy impact this could damage the connections at the pins, breaking strands of wire.

d. Penetration of water in connectors

The connectors are designed to prevent penetration of liquids (water, oil etc.); however, it is possible that when the tractor is cleaned using high-pressure water or steam, water could penetrate or condense in the connectors.

As the connectors are designed to prevent liquid penetration, any water that does get in will not be able to drain out, and thus may cause shortcircuits across the pins.

For this reason it is good practice to dry the connectors with a low pressure jet of compressed air after washing the tractor.

e. Oil or dirt on connectors

Oil or grease on the connectors or pins can create a poor contact (oil and grease are non-conductors) .

Clean the connectors thoroughly using a dry cloth or a low pressure jet of compressed air and use specific products (deoxidising sprays, etc.) to degrease the contacts.

- ★ Take care not to bend the pins when cleaning them.
- ★ Use dehydrated not lubricated compressed air.

1.3.3 REMOVAL, REFITTING AND DRYING OF CONNECTORS AND WIRING**a. Disconnection of connectors**

When disconnecting wiring, pull on the connectors rather than on the wires themselves. For connectors that are held in position with screws or levers, fully loosen the screws, then pull on the connector.

For connectors that are clipped together, fully depress the clip then pull the connector apart.

After disconnecting connectors, cover them in a waterproof material to prevent dirt or moisture getting into the contacts.

b. Connecting the connectors

Check the condition of the connectors:

- Make sure the pin contact surfaces are free of water, dirt or oil.
- Check that the connectors are not deformed and that the pins are not corroded.
- Check that the connector casings are not damaged or split.
- ★ If a connector is contaminated with oil or grease, or if moisture has penetrated the casing, clean it as described in paragraph 1.3.2.
- ★ If a connector is damaged, deformed or broken, replace it with a new one.

When connecting connectors, make sure they are properly aligned before applying any force.

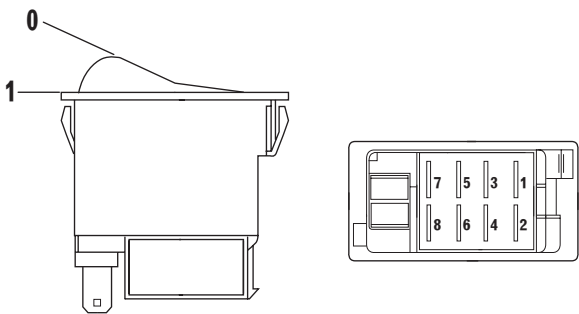
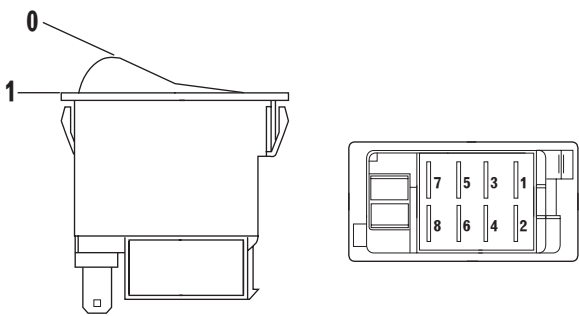
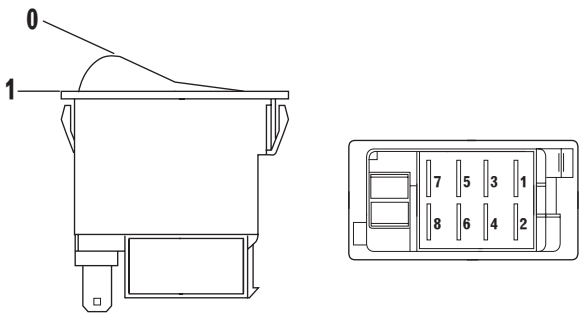
For connectors with clips, insert the two halves until they clip together.

2. INDICES

2.2 COMPONENT CODE INDEX

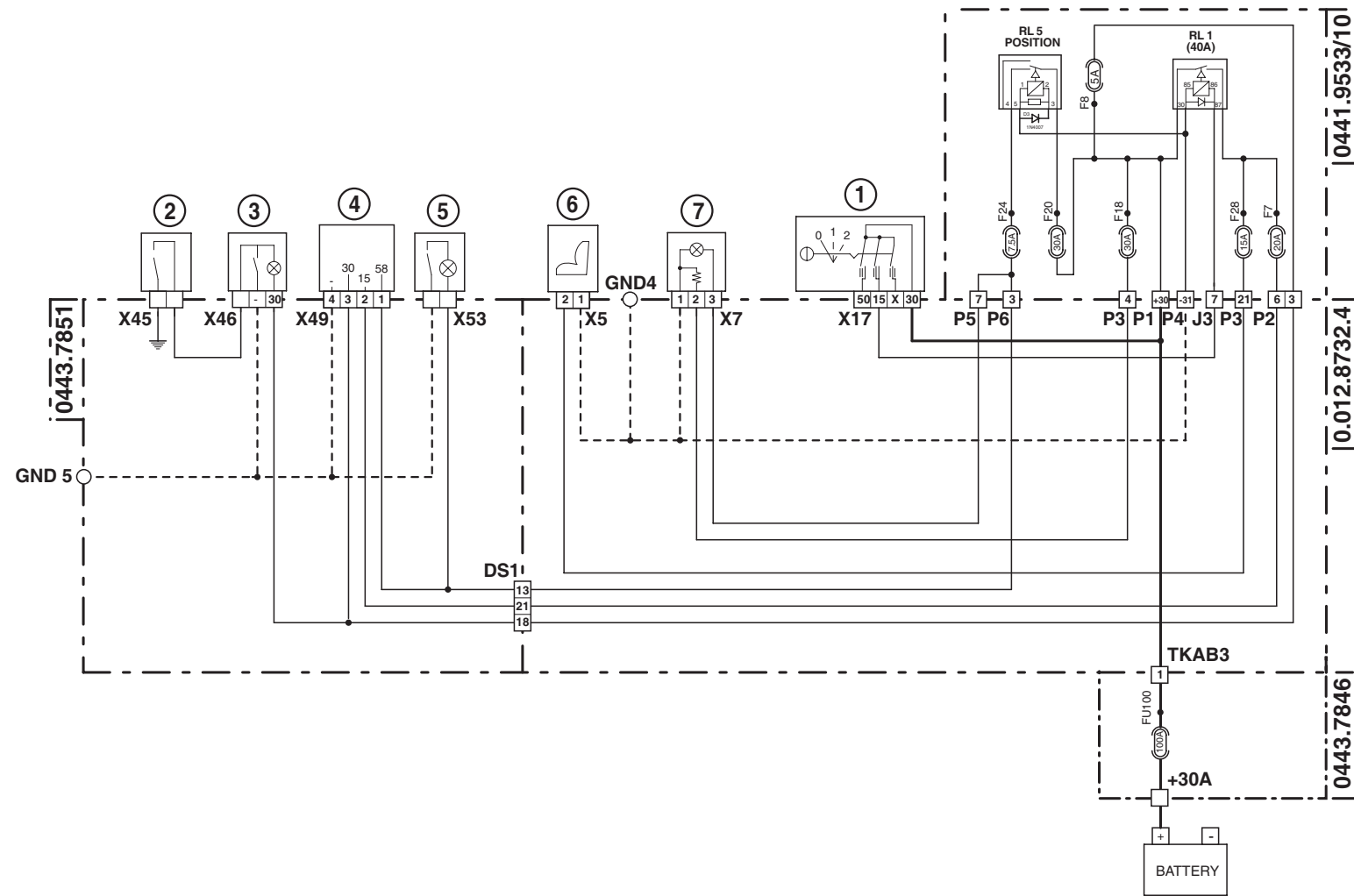
Code	Description	Technical (para. 3.2.xx)	Connector	System (para. 4.xx)
0441.1496.4	Rotating beacon on/off switch	45	FLASHING LIGHT	8-9
0441.1496.4	PTO AUTO switch	46	PTO AUTO	21
0441.1496.4	Rear worklights switch	40	WORK LIGHT	8-9
0441.1512.4	Starter switch	50	X17	2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21
0441.1920.4	Front left sidelight and direction indicator		X59	5-6
0441.1921.4	Front right sidelight and direction indicator		X60	5-6
0441.4087.4	Front left worklight on cab (with front lift)		X63	6
0441.4087.4	Front right worklight on cab (with front lift)		X64	6
0441.5586.4	Lift draft sensor	16	RIGHT DRAFT - LEFT DRAFT	20
0441.9280.4	Transmission display		X40	5-6-18
0442.2323.4	ISO4 socket (power supply to implements)		ISO4	12
0442.2324.4	ISO7 socket (implement connection)		ISO7	4-12-21
0442.5599.4	Front left worklight on cab (without front lift)		X61	8-9
0442.5599.4	Front right worklight on cab (without front lift)		X62	8-9
0442.6744.4	Air conditioning compressor		K	14
0442.9597.4	Lift control panel		X14	20
0443.8670.4	Armrest		X21	4-20
2.8039.160.0	Front right worklight (on hood)		X89	8-9
2.8039.160.0	Front left worklight (on hood)		X93	8-9
2.8039.240.0	Left headlamp		X86	5-6
2.8039.240.0	Right headlamp		X88	5-6
2.8039.250.0	Left headlamp (UK)		X86	5-6
2.8039.250.0	Right headlamp (UK)		X88	5-6
2.8519.008.0	Front axle suspension control unit		JX3 - YX4	12-17
2.8519.013.0	Rear lift control unit		JX1 - JX2	12-15-17-19-20-21
0441.9425.4/10	Lift and hand throttle console	54	EHR - EMR	4-20
0442.2746.4/10	Gearshift lever		X12	18
0442.9833.4/10	Rear left tail light and direction indicator (narrow fenders)		X66SX	5-6-15
0442.9834.4/10	Rear right tail light and direction indicator (narrow fenders)		X66DX	5-6-15
0443.7488/10	Instrument panel		ST1 - ST2	3-4-5-6-11-12-15-16-18-20-21
0443.8083/10	Transmission ECU		ECU PS	2-18

Connector	Type	Wiring code	Connection wiring or component code	Component description
X87		0.013.0663.4	0116.9304	Horn
X88	37	0.013.0663.4	2.8039.250.0	Right headlamp (UK)
			2.8039.240.0	Right headlamp

N°	Description	Code	Characteristics	Connector																											
41	Cab headlights dipped beam switch	0441.1496.4	 <table border="1" data-bbox="724 629 1235 792"> <thead> <tr> <th>Pin</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>●</td> <td>—</td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Pin	1	2	3	4	5	6	7	8	0									1	●	—			●				3
Pin	1	2	3	4	5	6	7	8																							
0																															
1	●	—			●																										
42	Lower front worklights (on cab) switch	0441.1496.4	 <table border="1" data-bbox="724 1211 1235 1375"> <thead> <tr> <th>Pin</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>●</td> <td>—</td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Pin	1	2	3	4	5	6	7	8	0									1	●	—			●				3A
Pin	1	2	3	4	5	6	7	8																							
0																															
1	●	—			●																										
43	50S lights switch	0441.1496.4	 <table border="1" data-bbox="724 1794 1235 1957"> <thead> <tr> <th>Pin</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> </tr> </thead> <tbody> <tr> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>●</td> <td>—</td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Pin	1	2	3	4	5	6	7	8	0									1	●	—			●				4
Pin	1	2	3	4	5	6	7	8																							
0																															
1	●	—			●																										

Pin	Volts.	Code	Description
16		FERNL	Main beam indicator light
17		HYDRA	Hydraulic system oil filter clogged
18			Not utilised
19		VORGL	Glowplugs test
20		RPTO	Rear PTO rpm
21		GROUND	Input, actual ground speed (radar)
22		WHEEL	Input, theoretical vehicle speed
23		TRAILER	Input, trailer braking indicator light (Italy)
24			Not utilised
25		EMR	Input, engine indicator light
26			Not utilised

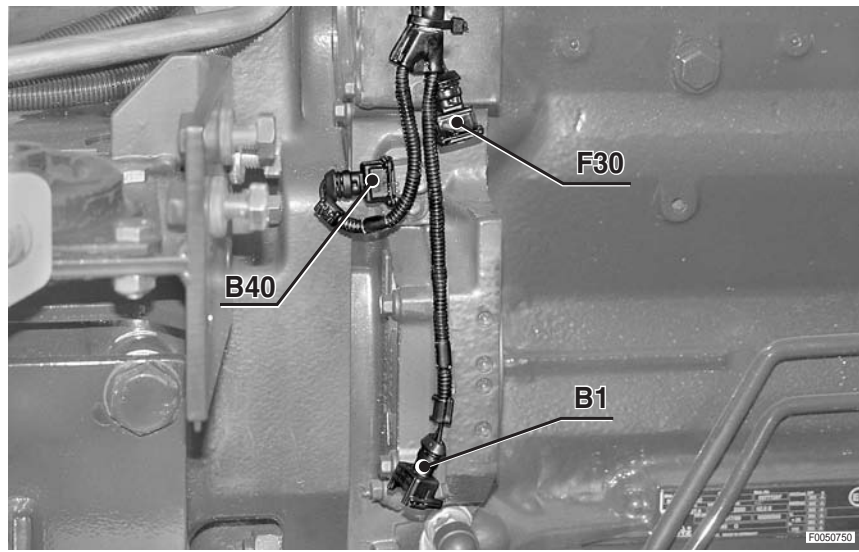
4.7 CAB ACCESSORY



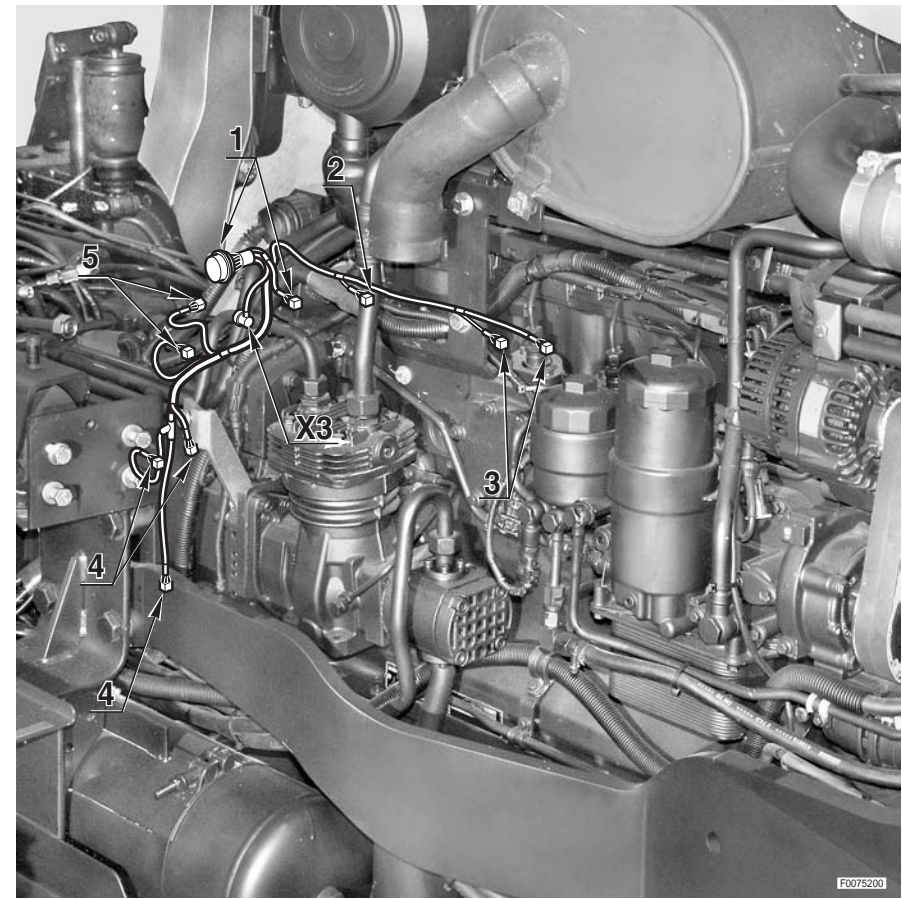
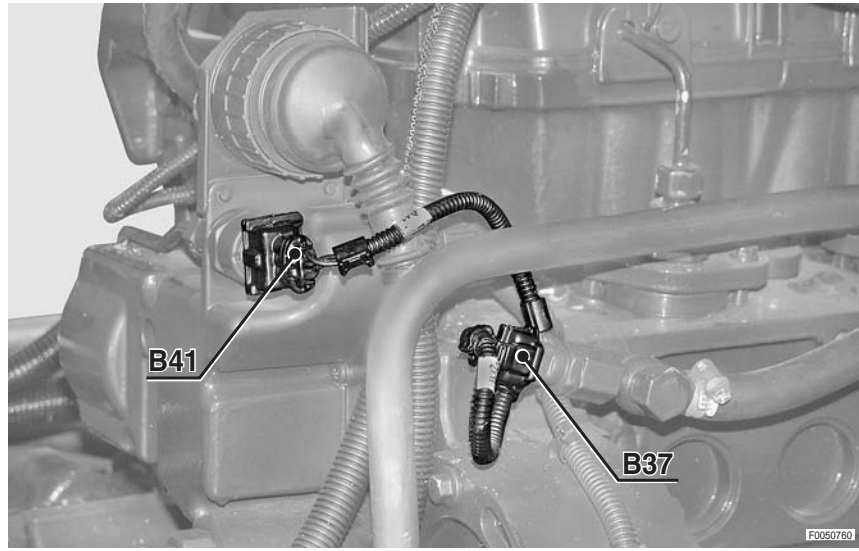
- 1 Starter switch
- 2 Door open warning signal switch
- 3 Interior roof light
- 4 Clock
- 5 Side console courtesy light
- 6 Driver seat air suspension compressor
- 7 Cigar lighter

ENGINE WIRING

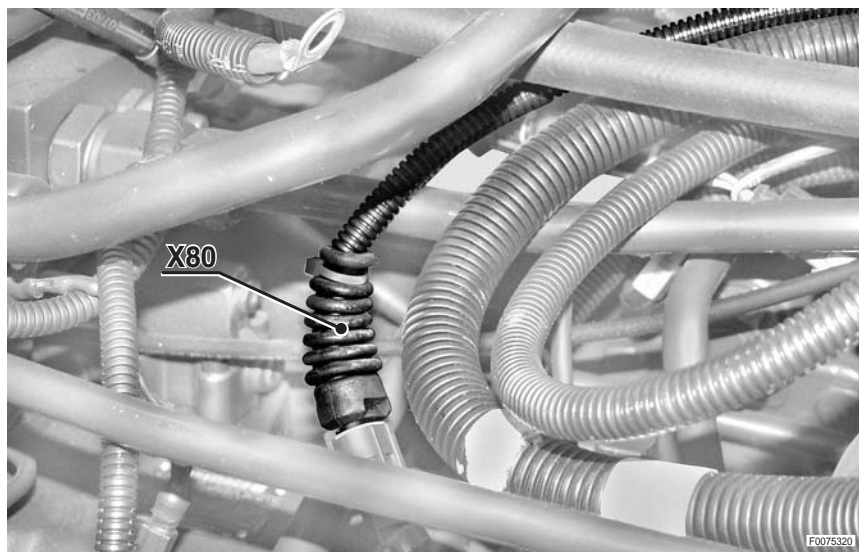
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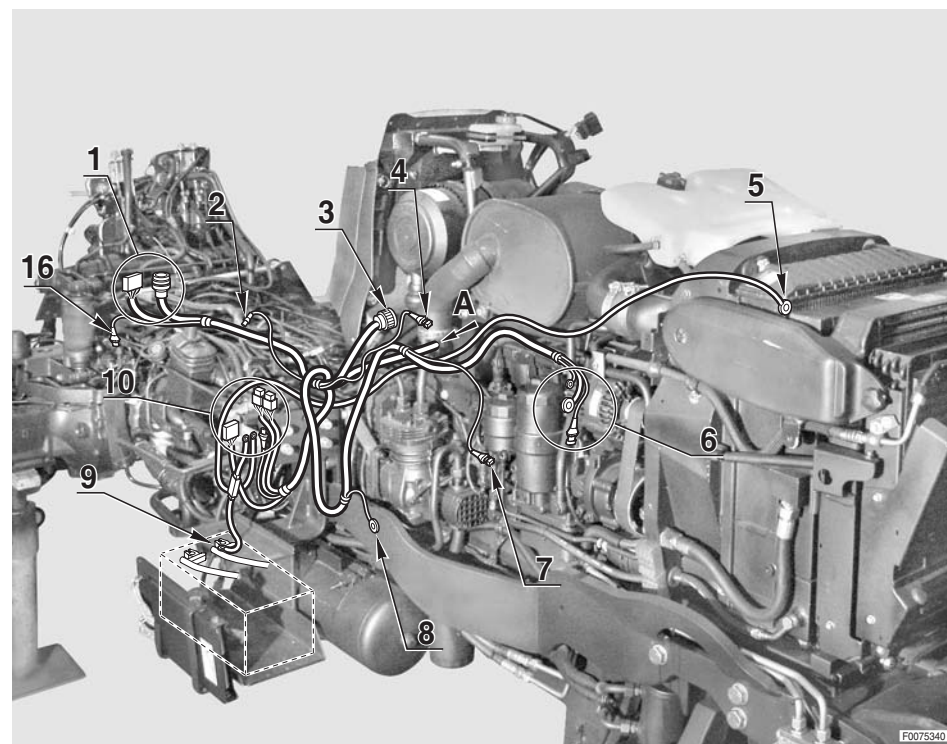
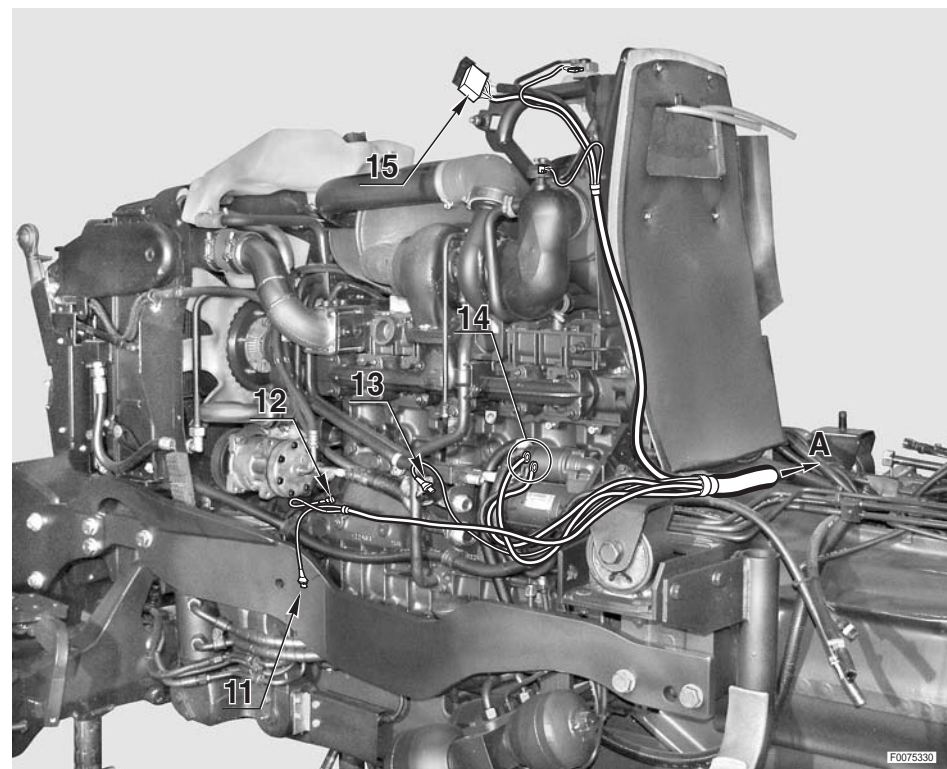
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16



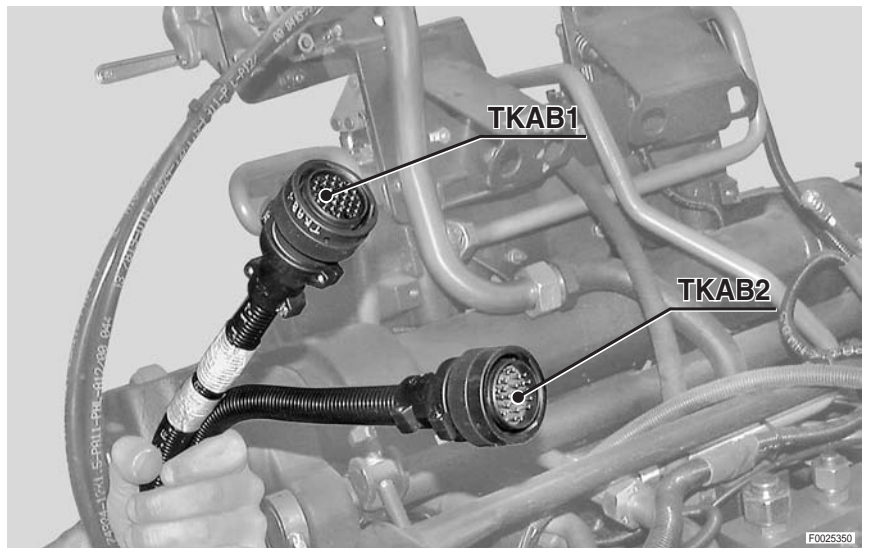
ENGINE WIRING



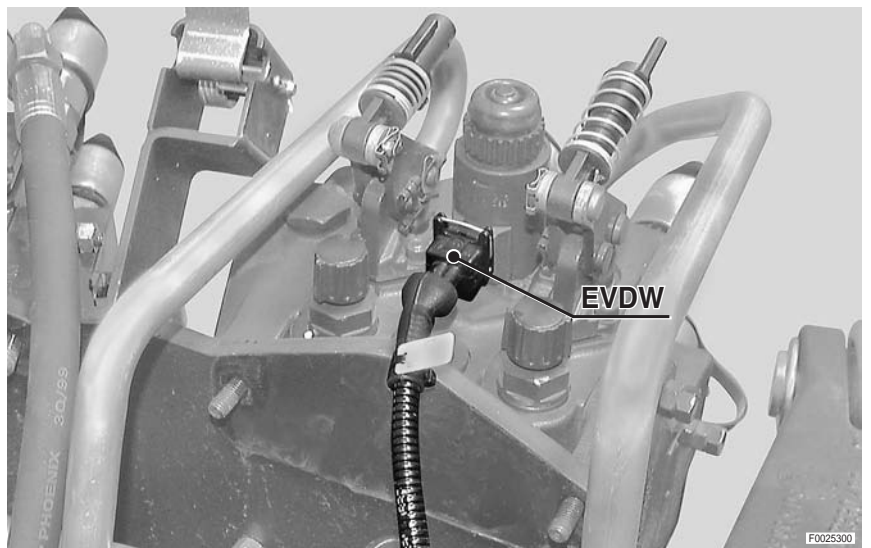
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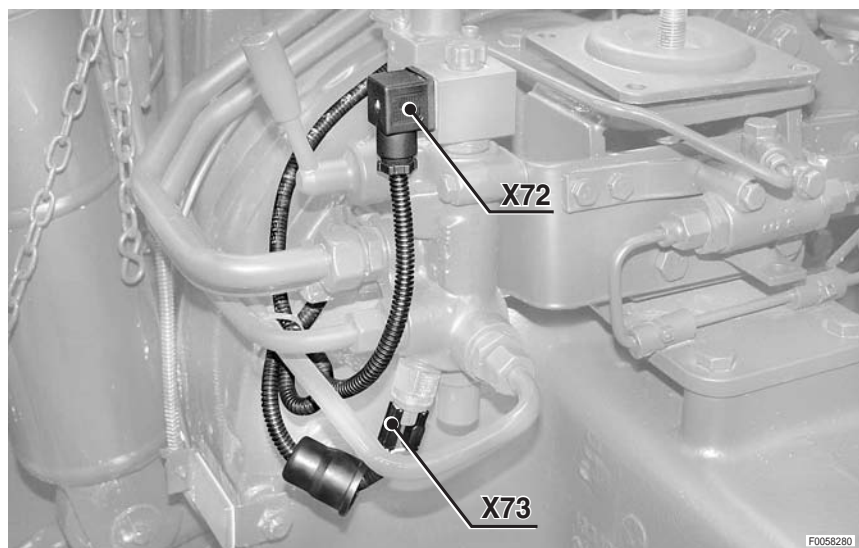


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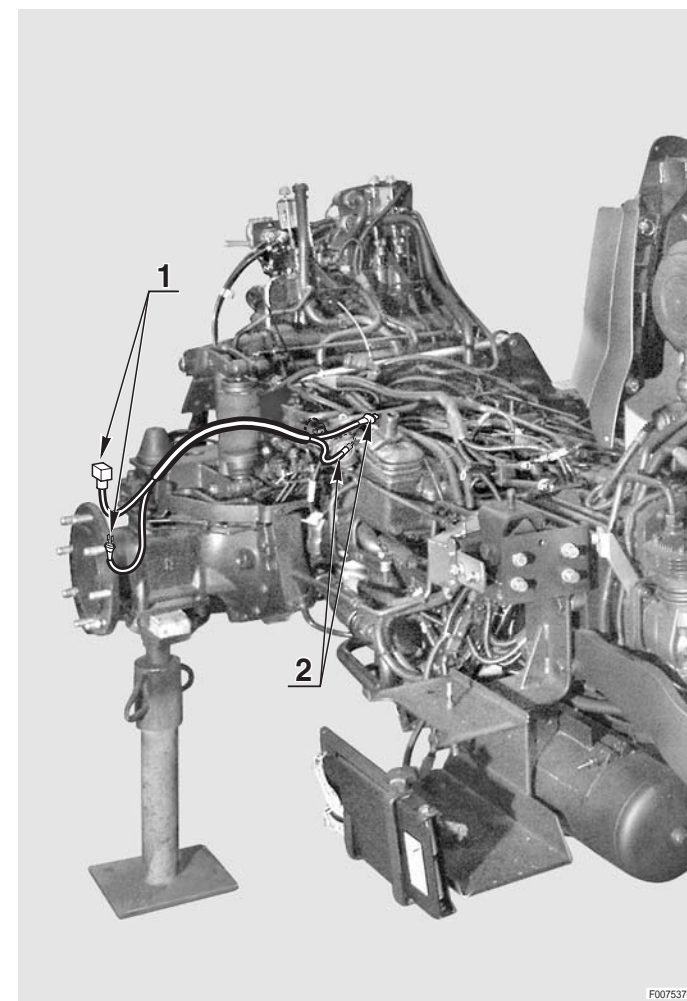
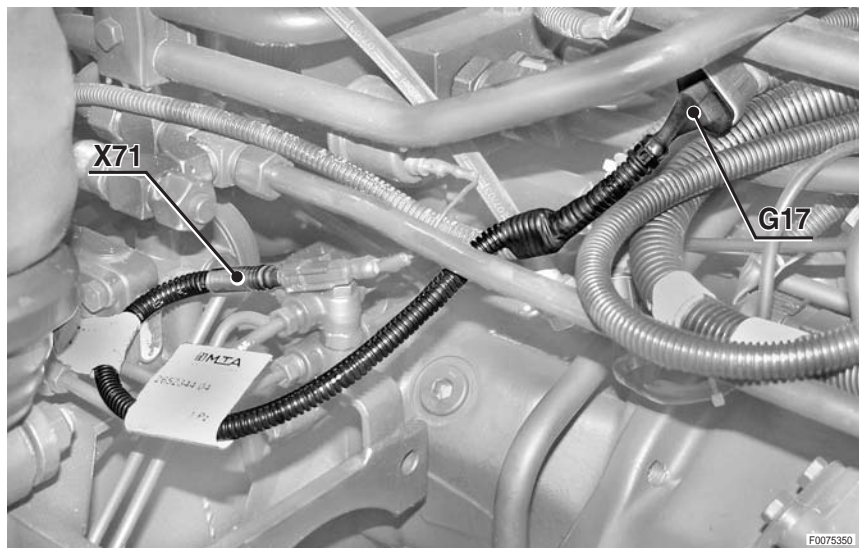


TRAILER BRAKE WIRING

1

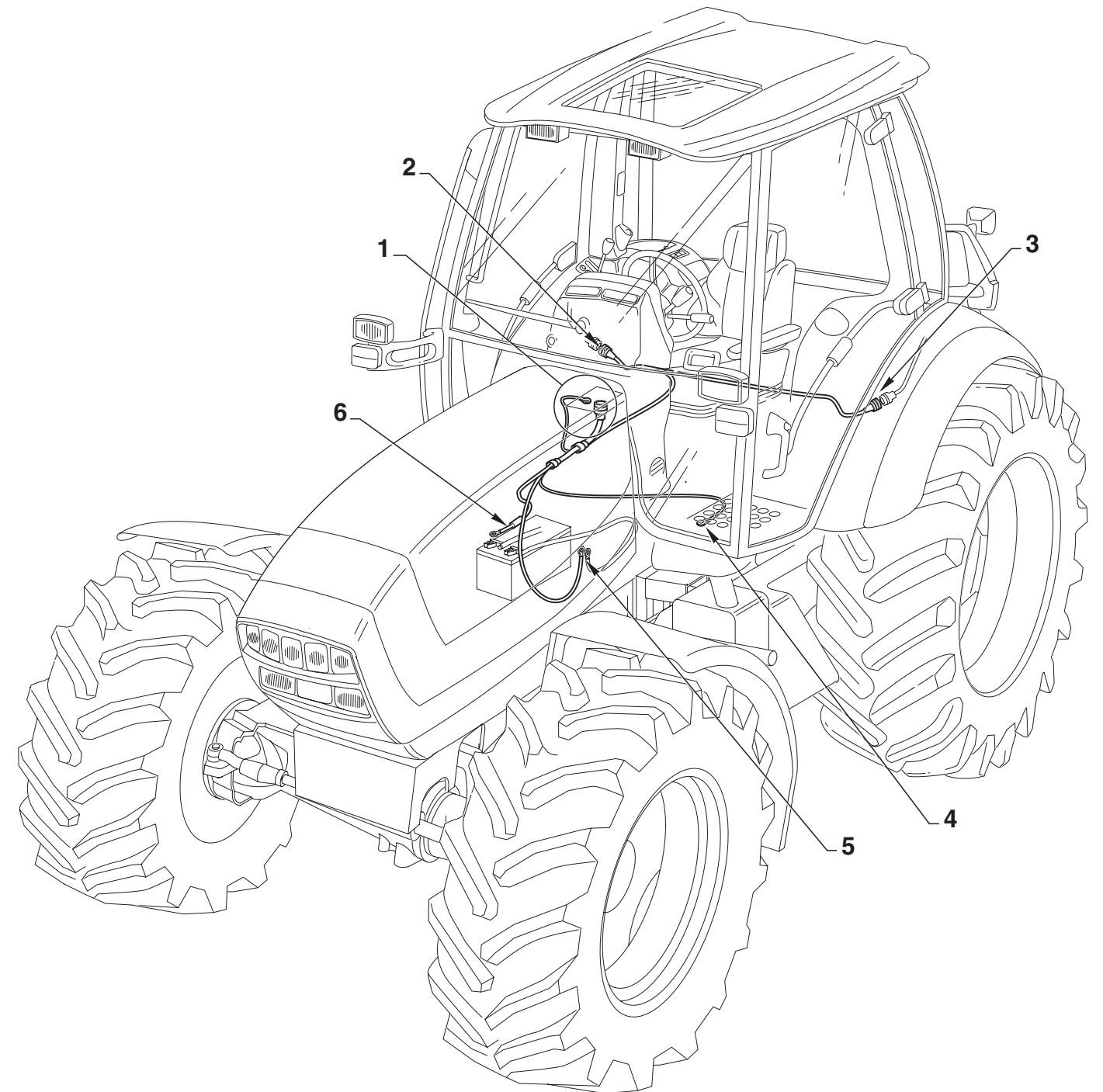
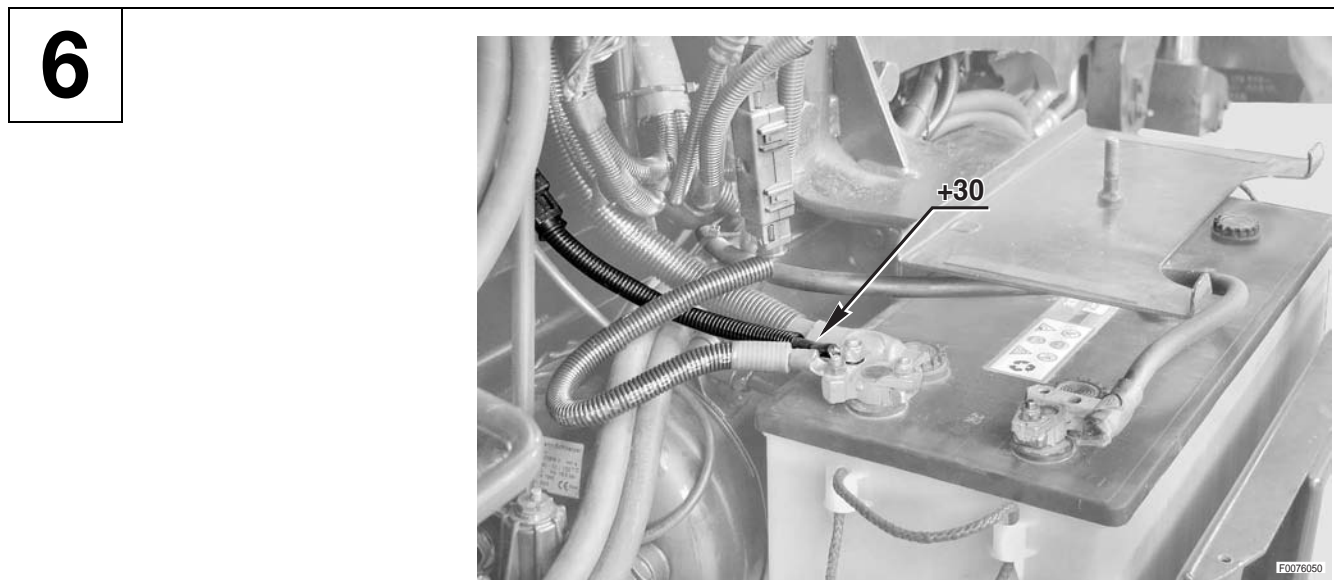
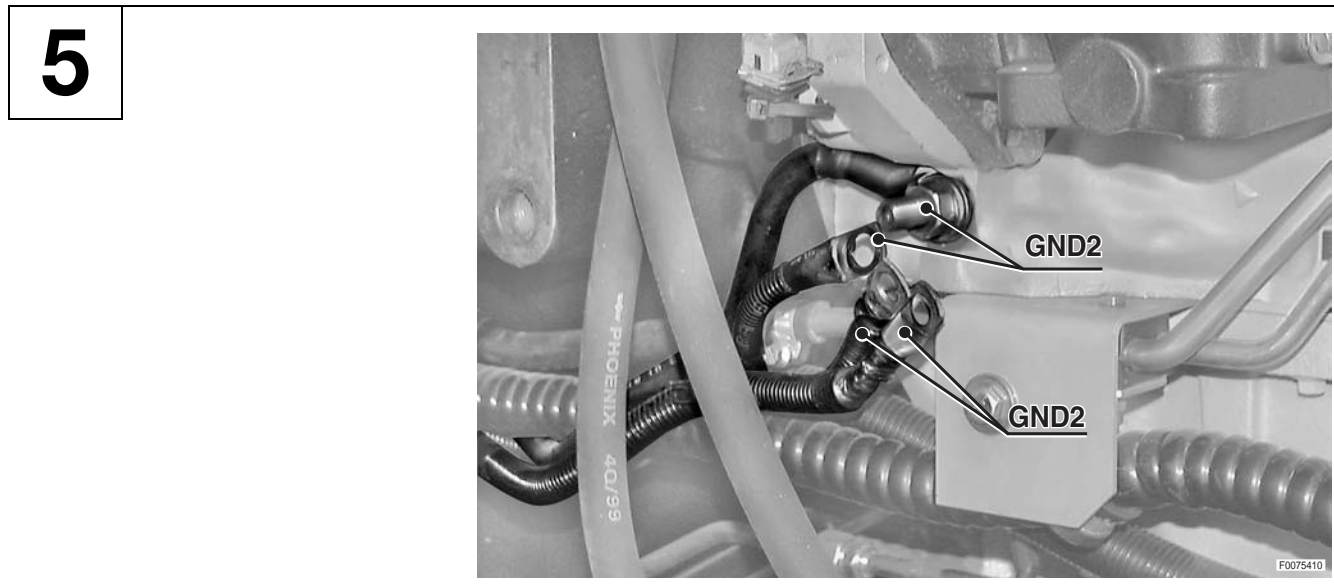
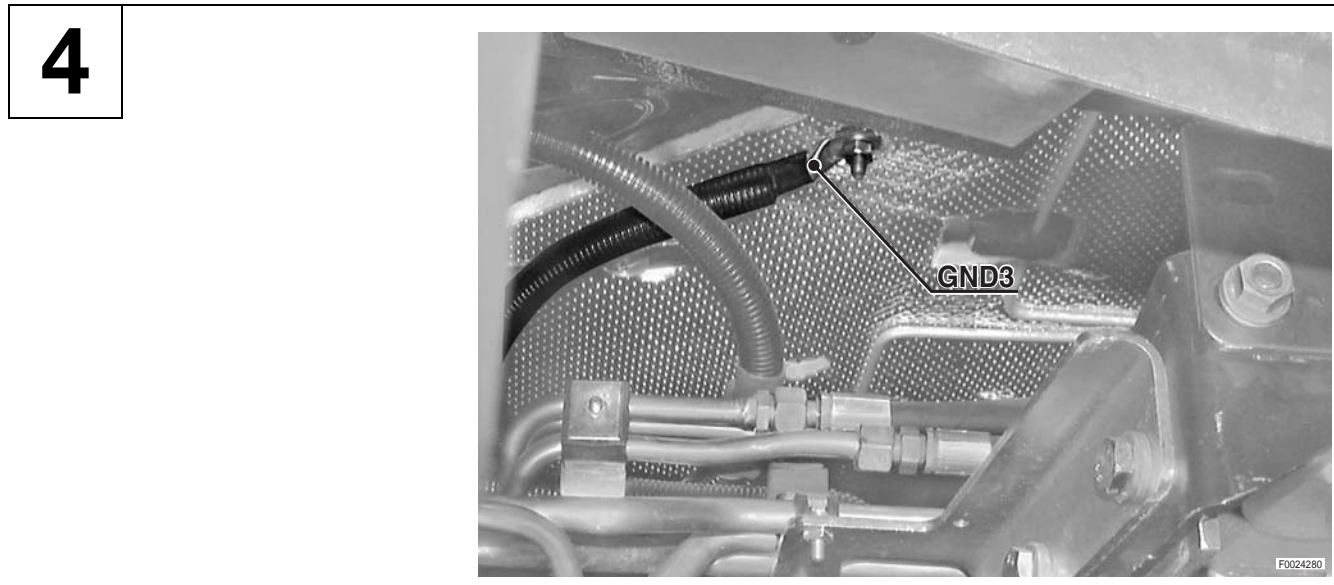


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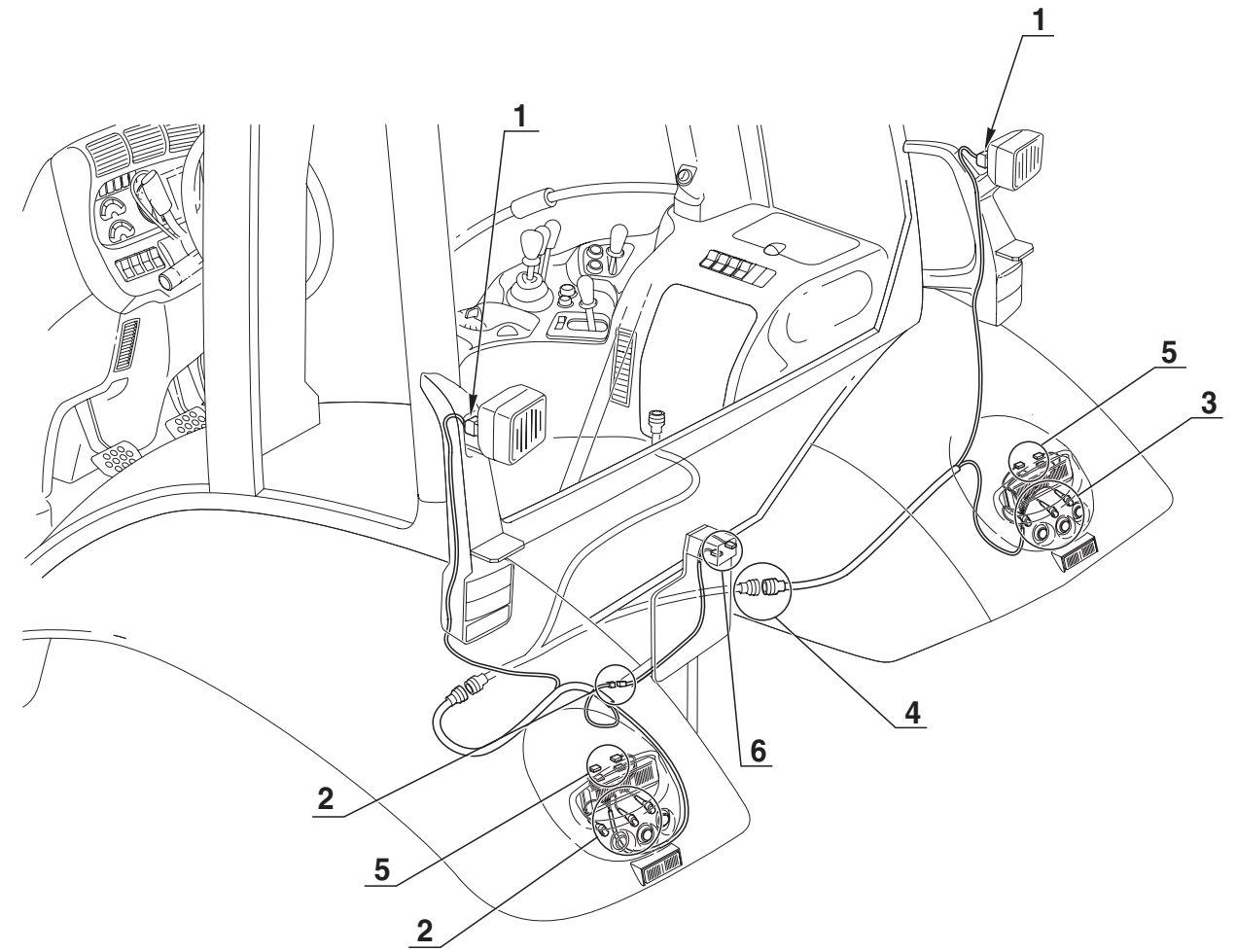
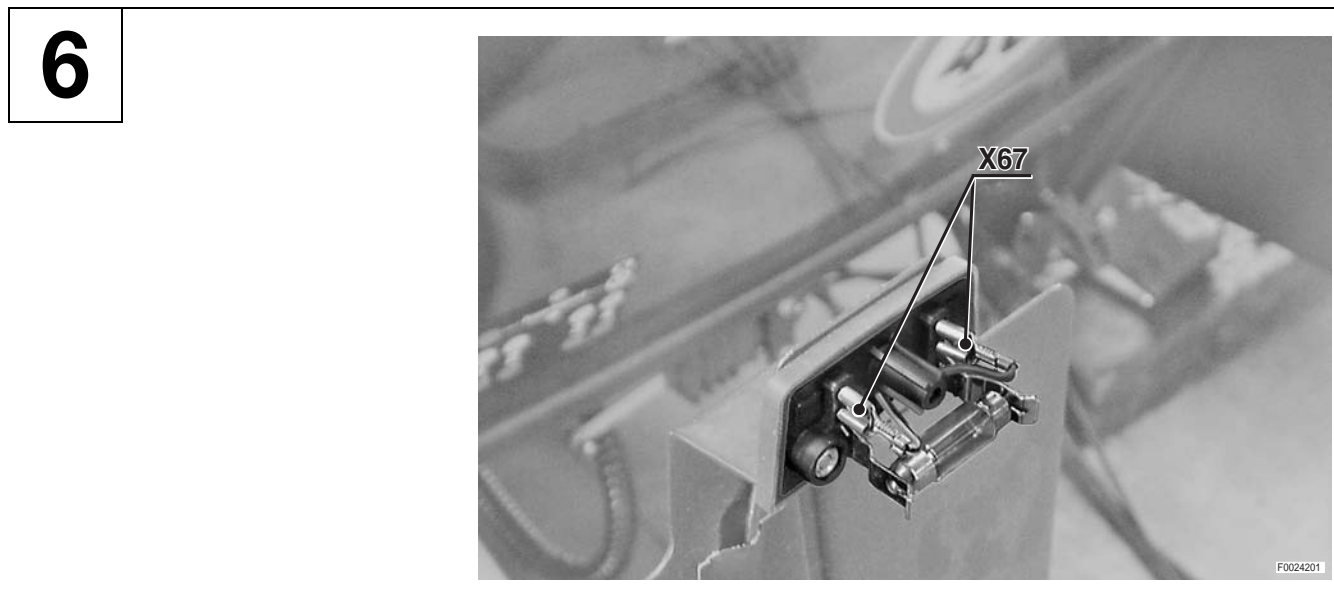
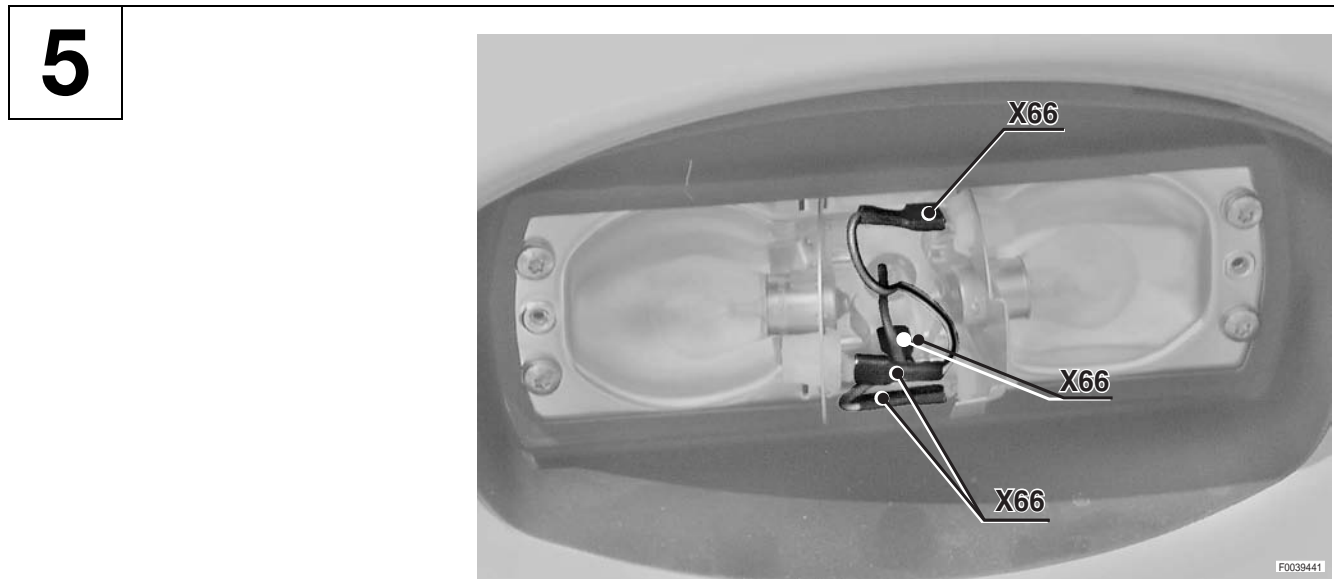
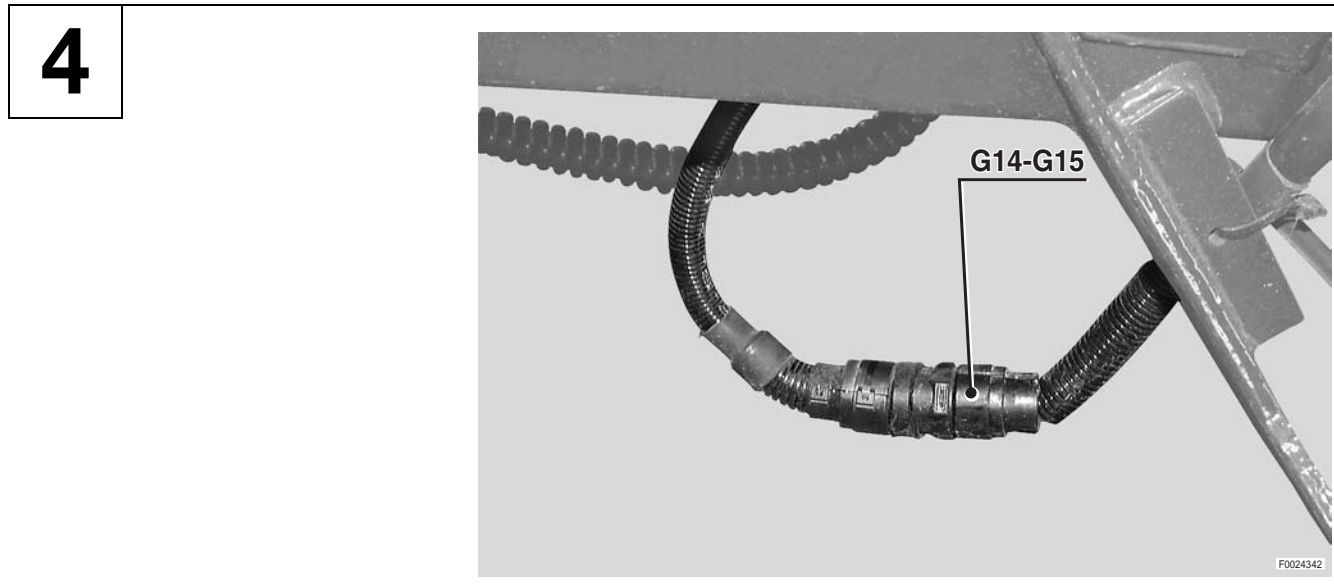


0443.7356.4
0443.7355.4

CAB POWER SUPPLY WIRING



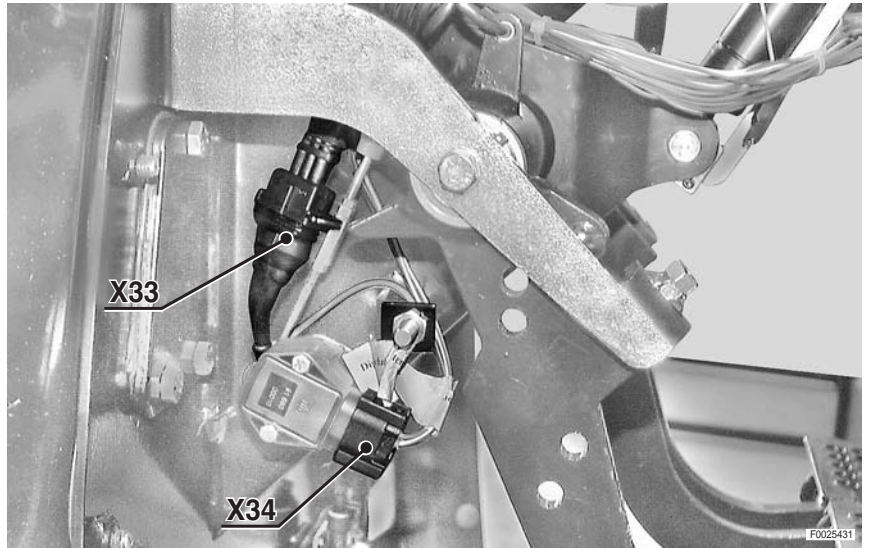
NUMBER PLATE LIGHT AND FENDER WIRING



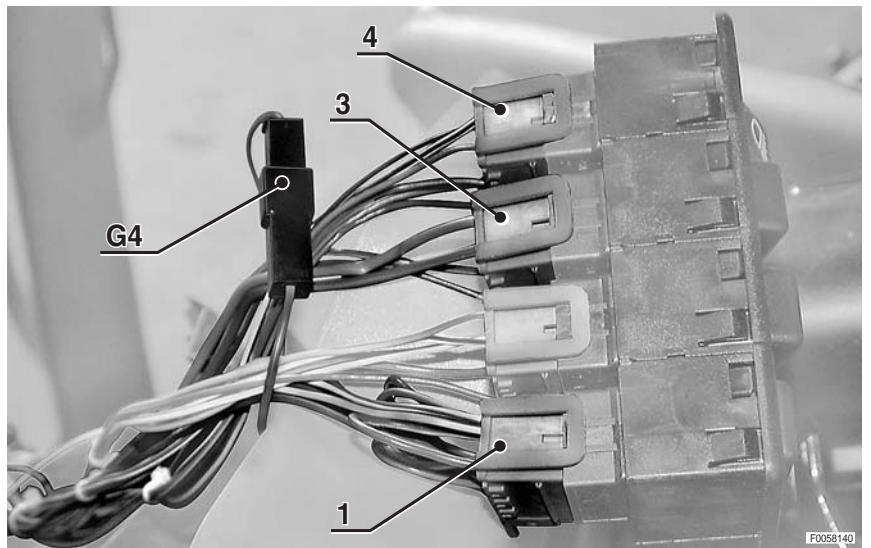
FENDER 0.012.2010.4/10	PLATE LIGHT 0.012.2018.4
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CONNECTORS LOCATION

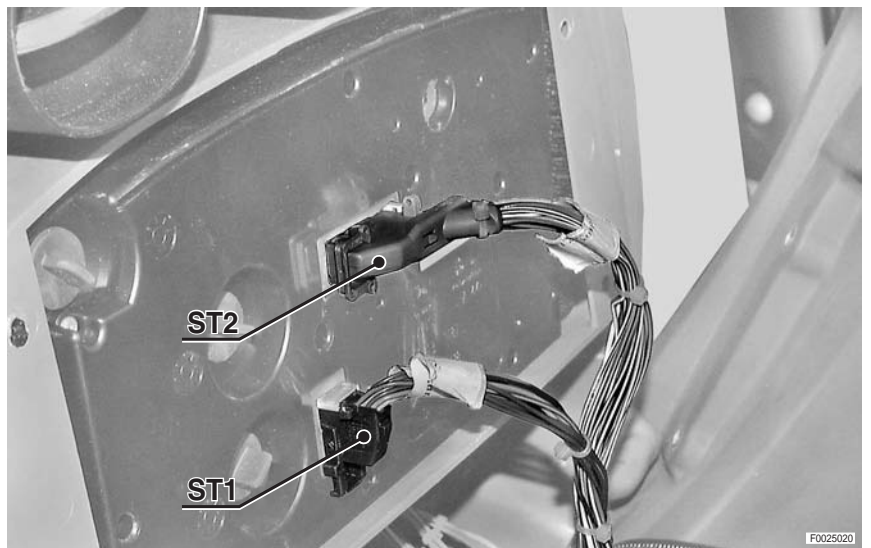
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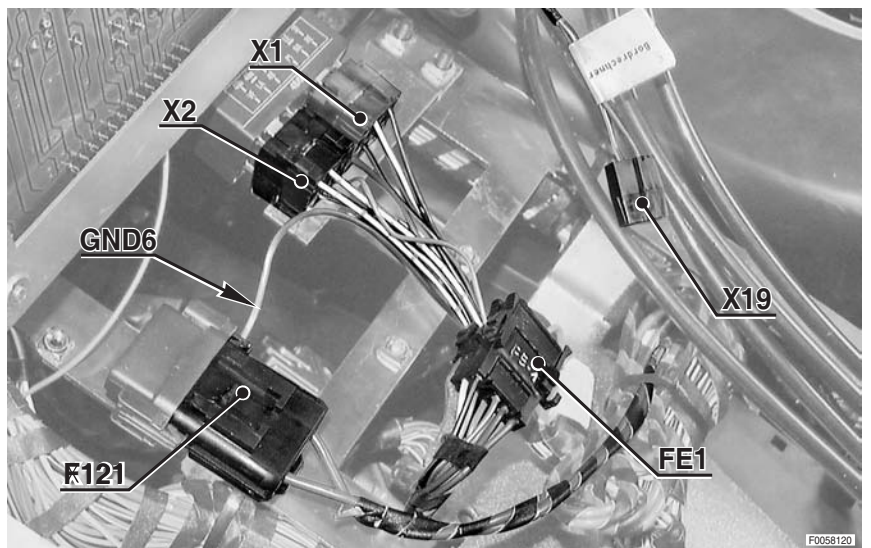
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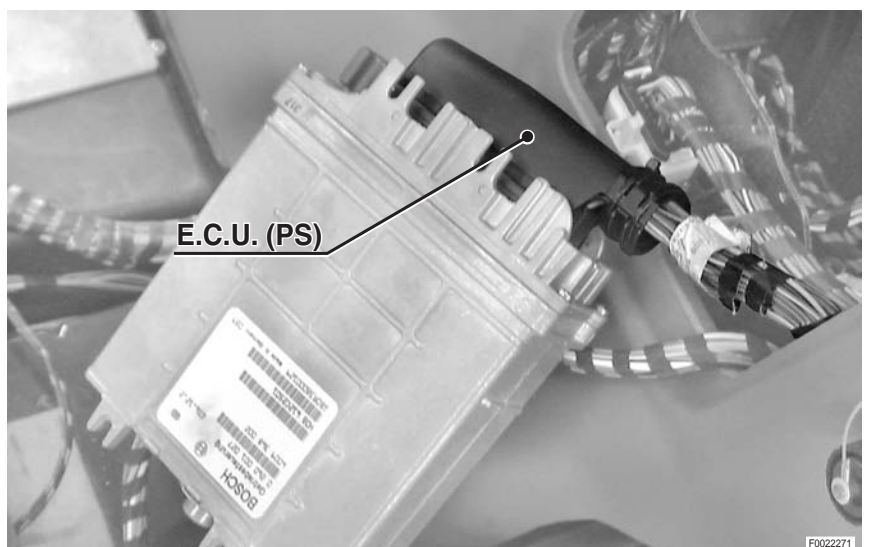
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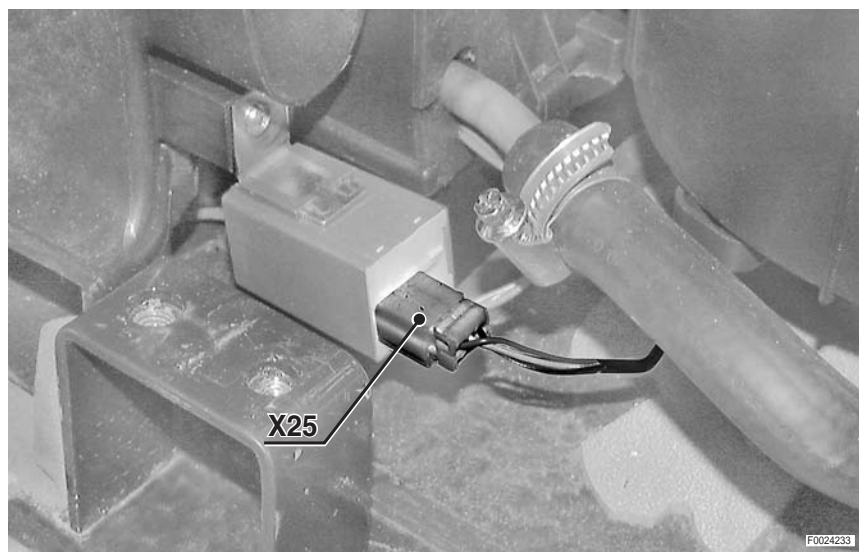


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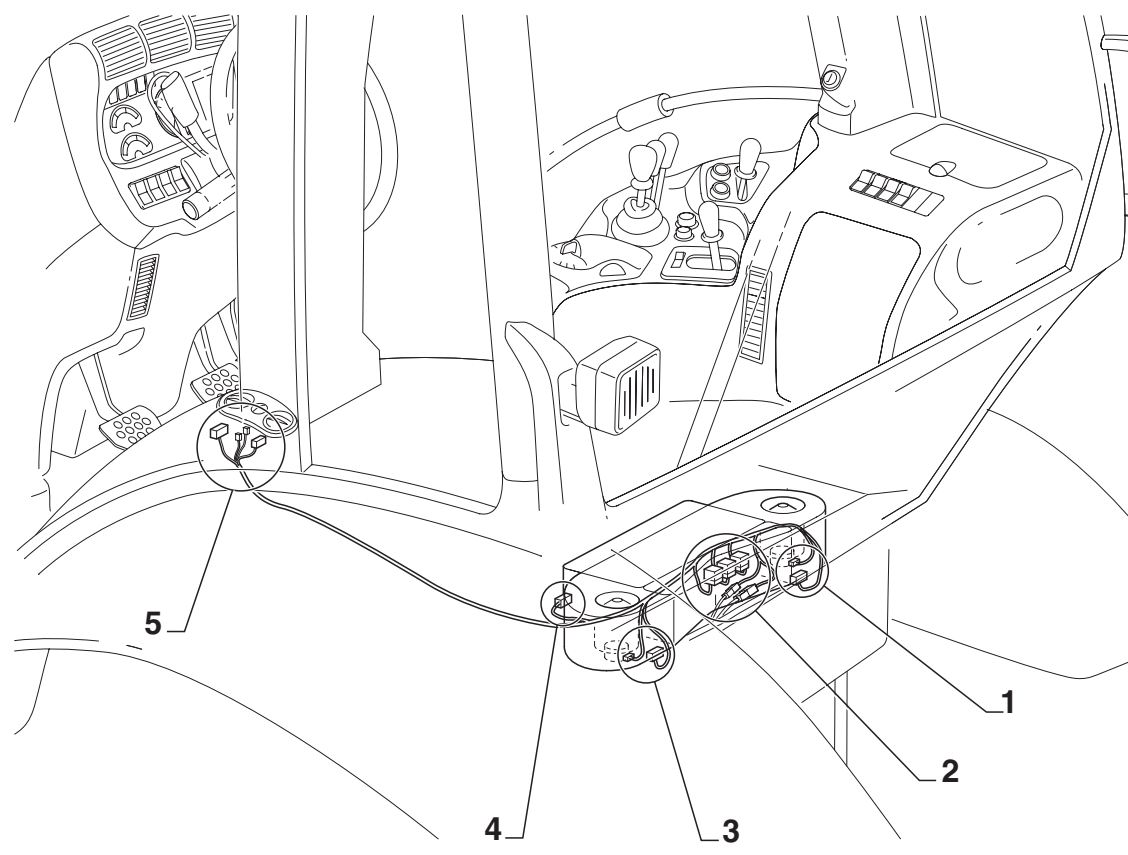
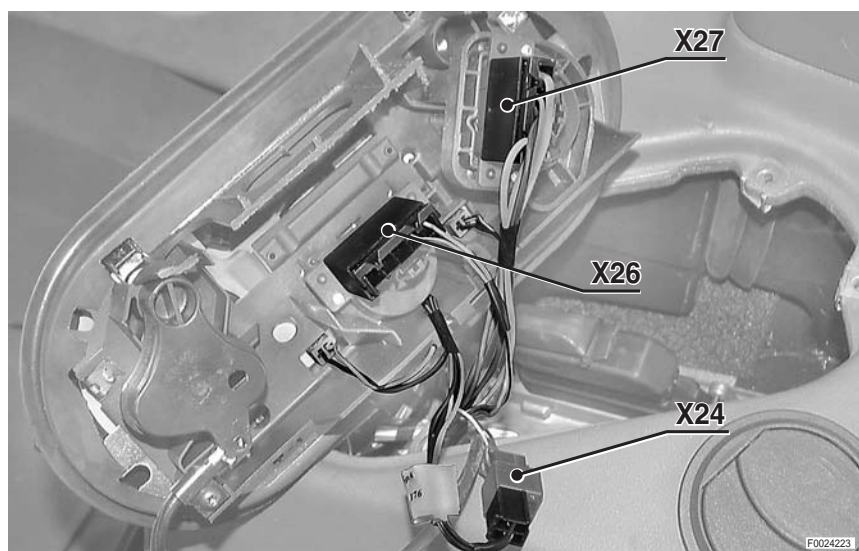


AIR CONDITIONING WIRING

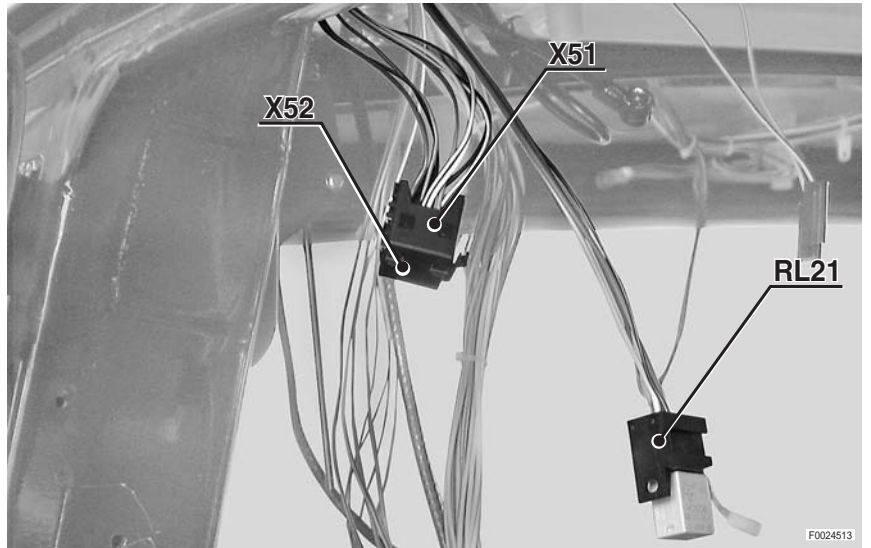
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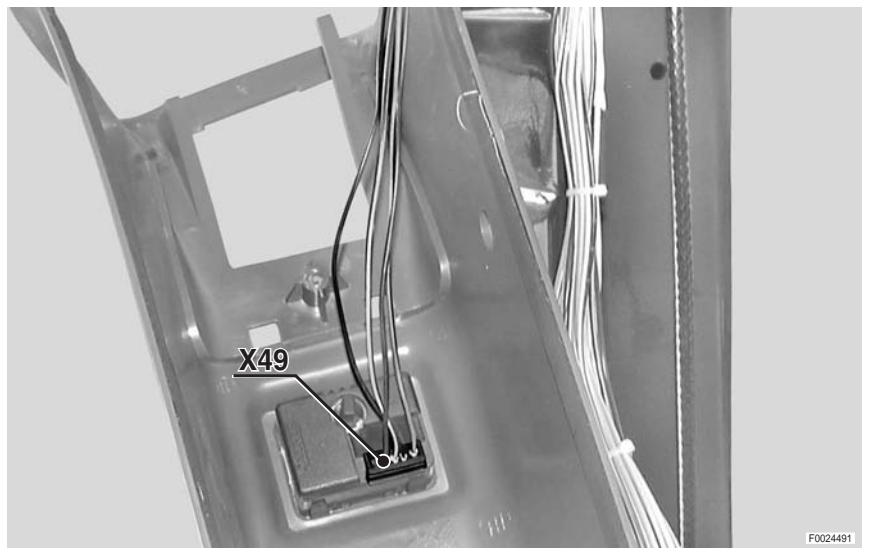
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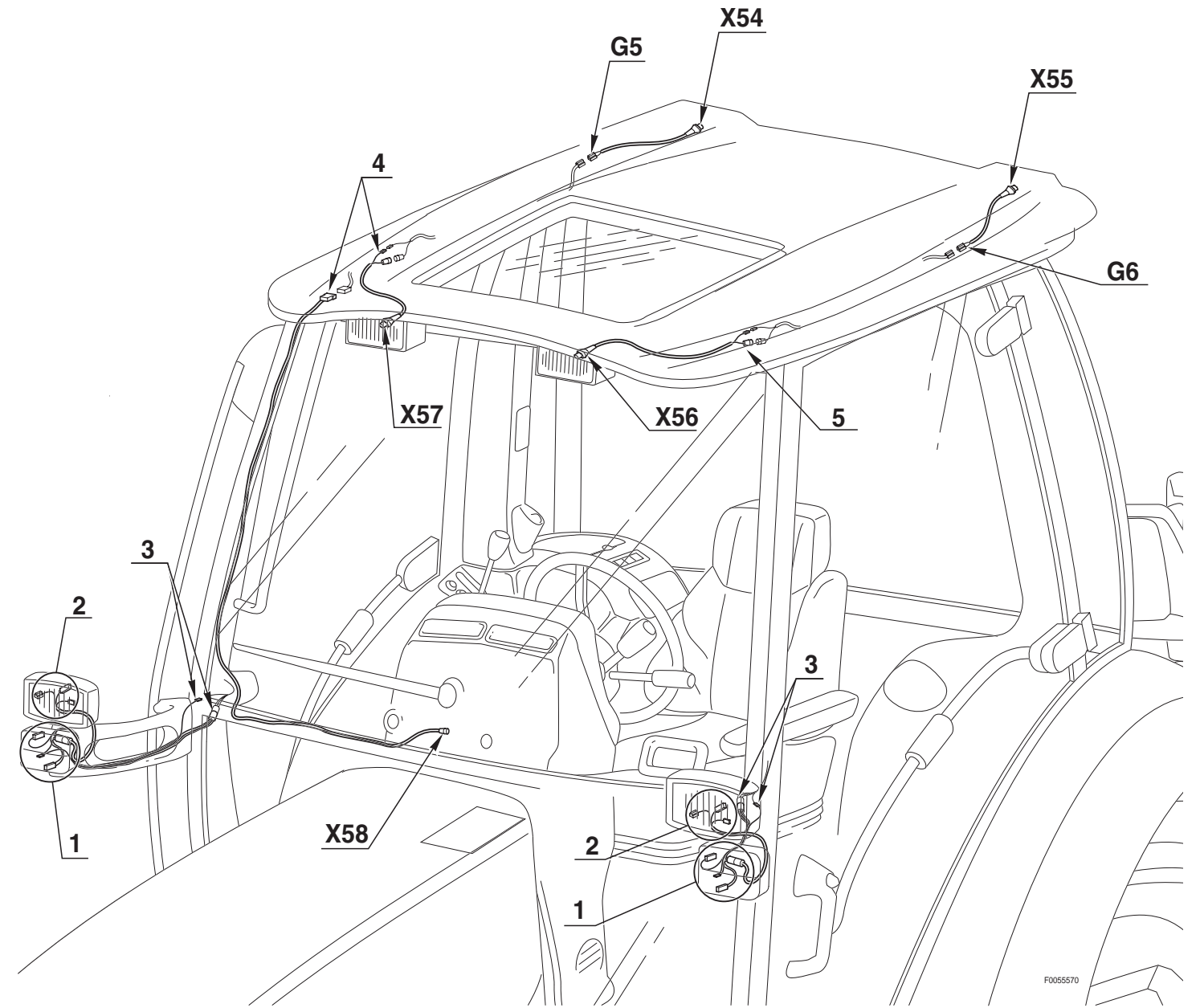
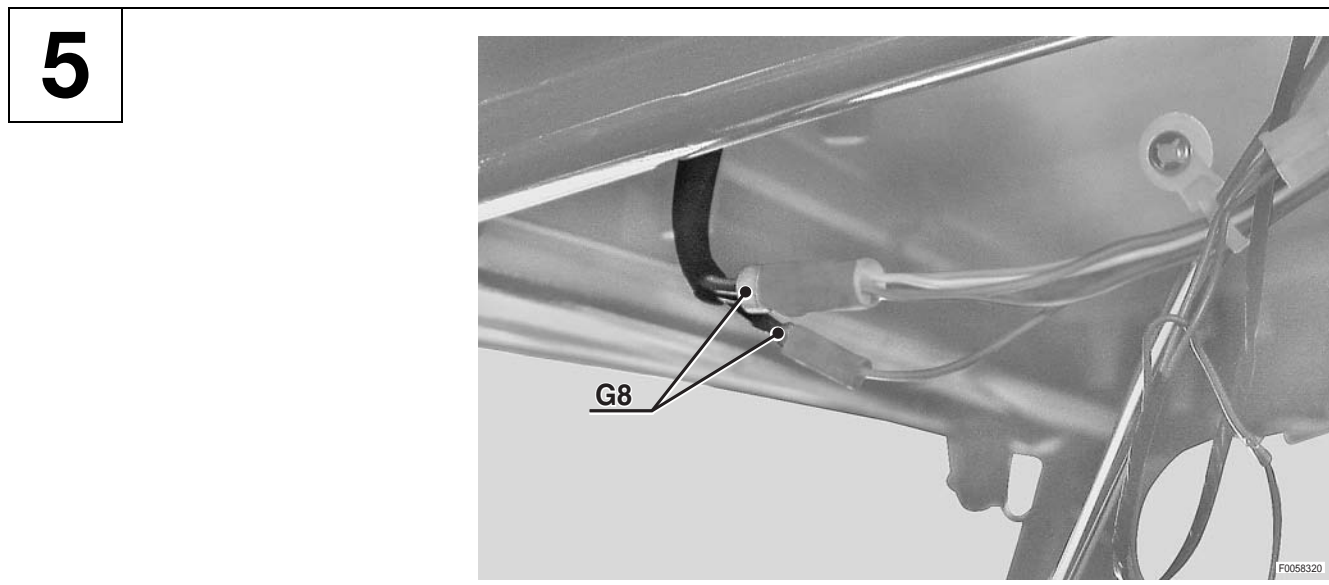
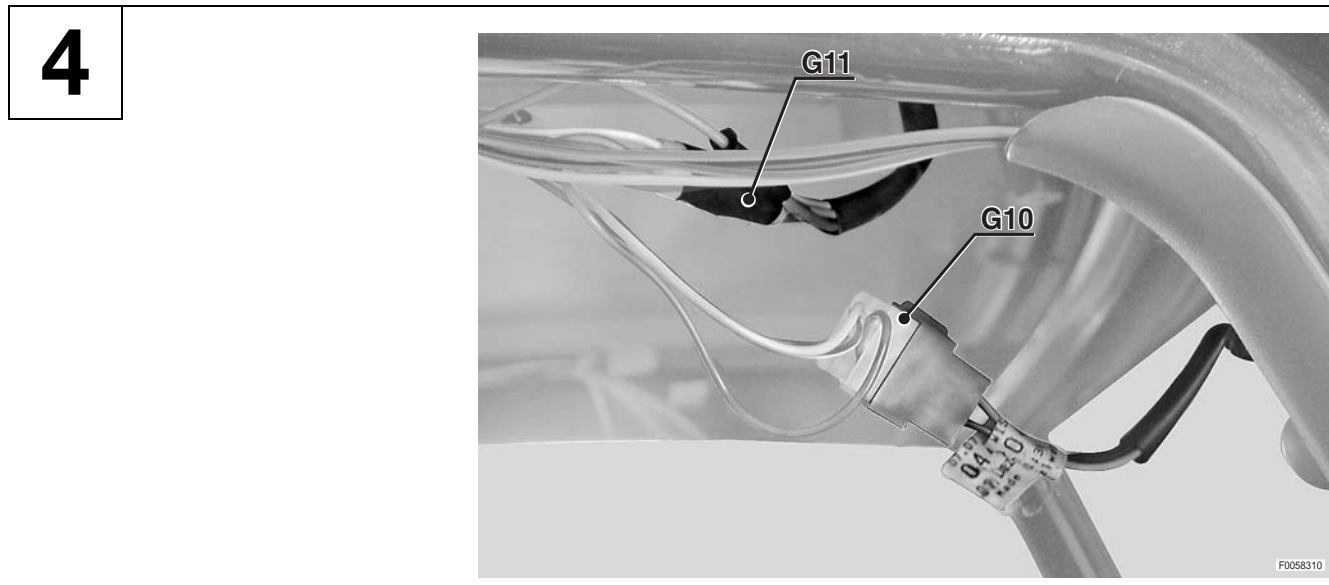
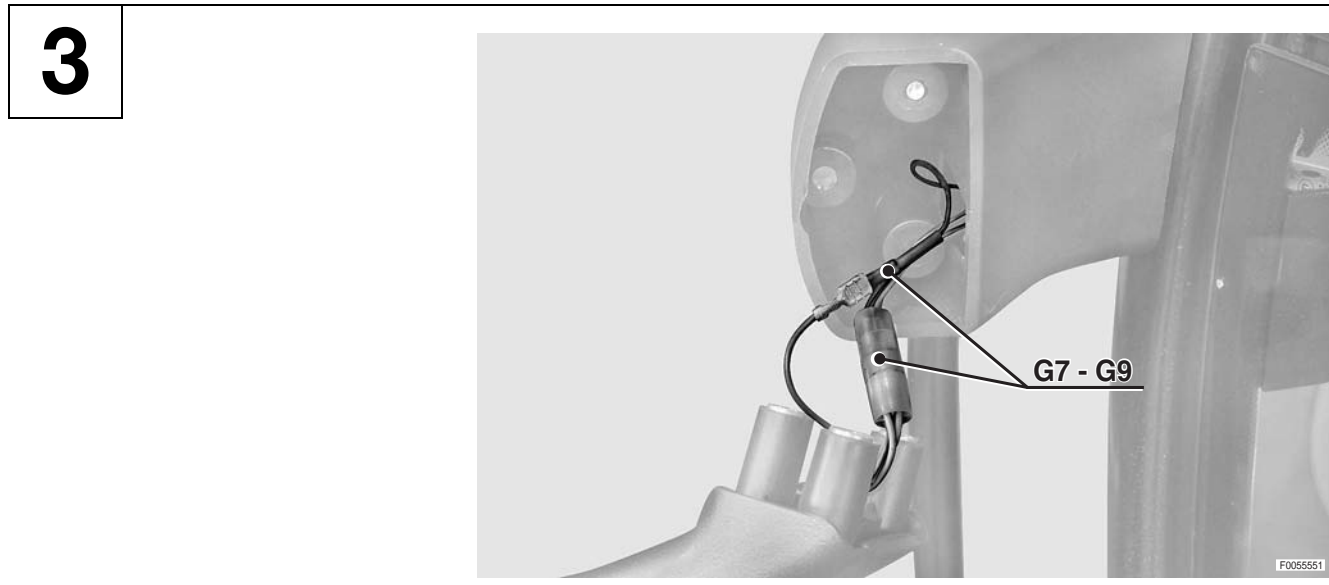
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9



WORKLIGHTS AND WINDSCREEN WIPER MOTOR WIRINGS



0441.1923.4 0441.2045
0442.5602 0443.4993
0441.6727

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