



**NEW HOLLAND**

**PRINT NO. 603.54.351.01**

**1<sup>st</sup> Service Manual Update  
models TN55D/S, TN65D/S, TN75D/S - Print no. 603.54.351.00**

### **IMPORTANT NOTES**

**These pages replace the corresponding pages in the Manual of models TN55D/S, TN65D/S, TN75D/S**

- preface pages 1 and 2.
- contents, pages 3, 4, 5, 6, 7, 8, 9 and 10.
- Section 00, pages 5 and 6.
- Section 10, Chapter 1, pages 1, 2, 3, 4, 5, 6, 15, 16, 19, 20, 21, 22, 65, 66, 81, 82, 83 and 84.
- Section 18, Chapter 1, pages 1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 15 and 16.
- Section 21, Chapter 1, pages 29 and 30.
- Section 21, Chapter 3, pages 1, 2, 9, 10, 25, 26, 27, 28, 29, 30, 31, 32, 33 and 34.
- Section 23, Chapter 1, pages 1, 2, 3, 4, 19 and 20.
- Section 25, Chapter 1, pages 1, 2, 7, 8, 13, 14, 41 and 42.
- Section 25, Chapter 2, pages 1, 2, 5, 6, 7, 8, 29, 30, 39 and 40.
- Section 27, Chapter 1, pages 1, 2, 3, 4, 21 and 22.
- Section 31, Chapter 1, pages 1, 2, 3 and 4.
- Section 33, Chapter 1, pages 3 and 4.
- Section 35, Chapter 1, pages 17, 18, 19, 20, 21, 22, 31, 32, 30 and 40.
- Section 35, Chapter 2, pages 1 and 2.
- Section 35, Chapter 4, pages 1, 2, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59 and 60.
- Section 41, Chapter 2, pages 5 and 6.
- Section 44, Chapter 1, pages 1 and 2.
- Section 55, Chapter 1, pages 11 and 12.

### **IMPORTANT NOTES**

**The following pages are newly issued:**

- pages 11 and 12, index.
- pages 95 and 96, Chapter 1, Section 10.
- pages 25, 26, 27, 28, 29 and 30, Chapter 1, Section 18.
- pages 35 to 158, Chapter 3, Section 21.
- pages 21 to 70, Chapter 1, Section 23.
- pages 41, 42, 43 and 44, Chapter 2, Section 25.
- pages 61 to 148, Chapter 4, Section 35.
- pages 1 to 132, Chapter 6, Section 35.
- pages 17 to 26, Chapter 1, Section 55.
- pages 19 to 34, Chapter 2, Section 55.
- pages 13 and 14, Chapter 3, Section 55.
- pages 111 to 276, Chapter 6, Section 55.

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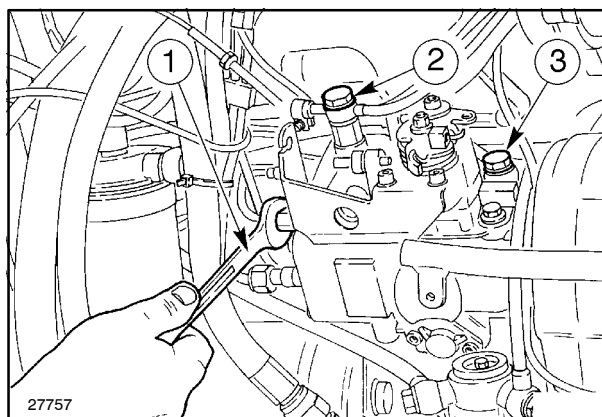
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## FUEL SYSTEM DATA

Turbocharger (Models TN 70D/S and TN 75D/S):	
- GARRETT type .....	T 25
Injection pump .....	rotating distributor with speed governor and advance variator incorporated
BOSCH pump:	
- Models TN 55D/S .....	VE 3/11 F 1150 L 767 - 99441584
- Models TN 65D/S .....	VE 3/11 F 1150 L 766 - 99441586
- Models TN 70D/S .....	VE 3/11 F 1150 L 764-2 - 500389114 - 500389115
- Models TN 75D/S .....	VE 3/11 F 1150 L 764 - 99441587
Direction of rotation .....	counter-clockwise
Injection order .....	1-2-3

Fuel injectors:	
BOSCH type .....	500307714
- Nozzle holder type .....	4791124
- Nozzle type .....	DLLA 132S 1320 - 99469341
Number of nozzle holes .....	5
Nozzle hole diameter .....	0.23
Pressure setting .....	3771.18 to 3945.23 psi (260 to 272 bar)
Delivery lines for BOSCH pump	
- type .....	99441952
- Pipe dimensions .....	6 x 1.75 x 540

8. Unscrew the unions: (1) on the injection pump delivery lines, (2) the fuel return lines and (3) the pump fuel supply line.
9. Disconnect the L.D.A. device connecting pipe to the inlet manifold (only model TN 70D/S and TN 75D/S).



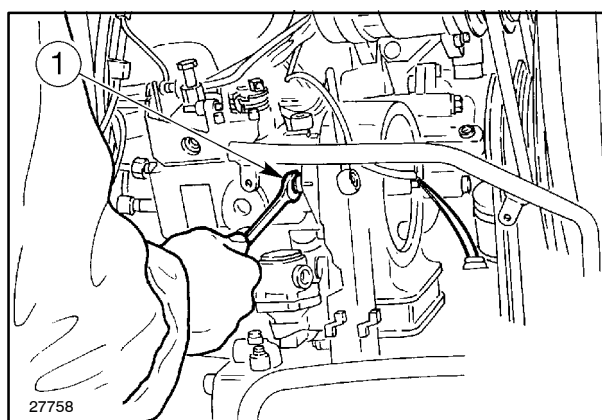
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10. Check that reference marks have been made (2) for timing the injection pump (1).



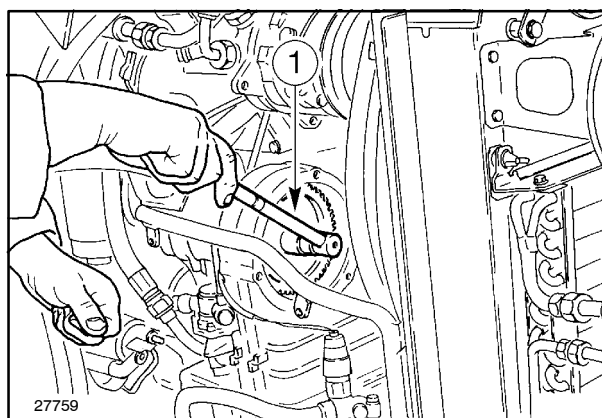
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11. Unscrew the bolts (1) securing the injection pump.



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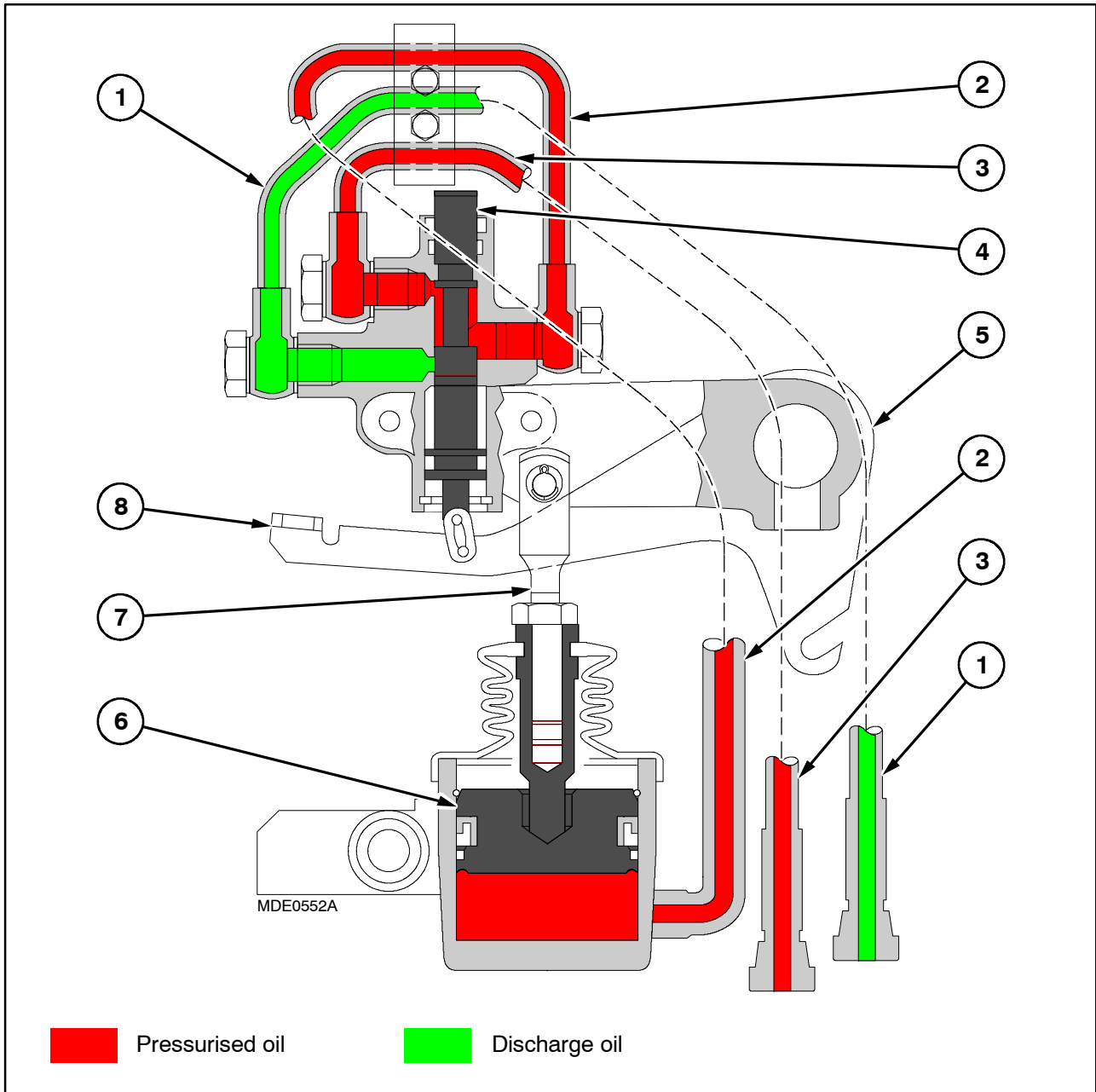
12. Unscrew the injection pump retaining nut from the control gear (1).



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## CLUTCH TROUBLESHOOTING

Problems	Possible Causes	Solutions
The clutch slips	<ol style="list-style-type: none"> <li>1. Worn disks 11 and 9, page 3, worn pressure plates and fly-wheel disk 1, page.</li> <li>2. Belleville spring disk (2, page 3) distorted or damaged.</li> <li>3. Oil or grease contaminating the friction lining of disks 11 and 9, page 3) and disk (1, page 4)</li> </ol>	<p>Check and compare the data given on the pages indicated, replace any parts which are worn up to or over the limit and adjust levers and clutch control linkage.</p> <p>Replace the Belleville spring disk.</p> <p>Replace the disks, identify and eliminate the source of the lubricant inside the clutch housing and thoroughly clean the friction surfaces.</p>
The clutch jerks	<ol style="list-style-type: none"> <li>1. Partial seizure of the external control linkage.</li> <li>2. Clutch disk (9, page 3) deformed.</li> <li>3. Clutch disk (9, page 3) with damaged hub springs or loose hub rivets.</li> <li>4. Oil or grease contaminating the friction lining of disks (11 and 9, page 3) and disk (1, page 4)</li> </ol>	<p>Check rod pivots and lubricate.</p> <p>Replace the disk and adjust the clutch control lever.</p> <p>Replace disc.</p> <p>Replace the disks, identify and eliminate the source of the lubricant inside the clutch housing and thoroughly clean the friction surfaces.</p>
Clutch sticks and drags	<ol style="list-style-type: none"> <li>1. Clutch disks (11 and 9, page 3) and disk (1, page 4) deformed.</li> <li>2. Seizure of external control linkage.</li> <li>3. Controls incorrectly adjusted.</li> </ol>	<p>Replace and adjust disks.</p> <p>Check, replace faulty parts and lubricate.</p> <p>Adjust the controls (see page 19).</p>
Clutch noisy when engaged and/or disengaged	<ol style="list-style-type: none"> <li>1. Thrust bearing worn.</li> <li>2. Clutch disk (9, page 3) with hub springs damaged.</li> </ol>	<p>Replace Bearing.</p> <p>Replace disc.</p>
Clutch pedal too stiff	<ol style="list-style-type: none"> <li>1. Partial seizure of the external control linkage.</li> <li>2. Partial seizure of pedal pivot.</li> </ol>	<p>Check rod pivots and lubricate.</p> <p>Check pivot and lubricate.</p>



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## DESCRIPTION AND OPERATION

### PTO CLUTCH ENGAGEMENT

The PTO clutch lever is composed of a lever (in the cab) and the connecting cable to the servo control unit.

The servo control unit comprises a hydraulic control valve and relative piston.

When the PTO clutch is engaged, by means of the lever in the cab, the connecting cable acts on lever (8), which pushes the control valve pin (4) upwards.

The pin (4) movement closes the oil passage to the outlet line (1).

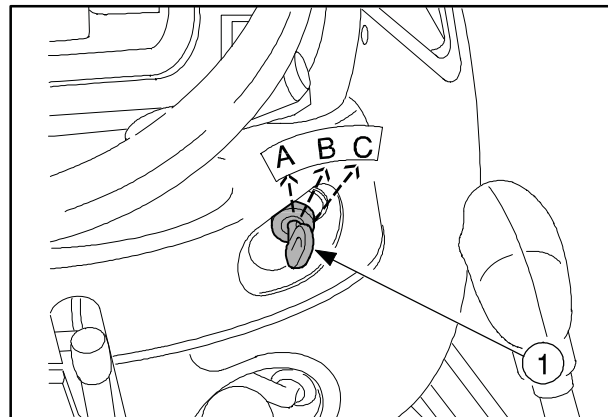
The oil from the pump passes through line (3), line (2), and acts on the piston (6).

The piston (6), under an oil pressure of 15.7 bar (227.72 psi) moves and, by means of tie-rod (7), moves lever (5), engaging the PTO clutch.

**CONTROL UNIT DESCRIPTION AND OPERATION**

**IGNITION**

During engine start-up, with key (1), the control unit carries out a self-diagnosis check.



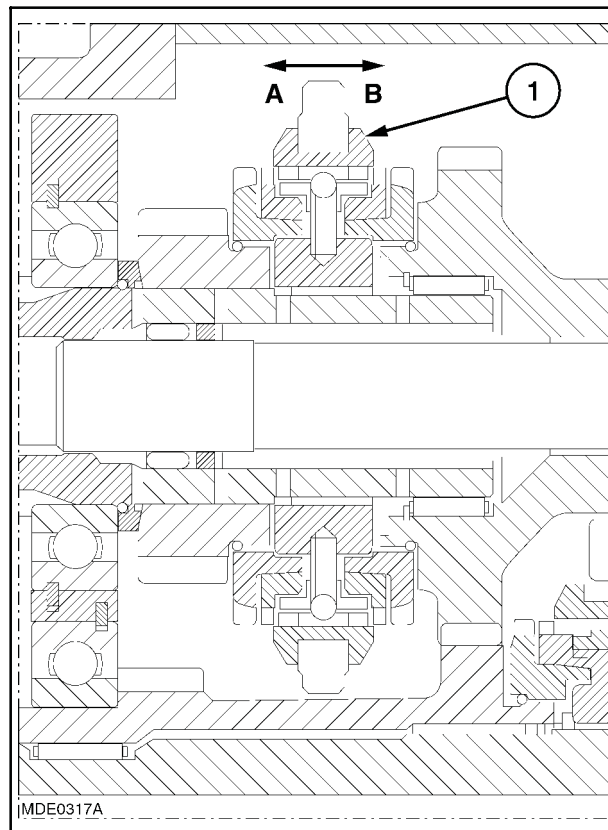
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On completion, the control unit moves the Shuttle synchroniser (1) to the opposite side from the position it held before engine start-up.

A = reverse gears engaged position.

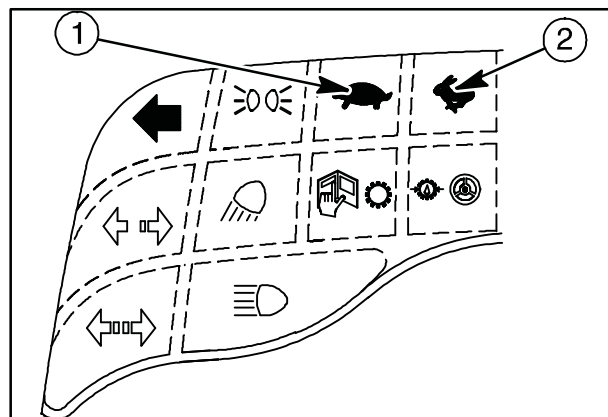
B = forward gears engaged position.

If the synchroniser has moved, the control unit will enable the gears.



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If the synchroniser has not moved from the original position, the control unit will note the fault and inform the operator, by simultaneously flashing indicator signals (1 and 2).



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## U FAULT CODES XX

CODE	FAULT	CAUSE
U19	OIL_TOO_COLD	Oil temperature below 50 °F (10 °C) (*).
U20	WRNG_STARTUP	Incorrect starting procedure. Press and release the clutch pedal.
U21	ERPM_TOO_LOW	Engine speed below 1200 rpm.
U22	ERPM_TOO_HIGH	Engine speed above 1400 rpm.
U23	LEVER_ERR	Shuttle lever in neutral.
U24	RANGE_NOT_ENG	Range gear lever in neutral.
U25	GEAR_NOT_ENG	Main gear lever in neutral.
U26	PEDAL_NOT_UP	Clutch pedal is not fully released.
U27	B_CAL_LOW_ERR	Clutch B calibration value too low.
U28	B_CAL_HIGH_ERR	Clutch B calibration value too high.
U29	A_CAL_LOW_ERR	Clutch A calibration value too low.
U30	A_CAL_HIGH_ERR	Clutch A calibration value too high.
U31	TRACTOR_MOVING	Wheel speed read: the tractor is moving.
U32	HI_LO_POS_ERR	The synchroniser is not in the HIGH - LOW position.

(\*) - between 50 °F (10 °C) and 68 °F (20 °C) and above 212 °F (100 °C) calibration is carried out by holding down keys (3 and 4 fig. 58) ▲ and ▼ on instrument **294084** even if the display shows "COLD OIL" or "HOT OIL".

## HA - CLUTCH PEDAL POSITION AND NEUTRAL SWITCH DISPLAY

In this menu the transmission is enabled.

This menu allows the tractor to be moved whilst showing, on the CDU display, the clutch pedal position and the clutch switch status.

The pedal position is expressed as a percentage of the entire stroke, whilst the switch condition is indicated with **ON** and **OFF**.

- Select the **HA** menu, as described on page 27, the display (2) shows the following information:

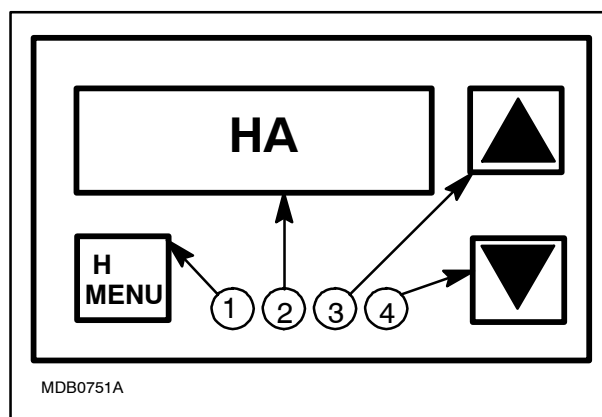
**xxx% ON**

or

**xxx% OFF**

where xxx is the percentage of the clutch pedal stroke, from 0 to 100%.

- Switch off the engine by turning the switch (1, fig. 78) to A (OFF).



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## Clutch pedal potentiometer (1) replacement

In the event of potentiometer (1) replacement, proceed as follows.

- Select the **H8** menu, as described on page 27.
- the instrument display shows:

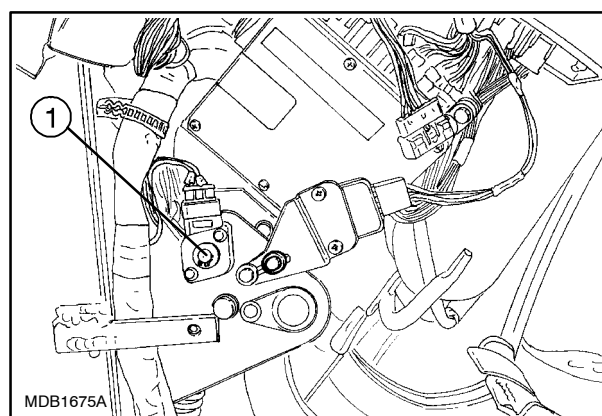
**ERASE?**

- Press the key ▼ (4) and hold down until the instrument displays the following sequence:

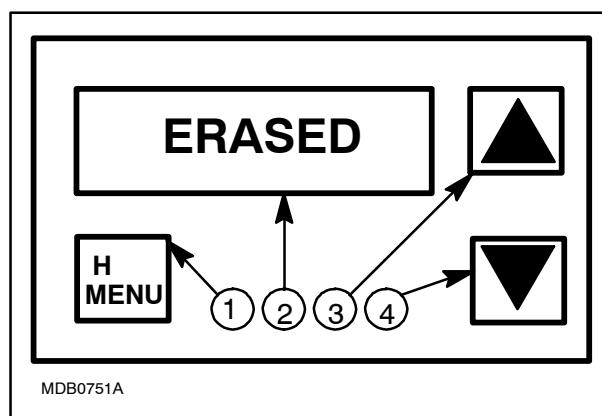
**ERASE 5s**  
**ERASE 4s**  
**ERASE 3s**  
**ERASE 2s**  
**ERASE 1s**  
**ERASED**

- Release the key ▼ (4);
- Turn the switch (1, fig. 78) to A (OFF) and wait for approx. 5 seconds;

The data of the previous potentiometer has been deleted.

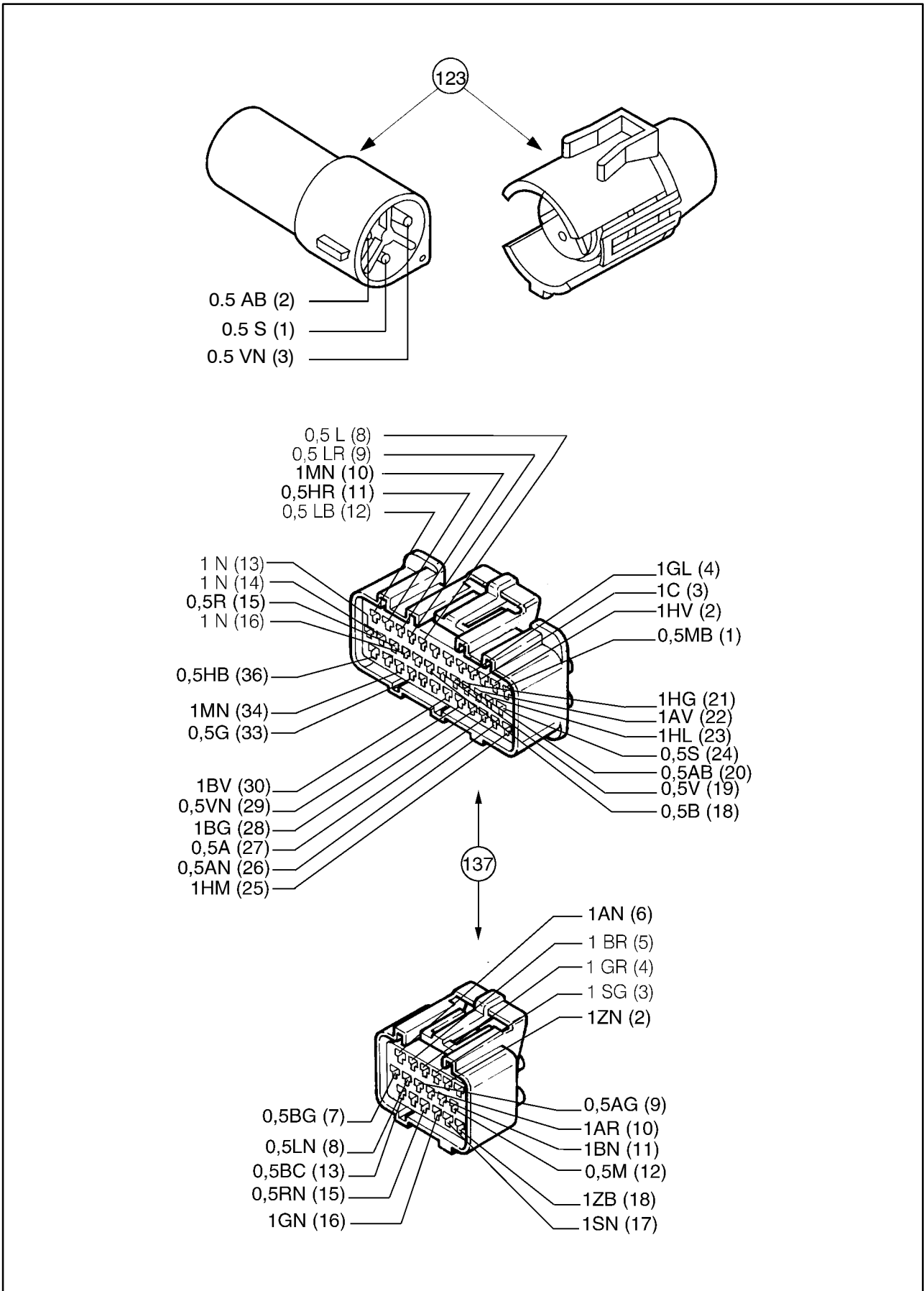


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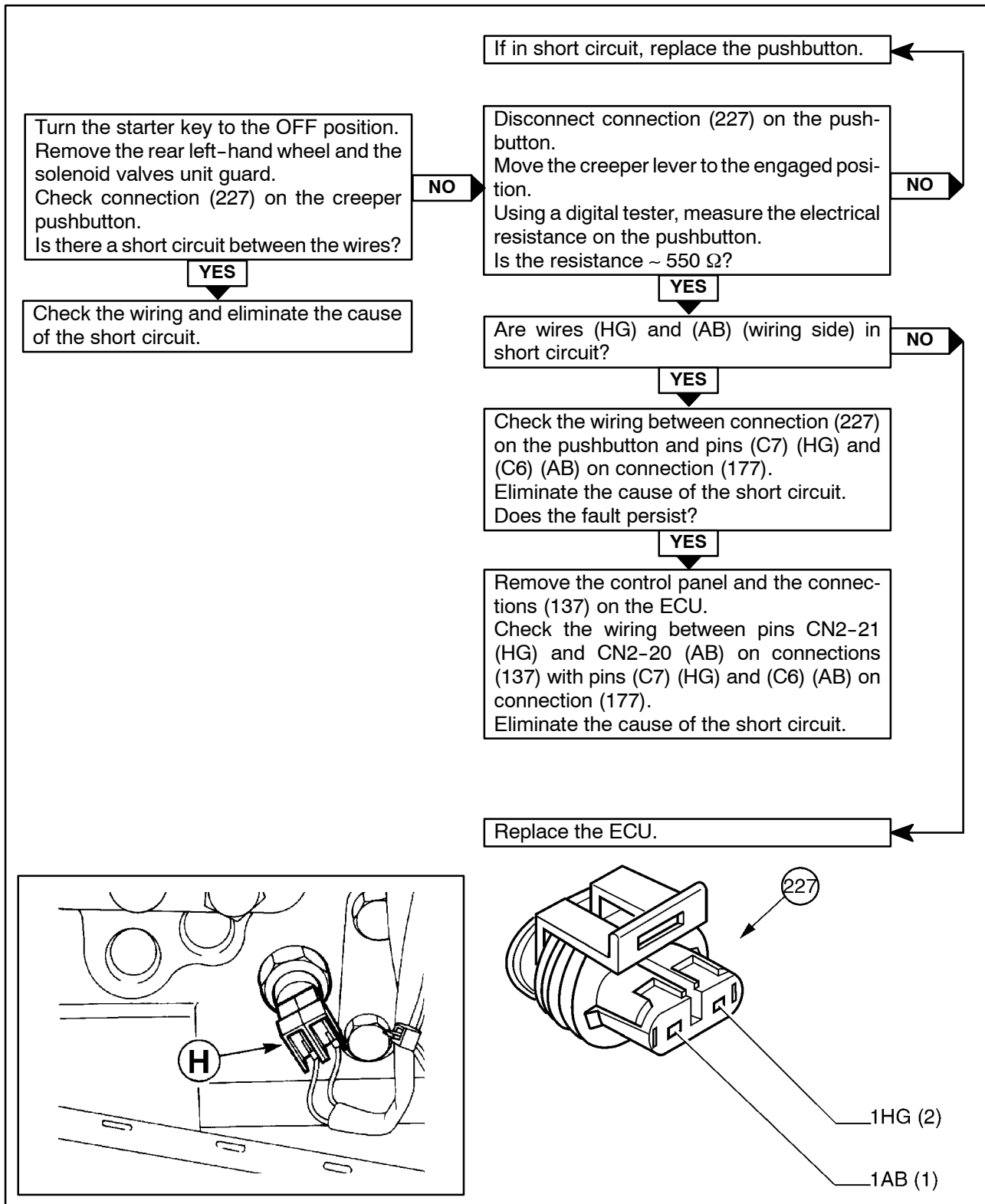
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FAULT CODE 12



**FAULT CODE 18**

The wiring on creeper pushbutton (H) is in short or the pushbutton is faulty.  
The tractor runs normally, but the HIGH and LOW functions cannot be used.



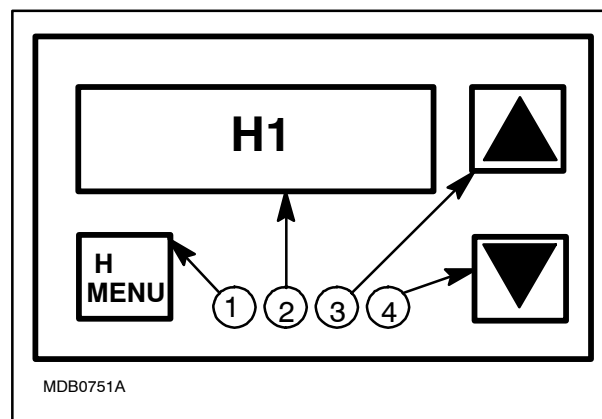
**FAULT CODE 24**

Neither of clutches (A) and (B) (1 and 2, Section 21, Chapter 3, page 10) have been calibrated.

The tractor runs, but movement is abrupt.

The H1 MENU must be calibrated each time the ECU is replaced or after data has been cancelled from the memory (H8 MENU) on the ECU.

Calibrate clutches (A) and (B), as described in the H1 MENU.



**FAULT CODE 33**

The wiring on the dump solenoid valve (4, Section 21, Chapter 3, page 10) is in short circuit or the solenoid valve is faulty.

The tractor runs normally but the hydraulic safety provided by the dump solenoid valve when the clutch pedal is pressed, is no longer present.

Turn the starter key to the OFF position.  
Remove the rear left-hand wheel and the solenoid valves unit guard.  
Disconnect connection (67) on the solenoid valve dump.  
Is the electrical resistance of the solenoid valve coil, measured with a digital tester,  $\sim 7 \Omega$ ?

**YES**

**NO**

Replace the solenoid valve coil if in short.

Are wires (ZB) and (ZN) (wiring side) in short circuit?

**YES**

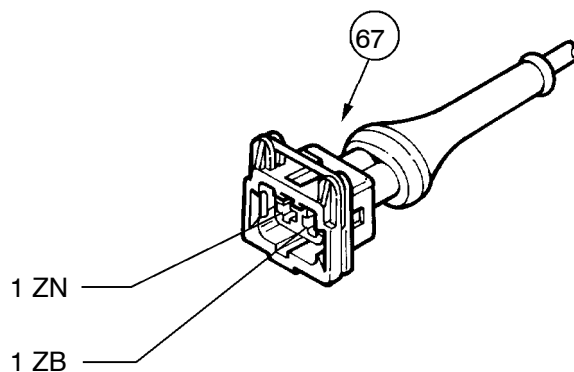
**NO**

Replace the ECU.

Check the wiring between connection (67) on the solenoid valve and pins (B8) (ZB) and (B3) (ZN) on connection (177).  
Eliminate the cause of the short circuit.  
Does the fault persist?

**YES**

Remove the control panel and the connections (137) on the ECU.  
Check the wiring between pins CN1-18 (ZB) and CN1-2 (ZN) on connections (137) with pins (B8) (ZB) and (B3) (ZN) on connection (177).  
Eliminate the cause of the short circuit.

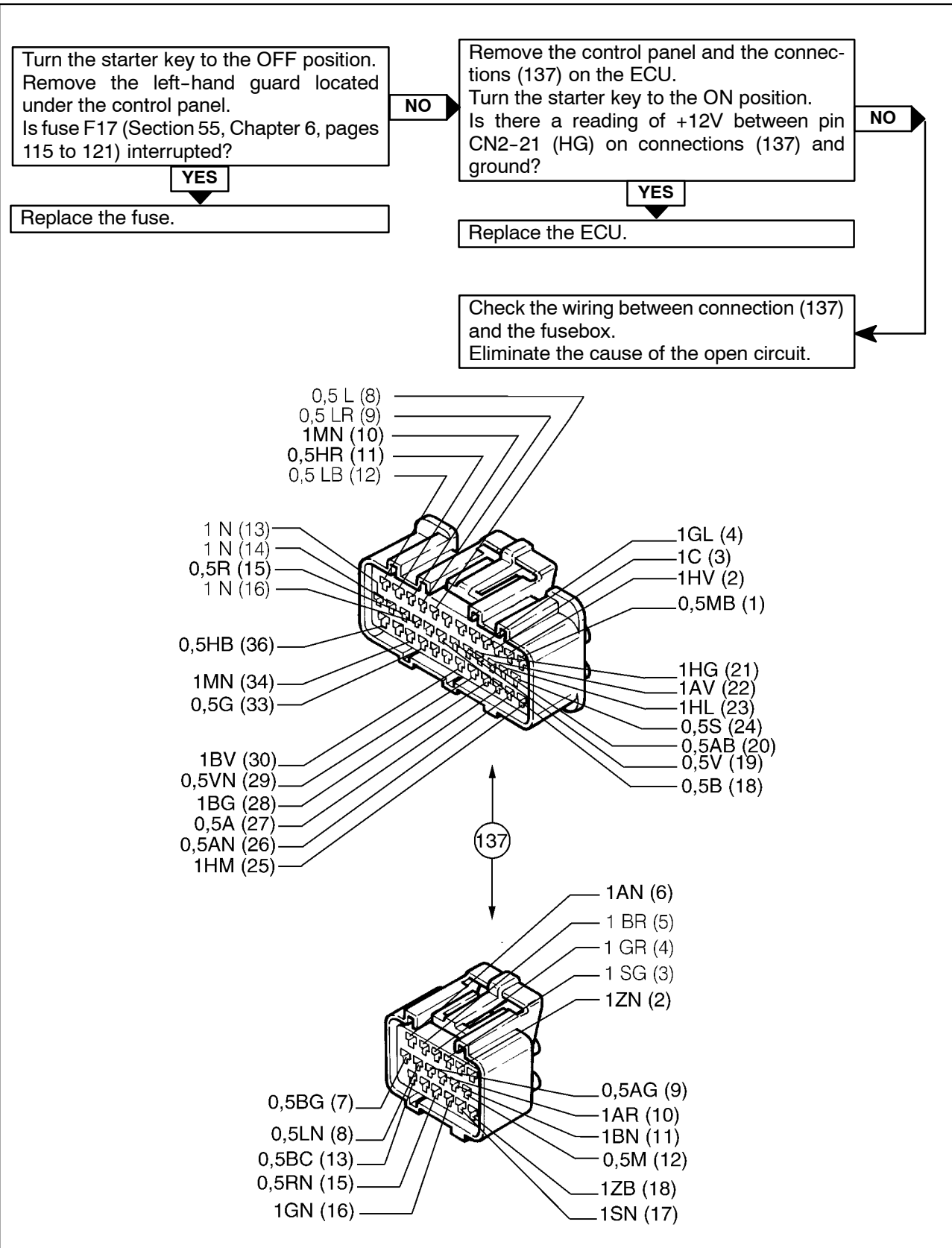




**FAULT CODE 46**

There is no supply voltage at the ECU.

The tractor runs normally but the HIGH - LOW function cannot be used.



**FAULT CODE 53**

The sensors supply voltage is much higher than the set value (+5V).

The tractor is not operative.

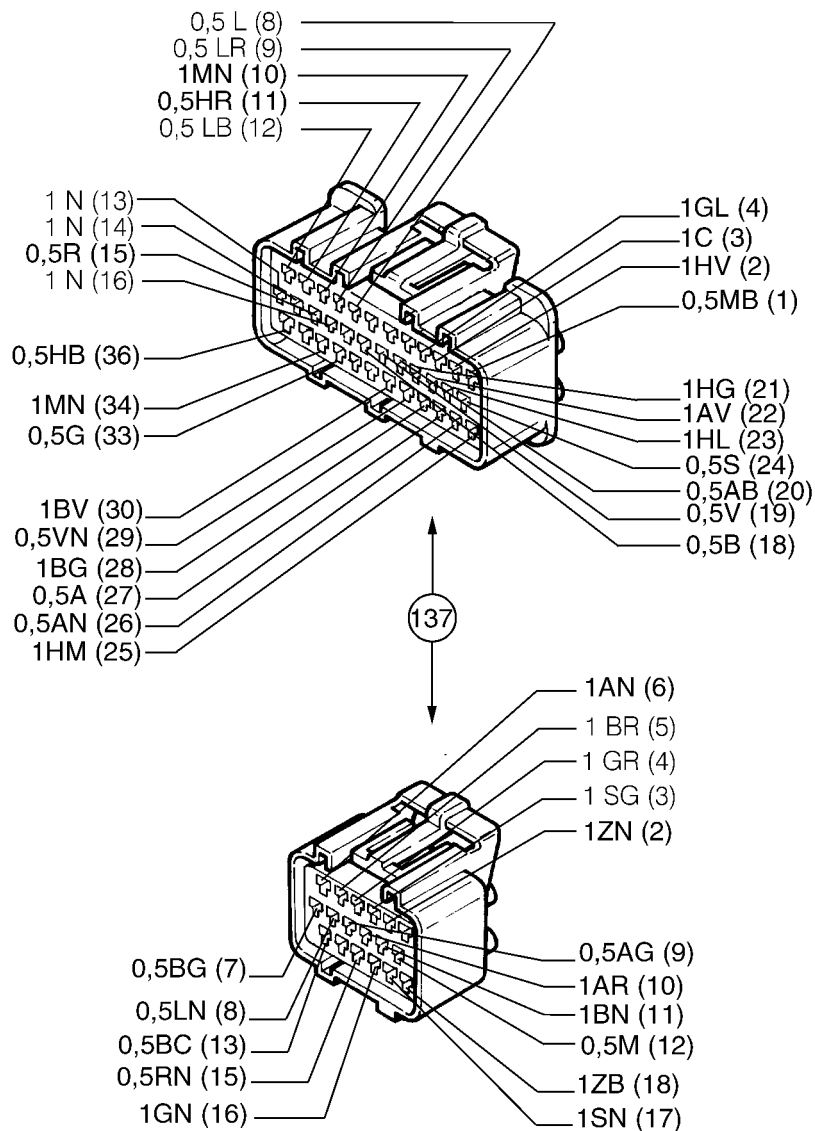
Turn the starter key to the OFF position.  
Remove the control panel and the connections (137) on the ECU.  
Is there a reading of +12V between pin CN2-20 (AB) (wiring side) and ground?

**NO**

Replace the ECU.

**YES**

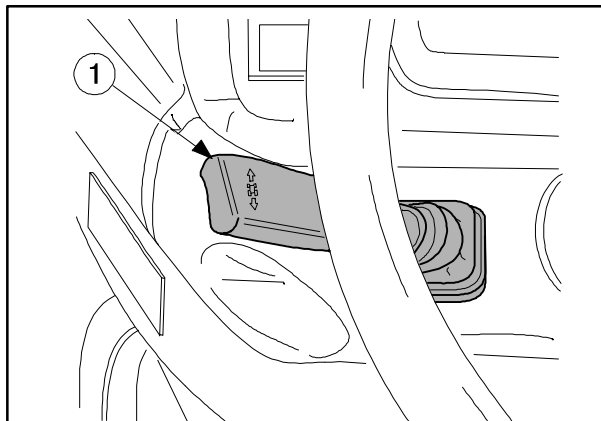
Check the wiring and eliminate the cause of the short on pin CN2-20 (AB) to +12V.



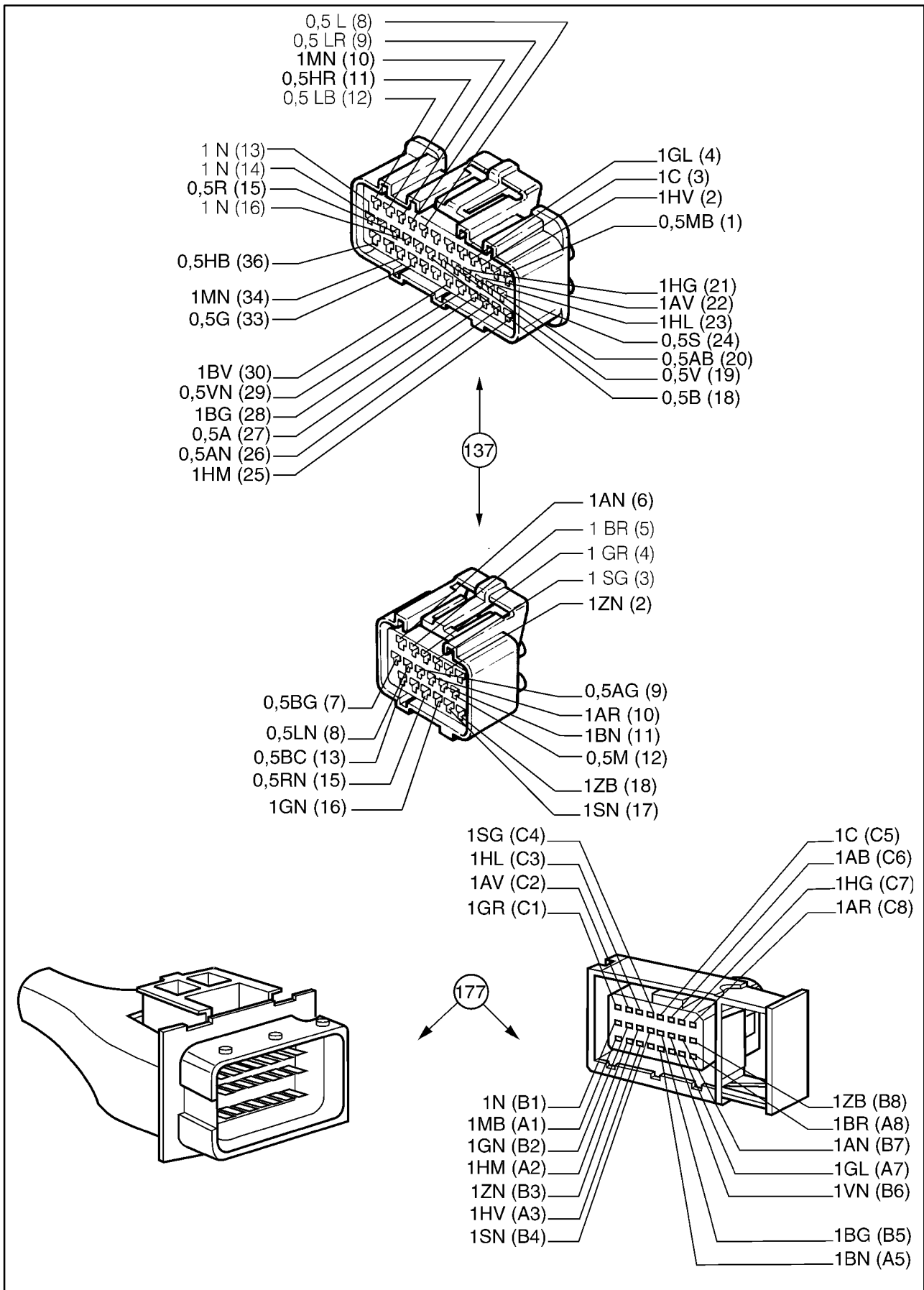
**FAULT CODE 59**

The Shuttle lever (1) is faulty.

Replace the Shuttle lever.



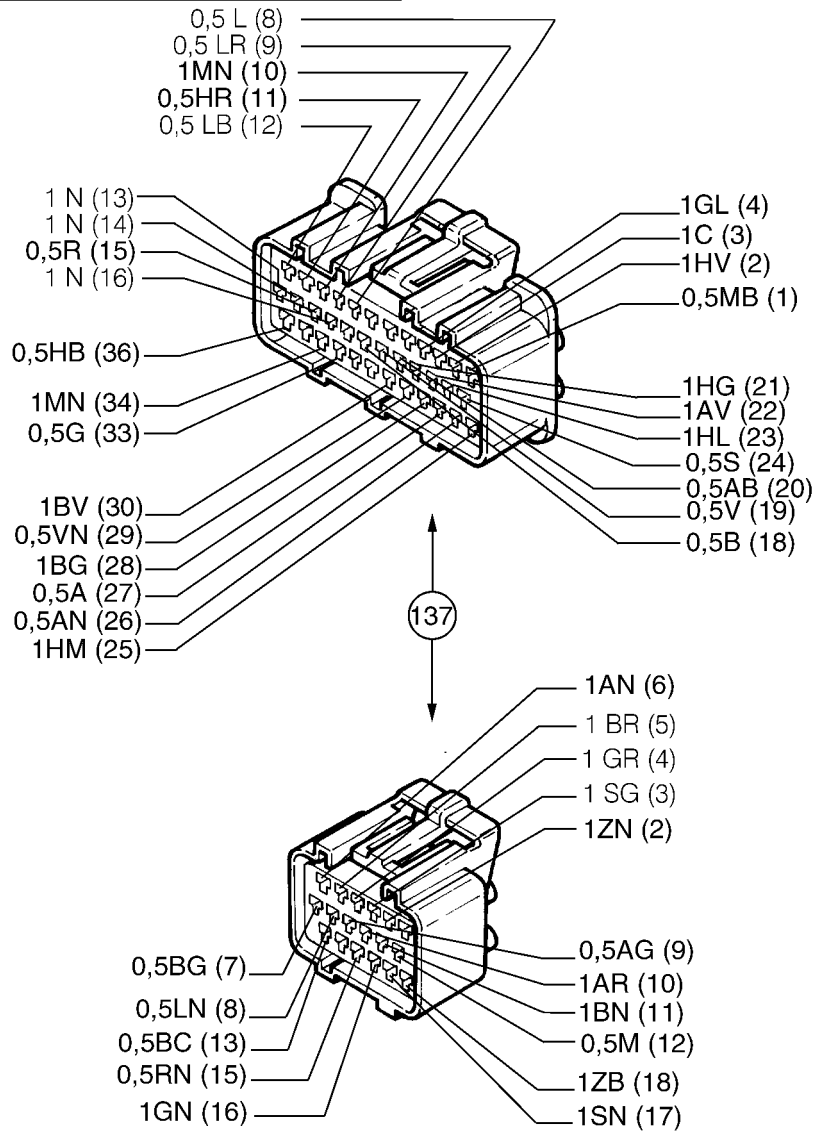
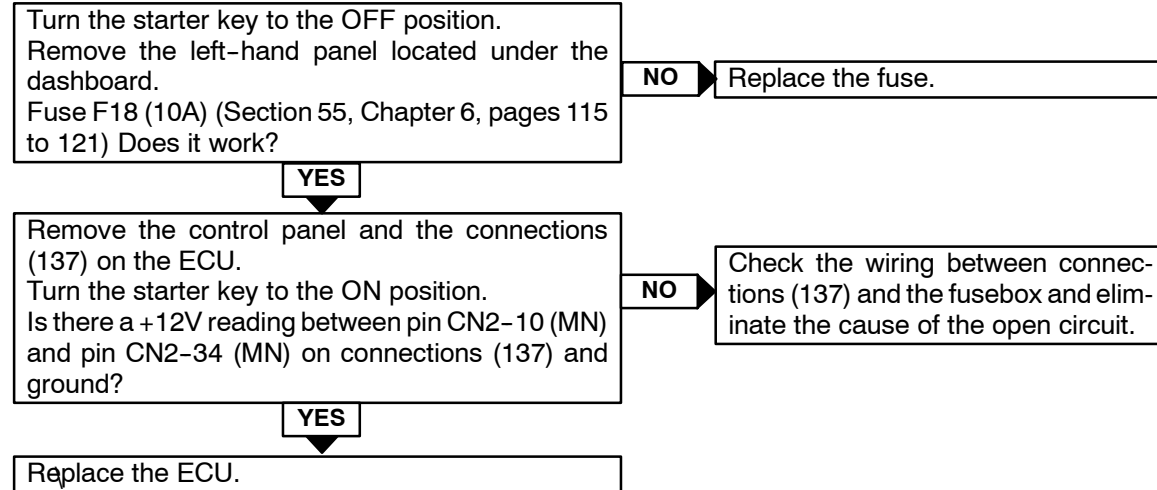
FAULT CODE 66



**FAULT CODE 74**

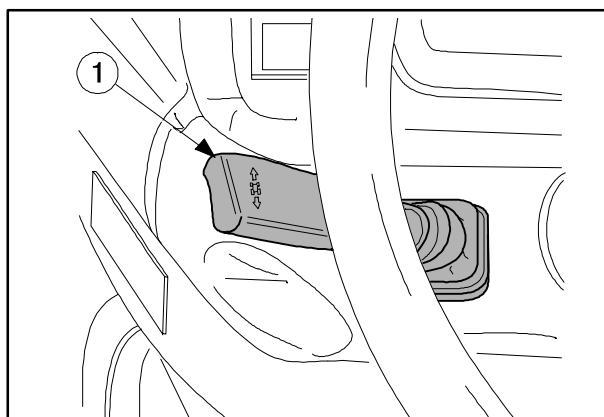
The supply voltage on the ECU is less than +9V.

The tractor is not operative.



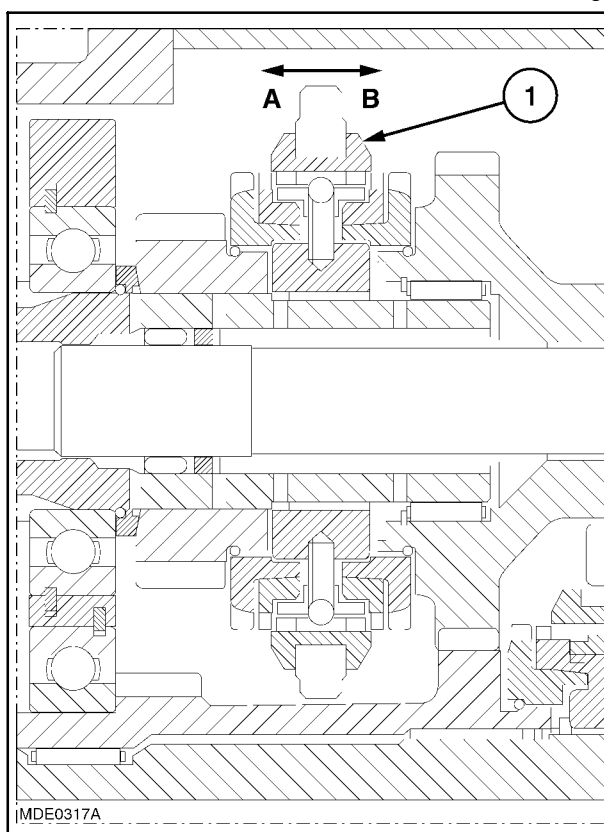
### SWITCH FROM FORWARD GEARS (HIGH) TO REVERSE GEARS

If the tractor has the forward gears (HIGH) engaged and the Power Shuttle lever (1) is moved back (reverse gears selection) the indicator (1, fig. 90) will light up.



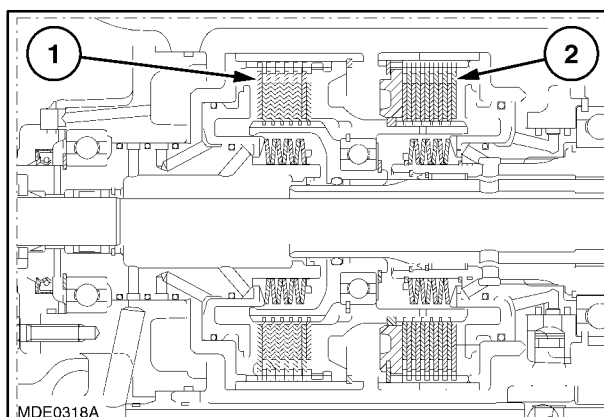
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The synchroniser (1) moves from position (B = forward gears engaged) to position (A = reverse gears engaged).



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The forward (HIGH) and reverse gears clutch remains engaged in both selections.



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## AUTOMATIC 4WD FAULT CODES INDICATION

In the event of an electrical or electronic fault, any eventual anomalous conditions are indicated by the illumination of an indicator lamp (1).

### FAULTS CODE DECODING

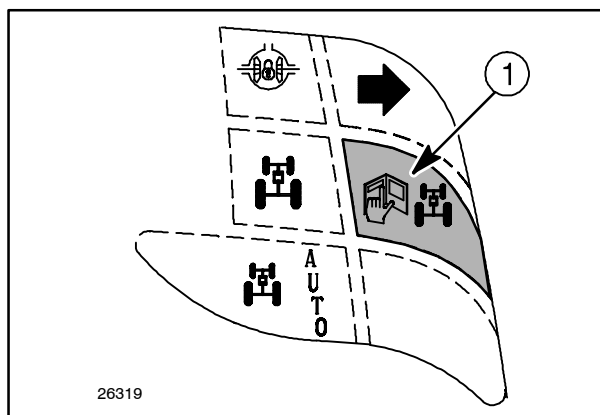
The indicator (1) identifies the error code in six phases:

1. 5 flashes in rapid succession to indicate imminent transmission of the error code;
2. 2 second pause;
3. n... flashes to indicate the first figure of the fault code;
4. 1 second pause;
5. n... flashes to indicate the second figure of the fault code;
6. 3 second pause.

The control unit only indicates one code at a time, giving priority to the most serious faults.

If a higher priority fault occurs whilst a lower priority fault is being displayed, the display sequence of higher priorities will wait until the sequence in progress ends, before becoming active.

To check for the presence of other codes the fault must be eliminated, allowing the control unit to proceed to the following fault.



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**IMPORTANT:** If a fault disables the automatic four-wheel drive function, the corresponding code will take precedence over other codes that were previously indicated; these codes will be saved by the system.

### - Example of the interpretation of fault code number 21 -

1 <sup>st</sup> phase	2 <sup>nd</sup> phase	3 <sup>rd</sup> phase	4 <sup>th</sup> phase	5 <sup>th</sup> phase	6 <sup>th</sup> phase
●●●●●	pause	●●	pause	●	pause
code transmission warning	2s	first digit 2	1s	second digit 1	3s
fault code composition 21					

## TROUBLESHOOTING

**ATTENTION**

Notes to help the operator make diagnosis and problem-solving easier.

1. The measurements taken to read:
  - voltage;
  - resistance;
  - frequency.
 must be carried out with a digital tester.

**NOTE:** the resistance values shown are valid for a temperature of 68 °F (20 °C) (ambient temperature). With higher or lower tractor temperatures, the relative resistance values shown in the manual should vary accordingly.

2. The "short to ground" message refers to a resistance value of less than 5 ohm ( $\Omega$ ).
3. When a fault occurs, before carrying out any kind of service operations, check that the specific connections (ECU, sensors, switches etc.) are correctly connected.  
A faulty connection could be the cause of incorrect tractor operation.
4. To facilitate problem solving, consult the ECU electrical wiring diagram, shown on page 69.
5. If the ECU needs to be replaced, the following operations must be carried out:

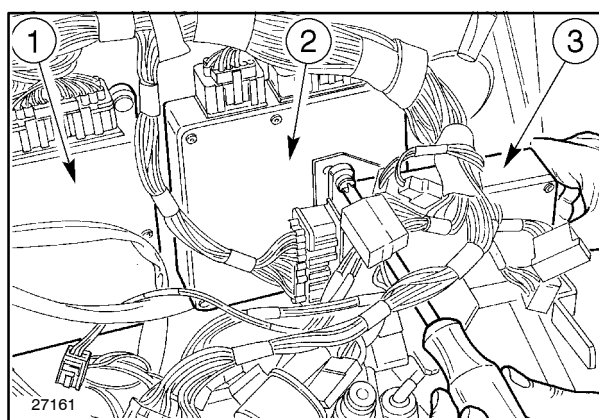
the **H8 MENU** function (cancellation of the resident non-volatile memory); also check that the self-configuration operation at the first start-up (after ECU replacement) is correct.

Requested calibration operations.

6. There are two types of faults:
  - FAULT RESET:** the fault will no longer be displayed if the cause has been eliminated or repaired, even without switching off the tractor, but the relative code will be saved in the non-volatile memory (see HF MENU);
  - NO FAULT RESET:** the fault remains on the alarm lamp when the cause is eliminated or solved. To remove the fault display, stop then restart the tractor. The fault will be saved (as a "no fault reset") in the non volatile memory (see HF MENU).
7. In certain cases the fault may also be indicated by the Front Power Take-off alarm lamp, as the ECU is common.
8. The connection references indicate: the wire dimension and colour, and the connection pin number.  
Example: 0.5 HL (15)  
0.5 = wire dimension;  
HL = wire colour;  
(15) = connection pin number.
9. The CN19 on the ECU connection (138) indicates the relative pin number.
10. The faults are listed in progressive order.

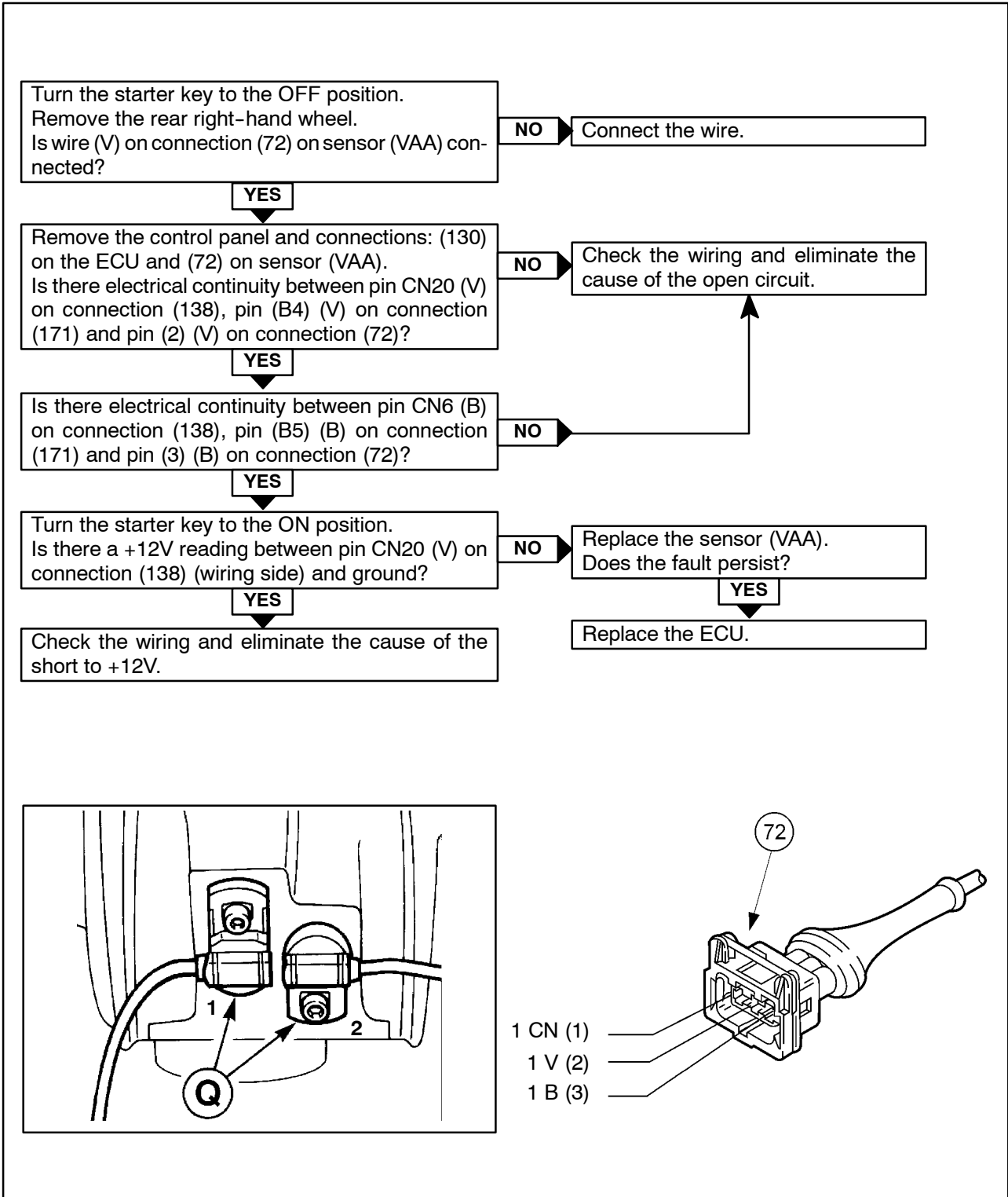
## ECU LOCATION

The ECU (3) is for Four-wheel drive and Front Power Take-off.



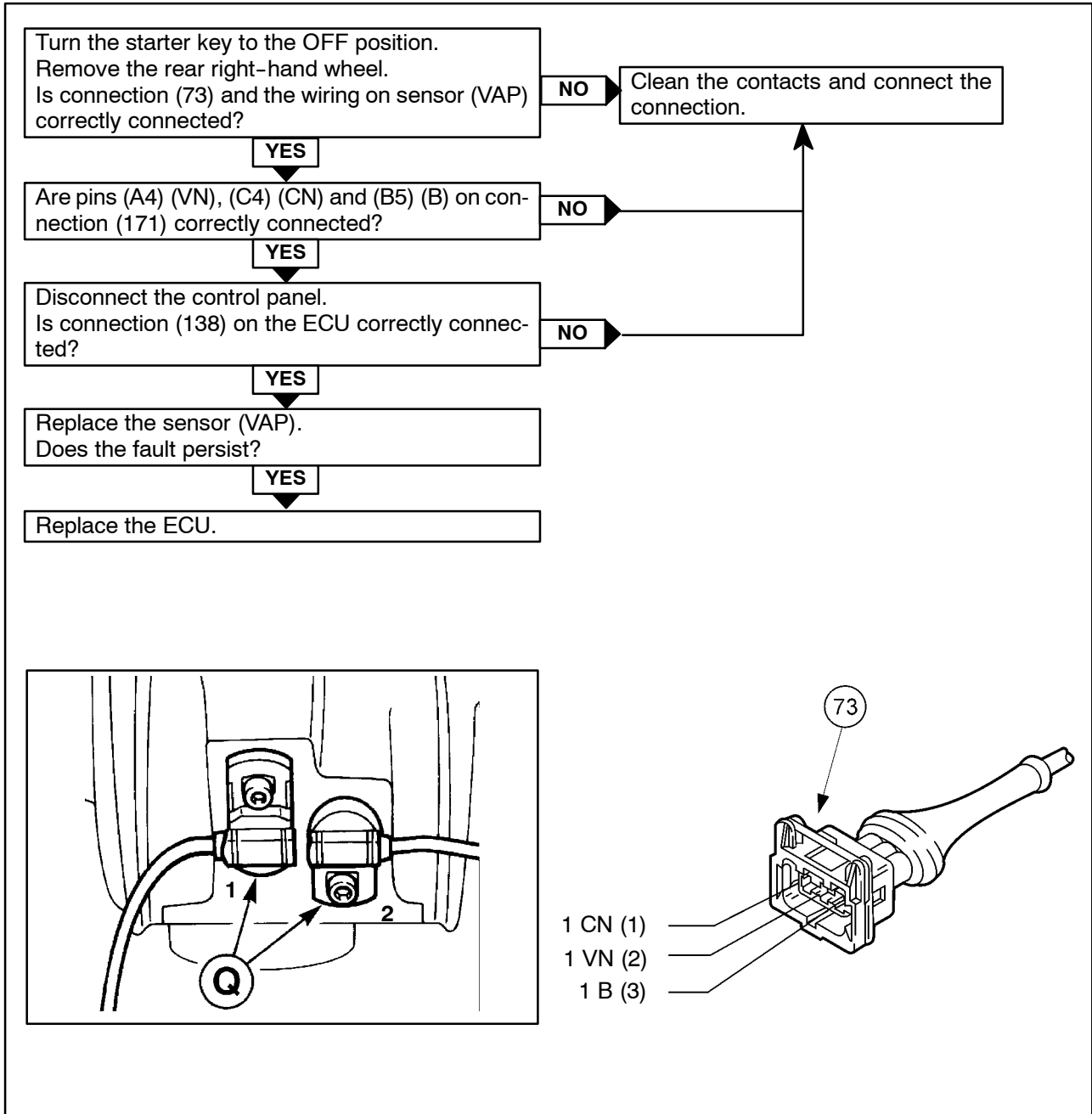
**FAULT CODE 21**

The front shaft speed sensor (VAA) (Q-1) is disconnected or in short to +12V.  
 Four-wheel drive may only be engaged/disengaged in "Manual" mode.



**FAULT CODE 26**

The frequency read on the rear shaft speed sensor (VAP) (Q-2) exceeds the maximum value.  
Four-wheel drive may only be engaged/disengaged in "Manual" mode.

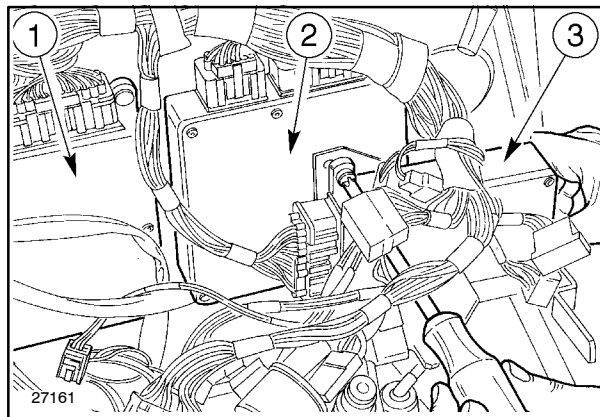


**FAULT CODE 35**

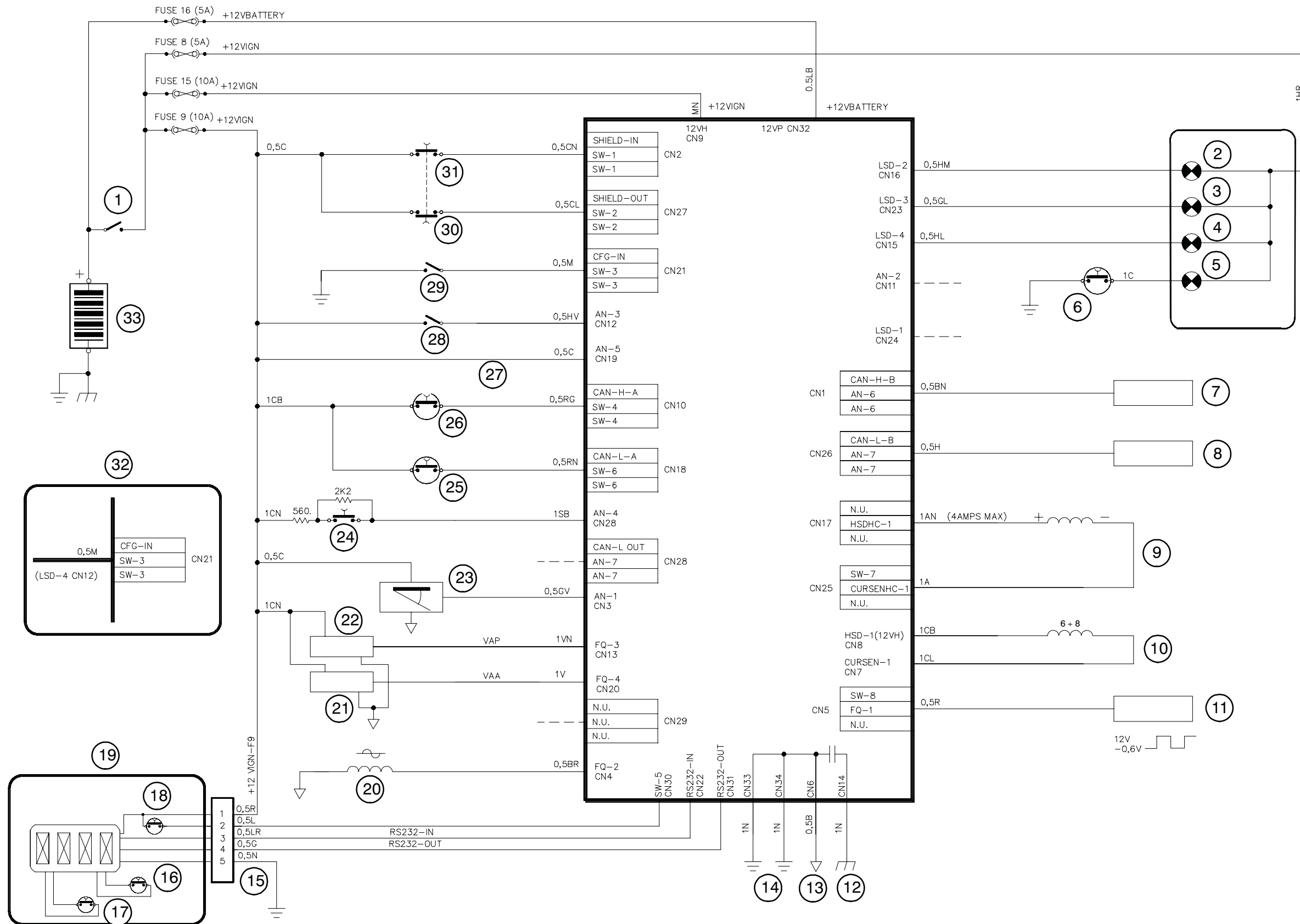
The ECU is faulty.

Four-wheel drive is always engaged.

Replace the ECU (3).



PTO AND 4WD ELECTRONIC CONTROL UNIT INPUT/OUTPUT WIRING DIAGRAM



## SECTION 25 - FRONT AXLE MECHANICAL TRANSMISSION

## Chapter 2 - Front mechanical transmission

## CONTENT

Section	Description	Page
<b>25 000</b>	Main data .....	1
	Tightening Torques .....	3
	Tools .....	5
	Cross-sectional views .....	7
	Description and Operation .....	8
	Front axle with brake .....	See Chapter 1
	Troubleshooting .....	10
<b>25 100 30</b>	Front axle. Installation - Removal .....	11
<b>25 100 38</b>	Front axle. Disassembly - Assembly .....	15
<b>25 104 34</b>	Front axle differential lock clutch assembly. Overhaul (with unit removed) .....	24
<b>25 108 46</b>	Steering knuckle bearing pins. Replacement .....	26
<b>25 108 47</b>	Steering knuckle bearing pins. Replacement .....	26
<b>25 102 24</b>	Front axle differential. Overhaul .....	36
<b>25 102 27</b>	Front axle differential with LIM-SLIP. Overhaul .....	37
<b>44 511 80</b>	Leading drive wheels toe-in check .....	39

## MAIN DATA

Type .....	steering, load bearing structure, pivoting at centre
<b>Bevel drive - differential</b>	
Pinion-crown gear ratio 18.64 mph (30 Km/h):	
- model TN 55D .....	9/42 = 1:2.14
- models TN 65D, TN 70D and TN 75D .....	8/30 = 1:2.66
Pinion-crown gear ratio 24.85 mph (40 km/h):	
- model TN 55D .....	11/40 = 1:2.75
- model TN 65D, TN 70D and TN 75D .....	10/30 = 1:3.33
Backlash between bevel drive teeth:	
- models TN 55D TN 65D, TN 70D and TN 75D .....	0.0059 to 0.0078 (0.15 to 0.20)
Thickness of bevel pinion position adjustment spacer (11, page 7) .....	0.0984 - 0.1012 - 0.1062 - 0.1110 - 0.1114 - 0.1118 - 0.1122 - 0.1259 - 0.1299 - 0.1338 - 0.1377 - 0.1417 - 0.1456 (2.5 - 2.6 - 2.7 - 2.8 - 2.9 - 3.0 - 3.1 - 3.2 - 3.3 - 3.4 - 3.5 - 3.6 - 3.7)
Thickness of pinion bearing adjustment spacer rings (12) ...	0.0984 - 0.1003 - 0.1023 - 0.1043 - 0.1062 - 0.1082 - 0.1102 - 0.1122 - 0.1141 - 0.1161 - 0.1181 - 0.1200 - 0.1220 - 0.1240 - 0.1259 - 0.1279 - 0.1299 - 0.1318 - 0.1338 - 0.1358 - 0.1377 - 0.1397 - 0.1417 - 0.1437 - 0.1456 - 0.1476 - 0.1496 - 0.1515 - 0.1535 - 0.1555 - 0.1574 - 0.1594 - 0.1614 - 0.1633 - 0.1653 - 0.1673 - 0.1692 - 0.1712 - 0.1732 - 0.1751 - 0.1771 - 0.1791 - 0.1811 - 0.1830 - 0.1850 - 0.1870 - 0.1889 (2.5 - 2.55 - 2.6 - 2.65 - 2.7 - 2.75 - 2.8 - 2.85 - 2.9 - 2.95 - 3.00 - 3.05 - 3.1 - 3.15 - 3.2 - 3.25 - 3.3 - 3.35 - 3.4 - 3.45 - 3.5 - 3.55 - 3.6 - 3.65 - 3.7 - 3.75 - 3.8 - 3.85 - 3.9 - 3.95 - 4.00 - 4.05 - 4.1 - 4.15 - 4.2 - 4.25 - 4.3 - 4.35 - 4.4 - 4.45 - 4.5 - 4.55 - 4.6 - 4.65 - 4.7 - 4.75 - 4.8)

(continued)

## BEVEL DRIVE ADJUSTMENTS

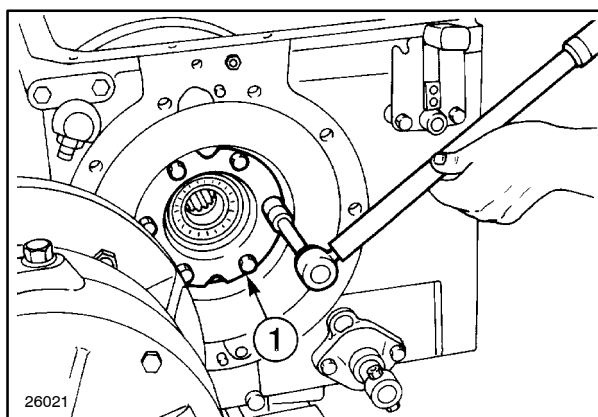
**Adjusting the ring bevel gear bearings and checking the clearance between the sides of the bevel gear pair teeth**



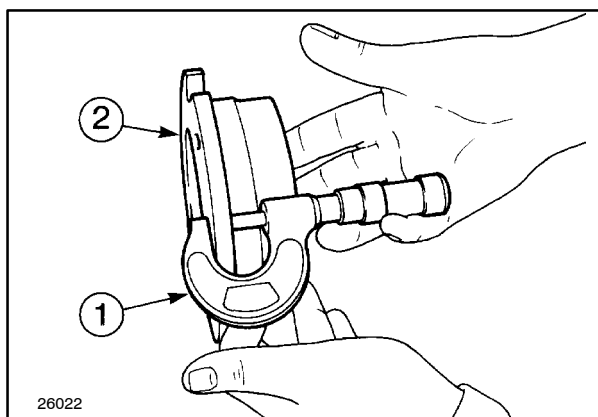
Always use appropriate tools to align fixing holes.  
NEVER USE YOUR FINGERS OR HANDS.

Proceed as follows.

1. Fit the bevel pinion, together with the relevant parts, and tighten the ring nut to a torque of 280 to 309 Nm (28.5 to 31.5 kgm).
2. Check that the pinion rolling drag torque is 0.040 to 0.450 kgm, corresponding to a dynamometric force on the mid-upper driven gear range of 5.9 to 62.8 N (0.6 to 6.4 kg).
3. With the bevel pinion fitted, insert the differential assembly complete with the ring bevel gear. Fit the LH support (1) on the transmission-gearbox, with a test shim of 0.019 in. (0.5 mm), tightening the three bolts at 120°, to a torque value of 59 Nm (6 kgm 120°).
4. Using a micrometer gauge (1), measure the thickness of the RH support (D<sub>1</sub>). Fit the support (2), without adjuster rings, on the transmission-gearbox, using the three lubricated bolts set at 120°.
5. Tighten the bolts gradually and alternately and, at the same time, turn the crown wheel to allow the bearings to settle, until the pinion crown reaches a rolling torque which is the same as that measured for the single pinion plus the values shown in the table:



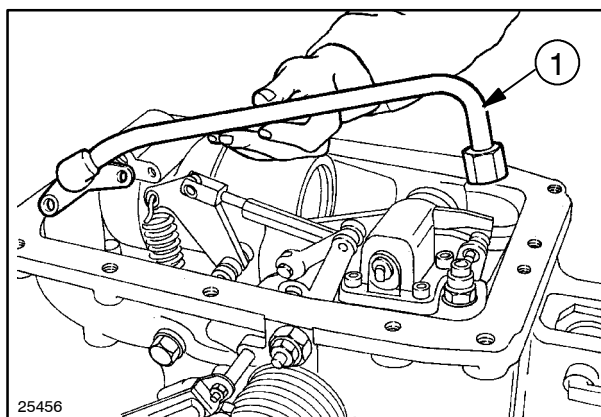
28



29

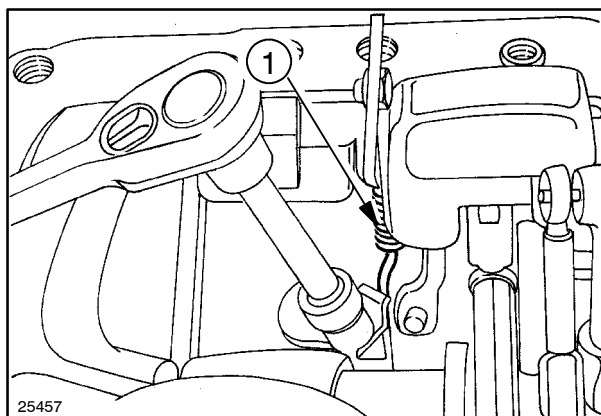
ROLLING CROWN				
9/40	9/38	11/39	11/36	11/32
28.66 to 44.09 lbs. (1.3 to 2.0 kg) 12.7 to 19.6 N		35.27 to 55.11 lbs. (1.6 to 2.5 kg) 15.7 to 24.5 N		41.88 to 66.13 lbs. (1.9 to 3.0 kg) 18.6 to 29.4 N

6. Remove the front bolts, the rear union and re-cover the oil delivery pipe (1) to the lift cylinder.



17

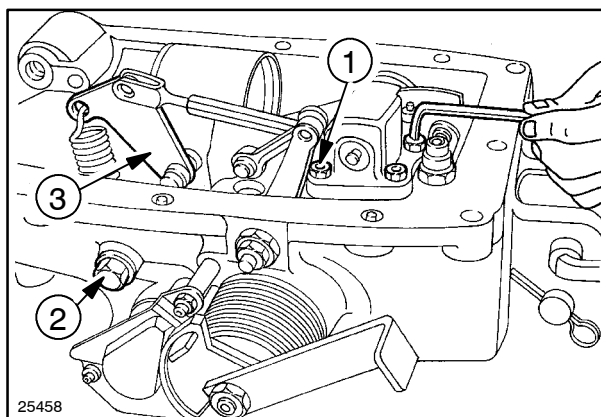
7. Unscrew the retaining bolts and remove the Lift-O-Matic device spring (1).



18

8. Unscrew the retaining bolts (1), loosen and remove the pin (2) and bush, then recover the control valve block lever mechanisms (3).

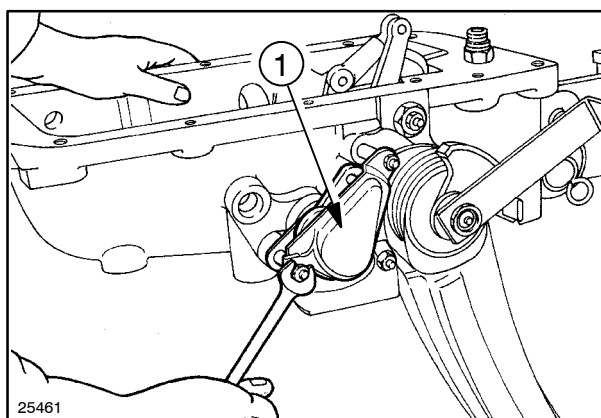
9. Unscrew the retaining bolts and remove the cylinder.



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10. Unscrew the retaining nuts and recover the support cap (1) and spring.

**NOTE:** Apply pressure on the support (1) to prevent the spring from pressing it against the retaining nut.



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## SECTION 35 - HYDRAULIC SYSTEM

### Chapter 4 - Electronically controlled hydraulic lift

#### CONTENT

Section	Description	Page
<b>35 000</b>	Main data .....	2
	Torque settings .....	4
	Tools .....	4
	Cross-sectional views .....	7
	Description and operation .....	12
<b>35 110 30</b>	Electronically controlled hydraulic lift. Removal-Installation .....	19
<b>35 110 53</b>	Draft sensor support. Removal-Installation .....	25
<b>35 130 30</b>	Lift electronic control unit. Replacement .....	26
<b>35 130 36</b>	Lift arms potentiometer. Replacement .....	27
<b>35 130 56</b>	Draft sensor. Removal-Installation .....	29
<b>35 134 42</b>	Electronically controlled hydraulic lift. Disassembly-Assembly .....	32
<b>35 138 20</b>	Hydraulic control valve. Removal-Installation .....	37
<b>35 138 24</b>	Hydraulic control valve. Disassembly-Assembly .....	38
	Lift calibration .....	40
	Faults code decoding .....	43
	Lift calibration (wit tool <b>294084</b> ) .....	44
	First start-up .....	57
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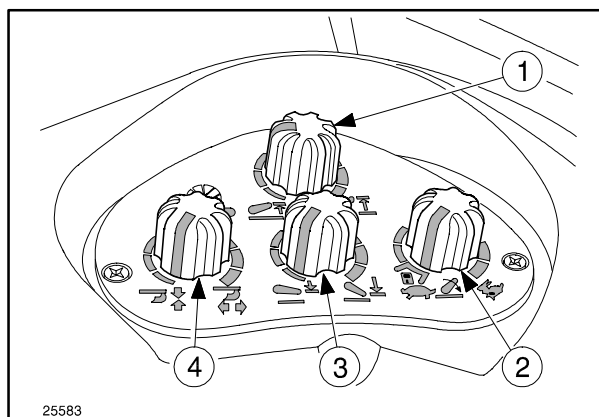
#### ATTENTION



Observe the following precautions when carrying out arc welding on a tractor fitted with an electronic lift.

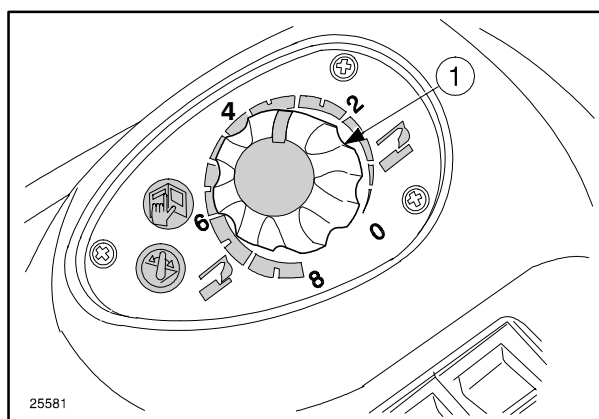
- Where possible, remove the part or tool that requires arc welding from the tractor.
- Disconnect both battery leads. Isolate the ends of the leads to prevent them from making contact with each other, or with the tractor.
- Position the welder ground clamp as near as possible to the area where welding is taking place.
- Remove the electronic control units located on the tractor if welding is to be carried out near these control units.
- The welding leads must not be positioned on, near or come into contact with any other electric leads or electronic components whilst welding is taking place.

- Move potentiometers (1, 2, 3 and 4) to the following positions:
- Potentiometer (1) to the max. raise position (turn clockwise);
- Potentiometer (2) to the arms descent speed max. position (turn clockwise);
- Potentiometer (3) to the max. lowered position (turn clockwise);
- Potentiometer (4) to the controlled operation position (turn counter-clockwise).



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- By turning knob (1), move the lift to the 75% raised position (corresponds to approx. position 2 on the decal).

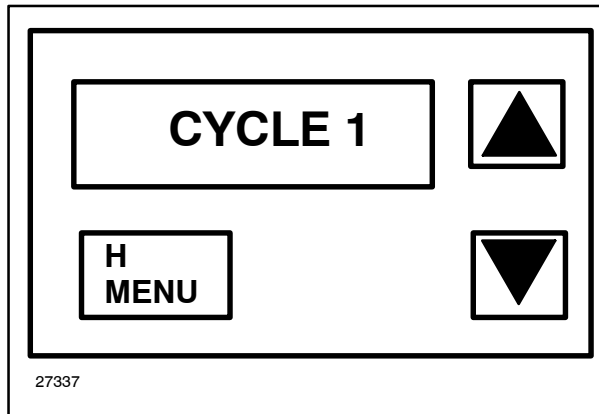


95

- During calibration the display on instrument **294084** shows the number of the raise/lower cycle from 1 to 3.

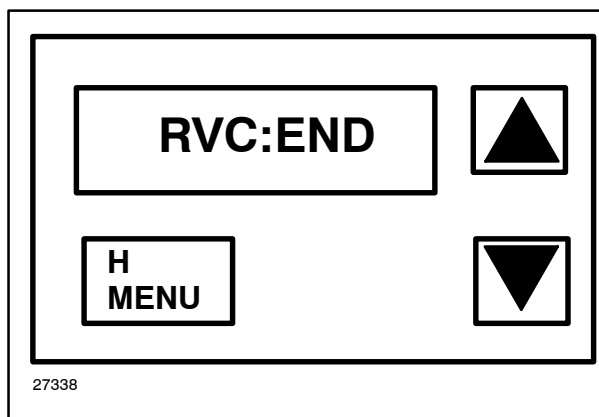
**CYCLE 1****CYCLE 2****CYCLE 3**

- A **U** fault code will appear on the display if a fault is detected during the calibration sequence.
- Calibrate the solenoid valves again, starting from cycle 0, if possible, after the fault is displayed.



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- On completion of the calibration sequence, the display will show "**RVC:END**". This means that the calibration operation has been carried out successfully and the display will not return to the HH menu.
- The only possible action is to turn the starter key to (1, fig. 91) position A (OFF).



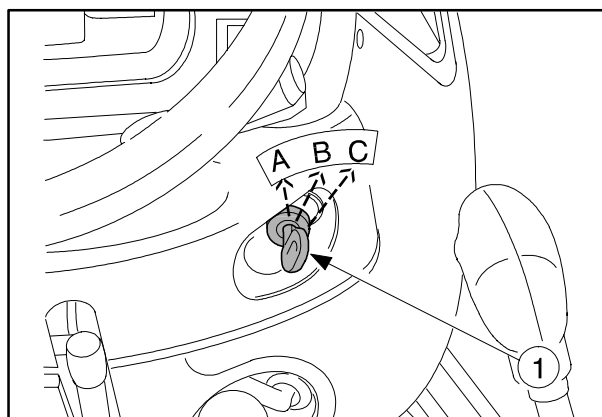
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**FIRST START-UP**

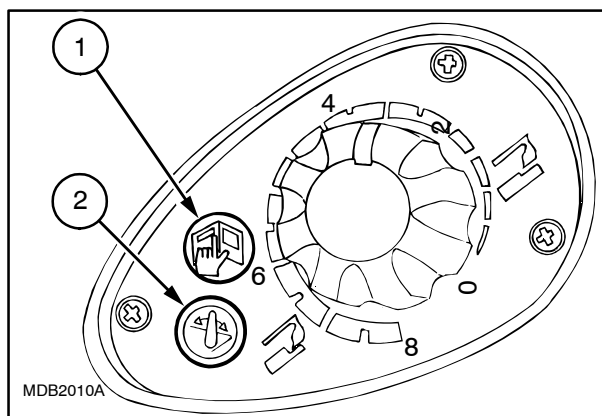
The first start-up procedure must be carried out in the following cases.

- At the end of the production line.
- Following ECU replacement.
- Following erasure of the Non-Volatile memory (NVM) (see H8 MENU).
- Following manual configuration (see H3 MENU).
- Turn switch (1) to B (ON) without switching on the engine.
- Indicator (1) will be illuminated (non-flashing), after a while indicator (1) will flash to repeat the recognised configuration code - i.e.: rapid flashing, followed by:
 

1 flash	Only front lift present.
2 flashes	Both Rear lift and differential lock present.
3 flashes	Rear lift, Front lift and differential lock present.
- Turn the key (1, fig. 113) to OFF for a few seconds: the configuration is now saved in the Non-Volatile memory (NVM).



113



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**FAULT CODE 15**

The wiring on the arms maximum raise potentiometer (1) is in short to +12V (power supply).

The rear lift (EDC) does not work, but allows the implement hitch to be caught at the height maximum value.

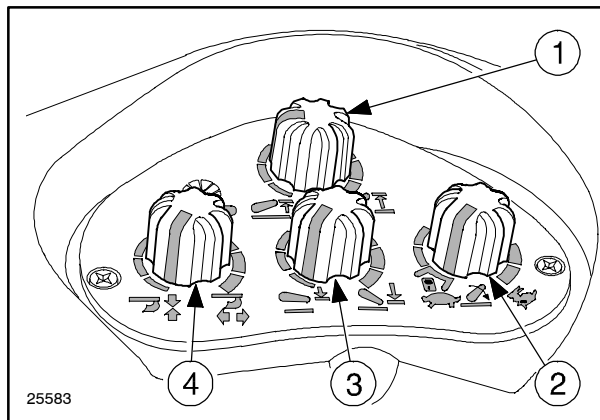
Turn the starter key to the OFF position.  
Remove the control panel and the connections (135) on the ECU.  
Turn the starter key to the ON position.  
Using a digital tester, measure the voltage between pin CN2-3 (A) on connection (135) (wiring side) and ground.  
Is the voltage at 0 V?

**YES**

Replace the ECU.

**NO**

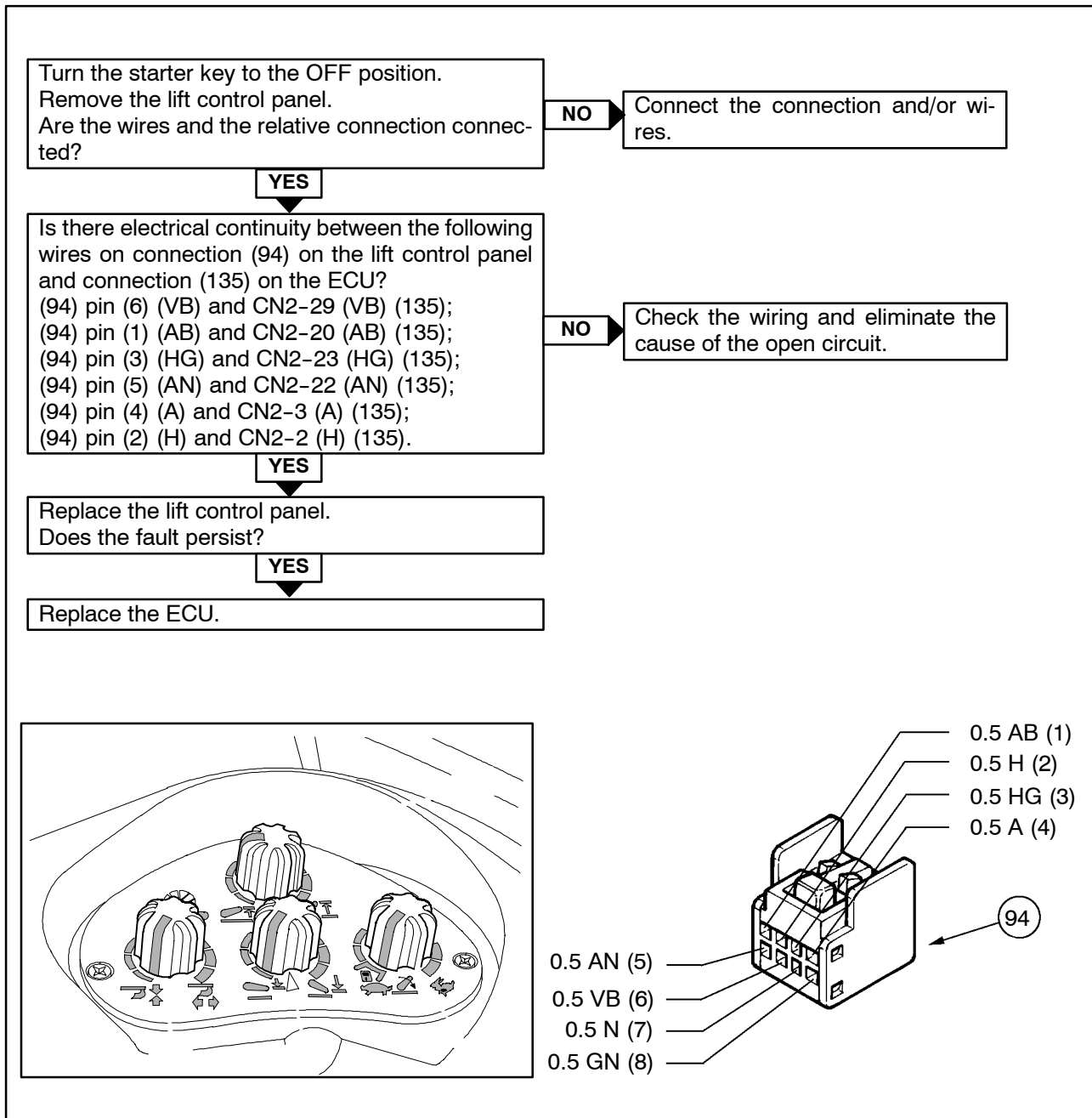
Check the wiring and eliminate the cause of the voltage presence.  
Does the fault persist?

**YES**

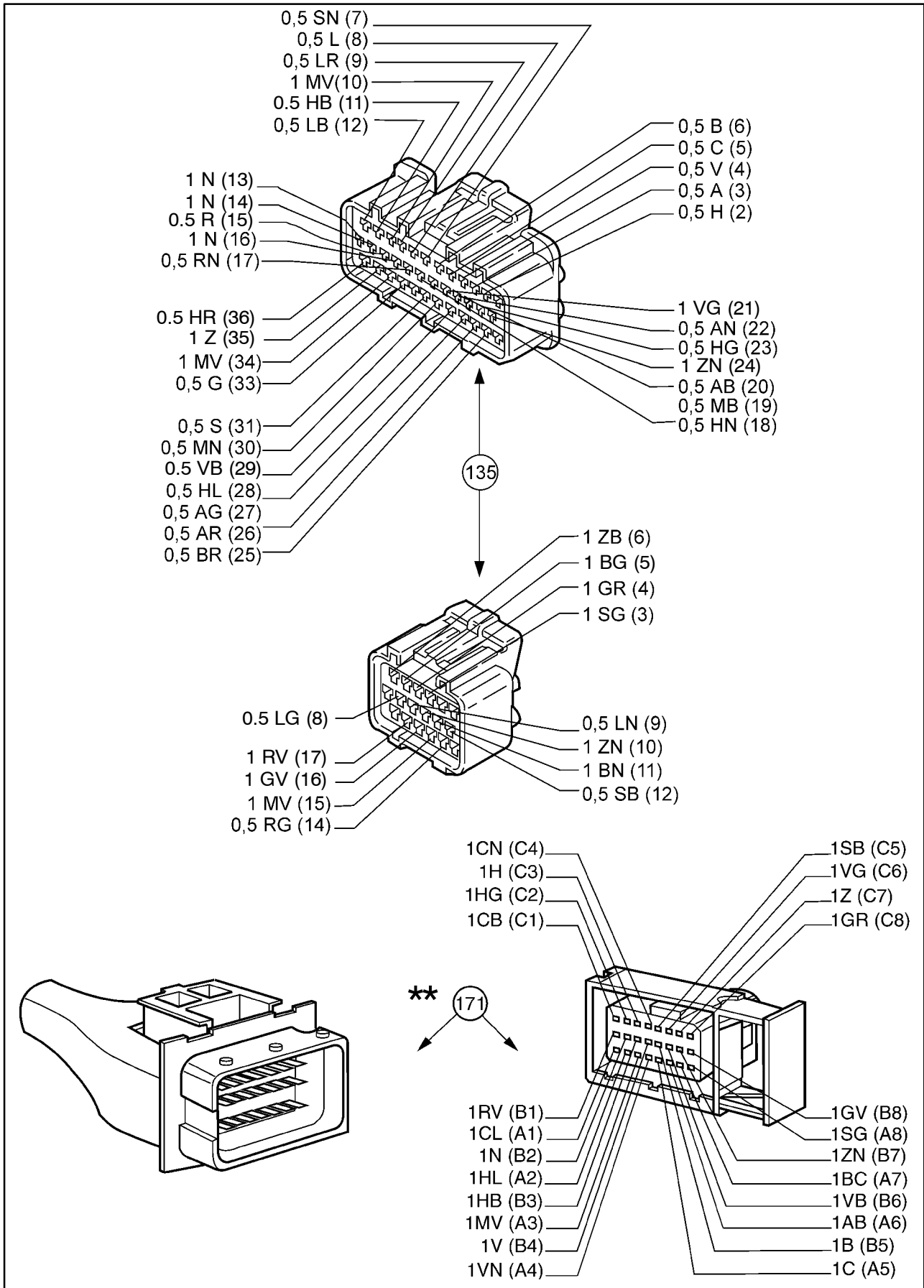
**FAULT CODE 23**

The rear lift control panel (EDC) is disconnected.

The rear lift (EDC) does not work, but can be operated from the external switches on the mudguards.



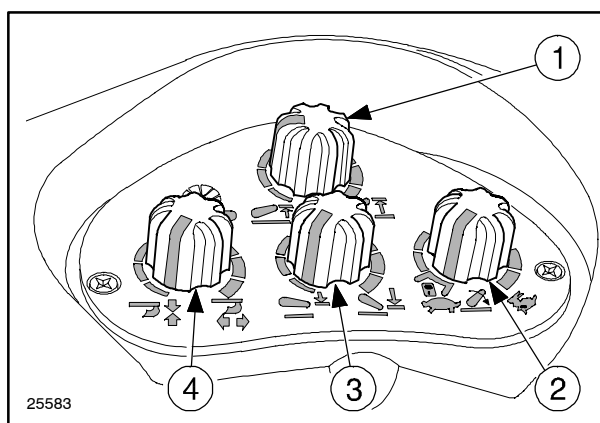
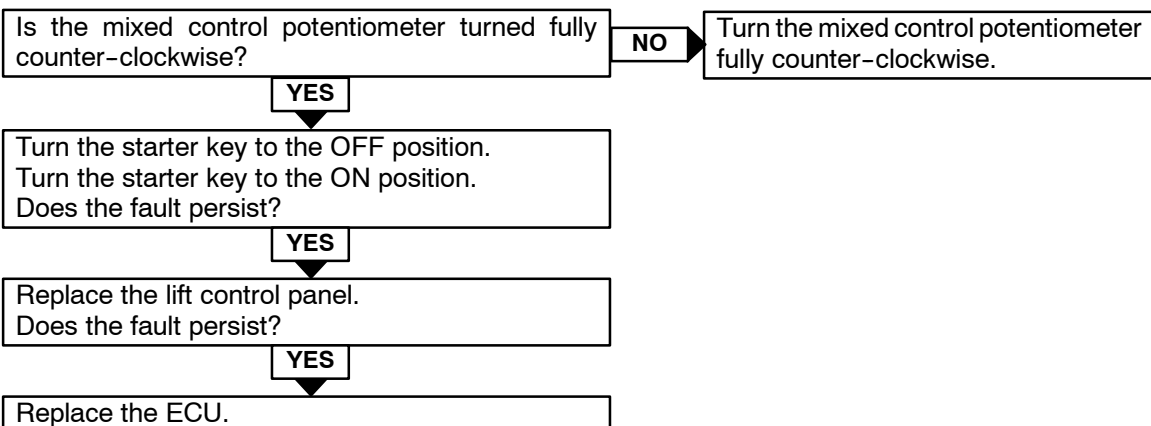
**FAULT CODE 28**



**FAULT CODE 37**

The mixed control potentiometer (4) is not turned fully clockwise. This fault can be displayed during lift arms calibration (FAULT 24).

The rear lift (EDC) does not work, therefore the lift arms mechanical stroke cannot be calibrated.



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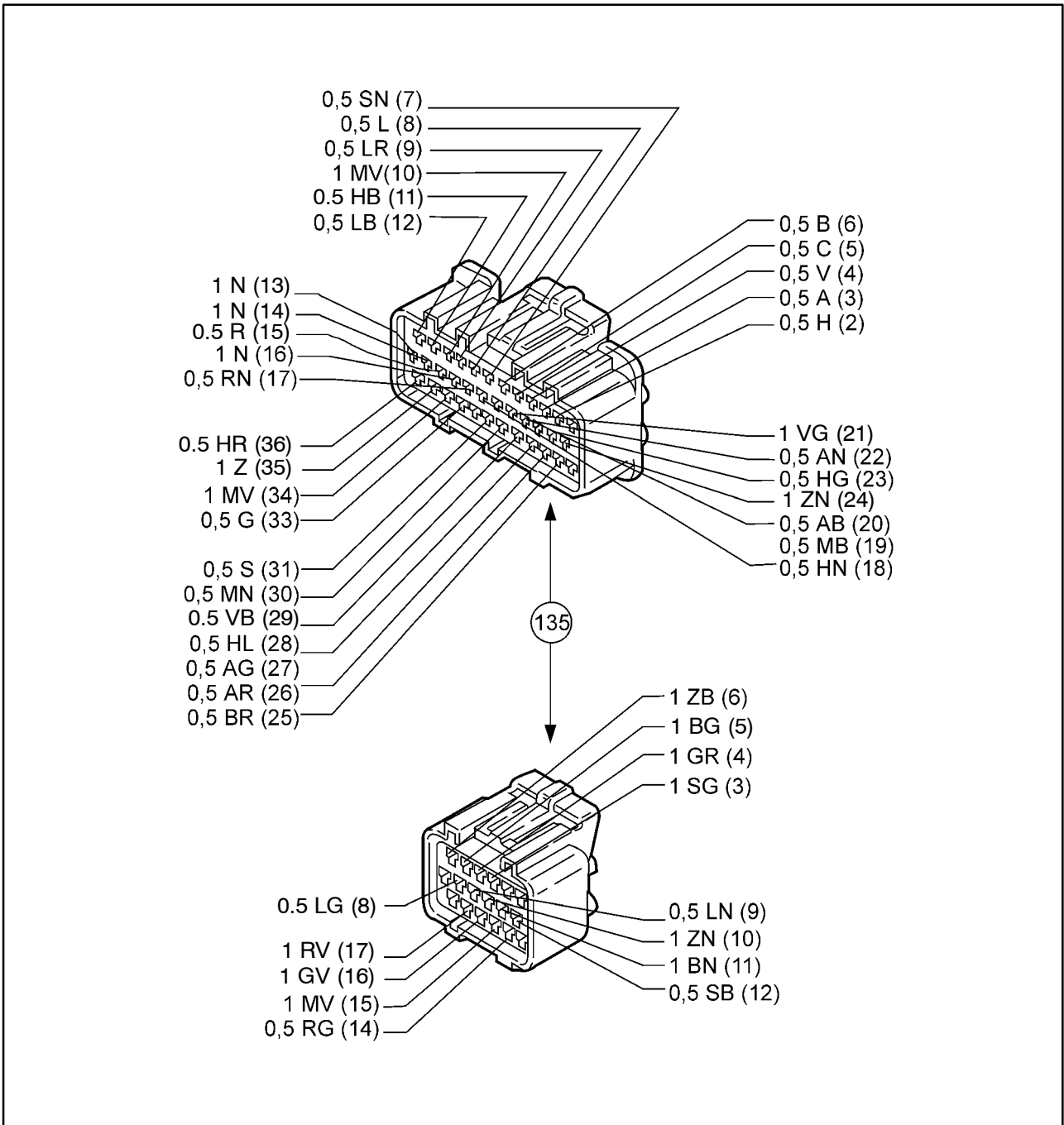
- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: [www.heydownloads.com](http://www.heydownloads.com) by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

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FAULT CODE 43



**FAULT CODE 53**

The power supply voltage on the sensors (+5V) is too high.

The rear lift (EDC) does not work, but it can be operated by means of the lift external switches.

Turn the starter key to the OFF position.  
Remove the control panel and the connections (135) on the ECU.  
Turn the starter key to the ON position.  
Between pin CN2-20 (AB) on connection (135) (wiring side) and ground, is the reading ~ 12V?

**NO**

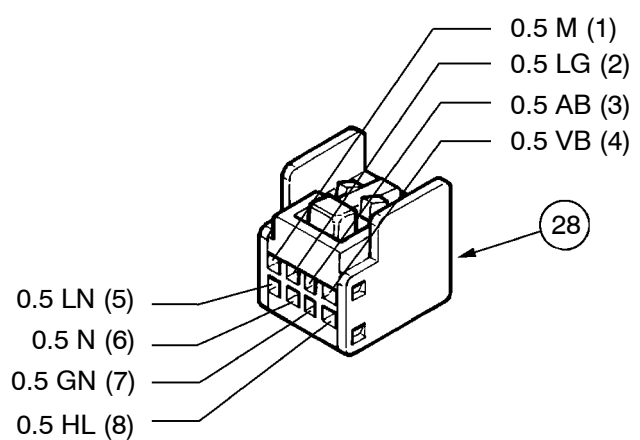
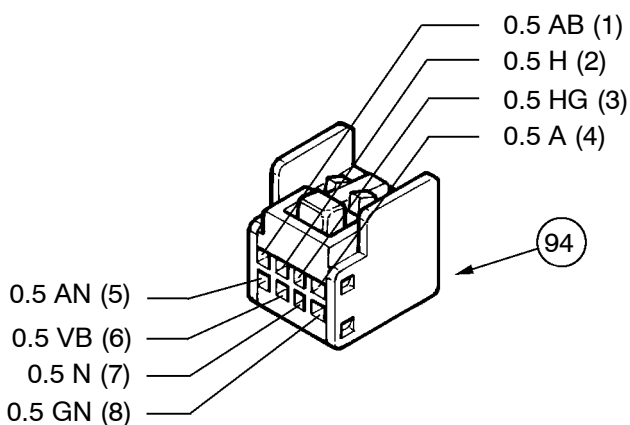
Turn the starter key to the OFF position.  
Replace the ECU.

**YES**

Turn the starter key to the OFF position.  
Check the wiring between: pin CN2-20 (AB), pin (A6) (AB) on connection (171) and the lift arms position potentiometer.  
Eliminate the cause of the short circuit to +12V.  
Does the fault persist?

**YES**

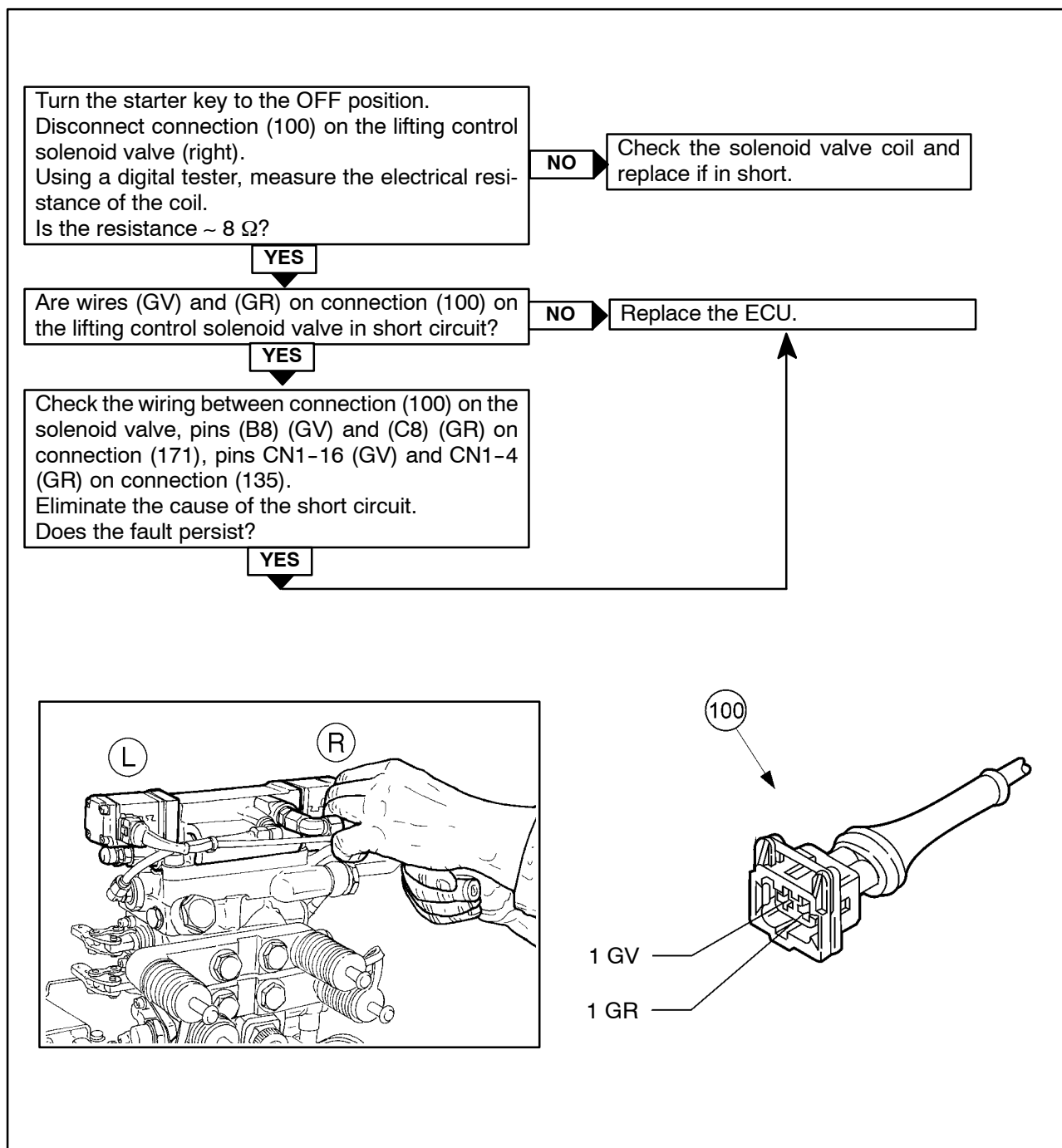
Check the wiring between: pin CN2-20 (AB), pin (3) (AB) on connection (28) on the working depth potentiometer and pin (1) (AB) on connection (94) on the lift control panel.  
Eliminate the cause of the short circuit to +12V.



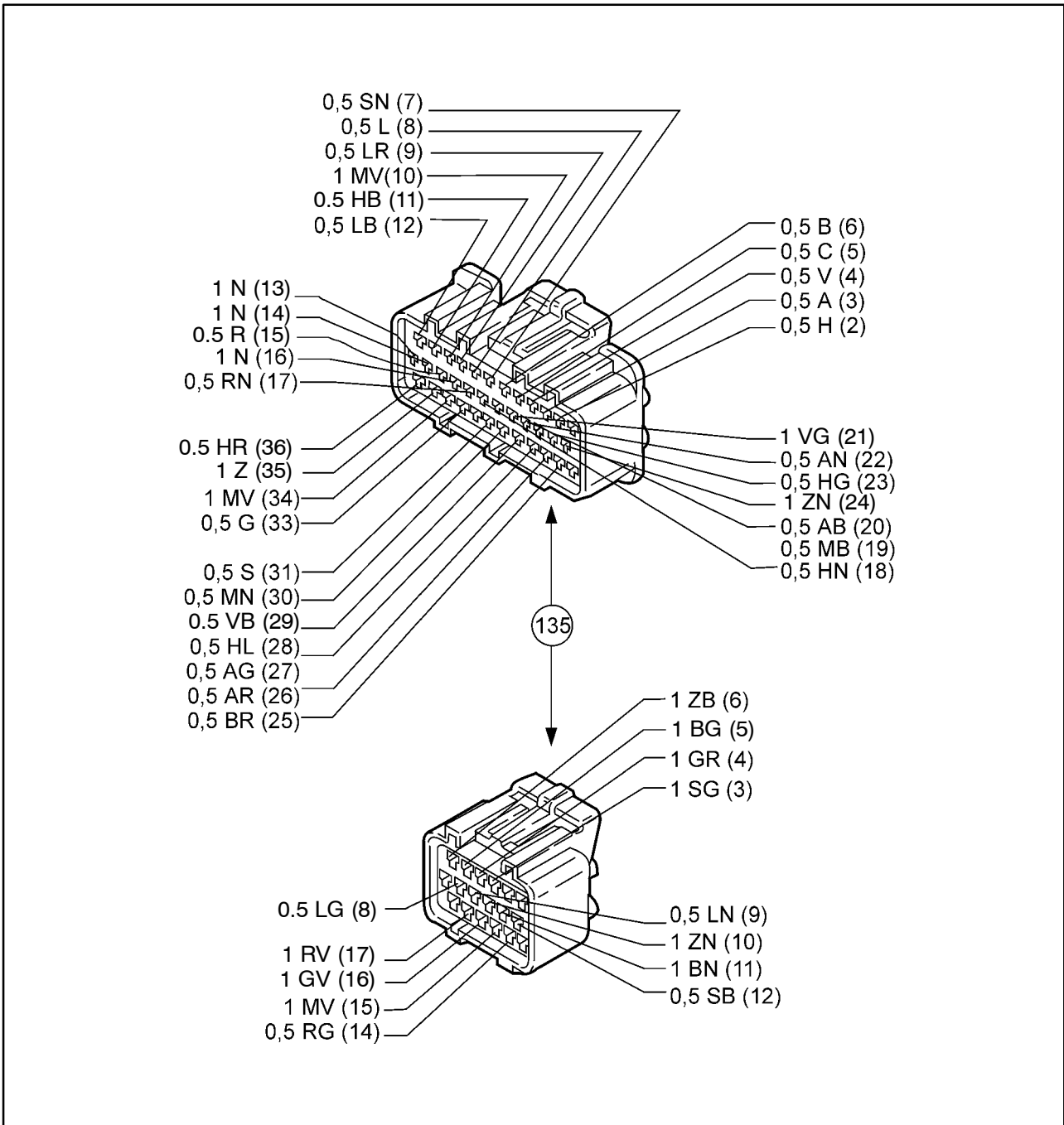
**FAULT CODE 66**

The wiring on the arms lift solenoid valve (R) is in short or the solenoid valve is faulty.

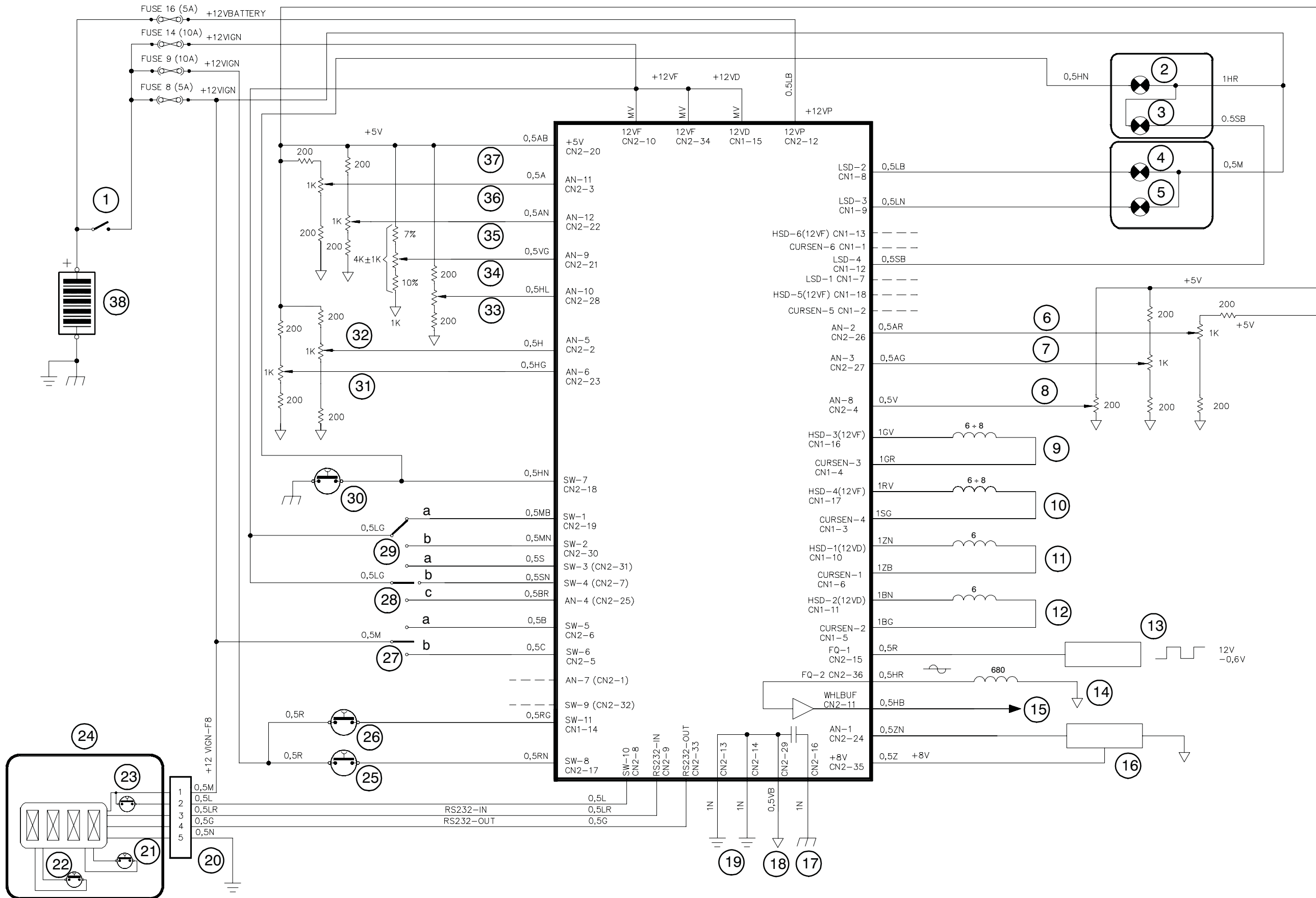
The rear lift (EDC) does not work, but it can be operated by means of the lift external switches.



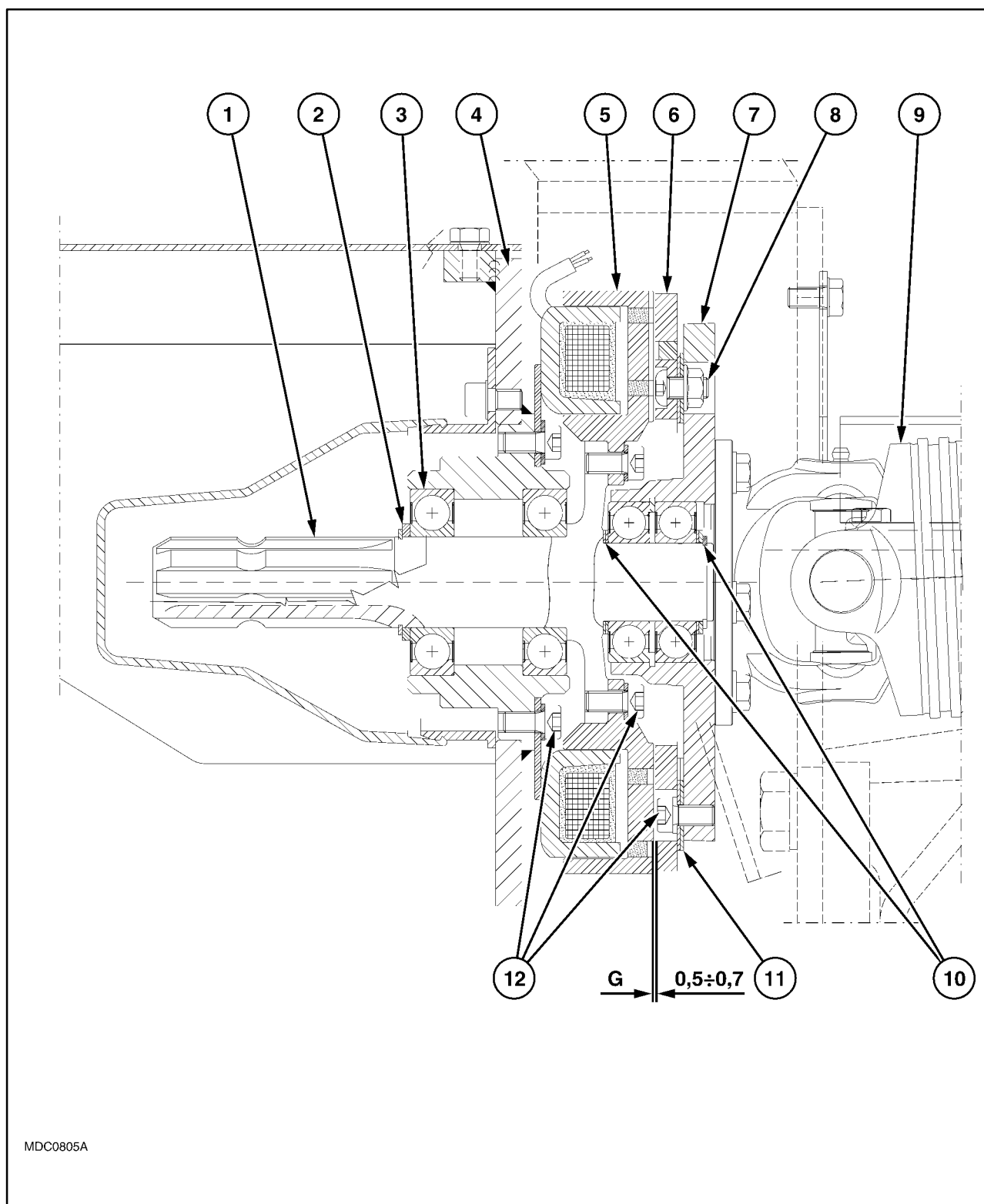
FAULT CODE 85



FRONT/REAR ELECTRONIC LIFT ELECTRONIC CONTROL UNIT INPUT/OUTPUT WIRING DIAGRAM



MPD2818A

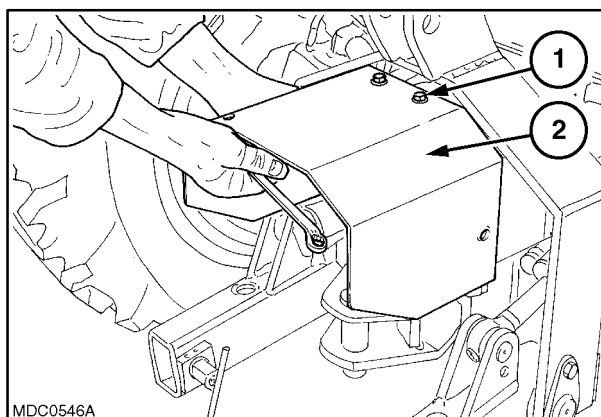


6

### Longitudinal views of shaft with front power take-off electromagnetic clutch

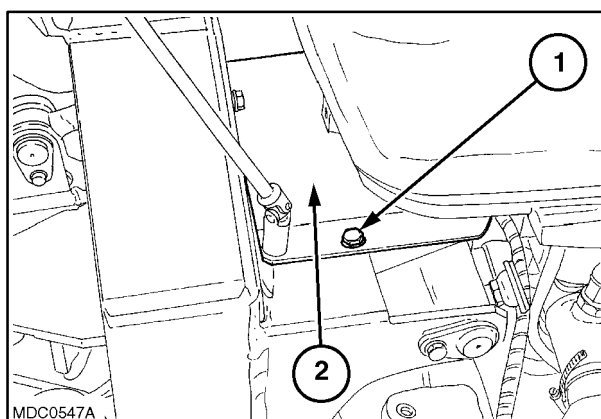
- |  |  |
|--|--|
| 1. Power take-off shaft.                           | 7. Constant velocity joint coupler flange. |
| 2. Thrust washer with snap ring.                   | 8. Clutch ring/spring retaining bolts.     |
| 3. Power take-off electromagnetic clutch bearings. | 9. Constant velocity joint.                |
| 4. Electromagnetic clutchcoupler flange.           | 10. Clearance adjustment shims <b>G</b> .  |
| 5. Power take-off electromagnetic clutch.          | 11. Power take-off clutch release spring.  |
| 6. Clutch ring.                                    | 12. Retaining Bolts.                       |

6. Remove the retaining bolts (1) and disassemble the guard (2) on the front power take-off.



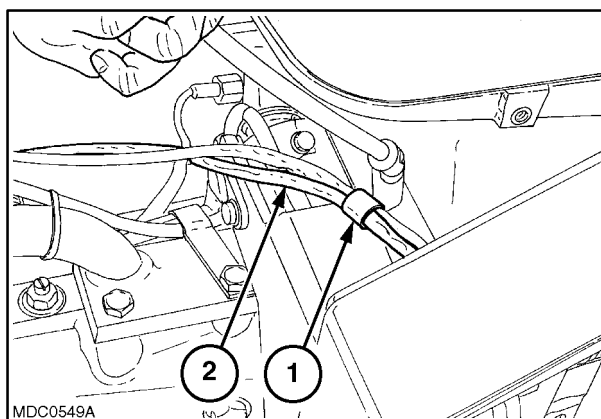
23

7. Remove the retaining bolts (1) and disassemble the upper guard (2) on the front lift.
8. Carry out operation **10 406 10: Radiator**, only removal (see Section 10, Chapter 1, page 91).



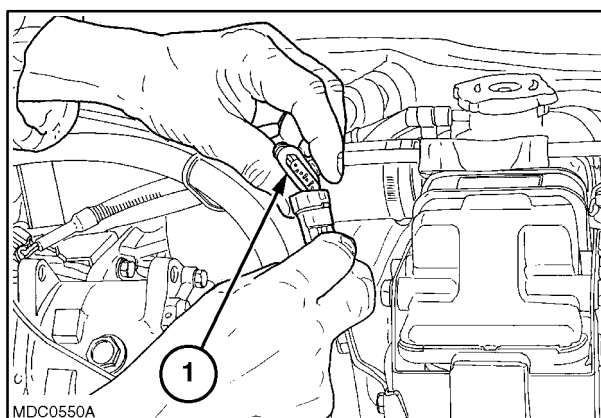
24

9. Remove the retaining brackets (1) and the electric cable clamps (2) that supply the electromagnetic coupling and the front lift arms position sensor, from the power steering piping.



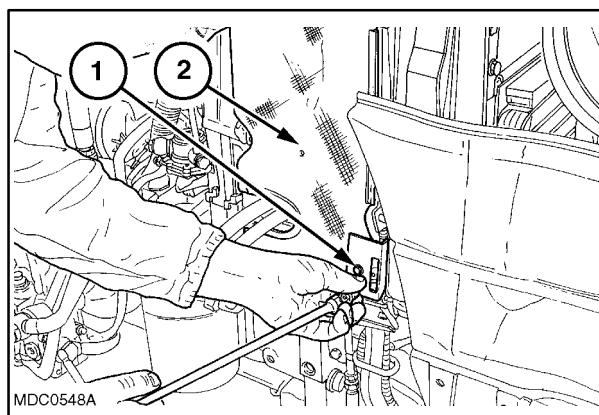
25

10. Disconnect the electrical connection (1) on the electromagnetic coupling.



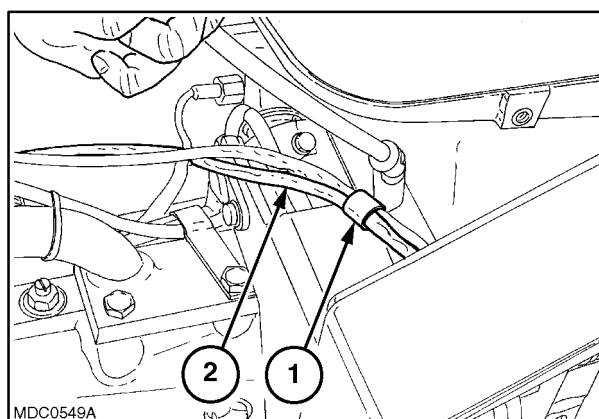
26

4. Remove the retaining bolts (1) and disassemble the right-hand safety grill (2).



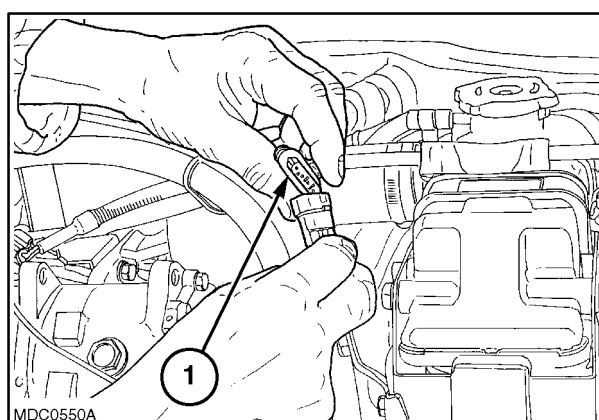
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5. Remove the retaining brackets (1) and the electric cable clamps (2) that supply the electromagnetic coupling and the front lift arms position sensor, from the power steering piping.



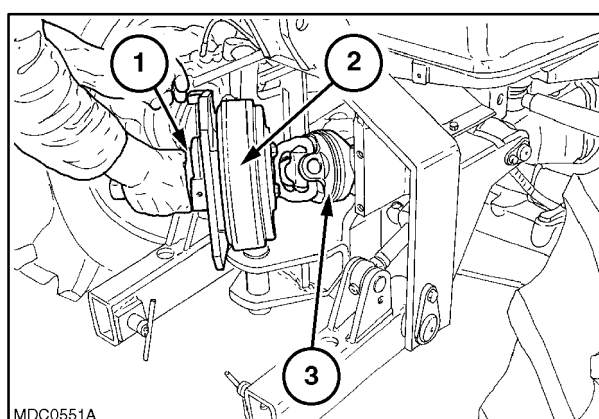
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6. Disconnect the electrical connection (1) on the electromagnetic coupling.



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7. Unscrew the four retaining bolts and remove the front power take-off (1) complete with electromagnetic coupler (2) and universal joint (3).



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## FRONT POWER TAKE-OFF CALIBRATIONS

### Calibration unit use

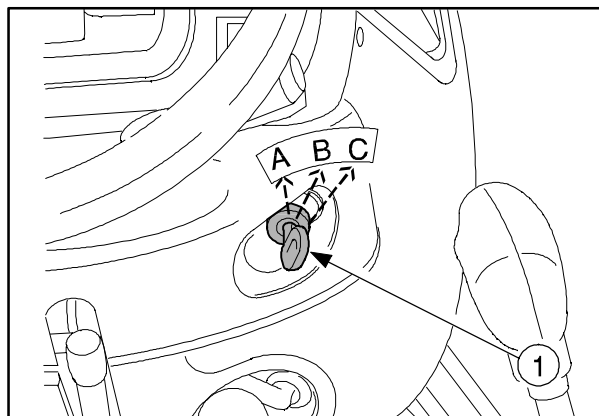
Specific remote diagnosis operations can be carried out with the Calibration and Diagnosis Unit (CDU).

### Faults code

If the Faults Detection Logic reads a fault condition, the code will flash on the indicator. In this manner, the fault condition can be displayed whilst in HH mode.

### HH MENU ACCESS

1. Turn switch (1) to A (OFF) and connect the CDU **294084** to the diagnosis socket (red connector).



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2. By holding down the H MENU key (1) on the CDU, turn switch (1, fig. 73) to C to start the engine.
3. After a brief pause, the display (2) shows:  
HH MENU
4. Release the H MENU key (1) on the CDU).
5. Select the required H menu by pressing the H MENU key (1) the correct number of times to display the relative code on the display (2), e.g.: once to access H1, five times to access H5, etc. Each time key (1) is pressed, the display (2) shows the H code obtained, i.e.: H1, H2 etc.

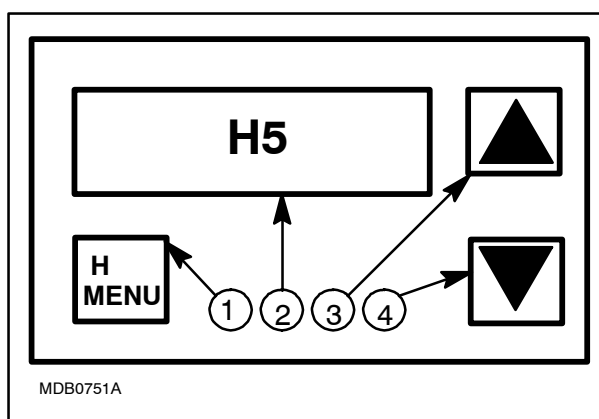
Remember that after the HF MENU, the count restarts from HH.

After a brief pause (2 seconds) the ECU enters the procedure of the selected menu.

Explanations of the relative menus are noted on the following pages.

If the operator presses key (1) whilst an H menu is in use, the menu is abandoned and the display (2) returns to the HH selection phase.

If the H code does not correspond with an active H menu, the display (2) returns to HH and waits for an ulterior selection.

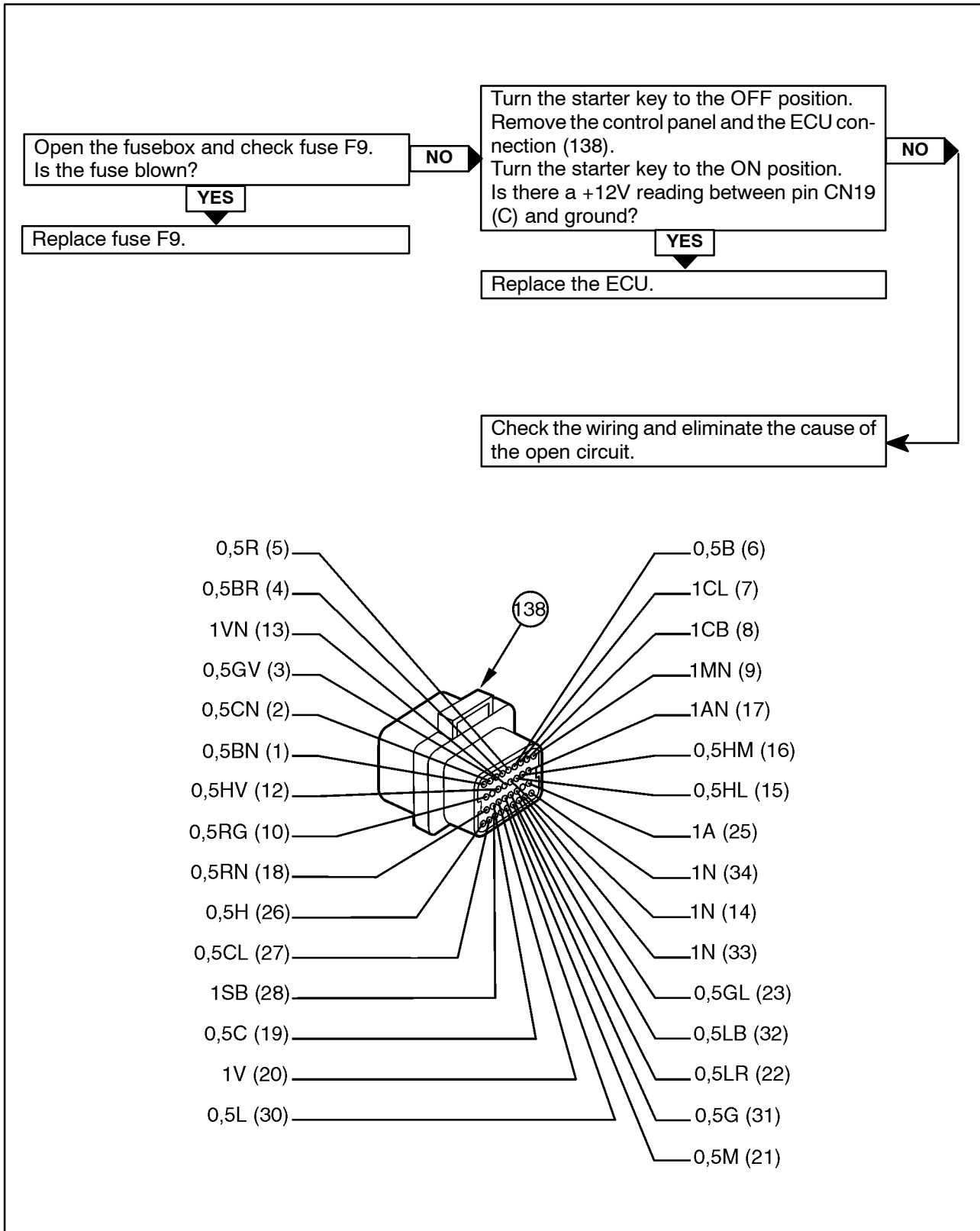


MDB0751A

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**FAULT CODE 11**

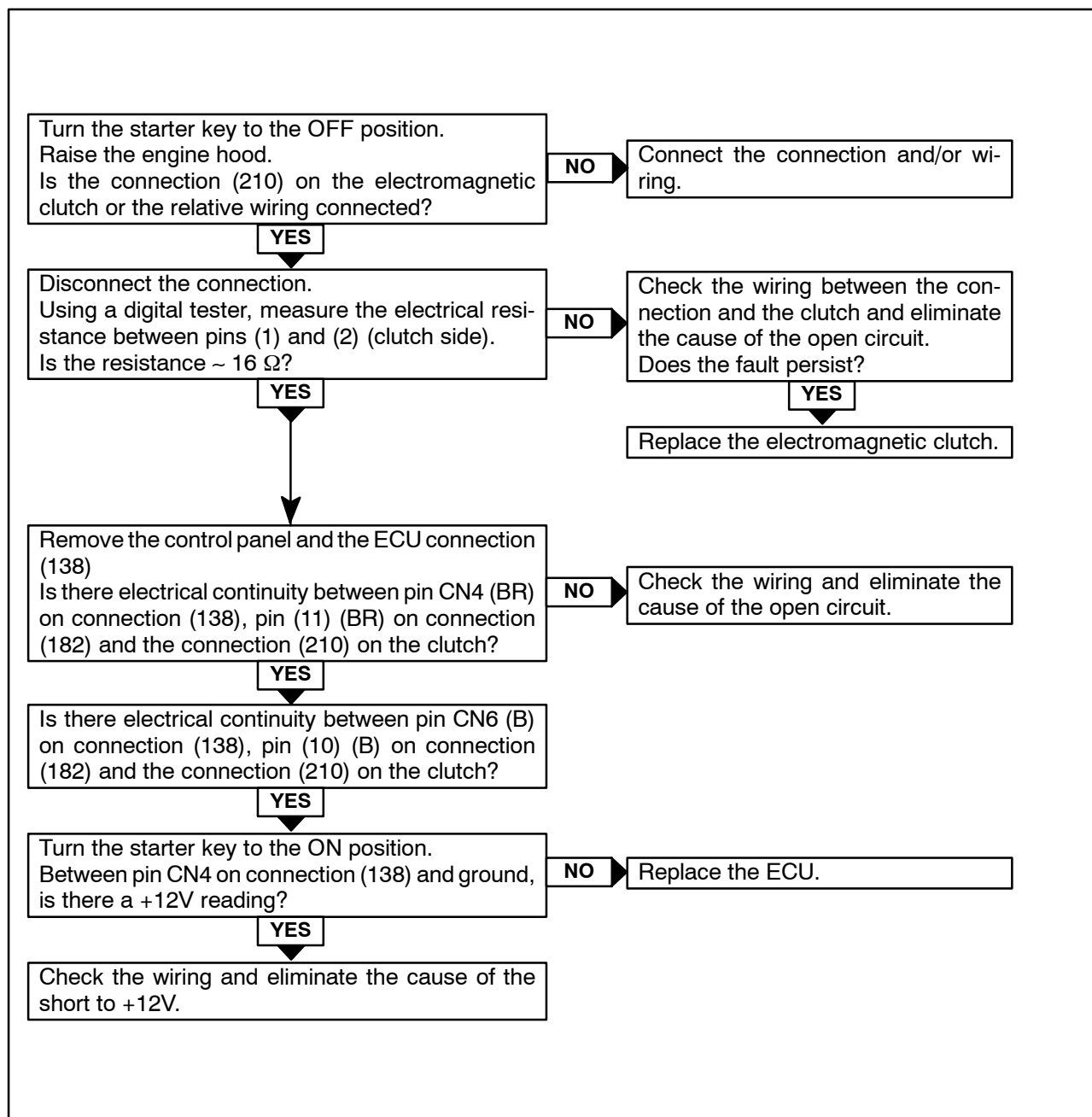
Fuse F9 (Section 55, Chapter 6, pages 115 to 121) or the relative wiring is interrupted.  
Four-wheel drive is always engaged and the Front Power Take-off does not work.



**FAULT CODE 32**

The slip reading coil wiring is disconnected or is in short to +12V or the coil is faulty.

The front PTO does not work.



### H1 - REAR LIFT RAISING AND LOWERING SOLENOID VALVES CALIBRATION

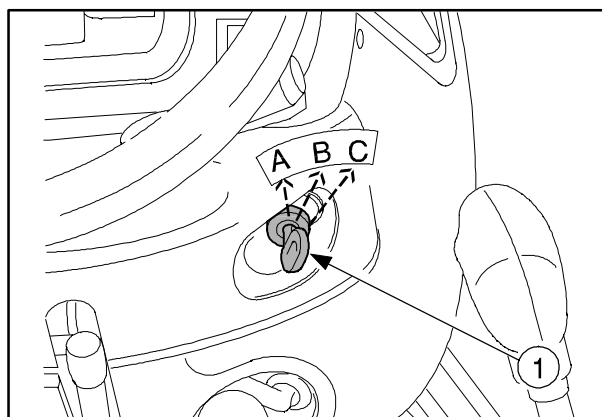
This procedure calibrates the rear lift control valve solenoid valves (EDC).

and must be carried out after the following operations:

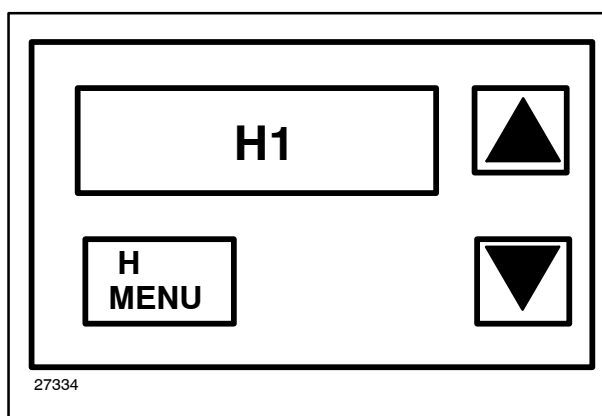
- ECU replacement;
- raising or lowering solenoid valves replacement;
- NVM cancellation (H8 menu)

### REAR LIFT RAISING AND LOWERING SOLENOID VALVES CALIBRATION MODE ACCESS

- Select the **H1** menu, as described on page 67.

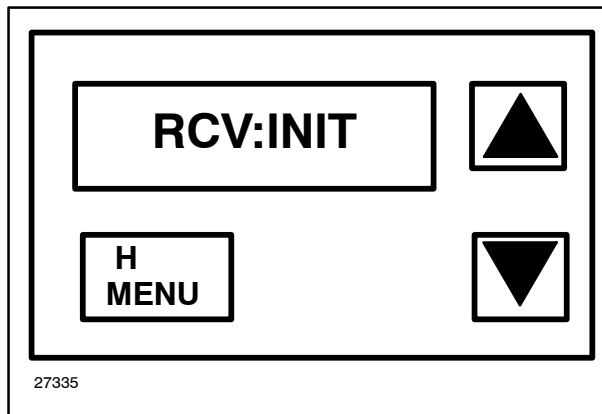


104



105

- The **294084** instrument will display **RCV:INIT**.
- Bring the engine revs to 1200 ÷ 1400 rpm;



106

## HF - ERRORS STORED IN THE NON-VOLATILE STORAGE OF THE ECU

When a fault is detected it is stored in the ECU non-volatile memory and signalled by the indicator lamp (1 fig. 129).

- Select the **HF** menu, as described on page 67, the display (2) shows the last fault saved.

Example: **E(9) = 15**

**E** = Fault.

**(9)** = Progressive memory cell.

**15** = Fault code.

- Use key ▼ (4) or ▲ (3) to display eventual faults saved in cells 1 to 9.

When no faults are saved, the display will show:

Example: **E(9)=00.**

- To proceed, press key ▼ (4) and hold down for 5 seconds.

Whilst key ▼ (4) is pressed, the display (2) carries out a reverse countdown of the remaining time, at 1 second pauses.

**ERASE 5s**

**ERASE 4s**

**ERASE 3s**

**ERASE 2s**

**ERASE 1s**

- After 5 seconds, the display (2) shows:

**ERASED**

On completion of the deleting procedure, release key ▼ (4, fig. 126).

---

**NOTE:** If key (4, fig. 126) is released whilst the display (2) is carrying out the reverse countdown, the display returns to the current cell of the buffer memory.

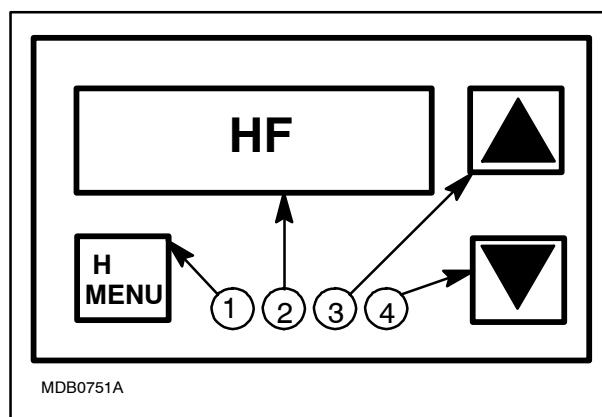
---

- Switch off the engine by turning switch (1) to A (OFF).

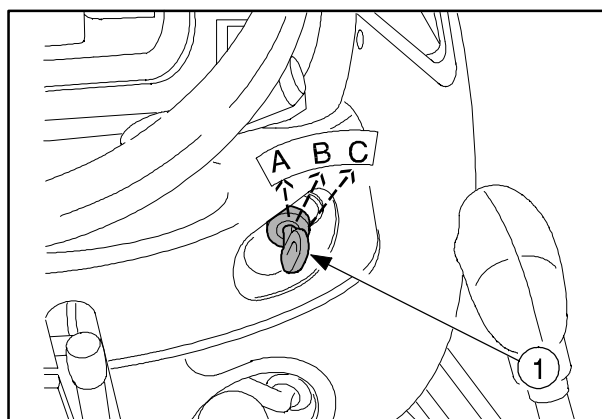
---

**NOTE:** If a pressure switch signal is detected during this operation, the procedure must be interrupted and normal operation must be resumed.

---



126



127

**FAULT CODE 48**

Fault on the front lift rapid up/down switch (1) or wiring.  
The front lift does not work.

Turn the starter key to the OFF position.  
Disconnect connection (205) on the up/down switch and check, using a digital tester, if the switch works.  
Does it work?

**YES**

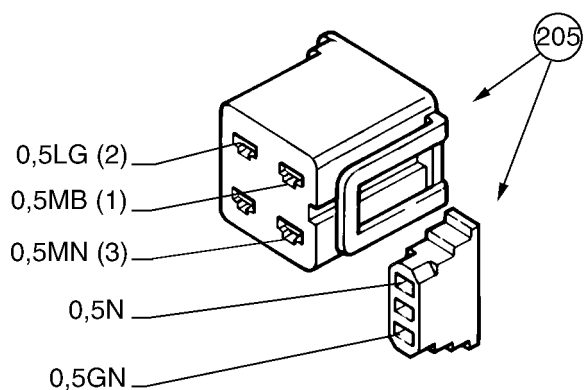
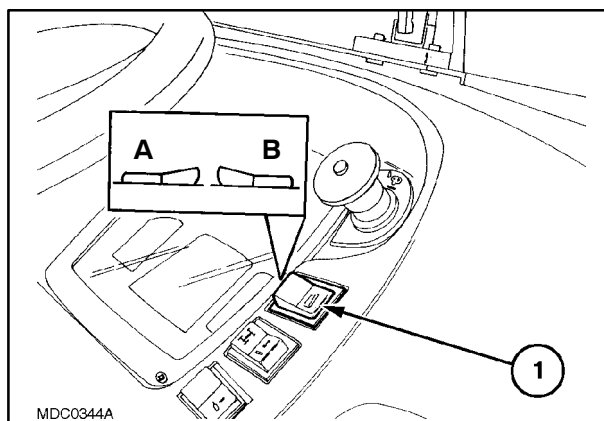
**NO** → Replace the switch.

Remove the control panel and the connections (135) on the ECU.  
Turn the starter key to the ON position.  
Between pin CN2-6 (B) or pin CN2-5 (C) on connection (135) and ground, is the reading +12V?

**YES**

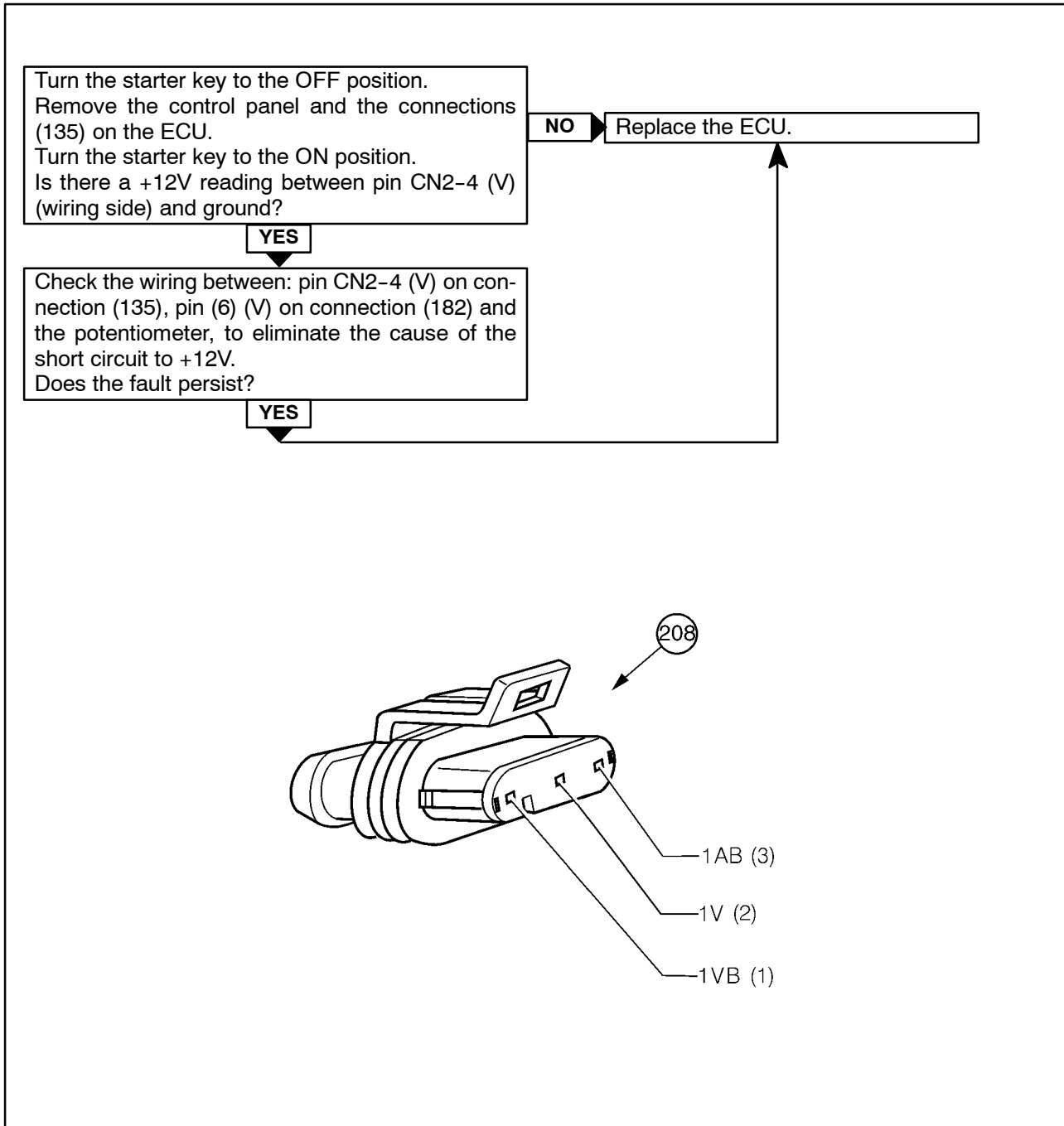
**NO** → Replace the ECU.

Check the wiring between connection (127) and the switch and eliminate the cause of the short to +12V.



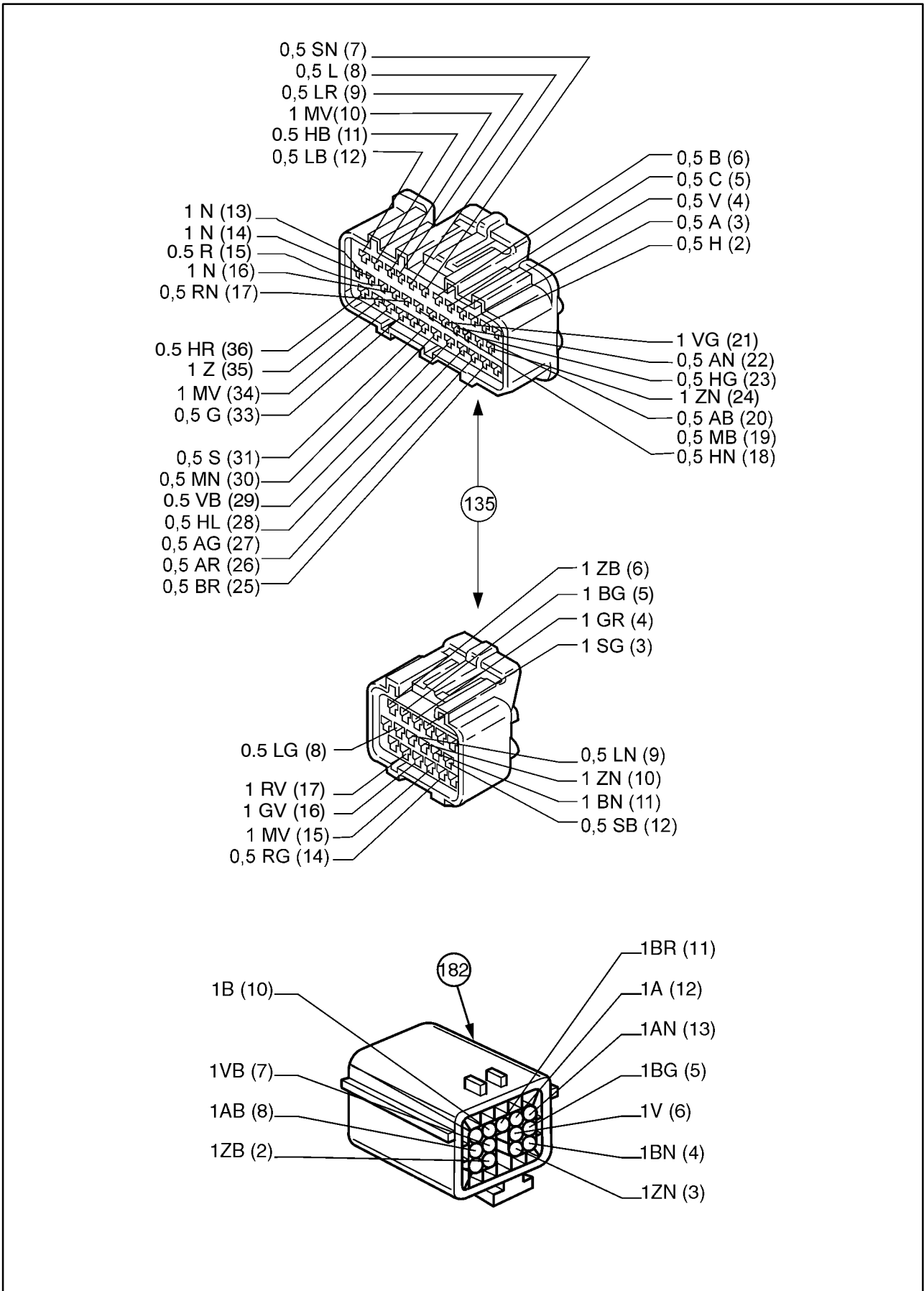
**FAULT CODE 56**

The wiring on position potentiometer (208) of the front lift arms is in short circuit to +12V (power supply).  
The front lift does not work.

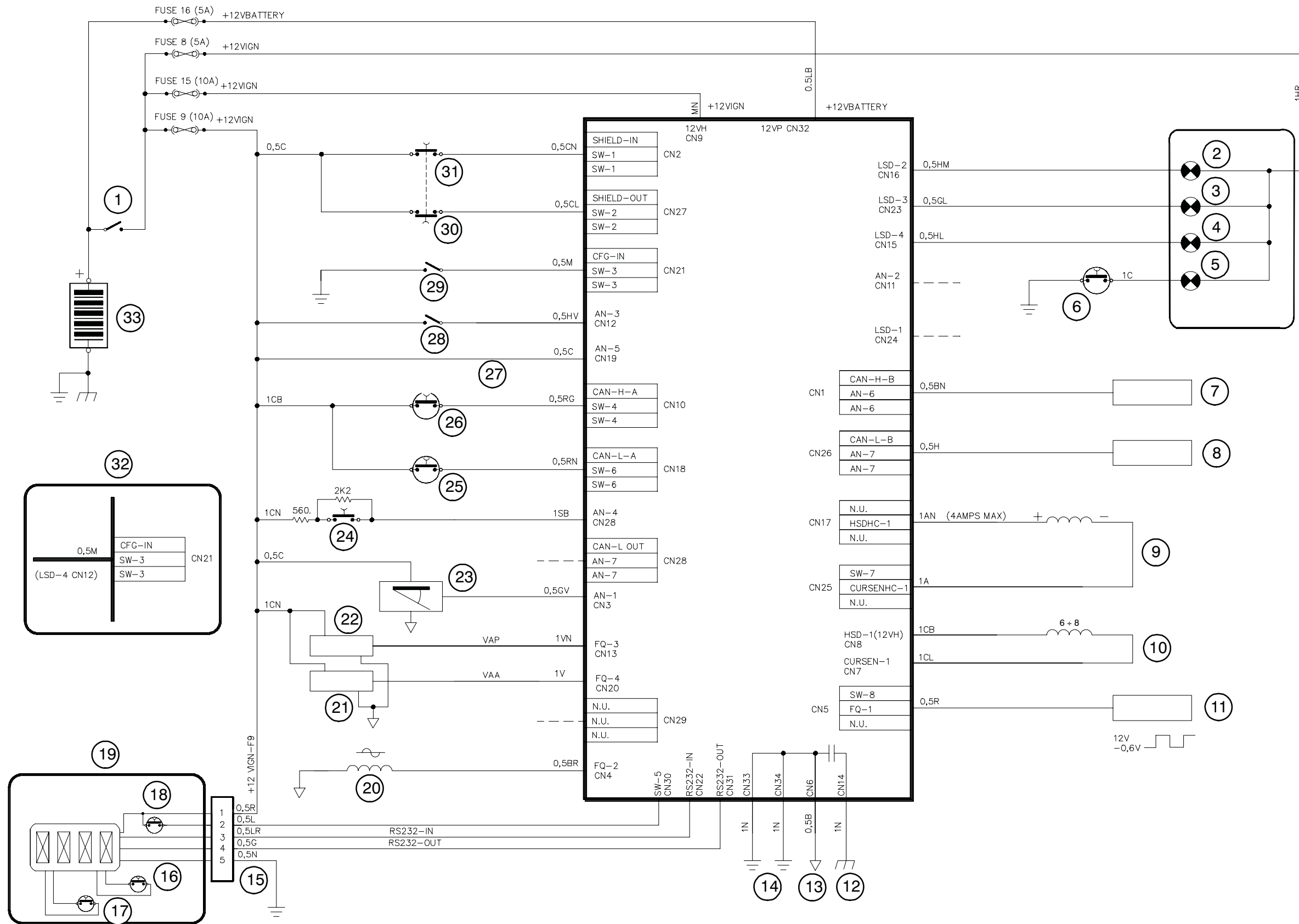




FAULT CODE 74



FRONT PTO AND 4WD ELECTRONIC CONTROL UNIT INPUT/OUTPUT WIRING DIAGRAM



## Chapter 1 - INSTRUMENTS

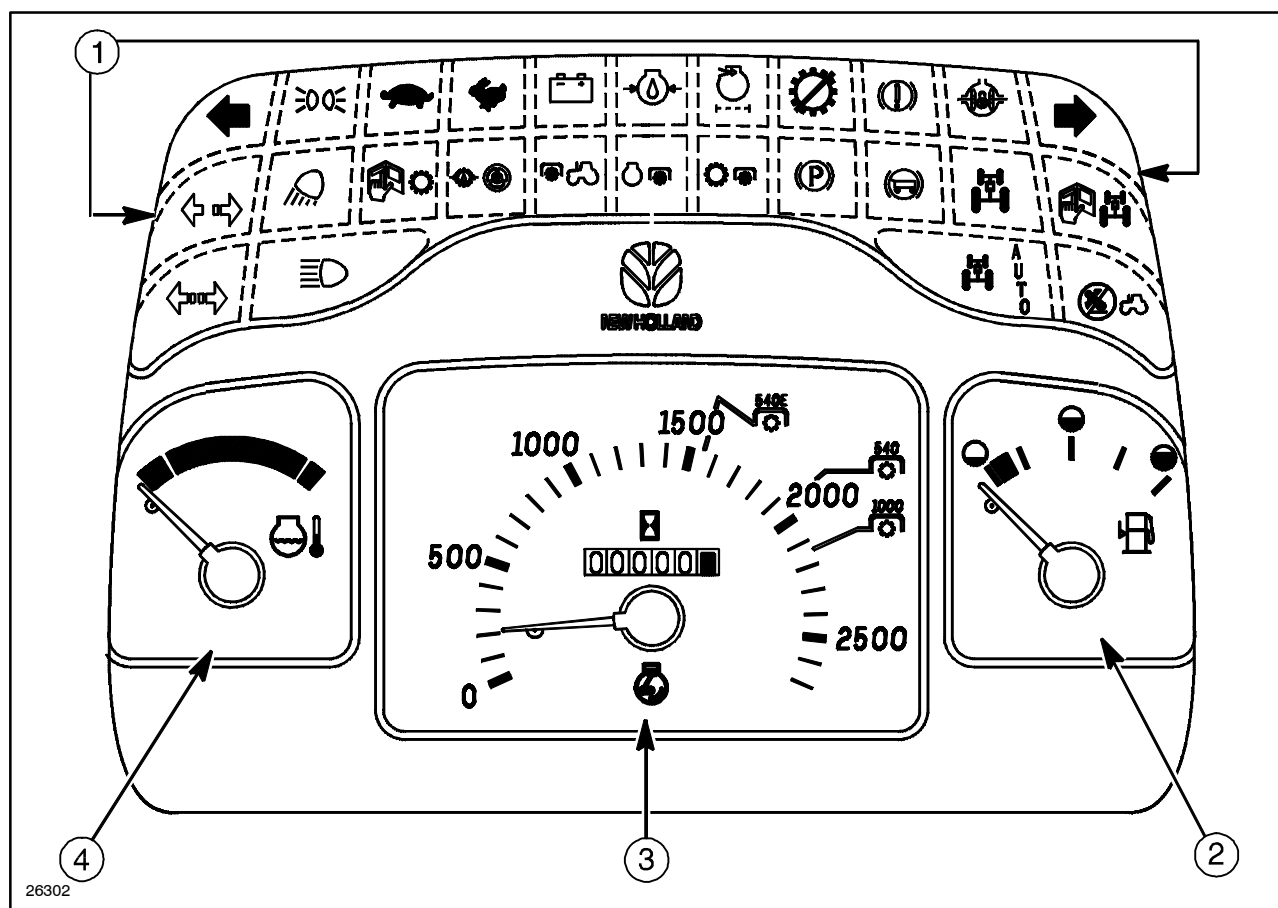
(version of frame no. 1269072)

### CONTENTS

Section	Description	Page
55100	Analog instruments .....	17
	Introduction .....	17
	Transmitters, sensors and switches .....	20
	Electronic module instruments .....	24

### ANALOG INSTRUMENTS

#### INTRODUCTION



20

The analog instrument panel is composed of four display sections:

1. Alarm and on/off indicator light panel
2. Fuel gauge
3. Speedometer/tachometer
4. Engine coolant temperature.

## Chapter 2 - COMPONENTS

(versions from frame no. 1269072)

### CONTENTS

Section	Description	Page
55 40440	Introduction .....	19
	Description of components .....	19
	Analogue instrument control panel .....	20
	Digital instrument control panel .....	21

### INTRODUCTION

The components described in this section are grouped in controls located inside the cab (in the spe-

cific locations listed below) and in controls positioned on the outside of the tractor:

1. Instrument panel controls (central control panel with analog or digital instruments).
2. Cab controls.
3. Operating controls, right-hand side.
4. Electronic lift controls.
5. Central console controls.
6. External controls.

### DESCRIPTION OF COMPONENTS

#### CENTRAL CONSOLE PANEL

The controls on the central console panel (with either an analog or digital control panel) are as follows:

- hazard warning light switch;
- clock adjustment pushbutton (only with digital control panel);
- function select pushbutton (only with digital control panel);

- function select pushbutton (only with digital control panel);

- four-wheel drive switch.

For the location of the controls listed above (according to the different types of instrument), refer to fig. 42 (analog instruments) or fig. 43 (digital instruments).

**Rotating beacon light ON/OFF switch (2).**

The switch has two positions:

- position **D** = rotating beacon ON;
- position **E** = rotating beacon OFF.

---

**NOTE:** The rotating beacon must be used when driving on the public highway. Plug the beacon into the power socket (1, fig. 65).

---

**Work light control button (3).**

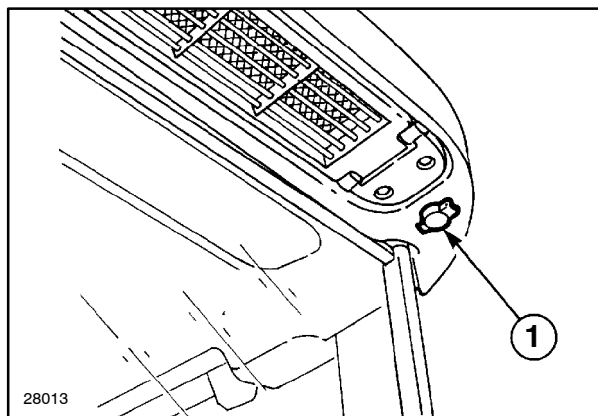
The pushbutton has three positions:

- position **A** = lights OFF;
- position **B** = rear lights ON, front lights OFF;
- position **C** = rear and front lights ON.

**Front windscreen washer switch (4).**

The switch has three positions:

- position **A** = OFF;
- position **B** = speed 1;
- position **C** = speed 2.



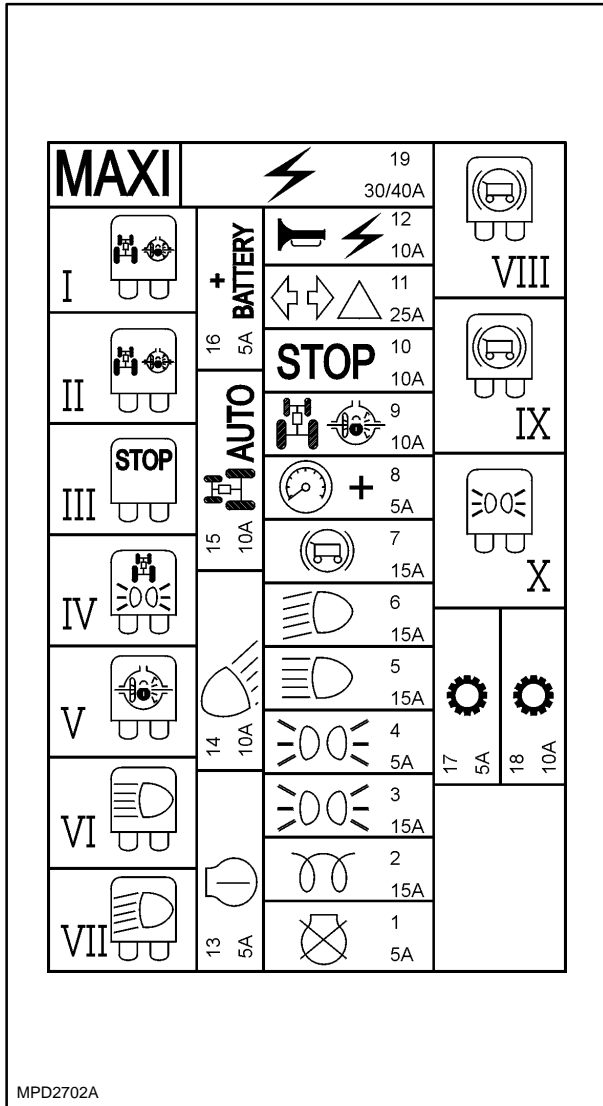
65

**ELECTRICAL CIRCUIT COMPONENTS**

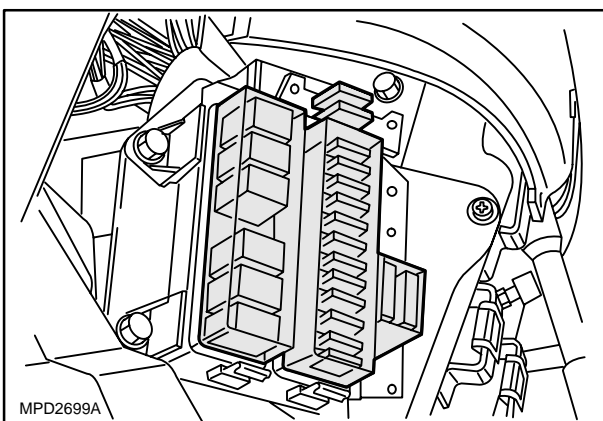
134	Electronic flasher
135	Front/rear electronic lift control unit
164	Front side connection – engine (10 PIN)
165	Front side connection – engine (1 PIN)
166	Cab system connection (8 PIN)
167	Cab system connection (1 PIN)
168	Trailer brake system connection (6 PIN)
169	Power socket connection 25/40 A
170	Front lights connection
171	Transmission side connection (24 PIN)
172	Transmission side connection (18 PIN)
173	Transmission side connection (2 PIN)
174	Transmission side connection (10 PIN)
175	Transmission side connection (2 PIN)
176	Trailer brake system intermediate connection
177	Power–shuttle system connection (24 PIN)
178	Air–conditioner connector connection
179	Power–shuttle system connection (2 PIN)
180	PTO and front lift system connection (14 PIN)
181	PTO and front lift system connection (18 PIN)
182	PTO and front lift system connection (13 PIN)
183	Seven pole power socket connection
184	Gear neutral switch connection
185	Intermediate connection for 4WD system
186	Operator safety system connection
187	Power–shuttle system connection (14 PIN)
188	Digital instrument connection
189	Rear lights connection (6 PIN)
190	Rear lights connection (2 PIN)
191	Swivel position lights connection
192	Rotating beacon socket connection
193	Suspended axle system connection
194	Suspended axle electronic control unit
195	Suspended axle circuit switch
196	Solenoid valve 1 suspended axle
197	Solenoid valve 2 suspended axle
198	Solenoid valve 3 suspended axle
199	Suspended axle angle position sensor
200	Pressure sensor 1 suspended axle

**FUSES AND RELAYS (version without cab)**

**⚠ DANGER:** If electrical system relays need to be changed, check that correct spare parts are used and that they are fitted in the correct positions. The use of structurally or functionally different relays – even if interchangeable – could seriously compromise tractor control with dangerous results.



**Fuse and relay main box** 104



**Fuse and relay main box** 105

**VERSION E (without cab) Fig. 104**

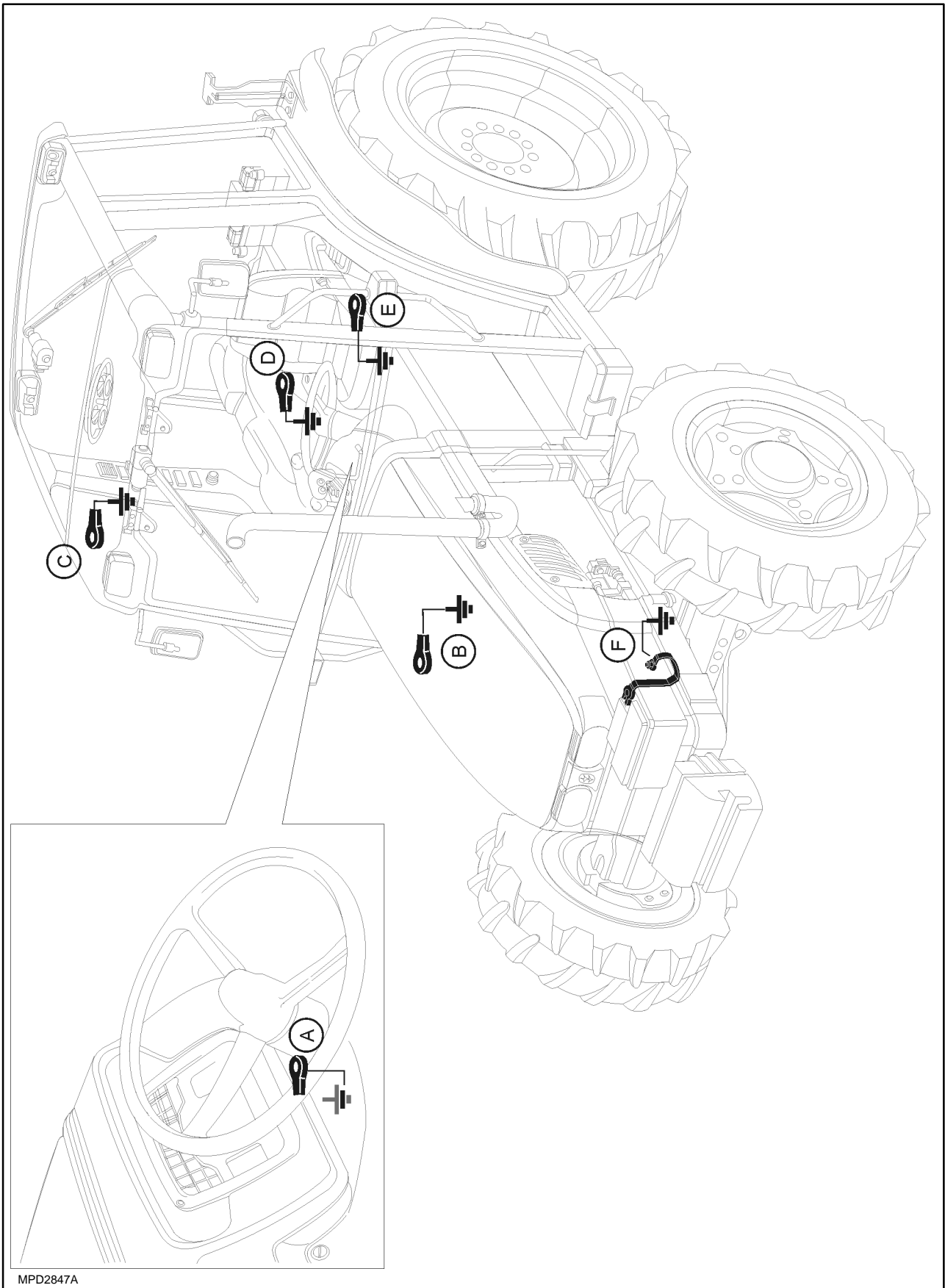
Permanent 4WD models with electrohydraulic differential lock and mechanical lift; predisposed for:

- Power-Shuttle
- Digital instrument
- 40A power socket
- N.A.S.O. circuit.
- Trailer brake
- PTO and front lift

**List of relay functions**

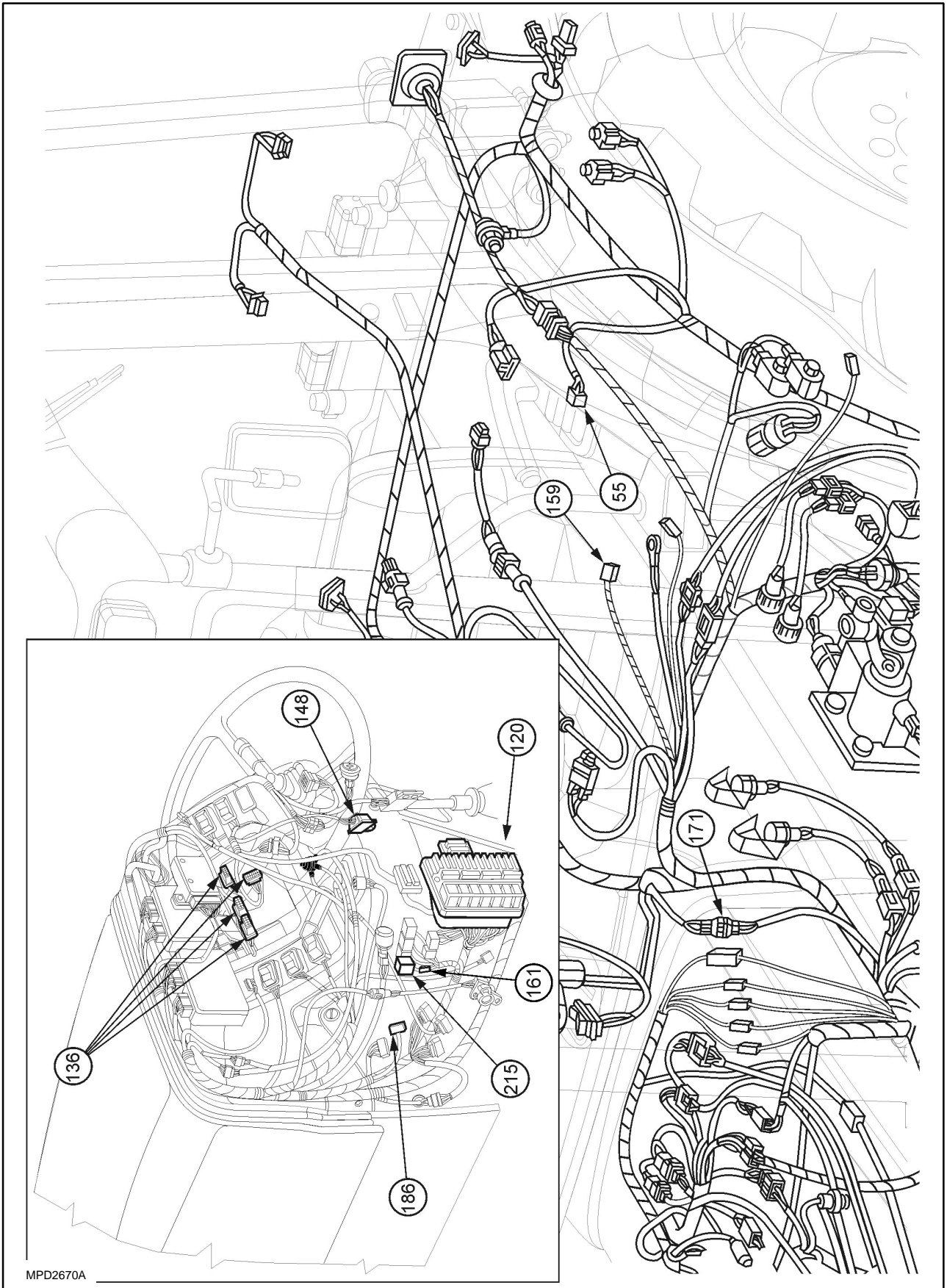
- I. Differential lock and brake lights circuit.
- II. Differential lock and brake lights circuit.
- III. Brake lights circuit.
- IV. Sidelights circuit.
- V. Differential lock circuit.
- VI. Full beam headlight circuit.
- VII. Dipped beam headlight circuit.
- VIII. Trailer brake circuit.
- IX. Trailer brake circuit.

GROUND POINTS LAYOUT



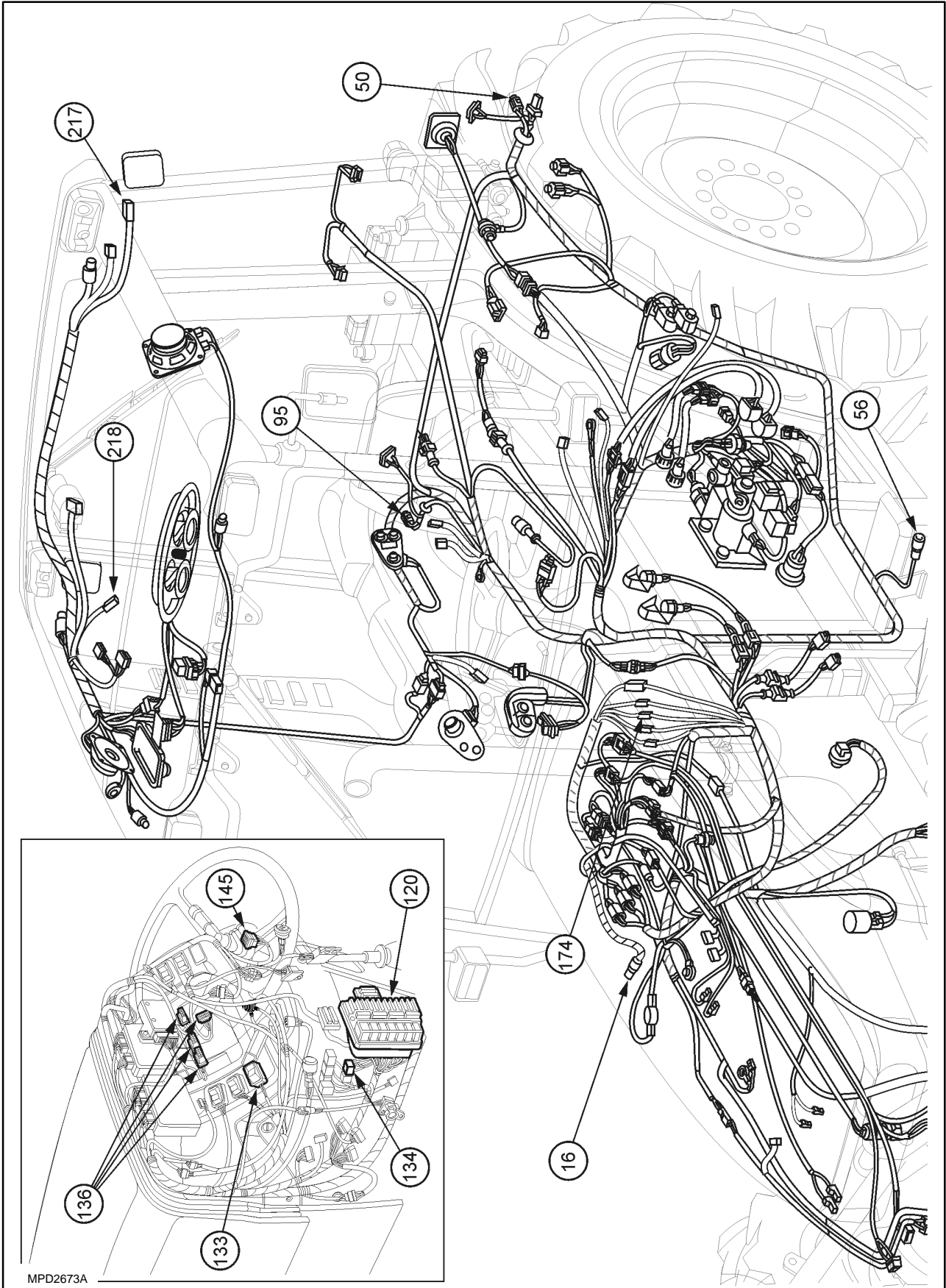
MPD2847A

WIRING DIAGRAM B



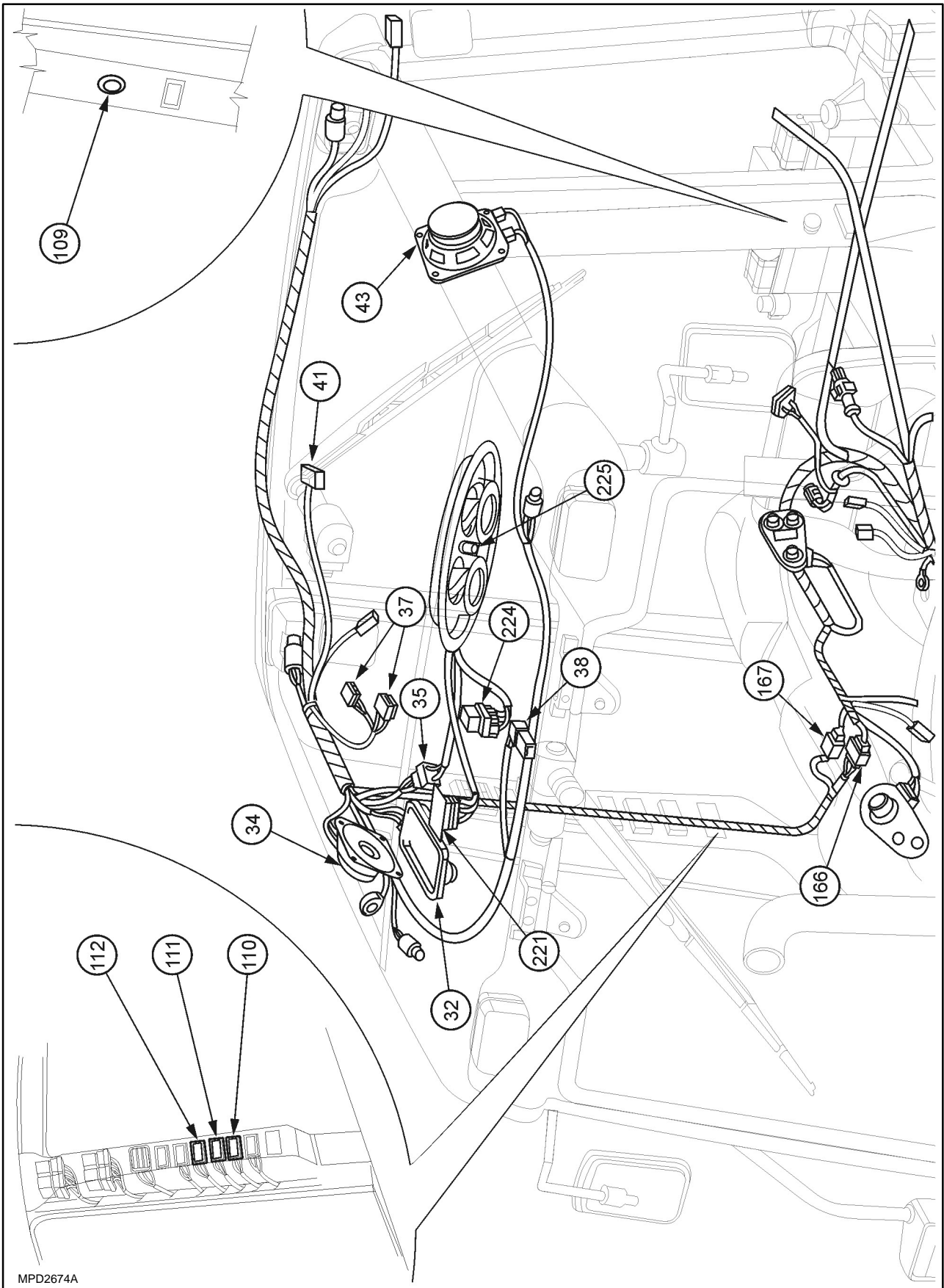
MPD2670A

WIRING DIAGRAMS D – E

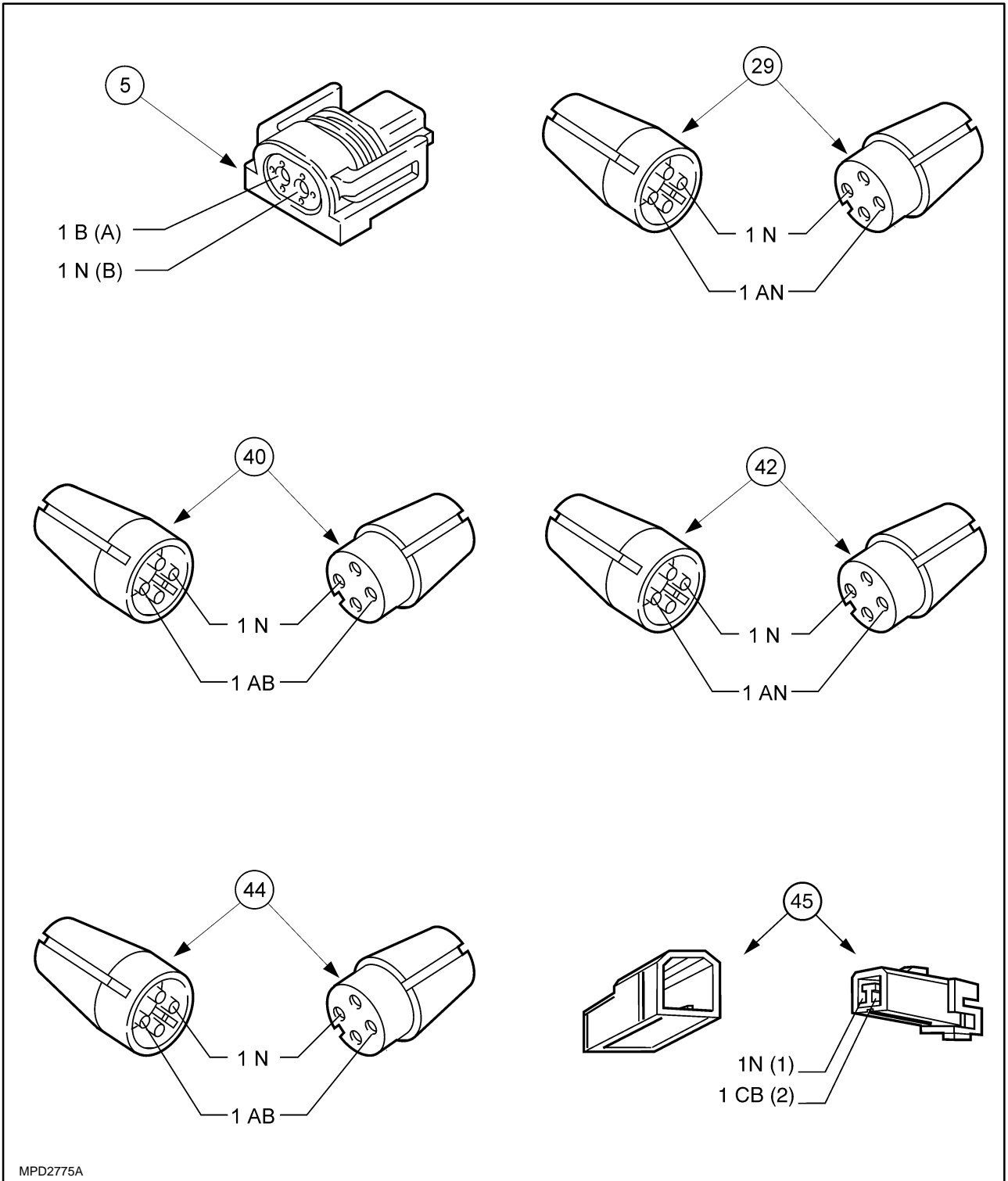


MPD2673A

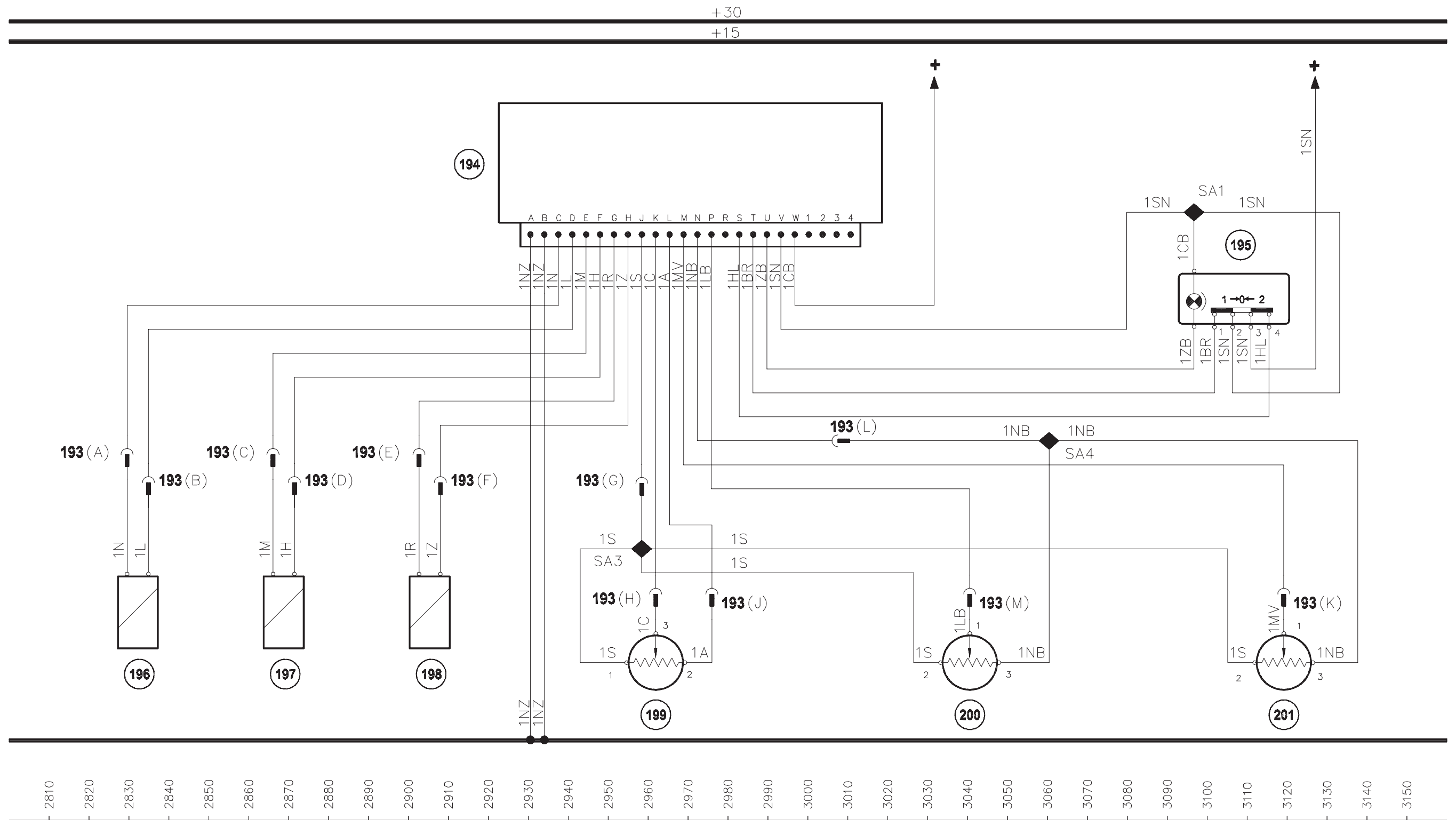
WIRING DIAGRAM F

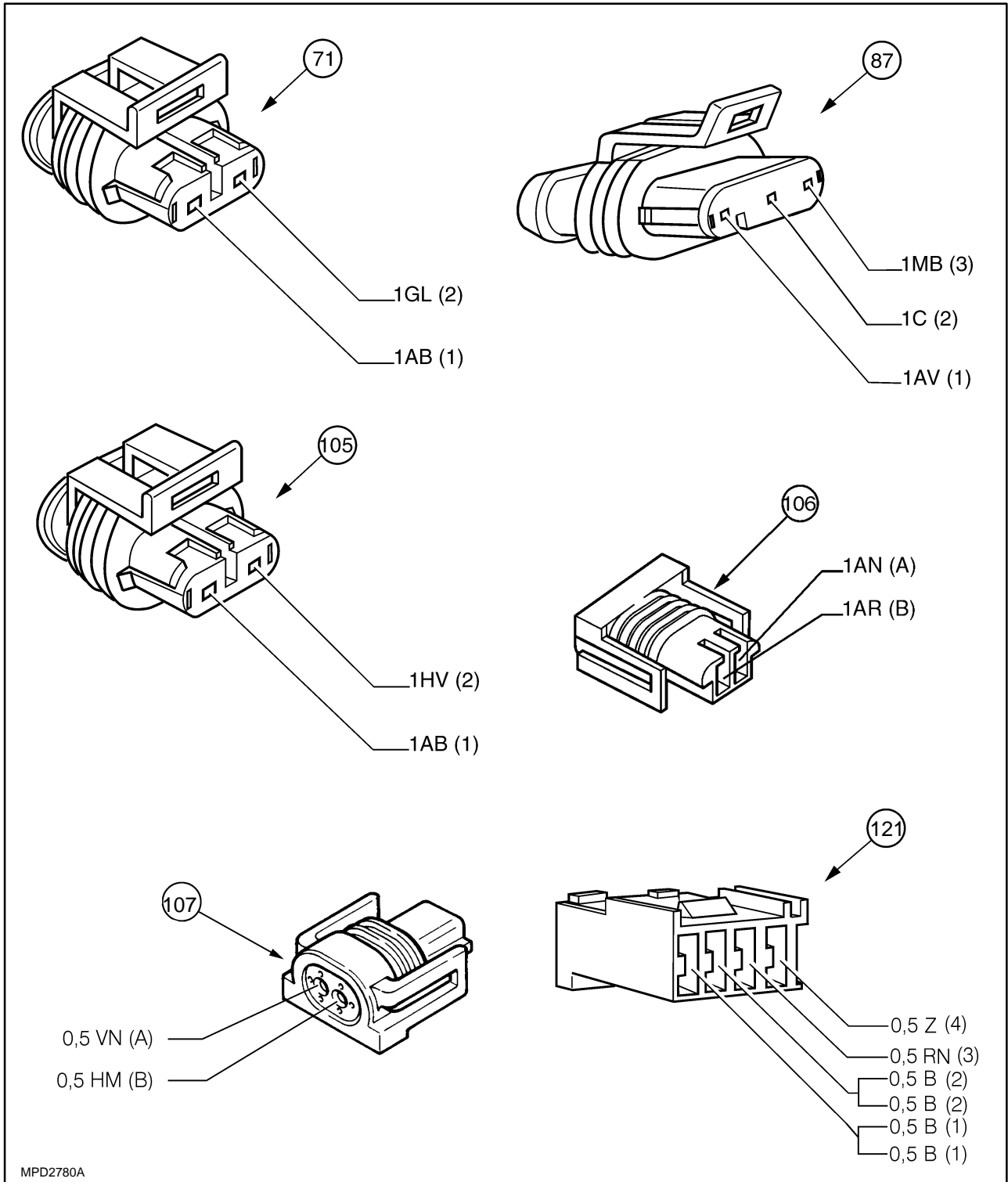


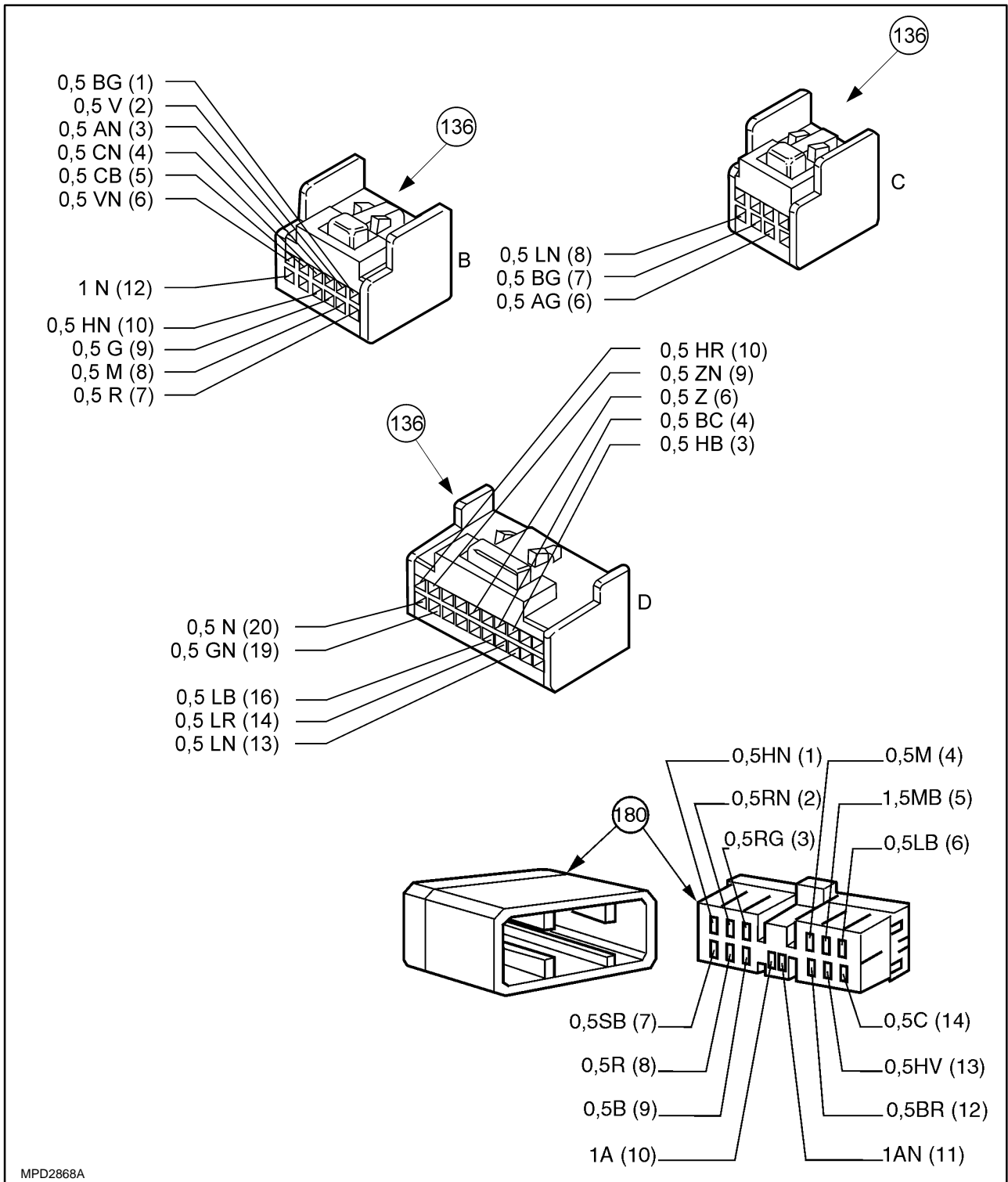
MPD2674A



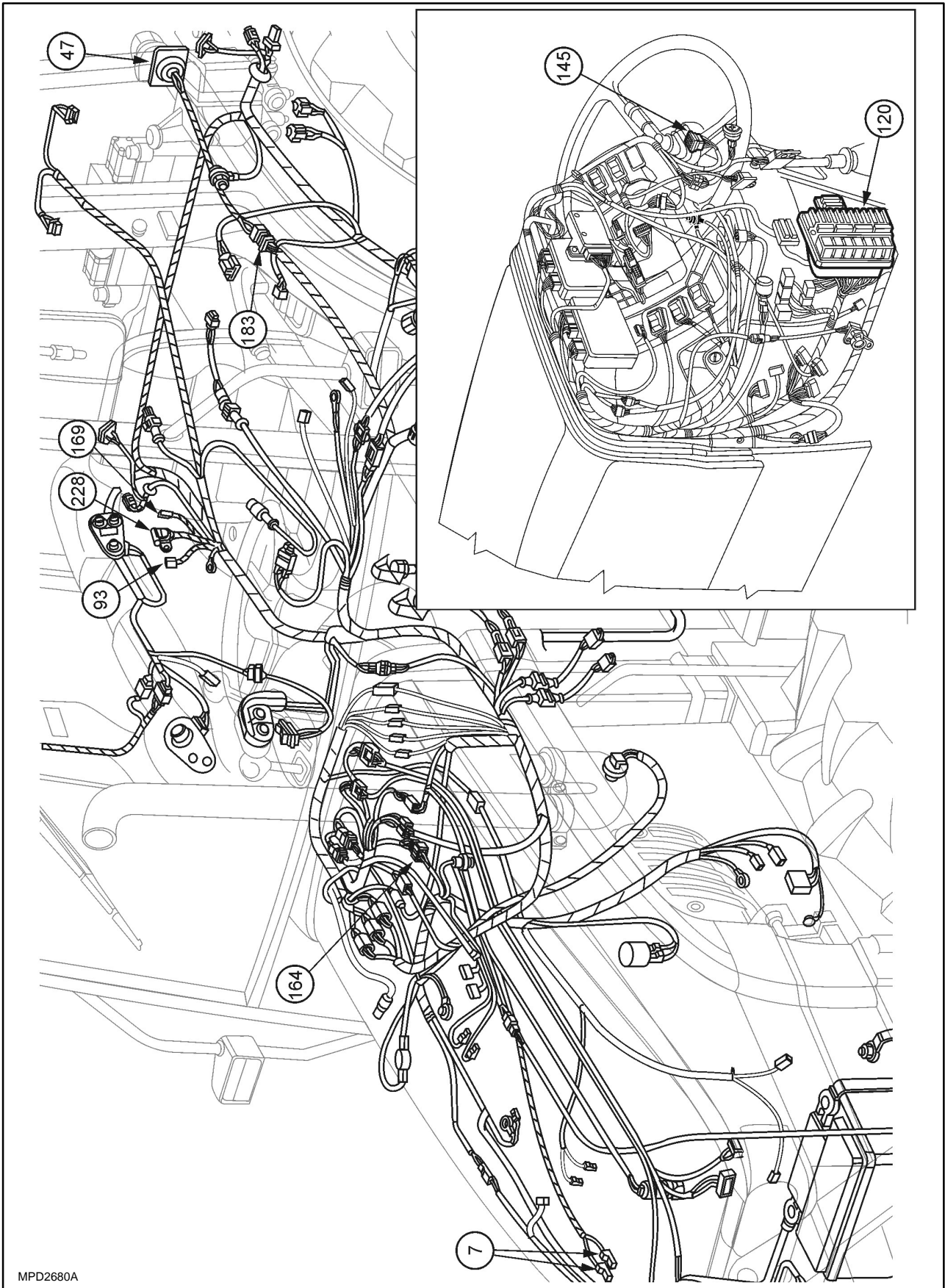
SUSPENDED AXLE CIRCUIT – DIAGRAM I





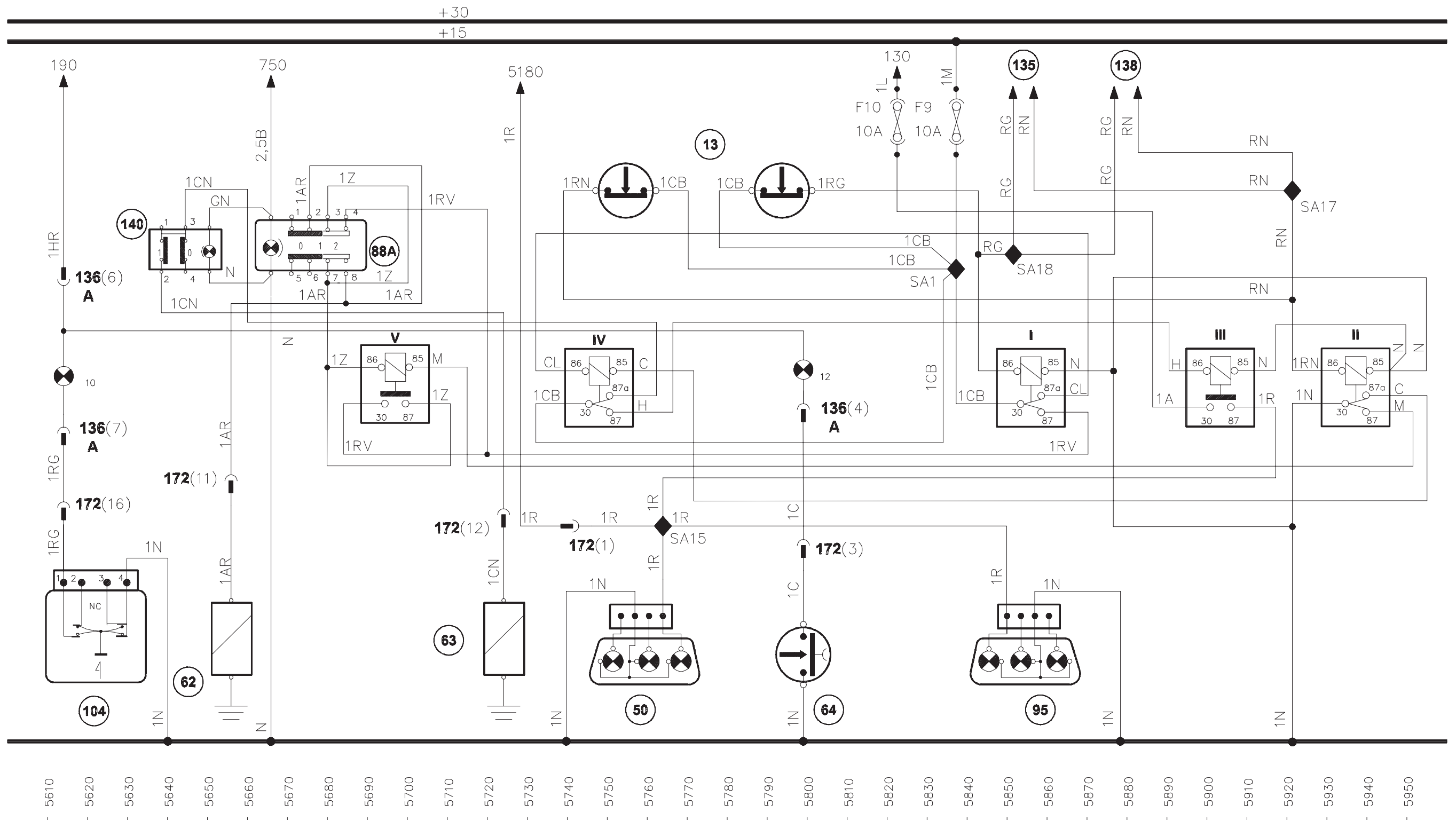


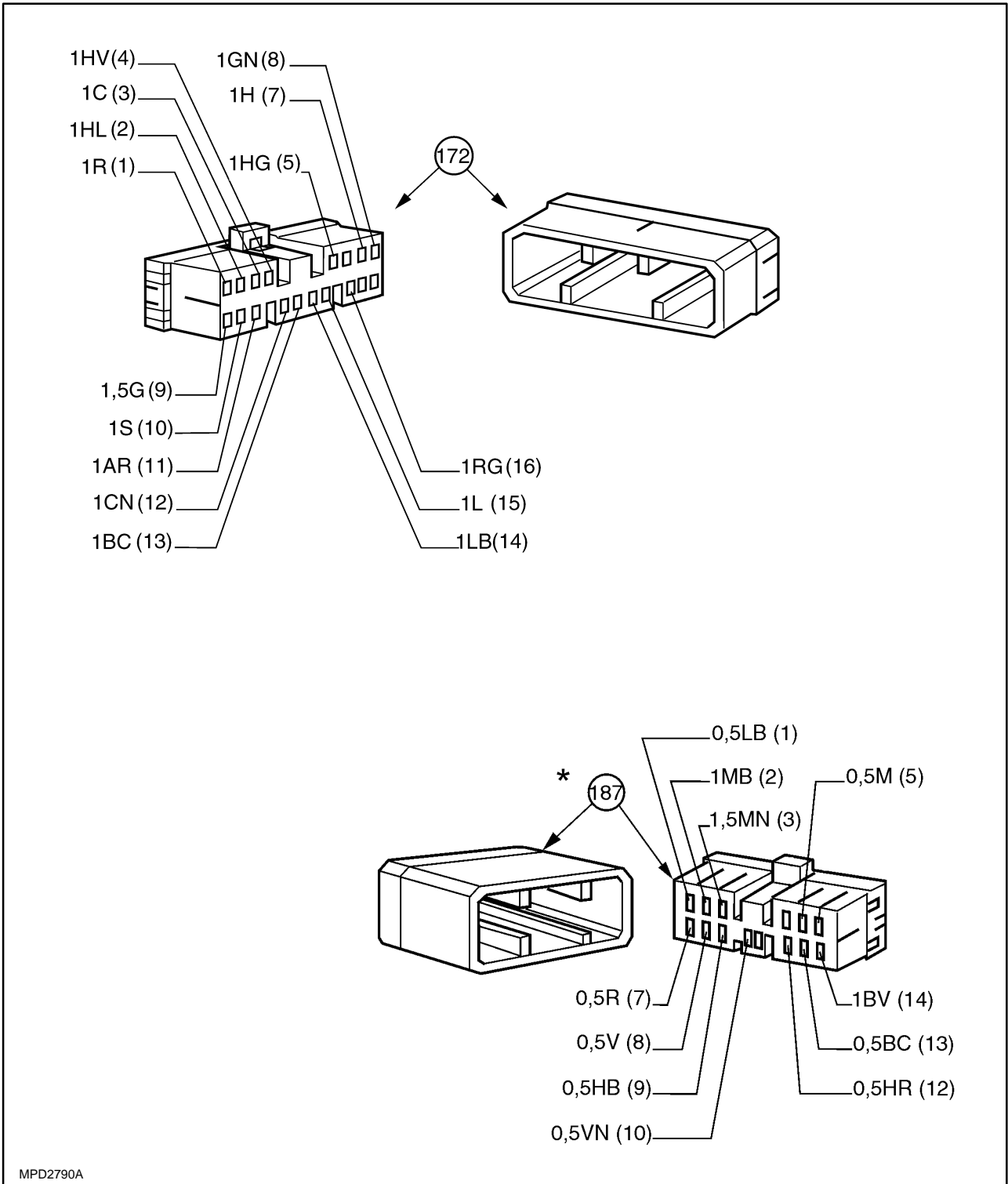
WIRING DIAGRAM O



MPD2680A

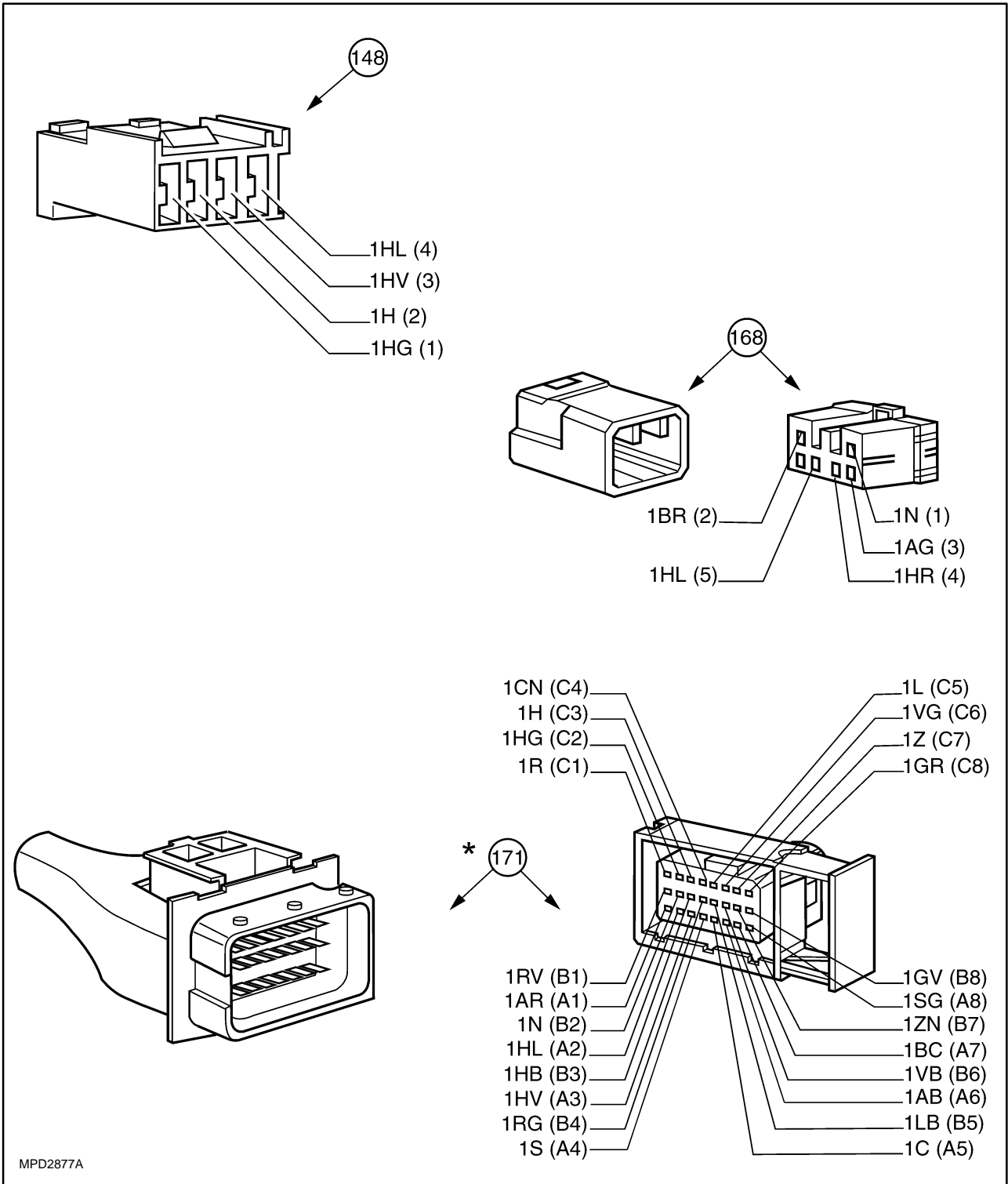
DIFFERENTIAL LOCK AND BRAKE LIGHTS CIRCUIT (Version with electrohydraulic 4WD) – DIAGRAM Q



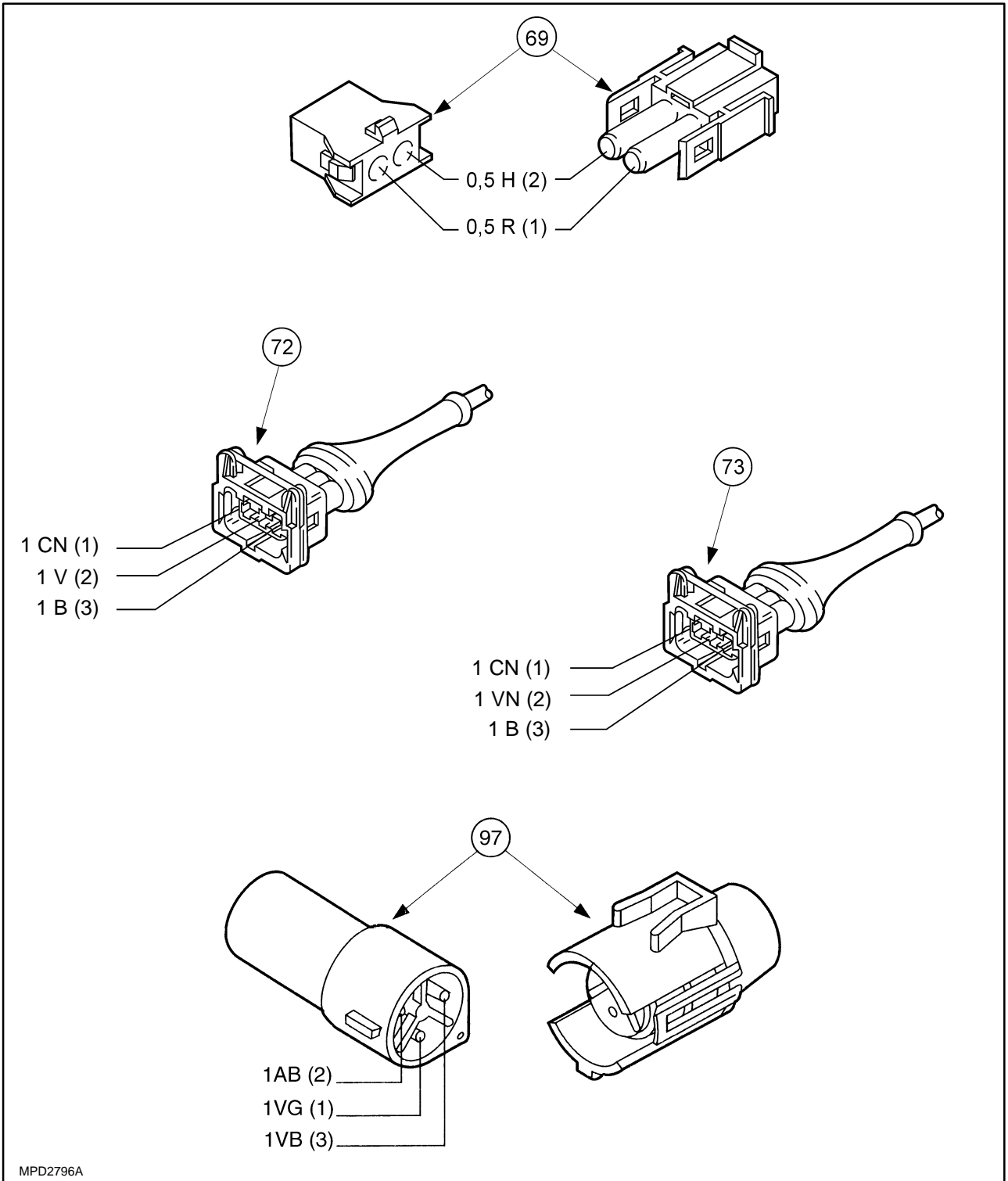


MPD2790A

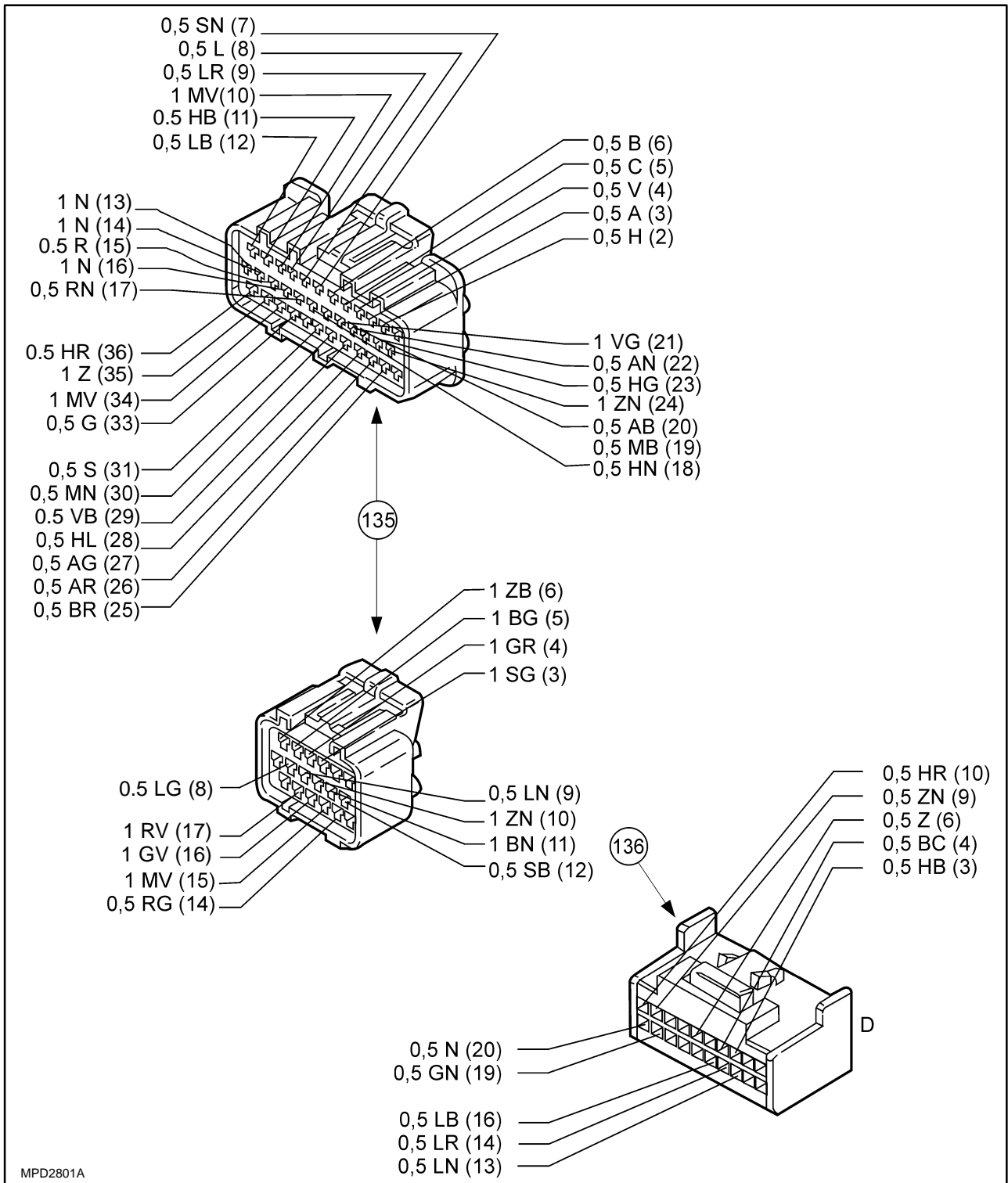
\* Only version with cab.



\* Version with electrohydraulic 4WD



MPD2796A



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