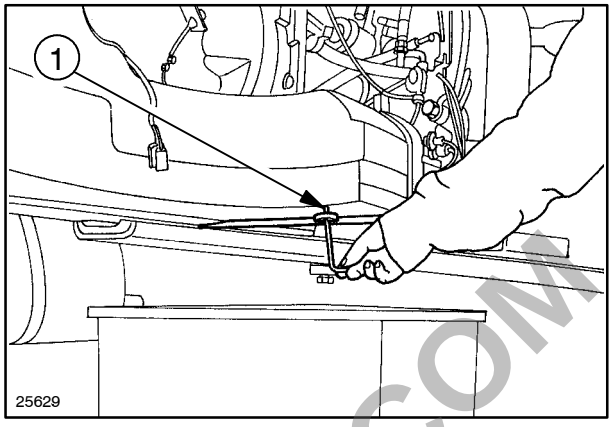
	Page	Date
Removal-Installation - coolant pump	92-93-94-95	01-04
Removal-Installation - thermostat valve	96-97	01-04
Removal - Installation Bosch injection pump	98-99-100	01-04
Bosch injection pump - timing	101-102	01-04
Bosch injection pump - air bleeding	103	01-04
Removal-Installation - injectors	104-105	01-04
Valve clearance adjustment	106-107	01-04
Coolant pump overhaul	108	01-04
Compression Test	109	11-96
18 - CLUTCH		
Data	1-2	01-04
Tightening torque - Tools	2	01-04
Cross-sectional views	3-4	01-04
Fault diagnosis	5	01-04
Removal-Installation - clutch	6-7-8-9-10	01-04
Clutch overhaul	11-12-13-14-15	01-04
Checks and measurements - clutch	16-17	01-04
Adjustments - clutch disengagement levers	17-18	01-04
Adjustments - clutch pedal	19	01-04
PTO clutch lever adjustment	20	01-04
PTO clutch servo control adjustment	21	01-04
PTO clutch servo control		
Cross-sectional views	22	01-04
Description and Operation	23-24	01-04
Servo control adjustment	25	01-04
PTO clutch engaged switch adjustment	26	01-04
21 - TRANSMISSIONS		
CHAPTER 1 - Transmission and range gear (16x16)		
Data	1-2	01-04
Tightening torques	2-3	01-04
Tools	4-5	01-04
Cross-sectional views	6-7-8-9-10	01-04
Description and Operation	11	01-04
Fault diagnosis	11-12	01-04
Removal-Installation - Rear transmission - gearbox casing	13-14-15-16-17-18-19-20-21-22-23-24	01-04
Disassembly-Assembly - transmission-gearbox casing	25-26-27-28-29-30-31-32	01-04
Gearbox driving and driven shafts end float adjustment.	33	01-04
Sealing compound application diagram	34	01-04
CHAPTER 2 - Mechanical transmission and splitter		
Data	1-2	01-04
Tightening torques	2	01-04
Tools	2	01-04
Cross-sectional views	3-4-5	01-04
Description and Operation	6	01-04
Fault diagnosis	7	01-04
Splitter device and creeper unit casing, shafts and bearings disassembly	8-9-10	01-04

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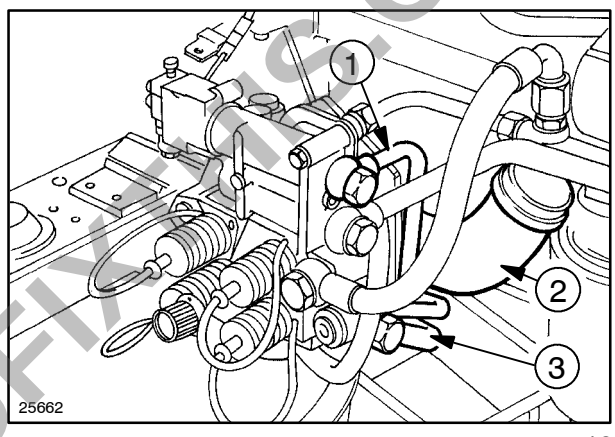
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14. Remove the drain plug (1) and retrieve the diesel in a suitable container.



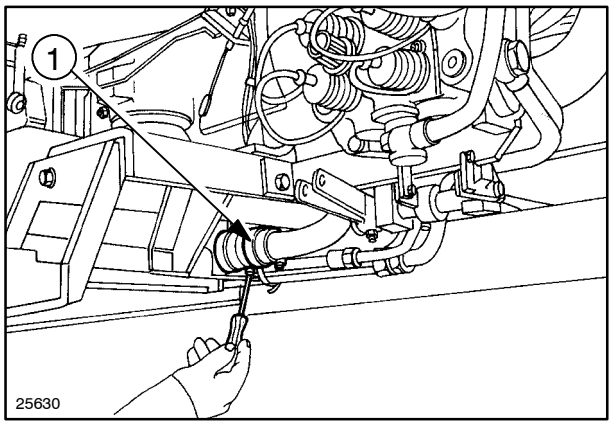
18

15. Disconnect the trailer brake control pipe (1) and the pipe (2) connecting the auxiliary control valves to the lift control valve.
16. Unscrew the clamp and disconnect the hydraulic pump inlet pipe (1).



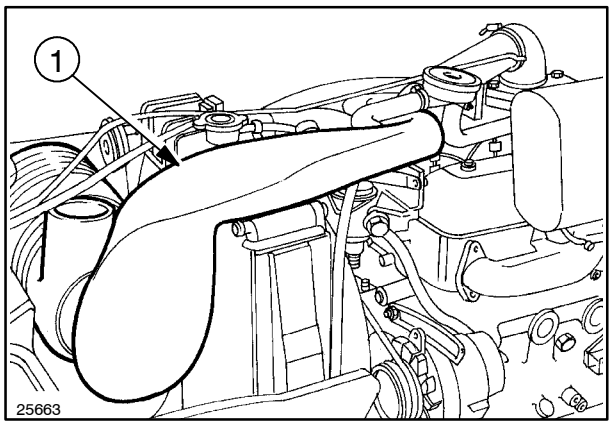
19

17. Loosen the clamp and detach the sleeve (1) from the relevant pipe, which you should then detach from the front tank and remove.



20

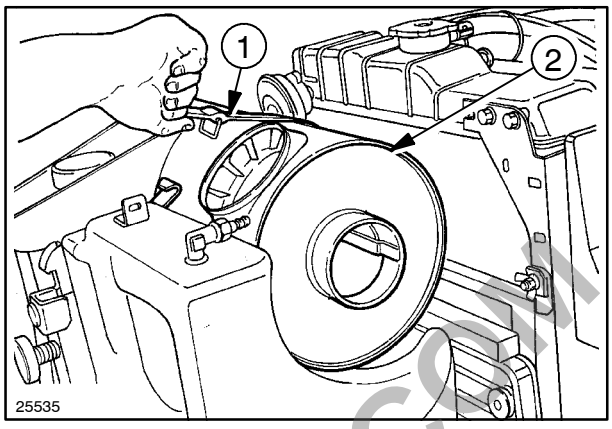
18. Unscrew the relevant clamps, detach the thermostarter connections and remove the sleeve (1) coupling the air filter to the intake manifold.



21

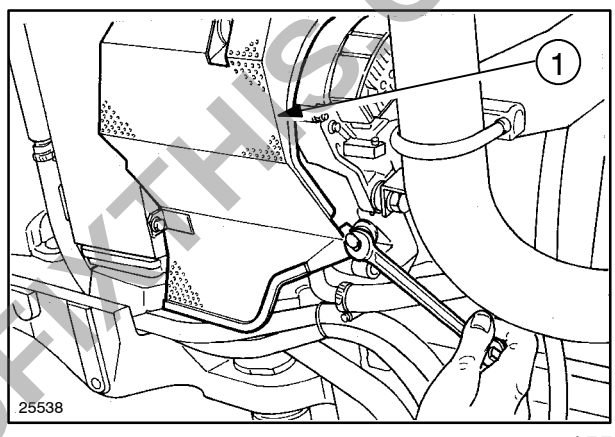
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4. Unhook the flexible belt (1) and remove the air filter (2).



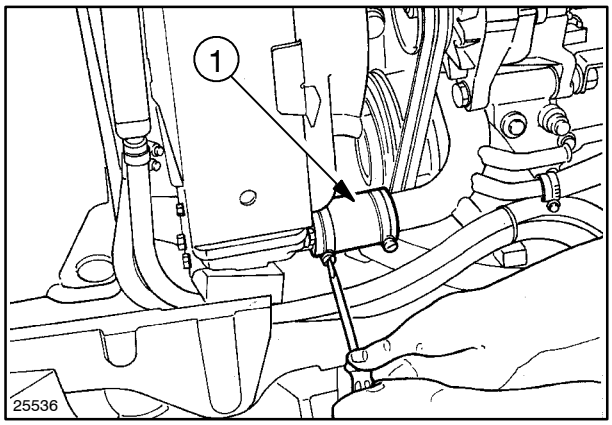
154

5. Take out the retaining bolts and remove the mesh guard (1). Carry out this operation on both sides.



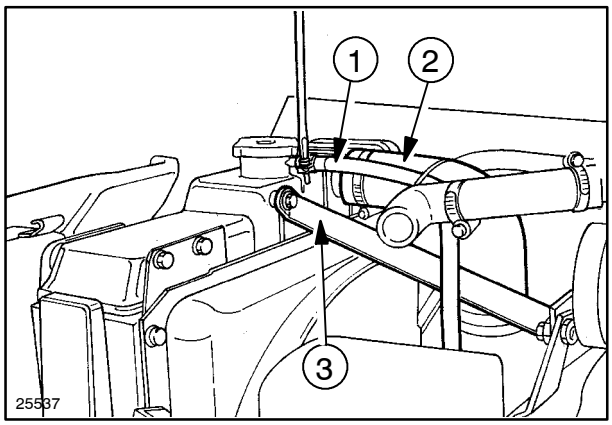
155

6. Drain off the coolant through the plug opening. Unscrew the clamps and disconnect the lower sleeve (1).



156

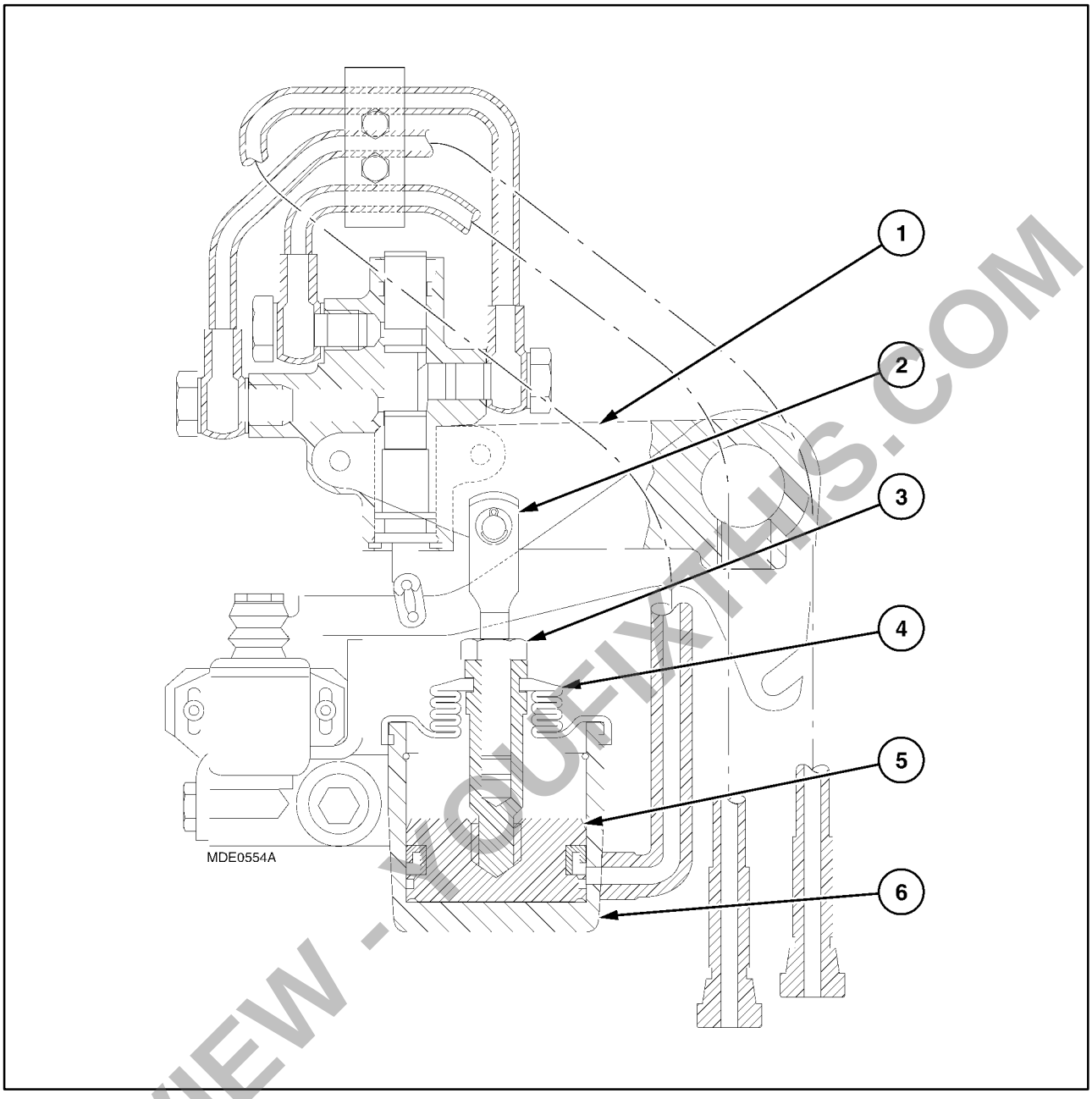
7. Unscrew the clamps and disconnect the upper sleeve (2) and the pipe (1) from the expansion tank. Unscrew the bolt securing the bracket (3) to the radiator.



157

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52

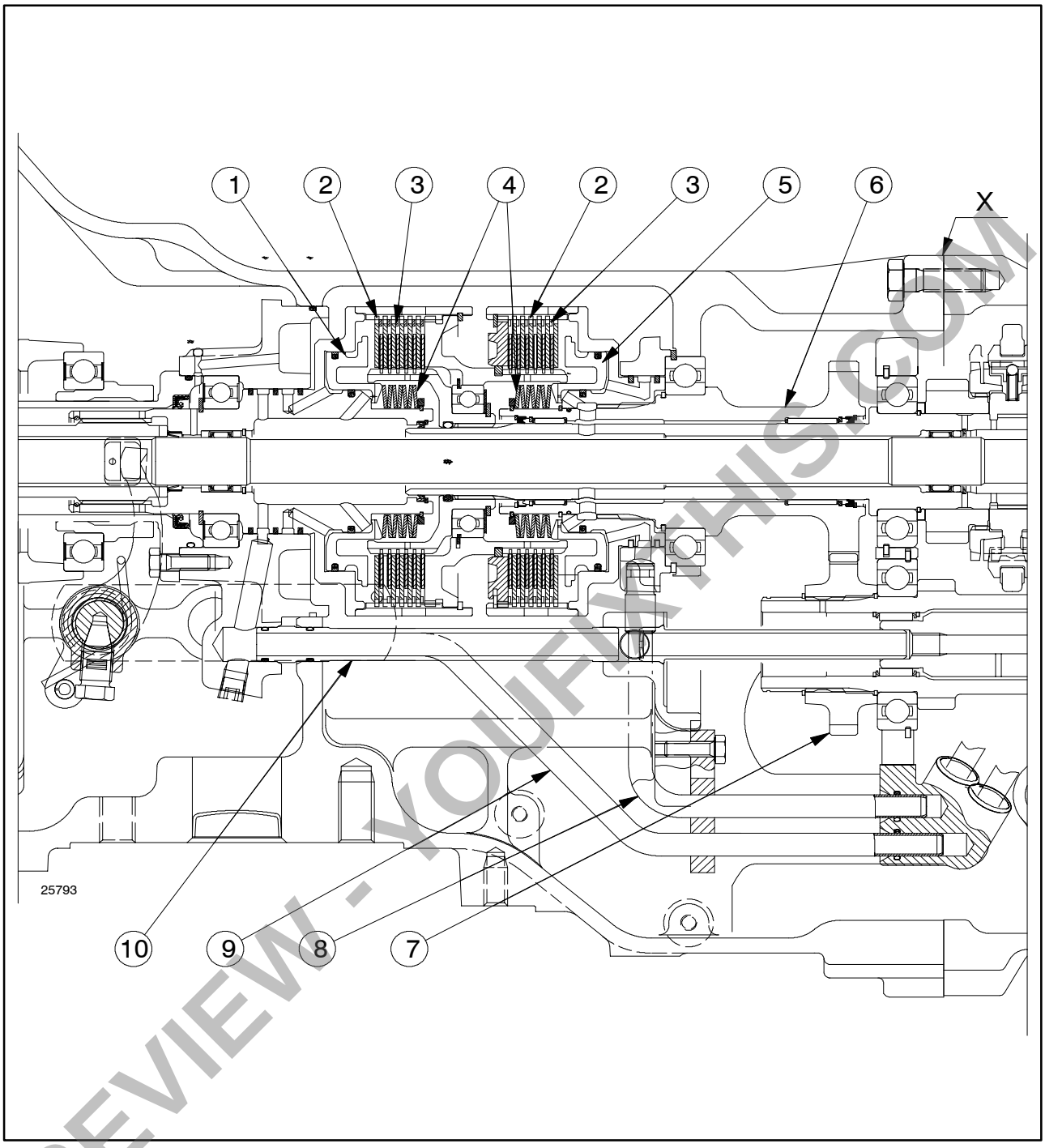
ADJUSTING THE PTO CLUTCH SERVO CONTROL

CAUTION

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

1. Detach the protective sleeve (4) from the fork pin (2) and unscrew the locknut (3).
2. Push the clutch lever (1) up.
3. Connect the fork (2) to the lever (1) by unscrewing the lever so that the control piston (5) goes against the bottom of the cylinder (6).
4. Unscrew the fork (2) one turn (1.25 mm) so that there is an internal clearance between the clutch control sleeve and levers.
5. Tighten the locknut (3) and attach the protective sleeve (4) to the fork pin (2).

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5

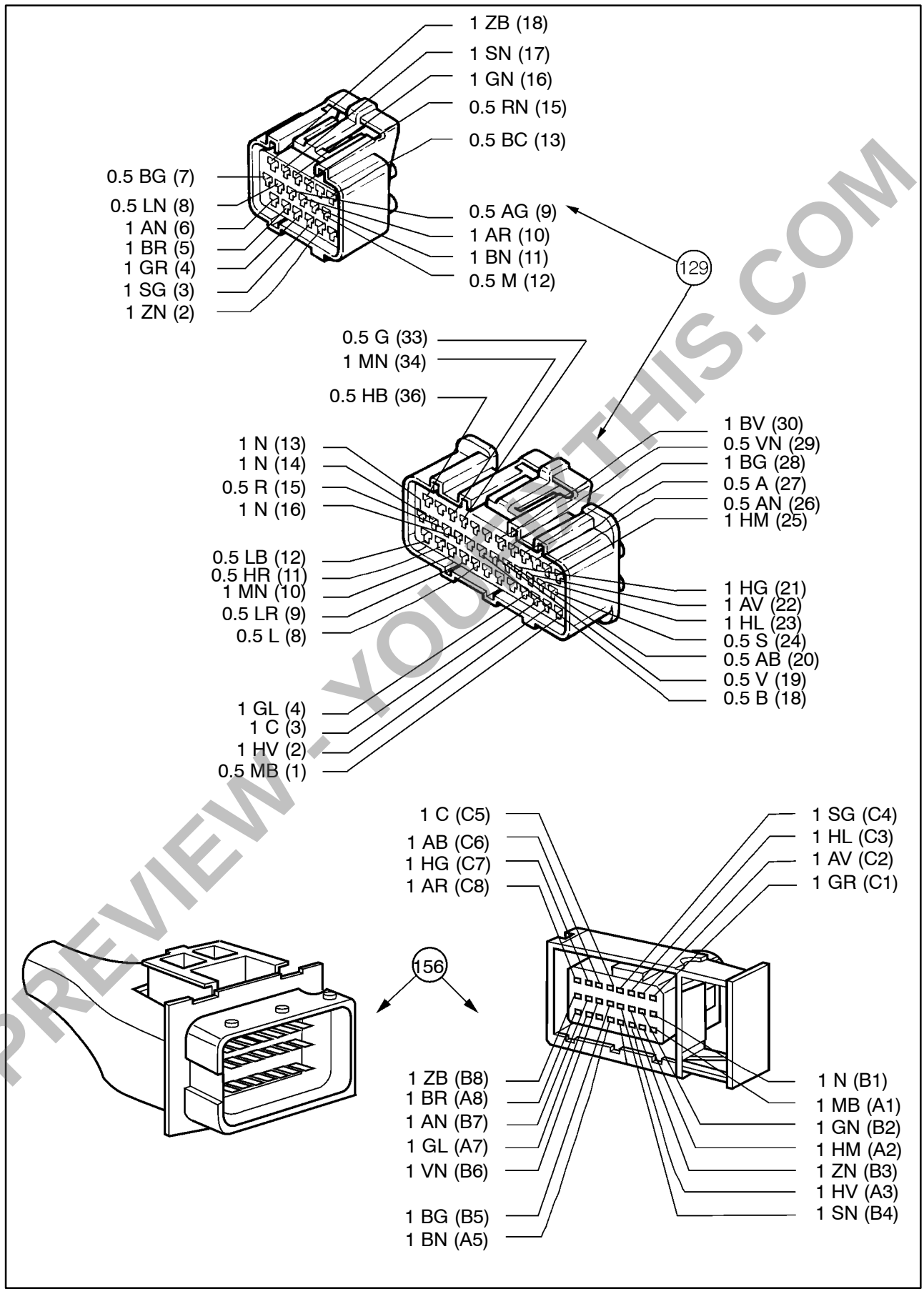
Longitudinal cross-sectional view of Power Shuttle gearbox

1. High speed and reverse clutch control piston.
2. Steel disks.
3. Friction disks.
4. Piston return Belleville washer.
5. Low speed clutch control piston.
6. Driving gear.
7. Driven gear.
8. Low speed clutch control pipes.
9. High speed and reverse clutch control pipes.
10. Lubrication control pipes.

Note - On assembly apply a bead of sealing compound to the surfaces **X** as indicated on page 34, chap. 1.

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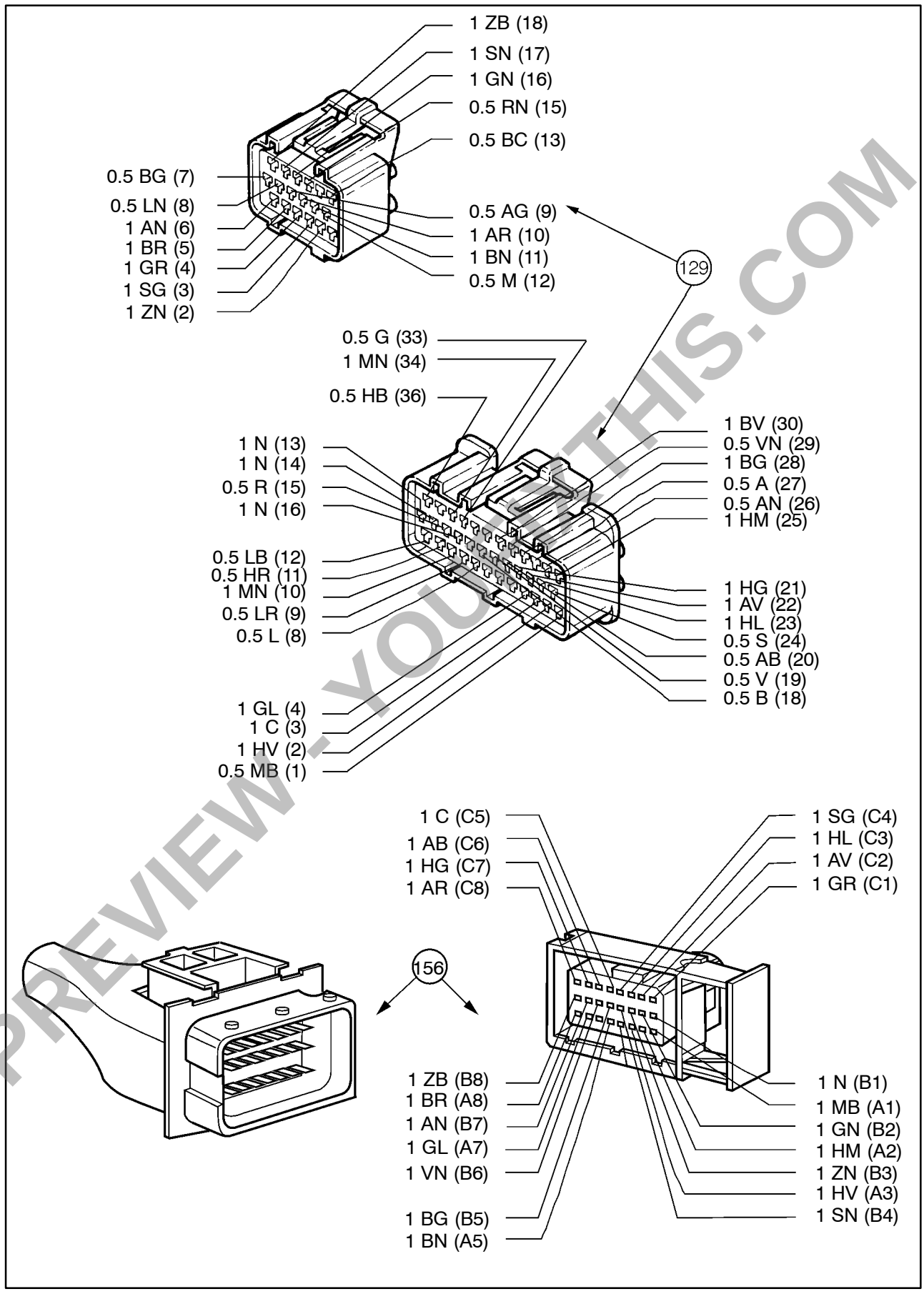
FAULT CODE 17



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FAULT CODE 52



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DESCRIPTION AND OPERATION

The drive gear housing is mounted below the rear transmission gearbox and is driven by the transmission shaft via gear unit (11, fig. 3).

Drive is then transmitted from the shaft (1) to the front axle by means of the propeller shaft that connects the two units.

Drive gear engagement and disengagement by means of the switch on the control panel. A light on the control panel illuminates when the drive gear is engaged.

ELECTROHYDRAULIC DRIVE GEAR TROUBLESHOOTING

Problems	Possible Causes	Solutions
4WD does not engage.	**1.** Drive gear engage/disengage switch faulty.	Replace differential lock switch.
	2. Solenoid valve control contactor faulty.	Check relay. Replace if necessary.
	3. Drive gear solenoid valve control jammed in delivery position.	Check solenoid valve. Replace if necessary.
	4. Spring (20, page 3) deformed.	Overhaul the unit.
4WD remains engaged.	**1.** Transmission oil level insufficient.	Top up oil level.
	2. Clogged oil filter.	Replace filter.
	3. Hydraulic pump faulty.	Overhaul or replace pump.
	4. Drive gear engage/disengage switch faulty.	Replace differential lock switch.
	5. No power at solenoid valve: connections loose or damaged, contactor defective.	Check electrical connections and replace defective parts.
	6. Drive gear solenoid valve control jammed in discharge position.	Overhaul or replace solenoid valve.
	7. Oil leakage through seals, leading to drop in pressure: hub, piston or delivery union seals, or drive gear shaft seal rings.	Replace all defective seals.
With electrohydraulic 4WD disengaged, drive cannot be engaged by operating the brake pedals.	**1.** Brake pump pressure switch faulty.	Replace the pressure switch.

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FAULT CODE 42

The steering sensor (O) is faulty or the relative wiring is in short to +12V (power supply).

The Four-wheel drive device, which should activate during a curve, does not work.

Turn the starter key to the OFF position.
Raise the bonnet.
Disconnect the two-way connection (SB) and (CN) the relative steering sensor.
With the wheels straight, measure the electrical resistance between the two pins (male) on the connection towards the sensor.
Is the resistance ~ 500 Ω?

NO ▶ Check the wiring and eliminate the cause of the short circuit.

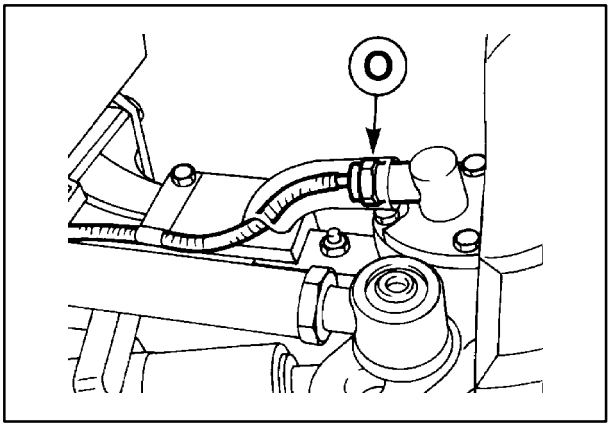
YES ▼

Turn the starter key to the ON position.
Remove the control panel and disconnect connection (130) on the ECU.
With the sensor connection disconnected, measure the voltage between pin CN28 (SB) on connection (130) and ground.
Is there a +12V reading?

NO ▶ Replace the ECU.

YES ▼

Check the wiring between pin CN28 (SB) on connection (130), pin (C5) (SB) on connection (156) and the connection on the steering sensor.
Eliminate the cause of the short circuit to +12V.



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FRONT AXLE DIFFERENTIAL

Overhaul (Op. 25 102 24)

In case of differential assembly overhaul it is necessary to adjust the backlash between the teeth of the planet pinions and side gears.
Proceed as follows.

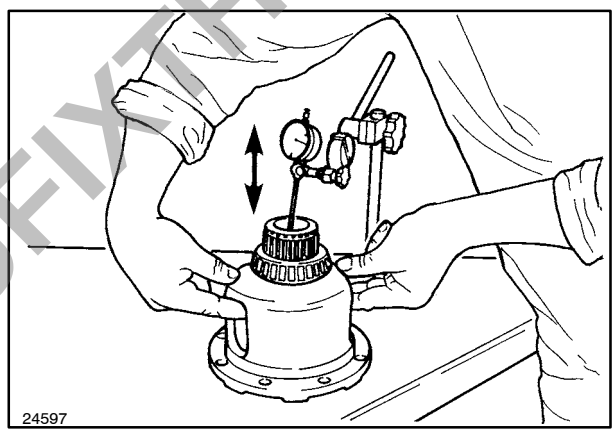
1. Thoroughly clean the components of the differential to remove any traces of oil that would otherwise prevent accurate backlash measurement.

2. Fit the two sun gears without thrust washers on the differential casing.

3. Fit the planet pinions complete with thrust washers and pins and screw down the pin retaining bolts by a few turns to hold the pins in place.

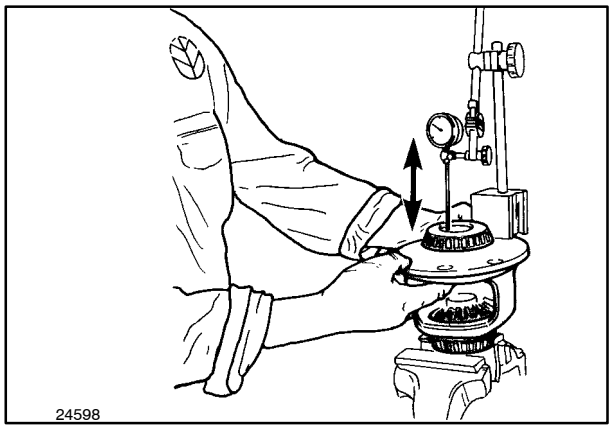
4. Position a dial gauge on the differential housing.

5. Move the left hand side gear to bring it into full contact with the planet pinion and then push it up against the differential housing, reading the endfloat (G_s) on the dial gauge.



98

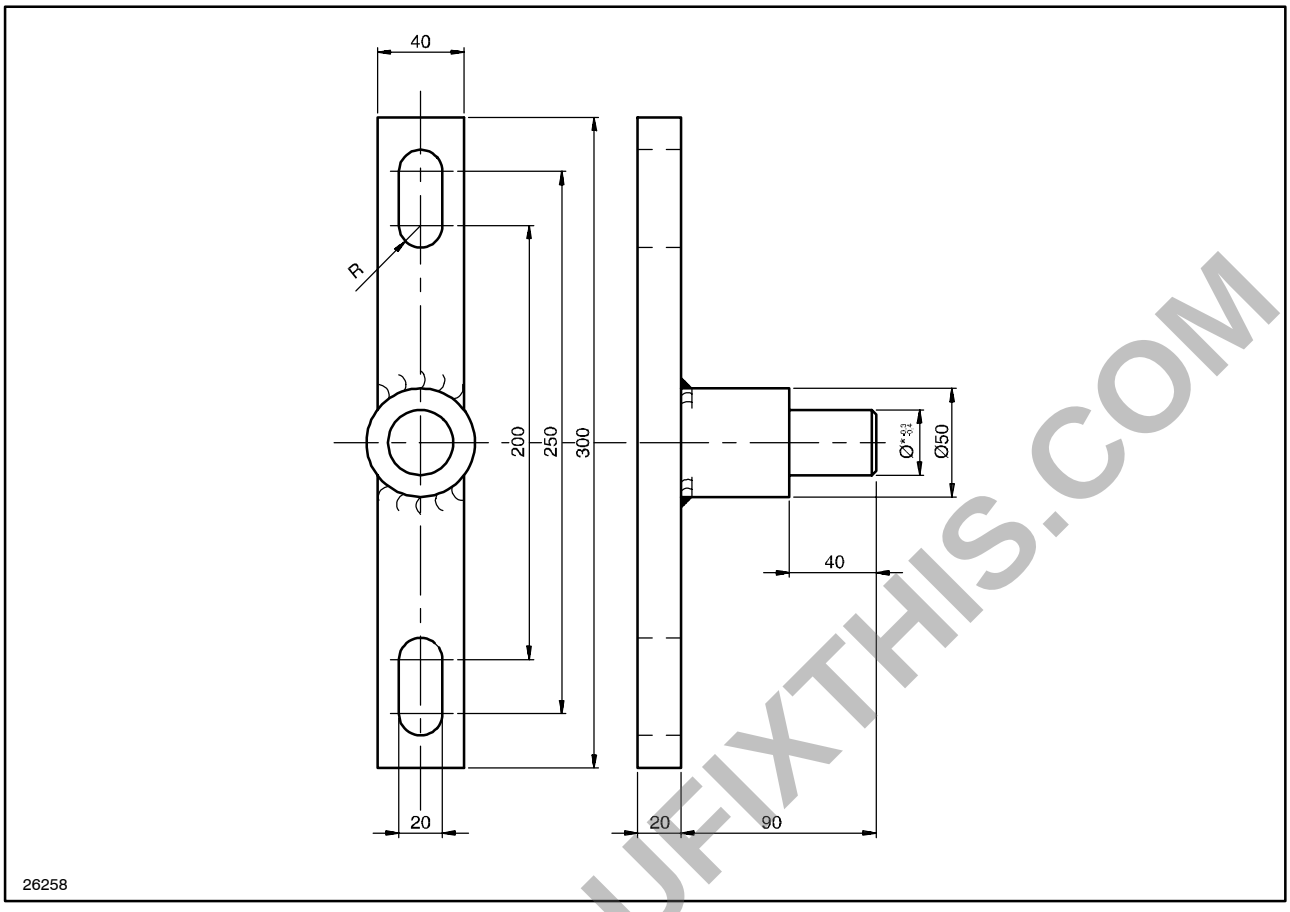
6. Repeat the above operations to measure the endfloat on the right hand side gear (G_d).
The normal backlash between the sides of the side gear and planet pinion teeth is **0.0059 in. (0.15 mm)**. Considering that between this value and the side gear endfloat there is an average ratio value of **1:1.7.**
The axial movement of the crown wheels corresponding to the normal clearance is:
0.0059 x 0.0669 = 0.0098 in.
(0.15 x 1.7 = 0.25 mm).
Therefore the rings to be inserted in the differential housing are given by:
$S_s = G_s$ - 0.0098 in. (0.25 mm) for the left-hand sun gear;
$S_d = G_d$ - 0.0098 in. (0.25 mm) for the right-hand sun gear;



99

7. Install shims as near as possible to the calculated value and, using a dial gauge and following the previously described procedure, check that the endfloat of the left- and right-hand sun gears is approximately 0.0098 in. (0.25 mm).

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6

Tool to be made for removal-installation of the final drives, to be used with a part of 50091. (Mark part with No. 50114 - Measurements in mm)

Construct in Fe 42 C material - (*) Define measurement according to the hydraulic jack seat.

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DESCRIPTION AND OPERATION

SERVICE BRAKES

The service brakes are hydraulically operated with oil bath disks.

The two control pumps (one for each pedal) are located in the front part of the cab and are connected to their respective pedals by means of two tie-rods.

These pumps can be operated individually or together. If operated together, the pedals are connected by a pin.

A connecting pipe between the two pumps ensures balanced braking, even when the brake disks are not equally worn.

The two control pumps are fed from a single reservoir positioned above the pumps.

The brake disks (one for each rear wheel) are located between the rear transmission casing and the final drive casing. The disks are splined on the differential drive shafts.

PARKING BRAKE

The parking brake is mechanically operated, by means of an intermediate gear on the rear bevel pinion shaft, and is controlled by a lever located on the left-hand side of the operator.

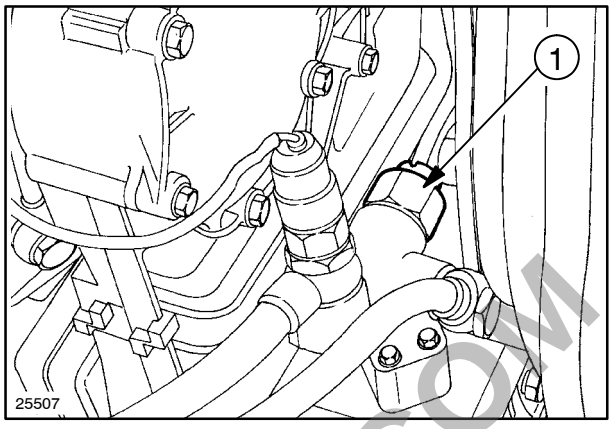
When the parking brake control lever is applied, the tie-rod acts on the external support lever and moves the braking sectors up against the three brake disks splined to the intermediate gear, thereby stopping the tractor.

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Op. 35 114 30
LIFT PRESSURE RELIEF VALVE
Removal-Installation

Proceed as follows.

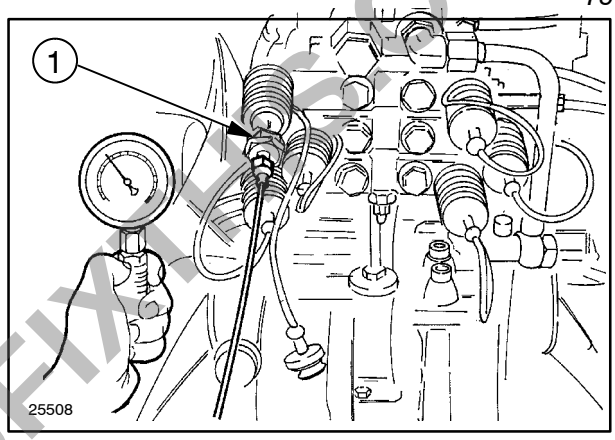
1. Remove the protective guard.
2. Remove the relief valve (1) and, if faulty, replace.
3. Re-position the protective guard.



79

Op. 35 114 32
LIFT PRESSURE RELIEF VALVE
Calibration

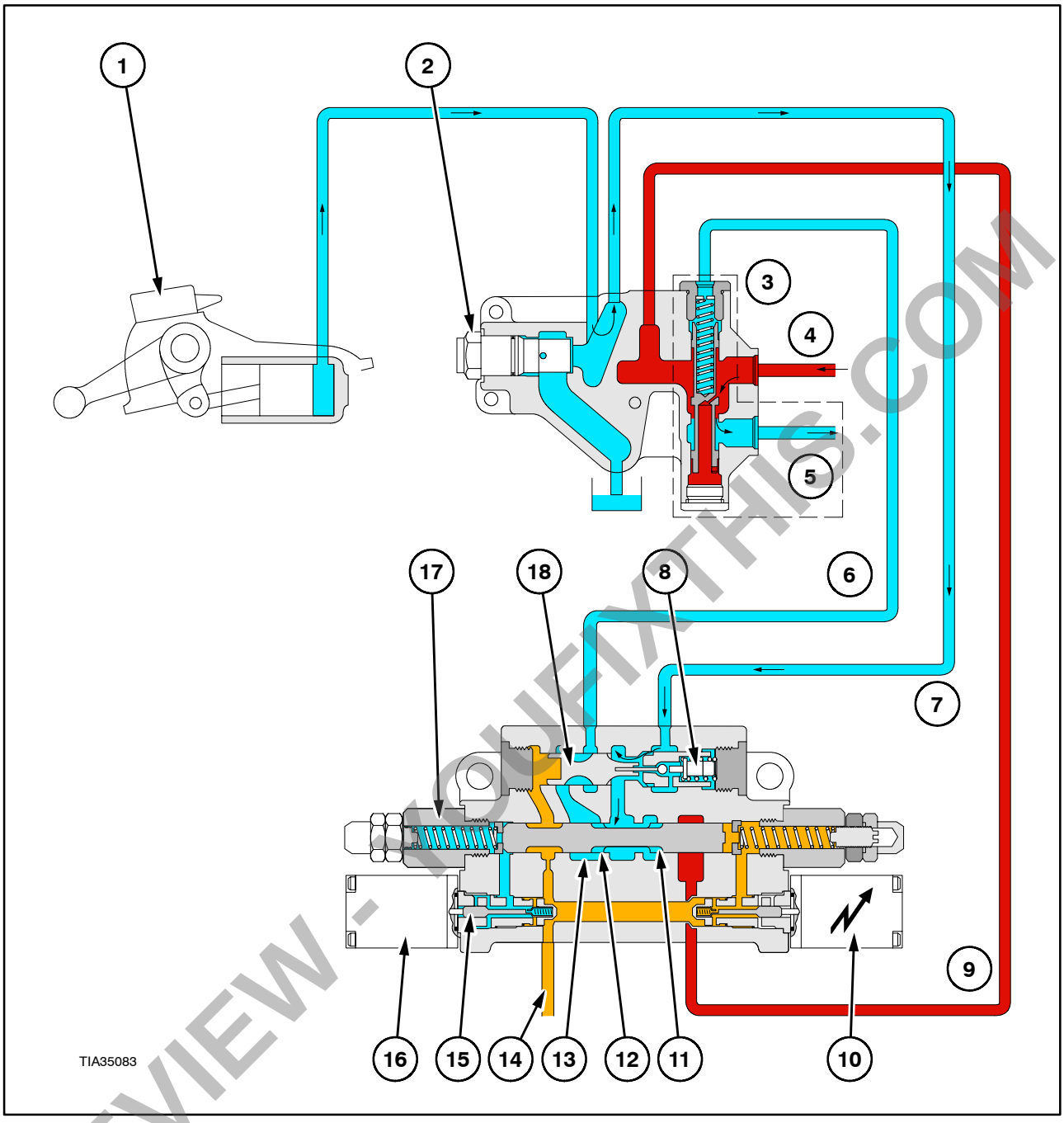
1. Run the engine until the oil in the system reaches a temperature of approximately 122 °F (50 °C).
2. Insert the union **380000554** (1) in a quick-fit female half-coupling and connect it to the 0 to 250 kg/cm2 scale pressure gauge, supplied with kit **380000240**.
3. Activate the half-coupling control valve block lever until the pressure relief valve cuts in.
4. With the engine running at medium speed the pressure gauge must show a pressure of about 2696 to 2769 psi (186 to 191 bar). If the valve setting does not correspond to the prescribed value, it is best to change it immediately. If necessary it can be adjusted by turning the threaded cap, using wrench **380000231**, tighten to increase the valve setting value or loosen to reduce the value.



80

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Electronic draft control functional diagram. Lowering phase

1. Hydraulic lift
2. Lift cylinder safety valve
3. Load maintaining valve
4. Hydraulic pump flow
5. Discharge in transmission casing
6. Load measuring line
7. To hydraulic lift
8. Non-return valve
9. Pump flow to hydraulic control valve
10. Solenoid valve (Lowering)
11. Control valve block pin infeed dosage device
12. Control valve block pin return to tank dosage device
13. Oil discharge hole
14. Low pressure circuit pilot pressure
15. Pilot valve
16. Solenoid valve (Lifting)
17. Control valve block pin centring spring
18. Lifting valve

Oil in delivery line from pump

Pilot oil at a pressure of 232 psi (16 bar)

Discharge oil

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FAULT CODE 16

The wiring on the draft sensor (1) is disconnected or in short to ground or the sensor is faulty.

The rear lift (EDC) does not work, but allows the implement hitch to be caught by means of the mixed control potentiometer in “position” control.

Turn the starter key to the OFF position.
Remove the rear right-hand wheel.
Is the draft sensor or wiring and connection damaged or disconnected?

NO → Disconnect the draft sensor connection.
Are pins (2 or 3) on connection (39) of the draft sensor in short?

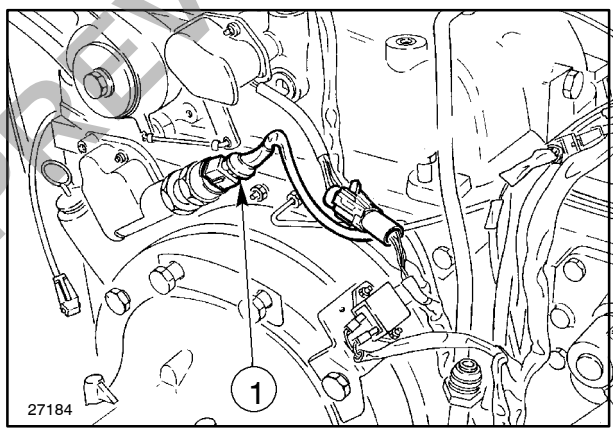
NO → Disconnect the control panel.
Is there electrical continuity on the following wires between connection (39) and connection (127) (ECU):
(39) pin (1) (VB) and pin CN2-29 (VB) (127);
(39) pin (2) (ZN) and pin CN2-24 (ZN) (127);
(39) pin (3) (Z) and pin CN2-35 (Z) (127)?

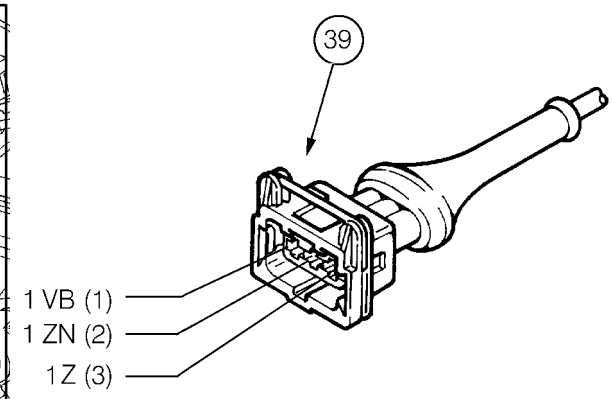
NO → Check the wiring, the connection (156) and eliminate the cause of the open circuit.
Does the fault persist?

YES → Replace the ECU.

YES → Check the wiring and eliminate the cause of the short circuit.
Does the fault persist?

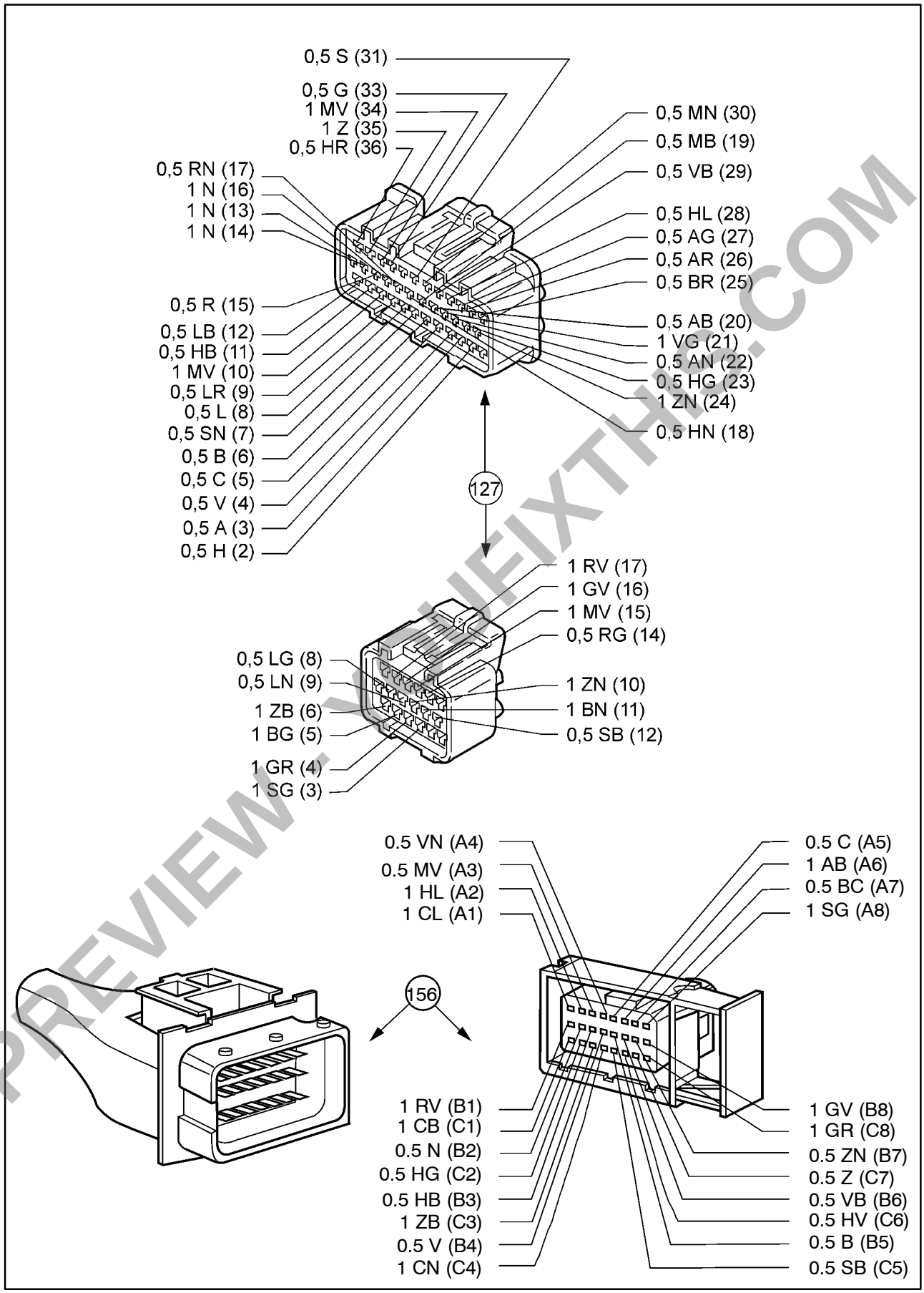
YES → Connect the connection.
or
Repair and/or replace the wiring.





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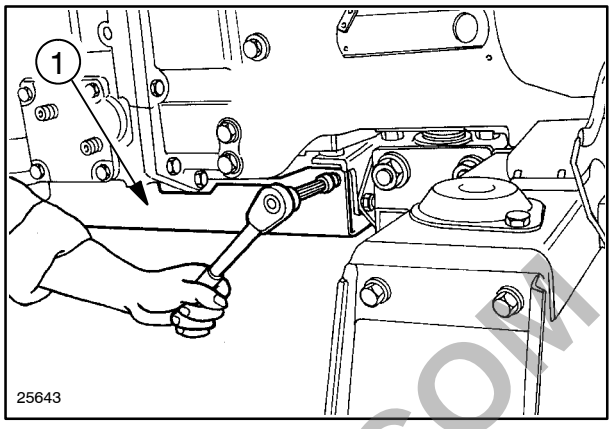
FAULT CODE 54



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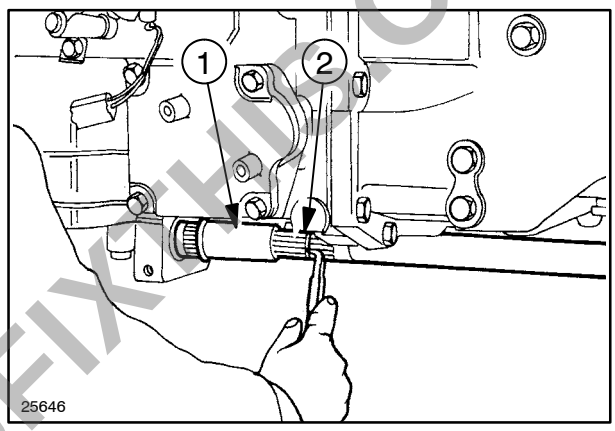
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22. Remove the retaining bolts and detach the rear guard (1).



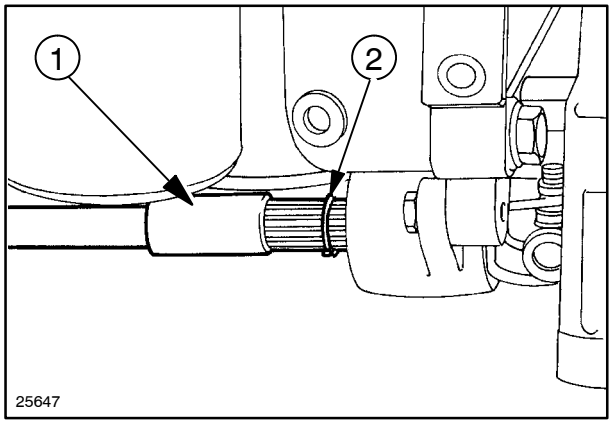
39

23. Remove the circlip (2) and move the rear sleeve forwards (1).



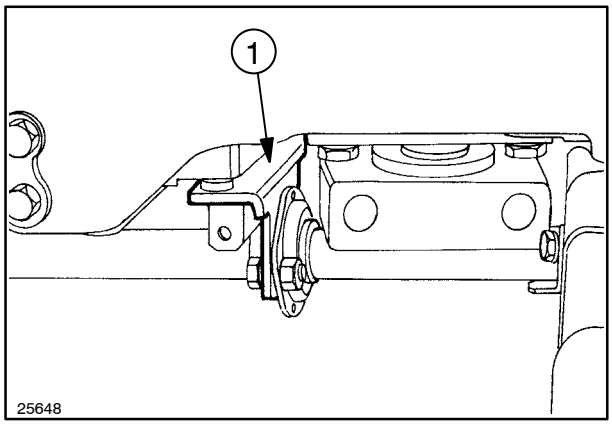
40

24. Remove the circlip (2) and move the front sleeve forwards (1).



41

25. Unscrew the bearing support retaining bolts (1) from the clutch box and remove the drive shaft and support.



42

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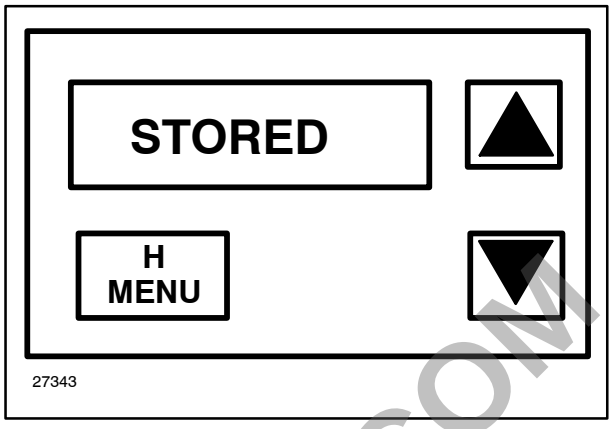
- Save the new configuration with key ▼, holding the key down until the display on instrument **380000282** shows the following sequence:

  STORE 5s
  STORE 4s
  STORE 3s
  STORE 2s
  STORE 1s

After 5 seconds, the display will show “STORED”.

STORED;

- If button ▼ is released whilst the instrument **380000282** is carrying out the countdown, the display will return to the selected mode.
- The only possible action is to turn the starter key to (1, fig. 105) position A (OFF).



115

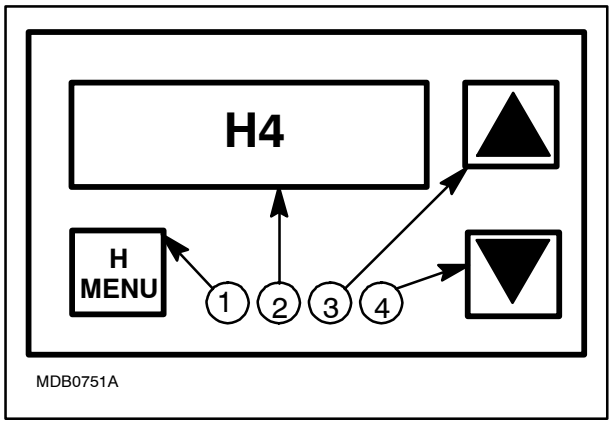
NOTE: *NONE mode selection results in ECU auto-configuration at the following start-up, follow the instructions shown on page 80 “FIRST START-UP”.*

NOTE: *Even if any of the available modes can be selected, incorrect mode selection can lead to an illuminated indicator fault or inefficient tractor operation.*

H4 - SOFTWARE REVISION LEVEL

The **H4** menu allows the software revision level present in the control unit to be displayed.

- Select the **H4** menu, as described on page 67, the display shows the following information.
  - Product identity **MB**
  - Software revision level (release) **00.01**
  - Hardware level **02.00**
  - Menu level **HHMENU**
- The parameters are shown in sequence, displayed for two seconds. After the last display, the module returns to the HH level.



116

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FAULT CODE 77

The lift arms maximum raise potentiometer (1) is not turned fully clockwise.

This fault can be displayed during lift arms calibration.

The front lift does not work and the fault prevents the front lift calibration operation.

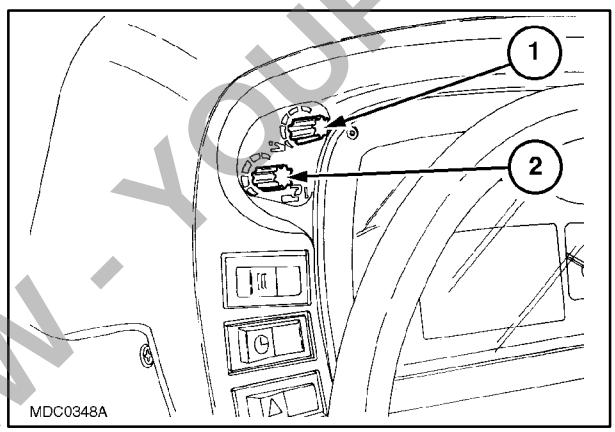
Turn the starter key to the OFF position.
Is the lift arms maximum raise potentiometer turned fully clockwise?

NO

Turn the potentiometer fully clockwise.
Does the fault persist?

YES

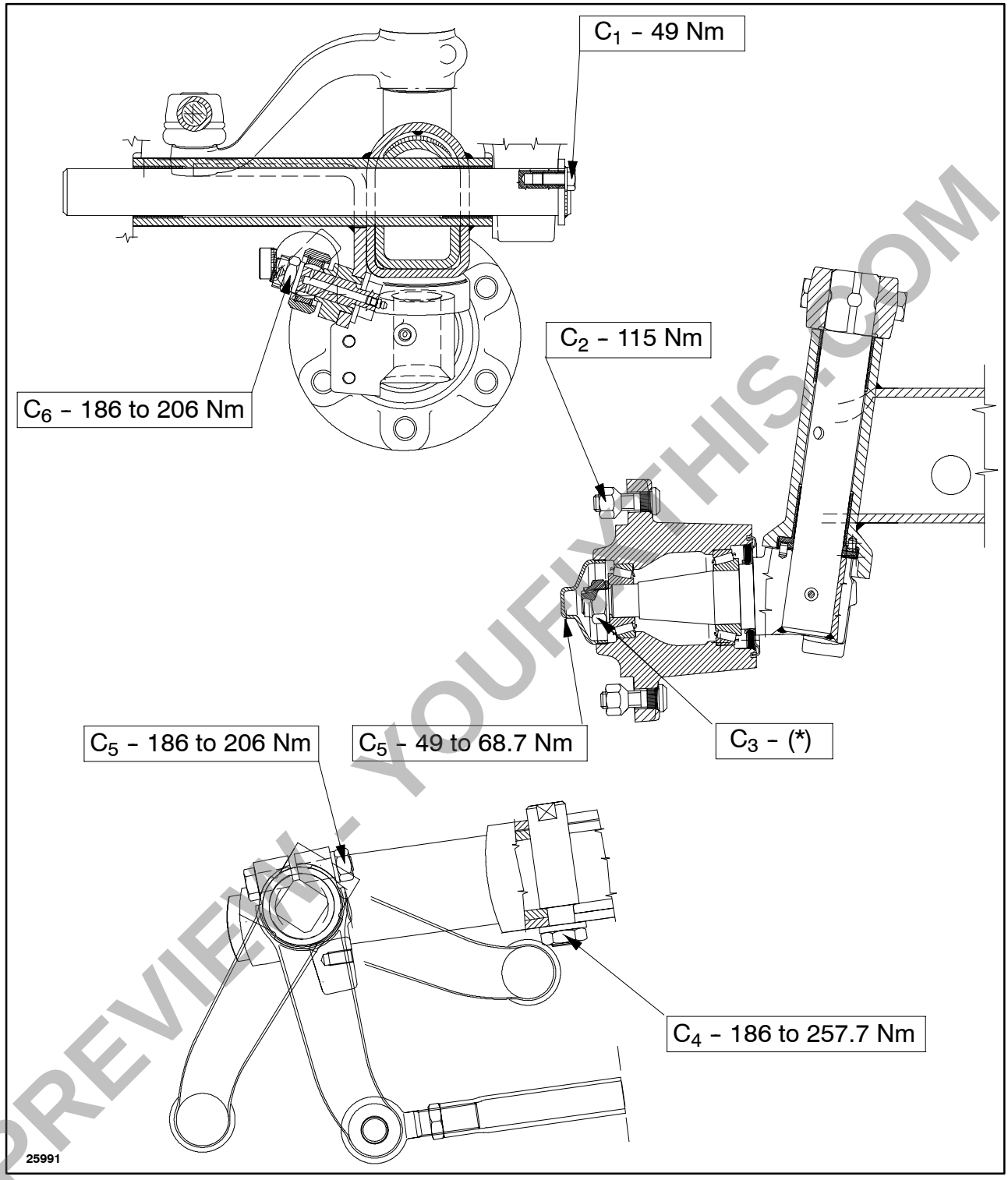
Replace potentiometer.



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TIGHTENING TORQUES



3

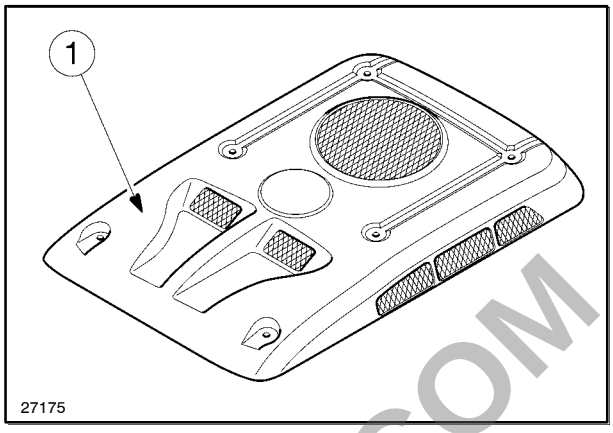
Torque settings - front axle wheel hub side

C1 Axle pivot pin retaining bolt
C2 Disk to hub retaining bolt
C3 Bearings adjuster nut
C4 Axle end retaining nut
C5 Cover for wheel hub bearing greasing
C6 Stub axle pin control lever retaining bolt nut
C7 Nut securing cylinder to fulcrum pin

(*) See operations 12 and 13, page 13

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14. Unscrew the six screws and remove the cab roof cover (1).



33

15. Remove the two hoses connected to the two rigid pipes (1) and the front retaining bracket.

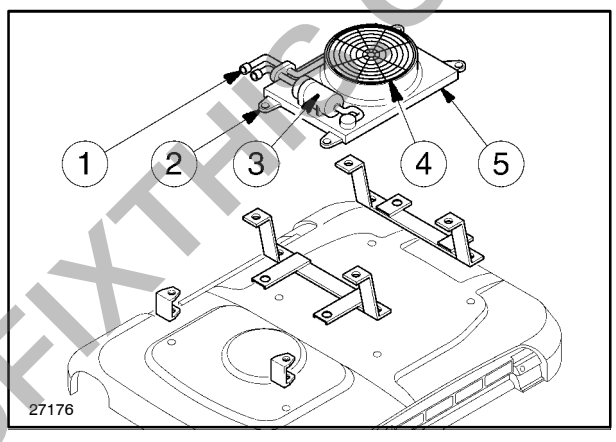
16. Disconnect the two electrical connections on the fan (4).

17. Unscrew the four retaining bolts and remove the cover (2) complete with fan (4) and filter (3), then remove the condenser (5).

18. From inside the cab, remove the two pipes connecting the compressor to the radiator expansion unit.

19. Remove the four condensate drain pipes and the two pipes connected to the heater radiator.

20. Take out the four retaining bolts (2) and remove the assembly containing the radiators of the heater and of the conditioning unit expansion device (1).



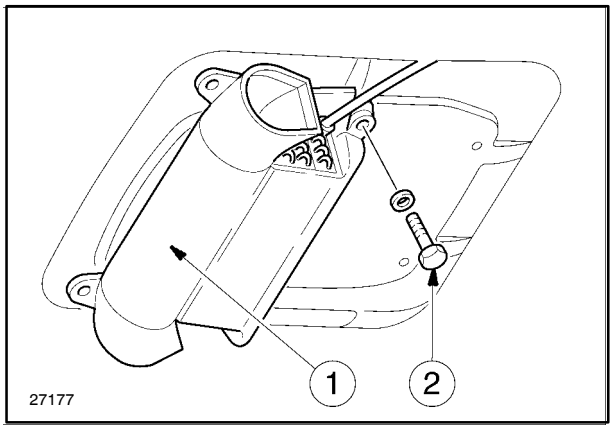
34

21. Take out the bolts on the heater-conditioner unit casing (1) and remove the radiators of the heater and air conditioning unit evaporator.

22. Remove the securing clamp and electric fan on the heater - conditioning unit.

23. Refit the heater-conditioner unit electric fan, securing in position with the clamp.

24. Fit the heater and evaporator radiators and the two half-casings, securing them with the screws.



35

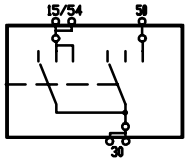
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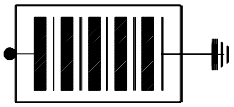
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SYMBOLS USED IN ELECTRICAL CIRCUITS



Starter switch



Battery



Fuse



Motor



Lights and warning indicators



Switch relay



Switch relay



Pressure switch/Sensor



Indicator switch



Speaker



Diode



Connection



Connection



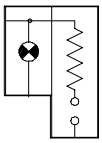
Cold starting aid (thermostarter)



Horn



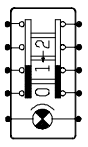
Variable resistor



Cigar lighter



Power socket

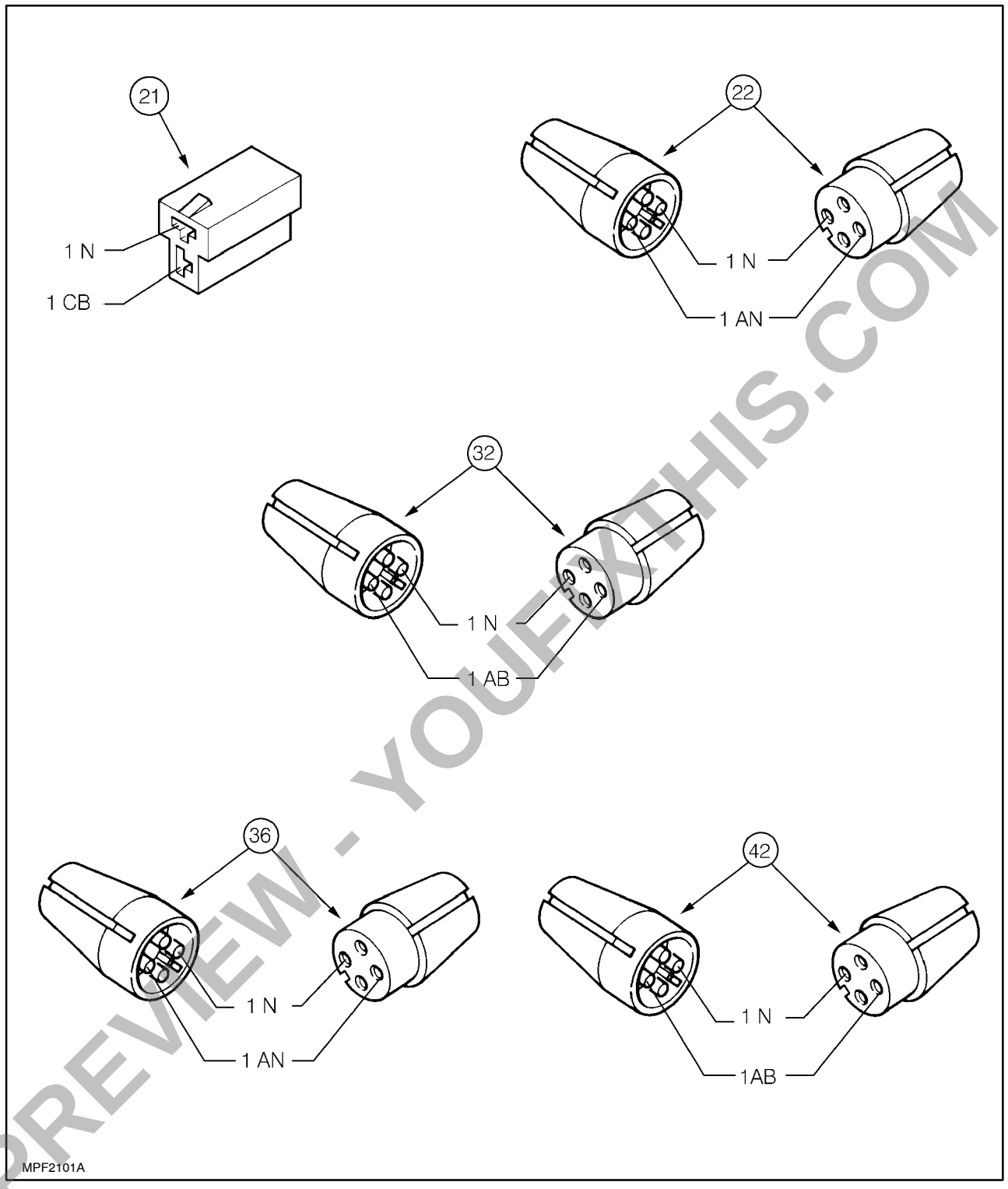


Control switch

MPD2703A

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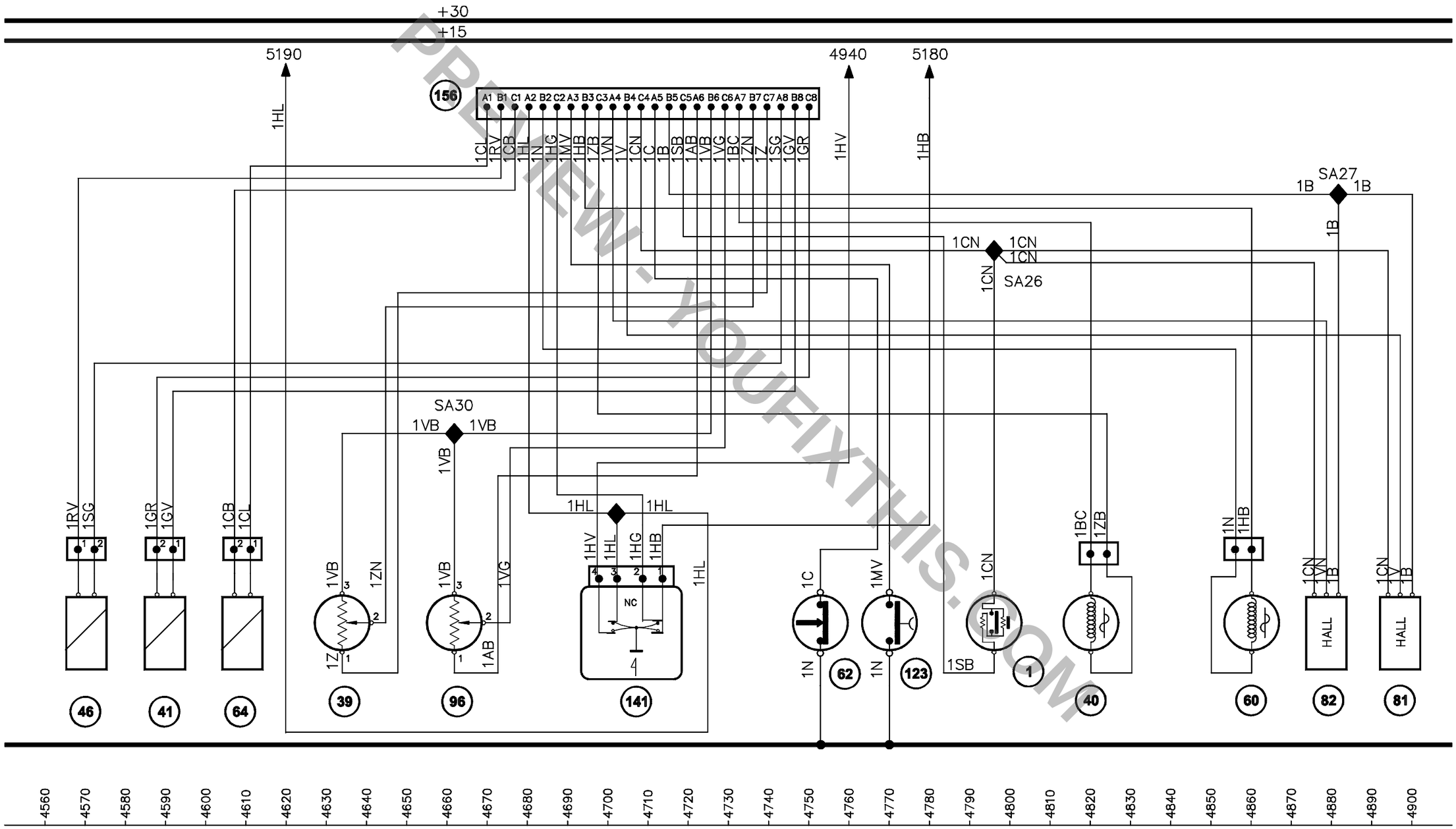
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47

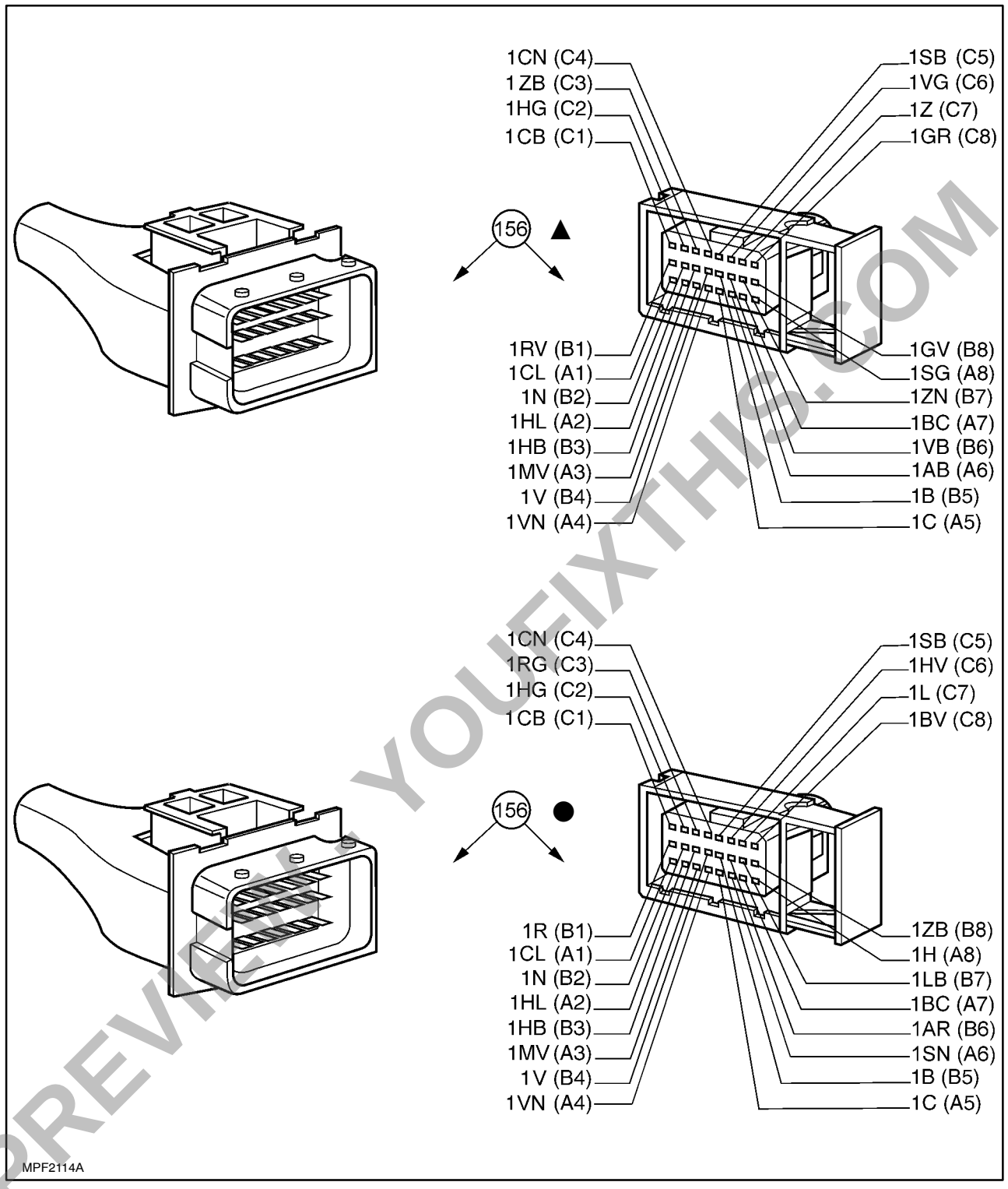
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TRANSMISSION CIRCUIT (VERSION WITH FOUR-WHEEL DRIVE AND ELECTRONIC LIFT) - DIAGRAM N/1



MPF1970A

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112

▲ Model with cab, 4WD version, electrohydraulic differential lock and electronic lift

● Standard transmission version

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