T5040, T5050, T5060, T5070 REPAIR MANUAL COMPLETE CONTENTS

The following pages are the collation of the contents pages from each section and chapter of the T5040, T5050, T5060, T5070 Repair manual. Complete Repair part # 84195945.

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

The sections listed above are the sections utilized for the T5040, T5050, T5060, T5070 Tractors.

84195947 1/09
Replaces 87758582

SECTION 33 – BRAKING SYSTEM

BOOK 3 - 87758577

Chapter 2 – Pneumatic Trailer Brakes

CONTENTS

SECTION 55 - ELECTRICAL SYSTEM

BOOK 4 - 87758578

Chapter 2 - Components

CONTENTS

SECTION 55 – ELECTRICAL SYSTEMS

BOOK 7 - 87758581

Chapter 9 - Fault Codes (Continued)

CONTENTS

GENERAL WORKSHOP TOOLS AND EQUIPMENT

It is essential that all tools and equipment are maintained in good condition and the correct safety equipment used where required.

Never use tools or equipment for any purpose other than that for which they were designed.

Never overload equipment such as hoists, jacks, axle and chassis stands or lifting slings. Damage caused by overloading is not always immediately apparent and may result in a fatal failure the next time that the equipment is used.

Do not use damaged or defective tools or equipment, particularly high speed equipment such as grinding wheels. A damaged grinding wheel can disintegrate without warning and cause serious injury.

Wear suitable eye protection when using grinding, chiselling or sand blasting equipment.

Wear a suitable breathing mask when using sand blasting equipment, working with asbestos based materials or using spraying equipment.

Glues - see Adhesives and Sealers.

High Pressure Air, Lubrication and Oil Test Equipment - see Lubricants and Greases.

Always keep high pressure equipment in good condition and regularly maintained, particularly at joints and unions.

Never direct a high pressure nozzle at the skin as the fluid may penetrate to the underlying tissue etc. and cause serious injury.

LEGAL ASPECTS

Many laws and regulations make requirements relating to health and safety in the use of materials and equipment in workshops.

Workshops should be familiar, in detail, with these and associated laws and regulations. Consult local factory inspectorate if in any doubt.

LUBRICANTS AND GREASES

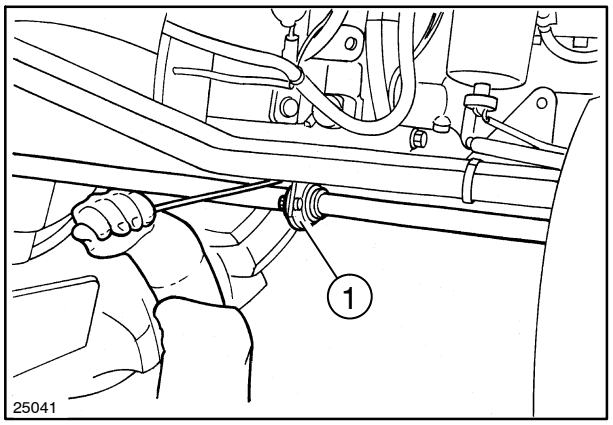
Avoid all prolonged and repeated contact with mineral oils, especially used oils. Used oils contaminated during service (e.g. routine service change sump oils) are more irritating and more likely to cause serious effects including skin cancer in the event of gross and prolonged skin contact.

Wash skin thoroughly after work involving oil. Proprietary hand cleaners may be of value provided they can be removed from the skin with water. Do not use petrol, paraffin or other solvents to remove oil from the skin.

Lubricants and greases may be slightly irritating to the eyes.

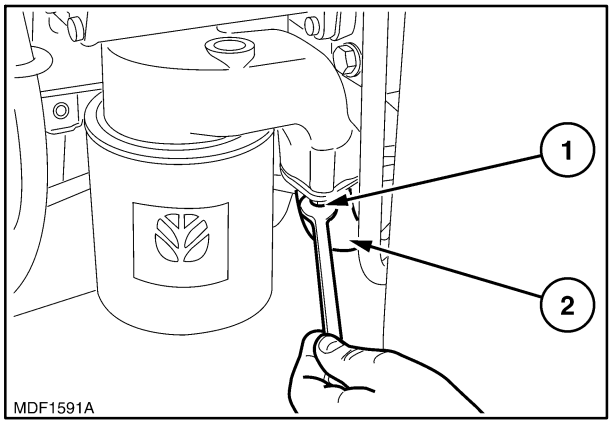
Repeated or prolonged skin contact should be avoided by wearing protective clothing if necessary. Particular care should be taken with used oils and greases containing lead. Do not allow work clothing to be contaminated with oil. Dry clean or launder such clothing at regular intervals. Discard oil soaked shoes.

12. Remove the propeller shaft central support (1) retaining bolts and extract the shaft together with the support.



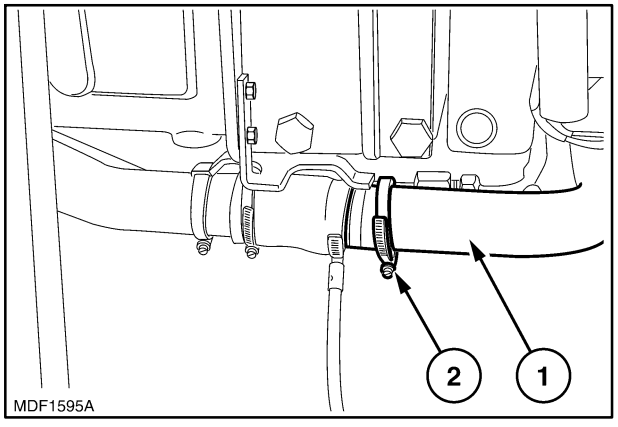
12

13. Remove the retaining bolts (1) of the draw pipe (2) of the lift pump.
    On the same side of the machine, on the left, unscrew the underlying oil pipes and, if there are clamps on them screwed onto the frame, unscrew them to free the pipes from the frame.
    a. Unscrew the nozzle oil delivery pipe on the high-pressure pump.
    b. On the power steering pump, unscrew the oil hose delivering oil to the power steering control valve.
    c. Again on the left-hand side behind the connection between the clutch casing and engine, on the control valve of the gearbox (if there is a hydraulic gearbox) or on the services control valve, unscrew the delivery and return pipes to the cooler and the supply pipe to the control valve.
    d. Still in the area of the latter, unscrew the second part of the front differential lock pipe.



13

14. Remove the two metal clamps (2) and the rigid pipe (1) for drawing oil from the transmission via the pumps of the lift and power steering, remove the pipe. On the same side of the machine, on the right, unscrew the underlying oil pipes and, if there are clamps on them screwed onto the frame, unscrew them to free the pipes from the frame.
    a. High pressure user supply pipe, remove the pipe.
    b. On the gearbox filter, remove the delivery to the gearbox control valve and extract the pipe, then remove the filter too.
    c. Again on the gearbox filter, remove the power steering outlet hose to the filter (in the case of the hydraulic transmission) or remove the supply pipe to the services control valve (in the case of the mechanical transmission) then remove the pipe.



14

Installation

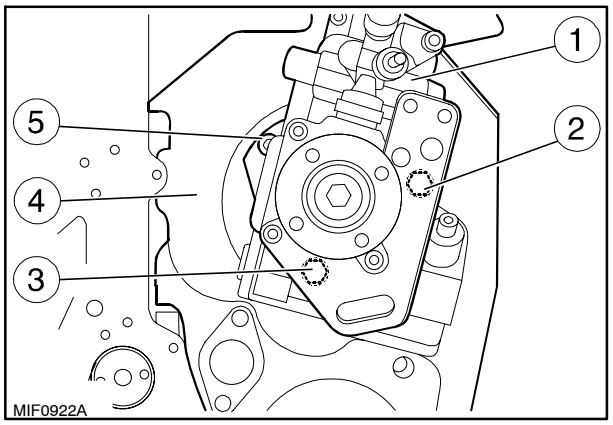
To install the engine, proceed as follows:

WARNING

Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

1. Respect the tightening torques prescribed on page 7.
2. Insert the three hooks of the chain in the eyelets on the engine and, using the hoist, lift the assembly off the platform support.
3. Position the engine on the front axle, trying to avoid incorrect operations with the hoist so as not to let the engine fan damage the fins of the radiator, then join the two assemblies together with the four retaining bolts.
4. Reposition the movable tool for dismantling tractors **380000569** under the engine and place a wooden block in between the point of contact between the tool and engine.
5. With the aid of the hoist, place the engine on the tool **380000569** and remove the lifting eyelet previously installed on the front of the engine.
6. Remove the fixed stand previously positioned under the support of the groove of the drive of the front axle and the wooden plug.
7. Remove the fixed U-bolt installed beforehand under the ballast support and the two wooden wedges locking the front wheels.
8. Remove the old sealing paste from the two surfaces between the engine and clutch casing.
9. Apply LOCTITE™ sealing compound on the engine/clutch casing contact surfaces.
10. Position wooden blocks under the rear wheels, make sure that the hand brake is fully applied and that all fixed and mobile stands are safely positioned.
11. The installation phase described here requires the presence of two or three workers to use the movable tool for dismantling tractors **380000569** to move the engine/front axle assembly close to the clutch casing.
12. In the phase of installing the engine/front axle assembly to the clutch casing, it is necessary to push on the front wheels, taking great care in the end phase of coupling over both the pipes and the cables/electrical connections to prevent crushing between the two bodies. During this phase, it is moreover necessary to turn the crankshaft with the aid of the radiator cooling fan to help the coupling between the sleeve and the drive shaft.
13. Secure both assemblies by tightening all the bolts locking the engine to the clutch casing.
14. Disconnect the hoist chains, remove the U-bolt previously installed under the clutch casing and recover the movable tool for dismantling tractors **380000569**.
15. Install the 4 plugs on the platform and install the footboard and, in the case of standard machines, install the lock pedal.
16. Install the two cabinets under the instrument panel with the 4 knobs.
17. Install the specific electric cable of the engine, bind it with the plastic clamps and with the related metal clamps, install the related plastic guards on the starter motor too.
18. Install the fan guard on the left-hand side.
19. Install the brake pipe support.
20. Install the two cylinder block / radiator connecting pipes, top and bottom, with the metal clamps.
21. Install the compressor as described in section 50 together with the pipes.
22. Install the condenser radiator together with the pipes and reconnect the top condenser retaining pin.
23. Install the dryer filter together with its support and piping, tightening the two retaining bolts.
24. Install the air / air cooler with the metal pipes and sleeves, tightening them with the metal clamps.
25. Install the air filter, ejector pipe, delivery pipe to the turbo with the pipe on the oil vapor recovery filter, and the air brakes compressor intake pipe (if installed), tighten the metal clamps, reconnect the electrical system to the clogged filter sensor.
26. Install the hood support, tightening the retaining bolts.
27. Install the support with the fuse-holder box on the hood support, tightening the two retaining bolts.
28. Install the support together with the relays protecting the system on the hood support, fitting the two retaining bolts.
29. Install the brake fluid reservoir onto the support and the two retaining clips.
30. Install the silencer together with the exhaust pipe.
31. Secure the silencer to the exhaust manifold with the four nuts and connect the air filter dust extractor pipe to the silencer exhaust, inserting the retaining clamp.

14. Remove the three nuts (2) (3) (5) securing the injection pump (1) to the engine flywheel casing (4) and extract it from its housing.



104

Installation

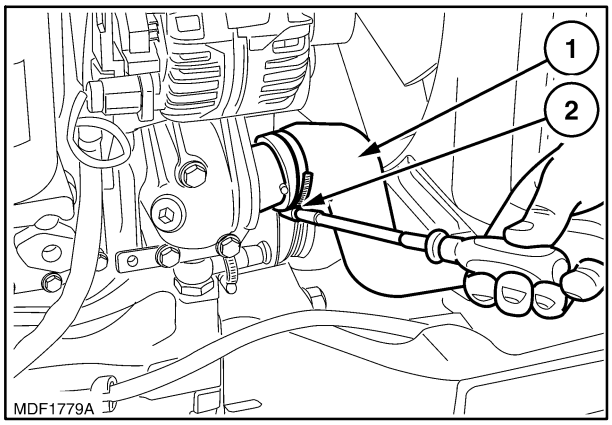
To refit the injection pump, proceed as follows:

WARNING

Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

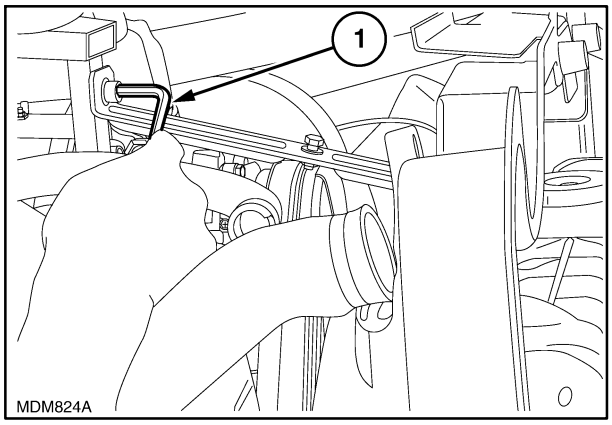
1. Respect the tightening torques prescribed on page 7.
2. When installing the BOSCH injection pump, insert the stud bolts in the engine flywheel casing into the mating holes on the pump flanging.
3. Do the timing for the injection pump in relation to the drive gear, proceeding as described on page 57.
4. Then loosen the retaining and safety bolt of the injection pump timing.
5. Reinsert the **L** spacer and tighten the retaining bolts.
6. Free the engine flywheel, take out the tools **380000988** and **380000732** and install the starter motor.
7. Reconnect the pipes and the fittings of the diesel delivery pipes to the injectors and the fittings of the diesel return pipe to the injection pump.
8. Install the three retaining brackets, insert the pipes on the line that connect the injection pump to the injectors, tightening the retaining bolts.
9. Reconnect the four pipes connecting the injection pump / injectors, tightening their fittings.
10. Reconnect the electrical connection for measuring the engine oil pressure.
11. Install the fittings of the pipes connecting the injection pump-injectors, the pipe connected to the thermostarter device and the electrical connection of the engine stop device.

19. Loosen the retaining clamp (2) and extract the pipe (1) joining the coolant pump to the bottom of the radiator.



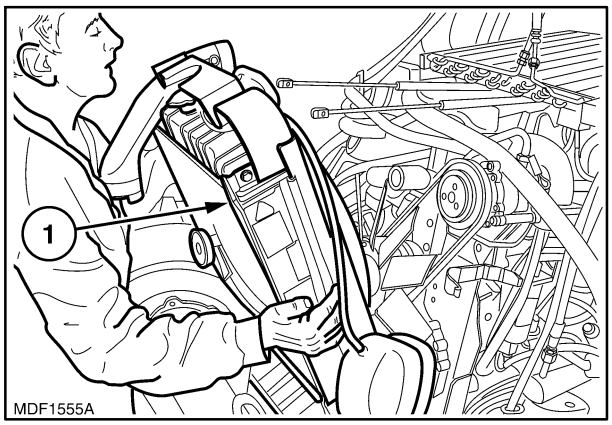
151

20. Remove the radiator / hood support bracket retaining bolts (1).



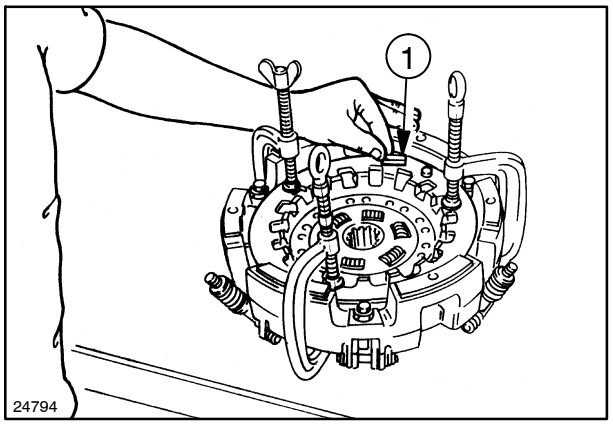
152

21. Take out the two radiator retaining bolts installed under the front axle support, removing the bolts, washers and lower rubber blocks.
22. Remove the radiator (1).



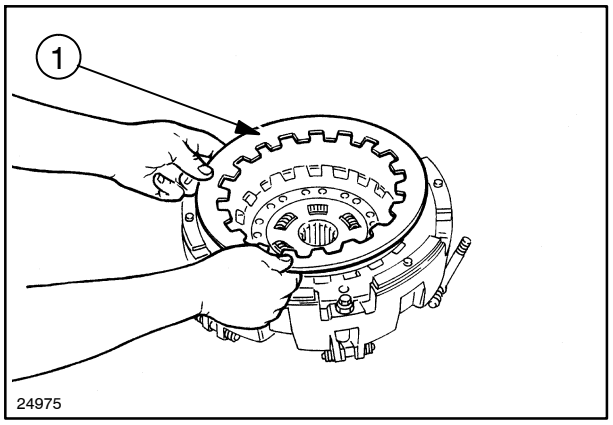
153

4. Extract the six spring retaining pins (1) from their seats.



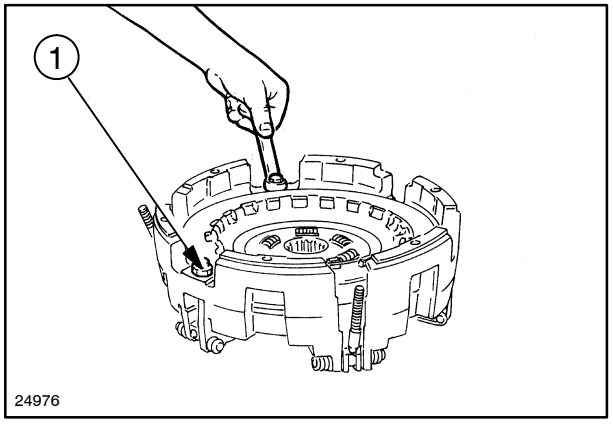
16

5. Remove the three clamps and extract the Belleville spring disk (1).



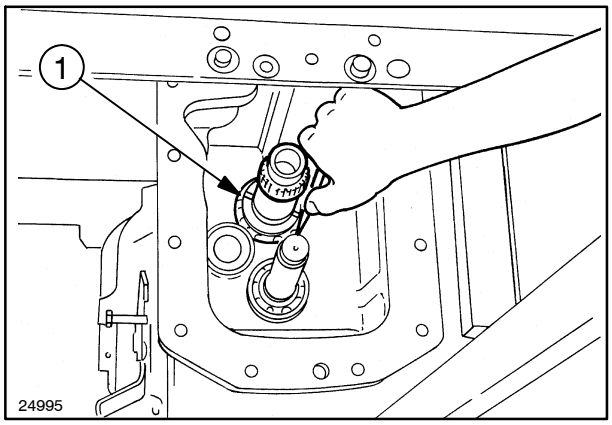
17

6. Loosen the three locknuts (1) on the main clutch lever adjustment screws.



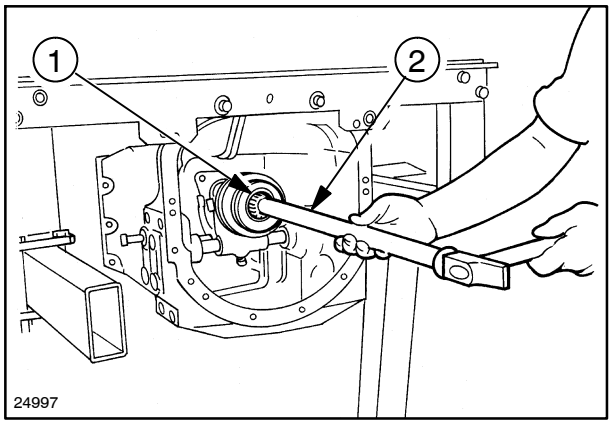
18

6. Remove the circlip (1) retaining the bearing and fixing the reverser driving shaft.



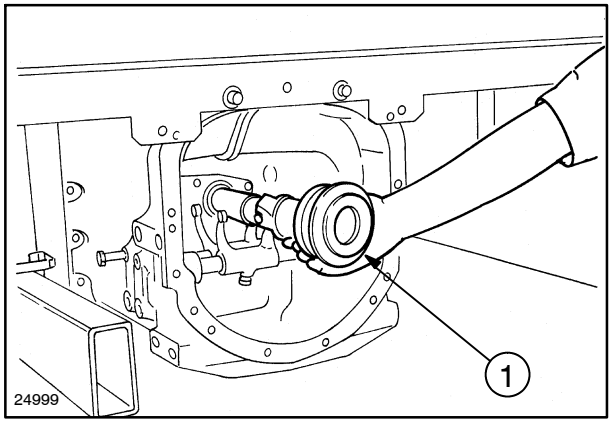
12

7. Operating from the front of the clutch-reverser casing and using an aluminium punch (2), remove the reverser driving shaft (1) from the rear of the casing.



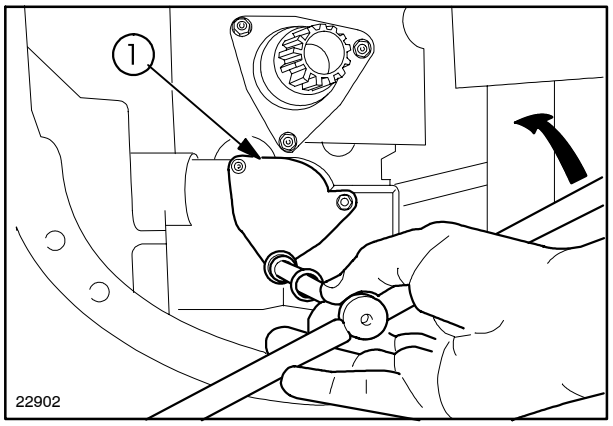
13

8. Release the retaining clips and extract the sliding sleeves (1).



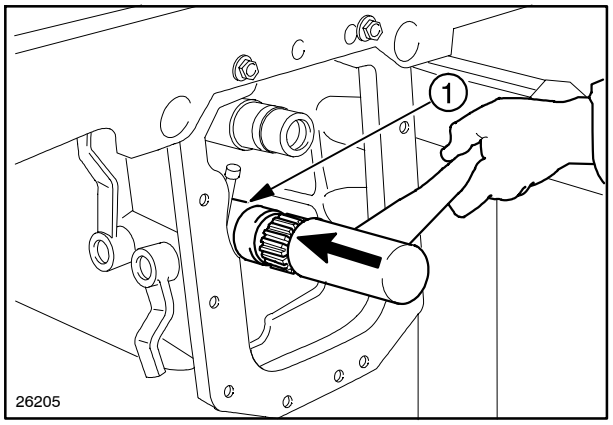
14

10. Remove the nuts, washers and cover (1).



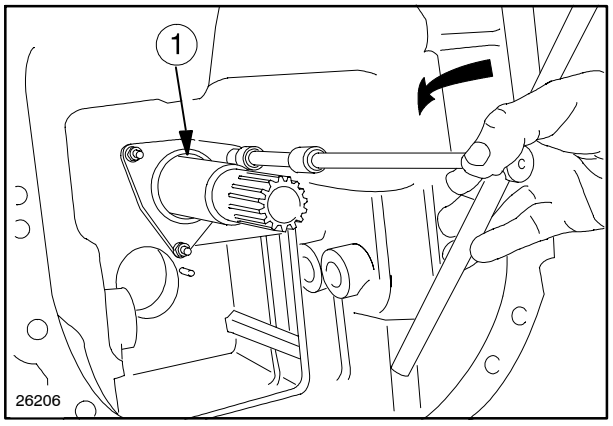
17

11. Working from the rear remove the snap ring and shaft (1) with relative bearing.

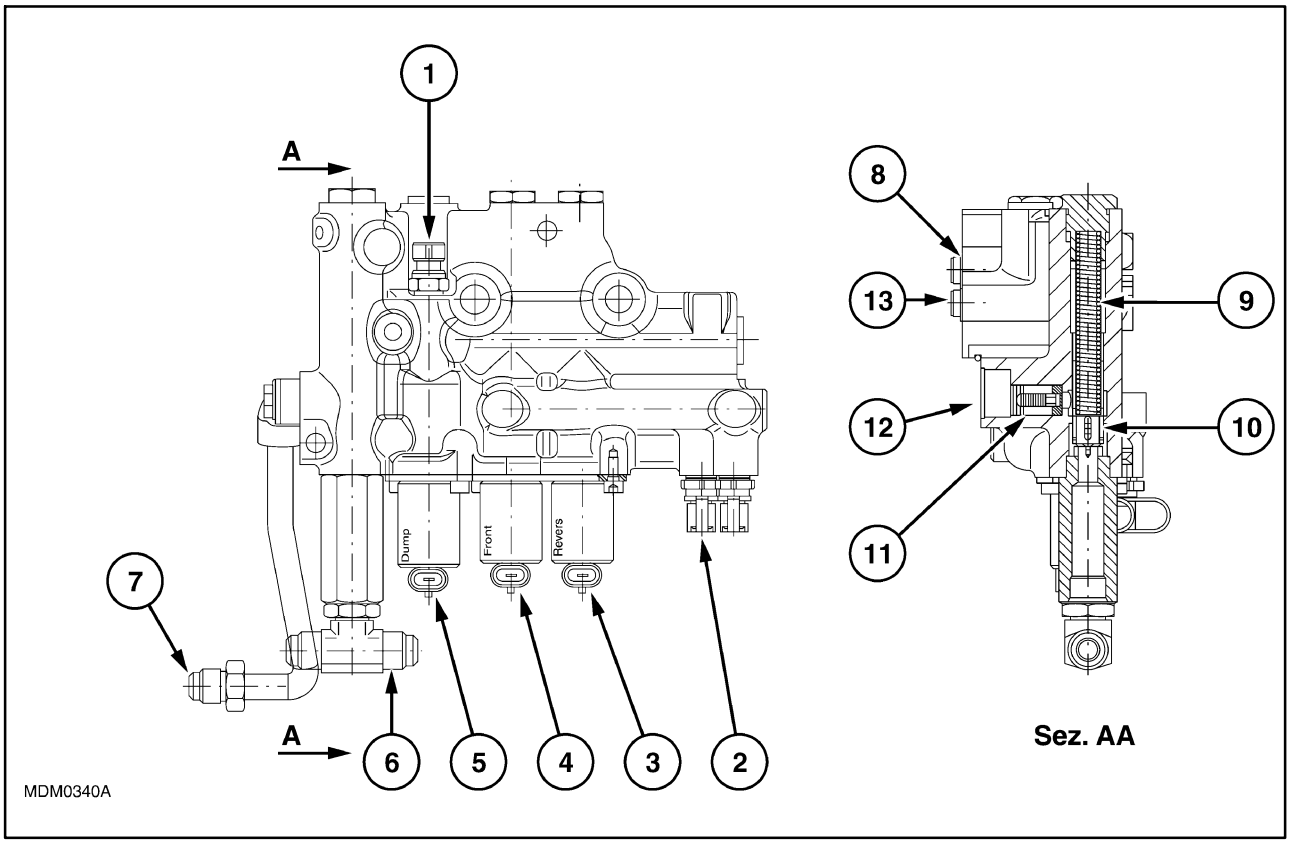


18

12. Remove the nuts and washers and the clutch sleeves support (1), together with the bearing.



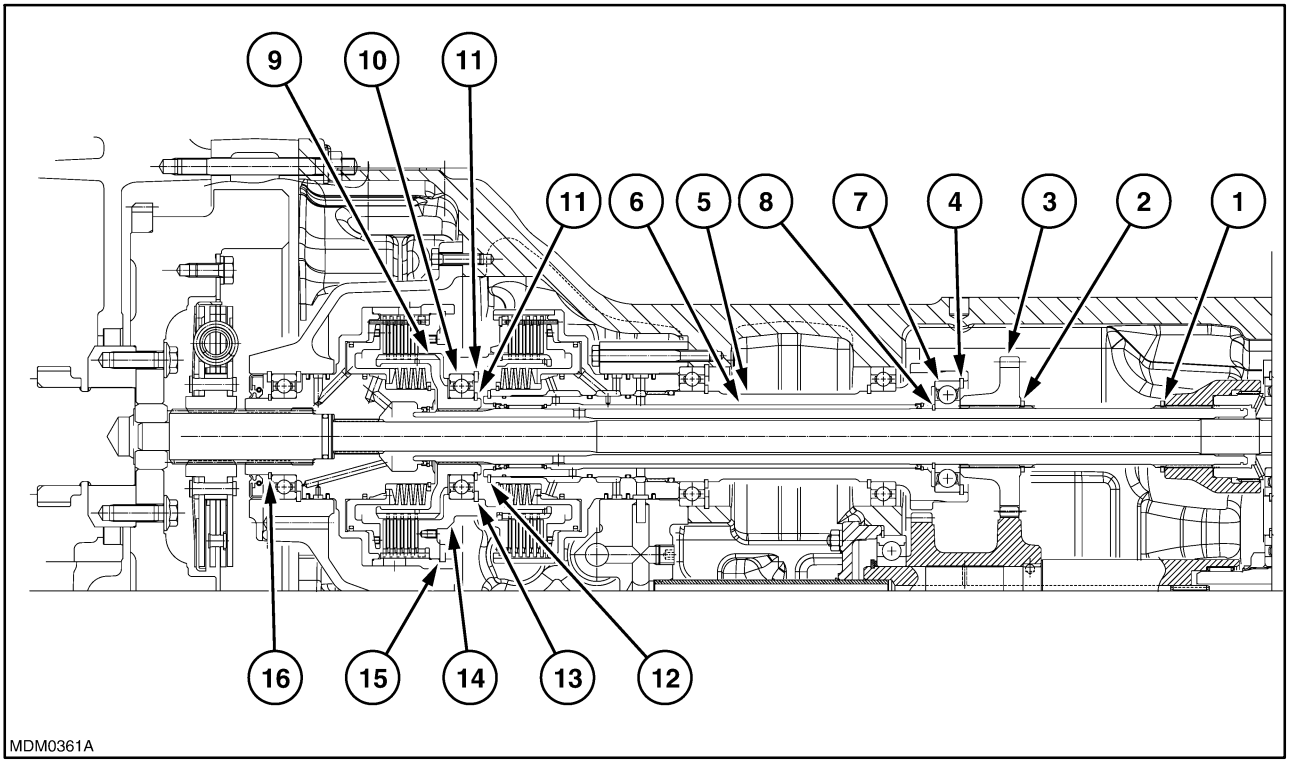
19



7

Power Shuttle transmission control valve

1. Transmission oil temp sensor.
2. Unions for diagnostic tests on clutch lines.
3. Reverse proportional solenoid valve.
4. Forward proportional solenoid valve.
5. Dump solenoid valve.
6. Power shuttle control valve supply union / oil delivery to the services control valve.
7. Heat exchanger hot oil delivery union.
8. Connections to the forward and reverse gear clutches.
9. Pressure relief valve spring.
10. Pressure relief valve spool.
11. Lubrication by-pass valve.
12. Cold oil lubrication line to the clutch casing.
13. Connection to the discharge.



42

Longitudinal section of the main shaft.

1. Gearbox driving gear thrust circlip.
2. Reverse driving gear rear thrust circlip.
3. Reverse driving gear.
4. Reverse gear shaft internal bearing retaining circlip.
5. Reverse driving gear / shaft.
6. Forward gear shaft.
7. Bearing.
8. Circlip.
9. Forward gear clutch driven hub A.
10. Bearing.
11. Circlip.
12. Reverse gear clutch hub retaining circlip B.
13. Circlip.
14. Forward gear clutch A bottom / reverse gear clutch B driving hub.
15. Retaining circlip part 14.
16. Forward gear clutch A bell housing circlip.

DRIVING SHAFT

Disassembly

WARNING

Handle all parts carefully. Do not put your hands or fingers between parts. Wear the prescribed safety clothing, including goggles, gloves and safety footwear.

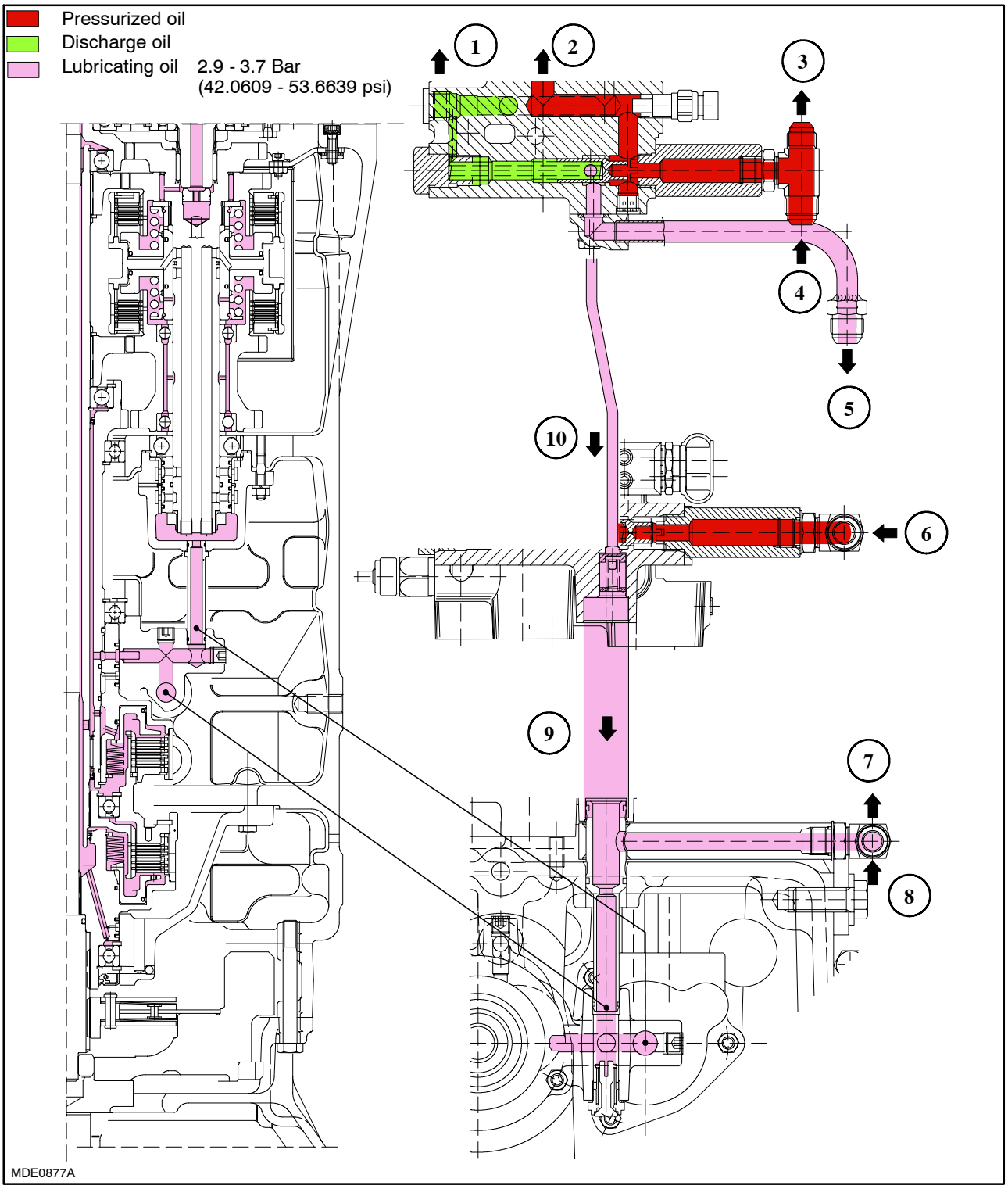
For the correct orientation of the various parts, refer to the picture 42.
To remove the gearbox, proceed as follows.

1. Remove the circlips (1 and 2, fig. 42).
2. Extract the reverse driving gear (3, fig. 42).
3. Take out the circlip (4, fig. 42).
4. Grip the forward gear shaft (6, fig. 42) from the back and tap on the reverse gear / shaft (5, fig. 42) on the back and extract it.

Transmission Fault Code Descriptions

Code	Description of Fault
2011	Clutch pedal potentiometer signal too low
2012	Clutch pedal potentiometer signal too high
2014	Voltage from the gear neutral position switch is high
2015	Voltage from the gear neutral position switch is low
2016	Voltage from the range position switch (R1) is high
2017	Voltage from the range position switch (R1) is low
2018	Voltage from the range position switch (R2) is high
2019	Voltage from the range position switch (R2) is low
2021	Transmission harness disconnected
2024	All the clutches must be calibrated
2025	Engine speed (rpm) high
2028	Clutch B not calibrated
2029	Clutch A not calibrated
2035	Wheel speed too high
2036	Engine speed (rpm) low
2037	Clutch disconnect switch open circuit
2038	Clutch B solenoid valve short to + 12 volts
2039	Clutch B solenoid valve open circuit or short to ground
2040	Inconsistent gear lever status switches.
2041	Clutch A solenoid valve open circuit or short to ground
2042	Clutch A solenoid valve short to + 12 volts
2047	Clutch disconnect switch set too high
2048	Clutch disconnect switch set too low
2049	Wheel speed sensor too high
2051	Oil temperature sensor open circuit
2052	Oil temperature sensor short circuit
2053	5 volt reference voltage too high
2054	5 volt reference voltage too low
2055	Shuttle lever forward switch voltage high
2056	Shuttle lever forward switch voltage low
2057	Shuttle lever reverse switch voltage high
2058	Shuttle lever reverse switch voltage low
2059	Shuttle Lever sw. disagree
2061	No seat safety switch transition in the last 25 hours of work
2069	Wheel speed sensor voltage too low
2097	Short circuit to +12V to the discharge (dump) solenoid valve
2098	Short circuit to ground or circuit open to the discharge (dump) solenoid valve

NOTE: *For resolution of the error codes, refer to Section 55, Chapter 9.*



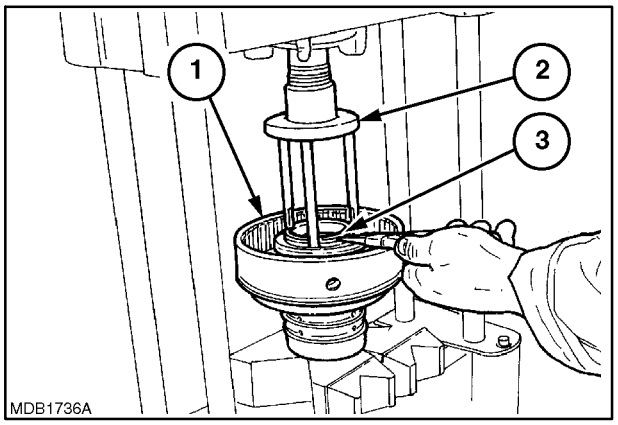
20

Power Shuttle transmission with Dual Command (2 Speed Power Shift) function (24+24) - Lubrication circuit

1. Discharge oil
2. Oil to solenoid valves
3. Oil to the differential lock, four-wheel drive, power take-off and p.t.o. brake
4. Pump pressure oil
5. Hot oil to the heat exchanger
6. Pump pressure oil
7. Power take-off lubrication
8. Cold oil from the heat exchanger
9. Cold oil to lubrication
10. Cold oil to the by-pass valve

10. Refit the lines on the Power Shuttle control valve and the solenoid valve support, then refit the front differential lock piping.
11. Assemble the tank support front bracket and cab support.
12. Assemble the gearbox-transmission oil heat exchanger piping and secure with the relative bracket.
13. Fit the Power Shuttle control valve feed line.
14. Fit the tank, resting it on the two support brackets.
15. Secure the tank with the two metal clamps. Insert the fuel return hose in the union on the tank cap.
16. Connect the fuel pump hose.
17. Tighten all the unions and clamps and secure the various pipes and hoses with clamps.
18. Connect the fuel gauge unit connections.
19. Connect the transmission-gearbox oil breather pipe.
20. Connect the 3-way union to the various fuel return lines.
21. Straighten the brake control lines and secure with the bracket.
22. Connect the two hydraulic pump pipes and the hydraulic lift delivery line.
23. Fit the trailer brake control valve pipe to the 4WD casing.
24. Fit the drive shaft and relative guard.
25. Assemble the RH cab support bracket and secure to the clutch casing with the retaining bolts.
26. Fit the two cab access steps.
27. Fit the rear wheels, raising the tractor with a hoist and a nylon sling. Extract the two fixed stands from under the final drives and the column from under the towbar.
28. Fit the two lift vertical tie-rods and the two anti-swing rods.
29. Make sure that all the transmission-gearbox drainage plugs are tightened and fill up with the quantities described in **Section 00**.
30. Fill up the fuel tank.
31. Connect the negative cable to the battery.

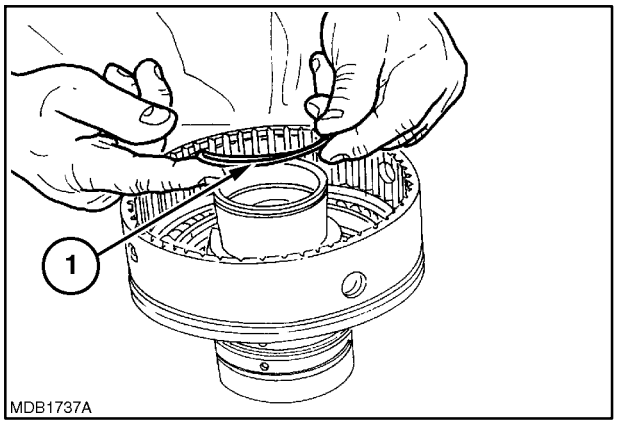
6. Position the clutch casing A (1) under a press and, using tool **380000291** (2) and adapter, compress the springs, remove the stop ring (3) and remove the Belleville washer.



94

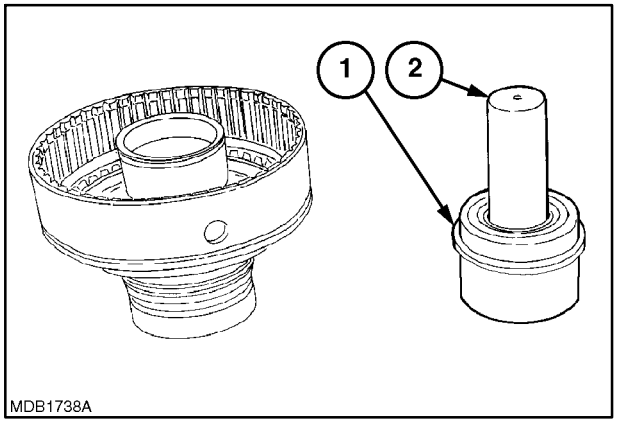
Replacing the Seal on the Clutch Casing Internal Hub

7. Position the O-Ring seal (1) in the relative seat on the clutch casing internal hub.



95

8. Position the external ring (1) of the seal on the guide on tool **380000290** (2).



96

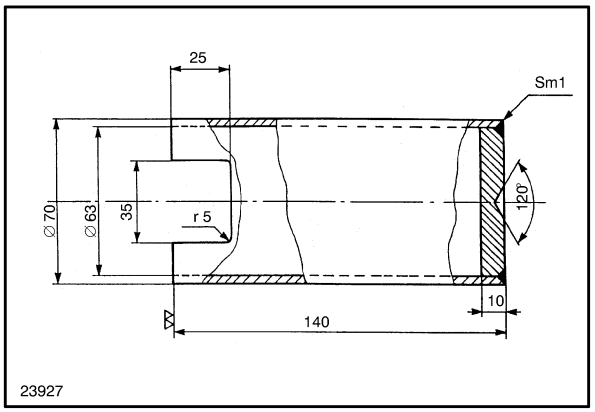
SPECIAL TOOLS

WARNING

The operations described in this section can only be carried out with the ESSENTIAL tools indicated by an (X).
To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools, which are to be made according to the drawings included in this manual.

380000279	Guard for fitting the seal (28, fig. 3)
380000280	Guard for fitting the seal (27, fig. 3)
380000285	Splining tool for fitting the seal (3, fig. 3)

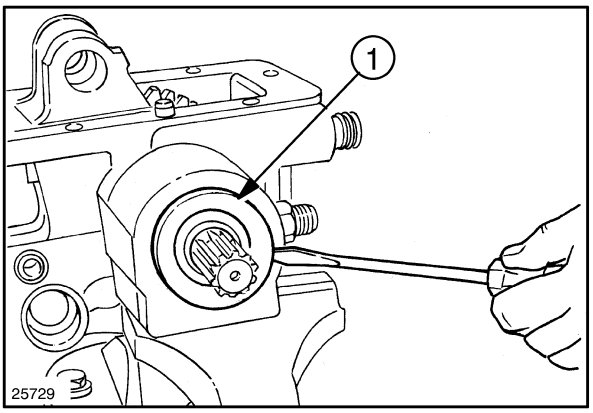
NOTE: *Make the tool in F42 material.*



2

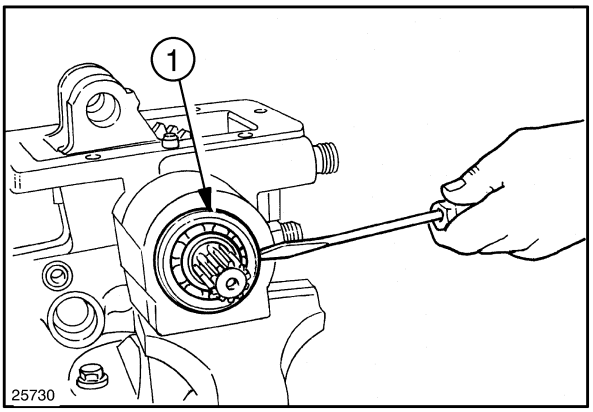
Adapter to make for drive gear spring disassembly-assembly. (Stamp no. 50107) (Measurements in mm)

4. Using a screwdriver, remove the dust ring (1).



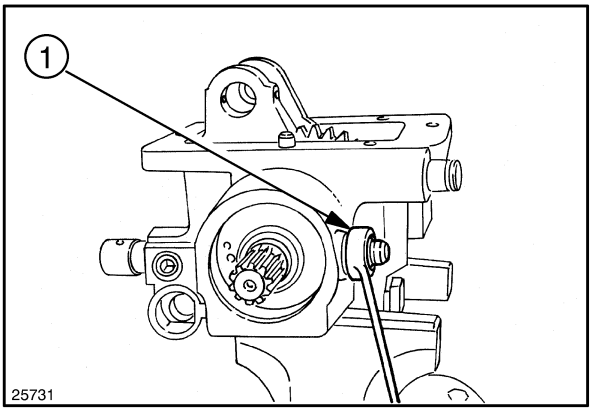
39

5. Remove the oil seal (1).

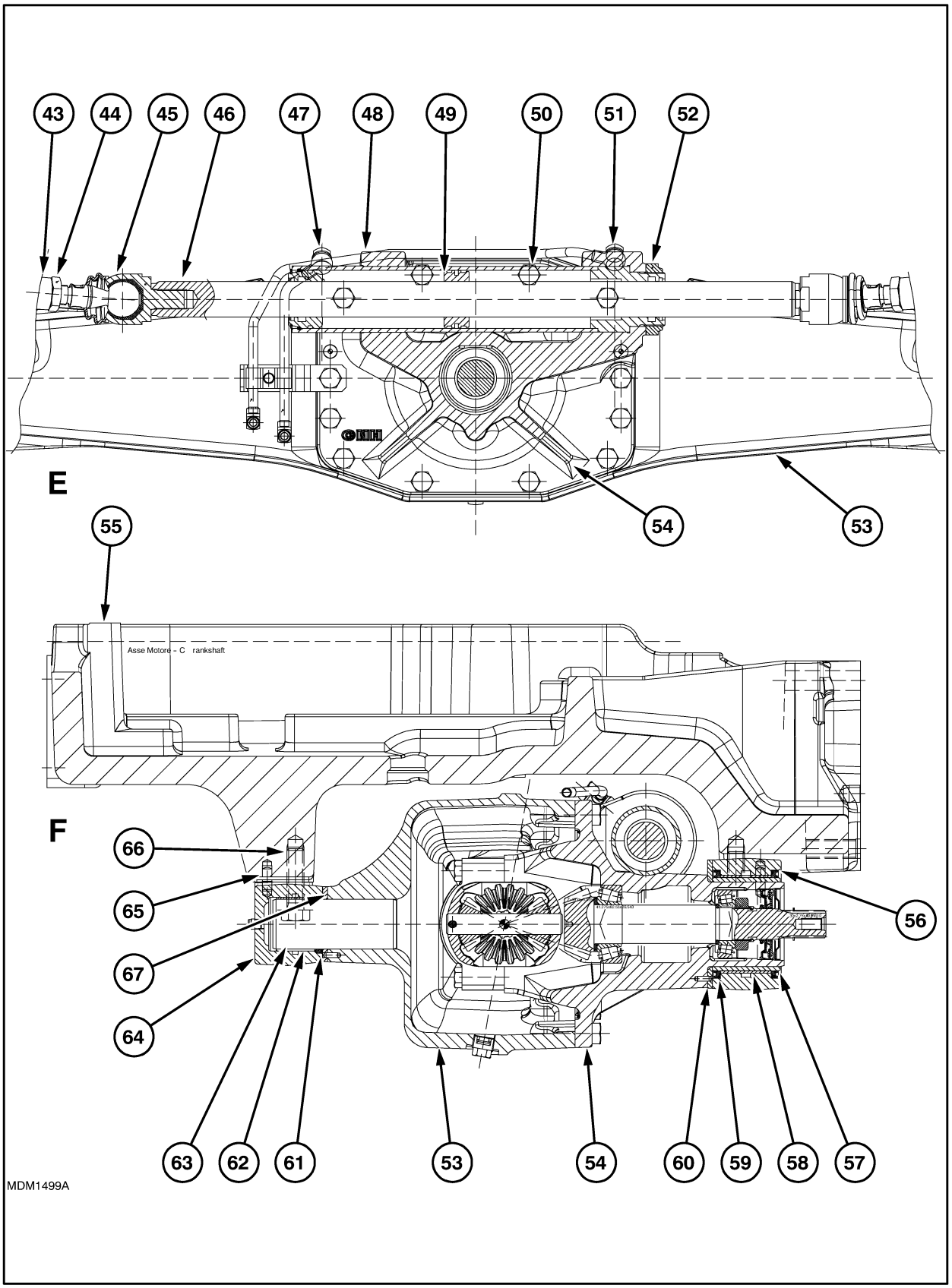


40

6. Remove the 4WD drive gear disengagement oil delivery union (1).



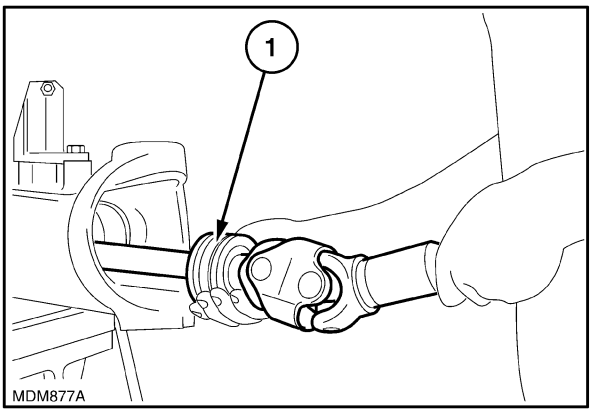
41



NOTE:*for the key, refer to page 15.*

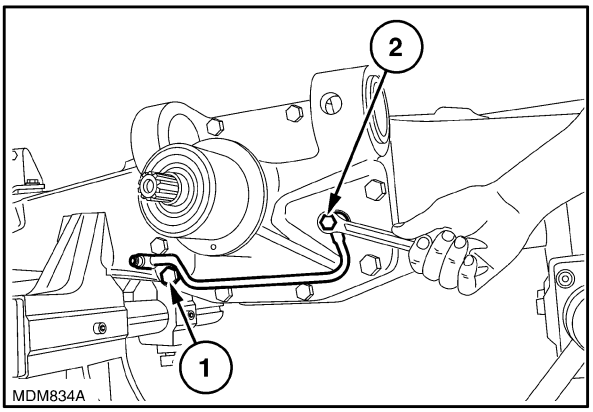
18. Using a crowbar, remove the axle shaft (1).

19. To disassemble the right-hand final drive follow the operations carried out for left-hand final drive disassembly, from operation no. 11. to operation no. 18.



40

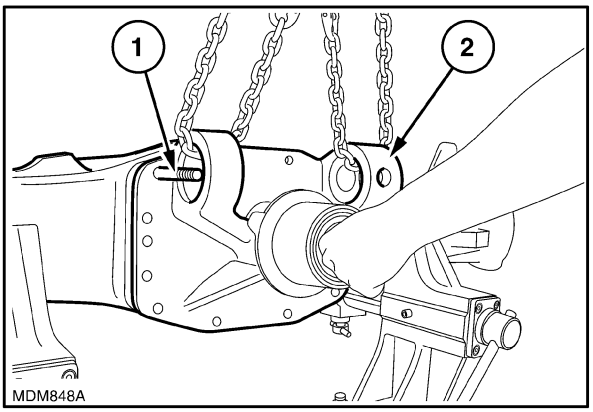
20. Take off the bracket (1), unscrew the union (2) and remove the differential lock control rigid pipe.



41

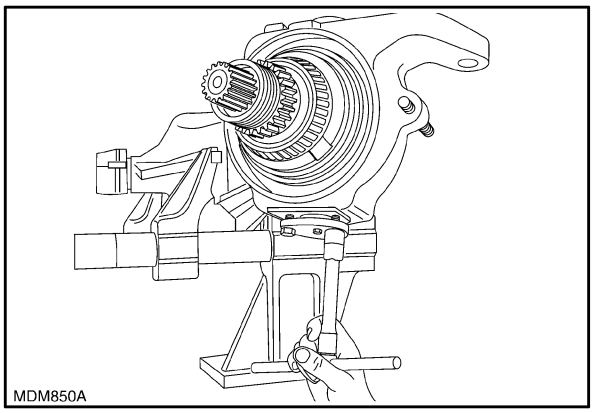
21. Unscrew the two bevel drive-differential support retaining bolts from the axle casing, screw on the two pins (1).

    Remove the remaining bolts and the bevel drive-differential support, attach a chain and put the hoist under strain. Remove the bevel drive-differential support (2) from the axle casing.



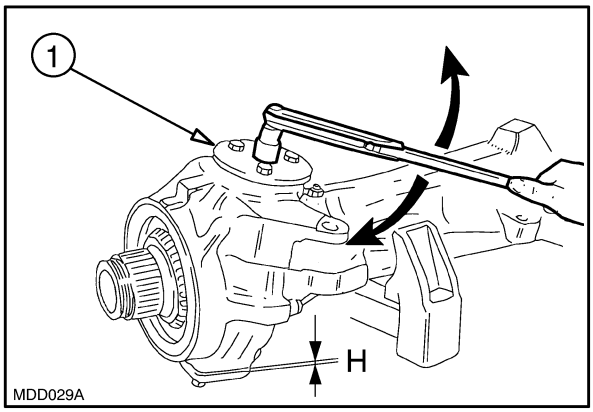
42

2. Fit the lower cover without adjustment plates, lubricate the three retaining bolts with engine oil.
3. Gradually tighten the lower cover bolts in sequence, while simultaneously rotating the casing to allow the excess grease to escape.



81

4. Using a torque wrench and tool **380000235** (1), check that the torque required to rotate the casing is: **3.9 to 5.8 Nm (3 to 4 ft-lbs)** without considering the peak starting value. If not, adjust by way of the lower cover bolts.
5. Measure the gap (H) created between the lower cover and the casing adjacent to each of the three bolts.

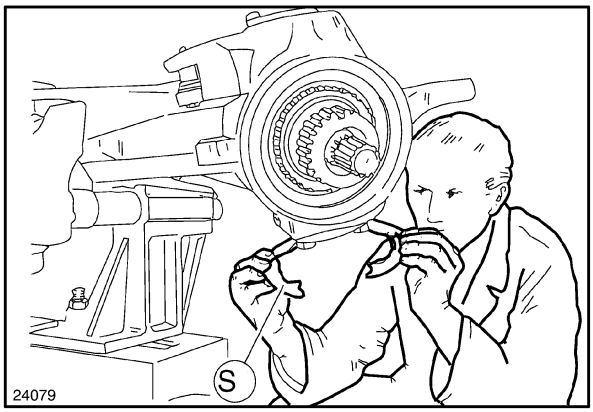


82

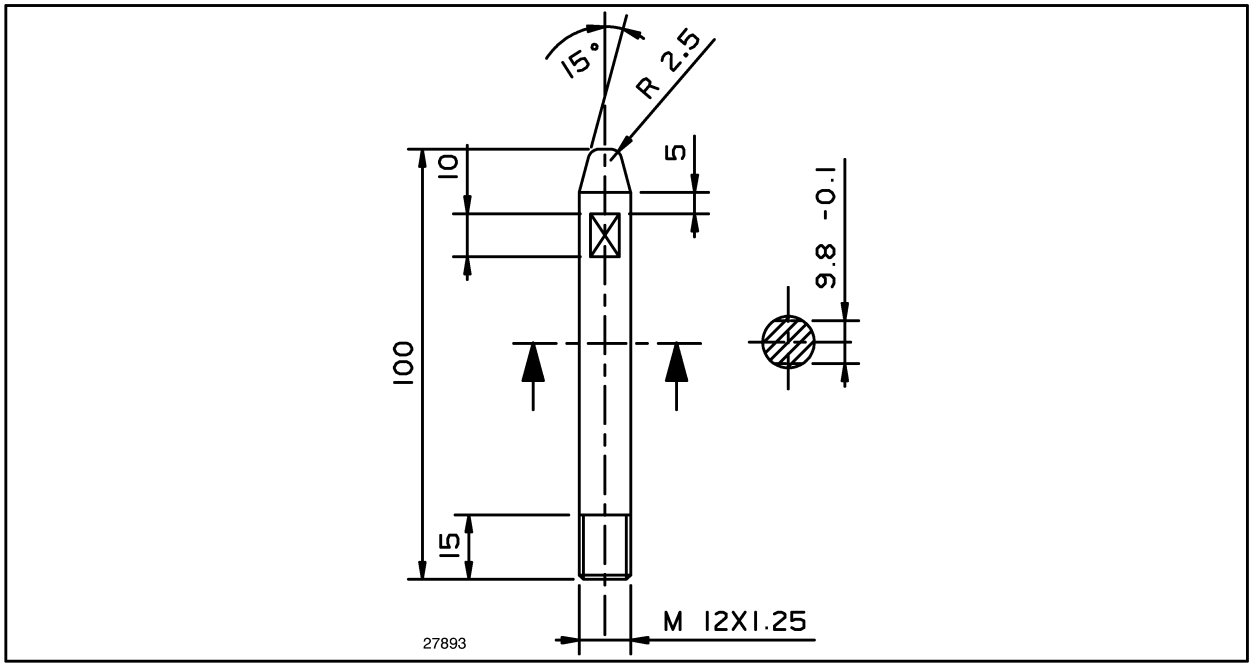
6. Calculate the average of the three values measured. The total thickness of the adjustment plates (16, fig. 5) to be fitted under the lower cover will be given by:

   S = H

   If necessary, round the value down to the next 0.05 mm (0.0019 in).

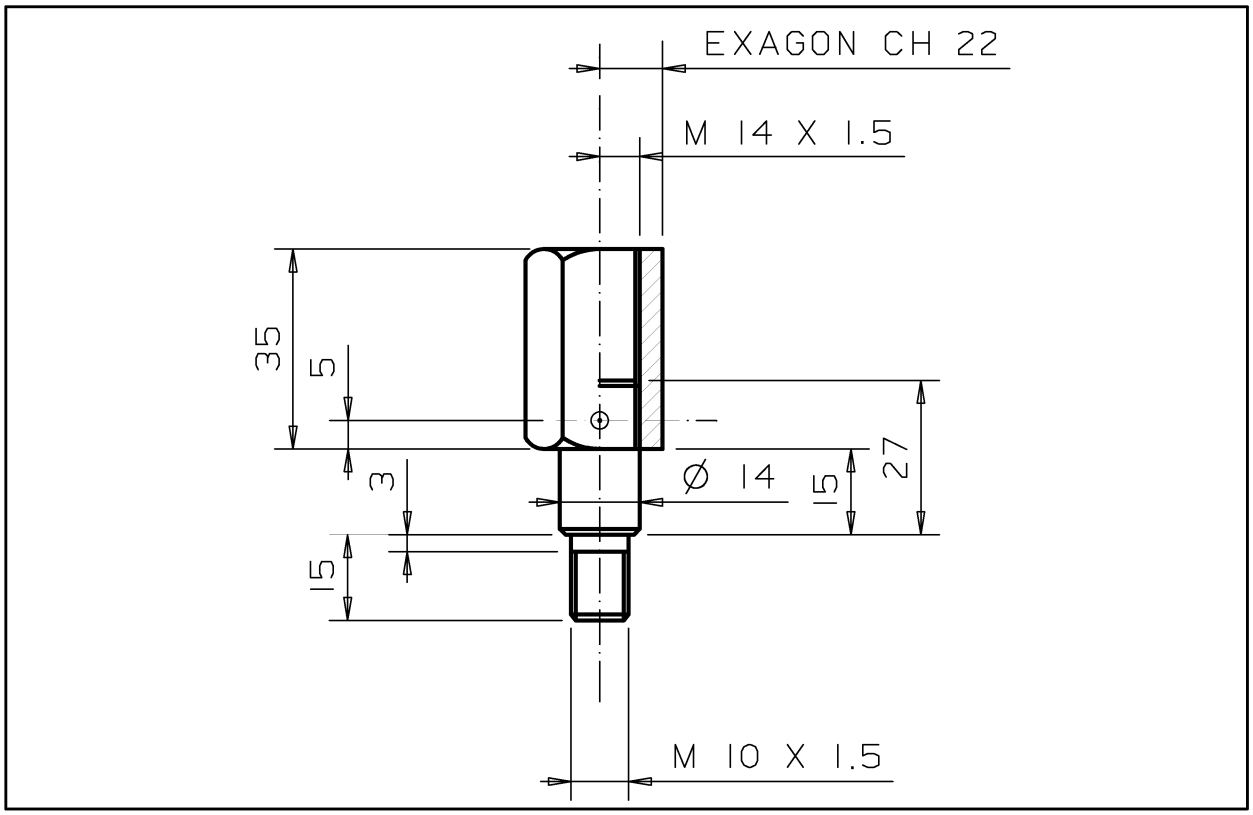


83



7

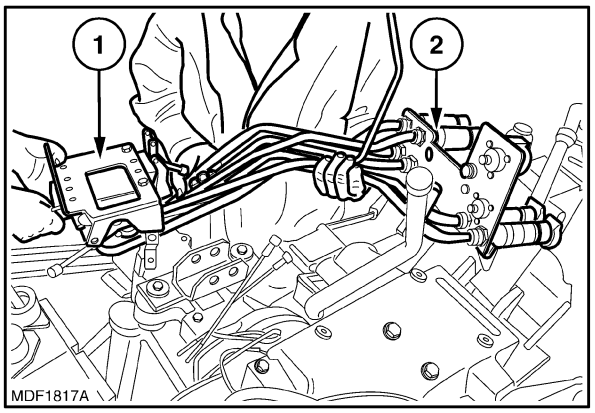
Tool to make for front axle reduction unit cover disassembly-assembly
(mark tool with no. 50169 - Measurements in mm)
Make in UNI C40 material



8

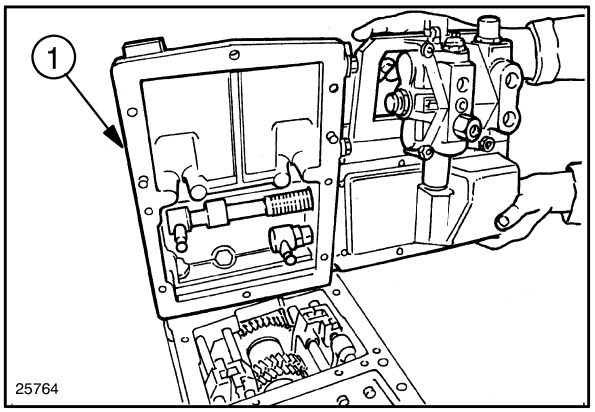
Tool to make for bevel pinion extraction
(mark tool with no. 50144 - Measurements in mm)
Construct in UNI C40 material. Retaining pin 3 x 20 mm.

18. Remove the control valve assembly (1), together with the respective pipes and quick-fit couplers (2).



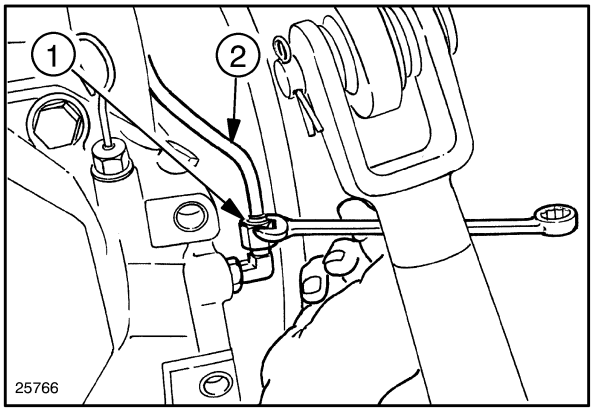
33

19. Unscrew the bolts, raise and remove the cover (1) and transmission-gearbox casing assembly.



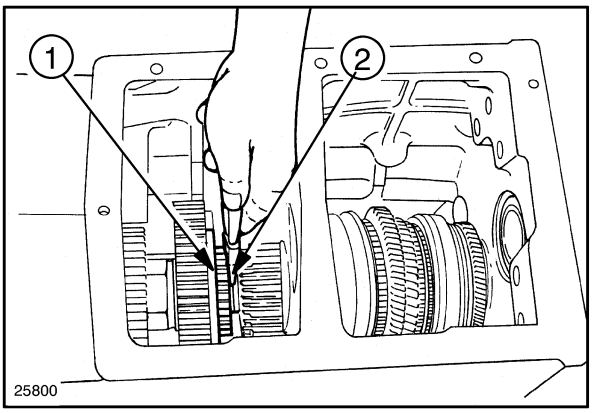
34

20. Remove the union (1) and disconnect the power take-off brake control pipe (2).



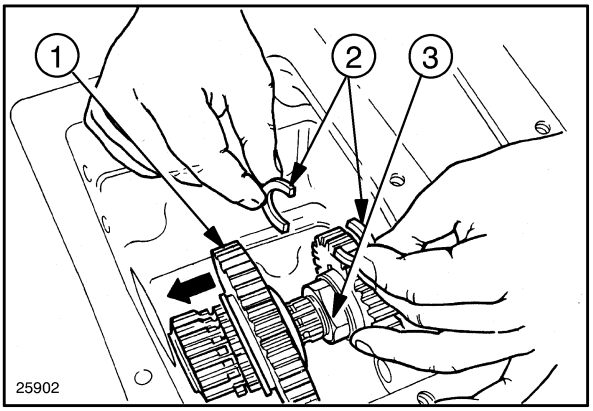
35

19. Move the engagement sleeve (1) until pliers (2) can be inserted to remove the circlip.



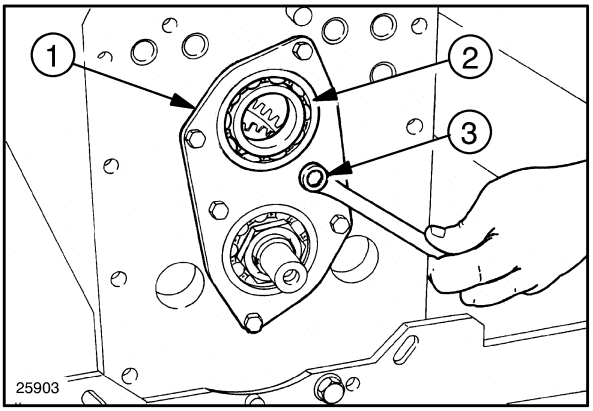
77

20. Move the gear unit (1) in the direction indicated by the arrow and remove the two split rings (2), unscrew the nut (3) and extract the bevel pinion and all parts.



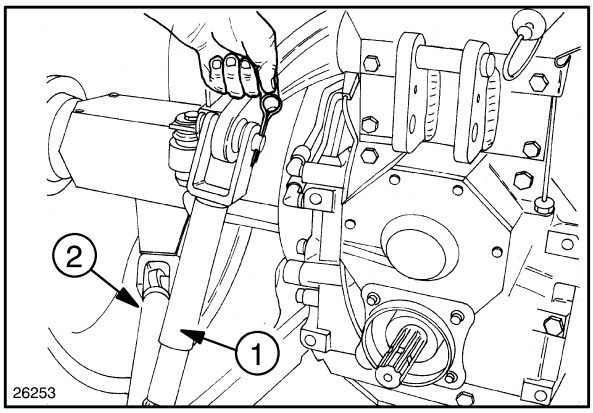
78

21. Unscrew the bolts (3), disassemble the support plate (1) and remove the bearing (2).



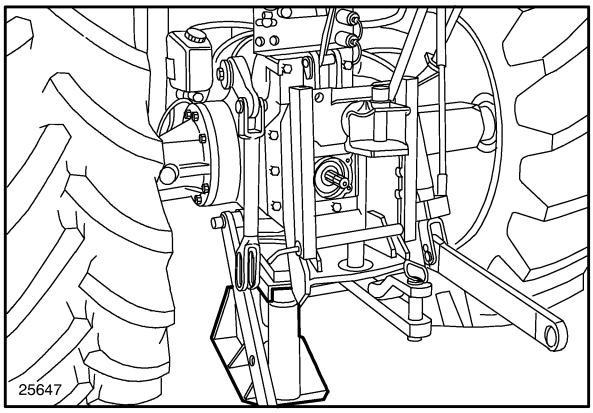
79

3. Detach the vertical tie-rod (1) and the LH anti-swing rod (2).



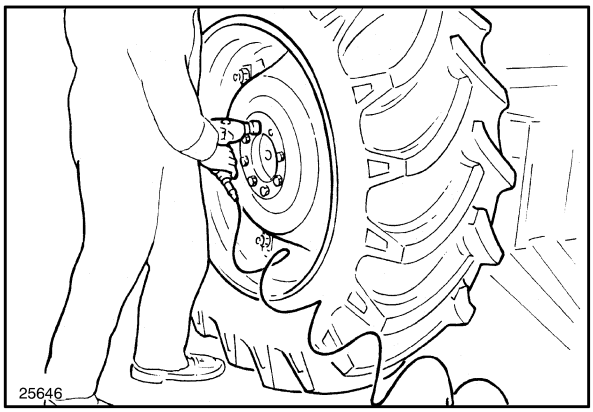
113

4. Raise the rear part of the tractor and position a fixed stand under the flex bar support.



114

5. Unscrew the retaining bolts and remove the rear LH wheel.
6. Detach the window washer reservoir from the support bracket and disconnect the electrical connections and delivery lines.



115

PTO Synchronized With Gears

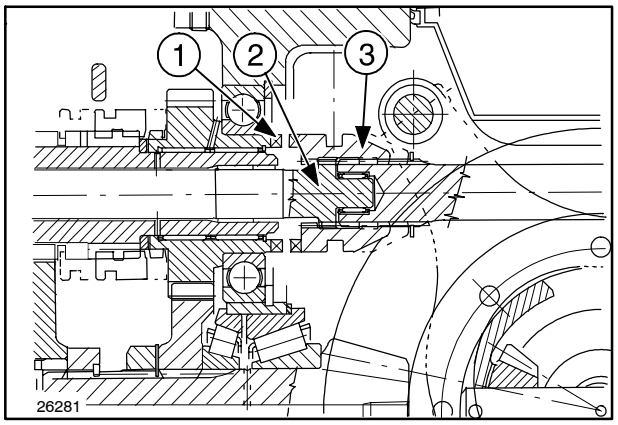
Proceed as follows:

1. Hold clutch lever (1, fig. 7) in position A.
2. Fully press the main gear clutch pedal.
3. Wait briefly, then move the lever (1, fig. 8) to position C and release the main gear clutch pedal.

In these conditions the PTO coupling sleeve (3, fig. 9) is directly driven by the main gear toothed coupling (1).

When the tractor is stationary, the synchronized PTO does not rotate; reverse the direction of rotation of the output shaft by moving from forward gear to reverse.

NOTE: *When the PTO is not in use, move lever (1, fig. 8) to position (E), in relation to the neutral position of the PTO coupling sleeve (3, fig. 9).*



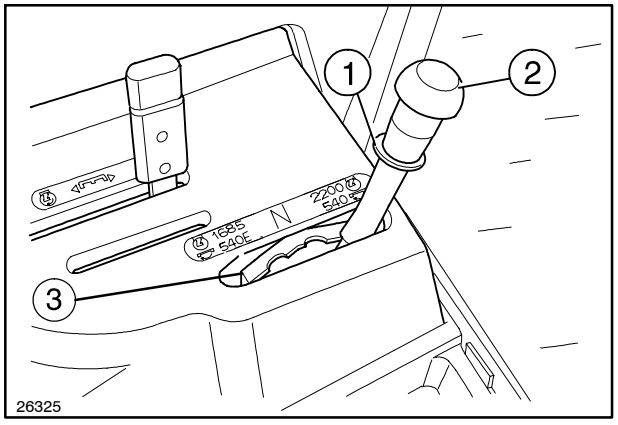
9

Selecting the Speed With the Lever (2, fig. 10)

To select power take-off speeds, proceed as described below:

1. Pull the stop knob (1) upwards.
2. Position lever (2) in the required speed sector (3).

This activates the external control lever (13, fig. 3) by means of a tie-rod. The external control lever rotates the internal cam device (14) and selects the required PTO speed by means of coupling sleeves (10 and 15).



10

SPECIAL TOOLS

⚠ WARNING ⚠

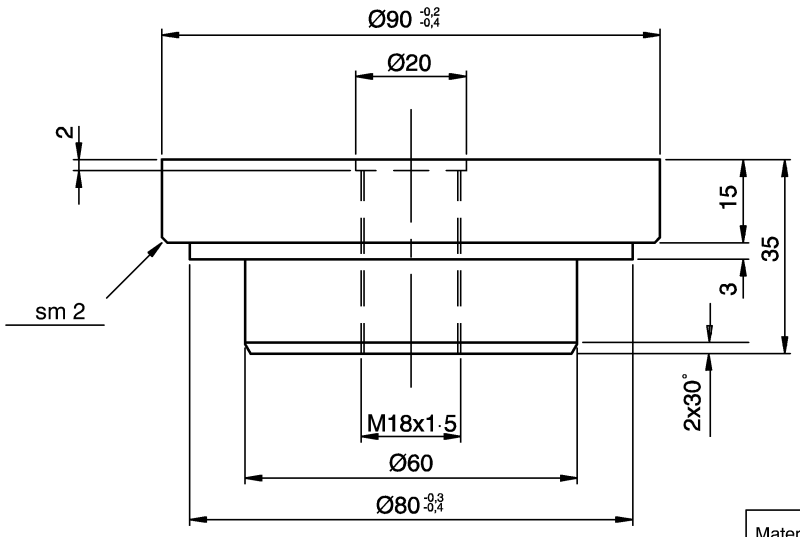
The operations described in this section can only be carried out with the ESSENTIAL tools indicated by an (X).

To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools, which are to be made according to the drawings included in this manual.

380000227 Hook for lifting the power take-off.

380000243 Press for clutch spring.

380000258 Handgrip (with **50135**).



Material	**UNI C 40**
Q.ty	**1**
Models	**Series T5000**
N. tool	**50135**

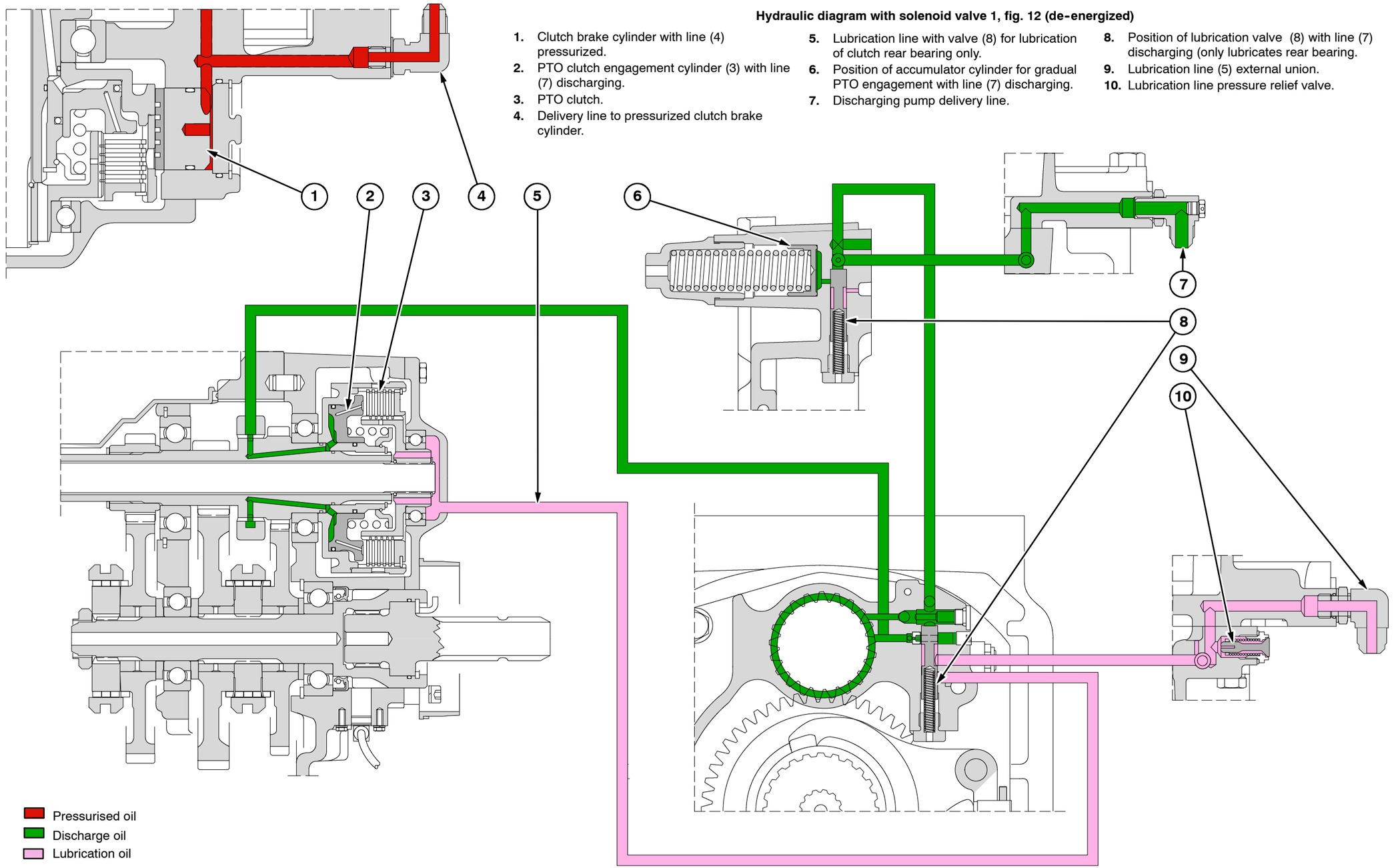
Drift (to use with 380000258)

2

26328

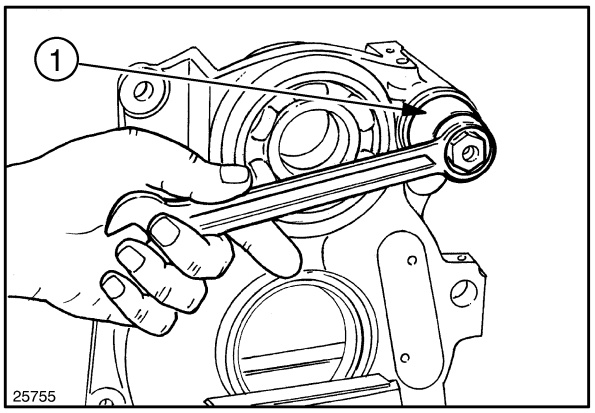
Hydraulic diagram with solenoid valve 1, fig. 12 (de-energized)

1. Clutch brake cylinder with line (4) pressurized.
2. PTO clutch engagement cylinder (3) with line (7) discharging.
3. PTO clutch.
4. Delivery line to pressurized clutch brake cylinder.
5. Lubrication line with valve (8) for lubrication of clutch rear bearing only.
6. Position of accumulator cylinder for gradual PTO engagement with line (7) discharging.
7. Discharging pump delivery line.
8. Position of lubrication valve (8) with line (7) discharging (only lubricates rear bearing.
9. Lubrication line (5) external union.
10. Lubrication line pressure relief valve.



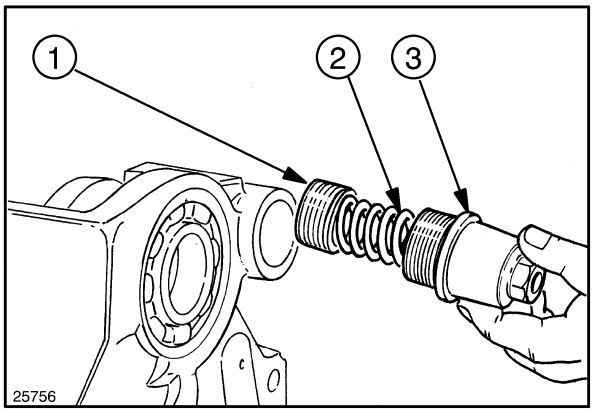
MDE0049A

16. Remove the accumulator cap (1).



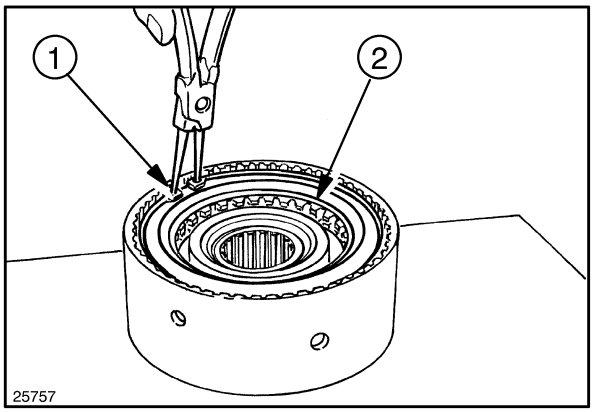
61

17. Remove the accumulator components, i.e.: the piston (1), the spring (2), the cover (3).



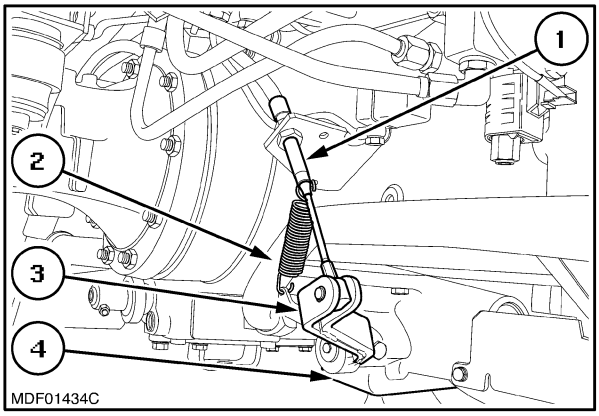
62

18. Remove the snap ring (1) the clutch disks reaction ring (2), and the driving and driven clutch disks.



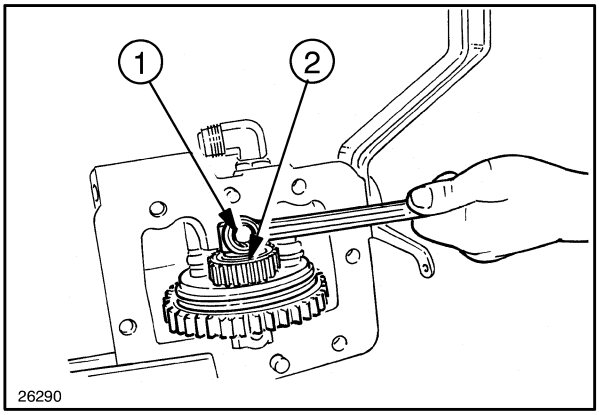
63

4. Disconnect the control linkage (1) and the return spring (2), from the brake control lever (3).
5. Detach the services solenoid valve support following the description in Section 31.
6. Take out the retaining bolts and remove the parking brake casing (4).



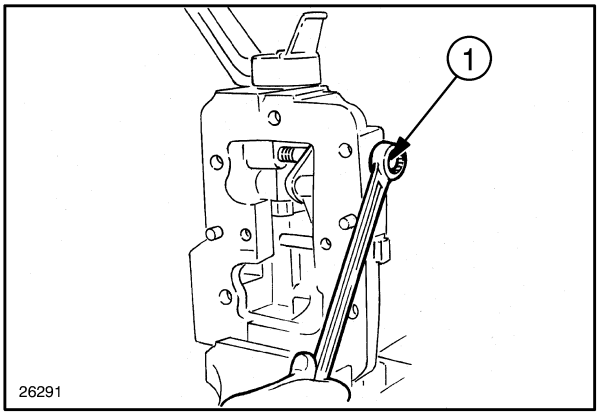
11

7. Take out the retaining bolts (1) and remove the pin (2) together with the brake disks and gear.



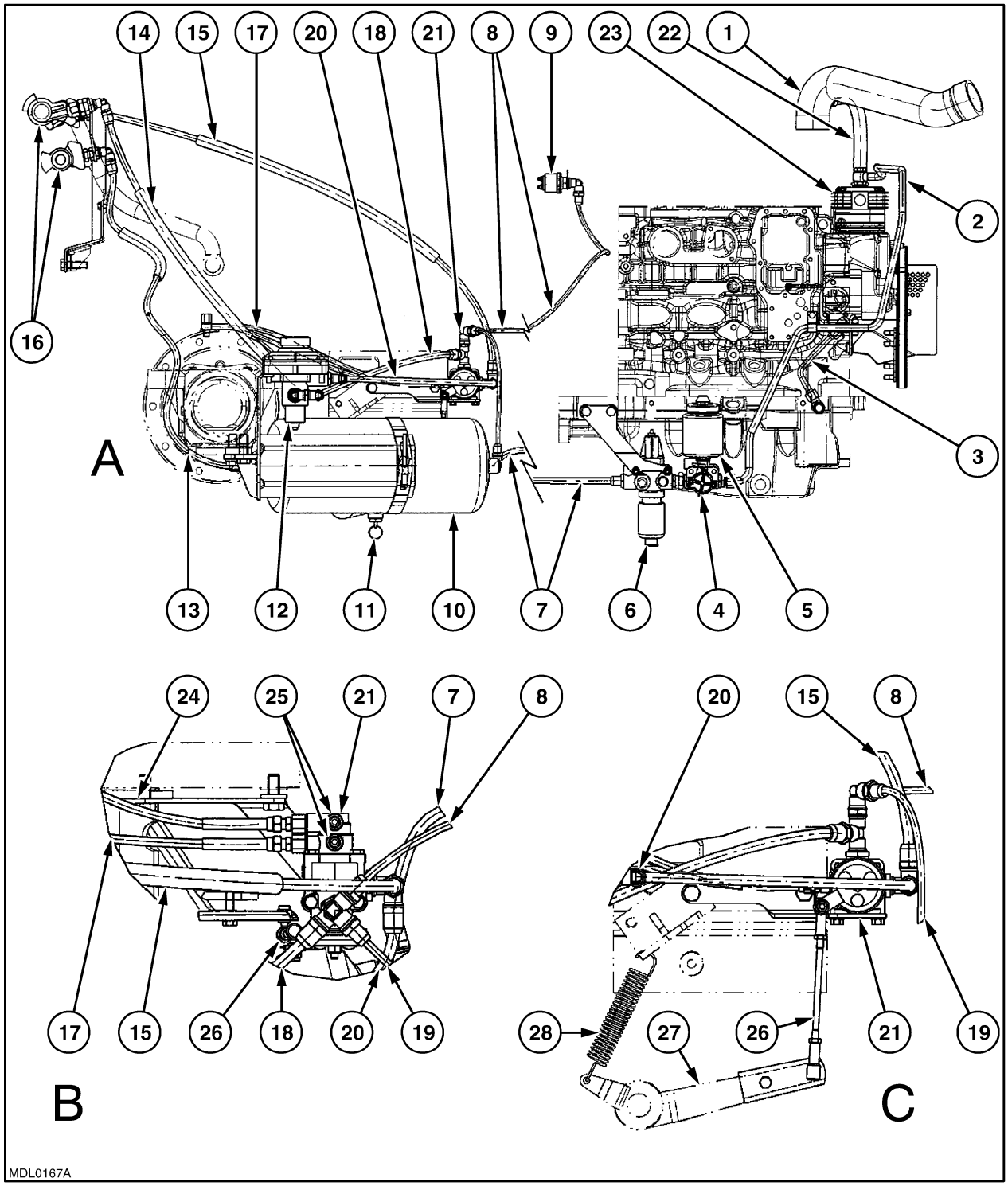
12

8. Unscrew the brake sectors support bolts (1) and remove.



13

SECTIONAL VIEWS



2

VIEW OF AIR BRAKE COMPONENTS

NOTE: *For the key see page 7.*

SECTION 35 - HYDRAULIC SYSTEMS

Chapter 1 - Rear Mechanical Hydraulic Lift

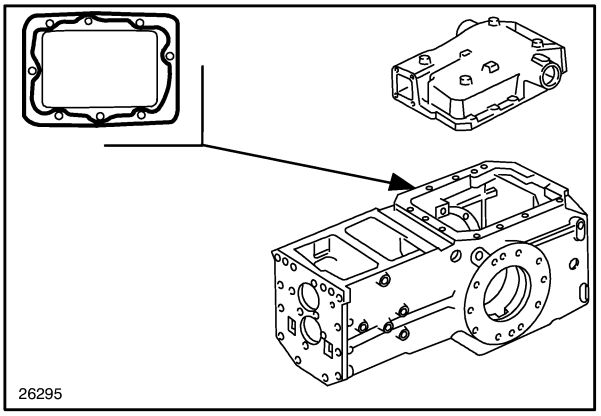
CONTENT

TROUBLESHOOTING (continued)

Problems	Possible Causes	Solutions
The lift moves too slowly.	Blocked discharge holes on delivery control valve.	Disassemble the valve, eliminate the cause of the obstruction and check the oil filter.
	Delivery control valve piston jammed.	Disassemble the valve and remove the cause of the piston jam.
The lift is unable to keep the load raised (with the engine running, the load moves up and down rhythmically; with the engine turned off, the load lowers).	Faulty seal on check valve.	Dismantle, check and replace the parts concerned, if necessary.
	Oil leaking past the seals on the control valve block pin seat.	Replace seals.
	Control valve block pin seal faulty.	Dismantle and clean the seal; replace the control valve block pin and seat if defective.
	Oil leaking past lift piston seal or seals on discharge fitting to cylinder.	Replace seals.
	Defective seal or cylinder safety valve set to very low value.	Renew it.
The pressure relief valve cuts in when the lift arms reach the completely raised position.	Lift arm travel set incorrectly.	Adjust correctly.
Poor lifting capacity.	Pressure relief valve set incorrectly.	Renew it.
	Cylinder safety valve set incorrectly.	Renew it.
	Poor pump efficiency (generally combined with a considerable increase in lift time).	Overhaul or replace the pump.

7. Assemble the trailer brake pipe and the oil filler pipe.
8. Connect the Fast Raise/Lower control tie-rod.
9. Connect the lift levers to the relative tie-rods.
10. Connect the PTO revs counter electrical connection.
11. Attach the fuel tank and transmission-gearbox breather pipes to the cab upright.
12. Assemble the three-point top link and the quick-fit coupling support plate for the auxiliary control valves.
13. Fit the two pole socket, seven pole socket, ground connections, quick-fit couplings and the trailer brake piping to the support bracket.
14. Fit the window washer tank, connect the connections to the pump and the delivery lines.
15. Assemble the right-hand vertical tie-rod adjustment unit.
16. Fit the lift ground control lever.
17. Assemble the vertical tie-rods and anti-swing rod.
18. Fit the towing hook and the three-point top link.

The types of sealing compounds to be applied are specified in Section 00.



51

Diagram showing application of sealing compound when fitting the hydraulic lift on the transmission-gearbox casing

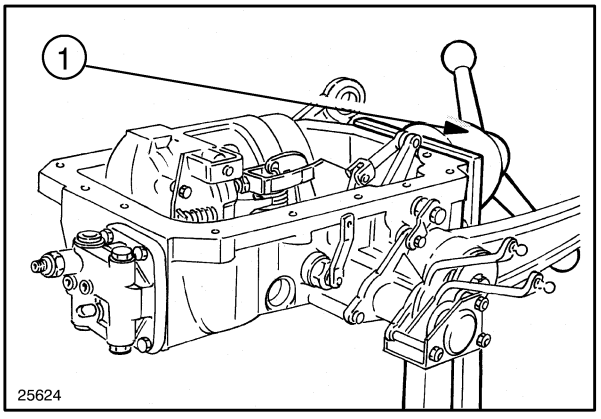
REAR HYDRAULIC LIFT

Disassembly

DANGER

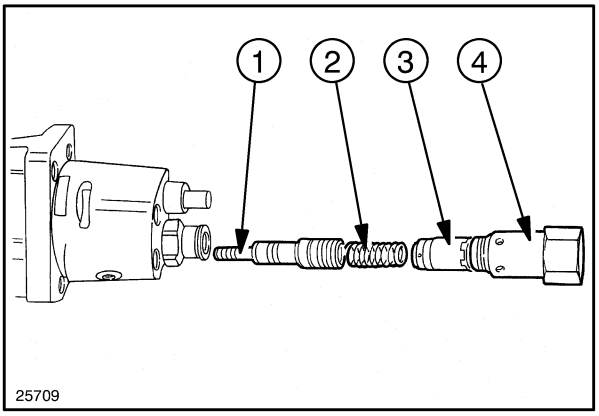
Handle all parts carefully. Do not put your hands or fingers between parts. Wear the prescribed safety clothing, including goggles, gloves and safety footwear.

Disassemble the external controls of the hydraulic lift as follows:



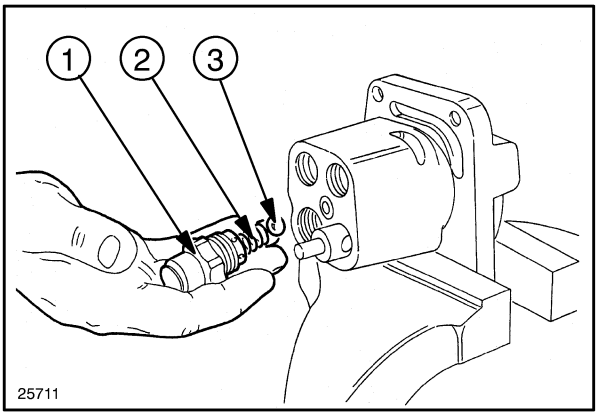
52

4. Remove the cylinder safety valve (4) and recover the arm lowering speed adjustment valve (3), the spring (2) and the pin (1).



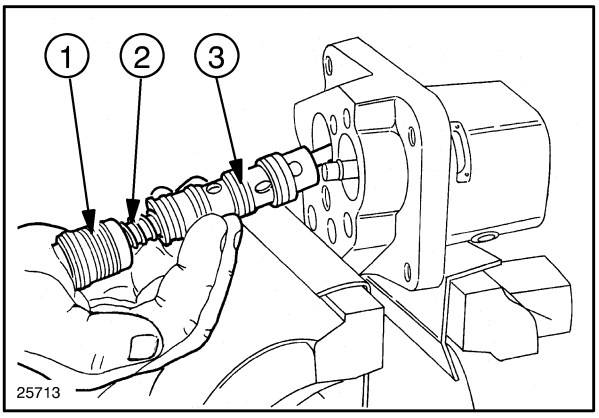
95

5. Remove the check valve: ball (1), spring (2) and union (3).



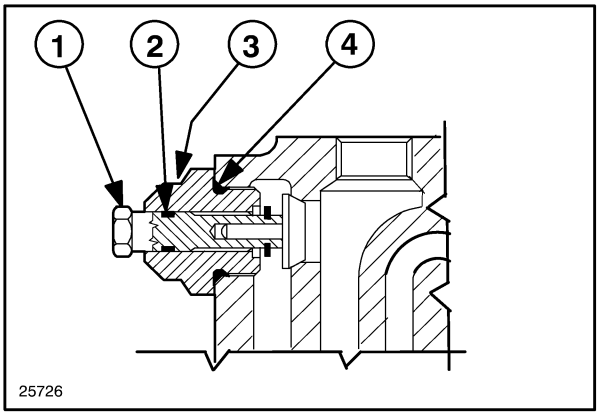
96

6. Extract the control valve pin (1) its seat (3) and the spring (2).



97

NOTE: *For operation of a double-acting cylinder, tighten the screw (1). For operation of a single-acting cylinder, loosen the screw.*



11

Single/Double-acting Switching Valve (of Control Valve Fig. 10 - 11 - 12)

1. Single/double-acting Switching Valve
2. Seal
3. Valve Retaining Plug
4. Seal

OVERHAUL

AUXILIARY CONTROL VALVES

Disassembly

WARNING

Handle all parts carefully. Do not put your hands or fingers between parts. Wear the prescribed safety clothing, including goggles, gloves and safety footwear.

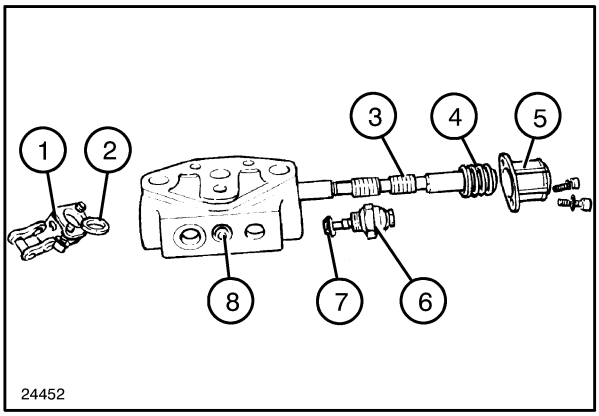
CAUTION

Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

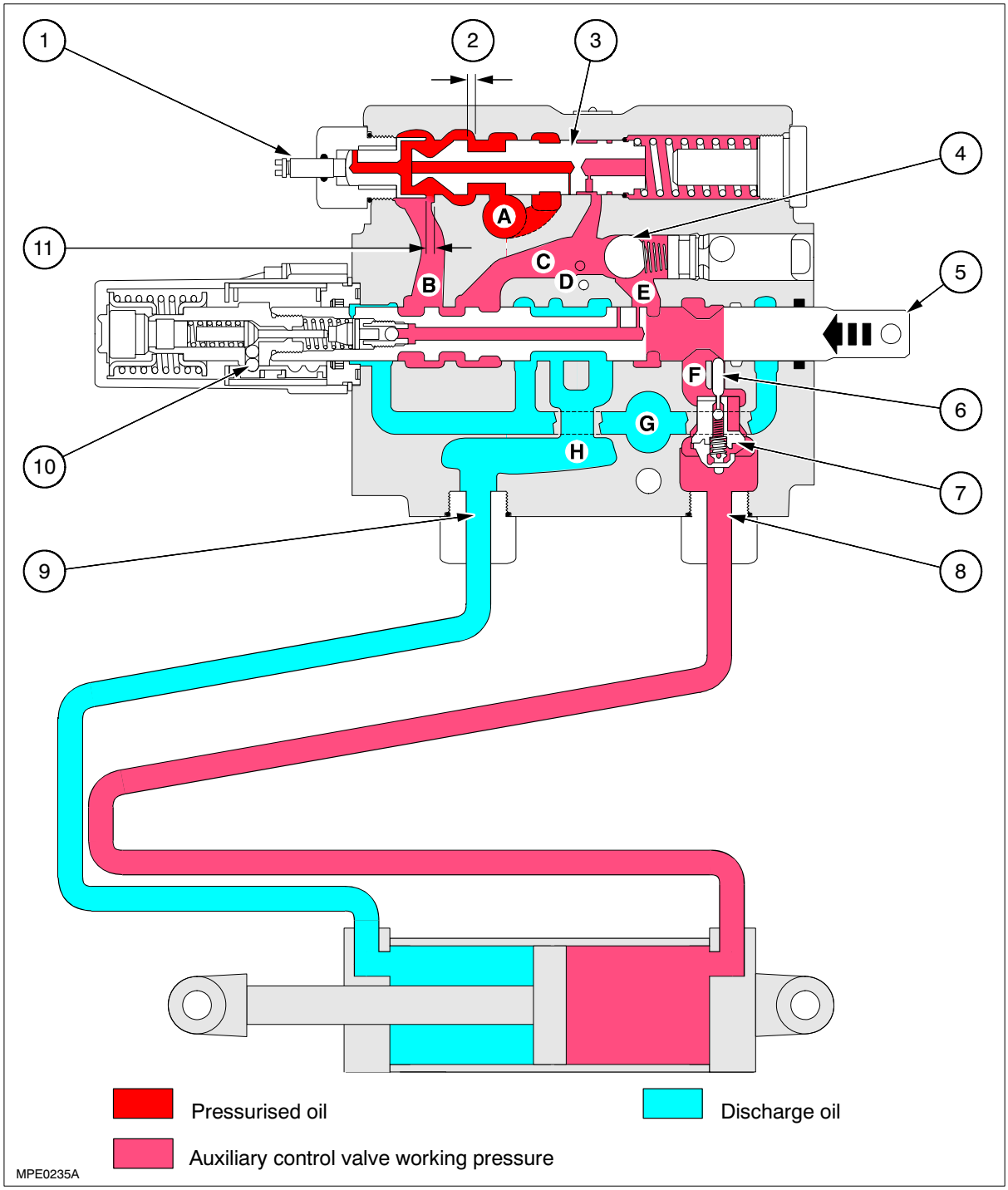
Convertible Single/Double Acting Auxiliary Control Valve

Disassemble the auxiliary control valve into its component parts, referring to fig. 3 and the following instructions:

1. Remove the cover (5), recover the spring (4) and the relative cup.
2. Extract the control valve stem (3).
3. Remove the control lever support (1) and recover the seal (2).
4. Remove the plug (6) and recover the single/double action switching valve (7).
5. Remove the valve housing (8) and recover the check valve and relative spring.
6. Check the condition of the seals before assembly.



12



9

Auxiliary control valve operation - Lifting (cylinder extension)

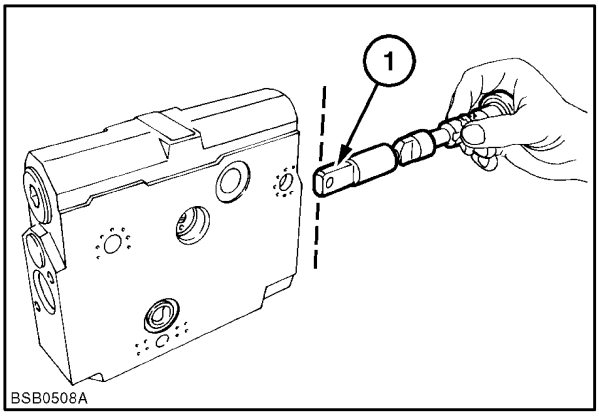
1. Flow control valve adjuster
2. Metering Land
3. Flow regulator
4. Load check valve
5. Control pin
6. Roll Pin
7. Lock Valve
8. Lifting duct (cylinder extension)
9. Lowering duct (cylinder retraction)
10. Centering pin and release mechanism
11. Manually adjusted flow rate throttle

Assembly

1. For assembly operations, follow the disassembly operations in reverse order.

   Remember to fit the lock valve before the control pin.

2. Before inserting the control pin in its seat, make sure that the flat sides (1) at the end of the pin are in an upright position, as in the figure. **DO NOT rotate the pin once inserted in the seat**, this would damage the pin and the lock valve piston.

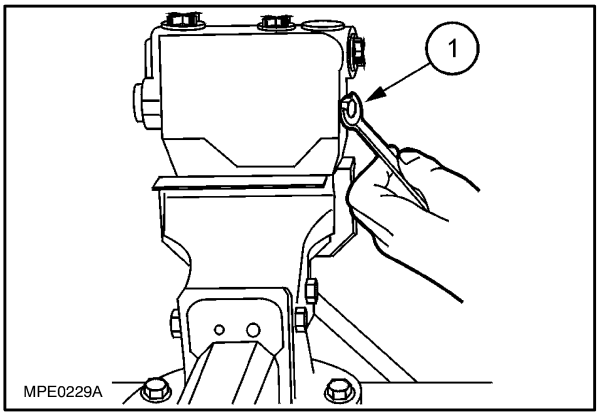


34

CONNECTING PLATE

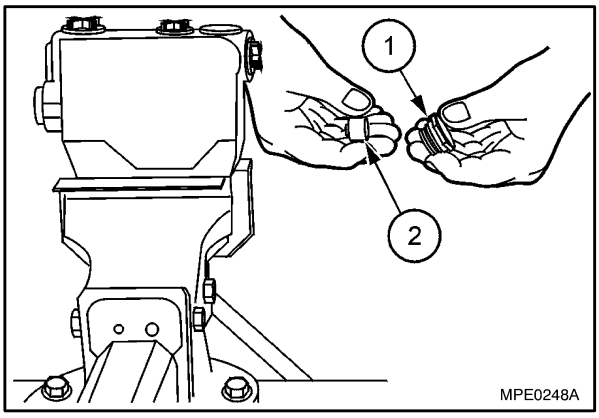
Disassembly - Assembly

1. Unscrew the closing cap (1).



35

2. Remove the plug (1) and the piston (2).

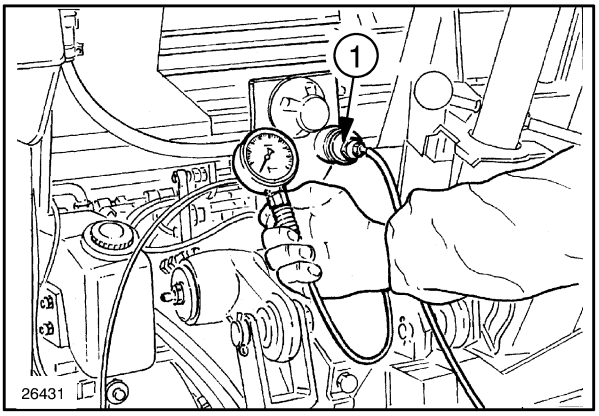


36

CHECK CALIBRATION ON SWITCHES
(8 and 16, fig. 10)

Proceed as follows:

1. Insert union **293190** (1) in the trailer brake coupling and connect to the pressure gauge with scale 0 to 39.2266 bar (580.151 psi) from kit **380000240**.
2. Without applying the service and parking brakes, operate the control lever of an auxiliary control (until the corresponding pressure relief valve is activated), hold this position for a few seconds then suddenly release the control lever.
3. Check that the parking brake release pressure remains at the prescribed level of: 11 to 12 bar (159.5415 to 174.0453 psi).
4. Apply the parking brake and disconnect the pressure gauge and union **293190** (1).



15

Troubleshooting

Problems	Possible causes	Solutions
On carrying out the operation described above, the trailer brake release pressure is nullified permanently.	Trailer brake circuit safety switch (8, fig. 10) setting higher than the nominal pressure (3 ± 0.5 bar [45.5113 ± 7.2518 psi]).	Replace switch.
	Switches (8 and 16) installed in incorrect positions, or electrical leads connected incorrectly.	Install the two switches in their correct positions or swap over the electrical power leads.

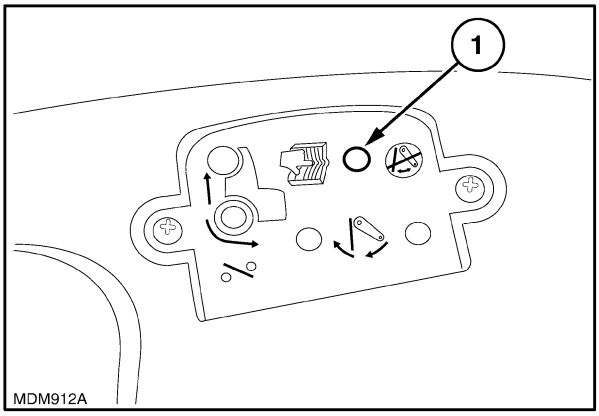
NOTE: *The switch (8) can be identified by the red paint mark between the two terminals.*

Lift Disabled / Failure Warning Light

When this light comes on it can mean two things:

A when the lamp blinks it means that the control unit has detected a fault in the lift's electronic control system and the dot-matrix display shows the fault code.

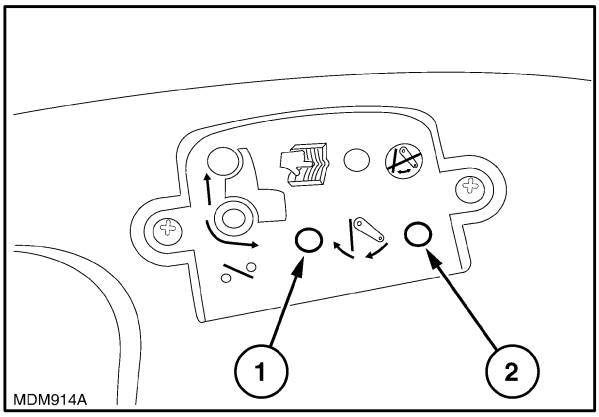
B when it lights up steady, it means that the lift is not enabled, that is the cab controls do not mirror the position of the lift arms and so it is not possible to operate the lift directly with the position lever.



14

Arms Lifting and Lowering Warning Lights

The lifting (2) and lowering (1) warning lights are mounted in parallel with the respective solenoid valves so they signal the actual lifting and lowering of the lift arms.



15

POSITION MODE

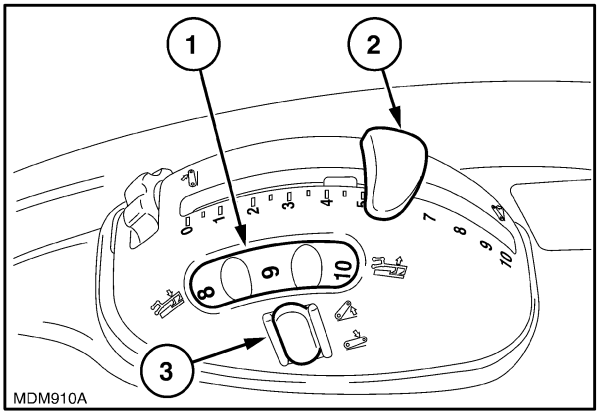
When working in **position** mode the implement keeps the height determined by the position lever and is not affected by the force of traction.

Set the draft adjustment ring (1) onto 10 and as a result the system will not read the force of traction.

Use the position lever (2) to find the desired height.

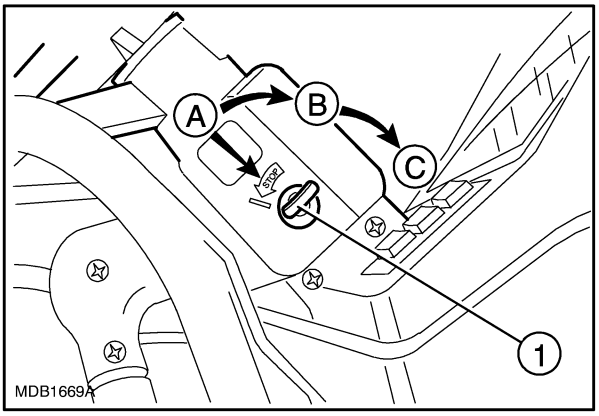
At the headland, use the Fast Raise/Lower button to raise the implement without using the position lever.

After repositioning the tractor, press the Fast Raise/ Lower button down to enter the ground.



16

8. After calibrating turn the switch (1) to **A** (OFF) to save the calibrations.



50

NOTE: *For calibration of the lift, it is advisable to calibrate the* ***arms position control potentiometer*** *and afterwards, without exiting calibration, calibrate the* ***solenoid valves****.*

Enter calibration either with program H1 of menu HH, or with button (1, fig. 46) pressed on rapid ground entry (fully down), then calibrate the lift by following the operations:

- 5, the one that appears on the central display,
- 1, 2, 3 and 4 to calibrate the arms lift potentiometer,
- 6, 7 and 8 to calibrate the solenoid valves.

OVERHAUL

TRANSMISSION, LIFT AND SERVICES ELECTRONIC CONTROL UNIT

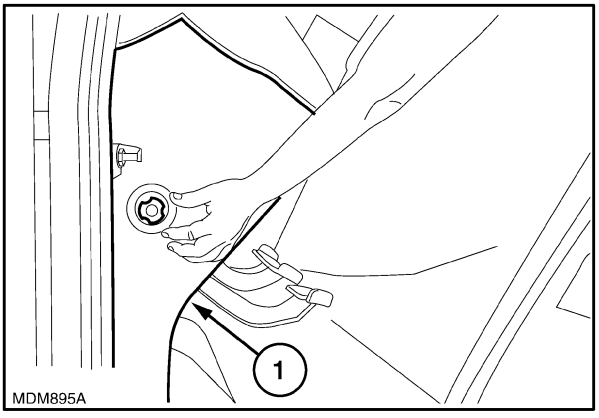
Disassembly

WARNING

Handle all parts carefully. Do not put your hands or fingers between parts. Wear the prescribed safety clothing, including goggles, gloves and safety footwear.

To remove the control unit, proceed as follows:

1. Disconnect and isolate the battery negative lead.
2. Take off the two knobs and remove the guard mounted under the panel on both sides.



51

Installation

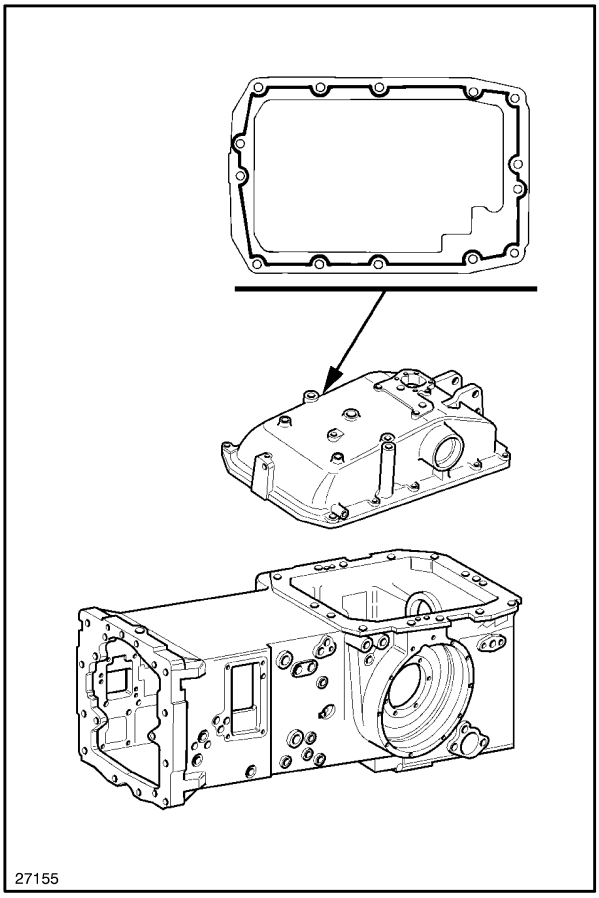
To install the hydraulic lift on the transmission casing, proceed as follows:

WARNING

Use suitable tools to align the holes. NEVER USE FINGERS OR HANDS.

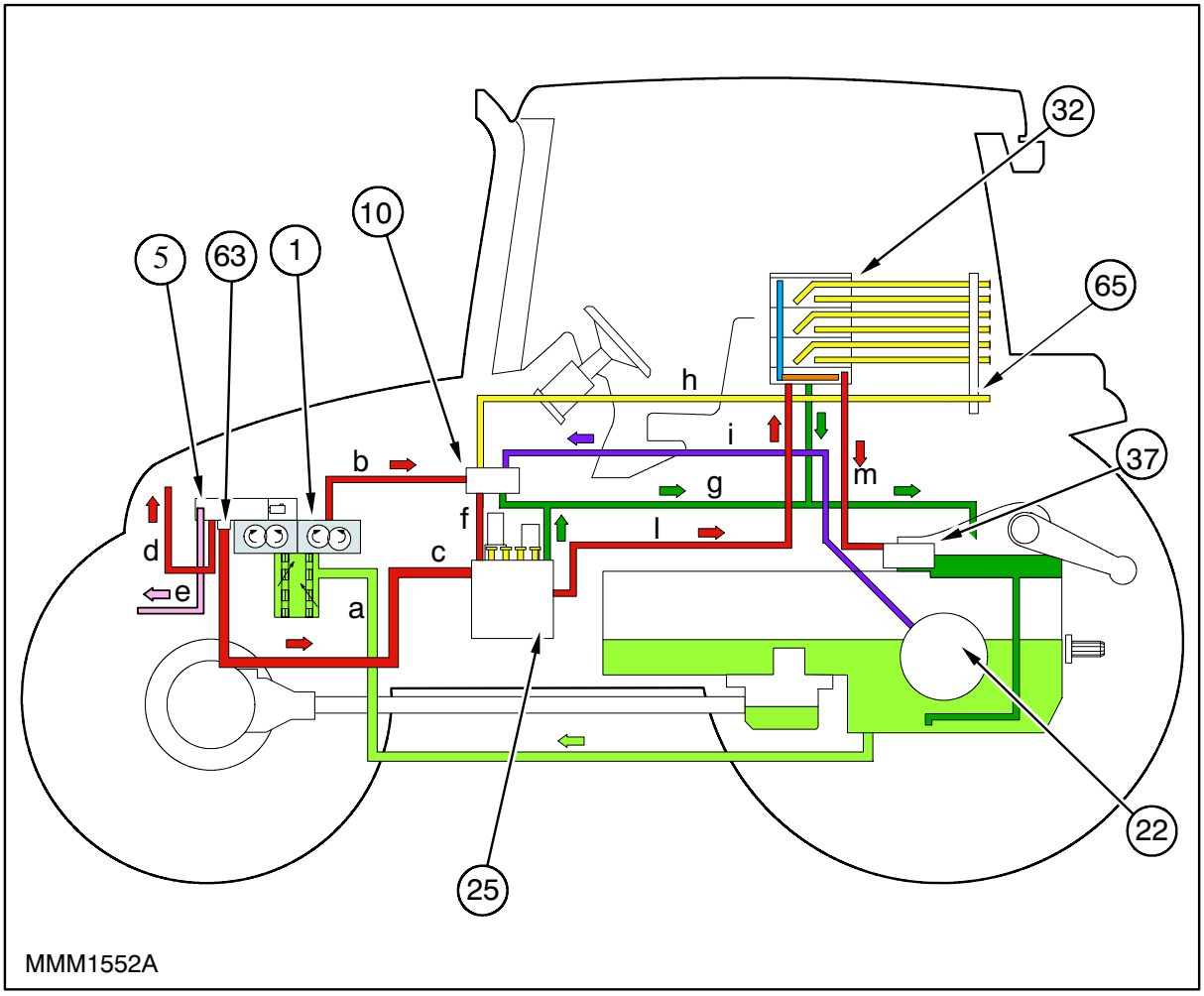
1. Reconnect the gear-synchronized PTO transmission lever.
2. Before reassembling the hydraulic lift on the rear transmission casing, carefully clean and degrease the mating surfaces, then apply sealing compound (approx. 2 mm) along the marked line shown in the drawing 92.
3. Assemble the hydraulic lift using tools **380000238** and **380000224**.
4. Secure the lift and potentiometer in position with the relative bolts.
5. Connect the PTO brake piping.
6. Connect the potentiometer connection, the relative tie-rod and the gear-synchronized PTO lever.
7. Assemble the lift oil delivery line.
8. Connect the lift oil discharge line.
9. Assemble the quick-fit coupler support bracket and connect the relative piping to the auxiliary control valves.
10. Connect the PTO speed sensor connection.
11. Connect the seven-pole and single-pole socket connections.
12. Attach the ground cable to the quick-fit coupler support bracket.
13. Assemble the oil top up pipe and the top link bracket.
14. Fit the quick-fit coupler locknuts.
15. Remove the wooden strip and secure the cab.
16. Assemble and secure the extra jacks.
17. Connect the vertical tie-rods.
18. Fit the third point top link.
19. Fit and secure the rear wheels.
20. Connect the negative cable to the battery.

NOTE: *The types of sealing compound are listed in the Repair Manual, Section 00.*



92

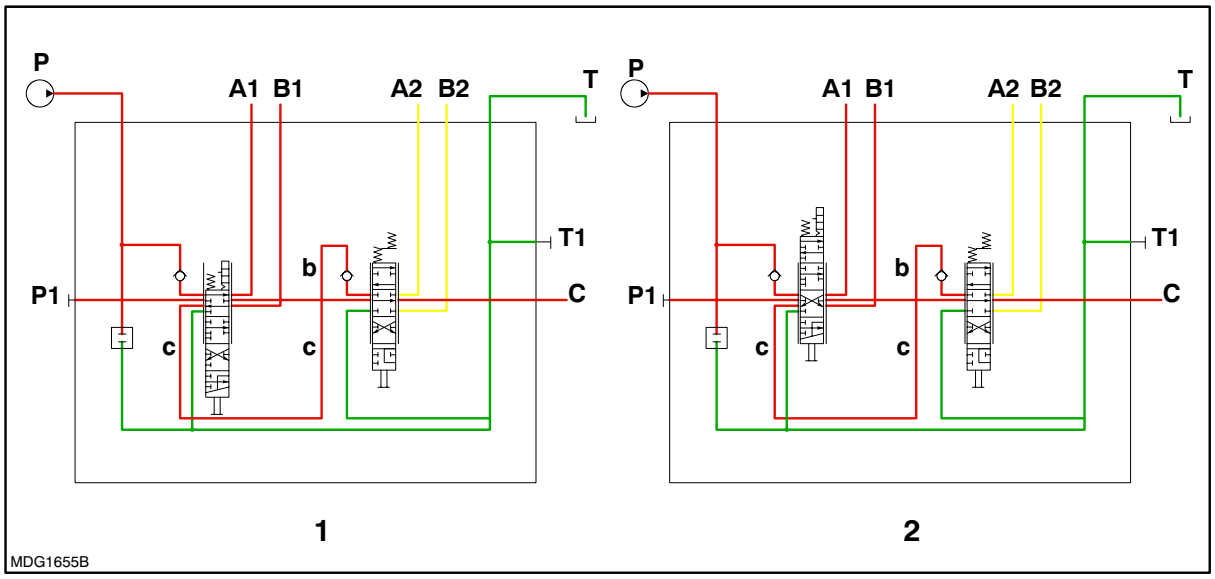
Diagram showing application of sealing compound when fitting the hydraulic lift on the transmission-gearbox casing.



11

High pressure circuit

NOTE: *Key, see page 15.*



28

A_1 Oil delivery for lifting.
B_1 Oil delivery for lowering.
A_2 Oil delivery for lowering.
B_2 Oil delivery for lifting.
C Oil delivery to the other system components (lift control valve).
P Control valve supply (from additional control valves).
P_1 Control valve supply (not used).
T Oil discharge from the control valve.
T_1 Oil discharge from the control valve (not used).
c Line to recover discharge oil from the cylinder of the 1st control valve to flow it into the 2nd control valve supply line.
b Supply line 2nd control valve.
1. Lifting phase 1st control valve.
2. Lowering phase 1st control valve.

Oil at static rest.

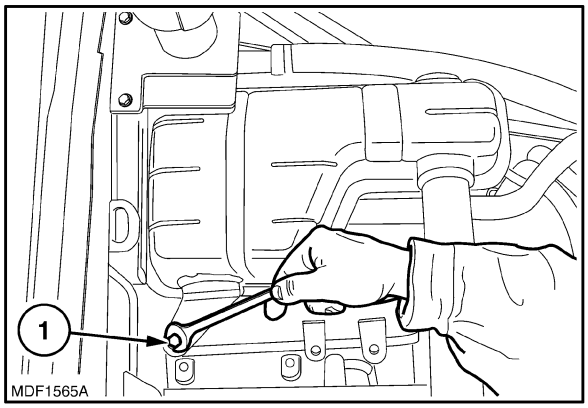
Pressurized oil.

Discharge oil.

One characteristic of these, open center, control valves is that the pump delivery is always available on both pins of the control valve even when operated at the same time.
On operating the first control valve, the one that would shut off the pump delivery as it is nearest the inlet, there will be:

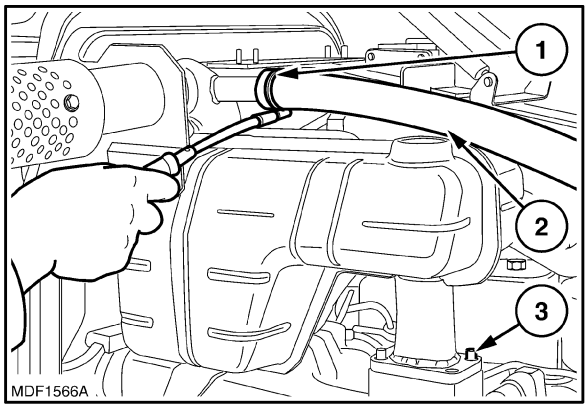
- Oil delivered on the quick coupler A_1, oil discharged from the quick coupler B_1 (1, fig. 28), lifting phase.
  The discharge oil enters the line (c) and supplies the second control valve pin line (b), if this is used.
- Oil delivered on the quick coupler B_2, oil discharged from the quick coupler A_1 (1, fig. 28) lowering phase.
  The discharge oil enters the line (c) and supplies the second control valve pin line (b), if this is used.

4. Take out the three exhaust silencer rear retaining bolts (1).



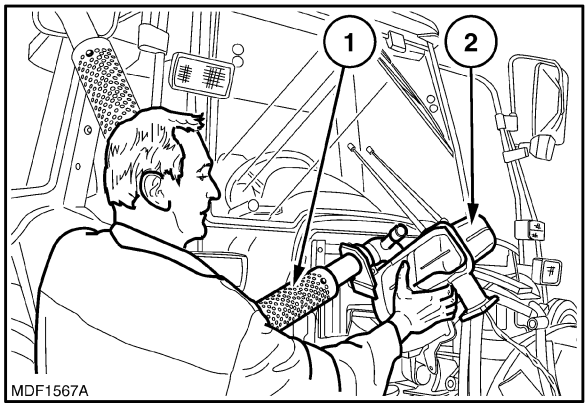
11

5. Remove the clamp (1), the air filter dust ejector pipe (2) and the four nuts (3) securing the silencer to the exhaust manifold.



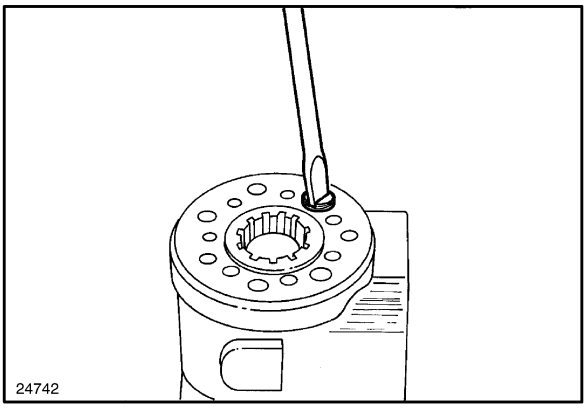
12

6. Remove the silencer (2) together with the exhaust pipe (1).



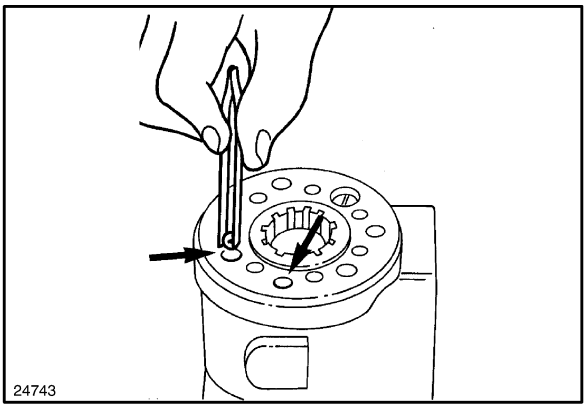
13

15. Screw the threaded plug into the non-return valve seat until the upper surface is below the coupling surface of the control valve body.



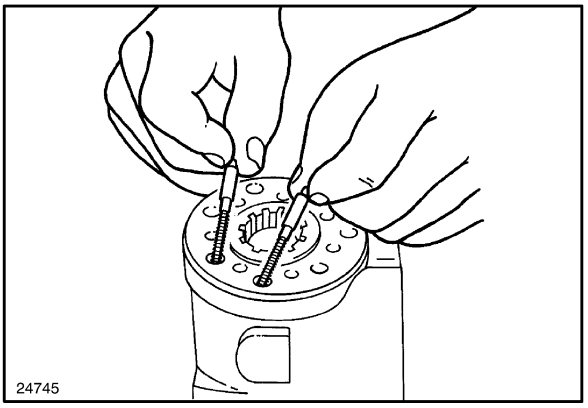
57

16. Insert the non-return valve balls into the two seats indicated by the arrows.



58

17. Position the pins, complete with springs, in the backflow valve seats indicated by the arrows (see fig. 58).



59

TORQUES

PARTS TO BE TIGHTENED	Thread	Tightening Torque	
		Nm	Ft-lbs
Front axle Bolt retaining axle support to engine	M18x1.5	353	260
Stub head locknut for steering transverse tie-rod	M16x1.5	102 to 123.5	75 to 91
Locknut for steering transverse tie-rod	M20x1	176	130
Axle articulation pin retaining bolt (C1 Figure 2)	M10x1.25	49	36
Nut securing leading wheel to hub (C2 Figure 2)	M18x1.5	314	232
Nut for bearing adjustment (C3 Figure 2)	M20x1.5	(*)	(*)
Nut for pin securing end of axle (C4 Figure 2)	M20x1.5	186 to 257.7	137 to 190
Nut for stub axles left and right-hand levers retaining bolt (C5 Figure 2)	M14x1.5	186 to 206	137 to 152
Nut securing cylinder to fulcrum pin (C6 Figure 2)	M18x1.5	186 to 206	137 to 152

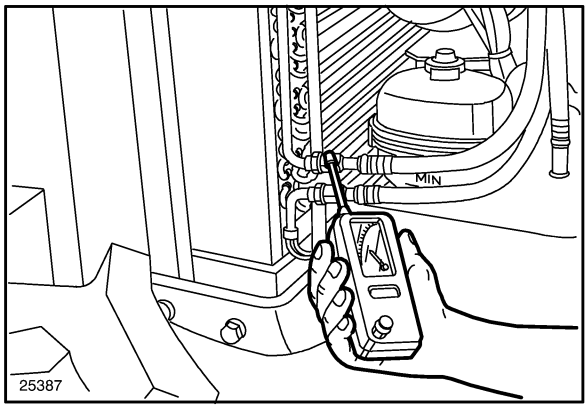
(*) See operations 4. and 5., page 11

SECTION 50 - CAB AIR CONDITIONING SYSTEM

Chapter 1 - Cab Air Conditioning System

CONTENT

CHECKING FOR REFRIGERANT LEAKS USING AN ELECTRONIC LEAK DETECTOR



14

The leak detector **380000314** is supplied in its own carrying case which also contains the two power supply batteries, the sensitivity test phial and an ear plug connection for audible leak indication.

The instrument comprises the main unit and the flexible probe which contain the sensor at the tip.

To correctly position the flexible probe, loosen (counter-clockwise) the thumbscrew located on the bottom left-hand corner of the case.

Mounted on the front of the instrument are the on/off switch, the red on/off LED and the acoustic gas detection indicator.

The socket for the headset connection is on the rear of the instrument. The battery compartment also houses the sensor element and a number of replacement felts.

Use

Set the switch to ON: start looking for leaks; the frequency and the amplitude of the audible signal will increase if gas is detected.

In the area around the leak, switch the instrument on and off again; the instrument will automatically switch to a new acoustic level. Carry out the following test each time you use the detector.

Hold the sensor element close to the open sensitivity test phial; when the detector starts to emit an audible signal, switch it on and off.

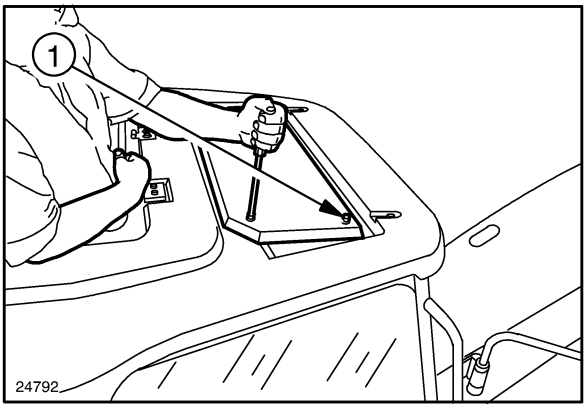
Refrigerant Gas Leak Test

The detector automatically adjusts its sensitivity in accordance with the quantity of gas present in air around the sensor tip when switched on and off.

In ventilated areas it can be extremely difficult to locate the source of a gas leak, as the leaking gas does not remain near the leakage point; in this case, it will be necessary to screen off the area in which the leak is suspected to obtain more accurate readings.

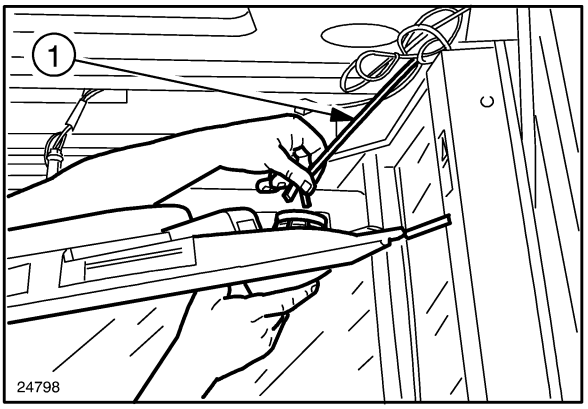
In cases where the presence of large leaks masks smaller leaks, first locate and repair the large leaks before attempting to locate the smaller leaks; this will facilitate the location of the smaller leaks.

5. Unscrew the four bolts (1) securing the evaporator cover.
6. Carry out the disassembly sequences described in section 90 for the **CAB CEILING TRIM**.



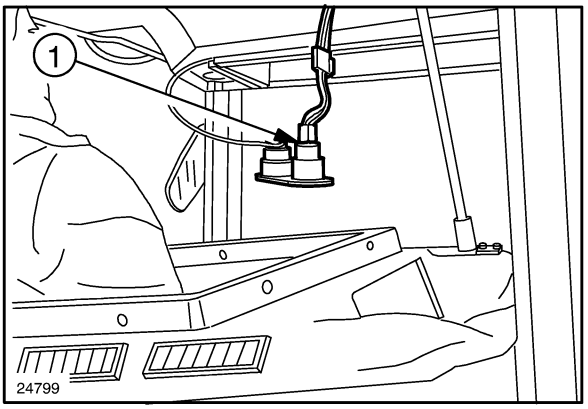
33

7. Disconnect the loudspeaker wires (1).



34

8. Unscrew the retaining screw and extract the fan control unit (1).

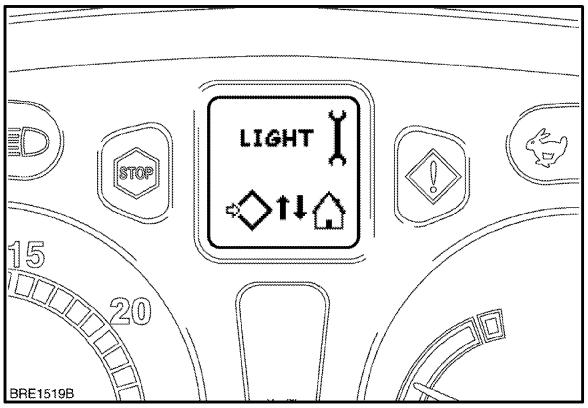


35

From 2 hours before the setting for light maintenance until the maintenance is done, then setting the value or setting another value, the maintenance icon with the remaining time is displayed on the monitor at each start for a time of 4 seconds.

If the time has been exceeded the icon will appear without the remaining time.

NOTE: *If the two intervals have been set at the same time the two icons will alternate for 4 seconds each.*



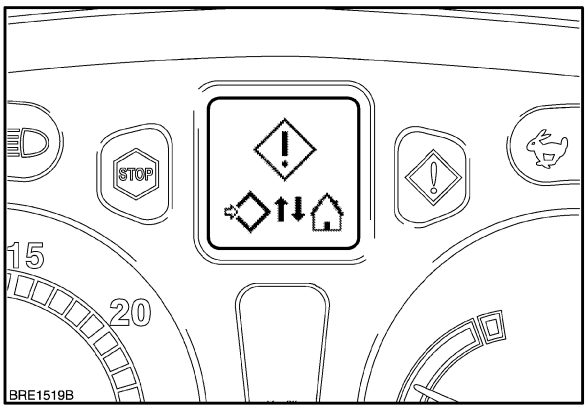
29

Access to the "Warnings Not Displayed" Menu

Go into the SETUP MENU as described above, once the monitor shows CAL, press the UP or DOWN button until the monitor shows the icon in the figure.

Press ENTER to display the warnings.

If there are any warnings not displayed, they will alternate automatically for 4 seconds, up to 3 times, at the end of which the system will automatically go back to the SETUP MENU options.



30

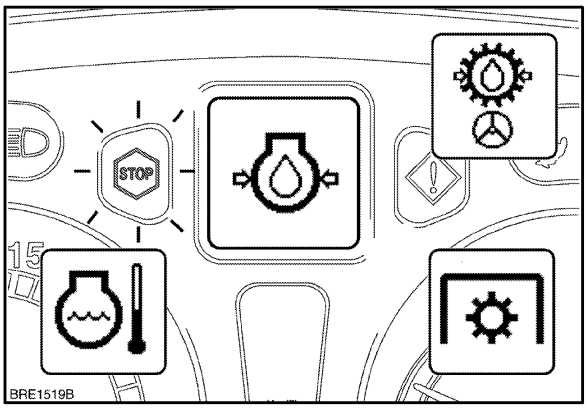
Warnings of a Critical Nature

Should a critical fault occur on the tractor the red warning light to the left of the monitor lights up and the monitor shows the icon relating to the fault.

Stop the tractor and repair the fault. Until the fault has been repaired the icon will remain on the monitor, accompanied by the red critical alarm warning light blinking and the buzzer will sound a critical alarm, at the same time the warning light or indicator on the dashboard will come on.

Serious fault signals comprise:

1. High coolant temperature.
2. Low engine oil lubrication pressure.
3. Low power steering - transmission oil pressure.
4. Leaving the driving seat with the PTO engaged.



31

Advanced Keypad

The advanced keypad comprises 16 keys that make it possible to select, check or program various functions and presentations on the central display. Keys 9, 11, and 12 are used to set and program many of the functions of the advanced keypad.

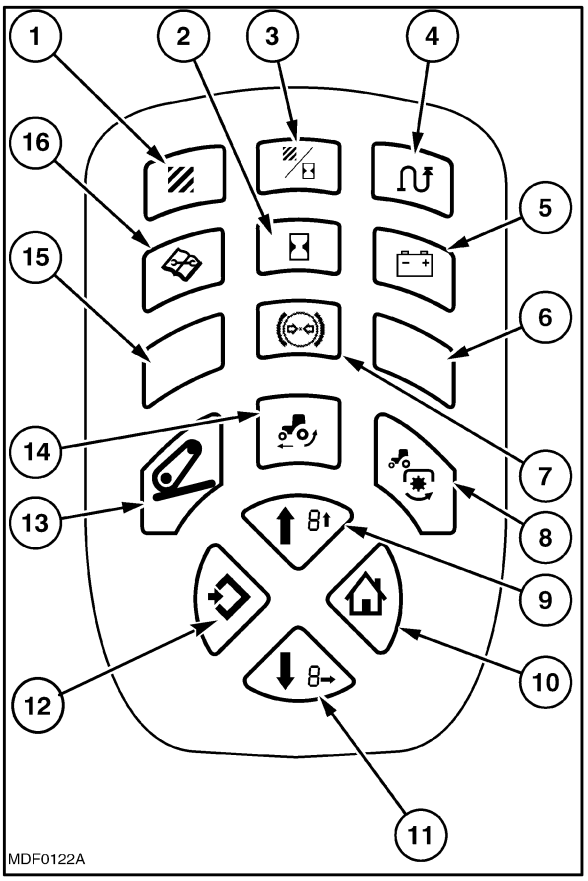
Unless instructed otherwise, press the keys one at a time to bring up the required screen. The monitor will show the confirmation symbol for the selected function.

Key: (D) = Function monitor
(C) = central digital display

1. **Worked area accumulator key (D)**. Pressing this key displays the total area worked in hectares or acres, depending on the set unit of measurement of the ground speed.
2. **Hour meter key (D)**. Press this key to display the total number of hours of engine operation. The hours recorded should be used as a guide to the service intervals for the tractor.
3. **Worked area per hour forecast key (D)**. Pressing this key shows the symbol associated with the area per hour together with a forecast of the area worked in one hour at the rate of work being performed at the time of the check.
4. **Odometer key (D)**. The odometer provides a visual indication of the distance travelled in kilometers or miles, depending on the set unit of measurement of the ground speed. Two display modes are available, 'A' and 'B'.
5. **Battery voltage control key (D)**. With the engine running, press this key to display the battery symbol together with a digital battery voltage indicator.
6. Key with no functions.
7. **Trailer air brake pressure gauge display button (D)**. Press this key to display the air brake pressure gauge.

NOTE: *The air brake function must be enabled in program H3 of the HH MENU on the dashboard, refer to chapter 10 in this section.*

8. **Power Take-Off speed key (C)**. Press this key to display the speed of rotation of the rear power take-off.
9. **Forward scroll key for the menu or numerical value (D)**. Press this key repeatedly to scroll forwards in the menu or change the value of a number.



14

DESCRIPTION AND OPERATION

The type of starting system installed depends on the type of gearbox fitted on the tractor. All systems consist of an ignition key-switch, heavy-duty wiring, a starter motor with an electromagnet, a starter relay and clutch pedal switch. These are the basic circuit components used on versions with mechanical gearbox. More sophisticated systems include other components, which ensure the engine can be started only under the proper conditions.

There are four types of gearbox: two manual ones, base with mechanical reverser (12X12), base with creeper (20X12); The starter circuit (with mechanical power take-off) is illustrated on pages 4. two electro-hydraulic ones with control via electronic modules, one with electro-hydraulic reverser (12X12), one with electro-hydraulic reverser and with Hi Lo (Dual Command/Two-Speed Power Shift) (24X24), the starter circuit is illustrated on page 7.

Only one starter motor available with rated power 4.2 kW. This motor has four poles, four brushes with integrated electromagnet and positive mesh engagement control.

The electromagnet consists of two parallel-connected windings. The low resistance intake winding is grounded via the engine, whilst the high resistance hold winding is grounded via the electromagnet body.

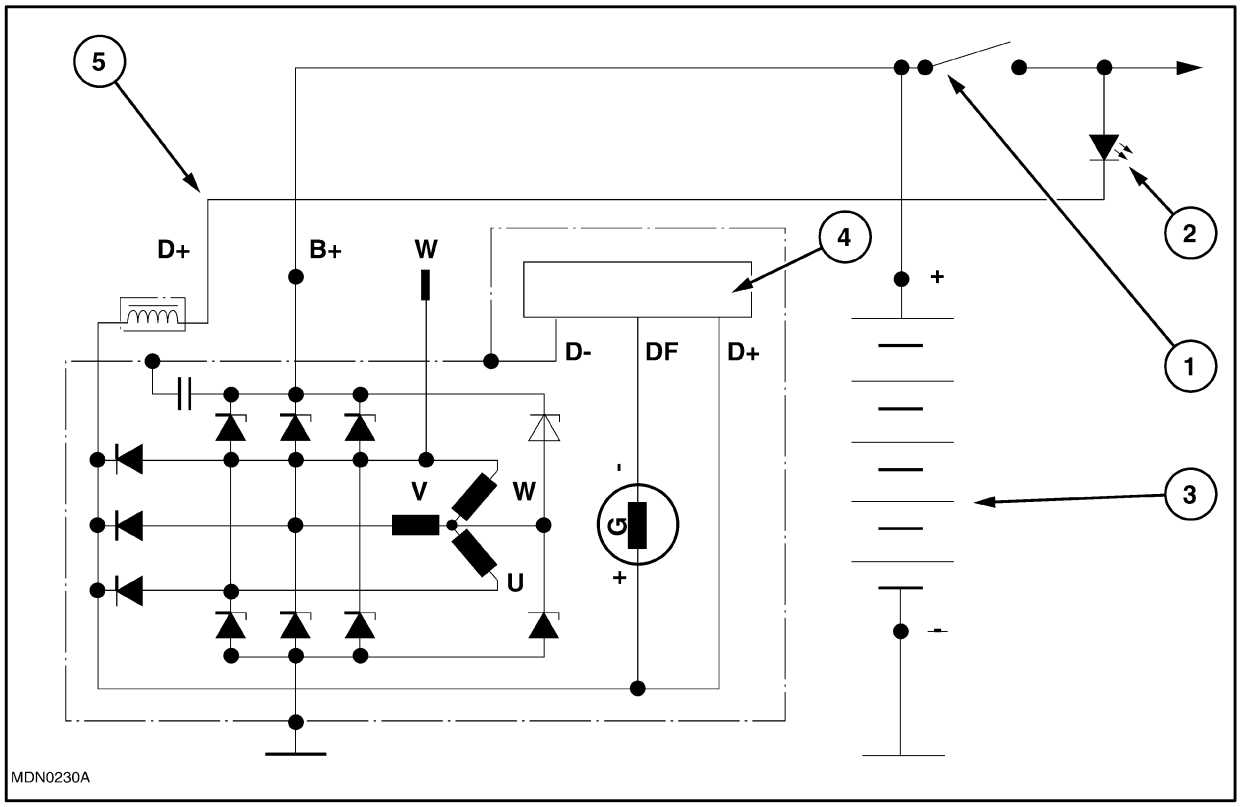
When the key-switch contact is turned on with the clutch pedal pressed and the mechanical power take-off disengaged (version with manual gearbox) or the Shuttle lever in neutral (version with electro-hydraulic gearbox) the electromagnet coils are energized and the plunger is magnetically drawn into the electromagnet. This movement, transmitted by an adjustable joint mechanism, makes the driving pinion engage the flywheel rim gear. When the pinion makes contact with the rim gear, the plunger closes a series of contacts in order to directly power-up all four field coils, thereby supplying full power to the starter motor.

At this stage, one end of the intake coil is connected to the positive battery pole through the starter switch, whilst the other end is connected to the positive battery pole through the solenoid valve contacts. In this manner the intake coil is bypassed, without absorbing power, and the hold coil exclusively maintains the electromagnet plunger in position.

The starter motor includes a series of contacts and a two-part electromagnet plunger that totally closes the contacts, even if the pinion teeth are not perfectly in line with those of the crown wheel. When this happens, a clutch spring compresses the pinion, forcing it to engage completely as soon as the starter motor begins to turn over.

When the key-switch is released, power to the electromagnet and motor is cut off. The electromagnet return spring, acting on the adjustable joint mechanism, frees the driving pinion from the gear and re-opens the solenoid valve contacts.

A roller-type clutch mechanism is incorporated in the driving pinion unit. This prevents the pinion from overspeeding if it remains engaged in the flywheel crown wheel after the engine has started.



2

Alternator charging circuit

1. Starter switch
2. Alternator charge LED
3. Battery
4. Alternator electronic voltage regulation circuit.
5. Alternator

B+ Battery connector
D+ Alternator charge indicator
W Not used

ALTERNATOR OPERATION

Refer to figure 2.

When the starter key is turned, low current passes from the battery through the rotor field wiring. The circuit closes between the LED indicating the charge, the alternator D+ terminal, the rotor field winding, the alternator regulator and earth (ground).

At this point the LED illuminates and the rotor is partially magnetized.

When the engine starts and the rotor, which is partially magnetized, rotates inside the stator windings, three-phase alternating current is generated. A constant quantity of this current is transformed into direct current by three field diodes incorporated in the rectifier unit.

The direct current is then reintroduced into the circuit to increase current flow through the rotor field winding.

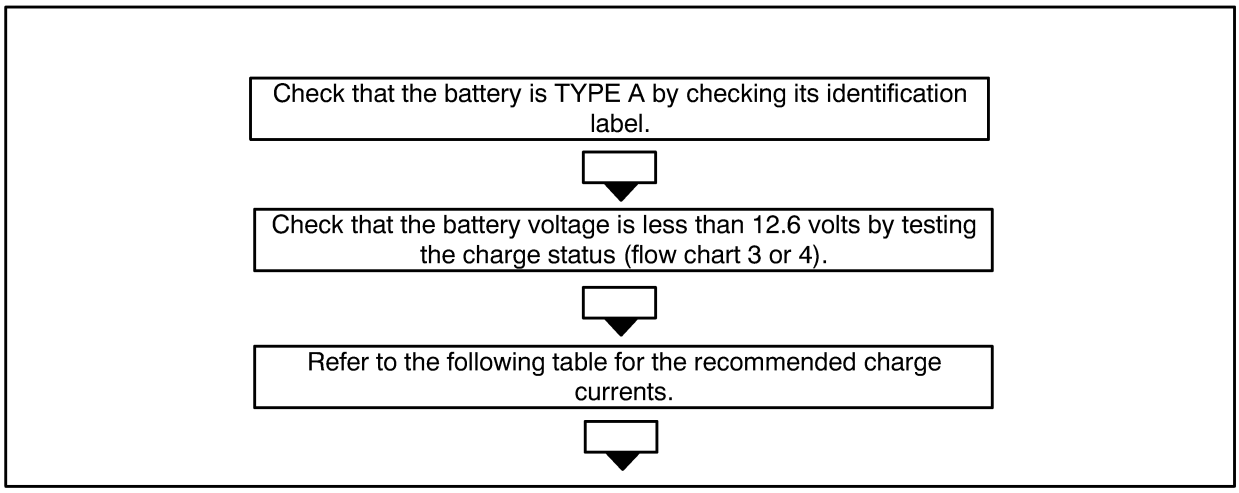
This action causes a constant increase in the rotor magnetic field, together with a rapid increase of current and voltage output.

As the generated voltage output (reflected by D+ terminal) increases, the LED intensity decreases and when the voltage at the D+ terminal equals that on the battery side of the warning light, the light goes out.

Voltage continues to increase until it reaches the pre-stabilized regulated voltage level.

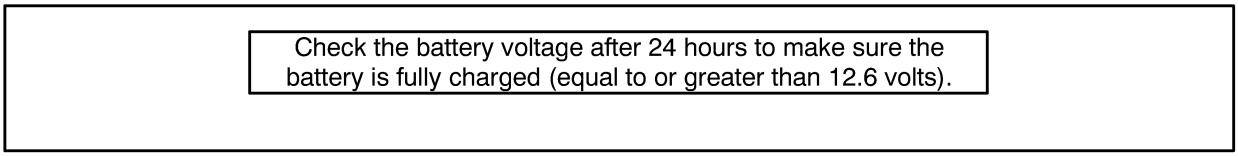
If the driving belt breaks, there will be no voltage accumulation in the alternator. The charge warning light will remain on - indicating the presence of a fault.

CHARGING



Flow Chart No. 8

BATTERY VOLTAGE	RECHARGE CURRENT	RECHARGE TIME	RECHARGE VOLTAGE
Volts	**Amps**	**Hours**	**Volts**
12.2 to 12.6	10% of the nominal value Ahr	4	15.9 to 16.2
Below 12.2	10% of the nominal value Ahr	8	15.9 to 16.2



NOTE: *Check that the charger used to charge the* ***A-Type*** *battery does not have a capacity greater than 16.2 volts, otherwise the battery could get damaged.*

CODE	DESCRIPTION
CONTROL SWITCHES (continued)	
SW-216	Differential lock warning light switch
SW-303	Air filter clogged switch
SW-312	Brake fluid level switch
SW-316	Left brake switch
SW-318	Right brake switch
SW-331	80 liter switch
POWER SOCKETS	
C-21A	ISO seven-pin socket
C-21B	North American seven-pin socket
C-88	Cigar/Cigarette Lighter
C-142	8A auxiliary power socket

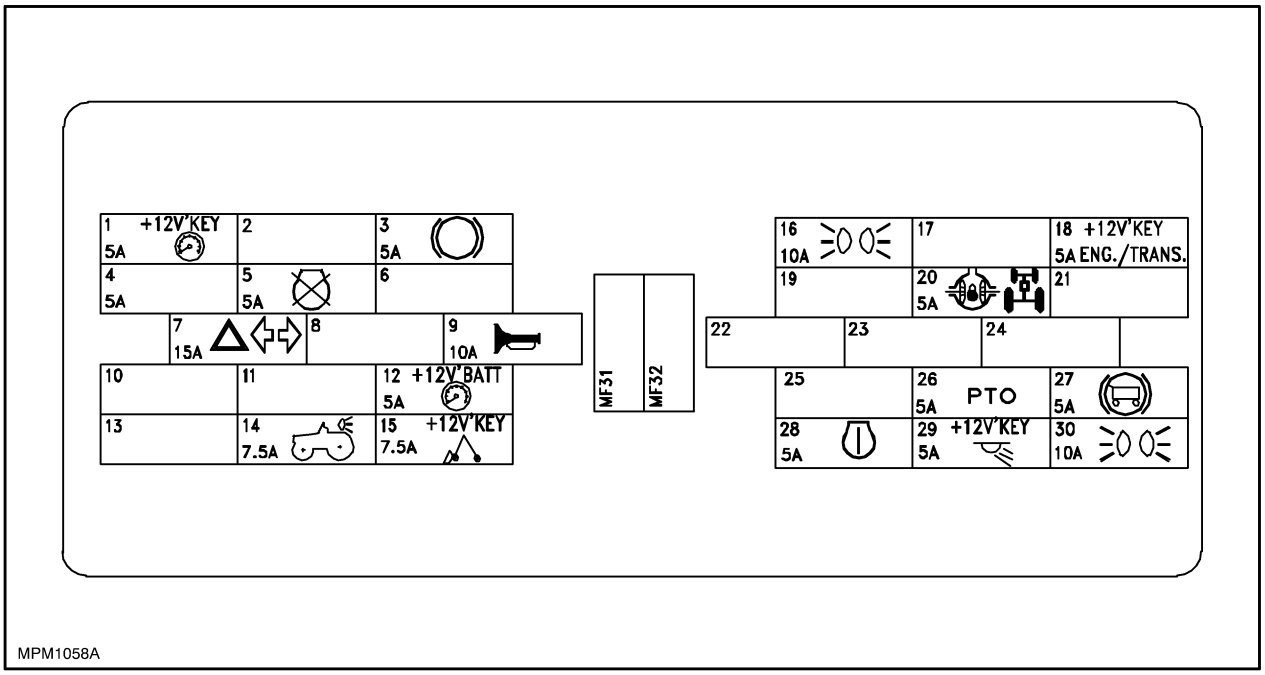
VERSION 4 - MODEL WITHOUT CAB, STANDARD VERSION - ISO

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.

Ready for:

- Electrohydraulic differential lock.
- Electrohydraulic 4WD.
- Electrohydraulic power take-off.
- Trailer brake circuit.



10

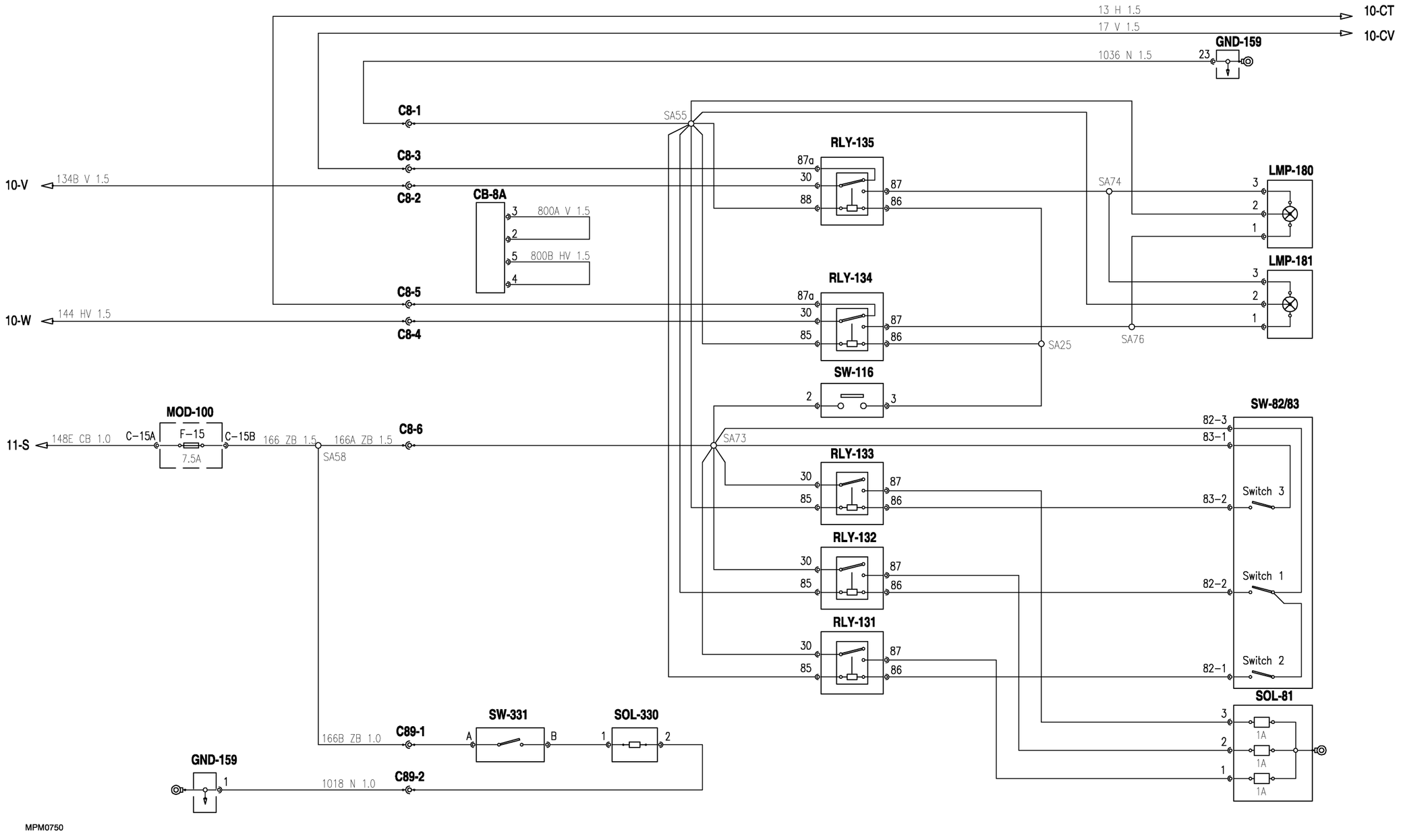
VERSION INDEX

The following pages contain the wiring diagrams for the two versions of the cab model and the three versions of the model without the cab, specifically:

TYPES OF VERSIONS FOR TRACTORS WITH CAB

TYPES OF VERSIONS FOR TRACTORS WITHOUT CAB

FRONT LOADER AND 80 LITER (21.1337 GALLON) COMBINED VALVE CIRCUIT - DIAGRAM 6



MPM0750

WINDSHIELD AND REAR WINDOW WASHER/WIPER CIRCUIT - DIAGRAM 15

SW-29 Front wiper switch

SW-45 Rear wiper switch

GND-92 Cab right upright top ground

MOD-100 Fuse box and main relay

- **F-19** (+30 Key) - Rear wiper and washer pump
- **F-21** (+30 Key) - Front wiper and washer pump

M-138 Wiper motor

GND-146 Ground on left mudguard

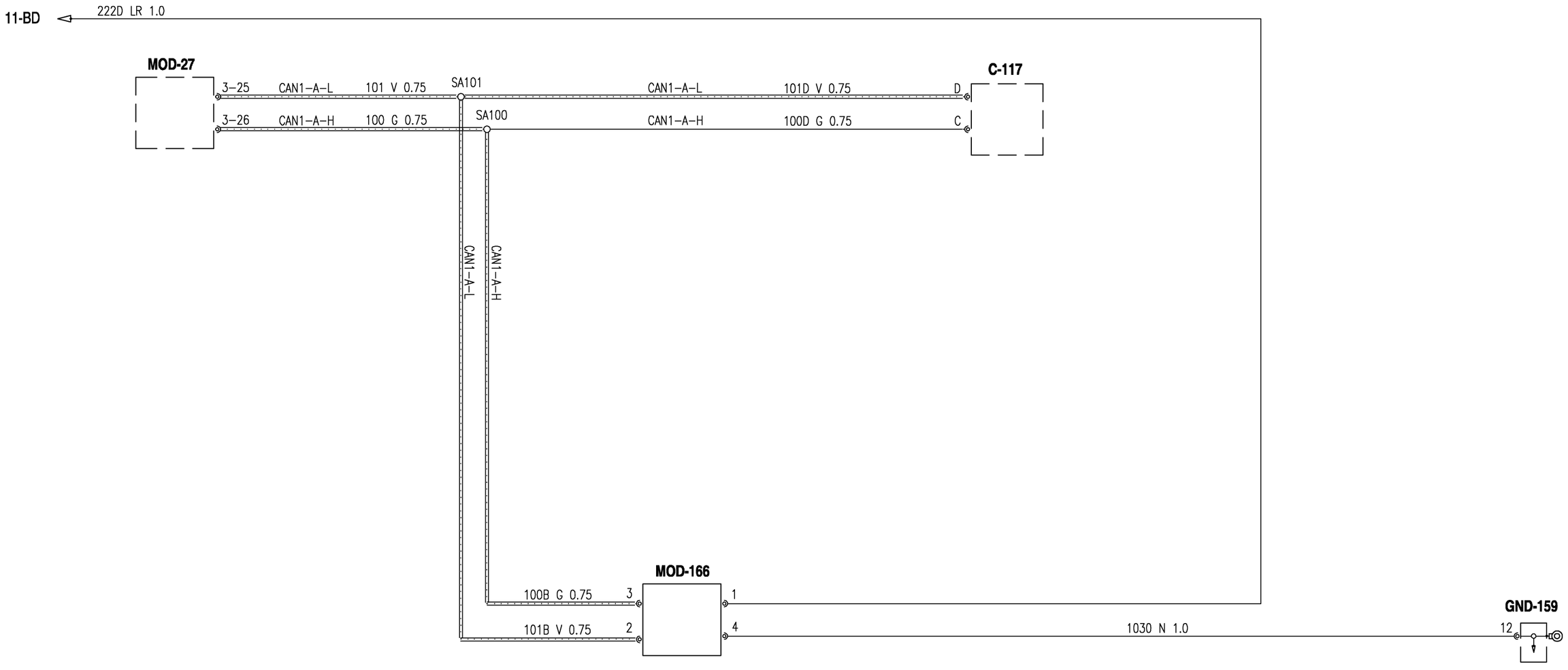
M-147 Windshield wiper pump

M-149 Rear wiper motor

GND-151 Ground on right mudguard

M-163 Rear window wiper pump

DIAGNOSTICS CONNECTION AND CAN LINE CIRCUIT - DIAGRAM 2



MPM0730

POWER SUPPLIES CIRCUIT - DIAGRAM 11

C-1 Cab/engine main connection

F-30/31 Mega-fuse box

- **F-1** 25A (ISO) / 40A (North America) power socket
- **F-2** Power supply fuses No. 6 - 7 - 8 - 9 - 12 - 33 - 34, side lights relay (fuses 16 - 29 - 30)
- **F-3** Power supply +30 starter switch (fuses no. 1 - 3 - 5 - 15 - 17 - 18 - 19 - 20 - 21 - 22 - 26 - 27 - 28 - 35) and +30 starter relay
- **F-4** Power supply fuses No. 36 - 37 - 38 - 40

C-34 ISO rear power socket connector/North America

C-57 Pneumatic seat supply connector

C-75 Ignition switch connection

C-76 Ignition switch connection

C-77 Ignition switch connection

C-78 Ignition switch connection

SW-75/76/77/78 Key-start ignition switch

MOD-100 Fuse box and main relay

- **F-1** (+30 Key) - Instrument (ADIC)
- **F-5** (+30 Key) - Engine stop circuit
- **F-18** (+30 Key) - Engine and transmission services
- **F-22** (+30 Key) - Ventilation/air-conditioning unit, radio
- **F-35** (+30 Key) - Brake lights, seat

GND-159 Dashboard ground

SOL-307 Engine shut-down solenoid valve

COMPONENT	NUMBER DIAGRAM	DESCRIPTION
SEN-340	9	Air brake pressure switch
BAT-500	8	Battery

POWER SOCKET AND TRAILER BRAKE CIRCUIT - DIAGRAM 9

C-2 Cab/transmission main connection

C-11 Cab/trailer brake main connection

C-21 Transmission/seven-pin socket connection

C-21A ISO seven-pin socket

C-21B North American seven-pin socket

MOD-27 Instrument

SW-73 Hand brake switch

MOD-100 Fuse box and main relay

F-27 (+30 Key) - Trailer brake circuit

RLY-1 Hand Brake

RLY-27 Trailer brake circuit

RLY-28 Trailer brake circuit

GND-136 Transmission ground

GND-159 Dashboard ground

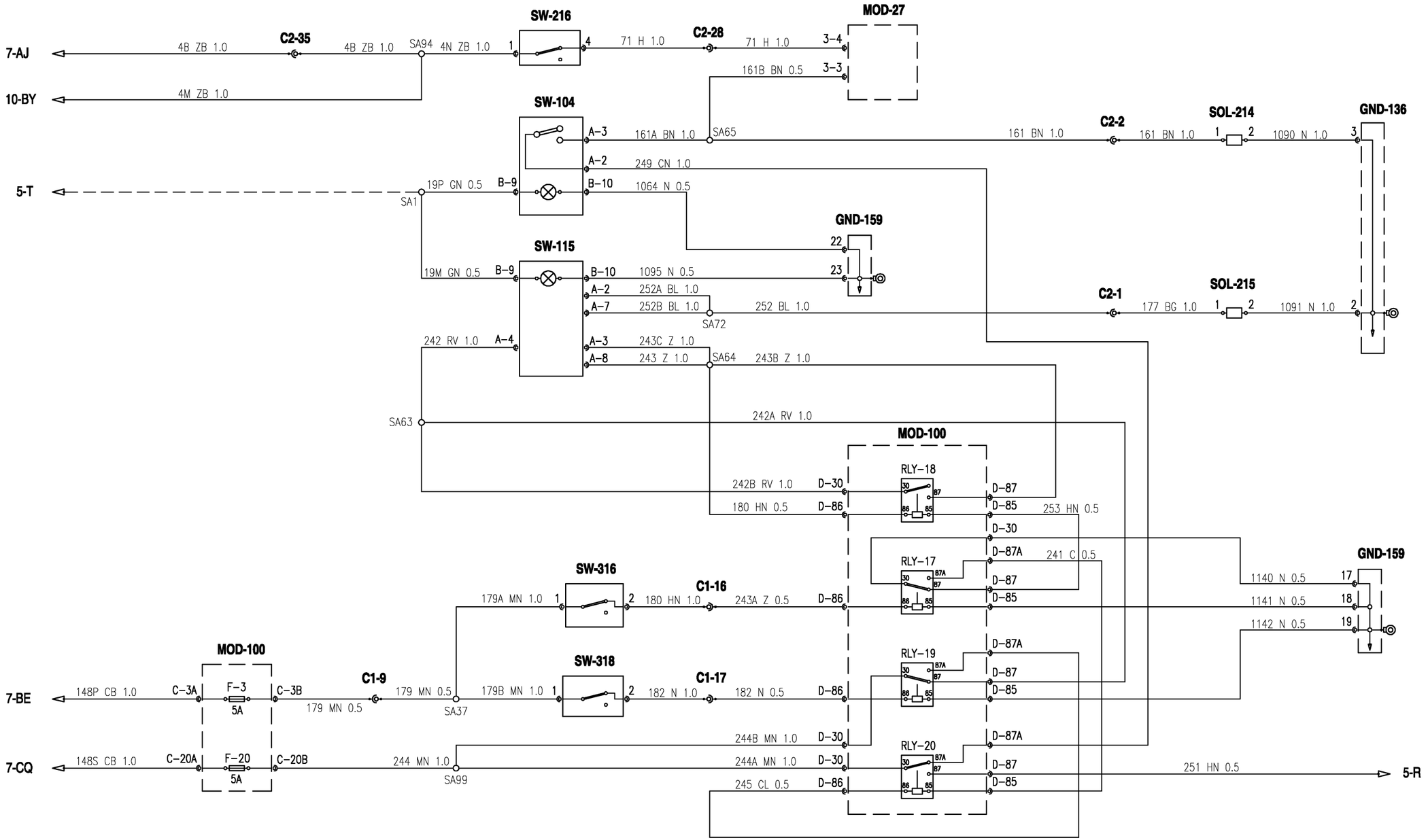
SEN-196 Actuated trailer brake warning light pressure switch 10 bar (145.0377 psi)

SOL-197 Trailer brake solenoid valves

SEN-198 Trailer brake circuit safety pressure switch 3.5 bar (50.7632 psi)

SEN-340 Air brake pressure switch

BRAKES AND DIFFERENTIAL LOCK CIRCUIT - DIAGRAM 2



MPM1007

WORK LIGHTS AND AUXILIARY FUNCTIONS CIRCUIT - DIAGRAM 11

C-1 Cab/engine main connection

C-8 Cab/front loader main connection (b)

MOD-27 Instrument

C-33 Engine/front lights connector

C-89 Connection of fitting for 80 liter pump variant

MOD-100 Fuse box and main relay

- **F-9** (+12V MF2 - 70A) - Horn, 8A power socket, cigar lighter
- **F-14** Rear work light
- **F-15** (+30 Key) - Front loader circuit
- **F-36** (+12V MF4 - 50A) - Front swivel work lights
- **RLY-6** Front swivel lights circuit

SW-112 Grille work lights switch

LMP-128 Rear work light

C-142 8A auxiliary power socket

GND-159 Dashboard ground

AUD-169 Horn

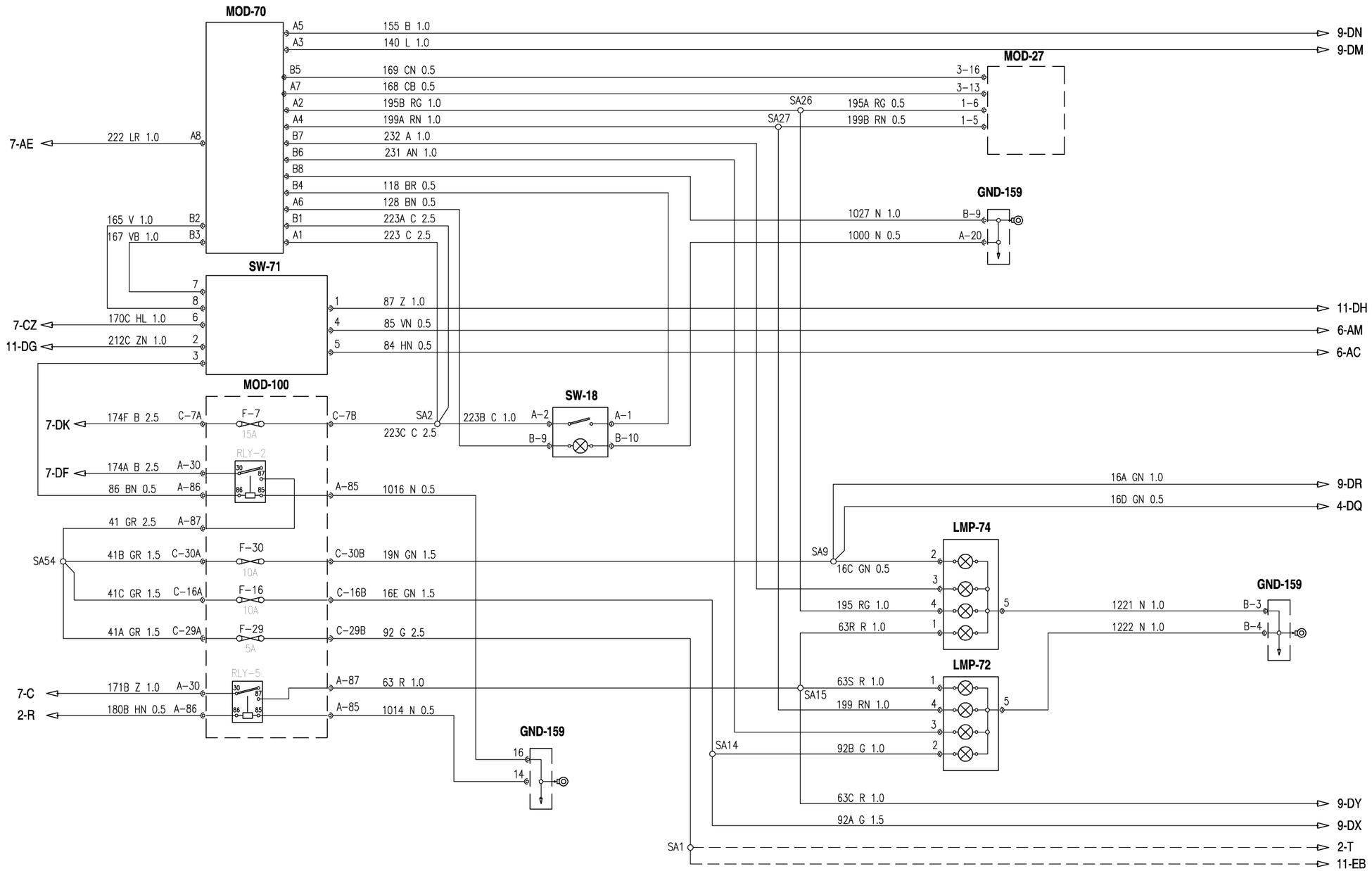
LMP-170 Left grille work light

LMP-171 Right grille work light

SOL-330 80 liter (21.1337 gallon) pump supplement solenoid valve

SW-331 80 liter (21.1337 gallon) switch

DIRECTION INDICATOR AND HAZARD LIGHTS CIRCUIT - DIAGRAM 5

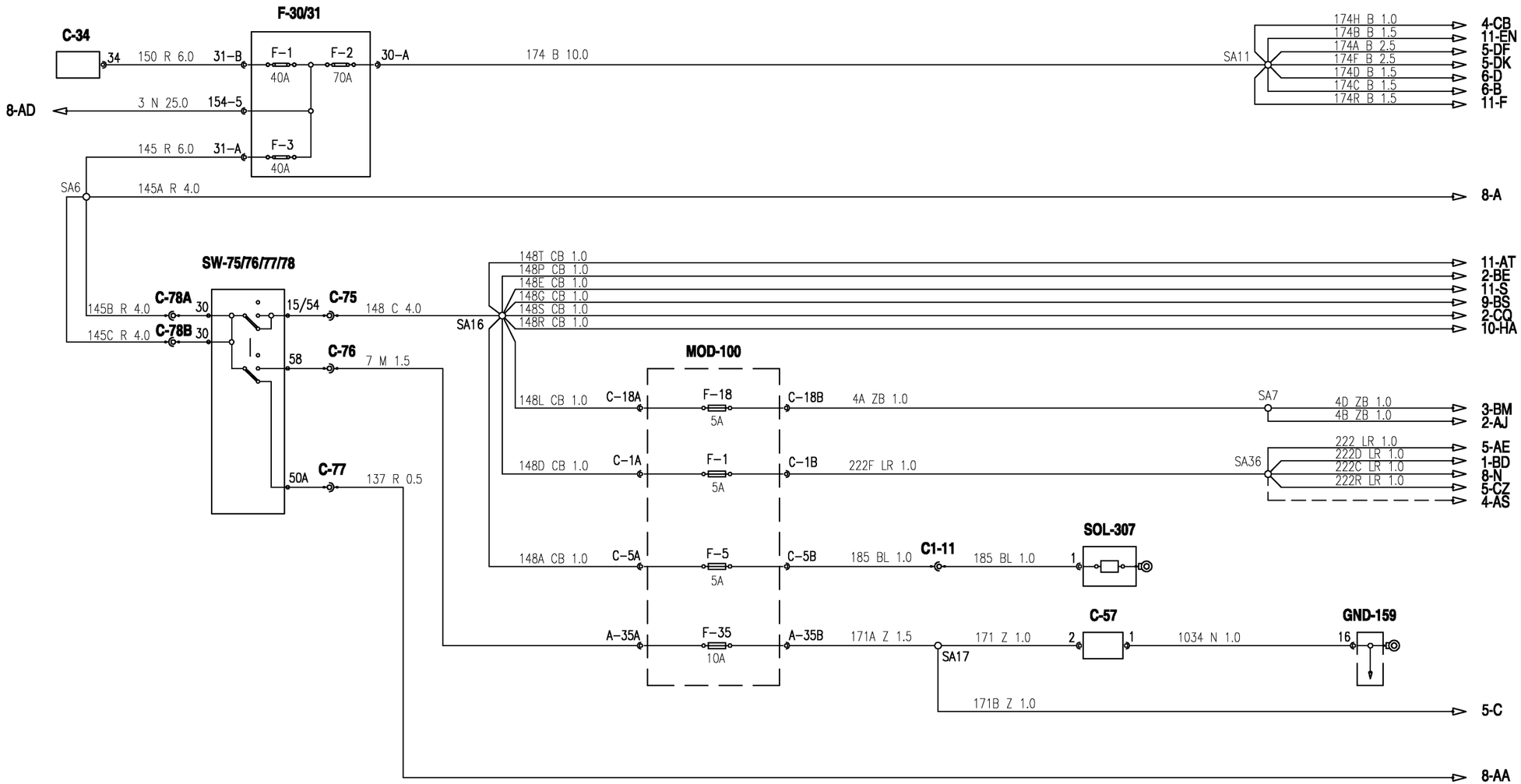


MPM1046

ELECTRICAL CIRCUITS COMPONENTS
VERSION 6

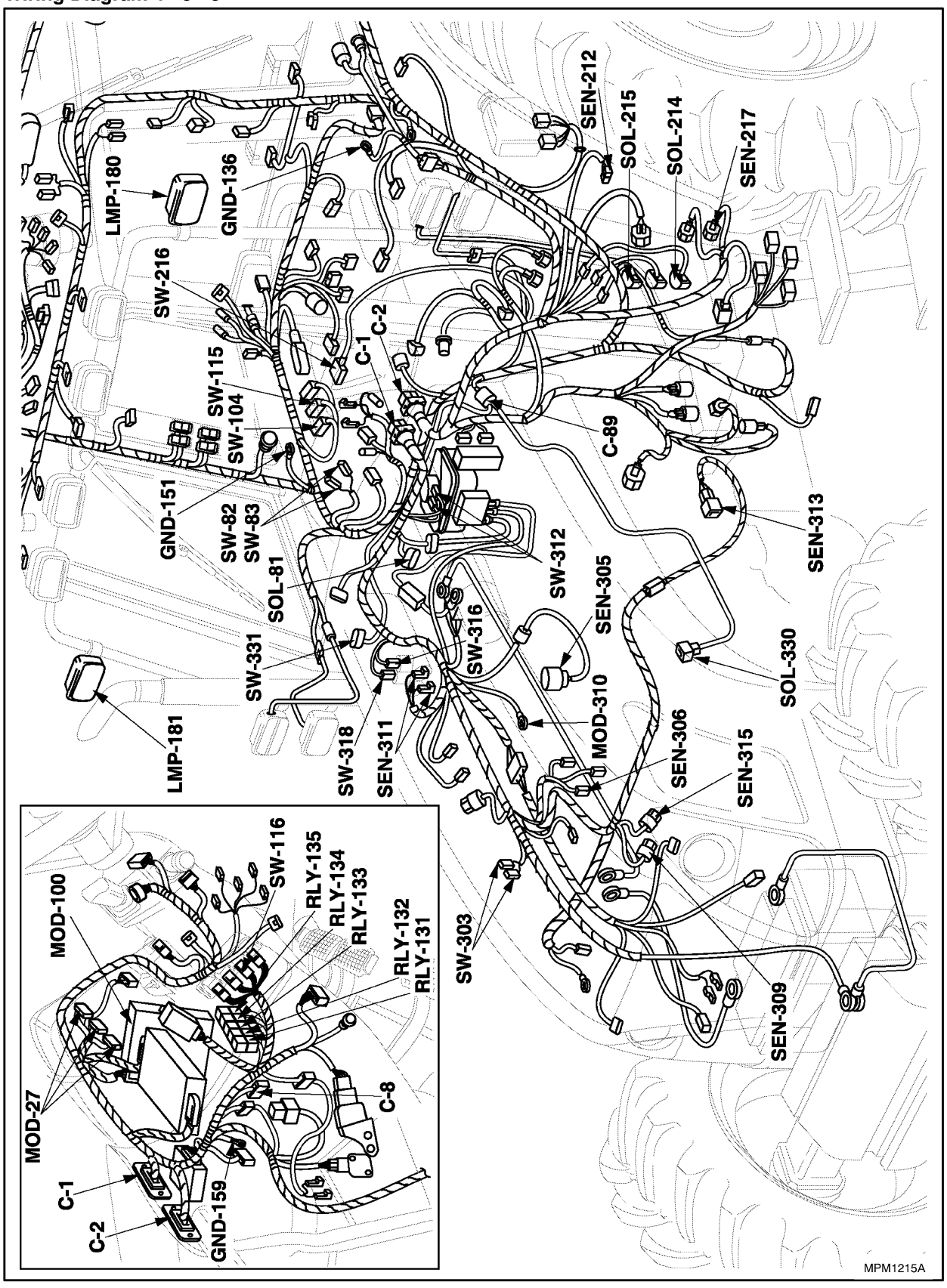
COMPONENT	NUMBER DIAGRAM	DESCRIPTION
C-1	2, 3, 4, 6, 7, 8, 11	Cab/engine main connection
C-2	2, 3, 8, 9, 10	Cab/transmission main connection
C-8	11	Cab/front loader main connection (b)
C-11	9	Cab/trailer brake main connection
SW-18	5	Emergency switch
C-21	9	Transmission/seven-pin socket connection
C-21A	9	ISO seven-pin socket
C-21B	9	North American seven-pin socket
C-23	8, 10	Connection for switch of indicator light/mechanical power take-off safety device
SW-23	8, 10	Safety switch / mechanical power take-off indicator light
MOD-27	1, 2, 3, 4, 5, 6, 8, 9, 10, 11	Instrument
F-30/31	7	Mega-fuse box
C-33	6, 11	Engine/front lights connector
C-34	7	North America rear power socket connector
SW-35	8	Clutch pedal switch
C-57	7	Pneumatic seat supply connector
SW-59	4	Operator present switch
MOD-61	8	Grid heater control unit
SW-64	4	Fast Raise/Lower switch
C-69	8	Grid heater relay connector (coil)
MOD-70	5	Flasher
SW-71	5	Lights switch
LMP-72	5	LH two-faced headlight

POWER SUPPLIES CIRCUIT - DIAGRAM 7

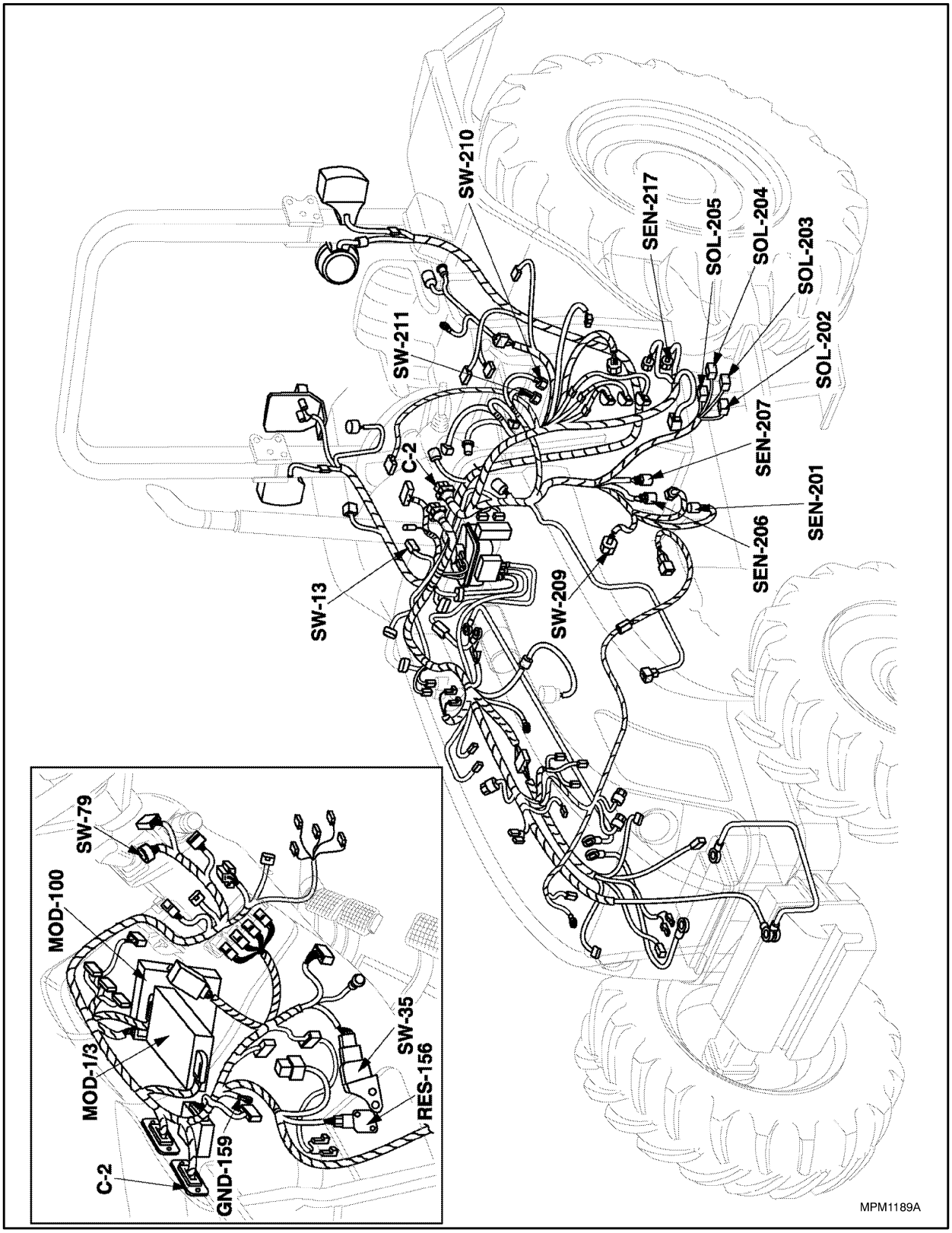


MPM1037

Wiring Diagram 4 - 5 - 6

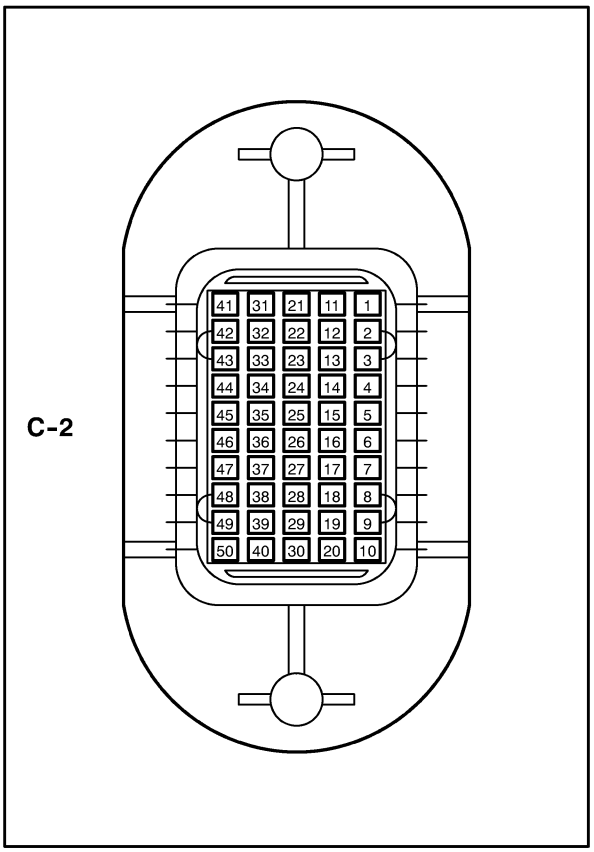


Wiring Diagram 12



Pin	Col.	Sect.	Pin	Col.	Sect.
1	BG	0.5	**26**	HB	0.5
2	BN	1.0	**27**	HN	0.5
3	AG	1.0	**28**	H	1.0
4	AN	1.0	**29**	MB	0.5
5	LG	1.0	**30**	MN	0.5
6	LN	1.0	**31**	VB	0.5
7	LR	1.0	**32**	NG	1.0
8	LV	1.0	**33**	BR	1.0
9	GR	1.0	**34**	ZB	1.0
10	GV	1.0	**35**	ZB	1.0
11	AV	1.0	**36**	S	1.0
12	RG	1.0	**37**	-	-
13	-	-	**38**	-	-
14	L	1.0	**39**	RN	0.5
15	B	1.0	**40**	MV	0.5
16	GN	1.0	**41**	-	-
17	G	1.5	**42**	SB	1.0
18	R	1.0	**43**	-	-
19	BV	0.5	**44**	A	1.0
20	NB	0.5	**45**	-	-
21	-	-	**46**	S	0.5
22	-	-	**47**	BR	1.0
23	-	-	**48**	BL	0.5
24	SN	1.0	**49**	GV	1.0
25	M	0.5	**50**	HV	1.0

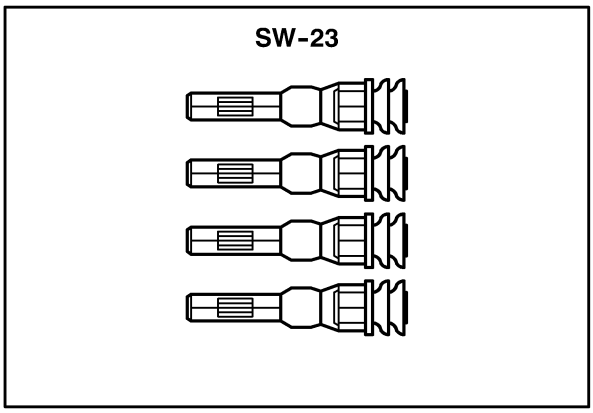
For Model With Cab, Version With Power Shuttle
Main Cable Side



44

Pin	Col.	Sect.	Pin	Col.	Sect.
1	HL	1.0	**3**	M	1.0
2	HG	1.0	**4**	M	1.0

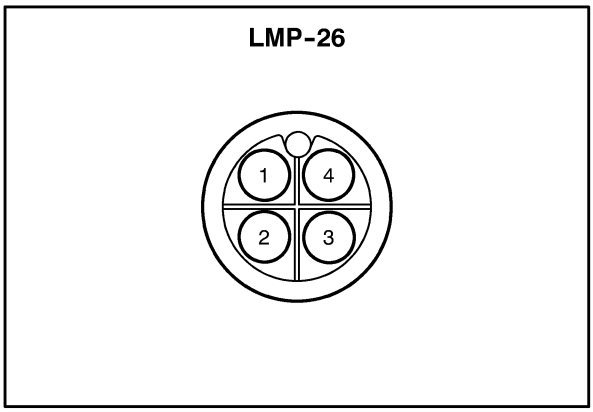
For Models Fitted With Power Shuttle



75

Pin	Col.	Sect.	Pin	Col.	Sect.
1	N	1.0	**3**	AG	1.0
2	–	–	**4**	–	–

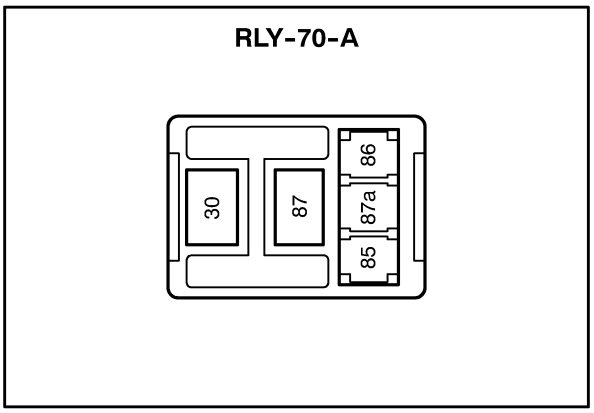
For Model With Cab



76

Pin	Col.	Sect.	Pin	Col.	Sect.
30	BR	1.0	**87**	CB	0.5
85	N	1.0	**87A**	HL	1.0
86	CN	0.5	**-**	-	-

For Model Without Cab (ISO)

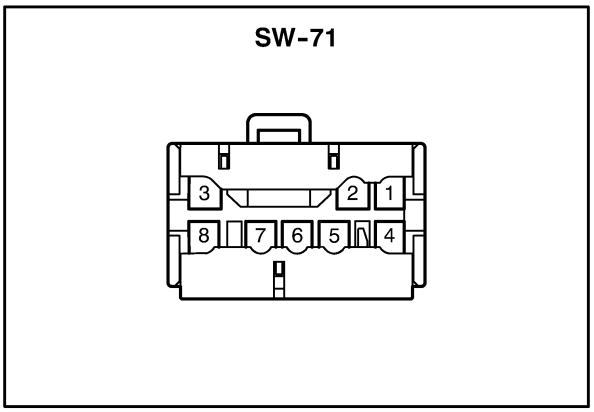


120

Pin	Col.	Sect.	Pin	Col.	Sect.
1	Z	1.0	**5**	HN	0.5
2	ZN	1.0	**6**	LR	1.0
3	BN	0.5	**7**	VB	1.0
4	VN	0.5	**8**	V	1.0

For Model With Cab, Standard Version

For Model Without Cab, Standard Version (North America)

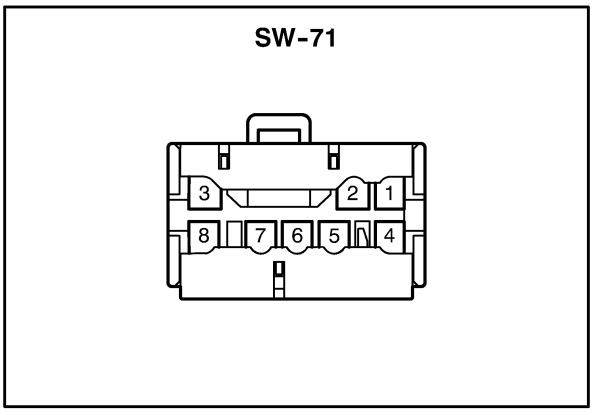


121

Pin	Col.	Sect.	Pin	Col.	Sect.
1	Z	1.0	**5**	HN	0.5
2	ZN	1.0	**6**	HL	1.0
3	BN	0.5	**7**	VB	1.0
4	VN	0.5	**8**	V	1.0

For Model With Cab, Version With Power Shuttle And Electronic Lift

For Model Without Cab, Version With Power Shuttle (North America)

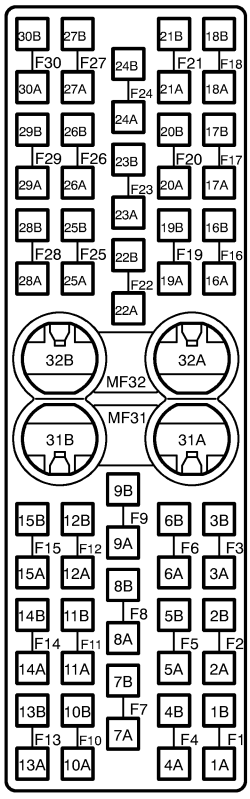


122

Pin	Col.	Sect.	Pin	Col.	Sect.
1A	CB	1.5	**17A**	-	-
1B	LR	1.0	**17B**	-	-
2A	CB	1.5	**18A**	CB	1.0
2B	HL	1.0	**18B**	ZB	1.0
3A	CB	1.0	**19A**	-	-
3B	MN	0.5	**19B**	-	-
4A	-	-	**20A**	-	-
4B	-	-	**20B**	-	-
5A	CB	1.0	**21A**	-	-
5B	BL	1.0	**21B**	-	-
6A	-	-	**22A**	-	-
6B	-	-	**22B**	-	-
7A	B	2.5	**23A**	CB	1.5
7B	C	2.5	**23B**	C	1.5
8A	-	-	**24A**	CB	0.5
8B	-	-	**24B**	R	0.5
9A	B	1.5	**25A**	-	-
9B	ZN	1.5	**25B**	-	-
10A	-	-	**26A**	-	-
10B	-	-	**26B**	-	-
11A	-	-	**27A**	CB	1.0
11B	-	-	**27B**	Z	1.0
12A	R	1.0	**28A**	R	0.5
12B	R	1.0	**28B**	R	0.5
13A	-	-	**29A**	GR	1.0
13B	-	-	**29B**	GN	1.0
14A	CB	1.5	**30A**	GR	1.5
14B	BL	1.0	**30B**	GN	1.0
15A	CB	1.0	**31A**	-	-
15B	ZB	1.5	**31B**	-	-
16A	GR	1.5	**32A**	-	-
16B	G	2.5	**32B**	-	-

For Model Without Cab, Version With Power Shuttle (North America)

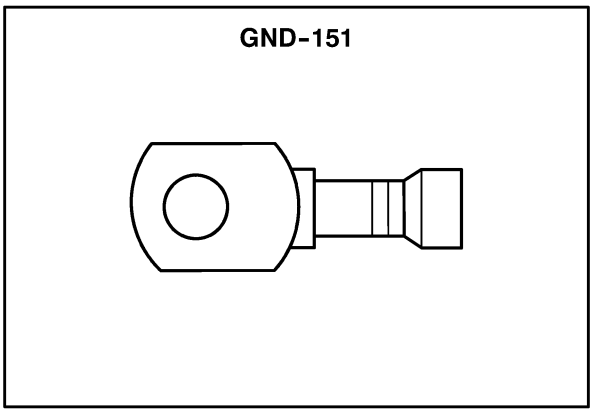
MOD-100C



153

Pin	Col.	Sect.	Pin	Col.	Sect.
1	N	1.0	9	N	1.0
2	N	0.5	10	N	0.5
3	-	-	11	N	1.0
4	-	-	12	N	0.5
5	N	0.5	13	N	0.5
6	N	0.5	14	-	-
7	N	0.5	15	-	-
8	-	-	16	-	-

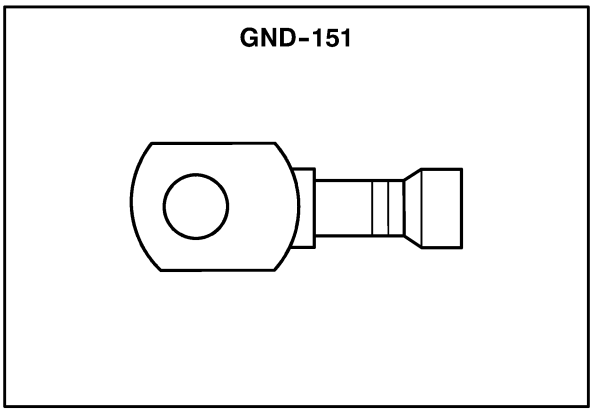
For Model With Cab, Version With Power Shuttle



198

Pin	Col.	Sect.	Pin	Col.	Sect.
1	N	1.0	9	N	1.0
2	N	0.5	10	N	0.5
3	-	-	11	N	1.0
4	-	-	12	N	0.5
5	N	0.5	13	N	0.5
6	N	0.5	14	N	0.5
7	N	0.5	15	-	-
8	-	-	16	-	-
3	-	-	-	-	-

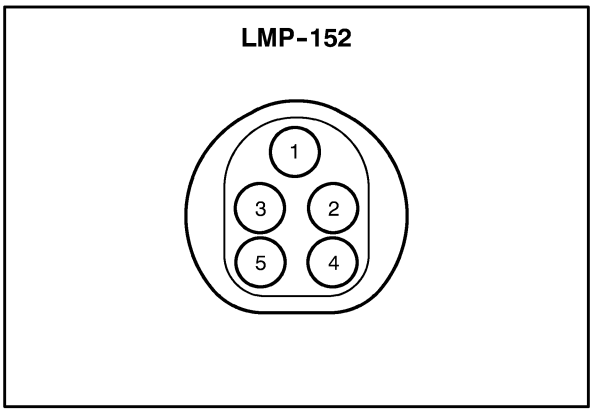
For Model With Cab, Version With Power Shuttle And Electronic Lift



199

Pin	Col.	Sect.	Pin	Col.	Sect.
1	-	-	4	R	1.0
2	N	1.0	5	G	1.0
3	AN	1.0	-	-	-

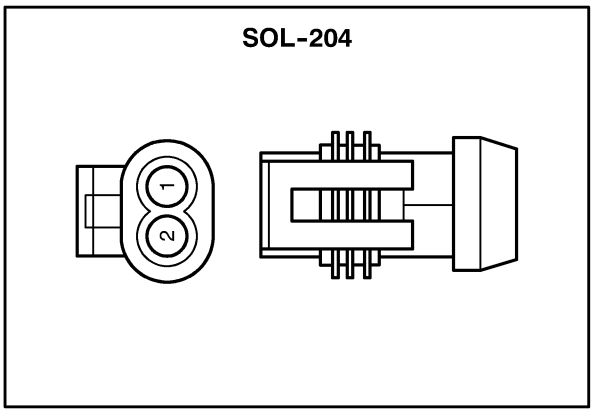
For Model With Cab



200

Pin	Col.	Sect.	Pin	Col.	Sect.
A	LV	1.0			
B	LR	1.0			

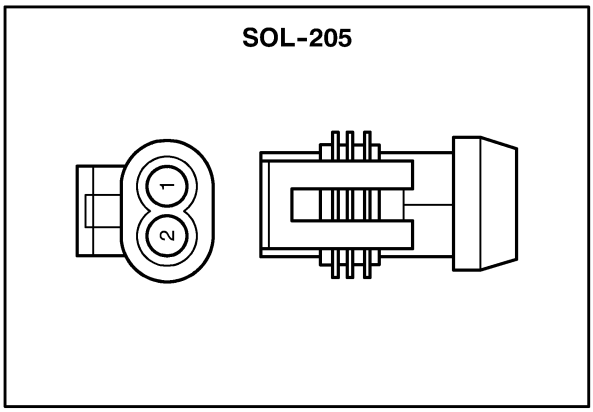
For Model Fitted With Power Shuttle And Electronic Lift



241

Pin	Col.	Sect.	Pin	Col.	Sect.
A	GV	1.0			
B	GR	1.0			

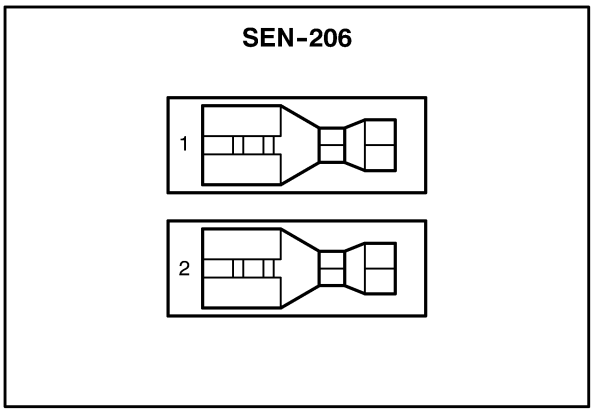
For Model Fitted With Power Shuttle And Electronic Lift



242

Pin	Col.	Sect.	Pin	Col.	Sect.
1	BV	1.0			
2	ZB	1.0			

For Model Fitted With Power Shuttle And Electronic Lift



243

SECTION 55 - ELECTRICAL SYSTEM

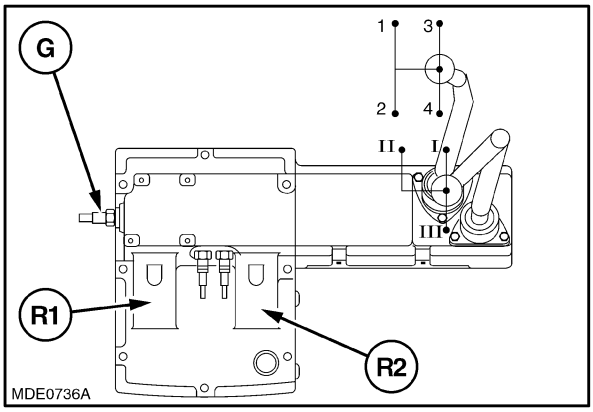
Chapter 8 - Components

CONTENTS

R2 (SW-211)
From pin **2** it sends a signal to pin **26** of **MOD3/1 (3A)** wire **0.5 (MN)** via the driving module transmission main connector **C2** pin **30**.

Functional test

With a tester switched onto ohmmeter putting the rods at the ends of the various switches we will have the values in the tables under the column of Ω, with the various gears engaged.



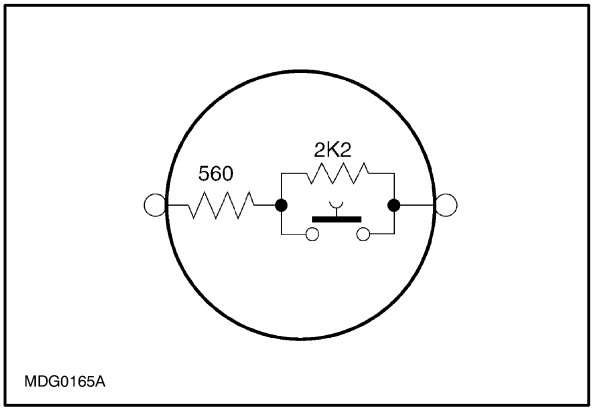
28

In the **TCM module** program **H9** of the diagnostics **HH MENU** of the control unit of the gearbox (TCM) the values in the table are the values that will be read on the display as the engaged gear varies.

In the **TCM module** program **H7** channel **Ch 2** move the gear lever if the gearbox lever status switches have no trouble, the display will show the selected gear.

In the **TCM module** program **H5** on operating the gear and range levers the display will show **d33** (G), **d34** (R1) and **d50** (R2).

With lever in.....	Gearbox sensor **G**		
	Switch status	Ω	Analog-digital conversion **H9** (Channel **16**)
Neutral	Closed	560	67
1st	Open	2760	30
2nd	Open	2760	30
3rd	Open	2760	30
4th	Open	2760	30

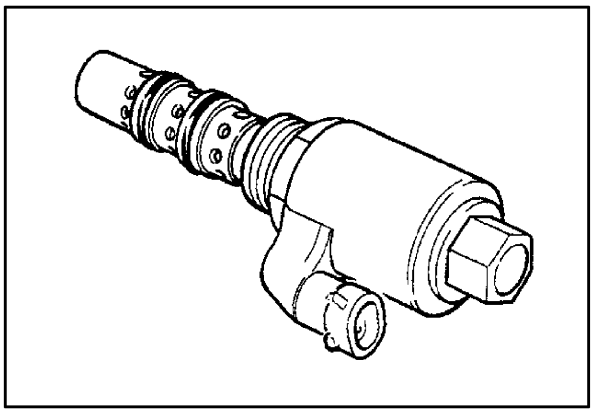


29

With lever in.....	Range sensor **R1**			Range sensor **R2**		
	Switch status	Ω	Analog-digital conversion **H9** (Channel **17**)	Switch status	Ω	Analog-digital conversion **H9** (Channel **18**)
Neutral	Open	2760	30	Open	2760	30
Medium	Closed	2760	67	Open	560	30
Fast	Closed	560	67	Closed	560	67
Low	Open	560	30	Closed	2760	67

PROPORTIONAL SOLENOID VALVES (PWM)

Whenever it is necessary to provide proportional control to the solenoid valves, it is much better to use a principle of operation called pulse width modulation (PWM). PWM is a variable DC voltage signal that is used to control the solenoid valves. The voltage signal is pulsed on and off many times a second (at a constant frequency of 500 Hz) at a constant supply voltage of 12 V.



31

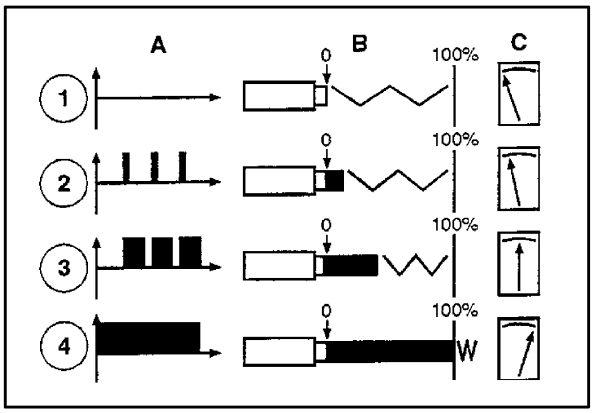
The processors contain transistors that are supplied with a constant input voltage which is switched on and off to achieve the variable input range. In this way the control module is able to limit the armature movement, so the hydraulic output flow of the solenoid is proportional to the average DC voltage. The lower voltage also allows the solenoid to operate with less residual magnetism and so the entire circuit will operate smoother.

The variable DC voltage signal level is determined by varying the duration of the ON pulse relative to the OFF pulse (see Fig. 32). The ratio between the ON time and the cycle time is called duty cycle and is stated as a percentage of one complete cycle.

Please refer to Fig. 32, diagrams 1 to 3 show the normal operating range of the PWM valve, and diagram 4 shows the initial 12V programming and fill time only. The diagrams in column A show the voltage signal that is sent to the valve, whereas column B shows the relevant spring pressure and column C the reading on a voltmeter connected to the solenoid valve.

Diagram 1 shows the OFF position: no signal is directed to the valve, which means no spring pressure in the valve at all and results in a zero voltage reading. Increasing the duty cycle causes some pressure to be made on the circuit (Diagram 2), which results in a voltmeter reading increase. Diagram 3 shows the maximum signal that is used during the normal activity of the valve: its duty cycle is around 0.5, which results in a spring pressure for the half of its run and in an indication of a 6 volt average DC current.

The electrical circuit to the solenoids can be checked by using a digital or analogue DC voltmeter, which will indicate the average voltage readings.



32

Error Code 1003 - No Signal From Speed Sensor

Possible fault modes:

1. Faulty connectors
2. Faulty speed sensor
3. Wiring fault
4. Control unit (XCM) trouble

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check the speed sensor connector **SEN-217**, transmission - cab main connector **C-2**, and the connectors of the control unit (XCM) **MOD-1/3 (1A)** and **MOD-1/3 (1B)**.

   A. Ensure that the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight. Repair or replace as necessary.

   B. If the connectors are okay, continue to step 2.
2. Check the speed sensor.

   A. If the speed sensor is loose in the parking brake housing or damaged, re-tighten or remove and replace the speed sensor as required.

   B. If the speed sensor is okay, continue to step 3.
3. Check the speed pickup gear.

   A. Remove the speed sensor and check for damage to the speed pickup gear inside the parking brake housing. If any damage is indicated, disassemble the housing and replace the speed pickup gear.

   B. If the speed pickup gear is okay, continue to step 4.
4. Check the speed sensor.

   A. Disconnect the connector of the speed sensor **SEN-217**. Measure the resistance between the connector **SEN-217** pin **2**, wire 1.0 **(BR)** and **SEN-217** pin **1**, wire 1.0 **(HB)**. If the resistance indicated is not approximately 680 ± 15% Ohm, remove and replace the speed sensor.

   B. If the value is okay, continue to step 5.
5. Check for an open circuit.

   A. Disconnect the connector of the control unit (XCM) **MOD-1/3 (1A)** and **MOD-1/3 (1B)**. Check between the connector:

   SEN-217 pin **1**, wire 1.0 **(HB)** and **MOD-1/3 (1B)** pin **34**, wire 0.5 **(HB)**

   SEN-217 pin **2**, wire 1.0 **(BR)** and **MOD-1/3 (1A)** pin **23**, wire 1.0 **(BR)**

   If an open circuit is indicated, repair or replace the harness as required.

   B. If the error is still present, download the correct level of software. If the error is repeated, remove and replace the control unit (XCM).

Error Code 1020 - Load Sensing Pin Voltage Too High (Short to + 12 Volt)

Possible fault modes:

1. Faulty connector
2. Faulty load sensing pin
3. Wiring harness faulty
4. Faulty controller

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check the +8 volt sensor supply in **H9**, ch **22**.

   A. If the value displayed is approximately 79, check for an intermittent circuit to the load sensing pin; repair or replace the harness as required. If the error re-occurs and no intermittent circuit is indicated, download the correct level of software. If the fault re-occurs, remove and replace the controller.

   B. If the value displayed is not approximately 79, continue to step 2.

2. Check for a short to +12 volts.

   A. Disconnect the connectors **MOD-1/3 (1B)** and **MOD-1/3 (1A)** of the controller and the connectors **SEN-221** and **SEN-225** of both load sensing pins. Turn the key start ON. Check between:
   SEN-221 pin **3** wire 1.0 **(B)** and **ground**
   SEN-221 pin **2** wire 1.0 **(HV)** and **ground**
   SEN-221 pin **1** wire 1.0 **(BR)** and **ground**
   SEN-225 pin **3** wire 1.0 **(B)** and **ground**
   SEN-225 pin **2** wire 1.0 **(CV)** and **ground**
   SEN-225 pin **1** wire 1.0 **(BR)** and **ground**
   If a voltage is indicated, repair or replace the harness as required.

   B. If harness okay, continue to step 3.

3. Replace the load sensing pin(s).

   A. Remove and replace the load sensing pin(s).

   B. If the error re-occurs, refit the old load sensing pins and download the correct level of software. If the fault re-occurs, remove and replace the controller.

Error Code 1059 - Reference Voltage to 8 Volt Load Sensing Pins, Too High (> +9V), Too Low (< +7V)

Possible fault modes:

1. Faulty connector
2. Wiring harness faulty
3. Faulty controller

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check for other fault codes being displayed.

   A. If any other error code is displayed, continue to these tests.

   B. If no other error code is displayed, continue to step 2.

2. Check the +8 volt sensor supply reference in **H9**, ch **22**.

   A. If the value displayed is not approximately 79, continue to step 3.

   B. If the value displayed is approximately 79, while still in H9, ch 22, wiggle the harness, draft pin connector **SEN-221** and **SEN-225**, connectors **MOD-1/3 (1B)** and **MOD-1/3 (3A)** and the transmission - cab main connector **C-2**, to check for an intermittent circuit. Channel 22 values will change if an intermittent circuit is detected; Repair or replace as necessary.

3. Check for a short to + 12 Volt.

   A. Disconnect the connectors **SEN-221** and **SEN-225**. Turn the key ON, check between:
   SEN-221 pin **3** wire 1.0 **(B)** and **ground**
   SEN-224 pin **3** wire 1.0 **(B)** and **ground**
   If a short to +12 Volt is detected, turn the key OFF. Disconnect the connector of the controller **MOD-1/3 (1B)**. Turn key ON. If a voltage is still indicated, repair or replace the harness as required.

   B. If there is no short to + 12 Volt, continue to step 4.

4. Check for a short to ground.

   A. Check between:
   SEN-221 pin **3** wire 1.0 **(B)** and **ground**
   SEN-224 pin **3** wire 1.0 **(B)** and **ground**
   If a short to ground is indicated, repair or replace the harness as required.

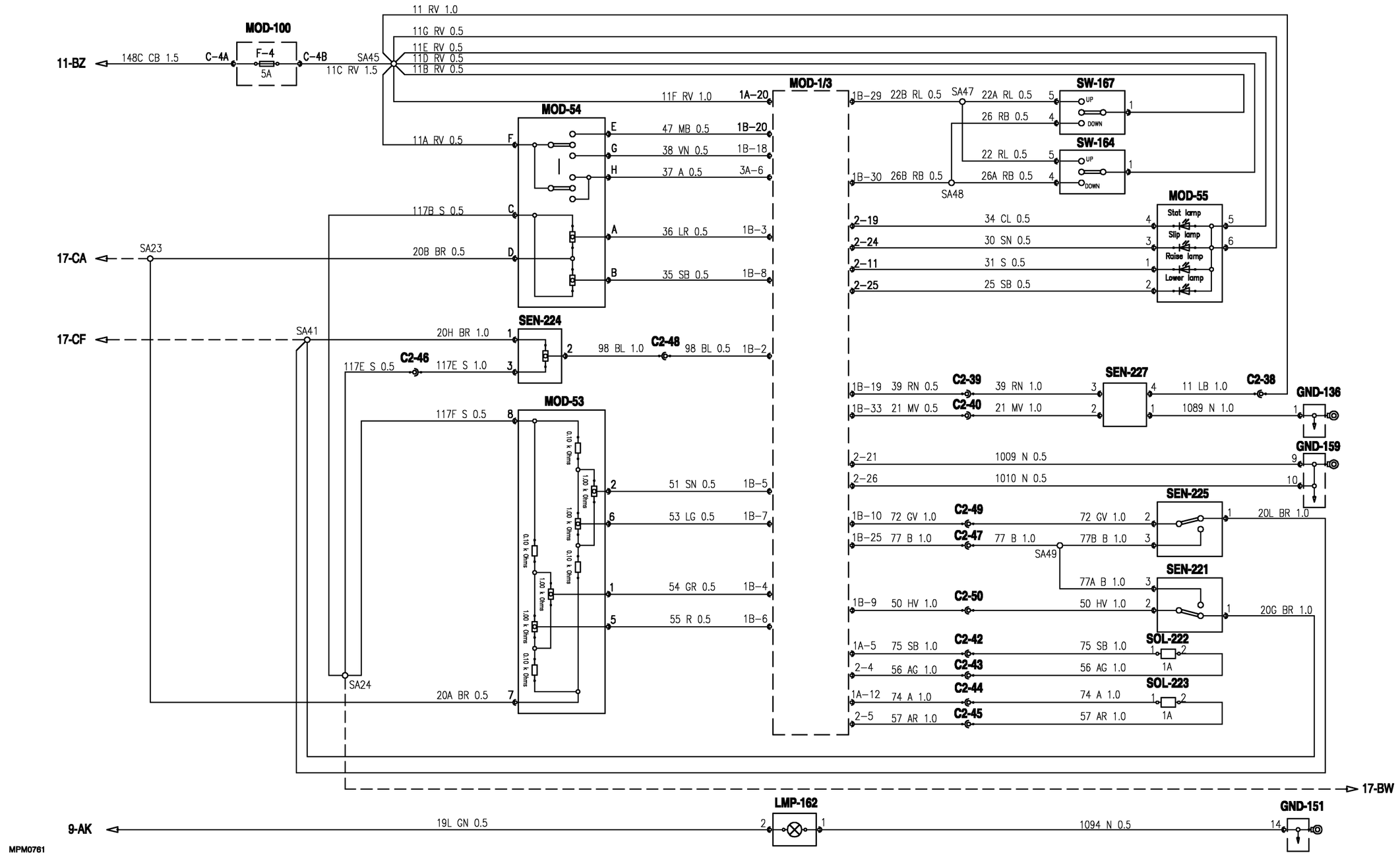
   B. If a short to ground is not indicated, continue to step 5.

5. Check for open circuit.

   A. Check between:
   SEN-221 pin **3** wire 1.0 **(B)** and **MOD-1/3 (1B)** pin **25** wire 1.0 **(B**)
   SEN-224 pin **3** wire 1.0 **(B)** and **MOD-1/3 (1B)** pin **25** wire 1.0 **(B)**
   If an open circuit is indicated, repair or replace the harness as required.

   B. If the harness is okay, download the correct level software. If the fault re-occurs, remove and replace controller.

ELECTRONIC LIFT CIRCUIT (EDC) - DIAGRAM 18



Error Code 2035 – Wheel Speed Too High

Cause:

The advance speed sensor connector is disconnected or in short circuit to ground.

Effects:

The tractor runs but may function irregularly.

Possible fault modes:

1. Faulty connectors
2. Faulty speed sensor
3. Wiring fault
4. Control unit (XCM) trouble

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check the speed sensor connector **SEN-217**, the transmission – cab main connector **C-2**, and the connectors of the control unit (XCM) **MOD-1/3 (1A)** and **MOD-1/3 (1B).**

   A. Ensure that the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight. Repair or replace as necessary.

   B. If the connectors are okay, continue to step 2.
2. Check the speed sensor.

   A. Disconnect the connector **SEN-217**. Measure the resistance between:
   SEN-217 pin **1** and **2**
   If the resistance indicated is not approximately 700 Ohm, remove and replace the speed sensor.

   B. If the resistance is okay, continue to step 3.
3. Check for a short to ground.

   A. Check between the connector:
   SEN-217 pin **1**, wire 1.0 **(HB)** and **ground**
   If a short to ground is indicated, repair or replace the harness as required.

   B. If the harness is okay, download the correct level software. If the error is repeated, remove and replace the control unit (XCM).

Error Code 2054 - + 5 Volt Reference Voltage Too Low

Cause:

Short to ground or break in the circuit of the + 5 Volt supply voltage to the switches of the shuttle lever, clutch pedal potentiometer, gear neutral and range, lift arms height potentiometer and lift control panels.

Effects:

Transmission is critically disabled.

Possible fault modes:

1. Wiring fault
2. Control unit (XCM) trouble

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check for other fault codes being displayed.

   A. If any other error code is displayed, continue to these tests.

   B. If no other error code is displayed, continue to step 2.
2. Check the +5 Volt sensor supply reference in **H9** Channel **21**.

   A. If the value displayed is not approximately 49, continue to step 3.

   B. If the value displayed is approximately 49, while still in H9, ch 5 wiggle the harness, the EDC control unit connectors **MOD-1/3 (1B)** and **MOD-1/3 (3A)**, the EDC control panel connector **MOD-54** and **MOD-53**, the connector **SEN-224** of the arm lift potentiometer **C-2** of the transmission-cab main wiring, the shuttle lever connector **SW-79**, the range and gear lever position sensing button connectors **SW-209**, **SW-210** and **SW-211**, the clutch pedal potentiometer connector **RES-156** to check for an intermittent circuit. Channel 5 values will change if an intermittent circuit is detected; Repair or replace as necessary.
3. Check for a short to ground.

   A. Disconnect the connector **MOD-1/3 (1B)**. Check between the connector:
   MOD-1/3 (1B) pin **17** wire 0.5 **(S)** and **ground**
   If a short to ground is indicated, repair or replace the harness as required.

   B. If the harness is okay, download the correct level of software. If the fault re-occurs, remove and replace the controller.

Error Code 2084 - Clutch B Safety Pressure Switch Short Circuit

Cause:

Short to a voltage between the clutch B safety pressure switch and the control unit (XCM), or the pressure switch is faulty.

During ignition, when the clutch fluid reaches the pressure switch with a pressure of > 11 bar (159.5415 psi), it sends a signal to the control unit (XCM) to enable clutch engagement.

Effects:

Pressure information is not available to the control unit (XCM). The tractor is not operative.

Possible fault modes:

1. Faulty connectors
2. Faulty pressure switch
3. Hydraulic circuit trouble
4. Wiring fault
5. Control unit (XCM) trouble

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check the safety pressure switch connector **SEN-207**, the transmission - cab main connector **C-2**, and the connectors of the control unit (XCM) **MOD-1/3 (1B)** and **MOD 1/3 (3B)**.

   A. Ensure that the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight. Repair or replace as necessary.

   B. If the connectors are okay, continue to step 2.
2. Check the pressure switch for an open circuit.

   A. Disconnect the connector **SEN-207**. Start the engine. Check for an open circuit between the switch terminals. If an open circuit is not indicated, continue to step 3.

   B. If an open circuit is indicated, continue to step 4.
3. Check the hydraulic system pressure.

   A. If the pressure indicated is approximately 16 bar (232.0604 psi), remove and replace the pressure switch.

   B. If the pressure indicated is less than approximately 11 bar (159.5415 psi), continue with the hydraulic troubleshooting procedure.
4. Check there is a short to positive.

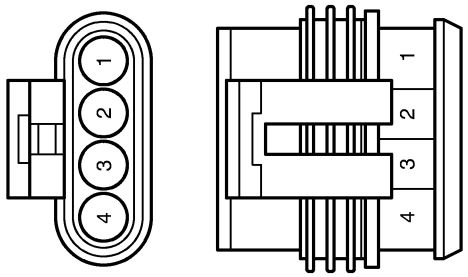
   A. Disconnect **SEN-207**. Turn the ignition key switch 'ON'. Measure the voltage between the connector: **SEN-207** terminal, wire 1.0 **(NB)** and **ground**
   If voltage is indicated, turn OFF the ignition key switch. Disconnect the connector **MOD-1/3 (1B)**. Turn the ignition key switch 'ON'. If a voltage is still indicated, repair or replace the harness as required.

   B. If no voltage is indicated, download the correct level of software. If the error is repeated, remove and replace the control unit (XCM).

Pin	Col.	Sect.	Pin	Col.	Sect.
1	B	0.5	**3**	RN	0.5
2	B	0.5	**4**	R	0.5

For Power-Shuttle version

SW-35

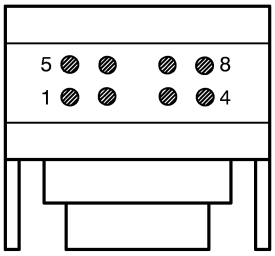


76

Pin	Col.	Sect.	Pin	Col.	Sect.
1	GR	0.5	**5**	R	0.5
2	SN	0.5	**6**	LG	0.5
3	-	-	**7**	BR	0.5
4	-	-	**8**	S	0.5

For model with cab, version with Power Shuttle and Electronic Lift

MOD-53

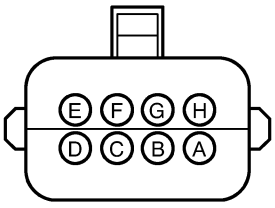


77

Pin	Col.	Sect.	Pin	Col.	Sect.
A	LR	0.5	**E**	MB	0.5
B	SB	0.5	**F**	RV	0.5
C	S	0.5	**G**	VN	0.5
D	BR	0.5	**H**	A	0.5

For model with cab, version with Power Shuttle and Electronic Lift

MOD-54



78

Fault Code 5035 - Short to + 12V From the PTO Switches on the Mudguards

Effects:

PTO disabled.
With the key ON and pressing the push-button the transmission control unit (XCM) signals fault:

Possible fault modes:

1. Faulty PTO switch
2. Wiring fault
3. Control unit (XCM) trouble

Remedies:

NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Disconnect the connector of the control unit (XCM) **MOD-1/3 (3A)** and the connector of the push-buttons on the mudguards **SW-127** and **SW-125**.

   A. Ensure that the connectors are connected, not damaged, the pins are in the correct position and that the fit is tight . Repair or replace as necessary.

   B. If the connectors are okay, continue to step 2.
2. Check the switches are sound.

   A. Disconnect both buttons **SW-127** and **SW-125**. Using a tester switched onto continuity tests, check whether between:
   SW-125 and **SW-127** pin **1** and pin **2** there is continuity
   SW-125 and **SW-127** pin **1** and pin **3** there is continuity only by pressing the button**.**

   B. If the push-buttons work properly, pass on to point 3, otherwise replace the push-button.
3. Check for a short to +12 volts.

   A. Turn the ignition key switch 'ON'. Measure the voltage between the connector**:**
   SW-127 pin **2,** wire 0.5 **(MN)** and **ground**
   SW-127pin **3,** wire 0.5 **(C)** and **ground**
   If positive voltage is detected, turn the key OFF. Disconnect the connector **MOD-1/3 (3A).** Turn the key ON and try again If voltage is still indicated, repair or replace the harness as required.

   B. If no voltage is indicated, download the correct level of software. If the error is repeated, remove and replace the control unit (XCM).

Error Code 14016 - 5V Supply Voltage is Too Low

Possible fault modes:

1. Faulty connectors
2. Short to ground pin **19** of **MOD-27 (1)**
3. Wiring fault
4. Faulty analog-digital instrument cluster (ADIC)

Remedies:

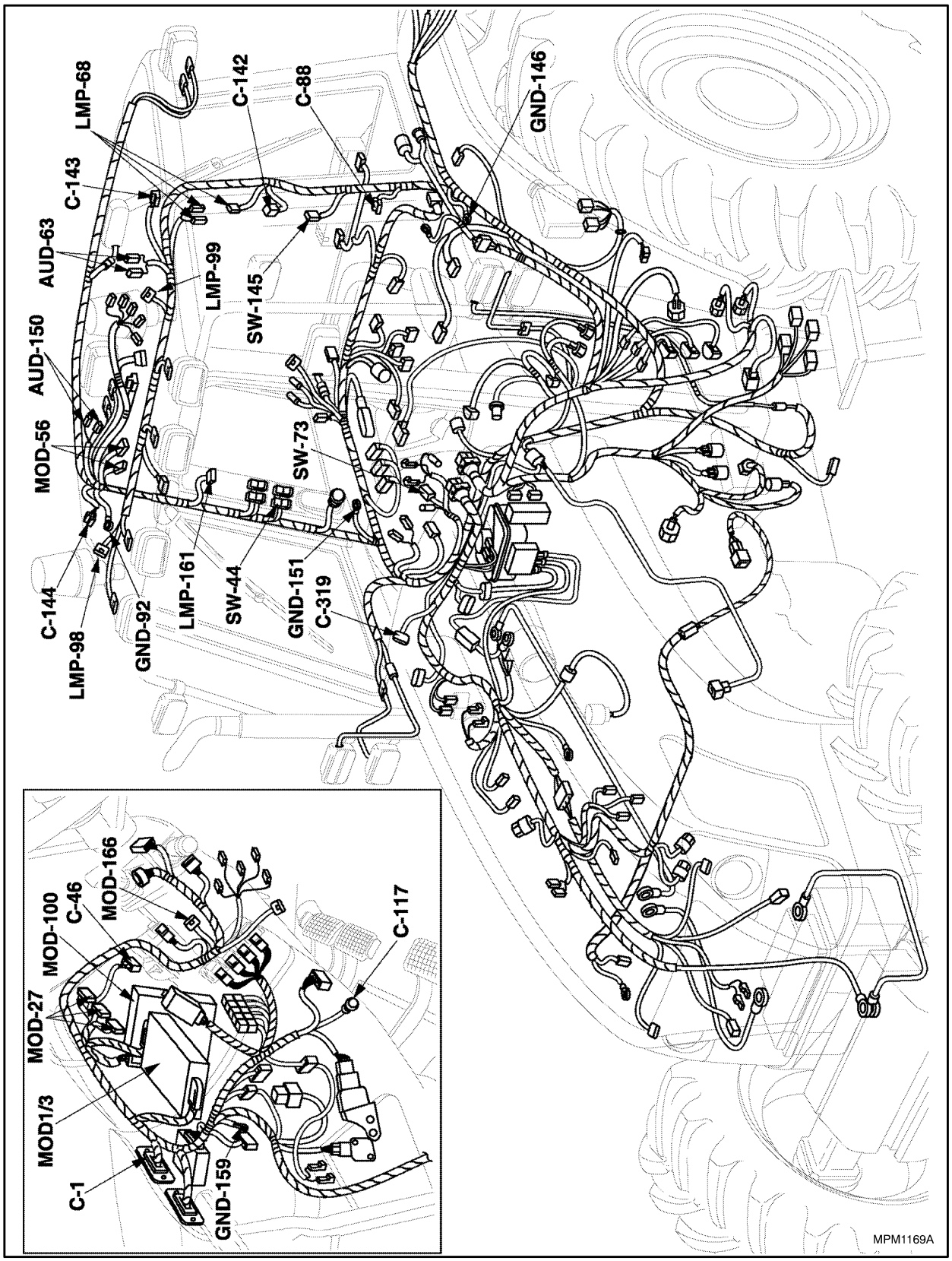
NOTE: *When the cause of the fault code has been rectified, clear the fault code and test the system for normal operation.*

1. Check the instrument cluster (ADIC) connector.

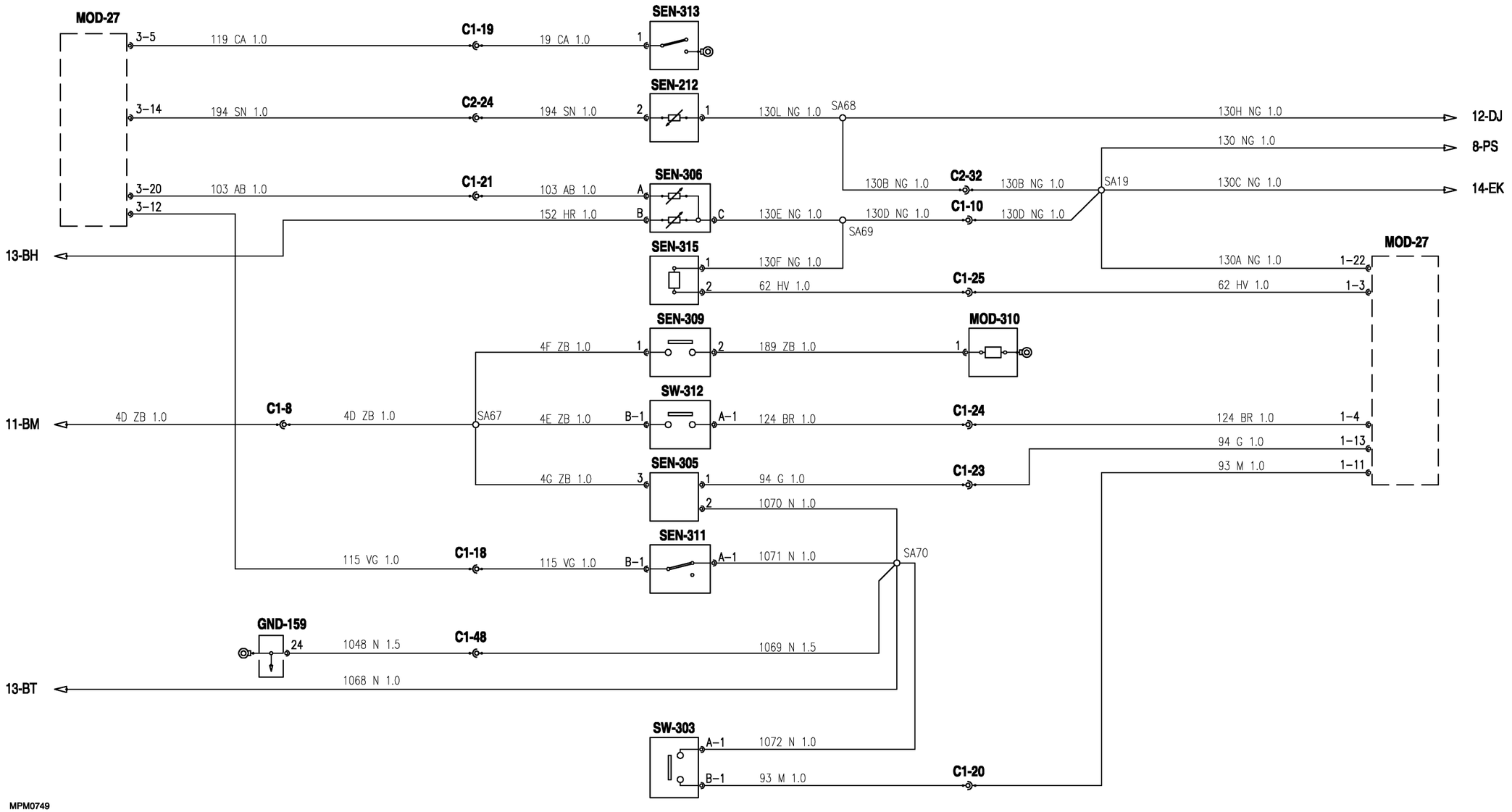
   A. Check in pin **19** of the instrument cluster (ADIC) connector **MOD-27 (1)**, check that it is free and no wires are shorted on the pin. Repair as required.

   B. If the pin is okay, the code may be signalled for a control unit internal error, download the correct software release. If the fault occurs again, remove and replace the control panel (ADIC).

COMPONENT LOCATION DIAGRAMS 1 – 2 – 3



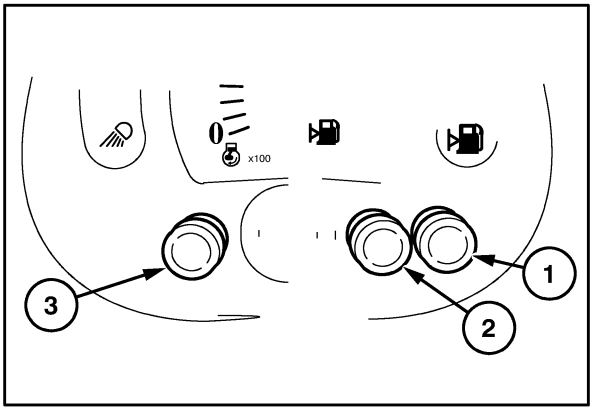
ENGINE, SENSORS AND TRANSMITTERS CIRCUIT - DIAGRAM 5



H9 MENU CONTROL PANEL VOLTMETER FUNCTIONS

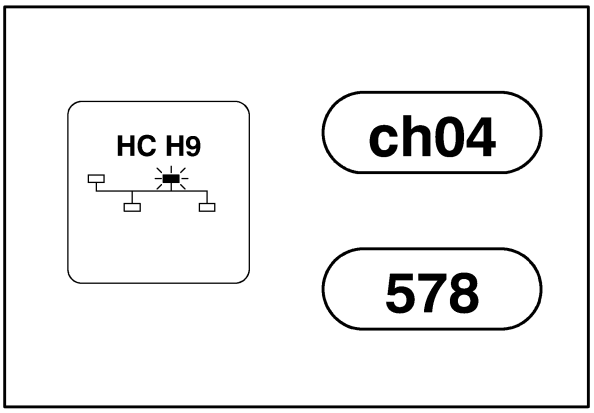
Access the HH MENU HO/HP as described on page 2 and proceed as follows.

- Select the H9 MENU with buttons (1) and (2), press key (3) to access the above-mentioned H9 MENU.



22

- The central display will show the selected channel number followed by the relevant measurement.
- It is possible to select the various channels by pressing buttons (1, fig. 22) and (2, fig. 22).
- Press button (3, fig. 22) to go back to H9, from here it is possible to move through all the menus.



23

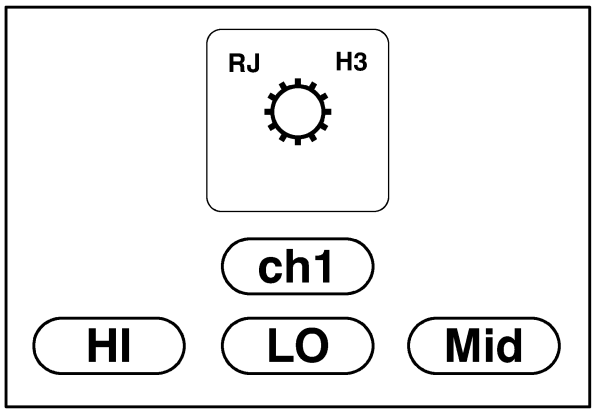
ch	Meaning	Typical Value
4	Supply voltage Vpp	~ 600
5	Sensor supply voltage at 5 V	~ 500
10	Supply voltage 12 VT	~ 600
23	Engine Coolant Temperature Gauge	20 to 950
24	Brake air pressure	40 to 500
25	Fuel level	60 full to 340 empty
26	Operator present (*).	-

(*) If in the H3 MENU you have selected the OLD operator present switch option, the diagnosis is done in H5 (switch transition test), if you have selected the NEW option the diagnosis can be done in H9 (switch signal analog reading).

- Select the gearbox (ch1), the central display will show the options: HI, LO and Mid (pick-up value with gear shift).

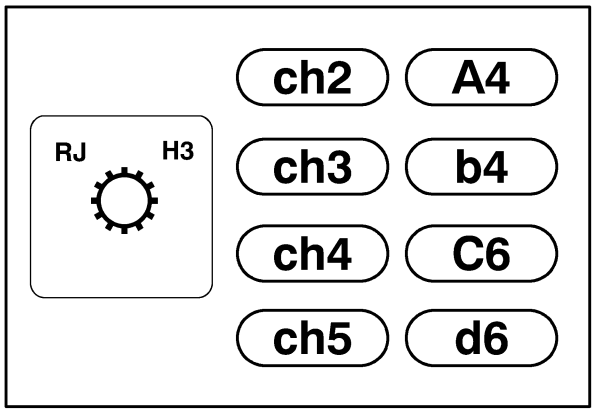
Clutch engagement time change speed threshold	
LO	5 kph (3 mph)
MID	6.5 kph (4 mph)
HI	13 kph (8 mph) *(default)*

- Select the required option with the buttons (1, fig. 67) and (2, fig. 67).



69

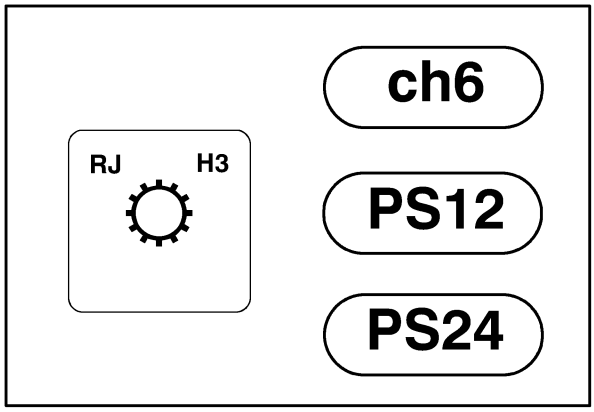
- It is possible to select the various channels by pressing buttons (1, fig. 67) and (2, fig. 67).
- After selecting the required channel you can change the filling time for each clutch (from 30 to 150 ms (milliseconds) with 10 ms increments.



70

NOTE: *The above values apply both to clutches A and B of the* ***Power shuttle 12X12*** *version and the clutches A, B, C and D of the* ***Power shuttle version with Dual Command (2 Speed Power Shift)*** *functions.*
The default filling times are:
clutches A and B - 40 ms
clutches C and D - 60 ms.

- Select the channel (ch6), the central display will show: PS12 (for machines with Power shuttle 12X12 transmission) and PS24 (for machines with Power shuttle transmission with Dual Command (2 Speed Power Shift) functions).
- Select the required option with the buttons (1, fig. 67) and (2, fig. 67).



71