SERVICE MANUAL

TD4020F / TD4030F / TD4040F

Tractors

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NEW HOLLAND

Repair Manual – TD F Series Tractors

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SECTION 21 – TRANSMISSIONS

Chapter 1 – Mechanical Transmission (12 x 12)

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21 000 – MAIN DATA – TIGHTENING TORQUES – SECTIONS – TOOL – DESCRIPTION AND OPERATION – FAULT DIAGNOSIS

Gearbox		4–speed, constant–mesh with synchronisers on all gears
Gearing type		helical gears
Range gear		Ordinary gear train with 3 forward ranges giving a total of 12 forward and 12 reverse speeds
– Gearing type		spur gears
– Reduction ratios :		
• Slow		$\frac{23x17}{43x50}$ = 1:(5.49)
• Normal		$\frac{23x27}{43x34}$ = 1:(2.35)
• Fast		1
Gearbox and range gear controls		Independent, hand operated levers located on right–hand side of operator
Thickness of gearbox driving shaft adjustment ring (5, page 5)	mm (in.)	3.00–3.25–3.50–3.75–4.00 (0.1181–0.128–0.1378–0.1476–0.1575)
Inside diameter of gearbox driven gears	mm (in.)	50.050 – 50.075 (1.9705 – 1.9715)
Outside diameter of bushings (17, page 5)	mm (in.)	49.925 – 49.950 (1.9655 – 1.9665)
Clearance between gears and bushings	mm (in.)	0.100 – 0.150 (0.0039 – 0.0059)
Diameter of gearbox driven shaft (19, page 5)	mm (in.)	39.175 – 39.191 (1.5423 – 1.5429)
Inside diameter of bushings (17, page 5)	mm (in.)	39.200 – 39.239 (1.5433 – 1.5448)
Clearance between shaft and bushings	mm (in.)	0.009 – 0.064 (0.0004 – 0.0025)

(continued overleaf)

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SECTION 21 – TRANSMISSIONS

Chapter 2 – Reverser

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21 000 – MAIN DATA – TIGHTENING TORQUES – SECTIONS – TOOLS – DESCRIPTION AND OPERATION – FAULT DIAGNOSIS

SYNCHRONISER REVERSER MAIN DATA

Type	Mechanical type spur gear unit, located between the main clutch and the gearbox. Comprises 1 driving gear, 1 intermediate gear and 1 idle gear.
Control	Hand lever located on left–hand side of the operator

GEARBOX MAIN DATA

Gearbox	4 speed, constant–mesh, with synchronisers on all gears
Gearing type	helical
Reduction unit	Ordinary gear train with 3 ranges providing a total of 12 gears
Gearing type	spur
Gearbox and reduction unit controls	Independent, with two hand levers located on right–hand side of the operator
For other main data see chapter 1.	

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TRANSMISSION–GEARBOX CASE
Adjusting gearbox driving shaft axial clearance

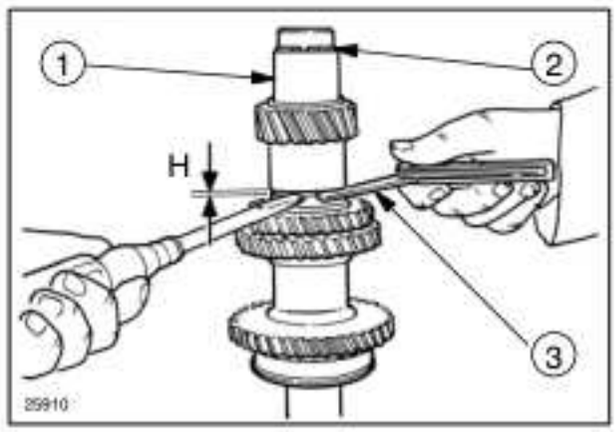
⚠ WARNING ⚠

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

Proceed as follows :

NOTE: Once fitted, the driving shaft gears must have an axial clearance of 0–0.25 mm (0–0.0098 in.). The bearings must therefore be adjusted to prevent them from being mounted with an axial preload.
To perform this adjustment, it is recommended making a tool in the workshop according to the specifications given in the drawing on page 4, Section 21, Chapter 1.

1. On the bench mount all the various components on the driving shaft together with the snap ring (2), replacing the two rear bearings and the adjuster ring with the tool **50007** (1) (see page 4, Section 21, Chapter 1).
2. Insert a screwdriver between the gear and its bushing and use a feeler gauge to measure the clearance (H).



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3. Measure the height (C) of the tool **50007** and the thickness of the inner rings of the two rear bearings (1 and 2).
4. The adjuster shims to be fitted is given by :

   S = H + C – A – B

   where:

   H = measured clearance

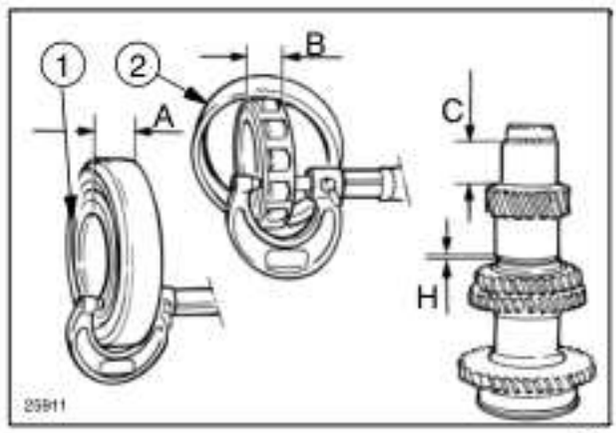
   A and **B** = **measured** thickness of the bearings

   C = height of the tool.

   Example :

   – measured clearance H = 1.3 mm (0.0512 in.)
   – height of tool = 43.5 mm (1.7126 in.)
   – thickness of ball bearing (1) = 22.9 mm (0.9016 in.)
   – thickness of roller bearing (2) = 18 mm (0.7087 in.)
   Thickness of adjuster ring :

   S = 1.3 + 43.5 – 22.9 – 18 = 3.9 mm
   (0.0512 + 1.7126 – 0.9016 – 0.7087 = 0.1535 in.)



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NOTE: The gears should be mounted with an axial clearance of 0–0.25 mm. In this instance, it will be necessary to fit a shim (S) of 3.75 mm to provide an axial clearance of : 3.9–3.75 = 0.15 mm.

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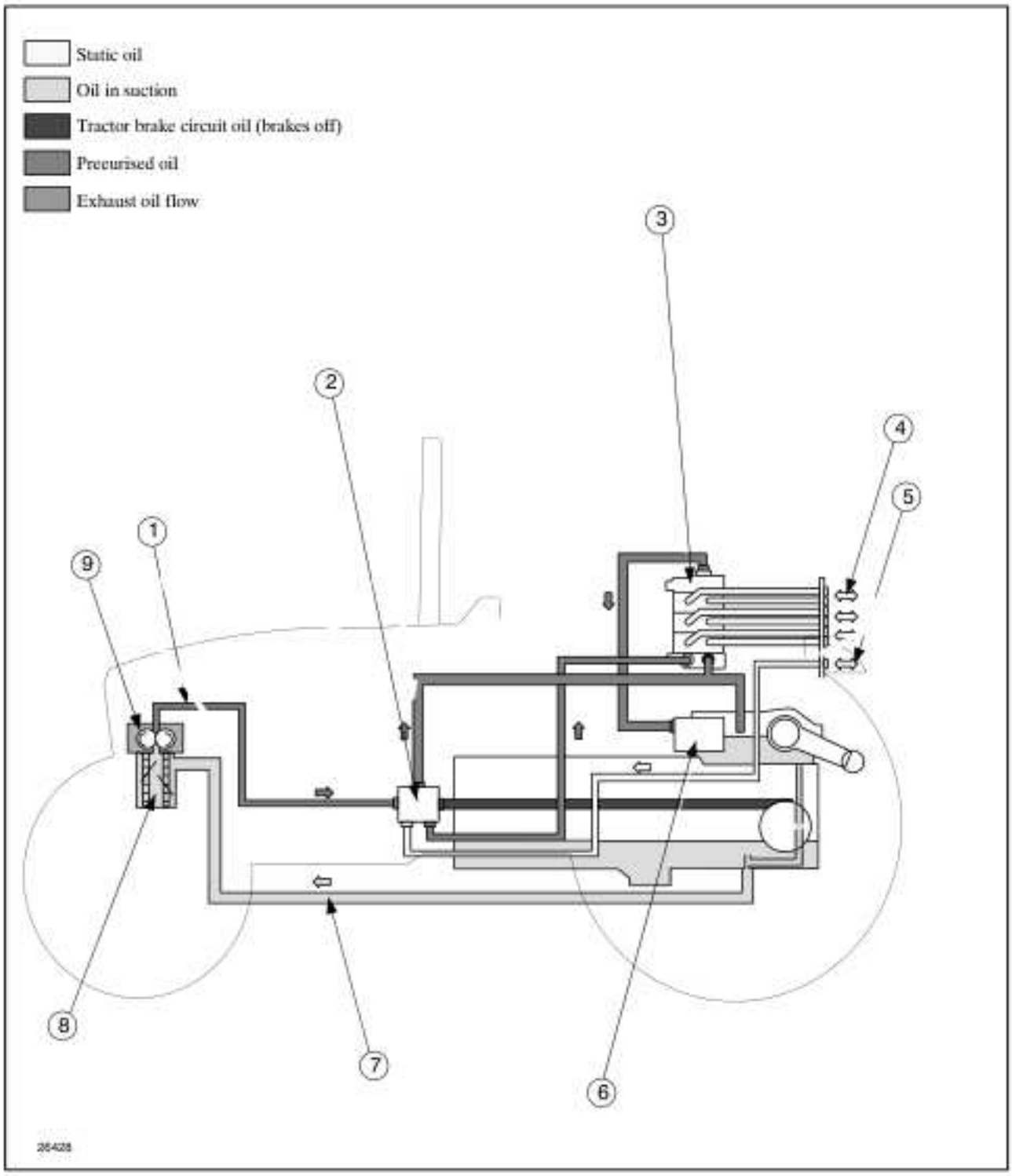
HYDRAULIC LIFT DIAGNOSTICS

Problems	Possible causes	Remedies
The lift does not raise.	1. Oil filter clogged.	Replace filter.
	2. Control valve jammed in discharge position.	Release control valve.
	3. Hydraulic pump defective.	Overhaul or replace pump.
The lift operates jerkily.	1. Oil filter clogged.	Replace filter.
	2. Air has got into the pump suction line.	Check that the couplings are airtight and the seals are effective.
The lift raises too slowly.	1. Oil filter clogged.	Replace filter.
	2. Oil leaking past piston seals or seals on discharge fitting to cylinder, with consequent loss of pressure.	Replace all defective seals.
	3. Hydraulic pump defective.	Overhaul or replace pump.
The lift operates too quickly.	1. Foreign matter between the ball and its seat on the discharge control valve.	Take off the valve, remove the foreign matter and inspect the oil filter.
	2. Discharge control valve ball seal defective.	Replace discharge control valve.
	3. Discharge control valve piston jammed.	Take off the valve and free the piston.
The lift operates too slowly.	1. Discharge ports on the discharge control valve blocked.	Take off the valve, unblock the holes and inspect the oil filter.
	2. Discharge control valve piston jammed.	Take off the valve and free the piston.

(continued overleaf)

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HYDRAULIC DIAGRAM OF TRAILER BRAKE AUXILIARY CONTROL VALVE



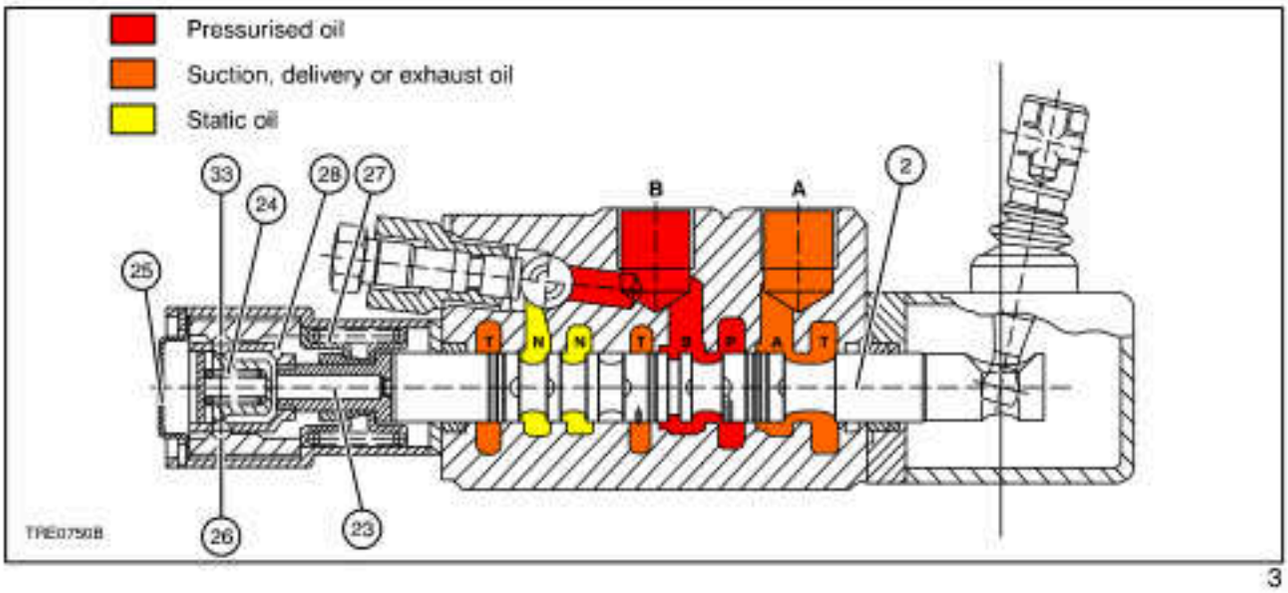
2

Diagram of the hydraulic trailer brake circuit

1. Delivery line to control valve (3).
2. Trailer brake control valve.
3. Auxiliary control valves.
4. Auxiliary control valve lines.
5. Trailer brake control valve line.
6. Lift control valve.
7. Suction line.
8. Oil filter.
9. Hydraulic pump.

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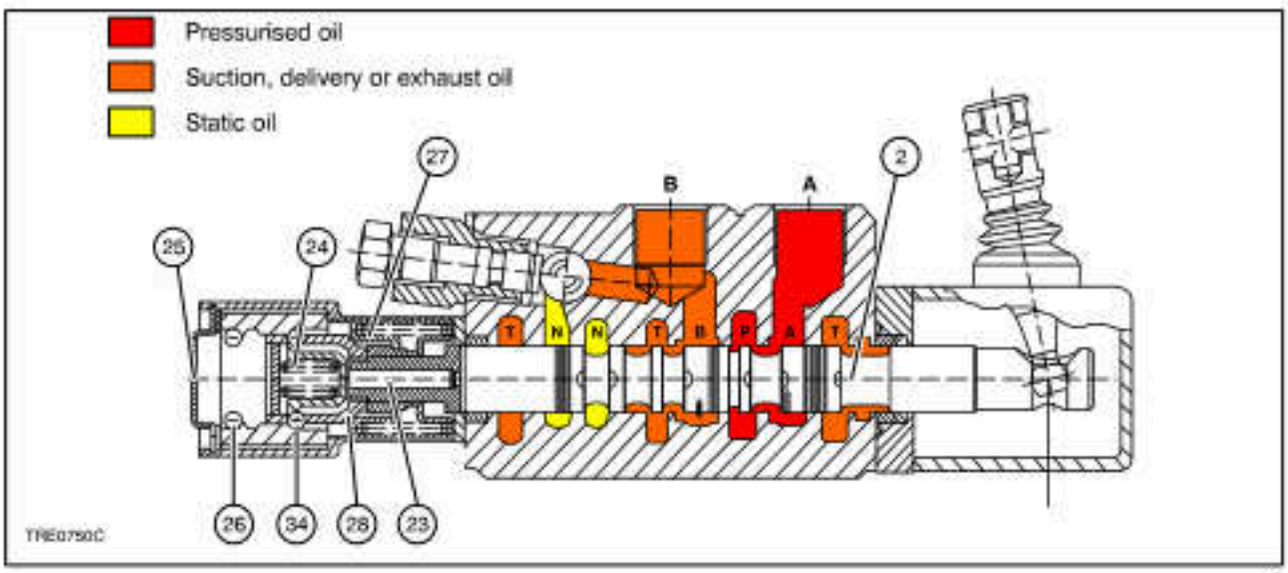
OPERATING STAGES OF AUXILIARY CONTROL VALVE FOR OPERATION A DOUBLE– ACTING CYLINDER AUTOMATIC DETENT RELEASE AND FLOAT POSITION



3

LIFTING

When the spool (2) moves to left, the detent balls (26) engage the groove (33), where they are held in place by the support (28) and spring (24). The movement of the spool (2) connects: the pressure line (P) with the line (B), and also the upper cylinder chamber with the exhaust line (T) by way of line (A), intercepting the supply of oil to the hydraulic lift control valve. Automatic detent release working principle is explained at page 6.



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LOWERING

When the spool (2) moves to right, the detent balls engage in the groove (34) where they are held in position by the support (28) and the spring (24). In this condition the oil contained in the lower chamber of the cylinder can flow to the exhaust (T) by way of line (B), while the upper chamber is connected with the pressure line (P) by way of line (A). On completion of the lowering operation, the detent will be automatically released as explained at Page 6.

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Steering to the right (fig. 5)

When you turn the steering wheel clockwise, the springs (11) fig. 2 deform, allowing the valve (12) fig. 4 to rotate in relation to the sleeve (11).

In this state, the following takes place:

- de–synchronisation of the internal ducts with parts (11) and (12) fig. 4, which were aligned in the neutral phase, resulting in interruption of the flow of oil to the outlet.
- alignment with the same number of internal ducts connected moment by moment with the rotor compartments at intake from the pump (7) fig. 4 and in the delivery line to the steering cylinders (2), thus allowing the wheels to be steered to the right.

Steering to the left

When you turn the steering wheel anticlockwise, the grooves inside parts (11) and (12) fig. 4 and the delivery lines to the steering cylinders are reversed, thus allowing the wheels to be steered to the left.

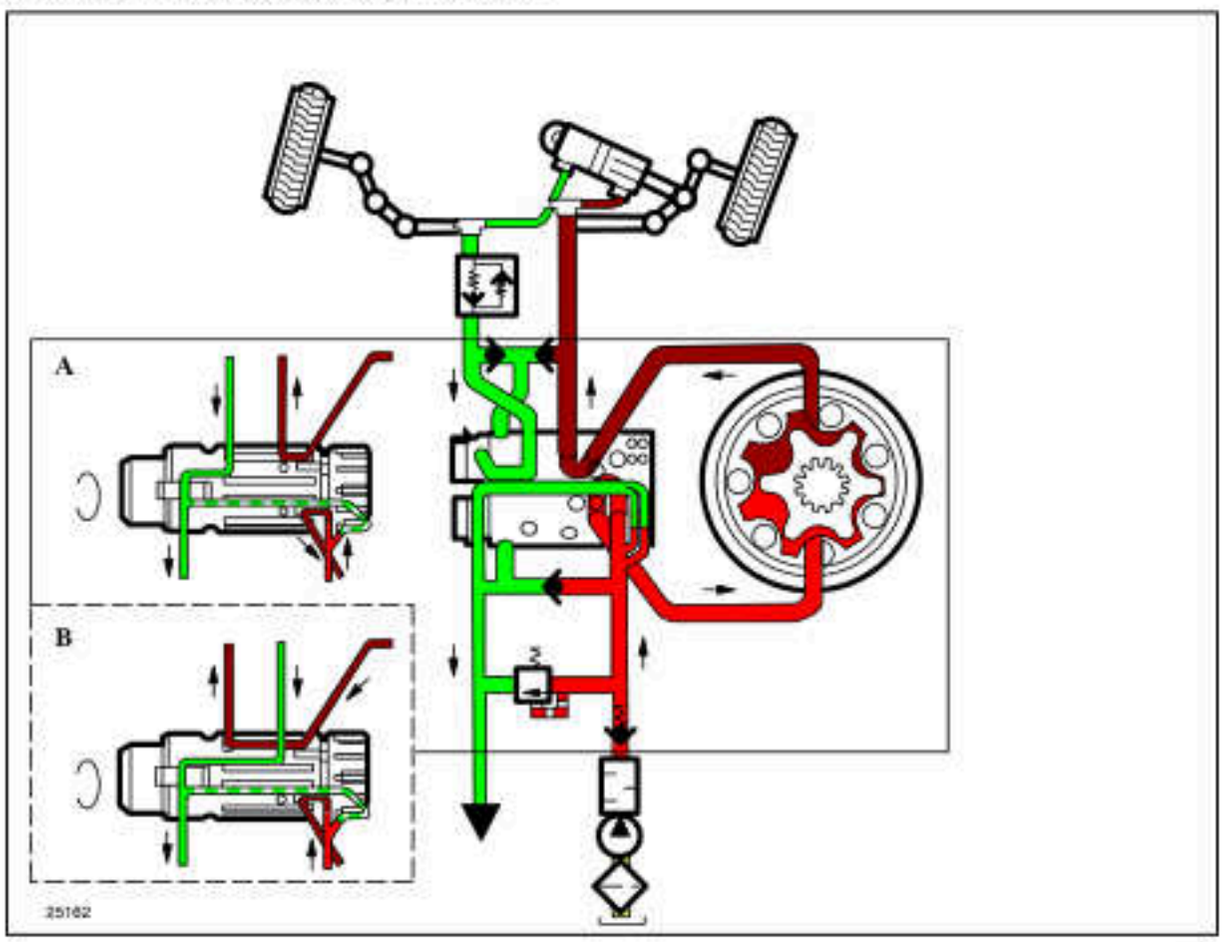
Steering to the right manually

If there is a fault or loss of oil pressure at the hydrostatic steering pump, steering can also be performed manually.

When you turn the steering wheel clockwise, the rotor inside the hydrostatic steering control valve (3) fig. 4 performs the function of a hand pump, sending oil to the control cylinder rod side (2), thus allowing the wheels to be steered to the right manually.

Steering to the left manually

When you turn the steering wheel anticlockwise, you act upon the rotor inside the hydrostatic steering control valve which, by operating as a hand pump as previously described, sends oil to the control cylinder piston side, thus allowing the wheels to be steered to the left manually.



5

Diagram showing operation of the hydrostatic steering

A Steering to the right

B Steering to the left

Oil in intake line

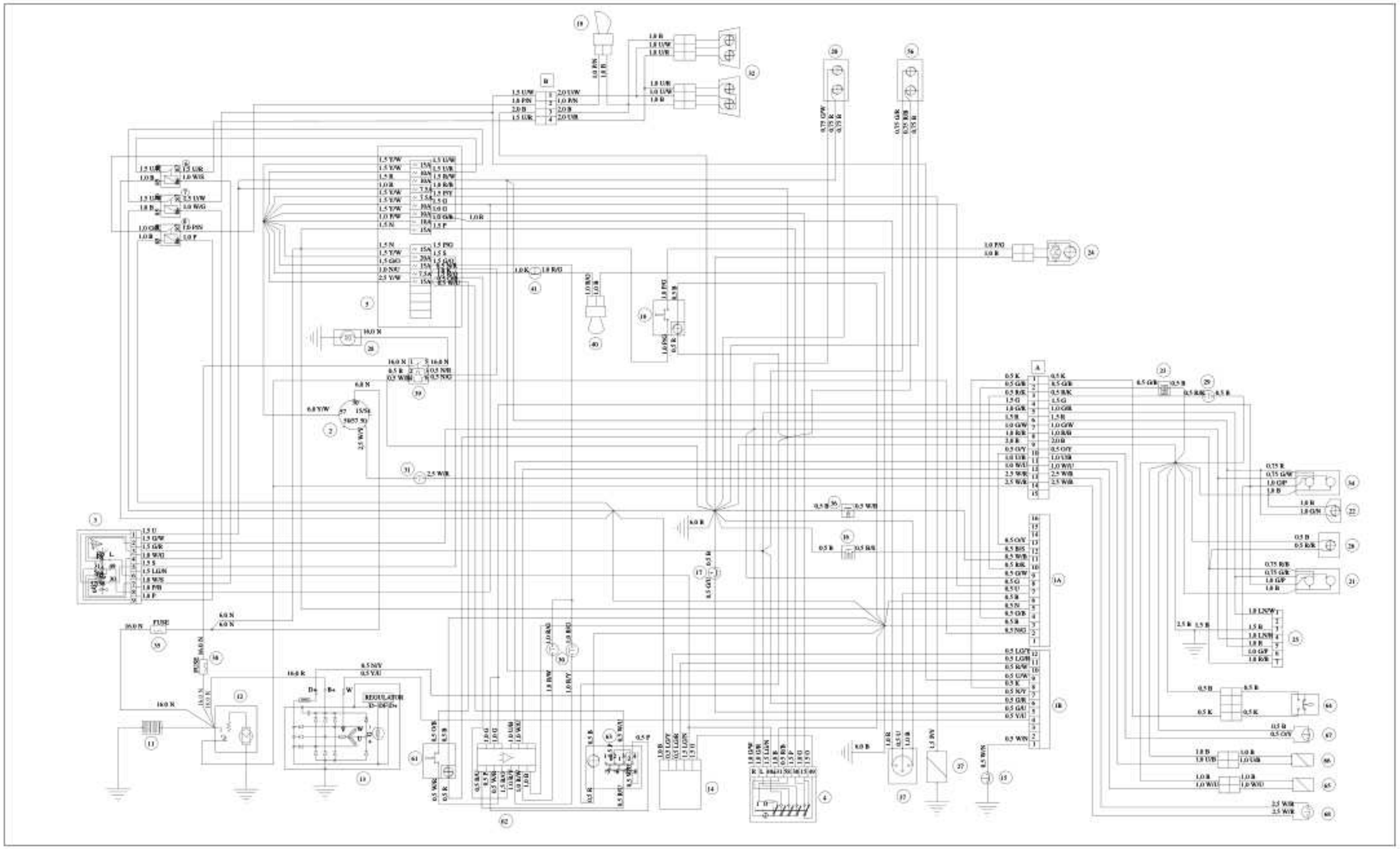
Oil in delivery line from pump

Oil in delivery line to hydraulic cylinder

Oil returning to reservoir

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GENERAL DIAGRAM –CENTRE(WITHOUT CAB)



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