SERVICE MANUAL

TD4020F / TD4030F / TD4040F

Tractor

Part number 47621082
English
October 2013

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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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CLUTCH TROUBLESHOOTING

Problems	Possible Problem	Solutions
The clutch slips	1. Worn disks 11 and 9, page 3, on pressure plates and flywheel.	Check and compare the data given on the pages indicated, replace any parts which are worn up to or over the limit and adjust levers and clutch control linkage.
	2. Belleville spring disk (2, page 3) distorted or damaged.	Replace the Belleville spring.
	3. Oil or grease contaminating the friction lining of disks 11 and 9, page 3).	Replace the disks, identify and eliminate the source of the lubricant inside the clutch housing and thoroughly clean the friction surfaces.
The clutch jerks	1. Partial seizure of the external control linkage.	Check rod pivots and lubricate.
	2. Clutch disk (9, page 3) deformed.	Replace the disk and adjust the clutch control lever.
	3. Clutch disk (9, page 3) with damaged hub springs or loose hub rivets.	Replace disk.
	4. Oil or grease contaminating the friction lining of disks (11 and 9, page 3).	Replace the disks, identify and eliminate the source of the lubricant inside the clutch housing and thoroughly clean the friction surfaces.
Clutch sticks and drags	1. Clutch disks (11 and 9, page 3) deformed.	Replace and adjust disks.
	2. Seizure of external control linkage.	Check, replace faulty parts and lubricate.
	3. Controls incorrectly adjusted.	Adjust the controls.
Clutch noisy when engaged and/or disengaged	1. Thrust bearing worn.	Replace bearing
	2. Clutch disk (9, page 3) with hub springs damaged.	Replace disk.
Clutch pedal too stiff	1. Partial seizure of the external control linkage.	Check rod pivots and lubricate.
	2. Partial seizure of pedal pivot.	Check pivot and lubricate.

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FRONT AXLE DIFFERENTIAL

Overhaul (Op. 25 102 24)

When overhauling the differential assembly it is necessary to adjust the backlash between the teeth of the planet pinions and the side gears.

Proceed as follows:

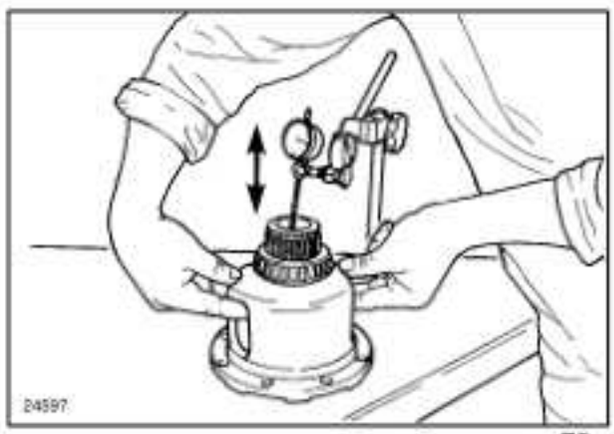
1. Thoroughly clean the components of the differential to remove any traces of oil which would otherwise prevent accurate backlash measurement.

2. Install the two side gears without thrust washers.

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

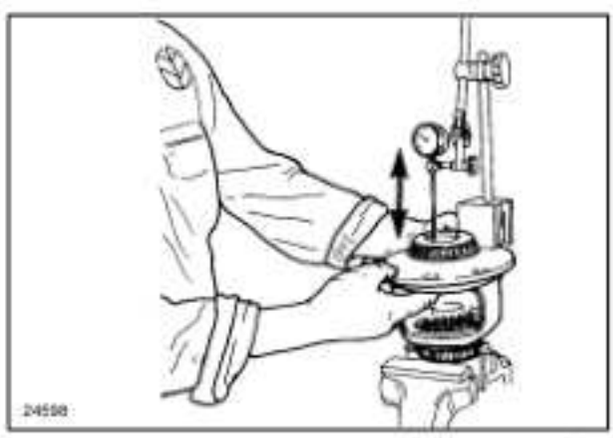
4. Position a dial gauge on the differential housing, as shown.

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



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6. Repeat the above operations to measure the endfloat on the right–hand side gear (G_d).
   The endfloat should be **0.25 mm (0.0098 in.)**. Therefore the shims to be inserted in the differential housing are given by:
   $S_s = G_s - 0.25$ mm (0.0098 in.) for the left–hand side gear;
   $S_d = G_d - 0.25$ mm (0.0098 in.) for the right–hand side gear.



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

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(b) Ground side voltage drop test

See figure 8.

1. Check the ignition key is in OFF position.
2. The circuit is the same as that described in the previous test, except that the millivoltmeter (4) is now connected between the negative battery terminal clamp and the alternator casing (negative side of casing).

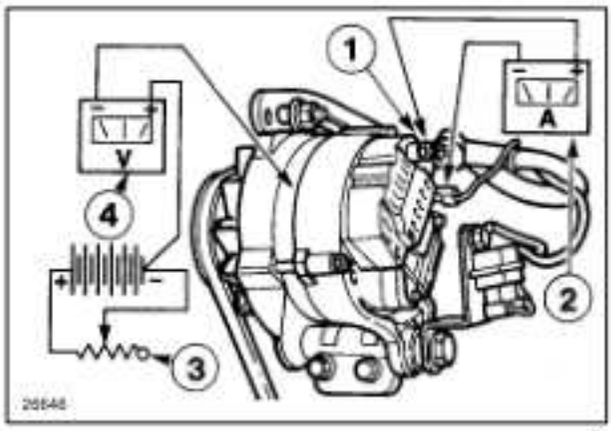
NOTE: C*heck the varying load resistance (3) is in minimum current absorption position (maximum resistance).*

3. Start the engine and increase speed to 2000 rev/min.
4. Increase resistance current load (decreasing resistance itself) slowly until the ammeter (2) reads 120 A. according to the type of alternator.
5. Note the reading on the voltmeter. This must not be higher than 200 millivolts.

A reading higher than 200 millivolts indicates malfunctioning due to excessive resistance in the external circuits.

If the alternator does not output required power and the millivoltmeter reading is less than 200 millivolts, there is a malfunctioning component in the alternator. Carry out the alternator component tests as described in this section.

6. Stop the engine.

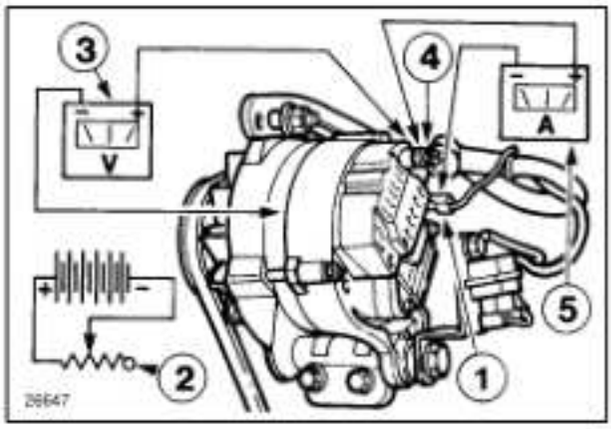


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4. MAXIMUM ALTERNATOR OUTPUT TEST

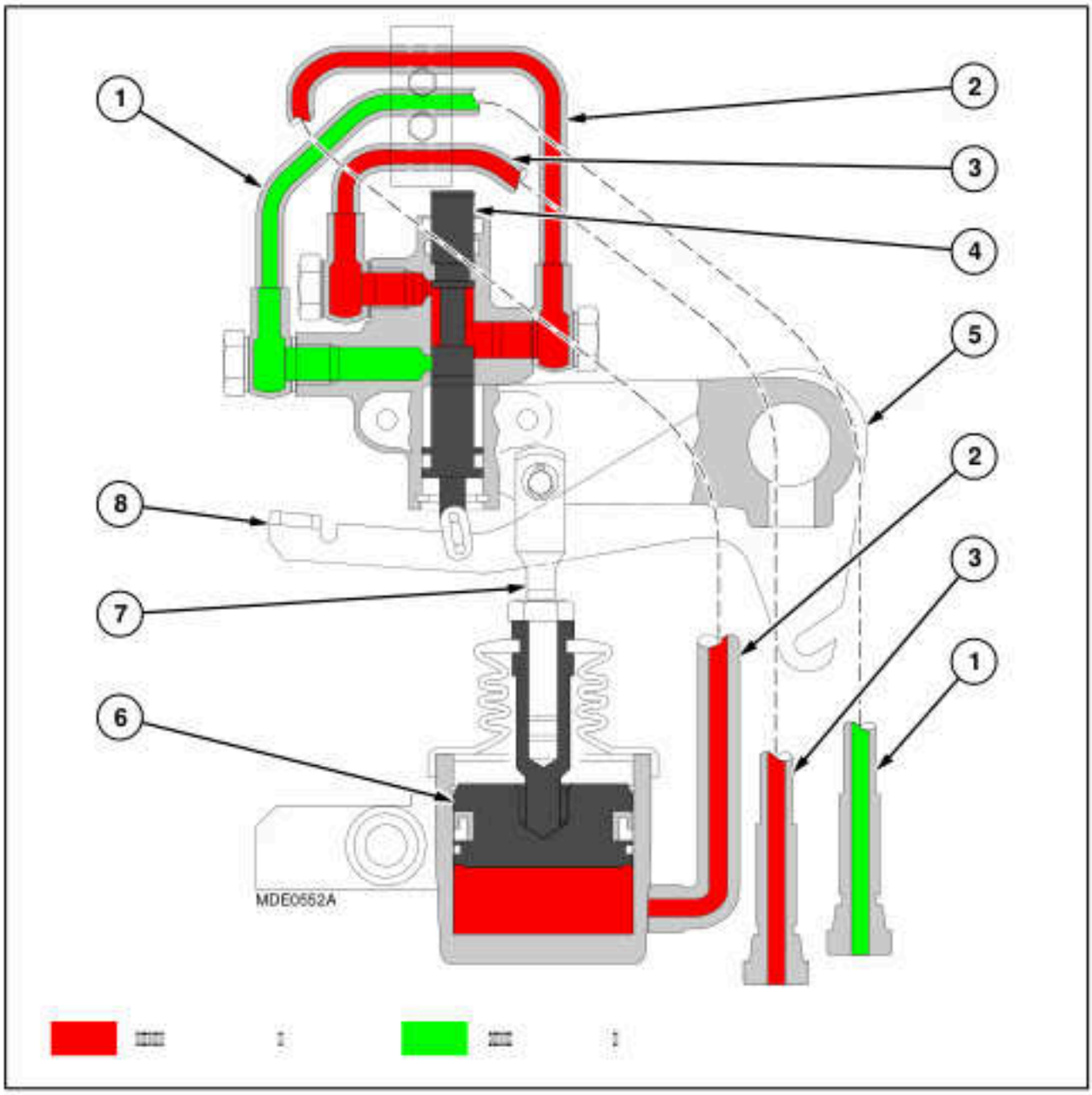
See figure 9.

1. Check the ignition key is in the OFF position.
2. Disconnect the negative battery cable and the B+ alternator wire (4).
3. Connect an ammeter (5) between B+ alternator terminal (4) and D+ wire (1) (negative side of the wire).
4. Connect a voltmeter (4) between the B+ alternator terminal (5) and earth (ground).
5. Reconnect the negative battery cable. Start the engine and increase speed to 2000 rev/min.



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DESCRIPTION AND OPERATION

ENGAGING THE PTO CONTROL CLUTCH

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

The servo control unit consists of a hydraulic control valve and piston.

When the PTO clutch is engaged with the control lever in the cab, the connecting cable acts on the lever (8) which, as it moves, pushes up the control valve drive pin (4).

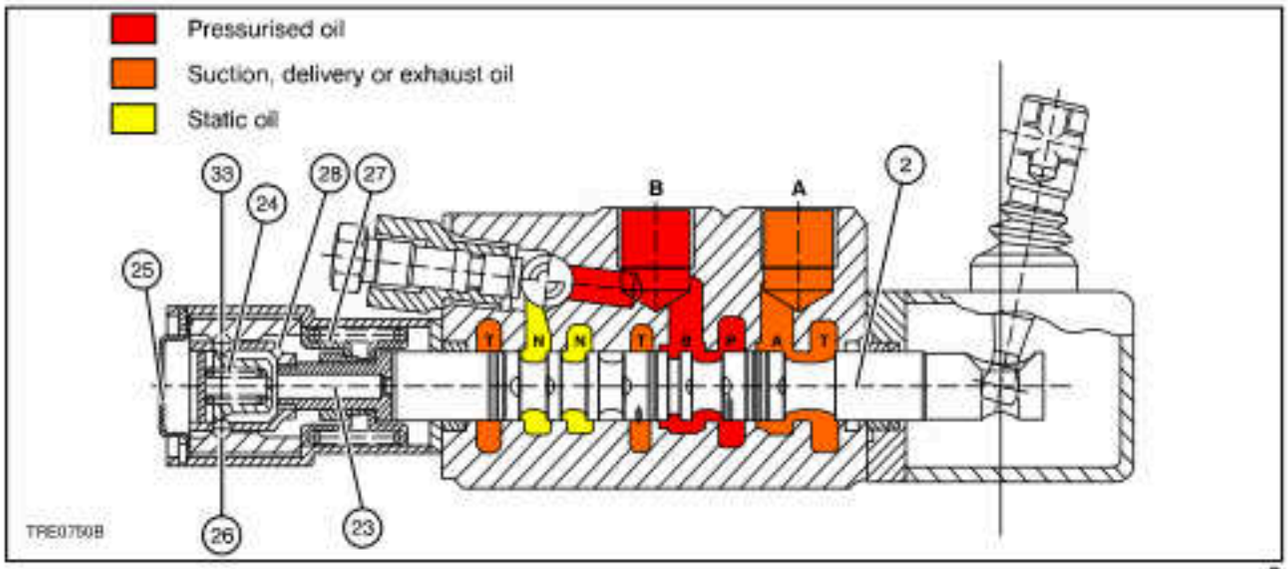
When the pin (4) moves up it closes the hole leading to the oil discharge pipe (1).

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

The piston (6), under an oil pressure of 15.7 (16) bar (kg/cm2)moves and, bymeans of tie—rod (7),moves lever (5), engaging the PTO clutch.

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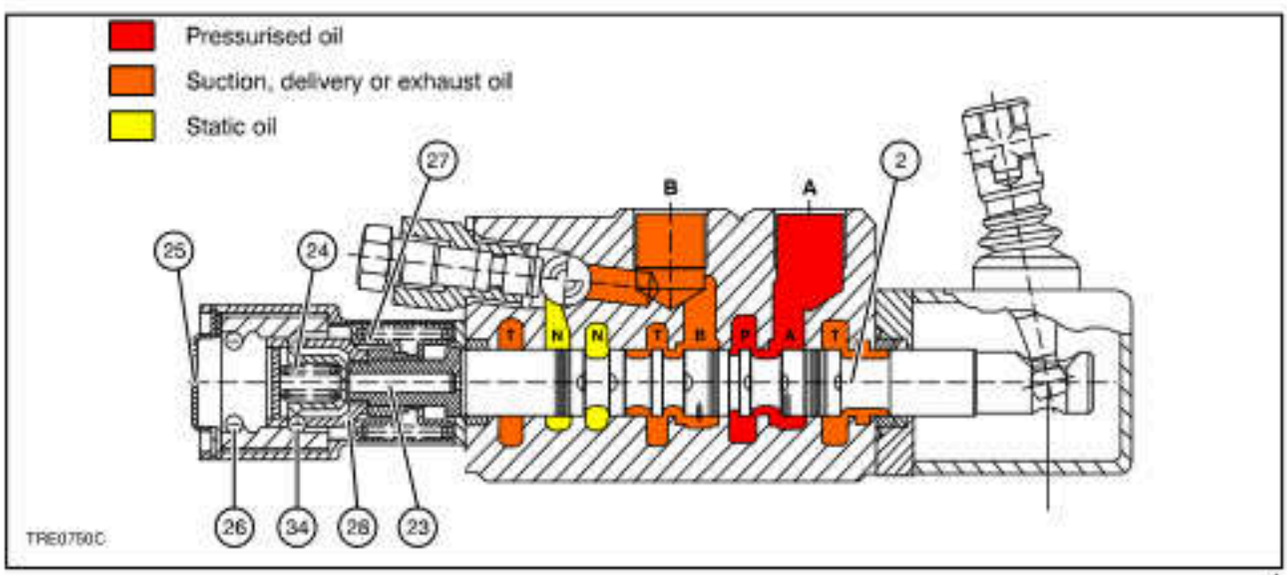
OPERATING STAGES OF AUXILIARY CONTROL VALVE FOR OPERATION A DOUBLE– ACTING CYLINDER AUTOMATIC DETENT RELEASE AND FLOAT POSITION



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.



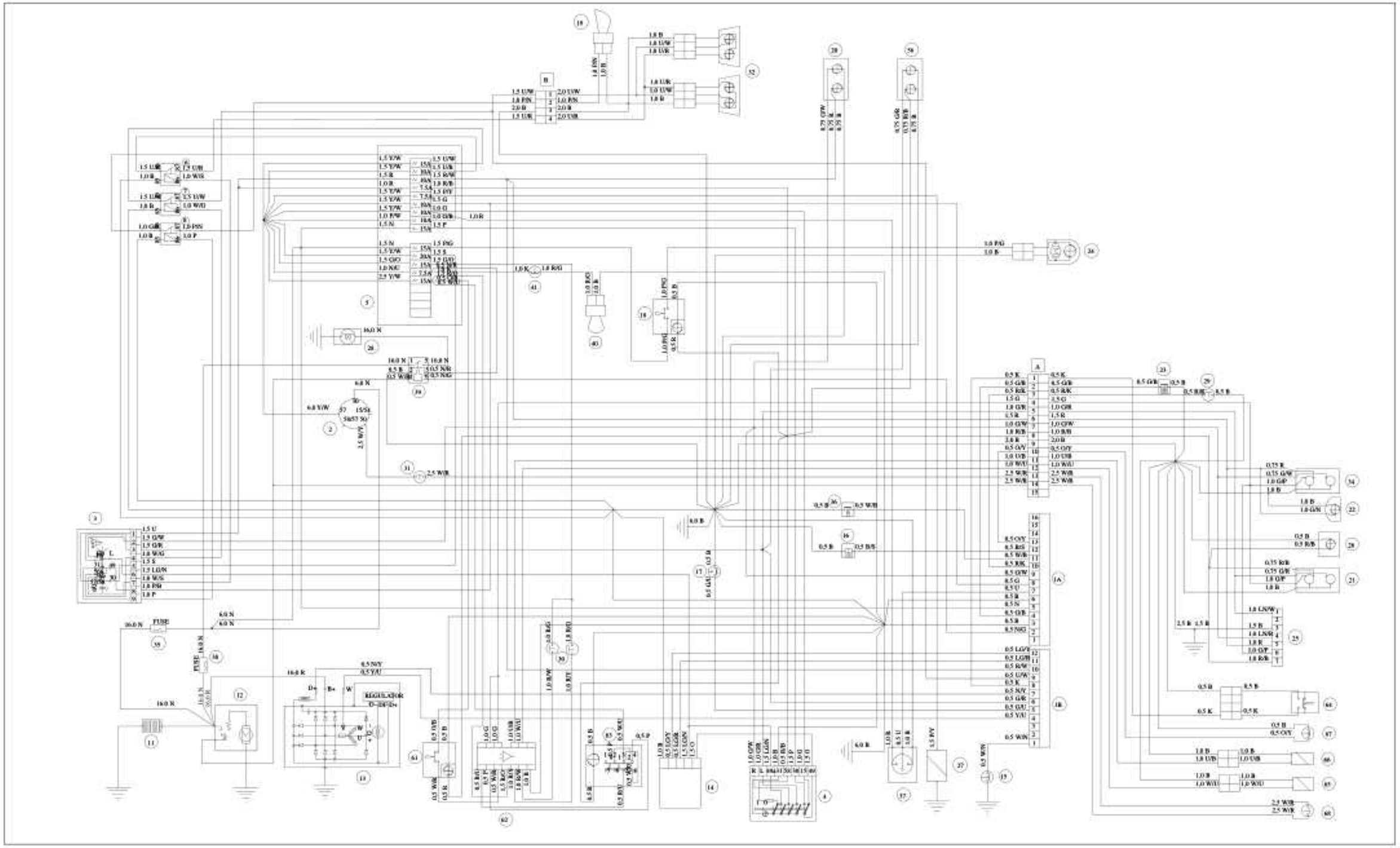
4

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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GENERAL DIAGRAM –CENTRE(WITHOUT CAB)



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