TECHNICAL MANUAL



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2155, 2355N, 2355, 2555, 2755, 2855N, 2955 AND 3155 TRACTORS TECHNICAL MANUAL TM4436 (MAY-90)

SECTION CONTENTS IN GROUPS – OPERATION AND TESTS

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10 – Tests

230 – Fuel and Air Intake System

05 – Fuel tank, auxiliary fuel tank and water trap
10 – Cold weather starting aids
15 – Speed control linkage
20 – Air cleaner

240 – Electrical System

05 – General
10 – Electrical diagrams (without SGB or ROPS)
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20 – Electrical diagrams (with SGB or ROPS)
25 – Circuit diagnosis (with SGB or ROPS)
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35 – Starting motor
40 – Alternator

250 – Power Train

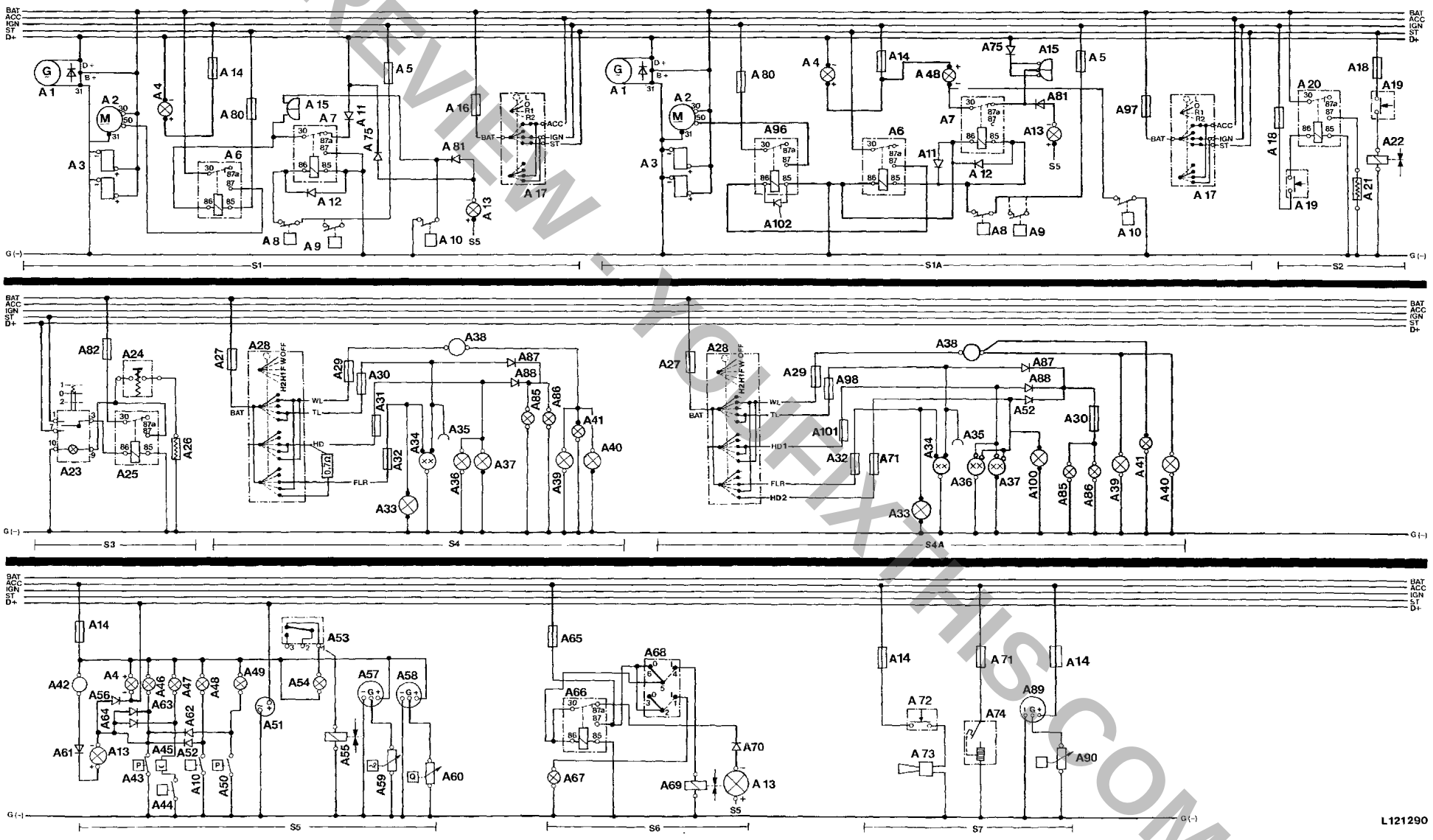
05 – Clutch operating linkages
10 – Engine single-stage clutch (without reverser)
15 – Engine single-stage clutch (with reverser)
20 – Engine dual-stage clutch
25 – Hi-Lo shift unit
30 – Reverser
35 – Creeper transmission
40 – Transmission shift linkages
45 – Synchronized transmission and transmission oil pump
50 – Collar shift transmission and transmission oil pumps
55 – Differential
60 – Final drives
65 – Independent PTO
70 – Continuous-running PTO
75 – Front PTO
80 – Front wheel drive u.j. drive shaft and disk clutch

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ELECTRICAL CIRCUIT DIAGRAM
(Complete Tractor*)



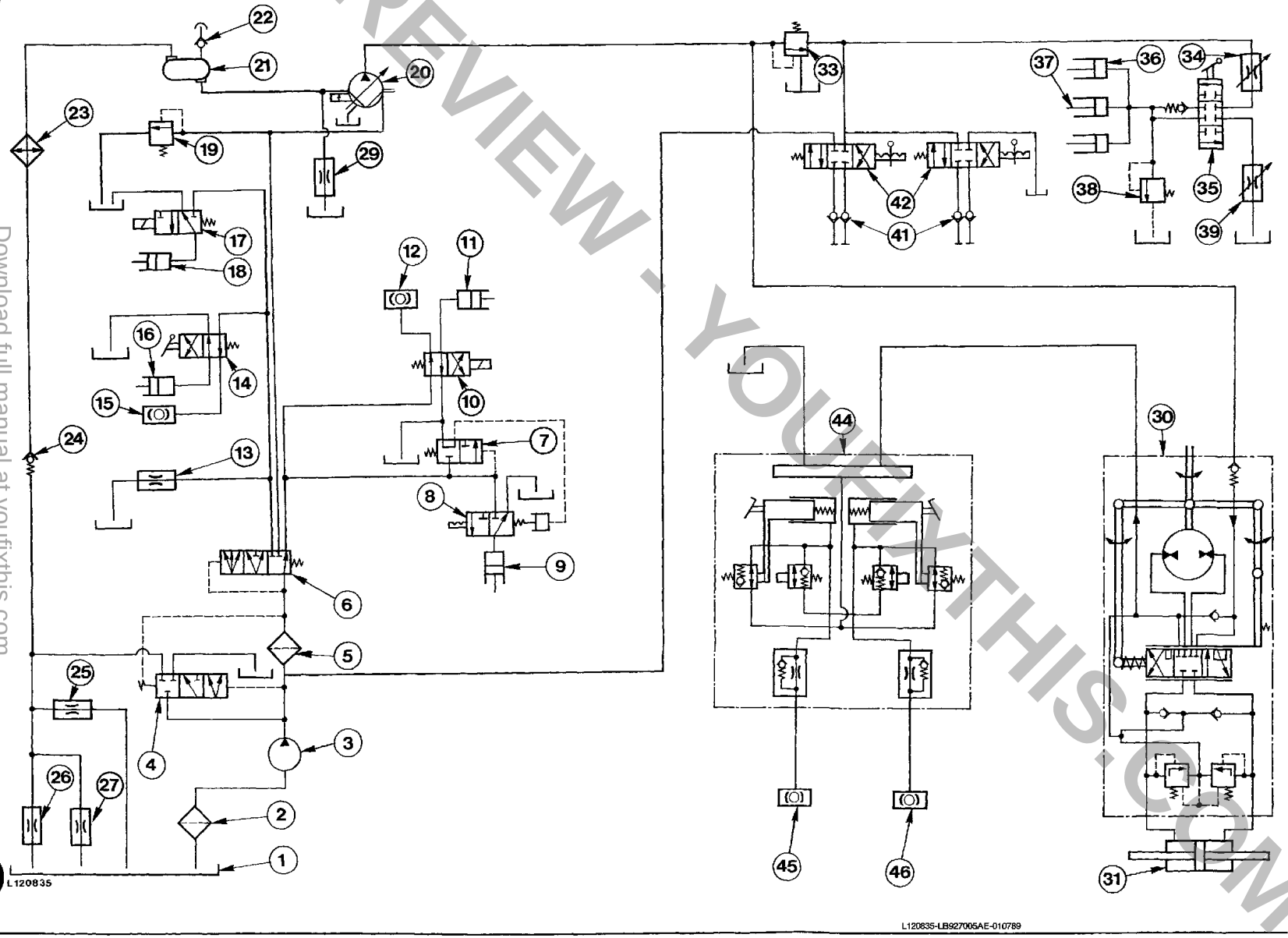
L121290

* On GP tractors up to Serial No. 618 699L

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TRACTOR WITH SOUND-GARD BODY, HI-LO SHIFT UNIT, INDEPENDENT PTO, FRONT WHEEL DRIVE AND FRONT PTO



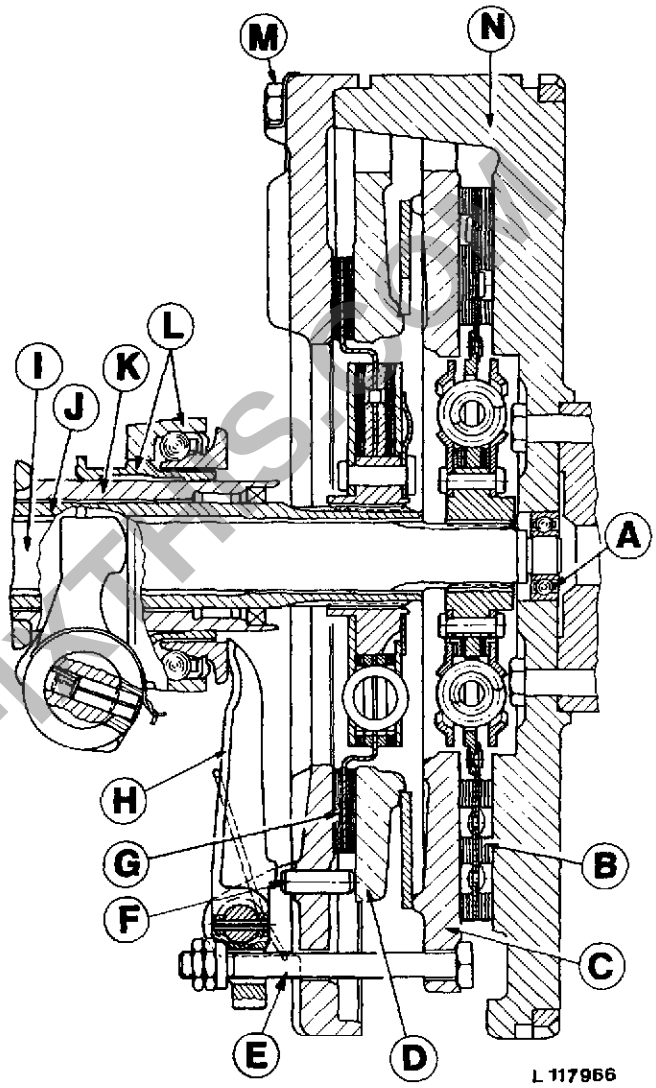
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DESCRIPTION

The engine dual-stage clutch combines the function of two single dry disk clutches. The dual-stage clutch has two different sized torsion damped driven disks. The front disk (B) is splined to drive shaft (I) and the rear driven disk (G) splined hollow drive shaft (J). Driven disk (B) transmits power to the transmission, whereas driven disk (G) transmits power to the PTO shaft.

A–Pilot ball bearing
B–Front clutch disk
C–Front pressure plate
D–Rear pressure plate (PTO)
E–Operating bolt (3 used)
F–Release pin (3 used)
G–Rear clutch disk (PTO)
H–Release lever (3 used)
I–Drive shaft
J–Hollow drive shaft
K–Carrier sleeve
L–Throw-out bearing
M–Cap screw (3 used)
N–Flywheel



L 117966

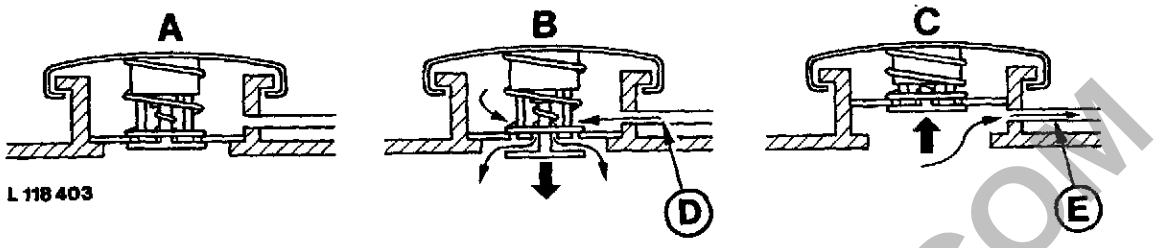
When clutch pedal is depressed to first-stage position, throw-out bearing (L) is pressed directly against release levers (H). The operating bolts (E) lift front pressure plate (C) from front clutch disk (B), thereby disconnecting drive between engine and transmission. Only when clutch pedal is fully depressed (second stage) are release levers (H) pressed against release pins (F) and release rear pressure plate (D) from rear clutch disk (G), which disconnects drive between engine and PTO.

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FUNCTION OF RADIATOR CAP (Tractors Without Expansion Tank)



L 118 403

A–Valve closed
B–Vacuum valve open
C–Pressure relief valve open
D–Air
E–Overflow tube

The radiator filler neck has a bayonet-fitting cap which has a pressure relief valve and a vacuum valve.
The pressure relief valve (C) in the cap permits the escape of coolant or steam when the pressure reaches a certain level.
Vacuum valve (B) in the cap opens at a certain underpressure, thus preventing the build-up of a vacuum in the cooling system.

The pressure cooling system permits the engine to be operated at high temperatures without boiling the coolant or losing it by evaporation.
Higher operating temperatures are desirable for efficient combustion and for evaporating contami nants from the crankcase.

L118403-LB522005AE-011087

DIAGNOSING MALFUNCTIONS

ENGINE OVERHEATS

Slack fan belt
Dirty radiator or grille screens
Low coolant level
Low engine oil level
Improper operation
Defective cylinder head gasket
Fuel injection pump incorrectly timed
Defective thermostat(s)
Defective radiator cap
Defective water pump
Corrode coolant passages

LOW COOLANT LEVEL

Improper maintenance
Improper operation
Damaged radiator
Water pump seal leakage
Leakage
Defective radiator cap

KUEHLER-LA722005AE-000186

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SPECIFICATIONS

Tractors Without Expansion Tank

Radiator cap pressure relief valve opens at a pressure of:	
– 3-cylinder tractors	40 to 50 kPa (0.4 to 0.5 bar; 6 to 7 psi)
– 4 and 6-cylinder engines	60 to 70 kPa (0.6 to 0.7 bar; 9 to 10 psi)

Tractors With Expansion Tank

Radiator cap pressure relief valve opens at a pressure of:	
– 1st stage, normal operation	60 kPa (0.6 bar; 9 psi)
– 2nd stage, should a malfunction occur	120 kPa (1.2 bar; 17 psi)

On All Tractors

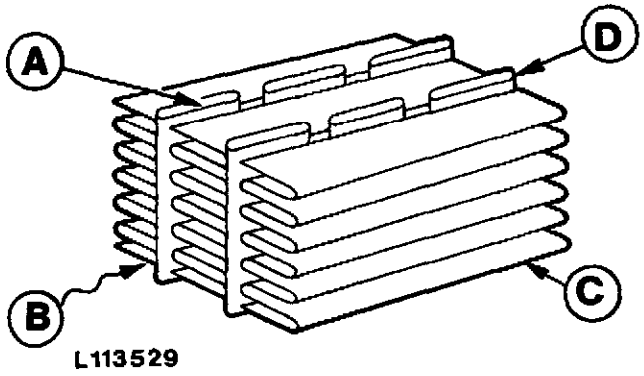
Cooling system test pressure	50 to 70 kPa (0.5 to 0.7 bar; 7 to 10 psi)

KUEHLER-LB522005AE-011087

DESCRIPTION OF RADIATOR

The engine radiator is of the conventional design with cooling tubes through which the coolant passes and soldered exterior fins.

The coolant in the cooling tubes is cooled by air (B) forced through the radiator core by the fan blades. Cooling surface of tubes is greatly increased by means of fins (C).



L113529

A–Coolant passage
B–Air
C–Fin
D–Tube

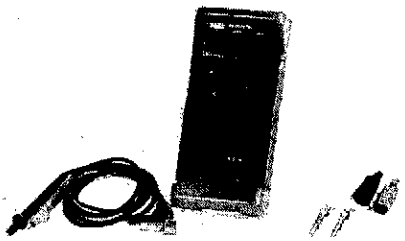
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SPECIAL TOOLS

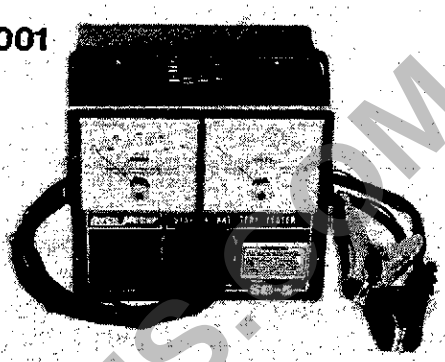
JT05791



Ⓐ

L119 019

JT28001



Ⓑ

L115 026

JT01633



Ⓒ

L112 416

A–Testing electrical components
B–Testing the batteries

C–Testing FWD control unit and fuel gauge

L119019,L115026,L112416-LA924010AE-010789

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TEMPERATURE CONTROL SWITCH

Temperature control switch setting	
Evaporator refrigerant temperature	
Contact points open (low limit)	−1°C (30°F)
Contact points close (high limit)	+3°C (37°F)

COMPRESSOR

Compressor relief valve opens at	3000 kPa (30 bar; 440 psi)
Full charge of oil (new or service exchange compressor, Frigidaire oil 525 or Reniso type KM)	330 cm^3 (11 fl.oz.)

KLIMAANL-LB529005BE-010389

TORQUES FOR HARDWARE

High-pressure or low-pressure switch to refrigerant line	14 Nm (10 ft-lb)

KLIMAANL-LB529005EE-010389

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PIN ASSIGNMENT – DASH PANEL, RIGHT-HAND

Pin Housing (A):

1 Worklight switch (Terminal 1)*
2 Worklight switch (Terminal 1)*
3 Ground
4 Starter relay (Terminal 87a)*
5 Handbrake indicator light relay (Terminal 30)
6 Hourmeter and acoustical warning signal (Terminals 1 and 3)
7 Starter relay (Terminal 87)
8 Starter relay (Terminal 86) and handbrake indicator light relay (Terminal 86)*
9 Handbrake indicator light relay (Terminal 30)
10 Handbrake indicator light relay (Terminal 87)*
11 Handbrake indicator light relay (Terminal 86) and starter relay (Terminal 86)
12 Handbrake indicator light relay (Terminal 87a) and acoustical warning signal (Terminal 2)

Socket Housing (B):

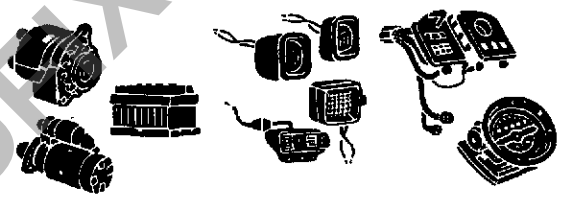
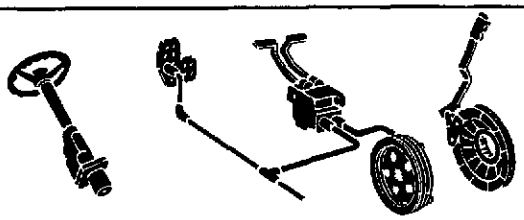
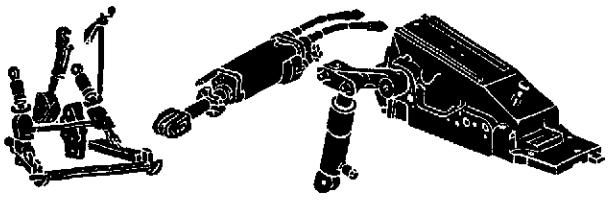
1 FWD switch (Terminal 3)
2 FWD switch (Terminal 1)
3 Starter relay (Terminal 30)
4 Horn button
5 High and low beam headlights switch (Terminal 2)
6 Engine/tractor speed meter (sending unit)
7 Hazard warning lights switch (Terminal 49a)*
8 Hazard warning lights switch (Terminal 49)*
9 Hazard warning lights switch (Terminal R) and turn-signal indicator warning light
10 Hazard warning lights switch (Terminal L)*
11 Fuse for neutral start switch
12 Fuse for neutral start switch

* Not connected

ELECDIAG-LB924020EE-010987

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SAFETY 	210
ENGINE 	220
FUEL AND AIR INTAKE SYSTEM 	230
ELECTRICAL SYSTEM 	240
POWER TRAIN 	250
STEERING SYSTEM AND BRAKES 	260
HYDRAULIC SYSTEM 	270
OPERATOR'S STATION 	290

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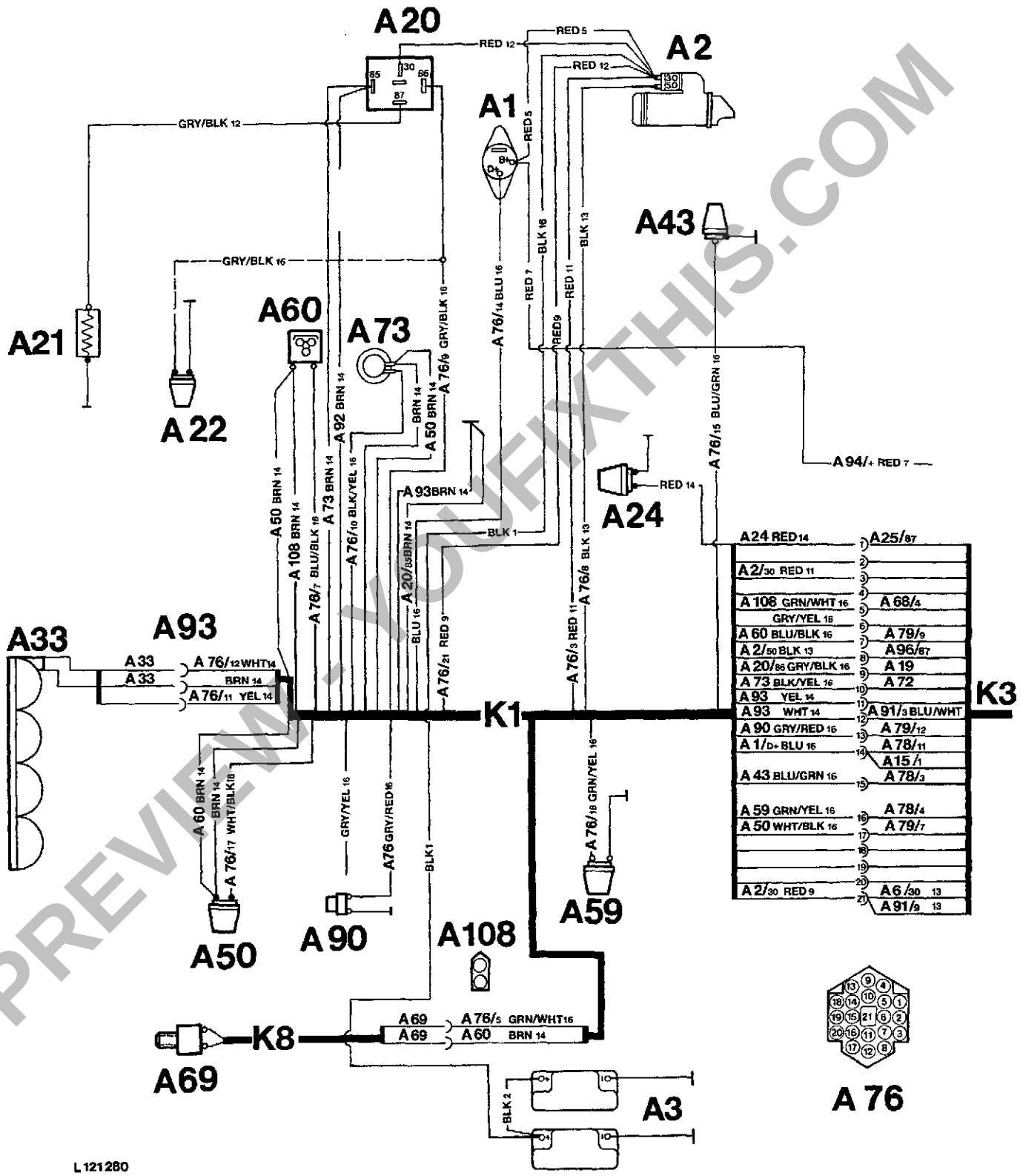
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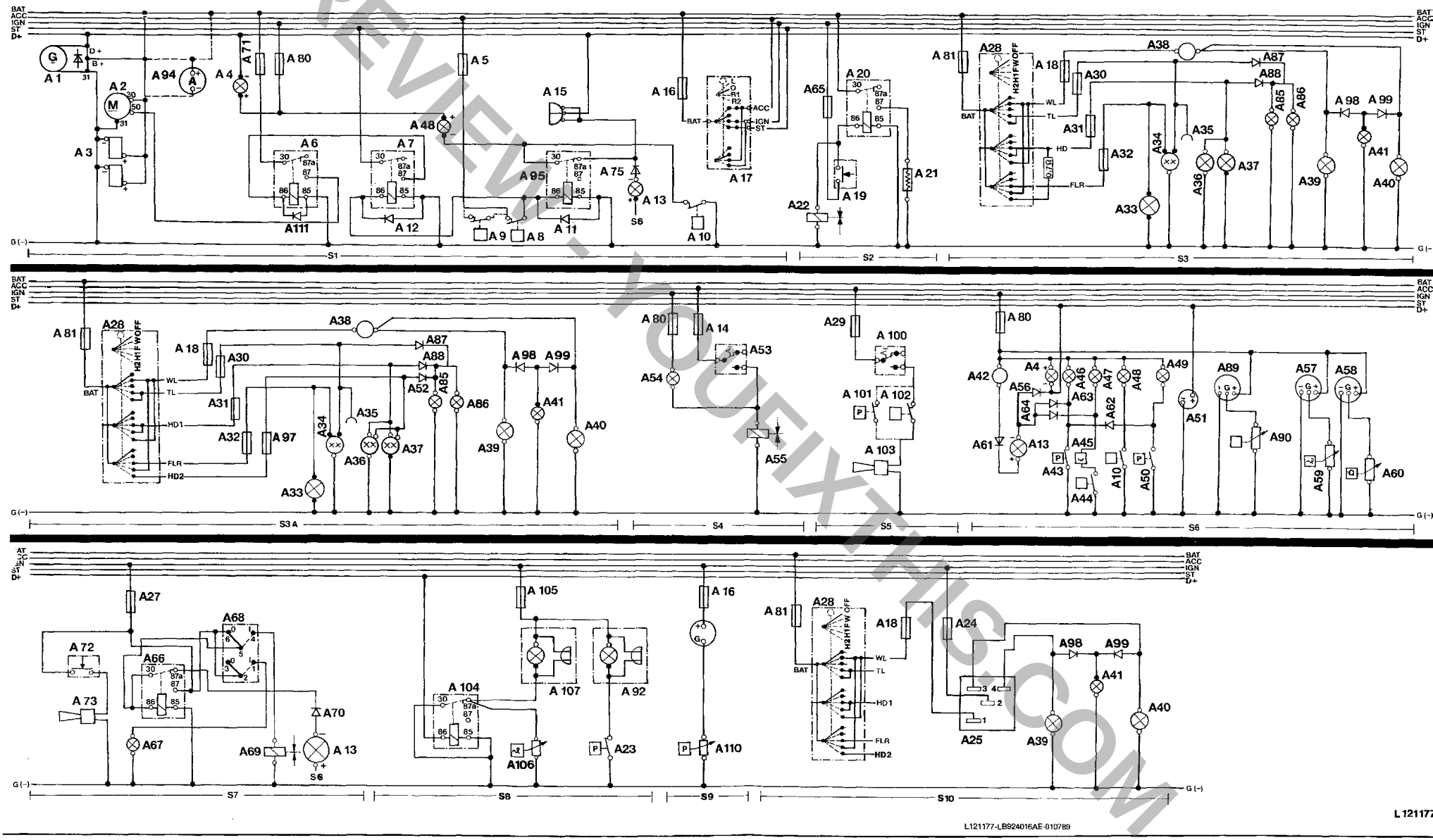
WIRING DIAGRAM – ENGINE (From Tractor Serial No. 637 101L)



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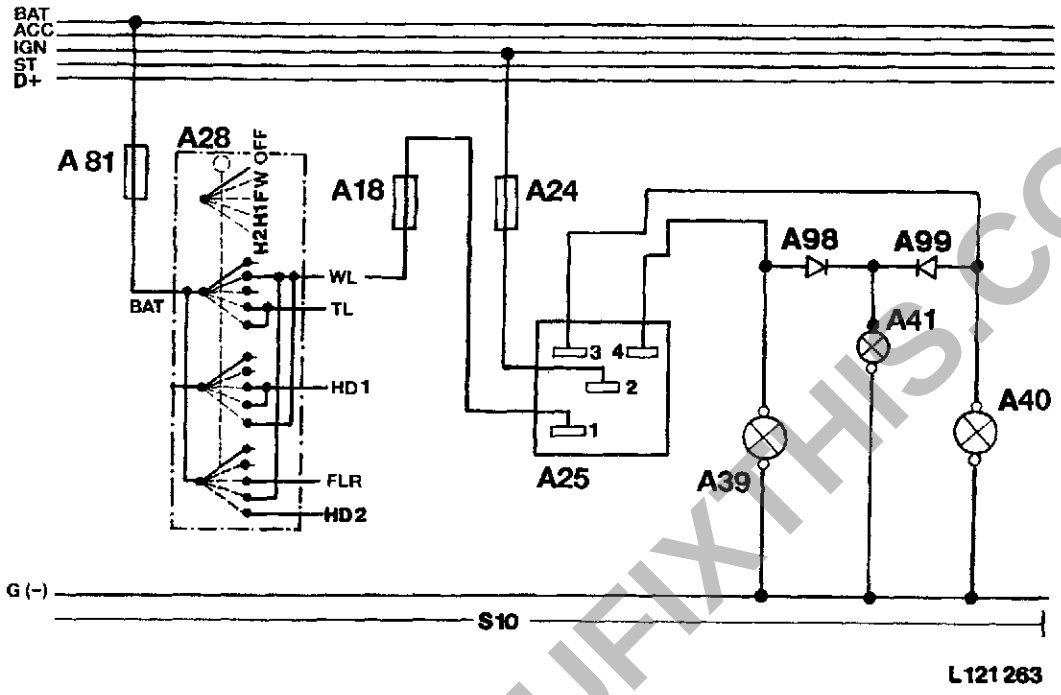
ELECTRICAL CIRCUIT DIAGRAM
(Complete Tractor)



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S10 – ELECTRICAL CIRCUIT DIAGRAM (TURN SIGNAL INDICATOR LIGHT)



A 2 Starting motor
A 3 Batteries
A17 Main switch
A18 Fuse 4
A24 Fuse 12
A25 Turn signal indicator light switch
A28 Light switch
A39 Turn signal indicator light, left-hand
A40 Turn signal indicator light, right-hand
A41 Turn signal indicator warning light
A76 21-pin plug (connecting point – engine)
A77 7-pin plug (connecting point – fender, l.h.)**
A79 12-pin plug (connecting point – instrument cluster, left-hand)
A81 Fuse 15
A82 3-pin plug (connecting point – fender, r.h.)**
A83 4-pin plug (connecting point – fender, l.h.)*
A84 2-pin plug (connecting point – fender, r.h.)*
A98 Diode
A99 Diode

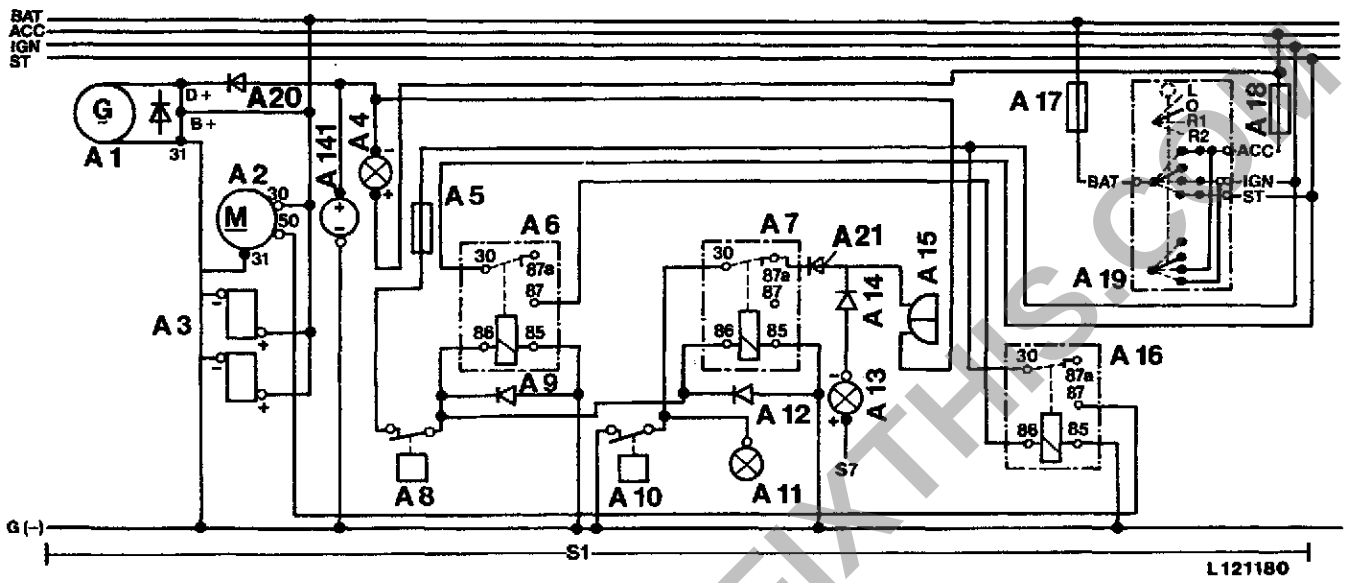
* Up to Tractor Serial No. 671 799L
** From Tractor Serial No. 671 800L

L121263-LB924017AE-010789

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S1 – ELECTRICAL CIRCUIT DIAGRAM (STARTING MOTOR AND CHARGING CIRCUIT)



A 1 Alternator
A 2 Starting motor
A 3 Batteries
A 4 Alternator indicator light
A 5 Fuse for neutral start switch (0.5 Ampere)
A 6 Starter relay
A 7 Relay for handbrake indicator light
A 8 Neutral start switch
A 9 Diode for starter relay
A10 Sending unit for handbrake indicator light
A11 Handbrake indicator light
A12 Diode for handbrake indicator light relay
A13 Warning light
A14 Diode
A15 Acoustical handbrake warning signal
A16 Starter relay
A 17 Fuse 8
A 18 Fuse 9
A 19 Main switch
A 20 Diode
A 21 Diode
A 45 21-pin plug (connecting point – engine)
A 46 12-pin plug (connecting point – transmission)
A 50 12-pin plug (connecting point – dash panel – left, left-hand)
A 51 12-pin plug (connecting point – dash panel – left, right-hand)
A 52 12-pin plug (connecting point – dash panel – right, left-hand)
A 53 12-pin plug (connecting point – dash panel – right, right-hand)
A141 Hourmeter

L121180-LB924025AE-010789

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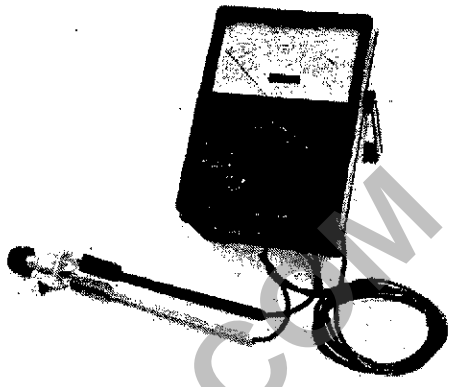
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TESTING BLOWER FAN SWITCH

Connect ohmmeter.

In the various switch positions, there must be continuity between the terminals as follows:

Switch "OFF" : Terminals H and L
First position : Terminals B, L and C
Second position : Terminals B, C and M
Third position : Terminals H, B and C



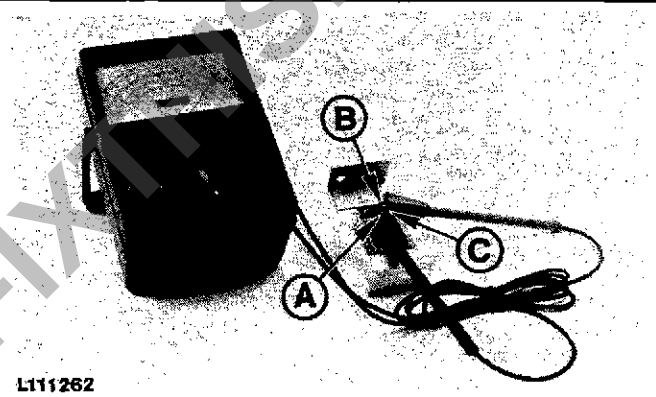
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TESTING BLOWER FAN RESISTOR

Connect ohmmeter to terminals (A) and (C) for "low" speed (see figure).
Resistance must be approx. 0.8 ohms.

Connect ohmmeter to terminals (A) and (B) for "medium" speed. Resistance must now be approx. 0.4 ohms.



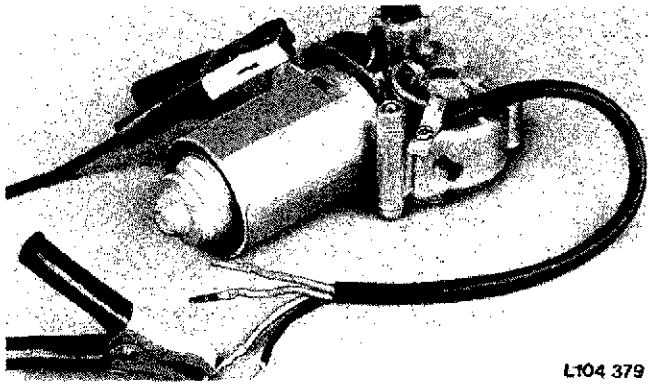
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TESTING WINDSHIELD WIPER MOTOR

Connect ground wire to motor housing and connect battery voltage to motor terminal 53. Motor must turn at low speed. When connecting battery voltage to terminal 53b, motor must turn at high speed.

Connect ground wire to motor housing. Connect battery voltage to terminal 53a and at the same time terminal 31b to terminal 53. The motor must then turn back to zero position and stop.



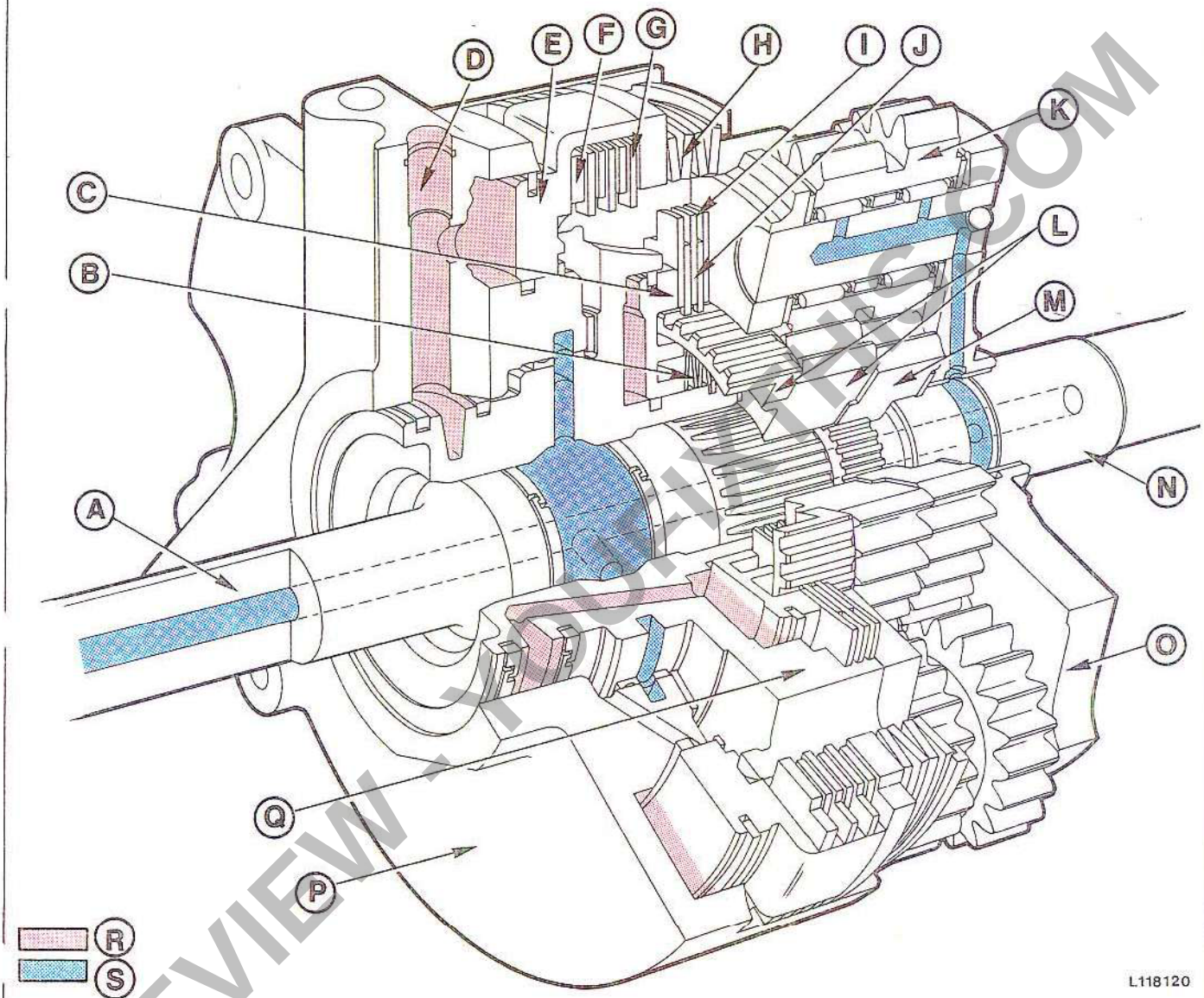
L104 379

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OIL FLOW IN HI-LO SHIFT UNIT (2155 to 2955 Tractors)



A–Transmission input shaft
B–Cupped springs of Hi clutch
C–Hi clutch piston
D–Pressure oil passage to Hi clutch and Lo brake piston
E–Lo brake piston
F–External splined brake disks
G–Internal splined brake disks
H–Cupped springs of Lo brake
I–External splined clutch disks
J–Internal splined clutch disks
K–Planet gear (3 used)
L–Sun gear with clutch hub
M–Sun gear
N–Drive shaft
O–Planet pinion carrier
P–Brake housing
Q–Hi clutch drum
R–Low-pressure oil
S–Lube oil

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DIAGNOSING MALFUNCTIONS

Excessive Gear Clash when Shifting

Worn synchronizer rings

Synchronizer splines damaged

Engine clutch not disengaging completely

Excessive Transmission Noise

Transmission shaft bearing damaged

Transmission parts worn or damaged

Taper roller bearings incorrectly adjusted

Transmission oil low, check oil level

Transmission Jumping Out of Gear

Shifter forks worn

Shift travel irregular

Shifter shaft detents worn

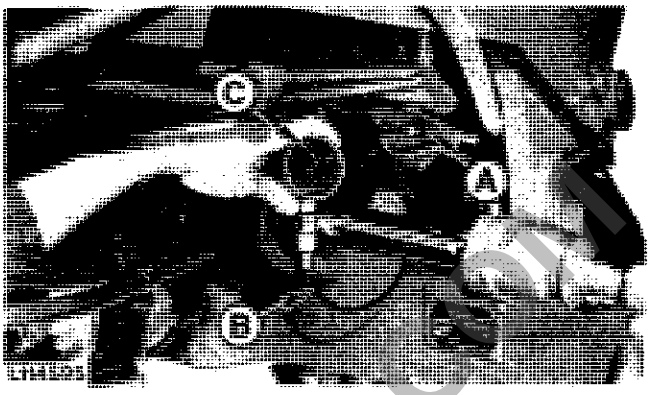
Transmission shaft "wanders" in transmission case

SYNGETR-LA725025AE-020186

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TESTING OPERATING PRESSURE OF PTO CLUTCH



CAUTION: Before testing PTO clutch operating pressure, support tractor front end securely and tilt front axle to the right (right-hand side lower). Apply handbrake firmly and ensure that no gear is engaged.

NOTE: Before testing, heat the hydraulic oil to 65° C (150° F) (see Section 270, Group 05). During testing, the engine speed must be 1500 rpm.

Connect a pressure gauge (C) to test plug bore of PTO clutch as shown in. With PTO engaged, there should be an operating pressure of 1050 kPa (10,5 bar; 150 psi). There should be no pressure reading at test connection of PTO brake.

A–Adapter KJD10142
B–Test hose JT05498*
C–Pressure gauge JT05474*

* Part of universal pressure test kit JT05470

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STEERING VALVE GEROTER LEAKAGE TEST

Warm oil to between 60 and 70°C (140 to 160°F).

Cycle steering valve from lock to lock approx. 15 times to stabilize temperature.

Remove steering valve work port lines. Plug steering valve ports.

Turn steering wheel to left-hand lock and apply 7 Nm (60 in-lb)) torque to steering shaft.

Continue to turn steering wheel to left and record time to make one full turn.

Turn steering wheel to right-hand lock and apply 7 Nm (60 in-lb) torque to steering shaft.Continue to turn steering wheel to right and measure time required for one full turn.

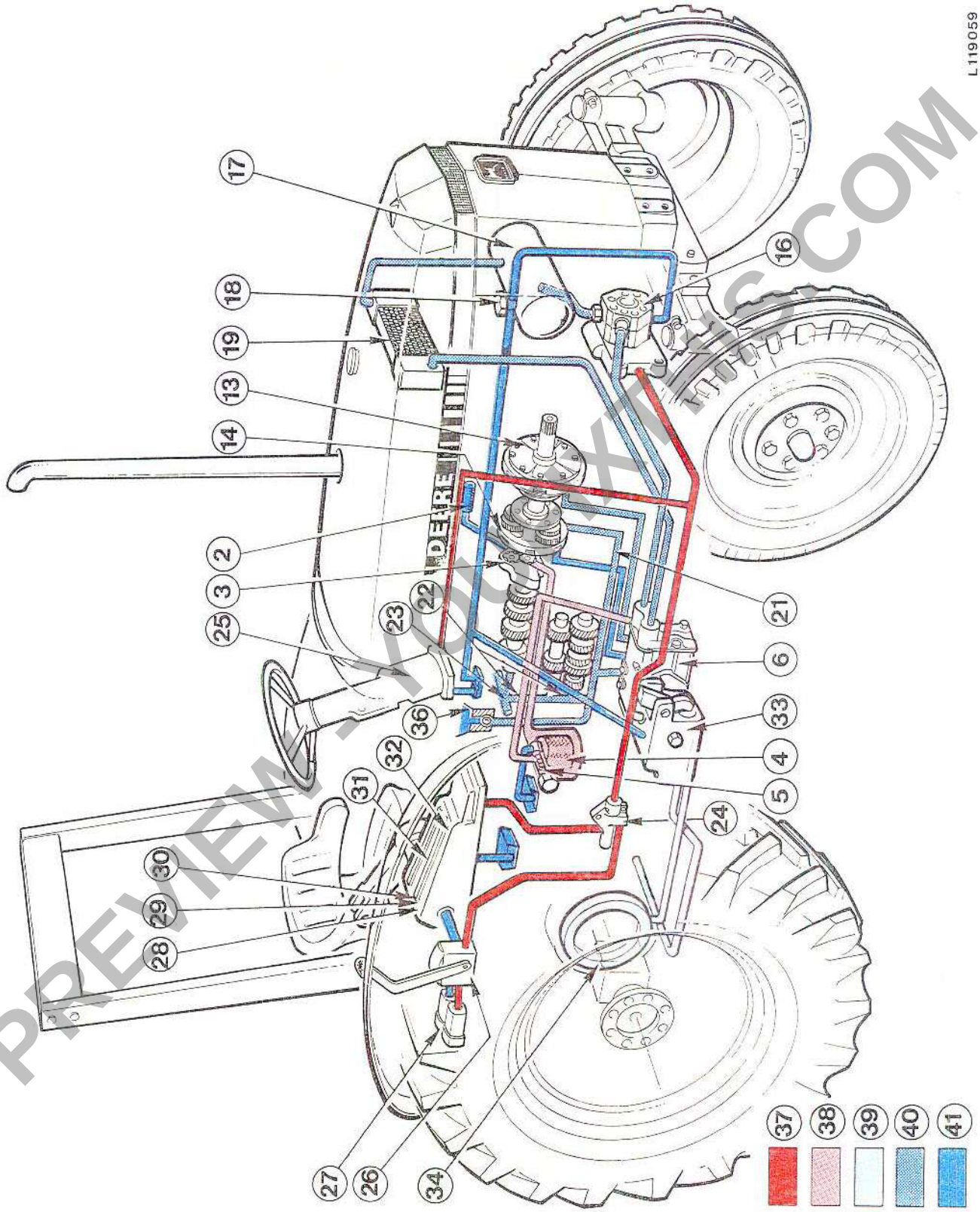
If steering wheel turns more than 1.5 rpm, this indicates excessive leakage.

Repair steering valve. See T.M. "Repair" for relevant tractor.

LENK-LB926005AE-011087

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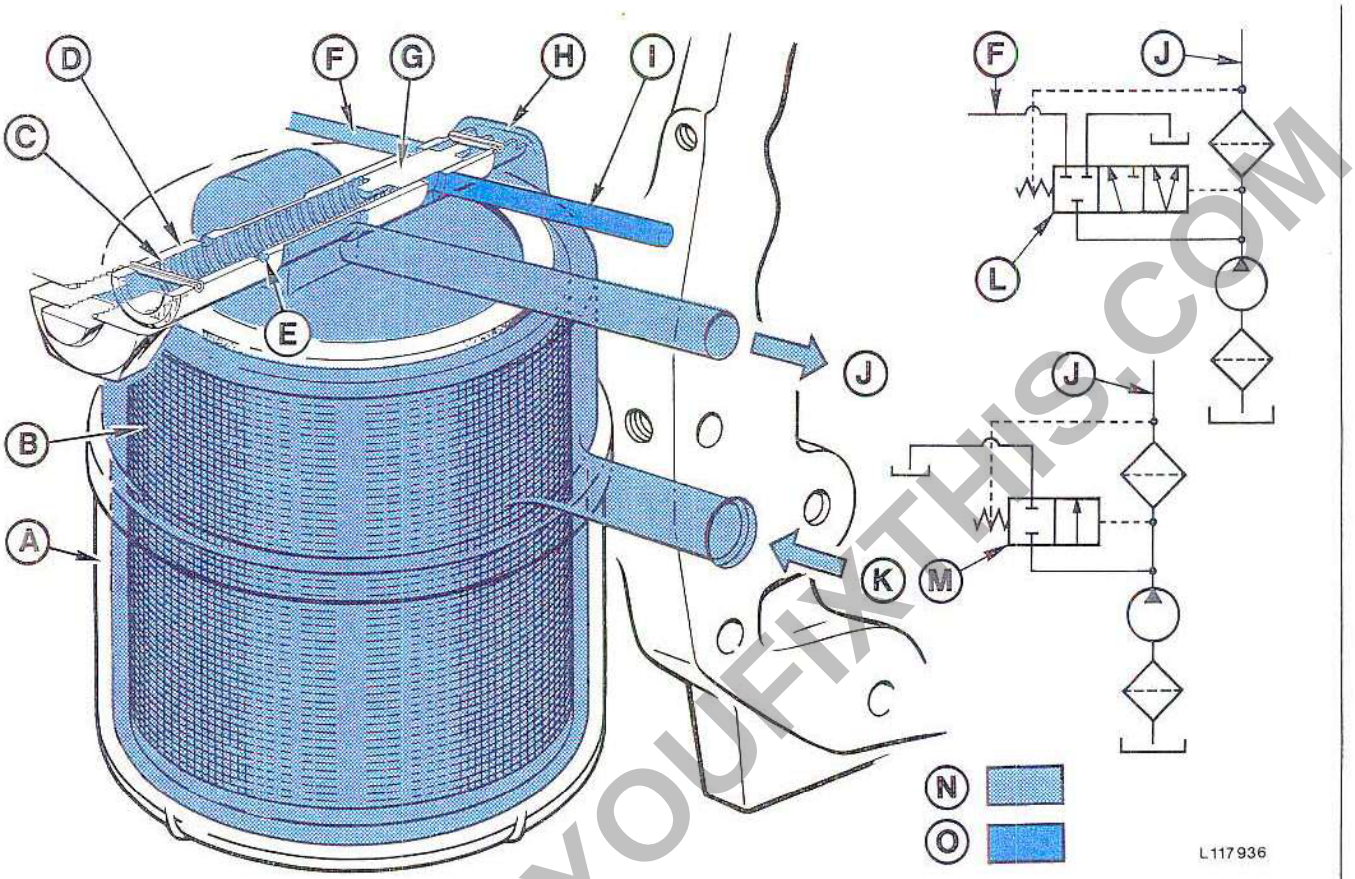
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BY-PASS VALVE – TRANSMISSION OIL FILTER (CLEAN FILTER)



A–Filter cover
B–Transmission oil filter
C–Spring
D–Valve sleeve
E–Relief bore*
F–To lube oil circuit*
G–Valve body
H–Rear end of by-pass valve
I–To sump
J–To transmission shift cover
K–From transmission oil pump
L–Pressure relief valve (synchronised transmission)
M–Pressure relief valve (collar shift transmission)
N–Lube oil
O–Pressure-free oil

Oil coming from the transmission oil pump passes through oil channel (K) into filter cover (A) outside transmission oil filter (B). This unfiltered oil is also supplied to rear end of by-pass valve (H). If transmission oil filter is clean, oil flows through filter via line (J) to the transmission shift cover.

Since the pressure of spring (C) on valve body (G) is higher than oil pressure on rear end of valve (H), the valve body remains in the position shown. No oil flows through channels (F* and I).

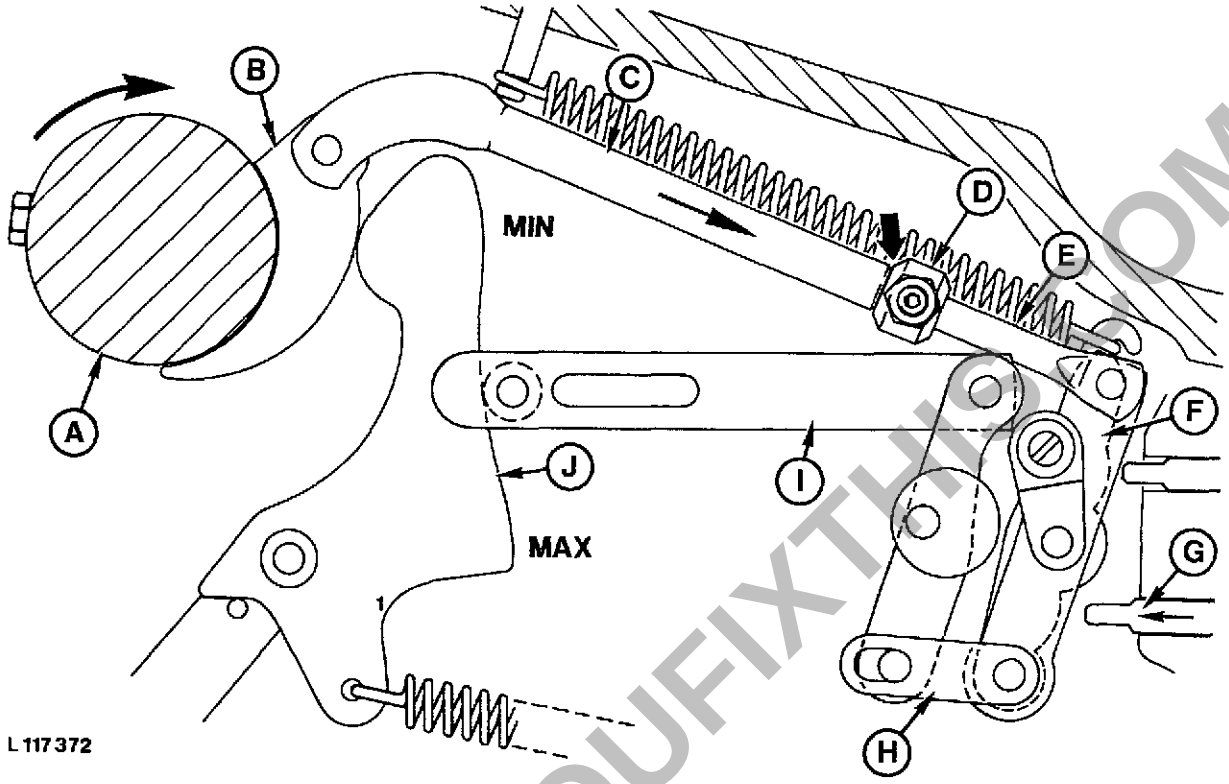
* On tractors with synchronized transmission only

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LIFT LIMIT WITH SHUT-OFF ROD



A–Rockshaft
B–Rockshaft cam
C–Pipe
D–Stop
E–Shut-off rod
F–Valve linkage
G–Pressure valve
H–Tab
I–Load selector link
J–Cam follower

During lifting, valve linkage (F) is forced against pressure valve (G). Shut-off rod (E) with adjustable stop (D) is mounted loosely in pipe (C). If rockshaft (A) with the lift arms is in its highest position, pipe (C) contacts stop (D), see arrow.

Valve linkage (F) rotates around its axis, pressure valve (G) is closed and the raising cycle is thus completed. Cam follower (J) has no function with load selector link (I) in position "MAX" or "MIN", as the slot in tab (H) has a compensating effect.

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TEMPERATURE CONTROL SWITCH

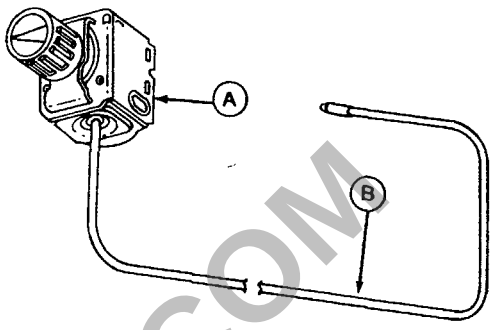
The purpose of the temperature control switch (A) is to regulate the temperature of the refrigerant in the evaporator, corresponding with the control knob setting selected by the operator.

The switch consists of a set of contact points receiving its power from the pressurizer motor switch. The current flows from temperature switch to compressor clutch.

Contact points in the temperature switch are controlled by a gas-filled temperature sensing tube (B) having a spring bellows or diaphragm on one end connected to a point operating mechanism. The other end of the sensing tube is inserted into the core of the evaporator.

When the control knob is turned on (clockwise), contact points close, thereby starting the compressor. However, the compressor will not operate unless the pressurizer motors are turned on. As the temperature in the evaporator reaches its specified lower limit, the contact points are allowed to open, in turn shutting off the compressor. The compressor will remain off until the temperature in the evaporator reaches its specified upper limit. When that limit is reached, the contact points close and the compressor starts operating. In this manner, the compressor turns off and on automatically to satisfy the demands of the evaporator.

Turning the control knob all the way to the left (counter-clockwise) manually opens the contact points in the switch housing, stopping the compressor.



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