270/255/245 ENGINES/CLUTCHES/PTO

Engine Specifications	270	255	245
No of cylinders	4	4	3
Bore in (mm)	3.8 (98)	3.8 (98)	3.6(91.4)
Stroke in (mm)	4.9 (125)	4.9(125)	5.0 (127)
Capacity in^3(litres)	228 (3.77)	228 (3.77)	152 (2.5)
Compression Ratio	16.8 : 1	16.8 : 1	18.5 : 1
B.H.P.	70	55	47
Maximum Torque lbf.ft (kgf.m)	190 (26.8)	160 (22.2)	128 (17.7)
Engine rev/min Max torque	1300	1200	1300
Foot Throttle	Standard	Standard	Standard

Clutch Specifications

Type	Double Dry disc (I.P.T.O.)
Diameter	Main and P.T.O. Clutches 11"
	Heavy duty single 13" clutch optional on standard models - 255/270
Operation	Main - Foot operated
	ITPO - Foot or hand operated

PTO Specifications

	270	255	245
H.P. @ 540 rev/min	58	44.5	36
Engine rev/min @ 540 PTO rev/min	1812	1812	1812
Maximum HP @ 2200 engine rev/min	62	47	40
No of splines	6	6	6
Shaft diameter in (mm)	$1\frac{3}{8}$ (34.9	$1\frac{3}{8}$ (34.9)	$1\frac{3}{8}$ (34.9)

98 SERIES ENGINE 270 - 255

1 Cylinder bore 98 mm, - - - commonisation of Parts.

2 Stroke length 125 mm, - - gives higher torque at lower speeds. Crankshaft 5 bearing.

3 Large valves fitted - - protruding from face of cylinder head - - - gives far better breathing.

4 Compression ratio 16.8 : 1 - - - made possible by improved breathing.

5 Piston combustion chamber toroidal recessed machined on top face to give clearance for valves - - - gives more efficient and cleaner combustion.

6 Material used for liners - - - able to stand up to increased torque.

7 Two sealing rings, used at bottom of liner - - - more effective sealing and additional damping of vibration, minimising cavitation erosion.

8 Both versions using C.A.V. D.P.A. fuel pump - - - equal fuel delivery, more reliable fewer moving parts, no separate lubricating system.

THE BALANCER

Mounted in the sump on the centre main bearing cap, it is driven from the oil pump gear and consists of 2 contra-rotating weighed gears which rotate at twice engine speed.
Reliability and driver comfort is greatly improved.

COMBUSTION

Direct injection above the piston. Efficient with low fuel consumption, and easy starting.
Long stroke design gives good back up torque and lugging power. Wet liners give good cooling and easy servicing. High grade material minimises bore wear.

FUEL SYSTEM

Fuel tank with 15 gallon (68.2 litres) 18 US Gall capacity mounted at the front of the tractors. Fuel lift pump mounted on the left hand side of the engine and operated by camshaft (on the 245 it is mounted on the right hand side).

On all three models the injection pump is a CAV DPA pump with mechanical governor.

FILTRATION

270/255	1	Pencil filter in the bottom of the fuel tank
	2	Gauze filter in the fuel lift pump
	3	Dual replaceable element fuel filters with sediment bowls
245	1	Pencil filter in the bottom of the fuel tank
	2	Single element fuel filter with sediment trap

INJECTION PUMP

270/255/245	1	Distributor type with mechanical governor
	2	Two air bleed points
	3	Thermostat for cold starting 255 and 270.
	4	Manual retarding device for cold starting 270 255.

OIL LUBRICATION SYSTEM

270/255	1	Force feed to all points
	2	Eccentric gear oil pump
	3	Sump contains 16 pints (9.09 litres) 2.4 US gall of Universal oil.
245	1	Force feed to all points
	2	Eccentric gear oil pump
	3	Sump contains 12 pints 6.8 litres 14 US PINTS of Universal oil.

ELECTRICAL SYSTEM

BATTERY

270 - 255 - 12 volt 128 amp hr

245 - 12 volt 95 amp hr

Positioned in front extension for easy maintenance and removal and away from heat.

DYNAMO 270-255-245	18 amp supply
ALTERNATOR	Optional - giving 34 amp supply and a higher battery charge at low engine speeds
STARTER MOTOR	Heavy duty solenoid pre-engaged type
	All negative earth systems

AIR FILTRATION

Cyclonic air filter using a washable element filter automatically discharges dirt to front of bulkhead. Less maintenance required. Air intake at front of tractor away from dirt and dust. No pre-cleaner to obstruct vision forwards.

COOLING SYSTEM

4 - core radiator gives larger cooling area. Air intake through front grill and side panels further improve cooling.

New overflow system uses dual valve pressure cap on radiator. 4 lbf/in^2 overflow valve and 1½ lbf/in^2 return valve. To check coolant level inspect translucent overflow bottle. If coolant is present the radiator is full.

A standard 'V' section belt is used to drive the fan, dynamo, alternator and water pump.

INSTRUMENTS

Printed circuit avoids complicated wiring

Tractometer - Engine revs and speeds in allggears plus hour meter

Fuel, battery condition, oil pressure and water temperature gauges

Last three zoned for easy reading

Anti-damp capsules ensure accuracy

Warning lights for main beam (blue) trafficators (green - when fitted

Dynamo or alternator charge (red)

TRACTOMETER SPEED READINGS IN RELATION TO TYRE SIZES

Wheel Equipment	Max. speed and engine revs		Increase or decrease
	mph	kph	compared to 12 x 36
11 x 28	16.19	25.9	Decrease 18.2%
11 x 32	17.6	28.3	Decrease 11.11%
13 x 28	17.6	28.3	Decrease 11.11%
11 x 36	19.1	30.4	Decrease 3.53%
12 x 36	19.8	31.7	As on tractometer
12 x 38	20.5	33.0	Increase 3.63%
14 x 30	19.3	30.8	Decrease 2.52%
15 x 30	19.8	31.7	As on tractometer

CLUTCHES

There are 3 basic clutch systems fitted to tractors:

1 Single PTO and Main drive use same clutch

2 Live dual clutch operated by two pressures on clutch pedal

3 Ind. double clutch operated by separate controls.

The Leyland double clutch model gives completely independent operation of the PTO. The clutch being operated by either a hand lever or foot pedal to the left of the driver. It may be latched in the disengaged position for short periods of time. (Up to 10 minutes) The PTO can be engaged and disengaged while the tractor is on the move. Main and PTO clutches are the same, 11" diameter. All available power can therefore be transmitted through the PTO shaft.

On standard models a single 11" clutch is fitted.

On 270/255 an optional 13" heavy duty clutch can be fitted.

HYDRAULICS - 270 - 255 - 245

SPECIFICATION

Functions	-	Position Control
	-	Draught Control
	-	Auxiliary Services Control
Pump	-	Plessey Dual Chamber Gear Type
Output	-	Main 6½ galls/min 29.5 litres 7.8 US gall
		By Pass Filter Pump 2½ galls/min 11.35 litres 3 US gall
Maximum Pressure	-	Position and Draught Control 2600 lb/in^2
Pump Disengagement	-	Standard
Draught Sensing	-	Double Acting Top Link
Maximum Lift:		
270/255	-	4000 lbs
245	-	3750 lbs
Oil Reservoir Cap	-	12½ galls 56.8 litres 15 US gall
Tapping Points	-	Main and Auxiliary
Safety Mechanical Lift Lock	-	Standard
Linkage	-	Standard 255 & 245, 270 Cat I & II
Linkage Stabiliser	-	Standard

OIL SUPPLY

Primary Filter between bull gears in transmission case,
Secondary filter and magnetic plug which are easily removed from rear casting.

By-pass valve in primary filter for when oil is very cold
External replaceable paper element filter

PUMP

Dual chamber pump driven from the primary PTO shaft
High output for auxiliary equipment, Position control and Draught Control.
Lower Output for replaceable external filter.
Gear type pump which is wear compensating.

HYDRAULIC QUADRANT AND OPERATION

1 3 LEVERS

Pear-shaped Lever	-	Lifts and lowers implement irrespective of service selected
Round Shaped Lever	-	Selects either draught control (fully raised point) or position control (fully lowered point) No intermediate control is available.
Square Shaped Lever	-	Operates auxiliary services from tapping on the right hand side.

1 DRAUGHT CONTROL

Round lever at the top of the quadrant; pear-shaped lever now adjusts the depth of the working implement.

3 POSITION CONTROL

Round lever at the bottom of the quadrang; pear shaped lever will now adjust the heigh of the implement.

4 To change between draught control and position control and vice-versa, the pear shaped lever MUST be against the stop at the top of the quadrant (under no circumstances should this stop be adjusted.)

5 SAFETY LIFT LOCK

This is only to be used when working on a stationary raised implement. During transport, the implement should be held on hydraulics in the fully raised position. This allows the hydraulic oil to act as a shock absorber.

To select safety lift lock, round lever in draught control (position control will not operate safety lift lock.) Pear shaped lever to be within 2" of the top of the quadrant an audible relief valve will be heard which ensures maximum lift of the linkage thereby allowing engagement or disengagement of safety lift lock.

6 When using main tapping point, constant oil supply may be achieved with draught control selected with pear shaped lever, as when engaging safety lift lock.

7 When using auxiliary services, no oil is available for the main circuit. Auxiliary is therefore the priority service.

QUADRANT RACK AND CHANNEL

This mechanism allows the channel to move in an opposite direction when the position and draught control lever is moved, even though the main lever moves in the same direction.

TOP LINK ANCHOR BRACKET

Double acting
Two stage Belville washer pack enabling weak and strong signals to be sensed.
Either of the 2 holes in the bracket can be selected to achieve the most efficient reading of varying strengths of top link signal.

3 POINT LINKAGE

(a) Designed to overcome the problem of trailed equipment e.g. Ploughs and cultivators

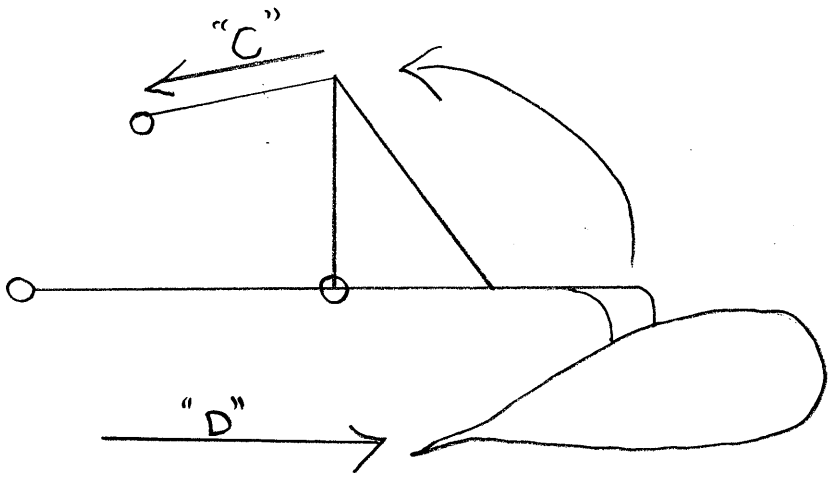
(b) Gives more manoeuverability on headlands and easier to transport between working sites.

(c) Working depth was achieved with depth wheel.

It was then realised that some weight transfer was possible by taking some weight on the lift arms, this assisted wheel grip.

PRINCIPLES OF DRAUGHT CONTROL

It was then noticed that the 'Draught Force D' on the implement due to the resistance of the plough passing through the soil, causes a rotation around the point joining the lower links and implement. This rotational movement causes a compression force 'Cp in the top link.



For a given working depth and speed the draught 'D' is proportional to the compression 'C' in the top link.

Therefore, in a constant soil if the implement goes deeper the draught and hence the compression on the top link, will increase. Conversely when the plough depth decreases, the draught and compression on the top link will decrease.
If this compression signal is relayed into the hydraulic system so that when there is an increase in signal, the plough is lifted out slightly, and with decrease in signal the plough is allowed to drop deep into work, then a constant depth is achieved.

DRAUGHT CONTROL NOT DEPTH CONTROL

Signal on top link is due to draught
Therefore depth governed by draught
Depth and draught are proportional in fairly constant soil conditions.
With change in soil texture the driver needs to adjust the draught control lever to achieve constant depth.

TYPES OF DRAUGHT SENSING

Single Acting Top Link
Double Acting Top Link
Lower Link Sensing

SINGLE ACTING TOP LINK

These will only sense compression signals
System satisfactory providing that:-

1. Shallow working done with depth wheel.
2. Mounted implements - e.g. Ploughs, are not too long and heavy.

Disadvantage is that if the weight and vertical soil force are large it results in an unmeasurable tension signal in the top link.

DOUBLE ACTING TOP LINK

This overcomes the previous problems and can measure a tension signal.

Good draught control at any depth.
Tension signals tend to keep the plough in the ground.
Compression signals tend to keep the plough out of the ground.
Small correction on draught lever will counteract a large variation in soil conditions.

LOWER LINK SENSING

Draught sensing achieved through the lower links via a torsion bar or flexible bar system.

WEIGHT TRANSFER

Weight comes from - Implement
Soil
Front of Tractor

The weight transfer comes from defying the implement going deeper in the ground.
The greater the combined downward forces (good shares assist) the greater the possible weight transfer.

Because Leyland draught links attach behind the axle, the weight transfer effect is greater.

POINTS FOR GUIDANCE

Always have Main lever at top of quadrant before selecting Position or Draught Control.

Relief valve does not "Blow-Off" in Position Control:

Relief valve only "Blows-Off with Main lever approximately 1" forward from Stop in Draught Control thus attaining max height.

Never transport equipment on the safety mechanical lift lock.

Constant oil supply can be achieved from the auxiliary tapping by fastening back the auxiliary lever. Aux. has priority over main lift.

For weak draught response use the top hole of the top link anchor bracket. For stronger draught response use the bottom hole.

LINKAGE:

Heavy duty, optional on 270 and 255 Cat 2 only
Standard linkage on 255 and 245
Linkage cat 1 and 2 achieved by changing ball ends
Heavy duty cat 2 balls pressed in
Lower links attachment to tractor must be moved to inner position for cat 1
This maintains the converging linkage to keep plough straight
As the links attach behind the back axle, more weight is achieved.