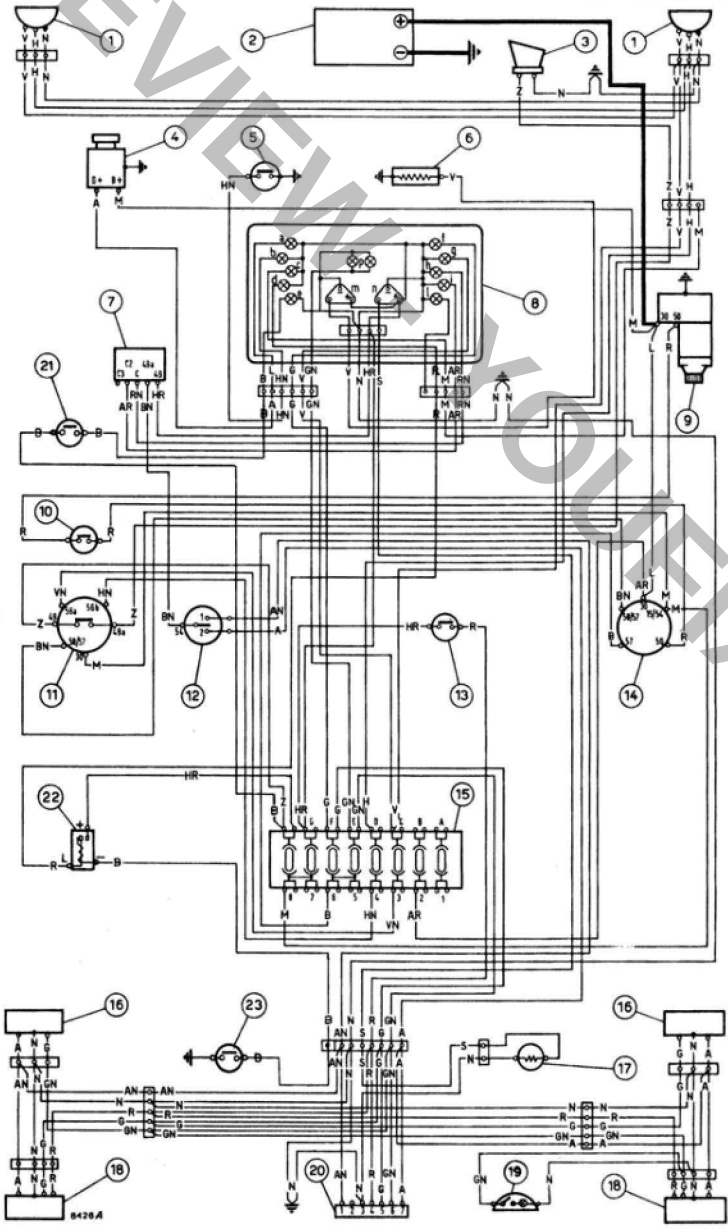
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Wiring Diagram - No Accessories

1. Headlamps
2. Battery
3. Horn
4. Alternator
5. Oil pressure warning transmitter
6. Water temperature transmitter
7. Tractor/first trailer/second trailer direction flasher
8. Multiple gauge (13 window)
   a. Alternator warning light
   b. Oil pressure warning light
   c. Air cleaner warning light
   d. Parking brake warning light
   e. Hazard warning indicator (AM) / Low brake oil level warning light (PM)
   f. Side light warning light
   g. Main beam warning light
   h. Tractor direction warning light
   i. First trailer direction warning light
   l. Second trailer direction warning light
   m. Water temperature gauge
   n. Fuel gauge
   p. Gauge light
9. Starter
10. Starter inhibitor switch
11. Lighting switch and horn button
12. Direction indicator switch
13. Stop light switch
14. Starter switch
15. Fuses
16. Side and front direction light
17. Fuel tank unit
18. Rear/direction/stop lights
19. Floodlight and switch
20. Seven-pole power point
21. Low brake oil level warning transmitter
22. Parking brake warning flasher
23. Parking brake warning transmitter

CABLE COLOUR CODE

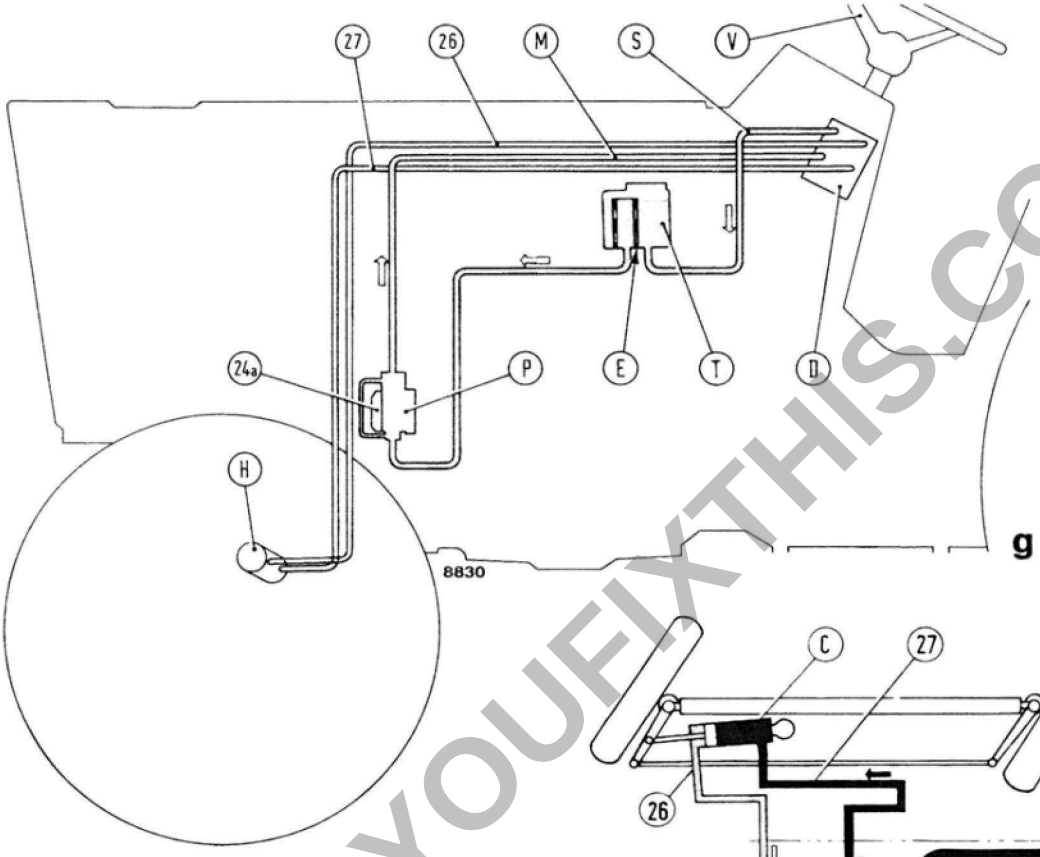
A = Light blue	H = Grey	R = Red
B = White	L = Dark blue	S = Pink
C = Orange	M = Brown	V = Green
G = Yellow	N = Black	Z = Mauve

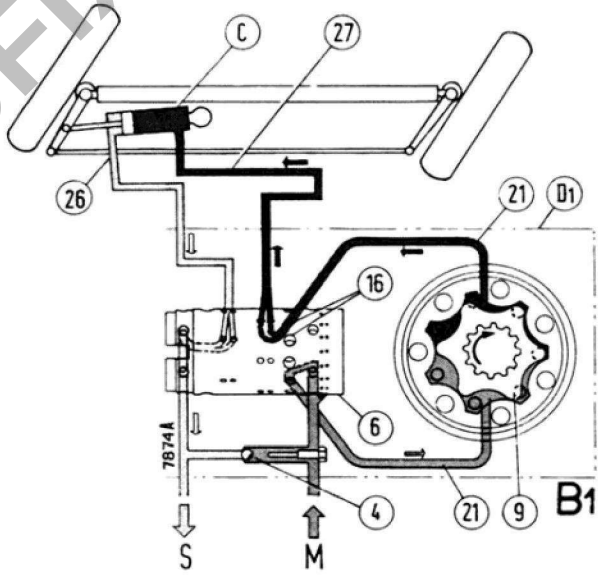
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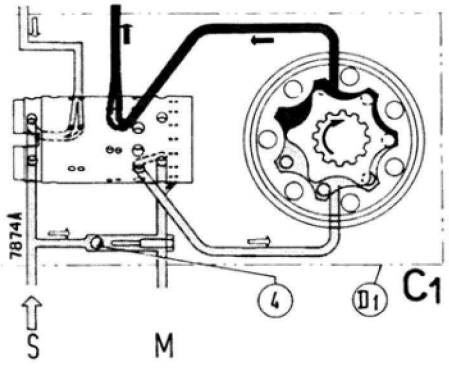
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Operation Diagram

(For missing references see the caption on the right)

A. Operation in straight-ahead driving position - **B**/**B**$_1$. R.H. and L.H. steer (Sd and Ss) with and without valve block (D_2) - **C**/**C**$_1$. R.H. and L.H. emergency steer (Sed and Ses) with and without valve block (D_2) - **d.** Operation diagram for straight-ahead driving (Sections D-D and F-F) - **D.** Hydraulic control unit including control valve (D_1) with or without valve block (D_2) - **e**/**f.** Operation diagram for two-stage R.H. steering (D-D and F-F) - E. Filter cartridge - **g.** Steering system schematics - H. Power cylinder - M. Pump outlet line - P. Hydraulic pump - S. Return to tank - T. Reservoir - V. Steering wheel - 23. Non-return valve of block (D_2) - 24. Relief valve of block (D_2) (set to 125 to 130 kg/cm² or 1778 to 1849 psi) - 24a. Relief valve of hydraulic pump (P) (set to 95 to 100 kg/cm² or 1351 to 1422 psi) - 25. Cylinder safety valves integral with block (D_2) (set to 200 kg/cm² or 2845 psi)

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CYLINDER LINERS

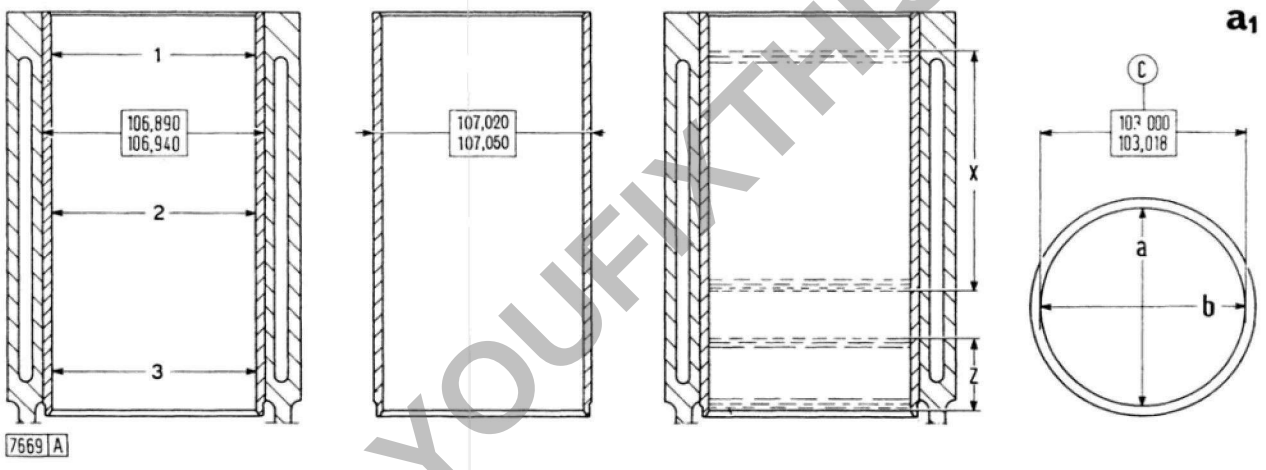
To inspect for wear proceed as follows:

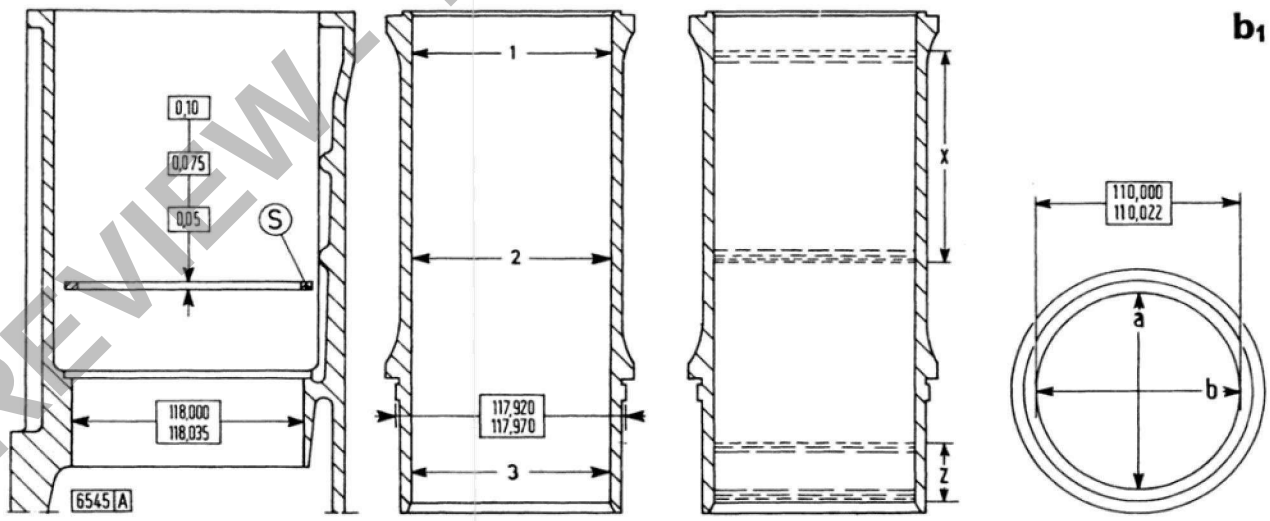
— Measure the liner bore diameter over the swept area (X).

— The diameter reading should be taken in both the upper and lower part of the swept area in plane (a) parallel to the crankshaft and in plane (b) at right angles to it.

— Compare the readings to establish the amount of liner ovality and taper.

To check the piston working clearance measure the liner bore diameter over (Z) in plane (b) only.





Liner and Block Inspection Data

a/b. Liner bore measurements at right angles - a_1. Model 780 - b_1. Model 880 - C. Liner fitted bore diameter - S. Protrusion shims - Z. Liner wear inspection length for assessment of piston fit on plane b at right angles to crankshaft - X. Liner wear inspection length (swept area) for assessment of ovality and taper on planes a and b - 1/2/3. New or re-bored liner bore measuring depth on planes a and b

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TIGHTENING TORQUE FIGURES

DESCRIPTION	Thread Size	Torque (°)	
		kgm	lb ft
Engine Block and Cylinder Head - Valve Gear - Crank Gear - Section 10			
Screw, cylinder head, 780 (C_1, page 17)	M 12 x 1.25	15	108
Nut, cylinder head, 880 (C_1, page 18)	M 16 x 1.5	23	166
Screw, rocker bracket (C_2, pages 17 and 18) — 780 — 880	 M 8 x 1.25 M 10 x 1.25	 2.5 5	 18 36
Screw, idler gear jack shaft, 880 (C_7, page 18)	M 8 x 1.25	2.3	16.5
Screw, main bearing cap (C_3, pages 17 and 18) — 780 — 880	 M 14 x 1.5 M 16 x 1.5	 15 14.5	 108 105
Screw, conn. rod cap (C_4, pages 17 and 18) — 780 — 880	 M 12 x 1.25 M 13 x 1	 11 13	 79 94
Screw, flywheel (C_5, pages 17 and 18) — 780 — 880	 M 12 x 1.25 M 12 x 1.5	 12 9.5	 87 69
Nut, crankshaft pulley hub, 780 (C_6, page 17)	M 30 x 1.5	30	217
Screw, crankshaft pulley hub, 880 (C_6, page 18)	M 18 x 1.5	30	217
Crank Gear - Section 103 Screw, balancer housing, 880 (C_2, page 8)	M 10 x 1.25	5	36
Screw, balancer housing — To sump, 780 (C_8, page 6) — To engine block, 880 (C_1, page 8)	 M 12 x 1.25 M 10 x 1.25	 12 5	 87 36
Fuel System - Section 104 Nut, injection pump shaft gear, 780 — BOSCH — CAV	 M 12 x 1.75 9/16″ 18 UNF	 6.5 8.3	 47 60
Nut, injection pump drive bush, 880	9/16″ 18 UNF	8.3	60
Screw, gear to injection pump shaft, 880	M 8 x 1.25	3	21.5
Nuts, injection pump to support, 780	M 8 x 1.25	2.5	18
Screw, injection pump to support, 880	M 8 x 1.25	2.5	18

(°) Wet, engine oil

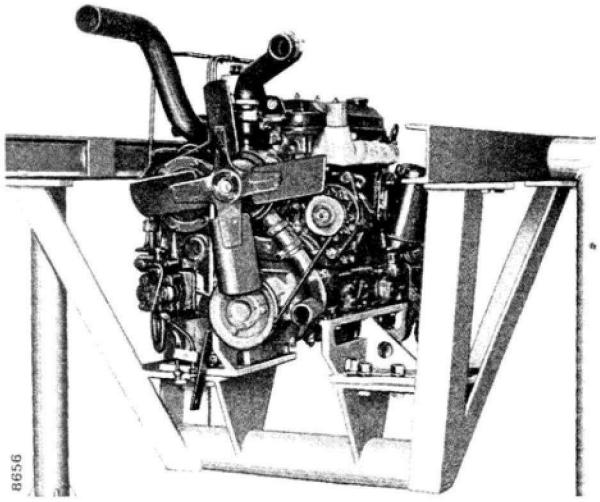
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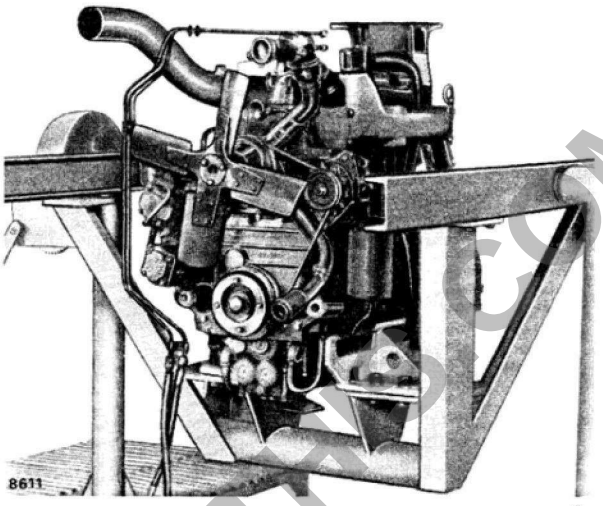
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ENGINE: To Remove and Refit



a



b

Engine in Position on Rotary Stand 290090
a. Model 780 - **b.** Model 880

TO REMOVE

Drain the cooling system, remove the exhaust silencer, the lower and upper side panels and the front grille.

Disconnect the battery negative leads, the starter leads, the front light leads and the horn conductors.

Remove the radiator and inlet manifold rubber sleeves

Disconnect the power steering cylinder lines, remove the front and rear propeller shaft guards from DT versions and disconnect the drag link from the swing lever on mechanically steered 780 tractors.

Place a jack under the engine sump, hoist the front ballast, remove front axle carrier screws from engine sump and detatch the axle assembly from the engine acting on the front wheels as shown on page 3.

Disconnect the fuel lines from the lift pump, from the second fuel filter and from the leak-off connection.

Disconnect the electrical leads from the alternator, oil pressure and water temperature transmitters.

Disconnect the tractor meter angle drive lead, throttle and shut-off links from the injection pump, lift inlet and outlet lines from the hydraulic pump, and the flexible steering pipes from the rigid piping.

Hoist the engine using hook **290740** as shown on page 3, remove the engine-transmission fixing nuts and bolts and separate the engine from the transmission.

Drain the sump oil, remove the sump, detatch the balancer oil line on 880 tractors, and place the engine assembly on rotary overhaul stand **290090**, using universal bracket **293002/1** as shown in Figs. a and b.

TO REFIT

Reverse the removal procedure and note the following points:

— When offering up the engine onto the transmission mesh the transmission and P.T.O. clutch shaft splines without forcing.

— Strictly adhere to the prescribed tightening torque figures.

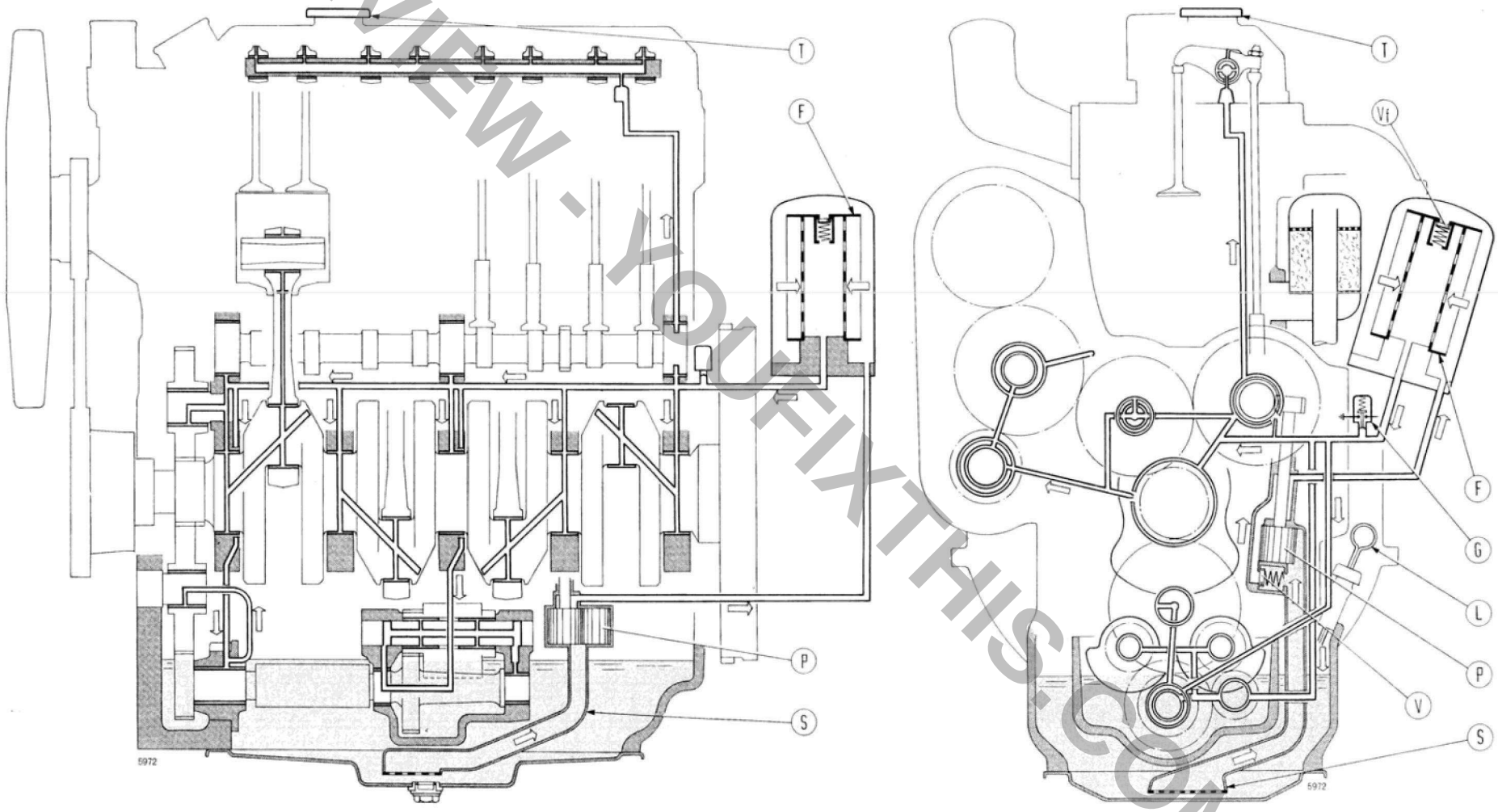
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Lubrication System Diagram (780 Tractor)

F. Filter - G. Oil pressure warning transmitter - L. Dipstick - P. Pump - S. Suction filter - T. Oil filler plug - V. Relief valve - Vf. By-pass valve (cuts in when inlet pressure is .9 to 1.1 kg/cm² or 12 to 15 psi higher than outlet pressure)

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FRONT AXLE - STEERING: Power Steering

FAULT FINDING CHART

FAULT	CAUSE	REMEDY
1. Leaking control unit.	**a.** Loose cover screws (C_2, page 9).	Tighten to prescribed torque.
	b. Damaged cover seals or sealing washer of screw (C_2).	Renew as necessary.
2. Heavy steering.	**a.** Faulty hydraulic pump.	Overhaul pump.
	b. Non-return valve (4) stuck open.	Clean valve and filter.
	c. Relief valve (24 or 24a) out of adjustment.	Reset valve.
	d. Relief valve (24 or 24a) failed or stuck open.	Remove foreign matter and clean filter. If trouble persists, renew valve block assembly OVP-20.
	e. Steering column binding in bush owing to rusting, pick-up, etc.	Remedy as necessary.
3. Loose steering.	**a.** Excessive clearance of steering column in control unit.	Renew any worn parts.
	b. Excessive clearance between shaft (7) and drive pin (1).	Renew worn parts as necessary.
	c. Excessive spline clearance on rotor (9) relative to shaft (7).	Renew worn parts as necessary.
	d. Build-up of clearances **a.**, **b.** and **c.** above.	Renew worn parts as necessary.
	e. Failed or weakened leaf spring (2).	Renew as necessary.
4a. Slow steering.	**a.** Leaking power cylinder piston gland.	Renew gland.
4b. No steering.	**b1.** Failed power cylinder piston rod.	Renew rod.
	b2. Failed actuating shaft (7) or pin (1).	Renew failed parts as necessary.
5. Engine off, no steering.	**a.** Worn rotor (9) and cam ring (8).	Renew worn parts.
	b. Damaged non-return valve (23).	Renew valve block assembly OVP-20.

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IDENTIFICATION DATA

	780 780 DT	880 880 DT
Marketing Code — Rear wheel drive (RWD) — Live front axle (LFA) Engineering code:		
— 8-speed, rear wheel drive (780 and 880 AM)	655.100.000	656.100.000 (*)
— 12-speed, rear wheel drive (780 and 880 AM)	655.111.000	656.111.000
— 8-speed, four wheel drive (780 and 880 AM)	655.127.000	656.127.000 (*)
— 12-speed, four wheel drive (780 and 880 AM)	655.129.000	656.129.000
— 12-speed, rear wheel drive (780 and 880 PM)	655.100.000 var. 720.286.040	656.100.000
— 16-speed, rear wheel drive (780 and 880 PM)	655.100.000 var. 720.111.170	656.100.000 var. 720.111.150
— 12-speed, four wheel drive (780 and 880 PM)	655.127.000 var. 720.286.050	656.127.000
— 16-speed, four wheel drive	655.127.000 var. 720.111.170	656.127.000 var. 720.111.150
Engine type (all versions)	FIAT 8045.04.2.. (with BOSCH pump) FIAT 8045.04.3.. (with C.A.V. pump)	FIAT OM C 03/75 (with C.A.V. pump)

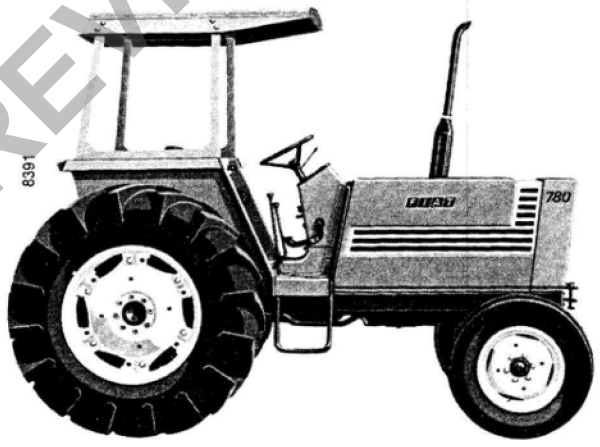
WEIGHTS (780 AM and 880)

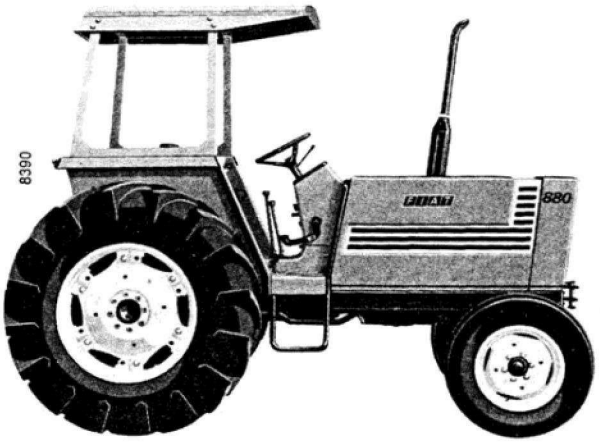
		kg	lbs.	kg	lbs.
Operating weight (including lift implement attachment, swinging drawbar and ROP frame)	Mod. 780	2440	5380	—	—
	Mod. 780 DT	2740	6040	—	—
	Mod. 880	—	—	2780	6130
	Mod. 880 DT	—	—	3080	6790

WEIGHTS (780 PM)

Operating weight with lift, implement attachment, swinging drawbar and ROP frame	Mod. 780	2530	5580	—	—
	Mod. 780 DT	2770	6110	—	—

(*) AM version 8 + 4 speeds





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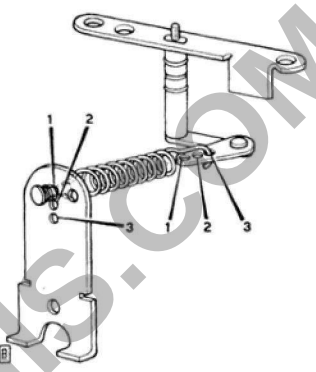
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MODEL 780 - CALIBRATION DATA - CAV INJECTION PUMP TYPE DPA 3342 F 150 - 771050

ASSEMBLY DATA

Pump rotation (drive end)	Anti-clockwise
Firing order	1-3-4-2
Governor control stud to metering valve lever pin	53 to 54 mm (2.08 to 2.13 in)
Roller spacing	50 mm (1.9685 in)
Pump timing	18° ± 1° B.T.D.C.
External timing mark degree position with respect to shaft key (on tool **290757**)	253°
Delivery connection of cylinder No. 1	Marked with letter X



Governor Spring Attachment Position on Control Arm 1 and 3

TEST PLAN

Procedure A

BOSCH test machine with WSF 2044/4X injector springs and EFEP 182 spray nozzles

RABOTTI test machine with FIAT 656829 injector springs and EFEP 182 spray nozzles

Release pressure	175 kg/cm² (2,483 psi)
Pipes	2 x 6 x 865 mm

Procedure B

Test machine incorporating injector bodies and nozzles as fitted to the engine

Release pressure	225 to 235 kg/cm² (3,200 to 3,343 psi)
Pipes	1.5 x 6 x 700 mm
Calibration fluid	FIAT CFB at 20° to 25 °C
Fuel pressure	.2 kg/cm² (2.8 psi)

Test No.	Lever Position L_1 = Throttle L_2 = Shut-off	Speed rpm	Transfer pressure kg/cm²	Advance degrees	PROCEDURE A Injector delivery cm³/1,000 shots	PROCEDURE A Back leakage cm³/100 shots	PROCEDURE B Injector delivery cm³/1,000 shots
1-2	—	100	1 min	—	—	—	—
3	—	800	—	7 to 8	—	—	—
4	—	1,250	—	9.5 to 10	—	—	—
5	—	180	—	3 to 3.5	—	—	—
6 (1)	—	300	—	0	—	—	—
7 (2)	—	—	—	—	—	—	—
8-9-10 (3)	L_1 = Full L_2 = Out	$1,250^{+0}_{-20}$	5.2 to 6.2	—	53.5 to 55.5(•)	14 min.	56 to 58 (•)
11-12		700 ± 5	3.2 to 4.2	—	54 to 57 (•)	—	56.5 to 59.5(•)
13 (1)		100	—	—	40 min	—	—
14	L_1 = Full L_2 = In	200	—	—	4 max	—	—
15 (3)	L_1 = Idle L_2 = Out	200	—	—	5 max	—	—
16 (4)	L_1 = Full L_2 = Out	1350	—	—	3 max	—	—
17 (5)		1250^{+0}_{-20}	—	—	53.5 to 55.5	—	—

(•) Max. spread 2 cm³/1,000 shots
(1) Manual start-retard activated
(2) 3-cylinder engine only
(3) Back off throttle lever adjusting screws fully
(4) Governor cut-in. Adjust maximum speed screw
(5) Recheck fuelling

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CONTENTS

00 - SPECIFICATION	Page	Date
Identification data - Weights	1	X-1979
Engine	2-3-4	X-1979
Power Train - Brakes - Steering - Front Axle	4	X-1979
Drive Train Diagrams	5-6-7	X-1979
Front Axle - Rear Wheels - Power Take Off	8	X-1979
Lift - Towing Attachments	8-9	X-1979
Ballasting - Body - Electrical System	9	X-1979
Lighting - Instruments and Accessories - Tyre Size	10	X-1979
Dimensions	11	X-1979
Capacities	12	X-1979

10 - ENGINE - Specification and Data		
Engine Block - Cylinder Head	1	X-1979
Crank Gear	2-3-4	X-1979
Crank Gear	5	X-1979
Valve Gear	6	X-1979
Valve Gear	7-8	X-1979
Lubrication System	8	X-1979
Cooling System	9	X-1979
Fuel System	10-11-12-13-14-15	X-1979
Tightening Torque Figures	16	X-1979
Longitudinal Section through Engine		
— 780 Tractor	17	X-1979
— 880 Tractor	18	X-1979

100 - ENGINE - Description - Performance Data - To Remove - To Refit		
Description	1	X-1979
Performance Data	2-3	X-1979
Compression Test	3	X-1979
To Remove - To Refit	4	X-1979

101 - ENGINE - Engine Block - Cylinder Head		
Cylinder Liners	1-2	X-1979
Cylinder Head	3-4	X-1979

102 - ENGINE - Valve Gear		
Camshaft - Valves, Guides and Springs	1	X-1979
Tappets, Pushrods and Rockers	2	X-1979
Valve Timing Gear Train	3	X-1979

103 - ENGINE - Crank Gear		
Crankshaft	1	X-1979
Main and Big-End Bearings and Caps	2	X-1979
Pistons and Rings	3	X-1979
Connecting Rods	4	X-1979
Flywheel	5	X-1979
Dynamic Balancer		
— 780 Tractor	6	X-1979
— 880 Tractor	7-8	X-1979

104 - ENGINE - Fuel System	Page	Date
Not available	—	—

105 - ENGINE - Lubrication System		
Lubrication System Diagram		
— 780 Tractor	1	X-1979
— 880 Tractor	2	X-1979
Oil Pump - Oil Filter - Oil Pressure Warning System	3	X-1979

106 - ENGINE - Cooling System		
Cooling System Diagram	1	X-1979
Description - Water Pump	2	X-1979
Radiator	3	X-1979
To Adjust Belt Tension - Water Temperature Gauge - Thermostat	4	X-1979

20 - POWER TRAIN - Specification and Data		
Clutches	1-2-3-4	X-1979
Gearbox and Splitter	4-5-6	X-1979
Crawler Gear	6	X-1979
Rear Bevel Drive and Differential	7	X-1979
Brakes	8-9	X-1979
Final Drives	9	X-1979
Power Take Off	9-10	X-1979
Tightening Torque Figures	11-12	X-1979
Cross Section through Power Train		
— 780 Tractor	13	X-1979
— 880 Tractor	14	X-1979
Longitudinal Section through Power Train		
— 780 Tractor	15	X-1979
— 880 Tractor	16	X-1979

200 - POWER TRAIN - To Remove and Refit		
Control Platform	1	X-1979

201 - POWER TRAIN - Clutch		
To Remove and Refit	1	X-1979
To Overhaul Ferodo Clutch	2-3-4	X-1979
To Adjust Ferodo Clutch	4-5	X-1979
To Overhaul Luk or O.M.G. Clutches	6-7-8	X-1979
To Adjust Luk or O.M.G. Clutches	8-9	X-1979
To Adjust Clutch Linkage	10	X-1979

202 - POWER TRAIN - Gearbox and Splitter		
To Remove - To Refit - To Dismantle	1-2-7	X-1979
Sections through Gearbox		
— 780, 8-speed	3	X-1979
— 880, 8-speed, AM	4	X-1979

Print No. **603.54.201** - *X-1979*

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Torque may be measured using a spring balance and a length of string wound over one of the drive gear spacers; the equivalent pull should be .7 to 1.4 kg or 7 to 14 N (1,549 to 3,086 lbs).

Clamp nut (5, page 10) using lock nut (7), remove the tool and measure dimension (H_3) using a suitable feeler gauge.

The thickness of shim (S_1, page 4) will be:

$$S_1 = H_4 - H_3$$

where,

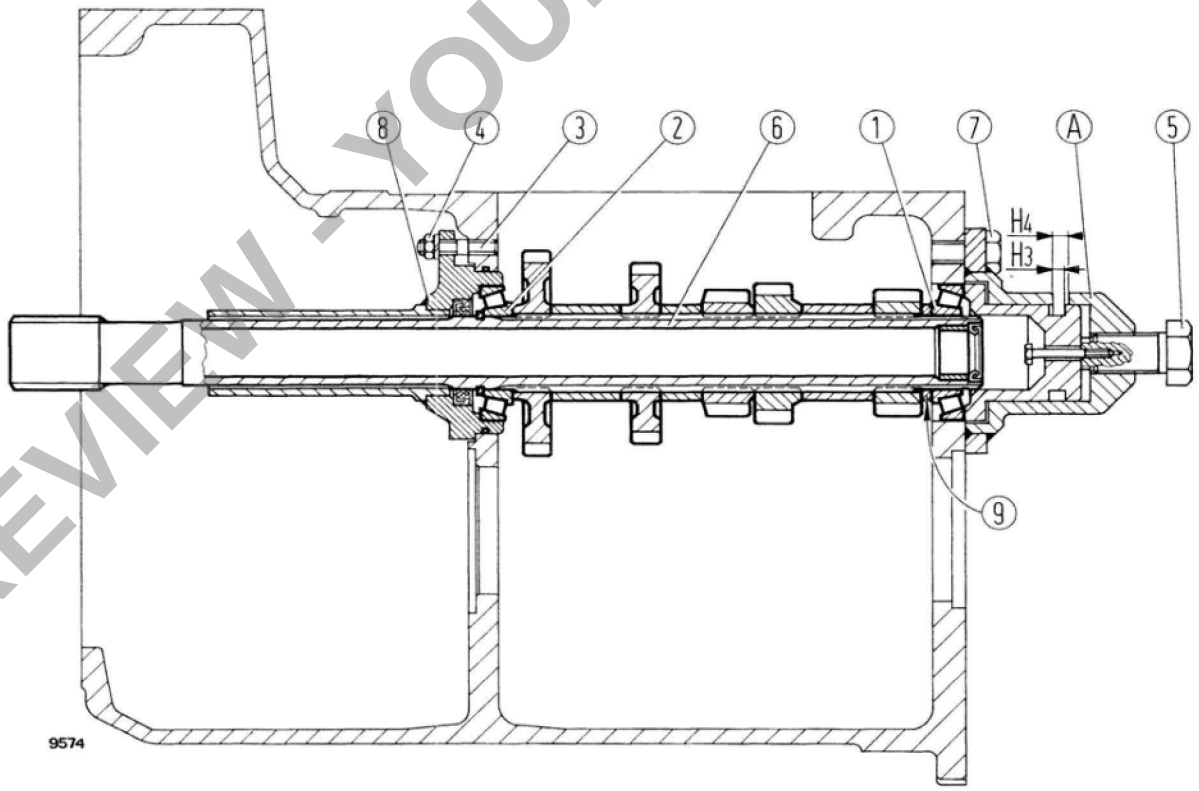
H_3 = Feeler gauge reading

H_4 = **6 mm** (.236 in), nominal tool slot width.

If necessary, round off S_1 to the nearest .05 mm down.

Drive Shaft Tapered Roller Bearings using tool 293659 (up to frame 887700)

Install drive shaft (6) with attached bearings (1 and 2), gears and spacers.
Fit cover (8) without shim (S_1, page 4) and tighten nuts (4) to the specified torque.
Place tool **293659** (A) on gearbox casing and tighten using capscrews (7).
Tighten screw (5) on tool until rotating torque, as measured at the end of drive shaft using bush **293427/1** (B, page 10) and torque spanner (P), is .02 to .04 kgm or .2 to .4 Nm (.145 to .289 ft lb).
This torque may be measured using a spring balance and length of string wrapped around one of the drive gear spacers; the pull on spring balance should be .7 to 1.4 kg or 7 to 14 N (1,549 to 3,086 lbs).
Measure gap (H_3) using a suitable feeler gauge.



Assessing Thickness of Drive Shaft Bearing Shim (S_1, page 4) Using Tool 293659 (up to Frame 887700)

A. Adjuster tool **293659** - H_3. Feeler gauge thickness - H_4 = 10 mm (.394 in) nominal tool slot width - 1/2. Tapered roller bearing - 3/4. Bearing cap studs and nuts - 5. Capscrew - 6. Drive shaft - 7. Gearbox casing tool capscrews - 8. Bearing cap - 9. Thrust washer.

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