WARNING



This symbol is your safety alert sign.
It means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



AVOID ACCIDENTS

Most accidents occuring in the workshop are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason MOST ACCIDENTS CAN BE PREVENTED by recognizing the real cause and doing something about it before the accident occurs.
Regardless of the care used in the design and production of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.
A careful operator is the best insurance against an accident. The complete observance of one simple rule would prevent many thousand serious injuries each year.

That rule is:
ATTENTION: Never attempt to clean, oil or adjust a machine while it is in motion.

SAFETY PRECAUTIONS

GENERAL

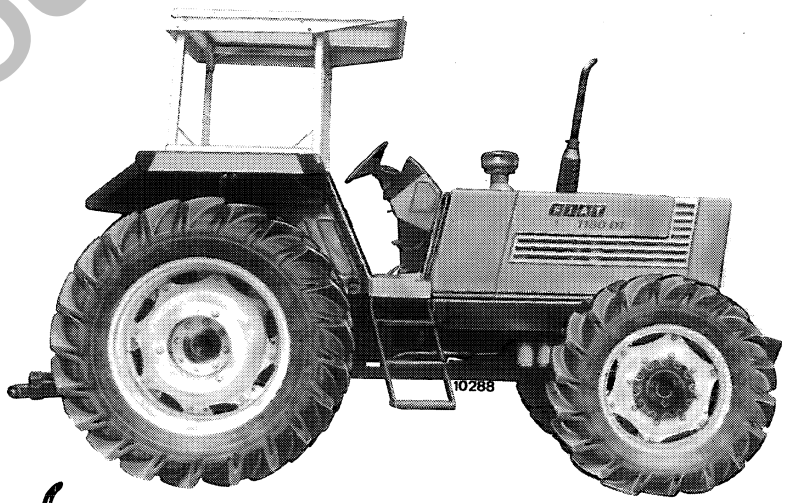
- Study the Operator's Manual before starting, operating, maintaining, fuelling or servicing machine.
- Do not wear rings, wrist watches, jewelry or loose or hanging apparel, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can catch on moving parts. Wear proper safety equipment as authorized for the job. Examples: Hard hats, safety shoes, heavy gloves, ear protectors, safety glasses or goggles.
- Machine should not be serviced with anyone in the operator's seat unless they are qualified to operate the machine and are assisting in the service.
- Never attempt to operate the machine or its tools from any other position that seated in the operator's seat.
- Never lubricate, service or adjust a machine with the engine running, except as called for in the Operator's Manuals.
- Shut off engine and check that hydraulic oil is no longer under pressure before removing caps and covers.
- Carry out all servicing operations with maximum care and attention.
- Shop or field service platforms and ladders used to maintain or service machinery should be constructed and maintained according to local or national requirements.
- Never check or fill fuel tanks, storage batteries or use starter fluid while smoking or near open flames, due to the presence of flammable fluid.
- Brakes are inoperative when manually released for servicing. Provision must be made to maintain control of the machine by blocking or other means.
- Ensure that the fuel gun is in contact with the filler when refuelling. To reduce the chance of a static electricity sparking maintain contact until after fuel flow is cut off.
- Use only designated towing or pulling attachment points. Use care in making attachment. Be sure pins and locks as provided are secure before pulling. Stay clear of drawbars, cables or chains under load.
- To move a disabled machine, use a trailer or low body truck if available.
- Load and unload on level ground affording full support to the trailer wheels.
- Use only grounded auxiliary power source for heaters, chargers, pumps and similar equipment to reduce the hazards of electrical shock.

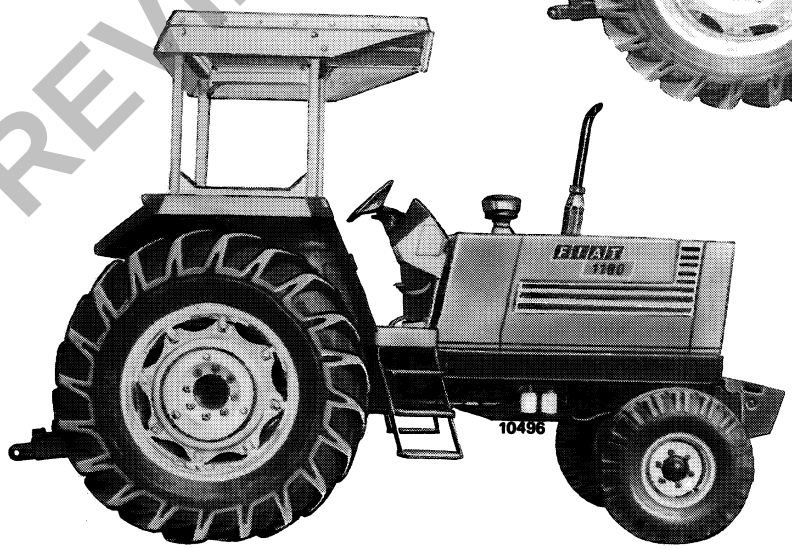
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IDENTIFICATION DATA

Marketing code:				
— 2-wheel drive	**1180**	**1380**	**1580**	**1880**
— 4-wheel drive	**1180 DT**	**1380 DT**	**1580 DT**	**1880 DT**
Engineering code:				
— 12-speed, 2-wheel drive	658.100.000	659.100.000	660.200.000	660.100.000
— 12-speed, 2-wheel drive with reverser	658.100.000 var. 720.110	659.100.000 var. 720.110	660.200.000 var. 720.110	660.100.000 var. 720.110
— 12-speed, 2-wheel drive with high speed bevel drive	658.100.000 var. 720.320	659.100.000 var. 720.320	—	—
— 24-speed, 2-wheel drive	658.100.000 var. 720.111	659.100.000 var. 720.111	660.200.000 var. 720.111	660.100.000 var. 720.111
— 24-speed, 2-wheel drive with high speed bevel drive	658.100.000 var. 720.111 + var. 720.320	659.100.000 var. 720.111 + var. 720.320	—	—





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ENGINE	1180 1180 DT	1380 1380 DT	1580 1580 DT	1880 1880 DT
Type	Nat. aspirated	Turbocharged	Nat. aspirated	Turbocharged
Injection	direct			
No. of cylinders	6			
Cylinder sleeves	dry, press fit		wet	
Bore x stroke	103 × 110 mm (4.05 × 4.33 in)		115 × 130 mm (4.53 × 5.12 in)	
Displacement	5499 cm^3		8102 cm^3	
Compression ratio	17 to 1	15.7 to 1	17 to 1	15.5 to 1
Max. horsepower DGM/DIN, metric	84.6 kW (115 HP)	99.4 kW (135 HP)	114.1 kW (155 HP)	132.5 kW (180 HP)
Max. output speed	2500 rpm	2400 rpm	2100 rpm	2100 rpm
Max. torque speed	1400 rpm	1600 rpm	1400 rpm	1400 rpm
Main bearings	7			
Sump	iron			
VALVE GEAR	OH valves, push rod operated			
Inlet — Opens B.T.D.C.	3°		8°	
Inlet — Closes A.B.D.C.	23°		60°	
Exhaust — Opens B.B.D.C.	48°30′		60°	
Exhaust — Closes A.T.D.C.	6°		8°	
Valve clearance — for timing check	.45 mm (.018 in)		.41 mm (.016 in)	
Normal — Inlet	.25 mm (.010 in)		.30 mm (.012 in)	
Normal — Exhaust	.35 mm (.014 in)		.50 mm (.020 in)	
FEED				
Air cleaner	dry, double cartridge, restriction indicator with centrifugal precleaner on hood			
Fuel filters (between pumps)	two, in line disposable paper cartridge (water separator with first filter)	two, in parallel, disposable paper cartridge (water separator integral with both filters) and bowl filter with mesh element on pump suction	two, in line, disposable paper cartridge (one paper, the other cloth) and bowl filter with mesh element on feed pump suction	

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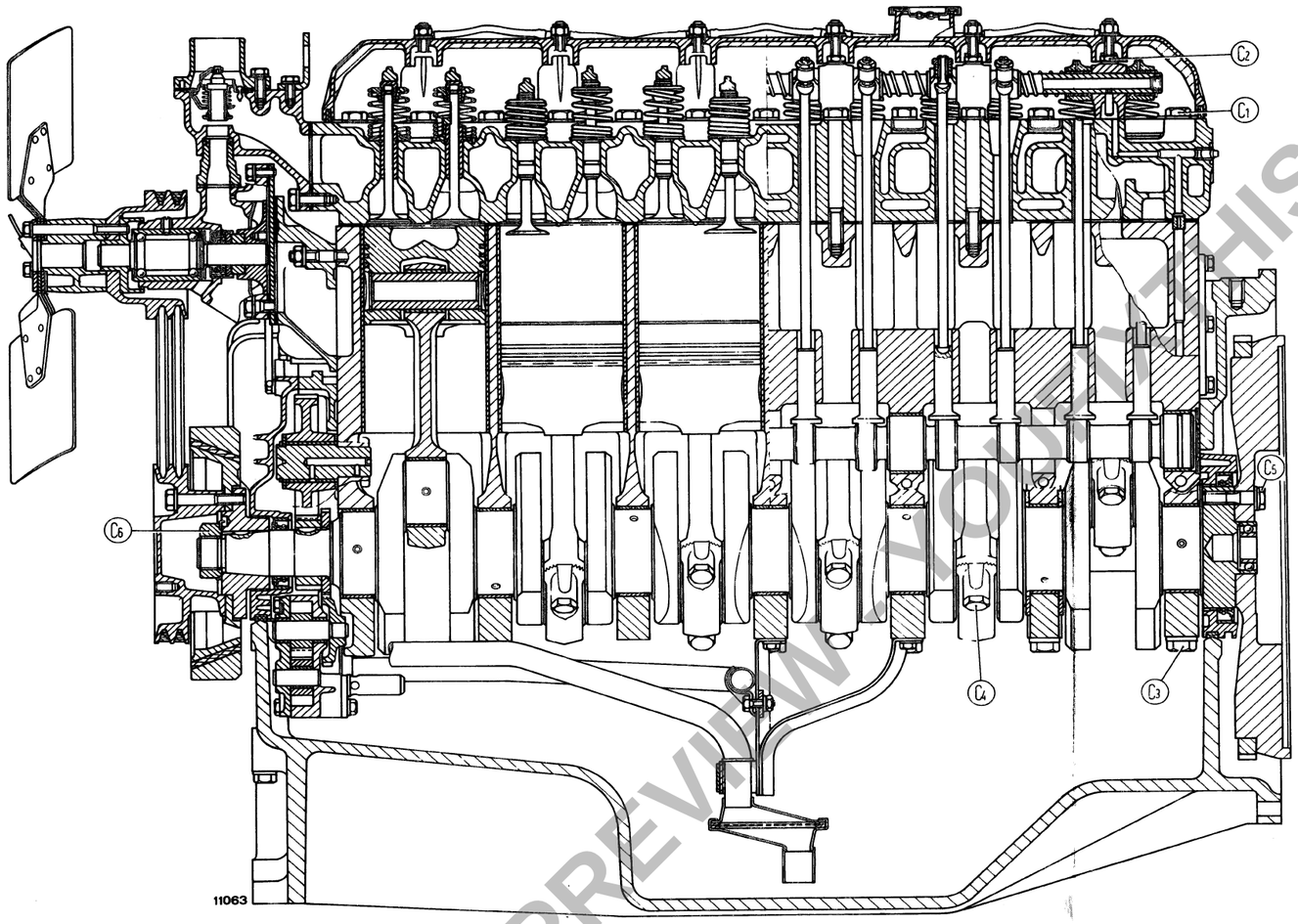
TORQUE DATA

DESCRIPTION	Thread size	Torque		
		Nm	kgm	ft.lb
Engine block and cylinder head - valve gear - crank gear - Section 10				
Capscrew, cylinder head, (C_1, pages 21 and 22)	M12 × 1.25	147	15	108
Nuts, cylinder head, 1580 (C_1, page 23)	M16 × 1.5	216	22	159
Nuts, cylinder head, 1880 (C_1, page 24)	M16 × 1.5	245	25	181
Capscrew, rocker shaft brackets (C_2, pages 21, 22, 23 and 24) — 1180-1380	M 8 × 1.25	23	2.3	17
Capscrew, rocker shaft brackets (C_2, pages 21, 22, 23 and 24) — 1580-1880	M10 × 1.25	49	5	36
Capscrew, intermediate gear jackshaft, 1580 and 1880 (C_7, pages 23 and 24)	M 8 × 1.25	29	3	22
Capscrew, main bearing cap (C_3, pages 21, 22, 23 and 24) — mod. 1180 and 1380	M14 × 1.5	147	15	108
Capscrew, main bearing cap (C_3, pages 21, 22, 23 and 24) — 1580	M16 × 1.5	206	21	152
Capscrew, main bearing cap (C_3, pages 21, 22, 23 and 24) — 1880	M16 × 1.5	235	24	173
Capscrew, connecting rod cap (C_4, pages 21, 22, 23 and 24) — 11180 and 1380 — early (*)	M12 × 1.25	108	11	79
Capscrew, connecting rod cap (C_4, pages 21, 22, 23 and 24) — 11180 and 1380 — late (*)	M12 × 1.25	88	9	65
Capscrew, connecting rod cap (C_4, pages 21, 22, 23 and 24) — 1580 and 1880	M14 × 1.5	118	12	87
Capscrew, flywheel (C_5, pages 21, 22, 23 and 24) — 1180 and 1380	M12 × 1.25	118	12	87
Capscrew, flywheel (C_5, pages 21, 22, 23 and 24) — 1580 and 1880	M16 × 1.5	275	28	202
Nut, crankshaft pulley hub, 1180 and 1380 (C_6, pages 21 and 22)	M30 × 1.5	294	30	217
Capscrew, crankshaft pulley hub, 1580 and 1880 (C_6, pages 23 et 24)	M22 × 1.5	559	57	412
Fuel system - Section 104				
Capscrew, rear cover to GARRETT turbocharger (15, page 3)	—	10	1	7
Nut, GARRETT turbocharger turbine shaft (3)	—	see text		
Capscrew, GARRETT turbocharger compressor housing (13) to turbine housing (14)	—	15	1.5	11
Nut, HOLSET turbocharger turbine shaft (13)	—	18	1.8	13

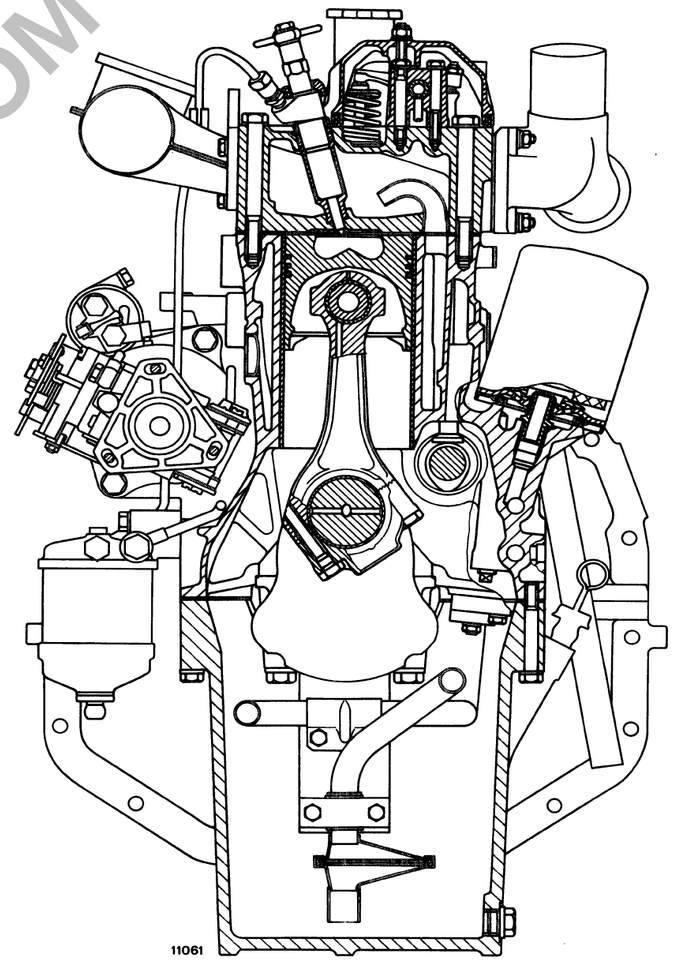
(*) Early capscrews (torqued to 108 Nm, 11 kgm, 80 ft.lb) are identified by bright silver colour, whereas late capscrews (torqued to 88 Nm, 9 kgm, 65 ft.lb.) are identified with black oxide colour.

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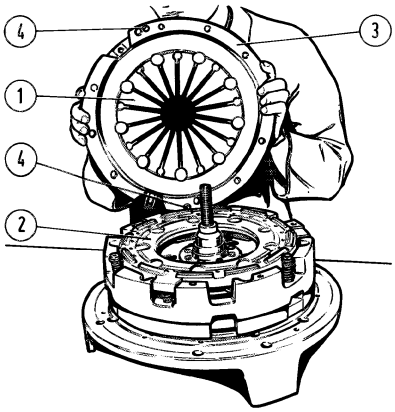
Longitudinal and cross sections through 1180 engine.

TORQUE DATA

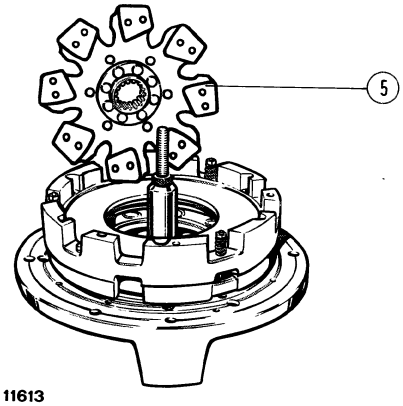
C_1 = 147 Nm (15 kgm, 108.5 ft.lb.)
C_2 = 23 Nm (2.3 kgm, 17 ft.lb.)
C_3 = 147 Nm (15 kgm, 108.5 ft.lb.)
C_4 = { 108 Nm (11 kgm, 80 ft.lb.) (early)*
{ 88 Nm (9 kgm, 65 ft.lb.) (late)*
C_5 = 118 Nm (12 kgm, 87 ft.lb.)
C_6 = 294 Nm (30 kgm, 217 ft.lb.)
(*) See note on page 19.

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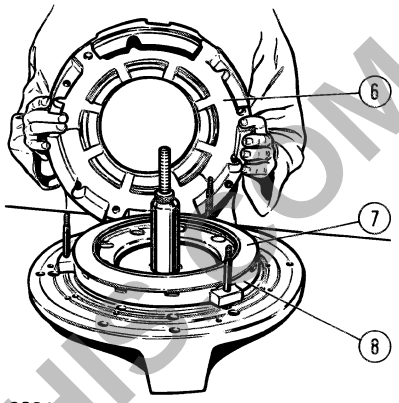
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8665



11613



8664

Disassembling (assembling) clutch using tool kit 291291/2.

1. Diaphragm spring - 2. Master clutch pressure plate - 3. Clutch cover - 4. Clutch cover centralisers - 5. Master clutch plate - 6. Support housing - 7. Dished spring - 8. PTO clutch pressure plate.

1. PTO clutch pressure plate (2, page 3). Dress contact surface to a maximum depth of 1 mm (.04 in). Subsequently dress the clutch housing (C) removing an equivalent amount of material.
2. Master clutch pressure plate (3, page 3). Proceed as described above and remove the same amount of material from clutch housing (B).
3. Clutch housing (4, page 3). Dress surface (A) to a maximum depth of .5 mm (.02 in). Remove the same amount of material from (B).

If necessary, dress engine flywheel contact surface to restore external undercut of .5 mm (.02 in).
Should diaphragm spring replacement be necessary (1, page 3) note that the spring is supplied together with cover (3) to which it is rivetted.
Assemble clutch parts using tools from tool kit **291291/2** or from universal tool kit **293650** noting the following points:

— position dished spring (7) on PTO clutch pressure plate with the convex side uppermost;

— adjust clutch as directed below.

FERODO 12″/12″ CLUTCH ADJUSTMENT (1180)

For a correct clutch adjustment the PTO clutch release levers should be aligned and ring (14, page 3) should be positioned at dimension (D_1) relative to the flywheel surface.
Clutch adjustment may be carried out with the clutch on the bench or installed on the flywheel.

1. On-bench clutch adjustment.

Position the clutch over the base plate of tool **291291/2** or universal tool **293650** and tighten using fasteners as directed for disassembly (pages 2 and 3).
Remove ring (14, page 3), install register (C, page 5) and lock with nut (D), tool **291291/2** or knob (L), universal tool **293650.** Using wrench (M), tighten or slacken PTO clutch release level adjusting screws (2) to obtain clearance (V_1), between the end of each release lever and register (C). Subsequently, tighten the screws through nuts (3).

On-flywheel clutch adjustment.

Insert centraliser **293801** in clutch driven plate bores ensuring that the end is in contact with bearing (10, page 3). Press register **291814** against centraliser.
Adjust clearance between release lever ends and register to .1 mm (.004 in) as directed above for clearance (V_1) adjustment.

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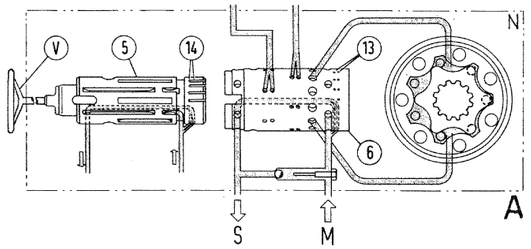
FAULT FINDING CHART

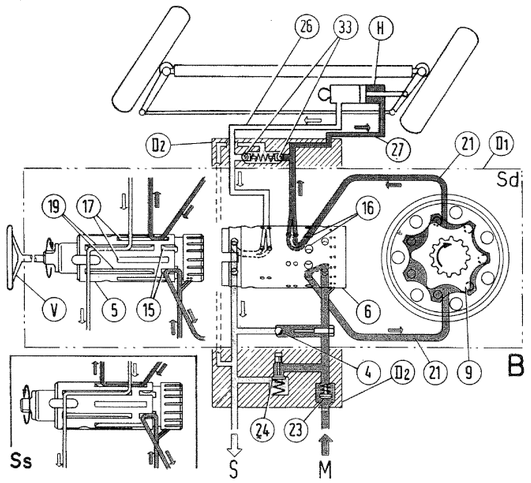
Fault	Cause	Remedy
1. Leaking control unit: **a.** Control side.	**a.** O-ring (31, page 7).	Replace seal and associated anti-extrusion ring using special tool **293388.**
b. Cover side.	**b_1.** Loose cover capscrews (C_1).	Tighten to specified torque 34 Nm - 3.5 kgm (25 ft.lb.)
	b_2. Damaged washer (25) or O-ring (35).	Replace washers and seals.
2. Heavy steering.	**a.** Faulty hydraulic pump.	Overhaul pump.
	b. Check valve (4) stuck open.	Clean valve and filter. Replace ball if necessary.
	c. Relief valve (24) out of adjustment.	Reset valve (125 bar - 127.5 kg/cm^2 1813 psi.
	d. Relief valve (24) failed or stuck open.	Remove foreign matter and clean filter (E, page 6). If trouble persists, renew valve block assembly (D_2, page 7).
	e. Steering column binding in bushing owing to rusting, pick-up, etc.	Remedy as necessary.
3. Loose steering.	**a.** Excessive clearance between column and rotary valve (5, page 7).	Replace any worn parts.
	b. Excessive clearance between shaft (7) and drive pin (1).	Replace worn parts as necessary.
	c. Excessive spline clearance on rotor (9) relative to shaft (7).	Replace worn parts as necessary.
	d. Build-up of clearance a., b. and c. above.	Replace worn parts as necessary.
	e. Failed or weakened leaf spring (2).	Replace as necessary.
4a. Slow steering.	**a.** Leaking power cylinder piston gland.	Replace gland.
4b. No steering.	**b1.** Failed power cylinder piston rod.	Replace rod.
	b2. Failed actuating shaft (7) or pin (1).	Replace failed parts as necessary.
5. Engine off, no steering.	**a.** Worn rotor (9) and cam ring (8).	Replace worn parts.
	b. Damaged check valve (23, page 7).	Renew valve block assembly OVP-20.
	c. Power cylinder safety valves (33, page 7) stuck open or damaged.	Remove foreign particles and clean filter or replace valve block assembly OVP-20 (D_2, page 7).

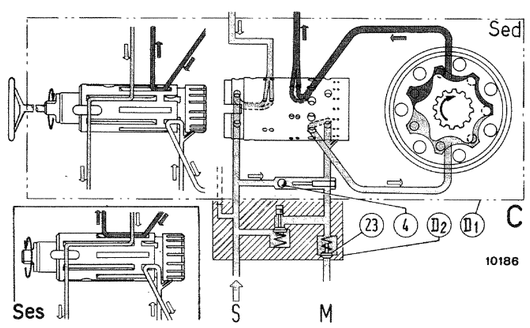
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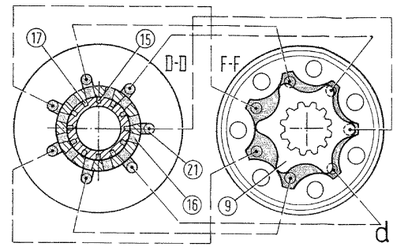
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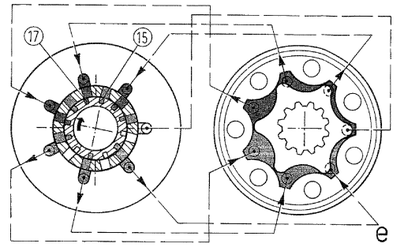
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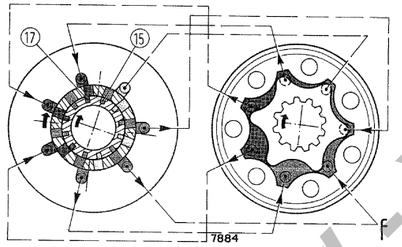


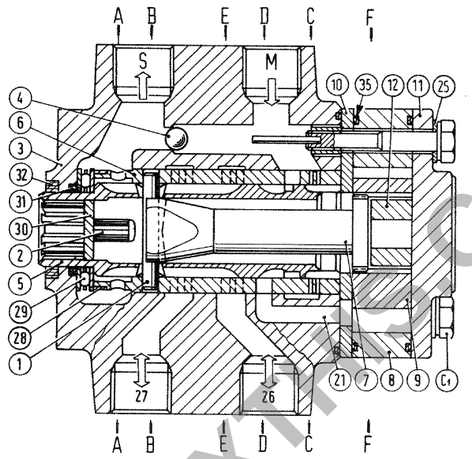


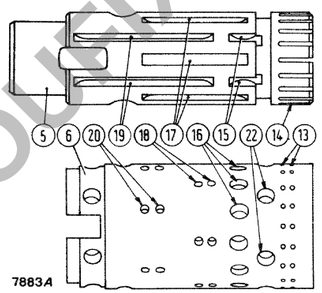


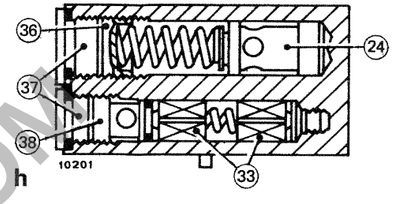


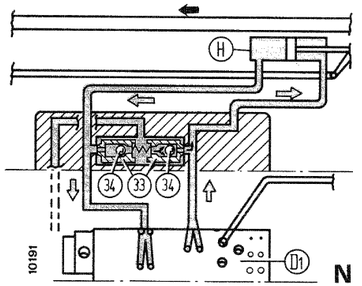


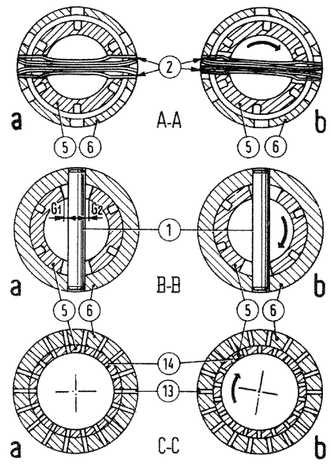


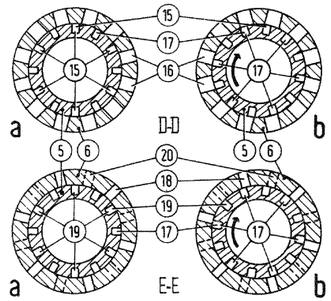












Operation diagram

a. Cross-sections with valve (5) in neutral - A. Operation in straight-ahead driving position - b. Cross-section with valve (5) in RH steer position (for LH steer, valve rotation is symmetrically opposite) - B. RH and LH steer (Sd and Ss) - C. RH and LH emergency steer (Sed and Ses) - C_1. Cover capscrews - d. Operation diagram for straight ahead driving (Sections D-D and F-F) - D_1. Hydraulic control valve OSPB 125 ON - D_2. Valve block OVP 20 - e, f. Operation diagram for two stage RH steering (DD and FF) - G_1 and G_2. Gap between pin (1) and rotary valve (5) - h. Section through valve block OVP 20 - H. Power cylinder - M. Pump outlet line - N. Make-up valve (34) operation with control unit D in neutral and cylinder (H) piston subject to external forces (shown by black arrow) - S. Return to tank - V. Steering wheel - 1. Drive pin - 2. Return spring - 3. Body - 4. Check valve - 5. Rotary valve - 6. Sleeve - 7. Rotary shaft - 8. Cam ring - 9. Rotor - 10. Abutment plate - 11. Cover - 12. Spacer - 13 and 14. Straight ahead pressure ports - 15. Rotor inlet passages (6 off) - 16. Connecting ports (12 off) communicating with passages (15) and (17) alternatively - 17. Outlets (6 off) to power cylinder communicating with the rotor outlet passages and ports (18) and (20) - 18. Outlet or exhaust ports (6 pairs) for RH power cylinder chamber - 19. Power cylinder exhaust passages (6 off) communicating with ports (18) and (20) - 20. LH power cylinder chamber outlet or exhaust ports (6 pairs), rod side - 21. Connecting ports for (16) and inlet or outlet rotor passage - 22. Supply ports for passages (15) - 23. Check valve in valve block (D_2) - 24. Pressure relief valve in valve block (D_2) (Setting: 125 bar - 127.5 kg/cm^2 - 1813 psi) - 25. Washer - 26. Connecting line for LH power cylinder chamber - 27. Connecting line for RH cylinder chamber, rod side - 28. Cup - 29. Thrust bearing - 30. Plug - 31. Seal - 32. Dust excluder - 33. Cylinder safety valve in valve block (D_2) (Setting: 200 bar - 204 kg/cm^2 - 2901 psi) - 34. Make up valve in valve (33) - 35. O-ring - 36. Valve (24) adjusting screw - 37. Plugs - 38. Valve (33) adjusting screw.

Oil pressure to power cylinder.
Oil pressure to rotor.
Inlet low pressure or return oil.
Trapped oil.

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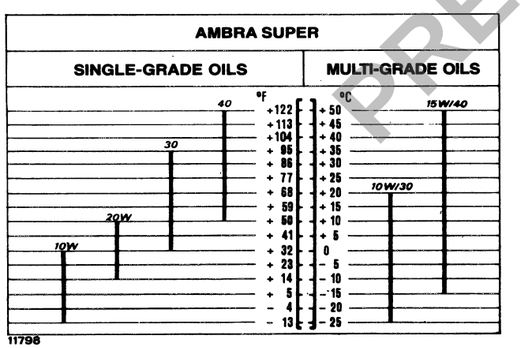
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CAPACITIES

DESCRIPTION	FIAT RECOMMENDED PRODUCT	FLUID CAPACITY 1180-1180 DT litres	1180-1180 DT pints	1180-1180 DT kg	1380-1380 DT litres	1380-1380 DT pints	1380-1380 DT kg	1580-1580 DT litres	1580-1580 DT pints	1580-1580 DT kg	1880-1880 DT litres	1880-1880 DT pints	1880-1880 DT kg	INTERNATIONAL DESIGNATION
Sump and filter oil	**AMBRA SUPER**	15.2	26¾	13.7	15.2 (4)	26¾	13.7 (4)	18.3	32¼	16.5	18.3	32¼	16.5	Diesel engine oil to MIL-L-2104C and API CD service
Sump oil		13.3	23½	12	13.3 (4)	23½	12 (4)	16.6	29¼	15	16.6	29¼	15	
Power steering fluid	**TUTELA MULTI F**	2.4	4¼	2.2	2.4	4¼	2.2	2.4	4¼	2.2	2.4	4¼	2.2	Transmission, drive train, oil-bath brakes and lift oil to Massey Ferguson MF1135 and Ford M2C 86A
Sensing bar support oil		1.2	2	1.1	1.2	2	1.1	1.2	2	1.1	1.2	2	1.1	
Transmission oil		18.3	32¼	16.5	18.3	32¼	16.5	18.3	32¼	16.5	18.3	32¼	16.5	
Live front axle oil:														
– axle casing		10.8	19	9.7	10.8	19	9.7	10.8	19	9.7	10.8	19	9.7	
– final drives (each)		2.1	3¾	1.9	2.1	3¾	1.9	2.1	3¾	1.9	2.1	3¾	1.9	
Rear transmission (bevel drive, final drives, brakes) and lift oil:														
– 2-wheel drive		54.2	95½	48.8 (1)	56.4	99½	50.8 (1)	56.4	99½	50.8 (1)	57.5	101½	51.8 (1)	
– 4-wheel drive		55.5	97¾	50 (2)	58.9	103¾	53 (2)	58.9	103¾	53 (2)	60	105¾	54 (2)	
Brake fluid	**AMBRA SUPER 10W**	.48	¾	.45	.48	¾	.45	.48	¾	.45	.48	¾	.45	MIL-L-2105C and API CD - SAE 10W oil
Front hub grease	**TUTELA G9**	—	—	—	—	—	—	—	—	—	—	—	—	Lithium-calcium grease to NLGI No. 2
Lubricator grease		—	—	—	—	—	—	—	—	—	—	—	—	
Coolant (incl. expansion tank):	Water and **"PARAFLU 11"** (5)													
– without cab		17	30	—	17	30	—	27	47½	—	27	47½	—	
– with cab		19	33½	—	19	33½	—	28.5	50¼	—	28.5	50¼	—	
Windshield washer fluid	Water and **DP1** (6)	2	3½	—	2	3½	—	2	3½	—	2	3½	—	
Fuel (diesel oil)														
– Main tank	Diesel oil	180	317	—	180	317	—	180	317	—	180	317	—	
– Auxiliary tank		100 (3)	176	—	100 (3)	176	—	100	176	—	100	176	—	

SAE VISCOSITY VERSUS OUTDOOR TEMPERATURE FOR OIL GRADE SELECTION



11798

(1) For rear hydraulic differential lock increase normal capacity by .5 kg (.55 dm³ or 1 Pint).
(2) For front and rear hydraulic differential lock increase normal capacity by 1.5 kg (1.7 dm³ or 2¼ Pint).
(3) Optional.
(4) Also applicable to 1280 and 1280DT.
(5) See section 106, page 3.
(6) Detergent fluid effective down to –10°C in 50-50 mixture. For temperatures below –10°C use DP1 without water.

NOTE
For utilization of existing OLIOFIAT stocks adhere to the following:
– AMBRA SUPER may be used to top up AMBRA and AGERTER, and vice versa;
– On supercharged engines **never top up** AMBRA SUPER with AMBRA;
– **Never top up** transmission with oil-bath brakes employing TUTELA MULTI F oil with AMBRA;
– Transmission with oil-bath brakes employing AF87S oil may be topped up with TUTELA MULTI F and vice versa.

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— repeat the above operation on remaining liners after removing each preceding liner and shim. Ensure that top face misalignment does not exceed .04 mm (.0016 in).

— degrease cylinder liner centralization bore in block and apply a **thin** film of "LOCTITE HVX/PIPE SEALANT" No. 576 jointing compound over a width of 3 to 4 mm (.118 to .157 in) (X, page 2) ensuring that it does not run.

— reinstall the liners and shims, aligning reference marks applied on disassembly.

Since setting of jointing compound takes 24 hours, if crankshaft and pistons are to be rotated during this time, secure liners to block using three spacers **290956** and four spacers **A.360712/3 (292162)** installed on cylinder head studs.

Note: If misalignment exceeds .04 mm (.0016 in) dress the liner centralization bore in the block using tool **A.394102 (291816)** with cutter **A.394107 (291818),** bush **A.394133 (291820)** and taper **A.394134 (291822).**

For removal and installation of 1180 and 1380 liners proceed as follows, with cold liners, using a suitable press:

— remove worn liner from bottom of block using plate **293349**.

— check block bore for ovality and, if necessary, rebore to .2 mm (.008 in) oversize.

— press replacement liner (if necessary, a .2 mm - .008 in - oversize liner) from the top of the block using plate **291501**.

— bore the liner to restore specified fitted bore diameter.

CYLINDER HEAD

The cylinder head top may be skimmed, if necessary, removing not more than .5 mm (.020 in).

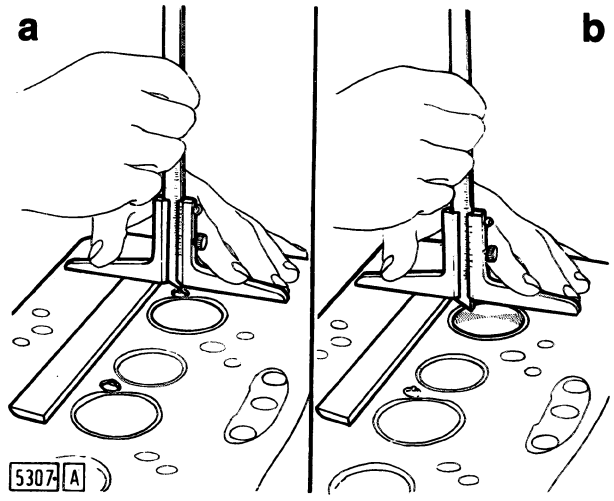
After skimming, check that fuel injector protrusion is as specified.

If necessary, replace injector sleeve proceeding as follows:

— thread the sleeve using taps M12 × 1.75, 1180 and 1380 or M24 × 1.5, 1580 and 1880;

— install puller **293784 (A.342137)** on injector studs and withdraw the sleeve;

— install replacement sleeve with attached sealing rings, press home and burnish in position using tool **293386/1**;

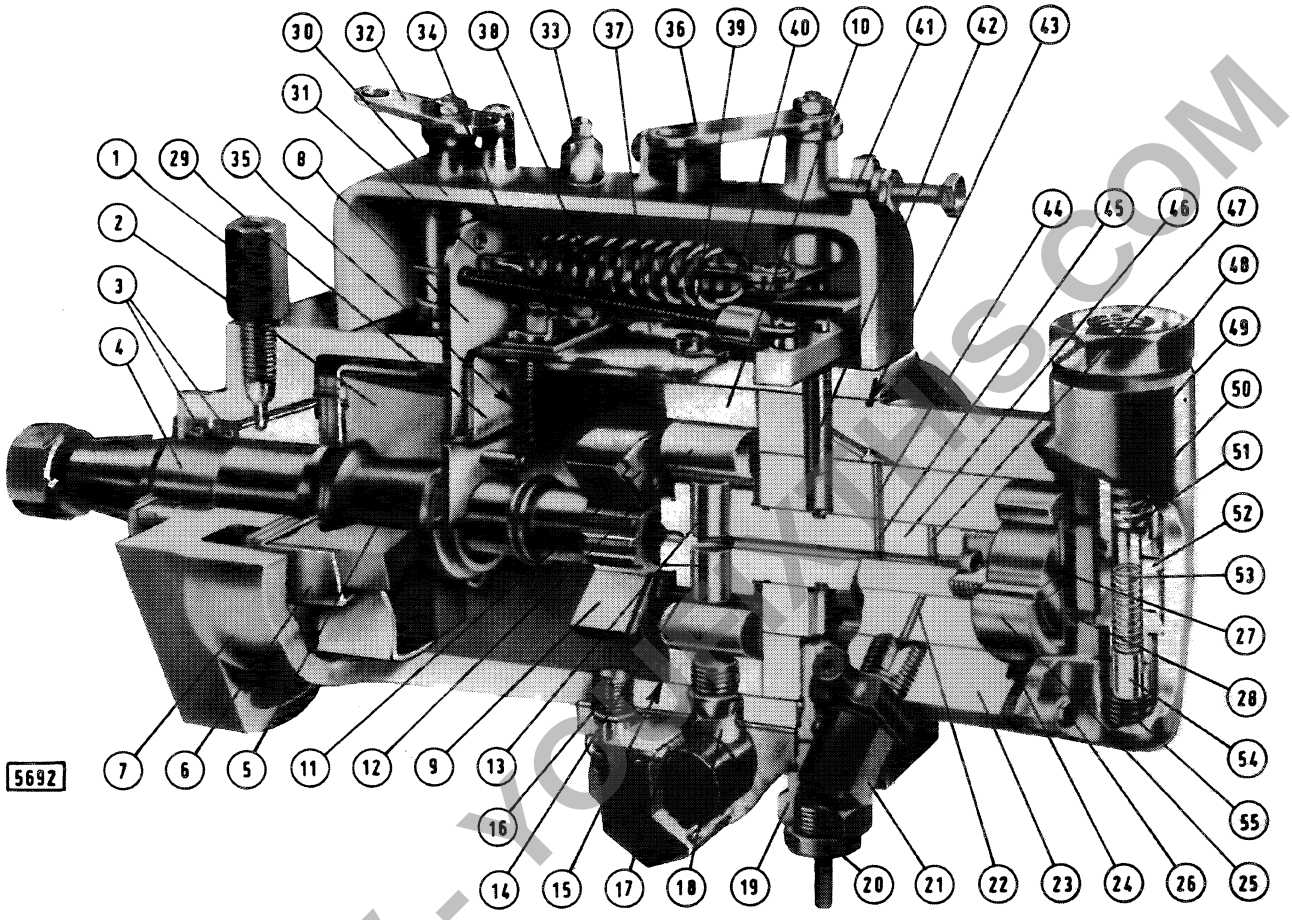


Checking fuel injector stand-out and valve stand-in.

a. Injector stand-out: 1 to 1.5 mm (.040 to .059 in) 1180 and 1380 (max. protrusion 1.8 mm, .071 in), 2.7 to 3.5 mm (.106 to .138 in) 1580 WEBER injectors (max. protrusion 3.8 mm, .150 in), 2.2 to 3 mm (.087 to .118 in) 1580 OMAP and BOSCH injectors (max. protrusion 3.3 mm, .130 in), 2.7 to 3.5 mm (.106 to .138 in) 1880 WEBER injectors (max. protrusion 3.8 mm, .150 in), 2.1 to 2.9 mm (.083 to .114 in) 1880 BOSCH injectors (max. protrusion 3.2 mm, .126 in) - b. Valve stand-in: .7 to 1.1 mm (.028 to .043 in), 1180 and 1380 (max. stand-in 1.4 mm, .055 in), .1 to .5 mm (.040 to .020 in), 1580 and 1880 intake valves (max. stand-in .7 mm, .028 in), .4 to .8 mm (.016 to .032 in) 1580 and 1880 exhaust valves (max. stand-in 1 mm, .040 in).

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Section through C.A.V. fuel injection pump.

1. Drain connector - 2. Governor flyweight - 3. Shaft seals - 4. Drive shaft - 5. Thrust sleeve - 6. Weight retainer - 7. Pump body - 8. Governor control arm - 9. Internally splined drive plate - 10. Cam ring - 11. Maximum fuel adjustment plate - 12. Roller - 13. Pump plunger - 14. Roller shoe - 15. Circlip (timing ring) - 16. Housing stud - 17. Advance device housing - 18. Cam advance lever - 19. Head locating fitting and transfer pressure fuel passage to advance piston chamber - 20. Manual start-retard control - 21. Delivery connector - 22. Delivery port - 23. Hydraulic head - 24. Head seal - 25. Transfer pump liner - 26. End plate retaining screw - 27. Transfer pump rotor - 28. Vanes - 29. Control bracket - 30. Control cover - 31. Idling spring guide - 32. Shut-off control lever - 33. Cover retaining nut - 34. Spring-loaded linkage hook - 35. Governor arm spring - 36. Throttle control lever - 37. Shut-off bar - 38. Governor spring - 39. Control bracket retaining screw - 40. Throttle link - 41. Maximum speed adjusting screw - 42. Metering valve - 43. Head sealing ring - 44. Metering port - 45. Inlet port - 46. Rotor - 47. Distributing port - 48. Inlet connection - 49. End plate and regulating valve - 50. Retaining spring - 51. Spring guide - 52. Valve sleeve - 53. Regulating spring - 54. Piston - 55. Priming spring.

INTERNAL TIMING C.A.V. DISTRIBUTOR PUMP (1180 and 1280)

Remove pump from test machine and connect inlet fitting marked "U" coupled to the injector of cylinder no. 1 to the end of tool **290755** (page 21).
Connect the other en of the tool to hand pump **290284** (T) filled with FIAT CFB oil, and operate the hand-pump until a 29.5 bar (30 kg/cm^2) (427 psi) pressure is obtained.
Do not exceed the specified pressure. Turn the pump drive shaft clockwise until a definite resistance is felt, indicating that the rollers are in contact with the cam ring lobes (spill cut-off).
Remove the cover plate and align the sharp timing edge of the circlip to reference line B stamped on the internally-splined drive flange (a).

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CLUTCH - FERODO 12″/12″ (1180)

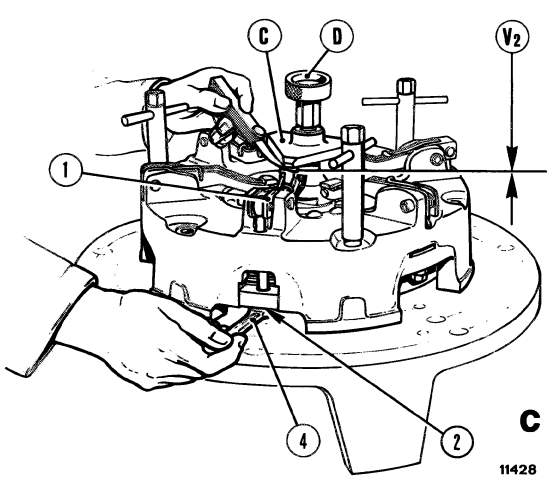
Type	twin, single drive plate
Control	master clutch pedal and PTO clutch hand lever
Release mechanism:	
— master clutch	diaphragm spring
— PTO clutch	dished spring
Plate material:	
— master clutch	cerametallic compound
— PTO clutch	organic compound
Plate thickness:	
— master clutch	9.7 to 10.2 mm (.382 to .401 in)
— PTO clutch	8.9 to 9.3 mm (.350 to .366 in)
— wear limit	see page 4, section 201
Master clutch control sleeve working clearance	.060 to .180 mm (.002 to .007 in)
PTO clutch control sleeve working clearance	.060 to .136 mm (.002 to .005 in)
Release lever alignment	see page 4, section 201
Clutch linkage adjustment	see page 10, section 201

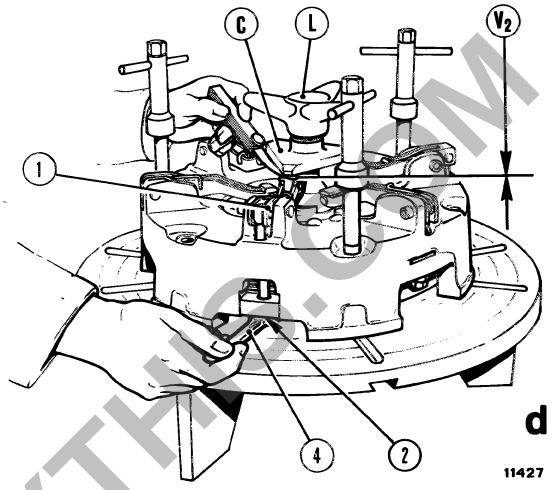
CLUTCH - LUK 12″/12″ (1180)

Type	twin, single drive plate
Control	master clutch pedal and PTO clutch hand lever
Release mechanism	dished spring
Plate material:	
— master clutch	cerametallic compound
— PTO clutch	organic compound
Plate thickness:	
— master clutch	8.8 to 9.6 mm (.346 to .378 in)
— PTO clutch	9.35 to 10.05 mm (.368 to .395 in)
— Wear limit	see page 7, section 201
Master clutch control sleeve working clearance	.060 to .180 mm (.002 to .007 in)
PTO clutch control sleeve working clearance	.060 to .136 mm (.002 to .005 in)
Release lever alignment	see page 9, section 201
Clutch linkage adjustment	see page 10, section 201

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Checking and adjusting PTO clutch release lever alignment on bench using tool 291291/2 (fig. c) or universal tool 293650 (fig. d).

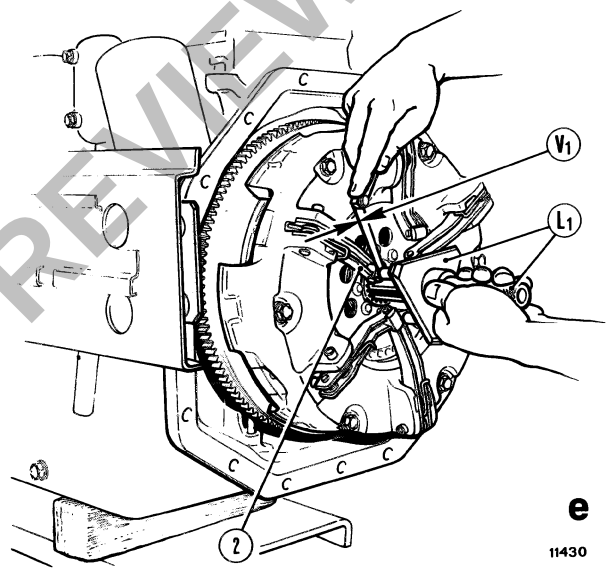
C. Register - D. Nuts - L. Knob - V_2. .1 mm (.004 in) universal tool **293650** or .8 mm (.032 in) tool **291291/2,** Release lever gap - 1. Release lever - 2. Adjustment nut - 4. Wrench from set **293763.**

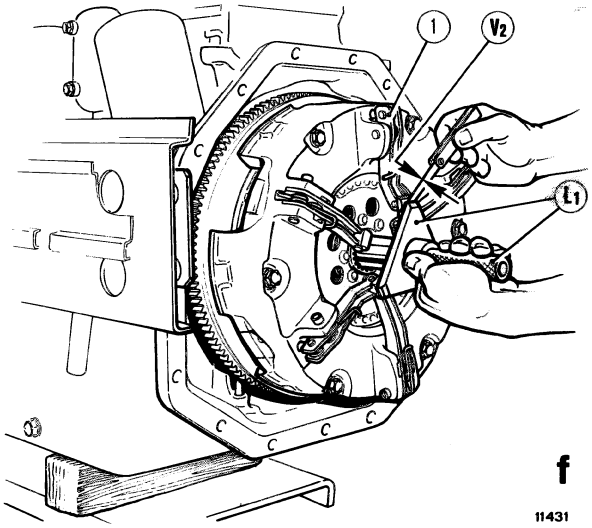
Screw in or back off PTO clutch nuts (2) to obtain a gap (V_2) beween each release lever and register (C).

2. On-flywheel clutch adjustment.

Insert centraliser (L_1) **293801** in clutch plate bore, ensuring that the end is in contact with bearing (10, pages 6 and 7) and press against register **293802.** Adjust gaps (V_1 and V_2) as indicated above.

Note: On-bench and on-flywheel clutch adjustment may result in quite considerable differences in terms of positioning, a fact which does not affect clutch efficien-





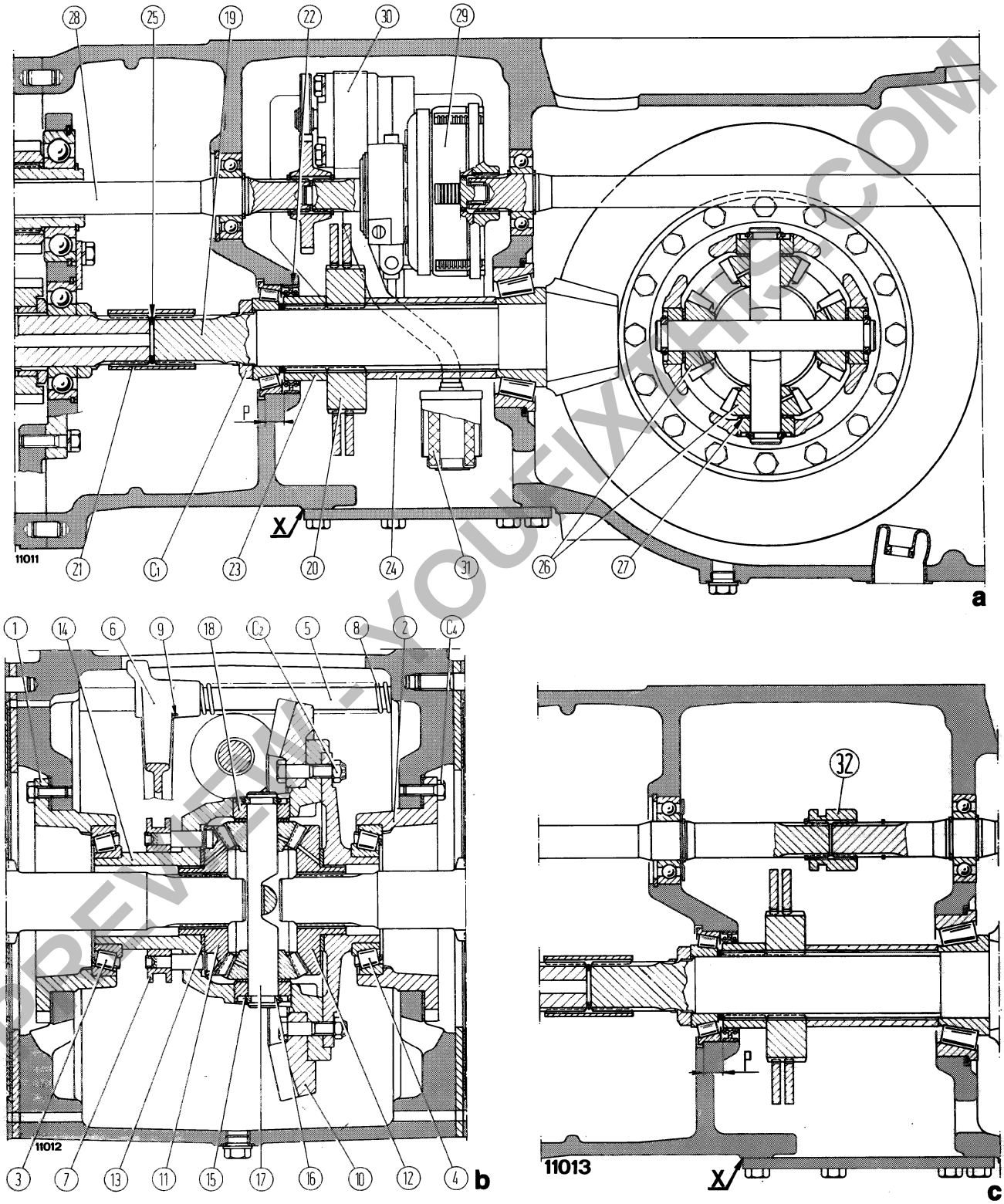
Checking clutch release lever alignment on flywheel.

e. Master clutch - f. PTO clutch - L_1. Centraliser **293801** with register **293802** - V_1 = .1 mm (.004 in). Gap between register pin ends and release levers - V_2 = .1 mm (.004 in). Gap between release lever and register surface - 1. PTO clutch release levers - 2. Master clutch release levers.

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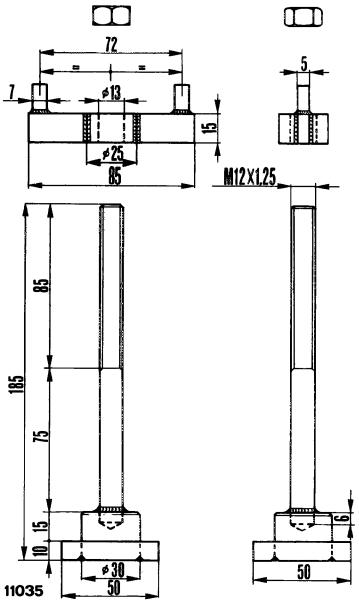
POWER TRAIN:
Bevel drive and differential



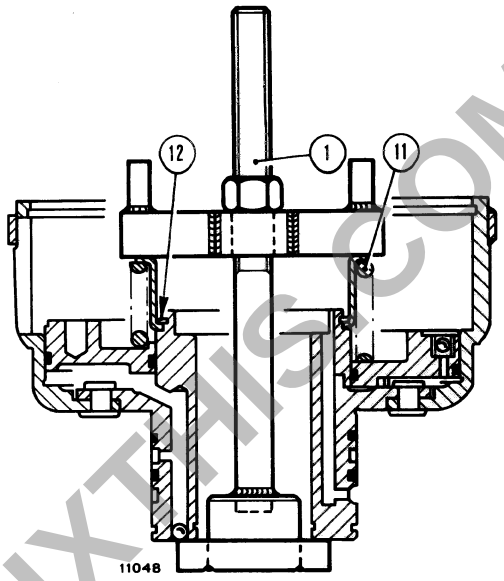
Longitudinal and cross sections through bevel drive and differential.

See caption on page 11.

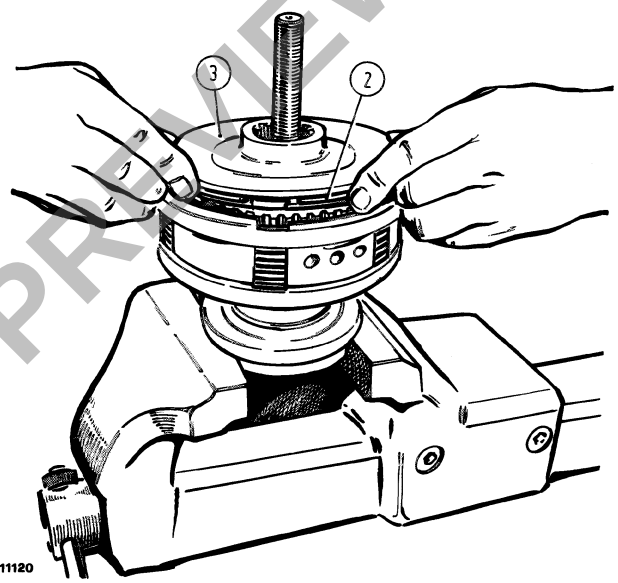
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PTO clutch plate spring remover and installer tool (dimensions in mm).



Removing (installing) clutch plate spring.
1. Field tool - 11. Spring - 12. Retaining ring.



Installing driven hub (3) retaining ring (2).

— back off tool (1) nut and retrieve spring (11);

— back off capscrew (13, page 5) and retrieve relief valve (14) with associated spring, withdraw two roll pins (15 and 17) and retrieve lube pressure limiting valve and spool (19).

Check condition of needle roller bearings and clutch plates. Refer to figure on page 5 for correct location, using tool (1) for retaining ring (12) installation. Retaining ring (2) may be installed by hand as shown.

Install locking wire (1, page 5).

After overhaul, install clutch assembly with associated hydraulic pump and, on early model tractors, filter with associated line or, late model tractors, upper line (40, page 4) to inserted into union on lower line (41).

Connect clutch-pump assembly to PTO shaft through drive gear (35) and then connect filter or upper line to the hydraulic pump.

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On assembly, install the differential caps ensuring that the reference marks are in register, and adjust the bevel drive as directed below.

Install the bevel drive/differential and final drive assemblies adopting a reversal of the disassembly procedure, fasten the bevel drive housing to the axle housing smearing the mating faces with one of the jointing compounds specified on page 7, Section A, and fill up the axle case with the specified type and grade of oil.

Bevel drive and differential adjustment.

1. Bevel pinion bearing adjustment and shim thickness determination using special-purpose tools (figs. a and b).

Proceed as follows:

— install bevel pinion bearing cones (7 and 9) and spacer (8) on tool **293804** (E);

— tighten tool nut (M) fully;

— measure depth (H_2) of tool pin below the top face;

— disassemble, lubricate bearings with engine oil and assemble on the tool, interposing bevel drive housing (10) with attached bearing cups;

— tighten tool nut (M) fully, simultaneously rotating the bevel drive housing through 10 turns to settle the bearings;

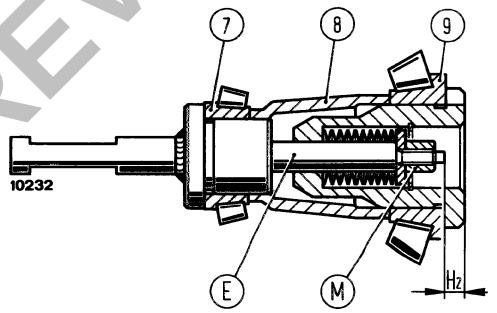
— assess dimension (H_1) in this condition;

— the thickness of shims (S_1) to be fitted is given by the following:

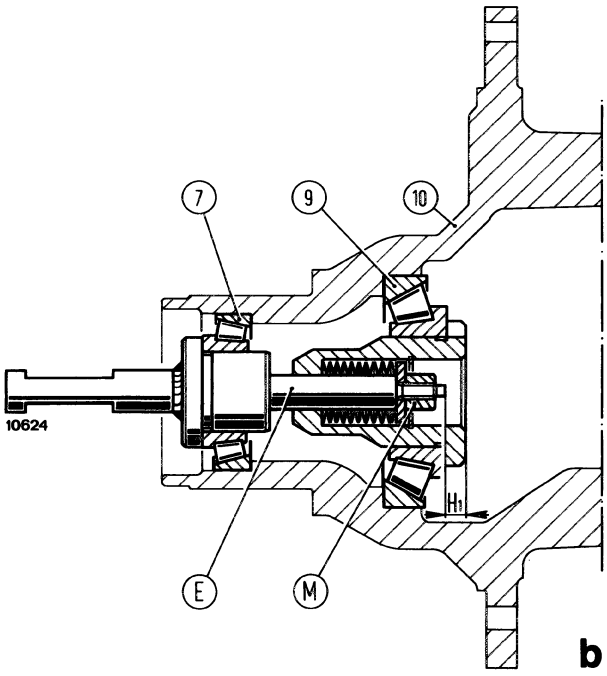
$$S_1 = H_1 - H_2$$

If necessary, round off to the nearest .05 mm (.002 in) up.

Note: On completion of adjustment leave the tool on drive head housing for subsequent bevel pinion position adjustment.



a



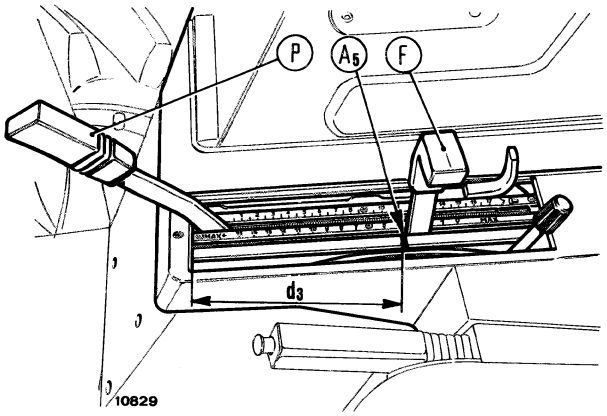
b

Determining bevel pinion bearing shim thickness (S_1, page 3, Section 402) using special-purpose tool 293804.

a. Measuring dimension (H_2) - b Measuring dimension (H_1) - E. Tool **293804** - H_1/H_2 Tool pin depth below top face - M. Tool nut - 7/9. Bearing cups - 8. Spacer - 10. Bevel drive and differential housing.

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Adjusting start of raise in draught control.

A_5. See text - d_3. = 195 to 200 mm (7.68 to 7.87 in) distance from start of slot on quadrant to draught control lever - F. Draught control lever - P. Position control lever.

— apply a reference mark (A_4, page 11) on quadrant at 65 to 70 mm (2.56 to 2.75 in) from start of slot and align lever (P) to mark;

— connect tie rod, adjusting length through fork (4, page 9) and then tighten locknut (3);

— carry out several raise strokes checking that start of raise always occurs when position control lever (P) is aligned to reference mark (A_4) previously applied.

4. Start of raise adjustment in draught control

Test conditions:

— no additional weight on lower links;

— system oil temperature 50° to 60°C;

— engine at 1200 to 1500 rpm;

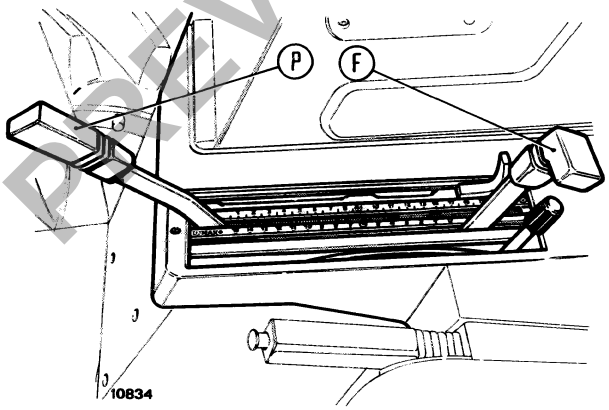
— sensitivity control knob (S, page 9) aligned with + sign (maximum sensitivity condition).

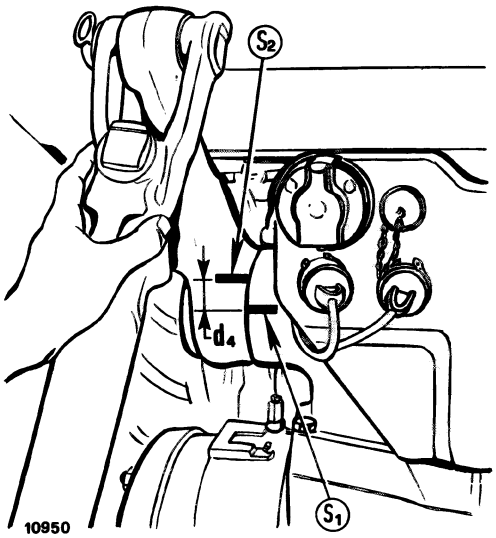
Subsequently, proceed as follows:

— carry out several raise strokes;

— move draught control lever (F) and position control lever (P) forward at start of stroke on quadrant;

— move draught control lever (F) gradually backward until arms raise;





Adjusting maximum lift arm travel.

d_4. = 2 to 2.5 mm (.078 to .098 in) distance from marks S_1 to S_2 (residual arm travel) - F. Draught control lever - P. Position control lever - S_1. Reference mark on lift body - S_2. Reference mark on lift arm.

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