FIAT
Trattori

855 C 955 C
85-55 95-55

WORKSHOP MANUAL

SERVIZI TECNICI DI ASSISTENZA

Reprinted

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855 C
955 C

WORKSHOP MANUAL

QUICK REFERENCE INDEX

SERVIZI TECNICI DI ASSISTENZA

FOREWORD

- The manual is divided into separately numbered sections.

- Two-digit sections contain:
  – tractor specification (00);
  – tractor sub-assembly specification and data (10 Engine, 20 Power Train, etc.).

- Three-digit sections deal with the overhaul of the sub-assemblies whose data are listed in the two-digit sections. The first two digits are the same as those of the associated data sections (e.g 20 - Power Train; 201 - Clutch; 202 - Transmission, splitter etc.).

- A contents list is provided to facilitate retrieval of desired information.

- Each sheet carries the print number of the manual and the date of issue in the bottom right-hand corner of the front page.

- Revised sheets will carry the same print number followed by a 2-digit number (e.g. first revision 603.54.256.01; second revision 603.54.256.02 etc.) and date of issue.
  Revised sheets will be accompanied by the updated contents sheet.

- All information herein is correct at the time of printing but is subject to alteration without prior notice. In case of discrepancies contact the nearest dealer, distributor or branch.

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GENERAL: Contents

SHIMS

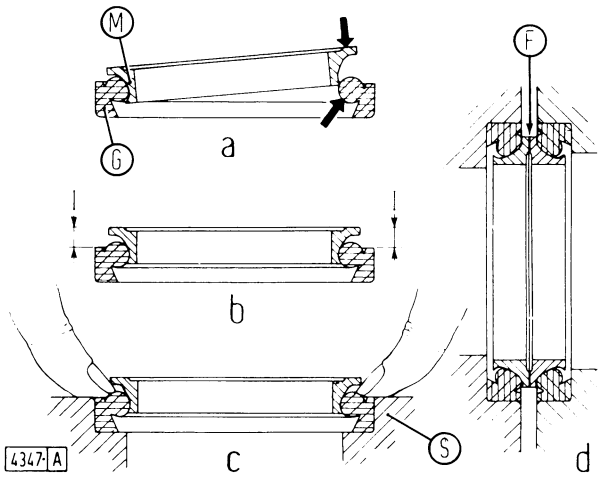
When adjusting, measure each shim with a micrometer gauge and add the values obtained. Do not rely on overall shim thickness or the nominal value indicated for each shim.

ROTARY SHAFT SEALS

To fit rotary shaft seals proceed as follows:
- Prior to fitting, soak the seals for at least half an hour in the fluid to be retained.
- Carefully clean the shaft and ensure that the contact surface is free from damage.
- Turn the end of the sealing lip towards the fluid. If of the thrower lip type, turn the grooves so that during shaft rotation the fluid tends to be thrown back.
- Smear the sealing lip with a very thin coat of lubricant (oil is better than grease) and pack the space between sealing lip and dust shield with grease (applicable to double-lip seals).
- Fit the seals into their housing using a flat-ended tool or ram. Under no circumstances fit with a mallet or hammer.
- Avoid entry of the seal into the recess in a tilted position. Exert a firm and uniform pressure squarely on it and ensure that the seal is pressed fully home.
- To prevent sealing lip damage during fitting, use some sort of protection before sliding over the shaft.

FLOATING RING SEALS

Carefully examine metal rings (M, figure a), ensuring that sealing surfaces are free from score marks, dents or wear caused by misalignment or warpage. Both metal rings (M), together with rubber seals, should be scrapped and replaced even if only one is found to be defective. Do not pair new and worn metal rings together, nor used rings of different pairs.
Install seals as follows:
1) Remove all sharp corners and burrs, and carefully clean the rubber seal housings.
2) Throughly clean the rubber seals.
3) Couple each metal ring (M) to the associated rubber seal (G) as shown in figure a and pressing or pushing as indicated by the arrows.
4) Check that each metal ring is correctly seated; dimension 1 (figure b) should be equal all round.
5) Place each seal assembly in position by depressing the rubber rings as shown in figure c.
6) Before pairing the seal assemblies (see figure d), clean sealing faces (F) using a lint-free cloth and smear a light coat of highly fluid oil over the contact surfaces.



Installing floating ring seals

F. Sealing faces - G. Rubber rings - I. Metal ring stand-out - M. Metal rings - S. Seal housing.

O-RINGS

Lubricate each ring prior to fitting and, on reassembly, slide over the part but do not twist, otherwise leakage will result.

SEALING COMPOUNDS

On the mating surfaces indicated with X apply one of the following sealing compounds: RTV SILMATE, RHODORSIL CAF 1 or LOCTITE PLASTIC GASKET.
Before applying the sealing compund, prepare the surfaces as follows:
- Using a wire brush, remove any deposits.
- Thoroughly degrease using one of the following detergents: Solvent, kerosene or hot water/soda solution.

BEARINGS

To fit bearings:
– Before installing on shafts, heat to 80° C to 90° C.
– Cool before pressing them into their seats.

ROLL PINS

When fitting straight roll pins ensure that they face in direction of work to stress the pin.
Coil roll pins can be installed in any position.

SPARE PARTS

Use exclusively **FIAT spare parts,** having the trade mark below.

These are the only parts that guarantee the quality, durability and safety of the original parts, being the same parts as fitted in production.
Only FIAT spare parts can offer this guarantee.
When ordering spare parts please state:
– Tractor model (marketing code) and frame number.
– Engine type and number.
– Part number (given on "Microfiches" or "Spare Parts Catalogue").

SERVICE TOOLS

The service tools indicated in this manual are:
– Designed specifically for tractors of the FIAT range.
– Essential for reliable repair work.
– Manufactured and tested in such a way as to offer efficient and durable working instruments.
The mechanic is also reminded that being equipped means:
– Operating in optimum working conditions.
– Obtaining the best results.
– Saving time and energy.
– Working in more safety.

NOTICE

Wear limits recommended for some parts are not binding, being given for guidance only.
"Front", "rear", "right", and "left" references are with operator facing normal direction of travel of tractor.

WARNING

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

AVOID ACCIDENTS

Most accidents occurring 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 PRECAUTION

GENERAL

- Strictly adhere to the maintenance and repair procedures indicated.
- 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, 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 than 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.
- Disconnect batteries and lable all controls to indicate operation in progress. Restrain machine and any equipment to be lifted.
- 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 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 points. Be sure pins and locks as provided are secure before pulling. Stay clear of drawbars, cables or chains under load.

GENERAL: Safety precautions

- 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. Anchor tractor to truck or trailer loading platform and block wheels as requested by carrier.
- Use only grounded auxiliary power source for heaters, chargers, pumps and similar equipment to reduce the hazards of electrical shock.
- Lift and handle all heavy parts with a lifting device of proper capacity.
- Watch out for people in the vicinity.
- Never place gasoline or diesel fuel in an open pan.
- Never use gasoline or solvent or other flammable fluid to clean parts. Use authorized commercial, non-flammable non-toxic solvents.
- When cleaning parts with compressed air use safety glasses with side shields or goggles.
- Limit the pressure to 2.1 bar (30 psi) according to local or national requirements.
- Do not run engine in a closed building without adequate ventilation.
- Do not smoke or permit any open flame or spark near when refueling or handling highly flammable materials.
- Do not use an open flame as a light source to look for leaks or for inspection anywhere on the tractor.
- Move carefully when under, in or near machine or implements. Wear required protective equipment, such as hard hats, safety glasses, safety shoes.
- When making equipment checks that require engine running, an operator should be in the operator's seat at all times with the mechanic in sight.
- For field service, move machine to level ground if possible and block machine. If work is absolutely necessary on a gradient, block machine and its attachments securely. Move the machine to level ground as soon as possible.
- Guard against kinking chains or cables. Do not lift or pull through a kinked chain or cable. Always wear heavy gloves when handling chain or cable.
- Be sure cables are anchored and the anchor point is strong enough to handle the expected load. Keep exposed personnel clear of anchor point and cable or chain.
- Keep maintenance area CLEAN and DRY. Remove water or oil puddles immediately.
- Do not pile oily, greasy rags - they are a fire hazard. Store in a closed metal container.
- Before starting machine or moving attachment, check, adjust and lock operator's seat. Be sure all personnel in the area are clear before starting or moving machine and any of its attachments.
- Do not carry loose objects in pockets that might fall unnoticed into open compartments.
- Wear proper protective equipment such as safety goggles or safety glasses with side shields, hard hats, safety shoes, heavy gloves where metal or other particles are apt to fly or fall.
- Wear welder's protective equipment such as dark safety glasses, helmets, protective clothing, gloves and safety shoes when welding. Dark safety glasses must be worn by anyone standing by when welding is in progress. DO NOT LOOK AT ARC WITHOUT PROPER EYE PROTECTION.
- Wire rope develops steel slivers. Use authorized protective equipment such as heavy gloves and safety glasses when handling.
- Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.

START UP

- Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gases.
- Do not place head, body, limbs, feet, fingers or hands near a rotating fan or belts. Be specially alert around a pusher fan.

ENGINE

- Turn radiator cap slowly to relieve pressure before removing. Add coolant only with engine stopped or idling if hot.
- Do not run engine when refueling and use care if engine is hot due to the increased possibility of fire if fuel is spilled.
- Never attempt to check or adjust fan belts when engine is running. Do not adjust engine fuel pump when the machine is in motion.
- Never lubricate a machine with the engine running.

ELECTRICAL SYSTEM

- When auxiliary batteries are used, connect both cable ends to the terminals as specified: (+) with (+) and (—) with (—). Do not short circuit terminals. BATTERY GAS IS HIGHLY INFLAMMABLE. Leave battery box open to improve ventilation when charging batteries. Never check charge by placing metal objects across the posts. Keep sparks or open flame away from batteries. Do not smoke near battery to guard against the possibility of accidental explosion.
- Check for fuel or battery electrolyte leaks before starting service or maintenance work. Eliminate leaks before proceeding.
- Do not charge batteries in a closed area. Provide proper ventilation to guard against an accidental explosion from an accumulation of explosive gases given off in the charging process.
- Disconnect batteries before working on electrical system, or starting repair work of any kind.

HYDRAULIC SYSTEM

- Fluid escaping under pressure from a very small hole can be almost invisible and can have sufficient force to penetrate the skin. Use a piece of cardboard or wood to search for suspected pressure leaks. DO NOT USE HANDS. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can develop if proper medical treatment is not administered immediately.
- When making pressure checks use the correct gauge for expected pressure.

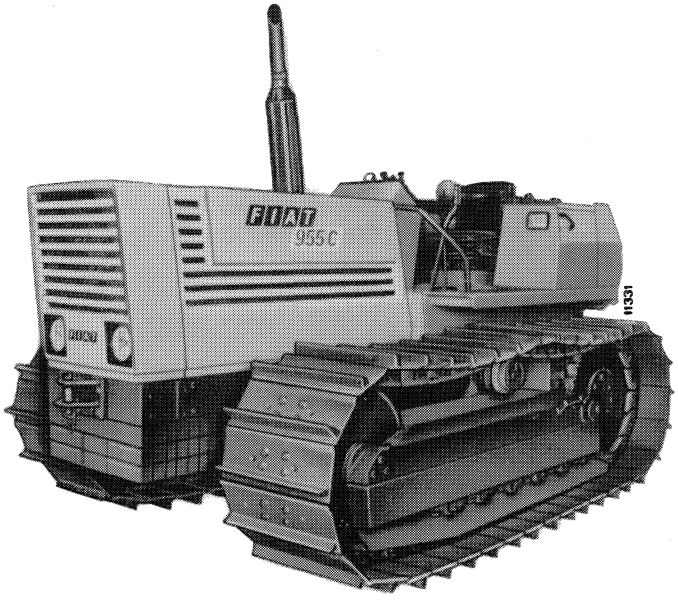
ATTACHMENTS

- Lift and handle all heavy parts with a lift device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lift eyes if provided. Watch out for people in the vicinity.
- Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.
- Guard against kinking chains or cables. Always wear heavy gloves when handling chains or cable.

IDENTIFICATION DATA

MODEL	CODE NUMBER			ENGINE	
	Marketing		Engineering		
	on hood	on plate		type	construction
Crawler	855C	855C	663.100.000	8045.04.275 (1) 8045.04.375 (2)	FIAT
Crawler	955C	955C	664.100.000	8055.05.205	FIAT

(1) BOSCH injection pump.
(2) C.A.V. injection pump.



SPECIFICATION

	855C	955C
WEIGHTS		
Operating weight (with front ballast weights and lift, without operator)	5420 (11950 lb)	6420 (14156 lb)
ENGINE		
Type	Diesel, 4-stroke, naturally aspirated	
Injection	Direct	
Number of cylinders	4	5
Sleeves	Dry	
Bore	103 mm (4.05 in)	
Stroke	110 mm (4.33 in)	
Displacement	3666 cm³ (223.69 in³)	4583 cm³ (279.65 in³)
Compression ratio	17 to 1	
Crankshaft rotation (seen from fan side)	Counterclockwise	Clockwise
Main bearings	5	6
Firing order	1-3-4-2	1-2-4-5-3
Max. output speed	2500 rpm	
Max. output, DGM/DIN	57.4 kw (78 HP)	64.8 kw (88 HP)
Max. torque speed	1400 rpm	1800 rpm
Drive ratios: Alternator	1 to 1.92	1 to 1.82
Drive ratios: Oil pump	1 to 0.5	1 to 1.265
Drive ratios: Water pump and fan	1 to 1.04	1 to 1.425
Drive ratios: Tractormeter	1 to 0.5	
Oil pan	Cast iron	
Engine balancer	Counterweight unit in oil pan	—
Valve gear	OH values, pushrod operated	
Intake: Opens: BTDC	3°	
Intake: Closes: ABDC	23°	
Exhaust: Opens: BBDC	48° 30'	
Exhaust: Closes: ATDC	6°	
Valve clearance (timing check)	0.45 mm (.018 in)	
Normal clearance (hot or cold):		
— Intake	0.25 mm (.010 in)	
— Exhaust	0.35 mm (.014 in)	

	855C	955C
Fuel system		
Air cleaner	Oil bath or dry double cartridge, centrifugal pre-cleaner with automatic dust unloader	
Fuel filters (on fuel transfer pump delivery)	Two, in line, disposable paper cartridge (water trap integral with first stage filter) (*)	
Fuel transfer pump	Double diaphragm	
– Operation	Cam, valve gear driven	
Injection pump	Distributor	
– Type – BOSCH	EP/VA4/110H 1250 CL 136-6-771151	VE5/11 F 1250 R58-4749797
– Type – C.A.V.	DPA 3342 F570 - 771541	–
Integral all speed governor:		
– BOSCH	Hydraulic	Centrifugal
– C.A.V.	Centrifugal	–
– Pump timing, B.T.D.C.:		
• BOSCH	13° ± 1°	8° ± 1°
• C.A.V.	18° ± 1°	–
Injectors	Three orifice	
– Injector type	See page 10, section 10	
– Nozzle opening pressure	225.5 ± 4.9 bar (230 ± 5 kg/cm² - 3270 ±70 psi)	
Firing order	1-3-4-2	1-2-4-5-3
Lubrication system	Forced feed, gear pump	
Pump drive	Camshaft	Crankshaft
Oil filters:		
– Suction	Wire mesh	
– Delivery	Full-flow cartridge	
Relief valve	In pump body	
Oil pressure at rated engine speed	2.9 to 3.9 bar (3 to 4 kg/cm² - 40 to 55 psi)	

(*) An optional water trap (Var 710.130) may be installed on fuel tank outlet.

SPECIFICATION

	855C	955C
Cooling system	Water, centrifugal pump	
Radiator, vertical tubes	3 row	4 row
—		
Expansion tank	Translucent plastic	
Fan, water pump pulley mounted	Suction, 4 steel blades	
Temperature control	Wax thermostat	
Tractormeter	On instrument panel	
— Drive	Camshaft	
— Hourmeter activation speed. rpm	1800	

POWER TRAIN

Clutch

12" twin plate, wet type with lobe-type gear pump and full-flow filter.
Overcentre engagement, hand lever control.
Post-release brake to facilitate gear engagement.
Sintered facings.

Transmission and Splitter

Spur sliding gear. Pinion drive splitter for 8 forward and 4 reverse speeds.
Transmission and splitter controlled through two separate levers located centrally in front of the operator.

Bevel drive with 9/49 ratio, located at center of rear transmission.

Single-reduction final drives with spur gears.

Steering clutches

Dry, multiple plate with spring-type mechanical power assistance, controlled through two hand levers.
11 drive plates and 11 driven plates per side.

Brakes (Service)

Band, mechanical control acting on steering clutch outer drums, controlled by separate pedals.
Parking brake acts on service brakes, controlled by hand lever to operator's right.

Power take-off (540 rpm)

- Direction of rotation (tractor viewed from rear) .....Clockwise
- Engine speed with P.T.O. at 540 rpm . 2124 rpm
- 1 3/8" 6-spline stub shaft.
- Hand lever control.

UNDERCARRIAGE

Rear suspension incorporating cross beam fastened to final drive housings and resting on track frames through lubricated bushings permitting independent track frame oscillation.
Transverse leaf spring front suspension.
Track frames, incorporating front guides, each with replaceable wear plate, five track rollers and one carrier roller (model 855C) or six track rollers and one carrier roller (model 955C). Lubricated-for-life rollers and front idlers.

Tracks consisting of 35 links (model 855C) or 38 links (model 955C).

Shoe width . . . . . 400 mm (16 in)

500 mm (20 in) width shoes and street plates optional.

REMOTE IMPLEMENT CONTROL HYDRAULIC SYSTEM (Optional)

This system is used for controlling the hitch or rear mounted or semi-integral implements. System is mounted on the right hand fender and consists of:

- Oil reservoir.
- Gear pump, engine timing gear driven.
- 2 or 3 convertible remote control valves plus optional float control valve, each with 1/2" quick-disconnect coupler ports for single or double-acting remote cylinders.

HITCH AND ROCKSHAFT CONTROLS (Optional)

External hydraulic cylinders with position and float control. Controlled through lever actuating an independent control valve connected with remote implement control valve pack.

Two external single-acting cylinders connected to lift arms mechanically.

Same gear pump supplying remote implement control hydraulic system.

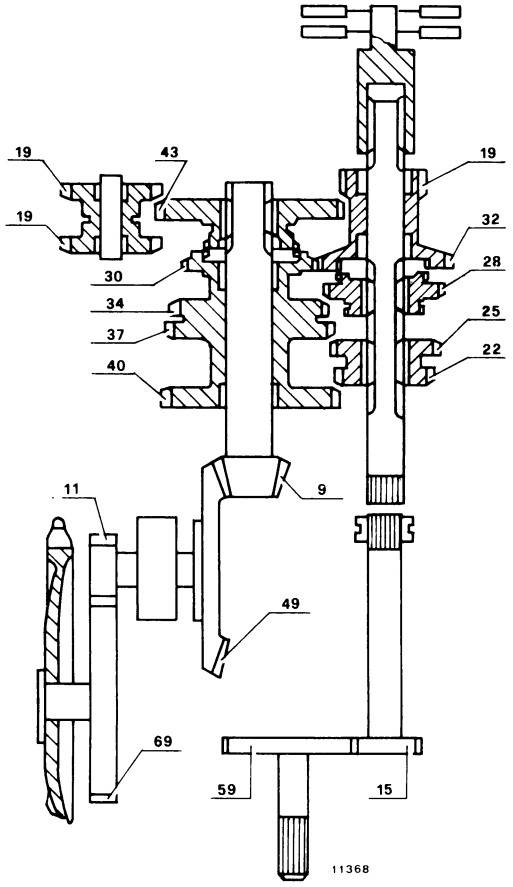
Design lift capacity, max. lift stroke and max. lift capacity (see section 40, pages 3 and 4).

Category 2 or 3 implement attachment with three-point linkage.

Standard lift arms and draft links.

Sway chains.

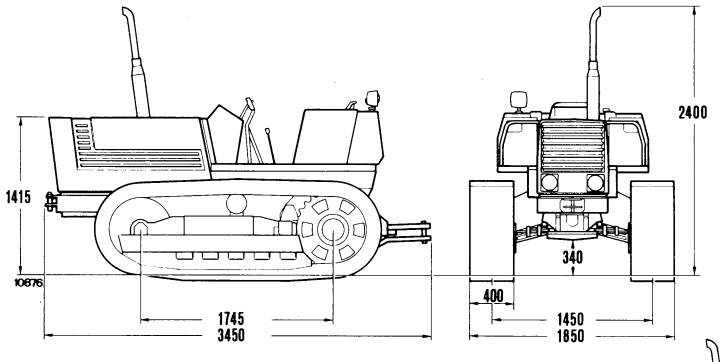
POWER TRAIN SCHEMATICS (Models 855C – 955C)



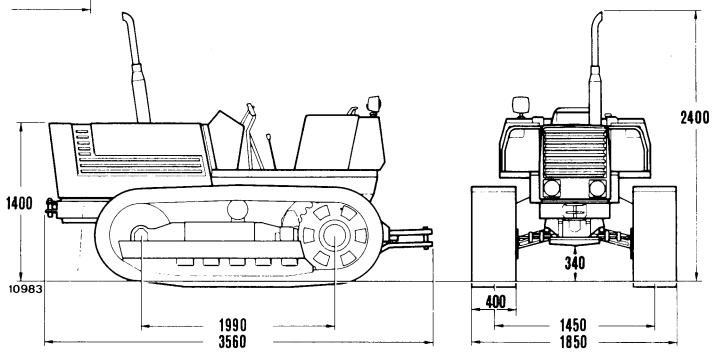
TRACTOR SPEED AT RATED ENGINE SPEED			
GEARS		Models 855C – 955C	
		kph	mph
Low forward	1st	2.1	1.3
	2nd	2.6	1.6
	3rd	3.2	1.9
	4th	4.2	2.6
High forward	1st	5.2	3.2
	2nd	6.4	3.9
	3rd	7.8	4.8
	4th	10.1	6.2
Reverse	1st	3.6	2.2
	2nd	4.5	2.8
	3rd	5.5	3.4
	4th	7.1	4.4

SPECIFICATION

OVERALL DIMENSIONS (in mm)



Mod. 855 C



Mod. 955 C

TOWING ATTACHMENTS

Rear

– Swinging drawbar, heavy type, height adjustable to three positions.

Front

– Tow hook, can be used with front ballasting.

BALLASTING

Consisting of 10 plates, inserted over two guides secured to the front suspension support, each of 33 kg (73 lb) for a total weight of 330 kg (728 lb).

BODY

Integral structure including: footboards, fenders, dash and seat support.
Forward operator's position. Full 4-piece hood. Flat fenders. Two sheet metal fuel tanks, one at rear and one on L.H. fender, for a total capacity of 170 litres (37.4 gal).
Lift remote control oil tank on R.H. fender, capacity 27 (5.9 gal).
"De-luxe" operator's seat with parallelogram suspension. Padded armrests. Tool kit and box positioned under L.H. armrest.

(*) Maintenance-free battery.

Dash with 15-function instrument panel and control board.

Hood

Square, full enclosing. Side flaps removable for easy access to engine.

ELECTRICAL SYSTEM (12 Volt)

Alternator with integral electronic voltage regulator.

Type: BOSCH G1 → 14V-33A27 and MARELLI AA108-14V-33A-1 (855C – 955C) or ISKRA AAG 1104-14V-33A and LUCAS 18ACR-14V-40A (855C).

Starter.....MARELLI MT 68MA

Battery located ahead of radiator, capacity:
– 855C ..... 100(*) 110/120 Ah (standard)
or 132/140 Ah (optional)
– 955C ..... 132/140 Ah

Lighting

Twin head lights, asymmetric high and low beams (45/40W bulb).
Two front lights incorporating 5W parking light and

21W turn signals.
Two tail lights incorporating 5W parking light and 21W turn signals and stop light.
5W license plate light.

Instruments and Accessories

Control board and 15-function instrument panel, of which 11 functions are utilized.

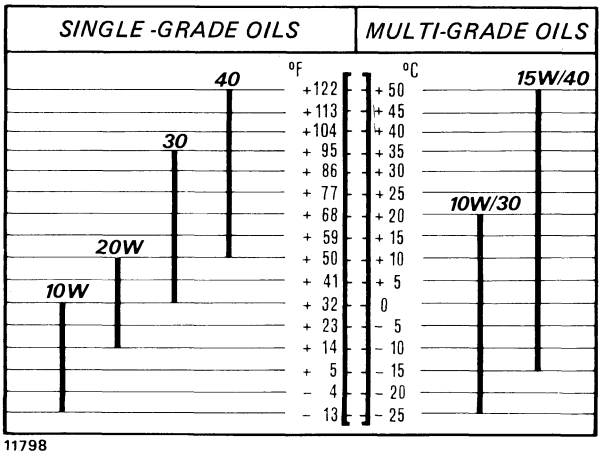
Optional water trap, 35W floodlight, cold starting aid and single pole power point.

Fuses: seven 8 amp and one 16 amp.

CAPACITIES

DESCRIPTION	FLUID					
	FIAT Recommended Product	CAPACITY			International designation
		liters	kg	pints	
Oil pan, filters and lines	AMBRA SUPER (2)	855C 11.7	10.5	20.6	Diesel engine oil to MIL-L-2104D and API CD service
		955C 13.8	12.4	24.3	
Oil pan and filters		855C 11.2	10.1	19.7	
		955C 12.8	11.5	22.5	
Oil pan only ..		855C 10.5	9.5	18.5	
		955C 11.1	10	19.5	
Air cleaner (1)		1.2	1.1	2.1	
Transmission, bevel drive and P.T.O.	TUTELA W90/M-DA	30.3	27.3	53.3	Transmission oil to MIL-L-2105C and API GL 5 service SAE 80W/90
Final drives (each)		5	4.5	8.8	
Clutch	TUTELA MULTI F	10.3	9.3	18.1	Transmission, drive train oil bath brakes and lift oil to Massey Ferguson MF1135 and Ford M2C 86A
Track rollers and idlers		2.3	2.1	4.0	
Remote control and lift system:					
– Tank and lines		25.5	23	45	
– Lift		3.3	3	5.8	
Lubricator grease	TUTELA G9	1.1	1	1.9	Lithium-calcium grease, NLGI No. 2
Coolant (incl. expansion tank)	water and "PARAFLU 11" (3)	855C 11	–	19.4	
		955C 12	–	21.1	
Fuel tanks (two off)	diesel oil	170	–	299.4	

AMBRA SUPER



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(1) Change cleaner oil when sludge or deposits reach a depth of around 1 cm or 1/2".

(2) SAE viscosity in relation to outdoor temperature: see table alongside.

(3) Fluid with oxidation, corrosion, foam and scale inhibiting properties, antifreeze down to –8° C, –15° C, –25° and –35°C in 20% , 30% , 40% and 50% mixtures with water. Coolant is effective for 2 years or 1600 hours.

ENGINE BLOCK – CYLINDER HEAD

	mm	in
Engine block		
Cylinder bore diameter in engine block	106.890 to 106.940	4.208 to 4.210
Sleeve O.D.	107.020 to 107.050	4.213 to 4.214
Sleeve interference fit in block	0.080 to 0.160	.0031 to .0062
Sleeve diameter oversize	0.2	0.007
Sleeve bore diameter	103.000 to 103.018 (1)	4.0551 to 4.0558 (1)
Maximum ovality and taper due to wear (2)	0.12	.0047
Sleeve bore oversize	0.2-0.4-0.6-0.8	0.007-0.015-0.023-0.031
Camshaft bushing bore diameter:		
– Front (955C)	55.280 to 55.305	2.176 to2.177
– Front (855C) or front intermediate (955C)	54.780 to 54.805	2.1567 to 2.1577
– Center (855C) or rear intermediate (955C)	54.280 to 54.305	2.1370 to 2.1380
– Rear	53.780 to 53.805	2.1173 to 2.1183
Tappet housing bore diameter	15.000 to 15.018	.5905 to .5912
Tappet oversize	0.1-0.2-0.3	.004-.008-.012
Main bearing housing bore diameter	80.587 to 80.607	3.1727 to 3.1735
Cylinder head		
Valve guide housing bore diameter in head	13.966 to 13.983	0.549 to 0.550
Valve guide oversize	0.2	0.007
Valve seat dimension	see page 2,section 101	
Valve stand-in	0.7 to 1.1	0.027 to 0.043
– Max. stand-in	1.4	.005
Injector stand-out	1 to 1.5	.04 to 0.6
– Max. stand-out	1.8	.07
Cylinder head height	92	3.622
Maximum head dressing allowance	0.5	0.02

(1) After reaming in position. Sleeves may be finished to .1 mm or .004 in oversize in production, in which case they are matched to corresponding oversize pistons.

(2) Measurement to be carried out over sweept area both parallel and at right angles to engine centerline.

CRANK GEAR

	mm	in
Crankshaft – Bearings		
Main journal diameter	79.791 to 79.810 (1)	3.141 to 3.142
Main journal undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.299-0.0399
Main bearing wall thickness	2,169 to 2,178	0.085 to 0.086
Main bearing undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299-0.0399
Main journal clearance in bearings	0.034 to 0.103	0.0013 to 0.0040
– Maximum wear clearance	0.180	.0071
Con rod journal diameter	63.725 to 63.744 (1)	2.509 to 2.510
Con rod journal undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299-0.0399
Head bearing wall thickness	1.805 to 1.815	0.0710 to 0.0714
Head bearing undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299-0.0399
Con rod journal clearance in head bearing	0.033 to 0.087	0.0013 to 0.0034
– Maximum wear clearance	0.180	.0071
Crankshaft thrust washer thickness	3.378 to 3.429	.1330 to .1350
Thrust washer oversize	.127-.254-.381-.508	.005-.009-.015-.019
Width of main bearing housing over thrust washers	31.766 to 31.918	1.2506 to 1.2566
Length of corresponding main journal	32.000 to 32.100	1.2598 to 1.2638
Crankshaft end float	.082 to .334	.0032 to .0131
– Maximum wear end float	.40	.016
Maximum main journal and con rod journal ovality or taper after grinding	0.01	0.00039
Maximum main journal and con rod journal ovality or taper due to wear	0.05	0.0019
Maximum main journal misalignment with crankshaft resting on end journals	0.10	0.0039
Maximum con rod journal misalignment relative to main journals (in either direction)	0.25	0.0098
Maximum tolerance on distance from outer con rod journal edge to crankshaft centerline	± 0.10	± 0.0039

(follows)

(1) 0.1 mm undersize con rod journal and main journal cranksahfts may be fitted in production coupled to corresponding undersize bearings.

CRANK GEAR *(continued)*

	mm	in
Maximum crankshaft flange run-out with stylus in A, page 2, section 103, over 108 mm (4.25 in) diameter, T.I.R	0.025	.0010
Maximum flywheel seat eccentricity relative to main journals	0.04	.0016
Connecting rods		
Piston pin bushing bore diameter	37.877 to 37.916	1.4912 to 1.4928
Piston pin bushing O.D.	37.979 to 38.017	1.4952 to 1.4967
Piston interference fit in bore	0.063 to 0.140	.0025 to .0055
Piston pin bushing fitted I.D.	34.005 to 34.012	1.3388 to 1.3391
Head bore diameter	62.408 to 62.420	2.4570 to 2.4575
Maximum connecting rod axis misalignment at 125 mm (5 in)	± 0.07	± 0.0027
Maximum connecting rod weight difference over one complete set of the same engine	25 gr	0.88 oz
Pistons		
Piston diameter 50 mm (2 in) from base of skirt, at right angles to pin centerline	102.813 to 102.825	4.047 to 4.048
Piston clearance in sleeve	0.175 to 0.205	0.0068 to 0.0080
– Max. wear clearance	0.30	.012
Piston oversize range	0.2-0.4-0.6-0.8	0.008-0.0016-0.024 0.031

(follows)

CRANK GEAR *(continued)*

	mm	in
Piston pin diameter	33.983 to 33.990	1.3379 to 1.3381
Piston pin housing bore in piston	33.993 to 34.000	1.3383 to 1.3385
Piston pin clearance in piston	0.003 to 0.017	.0061 to .0007
Piston pin oversize	0.2 to 0.5	0.0078 to 0.0196
Piston pin clearance in con rod bushing	0.015 to 0.029	0.0005 to 0.0011
– Maximum wear clearance	0.06	.0024
Maximum weight difference over a complete set of pistons	20 gr	0.70 oz
Piston ring clearance in groove:		
– Top	0.090 to 0.122	0.0035 to 0.0048
– 2nd	0.050 to 0.082	0.0019 to 0.0032
– 3rd	0.040 to 0.072	0.0015 to 0.0028
Maximum wear clearance:		
– Top	0.50	.02
– 2nd and 3rd	0.20	.008
Piston ring gap:		
– Top	0.35 to 0.55	0.0137 to 0.0216
– 2nd	0.30 to 0.50	0.0118 to 0.0196
– 3rd	0.30 to 0.45	0.0118 to 0.0177
Maximum wear gap	1.20	.047

CRANK GEAR

	mm	in
Engine balancer (855C)		
Intermediate gear jackshaft clearance in bushing (1) (19, page 5, section 103)	0.050 to 0.100	0.0019 to 0.0039
Counterweight gear shaft clearance in front bushing (1) (11)	0.050 to 0.100	0.0019 to 0.0039
Drive pinion clearance in bushings (1) (18)	0.050 to 0.100	0.0019 to 0.0039
Connecting sleeve spline backlash (13)	0.038 to 0.106	.0015 to .0042
Counterweight gear shaft clearance in rear bushing (11) (2)	0.013 to 0.061	0.0005 to 0.0024
Carrier clearance in counterweight bushings (26)	0.020 to 0.073	0.0007 to 0.0028
Counterweight bushing interference fit in housing	0.040 to 0.100	0.0015 to 0.0039
Idler gear jackshaft clearance in bushing (34) (2)	0.013 to 0.061	0.0005 to 0.0024
Gear backlash	0.080	0.0031
Balancer timing	See page 6, section 103	

(1) Bushing interference fit in housing: 0.063 to 0.140 mm (.002 to .005 in).
(2) Bushing interference fit in housing: 0.037 to 0.101 mm (.001 to .004 in).

VALVE GEAR

Valve Timing Gears		
Timing gear backlash	0.08	0.0031
Idler gear jack shaft diameter	31.975 to 32.000	1.2589 to 1.2598
Idler gear bushing fitted I.D. after reaming	32.050 to 32.075	1.2618 to 1.2628
Jack shaft journal clearance in bushing	0.050 to 0.100	0.0019 to 0.0039
— Maximum wear clearance	0.15	0.0059
Bushing interference fit in idler gear	0.063 to 0.140	0.0025 to 0.0055
Hydraulic pump drive gear shaft diameter	36.975 to 37.000	1.4557 to 1.4567
Bushing fitted I.D. after reaming	37.050 to 37.075	1.4586 to 1.4596
Shaft clearance in bushing	0.050 to 0.100	0.0019 to 0.0039
Bushing interference fit in housing	0.063 to 0.140	0.0025 to 0.0055
Pump drive gear thrust washer thickness (855C)	1.45 to 1.50	0.0571 to 0.0591

VALVE GEAR *(continued)*

	mm	in
Camshaft		
Camshaft bushing O.D.:		
– Front (955C)	55.375 to 55.430	2.180 to 2.182
– Front (855C) or front intermediate (955C)	54.875 to 54.930	2.160 to 2.162
– Center (855C) or rear intermediate (955C)	54.375 to 54.430	2.140 to 2.142
– Rear	53.875 to 53.930	2.121 to 2.123
Bushing interference fit in housing	0.070 to 0.150	0.0028 to 0.0059
Camshaft bushing fitted I.D. after reaming:		
– Front (955C)	51.580 to 51.630	2.030 to 2.032
– Front (855C) or front intermediate (955C)	51.080 to 51.130	2.011 to 2.013
– Center (855C) or rear intermediate (955C)	50.580 to 50.630	1.9913 to 1.9933
– Rear	50.080 to 50.130	1.9716 to 1.9736
Camshaft journal diameter:		
– Front (955C)	51.470 to 51.500	2.0264 to 2.0275
– Front (855C) or front intermediate (955C)	50.970 to 51.000	2.0067 to 2.0079
– Center (855C) or rear intermediate (955C)	50.470 to 50.500	1.9870 to 1.9882
– Rear	49.970 to 50.000	1.9673 to 1.9685
Camshaft journal clearance in bushing	0.080 to 0.160	0.0031 to 0.0063
Maximum wear clearance	0.20	0.0079
Camshaft end float (thrust plate to associated seat in camshaft)	0.070 to 0.220	0.0028 to 0.0087
Tappets		
Tappet O.D.	14.950 to 14.970	0.5886 to 0.5894
Tappet clearance in housing on engine block	0.030 to 0.068	0.0012 to 0.0027
Maximum wear clearance	0.15	0.0059
Tappet oversize	0.1-0.2-0.3	0.004-0.008 -0.012
Rocker arms		
Rocker arm bushing O.D.	21.006 to 21.031	0.8270 to 0.8280
Rocker arm bore diameter	20.939 to 20.972	0.8244 to 0.7902
Bushing interference fit in rocker arm	0.034 to 0.092	0.0013 to 0.0036
Rocker arm bracket bore diameter	18.016 to 18.034	0.7093 to 0.7100
Rocker arm shaft diameter	17.982 to 18.000	0.7079 to 0.7087
Rocker arm shaft clearance in bracket	0.016 to 0.052	0.0006 to 0.0020
– Maximum wear clearance	0.15	0.006
Rocker arm spacer spring length:		
– Free	59.5	2.3425
– Under 46 to 52 N (4.7 to 5.3 kg. 10.4 to 11.7 lb)	44	1.7323

(follows)

VALVE GEAR

(continued)

	mm	in
Valves, Guides and Springs		
Head diameter — Intake	43.750 to 44.000	1.7224 to 1.7323
Head diameter — Exhaust	36.750 to 37.000	1.4468 to 1.4567
Stem diameter	7.985 to 8.000	0.3144 to 0.3150
Valve face angle	45° 30' ± 7'	
Valve clearance — Timing check	0.45	0.01777
Valve clearance — Normal (cold or warm) — Intake	0.25	0.0010
Valve clearance — Normal (cold or warm) — Exhaust	0.35	0.0138
Cam lift(*) — Intake	5.250	0.2067
Cam lift(*) — Exhaust	5.777	0.2274
Valve lift (*) — Intake	9.31	0.3661
Valve lift (*) — Exhaust	10.25	0.4016
Valve guide O.D.	13.988 to 14.016	0.5507 to 0.5518
Valve guide oversize	0.2	0.0079
Valve guide interference fit in housing on cylinder head	0.005 to 0.050	0.0002 to 0.0020
Valve guide fitted I.D. after reaming	8.023 to 0.038	0.3159 to 0.3165
Valve stem clearance in guide	0.023 to 0.053	0.0009 to 0.0021
– Maximum wear clearance	0.13	0.0051
Maximum valve stem eccentricity over one revolution with stylus on sealing face	0.04	0.0016
Intake and exhaust valve spring length:		
– Free	65.5	2.579
– Valve closed, under 295 to 332 N (30.1 to 33.9 kg, 66.4 to 74.7 lb)	41	1.614
– Valve open, under 472 to 511N (48.1 to 52.1 kg, 106 to 115 lb)	30.8	1.213

(*) With 0.45 mm or 0.018 in valve clearance (for timing check).

ENGINE: Specification and Data

LUBRICATION SYSTEM

	855C	955C
Oil pump	Gear, camshaft driven	Gear, crankshaft driven
Oil pump drive ratio	0.5 to 1	1.265 to 1
Oil pressure, warm, at governed speed	2.9 - 3.9 bar (3 - 4 kg/cm² – 40 -55 psi)	
Relief valve crack-off setting	3.5 bar (3.6 kg/cm² – 50 psi)	
Shaft clearance in bushing	0.016 to 0.055 mm (,0006 to .0022 in)	0.016 to 0.070 mm (.0006 to .0027 in)
Shaft clearance in: – Driven gear (855C)	0.033 to 0.066 mm (0.0013 to 0.0026 in)	–
– Driven gear bushing (955C)	–	0.016 to 0.054 mm (.0006 to .0021 in)
Gear backlash	0.100 mm (0.0039 in)	
Gear clearance in pump body	0.060 to 0.170 mm (0.0024 to 0.0067 in)	.030 to .134 mm (.0012 to .0053 in)
Drive and driven gear width	40.961 to 41.000 mm (1.6126 to 1.6142 in)	15.973 to 16.000 mm (.6288 to .6299 in)
Gear housing depth in pump body	41.025 to 41.087 mm (1.6152 to 1.6176 in)	16.016 to 16.080 mm (.6305 to .6331 in)
Drive and driven gear end float	0.025 to 0.126 mm (0.0009 to 0.0049 in)	.016 to .107 mm (.0006 to .0042 in)
Pressure relief valve spring length: – Free – Closed, under 88 to 94 N (9 to 9.6 kg, 19.8 to 21 lb)	45 mm (1,77 in) 30.5 mm (1.20 in)	
Oil filters	Gauze on suction and main cartridge on delivery	

COOLING SYSTEM

Water pump	Centrifugal, vane	
Water pump drive ratio	1.040 to 1	1.425 to 1
Shaft interference fit in impeller	0.027 to 0.060 mm – (0.0011 to 0.0024 in)	
Shaft interference fit in fan hub	0.015 to 0.061 mm – (0.0006 to 0.0024 in)	
Face sealing bushing interference fit in impeller	0.012 to 0.058 mm – (0.0005 to 0.0023 in)	

(follows)

COOLING SYSTEM

(continued)

Thermostat	
Type	Wax
Opening temperature	79 ± 2° C
Fully open at	94° C to 95° C
Valve travel when fully open	7.5 mm (0.295 in)
Radiator	Vertical tube and steel fins, 3 or 4 row
Expansion tank	Translucent plastic
Fan	Suction, steel, 4-bladed
Water Temperature Gauge	Three coloured sectors
Temperature range:	
– White sector	30° to 65° C
– Green sector	65° to 105° C
– Red sector	105° to 115° C

FUEL SYSTEM

	855C	955C
Fuel Transfer Pump	Double diaphragm	
Operation	Engine driven	
Minimum fuel flow at 1.600 shaft rpm	100 litre/hour (22 Gall/hour)	
Drive shaft eccentricity	3 mm (0.118 in)	5.25 mm (0.206 in)
Fuel Transfer Pump Drive		
Shaft journal diameter	31.975 to 32.000 mm (1.2588 to 1.2598 in)	49.975 to 50.000 mm (1.9675 to 1.9685 in)
Bushing fitted I.D. after reaming	32.050 to 32.075 mm (1.2618 to 1.2628 in)	50.050 to 50.075 mm (1.9704 to 1.9715 in)
Shaft clearance in bushing	0.050 to 0.100 mm (0.0020 to 0.0040 in)	.050 to .100 mm (.002 to .005 in)
Bushing interference fit in housing	0.063 to 0.140 mm (0.0025 to 0.0055 in)	.066 to .142 mm (.002 to .005 in)
Inner washer thickness	1.45 to 1.50 mm (0.0570 to 0.0590 in)	1.45 to 1.50 mm (1.507 to 1.059 in)
Outer washer thickness	2.93 to 3.00 mm (0.1153 to 0.1181 in)	2.93 to 3.00 mm (.115 to .118 in)

ENGINE: Specification and Data

FUEL SYSTEM

	855C	955C
Injection pump	Distributor, integral governor and advance device	
– BOSCH	EP/VA 4/11OH 1250 CL136-6-771151	VE5/11 F1250 R58 - 4749797
– C.A.V.	DPA-3342 F570-771541	–
Direction of rotation	Counter clockwise	Clockwise
Firing order	1-3-4-2	1-2-4-5-3
Injectors:		
– Type – FIAT	EPPZ10F1-770577	
– Type – BOSCH	EPPZ50F3-771064	
– Type – C.A.V.	EPPZ60F3-770897	
– Type – O.M.A.P.	EPPZ70F3-770957	
– FIAT – Nozzle holder	KB70S1F10-767107	
– FIAT – Spray nozzle	DLL140S64F-770578	
– BOSCH – Nozzle holder	KBL70S177/4-771065	
– BOSCH – Spray nozzle	DLLA141S662-771066	
– C.A.V. – Nozzle holder	BKBL69S5376-770899	
– C.A.V. – Spray nozzle	BDLL140S6655-770902	
– O.M.A.P. – Nozzle holder	OKLL70S2974-770958	
– O.M.A.P. – Spray nozzle	OLL140S64F-770959	
Number of spray orifices	3	
Spray orifice diameter	0.35 mm (0.0138 in)	
Nozzle opening pressure	221-230 bar (225-235 kg/cm² - 3200 - 3340 psi)	
Delivery pipes:		
– Type	PRR25F17Z-768068	PRR59FV1Z-4750216
– Pipe size	1.5x6x480 mm (0.06x0.235x19 in)	1.5x6x570 mm (0.06x0.235x22.5 in)

MODEL 855C – CALIBRATION DATA - BOSCH INJECTION PUMP TYPE EP/VA 4/110 H 1250 CL 136-6-771151

ASSEMBLY DATA

Direction of rotation (drive end). Counter clockwise
Firing order 1-3-4-2
Rotor stroke to spill cut-off . . . . . 0.5 ± 0.02 mm (0.020 ± 0.0008 in)
Pump timing: 13° ± 1° B.T.D.C., cylinder No. 1 in compression stroke.
Preloaded shuttle spring length . . . . . 24.6 mm (0.9685 in)
Delivery connection to cylinder No. 1: Marked with letter A.

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.
Nozzle opening pressure . . . . . 147 bar (150 kg/cm², 2133 psi)
Pipes . . . . . 2x6x840 mm

Procedure B

Test machine with injector bodies and nozzles as fitted to engine.
Nozzle opening pressure . . . . . 221 to 230 bar (225 to 235 kg/cm², 3200 to 3343 psi)
Pipes . . . . . 1.5x6x700 mm
Calibration fluid: FIAT CFB at 40° ± 5° C (for lower test temperature add 0.25 cm³/1000 shots to each degree).
Fuel pressure . . . . . 0.2 bar (0.2 kg/cm², 2.8 psi)

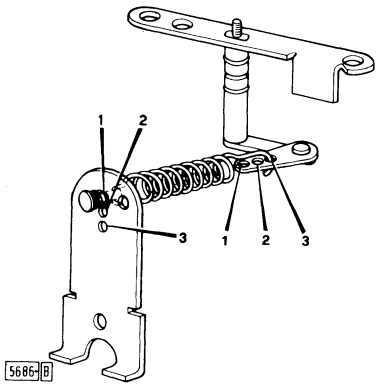
Test No.	Lever position L_1 = Shuttle L_2 = Throttle	Speed rpm	Transfer pressure bar (kg/cm²)	Advance piston stroke (*) mm	PROCEDURE A		PROCEDURE B	
					Injector delivery cm³/1000 shots	Back leakage cm³/100 shots	Injector delivery cm³/1000 shots	Back leakage cm³/100 shots
1	L_1 = Shut-off L_2 = Full	700 ± 5	–	–	0	–	0	–
2	L_1-L_2 = Full	700 ± 5	–	–	63,5 to 66,5	–	53 to 56	–
3	L_1-L_2 = Full	1300	–	–	45 to 53	–	38 to 46	–
4	–	100	0,6 to 1,1	–	–	–	–	–
5		700 ± 5	4,2 to 4,7	–	–	–	–	–
6		1250	6,2 to 6,7	–	–	–	–	–
7	L_1-L_2 = Full	250	–	–	⩽57	–	⩽57	–
8	L_1-L_2 = Full	100	–	–	⩾130	–	⩾130	–
9	–	400 550	–	0 (début)	–	–	–	–
10		700 ± 5	–	2 à 3	–	–	–	–
11		1100 to 1150	–	6,5 (fin)	–	–	–	–
12	L_1 = Full L_2 = Full (1)	1425 to 1475	–	–	0	–	0	–
13		1300	–	–	45 to 53	–	38 to 46	–
14	L_1 = Full (2) L_2 = Full	1250 $\pm^{0}_{20}$	–	–	61 to 64 (•)	–	53 to 56 (•)	–
15		1000	–	–	–	30 to 55	–	30 to 55
16		700 ± 5	–	–	63,5 to 66,5	–	53 to 56	–
17		500 ± 5	–	–	60 to 63	60 to 90	51 to 54	60 to 90
18	L_1 = Full L_2 = Idle (3)	400 to 500	–	–	0	–	0	–
19		350	–	–	12 to 22	–	10 to 18	–

(*) Using tool **292817**.
(•) Max. spread 2.5 cm³/1000 shots.
(1) Adjust max. speed screw.
(2) Adjust max. fuel screw.
(3) Adjust idling speed screw.

MODEL 855C – CALIBRATION DATA - C.A.V. INJECTION PUMP TYPE DPA 3342 F 570 - 771541

ASSEMBLY DATA

Pump rotation (drive end) . . . . . Counterclockwise
Firing order 1-3-4-2
Governor control stud to metering valve lever pin . . . . . $54 \pm {}^{0}_{1}$ mm ($2.13^{+0}_{-0.04}$ in)
Roller spacing . . . . . 49.98 mm (1.9677 in)
Pump timing: 18° ± 1° B.T.D.C., cylinder No. 1 in compression stroke.
External timing mark degree position with respect to shaft key (on tool **290757**) . . . . . 253° ± 30'
Delivery connection of cylinder No. 1: Marked with letter X.



Governor Spring Attachment Position on Control Arm 1 and 3.

TEST PLAN

HARTRIDGE test machine: 1100 - 875-800 with BDN 12 SD 12 (*) spray nozzles.

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.

Nozzle opening pressure . . . . . 175 to 183 bar . . . . . (178 to 187 kg/cm², 2357 to 2653 psi)
Pipes . . . . . 2x6x845 mm
Graduate emptying time . . . . . 30 seconds
Calibration fluid . . . . . FIAT CFB at 40 ± 2° C
Fuel pressure . . . . . 0.15 bar (0.15 kg/cm², 2.2 psi)

Test No.	Lever position L_1 = Throttle L_2 = Shut-off	Speed rpm	Transfer pressure bar (kg/cm²)	Advance degree	Injector delivery cm³/1000 shots	Spread cm³/1000 shots	Back leakage cm³/1000 shots
1 (1) - 2	L_1 = Full L_2 = Out	100	⩾0,8	–	–	–	–
3		1250	5,1 to 6,1	–	–	–	–
4 (2)		800	–	5,8 to 6,3	–	–	–
5		1050	–	7,8 to 8,3	–	–	–
6 - 7		800	–	–	52 to 53 (7)	⩽4	3 to 50
8		100	–	–	⩾40 (7)	–	–
9	L_1 = Full L_2 = In	200	–	–	⩽2,5	–	–
10 (3)	L_1 = Idle L_2 = Out	200	–	–	⩽4	–	–
11 (4)	L_1 = Full L_2 = Out	1250	–	–	–	–	–
12 (5)		1340	–	–	7,5	–	–
13 (6)		1250	–	–	–	–	–

Adjust no-load governed speed on engine.
(1) Delivery to all injectors.
(2) If necessary, shim up to 3 mm. Do not remove 0.5 mm shim positioned in spring seat on piston.
(3) Idle adjusting screw fully backed off.
(4) Check average delivery.
(5) Max spread: 12.5 cm³/1000 shots. Tighten screw.
(6) Delivery must not be less than of test No. 11, 2.0 cm³/1000 shots allowed.
(7) Read after 15 seconds.
(*) In case of dispute only the values measured with Hartridge machines are to be considered.

MODEL 955 C – CALIBRATION DATA - BOSCH INJECTION PUMP TYPE VE 5/11 F 1250 R 58 – 4749797

ASSEMBLY DATA

Direction of rotation (drive end).....Clockwise

Firing order.....1-2-4-5-3

Plunger lift to spill cut-off.... 0.20 mm (.0079 in)

Pump timing: 8° ± 1° B.T.D.C., cylinder No. 1 in compression stroke.

Delivery connection to cylinder No. 1: Marked with letter A.

TEST PLAN

BOSCH test machine with WSF 2044/4 X injector springs and EFEP 182 spray nozzles.
RABOTTI test machine with FIAT **656829** injector springs and EFEP 182 spray nozzles.
Nozzle opening pressure ..... 150 bar (153 kg/cm^2 or 2176 psi)
Pipes ..... 2x6x845 mm
Calibration fluid: FIAT CFB at 40 ± 2° C (for lower test temperature add. 0.25 cm/1000 shots to each degree).
Fuel pressure.....0.2 bar (0.2 kg/cm^2 or 2.9 psi)

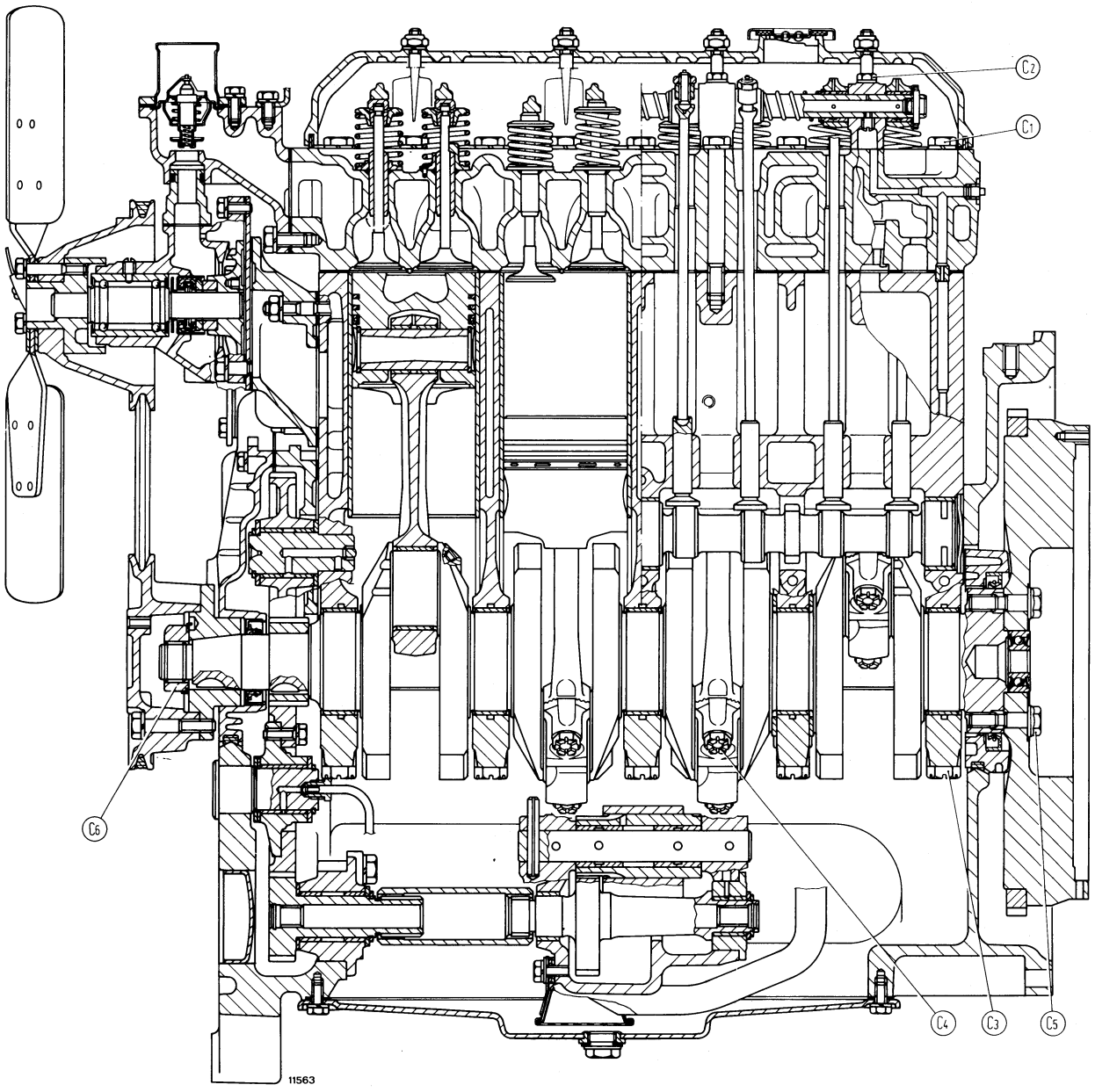
CALIBRATION DATA

Test No.	Lever position	Speed rpm	Transfer pressure kg/cm^2 /bar)	Advance piston stroke (*) mm	Injector delivery cm^3/1000 shots	Back leakage cm^3/1000 shots	Spread cm^3/1000 shots	Shut-off control activation voltage
1	max	500	–	1,5 to 2,1	–	–	–	12
2	max	800	–	3,7 to 4,3	–	–	–	12
3	max	1100	–	6,4 to 6,8	–	–	–	12
4	max	500	3 to 4	–	–	–	–	12
5	max	1000	5 to 6	–	–	–	–	12
6	max	1200	–	–	–	30 to 60	–	12
7	max	1400	–	–	0	–	–	12
8 ([1])	max	1325	–	–	30 to 36	–	–	12
9	max	1250 $\pm^{0}_{20}$	–	–	60,5 to 62,5	–	2,5	12
10 ([2])	max	900	–	–	64,5 to 66,5	–	–	12
11	max	500	–	–	55,5 to 58,5	–	–	12
12 ([3])	min	350	–	–	16 to 20	–	–	12
13	min	450	–	–	0	–	–	12
14	max	100	–	–	110 ± 5	–	–	12
15	max	200	–	–	52 ± 5	–	–	12
16	max	70	–	–	0	–	–	2,5

(*) Using tool **291751.**
([1]) Adjust max. speed screw.
([2]) Adjust max. fuel screw.
([3]) Adjust idling speed screw.

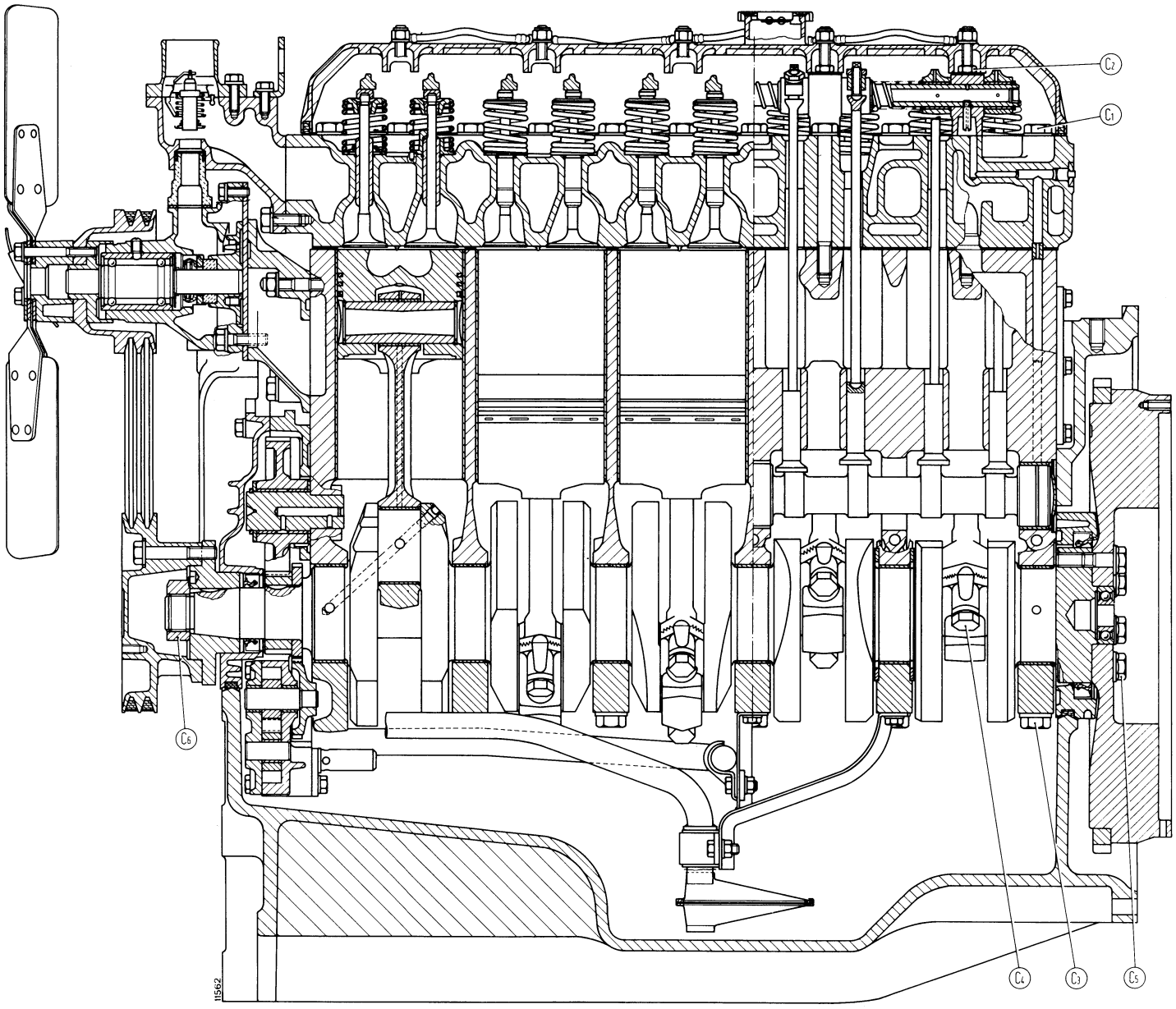
TIGHTENING TORQUE FIGURES

DESCRIPTION	Thread size	Torque		
		Nm	kgm	ft.lb
Engine Block and Cylinder Head - Valve Gear - Crank Gear - Section 10				
Screw, cylinder head (C_1, pages 15 and 16)	M 12 x 1.25	147	15	110
Screw, rocker arm bracket (C_2)	M 8 x 1.25	24	2.5	18
Screw, main bearing caps (C_3)	M 14 x 1.5	147	15	110
Screw, connecting rod caps (C_4)	M 12 x 1.25	108	11	80
Screw, engine flywheel (C_5)	M 12 x 1.25	118	12	87
Nut, hub to crankshaft (C_6)	M 30 x 1.5	294	30	215
Crank Gear - Section 103				
Screw, balancer housing to oil pan, 855C (C_8, page 5)	M 12 x 1.25	108	11	79
Fuel System - Section 104				
Nut, injection pump shaft gear:				
– BOSCH	M 12 x 1.75	64	6.5	47
– C.A.V.	9/16" 18 UNF	81	8.3	60
Nut, injection pump to support, 855C	M 8 x 1.25	24	2.5	18
Screw, injection pump to support, 955C	M 8 x 1.25	23	2.3	16.5



Longitudinal section through engine - 855C Tractors

ENGINE: Longitudinal Section



Longitudinal section through engine - 955C Tractors

Print No. **603.54.256.00** - *XI - 1986*

DESCRIPTION

FIAT engines installed on 855C and 955C crawler tractors are high-speed, 4-stroke, direct injection, in-line Diesel units.

Engine block - Single iron casting, dry sleeve, crankshaft, camshaft and valve tappet seats.

Cylinder head - Integral valve seats.

Valve gear - Pushrod operated overhead valves, helical gear driven camshaft.

Crank gear - Crankshaft running on 5 bearings (955C) or 6 bearings (955C), 3-ring light alloy pistons (one compression ring and two oil control rings).
On 855C tractors, a counterweight type engine balancer in the oil pan reduces engine and engine-induced vibrations.

The 955C tractor's five cylinder engine does not require a balancer.

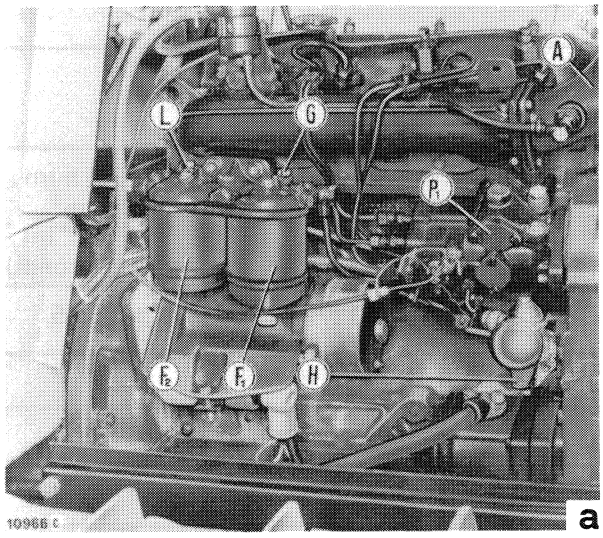
Air intake system - Through oil-bath or dry air cleaner.

Fuel system - Rotating distributor injection pump, three-orifice injectors.

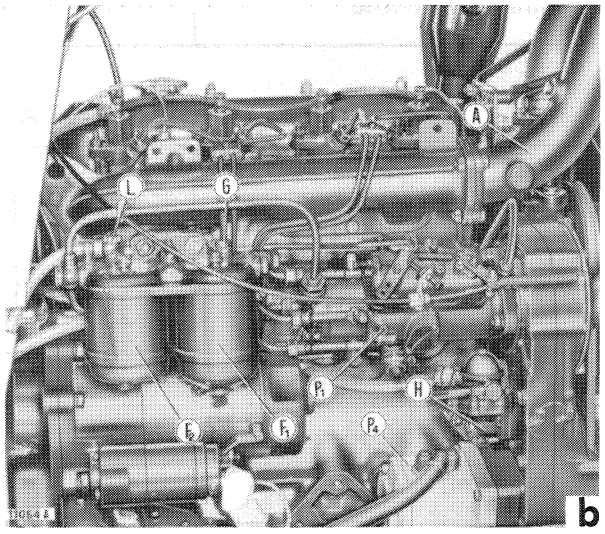
Lubrication system - Forced-feed, gear pump, full-flow oil filter and pressure relief valve.

Cooling system - Water, centrifugal pump, wax thermostat.

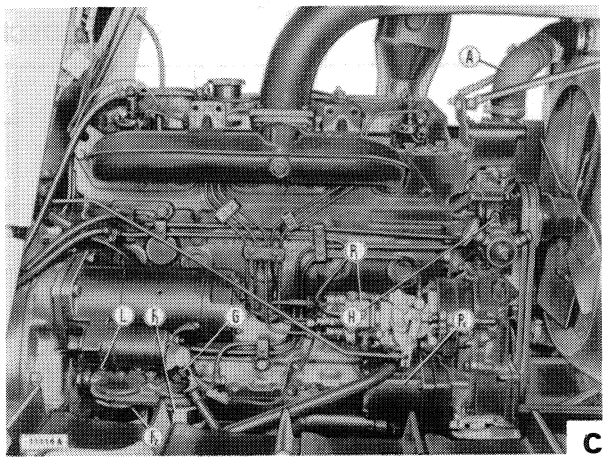
Engine starting - 12V, electromagnetically operated starter and thermostarter (optional).



a



b



c

RH side View of Engine

a. 855C with BOSCH injector pump - b. 855C with C.A.V. injection pump - c. 955C with BOSCH injection pump - A. Intake manifold - F_1. First stage fuel filter - F_2. Second stage fuel filter - G, L. Fuel bleed plugs - H. Fuel transfer pump priming lever - P_1. Distributor type fuel injection pump - P_4. Lift circuit hydraulic pump.

ENGINE: Performance Data

ON-BENCH PERFORMANCE DATA

Test plan

Engine without fan, air cleaner and exhaust silencer.
Barometric pressure 740 ± 5 mm Hg at 239 meters (785 ft) above sea level.
Ambient temperature: 20 ± 3° C.
R.H. 70%± 5.

Fuel density, 830 ± 10 g/l.

Pump timing, B.T.D.C. cylinder No. 1 on compression stroke:

- 855C — BOSCH pump . . . . . 13° ± 1°
  C.A.V. pump. . . . . 18° ± 1°
- 955C — BOSCH pump . . . . . 8° ± 1°

855C - BOSCH INJECTION PUMP

Throttle	rpm	kW		Time to burn 250 cm³ (15.25 cu. in) of fuel (seconds)
		2-hour run-in	50-hour run-in	
Maximum, full load	2500	⩾ 52 (°) (71 HP)	⩾ 53 (72 HP)	⩾ 55.5
Maximum, full torque	1400	⩾ 32 (°) (43.5 HP)	⩾ 33 (45 HP)	⩾ 92.8
Maximum, no-load	⩽ 2880	–	–	–
Minimum, no-load	650 to 700	–	–	–

855C - C.A.V. INJECTION PUMP

Throttle	rpm	kW		Time to burn 250 cm³ (15.25 cu. in) of fuel (seconds)
		2-hour run-in	50-hour run-in	
Maximum, full load	2500	⩾ 50.7 (°) (69 HP)	⩾ 53 (72 HP)	⩾ 55.5
Maximum, full torque	1400	⩾ 30.9 (°) (42 HP)	⩾ 32.4 (44 HP)	⩾ 94.3
Maximum, no-load	⩽ 2700	–	–	–
Minimum, no-load	650 to 700	–	–	–

955C - BOSCH INJECTION PUMP

Throttle	rpm	kW		Time to burn 250 cm³ (15.25 cu. in) of fuel (seconds)
		2-hour run-in	50-hour run-in	
Maximum, full load	2500	⩾ 64 (°) (87 HP)	⩾66.2 (90 HP)	⩾ 45.8
Maximum, full torque	1800	⩾ 50 (°) (68 HP)	⩾ 51.5 (70 HP)	⩾ 61.1
Maximum, no-load	⩽ 2740	–	–	–
Minimum, no-load	650 to 700	–	–	–

(°) Expected values.

COMPRESSION TEST

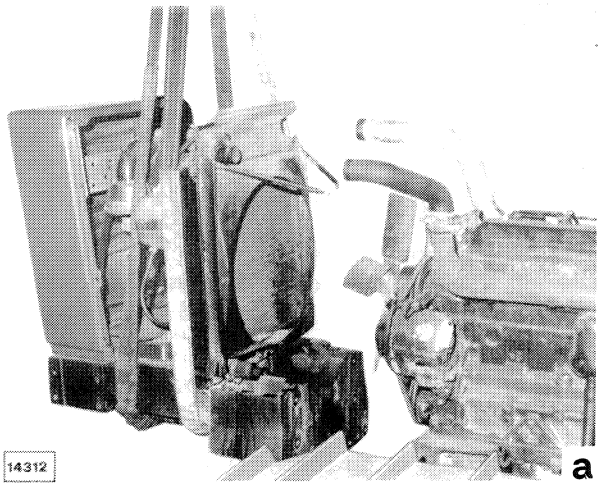
If engine performance is found to be unsatisfactory, check the injection system (nozzle and injection pump overhaul) and the compression in each cylinder.

⚠ DANGER ⚠

Highly flammable fluids. Do not use matches, cigarette lighters or other burning materials as a source of light.

To check engine compression use tester **291309** proceeding as follows:
- Remove the fuel injectors;
- Fit dummy injector **292631** in place of the injector of the cylinder under test, together with the associated copper washer;
- Hold the injection pump in shut-off condition and take the readings cranking the engine through the starter.

Compression should be 25.5 to 27.5 bar (26 to 28 kg/cm², 370 to 398 psi) as recorded at 40° C oil temperature, 760 mm Hg (sea level) barometric pressure with the engine running at 200 to 280 rpm. The minimum acceptable compression is 21.6 bar, 22 kg/cm² (330 psi).
The maximum compression differential between cylinders is not to exceed 3 kg/cm² (24.7 psi).
In this connection it should be noted that every 100 meters (328 ft) altitude increase from sea level results in approximately 1% decrease in compression.



Removing (installing) front suspension support.

Insufficient compression may be due to faulty valves and seats, pistons and associated rings, cylinder sleeves or cylinder head gaskets.

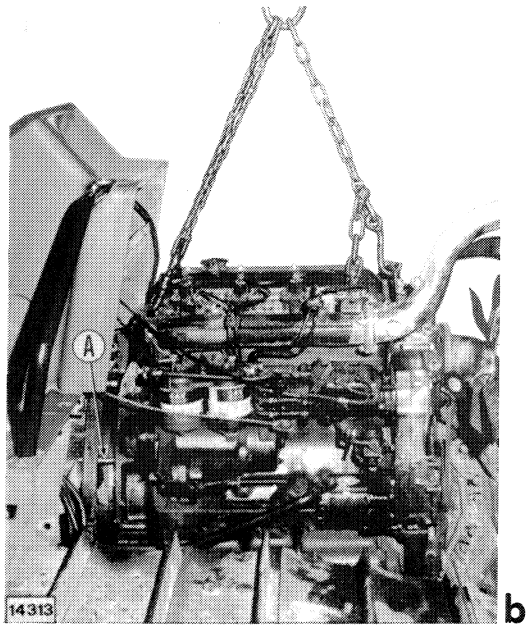
Note – The purpose of the compression test is merely to assess the consistency of compression in the cylinders and obtain an indication of the degree of wear affecting the parts which help to seal the combustion chambers, and the results should not be taken as an absolute indication of engine efficiency.

REMOVAL

⚠ CAUTION ⚠

Lift and handle all heavy parts by means of suitable lift. Ensure that assemblies or parts are supported by suitable slings and hooks. Ensure that no one is in the vicinity of load to be lifted.

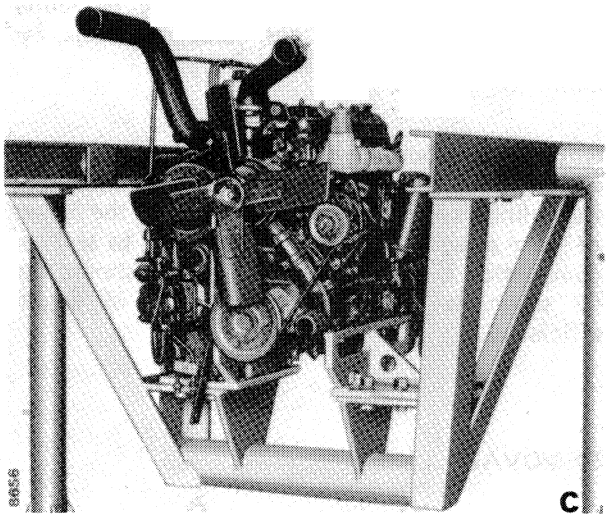
Remove hood side panel and muffler.
Drain engine coolant and clutch oil.
Disconnect the battery negative leads, the starter leads and the front light leads.
Remove the rubber hoses from radiator and intake manifold.



Removing (installing) engine using lift hook 290740/1.

A. Clutch and transmission drive shaft guide pins **292888**.

ENGINE: Removal - Installation



Engine in Position on Rotary Stand 290090.

Disconnect and remove hood top panel, side members and front ballast weight support.

Place a jack under the oil pan and attach a hoist to front suspension support (see figure **a**, page 3).

Remove the track frame braces. Using tools **292311** and **292927**, remove suspension pivot pin and withdraw leaf spring. Remove retaining screws and separate suspension support from engine block.

Disconnect fuel lines from transfer pump, second stage fuel filter and injector leakback.

Disconnect leads from alternator, engine and clutch oil pressure gauges and water temperature gauge.

Disconnect the tractormeter angle drive lead, throttle link and engine shut-off link from the injection pump. Drain remote control and lift oil tank and disconnect suction and delivery lines from hydraulic pump.

Note – Before proceeding further, check that clutch is engaged (lever forward).

Remove bottom cover from clutch housing. Take out screw (C_5, section 201, page 3) and free yoke (9) from associated control lever. Remove screw (C_7) and take out complete oil filter.

Remove yoke carrier from right hand side of housing.

Remove rear hood panel.

Place a support stand under the transmission housing.

Connect engine to a hoist through lift hook **290740/1** as shown in figure **b**, page 3.

Install guide pins **292888** in two diametrically opposed engine-clutch housing bolt holes. Remove remaining nuts and bolts.

Separate engine from clutch housing, taking care not to damage components.

Drain and remove oil pan. Secure engine to revolving stand **290090** through bracket **293002/2** (see figure **c**).

INSTALLATION

⚠ CAUTION ⚠

Use suitable tools to align holes.
NEVER USE FINGERS OR HANDS.

Reverse the removal procedure and note the following points:

- Lubricate sliding sleeve (16, section 201, page 3) and clutch release lever pivots.
- Before assembling engine and clutch housing, apply jointing compound to mating surfaces as directed in section A, page 5 and shown on page 2, section 201.
- Fill filter canister with oil.
- Strictly adhere to the specified tightening torque figures (see section 10, page 14 and section 20, pages 7 and 8).

CYLINDER SLEEVES

To inspect for wear proceed as follows:

- Measure the sleeve 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 sleeve ovality and taper.

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

If ovality or taper in excess of .12 mm (.0048 in), or piston working clearance in excess of .3 mm (.012 in) is detected, rebore (or replace) the sleeves to the oversize values envisaged (see page 1, Section 10). After machining, check the size by taking 2 dial gauge readings at right angles (a and b) and at 3 depths (1, 2 and 3).

Subsequently, fit replacement pistons of suitable size and weight (see pages 3 and 4, section 10).

For sleeve removal and installation, do not heat sleeves, use a suitable press and proceed as follows:

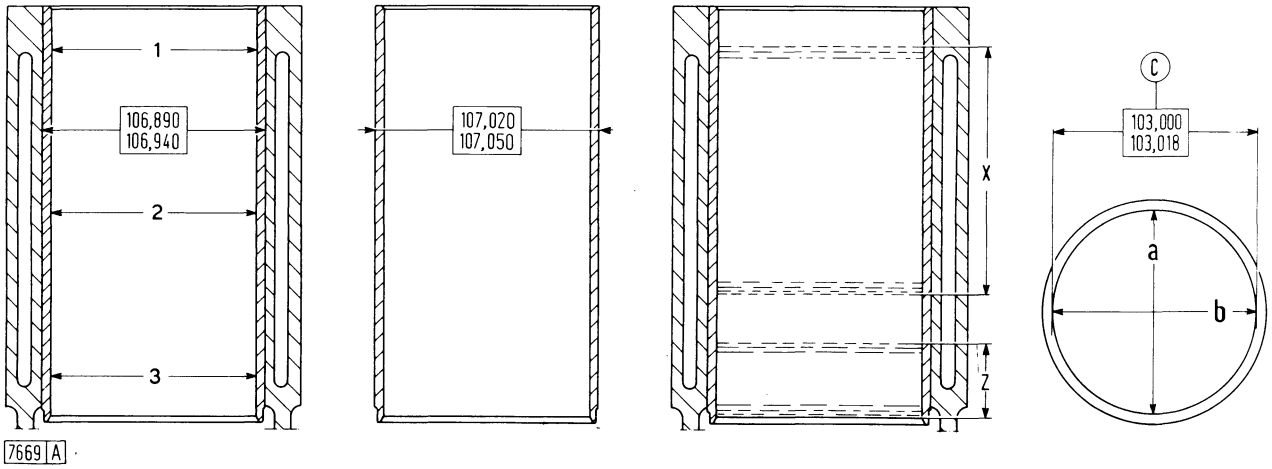
- Withdraw the worn sleeve from the bottom of the engine block using plate **293349.**
- Check engine block bore ovality and if necessary rebore to 0.2 mm (0,008 in) oversize.
- Press a new sleeve (0.2 mm oversize if necessary) from the top of the block using plate **291501.**
- Skim the sleeve to the specified diameter.

CYLINDER HEAD

The cylinder head face may be skimmed if necessary, removing not more than 0.5 mm (0.02 in).

After skimming, check that fuel injector stand-out is as specified in the illustration (see page 2). If stand-out is more than 1.8 mm (0.071 in) install a washer of suitable thickness in injector seat.

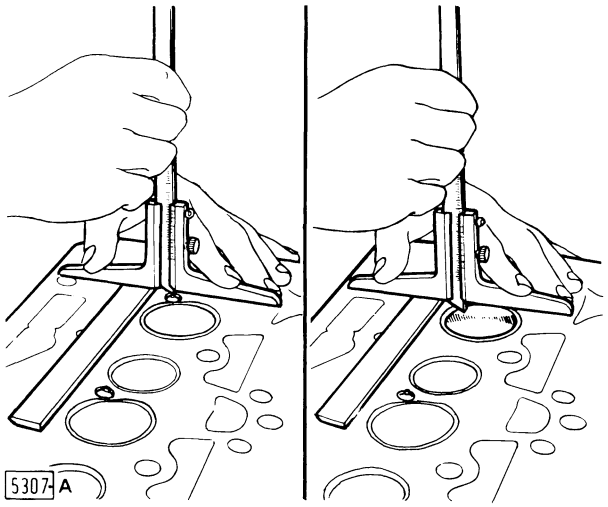
Note — When replacing sleeves or disassembling injectors, dress injector sealing face using cutter **293748** and bushing **293746** from kit **293742/1** and proceeding as directed in Service Bulletin 4/79. After dressing, check that valve stand-in does not exceed specified limit.



Sleeve and Block Inspection Data.

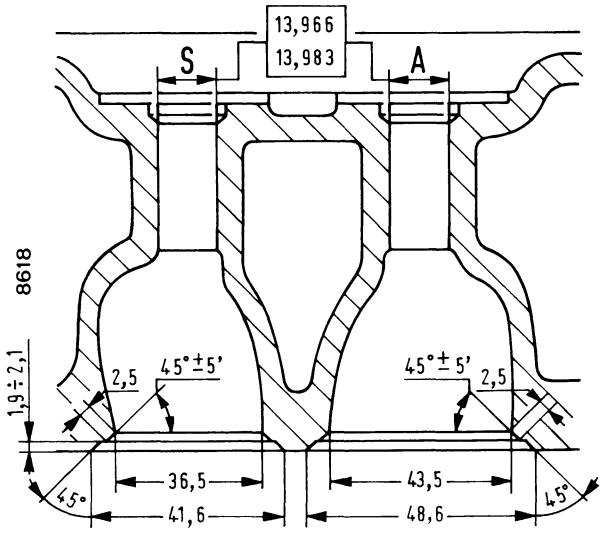
a, b. Sleeve bore measurements at right angles - C. Sleeve fitted bore diameter - S. Stand-out shims - Z. Sleeve wear inspection length for assessment of piston fit on plane b at right angles to crankshaft - X. Sleeve wear inspection length (swept area) for assessment of ovality and taper on planes a and b - 1, 2, 3. New or re-bored sleeve bore measuring depth on planes a and b.

ENGINE: Cylinder Head



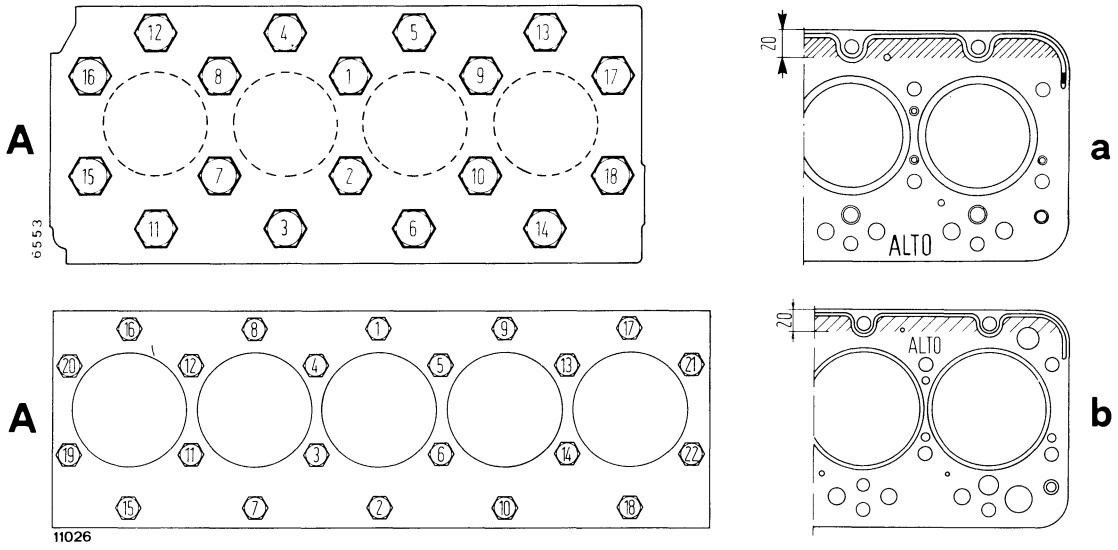
Checking Fuel Injector Stand-out and Valve Stand-in

a. Injector stand-out 1 to 1.5 mm (0.039 to 0.059 in) (Max. stand-out 1.8 mm 0.071 in) - b. Valve stand-in 0.7 to 1.1 mm (0.028 to 0.044 in) (Max. stand-in 1.4 mm - 0.055 in)



Valve Seat and Guide Housing Dimensions

A. Intake - B. Exhaust.



Cylinder Head Tightening Diagram and Scrap View of Head Gasket.

a. Model 855C - b. Model 955C - A = Fan side

When installing the cylinder head, throughly clean the mating surface and reposition the head gasket (provided with adhesive face) on the block with the mark "ALTO" facing towards the cylinder head. Position the cylinder head and tighten the hold-down bolts to the correct torque in the order shown.

NOTE

– Shaded area on gasket detail indicates adhesive surface.

– Cylinder head hold-down bolts are to be tightened in 3 successive stages as shown in the table below.

Stage	Nm	kgm	lb ft
1st	49	5	36
2nd	98	10	72
3rd	147	15	108

CAMSHAFT

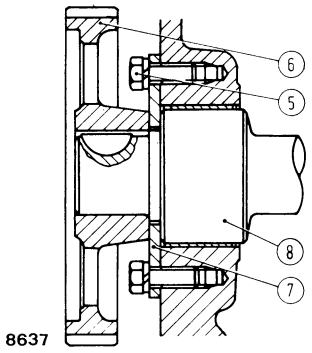
To remove the camshaft back off screws (5) securing thrust plate (7).

To inspect, place the camshaft over V-blocks and check journal eccentricity using a suitable dial gauge. Maximum allowance is 0.02 mm (0.0008 in).

To straighten the camshaft use a press for up to 0.2 mm (0.008 in) distortion. If distortion exceeds 0.2 mm (0.008 in), replace the camshaft.

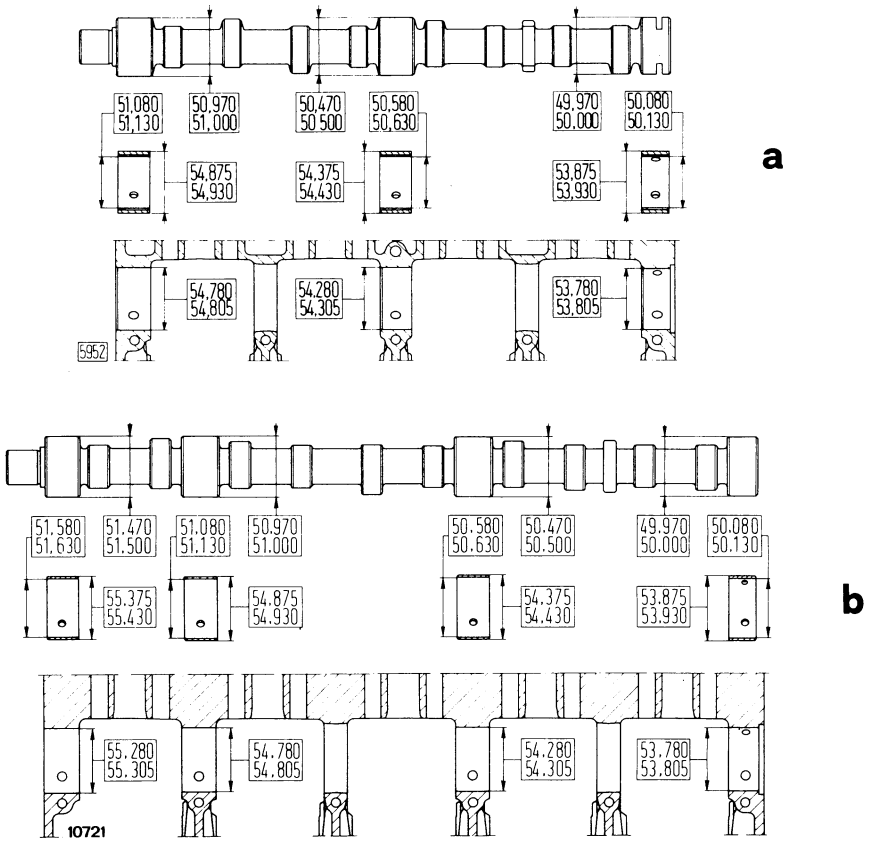
Replace worn bushings using remover/replacer **292103 (IVECO 360383).**

After installation, the new bushing must be reamed to size shown in figure, using reamer **293269 (IVECO 390363).**



Section through Camshaft Drive.

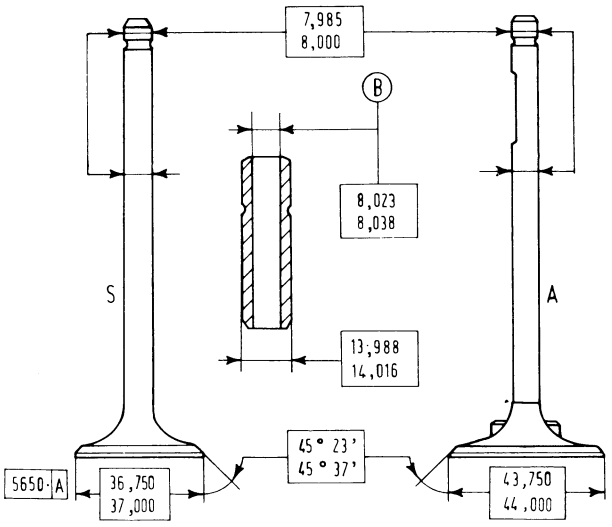
5. Retaining screw - 6. Drive gear - 7. Thrust plate - 8. Camshaft.



Camshaft, Journal and Housing Details.

Note - Bushing fitted I.D. given.
a. Model 855C - b. Model 955C.

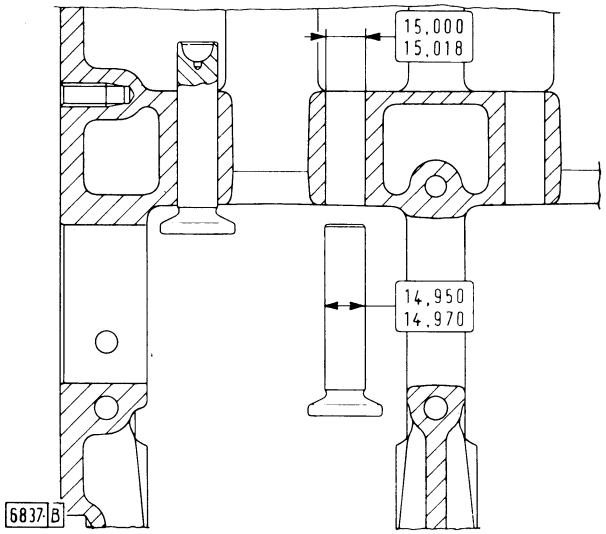
ENGINE: Valve Gear



Valve and Guide Details.

Note - Minimum land below head chamfer is .5 mm or .020 in.

A. Intake - B. Fitted diameter after reaming - S. Exhaust.



Tappet and Housing Details.

VALVES, GUIDES AND SPRINGS

To remove and install the valves use tool **291050.**

If sealing is defective grind valves together with seats using air grinder **290064** or hand grinder **290891**. If necessary, re-cut the valve seats as directed in the appropriate section and grind the valves.

After grinding, check that the minimum land below valve head chamfer is not less than 0.5 mm (0.020 in).

To remove and install the valve guides, use driver **291046/1.**

Valve guides should be a drive fit in their housings. If loose, they should be renewed without hesitation using oversize guides.

After installation each guide should be reamed with tool **291177.**

TAPPETS, PUSHRODS AND ROCKER ARMS

Ensure that the tappets slide smoothly in their housing without excessive clearance.

If excessive clearance is detected, replace with oversize tappets and open out the associated housing bores.

The pushrod should be perfectly straight and the rocker arm screw seat should not show signs of pick-up or undue wear. Replace as necessary.

Prior to removing the rocker arm end brackets take off the bracket-to-shaft retaining screw.

Inspect the rocker arm and screw working surfaces. When dressing becomes necessary, remove as little material as possible.

Valve Clearance Adjustment

Check the valve clearance using a suitable feeler gauge. For the correct clearance see the table on page 7, section 10.

To adjust, use wrench **291883**, working on each cylinder with the valves of the opposite cylinder in a condition of balance (i.e. start of intake stroke). Cylinder matching is as follows:

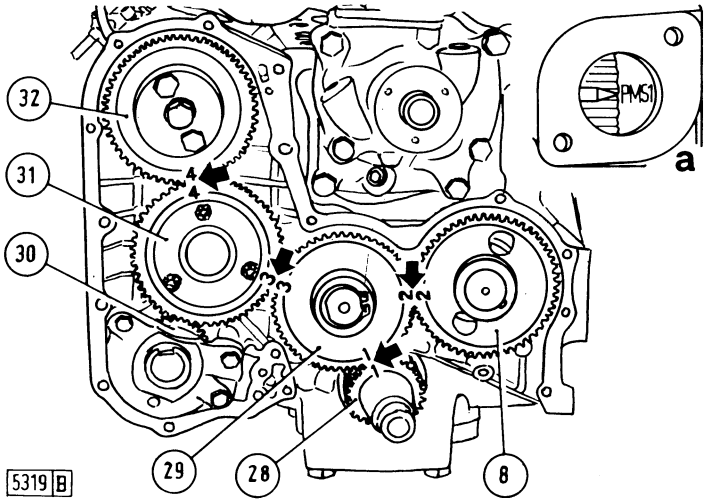
– 855C: 1-4, 3-2, 4-1, 2-3.

– 955C: 1-5, 2-3, 4-1, 5-2, 3-4.

VALVE TIMING GEAR TRAIN

For valve timing, proceed as follows:
– Turn the crankshaft to bring piston No. 1 to T.D.C. position on compression stroke.
– Install the drive gears and align as indicated.

To check that valve opening and closing angles are as specified on page 2, section 00, first adjust valve clearance provisionally to 0.45 mm or 0.018 in.



Valve Timing.

Note - Arrows point to timing marks to line up with piston No. 1 at T.D.C. on compression stroke (insert a).

a. Flywheel timing mark and pointer - 8. Camshaft gear - 28. Crankshaft pinion - 29. Idler gear - 30. Hydraulic pump gear - 31. Fuel transfer pump drive gear - 32. Injection pump drive gear.

CRANKSHAFT

Remove the pulley hub using tool **291504.**

Carefully inspect the crankshaft. Remember that even the slightest crack necessitates crankshaft replacement.

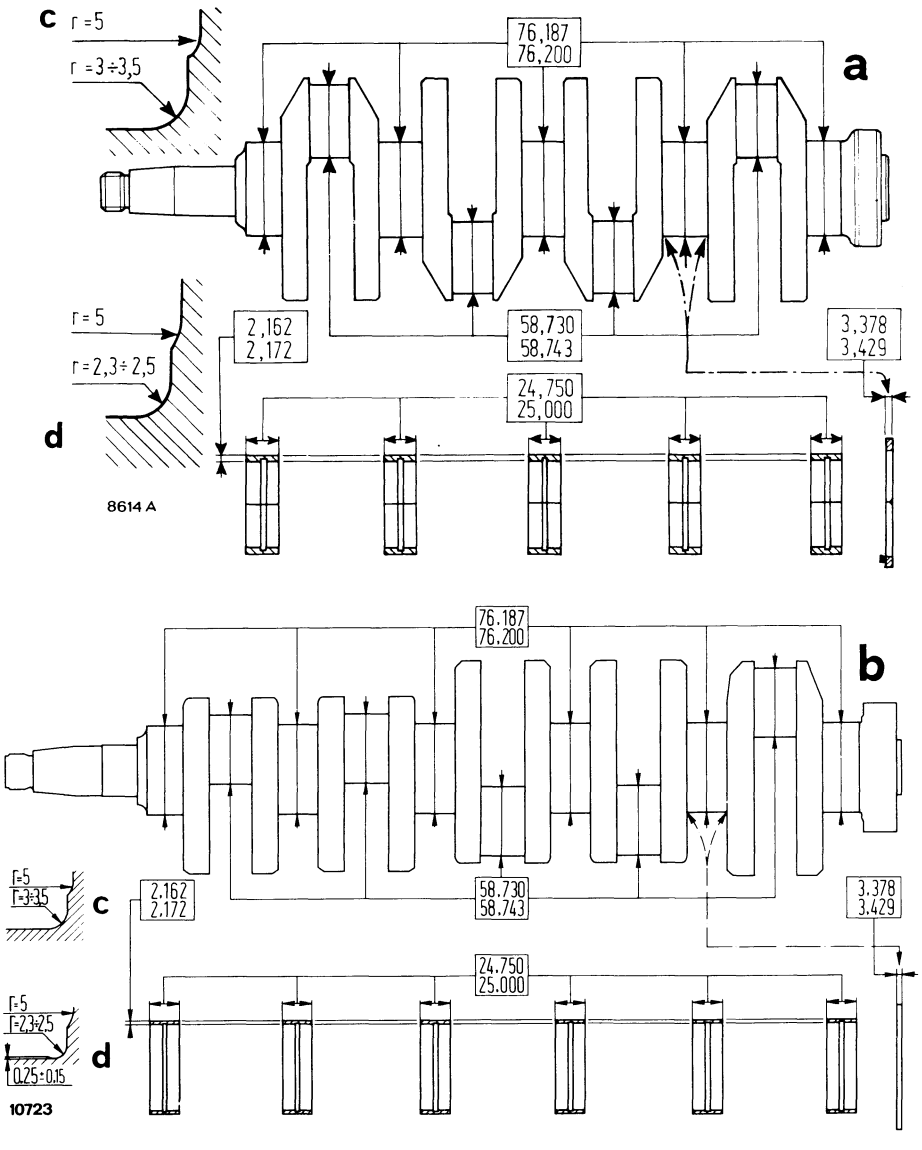
Check both main journals and connecting rod journals noting the following points:

- Pick-up and scratch marks may be remedied using extra-fine emery paper.
- Score marks, ovality and taper in excess of 0.05 mm (0.002 in), necessitate journal dressing to the nearest undersize dimension (see table).

After dressing blend the journal fillet radii as shown in (a) and (b), and inspect the crankshaft to ensure that:

- Journal ovality does not exceed 0.008 mm (0.0003 in).
- Journal taper does not exceed 0.01 mm (0.0004 in).
- Maximum main journal misalignment with the shaft over V-blocks does not exceed 0.10 mm or 0.004 in (D, page 2).
- Maximum misalignment of each pair of con rod journals with respect to main journals does not exceed ± 0.25 mm (± 0.010 in) (a, page 2).
- The distance from top of con rod journal to crankshaft centerline does not exceed ± 0.10 mm (± 0.004 in).
- Run-out and eccentricity, as measured with the dial gauge stylus at (A) and (B) respectively, does not exceed the limits specified in the table on page 3, Section 10.

Check the core plugs for leakage with oil at 14.7 bar, 15 kg/cm², 230 psi. Replace core plugs as necessary, peen in position and recheck for leakage.



Crankshaft, Bearing and Thrust Washer Details.

a. 855C - b. 955C - c. Connecting rod journal fillet radius details - d. Main journal fillet radius details.

After installing the crankshaft and tightening the bearing caps, check the end float at the last but one cap. If play is excessive (see table, page 2, section 10) install oversize thrust washers.

Crankshaft Front and Rear Seals

Check the metal-caged, double-lip spring-loaded rubber seals (page 15 and 16, Section 10).

When replacing the seals note the following points:

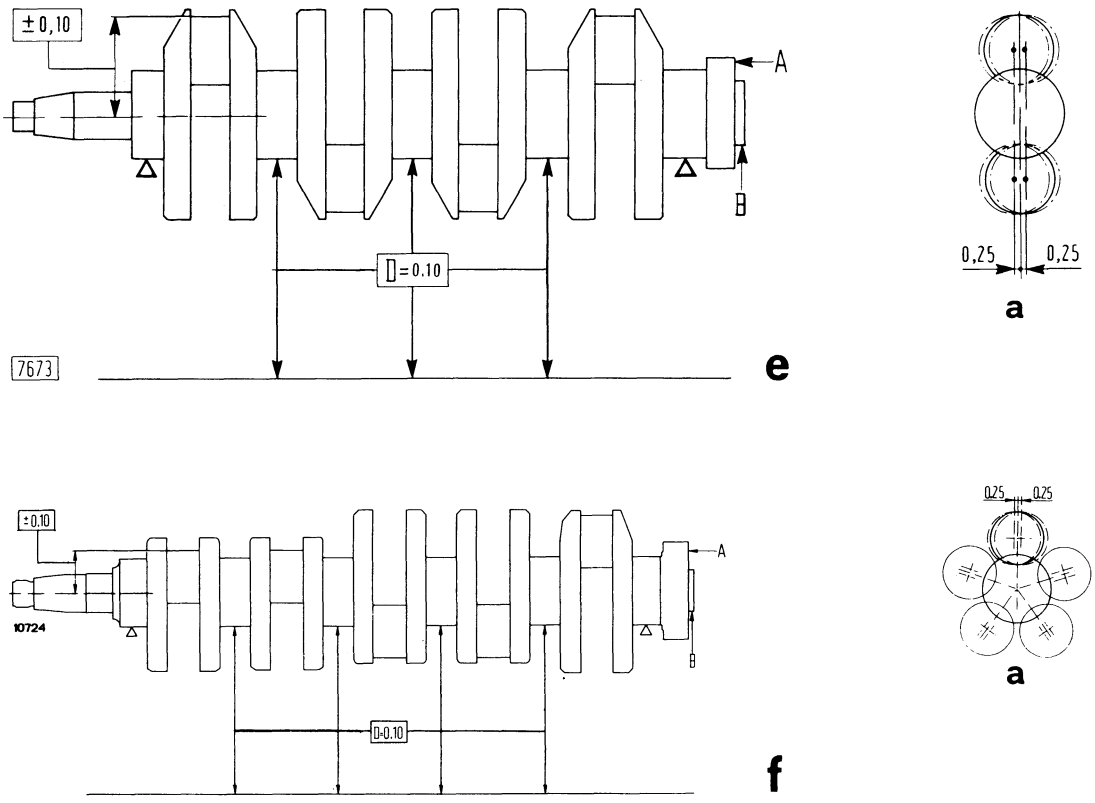
- Wipe off all traces of oil and thoroughly clean the seal seat.
- Soak the seal in engine oil for 30 minutes and install, applying a steady even pressure all round using a suitable drift.
- Smear the lips with a film of thick oil and pack the cavity with grease to prevent the seal from running dry when the engine is started for the first time.

MAIN AND CONNECTING ROD BEARINGS AND CAPS

The bearing caps with thin shell bearing inserts are numbered for correct installation.

The cap identification number should tally with that stamped on the engine block.

The crankshaft bearing running clearance may be checked using Perfect Circle Plastigage calibrated wire (page 3).



Checking Main Journal and Connecting Rod Journal Alignment.
a. Con rod journal to main journal maximum misalignment.

A and B. Stylus positions for flange run-out and eccentricity check - D. Maximum main journal misalignment - e. 855C - f. 955C.

PISTONS AND RINGS

Assess piston and sleeve wear as directed on page 1, Section 101 and in the figures on this page.

If the clearance is found to be in excess of 0.30 mm (0.012 in), rebore the sleeves and fit oversize pistons and rings (see table, pages 1 and 3, Section 10).

When replacing pistons, note that the weight difference between pistons of the same engine should not exceed 20 grams (2/3 oz).

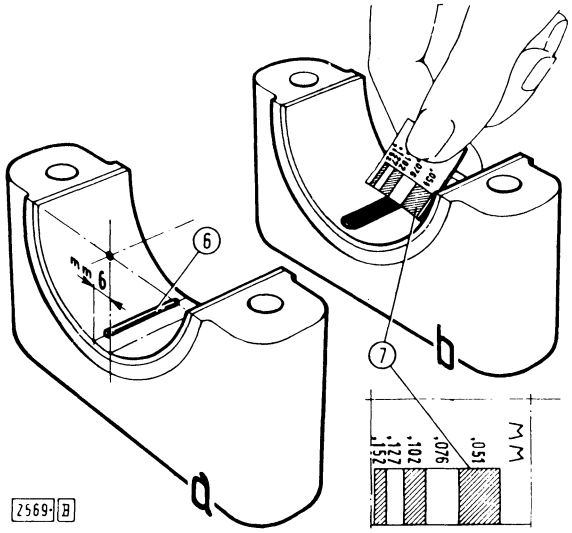
To remove and install piston rings use tool **292410.**

Check that ring side clearance (b) and fitted gap (c) do not exceed specified limits.

If the ring gap is found to be less than specified, grind the ring ends as necessary.

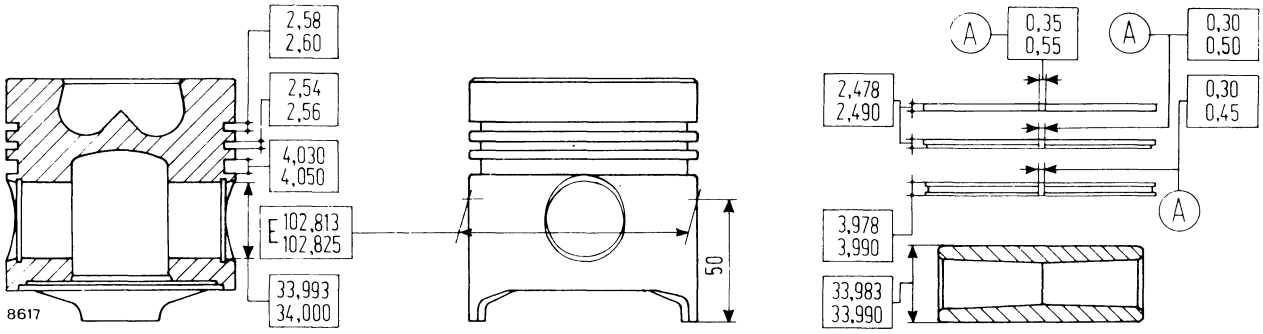
Install the rings in the order shown in figures on page 4.

When inserting the pistons in the cylinder sleeves ensure that the ring gaps are staggered at 180° from one another.



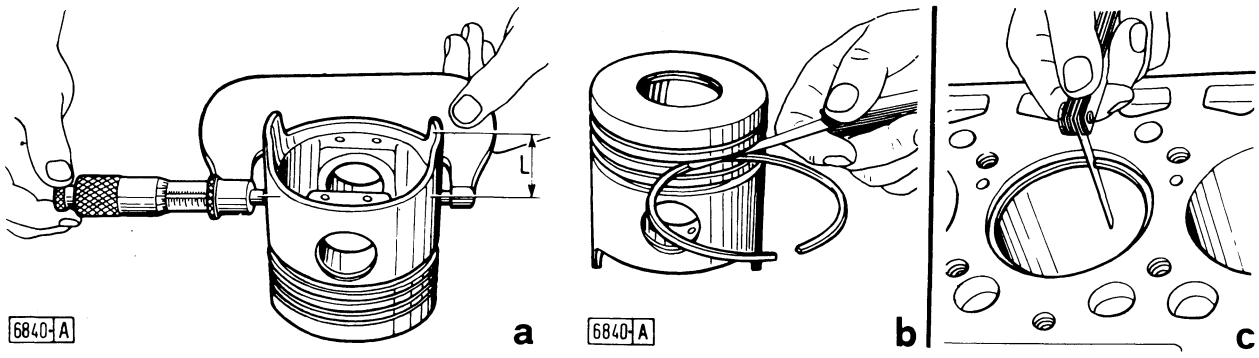
Checking Crankshaft Journal Running Clearance.

a. Calibrated wire in position on bearing cap - b. Comparing width of compressed calibrated wire with reference scale - 6. Calibrated wire - 7. Graduated scale printed on wire container.



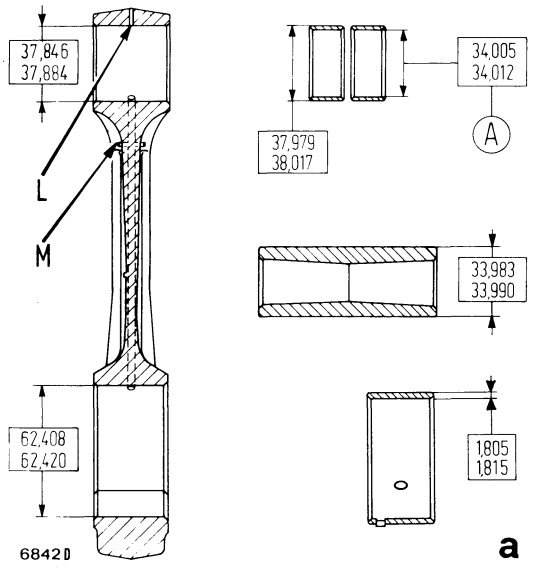
Piston, Pin and Ring Dimensions in mm.

A. Piston ring fitted gap - E. Piston diameter as measured 50 mm (2 in) from base of skirt.



Inspecting Pistons and Rings.

a. Measuring piston diameter at distance (L) from base of skirt - b. Measuring piston ring side clearance - c. Measuring piston ring gap - L. Measuring distance from skirt base, 50 mm (2 in).



Connecting Rod, Bearing, Bushing and Pin Details. Dimensions in mm.

A. Fitted dimension after reaming - L and M. Lubricant parts.

CONNECTING RODS

Check the piston pin bushings for looseness and displacement. They should be flush with connecting rod sides.

After press fitting, ream the bushings using a suitable expanding blade reamer.

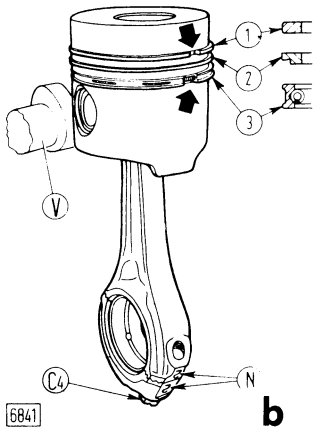
If necessary, the bushings and piston bosses may be opened out to the specified piston pin oversize (see table, page 4, Section 10).

Use gauge **293459** to check connecting rod axis alignment. Maximum misalignment of eye and head axis at 125 mm (5 in), away from the rod centerline should be as specified in the table. Any slight distortion may be remedied using a suitable press; however, if distortion is serious replace the connecting rod.

Replacement rods should be stamped with the reference numbers of the cylinder to which they belong. Also ensure that the weight difference between rods of the same engine does not exceed 25 grams (1 oz).

Ensure that the connecting rod lubricating ports (L and M, figure a) are unobstructed.

Note - When disassembling connecting rods, scrap and replace the cap capscrews.



Connecting rod/piston assembly in correct fitted position.

Note - Ring gaps arrowed (see text).

C4. Cap bolts - N. Cylinder reference - V. Camshaft - 1. Compression ring - 2. Oil control ring.

Connecting rod/piston installation

Introduce the pistons with attached rings and connecting rods in the associated sleeve, preferably using ring compressor **291048**, and position each assembly so that reference (N) on the connecting rods faces towards the side opposite the camshaft (V), as indicated in figure (b).

Installed piston T.D.C. stand-out from engine block should be 0.46 to 0.79 mm (0.018 to 0.031 in).

ENGINE BALANCER (855C TRACTORS)

Balancer Overhaul

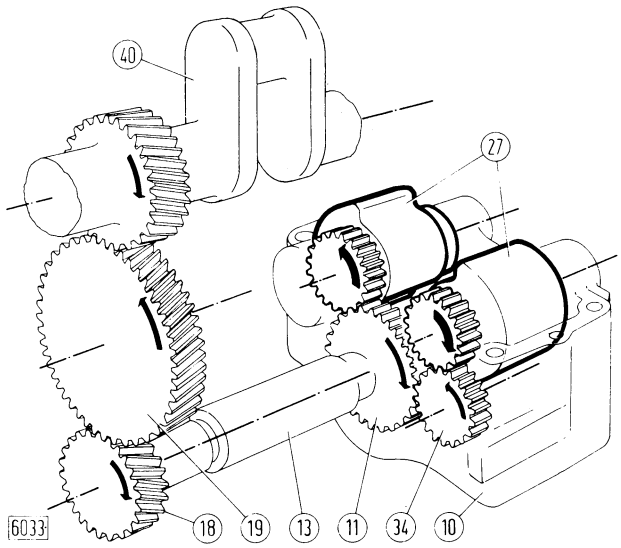
When removing the engine balancer note the following points:
- Drain the engine oil pan and remove the bottom cover.
- Take off the suction scoop, remove screws (C_8, and take off the counterweight assembly.
- If necessary, remove gear 18 with attached flange (16) withdrawing oil pipe (24) and capscrews (9).

To disassemble the counterweight assembly proceed as follows:
- Withdraw roll pins (25) and take off the weight carriers using a suitable driver.
- Remove flange retaining screws (7), retaining ring (30) and counterweight drive gear (11, page 6).
- Remove retaining ring (36) and idler gear (34).

Check for wear, replace any defective parts, ream the new bushing using expansion blade reamers **290001** and **291243.**

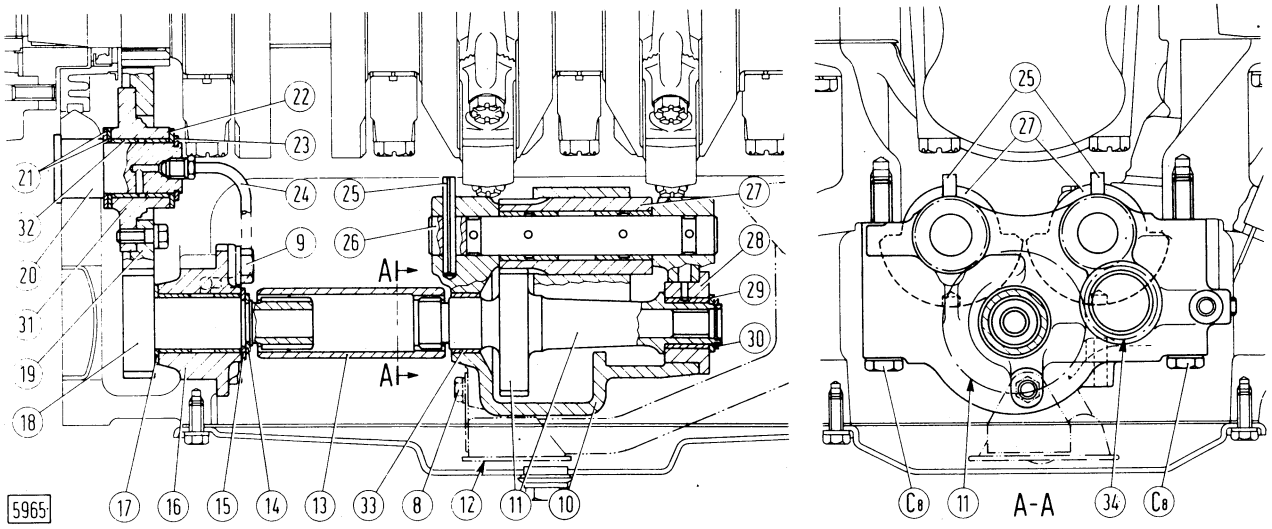
To install bushings, heat the weights in oil at 140° to 160° C.

When assembling parts, make sure that counterweight drive gear (11, page 6) and counterweight (27) are positioned so that all reference marks are as arrowed.



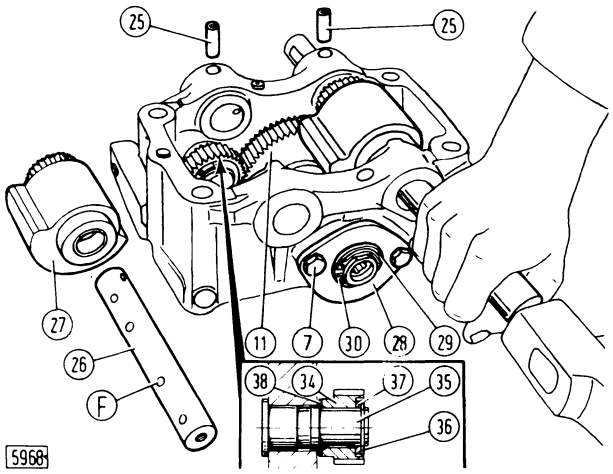
Engine Balancer Schematics (855C)

10. Housing - 11. Counterweight drive gear - 13. Sleeve - 18. Drive pinion - 19 Intermediate gear - 27. Counterweight - 34. Idler gear - 40. Crankshaft.



Section through Engine Balancer (855C)

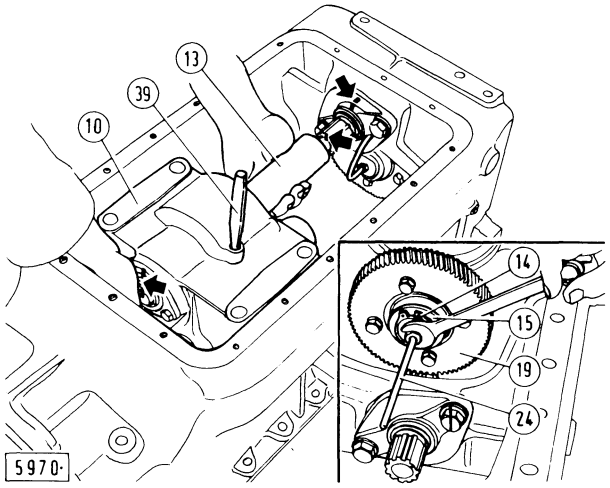
C_8. Counterweight housing capscrew - 8. Oil scoop capscrew - 9. Flange capscrew - 10 Housing - 11. Counterweight drive gear - 12. Oil scoop - 13. Sleeve - 14. Retaining ring - 15. Thrust washer - 16. Drive gear flange - 17. Thrust washer - 18. Drive pinion - 19. Intermediate gear - 20. Intermediate gear carrier - 21 Thrust washer - 22. Thrust washer - 23. Retaining ring - 24. Lubricating pipe - 25. Roll pin - 26. Counterweight carrier - 27. Counterweight - 28. Counterweight drive gear flange - 29. Thrust washer - 30. Retaining ring - 31. Intermediate gear flange - 32. Bushing - 33. Bushing - 34. Idler gear.



a

Removing Counterweight Carriers (855C)

a. Section through idler gear - F. Oil ports - 7. Flange capscrew - 11. Drive gear - 25. Roll pins -26. Counterweight carrier - 27. Counterweight - 28. Flange - 29. Thrust washer - 30. Retaining ring - 35. Idler gear carrier - 36. Retaining ring - 37. Thrust washer - 38. Thrust washer.



a

Installing Engine Balancer (10) with Sleeve (13) (855C).

(Timing marks arrowed)

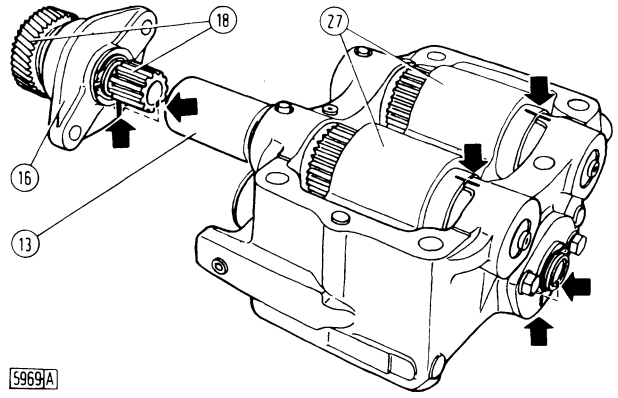
a. Installing oil pipe - 14 Retaining ring - 15. Thrust washer - 19. Intermediate gear - 39. Locking pin.

Note that:

- Idler gear (34) should be positioned with the longer end of hub facing towards the housing wall.
- Roll pin holes (26) in counterweight carriers should be aligned with associated holes in the housing.

When installing the counterweights, adjust timing as follows:

- Bring piston No. 1 to T.D.C. position.
- Secure drive pinion (18) to the oil pan, with the reference marks aligned as shown.
- Lock the counterweights in position with pin (39) and check reference mark alignment.
- Position sleeve (13) and tighten the capscrews to the specified torque.



Balancer Timing Marks (855C)

13. Sleeve - 16. Flange - 18. Drive pinion gear - 27. Counterweights.

FLYWHEEL

Flywheel is secured to crankshaft by means of self locking capscrews. Starter ring gear is shrunk on flywheel.

When replacing starter ring gear, heat in oil to 80-90° C and locate tooth chamfers facing inwards.

Flywheel capscrew holes are staggered to ensure correct flywheel positioning on crankshaft.

AIR CLEANER

Oil-bath air cleaner (standard equipment)

- Check oil level in cup at frequent intervals; oil should reach level mark (5).
- Change oil when it is found to be contaminated or when sludge in cup reaches a depth of around 1 cm or 1/2".
- Check that pre-cleaner and intake manifold pipe clamps are tight to prevent unfiltered air from being drawn into the engine.

Dry-type air cleaner (optional)

When the red restriction indicator on the dash-board lights up, remove air cleaner element (A) and clean as follows:

- with dry compressed air at less than 6.9 bar (7 kg/cm^2 or 100 psi), blowing from inside to outside, or
- wash in water and foamless detergent, rinse with running water at less than 2.9 bar (3 kg/cm^2 or 42 psi) pressure and dry with dry air at less than 50° C.

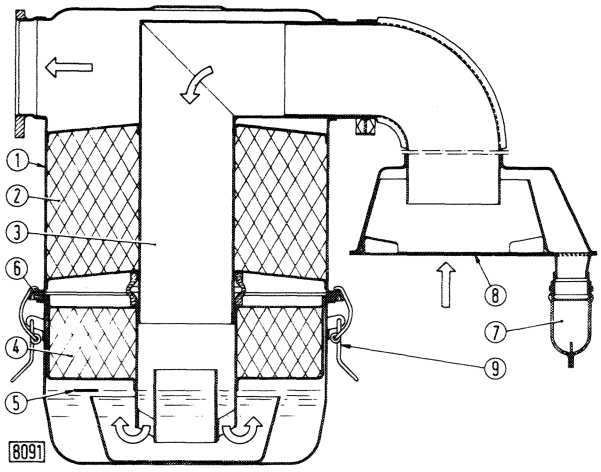
Moreover, note the following:

- never clean the element by striking against a hard surface;
- replace seal (B) if damaged;
- do not separate plastic fins from filter element body;
- clean sheet metal container interior using a damp cloth;
- do not wash or blow the inner element; replace after the outer element has been cleaned three times, or every 400 hours.

FUEL TANK

The fuel tank should be thoroughly cleaned whenever the tractor is overhauled.

Every 800 hours, remove the plug from the bottom of the rear fuel tank, raise the front of the tractor, and drain condensate and any sediment from the tank. This operation must be carried out with the tank almost empty and the engine off.



Section through Oil-Bath Air Cleaner.

1. Cleaner body - 2. Fixed filter element - 3. Air tube - 4. Removable filter element - 5. Level mark - 6. Seal - 7. Dust unloader - 8. Pre-cleaner - 9. Oil cup clips.

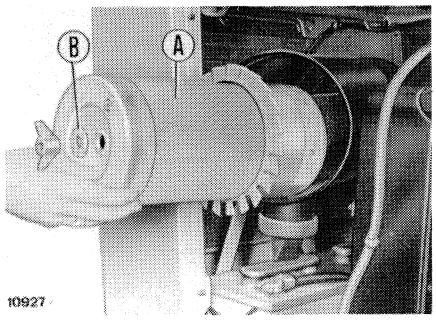
FUEL FILTERS

Every 50 hours, drain condensate from first-stage filter (F_1, page 1, Section 100) by backing off the associated screw through 3 or 4 turns and activating the fuel transfer pump.

Every 200 to 250 hours, change first-stage filter element (F_1). After four first-stage element changes, wait 40 to 50 hours and change second-stage filter (F_2).

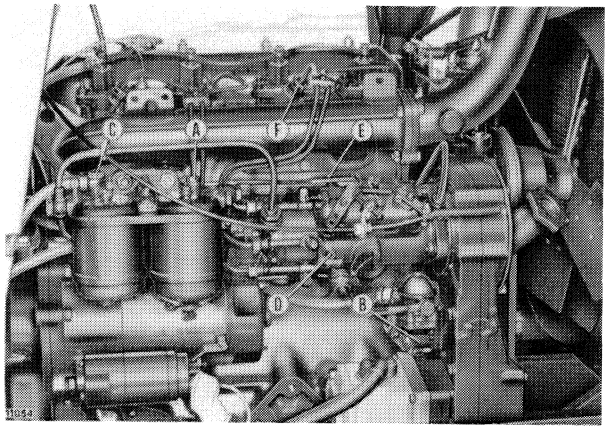
After servicing filters, bleed air from the fuel system as follows:

- for 855C tractors with C.A.V. injection pump, loosen plug **A** (figure a, page 2) two turns and pump hand primer lever **B** until a solid stream of fuel free of air bubbles flows from the opening in the plug. Tighten plug.

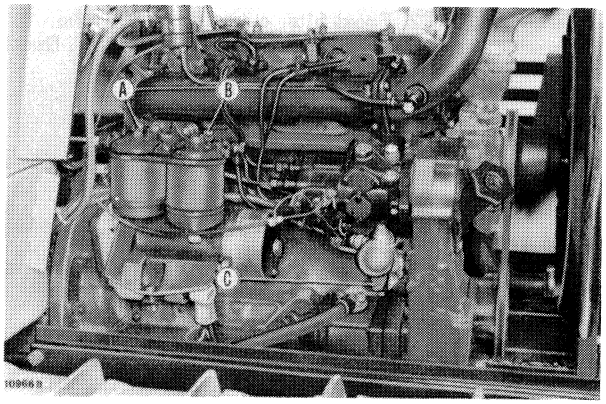


Dry-type Air Cleaner.

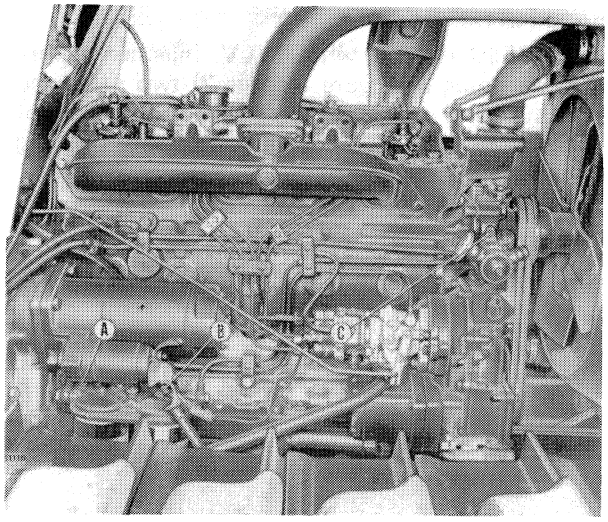
A. Outer filter element - B. Seal.



a



b



c

Bleeding air from fuel circuit.

a, b. 855C with C.A.V. (a) or BOSCH (b) injection pump - C. 955C - A, B, C, D, E and F. See text.

Repeat the above procedure on plug **C** and then on plug **D**.
Loosen screw **E** by approximately two turns, fully slacken connections **F** and crank the engine through the starter until fuel without air bubbles flows from the lines.
Tighten connections **F**, leaving screw **E** loose.
Start the engine and, when the fuel flowing from the screw is free from air bubbles, tighten screw **E**.

– For 855C tractors with BOSCH injection pump and for 955C tractors (figures **b** and **c** respectively), loosen plug **B** by two turns and pump hand primer lever **C** until a solid stream of fuel free of air bubbles flows from the opening in the plug.
Tighten plug **B**.
Bleed air from plug **A** in the same way.
After tightening the plug, pump lever **C** a few more times.

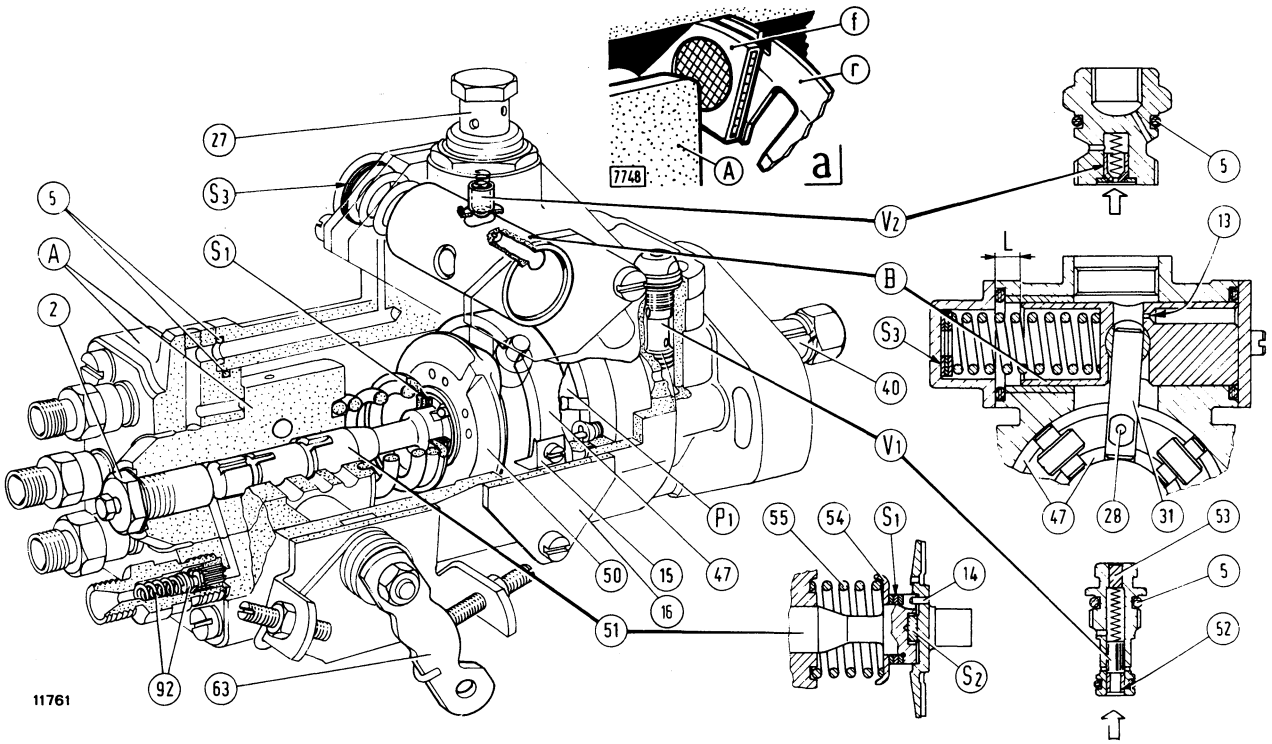
INTERNAL PUMP TIMING-BOSCH DISTRIBUTOR PUMP (855C)

Remove center plug (2, page 3) from hydraulic head and turn pump drive shaft until distributor rotor discharge passage is aligned with the delivery connector marked "A" corresponding to engine cylinder No. 1.

Install tool **290774** (Z) and extension **292551** (P) and zero the associated gauge **292197** (C) with the rotor in start of stroke position.

Remove side cover (16) for access to timing pointer (15) and slowly rotate the drive shaft clockwise until the rotor has moved 1 mm (.04 in).

Hold the shaft still and align pointer (15) to the cam ring mark applied in production.



Section through BOSCH injection pump.

a. Ring filter (f) and spring washer (r) inserted beween pump body and hydraulic head - A. Hydraulic head - B. Advance piston - L. Advance piston stroke - P_1. Transfer pump - S_1. Rotor spring preload shim - S_2. Spill cut-off shim - S_3. Advance spring preload shim - V_1. Pressure regulating valve - V_2. Overflow valve - 2. Center plug - 5. O-ring - 13. Fuel pressure feed to advance piston - 14. Rotor drive peg - 15. Timing pointer - 16. Pointer access cover - 27. Return connector - 28. Advance lever retaining pin - 31. Advance lever - 40. Pump drive shaft - 47. Roller carrier - 50. Cam ring - 51. Distributor rotor - 52. Regulating valve plunger retainer - 53. Regulating valve adjusting screw - 54. Spring cup - 55. Rotor spring - 63. Throttle lever - 92. Delivery valve.

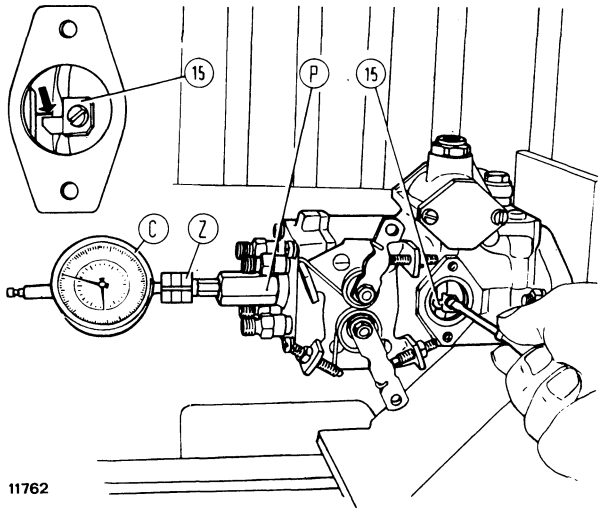
INTERNAL TIMING - C.A.V. DISTRIBUTOR PUMP

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** (R, page 5).

Connect the other end of the tool to hand pump **290284** (T) filled with **oliofiat CFB** oil, and operate the handpump until a 20.5 bar (30 kg/cm²) (427 psi) pressure is obtained.

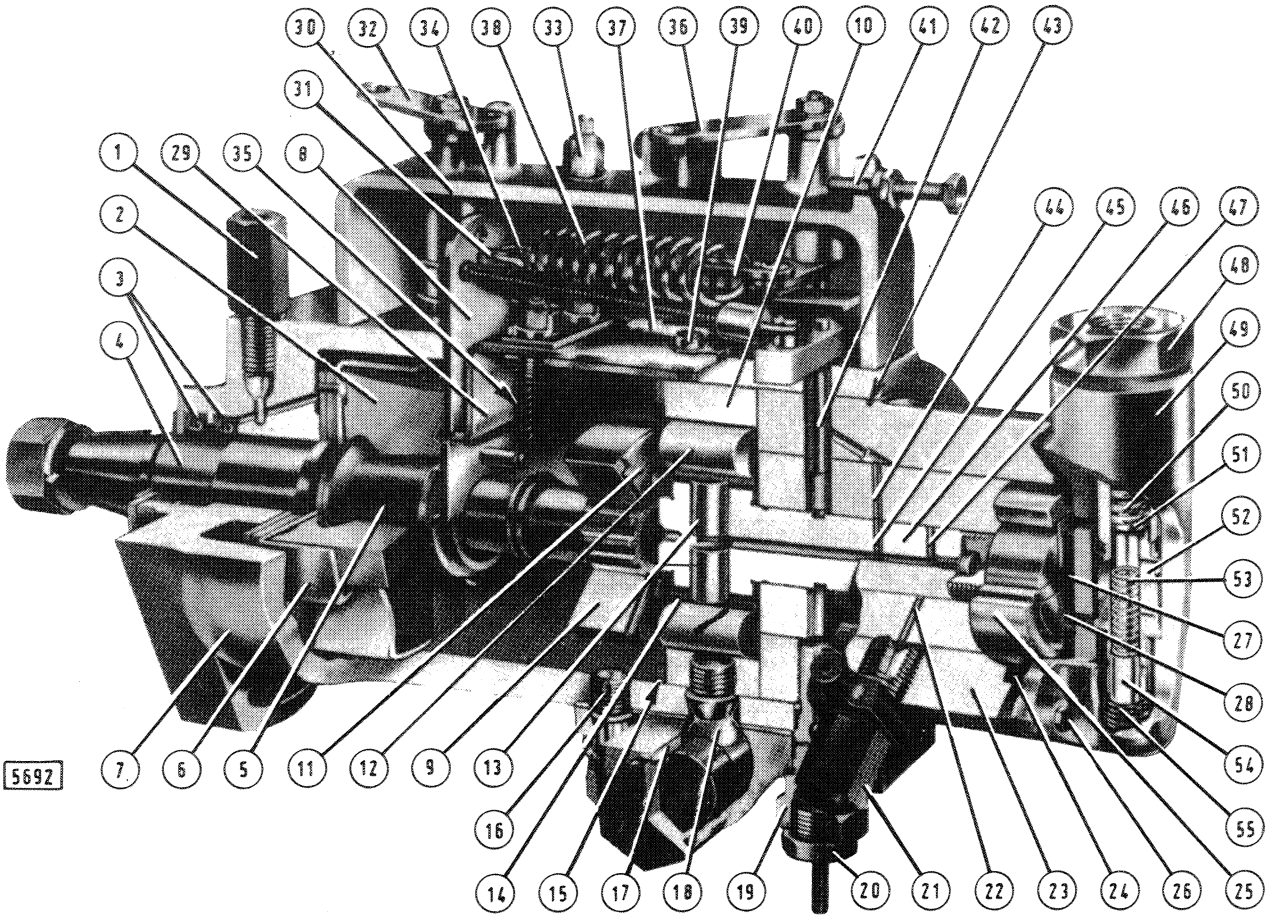
Do not exceed the specified pressure. Turn the pump drive shaft clockwise until a definite resistance is felt, indicating that the rollers are in contact with the cam ring lobes (spill cut-off).

Remove the cover plate and align the sharp timing edge of the circlip to reference line A stamped on the internally-splined drive flange (a, page 5).



Adjusting pump timing using tool 290774 (Z), extension 292551 (P) and gauge 292197 (C).

ENGINE:
Fuel system - Injection pump



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.

Hold the pump in the timed position, install flange marking tool **290757** (M) set to the degree position stated under "Assembly Data" to the pump drive shaft with attached key, and scribe a timing mark on the mounting flange.

INJECTION PUMP INSTALLATION AND EXTERNAL TIMING - BOSCH AND C.A.V. (855C)

Install injection pump to the engine according to the following instructions:

- smear flange gasket with jointing compound and place in position over the mounting flange;
- introduce the end of the pump drive shaft with attached bushing in the bore of drive gear and position the slots in the mounting flange over the retaining studs;
- align the reference marks on engine block and pump flange;
- tighten pump retaining nuts, reconnect fuel lines and bleed the system.

If external timing marks are missing or suspected

to be incorrect, check the timing as follows:

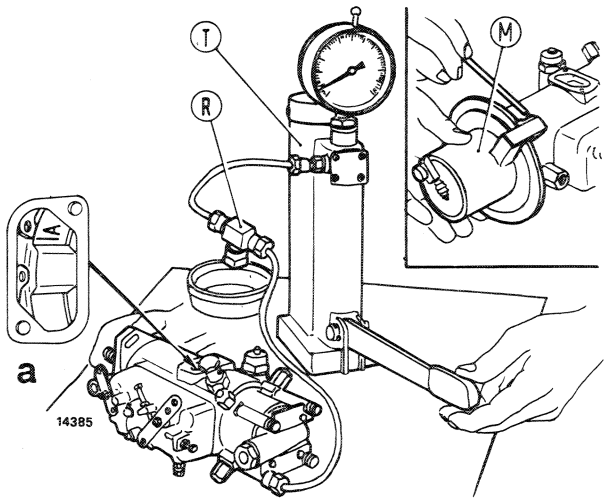
– remove cover plate, turn the flywheel and bring the cam ring timing mark in alignment with timing pointer (15, page 3) on BOSCH pumps, or letter "A" stamped on drive flange in alignment with the sharp timing edge of timing circlip on C.A.V. pumps.

As this timing position is equivalent to the point of commencement of injection (spill cut-off) in cylinder 1, check through bell housing aperture that the engine timing pointer is aligned to INIEZ. BOSCH or INIEZ. C.A.V. marks.

If adjustment is needed, slacken injection pump retaining nuts and turn both pump body and engine flywheel until correct alignment is obtained.

As a safeguard against possible valve timing errors, or incorrect injection pump installation, take off rocker cover and check that piston No. 1 is at the end of the compression stroke (i.e. valves closed).

Reapply the external timing marks on pump flange and engine block to facilitate subsequent pump timing.



Internal timing pump at 29.5 bar (30 kg/cm^2, or 47 psi) and applying external timing mark using tool 290757 (M).

a. Correct internal pump timing - T. Hand pump **290284** - R. Marking gauge tool **290755** with 30 kg/cm^2 relief valve (to be connected to hand pump and to injection pump delivery fitting marked "X".

BOSCH INJECTION PUMP INSTALLATION AND EXTERNAL TIMING (955C)

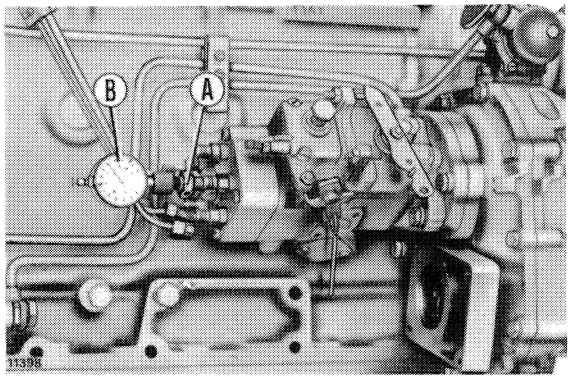
Install injection pump to the engine as follows:

– Place gasket in position between pump mounting flange and spacer, align the two reference marks and tighten screws.

– Insert shaft with associated toothed bushing and nut in drive gear and start spacer retaining screws.

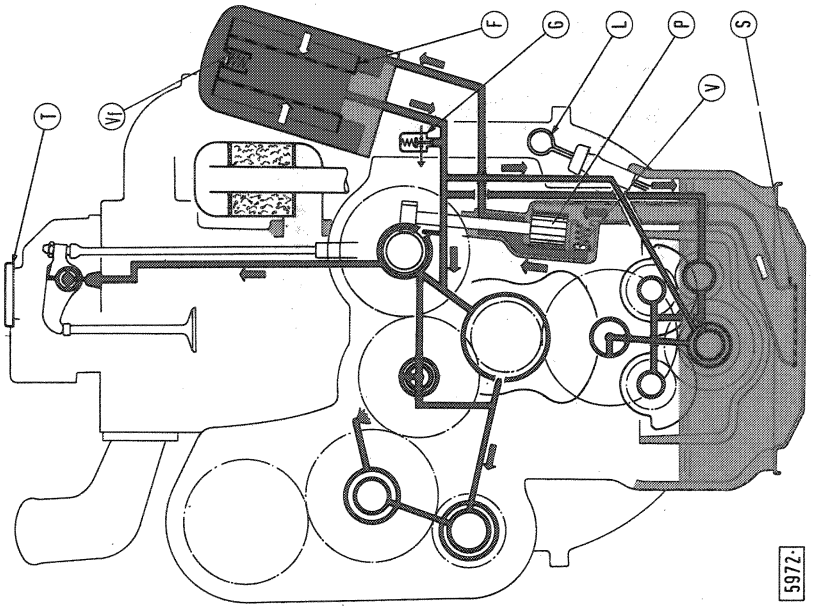
– Turn pump body until reference marks on engine block and spacer are aligned. Tighten retaining screws, reconnect fuel lines and bleed the system.

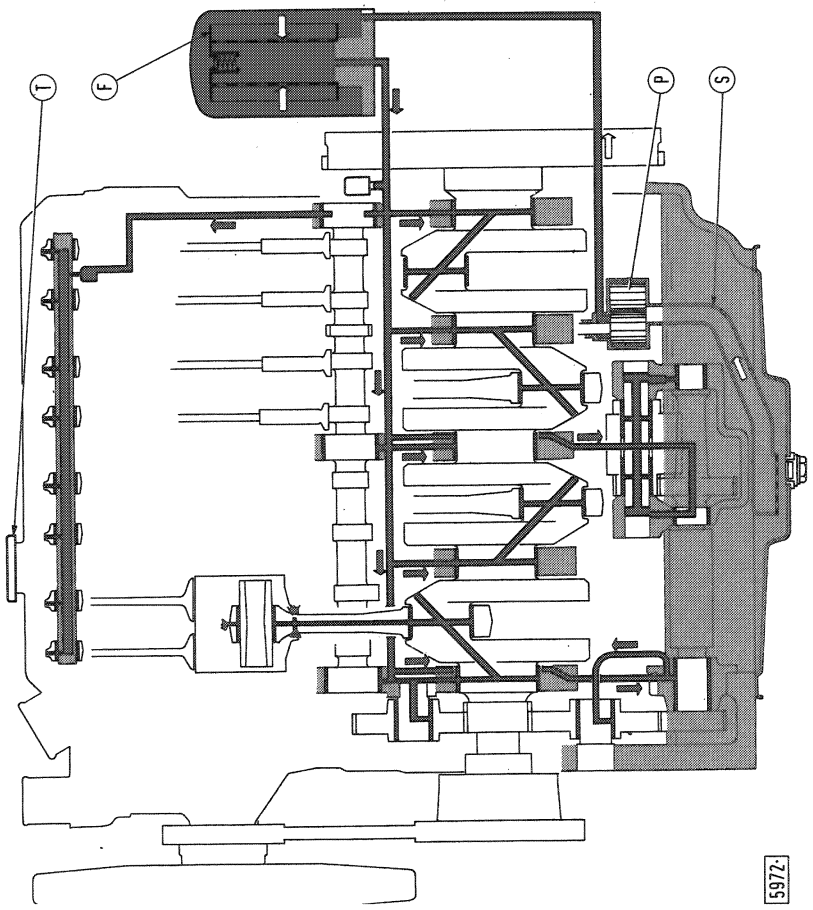
If external timing marks are missing or suspected to be incorrect, check the timing as follows:



Timing BOSCH injection pump on engine (955C)
A. Tool 291755 - B. Gauge 291754.

– Bring piston of cylinder No. 1 to end of compression stroke (valves closed) and turn flywheel counterclockwise as viewed from fan side until timing pointer is aligned with INIEZ. BOSCH mark.
– Remove plug (2, page 3) from pump and install tool **291755** (A, page 5) together with gauge **291754** (B), pre-loading shaft by around 2.5 mm or 0.098 in.
– Turn flywheel slowly back until plunger reaches spill cut-off, at which point the dial gauge pointer will cease to drop towards the pump.
– Zero dial gauge and turn flywheel slowly clockwise until timing pointer lines up with INIEZ. BOSCH. mark.
– Check that plunger stroke as read off dial gauge is 1 mm or 0.039 in.
If not, loosen pump or spacer retaining screws and turn pump counterclockwise (as viewed from pump drive side) to increase stroke, or clockwise to reduce stroke to specified value.
– Tighten retaining screws and reapply external timing marks on mounting flange and engine block to match mark on spacer.
– Reconnect fuel lines and bleed air from the circuit.

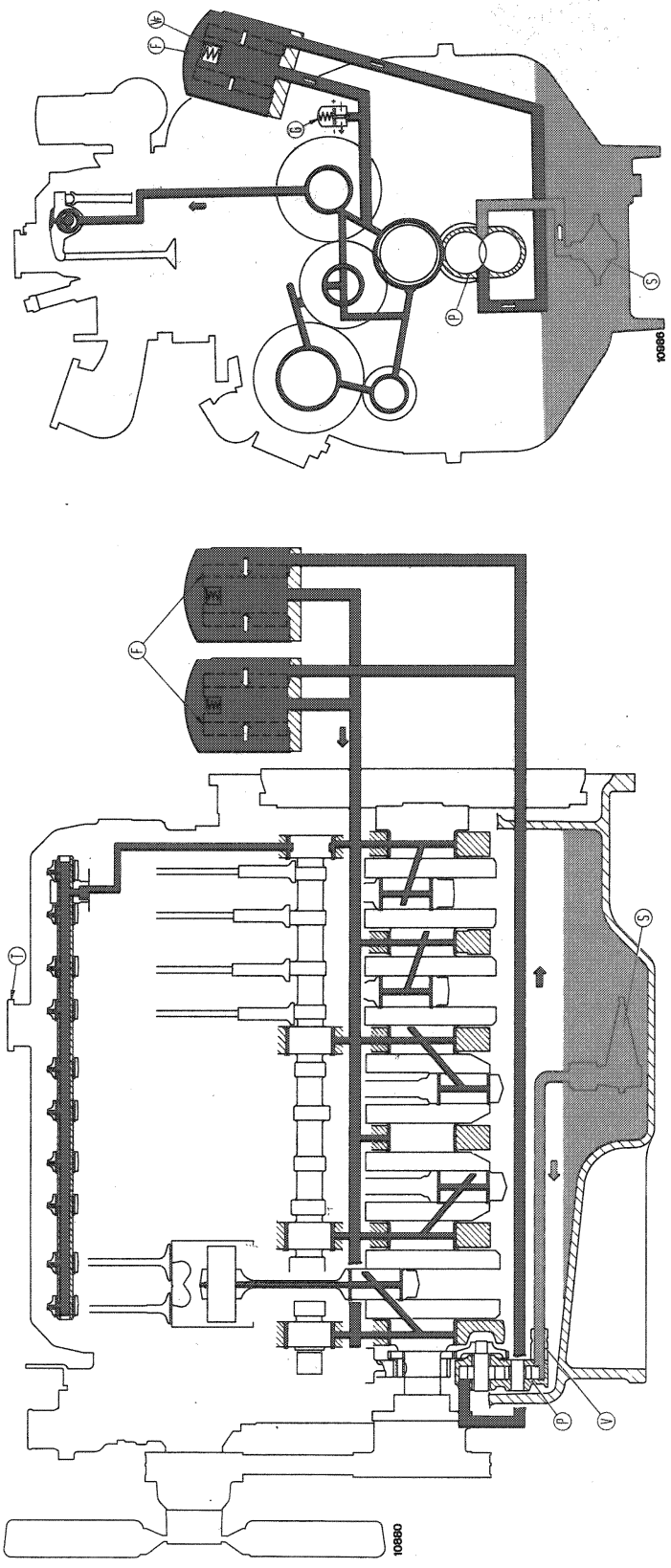




Lubrication System Diagram (855C)

F. Filter - G. Oil pressure sending unit - L. Dipstick - P. Pump - S. Suction filter - T. Oil filler cap - V. Relief valve - Vf. By-pass valve (cuts in when inlet pressure is 1.5 to 1.7 bar or 22 to 25 psi higher than outlet pressure).

ENGINE:
Lubrication system



Lubrication System Diagram (955C)

F. Filters - G. Oil pressure sending unit - P. Pump - S. Suction filter - T. Oil filler cap - V. Relief valve - Vf. Bypass valve (cuts in when inlet pressure is 1.5 to 1.7 bar or 22 to 25 psi higher than outlet pressure).

OIL PUMP

The oil pump is accessible after removing the engine oil pan.

In the course of overhaul, assess the amount of wear affecting the various components by comparison to the dimensions given in the table.

On 955C tractors, pump parts are not available and, if defective, the entire pump must be scrapped and replaced.

OIL FILTER

The paper element oil filter (F, pages 1 and 2) is a full-flow unit on the outlet side of the pump. Model 855C tractors feature a single filter, while 955C tractors have twin side-by-side filters.

A by-pass valve (Vf) will allow unfiltered oil to flow to the engine if the filter clogs.

Every 400 working hours, replace the filter element noting the following points:

- Smear the external seal with engine oil.
- Install the new filter element and tighten housing by hand until it is snug with the mounting flange.
- Turn the filter by hand through a further 3/4 turn. Do not overtighten.

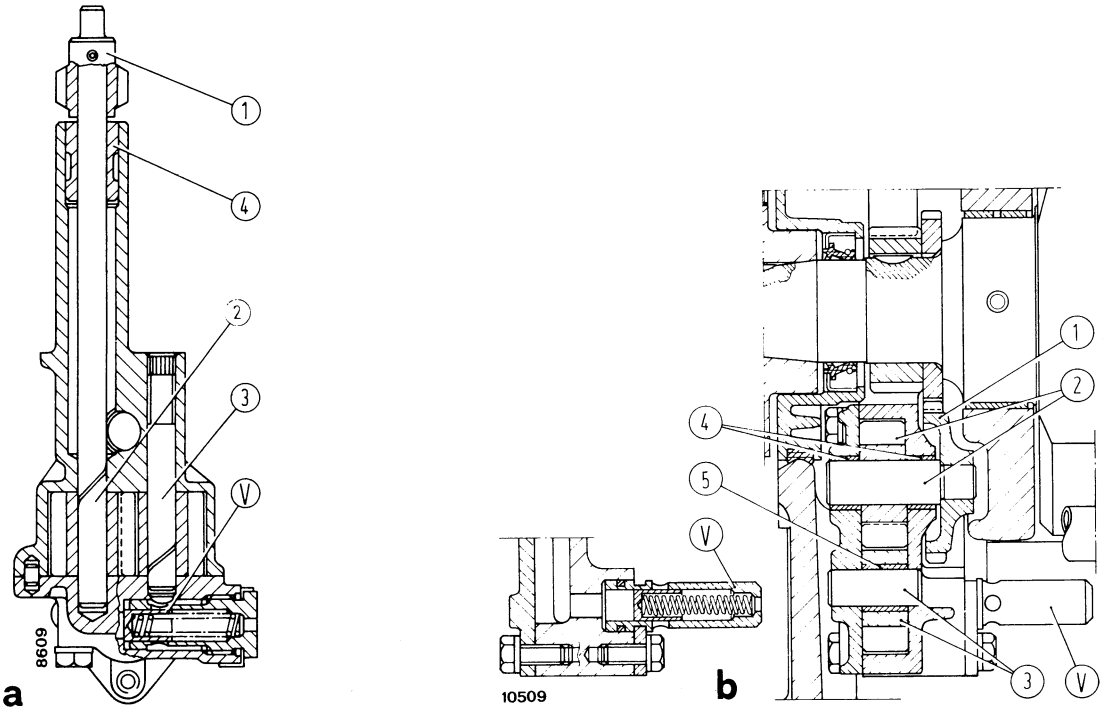
OIL PRESSURE INDICATING SYSTEM

The oil pressure indicating system includes a sending unit (G, pages 1 and 2) and a dash-mounted indicator light which comes on if:

- Oil pressure is low. The light may come on when the engine runs hot at low rpm; however, this is normal.
- Sending unit is inefficient.

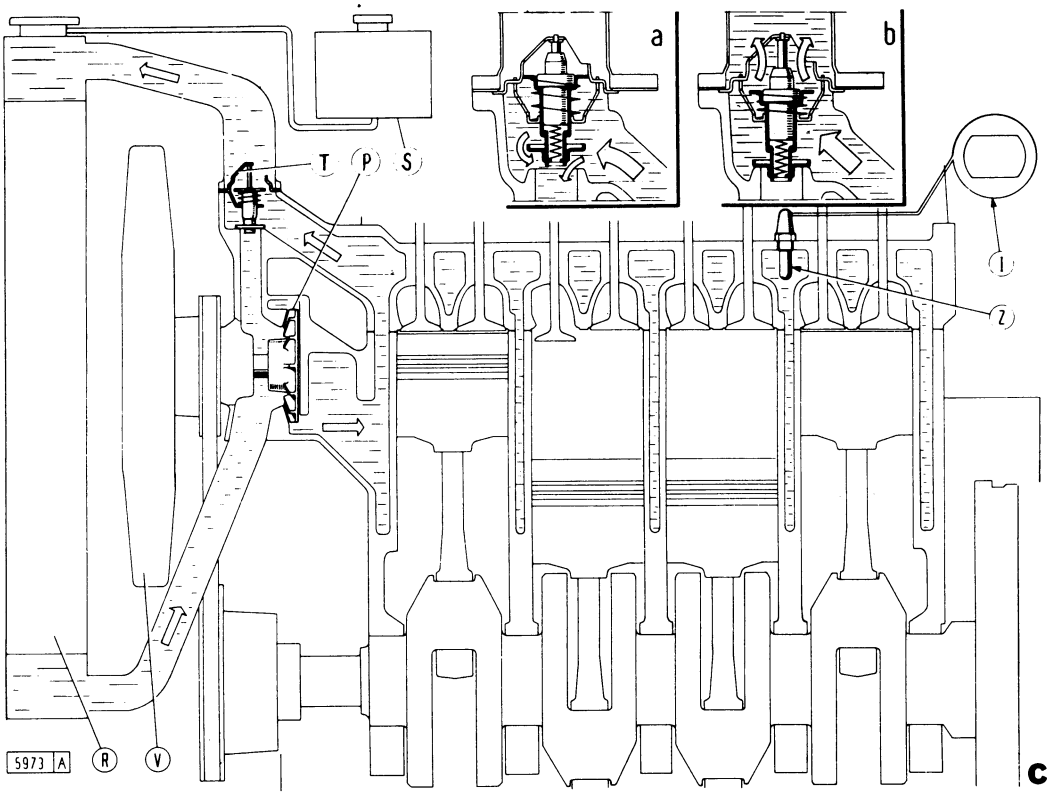
If the indicator light fails to come on when the master switch is operated, the possible causes are:

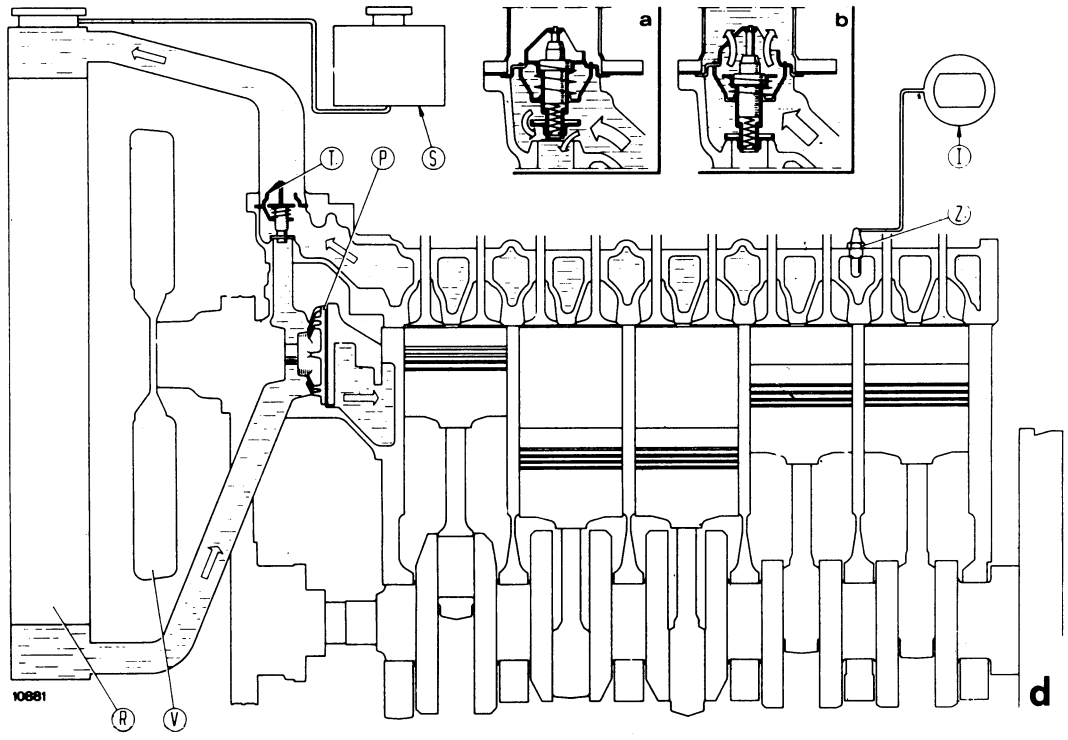
- Blown fuse.
- Burnt indicator light bulb filament.
- Open circuit across sending unit and indicator light.



Section through Oil Pump.

a. 855C - b. 955C - V. Relief valve - 1. Outer drive gear - 2. Drive gear and shaft - 3. Driven gear and shaft - 4. Bushing.





Cooling System Diagram.

a. Thermostat closed - b. Thermostat open - c. Model 855C - d. Model 955C - I. Water temperature gauge - P. Pump - R. Radiator - S. Expansion tank - T. Thermostat - V. Fan - Z. Sending unit.

DESCRIPTION

The cooling system installed on models 855C and 955C is filled with a mixture of water and **FIAT PARAFLU 11** (50% by volume) anti-freeze effective down to:

Degrees Centigrade	−8	−15	−25	−35
(Degrees Farenheit)	17.6	5	−13	−30
"PARAFLU 11" % by volume	20	30	40	50

Moreover, this mixture has oxidation, corrosion, foam and scale control properties to ensure long life protection to the system.

An expansion tank (S, page 1) connected to the radiator header tank is used to contain the liquid expelled by the system upon heating; the liquid is subsequently returned to the system as the temperature decreases.

Periodically check the coolant level in the transparent expansion tank (S); if the level remains constant it means that the system is free from leakage.

When topping up through the expansion tank, also ensure that the radiator is full by removing the radiator cap with a cold engine.

Your coolant is effective for a period of **2 years** or **1600 hours,** after which time the system should be drained, flushed and refilled with fresh coolant.

WATER PUMP

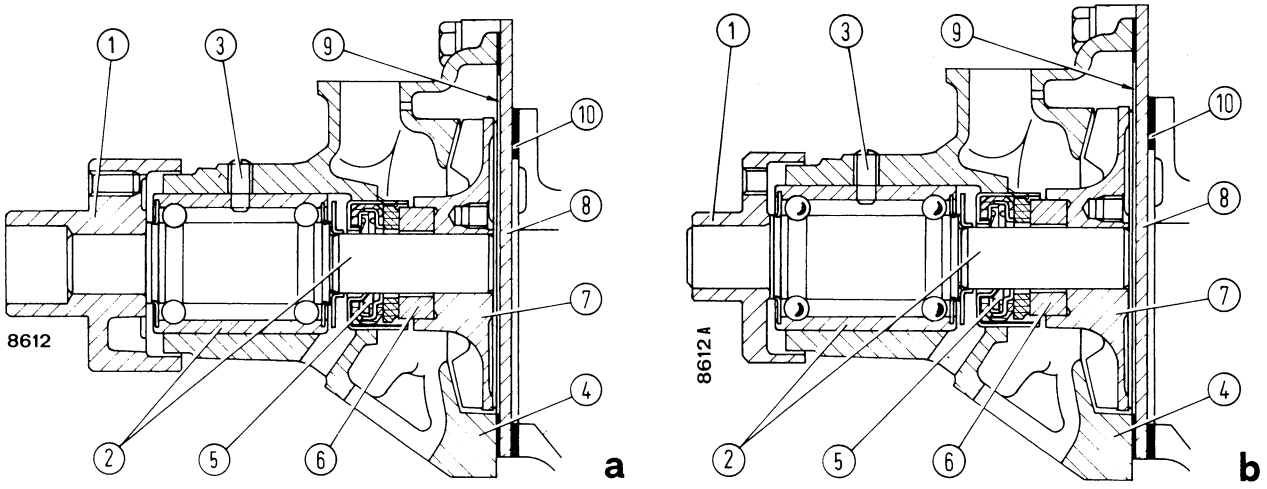
To overhaul pump proceed as follows:

- Remove cover (8, figure a and b) and shaft retaining screw (3).
- Tap end of shaft (2) lightly to break the film of oxide between shaft and impeller and remove the latter using puller **291182/1** (figure **c**, page 3).
- Using a suitable punch, withdraw shaft complete with bearing and fan hub.

Remove seal (5, figure **a** and **b**) only if replacement is necessary, i.e. when graphitized surface in contact with impeller bushing is no longer sufficiently smooth to prevent leakage.

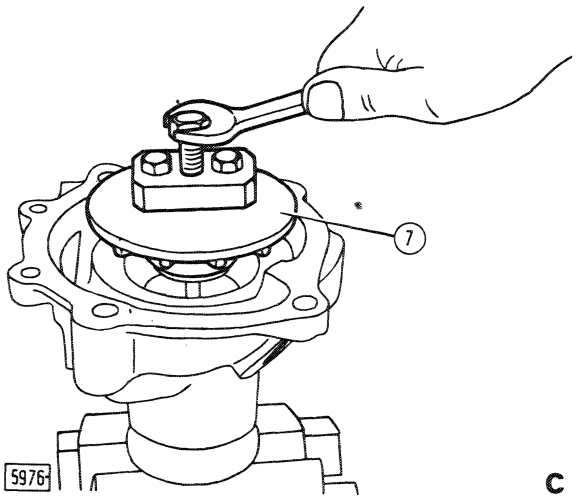
Reassemble parts bearing the following in mind:

- Bearing (2) requires no lubrication.
- Impeller (7) must be installed flush with end of drive shaft.



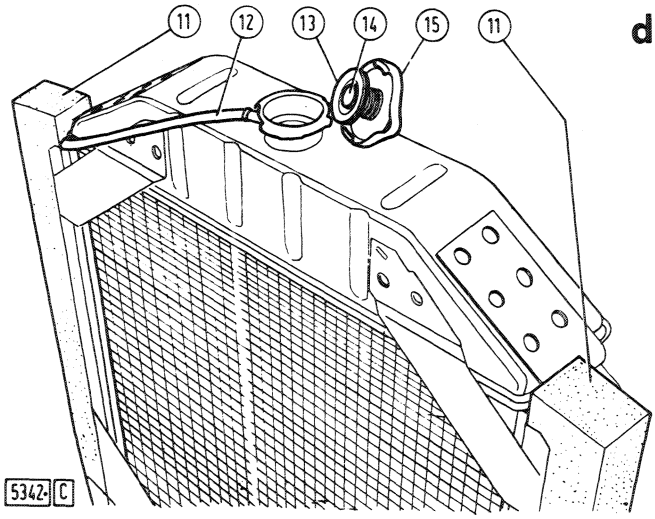
Section through water pump.

a. 855C - b. 955C - 1. Drive hub - 2. Drive shaft assembly - 3. Retaining screw - 4. Pump body - 5. Water seal - 6. Bushing - 7. Impeller - 8. Cover - 9. Gasket - 10. Gasket.



Removing Water Pump Impeller using Puller 291182/1.

7. Impeller.



Radiator.

11. Sealing strips - 12. Vapour exhaust pipe - 13. Pressure release valve (calibrated at 0.7 bar - 0.7 kg/cm^2 - 10.15 psi) - 14. Vacuum release valve - 15. Radiator cap.

RADIATOR

Radiator cap incorporates two valves: a pressure release valve (13, figure d) calibrated at 0.7 bar (0.7 kg/cm^2, 10.15 psi), and a vacuum release valve (14). Periodically check that valves operate correctly.

On overhaul, eliminate scale in radiator proceeding as follows:

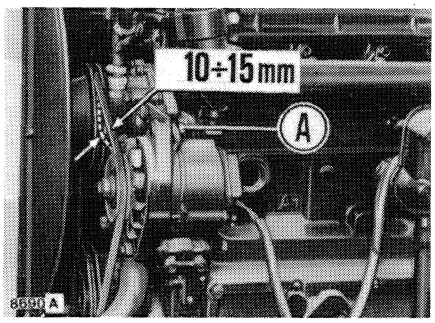
– Prepare and filter a solution of warm water and sodium bicarbonate (30 grams/litre), or use **Disincrostante FIAT** flushing solution in quantity indicated on container.
– Pour solution in radiator, drain and rinse with abundant running water.

To check for radiator leakage, submerge radiator in a tank of water at 30 ± 10° C (86 ± 50° F) and introduce internal air pressure of 0.98 bar (1 kg/cm^2, 14.2 psi) for 2 minutes. Repeat test at least three times.

When flushing the radiator, also flush the rest of the cooling system using the solution and procedures indicated above.
Operate tractor for about 1 hour before draining solution with the engine off.

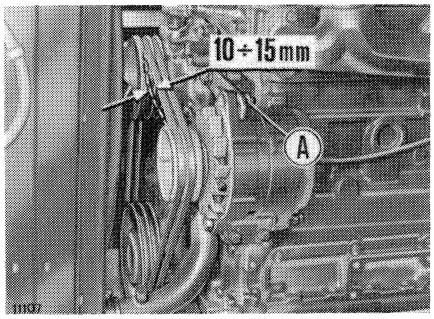
BELT TENSION ADJUSTMENT

To check tension of fan, water pump and alternator drive belt, apply a 118 N (12 kg or 26 1/2 lb) load on belt section between alternator and water pump pulley. Belt should deflect by 10 to 15 mm (0.4 to 0.6 in).
If necessary, adjust as follows:



Adjusting Fan, Water Pump and Alternator Drive Belt Tension (855C).

A. Alternator nut on belt tensioner.



Adjusting, Fan, Water Pump and Alternator Drive Belt Tension (955C).

A. Alternator nut on belt tensioner.

– Slacken nut (A) securing alternator to belt tensioner.
– Move alternator along bracket to obtain the desired tension and tighten nut (A).

WATER TEMPERATURE GAUGE

The water temperature gauge scale is divided into three coloured sectors corresponding to the following temperatures:

– White sector . . . . . 30 to 65° C (86 to 149° F)
– Green sector . . . . . 65 to 105° C (149 to 222° F)
– Red sector. . . . . 105 to 115° C (222 to 239° F)

In normal conditions, pointer should be over green sector.

To test instrument, submerge bulb in water and check scale with a reference thermometer; repeat test several times.

THERMOSTAT

Thermostat (T, page 1) is installed in cylinder head water outlet pipe. Since calibration is not possible, replace thermostat assy when temperature data specified in table are not met.

CLUTCH

Type	Twin 12" plate, oil bath, overcenter engagement
Number of driven plates	2
Plate material	Steel sintered facings
Control	Mechanical, hand lever
Oil pump	Rotor-type, integral with clutch control
Pump oil pressure with engine at rated speed	0.1 to 0.49 bar (0.1 to 0.5 kg/cm^2 - 1.45 to 7.25 psi)
Oil filter	Wire mesh element
Plate O.D. (5, page 3, Section 201)	304.546 to 305.054 mm (11.989 to 12.009 in)
Plate thickness	6.985 to 7.239 mm (.275 to .285 in)
– Minimum wear thickness	5.5 ([1]) mm (.216 in)
Inboard pressure plate thickness (3)	14 mm (.551 in)
Pressure plate spline to clutch support backlash	0.10 to 0.40 mm (.004 to .016 in)
Driven plate spline to clutch shaft hub blacklash	0.26 to 0.50 mm (.010 to .020 in)
Control sleeve carrier O.D. (6)	57.970 to 58.000 mm (2.282 to 2.283 in)
Control sleeve I.D. (16)	58.300 to 58.400 mm (2.295 to 2.299 in)
Control sleeve clearance on carrier	0.300 to 0.430 mm (.012 to .017 in)
Control sleeve O.D.	71.970 to 72.000 mm (2.833 to 2.835 in)
Oil pump front bushing I.D. (23)	72.050 to 72.100 mm (2.837 to 2.838 in)
Oil pump cover rear bushing I.D. (24)	72.030 to 72.104 mm (2.836 to 2.839 in)
Control sleeve clearance in:	
– Front bushing	0.050 to 0.130 mm (.002 to .005 in)
– Rear bushing	0.030 to 0.134 mm (.001 to .005 in)
Maximum bushing wear clearance	0.25 mm (.0098 in)

([1]) Check that lube channels have not worn off facings.

([2]) Fitted and reamed.

(follows)

CLUTCH

(continued)

Oil pump drive gear O.D. (10, page 3, Section 201)	83.965 to 84.000 mm (3.306 to 3.307 in)
Pump body bore diameter	84.100 to 84.130 mm (3.311 to 3.312 in)
Drive gear clearance in pump body	0.100 to 0.165 mm (.004 to .006 in)
Driven gear O.D.	131.960 to 132.000 mm (5.195 to 5.197 in)
Pump body bore diameter	132.100 to 132.140 mm (5.201 to 5.202 in)
Drive gear clearance in pump body	0.100 to 0.180 mm (.004 to .007 in)
Oil pump gear height	6.985 to 7.000 mm (.275 to .275 in)
Oil pump assy end play on control sleeve	0.050 to 0.428 mm (.002 to .017 in)
Release lever clearance on pivots (15)	0.016 to 0.077 mm (.0006 to .003 in)
– Maximum wear clearance	0.20 mm (.008 in)
Release link clearance on pivots (25)	0.032 to 0.077 mm (.001 to .003 in)
– Maximum wear clearance	0.15 mm (.006 in)
Release brake lining thickness	6 mm (.236 in)
– Maximum wear thickness	4 mm (.157 in)
Pressure plate pull-off spring length:	
– Free	58 mm (2.283 in)
– Under 258 to 283 N (26.3 to 28.9 kg or 57.998 to 63.618 lb)	31 mm (1.220 in)
Clutch adjustment	See section 201, page 5
Clutch linkage adjustment	See section 201, page 6

TRANSMISSION AND SPLITTER

Transmission	4-speed, sliding gear
Gears	Spur
Splitter	2 forward ranges, 1 reverse range, for a total of 8 forward and 4 reverse
— Gears	Spur
— Reduction ratios: low	(30 : 32) x (19 : 43) = 1: 2.414
— Reduction ratios: high	1
— Reduction ratios: reverse	(30 : 32) x (32 : 19) x (19 : 43) = 1 : 1.433
Transmission and splitter controls	Separate hand levers located centrally in front of operator
4th/splitter gear thrust washer thickness (3, page 1, section 202)	4.95 to 5.00 mm (.195 to .197 in)
Drive shaft rear bearing thrust washer thickness (4)	4.925 to 5.000 mm (.194 to .197 in)
Selector shaft detent ball spring length (20):	
— Free	44 mm (1.7 in)
— Under 278 to 308 N (28.4 to 31.4 kg, 62.494 to 69.238 lb)	33 mm (1.3 in)

BEVEL DRIVE

Bevel ratio	9/49 = 1 : 5.444
Bevel drive backlash	0.18 to 0.23 mm (0.00709 to 0.00905 in)
Nominal distance between ring gear centerline and back of pinion	173 mm (6.81 in)
Bevel pinion rear bearing thrust washer thickness	6.95 to 7.00 mm (.274 to .275 in)
Transmission driven gear spacer thickness	16.95 to 17.00 mm (.0667 to .669 in)

(follows)

POWER TRAIN: Specification and Data

BEVEL DRIVE

(continued)

Bevel pinion position adjustment	See page 1, Section 203
Bevel pinion position shim thickness range (S_1, page 1, Section 202)	1.20 - 1.25 - 1.30 - 1.35 - 1.40 - 1.45 - 1.50 - 1.55 - 1.60 - 1.65 - 1.70 - 1.75 - 1.80 mm (0.047 - 0.049 - 0.051 - 0.053 - 0.055 - 0.057 - 0.059 - 0.061 - 0.063 - 0.065 - 0.067 - 0.069 - 0.071 in)
Bevel pinion bearing adjustment	See pages 2 and 3, Section 203
Bevel pinion bearing shim thickness range (S_2)	5.70 - 5.75 - 5.80 - 5.85 - 5.90 - 5.95 - 6.00 - 6.05 - 6.10 - 6.15 - 6.20 - 6.25 - 6.30 - 6.35 - 6.40 - 6.45 - 6.50 - 6.55 - 6.60 - 6.65 - 6.70 mm (.224 - .226 - .228 - .230 - .232 - .234 - .236 - .238 - .240 - .242 - .244 - .246 - .248 - .250 - .252 - .254 - .256 - .258 - .260 - .262 - .264 in)
Ring gear bearing and bevel drive backlash adjustment	See pages 3 and 4, Section 203
Bearing and bevel drive backlash shim thickness (S_3 and S_4, page 3, Section 202)	0.15 - 0.2 - 0.5 mm (0.006 - 0.008 - 0.02 in)

STEERING CLUTCHES

Type	Dry, multiple plate, spring-type mechanical power assistance
Control	Hand lever
Number of plates (each clutch)	11 driven and 11 drive
Drive plate thickness	2.35 to 2.65 mm (.092 to .104 in)
Driven plate thickness	4.9 to 5.1 mm (.193 to .201 in)
– Minimum wear thickness	4 mm (.157 in)
Total clutch pack thickness	79.75 to 85.25 mm (3.140 to 3.356 in)
Drum/plate tooth backlash	0.1 to 0.4 mm (.004 to .016 in)
Control lever pivot diameter (14, page 2, Section 204)	25.967 to 26.000 mm (1.022 to 1.024 in)
Bushing fitted I.D. (16)	26.040 to 26.092 mm (1.025 to 1.027 in)
Pivot clearance in bushing	0.040 to 0.125 mm (.0016 to .005 in)
Bushing bore diameter in levers (13)	29.939 to 29.972 mm (1.179 to 1.180 in)

(follows)

STEERING CLUTCHES

(continued)

Bushing O.D.	29.979 to 30.000 mm (1.180 to 1.181 in)
Interference fit	0.007 to 0.061 mm (.0003 to .002 in)
Control spring length (4, page 1, Section 204; six springs per clutch):	
– Free	133 mm (5.236 in)
– Under 1044 to 1252 N (106.5 to 117.5 kg, 234.631 to 258.969 lb)	85 mm (3.346 in)
Steering clutch adjustment	See page 3, Section 204

BRAKES

Type	Band, acting on steeering clutch outer drums
Brake operation:	
– Service	Mechanical, separate pedals
– Parking	Mechanical, hand lever acting on service brake
Linings (31, page 5, Section 204)	6 per band
Lining thickness	6.2 to 6.5 mm (.224 to .256 in)
– Minimum wear thickness	4 mm (.157 in)
Lining width and developed length	92x120 mm (3.622x4.724 in)
Drum O.D. (5)	308 mm (12.12 in)
Pivot diameter at bushings (26, page 4, Section 204)	29.967 to 30.000 mm (1.180 to 1.181 in)
Bushing fitted I.D. (27)	30.040 to 30.092 mm (1.183 to 1.185 in)
Pivot clearance in bushings	0.040 to 0.125 mm (.001 to .005 in)
Control lever bushing O.D. (27)	33.975 to 34.000 mm (1.337 to 1.338 in)
Bushing bore diameter	33.927 to 33.966 mm (1.336 to 1.337 in)
Bushing interference fit	0.009 to 0.073 mm (.0003 to .003 in)
Brake linkage adjustment	See page 5, Section 204

POWER TRAIN: Specification and Data

FINAL DRIVE

Type	Pinion drive, spur gear
Reduction ratio	11/69 = 6.273 to 1
Pinion/spur gear backlash (33 and 34, page 6, Section 204)	0.20 to 0.30 mm (.008 to .012 in)
Spur gear spline fit on stub axle:	
— interference	0.000 to 0.024 mm (0 to .0009 in)
— clearance	0.000 to 0.072 mm (0 to .003 in)
Drive sprockets	
Number of teeth	27
Pitch diameter	694 mm (27.3 in)
Tooth width	50 to 52 mm (1.968 to 2.047 in)
Stub axle bearings	Two, ball

POWER TAKE-OFF

Type	Transmission-driven, single speed 540 rpm
Operation	Mechanical, hand lever to right of operator's seat
P.T.O. Drive/driven gear reduction ratio	15/59 = 3.93 to 1
Drive/driven gear backlash	0.10 to 0.20 mm (.004 to .008 in)
Drive sleeve spline clearance	0.030 to 0.106 mm (.001 to .004 in)
Spline shaft diameter (standard)	1 3/8" (6-spline)
Direction of rotation (tractor seen from rear)	Clockwise
Engine speed with P.T.O. at 540 rpm	2124 rpm
P.T.O. speed with engine at rated speed	635 rpm

TIGHTENING TORQUE FIGURES

DESCRIPTION	Thread size	Torque		
		Nm	kgm	ft. lb
Clutch - Section 201				
Capscrew, self-locking, clutch support to flywheel (C_1, page 3)	M 8 x 1.25	28	3	21
Capscrew, clutch housing bottom cover (C_2)	M 10 x 1.25	59	6	43
Capscrew, clutch housing to engine (C_3)	M 12 x 1.25	98	10	70
Capscrew, control sleeve support (C_4)	M 12 x 1.25	98	10	70
Capscrew, inner control lever (C_5)	M 16 x 1.5	157	16	116
Capscrew, oil suction pipe (C_6)	M 8 x 1.25	25	2.6	19
Capscrew, suction pipe flange (C_7)	M 8 x 1.25	25	2.6	19
Capscrew, release lever bushing (C_8)	M 10 x 1.25	59	6	43
Capscrew, control lever support	M 12 x 1.25	98	10	70
Capscrew, self locking, oil pump cover	M 8 x 1.25	28	2.9	21
Transmission and splitter - Section 202				
Lock ring, bevel pinion shaft (C_1, page 1)	M 40 x 1.5	294	30	217
Capscrew, clutch housing to transmission housing (C_2)	M 14 x 1.5	147	15	108
Capscrew, transmission cover (C_3)	M 12 x 1.25	98	10	70
Nut, transmission drive shaft front bearing cap	M 8 x 1.25	18	1.8	13
Bevel drive - Section 203				
Capscrew, self-locking, ring gear (C_4, page 3, Section 202)	M 14 x 1.5	216	22	159
Capscrew, ring gear shaft carrier (C_5)	M 12 x 1.25	98	10	70
Steering clutches - Brakes - Final drives - Section 204				
Nut, self-locking, relay lever (C_1, page 2)	M 24 x 2	333	34	246
Nut, spring stud (C_2, page 1)	M 14 x 1.25	94	9.6	69
Lock ring, inner drum (C_3)	M 32 x 1.5	490	50	360
Lock ring, outer drum (C_4, page 5)	M 32 x 1.5	490	50	360

(follows)

TIGHTENING TORQUE FIGURES

(continued)

DESCRIPTION	Thread size	Torque		
		Nm	kgm	lb. ft
Nut, lever link (C_5, page 2)	M 16 x 1.5	221	22.5	160
Capscrew, lever pivot (C_6, page 3, Section 204)	M 12 x 1.25	47	4.8	35
Nut, foot rest (C_7, page 4)	M 8 x 1.25	25	2.6	19
Nut, brake pedal (C_8)	M 12 x 1.25	98	10	70
Nut, brake band control lever (C_9)	M 22 x 1.5	235	24	173
Capscrew, brake hand lever ratchet	M 10 x 1.25	59	6	43
Capscrew, pivot carrier (C_{10})	M 10 x 1.25	59	6	43
Nut, final drive housing C_{11}, page 6)	M 16 x 1.5	221	22.5	160
Capscrew, brake adjustment cover (C_{12}, page 4)	M 10 x 1.25	59	6	43
Capscrew, final drive housing cover (C_{13}, page 6)	M 12 x 1.25	98	10	70
Nut, stub axle (C_{14})	M 65 x 2	588	60	435
Capscrew, drive sprocket (C_{15})	M 18 x 1.5	378	38.5	279
Power take-off - Section 205				
Nut, shaft (C_1, page 1)	M 36 x 1.5	245	25	180
Capscrew, bearing carrier (C_2)	M 12 x 1.25	98	10	70
Capscrew, cover (C_3)	M 16 x 1.5	221	22.5	160
Capscrew, guard (C_4)	M 8 x 1.25	25	2.6	19

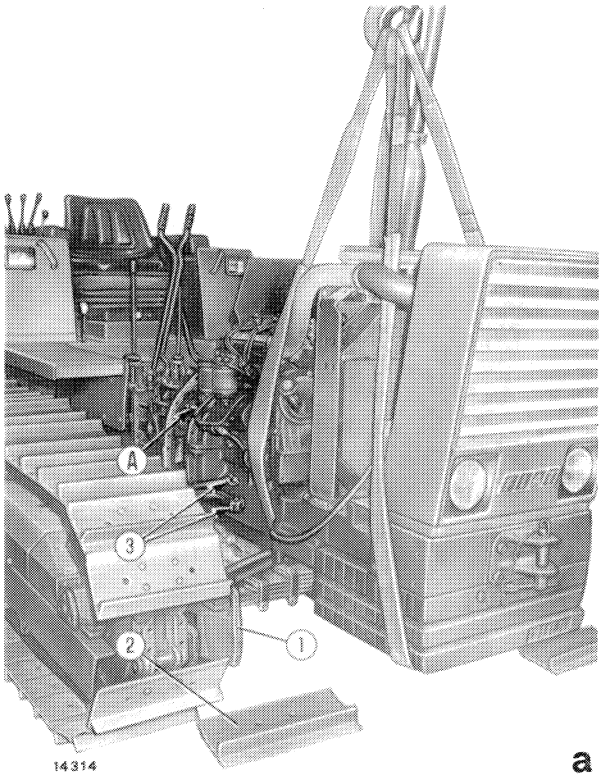
CLUTCH REMOVAL AND INSTALLATION

To gain access to the clutch, separate engine together with front suspension from clutch housing proceeding as follows:

⚠ CAUTION ⚠

Lift and handle all heavy components using a suitable lift. Ensure that all units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of load to be lifted.

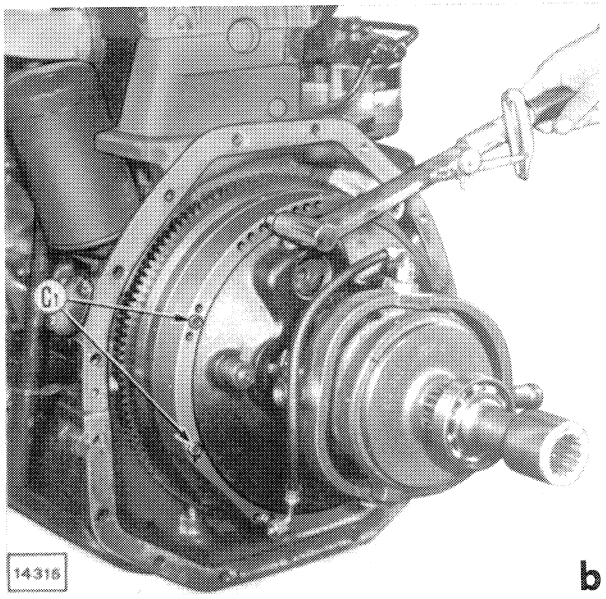
- Remove hood side panels, top panels and side members.
- Drain oil from clutch housing, disconnect battery negative lead, tractormeter cable, alternator and starter leads, accelerator and injection pump shut-off links and dashboard cables.
- Close fuel tank shut-off cock and disconnect fuel lines.
- Drain oil from remote control and lift tank and disconnect suction and delivery lines (3, figure a) from hydraulic pump.
- Check that clutch is engaged (hand lever forward).
- Remove bottom cover from clutch housing. Remove screw (C_5, page 3) from inside housing and free yoke lever (9) from linkage. Remove screw (C_7) and take out oil filter.
- Remove yoke carrier from right-hand side of housing.
- Remove rear hood panel.
- Place a support stand under transmission housing.
- Connect engine and suspension support to a hoist through nylon ropes **293769** positioned as shown in figure a.
- If weights are not properly balanced, put a wedge under whichever rope is slackest.
- Take off track frame guide plates (1) and remove the corresponding track shoes (2).
- Install guide pins **292888** (A) in two diametrically opposed clutch housing retaining bolt holes and remove remaining nuts and bolts.



a

Removing (installing) engine-front suspension assy using hoist and nylon ropes 293769.

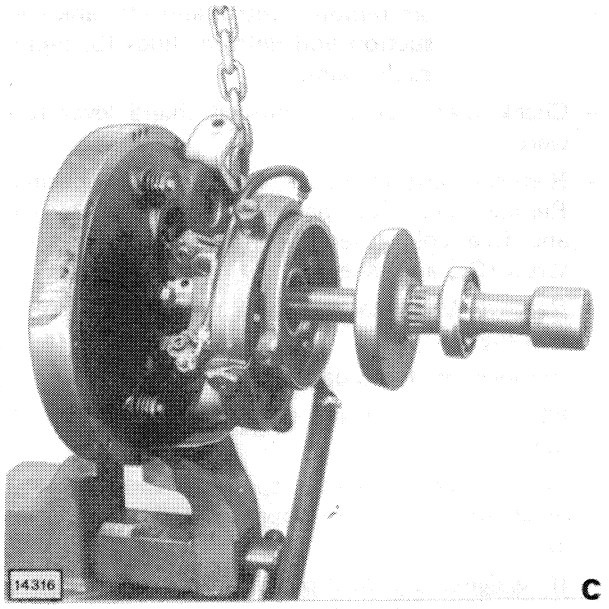
A. Clutch/transmission drive shaft guide pins **292888** - 1. Guide plate - 2. Track shoe - 3. Oil lines to hydraulic pump.



b

Tightening clutch-to-flywheel capscrews.

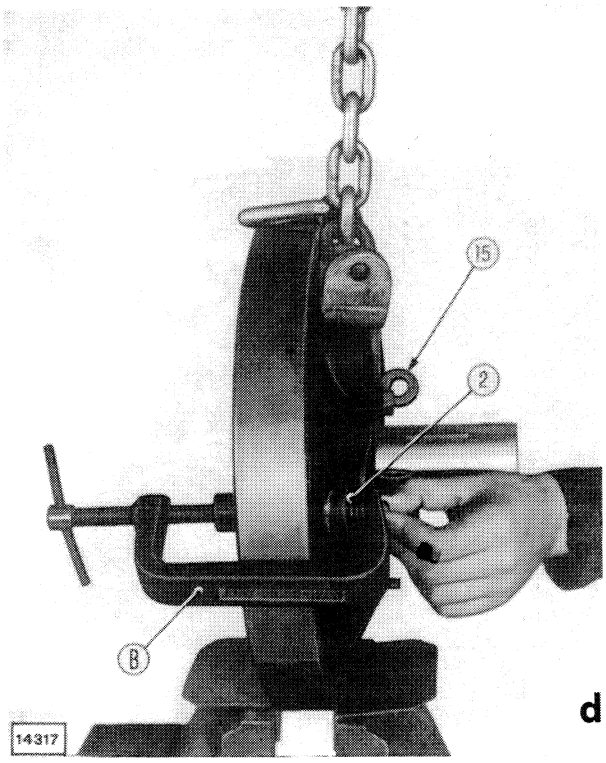
C_1. Capscrews.



c

– Separate engine together with front suspension support from clutch housing, taking care not to damage parts.

Subsequently remove clutch assembly from flywheel as follows:



d

Removing (installing) release levers.

B. Spring compressor - 2. Springs - 15. Release levers.

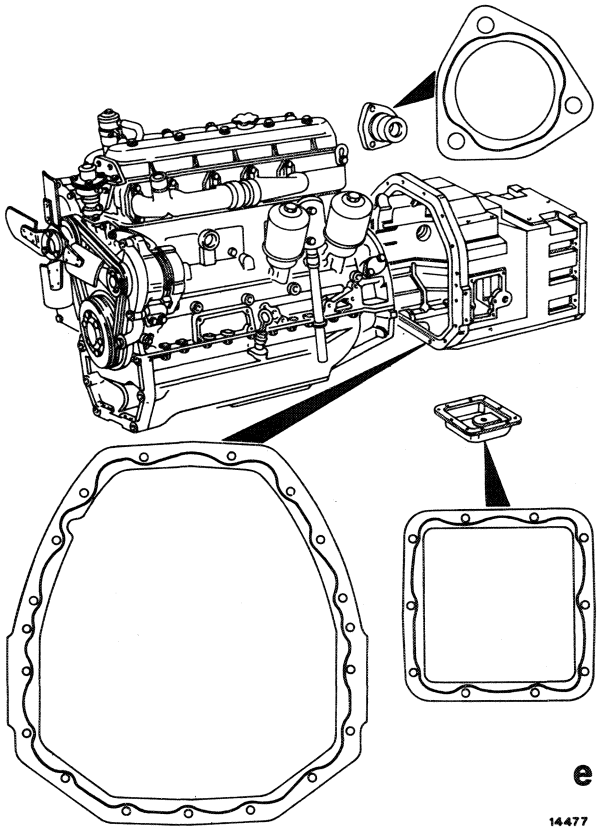
⚠ CAUTION ⚠

Guard against kinking chains or cables. Do not lift or pull through a kinked chain or cable. Always wear heavy gloves when handling chain or cable.

– Using an M 8 x 1.25 screw, secure a bracket of tool **291517** to clutch support. Attach a suitable hoist, take out a screw retaining clutch to flywheel and remove clutch assembly.
– With clutch assembly still supported by hoist, clamp in vice as shown in figure c.

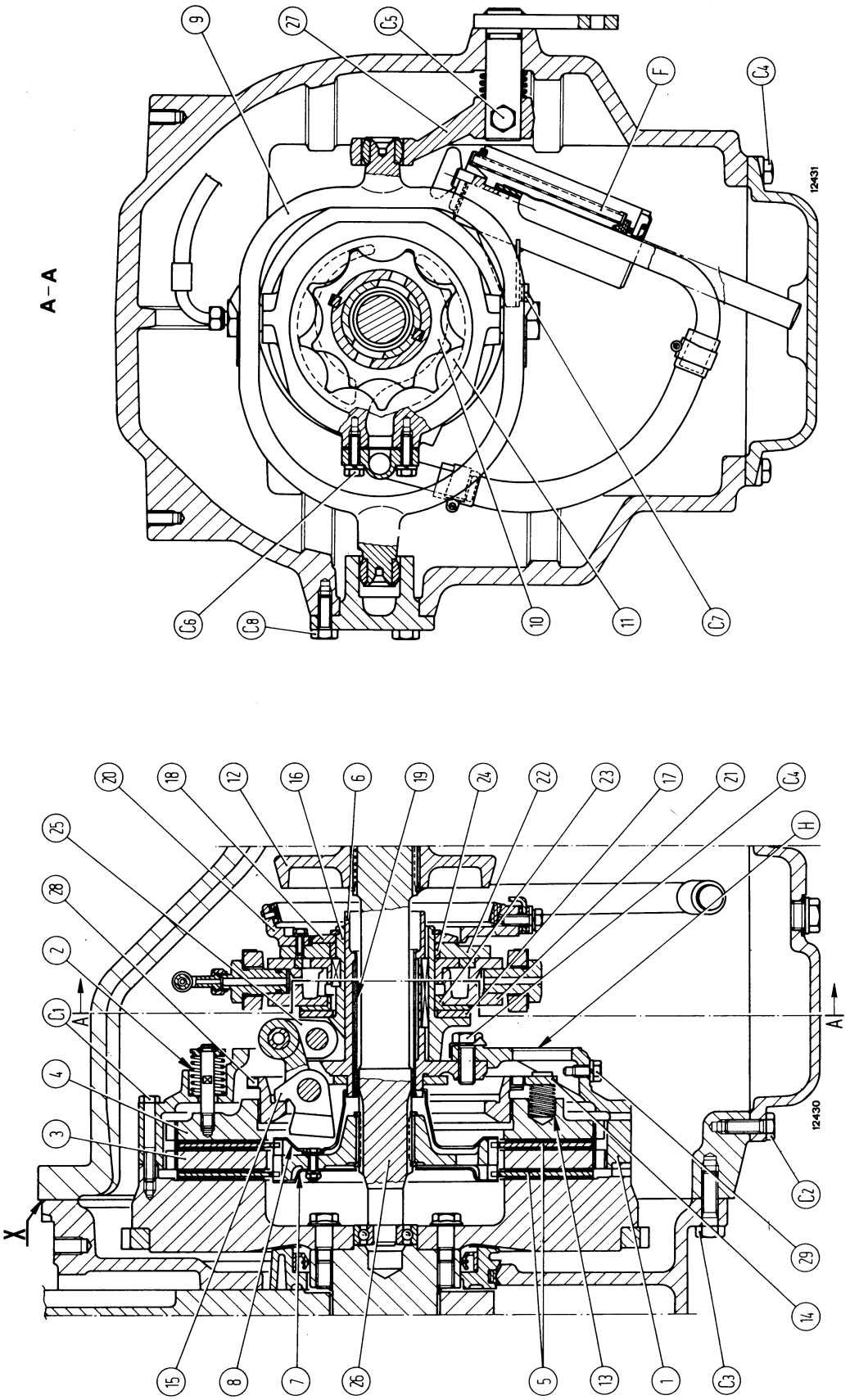
On reassembly, note the following points:

– Check condition of ball bearing pressed in flywheel. Scrap and replace bearing in the event of noise or binding. New bearing should be installed **without** packing housing with grease.
– Install clutch assembly on flywheel and tighten capscrews (C_1) to specified torque (figure b, page 1).
– Lubricate control sleeve (16, page 3) and control lever pivots.



e

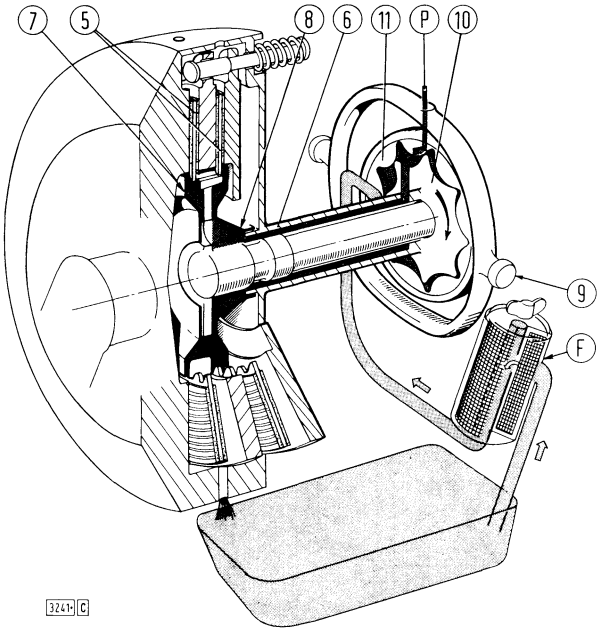
Applying jointing compound for clutch housing installation.



Section through clutch

C_1. Clutch support capscrew - C_2. Bottom cover capscrew - C_3. Clutch housing capscrew - C_4. Control sleeve support capscrew - C_5. Inner control lever capscrew - C_6. Oil suction pipe capscrew - C_7. Oil filter capscrew - C_8. Yoke carrier capscrew - F. Oil filter - H. Adjustment aperture - 1. Clutch support - 2. Pressure plate pull-off springs - 3. Inboard pressure plate - 4. Outboard pressure plate - 5. Clutch plates - 6. Control sleeve carrier - 7 and 8. Oil baffles - 9. Release yoke - 10 and 11. Oil pump gears - 12. Clutch brake hub - 13. Spring - 14. Lock ring retainer - 15. Release lever - 16. Control sleeve - 17 and 18. Thrust washer - 19. Tube - 20. Clutch brake outer ring - 21. Oil pump body - 22. Cover - 23. Front bushing - 24. Rear bushing - 25. Link - 26. Clutch shaft - 27. Inner control lever - 28. Lock ring - 29. Reference screw.

Note — On assembly, throughly clean and degrease mating surfaces **X** and apply jointing compound as shown on page 2 and directed on page 5, Section A.



CLUTCH COOLING CIRCUIT SCHEMATICS

F. Oil filter - P. Pressure point - 5. Clutch plates - 6. Control sleeve carrier - 7 and 8. Oil baffles - 9. Yoke - 10 and 11. Oil pump gears.

– Fill hydraulic circuit with **oliofiat TUTELA MULTI F** oil through filter body.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE FINGERS OR HANDS.

– Before installing engine and front suspension support on clutch housing, throughly clean and degrease mating surface and apply a ~2 mm or 1/16" bead of jointing compound as shown in figure c, page 2. Jointing compound types are listed on page 5, Section A.

– Tighten fasteners to the torque shown on page 14, Section 10 and page 7, Section 20.

– Top up oil and check level using dipstick. Start the engine and check that low clutch oil pressure indicator light goes off. If not, shut off the engine and prime the pump using a hand pump connected to the oil pressure sending unit fitting.

CLUTCH OVERHAUL

⚠ CAUTION ⚠

Handle all parts with care. Do not put hands or fingers between parts.

Clutch overhaul operations are carried out with assembly clamped in vice as shown in figure c, page 2.

Disassemble clutch as follows:

– Remove front retaining ring and take out inboard pressure plate and driven plates (5 and 3, page 3).

– Remove the second retaining ring and withdraw shaft (26) together with brake hub (12).

– Remove cotter pins, retrieve pivots and links and remove control sleeve (16) together with oil pump.

– Apply compressor **291363** (B, figure d) to springs (2). Remove spring locks, take off outboard pressure plate (4) and retrieve release levers (15).

– Remove screws retaining clutch brake outer ring (20). Remove the third retaining ring and take out rear washer (18), cover (22), bushing (24), gears (10 and 11), pump body (21), and front bushing (23), aligning key seat. Then remove front washer (17).

Check clutch driven plates for wear, replacing if necessary (see table, Section 20, page 1).

Check pressure plate and flywheel contact surfaces; if necessary, these surfaces may be dressed removing a minimum amount of material.

Check pressure plate and driven plate spline backlash, release lever-to-pivot clearance and control sleeve-to-front and rear bushing clearance against data shown on pages 1 and 2, Section 20.

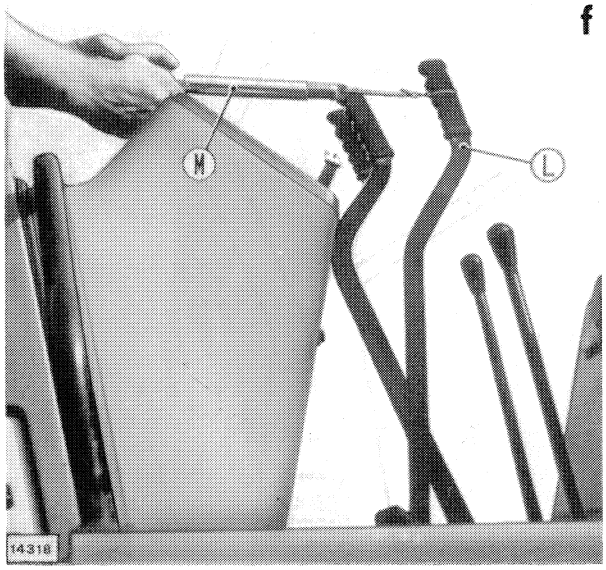
Check pressure plate spring length against data shown on page 2, Section 20.

Check clutch brake linings for wear (see page 2, Section 20).

Check that lock ring retainer (14, page 3) moves freely on the associated dowels.

Then adjust clutch as directed below.

f



Checking clutch engagement force (engine off).
L. Clutch lever - M. Spring scale.

CLUTCH ADJUSTMENT

When clutch adjustment is correct, engagement will require a force of 157 to 168 N (16 to 17 kg or 353 to 378 lb) applied to the hand lever grip (see figure 5) and a distinct click will be felt upon engagement.

NOTE – Clutch must be adjusted with the engine off.

As the clutch plates wear down, the actuation force will diminish and the click will become less pronounced. Adjust as follows:

– Remove cover from left hand side of housing and bring aperture (H, see page 3 and figure 9) into view.

– Insert wrench **290954** (B) supplied with tractor through aperture (H). Push wrench towards flywheel to free lock ring (28) from retainer (14).

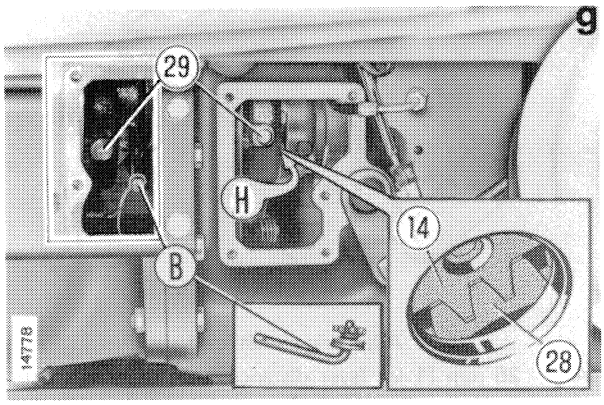
NOTE – Do not release hold on wrench (B), as spring (13) behind retainer (14) could push wrench out and cause it to fall down into the housing.
As a precautionary measure, a cord should be tied to the end of the wrench.

– Turn wrench clockwise to increase or counter-clockwise to reduce lever actuating force.

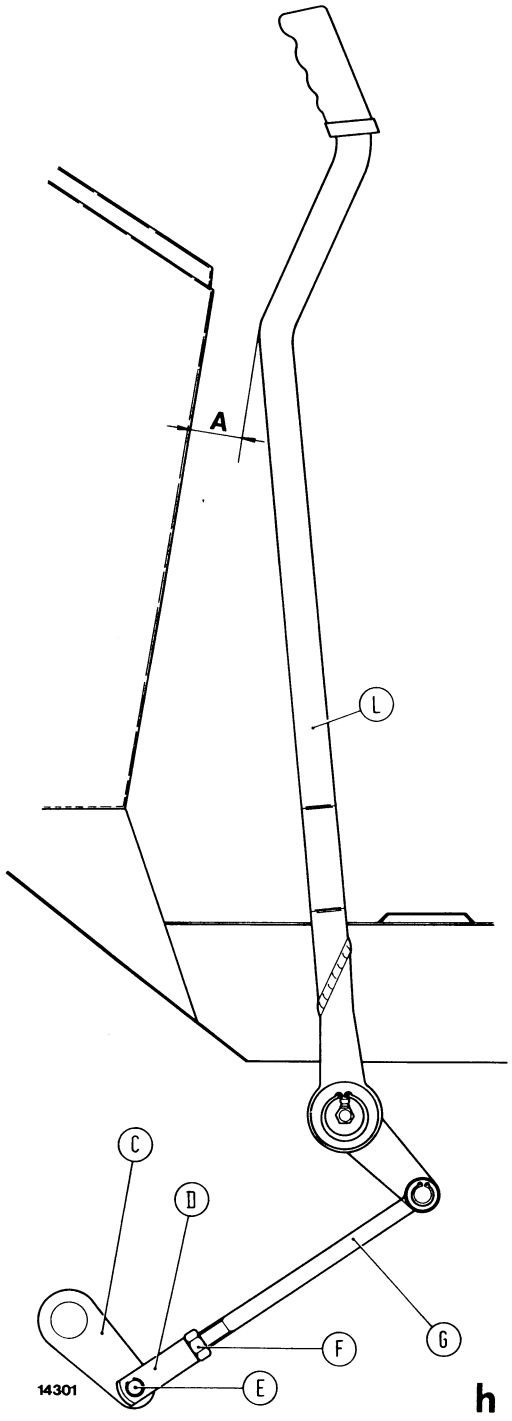
– Remove wrench and check that spring (13) returns retainer (14) to correct position on lock ring.

Reference screw (29) prevents the wrench from being removed if retainer position is not correct. Should the retainer fail to engage the lock ring automatically, push it in by hand and release it immediately thereafter.

g



Adjusting clutch engagement.
B. Wrench **290954** - H. Aperture - 14. Retainer - 28. Lock ring - 29. Reference screw.



Adjusting clutch lever

A ≃ 25 mm (1 in) lever distance from dash - C. Outer clutch control lever - D. Yoke - E. Pivot - F. Lock nut - G.Link - L. Clutch lever.

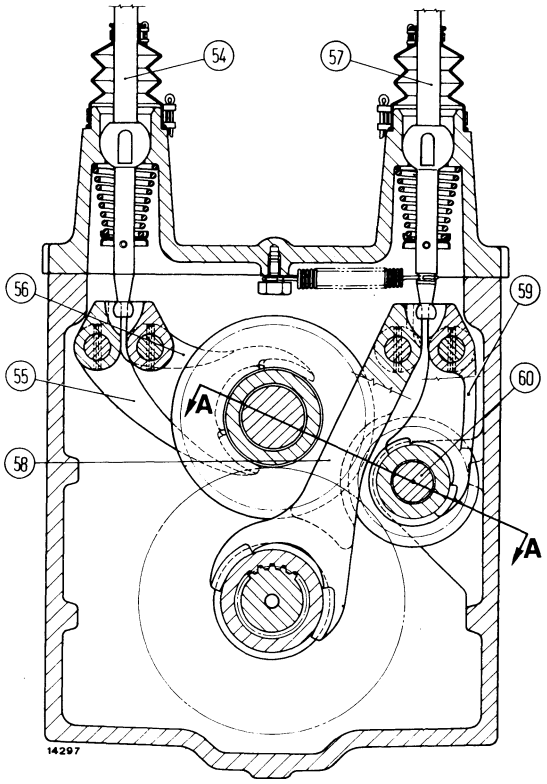
CLUTCH LEVER ADJUSTMENT

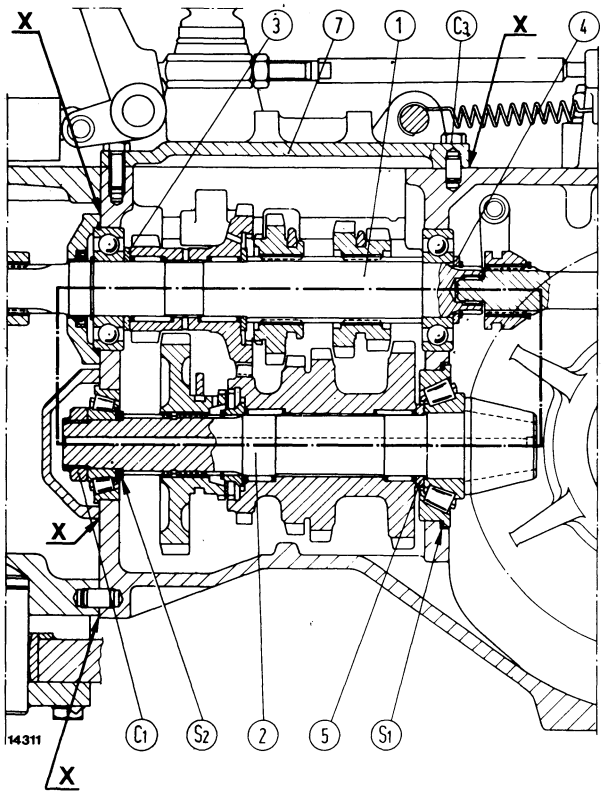
After adjusting clutch engagement, check lever (L) position with respect to dashboard as shown in figure h.

With clutch engaged, lever dogleg should lie approximately 25 mm or 1 in from dash.

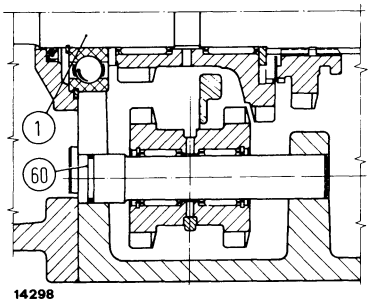
If necessary, adjust as follows:

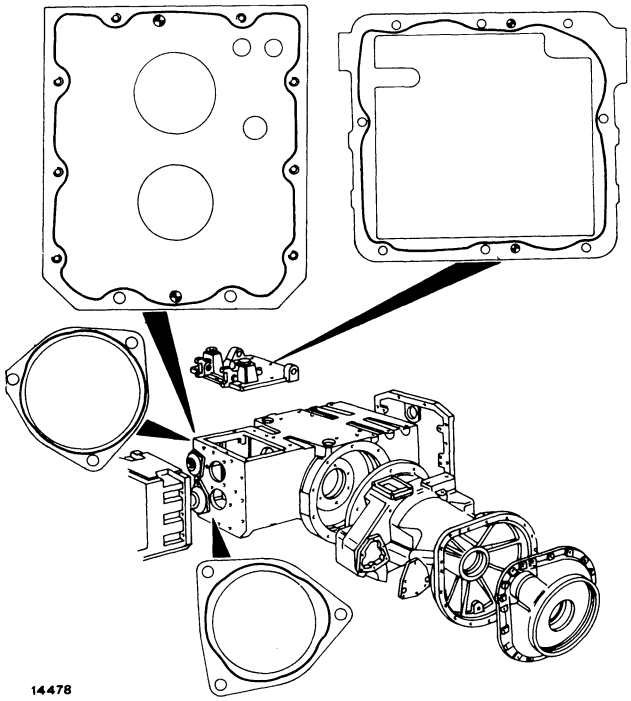
- Loosen lock nut (F), remove retaining ring and withdraw pivot (E).
- Tighten yoke (D) to move lever farther from dash, or loosen yoke to bring lever nearer.
- Install pivot (E) and check that lever position is correct.
- Install retaining ring and tighten lock nut (F).





A-A



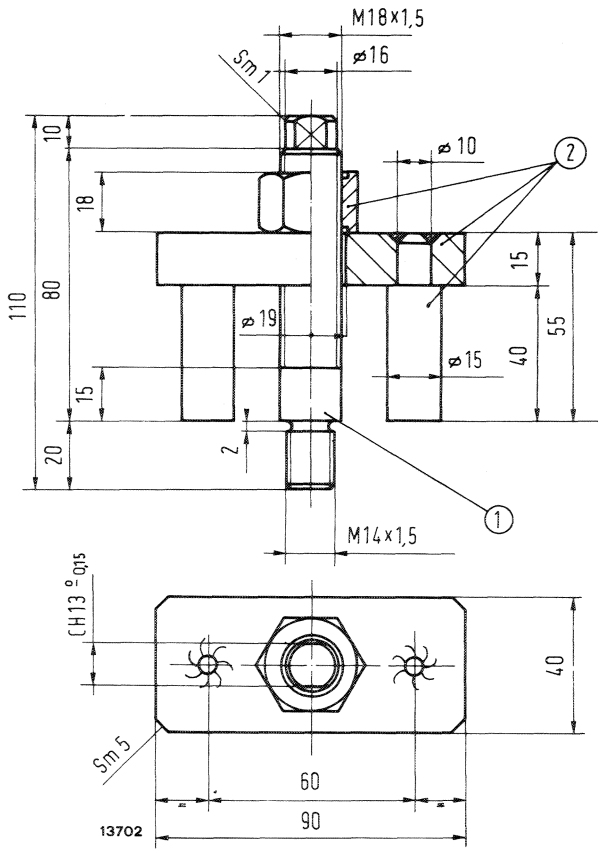


Longitudinal and cross section through transmission.

Note – Position of shafts (1 and 2) and associated bearings and gears on late model tractors is shown in the area enclosed by a heavy chain line on the longitudinal section.

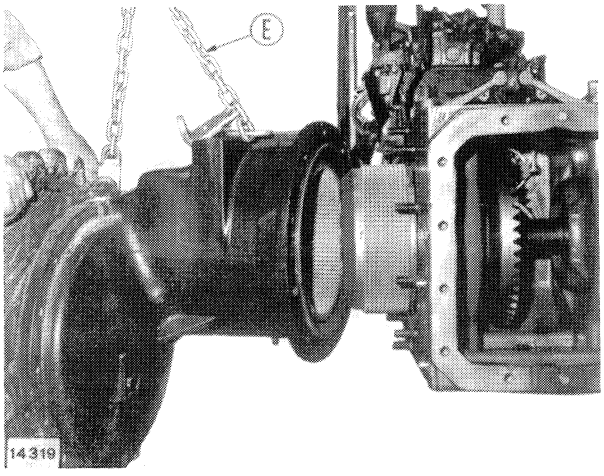
A - A. Section through reverse shaft - C_1. Bevel pinion lock ring - C_3. Cover capscrew - S_1. Bevel pinion position shims - S_2. Bevel pinion bearing shims - 1. Drive shaft - 2. Bevel pinion - 3, 4 and 5. Thrust washers - 7. Cover - 54. Gear shift lever - 55. 1st/2nd shifter fork - 56. 3rd/4th shifter fork - 57 Splitter/reverse lever - 58. High/low shifter fork - 59. Reverse relay fork - 60. Reverse shaft.

Note – On assembly, throughly clean and degrease mating surfaces "**X**" and apply an approximately 2 mm (1/16") bead of jointing compound as shown alongside.
Jointing compound types are listed on page 5, Section A.



Lift cylinder pivot removal tool 50033 (make in workshop) Dimensions in mm.

1. Threaded stud, material 40 CrMo4 (708 M 40) - 2. Nut and support, material Fe42C (43 C).



Removing (installing) final drives using hoist and lift hook 291517 (E).

REMOVAL - INSTALLATION

⚠ CAUTION ⚠

Lift and handle all heavy parts using a suitable lift. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of loads to be lifted.

Remove transmission housing as follows:

- Remove hood side panel and disconnect battery terminals.
- Remove master pins and stretch out tracks.
- Drain oil from clutch housing, transmission housing and hydraulic system. Do not mix oil types.
- Drain fuel tanks.
- Disconnect front and rear lighting leads, fuel lines and hydraulic pump suction and delivery lines.
- Remove fuel tanks, hydraulic oil reservoir, opetor's seat, covers, guards, footboards and fenders.
- Remove caps retaining crossbar to final drives and swinging drawbar support plate.
- Take off drawbar frame and remove drawbar.
- Remove lift cylinders by forcing out pivots with the tool shown alongside and take off lift arm and draft link mounting plates.
- Remove steering clutch levers, linkage and servo controls.
- Place a support stand under the rear transmission housing.
- Using lift hook **291517** (E), connect a hoist to each final drive as shown alongside. Remove retaining nuts (*) and lift off final drives.

⚠ CAUTION ⚠

Guard against kinking chains or cables. Do not lift or pull through a kinked chain or cable. Always wear heavy gloves when handling chain or cable.

(*) Two of the nuts can be reached only by removing pedal support cover and brake adjustment cover.

– Place a support stand under clutch housing. If the tractor is provided with ballast weights, also place a stand under weights.

– Connect transmission housing to a hoist through hook **291517.**

– Remove two diametrically opposed clutch housing capscrews. Install guide pins **292888** in their place and remove remaining capscrews.

– Separate and remove transmission housing.

After overhaul, apply jointing compound where directed and assemble components.
For the transmission housing, see note on page 1.

⚠ CAUTION ⚠

Use suitable tools to align holes. DO NOT USE FINGERS OR HANDS.

DISASSEMBLY

⚠ CAUTION ⚠

Handle all parts with care. Do not put hands or fingers between parts.
Wear safety equipment such as goggles, gloves and safety shoes.

Position transmission housing on suitable support stands and proceed as follows:

– Remove top cover (7, page 1).

– Remove rear cover (9, Section 205, page 1) together with P.T.O. gear.

– Remove P.T.O. drive gear (8).

– Disconnect P.T.O. control lever.

– Withdraw gear shifter forks and rails.

– Using puller **292927** together with adapter **292311**, remove reverse gear shaft, retrieving reverse gear and splitter fork.

– Using a suitable puller, remove steering clutch drums.

– Remove steering clutch relay levers (9, figure alongside), withdraw sleeves (6) and take out release forks (8).

– Remove ring gear capscrew (C_4).

– Remove right hand ring gear carrier (17) together with shims (S_4); shims may be reused if undamaged.

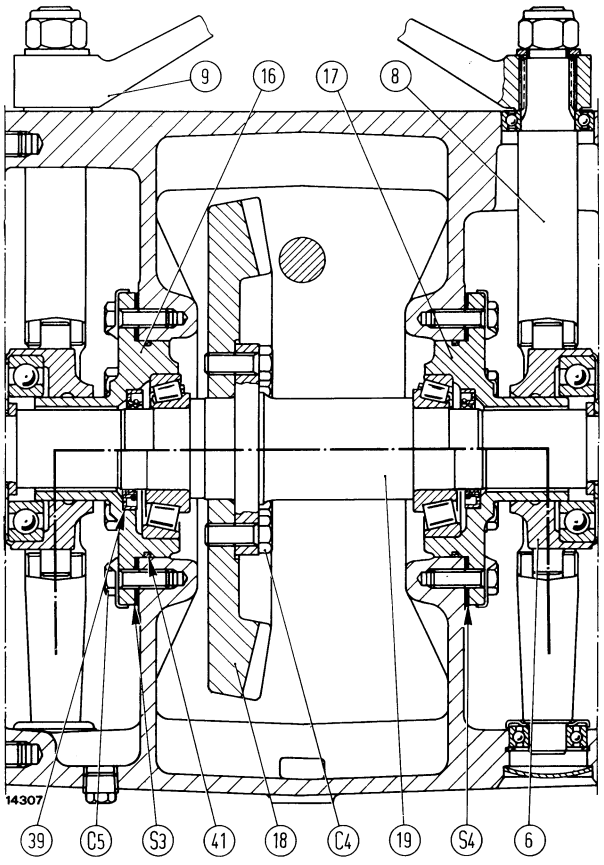
– Withdraw shaft (19) and remove ring gear (18).

– Remove covers over main shaft (1, page 1) and countershaft (2).

– Engage two gears simultaneously and loosen countershaft lock ring (C_1).

– Remove front retaining ring, withdraw main shaft using a suitable driver and retrieve gears from inside housing.

– Spread countershaft retaining ring, apply a suitable driver to the front end of the countershaft and force the shaft out the rear of the housing.



Cross section through transmission.

Note – Position of carriers (16 and 17), shaft (19) and associated bearings on late model tractors is shown in the area enclosed by a heavy chain line.

C_4. Ring gear capscrews - C_5. Capscrew - S.3 and S_4. Shims - 6. Clutch control sleeve - 8. Clutch fork lever - 9. Relay lever - 16 and 17. LH and RH ring gear carriers - 18. Ring gear - 19. Ring gear shaft - 39 and 41. Seals.

– Retrieve gears, spacers and shims (S_1 and S_2, page 1).

INSPECTION

Check seals for score marks, lip damage and distortion, replacing if necessary. Check early model needle roller bearing seats. If they show signs of hammering, scrap and replace the following parts:

– Transmission drive shaft (1, page 1).
– Bevel pinion and ring gear (2 and 18).
– Transmission driven gears.
– 4th/splitter drive gears.
– Transmission driven gear needle roller bearings.
– 4th/splitter drive gear needle roller bearings.
– Transmission drive shaft front and rear bearings.

Check condition of early model ring gear taper roller bearings; in the event of pitting or wear, scrap and replace the following parts:

– Ring gear shaft carriers (16 and 17, page 3).
– Ring gear shaft (19).
– Ring gear taper roller bearings.

If replacement is necessary, remove old bearings using universal pullers.

When installing new bearings, use drivers of suitable size and refer to figures on pages 1 and 2 for correct positioning.

ASSEMBLY

Refer to figures on page 1 and 3 for correct positioning of components and note that the bevel drive must be adjusted at the same time (see Section 203).

ADJUSTMENT

1. Bevel pinion position adjustment and shim thickness measurement (S_1, Section 202, page 1).

Install bevel pinion (2, figure a) provisionally without shims.

While turning bevel pinion (2) to settle bearings, tighten lock ring (C_1) until bevel pinion rotating torque is .5 to 1 Nm (.05 to .10 kgm or 36 to 72 ft. lb).

Install tool **293400/1** (D) on ring gear carriers as shown.

Tighten or back off the two centralizer cones to bring micrometer gauge spindle (5) in contact with rear bevel pinion bearing cone (1).

NOTE – Use spindle marked 150 to 175 mm.

Turn centralizer cones until tool is snug against seats, thus eliminating tool end play. Do not over-tighten.

Block micrometer gauge and spindle in position through screw (6).

Bring tip of spindle (5) in contact with bearing (1) and measure dimension (H_3).

Establish corrected nominal dimension (H_1) between ring gear centerline and back of pinion:

$$H_1 = H \pm C$$

where:

H = 173 mm (6.811 in). Nominal dimension between ring gear centerline and back of pinion.

C = Correction factor stamped on pinion, expressed in mm and proceed by + or – if different from 0, to be added to or subtracted from nominal dimension (H) according to sign.

Shim thickness (S_1) will be given by:

$$S_1 = H_3 - H_1$$

where:

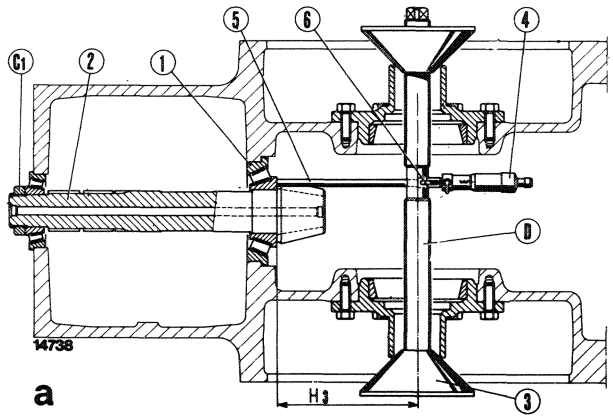
H_1 = Corrected nominal dimension between ring gear centerline and back of pinion.

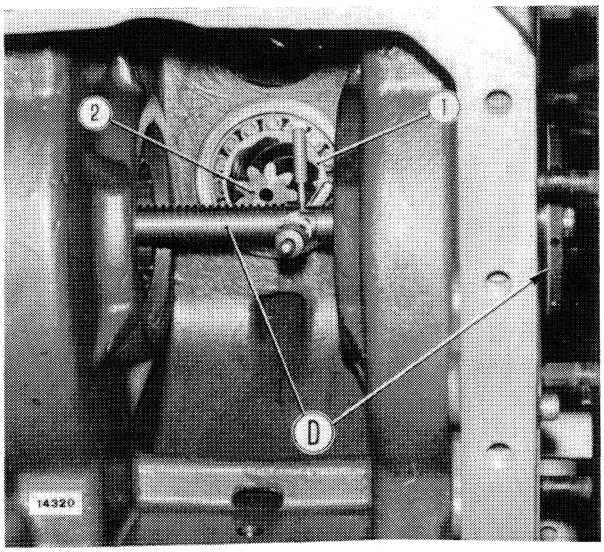
H_3 = Dimension measured with micrometer gauge.

If necessary, round up (S_1) to the nearest .05 mm or .002 in.

Example

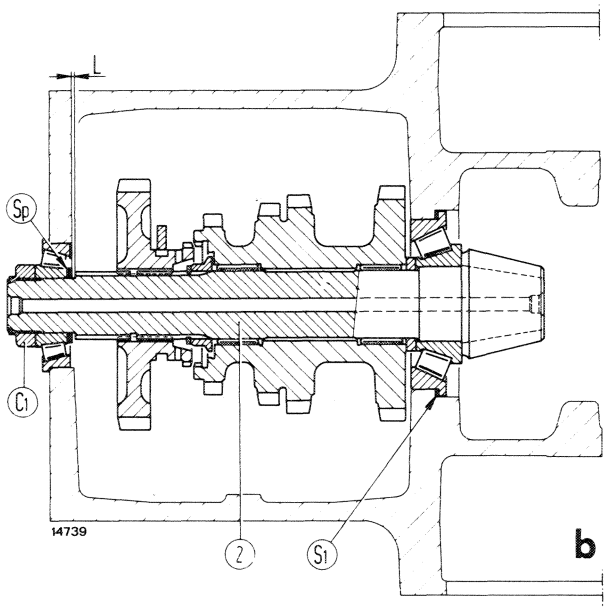
Dimension measured with micrometer gauge: H_3 = 174.32 mm.
Nominal dimension between ring gear centerline and back of pinion: H = 173 mm.
Correction factor: C = –.15 mm.
Corrected nominal dimension: H_1 = 173 –.15 = 172.85 mm.
Shim thickness:
$S_1 = H_3 - H_1$ = 174.32 – 172.85 = 1.50 mm.





Installation schematics for bevel pinion position check tool.

D. Universal tool **293400/1** - H_3. Dimension measured with tool - 1. Rear bevel pinion bearing cone - 2. Bevel pinion - 3. Centralizer cones - 4. Micrometer gauge - 5. Spindle - 6. Screw.



2. Bevel pinion bearing adjustment and shim thickness measurement (S_2, Section 202, page 1).

Make a 5 mm or 0.197 in test shim (Sp); if necessary, a shim from the standard series may be ground down.

Install bevel pinion (2) together with rear bearing, shim (S_1) as determined above, gears, spacers and test shim (Sp, figure b).

Install front bearing and, while turning bevel pinion to settle the bearings, tighten lock ring (C_1) until bevel pinion rotating torque is .5 to 1 Nm (.05 to 10 kgm or 36 to 72 ft. lb. See figure c.

Using a feeler gauge, measure clearance (L) between test shim (Sp) and splined end of bevel pinion.

Shim thickness (S_2) will be given by:

$$S_2 = Sp + L + 0.05$$

where:

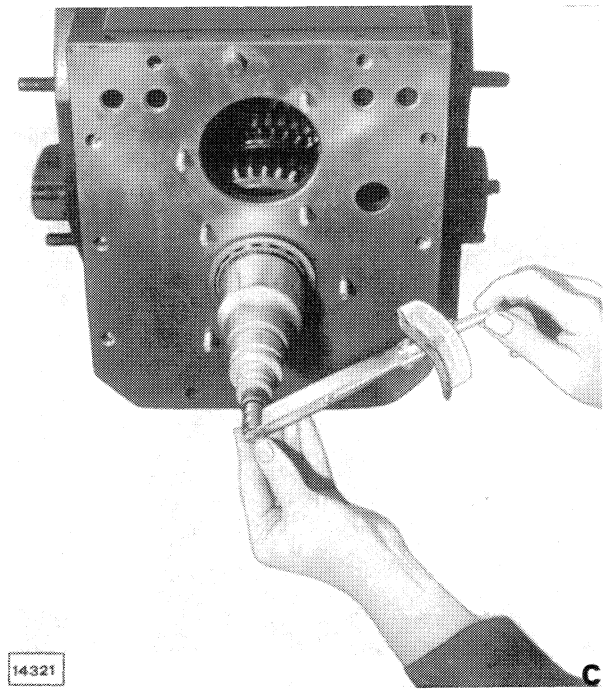
Sp = 5 mm (0.197 in). Test shim thickness.

L = Dimension measured with feeler gauge.

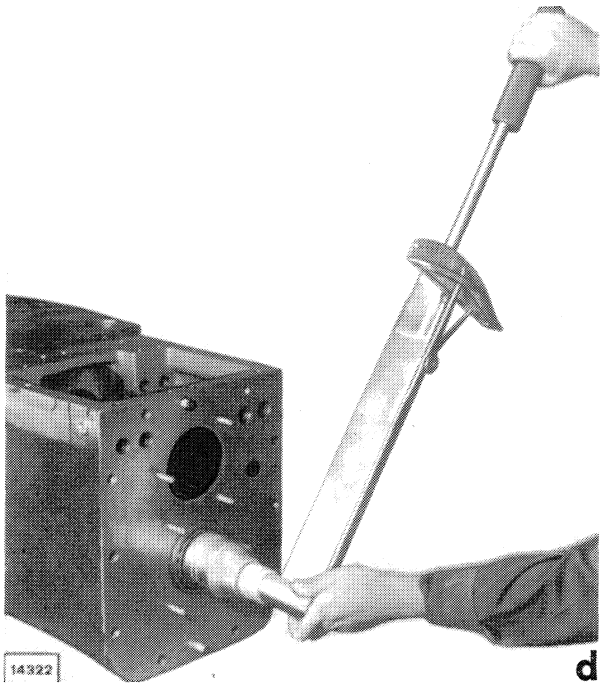
0.05 mm (.002 in) = Shim oversize, added to reduce bearing preload.

If necessary, round up (S_2)to the nearest .05 mm or .002 in.

Remove test shim (Sp), install shim (S_2) and tighten lock ring (C_1) to 294 Nm, 30 kgm or 216.854 ft. lb. (figure d, page 2).



Checking bevel pinion rotating torque.



Tightening bevel pinion lock ring.

Repeat rotating torque check, adjusting if necessary by changing shim (S_2). Increasing shim thickness will reduce torque, and vice versa.

Stake lock ring (C_1) in place.

3. Ring gear bearing adjustment and backlash check.

⚠ CAUTION ⚠

Handle all parts carefully.
Do not put hands and fingers between parts.

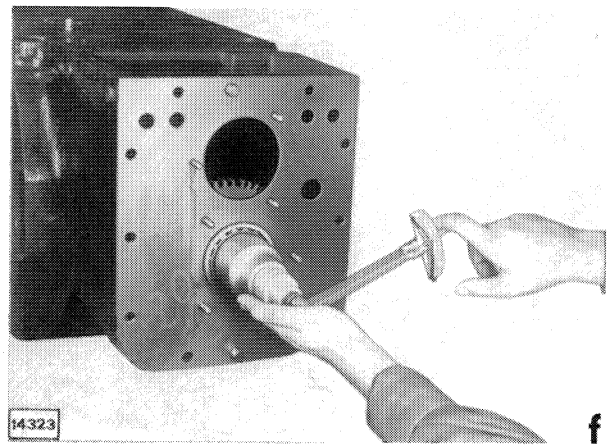
Put ring gear (18, Section 202, page 3) in transmission housing.

Install right hand bearing cone in ring gear shaft (19) and insert shaft through right hand carrier bore.

Provisionally tighten ring gear retaining screws.

Using guide pins **292888** (A, figure c) install right hand carrier (17) without shims or gasket and secure through three evenly-spaced and well lubricated screws tightened to 61 Nm (6.2 kgm or 45 ft. lb).

Heat left hand bearing cone to 80-90° C (175 to 195° F) and install on ring gear shaft.
Install left hand carrier (16) as directed for right hand carrier. While turning ring gear to settle bearings, tighten the three screws until bevel pinion rotating torque as measured at lock ring (C_1, Section 202, page 1) is .8 to 1.8 Nm (.08 to .18 kgm or .58 to 1.30 ft. lb). See figure f.



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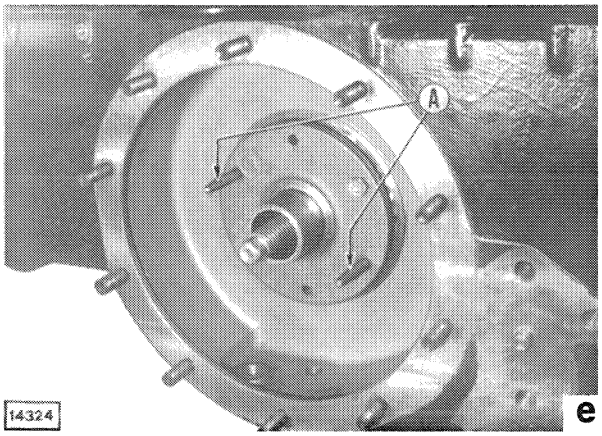
Checking bevel drive rotating torque.

Torque down screws (C_4, figure g) to 216 Nm (22 kgm or 159 ft. lb). Repeat rotating torque check.

Using a feeler gauge, measure clearance (L, figure i, page 4) between left hand carrier (16) and transmission housing boss in three evenly spaced positions.

Calculate the arithmetic average Lm of the three measurements.



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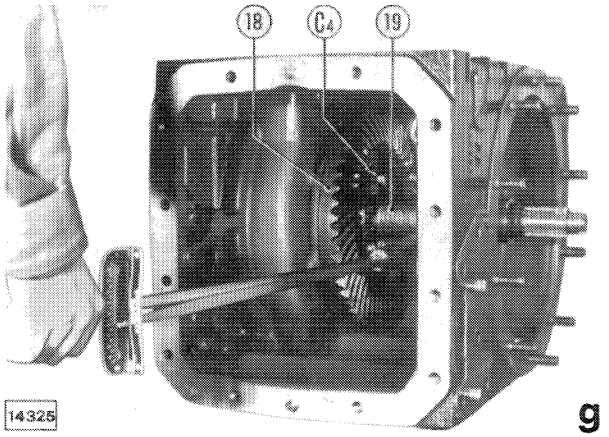
Centering a ring gear carrier using guide pins 292888 (A).



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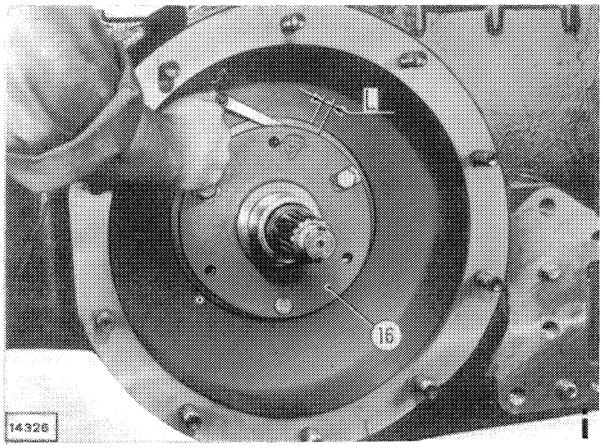
Torqueing down ring gear capscrews.
C_4. Capscrews - 18. Ring gear - 19. Shaft.



Measuring clearance (L) between carrier and housing.
16. Carrier.

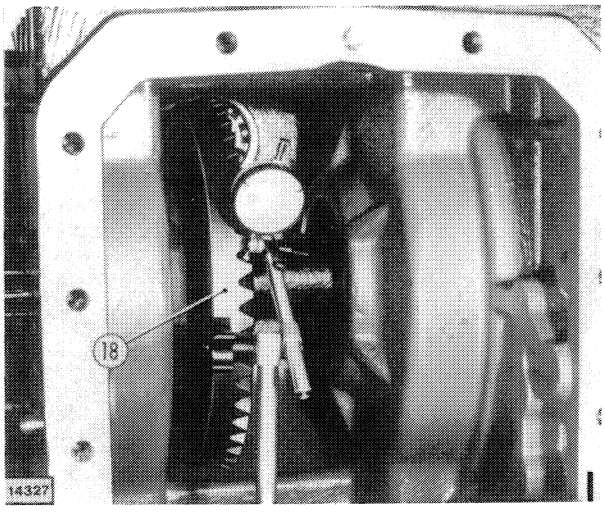
Total thickness (Sc) of carrier shims (S_3, S_4) will be given by:

$$Sc = Lm + 0.05 \text{ mm}$$

where:

0.05 mm (.0002 in) shim oversize, added to reduce bearing preload.

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



Checking bevel drive backlash (specified backlash = .18 to .23 mm or .007 to .009 in).
18. Ring gear.

Using a dial gauge with stylus at right angles to a ring gear tooth flank as shown in figure I, measure bevel drive backlash (6). Take measurements at three equi-spaced points and average readings.

Normal bevel drive backlash is .18 to .23 mm (.007 to .009 in), or an average of .20 mm (.008 in). If backlash is not as specified, multiply the backlash reading by 1.34 to obtain the corresponding ring gear end play.

Install a shim (S_4) on right hand carrier whose thickness is equal to the ring gear end play, i.e.:

$$S_4 = (G - 0.20) \times 1.34$$

Thickness of shim (S_3) to be installed under left hand carrier (23) will be given by:

$$S_3 = Sc - S_4$$

where:

Sc = Total thickness of ring gear shaft bearing shims.

Example:

Clearance measurements between left hand carrier and transmission housing: 2.6 mm, 2.7 mm and 3.0 mm.

$$Lm = \text{average clearance} = \frac{2.6 + 2.7 + 3.0}{3} = 2.77 \text{ mm}$$

Total shim thickness determination ($S_3 + S_4$):

$Sc = Lm + .05 = 2.77 + .05 = 2.82$ mm = 2.85 mm

Ring gear end play: G = 1.15 mm

Right hand carrier shim thickness:

$S_4 = (1.15 - 0.20) \times 1.34 = .95 \times 1.34 =$ 1.3 mm

Left hand carrier shim thickness:

$S_3 = Sc - S_4 = 2.85 - 1.3 = 1.55$ mm.

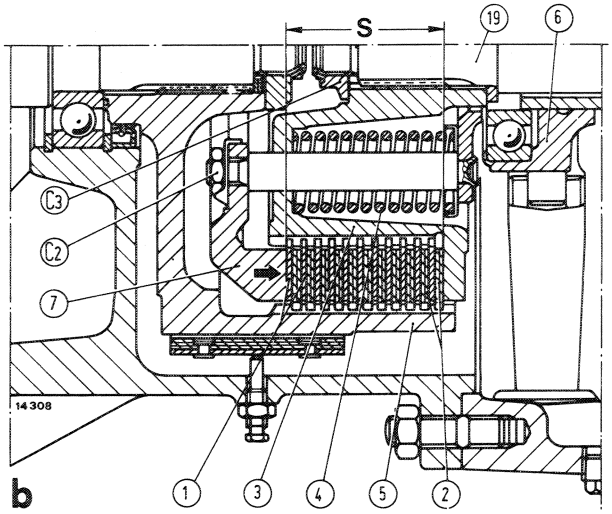
STEERING CLUTCHES

To gain access to steering clutches or brakes, remove final drive as follows:

CAUTION

Lift and handle all heavy parts using a suitable lift. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

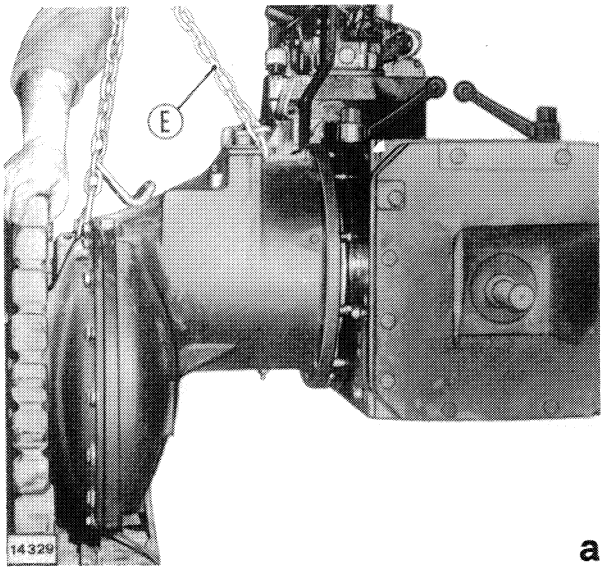
- Remove hood side panels and disconnect battery terminals.
- Remove master pins and stretch out tracks.
- Drain oil from transmission housing and hydraulic system. Do not mix oil types.
- Drain fuel tanks.
- Disconnect front and rear lighting leads, fuel lines and hydraulic pump suction and delivery lines.
- Remove fuel tanks, hydraulic oil tank, operator's seat, covers,guards, footboards and fenders.
- Remove caps retaining crossbar to final drives and swinging drawbar support plate.



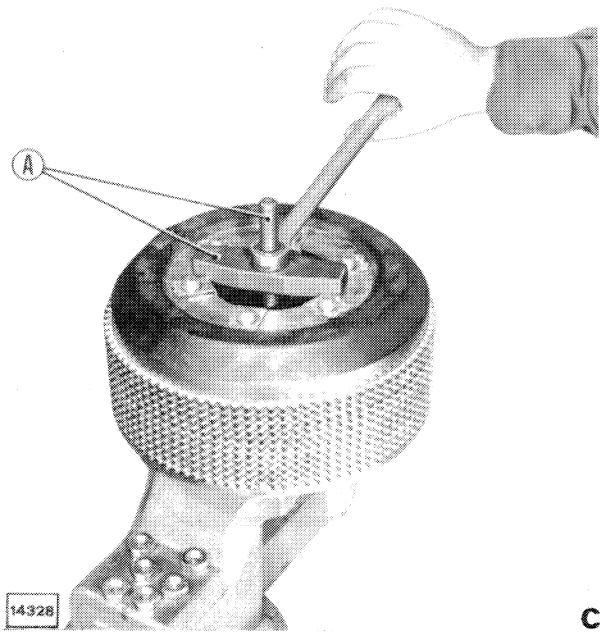
Longitudinal section through left-hand steering clutch.

Note – Install additional drive plates from the side indicated by the arrow to restore specified thickness (S).

C_2. Stud nut - C_3. Lock ring - S = 79.75 to 85.25 mm (3.140 to 3.356 in). Total clutch pack thickness - 1. Drive plates - 3. Inner drum - 4. Spring - 5. Outer drum - 6. Control sleeve - 7. Pressure plate - 19. Ring gear shaft.

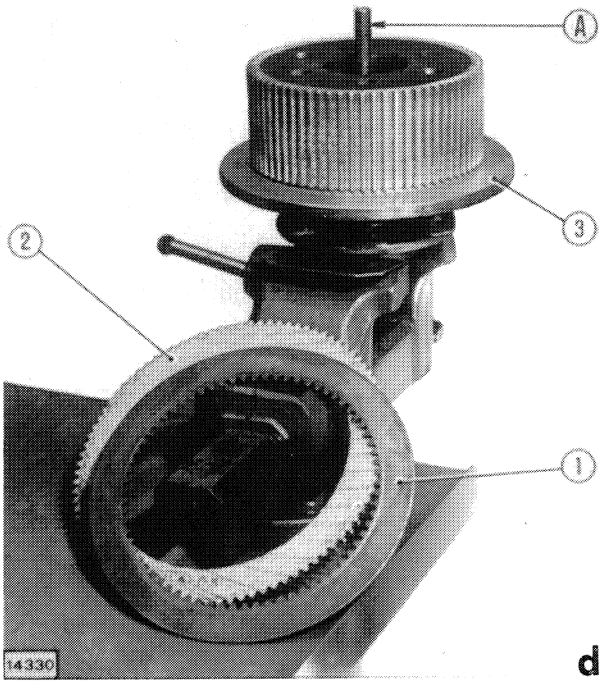


Removing (installing) final drive housing lift hook 291517 (E).



Disassembling (assembling) steering clutch using tool 290997 (A).

POWER TRAIN: Steering clutches - Brakes - Final drives



d

Steering clutch components.

A. Tool **290997** - 1. Drive plate - 2. Driven plate - 3. Inner drum.

– Remove drawbar and swing frame.

– Place a hydraulic jack under rear of transmission housing.

– Attach hook **291582** to drive sprocket. Remove screws (C_{15}, page 6) and lift off drive sprocket.

– Remove pedal support cover and brake adjustment cover from final drive housing.

– Raise rear of transmission housing by around 10 cm or 4 in.

– Attach hook **291517** (E), remove stud nuts (C_{11}) and remove final drive housing (see figure a, page 1).

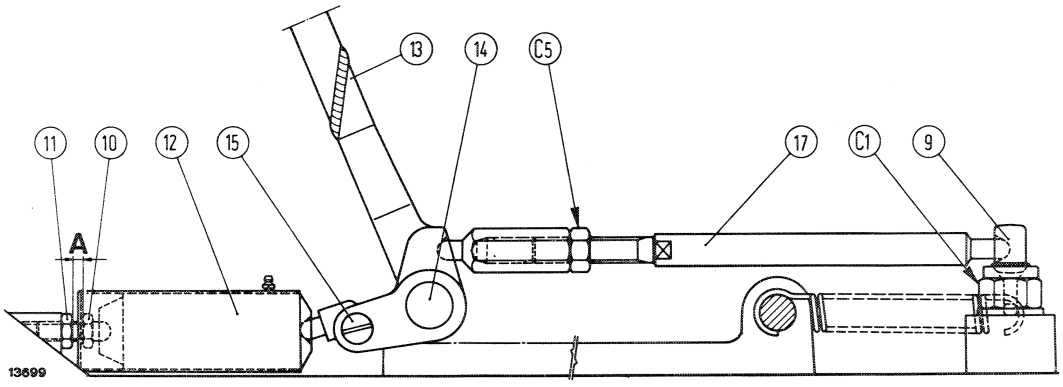
– Loosen ring gear (C_3) and slide clutch assembly off ring gear shaft.

– Install clutch on tool **290997** (A) and disassemble components as shown in figures **c** and **d**.

Scrap and replace any oil-soaked asbestos plates.

If plates are only wet on the surface, wash in gasoline and roughen up the surface with a wire brush.

Check that total thickness of drive/driven plate pack is as specified; if not, add one or more drive plates from the side indicated in figure **b**.

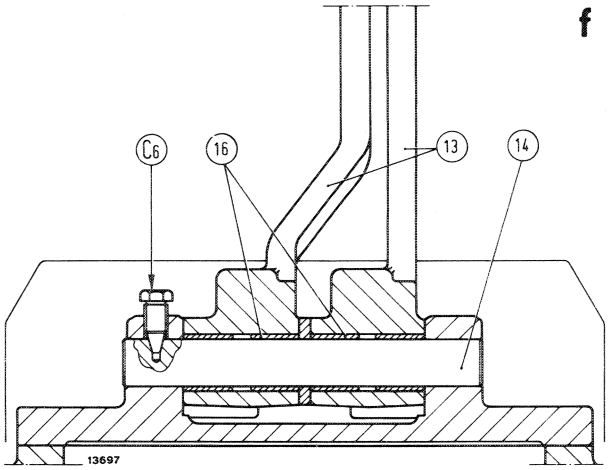


e

Steering clutch linkage.

A = 5 to 7 mm (.197 to .275 in). Clearance between nuts - C_1. Relay lever nut - C_5. Link adjuster nut - 9. Relay lever - 10. Rod - 11. Nut - 12. Servo - 13. Clutch control lever - 14. Pivot - 15. Stop pin - 17. Link.

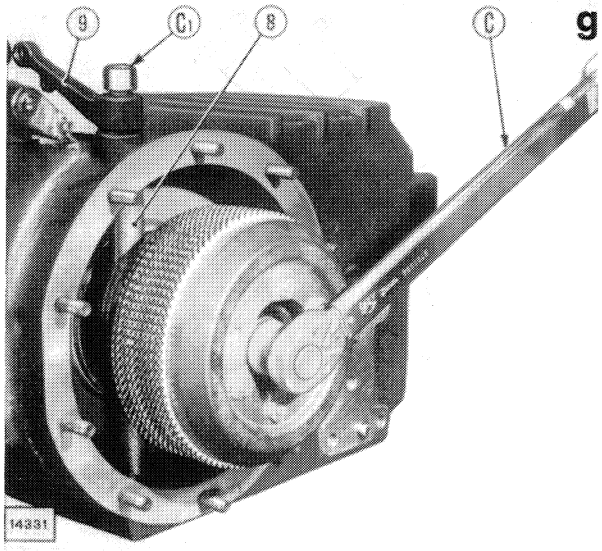
f



Section through steering clutch control lever pivot assembly.

C_6. Pivot screw - 13. Control levers - 14. Pivot - 16. Bushings.

g



Torqueing down left-hand steering clutch lock ring.

C_1. Relay lever nut - C. Torque wrench - 8. Release lever - 9. Relay lever.

Locate and eliminate any oil leakage past seals (39, 40, 41 and 42, page 6).

Check spring efficiency (4, see figure **b**, page 1).

CAUTION

Handle all parts with care. Do not put hands or fingers between parts.
Use suitable tools to align holes.
DO NOT USE FINGERS OR HANDS.

Assemble parts, lubricating pressure plate studs with **grassofiat TUTELA G9** or other approved grease.

Move control levers (13, figure **f**) in release position to align and center driven plates (2) and install outer drum (5, figure **b**, page 1).

Subsequently adjust steering clutch linkage as follows:

- Check that clearance (A) between rod and nut (10 and 11, figure **c**, page 2) is as specified.
- Check that control lever free travel at hand grip is around 80 mm or 3 in. To adjust, loosen nut (C_5) and slide link (17) in or out as necessary.
- Check alignment of levers (13), adjusting stop pins (15) if necessary.

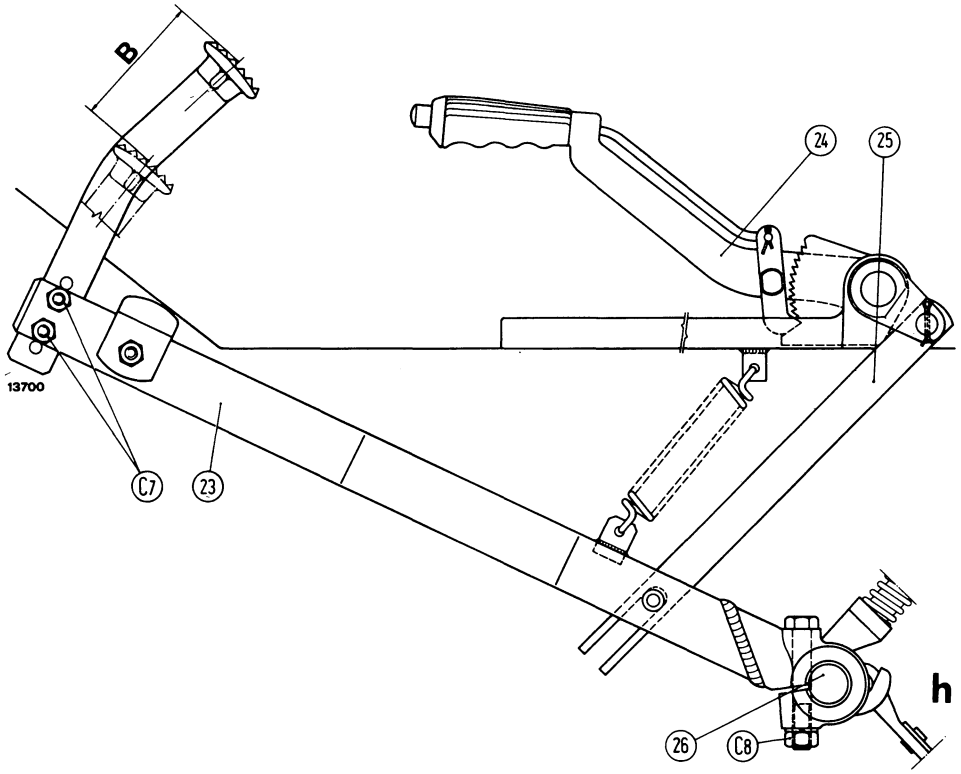
Assemble final drive housing to transmission housing, applying jointing compound as indicated on page 8.

BRAKES

Band-type brakes act on steering clutch outer drums. They are controlled through separate pedals on transmission housing sides, and can be locked by means of a hand lever when the tractor is parked.

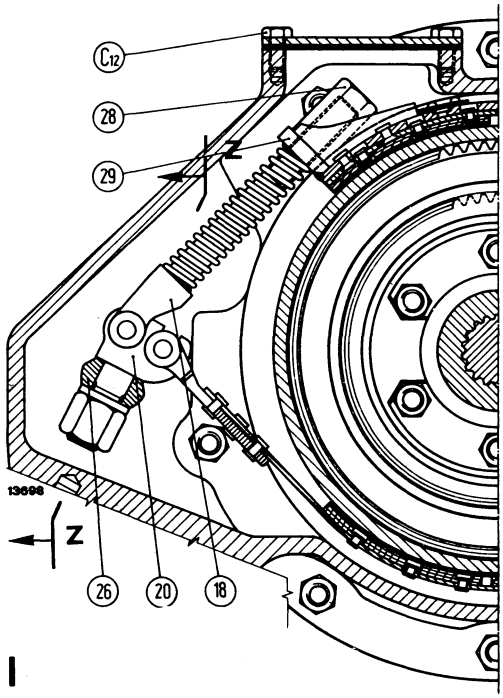
To disassemble brake unit, remove final drive as directed on page 1 and proceed as follows:

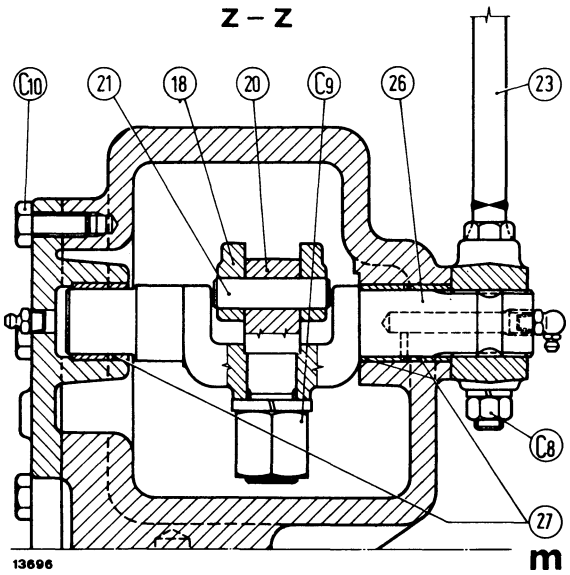
- Place final drive housing on support **290092** of revolving stand **290086.**
- Depress brake pedal (23, figure **h**, page 4) to block drum (5, figure **n**) and loosen lock ring (C_4).



Brake linkage.

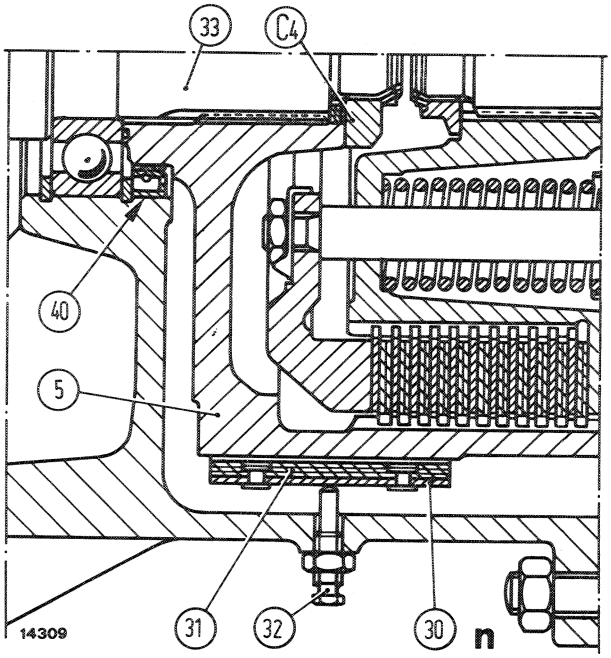
B = 80 to 90 mm (3.2 to 3.5 in). Pedal free travel - C_7. Pedal nut - C_8. Nut - 23. Pedal levers - 24. Hand lever - 25. Hand lever link.





Sections through brake linkage.

C_8. Nut - C_9. Nut - C_{10}. Pivot carrier capscrew - C_{12}. Adjustment cover capscrew - 18. Band link - 20. Band control lever - 21. Dowel - 23. Pedal lever - 26. Pivot - 27. Bushings - 28. Link adjuster nut - 29. Top end of band.



Section through left hand brake.

C_4. Drum lock ring - 5. Outer drum - 30. Brake band - 31. Lining - 32. Band centering screw - 33. Final drive pinion - 40. Seal.

– Loosen screw (32) and remove nut (28, figure **l**) to free end of brake band (29).

– Remove drum (5, figure **n**) and take out brake band.

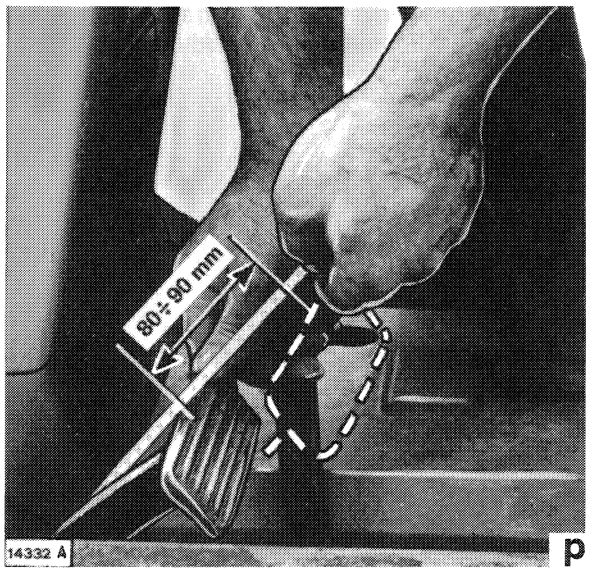
Check brake linings (31) for wear and compare thickness with specifications on page 5, Section 20.

If brake linings are soaked with oil and thus require replacement, check for leakage through seals (39, 40, 41and 42, page 6).

Inspect band working surfaces on drum (5, figure **n**). Drum surfaces may be dressed if unusually worn, but as little material as possible should be removed.

Before installing brake band, check that it clears the drum without pinching, adjusting end position as necessary to open out band.

Assemble part by reversing the removal sequence and perform the following adjustment operations:

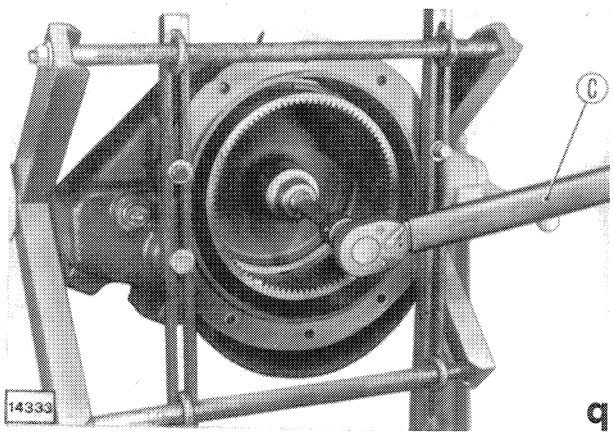


Checking brake pedal free travel.

a) Brake band centering: fully tighten screw (32), back off by two turns and secure with associated lock nut.

b) Pedal free travel adjustment: adjust nut (28, figure **l**, page 4) so that pedal free travel (B, figure **h**) is 80 to 90 mm or 3.2 to 3.5 in (see figure **p**).

Tighten lock ring (C_4, figure **n**) to the specified torque (see page 7, Section 20 and figure **q**) and stake in place.

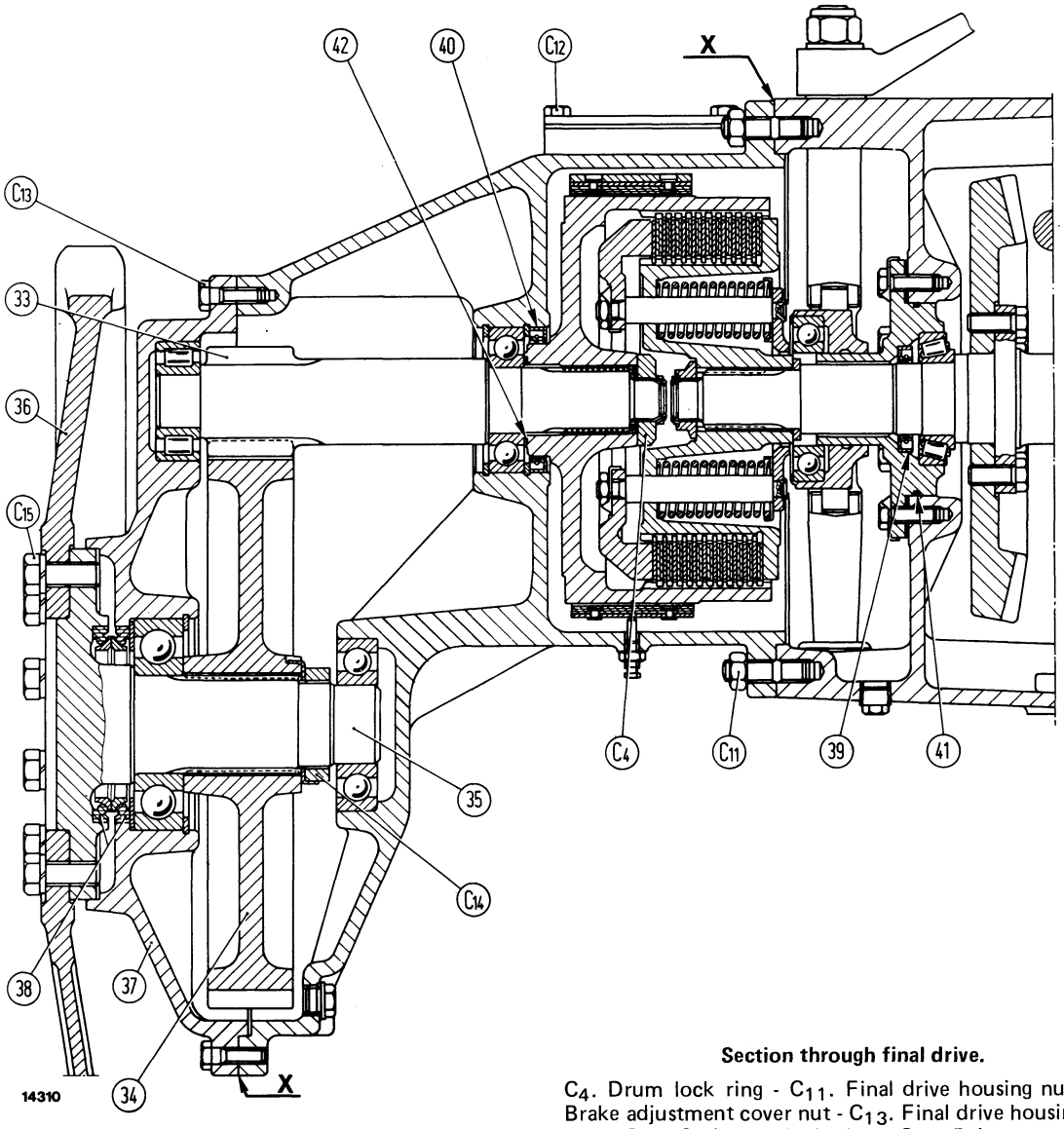


Tightening drum lock ring using torque wrench (c).

Assemble final drive housing to transmission applying jointing compound as directed on page 8.

FINAL DRIVES

Final drives consist of a pinion and spur gear train driven from the ring gear through the steering clutches.



Section through final drive.

C_4. Drum lock ring - C_{11}. Final drive housing nut - C_{12}. Brake adjustment cover nut - C_{13}. Final drive housing cover nut - C_{14}. Stub axle lock ring - C_{15}. Drive sprocket capscrew - 33. Pinion - 34. Spur gear - 35. Stub axle - 36. Drive sprocket - 37. Final drive housing cover - 38. Seal - 39 and 40. Seals - 41 and 42. O-rings.
X. See instructions on page 8.

Remove final drives as directed on page 1. Then proceed as follows:

CAUTION

Lift and handle all heavy parts using a suitable lift. Ensure that all units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

– Place final drive housing on revolving stand **290086** (A) with support **290092** (B) as shown in figure **r**.

– Drain oil and retain for further use.

– Attach hook **291582** (C) to drive sprocket, remove screws (C_{13}, page 6) and take off cover (37) together with spur gear (34).

– Depress brake pedal (23, figure **h**, page 4) to block drum (5, figure **n**, page 5) and loosen lock ring (C_4).

– Remove drum (5) and, using a suitable driver, force out pinion (33).

– Install two temporary screws (V, figure **t**) in two adjacent drive sprocket capscrew holes (C_{15}) and clamp cover (37) in vice.

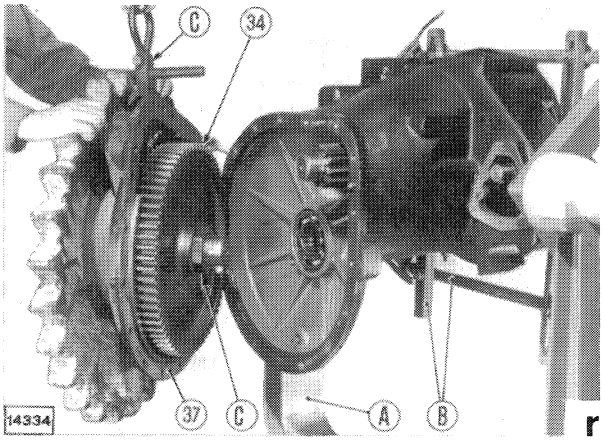
– Loosen lock ring (C_{14}) using wrench **291884** and remove stub axle (35).

Note – To facilitate stub axle removal, make two forcing screws as shown in figure **u**, page 8. Install forcing screws in two diametrically opposed drive sprocket capscrew holes (C_{15}).

CAUTION

Handle all parts with care. Do not put hands and fingers between parts.

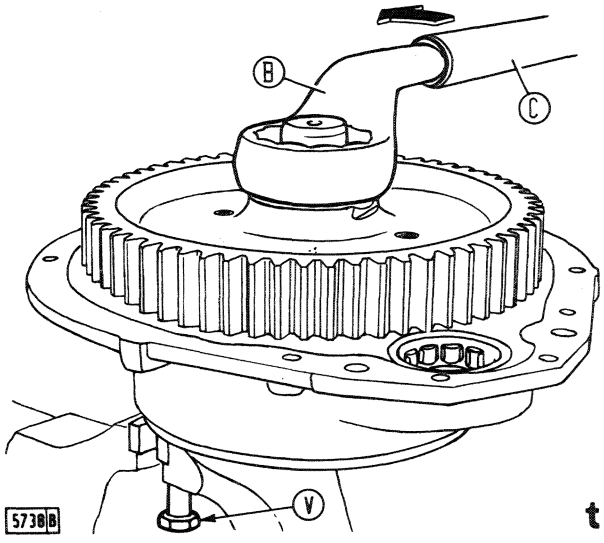
Check seal efficiency and condition of all bearings and gears, scrapping and replacing any worn or damaged parts.



Removing (installing) final drive cover.

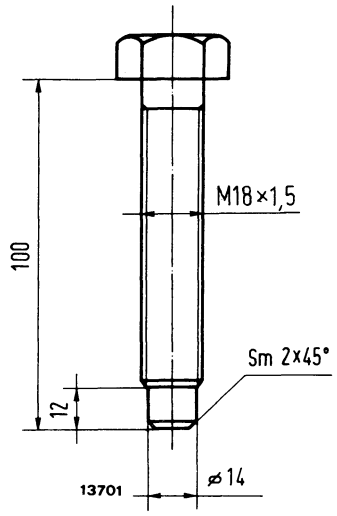
A. Revolving stand **290086** - B. Support **290092** - C. Lift hook **291582** - C_{14}. Stub axle lock ring - 34. Spur gear - 37. Cover.

Inspect and install floating ring seals (38, page 6) as directed on page 5, Section A.



Loosening stub axle lock ring.

C_{14}. Lock ring - B. Offset wrench **291884** - C. Extension **290240** - V. M 18 x 1.5 screws.



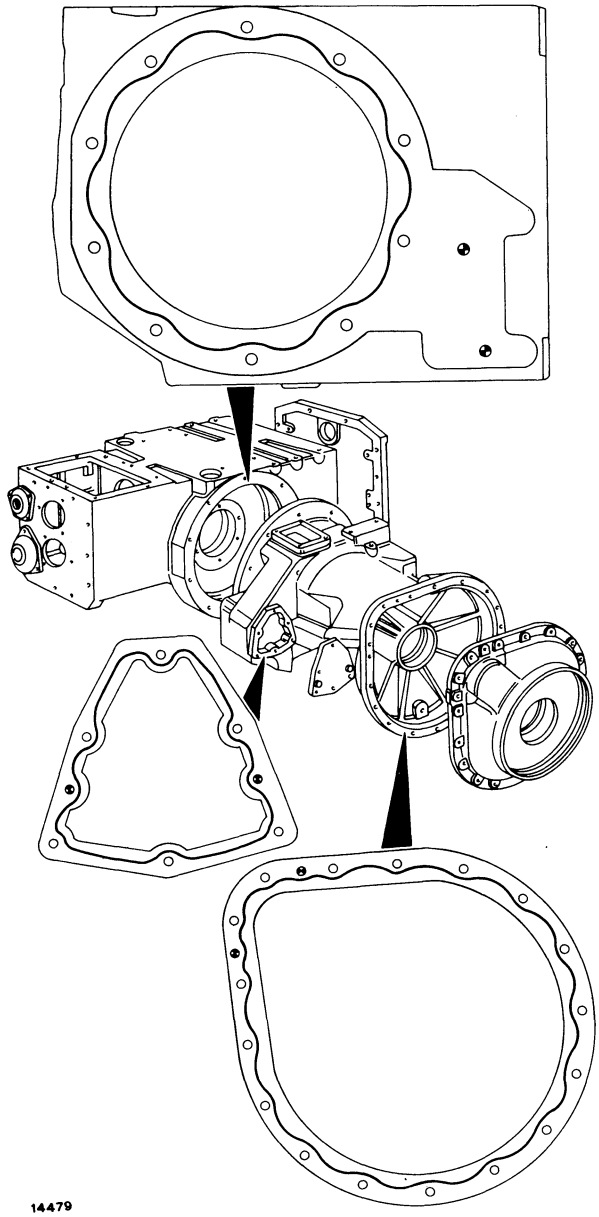
Forcing screws 50042 for stub axle removal - Dimensions in mm - Material 35 Cr Mo 4 (708 A 37).

⚠ CAUTION ⚠

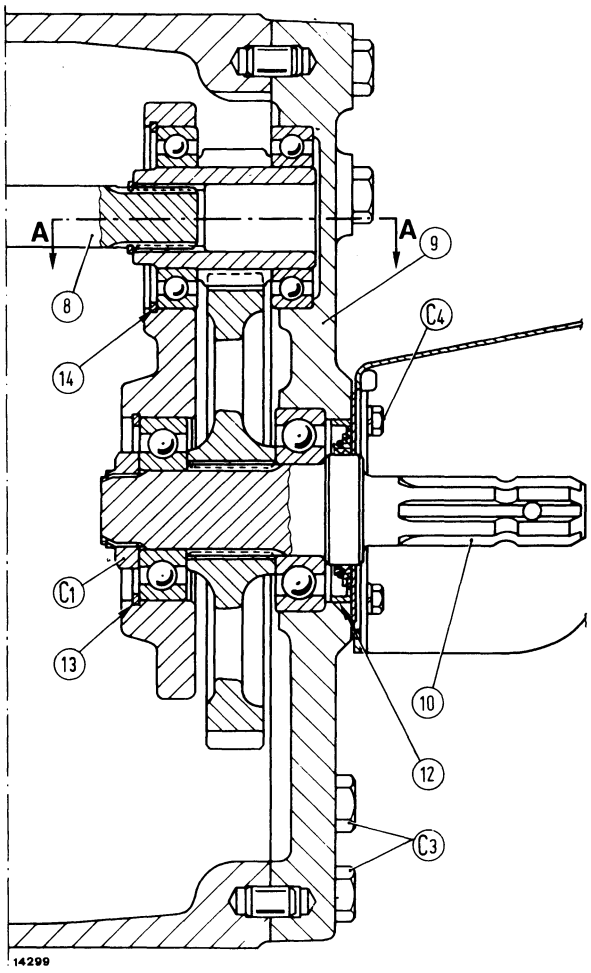
Use suitable tools to align holes.
DO NOT USE FINGERS OR HANDS.

Assemble parts referring to the illustration on page 6.

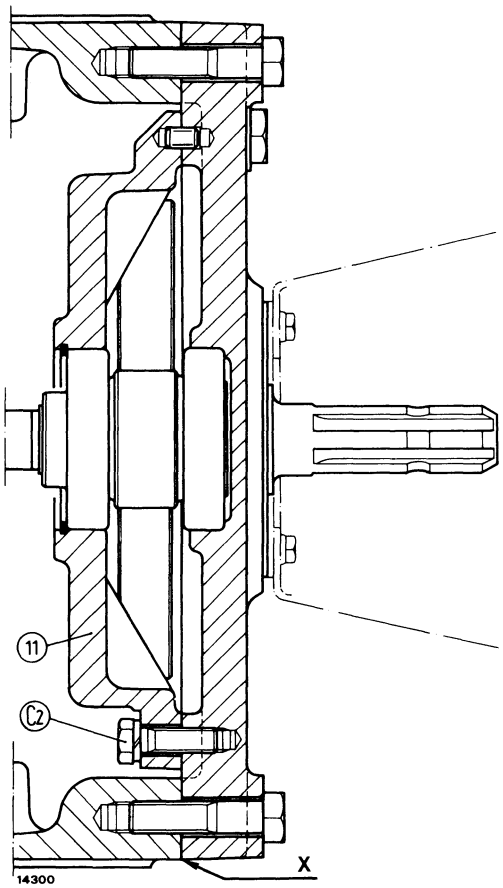
Throughly clean and degrease mating surfaces and apply a 2 mm or 1/16" bead of jointing compound as shown alongside. Jointing compound types are listed on page 5, Section A.



Applying jointing compound for final drive housing installation.



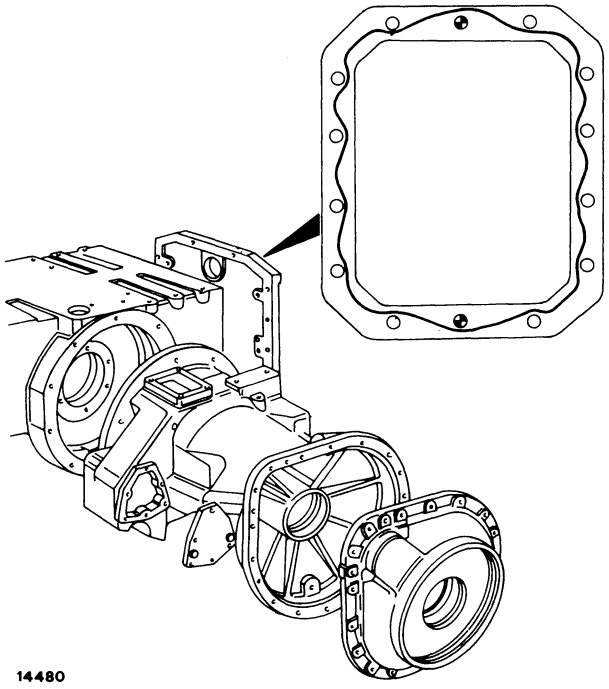
Section A–A



Longitudinal section through power takeoff.

C_1. Lock ring - C_2. Bearing carrier capscrew - C_3. Cover capscrew - C_4. Shield capscrew - 8. Drive shaft - 9. Rear transmission housing cover - 10. P.T.O. spline shaft - 11. Bearing carrier - 12. Seal - 13 and 14. Retaining rings.

Note – Prior to assembly, throughly clean and degrease mating surfaces **X** and apply a 2 mm or 1/16" bead of jointing compound to cover as shown alongside.
Jointing compound types are listed on page 5, Section A.



DESCRIPTION

Transmission-driven power takeoff features a spur gear set in the rear transmission cover.

REMOVAL AND INSTALLATION

Remove P.T.O. cover as follows:

- Remove hood side panels and disconnect battery terminals.
- Drain transmission housing and hydraulic system. Do not mix oil types.
- Drain fuel tank.
- Disconnect front and rear lighting cables, fuel lines and hydraulic pump suction and delivery lines.
- Remove fuel tank, hydraulic oil tank, operator's seat, covers, guards, footboards and fenders.
- Using the tool shown on page 2, Section 202, remove lower pivots and take off lift cylinders.
- Remove lift arm and draft link mounting plates.

⚠ CAUTION ⚠

Lift and handle all heavy parts using a suitable lift. Ensure that units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of the load to be lifted.

- Using hook **291517**, attach a hoist to P.T.O. cover, remove remaining capscrews (C_3) and lift off cover.

⚠ CAUTION ⚠

Use suitable tools to align holes.
DO NOT USE FINGERS OR HANDS.

OVERHAUL

To disassemble parts, hold gears stationary and remove lock ring (C_1, page 1). Remove carrier (11) and shield and slide out gears and shaft (10).

Replace worn bearings using universal pullers and suitable drivers. If necessary, replace seal (12).

After overhaul, assemble parts applying jointing compound as directed on page 1.

TRACK CHAINS

	855C	955C
Number of links per left-hand track:		
– Right-hand links (marked D)	35	38
– Left-hand links (marked S)	34	37
– Master link	1	1
Number of links per right-hand track:		
– Right-hand links (marked D)	34	37
– Left-hand links (marked S)	35	38
– Master link	1	1
Number of shoes per track	35	38
Shoe width:		
– Standard	400 mm (15.75 in)	
– Optional	500 mm (19.70 in)	
Track chain ground contact area with standard shoes	13.960 cm^2 (2163.8 in^2)	15.880 cm^2 (2461.4 in^2)
• Specific ground pressure	0.38 bar (0.39 kg/cm^2) (5.511 psi)	0.39 bar (0.40 kg/cm^2) (5.656 psi)
Number of track rollers (per track):		
– Single flange	3	3
– Double flange	2	3
Number of carrier rollers (per track)	1	1
Front idler and track rollers	Bushing-mounted	
Link height	83 mm (3.268 in)	
– wear limit	75 mm (2.953 in)	
Link width	33 mm (1.299 in)	
Pin center distance	160 mm (6.299 in)	
– wear limit	163.5 mm (6.437 in)	
Bushing O.D. (4, page 1, Section 301)	44.920 to 45.020 mm (1.768 to 1.772 in)	
Bushing bore in link	44.740 to 44.800 mm (1.761 to 1.764 in)	
Bushing interference fit	0.120 to 0.280 mm (.005 to .028 in)	
Pin diameter	29.970 to 30.040 mm (1.180 to 1.183 in)	
Pin bore in link	29.790 to 29.850 mm (1.173 to 1.175 in)	
Pin interference fit	0.120 to 0.250 mm (.005 to .009 in)	
Pin clearance in bushing	0.320 to 0.540 mm (.012 to .021 in)	
Master pin bushing thrust washer thickness	6.9 to 7.0 mm (.272 to .275 in)	

UNDERCARRIAGE: Specification and Data

TENSION MECHANISM

Adjustment	Hydraulic
Adjuster cylinder diameter (3, page 1, Section 302)	60 mm (2.362 in)
No. of springs (per track) 855C	1
No. of springs (per track) 955C	2
Inner spring length (2, 955C only):	
– Free	379 mm (14.9 in)
– Installed or under 6306 to 6973 N (643 to 711 Kg, 14175.89 to 15675.30 lb)	329 mm (12.95 in)
Outer spring length (1):	
– Free	466 mm (18.35 in)
– Installed or under 38638 to 42757 N (3940 to 4360 kg, 86858.22 to 96117.74 lb)	415 mm (16.3 in)

FRONT IDLERS – TRACK ROLLERS

Shaft diameter:	
– Front idler (8, page 1, Section 303)	55.120 to 55.150 mm (2.170 to 2.171 in)
– Track roller (8, page 3)	54.975 to 55.000 mm (2.164 to 2.165 in)
Bushing fitted I.D. (6)	55.213 to 55.364 mm ([1]) 2.174 to 2.180 in)
Shaft clearance in bushings:	
– Front idler	0.063 to 0.244 mm (.002 to .010 in)
– Track roller	0.213 to 0.389 mm (.008 to .015 in)
Bushing O.D. (6)	63.970 to 64.000 mm (2.518 to 2.520 in)
Bushing bore in carrier (2)	63.913 to 63.959 mm (2.516 to 2.518 in)
Bushing interference fit	0.011 to 0.087 mm (.0004 to .003 in)
Bushing carrier O.D. (2)	95.067 to 95.102 mm (3.743 to 3.744 in)
Carrier bore in idler or roller	95.000 to 95.035 mm (3.740 to 3.741 in)
Carrier interference fit	0.032 to 0.102 mm (.001 to .004 in)
End plate-to-idler guide side clearance (G_1)	0.5 to 1 mm (0.20 to .039 in)
Shim thickness (S_1)	0.5 mm (0.20 in)
Clearance between wear plate (G_2)	0.5 to 1 mm (0.20 to 0.039 in)
Shim thickness (S_2)	0.5 mm (0.20 in)

([1]) Unreamed.

CARRIER ROLLER

Shaft diameter at bushing (8, page 5, Section 301)	39.975 to 40.000 mm (1.574 to 1.575 in)
Bushing fitted I.D. (4)	40.085 to 40.180 mm (1) (1.578 to 1.582 in)
Shaft clearance in bushing	0.085 to 0.205 mm (.003 to .008 in)
Bushing O.D.	50.000 to 50.025 mm (1.968 to 1.969 in)
Bushing bore in roller (1)	49.900 to 49.940 mm (1.964 to 1.966 in)
Bushing interference fit	0.100 to 0.125 mm (.004 to .005 in)
Thrust washer thickness (2)	9.90 to 10.00 mm (.390 to .394 in)

TRACK FRAMES AND SUSPENSION

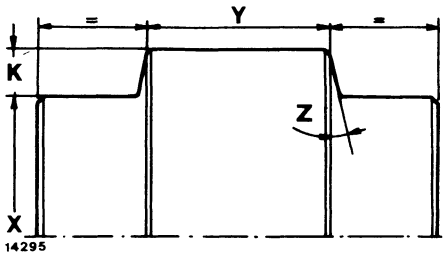
Front suspension pivot pin diameter (3, page 3, Section 304)	29.979 to 30.000 mm (1.180 to 1.181 in)
Bushing fitted I.D. (4)	30.050 to 30.105 mm (1) (1.183 to 1.185 in)
Pin clearance in bushing	0.050 to 0.126 mm (.0020 to .005 in)
Bushing interference fit	0.064 to 0.129 mm (.003 to .005 in)
Guide plate position shim thickness (S_1)	1 - 2 mm (.04 to .08 in)
Guide plate clearance in brace	4 mm (.157 in)
Rear suspension beam diameter:	
— at inboard bushing	79.954 to 80.000 mm (3.148 to 3.150 in)
— at outboard bushing	69.954 to 70.000 mm (2.754 to 2.756 in)
Bushing fitted I.D.:	
— inboard bushing	80.080 to 80.320 mm (1) (3.153 to 3.162 in)
— outboard bushing	70.080 to 70.320 mm (2) (2.759 to 2.768 in)
Beam clearance in bushings	0.080 to 0.366 mm (.003 to .014 in)
Bushing interference fit	0.086 to 0.176 mm (.003 to .007 in)
Track frame alignment shim thickness (S_2, S_3)	1 - 2 mm (.039 to .079 in)
Wear plate shim thickness (S_4, page 4)	1 mm (.039 in)
Track frame adjustment	See pages 2 and 3, Section 304

(1) Unreamed

UNDERCARRIAGE: Specification and Data

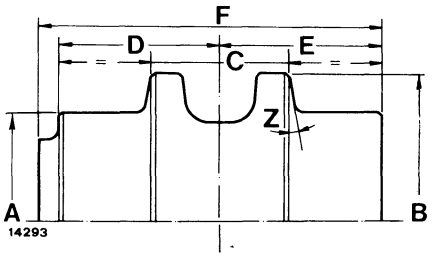
TIGHTENING TORQUE FIGURES

DESCRIPTION	Thread size	Torque		
		Nm	Kgm	ft. lb
Track chains - Section 301				
Nut, track shoes	9/16" 18UNF3	172	17.5	125
Capscrew, master pin (C_1, page 1)	M 16 x 1.5	221	22.5	160
Track tension mechanism - Section 302				
Capscrew, adjuster cylinder (C_2, page 1)	M 16 x 1.5	221	22.5	160
Capscrew, spring bracket (C_3)	M 16 x 1.5	221	22.5	160
Capscrew, selflocking, cylinder endplate (C_4)	M 10 x 0.25	61	6.2	45
Capscrew, yoke to idler brackets	M 14 x 1.5	147	15	110
Front idler - Track rollers - Carrier roller - Section 303				
Capscrew, idler guide (C_6, page 1)	M 14 x 1.5	113	11.5	80
Capscrew, shaft (C_7)	M 16 x 1.5	221	22.5	160
Capscrew, selflocking, bushing carrier (C_8)	M 10 x 1.25	59	6	40
Capscrew, selflocking, endplate (C_9)	M 14 x 1.5	162	16.5	113
Capscrew, selflocking, bushing carrier (C_{10}, page 3)	M 10 x 1.25	59	6	40
Capscrew, track roller bracket (C_{11})	M 16 x 1.5	221	22.5	160
Capscrew, carrier roller bracket (C_{12}, page 5)	M 16 x 1.5	221	22.5	160
Capscrew, selflocking, thrust washer (C_{13})	M 10 x 1.25	61	6.2	45
Capscrew, carriage roller cover (C_{14})	M 10 x 1.25	59	6	40
Track frames and suspensions - Section 304				
Nut, leaf spring center bolt	M 10 x 1.25	39	4	29
Nut, spring clip (C_{16}, page 3)	M 10 x 1.25	59	6	40
Nut, spring anchor (C_{17})	M 14 x 1.5	147	15	110
Capscrew, pivot pin (C_{18})	M 10 x 1.25	59	6	40
Capscrew, track frame brace (C_{19})	M 16 x 1.5	221	22.5	160
Capscrew, guide plate (C_{20})	M 16 x 1.5	221	22.5	160
Capscrew, support (C_{21}, page 4)	M 18 x 1.5	324	33	239
Capscrew, wear plate (C_{22})	M 12 x 1.25	98	10	72
Capscrew, selflocking, thrust washer (C_{23})	M 16 x 1.5	255	26	188
Capscrew, cover (C_{24})	M 16 x 1.5	221	22.5	160
Capscrew, suspension beam cap (C_{25})	M 18 x 1.5	314	32	232
Capscrew, track frame top guard (C_{26}, page 1, Section 302)	M 12 x 1.25	93	9.5	69
Capscrew, roller guard	M 12 x 1.25	98	10	72
Nut, roller guard stud	M 14 x 1.5	78	8	57



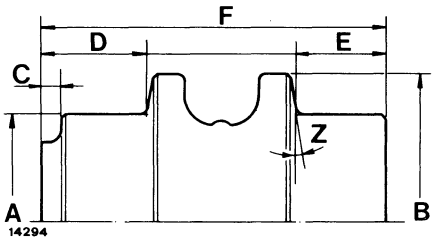
Front Idler Details.

K = 14.75 to 15.75 mm or .581 to .620 in (wear limit : 19 mm or 748 in; X = 549.5 to 550.5 mm or 21.634 to 21.673 in; Y = 55.5 to 56.5 mm or 2.185 to 2.224 in; Z = 10°.



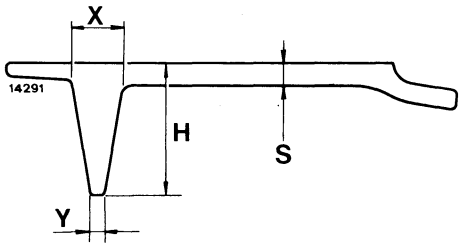
Early Model Carrier Roller Details.

A = 154.8 to 155 mm or 6.094 to 6.102 in; B = 187mm or 7.362 in; C = 56 to 57 mm or 2.205 to 2.244 in; D = E = 64 to 65 mm or 2.520 to 2.559 in; F = 137.5 to 138 mm or 5.413 to 5.433 in; Z = 10°.



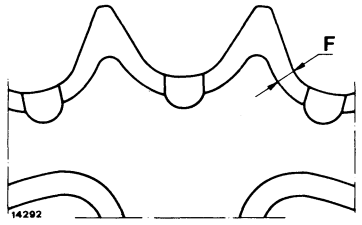
Late Model Carrier Roller Details.

A = 154.7 to 155.3 mm or 6.090 to 6.114 in; B = 186.6 to 187.4 mm or 7.346 to 7.378 in; C = 8 mm or .325 in; D = 42.35 mm or 1.667 in; E = 33.95 to 34.75 mm or 1.337 to 1.368 in; F = 137.7 to 138.3 mm or 5.421 to 5.445 in; Z = 10°.



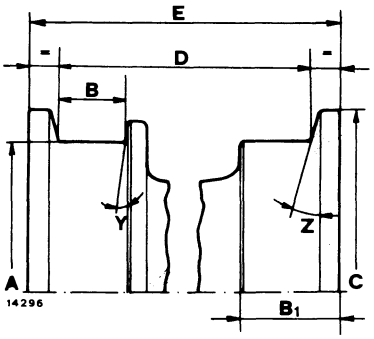
Track Shoe Details.

H = 52.2 to 53.8 mm or 2.055 to 2.118 in (wear limit: 22 mm or .866 in); S = 8.5 to 9.5 mm or .335 to .374 in; X = 20.5 to 21.5 mm or .807 to .846 in; Y = 5.5 to 6.5 mm or .216 to .254 in.



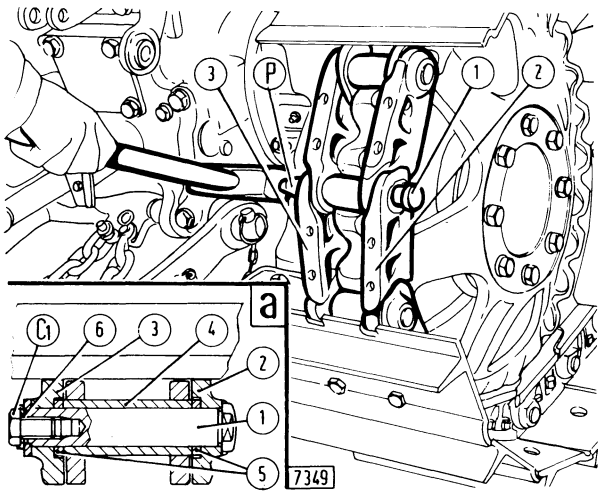
Drive Sprocket Details.

F = 10 to 11 mm or .394 to .433 in (steel sprocket) or 13 to 14 mm or .512 to .551 in (cast iron sprocket).



Double and Single Flange Track Roller Details.

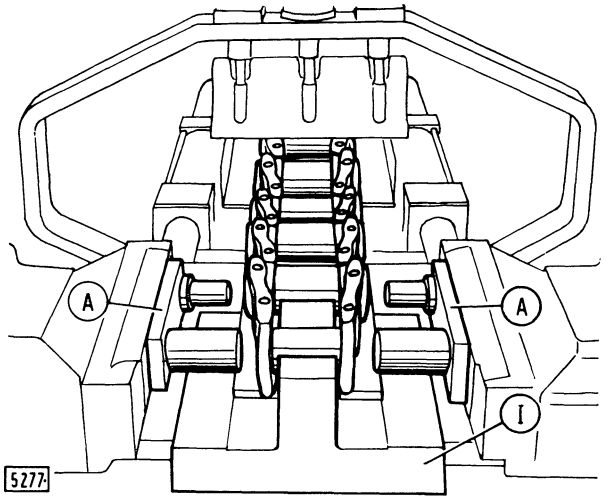
A = 184.8 to 185 mm or 7.275 to7.283 in; B = 35.5 to 36.5 mm or 1.398 to 1.437 in; B_1 = 49.5 to 50 mm or 1.949 to 1.968 in; C = 218 to 220 mm or 8.583 to 8.661 in; D = 134 to 135 mm or 5.275 to 5.315 in; E = 161.5 to 162.5 mm or 6.358 to 6.398 in; Y = 5°; Z = 7°.



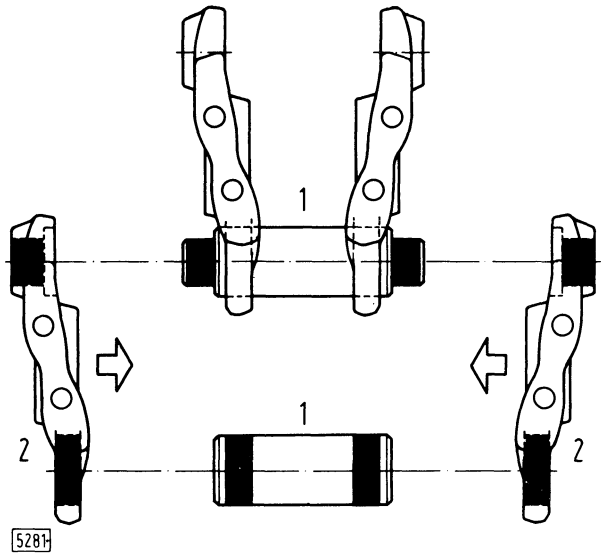
Removing Master Pin.

a. Section through master pin - C_1. Pin capscrew - P. Driver **291005/1** - 1. Master pin - 2. Right-hand link - 3. Left-hand link - 4. Bushing - 5. Thrust washers - 6. Lock washer.

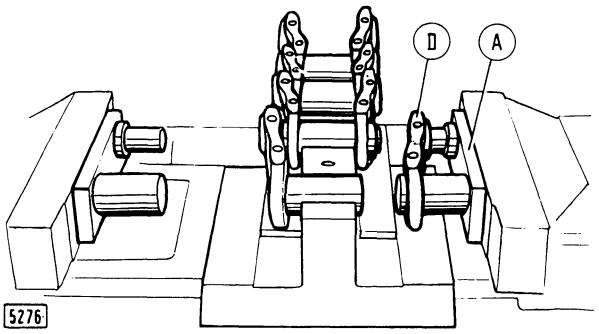
UNDERCARRIAGE: Track chains



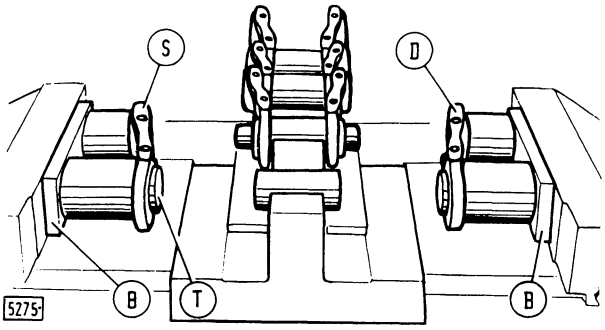
S_1. Place the end of the track chain over saddle (1) and install ram end disassembly adapters (A) as shown.



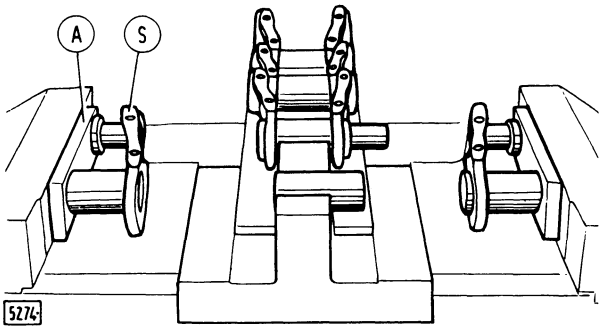
M_1. Part positions and track chain assembly sequence.



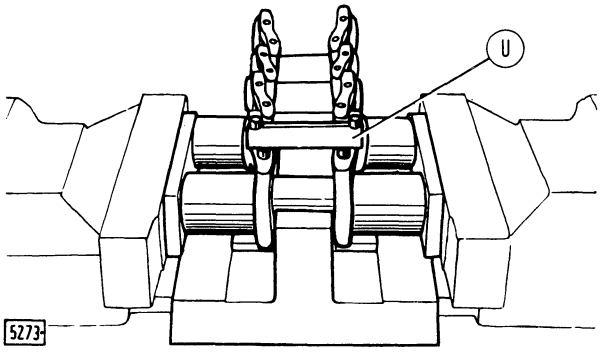
S_2. Operate right-hand ram: Adapter (A) advances towards the saddle, presses bushing and pin from the right-hand link (D) and returns with the link.



M_2. Place links (D and S) on ram end assembly adapters (B) and install pin and bushing over saddle.



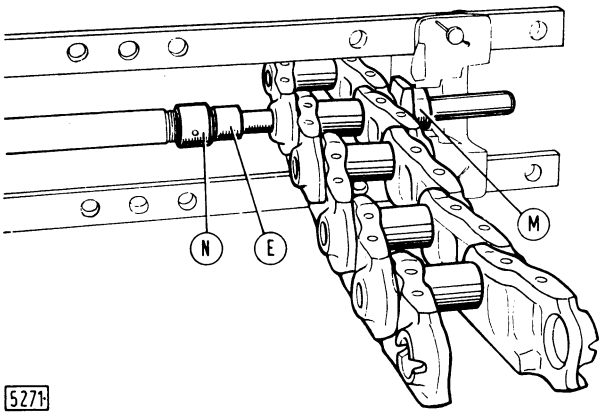
S_3. Operate left-hand ram: Adapter advances towards the saddle, presses bushing and pin from the left-hand link (5) and returns with the link.



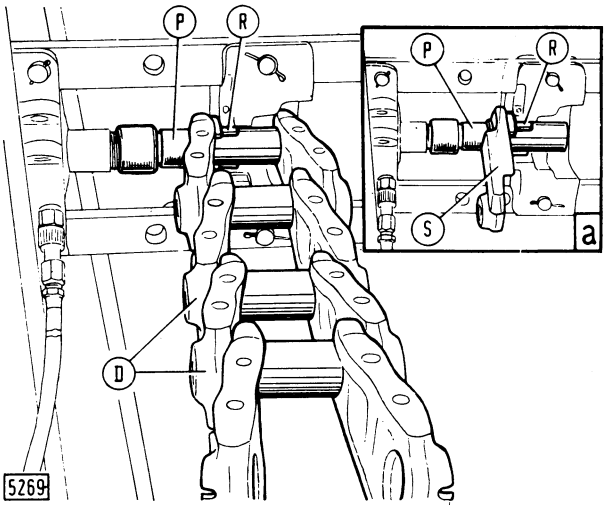
M_3. Operate both rams: Adapters (B) advance simultaneously towards saddle and press components together. Check link spacing using gauge (4).

Disassembling (S_1, S_2 and S_3) and assembling (M_1, M_2 and M_3) track chain using stationary double-ram track press 292451.

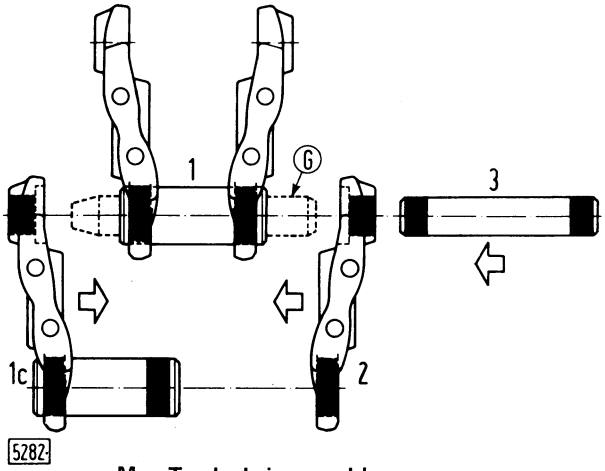
A. Ram end disassembly adapters **292435** - B. Ram end assembly adapters **292434** - D. Right-hand links - I. Saddle **292436** - S. Left-hand links - T. Master bushing spacer **292437** - U. Link spacing gauge **291015.**



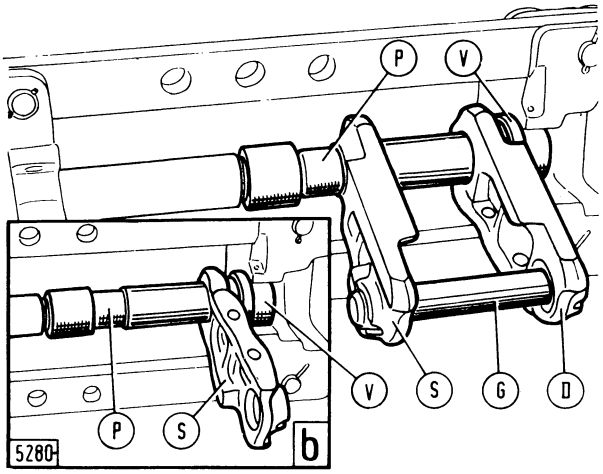
S_1. Remove all pins



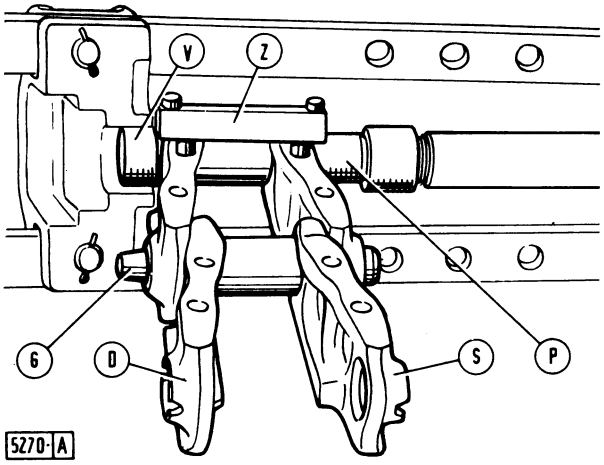
S_2. Separate all right-hand links (D), then remove all bushings (a) from left-hand links.



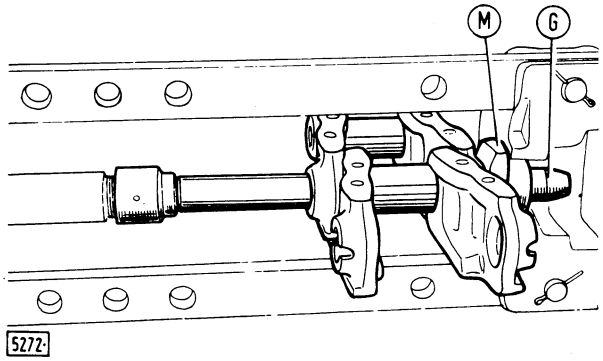
M_1. Track chain assembly sequence.



M_2. Install all bushings on left-hand links (b) and couple the first pair of links.



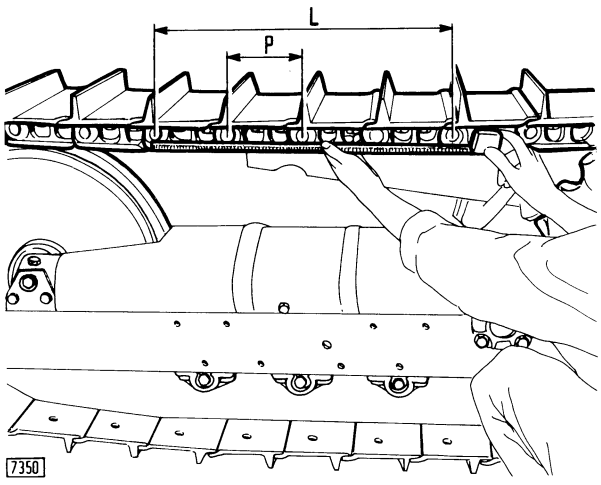
M_3. Install all right-hand links (D) and check spacing from left-hand links (S) using gauge (Z).



M_4. Install all pins and re-check link spacing.

Disassembling (S_1 and S_2) and assembling (M_1, M_2, M_3 and M_4) track chain using portable track press 291387.

D. Right-hand links - E. Pin forcing adapter **191008** - G. Pilot pin **191009** - M. Abutment plate **291010** - N. Sleeve **291386** - P. Bushing forcing adapter **291007** - R. Bushing removal spacer **291012/1** - S. Left-hand link - V. Abutment ring **291011** - Z. Link spacing gauge **291015**.



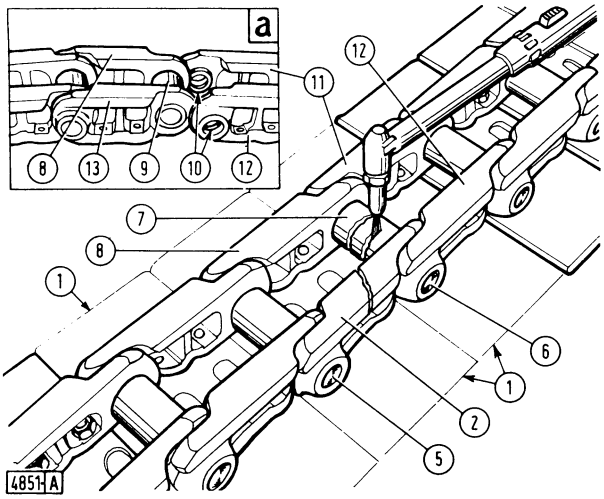
Measuring average pin center distance for assessment of pin and bushing wear.

L. Length over 4 links - P. Center distance (= $\frac{L}{4}$).

REMOVAL AND INSTALLATION

Refer to figures on page 1 and proceed as follows:

- Remove the two shoes adjacent to the master pin and release track tension to facilitate pin removal.
- Loosen pin capscrew (C_1), retrieve two lock washers and screw in driver **291005/1.**



Replacing a damaged link.

a. Thrust washer installation and chain coupling - 1. Track shoes - 2. Damaged link - 5 and 6. Pins (remove before flame-cutting) - 7. Bushing to be cut - 8, 11 and 12. Links - 9. New bushing - 10. Thrust ring - 13. New link.

- When coupling chains, install thrust rings in counterbores on links (2 and 3).

⚠ CAUTION ⚠

Handle all parts carefully. Do not put hands and fingers between parts. Wear safety equipment such as goggles, gloves and safety shoes.

DISASSEMBLY AND ASSEMBLY

Disassembly and assembly procedure and equipment are illustrated on pages 2 and 3.

Pin and bushing wear can be checked with track installed by calculating average pin center distance (P, figure a) with a taut track as shown alongside.

REPLACING A DAMAGED LINK

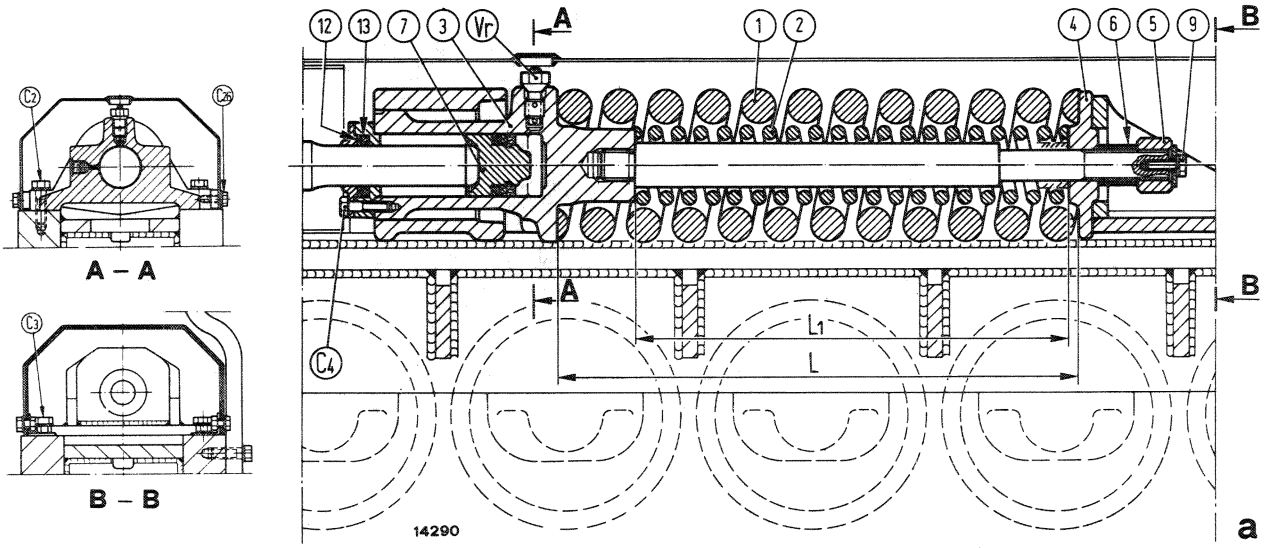
A damaged link which is not immediately adjacent to the master pin can be removed and replaced without disassembling the track. Proceed as follows:

- Remove track shoe (1, figure b) from the damaged link (2). Also remove the shoes at either side.
- Using a portable track press push out pins (5 and 6) from damaged link.

⚠ CAUTION ⚠

Handle all parts carefully.
Do not put hands and fingers between parts.
Wear safety equipment such as goggles, gloves and safety shoes.

- Using a cutting torch, cut off the center part of bushing, removing a section exceeding 20 mm or 3/4" in length.
- Take off damaged link (2) and install a new link.
- Take off link (8) and remove cut section of bushing (7) therefrom.
- Install a replacement bushing (9, detail a) on the new link (13) and fasten to the track chain.
- Install link (3) on bushing (9).
- Insert two thrust rings (10) on links (11 and 12) and install pins (5 and 6).



Longitudinal and cross sections through track tension mechanism.

C_2. Cylinder support capscrew - C_3. Spring bracket capscrew - C_4. Cylinder and plate capscrew - C_{26}. Top guard capscrew - L = 415 mm or 16.3 min. Outer spring installed length - L_1 = 329 mm or 12.95 in. Inner spring installed length - Vr. Adjuster fitting - 1. Outer spring - 2. Inner spring (955 C only) - 3. Adjuster cylinder with spring shaft - 4. Spring thrust plate - 5. Spring nut - 6. Thread guard - 7. Piston - 9. Set screw - 12. O-ring - 13. Seal.

TRACK TENSION MECHANISM

Remove track tension mechanism as follows:

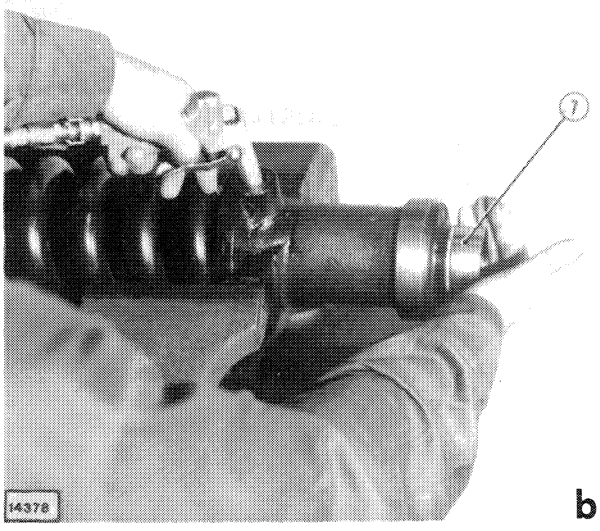
- uncouple track chain and spread out on ground. Remove top guard and roller guard.
- move front idler forward and withdraw yoke shaft from adjuster cylinder.
- remove nut (5, figure a) and take off thread guard (6). Replace nut (5) and turn through a few turns to compress springs, thus relieving load on cylinder support capscrews (C_2).
- remove capscrews (C_2) and lift off entire tension mechanism.

Disassemble adjuster piston (7) as follows:

- remove screws (C_4) and take off cylinder end plate together with seal and O-ring seat.
- force out piston (7) by injecting grease, or by removing fitting (Vr) and introducing compressed air as shown in figure b.

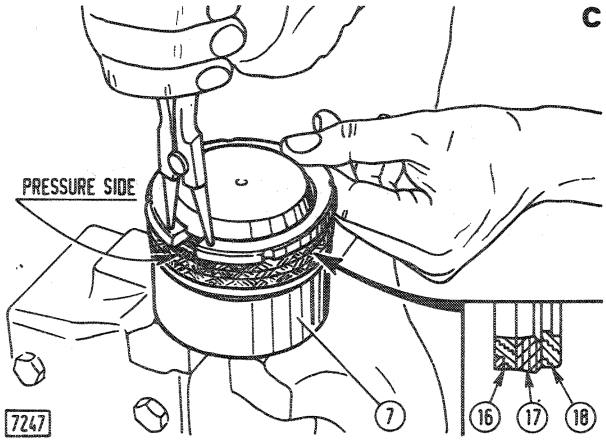
To remove springs (1 and 2), loosen nut (5).

Check cylinder (3) and seals for wear, replacing if necessary.



Removing piston (7) using compressed air.

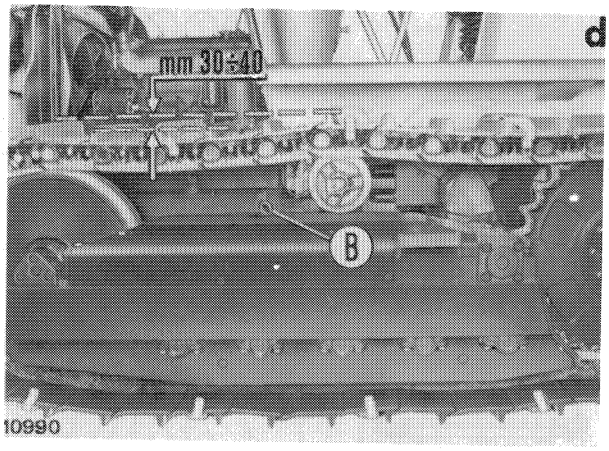
UNDERCARRIAGE: Track tension mechanism



Installing (removing) adjuster piston seal.

Note – Wording "PRESSURE SIDE" should be positioned as shown.

16. Abutment ring - 17. Sealing ring - 18. Retaining ring.



Checking track tension.

30 to 40 mm (1.2 to 1.5 in). Correct track sag under normal operating conditions - B. Fitting access cover.

When assembling tension mechanism, note the following points:

- Position piston seal parts as shown in figure c.
- Lubricate idler yoke shaft, piston and adjuster cylinder with **grassofiat TUTELA G 9** or other approved grease. Also lubricate threaded end of spring shaft before installing thread guard (6, page 1) and nut (5).

TRACK TENSION ADJUSTMENT

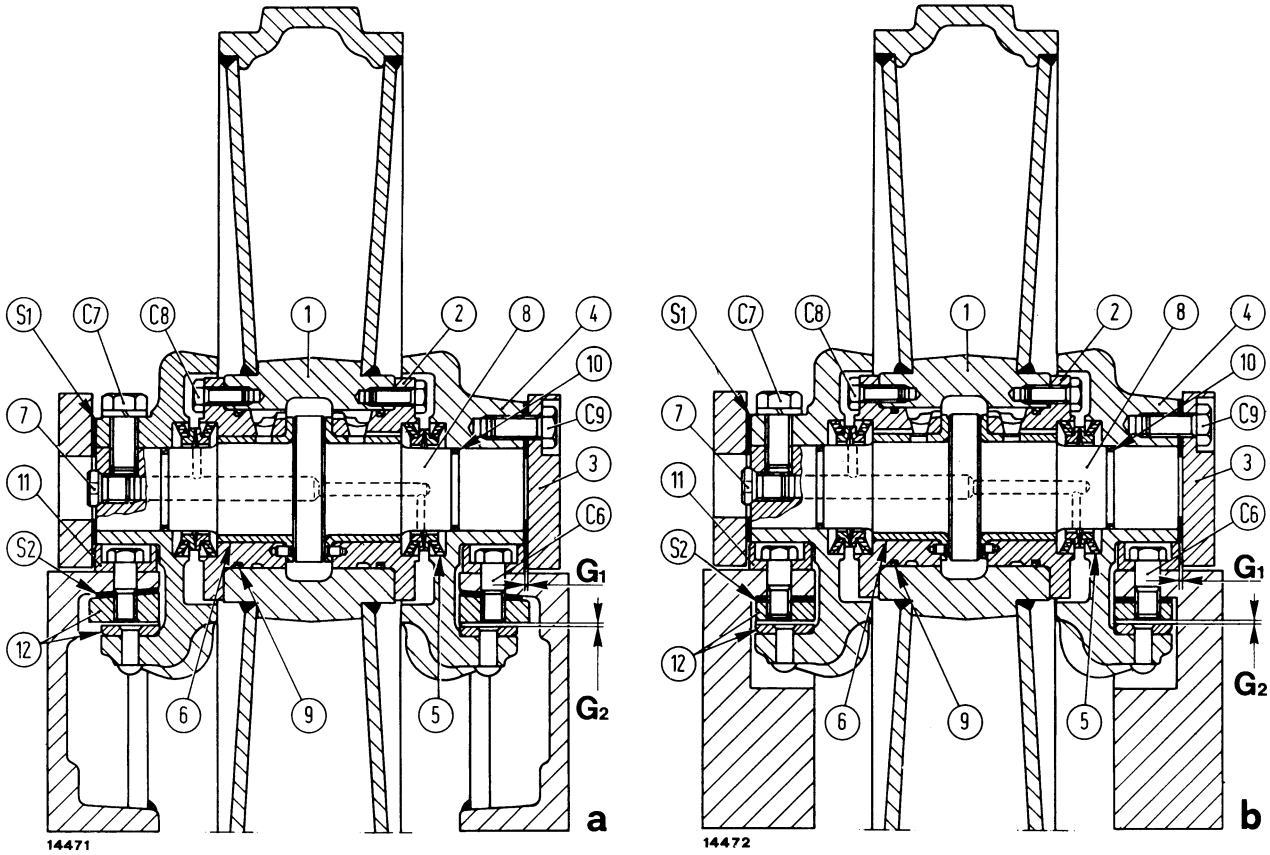
Track tension should be appropriate for ground conditions. The track tension indicated herein applies to normal operation over firm ground. When operating the tractor over shifting terrain or in sand, gravel, snow or ice, the track should be looser.

Remove earth and stones from shoes and links.

Force the track down with a crowbar applied between front idler and carrier roller.

Measure the amount of track sag with a straight edge. Under normal operating conditions, sag should be 30 to 40 mm or 1.2 to 1.5 in (see figure d).

To tighten the track, inject **grassofiat TUTELA G9** or other approved grease through adjuster cylinder fitting (Vr, figure a, page 1).
To loosen the track, loosen fitting by a few turns to release grease from cylinder. If necessary, back the tractor up slightly or insert a block of wood between sprocket and track.



Sections through front idler — 855 C Tractors (a) and 955 C Tractors (b).

C_6. Idler guide capscrew - C_7. Shaft capscrew - C_8. Bushing carrier capscrew - C_9. End plate capscrew - G_1 = 0.5 to 1 mm (.02 to .04 in). End plate to idler clearance. - G_2 = 0.5 to 1 mm (.02 to .04 in). Clearance between wear plates - S_1. End plate shim - S_2. Wear plate shim - 1. Front idler - 2. Bearing carrier - 3. End plate - 4. Idler bracket - 5. Seal - 6. Bushing - 7. Lube plug - 8. Shaft - 9 and 10. O-rings - 11. Idler guide - 12. Wear plates.

FRONT IDLER

OVERHAUL

Uncouple track, remove screws retaining tension mechanism yoke to idler brackets and take off front idler assembly.

Disassemble front idler as follows:

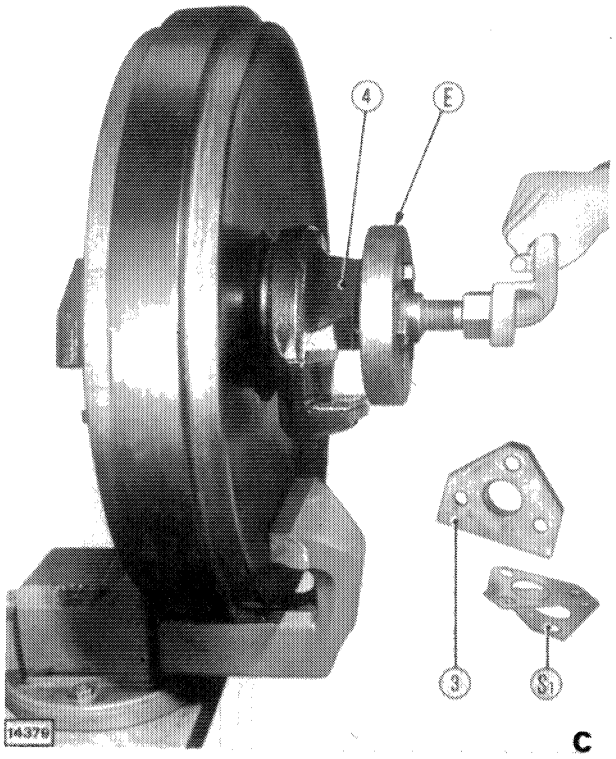
- remove capscrews (C_9), mark idler brackets (4) to ensure correct positioning on reassembly and remove from shafts using puller (E, figure c, page 2).
  If necessary, use hydraulic press **292912** with accessories as shown in figure d.
- slide off seals (10), take out screws (C_8) and remove bushing carriers (2) by forcing against shaft ends. If necessary, use press as shown in figure d, page 2.
- keep seal halves (5) paired to prevent incorrect matching on reassembly.

Inspect seals (5) as directed on page 5, section A, replacing as necessary.

If bushing (6) replacement is necessary, remove from carriers using a suitable driver and hydraulic press.

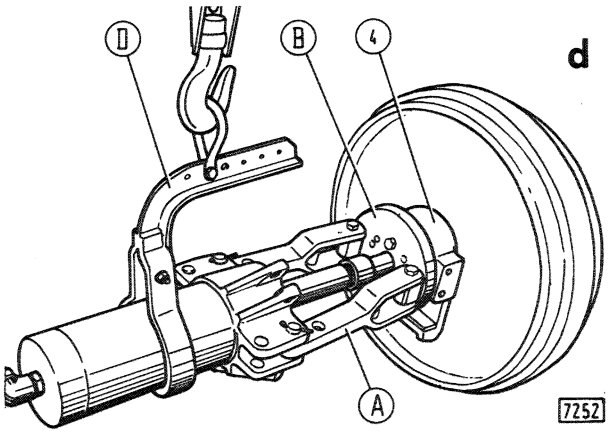
Check that idler guide (11) misaligment does not exceed 0.5 mm or 0.02 in.

UNDERCARRIAGE: Front idler - Track rollers - Carrier roller



Removing idler brackets using puller 293333 (E).
S_1. Shims - 3. End plate - 4. Bracket.

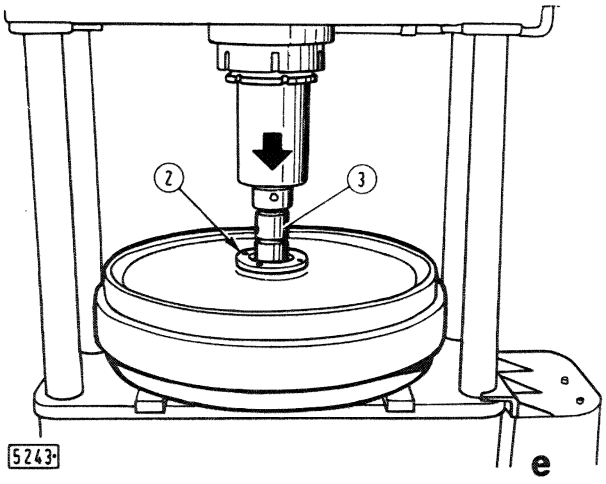
Check for severe wear on wear plates (12), particularly those attached to the track frame, and replace if necessary.



Removing idler brackets using portable hydraulic press 292912.
A. Puller legs **291588** - B. Plate **293334** - D. Support **291196** - 4. Bracket.

Install the front idler noting the following points:

- press bushings in carriers and one carrier assembly in position as directed on page 4 for track roller bushing reassembly.
- install idler shaft, press the other bushing assembly fully home and check that the shaft rotates freely.
- install floating ring seals (5), cleaning parts throughly and smearing a light coat of thin oil on sealing faces (F, see figure and directions on page 5, section A).



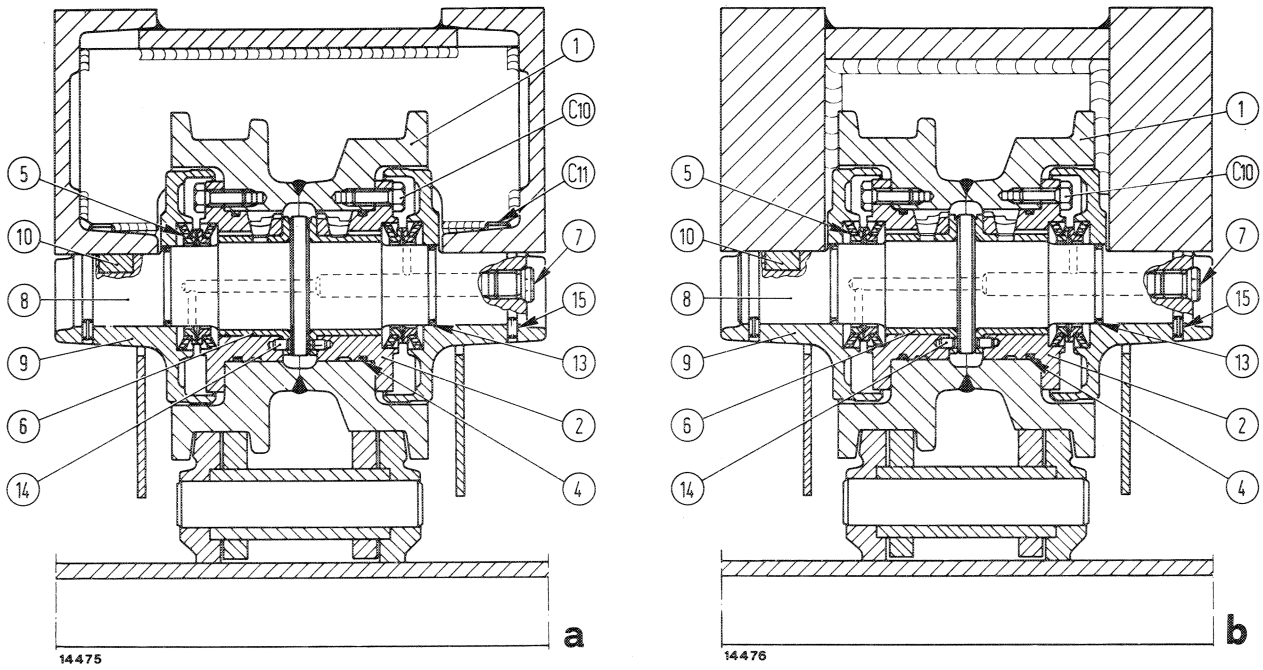
Removing bushing carriers at the press.
2. Bushing carrier - 3. Shaft.

ADJUSTMENT

Before installing idler brackets and end plates, proceed as follows:

- using a feeler gauge, check clearance (G_2, figures a and b, page 1). If necessary, restore specified clearance by adding or removing shims (S_2) between idler guides and track frame (*);
- install end plates (3) with shims (S_1) so that front idler centerline is aligned with track roller centerlines, and clearance (G_1) between end plates and ilder guides is 0.5 to 1 mm or .02 to .04 in;
- lubricate front idler with the correct grade of oil as directed on page 6.

(*) This adjustment is only necessary if idler guide and wear plates are severely worn, as clearance (G_2) is adjusted at the factory.



Sections through track rollers - 855 C tractors (a) and 955 C tractors (b).

C_{10}. Bushing carrier capscrew - C_{11}. Bracket capscrew - 1. Track roller - 2. Bushing carrier - 4. O-ring - 5. Floating ring seal - 6. Bushing - 7. Lube plug - 8. Shaft - 9. Roller bracket - 10. Key - 13. O-ring - 14. Dowel - 15. Roll pin.

TRACK ROLLERS

OVERHAUL

If only a few track rollers require overhaul, they may be removed as follows:

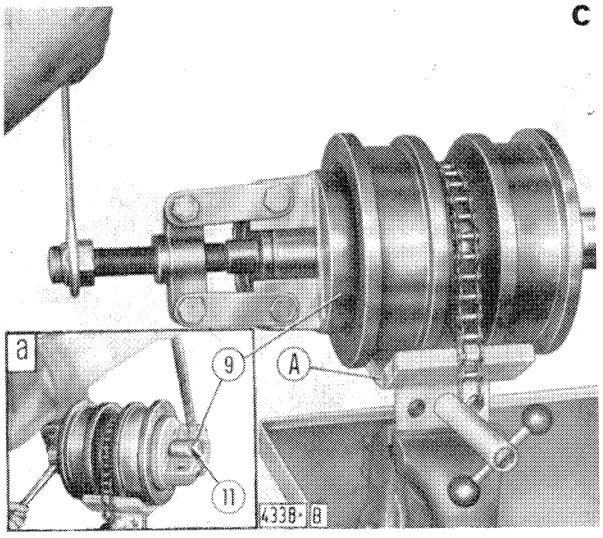
- release track tension;
- raise tractor and support suitably;
- remove roller guards and take off roller assembly using lift hook **291667.**

To remove brackets, secure roller in vice using clamp **291417** (figure c).

If possible, rotate bracket sufficiently to remove roll pin (15, figure a and b) from groove (11, figure c) as shown in figure c. Then withdraw brackets using puller **291427.**

If brackets cannot be rotated, use portable hydraulic press **291387** (figure d, page 4) to pull out brackets shearing the roll pin (15).

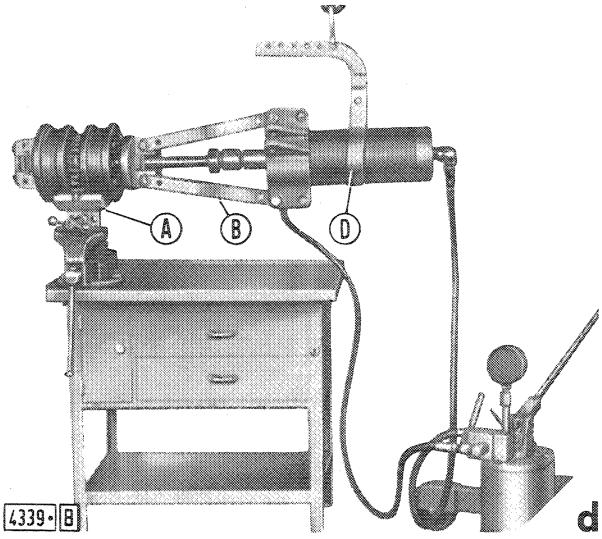
Take off O-rings (13, figures a and b), remove screws (C_{10}) and force out bushing carrier assembly using universal puller **292904** (figure e, page 4) or a hydraulic press (figure f) applied to end of roller shaft.



Removing roller (9) bracket using puller 291427.

a. Bracket rotation - A. Clamp **291417** - a. Roller bracket - 11. Roll pin groove.

UNDERCARRIAGE: Front idler - Track rollers - Carrier roller



Removing roller bracket using portable hydraulic press 292912.

A. Clamp **291417** - B. Puller legs **291588** - Support **291196.**

Keep floating ring seal halves (5, figures a and b, page 3) paired to prevent incorrect matching on reassembly.

If replacement is necessary, remove bushings (6) from carriers (2) using a suitable driver.

Install new bushings as follows:

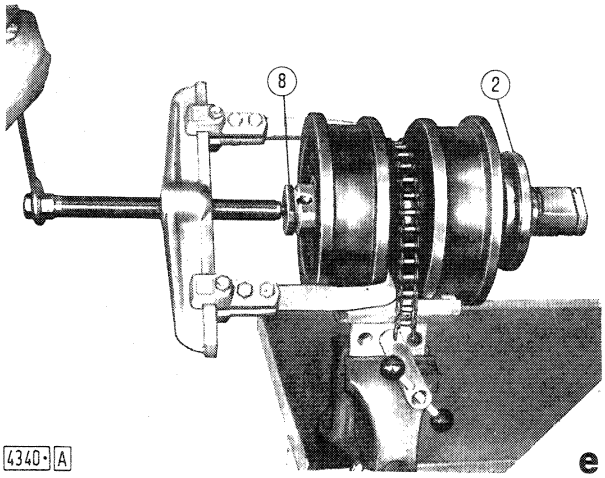
- remove dowels (14) from carriers. If removal is not possible, dowels may sawn off flush with carrier;
- press bushings in carriers so that lube ports (F, figure g, page 5) are aligned to within 2.5 mm or .10 in;
- drill two new dowel holes as shown in figure g; holes should be as far away as possible from lube ports;
- press dowels in place, ensuring that they do not protrude past the bushing flange face.

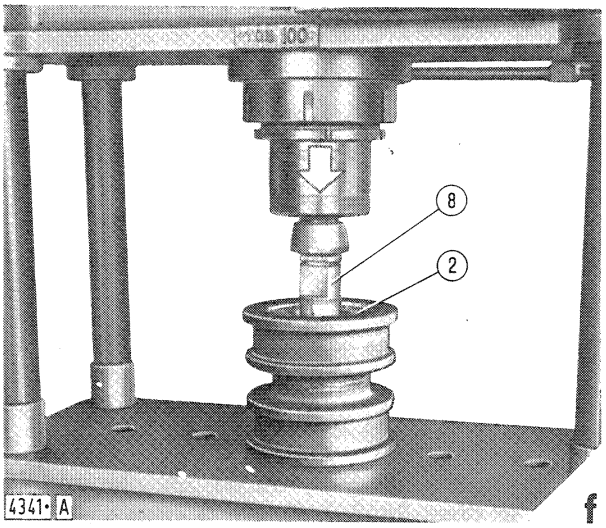
Reassemble track rollers as follows:

- install the first bushing carrier on the press (figure h, page 5) using guide pins **293333** (S) to keep carrier capscrew holes in alignment;
- install roller shaft, press home the other bushing carrier assembly and check that the roller shaft rotates freely;
- inspect floating ring seals (5, figure a, and b page 3), scrapping and replacing any damaged parts. Install seals as directed on page 5, section A;
- slide brackets (9, page 3) over roller shaft, exerting firm pressure to overcome face seal resistance and turning brackets so that roll pins (15) can be inserted in grooves on roller shaft;
- align the machined faces on the shaft with the flats on the brackets.

Install track rollers as shown in figure I, page 5 and noting the following points:

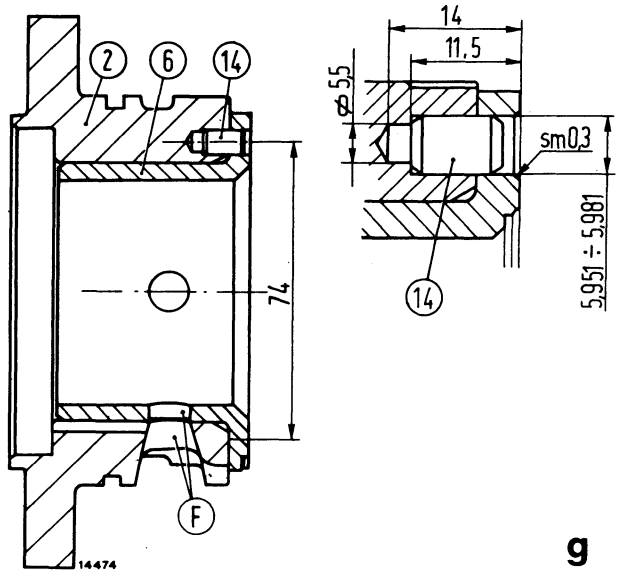
- drive key (10, page 3) into seat on shaft;





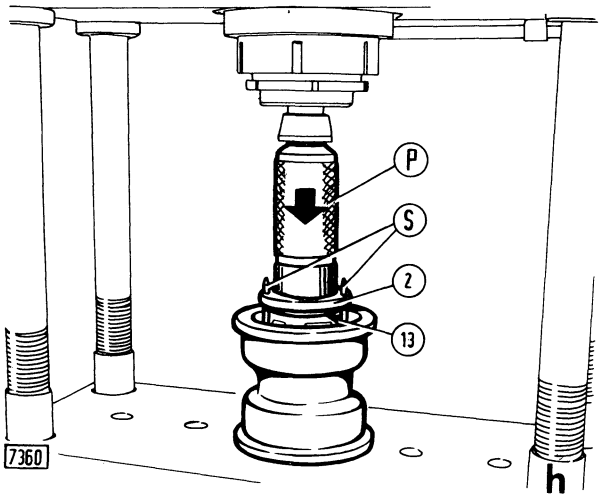
Removing bushing carriers from track roller.

e. Using puller **292904** - f. Using press - 2. Bushing carrier - 3. Roller shaft.



Track roller and front idler bushing carrier dowel hole dimensions.

F. Lube ports - 2. Bushing carrier - 14. Dowel.



Installing bushing carrier on track roller.

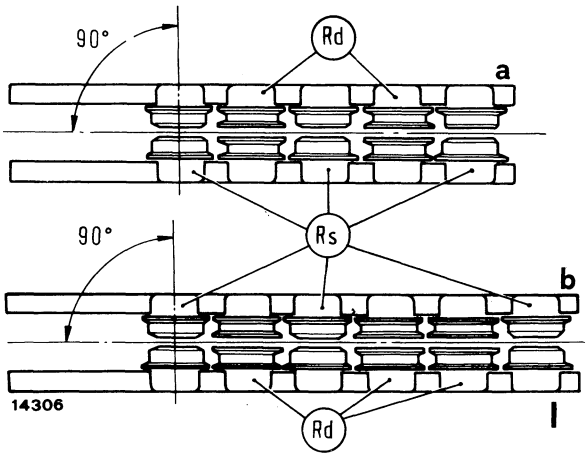
P. Driver **293475** - S. Guide pins **293333** - 2. Bushing carrier assembly - 13. O-ring.

– roller shafts should be parallel to one another and at right angles to the track frame centerline;

– lubricate rollers as directed on page 6.

CARRIER ROLLERS

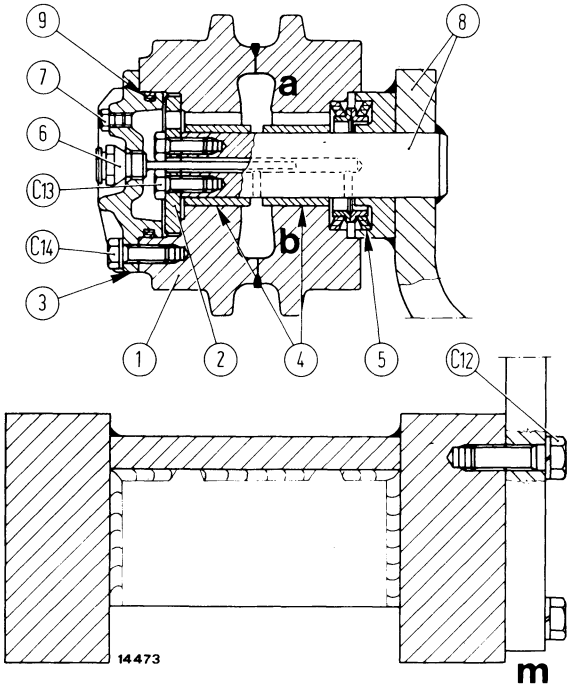
Following removal, secure each roller in vice using clamp **291417** and proceed as follows:



Track rollers in position on frame - 955 C tractors (a) and 955 C tractors (b).

Note - Roller shafts to be parallel to one another and at right angles to track frame centerline.

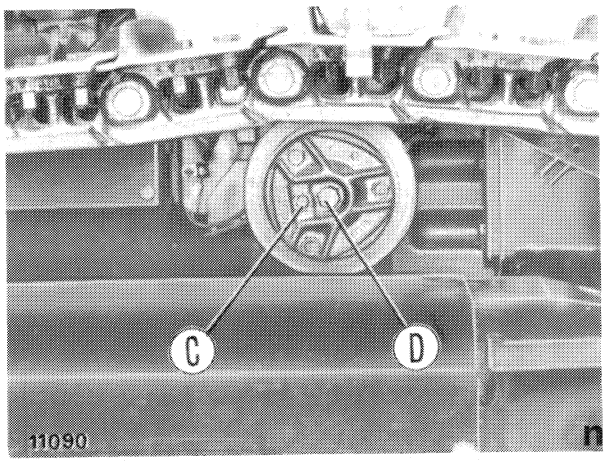
Rd. Double flange track rollers - Rs. Single flange track rollers.



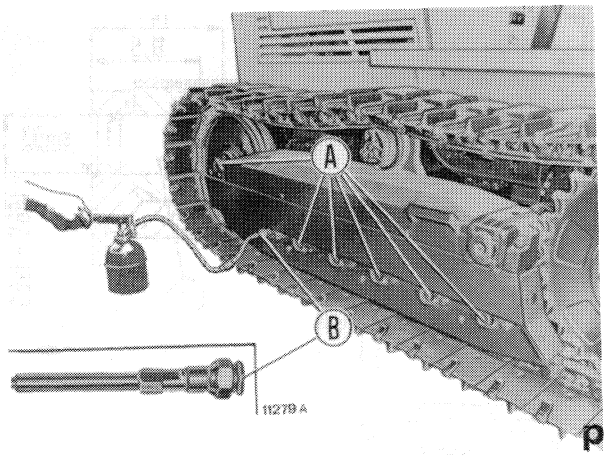
Section through carrier roller.

a. Late model - b. Early model - C_{12}. Bracket capscrew - C_{13}. Thrust plate capscrew - C_{14}. Cover capscrew - 1. Carrier roller - 2. Thrust plate - 3. Cover - 4. Bushing - 5. Floating ring seal - 6. Oil filter plug - 7. Oil level plug - 8. Roller shaft and bracket - 9. O-ring.

UNDERCARRIAGE: Front idler - Track rollers - Carrier roller



Checking and topping up carrier roller oil level.
C. Oil level plug - D. Oil filler plug.



Lubricating track rollers and front idler.
A. Lube plugs - B. Adapter (supplied with tractor).

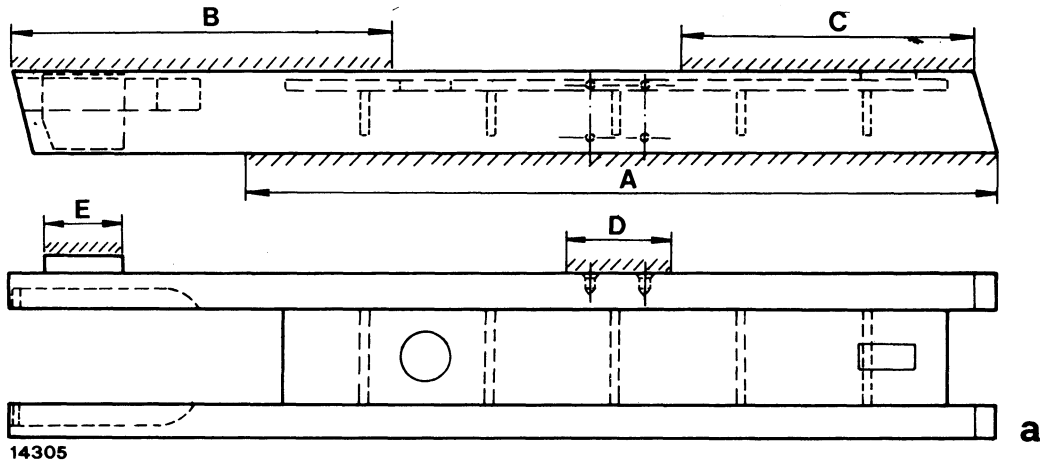
– take off cover (3, figure m, page 5) and thrust plate (2) and slide carrier roller and bushings off shaft (8).
– remove floating ring seal halves (5).

Install carrier roller noting the following points:
– install new bushings (4) at the press using a suitable driver;
– install floating ring seal (5) as directed on page 5, section A;
– if the thrust plate contact face is badly worn, reinstall with the worn side facing outwards;
– turn roller so that oil level aperture (G) is uppermost and lubricate with **oliofiat TUTELA MULTI F** or other approved oil through fitting (D, figure n) until oil issues from aperture (G).

TRACK ROLLER AND FRONT IDLER LUBRICATION

Following overhaul, lubricate track rollers and front idler with **oliofiat TUTELA MULTI F** or other approved oil as follows:
– place the assembly horizontal, i.e. in the same position as when installed on tractor;
– remove lube plug (A, figure p);
– screw in lube fitting (B) supplied with tractor and pump oil until oil flowing from slots on fitting is free of air bubbles;
– quickly unscrew fitting and replace plug.

The oil level should subsequently be checked at regular intervals as directed in the Operator's Handboock supplied with tractor.



Track frame inspection data

A = 1145 mm or 45.8 in (855 C); 1420 mm or 55.9 in (955 C). Machined track roller mounting surface - B. 828 mm or 32.6 in (855 C); 730 mm or 28.75 in (955 C). Machined idler guide mounting surface - C = 380 mm or 14.9 in (855 C); 620 mm or 24.4 in (955 C). Machined rear suspension beam support mounting surface - D. Machined carrier roller mounting surface - E. Guide plate mounting surface.

TRACK FRAMES

REMOVAL

Removal track frame assembly as follows:

⚠ CAUTION ⚠

Lift and handle all heavy parts using a suitable lift.
Ensure that all units or parts are supported by suitable slings or hooks. Ensure that no one is in the vicinity of load to be lifted.

- uncouple track chain and remove front brace (6, figure f, page 3);
- raise the side of the tractor concerned and prop up on two stands;
- remove drive sprocket, cover (4, figures g and h, page 4) thrust plate (5 or 5a) and associated shims (S_2 or S_3);
- raise track frame assembly and slide clear of rear suspension beam using a suitable hoist.

TRACK FRAME INSPECTION

Track frame does not normally require inspection. If it is suspected that a track frame is twisted or bent, however, inspect as directed below and referring to figure a.

Track roller mounting surfaces

Flatness tolerance for beam surfaces (A) is .2 mm or .008 in.

Idler guide mounting surfaces

Flatness tolerance for beam surfaces (B) is .2 mm or .008 in, while the plane formed by surfaces (B) should be parallel to the plane formed by surfaces (C) to within .2 mm or .008 in. Surfaces (C) should be co-planer to with in .5 or .020 in.

Suspension beam support mounting surfaces

Surfaces (C) should be flat to within .2 mm or .008 in and parallel with plane of surfaces (A) to within .2 mm or .008 in.

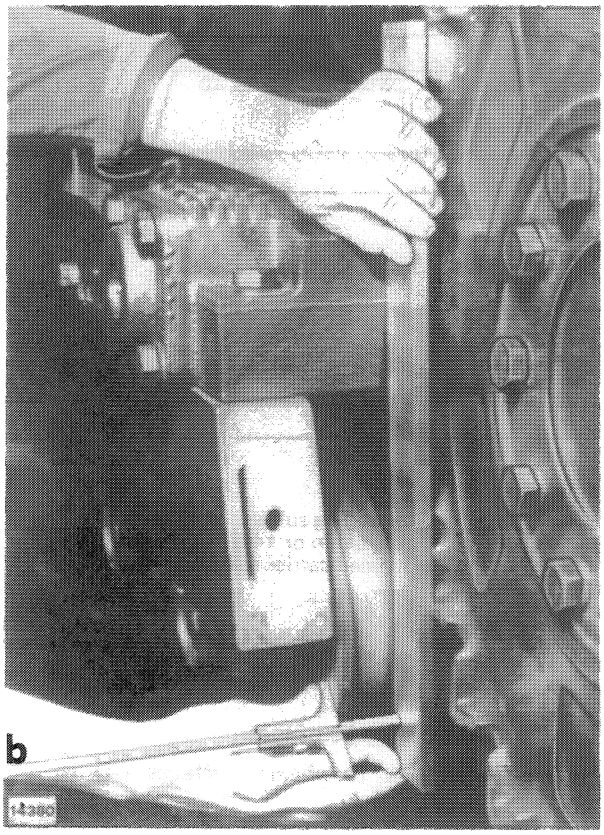
Carrier mounting surface

Plane of surfaces (D) and plane of surfaces (A) should be perpendicular to within .3 mm or .012 in.

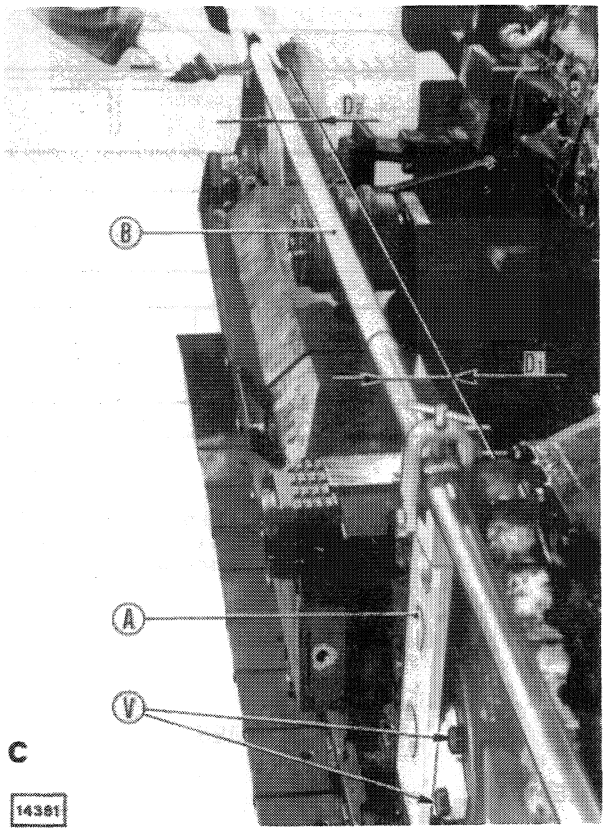
Track frame guide plate mounting surfaces

Plane of surfaces (E) and plane of surfaces (A) should be perpendicular to within .3 mm or .012 in.

When installing a new rear suspension beam



Checking drive sprocket alignment with track frame using a straight edge and depth gauge.



Checking front idler and drive sprocket alignment.

Note - D_2 to equal D_1 to within ± 2 mm or .08 in.

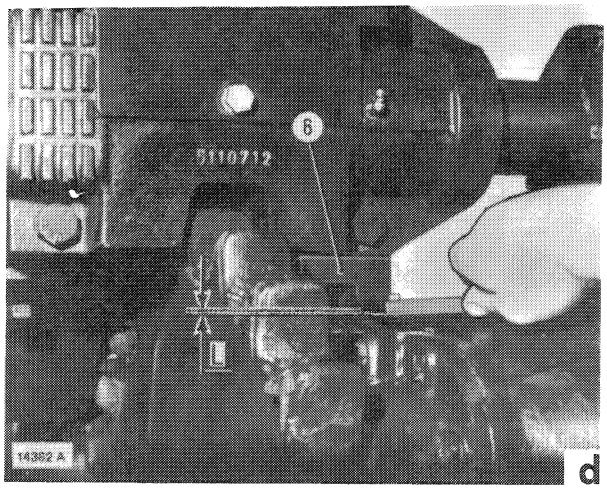
A. Bracket **291006** - B. Gauge bar **291572/1** - V. Bracket retaining screws.

or late model track frame support, carry out modifications illustrated in detail h, page 4.

TRACK FRAME INSTALLATION AND ADJUSTMENT

Install track frame assemblies as follows:

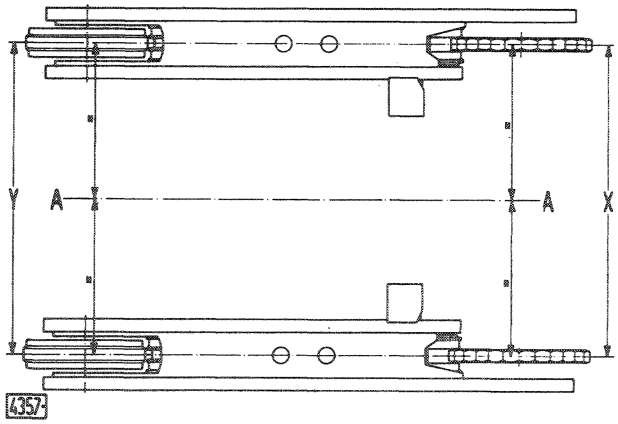
- temporarily install thrust plate (5 or 5a, figures g and h, page 4) on end of bar (1 or 1a), interposing shims (S_2 or S_3);
- using a straight edge (see figure b), check that drive sprocket is aligned with rear track roller on each frame. If necessary, adjust through shims;
- tighten screws (C_{23}, figures g and h, page 4) to the specified torque, install cover (4) and tighten screws (C_{24});
- install bracket **291006** (A, figure c) on drive sprocket hub and secure gauge bar **291572/1** (B) to bracket.
  Then proceed as follows:
  - mark centerlines of drive sprocket and front idler. Front idler centerline should be marked at three evenly spaced points, rotating the idler as necessary;
  - check that distance (D_2) from gauge bar to front idler centerline is equal to distance (D_1) from bar to drive sprocket centerline to within ± 2 mm or .08 in.
- secure front brace (2, figure f, page 3) and check that guide plate (1) is centered in brace. If not, adjust through shim (S_1);
- check that clearance (L, figure d) between wear plate (6) and final drive housing is 0 to 1 mm or 0 to .04 in.



d

Checking clearance (L) between wear plate and final drive housing.

L = 0 to 1 mm or 0 to .04 in. Clearance - 6. Wear plate.



e

Checking that track frames are parallel.

A - A. Tractor centerline.

Note – Maximum difference between dimensions Y and X not to exceed ± 4 mm or centerline A - A.

Check that track frames are parallel (see figure e) and lubricate track frame pivots using **grassofiat TUTELA G9** or other approved grease.

SUSPENSIONS

FRONT SUSPENSION

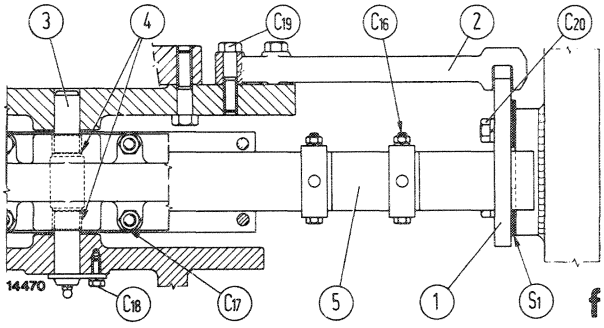
Front suspension features a center pivotting leaf spring supported by the track frame.

To remove, raise front of tractor to relieve load on guide plate (1, figure f), remove screw (C_{18}), apply slide hammer puller **292927** with adapter **292311** in place of front lube fitting and pull out pivot pin (3).

REAR SUSPENSION

Rear suspension features a cross beam connected to the final drive housing by means of bolted caps.

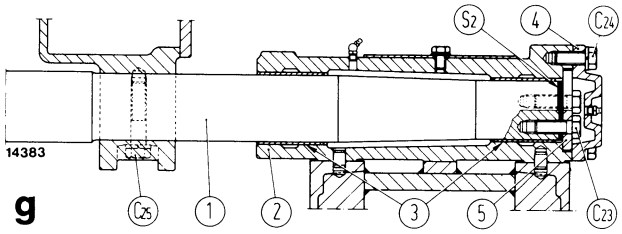
Track frames are retained to the end of the beam by a thrust plate (5 or 5a), figures g and h, page 4).

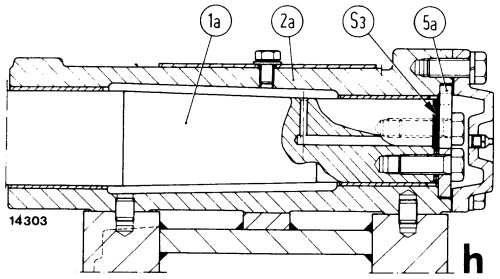


f

Front suspension connection to track frame.

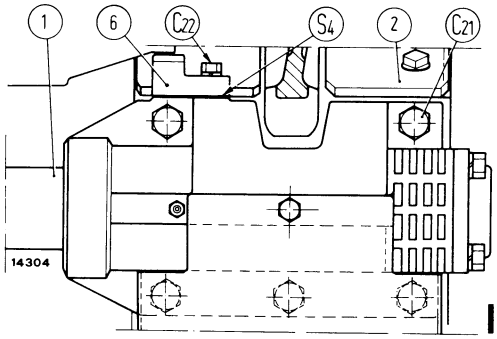
C_{16}. Spring clip nut - C_{17}. Spring anchor nut - C_{18}. Pivot pin capscrew - C_{19}. Brace capscrew - C_{20}. Guide plate capscrew - S_1. Shim - 1. Guide plate - 2. Brace - 3. Pivot pin - 4. Bushings - 5. Gear spring.



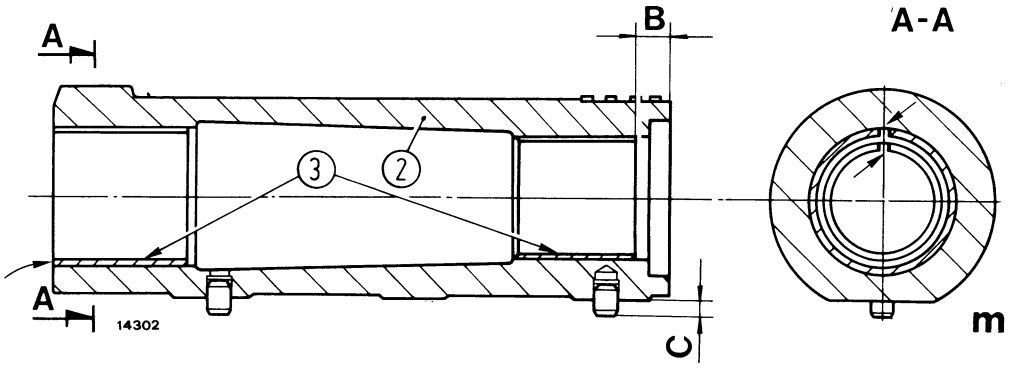


Sections through early model (g) and late model (h) suspension beam connection to track frame and view at track frame support (I).

C_{21}. Support capscrew - C_{22}. Wear plate capscrew - C_{23}. Thrust plate capscrew - C_{24}. Cover capscrew - C_{25}. Cap capscrew - S_2, S_3. Alignment shims - S_4. Wear plate shim - 1 and 1a. Suspension beam - 2 and 2a. Support - 3. Bushings - 4. Cover - 5 and 5a. Thrust plate - 6. Wear plate.



Note — If bushings (3) are worn, install new bushings as indicated in figure m.



Section through track frame support assembly.

Note — Arrow indicates that inner bushing (3) must be installed flush with inboard face of support. Arrows in Section A - A indicate correct bushing positions.

B = 21 mm or 8.2 in. Outer bushing stand-in from outboard face of support - C = 10 mm or .4 in. Dowel stand-out - 2. Track frame support - 3. Inner and outer bushings.

HYDRAULIC PUMP

Filter	
Type	full flow, paper element
Location	in tank, on pump suction side
Pump	
Type	gear, drawing from tank on right-hand fender
Location	behind timing cover
Model:	
– 855 C	TFP 200/19.5 S CO-01
– 955 C	TFP 200/17 S CO-01
Drive	engine valve timing gear
Rotation (seen from drive end)	counterclockwise
Pump drive ratio:	
– 855 C	0.910 to 1
– 955 C	1.116 to 1
Max. speed (at rated engine speed):	
– 855 C	2275 rpm
– 955 C	2915 rpm
Rated output:	
– 855 C	44.4 l/min (9.77 gal/min)
– 955 C	49.5 l/min (10.9 gal/min)
Output at 1450 rpm and pressure indicated on page 2, section 401:	
– new or reconditioned:	
• 855 C	26.3 l/min (5.78 gal/min)
• 955 C	22.9 l/min (5.07 gal/min)
– used:	
• 855 C	18.4 l/min (4.05 gal/min)
• 955 C	16.0 l/min (3.52 gal/min)
– test oil temperature	55 to 65°C (130 to 150°F)
– test oil grade	SAE 20
Pump gear journal dia	17.410 to 17.420 mm (.685 to .686 in)
Journal housing bore in bearings	17.444 to 17.505 mm (.687 to .689 in)
Journal clearance in bearings	.024 to .095 mm (.001 to .037 in)
– max. wear clearance	.110 mm (.004 in)

(follows)

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Specification and Data

HYDRAULIC PUMP

(continued)

Gear clearance in pump body	.048 to .080 mm (.002 to .003 in)
Max. pump body wear on suction side	.08 mm (.003 in)
Gear flank width — TFP 200/19.5	31.999 to 32.001 mm (1.2599 to 1.2600 in)
Gear flank width — TFP 200/17	27.999 to 28.001 mm (1.1023 to 1.024 in)
Bearing width — TFP 200/19.5	21.990 to 22.000 mm (.8657 to .8661 in)
Bearing width — TFP 200/17	19.990 to 20.000 mm (.7870 to .7874 in)
Bearing housing width in pump body — TFP 200/19.5	76.070 to 76.080 mm (2.9949 to 2.9953 in)
Bearing housing width in pump body — TFP 200/17	68.070 to 68.080 mm (2.6799 to 2.6803 in)
Gear and bearing end float (applicable to new and reconditioned pump)	.069 to .101 mm (.0027 to .0040 in)

REMOTE IMPLEMENT CONTROL VALVES

Tank	Welded sheet metal located on R.H. fender
Tank capacity	27 liters (5.95 gal)
Oil filter	
Type	full-flow, paper cartridge
Installation	on pump suction, in tank
Remote implement control valves	
Make	FIAT
Location	pack (up to a maximum of four) secured to oil tank support
Control	hand lever
Relief valve release pressure	186 to 191 bar (190 to 195 kg/cm^2 - 2698 to 2770 psi)
Type:	
– convertible single and double-acting	102/1/01930
– double-acting with float	102/1/01926
Spool clearance in valve body	0.003 to 0.006 mm (0.0001 to 0.0002 in)

(follows)

REMOTE IMPLEMENT CONTROL VALVES

(continued)

Relief valve spring free length	39.4 mm (1.55 in)
Spool return spring free length	42.8 mm (1.685 in)

ROCKSHAFT CONTROLS

Type	position and float control
Control	through one of remote implement control valve levers
Single-acting power cylinders (see figure a, Section 403, page 1)	two, hinged to lift arms and connected hydraulically in parallel
– bore and stroke	75 x 150 mm (2.95 x 5,90 in)
– total displacement of two cylinders	1325 cm^3 (80.85 in^3)
Relief valve release pressure (same valve as remote implement control valves)	186 to 191 bar (190 to 195 kg/cm^2 - 2758 to 2830 psi)
Design lift capacity	22477 Nm (2292 kgm - 16580 ft.lb)
Lift piston diameter	74,960 to 75.000 mm (2.351 to 2,953 in)
Lift cylinder bore	75.030 to 75.060 mm (2.954 to 2,955 in)
Piston working clearance in bore	0.030 to 0.100 mm (.001 to .004 in)
Bottom cylinder pivot diameter	29.870 to 30.000 mm (1.176 to 1.181 in)
Pivot housing bore	30.800 to 31.000 mm (1.212 to 1.220 in)
Pivot clearance in bore	0.800 to 1.130 mm (.031 to .044 in)
Top cylinder pivot diameter	27.979 to 28.000 mm (1.101 to 1.102 in)
Pivot housing bore on rod	28.065 to 28.149 mm (1.105 to 1.108 in)
Pivot clearance in bore	0.065 to 0.170 mm) (.002 to .007 in)
Rockshaft bushing bore in support	60.000 to 60.046 mm (2.362 to 2.364 in)
Bushing O.D.	60.111 to 60.161 mm (2.366 to 2.368 in)
Bushing interference fit	0.065 to 0.161 mm (.002 to .006 in)
Rockshaft journal diameter	54.970 to 55.000 mm (2.164 to 2.165 in)
Bushing fitted I.D.	55.100 to 55.184 mm (1) (2.169 to 2.172 in)
Rockshaft working clearance in bushings	0.100 to 0.214 mm (.004 to .008 in)
Rockshaft end float with lift arms in position	0.2 to 1.0 mm (.008 to .04 in)

(1) Unreamed.

(follows)

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Specification and Data

ROCKSHAFT CONTROLS

(continued)

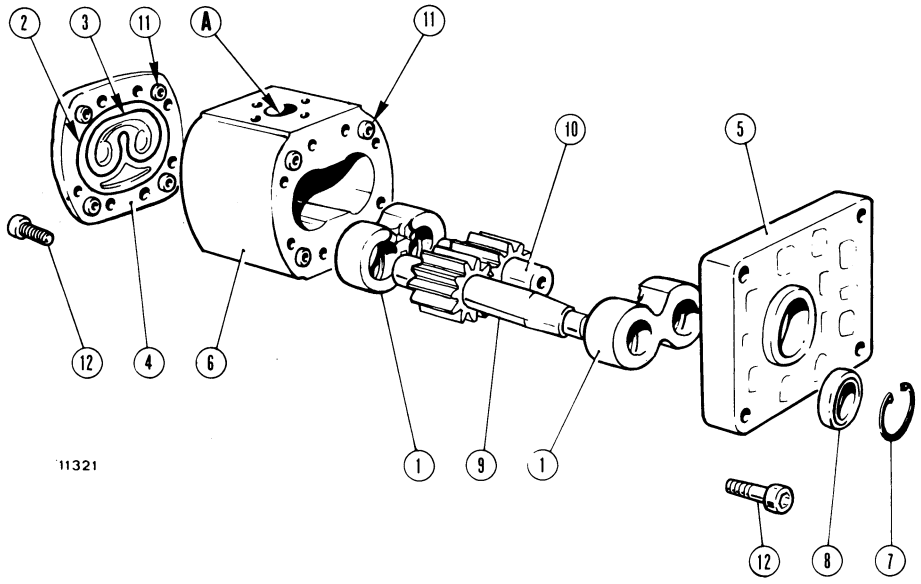
Filter	full-flow, paper element, same as remote implement control hydraulic system
Pump	gear, same as remote implement control hydraulic system

HITCH

Type	3-point
Category:	
– center link (7, section 404, page 1)	2a
– draft links (3)	2a or 3a
Max. lift capacity, starting with draft links horizontal and center link coupled to top hole, full stroke:	
– at draft link swivel bushings	35890 N (3660 kg or 80680 lb)
– center of gravity 610 mm or 24 in from swivel bushings	32650 N (3330 kg or 73397 lb)
Max. draft link end travel:	
– lift links retracted	604 mm (23.78 in)
– lift links extended	654 mm (25.75 in)

TIGHTENING TORQUE FIGURES

DESCRIPTION	Thread size	Torque		
		Nm	kgm	ft.lb
Hydraulic pump - Section 401				
Capscrew, pump (8 and 11, page 1)	M 6 x 1	8	0.8	5.8
Capscrew, pump cover (12)	—	34	3.5	25
Remote implement control valves - Section 402				
Capscrew, oil tank	M 12 x 1.25	98	10	72
Capscrew, cover	M 8 x 1.25	25	2.6	19
Capscrew, delivery line support	M 10 x 1.25	59	6	43
Capscrew, suction line	M 8 x 1.25	25	2.6	19
Nut, tie rods	3/8"-24 UNF-2A	20.4	2.1	15
Relief valve	1 1/16"-18 UNEF	20.2	2	14.5
Capscrew, control valve pack	M 10 x 1.25 M 10 x 1.25	59 44	6 4.5	43 32.4
Nut, control valve	M 10 x 1.25	59	6	43
Capscrew, support plate	M 10 x 1.25	59	6	43
Rockshaft controls - Section 403				
Capscrew, center link and rockshaft support (C_3, page 1)	M 18 x 1.5	348	35.5	257
Capscrew, lift arms to rockshaft (C_4)	M 14 x 1.5	147	15	108.5
Capscrew, cylinder bottom cylinder	M 10 x 1.25	59	6	43
Cylinder head (C_2)	M 10 x 2	2059	210	1520
Lock ring, piston (C_1)	M 20 x 1.5	711	72.5	524.4
Hitch and drawbar - Section 404				
Capscrew, cylinder and hitch support	M 20 x 1.5	431	44	318
Capscrew, front drawbar bracket	M 16 x 1.5	221	22.5	163
Capscrew, drawbar frame	M 20 x 1.5	431	44	318
Nut, drawbar frame	M 20 x 1.5	392	40	290
Capscrew, rear drawbar bracket	M 20 x 1.5	431	44	318
Nut, sway chain	M 20 x 1.5	333	34	245.6



Hydraulic pump components.

A. Suction port - 1. Bearings - 2. Cover O-rings - 3. Cover O-rings and anti-extrusion rings - 4/5. Covers - 6. Pump body - 7. Retaining ring - 8. Seal - 9. Drive gear shaft - 10. Driven gear shaft - 11. Dowels - 12. Cover capscrews.

HYDRAULIC PUMP

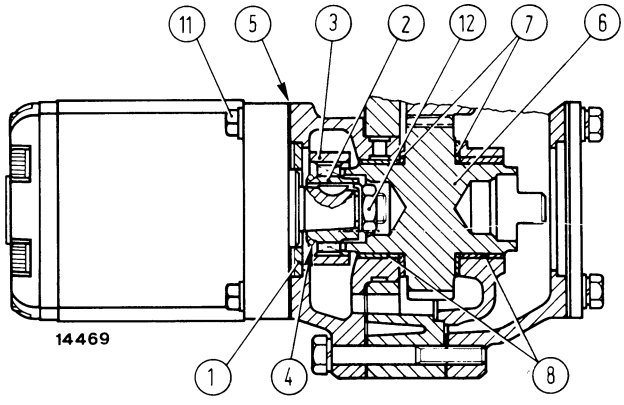
Pump is valve gear driven through a dog clutch.

To gain access to drive gear, remove valve gear cover.

Oil circulating in pump automatically lubricates and restores gear end float.

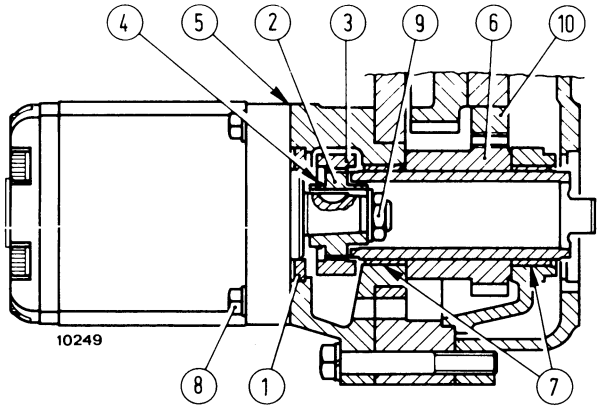
Overhaul

Refer to figure above when disassembling pump.



Section through pump drive (855 C).

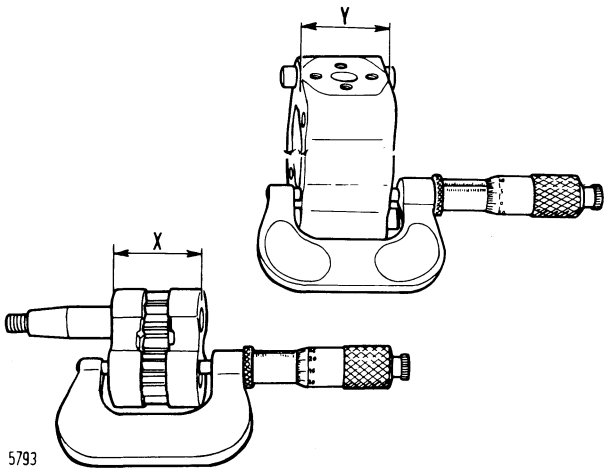
1. Centraliser - 2. Drive sleeve - 3. Drive ring - 4. Retaining ring - 5. Gasket - 6. Pump driven gear - 7. Thrust rings - 8. Bushings - 11. Pump capscrews - 12. Sleeve nut.



Section through pump drive (955 C).

1. Centraliser - 2. Drive sleeve - 3. Drive ring - 4. Retaining ring - 5. Gasket - 6. Pump driven gear - 7. Bushing - 8. Pump capscrews - 9. Sleeve nut - 10. Pump drive gear.

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Hydraulic pump



Checking gear end clearance in pump body.

Note – Dimension **X** to be smaller than dimension **Y** by .069 to .101 mm (.003 to .004) in.

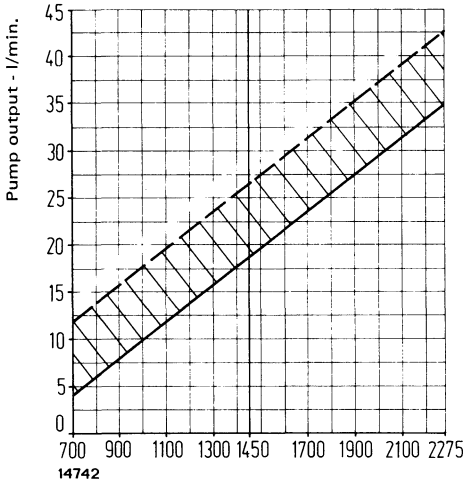
Mark the position of internal parts in order to restore them to their original position on assembly.

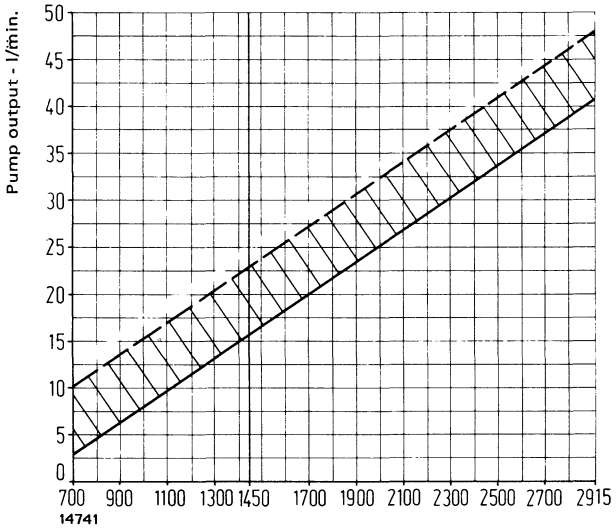
Check gear shaft and bearings for wear comparing the readings to the data given in the table on page 2, section 40.

Check gear side face flatness and squareness relative to the bearings, smearing the surfaces in question with carbon black. Small defects may be remedied using wet zero-grade emery cloth.

Check gear end clearance in the pump body with the bearings in position. The correct end float is .069 to .101 mm (.003 to .004 in). Any pump body face dressing with a view to restoring the specified end clearance should be carried out using wet 0-grade emery cloth, removing as little material as possible.

Liberally lubricate all pump parts using service oil, then assemble referring to the illustration on page 1 and noting the following points:
- ensure that the reference marks applied on disassembly are in register;
- position plastic anti-extrusion ring inside the center O-ring (3, page 1);
- gradually tighten the cover nuts and bolts to the pump body to the specified torque.



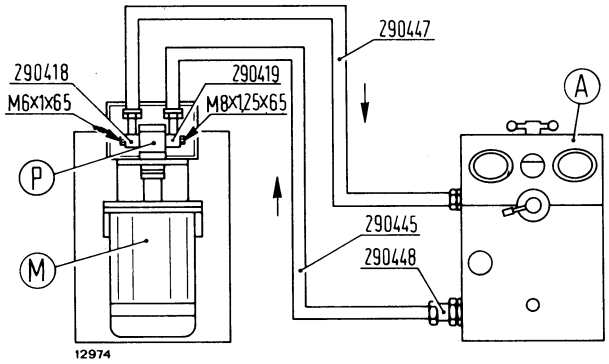


Pump speed-output chart.

TFP 200/19.5. Pump installed on 855 C - TFP 200/17. Pump installed on 955 C.
Test pressure 170 bar (173 kg/cm^2 or 2509 psi) - Oil temperature 55 to 65°C.

Pump drive ratio: { 0.910 to 1 for 855 C
1.166 to 1 for 955 C

When installing pump to tractor, fill both suction pipe and the pump body with **oliofiat TUTELA MULTI F** or other approved oil to facilitate priming and prevent seizure during initial service.



Pump output test set-up.

A. Output tester **291231** - M. Motor **291235** or **292150** - P. Pump under test (TFP 200/19.5 for 855 C and TFP 200/17 for 955 C).

Output test

Couple the pump to the drive motor and connect to output test machine using the equipment shown in figure.

Use **oliofiat IDRAULICAR AP51** (SAE 20) oil supplied with the test machine and carry out the output test at the specified temperature and pressure settings.

Compare the output figures obtained with the chart on page 2, noting the following:

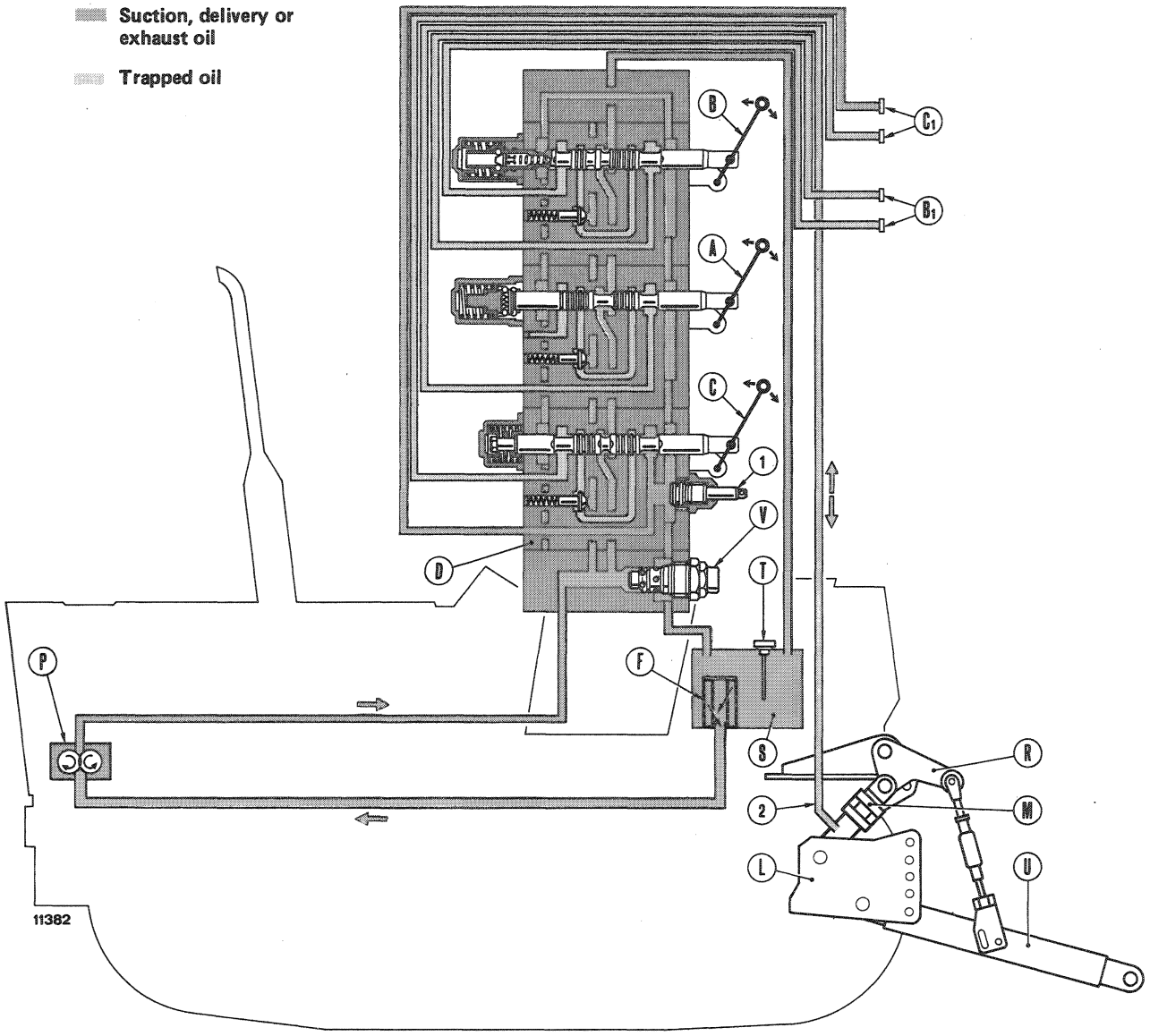
- output ratings of new or reconditioned pumps should be fairly close to the dotted line;
- output ratings of used pumps are acceptable if included in the shaded area of the chart.

If the pump is very near to, or lower than, the continuous line, the pump in question should be overhauled or replaced.

DESCRIPTION AND OPERATION

The spool-type remote implement control valves are suitable for single and double-acting cylinder applications. Float function is also provided.

For single-acting cylinder operation, screw (1) should be fully backed off, while for double-acting cylinder operation, screw should be fully in.

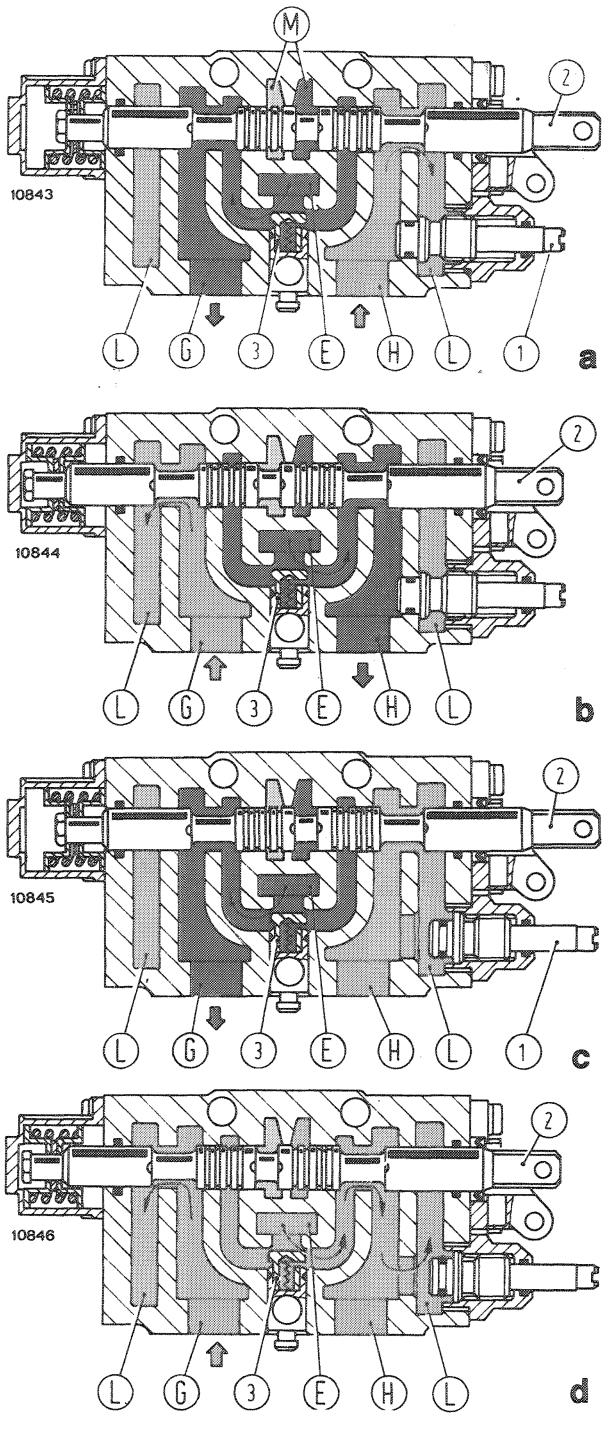


Remote implement control valve hydraulic system diagram.

A. Single-acting lift cylinder control lever - B. Float control valve lever - C. Single or double-acting remote cylinder control lever - B_1 and C_1. Single and double-acting cylinder ports - D. Remote implement control valves - F. Fullflow paper element filter on pump suction - L. Lift cylinder and hitch support - M. Single-acting lift cylinders - R. Lift arms - S. Oil tank - T. Oil filler cap with dipstick - U. Draft links - V. Relief valve - 1. Single/double action conversion screw - 2. Lift cylinder delivery hoses.

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Remote implement control valves

Valves may be banked up to five together, and are secured to the right-hand fender.
Valves are operated through an independant hydraulic circuit. A pump suction side oil filter is located in the oil tank (S, page 1).
A relief valve set to 186 to 191 bar (190 to 195 kg/cm^2 or 2758 to 2830 psi) is secured to the control valve mounting plate.
The figure on page 1 shows oil circulation through the three remote implement control valves with associated control levers in neutral position, where oil from the pump is directed through the remote implement control valves as arrowed and flows to the tank (S).



Remote implement control valve operation schematics for double-acting cylinders (figures a and b) and single-acting cylinders (figures c and d).

Note - For double-acting cylinder operation, screw (1) should be fully tightened; for single-acting cylinder operation, screw should be backed off.

Pressure oil
Suction, delivery or exhaust oil
Trapped oil

a. RAISING – When lever (C, page 1) is pushed forwards spool (2) establishes communication between inlet port (E) and cylinder lower chamber through check valve (3) and port (G) and between cylinder upper chamber and exhaust port (L) through port (H), preventing oil exhaust to tank (S) through ports (M). If the control lever is held forward, the raising phase continues until relevant cylinder reaches the end of its travel. Upon release, the lever springs back to neutral and the entire pump output is directed to the tank (S) through ports (M).

b. LOWERING – For implement lowering, pull control lever (C, page 1). Spool (2) moves as indicated in fig. b and permits oil contained in cylinder lower chamber to flow to exhaust (L) through port (G), while upper chamber is placed in communication with outlet port (E) through port (H) and check valve (3).

c. RAISING – When lever (C, page 1) is pushed forward, spool (2) establishes communication between cylinder and inlet port (E) through check valve (3) and port (G). Port (H), used for double-acting cylinders, is not used in this phase, since it is permanently connected with exhaust (L) when conversion valve (1) is opened.

d. LOWERING – When control lever (C, page 1) is pushed forward, spool (2) moves as indicated in fig. d. Oil contained in cylinder, pushed by weight of lifted implement, flows to exhaust (L) through port (G), while pump output is directed to exhaust (L) through check valve (3) and port (H).

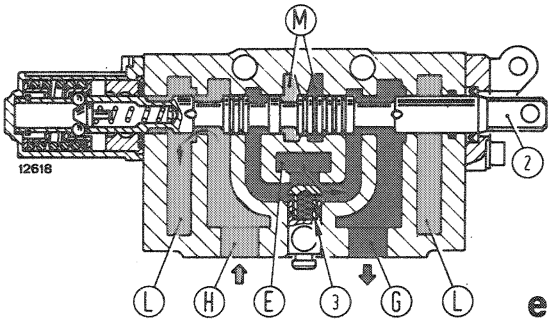
Remote implement control valve operation schematics - Double-acting cylinder (figures e, f) and float (figures g).

Pressure oil

Suction, delivery or exhaust oil

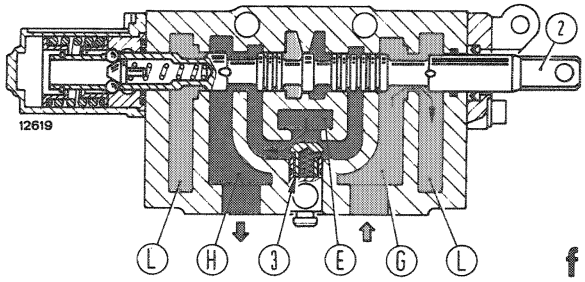
Trapped oil

e. **RAISING** – When lever (B, page 1) is pushed forward, spool (2) establishes communication between inlet port (E), and cylinder lower chamber through check valve (3) and port (G) and between upper chamber and exhaust port (L), through port (H), preventing oil exhaust to tank (S) through parts (M). If the control lever is held forward, the raising phase continues until relevant cylinder reaches the end of its travel. Upon release, the lever springs back to neutral and the entire pump output is directed to the tank through ports (M).



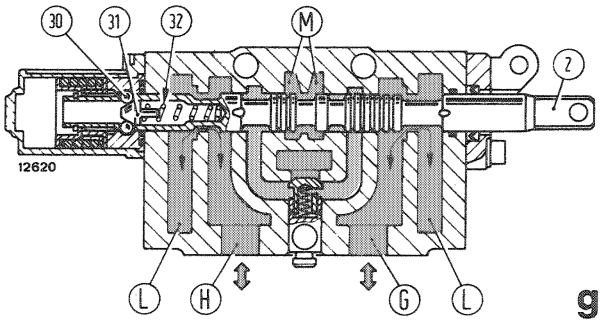
e

f. **LOWERING** – For implement lowering, push control lever (B, page 1). Spool (2) moves as indicated in fig. f and permits oil contained in cylinder lower chamber to flow to exhaust (L) through port (G) while upper chamber is placed in communication with outlet port (E) through port (H) and check valve (3).



f

g. **FLOAT** – For implement float operation, push lever (B, page 1) fully back. Spool (2) takes up position shown in fig. g where it is held by ball (30) retained in place by pin (31) and spring (32), and establishes communication between ports (M) directing entire pump output to tank, and between drain ports (L) through ports (H, G) and upper and lower cylinder chambers respectively. Thus, implement may follow the ground contour.

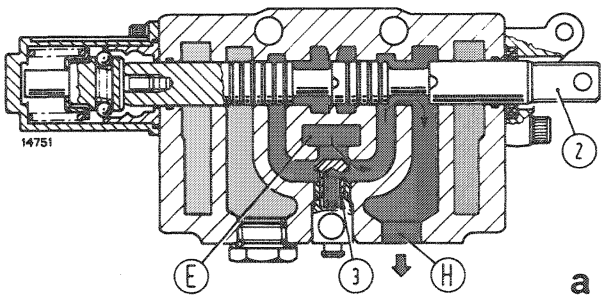


g

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Remote implement control valves

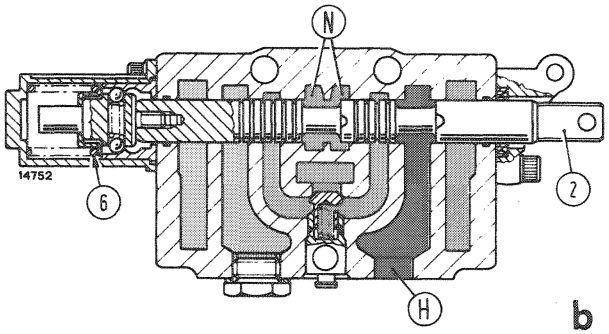
Pressure oil
Suction, delivery or exhaust oil
Trapped oil

Remote implement control valve schematics - Single-acting lift cylinder operation (figures a, b and c).



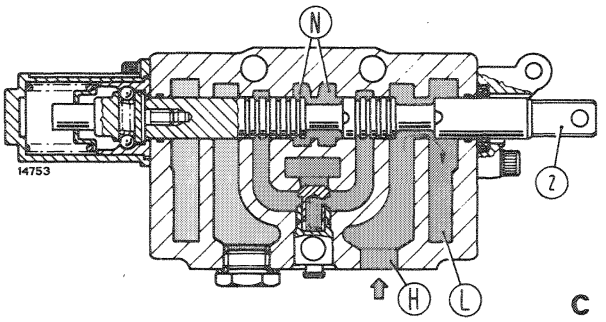
a

a. **RAISING** – When lever (A, page 1) is pulled back, spool (2) establishes communication between inlet port (E) and lift cylinder lower chamber through check value (3) and port (H), cutting off oil flow to tank (S, page 1). If lever is held back, implement raising phase continues until cylinders (M) reach the end of their travel.



b

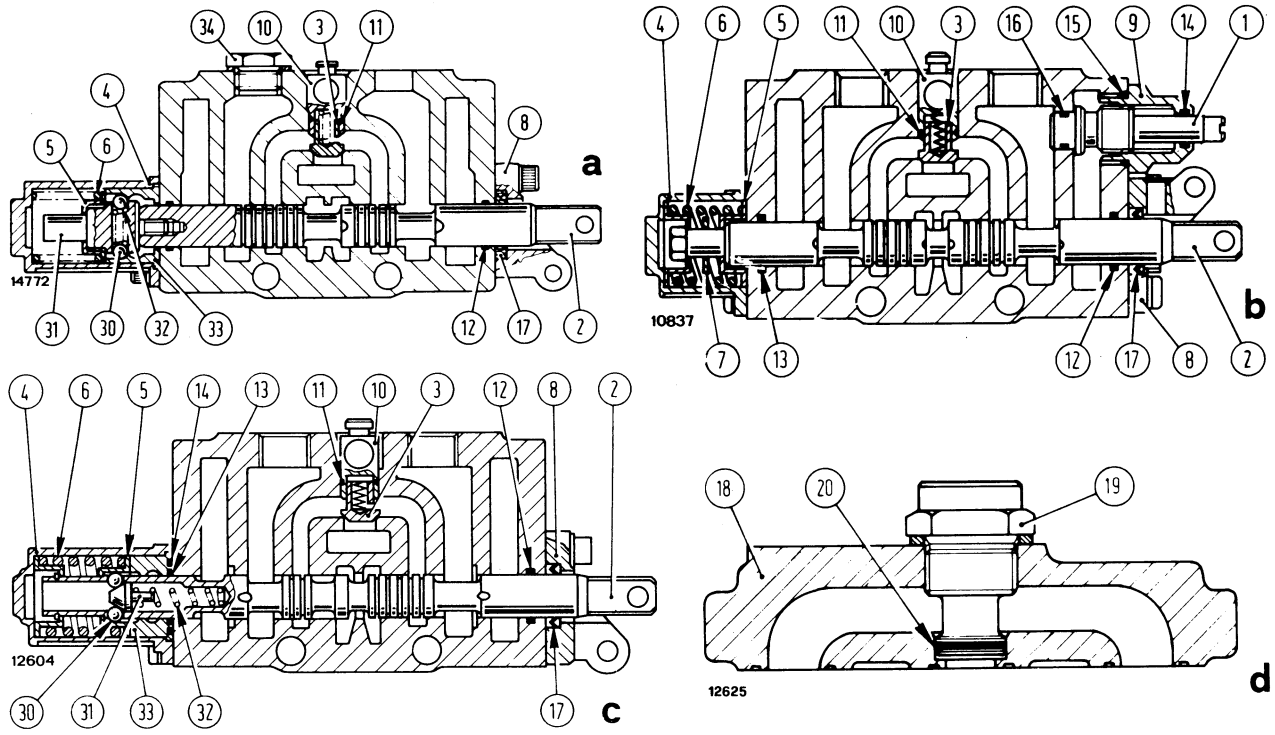
b. **NEUTRAL** – When lever (A, page 1) is released after raising implement (see diagram a), spool (2) is pulled back to neutral position by spring (6). While oil in port (H) and cylinders (M, page 1) remains under pressure, pump output is exhausted to tank (S) through ports (N).



c

c. **LOWERING** – When lever (A, page 1) is pushed forward, spool (2) takes up position shown in figure c and releases oil in cylinders (M) to exhaust (L) through port (H). Pump output is also exhausted through ports (N).

REMOTE IMPLEMENT CONTROL VALVES



Sections through remote implement control valves.

a. Single-acting cylinder remote control valve - b. Double-acting cylinder remote control valve - c. Float double-acting cylinder remote control valve - 1. Single/double action conversion valve - 2. Spool - 3. Check valve - 4. Cap - 5. Cup - 6. Spool spring - 7. Spacer - 8. Actuating lever support - 9. Valve plug - 10. Check valve seat - 11, 12, 13, 14, 15 and 16. O-rings - 17. Seal - 18. Rear plate - 19. Oil outer connection - 20. O-ring - 21. Front plate - 22. Inlet port - 23. Exhaust port - 24. Relief valve body - 25. Plug - 26. Relief valve spring - 27. Shim - 28. Shim - 29. Relief valve plunger - 30. Spool detent balls - 31. Ball retaining pin - 32. Spring - 33. Bushing.

Disassemble remote implement control valves referring to the sectional views above and noting the following points:

- remove caps (4), springs (6) and cups (5), and withdraw spools from actuating side of each valve body. On single-acting (figure a), single and double-acting (figure b) and float double-acting cylinder control valve spool disassembly (fig. c), also retrieve spool detent ball (30), pin (31) and spring (32);
- for control valves with single/double action conversion valve (figure b), back off plug (9) and remove valve (1);
- remove valve seat (10) using pliers. Take out check valve (3) and retrieve spring;
- to remove relief valve from control valve retaining plate, slacken valve body (24) and, working on the bench, back off plug (25) and retrieve spring (26), shims (27 and 28) and plunger (29).

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Remote implement control valves

— check seals for wear, replacing if necessary.

If spool replacement is necessary, note that spare spools are supplied mated with associated control valve body.

To install control valves, reverse the disassembly procedure and tighten control valve link nuts to 20 Nm (2 kgm or 14.5 ft. lb). Carry out the test described below.

On-tractor relief valve check (V, page 1)

— Insert fitting **293449** in a coupler port and connect to pressure gauge with 0 to 250 kg/cm² scale (0 to 3.556 psi) of kit **293300;**

— run engine until oil temperature reaches 50 ± 3°C;

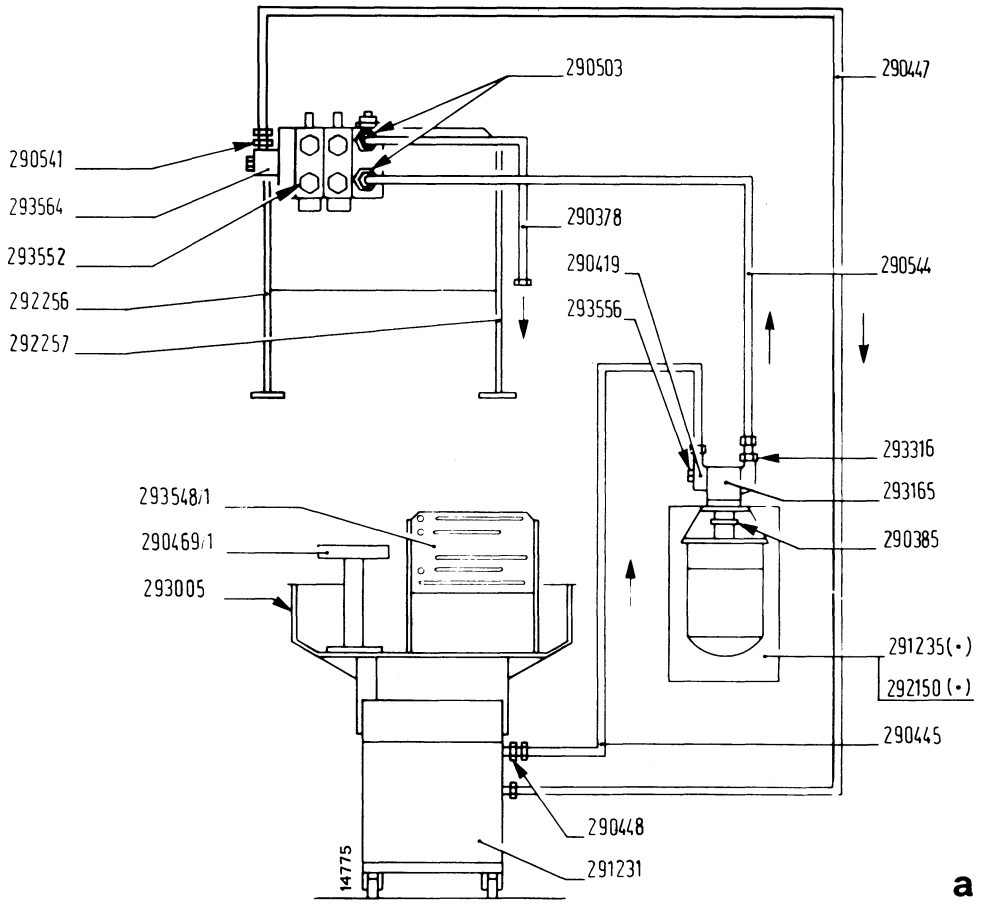
— move the appropriate remote implement control valve lever until the relief valve cracks off;

— with engine running at 1200 to 1300 rpm, pressure gauge (M) should indicate 186 to 191 bar (190 to 195 kg/cm² or 2,758 to 2,830 psi). If necessary, replace valve.

On-bench relief valve check (V, a, page 1).

Install remote implement control valve assembly under test and test equipment as directed in diagram (a), noting that oil return piping **290447** from control valve must be connected to the valve using connection **293564.**

Establish proper connections as indicated in the diagram, and test as follows: activate hydraulic pump, gradually increase pressure by acting on control handle of tester **291231** and check on pressure gauge that relief valve cracks off at 186 to 191 bar (190 to 195 kg/cm² or 2758 to 2830 psi). If not, scrap and replace valve.



Relief valve tester installation diagram.

(*) **Note** – Motor **291235** (6 to 10 HP) is indicated as an alternative to 9 to 15 HP motor **292150.**

Note – If tester is filled with oliofiat AP51 oil (SAE 20W), the above test and those that follow must be carried out at 60°C approx. and 12.5 l/min (22 Imp. pints/min) output, obtainable by running tester motor at higher speed (1450 rpm).

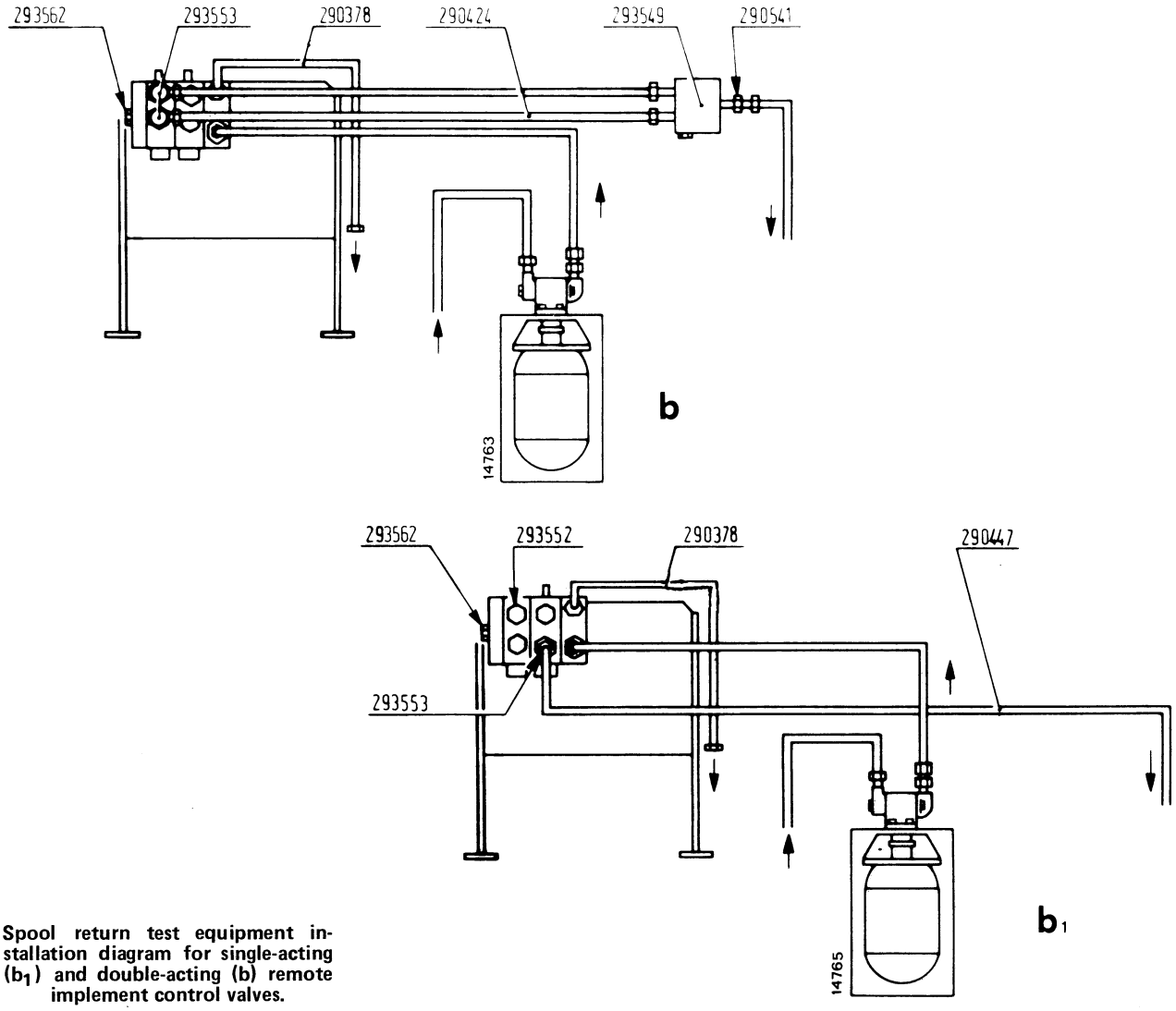
Spool return test (b, b_1)

Install remote implement control valve assembly under test and test equipment as indicated in diagram (b, b_1), noting the following points:

- on double-acting cylinder control valves (fig. b), oil delivery ports to cylinder must be connected to fitting with ball **293549** through associated lines **290424** and banjos **293553**;
- on single-acting cylinder control valves (fig. b_1), return line **290447** must be connected to oil delivery port to cylinder (port on opposite side of conversion valve, 1, page 5) through banjo **293553.**

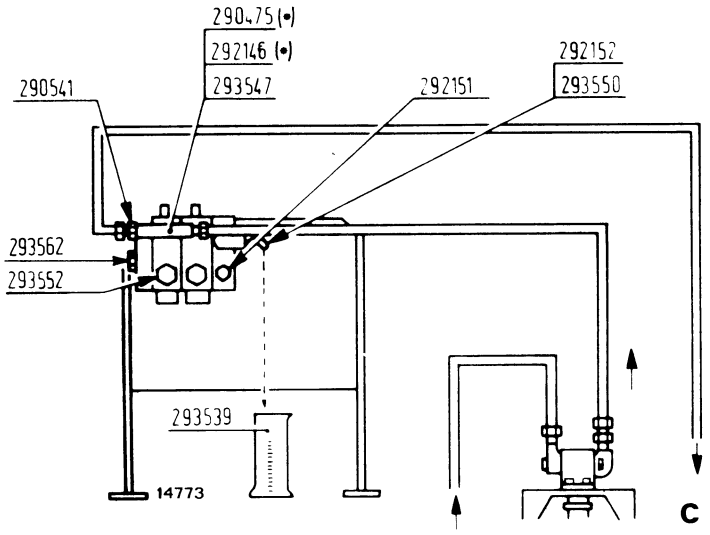
Establish proper connections as indicated in the diagram and test as follows:

- activate hydraulic pump, actuate spool hand lever (in both directions for double-acting control valves);
- gradually increase pressure through the control handle of output tester **291231** and check on the test pressure gauge that the setting is 170 bar 173 kg/cm^2 or 2460 psi). In these conditions the spool under test should slide freely and return to neutral without binding as soon as the control lever is released.



Spool return test equipment installation diagram for single-acting (b_1) and double-acting (b) remote implement control valves.

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Remote implement control valves



Spool leakage test equipment installation diagram for remote implement control valves (c).

(*) **290475** = Early type three-way adapter.
(*) **292146** = Late type three-way adapter.

– test the other spools after establishing the necessary connections.

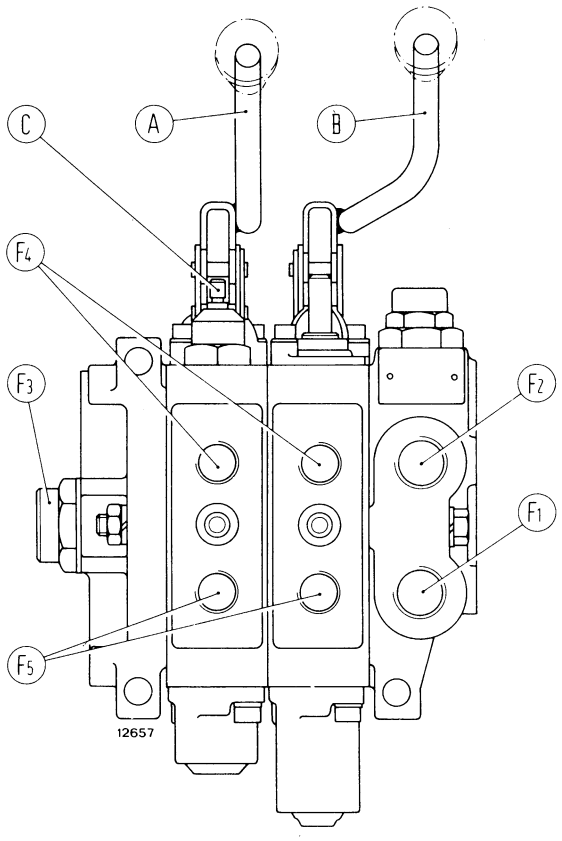
Remote implement control valve spool leakage test (c).

Install remote implement control valve assembly under test and test equipment as indicated in diagram (c) noting that three-way connection **292146** (or **290475**) is to be fitted to single-acting and double-acting cylinder valve using adapters **293547**.

After proper connection as indicated in the diagram, test as follows:

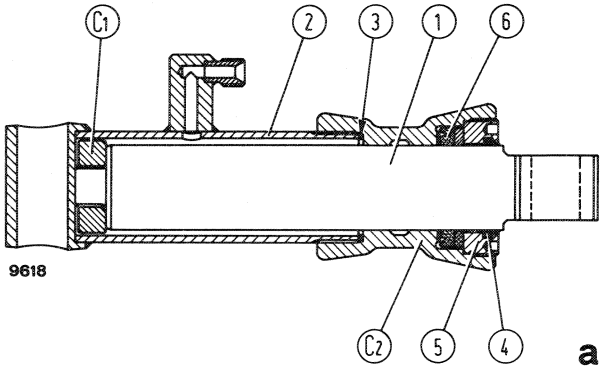
– activate the hydraulic pump, gradually increase pressure through control handle of output tester **291231** and check on tester gauge that the pressure reaches 170 bar (173 kg/cm², 2460 psi);
– collect leakage oil flowing from connection **293550** in graduate **293539** for exactly one minute and check the contents; leakage oil should not exceed 15 cc/minute (1.52 cu in/minute) for a new control valve, or 60 cc/minute (3.66 cu in/minute) for a used valve.

Repeat test on each control valve, testing each of the two cylinder delivery ports in turn.



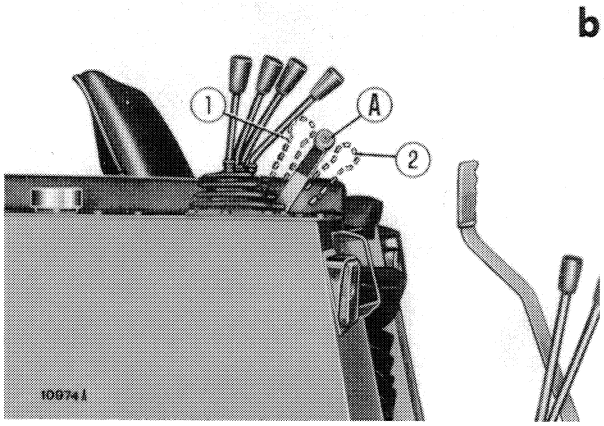
Remote control valve piping connection diagram.

A. Single/double acting convertible remote control valve lever - B. Float double-acting remote control valve lever - C. Single/double action conversion valve - F_1. Threaded hole (M 22x1.5) for oil inlet line fitting - F_2. Threaded hole (M 22x1.5) for oil exhaust line fitting - F_3. Threaded hole (G 3/4") for oil delivery connection to lift cylinders - F_4 and F_5. Threaded holes for oil delivery connections to single-acting or double-acting cylinders.



Section through a lift cylinder.

C_1. Lock ring - C_2. Cylinder head - 1. Piston - 2. Cylinder - 3. Copper washer - 4. Dust excluder - 6. Piston gland.



Rockshaft control lever positions.

A. Neutral position (with mechanical stop) - 1. Arms up - 2. Arms down (with mechanical stop).

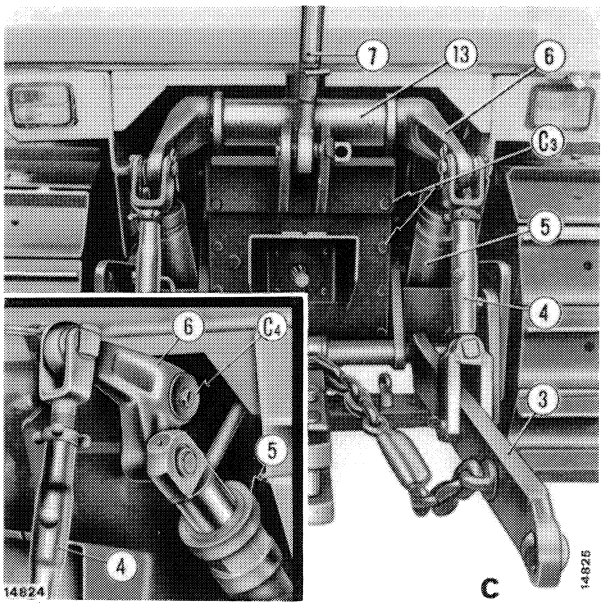
DESCRIPTION

Rockshaft and lift arms (6, figure c) are operated through two single-acting cylinders (see figure a).

Cylinders are supplied from the remote implement control valve circuit, a further single-acting cylinder being provided for this purpose.

When lever (A, figure b) is pushed forward to position 2, lift arms are lowered, and the hitch float function allows implement to follow ground contour.

A single relief valve (V, page 1, section 402) serves both remote implement control valve and lift cylinder circuits.



View of hitch.

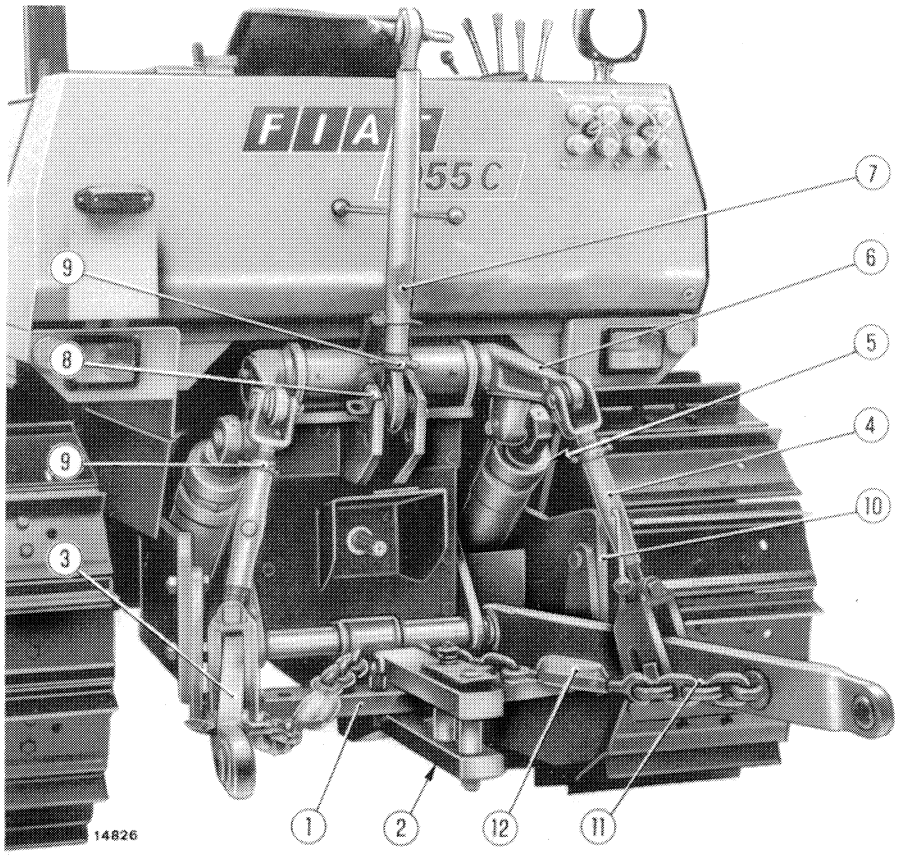
a. Detail of cylinder/lift arm/lift link articulation - C_3. Rockshaft and center link support capscrews - 3. Draft links - 4. Adjustable lift links - 5. Single-acting lift cylinders - 6. Lift arms - 7. Adjustable center link - 13. Rockshaft and center link support.

HITCH

The Category 3 three-point hitch features adjustable center link and lift links, and adjustable draft link sway chains (11).

Draft links (3) pivot on hitch supports (10) and are equipped with 29 mm or 1.14 in I.D. adapter bushings so that the hitch can also be used with Category 2 implements.

If lift links (4) and center link (7) are removed for any reason, liberally lubrificate threaded ends with **grassofiat TUTELA G9** or other approved grease prior to reassembly.



View of hitch and drawbar.

1. Drawbar frame - 2. Drawbar - 3. Draft links - 4. Adjustable lift links - 5. Single-acting lift cylinder - 6. Lift arms - 7. Adjustable center link - 8. Pivot pin - 9. Adjuster lock rings - 10. Hitch and cylinder supports - 11. Sway chains - 12. Adjuster sleeve.

CHARGING SYSTEM

	855 C	955 C
Alternator		
Type	three-phase, self-rectifying	
– Bosch	G1→14V-33A27	
– Marelli	AA108-14V-33A-1	
– Iskra	AAG1104-14V-33A	
– Lucas	18ACR-14V-40A	
Rated voltage	14 Volts	
Rotation (seen from pulley side)	clockwise	
Cut-in speed at 12 Vand 25° C	1050 to 1150 rpm	
Output at 14 V across battery after warm-up (°):		
– Bosch and Iskra, at 5000 rpm	⩾ 34A	
– Marelli, at 7000 rpm	⩾ 45A	
– Lucas, at 6000 rpm	⩾ 33A	
Rotor winding resistance (at 20° C):		
– Bosch and Iskra	3.4 to 3.74 Ohm	
– Marelli	3.4 to 3.8 Ohm	
– Lucas	3.04 to 3.36 Ohm	
On-machine alternator speed (at rated engine speed):		
– 855 C	4800 rpm	
– 955 C	4560 rpm	
Drive ratio:		
– 855 C	1.92 to 1	
– 955 C	1.82 to 1	
Voltage Regulator		
Type	integral transistor	
– Bosch	EE 14V 3	
– Marelli	RTT 110AT	
– Iskra	AER 1402 14V	
– Lucas	37657	
Alternator test speed	4000 rpm	
Voltage setting:		
– Bosch and Iskra	13.7 to 14.5 V	
– Lucas	14.2 to 14.5 V	
– Marelli	13.6 to 14 V	

ELECTRICAL SYSTEM: Specification and Data

STARTER

Type	MARELLI MT 68 MB
Voltage rating	12V
Rated output	3.5 kW
Rotation (seen from pinion end)	Clockwise
Starter drive ratio	9/127
No. of poles	4
Field winding	series
Control	Lever and freewheel
Operation	Through solenoid
Bench test data	
Running torque at 20° C:	
– Current	700 A max.
– Torque	19 Nm min: (1.9 kgm or 13.75 ft. lb)
– Speed	1700 rpm
– Voltage	9.1V
Lock torque at 20° C:	
– Current	1550 A max.
– Voltage	5.7V
– Torque	52 Nm min. (5.3 kgm or 38.3 ft. lb)
Light running torque at 20° C:	
– Current	80 A max.
– Voltage	11.6V min.
– Speed	7000 rpm min.
Mechanical data	
Brush spring pressure (new brushes)	1.28 to 1.52 bar (18.56 to 22 psi)
Mica undercut depth	1 mm max. (.040 in)
Clutch slip torque (pinion rotating torque)	.6 to .8 Nm or (.06 to .08 kgm or 4 to 6 ft. lb)

STARTER

(continued)

Commutator dia	44.840 to 45.000 mm (1.7653 to 1.7716 in)
– Maximum wear limit	43.840 mm (1.7259 in)
– Maximum ovality	.1 mm (.0039 in)
– Armature end float	.1 to .4 mm (.004 to .016 in)
Solenoid	
Winding resistance at 20°C — hold-in winding	.23 ± .01 Ohm
Winding resistance at 20°C — pull-in winding	.78 ± .04 Ohm
Current consumption at 12 V	70 A max.
Activation voltage	7 V max.
Moving contact level	2.2 to 3.5 Nm (.086 to .137 in)
Plunger stroke	14.3 mm (.562 in)
End of stroke plunger load at 12 V	40 kg min. (88 lb.)
Installation data	
Pole shoe I.D.	75.830 to 76.000 mm (2.9854 to 2.9921 in)
Armature O.D.	74.900 to 74.950 mm (2.9488 to 2.9508 in)
Drive end bushing I.D.	12.475 to 12.502 mm (.4911 to .4922 in)
Pinion journal O.D.	12.425 to 12.440 mm (.4892 to .4900 in)
Pinion clearance in bushing	.035 to .077 mm (.0014 to .0030 in)
Intermediate bushing I.D.	20.200 to 20.264 mm (.7953 to .7978 in)
Shaft journal dia.	19.967 to 20.000 mm (.7861 to .7874 in)
Shaft clearance in bushing	.200 to .297 mm (.0080 to .0116 in)
Commutator end bushing I.D.	14.000 to 14.027 mm (.5512 to .5522 in)
Shaft journal dia.	13.957 to 13.984 mm (.5506 to .549 in)
Shaft clearance in bushing	.016 to .070 mm (.0006 to .0027 in)
Lubrication data	
Starter driver helical groove (during overhaul)	**grassofiat TUTELA MR 3**
Commutator end thrust washer	**grassofiat TUTELA MR 3**

ELECTRICAL SYSTEM: Specification and Data

BATTERY

Model \ Characteristics	Type	Rated Voltage V	Nominal capacity (20 h rate) Ah	Current (3' at–18° C) A	Max. dimensions length x width x height mm	Weight with electrolyte kg
855C	DELCO1981149 (1)	12	100	460	330 x 174 x 240	
	MARELLI 6ATM25ZA	12	110	490	508 x 174 x 205	36
	SCAINI 62072	12	120	500	508 x 174 x 205	34.5
955C (2)	MARELLI 6ATM25A	12	132	580	508 x 174 x 205	40.5
	SCAINI 64072	12	140	600	508 x 174 x 205	34.5

(1) Maintenance free.
(2) Optional for 855C.

FUSES

Seven 8A and one 16A fuse located in fuse box.

Fuse	PROTECTED CIRCUIT	A
1	Thermostarter	16
2	Single-pole power point	8
3	High beam head lights and indicator	8
4	Low beam head lights	8
5	Front L.H. parking light – Rear R.H. parking light – Floodlight and switch – Instrument panel light	8
6	Front R.H. parking light – Rear L.H. parking light – Parking light indicator	8
7	Tractor turn signal lights and indicator – Tractor stop lights – Water temperature gauge – Fuel gauge – Battery charge indicator – Engine oil pressure indicator and sending unit – Air cleaner restriction indicator	8
8	Clutch low oil pressure sending unit and indicator	8

Note – Unprotected circuits: Starting and charging.

LIGHTING – INDICATORS – ACCESSORIES

Two asymmetric low and high beam head lights, double-filament 45/40 W bulb (white or yellow).

Two front lights including:
– Parking lights (5W bulb), white lens.
– Turn signal lights (21W bulb), orange lens.

Two tail lights including:
– Parking stop lights, double-filament 5/21 W bulb, red lens.
– Turn signal light (21W bulb), orange lens.

License plate light (5W bulb).

Floodlight with integral switch (35W), white.

Two rear red reflectors.

(follows)

(continued)

LIGHTING – INDICATORS – ACCESSORIES

Indicators (3W bulbs): – Battery charge (red). – Low engine oil pressure (red). – Air cleaner restriction (red). – Low clutch oil pressure (red). – Parking lights on (green) and dash light. – High beam on (blue). – Tractor turn signal lights on (green).
Thermostarter cold starting aid.

STARTER SWITCH

CO BO type, 4-position, 50 A.

Positions	Circuit completed
Position 0 30	Engine shut-off (955C) – Single pole power point.
Position 1 30-15/54 57-58/57	Lighting switch - Fuel gauge - Water temp. gauge - Battery charge indicator - Low engine oil pressure indicator - Turn signal lights and indicators - Engine oil pressure sending unit - Low clutch oil pressure indicator - Single-pole power point.
Position 2 30-15/54-50 57-58/57	Lighting switch - Fuel gauge - Water temp. gauge - Battery charge indicator - Low engine oil pressure indicator - Turn signal lights and indicators - Starter - Engine oil pressure sending unit - Low clutch oil pressure indicator - Single-pole power unit point.
Position 3 30-57	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking light - Parking lights indicator - Instrument panel lights - License plate light - Single-pole power point - Floodlight.

LIGHTING SWITCH

CO BO type, 4-position.

Positions	Circuits completed (°)
Position 0 30	–
Position 1 30-57/58	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - Horn - Floodlight.
Position 2 30-57/58-56b	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - Low beam - Horn - Floodlight.
Position 3 30-57/58-56a	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - High beam - Horn - Floodlight.

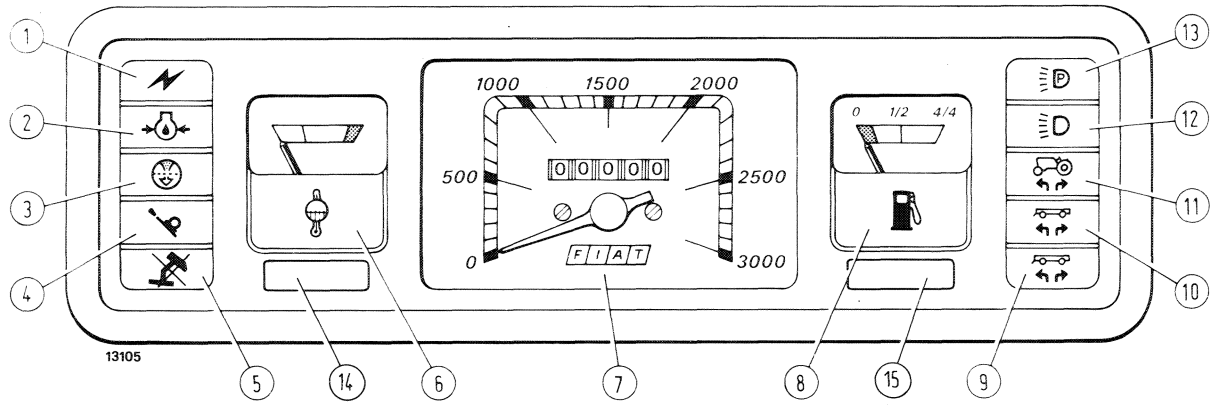
(°) Starter switch in position 1

TURN SIGNAL SWITCH

CO BO Type, 3-position.	
Positions	Circuit completed (°)
Position 0 54	Off
Position 1 (right) 54 1	Right-hand turn signal
Position 2 (left) 54 2	Left-hand turn signal

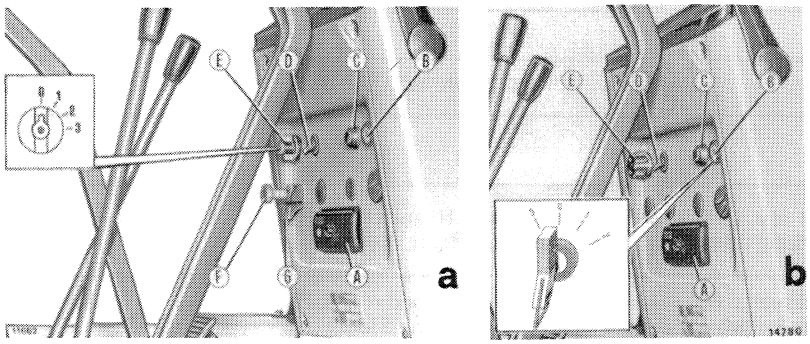
(°) Starter switch in position 1.

CONTROLS AND INSTRUMENTS



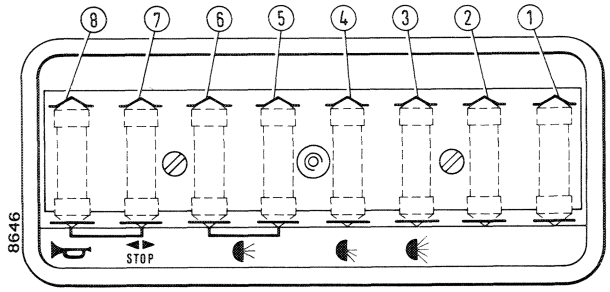
Instrument Panel

1. Battery charge indicator (red) - 2. Low engine oil pressure indicator (red) 3. Air cleaner restriction indicator (red) 4. Spare - 5. Spare - 6. Engine coolant temperature gauge - 7. Tractormeter - 8. Fuel gauge - 9. Spare - 10. Spare - 11. Tractor turn signal indicator (green) - 12. High beam indicator (blue) - 13. Parking lights indicator (green) - 14. Low clutch oil pressure indicator (red) - 15. Water trap restriction indicator.



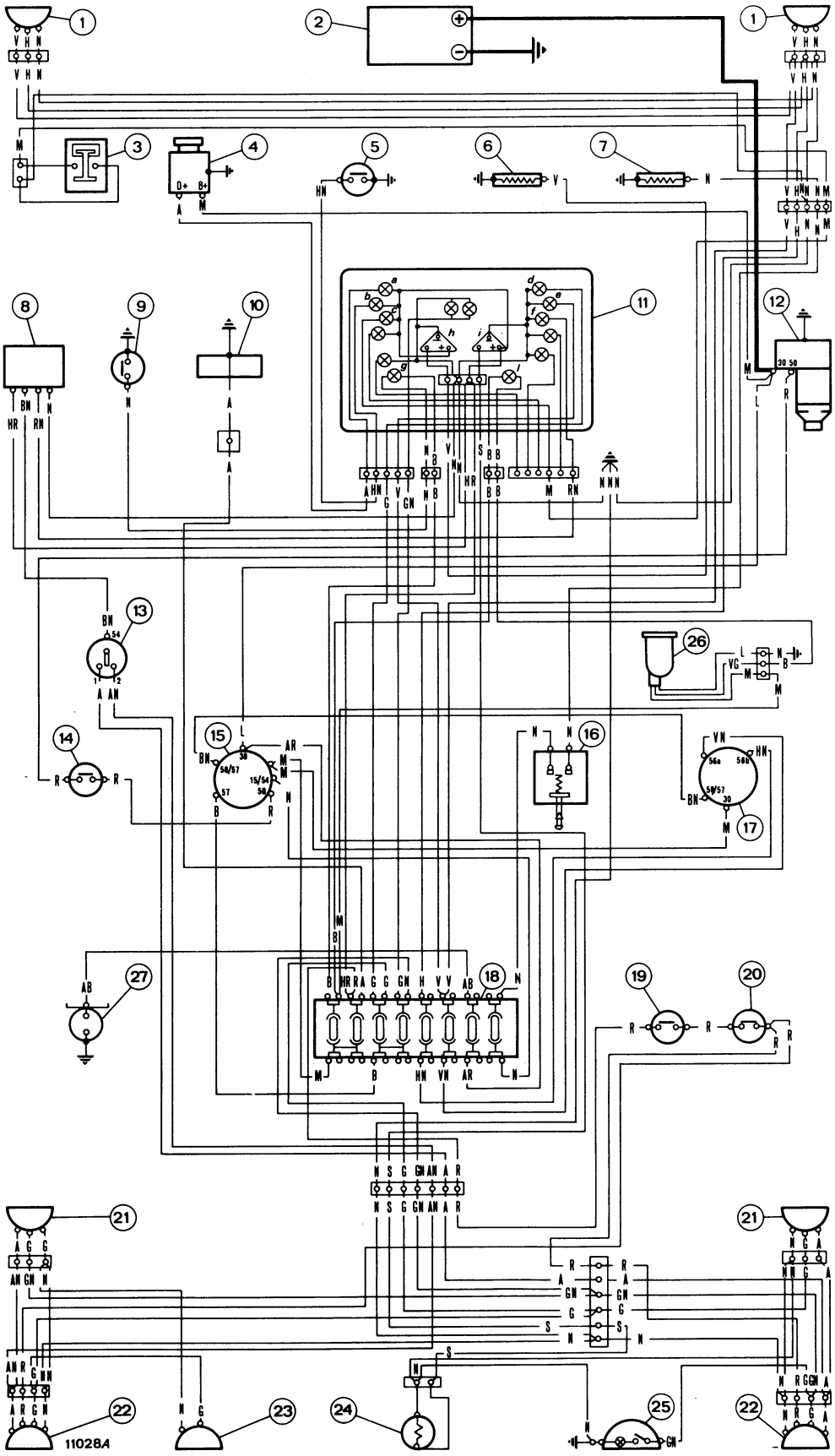
Control board

a. 855C - b. 955C - A. Fuse box - B. Starter switch (855C); Starter and engine shut-off switch (955C) - C. Thermostarter switch - D. Turn signal switch - E. Lighting switch - F. Engine shut-off knob (855C) - G. Lock



Fuse Unit

(For reference see page 4).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Wiring diagram

1. Head lights
2. Battery
3. Air cleaner restriction indicator
4. Alternator
5. Low engine oil pressure sending unit
6. Water temperature sending unit
7. Thermostarter (optional)
8. Tractor turn signal flasher
9. Low clutch oil pressure sending unit
10. Engine shut-off solenoid (model 955C only)
11. Multiple gauge (9-function)
    a. Battery charge indicator
    b. Low engine oil pressure indicator
    c. Air cleaner restriction indicator
    d. Parking light indicator
    e. High beam indicator
    f. Turn signal indicator
    g. Low clutch oil pressure indicator
    h. Engine water temperature gauge
    i. Fuel gauge
    l. Water trap restriction indicator
12. Starter
13. Turn signal switch
14. Starter inhibitor switch
15. Starter switch
16. Thermostarter switch
17. Lighting switch
18. Fuses
19, 20. Stop light switch
21. Front parking and turn signal lights
22. Rear parking/turn signal/stop lights
23. License plate light
24. Fuel gauge tank unit
25. Floodlight and switch
26. Water trap sending unit
27. Single-pole power point

CABLE COLOUR CODE

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

10 - ENGINE

100 - Removal - Installation - Bench test

290740/1	Hook, lift.
293002/2 or 293860	Bracket, universal, use with revolving stand **290090.**
291310	Tester, compression (kit **291309**).
292631	Dummy injector.
292888	Guide pins, engine/clutch housing.

101 - Engine block - Cylinder head

293349 or 293864	Plate, sleeve removal.
291501	Plate, sleeve installation.
293269 (390363)	Reamer, camshaft bushing.
292103 (360383)	Remover/replacer, camshaft bushing.
292208 (370008)	Handle (use with **292103**).
290947	Remover/replacer, tappet.
292913 ([1])	Lathe, universal valve seat.
291978	Cutter set, valve seat.
293784 (342137)	Puller, injector sleeve.
292240 (390425)	(Tap (M12 x 1,75), injector sleeve.
292243 (390771)	Clean-up tool, sleeve seat.
293742/2	Reamer set, injector sleeve.
293386/1	Burnisher, injector sleeve.
291160	Pliers, piston ring.
291048	Compressor, piston ring.
291113	Support, cylinder head.
291050	Compressor, valve spring.
291112	Support, valve.
291046/1 (360409/1)	Remover/replacer, valve guide.
291780 (360409/3)	Adapter, valve guide installation (use with **291046/1**).
290064	Grinder, valve.
291177 (390310)	Reamer, valve guide.
291883 (350108)	Wrench, rocker arm.
291979	Thermometer, digital.
293300	Pressure gauge set.
291966	Tachometer, digital.

([1]) Alternative to cutter set.

103 - Crank gear

291504	Puller, crankshaft pulley hub.

104 - Fuel system

290752	Plate, injection pump to rotary stand **290239.**
293671	Cleaners, injectors.
293760	Support, injector removal/installation (BOSCH - CAV - OMAP).
293761	Wrenches, injectors.
293786	Wrench, pump pressure fitting.
293401	Kit, on-tractor distributor pump diagnosis.
291755	Timing tool, injection pump (with gauge **291754** for 955 C or **292197**).

On-bench injection pump test equipment

292147	Spacer, injection pump test.
293149	Test machine, injection pump.
290765	Delivery lines (test A, 6x2x850 mm).
290284 or 293780	Hand pump, injector calibration check.

BOSCH injection pump

290766	Remover-replacer, rotor (855 C).
290664	Remover-replacer, rotor (955 C).
290774	Gauge, distributing rotor stroke.
290778	Spacer, rotor spring pre-load check (855 C).
290779	Installer, O-ring (855 C).
290780	Remover, O-ring.
290847 (365055)	Wrench, drive coupling (955 C).

292172 (342140) Puller, splined hub (955 C).

292133 Coupling, bench test.

290756 Coupling, bench test (855 C).

293787 Coupling, splined, bench test (27 mm dia.).

291747 Wrench, governer shaft (955 C).

291748 Wrench, rotor plug (955 C).

291749 Wrench, pressure regulating valve.

291752 Spacer, excess fuel check (955 C).

291912 (352141) Wrench, governor support (955 C).

291750 Extension, M 8x1 thread (use with **290744**, 955 C).

291751 Tester, advance.

292139 292548 Installer, O-ring.

292551 Extension, M 14.5x2 thread (use with **290774**, 855 C).

292553 Remover, pressure regulating valve retaining ring.

292554 Guard, cam plate.

292551 Extension, M 14.5x2 thread (use with **290774**, 855 C).

292553 Remover, pressure regulating valve retaining ring.

292554 Guard, cam plate.

292555/1 Remover/replacer, pump shaft.

292556 Wrench, shuttle and metering valve (855 C).

292557/1 Compressor, pressure regulating valve.

292558 Centralizer, hydraulic head (855 C).

292817/1 Tester, advance and feed pressure (855 C).

293387 Spacer, advance check (use with **292817/1**).

293378 Remover / replacer, pump shaft (855 C)

293392 Screw (use with **293378**).

CAV injection pump

290741 Guide, throttle lever spindle removal.

290742 Guide, throttle and shut-off lever O-ring installation.

290743/1 (365077) Tester, advance.

290744 Remover/replacer, transfer pump rotor (use with torque wrench).

290745 Guide, start-retard O-ring replacer.

290746 Guide, advance plug O-ring replacer.

290747 Wrench, distributor rotor flange.

290748 Plug, pump leakage test.

290749 Connector, transfer pump outlet pressure test.

290750 Connector, fuel drain line.

290751 Connector, fuel inlet line.

290753 Connector, pump leakage test.

290754 Wrench, fueling adjusting screw.

290755 Connector, relief valve, pump roller check.

290757 Gauge, timing, pump flange.

290758 Remover/replacer, cam ring pin.

290759 Replacer, pump shaft.

290764 Connector, drain.

290760 Connector, advance.

106 - Cooling system

291182/1 Puller, water pump impeller.

20 - POWER TRAIN

201 - Clutch

290954 Wrench, oil-bath clutch.

291363 Compressor, spring.

202 - Transmission and splitter

292888 Guide pins, clutch housing removal/installation.

291517 Hook, lift.

203 - Bevel drive

293400/1 Gauge, bevel pinion position.

292888 Guide pins, ring gear carriers.

293182 Adapter, M 8x1.25 (use with **292927**).
292311 Adapter, M 10x1 (use with **292927**).

204 - Steering clutches - Brakes - Final drives

291582 Hook, lift.
290997 Compressor, steering clutch spring.
292888 Guide pins, final drive housing cover.
291517 Hook, lift.
291884 Wrench, sprocket wheel nut.
291897 Steady, final drive pinion.

205 - Power takeoff

293812 Pins, M 6x1.5.
291896 Installer, PTO shaft bearing.

30 - UNDERCARRIAGE

301 - Track chains

292912 Track press, use with:
291008 Remover, track pin.
291010 Plate, pin installation/removal.
291007 Remover/replacer, bushing.
292012/1 Spacer, bushing removal.
291009 Installer, pin and bushing.
292451 Track press, use with:
292434 Brackets, link installation.
292435 Brackets, link removal.
292436 Saddle, pin and bushing installation/removal.
292437 Spacers, master bushing removal/installation.
291015 Gauge, track spacing.
291005/1 Remover/replacer, master pin (M 16x1.5).

303 - Front idler - Track rollers - Carrier roller

293333 Puller, front idler bracket.
292912 Press, idler and track roller bracket removal.
293334 Plate, idler brack removal (use with **292912**).
291588 Legs (use with **293334**).
291525 Guide pins (M 10x1.25), bushing carrier.
291417 Support, roller overhaul.
291427 Puller, track roller bracket.
291588 Legs (use with **292912**).
291667 Hook, lift.

304 - Track frames and suspensions

291006 Gauge, track frame alignment (use with **291572/1**).
291572/1 Bar, track frame alignment.
292927 Puller, front suspension pivot pin.
292311 Adapter (use with **292927**).

40 - HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM

401 - Hydraulic pump

291231 Tester, output, large, including:
290448 - adapter, suction;
290445 - pipe, suction;
290419 - connection, suction;
290418 - connection, delivery;
290447 - pipe, delivery.
291325 Motor, electric, pump (6-10 hp).
292150 Motor, electric, pump (9-15 hp) including:
290385 - coupling,drive.

402 - Remote implement control valves

293300 Kit, pressure gauge and fittings.
291231 Tester, output, including:

291235 - motor, electric (6-10 hp);
or
292150 - motor, electric (9-15 hp);
293005 - tank;
293165 - pump, hydraulic;
290385 - coupling;
293548/1 - support, valve;
292256 - bracket;
292257 - bracket;
290469/1 - support;
293539 - graduated glass;
290448 - adapter;
290445 - pipe;
293564 - banjo;
290419 - connection, suction;
293556 - screw;
293616 - adapter;
290544 - pipe;
293532 - adapter;
290378 - pipe, drain;
290541 - adapter;
290447 - pipe, return;
293552 - plug;
293562 - plug;
293553 - connection;
290424 - pipe;
293549 - connection, ball;
292146 or 290475 - fitting, 3-way;
293547 - adapter;
292152 - adapter;
293550 - connection, leak.

50 - ELECTRICAL SYSTEM

293489 Support, alternator bench test.
290623 Support, alternator bench test (955 C only).

FIAT
Trattori

85-55
95-55

WORKSHOP MANUAL

QUICK REFERENCE INDEX

S E R V I Z I T E C N I C I D I A S S I S T E N Z A

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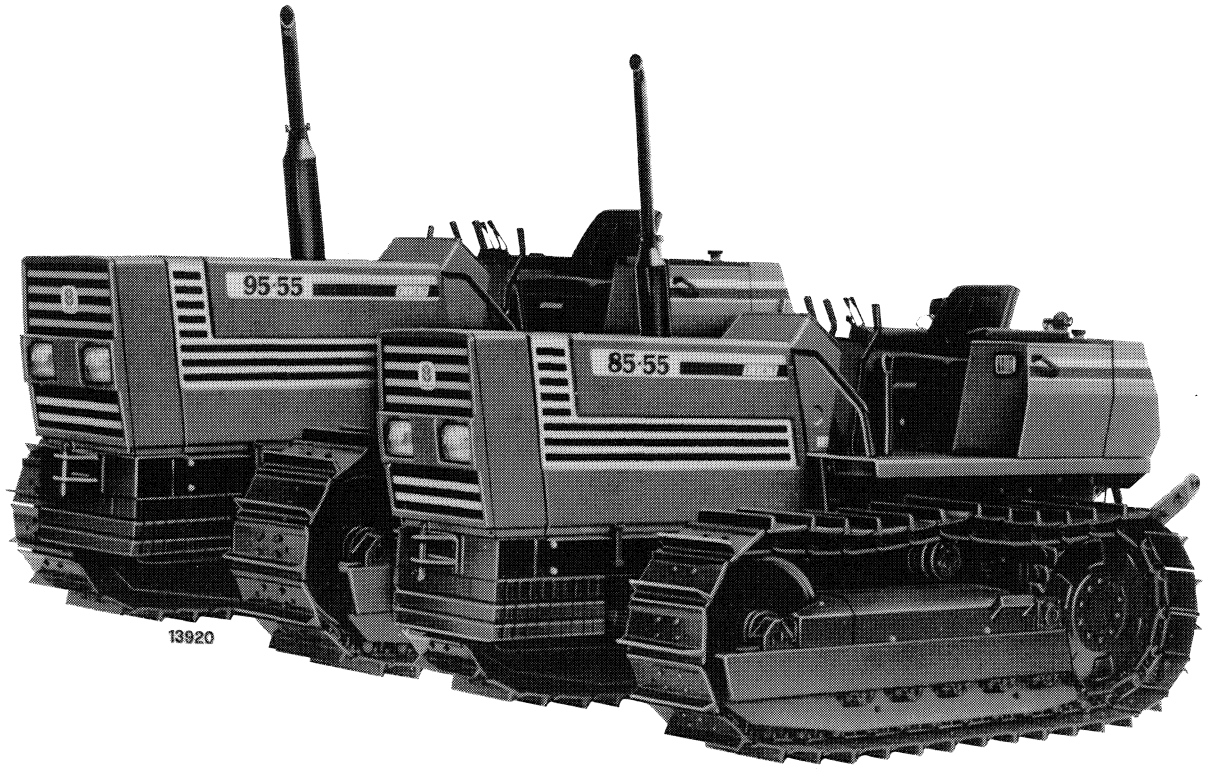
GENERAL: Contents

IDENTIFICATION DATA

MODEL	CODE NUMBER			ENGINE	
	Marketing		Engineering		
	on hood	on plate		type	construction
Crawler	85 - 55	85 - 55	663.100.000	8045.05.200 (1) 8045.05.300 (2)	FIAT
Crawler	95 - 55	95 - 55	664.100.000	8055.05.205	FIAT

(1) BOSCH injection pump.
(2) C.A.V. injection pump.



SPECIFICATION

	85 - 55	95 - 55
WEIGHTS		
Operating weight (with front ballast weights and lift) without operator	5420 (11950 lb)	6420 (14156 lb)
ENGINE		
Type	Diesel, 4-stroke, naturally aspirated	
Injection	Direct	
Number of cylinders	4	5
Sleeves	Dry	
Stroke	104 x 115 mm (4.094 x 4.257 in)	
Displacement	3908 cm^3 (238.466 in^3)	4885 cm^3 (298.083 in^3)
Compression ratio	17 to 1	
Crankshaft rotation (seen from fan side)	Counterclockwise	Clockwise
Main bearings	5	6
Firing order	1-3-4-2	1-2-4-5-3
Max. output speed	2500 rpm	
Max output, DGM/DIN	58.8kw (80HP)	66.2kw (90HP)
Max. torque speed	1500 rpm	
Drive ratios — Alternator	1 to 1.778	
Drive ratios — Oil pump	1 to 0.5	1 to 1.265
Drive ratios — Water pump and fan	1 to 1.04	1 to 1.41
Drive ratios — Tractormeter	1 to 0.5	
Oil pan	Cast iron	
Engine balancer	Counterweight unit in oil pan	—
Valve gear	OH values, pushrod operated	
Intake — Opens: BTDC	3°	
Intake — Closes: ABDC	23°	
Exhaust — Opens: BBDC	48° 30'	
Exhaust — Closes: ATDC	6°	
Valve clearance (timing check)	0.45 mm (.018 in)	
Normal clearance (hot or cold):		
— Intake	0.25 mm (.010 in)	
— Exhaust	0.35 mm (.014 in)	

	85 - 55	95 - 55
Fuel system		
Air cleaner	Oil bath or dry double cartridge, centrifugal pre-cleaner with automatic dust unloader	
Fuel filter (on fuel transfer pump delivery)	Two, in line , disposable paper cartridge (water trap with first stage filter) (*)	
Fuel transfer	Double diaphragm	
– Operation	Cam, valve gear driven	
Injection pump	Distributor with integral centrifugal governor and hydraulic automatic advance device	
– Type BOSCH	VE4/11 F 1250 L 164 - 4794588	VE5/11 F 1250 R 165 - 4794590
– Type C.A.V.	DPS 8520 A090 - 4797415	–
– Pump timing, B.T.D.C.:		
• BOSCH	4° ± 1°	6° ± 1°
• C.A.V.	0° ± 1°	–
Injectors	Three orifice	
– Injector type	See page 10, section 10	
– Nozzle opening pressure	230 to 238 bar (235 to 243 kg/cm² - 3342 to 3456 psi)	
Firing order	1-3-4-2	1-2-4-5-3
Lubrication system	Forced feed, gear pump	
Pump drive	Camshaft	Crankshaft
Oil filters:		
– Suction	Wire mesh	
– Delivery	Full-flow cartridge	
Relief valve	In pump body	
Oil pressure at rated engine speed	2.9 to 3.9 bar (3 to 4 kg/cm²) (42 to 57 psi)	4.5 to 4.9 bar (4.6 to 5 kg/cm²) (65 to 71 psi)

(*) An optional water trap (Var. 710.130) may be installed on fuel tank outlet.

SPECIFICATION

	85 - 55	95 - 55
Cooling system	Water, centrifugal pump	
Radiator, vertical tubes	Translucent plastic	
Expansion tank	3 row	4 row
Fan, water pump pulley mounted	Suction, 4 steel blades	
Temperature control	Wax thermostat	
Tractormeter	On instrument panel	
– Drive	Camshaft	
– Hourmeter activation speed. . . . . rpm	1800	

POWER TRAIN

Clutch

12" twin plate, wet type with lobe-type gear pump and full-flow filter.

Overcenter engagement, hand lever control.

Post-release brake to facilitate gear engagement.

Sintered facings.

Transmission and Splitter

Spur sliding gear. Pinion drive splitter for 8 forward and 4 reverse speeds.

Transmission and splitter controlled through two separate levers located centrally in front of the operator.

Bevel drive with 9/49 ratio, located at center of rear transmission. Single-reduction final drives with spur gears.

Steering clutches

Dry, multiple plate with spring-type mechanical power assistance, controlled through two hand levers.

11 drive plates and 11 driven plates per side.

BRAKE

Service

Band, mechanical control acting on steering clutch outer drums, controlled by separate pedals.

Parking brake acts on service brakes, controlled by hand lever to operator's right.

Power take-off (540 rpm)

Direction of rotation (tractor viewed from rear) . . . . . Clockwise

Engine speed with P.T.O. at 540 rpm . . . 2124 rpm

1 3/8" 6-spline stub shaft.

Hand lever control.

UNDERCARRIAGE

Rear suspension incorporating cross beam fastened to final drive housing and resting on track frames through lubricated bushing permitting independent track frame oscillation.

Transverse leaf spring front suspension.

Track frames, incorporating front guides, each with replaceable wear plate, five track rollers and one carrier roller (model 85 - 55) or six track rollers and one carrier roller (model (95 - 55).

Lubricated-for-life rollers and front idlers.

Tracks consisting of 35 links (model 85 -55) or 38 links (model 95 - 55).

Shoe width . . . . . 400 mm (16 in)

500 mm (20 in) width shoes and street plates optional.

REMOTE IMPLEMENT CONTROL HYDRAULIC SYSTEM (optional)

This system is used for controlling the hitch, rear mounted or semi-integral implements.

System is mounted on the right hand fender and consists of:

- Oil reservoir
- Gear pump, engine timing gear driven
- 2 or 3 convertible remote control valves plus option suction control valve, each with 1/2" quick-disconnect coupler ports for single or double-acting remote cylinders.

HITCH AND ROCKSHAFT CONTROLS (optional)

External hydraulic cylinder with position and float control.

Controlled through lever actuating an independent control valve connected with remote implement control valve pack.

Two external single-acting cylinders connected to lift arms mechanically.

Same gear pump supplying remote implement control hydraulic system.

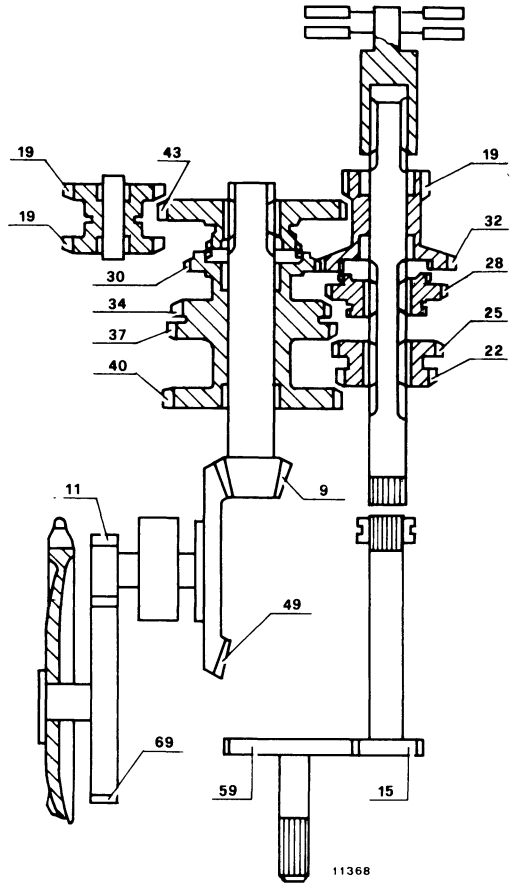
Design lift capacity, max. lift stroke and max. lift capacity (see 855C - 955C tractors, Section 40, page 3 and 4).

Category 2 or 3 implement attachment with three-point linkage.

Standard lift arms and draft links.

Sway chains.

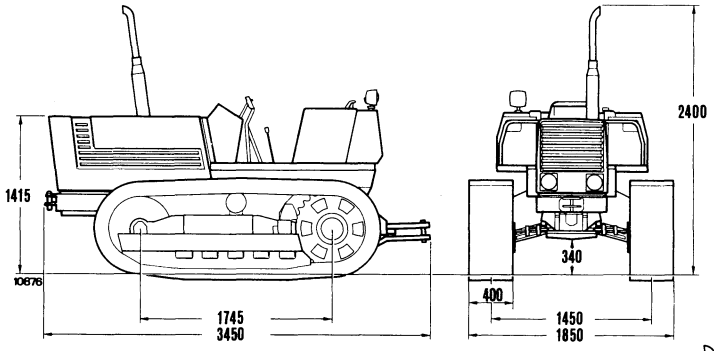
POWER TRAIN SCHEMATICS (Models 85 - 55 – 95 - 55)



TRACTOR SPEED AT RATED ENGINE SPEED			
GEARS		Models 85-55 – 95-55	
		kph	mph
Low forward	1st.	2.1	1.3
	2nd	2.6	1.6
	3rd	3.2	1.9
	4th	4.2	2.6
High forward	1st.	5.2	3.2
	2nd	6.4	3.9
	3rd	7.8	4.8
	4th	10.1	6.2
Reverse	1st.	3.6	2.2
	2nd	4.5	2.8
	3rd	5.5	3.4
	4th	7.1	4.4

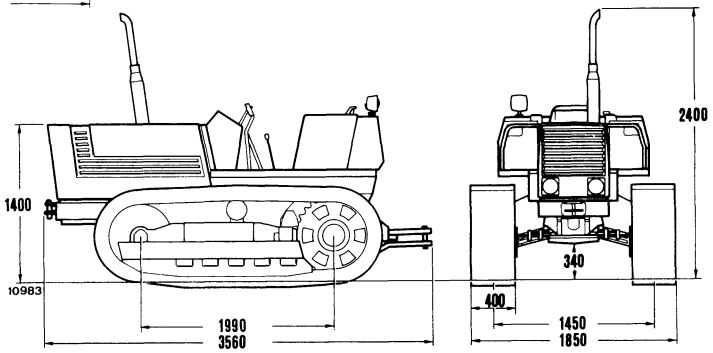
SPECIFICATION

OVERALL DIMENSIONS (in mm)



Model 85 - 55

Model 95 - 55



TOWING ATTACHMENTS

Rear
– Swinging drawbar, heavy type,height adjustable to three positions.

Front
– Tow hook, can be used with front ballasting.

BALLASTING

Consisting of 10 plates, inserted over two guides secured to the front suspension support, each of 33 kg (73 lb) for a total weight of 337 kg (743 lb).

BODY

Integral structure including: footboards, fenders, dash and seat support.
Forward operator's position.
Full 4-piece hood.
Flat fenders.
Two sheet metal fuel tanks, one at rear and one on L.H. fender, for a total capacity of 170 litres (37.4 gal).
Lift remote control oil tank on R.H. fender, capacity 27 litres (5.9 gal) tool kit and box positioned under L.H. armrest.
Dash with 15 function instrument panel and control board.
Optional ROPS frame.

Hood

Square, fully enclosing.
Side flaps removable for easy access to engine.

ELECTRICAL SYSTEM (12 Volt)

Alternator with integral electronic voltage regulator.
Type – BOSCH K1 → 14V 45A20 (85 - 55) and MARELLI AA125E-14V-45A (85 - 55 and 95 - 55).
Starter – MARELLI MT68MB maintenance -free.
Battery, located ahead of radiator.
Capacity 132 Ah (or 100 Ah for 85 - 55).

Lighting

Twin head lights, asymmetric high and low beams (45/40 W bulb).
Two front lights incorporating 5 W parking light and 21 W turn signals.
Two tail lights incorporating 5 W parking and 21 W turn signals and stop light.

5 W license plate light.

Instruments and Accessories

Control board and 15-function instrument panel, of which 4 functions are spare.

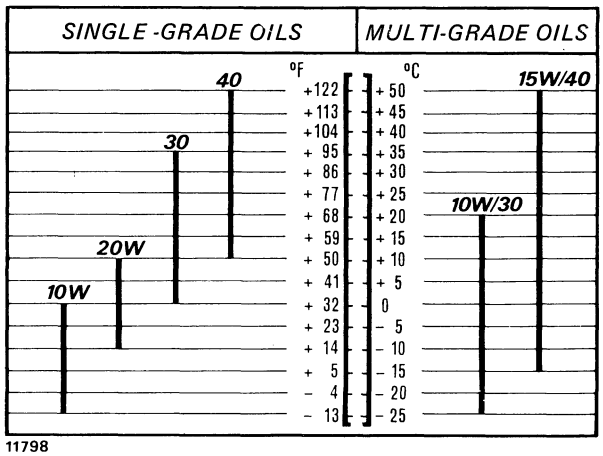
Optional water trap, 35 W floodlight, cold starting aid, ROPS frame and single pole power point.

Fuses; seven 8 amp and one 16 amp.

CAPACITIES

DESCRIPTION	FLUID					
	FIAT Recommended Product	CAPACITY			International designation
		Liters	kg	Pints	
Oil pan, filters and lines ..... 85 - 55....	AMBRA SUPER (2)	11.7	10.5	20.6	Diesel engine oil to MIL-L-2104D and API CD service
Oil pan, filters and lines ..... 95 - 55....		13.8	12.4	24.3	
Oil pan and filters ..... 85 - 55....		11.2	10.1	19.7	
Oil pan and filters ..... 95 - 55....		12.8	11.5	22.5	
Oil pan only .. 85 - 55....		10.5	9.5	18.5	
Oil pan only .. 95 - 55....		11.1	10	19.5	
Transmission, bevel drive and P.T.O.....	TUTELA W90/M-DA	30.3	27.3	53.3	Transmission oil to MIL-L-2105C and API GL 5 service SAE 80W/90
Final drives (each).....		5	4.5	8.8	
Air cleaner (1).....	TUTELA MULTI F	1.2	1.1	2.1	Transmission, drive train oilbath brakes and lift oil to Massey Ferguson MF1135 and Ford M2C 86A
Clutch.....		10.3	9.3	18.1	
Track rollers and idlers		2.3	2.1	4.0	
Remote control and lift system:					
– Tank and lines.....		25.5	23	45	
– Lift.....		3.3	3	5.8	
Lubricator grease.....	TUTELA G9	1.1	1	1.9	Lithium-calcium grease, NLGI No. 2
Coolant (incl. expansion tank) 85 - 55....	water and "PARAFLU 11" (3)	11	–	19.4	
Coolant (incl. expansion tank) 95 - 55....		12	–	21.1	
Fuel tanks (two off)	diesel oil	170	–	299.4	

AMBRA SUPER



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(1) Change cleaner oil when sludge or deposits reach a depth of around 1 cm or 1/2".

(2) SAE viscosity in relation to outdoor temperature: see table alongside.

(3) Fluid with oxidation, corrosion , foam and scale inhibiting properties, antifreeze down to –8° C, –15° C, –25° C and 35°C in 20%, 30%, 40%and 50%mixtures with water. Coolant is effective for **2 years** or **1600 hours.**

ENGINE BLOCK – CYLINDER HEAD

	mm	in
Engine block		
Cylinder bore diameter in engine block	106.850 to 106.900	4.207 to 4.209
Sleeve O.D.	107.020 to 107.050	4.213 to 4.214
Sleeve interference fit in block	0.120 to 0.200	.0047 to .0079
Sleeve diameter oversize	0.2	0.007
Sleeve bore diameter	104.000 to 104.024(1)	4.094 to 4.095 (1)
Maximum ovality and taper due to wear (2)	0.12	.0047
Sleeve bore oversize	0.4 to 0.8	0.015 to 0.031
Camshaft bushing bore diameter		
– Front (95 - 55)	55.280 to 55.305	2.176 to 2.177
– Front (85 - 55) or front intermediate (95 - 55)	54.780 to 54.805	2.1567 to 2.1577
– Center (85 - 55) or rear intermediate (95 - 55)	54.280 to 54.305	2.1370 to 2.1380
– Rear	53.780 to 53.805	2.1173 to 2.1183
Tappet housing bore diameter	15.000 to 15.018	.5905 to .5912
Tappet oversize	0.1-0.2-0.3	.004-.008-.012
Main bearing housing bore diameter	84.200 to 84.230	3.315 to 3.316
Cylinder head		
Valve guide housing bore diameter in head	13.950 to 13.983	0.549 to 0.550
Valve guide oversize	0.2	0.007
Valve seat dimensions	See page 2, Section 101	
Valve stand-in	0.7 to 1.0	0.027 to 0.039
– Max. stand-in	1.4	.005
Injector stand-out	.05 to .70	.002 to .027
– Max. stand-out	1.0	.039
Cylinder head height	92	3.622
Maximum head dressing allowance	0.5	0.02

(1) After reaming in position. Sleeves may be finished to .1 mm or .004 in oversize in production, in which case they matched to corresponding oversize pistons.

(2) Measurement to be carried out over swept area both parallel and at right angles to engine centerline.

CRANK GEAR

	mm	in
Crankshaft - Bearings		
Main journal diameter	76.187 to 76.200 ([1])	2.9994 to 2.9999
Main journal undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299 0.0399
Main bearing wall thickness	2.162 to 2.172	0.0851 to 0.0855
Main bearing undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299 0.0399
Main journal clearance in bearings	0.043 to 0.096	0.0016 to 0.0037
– Maximum wear clearance	0.180	.0071
Con rod journal diameter	58.730 to 58.743 ([1])	2.3122 to 2.3127
Con rod journal undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299 0.0399
Head bearing wall thickness	1.805 to 1.815	0.0710 to 0.0714
Head bearing undersize	0.254-0.508-0.762 1.016	0.0099-0.0199-0.0299 0.0399
Con rod journal clearance in head bearing	0.035 to 0.080	0.0013 to 0.0031
– Maximum wear clearance	0.180	.0071
Crankshaft thrust washer thickness	3.378 to 3.429	.1330 to .1350
Thrust washer oversize	.127	.005
Width of main bearing housing over thrust washers	31.766 to 31.918	1.2506 to 1.2566
Length of corresponding main journal	32.000 to 32.100	1.2598 to 1.2638
Crankshaft end float	.082 to .334	.0032 to .0131
– Maximum wear end float	.40	.016
Maximum main journal and con rod journal ovality or taper after grinding	0.01	0.00039
Maximum main journal and con rod journal ovality or taper due to wear	0.05	0.0019
Maximum main journal misalignment with crankshaft resting on end journals	0.10	0.0039
Maximum con rod journal misalignment relative to main journals (in either direction)	0.25	0.0098
Maximum tolerance on distance from outer con rod journal edge to crankshaft centerline	± 0.10	± 0.0039

(follows)

([1]) 0.1 mm undersize con rod journal and main journal crankshaft may be fitted in production coupled to corresponding undersize bearings.

CRANK GEAR *(continued)*

	mm	in
Maximum crankshaft flange run-out with stylus in A, page 2, Section 103, over 108 mm (4.25 in) diameter, T.I.R.	0.025	.0010
Maximum flywheel seat eccentricity relative to main journals	0.04	.0016
Connecting rods		
Piston pin bushing bore diameter	41.846 to 41.884	1.647 to 1.649
Piston pin bushing O.D.	41.979 to 42.017	1.653 to 1.654
Piston interference fit in bore	0.095 to 0.171	.0037 to ,0067
Piston pin bushing fitted I.D.	38.004 to 38.014	1.496 to 1.497
Head bore diameter	67.407 to 67.422	2.6538 to 2.654
Maximum connecting rod axis misalignment at 125 mm (5 in)	± 0.07	± 0.0027
Maximum connecting rod weight difference over one complete set of the same engine	25 gr.	0.88 oz
Pistons		
Piston stand-out from head at T.D.C.	0.462 to 0.787	0.018 to 0.030
Piston diameter 57 mm (2.24 in) from base of skirt, at right angles to pin centerline	103.812 to 103.826	4.087 to 4.088
Piston clearance in sleeve	0.174 to 0.212	0.007 to 0.008
– Max. wear clearance	0.30	.012
Piston oversize range	0.4-0.8	0.016-0.031

(follows)

ENGINE: Specification and Data

CRANK GEAR *(continued)*

	mm	in
Piston diameter	37.983 to 37.990	1.494 to 1.496
Piston housing bore in piston	37.993 to 38.000	1.496 to 1.496
Piston pin clearance in piston	0.003 to 0.017	.0061 to .0007
Piston pin clearance in con rod bushing	0.014 to 0.031	0.0005 to 0.0012
– Maximum wear clearance	0.06	.0024
Maximum weight difference over a complete set of piston	20 gr	0.70 oz
Piston ring clearance in groove		
– Top	0.090 to 0.122	0.0035 to 0.0048
– 2nd	0.060 to 0.092	0.0024 to 0.0036
– 3rd	0.040 to 0.075	0.0015 to 0.0029
Maximum wear clearance		
– Top	0.50	.02
– 2nd and 3rd	0.20	.008
Piston ring gap		
– Top	0.40 to 0.65	0.016 to 0.025
– 2nd	0.30 to 0.55	0.0118 to 0.022
– 3rd	0.30 to 0.60	0.0118 to 0.024
Maximum wear gap	1.20	.047

CRANK GEAR

	mm	in
Engine balancer (85 - 55)		
Idler gear jackshaft clearance in bushing (1) (see 19, page 5, Section 103, 855C - 955C)	0.050 to 0.100	0.0019 to 0.0039
Counterweight gear shaft clearance in front bushing (1) (see 11)	0.050 to 0.100	0.0019 to 0.0039
Drive pinion clearance in bushings (1) (see 18)	0.050 to 0.100	0.0019 to 0.0039
Connecting sleeve spline blacklash (see 13)	0.038 to 0.106	.0015 to .0042
Counterweight gear shaft clearance in rear bushing (see 11) (2)	0.013 to 0.061	0.0005 to 0.0024
Pivot clearance in flyweight bushings (see 26)	0.020 to 0.073	0.0007 to 0.0028
Counterweight bushing interference fit in housing	0.040 to 0.100	0.0015 to 0.0039
Idler gear jackshaft clearance in bushing (see 34) (2)	0.013 to 0.061	0.0005 to 0.0024
Gear backlash	0.080	0.0031
Balancer timing	See page 6, section 103 (855 C and 955 C tractors)	

(1) Bushing interference fit in housing 0.063 to 0.140 mm (.002 to .005 in).
(2) Bushing interference fit in housing 0.037 to 0.101 mm (.001 to .004 in).

VALVE GEAR

Valve Timing Gears		
Timing gear backlash	0.16	0.006
Idler gear jack shaft diameter	36.975 to 37.000	1.4557 to 1.4567
Idler gear bushing fitted I.D. after reaming	37.050 to 37.075	1.4586 to 1.4596
Jack shaft journal clearance in bushing	0.050 to 0.100	0.0019 to 0.0039
— Maximum wear clearance	0.15	0.0059
Bushing interference fit in idler gear	0.063 to 0.140	0.0025 to 0.0055
Hydraulic pump drive gear shaft diameter	36.975 to 37.000	1.4557 to 1.4567
Bushing fitted I.D. after reaming	37.050 to 37.075	1.4586 to 1.4596
Shaft clearance in bushing	0.050 to 0.100	0.0019 to 0.0039
Bushing interference fit in housing	0.063 to 0.140	0.0025 to 0.0055
Pump drive gear thrust washer thickness (85 - 55)	1.45 to 1.50	0.0571 to 0.0591

VALVE GEAR

(continued)

	mm	in
Camshaft		
Camshaft bushing O.D.		
– Front (95 - 55)	55.375 to 55.430	2.180 to 2.182
– Front (85 - 55) or front intermediate (95 - 55)	54.875 to 54.930	2.160 to 2.162
– Center (85 - 55) or rear intermediate (95 - 55)	54.375 to 54.430	2.140 to 2.142
– Rear	53.875 to 53.930	2.121 to 2.123
Bushing interference fit in housing	0.070 to 0.150	0.0028 to 0.0059
Camshaft bushing fitted I.D. after reaming		
– Front (95 - 55)	51.580 to 51.630	2.030 to 2.032
– Front (85 - 55) or front intermediate (95 - 55)	51.080 to 51.130	2.011 to 2.013
– Center (85 - 55) or rear intermediate (95 - 55)	50.580 to 50.630	1.9913 to 1.9933
– Rear	50.080 to 50.130	1.9716 to 1.9736
Camshaft journal diameter		
– Front (95 - 55)	51.470 to 51.500	2.0264 to 2.0275
– Front (85 - 55) or front intermediate (95 - 55)	50.970 to 51.000	2.9967 to 2.0079
– Center (85 - 55) or rear intermediate (95 - 55)	50470 to 50.500	1.9870 to 1.9882
– Rear	49.970 to 50.000	1.9673 to 1.9685
Camshaft journal clearance in bushing	0.080 to 0.160	0.0031 to 0.0063
Maximum wear clearance	0.20	0.0079
Camshaft end float (thrust plate to associated seat in camshaft)	0.070 to 0.220	0.0028 to 0.0087
Tappets		
Tappet O.D.	14.950 to 14.970	0.5886 to 0.5894
Tappet clearance in housing on engine block	0.030 to 0.068	0.0012 to 0.0027
Maximum wear clearance	0.15	0.0059
Tappet oversize	0.1-0.2-0.3	0.004-0.008-0.012
Rocker arms		
Rocker arm bushing O.D.	21.006 to 21.031	0.8270 to 0.8280
Rocker arm bore diameter	20.939 to 20.972	0.8244 to 0.7902
Bushing interference fit in rocker arm	0.034 to 0.092	0.0013 to 0.0036
Rocker arm bracket bore diameter	18.016 to 18.034	0.7093 to 0.7100
Rocker arm shaft diameter	17.982 to 18.000	0.7079 to 0.7087
Rocker arm shaft clearance in bracket	0.016 to 0.052	0.0006 to 0.0020
– Maximum wear clearance	0.15	0.006
Rocker arm spacer spring length		
– Free	59.5	2.3425
– Under 46 to 52 N (4.7 to 5.3 kg. 10.4 to 11.7 lb)	44	1.7323

(follows)

VALVE GEAR

(continued)

		mm	in
Valves, Guides and Springs			
Head diameter	Intake	45.300 to 45.500	1.7835 to 1.7913
	Exhaust	37.500 to 37.750	1.4764 to 1.4862
Stem diameter		7.985 to 8.000	0.3144 to 0.3150
Valve face angle	Intake	60° 30′ ± 7′	
	Exhaust	45° 30′ ± 7′	
Valve clearance	Timing check	0.45	0.0177
	Normal (cold or warm) — Intake	0.25	0.0010
	Normal (cold or warm) — Exhaust	0.35	0.0138
Cam lift (*)	Intake	5.250	0.2067
	Exhaust	5.677	0.2235
Valve lift (*)	Intake	9.31	0.3661
	Exhaust	10.06	0.3961
Valve guide O.D.		13.993 to 14.016	0.5509 to 0.5518
Valve guide oversize		0.2	0.0079
Valve guide interference fit in housing on cylinder head		0.010 to 0.066	0.0004 to 0.0026
Valve guide fitted I.D. after reaming		8.023 to 8.043	0.3159 to 0.3166
Valve stem clearance in guide		0.023 to 0.058	0.0009 to 0.0023
– Maximum wear clerance		0.13	0.0051
Maximum valve stem eccentricity over one revolution with stylus on sealing face		0.03	0.0012
Intake and exhaust valve spring length			
– Free		44.6	1.756
– Valve closed, under 256 to 284 N (26.1 to 29 kg. 57.5 to 63.8 lb)		34	1.338
– Valve open, under 502 to 554 N (51.2 to 56.5 kg. 112.8 to 124.5 lb)		23.8	.937

(*) With 0.45 mm or 0.018 in valve clearance (for timing check).

LUBRICATION SYSTEM

	85 - 55	95 - 55
Oil pump	Gear, camshaft driven	Gear, crankshaft driven
Oil pump drive ratio	0.5 to 1	1.265 to 1
Oil pressure, warm at governed speed	2.9 to 3.9 bar (3 to 4 kg/cm²) 42 to 56 psi)	4.5 to 4.9 bar (4.6 to 5 kg/cm²) (65 to 71 psi)
Relief valve crack-off setting	3.5 bar (3.6 kg/cm²) (51 psi)	4.7 bar (4.8 kg/cm²) (68 psi)
Shaft clearance in bushing	0.016 to 0.055 mm (0006 to .0022 in)	0.016 to 0.070 mm (.0006 to .0027 in)
Shaft clearance in — Driven gear (85 - 55)	0.033 to 0.066 mm (0.0013 to .0026 in)	—
— Driven gear bushing (95 - 55)	—	0.016 to 0.054 mm (.0006 to .0021 in)
Gear backlash	0.100 mm (0.0039 in)	
Gear clearance in pump body	0.060 to 0.170 mm (0.0024 to .0..67 in)	.030 to .134 mm .0012 to .0053 in)
Drive and driven gear width	40.961 to 41.000 mm (0.0024 to 0.0067 in)	15.973 to 16.000 mm (.0012 to .0053 in)
Gear housing depth in pump body	41.025 to 41.087 mm (1.6152 to 1.6176 in)	16.016 to 16.080 mm (.6305 to .6331 in)
Drive and driven gear end float	0.025 to 0.126 mm (0.0009 to 0.0049 in)	.016 to .107 mm (.0006 to .0042 in)
Pressure relief valve spring length — Free — Closed, under 88 to 94 N (9 to 9.6 kg. 19.8 to 21 lb)	45 mm (1.77 in) 30.5 mm (1.20 in)	
Oil filters	Gauze on suction and main cartridge on delivery	

COOLING SYSTEM

Water Pump	Centrifugal, vane	
Water pump drive ratio	1.04 to 1	1.41 to 1
Shaft interference fit in impeller	0.027 to 0.060 mm — (0.0011 to 0.0024 in)	
Shaft interference fit in fan hub	0.015 to 0.061 mm — (0.0006 to 0.0024 in)	
Face sealing bushing interference fit in impeller	0.012 to 0.058 mm — (0.0005 to 0.0023 in)	

COOLING SYSTEM

Thermostat	
Type	Wax
Opening temperature	79 ± 2° C
Fully open at	94° to 95° C
Valve travel when fully open	7.5 mm (0.295 in)
Radiator	Vertical tube and steel fins, 3 or 4 row
Expansion tank	Translucent plastic
Fan	Suction, steel, 4-bladed
Water Temperature Gauge	Three coloured sectors
Temperature range	
– White sector	30° to 65° C
– Green sector	65° to 105° C
– Red sector	105° to 115° C

FUEL SYSTEM

	85 - 55	95 - 55
Fuel Transfer Pump	Double diaphragm	
Operation	Engine driven	
Minimum fuel flow at 1.600 rpm shaft	100 litre/hour (22 Gall/hour)	
Drive shaft eccentricity	3 mm (0.118 in)	5.25 mm (0.206 in)
Fuel Transfer Pump Drive		
Shaft journal diameter	36.975 to 37.000 mm (1.4557 to 1.4567 in)	49.975 to 50.000 mm (1.9675 to 1.9685 in)
Bushing fitted I.D. after reaming	37.050 to 37.075 mm (1.4586 to 1.4596 in)	50.050 to 50.075 mm (1.9704 to 1.9715 in)
Shaft clearance in bushing	0.050 to 0.100 mm (0.0020 to 0.0040 in)	.050 to .100 mm (.002 to .005 in)
Bushing interference fit in housing	0.063 to 0.140 mm (0.0025 to 0.0055 in)	.066 to .142 mm (.002 to .005 in)
Inner washer thickness	1.45 to 1.50 mm (0.057 to 0.059 in)	1.45 to 1.50 mm (1.057 to 1.059 in)
Outer washer thickness	2.93 to 3.00 mm (0.1153 to 0.1181 in)	2.93 to 3.00 mm (.115 to .118 in)

ENGINE: Specification and Data

FUEL SYSTEM

		85 - 55	95 - 55
Injection pump		Distributor, integral governor and advance device	
– BOSCH		VE 4/11 F 1250 L164 - 4794588	VE 5/11 F 1250 R165 - 4794590
– C.A.V.		DPS 8520 A 090 4797415	
Direction of rotation		Counter clockwise	Clockwise
Firing order		1-3-4-2	1-2-4-5-3
Injectors			
–Type	W ALTECNA	4802394	
	BOSCH	4800029	
	C.A.V.	–	
	OMAP	4800031	
– W ALTECNA	Nozzle holder	KBEL 83S1W200 - 4802392	
	Spray nozzle	DLL 136S501W - 4802395	
– BOSCH	Nozzle holder	KBEL L83S35 - 4791124	
	Spray nozzle	DLLA 136S1000 - 4800030	
– C.A.V.	Nozzle holder	–	
	Spray nozzle		
– OMAP	Nozzle holder	OKLL 83S3392 - 4796644	
	Spray nozzle	OLL 136S9119 - 4776715	
Numer of spray orifices		3	
Spray orifice diameter		0.35 mm (0.0138 in)	
Nozzle opening pressure		230 - 238 bar (235 - 243 kg/cm² 3336 - 3452 psi)	
Delivery pipes			
– Type and size	BOSCH	4797516 1.5 x 6 x 530 mm (.06x.24x20.87 in)	4797534 1.5 x 6 x 570 mm (.06x.24x22.44 in)
	C.A.V.	4797522 2 x 6 x 530 mm (.08x.24x20.87 in)	–

MODEL 85 - 55 – CALIBRATION DATA BOSCH INJECTION PUMP TYPE VE4/11F1250L164-4794588
(Provisional data)

ASSEMBLY DATA

Pump rotation (drive side). . . . . Counterclockwise
Firing order. 1-3-4-2
Plunger lift to spill cut-off. . . . . .
. . . . . 0.2 ± 0.02 mm (0.008 ± 0.0008 in)
Pump timing: 4° ± 1° B.T.D.C., cylinder No. 1 in compression stroke.

Preloaded shuttle spring length . . . . . .mm –
Spring shim thickness . . . . . .mm –
Delivery connection of cylinder No. 1: Marked with letter A.

TEST PLAN

Test machine complying with . . . . . ISO 4008
Injectors complying with. . . . . .
. . . . . .ISO 4010: 1688 901 020 (°)
Test fluid. . . . . .ISO 4113 AT 40° ± 2° C

Fuel pressure. . . . . 0.2 bar (0.2 kg/cm^2, 2.8 psi)
Graduate drain time . . . . . .30"
Release pressure . . . . . .172 to 175 bar
. . . . . .(175 to 178 kg/cm^2 or 2483 to 2492 psi)
Lines (as per ISO 4093.2) . . . . . 6x2x840 mm

INSTALLATION DIMENSIONS

Symbol											
mm											

ADJUSTMENT VALUES

Operation description	rpm	Advance piston stroke mm	Fuel pressure bar (kg/cm^2)	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)	Spread cm^3/1000 shots
Full load delivery	800	3.8 to 4.2	3.8 to 4.4	71.5 to 72.5	0.2	3.5
Idle speed limit	350	–	–	21 to 25	0.2	3
Starting delivery	150	–	–	100 to 120	0.2	–
Full throttle limit	1350	–	–	32 to 38	0.2	–

TEST VALUES

Advance device check	rpm	mm	Fuel pressure check	rpm	bar (kg/cm^2)	Back leakage	rpm	cm^3/100 shots
	500	1.3 to 2.0		500	2.3 to 2.9			
	800	3.8 to 4.2		800	3.8 to 4.4		–	–
	1250	7.6 to 8.4		1250	5.7 to 6.3			

DELIVERY CHECK

Full throttle stop	rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)	Idle speed shut-off	rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)
	1400 to 1460	0	0.2		475	⩽ 2	0.2
	1350	32 to 38	0.2		425	4 to 10	0.2
	1250	63.5 to 66.5	0.2		350	21 to 25	0.2
	800	71.5 to 72.5	0.2				
	250	⩽65	0.2				

(°) With pad 1680 103 096.

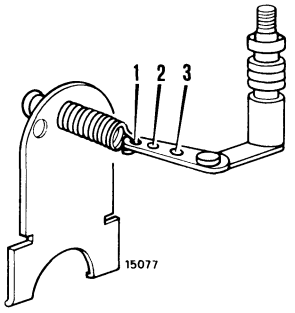
MODEL 85 - 55 – CALIBRATION DATA C.A.V. INJECTION PUMP TYPE DPS 8520 A 090 - 4797415
(Provisional data)

ASSEMBLY DATA

Pump rotation (drive side)..... Counter clockwise
Firing order..... 1-3-4-2
Governor control stud metering valve lever pin.....41 to 42 mm (1.61 to 1.65 in)
Pump timing: 0° ± 1° B.T.D.C., cylinder No. 1 compression stroke.
Flange guide dia .....50 mm (1.96 in)
Delivery connection of cylinder No. 1: Marked with letter "U".

TEST CONDITIONS

Test machine complying with ISO 4008.
Injectors complying with ISO 4010.
Test fluid: ISO 4113 at 40° ± 2° C.
Fuel pressure.....0.1 bar (0.1 kg/cm² or 1.4 psi)
Graduate drain time .....30"
Release pressure .....172 to 175 bar ..... (175 to 178 kg/cm² or 2483 to 2492 psi)
Lines: 6x2x845 mm (ISO 40937).
Adjust maximum speed screw to protrude 10.5 mm (0.92 in) from surface of associated nut.



Control spring hole 2.

Fully slacken fuel pressure adjusting screw, then tighten through 3 1/2 turns. Position valve adjusting screw so that it is just beneath the surface of the associated nut.
Fully slacken maximum speed, idle speed and anti-stall screw.
A 2.5 mm (0.098 in) shim is installed on the advance device spring side plug; no other shims are required.

Test No.	Lever position	Speed rpm	Advance degrees	Transfer pressure bar (kg/cm²)	Injector delivery cm³/200 shots	Spread cm³/200 shots	Back leakage cm³/100 shots
1 (1)		200	–	–	–	–	–
2 (2)		1000	–	–	–	–	–
3		100	–	–	–	–	–
4 (3)-5		950	5,5	4,2 to 5,4	–	–	–
6 (4)		1250	7,8 to 8,8	–	–	–	–
7-8	max.	750	–	–	10,3 to 10,5 (•)	⩽ 0,8	40 to 80 (°)
9 (5)		1250	–	–	–	–	–
10 (6)		1420	–	–	1,5 to 2	–	–
11 (7)		1250	–	–	–	–	–
12 (8)		300	0,8 to 1,3	–	–	–	–
13 (9)		250	0	–	⩾ 16	–	–
14 (10)		850	–	–	–	–	–
15 (11)	min.	350	–	–	2 to 2,5	–	–
16 (12)		350	–	–	⩽ 0,8	–	–
17 (13)		350	–	–	⩽ 0,5	–	–
18 (14)		–	–	–	–	–	–

(1) Delivery to all injectors.
(2) Run pump for 3'.
(3) Set pressure adjusting screw for specified advance and check that pressure is a specified.
(4) Stop test machine, disconnect transfer pressure gauge and install shut-off device. Activate shut-off device and start test machine.
(5) Record average delivery.
(6) Adjust max. speed screw and block in position.
(7) Delivery shall not be less than in test 9 by more than 0.4 cm³/200 shots.
(8) Prior to test bring machine speed to 100 revs and stop machine. Fully tighten valve adjusting screw, start machine and slacken screw until reaching specified values.
(9) Prior to test, bring machine speed to 100 revs, stop and restart machine.
(10) Adjust anti-stall screw for a delivery of 2 to 3 cm³/2000 shots. Block screw in position.
(11) Adjust idling speed screw.
(12) Shut-off lever closed.
(13) With shut-off device deactivated and shut-off lever open, wait 5" before performing test.
(14) Connect delivery fitting "U" to injector tester and maintain 54 bar (757 psi) pressure. Using timing tool, bring about hydraulic lockup, then position pump timing plate at +8.5°.
(•) Take reading after 15".
(°) Flow 300 to 600 cm³/minute.

MODEL 95 - 55 – CALIBRATION DATA BOSCH INJECTION PUMP TYPE VE5/11F1250R165-4794590
(Provisional data)

ASSEMBLY DATA

Pump rotation (drive side). . . . . .Clockwise
Firing order. 1-2-4-5-3
Plunger lift to spill cut-off. . . . . .
. . . . . 0.2 ± 0.02 mm (0.008 ± 0.0008 in)
Pump timing: 6° ± 1° B.T.D.C., cylinder No. 1 in compression stroke.

Preloaded shuttle spring length . . . . . .mm –
Spring shim thickness . . . . . .mm –
Delivery connection of cylinder No. 1: Marked with letter A.

TEST PLAN

Test machine complying with . . . . . ISO 4008
Injectors complying with. . . . . .
. . . . . .ISO 4010: 1688 901 020 (°)
Test fluid. . . . . ISO 4113 AT 45° ± 1° C

Fuel pressure. . . . . 0.2 bar (0.2 kg/cm^2, 2.8 psi)
Graduate drain time . . . . . .30"
Release pressure . . . . . 172 to 175 bar
. . . . . .(175 to 178 kg/cm^2 or 2483 to 2492 psi)
Lines (as per ISO 4093.2) . . . . . 6x2x840 mm

INSTALLATION DIMENSIONS

Symbol											
mm											

ADJUSTMENT VALUES

Operation description	rpm	Advance piston stroke mm	Fuel pressure bar (kg/cm^2)	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)	Spread cm^3/1000 shots
Full load delivery	800	2.5 to 2.9	3.8 to 4.4	70 to 71	0.2	3.5
Idle speed limit	350	–	–	8 to 14	0.2	3
Starting delivery	150	–	–	100 to 120	0.2	–
Full throttle limit	1360	–	–	42.5 to 49.5	0.2	–

TEST VALUES

Advance device check	rpm	mm	Fuel pressure check	rpm	bar (kg/cm^2)	Back leakage	rpm	cm^3/100 shots
	600	0.6 to 1.4		400	2.0 to 2.6		–	–
	800	2.5 to 2.9		800	3.8 to 4.4			
	1200	6.0 to 6.8		1200	5.6 to 6.2			

DELIVERY CHECK

	rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)		rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)
Full throttle stop	1400	16.5 to 22.5	0.2	Idle speed shut-off	400	⩽2	0.2
	1450	⩽2	0.2				
	1360	42.5 to 49.5	0.2		350	8 to 14	0.2
	1250	63.5 to 66.5	0.2				
	800	70 to 71	0.2		300	16 to 20	0.2
	500	63 to 66	0.2				
	250	⩽60	0.2				

(°) With pad 1680 103 096.

TIGHTENING TORQUE FIGURES

See page 14, section 10 for 855C and 955C tractors, with the exceptions indicated below.

ANGULAR TIGHTENING TORQUE FIGURES ([1])

DESCRIPTION	Thread size	Pre-torque			Angle
		Nm	kgm	ft. lb	
Capscrew, cylinder head (C_1, page 15 and 16, section 10, 855C and 955C)	M12 x 1.25	60	6.1	44	90° + 90°
Capscrew, main bearing cap (C_3).	M14 x 1.5	80	8.2	59	90°
Capscrew, con rod cap (C_4).	M11 x 1.5	40	4.1	29	60°
Capscrew, flywheel (C_5)	M12 x 1.5	40	4.1	29	60°

([1]) For tightening, use tool **292248**; for capscrews (C_1), see note on page 2, section 101.

ON-BENCH PERFORMANCE DATA

Test plan

Engine without fan, air cleaner and exhaust silencer.
Barometric pressure 740 ± 5 mm Hg at 239 metres (785 ft) above sea level.
Ambient temperature: 20 ± 3° C.
R.H. 70% ± 5.

Fuel density, 830 ± 10 g/l.
Pump timing, B.T.D.C. cylinder No. 1 on compression stroke:

– 85 - 55 BOSCH pump . . . . . .4° ± 1°
– 85 - 55 C.A.V. pump. . . . . .0° ± 1°
– 95 - 55 BOSCH pump . . . . . .6° ± 1°

85 - 55 – BOSCH injection pump

Throttle	rpm	kW		Fuel consumption kg/h
		2-hour run in	50-hour run-in	
Maximum, full load	2500	⩾ 54.8 (74.5 HP)	⩾ 56.6 (77 HP)	13.1 to 13.6
Maximum, full torque	1500	⩾ 37.8 (51.5 HP)	⩾ 39 (53 HP)	8.5 to 9.0
Maximum, no-load	2750 to 2790	–	–	–
Maximum, no-load	625 to 675	–	–	–

85 - 55 – C.A.V. injection pump

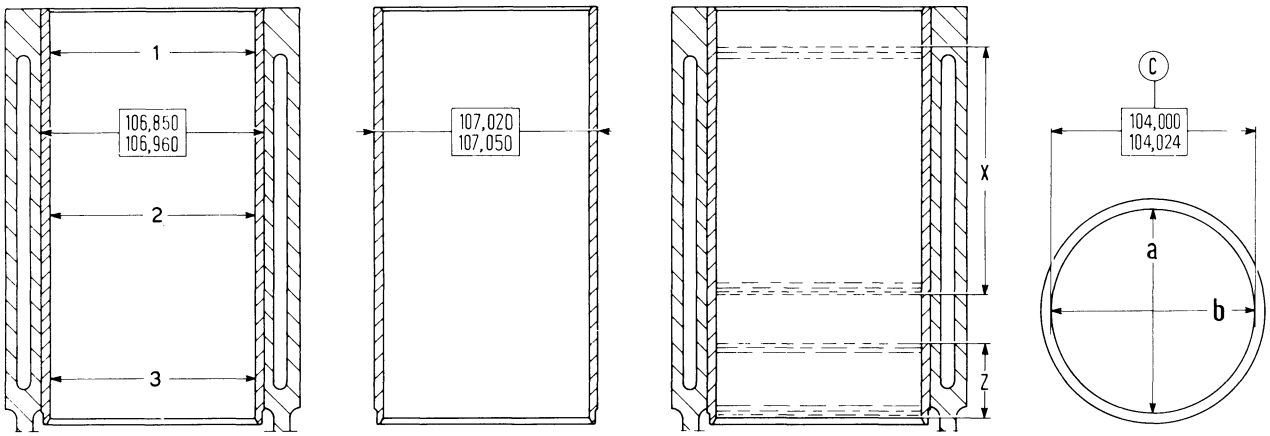
Throttle	rpm	kW		Fuel consumption kg/h
		2-hour run in	50-hour run-in	
Maximum, full load	2500	⩾ 54.8 (74.5 HP)	⩾ 56.6 (77 HP)	13.1 to 13.6
Maximum, full torque	1500	⩾ 37.8 (51.5 HP)	⩾ 39 (53 HP)	8.5 to 9.0
Maximum, no-load	2750 to 2790	–	–	–
Maximum, no-load	625 to 675	–	–	–

95 - 55 – BOSCH injection pump

Throttle	rpm	kW		Fuel consumption kg/h
		2-hour run in	50-hour run-in	
Maximum, full load	2500	⩾ 67.6 (92 HP)	⩾ 69.9 (95 HP)	15.8 to 16.4
Maximum, full torque	1500	⩾ 46.7 (63.5 HP)	⩾ 48.1 (65.5 HP)	10.3 to 10.9
Maximum, no-load	2750 to 2790	–	–	–
Maximum, no-load	625 to 675	–	–	–

CYLINDER SLEEVES

See the description in the corresponding section for 855C – 955C tractors, but referring to the following figure.

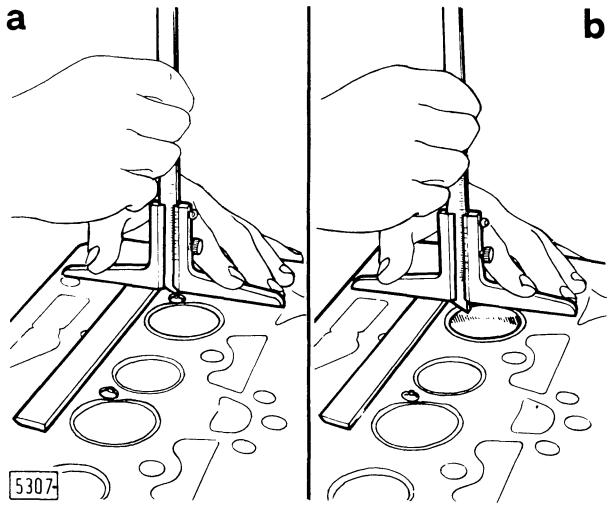


Sleeve and Block Inspection Data.

a, b. Sleeve bore measurements at right angles - C. Sleeve fitted bore diameter - S. Stand-out shims - Z. Sleeve wear inspection length for assessment of piston fit on plane b at right angles to crankshaft - X. Sleeve wear inspection length (swept area) for assessment of ovality and taper on planes a and b - 1, 2, 3. New ore re-bored sleeve bore measuring depth on planes a and b.

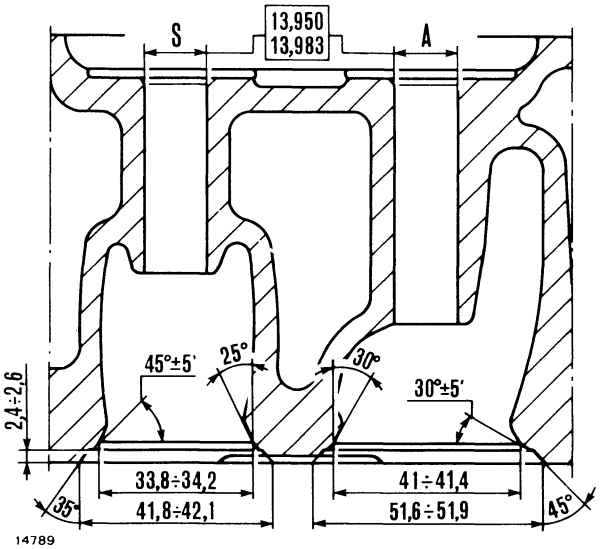
CYLINDER HEAD

See the description in the corresponding section for 855C – 955C tractors, but referring to the following figures and notes.



Checking Fuel Injector Stand-out and Valve Stand-in.

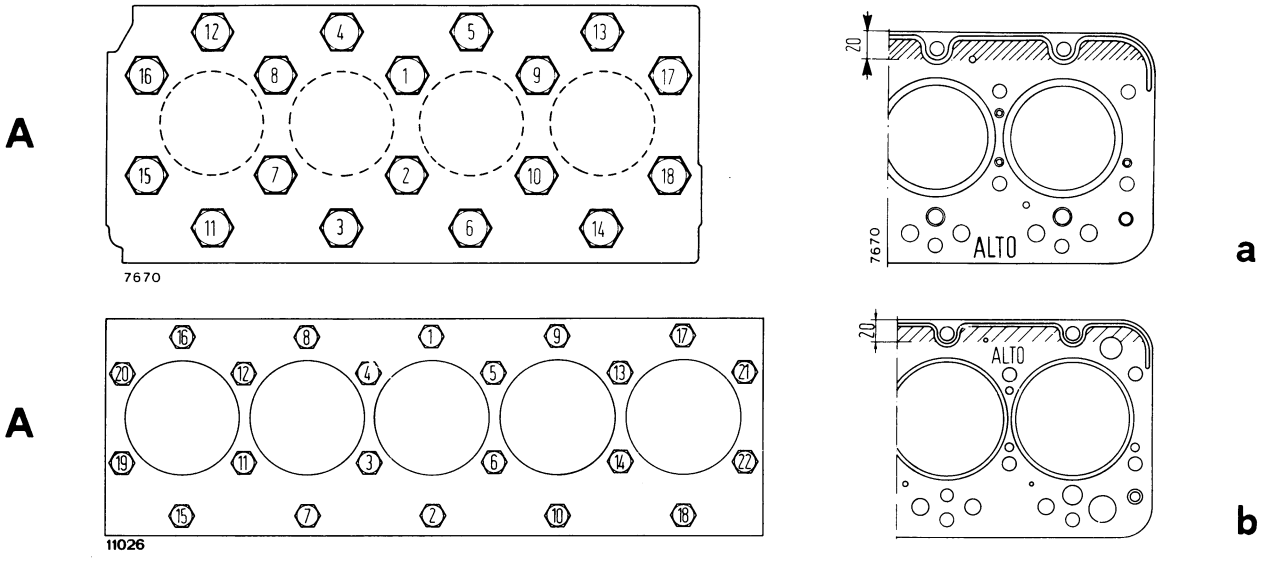
a. Injector stand-out .05 to .07 mm (.0019 to .0275 in) (Max. stand-out 1.0 mm - 0.039 in) - b. Valve stand-in 0.7 to 1.0 mm (0.028 to 0.039 in) (Max. stand-in 1.3 mm - 0.051 in).



Valve Seat and Guide Housing Dimensions.

A. Intake - B. Exhaust.

ENGINE:
Engine block - Cylinder head



Cylinder Head Tightening Diagram and Scrap View of Head Gasket.

a. Model 85 - 55 - b. Model 95 - 55 - A = Fan side.

When installing the cylinder head, throughly clean the mating surfaces and reposition the head gasket (provided with adhesive face) on the block with the mark "ALTO" facing towards the cylinder head.

Note
Cylinder head hold-down bolts are to be tightened in four successive stages, with an interval of fifteen minutes between stages. Refer to the sequence shown in the figure above and proceed as indicated in the table below.

STAGE	1	2	3	4
All models	Initial torque	Initial torque check	Tightening angle	
	60 Nm (6.1 kgm or 44 lb ft)	60 Nm (6.1 kgm or 44 lb ft)	90°	90°

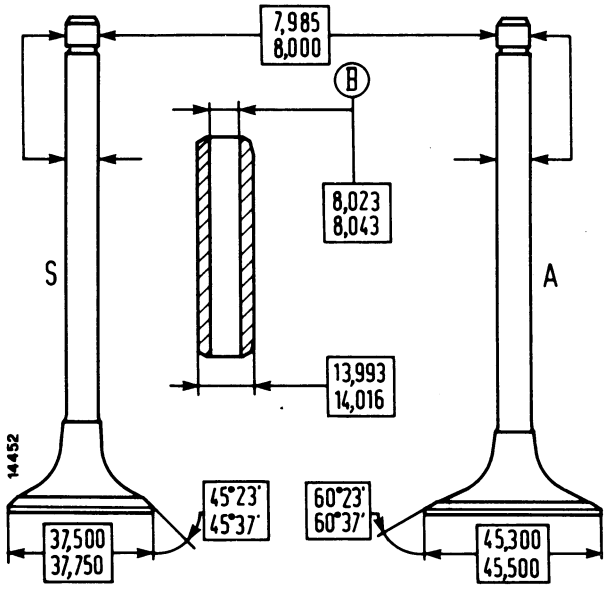
NOTE – When replacing injector sleeves, proceed as follows:

- Thread bottom of old sleeve using tool **292240** adjusted for a working depth of 8 mm or .037 in.
- Remove sleeve using tool **293784**.
- Remove any traces of metal left in sleeve seat using tool **292243.**
- Wet o-rings in engine oil and install on new sleeve. Press sleeve home in seat.
- Burnish bottom of sleeve using tool **293861.**
- Position bushing **293746/1** in sleeve and secure in place.
- Insert dresser **293747** in bushing and dress bottom of sleeve.
- Remove bushing and insert cutter **293790/1** in place of dresser. Replace bushing and cut injector taper seat.
- Check that injector standout from head bottom face is 0.05 to 0.70 mm or .002 to .027 in.

Note - Do not rotate sleeve during the foregoing operations.

VALVES, GUIDES AND SPRINGS

See the description on page 2, section 102 for 855C and 955C tractors, but referring to the figure below.



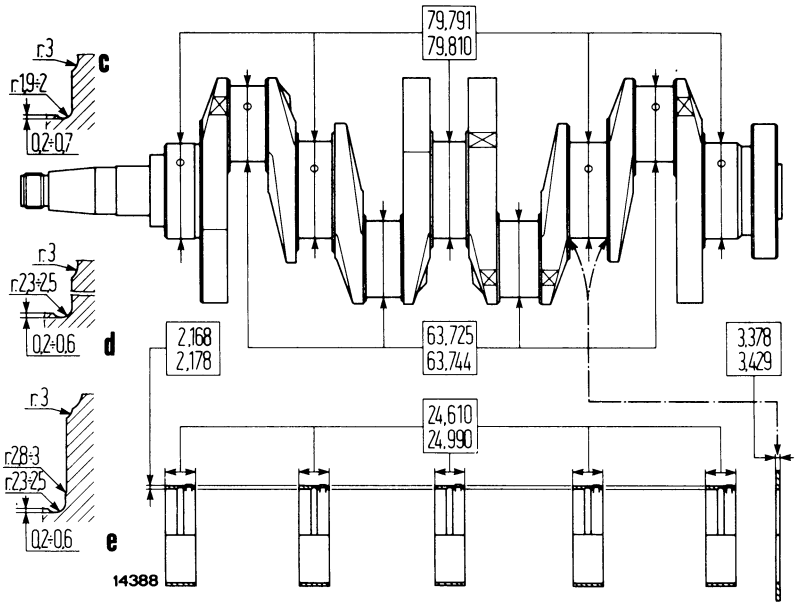
Valve and Guide Details.

Note - Minimum land below head chamfer is .5 mm or .020 in.

A. Intake - B. Fitted diameter after reaming - S. Exhaust.

CRANKSHAFT

See the descriptions and figures on pages 1 and 2, section 103 for 855C and 955C tractors, with the exception of the figure below, which substitutes that for 855C tractors.

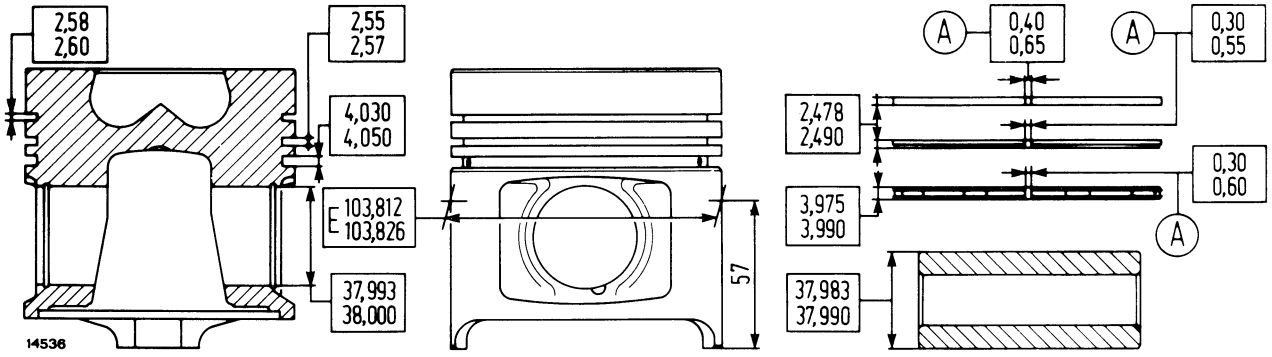


Crankshaft, Bearing and Thrust Washer Details.

c. Connecting rod journal fillet radius detail - d, e. Main journal fillet radius details.

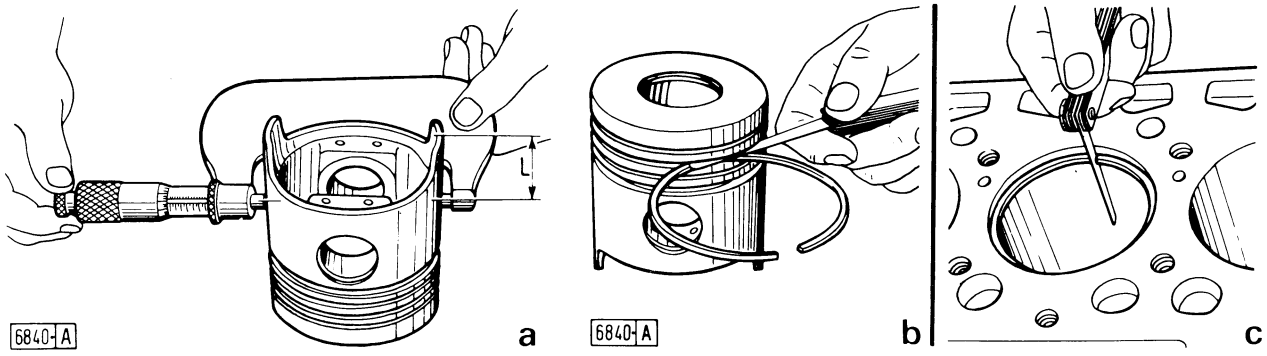
PISTON AND RINGS

See the description and figures on page 3, section 103 for 855C and 955C tractors, with the exception of the figures below.



Piston, Pin and Ring Dimensions in mm.

A. Piston ring fitted gap - E. Piston diameter as measured 57 mm (2.244 in) from base of skirt.

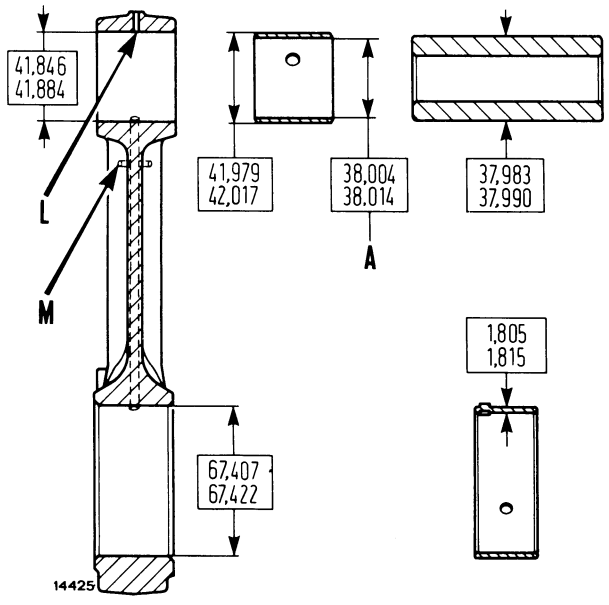


Inspecting Pistons and Rings.

a. Measuring piston diameter at distance (L) from base of skirt - b. Measuring piston ring side clearance - c. Measuring piston ring gap - L. Measuring distance from skirt base, 57 mm (2.244 in).

CONNECTING RODS

See the descriptions and figures on page 4, section 103 for 855C and 955C tractors, with the exception of the figure below.



Connecting Rod, Bearing, Bushing and Pin Details. Dimensions in mm.

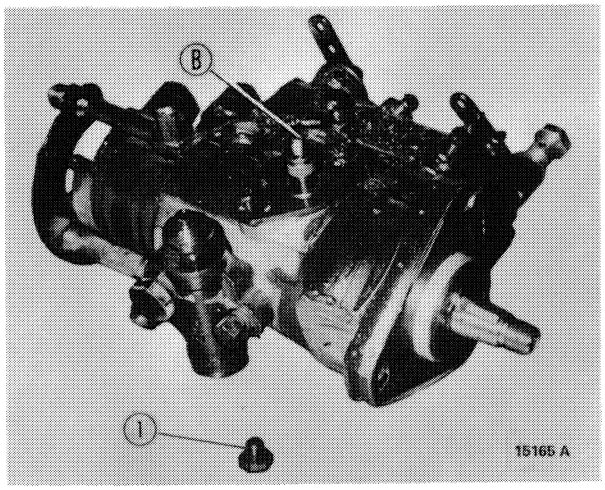
A. Fitted dimensions after reaming - L and M. Lubricant ports.

See the description and figures in the corresponding section for 855C and 955C tractors. The following text and figures apply only to the C.A.V. DPS pump installed on 85 - 55 tractors.

C.A.V. INJECTION PUMP REMOVAL (85 - 55 tractors)

Proceed as follows:

- Close shut-off cock on fuel transfer pump suction.
- Remove front cover to gain access to injection pump drive gear.
- Disconnect fuel suction and return lines, injector delivery lines accelerator link and engine shut-off connection from injection pump.
- If necessary, remove fuel transfer pump.
- Take off pump retaining nuts (C_1) and nut retaining pump shaft to drive gear. Remove injection pump.



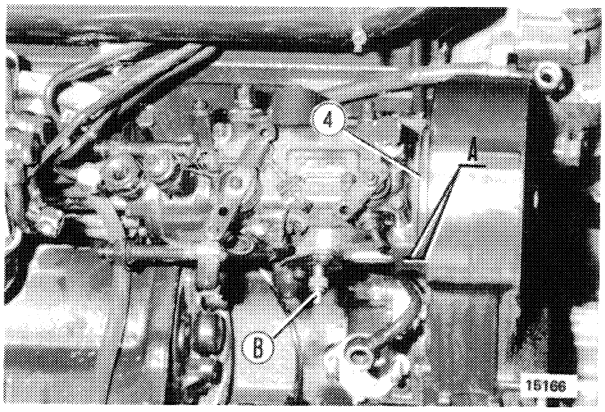
INSTALLATION AND EXTERNAL TIMING

Install injection pump to the engine as follows:

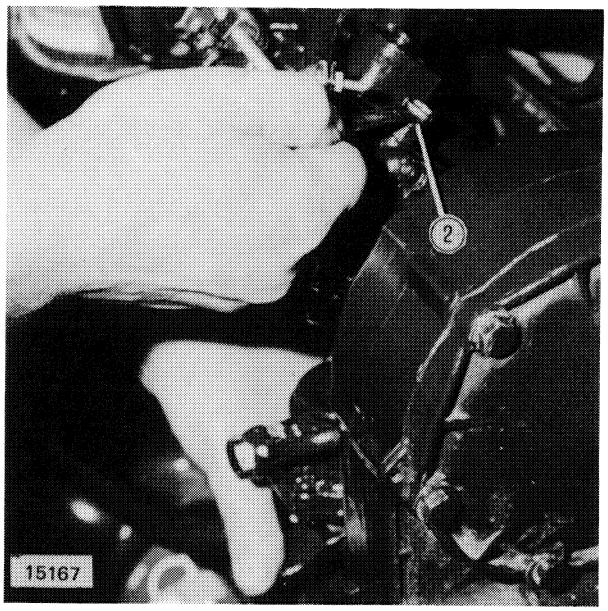
- Place gasket in position between pump mounting flange and spacer (4).
- Insert drive shaft in drive gear, secure with associated nut and start pump retaining screws (C_1).
- Turn pump body until reference marks (A) on pump and spacer (4) are aligned.
- Tighten pump nuts (C_1). Install fuel transfer pump, connect fuel lines and bleed the system as directed in the relevant section.

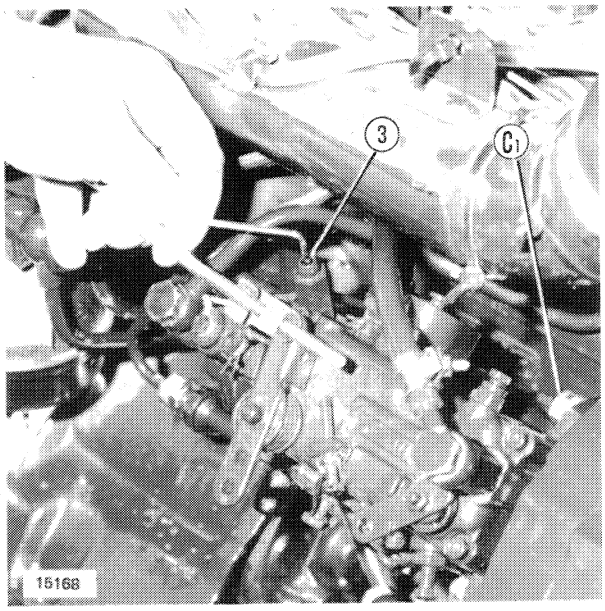
If external timing marks (A) are missing or suspected to be incorrect, check the timing as follows:

- Bring piston of cylinder No. 1 to end of compression stroke (valves closed); this position corresponds to the INIEZ. C.A.V. timing mark.
- Remove plug (1) from side cover and install tool **292411** (B).
- Mesh pump shaft with drive gear, block in this position , and start pump nuts (C_1).
- Turn pump body until spigot of tool (B) engages slot on pump shaft.
- Tighten pump nuts (C_1), apply timing marks (A) to mounting flange and spacer (4) and install fuel transfer pump.
- Remove tool **292411** (B) from cover hole, install plug (1) and tighten to 4.5 Nm (0.45 kgm or 3.3 lb. ft.).
- Reconnect fuel lines and bleed air from the circuit as described in the following section.



ENGINE:
Fuel system - Injection pump





INJECTION CIRCUIT BLEEDING

Bleed air from the circuit as follows:

- Loosen screw (2) by two turns and pump hand primer lever or activate starter until fuel flow is free of air bubbles.
- Tighten screw (2).
- Loosen socket head screw (3) by a few turns and bleed air from injection pump hydraulic head by activating starter until fuel flowing from opening is free of air bubbles.
- Tighten screw (3).

HYDRAULIC PUMP

Filter	
Type	Full flow, paper element
Location	In tank, on pump suction side
Pump	
Type	Gear, drawing from tank on right-hand fender
Location	Behind timing cover
Make	FIAT
Model:	
– 85 - 55	A 42
– 95 - 55	A 31
Drive	Engine valve timing gear
Rotation (seen from drive end)	Counterclockwise
Pump drive ratio:	
– 85 - 55	0.9310 to 1
– 95 - 55	1.1896 to 1
Max speed (at rated engine speed):	
– 85 - 55	2325 rpm
– 95 - 55	2975 rpm
Rated output:	
– 85 - 55	44.4 l/min (9.77 gal/min)
– 95 - 55	44.0 l/min (9.68 gal/min)
Output at 1450 rpm at pressure indicated on page 2, section 401:	
– New or reconditioned:	
• 85 - 55	25.8 l/min (5.68 gal/min)
• 95 - 55	20.0 l/min (4.4 gal/min)
– Used:	
• 85 - 55	18.0 l/min (3.96 gal/min)
• 95 - 55	14.0 l/min (3.08 gal/min)
– Test oil temperature	55 to 65° C (130 to 150° F)
– Test oil grade	SAE 20
Pump gear journal dia	17.400 to 17.418 mm (.685 to .686 in)
Journal housing bore in bearings	17.450 to 17.475 mm (1) (.687 to .688 in)
Journal clearance in bearings	.032 to .075 mm (.0012 to .0029 in)
– Max. wear clearance	.1 mm (.0039 in)

(1) Fitted and reamed.

(follows)

HYDRAULIC PUMP

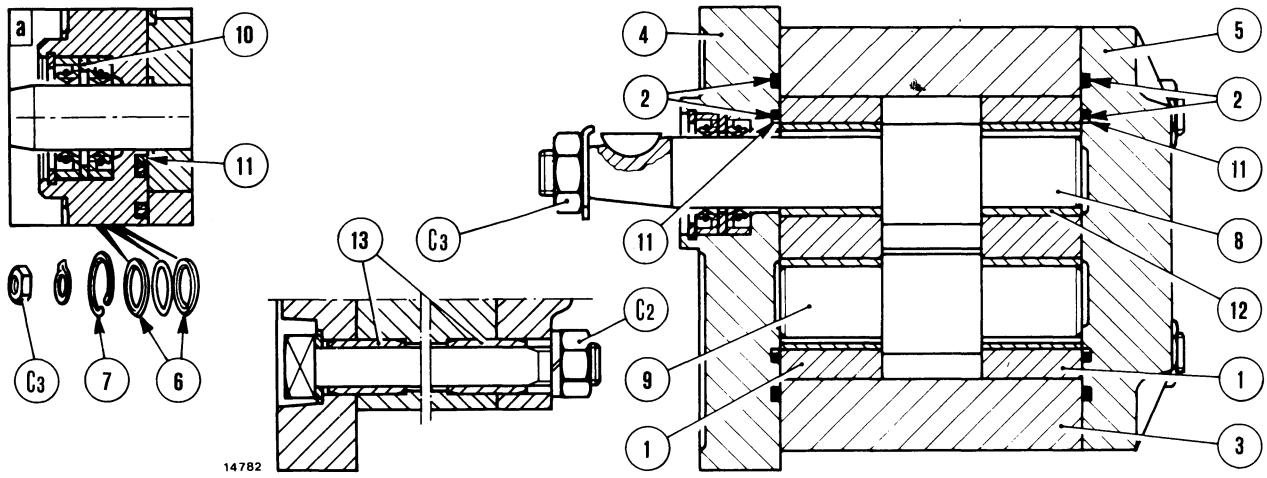
(continued)

Gear clearance in pump body	.010 to .070 mm (.0004 to .003 in)
Max. pump body wear on suction side	.01 mm (.004 in)
Gear flank width — A 42	30.800 to 30.815 mm (1.212 to 1.213 in)
Gear flank width — A 32	24.000 to 24.015 mm (.944 to .945 in)
Bearing width	24.490 to 24.510 mm (.9641 to .9649 in)
Bearing housing width in pump body — A 42	79.935 to 79.960 mm (3.147 to 3.148 in)
Bearing housing width in pump body — A 31	73.135 to 73.160 mm (2.879 to 2.880 in)
Gear and bearing end float (applicable to new and reconditioned pump)	.100 to .180 mm (.004 to .007 in)

TIGHTENING TORQUE FIGURES

See page 5, section 40 for 855C and 955C tractors, with the following exceptions:

DESCRIPTION	Thead size	Torque		
		Nm	kgm	ft. lb
Hydraulic pump - Section 401				
Capscrew, pump to engine (11, page 1)	M 6 x 1	8	0.8	5.8
Nut, pump cover (C_2)	M10 x 1.25	41	4.2	30.2
Nut, drive sleeve (C_3)	7/16" - 20UNF 2A	27	2.8	19.9



Hydraulic pump.

a. Seal assembly detail - C_2. Cover nut - C_3. Drive sleeve nut - 1. Gear bearings - 2. Cover seals - 3. Pump body - 4. Rear cover - 5. Front cover - 6. Drive shaft seals - 7. Seal retaining ring - 8. Drive gear shaft - 10. Spacer - 11. Antiextrusion ring - 12. Bonded bushings - 13. Reference bushings.

HYDRAULIC PUMP

Pump is valve gear driven through a dog clutch.

To gain access to drive gear, remove valve gear cover.

Oil circulating in pump automatically lubricates and restores gear end float.

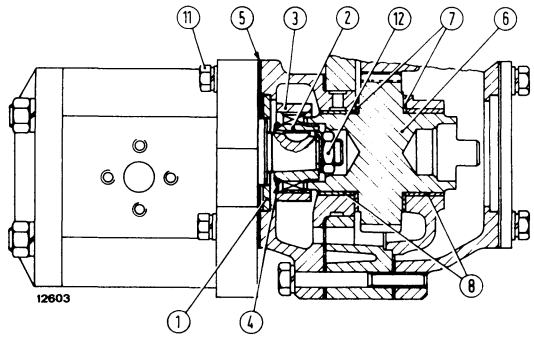
OVERHAUL

Refer to figure above when disassembling pump.

Mark the position of internal parts in order to restore them to their original position on assembly.

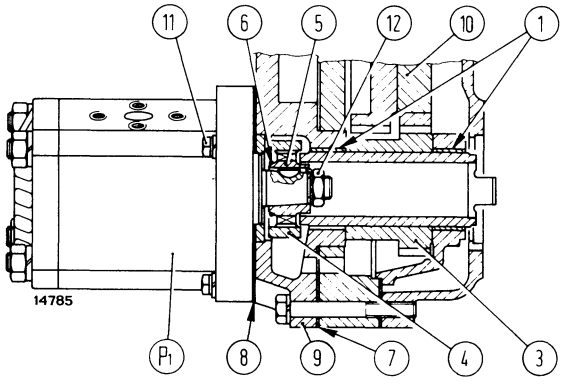
Check gear shaft and bearings for wear against data on pages 1 and 2, section 40.

Check side face flatness and squareness relative to bearings, smearing the surfaces in question with carbon black.



Section through pump drive (85 - 55).

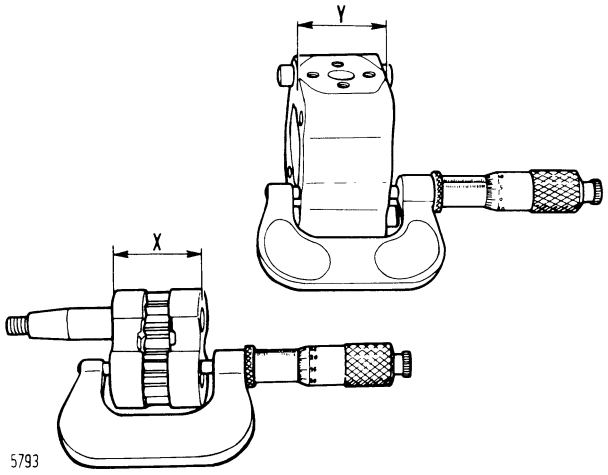
1. Centralizer - 2. Drive sleeve - 3. Sleeve drive ring - 4. Retaining ring - 5. Seal - 6. Drive gear - 7. Thrust rings - 8. Bushings - 11. Pump capscrews - 12. Sleeve nut.



Section through pump drive (95 - 55).

P_1. Hydraulic pump - 1. Bushings - 3. Drive gear - 4. Sleeve drive ring - 5. Drive sleeve - 6. Retaining ring - 7. Seal - 8. Seal - 9. Support - 10. Steering pump gear - 11. Pump capscrew - 12. Sleeve nut.

HYDRAULIC TRACTOR IMPLEMENT CONTROL SYSTEM: Hydraulic pump



Checking gear end clearance in pump body.

Note - Dimension X to be smaller than dimension Y by .10 to .18 mm or .004 to .007 in.

Small defects may be remedied using wet zero-grade emery cloth.

Check gear end clearance in pump body with the bearings in position.

- The correct clearance is .10 to .18 mm or .004 to .007 in. If necessary, dress body faces to restore clearance using wet emery cloth and removing as little material as possible.

Lubricate all parts using service oil, then assemble referring to the figure on page 1 and noting the following points:

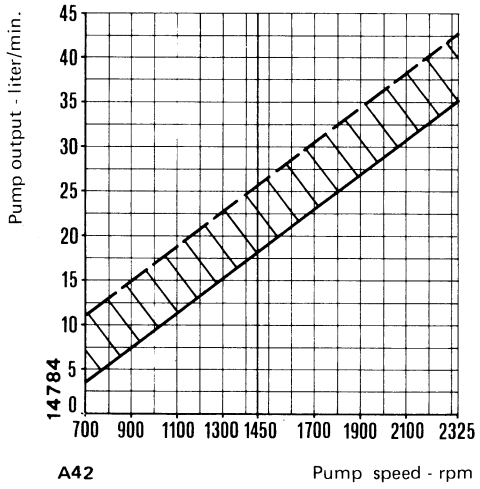
- Ensure that the reference marks applied on disassembly are in register.
- Position plastic anti-extrusion ring (11) inside the center o-ring (2).
- The bearings, which should slide into position by hand, must be introduced so that fillets on outer circumference face towards outlet port and slotted frontal surfaces abut the gears.
- Install drive shaft seals (6) on rear cover (4) with attached spacer (10) as shown in detail (a) and pack the lip cavity with **grassofiat TUTELA G9** or other approved grease.
- Progressively tighten the cover nuts and bolts to the specified torque.

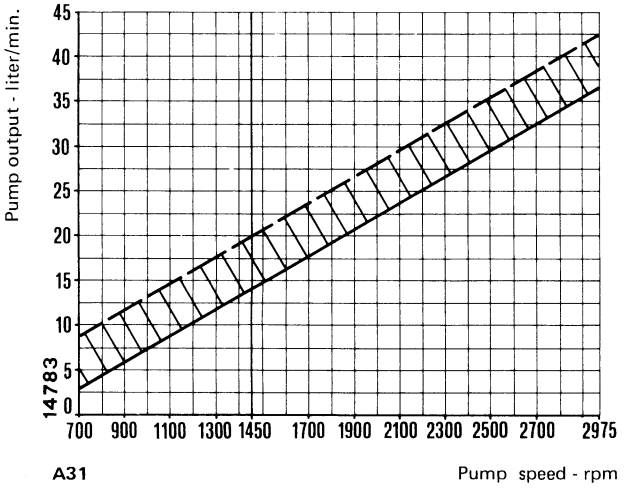
When installing pump to tractor, fill both suction pipe and the pump body with **oliofiat TUTELA MULTI F** or other approved oil to facilitate priming and prevent seizure during initial running.

Output test

Couple the pump to the drive motor and connect to output test machine using the equipment indicated for 855C and 955C tractors (see page 3, section 401).

Carry out test as directed for 855C and 955C tractors, but referring to charts below.





Hydraulic pump speed-output chart.

A 42. Pump for 85 - 55 - A 31. Pump for 95 - 55.
Test pressure 170 bar (173 kg/cm^2 or 24 psi) - Oil temperature 55 to 65° C - Pump drive ratio 0.931 to 1 for 85 - 55 or 1.1896 to 1 for 95 - 55.

CHARGING SYSTEM

Alternator	
Type	Three-phase, self-rectifying
– BOSCH	K1 → 14V - 45A 20 (1)
– MARELLI	AA 125E - 14V - 45A (2)
Rated voltage	14V
Rotation (seen from pulley side)	Clockwise
Cut-in speed at 12V and 25° C	950 to 1000 rpm
Output at 14V across battery, at 6000 rpm (BOSCH) or 7000 rpm (MARELLI), after warm-up (3)	⩾ 45A
Max output (3) BOSCH at 14000 rpm	47A
Max output (3) MARELLI at 14000 rpm	~ 50A
Rotor winding resistance BOSCH	3.4 to 3.74 Ohm
Rotor winding resistance MARELLI	3.0 to 3.2 Ohm
On-machine alternator speed at rated engine speed	4445 rpm
Drive ratio	1.778 to 1
Voltage regulator	
Type	Integral transistor
– BOSCH	EE 14V 3
– MARELLI	RTT 114A
Alternator test speed BOSCH	4000 rpm
Alternator test speed MARELLI	4000 to 6000 rpm
Voltage setting BOSCH	13.7 to 14.5 V
Voltage setting MARELLI	13.65 to 14.00 V

(1) 85 - 55 only.
(2) 1-groove (85 - 55) or 2-groove (95 - 55) pulley.
(3) Applicable to fully bedded-in brushes.

ELECTRICAL SYSTEM: Specification and Data

STARTER

Type	MARELLI MT 68 MA
Voltage rating	12 V
Rated output	3.5 kW
Rotation (seen from pinion end)	clockwise
Starter drive ratio	9/127
No. of poles	4
Field winding	series
Control	lever and freewheel
Operation	through solenoid
Bench test data	
Running torque at 20°C:	
– current	700 A max.
– torque	19 Nm min. (1.9 kgm or 13.75 ft.lb)
– speed	1700 rpm
– voltage	9.1 V
Lock torque at 20°C:	
– current	1550 A max.
– voltage	5.7 V
– torque	52 Nm min. (5.3 kgm or 38.3 ft.lb)
Light running torque at 20°C:	
– current	80 A max.
– voltage	11.6 V min.
– speed	7000 rpm min.
Mechanical data	
Brush spring pressure (new brushes)	1.28 to 1.52 bar (18.56 to 22 p.s.i.)
Mica undercut depth	1 mm max. (.040 in)
Clutch slip torque (pinion rotating torque)	.6 to .8 Nm (.06 to .08 kgm or .4 to .6 ft.lb.)

(follows)

STARTER

(continued)

Commutator dia	44.840 to 45.000 mm (1.7653 to 1.7716 in)
– Maximum wear limit	43.840 mm (1.7259 in)
– Maximum ovality	.1 mm (.0039 in)
– Armature end float	.1 to .4 mm (.004 to .016 in)
Solenoid	
Winding resistance at 20° C — hold-in winding	.23 ± .01 Ohm
Winding resistance at 20° C — pull-in winding	.78 ± .04 Ohm
Current consumption at 12V	70 A max.
Activation voltage	7V max.
Moving contact travel	2.2 to 3.5 Nm (.086 to .137 in)
Plunger stroke	14.3 mm (.562 in)
End of stroke plunger load at 12V	40 kg min (88 lb)
Installation data	
Pole shoe I.D.	75.830 to 76.000 mm (2.9854 to 2.9921 in)
Armature O.D.	74.900 to 74.950 mm (2.9488 to 2.9508 in)
Drive end bushing I.D.	12.475 to 12.502 mm (.4911 to 4922 in)
Pinion journal O.D.	12.425 to 12.440 mm (.4892 to 4900 in)
Pinion clearance in bushing	.035 to .077 mm (.0014 to .0030 in)
Intermediate bushing I.D.	20.200 to 20.264 mm (.7953 to .7978 in)
Shaft journal dia.	19.967 to 20.000 mm (.7861 to 7874 in)
Shaft clearance in bushing	.200 to .297 mm (.0080 to .0116 in)
Commutator end bushing I.D.	14.000 to 14.027 mm (.5512 to 55.22 in)
Shaft journal dia.	13.957 to 13.984 mm (.5505 to .549 in)
Shaft clearance in bushing	.016 to .070 mm (.0006 to .0027 in)
Lubrication data	
Starter drive helical groove (during overhaul)	**grassofiat TUTELA MR 3**
Commutator end thrust washer	**grassofiat TUTELA MR 3**

ELECTRICAL SYSTEM: Specification and Data

BATTERY ([1])

Characteristics / Model	Type	Rated Voltage V	Nominal capacity (20 h rate Ah	Current (3' at −18° C) A	Max. dimensions length x width x height mm	Weight with electrolyte kg
85 - 55	DELCO 1981149	12	100	460	330 x 174 x 240	
	MARELLI 434470 - ES	12	100	470	373 x 175 x 190	
95 - 55	MARELLI 456580 - ES ([2])	12	132	580	513 x 174 x 205	

([1]) Maintenance- free.
([2]) Optional for 85 - 55

FUSES

Seven 8A and one 16A fuse located in fuse box.

Fuse	PROTECTED CIRCUIT	A
1	Thermostarter	16
2	Single-pole power point	8
3	High beam head lights and indicator	8
4	Low beam head lights	8
5	Front L.H. parking light – Rear R.H. parking light – Floodlight and switch – Instrument panel light	8
6	Front R.H. parking light – Rear L.H. parking light – Parking light indicator	8
7	Tractor turn signal lights and indicator – Tractor stop lights – Water temperature gauge – Fuel gauge – Battery charge indicator – Engine oil pressure indicator and sending unit – Air cleaner restriction indicator	8
8	Clutch low oil pressure sending unit and indicator	8

Note – Unprotected circuits: Starting and charging.

LIGHTING – INDICATORS – ACCESSORIES

Two asymmetric low and high beam head lights, double-filament 45/40 W bulb (white or yellow).

Two front lights including:
- Parking lights (5W bulb), white lens.
- Turn signal lights (21W bulb), orange lens.

Two tail lights including:
- Parking/stop lights, double-filament 5/21 W bulb, red lens.
- Turn signal light (21W bulb), orange lens.

License plate light (5W bulb).

Floodlight with integral switch (35W), white.

Two rear red reflectors.

(follows)

(continued)

LIGHTING – INDICATORS – ACCESSORIES

Indicators (3W bulbs): – Battery charge (red). – Low engine oil pressure (red). – Air cleaner restriction (red). – Low clutch oil pressure (red). – Parking lights on (green) and dash light. – High beam on (blue). – Tractor turn signal lights on (green).
Thermostarter cold starting aid.

STARTER SWITCH

CO BO type, 4-position, 50 A.

Positions	Circuit completed
Position 0 30	Engine shut-off – Single pole power point.
Position 1 30-15/54 57-58/57	Lighting switch - Fuel gauge - Water temp. gauge - Battery charge indicator - Low engine oil pressure indicator - Turn signal lights and indicators - Engine oil pressure sending unit - Low clutch oil pressure indicator - Single-pole power point.
Position 2 30-15/54-50 57-58/57	Lighting switch - Fuel gauge - Water temp. gauge - Battery charge indicator - Low engine oil pressure indicator - Turn signal lights and indicators - Starter - Engine oil pressure sending unit - Low clutch oil pressure indicator - Single-pole power unit point.
Position 3 30-57	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking light - Parking lights indicator - Instrument panel lights - License plate light - Single-pole power point - Floodlight.

LIGHTING SWITCH

CO BO type, 4-position.

Positions	Circuits completed (°)
Position 0 30	–
Position 1 30-57/58	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - Horn - Floodlight.
Position 2 30-57/58-56b	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - Low beam - Horn - Floodlight.
Position 3 30-57/58-56a	Front R.H. and rear L.H. parking lights - Front L.H. and rear R.H. parking lights - Instrument panel light - Parking lights indicator - High beam - Horn - Floodlight.

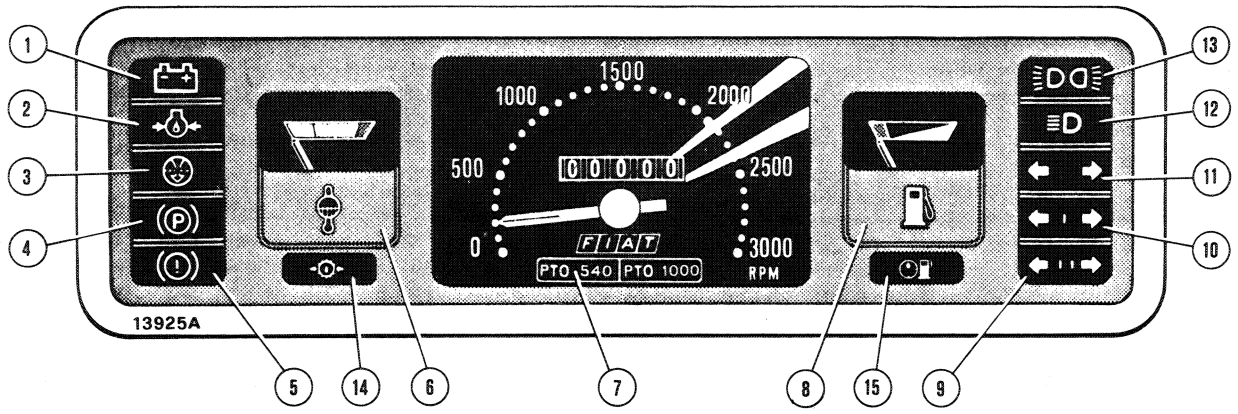
(°) Starter switch in position 1

TURN SIGNAL SWITCH

CO BO Type, 3-position.	
Positions	Circuit completed (°)
Position 0 54	Off
Position 1 (right) 54 1	Right-hand turn signal
Position 2 (left) 54 2	Left-hand turn signal

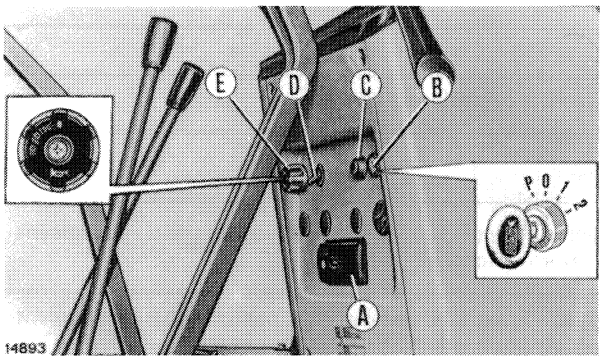
(°) Starter switch in position 1.

CONTROLS AND INSTRUMENTS



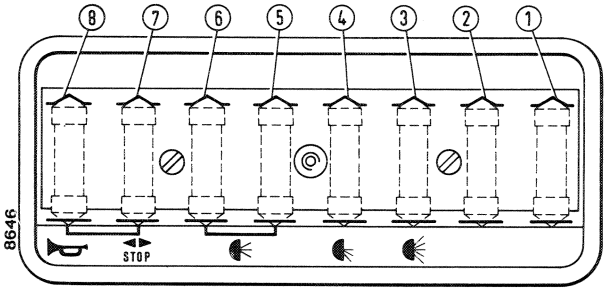
Instrument Panel

1. Battery charge indicator (red) - 2. Low engine oil pressure indicator (red) 3. Air cleaner restriction indicator (red) 4. Spare - 5. Spare - 6. Engine coolant temperature gauge - 7. Tractormeter - 8. Fuel gauge - 9. Spare - 10. Spare - 11. Tractor turn signal indicator (green) - 12. High beam indicator (blue) - 13. Parking lights indicator (green) - 14. Low clutch oil pressure indicator (red) - 15. Water trap restriction indicator.



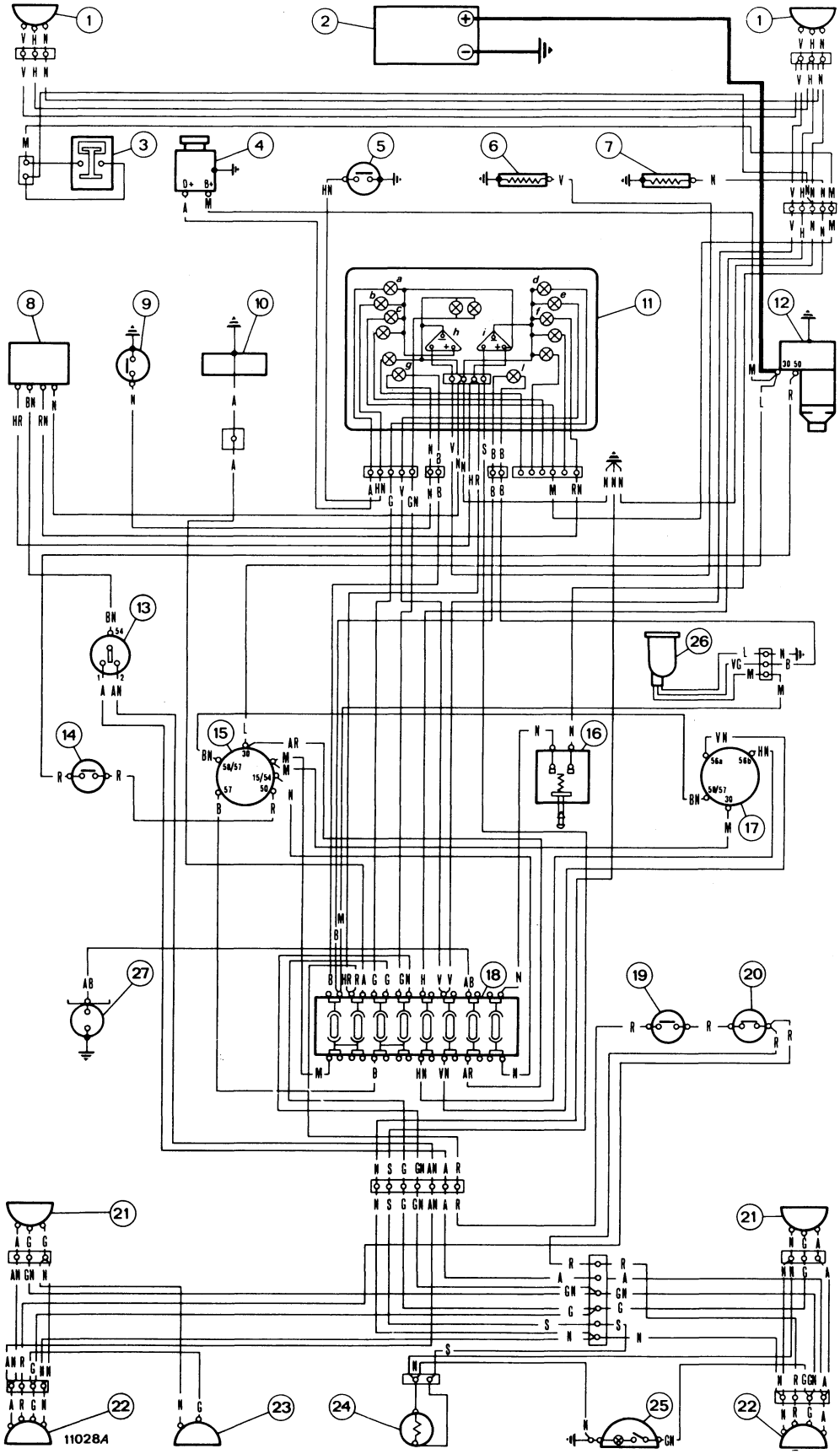
Control board

A. Fuse box - B. Starter and engine shut-off switch - C. Thermostarter switch - D. Turn signal switch - E. Lighting switch.



Fuse Unit

(For reference see page 4).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Wiring diagram

1. Head lights
2. Battery
3. Air cleaner restriction indicator
4. Alternator
5. Low engine oil pressure sending unit
6. Water temperature sending unit
7. Thermostarter (optional)
8. Tractor turn signal flasher
9. Low clutch oil pressure sending unit
10. Engine shut-off solenoid
11. Multiple gauge (9-function)
    a. Battery charge indicator
    b. Low engine oil pressure indicator
    c. Air cleaner restriction indicator
    d. Parking light indicator
    e. High beam indicator
    f. Turn signal indicator
    g. Low clutch oil pressure indicator
    h. Engine water temperature gauge
    i. Fuel gauge
    l. Water trap restriction indicator
12. Starter
13. Turn signal switch
14. Starter inhibitor switch
15. Starter switch
16. Thermostarter switch
17. Lighting switch
18. Fuses
19, 20. Stop light switch
21. Front parking and turn signal lights
22. Rear parking/turn signal/stop lights
23. License plate light
24. Fuel gauge tank unit
25. Floodlight and switch
26. Water trap sending unit
27. Single-pole power point

CABLE COLOUR CODE

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

Service tools are the same as those listed on pages 1, 2, 3 and 4, section 90 for 855 C and 955 C tractors, with the following exceptions.

101 - Engine block - Cylinder head

293864 Plate, sleeve removal (use also for 855C - 955C).

293746/1 Bushing (use with injector sleeve cutters **293742/2**).

293861 Burnisher, injector sleeve.

292248 Quadrant, cylinder head, main and con rod bearing cap and flywheel cap-screw angle tightening.

104 - Fuel system

On-bench test equipment, C.A.V. pump.

292397 Adapter, transfer pressure.

292415 Adapter, leakage.

292430 Adapter, inlet.

C.A.V. distributor injection pump.

292249 Tester, advance.

292251
292252
292253 Wrenches (torx 15 - 20 - 25).

292254 Guide, drive shaft seal installation.

292401 Gauge, timing (use with **290757**).

292405 Insert (use with **290757**).

292412 Adapter set (use with **290757**).

292414 Tester, feed pressure.

292411 Installation tool, injection pump.

292439 Connector, pump leakage test.

292440 Plug set (use with **292249**).

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