

Product: New Holland Fiat 855 C/955 C/85-55/95-55 Tractors Service Repair Manual

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855 C 955 C

85-55 95-55

***WORKSHOP
MANUAL***

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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FIAT

Trattori

855 C

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WORKSHOP MANUAL

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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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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:

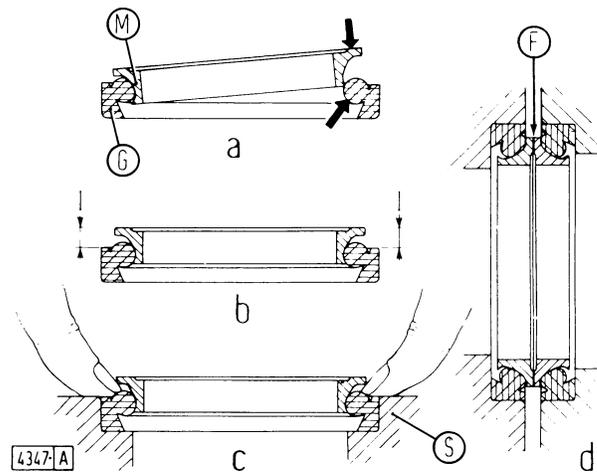
- Prior to fitting, soak the seals for at least half an hour in the fluid to be retained.
- Carefully clean the shaft and ensure that the contact surface is free from damage.
- Turn the end of the sealing lip towards the fluid. If of the thrower lip type, turn the grooves so that during shaft rotation 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) Thoroughly 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 compound, 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.

GENERAL: General Instructions

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 label 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.

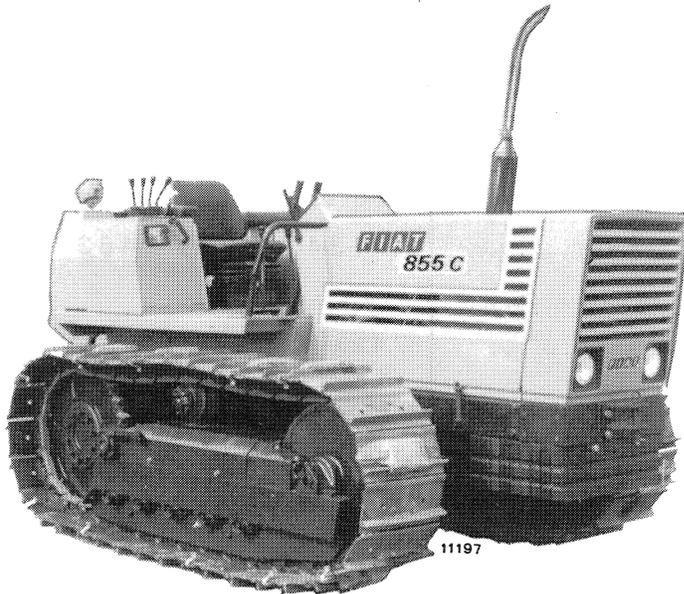
ATTACHMENTS

- 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	type	construction
	on hood	on plate			
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**WEIGHTS**

Operating weight (with front ballast weights and lift, without operator).....

ENGINE

Type

Injection

Number of cylinders

Sleeves

Bore

Stroke

Displacement

Compression ratio

Crankshaft rotation (seen from fan side)

Main bearings

Firing order

Max. output speed

Max. output, DGM/DIN

Max. torque speed

Drive ratios { Alternator

Oil pump

Water pump and fan

Tractormeter

Oil pan

Engine balancer

Valve gear

Intake

Opens: BTDC

Closes: ABDC

Exhaust

Opens: BBDC

Closes: ATDC

Valve clearance (timing check)

Normal clearance (hot or cold):

— Intake

— Exhaust

855C	955C
5420 (11950 lb)	6420 (14156 lb)
Diesel, 4-stroke, naturally aspirated	
Direct	
4	5
Dry	
103 mm (4.05 in)	
110 mm (4.33 in)	
3666 cm ³ (223.69 in ³)	4583 cm ³ (279.65 in ³)
17 to 1	
Counterclockwise	Clockwise
5	6
1-3-4-2	1-2-4-5-3
2500 rpm	
57.4 kw (78 HP)	64.8 kw (88 HP)
1400 rpm	1800 rpm
1 to 1.92	1 to 1.82
1 to 0.5	1 to 1.265
1 to 1.04	1 to 1.425
1 to 0.5	
Cast iron	
Counterweight unit in oil pan	—
OH valves, pushrod operated	
3°	
23°	
48° 30'	
6°	
0.45 mm (.018 in)	
Normal clearance (hot or cold):	
— Intake	
— Exhaust	
0.25 mm (.010 in)	
0.35 mm (.014 in)	

Fuel system

Air cleaner

Fuel filters (on fuel transfer pump delivery)

Fuel transfer pump

— Operation

Injection pump

— Type { BOSCH
C.A.V.

Integral all speed governor:

— BOSCH

— C.A.V.

— Pump timing, B.T.D.C.:

• BOSCH

• C.A.V.

Injectors

— Injector type

— Nozzle opening pressure

Firing order

Lubrication system

Pump drive

Oil filters:

— Suction

— Delivery

Relief valve

Oil pressure at rated engine speed

855C	955C
Oil bath or dry double cartridge, centrifugal pre-cleaner with automatic dust unloader	
Two, in line, disposable paper cartridge (water trap integral with first stage filter) (*)	
Double diaphragm	
Cam, valve gear driven	
Distributor	
EP/VA4/110H 1250 CL 136-6- 771151	VE5/11 F 1250 R58-4749797
DPA 3342 F570 - 771541	—
Hydraulic	Centrifugal
Centrifugal	—
13° ± 1°	8° ± 1°
18° ± 1°	—
Three orifice	
See page 10, section 10	
225.5 ± 4.9 bar (230 ± 5 kg/cm ² - 3270 ± 70 psi)	
1-3-4-2	1-2-4-5-3
Forced feed, gear pump	
Camshaft	Crankshaft
Wire mesh	
Full-flow cartridge	
In pump body	
2.9 to 3.9 bar (3 to 4 kg/cm ² - 40 to 55 psi)	

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

SPECIFICATION

Cooling system

Radiator, vertical tubes

—

Expansion tank

Fan, water pump pulley mounted

Temperature control

Tractormeter

— Drive

— Hourmeter activation speed. rpm

855C	955C
Water, centrifugal pump	
3 row	4 row
Translucent plastic	
Suction, 4 steel blades	
Wax thermostat	
On instrument panel	
Camshaft	
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.

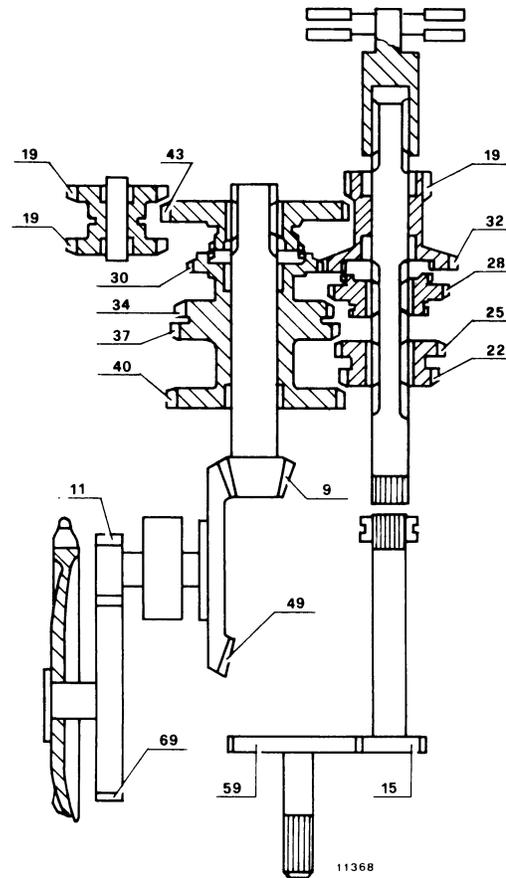
Design lift capacity, max. lift stroke and max. lift capacity (see section 40, pages 3 and 4).

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

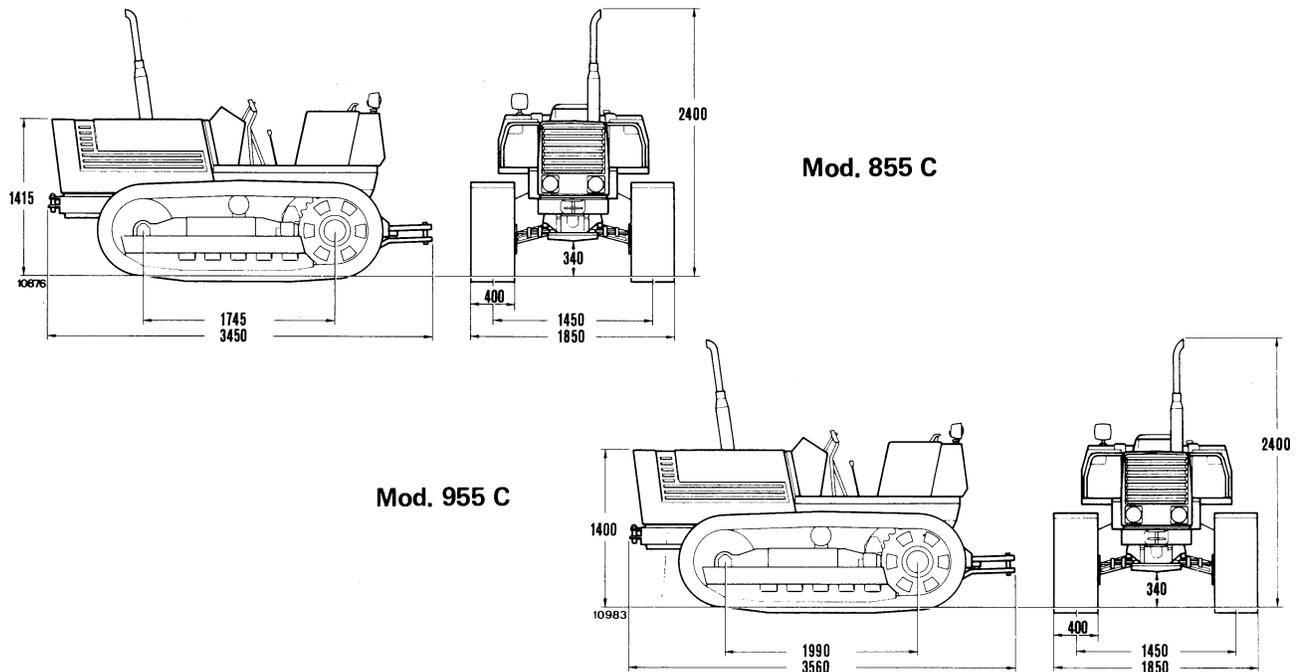
Standard lift arms and draft links.

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)****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.

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.

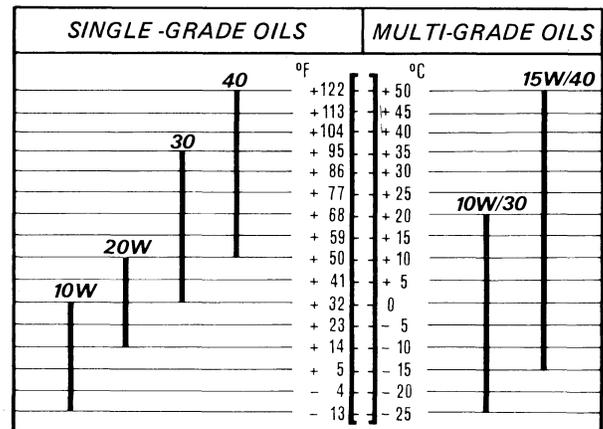
Instruments and Accessories

Control board and 15-function instrument panel,

CAPACITIES

DESCRIPTION	FLUID				International designation
	FIAT Recommended Product	CAPACITY			
		liters	kg	pints	
Oil pan, filters and lines	AMBRA SUPER ⁽²⁾	11.7	10.5	20.6	Diesel engine oil to MIL-L-2104D and API CD service
Oil pan and filters		13.8	12.4	24.3	
Oil pan only		11.2	10.1	19.7	
Air cleaner ⁽¹⁾		12.8	11.5	22.5	
		10.5	9.5	18.5	
		11.1	10	19.5	
		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⁾	11	–	19.4	
		12	–	21.1	
Fuel tanks (two off)	diesel oil	170	–	299.4	

AMBRA SUPER



- ⁽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.

SPECIFICATION

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 to 2.177
– 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 swept area both parallel and at right angles to engine centerline.

ENGINE: Specification and Data

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		
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.		
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.		
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		
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		
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)		
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.		
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)

ENGINE: Specification and Data

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

ENGINE: Specification and Data

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
{ 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
{ Normal (cold Intake	0.25	0.0010
{ or warm) Exhaust	0.35	0.0138
Cam lift(*) { Intake	5.250	0.2067
{ Exhaust	5.777	0.2274
Valve lift (*) { Intake	9.31	0.3661
{ 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/cm ² - 40 -55 psi)	
Relief valve crack-off setting	3.5 bar (3.6 kg/cm ² - 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	45 mm (1.77 in)	
– Closed, under 88 to 94 N (9 to 9.6 kg, 19.8 to 21 lb) ..	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)

FUEL SYSTEM

		855C	955C
Injection pump		Distributor, integral governor and advance device	
– BOSCH	.....	EP/VA 4/110H 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..... BOSCH..... C.A.V..... O.M.A.P.....	EPPZ10F1-770577 EPPZ50F3-771064 EPPZ60F3-770897 EPPZ70F3-770957	
– FIAT	{ Nozzle holder..... Spray nozzle.....	KB70S1F10-767107 DLL140S64F-770578	
– BOSCH	{ Nozzle holder..... Spray nozzle.....	KBL70S177/4-771065 DLLA141S662-771066	
– C.A.V.	{ Nozzle holder..... Spray nozzle.....	BKBL69S5376-770899 BDLL140S6655-770902	
– O.M.A.P.	{ Nozzle holder..... Spray nozzle.....	OKLL70S2974-770958 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/cm ² - 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)