FIATAGRI

FIAT 86 Series Tractors

3–cylinder engine models: 50V 55V 55F 60V 60F 62F
4–cylinder engine models: 70V 72F 72LP 82F 82LP

WORKSHOP MANUAL

SECTIONS

AFTER SALES SERVICE

06910107

Reprinted

FOREWORD

◊ *This Manual is subdivided into separately numbered (two–digits) Sections, each with indipendently numbered pages.*

For quick cross–reference, these Sections have the same identification number and denomination of the units appearing on the Repair Time Manual.

◊ *Topics and information contained herein can be easily traced by consulting the index pages that follow.*

◊ *Each page is identified at the bottom with the print number of the manual and the date of first issue or updating edition.*

◊ *Pages of future revised/updated editions will be identified with the same print number of the original edition, followed by a two–digit number (ex.: 1st updated edition 603.54.283.01; 2nd updated edition 603.54.283.02, etc.) and by the respective date of issue.*

These pages will be accompanied by a reprint of the index, updated.

◊ *All information herein are updated at the date appearing on the Manual. As NEW HOLLAND is constantly committed to product improvement, some information may not be to–date as a consequence of modifications implemented on the machines for technical or commercial reasons or for compliance to local legal requirements, differing in the various Countries.*

In case of discrepancies, please contact our nearest Sales and Service point.

IMPORTANT NOTICES

◊ *All maintenance and repair operations appearing on this manual must be performed exclusively by the FIATGRI Service network, which is committed to strictly follow the instructions and indications therein and to use, whenever necessary, the envisaged special tools.*

◊ *Whomever should carry out any operation or service work herein included without strictly following our indications and prescriptions will be held personally responsible for any ensuing damage.*

◊ *The Company and all of its Distributors, including but not limited to national, regional or local distributors, decline any and all responsibilities for any damage which may ensue from the abnormal behaviour of parts and/or components not duly authorized by the Company, including any of these used in carrying on maintenance and repair work on the product manufactured or distributed by the Company.*

In any case, no warranty coverage of any kind will be issued or prescribed regarding the product manufactured or distributed by the Company for damages consequent to an abnormal behaviour of parts or components which have not been duly authorized by the Company.

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GENERAL INSTRUCTIONS

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SHIMS

At each adjustment, select appropriate shim by measuring them one by one with a micrometer gauge and subsequently summing up the single thickness readings: do not rely on wrong overall reading of shim pack thickness or on the nominal value indicated for each shim.

ROTARY SHAFT SEALS

Install seals on rotary shaft correctly, as follows:

- prior to fitting, soak the seals for at least half an hour in the fluid to be retained;
- clean the shaft thoroughly and make sure that working surfaces are free from any damage;
- install the seal with the sealing lip side facing the fluid; in case of a thrower lip type seal, the grooves must be oriented so as to throw the fluid back in when the shaft is rotating;
- smear the sealing lip with a very thin coating of lubricant (oil is better than grease) and pack the space between sealing lip and dust shield with grease on double–lip type seals;
- fit seals into their housings by pressure or using a punch with a flat contact surface; under no circumstances hit the seal directly with a hammer or mallet;
- at assembly, make sure the seal is not entering the housing in tilted position and once fitted ensure that the seal is pressed fully home;
- to prevent that the sealing lip may be damaged by the shaft at installation, use some sort of protection when sliding it over the shaft.

O–RING SEALS

Lubricate each seal prior to fitting to prevent twisting at assembly and consequent loss of fluid tightness.

SEALING COMPOUNDS

On the mating surfaces indicated by a X apply one of the following sealing compounds: RTV SILMATE, RHODORSIL CAF 1 or LOCTITE PLASTIC GASKET.
Before applying the sealing compounds, treat mating surfaces as follows:

- using a wire brush, remove all metallic particles;
- thoroughly degrease surfaces using one of the following detergents: solvent, kerosene or a water/soda solution.

BEARINGS

When fitting bearings, it is recommended:

- pre–heating them 80°C to 90°C before installation on shafts;
- cooling them before force–fitting into their respective seats.

ROLL PINS

When fitting straight roll pins make sure the cut faces towards direction of work, to stress the pin.
Coil roll pins, instead, do not require any particular orientation at assembly.

SPARE PARTS

Use exclusively **NEW HOLLAND genuine spare parts**, the only ones that can be identified by this exclusive trademark.

These are the only ones that guarantee the same quality, durability and safety of the original Factory parts, being the same ones installed on the assembly line.
Only the **genuine NEW HOLLAND spare parts** offer this guarantee.
When ordering spare parts please state:

- tractor model (marketing code) and chassis serial number;
- engine type and serial number;
- part number, (given on "Microfiches" or "Spare Parts Catalogue").

SERVICE TOOLS

The service tools proposed and illustrated in this Manual are:

- envisaged and designed specifically for use on tractors of the FIATAGRI range;
- necessary for reliable service work;
- accurately made and thoroughly tested to offer efficient and durable working tools.

We should like to remind to Service operators that being in possess of the right tools means:

- working under optimum technical conditions;
- obtaining the best possible results;
- save time and fatigue;
- working under better safety conditions.

NOTICES

Wear limits given in this manual for some of the parts and components are to be considered indicative only, for guidance purposes, and are not binding.
Indications such as "front", "rear", "right" and "left" referred to different components are intended for the tractor operator sitting in the driver's seat and facing the direction of normal tractor travel.

HOW TO START AND MOVE A TRACTOR WITHOUT BATTERY

Cables of the outside energyzer must be connected exclusively to their respective positive and negative posts on the tractor, using clean and efficient clamps assuring adequate and stable contacts.
Disconnect all users (lights, windshield wiper, etc.) prior to starting the tractor.
Should it be necessary to verify the tractor electrical system operation, do it only with the outside energyzer connected; Ultimated the check, disconnect all electrical accessories and de–activate the energyzer before disconnecting its cables.

SAFETY

PAY ATTENTION TO THIS SYMBOL

This warning symbol calls your attention on important messages involving your personal safety.
Read the precautionary statements attentively and strictly comply with the recommended precautions in order to avoid any potential risk and safeguard your personal health and wellbeing.
Throughout this manual you will find this symbol associated with the following keywords:

***CAUTION** – For warnings intended to make you avoid wrong or inadequate repair practices which may potentially involve the repairman personal safety.*

***DANGER** – In the presence of warnings that specifically alert of potential physical danger for the safety of the repairman or of other persons directly or indirectly involved.*

AVOID ACCIDENTS !

Most accidents occurring in the workshop are caused by the failure of following some basic and simple safety rules and precautions.
For this reason MOST ACCIDENTS CAN BE PREVENTED by paying attention in advance to avoid the possible causes and act accordingly, being careful and cautious.

No matter what the type of machine, and no matter how well this has been designed and manufactured, it will be impossible to absolutely exclude the possibility of an accident.

A careful and cautious mechanic is the best guarantee against accidents.

Just the compliance to this one only simple safety rule would prevent the occurrence of a good many serious accidents:

DANGER – Never attempt to clean, lubricate or service the tractor with the engine started.

PRECAUTIONARY STATEMENTS

GENERAL

◊ Strictly follow all maintenance and servicing directions.

◊ Do not wear rings, wrist watches, jewelry and loose or hanging apparel such as, for example: ties, torn clothing, scarves, unbottoned or unzipped jackets that can be caught in moving parts.
We recommend, instead, to wear proper safety clothing and accessories, such as , for example: anti–skid shoes, gloves, safety goggles, helmets, etc.

◊ Do not carry on service work on the machine with persons sitting in the driver's seat, with the exception of operators abilitated to cooperate with you for the work at hand.

◊ Carry on all performance tests from the operator's seat.

◊ Unless otherwise specified, do not do any work on the machine while the engine is running.

◊ Before taking off caps, covers, valves, etc., stop the engine and relieve pressure from hydraulic circuit involved.

◊ All service work and operations must be carried on by constantly using maximum care and paying best attention.

◊ Shop and field platforms and ladders should be constructed and maintained in accordance with accident prevention regulations.

◊ Disconnect batteries and label all controls to warn that work is in progress.
Restrain machine and any implement to be lifted.

◊ Never check levels or fill fuel tanks and storage batteries while smoking or near open flames as fluids involved are flammable.

◊ Brakes are inactive when disconnected for servicing the machine, it will therefore be necessary to make provisions to securely restrain it by means of wedge blocks in order to prevent any movement that might be physically dangerous for the operator.

◊ Make sure that the fuel filler gun is and remains in contact with the tank filler cap during refuelling to prevent sparks due to static electricity.

◊ Use only designated towing or pulling attachment points. Use great care in connecting: make sure pins and locks are secure before attempting to pull. Stay clear of drabars, chains and cables under load.

◊ To move a disabled machine use a trailer or low body truck, if available.

◊ Load or unload the machine from transporter on level grounds affording full support to the trailer or truck wheels. Anchor tractor to load or trailer platform for transport and fit wedge blocks under the wheels as requested by the carrier.

◊ Use only grounded auxiliary power sources for heaters, chargers, pumps and similar equipment to avoid potential electrical shocks.

◊ Lift and handle all heavy parts with lifting tackle of adequate capacity.

◊ Watch out for people in the vicinities.

◊ Never pour gasoline or diesel fuel in open, large and low containers.

◊ Never use gasoline, diesel fuel or other flammable liquids as detergents: use, instead, commercial solvents, non flammable and non toxic.

◊ When cleaning parts with compressed air wear safety goggles with side protection.

◊ Limit the pressure to 2.1 bar (30 psi) in accordance to local safety regulations.

◊ Do not keep the engine running inside closed premises without adequate ventilation.

◊ Do not smoke, do not use open flames and do not not cause sparks in the vicinity when refuelling or handling easily inflammable materials.

◊ Do not use open flames as light sources with work in progress or when searching for "leaks" on the machine.

◊ Move carefully when working under/on the machine or near the same and wear the envisaged safety clothing and accessories: helmets, goggles and safety shoes.

◊ When carrying on inspection or checks requiring that the engine be running, call on the assistance of an operator remaining seated in the driver seat while watching the mechanic at work at all times.

◊ Fo field service, drive the machine on level grounds and make provisions to block it securely in place. If working on sloping grounds cannot be avoided, first move the machine, if possible, to the best available level grounds and block machine and its attachment securely to avoid accidents.

◊ Guard against kinking chains or cables: do not use them to lift or pull. Always wear heavy gloves when handling them.

◊ Be sure chains are anchored securely: check that the anchor point is strong enough for the expected load. Nobody should be near the anchor point, chain or pull cable and ropes.

◊ Keep maintenance floor area always CLEAN and DRY. Remove water or oil puddles immediately.

◊ Do not let oily, greasy wrags to pile up: they are a serious fire hazard. Always store them in a closed metal container. Before starting the machine or moving equipment check and inspect the driver's seat setting and locking. Also make sure no one else is present within the operating radius of the machine or equipment.

◊ Do not carry loose objects in your pockets that might fall inside disassembled parts and components.

◊ When in the presence of a potential hazard of being hit by flying metal particles or similar, wear goggles or glasses with side protection, helmets, special safety shoes and heavy gloves.

◊ Wear welders' protective accessories such as dark glasses, helmets, protective clothing, gloves and safety shoes when welding. Dark safety glasses must be worn also by anyone standing by when welding is in progress. DO NOT LOOK AT ARC WITHOUT PROPER EYE PROTECTION.

◊ Wire ropes develope steel slivers in time. When handling them, always use adequate protection (heavy gloves, safety glasses, etc.).

◊ Handle all parts with extreme care. Do not put hands and fingers in between parts. Always wear proper, designated clothing and accessories such as safety glasses, heavy gloves and safety shoes.

STARTING

◊ Do not run the engine inside closed premises without proper ventilation capable of eliminating exhaust gases.

◊ Never place head, body, legs and arms, feet, hands and fingers near rotating fans or belts.

ENGINE

◊ Turn radiator cap slowly to release cooling system pressure before removing it. Add coolant only when the engine is shut off or idling, if warm.

◊ Do not refuel with engine running, particularly if warm, to avoid the possibility of spilled fuel taking fire.

◊ Never attempt to verify or adjust fan belt tension when the engine is running. Do not adjust the fuel injection pump when the tractor is moving.

◊ Never lubricate a machine with the engine running.

ELECTRICAL SYSTEM

◊ When auxiliary batteries are used, be sure to connect both cable ends correctly: (+) with (+) and (–) with (–) and do not short–circuit terminals.
BATTERY GAS IS HIGHLY INFLAMMABLE.
Leave battery box open for better ventilation when charging batteries. Never check charge by placing metal objects across the posts. Keep sparks and open flames away from battery area and avoid smoking to prevent explosions.

◊ Check for fuel or battery electrolyte leaks before starting service or maintenance work: eliminate leaks, if any, before proceeding.

◊ Do not charge batteries inside closed premises or areas: make sure ventilation is adequate to prevent accidental explosions due to accumulation of explosive gas given off during the charging process.

◊ Always disconnect batteries before working on the electrical system.

HYDRAULICS

◊ Fluid escaping under pressure from a very small hole can almost be invisible but can have sufficient force to penetrate the skin.
Use a piece of cardboard or wood when searching for suspected pressure leaks. NEVER USE HANDS: if the fluid jet has penetrated under the skin, see a doctor at once as serious infection or skin reactions may develop if proper medical treatment is not administered immediately.

◊ When checking hydraulic system pressure use accident prevention provisions and the proper instruments and gauges.

WHEELS AND TYRES

◊ Make sure tyres are properly inflated to manufacturers specifications. Inspect rims and tyres periodically for damage.

◊ Stand sideways when checking tyre pressures.

◊ Check pressure only under unloaded machine and cold tyres conditions to avoid getting a wrong, overinflated pressure value.
Do not use reworked wheel parts as improper welding, brazing or heating may have weakened them and cause failures.

◊ Never cut or weld a wheel rim with the tyre installed and inflated.

◊ When removing or installing one or two wheels, restrain all the others by means of wedge blocks in order to prevent accidental movements potentially dangerous for the operator.
After jacking up the tractor in correspondence of the wheel or wheels to be removed, place the designated floor stands for proper supporting and safety.

◊ Deflate tyres before foreign objects from treads.

◊ Never inflate tyres with a flammable gas: explosion and personal injuries could be the result.

REMOVAL AND INSTALLATION WORK

◊ Lift and handle all heavy parts using lifting tackle of proper capacity. Keep people away from the load being lifted and make sure that parts and components are securely supported by proper hooks and chains and use the specific steel eyes for attachment.

◊ Handle all parts with extreme care, keep hands and fingers from between parts and wear the approved safety clothing and accessories such as goggles and glasses, gloves and shoes.

◊ Guard against kinking chains or steel wire ropes and always wear safety gloves when handling them.

GENERAL SPECIFICATIONS	3 –cylinder	4–cylinder
Engine,:		
– 50V model – type 8035.06.220 (BOSCH pump)	See data on p.10–9	–
– 50V model – type 8035.06.321 (C.A.V. pump)	See data on p.10–11	–
– 55V and 55F models – type 8035.06.222 (BOSCH pump)	See data on p.10–13	–
– 55V and 55F models – type 8035.06.323 (C.A.V. pump)	See data on p.10–15	–
– 60V, 60F and 62F models – type 8035.05.208 (BOSCH pump)	See data on p.10–17	–
– 60V, 60F and 62F models – type 8035.05.309 (C.A.V. pump)	See data on p.10–19	–
– 70V, 72F and 72LP models – type 8045.06.208 (BOSCH pump)	–	See data on p.10–21
– 70V, 72F and 72LP models – type 8045.06.309 (C.A.V. pump)	–	See data on p.10–23
– 82F and 82LP models – type 8045.05.208 (BOSCH pump)	–	See data on p.10–25
– 82F and 82LP models – type 8045.05.309 (C.A.V. pump)	–	See data on p.10–27
Cycle	diesel, 4–cycle, aspirated	
Injection	direct	
Number of in–line cylinders	3	4
Cylinder sleeves	dry, force–fitted in cranckase	
Piston diameter:		
– 50V model	100 mm (3.94 in)	–
– 55V and 55F models	100 mm (3.94 in)	–
– 60V, 60F and 62F models	104 mm (4.10 in)	–
– 70V,72F and 72LP models	–	100 mm (3.94 in)
– 82F and 82LP models	–	104 mm (4.10 in)
Piston stroke	115 mm (4.53 in)	
Engine displacement:		
– 50V model	2710 cm^3 (165.31 in^3)	–
– 55V and 55F models	2710 cm^3 (165.31 in^3)	–
– 60V, 60F and 62F models	2931 cm^3 (178.79 in^3)	–
– 70V, 72F and 72LP models	–	3613 cm^3 (220.40 in^3)
– 82F and 82LP models	–	3908 cm^3 (238.39 in^3)
Compression ratio	17÷1	
Max. power:		
– 50V model	33,1 kW (45 HP)	–
– 55V and 55F models	40,4 kW (55 HP)	–
– 60V, 60F and 62F models	44,1 kW (60 HP)	–
– 70V, 72F and 72LP models	–	51,5 kW (70 HP)
– 82F and 82LP models	–	58,8 kW (80 HP)
Max. output speed	2500 rpm	
Max. torque speed: 50V model	1300 rpm	–
Max. torque speed: 55V and 55F models	1400 rpm	–
Max. torque speed: 60V, 60F and 62F models	1500 rpm	–
Max. torque speed: 70V, 72F and 72LP models	–	1500 rpm
Max. torque speed: 82F and 82LP models	–	1400 rpm
Main bearings	4	5
Oil sump	cast–iron	

(continued)

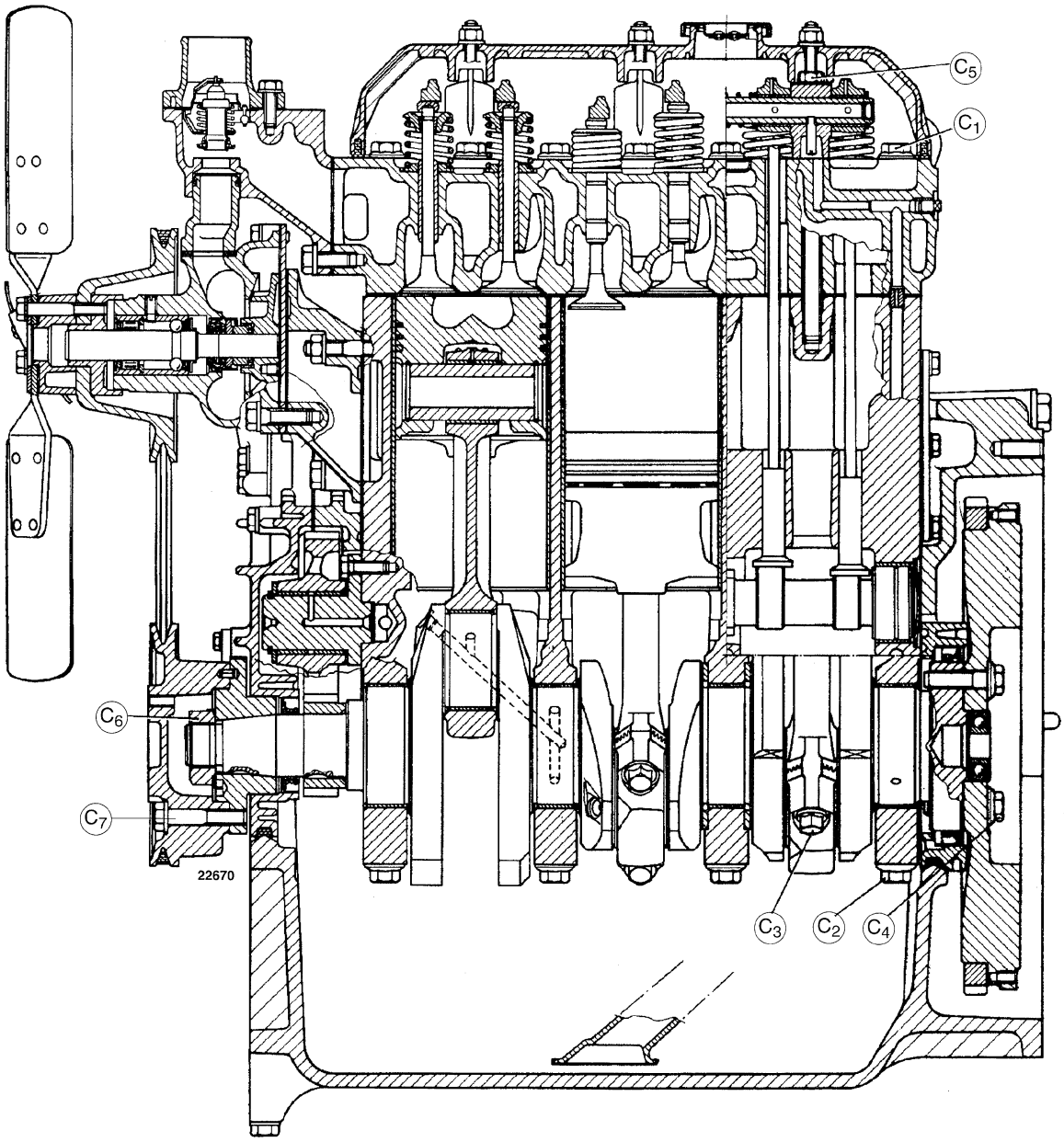
(follows)

GENERAL SPECIFICATIONS	3–cylinder	4–cylinder
Lubrication	forced, w/gear–type pump	
Pump drive	camshaft	
Engine/oil pump speed ratio	2:1	
Oil cleaning	through wire filter on intake and cartridge on delivery	
Normal oil pressure, warm engine running at max. speed :	2,9 ÷ 3,9 bar (3 ÷ 4 kg/cm^2 – 42.6 ÷ 56.9 psi)	
Pressure relief valve	inside pump housing	
Valve crack–off pressure	3,5 bar (3,6 Kg/cm^2 – 50.8 psi)	
For further lubrication data	See page 10–84	
Cooling	water circulation	
Radiator, 50V, 55V, 55F, 60V, 60F, 62F and 70V models	3–row vertical copper tubes	
Radiator, 72F, 72L, 82F and 82LP models	4–row vertical copper tubes	
Fan, attached to water pump pulley	suction, sheet metal, six blades	
Water pump	vane–type	
Engine/water pump speed ratio	1:1,403	
Temperature regulation	through thermostat	
Water temperature gauge	3–colour sector scale	
Temperature gauge dial sector temperatures:		
– starting white sector	30° ÷ 65° C (86° ÷ 149° F)	
– central green sector (normal operating temperature)	65° ÷ 105° C (86° ÷ 221° F)	
– final red sector	105° ÷ 115° C(221°÷ 239° F)	
For further cooling system data	See page 10–87	
Tractor meter	on instrument panel	
Drive	through camshaft gear	
Hourmeter/engine speed setting	1800 rpm	

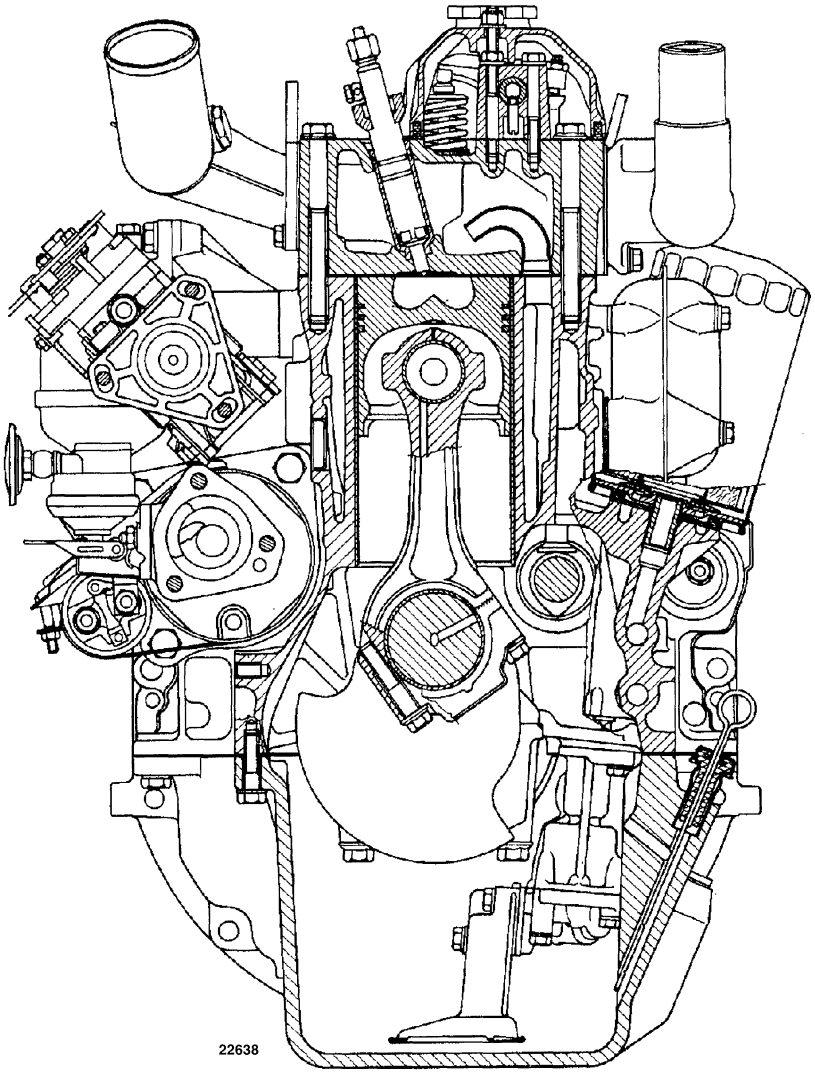
(continued)

(follows)

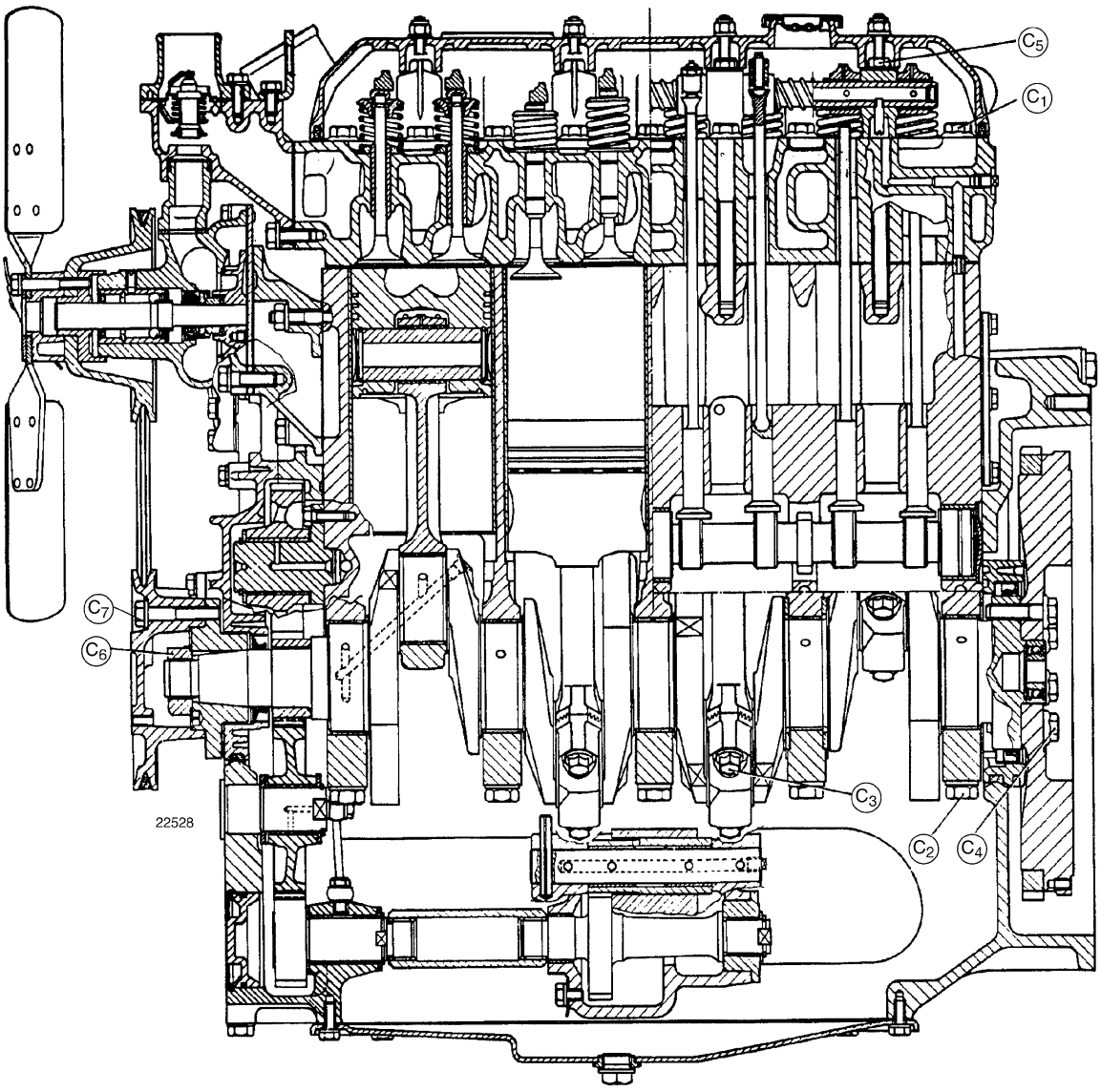
GENERAL SPECIFICATIONS	3–cylinder	4–cylinder
Timing	overhead type valves driven by the timing camshaft, located in the engine cranckase, through the push rod and rocker arm mechanism; the camshaft is driven by the engine cranckshaft through helical–tooth gears.	
Intake:		
– commencement: before T.D.C.	12°	
– end: after B.D.C.	31°	
Exhaust:		
– commencement: before B.D.C.	50°	
– end: after T.D.C.	16°	
Valve clearance for timing check	0,45 mm (.018 in)	
Normal operating valve clearance, measured on cold engine:		
– intake	0,30 ± 0,05 mm (.012 ± .002 in)	
– exhaust	0,30 ± 0,05 mm (.012 ± .002 in)	
For further timing data	See page 10–73	
Fuel system		
Air cleaning	through a dual–cartridge dry air cleaner, with clogged filter warning light, centrifugal pre–cleaner and automatic dust ejector	
Fuel transfer pump	double–diaphragm	
Fuel filtering	through wire filter in fuel transfer pump and a replaceable, cartridge–type filter in pump output	
Min. fuel output with drive shaft rotating at 1600 rpm	100 l/h (22 UK or 26 US gal)	
Cam drive	actuated by the engine timing mechanism	
BOSCH or C.A.V. fuel injection pump	distributor type	
All–speed, built–in speed governor:		
BOSCH and C.A.V.	mechanical flyweights	
Automatic, built–in advance variator:		
BOSCH and C.A.V.	hydraulic	
For further fuel system data	See prospect below	
For information concerning fixed advance (pump setting on engine for commencement of delivery, before T.D.C.) – Pressure setting – Firing order and others completing BOSCH and C.A.V. pump data, refer to the pages indicated hereafter in relation to the type of engine:		
– 50V model – type 8035.06.220 (BOSCH pump)	See data on p. 10–9	–
– 50V model – type 8035.06.321 (C.A.V. pump)	See data on p.10–11	–
– 55V and 55F models – type 8035.06.222 (BOSCH pump)	See data on p.10–13	–
– 55V and 55F models – type 8035.06.323 (C.A.V. pump)	See data on p.10–15	–
– 60V, 60F and 62F models – type 8035.05.208 (BOSCH pump)	See data on p.10–17	–
– 60V, 60F and 62F models – type 8035.05.309 (C.A.V. pump)	See data on p.10–19	–
– 70V, 72F and 72LP models – type 8045.06.208 (BOSCH pump)	–	See data on p.10–21
– 70V, 72F and 72LP models – type 8045.06.309 (C.A.V. pump)	–	See data on p.10–23
– 82F and 82LP models – type 8045.05.208 (BOSCH pump)	–	See data on p.10–25
– 82F and 82LP models – type 8045.05.309 (C.A.V. pump)	–	See data on p.10–27



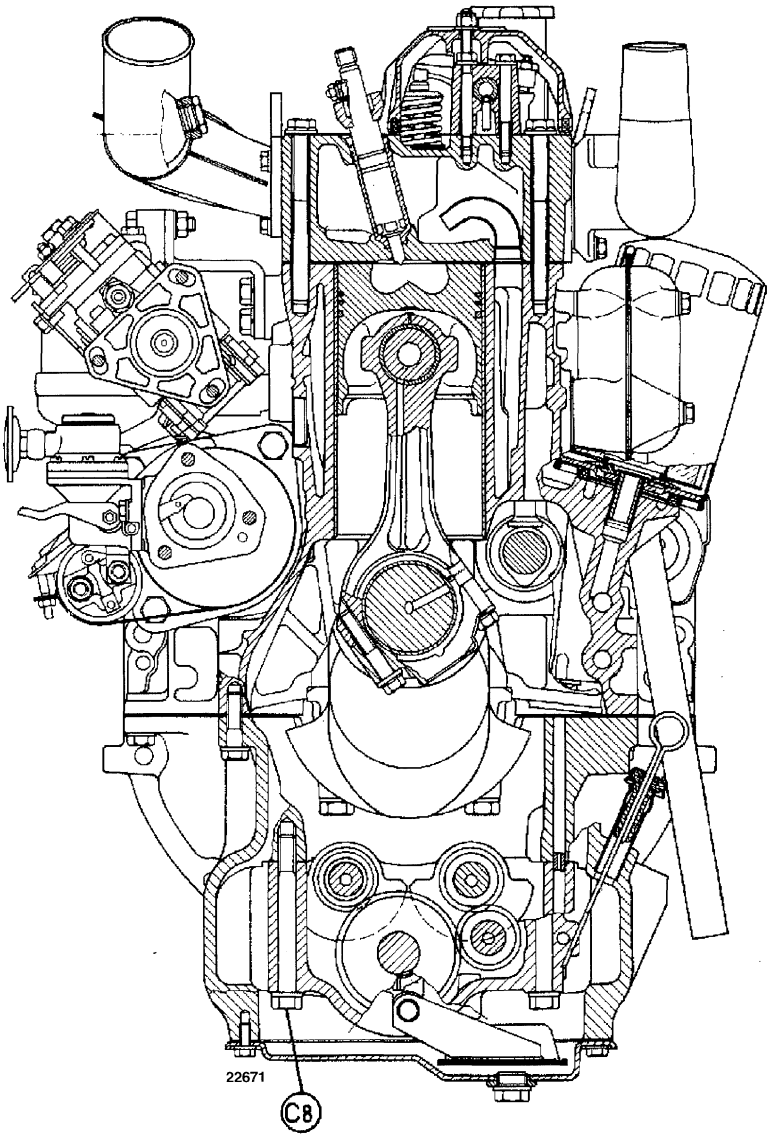
Longitudinal section of the 3–cylinder engine installed on the 50V – 55V – 55F – 60V – 60F – 62F model tractors



Cross–section of the 3–cylinder engine installed on the 50V – 55V – 55F – 60V – 60F – 62F model tractors



Longitudinal section of the 4–cylinder engine installed on the 70V – 72F – 72LP – 82F – 82LP model tractors



Cross–section of the 4–cylinder engine installed on the 70V – 72F – 72LP – 82F – 82LP model tractors

ANGULAR TORQUE WRENCH DATA

DESCRIPTION	Thread size	Torque		Angle
		Nm	kgm/ft–lb	
Cap screws, cylinder head (**C_1**, page 10–4, or page 10–6)	M 12 x 1.25	60	6,1/44	90° + 90°
Cap screws, main bearing caps (**C_2**)	M 14 x 1.5	80	8,2/59	90°
Cap screws, connecting rod caps (**C_3**)	M 11 x 1.5	40	4,1/30	60°
Cap screws, engine flywheel (**C_4**)	M 12 x 1.25	40	4,1/30	60°

TORQUE WRENCH DATA

DESCRIPTION	Thread size	Torque	
		Nm	kgm/ft–lb
Cap screws, rocker arm shaft bracket (**C_5**, page 10–4, or page 10–6)	M 8	25	2.5/18
Nut, crankshaft hub (**C_6**)	M 30 x 1.5	294	30/217
Cap screws, fan and alternator drive pulley (**C_7**)	M 10 x 1.25	55	5.6/40.5
Cap screws, balancer weights (**C_8**, page 10–7) for 70 – 72 – 82 models	M 12 x 1.25	110	11.2/81
Cap screws, inlet manifold (**C_9**, page 10–48)	M 8	25	2.6/19
Nut, alternator and belt stretcher (**C_{10}**, page 10–45)	M 10 x 1.25	55	5.6/40.5
Cap screws, engine coolant pump (**C_{11}**, page 10–46)	M 10 x 1.25	55	5.6/40.5
Nuts, injector stud (**C_{12}**, page 10–62)	M 8	25 **(*)**	2.6 **(*)**/19
Nuts, valve tappet cover (**C_{13}**)	M 8	15	1.5/11
Cap screws, rocker arm shaft brackets (**C_{14}**)	M 8	25	2.5/18
Cap screws, oil pump and cover (**C_{15}**, page 10–51)	M 8	25	2.6/19
Cap screws, timing box and cover (**C_{16}**, page 10–52)	M 8	25	2.6/19
Cap screws, intermediate flanged axle (**C_{17}**)	M 10 x 1,25	55	5.6/40.5
Cap screws, camshaft thrust plate (**C_{18}**)	M 8	35	3.6/26
Cap screws, crankcase rear cover (**C_{19}**, page 10–58)	M 8	25	2.6/19
Nuts, valve tappet adjustment setscrews (**C_{20}**, page 10–62)	M 8	22	2.2/16
Cap screws, exhaust manifold (**C_{21}**, page 10–46)	M 8	25	2.6/19
Cap screws, injection pump (**C_{22}**, page 10–93, or page 10–96)	M 8	25	2.6/19
Cap screws, engine oil sump (**C_{23}**, page 10–50)	M 12x1.25	69	7/51

(*) Tighten nuts at two subsequent stages, see page 10–62

FUEL SYSTEM MAIN DATA

BOSCH INJECTION SYSTEM	VE 3/11 F 1250 L 163–2 – 4804867
Engine	8035.06.220
Tractor	50V
Power output	45 HP
Cylinders	3
Stroke	115 mm (4.53 in)
Bore	100 mm (3.94 in)
Displacement	2710 cm^3 (165.31 in^3)
Max. power torque	2500 rpm
Injector types :	
– W ALTECNA	4802391
– BOSCH	4792442
– C.A.V.	–
– OMAP	4800032
Nozzle holder types :	
– W ALTECNA	KBEL 83S 1W200–4802392
– BOSCH	KBEL 83S 35–4791124
– C.A.V.	–
– OMAP	OKLL 83S 3392–4796644
Spray nozzle types :	
– W ALTECNA	DDL124S 500W–4802393
– BOSCH	DLLA 124S 1001–4792443
– C.A.V.	–
– OMAP	OOL124S 3990–4792447
Spray orifice diameter	0.31 mm (.012 in)
Number of spray holes	4
Pressure setting	230 ÷ 238 bar (235 ÷ 243 kg/cm^2 – 3407 ÷ 3523 psi)
Delivery pipes	4797506
Pipe size	6 x 1.5 x 475 mm (.24 x .06 x 19 in)
Assembly data	
Sense of pump rotation (drive end)	counterclockwise
Firing order	1–2–3
Pumping element pre–lifting from B.D.C.	0,2 ± 0,05 mm (.008 ± .002 in)
Pump setting on engine: commencement of delivery before T.D.C. at cylinder 1 in the compression phase **(*)**	$6^o \pm 1$
Pump delivery connection to cylinder 1	designated by the letter **A**.
Calibration test conditions	
Test bench complying with ISO 4008/1./2 standard	–
Injectors complying with ISO 7440 A 11 standard	1688901020 **(°)**
Test fluid ISO 4113	at the temperature of $40^o + 2^o$ ($104^o \pm 4^o$F)
Test glasses emptying time	30'
Note (*) Pumping element pre–lifting from B.D.C. for timing on engine (with 291754 and 291755 tools)	1 mm (.039 in)
Note (°) With button	1680103096

(continued)

(follows)

BOSCH INJECTION SYSTEM	VE 3/11 F 1250 L 163–2 – 4804867
Fuel transfer pressure: bar (kg/cm^2 – psi)	0.2 (0.2 – 2.9)
Injector pressure setting	172 ÷ 175 bar (175 ÷ 178 kg/cm^2– 2537 ÷ 2581 psi)
Pipes (complying with ISO 4093 std.)	6 x 2 x 840 mm (.24 x .08 x 33.6 in)

ADJUSTMENT DATA

Operation description	rpm	Advance piston stroke mm	Fuel pressure bar(kg/cm^2)	Unit delivery cm^3/1000 shots	Transfer bar (kg/cm^2)	Spread cm^3/1000 shots
Full load delivery	800	2.8 ÷ 3.2	4.2 ÷ 4.8	56.5 ÷ 57.5	0.2	3.5
Idle speed limit	350	–	–	10 ÷ 14	0.2	3
Starting delivery	150	–	–	100 ÷ 120	0.2	–
Full throttle limit	1350	–	–	39 ÷ 45	0.2	–

TEST DATA

Advance device check	rpm	mm	Fuel pressure check	rpm	bar (Kg/cm^2)	Back leakage	rpm	cm^3/100 shots
	600	0.6÷1.4	–	600	3.2÷3.8	–	–	–
	800	2.8÷3.2	–	800	4.2÷4.8	–	–	–
	1200	4.6÷5.4	–	1200	6.4÷7.0	–	–	–

DELIVERY CHECK

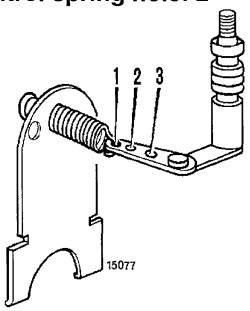
Full throttle stop	rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)	Idle speed shut–off	rpm	Delivery cm^3/1000 shots	Transfer pressure bar (kg/cm^2)
	1400÷1460	≤2	0.2	–	350	10÷14	0.2
	1350	39÷45	0.2	–	400	≤2	0.2
	1250	50.5÷53.5	0.2	–	–	–	–
	800	56.5÷57.5	0.2	–	–	–	–
	500	52.5÷55.5	0.2	–	–	–	–
	250	≤47	0.2	–	–	–	–
	150	100÷120	0.2	–	–	–	–

BENCH TEST PERFORMANCE DATA

Test conditions	
Fixed injection advance before T.D.C.at cylinder 1 in compression phase: (see page before).	Relative humidity: 70% + 5
Engine without fan, air cleaner and exhaust silencer.	Ambient temperature 20 ± 3° C (68 ± 3° F)
Barometric pressure 740 ± 5 mm Hg (at Turin altitude: 239 meters – 785 ft above sea level).	Fuel specific weight 830 ± 10 g/liter.

Throttle	Brake load	Engine speed rpm	Power output with engine run–in time of: 2–hour total kW (metric HP)	Power output with engine run–in time of: 50–hour total kW (metric HP)	Fuel consumption kg/h
Maximum	For max power output	2500	≥ 32.4 (44)	33.1 ÷ 35 (45 ÷ 47.6)	7.8 ÷ 8.2
Maximum	For max torque	1500	≥ 22.8 (31)	23.5 ÷ 25 (32 ÷ 34)	5.1÷ 5.6
Maximum	None (idling)	2750÷2790	–	–	–
Minimum	None (idling)	625÷675	–	–	–

FULE SYSTEM MAIN DATA

C.A.V. INJECTION SYSTEM	DPS 8522 A 170 A – 98404118
Engine	8035.06.321
Tractor	50V
Power output	45 (metric HP)
Cylinders	3
Stroke	115 mm (4.53 in)
Bore	100 mm (3.94 in)
Displacement	2710 cm^3 (165.31 in^3)
Max. power speed	2500 rpm
Injector type :	
– BOSCH	4824164
Nozzle holder type :	
– BOSCH	KBEL 83S 35–4791124
Nozzle type :	
– BOSCH	DLLA 134S 1113–4824165
Spray orifice diameter	0.31 mm (.012 in)
Number of spray holes	4
Pressure setting	260 ÷ 268 bar (265 ÷ 273 kg/cm^2 – 3842 ÷ 3958 psi)
Delivery pipes	–
Pipe size	6 x 2 x 475 (.24 x .08 x 19 in)
Assembly data Sense of pump rotation (drive end): counterclokwise Firing order : 1–2–3 Distance between governor bracket and metering pin: 40.45 ÷ 41.05 mm (1.618 ÷ 1.642 in) Pump timing on engine: commencement of delivery before T.D.C. at cylinder 1 in compression phase $0^o \pm 1^o$ Flange centering guide diameter : 50mm Pump delivery connection corresponding to cylinder 1: designated by letter **U**	**Control spring hole: 2** 
Calibration test conditions	
Test bench complying with ISO 4008/1../2 standard	–
Injectors complying with ISO 7440 A 11 standard	–
Test fluid ISO 4113	at $40^o \pm 2^o$ C ($104^o \pm 4^o$ F)
Test glass emptying time	30'
Fuel transfer pressure: bar (kg/cm^2 – psi)	0.1 (1.45 psi)
Injector pressure setting	172 ÷ 175 bar (175 ÷ 178 kg/cm^2 – 3842 ÷ 3958 psi)
Pipes complying with ISO 4093/1 standards	6 x 2 x 845 mm (.24 x .08 x 33.8 in)
Projecting height of maximum delivery setscrew above its locknut surface	9 mm (.35 in)
Back off completely the transfer pressure set screw and then screw it in	3.5 revs
Position the release valve set screw just below its locknut surface	–
Back off completely the maximum, minimum and shut–off exclusion screws	–
The advance device, spring end, fits a 2 mm (.08) shim	no others required

(continued)

(follows)

C.A.V. INJECTION SYSTEM		DPS 8522 A 170 A – 98404118					
PUMP CALIBRATION DATA							
Test n.	Throttle lever position	Speed rpm	Advance degrees	Transfer pressure bar (kg/cm²)	Unit delivery cm³/200 shots	Spread cm³/200 shots	Back leakage cm³/100 shots
1 (1)	max	200	–	–	–	–	–
2 (2)		1000	–	–	–	–	–
3		100	–	0.3	–	–	–
4 (+)		950	–	–	–	–	–
5 (3) – 6		950	2.75÷3.00 (15)	4.5÷5.6	–	–	–
7 (4)		1250	3.75÷4.75 (16)	–	–	–	–
8 – 9		750	–	–	8.6÷8.8(*)	≤1	40÷90(°)
10 (5)		1250	–	–	–	–	–
11 (6)		1420	–	–	1.5÷2.0	–	–
12 (x)		1520	–	–	≤1.4	–	–
13 (7)		1250	–	–	–	–	–
14 (8)		250	0.75÷1.75(17)	–	–	–	–
15 (9)		200	0	–	≥16.0	–	–
16 (11)	min	325	–	–	2.0÷2.5	–	–
17 (10)		850	–	–	–	–	–
18 (12)		325	–	–	≤0.8	–	–
19 (13)		325	–	–	≤0.5	–	–
20 (14)		–	–	–	–	–	–

1) Delivery to all injectors.
2) Run pump for 3'.
3) Set pressure adjusting screw for specified advance and check that pressure corresponds.
4) Stop test machine, disconnect transfer pressure gauge and install shut–off device. Activate the latter and re–start test machine.
5) Record average delivery.
6) Adjust max. speed screw and lock it in position.
7) Delivery shall not be less than in test 10 by more than 0.4 cm³/200 shots.
8) Prior to test, bring machine speed to 100 revs then stop it. Fully tighten release valve adjusting screw, start machine and slacken screw until reaching specified values.
9) Prior to test, bring machine speed to 100 revs then stop it and re–start it.
10) Adjust anti–stall screw for a delivery of 2 to 3 cm³/2000 shots and then lock it in position.
11) Adjust idling speed screw.
12) Shut–off lever closed.
13) With shut–off device deactivated and shut–off lever open, await 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 lock–up, then position pump timing plate at 11.25°.
15) 2.2÷2.4 mm (.088÷.096 in)
16) 3.0÷3.8 mm (.12÷.15 in)
17) 0.6÷1.4 mm (.024÷.056 in)
x) If delivery is more, adjust rod length at minimum (see above).
+) Inside pressure in pump housing, measured with a pressure gauge connected to the orifice in the drain screw, should read 0.1÷ 0.3 bar (kg/cm²_–1.45÷ 4.35 psi).
*) Take reading after 15". °) Flow 300 ÷ 675 cm³/min. (18÷ 40.5 in³/min).

BENCH TEST PERFORMANCE DATA

Fixed injection advance before T.D.C. at cylinder 1 in compression phase : (see page before).
Engine without fan, air cleaner and exhaust silencer.
Barometric pressure 740 ± 5 mm of Hg (at Turin altitude: 239 m – 785 ft. above sea level).

Relative humidity: 70% ± 5.
Ambient temperature 20 ± 3° C.
Fuel specific weight: 830 ± 10 g/liter.

Throttel	Brake load	Engine speed rpm	Power output with engine run–in time of: 2–hour total kW (metric HP)	50–hour total kW (metric HP)	Fuel consumptioin kg/h
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Maximum	For max torque	1500	≥ 22.8 (31)	23.5 ÷ 25 (32 ÷ 34)	5.1÷ 5.6
Maximum	None (idling)	2750÷2790	–	–	–
Minimum	None (idling)	625÷675	–	–	–