

ARONA

Door ons bedrijf is de
1-cylinder diesel,

Merk : ARONA

Type : AL186MR

Serienr: 00540

volledig gereviseerd.



Apeldoorn, 11 maart 2002



Motoren Revisie Apeldoorn

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Automerk: Naam:.....
Type: Contactpers.:
Bj.: cc Tel.:

carb. / inj. benzine / gas / diesel

Motorcode Chassisnr.:

- | | |
|---|--|
| <input type="checkbox"/> cilinderkop vlakken | <input type="checkbox"/> rekbouten |
| <input type="checkbox"/> koppakkingset | <input type="checkbox"/> distributieriem |
| <input type="checkbox"/> koppakking 1-2-3-4-5 | <input type="checkbox"/> aantrek koppels |
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Aantal	Onderdeel	Omschrijving	Stukpr.	Krt.	Totaalpr.	B

ARONA 1945 1 CIL. DIESEL

UITGEVOERDE WERKZAAMHEDEN

Cilinderkop demonteren en reinigen
 Cilinderkop reviseren
 Geleiders vervangen
 Tuimelaaras repareren
 Blok verbussen en honen

10.50 *	WERKPLAATSTARIEF	40.00		420.00	1
1.00 M	MILIEUTOESLAG	2.50		2.50	1

ONDERDELEN

1.00 V91483	KLEP	GM EUROPE	21.50	25%	16.13	1
1.00 I	KLEPGELEIDER 81-30102		11.80		11.80	1
1.00 I	CILINDER 001 WV 07		64.00		64.00	1

Totaalbedrag excl. btw		EUR	514.43
BTW 1 (19.00 %) over EUR	514.43	EUR	97.74
Totaalbedrag incl. btw !!! TAXATIE, GEEN FAKTUUR !!!		EUR	612.17

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ARONA

mod. **AL 185 M**

mod. **AL 186 M**

Leonard Lang b.v. Le. s

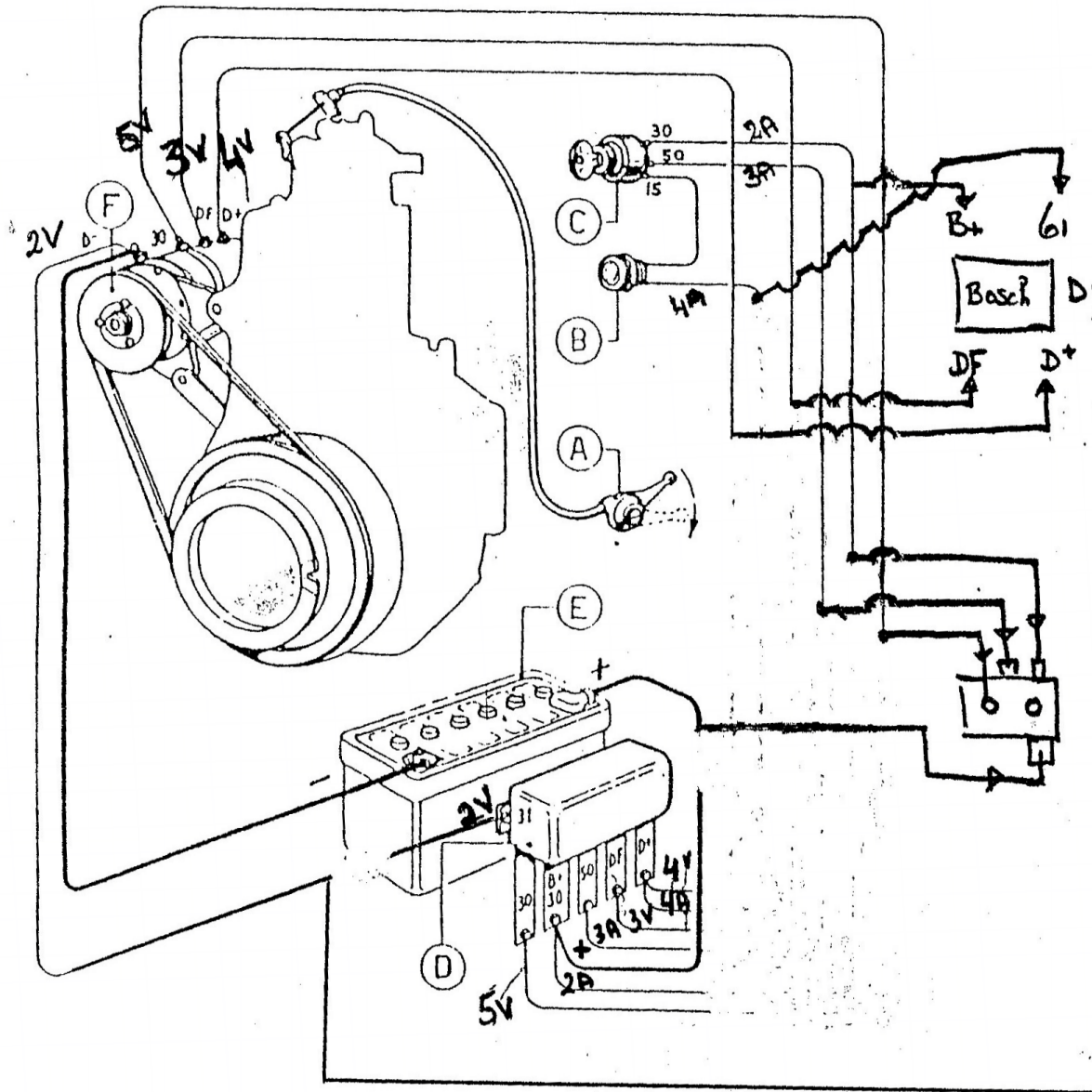
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Aronautic AD 185 / 186

Technische gegevens

Draairichting in vaarrichting linksom

4 takt diesel	
aantal cilinders	1
boring	85 mm
slag	80 mm
cilinder inhoud	454 cm ³
aantal omw./min.	2800
PK	10 / 3000
carter inhoud	2,2 kg
type olie	20 W 20
batterij capaciteit	60 AH
verstuiverdruk	180 kg/cm ²
dynastart	0,9 PK
klepspeling inlaat	0,2 mm
klepspeling uitlaat	0,2 mm
aanhaal koppel :	
cil. kopbout	6 kgm
verstuiverhouder	2,5 kgm
vliegwielmoer	14 kgm
drijfstangmoer	5,5 kgm
koppeling	Hurth HBW 5
overbreng verhouding	V. 2.05 : 1 A. 1.96 : 1
oliesoort	ATF type A
inhoud carter	0,35 ltr.
schroef	12 x 8 RH 3



- A. Decompression control lever
- B. Battery charge warning light
- C. Key starter switch
- D. Voltage regulator
- E. Battery (12 V – 50 Ah)
- F. Dynamotor

Fig. 17 – Dynamotor Electric Starter Diagram 12 V.

ENGINE CHARACTERISTICS	AL185	AL186
CYCLE DIESEL	4-stroke	4-stroke
CYLINDER VERTICAL	1	1
BORE mm	85mm	85mm
STROKE mm	80mm	90mm
DISPLACEMENT cm ³	454cm ³	510 cm ³

DIRECTION OF ROTATION	clockwise when looking at engine from flywheel side.
REVERSE GEAR	mechanical.
REVERSE AND REDUCTION GEAR RATIO	1:2,4.
REVERSE GEAR DIRECTION OF ROTATION	anticlockwise when looking from reverse gear side.
REDUCTION GEAR DIRECTION OF ROTATION	clockwise when looking from reverse-reduction gear side.

The descriptions and illustrations of this booklet are not binding. Although the main features of the engine herein described and illustrated remain unaltered, the ARONA Company reserves the right to effect (without obligation to immediately revise this publication) any modification of components, details or accessories which it feels necessary for any reason of technical or commercial nature.

FUEL INJECTION SYSTEM

This is composed of an injection pump, an atomizer fixed to an atomizer block and a fuel tank with built in filter.

A) INJECTION PUMP

This is a Bosch type: it is seated in a special housing in the crankcase. The cam acts on the pump unit roller through a rocker arm. See Fig. 1 on page 20 for stripping and re-assembly instructions regarding the component parts of the injection pump.

Fuel supplement. — The stroke of the fuel flow regulator fork is limited by a sliding rod. By means of an external handle, the sliding rod may be pulled outwards to allow the regulator fork to complete its stroke; this increases the capacity of the injection pump for easy starting. When the engine starts running, the first movement of the regulator fork allows the sliding rod to re-enter its normal position (Fig. 5 page 23).

B) ATOMIZER AND ATOMIZER BLOCK

The atomizer is a multiple jet type; it is clamped to the atomizer block by a ring nut. The parts of the unit are illustrated in Fig. 2 page 21. The atomizer has asymmetrically positioned jets and care must be taken to locate the reference dowels correctly: the dowels are arranged such that the unit is re-assembled in its pre-established position.

Setting and cleaning the atomizer. — The setting of spring 7) which operates needle 10) of the atomizer may be adjusted, if necessary, by turning the spring housing screw 3) which is then locked into position by cap 1).

The setting pressure must be 180 Kg. per sq. cm.

If the atomizer is dirty, the inner part may be cleaned with the aid of a small wooden stick and petrol; the needle in clean light gasoil to ensure that the needle will slide freely in its housing. The atomizer jets may be cleaned with a piece of thin steel wire.

C) FUEL TANK

This is mounted on the engine. On the underside of the tank is located the housing for the **fuel filter**, fibre cartridge type, which can be easily replaced by unscrewing the lock nut holding the filter unit inside the tank.

D) LUBRICATION

Force-feed lubrication of the crankshaft main bearings and the big-end bearings is effected by a gear pump.

The pump is driven by the crankshaft through two cylindrical gears. The circuit is fitted with a safety valve. The pump draws oil from the crankcase through an infeed tube and pumps it into the crankshaft. The inside of the crankpins is provided with a cavity and sealing cap such that the oil is subjected to centrifugal force and impurities retained in the cavity. Oil is fed into the main and big end bearing through feed holes.

Reverse gear lubrication: by the engine oil.

Max sump capacity:

- **Kg. 2,2 Marine engine**
- **Kg. 1,75 Industrial engine**

E) COOLING

Direct by sea water with volumetric pump. Bronze body and impeller.

F) STARTING

Electric by dynastart or by means of a pull-cord wound round the keyed pulley fitted to the flywheel.

Recommended fuel and lubricants

		Cold climate	Temperate climate	Tropical climate
Engine	O	Diesel Gamma SAE 10W	Diesel Gamma SAE 20W/30	Diesel Gamma SAE 30
Reverse gear	O	Same	Same	Same
Reduction gear	O	Same	Same	Same
Injection pump	O	Same	Same	Same
Oil bath air filter	O	Same	Same	Same
Various lubricating nipples	G	Grease 30	Grease 30	Grease 30
Starting motor	O	Diesel Gamma SAE 10W	Diesel Gamma SAE 20W/30	Diesel Gamma SAE 30
	G	Grease 30	Grease 30	Grease 30
Dynamo	G	Grease 30	Grease 30	Grease 30
Thrust bearing and supports	O	Diesel Gamma SAE 10W	Diesel Gamma SAE 20W/30	Diesel Gamma SAE 30

For dependable trouble free operation of the engine, as well as for protection of the injection components, use fuel having the following characteristics
Heat value – not less than 10500 kilocalories
Specific weight .830 - .860 kilograms per cubic decimetre
Diesel Index more than 52
Engler viscosity 20°C= 1.3 – 1.9
Sulphur content – not more than 1%

The engines have to be operated only with AGIP F.1 Diesel Gamma detergent oils having the viscosity ratings indicated in the table above, in relation to the climatic conditions in which they operate. Where AGIP products are unavailable the engine manufacturer recommends the use of:

- Engine oil – “HD” oil – S1 (DG – DM service of the API category
- Lubricating nipples – Lithium grease (N.L.G.I. No 2)

Other information concerning lubrication:

- The lubricant is poured into the engine through filler cap (17 page 11).
- Oil level is checked by dipstick (23 on page 11) on which maximum and minimum levels are marked. The oil level must not go above or below the indicated levels.
- The oil level must be checked frequently and when the engine is in a perfect vertical position; if necessary, top up with fresh oil to the maximum level indicated on the dipstick.
- **After the first 20 hours running** and, subsequently, **every 100 hours** unscrew drain cap (24 page 11) and drain out oil from the crankcase. Re-fill with fresh oil to the prescribed level.
- An oil drain pump is supplied. (Ref. 11 page 11).

Fuel. — The most suitable fuel is **diesel oil**. Fill tank through filler cap. (19 page 11). Fuel level should be at least 2 cms below the filler rim in order to avoid loss of fuel through the breather hole in the filler cap.

Fuel must be carefully filtered during filling and should not contain any water in suspension. It should be remembered that impurities in the fuel are almost the only, but very frequent, cause of atomizer trouble, which leads to loss of power and heavy fuel consumption. Impurities in the fuel can also cause abnormal wear in the pump unit and atomizer.

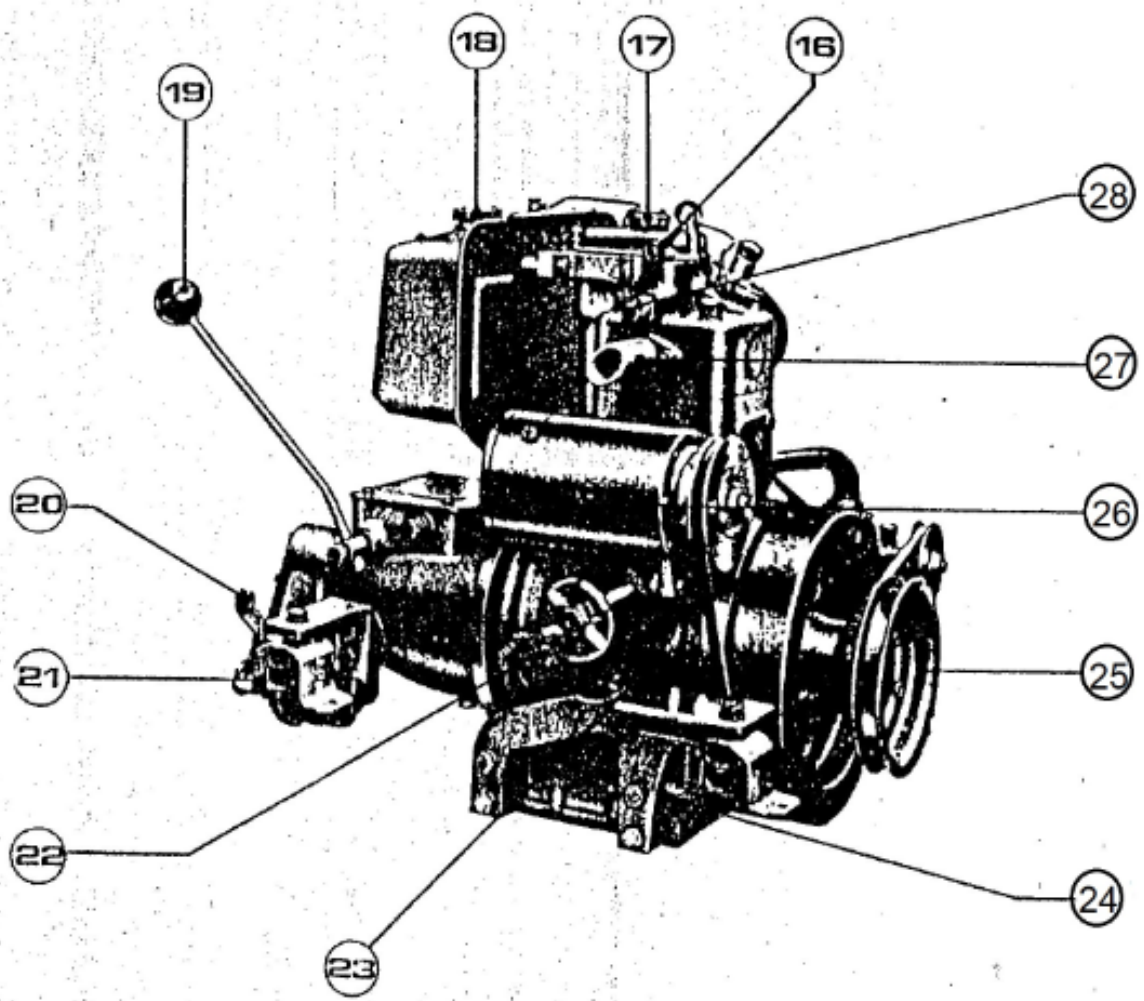
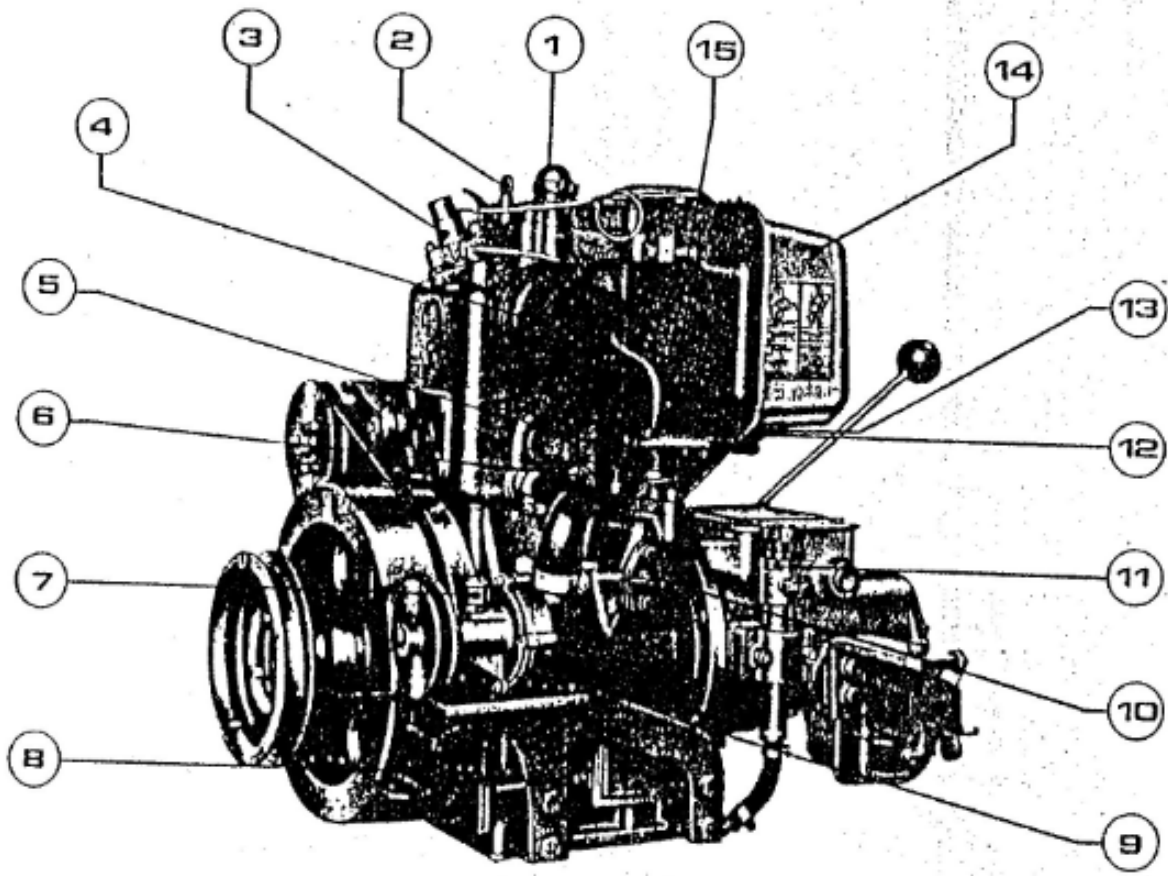
This trouble can be avoided by adopting the following system:

Fuel decanter. — It is inevitable that fuel delivered from tanker vehicles should contain impurities and particles in suspension. The only effective method of purifying large quantities of fuel is to let it stand. For this purpose, we advise a metal drum as shown in fig. 4 page 23. Tap 1) allows drainage of impurities, which settle on the bottom, whilst purified, fuel is drained from tap 2).

ARRANGEMENT OF OUTSIDE MEMBERS OF ENGINE

The photographs indicate the location of control and regulating members, connections and accessories assembled on the engine.

- 1) Starter sump plug
- 2) Eyebolt for engine lifting
- 3) Injector-holder and injector
- 4) Intake air filter
- 5) Injection pump delivery connector
- 6) Zinc plug and engine water drainage
- 7) Water pump greaser
- 8) Shock absorber on engine small end
- 9) Accelerator control lever
- 10) Fuel supplement handle and stop drive
- 11) Oil drain pump
- 12) Fuel filter disassembly bolt
- 13) Fuel filter
- 14) Fuel tank
- 15) Union for injection pump delivery pipe
- 16) Valve lifter lever
- 17) Oil supply plug
- 18) Fuel supply cap
- 19) Reversing gear engagement and disengagement lever
- 20) Propeller shaft connecting flange
- 21) Shock absorber on reversing gearbox
- 22) Oil filter
- 23) Oil level dipstick
- 24) Oil drainage plug
- 25) Starting pulley
- 26) Dynamotor
- 27) Drainage pipe connector
- 28) Engine water outlet



A) BEFORE STARTING THE ENGINE

Before starting the engine, the fuel infeed tube must be primed up to the injector in the following manner:

- Give the fuel supplement by pulling out handle (10 on page 11) without turning the handle, as shown in fig. 5 page 23. At the same time, shift the accelerator control to the middle position (slightly accelerated).
- Wind the starter rope clockwise round the pulley (25 on page 11), then pull the rope until the piston is on the compression stroke and tends to rewind the rope on the pulley.

This operation of pulling and rewinding the rope, making use of the compression of the engine and the inertia of the flywheel," primes the fuel infeed tube up to the injector. In general, when starting up for the first time (or when the engine has stopped due to lack of fuel), 7 or 8 pulls on the starter rope are necessary, i.e. until the characteristic noise of the injector in operation is heard.

(Where electric starting is fitted, it is obviously sufficient to turn on starter until the engine fires).

B) STARTING THE ENGINE BY ROPE

- a) Give fuel supplement (by pulling out handle – 10 on page 11) without turning it, as per fig. 5 page 23.
- b) Shift accelerator control to mid-position (slightly accelerated).
- c) Wind rope clockwise on pulley (25 page 11), then pull sharply for the entire length of rope to start engine.

(For subsequent starting, when the **engine is warmed up**, a sharp pull on the rope is sufficient).

C) SYSTEM FOR ELECTRIC STARTING

The standard outfit for electric starting with dynamotor as provided herein includes:

- a. the decompression control lever,
- b. the warning light.
- c. the starter key,
- d. the electric cables (Battery excluded).

For electric connections, follow fig. 17 page 29.

Note: Place the voltage regulator D) in vibration less position if possible; it is suggested to fasten it to the battery housing, preferably arranged as shown in figure, with terminals downwards.

VERY IMPORTANT: Remember to place earth connection for said regulator.

D) STARTING

To start the engine fitted with dynamotor, after preliminary operations for starting as shown on page 9 :

- 1) Put the compression on, keeping lever A) down.
- 2) Turn up key C): the engine will start running. Let it accelerate for a few seconds, then punt decompression off, leaving lever A).
- 3) After starting, leave the key, which will automatically return to the first notch. Never bring the key back to the zero position, while the engine is running: the charge check performed by warning light B) would then be switched off.

It is then very important: with running engine to keep key on first notch. With standstill engine to keep key on rest position.

- 4) Check performance of battery B) charge warning light. With running engine the light must be off. This means the dynamotor is charging the battery as required. If with running engine the light keeps being on, then dynamotor is not-charging and a plant inspection is to be effected at the earliest convenience.

WARNING: Never stop engine by shifting decompression lever A).

E) STARTING THE ENGINE IN A COLD CLIMATE

If starting is difficult because of low temperature, proceed as follows:

- a) Remove rubber plug (1 fig. 9 page 25) (marked « starter ») located on the rockerbox cover.
- b) Pour some lubricating oil of the type used in the engine into the reservoir (2 on fig. 9 page 25). The quantity of oil poured in should be about equal to the capacity of the reservoir.
- c) Close the reservoir with plug (1 fig. 9 page 25).
- d) Repeat all operations for normal starting.

F) AFTER STARTING

- Adjust engine revs by shifting the accelerator lever (9 on page 11) to the left to increase (+) and to the right to decrease (—).
- Where remote control is fitted, shift the appropriate hand lever.
- When the engine is firing, handle (10 on page 11) will automatically return to its normal running position and reduce the fuel flow to normal.

G) STOP THE ENGINE

To stop the engine, turn handle (10 on page 11) to the left (**stop**) without pulling outwards, such that the flow of fuel is shut off. Hold handle to the left until the engine stops. (Fig 8 on page 25).

If engine is not running for a long time or in a cold climate, it is advisable to drain the cooling water by loosening plug on the cylinder (6 on page 11) and let water flow.

The following checks and cleaning operations, which we recommend should be carried out with reasonable frequency, are as follows:

A) CHECK AND CLEAN THE ATOMIZER: See page 4.

B) CLEAN THE FUEL FILTER (fig. 3 page 22): We recommend that the filter be cleaned very frequently, in the following manner:

- Disconnect outfeed tube from cover 3) and empty fuel out of the tank.
- Unscrew nut 1), remove cover 3) and withdraw the filter cartridge 6).
- Dip the filter cartridge in gasoil or petrol to clean it. Replace the filter if heavily impregnated with impurities.
- Carefully wash the inside of the cover 3), then dry it with a clean rag. Ensure that gasket 4) is well seated in its place.
- Re-assemble all as stated in fig. 3 page 22.
- Reconnect the fuel outfeed tube.

C) CLEANING THE AIR INTAKE FILTER.

It is very important to clean the filter more or less frequently according to the dust content of the atmosphere in which the engine is run. **If necessary, the filter must be cleaned every day.**

To strip down the filter (fig. 14, page 28), open clips 5) and withdraw reservoir 4). Pull out the filter element 3) and wash it by dipping in kerosene or gasoil.

Remove all the oil contained in the reservoir 4), wash the reservoir with kerosene or gasoil, then refill with clean oil up to the level indicated on the internal oil level guide plate 6).

To reassemble the filter, bring the reservoir 4) up to the upper housing 1), ensure that the rubber gasket is well seated then put the clips 5) in the closed position.

D) REMOVAL OF CALCAREOUS SCALES.

Dissolve about 2% of sodium carbonate in water and filter the solution. Circulate this solution in the engine after removing the water already there and run the engine for about 30'. Change the solution for clean water and run the engine for 5', then repeat the operation with more clean water before permanent use (i.e. carry out a double rinse with fresh water).

E) RUNNING IN.

A certain running in period is necessary (besides that normally carried out by the factory) for new engines such that all mechanical parts settle down gradually. To run in the engine, run it for 50 hours, at 70% load capacity.

A) TOP DEAD CENTRE (fig. 12 page 27).

Point 2) indicates the flywheel position when the piston is at top dead centre. Point 2) is located on the engine cylinder.

When dot 3) coincides with point 2) coincides with point 2), the piston is at T.D.C.

When dot 3) coincides with point 1) pump action starts (I.P.).

The injection advance is 28 degrees equivalent to 65 mm. on the flywheel.

B) CHECKING START OF PUMP ACTION

If, at any time, the injector is renewed, the start of the Pump Action must be checked as follows:

- a) Unscrew injection pump infeed union and remove the valve (but not the valve seating) and its spring. Replace infeed union and screw up.
- b) Turn the engine slowly through the compression stroke by turning the flywheel in its normal direction of rotation: fuel will flow out of the infeed tube union.
- a) When the piston closes the cylinder intake hole, fuel will stop flowing out. This is the start of the Pump Action and must coincide with 28 degrees equivalent to 65 mm. on the flywheel, before the T.D.C.

If it is necessary to advance or retard the Pump Action, make use of the shim gaskets located under the injection pump fixing flange as follows:

- 1) Add shim gaskets to **retard** pump action.
- 2) Remove shim gaskets to **advance** pump action.

Attention. — Should it be necessary to renew the injector rocker arm, **do not** withdraw the rocker shaft which is fixed to the crankcase since its position is established at the factory in order to give the correct advance setting (fig. 7 page 27).

Should it be essential to change a worn rocker arm pin, note the marking on the pin flange: there may be the number or no marking at all.

The marks indicate that the pin with respect to flange is offcenter or that it is true.

C) CHECKING END OF PUMP ACTION.

The end of pump action is set by moving the fuel supplement handle flange, the lower bolt-hole of which is slotted.

Loosen the fastening bolts and swing the flange as required. (Fig. 6, page 24).

The following guide will serve as an out-of-works check: the pump action should be effected through 15°.

To check the end of pump action, adopt the same procedure used for checking the start of pump action. When start of pump action position has been reached, turn the flywheel slowly until Diesel fuel re-appears from the infeed tube union. The setting must be adjusted such that this point is reached about 15° **after** start of pump action.

D) ENGINE TIMING

After stripping down and overhauling the engine, re-assemble and time the camshaft with the crankshaft as indicated in fig. 10 page 26.

When the main shaft is in the **top dead centre** position of the induction stroke, set the gear markings 2) and 3) as shown in fig. 10.

E) TAPPET CLEARANCE

It is very important to frequently check the clearance between tappets and valves. This check must be effected **after the first 20 hours of running and every 15 days thereafter.**

Tappet clearance is adjusted by screwing the tappet adjustment screw in or out after first loosening the lock nut.

Clearances when the engine is cold are as follows:

Inlet 0,20 mm. Exhaust 0,20 mm.

Measurements are to be made after having brought the piston to the Top Dead Center at the end of the compression phase.

F) PISTON ASSEMBLY

An arrow F) is stamped on the crown of the piston (fig. 11 page 26).

Important, when assembling the piston, arrow F) Must be on the injection pump, i.e. pointing in the direction of rotation of the main shaft.

A) REVERSING GEAR

The reversing gear is of the planet wheel type. Directly built in the engine on the side opposite the flywheel and automatically lubricated with the same oil as the engine.

The control lever is moved towards the flywheel to obtain forward running, in the opposite direction to obtain reverse running.

B) TABLE OF PROBABLE CAUSES OF TROUBLE

Trouble	Probable Causes	Remedy
Reversing Gear Clutch slipping	Excessive play between clutch plates	Insert the special tapering punch into the centre one of the three holes on the periphery of the plate thrust-ring and push right down, causing the ball to move and release the plate thrust-ring, which must be rotated to the right (to reduce the play) still pressing on the punch. During the operation keep the outlet shaft stationary. Remove the punch and restore the locking of the plate thrust-ring. After adjustment, check the pressure on the plates,

		engaging and disengaging the clutch. Failure to adjust in good time accelerates plate wear.
	Excessive play of the brake band	After removing the cover of the reversing gear box, loosen the bolts located on the right and left of the said box. With a hook wrench unlock the right and left ring nuts located internally between the box and individual control levers; rotate the ring nuts the amount necessary to restore the play of the band (clockwise to increase it, counter-clockwise to decrease it). Take great care that the ring nut is turned exactly the same amount on the right lever and the left lever, since unequal regulation causes irrational division of the braking load, with consequent rapid wear of the bands. Lastly relock the ring nuts inside and the bolts outside the box.
Excessive heating of reversing gear oil	Thrust bearing seized	Take down and change
	Planet gear bearings seized	Take down and change

Below are some instructions for overhaul of the engine and replacement of component parts.

No consideration is given to operations common to all types of engines, such for example as valve grinding or replacement of a ball bearing, which do not require notions other than those used in automobile practice.

A) ENGINE DISASSEMBLY

After dismantling the accessory parts (tank, filter, fuel pipes, etc.), the procedure is as follows:

- 1) Dismantle the flywheel, using an extractor, which engages in the holes on the flywheel plate.
- 2) Dismantle the head and the bottom plate.
- 3) Dismantle the connecting rod, making use of a pipe wrench.
- 4) Dismantle the main bearing on the flywheel side and the plate on the distribution side, using two bolts screwed into the two holes on the edge, until they react on the crankcase.
- 5) Remove the tappets, camshaft, injection pump and regulator unit.
- 6) Take out the crankshaft, making sure the gear is not dragged on the bearing bush.

B) ENGINE OVERHAUL

B.I. • LINER WEAR

- a) If the diameter is not larger than 85.10 mm. it is only necessary to change the piston rings: in such case there will be a higher oil consumption until the new rings have adjusted themselves. It must be borne in mind that, in the event of negligent supervision, high oil consumption may be a cause of serious damage. The troubles that occur in many parts of the engine if it operates without oil even for a very

short time are in fact universally known. To avoid this it is advisable to restore the initial roughness of the liner by passing a hand wrapped with emery cloth (grain 80-100) over the inside with a suitable movement. The operation must be performed as follows (fig. 15 on page 28).

- 1) One hand is wrapped with a strip of emery cloth (grain 80-100).
 - 2) The hand is inserted in the liner and, keeping it pressed against the wall, is moved from the top to the bottom part, rotating it to the right at the same time. 3) Repeat the action, but rotating the hand in the opposite direction (i.e. to the left), so that the result is a surface with crossed lines, as can be seen in fig. 16 on page 28. The roughness of the new liner is 0,80 - 1 micron.
- b) For a diameter in excess of 85.10 mm. the liner must be bored, substituting the piston designed for the required enlargement. The piston rings will also have to be of enlarged type. Two enlargements are possible:

0,5 and 1 mm.

Hence the diameter of the ground liner may have one of two values:

$$\begin{array}{cc} 0 & 0 \\ \varnothing 85,5 + & \varnothing 86 + \\ 0,02 & 0,02 \end{array}$$

B.2. • PISTON RINGS

To carry out a check the piston rings are inserted in the bottom part of the cylinder; verify that the distance S) between the two ends, at the cut (fig. 13 on page 27), does not exceed:

0,8 mm. for the seal rings 1 mm. for the scraper ring

If such value is higher, or if the piston rings are found not to adhere perfectly to the surface of the liner on the whole of their circumference, they must be changed. Before assembling the new piston rings, carry out the check already described, bearing in mind that the distance between the two ends must be:

0,4 mm. for the seal rings 0,3 mm. for the scraper ring

If the play is found to be less, it must be brought to the right value by operating with a very fine file on the ends of the ring. We repeat that if the rings only are changed, roughness must be restored as indicated above.

B.3. • PISTON PIN • BUSHING • PISTON

The piston pin must be lightly forced into the piston, while it must have a clearance not exceeding 0.07 mm. in relation to the bushing of the connecting rod small end. If a check of any wear of the piston pin shows a larger clearance, the bushing must be changed. After replacement and boring the clearance between piston pin and hole must be 0.02-0.03 mm.

B.4. • ENGINE SHAFT

The engine shaft must be carefully washed so that its condition can be checked, and in particular the state of out-of-roundness of the connecting rod and bearing pins. Remove the closing flange of the chamber in the connecting rod pin: this chamber is the place where part of the foreign matter contained in the oil accumulates (through centrifugal force). Whenever the shaft is dismantled, this chamber and the oil inlet holes must be carefully cleaned. The maximum permissible wear limit is 0.10 mm. The diameters of the pins on the new shaft are:

Connecting rod pin

$$\begin{array}{c} 0 \\ \varnothing 42 - \\ 0,013 \end{array}$$

Flywheel side bearing

$$\begin{array}{c} 0 \\ \varnothing 40 - \\ 0,010 \end{array}$$

The engine splutters and stops	Lack of fuel	Fill up with carefully filtered diesel oil
Engine emits smoke from exhaust	Engine is overloaded	Reduce load
	The air filter is dirty	Clean the filter – Page 13
	The injection pump or the atomizer are not functioning properly	Repair or replace faulty components
Engine will not start	Fuel filter clogged	Clean filter, and if necessary the tubing
	Inlet and exhaust valves sticking	Lubricate valve guides with a few drops of naphtha
	Inlet and exhaust valves not correctly set	Set tappets to normal clearance
	Low compression (engine offers low resistance to top dead centre on compression stroke)	Valves not closing properly. Grind in valves. When refitting cylinder head tighten down bolts evenly
		Piston rings coked up or damaged and do not hold compression. Clean rings so that they turn smoothly in the piston channeling. Renew rings found in poor condition.

- 1) Fuel pipe infeed union.
- 2) Valve spring.
- 3) Infeed valve with seat and gasket.
- 4) Cylinder — Must never be substituted singly but always with piston. To take out, tap with a piece of fibre or brass.
- 5) Cylinder position fixing notch.
- 6) Cylinder position dowel. Must enter cylinder notch.
- 7) Upper spring cap.
- 8) Rocker stop stud.
- 9) Adjustment coupling.
- 10) Rocker spring.
- 11) Piston — Do not replace without new cylinder.
- 12) Lower spring cap.
- 13) Rocker block.
- 14) Split ring holding rocker stop stud.
- 15) Slide adjustment rod up to middle position.
- 16) The mark etched on the adjustment rod must coincide with the two dots etched under the coupling.
- 17) The mark on the coupling must coincide with the mark on the piston intake vane.
- 18) Adjustment Rod.
- 19) Remove ring.
- 20) Push rocker block upwards.

- 21) And withdraw stop stud.
- 22) Outer roller.
- 23) Inner roller.
- 24) Pin.

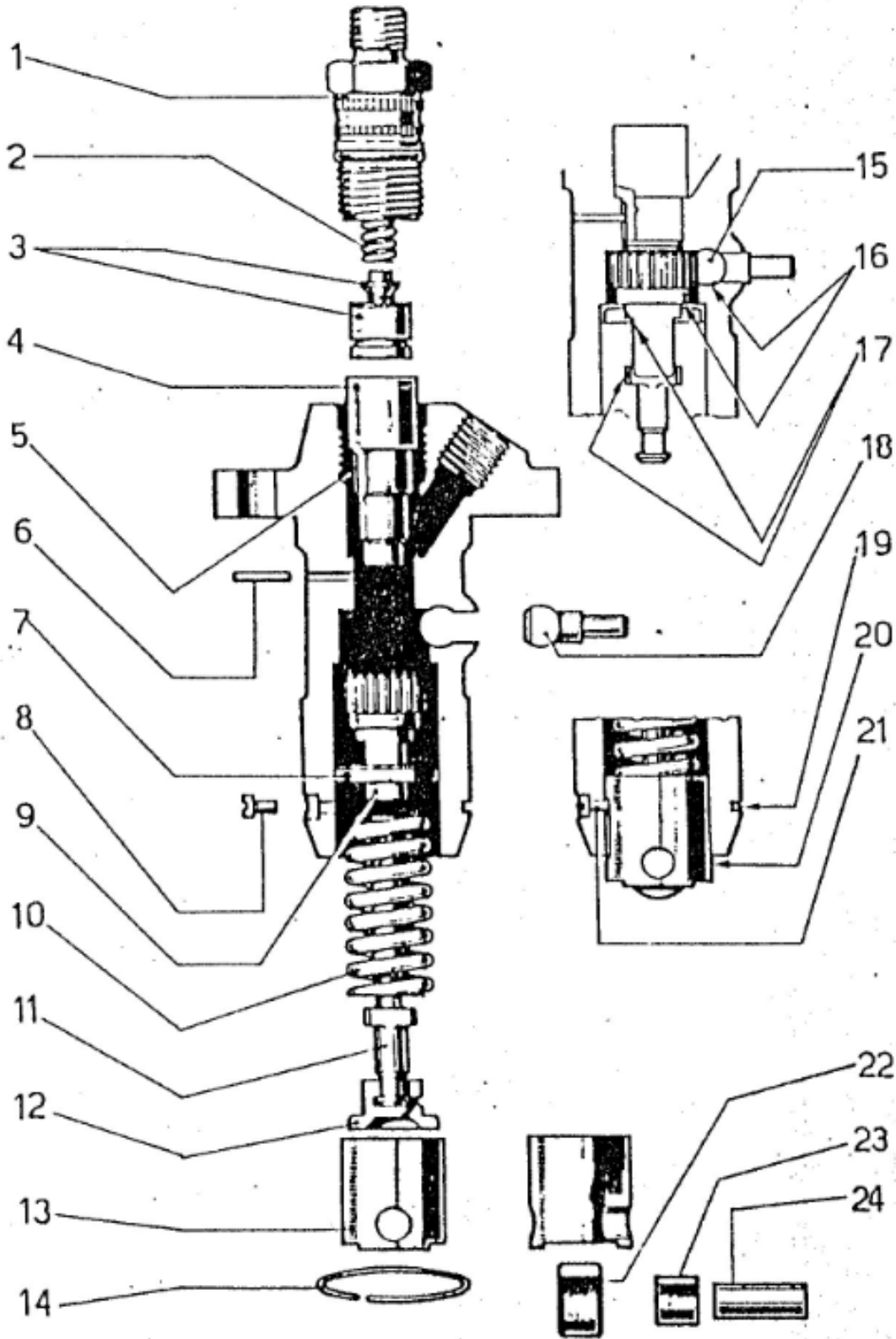


Fig. 1 – Instruction for stripping and re assembling the injection pump

- 1) Spring housing threaded locking ring
- 2) Spring seating
- 3) Spring housing screw
- 4) Injector block housing
- 5) Pressure rod
- 6) Injector locking ring nub
- 7) Spring for pressure rod
- 8) Fuel return union
- 9) Fuel return union locking bolt
- 10) Injector needle
- 11) Injector block

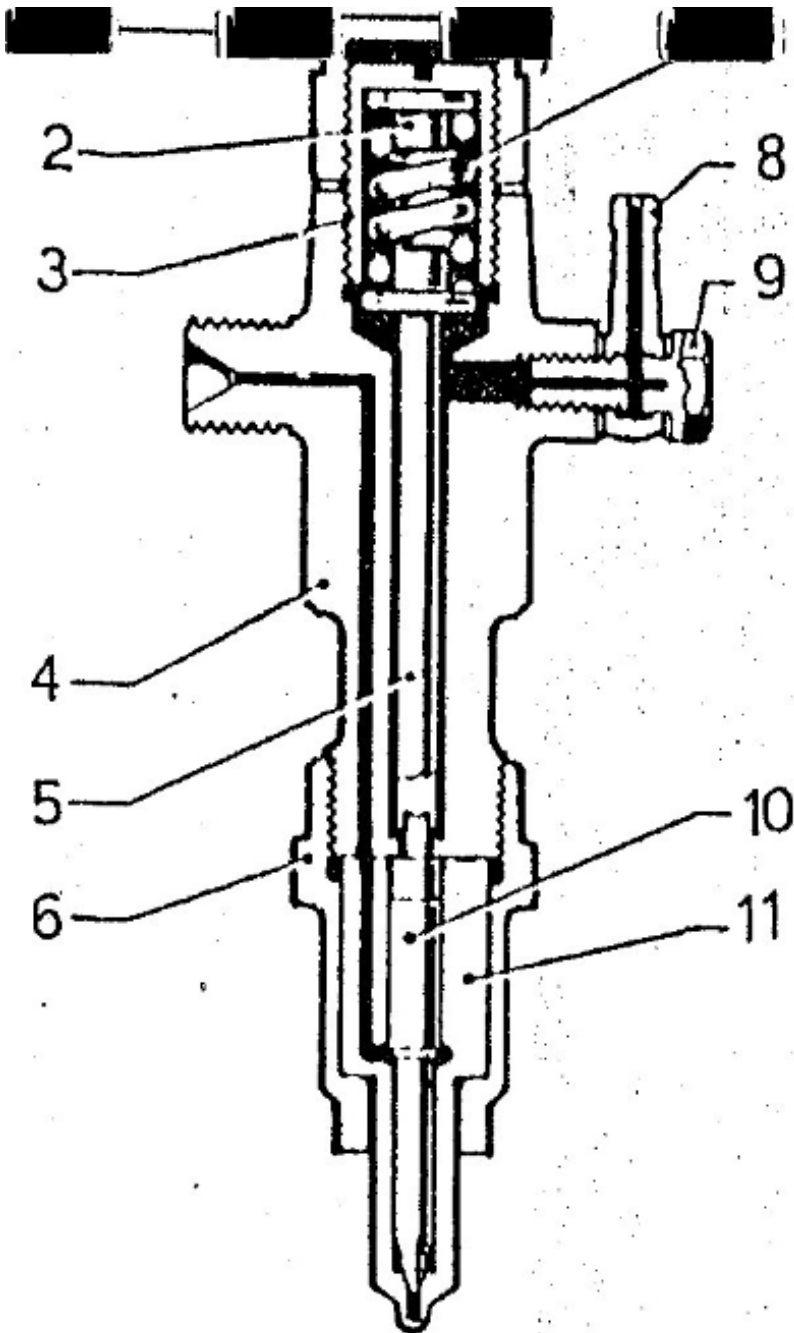


Fig. 2 – Section of injector and injector block

- 1) Filter housing bolt
- 2) Washer for lock nut
- 3) Filter cover
- 4) Cover gasket
- 5) Seal ring
- 6) Filter cartridge
- 7) Seal ring
- 8) Spring cup
- 9) Spring

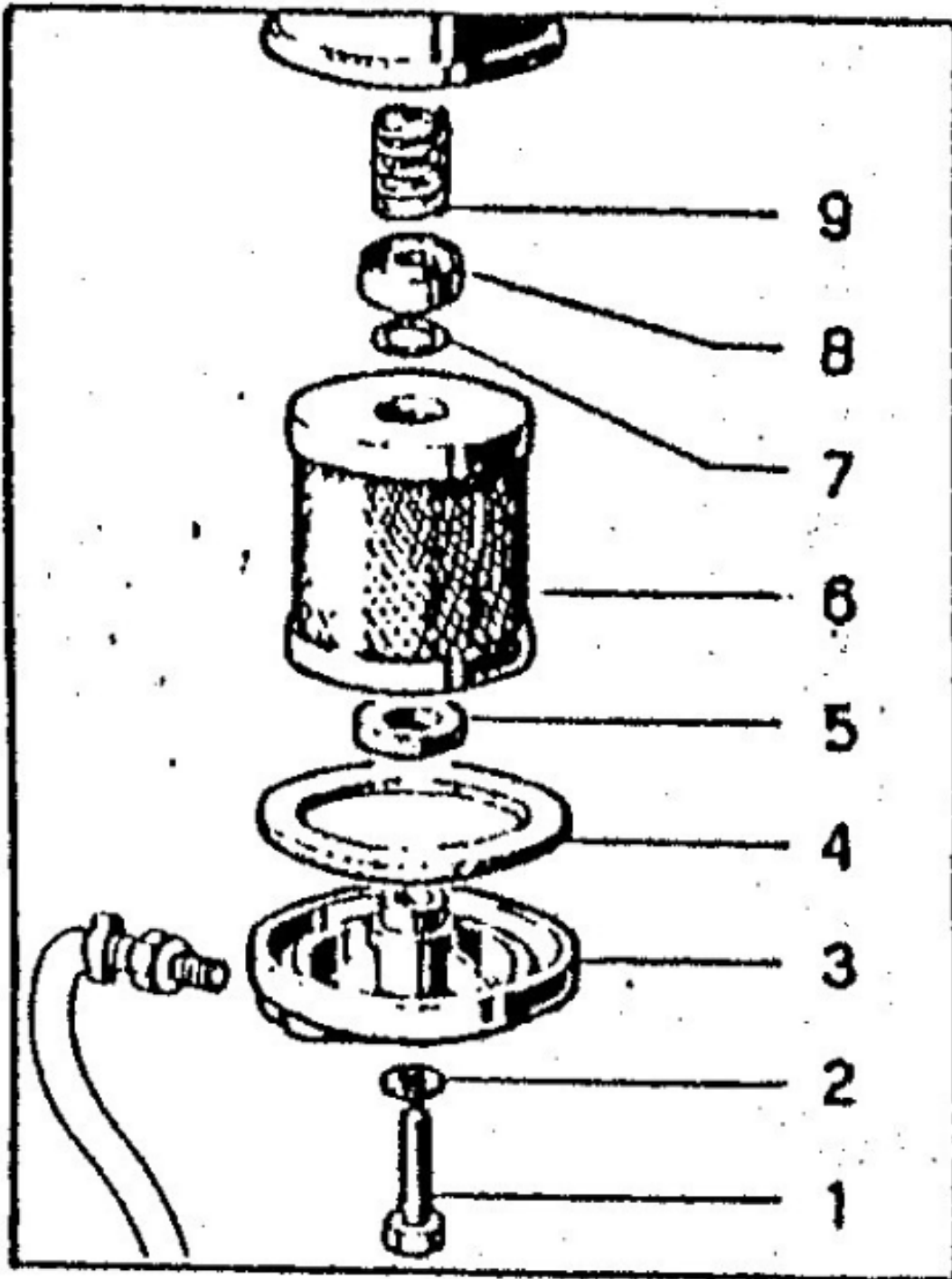


Fig. 3 – Fuel Filter

- 1) Drainage tap
- 2) Purified fuel tap

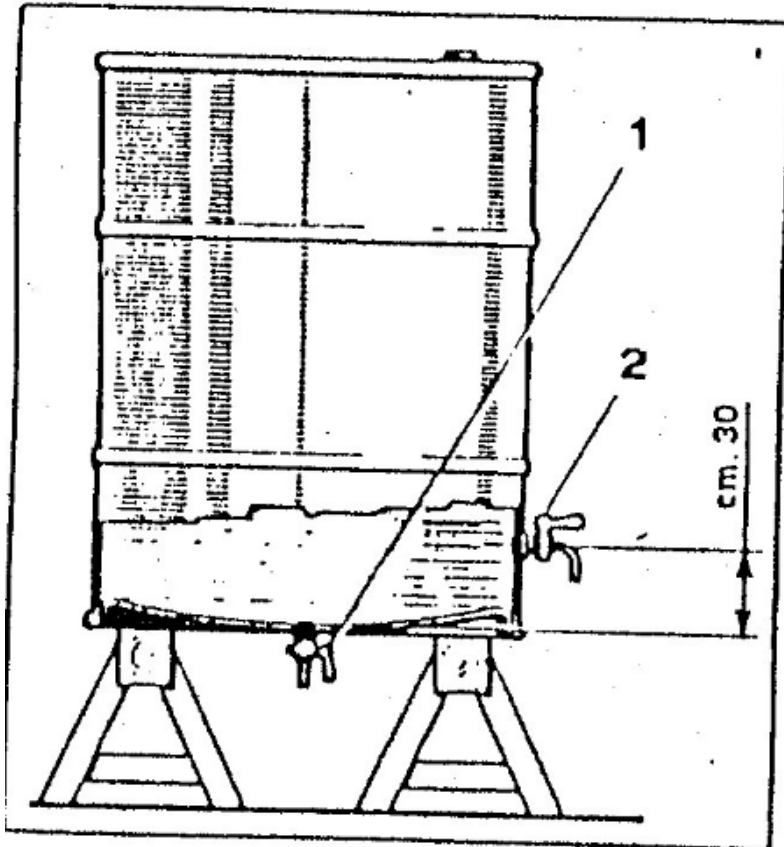


Fig. 4 – Fuel decanter tank

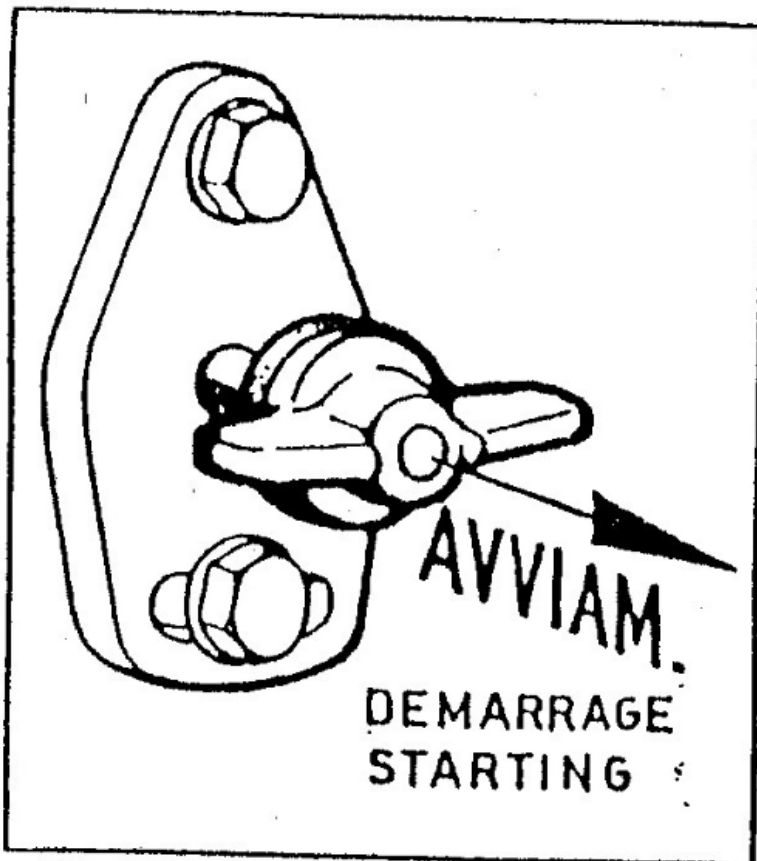


Fig. 5 – Starting – Pull out handle to obtain fuel supplement

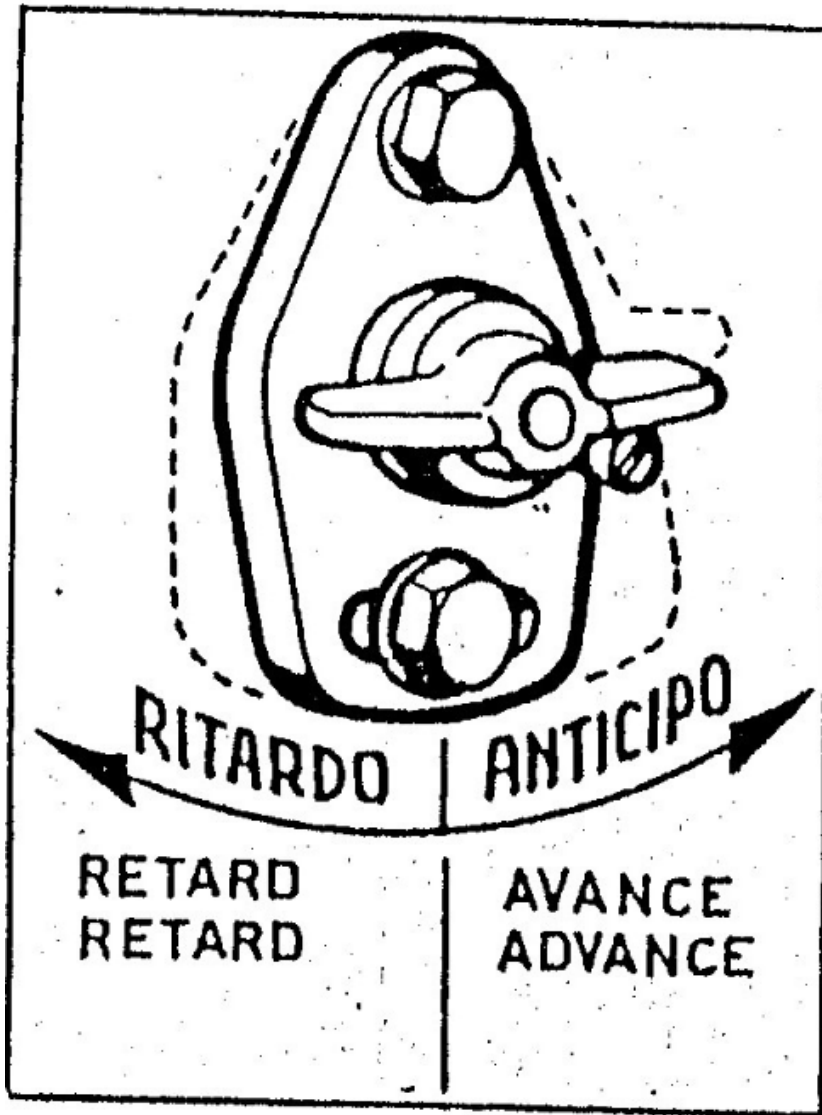


Fig. 6 – Setting end of pump action

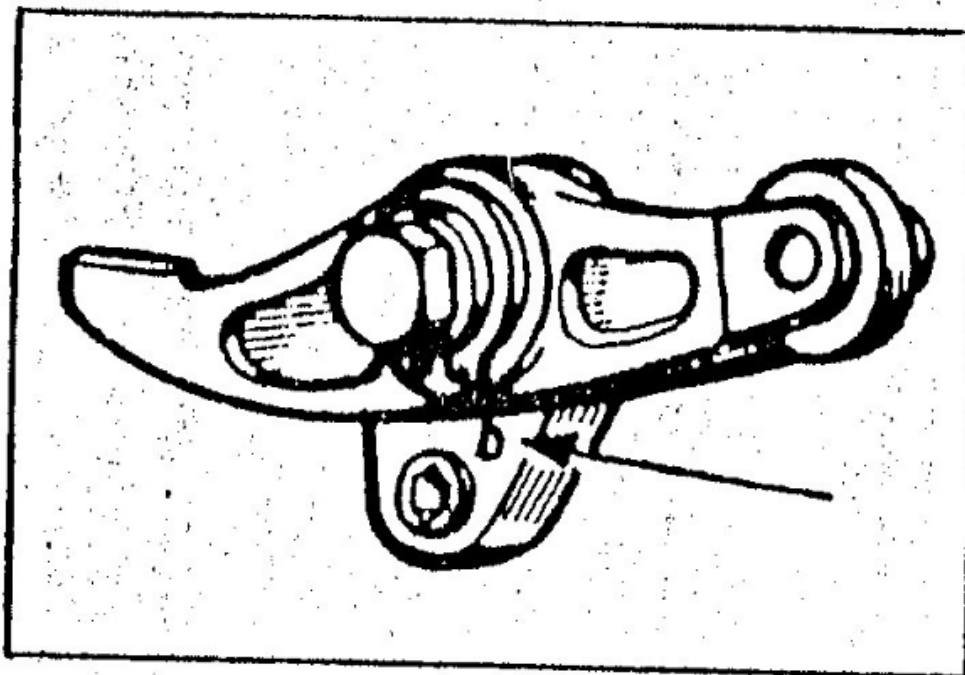


Fig. 7 – Injector rocker shaft

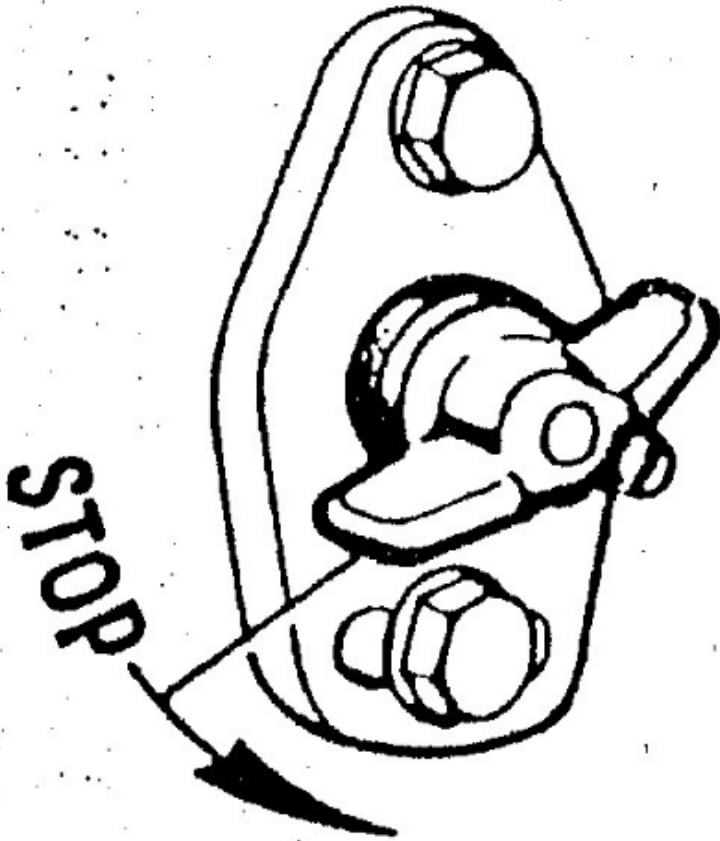


Fig. 8 – Stop Control – Turn handle to left without pulling outwards

- 1) Rubber plug for start reservoir
- 2) Starter reservoir

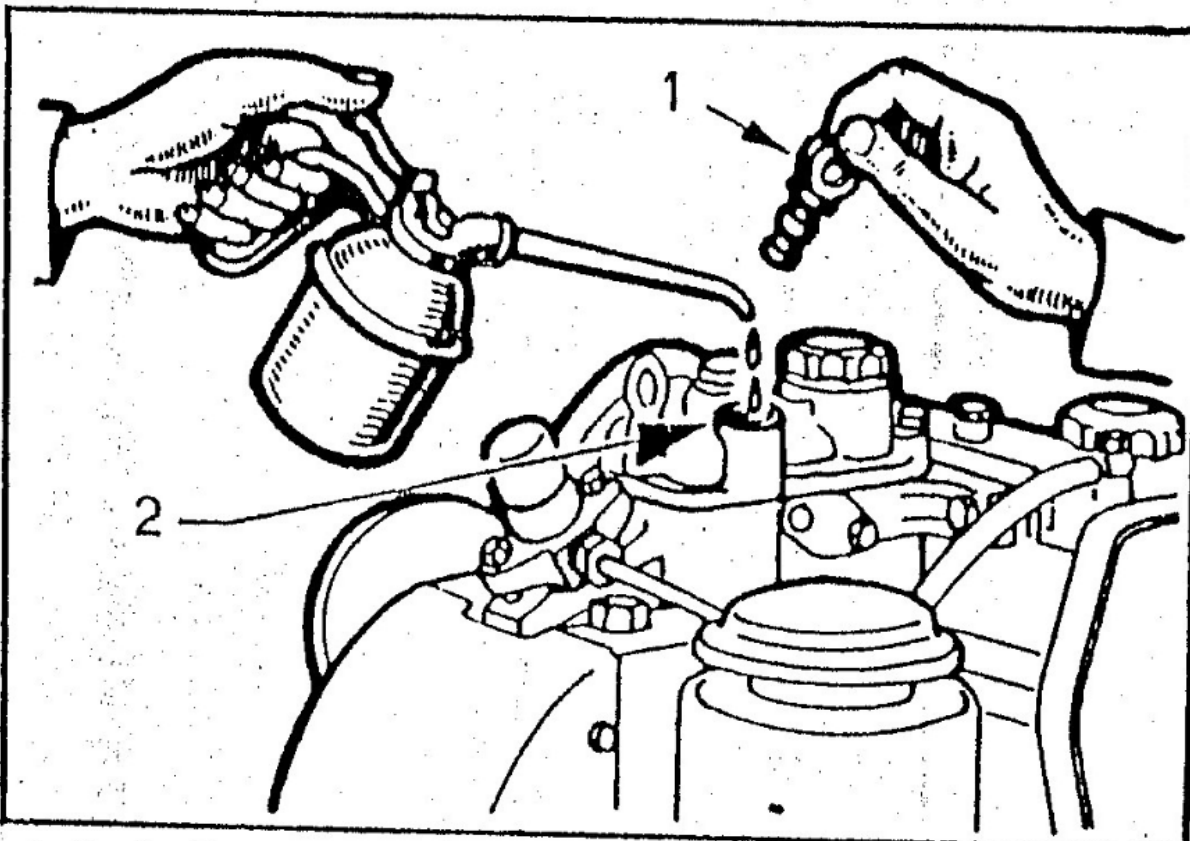


Fig. 9 – Preparation for starting in cold climate

- 1) Main shaft
- 2) Reference mark on main shaft gear
- 3) Reference mark on camshaft gear
- 4) Camshaft
- 5) Oil pump gear
- 6) Speed governor gear

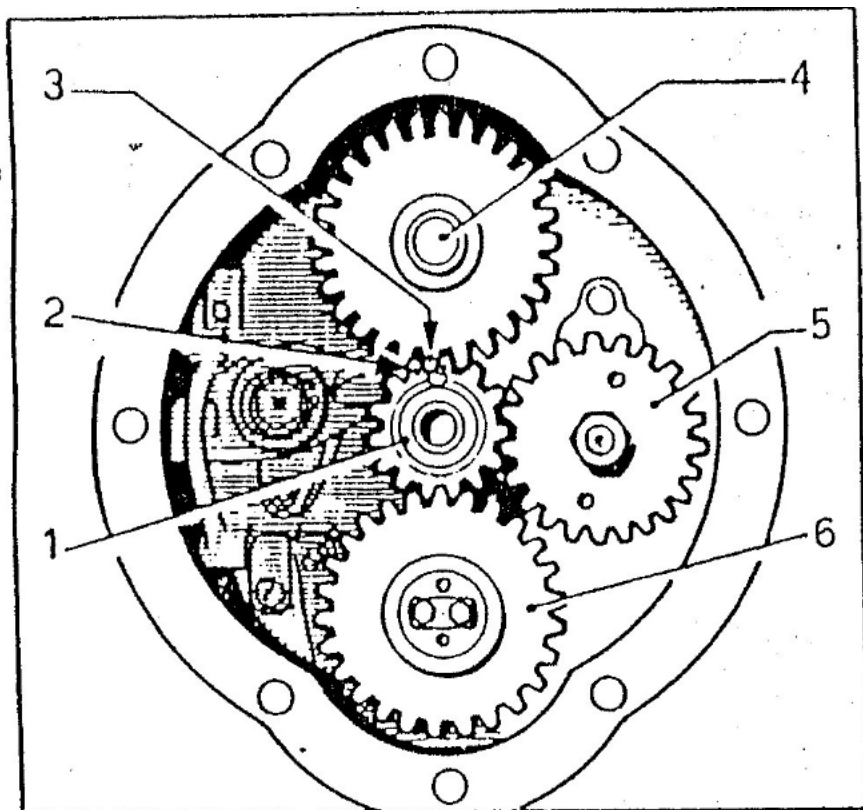


Fig. 10 – Engine timing reference marks

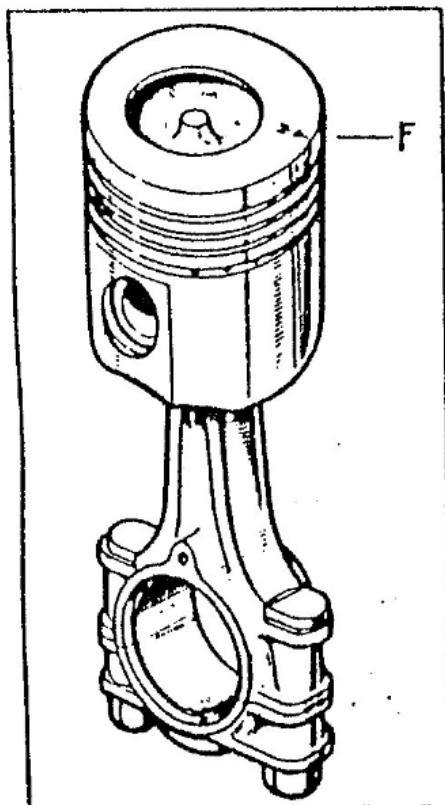


Fig. 11 – Piston assemblage

- 1) Pump action starts (I.P.)
- 2) Top dead centre (T.D.C.)
- 3) Flywheel reference mark

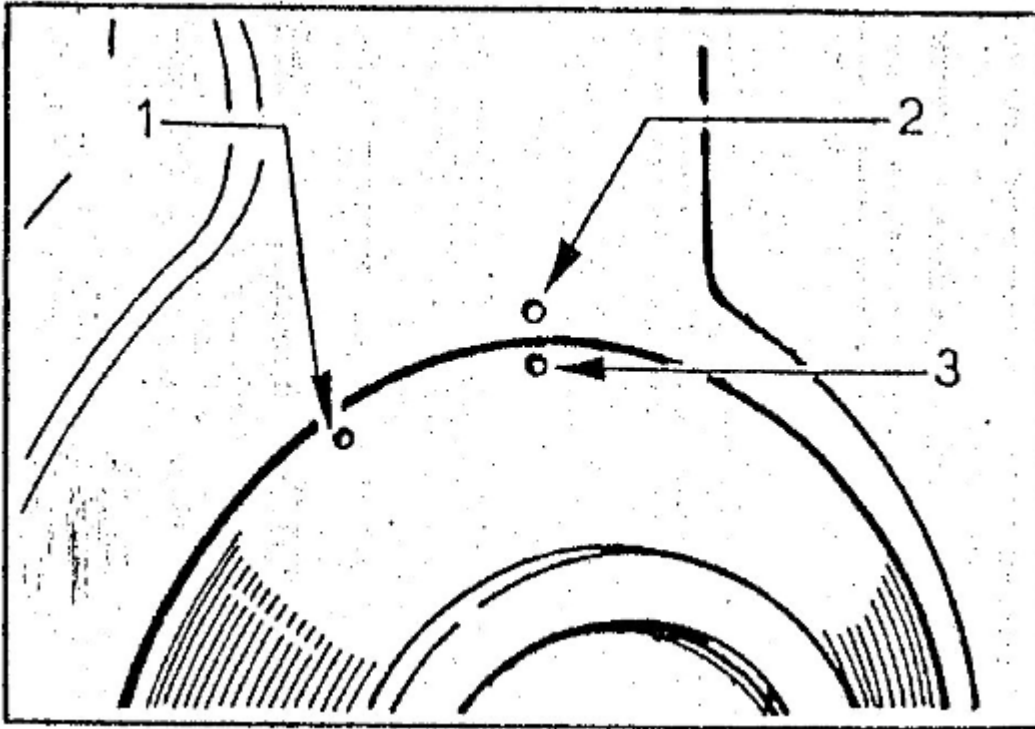


Fig. 12 – T.D.C. and pump action reference marks

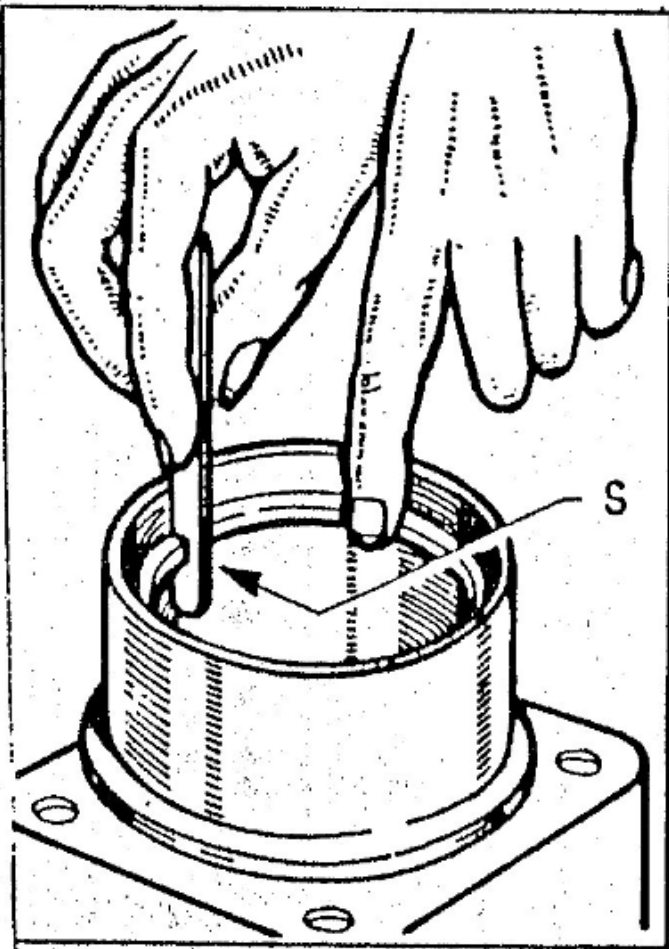


Fig. 13 – Check of the piston rings clearance

- 1) Filter housing
- 2) Gasket
- 3) Filter element
- 4) Oil reservoir
- 5) Locking book
- 6) Oil level guide

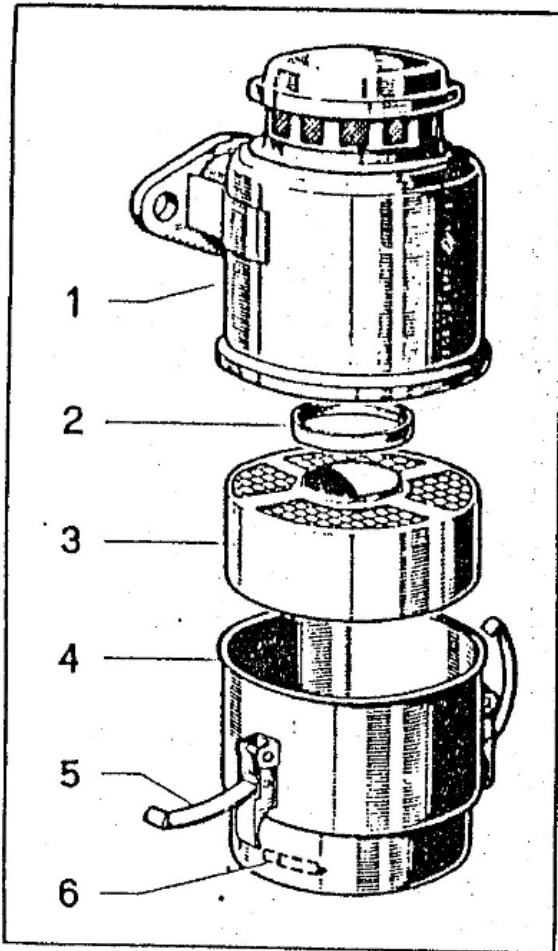


Fig. 14 – Stripping the air intake filter

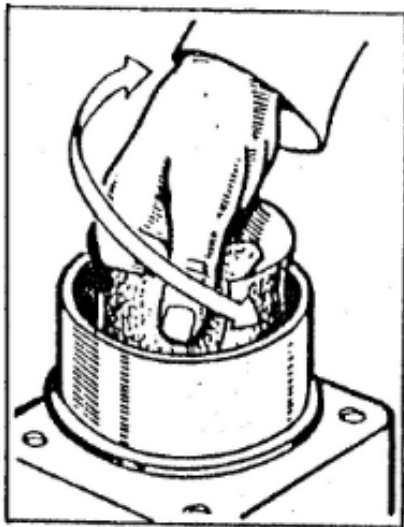


Fig. 15

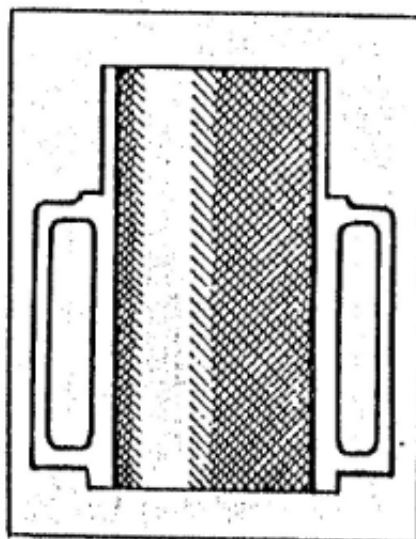


Fig. 16

- A) Decompression control lever
- B) Battery charge warning light
- C) Key starter switch
- D) Voltage regulator
- E) Battery (12V – 50Ah)
- F) Dynamotor

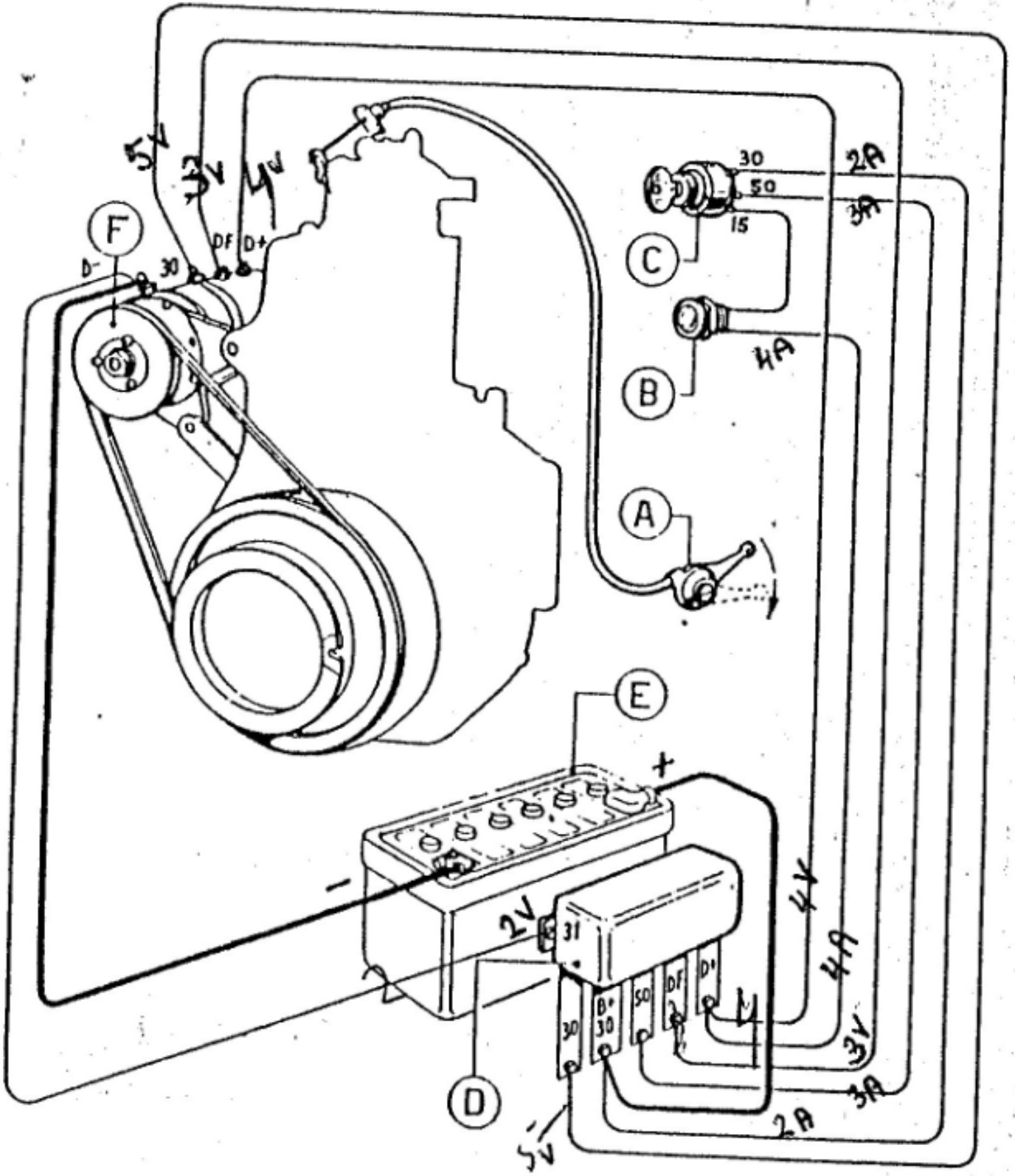


Fig. 17- Dynamotor Electric Starter Diagram 12V

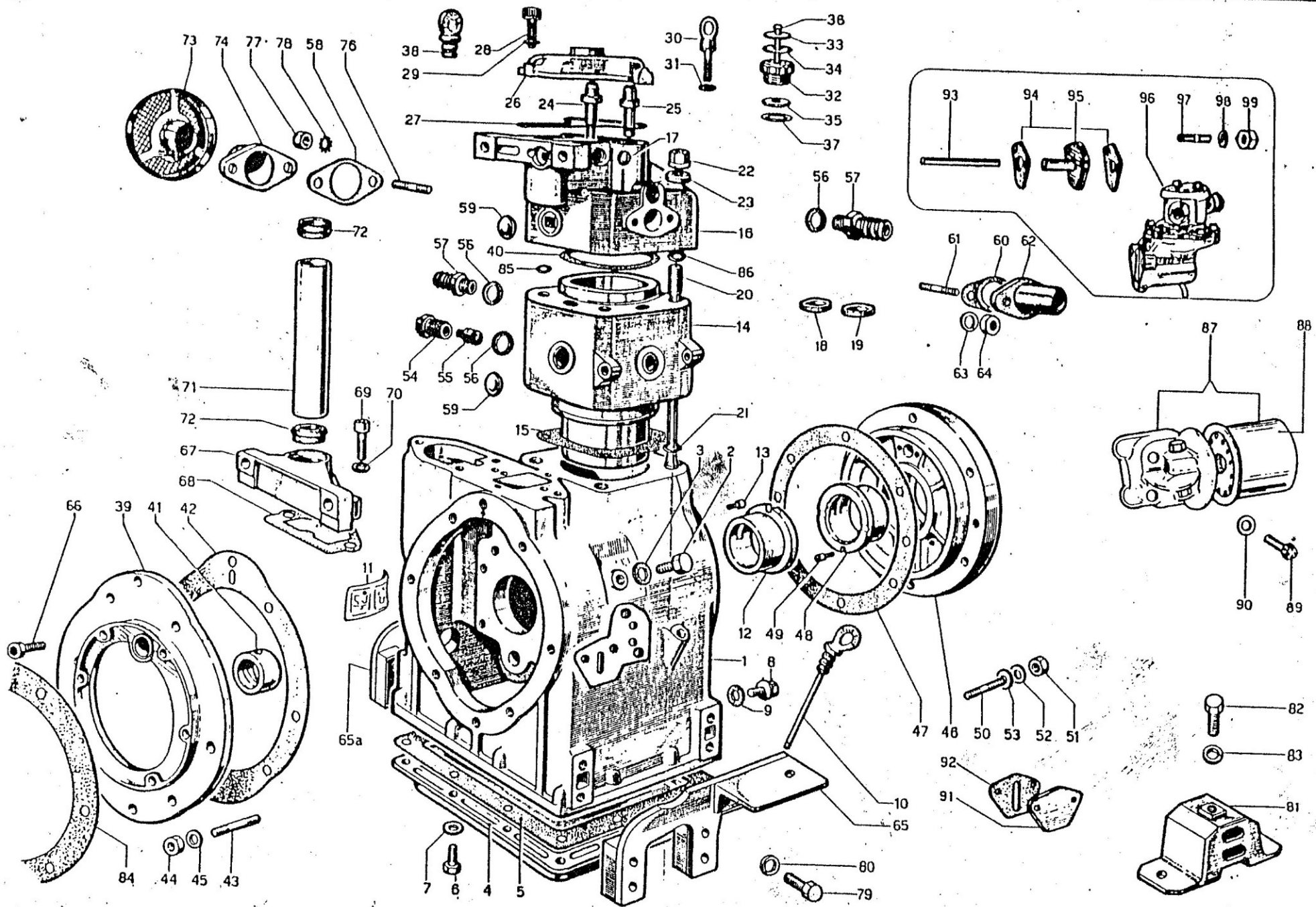


TAVOLA
TABLE 1

Rif. Rif. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÄ QUANTITY	
			AL 185	AL 186
1	283-1511-87	Basamento motore.	1	1
2	1-1770-01	Bullone 8x12 UNI5739 chiusura foro sul basamento.	1	1
3	200-4670-03	Guarnizione per bullone.	1	1
4	273-6645-67	Portina di fondo.	1	1
5	271-4600-90	Guarnizione per portina di fondo.	1	1
6	202-1770-02	Bullone 8x16 UNI5739 fissaggio portina di fondo.	12	12
7	1-7665-07	Rondella elastica per bullone.	12	12
8	26-8965-01	Teppo scarico olio portina.	1	1
9	260-4670-13	Guarnizione per teppo.	1	1
10	271-1400-18	Asta livello olio.	1	1
11	270-3334-35	Decalcomania Istruzione motore.	1	1
12	283-1610-66	Bronzina di banco lato presa di moto.	1	1
—	283-1610-67	Bronzina di banco - unica minorazione mm. 1.	1	1
13	271-8460-09	Spina filettata bloccaggio bronzina.	1	1
14	AL 17427	Cilindro motore.	1	1
15	AL 17519/A	Guarnizione per cilindro (SP 1/10).	1	1
15a	AL 17519/B	Guarnizione per cilindro (SP 3/10).	1	1
16	AL 17424	Testa motore.	1	1
17	260-8990-07	Teppo ad espansione chiusura foro perno bilancieri.	1	1
18	283-8000-36	Sede valvola aspirazione.	1	1
19	283-8000-37	Sede valvola scarico.	1	1
20	AL 18169	Prigioniero fissaggio testa.	4	4
21	OR 3050	Anello di tenuta tra cilindro e carter.	4	4
22	273-3206-13	Dado fissaggio testa e cilindro.	4	4
23	10,4UNI1734	Rondella per dado testata.	4	4
24	271-4845-06	Guida valvola aspirazione.	1	1
25	271-4845-17	Guida valvola scarico.	1	1
26	283-2125-32	Cappello per scatola bilancieri.	1	1
27	283-4400-12	Guarnizione per cappello (SP 5/10).	1	1
27a	283-4400-13	Guarnizione per cappello (SP 2/10).	1	1
27b	283-4400-14	Guarnizione per cappello (SP 3/10).	1	1
28	260-9730-27	Vite a brugola 8x25UNI1283 fissaggio a cappello.	1	1
29	1-7565-07	Rondella elastica per vite.	1	1
30	271-4260-04	Golfaro di sollevamento.	1	1
31	1-7565-07	Rondella elastica per golfaro.	1	1
—	270-9050-21	Teppo sfiatatoio completo (Tav. 1 - Fig. dal 32 al 37).	1	1
32	70-9050-11	Teppo sfiatatoio.	1	1
33	250-1210	Lamiera per valvola sfiatatoio.	1	1
34	260-9625-04	Valvola sfiatatoio.	1	1
35	70-5085-10	Lamiera paraolio per teppo.	1	1
36	70-7370-11	Ribattino fissaggio lamiera teppo.	1	1
37	406-1200-14	Anello tenuta per teppo.	1	1
38	270-9055-03	Teppo per starter.	1	1
39	AL 17464	Coperchio attacco invertitore.	1	1
40	AL 17456	Guarnizione per testata e cilindro.	1	1
41	AL 17520	Boccola sul coperchio attacco invertitore.	1	1
42	271-4600-01	Guarnizione per coperchio.	1	1
43	M8x22UNI15911	Prigioniero fissaggio invertitore.	5	5
44	M8UNI15587	Dado per prigioniero.	5	5
45	REO 8	Rondella elastica per dado.	5	5
46	273-8675-74	Supporto cuscinetto albero a gomito.	1	1
47	271-4600-09	Guarnizione supporto cuscinetto.	1	1
47a	4700-77	Guarnizione supporto cuscinetto (SP 1/10).	1	1
48	271-1610-23	Bronzina di banco lato volano.	1	1
—	271-1610-24	Bronzina di banco lato volano - unica minorazione mm. 1.	1	1
49	271-8460-09	Spina filettata bloccaggio bronzina.	1	1

TAVOLA
TABLE

Rif. Rif. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÄ QUANTITY	
			AL 185	AL 186
50	271-6780-43	Prigioniero M8x1,25 fissaggio supporto.	5	5
50a	23-6780-09	Prigioniero fissaggio supporto (parte superiore).	1	1
51	1-3240-18	Dado BUNI5588 per fissaggio supporto.	6	6
52	1-7565-07	Rondella elastica per dado.	6	6
53	45-7625-12	Rondella piana per dado.	6	6
54	AL 17529	Teppo porta zinco motore.	1	1
55	AL 17530	Zinco motore.	1	1
56	3205/4	Guarnizione per teppo.	1	1
57	25LA 10545	Ricordo entrata acqua.	1	1
58	271-4500-67	Guarnizione per filtro aria.	1	1
59	SDB 4050	Tappi ad espansione sul cilindro e testata.	6	6
60	283-4500-87	Guarnizione per marmitta scarico.	1	1
61	M8x18UNI15911	Vite prigioniera fissaggio flangia scarico.	2	2
62	6504	Flangia attacco tubo scarico.	1	1
63	REO 8	Rondella elastica.	2	2
64	M8UNI15587	Dado per detto.	2	2
65	AL 18343	Piede fissaggio motore (sinistro).	1	1
65a	AL 18342	Piede fissaggio motore (destra).	1	1
66	8x20UNI15931	Vite a brugola fissaggio coperchio.	7	7
67	273-4840-07	Guida per tubo protezione aste punterle.	1	1
68	273-4535-12	Guarnizione per guida protezione.	1	1
69	260-9730-27	Vite a brugola 8x25UNI15931 fissaggio guida.	2	2
70	1-7565-07	Rondella elastica per vite.	2	2
71	273-9520-19	Tubo protezione aste punterle.	1	1
72	70-4740-17	Guarnizione per tubo protezione aste punterle.	2	2
73	18391	Filtro aria.	1	1
74	AL 17545	Flangia attacco filtro aria.	1	1
76	M8x18UNI15911	Vite prigioniera fissaggio flangia.	2	2
77	M8UNI15587	Dado per vite.	2	2
78	REO 8	Rondella elastica.	2	2
79	M10x50UNI15737	Vite fissaggio piede	8	8
80	A10,4UNI1751	Rondella per detto.	8	8
81	18365	Supporto antivibrante.	2	2
82	M10x25UNI15739	Bullone fissaggio ammortizzatore.	2	2
83	A10,5UNI1751	Rosetta per detto.	2	2
84	7033	Guarnizione tra portina e invertitore.	1	1
85	OR 2043	Anello di tenuta tra cilindro e testata.	4	4
86	OR 112	Anello di tenuta sul prigioniero tra cilindro e testata.	4	4
87	FOL 585/OMMI	Filtro olio completo.	1	1
88	FT/4701	Cartuccia filtro olio.	1	1
89	M8x25UNI15740	Bullone fissaggio filtro olio.	2	2
90	8,4UNI1734	Rondella per detto.	2	2
91	15417	Coperchietto.	1	1
92	15418	Guarnizione per coperchietto.	1	1
93	271-6495-99	Pistoncino per pompa alimentazione.	1	1
94	255-4580-08	Guarnizione per pompa alimentazione (SP 10/10).	1	1
94a	270-4580-33	Guarnizione per pompa alimentazione (SP 8/10).	1	1
94b	270-4580-32	Guarnizione per pompa alimentazione (SP 5/10).	1	1
95	271-8901-80	Supporto per pistoncino.	1	1
96	6416-6585-07	Pompa alimentazione.	1	1
97	236-6780-12	Prigioniero fissaggio pompa alimentazione.	2	2
98	250-7555-07	Rondella elastica.	2	2
99	1-3240-18	Dado per prigioniero.	2	2
—	283-8180-33	Serie guarnizioni.	1	1

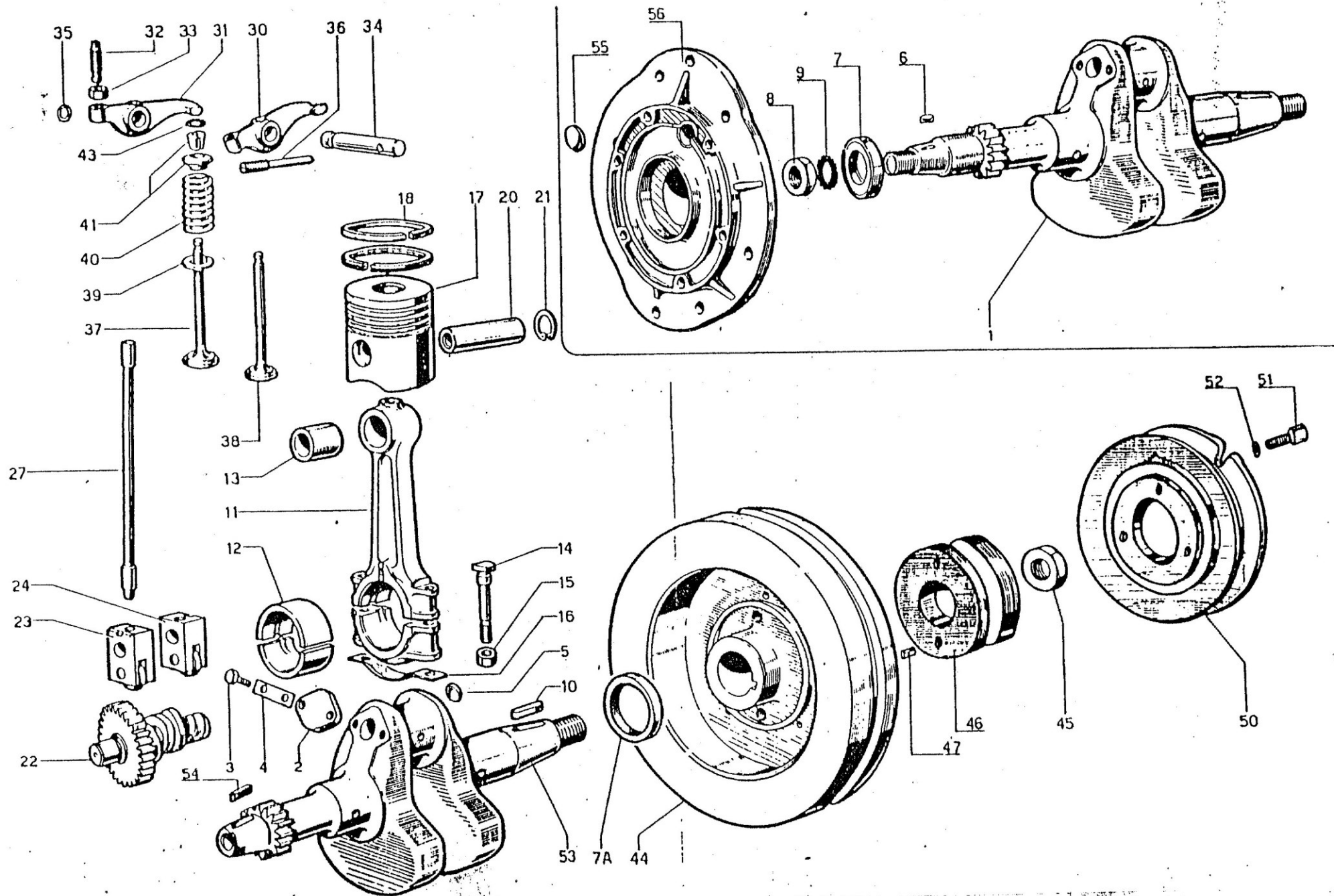


TAVOLA
TABLE 2

Rif. Réf. Ref.	Matricola ✓ Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	273-1050-62	Albero a gomito (versione Industriale).	1	—
1	292-1051-04	Albero a gomito (versione Industriale).	—	1
2	271-9000-13	Tappo per foro lubrificazione.	1	1
3	260-1755-01	Bullone 5x8UNI5739 per fissaggio tappo.	2	2
4	271-6330-48	Plastrina di sicurezza per bullone.	1	1
5	47-8990-08	Tappo ad espansione Ø 16 per albero.	1	1
6	70-2280-46	Chiavetta per albero Industriale lato distribuzione.	1	1
7	271-1210-71	Anello Angus 47x30x6 per albero a gomito Industriale.	1	1
7a	271-1210-76	Anello paraolio Gallino 40x60x10 rigatura destra.	1	1
—	271-1210-84	Anello paraolio Gallino minorato mm. 5/10.	1	1
8	11-3260-14	Dado 16UNI5509 per albero a gomito lato presa di moto.	1	1
9	25-7540-10	Rondella dentellata per dado.	1	1
10	291-2280-56	Chiavetta per volano.	1	1
11	271-1525-27	Biella.	1	1
—	271-1525-48	Biella (bronzina di testa 1ª minorazione — mm. 0,25).	1	1
—	271-1525-49	Biella (bronzina di testa 2ª minorazione — mm. 0,50).	1	1
12	271-1640-27	Bronzina testa di biella.	1	1
—	271-1640-28	Bronzina testa di biella (1ª minorazione — mm. 0,25).	1	1
—	271-1640-29	Bronzina testa di biella (2ª minorazione — mm. 0,50).	1	1
13	271-1630-07	Bronzina piede di biella.	1	1
14	271-1860-08	Bullone fissaggio cappello biella.	2	2
15	271-3240-17	Dado M8x1UNI5587 per fissaggio cappello di biella.	2	2
16	271-6330-12	Plastrina di sicurezza per dadi.	1	1
17	283-6501-44	Pistone.	1	—
—	283-6501-45	Pistone (1ª maggiorazione + mm. 0,50).	1	—
—	283-6501-46	Pistone (2ª maggiorazione + mm. 1).	1	—
17	292-6501-73	Pistone.	1	—
—	292-6501-74	Pistone (1ª maggiorazione + mm. 0,50).	—	1
—	292-6501-75	Pistone (2ª maggiorazione + mm. 1).	—	1
18	283-8210-55	Serie segmenti.	1	1
—	283-8210-56	Serie segmenti (+ mm. 0,50).	1	1
—	283-8210-57	Serie segmenti (+ mm. 1).	1	1
20	271-8480-09	Spinnotto pistone.	1	1
21	271-1240-19	Anello Seeger Ø 23 per tenuta spinnotto.	2	2
22	291-1010-60	Albero a camme.	1	1

TAVOLA
TABLE 4

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 11
23	271-4807-02	Punteria comando valvola scarico.	1	1
24	271-4807-01	Punteria comando valvola aspirazione.	1	1
27	271-1410-12	Asta punteria.	1	1
—	283-4330-20	Gruppo bilancieri completo (Tav. 2 Fig. dal 30 al 36).	2	2
30	283-1540-75	Bilanciere di scarico.	1	1
31	283-1540-74	Bilanciere di aspirazione.	1	1
32	270-9850-02	Vite registro bilanciere.	1	1
33	1-3240-10	Dado 7UNI5587 per vite registro bilancieri.	2	2
34	283-6045-25	Perno per bilancieri.	2	2
35	913-1200-28	Anello OR 112 per tenuta perno.	1	1
36	283-9020-75	Vite bloccaggio perno bilancieri.	1	1
37	283-9652-17	Valvola aspirazione.	1	1
38	283-9652-27	Valvola scarico.	1	1
39	271-3430-19	Dischetto per molla valvola.	1	1
40	271-5755-05	Molla valvola.	2	2
41	271-6410-17	Piatello con semiconi.	2	2
43	285-2135-68	Anello di tenuta per valvola.	2	2
44	AL 17892	Volano motore.	1	1
45	70-3260-56	Dado bloccaggio volano.	1	1
46	AL 18017	Puleggia sul volano comando pompe acqua.	1	1
47	6x10UNI11707	Spina di riferimento.	2	2
50	AL 17878	Puleggia per avviamento a strappo.	1	1
51	M8x22UNI5931	Vite a brugola fissaggio puleggia.	3	3
52	8,4UNI1751	Rondella per detto.	3	3
53	271-1050-40	Albero a gomito (versione autotrazione e marina).	1	1
—	292-1051-13	Albero a gomito (versione autotrazione e marina).	—	1
54	291-2280-49	Chiavetta per albero a gomito lato distribuzione (versione agricola).	1	1
55	284-8990-08	Tappo ad espansione per foro albero a camme.	1	1
56	271-6645-61	Portina basamento lato distribuzione.	1	1

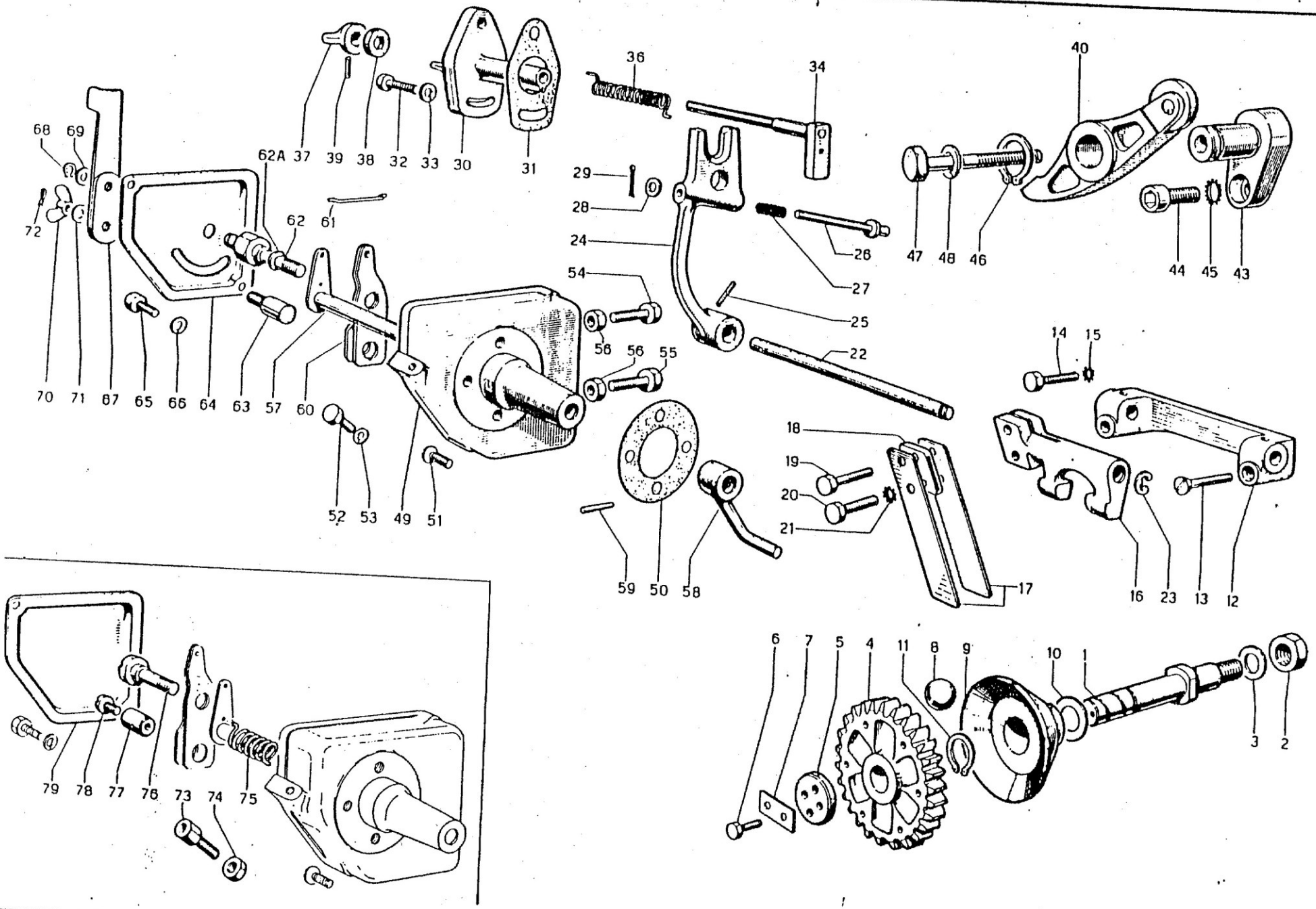


TAVOLA
TABLE 3

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	271-6130-16	Perno per Ingranaggio regolatore.	1	1
2	3-3240-33	Dado 10UNI5508 per fissaggio perno.	1	1
3	206-7625-19	Rondella piana per dado.	1	1
4	270-4910-05	Ingranaggio regolatore.	1	1
5	270-6370-38	Piastrina di rasamento per Ingranaggio.	1	1
6	428-1750-01	Bullone 4x0.7 per fissaggio piastrina.	2	2
7	270-6275-38	Piastrina di fermo per bulloni.	1	1
8	25-8245-11	Sfera 9/16" per regolatore.	6	6
9	270-2085-29	Campana regolatore.	1	1
10	270-7700-69	Rondella di protezione mozzo campana regolatore.	1	1
11	250-1240-06	Anello Seeger (alb. Ø 14) sul perno Ingranaggio regolatore.	1	1
12	270-8615-20	Supporto perno regolatore.	1	1
13	304-9800-13	Vite 6x35UNI6110 per fissaggio supporto.	1	1
14	260-1760-12	Bullone 6x35UNI5737 per fissaggio supporto.	1	1
15	203-7540-04	Rondella dentellata per bullone.	1	1
16	270-3945-27	Forcella comando regolatore.	1	1
17	270-5655-05	Molla regolatore.	2	2
18	270-1557-21	Bloccchetto distanziale per molla regolatore.	1	1
19	45-1755-04	Bullone 5x18UNI5739 fissaggio superiore molla.	1	1
20	238-1755-02	Bullone 5x12UNI5739 fissaggio inferiore molla.	1	1
21	250-7555-03	Rondella elastica per bullone.	2	2
22	270-6140-13	Perno per leva regolatore.	1	1
23	260-1165-06	Anello Benzing (alb. Ø 8) sul perno.	1	1
24	283-4182-06	Leva comando portata pompa iniezione.	1	1
25	209-8420-12	Spina conica bloccaggio leva.	1	1
26	283-6230-92	Pernetto per dispositivo correttore coppia.	1	1
27	283-5800-86	Molla per correttore coppia.	1	1
28	270-7625-02	Rondella piana per tenuta molla.	1	1
29	200-2800-02	Copiglia per tenuta perno.	1	1
—	271-4875-02	Supplemento combustibile e stop completo (Tav. 3: Fig. 30 - dal 34 al 39).	1	1
30	270-8615-23	Supporto alberino supplemento nafta.	1	1
31	270-4700-70	Guarnizione supporto alberino (Sp. 5/10).	1	1
31a	270-4700-71	Guarnizione supporto alberino (Sp. 10/10).	1	1
32	1-1760-05	Bullone fissaggio supporto alberino.	2	2
33	70-7625-62	Rondella piana per bullone.	2	2
34	271-2015-23	Canina con alberino per comando supplemento combustibile e stop.	1	1
36	270-5550-07	Molla per alberino.	1	1
37	270-5420-08	Maniglia comando supplemento nafta.	1	1
38	270-4775-37	Guarnizione in gomma per maniglia.	1	1
39	270-8420-01	Spina conica per fermo maniglia.	1	1
40	271-4330-03	Bilanciere comando pompa iniezione.	1	1
43	283-6110-64	Perno per bilanciere pompa iniezione.	1	1
44	260-9730-25	Vite a brugola 8x20UNI5931 fissaggio perno.	1	1
45	3-7540-06	Rondella dentellata per vite.	1	1
46	312-1240-13	Anello Seeger (alb. Ø 18) per tenuta bilanciere.	1	1
47	209-1770-15	Bullone 8x55UNI5737 fiss. perno.	1	1
48	1-7565-07	Rondella elastica per bullone.	1	1
—	273-2515-29	Gruppo comando a mano acceleratore completo (Tav. 3: Fig. 49-52 al 71).	1	1
49	270-7865-18	Scatola comando regolatore.	1	1

TAVOLA
TABLE

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
50	270-4700-69	Guarnizione per scatola regolatore.	1	1
51	3-9800-10	Vite 6x16UNI6110 fissaggio scatola.	3	3
52	276-1770-42	Bullone 6x10UNI5739 chiusura foro su scatola regolatore a mano.	1	1
53	1-7565-04	Rondella elastica per bullone.	1	1
54	270-1760-28	Bullone 6x35 registro leva comando regolatore.	1	1
55	270-1760-29	Bullone 6x30 registro leva comando regolatore.	1	1
56	105-3240-08	Dado 6UNI5508 per bullone.	2	2
57	270-6141-16	Perno per leva rinvio comando regolatore.	1	1
58	273-5200-85	Leva rinvio interna comando acceleratore.	1	1
59	209-8420-12	Spina conica bloccaggio leva di rinvio.	1	1
60	270-5200-86	Levetta di rinvio comando regolatore.	1	1
61	270-9245-31	Tirante per levetta comando acceleratore.	1	1
62	270-1861-50	Bullone fissaggio leva rinvio comando regolatore.	1	1
62a	1-7625-07	Rondella piana per bullone.	1	1
63	270-6140-71	Pernetto per leva di rinvio esterna.	1	1
64	270-2690-43	Coperchio scatola regolatore a mano.	1	1
65	105-1760-01	Bullone 6x10UNI5739 fissaggio coperchio scatola regolatore.	2	2
66	250-7555-04	Rondella elastica per bullone.	2	2
67	270-5200-88	Leva comando regolatore.	1	1
68	270-1240-77	Anello Seeger (alb. Ø 6) bloccaggio leva comando regolatore.	1	1
69	1-7625-07	Rondella per leva.	1	1
70	30-3200-01	Dado ad alette 5UNI5448 serraggio leva.	1	1
71	27-7625-05	Rondella piana per dado.	1	1
72	70-3695-19	Filo di sicurezza per dado.	1	1
—	273-2515-27	Gruppo comando a distanza acceleratore completo (Tav. 3: Fig. 49-54 dal 61-65-67-73 al 79).	1	1
73	70-9180-47	Terminale per guaina comando regolatore a distanza.	1	1
74	3-3240-19	Dado 6UNI5508 per registro terminale.	1	1
75	270-5680-25	Molla ritorno levetta comando regolatore.	1	1
76	270-9020-73	Vite fiss. levetta rinvio comando regolatore.	1	1
77	45-6000-16	Pastiglia per levetta comando regolatore.	1	1
78	30-9790-03	Vite bloccaggio cavetto comando regolatore.	1	1
79	270-2690-42	Coperchio scatola comando regolatore a distanza.	1	1

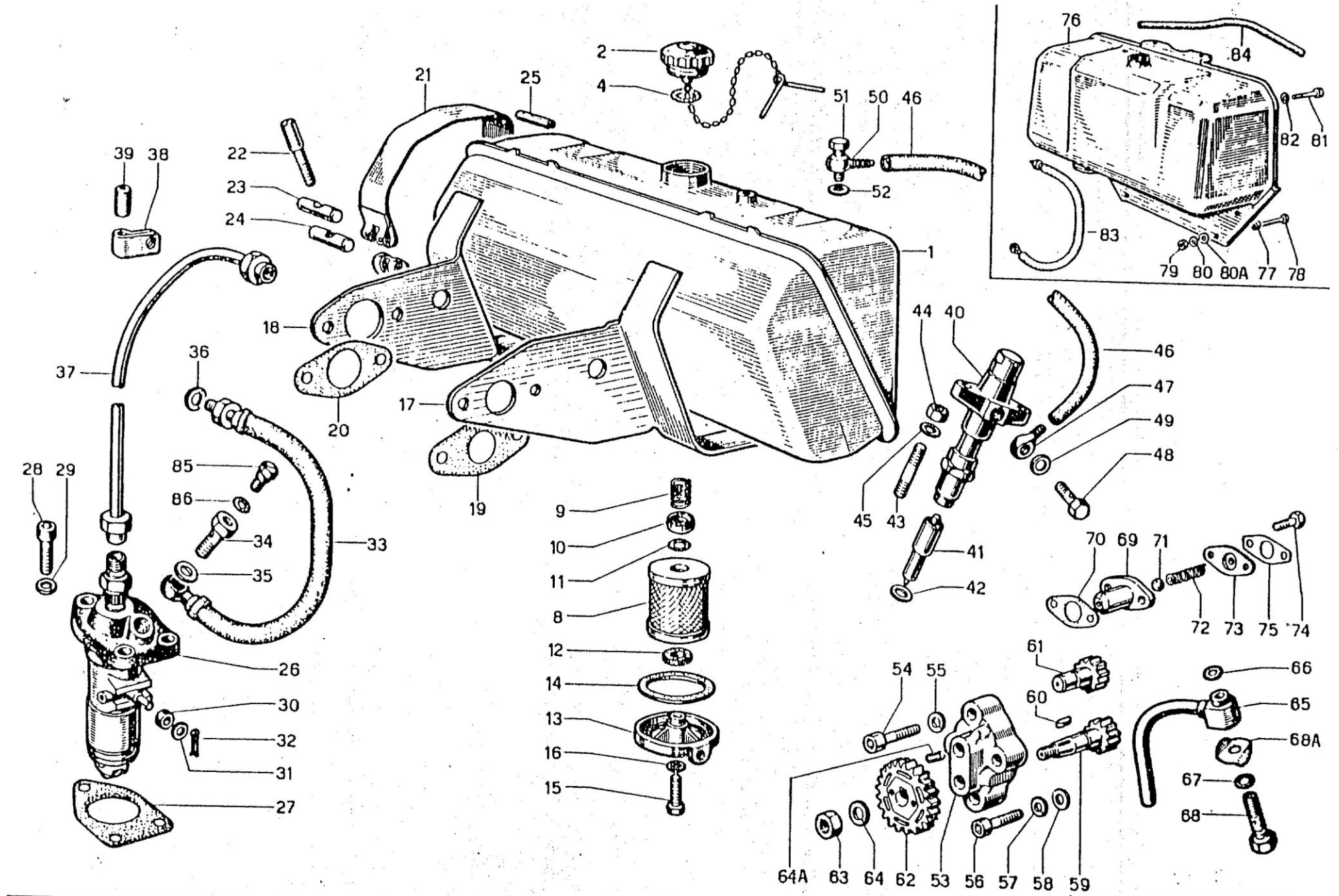


TAVOLA
TABLE 4

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	273-8101-21	Serbatolo combustibile (versione Industriale).	1	1
2	270-9032-06	Tappo serbatolo.	1	1
4	45-1200-15	Guarnizione per tappo OR 137.	1	1
—	273-3730-15	Filtro combustibile completo (Tav. 4 : Fig. da 8 a 16).	1	1
8	273-2175-09	Cartuccia filtrante (parte in feltro).	1	1
9	273-5575-06	Molla per filtro combustibile.	1	1
10	273-3930-19	Fondello supporto molla.	1	1
11	273-1200-32	Anello OR 109 per filtro nafta.	1	1
12	273-4490-17	Guarnizione per cartuccia filtrante.	1	1
13	273-2605-07	Coperchio per filtro combustibile.	1	1
14	260-4430-71	Guarnizione per coperchio.	1	1
15	245-1760-06	Bullone 6x20UNI5739 fissaggio coperchio filtro.	1	1
16	260-4670-01	Guarnizione per bullone.	1	1
17	271-5500-23	Mensola sostegno serbatolo (lato scarico).	1	1
18	6496-5500-28	Mensola sostegno serbatolo (lato aspirazione).	1	1
19	273-4500-77	Guarnizione per mensola lato scarico.	1	1
20	271-4500-67	Guarnizione per mensola lato aspirazione.	1	1
21	271-3616-09	Fascetta fissaggio serbatolo.	2	2
22	45-1860-65	Bullone serraggio fascetta serbatolo.	2	2
23	45-1557-19	Bloccetto per serraggio fascetta.	2	2
24	45-1557-20	Bloccetto filettato serraggio fascetta.	2	2
25	271-9600-57	Tubetto fra fascetta e serbatolo.	4	4
26	283-6590-26	Pompa iniezione.	1	—
—	292-6590-27	Pompa iniezione.	—	1
27	260-4580-08	Guarnizione pompa iniezione (Sp. 5/10).	1	1
27a	260-4580-12	Guarnizione pompa iniezione (Sp. 3/10).	1	1
27b	260-4580-01	Guarnizione pompa iniezione (Sp. 1/10).	1	1
28	260-9730-07	Vite a brugola 8x25UNI5931 fissaggio pompa iniezione.	3	3
29	1-7665-07	Rondella elastica per vite.	3	3
30	270-1580-16	Buccola per pompa iniezione.	1	1
31	27-7625-05	Rondella piana per buccola.	1	1
32	1-2800-03	Copiglia per tenuta buccola pompa iniezione.	1	1
33	271-9371-79	Tubo combustibile dal filtro alla pompa iniezione.	1	1
34	260-1900-67	Bullone raccordo fissaggio tubo alla pompa.	1	1
35	4670-15	Guarnizione in rame per bullone.	2	2
36	200-4670-03	Guarnizione per bullone racc. sul filtro combustibile.	1	1
37	271-9370-10	Tubo mandata nafta.	1	1
38	270-3615-43	Fascetta fermo tubo.	1	1
39	260-5390-06	Manicotto in gomma per fascetta.	1	1
40	273-6615-08	Portapolverizzatore.	1	—
—	292-6615-13	Portapolverizzatore.	—	1
41	270-6531-07	Polverizzatore.	1	—
—	292-6531-13	Polverizzatore.	—	1
42	4670-05	Guarnizione per polverizzatore (Sp. 5/10).	1	1
42a	271-4670-06	Guarnizione per polverizzatore (Sp. 10/10).	1	1
43	27-6780-18	Prigioniero fissaggio portapolverizzatore 8x25UNI5911.	2	2
44	4437	Dado per fissaggio portapolverizzatore.	2	2
45	1-7565-07	Rondella elastica per dado.	2	2
46	273-9570-80	Tubo spurgo nafta dal portapolverizzatore al serbatolo.	1	1
47	271-7270-32	Raccordo orientabile sul portapolverizzatore.	1	1
48	260-1900-01	Bullone raccordo M6x1 sul portapolverizzatore.	1	1
49	260-4670-01	Guarnizione per bullone raccordo.	2	2

TAVOLA
TABLE 5

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
50	260-7270-20	Raccordo orientabile tubo spurgo sul serbatolo.	1	1
51	200-1900-02	Bullone raccordo M8x1 sul serbatolo.	1	1
52	200-4670-03	Guarnizione per bullone raccordo.	2	2
—	270-6605-03	Pompa olio completa (Tav. 4 : Fig. 53 dal 59 al 64).	1	1
53	270-2840-17	Corpo pompa olio.	1	1
54	422-9730-30	Vite a brugola 8x25UNI5932 per fissaggio pompa olio.	2	2
55	1-7565-07	Rondella elastica per vite.	2	2
56	270-9730-15	Vite a brugola 6x30UNI5932 fissaggio laterale pompa.	1	1
57	1-7565-04	Rondella elastica per vite.	1	1
58	1-7625-07	Rondella piana per vite.	1	1
59	270-4950-05	Ingranaggio conduttore pompa olio.	1	1
60	260-2200-01	Chiusura per ingranaggio conduttore.	1	1
61	270-4950-06	Ingranaggio condotto pompa olio.	1	1
62	270-4975-03	Ingranaggio comando pompa olio.	1	1
63	270-3203-14	Dado 8UNI5507 fissaggio ingranaggio.	1	1
64	250-7555-07	Rondella elastica per dado.	1	1
64a	260-9765-01	Vite chiusura foro pompa olio.	1	1
65	203-7300-69	Tubo aspirazione olio.	1	1
66	203-4670-36	Guarnizione per tubo aspirazione.	1	1
67	260-1200-34	Anello OR 105 per tubo.	1	1
68	203-1861-08	Bullone fissaggio tubo aspirazione olio.	1	1
68a	270-5111-08	Laminino di sicurezza per bullone.	1	1
—	271-9680-08	Valvola regolazione pressione olio completa (Tav. 4 : Fig. dal 69 al 75).	1	1
69	271-2860-15	Corpo valvola pressione olio.	1	1
70	271-4760-07	Guarnizione per corpo valvola.	1	1
71	250-8245-05	Sfera per corpo valvola 9/32".	1	1
72	271-5755-26	Molla per valvolina pressione olio.	1	1
73	271-3895-05	Flangia per valvolina pressione olio.	1	1
74	238-1760-03	Bullone 6x12UNI5739 fissaggio corpo valvolina.	2	2
75	271-5110-84	Laminino di sicurezza per bullone.	1	1
76	273-8101-20	Serbatolo combustibile (lato distribuzione).	1	1
77	273-3525-92	Distanziatore per serbatolo.	1	1
78	11-1770-14	Bullone 8x30UNI5737 fissaggio.	2	2
79	1-3240-18	Dado 8UNI5508 per bullone.	2	2
80	1-7565-07	Rondella elastica per dado.	2	2
80a	45-7625-12	Rondella piana per dado.	2	2
81	47-1770-07	Bullone 8x30UNI5737 fissaggio superiore serbatolo.	2	2
82	1-7565-07	Rondella elastica per bullone.	2	2
83	270-9371-71	Tubo combustibile dal filtro alla pompa iniezione.	1	1
84	271-9570-69	Tubo spurgo nafta dal portapolverizzatore al serbatolo.	1	1
85	260-9080-37	Tappo per disaerazione pompa.	1	1
86	260-4650-55	Guarnizione per tappo.	1	1

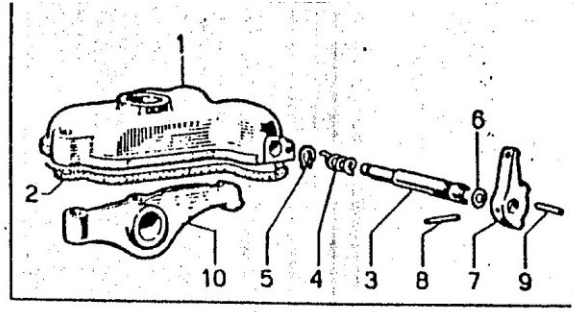
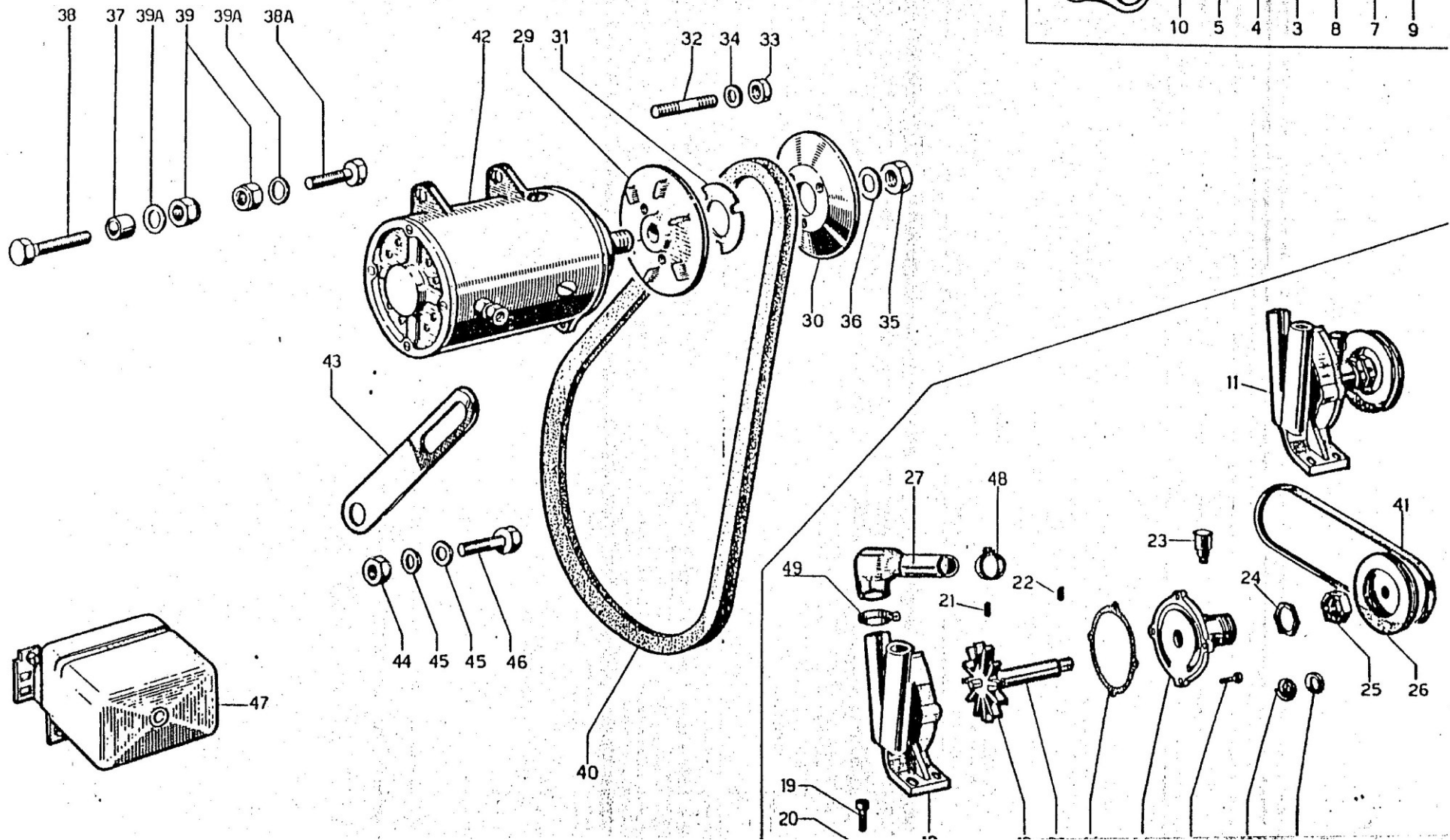


TAVOLA
TABLE 5

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	283-2125-36	Cappello per scatola bilanciere (avviamento cop de- compressione).	1	1
2	283-4400-13	Guarnizione per scatola bilancieri (Sp. 2/10).	1	1
2a	283-4400-14	Guarnizione per scatola bilancieri (Sp. 3/10).	1	1
3	283-1110-53	Albero per decompressione.	1	1
4	270-5680-24	Molla per ritorno levetta comando decompressione.	1	1
5	246-1165-04	Anello Benzling Ø 6 per albero decompressione.	1	1
6	268-1200-34	Anello OR 105 per albero.	1	1
7	270-5270-42	Levetta decompressione.	1	1
8	276-8430-23	Spina elastica 3x16 per bloccaggio levetta all'albero.	1	1
9	276-8430-23	Spina elastica 3x16 per fermo levetta sul cappello.	1	1
10	283-1540-64	Bilanciere comando valvola scarico per decompressione.	1	1
—	283-1540-76	Bilanciere comando valvola scarico per decompressione completo (Tav. 5 : Fig. 10; Tav. 2 : Fig. 32-33).	1	1
—	283-4330-21	Gruppo bilanciere completo per decompressione (Tav. 5 : Fig. 10; Tav. 2 : Fig. 31 a 36).	1	1
—	271-1470-17	Avviamento elettrico con dinamotore lato scarico.	1	1
11	AL-17465	Complessivo pompa acqua.	1	1
12	AL-17454	Corpo pompa acqua.	1	1
13	AL-17457	Girante per pompa acqua.	1	1
14	AL-17470	Guarnizione sulla pompa acqua.	1	1
15	AL-17455	Coperchio pompa.	1	1
16	M5x15UNI2383	Vite t.e.l. fissaggio coperchio.	4	4
17	—	Corda sevata.	1	1
18	AL-17458	Boccola premistoppa.	1	1
19	M8x15UNI2383	Vite t.e.l. fissaggio pompa.	2	2
20	REO 8	Rosetta per delfo.	2	2
21	M3x8UNI5923	Grano fissaggio girante.	1	1
22	M4x10UNI5923	Grano fissaggio puleggia.	1	1
23	1"1/8 gas UNI2658	Ingrassatore NI.	1	1
24	AL-17460	Controdado.	1	1
25	AL-17459	Dado premistoppa.	1	1

TAVOLA
TABLE

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
26	AL-17461	Puleggia per pompa acqua.	1	1
27	18190	Tubazione dalla pompa al cilindro.	1	1
28	AL-17469	Alberino sulla pompa.	1	1
29	70-8075-25	Sempipuleggia fissa dinamotore.	1	1
30	70-8075-26	Sempipuleggia mobile dinamotore.	1	1
31	260/81689	Plastrina registro puleggia (mm. 0,5).	1	1
—	260/71664	Plastrina registro puleggia (mm. 1).	2	2
—	260/81690	Plastrina registro puleggia (mm. 2).	2	2
32	260/81517	Prigioniero fissaggio sempipuleggia.	1	1
33	105-3240-08	Dado 6UNI207 per prigionieri.	3	3
34	1-7565-04	Rondella elastica per dado.	3	3
35	270-3206-14	Dado 14x1,5 fissaggio sempipuleggia.	1	1
36	105-1796	Rondella elastica per dado.	1	1
37	AL-17583	Distanziale per perno dinamotore.	1	1
38	M10x60UNI5737	Vite t.e. (lunga) per attacco dinamotore.	1	1
38a	M10x50UNI5737	Vite t.e. (corta) per attacco dinamotore.	1	1
39	N70/110M	Dado autobloccante per vite.	1	1
39a	10,5UNI1751	Rondella per dado.	2	2
40	Pirelli Z 40	Cinghia per dinamotore.	1	1
41	Pirelli Z 25	Cinghia per pompa.	1	1
42	4CA 15781	Dinamotore Bosch J(R)14V11A32 12 V. 1PS 0010.350.005.	1	1
43	18174	Staffa per attacco dinamotore.	1	1
44	M8UNI5587	Dado per vite.	1	1
45	8,4UNI1734	Rosetta per vite.	2	2
46	M8x25UNI5737	Vite t.e. fissaggio staffa dinamotore.	1	1
47	ZAD 14 V 11A	Regolatore di tensione.	1	1
—	0-190-219-001			
48	24 H8	Fascetta fissaggio tubazione pompa acqua.	1	1
49	28 H8	Fascetta fissaggio tubazione pompa acqua.	1	1

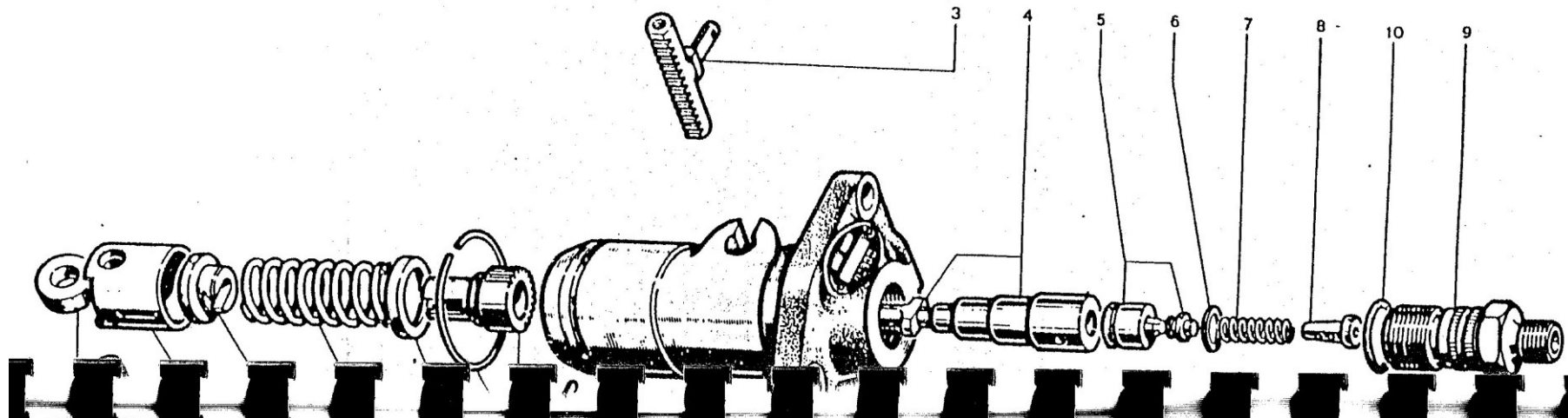


TAVOLA
TABLE 6

Rif. Réf. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	—	Corpo pompa.	1	1
2	277-6230-75	Perno orientamento cilindretto	1	1
3	270-9130	Asta regolazione.	1	1
4	279-6578-09	Pompante con pistoncino.	1	1
5	271-82157	Valvola di mandata completa.	1	1
6	271-4760-15	Guarnizione per valvola.	1	1
7	271-5755-34	Molla per valvola di mandata.	1	1
8	271-81808	Riempitore.	1	1
—	271-8335-29	Spessore per riempitore.	1	1
9	271-81766	Raccordo di mandata.	1	1
10	271-1200-31	Anello esterno di tenuta per raccordo.	1	1
11	260-4850-09	Guida pistoncino.	1	1
12	260-7980-20	Scodellino superiore.	1	1
13	260-5625-02	Molla per pistoncino.	1	1
14	260-6400-24	Piatello tenuta molla.	1	1
—	260-7215-33	Punteria completa (Tav. 6 : Fig. da 15 a 18).	1	1
15	260-7215-17	Punteria.	1	1
16	260-7770-20	Nulllo per punteria.	1	1
17	260-1970-54	Bussola per punteria.	1	1
18	260-6230-68	Perno punteria.	1	1
19	260-6230-69	Perno fissaggio punteria.	1	1
20	260-10103	Anello ritegno perno fissaggio punteria.	1	1

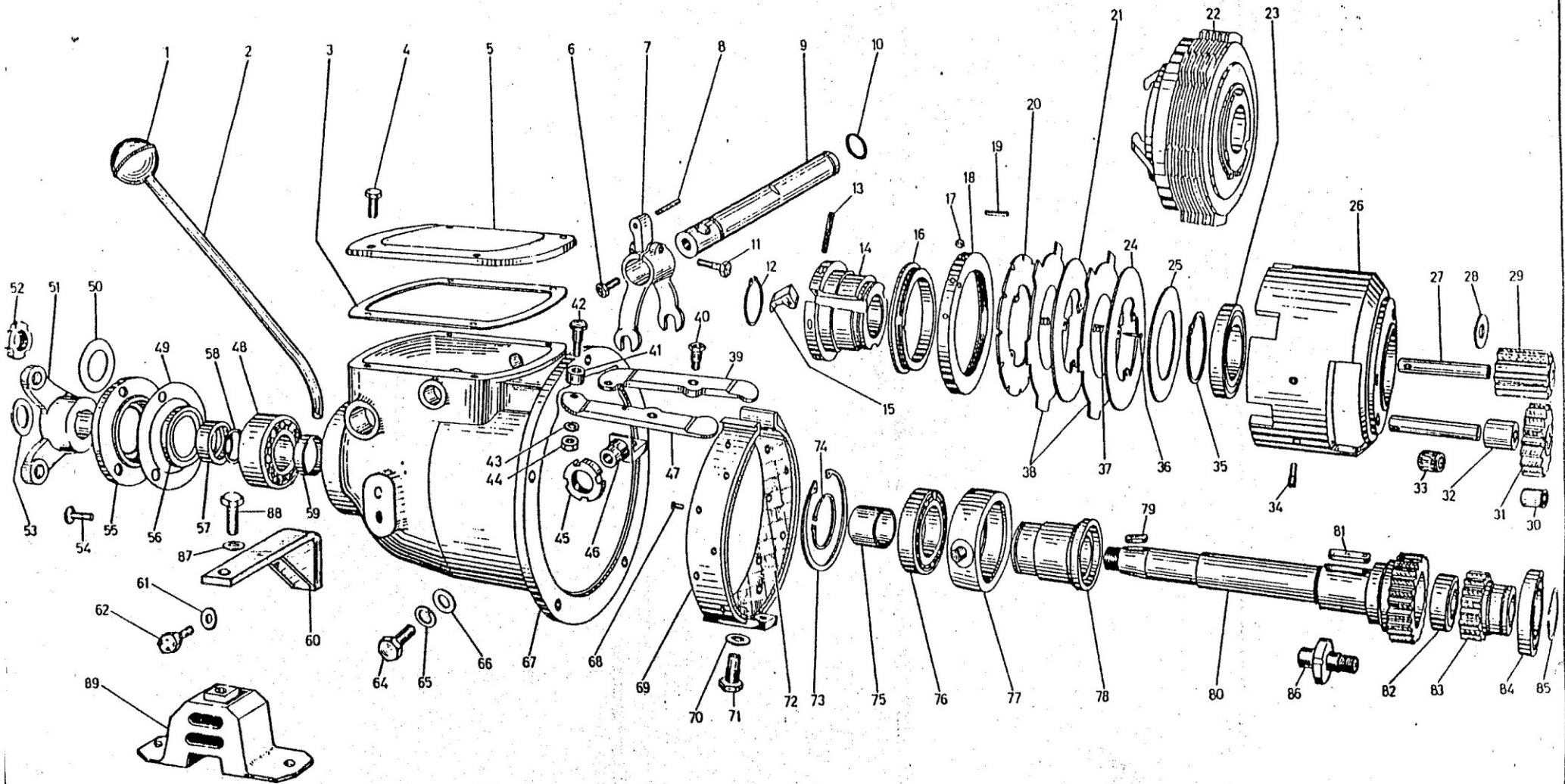


TAVOLA
TABLE 7

Rif. Rif. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	8584	Pomolo per leva di manovra.	1	1
2	7443	Leva di manovra.	1	1
3	8262	Guarnizione per portina.	1	1
4	M6x12UNI5739	Vite fissaggio coperchio invertitore.	4	4
5	8261	Portina ispezione invertitore.	1	1
6	M10x18UNI5739	Vite fissaggio leva manovra.	1	1
7	7866/1	Forcella comando cono scorrevole.	1	1
8	11463	Perno espansione leva comando fascia.	1	1
9	8782	Albero porta forcella comando cono.	1	1
10	OR 122	Anello sull'albero porta leva comando cono.	1	1
11	16276	Vite fissaggio forcella comando cono.	1	1
12	Seeger 30E	Anello elastico fissaggio bussola porta dischi frizione.	1	1
13	S 5x40	Spina tenuta nottolini (Connex).	3	3
14	11311	Bussola dentata porta dischi frizione.	1	1
15	10998	Nottolino prona dischi frizione.	3	3
16	10994	Anello porta ghiera registro frizione.	1	1
17	13/64"	Sfera sulla ghiera registro frizione.	1	1
18	10992	Ghiera registro frizione.	1	1
19	S 4x10	Spina per registro frizione (Connex).	2	2
20	10997	Spingi dischi frizione.	1	1
21	13346	Disco interno per frizione.	3	3
22	14200	Complessivo frizione.	1	1
23	16009	Cuscinetto sulla scatola Ingranaggi.	1	1
24	13463	Disco interno per frizione.	1	1
25	10995	Anello tenuta dischi frizione.	1	1
26	17521	Scatola Ingranaggi.	1	1
27	7259	Perno porta Ingranaggi.	4	4
28	14263	Rondella di spallamento Ingranaggi satelliti.	8	8
29	14260	Ingranaggio satellite distanziale.	2	2
30	14262	Boccola Ingranaggi satelliti.	2	2
31	14261	Ingranaggio satellite.	2	2
32	7261	Distanziale per Ingranaggi satelliti.	2	2
33	K 12/13	Cuscinetto a rullini per Ingranaggi satelliti.	6	6
34	7274	Fermo per perno Ingranaggi satelliti.	4	4
35	Seeger SSE	Anello elastico tenuta dischi frizione.	1	1
36	3x25	Spina tenuta dischi.	3	3
37	11265	Molle per attacco dischi frizione.	9	9
38	13347	Disco esterno per frizione.	3	3
39	11486	Leva destra comando fascia freno.	1	1
40	11481	Perno per leva comando fascia.	2	2
41	7055	Rullo sulle leva comando fascia.	2	2
42	11484	Perno per rullo sulla leva comando fascia.	2	2
43	A8.4UNI1751	Rosetta per dado.	2	2
44	M8UNI5589	Dado per perno sulla leva.	2	2
45	6973	Ghiera fissaggio perno.	2	2
46	8789	Perno registrabile porta leva.	2	2
47	11485	Leva sinistra comando fascia freno.	1	1
48	3305	Cuscinetto reggisplinta albero invertitore.	1	1
49	7091	Guarnizione per portina porta anello.	1	1

TAVOLA
TABLE

Rif. Rif. Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DENOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	A
50	8837	Spessore per rasamenti.		
51	7930	Flangia triangolare di moto.	1	
52	6973	Ghiera.	1	
53	18UNI3703	Rosetta sicurezza per flangia accoppiamento.	1	
54	8x20UNI1270	Vite fissaggio flangia porta anello.	3	
55	7073	Portina porta anello tenuta olio.	1	
56	3552/8	Anello tenuta olio sulla portina.	1	
57	7085	Distanziale cuscinetto reggisplinta.	1	
58	ON 133	Anello sull'albero invertitore.	1	
59	9032	Distanziale per cono scorrevole.	1	
60	18057	Piede supporto invertitore.	2	
61	10.5UNI1734	Rosetta per vite fissaggio invertitore.	4	
62	M10x30UNI5739	Vite fissaggio supporto invertitore.	4	
64	M10x28UNI5739	Vite fissaggio perno porta leva.	2	
65	10.5UNI1734	Rosetta sul perno porta leva.	2	
66	10.5UNI1751	Rosetta sul perno porta leva.	2	
67	8221/1	Carcassa invertitore.	1	
68	5x12	Rivetti tenuta ferodo.	10	
69	12339	Fascia freno.	1	
70	13UNI1734	Rosetta per vite fissaggio fascia.	2	
71	11482	Vite tenuta fascia freno.	2	
72	7458	Ferodo per fascia freno.	1	
73	Seeger 68 I	Anello elastico fissaggio cuscinetto sul cono scorrevole.	1	
74	Seeger 40E	Anello elastico fissaggio cuscinetto sul cono scorrevole.	1	
75	7083	Bussola per cono scorrevole.	1	
76	6008	Cuscinetto sul cono scorrevole.	1	
77	7081	Gabbia porta cuscinetto sul cono.	1	
78	7253	Cono scorrevole.	1	
79	6x6x18UNI92	Chavetta sull'albero invertitore.	1	
80	7254	Albero principale invertitore.	1	
81	8x7x30UNI92	Chavetta sull'albero invertitore.	2	
82	6302	Cuscinetto sull'albero invertitore.	1	
83	17466	Ingranaggio sull'albero motore.	4	
84	16008	Cuscinetto sull'ingranaggio conduttore.	1	
85	Seeger 40E	Anello elastico sull'ingranaggio conduttore.	1	
86	17473	Ghiera bloccaggio Ingranaggio.	1	
87	10.5UNI1751	Rosetta per fissaggio ammortizzatore.	2	
88	M10x25UNI5739	Dado fissaggio ammortizzatore.	2	
89	18365	Supporto antivibrante.	2	

TAVOLA
TABLE

8

N.º N.º Ref.	Matricola Matricule Part. Number	DENOMINAZIONE DÉNOMINATION DENOMINATION	QUANTITÀ QUANTITÉ QUANTITY	
			AL 185	AL 186
1	17564	Corpo riduttore.	1	1
2	10958	Guarnizione tra scatola Invertitore e corpo riduttore.	1	1
3	8x25UNI1707	Spina di riferimento.	1	1
4	M8x60UNI5931	Vite a brugola fissaggio corpo.	3	3
5	M8x27UNI5931	Vite a brugola fissaggio corpo.	3	3
6	6x10UNI1707	Spina di riferimento per coperchio.	2	2
7	BA 3552/8	Anello tenuta olio.	1	1
8	6972	Ingranaggio sull'albero riduttore.	1	1
9	7035	Chiera di fissaggio.	1	1
10	18UNI3703	Rondella per detta.	1	1
11	17566	Ingranaggio riduttore.	1	1
12	6304	Cuscinetto sull'ingranaggio riduttore.	1	1
13	6x6x18UNI192	Chiavetta sull'ingranaggio riduttore.	1	1
14	3305	Cuscinetto reggisplinta sull'ingranaggio riduttore.	1	1
15	Seeger 62 I	Anello per detto.	1	1
16	BA 3552/8	Anello tenuta olio.	1	1
17	7085	Distanziale porta anelli.	1	1
18	OR 4100	Anello tenuta olio.	1	1
19	8837	Spessore per rasamenti.	1	1
20	7930	Flangia triangolare sul riduttore.	1	1
21	7035	Chiera di fissaggio flangia.	1	1
22	18UNI3703	Rondella per detta.	1	1
23	17565	Coperchio riduttore.	1	1
24	17667	Guarnizione tra corpo riduttore e coperchio.	1	1
25	M6x20UNI5931	Vite a brugola fissaggio coperchio.	13	13
26	REO 6	Rondella per detta.	13	13
27	M10x1,25x15UNI5740	Tappo livello olio.	2	2
28	7438	Guarnizione per detto.	2	2

