



Pasquali Tractors

Instructions and Maintenance Manual for
Tractor Model 986 18 HP



Pasquali macchine agricole s.p.a.

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PREFACE

We welcome you among the numerous customers of Pasquali Macchine Agricole s.p.a. This tractor is the result of accurate studies carried out by specialized engineers to build a modern, rugged and functional machine that helps farmers improve the productivity of their farm.

We are confident that the high performance and simplicity of use of this machine will be to your satisfaction. The world wide reputation enjoyed by Pasquali is the best guarantee for you.

A long experience in this field, the use of high quality material, the accuracy of workmanship assure the greatest efficiency of our tractor which will offer you excellent performances for many years if you use it in the proper way and carry out the necessary maintenance.

We have, therefore, written this manual to make you familiar with the use of the tractor, its construction and operating features, also making maintenance easier for you.

We, therefore, suggest to you to read this manual carefully and follow our advice.

MAINTENANCE

All maintenance operations required to keep the tractor in perfect operating condition are described in this manual, however, not all these operations can be easily carried out by the private owner. It is, therefore, advisable to use only skilled mechanics recommended by our local distributor, when more complicated work is to be carried out. (In most cases our local distributor has his own suitably equipped workshop, with original spare parts and personnel trained by us).

To ensure perfect operation of the tractor in all its parts, we recommend that only original replacement parts should be used. Orders of spare parts must be made in accordance with our spare parts catalogue.

It is also advisable to read the attached engine manual thoroughly.



IDENTIFICATION DATA

The type and identification number of the tractor are stamped on the front differential housing and on the name plate (fig. 1).

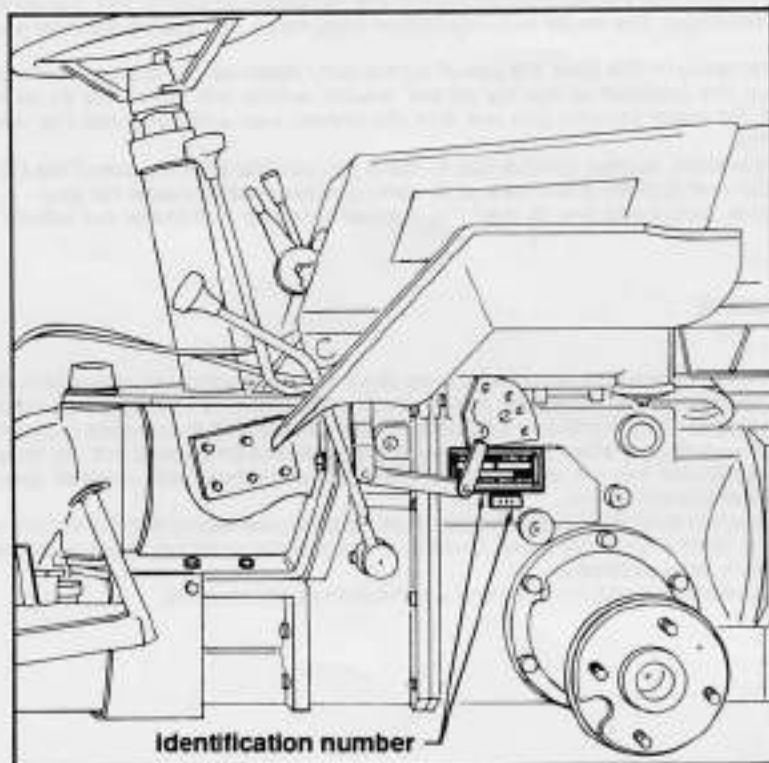


Fig. 1

The identification numbers are composed of:

- three digits indicating the type;
- the successive digits indicating the serial number, that is the progressive production number.

Also the spare parts of the tractor have an identification number indicated in the spare parts catalogue.

When placing orders for spare parts always state part number, type and serial number of the tractor.

**TECHNICAL SPECIFICATIONS OF TRACTOR**

Engine	- 4-stroke Lombardini fuel Diesel type LD A/100, direct injection, single-cylinder, bore 100 mm, stroke 90 mm, displacement 707 cc, compression ratio 17:1, max. power 18 HP at 3000 r.p.m., max. torque 43 N/m at 1800 r.p.m., air-cooled, forced lubrication, automatic compression release, oil-bath air cleaner.
Clutch	- Single dry plate.
Gearbox	- 12 speeds: 9 forward and 3 reverse
Transmission	- Four-wheel drive with pinion/crown differential on both axles: front ratio 1:4,500 - rear ratio 1:4,625; front differential lock,
Forward speed	- See performance table on page 4.
Brakes	- Service mechanical footbrakes acting on rear wheels. Parking mechanical handbrakes acting on rear wheels, controlled by lever and lock pin.
Tyres	- Agricultural tyred wheels. Front and rear wheels 6.00 - 16 or 6,50-16 4 PR
Steering	- With mechanical control by worm screw. Power steering upon request.
Hydraulic	- With gear pump, distributor and rear hydraulic lift.
Implements hitch	- 2 point (3 point hitch I.S.O. Cat. 0 upon request).
Power take-offs	- N. 2 $\left\{ \begin{array}{l} \text{top one standard spline} \\ \text{bottom one} \end{array} \right\} \begin{array}{l} \text{independent} \\ \text{synchronized} \end{array}$
	See page 5
Electric lighting and starting system	- 12 Volt battery, starting motor, alternator, voltage regulator, head lights, rear side lights and number plate light; rear socket



- Dashboard** - Key switch, light switch, engine oil pressure and lights warning light, engine stop button, hour-meter: it shows r.p.m. of engine, of independent power take-offs, forward motion at the various speeds, run-in hours, decompression release knob.
- Dimensions** - Length 2310 mm
Width 810 — 1180 mm
Height 1080 mm
- Weight** - 810 kg (unladen)

Speed table with engine at 3000 r.p.m. and wheels 6.00-16		
Position of levers		Speeds km/h
Ratio selector	Gear change	
Low	1st	0,6
	2nd	1,0
	3rd	2,3
Normal	1st	1,7
	2nd	2,7
	3rd	6,2
High	1st	6,8
	2nd	11,0
	3rd	24,5
Low	R (Reverse)	1,5
Normal		4,0
High		16,5



REVOLUTIONS AT THE POWER TAKE-OFFS

Top one standardized	Independent = 570 and 730 r.p.m. clockwise direction Synchronized = 6,38 for each revolution of rear wheels
Bottom one	Independent = 590 and 750 r.p.m. anticlockwise direction Synchronized = 6,61 for each revolution of rear wheels

IMPORTANT NOTICE

Pasqual tractors with their basic design, low center of gravity and proper distribution of weight are extremely stable; all this is an indispensable requisite to work on hillsides. However, do not abuse this advantage and always avoid hazardous manoeuvres with respect to the limits of the laws of gravity, inertia and ground adhesion, especially when the tractor is used to tow a loaded trailer.

Move slowly when terrain:

- 1) is very rough
- 2) has steep slopes on a hillside
- 3) is frozen or covered with snow.

— When going down a slope always keep the tractor in gear, generally using the same gear required if going uphill on the same route and with the same weight; of course, the heavier the weight, the lower the gear should be.

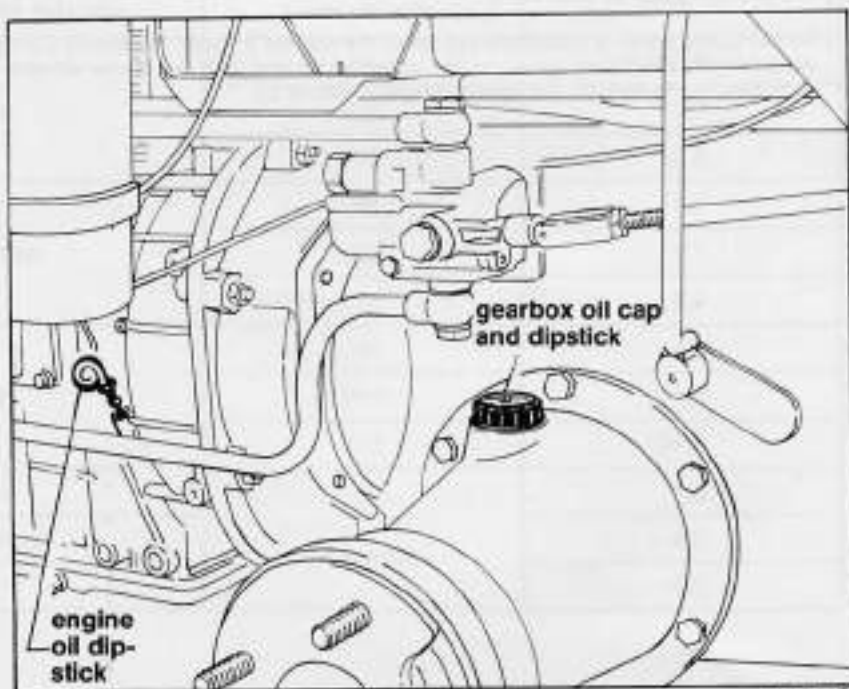


CHECKING THE NEW TRACTOR

The tractor is delivered completely supplied with oil; however, before operating it always check that the levels are correct.

Engine

- Check oil level by means of the appropriate dipstick; should the level be under the minimum mark, before starting the engine top it up until the maximum level is reached (fig. 2).
- Make sure that enough fuel is in the tank; if it is completely or almost empty fill it; however, before starting the engine drain the feeding line loosening the delivery connector of the injection pump and depressing repeatedly the hand lever of the feed pump. Always proceed as above whenever you have run out of fuel; therefore it is advisable to refuel before the tank is completely empty.
- As soon as the engine starts the oil pressure warning light on the dashboard (fig. 10) must be "off"; if it remains on or suddenly lights up during the regular operation turn off the engine immediately because it means that the oil pressure is insufficient, in which case do not use the tractor till the fault has been rectified.





- Engine air filter** - Check oil level and if necessary, top it up with oil of the same quality used for the engine until it reaches (without exceeding) the mark on the filter housing.
- Front and rear housings** - Check oil level in both housings through the appropriate caps with dipstick and if necessary, top oil up until the maximum level is reached (fig. 2-7).
- Hydraulic system** - Check the quantity of oil in the hydraulic system (fig. 3). Check oil level and top it up, if necessary, with the rear hydraulic lift completely lowered.
- Battery** - Check that battery is correctly connected, that the terminals are properly smeared with pure vaseline, that the electrolyte covers the battery elements completely (if necessary, top it up with distilled water only).
- Greasing and lubrication** - Check that all not painted parts are protected with grease, that the universal joints, the central articulation pivot as well as the rear hydraulic lift arm, all equipped with grease nipples, are sufficiently greased.
- Tyres** - Verify the inflation pressure of the tyres which should generally be 1,5 atm (see page 27).

RUNNING-IN

- 1) During the first 50 hours of operation both if the tractor is new or completely overhauled, perform only work requiring 60%–70% of the engine power at the most.
- 2) Starting the engine the first time in the day, especially in cold days, run the engine at tickover in neutral for a few minutes.
- 3) Change engine oil after the first 20 hours.
- 4) Change air filter oil after the first 8 hours.
- 5) Periodically check that there are no oil leaks and that all screws and nuts are strongly tightend especially those securing the wheels.

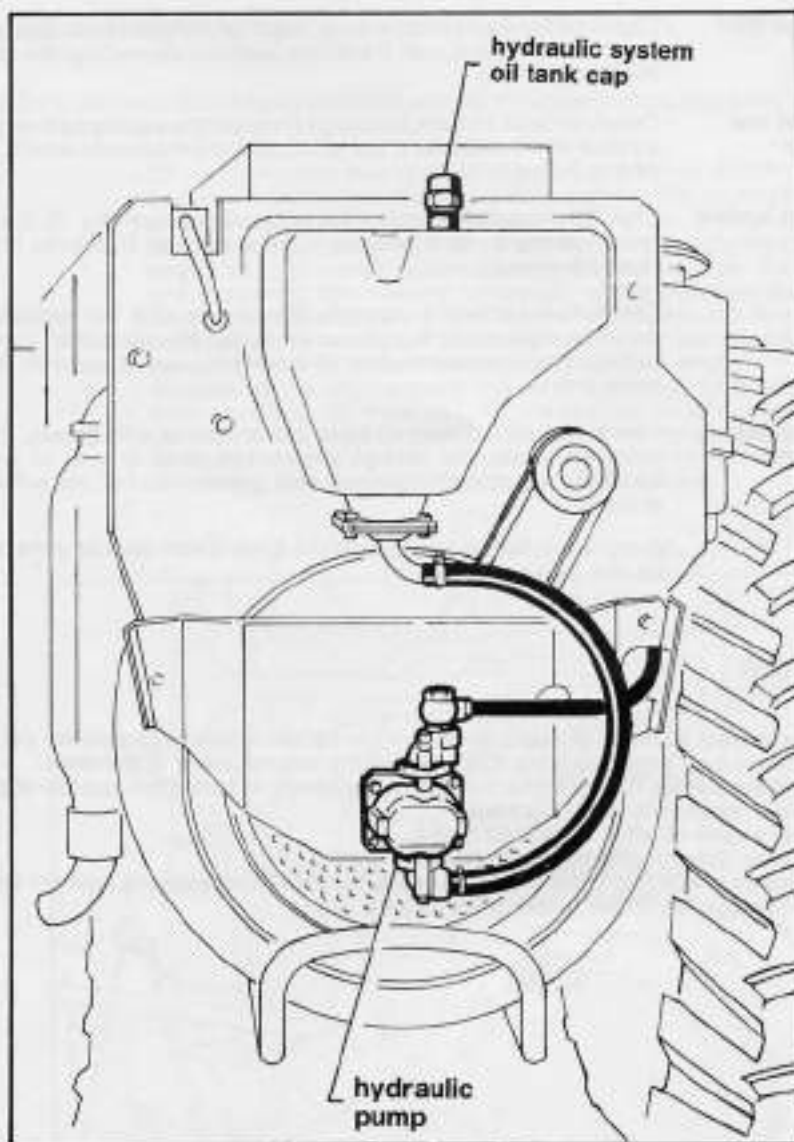


Fig. 3



USE OF CONTROLS AND INSTRUMENTS

- | | |
|--|---------------------------------------|
| A - Gear control lever | I - Hand brake lever |
| B - Ratio Selector | L - Hydraulic lift control lever |
| C - Accelerator control lever | M - Steering wheel |
| D - Clutch pedal | N - Engine stop knob |
| E - Front differential lock lever | O - Main switch and start key |
| F - Independent power take-offs speed control lever | P - Lights switch |
| G - Independent or synchronized power take-offs levers | Q - Engine oil pressure warning light |
| H - Brake pedal | R - Lights warning light |
| | S - Hour-meter |
| | T - Compression release knob |

(see fig. 4-5-6-7-8-9-10-11)

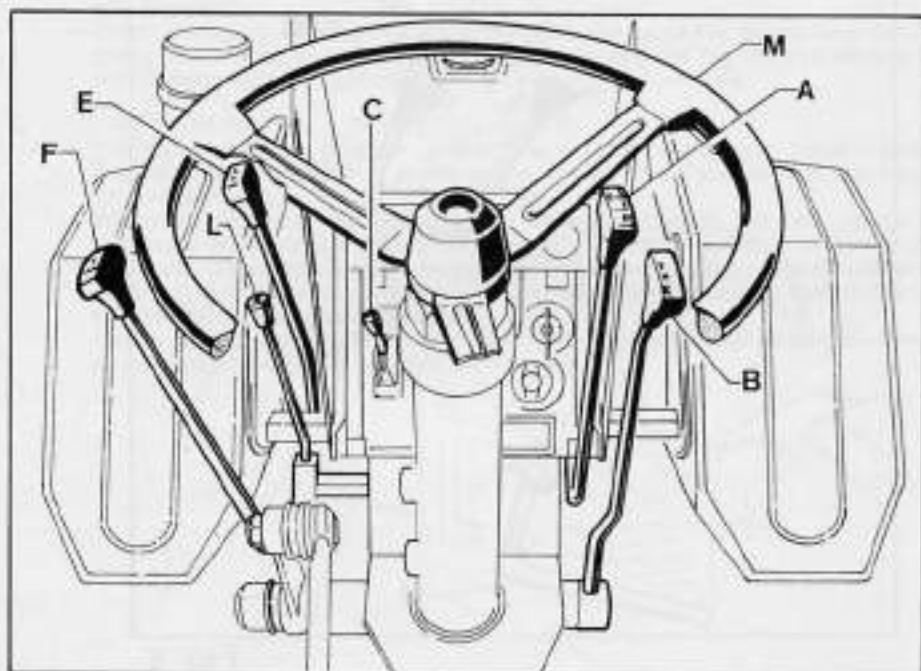
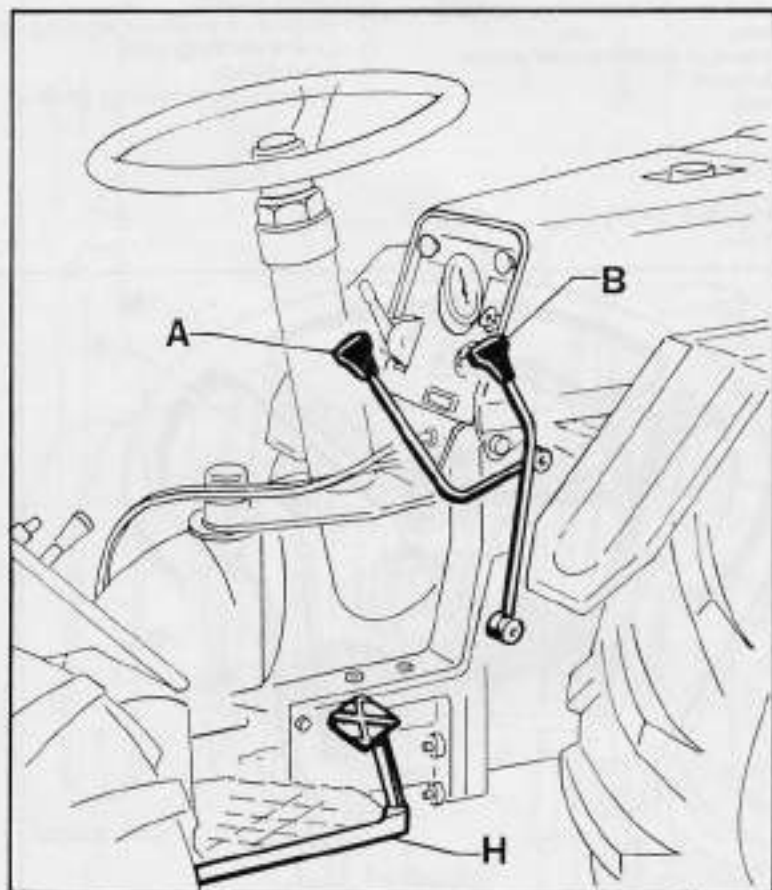


Fig 4

**A - GEAR CONTROL LEVER (fig. 4-5)**

- It is used to engage first forward gear, second gear, third gear, reverse.
- Three neutral positions are between each gear.
- Use the clutch before engaging each gear.

**Fig. 5**



B - RATIO CONTROL LEVER (fig. 4-5)

- For each gear engaged with lever A, three possible speeds can be selected by means of the ratio selector lever B which controls the engagement of low, normal, high speed gears to obtain 12 speeds (9 forward and 3 reverse) as shown in the table on page 4.
- Two neutral intermediate positions are alternated with the three engaged positions.
- The clutch must be depressed before engaging the ratio selector lever.

C - ACCELERATOR LEVER (fig. 4-6-10)

By lowering this lever the maximum acceleration of engine revolutions is obtained, by lifting it the number of revolutions decreases to the minimum.

D - CLUTCH PEDAL (fig. 6)

- Use of the clutch is essential before:
 - 1) engaging or disengaging the speeds
 - 2) engaging or disengaging the ratio lever
 - 3) engaging or disengaging the power take-offs
- Clutch pedal must always be depressed to its fullest extent and released gradually and gently.
- When changing speed, engaging the ratio selector or the power take-off if the gears do not engage immediately, it is better to activate the clutch a second time rather than push the control lever.

E - FRONT DIFFERENTIAL LOCK LEVER (fig. 4-6)

- The differential lock must be used only when it is necessary to travel in straight line (e.g. when ploughing) or when the wheels of the tractor skid due to poor ground adhesion.
- When the differential lock is engaged, the two axle shafts become integral as if they were one rigid axle. Therefore, use the differential lock only when it is really necessary avoiding steering (especially if the tractor is equipped with power steering), if the differential lock is engaged to prevent premature wear of the tyres and stress to the transmission gears.
- Gently jerking the steering wheel to the right or to the left will make the engaging or disengaging of the differential lock easier.

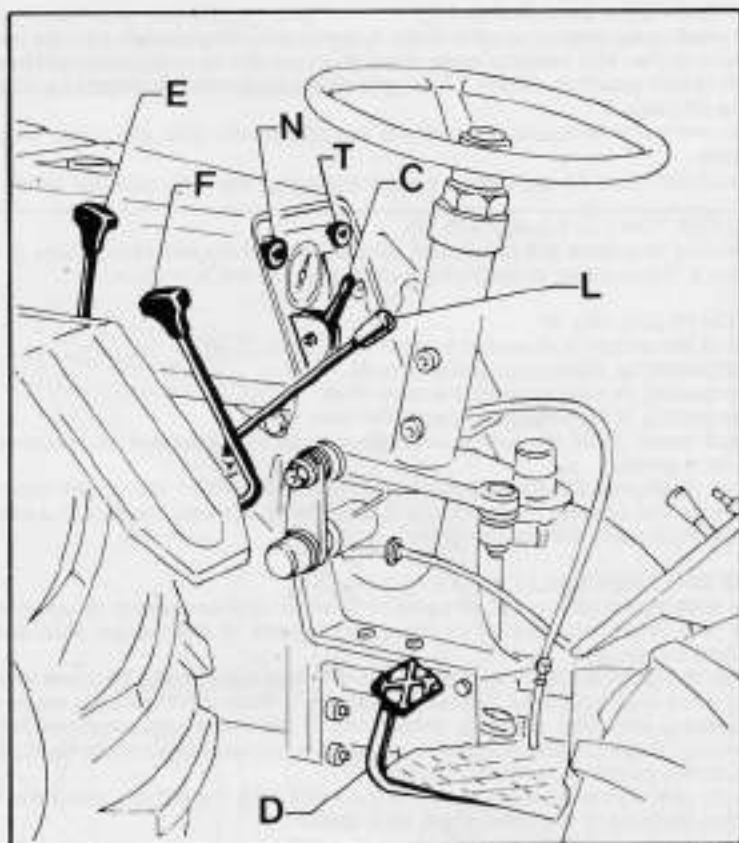


Fig.6

F - INDEPENDENT POWER TAKE-OFFS CONTROL LEVER (fig. 4-6)

- It is used to change the rotation speed of the two rear power take-offs (top one standardized Asa 1" 3/8) independently from tractor forward motion (see paragr. G); the power take-offs can operate either when the machine is in motion or stationary.
- The lever has also an intermediate neutral position to stop the rotation of the power take-offs.
- Before engaging, disengaging or changing the speed of the power take-offs, depress the clutch.

**G - INDEPENDENT OR SYNCHRONIZED POWER TAKE-OFFS LEVER (fig. 7)**

- In the rear housing there is a double coupling activated by means of lever G. When this lever is moved up, the two power take-offs rotate independently from tractor forward motion (as to the r.p.m. and rotation direction see page 5). When the lever is moved down the two power take-offs are synchronized with the r.p.m. of the rear drive wheels (for the synchronization ratio see page 5).
- The lever has also an intermediate neutral position to stop the rotation of the power take-offs.
- Before engaging or disengaging the independent or synchronized positions, use the clutch.

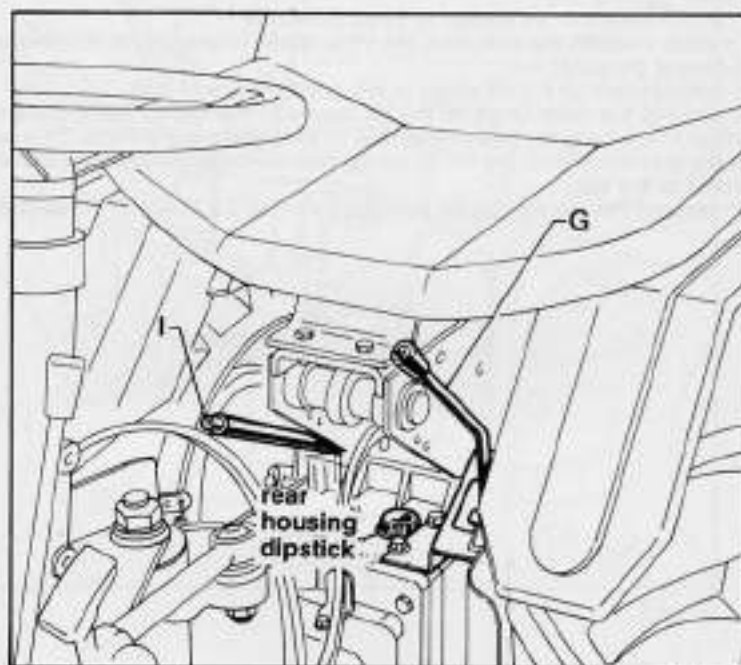


Fig. 7



H - BRAKE PEDAL (fig. 5)

The mechanical brakes of expanding shoe type act on the rear wheel drums. The setscrews on the adjustment levers give the possibility to adjust the shoe distance to obtain an equal braking effect on the two wheels. An offset-hole regulator (adjustment plate) allows to obtain the proper pedal movement as the brake lining wears.

I - HAND BRAKE LEVER (fig. 7)

It is used when the tractor is stationary and as an auxiliary brake in case of emergency. The control lever fitted with a lock pin acts on the shoes of the rear wheels by means of a mechanical linkage independent of the service brake.

L - HYDRAULIC LIFT CONTROL LEVER (fig. 4-6)

The lever L activating the rod of the hydraulic circuit distributor (fed by the hydraulic pump flanged to the engine), controls the oil flow to and from the rear ram. This ram powers the synchronous rotation of the two lift arms which by means of adjustable vertical lift tie rods raise or lower the (two points) implement carrier pivoting on the rear hubs (see fig. 13).

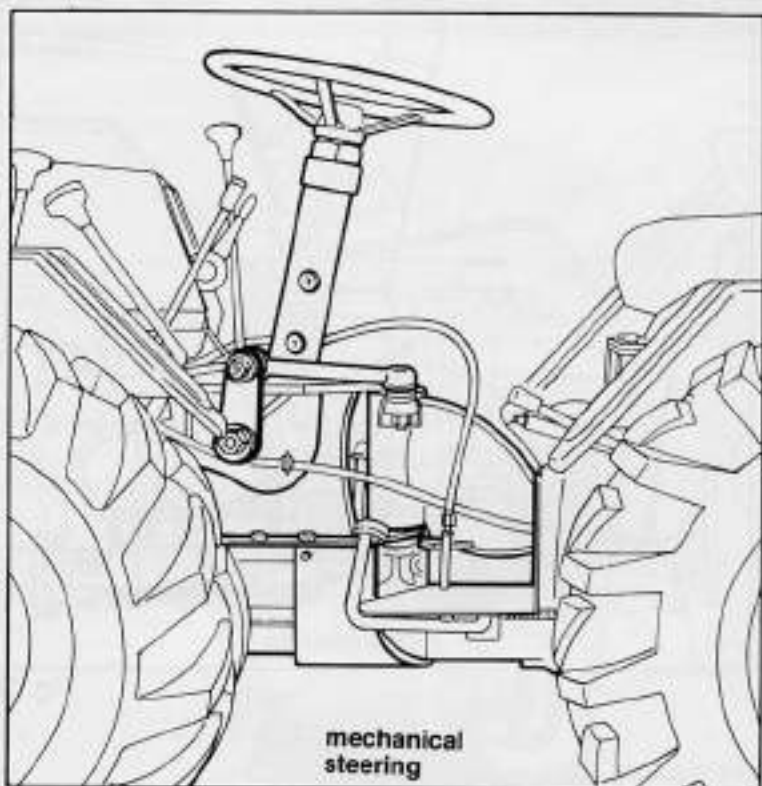
The control lever can be moved to three positions:

- 1) if moved towards the operator, the lift is raised to maximum; if released, it returns to central position;
- 2) in central position the lift stops in any position where it is;
- 3) by moving the lever forward, the lift lowers to the lowest point of travel, because the oil in the cylinder flows away due to the implement weight. This is the normal working position with the lift "floating" that is with the implement free to follow the profile of the soil.

Upon request the tractor can be equipped with an I.S.O. Cat. 1 three-point hitch.

**M - STEERING WHEEL (fig. 4-8)**

If turned to the left or to the right it moves a worm screw which by means of a lever activates the tie rod controlling the steering pivoting on the central articulation.

**Fig. 8**

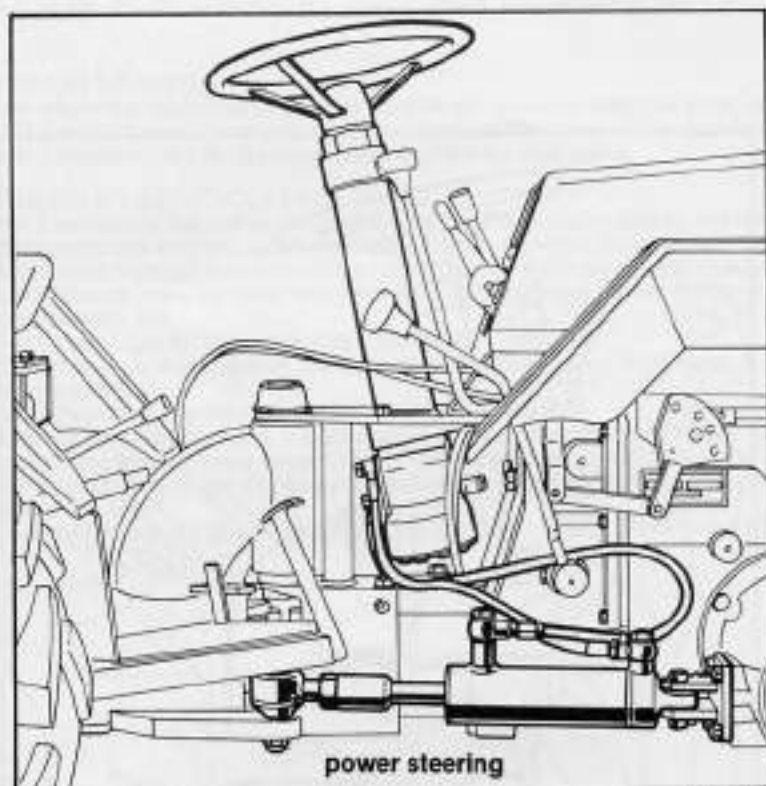


Fig. 9

POWER STEERING (upon request) (fig. 9)

The steering wheel, directly connected with the pivoting group of the power steering, when turned clockwise or anticlockwise allows the oil of the hydraulic circuit to flow into the ram controlling the steering. This practically avoids any manual effort on the steering wheel whose steering becomes particularly sensitive and accurate. Appropriate built-in shock-resistant valves assure the absorption of shocks coming from the wheels, where fore no reaction will be noticed on the steering wheel. All this assures an easy and safe drive.



Should the hydraulic system of the power steering fail by some mishap, the hydraulic steering already prearranged to work as hand pump allows to drive the tractor just the same; however a greater manual effort will be required to turn the steering wheel. This occurs also when it is necessary to steer with the engine not running.

N - ENGINE STOP KNOB (fig. 10)

It serves to stop the engine; when pulled it interrupts the flow of fuel to the injection pump thus stopping the engine. When released the knob returns to its prior position and is ready for the successive start. If the knob is in the pulled position the engine does not start. Do not stop the engine by turning or removing the key of the main switch because the engine would remain in motion and this might cause damage to the battery.

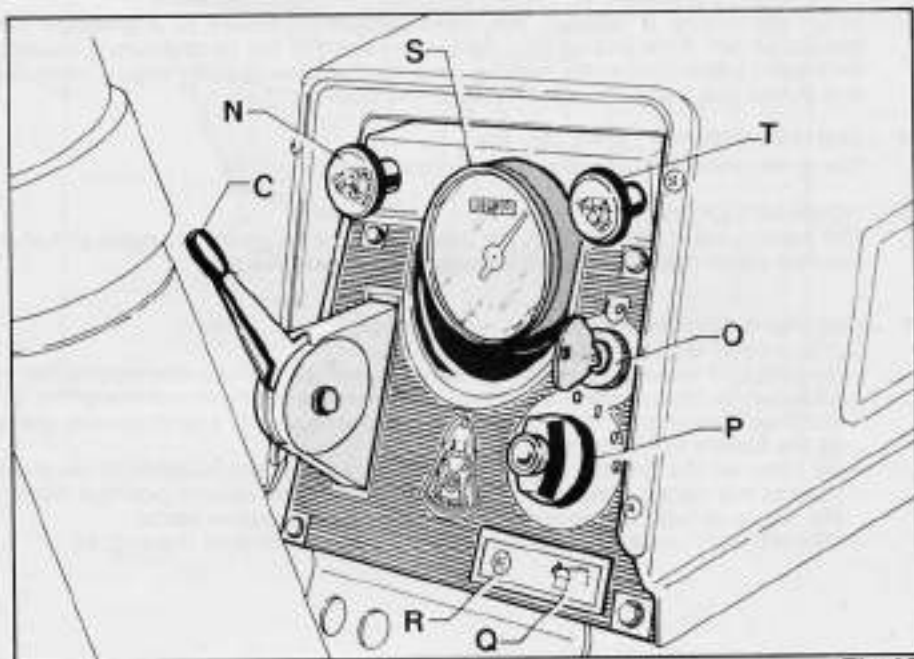


Fig.10

**O - MAIN SWITCH AND START KEY (fig. 10)**

It acts only by inserting its key. There are two positions: one if turned clockwise and the other if turned anticlockwise. In the first position, that is clockwise, the electric circuit is on (with the exclusion of the starter motor). In the second position the starter motor is activated but, as soon as the key is released, the switch returns to its first position by means of a return spring that is in the normal running position with the alternator recharging the battery and with the electric lighting and warning system on.

If the key is turned anticlockwise, the switch turns on the circuit of the lighting and warning light system which can be used with engine not running (parking position) for a short lapse of time to avoid discharging the battery completely. In this position the key can be removed.

P - LIGHT SWITCH (fig. 10)

With the main switch in "off" position the lighting system circuit is on; by turning the light switch clockwise the directional lights (including the licence-plate light) light up at the first position; at the second one the traffic beams are on. By turning the main switch to its original (open) position all lights turn off (fig. 11).

Q - OIL PRESSURE WARNING LIGHT (fig. 10)

When the engine is running, the warning light controlled by a pressure switch should go out. If it lights up (red light), it means that the oil pressure is insufficient for a good lubrication of the moving parts. In that case stop the engine immediately and do not use the tractor until the fault has been rectified.

R - LIGHTS WARNING LIGHT (fig. 10)

The green warning light lights up when the switch is put on.

S - HOUR-METER (fig. 10)

The instrument in the centre of the dashboard shows: r.p.m. of engine and of independent power take-offs, forward motion, run time in hours.

T - DECOMPRESSION KNOB

- It is used to facilitate starting.
- By pulling it the cylinder exhaust valve is opened thereby eliminating the compression in the bursting chamber; this reduces to minimum the effort of the starting motor to turn the driving shaft and consequently also the power absorbed by the battery will be reduced.
- As soon as the driving shaft has reached a sufficient number of revolutions, release the decompression knob; it will return to its normal position. Now with the return of full compression in the cylinder, the engine starts.
- **IMPORTANT:** never use the decompression knob to stop the engine.

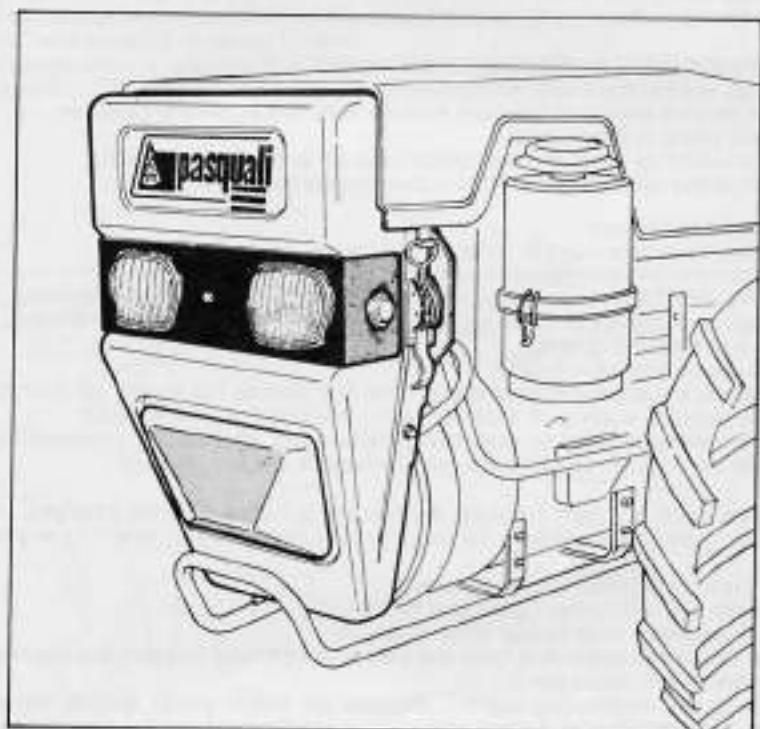


Fig.11



STARTING THE ENGINE

Before starting the engine always check:

- 1) engine oil level;
- 2) air filter oil level;
- 3) that the tank is sufficiently filled with fuel to prevent air from entering into the fuel line.

During the preparation for the start make sure that:

- 1) the tractor is stationary with the parking brake put on;
- 2) the gear change lever and the ratio selector lever are in neutral position;
- 3) the clutch pedal is depressed;
- 4) the independent or synchronized power take-off control is in neutral;
- 5) the lever of the rear hydraulic lift is in central position.

Then proceed as follows:

- 1) shift the accelerator control lever to half travel;
- 2) pull decompression knob without releasing it;
- 3) insert the ignition key in the switch and turn it clockwise to N. 2 position (contact with starting motor). Let the driving shaft turn for 3 or 4 seconds until it has reached a sufficient rotation speed;
- 4) release decompression knob;
- 5) after the first explosions release the ignition key; should the engine not start, try again for 3 or 4 seconds waiting 15 seconds before making the next attempt;
- 6) set the accelerator lever to minimum position and after having released the clutch pedal, let the engine run for some minutes until it is warm enough.

If the engine does not start because the battery is not sufficiently charged, start it by towing. This method should only be used if really necessary in which case proceed as follows:

- 1) attach the tractor to the towing vehicle;
- 2) engage the highest forward gear (3rd high);
- 3) set the accelerator lever to half travel position;
- 4) depress the clutch pedal and have the tractor towed until 15 km/h are reached;
- 5) release the clutch pedal gently;
- 6) as soon as the engine has started, depress the clutch pedal, setting the engine to tickover, the gear lever in neutral and unhook the tractor from the towing vehicle.

Turn now the starting switch key clockwise to first position and let the engine run at 1500 r.p.m. or so for several minutes in order that the alternator charges the battery for the next start.

IMPORTANT

If the engine is started without battery, detach the two yellow cables connecting the alternator to voltage regulator.



REFUELLING (fig. 12)

The tractor is fitted with a 4-stroke diesel engine. Fill fuel tank with diesel fuel before starting the engine. It is imperative that only such fuel be used in this engine. Refuelling should be carried out with the utmost care to avoid impurities entering the tank to prevent fuel blockage. When filling the tank always use a funnel provided with a mesh filter. Tank capacity is about 13 litres. Every 300 hours clean or change filter element in the tank bottom on the right. Also follow the instructions in "Engine Instruction Booklet".



Fig.12



STARTING THE TRACTOR

Before starting the tractor check the oil level in the

- front differential gearbox housing (fig. 2)
- rear differential housing (fig. 7)
- hydraulic circuit (fig. 3)

After starting the engine proceed as follows:

- release hand brake lever;
- depress clutch pedal;
- engage the most adequate gear for the work to be performed using the gear change and ratio selector lever;
- speed up the engine gradually and at the same time gently release the clutch pedal until the tractor is in motion;
- speed up gradually until the motion speed corresponding to the selected speed is obtained.

N.B. - Before activating one of the speed or ratio selector control levers always depress clutch pedal to its fullest extent.



USE OF TRACTOR

The high quality of the material used in the construction of Pasquali tractors is a guarantee; if the tractor is used properly it is also possible to obtain the best performances. We recommend you observe the following advice carefully:

USE OF THE MOST SUITABLE SPEEDS

The choice of the most suitable speeds for every type of work to be performed is considerably affected by many factors such as the type and slope of the land, the implements used, the load on the trailer, the turning radius to be made etc. The ideal speed and hence also the appropriate gear to be used are those which enable you to obtain the highest performances with the minimum fuel consumption. We basically recommend lower speeds for the work requiring considerable tractive efforts and the higher speeds for lighter work. It is a good rule to avoid submitting the engine to continuous overstress because its performance will be low and the exhaust very smoky owing to incomplete combustion. When the engine is overstressed, it has a tendency to reduce its revolutions even when the accelerator is at maximum; this is the typical case when it is necessary to use a lower speed.

USE OF DIFFERENTIAL LOCK

It must be used only when it is really necessary and for the time strictly indispensable. When ploughing it is used to prevent the wheels from slipping, to move forward in straight line and in case of soft soil, the wheels tend to slip due to poor ground adhesion. Always disengage it before turning to avoid damage to the transmission (especially if the tractor is fitted with power steering). Gently jerking the steering wheel to the right or to the left makes the engaging or disengaging of the differential lock easier.

USE OF POWER TAKE-OFFS

The tractor has two rear power take-offs (fig. 13 and 14).

The top power take-off shaft is standardized that is 1³/₈ (equal to 34,92 mm), has 6 splines, protrudes by 110 mm, has a transversal 8,3 mm Ø hole whose center line is at 25,4 mm from the rear end shaft plane. The bottom power take-off shaft ends by a two-tooth coupling suitable for attaching some Pasquali implements. (Option available to provide P.T.O. speeds up to 3000 R.P.M.)

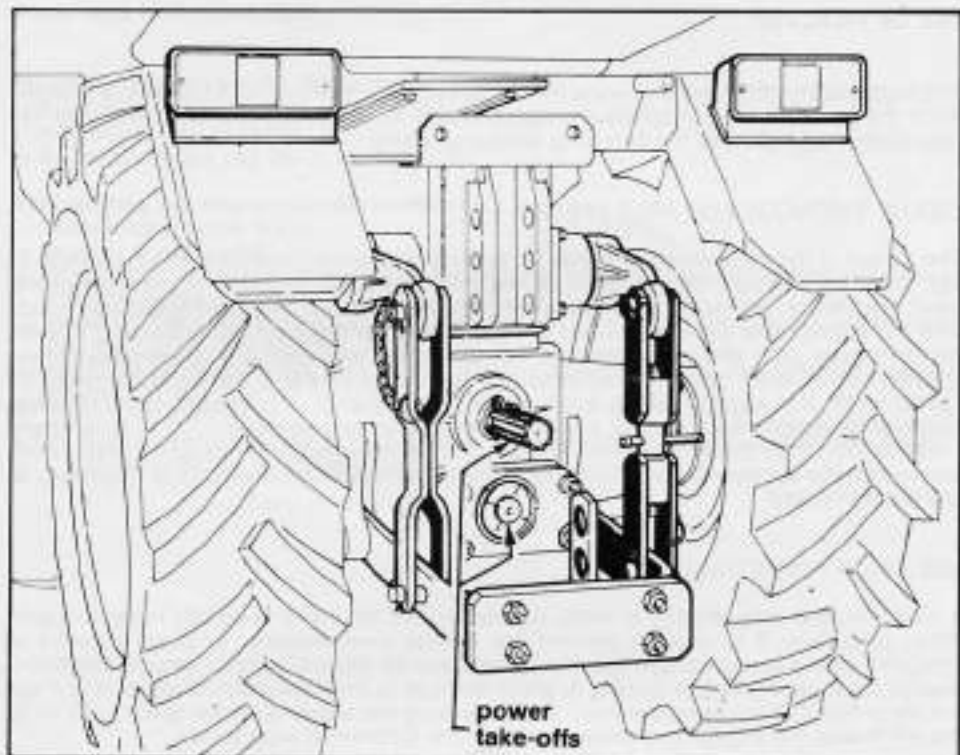


Fig. 13

The two power take-offs are connected by means of two gears and turn simultaneously. When engaging the power take-offs (levers F and G) always make sure that the engagement is complete; an incomplete engagement may cause wear or damage.

The synchronized power take-offs operate with the tractor forward motion only and serve basically to drive a trailer with drive wheels.

Synchronization ratio:

top power take-off = 1:6,38

bottom power take-off = 1:6,61

The size of tyres and the reduction ratio of the trailer gears must be selected on the basis of the r.p.m. of the driving power take-off.

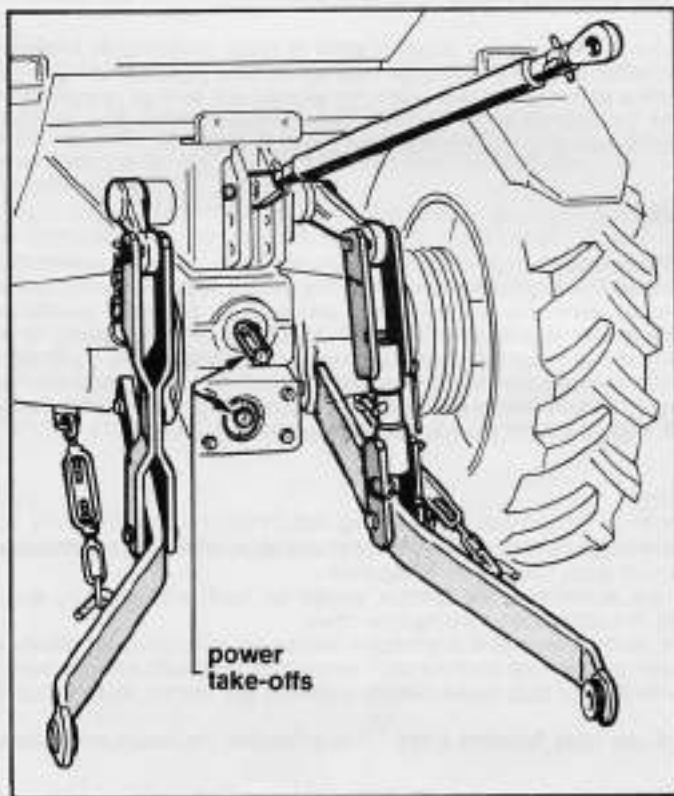


Fig. 14

Important: when a trailer with drive wheels is attached to the tractor, the power take-off driving the trailer differential must always be engaged in the synchronized position. An incorrect engagement of the power take-off in "independent" position would cause the breaking of transmission parts.

The power take-offs used in the "independent" position (two speeds) operate independently of the drive wheels transmission and being the ratio of their revolutions proportional to the engine speed they can drive the various implements both when the tractor is stationary and when in motion (for example in the case of rotary tillers, pumps, sprayers, hole augers, generators, winches, wood choppers, cutter bars etc.).



IMPROVEMENT OF TRACTOR SIDE STABILITY

To adapt the tractor to the working requirements of some implements and special cultivations and to increase its side stability on hilly lands, it is possible to widen the tractor track by means of the appropriate rear and front extensions and by reversing the wheels, whenever possible, by changing the right wheels with the left ones and viceversa making sure that tyre tread is pointing toward the front of the tractor.

USE OF BALLAST

When the tractor undergoes high tractive efforts and very heavy implements are used which may jeopardise its longitudinal stability, the wheels, even if the differential lock is used, can slip due to poor ground adhesion; this causes losses of power and speed, higher fuel consumption and wear of tyres. In this case it is necessary to ballast the tractor by applying the appropriate cast iron traction weights to the front wheels and if necessary to the rear wheels too. Never use ballast other than that recommended by the manufacturer. Never ballast the tractor if it is not necessary; this, beside being useless, can be harmful. A higher weight also increases fuel consumption.

CHOICE OF TYRES

The choice of the most suitable tyres has to be made in consideration of the type of soil in which the tractor will work keeping in mind that:

- narrow tyres are suitable if the tractor works on hard soil offering good traction conditions and in cultivations with narrow rows;
- wide tyres are recommended if the tractor works on soft (muddy, sandy etc.) soils, since their wider supporting surface with respect to that with narrow section reduce the possibility to skid or bog down beside allowing the tractor to enhance its traction force.

Important: Do not use wide flotation tyres, heavily loaded, for heavy operations.



Periodically check the inflation pressure of the tyres (when they are cold).

Make sure that:

- front and rear tyre inflation pressure is basically 1,5 atm. in condition of load balanced on both axles;
- in case of particular load conditions, however, inflation pressure should be adjusted so as to allow the front carriage to always tow the rear one with a skidding ratio within 1÷1,5% as foreseen by the different transmission ratio of the pinion/crown and differential on both axles;
- the above is important especially when the tractor is often used for road travel also because "agricultural" tyres are not destined to road travel;
- when a tyre is overloaded it reduces its rolling height and hence also its speed;
- when using the tractor avoid that the tyres — especially the tyre sides — bump into sharp edges;
- at the end of a working day check the state of the tread and remove the rocks that may have gone stuck in the tyres.

If the tyres have to be replaced owing to wear or other reasons it is advisable to replace the 4 tyres by new ones of the same make; this with a view to avoiding that the inevitable rolling difference in tyres of different make may cause skidding and hence premature wear.

IMPORTANT

Never keep your left foot on the clutch pedal when the tractor is in motion; even the slightest pressure on the pedal might cause rapid wear or burning of the clutch plate.



CHECKS DURING OPERATION

During the period of use always make sure that the tractor works in perfect order. If not, stop engine immediately, troubleshoot and take action to eliminate the causes.

FUEL TANK (fig. 12 and 15)

Make sure not to run out of fuel otherwise air might enter the engine feeding circuit in which case it would be necessary to drain it as described on page 6. It is advisable to fill the fuel tank also at the end of a working day to avoid — especially at night — that a water vapour may condense on the inside walls of the tank causing the formation of water.

ENGINE OIL PRESSURE (fig. 10)

The warning light on dashboard must turn off just a few seconds after the engine has started. Should it remain on or suddenly light up during the regular operation of the engine, warning that insufficient pressure is in the lubrication circuit, stop the engine immediately otherwise serious damage may ensue. Insufficient oil pressure may be caused by one of the following reasons:

- insufficient oil in the engine oil sump
- obstructed filter
- r.p.m. too low
- not appropriate oil viscosity
- faults in the pump or circuit

Important: the warning light might light up if the engine is very hot at the minimum of r.p.m.; however, if speeding it up a little it turns off immediately, it is only due to the regular thermal expansion of the main bearings.

MAIN STARTING SWITCH (fig. 10)

When the engine is running the switch key should always be in the first click position in clockwise direction.

If during the operation the key is turned in the removing position, beside excluding the engine oil pressure warning light it also excludes the voltage regulator and this might cause the gassing of the electrolyte since the battery gives a constant charge. So do not remove or turn the key in the removing position if the engine is running.



GRADE OF EXHAUST SMOKE

- Excessive exhaust smoke is due to faulty ignition and operation. The colour of smoke gives useful information for troubleshooting.
- **BLACK SMOKE** is generally caused by incomplete fuel combustion; the reason can be:
 - engine overloaded (it is necessary to engage a lower speed);
 - air filter obstructed;
 - faulty operation of the injectors;
 - injection pump out-of-tune or faulty timed.
- **BLUE SMOKE** is caused by oil entering the combustion chamber. First of all check if the trouble is caused by an excessive quantity of oil in the air filter; if the level is correct and the engine oil consumption is abnormal contact a specialized workshop.

IMPORTANT

When opening the hood for any inspection with running engine the gear control lever A must be moved to neutral position between the 1st gear and the reverse gear and the ratio selector lever B to one of the two neutral positions.

STOPPING THE ENGINE

- Before stopping the engine make sure that the control levers are in neutral position; then pull the stop knob. Do not try to stop the engine by turning and removing the switch key because the engine would continue running with the exclusion of the voltage regulator and damage to the battery would ensue.
- Turn and remove the switch key only when the engine is not running.
- If the tractor has worked for a long time and the engine is very hot it is advisable to let it run at the lowest speed for a few minutes to obtain a more gradual cooling.



ELECTRIC STARTING AND LIGHTING SYSTEM

BATTERY (fig. 15)

The electric lighting and starting system is equipped with a 62 A/h 12 Volt battery. Check the electrolyte level in each element at least every 50 working hours. Check it before starting work when the battery is at rest. The electrolyte should completely cover the battery cells by 1 cm. If the electrolyte level is low top it up with distilled water. The battery must be kept clean and dry especially the top part.

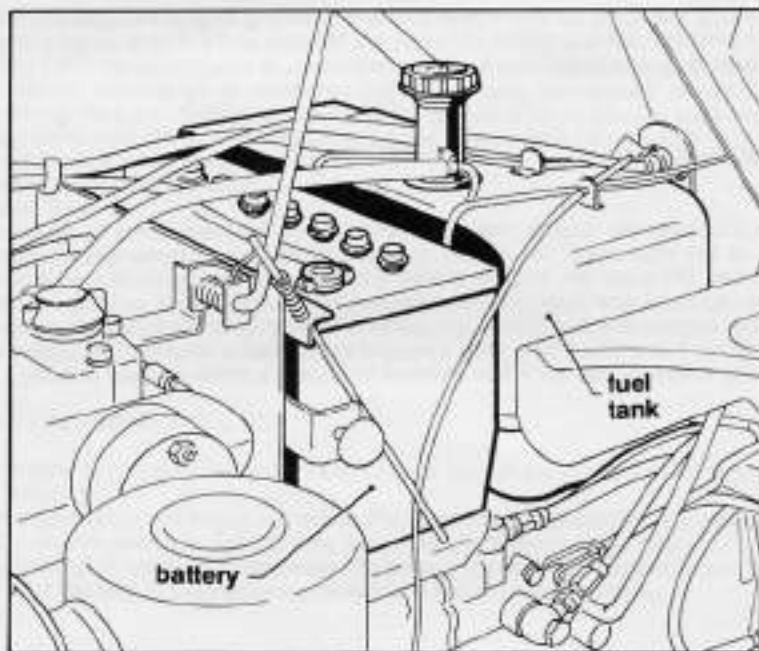


Fig. 15

Make sure that the terminals are well connected to the battery poles and often smear them with pure vasoline.

To tighten and unscrew the terminals nuts, use a spanner but before disconnect the earth cable.

**Important:**

- never keep the light on when the engine is not running;
- never let the battery discharge completely;
- never recharge it with external means if not disconnected;
- never invert the terminals;
- make sure that the polarities of the battery and battery charger are correct;
- if the battery requires frequent topping up with distilled water apply to a specialized workshop.

ALTERNATOR

The electric system is fed by an alternator generating plenty of current to recharge the battery.

To obtain a satisfactory operation of the alternator it is necessary to observe some rules because the diodes and transistors in the rectifier circuit are sensitive to overloads and reversion of polarity.

When the alternator is operating:

- 1) never disconnect the cables between the voltage regulator, the alternator and the battery;
- 2) never short-circuit the terminals of the alternator and voltage regulator between them and never earth them.

Generally the alternator does not require any maintenance.

In case of overhauling carefully clean commutators, check brush and rectifier diodes. Grease axle bearings every 2000 hours. All these operations should be done by specialized mechanics.

REGULATOR OF ALTERNATOR

No maintenance is required.

Any trouble, however, should be fixed by a specialized motor vehicle electrician and by no means by unskillful persons. Its checkover requires appropriate tools and technique.

STARTER MOTOR

It does not require either maintenance or lubrication. When starting it if the engine does not start immediately and further attempts have to be made, between one attempt and the other wait until the motor pinion has completely stopped.



FUSES (fig. 16)

The electric system is equipped with fuses to protect the lights and the starting system. Should a fuse blow, replace it by another with the same amperage. If this happens again, have the system checked by a motor vehicle electrician.

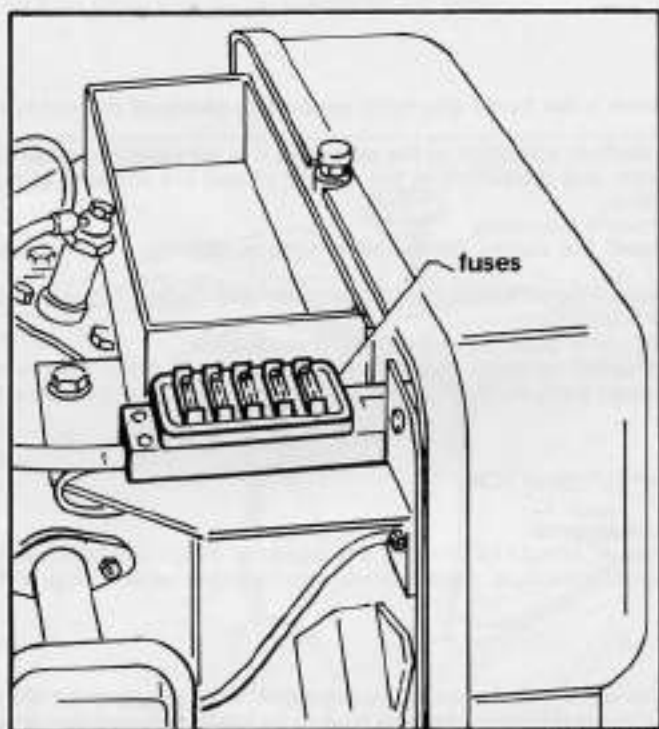


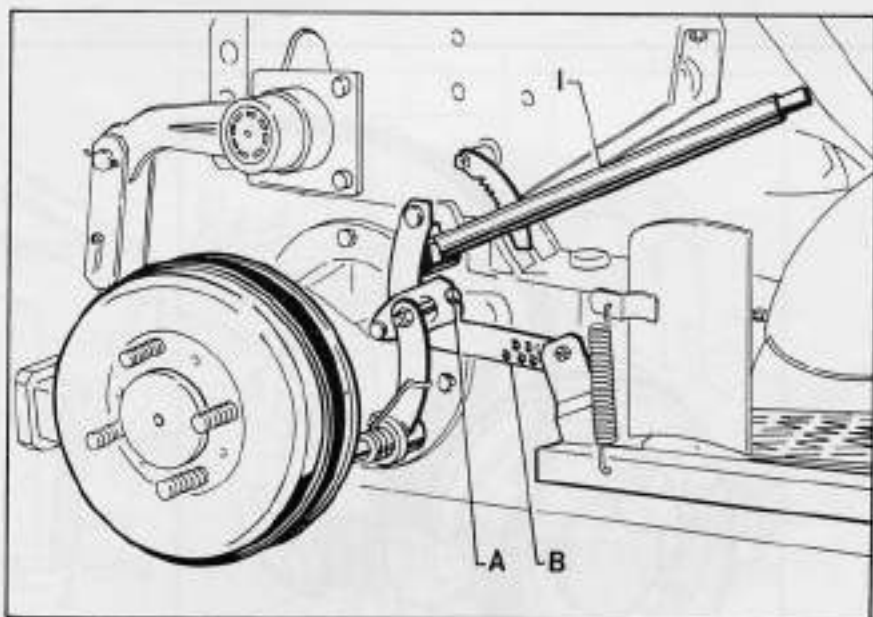
Fig.16

REAR SOCKET

When a trailer is attached to the tractor by inserting its electrical plug in the tractor socket (situated in the rear right lights assembly) it is possible to use the rear lights necessary for road travel.

**BRAKING SYSTEM (fig. 17-18)**

The braking system is mechanical and operates the brake shoes which act on the cast iron drums of the rear wheels.

**Fig.17**

For a correct use of the brakes it is necessary that the considerable braking effect is well balanced on the two wheels. The brakes are therefore of large diameter type with possibility of adjustments. The rear adjustment levers are fitted with setscrews (A - fig. 17) necessary to obtain a correct adjustment of the shoe travel and the synchronous braking of the two wheels. A plate with offset holes (regulator - B - fig. 17) fixed under the footboard allows adjustment to the foot brake as the brake shoes wear.

If the tractor, owing to the continuous use, does not travel in a straight direction when the brakes are activated, it is due to the poor braking action of one of the brakes. In this case adjust the brakes to restore the braking effect on both wheels.



Check the efficiency of the braking system at least every 100 working hours and any fault should be eliminated immediately.

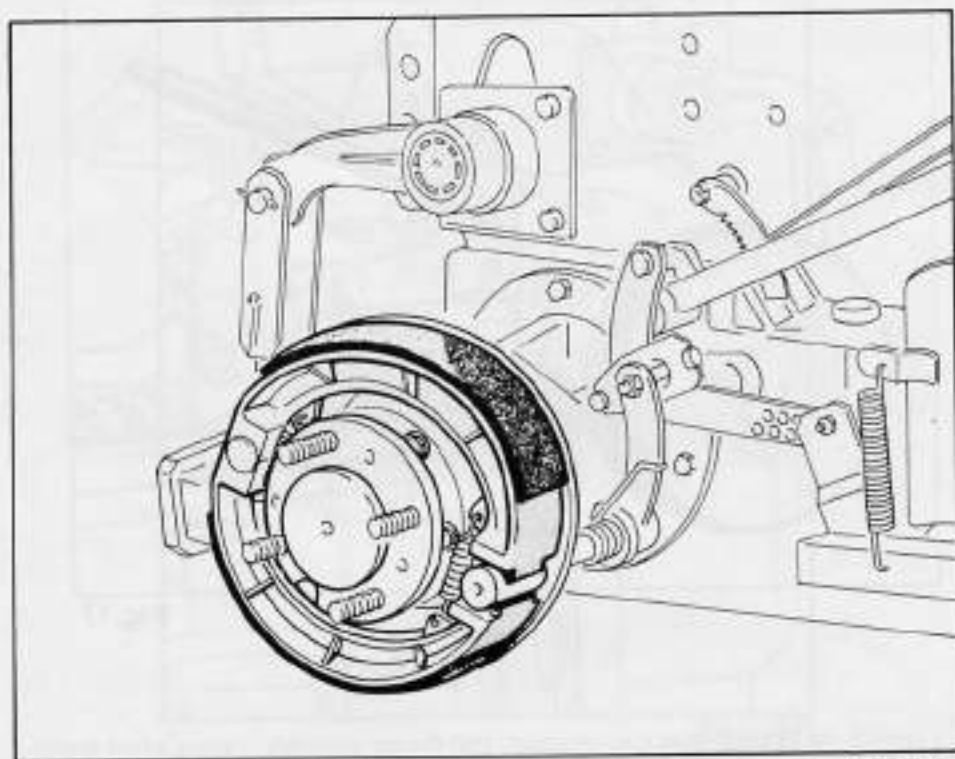


Fig 18

When going down a slope especially with a loaded trailer attached to the tractor, always brake with the engine using the same gear required if going uphill on the same route.



CLUTCH ADJUSTMENT (fig. 19)

To ensure that the clutch correctly connects the engine to the gearbox the clutch pedal must have a 3 cm free travel before disengaging the clutch.

After some time the free travel will reduce owing to the wear of the clutch plate. When the clutch travel is below a certain limit it must be adjusted to avoid slipping, overheating and wear of clutch.

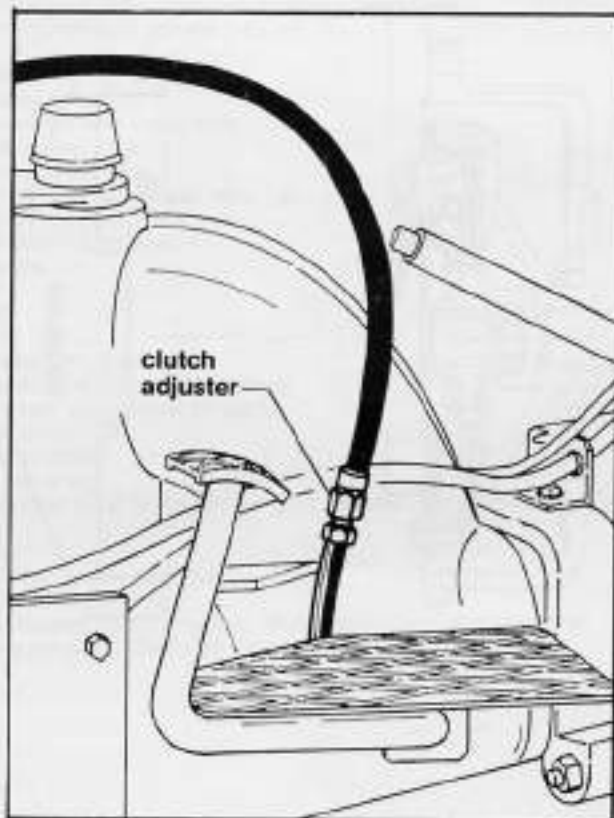


Fig.19



The distance is adjusted by the appropriate setscrew adjuster situated on the footboard at the base of the control cable (fig. 19).
When the adjustment is not possible because there is no more play to the setscrew adjuster, the clutch plate must be replaced.

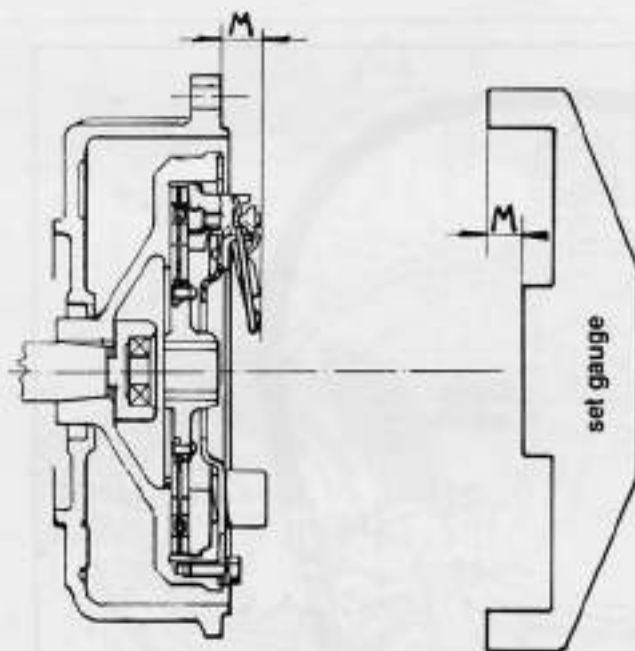


Fig. 20

Once replaced check that the distance M indicated in the figure is $19,5 \pm 0,05$ mm. The adjustment is effected by the screws of the 3 plates of the pressure plate using the appropriate set gauge supplied on request.



SCHEDULE OF MAINTENANCE

To obtain the best performance and a long life of the tractor the following periodical inspections are necessary:

EVERY 8 HOURS

- check engine oil level
- change air filter oil (in very dusty conditions every 5 hours)
- clean air filter

EVERY 30 HOURS

- grease top double cardan joint (2 grease nipples)
- grease rear hydraulic lift arm (3 grease nipples)
- grease central articulation (1 grease nipple)

EVERY 60 HOURS

- grease clutch pedal pin
- grease brake pedal pin and lever pins
- grease hand brake lever pins
- grease gear control lever pins
- grease independent P.T.O. control lever pin
- grease hydraulic lift control lever pins
- grease rear hydraulic lift rockshaft
- check tyre pressure

EVERY 100 HOURS

- change engine oil
- check electrolyte battery level
- check oil level of front differential gearbox
- check oil level of rear differential assembly
- check and adjust clutch play
- check and adjust brakes
- check regular tyres wear
- tighten all screws and nuts of tractor (engine, wheels, hubs, steering wheel etc.)

EVERY 300 HOURS

- change or accurately clean fuel filter
- change engine oil filter cartridge
- check density of battery electrolyte and recharge battery, if necessary
- check hydraulic system oil level and clean filter



EVERY 500 HOURS

- clean engine cooling fins
- clean engine feed pump membrane
- check and set injectors and injection pump
- check and adjust opening and closing play of engine valves

EVERY 1000 HOURS

- change oil of front differential gearbox
- change oil of rear differential
- change oil of hydraulic system

EVERY 2000 HOURS

- grease alternator shaft bearings (maintenance to be made by a motor vehicle electrician).
-

PRECAUTIONS TO BE TAKEN BEFORE LAYING UP

In case of a rather long period of inactivity, proceed as follows:

- 1) clean all the tractor outside;
- 2) remove the air filter and clean it carefully (see Engine Instruction Booklet);
- 3) check that oil lubrication plugs do not leak;
- 4) grease all not painted parts;
- 5) disconnect the terminals from the battery poles and smear both of them with vaseline;
- 6) fill tank with fuel to maximum level;
- 7) store the tractor in a neither damp or dusty place and if possible lift it from the ground laying it on appropriate stands;
- 8) cover the tractor with a protective canvas.

When the tractor is to be used again, arrange for all the inspections outlined in paragraph "Checking the new tractor" (page 6).


LUBRICATION TABLE FOR TRACTOR 986

Oil filling points	Lubrication type			Quantity	Lubrication interval
	With temperatures from + 30° to - 10°C	With temperatures from - 10°C to - 40°C	With temperatures from - 10°C to - 40°C		
ENGINE	Agip oil Super diesel 15W/40 (ref. MIL-L-2104 C)	Agip oil SAE 5W/20	Agip oil SAE 5W/20	2,6 kg	Every 100 hours (in case of a new engine change it after the first 20 hours)
AIR FILTER	same oil as for engine	same oil as for engine	same oil as for engine	0,3 kg	Every 8 hours
FRONT HOUSING	Agip oil Rotra SAE 85W/140	Agip oil Rotra THT (Massey Ferguson specif. 1135)	Agip oil Rotra THT (Massey Ferguson specif. 1135)	10 kg	Every 1000 hours
REAR HOUSING	Agip oil Rotra SAE 85W/140	Agip oil Rotra THT (Massey Ferguson specif. 1135)	Agip oil Rotra THT (Massey Ferguson specif. 1135)	5,2 kg	Every 1000 hours
HYDRAULIC SYSTEM	Agip oil OSO 68	Agip oil ARNICA 22	Esso oil INVAROL 40 EP	3 kg	Every 1000 hours
- CARDAN JOINT - CENTRAL ARTICULATION - HYDRAULIC LIFTING ARM	Agip grease 30	Multipurpose Consistence 2	Multipurpose Consistence 2		Every 30 hours
PINS AND SETSCREW ADJUSTERS WITHOUT GREASE NIPPLES	Agip grease 30	Multipurpose Consistence 2	Multipurpose Consistence 2		Every 60 hours

Change oil at the beginning of each season



SAFETY INSTRUCTIONS

The Pasquali line of tractors has been designed and tested with this goal in mind; "to reduce or minimize the potential for accidents". However, with careless or improper operation, coupled with inadequate maintenance, the possibility for personal injury to the operator increases. The following listed safety instructions are meant to remind the operator of some of the more obvious hazards associated with operating mechanical equipment coupled with some less obvious operating characteristics associated with articulated tractors. Please read them carefully before operating our equipment.

Before operating:

- 1) Read this manual thoroughly; be familiar with all of the controls and know how to stop quickly.
- 2) Keep all safety shields in place and confirm that all safety devices are operable.
- 3) Wear long pants and substantial shoes. If you are working in heavy brush or in orchards with low-hanging limbs, safety glasses and a helmet are advisable.
- 4) Start the tractor only when the clutch pedal is fully depressed disengaging the drive clutch.
- 5) Verify that the PTO speed selection lever is in neutral. If you are not using the PTO, the 1-3/8" 6-splined stub shaft should be removed and stored in the toolbox under the front hood.

While operating:

- 6) Start and operate the tractor only while sitting in the seat.
- 7) Before starting the engine:
 - a) Assure drive transmission levers are in neutral.
 - b) Assure PTO shift lever is in neutral.
 - c) Set the parking brake.
 - d) Depress the clutch fully.
- 8) After starting the engine, release the clutch slowly to confirm the transmission levers are in fact, in neutral.
- 9) Do not run the engine in a closed area without adequate ventilation. The exhaust fumes can cause great discomfort and might prove to be hazardous.
- 10) The tractors are designed to be operated by a single person. Under no circumstances should they carry passengers.
- 11) Operating these tractors safely requires constant attention; to minimize risks and maintain control, the operator should:
 - a) Operate the equipment only in daylight or where there is good artificial light.
 - b) Watch for deep holes or other hidden hazards.
 - c) Do not drive too closely to deep ditches, creeks or other hazards.
 - d) Reduce speed when on rough terrain or making sharp turns, particularly when on a hillside.
 - e) Avoid sudden stops and starts.
 - f) Do not leave the tractor unattended while it is running.
 - g) Keep the tractor in gear while going down a steep grade.
 - h) Adjust the weight distribution if wheels come off the ground.
- 12) Shut off the engine and set the hand brake before making any adjustments or repairs on the tractor.



- 13) Do not touch the engine or muffler while the engine is running. It is not enough to cause a burn.
- 14) To reduce fire hazard, keep the engine free of grease, grass, leaves or other flammable material.
- 15) Do not over-speed the engine. Maximum speed of the engine is 3.000 RPM's unloaded. Any adjustments to the governor settings should be made by a trained, authorized dealer, using an external tachometer.
- 16) Do not check the engine oil level or hydraulic oil level with the tractor running. Do not add hydraulic oil or engine lubricating oil with the engine running.



TABELLA LUBRIFICAZIONE

1) SOLLEVATORE IDRAULICO - Olio AGIP F.I OSO 55: Kg. 3

2) MOTORE

Olio Agip F.I Diesel Sigma SAE 40 (Estate) Kg. 2,800

Olio Agip F.I Diesel Sigma SAE 20W/20 (Inverno) Kg. 2,800

Cambio olio dopo le prime 20 ore di lavoro

Cambio olio ogni 100 ore successive

3) FILTRO ARIA - Riempimento a livello con lo stesso olio del motore
Cambio olio ogni 8 ore di lavoro in ambiente normale
Cambio olio ogni 5 ore di lavoro in ambiente polveroso

4) STERZO - Agip F.I. ROTRA SAE 140: Kg. 1,200
Controllare livello ogni 500 ore di lavoro (eventualmente rabboccare)

5) GRUPPO POSTERIORE - Agip F.I ROTRA SAE 140: Kg. 5
Cambio olio ogni 1000 ore di lavoro

6) TAPPO SCARICO OLIO MOTORE

7) GRUPPO CAMBIO - Agip F.I ROTRA SAE 140: Kg. 10
Cambio olio ogni 1000 ore di lavoro

8) TAPPO SCARICO OLIO GRUPPO CAMBIO

9) GIUNTO CARDANICO - Agip F.I GREASE 30
Ingrassare ogni 30 ore di lavoro

10) SNODO CENTRALE E BRACCI SOLLEVAMENTO - Agip F.I GREASE 30
Ingrassare ogni 30 ore di lavoro

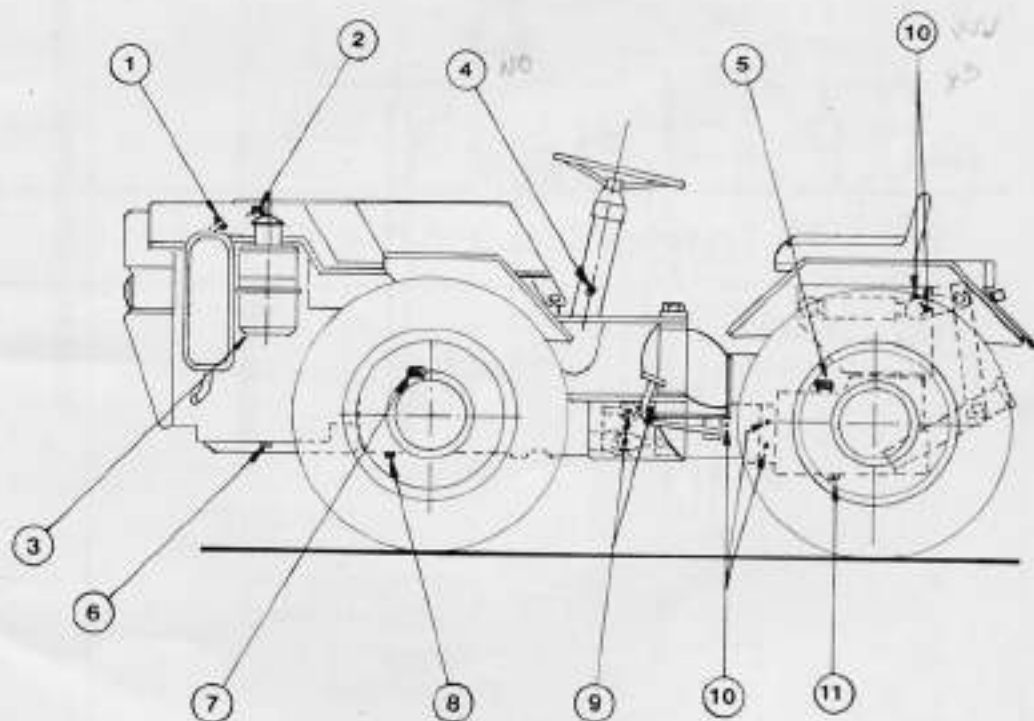
11) TAPPO SCARICO OLIO GRUPPO POSTERIORE



La trattrice viene consegnata completamente rifornita di olio*; comunque, prima di metterla in funzione, assicurarsi che le quantità siano a livello; lubrificare inoltre tutte le parti munite di ingrassatori.

Per quanto riguarda il motore, attenersi a quanto specificato sull'allegato libretto del costruttore.

* Olio di rodaggio da cambiare dopo 30 ore di lavoro.



+ P501

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