manuale d'officina
manuel d'atelier
workshop manual
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SAME

TITAN 160
TITAN 190

Servizi Commerciali di Gruppo

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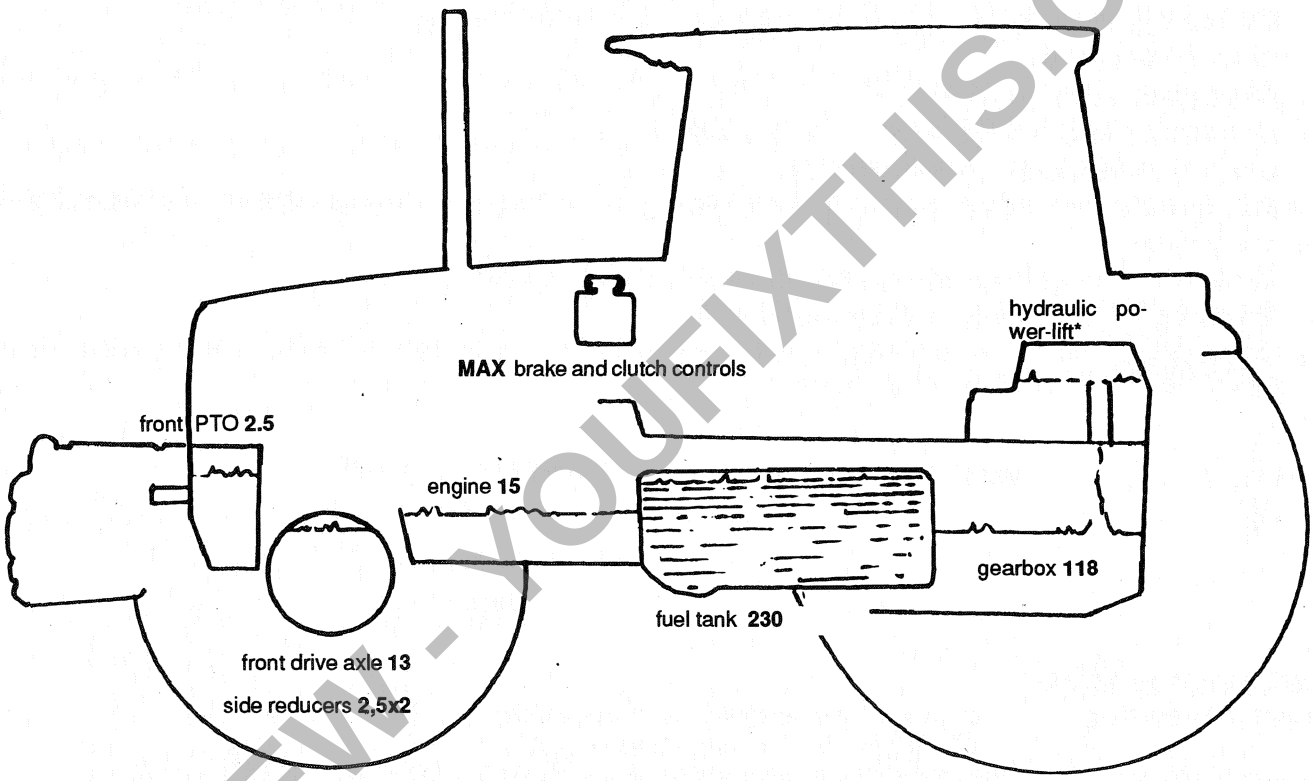
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FILLING OPERATIONS

quantities are in liters



* Total transmission oil plus hydraulic services - 16 litres remain within power-lift case and can flow back into gearbox only after removing the special level tube.
Part of the oil remains in the hydrostatic steering cylinder and power-lift lines.

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ENGINE RUNNING-IN
first 100 hours of operation

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The tractor is delivered to the customer ready for use under full power due to the exhaustive inspections to which the engine is subjected in our testing rooms.

Nevertheless, **FOR THE FIRST 50 HOURS' RUNNING**, it is recommended that the tractor not be run at maximum load for long periods, so as to enable the piston rings, as well as the various moving parts, to bed properly.

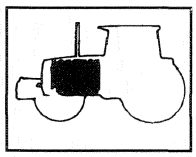
During this period we strongly recommend refraining from running the engine at low r.p.m. for long periods or running it at high r.p.m. when in neutral, as either situation is harmful and would result in engine components becoming bedded in such a way that the MAXIMUM ENGINE PERFORMANCE will not be guaranteed.

For satisfactory running-in, the following should be observed:

— whenever the engine is started up, it should be allowed to idle for a few minutes;
— avoid using the engine continuously at low or at high idling speeds with light loads;
— during the first 20 hours' work do not use the engine with excessively high loads; use tractor under full load for gradually longer periods;
— before stopping the engine, let it run for a few minutes at low idling speed;
— be sure to carry out the maintenance and checking operaations listed below:

during early hours' running	engine oil level:	check frequently
at 50 hours	change engine oil and filter:	use recommended oil only; before fitting the filter, oil the sealing ring

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specifications

type		1000.6-ATI
cycle		diesel
strokes		4
injection		direct
number of cylinders		6
cylinder arrangement		in line
bore x stroke	mm	105x115.5
stroke/bore ratio		1.1
displacement	cm^3	6000.66
compression ratio		16:1
maximum horsepower	HP CUNA kW	156 115
maximum horsepower speed	r.p.m.	2350
maximum torque	Nm	597
maximum torque speed	r.p.m.	1400
specific horsepower	kW/l	18.75
average piston speed (at max. speed)	m/min	9.040
minimum idling speed	r.p.m.	650÷700
maximum idling speed	r.p.m.	2520÷2550

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Operating efficiency, low fuel consumption and essential maintenance are the major goals achieved through the design of these engines. Modular construction is the fundamental principle permitting over 80% of components to be standardized.

These engines adopt our traditional and worldwide tested air-cooling system. In addition, the lower parts of both pistons and cylinders are kept at a constant temperature by a new auxiliary oil cooling system.

This provides further improvement in thermodynamic efficiency and a prompt engine response after a cold starting, with the latter already a typical property of our air-cooled engines.

Besides reducing the machine idle time after engine start-up, the engine warm-up time, during which major wear usually occurs, is greatly reduced.

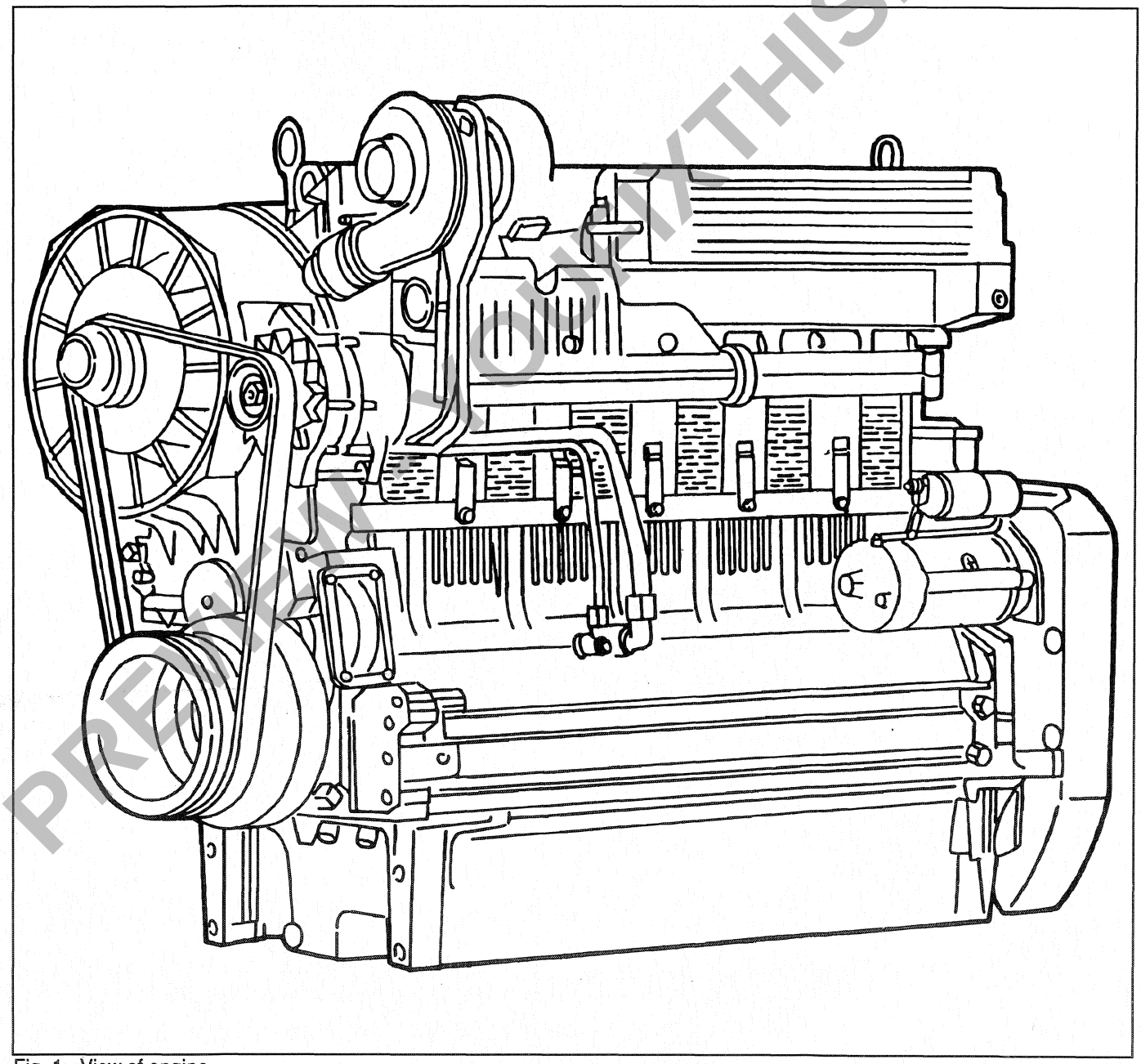
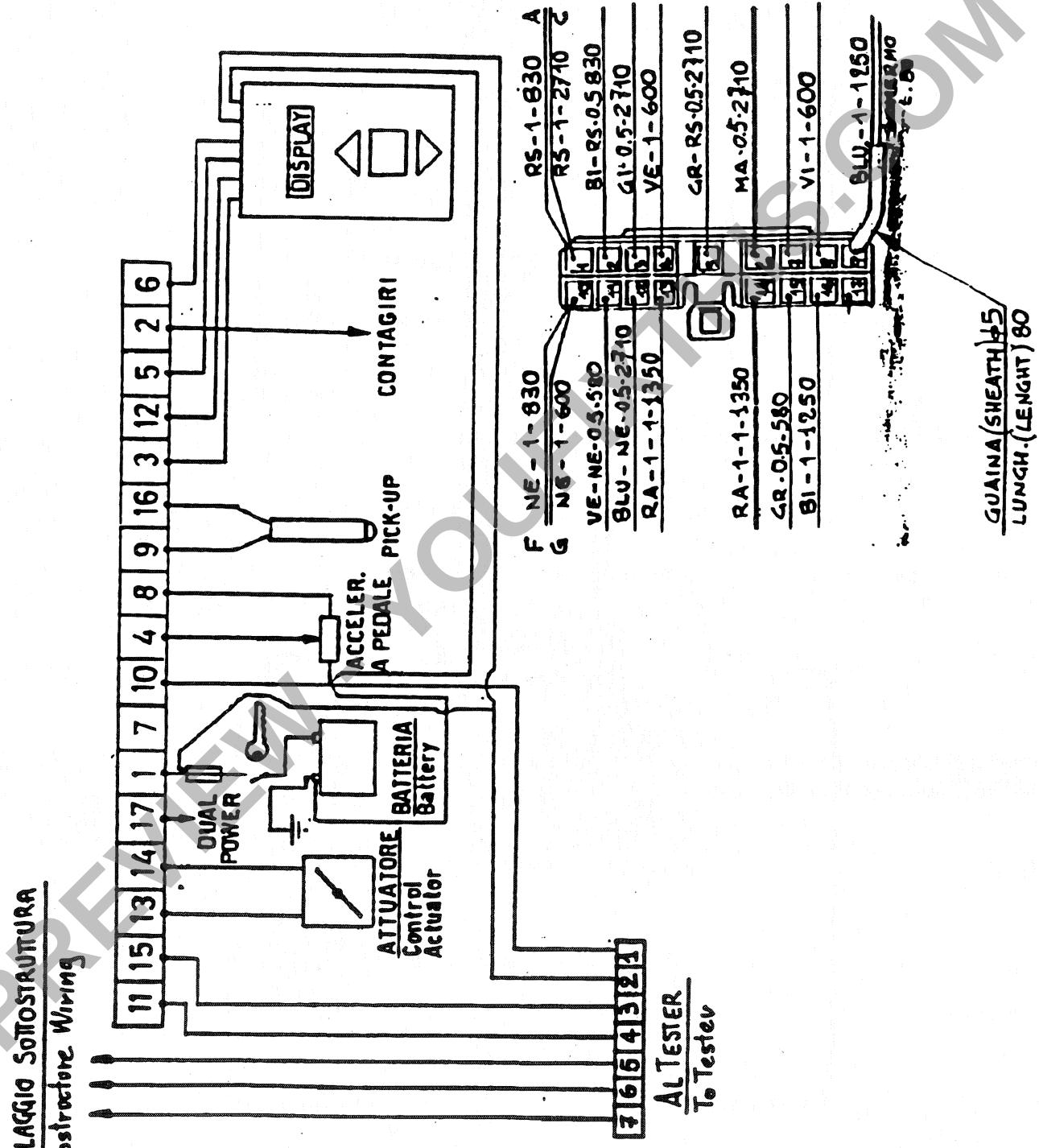


Fig. 1 - View of engine

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ELECTRONIC ENGINE GOVERNOR WIRING



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Checking the clutch

The clutch disk set clearance must not be less than prescribed values. Otherwise, replace the disks.

Check that the clutch disks slide freely in their seats.

The thrust piston must be replaced if it shows signs of scoring or bluish areas caused by tempering.

Examine the splined surfaces of the hub for the sliding of the clutch disks. In case of roughness, smooth using a file. If hollows are noted in the splined surface, replace the hub.

Check the efficiency of the piston return spring. Spring characteristics must correspond to table specifications. If necessary, replace the spring.

The clutch piston and the clutch brake piston seal rings must be replaced if excessively worn.

Manifold O-rings should be replaced if worn.

During every assembly, thouroughly clean oil ducts in the clutch housing using a compressor.

Valve assembly

Check that the lapped surfaces of the push rod and the pilot valve are not scored or worn.

Then check the stem seat (in the distributor housing) and ensure that the surfaces are not damaged.

Otherwise, replace the components.

Check the spring, ensuring that the setting values correspond to those in the specification table.

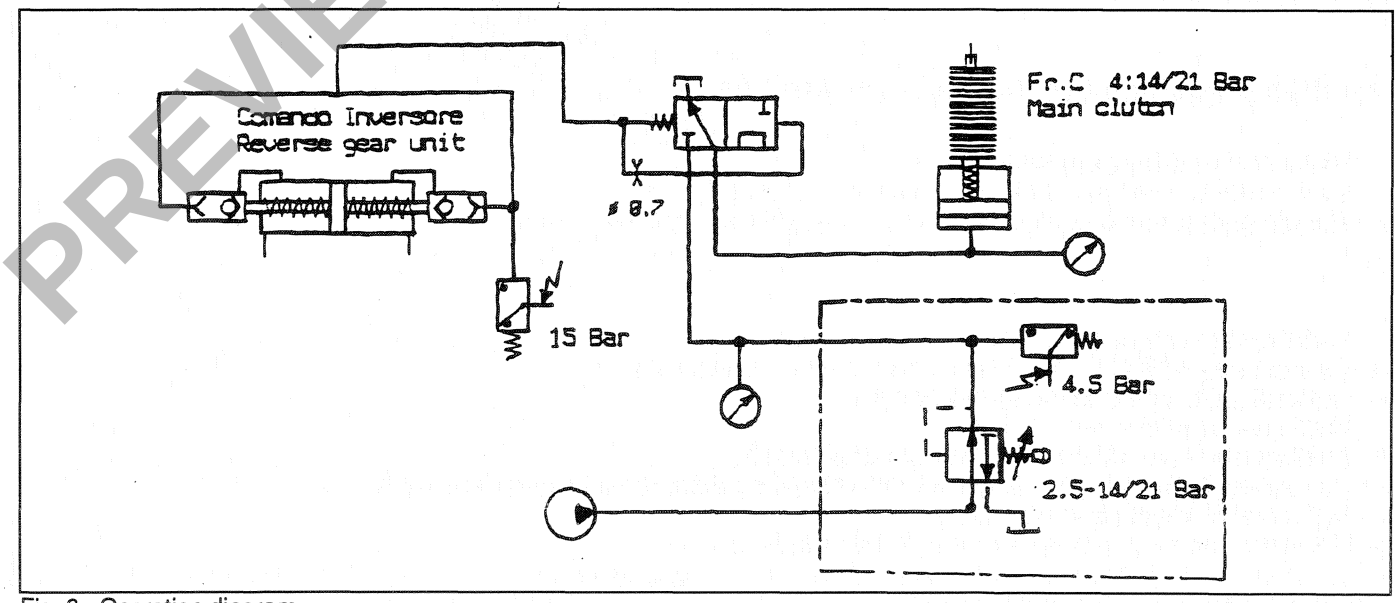


Fig. 6 - Operation diagram.

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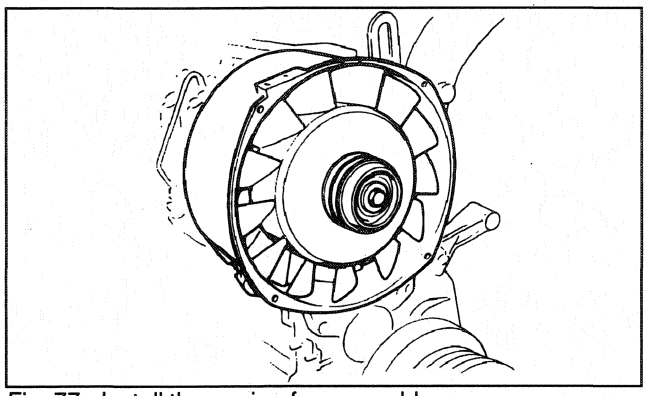


Fig. 77 - Install the engine fan assembly;

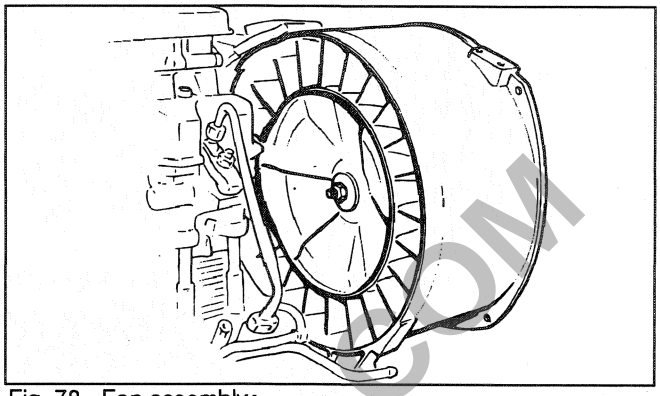


Fig. 78 - Fan assembly;

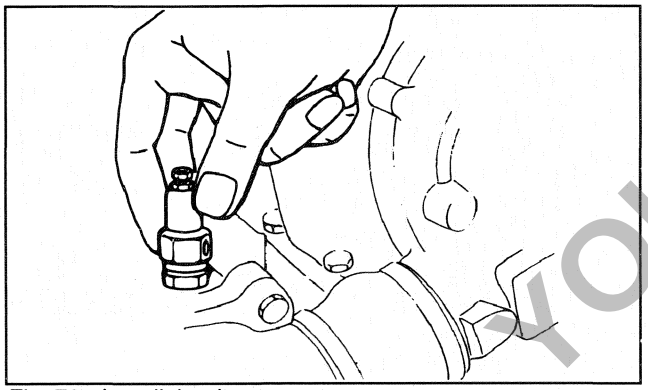


Fig. 79 - Install the thermostarter;

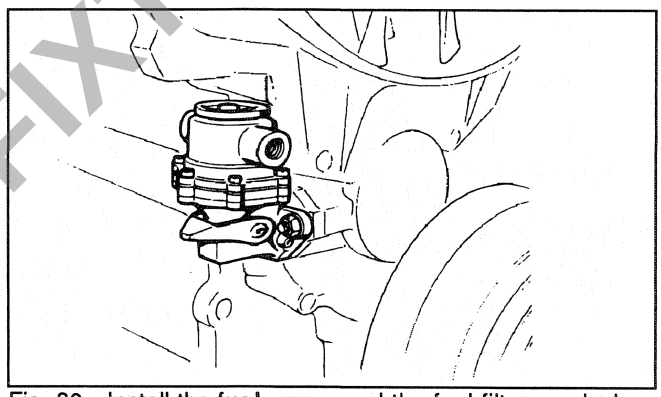


Fig. 80 - Install the fuel pump and the fuel filters and when required the fuel prefilter.
Fit the fuel system lines;

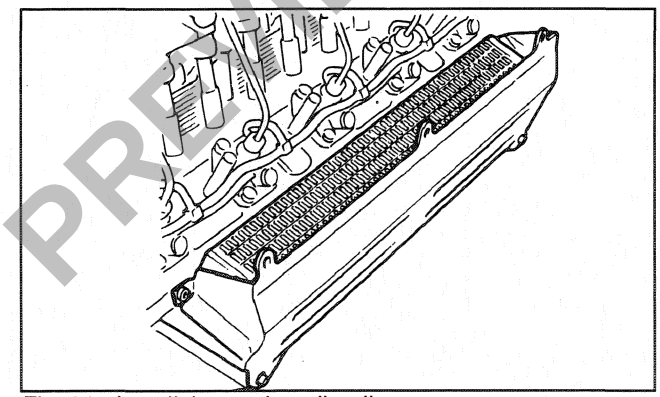


Fig. 81 - Install the engine oil radiator;

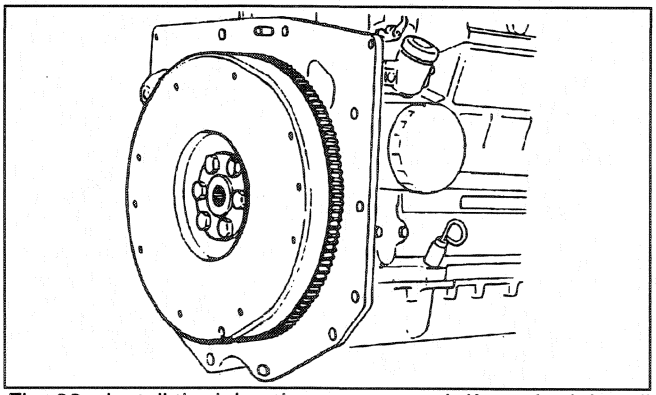


Fig. 82 - Install the injection pump guard. If required, install the external application auxiliary drive unit interposing enough shims so that between the gear teeth the required backlash may be established.
Install the engine flywheel;

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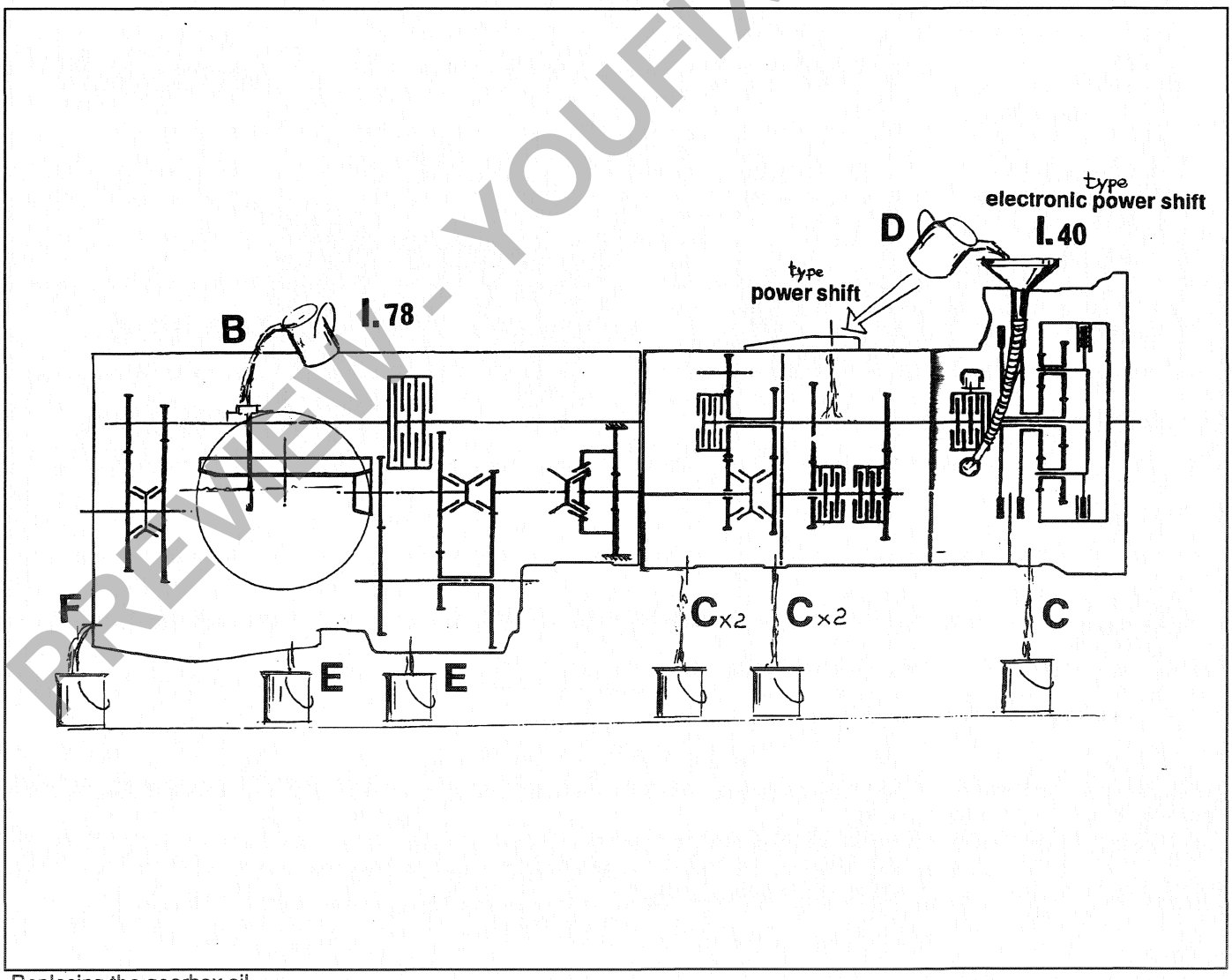
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OPERATIONS FOR REPLACING GEARBOX OIL

When replacing the gearbox oil, it is also necessary to drain the contents in the power-lift and in the hydrostatic steering system since these use the same oil for their operations as the gearbox.

To replace the gearbox oil (front and back), proceed as follows:

— Remove the power-lift cover and unscrew the oil level tube;
— Remove the five plugs **C**, positioned under the front gearbox;
— Remove the two plugs **E**, positioned under the rear gearbox and plug **F** placed in the rear part;
— Remove oil dipstick **B** placed in the left rear support;
— Restore front gearbox oil level through hole **D**, after having tightened the five drain plugs, until reaching the level indicated by sight plug **A** placed on the front right side of the gearbox;
— Restore the rear gearbox oil, after having tightened the three drain plugs, until reaching the maximum level indicated by the notch on the dipstick placed in the rear wheel support;
— The total amount of oil necessary must be divided approximately as shown in the figure.



Replacing the gearbox oil.

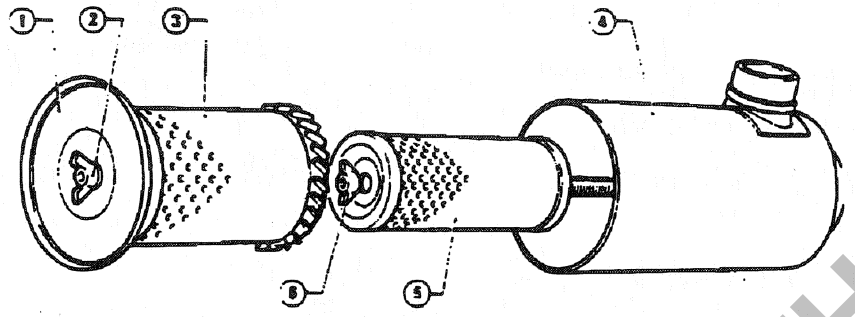
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Engine air filter

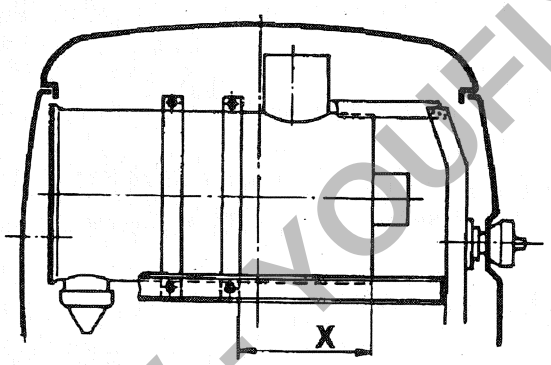
If a blocked air filter indicator switch is to be repaced, make sure that the new switch to be installed has the same setting specifications by checking the reference stamped on it.
— Aspirated engine blocked air filter indicator switch setting is 0.94 to 0.93 bar.

NOTE: Turbocharged engine air filter blocking indicator switch setting differs from those of aspirated engines.



1 - Filter cover
2 - Wing nut
3 - Outer filter cartridge
4 - Filter housing
5 - Inner filter safety cartridge
6 - Wing nut

Fig. 153 - Engine air filter.



air filter positioning x = 193 mm

Fig. 154 - Air filter positioning.

Tightening torques

Before tightening, all screws should be degreased, cleaned and lubricated with engine oil.

	Kgm	Nm
engine flywheel securing screws	11	108
rocker arm support securing screws	4	39
injection nozzle bracket securing nuts	4	39
injection tubes securing nuts	2.5÷3	24÷29
front pulley securing screws with front P.T.O.	34	333
without front P.T.O.	28	274
oil pump securing screws	4	39
oil pan securing screws	2.5	24
rear flange securing screws	5.5	54
front flange securing screws	28	277

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Cleaning cylinder heads

Clean the cylinder heads thoroughly by removing any coking inside both exhaust and intake ducts. Also clean cylinder head cooling fins carefully.

Checking valve seats

First descale and clean valve seats and then inspect for signs of pits or corrosion in the valve contact area, otherwise a new grinding (if light wear is found) or a replacement shall be provided.

To install new valve seat inserts proceed as follows:
chill the valve seat inserts in liquid nitrogen for easier installation in the cylinder head by running fit.

Valve seat inserts are supplied as finished parts and do not require any further machining. On installation, avoid knocking on the valve seats to prevent deformation.

NOTE - If no liquid nitrogen is available for valve seat insert chilling before installation, it is also possible to heat up the cylinder head to a temperature of 200 to 300 °C.

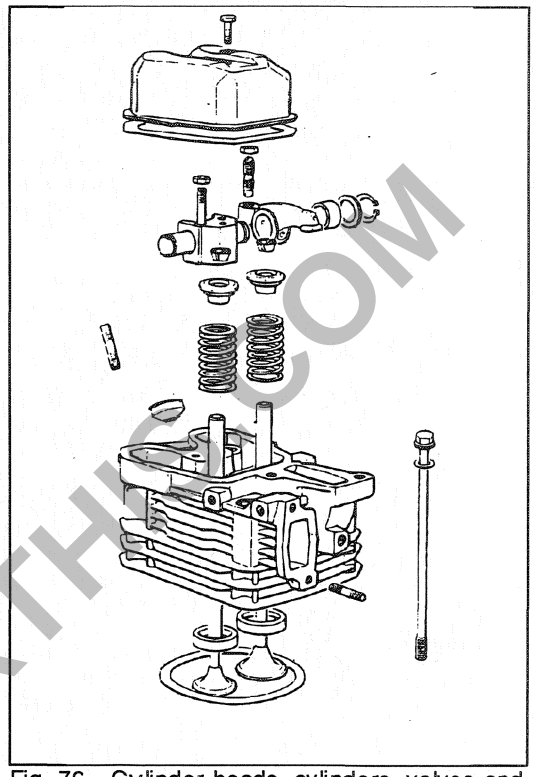


Fig. 76 - Cylinder heads, cylinders, valves and rocker arms.

Checking valves

Descale the valves using the special brush.

Make sure the valve seat is completely intact, otherwise replace.

Check the valve stem for deformation, be sure the stem outside diameter is not below specifications.

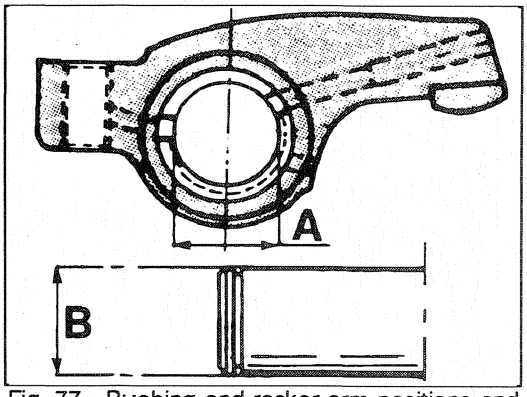


Fig. 77 - Bushing and rocker arm positions and wear check dimensions.
A - Rocker arm bushing inside diameter.
B - Rocker arm pin diameter.

Testing valve tightness

After grinding the valve seats, test valve tightness as follows: plug the intake and exhaust ports through the related valves and then pour in petrol and check for any leaks (if new valves are installed a slight dripping is allowed).

Checking valve guides

Inspect valve guide boring inside surface. It should be completely smooth and show no evidence of either seizing or scoring.

Use gauge no. 5.9030.020.0 (fig. 84) for measuring the valve guide inside diameter. Excessively worn guides are to be replaced.
When re-installing the valve guides, they should protrude 17.5 ± 0.2 mm from the seat in the cylinder head.

Using gauge tool no. 5.9030.626.0 for installation will restore this dimension automatically.

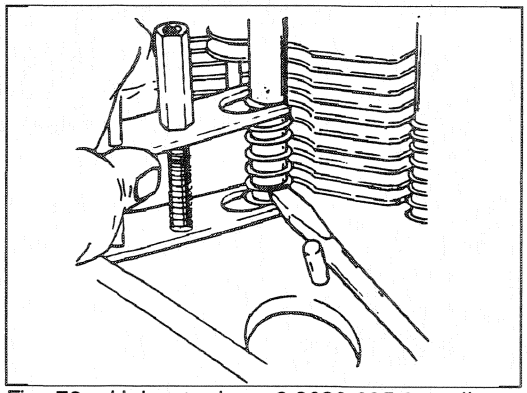


Fig. 78 - Using tool no. 6.9030.635.0 to disassemble the tappets' caps.

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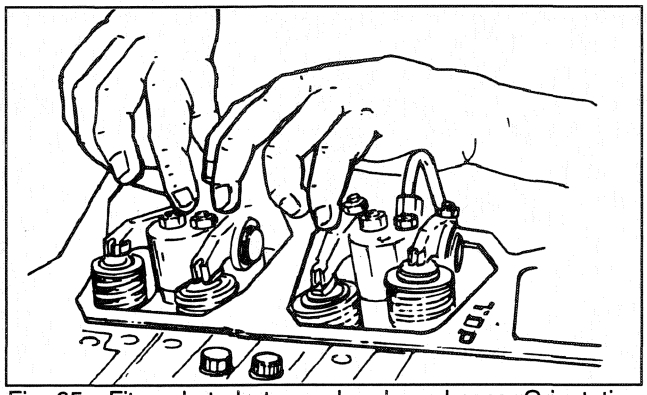
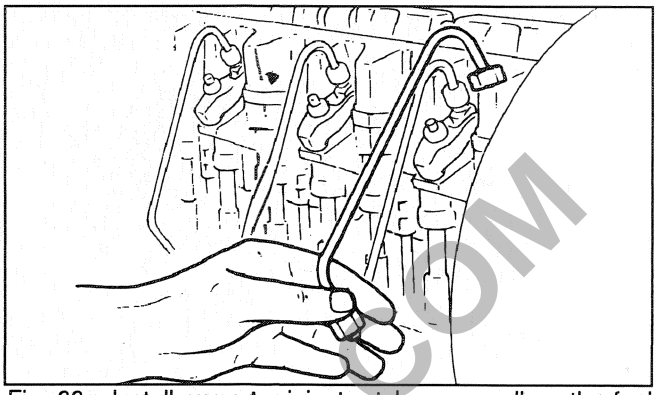
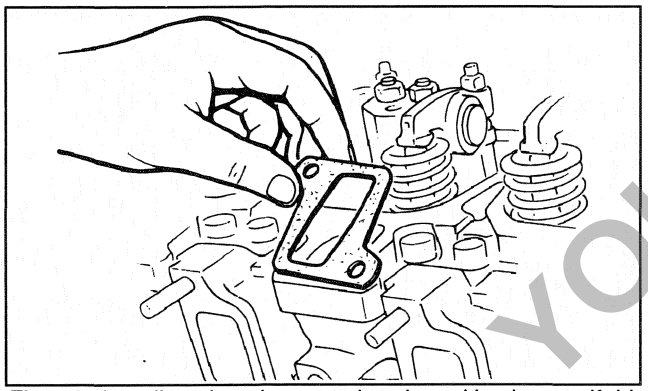
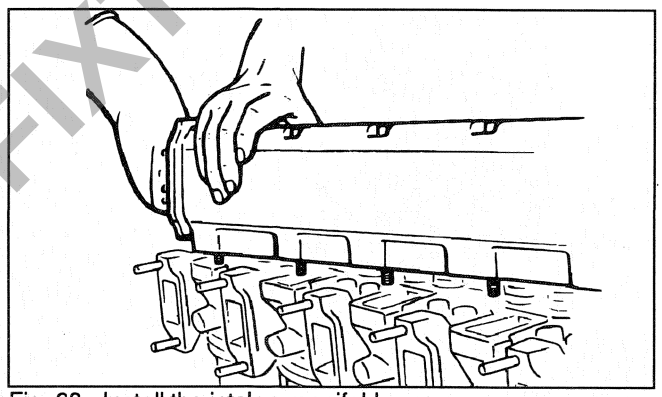
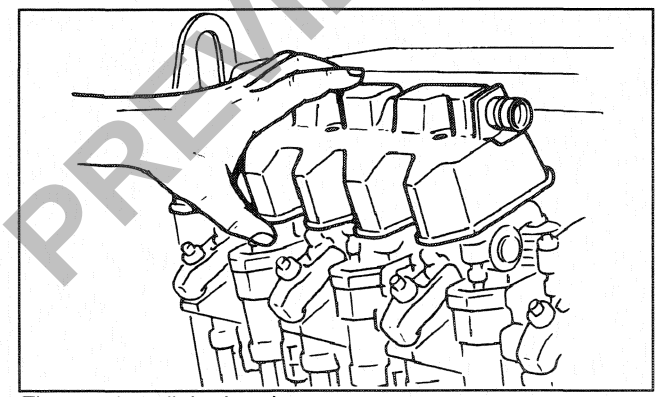


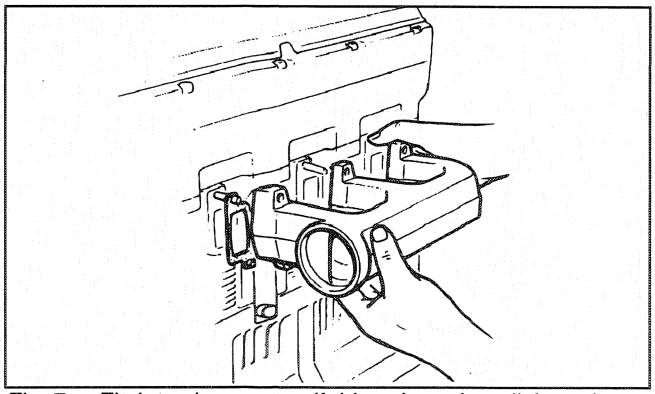
Fig. 65 - Fit gaskets between heads and caps. Orientation shall be provided according to "TOP" indication on them;


Fig. 66 - Install pump-to-injector tubes as well as the fuel recovery tubes from injection pumps and injectors;


Fig. 67 - Install gaskets between heads and intake manifold;


Fig. 68 - Install the intake manifold;


Fig. 69 - Install the head caps;


Fig. 70 - Fit the exhaust manifold gaskets. Install the exhaust manifold;

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ELECTRONIC ENGINE GOVERNOR

general information

The electronic engine speed governor permits an accurate and stable engine r.p.m. control. The system includes an ELECTRIC ACTUATOR, a MAGNETIC PICK-UP acting as a speed recorder, a PUSH-BUTTON PANEL with LED indication (hand throttle) and a POTENTIOMETER located on the accelerator pedal.

specifications

power supply	8 to 15 Vdc
card electrical input	35 mA + actuator current
maximum actuator current output	6 A
PICK-UP input	5 to 30 Vrms
operating temperature	-40 to +85 °C
humidity rate	from 0 to 100% non-condensed
control	isochronous or with statism
speed range	600 to 2550 r.p.m.
overspeed	set at 3000 r.p.m.
reliability	70 °C

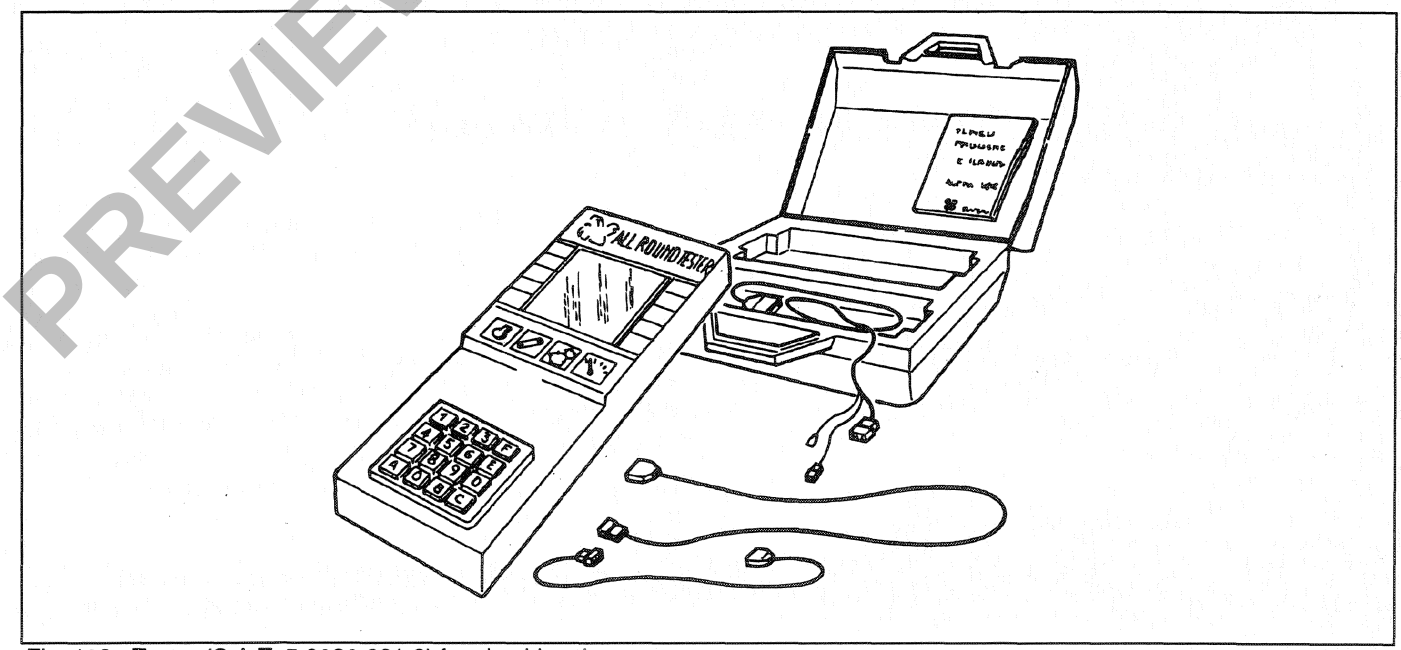


Fig. 102 - Tester (S.A.T. 5.9030.681.6) for checking the governor.

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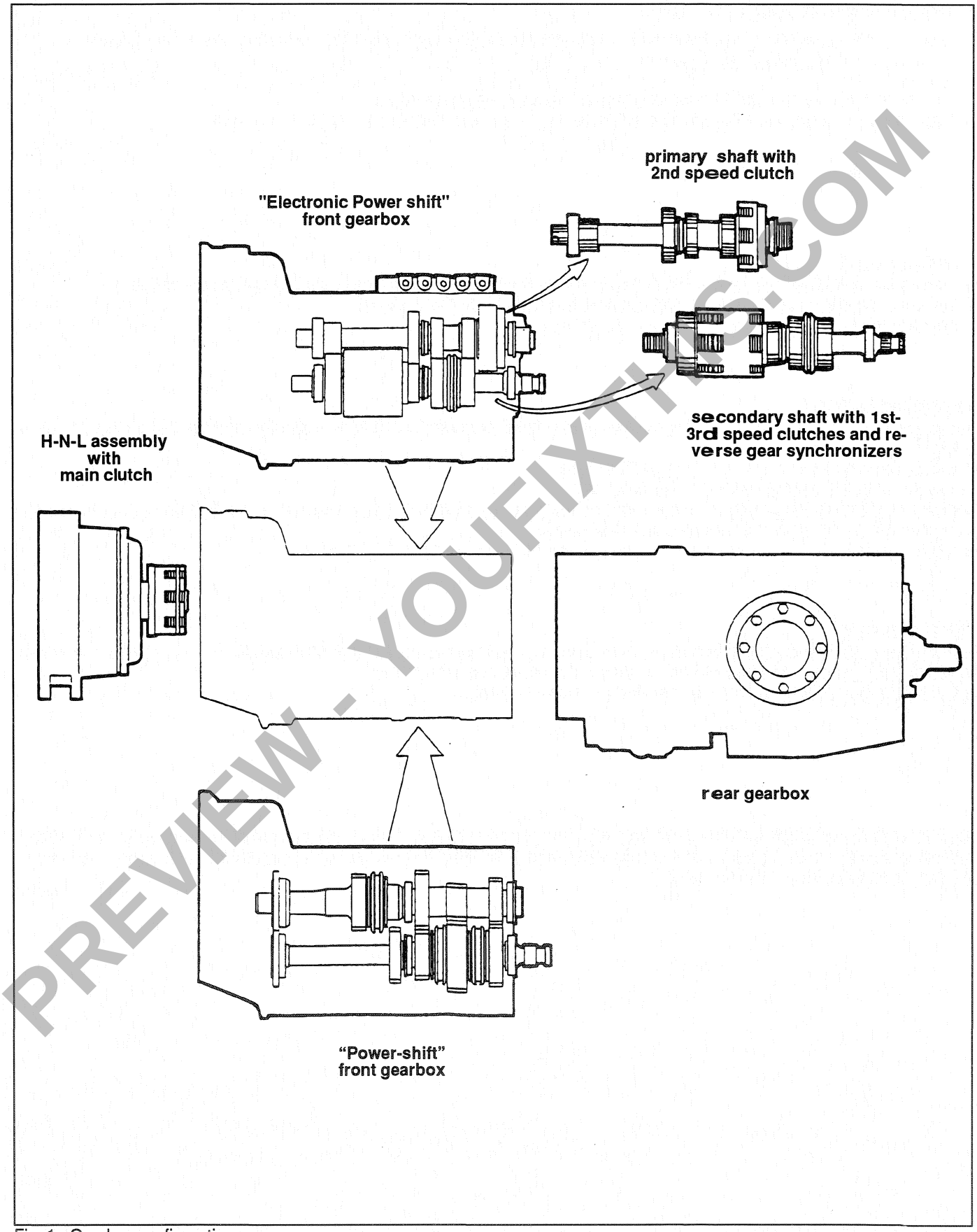


Fig. 1 - Gearbox configuration.

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Installing the secondary shaft

In the central wall of the gearbox, place the external bearing lock ring and insert the secondary shaft along with bearing, then fit the gear and the snap ring.

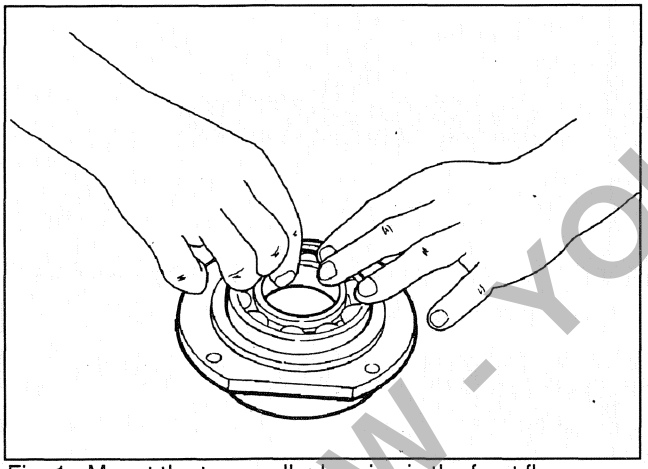


Fig. 1 - Mount the taper roller bearing in the front flange;

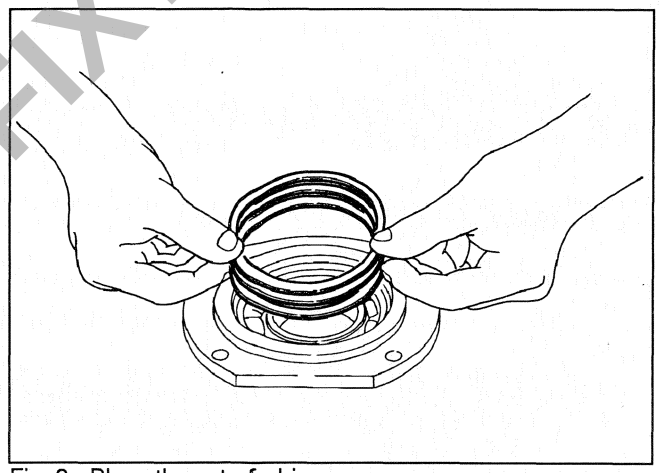


Fig. 2 - Place the set of shims;

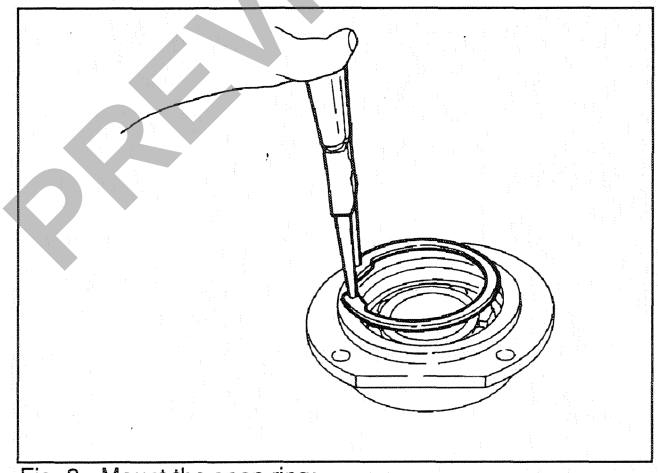


Fig. 3 - Mount the snap ring;

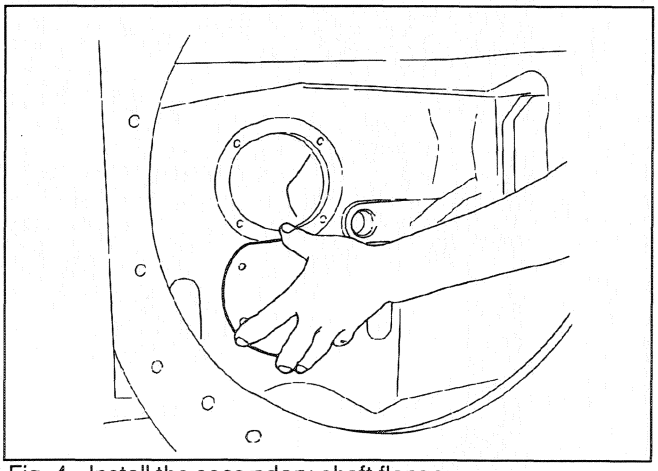


Fig. 4 - Install the secondary shaft flange;

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WARNING

Take the value of shim thickness for the adjustment of the thrust bearings as described at the beginning of this section.

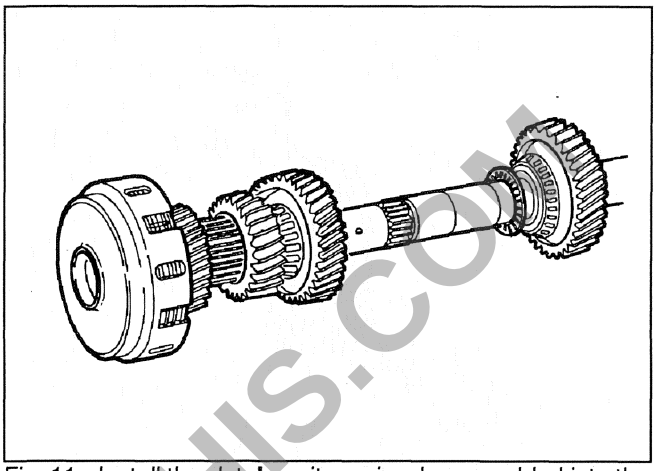


Fig. 11 - Install the clutch unit previously assembled into the primary shaft;

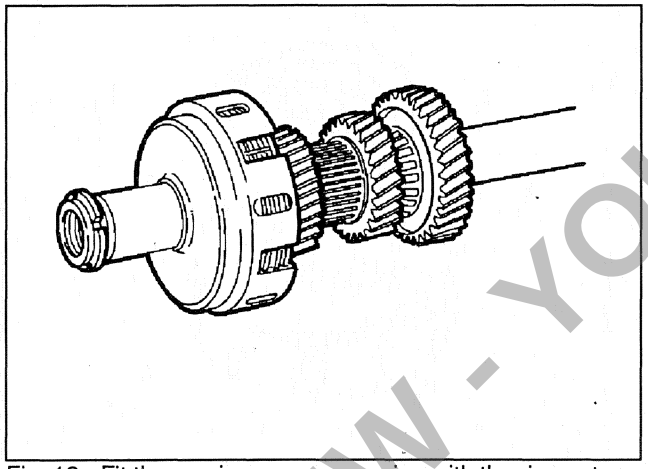


Fig. 12 - Fit the service spacer securing with the ring nut;

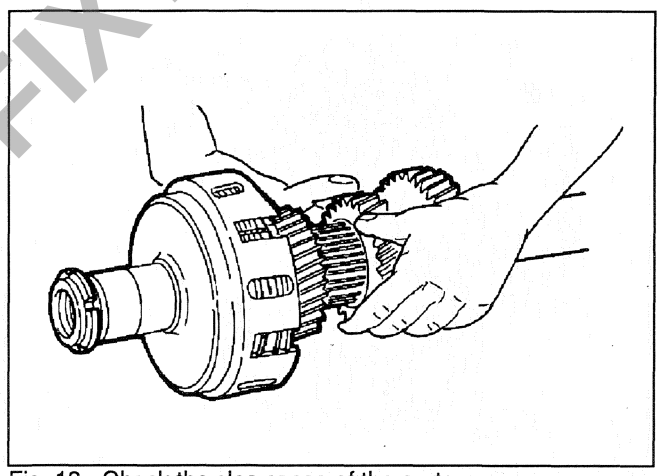


Fig. 13 - Check the clearance of the parts;

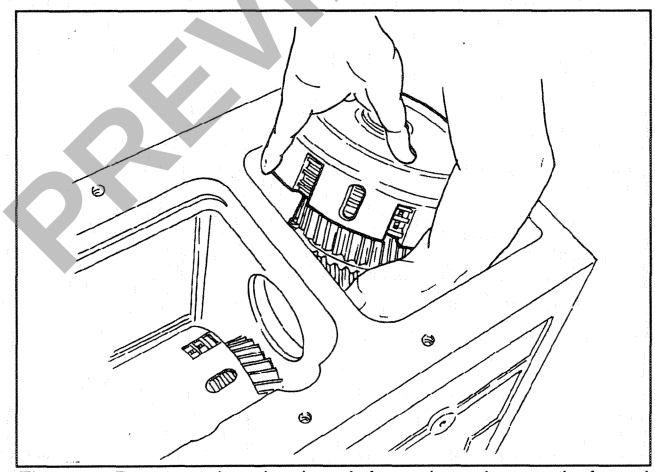


Fig. 14 - Remove the clutch unit from the primary shaft and position into the gearbox;

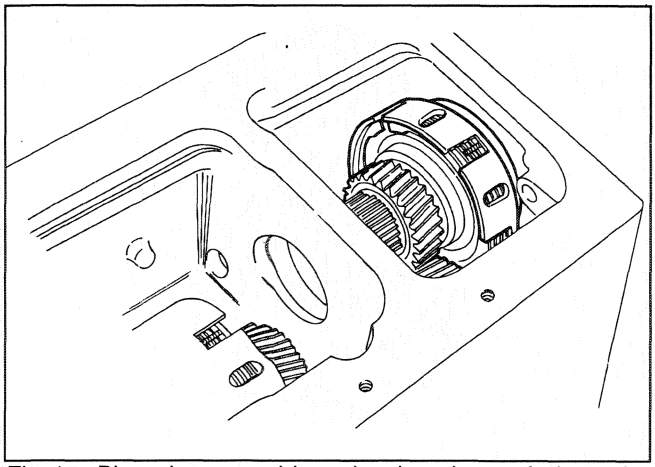


Fig. 15 - Place the assembly so that the primary shaft may be engaged;

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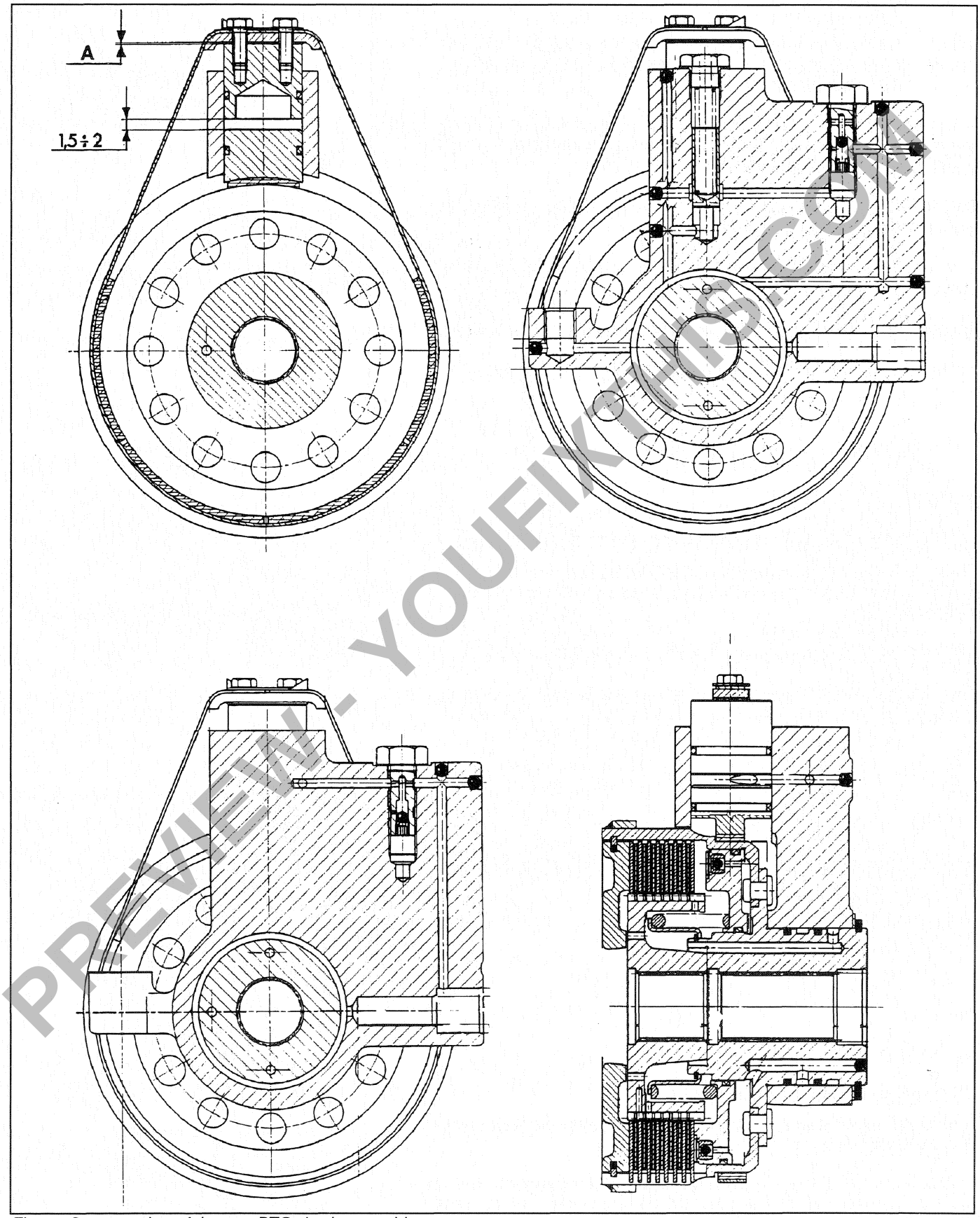


Fig. 5 - Cutaway view of the rear PTO clutch assembly.
A = Adjusting clearance.

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3-point hitch

The 3-point hitch is structured to be able to carry 2nd and 3rd category implements.

It is available in two versions:
— Completely mechanical;
— Mechanical with automatic implement hooking device and power-lift lifting rod with hydraulic adjustment equipped with electro-hydraulic controls.

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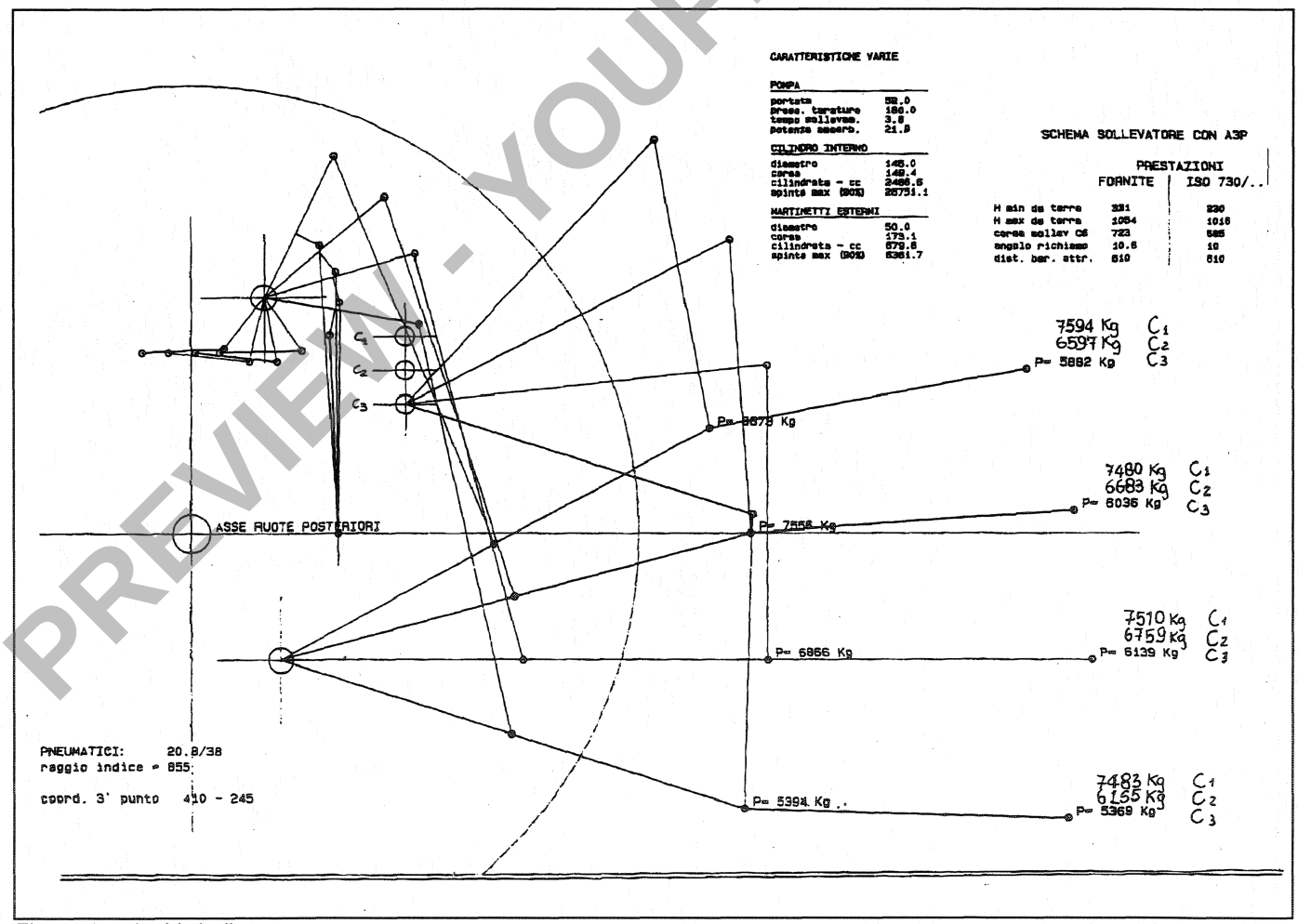


Fig. 1 - 3-point hitch diagram.

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Diagnosing malfunctions

clutch slips	check clutch assembly hydraulic system	replace out-of-setting valve springs	
		check seal rings on both piston and manifold	replace as necessary
	check piston for free stroke	remove any roughness preventing piston from sliding freely	
	check clutch disks for wear	replace the disks	
clutch will not disengage	incomplete distributor stroke	check control valve	replace defective parts
		check disks	burnt disks — replace disks
			jammed disks — remove any roughness preventing disks from sliding freely
	piston jammed in seat	return piston on the lathe and restore correct piston diameter as specified	

spring specifications

piston return spring	code no.	2.4019.373.1
wire diameter	mm	6.5
external diameter	mm	79.5
free spring length	mm	61.5
loaded spring length	- kg 75.7 (Nm 742) mm	30
	- kg 79.7 (Nm 782) mm	28

hydraulic system valve springs	code no.	2.4019.179.1
no. of springs used	no.	2
wire diameter	mm	1.2
external diameter	mm	8.8
free spring length	mm	63
loaded spring length	- kg 3.6 (Nm 35) mm	44.6
	- kg 4.6 (Nm 45) mm	39.5

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Cab disassembly

— Remove the rear wheels.
— Disconnect the hood and lift the part in contact with the cab.
CAUTION: in case it is necessary to disconnect the cab in order to disassemble the gearbox the driving position access ladders must be removed.
— Disconnect the third hitching point of the implement.
— Remove the glove compartment placed near the (L - V) speed range control lever, then remove the speed range control lever protective cover. Disconnect the lever after having removed the stop screw.
— Disconnect the super-reduction gear control lever by gaining access from under the cab near the right tank and loosening the stop screw.

— Unhook the rear electrical wiring harness on both sides by disconnecting the connection pins.
— Disconnect the electric wire connections to the UP - DOWN electrovalves of the power-lift hydraulic distributor.
— Disconnect the electric wire connections to the two PINs (RH - LH) of the lifting arms.
— Disconnect the electric wire of the power-lift safety switch.
— Disconnect the electric wire of the position sensor.

— Disconnect the control cables (Bowden) from the auxiliary hydraulic distributors by loosening the locknut and unscrewing the adjusting bushing until the distributor control is disconnected.
— Disconnect the brake control tubes (LH and RH pedals) from the security - brakes valve.
CAUTION: to prevent drainage of the system, plug the tubes connected to the pump.
— Disconnect the fuel recovery tube from the injection pump connected to the right-hand tank.
— Empty the fuel tank and loosen the tank securing screws (two per side), then move it towards the exterior.
— Remove the bulkhead between the cab and the engine in order to disconnect the tubes of the hydrostatic steering distributor.

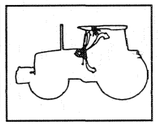
— Disconnect the terminals of the following electric wires:
- 2 dashboard wiring terminals;
- 1 starting safety device terminal;
- 1 ground wire terminal;
- 1 S.B.A. system terminal;
- 1 circular connector of the warning light assembly.

For these operations, gain access from the front, left part of the cab under the heating system.

— Disconnect the main clutch control cable (Bowden) from the left side of the gearbox.
— Disconnect the Freon delivery and return tubes of the air conditioning system in the front right area of the cab.
— Detach the engine actuator wire.
— Detach the engine pick-up wire.
— Disconnect the oil delivery tubes to the hydrostatic steering cylinders and the two oil delivery and return tubes to the distributor.
— Loosen the securing screws of the brake oil cup holding clamp.
— Remove the four securing screws of the cab silent-blocks.
— Disconnect the parking brake control cable (Bowden) tie rod from the lever under the gearbox.

— Hook the cab to a hoist using the special swing arm and lift it gradually, taking care to disconnect or release any electric wires that are still connected or engaged.
— Place the cab on an adequate wooden support.

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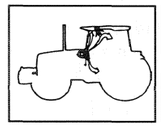
electronic control card

component nomenclature

Ref.	Part Name	Specification		
R1 - R2	Resistor	1	kΩ ±5%	0.25w
R3	Resistor	10	kΩ ±5%	0.25w
R4	Resistor	22	Ω ±5%	0.5w
R5	Resistor	120	Ω ±5%	0.25w
C1	Condenser	10	nF ±20%	50V
C2	Condenser	4.7	µF ±20%	63V
C3	Condenser	22	µF ±20%	25V
C4	Condenser	47	µF ±20%	50V
D1÷D4	1N 4004 Diode			
D5	1N 4148 Diode			
Dz 6	Zener Diode	Vz	15V	P 1w
Dz 7	Zener Diode	Vz	56V	P 0.5w
D 8	SCR BRY 55			
T 1	BD 238 Transistor			
T 1	BC 337 Transistor			
T 1	BDX 77 or BD 709 Transistor			
IC1	LM 555 N Internal circuit			
RL1 - RL2	Relays			12V
F	Fuse			1A
Z	Fuseholder			
VDR	Resistor			
R 6	Resistor	100	Ω±5%	0.5 w
R 7	Resistor	100	Ω±5%	0.25 w
R 8	Resistor	3.3	kΩ±5%	0.25 w
C 5	Condenser	0.1	µF±10%	50V
	Molex 6410 connector (1 piece)			
1±9	Eye (9 pieces)			
10 - 12	Eye (2 pieces)			
	faston (11 pieces)			
DSP	DSP Heat sink			
B	Base			
C 6		560	pF 50V ceramic type	

wiring nomenclature

Item no.	Color	Initials	Section mm^2	Length cm	Function
1	Brown-Black	MN	1.5	50	- alternator energizing
2	Gray	H	0.8	50	Max. potentiometer
3	Orange	C	0.8	60	Potentiometer wiper
4	Green	V	0.8	50	"0" potentiometer
5	Yellow	G	1.5	50	Positive alternator
6	White/Black	BN	1.5	60	speed switch
7	White	B	1.5	60	+ Alternator energizing
8	Blue/White	AB	0.8	60	Potentiometer strength
9	Orange/Black	CN	0.8	70	Pilot light
10	Black	N	2.5	60	Ground
12	Red/Black	RN	2.5	100	+ Engine



diagnosing malfunctions

checks are to be carried out with engine off and ignition key turned on position no. 1

After inserting the key into the ignition switch make sure there is positive input from the red cable to connection **"C"**.

Rotating the heater fan switch to first position, the following is obtained:
— 1 contact **"C"** closes on contact **"B"**
— 2 contact **"C"** closes on contact **"L"**

A) 2 wires come out of contact **"B"**:
-– yellow-black wire, supplying the potentiometer (connection **4**), for heating system setting.
— red wire, supplying hte the air-conditioning system potentiometer electronics.

B) A gray wire branches out from contact **"L"** and supplies the heater fan at the lowest speed by a voltage reducing resistance (at the resistance outlet, the heater fan supplying wire is red-black).

The other positions of switch **"I"** are used to select the fan speed.

For this reason, if the heater fan operates at the highest speed only, it is necessary to check the connections with the voltage reducing resistance and its efficiency as well.

Should the heater fan fail to operate, the switch being in any position, make sure voltage is supplied to its ends. This voltage should be 6 to 12 Volt (positive red-black and negative black wires).

If voltage is found, the fault may consist of a false contact of the commutator brushes or is due to interrupted or short-circuited starter windings. Otherwise check the supplying sequence as explained above.

Heat setting potentiometer

(It is located on the alternator energizing system).

Testing

Connect a tester (scale of 0 to 12 Volt d.c.) or a pilot light (12V-5W max.) to the brown (-) and white (+) wires.

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Language selection

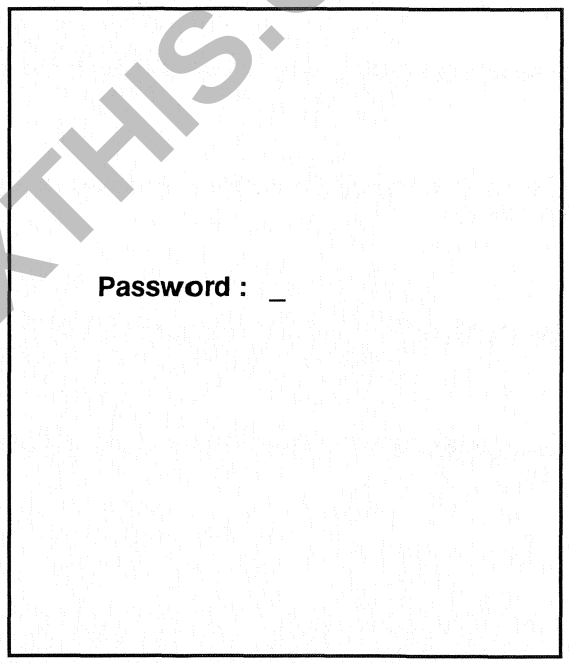
The tester has an internal program that allows the user to select one language (operator's dialogue language). The following languages are available:

ITALIAN
ENGLISH
GERMAN
FRENCH
PORTUGUESE
SPANISH

To select and memorize the language desired, proceed as follows:

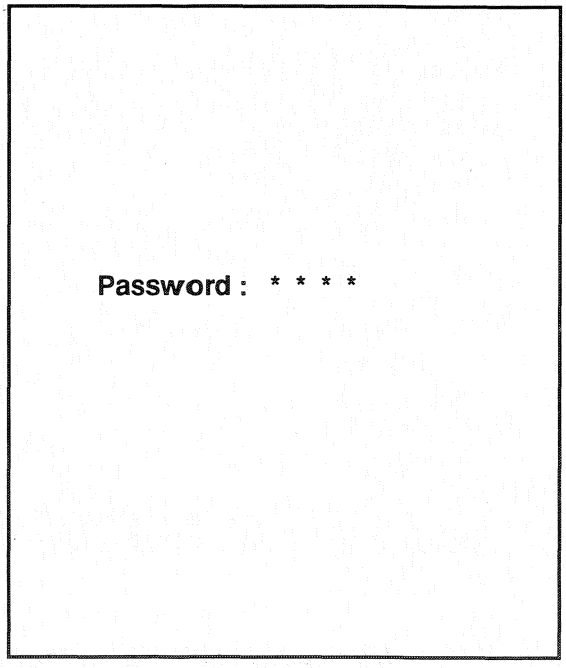
Before turning on the tester, push key [A] e and keep it pushed while turning the tester on. This allows the language changing program to be selected.

After turning the tester on, the word **"Password"** will appear on the display along with a flashing cursor.



Input the enabling code **123F**, using the tester keypad.

Four *'s will appear prompting the user to input the password.



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