FRUTTETO 60 II
FRUTTETO 75 II
FRUTTETO 85 II

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PERIODICITA DELLE OPERAZIONI DI MANUTENZIONE

DURANTE IL PERIODO DI RODAGGIO:
a 50 ore di lavoro

- Cambio olio motore
- Sostituzione filtro olio motore

Ogni 10 ore

- Controllo livello olio motore

Ogni 50 ore

- Controllo tensione cinghia ventilatore-alternatore
- Ingrassaggio perno incernieramento e snodo martinetto guida idrostatica
- Ingrassaggio perni comando frizione
- Ingrassaggio cuscinetto semiasse posteriore
- Ingrassaggio perno centrale oscillazione assale anteriore o ponte anteriore
- (solo 4 RM) Ingrassaggio supporto centrale albero di trasmissione
- (solo 2 RM) Ingrassaggio pivots ruote
- (solo 4 RM) Ingrassaggio cuscinetti forcelle mozzi ruote
- Ingrassaggio albero incernieramento 3° punto
- Ingrassaggio tiranti di sollevamento (gruppo sollevatore)
- Ingrassaggio leva di regolazione tirante di sollevamento destro
- Ingrassaggio perni pedali e perni per innesto frizioni

Ogni 150 ore

- Cambio olio motore
- Controllo livello olio trasmissione
- Controllo pressione pneumatici
- Controllo livello soluzione acida della batteria
- (solo 4 RM) Controllo livello olio differenziale anteriore
- (solo 4 RM) Controllo livello olio mozzi ruote anteriori
- Controllo corsa a vuoto pedali freni
- Controllo ed eventuale registrazione gioco pedale frizione

Ogni 300 ore

- Sostituzione cartuccia filtro gasolio
- Sostituzione filtro olio motore

Ogni 600 ore

- Controllo ed eventuale taratura iniettori
- Registrazione gioco punterie

Ogni 1200 ore

- (solo 2 RM) Lavaggio e ingrassaggio cuscinetti mozzi ruote anteriori
- (solo 4 RM) Cambio olio mozzi ruote anteriori
- (solo 4 RM) Cambio olio differenziale anteriore
- Revisione ed eventuale taratura pompe iniezione
- Controllo motorino d'avviamento

Ogni 1500 ore

- Sostituzione olio cambio - differenziale - sollevatore - sterzo idrostatico

All'accensione della spia luminosa

- Pulizia filtro aria motore (sostituire dopo 6 pulizie della cartuccia principale la cartuccia interna)
- Sostituzione filtro olio cambio - guida idrostatica - sollevatore

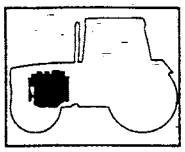
Pulire periodicamente

- Alette raffreddamento cilindri
- Scarico acqua dal filtro gasolio

Verificare periodicamente

- Serraggio dei dadi che fissano le ruote motrici
- Ispezione al radiatore dell'olio motore
- Registrazione freno di stazionamento
- Innesto bloccaggio differenziali
- Tubazioni guida idrostatica
- Scarico acqua filtro gasolio

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		FRUTTETO 60 II	FRUTTETO 75 II	FRUTTETO 85 II
type		**1000.3-A**	**1000.4-A**	**1000.4-AT**
cycle		diesel	diesel	diesel
strokes		4	4	4
injection		direct	direct	direct
number of cylinders		3	4	4
cylinder arrangement		in line	in line	in line
bore x stroke	mm	105x115.5	105x115.5	105x115.5
stroke/bore ratio		1.1	1.1	1.1
displacement	cm^3	3000.33	4000.44	4000.44
compression ratio		17:1	17:1	16:1
maximum horsepower	HP CUNA	60	75	85
	kW	44	55	62.4
maximum horsepower speed	r.p.m.	2350	2350	2350
maximum torque	daNm	21.1	24.4	29.4
	kgm	21.6	25	30
maximum torque speed	r.p.m.	1400	1400	1400
	HP/l	19.9	18.7	21.24
specific horsepower	kW/l	14.6	13.7	15.61
average piston speed (at max. speed)	m/min	9.040	9.040	9.040
minimum idling speed	r.p.m.	650÷700	650÷700	650÷700
maximum idling speed	r.p.m.	2490÷2520	2490÷2520	2490÷2520

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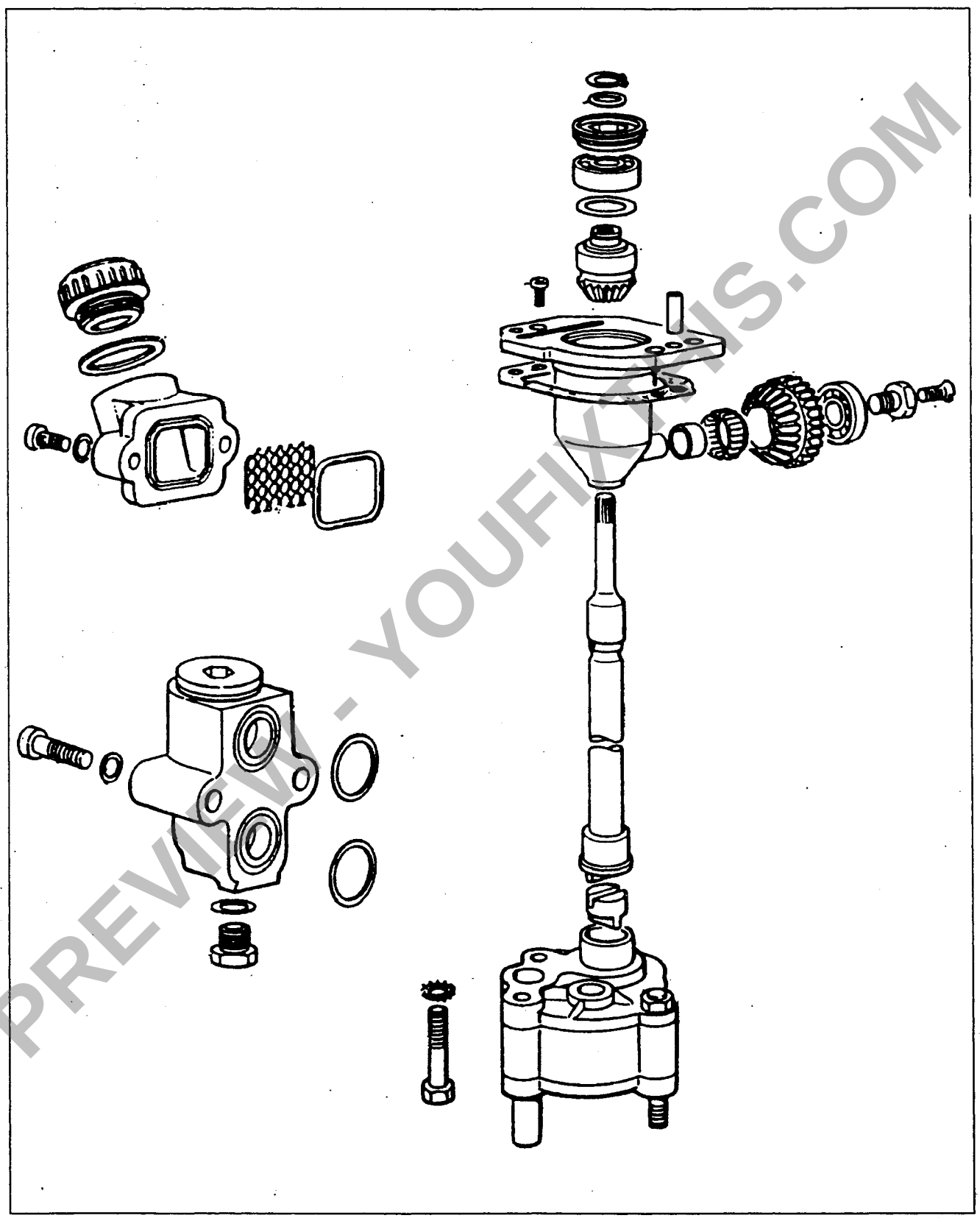


Fig. 6 - Oil pump.

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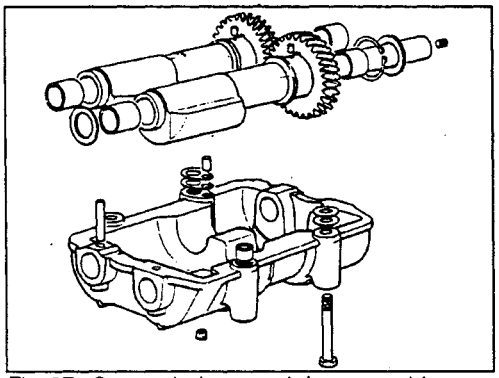


Fig. 37 - Counterbalance weights assembly components.

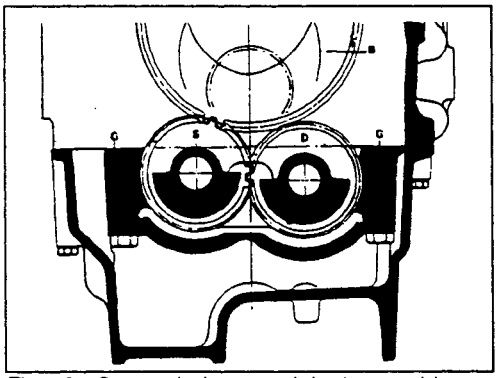


Fig. 38 - Counterbalance weights' assembly.

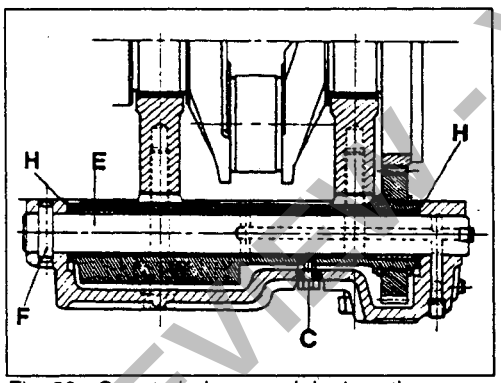


Fig. 39 - Counterbalance weights' section.

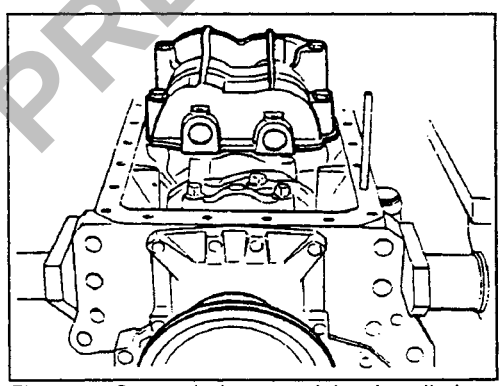


Fig. 40 - Counterbalance weights installed on engine.

FRUTTETO 75 - 85 II

Counterbalance weights for 4-cylinder engines

Specifications

end play of weights	mm	0.1 ÷ 0.43
backlash between the teeth of the weights and those of the crown wheel on the crankshaft	mm	0.20 ÷ 0.25
bushing nominal diameter	mm	$26^{+0.050}_{+0.075}$
maximum wear	mm	26.150

Checks

Check the conditions of the internal surface of the weights' bushings.
Make sure that bushings' internal diameter does not exceed the prescribed values. Otherwise, replace them.
Once the bushings have been installed, they should be bored in order to bring them to the diameter prescribed in the related specifications table.

Installing and timing

Position the weights marked by the letter **S** in the seat of its appropriate support, then position weight **D** so that the engraved teeth coincide, as shown in figure.

Install pins **E**, at the same time inserting shoulder washers **H** as appropriate.
Verify that the weights' end play is 0.1 to 0.43 mm.
Complete the installation by fastening the pin using lockpins **F** and the weights by means of screws **C**.
Fit the support complete with weights under the engine block so that the engraved tooth of weight **S** engages between the two engraved teeth of crown wheel **B** of the crankshaft. In addition, fit a number of shims **G** enough to obtain a clearance of 0.20 to 0.25 between the teeth of the crankshaft crown wheel and those of weight **S**.
Remove screw **C** and lock the screws fastening the weight support to the engine block, applying some Loctite 242.

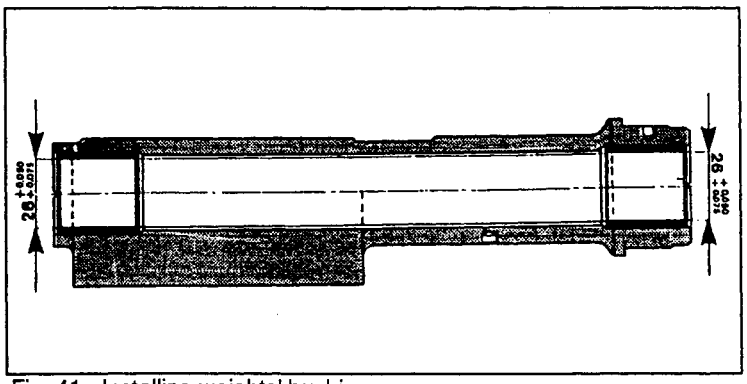


Fig. 41 - Installing weights' bushings.

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Pistons - gudgeon pins - piston rings

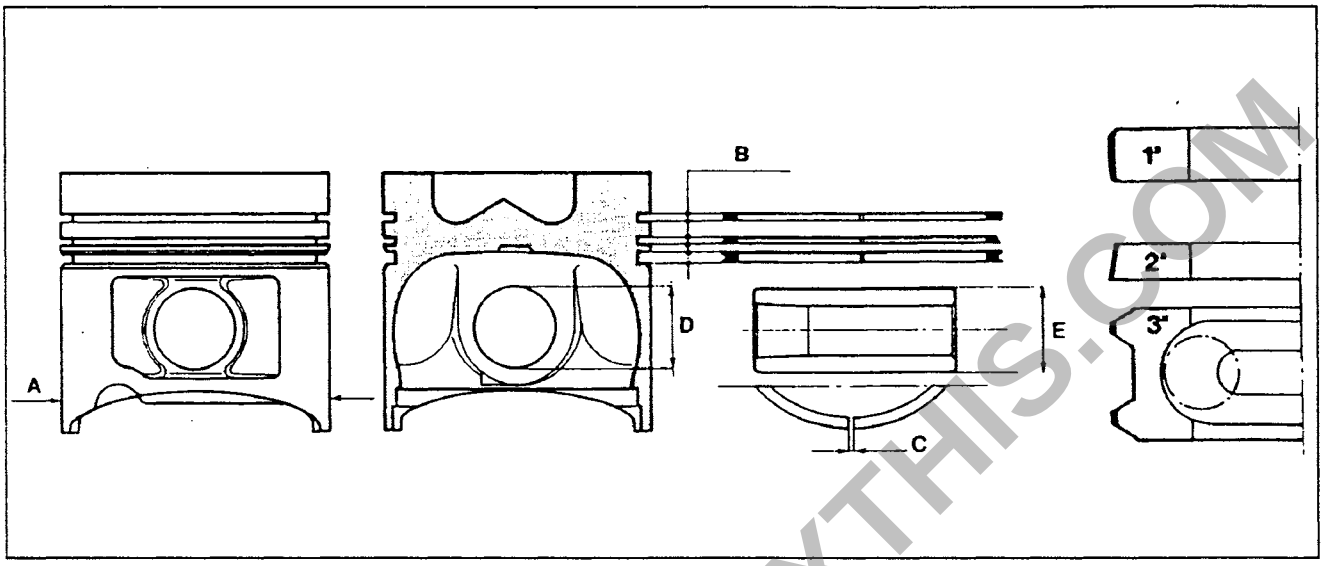


Fig. 27 - Piston, piston ring and gudgeon pin dimensions.

			Ø machining	Ø max wear
A piston diameter at 90° of the gudgeon pin axis and at 10 mm from the bottom base	mm		104.9±0.007	104.680
B clearance between piston rings and piston ring grooves (new piston rings)				
1st piston ring	mm	60-75HP	0.110 ÷ 0.142	0.250
	mm	85HP	0,113 ÷ 0,145	0,250
2nd piston ring	mm		$0.140^{+0.07}_{-0.11}$	0.150
3rd piston ring	mm		0.050 ÷0.085	0.150
C piston ring end gap	mm	60-75HP	0,400 ÷ 0,650	1,500
1st piston ring	mm	85HP	0.300 ÷ 0.500	1.500
2nd piston ring	mm		0.400 ÷0.650	1.500
3rd piston ring	mm		0.300 ÷0.600	1.500
D inside diameter of gudgeon bore in piston	mm		$35^{+0.012}_{+0.006}$	35.020
E diameter of gudgeon pin	mm		$35\ ^{0}_{-0.006}$	34.970

Pistons

Pistons are specially forged hypereutectic aluminium-silicone alloy. The air-fuel mixing chamber machined in the piston crown has a toroidal shape. Both the part number and reference A (air) are stamped on piston top. These represent the piston identification code.

Piston rings

Pay particular attention to the identification marks on the piston rings for correct assembly. Inserting the first or the second piston ring upside down will result in either uneven engine operation or serious damage, even though the piston groove is the correct one. The figure above shows correct installation.
Caution - When replacing piston rings, it is important to check that the second piston ring is also provided with external "CHROMIUM PLATED" sealing surface. (This is to avoid installing improper, non-chromium plated rings belonging to aspirated engines).

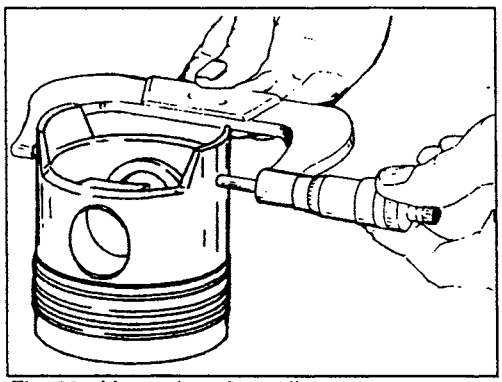
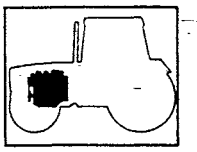


Fig. 28 - Measuring piston diameter.

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- **injection pump calibration**

After valve timing has been successfully completed, calibrate the injection pump by using equipment no. 5.9030.617.4 in addition to the equipment already positioned on the first cylinder with the exception of the comparator on the valve tappet rod.

It is advisable to make measurements on the first and last pumps only, as the intermediate pump shimmings can be averaged through a scaling calculation between the two measurements taken.

Add shims to each shim pack equal to the value stamped on the pumps.

Injection pump calibration consists of determining an 80.4 mm dimension between the pumps-to-block securing surface and the corresponding cam races when they are at the beginning of the injection phase.

Rotate the crankshaft to move the 1st cylinder piston into T.D.C. position (compression stroke end, valves closed) and set the comparator attached to the valve stem to zero; the same procedure as described in valve timing section shall apply.

Afterwards, rotate the crankshaft in the counterclockwise direction until a dimension of 2.92 mm and a 16 ° injection advance can be read from comparator dial. Correct positioning takes place when, while rotating in a counterclockwise direction, the 2.92 mm set point is exceeded, soon after coming back to such a dimension through clockwise crankshaft rotation so that any clearances may be taken up.

Fit special comparator no. 5.9030.617.4. To reset the comparator, lay the measuring roller onto a flat surface.

Insert the tool into the first imjection pump seat and take measurement reading from the comparator dial to align the bearing face with the engine block. This reading corresponds to shim pack **X**.

Add shims **Y** to each shim pack **X** equal to the dimension stamped on injection pump flange to obtain a total shim packing **(X + Y)** to be put between injection pump and engine block. This permits a 80.4 mm standard dimension to be determined.

Repeat same procedure on the last injection pump.

Caution - Install the injection pump after applying Silastik 738 silicone between shims, engine block and injection pump.

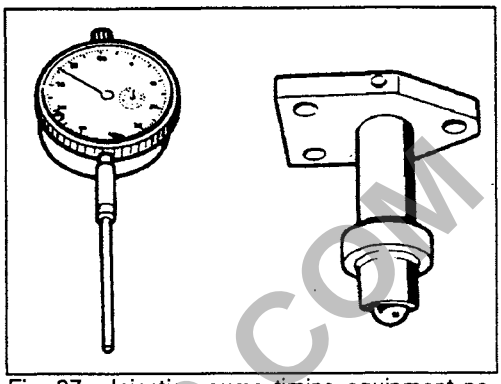


Fig. 37 - Injection pump timing equipment no. 5.9030.617.4.

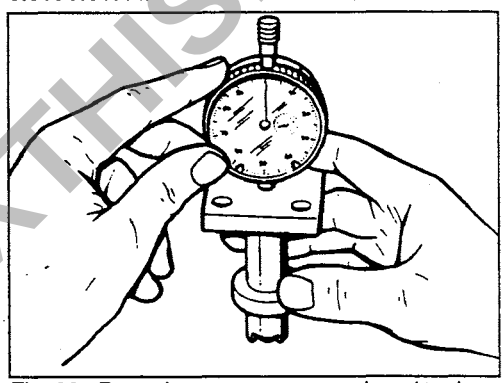


Fig. 38 - Resetting comparator-equipped tool no. 5.9030.617.4.

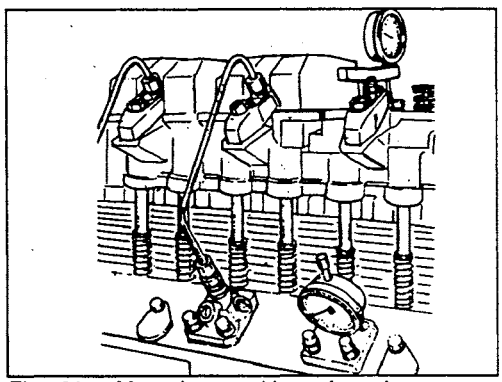


Fig. 39 - Mounting position of equipment no. 5.9030.617.4 fitted with comparator.

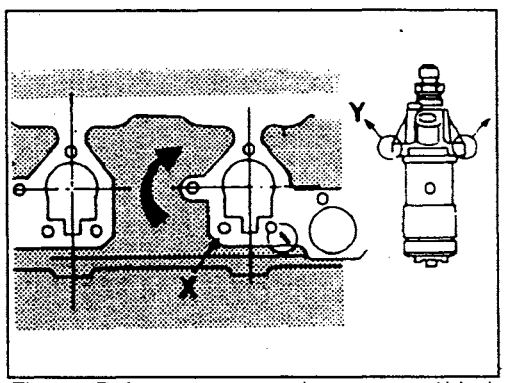


Fig. 40 - References stamped on pump and block for pump shimming and positioning.

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1000 SERIES ENGINE TIGHTENING TORQUES

Location	Notes	lb. ft.	N.m	Kgm
Flywheel Mounting	#1	79	108	11.0
Valve Rocker Arm Support		28	39	4.0
Fuel Injector Retaining Fork		28	39	4.0
Fuel Injector High Pressure Lines		17.7	24	2.5
1000.4 Engine Balancer Mounting	#2	57	78	8.0
1000.3 / 4 Engine Oil Pump Mounting		29	39	4.0
1000.6 Engine Oil Pump Mounting		29	39	4.0
Front Engine Timing Gear Cover		18	24.5	2.5
Rear Engine Oil Seal Retainer Plate		18	24.5	2.5
Stamped Steel Oil Pan		18	24,5	2,5
Cast Steel Oil Pan		18	24.5	2.5
Valve Cover, Stamped Steel		3.6	4.9	0.5
Valve Cover, Aluminum		7.23	9.81	1.0
* Pulley / Hub To Front Of Crankshaft		245	333	34
Front Crankshaft Pulley To Hub		36.1	49	5.0
Rear Engine Adaptor Plate		86,4	118	12
Front Of Engine to Front Support Flange		204	277	28.0
1000.W Water Manifold To Heads		21.4	29	3.0
1000.W Water Pump To Block		36.1	49	5.0
Connecting Rod Capscrews	#1 #3			
Main Bearing Caps	#1 #4			
Cylinder Heads To Block	#1 #5			
* PULLEY/HUB TO FRONT OF CRANKSHAFT WITH RING FEDER		274	372	38

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Il regolatore riceve il segnale di velocità sotto forma di segnale elettrico da un pick-up affacciato alla corona del volano motore e controlla l'attuatore montato sul motore tramite una centralina elettronica.
La centralina è interamente digitale e contiene sotto forma di programmi su memoria permanente (EPROM) , il modo di lavorare definito per ciascuna versione di motore .
E' possibile comunicare con la centralina mediante un PROGRAMMATORE ESTERNO dotato di specifiche funzioni per la diagnosi e la regolazione di alcuni parametri.

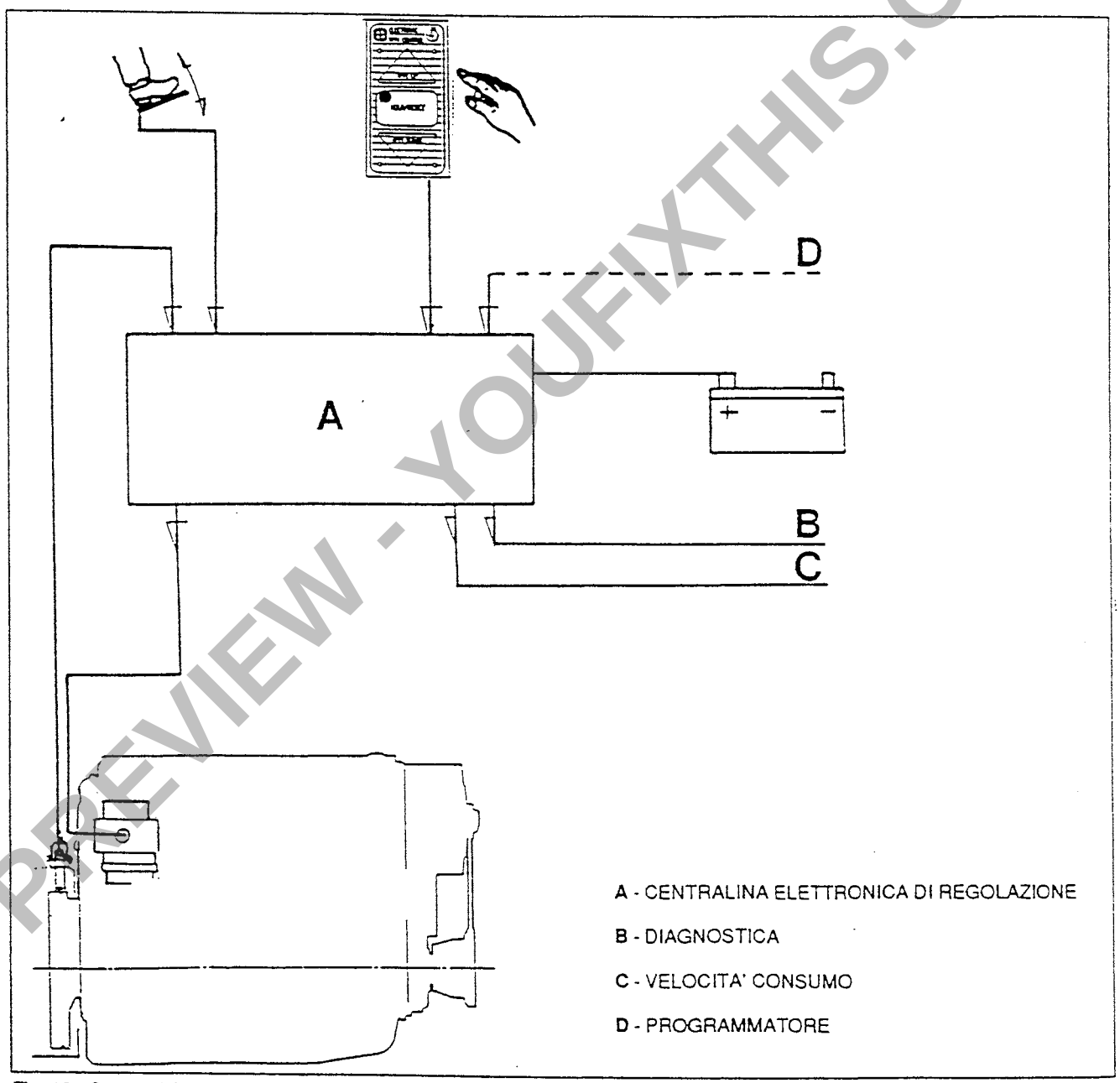


Fig. 18 - Composizione del sistema di regolazione elettronico del motore

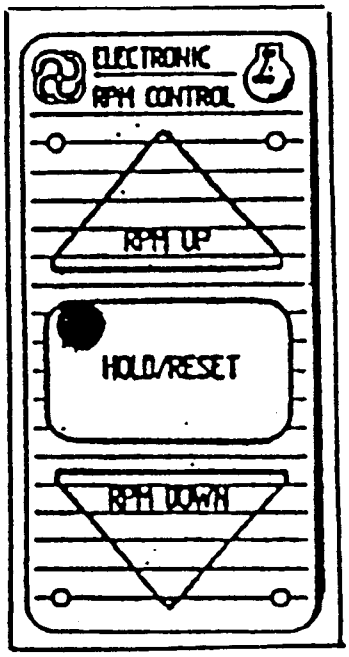
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Hand control of the electronic accelerator

When the pilot lamp is off the accelerator should be operated by pedal.

By using the RPM UP-RPM DOWN push-buttons it is possible to enter an idling speed value of 650 to 1500 r.p.m. This value will be stored until a new value is entered or unless the ignition key is removed and the power supply is cut off.



If a small correction is needed, the push-buttons should be tapped lightly. If they are kept depressed for a long time a rapid change in value will occur.

If the HOLD/RESET button is depressed, the pilot lamp lights up and this will result in a constant engine r.p.m.control through the governor.

This r.p.m. constant value can be found between the engine r.p.m. value entered and the engine peak r.p.m., by means of the upper button (if adjustments are necessary, also use the lower button).

N.B. In any case the foot pedal can always be used to accelerate beyond the maximum value entered.

If the foot pedal is depressed while the HOLD/RESET button is pressed, the electronic control will enter the value given through the pedal and after memorizing it a corresponding engine r.p.m. will be set.

Depressing a second time the HOLD/RESET push-button causes the pilot lamp to go out and control is now through the pedal.

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General Before attempting work on the electronic engine control system service personnel should be familiar with the general procedures and principals described on service bulletin 044 file 8 electrics. Remember also the engine will not run without fuel.

Automatic Engine Shutdown and Self Diagnosis Feature

The system is designed to shut the engine down automatically under certain predetermined circumstances and at the same time a self test programme is initiated.

The HOLD/RESET L.E.D. will flash in a repeated sequence indicating the area of malfunction.

The following table lists the tests and it is important to note that these indicate the area of fault and not necessarily the component.

L.E.D. Flash Sequence	Fault Area	Engine Symptom
ONE	Engine overspeed (exceeding 3000 RPM)	Stops - to reset turn ignition off and on
TWO	Control Actuator	Stops - will not start
THREE	Pedal Potentiometer	Runs and starts but no pedal control
FOUR	Engine Speed Sensor	Stops - will not start
FIVE	Electronic Control Unit	Stops - will not start

Control Actuator

Movement of the actuator can be viewed by removing the plug on top of the actuator and also by removing the engine oil filler neck.

With the engine stopped the injection pump rack is returned to the stop position under spring pressure (rearward).

As the engine starts to crank the rack should move immediately to the excess fuel position.

If there is no movement and the two flash sequence is showing, first check the actuator connections.

Check for mechanical obstruction by removing the plug in the top of the actuator and inserting a 5 mm allen key in the pivot screw.

Without undue force, the actuator should move smoothly against spring pressure. Any obstruction e.g. a seized pump element, will result in engine shut down.

The allen key can be used to manually move the pump rack to a run position and if the engine starts will confirm an electrical problem.

Important

When replacing an actuator assembly, check that the arm is connected to the fuel injection pump rack. There should be a maximum of 0.5 mm clearance between the arm and the rack. Before starting the engine insert the 5 mm allen key in the pivot screw and control engine speed manually until the electronic control is confirmed. Replace the plug

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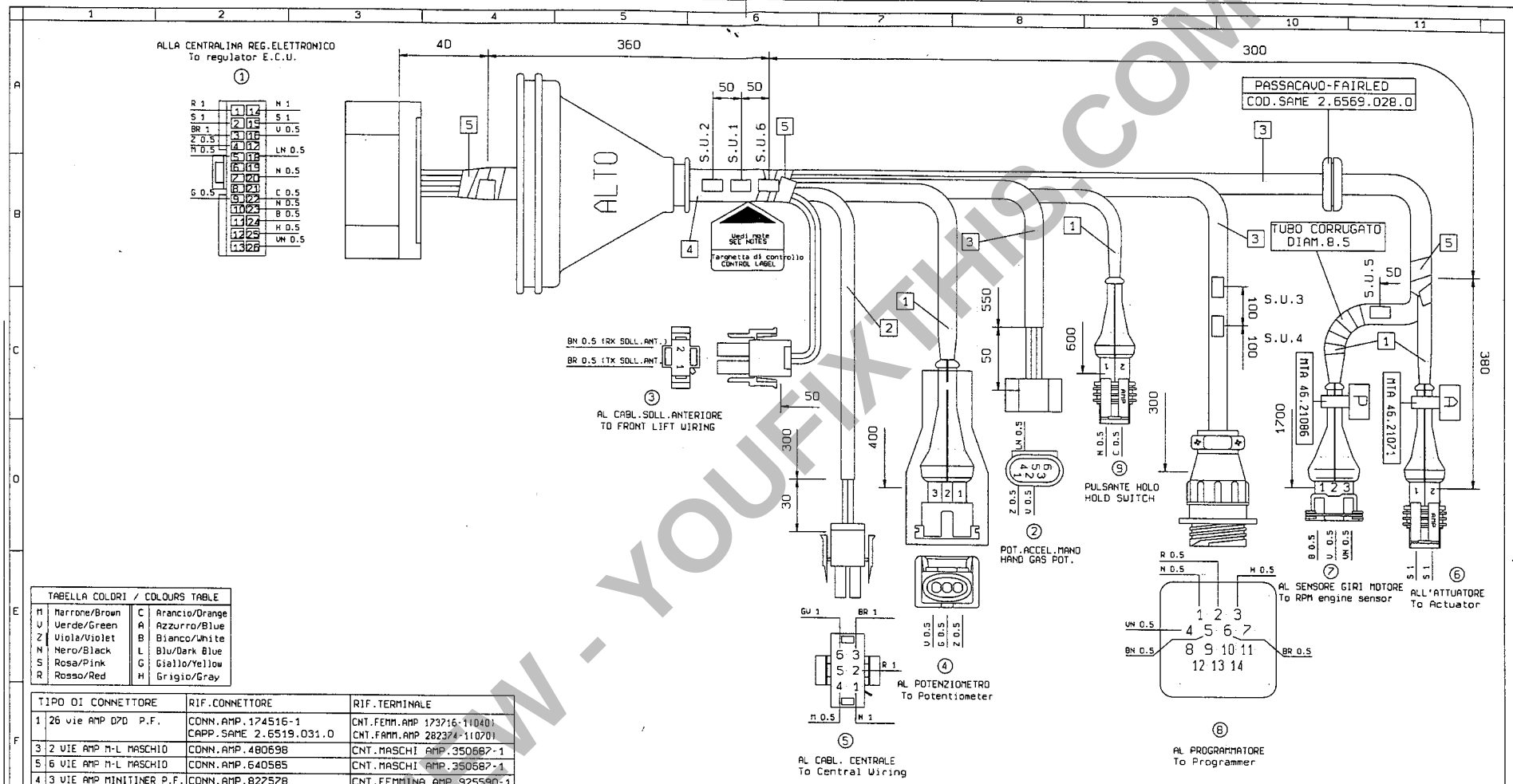


TABELLA COLORI / COLOURS TABLE			
M	Marrone/Brown	C	Arancio/Orange
V	Verde/Green	A	Azzurro/Blue
Z	Viola/Violet	B	Bianco/White
N	Nero/Black	L	Blu/Dark Blue
S	Rosa/Pink	G	Giallo/Yellow
R	Rosso/Red	H	Grigio/Gray

	TIPO DI CONNETTORE	RIF.CONNETTORE	RIF.TERMINALE
1	26 vie AMP DPD P.F.	CONN.AMP.174516-1 CAPP.SAME 2.6519.031.0	CNT.FEMM.AMP 173716-1(040) CNT.FAMM.AMP 282374-1(070)
3	2 VIE AMP M-L MASCHIO	CONN.AMP.480698	CNT.MASCHI AMP.350687-1
5	6 VIE AMP M-L MASCHIO	CONN.AMP.640585	CNT.MASCHI AMP.350687-1
4	3 VIE AMP MINITINER P.F.	CONN.AMP.827578 CAPP.MTA 45.20921	CNT.FEMMINA AMP.925590-1 CAPP.COBO 02.206.401
2	6 VIE AMP "QMS"	CONN.AMP.1-967360-1	CNT.FEMM.AMP 1-963727-1 GOMMINI AMP QMS
8	14 VIE AMP CPC P.F.	CONN.AMP.182641-1 CORAZZA AMP.182665-1	CNT.FEMMINA AMP.163873-1
9 6	2 VIE AMP.SUPERSEAL P.F.	CONN.AMP.282080-1 CAPP.MTA 45.20921	CNT.FEMM.AMP.282110-1 GOMM.AMP.281934-2
7	3 VIE AMP MINITINER P.F. STAGNO	CONN.AMP.282191-1 CAPP.MTA 45.20921	CNT.FEMMINA AMP 929939-1 GOMM.AMP 0-0828905-1

1	GUAINA IN PVC ø7x0.6 (105 °C)	Colore Nero	PVC SHEATH ø7x0.6 (105 °C)	Black Color
2	GUAINA IN PVC ø8x0.6 (105 °C)	Colore Nero	PVC SHEATH ø8x0.6 (105 °C)	Black Color
3	GUAINA IN PVC ø10x0.6 (105 °C)	Colore Nero	PVC SHEATH ø10x0.6 (105 °C)	Black Color
4	GUAINA IN PVC ø12x0.6 (105 °C)	Colore Nero	PVC SHEATH ø12x0.6 (105 °C)	Black Color
5	NASTRO AUTOESTINGUENTE IN PVC	Colore Nero	SELF-EXTINGUISH PVC BAND	Black Color
6	FASCETTE IN POLIAMMIDE MTA 46.21420	Colore Nero	POLYAMMIDE BANDS MTA 46.21420	Black Color

USARE CAVI "FASE II" - USED CABLES "FASE II"

TUTTI I CONNETTORI SONO VISTI DAL LATO INGRESSO CAVI - CONNECTORS VIEW FROM WIRES INPUT SIDE

FORNIRE SCIOLTE N°.5 FASCETTE MTA 46.21420 - SUPPLY FREE N°.5 BANDS MTA 46.21420

C.S.A. COMPONENTE SPECIALIZZATO DI ACQUISTO
SPECIALIZED PURCHASED COMPONENT
FORNITORE - SUPPLIER OEM

C.A.D. MODIFICARE SOLO SU SISTEMA CAD
HANDLING ON CAD SYSTEM ONLY

Scala per copie da microfilm - Microfilm printscale

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Materiale - Material: ELECTRONIC MOTOR WIRING	Disegnato - Drawn: RABBONI	Data - Date: 22/06/98	Tolleranze generali sec. tab. General tolerances acc tab.: 93660-61-62
Trattam. termico - Heat treatment	Control. - Checked: ESPOSITO	Data - Date: 22/06/98	Prodotto - Model: 566
Trattam. superf. - Surface treatment	Visto - Approved: ESPOSITO	Data - Date: 22/06/98	Validato il: 25/06/98
Denominaz. - Name: CABL.REGOLATORE ELETTRONICO	Deve essere conforme a: It must comply with: Norma di qualita' S-L-H: S-L-H quality spec.: 805	Capitolati S-L-H: S-L-H requirement:	SAME DEUTZ-FAHR GROUP S.p.A. Scale 1 Sheet: 1 di of 2
	N. dis. - P/N: 0.011.4349.4		Rev. 0

Modifiche - Design Changes(3-6-98) RABBONI OM.11410 f.6

F.to A2

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