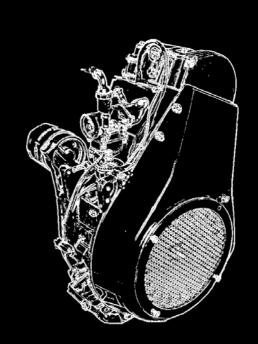
USE-MAINTENANCE

LGA 280 OHC LGA 340 OHC







Summary of first maintenance operations.

MAINTENANCE EXTRAORDINARY
AFTER THE FIRST 1.000 Km

Engine oil replacement.

Oil filter replacement.

LGA 280 - 340 OHC

PROCEDURE	ELEMENT	FREQUENCY x 1.000 Km													
		1	10	20	30	40	50	60	70	80	90	100			
	ENGINE OIL LEVEL					Ever	y 1.00	0 Km							
	COOLING SYSTEM														
	AIR CLEANER														
CHECK	FUEL PIPES AND UNIONS														
	EXHAUST SYSTEM														
	SPARK PLUGS														
	VALVE CLEARANCE		Every 5.000 Km												



Summary of first maintenance operations.

LGA 280 - 340 OHC

PROCEDURE	ELEMENT	FREQUENCY x 1.000 Km													
PROCEDURE	ELEIMENT	1	10	20	30	40	50	60	70	80	90	100			
	ENGINE OIL														
	LUBE OIL FILTER														
REPLACEMENT	FUEL FILTER														
	AIR CLEANER CARTRIDGE														
	SPARK PLUGS														
	TIMING BELT (*)														

(*) Once removed, the timing belt must be replaced, even if it has not reached its scheduled change interval. Keep the same maintenance intervals above 100.000 km.

Even if the set mileage has not been reached, replace the following:

- engine oil after one year
- timing belt after four years

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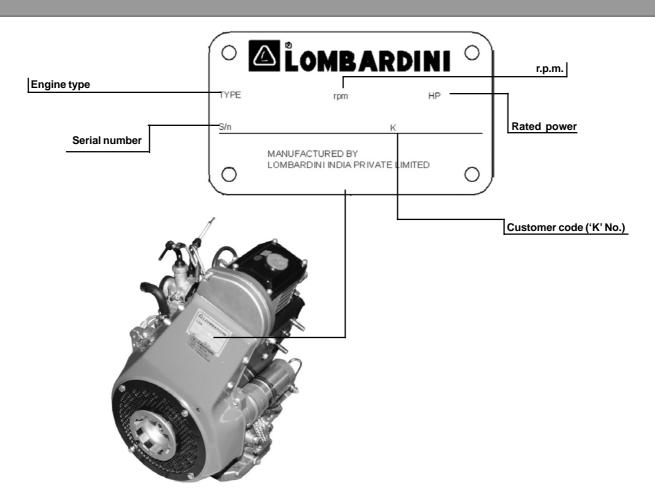
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ACCESSORY SET SUPPLIED WITH THE ENGINE

Request if not supplied.



ENGINE TYPE





PREFACE

Every attempt has been made to present within this service manual, accurate and up to date technical information. However, development on the Lombardini series is continuos. Therefore, the information within this manual is subject to change without notice and without obligation.

The information contained within this service manual is the sole property of Lombardini. As such, no reproduction or replication in whole or part is allowed without the express written permission of Lombardini.

Information presented within this manual assumes the following:

- 1 The person or persons performing service work on Lombardini series engines is properly trained and equipped to safely and professionally perform the subject operation;
- 2 The person or persons performing service work on Lombardini series engines possesses adequate hand and Lombardini special tools to safely and professionally perform the subject service operation;
- 3 The person or persons performing service work on Lombardini series engines has read the pertinent information regarding the subject service operations and fully understands the operation at hand.

GENERAL SERVICE MANUAL NOTES:

- 1- Use only genuine Lombardini spare parts. Failure to use genuine Lombardini parts could result in sub-standard performance and reduced engine life.
- 2- All data presented are in metric format. That is, dimensions are presented in millimeters (mm), torque is presented in Newton-meters (Nm), power in kilowatts (kW) weight is presented in kilograms (Kg), volume is presented in liters or cubic centimeters (cc) and pressure is presented in barometric units (bar).



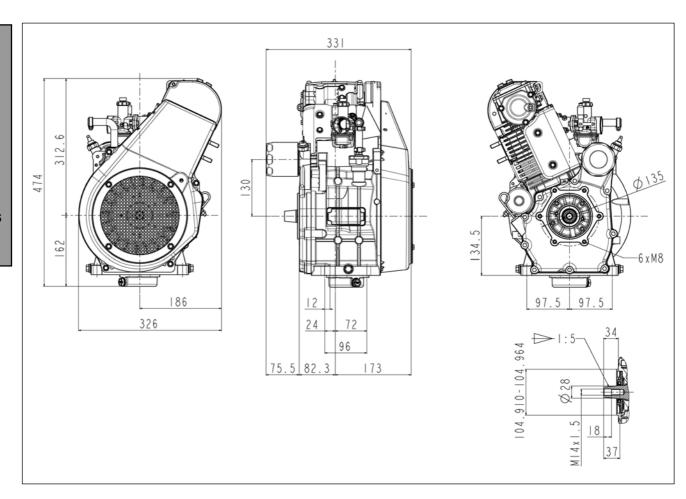
TECHNICAL FEATURES

		LGA 280 - 340 OHC					
WORKING CYCLE		Petrol	4 Stroke				
CYLINDERS	N.	1	1				
BORE	mm	74	82				
STROKE	mm	64	64				
DISPLACEMENT	cm³	275	338				
TIMING		Synchronized the	ought toothed belt				
LUBRICATION SYSTEM		Fully forced by a trochoidal pu					
COMPRESSION RATIO		8,0÷1					
R.P.M.	n.	. 6200					
OIL CAPACITY (WITH FILTER)	I.		1,7				
OIL CAPACITY (WITHOUT FILTER)	I.		1,6				
OIL CONSUMPTION	g/kW.h		0,8				
DRY WEIGHT	Kg.	3	0,5				
IGNITION SYSTEM		Electronic					
ELECTRIC STARTING		0,25 kW electric starter					
COOLING SYSTEM		Forced air					
SPARK PLUGS		CHAMPION RC12YC					

The inlet and exhaust system must not be modified with reference to what prescribed by Lombardini when the version was approved; the engine incorrect operation and the voidance of the warranty must be expected if they are submitted to any modification

LGA 280 340 OHC

OVERALL DIMENSIONS



BEFORE STARTING

USE

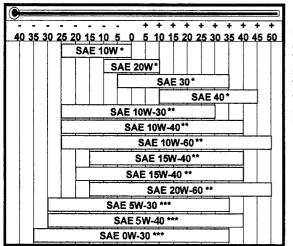
Carefully read and follow all instructions in this booklet as well as all those provided with the equipment on which this engine is used.

Failure to do so will make warranty void.



The engine may be damaged if operated with insufficient lube oil. It is also dangerous to fill in too much oil to the engine because a sudden increase in engine rpm could occur caused by its combustion. Use proper lube oil preserve your engine. Nothing affects the performance and durability of your engine more than the lube oil you use. If inferior quality oil is used, or if your engine oil is not changed regularly, the risk of piston seizure, piston ring sticking, and accelerated wear of the cylinder liner, bearing and other moving components increases significantly. Always use oil with the right viscosity for the ambient temperature in which your engine is being operated. Use the chart on this page when chosing your engine oil.

The used engine oil can cause skin-cancer if kept frequently in contact for prolonged periods. If contact with oil cannot be avoided, wash carefully your hands with water and soap as soon as possible. Do not disperse the oil in the ambient, as it has a high pollution power.



SAE CLASSIFICATION

In the SAE classification, oils differ on the basis of their viscosity, and no other qualitative characteristic is taken into account.

The first number refers to the viscosity when the engine is cold (symbol W = winter), while the second considers viscosity with the engine at régime.

The criteria for choosing must consider, during winter, the lowest outside temperature to which the engine will be subject and the highest functioning temperature during summer.

Single-grade oils are normally used when the running temperature varies scarcely.

Multi-grade oil is less sensitive to temperature changes.

SAE GRADE

* Mineral base

** Semi-synthetic base

*** Synthetic base

LUBRICANT INTERNATIONAL SPECIFICATIONS

They define testing performances and procedures that the lubricants need to successfully respond to in several engine testing and laboratory analysis so as to be considered qualified and in conformity to the regulations set for each lubrication type.

A.P.I : (American Petroleum Institute)

DETRO

MIL : Engine oil U.S. military specifications released for logistic reasons

ACEA : European Automobile Manufacturers Association

The following table is a useful reference when buying engine oil.

Codes are usually printed-out on the oil container and the understanding of their meaning is useful for comparing different brands and choosing the kind with the right characteristics.

Usually a specification showing a following letter or number is preferable to one with a preceding letter or number.

LIGHT DUTY DIESEL ENGINES

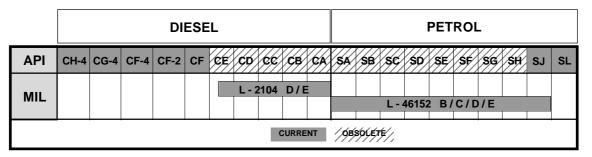
An SF oil, for instance, is more performing than a SE oil but less performing than a SG one.

ACEA REGULATIONS - ACEA SEQUENCES

HEAVY DUTY DIESEL ENGINES

FEIROL	LIGHT DOTT DIEGEL ENGINED	
A1 = Low-viscosity, for frictions reduction	B1 = Low-viscosity, for frictions reduction	E1= OBSOLETE
A2 = Standard	B2 = Standard	E2 = Standard
A3 = High performances	B3 = High performances (indirect injection)	E3 = Heavy conditions (Euro 1 - Euro 2 engines)
	B4 = High quality (direct injection)	E4 = Heavy conditions (Euro 1 - Euro 2 - Euro 3 engines)
		E5 = High performances in heavy conditions (Euro 1 - Euro 2 - Euro 3 engines)

API / MIL SEQUENCES



PRESCRIBED LUBRICANT

LGA 280 ENGINES OIL CAPACITY

AGIP SINT 2000 15W40/50

specifications

API SJ/CF ACEA A3-98 B3-98 MIL-L-46152 D/E.

OIL VOLUME AT MAX LEVEL WITH OIL FILTER Litres	1,7
OIL VOLUME TO THE MAX. LEVEL WITHOUT Litres	1,6

Nei paesi ove i prodotti AGIP non sono disponibili è prescritto olio per motori con specifiche API SJ/CF oppure corrispondente alla specifica militare MIL-L-46152 D/E.

Fill crankcase with engine oil.



Oil filling and level inspections must be carried out with the engine on a flat surface.

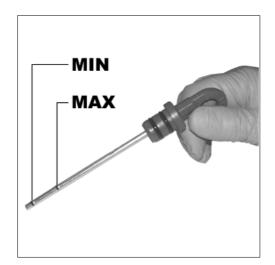
Remove the oil dipstick and fill in the recommended lubricating oil.





- Fit the dipstick correctly back in place.

- Make sure that is nearly at max.





To avoid explosions or fire outbreaks, do not smoke or use free flames during the operations. Fuel vapours are highly toxic. Only carry out the operations outdoors or in a well ventilated place.



Keep your face well away from the plug to prevent harmful vapours from being inhaled. Dispose of fuel in the correct way and do not litter as it is highly polluting.

Use of other types of fuel could damage the engine.

 $\label{thm:continuous} \textbf{Unleaded fuel must be used with a minimum of 95RON, it will avoid starting problems.}$

Do not use dirty diesel fuel or mixtures of diesel fuel and water since this would cause serious engine faults.

RUN-IN

During first 1500 Km do not exceed 70% of performance.

BEFORE STOPPING

MAINTENANCE



Run at idle speed for a few minutes.

Use only genuine Lombardini spare parts. Failure to use genuine Lombardini parts could result in sub-standard performance and reduced engine life.

The non-observance of the operations described in the following pages can involve the risk of technical damages to the machine and/or the installation.

Failure to do so will make warranty void.

Operation description.

AFTER THE FIRST 1.000 KM.

Engine oil replacement .

page 17

Maintenance operations to carry out on cold engine.

Oil filter replacement.

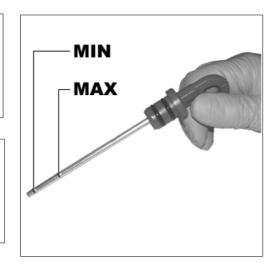
page 18



1.000 Km

Oil level check.

If level is under the minimum, fill up.







Every 5.000 Km

5.000 Km



- The following operation must be carried out on a cold engine.
- The piston must be positioned on its TDC.



Using a thickness gauge, check that clearance is 0.20 mm for the intake valve and 0.20 mm for the exhaust valve.



OPERATIONS TO BE CARRIED OUT AT 10.000 Km 20.000 Km 30.000 Km 40.000 Km 50.000 Km 60.000 Km 70.000 Km 80.000 Km 90.000 Km 100.000 Km

Air cleaner checking and cleaning.

Open air cleaner and remove element.

Always wear protective goggles if compressed air is used.







To clean the filter cartridge, tap it lightly and repeatedly on a hard surface to eliminate excess dirt. It is preferable to blow compressed air lengthways through paper filter elements, rather than crossways, and at a minimum distance of 250 mm.



Carefully clean the inside of the filter housing and of the support. Next mount the new filter element and housing.





If the filtering element is heavily clogged, it must be replaced.

Use on

Use only genuine Lombardini spare parts.

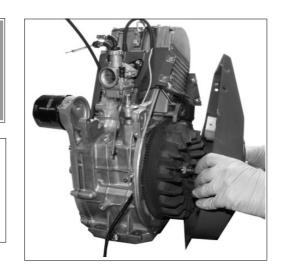


Make sure that the filter is mounted in the correct way otherwise dust and other impurities could enter the intake ducts.



Cooling system check.

Remove the fixing screws and then remove the air shroud.



Engine cooling efficiency is negatively affected if the cooling fins of the cylinder and cylinderhead are dirty: clean them with a brush soaked in diesel fuel and blow by compressed air.



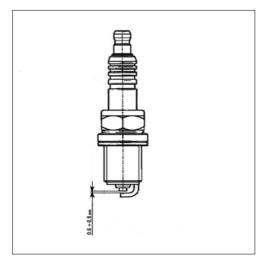


Spark plug check.

The spark plug must always be removed by using the proper wrench when the engine is cold to prevent damaging the cylinder head threading.



Using a thickness gauge, make sure that the distance between electrodes is $0.60 \div 0.70$ mm. Clean the electrodes with a metal brush (with brass bristles) and blow compressed air over them. If the ceramic insulation is chipped or if the electrodes are worn away, replace the spark plug.



The spark plug should be screwed onto the cylinder head initially by hand, and then tightened to 20 Nm by means of a torque wrench.





Check fuel pipes and unions. (Not supplied by Lombardini.)

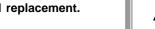
Check the exhaust system. (Not supplied by Lombardini.)

Make sure there is no fuel leakage in the feed circuit.

Make sure that there is no leakage in the exhaust system gaskets, broken pipes or holes in the muffler and catalytic converter.

These anomalies could prevent the engine from functioning or cause damages.

Engine oil replacement.





The used engine oil can cause skin-cancer if kept frequently in contact for extended periods. If contact with oil cannot be avoided, wash carefully your hands with water and soap as soon as possible. Do not disperse oil in the ambient, as it has a high pollution power.

In case of low use: every 1year.



To quickly and completely drain off the engine oil, it is advisable to carry out this operation when the engine is hot.

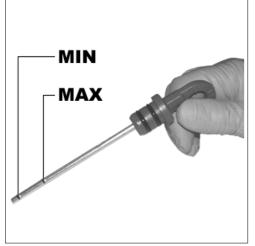
Remove the plug and drain the oil into a suitable vessel.



Re-install the oil drain-plug and fill-up the engine with new lube oil.



Make sure that it is at max with engine on level surface.



Before restarting, make sure that the oil dipstick and the oil drain have been correctly re-positioned to prevent lubricant from spilling out.

Oil filter replacement.

In case of low use: every year

Remove the oil filter by using the proper wrench.



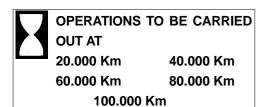
- Use only genuine Lombardini spare parts.

- When replacing the oil filter, keep it separate from other waste material.



Mount the new oil filter and tighten only by hand.





Fuel filter replacement. (Not supplied by Lombardini.)

When replacing the fuel filter, keep it separate from other waste material.

Air filter cartidge replacement.

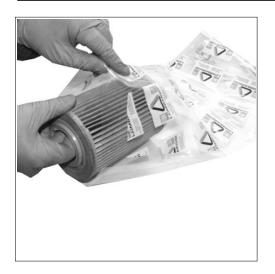
Open air cleaner and remove element.







Use only genuine Lombardini spare parts.



Make sure that the filter is mounted in the correct way otherwise dust and other impurities could enter the intake ducts.



Replace the spark plug.

Currently only the use of CHAMPION type RC12YC spark plugs is allowed. The distance between the electrodes must be 0.60-0,70 mm. Only replace with the proper spark plug. Do not use other types of spark plugs with this engine.



A

The spark plug must always be removed on a cold engine to prevent damaging the cylinder head threading.

Assemble the spark plug by tightening manually to the cylinder rim.

The final torque must be 20 Nm.





Following operations should be performed by authorized personnel trained on the product.





Every 50.000 Km

50.000 Km or 4 years

The toothed timing belt must be replaced when removed, even if its scheduled change interval is not over.

Replacement of timing belt.



ENGINE STORAGE (NOT INSTALLED)

- -If the engine is not to be used for long periods, check the storage environment, the type of packaging and make sure these conditions will allow proper maintenance. If necessary, cover the engine with protective sheeting.
- Do not store the engine directly on the ground, in damp environments, in areas exposed to the elements, near sources of danger, including less visible hazards such as high-voltage power lines, etc.

ENGINE STORAGE (INSTALLED)

If an installed engine is not to be used for long periods, it is necessary to carry out a number of maintenance procedures in order to preserve its level of efficiency and protect its components. If an installed engine is to be inactive for short periods, carry out the following:

- Check the electrical contacts and, if necessary, protect them using an anti-rust spray.
- Disconnect the battery.
- Empty the fuel tank to prevent the risk of fire.
- Remove the key from the dashboard and put it in a safe place to avoid acts of vandalism.
- Lock the cabin and the cowls to prevent strangers gaining access.



If the engine is not to be used for more than 1 month, it is necessary to apply protective measures that are valid for 6 months (see "Protective treatment").

If, after the first 6 months, the engine is still not to be used, it is necessary to carry out further measures to extend the protection period (see "Protective treatment").

PROTECTIVE TREATMENT

- 1 Check that the engine oil and coolant are up to level.
- 2 Run the engine at minimum idle speed for 15 minutes.
- Switch off the engine.
- 4 Remove the lubrication oil.
- 5 Fill the sump with protective oil: AGIP RUSTIA.
- 6 Start the engine and check for fuel and oil leaks.
- 7 Bring the engine to ¾ of the maximum speed for 5-10 minutes.
- 8 Switch off the engine.
- 9 Empty the fuel tank completely.
- 10 Replace the fuel filter.
- 11 Spray SAE 10W oil on the exhaust and intake manifolds.
- 12 Close all openings to prevent foreign bodies from entering.
- 13 Thoroughly clean all external parts of the engine using suitable products.
- 14 Treat non-painted parts with protective products (AGIP RUSTIA 100/F).
- 15 Loosen the alternator/fan belt.
- 16 If necessary, cover the engine with protective sheeting.



After one year of engine inactivity, the coolant loses its properties and must be replaced.

PREPARING THE ENGINE FOR OPERATION AFTER PROTECTIVE TREATMENT

After a period of inactivity and before installing and running the engine, it is necessary to carry out a few measures in order to ensure that it runs at maximum efficiency.

- Remove the protective sheeting.
- 2 Eliminate any blockages in the exhaust and intake ducts.
- 3 Use a cloth soaked in degreasing product to remove the external protective treatment.
- 4 Remove the intake manifold.
- 5 Inject lubrication oil (no more than 2 cm³) into the valves and install the intake manifold.
- 6 Adjust the alternator/fan belt tension
- 7 Turn the flywheel manually to check the movement of the mechanical parts.
- 8 Refill the tank with fresh fuel.
- 9 Start the engine and run at 3/4 of the maximum speed for 5-10 minutes.
- 10 Switch off the engine.
- 11 Remove the protective oil to replace with engine oil.
- 12 Introduce new oil (see "Lubricants") up to the correct level marked on the dipstick.
- 13 Replace the filters (air, oil, fuel) with original spare parts.
- 14 Empty the cooling circuit completely and pour in the new coolant up to the correct level.



Over time, a number of engine components and lubricants lose their properties, even when the engine is not in use, and so it is important to consider whether they need replacing, based not only on the mileage, but also on age and wear.

- 15 Install the engine and make the necessary connections and unions.
- 16 Make sure that electrical contacts are intact and efficient.
- 17 Check that the engine oil and coolant are up to level.
- 18 Start the engine and keep at minimum speed for a few minutes.
- 19 Check for leaks and, if necessary, find and eliminate the cause.
- 20 Switch off the engine.
- 21 Double check that the engine oil and coolant are up to level.

Ţ

IF STORAGE EXCEEDS 6 MONTHS PLEASE CONTACT LOMBARDINI AUTHORIZED SERVICE CENTRES.

	PROBABLE CAUSE							TRO	OUB	LES						
			Starts and stops	No power	Noisy	White smoke	Black smoke	Hunts	C o n s u m e s excessive oil	Overheats	Does not accel.	Spark plug fais to spark	Unstable engine operation.	Poor combustion	High oil pressure	Low oil pressure
	Grounded sparking plug															
	Disconnected or broken spark cable															
IGNITION	Faulty coil															
<u>N</u>	Faulty rotor															
	Loosened or oxidized cable clamp															
	Demagnetized flywheel															
	Clogged piping															
	Clogged fuel filter															
H H S	Presence of air in the fuel circuit															
FUEL CIRCUIT	Clogged tank breather (cap)															
FUEL	Clogged carburettor breathers															
	Dirty carburettor															
	Blocked carburettor needle valve															

			TROUBLES														
PROBABLE CAUSE		The engine does not start	Starts and stops	No power	Noisy	White smoke	Black smoke	Hunts	C o n s u m e s excessive oil	Overheats	Does not accel.	Spark plug fais to spark	Unstable engine operation.	Poor combustion	High oil pressure	Low oil pressure	
CAL	Low battery																
ELECTRICAL SYSTEM	Faulty starting switch																
ELE	Faulty starting motor																
	Air filter clogged																
NCE	Excessive idle operation																
MAINTENANCE	Incomplete running-in																
MAN	Engine overloaded												·				
	Clogged flywheel and sidewalls																

								TRO	OUB	LES						
	PROBABLE CAUSE		Starts and stops	No power	Noisy	White smoke	Black smoke	Hunts	C o n s u m e s excessive oil	Overheats	Does not accel.	Spark plug fais to spark	Unstable engine operation.	Poor combustion	High oil pressure	Low oil pressure
	Adjust carburetion															
S	Low idling setting															
ENTS PAIR	Worn or blocked piston rings															
STME E RE	Worn or blocked cylinder															
ADJUSTMENTS ENGINE REPAIRS	Sticking valves															
`	Excessive valve clearance															
	Broken timing belt															
	Oil level too high															
	Pression regulating valve jammed or dirty															
LUBRICATING SYSTEM	Worn oil pump															
BRICATII SYSTEM	Air in oil intake pipe															
LUB	Defective pressure gauge or pressure switch															
	Oil intake pipe clogged															
	Oil filter clogged															

NOTES

PART ORDERS

- For any spare parts order please specify following details:

ENGINE TYPE AND SERIAL NUMBER - Version (K) - on the engine name plate

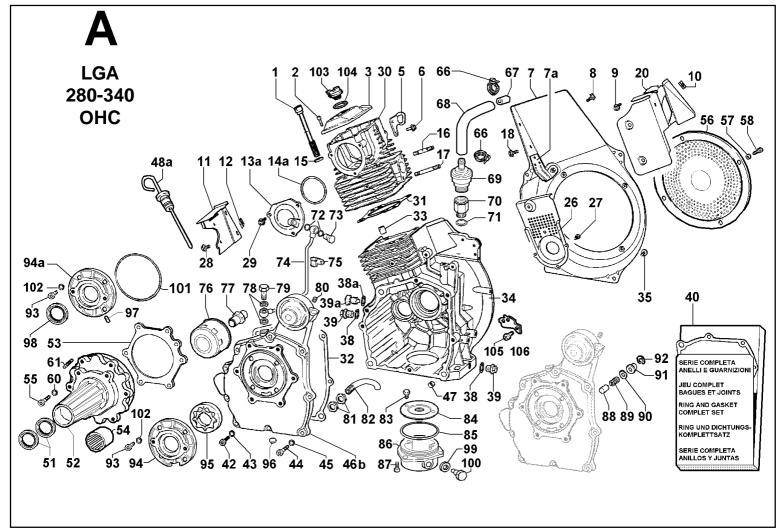


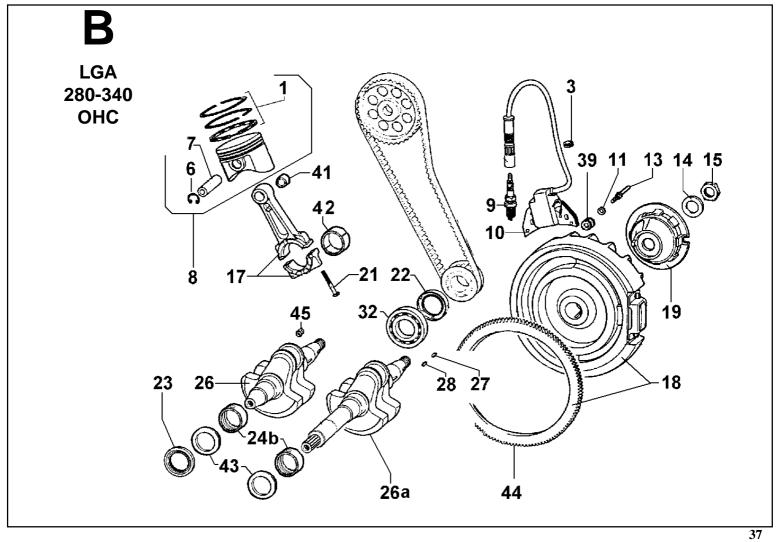
SPARE PARTS TABLE

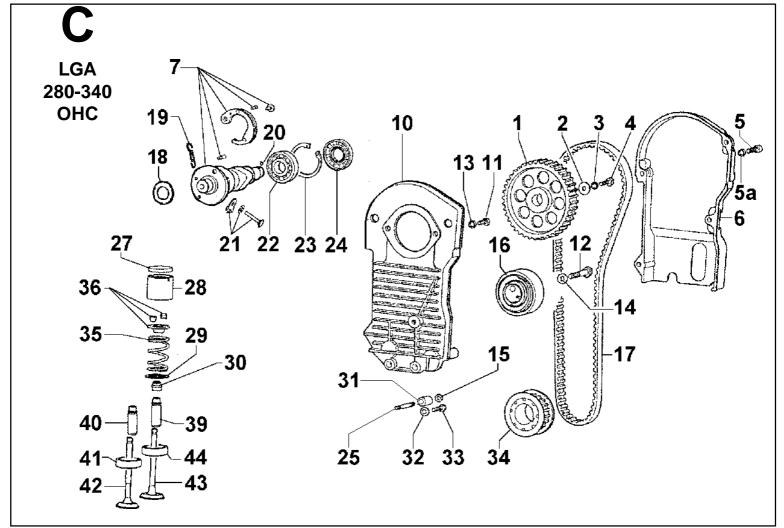
LGA 280 - 340 OHC

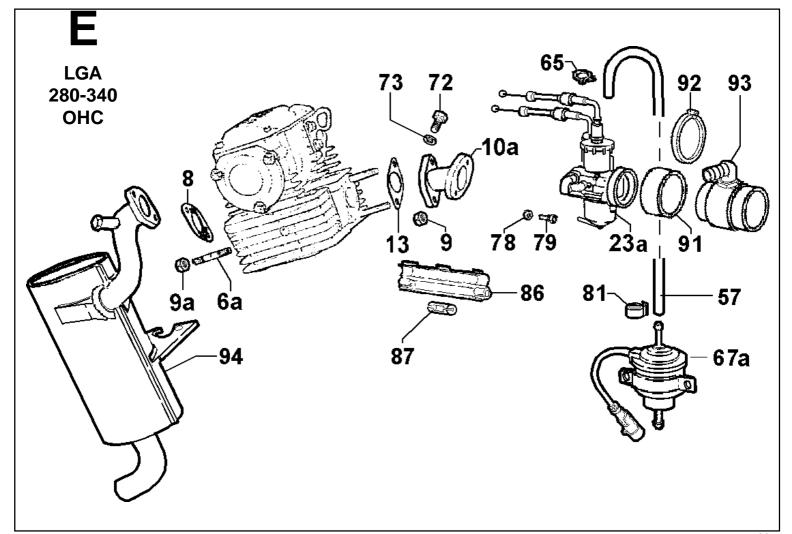
Drawing are subject to modifications - PIs contact Service Centers for special applications.

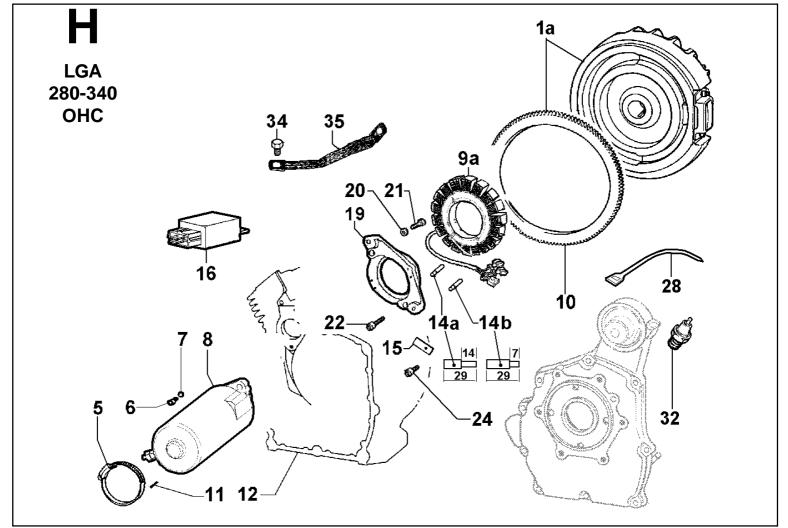
Α	CRANKCASE/CYLINDER HEAD/GEAR COVER/COOLING PANELS/LUBRICATING SYSTEM
В	CONN.ROD/PISTON/CRANKSHAFT/FLYWHEEL/IGNITION
С	TIMING/CAMSHAFT/VALVES
E	FUEL SYSTEM
Н	STARTING/ELECTRICAL SYSTEM











NOTES							

Data reported in this issue can be modified at any time by Lombardini.





42100 Reggio Emilia - Italia - ITALY Via Cav. del Lavoro Adelmo Lombardini, 2 Cas. Post. 1074 - Tel. (+39) 0522 3891 Telex 530003 Motlom I - Telegr.: Lombarmotor R.E.A. 227083 - Reg. Impr. RE 10875 Cod. fiscale e Partita IVA 01829970357 CEE Code IT 01829970357 E-MAIL: atlo@lombardini.it

Internet: http://www.lombardini.it

LOMBARDINIU.S.A. INC. LOMBARDINI MOTOREN GmbH LOMBARDINI (U.K.) LTD. LOMBARDINI SLOVAKIA sro LOMBARDINI INDIA P.L.

2150 Boggs Road, Bldg. 300, Suite 300 - Duluth, GA 30096, U.S.A. LOMBARDINI FRANCE S.A. Allée de Riottier, 47 - 69400 Limas-Villefranche S/Saône, France Berner Straße, 54 - 60437 Frankfurt/Main 50 - Deutschland Unit 7 - Ferry Mills, Osney Mead Industrial Estate - Oxford OX2 OES, U.K. LOMBARDINI ESPAÑA S.A. c/Paris, nº 1-9 - Poligono Industrial Cova Solera, 08191 - Rubi Barcelona, ESPÃNA SA 3 / 1697 036 57 Martin Slovenska Republika Plot No. J-2/1 MIDC Industrial Area - Chikaltana - (AURANGABAD) - 431210 Maharashtra - INDIA

	ENTE COMPILATOR TECO/ATI	COD. LIBRO	MODELLO N°	DATA EMISSIONE	REVISIONE 01	DATA	VISTO S
		1.5302.691	51115	30.11.2005		17.04.2008	Tell-