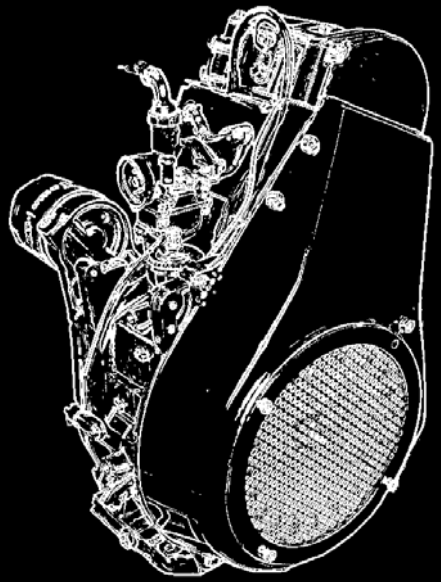
USE-MAINTENANCE

ISO 9001: 0446
QS 9000: 2231

LGA 280 OHC
LGA 340 OHC



LOMBARDINI

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
CHECK	ENGINE OIL LEVEL	Every 1.000 Km										
	COOLING SYSTEM		■	■	■	■	■	■	■	■	■	■
	AIR CLEANER		■	■	■	■	■	■	■	■	■	■
	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										
		1	10	20	30	40	50	60	70	80	90	100
REPLACEMENT	ENGINE OIL		■	■	■	■	■	■	■	■	■	■
	LUBE OIL FILTER		■	■	■	■	■	■	■	■	■	■
	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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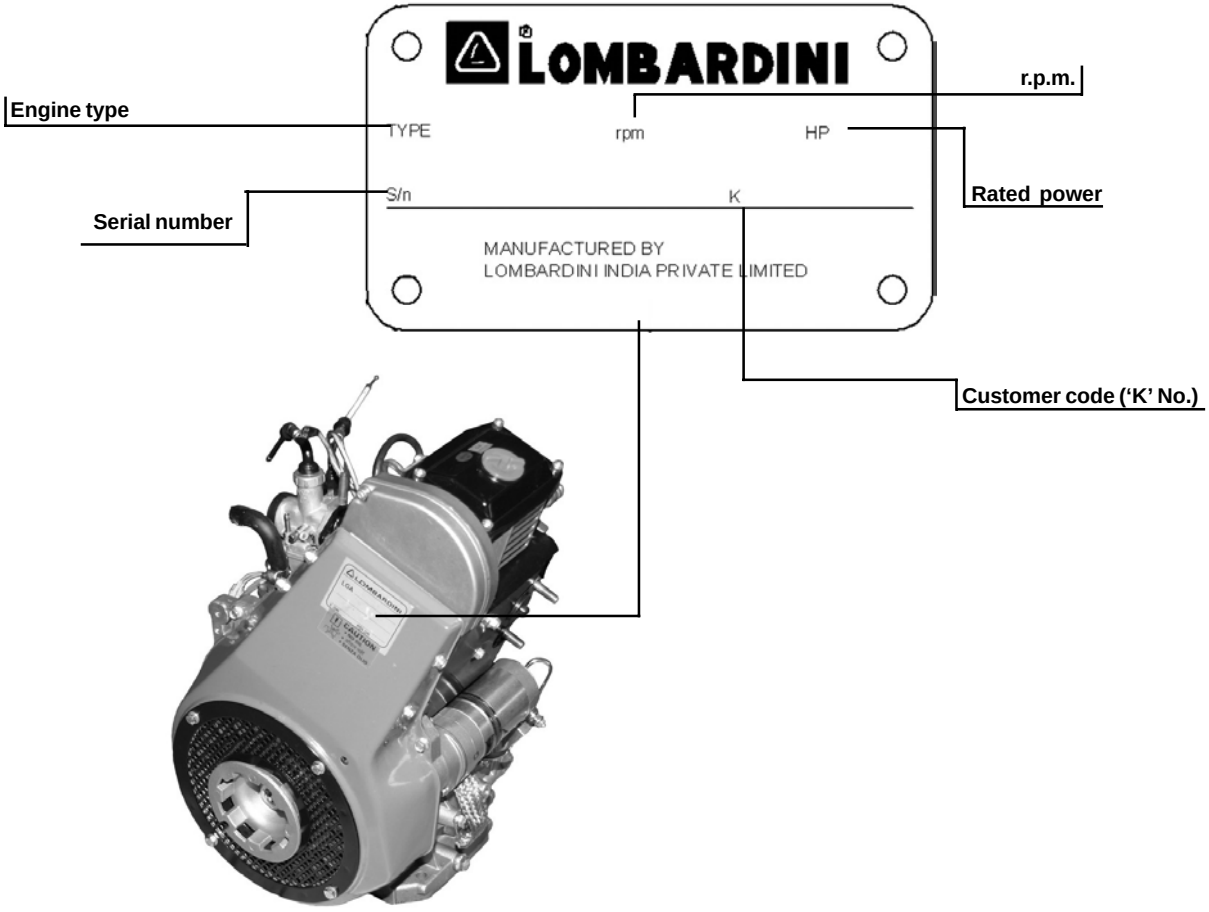
ACCESSORY SET SUPPLIED WITH THE ENGINE	Request if not supplied.	

ENGINE TYPE


LOMBARDINI
Engine type
TYPE
rpm
r.p.m.
HP
Rated power
S/n
Serial number
K
MANUFACTURED BY
LOMBARDINI INDIA PRIVATE LIMITED
Customer code ('K' No.)

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).

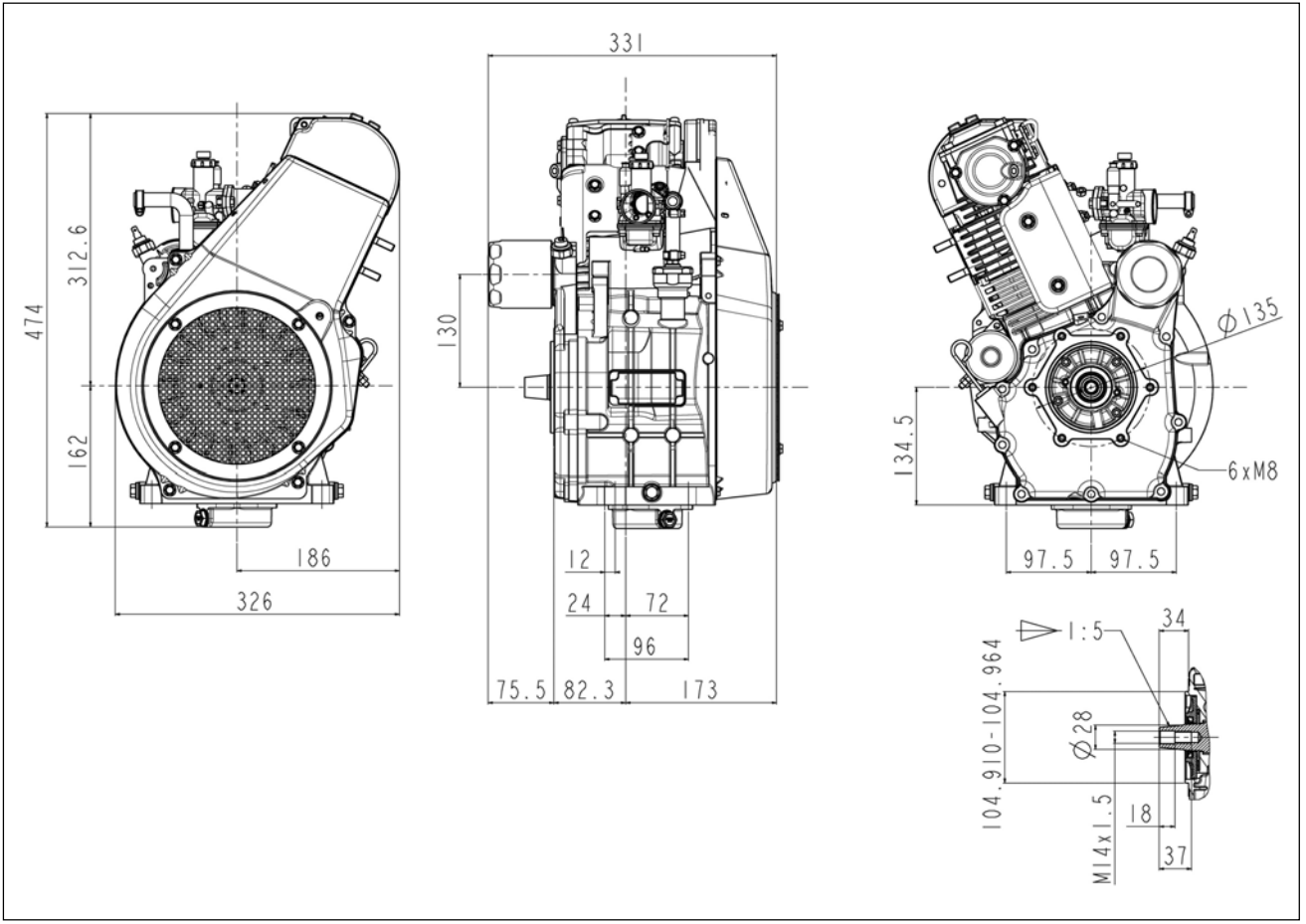
TECHNICAL FEATURES

		LGA 280 - 340 OHC	
WORKING CYCLE		Petrol 4 Stroke	
CYLINDERS	N.	1	1
BORE	mm	74	82
STROKE	mm	64	64
DISPLACEMENT	cm^3	275	338
TIMING		Synchronized throught toothed belt	
LUBRICATION SYSTEM		Fully forced by a trochoidal pump	
COMPRESSION RATIO		8,0÷1	
R.P.M.	n.	6200	
OIL CAPACITY (WITH FILTER)	l.	1,7	
OIL CAPACITY (WITHOUT FILTER)	l.	1,6	
OIL CONSUMPTION	g/kW.h	0,8	
DRY WEIGHT	Kg.	30,5	
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



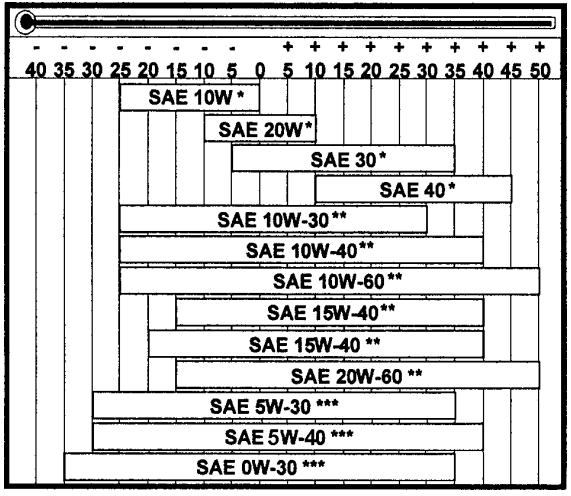
BEFORE STARTING

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

ACEA REGULATIONS - ACEA SEQUENCES

PETROL

A1 = Low-viscosity, for frictions reduction

A2 = Standard

A3 = High performances

LIGHT DUTY DIESEL ENGINES

B1 = Low-viscosity, for frictions reduction

B2 = Standard

B3 = High performances (indirect injection)

B4 = High quality (direct injection)

HEAVY DUTY DIESEL ENGINES

E1 = OBSOLETE

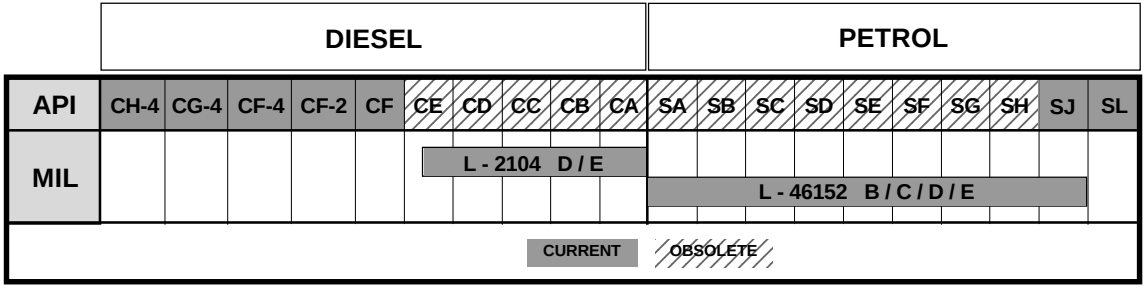
E2 = Standard

E3 = Heavy conditions (Euro 1 - Euro 2 engines)

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

AGIP SINT 2000 15W40/50	**specifications**	**API SJ/CF ACEA A3-98 B3-98 MIL-L-46152 D/E.**

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.

LGA 280 ENGINES OIL CAPACITY

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

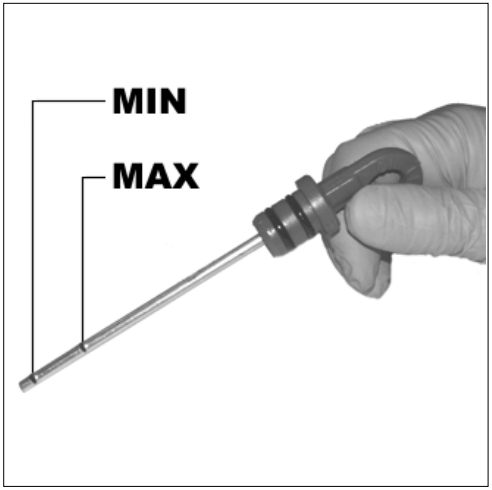
Fill crankcase with engine oil.

! **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.



Refuelling.

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.
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

SERVICE

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.

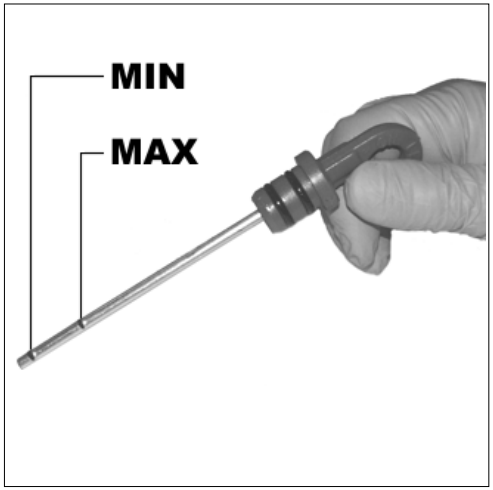
page 18

Every 1.000 Km

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.

Valve clearance check

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

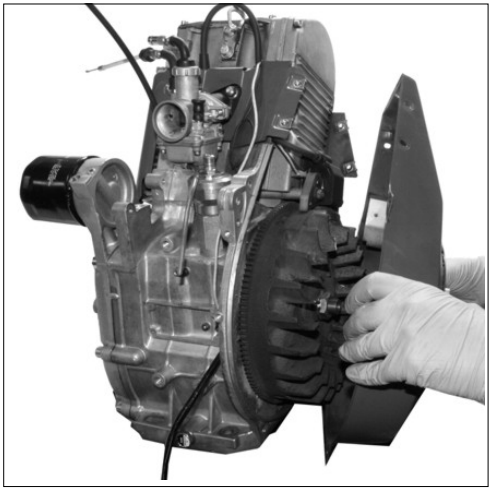
If the filtering element is heavily clogged, it must be replaced.

! Use only genuine Lombardini spare parts.

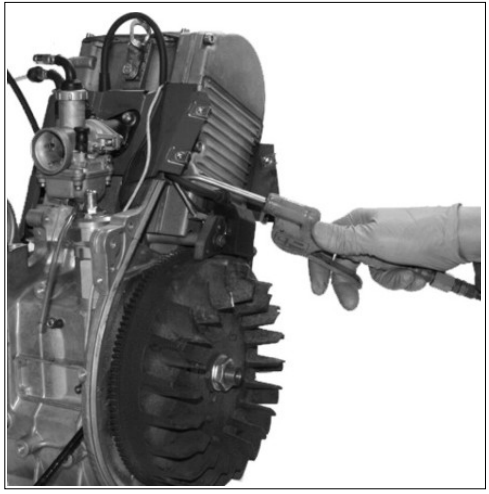
! Make sure that the filter is mounted in the correct way otherwise dust and other impurities could enter the intake ducts.

Cooling system check.

Remove the fixing screws and then remove the air shroud.



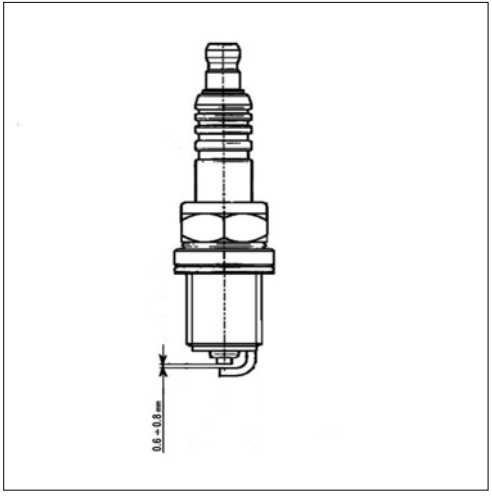
Engine cooling efficiency is negatively affected if the cooling fins of the cylinder and cylinder-head are dirty: clean them with a brush soaked in diesel fuel and blow by compressed air .



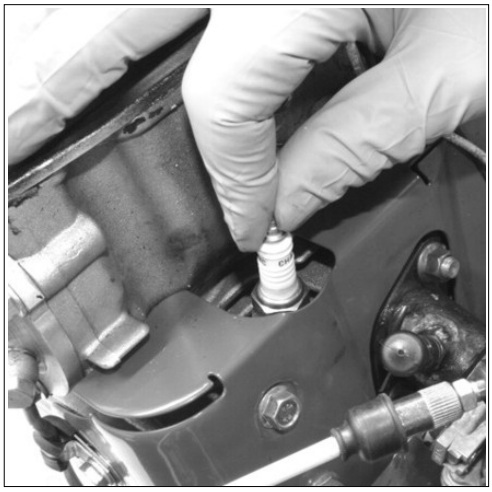
Spark plug check.

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 ÷ 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.)

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

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

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.

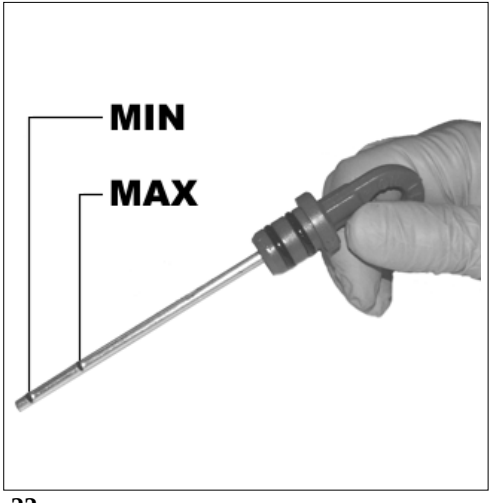
The used engine oil can cause skin-cancer if kept frequently in contact for extended periods. If contact with oil cannot be avoided, wash carefully your hands with water and soap as soon as possible. Do not disperse oil in the ambient, as it has a high pollution power.

- **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.

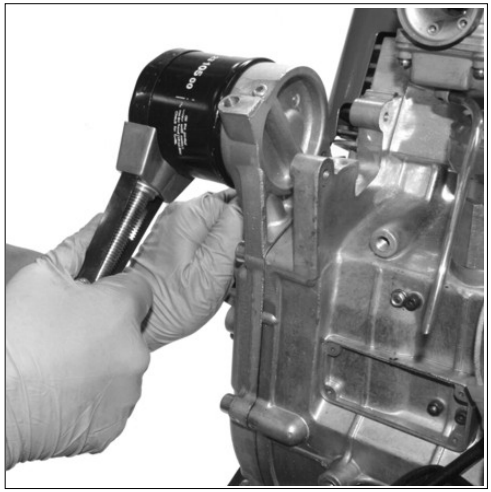
Re-install the oil drain-plug and fill-up the engine with new lube oil.

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.

OPERATIONS TO BE CARRIED OUT AT

20.000 Km **40.000 Km**

60.000 Km **80.000 Km**

100.000 Km

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.**

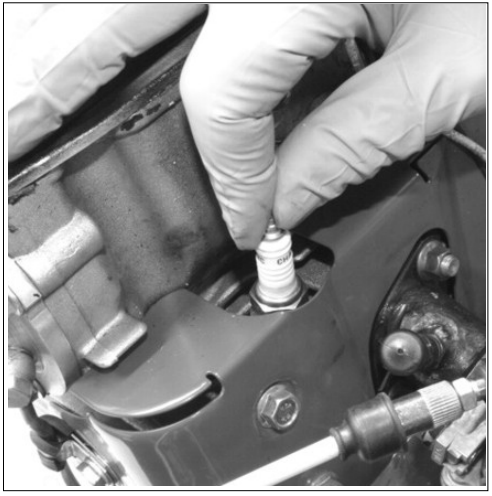
Replace the spark plug.

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.

Brand:
CHAMPION
Type:
RC12YC

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.

SERVICE

Every 50.000 Km

50.000 Km or 4 years

Replacement of timing belt.

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

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.
3 - 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.

1 - 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 cm^3) 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 ¾ 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.

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

PROBABLE CAUSE		TROUBLES														
		The engine does not start	Starts and stops	No power	Noisy	White smoke	Black smoke	Hunts	Consumes excessive oil	Overheats	Does not accel.	Spark plug fais to spark	Unstable engine operation.	Poor combustion	High oil pressure	Low oil pressure
IGNITION	Grounded sparking plug	■										■				
	Disconnected or broken spark cable	■										■				
	Faulty coil	■	■								■	■	■	■		
	Faulty rotor	■														
	Loosened or oxidized cable clamp	■														
	Demagnetized flywheel	■		■							■	■		■		
FUEL CIRCUIT	Clogged piping	■	■													
	Clogged fuel filter	■	■					■								
	Presence of air in the fuel circuit	■	■													
	Clogged tank breather (cap)	■	■					■								
	Clogged carburettor breathers	■	■				■				■		■			
	Dirty carburettor	■	■				■	■			■		■			
	Blocked carburettor needle valve		■								■					

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

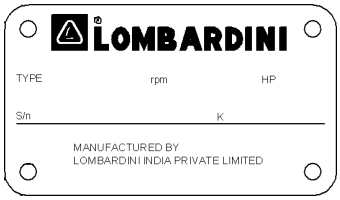
PROBABLE CAUSE		TROUBLES														
		The engine does not start	Starts and stops	No power	Noisy	White smoke	Black smoke	Hunts	Consumes excessive oil	Overheats	Does not accel.	Spark plug fais to spark	Unstable engine operation.	Poor combustion	High oil pressure	Low oil pressure
ADJUSTMENTS ENGINE REPAIRS	Adjust carburetion		■	■				■			■		■			
	Low idling setting		■													
	Worn or blocked piston rings			■		■			■		■					
	Worn or blocked cylinder			■		■			■		■					
	Sticking valves	■	■	■						■						
	Excessive valve clearance				■											
	Broken timing belt	■														
LUBRICATING SYSTEM	Oil level too high					■			■				■			
	Pression regulating valve jammed or dirty														■	■
	Worn oil pump															■
	Air in oil intake pipe															■
	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

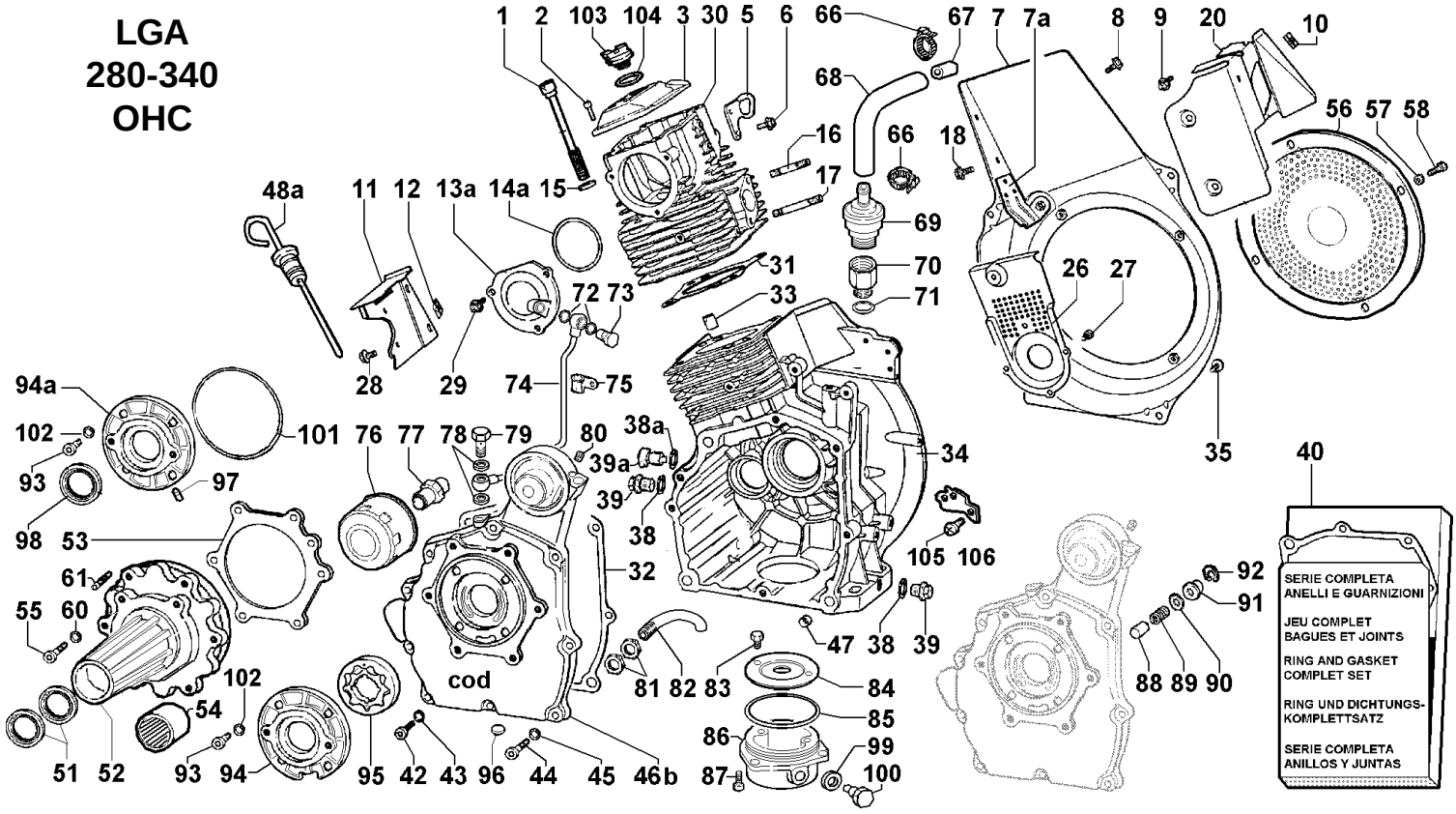
LGA 280 - 340 OHC

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

A	**CRANKCASE/CYLINDER HEAD/GEAR COVER/COOLING PANELS/LUBRICATING SYSTEM**
B	**CONN.ROD/PISTON/CRANKSHAFT/FLYWHEEL/IGNITION**
C	**TIMING/CAMSHAFT/VALVES**
E	**FUEL SYSTEM**
H	**STARTING/ELECTRICAL SYSTEM**

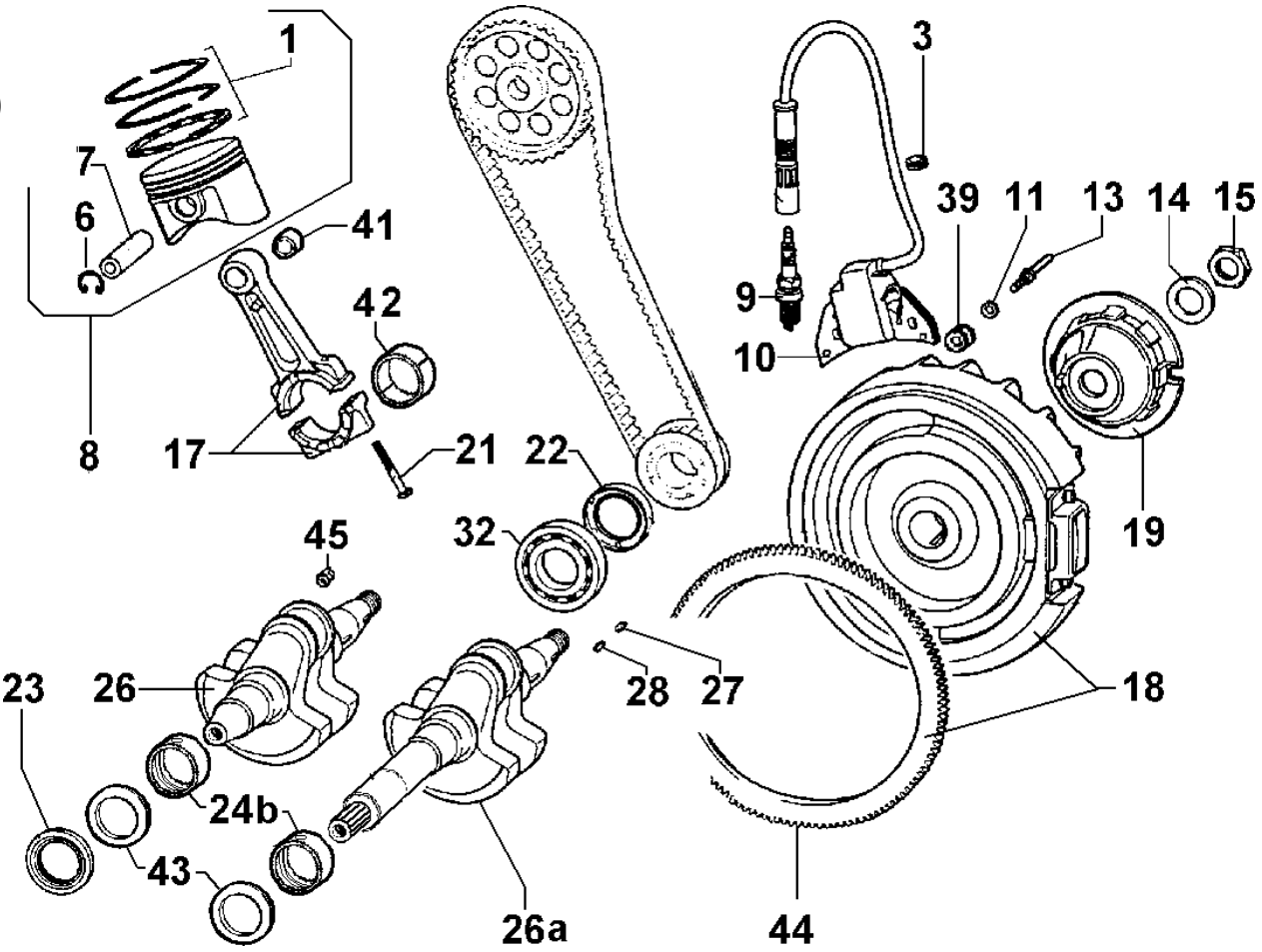
A

LGA
280-340
OHC



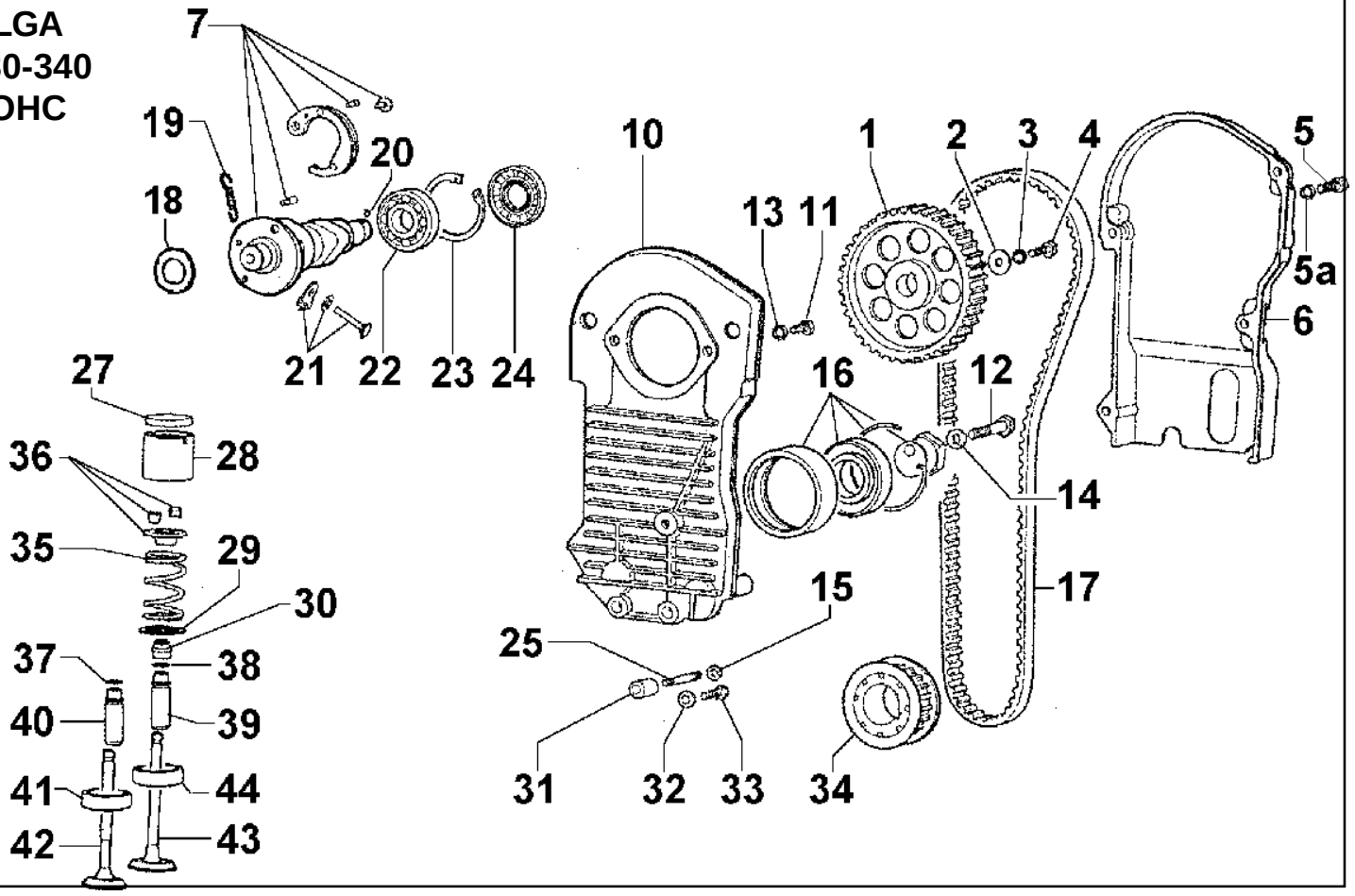
B

LGA
280-340
OHC



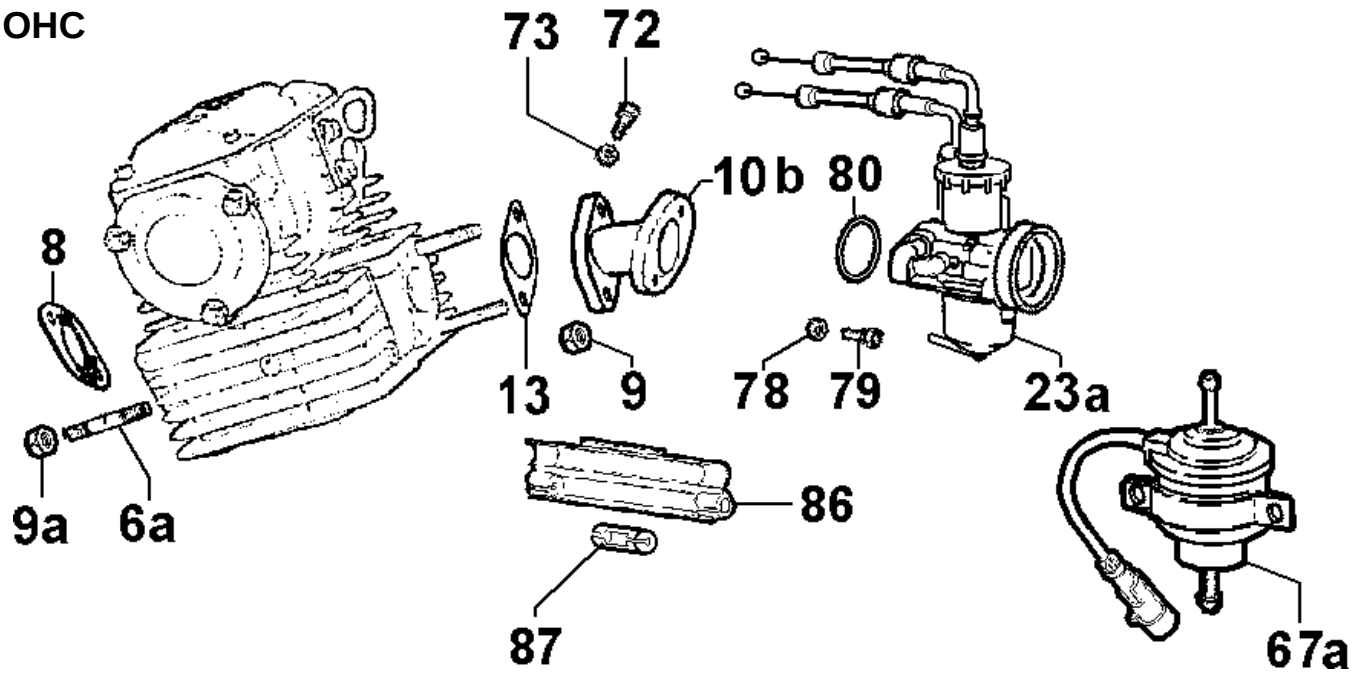
C

LGA
280-340
OHC



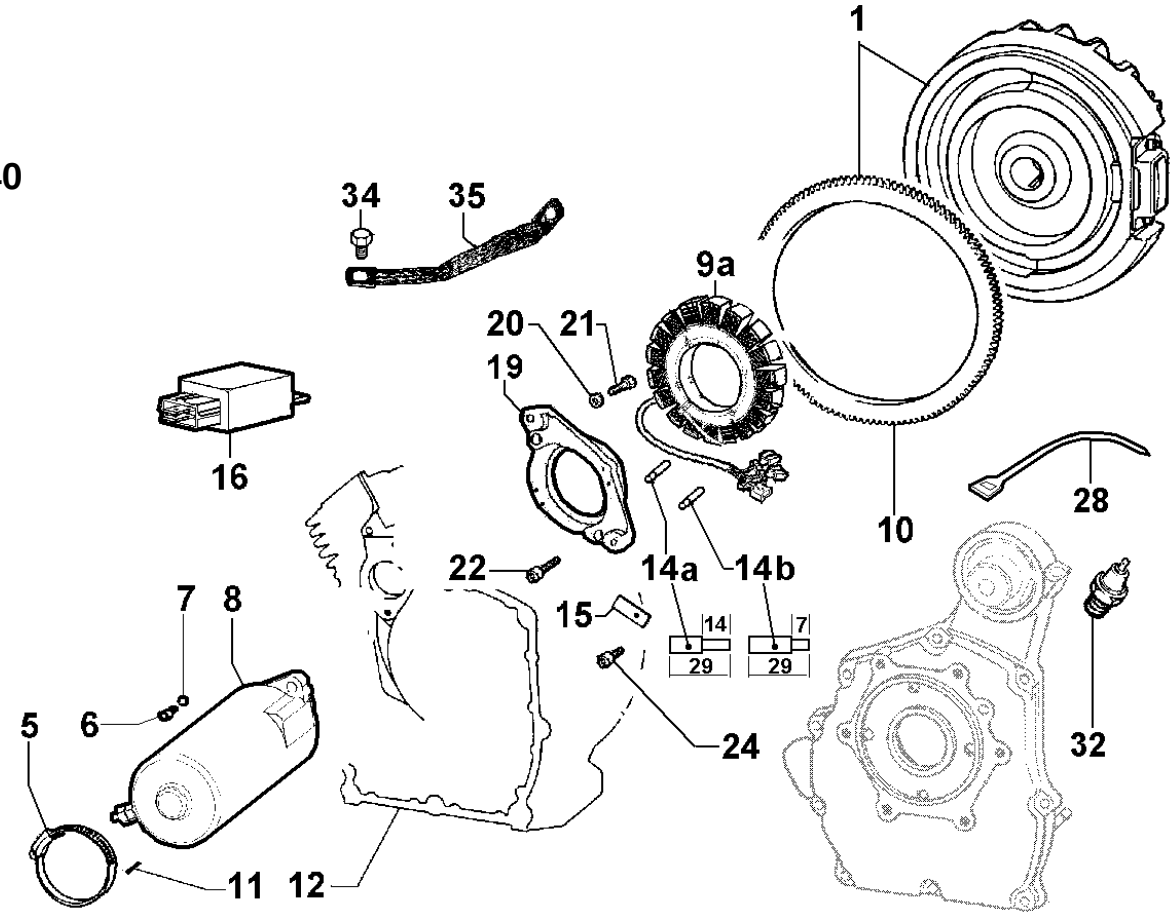
E

LGA
280-340
OHC



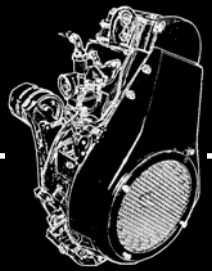
H

LGA
280-340
OHC



NOTES

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



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: atl@lombardini.it
Internet: http://www.lombardini.it

LOMBARDINI U.S.A. INC. 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
LOMBARDINI MOTOREN GmbH Berner Straβe, 54 - 60437 Frankfurt/Main 50 - Deutschland
LOMBARDINI (U.K.) LTD. Unit 7 - Ferry Mills, Osney Mead Industrial Estate - Oxford OX2 OES, U.K.
LOMBARDINI ESPAÑA S.A.c/Paris, n° 1-9 - Poligono Industrial Cova Solera, 08191 - Rubi Barcelona, ESPÃNA

ENTE COMPILATORE TECO/ATI	COD. LIBRO	MODELLO N°	DATA EMISSIONE	REVISIONE 00 DATA	VISTO
	1.5302.691	51115	30.11.2005	30.11.2005	