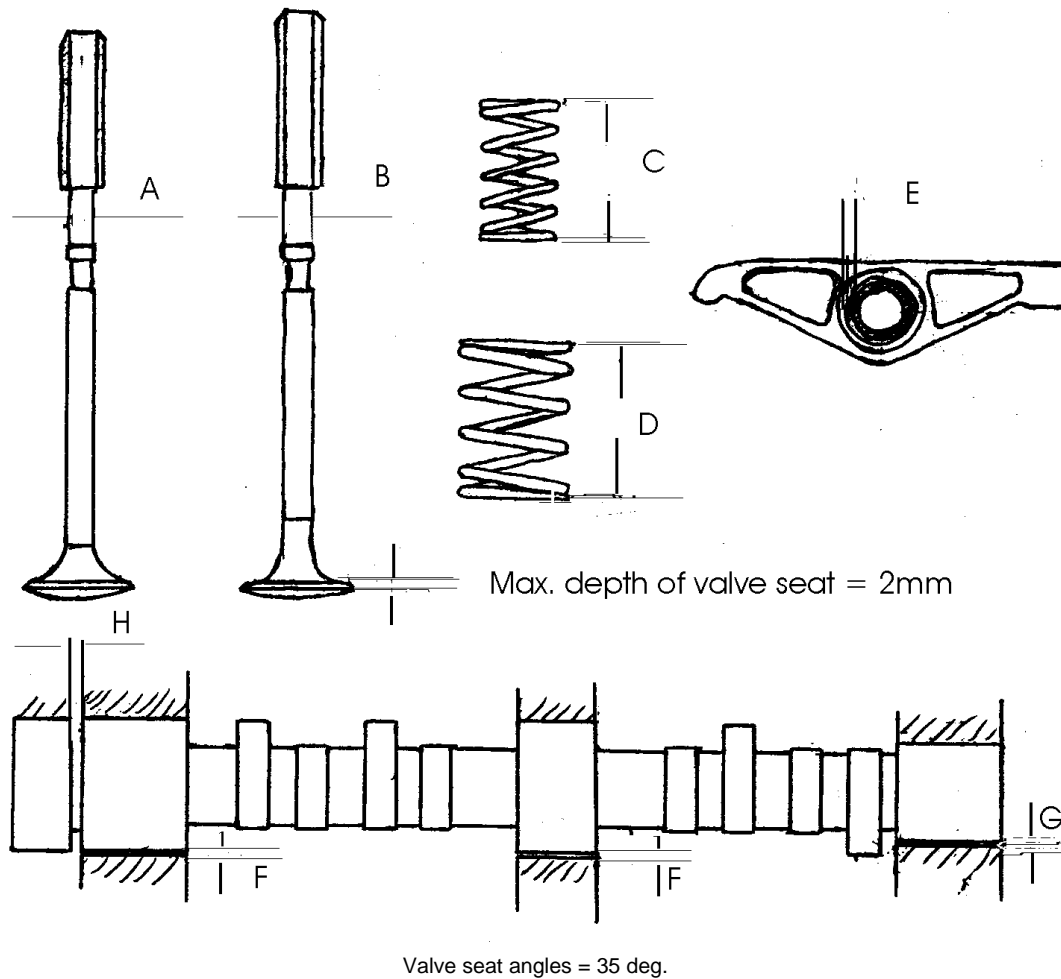


<p>LANCIA & C.</p> <p>FABBRICA AUTOMOBILI TORINO - S.p.A. Printed in Italy</p>	<p>LANCIA APRILIA Engine Types 97 & 99</p> <p>Valve Gear, Camshaft & Timing Description, Maintenance, Overhaul & Specifications</p>	<p>A.S.T. Sketch 28 I-PM</p> <p>Dec. 1946 Sheet 1/2</p>
<p>Lancia Modifications: 5/4/47, 25/10/50. Reset & redrawn by Paul Mayo, Lancia Library, including data from Lancia (England) Ltd archives & Keith Price in LMC Journal No.12, Sept.1961 - 25/03/2002; Revised 8/08/2009</p>		



Fitting tolerances & limits of wear for valves, valve guides, springs, rockers, camshafts & bearings	Fitting tolerance in mm	Limits of Wear mm
A Clearance between inlet valve stems & their guides	0.010 – 0.015	0.100
B Clearance between exhaust valve stems & their guides	0.020 – 0.025	0.109
C Length of internal spring under static load of 4 +/- 0.250kg	35.300	35.300 at 3.500kg
D Length of external spring under a static load of 9 +/- 0.500kg	37.300	37.300 at 8.000kg
E Clearance between the valve rockers & the rocker shafts	0 – 0.037	0.100
F Diametral play between the front & central bearing & the camshaft	0.060 – 0.099	0.920
G Diametral play between the rear bearing & the camshaft	0.008 – 0.045	0.120
H Axial play between the shoulder (retaining plate) & the groove in the camshaft	0.200 – 0.250	0.100

<p style="text-align: center;">LANCIA & C.</p> <p>FABBRICA AUTOMOBILI TORINO - S.p.A. Printed in Italy</p>	<p style="text-align: center;">LANCIA APRILIA Engine Types 97 & 99</p> <p style="text-align: center;">Valve Gear, Camshaft & Timing Description, Maintenance, Overhaul & Specifications</p>	<p style="text-align: center;">A.S.T. Sketch 28 I-PM</p> <p style="text-align: center;">Dec. 1946 Sheet 2/2</p>
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Camshaft & Timing Chain Description

In cast-iron box bolted to head. Driven by endless inverted tooth chain. Roller chains also fitted, Italian & English requiring new sprockets. Located by fork bolted to front end of box engaging in groove in front bearing.

Chain wheel spigoted and bolted to end of camshaft and drilled for Vernier timing, with loose dowel. Tapped 4BA (?) Spring-loaded jockey sprocket behind cover in front of block casting maintains chain tension. For renewal of timing chain, new chain can be de-linked and threaded through using old chain (see also below for fully dismantling). Also available are English sprocket and chain conversions, and although the crankshaft does not have to be removed, the front pulley, oil thrower and skew gear for the distributor have to be removed. Compare fore and aft dimensions with original (inverted toothed chain) before assembling, as roller chain replacements have been known to be larger in this respect.

When removing cylinder head, take chain wheel of camshaft, first marking with a dab of paint, and without disengaging chain allow it to drop, when it will rest on the jockey sprocket, so that the head can be lifted off. If after reassembly, engine proves difficult to start check the valve timing.

Description of Rocker Gear

Hollow shaft above camshaft carries four plain and four cranked rockers. Two interchangeable pairs of auxiliary rockers on shafts carried at each side on three pillars bear at their inner ends on plain rockers and at their outer ends on two outer valves. Cranked rockers operate two pairs of inner valves located below camshaft box, by short push rods and guides in box.

All four valves inclined to offside are inlet and those inclined to nearside are exhaust. Adjustment is by grub-screw and lock-nut on ends of rockers.

Description of Valves & Guides

Incline in head and not interchangeable. Head diameter of inlet marked A (aspirazione) – 35mm; exhaust marked S (scarico) – 33mm. Stem diameter 8mm. Face angle 45 deg. Split cone cotter fixing, double springs. Hardened thimbles on ends of valve stems. Valve guides are renewable; inlet guides chamfered at top, exhaust guides plain.

Timing an Aprilia Engine

- Rotate the engine until the 'O' on the flywheel is in line with the 1/3 mark stamped on the right-hand rear of the crankcase and with the distributor rotor pointing to firing on cylinder No.1 (right-hand front). In this position pistons No.1 and No.3 are at TDC. Warning! Flywheel can be bolted to engine 180 deg. out of position – so check to be sure.
- Set the valve tappet on No.3 cylinder (left-hand rear) to 0.016 inches on the backs of the cams.
- Turn the camshaft until the exhaust valve is just closing & the inlet valve just opening.
- Replace camshaft wheel without moving either camshaft or crankshaft & insert dowel into appropriate hole and tighten the lock-nut
- Rotate engine & check timing, the reset valve tappet clearance to 0.010 inches.
-

Fitting New Timing Chain

- Remove radiator, valve cover, front timing cover & engine sump
- Withdraw camshaft timing wheel & dismantle jockey sprocket assembly
- Remove all engine mounting bolts from engine bearers and raise engine enough to allow fan pulley to clear front cross member
- Remove engine fan pulley from crankshaft and three screws holding oil thrower plate (half-moon shape)
- Remove oil thrower & chain wheel from crankshaft.
- Extract taper pin from distributor drive gear & remove wheel & thrust washer. Timing chain can now be removed.
- Reassembly - Fit new gear and chain with wider flange of gear towards the engine.
- Reassemble all parts in reverse order, taking care to set valve timing as above.
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Roller chain modification

New crankshaft sprocket wheel must be 20 mm in width