

LANCIA & C.

FABBRICA AUTOMOBILI
TORINO - S.p.A.
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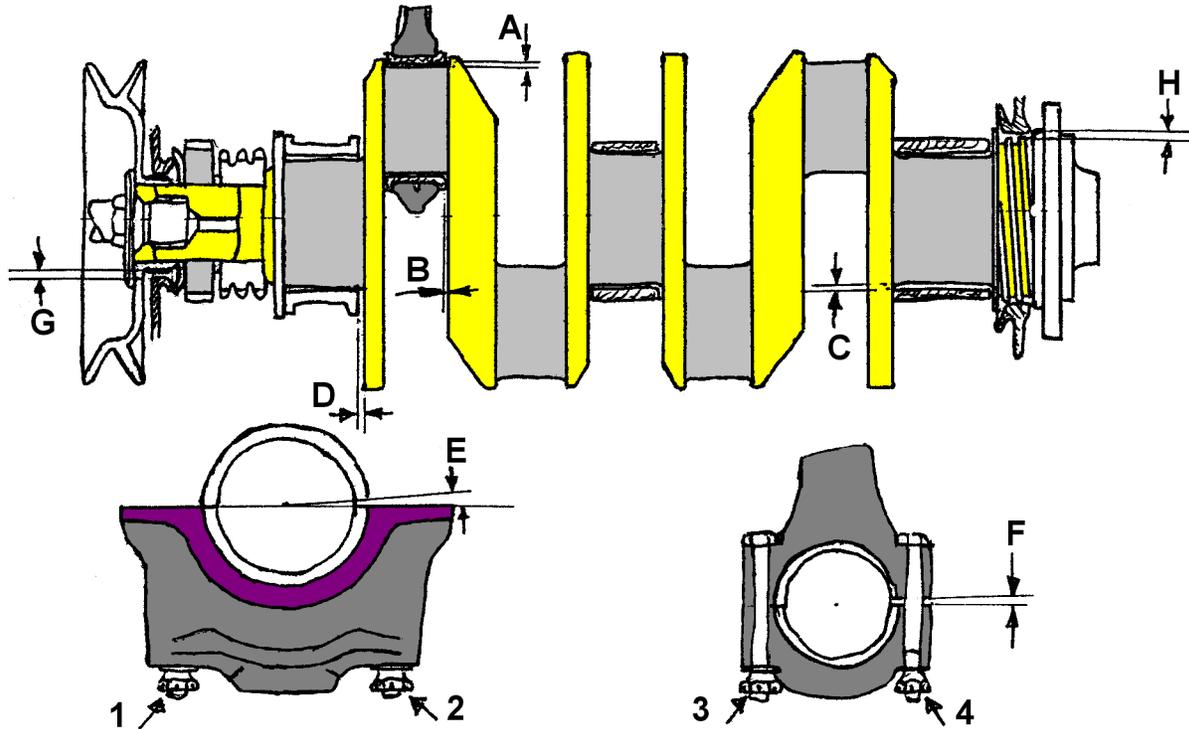
LANCIA APRILIA
Engines Tipo 97 & 99

Assembly Tolerances & Limits of Wear for
Crankshaft Journals, Main & Big-end Bearings

A.S.T.
Sketch 25 I-PM

Dec. 1946
Sheet 1/2

Reset & redrawn by Paul Mayo 25/03/2002, 8/08/2009 including info. from Keith Price LMCJ No.12 Sept.1961 & Lancia (England)\ Ltd



Assembly tolerances & wear limits	Fitting tolerance mm	Wear limit mm
A – Diametral tolerance between the big-end bearings & the crankshaft journals	0.015 – 0.025	0.070
B – Axial tolerance between the shoulder of the bearing & the crankshaft	0.040 – 0.060	0.100
C - Diametral tolerance between the main bearings & the crankshaft journals	0.015 – 0.025	0.070
D – Axial tolerance between the shoulder of the front bearing & the crankshaft	0.050 – 0.100	0.120
E – Pull of crankshaft bearing caps measured at the point indicated by arrows with nut (1) tight & nut (2) loose	0.030 – 0.050	-
F – Pull of big-end bearing caps at the point indicated by arrows with nut (3) tight & nut (4) loose	0.030 – 0.050	-
G – Diametral tolerance between crankshaft & front oil seal	0.200 – 0.240	-
H – Diametral tolerance between crankshaft & rear oil seal	0.120 – 0.160	-
Amounts by which Main & Crank Journals are to be reduced for fitting undersize Bearings		
	Engine 97 mm	Engine 99 mm
Diameter of crank journals for engines 97 up to No.7700	44.982 – 45.000	-
Diameter of crank journals for fitting 1 st undersize bearings	43.282 – 43.000 (1.712")	45.282 – 45.300
Diameter of crank journals for fitting 2 nd undersize bearings	43.082 – 43.100 (1.707 – 1.702")	45.082 – 45.100
Diameter of main journals for fitting 1 st undersize bearings	54.580 – 54.600 (2.155")	54.580 – 54.600
Diameter of main journals for fitting 2 nd undersize bearings	54.180 – 54.200 (2.145 – 2.135")	54.180 – 54.200

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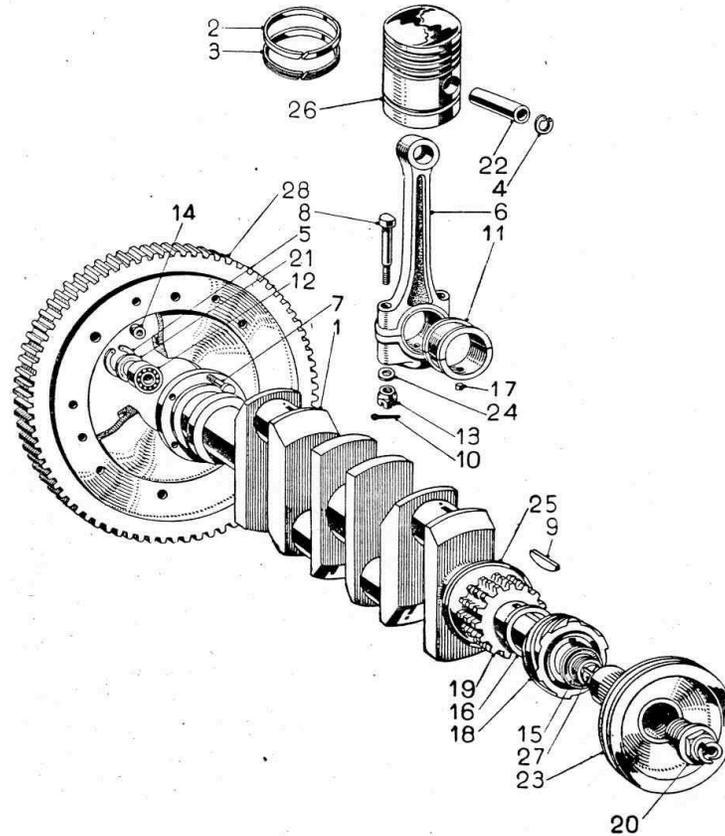
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Assembly Tolerances & Limits of Wear for
Crankshaft Journals, Main & Big-end Bearings

A.S.T.
Sketch 25 I-PM

Dec. 1946
Sheet 2/2

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Series 2 Tipo 99 Engine – Tav.4 from Parts Catalogue

Notes from Lancia (England) Ltd from 1950s	Engine 97 mm	Engine 99 mm
Crankshaft main bearings standard size diameter	55.000 (2.1654")	55.000
Crankshaft big-end bearings standard size diameter	45.0 plain (1.772") 43.5 lined	45.5
Crankshafts of Aprilia engines should not be ground below the following limits (24 April 1950)	Measurements	
Main bearing journals	minus 0.032 inches	
Big-end journals	minus 0.016 inches	
Crankshaft end-float should not be more than	0.0015 – 0.0020 inches	
All oil-ways in bottom halves of both main & big-end bearings		
Oil thrower clearances at each end =	0.003 – 0.004 inches	
Clearance between flange machined big-end bearing & web of crankshaft	0.00075 inches each side min. 0.001 max.	
Notes from Keith Price, LMC Journal No.12 September 1961		
<p>The crankshaft has three main bearings, the front bearing is bronze-backed, white metal lined, the other two are steel backed, located by dowels. It is not recommended to file caps nor scrape to fit.</p> <p>The crankshaft should turn easily without play & with end-float no greater than 0.003 inches (although see above), controlled by hardened steel flange held against shoulder of the front bearing by timing drive assembly. NOTE: clutch thrust is towards the rear of the engine. Timing gear sprocket, oil pump & distributor drive skew gear & fan pulley are keyed to the front end of shaft with one long key, tightened by starter dog nut. Flywheel with integral 121-tooth starter ring gear bolted to flange at rear end of crankshaft. Clutch spigot ball race held in end of crankshaft by a circlip.</p>		
<p>The connecting rods are made of Duralumin. On some models big-end bearings are direct onto duralumin rods, others have steel-backed white metal liners. Plain rods should be exchanged if worn. It is not recommended to take up lined bearings by filing caps. Should be easy fit on shaft. Diameter of crankpins is 45 mm with plain & 43.5 with lined bearings.</p>		