



## Engine Building Check Lists

### Lower End, Crank Case, List A

Last updated 03/23/06

This check list pertains to rebuilding the lower end of a Commando motor consisting of the crank cases, cam, and crank. It is assumed that the timing gears and oil pump have been removed. It is also assumed two super blend crank bearings are being used. It is assumed the conrods are to be reused.

Line No.	Description	Check
1	Measure cam and crank end play. Cam_____, Crank_____	.
2	Split Cases.	.
3	Remove crank shaft end bearing from cases.	.
4	Remove cam bushings from cases (if necessary).	.
5	If 1972 crank case, mill out drive side case to fix improper oil scavenge design.	.
6	If late style 1972 crank case, mill the timing side case for mounting the breather housing.	.
7	If 1972 crank case, add the two new breather holes to the timing side case.	.
8	Bead blast cases using walnut shells.	.
9	Thoroughly clean cases after bead blasting.	.
10	If 1972 crank case, seal the old oil scavenge hole in the timing side case.	.
11	Install new cam bushings (if necessary).	.

12	Line ream new cam bushings (if necessary).	.
13	Clean cases after reaming cam bushings.	.
14	Mark the crank bearings, drive side and timing side. Also mark the outer race outside (the opposite side that the inner race fits into the outer race) so when installed in the crank cases the inner race goes in the correct side.	.
15	Mark conrods and crank cheeks so they will be assembled in the same position they are in now.	.
16	Remove the conrods, keeping the bottoms with the correct rod.	.
17	Remove the inner races from the old bearings from the crank.	.
18	Split the crank.	.
19	Thoroughly clean the crank.	.
20	Reassemble the crank only, do not attach the conrods. Make sure the drive side is on the drive side and visa versa. Torque all bolts to specifications (30 ft lbs).	.
21	Polish conrod journals and end bearing journals.	.
22	Thoroughly clean the crank after polishing.	.
23	Install inner races for the crank end bearings on to the crank. Make sure the drive side inner race is on the drive side and visa versa.	.
24	Install the outer races into the proper crank case side.	.
25	Dry fit cam and crank in the crank cases to determine crank end play (around .005" to .010") and cam turns freely. Make sure you use enough bolts to be sure that the cases are tight together. Cam_____, Crank_____	.
26	Split cases and install any required crank shims (see <a href="#">Crank Case Shims</a> ). Shim_____	.
27	Repeat steps 23 and 24 until desired specifications are achieved. Cam_____, Crank_____	.
28	Clean crank case for painting.	.

29	Tape off crank cases for painting.	.
30	Paint cases.	.
31	Polish the conrods.	.
32	Thoroughly clean the conrods after polishing.	.
33	Install the big end bearing shells in the conrods making sure the bearing half with the hole is installed on the rod, not the cap.	.
34	Apply assembly lube to the big end bearing shells of the conrods.	.
35	Assemble the conrods on the crank making sure the oil hole is facing outward and that the drive side rod is on the drive side and visa versa. Use new bolts or at least new nuts. Torque all bolts to specifications (25 ft lbs).	.
36	Apply assembly lube to cam bushings.	.
37	Apply assembly lube to crank outer races in the cases.	.
38	Install the thrust washer on the cam in its proper alignment.	.
39	Insert the cam in one of the cases.	.
40	Place soft protection on the ends of the conrods and insert the crank into the one case.	.
41	Apply sealer to the parting surfaces of the two crank case halve. Use Yamabond # 4 Joint Compound.	.
42	Bolt the cases together with a bolt or screw in every hole.	.
43	Install the crank main oil seal on the drive side case with the spring facing towards the engine.	.

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