

# Indian Power Plus 100

## Bottom End Failure and Pinion Run

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By Frank Aliano

All 2002 and 2003 Indian Chiefs run an identical Power Plus 100 engine - which means that with few exceptions, they share the same components. This article deals with the problems and solutions related to the flywheel / connecting assembly. My company, Blackhawk Motor Works Inc., and P&M Powertrain Ltd., spent several months of Research and Development as contract consultants to Indian Motorcycle Co. We ran thousands of test miles to find the problems inherent to the Power Plus 100 engine and develop solutions to alleviate those ailments. Indian's engineering management approved the solutions, instituted a rebuild process for field failure engines and scheduled these solutions for implementation into the 2004 production engine. Unfortunately, as we all know, that production never happened. The good news is that we have the engine updates available for your engine should you need them. One of the biggest problems plaguing the '02 and '03 Power Plus 100 engine is in the flywheel assembly. These flywheels are assembled using tapered bores and corresponding tapered shafts; the keys to a good fit and long service life are proper materials, close tolerance machining, matching tapers and adherence to assembly process. The imported flywheels used by Indian Motorcycle Co. suffered from soft materials, machining problems, and unlike tapers. This has caused major problems with the flywheels assembly's ability to maintain its concentricity. Consequently, flywheels are shifting on the tapers and coming out of 'true'; leading to several problems like increased vibration, lower end knocks, broken pinion shafts and the loosening of the cast-in case race insert in the right side case, rendering the cases as bad. The flywheels need to be trued to within .002" on assembly and must maintain that run-out limit. Anything beyond that limit indicates trouble and we have seen engines with as much as .031" of pinion run-out. It is important to note that not every Power Plus 100 engine will suffer this problem; there are many engines out there running just fine. However, there are also a great many engines failing and each day they arrive each day at our facilities for a rebuilding using the updated and improved components we developed. The following test is a good way to determine the condition of your flywheel assembly. I urge every owner of a Power Plus 100 engine to have this test performed on your engine by a qualified technician in order to know the condition of your engine. It is a few dollars well spent. The outer and inner cam covers must be removed to perform the test. For owners of 2002 Chiefs, the technician needs only to loosen the pushrod adjusters all the way. For 2003 Chiefs with fixed length pushrods, the rocker covers will need to be removed as well as the rocker arm assemblies. The pushrods do not need to be removed. Once the valve train is slacked and the cam covers removed, install a dial indicator mounting device on the engine case with the indicator shaft resting on the pinion bushing. Once the dial indicator is installed and zeroed, rotate the engine one full revolution and read the total pinion shaft run-out. This will tell you all you need to know. If your pinion run-out is within .002", all is well. If it exceeds that amount, you need to consider an engine teardown and rebuild to correct the problem. If this problem is left long enough it will only cause more damage, like a broken pinion shaft or ruined cases and cost more to correct. Note: Please do not attempt to just tear the engine down and re-true the flywheels. Simply re-truing the wheels will not correct the situation and trying to increase torque values on the shafts will only create a whole new set of problems. We have worked with a major supplier of quality engine parts to procure the right flywheel/connecting rod assembly that will result in a

PP100 engine you can be confident with an engine that performs better and has a longer life. This flywheel assembly is the unit we have put thousands of miles on. Our facilities are working constantly to improve the PP100 engine and we are happy to help you with your engine. If you have any questions on this test or need help with getting your engine corrected, please feel free to contact us.

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